Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

June 12, 2018

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

Notice of Exempt Modification
76 East Ridge Road, Ridgefield, CT 06877
Latitude- 41.28080844
Longitude- -73.49290060

Dear Ms. Bachman,

T-Mobile currently maintains (9) existing antennas at the 100' level of the existing 130' monopole at 76 East Ridge Road in Ridgefield, CT. The tower and property is owned by the Town of Ridgefield. T-Mobile now intends to replace (6) of its existing antennas with (6) new 600/700/1900/2100 MHz antennas. These antennas would be installed at the same 100' level of the tower. T-Mobile also intends to replace (3) remote radio heads and add (2) hybrid cables.

This facility was originally approved by the Town of Ridgefield, the owner. The proposed modification complies with the original approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. 16-50j-72(b)(2). In accordance with R.C.S.A. 16-50j-73, a copy of this letter is being sent to Rudy Marconi, First Selectmen of the Town of Ridgefield, and Richard Baldelli, Director of Planning and Zoning for the Town of Ridgefield.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-72(b)(2).

1. The proposed modification will not result in an increase in the height of the existing structure

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitute an exempt modification under R.C.S.A. 16-50j-72(b)(2).

Sincerely,

Kyle Richers

Kyle Richers
Transcend Wireless
10 Industrial Ave., Suite 3
Mahwah, New Jersey 07430
908-447-4716
krichers@transcendwireless.com

cc: Rudy Marconi- as elected official, and tower/property owner
Richard Baldelli- as zoning official

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2012.

Information on the Property Records for the Municipality of Ridgefield was last updated on 8/6/2014.

Parcel Information

Location:	76 EAST RIDGE	Property Use:	Office	Primary Use:	Office Building
Unique ID:	E150204	Map Block Lot:	E15-0204	Acres:	1.90
490 Acres:	0.00	Zone:	RA	Volume / Page:	0182/0240
Developers Map / Lot:		Census:	2453		

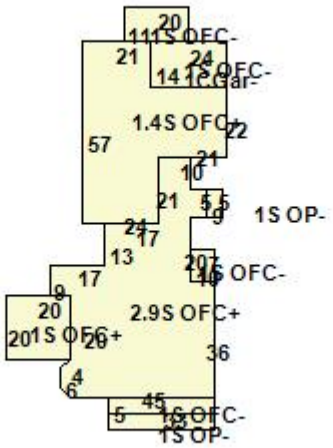
Value Information

	Appraised Value	70% Assessed Value
Land	1,600,000	1,120,010

	Appraised Value	70% Assessed Value
Buildings	1,037,348	726,140
Detached Outbuildings	293,220	205,250
Total	2,930,568	2,051,400

Building 1

Photo Not Available



Category:	Office	Use:	Office Building	Stories:	2.90

Above Grade:	10,921	Below Grade:	4,678	Below Grade Finish:	3,566
Construction:	Good	Year Built:	1930	Heating:	Hot Water
Fuel:	Oil	Cooling Percent:	100%	Siding:	Wood Shingles/Vinyl
Roof Material:	Asphalt Reg3 Tab				

Special Features

Attached Components

Type:	Construction:	Year Built:	Area:
Garage	Concrete Block/Frame	1930	336
Porch	Open	1930	330
Porch	Open	1930	45

Detached Outbuildings

Type:	Construction:	Year Built:	Length:	Width:	Area:
Garage	Detatched 1 Story Masonry	1930	0.00	0.00	4,320
Paving	Paving	1930	0.00	0.00	6,000
Shed	Average Shed	1930	0.00	0.00	144

MAP / LOT E15-0204 STREET 76 EAST RIDGE ZONING RA CARD NO. 1 OF 1 TYPE COMM./IND.

OWNER RIDGEFIELD TOWN OF

TRANSFER OF OWNERSHIP

	Deed Reference	Date Mo Day Year	Selling Price
RIDGEFIELD TOWN OF	0182/240		

REMARKS

98-A-344, 8-17-98; POUR CONC. FOR EQUIP. CABINET FOR WIRELESS COMM.
ATTCHMNT OF ADDTN ANTENNAS ON EXIST COMM TOWER 97-A-119,4/10/97
INSTALL 9 TELECOM. ATENNAS 01-A-152;5/2/01;EMERGENCY GENERATOR
GP-11-115-8/23/11:AT PD REMOVE OIL BURNER AND REPLACE WITH GAS.

ASSESSED VALUE	NO	CODE	2007	NO	CODE		NO	CODE		NO	CODE		NO	CODE	
COMM. LAND	1.90	21	269,720												
COMM. BLDG	1	22	1,132,300												
COMM. OUT BUILDING	3	25	72,200												
TOTAL			1,474,220												

Census Tract 2453 Dev. Lot

Survey No.'s

LAND VALUATION

	SIZE	LAND UNIT	SIZE ADJUSTMENT	TOPO / AMN	ESTIMATED LAND MARKET VALUE
PRIMARY SITE	1.90	650000	0.80	0.61	385320
COMM / IND. ACRES					
FRONT ACRES					
EXCESS ACRES					
TOTAL ACRES	1.90				385320

Inspection Date

Prior Assessment 1,327,130

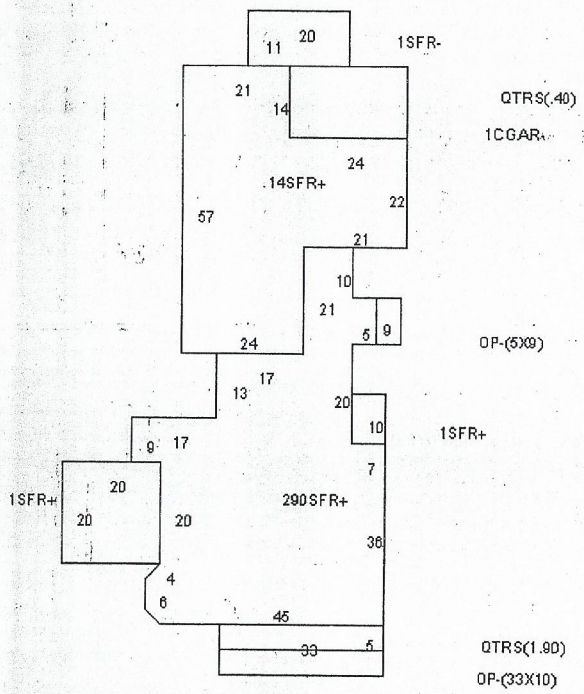
ESTIMATED MARKET VALUE

LAND VALUE	385,320
IMPROVEMENT VALUE	1,720,710
ESTIMATED MARKET VALUE	**2,106,030**

Town of Ridgefield

COMMENTS

POLICE STATION;BSMT=LOCKER RMS,1ST FLR=RECEPTION OFFICE+4 HOLDING CELLS,2ND FLR=CLASSRM+OFFICES & 3RD FLR=STORAGE;
01-R-15, 8/28/01; ACCENT PANELS. CO 8/29/02



PROPERTY FACTORS	
OCCUPANCY	OFFICE
CONSTRUCTION	WOOD FRAME
QUALITY	GOOD
STORY HEIGHT	2.75
SIDING TYPE	WOOD SHINGLE
FOUNDATION TYPE	STONE-BRICK
ROOF TYPE	HIP
ROOFING	ASPHALT
WALL FINISH	
FLOOR FINISH	
ELEVATOR / STOPS	
PLUMBING FIXTURES	41
HEATING	HOT WATER / OIL
% INSULATION	0
% AIR CONDITIONED	100%
% SPRINKLER	0
REMODEL YEAR	1989
ADDITION YEAR	
ECONOMIC LIFE	50
EFFECTIVE AGE	9
CONDITION	AVERAGE
FINISH PERCENT	100%

COMPUTATIONS			
DESCRIPTION	AREA	RATE	COST
MAIN	7,241	122	879,780
ADDITION	165	116	19,180
ADDITION	70	116	8,140
ADDITION	400	116	46,500
ADDITION	2,503	122	304,110
ADDITION	134	116	15,580
FINISH BSMT	3,566	40	143,210
UNFIN BSMT	1,189	22	25,990
ATT GARAGE	336	57	19,300
OP	330	49	16,040
OP	45	62	2,780
CLASS FACTOR			15
REPLACEMENT COST			1702720

SUMMARY OF IMPROVEMENTS

USE	STRY HGT	CONST	YR BLT	CONDITION	SIZE	AREA	REPLACEMENT COST	ACCUMLTD DEP NORM	ACCUMLTD DEP OBSOL	ESTIMATED VALUE
OFFICE	2.75	WOOD FRAME	1930	AVERAGE	SEE SKETCH	10,513	1,702,720	5		1,617,590
PAVING			1930	AVERAGE		6,000	34,740	50		17,370
GARAGE	1.0	RUBBLE/BRICK	1930	FAIR	80 X 54	4,320	211,330	60		84,530
SHED	1.0	AVERAGE SHED	1930	FAIR	18 X 8	144	4,430	60	30	1,240

GROSS LEASABLE AREA	10513	S.F.
BSMT UNFINISHED AREA	1189	S.F.
BSMT FINISHED AREA	3566	S.F.
UNFINISHED MEZZ. AREA		
FINISHED MEZZ. AREA		
MAIN BODY WALL HEIGHT	8	L.F.
MAIN BODY PERIMETER	264	L.F.

INSPECTOR KC DATE

TOTAL ESTIMATED IMPROVEMENT VALUE 103140

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11103A

Ridgefield/ Downtown1
76 East Ridge Road
Ridgefield, CT 06877

June 8, 2018

EBI Project Number: 6218004440

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	11.13 %

21 B Street · Burlington, MA 01803 · Tel: (781) 273.2500 · Fax: (781) 273.3311

EBI Consulting
environmental | engineering | due diligence

June 8, 2018

T-Mobile USA
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 06002

Emissions Analysis for Site: **CT11103A – Ridgefield/ Downtown1**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **76 East Ridge Road, Ridgefield, CT**, for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located 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 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ 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 population 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 population 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 ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz Band are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) is 1000 $\mu W/cm^2$. 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 T-Mobile Wireless antenna facility located at **76 East Ridge Road, Ridgefield, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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 equipment was calculated using the following assumptions:

1) 2 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

4) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These channels have a transmit power of 30 Watts per channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These channels have a transmit power of 30 Watts per channel

7) 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.

8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

9) The antennas used in this modeling are the **Ericsson AIR32 B66A/B2A** & **Ericsson AIR21 B2A/B4P** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAA24-43-U-A20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. The **Ericsson AIR32 B66A/B2A** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **Ericsson AIR21 B2A/B4P** has a maximum gain of **15.9 dBd** at its main lobe at 1900 MHz and 2100 MHz. The **RFS APXVAA24-43-U-A20** has a maximum gain of **13.15/ 13.55 dBd** at its main lobe at 600 MHz and 700 MHz respectively. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, 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.

10) The antenna mounting height centerline of the proposed antennas (both panel antennas and microwave dish) is **100 feet** above ground level (AGL).

11) 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.

12) All calculations were done with respect to uncontrolled / general population threshold limits.

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A	Make / Model:	Ericsson AIR32 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	100	Height (AGL):	100	Height (AGL):	100
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08
Antenna A1 MPE%	**3.80**	Antenna B1 MPE%	**3.80**	Antenna C1 MPE%	**3.80**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P	Make / Model:	Ericsson AIR21 B2A/B4P
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	100	Height (AGL):	100	Height (AGL):	100
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	4,668.54	ERP (W):	4,668.54	ERP (W):	4,668.54
Antenna A2 MPE%	**1.90**	Antenna B2 MPE%	**1.90**	Antenna C2 MPE%	**1.90**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20	Make / Model:	RFS APXVAA24-43-U-A20
Gain:	13.15/ 13.55 dBd	Gain:	13.15/ 13.55 dBd	Gain:	13.15/ 13.55 dBd
Height (AGL):	100	Height (AGL):	100	Height (AGL):	100
Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz	Frequency Bands	600 MHz / 700 MHz
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,598.01	ERP (W):	2,598.01	ERP (W):	2,598.01
Antenna A3 MPE%	**2.44**	Antenna B3 MPE%	**2.44**	Antenna C3 MPE%	**2.44**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**8.14 %**
Verizon Wireless	**1.80 %**
Sprint	**1.19 %**
Site Total MPE %:	**11.13 %**

T-Mobile Sector A Total:	8.14 %
T-Mobile Sector B Total:	8.14 %
T-Mobile Sector C Total:	8.14 %
Site Total:	11.13 %

T-Mobile Max Power Values (Per Sector)

T-Mobile _Max Power Values per sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	100	18.99	AWS - 2100 MHz	1000	1.90%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	100	18.99	PCS - 1900 MHz	1000	1.90%
T-Mobile AWS - 2100 MHz UMTS	2	1,167.14	100	9.50	AWS - 2100 MHz	1000	0.95%
T-Mobile PCS - 1900 MHz UMTS	0	1,167.14	100	0.00	PCS - 1900 MHz	1000	0.00%
T-Mobile PCS - 1900 MHz GSM	2	1,167.14	100	9.50	PCS - 1900 MHz	1000	0.95%
T-Mobile 600 MHz LTE	2	619.61	100	5.04	600 MHz	1000	1.26%
T-Mobile 700 MHz LTE	2	679.39	100	5.53	700 MHz	467	1.18%
						Total:	**8.14%**

Summary

All calculations performed for this analysis yielded results that were **within** the allowable limits for general population exposure to RF Emissions.

The anticipated maximum composite contributions from the T-Mobile facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

T-Mobile Sector	Power Density Value (%)
Sector A:	8.14 %
Sector B:	8.14 %
Sector C:	8.14 %
T-Mobile Per Sector Maximum (Sector A):	8.14 %
Site Total:	11.13 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.13%** of the allowable FCC established general population limit sampled at the ground level. This is based upon 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.

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

130-ft Existing Valmont Monopole

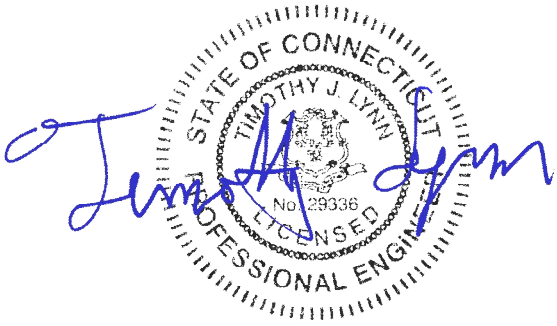
Proposed T-Mobile
Antenna Upgrade

Site Ref: CT11103A

76 East Ridge Road
Ridgefield, CT

CENTEK Project No. 18058.26

Date: May 23, 2018



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade proposed by T-Mobile on the existing monopole (tower) located in Ridgefield, CT.

The host tower is a 130-ft tall, three-section, twelve sided, tapered monopole, originally designed and manufactured by Valmont Industries Inc.; order no. 10533-89 dated October 24, 1989. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Infinigy dated May 25, 2016 and a T-Mobile RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 16.26-in at the top and 43.80-in at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- UNKNOWN (EXISTING):
  Antennas: One (1) RFS PD 440 dipole antenna mounted on the Verizon 13-ft platform with handrails with an elevation of 130-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- VERIZON (EXISTING):
  Antennas: Three (3) Kathrein 800-10735, four (4) Andrew HBXX-9014DS, three (3) Antel BXA-80080/4CF and two (2) Andrew HBXX-6516DS panel antennas mounted on the existing 13-ft platform with handrails with a RAD center elevation of 128-ft above grade level.
  Appurtenances: Three (3) Alcatel-Lucent RRH2x60-LTE remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads and two (2) RFS DB-T1-6Z-8AB-0Z distribution boxes mounted on the existing 13-ft platform with handrails with a RAD center elevation of 128-ft above grade level.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables running on the inside of the existing tower and six (6) 7/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cable running on the exterior of the existing tower.
- SPRINT (EXISTING):
  Antennas: Three (3) RFS APXVSPP18-C-A20 panel antennas, three (3) RFS APXVTM-14 panel antennas, three (3) 1900MHz 4X45W RRH's, three (3) 800MHz 2X50W RRH's and three (3) TD-RRH8x20-25 RRH's mounted on a 13-ft platform with handrails with a RAD center elevation of 118-ft above grade level.
  Coax Cables: Three (3) 1-5/8" ∅ and one (1) 1-1/4" ∅ fiber cables running on the exterior of the existing tower.

- TOWN (EXISTING):
  Antennas: One (1) 3-ft mounted pipe mounted with an elevation of 107-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: One (1) RFS PD 440 dipole antenna and two (2) RFS PD 1142 Omni-directional whip antennas mounted on the T-Mobile 13-ft platform with handrails with an elevation of 100-ft above grade level.
  Coax Cables: Three (3) 1/2" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: One (1) 3-ft mounted pipe mounted with an elevation of 87-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: One (1) RFS PD 1121-6 dipole antenna and one (1) RFS PD 1142 Omni-directional whip antenna mounted on one (1) 3-ft standoff with an elevation of 86-ft above grade level.
  Coax Cables: Two (2) 1/2" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: One (1) 3-ft mounted pipe mounted with an elevation of 83-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: One (1) RFS PD 1142 and one (1) RFS PD 1167 Omni-directional whip antennas mounted on two (2) 3-ft standoffs with an elevation of 58-ft above grade level.
  Coax Cables: Two (2) 1/2" ∅ coax cables running on the inside of the existing tower.
- VERIZON (EXISTING):
  Antennas: One (1) GPS antenna mounted on a 3-ft standoff with an elevation of 50-ft above grade level.
  Coax Cables: One (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Three (3) Ericsson AIR21 panel antennas and three (3) TMAs mounted on a 13-ft platform with handrails with a RAD center elevation of 100-ft above grade level.
  Coax Cables: Twelve (12) 7/8" ∅ coax cables and one (1) fiber cable running on the inside of the existing tower.
- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Three (3) Ericsson AIR21 panel antennas, three (3) Andrew LNX-6515DS panel antennas and three (3) Ericsson RRUS-11 remote radio heads mounted on a 13-ft platform with handrails with a RAD center elevation of 100-ft above grade level.

- **T-MOBILE (PROPOSED):**
  Misc. Equipment: Three (3) Ericsson AIR32 panel antennas, three (3) RFS APXVAA24_43 panel antennas, three (3) Ericsson 4449 B71 B12 remote radio heads mounted on a 13-ft platform with handrails with a RAD center elevation of 100-ft above grade level.
  Coax Cables: Two (2) 6x12 fiber lines running on the interior of the monopole.

Primary Assumptions Used in the Analysis

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

Analysis

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

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Fairfield; v = 90-110 mph	*[Annex B of TIA-222-G-2005]*
	Ridgefield; v = 93 mph	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 93 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **96.1%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L3)	0.00'-44.84'	96.1%	**PASS**

Foundation and Anchors

The existing foundation consists of a 6-ft ∅ x 21.0-ft long reinforced concrete caisson. The base of the tower is connected to the foundation by means of (12) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 8.5-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	32 kips
	Compression	33 kips
	Moment	2918 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	58.8%	**PASS**
	Lateral Deflection	0.24 in.(1)	**PASS**

(1) Lateral deflection limited to 0.75 in under service load combination per TIA-222-G section 9.5.

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Shear	75.5%	**PASS**
Base Plate	Bending	63.3%	**PASS**

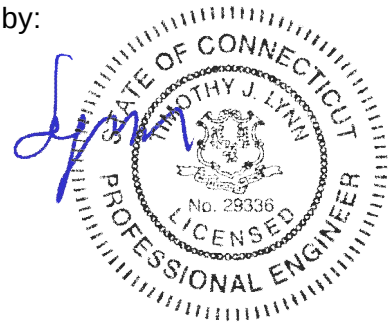
Conclusion

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

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

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

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

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

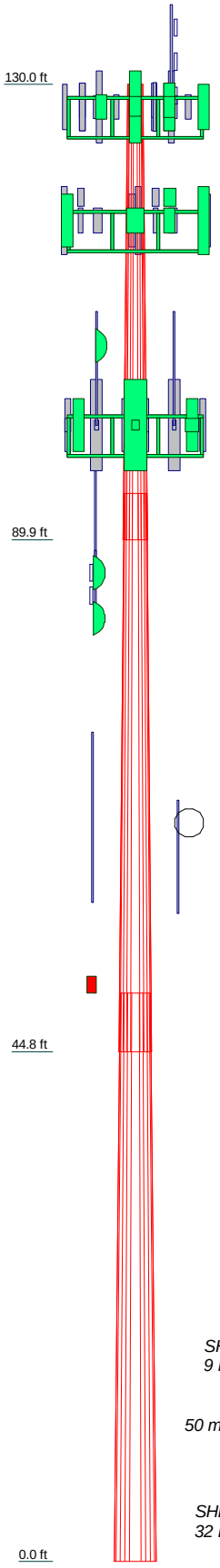
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

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

tnxTower Features:

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	40.08	12	0.2190	4.08	16.2600	25.0800		2.0
2	49.17	12	0.3130	5.17	23.7435	34.5600	A572-65	4.9
3	50.00	12	0.3750		32.7973	43.8000		7.8
								14.6



ALL REACTIONS ARE FACTORED

AXIAL 73 K
SHEAR 9 K
MOMENT 903 kip-ft
TORQUE 2 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 33 K
SHEAR 32 K
MOMENT 2918 kip-ft
TORQUE 7 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
440-3 (Town - Existing)	130	APXVSPP18-C-A20 (Sprint - Existing)	118
800-10735 (Verizon - Existing)	128	Valmont 13' Platform w/Rails (Sprint - Existing)	117
HBXX-9014DS (Verizon - Existing)	128	3-ft Dish (Town)	107
BXA-80080/4CF (Verizon - Existing)	128	AIR21 B2A/B4P (T-Mobile - Existing)	100
HBX-6516DS (Verizon - Existing)	128	AIR32 (T-Mobile - Proposed)	100
800-10735 (Verizon - Existing)	128	AIR32 (T-Mobile - Proposed)	100
HBXX-6516DS (Verizon - Existing)	128	AIR32 (T-Mobile - Proposed)	100
BXA-80080/4CF (Verizon - Existing)	128	APXVAARR24-43 (T-Mobile - Proposed)	100
HBXX-9014DS (Verizon - Existing)	128	APXVAARR24-43 (T-Mobile - Proposed)	100
800-10735 (Verizon - Existing)	128	APXVAARR24-43 (T-Mobile - Proposed)	100
HBXX-9014DS (Verizon - Existing)	128	TMA 10"x8"x3" (T-Mobile - Existing)	100
BXA-80080/4CF (Verizon - Existing)	128	TMA 10"x8"x3" (T-Mobile - Existing)	100
RRH2x60-PCS (Verizon - Existing)	128	TMA 10"x8"x3" (T-Mobile - Existing)	100
RRH2x60-PCS (Verizon - Existing)	128	Radio 4449 B71 B12 (T-Mobile - Proposed)	100
RRH2x60-PCS (Verizon - Existing)	128	Radio 4449 B71 B12 (T-Mobile - Proposed)	100
RRH2x60-07-U (Verizon - Existing)	128	Radio 4449 B71 B12 (T-Mobile - Proposed)	100
RRH2x60-07-U (Verizon - Existing)	128	PD1142-1 (Town - Existing)	100
RRH2x60-07-U (Verizon - Existing)	128	PD1142-1 (Town - Existing)	100
RRH4x45/2x90-AWS (Verizon - Existing)	128	440-3 (Town - Existing)	100
RRH4x45/2x90-AWS (Verizon - Existing)	128	AIR21 B2A/B4P (T-Mobile - Existing)	100
RRH4x45/2x90-AWS (Verizon - Existing)	128	AIR21 B2A/B4P (T-Mobile - Existing)	100
DB-T1-6Z-8AB-0Z (Verizon - Existing)	128	Valmont 13' Platform w/Rails (T-Mobile - Existing)	99
DB-T1-6Z-8AB-0Z (Verizon - Existing)	128	3-ft Dish (Town)	87
HBXX-9014DS (Verizon - Existing)	128	3' Stand-off Mount (Town - Existing)	86
Valmont 13' Platform w/Rails (Verizon - Existing)	127	PD1142-1 (Town - Existing)	86
APXVSPP18-C-A20 (Sprint - Existing)	118	PD1121-6 (Town - Existing)	86
APXVSPP18-C-A20 (Sprint - Existing)	118	3-ft Dish (Town)	83
APXVTM14 (Sprint - Existing)	118	3' Stand-off Mount (Town - Existing)	58
APXVTM14 (Sprint - Existing)	118	PD1167 (Town - Existing)	58
APXVTM14 (Sprint - Existing)	118	PD1142-1 (Town - Existing)	58
FD-RRH 4x45 1900 (Sprint - Existing)	118	3' Stand-off Mount (Town - Existing)	58
FD-RRH 4x45 1900 (Sprint - Existing)	118	3' GPS Stand-off Mount (Verizon - Existing)	50
FD-RRH 4x45 1900 (Sprint - Existing)	118	GPS (Verizon - Existing)	50
FD-RRH 2x50 800 (Sprint - Existing)	118		
FD-RRH 2x50 800 (Sprint - Existing)	118		
FD-RRH 2x50 800 (Sprint - Existing)	118		
TD-RRH8x20-25 (Sprint - Existing)	118		
TD-RRH8x20-25 (Sprint - Existing)	118		
TD-RRH8x20-25 (Sprint - Existing)	118		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 96.1%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **18058.26 - CT11103A**		
Project: **130' Valmont Monopole - 76 East Ridge Rd., Ridgefield, CT**		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 05/23/18	Scale: NTS
Path:		Dwg No. E-1

Tower Input Data

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

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 93 mph.
Structure Class III.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned		Calculate Redundant Bracing Forces
	Consider Moments - Diagonals	√	Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification		Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios		Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice	√	Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz		Use Azimuth Dish Coefficients		Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric				

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	130.00-89.92	40.08	4.08	12	16.2600	25.0800	0.2190	0.8760	A572-65 (65 ksi)
L2	89.92-44.84	49.17	5.17	12	23.7435	34.5600	0.3130	1.2520	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	44.84-0.00	50.00		12	32.7973	43.8000	0.3750	1.5000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	16.8336	11.3118	371.5183	5.7427	8.4227	44.1093	752.7969	5.5673	3.7708	17.218
	25.9647	17.5315	1383.0622	8.9002	12.9914	106.4595	2802.4590	8.6285	6.1345	28.012
L2	25.5110	23.6147	1654.7432	8.3881	12.2991	134.5415	3352.9584	11.6224	5.5244	17.65
	35.7791	34.5162	5167.1820	12.2604	17.9021	288.6358	10470.1117	16.9878	8.4232	26.911
L3	35.1313	39.1499	5252.9582	11.6072	16.9890	309.1977	10643.9175	19.2684	7.7847	20.759
	45.3451	52.4357	12620.9652	15.5461	22.6884	556.2739	25573.4973	25.8073	10.7334	28.622

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 130.00-89.92				1	1	1			
L2 89.92-44.84				1	1	1			
L3 44.84-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
7/8 (Verizon - Existing)	A	Surface Ar (CaAa)	130.00 - 10.00	6	6	0.000 0.000	1.1100		0.54
HYBRIFLEX 1-5/8" (Verizon - Existing)	A	Surface Ar (CaAa)	130.00 - 10.00	2	2	0.000 0.000	1.9800		1.90
HYBRIFLEX 1-5/8" (T-Mobile - Existing)	A	Surface Ar (CaAa)	100.00 - 10.00	3	3	0.000 0.000	1.9800		1.90

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
7/8 (Verizon - Existing)	A	No	Inside Pole	130.00 - 10.00	12	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.54 0.54 0.54
1/2 (Verizon - Existing)	A	No	Inside Pole	50.00 - 10.00	1	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.25 0.25 0.25
HYBRIFLEX 1-5/8" (Sprint - Existing)	C	No	Inside Pole	118.00 - 10.00	3	No Ice 1/2" Ice	0.00 0.00	1.90 1.90

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1" Ice	0.00	1.90
HYBRIFLEX 1-1/4" (Sprint - Existing)	C	No	Inside Pole	118.00 - 10.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
LCF78-50J (7/8 FOAM) (T-Mobile - Existing)	C	No	Inside Pole	100.00 - 10.00	12	No Ice	0.00	0.53
						1/2" Ice	0.00	0.53
						1" Ice	0.00	0.53
1/2 (Town)	A	No	Inside Pole	130.00 - 28.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	A	No	Inside Pole	107.00 - 28.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	A	No	Inside Pole	100.00 - 28.00	4	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	A	No	Inside Pole	87.00 - 28.00	3	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	A	No	Inside Pole	83.00 - 28.00	1	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
1/2 (Town)	A	No	Inside Pole	58.00 - 28.00	2	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-89.92	A	0.000	0.000	48.552	0.000	0.62
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.26
L2	89.92-44.84	A	0.000	0.000	74.659	0.000	0.98
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.60
L3	44.84-0.00	A	0.000	0.000	57.688	0.000	0.73
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.47

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	130.00-89.92	A	2.113	0.000	0.000	108.350	0.000	2.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.26
L2	89.92-44.84	A	2.012	0.000	0.000	164.756	0.000	3.23
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.60
L3	44.84-0.00	A	1.798	0.000	0.000	124.667	0.000	2.36
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.47

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	130.00-89.92	-0.9887	-0.5708	-1.0213	-0.5897
L2	89.92-44.84	-1.3299	-0.7678	-1.4086	-0.8133
L3	44.84-0.00	-1.1827	-0.6828	-1.4589	-0.8423

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	7/8	89.92 - 130.00	1.0000	1.0000
L1	4	HYBRIFLEX 1-5/8"	89.92 - 130.00	1.0000	1.0000
L1	8	HYBRIFLEX 1-5/8"	89.92 - 100.00	1.0000	1.0000
L2	3	7/8	44.84 - 89.92	1.0000	1.0000
L2	4	HYBRIFLEX 1-5/8"	44.84 - 89.92	1.0000	1.0000
L2	8	HYBRIFLEX 1-5/8"	44.84 - 89.92	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral / Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft / ft / ft	°	ft		ft^2	ft^2	K
HBXX-9014DS	A	From Face	3.00	0.0000	128.00	No Ice	5.42	3.28	0.04
(Verizon - Existing)			-3.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
800-10735	A	From Face	3.00	0.0000	128.00	No Ice	8.64	3.75	0.03
(Verizon - Existing)			0.00			1/2" Ice	9.11	4.20	0.07
			0.00			1" Ice	9.60	4.67	0.12
HBXX-9014DS	A	From Face	3.00	0.0000	128.00	No Ice	5.42	3.28	0.04
(Verizon - Existing)			-3.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
BXA-80080/4CF	A	From Face	3.00	0.0000	128.00	No Ice	4.80	2.84	0.01
(Verizon - Existing)			-6.00			1/2" Ice	5.12	3.15	0.05
			0.00			1" Ice	5.45	3.47	0.08
HBX-6516DS	B	From Face	3.00	0.0000	128.00	No Ice	3.33	1.99	0.01
(Verizon - Existing)			-3.00			1/2" Ice	3.66	2.31	0.03
			0.00			1" Ice	3.99	2.63	0.05
800-10735	B	From Face	3.00	0.0000	128.00	No Ice	8.64	3.75	0.03
(Verizon - Existing)			0.00			1/2" Ice	9.11	4.20	0.07
			0.00			1" Ice	9.60	4.67	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
HBXX-6516DS	B	From Face	3.00	0.0000	128.00	No Ice	5.42	3.28	0.04
(Verizon - Existing)			-3.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
BXA-80080/4CF	B	From Face	3.00	0.0000	128.00	No Ice	4.80	2.84	0.01
(Verizon - Existing)			-6.00			1/2" Ice	5.12	3.15	0.05
			0.00			1" Ice	5.45	3.47	0.08
HBXX-9014DS	C	From Face	3.00	0.0000	128.00	No Ice	5.42	3.28	0.04
(Verizon - Existing)			-3.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
800-10735	C	From Face	3.00	0.0000	128.00	No Ice	8.64	3.75	0.03
(Verizon - Existing)			0.00			1/2" Ice	9.11	4.20	0.07
			0.00			1" Ice	9.60	4.67	0.12
HBXX-9014DS	C	From Face	3.00	0.0000	128.00	No Ice	5.42	3.28	0.04
(Verizon - Existing)			-3.00			1/2" Ice	5.76	3.61	0.07
			0.00			1" Ice	6.11	3.94	0.11
BXA-80080/4CF	C	From Face	3.00	0.0000	128.00	No Ice	4.80	2.84	0.01
(Verizon - Existing)			-6.00			1/2" Ice	5.12	3.15	0.05
			0.00			1" Ice	5.45	3.47	0.08
RRH2x60-PCS	A	From Face	3.00	0.0000	128.00	No Ice	2.15	1.35	0.06
(Verizon - Existing)			-3.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	B	From Face	3.00	0.0000	128.00	No Ice	2.15	1.35	0.06
(Verizon - Existing)			-3.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-PCS	C	From Face	3.00	0.0000	128.00	No Ice	2.15	1.35	0.06
(Verizon - Existing)			-3.00			1/2" Ice	2.34	1.50	0.07
			0.00			1" Ice	2.54	1.67	0.09
RRH2x60-07-U	A	From Face	3.00	0.0000	128.00	No Ice	2.10	1.41	0.05
(Verizon - Existing)			0.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	B	From Face	3.00	0.0000	128.00	No Ice	2.10	1.41	0.05
(Verizon - Existing)			0.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH2x60-07-U	C	From Face	3.00	0.0000	128.00	No Ice	2.10	1.41	0.05
(Verizon - Existing)			0.00			1/2" Ice	2.29	1.56	0.07
			0.00			1" Ice	2.48	1.74	0.09
RRH4x45/2x90-AWS	A	From Face	3.00	0.0000	128.00	No Ice	2.58	1.69	0.08
(Verizon - Existing)			3.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Face	3.00	0.0000	128.00	No Ice	2.58	1.69	0.08
(Verizon - Existing)			3.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Face	3.00	0.0000	128.00	No Ice	2.58	1.69	0.08
(Verizon - Existing)			3.00			1/2" Ice	2.79	1.87	0.10
			0.00			1" Ice	3.01	2.06	0.12
DB-T1-6Z-8AB-0Z	A	From Face	3.00	0.0000	128.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	B	From Face	3.00	0.0000	128.00	No Ice	4.80	2.00	0.04
(Verizon - Existing)			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
Valmont 13' Platform w/Rails	C	None		0.0000	127.00	No Ice	53.00	53.00	2.00
(Verizon - Existing)						1/2" Ice	68.00	68.00	3.00
						1" Ice	83.00	83.00	4.00
APXVSPP18-C-A20	A	From Face	3.00	0.0000	118.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			-6.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20	B	From Face	3.00	0.0000	118.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			-6.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVSPP18-C-A20	C	From Face	3.00	0.0000	118.00	No Ice	8.02	5.28	0.06
(Sprint - Existing)			-6.00			1/2" Ice	8.48	5.74	0.11
			0.00			1" Ice	8.94	6.20	0.16
APXVTM14	A	From Face	3.00	0.0000	118.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			6.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	B	From Face	3.00	0.0000	118.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			6.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
APXVTM14	C	From Face	3.00	0.0000	118.00	No Ice	6.34	3.61	0.06
(Sprint - Existing)			6.00			1/2" Ice	6.72	3.97	0.10
			0.00			1" Ice	7.10	4.33	0.14
FD-RRH 4x45 1900	A	From Face	3.00	0.0000	118.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	B	From Face	3.00	0.0000	118.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 4x45 1900	C	From Face	3.00	0.0000	118.00	No Ice	2.32	2.38	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.52	2.59	0.08
			0.00			1" Ice	2.74	2.80	0.11
FD-RRH 2x50 800	A	From Face	3.00	0.0000	118.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	B	From Face	3.00	0.0000	118.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
FD-RRH 2x50 800	C	From Face	3.00	0.0000	118.00	No Ice	2.06	1.93	0.06
(Sprint - Existing)			-3.00			1/2" Ice	2.24	2.11	0.09
			2.00			1" Ice	2.43	2.29	0.11
TD-RRH8x20-25	A	From Face	3.00	0.0000	118.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Face	3.00	0.0000	118.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Face	3.00	0.0000	118.00	No Ice	4.05	1.53	0.07
(Sprint - Existing)			0.00			1/2" Ice	4.30	1.71	0.10
			0.00			1" Ice	4.56	1.90	0.13
Valmont 13' Platform w/Rails	C	None		0.0000	117.00	No Ice	53.00	53.00	2.00
(Sprint - Existing)						1/2" Ice	68.00	68.00	3.00
						1" Ice	83.00	83.00	4.00
AIR21 B2A/B4P	A	From Face	3.00	0.0000	100.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	B	From Face	3.00	0.0000	100.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR21 B2A/B4P	C	From Face	3.00	0.0000	100.00	No Ice	6.05	4.36	0.08
(T-Mobile - Existing)			5.00			1/2" Ice	6.42	4.70	0.12
			0.00			1" Ice	6.80	5.06	0.17
AIR32	A	From Face	3.00	0.0000	100.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
AIR32	B	From Face	3.00	0.0000	100.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
AIR32	C	From Face	3.00	0.0000	100.00	No Ice	6.51	4.71	0.13
(T-Mobile - Proposed)			-5.00			1/2" Ice	6.89	5.07	0.18
			0.00			1" Ice	7.27	5.43	0.23
APXVAARR24-43	A	From Face	3.00	0.0000	100.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAARR24-43	B	From Face	3.00	0.0000	100.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
APXVAARR24-43	C	From Face	3.00	0.0000	100.00	No Ice	20.24	8.89	0.16
(T-Mobile - Proposed)			0.00			1/2" Ice	20.89	9.49	0.27
			0.00			1" Ice	21.54	10.09	0.39
TMA 10"x8"x3"	A	From Face	3.00	0.0000	100.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	B	From Face	3.00	0.0000	100.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
TMA 10"x8"x3"	C	From Face	3.00	0.0000	100.00	No Ice	0.67	0.26	0.02
(T-Mobile - Existing)			0.00			1/2" Ice	0.77	0.33	0.02
			0.00			1" Ice	0.88	0.41	0.03
Radio 4449 B71 B12	A	From Face	3.00	0.0000	100.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	B	From Face	3.00	0.0000	100.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Radio 4449 B71 B12	C	From Face	3.00	0.0000	100.00	No Ice	1.64	1.29	0.07
(T-Mobile - Proposed)			-5.00			1/2" Ice	1.80	1.44	0.09
			0.00			1" Ice	1.97	1.59	0.11
Valmont 13' Platform w/Rails	C	None		0.0000	99.00	No Ice	40.00	40.00	1.70
(T-Mobile - Existing)						1/2" Ice	51.00	51.00	2.55
						1" Ice	62.00	62.00	3.40
3' GPS Stand-off Mount	A	From Face	0.00	0.0000	50.00	No Ice	2.45	2.45	0.05
(Verizon - Existing)			0.00			1/2" Ice	3.98	3.98	0.07
			0.00			1" Ice	5.51	5.51	0.10
GPS	A	From Face	3.00	0.0000	50.00	No Ice	1.00	1.00	0.01
(Verizon - Existing)			0.00			1/2" Ice	1.50	1.50	0.01
			0.00			1" Ice	2.00	2.00	0.02
3' Stand-off Mount	B	From Face	0.00	0.0000	58.00	No Ice	2.45	2.45	0.05
(Town - Existing)			0.00			1/2" Ice	3.98	3.98	0.07
			0.00			1" Ice	5.51	5.51	0.10
PD1167	B	From Face	3.00	0.0000	58.00	No Ice	1.06	1.06	0.01
(Town - Existing)			0.00			1/2" Ice	2.26	2.26	0.02
			4.00			1" Ice	3.47	3.47	0.04
3' Stand-off Mount	A	From Face	0.00	0.0000	58.00	No Ice	2.45	2.45	0.05
(Town - Existing)			0.00			1/2" Ice	3.98	3.98	0.07
			0.00			1" Ice	5.51	5.51	0.10
PD1142-1	A	From Face	3.00	0.0000	58.00	No Ice	1.32	1.32	0.01
(Town - Existing)			0.00			1/2" Ice	3.21	3.21	0.02
			7.50			1" Ice	5.12	5.12	0.05
3' Stand-off Mount	A	From Face	0.00	0.0000	86.00	No Ice	2.45	2.45	0.05
(Town - Existing)			0.00			1/2" Ice	3.98	3.98	0.07
			0.00			1" Ice	5.51	5.51	0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
PD1142-1	A	From Face	3.00	0.0000	86.00	No Ice	1.32	1.32	0.01
(Town - Existing)			0.00			1/2" Ice	3.21	3.21	0.02
			5.00			1" Ice	5.12	5.12	0.05
PD1121-6	A	From Face	3.00	0.0000	86.00	No Ice	0.23	0.23	0.00
(Town - Existing)			0.00			1/2" Ice	0.41	0.41	0.00
			0.00			1" Ice	0.60	0.60	0.00
PD1142-1	A	From Face	3.00	0.0000	100.00	No Ice	1.32	1.32	0.01
(Town - Existing)			0.00			1/2" Ice	3.21	3.21	0.02
			5.00			1" Ice	5.12	5.12	0.05
PD1142-1	B	From Face	3.00	0.0000	100.00	No Ice	1.32	1.32	0.01
(Town - Existing)			0.00			1/2" Ice	3.21	3.21	0.02
			5.00			1" Ice	5.12	5.12	0.05
440-3	C	From Face	3.00	0.0000	100.00	No Ice	1.48	1.48	0.02
(Town - Existing)			0.00			1/2" Ice	2.66	2.66	0.03
			5.00			1" Ice	3.85	3.85	0.03
440-3	B	From Face	3.00	0.0000	130.00	No Ice	1.48	1.48	0.02
(Town - Existing)			0.00			1/2" Ice	2.66	2.66	0.03
			2.00			1" Ice	3.85	3.85	0.03

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
3-ft Dish	C	Paraboloid w/o	From	2.00	Worst		107.00	3.00	No Ice	7.07	0.06
(Town)		Radome	Leg	0.00					1/2" Ice	7.47	0.10
				0.00					1" Ice	7.86	0.14
3-ft Dish	C	Paraboloid w/o	From	2.00	Worst		87.00	3.00	No Ice	7.07	0.06
(Town)		Radome	Leg	0.00					1/2" Ice	7.47	0.10
				0.00					1" Ice	7.86	0.14
3-ft Dish	C	Paraboloid w/o	From	2.00	Worst		83.00	3.00	No Ice	7.07	0.06
(Town)		Radome	Leg	0.00					1/2" Ice	7.47	0.10
				0.00					1" Ice	7.86	0.14

Tower Pressures - No Ice

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1	108.79	1.012	24	71.473	A	0.000	71.473	71.473	100.00	48.552	0.000
130.00-89.92					B	0.000	71.473		100.00	0.000	0.000
					C	0.000	71.473		100.00	0.000	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L2 89.92-44.84	66.66	0.88	21	115.134	A	0.000	115.134	115.134	100.00	74.659	0.000
					B	0.000	115.134		100.00	0.000	0.000
					C	0.000	115.134		100.00	0.000	0.000
L3 44.84-0.00	21.64	0.7	17	150.343	A	0.000	150.343	150.343	100.00	57.688	0.000
					B	0.000	150.343		100.00	0.000	0.000
					C	0.000	150.343		100.00	0.000	0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation	z	K_Z	q_z	t_Z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	in	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L1 130.00-89.92	108.79	1.012	6	2.1126	85.585	A	0.000	85.585	85.585	100.00	108.350	0.000
						B	0.000	85.585		100.00	0.000	0.000
						C	0.000	85.585		100.00	0.000	0.000
L2 89.92-44.84	66.66	0.88	5	2.0116	131.007	A	0.000	131.007	131.007	100.00	164.756	0.000
						B	0.000	131.007		100.00	0.000	0.000
						C	0.000	131.007		100.00	0.000	0.000
L3 44.84-0.00	21.64	0.7	4	1.7976	165.375	A	0.000	165.375	165.375	100.00	124.667	0.000
						B	0.000	165.375		100.00	0.000	0.000
						C	0.000	165.375		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
L1 130.00-89.92	108.79	1.012	8	71.473	A	0.000	71.473	71.473	100.00	48.552	0.000
					B	0.000	71.473		100.00	0.000	0.000
					C	0.000	71.473		100.00	0.000	0.000
L2 89.92-44.84	66.66	0.88	7	115.134	A	0.000	115.134	115.134	100.00	74.659	0.000
					B	0.000	115.134		100.00	0.000	0.000
					C	0.000	115.134		100.00	0.000	0.000
L3 44.84-0.00	21.64	0.7	6	150.343	A	0.000	150.343	150.343	100.00	57.688	0.000
					B	0.000	150.343		100.00	0.000	0.000
					C	0.000	150.343		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

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

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	24	1	1	71.473	1.92	47.96	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1	21	1	1	115.134	2.68	59.49	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	17	1	1	150.343	2.84	63.39	C
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	449.43 kip-ft	7.45		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	24	1	1	71.473	3.12	77.82	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1.2		1	1	71.473			
L2	1.59	4.86	A	1	1	21	1	1	115.134	4.34	96.25	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1.2		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	17	1	1	150.343	3.39	75.71	C
			B	1	1		1	1	150.343			
			C	1	1.194		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	702.06 kip-ft	10.85		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	24	1	1	71.473	1.92	47.96	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1	21	1	1	115.134	2.68	59.49	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	17	1	1	150.343	2.84	63.39	C
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	449.43 kip-ft	7.45		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1.2	24	1	1	71.473	3.19	79.48	A
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1.2	21	1	1	115.134	4.54	100.74	A
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1.2	17	1	1	150.343	3.41	76.06	A
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	723.16 kip-ft	11.14		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	2.35	4.38	A	1	1.2	6	1	1	85.585	1.04	25.85	C
130.00-89.92			B	1	1.2		1	1	85.585			
			C	1	1.2		1	1	85.585			
L2	3.83	8.45	A	1	1.2	5	1	1	131.007	1.36	30.16	C
89.92-44.84			B	1	1.2		1	1	131.007			
			C	1	1.2		1	1	131.007			
L3 44.84-0.00	2.82	11.90	A	1	1.2	4	1	1	165.375	1.20	26.76	C
			B	1	1.2		1	1	165.375			
			C	1	1.2		1	1	165.375			
Sum Weight:	9.00	24.73						OTM	229.31 kip-ft	3.60		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face e	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	2.35	4.38	A	1	1.2	6	1	1	85.585	1.40	34.92	C
130.00-89.92			B	1	1.2		1	1	85.585			
			C	1	1.2		1	1	85.585			
L2	3.83	8.45	A	1	1.2	5	1	1	131.007	1.82	40.27	C
89.92-44.84			B	1	1.2		1	1	131.007			
			C	1	1.2		1	1	131.007			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L3 44.84-0.00	2.82	11.90	A	1	1.2	4	1	1	165.375	1.49	33.14	C
			B	1	1.2		1	1	165.375			
			C	1	1.2		1	1	165.375			
Sum Weight:	9.00	24.73						OTM	305.45 kip-ft	4.70		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	2.35	4.38	A	1	1.2	6	1	1	85.585	1.04	25.85	C
130.00-89.92			B	1	1.2		1	1	85.585			
			C	1	1.2		1	1	85.585			
L2	3.83	8.45	A	1	1.2	5	1	1	131.007	1.36	30.16	C
89.92-44.84			B	1	1.2		1	1	131.007			
			C	1	1.2		1	1	131.007			
L3 44.84-0.00	2.82	11.90	A	1	1.2	4	1	1	165.375	1.20	26.76	C
			B	1	1.2		1	1	165.375			
			C	1	1.2		1	1	165.375			
Sum Weight:	9.00	24.73						OTM	229.31 kip-ft	3.60		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	2.35	4.38	A	1	1.2	6	1	1	85.585	1.52	38.01	A
130.00-89.92			B	1	1.2		1	1	85.585			
			C	1	1.2		1	1	85.585			
L2	3.83	8.45	A	1	1.2	5	1	1	131.007	1.97	43.72	A
89.92-44.84			B	1	1.2		1	1	131.007			
			C	1	1.2		1	1	131.007			
L3 44.84-0.00	2.82	11.90	A	1	1.2	4	1	1	165.375	1.58	35.31	A
			B	1	1.2		1	1	165.375			
			C	1	1.2		1	1	165.375			
Sum Weight:	9.00	24.73						OTM	331.42 kip-ft	5.08		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	8	1	1	71.473	0.62	15.53	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1	7	1	1	115.134	0.87	19.27	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	6	1	1	150.343	0.92	20.53	C
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	145.55 kip-ft	2.41		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	8	1	1	71.473	1.01	25.20	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1.2		1	1	71.473			
L2	1.59	4.86	A	1	1	7	1	1	115.134	1.41	31.17	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1.2		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	6	1	1	150.343	1.10	24.52	C
			B	1	1		1	1	150.343			
			C	1	1.194		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	227.36 kip-ft	3.51		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1	8	1	1	71.473	0.62	15.53	C
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1	7	1	1	115.134	0.87	19.27	C
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1	6	1	1	150.343	0.92	20.53	C
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	145.55 kip-ft	2.41		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	1.97	A	1	1.2	8	1	1	71.473	1.03	25.74	A
130.00-89.92			B	1	1		1	1	71.473			
			C	1	1		1	1	71.473			
L2	1.59	4.86	A	1	1.2	7	1	1	115.134	1.47	32.62	A
89.92-44.84			B	1	1		1	1	115.134			
			C	1	1		1	1	115.134			
L3 44.84-0.00	1.19	7.79	A	1	1.2	6	1	1	150.343	1.10	24.63	A
			B	1	1		1	1	150.343			
			C	1	1		1	1	150.343			
Sum Weight:	3.66	14.62						OTM	234.19 kip-ft	3.61		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	14.62					
Bracing Weight	0.00					
Total Member Self-Weight	14.62			-0.86	2.22	
Total Weight	27.76			-0.86	2.22	
Wind 0 deg - No Ice		-0.01	-16.55	-1463.23	3.22	-2.61
Wind 30 deg - No Ice		10.14	-17.52	-1503.86	-868.42	-4.35
Wind 45 deg - No Ice		14.14	-14.10	-1212.83	-1214.65	-3.34
Wind 60 deg - No Ice		14.37	-8.27	-731.17	-1269.73	-0.51
Wind 90 deg - No Ice		16.60	0.01	0.14	-1467.08	0.92
Wind 120 deg - No Ice		14.38	8.28	731.19	-1270.73	2.11
Wind 135 deg - No Ice		11.74	11.71	1033.90	-1037.44	2.50
Wind 150 deg - No Ice		8.31	14.33	1266.09	-733.30	2.72
Wind 180 deg - No Ice		0.01	16.55	1461.51	1.22	2.61
Wind 210 deg - No Ice		-10.14	17.52	1502.14	872.86	4.35
Wind 225 deg - No Ice		-14.14	14.10	1211.11	1219.09	3.34
Wind 240 deg - No Ice		-14.37	8.27	729.45	1274.17	0.51
Wind 270 deg - No Ice		-16.60	-0.01	-1.87	1471.52	-0.92
Wind 300 deg - No Ice		-14.38	-8.28	-732.91	1275.17	-2.11
Wind 315 deg - No Ice		-11.74	-11.71	-1035.62	1041.88	-2.50
Wind 330 deg - No Ice		-8.31	-14.33	-1267.81	737.74	-2.72
Member Ice	10.11					
Total Weight Ice	66.16			-5.69	10.19	
Wind 0 deg - Ice		-0.00	-7.66	-681.32	10.47	-1.03
Wind 30 deg - Ice		4.58	-7.92	-679.09	-379.42	-2.35
Wind 45 deg - Ice		6.21	-6.20	-537.07	-522.58	-2.00
Wind 60 deg - Ice		6.65	-3.83	-343.27	-576.48	-0.73
Wind 90 deg - Ice		6.64	0.00	-5.42	-595.38	-0.25
Wind 120 deg - Ice		5.75	3.31	296.36	-514.39	0.29
Wind 135 deg - Ice		4.70	4.68	421.32	-418.21	0.55
Wind 150 deg - Ice		3.32	5.74	517.19	-292.83	0.76

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 180 deg - Ice		0.00	7.66	669.94	9.92	1.03
Wind 210 deg - Ice		-4.58	7.92	667.71	399.80	2.35
Wind 225 deg - Ice		-6.21	6.20	525.69	542.96	2.00
Wind 240 deg - Ice		-6.65	3.83	331.89	596.86	0.73
Wind 270 deg - Ice		-6.64	-0.00	-5.97	615.77	0.25
Wind 300 deg - Ice		-5.75	-3.31	-307.74	534.77	-0.29
Wind 315 deg - Ice		-4.70	-4.68	-432.71	438.59	-0.55
Wind 330 deg - Ice		-3.32	-5.74	-528.57	313.22	-0.76
Total Weight	27.76			-0.86	2.22	
Wind 0 deg - Service		-0.00	-5.36	-473.53	0.98	-0.85
Wind 30 deg - Service		3.28	-5.67	-486.69	-281.29	-0.58
Wind 45 deg - Service		4.58	-4.57	-392.45	-393.42	-0.39
Wind 60 deg - Service		4.65	-2.68	-236.46	-411.25	-0.16
Wind 90 deg - Service		5.38	0.00	0.37	-475.16	0.30
Wind 120 deg - Service		4.66	2.68	237.11	-411.58	0.68
Wind 135 deg - Service		3.80	3.79	335.14	-336.03	0.81
Wind 150 deg - Service		2.69	4.64	410.33	-237.54	0.88
Wind 180 deg - Service		0.00	5.36	473.62	0.33	0.85
Wind 210 deg - Service		-3.28	5.67	486.78	282.61	0.58
Wind 225 deg - Service		-4.58	4.57	392.53	394.73	0.39
Wind 240 deg - Service		-4.65	2.68	236.55	412.57	0.16
Wind 270 deg - Service		-5.38	-0.00	-0.28	476.48	-0.30
Wind 300 deg - Service		-4.66	-2.68	-237.03	412.89	-0.68
Wind 315 deg - Service		-3.80	-3.79	-335.06	337.34	-0.81
Wind 330 deg - Service		-2.69	-4.64	-410.25	238.85	-0.88

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice

Comb. No.	Description
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	130 - 89.92	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-39.42	2.58	1.80
			Max. Mx	26	-12.19	356.00	0.56
			Max. My	2	-12.21	0.99	352.49
			Max. Vy	26	-17.27	356.00	0.56
			Max. Vx	2	-17.17	0.99	352.49
			Max. Torque	5			1.76
L2	89.92 - 44.836	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-53.74	8.63	4.61
			Max. Mx	26	-20.37	1243.53	1.60
			Max. My	2	-20.38	2.82	1235.01
			Max. Vy	26	-22.47	1243.53	1.60
			Max. Vx	4	-23.53	-708.69	1225.70

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	5			6.26
L3	44.836 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	34	-72.51	12.78	6.99
			Max. Mx	26	-33.28	2475.16	2.81
			Max. My	4	-33.27	-1459.46	2525.17
			Max. Vy	26	-26.60	2475.16	2.81
			Max. Vx	4	-28.08	-1459.46	2525.17
			Max. Torque	5			6.87

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	43	72.51	-0.00	-7.66
	Max. H_x	26	33.31	26.56	0.01
	Max. H_z	4	33.31	-16.22	28.04
	Max. M_x	4	2525.17	-16.22	28.04
	Max. M_z	10	2469.53	-26.56	-0.01
	Max. Torsion	5	6.85	-16.22	28.04
	Min. Vert	31	24.98	18.79	18.73
	Min. H_x	10	33.31	-26.56	-0.01
	Min. H_z	20	33.31	16.22	-28.04
	Min. M_x	20	-2523.10	16.22	-28.04
	Min. M_z	26	-2475.16	26.56	0.01
	Min. Torsion	21	-6.85	16.22	-28.04

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	27.76	-0.00	0.00	-0.88	2.28	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	33.31	-0.01	-26.47	-2461.72	4.48	-4.13
0.9 Dead+1.6 Wind 0 deg - No Ice	24.98	-0.01	-26.47	-2428.36	3.73	-4.13
1.2 Dead+1.6 Wind 30 deg - No Ice	33.31	16.22	-28.04	-2525.17	-1459.47	-6.85
0.9 Dead+1.6 Wind 30 deg - No Ice	24.98	16.22	-28.04	-2491.87	-1441.03	-6.85
1.2 Dead+1.6 Wind 45 deg - No Ice	33.31	22.63	-22.57	-2036.73	-2041.25	-5.26
0.9 Dead+1.6 Wind 45 deg - No Ice	24.98	22.63	-22.57	-2009.76	-2015.14	-5.26
1.2 Dead+1.6 Wind 60 deg - No Ice	33.31	23.00	-13.23	-1229.90	-2137.47	-0.81
0.9 Dead+1.6 Wind 60 deg - No Ice	24.98	23.00	-13.23	-1213.11	-2109.42	-0.81
1.2 Dead+1.6 Wind 90 deg - No Ice	33.31	26.56	0.01	0.60	-2469.53	1.45
0.9 Dead+1.6 Wind 90 deg - No Ice	24.98	26.56	0.01	0.86	-2437.01	1.45

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 120 deg - No Ice	33.31	23.01	13.25	1230.65	-2139.19	3.32
0.9 Dead+1.6 Wind 120 deg - No Ice	24.98	23.01	13.25	1214.38	-2111.10	3.32
1.2 Dead+1.6 Wind 135 deg - No Ice	33.31	18.79	18.73	1740.00	-1746.66	3.94
0.9 Dead+1.6 Wind 135 deg - No Ice	24.98	18.79	18.73	1716.88	-1723.85	3.94
1.2 Dead+1.6 Wind 150 deg - No Ice	33.31	13.29	22.93	2130.71	-1234.90	4.30
0.9 Dead+1.6 Wind 150 deg - No Ice	24.98	13.29	22.93	2102.34	-1218.97	4.30
1.2 Dead+1.6 Wind 180 deg - No Ice	33.31	0.01	26.47	2459.56	1.07	4.13
0.9 Dead+1.6 Wind 180 deg - No Ice	24.98	0.01	26.47	2426.77	0.37	4.13
1.2 Dead+1.6 Wind 210 deg - No Ice	33.31	-16.22	28.04	2523.10	1464.95	6.85
0.9 Dead+1.6 Wind 210 deg - No Ice	24.98	-16.22	28.04	2490.33	1445.08	6.85
1.2 Dead+1.6 Wind 225 deg - No Ice	33.31	-22.63	22.57	2034.66	2046.79	5.26
0.9 Dead+1.6 Wind 225 deg - No Ice	24.98	-22.63	22.57	2008.22	2019.23	5.26
1.2 Dead+1.6 Wind 240 deg - No Ice	33.31	-23.00	13.23	1227.74	2143.11	0.81
0.9 Dead+1.6 Wind 240 deg - No Ice	24.98	-23.00	13.23	1211.51	2113.57	0.81
1.2 Dead+1.6 Wind 270 deg - No Ice	33.31	-26.56	-0.01	-2.81	2475.16	-1.45
0.9 Dead+1.6 Wind 270 deg - No Ice	24.98	-26.56	-0.01	-2.50	2441.17	-1.45
1.2 Dead+1.6 Wind 300 deg - No Ice	33.31	-23.01	-13.25	-1232.88	2144.77	-3.32
0.9 Dead+1.6 Wind 300 deg - No Ice	24.98	-23.01	-13.25	-1216.03	2115.22	-3.32
1.2 Dead+1.6 Wind 315 deg - No Ice	33.31	-18.79	-18.73	-1742.22	1752.22	-3.94
0.9 Dead+1.6 Wind 315 deg - No Ice	24.98	-18.79	-18.73	-1718.53	1727.95	-3.94
1.2 Dead+1.6 Wind 330 deg - No Ice	33.31	-13.29	-22.93	-2132.91	1240.45	-4.30
0.9 Dead+1.6 Wind 330 deg - No Ice	24.98	-13.29	-22.93	-2103.97	1223.07	-4.30
1.2 Dead+1.0 Ice+1.0 Temp	72.51	-0.00	-0.00	-6.99	12.78	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	72.51	-0.00	-7.66	-792.98	13.16	-1.03
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	72.51	4.58	-7.92	-787.91	-439.03	-2.36
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	72.51	6.21	-6.20	-623.67	-605.51	-2.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	72.51	6.65	-3.83	-399.72	-669.70	-0.74
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	72.51	6.64	0.00	-6.69	-693.58	-0.26
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	72.51	5.75	3.31	345.35	-599.21	0.29
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	72.51	4.70	4.68	491.13	-487.00	0.54
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	72.51	3.32	5.74	602.97	-340.72	0.76

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	72.51	0.00	7.66	778.80	12.50	1.03
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	72.51	-4.58	7.92	773.90	464.66	2.36
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	72.51	-6.21	6.20	609.65	631.14	2.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	72.51	-6.65	3.83	385.67	695.37	0.74
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	72.51	-6.64	-0.00	-7.35	719.24	0.26
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	72.51	-5.75	-3.31	-359.40	624.87	-0.29
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	72.51	-4.70	-4.68	-505.19	512.66	-0.54
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	72.51	-3.32	-5.74	-617.02	366.38	-0.76
Dead+Wind 0 deg - Service	27.76	-0.00	-5.36	-495.57	2.68	-0.85
Dead+Wind 30 deg - Service	27.76	3.28	-5.67	-508.76	-291.86	-0.58
Dead+Wind 45 deg - Service	27.76	4.58	-4.57	-410.46	-408.90	-0.39
Dead+Wind 60 deg - Service	27.76	4.65	-2.68	-247.93	-427.93	-0.17
Dead+Wind 90 deg - Service	27.76	5.38	0.00	-0.55	-494.69	0.30
Dead+Wind 120 deg - Service	27.76	4.66	2.68	246.74	-428.28	0.68
Dead+Wind 135 deg - Service	27.76	3.80	3.79	349.13	-349.36	0.81
Dead+Wind 150 deg - Service	27.76	2.69	4.64	427.67	-246.47	0.88
Dead+Wind 180 deg - Service	27.76	0.00	5.36	493.78	2.00	0.85
Dead+Wind 210 deg - Service	27.76	-3.28	5.67	506.97	296.54	0.58
Dead+Wind 225 deg - Service	27.76	-4.58	4.57	408.67	413.58	0.39
Dead+Wind 240 deg - Service	27.76	-4.65	2.68	246.14	432.62	0.17
Dead+Wind 270 deg - Service	27.76	-5.38	-0.00	-1.24	499.38	-0.30
Dead+Wind 300 deg - Service	27.76	-4.66	-2.68	-248.53	432.96	-0.68
Dead+Wind 315 deg - Service	27.76	-3.80	-3.79	-350.92	354.04	-0.81
Dead+Wind 330 deg - Service	27.76	-2.69	-4.64	-429.47	251.16	-0.88

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-27.76	0.00	0.00	27.76	0.00	0.000%
2	-0.01	-33.31	-26.47	0.01	33.31	26.47	0.000%
3	-0.01	-24.98	-26.47	0.01	24.98	26.47	0.000%
4	16.22	-33.31	-28.04	-16.22	33.31	28.04	0.000%
5	16.22	-24.98	-28.04	-16.22	24.98	28.04	0.000%
6	22.63	-33.31	-22.57	-22.63	33.31	22.57	0.000%
7	22.63	-24.98	-22.57	-22.63	24.98	22.57	0.000%
8	23.00	-33.31	-13.23	-23.00	33.31	13.23	0.000%
9	23.00	-24.98	-13.23	-23.00	24.98	13.23	0.000%
10	26.56	-33.31	0.01	-26.56	33.31	-0.01	0.000%
11	26.56	-24.98	0.01	-26.56	24.98	-0.01	0.000%
12	23.01	-33.31	13.25	-23.01	33.31	-13.25	0.000%
13	23.01	-24.98	13.25	-23.01	24.98	-13.25	0.000%
14	18.79	-33.31	18.73	-18.79	33.31	-18.73	0.000%
15	18.79	-24.98	18.73	-18.79	24.98	-18.73	0.000%
16	13.29	-33.31	22.93	-13.29	33.31	-22.93	0.000%
17	13.29	-24.98	22.93	-13.29	24.98	-22.93	0.000%
18	0.01	-33.31	26.47	-0.01	33.31	-26.47	0.000%
19	0.01	-24.98	26.47	-0.01	24.98	-26.47	0.000%
20	-16.22	-33.31	28.04	16.22	33.31	-28.04	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
21	-16.22	-24.98	28.04	16.22	24.98	-28.04	0.000%
22	-22.63	-33.31	22.57	22.63	33.31	-22.57	0.000%
23	-22.63	-24.98	22.57	22.63	24.98	-22.57	0.000%
24	-23.00	-33.31	13.23	23.00	33.31	-13.23	0.000%
25	-23.00	-24.98	13.23	23.00	24.98	-13.23	0.000%
26	-26.56	-33.31	-0.01	26.56	33.31	0.01	0.000%
27	-26.56	-24.98	-0.01	26.56	24.98	0.01	0.000%
28	-23.01	-33.31	-13.25	23.01	33.31	13.25	0.000%
29	-23.01	-24.98	-13.25	23.01	24.98	13.25	0.000%
30	-18.79	-33.31	-18.73	18.79	33.31	18.73	0.000%
31	-18.79	-24.98	-18.73	18.79	24.98	18.73	0.000%
32	-13.29	-33.31	-22.93	13.29	33.31	22.93	0.000%
33	-13.29	-24.98	-22.93	13.29	24.98	22.93	0.000%
34	0.00	-72.51	0.00	0.00	72.51	0.00	0.000%
35	-0.00	-72.51	-7.66	0.00	72.51	7.66	0.000%
36	4.58	-72.51	-7.92	-4.58	72.51	7.92	0.000%
37	6.21	-72.51	-6.20	-6.21	72.51	6.20	0.000%
38	6.65	-72.51	-3.83	-6.65	72.51	3.83	0.000%
39	6.64	-72.51	0.00	-6.64	72.51	-0.00	0.001%
40	5.75	-72.51	3.31	-5.75	72.51	-3.31	0.000%
41	4.70	-72.51	4.68	-4.70	72.51	-4.68	0.000%
42	3.32	-72.51	5.74	-3.32	72.51	-5.74	0.000%
43	0.00	-72.51	7.66	-0.00	72.51	-7.66	0.001%
44	-4.58	-72.51	7.92	4.58	72.51	-7.92	0.000%
45	-6.21	-72.51	6.20	6.21	72.51	-6.20	0.000%
46	-6.65	-72.51	3.83	6.65	72.51	-3.83	0.000%
47	-6.64	-72.51	-0.00	6.64	72.51	0.00	0.001%
48	-5.75	-72.51	-3.31	5.75	72.51	3.31	0.000%
49	-4.70	-72.51	-4.68	4.70	72.51	4.68	0.000%
50	-3.32	-72.51	-5.74	3.32	72.51	5.74	0.000%
51	-0.00	-27.76	-5.36	0.00	27.76	5.36	0.000%
52	3.28	-27.76	-5.67	-3.28	27.76	5.67	0.000%
53	4.58	-27.76	-4.57	-4.58	27.76	4.57	0.000%
54	4.65	-27.76	-2.68	-4.65	27.76	2.68	0.000%
55	5.38	-27.76	0.00	-5.38	27.76	-0.00	0.000%
56	4.66	-27.76	2.68	-4.66	27.76	-2.68	0.000%
57	3.80	-27.76	3.79	-3.80	27.76	-3.79	0.000%
58	2.69	-27.76	4.64	-2.69	27.76	-4.64	0.000%
59	0.00	-27.76	5.36	-0.00	27.76	-5.36	0.000%
60	-3.28	-27.76	5.67	3.28	27.76	-5.67	0.000%
61	-4.58	-27.76	4.57	4.58	27.76	-4.57	0.000%
62	-4.65	-27.76	2.68	4.65	27.76	-2.68	0.000%
63	-5.38	-27.76	-0.00	5.38	27.76	0.00	0.000%
64	-4.66	-27.76	-2.68	4.66	27.76	2.68	0.000%
65	-3.80	-27.76	-3.79	3.80	27.76	3.79	0.000%
66	-2.69	-27.76	-4.64	2.69	27.76	4.64	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00026486
3	Yes	5	0.00000001	0.00011873
4	Yes	6	0.00000001	0.00015918
5	Yes	6	0.00000001	0.00004265

6	Yes	6	0.00000001	0.00017856
7	Yes	6	0.00000001	0.00004643
8	Yes	6	0.00000001	0.00014965
9	Yes	6	0.00000001	0.00004438
10	Yes	5	0.00000001	0.00011175
11	Yes	5	0.00000001	0.00005082
12	Yes	6	0.00000001	0.00015795
13	Yes	6	0.00000001	0.00004728
14	Yes	6	0.00000001	0.00016014
15	Yes	6	0.00000001	0.00004579
16	Yes	6	0.00000001	0.00013894
17	Yes	5	0.00000001	0.00094502
18	Yes	5	0.00000001	0.00025463
19	Yes	5	0.00000001	0.00011432
20	Yes	6	0.00000001	0.00018882
21	Yes	6	0.00000001	0.00005274
22	Yes	6	0.00000001	0.00017847
23	Yes	6	0.00000001	0.00004632
24	Yes	6	0.00000001	0.00014761
25	Yes	6	0.00000001	0.00004359
26	Yes	5	0.00000001	0.00010162
27	Yes	5	0.00000001	0.00004641
28	Yes	6	0.00000001	0.00014138
29	Yes	5	0.00000001	0.00096038
30	Yes	6	0.00000001	0.00016049
31	Yes	6	0.00000001	0.00004577
32	Yes	6	0.00000001	0.00016062
33	Yes	6	0.00000001	0.00004812
34	Yes	4	0.00000001	0.00011222
35	Yes	6	0.00000001	0.00019792
36	Yes	6	0.00000001	0.00045467
37	Yes	6	0.00000001	0.00051596
38	Yes	6	0.00000001	0.00038884
39	Yes	5	0.00024496	0.00086841
40	Yes	6	0.00000001	0.00031052
41	Yes	6	0.00000001	0.00034121
42	Yes	6	0.00000001	0.00029880
43	Yes	5	0.00024348	0.00099040
44	Yes	6	0.00000001	0.00053870
45	Yes	6	0.00000001	0.00053022
46	Yes	6	0.00000001	0.00038104
47	Yes	5	0.00024494	0.00091001
48	Yes	6	0.00000001	0.00033577
49	Yes	6	0.00000001	0.00037752
50	Yes	6	0.00000001	0.00034906
51	Yes	4	0.00000001	0.00022374
52	Yes	4	0.00000001	0.00060754
53	Yes	4	0.00000001	0.00075635
54	Yes	4	0.00000001	0.00046691
55	Yes	4	0.00000001	0.00011075
56	Yes	4	0.00000001	0.00056357
57	Yes	4	0.00000001	0.00056184
58	Yes	4	0.00000001	0.00039617
59	Yes	4	0.00000001	0.00022141
60	Yes	4	0.00000001	0.00076447
61	Yes	4	0.00000001	0.00076786
62	Yes	4	0.00000001	0.00045031
63	Yes	4	0.00000001	0.00011114
64	Yes	4	0.00000001	0.00041182
65	Yes	4	0.00000001	0.00057580
66	Yes	4	0.00000001	0.00060659

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 89.92	25.534	60	1.7116	0.0063
L2	94.003 - 44.836	13.435	60	1.3838	0.0058
L3	50.003 - 0	3.672	60	0.6865	0.0018

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	440-3	60	25.534	1.7116	0.0063	27150
128.00	HBXX-9014DS	60	24.823	1.6969	0.0063	27150
127.00	Valmont 13' Platform w/Rails	60	24.469	1.6895	0.0063	27150
118.00	APXVSPP18-C-A20	60	21.297	1.6209	0.0064	11312
117.00	Valmont 13' Platform w/Rails	60	20.948	1.6129	0.0064	10442
107.00	3-ft Dish	60	17.543	1.5258	0.0063	5901
100.00	AIR21 B2A/B4P	60	15.275	1.4543	0.0061	4524
99.00	Valmont 13' Platform w/Rails	60	14.961	1.4432	0.0060	4378
87.00	3-ft Dish	60	11.428	1.2890	0.0053	3623
86.00	3' Stand-off Mount	60	11.154	1.2746	0.0052	3603
83.00	3-ft Dish	60	10.354	1.2298	0.0050	3545
58.00	3' Stand-off Mount	60	4.918	0.8178	0.0025	3122
50.00	3' GPS Stand-off Mount	60	3.672	0.6864	0.0018	3070

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	130 - 89.92	126.513	20	8.5149	0.0460
L2	94.003 - 44.836	66.666	20	6.8812	0.0368
L3	50.003 - 0	18.246	20	3.4135	0.0143

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.00	440-3	20	126.513	8.5149	0.0471	5705
128.00	HBXX-9014DS	20	123.001	8.4414	0.0467	5705
127.00	Valmont 13' Platform w/Rails	20	121.246	8.4045	0.0465	5705
118.00	APXVSPP18-C-A20	20	105.562	8.0624	0.0446	2375
117.00	Valmont 13' Platform w/Rails	20	103.839	8.0225	0.0443	2192
107.00	3-ft Dish	20	86.998	7.5886	0.0417	1235
100.00	AIR21 B2A/B4P	20	75.777	7.2325	0.0394	945

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
99.00	Valmont 13' Platform w/Rails	20	74.222	7.1771	0.0391	914
87.00	3-ft Dish	20	56.725	6.4100	0.0339	751
86.00	3' Stand-off Mount	20	55.370	6.3379	0.0334	746
83.00	3-ft Dish	20	51.403	6.1155	0.0319	732
58.00	3' Stand-off Mount	20	24.431	4.0666	0.0183	634
50.00	3' GPS Stand-off Mount	20	18.243	3.4133	0.0143	621

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	130 - 89.92 (1)	TP25.08x16.26x0.219	40.08	0.00	0.0	16.8979	-11.72	1146.13	0.010
L2	89.92 - 44.836 (2)	TP34.56x23.7435x0.313	49.17	0.00	0.0	33.3705	-19.90	2295.32	0.009
L3	44.836 - 0 (3)	TP43.8x32.7973x0.375	50.00	0.00	0.0	52.4357	-33.27	3468.51	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	130 - 89.92 (1)	TP25.08x16.26x0.219	386.88	558.84	0.692	0.00	558.84	0.000
L2	89.92 - 44.836 (2)	TP34.56x23.7435x0.313	1416.78	1545.95	0.916	0.00	1545.95	0.000
L3	44.836 - 0 (3)	TP43.8x32.7973x0.375	2917.55	3066.37	0.951	0.00	3066.37	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	130 - 89.92 (1)	TP25.08x16.26x0.219	19.14	573.07	0.033	1.76	1133.16	0.002
L2	89.92 - 44.836 (2)	TP34.56x23.7435x0.313	27.18	1147.66	0.024	6.25	3134.70	0.002
L3	44.836 - 0 (3)	TP43.8x32.7973x0.375	32.44	1734.26	0.019	6.85	6217.63	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	130 - 89.92 (1)	0.010	0.692	0.000	0.033	0.002	0.704 ✔	1.000	4.8.2 ✔
L2	89.92 - 44.836 (2)	0.009	0.916	0.000	0.024	0.002	0.926 ✔	1.000	4.8.2 ✔
L3	44.836 - 0 (3)	0.010	0.951	0.000	0.019	0.001	0.961 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	130 - 89.92	Pole	TP25.08x16.26x0.219	1	-11.72	1146.13	70.4	Pass
L2	89.92 - 44.836	Pole	TP34.56x23.7435x0.313	2	-19.90	2295.32	92.6	Pass
L3	44.836 - 0	Pole	TP43.8x32.7973x0.375	3	-33.27	3468.51	96.1	Pass
							Summary	
						Pole (L3)	96.1	Pass
						RATING =	**96.1**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	130-FT Valmont Monopole Ridgefield, CT
Rev. 0: 5/23/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.26

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 2918 \cdot ft \cdot kips$	(Input From tnxTower)
Shear Force =	$Shear := 32 \cdot kips$	(Input From tnxTower)
Axial Force =	$R_u := 33 \cdot kips$	(Input From tnxTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 12$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 49.75 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1.02$	Table 2-1 Addendum 3

Base Plate Data:

ASTMA572 Grade 60

Plate Yield Strength =	$F_{yf} := 60 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 2.5 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 56.5 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 43.8 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.375 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 190.7 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 2.7 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 75.5$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed" \right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \right] \cdot 100 = 53.9$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \le 1.00, "OK", "Overstressed" \right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 44.05 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le \left(D_{BC} + 6 \cdot t_{TP}\right) \\ \left(D_{BC} + 6 \cdot t_{TP}\right) & \text{otherwise} \end{cases} = 56.5 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.262$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := \operatorname{asin}\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.647$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := \operatorname{acos}\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.34$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := \min\left(\theta_1, \theta_2, \theta_3\right) = 0.262$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot \left(D_{BC} - D_e\right) = 2.85 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot \sin(\theta) = 12.876 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := \left(D_{oe} - D_e\right) \cdot \sin(\theta) = 3.222 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 16.099 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 1.581 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 63.3 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 0.609 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 24.4 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

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Subject:	CAISSON FOUNDATION
Location:	130-ft Valmont Monopole Ridgefield, CT
Rev. 0: 5/23/18	Prepared by: TJL Checked by: C.F.C. Job No. 18058.26

Caisson Foundation:

Input Data:

Shear Force =	$S := 32k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 2918ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 33k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 3037ft \cdot k$	*USER INPUT--FROM LPILE*
Moment Capacity =	$Mn := 5689ft \cdot k$	*USER INPUT--FROM LPILE*
Foundation Diameter =	$d := 6.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 21.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 0.5ft$	*USER INPUT*
Number of Rebar =	$n := 26$	*USER INPUT*
Area of Rebar =	$Ar := 1.56in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9Mn}{Mu} = 1.7$

Factor of Safety Required = $FS_{reqd} := 1$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1805800.WI\26_CT11103A\05_Structural\Tower Analysis\Backup Documentation\L-Pile\
Name of input data file: Ridgefield Caisson Analysis.lpd
Name of output file: Ridgefield Caisson Analysis.lpo
Name of plot output file: Ridgefield Caisson Analysis.lpp
Name of runtime file: Ridgefield Caisson Analysis.lpr

Time and Date of Analysis

Date: May 23, 2018 Time: 15:51:45

Problem Title

15001.095 - Ridgefield

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output summary table of values for pile-head deflection, maximum bending moment, and shear force only
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Only summary tables of pile-head deflection, maximum bending moment, and maximum shear force are to be printed in output file.

Pile Structural Properties and Geometry

Pile Length = 252.00 in

Depth of ground surface below top of pile = 6.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	72.00000000	1319167.	4071.5000	3122018.
2	252.0000	72.00000000	1319167.	4071.5000	3122018.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness

that the above values of moment of inertia and modulus of are not used
for any computations other than total stress due to combined axial
loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 3 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 6.000 in
Distance from top of pile to bottom of layer = 46.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for
the above soil layer.

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 46.000 in
Distance from top of pile to bottom of layer = 102.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for
the above soil layer.

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 102.000 in
Distance from top of pile to bottom of layer = 282.000 in
p-y subgrade modulus k for top of soil layer = 0.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 0.000 lbs/in**3

NOTE: Internal default values for p-y subgrade modulus will be computed for
the above soil layer.

(Depth of lowest layer extends 30.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 6 points

Point	Depth X	Eff. Unit Weight

No.	in	lbs/in**3
1	6.00	0.06700
2	46.00	0.06700
3	46.00	0.06700
4	102.00	0.06700
5	102.00	0.06700
6	282.00	0.05400

Shear Strength of Soils

Shear strength parameters with depth defined using 6 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	6.000	0.00000	30.00	------	------
2	46.000	0.00000	30.00	------	------
3	46.000	0.00000	30.00	------	------
4	102.000	0.00000	38.00	------	------
5	102.000	0.00000	38.00	------	------
6	282.000	0.00000	45.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 2

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 32000.000 lbs
Bending moment at pile head = 35016000.000 in-lbs
Axial load at pile head = 33000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Load Case Number 2

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 13000.000 lbs
Bending moment at pile head = 14616000.000 in-lbs
Axial load at pile head = 33000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 72.0000 in

Material Properties:

Compressive Strength of Concrete = 3.000 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 26
Area of Single Bar = 1.56000 in**2
Number of Rows of Reinforcing Bars = 13
Area of Steel = 40.560 in**2

Area of Shaft = 4071.504 in**2
Percentage of Steel Reinforcement = 0.996 percent
Cover Thickness (edge to bar center) = 5.000 in

Unfactored Axial Squash Load Capacity = 12712.51 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	3.120	30.774
2	3.120	28.986
3	3.120	25.512
4	3.120	20.557
5	3.120	14.406
6	3.120	7.419
7	3.120	0.000
8	3.120	-7.419
9	3.120	-14.406
10	3.120	-20.557
11	3.120	-25.512
12	3.120	-28.986
13	3.120	-30.774

Axial Thrust Force = 33000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
3919951.	4.703941E+12	8.333333E-07	0.00003249	38.98249519	99.74015210	815.78137
7796347.	4.677808E+12	0.00000167	0.00006260	37.55940950	190.31042	1562.78026
11629592.	4.651837E+12	0.00000250	0.00009275	37.10118735	279.29503	2310.94928
15418665.	4.625599E+12	0.00000333	0.00012287	36.85989153	366.45106	3057.94044
15418665.	3.700480E+12	0.00000417	0.00008748	20.99632680	260.62795	5531.46584
15418665.	3.083733E+12	0.00000500	0.00010345	20.68930185	306.53541	6682.27762

```
   15418665.  2.643200E+12    0.00000583    0.00011943   20.47407496     352.04746
 7832.39977
   15418665.  2.312800E+12    0.00000667    0.00013566   20.34942520     397.80244
 8975.41298
   15418665.  2.055822E+12    0.00000750    0.00015167   20.22229278     442.42807
10124.99090
   15418665.  1.850240E+12    0.00000833    0.00016770   20.12367761     486.65915
11273.82189
   15418665.  1.682036E+12    0.00000917    0.00018375   20.04582489     530.49394
12421.89993
   15418665.  1.541866E+12    0.00001000    0.00019984   19.98356974     573.93078
13569.21755
   15418665.  1.423261E+12    0.00001083    0.00021594   19.93333304     616.96790
14715.76838
   15418665.  1.321600E+12    0.00001167    0.00023208   19.89255917     659.60352
15861.54572
   15418665.  1.233493E+12    0.00001250    0.00024824   19.85937488     701.83585
17006.54258
   15773365.  1.183002E+12    0.00001333    0.00026443   19.83237255     743.66297
18150.75299
   16710695.  1.179578E+12    0.00001417    0.00028065   19.81048143     785.08316
19294.16865
   17646507.  1.176434E+12    0.00001500    0.00029689   19.79286683     826.09456
20436.78210
   18580785.  1.173523E+12    0.00001583    0.00031317   19.77886569     866.69513
21578.58773
   19513521.  1.170811E+12    0.00001667    0.00032947   19.76795447     906.88308
22719.57664
   20444703.  1.168269E+12    0.00001750    0.00034579   19.75970614     946.65645
23859.74150
   21374318.  1.165872E+12    0.00001833    0.00036215   19.75377095     986.01322
24999.07521
   22302355.  1.163601E+12    0.00001917    0.00037854   19.74986136    1024.95139
26137.56989
   23228802.  1.161440E+12    0.00002000    0.00039495   19.74773920    1063.46901
27275.21682
   24153647.  1.159375E+12    0.00002083    0.00041140   19.74720275    1101.56400
28412.00829
   25076877.  1.157394E+12    0.00002167    0.00042788   19.74808252    1139.23429
29547.93584
   25998479.  1.155488E+12    0.00002250    0.00044438   19.75023258    1176.47770
30682.99199
   26918440.  1.153647E+12    0.00002333    0.00046092   19.75353062    1213.29217
31817.16743
   27836746.  1.151865E+12    0.00002417    0.00047748   19.75786936    1249.67546
32950.45410
   28753388.  1.150136E+12    0.00002500    0.00049408   19.76315868    1285.62549
34082.84190
   29668344.  1.148452E+12    0.00002583    0.00051071   19.76931489    1321.13980
```

35214.32461					
30581611.	1.146810E+12	0.00002667	0.00052737	19.77627361	1356.21645
36344.88915					
31493165.	1.145206E+12	0.00002750	0.00054406	19.78396833	1390.85280
37474.53040					
32402998.	1.143635E+12	0.00002833	0.00056078	19.79234970	1425.04679
38603.23554					
33311094.	1.142095E+12	0.00002917	0.00057754	19.80136836	1458.79593
39730.99654					
34217435.	1.140581E+12	0.00003000	0.00059433	19.81098139	1492.09774
40857.80452					
35122012.	1.139092E+12	0.00003083	0.00061115	19.82115448	1524.94997
41983.64711					
36024806.	1.137625E+12	0.00003167	0.00062801	19.83185327	1557.35004
43108.51521					
36925802.	1.136179E+12	0.00003250	0.00064490	19.84304774	1589.29542
44232.39904					
38722335.	1.133337E+12	0.00003417	0.00067878	19.86682284	1651.81191
46477.17003					
40511488.	1.130553E+12	0.00003583	0.00071281	19.89230382	1712.47870
48717.87006					
42293113.	1.127816E+12	0.00003750	0.00074698	19.91934049	1771.27378
50954.41513					
44067086.	1.125117E+12	0.00003917	0.00078129	19.94782341	1828.17528
53186.70396					
45833250.	1.122447E+12	0.00004083	0.00081575	19.97765386	1883.15983
55414.64373					
47591459.	1.119799E+12	0.00004250	0.00085037	20.00875676	1936.20362
57638.13160					
49341557.	1.117167E+12	0.00004417	0.00088515	20.04107201	1987.28203
59857.06004					
50777430.	1.107871E+12	0.00004583	0.00091802	20.02951491	2033.44775
60000.00000					
51901989.	1.092673E+12	0.00004750	0.00094888	19.97640717	2074.90640
60000.00000					
52985698.	1.077675E+12	0.00004917	0.00097960	19.92400539	2114.44578
60000.00000					
53872966.	1.059796E+12	0.00005083	0.00100894	19.84803665	2150.55843
60000.00000					
54658854.	1.041121E+12	0.00005250	0.00103763	19.76429164	2184.32003
60000.00000					
55441033.	1.023527E+12	0.00005417	0.00106640	19.68739593	2216.69574
60000.00000					
56219438.	1.006915E+12	0.00005583	0.00109527	19.61675942	2247.67209
60000.00000					
56777672.	9.874378E+11	0.00005750	0.00112229	19.51812065	2275.23330
60000.00000					
57309216.	9.686065E+11	0.00005917	0.00114918	19.42273915	2301.34366
60000.00000					

57837900.	9.507600E+11	0.00006083	0.00117614	19.33385932	2326.22312
60000.00000					
58363687.	9.338190E+11	0.00006250	0.00120319	19.25097907	2349.86090
60000.00000					
58819246.	9.166636E+11	0.00006417	0.00123200	19.19999993	2373.64920
60000.00000					
59426987.	9.026884E+11	0.00006583	0.00126070	19.14988124	2395.84524
60000.00000					
59793099.	8.858237E+11	0.00006750	0.00128587	19.04998934	2413.99592
60000.00000					
60120760.	8.692158E+11	0.00006917	0.00131068	18.94962537	2430.76122
60000.00000					
60446346.	8.533602E+11	0.00007083	0.00133556	18.85495412	2446.46771
60000.00000					
60769826.	8.382045E+11	0.00007250	0.00136051	18.76559365	2461.10629
60000.00000					
61091181.	8.237013E+11	0.00007417	0.00138552	18.68120062	2474.66783
60000.00000					
61410372.	8.098071E+11	0.00007583	0.00141061	18.60145748	2487.14283
60000.00000					
61727387.	7.964824E+11	0.00007750	0.00143577	18.52608097	2498.52184
60000.00000					
62042186.	7.836908E+11	0.00007917	0.00146101	18.45480502	2508.79494
60000.00000					
62354748.	7.713989E+11	0.00008083	0.00148631	18.38739145	2517.95219
60000.00000					
62661356.	7.595316E+11	0.00008250	0.00151164	18.32291329	2525.96554
60000.00000					
62844695.	7.466696E+11	0.00008417	0.00153512	18.23904383	2532.34733
60000.00000					
63026347.	7.342875E+11	0.00008583	0.00155866	18.15916121	2537.76002
60000.00000					
63206303.	7.223578E+11	0.00008750	0.00158227	18.08304870	2542.19555
60000.00000					
63384547.	7.108547E+11	0.00008917	0.00160594	18.01050460	2545.64565
60000.00000					
63572781.	6.998838E+11	0.00009083	0.00163500	17.99999893	2548.53208
60000.00000					
63770930.	6.894155E+11	0.00009250	0.00165888	17.93382132	2549.75190
60000.00000					
63938754.	6.789956E+11	0.00009417	0.00168215	17.86350238	2548.89635
60000.00000					
64103776.	6.689090E+11	0.00009583	0.00170548	17.79634202	2544.97841
60000.00000					
64267666.	6.591556E+11	0.00009750	0.00172889	17.73218572	2545.76860
60000.00000					
64430415.	6.497185E+11	0.00009917	0.00175236	17.67089403	2547.98779
60000.00000					
64752414.	6.317309E+11	0.00010250	0.00179953	17.55638516	2549.98189

60000.00000
65067877. 6.148146E+11 0.00010583 0.00184707 17.45260084 2543.47270
60000.00000
65379265. 5.988940E+11 0.00010917 0.00189487 17.35758841 2547.37229
60000.00000
65608630. 5.831878E+11 0.00011250 0.00194086 17.25213039 2549.75147
60000.00000
65764802. 5.677537E+11 0.00011583 0.00198531 17.13937032 2546.76272
60000.00000
65918042. 5.531584E+11 0.00011917 0.00202999 17.03488648 2542.14737
60000.00000
66069387. 5.393419E+11 0.00012250 0.00207484 16.93750942 2546.61405
60000.00000
66218791. 5.262420E+11 0.00012583 0.00211988 16.84670269 2549.23894
60000.00000
66540151. 5.151496E+11 0.00012917 0.00217000 16.80000007 2548.57123
60000.00000
66550369. 5.022669E+11 0.00013250 0.00222108 16.76285684 2542.06741
60000.00000
66686977. 4.909471E+11 0.00013583 0.00226546 16.67822564 2542.57284
60000.00000
66822413. 4.801611E+11 0.00013917 0.00230998 16.59867561 2546.39692
60000.00000
66956644. 4.698712E+11 0.00014250 0.00235465 16.52386987 2548.86253
60000.00000
67089656. 4.600434E+11 0.00014583 0.00239947 16.45350802 2549.94705
60000.00000
67220253. 4.506386E+11 0.00014917 0.00244455 16.38802564 2546.54578
60000.00000
67349590. 4.416367E+11 0.00015250 0.00248978 16.32642710 2541.76893
60000.00000
67478136. 4.330148E+11 0.00015583 0.00253512 16.26817167 2537.64236
60000.00000
67605876. 4.247490E+11 0.00015917 0.00258058 16.21306193 2542.24987
60000.00000
67732815. 4.168173E+11 0.00016250 0.00262615 16.16092193 2545.80211
60000.00000
67858920. 4.091995E+11 0.00016583 0.00267184 16.11158216 2548.28338
60000.00000
67914620. 4.014657E+11 0.00016917 0.00271389 16.04272878 2549.53118
60000.00000
67968332. 3.940193E+11 0.00017250 0.00275596 15.97655761 2549.99657
60000.00000
68020721. 3.868477E+11 0.00017583 0.00279823 15.91410506 2546.77680
60000.00000
68072808. 3.799413E+11 0.00017917 0.00284058 15.85437334 2543.20813
60000.00000
68124686. 3.732859E+11 0.00018250 0.00288298 15.79713500 2539.62950
60000.00000

68176344.	3.668682E+11	0.00018583	0.00292544	15.74225700	2536.04086
60000.00000					
68227780.	3.606755E+11	0.00018917	0.00296795	15.68961704	2534.34021
60000.00000					
68279011.	3.546962E+11	0.00019250	0.00301053	15.63910568	2538.16390
60000.00000					
68279011.	3.486588E+11	0.00019583	0.00305500	15.59999907	2541.79558
60000.00000					
68279011.	3.428235E+11	0.00019917	0.00310700	15.59999907	2545.78292
60000.00000					
68325876.	3.374117E+11	0.00020250	0.00315900	15.59999907	2548.45554
60000.00000					
68489129.	3.327407E+11	0.00020583	0.00321027	15.59647357	2549.79337
60000.00000					
68517256.	3.275725E+11	0.00020917	0.00325437	15.55876386	2549.38253
60000.00000					
68544396.	3.225619E+11	0.00021250	0.00329871	15.52336299	2546.16559
60000.00000					
68571384.	3.177053E+11	0.00021583	0.00334311	15.48930109	2542.93936
60000.00000					
68598216.	3.129957E+11	0.00021917	0.00338755	15.45652020	2539.70372
60000.00000					
68624885.	3.084264E+11	0.00022250	0.00343205	15.42496455	2536.45859
60000.00000					
68651401.	3.039914E+11	0.00022583	0.00347661	15.39458692	2533.20369
60000.00000					
68677756.	2.996848E+11	0.00022917	0.00352122	15.36533797	2529.93895
60000.00000					
68703948.	2.955009E+11	0.00023250	0.00356589	15.33717263	2529.28289
60000.00000					
68755819.	2.874808E+11	0.00023917	0.00365540	15.28392327	2536.81367
60000.00000					
68807015.	2.798929E+11	0.00024583	0.00374516	15.23453414	2542.69089
60000.00000					
68857506.	2.727030E+11	0.00025250	0.00383515	15.18872845	2546.87385
60000.00000					

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 68266.34272 in-kip

Axial Thrust Force = 33000.00 lbs

Bending Moment	Bending Stiffness	Bending Curvature	Maximum Strain	Neutral Axis Position	Max. Concrete Stress	Max. Steel Stress

in-lbs	lb-in2	rad/in	in/in	inches	psi	psi
3919951.	4.703941E+12	8.333333E-07	0.00003249	38.98249519	99.74015210	815.78137
7796347.	4.677808E+12	0.00000167	0.00006260	37.55940950	190.31042	1562.78026
11629592.	4.651837E+12	0.00000250	0.00009275	37.10118735	279.29503	2310.94928
15418665.	4.625599E+12	0.00000333	0.00012287	36.85989153	366.45106	3057.94044
15418665.	3.700480E+12	0.00000417	0.00008748	20.99632680	260.62795	5531.46584
15418665.	3.083733E+12	0.00000500	0.00010345	20.68930185	306.53541	6682.27762
15418665.	2.643200E+12	0.00000583	0.00011943	20.47407496	352.04746	7832.39977
15418665.	2.312800E+12	0.00000667	0.00013566	20.34942520	397.80244	8975.41298
15418665.	2.055822E+12	0.00000750	0.00015167	20.22229278	442.42807	10124.99090
15418665.	1.850240E+12	0.00000833	0.00016770	20.12367761	486.65915	11273.82189
15418665.	1.682036E+12	0.00000917	0.00018375	20.04582489	530.49394	12421.89993
15418665.	1.541866E+12	0.00001000	0.00019984	19.98356974	573.93078	13569.21755
15418665.	1.423261E+12	0.00001083	0.00021594	19.93333304	616.96790	14715.76838
15418665.	1.321600E+12	0.00001167	0.00023208	19.89255917	659.60352	15861.54572
15418665.	1.233493E+12	0.00001250	0.00024824	19.85937488	701.83585	17006.54258
15773365.	1.183002E+12	0.00001333	0.00026443	19.83237255	743.66297	18150.75299
16710695.	1.179578E+12	0.00001417	0.00028065	19.81048143	785.08316	19294.16865
17646507.	1.176434E+12	0.00001500	0.00029689	19.79286683	826.09456	20436.78210
18580785.	1.173523E+12	0.00001583	0.00031317	19.77886569	866.69513	21578.58773
19513521.	1.170811E+12	0.00001667	0.00032947	19.76795447	906.88308	22719.57664
20444703.	1.168269E+12	0.00001750	0.00034579	19.75970614	946.65645	23859.74150
21374318.	1.165872E+12	0.00001833	0.00036215	19.75377095	986.01322	24999.07521
22302355.	1.163601E+12	0.00001917	0.00037854	19.74986136	1024.95139	

26137.56989					
23228802.	1.161440E+12	0.00002000	0.00039495	19.74773920	1063.46901
27275.21682					
24153647.	1.159375E+12	0.00002083	0.00041140	19.74720275	1101.56400
28412.00829					
25076877.	1.157394E+12	0.00002167	0.00042788	19.74808252	1139.23429
29547.93584					
25998479.	1.155488E+12	0.00002250	0.00044438	19.75023258	1176.47770
30682.99199					
26918440.	1.153647E+12	0.00002333	0.00046092	19.75353062	1213.29217
31817.16743					
27836746.	1.151865E+12	0.00002417	0.00047748	19.75786936	1249.67546
32950.45410					
28753388.	1.150136E+12	0.00002500	0.00049408	19.76315868	1285.62549
34082.84190					
29668344.	1.148452E+12	0.00002583	0.00051071	19.76931489	1321.13980
35214.32461					
30581611.	1.146810E+12	0.00002667	0.00052737	19.77627361	1356.21645
36344.88915					
31493165.	1.145206E+12	0.00002750	0.00054406	19.78396833	1390.85280
37474.53040					
32402998.	1.143635E+12	0.00002833	0.00056078	19.79234970	1425.04679
38603.23554					
33311094.	1.142095E+12	0.00002917	0.00057754	19.80136836	1458.79593
39730.99654					
34217435.	1.140581E+12	0.00003000	0.00059433	19.81098139	1492.09774
40857.80452					
35122012.	1.139092E+12	0.00003083	0.00061115	19.82115448	1524.94997
41983.64711					
36024806.	1.137625E+12	0.00003167	0.00062801	19.83185327	1557.35004
43108.51521					
36925802.	1.136179E+12	0.00003250	0.00064490	19.84304774	1589.29542
44232.39904					
38722335.	1.133337E+12	0.00003417	0.00067878	19.86682284	1651.81191
46477.17003					
40511488.	1.130553E+12	0.00003583	0.00071281	19.89230382	1712.47870
48717.87006					
42293113.	1.127816E+12	0.00003750	0.00074698	19.91934049	1771.27378
50954.41513					
44067086.	1.125117E+12	0.00003917	0.00078129	19.94782341	1828.17528
53186.70396					
45833250.	1.122447E+12	0.00004083	0.00081575	19.97765386	1883.15983
55414.64373					
47591459.	1.119799E+12	0.00004250	0.00085037	20.00875676	1936.20362
57638.13160					
49341557.	1.117167E+12	0.00004417	0.00088515	20.04107201	1987.28203
59857.06004					
50777430.	1.107871E+12	0.00004583	0.00091802	20.02951491	2033.44775
60000.00000					

51901989.	1.092673E+12	0.00004750	0.00094888	19.97640717	2074.90640
60000.00000					
52985698.	1.077675E+12	0.00004917	0.00097960	19.92400539	2114.44578
60000.00000					
53872966.	1.059796E+12	0.00005083	0.00100894	19.84803665	2150.55843
60000.00000					
54658854.	1.041121E+12	0.00005250	0.00103763	19.76429164	2184.32003
60000.00000					
55441033.	1.023527E+12	0.00005417	0.00106640	19.68739593	2216.69574
60000.00000					
56219438.	1.006915E+12	0.00005583	0.00109527	19.61675942	2247.67209
60000.00000					
56777672.	9.874378E+11	0.00005750	0.00112229	19.51812065	2275.23330
60000.00000					
57309216.	9.686065E+11	0.00005917	0.00114918	19.42273915	2301.34366
60000.00000					
57837900.	9.507600E+11	0.00006083	0.00117614	19.33385932	2326.22312
60000.00000					
58363687.	9.338190E+11	0.00006250	0.00120319	19.25097907	2349.86090
60000.00000					
58819246.	9.166636E+11	0.00006417	0.00123200	19.19999993	2373.64920
60000.00000					
59426987.	9.026884E+11	0.00006583	0.00126070	19.14988124	2395.84524
60000.00000					
59793099.	8.858237E+11	0.00006750	0.00128587	19.04998934	2413.99592
60000.00000					
60120760.	8.692158E+11	0.00006917	0.00131068	18.94962537	2430.76122
60000.00000					
60446346.	8.533602E+11	0.00007083	0.00133556	18.85495412	2446.46771
60000.00000					
60769826.	8.382045E+11	0.00007250	0.00136051	18.76559365	2461.10629
60000.00000					
61091181.	8.237013E+11	0.00007417	0.00138552	18.68120062	2474.66783
60000.00000					
61410372.	8.098071E+11	0.00007583	0.00141061	18.60145748	2487.14283
60000.00000					
61727387.	7.964824E+11	0.00007750	0.00143577	18.52608097	2498.52184
60000.00000					
62042186.	7.836908E+11	0.00007917	0.00146101	18.45480502	2508.79494
60000.00000					
62354748.	7.713989E+11	0.00008083	0.00148631	18.38739145	2517.95219
60000.00000					
62661356.	7.595316E+11	0.00008250	0.00151164	18.32291329	2525.96554
60000.00000					
62844695.	7.466696E+11	0.00008417	0.00153512	18.23904383	2532.34733
60000.00000					
63026347.	7.342875E+11	0.00008583	0.00155866	18.15916121	2537.76002
60000.00000					
63206303.	7.223578E+11	0.00008750	0.00158227	18.08304870	2542.19555

60000.00000
63384547. 7.108547E+11 0.00008917 0.00160594 18.01050460 2545.64565
60000.00000
63572781. 6.998838E+11 0.00009083 0.00163500 17.99999893 2548.53208
60000.00000
63770930. 6.894155E+11 0.00009250 0.00165888 17.93382132 2549.75190
60000.00000
63938754. 6.789956E+11 0.00009417 0.00168215 17.86350238 2548.89635
60000.00000
64103776. 6.689090E+11 0.00009583 0.00170548 17.79634202 2544.97841
60000.00000
64267666. 6.591556E+11 0.00009750 0.00172889 17.73218572 2545.76860
60000.00000
64430415. 6.497185E+11 0.00009917 0.00175236 17.67089403 2547.98779
60000.00000
64752414. 6.317309E+11 0.00010250 0.00179953 17.55638516 2549.98189
60000.00000
65067877. 6.148146E+11 0.00010583 0.00184707 17.45260084 2543.47270
60000.00000
65379265. 5.988940E+11 0.00010917 0.00189487 17.35758841 2547.37229
60000.00000
65608630. 5.831878E+11 0.00011250 0.00194086 17.25213039 2549.75147
60000.00000
65764802. 5.677537E+11 0.00011583 0.00198531 17.13937032 2546.76272
60000.00000
65918042. 5.531584E+11 0.00011917 0.00202999 17.03488648 2542.14737
60000.00000
66069387. 5.393419E+11 0.00012250 0.00207484 16.93750942 2546.61405
60000.00000
66218791. 5.262420E+11 0.00012583 0.00211988 16.84670269 2549.23894
60000.00000
66540151. 5.151496E+11 0.00012917 0.00217000 16.80000007 2548.57123
60000.00000
66550369. 5.022669E+11 0.00013250 0.00222108 16.76285684 2542.06741
60000.00000
66686977. 4.909471E+11 0.00013583 0.00226546 16.67822564 2542.57284
60000.00000
66822413. 4.801611E+11 0.00013917 0.00230998 16.59867561 2546.39692
60000.00000
66956644. 4.698712E+11 0.00014250 0.00235465 16.52386987 2548.86253
60000.00000
67089656. 4.600434E+11 0.00014583 0.00239947 16.45350802 2549.94705
60000.00000
67220253. 4.506386E+11 0.00014917 0.00244455 16.38802564 2546.54578
60000.00000
67349590. 4.416367E+11 0.00015250 0.00248978 16.32642710 2541.76893
60000.00000
67478136. 4.330148E+11 0.00015583 0.00253512 16.26817167 2537.64236
60000.00000

67605876.	4.247490E+11	0.00015917	0.00258058	16.21306193	2542.24987
60000.00000					
67732815.	4.168173E+11	0.00016250	0.00262615	16.16092193	2545.80211
60000.00000					
67858920.	4.091995E+11	0.00016583	0.00267184	16.11158216	2548.28338
60000.00000					
67914620.	4.014657E+11	0.00016917	0.00271389	16.04272878	2549.53118
60000.00000					
67968332.	3.940193E+11	0.00017250	0.00275596	15.97655761	2549.99657
60000.00000					
68020721.	3.868477E+11	0.00017583	0.00279823	15.91410506	2546.77680
60000.00000					
68072808.	3.799413E+11	0.00017917	0.00284058	15.85437334	2543.20813
60000.00000					
68124686.	3.732859E+11	0.00018250	0.00288298	15.79713500	2539.62950
60000.00000					
68176344.	3.668682E+11	0.00018583	0.00292544	15.74225700	2536.04086
60000.00000					
68227780.	3.606755E+11	0.00018917	0.00296795	15.68961704	2534.34021
60000.00000					
68279011.	3.546962E+11	0.00019250	0.00301053	15.63910568	2538.16390
60000.00000					
68279011.	3.486588E+11	0.00019583	0.00305500	15.59999907	2541.79558
60000.00000					
68279011.	3.428235E+11	0.00019917	0.00310700	15.59999907	2545.78292
60000.00000					
68325876.	3.374117E+11	0.00020250	0.00315900	15.59999907	2548.45554
60000.00000					
68489129.	3.327407E+11	0.00020583	0.00321027	15.59647357	2549.79337
60000.00000					
68517256.	3.275725E+11	0.00020917	0.00325437	15.55876386	2549.38253
60000.00000					
68544396.	3.225619E+11	0.00021250	0.00329871	15.52336299	2546.16559
60000.00000					
68571384.	3.177053E+11	0.00021583	0.00334311	15.48930109	2542.93936
60000.00000					
68598216.	3.129957E+11	0.00021917	0.00338755	15.45652020	2539.70372
60000.00000					
68624885.	3.084264E+11	0.00022250	0.00343205	15.42496455	2536.45859
60000.00000					
68651401.	3.039914E+11	0.00022583	0.00347661	15.39458692	2533.20369
60000.00000					
68677756.	2.996848E+11	0.00022917	0.00352122	15.36533797	2529.93895
60000.00000					
68703948.	2.955009E+11	0.00023250	0.00356589	15.33717263	2529.28289
60000.00000					
68755819.	2.874808E+11	0.00023917	0.00365540	15.28392327	2536.81367
60000.00000					
68807015.	2.798929E+11	0.00024583	0.00374516	15.23453414	2542.69089

```
  60000.00000
     68857506.  2.727030E+11    0.00025250    0.00383515   15.18872845    2546.87385
  60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 =   68266.34272
in-kip




---------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  1
---------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       32000.000 lbs
Specified moment at pile head       =    35016000.000 in-lbs
Specified axial load at pile head   =       33000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.



---------------------------------------------------------------------------
             Computed Values of Load Distribution and Deflection
                 for Lateral Loading for Load Case Number  2
---------------------------------------------------------------------------

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)
Specified shear force at pile head  =       13000.000 lbs
Specified moment at pile head       =    14616000.000 in-lbs
Specified axial load at pile head   =       33000.000 lbs


Output Verification:

Computed forces and moments are within specified convergence limits.



---------------------------------------------------------------------------
                           Summary of Pile Response(s)
---------------------------------------------------------------------------
```

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 32000.	M= 3.50E+07	33000.0000	0.9246422	3.6448E+07	-325541.
1	V= 13000.	M= 1.46E+07	33000.0000	0.2346619	1.5238E+07	-132366.

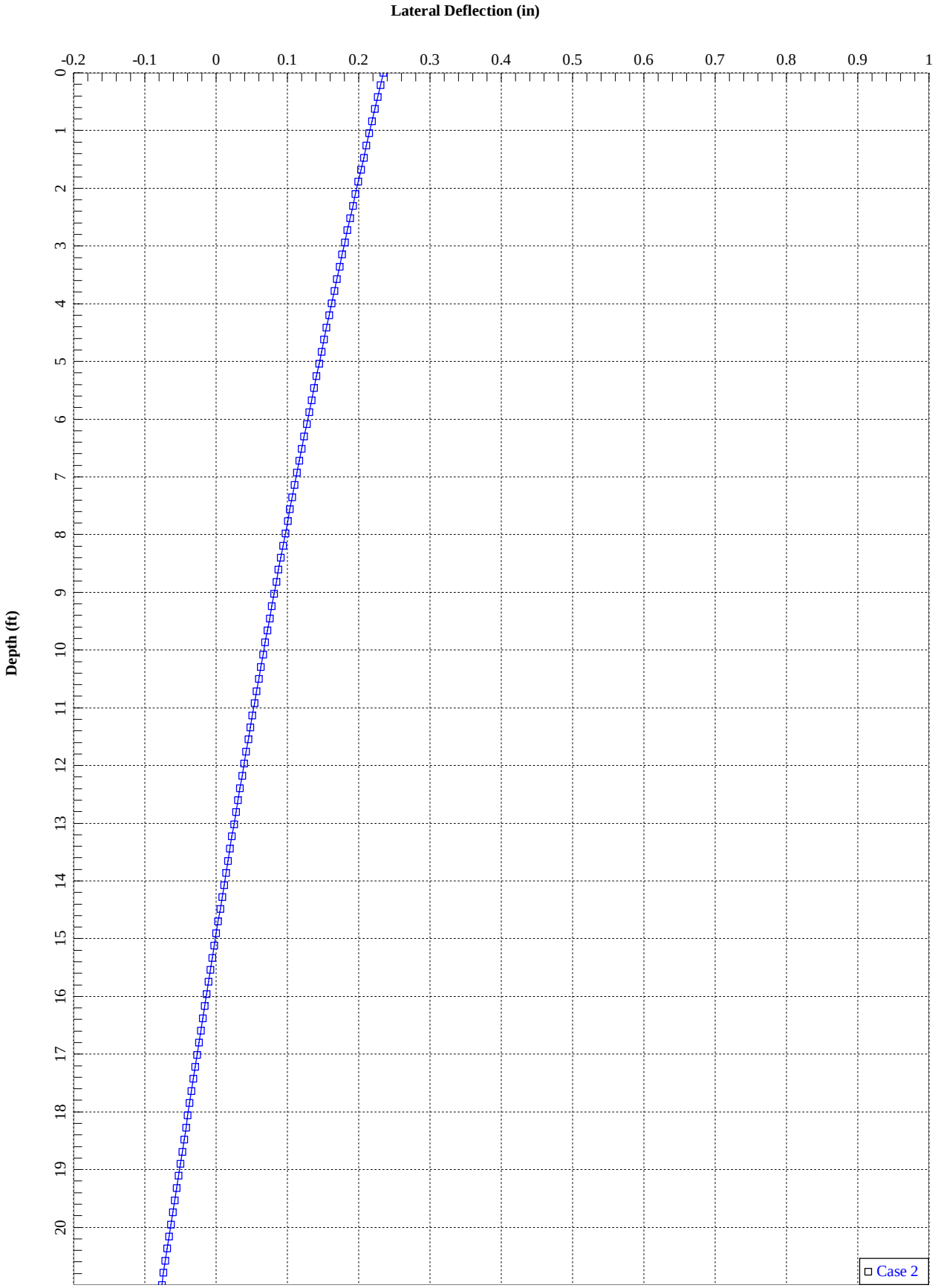
Computed Pile-head Stiffness Matrix Members
K22, K23, K32, K33 for Superstructure

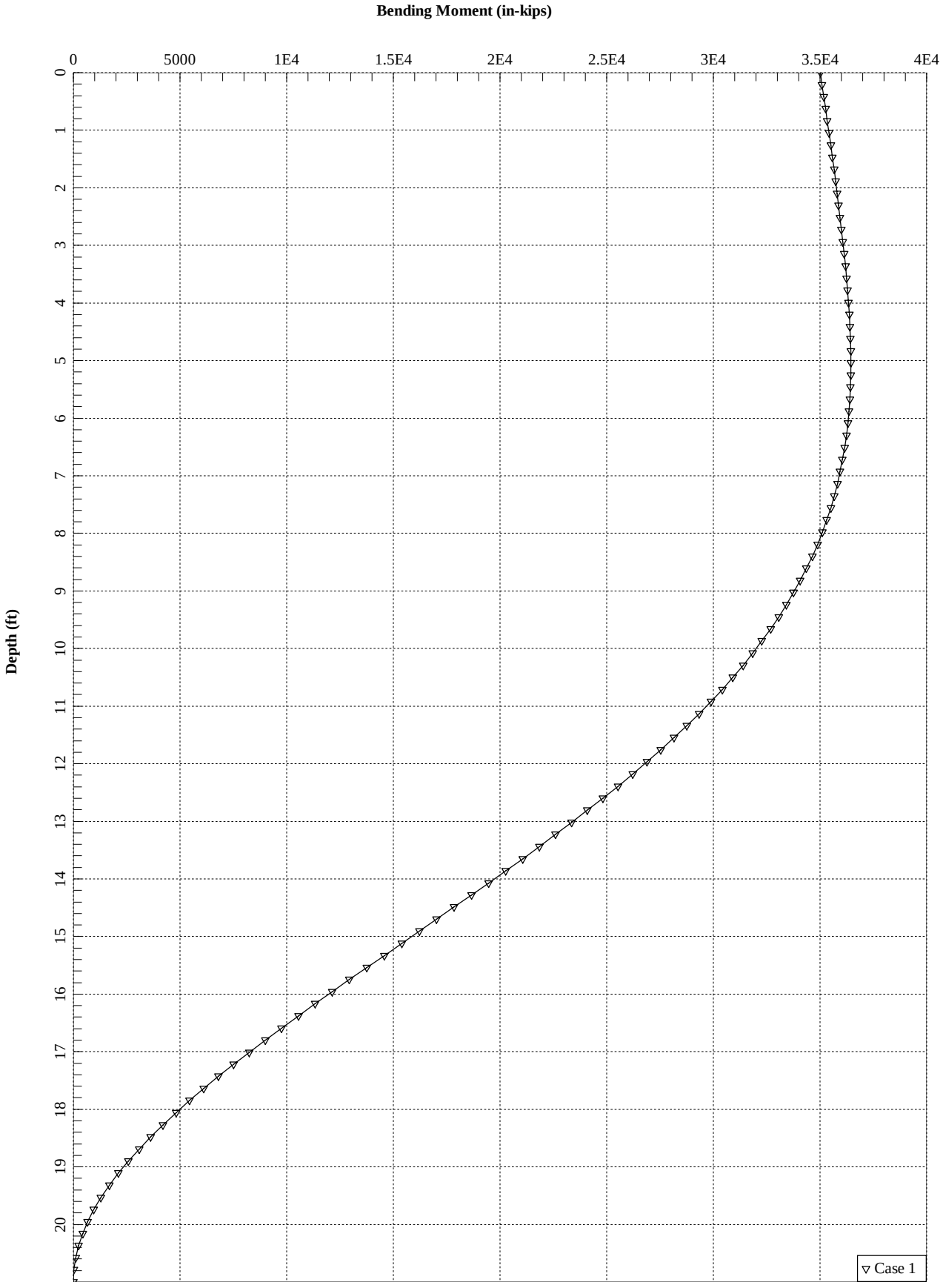
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00150179	3200.00005	460969.79441	2130794.	3.069474E+08
0.00452083	9632.95986	1387657.	2130794.	3.069474E+08
0.00716535	15267.88015	2199385.	2130794.	3.069474E+08
0.00904166	19265.91972	2775315.	2130794.	3.069474E+08
0.01049704	22367.04014	3222041.	2130794.	3.069474E+08
0.01168618	24900.84001	3587042.	2130794.	3.069474E+08
0.01269158	27043.13728	3895647.	2130794.	3.069474E+08
0.01356287	28898.87958	4162944.	2130734.	3.069367E+08
0.01433197	30535.76030	4398674.	2130604.	3.069133E+08
0.01502034	32000.00000	4609510.	2130444.	3.068845E+08

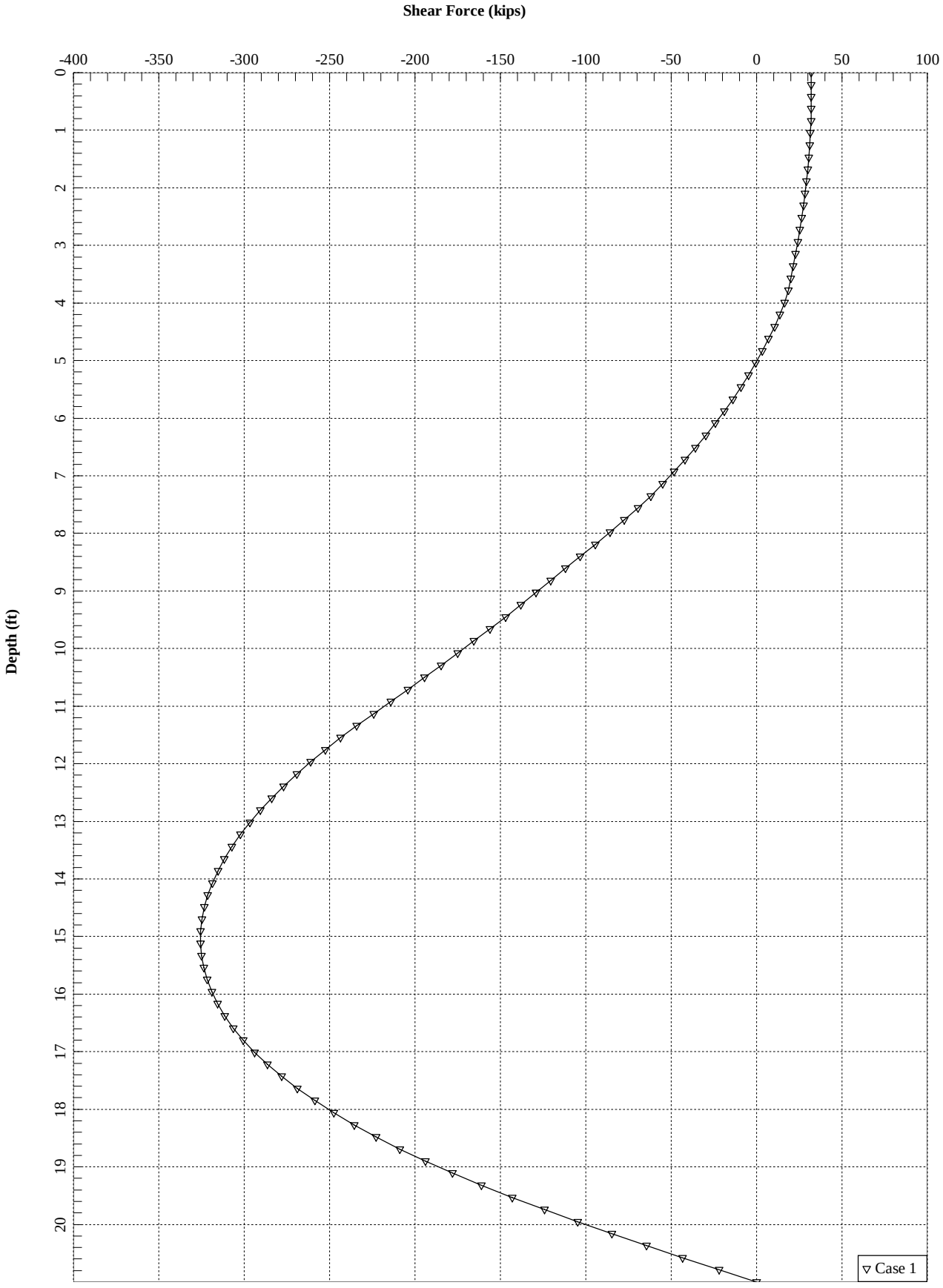
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad
0.00006410	19674.84829	3501600.	3.069474E+08	5.462848E+10
0.00019380	59241.20115	10540866.	3.056835E+08	5.439068E+10
0.00031630	93939.04838	16706878.	2.969960E+08	5.282017E+10
0.00081598	122275.97391	21081733.	1.498508E+08	2.583594E+10
0.00109443	145883.94744	24475134.	1.332972E+08	2.236343E+10
0.00129060	165125.75312	27247744.	1.279453E+08	2.111252E+10
0.00144870	181444.58502	29591953.	1.252463E+08	2.042652E+10
0.00157971	195476.35886	31622599.	1.237418E+08	2.001796E+10
0.00168966	207629.95391	33413756.	1.228830E+08	1.977549E+10
0.00179356	218905.11981	35016000.	1.220504E+08	1.952315E+10

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 2


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1


Shear Force (kips)
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
Case 1

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Section 1 - Site Information

Site ID: CT11103A
Status: Draft
Version: 3.1
Project Type: L600
Approved: Not Approved
Approved By: Not Approved
Last Modified: 4/30/2018 5:10:40 PM
Last Modified By: GSM1900\AMurill9

Site Name: Ridgefield/ Downtown1
Site Class: Monopole
Site Type: Structure Non Building
Solution Type:
Plan Year:
Market: CONNECTICUT
Vendor: Ericsson
Landlord: Town of Ridgefield

Latitude: 41.28080844
Longitude: -73.49290060
Address: 76 East Ridge Road
City, State: Ridgefield, CT
Region: NORTHEAST

RAN Template: 67D92DB Outdoor			AL Template: 67D92DB_2xAIR+1OP	
Sector Count: 3	Antenna Count: 9	Coax Line Count: 6	TMA Count: 3	RRU Count: 3

Section 2 - Existing Template Images

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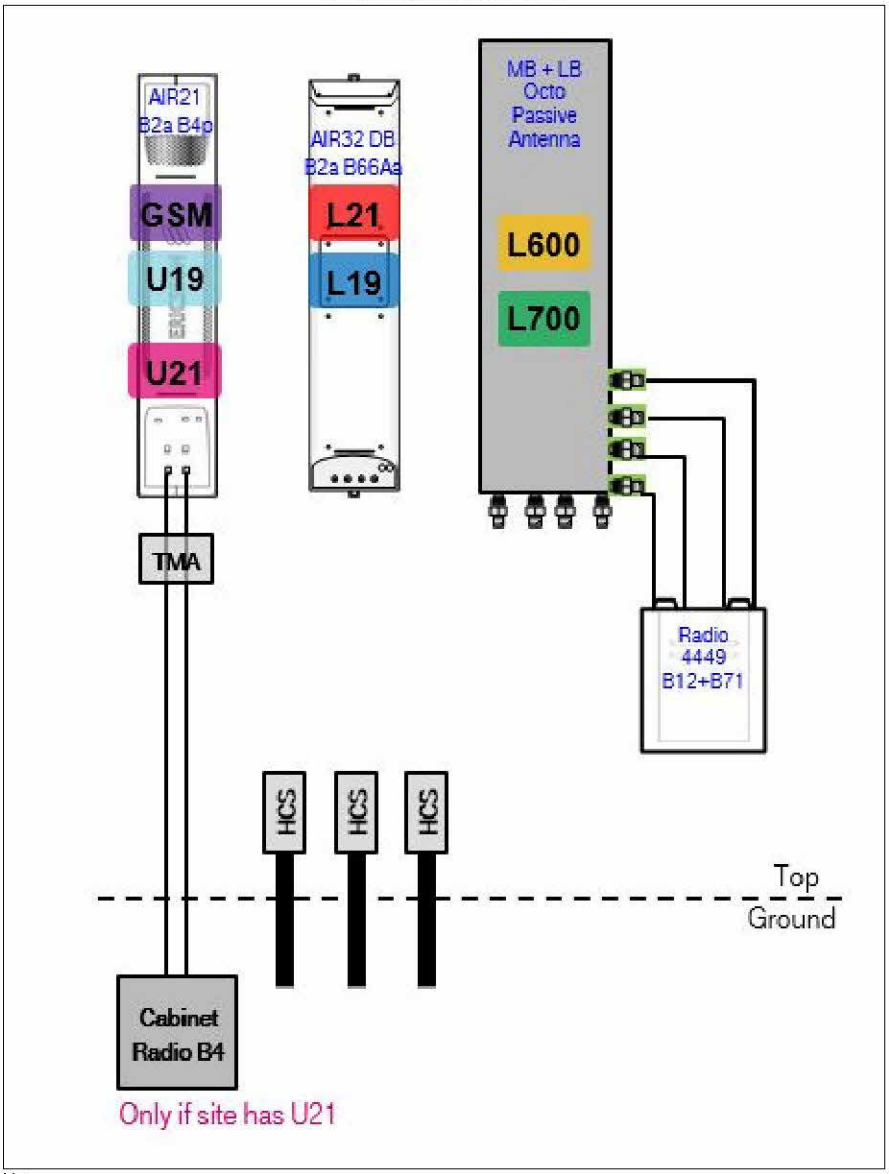
Section 3 - Proposed Template Images

67D92DB_2xAIR+1OP.JPG



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Section 5 - RAN Equipment

Existing RAN Equipment		
Template: 792DB Outdoor		
Enclosure	1	2
Enclosure Type	RBS 6131	Tower Top Mount
Baseband	DUS41 (L2100, L1900, L700); DUW30 (U2100); DUG20 (G1900)	
Hybrid Cable System		Ericsson 9x18 HCS *Select Length*
Multiplexer	XMU (L2100, L1900, L700)	
Radio	RU22 (x6) (U2100)	

Proposed RAN Equipment		
Template: 67D92DB Outdoor		
Enclosure	1	2
Enclosure Type	RBS 6131	Ancillary Equipment
Baseband	DUW30 (U1900 (DECOMMISSIONED)); DUW30 (U2100); DUG20 (G1900); BB 5216 (L2100, L1900, L700, L600)	
Hybrid Cable System		Ericsson 9x18 HCS 40m; Ericsson 6x12 HCS 6AWG 40m (x2)
Multiplexer	XMU	
Radio	RU22 (x6) (U2100)	
RAN Scope of Work:		

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Section 6 - A&L Equipment

Existing Template: 702Cu
Proposed Template: 67D92DB_2xAIR+1OP

Sector 1 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	110		110	110	
M. Tilt	0		0	0	
Height	100		100	100	
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	U2100	L700	L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables		Generic Feeder Coax - 125 ft. (x2)	Fiber Jumper		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio			RRUS11 B12 (At Antenna)		
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Sector 1 (Proposed) view from behind											
Coverage Type	A - Outdoor Macro										
Antenna	1		2				3	4			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	110		110					110			
M. Tilt	0		0					0			
Height	100		100					100			
Ports	P1	P2	P3	P4	P5	P6		P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600		L2100	L2100	L1900	L1900
Dark Tech.											
Restricted Tech.											
Decomm. Tech.	U1900										
E. Tilt											
Cables		1 5/8In AVA COAX CABLE FIRE RETARDENT - 125 ft. (x2) JUMPER 6' DIN MALE-DIN MALE (x2)			JUMPER 6' DIN MALE-DIN MALE (x2)	JUMPER 6' DIN MALE-DIN MALE (x2)		Fiber Jumper		Fiber Jumper	
TMAs		Generic Twin Style 1B - AWS (AtAntenna)									
Diplexers / Combiners											
Radio					Radio 4449 B71+B12 (AtAntenna)						
Sector Equipment											

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Sector 2 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	230		230	230	
M. Tilt	0		0	0	
Height	100		100	100	
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	U2100	L700	L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables		Generic Feeder Coax - 125 ft. (x2)	Fiber Jumper		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio			RRUS11 B12 (At Antenna)		
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro										
Antenna	1		2				3	4			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	230		230					230			
M. Tilt	0		0					0			
Height	100		100					100			
Ports	P1	P2	P3	P4	P5	P6		P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600		L2100	L2100	L1900	L1900
Dark Tech.											
Restricted Tech.											
Decomm. Tech.	U1900										
E. Tilt											
Cables		1 5/8In AVA COAX CABLE FIRE RETARDENT - 125 ft. (x2) JUMPER 6' DIN MALE-DIN MALE (x2)			JUMPER 6' DIN MALE-DIN MALE (x2)	JUMPER 6' DIN MALE-DIN MALE (x2)		Fiber Jumper		Fiber Jumper	
TMAs		Generic Twin Style 1B - AWS (AtAntenna)									
Diplexers / Combiners											
Radio					Radio 4449 B71+B12 (AtAntenna)						
Sector Equipment											

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Sector 3 (Existing) view from behind					
Coverage Type	A - Outdoor Macro				
Antenna	1		2	3	
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		Andrew - LNX-6515DS-A1M (Dual)	Ericsson - AIR21 KRC118023-1_B2P_B4A (Quad)	
Azimuth	350		350	350	
M. Tilt	0		0	0	
Height	100		100	100	
Ports	P1	P2	P3	P4	P5
Active Tech.	L1900 G1900	U2100	L700	L2100	
Dark Tech.					
Restricted Tech.					
Decomm. Tech.					
E. Tilt					
Cables		Generic Feeder Coax - 125 ft. (x2)	Fiber Jumper		
TMAs		Generic Twin Style 1B - AWS (AtAntenna)			
Diplexers / Combiners					
Radio			RRUS11 B12 (At Antenna)		
Sector Equipment					

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Sector 3 (Proposed) view from behind											
Coverage Type	A - Outdoor Macro										
Antenna	1		2				3	4			
Antenna Model	Ericsson - AIR21 KRC118023-1_B2A_B4P (Quad)		RFS - APXVAARR24_43-U-NA20 (Octo)				Empty Antenna Mount (Empty mount)	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)			
Azimuth	350		350					350			
M. Tilt	0		0					0			
Height	100		100					100			
Ports	P1	P2	P3	P4	P5	P6		P7	P8	P9	P10
Active Tech.	G1900	U2100			L700 L600	L700 L600		L2100	L2100	L1900	L1900
Dark Tech.											
Restricted Tech.											
Decomm. Tech.	U1900										
E. Tilt											
Cables		1 5/8In AVA COAX CABLE FIRE RETARDENT - 125 ft. (x2) JUMPER 6' DIN MALE-DIN MALE (x2)			JUMPER 6' DIN MALE-DIN MALE (x2)	JUMPER 6' DIN MALE-DIN MALE (x2)		Fiber Jumper		Fiber Jumper	
TMAs		Generic Twin Style 1B - AWS (AtAntenna)									
Diplexers / Combiners											
Radio					Radio 4449 B71+B12 (AtAntenna)						
Sector Equipment											

Unconnected Equipment:

Scope of Work:

RAN Template:	A&L Template:	Power System Template:
67D92DB Outdoor	67D92DB_2xAIR+1OP	Custom

CT11103A_L600_3.1_draft

Section 7 - Power Systems Equipment

Existing Power Systems Equipment
----- This section is intentionally blank. -----

Proposed Power Systems Equipment

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

FEATURES / BENEFITS

This antenna provides a 8 Port multi-band flexible platform for advanced use for flexible use in deployment scenarios for encompassing 600MHz, 700MHz, AWS & PCS applications.

- **24 Inch Width For Easier Zoning**
- **Field Replaceable (Integrated) AISG RET platform for reduced environmental exposure and long lasting quality**
- **Superior elevation pattern performance across the entire electrical down tilt range**
- **Includes three AISG RET motors - Includes 0.5m AISG jumper for optional diasy chain of two high band RET motors for one single AISG point of high band tilt control.**
- **Low band arrays driven by a single RET motor**

Technical Features

LOW BAND LEFT ARRAY (617-746 MHZ) [R1]

Frequency Band	MHz	617-698	698-746
Gain	dBi	15.1	15.5
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.4
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	24
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

LOW BAND RIGHT ARRAY (617-746 MHZ) [R2]

Frequency Band	MHz	617-698	698-746
Gain	dBi	14.8	15.1
Horizontal Beamwidth @3dB	Deg	65	62
Vertical Beamwidth @3dB	Deg	11.4	10.3
Electrical Downtilt Range	Deg	0-12	0-12
Upper Side Lobe Suppression 0 to +20	dB	19	20
Front-to-Back, at +/-30°, Copolar	dB	25	23
Cross Polar Discrimination (XPD) @ Boresight	dB	19	19
Cross Polar Discrimination (XPD) @ +/-60	dB	5	3
3rd Order PIM 2 x 43dBm	dBc		-153
VSWR	-	1.5:1	1.5:1
Cross Polar Isolation	dB	25	25
Maximum Effective Power per Port	Watt	250	250

RADIO FREQUENCY SYSTEMS
The Clear Choice®

Dual Slant Polarized Quad Band (8 Port) Antenna, 617-746/617-746/1695-2200/1695-2200MHz, 65deg, 15/15/18/18dBi, 2.4m (8ft), VET, RET, 0-12°/0-12°/2-12°/2-12°

ELECTRICAL SPECIFICATIONS

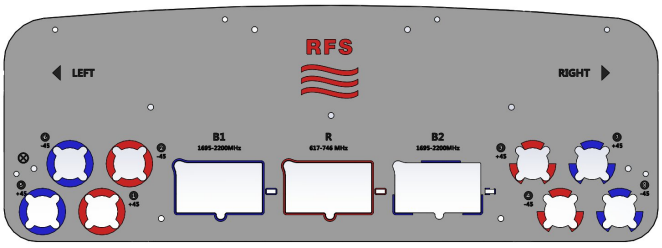
Impedance	Ohm	50.0
Polarization	Deg	±45°

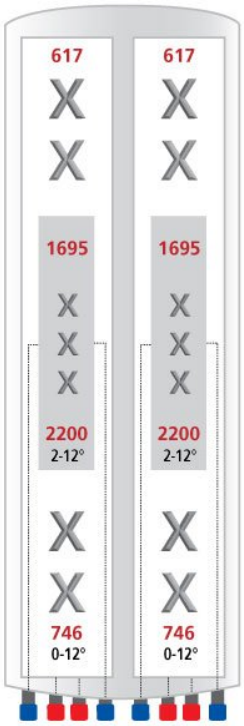
MECHANICAL SPECIFICATIONS

Dimensions - H x W x D	mm (in)	2436 x 609 x 222 (95.9 x 24 x 8.7)
Weight (Antenna Only)	kg (lb)	58 (128)
Weight (Mounting Hardware only)	kg (lb)	11.5 (25.3)
Shipping Weight	kg (lb)	80 (176)
Connector type		8 x 4.3-10 female at bottom + 6 AISG connectors (3 male, 3 female)
Adjustment mechanism		Integrated RET solution AISG compliant (Field Replaceable) + Manual Override + External Tilt Indicator
Mounting Hardware Material		Galvanized steel
Radome Material / Color		Fiber Glass / Light Grey RAL7035

TESTING AND ENVIRONMENTAL

Temperature Range	°C (°F)	-40 to 60 (-40 to 140)
Lightning protection		IEC 61000-4-5
Survival/Rated Wind Velocity	km/h	241 (150)
Environmental		ETSI 300-019-2-4 Class 4.1E





ORDERING INFORMATION

Order No.	Configuration	Mounting Hardware	Mounting pipe Diameter	Shipping Weight
APXVAARR24_43-U-NA20	Field Replace RET included (3)	APM40-5E Beam tilt kit (included)	60-120mm	80 Kg

AIR-32 B4A/B2P & B2A/B66AA

ERICSSON ANTENNA INTEGRATED RADIO AIR-32

Radio		
	Single Band (B4a/B2p)	**Dual Band (B2a/B66Aa)**
Band 2 (1850-1910 / 1930-1990 MHz)	Passive frequency band	Active frequency band
Band 4 (1710-1755 / 2110-2155 MHz)	Active frequency band	Subset of Band 66A (AWS 1+3)
Band 66A (1710-1780 / 2110-2180 MHz)	N/A	Active frequency band
PA Output Power	4 x 30W	2 x (4 x 30) W
Downlink EIRP in bore-sight direction for each active band	4 x 62.5 dBmi	4 x 62.5 dBmi
Instantaneous bandwidth	45 MHz (W, L)	B2: 40 MHz (W, L) B2: 20 MHz (G) B66A: 70 MHz (W, L)
Capacity (single standard per unit)	6 GSM 6 WCDMA 2 x 20 MHz LTE	6 GSM (B2 only) 6 WCDMA per Active frequency band 2 x 20 MHz LTE per band
Multi-RAT capability	WCDMA and LTE on both PAs	WCDMA and GSM on both PAs (B2 only) WCDMA and LTE on both PAs (B2 and B4) GSM and LTE (B2 only)

Interfaces		
Optical CPRI	2 x 10 Gbps	2 x 10 Gbps per Active frequency band
DC Power	-48 VDC 3-wire or 2-wire	-48 VDC 3-wire or 2-wire (separate input for both radios)
AC power (Optional)	PSU-AC 08	PSU-AC 08
Passive antenna	4 RF connectors (7/16 female)	N/A
Environmental		
Operating Temperature Range	-40 to +55 °C	-40 to +55 °C
Solar Radiation	≤ 1,120 W/m²	≤ 1,120 W/m²
Relative Humidity	5 to 100%	5 to 100%
Absolute Humidity	0.26 to 40 g/m^3	0.26 to 40 g/m^3
Maximum temperature change	1.0°C/min	1.0°C/min
Antenna		
Electrical Tilt	2º – 12º (B4) 2º – 12º (B2)	2º – 12º (B66A) 2º – 12º (B2)
Bore-sight antenna gain	18 dBi (B4) 17.5 dBi (B2)	18 dBi (B66A) 17.5 dBi (B2)
Nominal beam-width, azimuth	65º (B4) 63º (B2)	65º (B66A) 63º (B2)
Nominal beam-width, elevation	6º (B4) 6º (B2)	6º (B66A) 6º (B2)
Mechanical		
Weight	48 Kg (105.8 lbs)	60 Kg (132.2 lbs)
Dimensions (H x W x D)	1439 x 327 x 220 mm (56.6” x 12.9” x 8.7”)	1439 x 327 x 220 mm (56.6” x 12.9” x 8.7”)
Wind load at 42 m/s (150 km/h) Front / Lateral / Rear	640N / 300N / 660N	640N / 300N / 660N

T-Mobile

WIRELESS COMMUNICATIONS FACILITY

RIDGEFIELD/DOWNTOWN
SITE ID: CT11103A
76 EAST RIDGE ROAD
RIDGEFIELD, CT 06877

T-MOBILE RF CONFIGURATION

67D92DB_2XAIR+10P

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA-222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2016 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T-MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

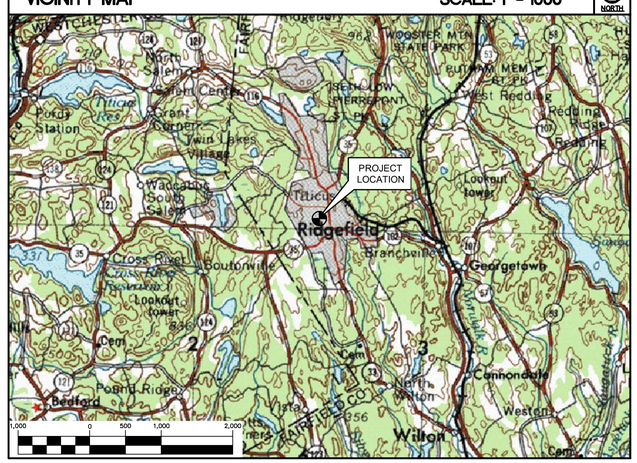
TO: 76 EAST RIDGE ROAD
RIDGEFIELD, CT 06877

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.30 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT-187. CONTINUE TO FOLLOW CT-187.	0.14 MI.
4.	TURN LEFT ONTO CT-305/OLD WINDSOR RD. CONTINUE TO FOLLOW CT-305.	1.89 MI.
5.	MERGE ONTO I-91 S TOWARD HARTFORD.	2.33 MI.
6.	MERGE ONTO I-84 W VIA EXIT 32A TOWARD WATERBURY.	5.66 MI.
7.	KEEP LEFT TO TAKE I-84 W TOWARD WATERBURY.	13.29 MI.
8.	MERGE ONTO US-7 S VIA EXIT 3 ON THE LEFT TOWARD NORWALK.	45.83 MI.
9.	TURN RIGHT ONTO DANBURY RD/CT-35.	4.72 MI.
10.	TURN LEFT ONTO GROVE ST.	2.58 MI.
11.	TURN LEFT ONTO PROSPECT ST.	0.49 MI.
12.	TAKE THE 1ST RIGHT ONTO E RIDGE RD.	0.02 MI.
13.	76 E RIDGE RD, RIDGEFIELD, CT 06877-5022, 76 E RIDGE RD IS ON THE LEFT.	0.23 MI.

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE AND REPLACE EXISTING POSITION TWO (2) ANTENNA, TYPICAL OF (3)/(1) PER SECTOR, WITH (3) NEW RES ANTENNAS.
   B. REMOVE EXISTING POSITION THREE (3) ANTENNA, TYPICAL OF (3)/(1) PER SECTOR.
   C. INSTALL PROPOSED PANEL ANTENNA IN POSITION FOUR (4), TYPICAL OF (3)/(1) PER SECTOR.
   D. REMOVE AND REPLACE EXISTING REMOTE RADIO UNIT, (3)/(1) PER SECTOR.
   E. INSTALL (2) PROPOSED 6X12 HYBRID CABLES ROUTED WITHIN EXISTING MONOPOLE TOWER.

PROJECT INFORMATION

SITE NAME:	RIDGEFIELD/DOWNTOWN
SITE ID:	CT11103A
SITE ADDRESS:	76 EAST RIDGE ROAD RIDGEFIELD, CT 06877
APPLICANT:	T-MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	BRIAN PAUL (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (860) 550-5971
ENGINEER:	CENTEK ENGINEERING, INC. 63-2 NORTH BRANFORD RD. BRANFORD, CT 06405
PROJECT COORDINATES:	LATITUDE: 41°-16'-50.93" N LONGITUDE: 73°-29'-34.11" W GROUND ELEVATION: 750'± AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND SITE NOTES	0
C-1	SITE LOCATION PLAN	0
C-2	COMPOUND AND ELEVATION PLAN	0
C-3	ANTENNA MOUNTING CONFIG.	0
E-1	TYPICAL ELECTRICAL DETAILS	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

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WIRELESS COMMUNICATIONS FACILITY
RIDGEFIELD/DOWNTOWN
SITE ID: CT11103A
76 EAST RIDGE ROAD
RIDGEFIELD, CT 06877

DATE: 05/23/18
SCALE: AS NOTED
JOB NO. 18058.26

TITLE SHEET

T-1

Sheet No. 1 of 6

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 93 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7-10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7-10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
3. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD)

   A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 50 KSI)
   B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
   C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
   D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
   E. PIPE---ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS---ASTM A325-N
   G. U-BOLTS---ASTM A36
   H. ANCHOR RODS---ASTM F 1554
   I. WELDING ELECTRODE---ASTM E 70XX

2. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
10. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

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SITE ID: CT11103A
76 EAST RIDGE ROAD
RIDGEFIELD, CT 06877

DATE: 05/23/18
SCALE: AS NOTED
JOB NO. 18058.26

DESIGN BASIS AND SITE NOTES

N-1

Sheet No. 2 of 6

1 / C-1 **SITE LOCATION PLAN**
SCALE: 1" = 100'

APPROX. NORTH

GRAPHIC SCALE
100 0 50 100 200 400
(IN FEET)
1 inch = 100 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

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DATE: 05/23/18
SCALE: AS NOTED
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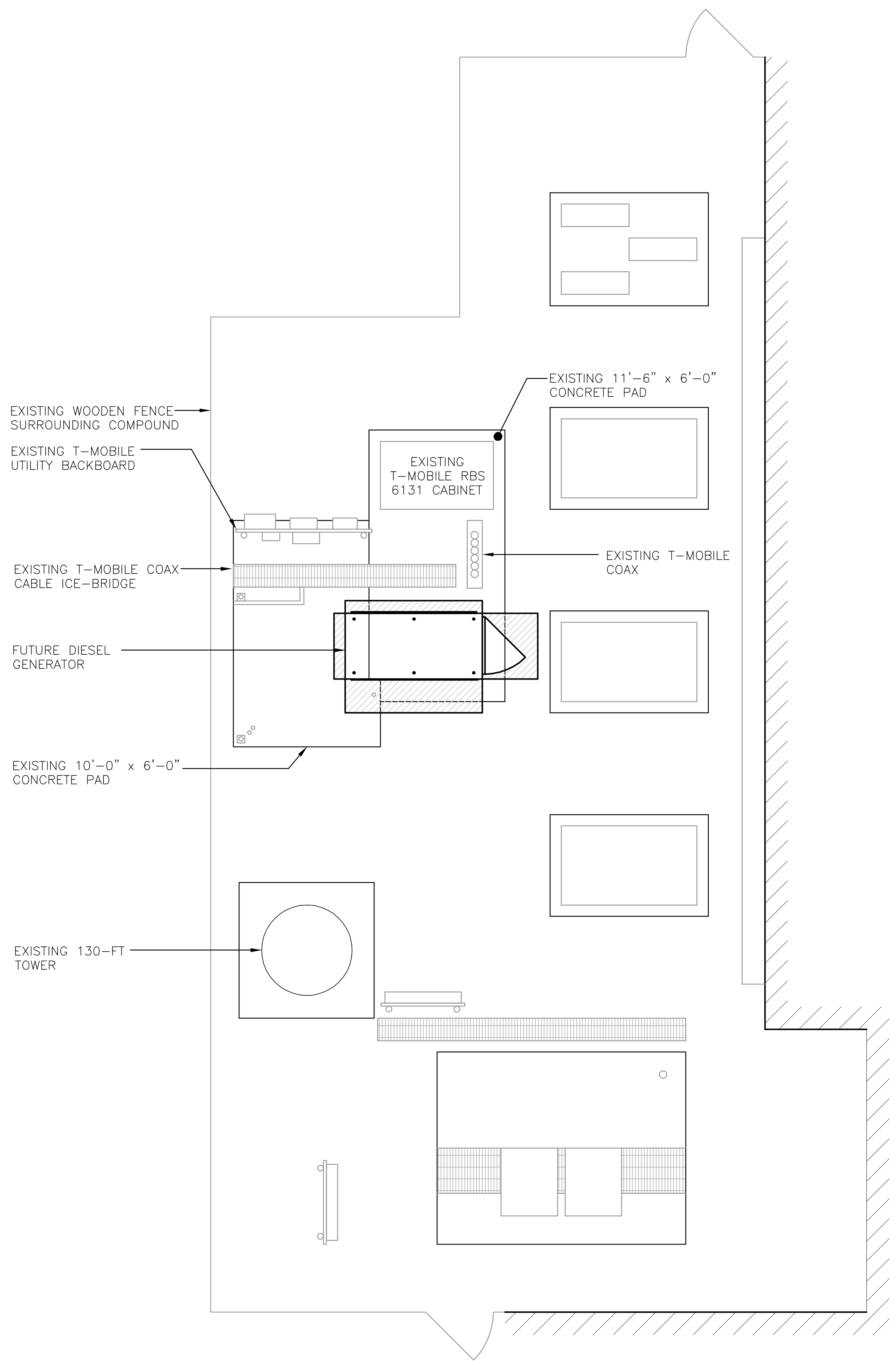
SITE LOCATION PLAN

C-1

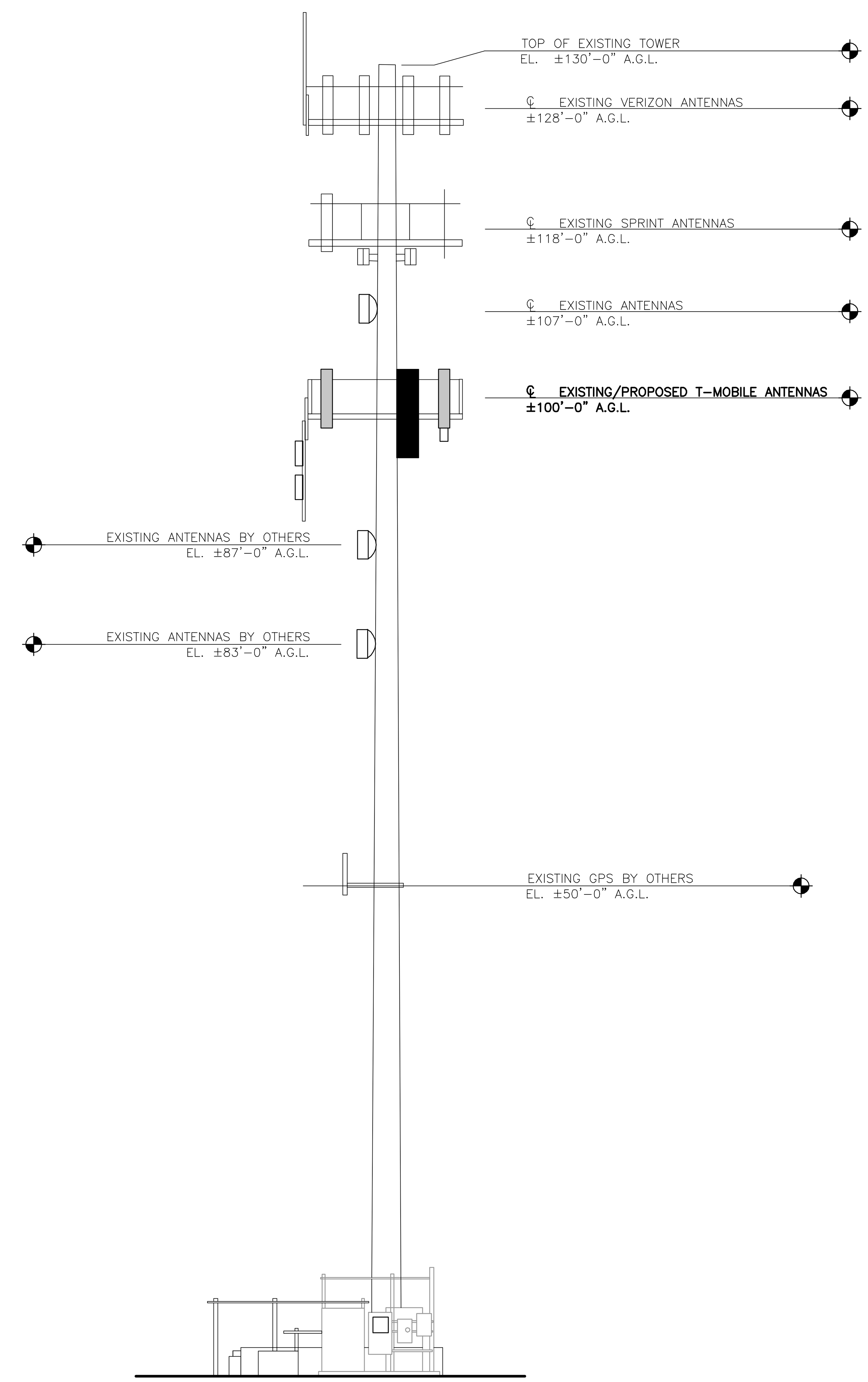
Sheet No. 3 of 6



1 C-2 **COMPOUND PLAN**
SCALE: 1" = 4'

TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 4 ft.



2 C-2 **SOUTH TOWER ELEVATION**
SCALE: 1" = 8'

GRAPHIC SCALE
(IN FEET)
1 inch = 8 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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

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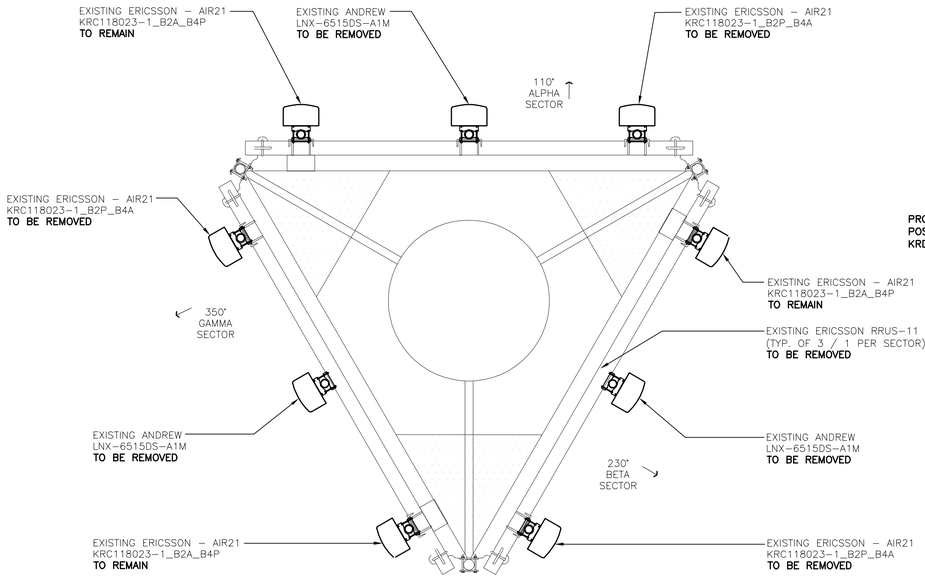
DATE: 05/23/18
SCALE: AS NOTED
JOB NO. 18058.26

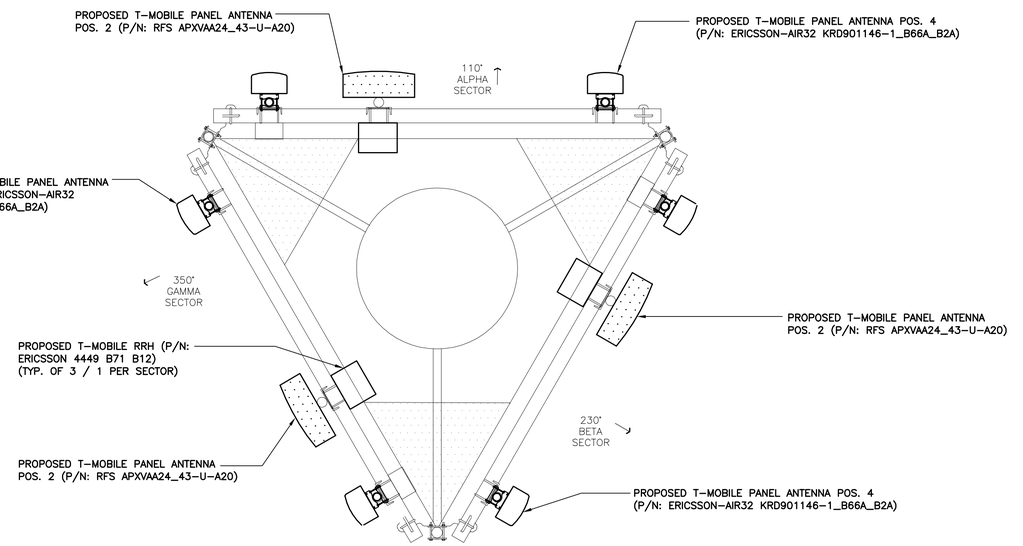
COMPOUND AND ELEVATION PLAN

C-2

Sheet No. 4 of 6



1 C-3 **EXISTING ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' **100' ELEVATION** TRUE NORTH



T-MOBILE RAN TEMPLATE: 67D92DB
T-MOBILE RF CONFIGURATION: 67D92DB_2xAIR+1OP

2 C-3 **PROPOSED ANTENNA MOUNTING CONFIGURATION**
SCALE: 1/2" = 1' **100' ELEVATION** TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

STATE OF CONNECTICUT TIMOTHY J. LYNCH 29809 REGISTERED PROFESSIONAL ENGINEER

T-Mobile
Transcend Wireless

CENTEK engineering
Centered on Solutions℠
(203) 488-0580
(203) 488-8587 Fax
63-2 North Branford Road
Branford, CT 06405
www.CentekEng.com

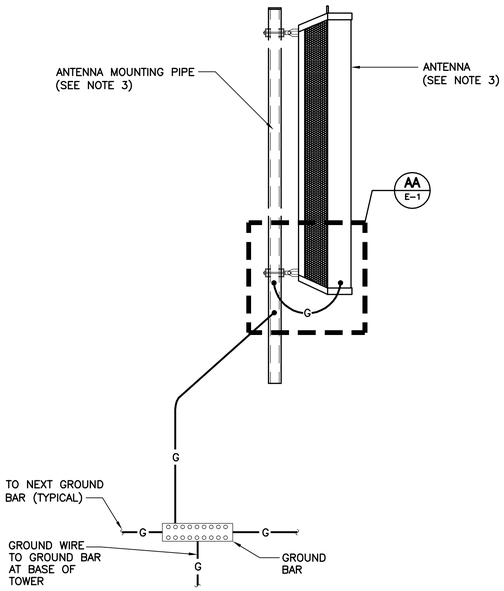
T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
RIDGEFIELD/DOWNTOWN
SITE ID: CT11103A
76 EAST RIDGE ROAD
RIDGEFIELD, CT 06877

DATE: 05/23/18
SCALE: AS NOTED
JOB NO. 18058.26

ANTENNA MOUNTING CONFIG.

C-3

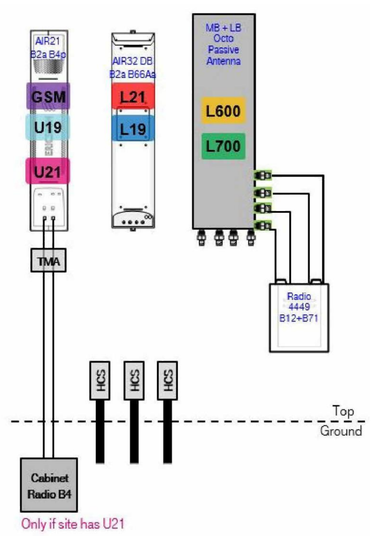
Sheet No. 5 of 6



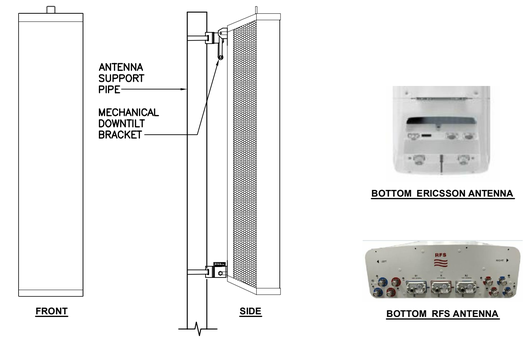
NOTES:

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

1 / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE

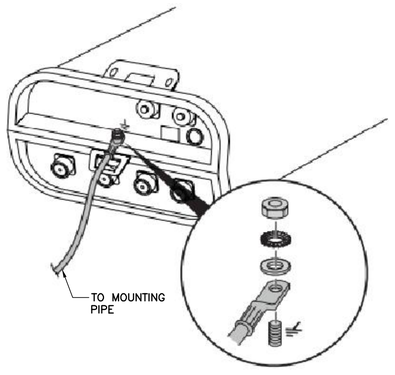


2 / E-1 **PROPOSED PLUMBING DIAGRAM**
SCALE: NONE



ALPHA/BETA/GAMMA ANTENNA			
EQUIPMENT		DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: KRD901146-1_B66A_B2A		56.65"L x 12.87"W x 8.66"D	132.2 LBS.
MAKE: RFS MODEL: APXVAA24_43-U-A20		95.9"L x 24.0"W x 8.7"D	147.4 LBS.

3 / E-1 **PROPOSED ANTENNA DETAIL**
SCALE: NONE



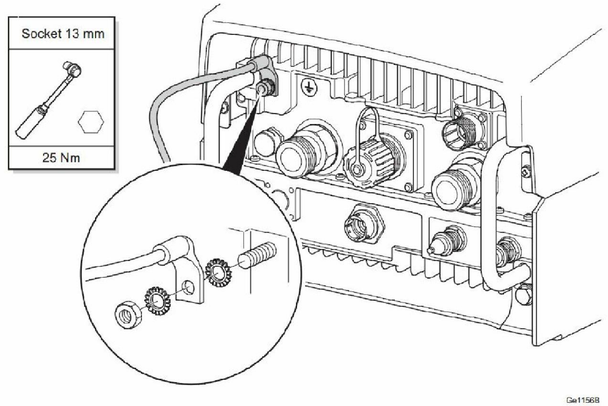
4 / E-1 **TYPICAL ANTENNA GROUNDING DETAIL**
SCALE: NONE

ISOMETRIC VIEW

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71B12	14.9"L x 13.2"W x 10.4"D	74 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

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

5 / E-1 **PROPOSED RRU DETAIL**
SCALE: NONE



6 / E-1 **TYPICAL RRU GROUNDING DETAIL**
NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	05/30/18	CDZ	CAG	ISSUED FOR CONSTRUCTION

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RIDGEFIELD, CT 06877

DATE: 05/23/18
SCALE: AS NOTED
JOB NO. 18058.26

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 6 of 6

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, June 14, 2018 12:43 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CT11103 CSC Zoning

Your package has been delivered.

Delivery Date: Thursday, 06/14/2018
Delivery Time: 12:39 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424296050507
Ship To:	Richard Baldelli Town of Ridgefield 400 MAIN ST RIDGEFIELD, CT 06877 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	RECEIVER SANTIANI
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11103 CSC Zoning

Download the UPS mobile app

Kyle Richers

From: UPS Quantum View <pkginfo@ups.com>
Sent: Thursday, June 14, 2018 12:43 PM
To: krichers@transcendwireless.com
Subject: UPS Delivery Notification, Reference Number 1: CT11103 first selectmen

Your package has been delivered.

Delivery Date: Thursday, 06/14/2018
Delivery Time: 12:39 PM

At the request of TRANSCEND WIRELESS this notice alerts you that the status of the shipment listed below has changed.

Shipment Detail

Tracking Number:	1ZV257424297080518
Ship To:	First Selectmen Marconi Town of Ridgefield 400 MAIN ST RIDGEFIELD, CT 06877 US
UPS Service:	UPS GROUND
Number of Packages:	1
Weight:	1.0 LBS
Delivery Location:	RECEIVER SANTIANI
Signature Required:	A signature is required for package delivery
Reference Number 1:	CT11103 first selectmen

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