Filed by:
Kri Pelletier, Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3804 - kpelletier@sbasite.com

August 3, 2018

Melanie A. Bachman
Acting Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

Notice of Exempt Modification
940 Meriden Road, Waterbury, CT
41 33 11.8 N
-72 59 36.1 W
T-Mobile #: CTNH331B_SA

Dear Ms. Bachman:

T-Mobile currently maintains (9) antennas at the 99-foot level of the existing 119-foot Monopole Tower at 940 Meriden Rd., Waterbury, CT. The property is owned by Pine Grove Cemetery Association, Inc. The Tower is owned by SBA Infrastructure, LLC. T-Mobile now intends to remove (3) existing cell antennas and replace with (4) newer technology cell antennas at the 99-foot level of the tower. The proposed full scope of work is as follows:

Remove:

- (6) 1-5/8" lines
- (3) Ericsson RRUS 11
- (3) Ericsson Double TMA 17/21
- (3) 782 11056

At ground level:

- (3) RRUs

Remove and Replace:

- Remove:
  - (1) 1-5/8" hybrid
- Replace with:
  - (2) 1-1/4" hybrid
- Remove:
  - (3) Andrew - LNX-6515DS-A1M – Panel Antennas
- Replace with:
  - (3) RFS APXVAARR24_43-U-NA20 – Panel Antennas
- Remove:
  - (3) existing TMAs
- Replace with:
  - (3) Ericsson KRY 112 489/2

- Remove:
  - (3) existing TMAs
- Replace with :
  - (3) Ericsson KRY 112 144/2
- Remove:
  - Existing handrail
- Replace with:
  - SitePro RMQP-4096-HK

Install:

- (3) Ericsson Radio 4449 B71 + B12
- (1) Ericsson - Ericsson Air 32 KRD901146- 1_B66A_B2A – Panel Antenna

Existing Equipment to Remain (Including entitlements):

- (3) RFS - APX16DWV-16DWVS-E-ACU – Panel Antennas
- (3) Ericsson - Ericsson Air 32 KRD901146- 1_B66A_B2A – Panel Antennas
- (3) RFS ATMAA1412D-1A20 TMA
- (1) Low Profile Platform
- (12) 1-5/8" lines

This facility was approved by the Council on February 27, 2007 under Docket 321. Approval was for a steel monopole no taller than 110' to provide public and private services. A D&M plan was to be produced and an RF report provided whenever emissions were to change. Space was to be given to the City safety services at no cost. On January 7, 2010 under Petition No. 927, the Council ruled to allow a 10-foot extension to the tower. It is SBA's opinion that the proposed modification complies with all tower conditions.

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 the City's Mayor, Neil M. O'Leary, and City Planner, James A. Sequin, as well as to the Property Owner. (Separate notice is not being sent to the tower owner, as it belongs to SBA.)

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 modifications will not result in an increase in the height of the existing structure.
2. The proposed modification 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 telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kri Pelletier
Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581
508.251.0720 x3804 + T - 508.366.2610 + F - kpelletier@sbasite.com

Attachments

cc: Neil M. O'Leary, Mayor / with attachments
City of Waterbury, City Hall Building, 235 Grand Street, Waterbury, CT 06702
James A. Sequin, AICP, City Planner / with attachments
City of Waterbury, City Hall Building, 235 Grand Street, Waterbury, CT 06702
Pine Grove Cemetery Association, Inc. / with attachments
850 Meriden Road Waterbury CT 06705

POWER DENSITY

T-Mobile Site Inventory and Power Data by Antenna

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C	Sector:	D
Antenna #:	1	Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR32 B66A/B2A	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	Gain:	15.9 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	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	Channel Count	6
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	300
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	11,671.35
Antenna A1 MPE%	**3.88**	Antenna B1 MPE%	**3.88**	Antenna C1 MPE%	**3.88**	Antenna D1 MPE%	**4.85**
Antenna #:	2	Antenna #:	2	Antenna #:	2		
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20		
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd		
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99		
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	6	Channel Count	6	Channel Count	6		
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180		
ERP (W):	5,502.05	ERP (W):	5,502.05	ERP (W):	5,502.05		
Antenna A2 MPE%	**2.29**	Antenna B2 MPE%	**2.29**	Antenna C2 MPE%	**2.29**		
Antenna #:	3	Antenna #:	3	Antenna #:	3		
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20		
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd		
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99		
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):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08		
Antenna A3 MPE%	**2.39**	Antenna B3 MPE%	**2.39**	Antenna C3 MPE%	**2.39**		

Site Summary Tables

T-Mobile Sector A Total:	8.56 %
T-Mobile Sector B Total:	8.56 %
T-Mobile Sector C Total:	8.56 %
T-Mobile Sector D Total:	4.85 %
Site Total:	21.37 %

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Sectors A, B & C)	**8.56 %**
Nextel	0.37%
Clearwire MW	0.06%
Clearwire	3.50%
Sprint	0.22%
MetroPCS	2.41%
Verizon Wireless	6.25%
Site Total MPE %:	**21.37 %**

T-Mobile Max Power Values (Sectors A, B & C)

T-Mobile _Max Power Values (Sectors A, B & C)	# 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	99	19.41	AWS - 2100 MHz	1000	1.94%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	99	19.41	PCS - 1900 MHz	1000	1.94%
T-Mobile PCS - 1900 MHz GSM	2	922.83	99	7.67	PCS - 1900 MHz	1000	0.77%
T-Mobile PCS - 1900 MHz UMTS	2	922.83	99	7.67	PCS - 1900 MHz	1000	0.77%
T-Mobile AWS - 2100 MHz UMTS	2	914.37	99	7.60	AWS - 2100 MHz	1000	0.76%
T-Mobile 600 MHz LTE	2	591.73	99	4.92	600 MHz	400	1.23%
T-Mobile 700 MHz LTE	2	648.82	99	5.39	700 MHz	467	1.15%
						Total:	**8.56%**

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Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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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 2017.

CITY OF WATERBURY

Information on the Property Records for the Municipality of Waterbury was last updated on 8/2/2018.

Property Summary Information

Parcel Data And Values | Building | Outbuildings | Permits | Google Map

Parcel Information

Location:	940 MERIDEN RD	Property Use:	Church	Primary Use:	Church - Sanctuary (Chapel)
Unique ID:	030203770070	Map Block Lot:	0302-0377-0070	Acres:	104.00
490 Acres:	0.00	Zone:	RL	Volume / Page:	368/ 217
Developers Map / Lot:		Census:			

Value Information

	Appraised Value	Assessed Value
Land	1,505,248	1,053,670
Buildings	349,237	244,470
Detached Outbuildings	64,660	45,260
Total	1,919,145	1,343,400

Owner's Information

Owner's Data
PINE GROVE CEMETERY ASSOCIATION 850 MERIDEN RD WATERBURY, CT 06705-0000

Back To Search (JavaScript:window.history.back(1);)

Print View (PrintPage.aspx?towncode=151&uniqueid=030203770070)

Information Published With Permission From The Assessor

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: CTNH331B

NH331/OPTA Pine Grove
940 Meriden Road
Waterbury, CT 06705

July 24, 2018

EBI Project Number: 6218005236

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	21.37 %

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

July 24, 2018

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

Emissions Analysis for Site: **CTNH331B – NH331/OPTA Pine Grove**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **940 Meriden Road, Waterbury, 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) bands 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 **940 Meriden Road, Waterbury, 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 (PCS Band - 1900 MHz) were considered for sectors A, B &C of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 UMTS channels (AWS Band – 2100 MHz) were considered for sectors A, B &C of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 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.

5) 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

6) 2 LTE channels (600 MHz Band) were considered for sectors A, B &C of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

7) 2 LTE channels (700 MHz Band) were considered for sectors A, B &C of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

8) 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.

9) 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.

10) The antennas used in this modeling are the **Ericsson AIR32 B66A/B2A** & **RFS APX16DWV-16DWVS-E-A20** for 1900 MHz (PCS) and 2100 MHz (AWS) channels and the **RFS APXVAARR24_43-U-NA20** for 600 MHz and 700 MHz channels. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. 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.

11) The antenna mounting height centerline of the proposed antennas (both panel antennas and microwave dish) is **99 feet** above ground level (AGL).

12) 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.

13) 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	Sector:	D
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 B66A/B2A	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	Gain:	15.9 dBd
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99	Height (AGL):	99
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	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	Channel Count	6
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	300
ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	9,337.08	ERP (W):	11,671.35
Antenna A1 MPE%	**3.88**	Antenna B1 MPE%	**3.88**	Antenna C1 MPE%	**3.88**	Antenna D1 MPE%	**4.85**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**		
Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20	Make / Model:	RFS APX16DWV-16DWVS-E-A20		
Gain:	16.3 dBd	Gain:	16.3 dBd	Gain:	16.3 dBd		
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99		
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	6	Channel Count	6	Channel Count	6		
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180		
ERP (W):	5,502.05	ERP (W):	5,502.05	ERP (W):	5,502.05		
Antenna A2 MPE%	**2.29**	Antenna B2 MPE%	**2.29**	Antenna C2 MPE%	**2.29**		
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**		
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20		
Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd	Gain:	12.95 / 13.35 dBd		
Height (AGL):	99	Height (AGL):	99	Height (AGL):	99		
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):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08		
Antenna A3 MPE%	**2.39**	Antenna B3 MPE%	**2.39**	Antenna C3 MPE%	**2.39**		

Site Summary Tables

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Sectors A, B & C)	**8.56 %**
Nextel	0.37%
Clearwire MW	0.06%
Clearwire	3.50%
Sprint	0.22%
MetroPCS	2.41%
Verizon Wireless	6.25%
Site Total MPE %:	**21.37 %**

T-Mobile Sector A Total:	8.56 %
T-Mobile Sector B Total:	8.56 %
T-Mobile Sector C Total:	8.56 %
T-Mobile Sector D Total:	4.85 %
Site Total:	21.37 %

T-Mobile Max Power Values (Sectors A, B & C)

T-Mobile _Max Power Values (Sectors A, B & C)	# 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	99	19.41	AWS - 2100 MHz	1000	1.94%
T-Mobile PCS - 1900 MHz LTE	2	2,334.27	99	19.41	PCS - 1900 MHz	1000	1.94%
T-Mobile PCS - 1900 MHz GSM	2	922.83	99	7.67	PCS - 1900 MHz	1000	0.77%
T-Mobile PCS - 1900 MHz UMTS	2	922.83	99	7.67	PCS - 1900 MHz	1000	0.77%
T-Mobile AWS - 2100 MHz UMTS	2	914.37	99	7.60	AWS - 2100 MHz	1000	0.76%
T-Mobile 600 MHz LTE	2	591.73	99	4.92	600 MHz	400	1.23%
T-Mobile 700 MHz LTE	2	648.82	99	5.39	700 MHz	467	1.15%
						Total:	**8.56%**

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:	8.56 %
Sector B:	8.56 %
Sector C:	8.56 %
Sector D:	4.85 %
T-Mobile Maximum MPE% (Sectors A, B & C):	8.56 %
Site Total:	21.37 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **21.37%** 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.

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Structural Analysis Report

Client: T-Mobile

Client Site ID: CTNH331B
Client Site Name: NH331/OPTA Pine Grove
AppID: 87441, v1

SBA Site Name: Waterbury 4, CT
SBA Site ID: CT13070-A
119 ft Monopole
940 Meriden Road
Waterbury, Connecticut 06705
Lat: 41.553278, Long: -72.993361

Project number: CT13070-TMO-071018

Analysis Results

Tower	68.80%	Pass
Foundation	61.71%	Pass

Client Mount modification / replacement

Net change in tower stress due to mount Modification / replacement	2.10%

Twist and Sway with a 10 dB Degradation Limit

Elev (ft)	Model	Frequency (GHz)	Calculated Twist/Sway (°)	Allowable Twist/Sway (°)	Analysis Results
118.0	Andrew Microwaves - VHLP2.5-11 - Dish	10.500	0.817	2.023	Sufficient
		11.700	0.817	1.815	Sufficient

** Client must review the operational limits of the Microwave dish*

Prepared by:

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STATE OF CONNECTICUT
NITESH AHUJA
No. 27942
LICENSED
PROFESSIONAL ENGINEER

7/16/2018

July 12, 2018

Prepared in compliance with:

- *ANSI/TIA/EIA 222-G Structural Standard for Antennas and Antenna Supporting Structures*
- *2012 International Building Code (IBC)*

Table of Contents

Executive Summary

The enclosed structural analysis was performed for T-Mobile on July 17, 2018 to verify the structural capacity of the 119 ft Monopole located at 940 Meriden Road, Waterbury, Connecticut 06705 to support the proposed antenna, transmission lines and mounting equipment in addition to those currently installed. The following documents were used to determine the geotechnical characteristics, foundation data, tower geometry and member sizes/type:

Table 1 List of Documents Used

Item	Document
Tower design/drawings	Tower Drawing prepared by Sabre, Job #07-03039 dated 4/23/07
Foundation drawings	Foundation Drawing prepared by Sabre, Job #03039 dated 4/23/07
Geotechnical report	Geotechnical Report prepared by Gemini Geotechnical Associates, Project #07023CT dated 3/13/07
Modification drawings	Modification Drawing prepared by FDH, Project #09-01077E S3 dated 10/13/09
Latest SA	TES, Project Number: 52184, dated 05/01/18

The analysis was performed in accordance with the following requirements:

Table 2 Code Related Data

Jurisdiction (State/County/City)	Connecticut/New Haven/Waterbury
Governing Codes	ANSI/TIA/EIA 222-G, 2012 IBC/2016 CT. State Building Code
Base Wind Speed	97.0 mph (Ultimate Wind Speed: 125 mph 3-Sec. Gust)
Wind Speed with Ice	50 mph (3-Sec. Gust)
Ice Thickness	0.75”
Structural Class	II
Exposure Category	C
Topographic Category	1
Crest Height	0 ft

“This structural analysis is based upon the tower being classified as a class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.”

The SBA Communications Corporation verifies that the 119 ft Monopole located at 940 Meriden Road, Waterbury, Connecticut 06705 is ***Sufficient*** to support the proposed loadings for T-Mobile in addition to those currently existing based on standards set forth in governing building codes and dependent on T-Mobile satisfying all Installation Requirements provided herein. The analysis performed assumes the site information provided is accurate and the tower/foundation has been properly designed, manufactured, installed and maintained. Additional details regarding the assumptions and limitations are provided within the Assumptions and Limitations section of this report.

Assumptions

This analysis was completed based on the following assumptions:

- Tower has been properly maintained
- Tower erection was in accordance to manufacturer drawings
- Leg flanges have been properly designed by manufacturer to not be a limiting reaction
- Welds have been properly designed and installed by manufacturer to not be a limiting reaction
- Foundation was constructed in accordance to manufacturer drawings
- Foundation does not have structural damage
- Bolts have been properly tightened according to manufacturer specifications
- Appurtenance, mount and transmission line sizes and weights are best estimates using the TES database and manufacturer information

Limitations

The computer generated analysis performed by the TES software is limited to theoretical capacities of the towers structural members and does not account for any missing or damaged members or connections. The tower and foundation are assumed to have been properly designed, fabricated, installed and maintained, barring any conflicting findings from the most recent inspection. All leg flanges, welds and bolts are assumed to be designed by the manufacturer in such a way that these are not limiting reactions.
SBA Communications Corporation has used its due diligence to verify the information provided to perform this analysis. It is unreasonable to perform a more detailed inspection of a tower and its components. This report is not a condition assessment of the tower or foundation.

Installation Requirements

This analysis was performed under the assumption that T-Mobile will place the proposed equipment and feed lines at a height of 99 ft and in accordance with the coax layout shown. RRUs are to be installed on existing mounts behind tenant's antennas unless otherwise noted. No equipment is to be installed directly in the climbing path. All equipment is to be installed per mount manufacturer specifications. In case site conditions do not allow for the required installation parameters to be met T-Mobile must notify SBA Communications Corporation engineers for approval of an alternative placement.

Appurtenance Loading

Existing Loading:

The existing antenna and feed line information was obtained from the Site Summary and/or previous Structural Analysis. SBA Communications Corporation uses due diligence to ensure reasonably accurate information has been recorded. The existing loadings are shown in Table 3.

Table 3 Existing Appurtenances

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	118.0	3	1900 MHz RRH	LP Platform w/ Handrail [RMQP-4096-HK]	(3) 1-1/4" Fiber (1) 1.689" Fiber (2) 1/2"	Sprint Nextel
2		6	800 MHz RRH			
3		3	Nokia - AAHC - Panel			
4		3	Commscope - NNVV-65B-R4 - Panel			
5		3	TD-RRH8x20-25			
6		2	Andrew Microwaves - VHLP2.5-11 - Dish			
7	99.0	3	782 11056	Low Profile Platform	(18) 1 5/8" (1) 1-5/8" Hybrid	T-Mobile
8		3	Ericsson RRUS 11			
9		3	Ericsson Double TMA 17/21			
10		3	Andrew - LNX-6515DS-A1M - Panel			
11		3	RFS ATMAA1412D-1A20 TMA			
12		3	RFS - APX16DWV-16DWVS-E-ACU - Panel			
13		3	Ericsson - Ericsson Air 32 KRD901146-1_B66A_B2A - Panel			
17	87.0	3	1900 MHz 4X45 RRH	Low Profile Platform	(18) 1 5/8" (2) 1 5/8" Hybrid	Verizon
18		3	Antel - BXA-80063/4CF - Panel			
19		2	DB-T1-6Z-8AB-0Z			
20		3	RRH2X60-700			
21		3	RRH2X60-PCS			
22		9	Andrew - SBNHH-1D65B - Panel			
23	77.0	3	RFS - APXV18-206517S-C - Panel	Pipe	(6) 1 5/8"	Metro PCS

*All coax are inside the pole

Proposed Loading:

Information pertaining to proposed antennas and transmission lines were based upon the APP ID 87441, v1 from T-Mobile and is listed in Table 4.

Table 4 Proposed Appurtenances

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
11	99.0	3	RFS - APX16DWV-16DWVS-E-ACU - Panel	Platform SitePro RMQP-4096-HK	(2) 1-1/4" Hybrid (12) 1 5/8"	T-Mobile
12		4	Ericsson - Ericsson Air 32 KRD901146-1_B66A_B2A - Panel			
13		3	RFS APXVAARR24_43-U-NA20 - Panel			
14		3	Ericsson Radio 4449 B71 + B12			
15		3	Ericsson KRY 112 489/2			
16		3	Ericsson KRY 112 144/2			

Results

Tower

The results of the structural analysis performed with the TES software are shown below. Table 5 shows the most critical member elements and the percentage of the force in the member with respect to the member capacity. Capacities of up to 105% are considered acceptable. The foundation reactions obtained from TES are shown in Table 6. Table 7 displays the twist and sway at service wind speeds. These reactions are used for the analysis of the foundation systems. Additional information for the tower analysis is provided within the Appendix.

Table 5 Tower Analysis Summary

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	59.8%	68.8%	44.0%
Pass/Fail	Pass	Pass	Pass

Table 6 Tower Base Reactions

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	2362.0	27.0	37.4

Table 7 Twist and Sway with a 10 dB Degradation Limit (for dishes only)

Elev (ft)	Model	Frequency (GHz)	Calculated Twist/Sway (°)	Allowable Twist/Sway (°)	Analysis Results
118.0	Andrew Microwaves - VHLP2.5-11 - Dish	10.500	0.817	2.023	Sufficient
		11.700	0.817	1.815	Sufficient

** Client must review the operational limits of the Microwave dish*

Table 8 Client mount modification / replacement

Tower stress with mount Modification / replacement	Tower stress without mount Modification / replacement	Difference
68.80%	66.70%	2.10%

Foundation System

The results of the foundation based on the geotechnical report and foundation mapping or design drawings are shown below in Table 9. Additional information for the foundation analysis is provided within the Appendix.

Table 9 Foundation Analysis Summary

Structural Component	% capacity	Analysis Result
Foundation	61.71%	Pass

Appendix

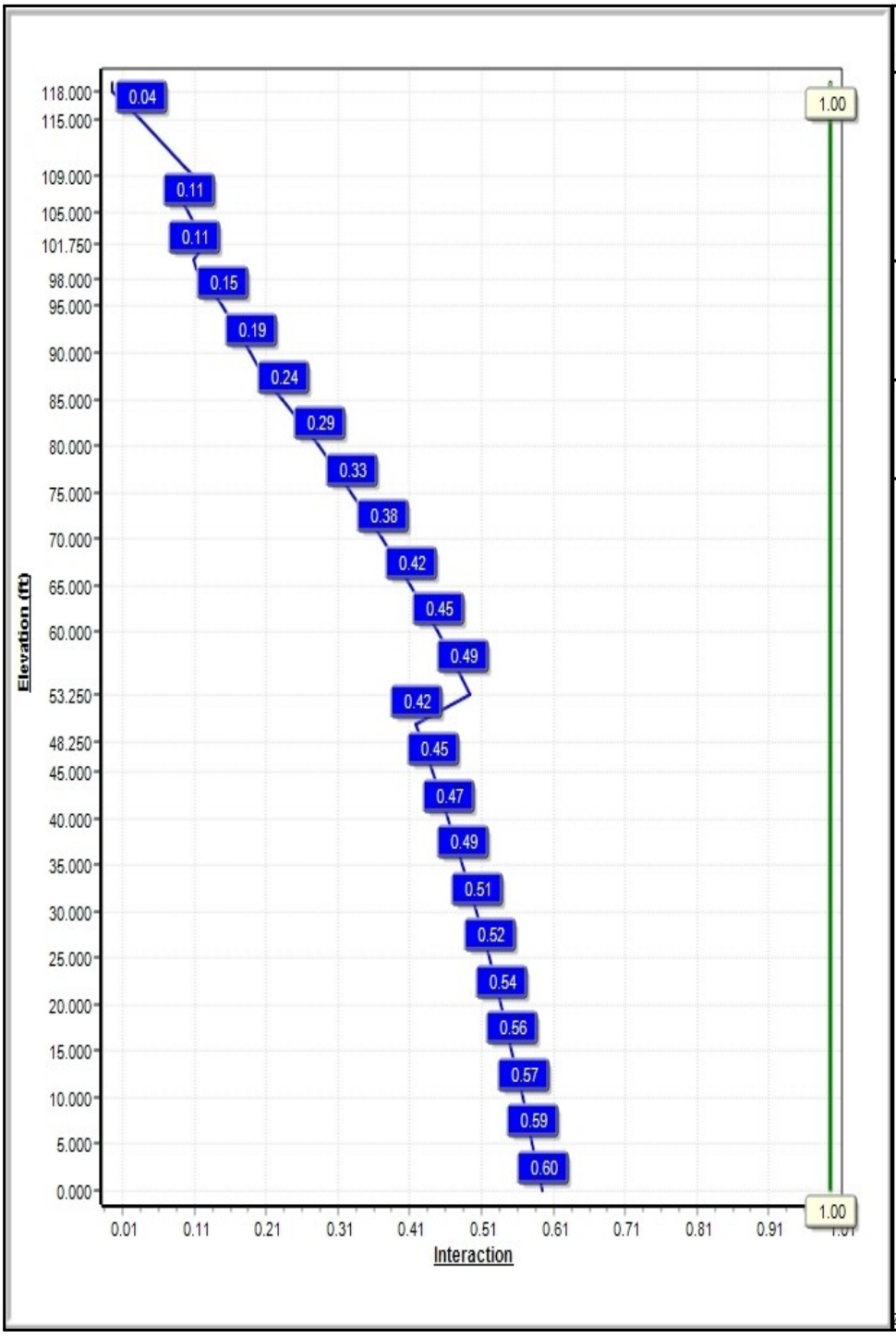
Usage Diagram - Max Ratio 59.84% at 0.0ft

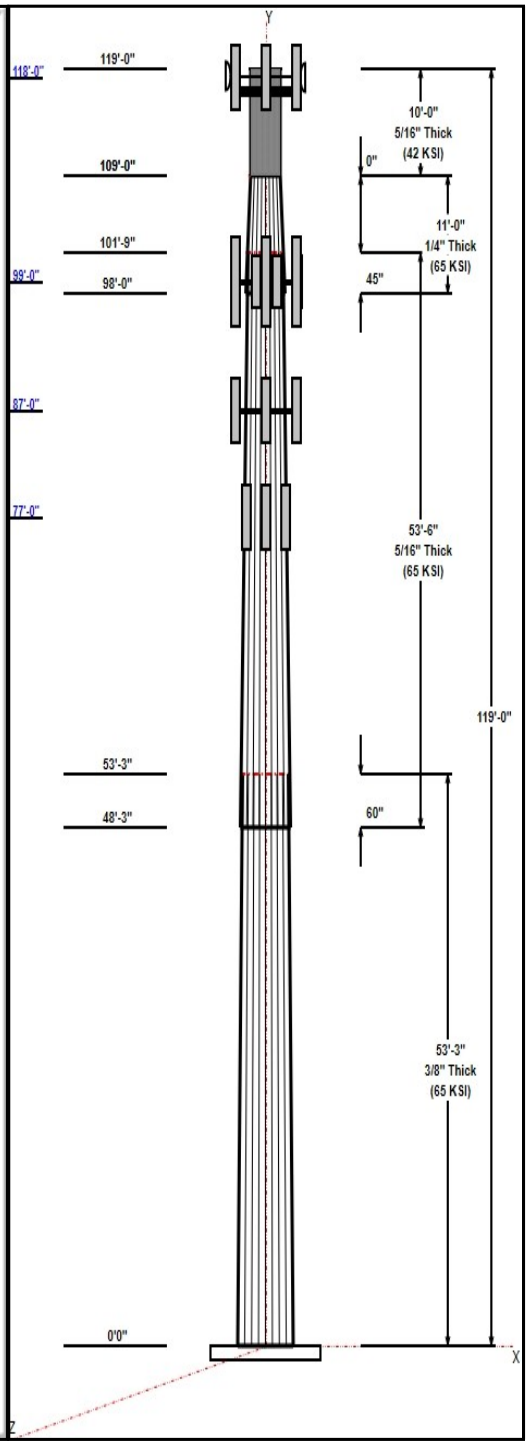
Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT	**Exposure:**	C	
Height:	119.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 9 97 mph Wind

Iterations: 22





Structure: CT13070-A

Type: Custom
Site Name: Waterbury 4, CT
Height: 119.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.00000

7/12/2018

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	53.25	37.99	49.39	0.375		0.21408	65
2	53.50	28.23	39.69	0.313	Slip	0.21408	65
3	11.00	27.18	29.53	0.250	Slip	0.21408	65
4	10.00	26.00	26.00	0.312	Butt	0.00000	42

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
118.00	118.00	3	1900 MHz RRH	Sprint Nextel
118.00	118.00	6	800 MHz RRH	Sprint Nextel
118.00	118.00	3	AAHC	Sprint Nextel
118.00	118.00	1	LP Platform w/ Handrail	Sprint Nextel
118.00	118.00	3	NNVV-65B-R4	Sprint Nextel
118.00	118.00	3	TD-RRH8x20-25	Sprint Nextel
118.00	118.00	2	VHLP2.5-11	Sprint Nextel
99.00	99.00	3	APX16DWV-16DWVS-E-A	T-Mobile
99.00	99.00	4	Ericsson Air 32	T-Mobile
99.00	99.00	3	Ericsson KRY 112 144/2	T-Mobile
99.00	99.00	3	Ericsson KRY 112 489/2	T-Mobile
99.00	99.00	3	Ericsson Radio 4449 B71	T-Mobile
99.00	99.00	1	Platform SitePro	T-Mobile
99.00	99.00	3	RFS	T-Mobile
87.00	87.00	3	1900 MHz 4X45 RRH	Verizon
87.00	87.00	3	BXA-80063/4CF	Verizon
87.00	87.00	2	DB-T1-6Z-8AB-0Z	Verizon
87.00	87.00	1	Low Profile Platform	Verizon
87.00	87.00	3	RRH2X60-700	Verizon
87.00	87.00	3	RRH2X60-PCS	Verizon
87.00	87.00	9	SBNHH-1D65B	Verizon
77.00	77.00	3	APXV18-206517S-C	Metro PCS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	118.00	Inside	1-1/4" Fiber	Sprint Nextel
0.00	118.00	Inside	1.689" Fiber	Sprint Nextel
0.00	118.00	Inside	1/2" Coax	Sprint Nextel
0.00	99.00	Inside	1 5/8" Coax	T-Mobile
0.00	99.00	Inside	1-1/4" Hybrid	T-Mobile
0.00	87.00	Inside	1 5/8" Coax	Verizon
0.00	87.00	Inside	1 5/8" Hybrid	Verizon
0.00	77.00	Inside	1 5/8" Coax	Metro PCS

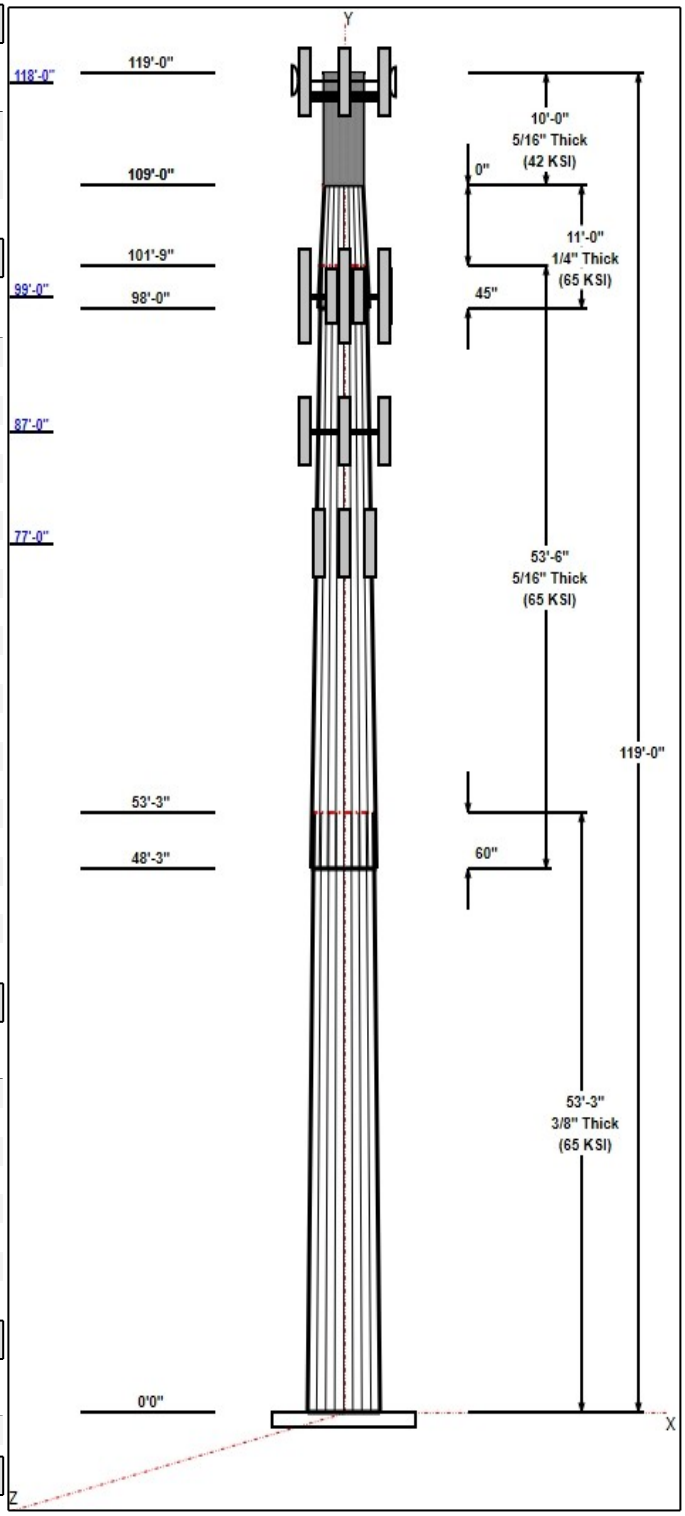
Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Cluster

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	53.3	60.0	Clipped

Reactions

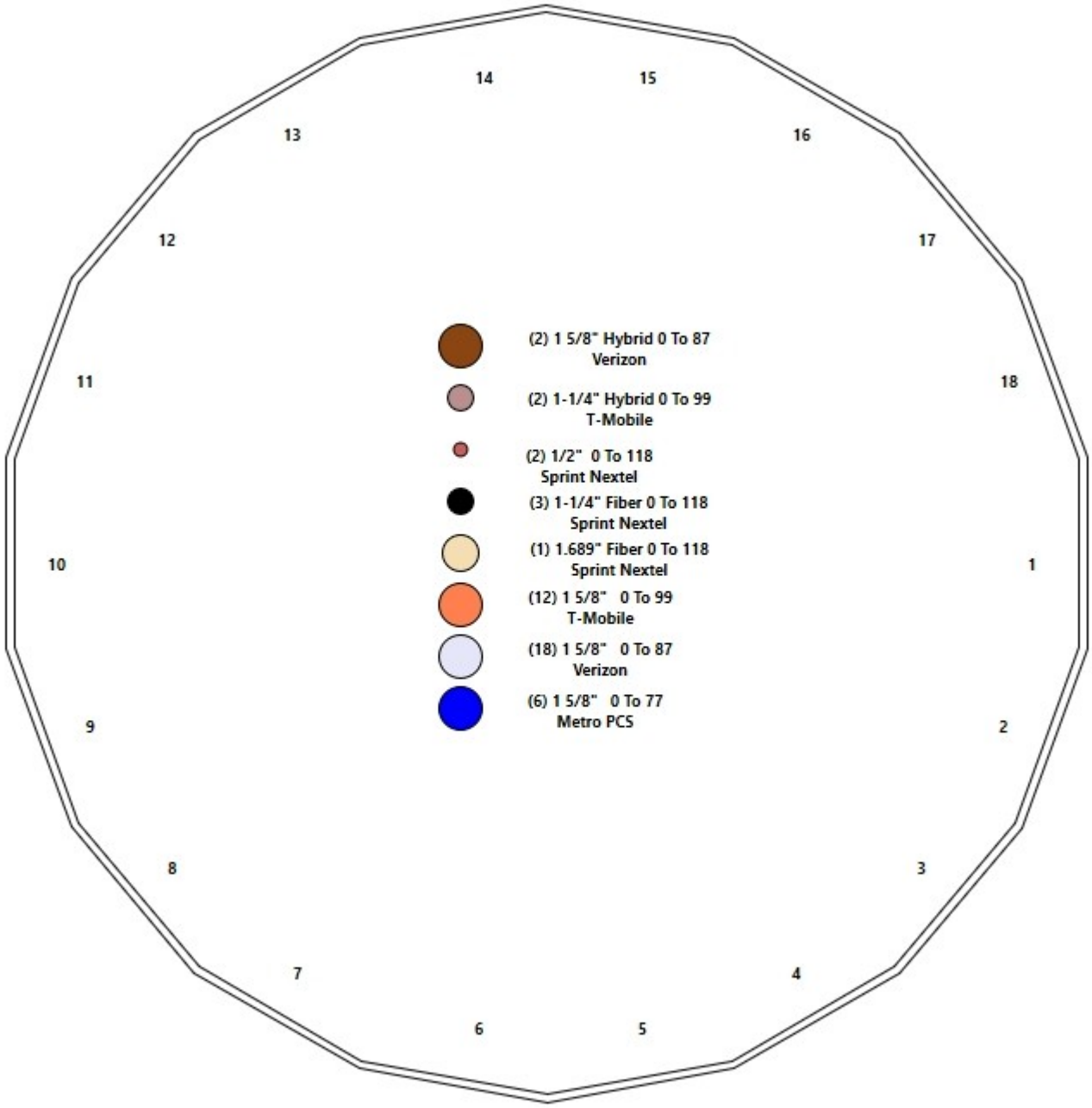


Load Case	Moment	Shear	Axial
1.2D + 1.6W 9 97 mph Wind	2362.0	27.0	37.4
0.9D + 1.6W 9 97 mph Wind	2344.0	27.0	28.0
1.2D + 1.0Di + 1.0Wi 50 mph Wind	633.7	7.4	57.5
1.2D + 1.0E	104.8	1.1	37.4
0.9D + 1.0E	103.9	1.1	28.1
1.0D + 1.0W 60 mph Wind	562.2	6.4	31.2

Structure: CT13070-A - Coax Line Placement

Type: Monopole
Site Name: Waterbury 4, CT
Height: 119.00 (ft)

7/12/2018



Shaft Properties

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	53.250	0.3750	65		0.00	9,341
2	18	53.500	0.3125	65	Slip	60.00	6,075
3	18	11.000	0.2500	65	Slip	45.00	835
4	R	10.000	0.3120	42	Flange	0.00	857
					Total Shaft Weight:		**17,108**

	Bottom						Top						
Sec. No.	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Dia (in)**	**Elev (ft)**	**Area (sqin)**	**Ix (in^4)**	**W/t Ratio**	**D/t Ratio**	**Taper**
1	49.39	0.00	58.34	17707.72	21.81	131.71	37.99	53.25	44.77	8003.18	16.45	101.3	0.214083
2	39.69	48.25	39.05	7648.75	20.98	126.99	28.23	101.75	27.69	2727.23	14.52	90.34	0.214083
3	29.53	98.00	23.24	2517.77	19.42	118.14	27.18	109.00	21.37	1957.91	17.76	108.7	0.214083
4	26.00	109.0	25.18	2078.44	0.00	83.33	26.00	119.00	25.18	2078.44	0.00	83.33	0.000000

Load Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 6

Discrete Appurtenances

				No Ice			Ice				
No.	**Elev (ft)**	**Description**	**Qty**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Weight (lb)**	**CaAa (sf)**	**CaAa Factor**	**Hor. Ecc. (ft)**	**Vert Ecc (ft)**
1	118.0	1900 MHz RRH	3	60.00	2.77	0.67	141.46	4.008	0.67	0.00	0.00
2	118.0	800 MHz RRH	6	53.00	2.49	0.67	125.21	3.607	0.67	0.00	0.00
3	118.0	AAHC	3	103.70	4.21	0.75	206.82	5.002	0.75	0.00	0.00
4	118.0	LP Platform w/ Handrail	1	2448.72	46.00	1.00	4952.05	79.23	1.00	0.00	0.00
5	118.0	NNVV-65B-R4	3	84.70	12.27	0.74	389.78	13.69	0.74	0.00	0.00
6	118.0	TD-RRH8x20-25	3	70.00	4.05	0.67	93.85	4.326	0.67	0.00	0.00
7	118.0	VHLP2.5-11	2	48.00	8.43	1.00	218.01	10.09	1.00	0.50	0.00
8	99.00	APX16DWV-16DWVS-E-ACU	3	40.70	6.08	0.65	121.73	8.059	0.66	0.00	0.00
9	99.00	Ericsson Air 32	4	132.20	6.51	0.86	307.75	7.641	0.87	0.00	0.00
10	99.00	Ericsson KRY 112 144/2	3	11.00	0.41	0.75	21.34	0.866	0.75	0.00	0.00
11	99.00	Ericsson KRY 112 489/2	3	15.40	0.65	0.75	32.30	1.237	0.75	0.00	0.00
12	99.00	Ericsson Radio 4449 B71 + B12	3	41.90	2.06	0.75	91.00	3.045	0.75	0.00	0.00
13	99.00	Platform SitePro RMQP-4096-HK	1	2448.72	34.54	1.00	4498.52	61.14	1.00	0.00	0.00
14	99.00	RFS APXVAARR24_43-U-NA20	3	59.40	13.04	0.75	278.26	16.32	0.75	0.00	0.00
15	87.00	1900 MHz 4X45 RRH	3	59.50	2.71	0.99	135.34	3.907	0.99	0.00	0.00
16	87.00	BXA-80063/4CF	3	9.90	4.72	0.72	105.07	6.471	0.72	0.00	0.00
17	87.00	DB-T1-6Z-8AB-0Z	2	44.00	4.80	0.85	178.82	5.624	0.86	0.00	0.00
18	87.00	Low Profile Platform	1	1500.00	22.00	1.00	2739.52	38.72	1.00	0.00	0.00
19	87.00	RRH2X60-700	3	60.00	3.50	0.73	142.66	4.247	0.74	0.00	0.00
20	87.00	RRH2X60-PCS	3	55.00	2.20	0.89	134.05	2.799	0.90	0.00	0.00
21	87.00	SBNHH-1D65B	9	40.00	8.16	0.82	230.41	9.386	0.82	0.00	0.00
22	77.00	APXV18-206517S-C	3	26.40	5.17	0.74	113.26	7.392	0.76	0.00	0.00
		Totals:	**68**	**9,881.04**			**23,060.53**				

Linear Appurtenances

Bottom Elev. (ft)	**Top Elev. (ft)**	**Description**	**Exposed Width**	**Exposed**
0.00	118.0	(3) 1-1/4" Fiber	0.00	Inside
0.00	118.0	(1) 1.689" Fiber	0.00	Inside
0.00	118.0	(2) 1/2" Coax	0.00	Inside
0.00	99.00	(12) 1 5/8" Coax	0.00	Inside
0.00	99.00	(2) 1-1/4" Hybrid	0.00	Inside
0.00	87.00	(18) 1 5/8" Coax	0.00	Inside
0.00	87.00	(2) 1 5/8" Hybrid	0.00	Inside
0.00	77.00	(6) 1 5/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 7

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.3750	49.390	58.338	17707.7	21.81	131.71	75.7	706.2	0.0
5.00		0.3750	48.320	57.064	16572.7	21.31	128.85	76.3	675.5	981.7
10.00		0.3750	47.249	55.790	15487.3	20.81	126.00	76.9	645.6	960.0
15.00		0.3750	46.179	54.516	14450.4	20.30	123.14	77.5	616.3	938.4
20.00		0.3750	45.108	53.242	13460.8	19.80	120.29	78.1	587.8	916.7
25.00		0.3750	44.038	51.968	12517.4	19.30	117.43	78.7	559.8	895.0
30.00		0.3750	42.968	50.694	11619.2	18.79	114.58	79.3	532.6	873.3
35.00		0.3750	41.897	49.420	10765.0	18.29	111.73	79.9	506.1	851.7
40.00		0.3750	40.827	48.146	9953.7	17.79	108.87	80.5	480.2	830.0
45.00		0.3750	39.756	46.872	9184.3	17.28	106.02	81.1	455.0	808.3
48.25	Bot - Section 2	0.3750	39.061	46.044	8706.0	16.96	104.16	81.5	439.0	513.8
50.00		0.3750	38.686	45.598	8455.5	16.78	103.16	81.7	430.5	504.3
53.25	Top - Section 1	0.3125	38.615	37.990	7041.7	20.38	123.57	0.0	0.0	923.6
55.00		0.3125	38.240	37.618	6837.1	20.17	122.37	77.7	352.2	225.1
60.00		0.3125	37.170	36.557	6274.4	19.56	118.94	78.4	332.5	631.0
65.00		0.3125	36.100	35.495	5743.5	18.96	115.52	79.1	313.4	612.9
70.00		0.3125	35.029	34.433	5243.4	18.35	112.09	79.8	294.8	594.9
75.00		0.3125	33.959	33.372	4773.2	17.75	108.67	80.5	276.8	576.8
77.00		0.3125	33.531	32.947	4593.3	17.51	107.30	80.8	269.8	225.7
80.00		0.3125	32.888	32.310	4332.0	17.15	105.24	81.2	259.4	333.1
85.00		0.3125	31.818	31.248	3918.8	16.54	101.82	81.9	242.6	540.7
87.00		0.3125	31.390	30.824	3761.2	16.30	100.45	82.2	236.0	211.2
90.00		0.3125	30.748	30.187	3532.8	15.94	98.39	82.5	226.3	311.4
95.00		0.3125	29.677	29.125	3173.0	15.33	94.97	82.5	210.6	504.6
98.00	Bot - Section 3	0.3125	29.035	28.488	2969.3	14.97	92.91	82.5	201.4	294.1
99.00		0.3125	28.821	28.276	2903.4	14.85	92.23	82.5	198.4	175.4
100.00		0.3125	28.607	28.063	2838.5	14.73	91.54	82.5	195.4	174.1
101.75	Top - Section 2	0.2500	28.732	22.600	2316.3	18.85	114.93	0.0	0.0	301.5
105.00		0.2500	28.036	22.048	2150.7	18.36	112.15	79.8	151.1	246.9
109.00	Top - Section 3	0.0000	0.000	0.000	0.0	NAN	NAN	80.5	141.9	295.5
109.00	Bot - Section 4	0.2500	27.180	21.368	1957.9	17.76	108.72	80.5	141.9	
110.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	85.7
115.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	428.4
118.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	257.0
119.00		0.3120	26.000	25.179	2078.4	0.00	83.33	41.2	159.9	85.7
										17108.3

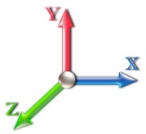
Wind Loading - Shaft

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Load Case: 1.2D + 1.6W 9 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	373.76	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	365.66	0.650	0.000	5.00	20.670	13.44	459.9	0.0	1178.1
10.00		1.00	0.85	19.450	21.40	357.55	0.650	0.000	5.00	20.217	13.14	449.9	0.0	1152.1
15.00		1.00	0.85	19.450	21.40	349.45	0.650	0.000	5.00	19.764	12.85	439.8	0.0	1126.0
20.00		1.00	0.90	20.638	22.70	351.62	0.650	0.000	5.00	19.312	12.55	455.9	0.0	1100.0
25.00		1.00	0.95	21.630	23.79	351.43	0.650	0.000	5.00	18.859	12.26	466.7	0.0	1074.0
30.00		1.00	0.98	22.477	24.72	349.54	0.650	0.000	5.00	18.406	11.96	473.3	0.0	1048.0
35.00		1.00	1.01	23.218	25.54	346.40	0.650	0.000	5.00	17.953	11.67	476.9	0.0	1022.0
40.00		1.00	1.04	23.880	26.27	342.33	0.650	0.000	5.00	17.500	11.37	478.1	0.0	996.0
45.00		1.00	1.07	24.479	26.93	337.51	0.650	0.000	5.00	17.047	11.08	477.4	0.0	970.0
48.25	Bot - Section 2	1.00	1.09	24.841	27.33	334.05	0.650	0.000	3.25	10.838	7.04	308.0	0.0	616.5
50.00		1.00	1.09	25.029	27.53	332.09	0.650	0.000	1.75	5.849	3.80	167.5	0.0	605.2
53.25	Top - Section 1	1.00	1.11	25.363	27.90	328.29	0.650	0.000	3.25	10.715	6.96	310.9	0.0	1108.4
55.00		1.00	1.12	25.536	28.09	331.58	0.650	0.000	1.75	5.691	3.70	166.2	0.0	270.1
60.00		1.00	1.14	26.008	28.61	325.26	0.650	0.000	5.00	15.953	10.37	474.6	0.0	757.2
65.00		1.00	1.16	26.450	29.09	318.57	0.650	0.000	5.00	15.500	10.07	469.0	0.0	735.5
70.00		1.00	1.17	26.866	29.55	311.54	0.650	0.000	5.00	15.047	9.78	462.5	0.0	713.9
75.00		1.00	1.19	27.259	29.98	304.22	0.650	0.000	5.00	14.594	9.49	455.1	0.0	692.2
77.00	Appurtenance(s)	1.00	1.20	27.410	30.15	301.22	0.650	0.000	2.00	5.711	3.71	179.1	0.0	270.8
80.00		1.00	1.21	27.632	30.39	296.64	0.650	0.000	3.00	8.430	5.48	266.5	0.0	399.7
85.00		1.00	1.22	27.987	30.79	288.82	0.650	0.000	5.00	13.688	8.90	438.3	0.0	648.8
87.00	Appurtenance(s)	1.00	1.23	28.124	30.94	285.64	0.650	0.000	2.00	5.349	3.48	172.1	0.0	253.5
90.00		1.00	1.24	28.325	31.16	280.79	0.650	0.000	3.00	7.887	5.13	255.6	0.0	373.7
95.00		1.00	1.25	28.650	31.51	272.56	0.650	0.000	5.00	12.783	8.31	419.0	0.0	605.5
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	267.54	0.650	0.000	3.00	7.452	4.84	245.9	0.0	352.9
99.00	Appurtenance(s)	1.00	1.26	28.900	31.79	265.85	0.650	0.000	1.00	2.490	1.62	82.3	0.0	210.4
100.00		1.00	1.27	28.961	31.86	264.16	0.650	0.000	1.00	2.472	1.61	81.9	0.0	208.9
101.75	Top - Section 2	1.00	1.27	29.067	31.97	261.17	0.650	0.000	1.75	4.282	2.78	142.4	0.0	361.8
105.00		1.00	1.28	29.260	32.19	260.22	0.650	0.000	3.25	7.806	5.07	261.3	0.0	296.3
109.00	Top - Section 3	1.00	1.29	29.491	32.44	253.27	0.650	0.000	4.00	9.345	6.07	315.3	0.0	354.6
110.00		1.00	1.29	29.548	32.50	238.82	0.600	0.000	1.00	2.167	1.30	67.6	0.0	102.8
115.00		1.00	1.30	29.826	32.81	239.94	0.600	0.000	5.00	10.833	6.50	341.2	0.0	514.1
118.00	Appurtenance(s)	1.00	1.31	29.988	32.99	240.59	0.600	0.000	3.00	6.500	3.90	205.8	0.0	308.4
119.00		1.00	1.31	30.041	33.05	240.81	0.600	0.000	1.00	2.167	1.30	68.7	0.0	102.8
								Totals:	**119.00**			**10,534.5**		**20,530.0**

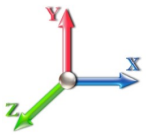
Discrete Appurtenance Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Load Case: 1.2D + 1.6W 9 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	AAHC	3	29.988	32.986	0.68	0.90	8.53	373.32	0.000	0.000	449.95	0.00	0.00
2	118.00	1900 MHz RRH	3	29.988	32.986	0.60	0.90	5.01	216.00	0.000	0.000	264.47	0.00	0.00
3	118.00	800 MHz RRH	6	29.988	32.986	0.60	0.90	9.01	381.60	0.000	0.000	475.47	0.00	0.00
4	118.00	VHLP2.5-11	2	29.988	32.986	1.00	1.00	16.86	115.20	1.583	0.000	889.84	880.57	0.00
5	118.00	LP Platform w/ Handrail	1	29.988	32.986	1.00	1.00	46.00	2938.46	0.000	0.000	2427.80	0.00	0.00
6	118.00	NNVV-65B-R4	3	29.988	32.986	0.67	0.90	24.52	304.92	0.000	0.000	1293.89	0.00	0.00
7	118.00	TD-RRH8x20-25	3	29.988	32.986	0.60	0.90	7.33	252.00	0.000	0.000	386.68	0.00	0.00
8	99.00	RFS	3	28.900	31.790	0.60	0.80	23.47	213.84	0.000	0.000	1193.86	0.00	0.00
9	99.00	Platform SitePro	1	28.900	31.790	1.00	1.00	34.54	2938.46	0.000	0.000	1756.82	0.00	0.00
10	99.00	Ericsson Radio 4449 B71	3	28.900	31.790	0.60	0.80	3.71	150.84	0.000	0.000	188.60	0.00	0.00
11	99.00	Ericsson KRY 112 489/2	3	28.900	31.790	0.60	0.80	1.17	55.44	0.000	0.000	59.51	0.00	0.00
12	99.00	Ericsson KRY 112 144/2	3	28.900	31.790	0.60	0.80	0.74	39.60	0.000	0.000	37.54	0.00	0.00
13	99.00	Ericsson Air 32	4	28.900	31.790	0.69	0.80	17.98	634.56	0.000	0.000	914.42	0.00	0.00
14	99.00	APX16DWV-16DWVS-E-	3	28.900	31.790	0.52	0.80	9.47	146.52	0.000	0.000	481.69	0.00	0.00
15	87.00	SBNHH-1D65B	9	28.124	30.936	0.66	0.80	48.24	432.00	0.000	0.000	2387.57	0.00	0.00
16	87.00	RRH2X60-PCS	3	28.124	30.936	0.71	0.80	4.71	198.00	0.000	0.000	233.12	0.00	0.00
17	87.00	RRH2X60-700	3	28.124	30.936	0.58	0.80	6.12	216.00	0.000	0.000	303.11	0.00	0.00
18	87.00	Low Profile Platform	1	28.124	30.936	1.00	1.00	22.00	1800.00	0.000	0.000	1088.96	0.00	0.00
19	87.00	DB-T1-6Z-8AB-0Z	2	28.124	30.936	0.68	0.80	6.56	105.60	0.000	0.000	324.65	0.00	0.00
20	87.00	BXA-80063/4CF	3	28.124	30.936	0.65	0.90	9.15	35.64	0.000	0.000	452.92	0.00	0.00
21	87.00	1900 MHz 4X45 RRH	3	28.124	30.936	0.79	0.80	6.42	214.20	0.000	0.000	317.75	0.00	0.00
22	77.00	APXV18-206517S-C	3	27.410	30.151	0.59	0.80	9.18	95.04	0.000	0.000	442.95	0.00	0.00
							Totals:		**11,857.25**			**16,371.56**		

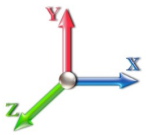
Total Applied Force Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Load Case: 1.2D + 1.6W 9 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		459.94	1452.44	0.00	0.00
10.00		449.86	1426.43	0.00	0.00
15.00		439.78	1400.42	0.00	0.00
20.00		455.93	1374.41	0.00	0.00
25.00		466.66	1348.40	0.00	0.00
30.00		473.27	1322.39	0.00	0.00
35.00		476.85	1296.38	0.00	0.00
40.00		478.08	1270.36	0.00	0.00
45.00		477.40	1244.35	0.00	0.00
48.25		307.99	794.88	0.00	0.00
50.00		167.47	701.19	0.00	0.00
53.25		310.90	1286.71	0.00	0.00
55.00		166.24	366.18	0.00	0.00
60.00		474.65	1031.59	0.00	0.00
65.00		469.01	1009.91	0.00	0.00
70.00		462.46	988.23	0.00	0.00
75.00		455.11	966.56	0.00	0.00
77.00	(3) attachments	622.03	475.59	0.00	0.00
80.00		266.49	541.86	0.00	0.00
85.00		438.26	885.77	0.00	0.00
87.00	(24) attachments	5280.16	3349.68	0.00	0.00
90.00		255.57	440.54	0.00	0.00
95.00		418.96	716.89	0.00	0.00
98.00		245.85	419.73	0.00	0.00
99.00	(20) attachments	4714.76	4411.98	0.00	0.00
100.00		81.90	213.89	0.00	0.00
101.75		142.40	370.55	0.00	0.00
105.00		261.29	312.56	0.00	0.00
109.00		315.27	374.64	0.00	0.00
110.00		67.61	107.83	0.00	0.00
115.00		341.20	539.16	0.00	0.00
118.00	(21) attachments	6393.93	4905.00	880.57	0.00
119.00		68.73	102.81	0.00	0.00
	Totals:	**26,906.01**	**37,449.30**	**880.57**	**0.00**

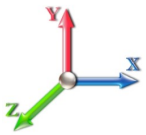
Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Load Case: 1.2D + 1.6W 9 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-37.40	-26.97	-0.87	-2362.0	-0.01	2362.00	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.598
5.00	-35.87	-26.62	-0.87	-2227.1	-0.01	2227.16	3920.48	1960.24	7723.84	3867.66	0.10	-0.184	0.000	0.585
10.00	-34.36	-26.28	-0.87	-2094.0	-0.01	2094.06	3862.67	1931.34	7438.74	3724.90	0.39	-0.370	0.000	0.571
15.00	-32.88	-25.93	-0.87	-1962.6	-0.01	1962.68	3803.51	1901.75	7156.21	3583.42	0.88	-0.556	0.000	0.557
20.00	-31.42	-25.56	-0.87	-1833.0	-0.01	1833.02	3742.99	1871.49	6876.43	3443.32	1.56	-0.743	0.000	0.541
25.00	-30.00	-25.17	-0.87	-1705.2	-0.01	1705.21	3681.11	1840.56	6599.58	3304.69	2.44	-0.930	0.000	0.524
30.00	-28.61	-24.77	-0.87	-1579.3	-0.01	1579.34	3617.88	1808.94	6325.84	3167.62	3.52	-1.117	-0.001	0.507
35.00	-27.24	-24.36	-0.87	-1455.4	-0.01	1455.48	3553.28	1776.64	6055.40	3032.20	4.79	-1.302	-0.001	0.488
40.00	-25.91	-23.93	-0.87	-1333.7	-0.01	1333.71	3487.33	1743.67	5788.43	2898.52	6.25	-1.487	-0.001	0.468
45.00	-24.62	-23.48	-0.88	-1214.0	-0.01	1214.07	3420.03	1710.01	5525.12	2766.66	7.91	-1.669	-0.001	0.446
48.25	-23.79	-23.19	-0.88	-1137.7	-0.01	1137.75	3375.55	1687.77	5356.01	2681.98	9.08	-1.787	-0.001	0.431
50.00	-23.06	-23.03	-0.88	-1097.1	-0.02	1097.17	3351.36	1675.68	5265.64	2636.73	9.75	-1.851	-0.001	0.423
53.25	-21.75	-22.71	-0.88	-1022.3	-0.02	1022.31	2647.50	1323.75	4165.57	2085.88	11.05	-1.967	-0.001	0.499
55.00	-21.34	-22.58	-0.88	-982.56	-0.02	982.56	2630.02	1315.01	4097.26	2051.68	11.78	-2.029	-0.001	0.487
60.00	-20.25	-22.14	-0.88	-869.64	-0.02	869.64	2579.17	1289.59	3903.72	1954.76	14.01	-2.222	-0.001	0.453
65.00	-19.20	-21.69	-0.88	-758.95	-0.02	758.95	2526.96	1263.48	3712.68	1859.10	16.44	-2.406	-0.002	0.416
70.00	-18.17	-21.24	-0.88	-650.51	-0.03	650.51	2473.39	1236.70	3524.34	1764.79	19.06	-2.581	-0.002	0.376
75.00	-17.18	-20.77	-0.88	-544.32	-0.03	544.32	2418.47	1209.23	3338.88	1671.92	21.85	-2.743	-0.002	0.333
77.00	-16.71	-20.15	-0.88	-502.78	-0.03	502.78	2396.12	1198.06	3265.54	1635.20	23.01	-2.805	-0.002	0.315
80.00	-16.14	-19.89	-0.88	-442.34	-0.03	442.34	2362.18	1181.09	3156.47	1580.58	24.80	-2.893	-0.002	0.287
85.00	-15.25	-19.43	-0.88	-342.90	-0.03	342.90	2304.54	1152.27	2977.30	1490.86	27.90	-3.022	-0.003	0.237
87.00	-12.18	-13.99	-0.88	-304.05	-0.04	304.05	2281.10	1140.55	2906.58	1455.45	29.18	-3.069	-0.003	0.214
90.00	-11.73	-13.72	-0.88	-262.09	-0.04	262.09	2242.72	1121.36	2798.02	1401.09	31.13	-3.133	-0.003	0.192
95.00	-11.02	-13.28	-0.88	-193.47	-0.04	193.47	2163.84	1081.92	2603.70	1303.79	34.46	-3.225	-0.003	0.154
98.00	-10.61	-13.02	-0.88	-153.63	-0.04	153.63	2116.52	1058.26	2490.47	1247.09	36.50	-3.272	-0.003	0.128
99.00	-6.47	-8.06	-0.88	-140.62	-0.04	140.62	2100.74	1050.37	2453.28	1228.47	37.19	-3.286	-0.004	0.118
100.00	-6.26	-7.97	-0.88	-132.56	-0.04	132.56	2084.97	1042.48	2416.38	1209.99	37.88	-3.299	-0.004	0.113
101.75	-5.90	-7.80	-0.88	-118.62	-0.04	118.62	1611.41	805.70	1884.17	943.49	39.09	-3.321	-0.004	0.129
105.00	-5.60	-7.53	-0.88	-93.26	-0.05	93.26	1583.50	791.75	1805.91	904.30	41.37	-3.357	-0.004	0.107
109.00	-5.24	-7.20	-0.88	-63.14	-0.05	63.14	0.00	0.00	0.00	0.00	44.20	-3.399	-0.005	0.077
109.00	-5.24	-7.20	-0.88	-63.14	-0.05	63.14	0.00	0.00	0.00	0.00	44.20	-3.399	-0.005	0.113
110.00	-5.13	-7.12	-0.88	-55.94	-0.05	55.94	933.38	466.69	986.46	590.00	44.91	-3.407	-0.005	0.101
115.00	-4.61	-6.75	-0.88	-20.33	-0.05	20.33	933.38	466.69	986.46	590.00	48.49	-3.433	-0.005	0.040
118.00	-0.10	-0.07	0.00	-0.07	0.00	0.07	933.38	466.69	986.46	590.00	50.65	-3.438	-0.006	0.000
119.00	0.00	-0.07	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00	51.37	-3.438	-0.006	0.000

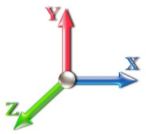
Wind Loading - Shaft

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Load Case: 0.9D + 1.6W 9 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	373.76	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	365.66	0.650	0.000	5.00	20.670	13.44	459.9	0.0	883.5
10.00		1.00	0.85	19.450	21.40	357.55	0.650	0.000	5.00	20.217	13.14	449.9	0.0	864.0
15.00		1.00	0.85	19.450	21.40	349.45	0.650	0.000	5.00	19.764	12.85	439.8	0.0	844.5
20.00		1.00	0.90	20.638	22.70	351.62	0.650	0.000	5.00	19.312	12.55	455.9	0.0	825.0
25.00		1.00	0.95	21.630	23.79	351.43	0.650	0.000	5.00	18.859	12.26	466.7	0.0	805.5
30.00		1.00	0.98	22.477	24.72	349.54	0.650	0.000	5.00	18.406	11.96	473.3	0.0	786.0
35.00		1.00	1.01	23.218	25.54	346.40	0.650	0.000	5.00	17.953	11.67	476.9	0.0	766.5
40.00		1.00	1.04	23.880	26.27	342.33	0.650	0.000	5.00	17.500	11.37	478.1	0.0	747.0
45.00		1.00	1.07	24.479	26.93	337.51	0.650	0.000	5.00	17.047	11.08	477.4	0.0	727.5
48.25	Bot - Section 2	1.00	1.09	24.841	27.33	334.05	0.650	0.000	3.25	10.838	7.04	308.0	0.0	462.4
50.00		1.00	1.09	25.029	27.53	332.09	0.650	0.000	1.75	5.849	3.80	167.5	0.0	453.9
53.25	Top - Section 1	1.00	1.11	25.363	27.90	328.29	0.650	0.000	3.25	10.715	6.96	310.9	0.0	831.3
55.00		1.00	1.12	25.536	28.09	331.58	0.650	0.000	1.75	5.691	3.70	166.2	0.0	202.6
60.00		1.00	1.14	26.008	28.61	325.26	0.650	0.000	5.00	15.953	10.37	474.6	0.0	567.9
65.00		1.00	1.16	26.450	29.09	318.57	0.650	0.000	5.00	15.500	10.07	469.0	0.0	551.6
70.00		1.00	1.17	26.866	29.55	311.54	0.650	0.000	5.00	15.047	9.78	462.5	0.0	535.4
75.00		1.00	1.19	27.259	29.98	304.22	0.650	0.000	5.00	14.594	9.49	455.1	0.0	519.1
77.00	Appurtenance(s)	1.00	1.20	27.410	30.15	301.22	0.650	0.000	2.00	5.711	3.71	179.1	0.0	203.1
80.00		1.00	1.21	27.632	30.39	296.64	0.650	0.000	3.00	8.430	5.48	266.5	0.0	299.8
85.00		1.00	1.22	27.987	30.79	288.82	0.650	0.000	5.00	13.688	8.90	438.3	0.0	486.6
87.00	Appurtenance(s)	1.00	1.23	28.124	30.94	285.64	0.650	0.000	2.00	5.349	3.48	172.1	0.0	190.1
90.00		1.00	1.24	28.325	31.16	280.79	0.650	0.000	3.00	7.887	5.13	255.6	0.0	280.3
95.00		1.00	1.25	28.650	31.51	272.56	0.650	0.000	5.00	12.783	8.31	419.0	0.0	454.1
98.00	Bot - Section 3	1.00	1.26	28.838	31.72	267.54	0.650	0.000	3.00	7.452	4.84	245.9	0.0	264.7
99.00	Appurtenance(s)	1.00	1.26	28.900	31.79	265.85	0.650	0.000	1.00	2.490	1.62	82.3	0.0	157.8
100.00		1.00	1.27	28.961	31.86	264.16	0.650	0.000	1.00	2.472	1.61	81.9	0.0	156.7
101.75	Top - Section 2	1.00	1.27	29.067	31.97	261.17	0.650	0.000	1.75	4.282	2.78	142.4	0.0	271.3
105.00		1.00	1.28	29.260	32.19	260.22	0.650	0.000	3.25	7.806	5.07	261.3	0.0	222.2
109.00	Top - Section 3	1.00	1.29	29.491	32.44	253.27	0.650	0.000	4.00	9.345	6.07	315.3	0.0	265.9
110.00		1.00	1.29	29.548	32.50	238.82	0.600	0.000	1.00	2.167	1.30	67.6	0.0	77.1
115.00		1.00	1.30	29.826	32.81	239.94	0.600	0.000	5.00	10.833	6.50	341.2	0.0	385.6
118.00	Appurtenance(s)	1.00	1.31	29.988	32.99	240.59	0.600	0.000	3.00	6.500	3.90	205.8	0.0	231.3
119.00		1.00	1.31	30.041	33.05	240.81	0.600	0.000	1.00	2.167	1.30	68.7	0.0	77.1
								Totals:	**119.00**			**10,534.5**		**15,397.5**

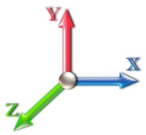
Discrete Appurtenance Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Load Case: 0.9D + 1.6W 9 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	AAHC	3	29.988	32.986	0.68	0.90	8.53	279.99	0.000	0.000	449.95	0.00	0.00
2	118.00	1900 MHz RRH	3	29.988	32.986	0.60	0.90	5.01	162.00	0.000	0.000	264.47	0.00	0.00
3	118.00	800 MHz RRH	6	29.988	32.986	0.60	0.90	9.01	286.20	0.000	0.000	475.47	0.00	0.00
4	118.00	VHLP2.5-11	2	29.988	32.986	1.00	1.00	16.86	86.40	1.583	0.000	889.84	880.57	0.00
5	118.00	LP Platform w/ Handrail	1	29.988	32.986	1.00	1.00	46.00	2203.85	0.000	0.000	2427.80	0.00	0.00
6	118.00	NNVV-65B-R4	3	29.988	32.986	0.67	0.90	24.52	228.69	0.000	0.000	1293.89	0.00	0.00
7	118.00	TD-RRH8x20-25	3	29.988	32.986	0.60	0.90	7.33	189.00	0.000	0.000	386.68	0.00	0.00
8	99.00	RFS	3	28.900	31.790	0.60	0.80	23.47	160.38	0.000	0.000	1193.86	0.00	0.00
9	99.00	Platform SitePro	1	28.900	31.790	1.00	1.00	34.54	2203.85	0.000	0.000	1756.82	0.00	0.00
10	99.00	Ericsson Radio 4449 B71	3	28.900	31.790	0.60	0.80	3.71	113.13	0.000	0.000	188.60	0.00	0.00
11	99.00	Ericsson KRY 112 489/2	3	28.900	31.790	0.60	0.80	1.17	41.58	0.000	0.000	59.51	0.00	0.00
12	99.00	Ericsson KRY 112 144/2	3	28.900	31.790	0.60	0.80	0.74	29.70	0.000	0.000	37.54	0.00	0.00
13	99.00	Ericsson Air 32	4	28.900	31.790	0.69	0.80	17.98	475.92	0.000	0.000	914.42	0.00	0.00
14	99.00	APX16DWV-16DWVS-E-	3	28.900	31.790	0.52	0.80	9.47	109.89	0.000	0.000	481.69	0.00	0.00
15	87.00	SBNHH-1D65B	9	28.124	30.936	0.66	0.80	48.24	324.00	0.000	0.000	2387.57	0.00	0.00
16	87.00	RRH2X60-PCS	3	28.124	30.936	0.71	0.80	4.71	148.50	0.000	0.000	233.12	0.00	0.00
17	87.00	RRH2X60-700	3	28.124	30.936	0.58	0.80	6.12	162.00	0.000	0.000	303.11	0.00	0.00
18	87.00	Low Profile Platform	1	28.124	30.936	1.00	1.00	22.00	1350.00	0.000	0.000	1088.96	0.00	0.00
19	87.00	DB-T1-6Z-8AB-0Z	2	28.124	30.936	0.68	0.80	6.56	79.20	0.000	0.000	324.65	0.00	0.00
20	87.00	BXA-80063/4CF	3	28.124	30.936	0.65	0.90	9.15	26.73	0.000	0.000	452.92	0.00	0.00
21	87.00	1900 MHz 4X45 RRH	3	28.124	30.936	0.79	0.80	6.42	160.65	0.000	0.000	317.75	0.00	0.00
22	77.00	APXV18-206517S-C	3	27.410	30.151	0.59	0.80	9.18	71.28	0.000	0.000	442.95	0.00	0.00
							Totals:		**8,892.94**			**16,371.56**		

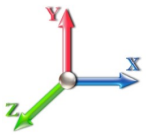
Total Applied Force Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 14

Load Case: 0.9D + 1.6W 9 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		459.94	1089.33	0.00	0.00
10.00		449.86	1069.82	0.00	0.00
15.00		439.78	1050.31	0.00	0.00
20.00		455.93	1030.81	0.00	0.00
25.00		466.66	1011.30	0.00	0.00
30.00		473.27	991.79	0.00	0.00
35.00		476.85	972.28	0.00	0.00
40.00		478.08	952.77	0.00	0.00
45.00		477.40	933.26	0.00	0.00
48.25		307.99	596.16	0.00	0.00
50.00		167.47	525.89	0.00	0.00
53.25		310.90	965.03	0.00	0.00
55.00		166.24	274.63	0.00	0.00
60.00		474.65	773.69	0.00	0.00
65.00		469.01	757.43	0.00	0.00
70.00		462.46	741.18	0.00	0.00
75.00		455.11	724.92	0.00	0.00
77.00	(3) attachments	622.03	356.70	0.00	0.00
80.00		266.49	406.40	0.00	0.00
85.00		438.26	664.32	0.00	0.00
87.00	(24) attachments	5280.16	2512.26	0.00	0.00
90.00		255.57	330.41	0.00	0.00
95.00		418.96	537.67	0.00	0.00
98.00		245.85	314.80	0.00	0.00
99.00	(20) attachments	4714.76	3308.98	0.00	0.00
100.00		81.90	160.42	0.00	0.00
101.75		142.40	277.91	0.00	0.00
105.00		261.29	234.42	0.00	0.00
109.00		315.27	280.98	0.00	0.00
110.00		67.61	80.87	0.00	0.00
115.00		341.20	404.37	0.00	0.00
118.00	(21) attachments	6393.93	3678.75	880.57	0.00
119.00		68.73	77.11	0.00	0.00
	Totals:	**26,906.01**	**28,086.98**	**880.57**	**0.00**

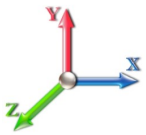
Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 15	

Load Case: 0.9D + 1.6W 9 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.04	-26.95	-0.87	-2344.0	-0.01	2344.01	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.592
5.00	-26.87	-26.58	-0.87	-2209.2	-0.01	2209.25	3920.48	1960.24	7723.84	3867.66	0.10	-0.183	0.000	0.578
10.00	-25.72	-26.20	-0.87	-2076.3	-0.01	2076.37	3862.67	1931.34	7438.74	3724.90	0.39	-0.367	0.000	0.564
15.00	-24.59	-25.84	-0.87	-1945.3	-0.01	1945.36	3803.51	1901.75	7156.21	3583.42	0.87	-0.552	0.000	0.550
20.00	-23.48	-25.44	-0.87	-1816.1	-0.01	1816.18	3742.99	1871.49	6876.43	3443.32	1.55	-0.737	0.000	0.534
25.00	-22.39	-25.04	-0.87	-1688.9	-0.01	1688.96	3681.11	1840.56	6599.58	3304.69	2.42	-0.922	0.000	0.517
30.00	-21.33	-24.61	-0.87	-1563.7	-0.01	1563.79	3617.88	1808.94	6325.84	3167.62	3.49	-1.107	-0.001	0.500
35.00	-20.29	-24.18	-0.87	-1440.7	-0.01	1440.72	3553.28	1776.64	6055.40	3032.20	4.75	-1.291	-0.001	0.481
40.00	-19.28	-23.74	-0.88	-1319.8	-0.01	1319.82	3487.33	1743.67	5788.43	2898.52	6.20	-1.473	-0.001	0.461
45.00	-18.30	-23.29	-0.88	-1201.1	-0.01	1201.12	3420.03	1710.01	5525.12	2766.66	7.84	-1.653	-0.001	0.440
48.25	-17.67	-22.99	-0.88	-1125.4	-0.01	1125.44	3375.55	1687.77	5356.01	2681.98	9.00	-1.770	-0.001	0.425
50.00	-17.12	-22.83	-0.88	-1085.2	-0.01	1085.21	3351.36	1675.68	5265.64	2636.73	9.66	-1.833	-0.001	0.417
53.25	-16.13	-22.51	-0.88	-1011.0	-0.02	1011.01	2647.50	1323.75	4165.57	2085.88	10.95	-1.948	-0.001	0.491
55.00	-15.81	-22.37	-0.88	-971.61	-0.02	971.61	2630.02	1315.01	4097.26	2051.68	11.68	-2.010	-0.001	0.480
60.00	-14.98	-21.92	-0.88	-859.75	-0.02	859.75	2579.17	1289.59	3903.72	1954.76	13.89	-2.200	-0.001	0.446
65.00	-14.18	-21.46	-0.88	-750.16	-0.02	750.16	2526.96	1263.48	3712.68	1859.10	16.29	-2.383	-0.002	0.409
70.00	-13.40	-21.01	-0.88	-642.84	-0.02	642.84	2473.39	1236.70	3524.34	1764.79	18.88	-2.555	-0.002	0.370
75.00	-12.66	-20.54	-0.88	-537.80	-0.03	537.80	2418.47	1209.23	3338.88	1671.92	21.64	-2.715	-0.002	0.327
77.00	-12.30	-19.92	-0.88	-496.71	-0.03	496.71	2396.12	1198.06	3265.54	1635.20	22.80	-2.777	-0.002	0.309
80.00	-11.87	-19.66	-0.88	-436.95	-0.03	436.95	2362.18	1181.09	3156.47	1580.58	24.57	-2.864	-0.002	0.282
85.00	-11.20	-19.20	-0.88	-338.65	-0.03	338.65	2304.54	1152.27	2977.30	1490.86	27.64	-2.991	-0.003	0.232
87.00	-8.96	-13.81	-0.88	-300.25	-0.04	300.25	2281.10	1140.55	2906.58	1455.45	28.90	-3.038	-0.003	0.210
90.00	-8.62	-13.55	-0.88	-258.82	-0.04	258.82	2242.72	1121.36	2798.02	1401.09	30.83	-3.101	-0.003	0.189
95.00	-8.10	-13.11	-0.88	-191.09	-0.04	191.09	2163.84	1081.92	2603.70	1303.79	34.13	-3.192	-0.003	0.150
98.00	-7.79	-12.85	-0.88	-151.77	-0.04	151.77	2116.52	1058.26	2490.47	1247.09	36.15	-3.238	-0.003	0.126
99.00	-4.75	-7.96	-0.88	-138.92	-0.04	138.92	2100.74	1050.37	2453.28	1228.47	36.83	-3.252	-0.004	0.115
100.00	-4.59	-7.87	-0.88	-130.97	-0.04	130.97	2084.97	1042.48	2416.38	1209.99	37.51	-3.265	-0.004	0.111
101.75	-4.32	-7.71	-0.88	-117.20	-0.04	117.20	1611.41	805.70	1884.17	943.49	38.71	-3.287	-0.004	0.127
105.00	-4.10	-7.44	-0.88	-92.15	-0.05	92.15	1583.50	791.75	1805.91	904.30	40.96	-3.322	-0.004	0.105
109.00	-3.83	-7.11	-0.88	-62.39	-0.05	62.39	0.00	0.00	0.00	0.00	43.76	-3.363	-0.005	0.075
109.00	-3.83	-7.11	-0.88	-62.39	-0.05	62.39	0.00	0.00	0.00	0.00	43.76	-3.363	-0.005	0.110
110.00	-3.75	-7.04	-0.88	-55.28	-0.05	55.28	933.38	466.69	986.46	590.00	44.47	-3.372	-0.005	0.098
115.00	-3.37	-6.67	-0.88	-20.10	-0.05	20.10	933.38	466.69	986.46	590.00	48.01	-3.397	-0.005	0.038
118.00	-0.07	-0.07	0.00	-0.07	0.00	0.07	933.38	466.69	986.46	590.00	50.15	-3.401	-0.006	0.000
119.00	0.00	-0.07	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00	50.86	-3.401	-0.006	0.000

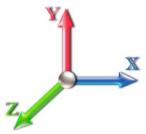
Wind Loading - Shaft

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	21.705	26.05	148.1	381.7	1559.8
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	21.327	25.59	145.5	401.0	1553.0
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	20.920	25.10	142.7	408.8	1534.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	20.500	24.60	148.4	411.6	1511.7
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	20.074	24.09	152.3	411.5	1485.5
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	19.644	23.57	154.9	409.5	1457.5
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	19.210	23.05	156.4	406.0	1428.0
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	18.774	22.53	157.2	401.5	1397.5
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	5.00	18.336	22.00	157.4	396.2	1366.2
48.25	Bot - Section 2	1.00	1.09	6.600	7.26	0.00	1.200	1.558	3.25	11.682	14.02	101.8	255.0	871.6
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	1.75	6.305	7.57	55.3	138.7	743.8
53.25	Top - Section 1	1.00	1.11	6.739	7.41	0.00	1.200	1.574	3.25	11.568	13.88	102.9	254.8	1363.2
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	1.75	6.151	7.38	55.1	136.4	406.5
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	17.280	20.74	157.6	382.6	1139.8
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	16.838	20.21	156.2	375.2	1110.7
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	16.395	19.67	154.5	367.4	1081.2
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	5.00	15.951	19.14	152.5	359.2	1051.4
77.00	Appurtenance(s)	1.00	1.20	7.283	8.01	0.00	1.200	1.633	2.00	6.255	7.51	60.1	142.3	413.1
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	3.00	9.250	11.10	89.6	210.4	610.1
85.00		1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	15.062	18.07	147.8	342.0	990.9
87.00	Appurtenance(s)	1.00	1.23	7.473	8.22	0.00	1.200	1.653	2.00	5.899	7.08	58.2	135.4	388.9
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	3.00	8.716	10.46	86.6	199.8	573.5
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	5.00	14.172	17.01	142.4	323.9	929.4
98.00	Bot - Section 3	1.00	1.26	7.662	8.43	0.00	1.200	1.672	3.00	8.288	9.95	83.8	191.0	543.9
99.00	Appurtenance(s)	1.00	1.26	7.679	8.45	0.00	1.200	1.674	1.00	2.769	3.32	28.1	64.3	274.8
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	1.00	2.751	3.30	27.9	63.9	272.8
101.75	Top - Section 2	1.00	1.27	7.723	8.50	0.00	1.200	1.679	1.75	4.772	5.73	48.6	110.7	472.5
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	3.25	8.718	10.46	89.5	201.6	497.9
109.00	Top - Section 3	1.00	1.29	7.836	8.62	0.00	1.200	1.690	4.00	10.472	12.57	108.3	242.0	596.5
110.00		1.00	1.29	7.851	8.64	0.00	1.200	1.692	1.00	2.449	2.94	25.4	57.2	160.1
115.00		1.00	1.30	7.925	8.72	0.00	1.200	1.699	5.00	12.250	14.70	128.1	287.6	801.6
118.00	Appurtenance(s)	1.00	1.31	7.968	8.76	0.00	1.200	1.704	3.00	7.352	8.82	77.3	173.0	481.4
119.00		1.00	1.31	7.982	8.78	0.00	1.200	1.705	1.00	2.451	2.94	25.8	57.7	160.5
								Totals:	**119.00**			**3,526.6**		**29,230.2**

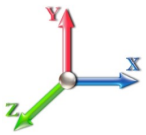
Discrete Appurtenance Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	AAHC	3	7.968	8.765	0.68	0.90	10.13	607.67	0.000	0.000	88.78	0.00	0.00
2	118.00	1900 MHz RRH	3	7.968	8.765	0.60	0.90	7.25	388.67	0.000	0.000	63.55	0.00	0.00
3	118.00	800 MHz RRH	6	7.968	8.765	0.60	0.90	13.05	688.24	0.000	0.000	114.37	0.00	0.00
4	118.00	VHLP2.5-11	2	7.968	8.765	1.00	1.00	20.19	357.23	1.583	0.000	176.98	280.21	0.00
5	118.00	LP Platform w/ Handrail	1	7.968	8.765	1.00	1.00	79.23	4490.52	0.000	0.000	694.43	0.00	0.00
6	118.00	NNVV-65B-R4	3	7.968	8.765	0.67	0.90	27.36	1044.67	0.000	0.000	239.76	0.00	0.00
7	118.00	TD-RRH8x20-25	3	7.968	8.765	0.60	0.90	7.83	257.56	0.000	0.000	68.59	0.00	0.00
8	99.00	RFS	3	7.679	8.447	0.60	0.80	29.38	674.53	0.000	0.000	248.18	0.00	0.00
9	99.00	Platform SitePro	1	7.679	8.447	1.00	1.00	61.14	5636.99	0.000	0.000	516.42	0.00	0.00
10	99.00	Ericsson Radio 4449 B71	3	7.679	8.447	0.60	0.80	5.48	254.05	0.000	0.000	46.30	0.00	0.00
11	99.00	Ericsson KRY 112 489/2	3	7.679	8.447	0.60	0.80	2.23	91.15	0.000	0.000	18.81	0.00	0.00
12	99.00	Ericsson KRY 112 144/2	3	7.679	8.447	0.60	0.80	1.56	61.33	0.000	0.000	13.16	0.00	0.00
13	99.00	Ericsson Air 32	4	7.679	8.447	0.70	0.80	21.25	1336.77	0.000	0.000	179.48	0.00	0.00
14	99.00	APX16DWV-16DWVS-E-	3	7.679	8.447	0.52	0.80	12.69	295.95	0.000	0.000	107.17	0.00	0.00
15	87.00	SBNHH-1D65B	9	7.473	8.220	0.66	0.80	55.62	2145.72	0.000	0.000	457.19	0.00	0.00
16	87.00	RRH2X60-PCS	3	7.473	8.220	0.72	0.80	6.03	435.15	0.000	0.000	49.54	0.00	0.00
17	87.00	RRH2X60-700	3	7.473	8.220	0.59	0.80	7.55	403.59	0.000	0.000	62.09	0.00	0.00
18	87.00	Low Profile Platform	1	7.473	8.220	1.00	1.00	38.73	2739.52	0.000	0.000	318.32	0.00	0.00
19	87.00	DB-T1-6Z-8AB-0Z	2	7.473	8.220	0.69	0.80	7.72	375.25	0.000	0.000	63.47	0.00	0.00
20	87.00	BXA-80063/4CF	3	7.473	8.220	0.65	0.90	12.67	245.20	0.000	0.000	104.11	0.00	0.00
21	87.00	1900 MHz 4X45 RRH	3	7.473	8.220	0.79	0.80	9.25	385.10	0.000	0.000	76.07	0.00	0.00
22	77.00	APXV18-206517S-C	3	7.283	8.011	0.61	0.80	13.48	275.81	0.000	0.000	108.01	0.00	0.00
							Totals:		**23,190.66**			**3,814.78**		

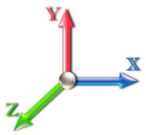
Total Applied Force Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 18

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		148.07	1834.13	0.00	0.00
10.00		145.49	1827.40	0.00	0.00
15.00		142.71	1809.25	0.00	0.00
20.00		148.39	1786.05	0.00	0.00
25.00		152.29	1759.92	0.00	0.00
30.00		154.86	1731.86	0.00	0.00
35.00		156.43	1702.41	0.00	0.00
40.00		157.24	1671.89	0.00	0.00
45.00		157.43	1640.54	0.00	0.00
48.25		101.78	1049.90	0.00	0.00
50.00		55.35	839.87	0.00	0.00
53.25		102.90	1541.53	0.00	0.00
55.00		55.09	502.56	0.00	0.00
60.00		157.62	1414.22	0.00	0.00
65.00		156.20	1385.09	0.00	0.00
70.00		154.48	1355.59	0.00	0.00
75.00		152.50	1325.75	0.00	0.00
77.00	(3) attachments	168.14	798.71	0.00	0.00
80.00		89.64	752.31	0.00	0.00
85.00		147.85	1227.80	0.00	0.00
87.00	(24) attachments	1188.98	7213.16	0.00	0.00
90.00		86.59	640.39	0.00	0.00
95.00		142.40	1040.80	0.00	0.00
98.00		83.83	610.71	0.00	0.00
99.00	(20) attachments	1157.59	8647.80	0.00	0.00
100.00		27.95	277.83	0.00	0.00
101.75		48.65	481.29	0.00	0.00
105.00		89.47	514.19	0.00	0.00
109.00		108.31	616.59	0.00	0.00
110.00		25.38	165.07	0.00	0.00
115.00		128.14	826.72	0.00	0.00
118.00	(21) attachments	1523.79	8331.05	280.21	0.00
119.00		25.82	160.53	0.00	0.00
	Totals:	**7,341.34**	**57,482.90**	**280.21**	**0.00**

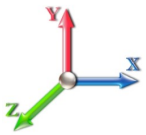
Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00

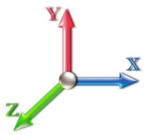


Iterations 20

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-57.48	-7.37	-0.28	-633.65	0.00	633.65	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.172
5.00	-55.64	-7.26	-0.28	-596.83	0.00	596.83	3920.48	1960.24	7723.84	3867.66	0.03	-0.049	0.000	0.169
10.00	-53.81	-7.16	-0.28	-560.50	0.00	560.50	3862.67	1931.34	7438.74	3724.90	0.11	-0.099	0.000	0.164
15.00	-51.99	-7.06	-0.28	-524.69	0.00	524.69	3803.51	1901.75	7156.21	3583.42	0.24	-0.149	0.000	0.160
20.00	-50.20	-6.95	-0.28	-489.38	0.00	489.38	3742.99	1871.49	6876.43	3443.32	0.42	-0.199	0.000	0.156
25.00	-48.43	-6.84	-0.28	-454.62	0.00	454.62	3681.11	1840.56	6599.58	3304.69	0.65	-0.249	0.000	0.151
30.00	-46.70	-6.71	-0.28	-420.44	0.00	420.44	3617.88	1808.94	6325.84	3167.62	0.94	-0.298	0.000	0.146
35.00	-44.99	-6.59	-0.28	-386.88	0.00	386.88	3553.28	1776.64	6055.40	3032.20	1.28	-0.348	0.000	0.140
40.00	-43.31	-6.45	-0.28	-353.96	0.00	353.96	3487.33	1743.67	5788.43	2898.52	1.67	-0.397	0.000	0.135
45.00	-41.67	-6.31	-0.28	-321.69	0.00	321.69	3420.03	1710.01	5525.12	2766.66	2.11	-0.445	0.000	0.128
48.25	-40.62	-6.22	-0.28	-301.17	0.00	301.17	3375.55	1687.77	5356.01	2681.98	2.43	-0.476	0.000	0.124
50.00	-39.78	-6.17	-0.28	-290.29	0.00	290.29	3351.36	1675.68	5265.64	2636.73	2.61	-0.493	0.000	0.122
53.25	-38.23	-6.07	-0.28	-270.23	0.00	270.23	2647.50	1323.75	4165.57	2085.88	2.95	-0.524	0.000	0.144
55.00	-37.73	-6.04	-0.28	-259.60	0.00	259.60	2630.02	1315.01	4097.26	2051.68	3.15	-0.540	0.000	0.141
60.00	-36.31	-5.90	-0.28	-229.42	0.00	229.42	2579.17	1289.59	3903.72	1954.76	3.74	-0.591	0.000	0.131
65.00	-34.92	-5.75	-0.28	-199.94	0.00	199.94	2526.96	1263.48	3712.68	1859.10	4.39	-0.640	0.000	0.121
70.00	-33.56	-5.61	-0.28	-171.18	0.00	171.18	2473.39	1236.70	3524.34	1764.79	5.08	-0.686	-0.001	0.111
75.00	-32.24	-5.46	-0.28	-143.13	0.00	143.13	2418.47	1209.23	3338.88	1671.92	5.82	-0.729	-0.001	0.099
77.00	-31.44	-5.29	-0.28	-132.22	0.00	132.22	2396.12	1198.06	3265.54	1635.20	6.13	-0.745	-0.001	0.094
80.00	-30.69	-5.21	-0.28	-116.35	0.00	116.35	2362.18	1181.09	3156.47	1580.58	6.61	-0.768	-0.001	0.087
85.00	-29.46	-5.05	-0.28	-90.32	0.00	90.32	2304.54	1152.27	2977.30	1490.86	7.43	-0.802	-0.001	0.073
87.00	-22.26	-3.77	-0.28	-80.22	0.00	80.22	2281.10	1140.55	2906.58	1455.45	7.77	-0.814	-0.001	0.065
90.00	-21.62	-3.68	-0.28	-68.92	0.00	68.92	2242.72	1121.36	2798.02	1401.09	8.29	-0.831	-0.001	0.059
95.00	-20.58	-3.53	-0.28	-50.52	0.00	50.52	2163.84	1081.92	2603.70	1303.79	9.17	-0.855	-0.001	0.048
98.00	-19.97	-3.44	-0.28	-39.93	0.00	39.93	2116.52	1058.26	2490.47	1247.09	9.72	-0.868	-0.001	0.041
99.00	-11.34	-2.15	-0.28	-36.50	0.00	36.50	2100.74	1050.37	2453.28	1228.47	9.90	-0.871	-0.001	0.035
100.00	-11.06	-2.12	-0.28	-34.35	0.00	34.35	2084.97	1042.48	2416.38	1209.99	10.08	-0.875	-0.001	0.034
101.75	-10.58	-2.06	-0.28	-30.64	0.00	30.64	1611.41	805.70	1884.17	943.49	10.40	-0.880	-0.001	0.039
105.00	-10.07	-1.97	-0.28	-23.93	0.00	23.93	1583.50	791.75	1805.91	904.30	11.00	-0.890	-0.001	0.033
109.00	-9.46	-1.85	-0.28	-16.06	0.00	16.06	0.00	0.00	0.00	0.00	11.76	-0.900	-0.001	0.025
109.00	-9.46	-1.85	-0.28	-16.06	0.00	16.06	0.00	0.00	0.00	0.00	11.76	-0.900	-0.001	0.037
110.00	-9.29	-1.82	-0.28	-14.20	0.00	14.20	933.38	466.69	986.46	590.00	11.94	-0.902	-0.001	0.034
115.00	-8.47	-1.68	-0.28	-5.08	0.00	5.08	933.38	466.69	986.46	590.00	12.89	-0.909	-0.002	0.018
118.00	-0.16	-0.03	0.00	-0.03	0.00	0.03	933.38	466.69	986.46	590.00	13.47	-0.910	-0.002	0.000
119.00	0.00	-0.03	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00	13.66	-0.910	-0.002	0.000

Seismic Segment Forces (Factored)

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

Load Case:	1.2D + 1.0E							**Iterations**	19
Gust Response Factor	1.10				**Sds**	0.13		**Ss**	0.19
Dead Load Factor	1.20	**Seismic Load Factor**	1.00		**Sd1**	0.04		**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency**	0.46		**SA**	0.02		**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		981.72	0.00	0.04	0.02	15.03	
10.00		960.04	0.01	0.06	0.03	19.81	
15.00		938.37	0.03	0.07	0.04	21.40	
20.00		916.69	0.05	0.07	0.04	21.85	
25.00		895.01	0.08	0.07	0.04	22.01	
30.00		873.34	0.12	0.07	0.03	22.15	
35.00		851.66	0.16	0.07	0.03	22.16	
40.00		829.99	0.21	0.06	0.02	21.66	
45.00		808.31	0.27	0.05	0.01	19.99	
48.25	Bot - Section 2	513.78	0.31	0.04	0.01	11.56	
50.00		504.30	0.33	0.04	0.01	10.44	
53.25	Top - Section 1	923.64	0.38	0.02	0.01	14.83	
55.00		225.12	0.40	0.02	0.01	2.89	
60.00		631.00	0.48	-0.01	0.01	0.71	
65.00		612.94	0.56	-0.04	0.01	-7.25	
70.00		594.88	0.65	-0.07	0.02	-13.21	
75.00		576.81	0.75	-0.10	0.04	-15.86	
77.00	Appurtenance(s)	304.87	0.79	-0.11	0.05	-8.54	
80.00		333.08	0.85	-0.12	0.07	-9.03	
85.00		540.69	0.96	-0.12	0.11	-11.50	
87.00	Appurtenance(s)	2712.4	1.01	-0.11	0.14	-47.35	
90.00		311.41	1.08	-0.08	0.18	-3.18	
95.00		504.56	1.20	0.01	0.26	3.01	
98.00	Bot - Section 3	294.07	1.28	0.10	0.32	5.33	
99.00	Appurtenance(s)	3658.0	1.31	0.13	0.34	82.66	
100.00		174.06	1.33	0.17	0.37	4.75	
101.75	Top - Section 2	301.47	1.38	0.25	0.41	10.85	
105.00		246.88	1.47	0.43	0.51	13.30	
109.00	Top - Section 3	295.47	1.59	0.73	0.65	23.35	
110.00		85.68	1.61	0.83	0.69	7.36	
115.00		428.39	1.77	1.38	0.92	52.89	
118.00	Appurtenance(s)	4074.9	1.86	1.82	1.08	606.22	
119.00		85.68	1.89	1.98	1.14	13.51	
	Totals:	**26,989.3**				**933.8**	**Total Wind:** **26,906.0**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

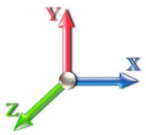
Load Case: 1.2D + 1.0E

Gust Response Factor	1.10			**Sds**	0.13			**Iterations**	19
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.04			**Ss**	0.19
Wind Load Factor	0.00	**Structure Frequency**	0.46	**SA**	0.02			**S1**	0.06
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-37.45	-1.05	0.00	-104.75	0.00	104.75	3976.93	1988.46	8011.33	4011.62		0.00	0.00	0.036
5.00	-36.00	-1.04	0.00	-99.49	0.00	99.49	3920.48	1960.24	7723.84	3867.66		0.00	-0.01	0.035
10.00	-34.57	-1.03	0.00	-94.29	0.00	94.29	3862.67	1931.34	7438.74	3724.90		0.02	-0.02	0.034
15.00	-33.17	-1.01	0.00	-89.15	0.00	89.15	3803.51	1901.75	7156.21	3583.42		0.04	-0.02	0.034
20.00	-31.79	-0.99	0.00	-84.10	0.00	84.10	3742.99	1871.49	6876.43	3443.32		0.07	-0.03	0.033
25.00	-30.45	-0.97	0.00	-79.15	0.00	79.15	3681.11	1840.56	6599.58	3304.69		0.11	-0.04	0.032
30.00	-29.12	-0.95	0.00	-74.28	0.00	74.28	3617.88	1808.94	6325.84	3167.62		0.16	-0.05	0.031
35.00	-27.83	-0.94	0.00	-69.50	0.00	69.50	3553.28	1776.64	6055.40	3032.20		0.22	-0.06	0.031
40.00	-26.56	-0.92	0.00	-64.83	0.00	64.83	3487.33	1743.67	5788.43	2898.52		0.28	-0.07	0.030
45.00	-25.31	-0.90	0.00	-60.24	0.00	60.24	3420.03	1710.01	5525.12	2766.66		0.36	-0.08	0.029
48.25	-24.52	-0.89	0.00	-57.32	0.00	57.32	3375.55	1687.77	5356.01	2681.98		0.41	-0.08	0.029
50.00	-23.82	-0.88	0.00	-55.77	0.00	55.77	3351.36	1675.68	5265.64	2636.73		0.45	-0.09	0.028
53.25	-22.53	-0.86	0.00	-52.91	0.00	52.91	2647.50	1323.75	4165.57	2085.88		0.51	-0.09	0.034
55.00	-22.16	-0.86	0.00	-51.40	0.00	51.40	2630.02	1315.01	4097.26	2051.68		0.54	-0.10	0.033
60.00	-21.13	-0.86	0.00	-47.09	0.00	47.09	2579.17	1289.59	3903.72	1954.76		0.65	-0.11	0.032
65.00	-20.12	-0.87	0.00	-42.77	0.00	42.77	2526.96	1263.48	3712.68	1859.10		0.76	-0.12	0.031
70.00	-19.13	-0.87	0.00	-38.45	0.00	38.45	2473.39	1236.70	3524.34	1764.79		0.89	-0.13	0.030
75.00	-18.17	-0.87	0.00	-34.12	0.00	34.12	2418.47	1209.23	3338.88	1671.92		1.03	-0.14	0.028
77.00	-17.69	-0.87	0.00	-32.38	0.00	32.38	2396.12	1198.06	3265.54	1635.20		1.09	-0.14	0.027
80.00	-17.15	-0.87	0.00	-29.78	0.00	29.78	2362.18	1181.09	3156.47	1580.58		1.18	-0.15	0.026
85.00	-16.26	-0.87	0.00	-25.44	0.00	25.44	2304.54	1152.27	2977.30	1490.86		1.33	-0.15	0.024
87.00	-12.91	-0.86	0.00	-23.71	0.00	23.71	2281.10	1140.55	2906.58	1455.45		1.40	-0.16	0.022
90.00	-12.47	-0.86	0.00	-21.13	0.00	21.13	2242.72	1121.36	2798.02	1401.09		1.50	-0.16	0.021
95.00	-11.76	-0.86	0.00	-16.84	0.00	16.84	2163.84	1081.92	2603.70	1303.79		1.68	-0.17	0.018
98.00	-11.34	-0.85	0.00	-14.27	0.00	14.27	2116.52	1058.26	2490.47	1247.09		1.79	-0.18	0.017
99.00	-6.92	-0.75	0.00	-13.42	0.00	13.42	2100.74	1050.37	2453.28	1228.47		1.82	-0.18	0.014
100.00	-6.71	-0.75	0.00	-12.67	0.00	12.67	2084.97	1042.48	2416.38	1209.99		1.86	-0.18	0.014
101.75	-6.34	-0.74	0.00	-11.36	0.00	11.36	1611.41	805.70	1884.17	943.49		1.93	-0.18	0.016
105.00	-6.03	-0.72	0.00	-8.97	0.00	8.97	1583.50	791.75	1805.91	904.30		2.05	-0.18	0.014
109.00	-5.65	-0.70	0.00	-6.08	0.00	6.08	0.00	0.00	0.00	0.00		2.21	-0.19	0.011
109.00	-5.65	-0.70	0.00	-6.08	0.00	6.08	0.00	0.00	0.00	0.00		2.21	-0.19	0.016
110.00	-5.54	-0.69	0.00	-5.38	0.00	5.38	933.38	466.69	986.46	590.00		2.24	-0.19	0.015
115.00	-5.01	-0.64	0.00	-1.92	0.00	1.92	933.38	466.69	986.46	590.00		2.44	-0.19	0.009
118.00	-0.10	-0.01	0.00	-0.01	0.00	0.01	933.38	466.69	986.46	590.00		2.56	-0.19	0.000
119.00	0.00	-0.01	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00		2.60	-0.19	0.000

Seismic Segment Forces (Factored)

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 22

Load Case:	0.9D + 1.0E							**Iterations**	19
Gust Response Factor	1.10				**Sds**	0.13		**Ss**	0.19
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.04		**S1**	0.06
Wind Load Factor	0.00	**Structure Frequency**	0.46		**SA**	0.02		**Seismic Importance Factor**	1.00

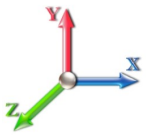
Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		981.72	0.00	0.04	0.02	15.03	
10.00		960.04	0.01	0.06	0.03	19.81	
15.00		938.37	0.03	0.07	0.04	21.40	
20.00		916.69	0.05	0.07	0.04	21.85	
25.00		895.01	0.08	0.07	0.04	22.01	
30.00		873.34	0.12	0.07	0.03	22.15	
35.00		851.66	0.16	0.07	0.03	22.16	
40.00		829.99	0.21	0.06	0.02	21.66	
45.00		808.31	0.27	0.05	0.01	19.99	
48.25	Bot - Section 2	513.78	0.31	0.04	0.01	11.56	
50.00		504.30	0.33	0.04	0.01	10.44	
53.25	Top - Section 1	923.64	0.38	0.02	0.01	14.83	
55.00		225.12	0.40	0.02	0.01	2.89	
60.00		631.00	0.48	-0.01	0.01	0.71	
65.00		612.94	0.56	-0.04	0.01	-7.25	
70.00		594.88	0.65	-0.07	0.02	-13.21	
75.00		576.81	0.75	-0.10	0.04	-15.86	
77.00	Appurtenance(s)	304.87	0.79	-0.11	0.05	-8.54	
80.00		333.08	0.85	-0.12	0.07	-9.03	
85.00		540.69	0.96	-0.12	0.11	-11.50	
87.00	Appurtenance(s)	2712.4	1.01	-0.11	0.14	-47.35	
90.00		311.41	1.08	-0.08	0.18	-3.18	
95.00		504.56	1.20	0.01	0.26	3.01	
98.00	Bot - Section 3	294.07	1.28	0.10	0.32	5.33	
99.00	Appurtenance(s)	3658.0	1.31	0.13	0.34	82.66	
100.00		174.06	1.33	0.17	0.37	4.75	
101.75	Top - Section 2	301.47	1.38	0.25	0.41	10.85	
105.00		246.88	1.47	0.43	0.51	13.30	
109.00	Top - Section 3	295.47	1.59	0.73	0.65	23.35	
110.00		85.68	1.61	0.83	0.69	7.36	
115.00		428.39	1.77	1.38	0.92	52.89	
118.00	Appurtenance(s)	4074.9	1.86	1.82	1.08	606.22	
119.00		85.68	1.89	1.98	1.14	13.51	
	Totals:	**26,989.3**				**933.8**	**Total Wind:** **26,906.0**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.13	**Iterations**	19		
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.04	**Ss**	0.19		
Wind Load Factor	0.00	**Structure Frequency**	0.46	**SA**	0.02	**S1**	0.06	**Seismic Importance Factor**	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-28.09	-1.05	0.00	-103.88	0.00	103.88	3976.93	1988.46	8011.33	4011.62		0.00	0.00	0.033
5.00	-27.00	-1.04	0.00	-98.62	0.00	98.62	3920.48	1960.24	7723.84	3867.66		0.00	-0.01	0.032
10.00	-25.93	-1.02	0.00	-93.42	0.00	93.42	3862.67	1931.34	7438.74	3724.90		0.02	-0.02	0.032
15.00	-24.88	-1.01	0.00	-88.30	0.00	88.30	3803.51	1901.75	7156.21	3583.42		0.04	-0.02	0.031
20.00	-23.85	-0.99	0.00	-83.28	0.00	83.28	3742.99	1871.49	6876.43	3443.32		0.07	-0.03	0.031
25.00	-22.83	-0.97	0.00	-78.35	0.00	78.35	3681.11	1840.56	6599.58	3304.69		0.11	-0.04	0.030
30.00	-21.84	-0.95	0.00	-73.51	0.00	73.51	3617.88	1808.94	6325.84	3167.62		0.16	-0.05	0.029
35.00	-20.87	-0.93	0.00	-68.77	0.00	68.77	3553.28	1776.64	6055.40	3032.20		0.21	-0.06	0.029
40.00	-19.92	-0.91	0.00	-64.13	0.00	64.13	3487.33	1743.67	5788.43	2898.52		0.28	-0.07	0.028
45.00	-18.98	-0.89	0.00	-59.59	0.00	59.59	3420.03	1710.01	5525.12	2766.66		0.36	-0.08	0.027
48.25	-18.39	-0.88	0.00	-56.70	0.00	56.70	3375.55	1687.77	5356.01	2681.98		0.41	-0.08	0.027
50.00	-17.86	-0.87	0.00	-55.16	0.00	55.16	3351.36	1675.68	5265.64	2636.73		0.44	-0.09	0.026
53.25	-16.90	-0.85	0.00	-52.34	0.00	52.34	2647.50	1323.75	4165.57	2085.88		0.50	-0.09	0.031
55.00	-16.62	-0.85	0.00	-50.85	0.00	50.85	2630.02	1315.01	4097.26	2051.68		0.54	-0.09	0.031
60.00	-15.85	-0.85	0.00	-46.59	0.00	46.59	2579.17	1289.59	3903.72	1954.76		0.64	-0.10	0.030
65.00	-15.09	-0.85	0.00	-42.32	0.00	42.32	2526.96	1263.48	3712.68	1859.10		0.76	-0.12	0.029
70.00	-14.35	-0.86	0.00	-38.05	0.00	38.05	2473.39	1236.70	3524.34	1764.79		0.88	-0.12	0.027
75.00	-13.62	-0.86	0.00	-33.77	0.00	33.77	2418.47	1209.23	3338.88	1671.92		1.02	-0.13	0.026
77.00	-13.27	-0.86	0.00	-32.06	0.00	32.06	2396.12	1198.06	3265.54	1635.20		1.08	-0.14	0.025
80.00	-12.86	-0.86	0.00	-29.50	0.00	29.50	2362.18	1181.09	3156.47	1580.58		1.16	-0.14	0.024
85.00	-12.20	-0.86	0.00	-25.22	0.00	25.22	2304.54	1152.27	2977.30	1490.86		1.32	-0.15	0.022
87.00	-9.68	-0.85	0.00	-23.51	0.00	23.51	2281.10	1140.55	2906.58	1455.45		1.39	-0.16	0.020
90.00	-9.35	-0.85	0.00	-20.96	0.00	20.96	2242.72	1121.36	2798.02	1401.09		1.49	-0.16	0.019
95.00	-8.82	-0.85	0.00	-16.71	0.00	16.71	2163.84	1081.92	2603.70	1303.79		1.66	-0.17	0.017
98.00	-8.50	-0.84	0.00	-14.17	0.00	14.17	2116.52	1058.26	2490.47	1247.09		1.77	-0.17	0.015
99.00	-5.19	-0.75	0.00	-13.33	0.00	13.33	2100.74	1050.37	2453.28	1228.47		1.80	-0.17	0.013
100.00	-5.03	-0.74	0.00	-12.58	0.00	12.58	2084.97	1042.48	2416.38	1209.99		1.84	-0.18	0.013
101.75	-4.75	-0.73	0.00	-11.28	0.00	11.28	1611.41	805.70	1884.17	943.49		1.91	-0.18	0.015
105.00	-4.52	-0.72	0.00	-8.90	0.00	8.90	1583.50	791.75	1805.91	904.30		2.03	-0.18	0.013
109.00	-4.24	-0.69	0.00	-6.03	0.00	6.03	0.00	0.00	0.00	0.00		2.18	-0.19	0.010
109.00	-4.24	-0.69	0.00	-6.03	0.00	6.03	0.00	0.00	0.00	0.00		2.18	-0.19	0.015
110.00	-4.16	-0.69	0.00	-5.34	0.00	5.34	933.38	466.69	986.46	590.00		2.22	-0.19	0.014
115.00	-3.75	-0.63	0.00	-1.91	0.00	1.91	933.38	466.69	986.46	590.00		2.42	-0.19	0.007
118.00	-0.08	-0.01	0.00	-0.01	0.00	0.01	933.38	466.69	986.46	590.00		2.54	-0.19	0.000
119.00	0.00	-0.01	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00		2.58	-0.19	0.000

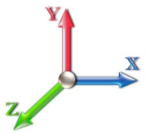
Wind Loading - Shaft

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	231.19	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	226.18	0.650	0.000	5.00	20.670	13.44	110.0	0.0	981.7
10.00		1.00	0.85	7.442	8.19	221.17	0.650	0.000	5.00	20.217	13.14	107.6	0.0	960.0
15.00		1.00	0.85	7.442	8.19	216.16	0.650	0.000	5.00	19.764	12.85	105.2	0.0	938.4
20.00		1.00	0.90	7.896	8.69	217.50	0.650	0.000	5.00	19.312	12.55	109.0	0.0	916.7
25.00		1.00	0.95	8.276	9.10	217.38	0.650	0.000	5.00	18.859	12.26	111.6	0.0	895.0
30.00		1.00	0.98	8.600	9.46	216.21	0.650	0.000	5.00	18.406	11.96	113.2	0.0	873.3
35.00		1.00	1.01	8.883	9.77	214.27	0.650	0.000	5.00	17.953	11.67	114.0	0.0	851.7
40.00		1.00	1.04	9.137	10.05	211.75	0.650	0.000	5.00	17.500	11.37	114.3	0.0	830.0
45.00		1.00	1.07	9.366	10.30	208.77	0.650	0.000	5.00	17.047	11.08	114.2	0.0	808.3
48.25	Bot - Section 2	1.00	1.09	9.505	10.46	206.63	0.650	0.000	3.25	10.838	7.04	73.7	0.0	513.8
50.00		1.00	1.09	9.576	10.53	205.42	0.650	0.000	1.75	5.849	3.80	40.0	0.0	504.3
53.25	Top - Section 1	1.00	1.11	9.704	10.67	203.06	0.650	0.000	3.25	10.715	6.96	74.3	0.0	923.6
55.00		1.00	1.12	9.770	10.75	205.10	0.650	0.000	1.75	5.691	3.70	39.8	0.0	225.1
60.00		1.00	1.14	9.951	10.95	201.19	0.650	0.000	5.00	15.953	10.37	113.5	0.0	631.0
65.00		1.00	1.16	10.120	11.13	197.05	0.650	0.000	5.00	15.500	10.07	112.2	0.0	612.9
70.00		1.00	1.17	10.279	11.31	192.71	0.650	0.000	5.00	15.047	9.78	110.6	0.0	594.9
75.00		1.00	1.19	10.430	11.47	188.18	0.650	0.000	5.00	14.594	9.49	108.8	0.0	576.8
77.00	Appurtenance(s)	1.00	1.20	10.488	11.54	186.32	0.650	0.000	2.00	5.711	3.71	42.8	0.0	225.7
80.00		1.00	1.21	10.572	11.63	183.49	0.650	0.000	3.00	8.430	5.48	63.7	0.0	333.1
85.00		1.00	1.22	10.708	11.78	178.65	0.650	0.000	5.00	13.688	8.90	104.8	0.0	540.7
87.00	Appurtenance(s)	1.00	1.23	10.761	11.84	176.68	0.650	0.000	2.00	5.349	3.48	41.2	0.0	211.2
90.00		1.00	1.24	10.838	11.92	173.69	0.650	0.000	3.00	7.887	5.13	61.1	0.0	311.4
95.00		1.00	1.25	10.962	12.06	168.60	0.650	0.000	5.00	12.783	8.31	100.2	0.0	504.6
98.00	Bot - Section 3	1.00	1.26	11.034	12.14	165.49	0.650	0.000	3.00	7.452	4.84	58.8	0.0	294.1
99.00	Appurtenance(s)	1.00	1.26	11.057	12.16	164.44	0.650	0.000	1.00	2.490	1.62	19.7	0.0	175.4
100.00		1.00	1.27	11.081	12.19	163.39	0.650	0.000	1.00	2.472	1.61	19.6	0.0	174.1
101.75	Top - Section 2	1.00	1.27	11.121	12.23	161.55	0.650	0.000	1.75	4.282	2.78	34.1	0.0	301.5
105.00		1.00	1.28	11.195	12.31	160.96	0.650	0.000	3.25	7.806	5.07	62.5	0.0	246.9
109.00	Top - Section 3	1.00	1.29	11.284	12.41	156.66	0.650	0.000	4.00	9.345	6.07	75.4	0.0	295.5
110.00		1.00	1.29	11.305	12.44	147.72	0.600	0.000	1.00	2.167	1.30	16.2	0.0	85.7
115.00		1.00	1.30	11.412	12.55	148.42	0.600	0.000	5.00	10.833	6.50	81.6	0.0	428.4
118.00	Appurtenance(s)	1.00	1.31	11.474	12.62	148.82	0.600	0.000	3.00	6.500	3.90	49.2	0.0	257.0
119.00		1.00	1.31	11.494	12.64	148.95	0.600	0.000	1.00	2.167	1.30	16.4	0.0	85.7
								Totals:	**119.00**			**2,519.1**		**17,108.3**

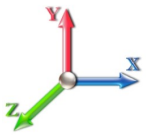
Discrete Appurtenance Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	AAHC	3	11.474	12.621	0.68	0.90	8.53	311.10	0.000	0.000	107.60	0.00	0.00
2	118.00	1900 MHz RRH	3	11.474	12.621	0.60	0.90	5.01	180.00	0.000	0.000	63.24	0.00	0.00
3	118.00	800 MHz RRH	6	11.474	12.621	0.60	0.90	9.01	318.00	0.000	0.000	113.70	0.00	0.00
4	118.00	VHLP2.5-11	2	11.474	12.621	1.00	1.00	16.86	96.00	1.583	0.000	212.79	336.92	0.00
5	118.00	LP Platform w/ Handrail	1	11.474	12.621	1.00	1.00	46.00	2448.72	0.000	0.000	580.57	0.00	0.00
6	118.00	NNVV-65B-R4	3	11.474	12.621	0.67	0.90	24.52	254.10	0.000	0.000	309.41	0.00	0.00
7	118.00	TD-RRH8x20-25	3	11.474	12.621	0.60	0.90	7.33	210.00	0.000	0.000	92.47	0.00	0.00
8	99.00	RFS	3	11.057	12.163	0.60	0.80	23.47	178.20	0.000	0.000	285.49	0.00	0.00
9	99.00	Platform SitePro	1	11.057	12.163	1.00	1.00	34.54	2448.72	0.000	0.000	420.11	0.00	0.00
10	99.00	Ericsson Radio 4449 B71	3	11.057	12.163	0.60	0.80	3.71	125.70	0.000	0.000	45.10	0.00	0.00
11	99.00	Ericsson KRY 112 489/2	3	11.057	12.163	0.60	0.80	1.17	46.20	0.000	0.000	14.23	0.00	0.00
12	99.00	Ericsson KRY 112 144/2	3	11.057	12.163	0.60	0.80	0.74	33.00	0.000	0.000	8.98	0.00	0.00
13	99.00	Ericsson Air 32	4	11.057	12.163	0.69	0.80	17.98	528.80	0.000	0.000	218.67	0.00	0.00
14	99.00	APX16DWV-16DWVS-E-	3	11.057	12.163	0.52	0.80	9.47	122.10	0.000	0.000	115.19	0.00	0.00
15	87.00	SBNHH-1D65B	9	10.761	11.837	0.66	0.80	48.24	360.00	0.000	0.000	570.95	0.00	0.00
16	87.00	RRH2X60-PCS	3	10.761	11.837	0.71	0.80	4.71	165.00	0.000	0.000	55.75	0.00	0.00
17	87.00	RRH2X60-700	3	10.761	11.837	0.58	0.80	6.12	180.00	0.000	0.000	72.48	0.00	0.00
18	87.00	Low Profile Platform	1	10.761	11.837	1.00	1.00	22.00	1500.00	0.000	0.000	260.41	0.00	0.00
19	87.00	DB-T1-6Z-8AB-0Z	2	10.761	11.837	0.68	0.80	6.56	88.00	0.000	0.000	77.63	0.00	0.00
20	87.00	BXA-80063/4CF	3	10.761	11.837	0.65	0.90	9.15	29.70	0.000	0.000	108.31	0.00	0.00
21	87.00	1900 MHz 4X45 RRH	3	10.761	11.837	0.79	0.80	6.42	178.50	0.000	0.000	75.98	0.00	0.00
22	77.00	APXV18-206517S-C	3	10.488	11.536	0.59	0.80	9.18	79.20	0.000	0.000	105.92	0.00	0.00
							Totals:		**9,881.04**			**3,914.98**		

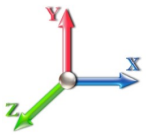
Total Applied Force Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 26

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		109.99	1210.37	0.00	0.00
10.00		107.58	1188.69	0.00	0.00
15.00		105.17	1167.02	0.00	0.00
20.00		109.03	1145.34	0.00	0.00
25.00		111.59	1123.66	0.00	0.00
30.00		113.17	1101.99	0.00	0.00
35.00		114.03	1080.31	0.00	0.00
40.00		114.32	1058.64	0.00	0.00
45.00		114.16	1036.96	0.00	0.00
48.25		73.65	662.40	0.00	0.00
50.00		40.05	584.33	0.00	0.00
53.25		74.35	1072.26	0.00	0.00
55.00		39.75	305.15	0.00	0.00
60.00		113.50	859.65	0.00	0.00
65.00		112.16	841.59	0.00	0.00
70.00		110.59	823.53	0.00	0.00
75.00		108.83	805.46	0.00	0.00
77.00	(3) attachments	148.75	396.33	0.00	0.00
80.00		63.73	451.55	0.00	0.00
85.00		104.80	738.14	0.00	0.00
87.00	(24) attachments	1262.66	2791.40	0.00	0.00
90.00		61.12	367.12	0.00	0.00
95.00		100.19	597.41	0.00	0.00
98.00		58.79	349.78	0.00	0.00
99.00	(20) attachments	1127.45	3676.65	0.00	0.00
100.00		19.59	178.24	0.00	0.00
101.75		34.05	308.79	0.00	0.00
105.00		62.48	260.47	0.00	0.00
109.00		75.39	312.20	0.00	0.00
110.00		16.17	89.86	0.00	0.00
115.00		81.59	449.30	0.00	0.00
118.00	(21) attachments	1529.00	4087.50	336.92	0.00
119.00		16.44	85.68	0.00	0.00
	Totals:	**6,434.11**	**31,207.75**	**336.92**	**0.00**

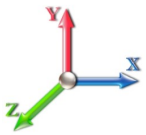
Calculated Forces

Structure:	CT13070-A	**Code:**	EIA/TIA-222-G	7/12/2018	
Site Name:	Waterbury 4, CT	**Exposure:**	C		
Height:	119.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	B - Competent Rock		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 20

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-31.21	-6.45	-0.34	-562.19	0.00	562.19	3976.93	1988.46	8011.33	4011.62	0.00	0.000	0.000	0.148
5.00	-29.99	-6.36	-0.34	-529.97	0.00	529.97	3920.48	1960.24	7723.84	3867.66	0.02	-0.044	0.000	0.145
10.00	-28.80	-6.27	-0.34	-498.18	0.00	498.18	3862.67	1931.34	7438.74	3724.90	0.09	-0.088	0.000	0.141
15.00	-27.63	-6.19	-0.34	-466.82	0.00	466.82	3803.51	1901.75	7156.21	3583.42	0.21	-0.132	0.000	0.138
20.00	-26.48	-6.09	-0.34	-435.90	0.00	435.90	3742.99	1871.49	6876.43	3443.32	0.37	-0.177	0.000	0.134
25.00	-25.35	-6.00	-0.34	-405.43	0.00	405.43	3681.11	1840.56	6599.58	3304.69	0.58	-0.221	0.000	0.130
30.00	-24.24	-5.90	-0.34	-375.44	0.00	375.44	3617.88	1808.94	6325.84	3167.62	0.84	-0.266	0.000	0.125
35.00	-23.16	-5.80	-0.34	-345.95	0.00	345.95	3553.28	1776.64	6055.40	3032.20	1.14	-0.310	0.000	0.121
40.00	-22.09	-5.69	-0.34	-316.96	0.00	316.96	3487.33	1743.67	5788.43	2898.52	1.49	-0.354	0.000	0.116
45.00	-21.06	-5.59	-0.34	-288.50	0.00	288.50	3420.03	1710.01	5525.12	2766.66	1.88	-0.397	0.000	0.110
48.25	-20.39	-5.51	-0.34	-270.34	0.00	270.34	3375.55	1687.77	5356.01	2681.98	2.16	-0.425	0.000	0.107
50.00	-19.81	-5.48	-0.34	-260.69	0.00	260.69	3351.36	1675.68	5265.64	2636.73	2.32	-0.440	0.000	0.105
53.25	-18.73	-5.40	-0.34	-242.89	0.00	242.89	2647.50	1323.75	4165.57	2085.88	2.63	-0.468	0.000	0.124
55.00	-18.42	-5.37	-0.34	-233.44	0.00	233.44	2630.02	1315.01	4097.26	2051.68	2.80	-0.482	0.000	0.121
60.00	-17.56	-5.26	-0.34	-206.59	0.00	206.59	2579.17	1289.59	3903.72	1954.76	3.33	-0.528	-0.001	0.113
65.00	-16.72	-5.15	-0.34	-180.28	0.00	180.28	2526.96	1263.48	3712.68	1859.10	3.91	-0.572	-0.001	0.104
70.00	-15.89	-5.05	-0.34	-154.51	0.00	154.51	2473.39	1236.70	3524.34	1764.79	4.53	-0.614	-0.001	0.094
75.00	-15.08	-4.94	-0.34	-129.28	0.00	129.28	2418.47	1209.23	3338.88	1671.92	5.20	-0.652	-0.001	0.084
77.00	-14.69	-4.79	-0.34	-119.41	0.00	119.41	2396.12	1198.06	3265.54	1635.20	5.47	-0.667	-0.001	0.079
80.00	-14.24	-4.72	-0.34	-105.05	0.00	105.05	2362.18	1181.09	3156.47	1580.58	5.90	-0.688	-0.001	0.073
85.00	-13.50	-4.62	-0.34	-81.43	0.00	81.43	2304.54	1152.27	2977.30	1490.86	6.64	-0.718	-0.001	0.060
87.00	-10.72	-3.32	-0.34	-72.20	0.00	72.20	2281.10	1140.55	2906.58	1455.45	6.94	-0.729	-0.001	0.054
90.00	-10.35	-3.26	-0.34	-62.24	0.00	62.24	2242.72	1121.36	2798.02	1401.09	7.40	-0.745	-0.001	0.049
95.00	-9.76	-3.15	-0.34	-45.95	0.00	45.95	2163.84	1081.92	2603.70	1303.79	8.20	-0.767	-0.001	0.040
98.00	-9.41	-3.09	-0.34	-36.49	0.00	36.49	2116.52	1058.26	2490.47	1247.09	8.68	-0.778	-0.001	0.034
99.00	-5.75	-1.91	-0.34	-33.40	0.00	33.40	2100.74	1050.37	2453.28	1228.47	8.84	-0.781	-0.001	0.030
100.00	-5.57	-1.89	-0.34	-31.49	0.00	31.49	2084.97	1042.48	2416.38	1209.99	9.01	-0.784	-0.001	0.029
101.75	-5.26	-1.85	-0.34	-28.18	0.00	28.18	1611.41	805.70	1884.17	943.49	9.30	-0.789	-0.001	0.033
105.00	-5.00	-1.79	-0.34	-22.16	0.00	22.16	1583.50	791.75	1805.91	904.30	9.84	-0.798	-0.002	0.028
109.00	-4.69	-1.71	-0.34	-15.00	0.00	15.00	0.00	0.00	0.00	0.00	10.51	-0.808	-0.002	0.021
109.00	-4.69	-1.71	-0.34	-15.00	0.00	15.00	0.00	0.00	0.00	0.00	10.51	-0.808	-0.002	0.030
110.00	-4.60	-1.69	-0.34	-13.29	0.00	13.29	933.38	466.69	986.46	590.00	10.68	-0.810	-0.002	0.027
115.00	-4.15	-1.60	-0.34	-4.83	0.00	4.83	933.38	466.69	986.46	590.00	11.53	-0.816	-0.002	0.013
118.00	-0.09	-0.02	0.00	-0.02	0.00	0.02	933.38	466.69	986.46	590.00	12.05	-0.817	-0.002	0.000
119.00	0.00	-0.02	0.00	0.00	0.00	0.00	933.38	466.69	986.46	590.00	12.22	-0.817	-0.002	0.000

Final Analysis Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 28

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 9 97 mph Wind	27.0	0.00	37.40	0.01	0.87	2362.00
0.9D + 1.6W 9 97 mph Wind	27.0	0.00	28.04	0.01	0.87	2344.01
1.2D + 1.0Di + 1.0Wi 50 mph Wind	7.4	0.00	57.48	0.00	0.28	633.65
1.2D + 1.0E	1.1	0.00	37.45	0.00	0.00	104.75
0.9D + 1.0E	1.1	0.00	28.09	0.00	0.00	103.88
1.0D + 1.0W 60 mph Wind	6.4	0.00	31.21	0.00	0.34	562.19

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 9 97 mph Wind	-37.40	-26.97	-0.87	-2362.0	-0.01	-2362.0	3976.93	1988.4	8011.33	4011.62	0.00	0.598
0.9D + 1.6W 9 97 mph Wind	-28.04	-26.95	-0.87	-2344.0	-0.01	-2344.0	3976.93	1988.4	8011.33	4011.62	0.00	0.592
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-57.48	-7.37	-0.28	-633.65	0.00	-633.65	3976.93	1988.4	8011.33	4011.62	0.00	0.172
1.2D + 1.0E	-37.45	-1.05	0.00	-104.75	0.00	-104.75	3976.93	1988.4	8011.33	4011.62	0.00	0.036
0.9D + 1.0E	-28.09	-1.05	0.00	-103.88	0.00	-103.88	3976.93	1988.4	8011.33	4011.62	0.00	0.033
1.0D + 1.0W 60 mph Wind	-31.21	-6.45	-0.34	-562.19	0.00	-562.19	3976.93	1988.4	8011.33	4011.62	0.00	0.148

Base Plate Summary

Structure:	CT13070-A		**Code:**	EIA/TIA-222-G	7/12/2018
Site Name:	Waterbury 4, CT		**Exposure:**	C	
Height:	119.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	B - Competent Rock	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 29

Reactions

Original Design

Moment (kip-ft):	3142.00
Axial (kip):	42.00
Shear (kip):	29.00

Analysis

Moment (kip-ft):	2362.00
Axial (kip):	57.48
Shear (kip):	26.97
Moment Design %:	75.18

Base Plate

Yield (ksi):	60.00
Width (in):	53.25
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	9.00
Effective Len (in):	10.37
Moment (kip-in):	554.15
Allow Stress (ksi):	81.00
Applied Stress (ksi):	0.00
Stress Ratio:	0.44

Anchor Bolts

Bolt Circle:	55.75
Number Bolts:	12.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00

Compression

Force (kip):	174.26
Allowable (kip):	260.00
Ratio:	0.69

Tension

Force (kip):	164.68
Allowable (kip):	260.00
Ratio:	0.65

Monopole Mat Foundation Design

			Date: 7/12/2018
Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-G
Site Name:	NH331/OPTA Pine	**Structure Height (Ft.):**	119
Site Number:	CT13070-A	**Engineer Name:**	S. Berthomieu
Engr. Number:		**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

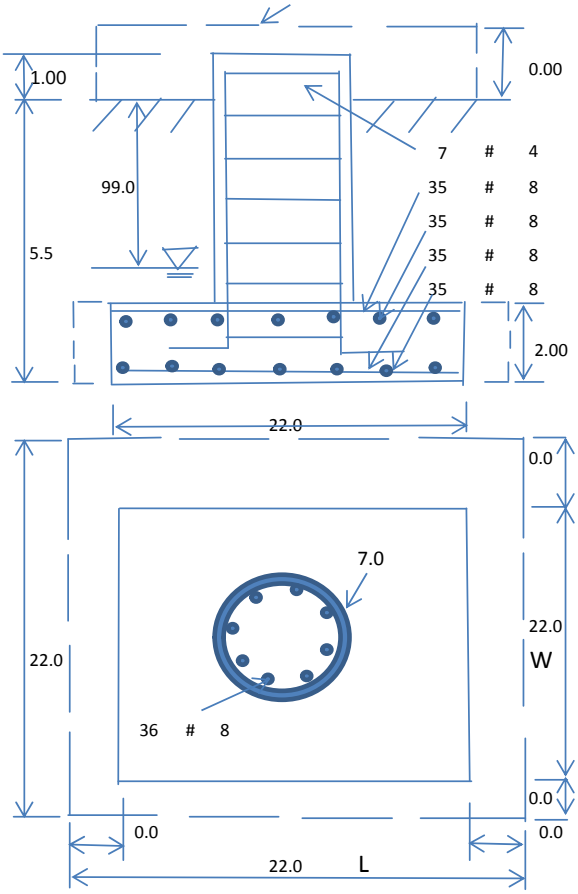
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	37.4	Shear Force (Kips):	27.0
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2362.0
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	5.5
Pier Height A. G. (ft.):	1.00	Thickness of Pad (ft):	2.00
Length of Pad (ft.):	22	Width of Pad (ft.):	22
Final Length of pad (ft)	22.0	Final width of pad (ft):	22.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	36	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	8	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	35	Qty. of Rebar in Pad (W):	35	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	130.0	Soil Buoyant Weight:	50.0	Pcf		
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	16000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	1559.30	Total Dry Soil Weight (Kips):	202.71
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	202.71	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1141.18	Total Dry Concrete Weight (Kips):	171.18
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	171.18	Total Vertical Load on Base (Kips):	411.29

Check Soil Capacities:

				Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2595	<	Allowable Factored Soil Bearing (psf): 12000	0.22	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	4112.9	>	Design Factored Momont (kips-ft): 2538	0.62	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.62	OK!			

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75			
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00			
				Load/ Capacity Ratio		
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	4845.7	>	Design Factored Moment (Mu, Kips-F	2483.5	0.51	OK!
Calculated Shear Capacity (Kips):	660.1	>	Design Factored Shear (Kips):	27.0	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	1535.8	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9747.6	>	Design Factored Axial Load (Pu Kips):	37.4	0.00	OK!
Moment & Axial Strength Combination:	0.51	OK!	Check Tie Spacing (Design/Required):		1	OK!
Pier Reinforcement Ratio:	0.005	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	513.4	>	One-Way Factored Shear (L-D. Kips):	173.1	0.34	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	513.4	>	One-Way Factored Shear (W-D., Kips)	173.1	0.34	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	483.0	>	One-Way Factored Shear (C-C, Kips):	173.2	0.36	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0051		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at Bottom (L-Direct. K-Ft):	501.3	0.21	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at Bottom (W-Direct. K-Ft):	501.3	0.21	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	3397.4	>	Moment at Bottom (C-C Dir. K-Ft):	709.0	0.21	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0051	OK!	Upper Steel Reinf. Ratio (W-Direct.):	0.0051		
Upper Steel Pad Moment Capacity (L-Direction. Kips-ft):	2435.7	>	Moment at the top (L-Dir Kips-Ft):	101.0	0.04	OK!
Upper Steel Pad Moment Capacity (W-Direction. Kips-ft):	2435.7	>	Moment at the top (W-Dir Kips-Ft):	101.0	0.04	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	3397.4	>	Moment at the top (C-C Direc. K-Ft):	272.1	0.08	OK!

CENTEK engineering

Centered on Solutions℠

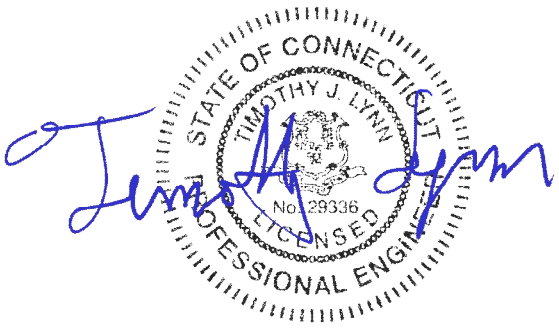
Structural Analysis Report

Antenna Mount Analysis

T-Mobile Site #: CTNH331B

940 Meriden Road
Waterbury, CT 06705

Centek Project No. 18058.35



Date: May 29, 2018

Max Stress Ratio = 43.9%

Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

May 29, 2018

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTNH331B
940 Meriden Road
Waterbury, CT 06705

Centek Project No. 18058.35

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the existing mount, consisting of one (1) 13-ft platform to support the equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2012 International Building Code as modified by the 2016 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Platform: Four (4) Ericsson AIR32 panel antennas, three (3) RFS APX16DWV-16DWVS-E-A20 panel antennas, three (3) RFS APXVAARR24-43-NA20 panel antennas, six (6) KRY112 TMAs and three (3) Ericsson 4449 B71_B12 remote radio units mounted on one (1) proposed low profile platform with a RAD center elevation of 99-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2012 International Building Code as modified by the 2016 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Waterbury as required in Appendix N of the 2016 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the existing antenna platform is structurally inadequate to support the proposed antenna configuration. Replacement of the existing platform with a SItePro platform (p/n RMQP-4096-HK) is required. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

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

Section 2 - Calculations

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

Subject: TIA-222-G Loads

Location: Waterbury, CT

Rev. 0: 5/29/18

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 18058.35

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed $V := 97$ mph (User Input - 2016 CSBC Appendix N)

Basic Wind Speed with Ice $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = Structure_Type := Pole (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 120$ ft (User Input)

Height to Center of Antennas = $z_{AT\&T} := 99$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor =

$$K_d := \begin{cases} 0.95 & \text{if Structure\_Type = Pole} \\ 0.85 & \text{if Structure\_Type = Lattice} \end{cases} = 0.95$$

(Per Table 2-2 of TIA-222-G)

Importance Factors =

$$I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$$

(Per Table 2-3 of TIA-222-G)

$$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$$

$$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$$

$$K_{iz} := \left(\frac{z_{AT\&T}}{33}\right)^{0.1} = 1.116$$

$$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.674$$

Velocity Pressure Coefficient Antennas =

$$Kz_{AT\&T} := 2.01\left(\left(\frac{z_{AT\&T}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.263$$

Velocity Pressure w/o Ice Antennas =

$$qz_{AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V^2 \cdot I_{Wind} = 28.9$$

Velocity Pressure with Ice Antennas =

$$qz_{ice.AT\&T} := 0.00256 \cdot K_d \cdot Kz_{AT\&T} \cdot V_i^2 \cdot I_{Wind} = 7.679$$

CENTEK engineering
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63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Waterbury, CT
Rev. 0: 5/29/18	Prepared by: T.J.L. Checked by: C.F.C. Job No. 18058.35

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 133$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 207$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 140$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 73$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 54$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 133$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5384$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 174$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 174$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFS APXV16DWV-16DWVS-E-A20		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 55.9$	in	(User Input)
Antenna Width =	$W_{ant} := 13$	in	(User Input)
Antenna Thickness =	$T_{ant} := 3.15$	in	(User Input)
Antenna Weight =	$WT_{ant} := 41$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.3$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 205$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.2$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 50$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 73$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 2.7$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 29$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 41$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2289$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4005$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 130$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 130$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 644$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 233$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 202$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 89$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 411$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 411$	lbs

Development of Wind & Ice Load on TMA's

TMA Data:

TMA Model = Ericsson KRY112 TMA

TMA Shape = Flat (User Input)

TMA Height = $L_{TMA} := 7.7$ in (User Input)

TMA Width = $W_{TMA} := 7.5$ in (User Input)

TMA Thickness = $T_{TMA} := 3.4$ in (User Input)

TMA Weight = $WT_{TMA} := 11$ lbs (User Input)

Number of TMA's = $N_{TMA} := 1$ (User Input)

TMA Aspect Ratio = $Ar_{TMA} := \frac{L_{TMA}}{W_{TMA}} = 1$

TMA Force Coefficient = $Ca_{TMA} = 1.2$

Wind Load (without ice)

Surface Area for One TMA = $SA_{TMAF} := \frac{L_{TMA} \cdot W_{TMA}}{144} = 0.4$ sf

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAF} = 15$ lbs

Surface Area for One TMA = $SA_{TMAS} := \frac{L_{TMA} \cdot T_{TMA}}{144} = 0.2$ sf

Total TMA Wind Force = $F_{TMA} := qz_{AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{TMAS} = 7$ lbs

Wind Load (with ice)

Surface Area for One TMA w/ Ice = $SA_{ICETMAF} := \frac{\left(L_{TMA} + 2 \cdot t_{iz}\right) \cdot \left(W_{TMA} + 2 \cdot t_{iz}\right)}{144} = 0.8$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAF} = 8$ lbs

Surface Area for One TMA w/ Ice = $SA_{ICETMAS} := \frac{\left(L_{TMA} + 2 \cdot t_{iz}\right) \cdot \left(T_{TMA} + 2 \cdot t_{iz}\right)}{144} = 0.5$ sf

Total TMA Wind Force w/ Ice = $Fi_{TMA} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{TMA} \cdot K_a \cdot SA_{ICETMAS} = 5$ lbs

Gravity Load (without ice)

Weight of All TMAs = $WT_{TMA} \cdot N_{TMA} = 11$ lbs

Gravity Loads (ice only)

Volume of Each TMA = $V_{TMA} := L_{TMA} \cdot W_{TMA} \cdot T_{TMA} = 196$ cu in

Volume of Ice on Each TMA = $V_{ice} := \left(L_{TMA} + 2 \cdot t_{iz}\right)\left(W_{TMA} + 2 \cdot t_{iz}\right) \cdot \left(T_{TMA} + 2 \cdot t_{iz}\right) - V_{TMA} = 612$ cu in

Weight of Ice on Each TMA = $W_{ICETMA} := \frac{V_{ice}}{1728} \cdot Id = 20$ lbs

Weight of Ice on All TMAs = $W_{ICETMA} \cdot N_{TMA} = 20$ lbs

Development of Wind & Ice Load on RRUS's

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 52$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 41$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 21$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.7$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.AT\&T} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 18$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

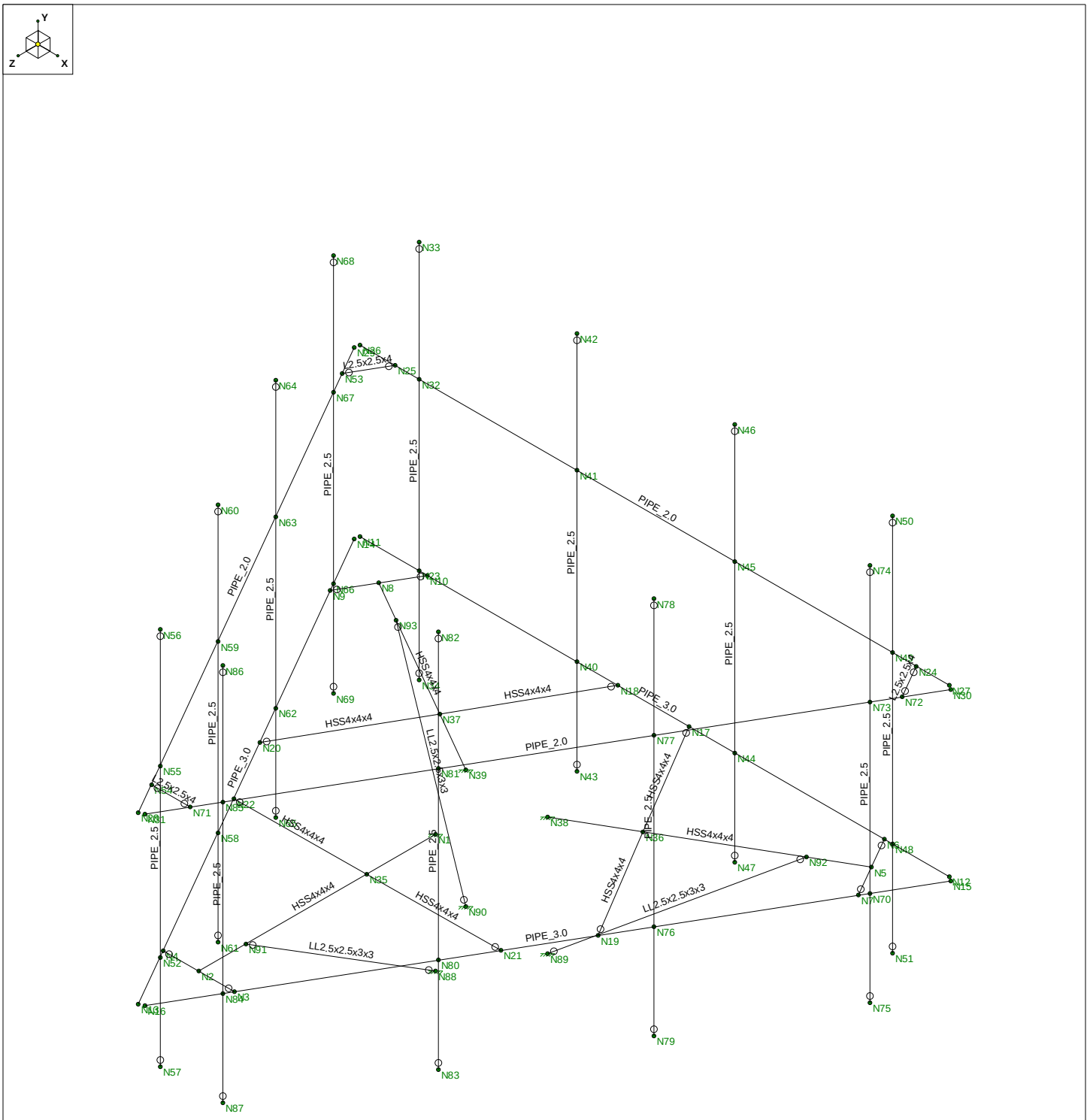
Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2106$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 68$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 68$ lbs



Envelope Only Solution

Centek		
TJL	CTNH331B	May 29, 2018 at 3:07 PM
18058.35	Member Framing	Mount - Proposed.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	12
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	No
RISAConnection Code	AISC 13th(360-05): ASD
Cold Formed Steel Code	AISI S100-10: ASD
Wood Code	AWC NDS-12: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-11
Masonry Code	ACI 530-11: ASD
Aluminum Code	AA ADM1-10: ASD - Building
	AISC 14th(360-10): ASD

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	150.001
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#3
Footing Top Bar Cover (in)	2
Footing Bottom Bar	#3
Footing Bottom Bar Cover (in)	3.5
Pedestal Bar	#3
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#3

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	58	1.2
3	A992	29000	11154	.3	.65	.49	50	1.1	58	1.2
4	A500 Gr.42	29000	11154	.3	.65	.49	42	1.3	58	1.1
5	A500 Gr.46	29000	11154	.3	.65	.49	46	1.2	58	1.1
6	A53 Gr B	29000	11154	.3	.65	.49	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Outrigger	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
2	Horz Pipe	PIPE_3.0	Beam	Pipe	A53 Gr B	Typical	2.07	2.85	2.85	5.69
3	Antenna Pipe	PIPE_2.5	Beam	Pipe	A53 Gr B	Typical	1.61	1.45	1.45	2.89
4	Handrail	PIPE_2.0	Beam	Pipe	A53 Gr B	Typical	1.02	.627	.627	1.25
5	Support	HSS4x4x4	Beam	Pipe	A500 Gr.46	Typical	3.37	7.8	7.8	12.8
6	Kicker	LL2.5x2.5x3x3	Beam	Pipe	A36 Gr.36	Typical	1.8	2.46	1.07	.023
7	Handrail Corner	L2.5x2.5x4	Beam	Pipe	A36 Gr.36	Typical	1.19	.692	.692	.026

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torqu...	Kyy	Kzz	Cb	Function
1	M1	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
2	M2	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
3	M3	Outrigger	5	Segment	Segment	Segment	Segment	Segme...				Lateral
4	M4	Horz Pipe	12.45	5	5	5	5					Lateral
5	M5	Horz Pipe	12.45	5	5	5	5					Lateral
6	M6	Horz Pipe	12.45	5	5	5	5					Lateral
7	M10	Support	2.786			Lbyy						Lateral
8	M11	Support	2.811			Lbyy						Lateral
9	M12	Support	2.786			Lbyy						Lateral
10	M13	Handrail	12.45			Lbyy						Lateral
11	M14	Handrail	12.45			Lbyy						Lateral
12	M15	Handrail	12.45			Lbyy						Lateral
13	M16	Antenna Pipe	8			Lbyy						Lateral
14	M17	Support	2.811			Lbyy						Lateral
15	M18	Support	2.761			Lbyy						Lateral
16	M19	Support	2.761			Lbyy						Lateral
17	M20	Antenna Pipe	8			Lbyy						Lateral
18	M21	Antenna Pipe	8			Lbyy						Lateral
19	M22	Antenna Pipe	8			Lbyy						Lateral
20	M23	Antenna Pipe	8			Lbyy						Lateral
21	M24	Antenna Pipe	8			Lbyy						Lateral
22	M25	Antenna Pipe	8			Lbyy						Lateral
23	M26	Antenna Pipe	8			Lbyy						Lateral
24	M27	Antenna Pipe	8			Lbyy						Lateral
25	M28	Antenna Pipe	8			Lbyy						Lateral
26	M29	Antenna Pipe	8			Lbyy						Lateral
27	M30	Antenna Pipe	8			Lbyy						Lateral
28	M31	Handrail Co...	.821			Lbyy						Lateral
29	M32	Handrail Co...	.821			Lbyy						Lateral
30	M33	Handrail Co...	.821			Lbyy						Lateral
31	M34	Kicker	4.717			Lbyy						Lateral
32	M35	Kicker	4.717			Lbyy						Lateral
33	M36	Kicker	4.717			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			Outrigger	Beam	Pipe	A500 Gr....	Typical
2	M2	N38	N5			Outrigger	Beam	Pipe	A500 Gr....	Typical
3	M3	N39	N8			Outrigger	Beam	Pipe	A500 Gr....	Typical
4	M4	N16	N15			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
5	M5	N13	N14			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
6	M6	N12	N11			Horz Pipe	Beam	Pipe	A53 Gr B	Typical
7	M7	N9	N10			RIGID	None	None	RIGID	Typical
8	M8	N7	N6			RIGID	None	None	RIGID	Typical
9	M9	N3	N4			RIGID	None	None	RIGID	Typical
10	M10	N22	N35			Support	Beam	Pipe	A500 Gr....	Typical
11	M11	N36	N17			Support	Beam	Pipe	A500 Gr....	Typical
12	M12	N37	N20			Support	Beam	Pipe	A500 Gr....	Typical
13	M13	N31	N30			Handrail	Beam	Pipe	A53 Gr B	Typical
14	M14	N28	N29			Handrail	Beam	Pipe	A53 Gr B	Typical
15	M15	N27	N26			Handrail	Beam	Pipe	A53 Gr B	Typical
16	M16	N34	N33			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
17	M17	N35	N21			Support	Beam	Pipe	A500 Gr....	Typical
18	M18	N36	N19			Support	Beam	Pipe	A500 Gr....	Typical
19	M19	N18	N37			Support	Beam	Pipe	A500 Gr....	Typical
20	M20	N43	N42			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
21	M21	N47	N46			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
22	M22	N51	N50			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
23	M23	N57	N56			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
24	M24	N61	N60			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
25	M25	N65	N64			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
26	M26	N69	N68			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
27	M27	N75	N74			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
28	M28	N79	N78			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
29	M29	N83	N82			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
30	M30	N87	N86			Antenna Pipe	Beam	Pipe	A53 Gr B	Typical
31	M31	N53	N25			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
32	M32	N72	N24			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
33	M33	N54	N71			Handrail Corner	Beam	Pipe	A36 Gr.36	Typical
34	M34	N91	N88			Kicker	Beam	Pipe	A36 Gr.36	Typical
35	M35	N93	N90			Kicker	Beam	Pipe	A36 Gr.36	Typical
36	M36	N92	N89			Kicker	Beam	Pipe	A36 Gr.36	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	0	0	1	0	
2	N2	0	0	6	0	
3	N3	0.75	0	6	0	
4	N4	-0.75	0	6	0	
5	N5	5.196152	0	-3	0	
6	N6	4.821152	0	-3.649519	0	
7	N7	5.571152	0	-2.350481	0	
8	N8	-5.196152	0	-3	0	
9	N9	-5.571152	0	-2.350481	0	
10	N10	-4.821152	0	-3.649519	0	
11	N11	-6.25	0	-3.649519	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
12	N12	6.2	0	-3.649519	0	
13	N13	-0.035576	0	7.237418	0	
14	N14	-6.260576	0	-3.544598	0	
15	N15	6.285576	0	-3.587899	0	
16	N16	0.060576	0	7.194117	0	
17	N17	.7	0	-3.649519	0	
18	N18	-.8	0	-3.649519	0	
19	N19	3.560576	0	1.131939	0	
20	N20	-3.535576	0	1.17524	0	
21	N21	2.810576	0	2.430977	0	
22	N22	-2.785576	0	2.474279	0	
23	N23	-5	0	-3.649519	0	
24	N24	5.5	3.5	-3.649519	0	
25	N25	-5.5	3.5	-3.649519	0	
26	N26	-6.25	3.5	-3.649519	0	
27	N27	6.2	3.5	-3.649519	0	
28	N28	-0.035576	3.5	7.237418	0	
29	N29	-6.260576	3.5	-3.544598	0	
30	N30	6.285576	3.5	-3.587899	0	
31	N31	0.060576	3.5	7.194117	0	
32	N32	-5	3.5	-3.649519	0	
33	N33	-5	6	-3.649519	0	
34	N34	-5	-2	-3.649519	0	
35	N35	0	0	2.452725	0	
36	N36	2.143125	0	-1.237334	0	
37	N37	-2.161623	0	-1.248013	0	
38	N38	0.866025	0	-.5	0	
39	N39	-0.866025	0	-.5	0	
40	N40	-1.667	0	-3.649519	0	
41	N41	-1.667	3.5	-3.649519	0	
42	N42	-1.667	6	-3.649519	0	
43	N43	-1.667	-2	-3.649519	0	
44	N44	1.666	0	-3.649519	0	
45	N45	1.666	3.5	-3.649519	0	
46	N46	1.666	6	-3.649519	0	
47	N47	1.666	-2	-3.649519	0	
48	N48	4.999	0	-3.649519	0	
49	N49	4.999	3.5	-3.649519	0	
50	N50	4.999	6	-3.649519	0	
51	N51	4.999	-2	-3.649519	0	
52	N52	-0.660576	0	6.154887	0	
53	N53	-5.910576	3.5	-2.93838	0	
54	N54	-0.410576	3.5	6.587899	0	
55	N55	-0.660576	3.5	6.154887	0	
56	N56	-0.660576	6	6.154887	0	
57	N57	-0.660576	-2	6.154887	0	
58	N58	-2.327076	0	3.268424	0	
59	N59	-2.327076	3.5	3.268424	0	
60	N60	-2.327076	6	3.268424	0	
61	N61	-2.327076	-2	3.268424	0	
62	N62	-3.993576	0	0.381961	0	
63	N63	-3.993576	3.5	0.381961	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
64	N64	-3.993576	6	0.381961	0	
65	N65	-3.993576	-2	0.381961	0	
66	N66	-5.660076	0	-2.504501	0	
67	N67	-5.660076	3.5	-2.504501	0	
68	N68	-5.660076	6	-2.504501	0	
69	N69	-5.660076	-2	-2.504501	0	
70	N70	5.660576	0	-2.505368	0	
71	N71	0.410576	3.5	6.587899	0	
72	N72	5.910576	3.5	-2.93838	0	
73	N73	5.660576	3.5	-2.505368	0	
74	N74	5.660576	6	-2.505368	0	
75	N75	5.660576	-2	-2.505368	0	
76	N76	3.994076	0	0.381095	0	
77	N77	3.994076	3.5	0.381095	0	
78	N78	3.994076	6	0.381095	0	
79	N79	3.994076	-2	0.381095	0	
80	N80	2.327576	0	3.267558	0	
81	N81	2.327576	3.5	3.267558	0	
82	N82	2.327576	6	3.267558	0	
83	N83	2.327576	-2	3.267558	0	
84	N84	0.661076	0	6.15402	0	
85	N85	0.661076	3.5	6.15402	0	
86	N86	0.661076	6	6.15402	0	
87	N87	0.661076	-2	6.15402	0	
88	N88	0	-2.5	1	0	
89	N89	0.866025	-2.5	-.5	0	
90	N90	-0.866025	-2.5	-.5	0	
91	N91	0	0	5	0	
92	N92	4.330127	0	-2.5	0	
93	N93	-4.330127	0	-2.5	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N38	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N39	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N88	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N89	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N90	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N91						
8	N92						
9	N93						

Member Point Loads (BLC 2 : Equipment Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.021	7.5
2	M23	Y	-.021	7.5
3	M27	Y	-.021	7.5
4	M16	Y	-.021	2.5

Member Point Loads (BLC 2 : Equipment Weight) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
5	M23	Y	-.021	2.5
6	M27	Y	-.021	2.5
7	M22	Y	-.067	7.5
8	M26	Y	-.067	7.5
9	M29	Y	-.067	7.5
10	M30	Y	-.067	7.5
11	M22	Y	-.067	2.5
12	M26	Y	-.067	2.5
13	M29	Y	-.067	2.5
14	M30	Y	-.067	2.5
15	M20	Y	-.077	1
16	M24	Y	-.077	1
17	M28	Y	-.077	1
18	M20	Y	-.077	7
19	M24	Y	-.077	7
20	M28	Y	-.077	7
21	M20	Y	-.074	%50
22	M24	Y	-.074	%50
23	M28	Y	-.074	%50

Member Point Loads (BLC 3 : Ice Weight)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Y	-.065	7.5
2	M23	Y	-.065	7.5
3	M27	Y	-.065	7.5
4	M16	Y	-.065	2.5
5	M23	Y	-.065	2.5
6	M27	Y	-.065	2.5
7	M22	Y	-.087	7.5
8	M26	Y	-.087	7.5
9	M29	Y	-.087	7.5
10	M30	Y	-.087	7.5
11	M22	Y	-.087	2.5
12	M26	Y	-.087	2.5
13	M29	Y	-.087	2.5
14	M30	Y	-.087	2.5
15	M20	Y	-.206	1
16	M24	Y	-.206	1
17	M28	Y	-.206	1
18	M20	Y	-.206	7
19	M24	Y	-.206	7
20	M28	Y	-.206	7
21	M20	Y	-.068	%50
22	M24	Y	-.068	%50
23	M28	Y	-.068	%50

Member Point Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.015	7.5
2	M16	X	.015	2.5
3	M23	X	.037	7.5

Member Point Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
4	M27	X	.037	7.5
5	M23	X	.037	2.5
6	M27	X	.037	2.5
7	M22	X	.027	7.5
8	M22	X	.027	2.5
9	M26	X	.037	7.5
10	M29	X	.037	7.5
11	M30	X	.037	7.5
12	M26	X	.037	2.5
13	M29	X	.037	2.5
14	M30	X	.037	2.5
15	M20	X	.045	1
16	M20	X	.045	7
17	M24	X	.101	1
18	M28	X	.101	1
19	M24	X	.101	7
20	M28	X	.101	7
21	M20	X	.018	%50

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	X	.025	7.5
2	M16	X	.025	2.5
3	M23	X	.103	7.5
4	M27	X	.103	7.5
5	M23	X	.103	2.5
6	M27	X	.103	2.5
7	M22	X	.07	7.5
8	M22	X	.07	2.5
9	M26	X	.104	7.5
10	M29	X	.104	7.5
11	M30	X	.104	7.5
12	M26	X	.104	2.5
13	M29	X	.104	2.5
14	M30	X	.104	2.5
15	M20	X	.117	1
16	M20	X	.117	7
17	M24	X	.322	1
18	M28	X	.322	1
19	M24	X	.322	7
20	M28	X	.322	7
21	M20	X	.041	%50

Member Point Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.037	7.5
2	M16	Z	.037	2.5
3	M23	Z	.015	7.5
4	M27	Z	.015	7.5
5	M23	Z	.015	2.5
6	M27	Z	.015	2.5

Member Point Loads (BLC 6 : Wind w/ Ice Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
7	M22	Z	.037	7.5
8	M22	Z	.037	2.5
9	M26	Z	.027	7.5
10	M29	Z	.027	7.5
11	M30	Z	.027	7.5
12	M26	Z	.027	2.5
13	M29	Z	.027	2.5
14	M30	Z	.027	2.5
15	M20	Z	.101	1
16	M20	Z	.101	7
17	M24	Z	.045	1
18	M28	Z	.045	1
19	M24	Z	.045	7
20	M28	Z	.045	7
21	M24	Z	.018	%50
22	M28	Z	.018	%50

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M16	Z	.103	7.5
2	M16	Z	.103	2.5
3	M23	Z	.025	7.5
4	M27	Z	.025	7.5
5	M23	Z	.025	2.5
6	M27	Z	.025	2.5
7	M22	Z	.104	7.5
8	M22	Z	.104	2.5
9	M26	Z	.07	7.5
10	M29	Z	.07	7.5
11	M30	Z	.07	7.5
12	M26	Z	.07	2.5
13	M29	Z	.07	2.5
14	M30	Z	.07	2.5
15	M20	Z	.322	1
16	M20	Z	.322	7
17	M24	Z	.117	1
18	M28	Z	.117	1
19	M24	Z	.117	7
20	M28	Z	.117	7
21	M24	Z	.041	%50
22	M28	Z	.041	%50

Member Distributed Loads (BLC 4 : Wind w/ Ice X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M14	X	.003	.003	0	0
2	M5	X	.003	.003	0	0
3	M5	X	.003	.003	0	0
4	M24	X	.003	.003	0	0
5	M28	X	.003	.003	0	0
6	M16	X	.003	.003	0	0

Member Distributed Loads (BLC 4 : Wind w/ Ice X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
7	M20	X	.003	.003	0	0
8	M21	X	.003	.003	0	0
9	M22	X	.003	.003	0	0
10	M13	X	.003	.003	0	0
11	M4	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M14	X	.008	.008	0	0
2	M5	X	.008	.008	0	0
3	M5	X	.008	.008	0	0
4	M24	X	.008	.008	0	0
5	M28	X	.008	.008	0	0
6	M16	X	.008	.008	0	0
7	M20	X	.008	.008	0	0
8	M21	X	.008	.008	0	0
9	M22	X	.008	.008	0	0
10	M13	X	.008	.008	0	0
11	M4	X	.008	.008	0	0

Member Distributed Loads (BLC 6 : Wind w/ Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M15	Z	.003	.003	0	0
2	M6	Z	.003	.003	0	0
3	M20	Z	.003	.003	0	0
4	M26	Z	.003	.003	0	0
5	M25	Z	.003	.003	0	0
6	M24	Z	.003	.003	0	0
7	M23	Z	.003	.003	0	0
8	M27	Z	.003	.003	0	0
9	M28	Z	.003	.003	0	0
10	M29	Z	.003	.003	0	0
11	M30	Z	.003	.003	0	0
12	M14	Z	.003	.003	0	0
13	M5	Z	.003	.003	0	0
14	M13	Z	.003	.003	0	0
15	M4	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M15	Z	.008	.008	0	0
2	M6	Z	.008	.008	0	0
3	M20	Z	.008	.008	0	0
4	M26	Z	.008	.008	0	0
5	M25	Z	.008	.008	0	0
6	M24	Z	.008	.008	0	0
7	M23	Z	.008	.008	0	0
8	M27	Z	.008	.008	0	0
9	M28	Z	.008	.008	0	0
10	M29	Z	.008	.008	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
11	M30	Z	.008	.008	0	0
12	M14	Z	.008	.008	0	0
13	M5	Z	.008	.008	0	0
14	M13	Z	.008	.008	0	0
15	M4	Z	.008	.008	0	0

Member Distributed Loads (BLC 8 : BLC 2 Transient Area Loads)

	Member Label	Direction	Start Magnitude[k/ft,F,ksf]	End Magnitude[k/...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-.033	-.019	2	3.5
2	M1	Y	-.019	-.005	3.5	5
3	M4	Y	-.003	-.006	0	2.49
4	M4	Y	-.006	-.01	2.49	4.98
5	M5	Y	.0003227	-.006	0	2.49
6	M5	Y	-.006	-.013	2.49	4.98
7	M9	Y	-.006	-.006	.317	1.183
8	M10	Y	-.012	-.012	.242	2.779
9	M17	Y	-.013	-.013	.0003843	2.559
10	M2	Y	-.032	-.019	2	3.5
11	M2	Y	-.019	-.005	3.5	5
12	M4	Y	-.013	-.006	7.47	9.96
13	M4	Y	-.006	.0003127	9.96	12.45
14	M6	Y	-.003	-.006	0	2.49
15	M6	Y	-.006	-.01	2.49	4.98
16	M8	Y	-.006	-.006	.318	1.183
17	M11	Y	-.012	-.012	0	2.556
18	M18	Y	-.012	-.012	.009	2.525
19	M3	Y	-.032	-.019	2	3.5
20	M3	Y	-.019	-.005	3.5	5
21	M5	Y	-.009	-.006	7.47	9.96
22	M5	Y	-.006	-.003	9.96	12.45
23	M6	Y	-.013	-.006	7.47	9.96
24	M6	Y	-.006	.0003098	9.96	12.45
25	M7	Y	-.006	-.006	.318	1.182
26	M12	Y	-.012	-.012	.0001388	2.537
27	M19	Y	-.012	-.012	.239	2.754

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(Me...	Surface(...
1	Self Weight	DL		-1						
2	Equipment Weight	None					23		3	
3	Ice Weight	None					23			
4	Wind w/ Ice X	None					21	11		
5	Wind X	None					21	11		
6	Wind w/ Ice Z	None					22	15		
7	Wind Z	None					22	15		
8	BLC 2 Transient Area Loads	None						27		

Load Combinations

	Description	So...	PDelta	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	4	1														
4	1.2D + 1.6W (X-dir...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (X-dir...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0...	Yes	Y		1	1.2	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	.083	5	.622	3	-.264	2	-.257	5	.021	5	.417	1
2		min	-2.021	1	-.043	5	-6.062	4	-.663	3	-2.169	2	.034	5
3	N38	max	1.14	5	.671	6	2.633	1	.104	6	.5	4	.677	6
4		min	-5.212	1	-.04	2	-1.246	5	-.166	2	.01	2	.411	5
5	N39	max	.763	6	.575	1	.147	6	.355	3	-.1	3	-.119	2
6		min	-3.098	2	.425	5	-2.268	2	-.07	5	-1.21	4	-.414	4
7	N88	max	.001	1	2.598	4	4.131	4	0	1	0	6	0	6
8		min	0	6	.731	2	1.149	2	0	1	0	2	0	2
9	N89	max	3.439	1	2.498	1	.09	5	0	5	0	5	0	3
10		min	-.156	5	-.099	5	-1.986	1	0	3	0	3	0	5
11	N90	max	1.148	2	1.32	6	.663	2	0	4	0	1	0	4
12		min	-1.805	6	-.816	2	-1.042	6	0	1	0	4	0	1
13	Totals:	max	0	6	6.469	6	0	2						
14		min	-5.874	1	2.957	2	-5.283	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
1	N1	max	0	1	0	5	0	4	0	3	0	2	0	5
2		min	0	5	0	3	0	2	0	5	0	5	0	1
3	N2	max	.033	2	-.005	2	.003	4	1.903e-03	4	3.705e-05	5	3.192e-03	2
4		min	0	6	-.036	4	0	2	1.68e-04	2	-1.274e-04	2	-3.314e-04	6
5	N3	max	.033	2	.023	2	.003	4	1.903e-03	4	5.334e-04	2	-8.741e-04	6
6		min	0	6	-.039	4	.001	3	1.68e-04	2	-3.026e-04	4	-1.01e-02	1
7	N4	max	.033	2	-.017	6	.004	4	1.903e-03	4	4.951e-04	4	1.324e-03	4
8		min	0	6	-.035	1	-.001	2	1.68e-04	2	8.072e-05	3	-9.166e-03	2
9	N5	max	.002	4	.008	5	.006	5	-3.089e-07	6	7.297e-04	2	1.669e-03	5
10		min	-.004	2	-.035	1	-.013	1	-1.704e-03	1	6.347e-05	6	-1.221e-03	1
11	N6	max	0	6	-.009	6	.007	5	6.258e-03	5	8.829e-05	2	-8.262e-04	6
12		min	-.01	2	-.042	1	-.01	1	1.662e-04	3	-4.414e-05	6	-3.243e-03	1
13	N7	max	.005	4	.027	5	.004	5	5.448e-03	4	1.409e-03	1	-1.158e-03	6
14		min	.001	3	-.027	1	-.017	1	1.56e-03	3	-1.027e-04	5	-5.008e-03	1
15	N8	max	-.001	3	.02	2	.014	2	1.5e-03	2	5.515e-04	1	-7.06e-05	3
16		min	-.006	1	-.009	6	.002	6	-1.63e-03	4	-4.24e-04	5	-1.806e-03	5
17	N9	max	0	3	.03	5	.017	2	5.714e-03	5	7.107e-04	2	2.479e-03	4
18		min	-.009	4	-.006	3	.002	6	-3.448e-03	1	6.384e-05	6	-3.623e-03	2
19	N10	max	0	6	.028	2	.014	5	6.9e-03	5	1.942e-04	1	3.11e-03	4
20		min	-.01	1	-.017	6	.002	3	-1.481e-03	1	-6.113e-04	5	-2.437e-03	1
21	N11	max	0	6	.071	2	.014	1	7.329e-03	5	1.369e-04	1	2.851e-03	4
22		min	-.01	1	-.063	4	0	6	-1.684e-03	1	-6.645e-04	5	-2.488e-03	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
23	N12	max	0	6	-.022	6	.006	4	6.563e-03	5	8.423e-05	5	-7.736e-04	6
24		min	-.01	2	-.096	1	-.01	2	2.845e-04	3	-6.794e-05	3	-3.243e-03	1
25	N13	max	.037	1	-.022	6	0	6	2.022e-03	4	5.555e-04	4	1.162e-03	4
26		min	.003	6	-.113	1	-.003	2	-2.882e-04	2	8.99e-05	3	-9.558e-03	2
27	N14	max	-.002	3	.09	5	.023	2	5.844e-03	5	7.48e-04	2	2.877e-03	4
28		min	-.016	5	-.012	3	.002	6	-3.296e-03	1	7.099e-05	6	-3.911e-03	2
29	N15	max	.006	4	.086	5	.005	5	5.55e-03	4	1.506e-03	1	-1.195e-03	6
30		min	-.021	1	-.015	3	-.03	1	1.464e-03	3	-1.308e-04	5	-5.409e-03	1
31	N16	max	.041	2	.101	2	.006	1	2.074e-03	4	5.252e-04	2	-7.926e-04	6
32		min	-.003	4	-.053	4	0	5	4.263e-04	3	-3.559e-04	4	-1.039e-02	1
33	N17	max	0	6	.021	5	.004	2	7.514e-03	5	-1.067e-05	6	3.895e-04	3
34		min	-.009	2	-.013	3	0	6	-1.952e-04	3	-1.491e-04	2	-6.145e-04	5
35	N18	max	0	6	.02	5	.007	5	7.628e-03	5	5.93e-04	5	7.549e-04	4
36		min	-.009	1	-.024	3	0	1	-2.119e-04	3	-1.756e-04	1	2.887e-04	2
37	N19	max	.015	1	-.028	5	.003	5	4.925e-03	1	-4.926e-05	6	-1.257e-03	6
38		min	0	6	-.054	1	-.01	1	5.484e-04	6	-5.038e-04	1	-7.242e-03	1
39	N20	max	.011	2	.019	2	.011	2	2.25e-03	4	1.744e-04	4	3.207e-03	4
40		min	-.002	4	-.026	4	.001	6	-3.895e-03	2	-9.79e-05	2	-5.661e-03	2
41	N21	max	.012	2	-.025	5	.002	4	3.892e-03	1	2.051e-04	1	-1.25e-03	6
42		min	0	6	-.054	1	-.011	2	4.652e-04	6	3.452e-05	6	-8.443e-03	1
43	N22	max	.012	2	.02	2	.01	1	1.487e-03	4	5.119e-04	2	3.018e-03	4
44		min	0	6	-.025	4	.001	6	-3.139e-03	2	-3.825e-05	4	-6.667e-03	2
45	N23	max	0	6	.033	2	.013	5	7.329e-03	5	1.369e-04	1	2.846e-03	4
46		min	-.01	1	-.02	4	.002	3	-1.684e-03	1	-6.717e-04	5	-2.493e-03	1
47	N24	max	.11	1	-.009	6	.419	4	1.293e-02	4	2.131e-03	5	3.6e-04	4
48		min	-.001	6	-.066	1	.064	3	1.778e-03	3	-4.016e-03	1	-2.734e-03	2
49	N25	max	.109	1	.048	2	.497	5	1.581e-02	4	-4.166e-04	3	-2.224e-04	6
50		min	-.001	6	-.018	6	-.151	1	-4.03e-03	1	-4.528e-03	5	-2.504e-03	1
51	N26	max	.109	1	.07	2	.456	5	1.581e-02	4	-4.166e-04	3	-2.201e-04	6
52		min	-.001	6	-.016	6	-.175	1	-4.03e-03	1	-4.521e-03	5	-2.502e-03	1
53	N27	max	.11	1	-.008	6	.402	4	1.293e-02	4	2.125e-03	5	3.581e-04	4
54		min	-.001	6	-.089	1	.075	3	1.778e-03	3	-4.016e-03	1	-2.736e-03	2
55	N28	max	.59	1	-.022	3	.102	5	2.978e-03	5	4.008e-03	4	4.501e-04	5
56		min	.013	6	-.07	4	-.225	1	-7.901e-03	1	-8.352e-04	2	-1.644e-02	1
57	N29	max	.257	1	.072	5	.329	5	7.799e-03	5	3.869e-03	2	8.626e-03	5
58		min	-.339	5	.002	3	-.034	1	-2.667e-03	1	3.202e-04	6	-9.392e-03	1
59	N30	max	.318	1	.068	5	.282	4	6.759e-03	4	7.425e-03	1	-1.597e-03	6
60		min	.064	6	-.06	1	.018	3	1.14e-03	3	-1.058e-03	5	-1.247e-02	1
61	N31	max	.59	2	.059	2	.213	1	7.187e-03	2	-5.934e-04	3	-2.852e-04	6
62		min	-.006	6	-.08	4	.029	6	7.703e-04	6	-3.515e-03	4	-1.611e-02	1
63	N32	max	.109	1	.033	2	.524	5	1.589e-02	4	-4.025e-04	3	-2.539e-04	6
64		min	-.001	6	-.02	4	-.135	1	-4.072e-03	1	-4.331e-03	5	-2.457e-03	1
65	N33	max	.192	1	.033	2	1.025	5	0	1	-4.025e-04	3	0	1
66		min	.006	6	-.02	4	-.257	1	0	1	-4.331e-03	5	0	1
67	N34	max	.066	4	.033	2	.053	1	0	1	1.369e-04	1	0	1
68		min	-.069	1	-.02	4	-.163	5	0	1	-6.717e-04	5	0	1
69	N35	max	.012	2	-.002	2	.001	4	2.994e-04	4	6.478e-04	2	-5.042e-05	5
70		min	0	6	-.004	6	0	2	1.248e-04	2	2.168e-06	6	-6.108e-04	1
71	N36	max	.001	4	-.001	5	.002	5	4.014e-04	4	2.165e-04	2	-1.897e-04	5
72		min	0	3	-.003	3	-.001	1	2.322e-04	3	-1.167e-04	4	-5.5e-04	1
73	N37	max	0	3	0	2	.006	5	3.297e-04	5	2.852e-04	1	1.54e-04	4
74		min	-.003	4	-.003	6	0	3	-2.255e-04	3	4.876e-05	3	-2.377e-04	2

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
75	N38	max	0	1	0	2	0	5	0	2	0	2	0	5
76		min	0	5	0	6	0	1	0	6	0	4	0	6
77	N39	max	0	2	0	5	0	2	0	5	0	4	0	4
78		min	0	6	0	1	0	6	0	3	0	3	0	2
79	N40	max	0	6	.017	5	.015	5	8.775e-03	5	6.528e-04	5	1.409e-04	6
80		min	-.01	1	-.028	3	-.001	1	-3.984e-04	1	-4.86e-06	3	-3.365e-04	2
81	N41	max	.109	1	.016	5	.659	5	2.014e-02	5	2.122e-04	5	3.947e-04	5
82		min	-.001	6	-.028	3	-.028	1	-7.796e-04	1	-2.211e-03	1	-2.358e-03	1
83	N42	max	.2	1	.016	5	1.314	5	0	1	2.122e-04	5	0	1
84		min	-.011	5	-.029	3	-.051	1	0	1	-2.211e-03	1	0	1
85	N43	max	.003	6	.016	5	.009	3	0	1	6.528e-04	5	0	1
86		min	-.01	2	-.028	3	-.176	5	0	1	-4.86e-06	3	0	1
87	N44	max	0	6	.018	5	.005	5	8.747e-03	5	1.301e-04	1	2.028e-04	6
88		min	-.01	2	-.01	3	0	3	-1.167e-05	3	-5.186e-05	5	-5.337e-04	2
89	N45	max	.109	1	.018	5	.535	5	1.481e-02	4	3.053e-03	5	4.597e-05	6
90		min	-.001	6	-.011	3	.011	3	4.391e-04	3	-2.589e-03	1	-1.876e-03	2
91	N46	max	.168	2	.018	5	.979	4	0	1	3.053e-03	5	0	1
92		min	-.003	6	-.011	3	.025	3	0	1	-2.589e-03	1	0	1
93	N47	max	.005	6	.018	5	0	3	0	1	1.301e-04	1	0	1
94		min	-.021	2	-.01	3	-.205	5	0	1	-5.186e-05	5	0	1
95	N48	max	0	6	-.011	6	.007	5	6.563e-03	5	9.067e-05	5	-7.672e-04	6
96		min	-.01	2	-.049	1	-.01	1	2.845e-04	3	-6.794e-05	3	-3.237e-03	1
97	N49	max	.11	1	-.011	6	.432	4	1.299e-02	4	2.025e-03	5	4.517e-04	4
98		min	-.001	6	-.05	1	.056	3	1.792e-03	3	-3.665e-03	1	-2.648e-03	2
99	N50	max	.209	2	-.011	6	.847	4	0	1	2.025e-03	5	0	1
100		min	-.012	4	-.05	1	.11	3	0	1	-3.665e-03	1	0	1
101	N51	max	-.018	6	-.011	6	-.009	3	0	1	9.067e-05	5	0	1
102		min	-.086	1	-.049	1	-.151	5	0	1	-6.794e-05	3	0	1
103	N52	max	.034	1	-.018	6	.003	4	2.018e-03	4	5.591e-04	4	1.165e-03	4
104		min	0	6	-.045	1	-.001	2	-2.915e-04	2	8.695e-05	3	-9.556e-03	2
105	N53	max	.284	1	.052	5	.315	5	7.801e-03	5	3.874e-03	2	8.626e-03	5
106		min	-.315	5	-.003	3	-.05	1	-2.665e-03	1	3.195e-04	6	-9.393e-03	1
107	N54	max	.597	1	-.021	3	.119	5	2.976e-03	5	4.011e-03	4	4.51e-04	5
108		min	.003	6	-.053	1	-.229	1	-7.903e-03	1	-8.413e-04	2	-1.644e-02	1
109	N55	max	.601	1	-.018	6	.131	4	2.958e-03	5	3.775e-03	4	4.533e-04	5
110		min	-.003	6	-.045	1	-.231	1	-8.07e-03	1	-8.686e-04	2	-1.646e-02	1
111	N56	max	1.12	1	-.018	6	.229	5	0	1	3.775e-03	4	0	1
112		min	-.011	4	-.045	1	-.473	1	0	1	-8.686e-04	2	0	1
113	N57	max	.031	4	-.018	6	.006	2	0	1	5.591e-04	4	0	1
114		min	-.195	2	-.045	1	-.044	4	0	1	8.695e-05	3	0	1
115	N58	max	.02	2	.016	2	.006	1	2.031e-03	4	8.187e-04	2	2.811e-03	4
116		min	0	4	-.028	6	.001	3	-4.215e-03	2	-4.372e-05	4	-7.751e-03	2
117	N59	max	.607	2	.016	2	.204	4	4.625e-03	4	2.334e-03	4	4.104e-03	4
118		min	-.124	4	-.028	6	-.235	2	-7.586e-03	1	5.016e-04	3	-1.805e-02	2
119	N60	max	1.2	2	.016	2	.363	4	0	1	2.334e-03	4	0	1
120		min	-.248	4	-.028	6	-.463	1	0	1	5.016e-04	3	0	1
121	N61	max	.066	4	.016	2	.107	2	0	1	8.187e-04	2	0	1
122		min	-.147	2	-.028	6	-.035	4	0	1	-4.372e-05	4	0	1
123	N62	max	.011	2	.019	2	.01	2	2.974e-03	4	1.931e-04	4	3.908e-03	4
124		min	-.003	4	-.022	4	.001	6	-3.448e-03	2	3.357e-05	3	-6.813e-03	2
125	N63	max	.449	2	.019	2	.246	4	5.66e-03	4	4.228e-03	2	5.884e-03	4
126		min	-.196	4	-.022	4	-.145	2	-5.665e-03	2	2.64e-04	6	-1.147e-02	1

Envelope Joint Displacements (Continued)

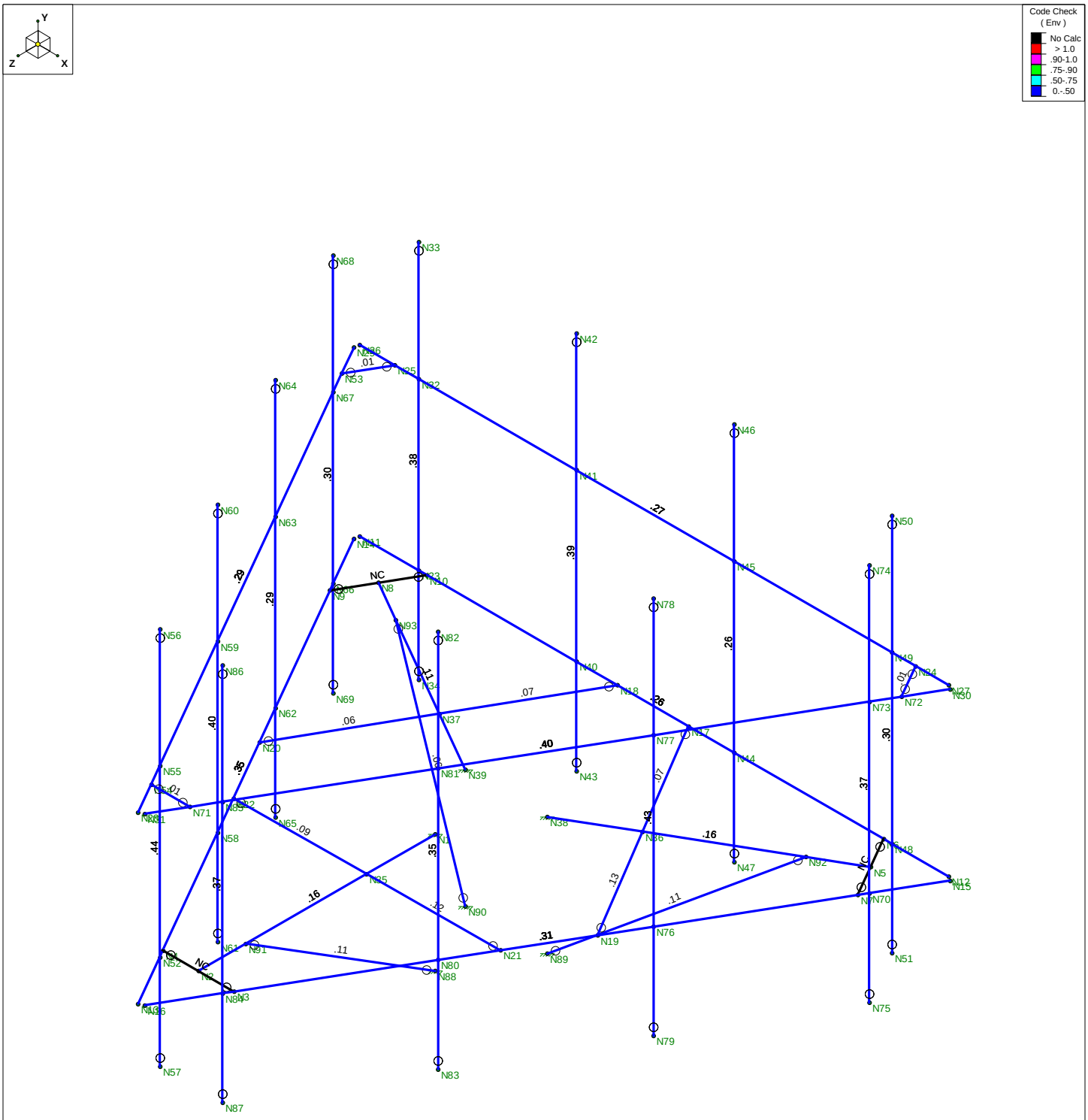
	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
127	N64	max	.793	2	.019	2	.418	4	0	1	4.228e-03	2	0	1
128		min	-.372	4	-.022	4	-.315	2	0	1	2.64e-04	6	0	1
129	N65	max	.09	4	.019	2	.093	2	0	1	1.931e-04	4	0	1
130		min	-.152	2	-.022	4	-.063	4	0	1	3.357e-05	3	0	1
131	N66	max	0	3	.038	5	.018	2	5.848e-03	5	7.591e-04	2	2.874e-03	4
132		min	-.01	4	-.007	3	.002	6	-3.291e-03	1	7.024e-05	6	-3.913e-03	2
133	N67	max	.304	1	.038	5	.305	5	7.756e-03	5	3.679e-03	2	8.739e-03	5
134		min	-.297	5	-.007	3	-.061	1	-2.629e-03	1	3.038e-04	6	-9.463e-03	1
135	N68	max	.613	1	.038	5	.558	5	0	1	3.679e-03	2	0	1
136		min	-.56	5	-.007	3	-.14	1	0	1	3.038e-04	6	0	1
137	N69	max	.059	4	.038	5	.097	1	0	1	7.591e-04	2	0	1
138		min	-.097	2	-.007	3	-.129	5	0	1	7.024e-05	6	0	1
139	N70	max	.005	4	.034	5	.004	5	5.555e-03	4	1.512e-03	1	-1.193e-03	6
140		min	-.001	2	-.024	1	-.018	1	1.468e-03	3	-1.272e-04	5	-5.407e-03	1
141	N71	max	.597	1	.044	2	.217	1	7.186e-03	2	-5.945e-04	3	-2.862e-04	6
142		min	.004	6	-.057	4	.035	6	7.686e-04	6	-3.518e-03	4	-1.611e-02	1
143	N72	max	.376	1	.048	5	.277	4	6.761e-03	4	7.432e-03	1	-1.596e-03	6
144		min	.064	6	-.039	1	.026	3	1.142e-03	3	-1.055e-03	5	-1.247e-02	1
145	N73	max	.414	1	.034	5	.274	4	6.729e-03	4	7.092e-03	1	-1.613e-03	6
146		min	.065	6	-.024	1	.031	3	1.142e-03	3	-9.09e-04	5	-1.256e-02	1
147	N74	max	.816	1	.034	5	.485	4	0	1	7.092e-03	1	0	1
148		min	.113	6	-.024	1	.065	3	0	1	-9.09e-04	5	0	1
149	N75	max	-.027	6	.034	5	-.039	3	0	1	1.512e-03	1	0	1
150		min	-.131	1	-.024	1	-.13	1	0	1	-1.272e-04	5	0	1
151	N76	max	.02	1	-.024	5	.004	5	4.698e-03	1	-6.507e-05	6	-1.306e-03	6
152		min	0	6	-.052	1	-.007	1	9.746e-04	6	-2.813e-04	1	-8.365e-03	1
153	N77	max	.638	1	-.024	5	.257	4	8.654e-03	1	2.798e-03	1	-1.737e-03	6
154		min	.064	6	-.052	1	.06	3	1.765e-03	6	-1.056e-03	5	-1.822e-02	1
155	N78	max	1.235	1	-.024	5	.501	1	0	1	2.798e-03	1	0	1
156		min	.116	6	-.052	1	.122	3	0	1	-1.056e-03	5	0	1
157	N79	max	-.031	6	-.024	5	-.021	6	0	1	-6.507e-05	6	0	1
158		min	-.162	1	-.052	1	-.12	1	0	1	-2.813e-04	1	0	1
159	N80	max	.016	1	-.026	5	.003	4	4.935e-03	1	4.77e-04	1	-1.223e-03	6
160		min	0	6	-.046	1	-.009	2	6.379e-04	6	3.496e-05	6	-9.949e-03	1
161	N81	max	.645	1	-.026	5	.245	1	7.718e-03	1	-3.221e-04	3	-1.41e-03	6
162		min	.047	6	-.046	1	.059	6	1.18e-03	6	-2.149e-03	4	-1.771e-02	1
163	N82	max	1.202	1	-.026	5	.477	1	0	1	-3.221e-04	3	0	1
164		min	.089	6	-.046	1	.1	6	0	1	-2.149e-03	4	0	1
165	N83	max	-.029	6	-.026	5	-.014	6	0	1	4.77e-04	1	0	1
166		min	-.223	1	-.046	1	-.127	1	0	1	3.496e-05	6	0	1
167	N84	max	.035	2	.034	2	.002	4	2.068e-03	4	5.196e-04	2	-7.958e-04	6
168		min	0	6	-.04	4	.001	3	4.208e-04	3	-3.591e-04	4	-1.039e-02	1
169	N85	max	.601	1	.033	2	.219	1	7.338e-03	2	-5.547e-04	3	-2.912e-04	6
170		min	.01	6	-.041	4	.038	6	7.627e-04	6	-3.278e-03	4	-1.614e-02	1
171	N86	max	1.111	1	.033	2	.439	1	0	1	-5.547e-04	3	0	1
172		min	.019	6	-.041	4	.066	6	0	1	-3.278e-03	4	0	1
173	N87	max	-.019	6	.034	2	-.009	3	0	1	5.196e-04	2	0	1
174		min	-.215	1	-.04	4	-.046	4	0	1	-3.591e-04	4	0	1
175	N88	max	0	6	0	2	0	2	0	1	0	2	0	2
176		min	0	1	0	4	0	4	0	1	0	6	0	6
177	N89	max	0	5	0	5	0	1	0	3	0	3	0	5
178		min	0	1	0	1	0	5	0	5	0	5	0	3

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [...	LC	Y Rotation [...	LC	Z Rotation [...	LC
179	N90	max	0	6	0	2	0	6	0	1	0	4	0	1
180		min	0	2	0	6	0	2	0	4	0	1	0	4
181	N91	max	.032	2	-.003	2	.003	4	1.243e-03	4	3.762e-04	2	2.127e-03	2
182		min	0	6	-.015	4	0	2	1.186e-04	2	7.597e-06	6	-2.784e-04	6
183	N92	max	.003	4	.002	5	.007	5	3.061e-05	3	3.914e-04	2	1.001e-03	5
184		min	-.001	2	-.014	1	-.008	1	-1.019e-03	4	-9.122e-06	4	-8.079e-04	1
185	N93	max	-.001	3	.006	2	.013	5	8.914e-04	2	3.16e-04	1	5.363e-05	3
186		min	-.007	4	-.006	6	.001	3	-1.166e-03	4	7.086e-06	6	-1.103e-03	5

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc...	LC	Shea...	Loc.....	L...	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M1	HSS4x4x4	.165	0	1	.092	4.01	y 1	138.291	139.518	16.181	16.181	1...	H1-1b
2	M2	HSS4x4x4	.155	3.9...	1	.066	4.01	y 1	135.844	139.518	16.181	16.181	2...	H1-1b
3	M3	HSS4x4x4	.106	5	4	.064	4.01	z 5	138.935	139.518	16.181	16.181	1...	H1-1b
4	M4	PIPE_3.0	.315	1.4...	2	.246	1.2...	2	57.037	65.205	5.749	5.749	1	H1-1b
5	M5	PIPE_3.0	.349	1.5...	1	.303	1.4...	1	57.037	65.205	5.749	5.749	1	H1-1b
6	M6	PIPE_3.0	.256	10....	4	.227	11....	4	57.037	65.205	5.749	5.749	1	H1-1b
7	M10	HSS4x4x4	.086	2.7...	4	.089	0	z 2	135.06	139.518	16.181	16.181	1...	H1-1b
8	M11	HSS4x4x4	.073	0	3	.089	2.8...	y 5	134.98	139.518	16.181	16.181	1...	H1-1b
9	M12	HSS4x4x4	.064	0	4	.080	2.7...	y 2	135.06	139.518	16.181	16.181	1...	H1-1b
10	M13	PIPE_2.0	.404	7.9...	1	.167	11....	1	6.346	32.13	1.872	1.872	4...	H1-1b
11	M14	PIPE_2.0	.294	4.6...	2	.146	7.9...	2	6.346	32.13	1.872	1.872	3...	H1-1b
12	M15	PIPE_2.0	.271	7.7...	1	.115	4.5...	5	6.346	32.13	1.872	1.872	4...	H1-1b
13	M16	PIPE_2.5	.382	2	4	.103	2	5	30.038	50.715	3.596	3.596	1...	H1-1b
14	M17	HSS4x4x4	.125	0	1	.113	0	y 1	134.981	139.518	16.181	16.181	1...	H1-1b
15	M18	HSS4x4x4	.133	0	1	.105	0	y 1	135.137	139.518	16.181	16.181	1...	H1-1b
16	M19	HSS4x4x4	.065	2.7...	5	.087	0	z 5	135.138	139.518	16.181	16.181	1...	H1-1b
17	M20	PIPE_2.5	.393	2	4	.076	2	1	30.038	50.715	3.596	3.596	2...	H1-1b
18	M21	PIPE_2.5	.263	2	1	.086	2	1	30.038	50.715	3.596	3.596	2...	H1-1b
19	M22	PIPE_2.5	.302	2	4	.094	2	1	30.038	50.715	3.596	3.596	1...	H1-1b
20	M23	PIPE_2.5	.439	2	1	.085	2	4	30.038	50.715	3.596	3.596	1...	H1-1b
21	M24	PIPE_2.5	.400	2	1	.078	2	4	30.038	50.715	3.596	3.596	1...	H1-1b
22	M25	PIPE_2.5	.290	2	1	.110	2	2	30.038	50.715	3.596	3.596	1...	H1-1b
23	M26	PIPE_2.5	.296	2	5	.088	2	2	30.038	50.715	3.596	3.596	1...	H1-1b
24	M27	PIPE_2.5	.371	2	2	.149	2	1	30.038	50.715	3.596	3.596	1...	H1-1b
25	M28	PIPE_2.5	.426	2	1	.098	5.5	1	30.038	50.715	3.596	3.596	1...	H1-1b
26	M29	PIPE_2.5	.355	2	2	.082	2	4	30.038	50.715	3.596	3.596	1...	H1-1b
27	M30	PIPE_2.5	.371	2	2	.082	2	4	30.038	50.715	3.596	3.596	1...	H1-1b
28	M31	L2.5x2.5x4	.007	.411	5	.145	.821	y 4	37.717	38.556	1.114	2.537	1...	H2-1
29	M32	L2.5x2.5x4	.011	.411	1	.117	0	y 4	37.717	38.556	1.114	2.537	1...	H2-1
30	M33	L2.5x2.5x4	.008	.411	4	.183	0	y 1	37.717	38.556	1.114	2.537	1...	H2-1
31	M34	LL2.5x2.5x3x3	.113	4.7...	4	.004	4.7...	y 1	43.374	58.32	3.954	2.55	1	H1-1...
32	M35	LL2.5x2.5x3x3	.057	4.7...	6	.003	0	y 4	43.374	58.32	3.954	2.55	1	H1-1...
33	M36	LL2.5x2.5x3x3	.108	4.7...	1	.003	0	y 4	43.374	58.32	3.954	2.55	1	H1-1...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTNH331B	May 29, 2018 at 3:07 PM
18058.35	Unity Check	Mount - Proposed.r3d

SITE NAME: NH331/OPTA PINE GROVE

940 MERIDEN ROAD
WATERBURY, CT 06705

SITE NUMBER: CTNH331B

PROJECT: T-MOBILE L600

CONFIGURATION: 67D94DB_1xAIR+1QP+1OP

T-MOBILE TECHNICIAN SITE SAFETY NOTES

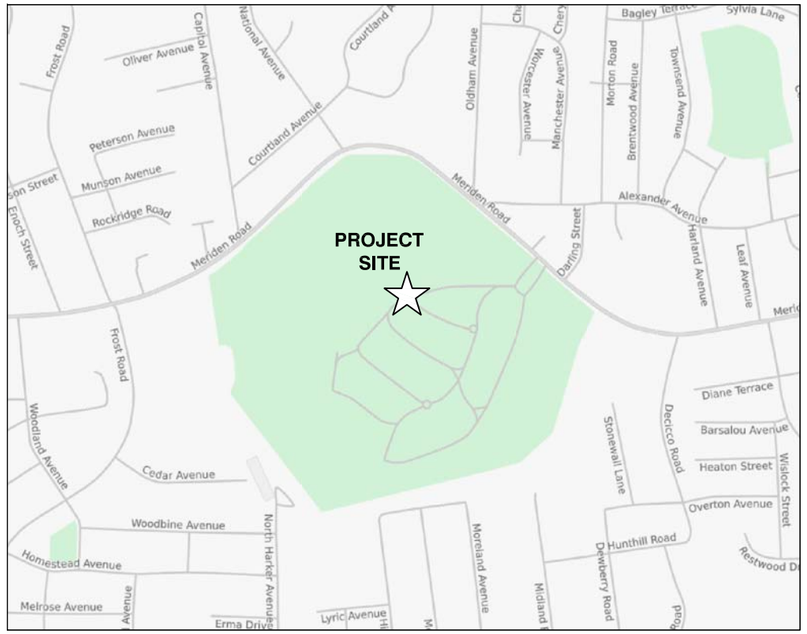
LOCATION	SPECIAL RESTRICTIONS
ANTENNA/TMA	
SECTOR A:	ACCESS NOT PERMITTED
SECTOR B:	ACCESS NOT PERMITTED
SECTOR C:	ACCESS NOT PERMITTED
SECTOR D:	ACCESS NOT PERMITTED
GPS/LMU:	UNRESTRICTED*
(*CAUTION: OSHA-APPROVED PORTABLE 8' STEP-LADDER REQUIRED)	
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

GENERAL NOTES

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

SPECIAL CONSTRUCTION NOTES

1. TOWER OWNER SHALL PROVIDE GLOBAL STRUCTURAL STABILITY ANALYSIS OF EXISTING ANTENNA SUPPORT STRUCTURE. GENERAL CONTRACTOR SCOPE OF WORK SHALL INCLUDE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE-BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. PROTERRA DESIGN GROUP ASSUMES THAT THE MONOPOLE IS PROPERLY CONSTRUCTED AND MAINTAINED. ALL STRUCTURAL MEMBERS AND THEIR CONNECTION ARE ASSUMED TO BE IN GOOD CONDITION AND ARE FREE FROM DEFECTS WITH NO DETERIORATION TO ITS MEMBER CAPACITIES.
3. REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS (MSA) PREPARED BY CENTEK ENGINEERING DATED MAY 29, 2018.



PROJECT INFORMATION

SCOPE OF WORK:	UNMANNED TELECOMMUNICATIONS FACILITY T-MOBILE EQUIPMENT MODERNIZATION
ZONING JURISDICTION:	SPECIAL ZONING NOTE (ELIGIBLE FACILITY REQUEST): BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW OR ADMINISTRATIVE REVIEW).
T-MOBILE E911 ADDRESS:	940 MERIDEN ROAD WATERBURY, CT 06705
SBA BUSINESS ADDRESS:	940 MERIDEN ROAD WATERBURY, CT 06705
LATITUDE:	41° 33' 11.80" N (41.5533°) (FROM SBA RECORD)
LONGITUDE:	72° 59' 36.10" W (-72.9934°) (FROM SBA RECORD)
JURISDICTION:	CITY OF WATERBURY / CSC SITING COUNCIL
BUILDING CODE:	2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS (IBC 2012 BASED)
ELECTRICAL CODE:	2014 NATIONAL ELECTRICAL CODE AND AMENDMENTS
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	SBA INFRASTRUCTURE, LLC
SBA SITE ID:	CT13070-A
SBA SITE NAME:	WATERBURY 4, CT
SBA REGIONAL SITE MANAGER:	STEPHEN ROTH (860) 539-4920

APPROVALS

PROJECT MANAGER	DATE
CONSTRUCTION	DATE
RF ENGINEERING	DATE
ZONING / SITE ACQ.	DATE
OPERATIONS	DATE
TOWER OWNER	DATE

DIG SAFE SYSTEM
(MA, ME, NH, RI, VT):
1-888-344-7233

CALL BEFORE YOU DIG
(CT): 1-800-922-4455

UNDERGROUND SERVICE ALERT

DRAWING INDEX

SHEET NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	1
GN-1	GENERAL NOTES	1
A-1	COMPOUND & ELEVATION PLAN	1
A-2	EXISTING & PROPOSED ANTENNA PLAN	1
A-3	DETAILS	1
E-1	ONE-LINE DIAGRAM & GROUNDING DETAILS	1

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
7-31-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	07/31/18	CONSTRUCTION REVISED	JEB
0	06/15/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH331B
SITE NAME:
NH331/OPTA PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

GROUNDING NOTES

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTNING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER SURCUITS TO BTS EQUIPMENT.
5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. MISCELLANEOUS ELECTRICL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11. METAL CONDUIT SHALL BE MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWS COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – SBA COMMUNICATIONS CORP.
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T-MOBILE
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CUR\BS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (FY = 36 KSI) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (FY = 35 KSI). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH UMTS SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;

    AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), STEEL CONSTRUCTION MANUAL, 14TH EDITION;

    TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-G, STRUCTURAL STANDARDS FOR STEEL

    ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

ABBREVIATIONS

AGL	ABOVE GRADE LEVEL	EQ	EQUAL	REQ	REQUIRED
AWG	AMERICAN WIRE GAUGE	G.C.	GENERAL CONTRACTOR	RF	RADIO FREQUENCY
BTCW	BARE TINNED SOLID COPPER WIRE	GRC	GALVANIZED RIGID CONDUIT	TBD	TO BE DETERMINED
		MGB	MASTER GROUND BAR	TBR	TO BE REMOVED
BGR	BURIED GROUND RING	MIN	MINIMUM	TBRR	TO BE REMOVED AND REPLACED
BTS	BASE TRANSCEIVER STATION	PROPOSED	NEW OR (P)	TYP	TYPICAL
EXISTING	EXISTING OR (E)	N.T.S.	NOT TO SCALE	VIF	VERIFY IN FIELD
EGB	EQUIPMENT GROUND BAR	RAD	RADIATION CENTERLINE (ANTENNA)		
EGR	EQUIPMENT GROUND RING	REF	REFERENCE		

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
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WESTBOROUGH, MA 01581 TEL: (508) 251-0720

ProTerra DESIGN GROUP, LLC
4 Bay Road, Building A
Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
7-31-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

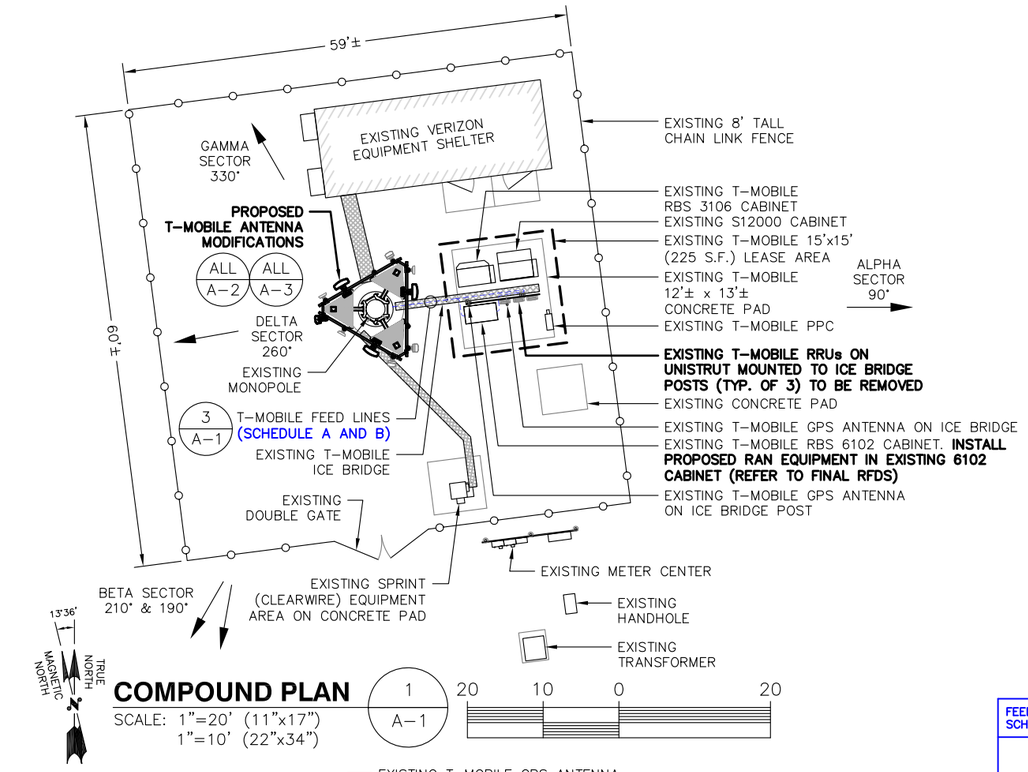
SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	07/31/18	CONSTRUCTION REVISED	JEB
0	06/15/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH331B
SITE NAME:
NH331/OPTA PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



COMPOUND PLAN

SCALE: 1"=20' (11"x17")
1"=10' (22"x34")

1 / A-1

20 10 0 20

IMAGE SOURCE: PROTERRA 05/26/18

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

2 / A-1

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

SPECIAL CONSTRUCTION NOTE (SBA-PROVIDED ANTENNA MOUNT STRUCTURAL MOD SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ANTENNA MOUNT STRUCTURAL AUGMENTS (STRUCTURAL MODIFICATIONS) AT THE T-MOBILE RAD/VERTICAL EQUIPMENT SPACE PER RECOMMENDATIONS FROM SBA-PROVIDED ANTENNA MOUNT STRUCTURAL ANALYSIS AND ANY SUPPLEMENTAL CONSTRUCTION DRAWINGS (ANALYSIS PROVIDED BY CENTEK ENGINEERING DATED 05/29/18).

SPECIAL CONSTRUCTION NOTE:
T-MOBILE WORK IS CONTINGENT ON THE FOLLOWING:
* COMPLETION OF A GLOBAL STRUCTURAL STABILITY ANALYSIS.
* COMPLETED MOUNT STRUCTURAL ANALYSIS [REFER TO ANTENNA MOUNT STRUCTURAL ANALYSIS (MSA) PREPARED BY CENTEK ENGINEERING DATED MAY 29, 2018].
* GC SHALL FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS AS INDICATED IN BEFORE-MENTIONED GLOBAL AND MOUNT ANALYSIS.

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (12) 1⅝" COAX (ACTIVE) AND (1) 6 X12 HYBRID TO 99' RAD EXISTING TO BE REMOVED: (6) 1⅝" COAX	UP INSIDE MONOPOLE TO RAD
B	PROPOSED: (1) 6 X 12 HYBRID TO 99' RAD;	UP INSIDE MONOPOLE TO RAD

NOTE: EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER

T-MOBILE FEED LINES (REFER TO SBA-PROVIDED STRUCTURAL ANALYSIS FOR SPECIAL FEEDLINE INSTALLATION REQUIREMENTS, STACKING, BUNDLING, SHIELDING, MOUNTING AND RELOCATION OF EXISTING OR PROPOSED FEEDLINES)

IMAGE SOURCE: PROTERRA 05/26/18

FEEDLINE PHOTO DETAIL AT TOWER BASE

SCALE: N.T.S.

3 / A-1

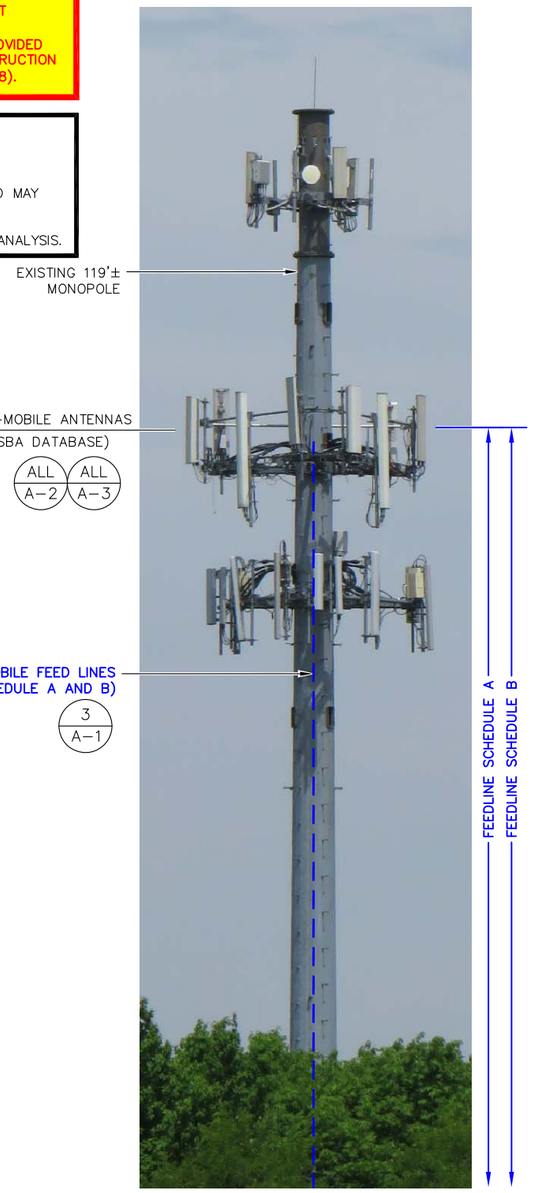


IMAGE SOURCE: PROTERRA 05/26/18

PARTIAL ELEVATION PHOTO DETAIL

SCALE: N.T.S.

4 / A-1

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
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WESTBOROUGH, MA 01581 TEL: (508) 251-0720

PROTERRA DESIGN GROUP, LLC
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Suite 200
Hadley, MA 01035 Ph: (413)320-4918

STATE OF CONNECTICUT
JESSE M. MORENO
No. 24389
LICENSED PROFESSIONAL ENGINEER
7-31-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

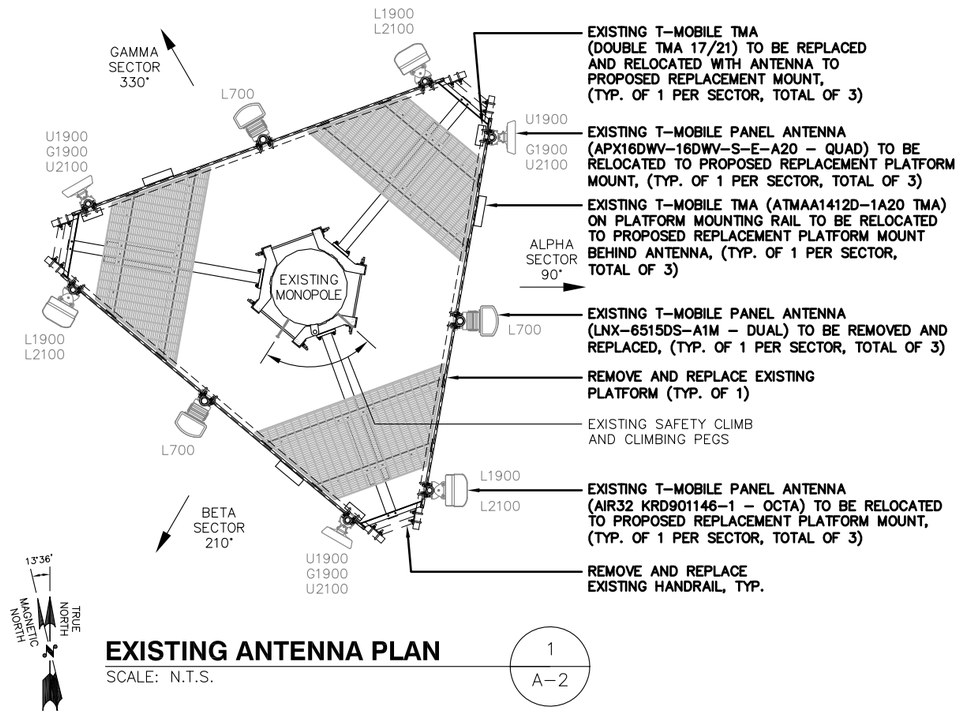
REV.	DATE	DESCRIPTION	BY
1	07/31/18	CONSTRUCTION REVISED	JEB
0	06/15/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH331B
SITE NAME:
NH331/OPTA PINE GROVE

SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
COMPOUND & ELEVATION PLAN

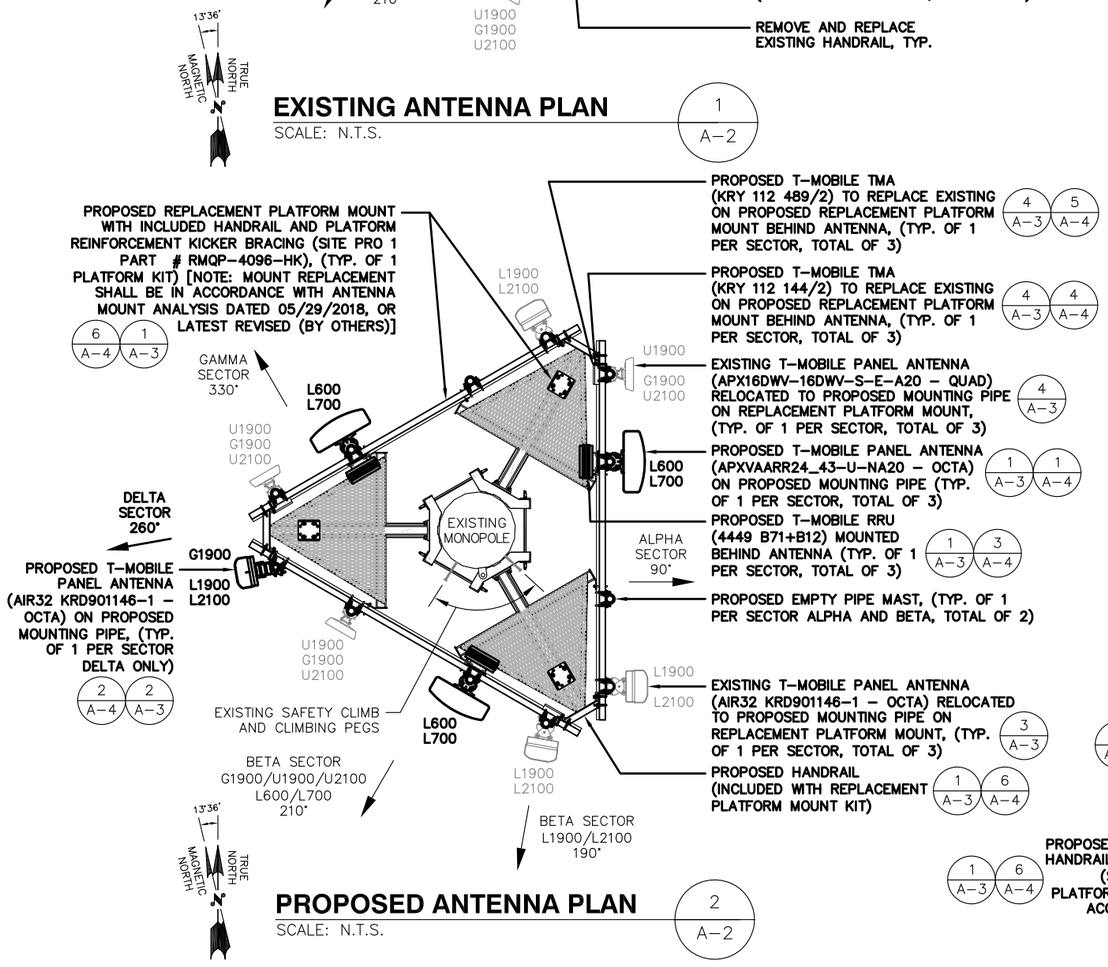
SHEET NUMBER
A-1



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-2



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-2

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NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

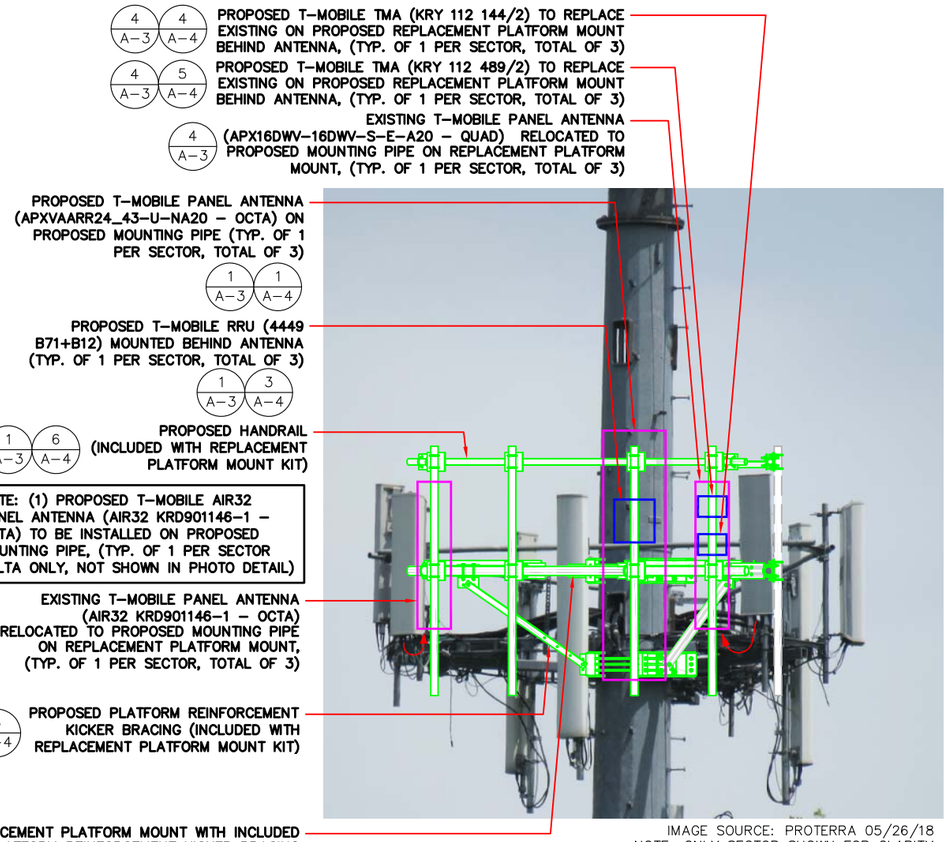

IMAGE SOURCE: PROTERRA 05/26/18
NOTE: ONLY SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-2

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SITE NAME:
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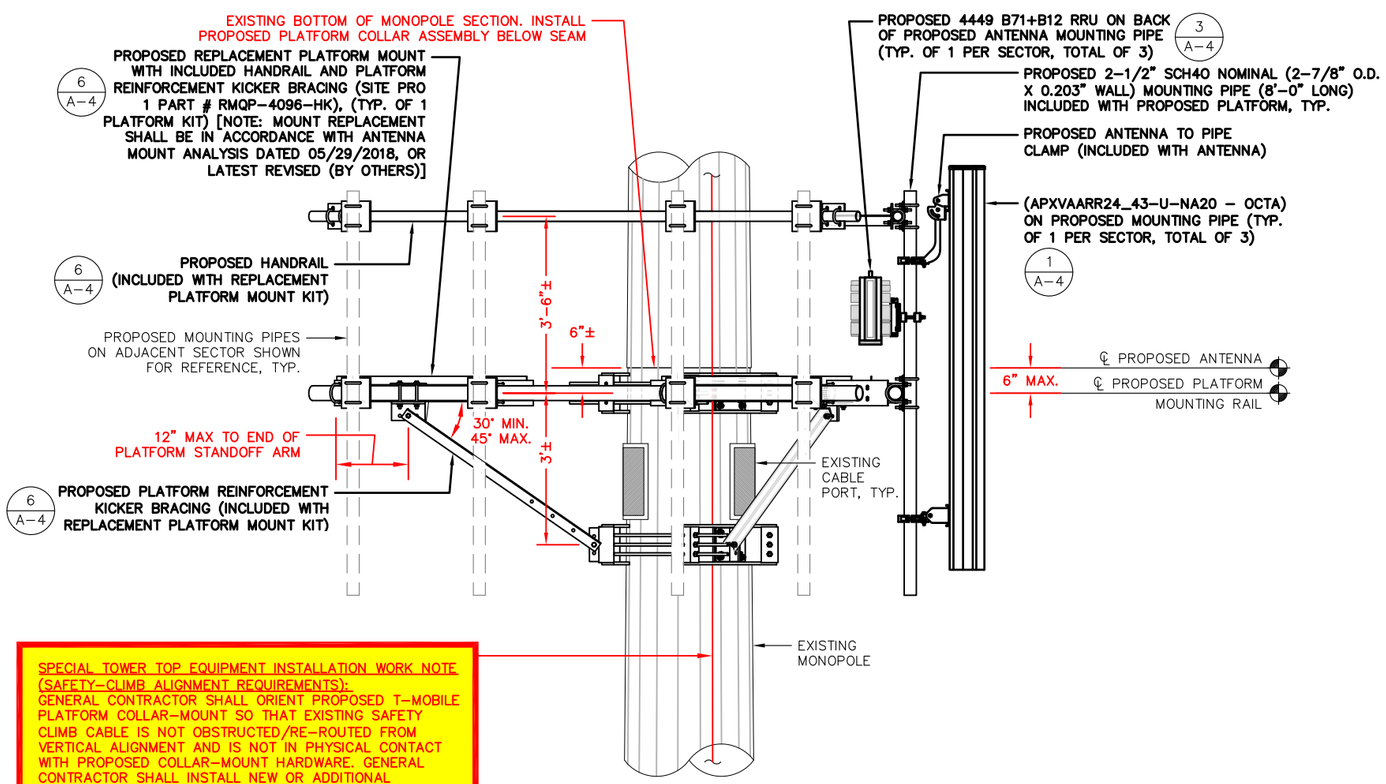
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

SHEET NUMBER
A-2

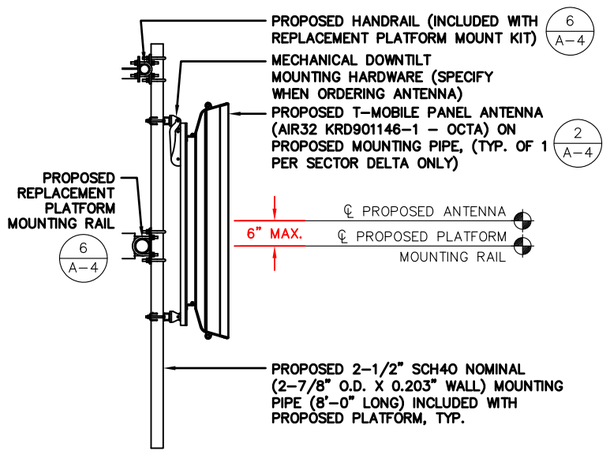


SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED T-MOBILE PLATFORM COLLAR-MOUNT SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH PROPOSED COLLAR-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

PROPOSED ANTENNA (APXVAARR24_43-U-NA20 OCTA) AND PLATFORM MOUNTING DETAIL

1 / A-3

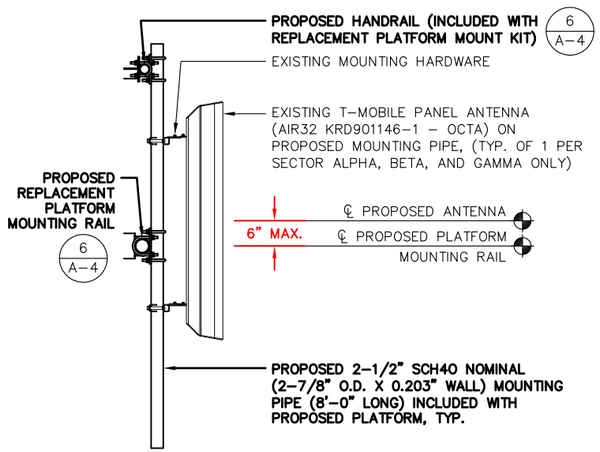
SCALE: N.T.S.



PROPOSED (AIR32 KRD901146-1 - OCTA) ANTENNA MOUNTING DETAIL

2 / A-3

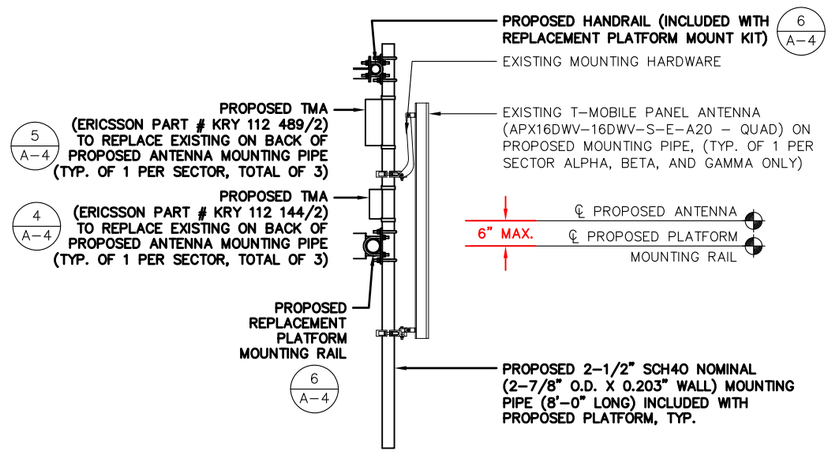
SCALE: N.T.S.



RELOCATED EXISTING (AIR32 KRD901146-1 - OCTA) ANTENNA MOUNTING DETAIL

3 / A-3

SCALE: N.T.S.



RELOCATED EXISTING (APX16DWV-16DWV-S-E-A20 - QUAD) ANTENNA MOUNTING DETAIL

4 / A-3

SCALE: N.T.S.

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NOTE:
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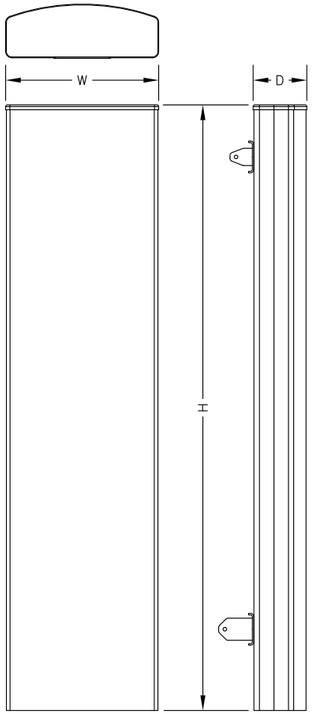
SITE NAME:
NH331/OPTA PINE GROVE

SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
DETAILS

SHEET NUMBER
A-3

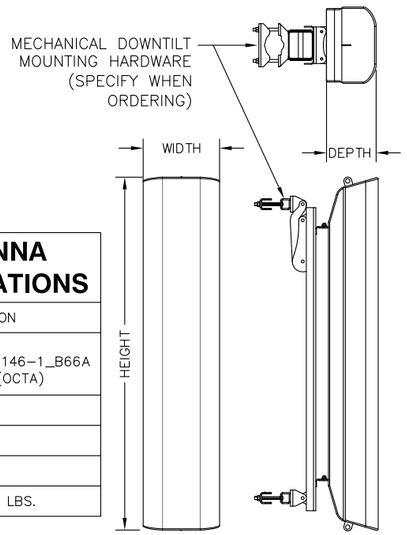


L600/L700 ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTA)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS. (ANTENNA ONLY, WITHOUT MOUNTING HARDWARE)

ANTENNA DETAIL (APXVAARR24_43-U-NA20 OCTA) — 1 / A-4

SCALE: N.T.S.

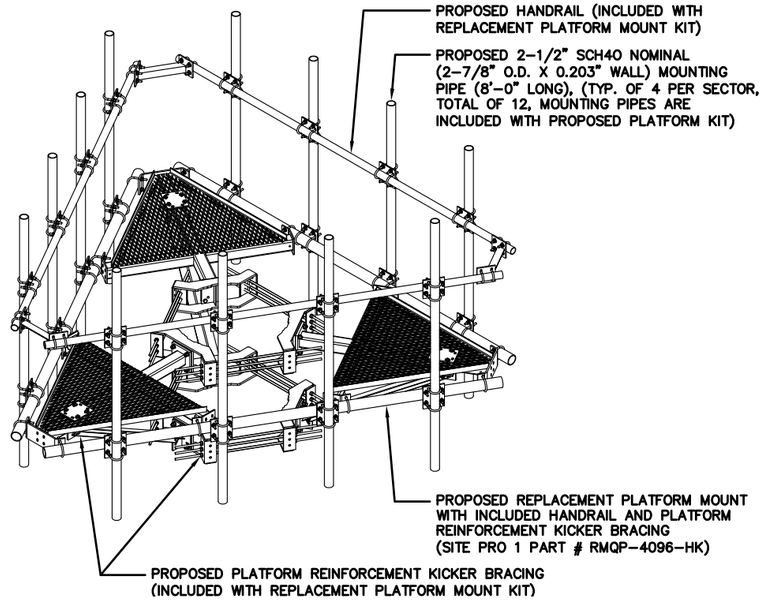


AIR ANTENNA SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	AIR32 KRD901146-1_B66A _B2A (OCTA)
HEIGHT	56.6"
WIDTH	12.9"
DEPTH	8.7"
WEIGHT	132.2± LBS.

ANTENNA DETAIL (AIR32 KRD901146-1_B66A_B2A OCTA) — 2 / A-4

SCALE: N.T.S.

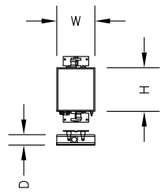


SECTOR FRAME DETAIL — 6 / A-4

SCALE: N.T.S.

TMA SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	KRY 112 144/2
HEIGHT	6.9"
WIDTH	6.1"
DEPTH	2.8"
WEIGHT	11± LBS.

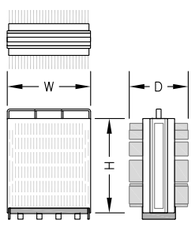


TMA DETAIL (KRY 112 144/2) — 4 / A-4

SCALE: N.T.S.

RRU SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	4449 B71+B12
HEIGHT	14.9"
WIDTH	13.2"
DEPTH	9.2"
WEIGHT	74± LBS.

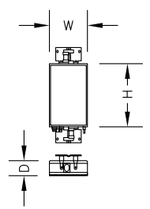


REMOTE RADIO UNIT (RRU) DETAIL (4449 B71+B12) — 3 / A-4

SCALE: N.T.S.

TMA SPECIFICATIONS

MANUF.	ERICSSON
MODEL #	KRY 112 489/2
HEIGHT	11"
WIDTH	6.1"
DEPTH	3.9"
WEIGHT	15.4± LBS.



TMA DETAIL (KRY 112 489/2) — 4 / A-4

SCALE: N.T.S.

ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD	AZIMUTH	RADIOS	CABLE FEED LINES
ALPHA	G1900, U1900, U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	99'±	90°	–	EXISTING (4) 1-5/8" COAX
	L600, L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	99'±	90°	PROPOSED (1) 4449 B71+B12	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900, L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	99'±	90°	–	EXISTING (1) SHARED 6X12 HYBRID CABLE TRUNK
BETA	G1900, U1900, U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	99'±	210°	–	EXISTING (4) 1-5/8" COAX
	L600, L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	99'±	210°	PROPOSED (1) 4449 B71+B12	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900, L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	99'±	190°	–	EXISTING (1) SHARED 6X12 HYBRID CABLE TRUNK
GAMMA	G1900, U1900, U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	99'±	330°	–	EXISTING (4) 1-5/8" COAX
	L600, L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	99'±	330°	PROPOSED (1) 4449 B71+B12	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L1900, L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	99'±	330°	–	EXISTING (1) SHARED 6X12 HYBRID CABLE TRUNK
DELTA	G1900, L1900, L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	99'±	260°	–	SHARE EXISTING (1) SHARED 6X12 HYBRID CABLE TRUNK – TO BE VERIFIED

EXISTING (12) 1-5/8" COAX, (1) EXISTING 6X12 HYBRID CABLE TRUNK AND (1) PROPOSED 6X12 HYBRID CABLE TRUNK TO SERVE ALL SECTORS (NOTE: VERIFY DELTA DOES NOT REQUIRE ADDITIONAL HYBRID TO BE INSTALLED) BASED ON RFDS DATED 04/18/2018. REFER TO FINAL RFDS AND FINAL COLLO-APPLICATION FOR FINAL CONFIGURATION AND QUANTITIES.

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SHEET TITLE
DETAILS

SHEET NUMBER
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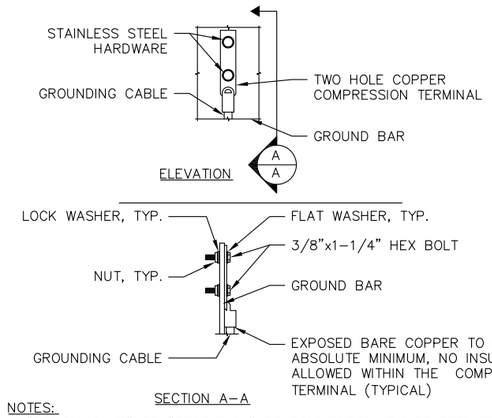
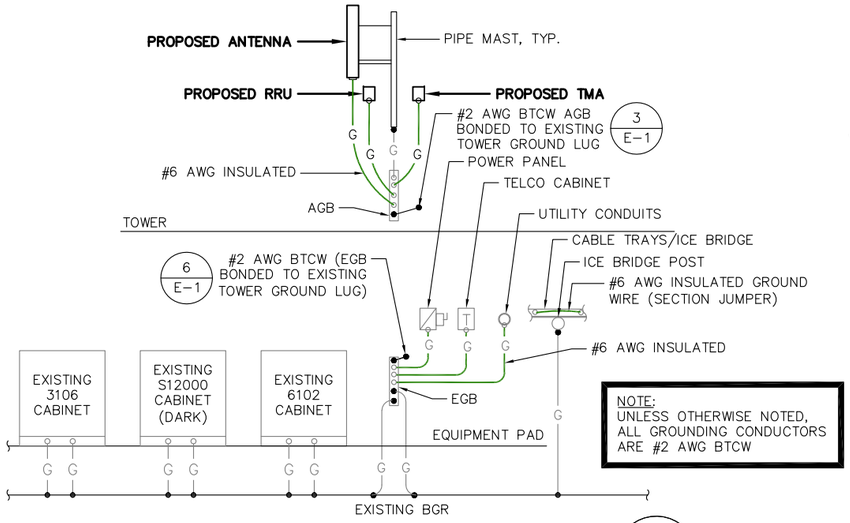


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.

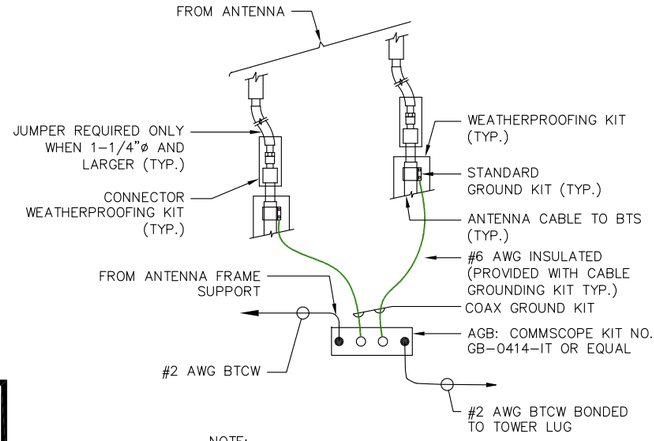


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.

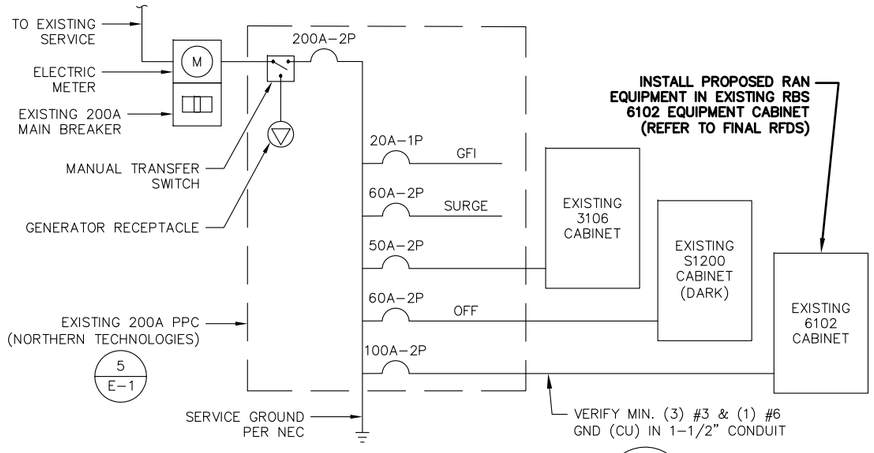


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.



ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

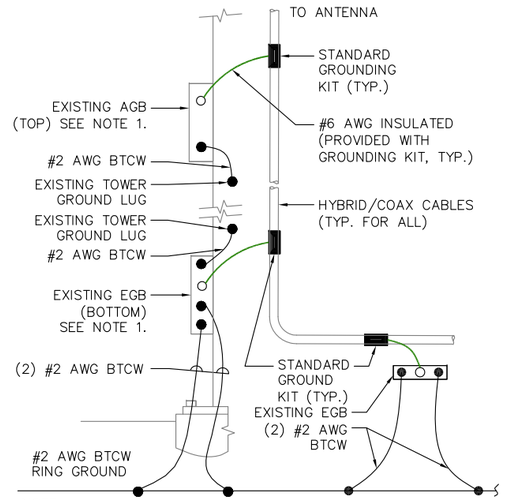
IMAGE SOURCE: PROTERRA 05/26/18

IMAGE SOURCE: PROTERRA 05/26/18

PHOTO DETAIL: PPC PANEL

5 / E-1

SCALE: N.T.S.



NOTE:
1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE ADDITIONAL AGB/EGB AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED

TOWER BOTTOM CABLE GROUNDING DETAIL

6 / E-1

SCALE: N.T.S.

ELECTRICAL LEGEND

A	AMPERE
V	VOLT
KWH	KILOWATT - HOUR
C	CONDUIT
GRC	GALVANIZED RIGID CONDUIT
BTCW	BARE TINNED (SOLID) COPPER WIRE (#2 AWG, UNLESS NOTES OTHERWISE)
G	GROUND
MGB	GROUND
MGB	MASTER GROUND BAR — ○ MECHANICAL CONNECTION ● CADWELD CONNECTION
AGB/EGB	EQUIPMENT GROUND BAR/ANTENNA GROUND BAR
G	GROUND COPPER WIRE, SIZE AS NOTED
	EXPOSED WIRING
	INSULATED GROUNDING CONDUCTOR (#6 AWG STRANDED, UNLESS NOTED OTHERWISE)
	5/8"x10' COPPER CLAD STAINLESS STEEL GROUND ROD
	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION
PPC	POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2017 AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. RIGID STEEL CONDUITS SHALL BE GROUNDED AT BOTH ENDS.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THHN INSULATION AS REQUIRED BY NEC.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL ROOM AND PROPOSED CELL SITE POWER PEDESTAL AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROPOSED CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON DRAWING A-1. PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
11. GROUNDING SHALL COMPLY WITH NEC ART. 250.
12. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
13. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
14. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
15. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
16. CONNECTIONS TO MGB SHALL BE ARRANGED IN THREE MAIN GROUPS: SURGE PRODUCERS (COAXIAL CABLE GROUND KITS, TELCO AND POWER PANEL GROUND); (GROUNDING ELECTRODE RING OR BUILDING STEEL); NON-SURGING OBJECTS (EGB GROUND IN BTS UNIT).
17. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LYGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
18. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
19. BOND ANTENNA MOUNTING BRACKETS, COAXIAL CABLE GROUND KITS, AND ALNA TO EGB PLACED NEAR THE ANTENNA LOCATION.
20. BOND ANTENNA EGB'S AND MGB TO WATER MAIN/GROUND RING.
21. TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION.
22. BOND ANY METAL OBJECTS WITHIN 7 FEET OF PROPOSED EQUIPMENT OR CABINET TO MASTER GROUND BAR.
23. VERIFY PROPOSED SERVICE UPGRADE WITH LOCAL UTILITY COMPANY PRIOR TO CONSTRUCTION.

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STATE OF CONNECTICUT
JESSE M. MORENO
No. 34389
LICENSED PROFESSIONAL ENGINEER
FOR CONSTRUCTION
7-31-18

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	07/31/18	CONSTRUCTION REVISED	JEB
0	06/15/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CTNH331B
SITE NAME:
NH331/OPTA PINE GROVE
SITE ADDRESS:
940 MERIDEN ROAD
WATERBURY, CT 06705

SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER
E-1