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

October 31, 2018

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

Notice of Exempt Modification
2-4 Volunteer Drive
Windsor Locks, CT 06096
T-Mobile Site #: CT11319C_L700-4x2
N 41° 55' 41.18" / W 72° 38' 48.42"

Dear Ms. Bachman:

T-Mobile currently maintains (9) antennas at the 135-foot level of the existing 195-foot Self Support Tower at 2-4 Volunteer Drive in Windsor Locks, CT. The tower is owned by MCM Acquisition 2017, LLC, an SBA entity. (SBA recently acquired the site from MCM). The property is owned by the Town of Windsor Locks. T-Mobile now intends to replace (6) existing antennas with (6) newer technology cell antennas at the 135-foot level of the tower. The proposed full scope of work is as follows:

Remove:
- (3) 1-5/8" lines

At ground level:
- (3) RRUs on H-frame

Remove and Replace:
- Remove: (3) EMS - RR90-17-02DP – Panel Antennas
  - Replace with: (3) RFS - APXVAARR24_43-U-NA20 (Octa) – Panel Antennas
- Remove: (3) Andrew - LNX-6515DS-A1M – Panel Antennas
  - Replace with: (3) Ericsson - AIR32 KRD901146-1_B66A (Octa) – Panel Antennas
- Remove: (3) 7" x 6" x 3" TMAs
  - Replace with: (6) Ericsson - KRY 112 144/2 – TMAs
- Remove: (3) existing pipe masts
  - Replace with: (3) new 2-1/2" std. (2.88" OD) steel pipe masts - secure existing and proposed pipe masts to existing mount with min. two points of connection

Install:
- (3) Ericsson - Radio 4449 B71 + B12 - RRUs
- (3) 1-1/4" hybrid

  At ground level – within existing leased space
- (1) PPC on existing H-frame

Existing Equipment to Remain (Including entitlements):

- (3) RFS - APX16DWV-16DWVS-E-A20 – Panel Antennas
- (3) T-Frame
- (15) 1-5/8" lines

This facility was approved prior to the Council's jurisdiction, on 6/29/1999 by the Town of Windsor Locks Planning Department. Per Building Official Mark Doody, Zoning Sign-off was part of the building permit approval process for the 200' tower. There were no post-constructions conditions placed on the tower. This modification complies with all 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 J. Christopher Kervick, the Town of Windsor Locks' First Selectman and representative for the Town as Property Owner, as well as Town Planner, Jennifer Rodriguez. (Separate notice is not being sent to 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: J. Christopher Kervick., First Selectman / with attachments
Town of Windsor Locks, 50 Church Street, Windsor Locks, CT 06096
Jennifer Rodriguez, Town Planner / with attachments
Town of Windsor Locks, 50 Church Street, Windsor Locks, CT 06096

POWER DENSITY

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.68**	Antenna B1 MPE%	**1.68**	Antenna C1 MPE%	**1.68**
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):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
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	3	Channel Count	3	Channel Count	3
Total TX Power(W):	70	Total TX Power(W):	70	Total TX Power(W):	70
ERP (W):	2,986.06	ERP (W):	2,986.06	ERP (W):	2,986.06
Antenna A2 MPE%	**0.65**	Antenna B2 MPE%	**0.65**	Antenna C2 MPE%	**0.65**
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 / 13.35dBd	Gain:	12.95 / 13.35dBd	Gain:	12.95 / 13.35dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
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):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.25**	Antenna B3 MPE%	**1.25**	Antenna C3 MPE%	**1.25**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.58 %**
AT&T	**0.99 %**
Verizon Wireless	**3.16 %**
Clearwire	**0.32 %**
Sprint	**4.47 %**
Windsor Fire Dept	**1.44 %**
Site Total MPE %:	**13.96 %**

T-Mobile Sector A Total:	3.58 %
T-Mobile Sector B Total:	3.58 %
T-Mobile Sector C Total:	3.58 %
Site Total:	13.96 %

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4 VOLUNTEER DRIVE

Location	4 VOLUNTEER DRIVE	**Mblu**	34/ 62/ 80/ 4/
UID	00023300	**Owner**	WINDSOR LOCKS TOWN OF
Assessment	$1,292,200	**Appraisal**	$1,845,800
PID	1943	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,328,100	$517,700	$1,845,800
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$929,800	$362,400	$1,292,200

Owner of Record

Owner	WINDSOR LOCKS TOWN OF	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	50 CHURCH ST WINDSOR LOCKS, CT 06096	**Book & Page**	113/299
		Sale Date	11/16/1972

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
WINDSOR LOCKS TOWN OF	$0		113/299	11/16/1972

Building Information

Building 1 : Section 1

Year Built:	1975
Living Area:	16,268
Replacement Cost:	$1,619,556
Building Percent Good:	75
Replacement Cost Less Depreciation:	$1,214,700

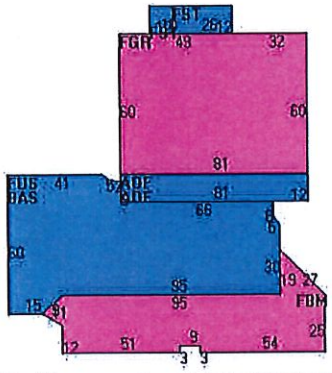
Building Photo

Building Attributes	
Field	**Description**
STYLE	Other Municip
MODEL	Ind/Comm

Stories:	1
Occupancy	
Exterior Wall A	Brick
Exterior Wall B	
Roof Structure	Flat
Roof Cover	Tar & Gravel
Interior Wall A	Drywall/Sheet
Interior Wall B	Minim/Masonry
Interior Floor A	Ceram Clay Til
Interior Floor B	Carpet
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Municipal
Total Rooms	
Total Bedrooms	00
Total Baths	0
Fireplace Types	
Fireplaces	
Heat/AC	Heat/AC Pkg
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil and Walls
Rooms/Prtns	Average
Wall Height	11.00
% Comn Wall	0.00

(http://images.vgsi.com/photos/WindsorlocksCTPhotos//00\00\32/13.jpg)

Building Layout



(http://images.vgsi.com/photos/WindsorlocksCTPhotos//Sketches

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	5,418	5,418
FUS	Upper Sty	5,418	5,418
FBM	Fin Bsmt	3,056	3,056
AOF	Office	1,944	1,944
FST	Utility	432	432
FGR	Fin Garage	4,860	0
		21,128	16,268

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
SPRK	Sprinklers	15836.00 S.F.	$9,500	1

Parcel Information

Use Code 901I
Description Municipal
Deeded Acres 11.20

Land

Land Use

Use Code	901I
Description	Municipal
Zone	RESA
Neighborhood	
Alt Land Appr Category	No

Land Line Valuation

Size (Acres)	11.20
Frontage	947
Depth	0
Assessed Value	$362,400
Appraised Value	$517,700

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
GAR1	Garage	G	Good	2592.00 S.F.	$50,500	1
PAV	Paving	A	Asphalt	46600.00 S.F.	$38,400	1
GAR1	Garage	A	Average	800.00 S.F.	$15,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$1,324,100	$517,700	$1,841,800
2012	$1,324,100	$337,500	$1,661,600
2007	$1,585,800	$294,000	$1,879,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2013	$927,000	$362,400	$1,289,400
2012	$927,000	$236,300	$1,163,300
2007	$1,110,200	$205,900	$1,316,100

SBA Network Services, LLC

To: CONNECTICUT SITING COUNCIL 129986

Check Number: 2133827
Date: 08/22/2018

Invoice Number	Invoice Date	Description	Gross Amount	Taxes Withheld	Net Amount
PRSF08201806	08/22/2018	CSC FEE_CT11319C_L700 4X2	$ 625.00	$ 0.00	$ 625.00
			$ 625.00	$ 0.00	$ 625.00

SBA Network Services, LLC
8051 Congress Avenue
Boca Raton, FL 33487-1307
(561) 995-7670

Wells Fargo Bank

2133827

061209756

129986

DATE 08/22/2018

AMOUNT $ 625.00

Void After 120 Days

Six Hundred Twenty Five Dollars And 00 Cents

Pay to the Order of:

CONNECTICUT SITING COUNCIL
ACCOUNTS RECEIVABLE
TEN FRANKLIN SQUARE

NEW BRITAIN, CT 06051

⑈2133827⑈ ⑆061209756⑆ 2079900424566⑈

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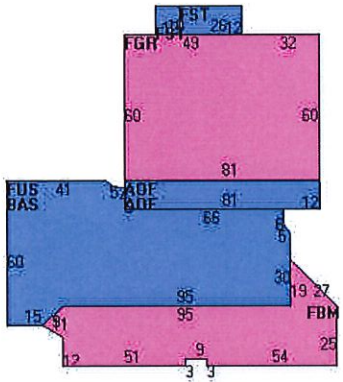
Interior Wall A	Drywall/Sheet
Interior Wall B	Minim/Masonry
Interior Floor A	Ceram Clay Til
Interior Floor B	Carpet
Heating Fuel	Oil
Heating Type	Forced Air-Duc
AC Type	Central
Bldg Use	Municipal
Total Rooms	
Total Bedrooms	00
Total Baths	0
Fireplace Types	
Fireplaces	
Heat/AC	Heat/AC Pkg
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Ceil and Walls
Rooms/Prtns	Average
Wall Height	11.00
% Comn Wall	0.00

(http://images.vgsi.com/photos/WindsorlocksCTPhotos//00\00\32/13.jpg)

Building Layout



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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: CT11319C

Windsor Locks/RT 20
2-4 Volunteer Drive
Windsor Locks, CT 06096

October 8, 2018

EBI Project Number: 6218006521

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	13.96 %

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

EBI Consulting
environmental | engineering | due diligence

October 8, 2018

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

Emissions Analysis for Site: **CT11319C – Windsor Locks/RT 20**

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **2-4 Volunteer Drive, Windsor Locks, 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 frequency bands 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) frequency 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 **2-4 Volunteer Drive, Windsor Locks, 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) 1 GSM channels (PCS Band - 1900 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 15 Watts per Channel.

2) 1 UMTS channel (AWS Band – 2100 MHz) was considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

5) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

8) For the following calculations the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antennas used in this modeling are the **Ericsson AIR32 KRD901146-1 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.

10) The antenna mounting height centerline of the proposed antennas is **135 feet** above ground level (AGL).

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A	Make / Model:	Ericsson AIR32 KRD901146-1 B66A/B2A
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)	Frequency Bands	1900 MHz (PCS) / 2100 MHz (AWS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	200	Total TX Power(W):	200	Total TX Power(W):	200
ERP (W):	7,780.90	ERP (W):	7,780.90	ERP (W):	7,780.90
Antenna A1 MPE%	**1.68**	Antenna B1 MPE%	**1.68**	Antenna C1 MPE%	**1.68**
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):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
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	3	Channel Count	3	Channel Count	3
Total TX Power(W):	70	Total TX Power(W):	70	Total TX Power(W):	70
ERP (W):	2,986.06	ERP (W):	2,986.06	ERP (W):	2,986.06
Antenna A2 MPE%	**0.65**	Antenna B2 MPE%	**0.65**	Antenna C2 MPE%	**0.65**
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 / 13.35dBd	Gain:	12.95 / 13.35dBd	Gain:	12.95 / 13.35dBd
Height (AGL):	135 feet	Height (AGL):	135 feet	Height (AGL):	135 feet
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):	2,443.03	ERP (W):	2,443.03	ERP (W):	2,443.03
Antenna A3 MPE%	**1.25**	Antenna B3 MPE%	**1.25**	Antenna C3 MPE%	**1.25**

Site Composite MPE%	
Carrier	**MPE%**
T-Mobile (Per Sector Max)	**3.58 %**
AT&T	**0.99** %
Verizon Wireless	**3.16** %
Clearwire	**0.32** %
Sprint	**4.47** %
Windsor Fire Dept	**1.44** %
Site Total MPE %:	**13.96 %**

T-Mobile Sector A Total:	3.58 %
T-Mobile Sector B Total:	3.58 %
T-Mobile Sector C Total:	3.58 %
Site Total:	13.96 %

T-Mobile Maximum MPE Power Values (Per Sector)

T-Mobile _Frequency Band / Technology (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile PCS - 1900 MHz LTE	2	1,556.18	135	6.72	PCS - 1900 MHz	1000.00	0.67%
T-Mobile AWS - 2100 MHz LTE	2	2,334.27	135	10.09	AWS - 2100 MHz	1000.00	1.01%
T-Mobile PCS - 1900 MHz GSM	2	639.87	135	2.76	PCS - 1900 MHz	1000.00	0.28%
T-Mobile AWS - 2100 MHz UMTS	1	1,706.32	135	3.69	AWS - 2100 MHz	1000.00	0.37%
T-Mobile 600 MHz LTE	2	788.97	135	3.41	600 MHz	400.00	0.85%
T-Mobile 700 MHz LTE	2	432.54	135	1.87	700 MHz	467.00	0.40%
						Total:	**3.58%**

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:	3.58 %
Sector B:	3.58 %
Sector C:	3.58 %
T-Mobile Maximum MPE % (Per Sector):	3.58 %
Site Total:	13.96 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **13.96%** 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.

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 195 ft PIROD Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT22108-A

Customer Site Name: Windsor Locks @ Volunteer Drive

Carrier Name: T-Mobile

Carrier Site ID / Name: CT11319C / Windsor locks/Rt 20

Site Location: 2-4 Volunteer Drive

Windsor Locks, Connecticut

HARTFORD County

Latitude: 41.928100

Longitude: -72.646800

9/21/18

Analysis Result:

Max Structural Usage: 85.1% [Pass]

Max Foundation Usage: 46.0% [Pass]

Additional Usage Caused by Mount Modification: + 0.0%

Report Prepared by: Matthew Baker

Introduction

The purpose of this report is to summarize the analysis results on the 195 ft PIROD Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	PiROD Eng. File #A-115761-1, Archive #F-0078802, dated 10/06/00
Foundation Drawing	PiROD Eng. File #A-115761-1, Archive #F-0078802, dated 10/06/00
Geotechnical Report	Tectonic Engineering Consultants W.O. #2295 01, dated 05/18/99
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESTowers,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft

This structural analysis is based upon the tower being classified as a Structure 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.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	203.4	1	Andrew - DB224-A	Direct	(1) 7/8"	WLPD
2	183.7	5	Andrew - 20' Dipoles w/ (4) Element	(3) T-Frame	(8) 7/8"	
3	182.8	1	2.5" Ø x 20.0' Omni			
4	180.6	1	1.3" Ø x 13.0' Omni			
5	179.1	1	1.3" Ø x 10.0' Omni			
6	161.5	3	Kathrein - 800 10121 – Panel	(3) Sector Frame w/ Mods	(9) 1 5/8" *(2) 0.78" DC Power *(1) 0.39" Fiber	AT&T
7		3	Andrew - SBNH-1D6565C - Panel			
8		3	Cci - TPA-65R-LCUUUU-H8 - Panel			
9		6	Powerwave - LGP21401 - TMA			
10		6	Kathrein - 860 10025 - RET			
11		3	Ericsson - RRUS 11 (Band 12) (55 lb) - RRU			
12		3	Ericsson - RRUS 32 B2 - RRU			
13		3	Ericsson - RRUS 32 B30 - RRU			
14		2	Raycap - DC6-48-60-18-8F - SP			
15	146.8	1	Raycap - RRFDC-3315-PF-48 – SP	Direct	(12) 1 5/8" (1) 1 1/4"	Verizon
16	145.7	1	6.0' x 1.0' x 6.5" Panel	(3) T- Frame		
17		2	Amphenol - BXA-70063/6CF-EDIN - Panel			
18		3	Antel - BXA-171063-12CF-EDIN-5 - Panel			
19	145.5	3	Alcatel-Lucent - 9442 RRH2x40 AWS - RRH			
-	138.3	3	EMS - RR90-17-02DP - Panel	(3) T- Frame	(18) 1 5/8"	T-Mobile
-		3	RFS - 4.7'x1.1'x3.5' Panel			
-		3	7" x 6" x 3" TMA			
-	137.8	3	Andrew - LNX-6515DS-A1M - Panel			
25	116.8	3	RFS - APXVSPP18-C-A20 - Panel	(3) T- Frame	(4) 1-1/4" Fiber	Sprint Nextel
26	115.0	3	RFS - APXVTM14-C-I20 - Panel			
27		3	Alcatel-Lucent - TD-RRH8x20-25 - RRH			
28	110.3	3	Alcatel-Lucent - 800 MHz RRH	Direct		
29	107.6	3	Alcatel-Lucent - 1900 MHz RRH	Direct		
30	104.6	1	Andrew - 3.3' Dish	(3) Standoffs	(2) 1/2" (1) 1-5/16" Conduit	Clearwire
31	104.0	1	Andrew - VHLP1-23-DW1			
32		3	Argus - LLPX310R-V1 - Panel			
33	103.8	3	Alcatel-Lucent - SPI-22132825WB -			
34	102.4	1	12" x 12" x 6.38" Junction Box	Direct		
35	75.9	1	3.5" Ø x 8" GPS	(1) Standoff	(1) 1/2"	Unknown
36	60.0	1	PCTEL - GPS-TMG-HR-26N - GPS	Direct	(1) 1/2"	Sprint Nextel

*Inside (1) 3" Conduit

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
20	135.0	3	Ericsson - AIR32 KRD901146-1_B66A (Octa) - Panel	(3) T-Frame w/ Mods (Replace Existing Pipe mast w/ new 2-1/2" std. (2.88" OD) steel pipe mast secured to the existing mount (typ. Of 1 per sector, total of 3); Secure the existing and proposed pipe masts to the existing mount with a minimum of two points of connection (typ. Of 3 per sector, total of 9))	(15) 1 5/8" (3) 1 1/4" Hybrid	T-Mobile
21		3	RFS - APX16DWV-16DWVS-E-A20 - Panel			
22		3	RFS - APXVAARR24_43-U-NA20 (Octa) - Panel			
23		6	Ericsson - KRY 112 144/2 - TMA			
24		3	Ericsson - Radio 4449 B71 + B12 - RRU			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	**64.6%**	**85.1%**	**54.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	340.3	292.1	36.0

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

Elevation (ft)	Antenna / Dish	Carrier	Twist (deg)	Sway (deg)
101.4	Andrew - 3.3' Dish - Dish	Clearwire	0.013	0.138
101.4	Andrew - VHLP1-23-DW1 - Dish	Clearwire	0.013	0.138

It is recommended that the carriers review the twist and sway values of the microwave dishes.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.

4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.

5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.

6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Structure: CT22108-A-SBA

Site Name:	Windsor Locks @ Volunteer Drive			**Code:**	EIA/TIA-222-G	9/21/2018
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	97.00	
Height:	195.00 (ft)	**Base Width:**	20.00	**Basic Ice WS:**	50.00	
Base Elev:	5.00 (ft)	**Top Width:**	4.50	**Operational WS:**	60.00	Page: 1

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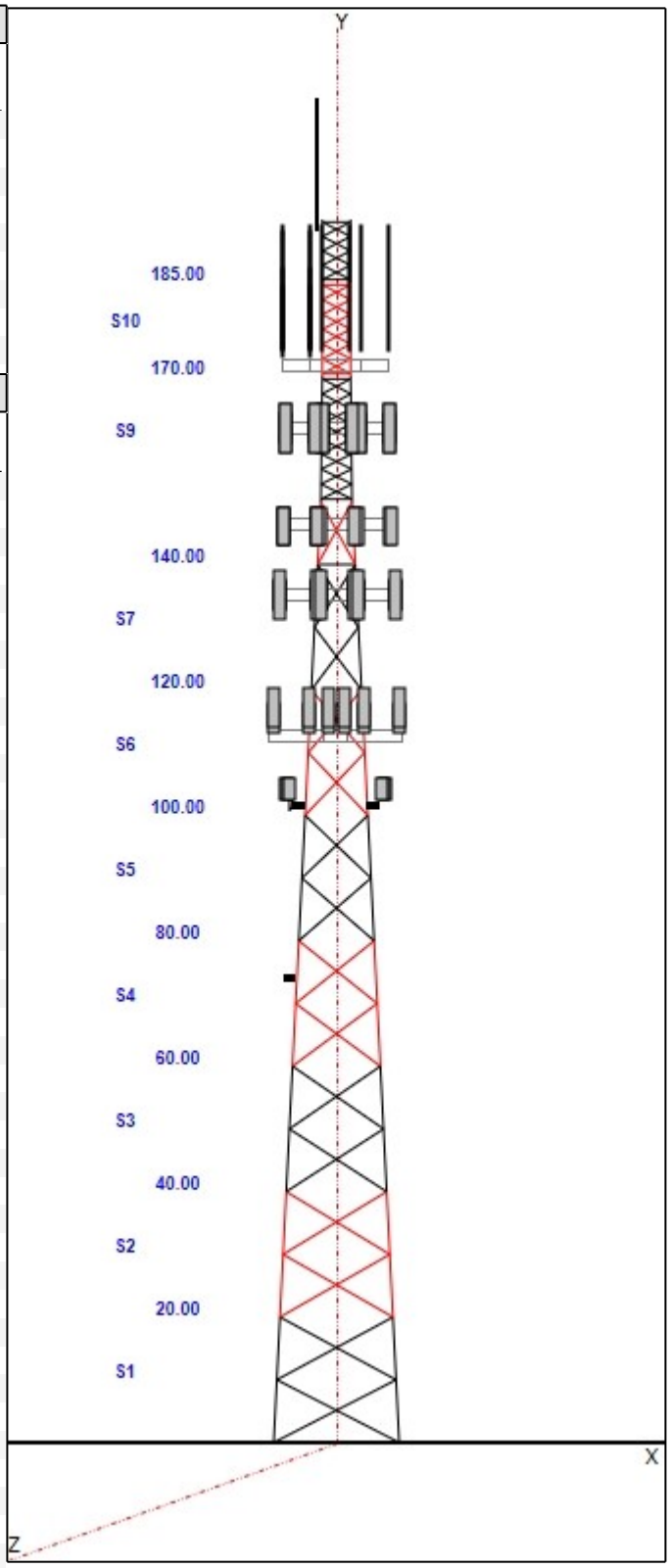
Section Properties

Sect	Leg Members	Diagonal Members	Horizontal Members
1	12B 12"BD 2.25"	DAE 3.5X3.5X0.3125	
2	12B 12"BD 2.25"	SAE 3.5X3.5X0.3125	
3-4	12B 12"BD 2"	SAE 3X3X0.3125	
5	12B 12"BD 1.75"	SAE 3X3X0.3125	
6	12B 12"BD 1.75"	SAE 3X3X0.1875	
7	12B 12"BD 1.5"	SAE 2.5X2.5X0.1875	SAE 2.5X2.5X0.1875
8	12B 12"BD 1.25"	SAE 2.5X2.5X0.1875	
9	SOL 2" SOLID	SOL 7/8" SOLID	SOL 1" SOLID
10-11	SOL 1 3/4" SOLID	SOL 3/4" SOLID	SOL 7/8" SOLID

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
195.00	195.00	1	Lightning Rod
195.00	195.00	1	Beacon
195.00	203.40	1	Andrew - DB224-A
171.50	171.50	3	15' T-Frame
171.50	183.70	5	Andrew - 20' Dipoles w/ (4) Element
171.50	182.80	1	2.5” Ø x 20.0’ Omni
171.50	180.60	1	1.3” Ø x 13.0’ Omni
171.50	179.10	1	1.3” Ø x 10.0’ Omni
161.50	161.50	3	T-Frame
161.50	161.50	2	(3) Stabilizer Kit (4' FW)
161.50	161.50	1	(3) Stabilizer Kit (4' FW)
161.50	161.50	1	(3) Stabilizer Kit (4' FW)
161.50	161.50	3	Kathrein - 800 10121
161.50	161.50	3	Andrew - SBNH-1D6565C
161.50	161.50	3	Cci - TPA-65R-LCUUUU-H8
161.50	161.50	6	Powerwave - LGP21401 - TMA
161.50	161.50	6	Kathrein - 860 10025 - RET
161.50	161.50	3	Ericsson - RRUS 11 (Band 12) (55 lb) - RRU
161.50	161.50	3	Ericsson - RRUS 32 B2 - RRU
161.50	161.50	3	Ericsson - RRUS 32 B30 - RRU
161.50	161.50	2	Raycap - DC6-48-60-18-8F - SP
146.80	146.80	1	Raycap - RRFDC-3315-PF-48 - SP
146.00	146.00	3	Sector Frame
146.00	145.70	1	6.0' x 1.0' x 6.5" Panel
146.00	145.70	2	Amphenol - BXA-70063/6CF-EDIN
146.00	145.70	3	Antel - BXA-171063-12CF-EDIN-5
146.00	145.50	3	Alcatel-Lucent - 9442 RRH2x40 AWS - RRH
135.00	135.00	3	Sector Frame
135.00	135.00	3	Ericsson - AIR32 KRD901146-1_B66A (Octa)
135.00	135.00	3	RFS - APX16DWV-16DWVS-E-A20
135.00	135.00	3	RFS - APXVAARR24_43-U-NA20 (Octa)
135.00	135.00	6	Ericsson - KRY 112 144/2 - TMA
135.00	135.00	3	Ericsson - Radio 4449 B71 + B12 - RRU
112.30	112.30	3	Sector Frame-Pipe/Rod
112.30	116.80	3	RFS - APXVSPP18-C-A20
112.30	115.00	3	RFS - APXVTM14-C-I20
112.30	115.00	3	Alcatel-Lucent - TD-RRH8x20-25 - RRH
110.30	110.30	3	Alcatel-Lucent - 800 MHz RRH
107.60	107.60	3	Alcatel-Lucent - 1900 MHz RRH
102.40	102.40	1	12" x 12" x 6.38" Junction Box



101.40	101.40	3	Standoffs
101.40	104.60	1	Andrew - 3.3' Dish
101.40	104.00	1	Andrew - VHLP1-23-DW1
101.40	104.00	3	Argus - LLPX310R-V4
101.40	103.80	3	Alcatel-Lucent - SPI-22132825WB
74.00	75.90	1	3.5" Ø x 8" GPS
74.00	74.00	1	Standoff
60.00	60.00	1	PCTEL - GPS-TMG-HR-26N - GPS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	195.00	1	7/8" Coax
0.00	171.50	8	7/8" Coax
0.00	161.50	9	1 5/8" Coax
0.00	161.50	1	3" Conduit
0.00	161.50	1	3/8" Fiber
0.00	161.50	2	7/8" DC Power
0.00	146.00	1	1 1/4" Coax
0.00	146.00	6	1 5/8" Coax
0.00	146.00	6	1 5/8" Coax
0.00	135.00	15	1 5/8" Coax
0.00	135.00	3	1-1/4" Hybrid
0.00	112.30	4	1-1/4" Fiber
0.00	101.40	1	1-5/16" Conduit
0.00	101.40	2	1/2" Coax
0.00	74.00	1	1/2" Coax
0.00	60.00	1	1/2" Coax

Base Reactions

Leg			Overturning		
Max Uplift:	-292.08	(kips	Moment:	5536.92	(ft-kips)
Max Down:	340.25	(kips	Total Down:	61.74	(kips)
Max Shear:	35.95	(kips	Total Shear:	53.46	(kips)

Structure: CT22108-A-SBA

Site Name:	Windsor Locks @ Volunteer Drive			**Code:**	EIA/TIA-222-G	9/21/2018
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	97.00	
Height:	195.00 (ft)	**Base Width:**	20.00	**Basic Ice WS:**	50.00	
Base Elev:	5.00 (ft)	**Top Width:**	4.50	**Operational WS:**	60.00	Page: 3

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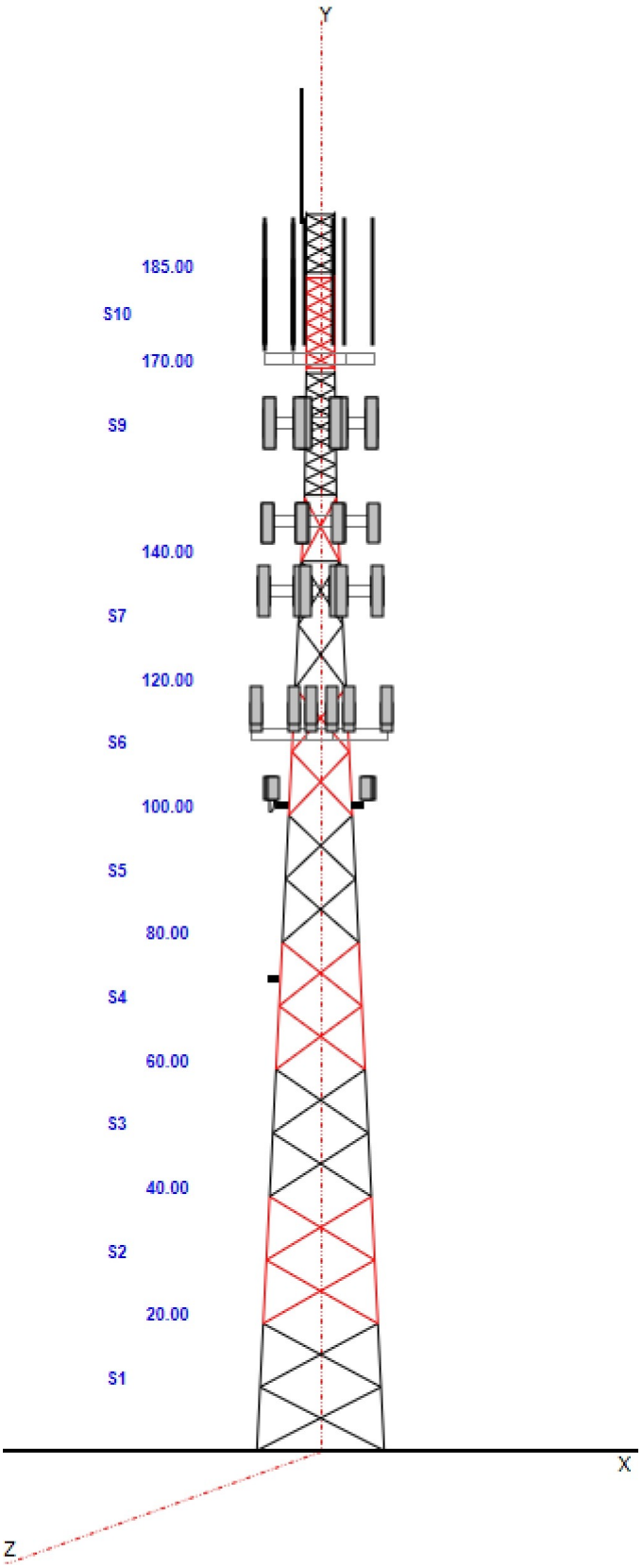

Structure: CT22108-A-SBA - Coax Line Placement

Type: Self Support
Site Name: Windsor Locks @ Volunteer Drive
Height: 195.00 (ft)

9/21/2018

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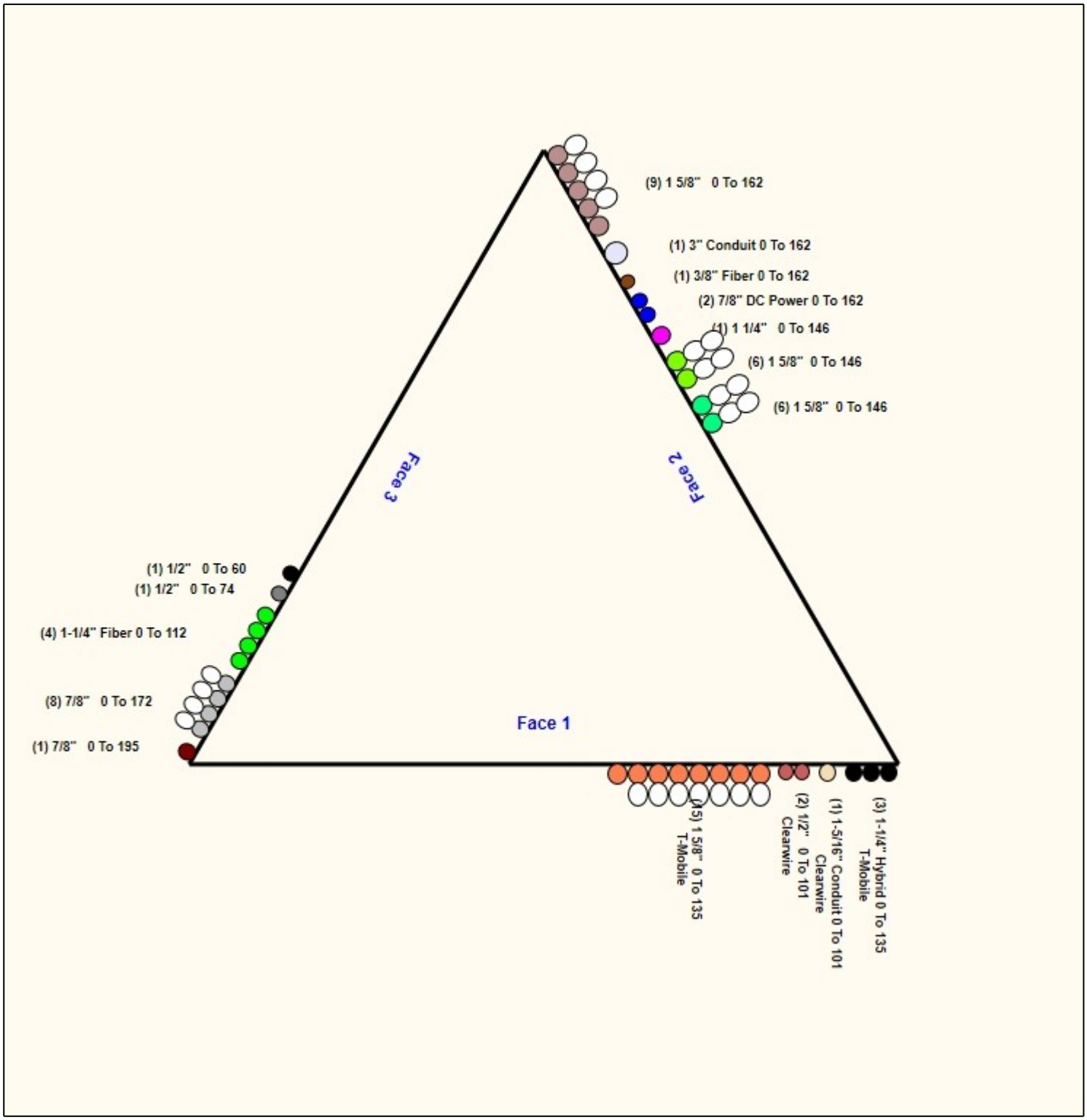

Loading Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 5	

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Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	Ice Weight (lb)	Ice CaAa (sf)	Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
195.00	Lightning Rod	1	5.00	0.500	33.67	2.889	72.000	1.000	1.000	1.00	1.00	0.000
195.00	Beacon	1	36.00	2.720	218.31	4.019	28.000	17.500	17.500	1.00	1.00	0.000
195.00	Andrew - DB224-A	1	35.00	5.650	275.06	29.777	255.000	0.000	0.000	1.00	1.00	8.400
171.50	15' T-Frame	3	400.00	10.000	779.69	21.865	0.000	0.000	0.000	0.75	0.75	0.000
171.50	Andrew - 20' Dipoles w/ (4) Element	5	60.00	7.520	361.51	23.681	240.000	3.000	3.000	1.00	1.00	12.20
171.50	2.5" Ø x 20.0' Omni	1	55.00	6.000	259.86	15.648	240.000	3.000	3.000	1.00	1.00	11.30
171.50	1.3" Ø x 13.0' Omni	1	40.00	3.900	173.84	10.227	156.000	3.000	3.000	1.00	1.00	9.100
171.50	1.3" Ø x 10.0' Omni	1	25.00	3.000	128.42	7.904	120.000	3.000	3.000	1.00	1.00	7.600
161.50	T-Frame	3	400.00	10.000	775.88	21.746	0.000	0.000	0.000	0.75	0.75	0.000
161.50	(3) Stabilizer Kit (4' FW)	2	140.00	3.700	376.80	8.915	0.000	0.000	0.000	0.75	1.00	0.000
161.50	(3) Stabilizer Kit (4' FW)	1	140.00	3.700	376.80	8.915	0.000	0.000	0.000	0.75	1.00	0.000
161.50	(3) Stabilizer Kit (4' FW)	1	140.00	3.700	376.80	8.915	0.000	0.000	0.000	0.75	1.00	0.000
161.50	Kathrein - 800 10121	3	46.30	5.150	200.93	7.986	54.500	10.300	5.900	0.80	0.82	0.000
161.50	Andrew - SBNH-1D6565C	3	66.10	11.470	375.55	15.846	96.400	11.900	7.100	0.80	0.84	0.000
161.50	Cci - TPA-65R-LCUUUU-H8	3	75.00	13.300	513.93	15.562	96.000	14.400	8.600	0.80	0.83	0.000
161.50	Powerwave - LGP21401 - TMA	6	14.10	1.290	47.75	2.415	14.400	9.200	2.600	0.80	0.50	0.000
161.50	Kathrein - 860 10025 - RET	6	1.20	0.180	9.27	0.690	7.600	2.400	2.000	0.80	0.50	0.000
161.50	Ericsson - RRUS 11 (Band 12) (55	3	50.70	2.520	145.99	3.704	17.000	17.800	9.200	0.80	0.67	0.000
161.50	Ericsson - RRUS 32 B2 - RRU	3	53.00	2.740	152.61	4.027	27.200	12.100	7.000	0.80	0.67	0.000
161.50	Ericsson - RRUS 32 B30 - RRU	3	60.00	2.740	172.76	4.027	27.200	12.100	7.000	0.80	0.67	0.000
161.50	Raycap - DC6-48-60-18-8F - SP	2	31.80	0.920	115.02	1.510	24.000	11.000	11.000	0.80	1.00	0.000
146.80	Raycap - RRFDC-3315-PF-48 - SP	1	26.90	2.500	155.47	3.340	19.100	15.700	10.200	1.00	1.00	0.000
146.00	Sector Frame	3	500.00	17.500	1430.78	36.069	0.000	0.000	0.000	0.75	0.75	0.000
146.00	6.0' x 1.0' x 6.5" Panel	1	45.00	8.160	265.06	11.897	72.000	12.000	6.000	0.80	0.81	-0.300
146.00	Amphenol - BXA-70063/6CF-EDIN	2	17.00	7.570	214.73	11.255	71.000	11.200	5.200	0.80	0.78	-0.300
146.00	Antel - BXA-171063-12CF-EDIN-5	3	15.00	4.780	142.76	7.926	72.400	6.100	4.100	0.80	0.88	-0.300
146.00	Alcatel-Lucent - 9442 RRH2x40	3	50.70	2.250	129.08	3.674	15.400	8.200	15.000	0.80	0.67	-0.500
135.00	Sector Frame	3	450.00	14.000	914.20	23.284	0.000	0.000	0.000	0.75	0.75	0.000
135.00	Ericsson - AIR32	3	132.20	6.510	370.85	8.015	57.000	12.900	8.700	0.80	0.86	0.000
135.00	RFS - APX16DWV-16DWVS-E-A20	3	40.70	6.610	195.14	9.483	55.900	13.300	3.100	0.80	0.66	0.000
135.00	RFS - APXVAARR24_43-U-NA20	3	128.00	20.240	747.05	22.775	95.900	24.000	7.800	0.80	0.70	0.000
135.00	Ericsson - KRY 112 144/2 - TMA	6	11.00	0.410	25.22	1.037	6.900	6.100	2.700	0.80	0.50	0.000
135.00	Ericsson - Radio 4449 B71 + B12 -	3	70.00	1.650	167.63	2.384	15.000	13.200	9.300	0.80	0.67	0.000
112.30	Sector Frame-Pipe/Rod	3	450.00	14.000	906.81	23.136	0.000	0.000	0.000	0.75	0.75	0.000
112.30	RFS - APXVSPP18-C-A20	3	57.00	8.020	281.43	11.647	72.000	11.800	7.000	0.80	0.83	4.500
112.30	RFS - APXVTM14-C-I20	3	56.20	6.340	269.07	7.811	56.300	12.600	6.300	0.80	0.78	2.700
112.30	Alcatel-Lucent - TD-RRH8x20-25 -	3	70.00	4.050	196.89	5.885	26.100	18.600	6.700	0.80	0.67	2.700
110.30	Alcatel-Lucent - 800 MHz RRH	3	53.00	2.490	149.03	3.975	19.700	13.000	10.800	0.80	0.67	0.000
107.60	Alcatel-Lucent - 1900 MHz RRH	3	44.00	3.800	185.74	5.605	23.000	13.000	17.000	0.80	0.67	0.000
102.40	12" x 12" x 6.38" Junction Box	1	10.00	1.400	63.17	2.481	12.000	12.000	8.000	1.00	1.00	0.000
101.40	Standoffs	3	120.00	4.500	253.38	11.182	0.000	0.000	0.000	0.75	0.75	0.000
101.40	Andrew - 3.3' Dish	1	140.00	8.920	372.43	11.157	36.000	36.000	0.000	1.00	1.00	3.200
101.40	Andrew - VHLP1-23-DW1	1	14.00	1.610	59.10	2.576	15.300	15.300	8.700	1.00	1.00	2.600
101.40	Argus - LLPX310R-V4	3	28.70	4.310	144.33	6.426	42.100	11.800	4.500	0.80	0.73	2.600
101.40	Alcatel-Lucent - SPI-22132825WB	3	33.10	1.820	89.05	3.063	16.100	11.600	6.000	0.80	0.67	2.400
74.00	3.5" Ø x 8" GPS	1	10.00	0.160	16.90	0.638	8.000	2.000	2.000	1.00	1.00	1.900
74.00	Standoff	1	120.00	4.500	250.27	11.026	0.000	0.000	0.000	1.00	1.00	0.000
60.00	PCTEL - GPS-TMG-HR-26N - GPS	1	0.60	0.090	6.45	0.308	5.000	3.200	3.200	1.00	1.00	0.000

Loading Summary

Structure:	CT22108-A-SBA		**Code:**	EIA/TIA-222-G	9/21/2018
Site Name:	Windsor Locks @ Volunteer Drive		**Exposure:**	C	
Height:	195.00 (ft)		**Crest Height:**	0.00	
Base Elev:	5.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	0.85	**Topography:** 1	**Struct Class:**	II	Page: 6

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Tower Engineering Solutions

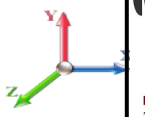
Totals:	**120**	**12,027.00**	**35,817.43**	**Number of Appurtenances : 48**

Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	195.00	7/8" Coax	1	1.11	0.52	100.00	3	Individual NR		N	1.00	1.00	
0.00	171.50	7/8" Coax	8	1.11	0.52	50.00	3	Block		N	1.00	0.67	
0.00	161.50	1 5/8" Coax	9	1.98	1.04	50.00	2	Block		N	1.00	0.59	
0.00	161.50	3" Conduit	1	3.02	1.78	100.00	2	Individual NR		N	1.00	1.00	
0.00	161.50	3/8" Fiber	1	0.38	0.06	100.00	2	Individual NR		N	1.00	1.00	0
0.00	161.50	7/8" DC Power	2	0.88	0.65	100.00	2	Individual NR		N	1.00	1.00	0
0.00	146.00	1 1/4" Coax	1	1.55	0.66	100.00	2	Individual NR		N	1.00	1.00	0
0.00	146.00	1 5/8" Coax	6	1.98	1.04	33.30	2	Block		N	1.00	0.47	
0.00	146.00	1 5/8" Coax	6	1.98	1.04	33.30	2	Block		N	1.00	1.00	0
0.00	135.00	1 5/8" Coax	15	1.98	1.04	50.00	1	Block		N	1.00	1.00	
0.00	135.00	1-1/4" Hybrid	3	1.25	0.95	50.00	1	Individual IR		N	1.00	1.00	
0.00	112.30	1-1/4" Fiber	4	1.25	0.95	100.00	3	Individual IR		N	1.00	0.59	
0.00	101.40	1-5/16" Conduit	1	1.38	1.13	100.00	1	Individual NR		N	1.00	1.00	0
0.00	101.40	1/2" Coax	2	0.65	0.16	100.00	1	Individual NR		N	1.00	1.00	0
0.00	74.00	1/2" Coax	1	0.65	0.16	100.00	3	Individual NR		N	1.00	1.00	0
0.00	60.00	1/2" Coax	1	0.65	0.16	100.00	3	Individual NR		N	1.00	1.00	

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 8	



Tower Engineering Solutions

Load Case: 1.2D + 1.6W Normal Wind — 1.2D + 1.6W 97 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	1.00	1.00	0.00	35.27	126.82	0.00	9,724.3	0.0	2400.35	1827.51	4,227.86
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	32.73	126.82	0.00	7,316.7	0.0	2630.08	2181.52	4,811.60
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	1.00	1.00	0.00	27.28	126.82	0.00	6,206.3	0.0	2422.68	2399.30	4,821.98
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	25.58	125.41	0.00	6,058.5	0.0	2383.53	2535.19	4,918.71
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	23.37	124.65	0.00	5,149.4	0.0	2273.88	2664.23	4,938.11
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	1.00	1.00	0.00	22.05	117.29	0.00	4,494.5	0.0	2165.60	2687.93	4,853.52
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	1.00	1.00	0.00	19.67	100.77	0.00	3,757.9	0.0	1942.09	2277.80	4,219.89
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	8.71	29.94	0.00	1,382.5	0.0	856.41	578.54	1,434.95
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	1.00	1.00	0.00	7.74	34.92	0.00	1,773.0	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	1.00	1.00	0.00	5.00	2.50	0.00	855.1	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	1.00	1.00	0.00	3.45	0.93	0.00	585.8	0.0	398.71	27.01	425.73
														47,304.0	**0.0**			**36,981.32**

Load Case: 1.2D + 1.6W 60° Wind — 1.2D + 1.6W 97 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

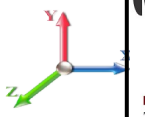
Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	0.80	1.00	0.00	30.40	126.82	0.00	9,724.3	0.0	2068.74	1827.51	3,896.25
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	28.27	126.82	0.00	7,316.7	0.0	2271.30	2181.52	4,452.82
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	0.80	1.00	0.00	23.79	126.82	0.00	6,206.3	0.0	2112.37	2399.30	4,511.67
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	22.41	125.41	0.00	6,058.5	0.0	2088.01	2535.19	4,623.20
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	20.50	124.65	0.00	5,149.4	0.0	1994.01	2664.23	4,658.24
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	0.80	1.00	0.00	19.45	117.29	0.00	4,494.5	0.0	1910.39	2687.93	4,598.31
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	0.80	1.00	0.00	17.47	100.77	0.00	3,757.9	0.0	1725.36	2277.80	4,003.15
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	7.79	29.94	0.00	1,382.5	0.0	766.25	578.54	1,344.79
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	0.80	1.00	0.00	7.74	34.92	0.00	1,773.0	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	0.80	1.00	0.00	5.00	2.50	0.00	855.1	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	0.80	1.00	0.00	3.45	0.93	0.00	585.8	0.0	398.71	27.01	425.73
														47,304.0	**0.0**			**34,843.14**

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 9	



Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90° Wind — 1.2D + 1.6W 97 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	0.85	1.00	0.00	31.62	126.82	0.00	9,724.3	0.0	2151.64	1827.51	3,979.15
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	29.38	126.82	0.00	7,316.7	0.0	2360.99	2181.52	4,542.51
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	0.85	1.00	0.00	24.66	126.82	0.00	6,206.3	0.0	2189.95	2399.30	4,589.25
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	23.20	125.41	0.00	6,058.5	0.0	2161.89	2535.19	4,697.08
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	21.21	124.65	0.00	5,149.4	0.0	2063.98	2664.23	4,728.21
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	0.85	1.00	0.00	20.10	117.29	0.00	4,494.5	0.0	1974.19	2687.93	4,662.12
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	0.85	1.00	0.00	18.02	100.77	0.00	3,757.9	0.0	1779.54	2277.80	4,057.34
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.02	29.94	0.00	1,382.5	0.0	788.79	578.54	1,367.33
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	0.85	1.00	0.00	7.74	34.92	0.00	1,773.0	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	0.85	1.00	0.00	5.00	2.50	0.00	855.1	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	0.85	1.00	0.00	3.45	0.93	0.00	585.8	0.0	398.71	27.01	425.73
														47,304.0	**0.0**			**35,377.69**

Load Case: 0.9D + 1.6W Normal Wind — 0.9D + 1.6W 97 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

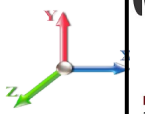
Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	1.00	1.00	0.00	35.27	126.82	0.00	7,293.2	0.0	2400.35	1827.51	4,227.86
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	32.73	126.82	0.00	5,487.5	0.0	2630.08	2181.52	4,811.60
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	1.00	1.00	0.00	27.28	126.82	0.00	4,654.7	0.0	2422.68	2399.30	4,821.98
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	25.58	125.41	0.00	4,543.9	0.0	2383.53	2535.19	4,918.71
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	23.37	124.65	0.00	3,862.1	0.0	2273.88	2664.23	4,938.11
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	1.00	1.00	0.00	22.05	117.29	0.00	3,370.9	0.0	2165.60	2687.93	4,853.52
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	1.00	1.00	0.00	19.67	100.77	0.00	2,818.4	0.0	1942.09	2277.80	4,219.89
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	8.71	29.94	0.00	1,036.9	0.0	856.41	578.54	1,434.95
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	1.00	1.00	0.00	7.74	34.92	0.00	1,329.8	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	1.00	1.00	0.00	5.00	2.50	0.00	641.3	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	1.00	1.00	0.00	3.45	0.93	0.00	439.3	0.0	398.71	27.01	425.73
														35,478.0	**0.0**			**36,981.32**

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 10	



Tower Engineering Solutions

Load Case: 0.9D + 1.6W 60° Wind — 0.9D + 1.6W 97 mph Wind at 60° From Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	0.80	1.00	0.00	30.40	126.82	0.00	7,293.2	0.0	2068.74	1827.51	3,896.25
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	28.27	126.82	0.00	5,487.5	0.0	2271.30	2181.52	4,452.82
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	0.80	1.00	0.00	23.79	126.82	0.00	4,654.7	0.0	2112.37	2399.30	4,511.67
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	22.41	125.41	0.00	4,543.9	0.0	2088.01	2535.19	4,623.20
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	20.50	124.65	0.00	3,862.1	0.0	1994.01	2664.23	4,658.24
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	0.80	1.00	0.00	19.45	117.29	0.00	3,370.9	0.0	1910.39	2687.93	4,598.31
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	0.80	1.00	0.00	17.47	100.77	0.00	2,818.4	0.0	1725.36	2277.80	4,003.15
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	7.79	29.94	0.00	1,036.9	0.0	766.25	578.54	1,344.79
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	0.80	1.00	0.00	7.74	34.92	0.00	1,329.8	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	0.80	1.00	0.00	5.00	2.50	0.00	641.3	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	0.80	1.00	0.00	3.45	0.93	0.00	439.3	0.0	398.71	27.01	425.73
														35,478.0	**0.0**			**34,843.14**

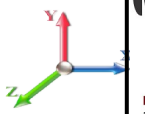
Load Case: 0.9D + 1.6W 90° Wind — 0.9D + 1.6W 97 mph Wind at 90° From Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	17.40	24.365	23.64	0.00	0.12	2.88	0.85	1.00	0.00	31.62	126.82	0.00	7,293.2	0.0	2151.64	1827.51	3,979.15
2	30.0	20.77	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	29.38	126.82	0.00	5,487.5	0.0	2360.99	2181.52	4,542.51
3	50.0	22.85	17.472	22.04	0.00	0.13	2.86	0.85	1.00	0.00	24.66	126.82	0.00	4,654.7	0.0	2189.95	2399.30	4,589.25
4	70.0	24.39	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	23.20	125.41	0.00	4,543.9	0.0	2161.89	2535.19	4,697.08
5	90.0	25.63	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	21.21	124.65	0.00	3,862.1	0.0	2063.98	2664.23	4,728.21
6	110.0	26.69	12.992	18.83	0.00	0.17	2.71	0.85	1.00	0.00	20.10	117.29	0.00	3,370.9	0.0	1974.19	2687.93	4,662.12
7	130.0	27.60	10.974	17.23	0.00	0.19	2.63	0.85	1.00	0.00	18.02	100.77	0.00	2,818.4	0.0	1779.54	2277.80	4,057.34
8	145.0	28.22	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.02	29.94	0.00	1,036.9	0.0	788.79	578.54	1,367.33
9	160.0	28.79	0.000	13.44	0.00	0.14	2.82	0.85	1.00	0.00	7.74	34.92	0.00	1,329.8	0.0	854.95	828.98	1,683.93
10	177.5	29.41	0.000	8.71	0.00	0.13	2.87	0.85	1.00	0.00	5.00	2.50	0.00	641.3	0.0	573.12	71.93	645.05
11	190.0	29.82	0.000	6.00	0.00	0.13	2.85	0.85	1.00	0.00	3.45	0.93	0.00	439.3	0.0	398.71	27.01	425.73
														35,478.0	**0.0**			**35,377.69**

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 11	



Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	24.365	62.44	38.80	0.22	2.54	1.00	1.00	1.85	60.45	172.13	67.77	21,143.	11418.8	602.67	470.02	1,072.69
2	30.0	5.52	22.326	63.53	39.89	0.24	2.47	1.00	1.00	2.01	59.33	175.94	73.77	17,518.	10202.0	687.43	575.10	1,262.53
3	50.0	6.07	17.472	61.40	39.36	0.25	2.44	1.00	1.00	2.10	53.36	178.11	77.18	16,281.	10075.1	672.79	641.77	1,314.56
4	70.0	6.48	15.857	60.28	38.25	0.27	2.37	1.00	1.00	2.17	51.49	178.25	70.20	16,083.	10024.9	671.80	648.09	1,319.88
5	90.0	6.81	14.383	55.72	36.89	0.30	2.31	1.00	1.00	2.22	47.69	178.70	66.69	14,958.	9809.1	636.78	683.12	1,319.91
6	110.0	7.09	12.992	54.30	35.47	0.34	2.19	1.00	1.00	2.27	46.28	167.51	46.90	13,613.	9119.2	611.10	681.23	1,292.34
7	130.0	7.33	10.974	53.66	36.43	0.41	2.04	1.00	1.00	2.30	45.44	140.27	46.05	12,022.	8264.9	577.18	560.07	1,137.24
8	145.0	7.50	4.586	24.44	16.62	0.46	1.95	1.00	1.00	2.33	20.85	41.15	21.72	4,517.7	3135.2	259.60	140.99	400.59
9	160.0	7.65	0.000	66.16	52.71	0.62	1.79	1.00	1.00	2.35	50.36	44.85	25.84	6,862.9	5089.9	586.66	139.91	726.57
10	177.5	7.81	0.000	48.26	39.54	0.64	1.79	1.00	1.00	2.37	37.18	2.91	5.93	3,500.2	2645.1	440.96	24.79	465.75
11	190.0	7.92	0.000	33.63	27.63	0.67	1.78	1.00	1.00	2.39	26.57	0.93	3.98	2,417.7	1831.9	318.20	13.21	331.41
														128,920.0	**81616.0**			**10,643.47**

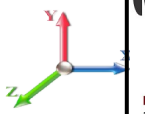
Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	24.365	62.44	38.80	0.22	2.54	0.80	1.00	1.85	55.58	172.13	67.77	21,143.	11418.8	554.09	470.02	1,024.11
2	30.0	5.52	22.326	63.53	39.89	0.24	2.47	0.80	1.00	2.01	54.87	175.94	73.77	17,518.	10202.0	635.69	575.10	1,210.80
3	50.0	6.07	17.472	61.40	39.36	0.25	2.44	0.80	1.00	2.10	49.86	178.11	77.18	16,281.	10075.1	628.73	641.77	1,270.49
4	70.0	6.48	15.857	60.28	38.25	0.27	2.37	0.80	1.00	2.17	48.32	178.25	70.20	16,083.	10024.9	630.42	648.09	1,278.51
5	90.0	6.81	14.383	55.72	36.89	0.30	2.31	0.80	1.00	2.22	44.81	178.70	66.69	14,958.	9809.1	598.37	683.12	1,281.49
6	110.0	7.09	12.992	54.30	35.47	0.34	2.19	0.80	1.00	2.27	43.68	167.51	46.90	13,613.	9119.2	576.79	681.23	1,258.02
7	130.0	7.33	10.974	53.66	36.43	0.41	2.04	0.80	1.00	2.30	43.24	140.27	46.05	12,022.	8264.9	549.30	560.07	1,109.36
8	145.0	7.50	4.586	24.44	16.62	0.46	1.95	0.80	1.00	2.33	19.93	41.15	21.72	4,517.7	3135.2	248.18	140.99	389.17
9	160.0	7.65	0.000	66.16	52.71	0.62	1.79	0.80	1.00	2.35	50.36	44.85	25.84	6,862.9	5089.9	586.66	139.91	726.57
10	177.5	7.81	0.000	48.26	39.54	0.64	1.79	0.80	1.00	2.37	37.18	2.91	5.93	3,500.2	2645.1	440.96	24.79	465.75
11	190.0	7.92	0.000	33.63	27.63	0.67	1.78	0.80	1.00	2.39	26.57	0.93	3.98	2,417.7	1831.9	318.20	13.21	331.41
														128,920.0	**81616.0**			**10,345.69**

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 12	



Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	24.365	62.44	38.80	0.22	2.54	0.85	1.00	1.85	56.80	172.13	67.77	21,143.	11418.8	566.23	470.02	1,036.25
2	30.0	5.52	22.326	63.53	39.89	0.24	2.47	0.85	1.00	2.01	55.98	175.94	73.77	17,518.	10202.0	648.63	575.10	1,223.73
3	50.0	6.07	17.472	61.40	39.36	0.25	2.44	0.85	1.00	2.10	50.74	178.11	77.18	16,281.	10075.1	639.74	641.77	1,281.51
4	70.0	6.48	15.857	60.28	38.25	0.27	2.37	0.85	1.00	2.17	49.12	178.25	70.20	16,083.	10024.9	640.77	648.09	1,288.85
5	90.0	6.81	14.383	55.72	36.89	0.30	2.31	0.85	1.00	2.22	45.53	178.70	66.69	14,958.	9809.1	607.97	683.12	1,291.10
6	110.0	7.09	12.992	54.30	35.47	0.34	2.19	0.85	1.00	2.27	44.33	167.51	46.90	13,613.	9119.2	585.37	681.23	1,266.60
7	130.0	7.33	10.974	53.66	36.43	0.41	2.04	0.85	1.00	2.30	43.79	140.27	46.05	12,022.	8264.9	556.27	560.07	1,116.33
8	145.0	7.50	4.586	24.44	16.62	0.46	1.95	0.85	1.00	2.33	20.16	41.15	21.72	4,517.7	3135.2	251.03	140.99	392.02
9	160.0	7.65	0.000	66.16	52.71	0.62	1.79	0.85	1.00	2.35	50.36	44.85	25.84	6,862.9	5089.9	586.66	139.91	726.57
10	177.5	7.81	0.000	48.26	39.54	0.64	1.79	0.85	1.00	2.37	37.18	2.91	5.93	3,500.2	2645.1	440.96	24.79	465.75
11	190.0	7.92	0.000	33.63	27.63	0.67	1.78	0.85	1.00	2.39	26.57	0.93	3.98	2,417.7	1831.9	318.20	13.21	331.41
														128,920.0	**81616.0**			**10,420.14**

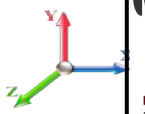
Load Case: 1.0D + 1.0W Normal Wind — 1.0D + 1.0W 60 mph Wind at Normal To Face

Wind Load Factor: 1.00
Dead Load Factor: 1.00
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	24.365	23.64	0.00	0.12	2.88	1.00	1.00	0.00	37.65	126.82	0.00	8,103.6	0.0	612.73	437.02	1,049.74
2	30.0	7.95	22.326	23.64	0.00	0.13	2.84	1.00	1.00	0.00	35.28	126.82	0.00	6,097.3	0.0	677.86	521.67	1,199.53
3	50.0	8.74	17.472	22.04	0.00	0.13	2.86	1.00	1.00	0.00	29.62	126.82	0.00	5,171.9	0.0	629.08	573.75	1,202.83
4	70.0	9.33	15.857	22.04	0.00	0.14	2.81	1.00	1.00	0.00	27.92	125.41	0.00	5,048.8	0.0	622.12	606.25	1,228.37
5	90.0	9.81	14.383	18.83	0.00	0.14	2.79	1.00	1.00	0.00	25.06	124.65	0.00	4,291.2	0.0	583.06	637.10	1,220.16
6	110.0	10.21	12.992	18.83	0.00	0.17	2.71	1.00	1.00	0.00	23.70	117.29	0.00	3,745.5	0.0	556.70	642.77	1,199.48
7	130.0	10.56	10.974	17.23	0.00	0.19	2.63	1.00	1.00	0.00	20.84	100.77	0.00	3,131.6	0.0	492.15	544.70	1,036.85
8	145.0	10.80	4.586	7.81	0.00	0.21	2.56	1.00	1.00	0.00	9.09	29.94	0.00	1,152.1	0.0	213.67	138.35	352.02
9	160.0	11.02	0.000	13.44	0.00	0.14	2.82	1.00	1.00	0.00	7.74	34.92	0.00	1,477.5	0.0	204.45	198.24	402.68
10	177.5	11.25	0.000	8.71	0.00	0.13	2.87	1.00	1.00	0.00	5.00	2.50	0.00	712.6	0.0	137.05	17.20	154.25
11	190.0	11.41	0.000	6.00	0.00	0.13	2.85	1.00	1.00	0.00	3.45	0.93	0.00	488.2	0.0	95.35	6.46	101.81
														39,420.0	**0.0**			**9,147.71**

Section Forces

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 13	



Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60° Wind — 1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	24.365	23.64	0.00	0.12	2.88	0.80	1.00	0.00	32.78	126.82	0.00	8,103.6	0.0	533.43	437.02	970.45
2	30.0	7.95	22.326	23.64	0.00	0.13	2.84	0.80	1.00	0.00	30.81	126.82	0.00	6,097.3	0.0	592.06	521.67	1,113.73
3	50.0	8.74	17.472	22.04	0.00	0.13	2.86	0.80	1.00	0.00	26.13	126.82	0.00	5,171.9	0.0	554.87	573.75	1,128.62
4	70.0	9.33	15.857	22.04	0.00	0.14	2.81	0.80	1.00	0.00	24.75	125.41	0.00	5,048.8	0.0	551.45	606.25	1,157.70
5	90.0	9.81	14.383	18.83	0.00	0.14	2.79	0.80	1.00	0.00	22.18	124.65	0.00	4,291.2	0.0	516.13	637.10	1,153.23
6	110.0	10.21	12.992	18.83	0.00	0.17	2.71	0.80	1.00	0.00	21.10	117.29	0.00	3,745.5	0.0	495.68	642.77	1,138.45
7	130.0	10.56	10.974	17.23	0.00	0.19	2.63	0.80	1.00	0.00	18.65	100.77	0.00	3,131.6	0.0	440.33	544.70	985.02
8	145.0	10.80	4.586	7.81	0.00	0.21	2.56	0.80	1.00	0.00	8.17	29.94	0.00	1,152.1	0.0	192.11	138.35	330.46
9	160.0	11.02	0.000	13.44	0.00	0.14	2.82	0.80	1.00	0.00	7.74	34.92	0.00	1,477.5	0.0	204.45	198.24	402.68
10	177.5	11.25	0.000	8.71	0.00	0.13	2.87	0.80	1.00	0.00	5.00	2.50	0.00	712.6	0.0	137.05	17.20	154.25
11	190.0	11.41	0.000	6.00	0.00	0.13	2.85	0.80	1.00	0.00	3.45	0.93	0.00	488.2	0.0	95.35	6.46	101.81
														39,420.0	**0.0**			**8,636.40**

Load Case: 1.0D + 1.0W 90° Wind — 1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

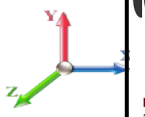
Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	24.365	23.64	0.00	0.12	2.88	0.85	1.00	0.00	34.00	126.82	0.00	8,103.6	0.0	553.25	437.02	990.27
2	30.0	7.95	22.326	23.64	0.00	0.13	2.84	0.85	1.00	0.00	31.93	126.82	0.00	6,097.3	0.0	613.51	521.67	1,135.18
3	50.0	8.74	17.472	22.04	0.00	0.13	2.86	0.85	1.00	0.00	27.00	126.82	0.00	5,171.9	0.0	573.42	573.75	1,147.17
4	70.0	9.33	15.857	22.04	0.00	0.14	2.81	0.85	1.00	0.00	25.54	125.41	0.00	5,048.8	0.0	569.12	606.25	1,175.37
5	90.0	9.81	14.383	18.83	0.00	0.14	2.79	0.85	1.00	0.00	22.90	124.65	0.00	4,291.2	0.0	532.86	637.10	1,169.97
6	110.0	10.21	12.992	18.83	0.00	0.17	2.71	0.85	1.00	0.00	21.75	117.29	0.00	3,745.5	0.0	510.93	642.77	1,153.70
7	130.0	10.56	10.974	17.23	0.00	0.19	2.63	0.85	1.00	0.00	19.20	100.77	0.00	3,131.6	0.0	453.28	544.70	997.98
8	145.0	10.80	4.586	7.81	0.00	0.21	2.56	0.85	1.00	0.00	8.40	29.94	0.00	1,152.1	0.0	197.50	138.35	335.85
9	160.0	11.02	0.000	13.44	0.00	0.14	2.82	0.85	1.00	0.00	7.74	34.92	0.00	1,477.5	0.0	204.45	198.24	402.68
10	177.5	11.25	0.000	8.71	0.00	0.13	2.87	0.85	1.00	0.00	5.00	2.50	0.00	712.6	0.0	137.05	17.20	154.25
11	190.0	11.41	0.000	6.00	0.00	0.13	2.85	0.85	1.00	0.00	3.45	0.93	0.00	488.2	0.0	95.35	6.46	101.81
														39,420.0	**0.0**			**8,764.23**

Force/Stress Compression Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 14	



Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	12B - 12"BD 2.25"	-330.55	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.38	50.00	514.03	64.3	Member X
2	40	12B - 12"BD 2.25"	-298.35	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.38	50.00	514.03	58.0	Member X
3	60	12B - 12"BD 2"	-262.24	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.41	50.00	405.83	64.6	Member X
4	80	12B - 12"BD 2"	-224.60	1.2D + 1.6W Normal Wind	10.02	100	100	100	24.41	50.00	405.83	55.3	Member X
5	100	12B - 12"BD 1.75"	-184.40	1.2D + 1.6W Normal Wind	10.02	100	100	100	25.99	50.00	308.82	59.7	Member X
6	120	12B - 12"BD 1.75"	-140.48	1.2D + 1.6W Normal Wind	10.02	100	100	100	25.99	50.00	308.82	45.5	Member X
7	140	12B - 12"BD 1.5"	-98.20	1.2D + 1.6W Normal Wind	10.02	100	100	100	30.32	50.00	222.99	44.0	Member X
8	150	12B - 12"BD 1.25"	-55.34	1.2D + 1.6W Normal Wind	10.02	100	100	100	36.38	50.00	150.33	36.8	Member X
9	170	SOL - 2" SOLID	-46.88	1.2D + 1.6W Normal Wind	2.40	100	100	100	57.51	50.00	111.01	42.2	Member X
10	185	SOL - 1 3/4" SOLID	-11.56	1.2D + 1.6W Normal Wind	0.42	100	100	100	11.44	50.00	107.21	10.8	Member X
11	195	SOL - 1 3/4" SOLID	-2.19	1.2D + 1.0Di + 1.0Wi Normal	2.29	100	100	100	62.85	50.00	81.08	2.7	Member X

Splices

		Top Splice						Bottom Splice					
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	1.2D + 1.6W Normal Wind	307.28	0.00	0.0			1.2D + 1.6W Normal Wind	340.65	0.00			
2	40	1.2D + 1.6W Normal Wind	271.82	0.00	0.0			1.2D + 1.6W Normal Wind	307.28	0.00		1/4 A325	6
3	60	1.2D + 1.6W Normal Wind	234.63	0.00	0.0			1.2D + 1.6W Normal Wind	271.82	0.00		1/4 A325	6
4	80	1.2D + 1.6W Normal Wind	195.25	0.00	0.0			1.2D + 1.6W Normal Wind	234.63	0.00		1/4 A325	6
5	100	1.2D + 1.6W Normal Wind	152.37	0.00	0.0			1.2D + 1.6W Normal Wind	195.25	0.00		1 A325	6
6	120	1.2D + 1.6W Normal Wind	109.18	0.00	0.0			1.2D + 1.6W Normal Wind	152.37	0.00		1 A325	6
7	140	1.2D + 1.6W Normal Wind	69.82	0.00	0.0			1.2D + 1.6W Normal Wind	109.18	0.00		1 A325	6
8	150	1.2D + 1.6W Normal Wind	50.76	0.00	0.0			1.2D + 1.6W Normal Wind	69.82	0.00		1 A325	6
9	170	1.2D + 1.6W Normal Wind	11.67	0.00	0.0			1.2D + 1.6W Normal Wind	50.76	0.00		1 A325	6
10	185	1.2D + 1.0Di + 1.0Wi Normal Wi	2.82	0.00	0.0			1.2D + 1.6W Normal Wind	11.67	0.00			
11	195	1.2D + 1.0Di + 1.0Wi 90° Wind	0.40	0.00	0.0			1.2D + 1.0Di + 1.0Wi Normal Wi	2.82	0.00			

HORIZONTAL MEMBERS

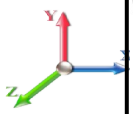
Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20										0.00	0	0				
2	40										0.00	0	0				
3	60										0.00	0	0				
4	80										0.00	0	0				
5	100										0.00	0	0				
6	120										0.00	0	0				
7	140	SAE - 2.5X2.5X0.1875	-2.55	0.9D + 1.6W Normal Wind	6.00	100	100	100	145.45	36.00	9.63	1	1	31.81	17.94	26	Member Z
8	150										0.00	0	0				
9	170	SOL - 1" SOLID	-1.05	0.9D + 1.6W Normal Wind	4.99	100	100	100	167.65	50.00	6.31	0	0			17	Member X
10	185	SOL - 7/8" SOLID	-2.48	1.2D + 1.6W Normal Wind	4.50	100	100	100	172.76	50.00	4.55	0	0			54	Member X
11	195	SOL - 7/8" SOLID	-0.76	0.9D + 1.6W 90° Wind	4.50	100	100	100	172.76	50.00	4.55	0	0			17	Member X

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20	DAE - 3.5X3.5X0.3125	-10.1	1.2D + 1.6W Normal Wind	21.92	50	50	50	204.79	36.00	22.52	1	1	43.49	75.0	45	Member Y
2	40	SAE - 3.5X3.5X0.3125	-9.33	1.2D + 1.6W 90° Wind	20.16	50	50	50	175.28	36.00	15.37	1	1	43.49	37.5	61	Member Z
3	60	SAE - 3X3X0.3125	-9.09	1.2D + 1.6W 90° Wind	18.45	50	50	50	187.93	36.00	11.39	1	1	43.49	37.5	80	Member Z

Force/Stress Compression Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 15	



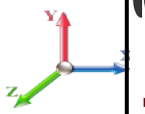
Tower Engineering Solutions

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
4	80	SAE - 3X3X0.3125	-8.86	1.2D + 1.6W 90° Wind	16.80	50	50	50	171.17	36.00	13.73	1	1	43.49	37.5	65	Member Z
5	100	SAE - 3X3X0.3125	-8.81	1.2D + 1.6W 90° Wind	15.24	50	50	50	155.27	36.00	16.68	1	1	31.81	29.9	53	Member Z
6	120	SAE - 3X3X0.1875	-8.15	1.2D + 1.6W 90° Wind	13.80	50	50	50	138.89	36.00	12.77	1	1	31.81	17.9	64	Member Z
7	140	SAE - 2.5X2.5X0.1875	-7.55	1.2D + 1.6W 90° Wind	12.50	50	50	50	151.56	36.00	8.87	1	1	31.81	17.9	85	Member Z
8	150	SAE - 2.5X2.5X0.1875	-8.15	1.2D + 1.6W Normal Wind	11.42	50	50	50	138.38	36.00	10.64	1	1	31.81	17.9	77	Member Z
9	170	SOL - 7/8" SOLID	-3.51	1.2D + 1.6W 90° Wind	5.51	50	50	50	135.94	50.00	7.35	0	0			48	Member X
10	185	SOL - 3/4" SOLID	-3.90	1.2D + 1.6W Normal Wind	5.08	50	50	50	146.35	50.00	4.66	0	0			84	Member X
11	195	SOL - 3/4" SOLID	-1.17	1.2D + 1.6W 60° Wind	5.05	50	50	50	145.44	50.00	4.72	0	0			25	Member X

Force/Stress Tension Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 16	



TES Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	12B - 12"BD 2.25"	285.17	0.9D + 1.6W 60° Wind	50	536.85	53.1	Member
2	40	12B - 12"BD 2.25"	257.73	0.9D + 1.6W 60° Wind	50	536.85	48.0	Member
3	60	12B - 12"BD 2"	227.02	0.9D + 1.6W 60° Wind	50	423.90	53.6	Member
4	80	12B - 12"BD 2"	193.86	0.9D + 1.6W 60° Wind	50	423.90	45.7	Member
5	100	12B - 12"BD 1.75"	158.15	0.9D + 1.6W 60° Wind	50	324.45	48.7	Member
6	120	12B - 12"BD 1.75"	118.43	0.9D + 1.6W 60° Wind	50	324.45	36.5	Member
7	140	12B - 12"BD 1.5"	80.67	0.9D + 1.6W 60° Wind	50	238.50	33.8	Member
8	150	12B - 12"BD 1.25"	42.01	0.9D + 1.6W 60° Wind	50	165.60	25.4	Member
9	170	SOL - 2" SOLID	35.56	0.9D + 1.6W 60° Wind	50	141.37	25.2	Member
10	185	SOL - 1 3/4" SOLID	4.59	0.9D + 1.6W 60° Wind	50	108.24	4.2	Member
11	195	SOL - 1 3/4" SOLID	1.16	0.9D + 1.6W 60° Wind	50	108.24	1.2	Bolt Shear

Splices

		Top Splice					Bottom Splice				
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	20	0.9D + 1.6W 60° Wind	264.14	0.00	0.0			0.9D + 1.6W 60° Wind	294.2	0.00			
2	40	0.9D + 1.6W 60° Wind	233.91	0.00	0.0			0.9D + 1.6W 60° Wind	264.1	457.92	57.7	1 1/4 A325	6
3	60	0.9D + 1.6W 60° Wind	201.64	0.00	0.0			0.9D + 1.6W 60° Wind	233.9	457.92	51.1	1 1/4 A325	6
4	80	0.9D + 1.6W 60° Wind	166.75	0.00	0.0			0.9D + 1.6W 60° Wind	201.6	457.92	44.0	1 1/4 A325	6
5	100	0.9D + 1.6W 60° Wind	127.61	0.00	0.0			0.9D + 1.6W 60° Wind	166.7	318.06	52.4	1 A325	6
6	120	0.9D + 1.6W 60° Wind	90.31	0.00	0.0			0.9D + 1.6W 60° Wind	127.6	318.06	40.1	1 A325	6
7	140	0.9D + 1.6W 60° Wind	54.08	0.00	0.0			0.9D + 1.6W 60° Wind	90.31	318.06	28.4	1 A325	6
8	150	0.9D + 1.6W 60° Wind	34.51	0.00	0.0			0.9D + 1.6W 60° Wind	54.08	318.06	17.0	1 A325	6
9	170	0.9D + 1.6W Normal Wind	4.40	0.00	0.0			0.9D + 1.6W 60° Wind	34.51	318.06	10.9	1 A325	6
10	185	0.9D + 1.6W 60° Wind	1.14	0.00	0.0			0.9D + 1.6W Normal Wind	4.40	0.00			
11	195		0.00	0.00	0.0			0.9D + 1.6W 60° Wind	1.14	0.00			

HORIZONTAL MEMBERS

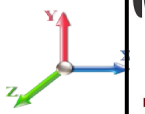
Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	-			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	SAE - 2.5X2.5X0.1875	2.74	1.2D + 1.6W 60° Wind	36	22.55	1	1	31.81	17.94	10.66	25.7	Blck Shear
8	150	-			36	0.00	0	0					
9	170	SOL - 1" SOLID	1.91	1.2D + 1.6W Normal Wi	50	35.34	0	0				5.4	Member
10	185	SOL - 7/8" SOLID	1.82	1.2D + 1.6W 60° Wind	50	27.06	0	0				6.7	Member
11	195	SOL - 7/8" SOLID	0.99	0.9D + 1.6W 60° Wind	50	27.06	0	0				3.7	Member

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	DAE - 3.5X3.5X0.3125	9.18	1.2D + 1.6W 90° Wind	36	122.35	1	1	43.49	75.04	47.40	21.1	Bolt Shear
2	40	SAE - 3.5X3.5X0.3125	9.11	1.2D + 1.6W 90° Wind	36	54.17	1	1	43.49	37.52	23.70	38.4	Blck Shear
3	60	SAE - 3X3X0.3125	8.77	0.9D + 1.6W 90° Wind	36	44.05	1	1	43.49	37.52	20.30	43.2	Blck Shear
4	80	SAE - 3X3X0.3125	8.59	0.9D + 1.6W 90° Wind	36	44.05	1	1	43.49	37.52	20.30	42.3	Blck Shear

Force/Stress Tension Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 17	



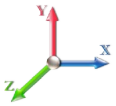
Tower Engineering Solutions

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
5	100	SAE - 3X3X0.3125	8.72	1.2D + 1.6W 90° Wind	36	46.60	1	1	31.81	29.91	19.47	44.8	Blck Shear
6	120	SAE - 3X3X0.1875	7.88	0.9D + 1.6W 90° Wind	36	28.68	1	1	31.81	17.94	11.68	67.5	Blck Shear
7	140	SAE - 2.5X2.5X0.1875	7.37	1.2D + 1.6W 90° Wind	36	22.55	1	1	31.81	17.94	10.66	69.1	Blck Shear
8	150	SAE - 2.5X2.5X0.1875	7.62	0.9D + 1.6W 60° Wind	36	22.55	1	1	31.81	17.94	10.66	71.4	Blck Shear
9	170	SOL - 7/8" SOLID	3.65	1.2D + 1.6W Normal Wi	50	27.06	0	0				13.5	Member
10	185	SOL - 3/4" SOLID	2.95	1.2D + 1.6W 60° Wind	50	19.88	0	0				14.8	Member
11	195	SOL - 3/4" SOLID	0.87	0.9D + 1.6W 90° Wind	50	19.88	0	0				4.4	Member

Support Forces Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 18	



Tower Engineering Solutions

Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	-0.01	340.25	-35.95	
	1a	12.89	-139.26	-8.75	
	1b	-12.88	-139.25	-8.76	
1.2D + 1.6W 60° Wind	1	-1.12	176.02	-18.18	
	1a	-16.15	173.10	8.23	
	1b	-27.17	-287.39	-15.71	
1.2D + 1.6W 90° Wind	1	-1.34	20.67	-1.65	
	1a	-26.65	288.32	14.75	
	1b	-23.86	-247.25	-13.09	
0.9D + 1.6W Normal Wind	1	-0.01	334.63	-35.51	
	1a	13.25	-144.17	-8.97	
	1b	-13.24	-144.16	-8.98	
0.9D + 1.6W 60° Wind	1	-1.12	170.63	-17.75	
	1a	-15.79	167.75	8.01	
	1b	-27.53	-292.08	-15.92	
0.9D + 1.6W 90° Wind	1	-1.35	15.50	-1.23	
	1a	-26.28	282.80	14.52	
	1b	-24.22	-252.00	-13.30	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	156.14	-7.70	
	1a	6.67	3.08	-3.99	
	1b	-6.66	3.12	-3.99	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.18	104.61	-2.46	
	1a	-2.14	102.94	1.13	
	1b	-11.00	-45.22	-6.36	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.21	54.30	2.60	
	1a	-5.35	139.83	3.04	
	1b	-9.89	-31.79	-5.64	
1.0D + 1.0W Normal Wind	1	0.00	94.84	-9.81	
	1a	2.26	-21.70	-1.64	
	1b	-2.26	-21.69	-1.64	
1.0D + 1.0W 60° Wind	1	-0.29	54.97	-5.46	
	1a	-4.84	54.20	2.50	
	1b	-5.76	-57.72	-3.33	
1.0D + 1.0W 90° Wind	1	-0.35	17.22	-1.42	
	1a	-7.40	82.19	4.11	
	1b	-4.96	-47.96	-2.69	

Max Reactions

Leg			Overturning		
Max Uplift:	-292.08	(kips)	Moment:	5536.92	(ft-kips)
Max Down:	340.25	(kips)	Total Down:	61.74	(kips)
Max Shear:	35.95	(kips)	Total Shear:	53.46	(kips)

Analysis Summary

Structure:	CT22108-A-SBA	**Code:**	EIA/TIA-222-G	9/21/2018	
Site Name:	Windsor Locks @ Volunteer Drive	**Exposure:**	C		
Height:	195.00 (ft)	**Crest Height:**	0.00		
Base Elev:	5.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Max Reactions

Leg			Overturning		
Max Uplift:	-292.08	(kips)	Moment:	5536.92	(ft-kips)
Max Down:	340.25	(kips)	Total Down:	61.74	(kips)
Max Shear:	35.95	(kips)	Total Shear:	53.46	(kips)

Anchor Bolts

Bolt Size (in.):	1.25	Number Bolts:	6
Yield Strength (Ksi):	105.00	Tensile Strength (Ksi):	150.00
Detail Type:	C		

Interaction Ratio: 0.51

Max Usages

Max Leg: 64.6% (1.2D + 1.6W Normal Wind - Sect 3)
Max Diag: 85.1% (1.2D + 1.6W 90° Wind - Sect 7)
Max Horiz: 54.5% (1.2D + 1.6W Normal Wind - Sect 10)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.6W 97 mph Wind at 60° From Face	60.00	0.1590	0.0252	0.3032
	70.00	0.2147	-0.0107	0.3549
	100.00	0.4487	0.0493	0.5452
	110.00	0.5496	0.0553	0.6056
	130.00	0.7833	0.0672	0.7420
	150.00	1.0617	0.0901	0.8813
	162.40	1.2585	1.0940	0.9425
	170.42	1.3823	1.7089	1.9284
	195.00	1.7838	1.8622	1.3203
0.9D + 1.6W 97 mph Wind at 90° From Face	60.00	0.1587	-0.0282	0.3040
	70.00	0.2147	-0.0332	0.3545
	100.00	0.4482	-0.0523	0.5436
	110.00	0.5489	-0.0576	0.6008
	130.00	0.7812	-0.0657	0.7376
	150.00	1.0589	-0.0727	0.8688
	162.40	1.2525	-0.3182	0.9148
	170.42	1.3620	-0.4545	0.9807
	195.00	1.7496	-0.4540	0.9425
0.9D + 1.6W 97 mph Wind at Normal To Face	60.00	0.1649	0.0008	0.3142
	70.00	0.2244	0.0001	0.3666
	100.00	0.4652	0.0008	0.5691
	110.00	0.5700	0.0010	0.6367
	130.00	0.8136	0.0014	0.7749
	150.00	1.1054	-0.0014	0.9217
	162.40	1.3157	-0.2419	1.0011
	170.42	1.4815	-0.3735	3.3285
	195.00	1.9338	0.3592	2.4250

1.0D + 1.0W 60 mph Wind at 60° From Face	60.00	0.0385	-0.0050	0.0734
	70.00	0.0523	-0.0059	0.0859
	100.00	0.1087	-0.0092	0.1317
	110.00	0.1332	-0.0100	0.1467
	130.00	0.1896	-0.0110	0.1786
	150.00	0.2571	-0.0112	0.2131
	162.40	0.3046	0.1098	0.2247
	170.42	0.3344	0.1673	0.4445
	195.00	0.4311	0.1676	0.3008
1.0D + 1.0W 60 mph Wind at 90° From Face	60.00	0.0387	-0.0068	0.0738
	70.00	0.0522	-0.0080	0.0860
	100.00	0.1089	-0.0126	0.1316
	110.00	0.1333	-0.0139	0.1456
	130.00	0.1896	-0.0158	0.1783
	150.00	0.2564	-0.0176	0.2101
	162.40	0.3031	-0.0768	0.2208
	170.42	0.3296	-0.1096	0.2329
	195.00	0.4230	-0.1083	0.2271
1.0D + 1.0W 60 mph Wind at Normal To Face	60.00	0.0403	0.0003	0.0765
	70.00	0.0547	0.0000	0.0890
	100.00	0.1132	0.0000	0.1381
	110.00	0.1386	0.0001	0.1543
	130.00	0.1977	0.0005	0.1878
	150.00	0.2679	0.0001	0.2220
	162.40	0.3187	-0.0555	0.2417
	170.42	0.3587	-0.0853	0.7977
	195.00	0.4680	0.0832	0.5823
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	60.00	0.0525	0.0063	0.0997
	70.00	0.0695	-0.0044	0.1177
	100.00	0.1492	0.0124	0.1856
	110.00	0.1838	0.0139	0.2099
	130.00	0.2651	0.0172	0.2643
	150.00	0.3672	0.0236	0.3300
	162.40	0.4423	0.3089	0.3630
	170.42	0.4904	0.4786	0.9502
	195.00	0.6505	0.4849	1.0701
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	60.00	0.0519	-0.0085	0.0997
	70.00	0.0695	-0.0100	0.1170
	100.00	0.1479	-0.0159	0.1844
	110.00	0.1822	-0.0177	0.2070
	130.00	0.2629	-0.0211	0.2619
	150.00	0.3636	-0.0246	0.3216
	162.40	0.4367	-0.1487	0.3514
	170.42	0.4773	-0.2175	0.5946
	195.00	0.6278	-0.2156	0.7761
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	60.00	0.0526	0.0001	0.1031
	70.00	0.0716	0.0000	0.1209
	100.00	0.1530	0.0003	0.1941
	110.00	0.1889	-0.0003	0.2195
	130.00	0.2752	-0.0003	0.2788
	150.00	0.3821	-0.0013	0.3453
	162.40	0.4638	-0.1217	0.3961
	170.42	0.5329	-0.1866	1.5952
	195.00	0.7216	0.1817	1.6421
1.2D + 1.6W 97 mph Wind at 60° From Face	60.00	0.1592	0.0252	0.3038
	70.00	0.2151	-0.0107	0.3556
	100.00	0.4495	0.0494	0.5463
	110.00	0.5507	0.0554	0.6071
	130.00	0.7848	0.0673	0.7438
	150.00	1.0640	0.0903	0.8838
	162.40	1.2614	1.0965	0.9452
	170.42	1.3856	1.7128	1.9302
	195.00	1.7882	1.8688	1.3216

1.2D + 1.6W 97 mph Wind at 90° From Face	60.00	0.1590	-0.0283	0.3046
	70.00	0.2150	-0.0333	0.3552
	100.00	0.4489	-0.0524	0.5448
	110.00	0.5499	-0.0577	0.6022
	130.00	0.7828	-0.0657	0.7395
	150.00	1.0612	-0.0728	0.8712
	162.40	1.2553	-0.3181	0.9173
	170.42	1.3651	-0.4543	0.9784
	195.00	1.7538	-0.4537	0.9451
1.2D + 1.6W 97 mph Wind at Normal To Face	60.00	0.1652	0.0008	0.3149
	70.00	0.2248	0.0001	0.3673
	100.00	0.4661	0.0007	0.5705
	110.00	0.5712	0.0009	0.6383
	130.00	0.8154	0.0014	0.7770
	150.00	1.1079	-0.0013	0.9240
	162.40	1.3188	-0.2420	1.0040
	170.42	1.4850	-0.3736	3.3336
	195.00	1.9386	0.3590	2.4281

Last revised on June 29, 2018

Mat Foundation Design for Self Supporting Tower

			Date: 9/18/2018
Customer Name:	SBA Communications Corp	EIA/TIA Standard:	EIA-222-G
Site Name:		Structure Height (Ft.):	195
Site Nmber:	CT22108-A-SBA	Engineer Name:	M. Baker
Engr. Number:	60369	Engineer Login ID:	

Foundation Info Obtained from: Drawings/Calculations

Analysis or Design? Analysis

Number of Tower Legs: 3 Legs

Base Reactions (Factored):

(1). Individual Leg:

Axial Load (Kips):	340.3	Uplift Force (Kips):	292.1
Shear Force (Kips):	36.0		

(2). Tower Base:

Total Vertical Load (Kips):	61.7	Total Shear Force (Kips):	53.5
Moment (Kips-ft):	5536.9		

Foundation Geometries:

Leg distance (Center-to-Center ft.):		20.0	Mods required -Yes/No ?:	No	
Diameter of Pier (ft.):	Square	2.9	Pier Height A. G. (ft.):	5.00	
Tower center to mat center (ft):		0.00	Depth of Base BG (ft.):	10.0	
Length of Pad (ft.):		29.5	Width of Pad (ft.):	29.5	
Thickness of Pad (ft):		3.50			

Material Properties and Reabr Info:

Concrete Strength (psi):	4500	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:	27	Tie Spacing (in):	12.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

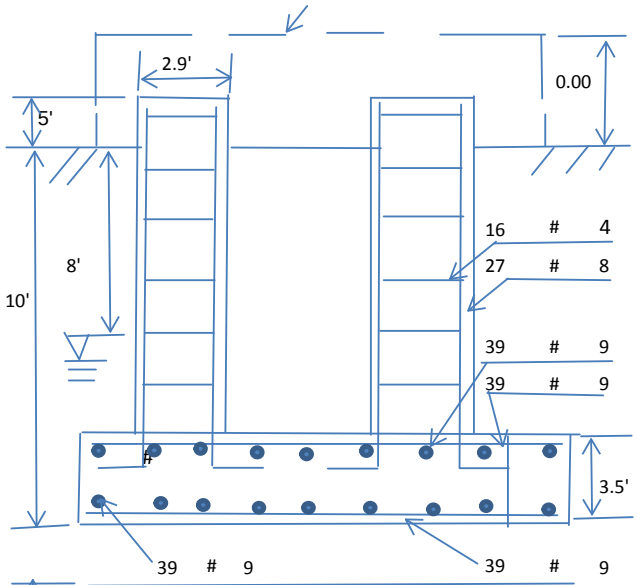
Qty. of Rebar in Pad (L):	39	Qty. of Rebar in Pad (W):	39

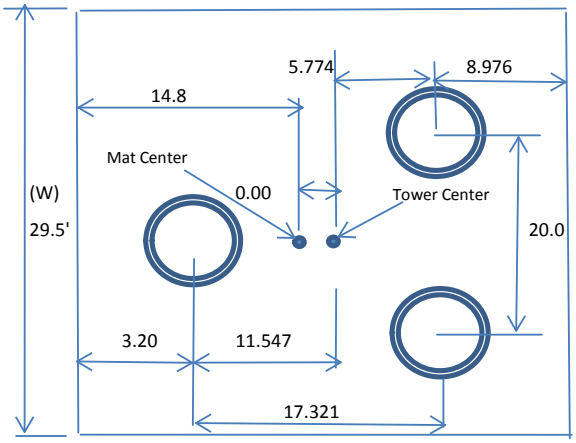
Rebar at the top of the concrete pad:

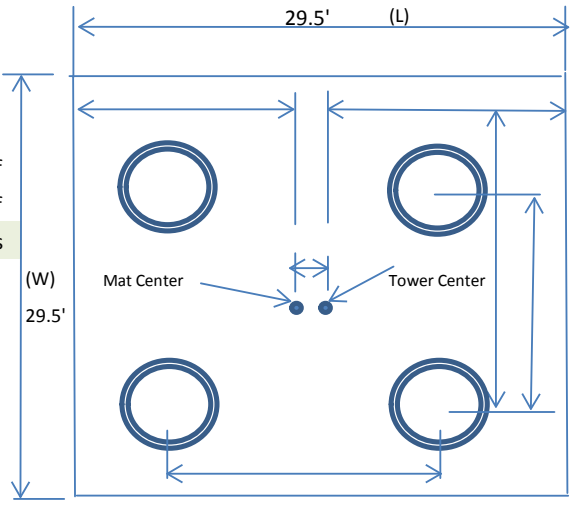
Qty. of Rebar in Pad (L):	39	Qty. of Rebar in Pad (W):	39

Soil Design Parameters:

Soil Unit Weight (pcf):	100.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	8.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	7000	Consider ties in concrete shear strength:	Yes	







Allowable overstress %: 5.00% **TES Engr. Number:** 60369 Page 2/2 Date: 9/18/2018

Apply 1.35 for e/w per G/H: 1

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

Total Dry Soil Volume (cu. Ft.):	5494.28	Total Dry Soil Weight (Kips):	549.43
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	549.43	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1592.61	Total Dry Concrete Weight (Kips):	238.89
Total Buoyant Concrete Volume (cu. Ft.):	1740.50	Total Buoyant Concrete Weight (Kips):	152.47
Total Effective Concrete Weight (Kips):	391.36	Total Vertical Load on Base (Kips):	1002.52

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2423.50	<	Allowable Factored Soil Bearing (psf):	5250	0.46	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	13399.6	>	Design Factored Momont (kips-ft):	6214	0.46	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	2.16	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		
(1) Concrete Pier:					Load/ Capacity Ratio	
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	1101.9	>	Design Factored Moment (Mu, Kips-Ft)	413.4	0.38	OK!
Calculated Shear Capacity (Kips):	102.3	>	Design Factored Shear (Kips):	36.0	0.35	OK!
Calculated Tension Capacity (Tn, Kips):	1151.8	>	Design Factored Tension (Tu Kips):	292.1	0.25	OK!
Calculated Compression Capacity (Pn, Kips):	2342.2	>	Design Factored Axial Load (Pu Kips):	340.3	0.15	OK!
Moment & Tension Strength Combination:	0.38	OK!	Check Tie Spacing (Design/Req'd):	1		OK!
Pier Reinforcement Ratio:	0.018	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L or W Direction, Kips):	1369.2	>	One-Way Factored Shear (L/W-Dir Kips	297.5	0.22	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	1063.2	>	One-Way Factored Shear (Dia. Dir, Kips	236.1	0.22	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct.):	0.0029		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0026		
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	6589.5	>	Moment at Bottom (L-Direct. K-Ft):	1771.4	0.27	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	6237.8	>	Moment at Bottom (Dia. Dir. K-Ft):	1476.5	0.24	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0029		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0026		
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	6589.5	>	Moment at the top (L-Dir Kips-Ft):	657.6	0.10	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	6237.8	>	Moment at the top (Dia. Dir., K-Ft):	410.2	0.07	OK!
Punching Failure Capacity (Kips):	1536.4	>	Punch. Failure Factored Shear (K):	340.3	0.22	OK!

July 31, 2018
October 26, 2018 (Rev.1)

SBA T-Mobile

SBA Communications Corporation
134 Flanders Rd., Suite 125
Westborough, MA 01581

RE:	SBA Site ID:	CT22108-A
	Site Number:	CT11319C
	Site Name:	WINDSOR LOCKS
	Site Address:	2 Volunteer Drive Windsor Locks, CT 06096

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by T-Mobile to perform a mount analysis on the existing T-Mobile antenna mounts to determine their capabilities of supporting the following equipment loading:

- (3) APX16DWV-16DWVS-E-A20 Antennas (59.9"x13.0"x3.2" – Wt. = 42 lbs. /each)
- (6) KRY 112 144/2 TMA's (6.9"x6.1"x2.8" – Wt. = 11 lbs. /each)
- **(3) APXVAARR24_43-U-NA20 Antennas (96.0"x24.0"x8.7" – Wt. = 128 lbs. /each)**
- **(3) AIR 32 KRD901146-1_B66A_B2A Antennas (56.6"x12.9"x8.7" – Wt. = 132 lbs. /each)**
- **(3) RRUS 4449 B71 + B12 RRH's (13.1"x14.9"x9.2" – Wt. = 74 lbs. /each)**

**Proposed equipment shown in bold.*

No original structural design documents or fabrication drawings were available for the existing mounts. HDG's sub-consultant, ProVertic LLC, conducted a survey climb and mapping of the existing T-Mobile antenna mounts on July 16, 2018.

Based on our analysis, we have determined that the existing antenna mount **IS CAPABLE** of supporting the proposed antenna installations with the following modifications:

- **Replace existing pipe mast with new 2-1/2" std. (2.88" O.D.) steel pipe mast secured to the existing mount (typ. of 1 per sector, total of 3).**
- **Secure the existing and proposed pipe masts to the existing mount with a minimum of two points of connection (typ. of 3 per sector, total of 9).**

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Existing Mount Rating	23	LC1	135%	**FAIL**
Proposed Mount Rating	38	LC2	69%	**PASS**

This analysis was conducted in accordance with EIA/TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, and the International Building Code 2012 (See the attached analysis).

Reference Documents:

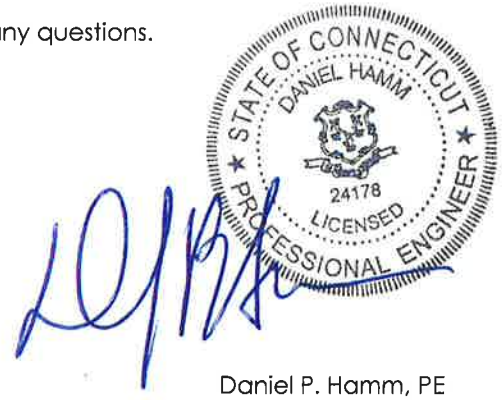
- Mount mapping report prepared by ProVertic LLC.

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to T-Mobile's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC



Michael Cabral
Structural Dept. Head

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 10/26/2018
Project Name: WINDSOR LOCKS
Project Number: CT11319C
Designed By: BD **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	135 (ft)
z_g=	1200 (ft)
α=	7.0
K_z=	**1.077**

$K_{zmin} \le K_z \le 2.01$

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_e
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.4 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_e K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}=	**#DIV/0!**

K_h=	#DIV/0!
K_e=	0 (from Table 2-4)
K_t=	0 (from Table 2-5)
f=	0 (from Table 2-5)
z=	135
H=	0 (Ht. of the crest above surrounding terrain)
K_{zt}=	1.00

(If Category 1 then K_{zt} =1.0)

Category=	**1**

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2.6.7 Gust Effect Factor

2.6.7.1 Self Supporting Lattice Structures

Gh = 1.0 Latticed Structures > 600 ft

Gh = 0.85 Latticed Structures 450 ft or less

Gh = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	195	Gh=	0.85

2.6.7.2 Guyed Masts Gh= 0.85

2.6.7.3 Pole Structures Gh= 1.1

2.6.9 Appurtenances Gh= 1.0

2.6.7.4 Structures Supported on Other Structures
(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

Gh=	**1.35**	**Gh=**	**1.00**

2.6.9.2 Design Wind Force on Appurtenances

$F = q_z * Gh * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_d * V_{max}^2 * I$

		K_z=	1.077
		K_{zt}=	1.0
q_z=	**25.83**	K_d=	0.85
$q_{z\,(ice)}$=	**5.86**	V_{max}=	105
		$V_{max\,(ice)}$=	50
		I=	1.0

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95

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Determine Ca:

Table 2-8

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Round	C < 32 (Subcritical)	0.7	0.8	1.2
	32 ≤ C ≤ 64 (Transitional)	$3.76/(C^{0.485})$	$3.37/(C^{0.415})$	$38.4/(C^{1.0})$
	C > 64 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance, and the section length considered to have uniform wind load).

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.00 in**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (1" Ice)
APXVAARR24_43-U-NA20 Antenna	96.0	24.0	8.7	16.00	4.00	1.27	**523**	**131**
AIR 32 KRD901146-1_B66A_B2A Antenna	56.6	12.9	8.7	5.07	4.39	1.28	**168**	**46**
APX16DWV-16DWVS-E-A20 Antenna	59.9	13.0	3.2	5.41	4.61	1.29	**181**	**49**
RRUS 4449 B71 + B12 RRH	13.1	14.9	9.2	1.36	0.88	1.20	**42**	**12**
KRY 112 144/2 TMA	6.9	6.1	2.8	0.29	1.13	1.20	**9**	**4**

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Designed By: BD **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice:	1	in.
Density of ice:	56	pcf

APX16DWV-16DWVS-E-A20 Antenna

Weight of ice based on total radial SF area:

Height (in):	59.9		
Width (in):	13.0		
Depth (in):	3.2		
Total weight of ice on object:		76	lbs
Weight of object:	42	lbs	
Combined weight of ice and object:		118	lbs

AIR 32 KRD901146-1_B66A_B2A Antenna

Weight of ice based on total radial SF area:

Height (in):	56.6		
Width (in):	12.9		
Depth (in):	8.7		
Total weight of ice on object:		97	lbs
Weight of object:	132	lbs	
Combined weight of ice and object:		229	lbs

APXVAARR24_43-U-NA20 Antenna

Weight of ice based on total radial SF area:

Height (in):	96.0		
Width (in):	24.0		
Depth (in):	8.7		
Total weight of ice on object:		234	lbs
Weight of object:	128	lbs	
Combined weight of ice and object:		362	lbs

4449 B71+B12 RRH

Weight of ice based on total radial SF area:

Height (in):	13.1		
Width (in):	14.9		
Depth (in):	9.2		
Total weight of ice on object:		34	lbs
Weight of object:	74	lbs	
Combined weight of ice and object:		108	lbs

KRY 112 144/2 TMA

Weight of ice based on total radial SF area:

Height (in):	6.9		
Width (in):	6.1		
Depth (in):	2.8		
Total weight of ice on object:		7	lbs
Weight of object:	11	lbs	
Combined weight of ice and object:		18	lbs

2" pipe

Per foot weight of ice:

diameter (in):	2.38		
Per foot weight of ice on object:		4	plf

4" pipe

Per foot weight of ice:

diameter (in):	4.5		
Per foot weight of ice on object:		7	plf

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Mount Calculations
(Existing Conditions)

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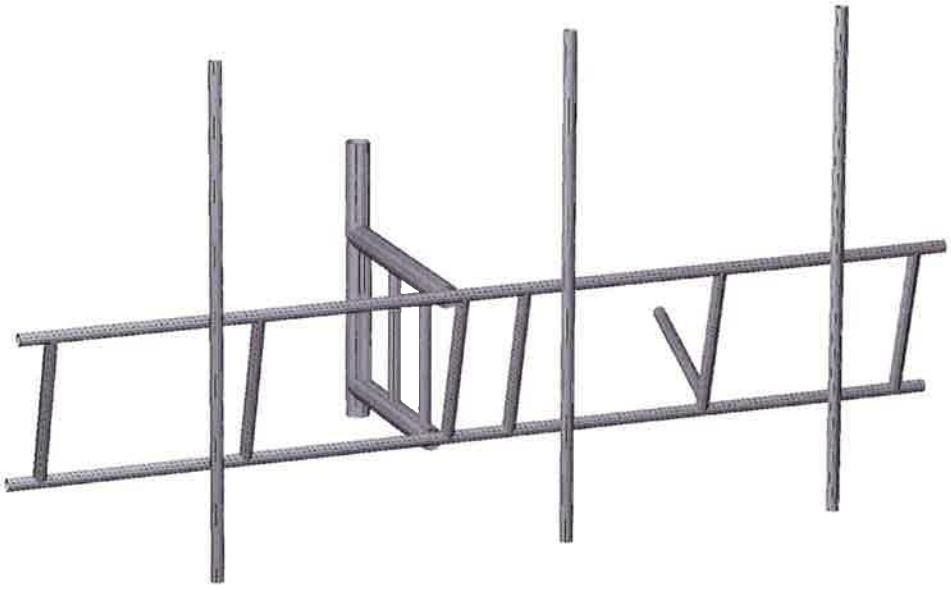

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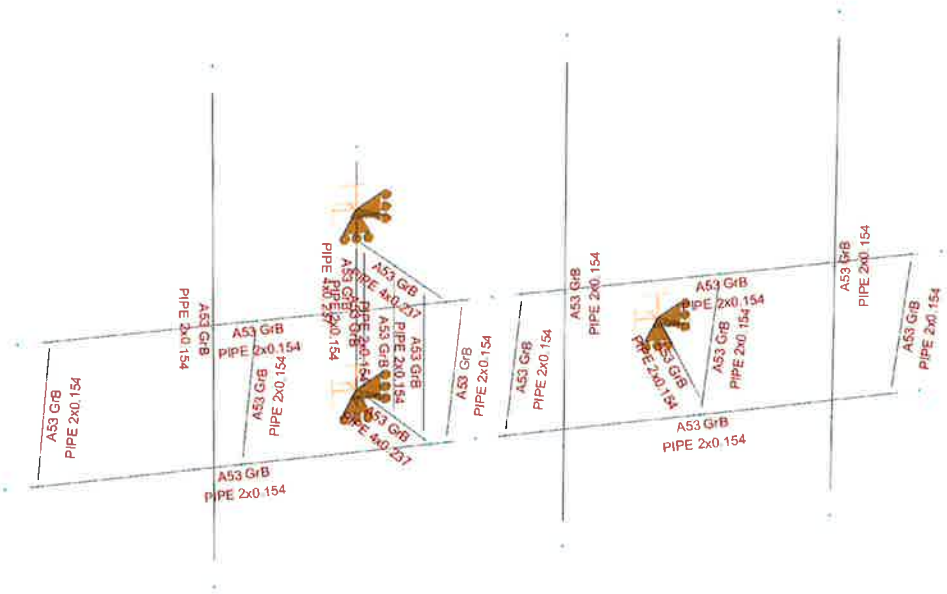

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Load data

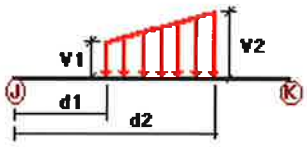
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

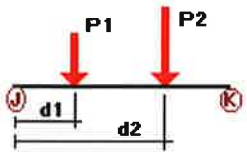
Condition	Description	Comb.	Category
DL	Dead Load	No	DL
Wo	Wind Load (No Ice)	No	WIND
Wi	Wind Load (With Ice)	No	WIND
Di	Ice Load	No	LL

Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Di	6	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	7	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	8	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	9	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	10	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	11	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	21	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	23	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	24	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	25	Y	-0.007	-0.007	0.00	Yes	100.00	Yes
	26	Y	-0.007	-0.007	0.00	Yes	100.00	Yes
	27	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	28	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	29	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	38	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	39	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	40	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	41	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	60	Y	-0.004	-0.004	0.00	Yes	100.00	Yes
	61	Y	-0.007	-0.007	0.00	Yes	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	21	y	-0.021	1.00	No
		y	-0.021	5.99	No
		y	-0.022	3.00	No
	23	y	-0.064	0.00	No
		y	-0.064	8.00	No
		y	-0.074	3.00	No
	24	y	-0.066	1.00	No
		y	-0.066	5.72	No
Wo	21	z	-0.091	1.00	No
		z	-0.091	5.99	No
	23	z	-0.262	0.00	No
		z	-0.262	8.00	No
	24	z	-0.084	1.00	No
		z	-0.084	5.72	No
Wi	21	z	-0.025	1.00	No
		z	-0.025	5.99	No
	23	z	-0.066	0.00	No
		z	-0.066	8.00	No
	24	z	-0.023	1.00	No
		z	-0.023	5.72	No
Di	21	y	-0.038	1.00	No
		y	-0.038	5.99	No
		y	-0.014	3.00	No
	23	y	-0.117	0.00	No
		y	-0.117	8.00	No
		y	-0.034	3.00	No
	24	y	-0.049	1.00	No
		y	-0.049	5.72	No

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	0.00	0.00
Wo	Wind Load (No Ice)	No	0.00	0.00	0.00
Wi	Wind Load (With Ice)	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
Wo	0.00	0.00	0.00
Wi	0.00	0.00	0.00
Di	0.00	0.00	0.00

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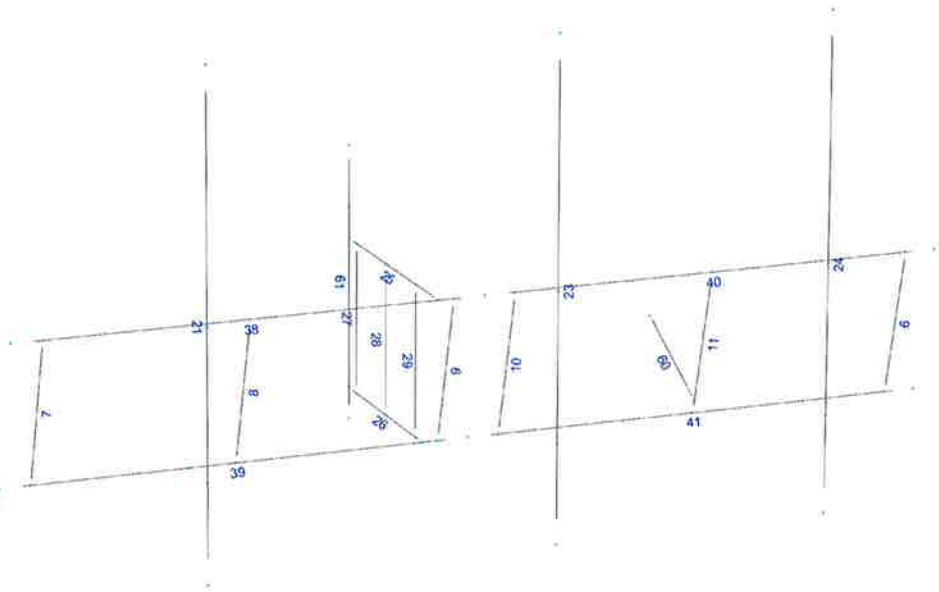

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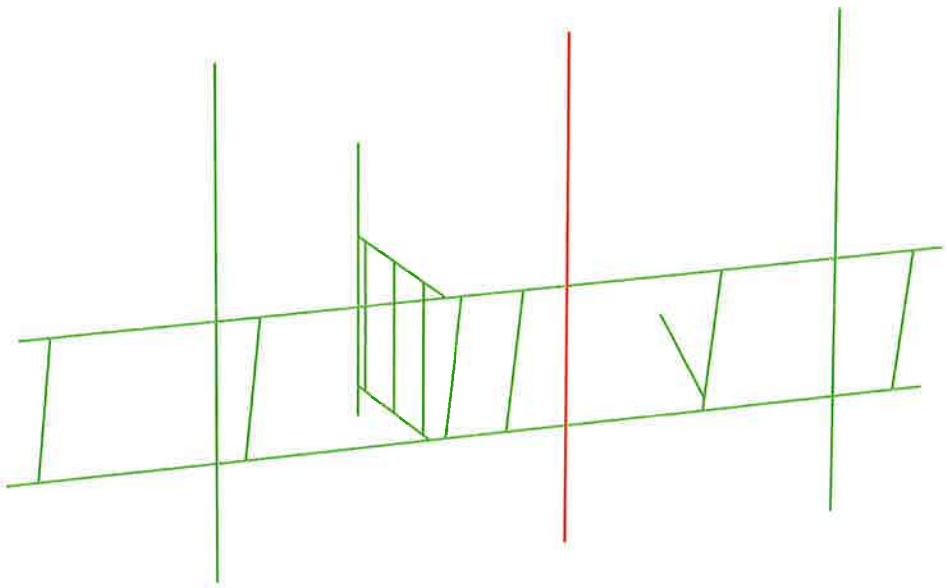
Design status

- Not designed
- Error on design
- Design O.K.
- With warnings



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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+1.6Wo
LC2=0.9DL+1.6Wo
LC3=1.2DL+Wi+Di
LC4=1.2DL
LC5=0.9DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	PIPE 2x0.154	**6**	LC1 at 100.00%	0.18	OK	Eq. H1-1b
		7	LC1 at 100.00%	0.07	OK	Eq. H1-1b
		8	LC3 at 0.00%	0.22	OK	Eq. H1-1b
		9	LC3 at 100.00%	0.15	OK	Eq. H1-1b
		10	LC3 at 0.00%	0.41	OK	Eq. H1-1b
		11	LC2 at 90.63%	0.47	OK	Eq. H1-1b
		21	LC1 at 47.92%	0.33	OK	Eq. H1-1b
		23	LC1 at 50.00%	1.35	**N.G.**	Eq. H1-1b
		24	LC1 at 47.92%	0.31	OK	Eq. H1-1b
		27	LC3 at 0.00%	0.09	OK	Eq. H1-1b
		28	LC3 at 0.00%	0.21	OK	Eq. H1-1b
		29	LC3 at 0.00%	0.33	OK	Eq. H1-1b
		38	LC2 at 90.63%	0.73	OK	Eq. H1-1b
		39	LC3 at 90.63%	0.65	OK	Eq. H1-1b
		40	LC3 at 7.29%	0.41	OK	Eq. H1-1b
		41	LC3 at 48.96%	0.30	OK	Eq. H1-1b
		60	LC1 at 0.00%	0.58	OK	Eq. H1-1b
	PIPE 4x0.237	**25**	LC3 at 100.00%	0.23	OK	Eq. H1-1b
		26	LC3 at 100.00%	**0.27**	**OK**	Eq. H1-1b
		61	LC3 at 67.19%	0.11	OK	Eq. H1-1b

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Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	-0.75	0.00	0.00	0
3	-0.75	-2.42	-0.665	0
5	7.50	0.00	0.00	0
6	-7.50	0.00	0.00	0
7	7.50	-2.42	-0.665	0
8	-7.50	-2.42	-0.665	0
9	7.00	0.00	0.00	0
10	7.00	-2.42	-0.665	0
11	3.75	0.00	0.00	0
12	3.75	-2.42	-0.665	0
13	0.50	0.00	0.00	0
14	0.50	-2.42	-0.665	0
15	-7.00	0.00	0.00	0
16	-7.00	-2.42	-0.665	0
19	-3.75	0.00	0.00	0
20	-3.75	-2.42	-0.665	0
21	-0.50	0.00	0.00	0
22	-0.50	-2.42	-0.665	0
24	5.583	-2.42	-0.665	0
25	5.583	0.00	0.00	0
28	1.125	0.00	0.00	0

29	1.125	-2.42	-0.665	0
38	-4.50	0.00	0.00	0
40	-4.50	-2.42	-0.665	0
52	5.583	0.00	0.20	0
53	1.125	0.00	0.20	0
55	-4.50	0.00	0.20	0
56	5.583	4.00	0.20	0
57	1.125	4.00	0.20	0
59	-4.50	4.00	0.20	0
60	5.583	-4.00	0.20	0
61	1.125	-4.00	0.20	0
63	-4.50	-4.00	0.20	0
64	-0.75	0.00	-3.875	0
65	-0.75	-2.42	-3.875	0
66	-0.75	0.00	-3.542	0
67	-0.75	-2.42	-3.542	0
68	-0.75	0.00	-2.25	0
69	-0.75	-2.42	-2.25	0
70	-0.75	0.00	-0.959	0
71	-0.75	-2.42	-0.959	0
76	0.00	0.00	0.00	0
77	0.00	-2.42	-0.665	0
94	-4.50	-2.42	0.20	0
96	1.125	-2.42	0.20	0
97	5.583	-2.42	0.20	0
107	5.00	-2.20	-5.3325	0
117	3.75	-2.20	-0.6045	0
118	-0.75	1.50	-3.875	0
119	-0.75	-2.92	-3.875	0
120	-0.75	0.50	-3.875	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
65	1	1	1	1	1	1
107	1	1	1	1	1	1
120	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
6	9	10		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
7	15	16		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
8	19	20		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
9	21	22		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
10	13	14		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
11	11	12		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
21	59	63		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
23	57	61		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
24	56	60		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

25	1	64	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00
26	3	65	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00
27	66	67	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
28	68	69	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
29	70	71	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
38	6	76	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
39	8	77	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
40	76	5	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
41	77	7	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
60	117	107	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
61	119	118	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00

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Mount Calculations
(Proposed Conditions)

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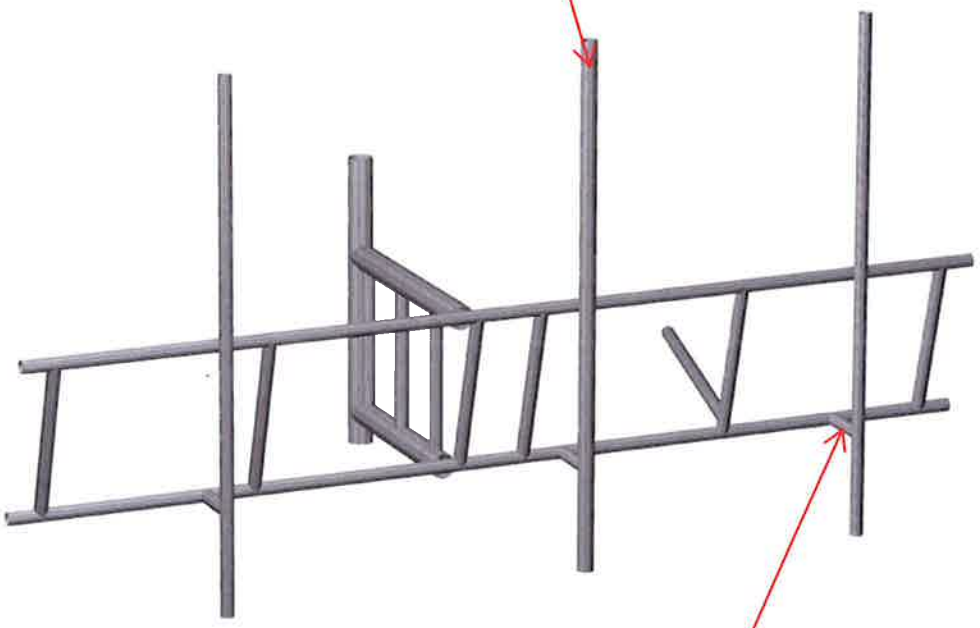

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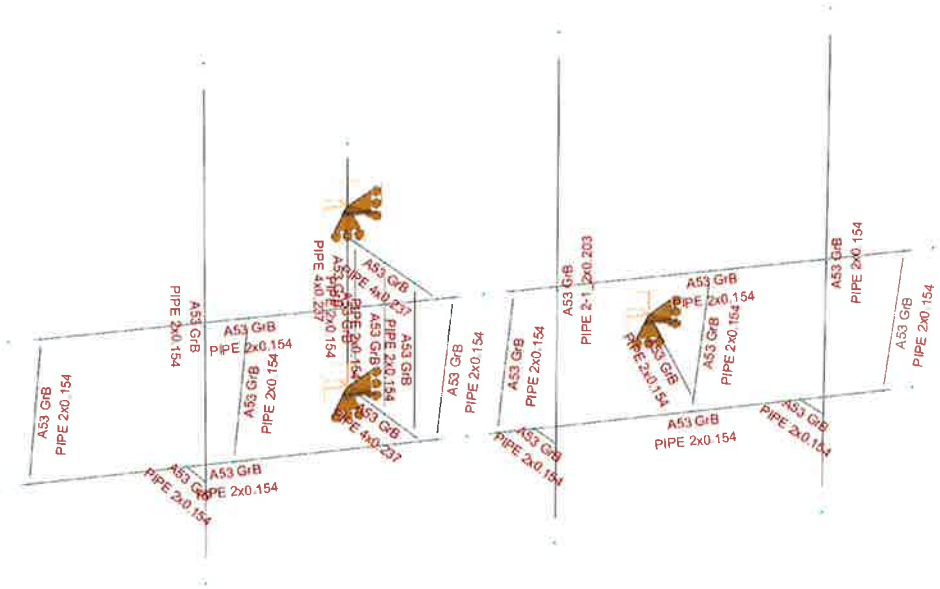

Bentley

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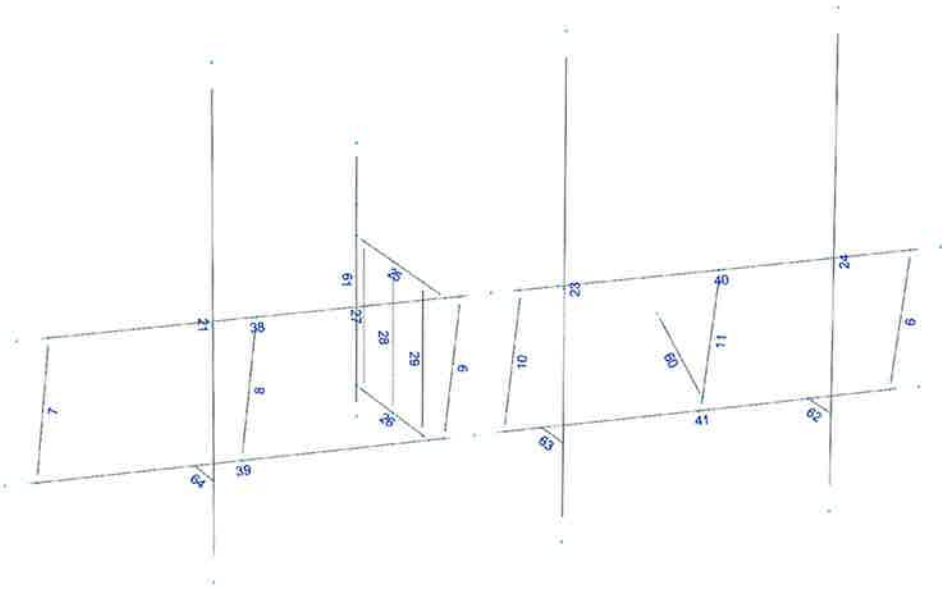

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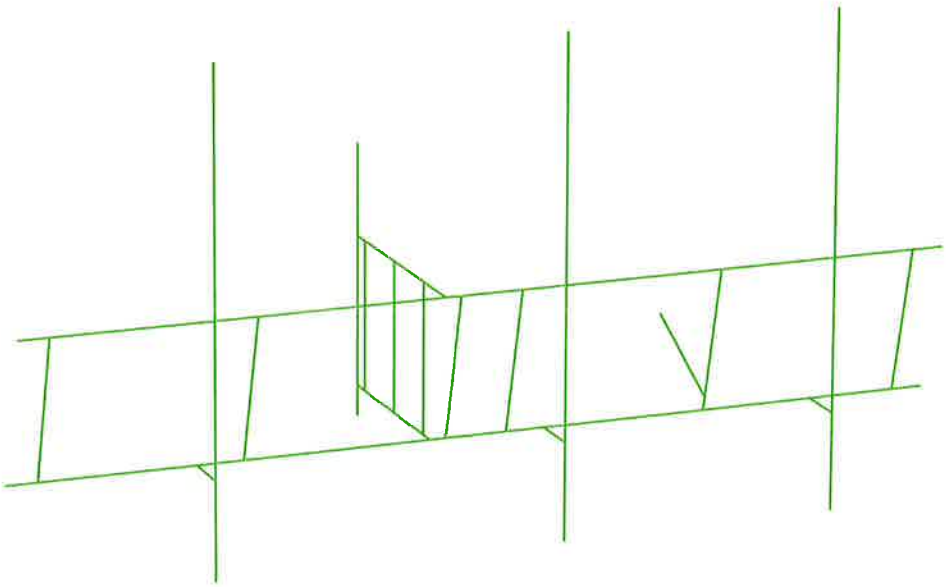
Design status

- Not designed
- Error on design
- Design O.K.
- With warnings



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Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2DL+1.6Wo
LC2=0.9DL+1.6Wo
LC3=1.2DL+Wi+Di
LC4=1.2DL
LC5=0.9DL

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	PIPE 2-1_2x0.203	**23**	LC1 at 47.92%	**0.68**	**OK**	Eq. H1-1b
	PIPE 2x0.154	**6**	LC1 at 100.00%	0.13	OK	Eq. H1-1b
		7	LC1 at 100.00%	0.05	OK	Eq. H1-1b
		8	LC3 at 0.00%	0.19	OK	Eq. H1-1b
		9	LC3 at 100.00%	0.14	OK	Eq. H1-1b
		10	LC1 at 0.00%	0.30	OK	Eq. H1-1b
		11	LC2 at 90.63%	0.40	OK	Eq. H1-1b
		21	LC1 at 47.92%	0.33	OK	Eq. H1-1b
		24	LC1 at 47.92%	0.31	OK	Eq. H1-1b
		27	LC3 at 0.00%	0.09	OK	Eq. H1-1b
		28	LC3 at 0.00%	0.22	OK	Eq. H1-1b
		29	LC3 at 0.00%	0.34	OK	Eq. H1-1b
		38	LC2 at 90.63%	**0.69**	**OK**	Eq. H1-1b
		39	LC3 at 90.63%	0.66	OK	Eq. H1-1b
		40	LC1 at 14.58%	0.50	OK	Eq. H3-6
		41	LC2 at 48.96%	0.28	OK	Eq. H1-1b
		60	LC1 at 0.00%	0.54	OK	Eq. H1-1b
		62	LC2 at 0.00%	0.11	OK	Eq. H1-1b
		63	LC2 at 100.00%	0.57	OK	Eq. H1-1b
		64	LC2 at 100.00%	0.07	OK	Eq. H1-1b
	PIPE 4x0.237	**25**	LC3 at 100.00%	0.24	OK	Eq. H1-1b
		26	LC3 at 100.00%	**0.27**	**OK**	Eq. H1-1b
		61	LC3 at 67.19%	0.11	OK	Eq. H1-1b

Bentley

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Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	-0.75	0.00	0.00	0
3	-0.75	-2.42	-0.665	0
5	7.50	0.00	0.00	0
6	-7.50	0.00	0.00	0
7	7.50	-2.42	-0.665	0
8	-7.50	-2.42	-0.665	0
9	7.00	0.00	0.00	0
10	7.00	-2.42	-0.665	0
11	3.75	0.00	0.00	0
12	3.75	-2.42	-0.665	0
13	0.50	0.00	0.00	0
14	0.50	-2.42	-0.665	0
15	-7.00	0.00	0.00	0
16	-7.00	-2.42	-0.665	0
19	-3.75	0.00	0.00	0
20	-3.75	-2.42	-0.665	0
21	-0.50	0.00	0.00	0
22	-0.50	-2.42	-0.665	0
24	5.583	-2.42	-0.665	0
25	5.583	0.00	0.00	0
28	1.125	0.00	0.00	0

29	1.125	-2.42	-0.665	0
38	-4.50	0.00	0.00	0
40	-4.50	-2.42	-0.665	0
52	5.583	0.00	0.20	0
53	1.125	0.00	0.20	0
55	-4.50	0.00	0.20	0
56	5.583	4.00	0.20	0
57	1.125	4.00	0.20	0
59	-4.50	4.00	0.20	0
60	5.583	-4.00	0.20	0
61	1.125	-4.00	0.20	0
63	-4.50	-4.00	0.20	0
64	-0.75	0.00	-3.875	0
65	-0.75	-2.42	-3.875	0
66	-0.75	0.00	-3.542	0
67	-0.75	-2.42	-3.542	0
68	-0.75	0.00	-2.25	0
69	-0.75	-2.42	-2.25	0
70	-0.75	0.00	-0.959	0
71	-0.75	-2.42	-0.959	0
76	0.00	0.00	0.00	0
77	0.00	-2.42	-0.665	0
94	-4.50	-2.42	0.20	0
96	1.125	-2.42	0.20	0
97	5.583	-2.42	0.20	0
107	5.00	-2.20	-5.3325	0
117	3.75	-2.20	-0.6045	0
118	-0.75	1.50	-3.875	0
119	-0.75	-2.92	-3.875	0
120	-0.75	0.50	-3.875	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
65	1	1	1	1	1	1
107	1	1	1	1	1	1
120	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
6	9	10		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
7	15	16		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
8	19	20		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
9	21	22		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
10	13	14		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
11	11	12		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
21	59	63		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
23	57	61		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
24	56	60		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

25	1	64	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00
26	3	65	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00
27	66	67	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
28	68	69	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
29	70	71	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
38	6	76	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
39	8	77	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
40	76	5	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
41	77	7	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
60	117	107	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
61	119	118	PIPE 4x0.237	A53 GrB	0.00	0.00	0.00
62	24	97	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
63	29	96	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
64	40	94	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

SITE NAME: WINDSOR LOCKS/RT 20

2–4 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096

SPECIAL WORK NOTE:
ELECTRICAL CONTRACTOR SHALL COORDINATE POWER WALK WITH UTILITY PURVEYOR AND CONSTRUCTION MANAGER TO CONFIRM EXISTING CAPACITY OF SWITCH GEAR AND TRANSFORMER PRIOR TO COMMENCEMENT OF CONSTRUCTION

SPECIAL CONSTRUCTION WORK NOTE (PAINT–TO–MATCH REQUIRED):
PAINT–TO–MATCH FAA RED ALL PROPOSED AND EXPOSED EQUIPMENT, INCLUDING EXISTING UN–PAINTED LEGACY EQUIPMENT CONSISTING OF ANTENNA RADOMES, ANTENNA BACKPLANES, RRU SOLAR SHIELD, TMA, AND ASSOCIATED MOUNTING HARDWARE (PIPES, BRACKETS, HANGERS), AND EXPOSED HYBDRID CABLES, COAX JUMPERS, FIBER JUMPERS AND DC CABLES. ANTENNA RADOME PAINT SHALL CONTAIN <5% METALLIC PIGMENTS/EMULSIONS AND EQUIVALENT TO SHERMAN–WILLIAMS COROTHANE II (AND/OR OTHERWISE APPROVED BY ANTENNA MANUFACTURER/RF ENGINEER).

SITE NUMBER: CT11319C

PROJECT: T-MOBILE L600

CONFIGURATION: 67D94DB

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
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 TO FURNISH, INSTALL AND COMPLETE ALL REQUIRED STRUCTURAL MODIFICATIONS, RE–BUNDLING OF COAXIAL CABLES OR OTHER SPECIAL MODIFICATIONS AS OUTLINED THEREIN.
2. 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.
3. PROTERRA DESIGN GROUP ASSUMES THAT THE SELF SUPPORT TOWER 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.
4. ANY REQUIRED ANTENNA MOUNT WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE ANTENNA MOUNT STRUCTURAL ANALYSIS, (MSA) PREPARED BY OTHERS.

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).
SITE ADDRESS:	2–4 VOLUNTEER DRIVE WINDSOR LOCKS, CT 06096
LATITUDE:	41° 55' 41.16" N (41.9281°) (FROM SBA RECORD)
LONGITUDE:	72° 38' 48.42" W (–72.6468°) (FROM SBA RECORD)
JURISDICTION:	TOWN OF WINDSOR LOCKS / CT SITING COUNCIL
BUILDING CODE:	2016 CONNECTICUT STATE BUILDING CODE WITH AMENDMENTS. (IBC 2012 BASED)
ELECTRICAL CODE:	2014 NATIONAL ELECTRICAL CODE WITH AMENDMENTS
CURRENT USE:	TELECOMMUNICATIONS FACILITY
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
TOWER OWNER:	MCM ACQUISITION 2017, LLC
SBA SITE ID:	CT22108–A
SBA SITE NAME:	WINDSOR LOCKS @ VOLUNTEER DRIVE
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	2
GN–1	GENERAL NOTES	2
A–1	COMPOUND PLAN	2
A–2	ELEVATIONS	2
A–3	EXISTING & PROPOSED ANTENNA PLAN	2
A–4	DETAILS	2
A–5	DETAILS	2
E–1	ONE–LINE DIAGRAM & GROUNDING DETAILS	2

T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
OFFICE: (860) 648–1116

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
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
2	09/24/18	CONSTRUCTION REVISED	PN
1	08/31/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT11319C
SITE NAME:
WINDSOR LOCKS/RT 20
SITE ADDRESS:
2–4 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096

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

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STATE OF CONNECTICUT
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

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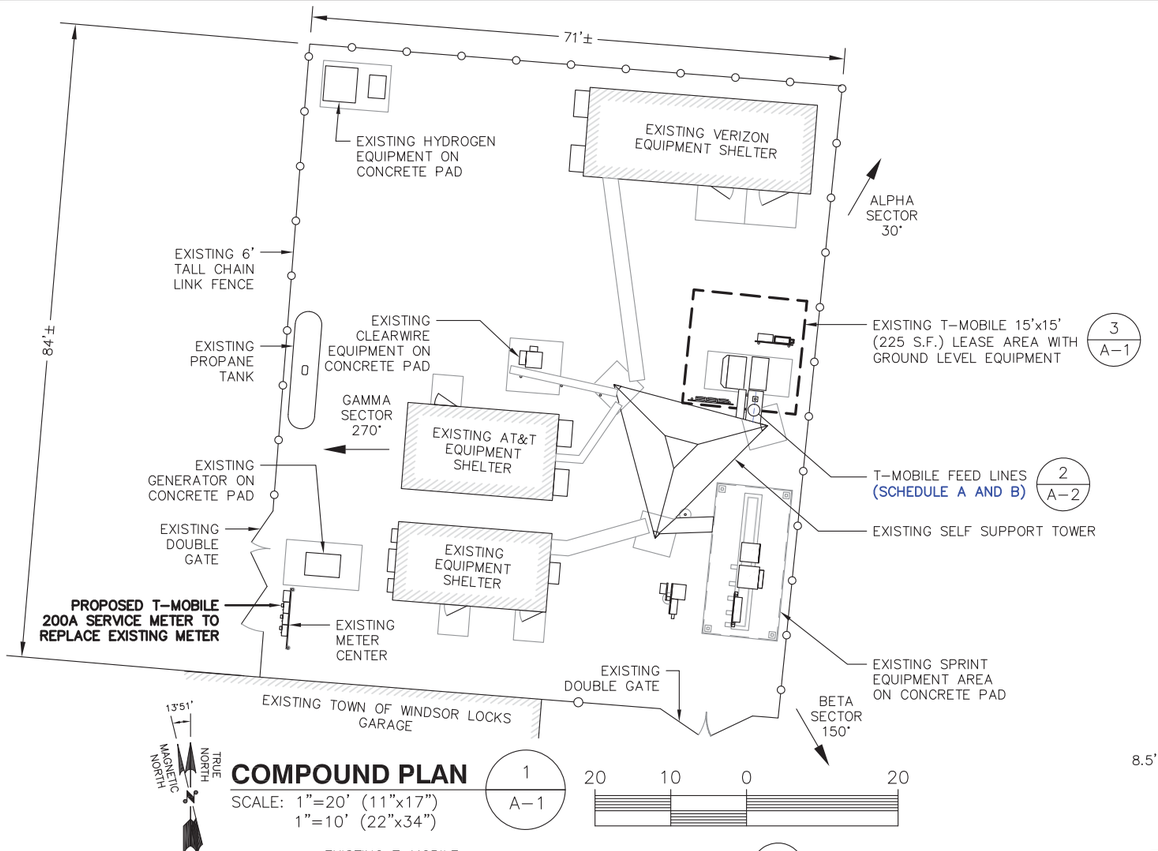
CT11319C
SITE NAME:
WINDSOR LOCKS/RT 20
SITE ADDRESS:
2-4 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



COMPOUND PLAN

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

1 / A-1

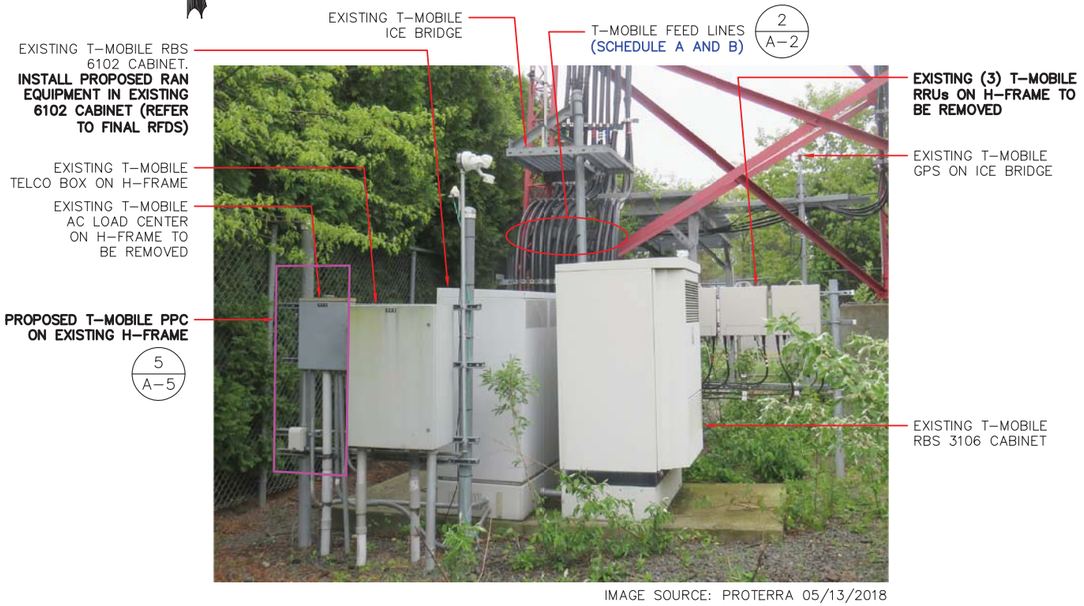
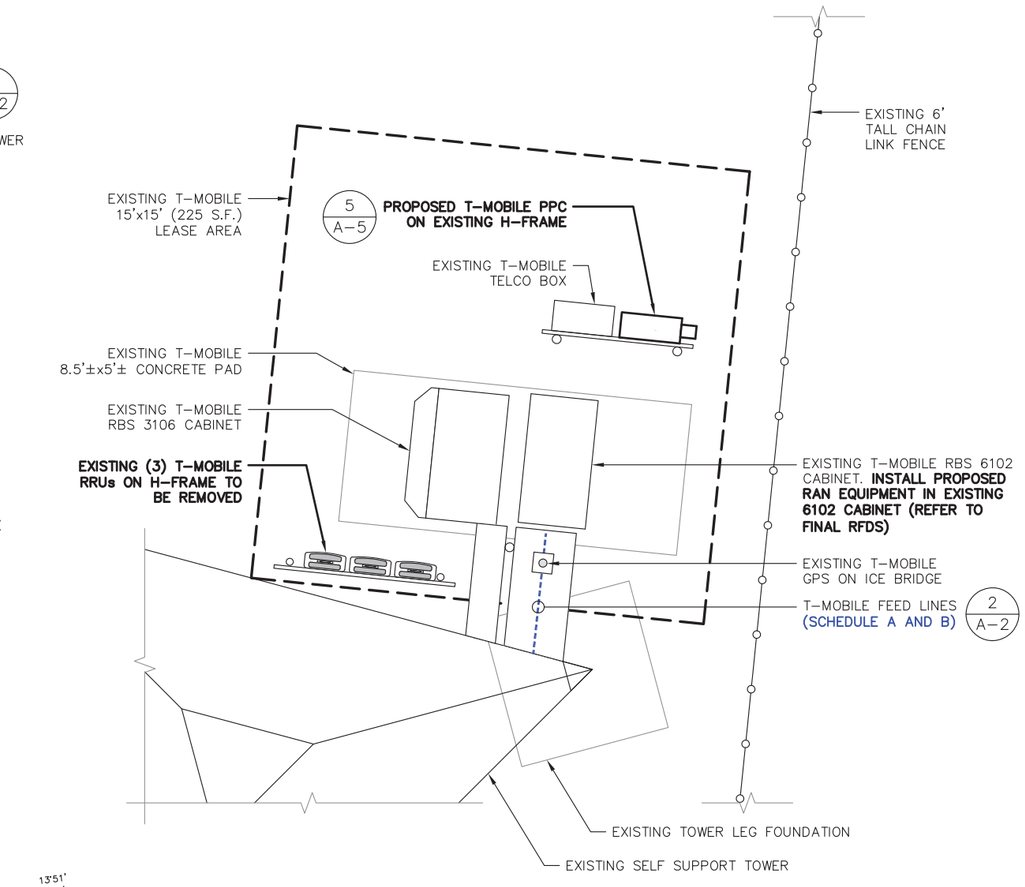


IMAGE SOURCE: PROTERRA 05/13/2018

EQUIPMENT PHOTO DETAIL

SCALE: N.T.S.

2 / A-1



GROUND EQUIPMENT PLAN

SCALE: 1"=5' (11"x17")
1"=2.5' (22"x34")

3 / A-1

5 2.5 0 5

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COMPOUND PLAN

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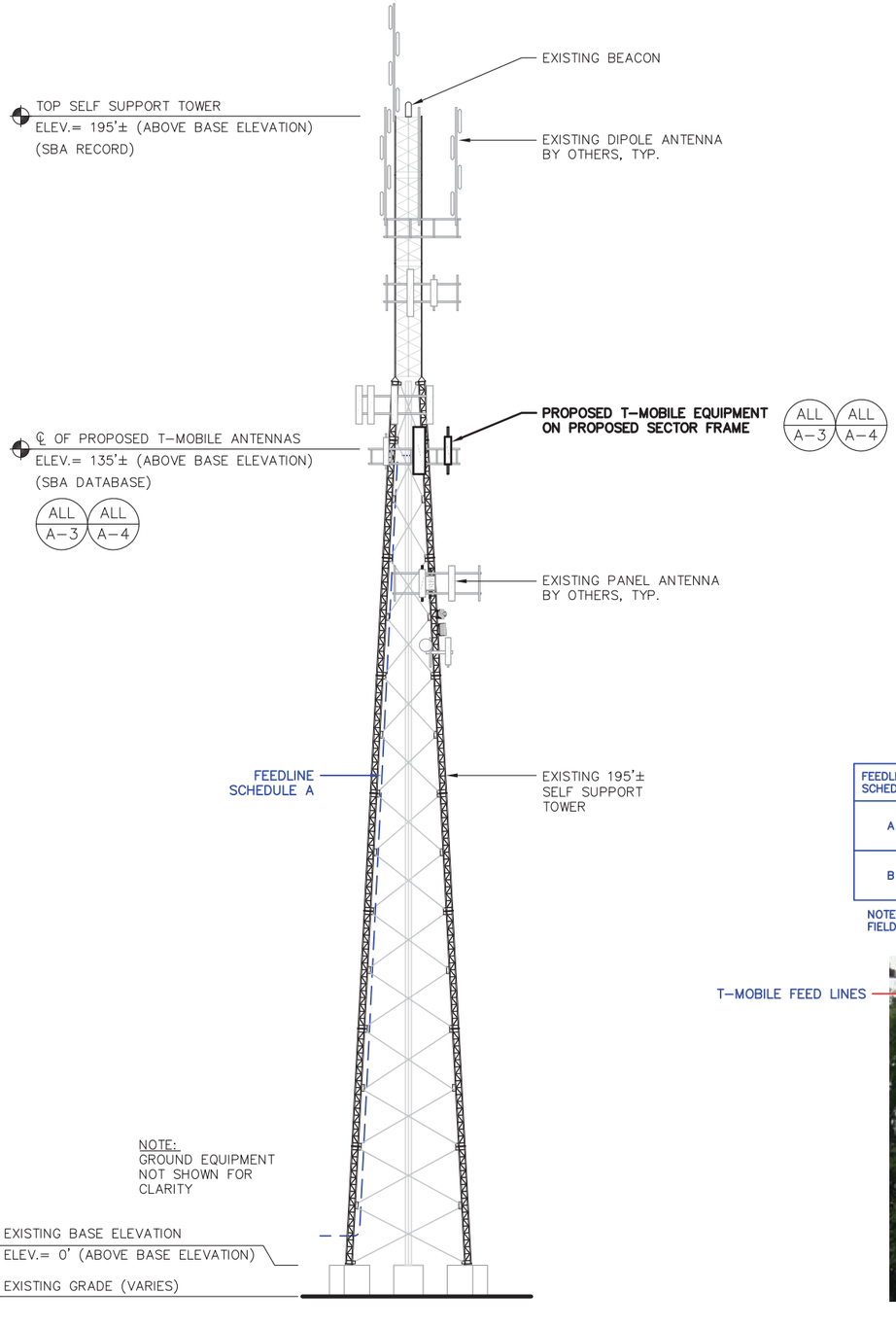

ELEVATION DETAIL

1 / A-2

SCALE: 1"=25' (11"x17")
1"=12.5' (22"x34")

25 12.5 0 25

FEEDLINE SCHEDULE	FEEDLINE DESCRIPTION	LOCATION
A	EXISTING TO REMAIN: (15) 1⅝" COAX TO 135' RAD; EXISTING TO BE REMOVED (3) 1⅝" COAX	UP CABLE LADDER ON SELF SUPPORT TOWER TO RAD
B	PROPOSED: (3) 6 X 12 HYBRID TO 135' RAD;	UP CABLE LADDER ON SELF SUPPORT TOWER TO RAD

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

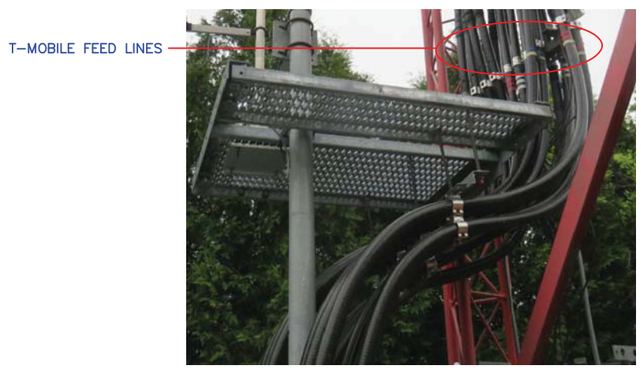

IMAGE SOURCE: PROTERRA 05/13/2018

FEEDLINE PHOTO DETAIL AT TOWER BASE

2 / A-2

SCALE: N.T.S.

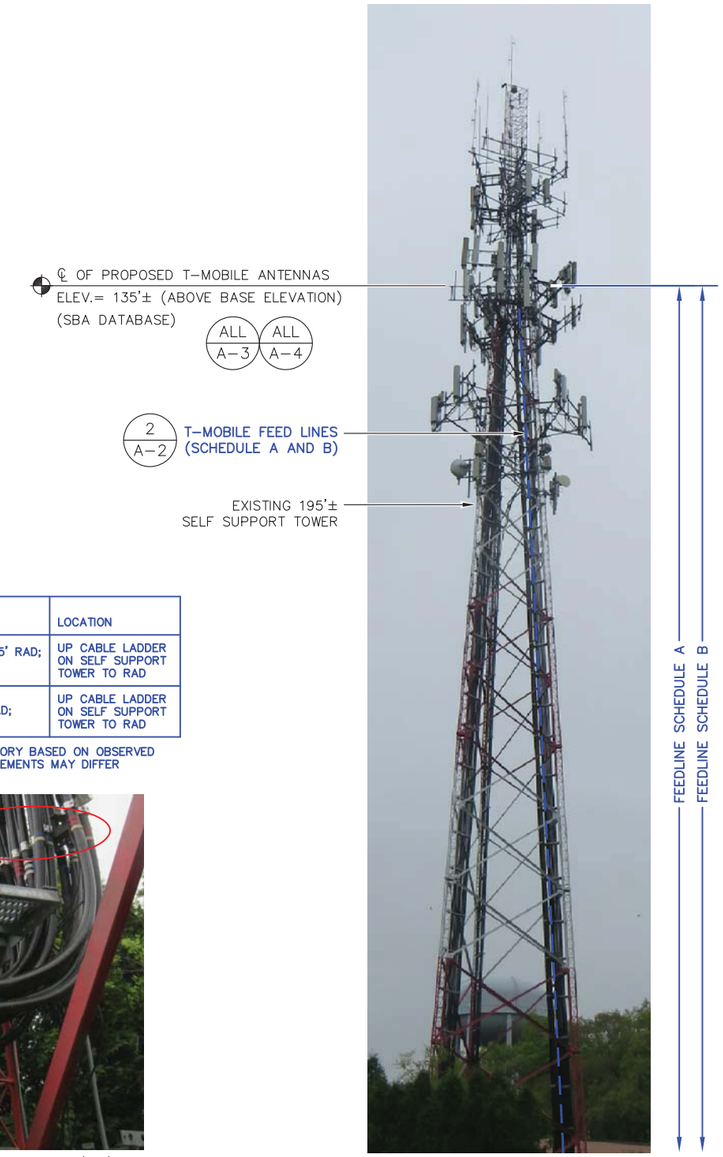

IMAGE SOURCE: PROTERRA 05/13/2018

PARTIAL ELEVATION PHOTO DETAIL

3 / A-2

SCALE: N.T.S.

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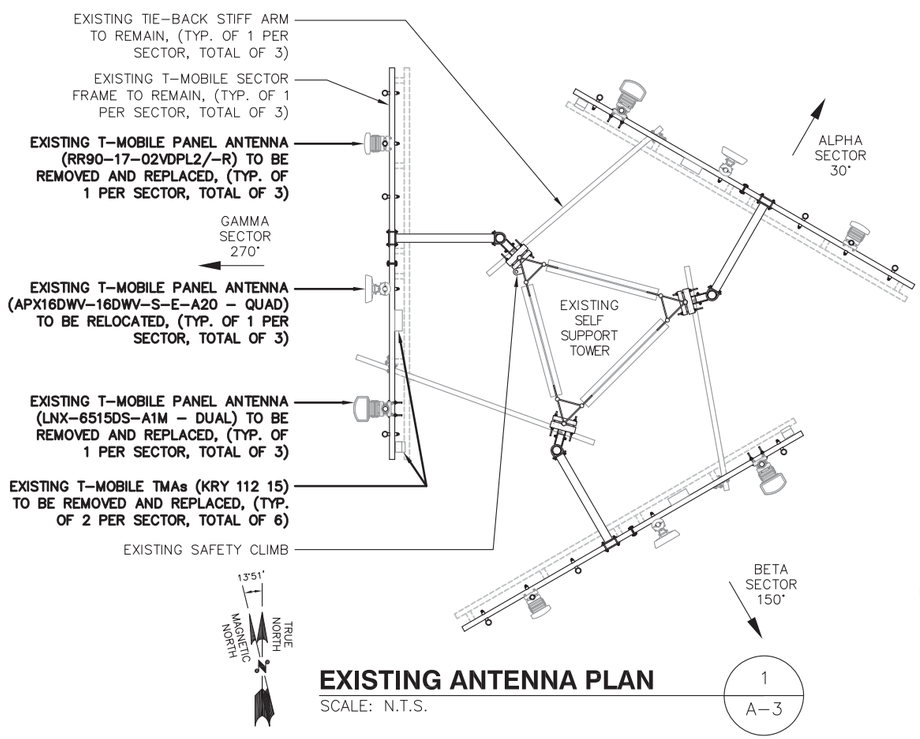
SHEET TITLE
ELEVATIONS

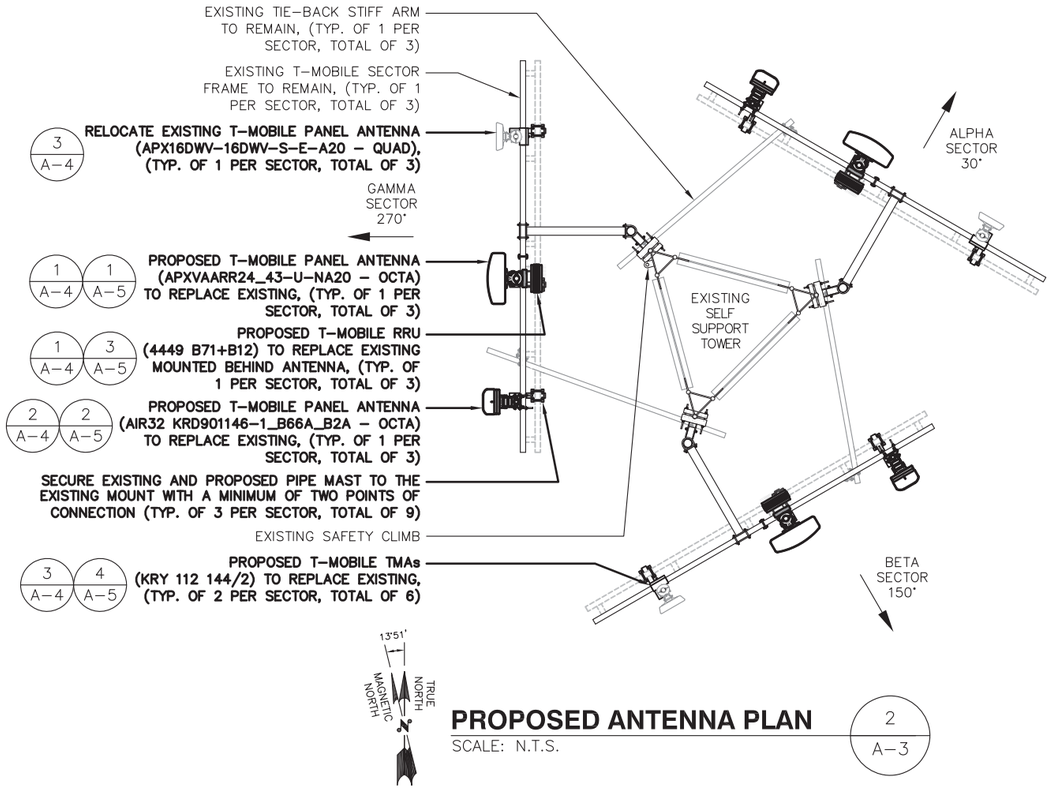
SHEET NUMBER
A-2



EXISTING ANTENNA PLAN

SCALE: N.T.S.

1 / A-3



PROPOSED ANTENNA PLAN

SCALE: N.T.S.

2 / A-3

EXISTING T-MOBILE PANEL ANTENNA (LNX-6515DS-A1M - DUAL) TO BE REMOVED AND REPLACED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

2 / A-4 2 / A-5 PROPOSED T-MOBILE PANEL ANTENNA (AIR32 KRD901146-1_B66A_B2A - OCTA) TO REPLACE EXISTING, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

EXISTING T-MOBILE TMAs (KRY 112 15) TO BE REMOVED AND REPLACED, (TYP. OF 2 PER SECTOR, TOTAL OF 6)

1 / A-4 3 / A-5 PROPOSED T-MOBILE RRU (4449 B71+B12) TO REPLACE EXISTING MOUNTED BEHIND ANTENNA, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

1 / A-4 1 / A-5 PROPOSED T-MOBILE PANEL ANTENNA (APXVAARR24_43-U-NA20 - OCTA) TO REPLACE EXISTING, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

EXISTING T-MOBILE PANEL ANTENNA (APX16DWV-16DWV-S-E-A20 - QUAD) TO BE RELOCATED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

EXISTING T-MOBILE PANEL ANTENNA (RR90-17-02VDPL2/-R) TO BE REMOVED, (TYP. OF 1 PER SECTOR, TOTAL OF 3)

3 / A-4 RELOCATED POSITION OF EXISTING T-MOBILE PANEL ANTENNA (APX16DWV-16DWV-S-E-A20 - QUAD), (TYP. OF 1 PER SECTOR, TOTAL OF 3)

PROPOSED T-MOBILE TMAs (KRY 112 144/2) TO REPLACE EXISTING, (TYP. OF 2 PER SECTOR, TOTAL OF 6)

3 / A-4 4 / A-5

SECURE EXISTING AND PROPOSED PIPE MAST TO THE EXISTING MOUNT WITH A MINIMUM OF TWO POINTS OF CONNECTION (TYP. OF 3 PER SECTOR, TOTAL OF 9)

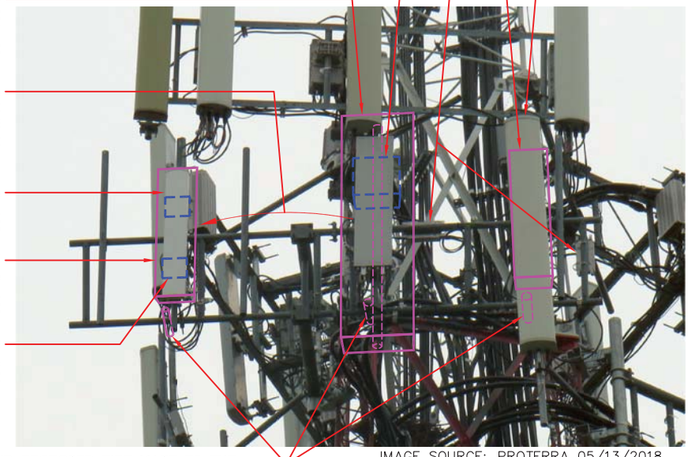


IMAGE SOURCE: PROTERRA 05/13/2018
NOTE: ONLY SECTOR SHOWN FOR CLARITY

ANTENNA PHOTO DETAIL

SCALE: N.T.S.

3 / A-3

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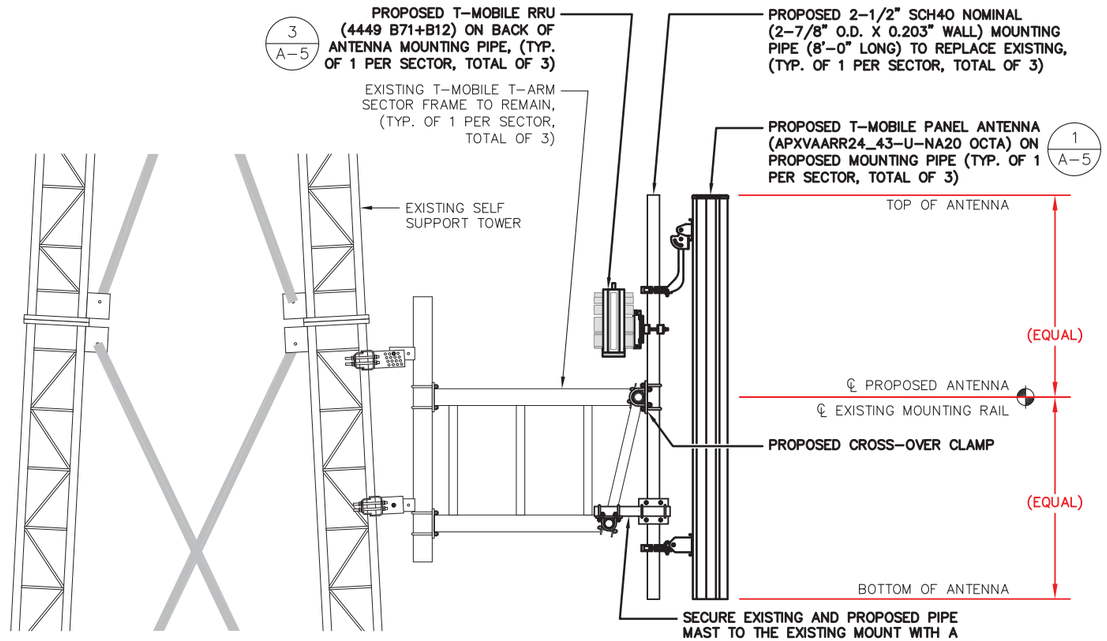
WINDSOR LOCKS, CT 06096

SHEET TITLE
EXISTING & PROPOSED ANTENNA PLAN

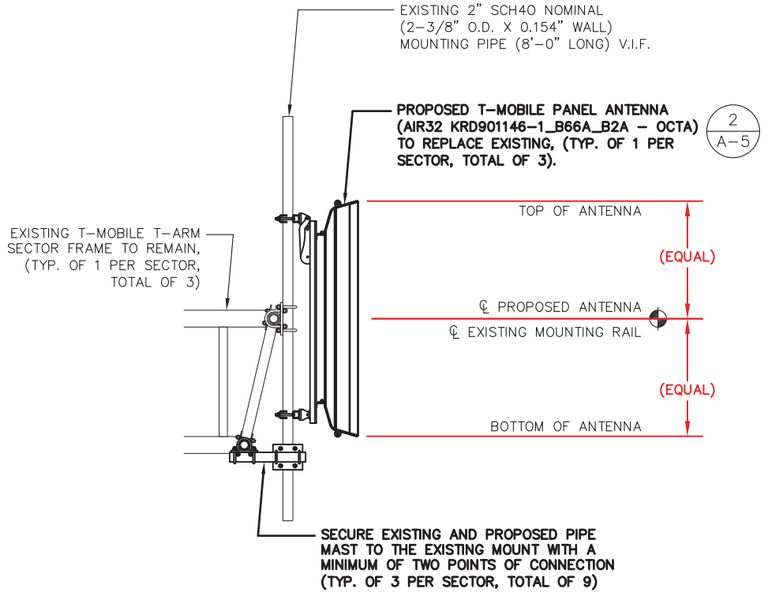
SHEET NUMBER
A-3



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

SCALE: N.T.S.

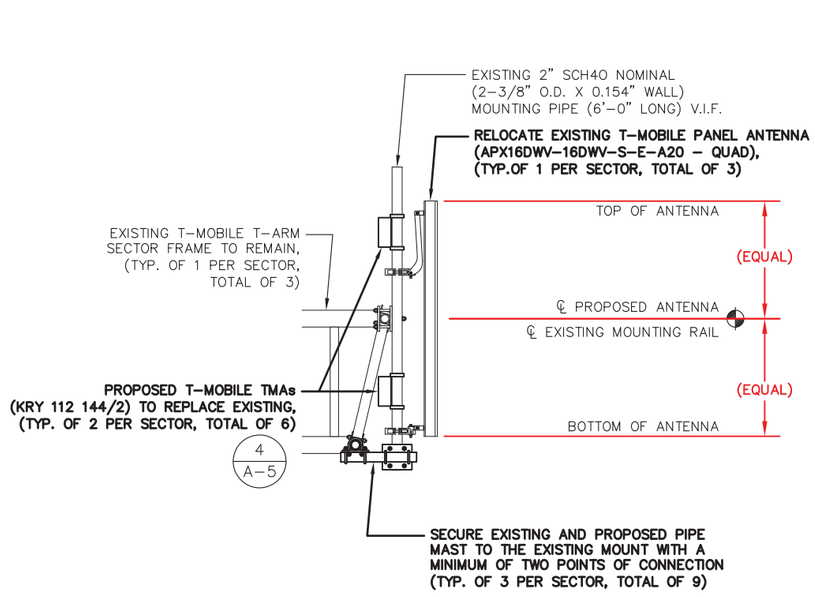
1
A-4



PROPOSED ANTENNA MOUNTING DETAIL (AIR32 KRD901146-1_B66A_B2A - OCTA)

SCALE: N.T.S.

2
A-4



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

SCALE: N.T.S.

3
A-4

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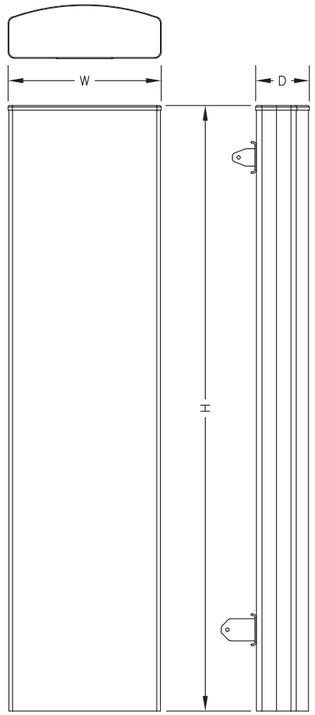
SHEET TITLE
DETAILS

SHEET NUMBER
A-4

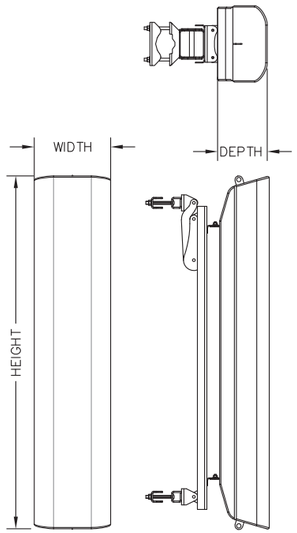


APXVAARR24_43-U-NA20 (OCTA) ANTENNA SPECIFICATIONS

MANUF.	RFS
MODEL #	APXVAARR24_43-U-NA20 (OCTA)
HEIGHT	95.9"
WIDTH	24"
DEPTH	8.7"
WEIGHT	128± LBS.

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.



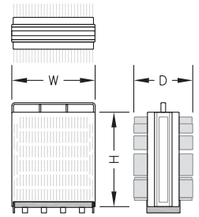
ANTENNA DETAIL (AIR32 KRD901146-1_B66A_B2A OCTA)

2 / A-5

SCALE: N.T.S.

RRU SPECIFICATIONS

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



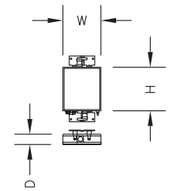
REMOTE RADIO UNIT (RRU) DETAIL (4449 B71+B12)

3 / A-5

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-5

SCALE: N.T.S.

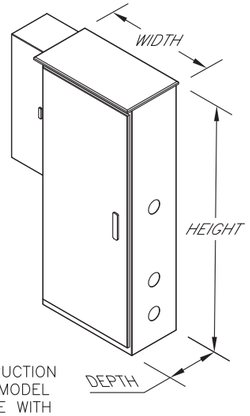
ANTENNA DETAIL (APXVAARR24_43-U-NA20 OCTA)

1 / A-5

SCALE: N.T.S.

PPC SPECIFICATIONS

MANUF.	VERTIV NETXTEND
MODEL #	CS7S2-W836
HEIGHT	60"
WIDTH	25"
DEPTH	10"
WEIGHT	150± LBS.



TO BE PROVIDED BY T-MOBILE
CONFIRM MODEL NUMBER WITH CONSTRUCTION MANAGER PRIOR TO CONSTRUCTION – MODEL AND MANUFACTURER TO BE COMPATIBLE WITH PROPOSED 150A BREAKER

POWER PROTECTION CABINET (PPC)

5 / A-5

SCALE: N.T.S.

ANTENNA CONFIGURATION

SECTOR	BAND	ANTENNA MODEL	ANTENNA RAD (SBA DATABASE)	AZIMUTH	RADIOS/TMAs	CABLE FEED LINES
ALPHA	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	135'±	30°	–	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	135'±	30°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	G1900 U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	135'±	30°	PROPOSED (2) KRY 112 144/2	EXISTING (4) 1-5/8" COAX
BETA	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	135'±	150°	–	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	135'±	150°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	G1900 U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	135'±	150°	PROPOSED (2) KRY 112 144/2	EXISTING (4) 1-5/8" COAX
GAMMA	L1900 L2100	ERICSSON – AIR32 KRD901146-1_B66A_B2A (OCTA)	135'±	270°	–	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	L600 L700	RFS – APXVAARR24_43-U-NA20 (OCTA)	135'±	270°	PROPOSED (1) 4449 B71+B12 RRU,	PROPOSED (1) SHARED 6X12 HYBRID CABLE TRUNK
	G1900 U2100	RFS – APX16DWV-16DWV-S-E-A20 (QUAD)	135'±	270°	PROPOSED (2) KRY 112 144/2	EXISTING (4) 1-5/8" COAX

REFER TO FINAL RFDS FOR FINAL ANTENNA SETTINGS, CONFIGURATION, QUANTITIES AND RAN WIRING.

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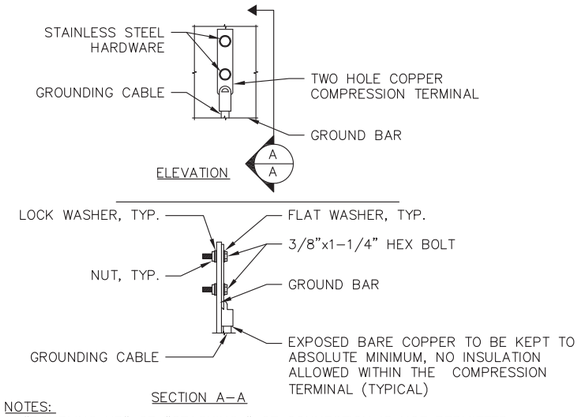
WINDSOR LOCKS/RT 20

SITE ADDRESS:
2-4 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096

SHEET TITLE
DETAILS

SHEET NUMBER
A-5

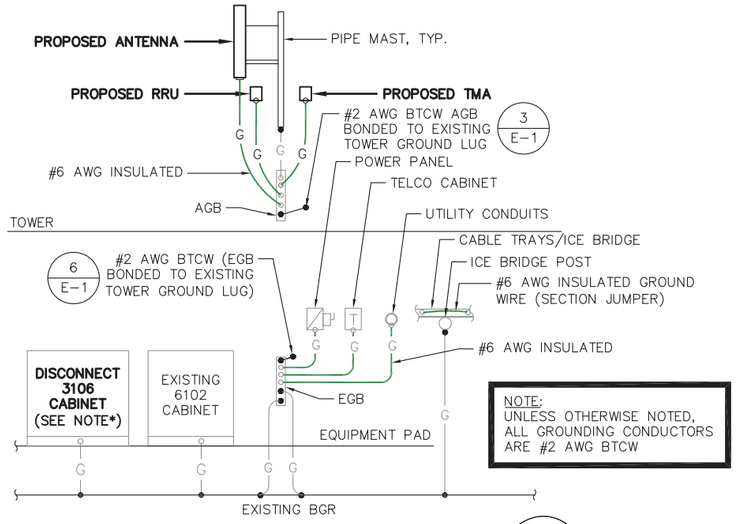


NOTES:
1. "DOUBLING UP" OR "STACKING " OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB, AND MGB.

TYPICAL GROUND BAR CONNECTION DETAIL

1 / E-1

SCALE: N.T.S.

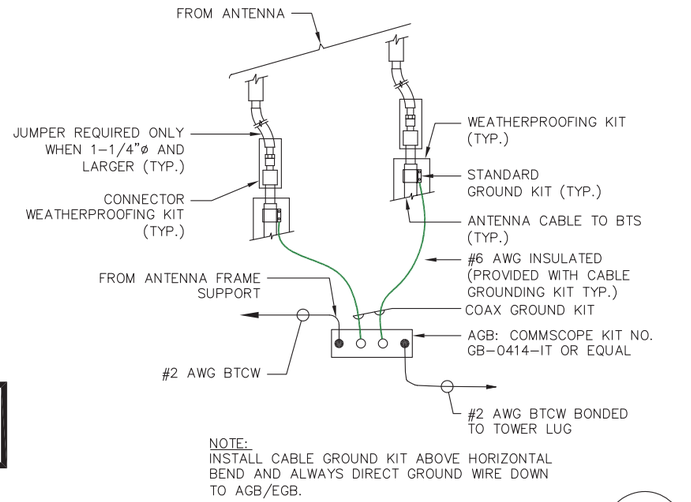


NOTE:
UNLESS OTHERWISE NOTED, ALL GROUNDING CONDUCTORS ARE #2 AWG BTCW

TYPICAL GROUNDING RISER DIAGRAM

2 / E-1

SCALE: N.T.S.

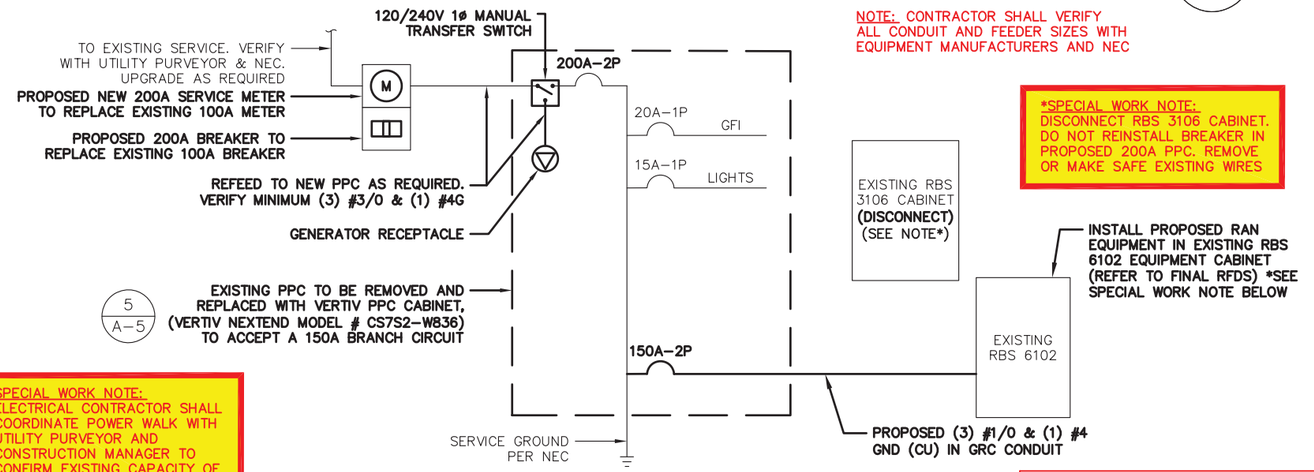


NOTE:
INSTALL CABLE GROUND KIT ABOVE HORIZONTAL BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO AGB/EGB.

TOWER TOP CABLE GROUNDING DETAIL

3 / E-1

SCALE: N.T.S.



NOTE: CONTRACTOR SHALL VERIFY ALL CONDUIT AND FEEDER SIZES WITH EQUIPMENT MANUFACTURERS AND NEC

*SPECIAL WORK NOTE:
DISCONNECT RBS 3106 CABINET. DO NOT REINSTALL BREAKER IN PROPOSED 200A PPC. REMOVE OR MAKE SAFE EXISTING WIRES

*SPECIAL WORK NOTE:
ELECTRICAL CONTRACTOR SHALL COORDINATE POWER WALK WITH UTILITY PURVEYOR AND CONSTRUCTION MANAGER TO CONFIRM EXISTING CAPACITY OF SWITCH GEAR AND TRANSFORMER PRIOR TO COMMENCEMENT OF CONSTRUCTION

*SPECIAL WORK NOTE:
AN INTERNAL EQUIPMENT CABINET UPGRADE WITHIN THE 6102 IS REQUIRED TO ALLOW THE CABINET TO BE WIRED FOR 150A SERVICE. THE POWER CONNECTION UNIT (PCU AC 08) SHALL BE INSTALLED PER MANUFACTURERS SPECIFICATIONS PRIOR TO UPGRADING THE BREAKER.

ONE LINE POWER SCHEMATIC

4 / E-1

SCALE: N.T.S.

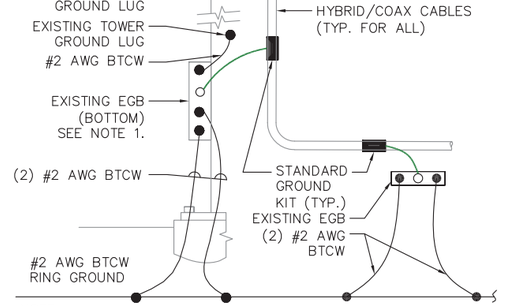
CONTRACTOR NOTE:
G.C. TO VERIFY THAT THE EXISTING CONDUITS AND WIRE SIZES ARE ADEQUATE FOR THE PROPOSED LOADING IN ACCORDANCE WITH NEC AND INCLUDE ELECTRICAL UPGRADES IN THE SCOPE OF WORK AS REQUIRED.

ELECTRICAL 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
	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
PPC	● EXOTHERMIC (CAD WELD) OR ○ MECHANICAL (COMPRESSION TYPE) CONNECTION; POWER PROTECTION CABINET
	OMNI-DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALL

ELECTRICAL & GROUNDING NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) 2014 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.



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

5 / E-1

SCALE: N.T.S.

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OFFICE: (860) 648-1116

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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
THOMAS E. JOHNSON
No. 28192
LICENSED PROFESSIONAL ENGINEER
FOR SCHEMATIC ONLY

CHECKED BY: JMM/TEJ

APPROVED BY: JMM/TEJ

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
2	09/24/18	CONSTRUCTION REVISED	PN
1	08/31/18	ISSUED FOR CONSTRUCTION	PN
0	08/22/18	ISSUED FOR CONSTRUCTION	JEB

SITE NUMBER:
CT11319C
SITE NAME:
WINDSOR LOCKS/RT 20
SITE ADDRESS:
2-4 VOLUNTEER DRIVE
WINDSOR LOCKS, CT 06096

SHEET TITLE
ONE-LINE DIAGRAM & GROUNDING DETAILS

SHEET NUMBER
E-1