

August 22, 2016

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

Re: **Notice of Exempt Modification – Facility Modification  
162 Birdseye Road, Shelton, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) antennas at the 99-foot level of the existing 120-foot tower at 162 Birdseye Road in Shelton, Connecticut (the “Property”). The tower is owned by SBA. The Council approved Cellco’s use of this tower in 2007. Cellco now intends to modify its facility by replacing six (6) existing antennas with three (3) model SBNHH-1D65A, 700 MHz antennas and three (3) model SBNHH-1D65A, 2100 MHz antennas, all at the same 99-foot level on the tower. Cellco also intends to replace three (3) remote radio heads (“RRHs”) with three (3) newer model RRHs and install three (3) new RRHs. Included in Attachment 1 are specifications for Cellco’s replacement antennas and RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 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 Mark A. Lauretti, Mayor of the City of Shelton. A copy of this letter is also being sent to Rudolph and Karen E. Hudak, the owners of the Property and to SBA, the tower owner.

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

15106265-v1

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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas and RRHs will be installed on Cellco's existing antenna platform at a height of 99 feet on the existing tower.

2. The proposed modifications will not involve any change to ground-mounted equipment and, therefore, 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 (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. A cumulative General Power Density table for Cellco's modified facility is included in Attachment 2.

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

6. The tower and its foundation can support Cellco's proposed modifications. (See Structural Analysis Report included in Attachment 3).

A copy of the Shelton Assessor's Parcel Map and property owner information is included in Attachment 4.

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Mark A. Lauretti, Mayor  
Rudolph and Karen E. Hudak  
SBA  
Tim Parks

# **ATTACHMENT 1**



## SBNHH-1D65A

**Multiband Antenna, 698–896 and 2x 1695–2360 MHz, 65° horizontal beamwidth, internal RET. Both high bands share the same electrical tilt.**

- Interleaved dipole technology providing for attractive, low wind load mechanical package

### Electrical Specifications

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain, dBi	13.4	13.5	16.5	16.7	17.2	17.5
Beamwidth, Horizontal, degrees	66	61	70	65	62	61
Beamwidth, Vertical, degrees	17.6	15.9	7.1	6.6	6.2	5.5
Beam Tilt, degrees	0–18	0–18	0–10	0–10	0–10	0–10
USLS (First Lobe), dB	16	13	13	13	12	12
Front-to-Back Ratio at 180°, dB	25	27	28	28	27	29
Isolation, dB	25	25	25	25	25	25
Isolation, Intersystem, dB	30	30	30	30	30	30
VSWR   Return Loss, dB	1.5   14.0	1.5   14.0	1.5   14.0	1.5   14.0	1.5   14.0	1.5   14.0
PIM, 3rd Order, 2 x 20 W, dBc	-153	-153	-153	-153	-153	-153
Input Power per Port, maximum, watts	350	350	350	350	350	300
Polarization	±45°	±45°	±45°	±45°	±45°	±45°
Impedance	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm	50 ohm

### Electrical Specifications, BASTA\*

Frequency Band, MHz	698–806	806–896	1695–1880	1850–1990	1920–2200	2300–2360
Gain by all Beam Tilts, average, dBi	13.1	13.1	16.1	16.5	16.7	17.2
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.5	±0.5	±0.3	±0.5	±0.4
	0°   13.4	0°   13.4	0°   16.0	0°   16.3	0°   16.5	0°   17.0
Gain by Beam Tilt, average, dBi	9°   13.1	9°   13.1	5°   16.2	5°   16.5	5°   16.8	5°   17.3
	18°   12.7	18°   12.7	10°   16.1	10°   16.5	10°   16.6	10°   16.9
Beamwidth, Horizontal Tolerance, degrees	±3.1	±5.4	±2.8	±4	±6.6	±4.6
Beamwidth, Vertical Tolerance, degrees	±1.8	±1.4	±0.3	±0.4	±0.5	±0.3
USLS, beampeak to 20° above beampeak, dB	15	14	15	15	15	14
Front-to-Back Total Power at 180° ± 30°, dB	22	21	26	26	24	25
CPR at Boresight, dB	22	16	22	25	21	22
CPR at Sector, dB	10	6	12	8	5	4

\* CommScope® supports NGMN recommendations on Base Station Antenna Standards (BASTA). To learn more about the benefits of BASTA, [download the whitepaper Time to Raise the Bar on BSAs.](#)

### General Specifications

Antenna Type	Sector with internal RET
Band	Multiband
Brand	DualPol®
Operating Frequency Band	1695 – 2360 MHz   698 – 896 MHz
Performance Note	Outdoor usage

### Mechanical Specifications

Color	Light gray
Lightning Protection	dc Ground

SBNHH-1D65A

Radiator Material	Aluminum   Low loss circuit board
Radome Material	Fiberglass, UV resistant
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	445.0 N @ 150 km/h 100.0 lbf @ 150 km/h
Wind Loading, lateral	145.0 N @ 150 km/h 32.6 lbf @ 150 km/h
Wind Loading, rear	523.0 N @ 150 km/h 117.6 lbf @ 150 km/h
Wind Speed, maximum	241 km/h   150 mph

## Dimensions

Depth	180.0 mm   7.1 in
Length	1413.0 mm   55.6 in
Width	301.0 mm   11.9 in
Net Weight, without mounting kit	15.2 kg   33.5 lb

## Remote Electrical Tilt (RET) Information

Input Voltage	10–30 Vdc
Internal RET	High band (1)   Low band (1)
Power Consumption, idle state, maximum	2.0 W
Power Consumption, normal conditions, maximum	13.0 W
Protocol	3GPP/AISG 2.0 (Multi-RET)
RET Interface	8-pin DIN Female   8-pin DIN Male
RET Interface, quantity	1 female   1 male

## Packed Dimensions

Depth	296.0 mm   11.7 in
Length	1589.0 mm   62.6 in
Width	390.0 mm   15.4 in
Shipping Weight	26.1 kg   57.5 lb

## Regulatory Compliance/Certifications

### Agency

RoHS 2011/65/EU  
China RoHS SJ/T 11364-2006  
ISO 9001:2008

### Classification

Compliant by Exemption  
Above Maximum Concentration Value (MCV)  
Designed, manufactured and/or distributed under this quality management system



## Included Products

SBNHH-1D65A

BSAMNT-1 — Wide Profile Antenna Downtilt Mounting Kit for 2.4 - 4.5 in (60 - 115 mm) OD round members. Kit contains one scissor top bracket set and one bottom bracket set.

## \* Footnotes

Performance Note	Severe environmental conditions may degrade optimum performance
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# ALCATEL-LUCENT B13 RRH4X30-4R

Alcatel-Lucent B13 Remote Radio Head 4x30-4R is the newest addition of Remote Radio Head to the extended product line of Alcatel-Lucent's distributed Base Station solutions, aimed at facilitating smooth RF site acquisition and related civil engineering.

**Supporting 2Tx/4Tx MIMO and 4-way Rx diversity**, Alcatel-Lucent B13 RRH4x30-4R allows operators to have a compact radio solution to deploy LTE in the 700U band (700 MHz, 3GPP band 13), providing them with the means to achieve high capacity, high quality and high coverage with minimum site requirements.

The Alcatel-Lucent B13 RRH4x30-4R product has four transmit RF paths, offering the possibility to **select, via software only, 2Tx or 4Tx MIMO configurations** with either 2x60 W or 4x30 W RF output power. It supports also 4-way Rx diversity and up to 10MHz instantaneous bandwidth.

The Alcatel-Lucent B13 RRH4x30-4R is a near zero-footprint solution and operates noise free, simplifying negotiations with site property owners and minimizing environmental impacts.

Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the RF feeder needs and installation costs.

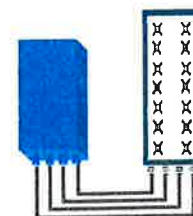


## FEATURES

- Supporting LTE in 700 MHz band (700U, 3GPP band 13)
- LTE 2Tx or 4Tx MIMO (SW switchable)
- Output power: Up to 2x60W or 4x30W
- 10MHz LTE carrier with 4Rx Diversity
- Convection-cooled (fan-less)
- Supports AISG 2.0 ALD devices (RET, TMA) through RS485 or RF ports

## BENEFITS

- Compact to reduce additional footprint when adding LTE in 700U band
- MIMO scheme operation selection (2Tx or 4Tx) by software only
- Improves downlink spectral efficiency through MIMO4
- Increases LTE coverage thanks to 4Rx diversity capability and best in class Rx sensitivity
- Flexible mounting options: Pole or Wall



4x30W with 4T4R  
or  
2x60W with 2T4R

Can be switched between modes via SW w/o site visit



# TECHNICAL SPECIFICATIONS

Features & performance	
Number of TX/RX paths	4 duplexed (either 4T4R or 2T4R by SW)
Frequency band	U700 (C) (3GPP bands 13): DL: 746 - 756 MHz / UL: 777 - 787 MHz
Instantaneous bandwidth - #carriers	10MHz – 1 LTE carrier (in 10MHz occupied bandwidth)
LTE carrier bandwidth	10 MHz
RF output power	2x60W or 4x30W (by SW)
Noise figure – RX Diversity scheme	2 dB typ. (<2.5 dB max) – 2 or 4 way Rx diversity
Sizes (HxWxD) in mm (in.)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield)
Volume in L	38 (with solar shield)
Weight in kg (lb) (w/o mounting HW)	26 (57.2) (with solar shield)
DC voltage range	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption
DC power consumption	550W typical @100% RF load ( in 2Tx or 4TX mode)
Environmental conditions	-40°C (-40°F) / +55°C (+131°F)
Wind load (@150km/h or 93mph)	IP65 Frontal: <200N / Lateral : <150N
Antenna ports	4 ports 7/16 DIN female (50 ohms) VSWR < 1.5
CPRI ports	2 CPRI ports (HW ready for Rate7, 9.8 Gbps) SFP single mode dual fiber
AISG interfaces	1 AISG2.0 output (RS485) Integrated Smart Bias Tees (x2)
Misc. Interfaces	4 external alarms (1 connector) – 4 RF Tx & 4 RF Rx monitor ports - 1 DC connector (2 pins)
Installation conditions	Pole and wall mounting
Regulatory compliance	3GPP 36.141 / 3GPP 36.113 / GR-1089-CORE / GR-3108-CORE / UL 60950-1 / FCC Part 27

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# ALCATEL-LUCENT WIRELESS PRODUCT DATASHEET B4 RRH2X60-4R FOR AWS BAND APPLICATIONS

The Alcatel-Lucent B4 RRH2x60-4R is a high power, small form factor Remote Radio Head operating in the AWS frequency band (3GPP Band 4) for LTE technology. It is designed with an eco-efficient approach, providing operators with the means to achieve high quality and high capacity coverage with minimum site requirements and efficient operation.



A distributed Node B expands the deployment options by using two components, a Base Band Unit (BBU) containing the digital assets and a separate RRH containing the radio-frequency (RF) elements. This modular design optimizes available space and allows the main components of a Node B to be installed separately, within the same site or several kilometers apart.

The Alcatel-Lucent B4 RRH2x60-4R is linked to the BBU by an optical-fiber connection carrying downlink and uplink digital radio signals along with operations, administration and maintenance (OA&M) information.

## **SUPERIOR RF PERFORMANCE**

The Alcatel-Lucent B4 RRH2x60-4R integrates all the latest

technologies. This allows operators to offer best-in-class characteristics.

It delivers an outstanding 120 watts of total RF power thanks to its two transmit RF paths of 60 W each.

It is ideally suited to support multiple-input multiple-output (MIMO) 2x2 operation.

It includes four RF receivers to natively support 4-way uplink reception diversity. This improves the radio uplink coverage and this can be used to extend the cell radius commensurate with 2x2MIMO 2x60 W for the downlink.

It supports multiple discontinuous LTE carriers within an instantaneous bandwidth of 45 MHz corresponding to the entire AWS B4 spectrum.

The latest generation power amplifiers (PA) used in this product achieve high efficiency (>40%), resulting in improved power consumption figures.

## **OPTIMIZED TCO**

The Alcatel-Lucent B4 RRH2x60-4R is designed to make available all the benefits of a distributed Node B, with excellent RF characteristics, with low capital expenditures (CAPEX) and low operating expenditures (OPEX).

The Alcatel-Lucent B4 RRH2x60-4R is a very cost-effective solution to deploy LTE MIMO.

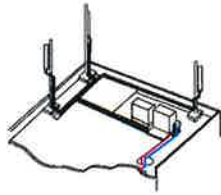
## **EASY INSTALLATION**

The B4 RRH2x60-4R includes a reversible mounting bracket which allows for ease of installation behind an antenna, or on a rooftop knee wall while providing easy access to the mid body RF connectors.

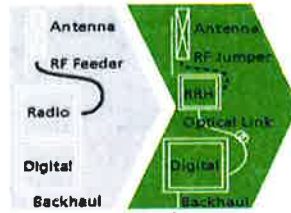
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent B4 RRH2x60-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent B4 RRH2x60-4R is a zero-footprint solution and is convection cooled without fans for silent operation, simplifying negotiations with site property owners and minimizing environmental impacts.

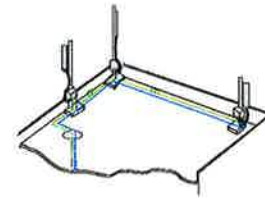
Installation can easily be done by a single person as the Alcatel-Lucent B4 RRH2x60-4R is compact and weighs about 25 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

## FEATURES

- B4 RRH2x60-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- Support multiple carriers over the entire 3GPP band 4
- B4 RRH2x60-4R is optimized for LTE operation
- B4 RRH2x60-4R is a very compact and lightweight product
- Advanced power management techniques are embedded to provide power savings, such as PA bias control

## BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and

silent solutions, with minimum impact on the neighborhood, which ease the deployment

- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

## TECHNICAL SPECIFICATIONS

Specifications listed are hardware capabilities. Some capabilities depend on support in a specific software release or future release.

### Dimensions and weights

- HxWxD : 930x270x146 mm (with solar shield)
- Weight : 25 kg (55 lbs) (with solar shield)

### Electrical Data

- Power Supply : -48V DC (-38 to -57V)
- Power Consumption: 346W typ. @2x30W (100%RF), 560W typ. @2x60W (100%RF)

### RF Characteristics

- Frequency band: 1710-1755, UL / 2110-2155 MHz, DL (3GPP band 4)
- Output power: 2x60W at antenna connectors
- Technology supported: LTE
- Instantaneous bandwidth: 45 MHz
- Rx diversity: 2-way and 4-way uplink reception
- Typical sensitivity without Rx diversity: -105 dBm for LTE

### Connectivity

- Two CPRI (3-6) optical ports for daisy chaining and up to six RRHs per fiber
- Type of optical fiber: Single-Mode (SM) and Multi-Mode (MM) SFPs
- Optical fiber length: up to 300m using MM fiber, up to 15km using SM fiber
- TMA/RETA : AISG 2.0 (RS485 connector and internal Bias-Tee)
- Four external alarms
- Surge protection for all external ports (DC and RF)

### Environmental specifications

- Operating temperature: -40°C to 55°C including solar load
- Operating relative humidity: 8% to 100%
- Environmental Conditions : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65

- Acoustic Noise : Noiseless (natural convection cooling)

### Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B
- Health : EN 50385

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# **ATTACHMENT 2**

Site Name: Shelton N Tower Height: 118Ft.	General		Power	Density	CALC. POWER DENS		FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
	CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	DENS	DENS				
*AT&T	1	500	108	1900	0.0173	1.0000	0.17%			
*AT&T	1	500	108	880	0.0173	0.5867	0.29%			
*AT&T	6	427	108	1900	0.0886	1.0000	0.89%			
*AT&T	6	296	108	880	0.0614	0.5867	1.05%			
*AT&T	1	500	108	740	0.0173	0.4933	0.35%			
*Sprint	2	35	118.3	1900	0.0020	1.0000	0.02%			
*Sprint	1	20	118.3	850	0.0006	0.5667	0.01%			
*Sprint	2	35	118.3	2500	0.0020	1.0000	0.02%			
*Nextel	9	100	120	860	0.0249	0.5733	0.43%			
Verizon PCS	1	1551	99	0.0569	1970	1.0000	5.69%			
Verizon Cellular	9	366	99	0.1208	869	0.5793	20.86%			
Verizon AWS	1	1570	99	0.0576	2145	1.0000	5.76%			
Verizon 700	1	386	99	0.0142	746	0.4973	2.85%			
* Source: Siting Council										38.39%

# **ATTACHMENT 3**



**Tower Engineering Solutions**

Phone (972) 483-0607, Fax (972) 975-9615  
8445 Freeport Parkway, Suite 375, Irving, Texas 75063

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## **Structural Analysis Report**

**Existing 118 ft SUMMIT Monopole**  
**Customer Name: SBA Communications Corp**  
**Customer Site Number: CT46133-A**  
**Customer Site Name: Shelton-north**  
**Carrier Name: Verizon**  
**Carrier Site ID / Name: Shelton North**  
**Site Location: 162 Birdseye Rd**  
**Shelton, Connecticut**  
**Fairfield County**  
**Latitude: 41.325777**  
**Longitude: -73.148694**

### **Analysis Result:**

**Max Structural Usage: 99.8% [Pass]**  
**Max Foundation Usage: 96.0% [Pass]**  
**Report Prepared By : Khup Hatzaw**



6/29/16



## Introduction

The purpose of this report is to summarize the analysis results on the 118 ft SUMMIT Monopole 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

<b>Tower Drawings</b>	Paul J. Ford and Company, Job # 29200-1700 dated 11/15/2000.
<b>Foundation Drawing</b>	Paul J. Ford and Company, Job # 29200-1700 dated 11/15/2000.
<b>Geotechnical Report</b>	Dr. Clarence Welti, P.E., P.C. Project # CT-0921 dated 06/05/2000.
<b>Modification Drawings</b>	Vertical Solutions, Site # CT46133-A dated 03/15/2013.
<b>Previous Analysis</b>	FDH Engineering, Inc. Project # 1423GS1400 dated 04/11/2014.

## Analysis Criteria

The structural analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-F. In accordance with this standard, the structure was analyzed using **TESPoles**, 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.

<b>Basic Wind Speed Used in the Analysis:</b>	85.0 mph (fastest mile)
<b>Basic Wind Speed with Ice:</b>	74 mph (fastest mile) with 1/2" radial ice concurrent
<b>Operational Wind Speed:</b>	50 mph + 0" Radial ice
<b>Standard/Codes:</b>	ANSI/TIA/EIA 222-F / 2005 Connecticut State Building Code
<b>Exposure Category:</b>	C
<b>Crest Height:</b>	0 ft

## 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	118.0	3	RFS - APXVSP18-C-A20 - Panel	Platform w/ Hand Rails	(4) 1-1/4" Hybrid	Sprint
2		3	RFS - APXVC-120 - Panel			
3		4	RFS - ACU-A20-N - RET			
4		3	Ericsson - RRU (26.1"x18.6"x6.7") - RRU			
5		3	Alcatel Lucent - TD-RRH8x20-25 - RRH			
6		3	Alcatel Lucent - 800 MHz - RRH			
7		3	Alcatel Lucent - External Notch Filters			
8	108.0	3	Kathrein - 800-10121 - Panel	Low Profile Platform	(6) 1 1/4" (1) 1/2" (1) 3/8" (2) 5/8"	AT&T
9		3	Powerwave - P65-16-XLH-RR - Panel			
10		6	Powerwave - LGP21401 - TMA			
11		6	Ericsson - RRUS 11 - TMA/TTA			
12		3	REC/RET			
13		1	Raycap - DC6-48-60-18-8F - SA			
-	101.0	1	RFS - DB-T1-6Z-8AB-OZ - Distribution Box	Low Profile Platform	(12) 1 5/8" (1) 1 5/8" Hybrid	Verizon
-		6	RFS - FD9R6004/2C-3L - Diplexer			
-	99.0	3	Antel - BXA-70063/4CF - Panel			
-		3	Antel - BXA-171063-12BF - Panel			
-		3	Andrew - HBX-6517DS-VTM - Panel			
-		3	Andrew - LNX-6514DS-VTM - Panel			
-		3	Alcatel Lucent - RRH2x40-AWS - RRH			

## 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
14	99.0	6	Andrew - SBNHH-1D65A - Panel	Low Profile Platform	(12) 1 5/8" (1) 1 5/8" Hybrid	Verizon
15		3	Andrew - LNX-6514DS-VTM - Panel			
16		3	Antel - BXA-171063-12BF - Panel			
17	101.0	3	Alcatel Lucent - RRH2x60-AWS - RRH			
18		3	Alcatel Lucent - RRH2X60-700 - RRH			
19		1	RFS - DB-T1-6Z-8AB-OZ - Distribution Box			

All transmission lines are considered running inside of the pole shafts.

## 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:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	<b>99.8%</b>	<b>90.8%</b>	<b>70.0%</b>
Pass/Fail	<b>Pass</b>	<b>Pass</b>	<b>Pass</b>

## Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Original Design Reactions	<b>1810.0</b>	<b>20.0</b>	<b>18.5</b>
Analysis Reactions	<b>2102.9</b>	<b>23.9</b>	<b>28.0</b>
% of Design Reactions	<b>116.2%</b>	<b>119.7%</b>	<b>151.1%</b>

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):**

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-F for the installed antennas. Maximum twist/sway at the elevation of the proposed equipment is 1.8777 degrees under the operational wind speed as specified in the Analysis Criteria.

### **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-F 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 or/and 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.

## Usage Diagram - Max Stress 99.8% at 10.0ft

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69

6/28/2016

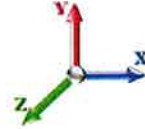


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**Dead Load Factor:** 1.00  
**Wind Load Factor:** 1.00

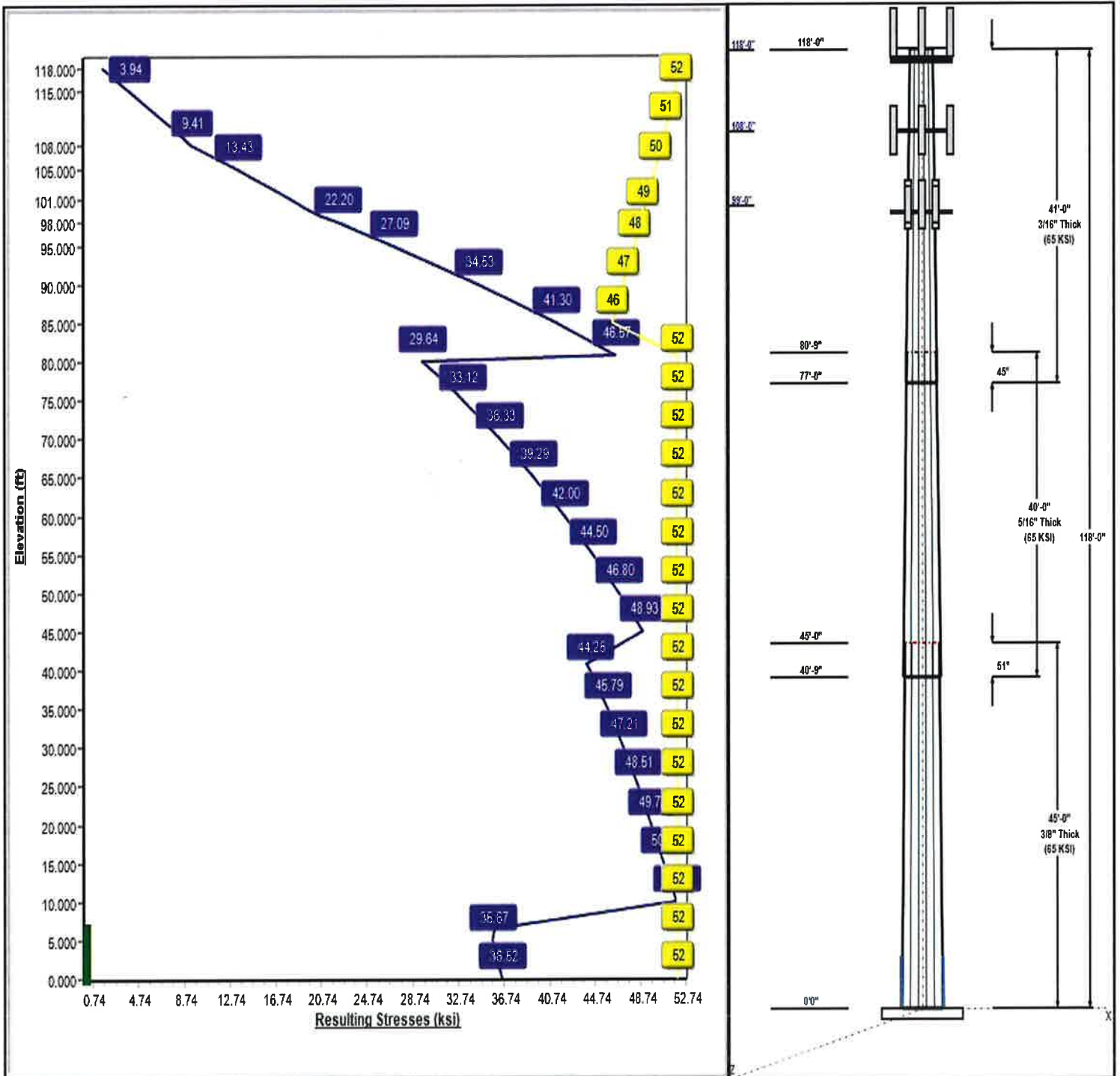
**Iterations:** 23

**Load Case : 85 mph Wind with 0 in Ice**



52 Allowable Stress  
52 Resulting Stress

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**Structure: CT46133-A-SBA**

**Type:** Tapered  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.00 (ft)

**Base Shape:** 12 Sided  
**Taper:** 0.16500

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**Shaft Properties**

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	45.00	33.05	40.47	0.375		0.16500	65
2	40.00	27.77	34.37	0.313	Slip	0.16500	65
3	41.00	22.00	28.77	0.188	Slip	0.16500	65

**Discrete Appurtenances**

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
118.00	120.00	3	800 MHz RRH	Sprint
118.00	120.00	4	ACU-A20-N	Sprint
118.00	120.00	3	ALU - External Notch	Sprint
118.00	120.00	3	APXVC-120	Sprint
118.00	120.00	3	APXVSP18-C-A20	Sprint
118.00	118.00	1	Platform w/ Hand Rails	Sprint
118.00	120.00	3	RRU	Sprint
118.00	120.00	3	TD-RRH8x20-25	Sprint
108.00	108.00	3	800-10121	AT&T
108.00	108.00	1	DC6-48-60-18-8F	AT&T
108.00	108.00	6	LGP21401	AT&T
108.00	108.00	1	Low Profile Platform	AT&T
108.00	108.00	3	P65-16-XLH-RR	AT&T
108.00	108.00	3	REC/RET	AT&T
108.00	108.00	6	RRUS 11	AT&T
101.00	101.00	1	DB-T1-6Z-8AB-0Z	Verizon
101.00	101.00	3	RRH2X60-700	Verizon
101.00	101.00	3	RRH2X60-AWS	Verizon
99.00	99.00	3	BXA-171063-12BF	Verizon
99.00	99.00	3	LNx-6514DS-VTM	Verizon
99.00	99.00	6	SBNHH-1D65A	Verizon
98.00	98.00	1	Low Profile Platform	AT&T

**Linear Appurtenances**

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	118.00	Inside	1-1/4" Hybrid	Sprint
0.00	108.00	Inside	1 1/4" Coax	AT&T
0.00	108.00	Inside	1/2" Coax	AT&T
0.00	108.00	Inside	3/8" Coax	AT&T
0.00	108.00	Inside	5/8" Coax	AT&T
0.00	99.00	Inside	1 5/8" Coax	Verizon
0.00	99.00	Inside	1 5/8" Hybrid	Verizon
0.00	9.25	Inside	1.5" Reinforcing Plate	

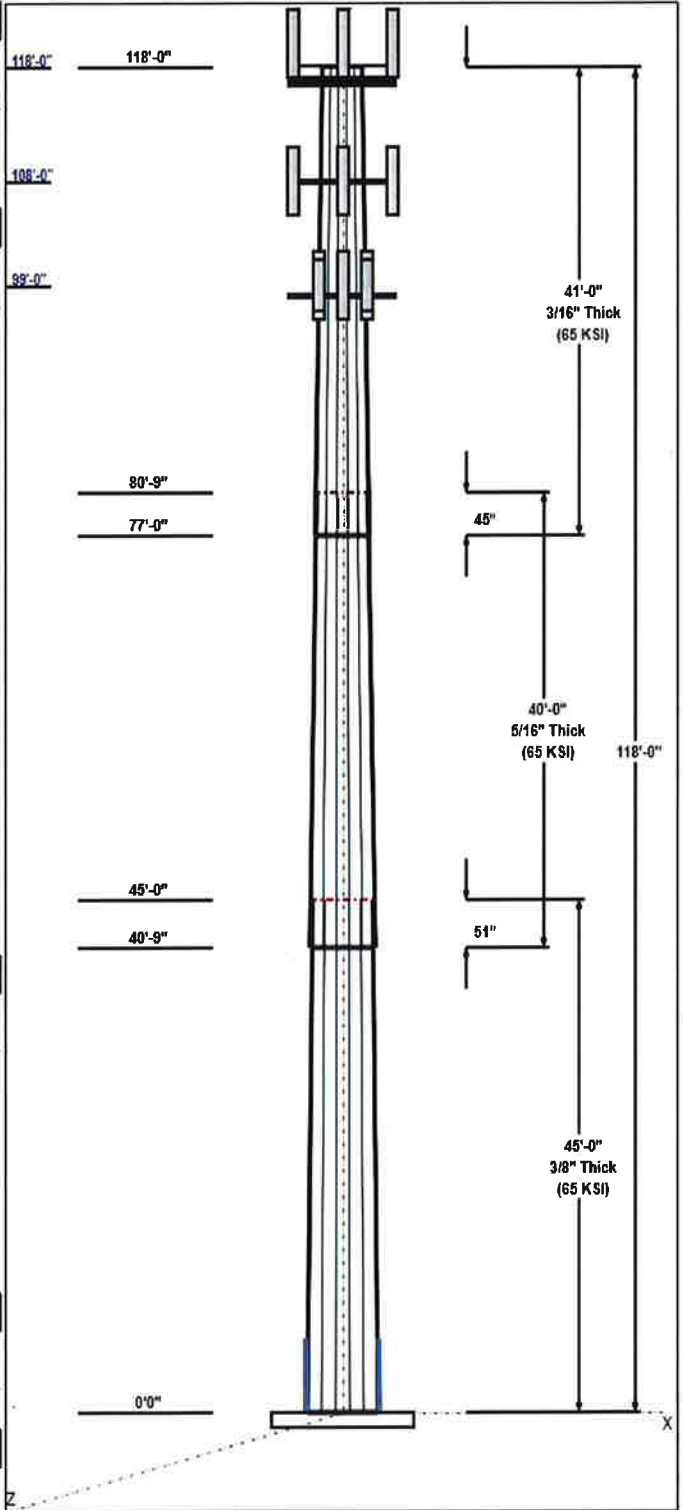
**Anchor Bolts**

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

**Base Plate**

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.2500	46.0	50.0	Clipped

**Reactions**



Structure: CT46133-A-SBA

**Type:** Tapered  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.00 (ft)

**Base Shape:** 12 Sided  
**Taper:** 0.16500

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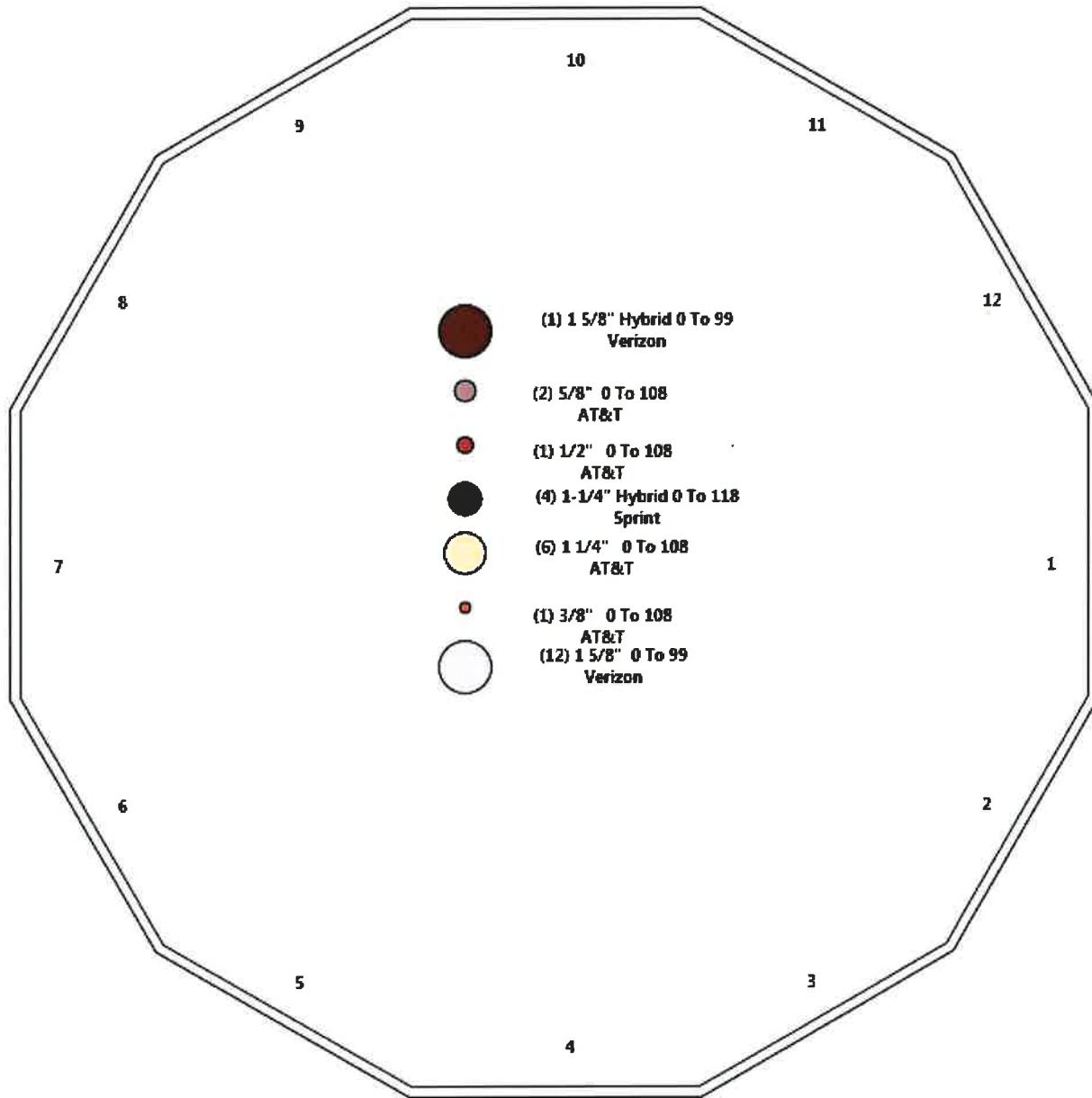
Load Case	Moment	Shear	Axial
85 mph Wind with 0" Ice	2102.9	23.9	22.9
73.61 mph Wind with 0.5" Ice	1519.5	17.4	28.0
50 mph Wind with 0" Ice	728.6	8.3	22.9

Structure: CT46133-A-SBA - Coax Line Placement

Type: Monopole  
Site Name: Shelton-north  
Height: 118.00 (ft)

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## Shaft Properties

<b>Structure:</b> CT46133-A-SBA	<b>Code:</b> EIA/TIA-222-F	6/28/2016
<b>Site Name:</b> Shelton-north	<b>Exposure:</b> C	
<b>Height:</b> 118.00 (ft)	<b>Gh:</b> 1.69	
<b>Base Elev:</b> 0.000 (ft)	<b>Struct Class:</b> II	



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Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	12	45.000	0.3750	65		0.00	6,727
2	12	40.000	0.3125	65	Slip	51.00	4,213
3	12	41.000	0.1875	65	Slip	45.00	2,122
<b>Total Shaft Weight:</b>							<b>13,062</b>

### Bottom

### Top

Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	40.47	0.00	48.41	9934.45	26.77	107.92	33.05	45.00	39.45	5374.28	21.47	88.12	0.165000
2	34.37	40.75	34.27	5074.32	27.33	109.99	27.77	80.75	27.63	2659.10	21.67	88.87	0.165000
3	28.77	77.00	17.25	1798.52	38.96	153.41	22.00	118.0	13.17	799.76	29.30	117.33	0.165000

### Additional Steel

Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Fu (ksi)	Offset (in)	Intermediate Connectors		Termination Connectors			
							Description	Spacing (in)	Description	Spacing (in)	Lower Qty	Upper Qty
0.00	6.50	4	PLT 6"x1.5"(1.25" Hole)	50	65	0.00	AJM20&sleeve	18.00	AJM20&sleeve	3.00	11	11

## Loading Summary

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

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### Discrete Appurtenances

No.	Elev (ft)	Description	Qty	No Ice			Ice			Hor. Ecc. (ft)	Vert Ecc (ft)
				Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor		
1	118.00	800 MHz RRH	3	53.00	2.49	0.50	74.10	2.820	0.50	0.00	2.00
2	118.00	ACU-A20-N	4	1.00	0.14	0.79	2.30	0.220	0.50	0.00	2.00
3	118.00	ALU - External Notch Filters	3	8.80	0.78	0.69	13.80	0.960	0.50	0.00	2.00
4	118.00	APXVC-120	3	57.00	8.26	0.83	106.50	9.080	0.50	0.00	2.00
5	118.00	APXVSP18-C-A20	3	57.00	8.26	0.83	106.50	9.080	0.50	0.00	2.00
6	118.00	Platform w/ Hand Rails	1	2000.00	40.00	1.00	2600.00	48.000	1.00	0.00	0.00
7	118.00	RRU	3	70.00	4.72	0.50	95.00	5.160	0.50	0.00	2.00
8	118.00	TD-RRH8x20-25	3	70.00	4.72	0.69	92.00	4.970	0.50	0.00	2.00
9	108.00	800-10121	3	44.10	5.45	0.79	77.00	6.090	0.50	0.00	0.00
10	108.00	DC6-48-60-18-8F	1	31.80	1.47	0.75	49.50	1.670	0.50	0.00	0.00
11	108.00	LGP21401	6	19.00	1.26	0.50	26.10	1.500	0.50	0.00	0.00
12	108.00	Low Profile Platform	1	1500.00	20.00	1.00	1800.00	24.000	1.00	0.00	0.00
13	108.00	P65-16-XLH-RR	3	53.00	8.40	0.85	100.20	9.220	0.90	0.00	0.00
14	108.00	REC/RET	3	50.00	2.57	0.69	66.10	2.890	0.50	0.00	0.00
15	108.00	RRUS 11	6	50.70	2.94	0.76	66.00	3.140	0.50	0.00	0.00
16	101.00	DB-T1-6Z-8AB-OZ	1	18.90	5.60	0.71	46.00	5.870	0.50	0.00	0.00
17	101.00	RRH2X60-700	3	60.00	4.00	0.50	80.00	4.250	0.50	0.00	0.00
18	101.00	RRH2X60-AWS	3	60.00	4.00	0.50	80.00	4.250	0.50	0.00	0.00
19	99.00	BXA-171063-12BF	3	15.00	4.73	0.84	42.20	5.400	0.50	0.00	0.00
20	99.00	LNK-6514DS-VTM	3	33.10	8.33	0.80	83.10	9.150	0.50	0.00	0.00
21	99.00	SBNHH-1D65A	6	33.50	6.36	0.83	68.80	6.740	0.50	0.00	0.00
22	98.00	Low Profile Platform	1	1500.00	20.00	1.00	1800.00	24.000	1.00	0.00	0.00
<b>Totals:</b>			<b>66</b>	<b>7,566.90</b>			<b>10,319.60</b>				

### Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	No Ice		Ice		Exposed
			Weight (lb/ft)	CaAa (sf/ft)	Weight (lb/ft)	CaAa (sf/ft)	
0.00	118.00	(4) 1-1/4" Hybrid	3.82	0.00	0.00	0.00	Inside
0.00	108.00	(6) 1 1/4" Coax	3.96	0.00	0.00	0.00	Inside
0.00	108.00	(1) 1/2" Coax	0.16	0.00	0.00	0.00	Inside
0.00	108.00	(1) 3/8" Coax	0.08	0.00	0.00	0.00	Inside
0.00	108.00	(2) 5/8" Coax	0.30	0.00	0.00	0.00	Inside
0.00	99.00	(12) 1 5/8" Coax	12.48	0.00	0.00	0.00	Inside
0.00	99.00	(1) 1 5/8" Hybrid	1.10	0.00	0.00	0.00	Inside
0.00	9.25	(1) 1.5" Reinforcing Plate	0.00	0.25	7.78	0.33	Inside
<b>Totals:</b>			<b>2,280.71</b>		<b>71.97</b>		

## Shaft Section Properties

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

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**Increment Length:** 5 (ft)

Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	Fb (ksi)	Weight (lb)	Additional Reinforcing			
											Area (in^2)	Ixp (in^4)	Iyp (in^4)	Weight (lb)
0.00	RB1	0.3750	40.470	48.415	9934.4	26.77	107.92	65	52	0.0	36.00	11922.1	4046.0	
5.00		0.3750	39.645	47.419	9333.7	26.18	105.72	65	52	815.2	36.00	11459.2	3891.7	612.5
6.50	RT1	0.3750	39.398	47.120	9158.4	26.01	105.06	65	52	241.3	36.00	11322.1	3846.0	183.8
10.00		0.3750	38.820	46.422	8757.8	25.59	103.52	65	52	557.0				
15.00		0.3750	37.995	45.426	8206.0	25.01	101.32	65	52	781.3				
20.00		0.3750	37.170	44.430	7677.8	24.42	99.12	65	52	764.4				
25.00		0.3750	36.345	43.434	7172.9	23.83	96.92	65	52	747.5				
30.00		0.3750	35.520	42.438	6690.6	23.24	94.72	65	52	730.5				
35.00		0.3750	34.695	41.441	6230.4	22.65	92.52	65	52	713.6				
40.00		0.3750	33.870	40.445	5791.8	22.06	90.32	65	52	696.6				
40.75	Bot - Section 2	0.3750	33.746	40.296	5727.8	21.97	89.99	65	52	103.0				
45.00	Top - Section 1	0.3125	33.670	33.566	4767.3	26.73	107.74	65	52	1067.2				
50.00		0.3125	32.845	32.736	4422.3	26.02	105.10	65	52	564.0				
55.00		0.3125	32.020	31.906	4094.3	25.31	102.46	65	52	549.9				
60.00		0.3125	31.195	31.076	3782.9	24.60	99.82	65	52	535.8				
65.00		0.3125	30.370	30.245	3487.8	23.90	97.18	65	52	521.7				
70.00		0.3125	29.545	29.415	3208.4	23.19	94.54	65	52	507.5				
75.00		0.3125	28.720	28.585	2944.4	22.48	91.90	65	52	493.4				
77.00	Bot - Section 3	0.3125	28.390	28.253	2842.9	22.20	90.85	65	52	193.4				
80.00		0.3125	27.895	27.755	2695.2	21.77	89.26	65	52	460.5				
80.75	Top - Section 2	0.1875	28.146	16.880	1684.2	38.08	150.11	65	52	113.8				
85.00		0.1875	27.445	16.457	1560.6	37.08	146.37	65	46	241.1				
90.00		0.1875	26.620	15.959	1423.2	35.90	141.97	65	47	275.8				
95.00		0.1875	25.795	15.461	1294.0	34.72	137.57	65	48	267.3				
98.00		0.1875	25.300	15.162	1220.4	34.01	134.93	65	49	156.3				
99.00		0.1875	25.135	15.062	1196.5	33.78	134.05	65	49	51.4				
100.00		0.1875	24.970	14.962	1172.9	33.54	133.17	65	49	51.1				
101.00		0.1875	24.805	14.863	1149.7	33.30	132.29	65	49	50.7				
105.00		0.1875	24.145	14.464	1059.7	32.36	128.77	65	50	199.6				
108.00		0.1875	23.650	14.165	995.3	31.65	126.13	65	51	146.1				
110.00		0.1875	23.320	13.966	953.9	31.18	124.37	65	51	95.7				
115.00		0.1875	22.495	13.468	855.5	30.00	119.97	65	52	233.4				
118.00		0.1875	22.000	13.169	799.8	29.30	117.33	65	52	136.0				
<b>Total Weight</b>										<b>13062.1</b>				
											<b>796.3</b>			



## Wind Loading - Shaft

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

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**Load Case:** 85 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00	RB1	0.00	1.00	18.496	31.26	286.66	1.030	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	18.496	31.26	280.82	1.030	0.000	5.00	16.691	17.19	537.4	0.0	815.2
6.50	RT1	0.00	1.00	18.496	31.26	279.07	1.030	0.000	1.50	4.940	5.09	159.1	0.0	241.3
10.00		0.00	1.00	18.496	31.26	274.98	1.030	0.000	3.50	11.407	11.75	367.3	0.0	557.0
15.00		0.00	1.00	18.496	31.26	269.13	1.030	0.000	5.00	16.003	16.48	515.2	0.0	781.3
20.00		0.00	1.00	18.496	31.26	263.29	1.030	0.000	5.00	15.659	16.13	504.2	0.0	764.4
25.00		0.00	1.00	18.496	31.26	257.44	1.030	0.000	5.00	15.316	15.78	493.1	0.0	747.5
30.00		0.00	1.00	18.496	31.26	251.60	1.030	0.000	5.00	14.972	15.42	482.0	0.0	730.5
35.00		0.00	1.02	18.810	31.79	247.83	1.030	0.000	5.00	14.628	15.07	479.0	0.0	713.6
40.00		0.00	1.06	19.541	33.02	246.60	1.030	0.000	5.00	14.284	14.71	485.9	0.0	696.6
40.75	Bot - Section 2	0.00	1.06	19.645	33.20	246.35	1.030	0.000	0.75	2.113	2.18	72.3	0.0	103.0
45.00	Top - Section 1	0.00	1.09	20.210	34.15	244.67	1.030	0.000	4.25	12.049	12.41	423.9	0.0	1067.2
50.00		0.00	1.13	20.827	35.20	246.88	1.030	0.000	5.00	13.857	14.27	502.4	0.0	564.0
55.00		0.00	1.16	21.402	36.17	243.98	1.030	0.000	5.00	13.514	13.92	503.4	0.0	549.9
60.00		0.00	1.19	21.941	37.08	240.67	1.030	0.000	5.00	13.170	13.56	503.0	0.0	535.8
65.00		0.00	1.21	22.449	37.94	237.00	1.030	0.000	5.00	12.826	13.21	501.2	0.0	521.7
70.00		0.00	1.24	22.929	38.75	233.01	1.030	0.000	5.00	12.482	12.86	498.2	0.0	507.5
75.00		0.00	1.26	23.386	39.52	228.75	1.030	0.000	5.00	12.139	12.50	494.1	0.0	493.4
77.00	Bot - Section 3	0.00	1.27	23.562	39.82	226.97	1.030	0.000	2.00	4.759	4.90	195.2	0.0	193.4
80.00		0.00	1.29	23.821	40.26	224.24	1.030	0.000	3.00	7.129	7.34	295.6	0.0	460.5
80.75	Top - Section 2	0.00	1.29	23.884	40.36	223.54	1.030	0.000	0.75	1.763	1.82	73.3	0.0	113.8
85.00		0.00	1.31	24.237	40.96	222.54	1.030	0.000	4.25	9.844	10.14	415.3	0.0	241.1
90.00		0.00	1.33	24.636	41.63	217.62	1.030	0.000	5.00	11.264	11.60	483.0	0.0	275.8
95.00		0.00	1.35	25.020	42.28	212.51	1.030	0.000	5.00	10.920	11.25	475.6	0.0	267.3
98.00	Appurtenance(s)	0.00	1.36	25.243	42.66	209.36	1.030	0.000	3.00	6.387	6.58	280.6	0.0	156.3
99.00	Appurtenance(s)	0.00	1.37	25.316	42.78	208.29	1.030	0.000	1.00	2.101	2.16	92.6	0.0	51.4
100.00		0.00	1.37	25.389	42.91	207.22	1.030	0.000	1.00	2.088	2.15	92.3	0.0	51.1
101.00	Appurtenance(s)	0.00	1.38	25.461	43.03	206.15	1.030	0.000	1.00	2.074	2.14	91.9	0.0	50.7
105.00		0.00	1.39	25.745	43.51	201.78	1.030	0.000	4.00	8.158	8.40	365.6	0.0	199.6
108.00	Appurtenance(s)	0.00	1.40	25.953	43.86	198.44	1.030	0.000	3.00	5.974	6.15	269.9	0.0	146.1
110.00		0.00	1.41	26.090	44.09	196.18	1.030	0.000	2.00	3.914	4.03	177.8	0.0	95.7
115.00		0.00	1.43	26.423	44.66	190.45	1.030	0.000	5.00	9.545	9.83	439.0	0.0	233.4
118.00	Appurtenance(s)	0.00	1.44	26.618	44.99	186.94	1.030	0.000	3.00	5.562	5.73	257.7	0.0	136.0
								<b>Totals:</b>	<b>118.00</b>			<b>11,527.0</b>	<b>13,062.1</b>	

## Discrete Appurtenance Forces

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

6/28/2016

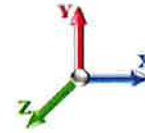
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**Load Case:** 85 mph Wind with 0" Ice

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00



**Iterations:** 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	APXVC-120	3	26.747	45.202	0.83	20.57	171.00	0.000	2.000	929.68	0.00	1859.36
2	118.00	800 MHz RRH	3	26.747	45.202	0.50	3.74	159.00	0.000	2.000	168.83	0.00	337.66
3	118.00	ACU-A20-N	4	26.747	45.202	0.79	0.44	4.00	0.000	2.000	20.00	0.00	39.99
4	118.00	ALU - External Notch Filters	3	26.747	45.202	0.69	1.61	26.40	0.000	2.000	72.98	0.00	145.97
5	118.00	TD-RRH8x20-25	3	26.747	45.202	0.69	9.77	210.00	0.000	2.000	441.64	0.00	883.28
6	118.00	APXVSP18-C-A20	3	26.747	45.202	0.83	20.57	171.00	0.000	2.000	929.68	0.00	1859.36
7	118.00	Platform w/ Hand Rails	1	26.618	44.985	1.00	40.00	2000.00	0.000	0.000	1799.41	0.00	0.00
8	118.00	RRU	3	26.747	45.202	0.50	7.08	210.00	0.000	2.000	320.03	0.00	640.06
9	108.00	RRUS 11	6	25.953	43.861	0.76	13.41	304.20	0.000	0.000	588.02	0.00	0.00
10	108.00	REC/RET	3	25.953	43.861	0.69	5.32	150.00	0.000	0.000	233.34	0.00	0.00
11	108.00	P65-16-XLH-RR	3	25.953	43.861	0.85	21.42	159.00	0.000	0.000	939.51	0.00	0.00
12	108.00	Low Profile Platform	1	25.953	43.861	1.00	20.00	1500.00	0.000	0.000	877.23	0.00	0.00
13	108.00	LGP21401	6	25.953	43.861	0.50	3.78	114.00	0.000	0.000	165.80	0.00	0.00
14	108.00	DC6-48-60-18-8F	1	25.953	43.861	0.75	1.10	31.80	0.000	0.000	48.36	0.00	0.00
15	108.00	800-10121	3	25.953	43.861	0.79	12.92	132.30	0.000	0.000	566.53	0.00	0.00
16	101.00	RRH2X60-AWS	3	25.461	43.030	0.50	6.00	180.00	0.000	0.000	258.18	0.00	0.00
17	101.00	RRH2X60-700	3	25.461	43.030	0.50	6.00	180.00	0.000	0.000	258.18	0.00	0.00
18	101.00	DB-T1-6Z-8AB-OZ	1	25.461	43.030	0.71	3.98	18.90	0.000	0.000	171.09	0.00	0.00
19	99.00	SBNHH-1D65A	6	25.316	42.784	0.83	31.67	201.00	0.000	0.000	1355.10	0.00	0.00
20	99.00	LNx-6514DS-VTM	3	25.316	42.784	0.80	19.99	99.30	0.000	0.000	855.34	0.00	0.00
21	99.00	BXA-171063-12BF	3	25.316	42.784	0.84	11.92	45.00	0.000	0.000	509.97	0.00	0.00
22	98.00	Low Profile Platform	1	25.243	42.660	1.00	20.00	1500.00	0.000	0.000	853.21	0.00	0.00
<b>Totals:</b>								<b>7,566.90</b>			<b>12,362.10</b>		

## Total Applied Force Summary

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

6/28/2016

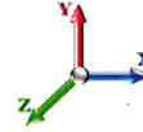
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**Load Case:** 85 mph Wind with 0" Ice

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		537.37	924.73	0.00	0.00
6.50		159.05	274.11	0.00	0.00
10.00		367.25	633.67	0.00	0.00
15.00		515.24	890.83	0.00	0.00
20.00		504.17	873.88	0.00	0.00
25.00		493.10	856.93	0.00	0.00
30.00		482.03	839.98	0.00	0.00
35.00		478.95	823.03	0.00	0.00
40.00		485.88	806.08	0.00	0.00
40.75		72.26	119.45	0.00	0.00
45.00		423.87	1160.21	0.00	0.00
50.00		502.39	673.51	0.00	0.00
55.00		503.45	659.38	0.00	0.00
60.00		502.99	645.26	0.00	0.00
65.00		501.20	631.13	0.00	0.00
70.00		498.20	617.01	0.00	0.00
75.00		494.13	602.88	0.00	0.00
77.00		195.20	237.20	0.00	0.00
80.00		295.62	526.17	0.00	0.00
80.75		73.30	130.27	0.00	0.00
85.00		415.32	334.11	0.00	0.00
90.00		483.03	385.24	0.00	0.00
95.00		475.57	376.76	0.00	0.00
98.00	(1) appurtenances	1133.85	1721.99	0.00	0.00
99.00	(12) appurtenances	2813.02	418.62	0.00	0.00
100.00		92.27	59.40	0.00	0.00
101.00	(7) appurtenances	779.36	437.96	0.00	0.00
105.00		365.62	232.85	0.00	0.00
108.00	(23) appurtenances	3688.69	2562.38	0.00	0.00
110.00		177.76	103.36	0.00	0.00
115.00		439.01	252.46	0.00	0.00
118.00	(23) appurtenances	4939.96	3098.81	0.00	5765.68
	<b>Totals:</b>	<b>23,889.11</b>	<b>22,909.66</b>	<b>0.00</b>	<b>5,765.68</b>

## Resulting Forces and Deflections

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

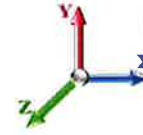
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**Load Case:** 85 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-23.931	-22.865	0.000	0.000	0.000	-2102.892	0.000	0.000	0.000	0.000	0.000
5.00	-23.443	-21.887	0.000	0.000	0.000	-1983.240	-0.111	0.000	0.111	-0.208	0.000
6.50	-23.323	-21.570	0.000	0.000	0.000	-1948.075	-0.187	0.000	0.187	-0.271	0.000
10.00	-23.032	-20.850	0.000	0.000	0.000	-1866.447	-0.440	0.000	0.440	-0.417	0.000
15.00	-22.610	-19.849	0.000	0.000	0.000	-1751.287	-1.035	0.000	1.035	-0.711	0.000
20.00	-22.190	-18.869	0.000	0.000	0.000	-1638.237	-1.937	0.000	1.937	-1.005	0.000
25.00	-21.772	-17.911	0.000	0.000	0.000	-1527.288	-3.147	0.000	3.147	-1.298	0.000
30.00	-21.355	-16.975	0.000	0.000	0.000	-1418.431	-4.663	0.000	4.663	-1.590	0.000
35.00	-20.933	-16.062	0.000	0.000	0.000	-1311.657	-6.484	0.000	6.484	-1.881	0.000
40.00	-20.462	-15.215	0.000	0.000	0.000	-1206.995	-8.608	0.000	8.608	-2.168	0.000
40.75	-20.424	-15.047	0.000	0.000	0.000	-1191.648	-8.952	0.000	8.952	-2.212	0.000
45.00	-20.016	-13.814	0.000	0.000	0.000	-1104.849	-11.031	0.000	11.031	-2.455	0.000
50.00	-19.551	-13.063	0.000	0.000	0.000	-1004.771	-13.752	0.000	13.752	-2.734	0.000
55.00	-19.080	-12.329	0.000	0.000	0.000	-907.018	-16.779	0.000	16.779	-3.041	0.000
60.00	-18.602	-11.618	0.000	0.000	0.000	-811.617	-20.124	0.000	20.124	-3.340	0.000
65.00	-18.117	-10.930	0.000	0.000	0.000	-718.609	-23.775	0.000	23.775	-3.628	0.000
70.00	-17.627	-10.265	0.000	0.000	0.000	-628.025	-27.721	0.000	27.721	-3.902	0.000
75.00	-17.122	-9.645	0.000	0.000	0.000	-539.889	-31.945	0.000	31.945	-4.161	0.000
77.00	-16.930	-9.387	0.000	0.000	0.000	-505.645	-33.709	0.000	33.709	-4.262	0.000
80.00	-16.609	-8.859	0.000	0.000	0.000	-454.855	-36.432	0.000	36.432	-4.406	0.000
80.75	-16.543	-8.702	0.000	0.000	0.000	-442.398	-37.126	0.000	37.126	-4.442	0.000
85.00	-16.139	-8.332	0.000	0.000	0.000	-372.089	-41.163	0.000	41.163	-4.627	0.000
90.00	-15.664	-7.912	0.000	0.000	0.000	-291.394	-46.171	0.000	46.171	-4.929	0.000
95.00	-15.182	-7.530	0.000	0.000	0.000	-213.073	-51.469	0.000	51.469	-5.182	0.000
98.00	-13.903	-5.900	0.000	0.000	0.000	-167.528	-54.763	0.000	54.763	-5.307	0.000
99.00	-11.067	-5.738	0.000	0.000	0.000	-153.625	-55.878	0.000	55.878	-5.344	0.000
100.00	-10.973	-5.681	0.000	0.000	0.000	-142.558	-57.000	0.000	57.000	-5.380	0.000
101.00	-10.163	-5.305	0.000	0.000	0.000	-131.585	-58.129	0.000	58.129	-5.413	0.000
105.00	-9.785	-5.093	0.000	0.000	0.000	-90.933	-62.708	0.000	62.708	-5.523	0.000
108.00	-5.867	-2.896	0.000	0.000	0.000	-61.579	-66.195	0.000	66.195	-5.584	0.000
110.00	-5.683	-2.806	0.000	0.000	0.000	-49.845	-68.538	0.000	68.538	-5.616	0.000
115.00	-5.222	-2.595	0.000	0.000	0.000	-21.432	-74.443	0.000	74.443	-5.669	0.000
118.00	-4.940	0.000	0.000	0.000	0.000	-5.766	0.000	0.000	78.006	-5.683	0.000

## Resulting Stresses

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

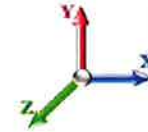
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**Load Case:** 85 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

### Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.47	1.00	0.00	0.00	0.00	53.21	36.52	52.0	0.702
5.00	0.46	1.00	0.00	0.00	0.00	35.67	35.67	52.0	0.686
6.50	0.46	1.01	0.00	0.00	0.00	35.41	35.87	52.0	0.690
10.00	0.45	1.01	0.00	0.00	0.00	51.39	51.87	52.0	0.998
15.00	0.44	1.01	0.00	0.00	0.00	50.37	50.84	52.0	0.978
20.00	0.42	1.01	0.00	0.00	0.00	49.26	49.72	52.0	0.956
25.00	0.41	1.02	0.00	0.00	0.00	48.07	48.51	52.0	0.933
30.00	0.40	1.02	0.00	0.00	0.00	46.78	47.21	52.0	0.908
35.00	0.39	1.03	0.00	0.00	0.00	45.37	45.79	52.0	0.881
40.00	0.38	1.03	0.00	0.00	0.00	43.84	44.26	52.0	0.851
40.75	0.37	1.03	0.00	0.00	0.00	43.61	44.02	52.0	0.847
45.00	0.41	1.21	0.00	0.00	0.00	48.47	48.93	52.0	0.941
50.00	0.40	1.21	0.00	0.00	0.00	46.36	46.80	52.0	0.900
55.00	0.39	1.22	0.00	0.00	0.00	44.06	44.50	52.0	0.856
60.00	0.37	1.22	0.00	0.00	0.00	41.57	42.00	52.0	0.808
65.00	0.36	1.22	0.00	0.00	0.00	38.87	39.29	52.0	0.756
70.00	0.35	1.22	0.00	0.00	0.00	35.92	36.33	52.0	0.699
75.00	0.34	1.22	0.00	0.00	0.00	32.71	33.12	52.0	0.637
77.00	0.33	1.22	0.00	0.00	0.00	31.37	31.77	52.0	0.611
80.00	0.32	1.22	0.00	0.00	0.00	29.24	29.64	52.0	0.570
80.75	0.52	1.99	0.00	0.00	0.00	45.92	46.57	52.0	0.896
85.00	0.51	1.99	0.00	0.00	0.00	40.65	41.30	46.3	0.891
90.00	0.50	1.99	0.00	0.00	0.00	33.86	34.53	47.2	0.731
95.00	0.49	2.00	0.00	0.00	0.00	26.38	27.09	48.2	0.562
98.00	0.39	1.86	0.00	0.00	0.00	21.57	22.20	48.7	0.456
99.00	0.38	1.49	0.00	0.00	0.00	20.05	20.59	48.9	0.421
100.00	0.38	1.49	0.00	0.00	0.00	18.85	19.40	49.1	0.395
101.00	0.36	1.39	0.00	0.00	0.00	17.64	18.15	49.3	0.368
105.00	0.35	1.37	0.00	0.00	0.00	12.87	13.43	50.0	0.269
108.00	0.20	0.84	0.00	0.00	0.00	9.09	9.41	50.6	0.186
110.00	0.20	0.83	0.00	0.00	0.00	7.57	7.90	50.9	0.155
115.00	0.19	0.79	0.00	0.00	0.00	3.50	3.94	51.9	0.076
118.00	0.00	0.76	0.00	0.00	0.00	0.99	1.65	52.0	0.032



## Wind Loading - Shaft

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

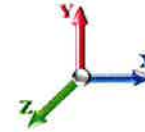
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**Load Case:** 73.61 mph Wind with 0.5" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00	RB1	0.00	1.00	13.871	23.44	248.25	1.030	0.500	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	13.871	23.44	243.19	1.030	0.500	5.00	17.107	17.62	413.1	125.7	940.9
6.50	RT1	0.00	1.00	13.871	23.44	241.67	1.030	0.500	1.50	5.065	5.22	122.3	37.5	278.7
10.00		0.00	1.00	13.871	23.44	238.13	1.030	0.500	3.50	11.698	12.05	282.5	86.2	643.2
15.00		0.00	1.00	13.871	23.44	233.07	1.030	0.500	5.00	16.420	16.91	396.5	120.5	901.9
20.00		0.00	1.00	13.871	23.44	228.01	1.030	0.500	5.00	16.076	16.56	388.2	117.9	882.3
25.00		0.00	1.00	13.871	23.44	222.95	1.030	0.500	5.00	15.732	16.20	379.9	115.3	862.8
30.00		0.00	1.00	13.871	23.44	217.89	1.030	0.500	5.00	15.389	15.85	371.6	112.8	843.3
35.00		0.00	1.02	14.106	23.84	214.62	1.030	0.500	5.00	15.045	15.50	369.4	110.2	823.7
40.00		0.00	1.06	14.655	24.77	213.55	1.030	0.500	5.00	14.701	15.14	375.0	107.6	804.2
40.75	Bot - Section 2	0.00	1.06	14.733	24.90	213.34	1.030	0.500	0.75	2.176	2.24	55.8	16.1	119.1
45.00	Top - Section 1	0.00	1.09	15.156	25.61	211.89	1.030	0.500	4.25	12.403	12.78	327.2	90.9	1158.1
50.00		0.00	1.13	15.620	26.40	213.80	1.030	0.500	5.00	14.274	14.70	388.1	104.4	668.4
55.00		0.00	1.16	16.051	27.13	211.29	1.030	0.500	5.00	13.930	14.35	389.2	101.8	651.7
60.00		0.00	1.19	16.455	27.81	208.42	1.030	0.500	5.00	13.586	13.99	389.2	99.2	635.0
65.00		0.00	1.21	16.836	28.45	205.24	1.030	0.500	5.00	13.243	13.64	388.1	96.6	618.3
70.00		0.00	1.24	17.196	29.06	201.79	1.030	0.500	5.00	12.899	13.29	386.1	94.1	601.6
75.00		0.00	1.26	17.538	29.64	198.10	1.030	0.500	5.00	12.555	12.93	383.3	91.5	584.9
77.00	Bot - Section 3	0.00	1.27	17.671	29.86	196.56	1.030	0.500	2.00	4.926	5.07	151.5	36.2	229.6
80.00		0.00	1.29	17.865	30.19	194.19	1.030	0.500	3.00	7.379	7.60	229.5	54.0	514.5
80.75	Top - Section 2	0.00	1.29	17.912	30.27	193.58	1.030	0.500	0.75	1.826	1.88	56.9	13.5	127.3
85.00		0.00	1.31	18.177	30.72	192.72	1.030	0.500	4.25	10.198	10.50	322.7	74.4	315.4
90.00		0.00	1.33	18.476	31.22	188.46	1.030	0.500	5.00	11.680	12.03	375.6	84.9	360.7
95.00		0.00	1.35	18.764	31.71	184.03	1.030	0.500	5.00	11.336	11.68	370.3	82.3	349.6
98.00	Appurtenance(s)	0.00	1.36	18.931	31.99	181.30	1.030	0.500	3.00	6.637	6.84	218.7	48.5	204.8
99.00	Appurtenance(s)	0.00	1.37	18.986	32.09	180.38	1.030	0.500	1.00	2.185	2.25	72.2	16.1	67.5
100.00		0.00	1.37	19.041	32.18	179.46	1.030	0.500	1.00	2.171	2.24	72.0	15.9	67.0
101.00	Appurtenance(s)	0.00	1.38	19.095	32.27	178.52	1.030	0.500	1.00	2.157	2.22	71.7	15.8	66.6
105.00		0.00	1.39	19.308	32.63	174.74	1.030	0.500	4.00	8.492	8.75	285.4	61.7	261.3
108.00	Appurtenance(s)	0.00	1.40	19.464	32.89	171.85	1.030	0.500	3.00	6.224	6.41	210.9	45.4	191.5
110.00		0.00	1.41	19.566	33.07	169.90	1.030	0.500	2.00	4.081	4.20	139.0	29.8	125.6
115.00		0.00	1.43	19.816	33.49	164.93	1.030	0.500	5.00	9.961	10.26	343.6	72.0	305.4
118.00	Appurtenance(s)	0.00	1.44	19.963	33.74	161.89	1.030	0.500	3.00	5.812	5.99	202.0	42.3	178.2
<b>Totals:</b>									<b>118.00</b>			<b>8,927.2</b>		<b>15,383.0</b>



## Discrete Appurtenance Forces

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

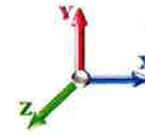
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**Load Case:** 73.61 mph Wind with 0.5" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	APXVC-120	3	20.059	33.899	0.50	13.62	319.50	0.000	2.000	461.71	0.00	923.42
2	118.00	800 MHz RRH	3	20.059	33.899	0.50	4.23	222.30	0.000	2.000	143.39	0.00	286.79
3	118.00	ACU-A20-N	4	20.059	33.899	0.50	0.44	9.20	0.000	2.000	14.92	0.00	29.83
4	118.00	ALU - External Notch Filters	3	20.059	33.899	0.50	1.44	41.40	0.000	2.000	48.82	0.00	97.63
5	118.00	TD-RRH8x20-25	3	20.059	33.899	0.50	7.46	276.00	0.000	2.000	252.72	0.00	505.44
6	118.00	APXVSP18-C-A20	3	20.059	33.899	0.50	13.62	319.50	0.000	2.000	461.71	0.00	923.42
7	118.00	Platform w/ Hand Rails	1	19.963	33.737	1.00	48.00	2600.00	0.000	0.000	1619.37	0.00	0.00
8	118.00	RRU	3	20.059	33.899	0.50	7.74	285.00	0.000	2.000	262.38	0.00	524.76
9	108.00	RRUS 11	6	19.464	32.894	0.50	9.42	396.00	0.000	0.000	309.86	0.00	0.00
10	108.00	REC/RET	3	19.464	32.894	0.50	4.33	198.30	0.000	0.000	142.60	0.00	0.00
11	108.00	P65-16-XLH-RR	3	19.464	32.894	0.90	24.89	300.60	0.000	0.000	818.86	0.00	0.00
12	108.00	Low Profile Platform	1	19.464	32.894	1.00	24.00	1800.00	0.000	0.000	789.46	0.00	0.00
13	108.00	LGP21401	6	19.464	32.894	0.50	4.50	156.60	0.000	0.000	148.02	0.00	0.00
14	108.00	DC6-48-60-18-8F	1	19.464	32.894	0.50	0.83	49.50	0.000	0.000	27.47	0.00	0.00
15	108.00	800-10121	3	19.464	32.894	0.50	9.13	231.00	0.000	0.000	300.49	0.00	0.00
16	101.00	RRH2X60-AWS	3	19.095	32.270	0.50	6.38	240.00	0.000	0.000	205.72	0.00	0.00
17	101.00	RRH2X60-700	3	19.095	32.270	0.50	6.38	240.00	0.000	0.000	205.72	0.00	0.00
18	101.00	DB-T1-6Z-8AB-OZ	1	19.095	32.270	0.50	2.94	46.00	0.000	0.000	94.71	0.00	0.00
19	99.00	SBNHH-1D65A	6	18.986	32.086	0.50	20.22	412.80	0.000	0.000	648.79	0.00	0.00
20	99.00	LNx-6514DS-VTM	3	18.986	32.086	0.50	13.73	249.30	0.000	0.000	440.39	0.00	0.00
21	99.00	BXA-171063-12BF	3	18.986	32.086	0.50	8.10	126.60	0.000	0.000	259.90	0.00	0.00
22	98.00	Low Profile Platform	1	18.931	31.993	1.00	24.00	1800.00	0.000	0.000	767.84	0.00	0.00
<b>Totals:</b>								<b>10,319.60</b>			<b>8,424.84</b>		

## Total Applied Force Summary

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

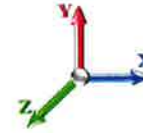
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**Load Case:** 73.61 mph Wind with 0.5" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		413.07	1050.40	0.00	0.00
6.50		122.30	311.58	0.00	0.00
10.00		282.46	719.83	0.00	0.00
15.00		396.47	1011.34	0.00	0.00
20.00		388.17	991.81	0.00	0.00
25.00		379.87	972.28	0.00	0.00
30.00		371.57	952.75	0.00	0.00
35.00		369.42	933.21	0.00	0.00
40.00		375.02	913.68	0.00	0.00
40.75		55.79	135.53	0.00	0.00
45.00		327.23	1251.14	0.00	0.00
50.00		388.10	777.89	0.00	0.00
55.00		389.21	761.19	0.00	0.00
60.00		389.16	744.48	0.00	0.00
65.00		388.09	727.77	0.00	0.00
70.00		386.10	711.07	0.00	0.00
75.00		383.29	694.36	0.00	0.00
77.00		151.51	273.38	0.00	0.00
80.00		229.48	580.21	0.00	0.00
80.75		56.92	143.72	0.00	0.00
85.00		322.68	408.47	0.00	0.00
90.00		375.65	470.14	0.00	0.00
95.00		370.27	459.08	0.00	0.00
98.00	(1) appurtenances	986.55	2070.45	0.00	0.00
99.00	(12) appurtenances	1421.28	878.07	0.00	0.00
100.00		71.96	75.35	0.00	0.00
101.00	(7) appurtenances	577.86	600.90	0.00	0.00
105.00		285.40	294.57	0.00	0.00
108.00	(23) appurtenances	2747.64	3348.44	0.00	0.00
110.00		138.99	133.19	0.00	0.00
115.00		343.61	324.45	0.00	0.00
118.00	(23) appurtenances	3466.97	4262.57	0.00	3291.28
	<b>Totals:</b>	<b>17,352.08</b>	<b>27,983.31</b>	<b>0.00</b>	<b>3,291.28</b>

## Resulting Forces and Deflections

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

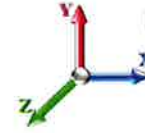
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**Load Case:** 73.61 mph Wind with 0.5" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-17.389	-27.960	0.000	0.000	0.000	-1519.469	0.000	0.000	0.000	0.000	0.000
5.00	-17.020	-26.881	0.000	0.000	0.000	-1432.526	-0.080	0.000	0.080	-0.150	0.000
6.50	-16.932	-26.548	0.000	0.000	0.000	-1406.996	-0.135	0.000	0.135	-0.196	0.000
10.00	-16.719	-25.782	0.000	0.000	0.000	-1347.734	-0.318	0.000	0.318	-0.301	0.000
15.00	-16.407	-24.713	0.000	0.000	0.000	-1264.143	-0.748	0.000	0.748	-0.514	0.000
20.00	-16.095	-23.667	0.000	0.000	0.000	-1182.112	-1.399	0.000	1.399	-0.726	0.000
25.00	-15.785	-22.642	0.000	0.000	0.000	-1101.637	-2.272	0.000	2.272	-0.937	0.000
30.00	-15.475	-21.639	0.000	0.000	0.000	-1022.715	-3.367	0.000	3.367	-1.148	0.000
35.00	-15.161	-20.660	0.000	0.000	0.000	-945.340	-4.681	0.000	4.681	-1.357	0.000
40.00	-14.803	-19.725	0.000	0.000	0.000	-869.537	-6.214	0.000	6.214	-1.564	0.000
40.75	-14.779	-19.565	0.000	0.000	0.000	-858.435	-6.462	0.000	6.462	-1.596	0.000
45.00	-14.476	-18.276	0.000	0.000	0.000	-795.624	-7.963	0.000	7.963	-1.771	0.000
50.00	-14.127	-17.459	0.000	0.000	0.000	-723.247	-9.925	0.000	9.925	-1.972	0.000
55.00	-13.774	-16.660	0.000	0.000	0.000	-652.614	-12.109	0.000	12.109	-2.193	0.000
60.00	-13.414	-15.883	0.000	0.000	0.000	-583.747	-14.521	0.000	14.521	-2.408	0.000
65.00	-13.047	-15.127	0.000	0.000	0.000	-516.680	-17.154	0.000	17.154	-2.615	0.000
70.00	-12.676	-14.393	0.000	0.000	0.000	-451.444	-19.998	0.000	19.998	-2.812	0.000
75.00	-12.289	-13.691	0.000	0.000	0.000	-388.064	-23.043	0.000	23.043	-2.998	0.000
77.00	-12.144	-13.408	0.000	0.000	0.000	-363.487	-24.314	0.000	24.314	-3.071	0.000
80.00	-11.897	-12.827	0.000	0.000	0.000	-327.056	-26.277	0.000	26.277	-3.174	0.000
80.75	-11.850	-12.670	0.000	0.000	0.000	-318.133	-26.778	0.000	26.778	-3.200	0.000
85.00	-11.543	-12.245	0.000	0.000	0.000	-267.769	-29.687	0.000	29.687	-3.333	0.000
90.00	-11.181	-11.759	0.000	0.000	0.000	-210.054	-33.297	0.000	33.297	-3.551	0.000
95.00	-10.809	-11.299	0.000	0.000	0.000	-154.149	-37.116	0.000	37.116	-3.733	0.000
98.00	-9.697	-9.289	0.000	0.000	0.000	-121.723	-39.491	0.000	39.491	-3.824	0.000
99.00	-8.224	-8.504	0.000	0.000	0.000	-112.026	-40.294	0.000	40.294	-3.851	0.000
100.00	-8.151	-8.430	0.000	0.000	0.000	-103.802	-41.104	0.000	41.104	-3.877	0.000
101.00	-7.541	-7.863	0.000	0.000	0.000	-95.651	-41.918	0.000	41.918	-3.901	0.000
105.00	-7.244	-7.581	0.000	0.000	0.000	-65.486	-45.221	0.000	45.221	-3.981	0.000
108.00	-4.272	-4.430	0.000	0.000	0.000	-43.753	-47.736	0.000	47.736	-4.025	0.000
110.00	-4.126	-4.305	0.000	0.000	0.000	-35.210	-49.426	0.000	49.426	-4.047	0.000
115.00	-3.762	-4.004	0.000	0.000	0.000	-14.578	-53.684	0.000	53.684	-4.084	0.000
118.00	-3.467	0.000	0.000	0.000	0.000	-3.291	0.000	0.000	56.252	-4.093	0.000

## Resulting Stresses

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

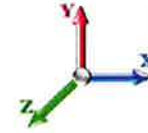
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**Load Case:** 73.61 mph Wind with 0.5" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 23

### Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.58	0.73	0.00	0.00	0.00	38.45	26.39	52.0	0.508
5.00	0.57	0.73	0.00	0.00	0.00	25.77	25.77	52.0	0.495
6.50	0.56	0.73	0.00	0.00	0.00	25.58	26.14	52.0	0.503
10.00	0.56	0.73	0.00	0.00	0.00	37.11	37.69	52.0	0.725
15.00	0.54	0.73	0.00	0.00	0.00	36.36	36.92	52.0	0.710
20.00	0.53	0.74	0.00	0.00	0.00	35.55	36.10	52.0	0.694
25.00	0.52	0.74	0.00	0.00	0.00	34.67	35.22	52.0	0.677
30.00	0.51	0.74	0.00	0.00	0.00	33.73	34.26	52.0	0.659
35.00	0.50	0.74	0.00	0.00	0.00	32.70	33.22	52.0	0.639
40.00	0.49	0.74	0.00	0.00	0.00	31.59	32.10	52.0	0.617
40.75	0.49	0.75	0.00	0.00	0.00	31.42	31.93	52.0	0.614
45.00	0.54	0.88	0.00	0.00	0.00	34.90	35.48	52.0	0.682
50.00	0.53	0.88	0.00	0.00	0.00	33.37	33.93	52.0	0.653
55.00	0.52	0.88	0.00	0.00	0.00	31.70	32.26	52.0	0.620
60.00	0.51	0.88	0.00	0.00	0.00	29.90	30.45	52.0	0.586
65.00	0.50	0.88	0.00	0.00	0.00	27.95	28.49	52.0	0.548
70.00	0.49	0.88	0.00	0.00	0.00	25.82	26.36	52.0	0.507
75.00	0.48	0.87	0.00	0.00	0.00	23.51	24.04	52.0	0.462
77.00	0.47	0.87	0.00	0.00	0.00	22.55	23.07	52.0	0.444
80.00	0.46	0.87	0.00	0.00	0.00	21.03	21.54	52.0	0.414
80.75	0.75	1.43	0.00	0.00	0.00	33.02	33.87	52.0	0.651
85.00	0.74	1.43	0.00	0.00	0.00	29.25	30.10	46.3	0.650
90.00	0.74	1.42	0.00	0.00	0.00	24.41	25.26	47.2	0.535
95.00	0.73	1.42	0.00	0.00	0.00	19.09	19.97	48.2	0.415
98.00	0.61	1.30	0.00	0.00	0.00	15.67	16.44	48.7	0.337
99.00	0.56	1.11	0.00	0.00	0.00	14.62	15.30	48.9	0.313
100.00	0.56	1.11	0.00	0.00	0.00	13.73	14.42	49.1	0.294
101.00	0.53	1.03	0.00	0.00	0.00	12.82	13.47	49.3	0.273
105.00	0.52	1.02	0.00	0.00	0.00	9.27	9.95	50.0	0.199
108.00	0.31	0.61	0.00	0.00	0.00	6.46	6.85	50.6	0.136
110.00	0.31	0.60	0.00	0.00	0.00	5.35	5.75	50.9	0.113
115.00	0.30	0.57	0.00	0.00	0.00	2.38	2.85	51.9	0.055
118.00	0.00	0.53	0.00	0.00	0.00	0.56	1.08	52.0	0.021

## Wind Loading - Shaft

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

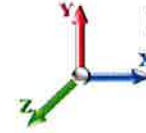
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**Load Case:** 50 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00	RB1	0.00	1.00	6.400	10.82	168.63	1.030	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		0.00	1.00	6.400	10.82	165.19	1.030	0.000	5.00	16.691	17.19	185.9	0.0	815.2
6.50	RT1	0.00	1.00	6.400	10.82	164.16	1.030	0.000	1.50	4.940	5.09	55.0	0.0	241.3
10.00		0.00	1.00	6.400	10.82	161.75	1.030	0.000	3.50	11.407	11.75	127.1	0.0	557.0
15.00		0.00	1.00	6.400	10.82	158.31	1.030	0.000	5.00	16.003	16.48	178.3	0.0	781.3
20.00		0.00	1.00	6.400	10.82	154.88	1.030	0.000	5.00	15.659	16.13	174.5	0.0	764.4
25.00		0.00	1.00	6.400	10.82	151.44	1.030	0.000	5.00	15.316	15.78	170.6	0.0	747.5
30.00		0.00	1.00	6.400	10.82	148.00	1.030	0.000	5.00	14.972	15.42	166.8	0.0	730.5
35.00		0.00	1.02	6.509	11.00	145.78	1.030	0.000	5.00	14.628	15.07	165.7	0.0	713.6
40.00		0.00	1.06	6.762	11.43	145.06	1.030	0.000	5.00	14.284	14.71	168.1	0.0	696.6
40.75	Bot - Section 2	0.00	1.06	6.798	11.49	144.91	1.030	0.000	0.75	2.113	2.18	25.0	0.0	103.0
45.00	Top - Section 1	0.00	1.09	6.993	11.82	143.93	1.030	0.000	4.25	12.049	12.41	146.7	0.0	1067.2
50.00		0.00	1.13	7.207	12.18	145.22	1.030	0.000	5.00	13.857	14.27	173.8	0.0	564.0
55.00		0.00	1.16	7.406	12.52	143.52	1.030	0.000	5.00	13.514	13.92	174.2	0.0	549.9
60.00		0.00	1.19	7.592	12.83	141.57	1.030	0.000	5.00	13.170	13.56	174.0	0.0	535.8
65.00		0.00	1.21	7.768	13.13	139.41	1.030	0.000	5.00	12.826	13.21	173.4	0.0	521.7
70.00		0.00	1.24	7.934	13.41	137.07	1.030	0.000	5.00	12.482	12.86	172.4	0.0	507.5
75.00		0.00	1.26	8.092	13.68	134.56	1.030	0.000	5.00	12.139	12.50	171.0	0.0	493.4
77.00	Bot - Section 3	0.00	1.27	8.153	13.78	133.51	1.030	0.000	2.00	4.759	4.90	67.5	0.0	193.4
80.00		0.00	1.29	8.242	13.93	131.90	1.030	0.000	3.00	7.129	7.34	102.3	0.0	460.5
80.75	Top - Section 2	0.00	1.29	8.265	13.97	131.49	1.030	0.000	0.75	1.763	1.82	25.4	0.0	113.8
85.00		0.00	1.31	8.387	14.17	130.90	1.030	0.000	4.25	9.844	10.14	143.7	0.0	241.1
90.00		0.00	1.33	8.525	14.41	128.01	1.030	0.000	5.00	11.264	11.60	167.1	0.0	275.8
95.00		0.00	1.35	8.657	14.63	125.00	1.030	0.000	5.00	10.920	11.25	164.6	0.0	267.3
98.00	Appurtenance(s)	0.00	1.36	8.735	14.76	123.15	1.030	0.000	3.00	6.387	6.58	97.1	0.0	156.3
99.00	Appurtenance(s)	0.00	1.37	8.760	14.80	122.53	1.030	0.000	1.00	2.101	2.16	32.0	0.0	51.4
100.00		0.00	1.37	8.785	14.85	121.90	1.030	0.000	1.00	2.088	2.15	31.9	0.0	51.1
101.00	Appurtenance(s)	0.00	1.38	8.810	14.89	121.26	1.030	0.000	1.00	2.074	2.14	31.8	0.0	50.7
105.00		0.00	1.39	8.908	15.06	118.69	1.030	0.000	4.00	8.158	8.40	126.5	0.0	199.6
108.00	Appurtenance(s)	0.00	1.40	8.980	15.18	116.73	1.030	0.000	3.00	5.974	6.15	93.4	0.0	146.1
110.00		0.00	1.41	9.028	15.26	115.40	1.030	0.000	2.00	3.914	4.03	61.5	0.0	95.7
115.00		0.00	1.43	9.143	15.45	112.03	1.030	0.000	5.00	9.545	9.83	151.9	0.0	233.4
118.00	Appurtenance(s)	0.00	1.44	9.211	15.57	109.97	1.030	0.000	3.00	5.562	5.73	89.2	0.0	136.0
<b>Totals:</b>									<b>118.00</b>			<b>3,988.6</b>		<b>13,062.1</b>



## Discrete Appurtenance Forces

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

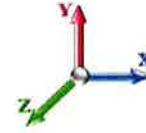
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**Load Case:** 50 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa Factor	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	118.00	APXVC-120	3	9.255	15.641	0.83	20.57	171.00	0.000	2.000	321.69	0.00	643.38
2	118.00	800 MHz RRH	3	9.255	15.641	0.50	3.74	159.00	0.000	2.000	58.42	0.00	116.84
3	118.00	ACU-A20-N	4	9.255	15.641	0.79	0.44	4.00	0.000	2.000	6.92	0.00	13.84
4	118.00	ALU - External Notch Filters	3	9.255	15.641	0.69	1.61	26.40	0.000	2.000	25.25	0.00	50.51
5	118.00	TD-RRH8x20-25	3	9.255	15.641	0.69	9.77	210.00	0.000	2.000	152.82	0.00	305.63
6	118.00	APXVSP18-C-A20	3	9.255	15.641	0.83	20.57	171.00	0.000	2.000	321.69	0.00	643.38
7	118.00	Platform w/ Hand Rails	1	9.211	15.566	1.00	40.00	2000.00	0.000	0.000	622.63	0.00	0.00
8	118.00	RRU	3	9.255	15.641	0.50	7.08	210.00	0.000	2.000	110.74	0.00	221.47
9	108.00	RRUS 11	6	8.980	15.177	0.76	13.41	304.20	0.000	0.000	203.47	0.00	0.00
10	108.00	REC/RET	3	8.980	15.177	0.69	5.32	150.00	0.000	0.000	80.74	0.00	0.00
11	108.00	P65-16-XLH-RR	3	8.980	15.177	0.85	21.42	159.00	0.000	0.000	325.09	0.00	0.00
12	108.00	Low Profile Platform	1	8.980	15.177	1.00	20.00	1500.00	0.000	0.000	303.54	0.00	0.00
13	108.00	LGP21401	6	8.980	15.177	0.50	3.78	114.00	0.000	0.000	57.37	0.00	0.00
14	108.00	DC6-48-60-18-8F	1	8.980	15.177	0.75	1.10	31.80	0.000	0.000	16.73	0.00	0.00
15	108.00	800-10121	3	8.980	15.177	0.79	12.92	132.30	0.000	0.000	196.03	0.00	0.00
16	101.00	RRH2X60-AWS	3	8.810	14.889	0.50	6.00	180.00	0.000	0.000	89.33	0.00	0.00
17	101.00	RRH2X60-700	3	8.810	14.889	0.50	6.00	180.00	0.000	0.000	89.33	0.00	0.00
18	101.00	DB-T1-6Z-8AB-0Z	1	8.810	14.889	0.71	3.98	18.90	0.000	0.000	59.20	0.00	0.00
19	99.00	SBNHH-1D65A	6	8.760	14.804	0.83	31.67	201.00	0.000	0.000	468.89	0.00	0.00
20	99.00	LNX-6514DS-VTM	3	8.760	14.804	0.80	19.99	99.30	0.000	0.000	295.97	0.00	0.00
21	99.00	BXA-171063-12BF	3	8.760	14.804	0.84	11.92	45.00	0.000	0.000	176.46	0.00	0.00
22	98.00	Low Profile Platform	1	8.735	14.761	1.00	20.00	1500.00	0.000	0.000	295.23	0.00	0.00
<b>Totals:</b>								<b>7,566.90</b>			<b>4,277.54</b>		

## Total Applied Force Summary

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

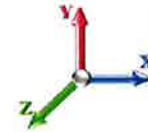
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**Load Case:** 50 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		185.94	924.73	0.00	0.00
6.50		55.04	274.11	0.00	0.00
10.00		127.08	633.67	0.00	0.00
15.00		178.28	890.83	0.00	0.00
20.00		174.45	873.88	0.00	0.00
25.00		170.62	856.93	0.00	0.00
30.00		166.79	839.98	0.00	0.00
35.00		165.73	823.03	0.00	0.00
40.00		168.13	806.08	0.00	0.00
40.75		25.00	119.45	0.00	0.00
45.00		146.67	1160.21	0.00	0.00
50.00		173.84	673.51	0.00	0.00
55.00		174.20	659.38	0.00	0.00
60.00		174.05	645.26	0.00	0.00
65.00		173.42	631.13	0.00	0.00
70.00		172.39	617.01	0.00	0.00
75.00		170.98	602.88	0.00	0.00
77.00		67.54	237.20	0.00	0.00
80.00		102.29	526.17	0.00	0.00
80.75		25.36	130.27	0.00	0.00
85.00		143.71	334.11	0.00	0.00
90.00		167.14	385.24	0.00	0.00
95.00		164.56	376.76	0.00	0.00
98.00	(1) appurtenances	392.34	1721.99	0.00	0.00
99.00	(12) appurtenances	973.36	418.62	0.00	0.00
100.00		31.93	59.40	0.00	0.00
101.00	(7) appurtenances	269.67	437.96	0.00	0.00
105.00		126.51	232.85	0.00	0.00
108.00	(23) appurtenances	1276.36	2562.38	0.00	0.00
110.00		61.51	103.36	0.00	0.00
115.00		151.91	252.46	0.00	0.00
118.00	(23) appurtenances	1709.33	3098.81	0.00	1995.05
	<b>Totals:</b>	<b>8,266.13</b>	<b>22,909.66</b>	<b>0.00</b>	<b>1,995.05</b>

## Resulting Forces and Deflections

**Structure:** CT46133-A-SB  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

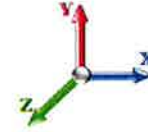
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**Load Case:** 50 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 22

Elev (ft)	Lateral FX (-) (kips)	Axial FY (-) (kips)	Lateral FZ (kips)	Moment MX (ft-kips)	Torsion MY (ft-kips)	Moment MZ (ft-kips)	Deflect X (in)	Deflect Z (in)	Deflect Resultant (in)	Rotation Sway (deg)	Rotation Twist (deg)
0.00	-8.280	-22.904	0.000	0.000	0.000	-728.589	0.000	0.000	0.000	0.000	0.000
5.00	-8.111	-21.973	0.000	0.000	0.000	-687.190	-0.038	0.000	0.038	-0.072	0.000
6.50	-8.070	-21.694	0.000	0.000	0.000	-675.024	-0.065	0.000	0.065	-0.094	0.000
10.00	-7.969	-21.050	0.000	0.000	0.000	-646.781	-0.153	0.000	0.153	-0.145	0.000
15.00	-7.824	-20.146	0.000	0.000	0.000	-606.934	-0.359	0.000	0.359	-0.246	0.000
20.00	-7.679	-19.259	0.000	0.000	0.000	-567.816	-0.671	0.000	0.671	-0.348	0.000
25.00	-7.535	-18.390	0.000	0.000	0.000	-529.421	-1.091	0.000	1.091	-0.450	0.000
30.00	-7.392	-17.539	0.000	0.000	0.000	-491.746	-1.616	0.000	1.616	-0.551	0.000
35.00	-7.247	-16.705	0.000	0.000	0.000	-454.787	-2.247	0.000	2.247	-0.652	0.000
40.00	-7.085	-15.894	0.000	0.000	0.000	-418.554	-2.983	0.000	2.983	-0.751	0.000
40.75	-7.072	-15.769	0.000	0.000	0.000	-413.241	-3.103	0.000	3.103	-0.767	0.000
45.00	-6.932	-14.600	0.000	0.000	0.000	-383.187	-3.824	0.000	3.824	-0.851	0.000
50.00	-6.772	-13.917	0.000	0.000	0.000	-348.528	-4.767	0.000	4.767	-0.948	0.000
55.00	-6.611	-13.249	0.000	0.000	0.000	-314.668	-5.817	0.000	5.817	-1.054	0.000
60.00	-6.447	-12.595	0.000	0.000	0.000	-281.614	-6.977	0.000	6.977	-1.158	0.000
65.00	-6.280	-11.957	0.000	0.000	0.000	-249.381	-8.244	0.000	8.244	-1.258	0.000
70.00	-6.112	-11.335	0.000	0.000	0.000	-217.979	-9.613	0.000	9.613	-1.353	0.000
75.00	-5.938	-10.730	0.000	0.000	0.000	-187.418	-11.079	0.000	11.079	-1.443	0.000
77.00	-5.873	-10.490	0.000	0.000	0.000	-175.541	-11.691	0.000	11.691	-1.478	0.000
80.00	-5.762	-9.963	0.000	0.000	0.000	-157.924	-12.636	0.000	12.636	-1.528	0.000
80.75	-5.740	-9.830	0.000	0.000	0.000	-153.602	-12.877	0.000	12.877	-1.540	0.000
85.00	-5.601	-9.491	0.000	0.000	0.000	-129.208	-14.278	0.000	14.278	-1.605	0.000
90.00	-5.439	-9.102	0.000	0.000	0.000	-101.202	-16.017	0.000	16.017	-1.710	0.000
95.00	-5.272	-8.725	0.000	0.000	0.000	-74.010	-17.857	0.000	17.857	-1.797	0.000
98.00	-4.829	-7.014	0.000	0.000	0.000	-58.194	-19.001	0.000	19.001	-1.841	0.000
99.00	-3.844	-6.626	0.000	0.000	0.000	-53.365	-19.388	0.000	19.388	-1.854	0.000
100.00	-3.812	-6.567	0.000	0.000	0.000	-49.521	-19.778	0.000	19.778	-1.866	0.000
101.00	-3.531	-6.136	0.000	0.000	0.000	-45.709	-20.170	0.000	20.170	-1.878	0.000
105.00	-3.399	-5.906	0.000	0.000	0.000	-31.588	-21.760	0.000	21.760	-1.916	0.000
108.00	-2.039	-3.387	0.000	0.000	0.000	-21.389	-22.972	0.000	22.972	-1.937	0.000
110.00	-1.975	-3.286	0.000	0.000	0.000	-17.312	-23.786	0.000	23.786	-1.948	0.000
115.00	-1.815	-3.038	0.000	0.000	0.000	-7.439	-25.837	0.000	25.837	-1.967	0.000
118.00	-1.709	0.000	0.000	0.000	0.000	-1.995	0.000	0.000	27.075	-1.972	0.000



## Resulting Stresses

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

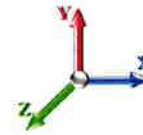
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**Load Case:** 50 mph Wind with 0" Ice

**Dead Load Factor** 1.00  
**Wind Load Factor** 1.00



**Iterations:** 22

### Applied Stresses

Elev (ft)	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvt Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	fb Combined (ksi)	Fb Allow Stress (ksi)	f/Fb Stress Ratio
0.00	0.47	0.35	0.00	0.00	0.00	18.44	12.65	52.0	0.243
5.00	0.46	0.35	0.00	0.00	0.00	12.36	12.36	52.0	0.238
6.50	0.46	0.35	0.00	0.00	0.00	12.27	12.73	52.0	0.245
10.00	0.45	0.35	0.00	0.00	0.00	17.81	18.27	52.0	0.351
15.00	0.44	0.35	0.00	0.00	0.00	17.46	17.91	52.0	0.344
20.00	0.43	0.35	0.00	0.00	0.00	17.08	17.52	52.0	0.337
25.00	0.42	0.35	0.00	0.00	0.00	16.66	17.10	52.0	0.329
30.00	0.41	0.35	0.00	0.00	0.00	16.22	16.64	52.0	0.320
35.00	0.40	0.36	0.00	0.00	0.00	15.73	16.15	52.0	0.311
40.00	0.39	0.36	0.00	0.00	0.00	15.20	15.61	52.0	0.300
40.75	0.39	0.36	0.00	0.00	0.00	15.12	15.53	52.0	0.299
45.00	0.43	0.42	0.00	0.00	0.00	16.81	17.26	52.0	0.332
50.00	0.43	0.42	0.00	0.00	0.00	16.08	16.52	52.0	0.318
55.00	0.42	0.42	0.00	0.00	0.00	15.29	15.72	52.0	0.302
60.00	0.41	0.42	0.00	0.00	0.00	14.43	14.85	52.0	0.286
65.00	0.40	0.42	0.00	0.00	0.00	13.49	13.90	52.0	0.267
70.00	0.39	0.42	0.00	0.00	0.00	12.47	12.87	52.0	0.248
75.00	0.38	0.42	0.00	0.00	0.00	11.36	11.75	52.0	0.226
77.00	0.37	0.42	0.00	0.00	0.00	10.89	11.28	52.0	0.217
80.00	0.36	0.42	0.00	0.00	0.00	10.15	10.54	52.0	0.203
80.75	0.58	0.69	0.00	0.00	0.00	15.95	16.57	52.0	0.319
85.00	0.58	0.69	0.00	0.00	0.00	14.11	14.74	46.3	0.318
90.00	0.57	0.69	0.00	0.00	0.00	11.76	12.39	47.2	0.262
95.00	0.56	0.69	0.00	0.00	0.00	9.16	9.80	48.2	0.203
98.00	0.46	0.65	0.00	0.00	0.00	7.49	8.03	48.7	0.165
99.00	0.44	0.52	0.00	0.00	0.00	6.96	7.46	48.9	0.152
100.00	0.44	0.52	0.00	0.00	0.00	6.55	7.04	49.1	0.143
101.00	0.41	0.48	0.00	0.00	0.00	6.13	6.59	49.3	0.134
105.00	0.41	0.48	0.00	0.00	0.00	4.47	4.95	50.0	0.099
108.00	0.24	0.29	0.00	0.00	0.00	3.16	3.43	50.6	0.068
110.00	0.24	0.29	0.00	0.00	0.00	2.63	2.91	50.9	0.057
115.00	0.23	0.27	0.00	0.00	0.00	1.22	1.52	51.9	0.029
118.00	0.00	0.26	0.00	0.00	0.00	0.34	0.57	52.0	0.011

## Final Analysis Summary

**Structure:** CT46133-A-SBA  
**Site Name:** Shelton-north  
**Height:** 118.00 (ft)  
**Base Elev:** 0.000 (ft)

**Code:** EIA/TIA-222-F  
**Exposure:** C  
**Gh:** 1.69  
**Struct Class:** II

6/28/2016

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### Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
85 mph Wind with 0" Ice	23.9	0.00	22.87	0.00	0.00	2102.89
73.61 mph Wind with 0.5" Ice	17.4	0.00	27.96	0.00	0.00	1519.47
50 mph Wind with 0" Ice	8.3	0.00	22.90	0.00	0.00	728.59

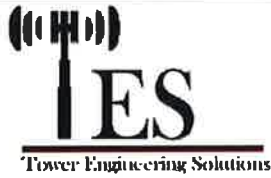
### Max Stresses

Load Case	fa Axial (Y) (ksi)	fvx Shear (X) (ksi)	fvz Shear (Z) (ksi)	fvT Torsion (ksi)	fbx Bending (X) (ksi)	fbz Bending (Z) (ksi)	Combined Stress (ksi)	Allowable Stress (ksi)	Elev (ft)	Stress Ratio
85 mph Wind with 0" Ice	0.45	1.01	0.00	0.00	0.00	51.39	51.87	52.0	10.00	0.998
73.61 mph Wind with 0.5" Ice	0.56	0.73	0.00	0.00	0.00	37.11	37.69	52.0	10.00	0.725
50 mph Wind with 0" Ice	0.45	0.35	0.00	0.00	0.00	17.81	18.27	52.0	10.00	0.351

### Additional Steel Summary

└ Intermediate Connectors ┘
└ Upper Termination ┘
└ Lower Termination ┘
└ Max Member ───

Elev From (ft)	Elev To (ft)	Member	VQ/I (lb/in)	V (kips)	Shear Allow (kips)	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Num Reqd	Num Actual	MQ/I (kips)	Ta (kips)	Pa (kips)	Ratio
0.0	6.5	(4) PLT-6"x1.5"(1.25" Hole)	245.3	4.42	33.0	245.8	8	11	254.4	0	11	254.4	308.7	338.5	0.751



# Monopole Mat Foundation Design

Date	6/24/2016
Customer Name:	SBA Communications Corp
Site Name:	Shelton-North
Site Number:	CT46133-A-SBA
Engr. Number:	N/A23557
EIA/TIA Standard:	EIA-222-F
Structure Height (Ft.):	118
Engineer Name:	H. You
Engineer Login ID:	JES

### Foundation Info Obtained from:

Structure Type:

Analysis or Design?

Base Reactions (Unfactored)

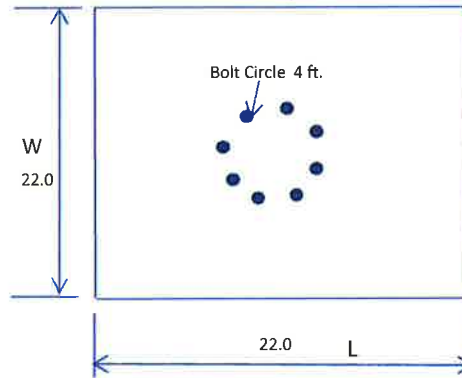
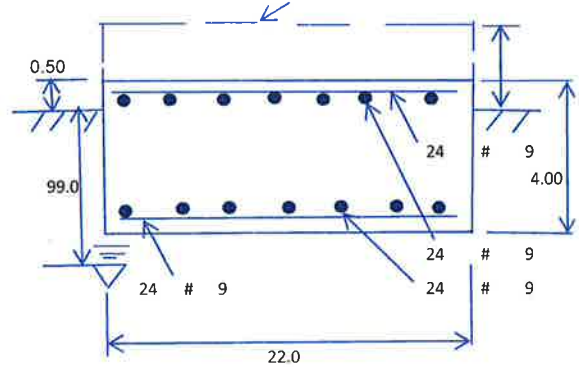
Axial Load (Kips):	22.9	Shear Force (Kips):	23.9
Uplift Force (Kips):	0.0	Moment (Kips-ft):	2102.9

### Foundation Geometries:

Anchor Bolt Circle (ft.):	4.00	Depth of Base BG (ft.):	3.50
Thickness of Pad (ft):	4.00	Width of Pad (ft.):	22
Length of Pad (ft.):	22	Final Length of pad (ft)	22.0
		Final width of pad (ft):	22.0

### Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Pad Rebar Yield (Ksi):	60	Tie Spacing (in):	6.0	
Pad Steel Rebar Size (#):	9	Unit Weight of Concrete:	150.0	pcf
Concrete Cover (in.):	3			
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	24	Qty. of Rebar in Pad (W):	24	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	24	Qty. of Rebar in Pad (W):	24	



### Soil Design Parameters:

Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Allowable Net Soil Bearing (psf):	6000	Allowable Skin Friction:		Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00			

### Foundation Analysis and Design:

Total Dry Soil Volume (cu. Ft.):	0.00	Total Dry Soil Weight (Kips):	0.00
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	0.00	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	1936.00	Total Dry Concrete Weight (Kips):	290.40
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	290.40	Total Vertical Load on Base (Kips):	313.27

### Check Soil Capacities:

Calculated Maxium Net Soil Pressure under the base (psf):	3007	<	Allowable Soil Bearing (psf):	6000	0.50	OK!
Allowable Foundation Overturning Resistance (SF=1.5, kips-ft.):	2297.3	>	Applied Momont (kips-ft):	2200	0.96	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.57					OK!

Load/  
Capacity  
Ratio

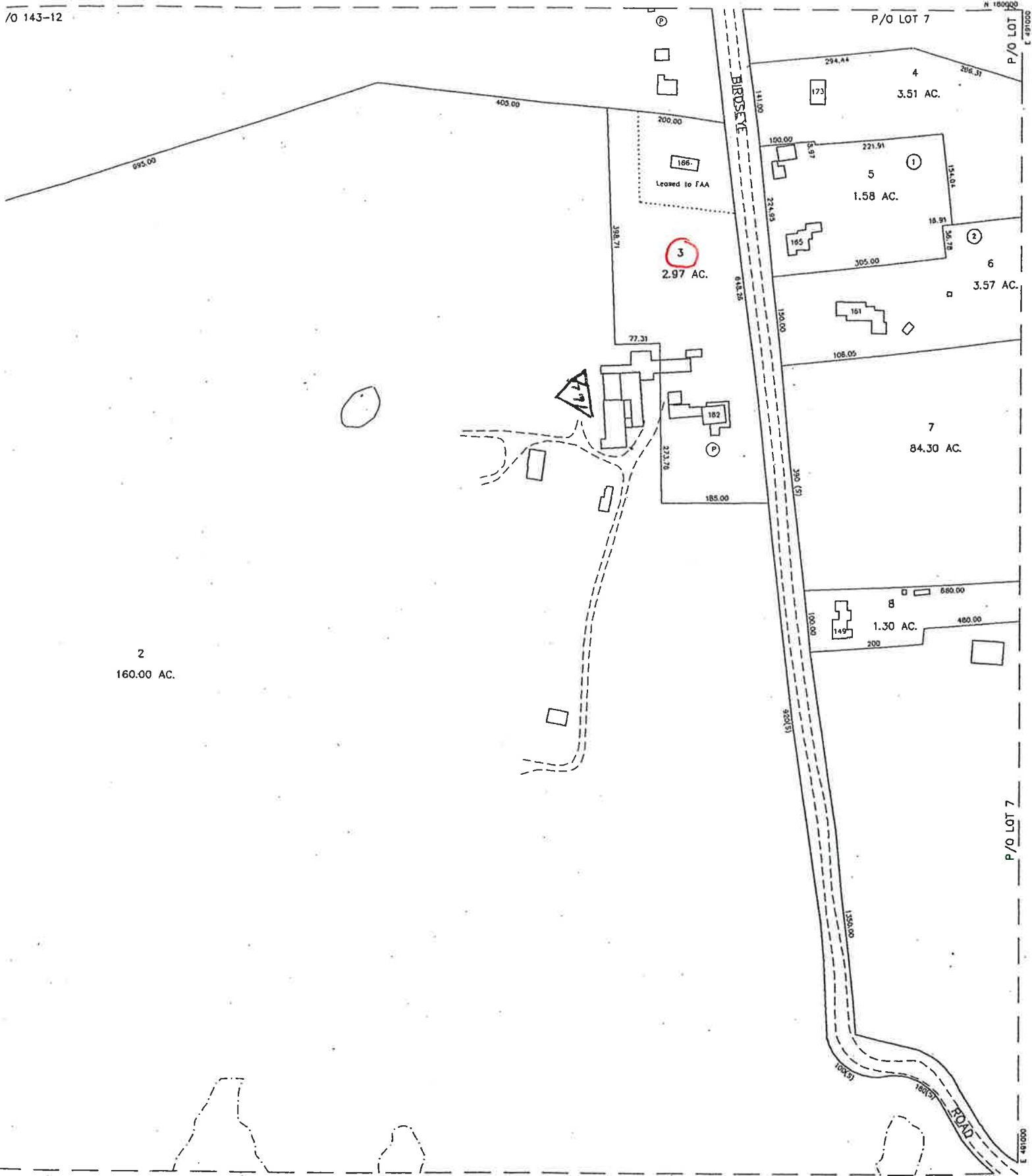
**Check the capacities of Reinforcing Concrete:**

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.30

**Concrete Pad:**

One-Way Design Shear Capacity (L-Direction, Kips):	963.8	>	One-Way Factored Shear (L-D. Kips):	239.0	0.25	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	963.8	>	One-Way Factored Shear (W-D., Kips):	239.0	0.25	OK!
One-Way Design Shear Capacity (Corner-Corner, Kips):	1165.9	>	One-Way Factored Shear (C-C, Kips):	487.1	0.42	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct. ):	0.0020	OK!	Lower Steel Pad Reinf. Ratio (W-Direct	0.0020		
Lower Steel Pad Moment Capacity (L-Direction, Kips-ft):	4683.7	>	Moment at Bottom ( L-Direct. K-Ft):	464.0	0.10	OK!
Lower Steel Pad Moment Capacity (W-Direction, Kips-ft):	4683.7	>	Moment at Bottom ( W-Direct. K-Ft):	464.0	0.10	OK!
Lower Steel Pad Moment Capacity (Corner-Corner, K-ft):	6596.2	>	Moment at Bottom ( C-C Dir. K-Ft):	656.2	0.10	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct. ):	0.0020	OK!	Upper Steel Reinf. Ratio (W-Direct. ):	0.0020		
Upper Steel Pad Moment Capacity (L-Direction, Kips-ft):	4683.7	>	Moment at the top (L-Dir Kips-Ft):	329.3	0.07	OK!
Upper Steel Pad Moment Capacity (W-Direction, Kips-ft):	4683.7	>	Moment at the top (W-Dir Kips-Ft):	329.3	0.07	OK!
Upper Steel Pad Moment Capacity (Corner-Corner, K-ft):	6596.2	>	Moment at the top (C-C Direc. K-Ft):	586.7	0.09	OK!

# **ATTACHMENT 4**



2  
160.00 AC.

3  
2.97 AC.

4  
3.51 AC.

5  
1.58 AC.

6  
3.57 AC.

7  
84.30 AC.

8  
1.30 AC.

ZONE R-1

REVISION 8/23/02  
LAST LOT # 9

133 134 135

124

143

**CITY OF SHELTON REAL PROPERTY DATA**

PROPERTY LOCATION	ASSRS MAP - LOT	SURVEY MAP - LOT	ZONE	CENSUS TRACT	MBHD	SITE	CARD	RUNDATE	SIDE
162 BIRDSEYE RD	134.-3		R-1	1106.	12030	01		07/13/2015	1
CURRENT OWNER									
NAME 1 - HUDAK RUDOLPH&KAREN E MCGUIRE									
NAME 2 - TRS ROBERTA G HUDAK FAM TRUST									
ADDRESS - 162 BIRDSEYE RD									
ADDRESS - SHELTON CT									
ZIP - 06484									
OWNER HISTORY									
NAME	VOL	PAGE	DATE	SALE PRICE	VALID	DEED TYP			
HUDAK RUDOLPH&KAREN E MCGUIRE	2651	94	02/06/2006		N	N			
HUDAK RUDOLPH & KAREN E TRS OF	2416	203	08/10/2004		N	Q			
HUDAK RUDOLPH & KAREN E T	2416	201	08/10/2004		N	Q			
HUDAK RUDOLPH & KAREN E T	2369	93	05/05/2004		N	C			
HUDAK RUDOLPH & EST OF	1970	313	07/24/2002		N	P			
HUDAK RUDOLPH & ROBERTA G	1543	123	10/06/1998		N	Q			
HUDAK RUDOLPH	263	992	00/00/0 00		N				

LAND TYPE	ACREAGE	INFL CODE	INFL FACT	USE CODE	UNIT PRICE	FULL VALUE	ASSESSED
PRIME SITE	.92			1-1	101020.00	101020	70714
RESIDUAL	2.05	OTHER	.75	1-2	24450.00	37592	26314
TOTAL						138612	97020

LAND DESCRIPTION DATA	
SBHD TYPE	NOTES
RESIDENTIAL	TELECOMMUNICATIONS TOWERS ON PROPERTY
LOCAL	TELECOM BLDG OWNED BY FAA
LIGHT	
30' TO 60'	
AVERAGE	
EVEN	
NO	
PRIVATE	
ELECTRIC	
TYPICAL	
TYPICAL	
PAVED	

PROPERTY CLASSIFICATION CODES	USE ASSESSMENT
1-1 LAND	6-1 FARM
1-2 EXCESS ACREAGE	6-2 FOREST
1-3 DWELLINGS	6-3 OPEN SPACE
1-4 OUTBUILDINGS	6-4 OUTBUILDINGS
1-5 CONDOMINIUMS	6-5 WATER SUPPLY

PROPERTY CLASSIFICATION CODES	USE ASSESSMENT
1-6 MOBILE MFG HOMES	5-1 RESIDENTIAL LAND
1-7 CONDO OPTIONS	5-2 COMMERCIAL LAND
1-8 MIXED - USE	5-3 INDUSTRIAL LAND
	5-4 WETLANDS
	5-5 OUTBUILDINGS

PROPERTY CLASSIFICATION CODES	USE ASSESSMENT
PUBLIC UTILITY	4- VACANT LAND
4-1 LAND	5-1 RESIDENTIAL LAND
4-2 BUILDINGS	5-2 COMMERCIAL LAND
4-3 OUTBUILDINGS	5-3 INDUSTRIAL LAND
	5-4 WETLANDS
	5-5 OUTBUILDINGS

PROPERTY CLASSIFICATION CODES	USE ASSESSMENT
6-1 FARM	
6-2 FOREST	
6-3 OPEN SPACE	
6-4 OUTBUILDINGS	
6-5 WATER SUPPLY	

ASSESSMENT INFORMATION				
YEAR	CLASS	UNITS	FULL VALUE	ASSESSED
2011	1-1	1.00	101008	70710
	1-2	2.05	37592	26310
	1-3	1.00	196680	137680
	1-4	5.00	27020	18910
TOTAL			362300	253610
2006	1-1	1.00	160009	112010
	1-2	2.05	51491	36040
	1-3	1.00	216320	151420
	1-4	5.00	29780	20850
TOTAL			457600	320320
2004	1-1	1.00	104544	73180
	1-2	2.05	33656	23560
	1-3	1.00	133030	93120
	1-4	5.00	18370	12860
TOTAL			289600	202720

COST CALCULATIONS					
ITEM	MEAS1	MEAS2	UNIT	RATE	RCN
UNFN FULL	330		SQFT X	61.75-	\$20,380-
UNFN HALF	566		SQFT X	16.47	\$9,327
BASMT AREA	1131		SQFT X	34.37	\$38,875
FIN HALF	1		SQFT X	85.70	\$86
SEC STORY	1131		SQFT X	107.60	\$121,703
FRST STORY	1275		SQFT X	145.80	\$185,901
#F BATHS	1		QTY X	9,037	\$9,038
TOTALS =(RCN=	344,550		)*(GOOD=	60%)*(RCNLD	206,731 )
(FUNCT=100%)*(MKT	=090%)*(RCNLD		206,731 )=FINAL RCNLD=		\$186,058
TOTAL OTHER IMPRV (RCNLD)=					\$37,659
GRAND TOTAL IMPRV (RCNLD)=					\$223,717
GRAND TOTAL FOR LAND+IMPRV					\$362,300



CITY OF SHELTON REAL PROPERTY DATA

ASSRS MAP - LOT SURVEY MAP - LOT

SIDE

2

134.-3

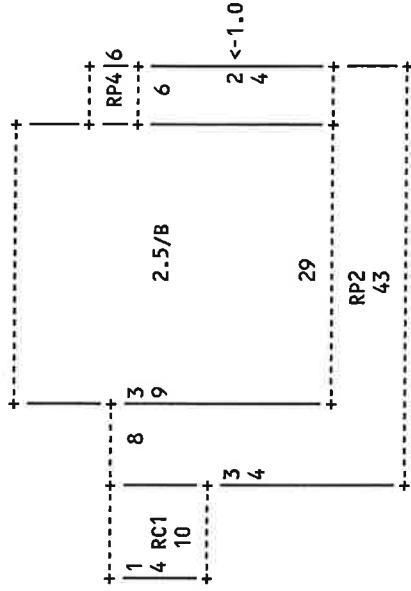
BIRDSEYE RD

BUILDING DESCRIPTION DATA

SKETCH

STYLE COLONIAL  
 USE CODE 1-3 -RES DWELLING  
 # OF FAMILIES 1  
 STORIES 2.5  
 YR BUILT 1747  
 EFF YR BUILT  
 PARTIAL CONST  
 EXTERIOR COND  
 EXTERIOR MAT  
 HEAT TYPE  
 FUEL TYPE  
 KITCHENS 1  
 # BATHS 2  
 #H BATHS 0  
 EXTRA FIXTURES 0  
 BEDROOMS 3  
 ROOMS 8  
 FIREPLC STACK  
 FIREPLC OP  
 TYP FIREPLC  
 INTERIOR COND  
 BASMT GAR OPEN  
 REMODEL YEAR  
 CLASS IV  
 CLASS MODIFIER 1.00  
 FRST STORY 1275  
 FIN HALF 1-  
 FIN TOR  
 SEC STORY 1131  
 ADD STORY  
 FIN OVGAR  
 FIN ATTIC  
 BASMT AREA 1131  
 FIN BASMT  
 REC ROOM  
 UNFN HALF  
 UNFN TOR  
 UNFN FULL  
 SFCA  
 FRVU VALUE CD  
 FTOTAL  
 ASSESSED VAL 253610

SFLA :2075



IMPROVEMENT DATA

STR/MOD-DESCR	MEASURE	DIM 1	DIM 2	QTY	CLASS	COND	YR BLT	USE CD	RCN	PCT GD	COST MOD	RENLD	ASSESSED
CARPOT	SQUARE FEE	140		1	C	3	1920	1-3	2709	60		1625	1137
PORCH, COVER	SQUARE FEE	552		1	C	3	1747	1-3	12851	60		7711	5397
PORCH, ENCLSD	SQUARE FEE	36		1	C	3	1920	1-3	2179	60		1307	914
BARN, 1.0 GEN	DIMENSIONS	36	20	1	C	2	1900	1-4	21950	25		5488	3841
COMMON WALL	QUANTITY			1	C	2	1747	1-3					
SHED, WOOD	DIMENSIONS	12	23	1	C	2	1900	1-4	4064	25		1016	711
CARPOT	DIMENSIONS	8	23	1	C	3	1985	1-4	3561	81		2884	2018
ATT GAR 1.0 ST	DIMENSIONS	20	35	1	C	3	1930	1-4	25980	60		15588	10911
TOTAL													26361

BUILDING PERMITS

NUMBER	DATE	VALUE	DESCRIPTION	C.O. DATE	COMP DATE
TOTAL					

NOTES