

October 17, 2016

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

**Re: Notice of Exempt Modification – Facility Modification
134R Creamery Road, Durham, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains nine (9) flush mounted antennas at the top of the existing 109-foot tower at 134R Creamery Road in Durham, Connecticut (the “Property”). The tower is owned by SBA Communications Corporation (“SBA”). The Council approved Cellco’s use of this tower in 2013 (Petition No. 1092). Cellco now intends to modify its facility by replacing all of its existing antennas with three (3) model SBNHH-1D65B, 700/1900 MHz antennas; three (3) model SBNHH-1D65B, 850 MHz antennas; and three (3) model SBNHH-1D65B, 2100 MHz antennas, all at the top level on the tower. Cellco also intends to replace six (6) remote radio heads (“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 notice is being sent to Laura L. Francis, First Selectwoman of the Town of Durham. A copy of this letter is also being sent to William W. Lawson, Jr., the owner of the Property and 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).

Ms. Melanie A. Bachman

October 17, 2016

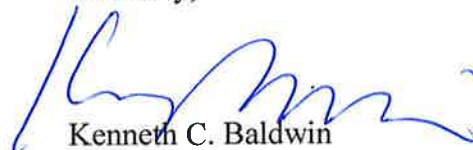
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1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco's replacement antennas will be installed at the top of the 109-foot tower.
2. The proposed modifications will not involve any change to ground-mounted 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 Town 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

KCB/vak

Enclosures

cc: Laura L. Francis, Durham First Selectwoman
William W. Lawson, Jr.
SBA Communications Corp.
Tim Parks

ATTACHMENT 1



SBNHH-1D65B

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	14.9	14.7	17.7	18.2	18.6	18.6
Beamwidth, Horizontal, degrees	68	66	69	66	63	58
Beamwidth, Vertical, degrees	12.1	10.7	5.6	5.2	5.0	4.5
Beam Tilt, degrees	0–14	0–14	0–7	0–7	0–7	0–7
USLS (First Lobe), dB	14	13	15	15	15	13
Front-to-Back Ratio at 180°, dB	27	29	28	28	28	27
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	14.5	14.3	17.4	17.9	18.2	18.3
Gain by all Beam Tilts Tolerance, dB	±0.5	±0.8	±0.4	±0.3	±0.5	±0.3
Gain by Beam Tilt, average, dBi	0° 14.6	0° 14.5	0° 17.4	0° 17.8	0° 18.1	0° 18.2
	7° 14.6	7° 14.4	3° 17.5	3° 17.9	3° 18.3	3° 18.4
	14° 14.2	14° 13.6	7° 17.4	7° 17.9	7° 18.2	7° 18.4
Beamwidth, Horizontal Tolerance, degrees	±2.2	±3.4	±2	±4.6	±5.7	±4.3
Beamwidth, Vertical Tolerance, degrees	±0.8	±1	±0.3	±0.2	±0.3	±0.2
USLS, beampeak to 20° above beampeak, dB	16	14	16	16	16	15
Front-to-Back Total Power at 180° ± 30°, dB	25	26	27	26	26	26
CPR at Boresight, dB	22	23	21	20	20	22
CPR at Sector, dB	13	11	16	12	11	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-1D65B

Radiator Material	Aluminum Low loss circuit board
Radome Material	Fiberglass, UV resistant
Reflector Material	Aluminum
RF Connector Interface	7-16 DIN Female
RF Connector Location	Bottom
RF Connector Quantity, total	6
Wind Loading, frontal	618.0 N @ 150 km/h 138.9 lbf @ 150 km/h
Wind Loading, lateral	197.0 N @ 150 km/h 44.3 lbf @ 150 km/h
Wind Loading, rear	728.0 N @ 150 km/h 163.7 lbf @ 150 km/h
Wind Speed, maximum	241 km/h 150 mph

Dimensions

Depth	180.0 mm 7.1 in
Length	1851.0 mm 72.9 in
Width	301.0 mm 11.9 in
Net Weight, without mounting kit	18.4 kg 40.6 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	2025.0 mm 79.7 in
Width	390.0 mm 15.4 in
Shipping Weight	31.0 kg 68.3 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



SBNHH-1D65B

Included Products

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

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.

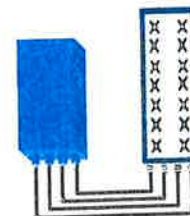


FEATURES

- 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 RRH2X60-1900A-4R FOR BAND 2/25 APPLICATIONS

The Alcatel-Lucent RRH2x60-1900A-4R is a high power, small form factor Remote Radio Head operating in the PCS 1900MHz frequency band for WCDMA and LTE technologies. 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 RRH2x60-1900A-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 RRH2x60-1900A-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.

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 RRH2x60-1900A-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).

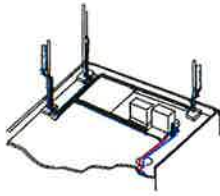
The Alcatel-Lucent RRH2x60-1900A-4R is a very cost-effective solution to deploy LTE MIMO.

EASY INSTALLATION

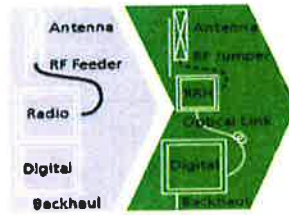
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-1900A-4R installation, providing more flexible site selection and improved network quality along with greatly reduced installation time and costs.

The Alcatel-Lucent RRH2x60-1900A-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.

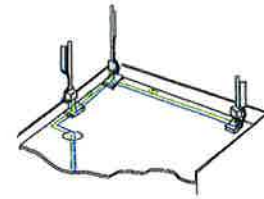
Installation can easily be done by a single person as the Alcatel-Lucent RRH2x60-190A-4R is compact and weighs about 21 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

- RRH2x60-1900A-4R integrates two power amplifiers of 60W rating (at each antenna connector)
- RRH2x60-1900A-4R can operate WCDMA only, LTE only or a mix of WCDMA and LTE
- RRH2x60-1900A-4R offers the possibility for WCDMA (non MIMO) to operate the two radio chains independently (2 blocks of 20 MHz anywhere in the band)

- RRH2x60-1900A-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 deployment and/or WCDMA and LTE simultaneous 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 : 500x285x208 mm (30l with solar shield)
- Weight : 21 kg (46 lbs) (with solar shield)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption: 460W typ. @2x60W (100%RF)

RF Characteristics

- Supported spectrum: DL 1930-1990 / UL 1850-1910
- Frequency band: 3GPP band 2/25
- Output power: 2x60W at antenna connectors
- Technology supported: W-CDMA and LTE
- Instantaneous bandwidth: 20 MHz (MIMO) or 2x20 MHz (non MIMO)
- Rx diversity: 2-way and 4-way uplink reception

- Typical sensitivity without Rx diversity: -124.8dBm for WCDMA and -105 dBm for LTE

Connectivity

- Two CPRI 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 500m using MM fiber, up to 15km using SM fiber
- TMA/RETA: AISG 2.0 (RS485 connector and internal Bias-Tee)
- Six 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: ETS300-019-1-4 class4.1E
- 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
- Safety : IEC60950-1, EN 60825-1
- Regulatory: CE Mark-European Directive 2002/95/EC (RoHS), 2002/96/EC (WEEE), 1999/5/EC (R&TTE)
- Health : EN 50385

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B66A RRH 4X45 - PHYSICAL CHARACTERISTICS- TARGET 15.1



- Commercial Product Will include B66 support of AWS 1 and 3.
- Lower AWS 3 UL Not in 3GPP Band 66 Definition

B4 RRH4x45-4R (AWS-Extension Band)	
Frequency Band	LR15.1 – B4 / LR16.1 B66 (AWS 1 and 3 only)
RF Output Power	2x90W/4x45W (SW configurable)
Operational range	2110-2180 MHz, DL/ 1710-1780 MHz UL
Instantaneous Bandwidth	70MHz
Configuration (HW readiness)	LTE: 2T2R, 2T4R, 4T4R
Carrier Bandwidths	5, 10, 15 and 20 MHz
Interfaces	2x CPRI Rate 7 Ports Antenna Connectors 4.3-10
AISG Support	AISG 2.0 for RET Internal Smart Bias T
Monitor Ports	NA (Spec An to replace ports)
Environmental	GR487 Compliance / GR3178 Compliance (with exceptions)
Mounting options	Pole/Wall
Connectors location	All bottom
External Alarms	4
Annual Return Rate (Target)	<2%
Operating Temperature	-40 C to +55 C (without solar load)

Physical Dimensions – Not to Exceed		
	W/O Solar Shield	With Solar Shield
Dimensions HxWxD	H = 26in W = 11.4in D = 5.9in (H=660mm) (W=290mm) (D=150mm)	H = 26.6in W = 12in D = 6.8in (H=675mm) (W=304mm) (D=173mm)
Volume	29l	35.5l
Weight		64lbs / 29kg



ATTACHMENT 2

ATTACHMENT 3



Tower Engineering Solutions

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

Structural Analysis Report

Existing 109 ft EEI Monopole

Customer Name: SBA Communications Corp

Customer Site Number: CT46140-A

Customer Site Name: S. Durham-rt 17/ Lawson

Carrier Name: Verizon

Carrier Site ID / Name: Durham South CT

Site Location: 134 R Creamery Road

Durham, Connecticut

MIDDLESEX County

Latitude: 41.441352

Longitude: -72.696147

Analysis Result:

Max Structural Usage: 45.1% [Pass]

Max Foundation Usage: 23% [Pass]

Report Prepared By : Jie Chen



Introduction

The purpose of this report is to summarize the analysis results on the 109 ft EEI 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

Tower Drawings	Engineered Endeavors, Inc. (Job No. 12807-E01 Rev. 1) Structure Design Calculations dated August 4, 2004
Foundation Drawing	Engineered Endeavors, Inc. (Project No. 12807) Foundation Design Calculations dated July 28, 2004
Geotechnical Report	Clarence Welti Assoc., Inc. (Project Name Sprint Site-CT33XC526) Geotechnical Study dated October 25, 2000
Modification Drawings	FDH, Project # 13TFSP1400, Dated 12/27/2013

Analysis Criteria

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

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed $V_{ult} = 126.0$ mph (3-Sec. Gust)/ Nominal Design Wind Speed $V_{asd} = 98.0$ mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2012 IBC / 2016 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	$S_s = 0.179$, $S_1 = 0.062$

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
-	108.0	6	Amphenol BXA-70063-6CF-EDIN-X	Flush Mount	(2) 1 5/8" Fiber	Verizon
-		6	Amphenol BXA-171063-12CF-EDIN-0			
-		3	Alcatel Lucent RRH2X40-AWS			
-		3	Alcatel Lucent RRH2x40-07U			
-		1	Rfs Celwave DB-B1-6C-8AB-OZ			
6	96.5	3	Andrew UMWD-06516-XD - Panel	(1) Collar Mount with 4' Side arms & Mast Pipes	(6) 1 1/4"	Sprint
7	76.0	1	GPS	(1) 6' Side Mount	(1) 1/2"	
8	78.5	1	10'x1" Omni	(1) Side Mount	(2) 1/2"	Town of Durham
9	71.7	1	3'6" x 2'6" Dipole			

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
1	108.0	9	Andrew SBNHH-1D65B - Panel	Flush Mount	(2) 1 5/8" Fiber	Verizon
2		3	Alcatel Lucent RRH 4x45-AWS			
3		3	Alcatel Lucent RRH2x60-700			
4		3	Alcatel Lucent RRH2X60-PCS			
5		2	Rfs Celwave DB-T1-6Z-8AB-OZ			

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:	35.0%	32.7%	45.1%
Pass/Fail	Pass	Pass	Pass

Foundations

	Moment (Kip-Ft)	Shear (Kips)
Original Design Reactions	2596.4	28.5
Analysis Reactions	1290.7	17.6
Factored Reactions*	3505.1	38.5
% of Design Reactions	36.8%	45.8%

* Per section 15.5.1 of the TIA-222-G standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

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-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.3319 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-222-G standards and the 2012 IBC under the design basic wind speed specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC**. Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.
2. The analysis is based on the presumption that the tower members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.
3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion.
4. An initial tension of 10% of the break strength on all the existing guy wires was assumed in all the structural analyses of guyed towers unless different values were provided by the client. **TES** cannot take responsibility for the deviations in the analysis results because of differences in the initial tension forces of the existing guy wires.
5. Secondary component or connection secondary components, welds and bolts are assumed to be able to carry their intended original design loads. **TES** cannot take responsibility for verification of the adequacy on the connections, bolts and welds present in the structure.
6. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.
7. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.
8. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.
9. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 34.96% at 0.0ft

Structure: CT46140-A-SBA
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)
Base Elev: 0.000 (ft)

Code: EIA/TIA-222-G
Exposure: C
Gh: 1.1

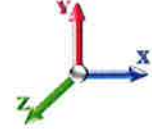
10/11/2016



Page: 1

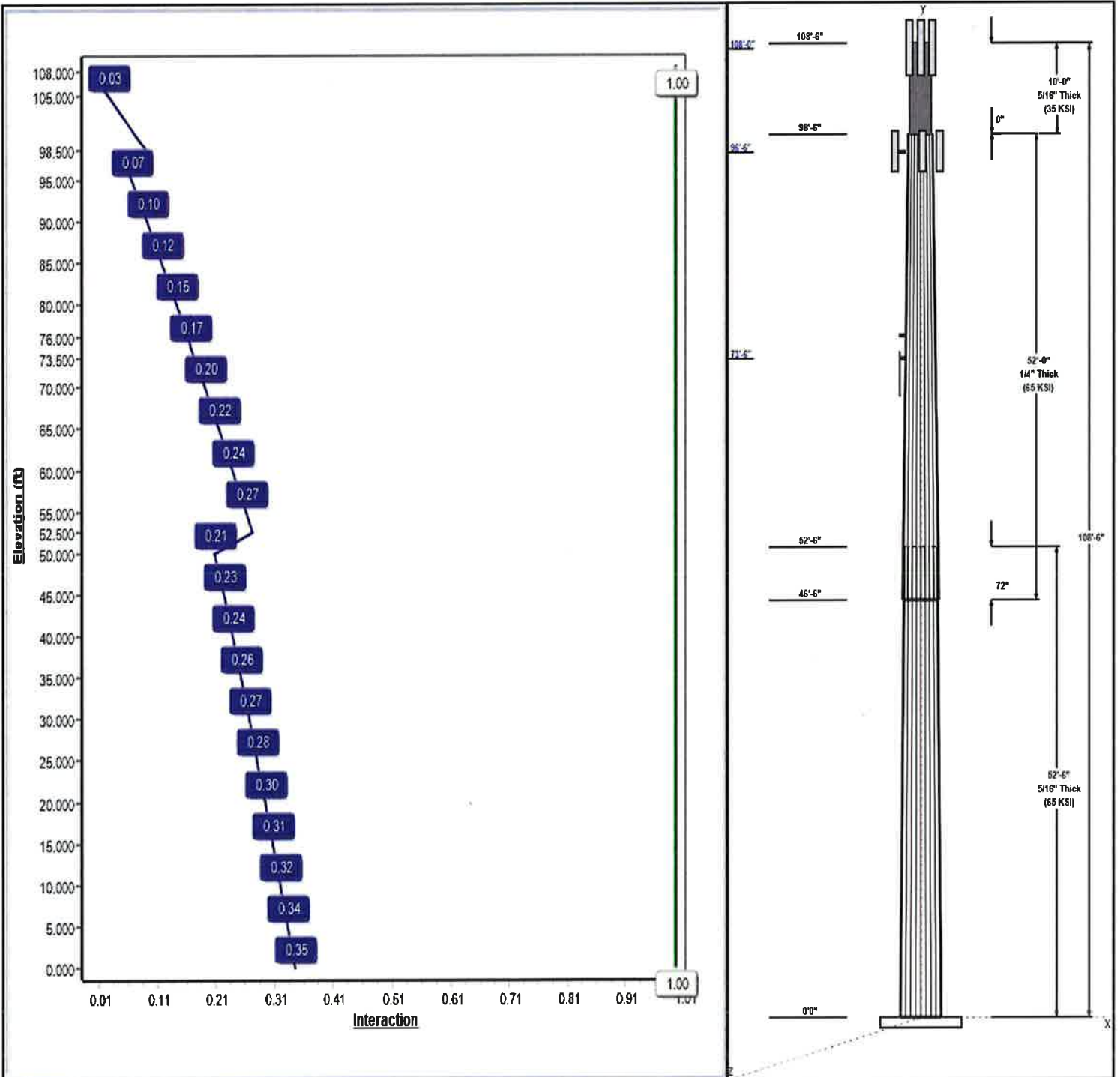
Dead Load Factor: 1.20
Wind Load Factor: 1.60

Load Case : 1.2D + 1.6W 98 mph Wind



Iterations: 18

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Structure: CT46140-A-SBA

Type: Custom
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.25659

10/11/2016



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Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	52.50	42.53	56.00	0.313		0.25659	65
2	52.00	31.23	44.57	0.250	Slip	0.25659	65
3	10.00	28.00	28.00	0.312	Butt	0.00000	35

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
108.50	108.50	1	Lightning Rod	
108.00	108.00	9	SBNHH-1D65B	Verizon
108.00	108.00	3	RRH2x60-700	Verizon
108.00	108.00	3	RRH2X60-PCS	Verizon
108.00	108.00	2	DB-T1-6Z-8AB-0Z	Verizon
108.00	108.00	1	Flush Mount	Verizon
108.00	108.00	3	RRH 4x45-AWS	Verizon
96.50	96.50	3	UMWD-06516-XD	Sprint
96.50	96.50	1	Collar Mount	Sprint
96.50	96.50	1	4 ft Sidearm	Sprint
76.00	76.00	1	GPS	Sprint
76.00	76.00	1	6 ft Sidearm	Sprint
73.50	78.50	1	10' x1" Omni	Town of Durham
73.50	71.70	1	3'6" x 2'6" Dipole	Town of Durham
73.50	73.50	1	Sidearm	Town of Durham

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	108.00	Inside	1 5/8" Fiber	Verizon
0.00	96.50	Inside	1 1/4" Coax	Sprint
0.00	76.00	Inside	1/2" Coax	Sprint
0.00	73.50	Inside	1/2" Coax	Town of Durham

Anchor Bolts

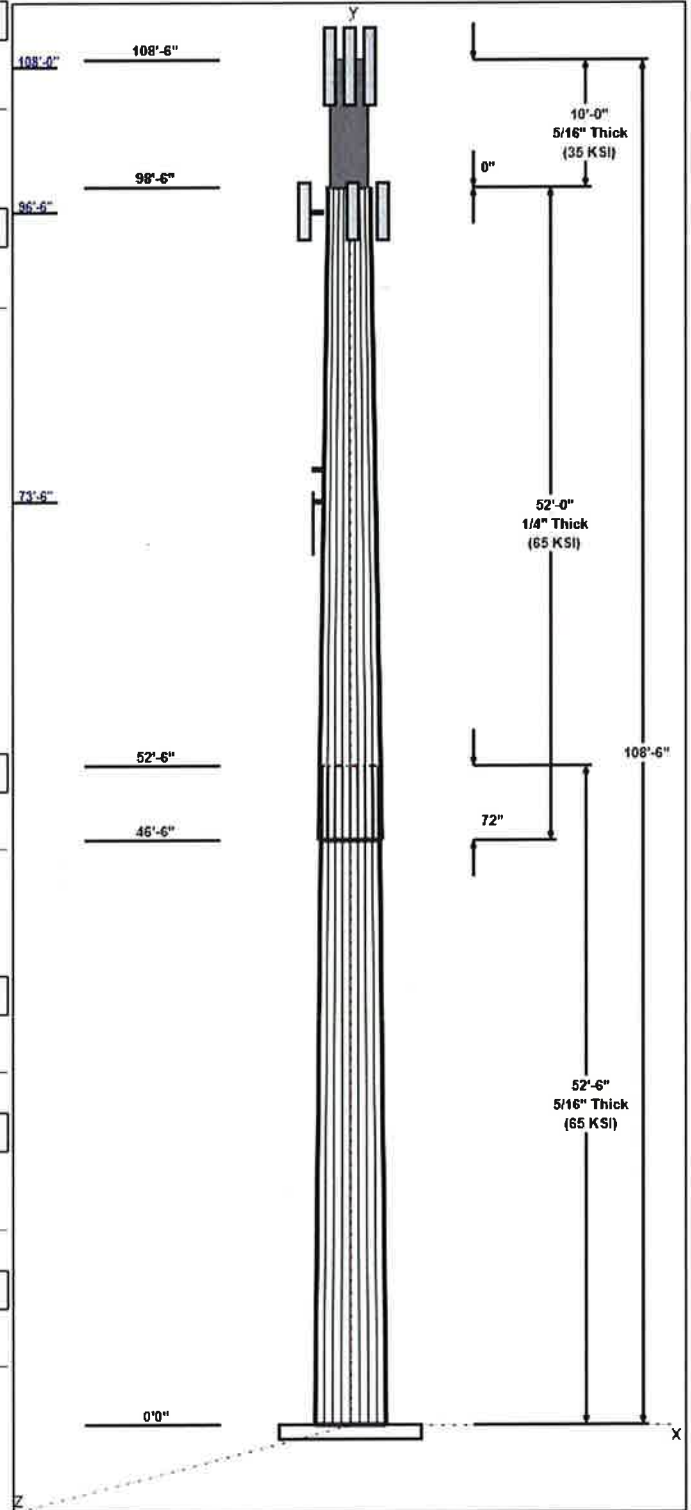
Qty	Specifications	Grade (ksi)	Arrangement
12	2.25" 18J	75.0	Radial

Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
1.5000	71.0	60.0	Round

Reactions

Load Case	Moment	Shear	Axial
1.2D + 1.6W 98 mph Wind	1290.7	17.6	20.9
0.9D + 1.6W 98 mph Wind	1287.8	17.6	15.7
1.2D + 1.0Di + 1.0Wi 50 mph Wind	357.3	5.1	33.3
1.2D + 1.0E	47.2	0.6	20.9
0.9D + 1.0E	47.1	0.6	15.7
1.0D + 1.0W 60 mph Wind	301.9	4.1	17.4



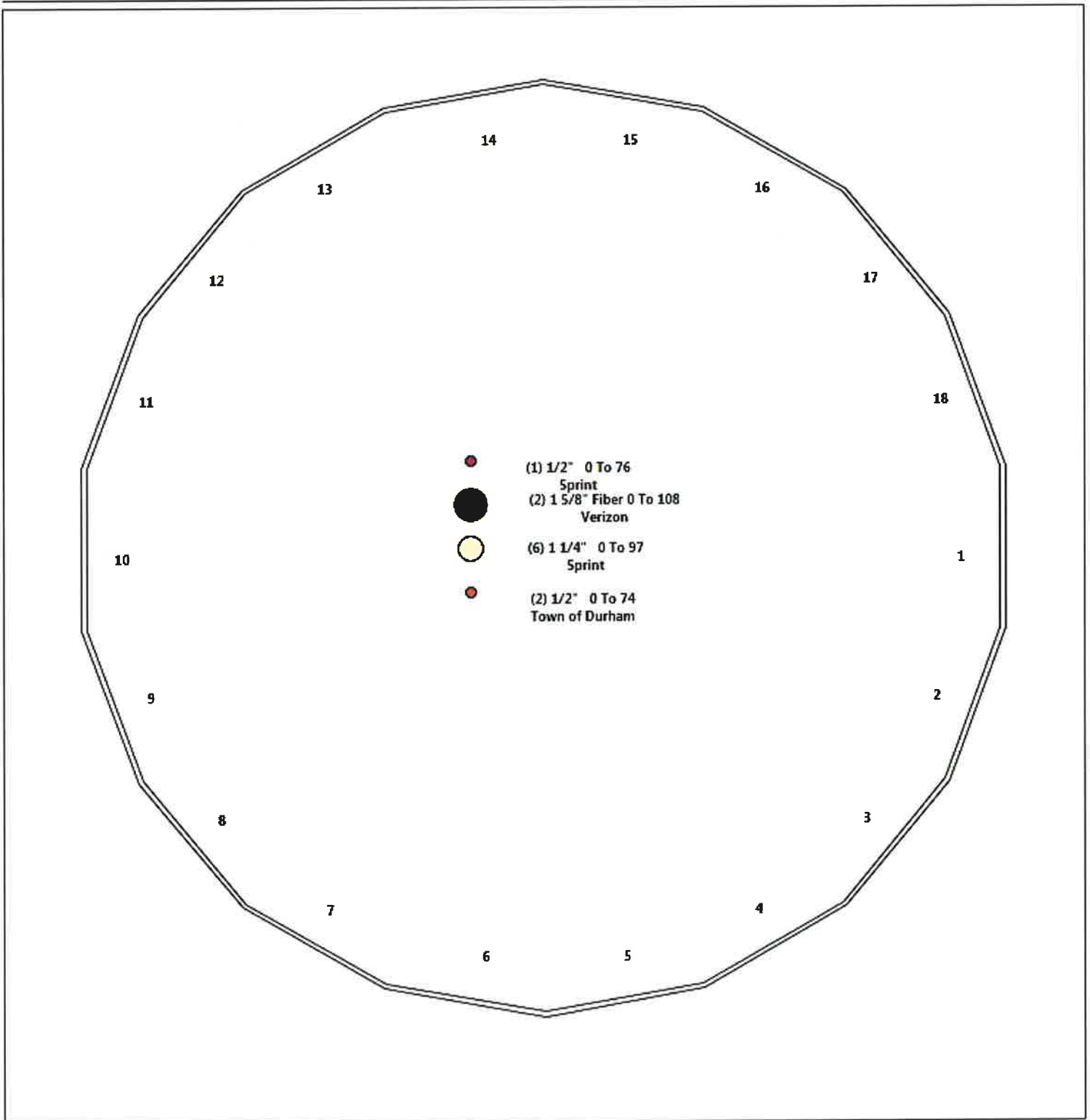
Structure: CT46140-A-SBA - Coax Line Placement

Type: Monopole
Site Name: S. Durham-rt 17/ Lawson
Height: 108.50 (ft)

10/11/2016



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Shaft Properties

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



Page: 4

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	52.500	0.3125	65		0.00	8,674
2	18	52.000	0.2500	65	Slip	72.00	5,286
3	R	10.000	0.3120	35	Flange	0.00	923
Total Shaft Weight:							14,883

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	56.00	0.00	55.23	21640.51	30.19	179.20	42.53	52.50	41.87	9428.49	22.59	136.0	0.256590
2	44.57	46.50	35.17	8726.53	30.02	178.27	31.23	98.50	24.58	2979.59	20.61	124.9	0.256590
3	28.00	98.50	27.14	2602.69	0.00	89.74	28.00	108.50	27.14	2602.69	0.00	89.74	0.000000

Load Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	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	108.50	Lightning Rod	1	5.00	0.50	1.00	25.28	2.190	1.00	0.00	0.00
2	108.00	SBNHH-1D65B	9	40.00	8.16	0.83	235.35	9.415	0.83	0.00	0.00
3	108.00	RRH2x60-700	3	60.00	3.50	0.76	144.47	4.264	0.76	0.00	0.00
4	108.00	RRH2X60-PCS	3	55.00	2.20	0.89	136.18	2.814	0.89	0.00	0.00
5	108.00	DB-T1-6Z-8AB-0Z	2	18.90	4.80	0.90	157.18	5.644	0.90	0.00	0.00
6	108.00	Flush Mount	1	350.00	5.00	1.00	633.72	8.378	1.00	0.00	0.00
7	108.00	RRH 4x45-AWS	3	60.00	2.77	0.99	140.74	3.998	0.99	0.00	0.00
8	96.50	UMWD-06516-XD	3	13.20	3.68	0.76	101.17	4.611	0.76	0.00	0.00
9	96.50	Collar Mount	1	350.00	5.00	1.00	630.54	8.340	1.00	0.00	0.00
10	96.50	4 ft Sidearm	1	53.32	3.50	1.00	155.79	11.148	1.00	0.00	0.00
11	76.00	GPS	1	10.00	1.00	1.00	37.39	1.665	1.00	0.00	0.00
12	76.00	6 ft Sidearm	1	70.00	5.15	1.00	167.83	11.509	1.00	0.00	0.00
13	73.50	10' x1" Omni	1	12.00	1.25	1.00	35.40	5.313	1.00	0.00	5.00
14	73.50	3'6" x 2'6" Dipole	1	15.00	1.74	1.00	67.61	3.844	1.00	0.00	-1.80
15	73.50	Sidearm	1	53.32	3.50	1.00	153.03	10.943	1.00	0.00	0.00
Totals:			32	1,881.04			5,906.78				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	108.00	(2) 1 5/8" Fiber	0.00	Inside
0.00	96.50	(6) 1 1/4" Coax	0.00	Inside
0.00	76.00	(1) 1/2" Coax	0.00	Inside
0.00	73.50	(2) 1/2" Coax	0.00	Inside

Shaft Section Properties

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Increment Length: 5 (ft)

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in ²)	Ix (in ⁴)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in ³)	Weight (lb)
0.00		0.3125	56.000	55.233	21640.5	30.19	179.20	65.9	761.1	0.0
5.00		0.3125	54.717	53.961	20179.0	29.46	175.09	66.7	726.4	928.9
10.00		0.3125	53.434	52.688	18784.9	28.74	170.99	67.6	692.4	907.3
15.00		0.3125	52.151	51.416	17456.4	28.02	166.88	68.4	659.3	885.6
20.00		0.3125	50.868	50.143	16192.2	27.29	162.78	69.3	627.0	864.0
25.00		0.3125	49.585	48.871	14990.5	26.57	158.67	70.2	595.4	842.3
30.00		0.3125	48.302	47.598	13849.7	25.84	154.57	71.0	564.7	820.7
35.00		0.3125	47.019	46.326	12768.4	25.12	150.46	71.9	534.9	799.0
40.00		0.3125	45.736	45.053	11744.9	24.40	146.36	72.7	505.8	777.4
45.00		0.3125	44.453	43.781	10777.5	23.67	142.25	73.6	477.5	755.7
46.50	Bot - Section 2	0.3125	44.069	43.399	10498.1	23.45	141.02	73.8	469.2	222.5
50.00		0.3125	43.171	42.508	9864.8	22.95	138.15	74.4	450.1	926.1
52.50	Top - Section 1	0.2500	43.029	33.944	7848.3	28.94	172.12	0.0	0.0	649.8
55.00		0.2500	42.388	33.435	7500.5	28.49	169.55	67.9	348.5	286.6
60.00		0.2500	41.105	32.417	6836.1	27.58	164.42	69.0	327.6	560.2
65.00		0.2500	39.822	31.399	6212.1	26.68	159.29	70.0	307.3	542.9
70.00		0.2500	38.539	30.381	5627.3	25.77	154.15	71.1	287.6	525.6
73.50		0.2500	37.641	29.668	5240.5	25.14	150.56	71.8	274.2	357.6
75.00		0.2500	37.256	29.363	5080.3	24.87	149.02	72.2	268.6	150.7
76.00		0.2500	36.999	29.159	4975.4	24.69	148.00	72.4	264.9	99.6
80.00		0.2500	35.973	28.345	4570.1	23.96	143.89	73.2	250.2	391.3
85.00		0.2500	34.690	27.327	4095.1	23.06	138.76	74.3	232.5	473.6
90.00		0.2500	33.407	26.309	3654.3	22.15	133.63	75.3	215.5	456.3
95.00		0.2500	32.124	25.291	3246.3	21.25	128.50	76.4	199.0	439.0
96.50		0.2500	31.739	24.986	3130.1	20.98	126.96	76.7	194.2	128.3
98.50	Top - Section 2	0.2500	31.226	24.578	2979.6	20.61	124.90	77.2	187.9	168.7
98.50	Bot - Section 3	0.3120	28.000	27.139	2602.7	16.52	100.08	35.0	185.9	
100.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	138.5
105.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	461.7
108.00		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	277.0
108.50		0.3120	28.000	27.139	2602.7	0.00	89.74	35.0	185.9	46.2

14882.9

Wind Loading - Shaft

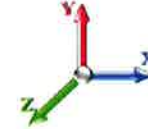
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.6W 98 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.60



Iterations 18

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.853	21.84	428.14	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.853	21.84	418.34	0.650	0.000	5.00	23.422	15.22	532.0	0.0	1114.7
10.00		1.00	0.85	19.853	21.84	408.53	0.650	0.000	5.00	22.879	14.87	519.6	0.0	1088.7
15.00		1.00	0.85	19.853	21.84	398.72	0.650	0.000	5.00	22.336	14.52	507.3	0.0	1062.7
20.00		1.00	0.90	21.065	23.17	400.60	0.650	0.000	5.00	21.793	14.17	525.2	0.0	1036.7
25.00		1.00	0.95	22.078	24.29	399.78	0.650	0.000	5.00	21.251	13.81	536.7	0.0	1010.8
30.00		1.00	0.98	22.942	25.24	396.98	0.650	0.000	5.00	20.708	13.46	543.5	0.0	984.8
35.00		1.00	1.01	23.699	26.07	392.76	0.650	0.000	5.00	20.165	13.11	546.7	0.0	958.8
40.00		1.00	1.04	24.375	26.81	387.45	0.650	0.000	5.00	19.622	12.75	547.2	0.0	932.8
45.00		1.00	1.07	24.987	27.49	381.28	0.650	0.000	5.00	19.079	12.40	545.4	0.0	906.8
46.50	Bot - Section 2	1.00	1.08	25.160	27.68	379.29	0.650	0.000	1.50	5.618	3.65	161.7	0.0	267.0
50.00		1.00	1.09	25.547	28.10	374.41	0.650	0.000	3.50	13.067	8.49	381.9	0.0	1111.4
52.50	Top - Section 1	1.00	1.11	25.811	28.39	370.74	0.650	0.000	2.50	9.171	5.96	270.8	0.0	779.8
55.00		1.00	1.12	26.065	28.67	371.32	0.650	0.000	2.50	9.035	5.87	269.4	0.0	343.9
60.00		1.00	1.14	26.547	29.20	363.40	0.650	0.000	5.00	17.663	11.48	536.4	0.0	672.2
65.00		1.00	1.16	26.998	29.70	355.03	0.650	0.000	5.00	17.120	11.13	528.8	0.0	651.5
70.00		1.00	1.17	27.423	30.16	346.29	0.650	0.000	5.00	16.577	10.77	520.0	0.0	630.7
73.50	Appurtenance(s)	1.00	1.19	27.706	30.48	339.96	0.650	0.000	3.50	11.281	7.33	357.6	0.0	429.1
75.00		1.00	1.19	27.824	30.61	337.20	0.650	0.000	1.50	4.753	3.09	151.3	0.0	180.8
76.00	Appurtenance(s)	1.00	1.19	27.901	30.69	335.34	0.650	0.000	1.00	3.142	2.04	100.3	0.0	119.5
80.00		1.00	1.21	28.204	31.02	327.81	0.650	0.000	4.00	12.350	8.03	398.5	0.0	469.6
85.00		1.00	1.22	28.567	31.42	318.14	0.650	0.000	5.00	14.948	9.72	488.5	0.0	568.3
90.00		1.00	1.24	28.912	31.80	308.22	0.650	0.000	5.00	14.406	9.36	476.5	0.0	547.5
95.00		1.00	1.25	29.243	32.17	298.08	0.650	0.000	5.00	13.863	9.01	463.8	0.0	526.8
96.50	Appurtenance(s)	1.00	1.26	29.340	32.27	294.99	0.650	0.000	1.50	4.053	2.63	136.0	0.0	154.0
98.50	Top - Section 2	1.00	1.26	29.467	32.41	290.85	0.650	0.000	2.00	5.328	3.46	179.6	0.0	202.4
100.00		1.00	1.27	29.561	32.52	257.25	0.600	0.000	1.50	3.500	2.10	109.3	0.0	166.2
105.00		1.00	1.28	29.866	32.85	258.57	0.600	0.000	5.00	11.667	7.00	368.0	0.0	554.1
108.00	Appurtenance(s)	1.00	1.29	30.044	33.05	259.34	0.600	0.000	3.00	7.000	4.20	222.1	0.0	332.5
108.50	Appurtenance(s)	1.00	1.29	30.073	33.08	259.47	0.600	0.000	0.50	1.167	0.70	37.1	0.0	55.4
Totals:									108.50			10,960.9		17,859.5

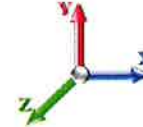
Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Page: 8
	Struct Class: II	



Load Case: 1.2D + 1.6W 98 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.60



Iterations 18

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	30.073	33.080	1.00	1.00	0.50	6.00	0.000	0.000	26.46	0.00	0.00
2	108.00	RRH 4x45-AWS	3	30.044	33.048	0.99	1.00	8.23	216.00	0.000	0.000	435.01	0.00	0.00
3	108.00	Flush Mount	1	30.044	33.048	1.00	1.00	5.00	420.00	0.000	0.000	264.39	0.00	0.00
4	108.00	DB-T1-6Z-8AB-OZ	2	30.044	33.048	0.90	1.00	8.64	45.36	0.000	0.000	456.86	0.00	0.00
5	108.00	RRH2X60-PCS	3	30.044	33.048	0.89	1.00	5.87	198.00	0.000	0.000	310.60	0.00	0.00
6	108.00	RRH2x60-700	3	30.044	33.048	0.76	1.00	7.98	216.00	0.000	0.000	421.96	0.00	0.00
7	108.00	SBNHH-1D65B	9	30.044	33.048	0.83	1.00	60.96	432.00	0.000	0.000	3223.14	0.00	0.00
8	96.50	4 ft Sidearm	1	29.340	32.274	1.00	1.00	3.50	63.98	0.000	0.000	180.73	0.00	0.00
9	96.50	Collar Mount	1	29.340	32.274	1.00	1.00	5.00	420.00	0.000	0.000	258.19	0.00	0.00
10	96.50	UMWD-06516-XD	3	29.340	32.274	0.76	1.00	8.39	47.52	0.000	0.000	433.27	0.00	0.00
11	76.00	6 ft Sidearm	1	27.901	30.692	1.00	1.00	5.15	84.00	0.000	0.000	252.90	0.00	0.00
12	76.00	GPS	1	27.901	30.692	1.00	1.00	1.00	12.00	0.000	0.000	49.11	0.00	0.00
13	73.50	Sidearm	1	27.706	30.476	1.00	1.00	3.50	63.98	0.000	0.000	170.67	0.00	0.00
14	73.50	3'6" x 2'6" Dipole	1	27.561	30.318	1.00	1.00	1.74	18.00	0.000	-1.800	84.40	0.00	-151.93
15	73.50	10' x1" Omni	1	28.092	30.901	1.00	1.00	1.25	14.40	0.000	5.000	61.80	0.00	309.01
Totals:									2,257.25			6,629.49		

Total Applied Force Summary

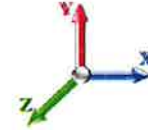
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



Page: 9

Load Case: 1.2D + 1.6W 98 mph Wind

Dead Load Factor 1.20
Wind Load Factor 1.60



Iterations 18

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		531.96	1154.52	0.00	0.00
10.00		519.64	1128.55	0.00	0.00
15.00		507.31	1102.57	0.00	0.00
20.00		525.19	1076.59	0.00	0.00
25.00		536.74	1050.61	0.00	0.00
30.00		543.50	1024.63	0.00	0.00
35.00		546.71	998.65	0.00	0.00
40.00		547.16	972.67	0.00	0.00
45.00		545.38	946.69	0.00	0.00
46.50		161.70	278.94	0.00	0.00
50.00		381.89	1139.25	0.00	0.00
52.50		270.79	799.72	0.00	0.00
55.00		269.40	363.83	0.00	0.00
60.00		536.40	712.08	0.00	0.00
65.00		528.76	691.29	0.00	0.00
70.00		520.04	670.51	0.00	0.00
73.50	(3) attachments	674.42	553.38	0.00	157.09
75.00		151.30	192.16	0.00	0.00
76.00	(2) attachments	402.29	223.07	0.00	0.00
80.00		398.47	499.19	0.00	0.00
85.00		488.52	605.28	0.00	0.00
90.00		476.48	584.50	0.00	0.00
95.00		463.78	563.71	0.00	0.00
96.50	(5) attachments	1008.24	696.56	0.00	0.00
98.50		179.61	207.67	0.00	0.00
100.00		109.26	170.19	0.00	0.00
105.00		367.95	567.29	0.00	0.00
108.00	(21) attachments	5334.04	1867.73	0.00	0.00
108.50	(1) attachments	63.51	61.41	0.00	0.00
	Totals:	17,590.44	20,903.20	0.00	157.09

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



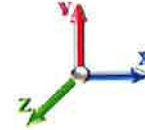
Page: 10

Load Case: 1.2D + 1.6W 98 mph Wind

Iterations 18

Dead Load Factor 1.20

Wind Load Factor 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-20.89	-17.61	0.00	-1290.6	0.00	1290.69	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.350
5.00	-19.71	-17.10	0.00	-1202.6	0.00	1202.67	3241.53	1620.76	7261.66	3636.23	0.04	-0.082	0.000	0.337
10.00	-18.56	-16.60	0.00	-1117.1	0.00	1117.17	3205.46	1602.73	7010.56	3510.49	0.18	-0.164	0.000	0.324
15.00	-17.44	-16.12	0.00	-1034.1	0.00	1034.14	3167.44	1583.72	6759.13	3384.59	0.39	-0.245	0.000	0.311
20.00	-16.34	-15.61	0.00	-953.55	0.00	953.55	3127.48	1563.74	6507.68	3258.68	0.69	-0.326	0.000	0.298
25.00	-15.27	-15.09	0.00	-875.50	0.00	875.50	3085.56	1542.78	6256.52	3132.91	1.08	-0.407	0.000	0.284
30.00	-14.23	-14.56	0.00	-800.06	0.00	800.06	3041.69	1520.85	6005.97	3007.45	1.55	-0.486	0.000	0.271
35.00	-13.22	-14.02	0.00	-727.28	0.00	727.28	2995.87	1497.94	5756.34	2882.45	2.10	-0.564	0.000	0.257
40.00	-12.24	-13.48	0.00	-657.18	0.00	657.18	2948.10	1474.05	5507.93	2758.06	2.73	-0.642	0.000	0.243
45.00	-11.28	-12.93	0.00	-589.79	0.00	589.79	2898.39	1449.19	5261.05	2634.44	3.45	-0.717	0.000	0.228
46.50	-11.00	-12.77	0.00	-570.40	0.00	570.40	2883.09	1441.55	5187.33	2597.52	3.67	-0.740	0.000	0.223
50.00	-9.86	-12.38	0.00	-525.69	0.00	525.69	2846.72	1423.36	5016.02	2511.74	4.24	-0.792	0.000	0.213
52.50	-9.05	-12.11	0.00	-494.74	0.00	494.74	2057.96	1028.98	3624.72	1815.05	4.66	-0.829	0.000	0.277
55.00	-8.68	-11.84	0.00	-464.47	0.00	464.47	2043.11	1021.55	3544.30	1774.78	5.11	-0.865	0.000	0.266
60.00	-7.96	-11.30	0.00	-405.26	0.00	405.26	2011.95	1005.98	3383.36	1694.19	6.06	-0.947	0.000	0.243
65.00	-7.26	-10.77	0.00	-348.74	0.00	348.74	1978.85	989.42	3222.55	1613.67	7.09	-1.026	0.000	0.220
70.00	-6.59	-10.25	0.00	-294.87	0.00	294.87	1943.79	971.90	3062.19	1533.37	8.21	-1.100	0.000	0.196
73.50	-6.05	-9.57	0.00	-258.84	0.00	258.84	1918.09	959.05	2950.37	1477.38	9.03	-1.149	0.000	0.178
75.00	-5.85	-9.41	0.00	-244.49	0.00	244.49	1906.79	953.39	2902.59	1453.45	9.40	-1.169	0.000	0.171
76.00	-5.63	-9.01	0.00	-235.08	0.00	235.08	1899.15	949.58	2870.79	1437.53	9.65	-1.183	0.000	0.167
80.00	-5.14	-8.61	0.00	-199.04	0.00	199.04	1867.83	933.91	2744.05	1374.07	10.66	-1.232	0.000	0.148
85.00	-4.53	-8.11	0.00	-156.01	0.00	156.01	1826.92	913.46	2586.89	1295.37	11.98	-1.287	0.000	0.123
90.00	-3.96	-7.62	0.00	-115.47	0.00	115.47	1784.07	892.03	2431.43	1217.52	13.36	-1.335	0.000	0.097
95.00	-3.40	-7.15	0.00	-77.36	0.00	77.36	1739.26	869.63	2277.96	1140.67	14.77	-1.372	0.000	0.070
96.50	-2.73	-6.12	0.00	-66.64	0.00	66.64	1725.44	862.72	2232.35	1117.84	15.21	-1.382	0.000	0.061
98.50	-2.52	-5.94	0.00	-54.39	0.00	54.39	1706.74	853.37	2171.89	1087.56	15.79	-1.393	0.000	0.052
98.50	-2.52	-5.94	0.00	-54.39	0.00	54.39	854.88	427.44	974.68	581.27	15.79	-1.393	0.000	0.097
100.00	-2.35	-5.82	0.00	-45.49	0.00	45.49	854.88	427.44	974.68	581.27	16.23	-1.400	0.000	0.081
105.00	-1.79	-5.44	0.00	-16.36	0.00	16.36	854.88	427.44	974.68	581.27	17.70	-1.417	0.000	0.030
108.00	-0.06	-0.06	0.00	-0.03	0.00	0.03	854.88	427.44	974.68	581.27	18.60	-1.419	0.000	0.000
108.50	0.00	-0.06	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	18.74	-1.419	0.000	0.000

Wind Loading - Shaft

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



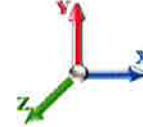
Page: 11

Load Case: 0.9D + 1.6W 98 mph Wind

Iterations 18

Dead Load Factor 0.90

Wind Load Factor 1.60



Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.853	21.84	428.14	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.853	21.84	418.34	0.650	0.000	5.00	23.422	15.22	532.0	0.0	836.0
10.00		1.00	0.85	19.853	21.84	408.53	0.650	0.000	5.00	22.879	14.87	519.6	0.0	816.5
15.00		1.00	0.85	19.853	21.84	398.72	0.650	0.000	5.00	22.336	14.52	507.3	0.0	797.0
20.00		1.00	0.90	21.065	23.17	400.60	0.650	0.000	5.00	21.793	14.17	525.2	0.0	777.6
25.00		1.00	0.95	22.078	24.29	399.78	0.650	0.000	5.00	21.251	13.81	536.7	0.0	758.1
30.00		1.00	0.98	22.942	25.24	396.98	0.650	0.000	5.00	20.708	13.46	543.5	0.0	738.6
35.00		1.00	1.01	23.699	26.07	392.76	0.650	0.000	5.00	20.165	13.11	546.7	0.0	719.1
40.00		1.00	1.04	24.375	26.81	387.45	0.650	0.000	5.00	19.622	12.75	547.2	0.0	699.6
45.00		1.00	1.07	24.987	27.49	381.28	0.650	0.000	5.00	19.079	12.40	545.4	0.0	680.1
46.50 Bot - Section 2		1.00	1.08	25.160	27.68	379.29	0.650	0.000	1.50	5.618	3.65	161.7	0.0	200.2
50.00		1.00	1.09	25.547	28.10	374.41	0.650	0.000	3.50	13.067	8.49	381.9	0.0	833.5
52.50 Top - Section 1		1.00	1.11	25.811	28.39	370.74	0.650	0.000	2.50	9.171	5.96	270.8	0.0	584.8
55.00		1.00	1.12	26.065	28.67	371.32	0.650	0.000	2.50	9.035	5.87	269.4	0.0	257.9
60.00		1.00	1.14	26.547	29.20	363.40	0.650	0.000	5.00	17.663	11.48	536.4	0.0	504.2
65.00		1.00	1.16	26.998	29.70	355.03	0.650	0.000	5.00	17.120	11.13	528.8	0.0	488.6
70.00		1.00	1.17	27.423	30.16	346.29	0.650	0.000	5.00	16.577	10.77	520.0	0.0	473.0
73.50 Appurtenance(s)		1.00	1.19	27.706	30.48	339.96	0.650	0.000	3.50	11.281	7.33	357.6	0.0	321.8
75.00		1.00	1.19	27.824	30.61	337.20	0.650	0.000	1.50	4.753	3.09	151.3	0.0	135.6
76.00 Appurtenance(s)		1.00	1.19	27.901	30.69	335.34	0.650	0.000	1.00	3.142	2.04	100.3	0.0	89.6
80.00		1.00	1.21	28.204	31.02	327.81	0.650	0.000	4.00	12.350	8.03	398.5	0.0	352.2
85.00		1.00	1.22	28.567	31.42	318.14	0.650	0.000	5.00	14.948	9.72	488.5	0.0	426.2
90.00		1.00	1.24	28.912	31.80	308.22	0.650	0.000	5.00	14.406	9.36	476.5	0.0	410.7
95.00		1.00	1.25	29.243	32.17	298.08	0.650	0.000	5.00	13.863	9.01	463.8	0.0	395.1
96.50 Appurtenance(s)		1.00	1.26	29.340	32.27	294.99	0.650	0.000	1.50	4.053	2.63	136.0	0.0	115.5
98.50 Top - Section 2		1.00	1.26	29.467	32.41	290.85	0.650	0.000	2.00	5.328	3.46	179.6	0.0	151.8
100.00		1.00	1.27	29.561	32.52	257.25	0.600	0.000	1.50	3.500	2.10	109.3	0.0	124.7
105.00		1.00	1.28	29.866	32.85	258.57	0.600	0.000	5.00	11.667	7.00	368.0	0.0	415.6
108.00 Appurtenance(s)		1.00	1.29	30.044	33.05	259.34	0.600	0.000	3.00	7.000	4.20	222.1	0.0	249.3
108.50 Appurtenance(s)		1.00	1.29	30.073	33.08	259.47	0.600	0.000	0.50	1.167	0.70	37.1	0.0	41.6
Totals:									108.50			10,960.9		13,394.6

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Page: 12
	Struct Class: II	



Load Case: 0.9D + 1.6W 98 mph Wind

Dead Load Factor 0.90
Wind Load Factor 1.60



Iterations 18

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	30.073	33.080	1.00	1.00	0.50	4.50	0.000	0.000	26.46	0.00	0.00
2	108.00	RRH 4x45-AWS	3	30.044	33.048	0.99	1.00	8.23	162.00	0.000	0.000	435.01	0.00	0.00
3	108.00	Flush Mount	1	30.044	33.048	1.00	1.00	5.00	315.00	0.000	0.000	264.39	0.00	0.00
4	108.00	DB-T1-6Z-8AB-0Z	2	30.044	33.048	0.90	1.00	8.64	34.02	0.000	0.000	456.86	0.00	0.00
5	108.00	RRH2X60-PCS	3	30.044	33.048	0.89	1.00	5.87	148.50	0.000	0.000	310.60	0.00	0.00
6	108.00	RRH2x60-700	3	30.044	33.048	0.76	1.00	7.98	162.00	0.000	0.000	421.96	0.00	0.00
7	108.00	SBNHH-1D65B	9	30.044	33.048	0.83	1.00	60.96	324.00	0.000	0.000	3223.14	0.00	0.00
8	96.50	4 ft Sidearm	1	29.340	32.274	1.00	1.00	3.50	47.99	0.000	0.000	180.73	0.00	0.00
9	96.50	Collar Mount	1	29.340	32.274	1.00	1.00	5.00	315.00	0.000	0.000	258.19	0.00	0.00
10	96.50	UMWD-06516-XD	3	29.340	32.274	0.76	1.00	8.39	35.64	0.000	0.000	433.27	0.00	0.00
11	76.00	6 ft Sidearm	1	27.901	30.692	1.00	1.00	5.15	63.00	0.000	0.000	252.90	0.00	0.00
12	76.00	GPS	1	27.901	30.692	1.00	1.00	1.00	9.00	0.000	0.000	49.11	0.00	0.00
13	73.50	Sidearm	1	27.706	30.476	1.00	1.00	3.50	47.99	0.000	0.000	170.67	0.00	0.00
14	73.50	3'6" x 2'6" Dipole	1	27.561	30.318	1.00	1.00	1.74	13.50	0.000	-1.800	84.40	0.00	-151.93
15	73.50	10' x1" Omni	1	28.092	30.901	1.00	1.00	1.25	10.80	0.000	5.000	61.80	0.00	309.01
Totals:								1,692.94				6,629.49		

Total Applied Force Summary

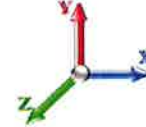
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Page: 13
	Struct Class: II	



Load Case: 0.9D + 1.6W 98 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 18

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		531.96	865.89	0.00	0.00
10.00		519.64	846.41	0.00	0.00
15.00		507.31	826.92	0.00	0.00
20.00		525.19	807.44	0.00	0.00
25.00		536.74	787.95	0.00	0.00
30.00		543.50	768.47	0.00	0.00
35.00		546.71	748.98	0.00	0.00
40.00		547.16	729.50	0.00	0.00
45.00		545.38	710.01	0.00	0.00
46.50		161.70	209.20	0.00	0.00
50.00		381.89	854.44	0.00	0.00
52.50		270.79	599.79	0.00	0.00
55.00		269.40	272.87	0.00	0.00
60.00		536.40	534.06	0.00	0.00
65.00		528.76	518.47	0.00	0.00
70.00		520.04	502.88	0.00	0.00
73.50	(3) attachments	674.42	415.03	0.00	157.09
75.00		151.30	144.12	0.00	0.00
76.00	(2) attachments	402.29	167.30	0.00	0.00
80.00		398.47	374.39	0.00	0.00
85.00		488.52	453.96	0.00	0.00
90.00		476.48	438.37	0.00	0.00
95.00		463.78	422.78	0.00	0.00
96.50	(5) attachments	1008.24	522.42	0.00	0.00
98.50		179.61	155.75	0.00	0.00
100.00		109.26	127.64	0.00	0.00
105.00		367.95	425.47	0.00	0.00
108.00	(21) attachments	5334.04	1400.80	0.00	0.00
108.50	(1) attachments	63.51	46.06	0.00	0.00
	Totals:	17,590.44	15,677.40	0.00	157.09

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



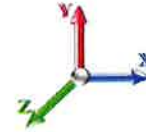
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Load Case: 0.9D + 1.6W 98 mph Wind

Iterations 18

Dead Load Factor 0.90

Wind Load Factor 1.60



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-15.66	-17.60	0.00	-1287.7	0.00	1287.79	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.347
5.00	-14.77	-17.09	0.00	-1199.7	0.00	1199.78	3241.53	1620.76	7261.66	3636.23	0.04	-0.082	0.000	0.335
10.00	-13.91	-16.59	0.00	-1114.3	0.00	1114.33	3205.46	1602.73	7010.56	3510.49	0.17	-0.163	0.000	0.322
15.00	-13.06	-16.10	0.00	-1031.4	0.00	1031.40	3167.44	1583.72	6759.13	3384.59	0.39	-0.245	0.000	0.309
20.00	-12.23	-15.58	0.00	-950.92	0.00	950.92	3127.48	1563.74	6507.68	3258.68	0.69	-0.325	0.000	0.296
25.00	-11.43	-15.06	0.00	-873.00	0.00	873.00	3085.56	1542.78	6256.52	3132.91	1.08	-0.405	0.000	0.282
30.00	-10.64	-14.52	0.00	-797.70	0.00	797.70	3041.69	1520.85	6005.97	3007.45	1.54	-0.485	0.000	0.269
35.00	-9.88	-13.98	0.00	-725.09	0.00	725.09	2995.87	1497.94	5756.34	2882.45	2.09	-0.563	0.000	0.255
40.00	-9.14	-13.44	0.00	-655.17	0.00	655.17	2948.10	1474.05	5507.93	2758.06	2.73	-0.640	0.000	0.241
45.00	-8.42	-12.89	0.00	-587.97	0.00	587.97	2898.39	1449.19	5261.05	2634.44	3.44	-0.715	0.000	0.226
46.50	-8.21	-12.74	0.00	-568.63	0.00	568.63	2883.09	1441.55	5187.33	2597.52	3.67	-0.738	0.000	0.222
50.00	-7.35	-12.35	0.00	-524.06	0.00	524.06	2846.72	1423.36	5016.02	2511.74	4.23	-0.790	0.000	0.211
52.50	-6.74	-12.07	0.00	-493.19	0.00	493.19	2057.96	1028.98	3624.72	1815.05	4.65	-0.826	0.000	0.275
55.00	-6.46	-11.81	0.00	-463.01	0.00	463.01	2043.11	1021.55	3544.30	1774.78	5.09	-0.863	0.000	0.264
60.00	-5.92	-11.27	0.00	-403.98	0.00	403.98	2011.95	1005.98	3383.36	1694.19	6.04	-0.945	0.000	0.242
65.00	-5.40	-10.74	0.00	-347.63	0.00	347.63	1978.85	989.42	3222.55	1613.67	7.07	-1.023	0.000	0.218
70.00	-4.89	-10.22	0.00	-293.94	0.00	293.94	1943.79	971.90	3062.19	1533.37	8.19	-1.096	0.000	0.194
73.50	-4.49	-9.54	0.00	-258.03	0.00	258.03	1918.09	959.05	2950.37	1477.38	9.01	-1.145	0.000	0.177
75.00	-4.34	-9.38	0.00	-243.72	0.00	243.72	1906.79	953.39	2902.59	1453.45	9.37	-1.166	0.000	0.170
76.00	-4.18	-8.98	0.00	-234.34	0.00	234.34	1899.15	949.58	2870.79	1437.53	9.62	-1.179	0.000	0.165
80.00	-3.81	-8.58	0.00	-198.42	0.00	198.42	1867.83	933.91	2744.05	1374.07	10.63	-1.229	0.000	0.147
85.00	-3.36	-8.08	0.00	-155.54	0.00	155.54	1826.92	913.46	2586.89	1295.37	11.95	-1.284	0.000	0.122
90.00	-2.92	-7.60	0.00	-115.14	0.00	115.14	1784.07	892.03	2431.43	1217.52	13.32	-1.331	0.000	0.096
95.00	-2.51	-7.12	0.00	-77.15	0.00	77.15	1739.26	869.63	2277.96	1140.67	14.73	-1.368	0.000	0.069
96.50	-2.01	-6.10	0.00	-66.46	0.00	66.46	1725.44	862.72	2232.35	1117.84	15.16	-1.378	0.000	0.061
98.50	-1.86	-5.92	0.00	-54.26	0.00	54.26	1706.74	853.37	2171.89	1087.56	15.74	-1.389	0.000	0.051
98.50	-1.86	-5.92	0.00	-54.26	0.00	54.26	854.88	427.44	974.68	581.27	15.74	-1.389	0.000	0.096
100.00	-1.73	-5.81	0.00	-45.37	0.00	45.37	854.88	427.44	974.68	581.27	16.18	-1.396	0.000	0.080
105.00	-1.31	-5.43	0.00	-16.33	0.00	16.33	854.88	427.44	974.68	581.27	17.65	-1.413	0.000	0.030
108.00	-0.04	-0.06	0.00	-0.03	0.00	0.03	854.88	427.44	974.68	581.27	18.54	-1.415	0.000	0.000
108.50	0.00	-0.06	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	18.69	-1.415	0.000	0.000

Wind Loading - Shaft

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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

Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 17

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	24.457	29.35	166.8	431.0	1545.7
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	23.988	28.79	163.6	452.0	1540.7
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	23.491	28.19	160.3	460.2	1522.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	22.982	27.58	166.4	462.6	1499.4
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	22.466	26.96	170.4	461.7	1472.5
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	21.946	26.34	173.0	458.6	1443.4
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	21.422	25.71	174.4	454.0	1412.8
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	20.897	25.08	175.0	448.1	1380.9
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	5.00	20.369	24.44	174.9	441.3	1348.1
46.50 Bot - Section 2		1.00	1.08	6.549	7.20	0.00	1.200	1.552	1.50	6.006	7.21	51.9	131.7	398.7
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	3.50	13.979	16.77	122.7	306.9	1418.3
52.50 Top - Section 1		1.00	1.11	6.719	7.39	0.00	1.200	1.571	2.50	9.825	11.79	87.1	217.2	997.0
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	2.50	9.693	11.63	86.8	215.1	559.1
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	18.990	22.79	173.2	421.5	1093.7
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	18.457	22.15	171.2	412.2	1063.7
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	17.925	21.51	168.9	402.6	1033.2
73.50 Appurtenance(s)		1.00	1.19	7.212	7.93	0.00	1.200	1.625	3.50	12.229	14.67	116.4	276.9	706.0
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	1.50	5.160	6.19	49.3	117.7	298.5
76.00 Appurtenance(s)		1.00	1.19	7.263	7.99	0.00	1.200	1.631	1.00	3.413	4.10	32.7	78.1	197.6
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	4.00	13.442	16.13	130.3	305.7	775.3
85.00		1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	16.323	19.59	160.2	371.4	939.7
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	5.00	15.788	18.95	156.8	360.4	908.0
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	5.00	15.252	18.30	153.3	349.2	876.0
96.50 Appurtenance(s)		1.00	1.26	7.637	8.40	0.00	1.200	1.670	1.50	4.470	5.36	45.1	103.7	257.7
98.50 Top - Section 2		1.00	1.26	7.671	8.44	0.00	1.200	1.673	2.00	5.886	7.06	59.6	136.5	338.9
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	1.50	3.919	4.70	39.8	91.1	257.4
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	5.00	13.070	15.68	134.1	305.4	859.5
108.00 Appurtenance(s)		1.00	1.29	7.821	8.60	0.00	1.200	1.689	3.00	7.844	9.41	81.0	183.8	516.2
108.50 Appurtenance(s)		1.00	1.29	7.828	8.61	0.00	1.200	1.690	0.50	1.307	1.57	13.5	30.6	86.1
Totals:									108.50			3,558.9		26,746.9

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

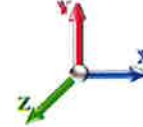


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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 17

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	108.50	Lightning Rod	1	7.828	8.611	1.00	2.19	20.28	0.000	0.000	18.85	0.00	0.00
2	108.00	RRH 4x45-AWS	3	7.821	8.603	0.99	11.87	386.52	0.000	0.000	102.14	0.00	0.00
3	108.00	Flush Mount	1	7.821	8.603	1.00	8.38	603.72	0.000	0.000	72.07	0.00	0.00
4	108.00	DB-T1-6Z-8AB-0Z	2	7.821	8.603	0.90	10.16	321.92	0.000	0.000	87.39	0.00	0.00
5	108.00	RRH2X60-PCS	3	7.821	8.603	0.89	7.51	441.53	0.000	0.000	64.63	0.00	0.00
6	108.00	RRH2x60-700	3	7.821	8.603	0.76	9.72	409.10	0.000	0.000	83.63	0.00	0.00
7	108.00	SBNHH-1D65B	9	7.821	8.603	0.83	70.33	2190.17	0.000	0.000	605.04	0.00	0.00
8	96.50	4 ft Sidearm	1	7.637	8.401	1.00	11.15	135.77	0.000	0.000	93.66	0.00	0.00
9	96.50	Collar Mount	1	7.637	8.401	1.00	8.34	600.54	0.000	0.000	70.06	0.00	0.00
10	96.50	UMWD-06516-XD	3	7.637	8.401	0.76	10.51	311.42	0.000	0.000	88.32	0.00	0.00
11	76.00	6 ft Sidearm	1	7.263	7.989	1.00	11.51	151.83	0.000	0.000	91.95	0.00	0.00
12	76.00	GPS	1	7.263	7.989	1.00	1.67	31.39	0.000	0.000	13.30	0.00	0.00
13	73.50	Sidearm	1	7.212	7.933	1.00	10.94	133.02	0.000	0.000	86.81	0.00	0.00
14	73.50	3'6" x 2'6" Dipole	1	7.174	7.892	1.00	3.84	54.41	0.000	-1.800	30.33	0.00	-54.60
15	73.50	10' x 1" Omni	1	7.313	8.044	1.00	5.31	23.80	0.000	5.000	42.73	0.00	213.67
Totals:								5,815.42			1,550.92		

Total Applied Force Summary

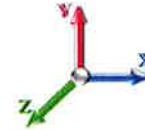
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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

Dead Load Factor 1.20
Wind Load Factor 1.00



Iterations 17

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		166.84	1585.50	0.00	0.00
10.00		163.64	1580.59	0.00	0.00
15.00		160.25	1562.75	0.00	0.00
20.00		166.35	1539.20	0.00	0.00
25.00		170.44	1512.33	0.00	0.00
30.00		173.00	1483.27	0.00	0.00
35.00		174.45	1452.62	0.00	0.00
40.00		175.02	1420.76	0.00	0.00
45.00		174.88	1387.95	0.00	0.00
46.50		51.92	410.66	0.00	0.00
50.00		122.71	1446.20	0.00	0.00
52.50		87.14	1016.95	0.00	0.00
55.00		86.81	578.97	0.00	0.00
60.00		173.22	1133.58	0.00	0.00
65.00		171.22	1103.54	0.00	0.00
70.00		168.90	1073.07	0.00	0.00
73.50	(3) attachments	276.30	945.11	0.00	159.07
75.00		49.33	309.91	0.00	0.00
76.00	(2) attachments	137.98	388.38	0.00	0.00
80.00		130.27	804.87	0.00	0.00
85.00		160.22	976.68	0.00	0.00
90.00		156.84	944.93	0.00	0.00
95.00		153.26	912.92	0.00	0.00
96.50	(5) attachments	297.12	1316.53	0.00	0.00
98.50		59.59	344.15	0.00	0.00
100.00		39.81	261.33	0.00	0.00
105.00		134.13	872.66	0.00	0.00
108.00	(21) attachments	1095.87	4877.11	0.00	0.00
108.50	(1) attachments	32.37	106.33	0.00	0.00
	Totals:	5,109.86	33,348.83	0.00	159.07

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



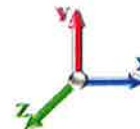
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Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Iterations 17

Dead Load Factor 1.20

Wind Load Factor 1.00



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-33.35	-5.12	0.00	-357.32	0.00	357.32	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.105
5.00	-31.76	-4.96	0.00	-331.75	0.00	331.75	3241.53	1620.76	7261.66	3636.23	0.01	-0.023	0.000	0.101
10.00	-30.18	-4.81	0.00	-306.94	0.00	306.94	3205.46	1602.73	7010.56	3510.49	0.05	-0.045	0.000	0.097
15.00	-28.61	-4.66	0.00	-282.90	0.00	282.90	3167.44	1583.72	6759.13	3384.59	0.11	-0.067	0.000	0.093
20.00	-27.07	-4.50	0.00	-259.62	0.00	259.62	3127.48	1563.74	6507.68	3258.68	0.19	-0.090	0.000	0.088
25.00	-25.56	-4.34	0.00	-237.12	0.00	237.12	3085.56	1542.78	6256.52	3132.91	0.30	-0.111	0.000	0.084
30.00	-24.07	-4.17	0.00	-215.44	0.00	215.44	3041.69	1520.85	6005.97	3007.45	0.42	-0.133	0.000	0.080
35.00	-22.62	-4.00	0.00	-194.60	0.00	194.60	2995.87	1497.94	5756.34	2882.45	0.58	-0.154	0.000	0.075
40.00	-21.20	-3.83	0.00	-174.60	0.00	174.60	2948.10	1474.05	5507.93	2758.06	0.75	-0.175	0.000	0.071
45.00	-19.81	-3.65	0.00	-155.47	0.00	155.47	2898.39	1449.19	5261.05	2634.44	0.94	-0.195	0.000	0.066
46.50	-19.40	-3.60	0.00	-149.99	0.00	149.99	2883.09	1441.55	5187.33	2597.52	1.00	-0.201	0.000	0.064
50.00	-17.95	-3.48	0.00	-137.38	0.00	137.38	2846.72	1423.36	5016.02	2511.74	1.16	-0.214	0.000	0.061
52.50	-16.94	-3.39	0.00	-128.69	0.00	128.69	2057.96	1028.98	3624.72	1815.05	1.27	-0.224	0.000	0.079
55.00	-16.36	-3.31	0.00	-120.21	0.00	120.21	2043.11	1021.55	3544.30	1774.78	1.39	-0.233	0.000	0.076
60.00	-15.22	-3.13	0.00	-103.69	0.00	103.69	2011.95	1005.98	3383.36	1694.19	1.65	-0.254	0.000	0.069
65.00	-14.12	-2.96	0.00	-88.02	0.00	88.02	1978.85	989.42	3222.55	1613.67	1.92	-0.274	0.000	0.062
70.00	-13.05	-2.79	0.00	-73.22	0.00	73.22	1943.79	971.90	3062.19	1533.37	2.22	-0.293	0.000	0.054
73.50	-12.10	-2.51	0.00	-63.29	0.00	63.29	1918.09	959.05	2950.37	1477.38	2.44	-0.305	0.000	0.049
75.00	-11.79	-2.46	0.00	-59.53	0.00	59.53	1906.79	953.39	2902.59	1453.45	2.54	-0.310	0.000	0.047
76.00	-11.40	-2.32	0.00	-57.07	0.00	57.07	1899.15	949.58	2870.79	1437.53	2.60	-0.313	0.000	0.046
80.00	-10.60	-2.19	0.00	-47.78	0.00	47.78	1867.83	933.91	2744.05	1374.07	2.87	-0.325	0.000	0.040
85.00	-9.62	-2.03	0.00	-36.83	0.00	36.83	1826.92	913.46	2586.89	1295.37	3.22	-0.338	0.000	0.034
90.00	-8.68	-1.87	0.00	-26.70	0.00	26.70	1784.07	892.03	2431.43	1217.52	3.58	-0.349	0.000	0.027
95.00	-7.77	-1.71	0.00	-17.37	0.00	17.37	1739.26	869.63	2277.96	1140.67	3.95	-0.358	0.000	0.020
96.50	-6.45	-1.40	0.00	-14.81	0.00	14.81	1725.44	862.72	2232.35	1117.84	4.06	-0.360	0.000	0.017
98.50	-6.11	-1.34	0.00	-12.00	0.00	12.00	1706.74	853.37	2171.89	1087.56	4.22	-0.362	0.000	0.015
98.50	-6.11	-1.34	0.00	-12.00	0.00	12.00	854.88	427.44	974.68	581.27	4.22	-0.362	0.000	0.028
100.00	-5.85	-1.30	0.00	-9.99	0.00	9.99	854.88	427.44	974.68	581.27	4.33	-0.364	0.000	0.024
105.00	-4.98	-1.16	0.00	-3.50	0.00	3.50	854.88	427.44	974.68	581.27	4.71	-0.368	0.000	0.012
108.00	-0.11	-0.03	0.00	-0.02	0.00	0.02	854.88	427.44	974.68	581.27	4.94	-0.368	0.000	0.000
108.50	0.00	-0.03	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	4.98	-0.368	0.000	0.000

Seismic Segment Forces (Factored)

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0E

Gust Response Factor	1.10	Sds	0.12		Iterations	16	
Dead Load Factor	1.20	Seismic Load Factor	1.00	Sd1	0.04	Ss	0.18
Wind Load Factor	0.00	Structure Frequency	0.93	SA	0.04	S1	0.06
						Seismic Importance Factor	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		928.90	0.00	0.04	0.02	8.68	
10.00		907.25	0.02	0.06	0.04	12.19	
15.00		885.60	0.04	0.07	0.04	13.57	
20.00		863.95	0.06	0.07	0.04	14.16	
25.00		842.30	0.10	0.07	0.04	14.54	
30.00		820.65	0.14	0.07	0.03	14.83	
35.00		799.01	0.20	0.06	0.02	14.90	
40.00		777.36	0.26	0.05	0.02	14.41	
45.00		755.71	0.33	0.04	0.01	13.00	
46.50	Bot - Section 2	222.49	0.35	0.03	0.01	3.67	
50.00		926.13	0.40	0.02	0.01	13.15	
52.50	Top - Section 1	649.83	0.44	0.00	0.01	7.81	
55.00		286.59	0.49	-0.01	0.01	2.70	
60.00		560.20	0.58	-0.04	0.01	1.95	
65.00		542.88	0.68	-0.08	0.03	-1.19	
70.00		525.56	0.79	-0.11	0.05	-2.99	
73.50	Appurtenance(s)	437.91	0.87	-0.12	0.08	-2.55	
75.00		150.65	0.90	-0.12	0.09	-0.78	
76.00	Appurtenance(s)	179.57	0.93	-0.12	0.10	-0.80	
80.00		391.35	1.03	-0.10	0.15	0.26	
85.00		473.60	1.16	-0.03	0.23	5.92	
90.00		456.28	1.30	0.12	0.34	13.99	
95.00		438.96	1.45	0.38	0.48	24.28	
96.50	Appurtenance(s)	571.23	1.50	0.49	0.54	36.55	
98.50	Top - Section 2	168.66	1.56	0.65	0.61	12.90	
100.00		138.52	1.61	0.80	0.68	11.99	
105.00		461.74	1.77	1.41	0.93	57.51	
108.00	Appurtenance(s)	1549.8	1.87	1.89	1.11	233.43	
108.50	Appurtenance(s)	51.17	1.89	1.98	1.14	7.94	
Totals:		16,763.9				546.0	Total Wind: 17,590.4

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

Calculated Forces

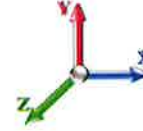
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.2D + 1.0E

Gust Response Factor 1.10	Sds 0.12	Iterations 16	
Dead Load Factor 1.20	Seismic Load Factor 1.00	Sd1 0.04	Ss 0.18
Wind Load Factor 0.00	Structure Frequency 0.93	SA 0.04	S1 0.06
		Seismic Importance Factor 1.00	



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-20.90	-0.55	0.00	-47.24	0.00	47.24	3275.65	1637.82	7512.12	3761.64	0.00	0.00	0.00	0.019
5.00	-19.75	-0.55	0.00	-44.47	0.00	44.47	3241.53	1620.76	7261.66	3636.23	0.00	0.00	0.00	0.018
10.00	-18.62	-0.54	0.00	-41.74	0.00	41.74	3205.46	1602.73	7010.56	3510.49	0.01	-0.01	0.018	0.018
15.00	-17.52	-0.52	0.00	-39.06	0.00	39.06	3167.44	1583.72	6759.13	3384.59	0.01	-0.01	0.017	0.017
20.00	-16.44	-0.51	0.00	-36.45	0.00	36.45	3127.48	1563.74	6507.68	3258.68	0.03	-0.01	0.016	0.016
25.00	-15.39	-0.50	0.00	-33.90	0.00	33.90	3085.56	1542.78	6256.52	3132.91	0.04	-0.02	0.016	0.016
30.00	-14.37	-0.48	0.00	-31.43	0.00	31.43	3041.69	1520.85	6005.97	3007.45	0.06	-0.02	0.015	0.015
35.00	-13.37	-0.47	0.00	-29.02	0.00	29.02	2995.87	1497.94	5756.34	2882.45	0.08	-0.02	0.015	0.015
40.00	-12.39	-0.45	0.00	-26.69	0.00	26.69	2948.10	1474.05	5507.93	2758.06	0.10	-0.02	0.014	0.014
45.00	-11.45	-0.44	0.00	-24.43	0.00	24.43	2898.39	1449.19	5261.05	2634.44	0.13	-0.03	0.013	0.013
46.50	-11.17	-0.44	0.00	-23.78	0.00	23.78	2883.09	1441.55	5187.33	2597.52	0.14	-0.03	0.013	0.013
50.00	-10.03	-0.42	0.00	-22.25	0.00	22.25	2846.72	1423.36	5016.02	2511.74	0.16	-0.03	0.012	0.012
52.50	-9.23	-0.41	0.00	-21.20	0.00	21.20	2057.96	1028.98	3624.72	1815.05	0.18	-0.03	0.016	0.016
55.00	-8.87	-0.41	0.00	-20.16	0.00	20.16	2043.11	1021.55	3544.30	1774.78	0.19	-0.03	0.016	0.016
60.00	-8.15	-0.41	0.00	-18.10	0.00	18.10	2011.95	1005.98	3383.36	1694.19	0.23	-0.04	0.015	0.015
65.00	-7.46	-0.41	0.00	-16.05	0.00	16.05	1978.85	989.42	3222.55	1613.67	0.27	-0.04	0.014	0.014
70.00	-6.79	-0.41	0.00	-14.00	0.00	14.00	1943.79	971.90	3062.19	1533.37	0.32	-0.04	0.013	0.013
73.50	-6.24	-0.41	0.00	-12.57	0.00	12.57	1918.09	959.05	2950.37	1477.38	0.35	-0.05	0.012	0.012
75.00	-6.05	-0.41	0.00	-11.96	0.00	11.96	1906.79	953.39	2902.59	1453.45	0.37	-0.05	0.011	0.011
76.00	-5.82	-0.41	0.00	-11.55	0.00	11.55	1899.15	949.58	2870.79	1437.53	0.38	-0.05	0.011	0.011
80.00	-5.32	-0.41	0.00	-9.91	0.00	9.91	1867.83	933.91	2744.05	1374.07	0.42	-0.05	0.010	0.010
85.00	-4.72	-0.40	0.00	-7.86	0.00	7.86	1826.92	913.46	2586.89	1295.37	0.47	-0.05	0.009	0.009
90.00	-4.13	-0.39	0.00	-5.85	0.00	5.85	1784.07	892.03	2431.43	1217.52	0.53	-0.06	0.007	0.007
95.00	-3.57	-0.36	0.00	-3.91	0.00	3.91	1739.26	869.63	2277.96	1140.67	0.59	-0.06	0.005	0.005
96.50	-2.87	-0.33	0.00	-3.36	0.00	3.36	1725.44	862.72	2232.35	1117.84	0.61	-0.06	0.005	0.005
98.50	-2.67	-0.31	0.00	-2.71	0.00	2.71	1706.74	853.37	2171.89	1087.56	0.63	-0.06	0.004	0.004
98.50	-2.67	-0.31	0.00	-2.71	0.00	2.71	854.88	427.44	974.68	581.27	0.63	-0.06	0.008	0.008
100.00	-2.50	-0.30	0.00	-2.24	0.00	2.24	854.88	427.44	974.68	581.27	0.65	-0.06	0.007	0.007
105.00	-1.93	-0.24	0.00	-0.73	0.00	0.73	854.88	427.44	974.68	581.27	0.72	-0.06	0.004	0.004
108.00	-0.06	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	0.75	-0.06	0.000	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	0.76	-0.06	0.000	0.000

Seismic Segment Forces (Factored)

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

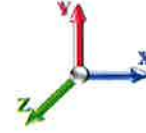


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Load Case: 0.9D + 1.0E

Iterations 16

Gust Response Factor 1.10	Sds 0.12	Ss 0.18
Dead Load Factor 0.90	Seismic Load Factor 1.00	Sd1 0.04
Wind Load Factor 0.00	Structure Frequency 0.93	SA 0.04
	Seismic Importance Factor 1.00	S1 0.06



Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		928.90	0.00	0.04	0.02	8.68	
10.00		907.25	0.02	0.06	0.04	12.19	
15.00		885.60	0.04	0.07	0.04	13.57	
20.00		863.95	0.06	0.07	0.04	14.16	
25.00		842.30	0.10	0.07	0.04	14.54	
30.00		820.65	0.14	0.07	0.03	14.83	
35.00		799.01	0.20	0.06	0.02	14.90	
40.00		777.36	0.26	0.05	0.02	14.41	
45.00		755.71	0.33	0.04	0.01	13.00	
46.50	Bot - Section 2	222.49	0.35	0.03	0.01	3.67	
50.00		926.13	0.40	0.02	0.01	13.15	
52.50	Top - Section 1	649.83	0.44	0.00	0.01	7.81	
55.00		286.59	0.49	-0.01	0.01	2.70	
60.00		560.20	0.58	-0.04	0.01	1.95	
65.00		542.88	0.68	-0.08	0.03	-1.19	
70.00		525.56	0.79	-0.11	0.05	-2.99	
73.50	Appurtenance(s)	437.91	0.87	-0.12	0.08	-2.55	
75.00		150.65	0.90	-0.12	0.09	-0.78	
76.00	Appurtenance(s)	179.57	0.93	-0.12	0.10	-0.80	
80.00		391.35	1.03	-0.10	0.15	0.26	
85.00		473.60	1.16	-0.03	0.23	5.92	
90.00		456.28	1.30	0.12	0.34	13.99	
95.00		438.96	1.45	0.38	0.48	24.28	
96.50	Appurtenance(s)	571.23	1.50	0.49	0.54	36.55	
98.50	Top - Section 2	168.66	1.56	0.65	0.61	12.90	
100.00		138.52	1.61	0.80	0.68	11.99	
105.00		461.74	1.77	1.41	0.93	57.51	
108.00	Appurtenance(s)	1549.8	1.87	1.89	1.11	233.43	
108.50	Appurtenance(s)	51.17	1.89	1.98	1.14	7.94	
Totals:		16,763.9				546.0	Total Wind: 17,590.4

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

Calculated Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

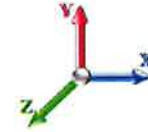


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Load Case: 0.9D + 1.0E

Iterations 16

Gust Response Factor 1.10	Sds 0.12	Ss 0.18
Dead Load Factor 0.90	Seismic Load Factor 1.00	Sd1 0.04
Wind Load Factor 0.00	Structure Frequency 0.93	SA 0.04
	Seismic Importance Factor 1.00	



Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-15.68	-0.55	0.00	-47.13	0.00	47.13	3275.65	1637.82	7512.12	3761.64	0.00	0.00	0.00	0.017
5.00	-14.81	-0.55	0.00	-44.36	0.00	44.36	3241.53	1620.76	7261.66	3636.23	0.00	0.00	0.00	0.017
10.00	-13.96	-0.53	0.00	-41.63	0.00	41.63	3205.46	1602.73	7010.56	3510.49	0.01	-0.01	-0.01	0.016
15.00	-13.14	-0.52	0.00	-38.95	0.00	38.95	3167.44	1583.72	6759.13	3384.59	0.01	-0.01	-0.01	0.016
20.00	-12.33	-0.51	0.00	-36.34	0.00	36.34	3127.48	1563.74	6507.68	3258.68	0.03	-0.01	-0.01	0.015
25.00	-11.54	-0.49	0.00	-33.80	0.00	33.80	3085.56	1542.78	6256.52	3132.91	0.04	-0.02	-0.02	0.015
30.00	-10.77	-0.48	0.00	-31.33	0.00	31.33	3041.69	1520.85	6005.97	3007.45	0.06	-0.02	-0.02	0.014
35.00	-10.03	-0.46	0.00	-28.94	0.00	28.94	2995.87	1497.94	5756.34	2882.45	0.08	-0.02	-0.02	0.013
40.00	-9.30	-0.45	0.00	-26.61	0.00	26.61	2948.10	1474.05	5507.93	2758.06	0.10	-0.02	-0.02	0.013
45.00	-8.59	-0.44	0.00	-24.36	0.00	24.36	2898.39	1449.19	5261.05	2634.44	0.13	-0.03	-0.03	0.012
46.50	-8.38	-0.43	0.00	-23.70	0.00	23.70	2883.09	1441.55	5187.33	2597.52	0.14	-0.03	-0.03	0.012
50.00	-7.52	-0.42	0.00	-22.18	0.00	22.18	2846.72	1423.36	5016.02	2511.74	0.16	-0.03	-0.03	0.011
52.50	-6.92	-0.41	0.00	-21.13	0.00	21.13	2057.96	1028.98	3624.72	1815.05	0.18	-0.03	-0.03	0.015
55.00	-6.65	-0.41	0.00	-20.10	0.00	20.10	2043.11	1021.55	3544.30	1774.78	0.19	-0.03	-0.03	0.015
60.00	-6.12	-0.41	0.00	-18.05	0.00	18.05	2011.95	1005.98	3383.36	1694.19	0.23	-0.04	-0.04	0.014
65.00	-5.60	-0.41	0.00	-16.01	0.00	16.01	1978.85	989.42	3222.55	1613.67	0.27	-0.04	-0.04	0.013
70.00	-5.09	-0.41	0.00	-13.97	0.00	13.97	1943.79	971.90	3062.19	1533.37	0.32	-0.04	-0.04	0.012
73.50	-4.68	-0.41	0.00	-12.54	0.00	12.54	1918.09	959.05	2950.37	1477.38	0.35	-0.05	-0.05	0.011
75.00	-4.53	-0.41	0.00	-11.92	0.00	11.92	1906.79	953.39	2902.59	1453.45	0.37	-0.05	-0.05	0.011
76.00	-4.37	-0.41	0.00	-11.52	0.00	11.52	1899.15	949.58	2870.79	1437.53	0.38	-0.05	-0.05	0.010
80.00	-3.99	-0.41	0.00	-9.88	0.00	9.88	1867.83	933.91	2744.05	1374.07	0.42	-0.05	-0.05	0.009
85.00	-3.54	-0.40	0.00	-7.84	0.00	7.84	1826.92	913.46	2586.89	1295.37	0.47	-0.05	-0.05	0.008
90.00	-3.10	-0.39	0.00	-5.84	0.00	5.84	1784.07	892.03	2431.43	1217.52	0.53	-0.06	-0.06	0.007
95.00	-2.68	-0.36	0.00	-3.90	0.00	3.90	1739.26	869.63	2277.96	1140.67	0.59	-0.06	-0.06	0.005
96.50	-2.16	-0.33	0.00	-3.36	0.00	3.36	1725.44	862.72	2232.35	1117.84	0.61	-0.06	-0.06	0.004
98.50	-2.00	-0.31	0.00	-2.70	0.00	2.70	1706.74	853.37	2171.89	1087.56	0.63	-0.06	-0.06	0.004
98.50	-2.00	-0.31	0.00	-2.70	0.00	2.70	854.88	427.44	974.68	581.27	0.63	-0.06	-0.06	0.007
100.00	-1.87	-0.30	0.00	-2.24	0.00	2.24	854.88	427.44	974.68	581.27	0.65	-0.06	-0.06	0.006
105.00	-1.45	-0.24	0.00	-0.73	0.00	0.73	854.88	427.44	974.68	581.27	0.71	-0.06	-0.06	0.003
108.00	-0.05	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	0.75	-0.06	-0.06	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	0.76	-0.06	-0.06	0.000

Wind Loading - Shaft

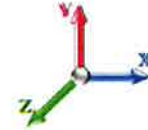
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 17

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	262.13	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	256.12	0.650	0.000	5.00	23.422	15.22	124.6	0.0	928.9
10.00		1.00	0.85	7.442	8.19	250.12	0.650	0.000	5.00	22.879	14.87	121.7	0.0	907.3
15.00		1.00	0.85	7.442	8.19	244.11	0.650	0.000	5.00	22.336	14.52	118.9	0.0	885.6
20.00		1.00	0.90	7.896	8.69	245.27	0.650	0.000	5.00	21.793	14.17	123.0	0.0	864.0
25.00		1.00	0.95	8.276	9.10	244.76	0.650	0.000	5.00	21.251	13.81	125.7	0.0	842.3
30.00		1.00	0.98	8.600	9.46	243.05	0.650	0.000	5.00	20.708	13.46	127.3	0.0	820.7
35.00		1.00	1.01	8.883	9.77	240.47	0.650	0.000	5.00	20.165	13.11	128.1	0.0	799.0
40.00		1.00	1.04	9.137	10.05	237.22	0.650	0.000	5.00	19.622	12.75	128.2	0.0	777.4
45.00		1.00	1.07	9.366	10.30	233.44	0.650	0.000	5.00	19.079	12.40	127.8	0.0	755.7
46.50 Bot - Section 2		1.00	1.08	9.431	10.37	232.22	0.650	0.000	1.50	5.618	3.65	37.9	0.0	222.5
50.00		1.00	1.09	9.576	10.53	229.23	0.650	0.000	3.50	13.067	8.49	89.5	0.0	926.1
52.50 Top - Section 1		1.00	1.11	9.675	10.64	226.99	0.650	0.000	2.50	9.171	5.96	63.4	0.0	649.8
55.00		1.00	1.12	9.770	10.75	227.34	0.650	0.000	2.50	9.035	5.87	63.1	0.0	286.6
60.00		1.00	1.14	9.951	10.95	222.49	0.650	0.000	5.00	17.663	11.48	125.7	0.0	560.2
65.00		1.00	1.16	10.120	11.13	217.37	0.650	0.000	5.00	17.120	11.13	123.9	0.0	542.9
70.00		1.00	1.17	10.279	11.31	212.01	0.650	0.000	5.00	16.577	10.77	121.8	0.0	525.6
73.50 Appurtenance(s)		1.00	1.19	10.385	11.42	208.14	0.650	0.000	3.50	11.281	7.33	83.8	0.0	357.6
75.00		1.00	1.19	10.430	11.47	206.45	0.650	0.000	1.50	4.753	3.09	35.4	0.0	150.7
76.00 Appurtenance(s)		1.00	1.19	10.459	11.50	205.31	0.650	0.000	1.00	3.142	2.04	23.5	0.0	99.6
80.00		1.00	1.21	10.572	11.63	200.70	0.650	0.000	4.00	12.350	8.03	93.4	0.0	391.3
85.00		1.00	1.22	10.708	11.78	194.78	0.650	0.000	5.00	14.948	9.72	114.4	0.0	473.6
90.00		1.00	1.24	10.838	11.92	188.71	0.650	0.000	5.00	14.406	9.36	111.6	0.0	456.3
95.00		1.00	1.25	10.962	12.06	182.50	0.650	0.000	5.00	13.863	9.01	108.7	0.0	439.0
96.50 Appurtenance(s)		1.00	1.26	10.998	12.10	180.61	0.650	0.000	1.50	4.053	2.63	31.9	0.0	128.3
98.50 Top - Section 2		1.00	1.26	11.046	12.15	178.07	0.650	0.000	2.00	5.328	3.46	42.1	0.0	168.7
100.00		1.00	1.27	11.081	12.19	157.50	0.600	0.000	1.50	3.500	2.10	25.6	0.0	138.5
105.00		1.00	1.28	11.195	12.31	158.31	0.600	0.000	5.00	11.667	7.00	86.2	0.0	461.7
108.00 Appurtenance(s)		1.00	1.29	11.262	12.39	158.78	0.600	0.000	3.00	7.000	4.20	52.0	0.0	277.0
108.50 Appurtenance(s)		1.00	1.29	11.273	12.40	158.86	0.600	0.000	0.50	1.167	0.70	8.7	0.0	46.2
Totals:									108.50			2,567.9		14,882.9

Discrete Appurtenance Forces

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II

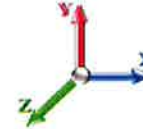


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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 17

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	CaAa x Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)	
1	108.50	Lightning Rod	1	11.273	12.400	1.00	1.00	0.50	5.00	0.000	0.000	6.20	0.00	0.00
2	108.00	RRH 4x45-AWS	3	11.262	12.388	0.99	1.00	8.23	180.00	0.000	0.000	101.91	0.00	0.00
3	108.00	Flush Mount	1	11.262	12.388	1.00	1.00	5.00	350.00	0.000	0.000	61.94	0.00	0.00
4	108.00	DB-T1-6Z-8AB-0Z	2	11.262	12.388	0.90	1.00	8.64	37.80	0.000	0.000	107.03	0.00	0.00
5	108.00	RRH2X60-PCS	3	11.262	12.388	0.89	1.00	5.87	165.00	0.000	0.000	72.77	0.00	0.00
6	108.00	RRH2x60-700	3	11.262	12.388	0.76	1.00	7.98	180.00	0.000	0.000	98.86	0.00	0.00
7	108.00	SBNHH-1D65B	9	11.262	12.388	0.83	1.00	60.96	360.00	0.000	0.000	755.11	0.00	0.00
8	96.50	4 ft Sidearm	1	10.998	12.098	1.00	1.00	3.50	53.32	0.000	0.000	42.34	0.00	0.00
9	96.50	Collar Mount	1	10.998	12.098	1.00	1.00	5.00	350.00	0.000	0.000	60.49	0.00	0.00
10	96.50	UMWD-06516-XD	3	10.998	12.098	0.76	1.00	8.39	39.60	0.000	0.000	101.50	0.00	0.00
11	76.00	6 ft Sidearm	1	10.459	11.505	1.00	1.00	5.15	70.00	0.000	0.000	59.25	0.00	0.00
12	76.00	GPS	1	10.459	11.505	1.00	1.00	1.00	10.00	0.000	0.000	11.50	0.00	0.00
13	73.50	Sidearm	1	10.385	11.424	1.00	1.00	3.50	53.32	0.000	0.000	39.98	0.00	0.00
14	73.50	3'6" x 2'6" Dipole	1	10.331	11.364	1.00	1.00	1.74	15.00	0.000	-1.800	19.77	0.00	-35.59
15	73.50	10' x 1" Omni	1	10.530	11.583	1.00	1.00	1.25	12.00	0.000	5.000	14.48	0.00	72.40
Totals:								1,881.04			1,553.14			

Total Applied Force Summary

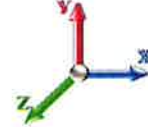
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 17

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		124.63	962.10	0.00	0.00
10.00		121.74	940.45	0.00	0.00
15.00		118.85	918.80	0.00	0.00
20.00		123.04	897.15	0.00	0.00
25.00		125.75	875.50	0.00	0.00
30.00		127.33	853.85	0.00	0.00
35.00		128.08	832.21	0.00	0.00
40.00		128.19	810.56	0.00	0.00
45.00		127.77	788.91	0.00	0.00
46.50		37.88	232.45	0.00	0.00
50.00		89.47	949.37	0.00	0.00
52.50		63.44	666.43	0.00	0.00
55.00		63.12	303.19	0.00	0.00
60.00		125.67	593.40	0.00	0.00
65.00		123.88	576.08	0.00	0.00
70.00		121.83	558.76	0.00	0.00
73.50	(3) attachments	158.00	461.15	0.00	36.80
75.00		35.45	160.13	0.00	0.00
76.00	(2) attachments	94.25	185.89	0.00	0.00
80.00		93.35	415.99	0.00	0.00
85.00		114.45	504.40	0.00	0.00
90.00		111.63	487.08	0.00	0.00
95.00		108.65	469.76	0.00	0.00
96.50	(5) attachments	236.21	580.47	0.00	0.00
98.50		42.08	173.06	0.00	0.00
100.00		25.60	141.82	0.00	0.00
105.00		86.20	472.74	0.00	0.00
108.00	(21) attachments	1249.64	1556.45	0.00	0.00
108.50	(1) attachments	14.88	51.17	0.00	0.00
	Totals:	4,121.04	17,419.34	0.00	36.80

Calculated Forces

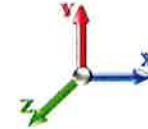
Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



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Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00
Wind Load Factor 1.00



Iterations 17

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-17.42	-4.12	0.00	-301.89	0.00	301.89	3275.65	1637.82	7512.12	3761.64	0.00	0.000	0.000	0.086
5.00	-16.46	-4.00	0.00	-281.27	0.00	281.27	3241.53	1620.76	7261.66	3636.23	0.01	-0.019	0.000	0.082
10.00	-15.51	-3.89	0.00	-261.25	0.00	261.25	3205.46	1602.73	7010.56	3510.49	0.04	-0.038	0.000	0.079
15.00	-14.59	-3.77	0.00	-241.82	0.00	241.82	3167.44	1583.72	6759.13	3384.59	0.09	-0.057	0.000	0.076
20.00	-13.70	-3.65	0.00	-222.96	0.00	222.96	3127.48	1563.74	6507.68	3258.68	0.16	-0.076	0.000	0.073
25.00	-12.82	-3.53	0.00	-204.70	0.00	204.70	3085.56	1542.78	6256.52	3132.91	0.25	-0.095	0.000	0.069
30.00	-11.96	-3.40	0.00	-187.05	0.00	187.05	3041.69	1520.85	6005.97	3007.45	0.36	-0.114	0.000	0.066
35.00	-11.13	-3.28	0.00	-170.03	0.00	170.03	2995.87	1497.94	5756.34	2882.45	0.49	-0.132	0.000	0.063
40.00	-10.32	-3.15	0.00	-153.64	0.00	153.64	2948.10	1474.05	5507.93	2758.06	0.64	-0.150	0.000	0.059
45.00	-9.53	-3.02	0.00	-137.88	0.00	137.88	2898.39	1449.19	5261.05	2634.44	0.81	-0.168	0.000	0.056
46.50	-9.30	-2.99	0.00	-133.35	0.00	133.35	2883.09	1441.55	5187.33	2597.52	0.86	-0.173	0.000	0.055
50.00	-8.35	-2.90	0.00	-122.90	0.00	122.90	2846.72	1423.36	5016.02	2511.74	0.99	-0.185	0.000	0.052
52.50	-7.68	-2.83	0.00	-115.66	0.00	115.66	2057.96	1028.98	3624.72	1815.05	1.09	-0.194	0.000	0.067
55.00	-7.38	-2.77	0.00	-108.58	0.00	108.58	2043.11	1021.55	3544.30	1774.78	1.19	-0.202	0.000	0.065
60.00	-6.78	-2.64	0.00	-94.74	0.00	94.74	2011.95	1005.98	3383.36	1694.19	1.42	-0.222	0.000	0.059
65.00	-6.21	-2.52	0.00	-81.53	0.00	81.53	1978.85	989.42	3222.55	1613.67	1.66	-0.240	0.000	0.054
70.00	-5.65	-2.40	0.00	-68.94	0.00	68.94	1943.79	971.90	3062.19	1533.37	1.92	-0.257	0.000	0.048
73.50	-5.19	-2.24	0.00	-60.51	0.00	60.51	1918.09	959.05	2950.37	1477.38	2.11	-0.269	0.000	0.044
75.00	-5.03	-2.20	0.00	-57.16	0.00	57.16	1906.79	953.39	2902.59	1453.45	2.20	-0.273	0.000	0.042
76.00	-4.84	-2.11	0.00	-54.96	0.00	54.96	1899.15	949.58	2870.79	1437.53	2.26	-0.276	0.000	0.041
80.00	-4.43	-2.01	0.00	-46.54	0.00	46.54	1867.83	933.91	2744.05	1374.07	2.49	-0.288	0.000	0.036
85.00	-3.92	-1.90	0.00	-36.48	0.00	36.48	1826.92	913.46	2586.89	1295.37	2.80	-0.301	0.000	0.030
90.00	-3.44	-1.78	0.00	-27.00	0.00	27.00	1784.07	892.03	2431.43	1217.52	3.12	-0.312	0.000	0.024
95.00	-2.97	-1.67	0.00	-18.09	0.00	18.09	1739.26	869.63	2277.96	1140.67	3.45	-0.321	0.000	0.018
96.50	-2.39	-1.43	0.00	-15.59	0.00	15.59	1725.44	862.72	2232.35	1117.84	3.56	-0.323	0.000	0.015
98.50	-2.21	-1.39	0.00	-12.72	0.00	12.72	1706.74	853.37	2171.89	1087.56	3.69	-0.326	0.000	0.013
98.50	-2.21	-1.39	0.00	-12.72	0.00	12.72	854.88	427.44	974.68	581.27	3.69	-0.326	0.000	0.024
100.00	-2.07	-1.36	0.00	-10.64	0.00	10.64	854.88	427.44	974.68	581.27	3.79	-0.327	0.000	0.021
105.00	-1.60	-1.27	0.00	-3.83	0.00	3.83	854.88	427.44	974.68	581.27	4.14	-0.331	0.000	0.008
108.00	-0.05	-0.02	0.00	-0.01	0.00	0.01	854.88	427.44	974.68	581.27	4.35	-0.332	0.000	0.000
108.50	0.00	-0.01	0.00	0.00	0.00	0.00	854.88	427.44	974.68	581.27	4.38	-0.332	0.000	0.000

Final Analysis Summary

Structure: CT46140-A-SBA	Code: EIA/TIA-222-G	10/11/2016
Site Name: S. Durham-rt 17/ Lawson	Exposure: C	
Height: 108.50 (ft)	Crest Height: 0.00	
Base Elev: 0.000 (ft)	Site Class: B - Competent Rock	
Gh: 1.1	Topography: 1	Struct Class: II



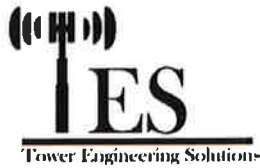
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Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 98 mph Wind	17.6	0.00	20.89	0.00	0.00	1290.69
0.9D + 1.6W 98 mph Wind	17.6	0.00	15.66	0.00	0.00	1287.79
1.2D + 1.0Di + 1.0Wi 50 mph Wind	5.1	0.00	33.35	0.00	0.00	357.32
1.2D + 1.0E	0.6	0.00	20.90	0.00	0.00	47.24
0.9D + 1.0E	0.6	0.00	15.68	0.00	0.00	47.13
1.0D + 1.0W 60 mph Wind	4.1	0.00	17.42	0.00	0.00	301.89

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 98 mph Wind	-20.89	-17.61	0.00	-1290.6	0.00	-1290.6	3275.65	1637.8	7512.12	3761.64	0.00	0.350
0.9D + 1.6W 98 mph Wind	-15.66	-17.60	0.00	-1287.7	0.00	-1287.7	3275.65	1637.8	7512.12	3761.64	0.00	0.347
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-33.35	-5.12	0.00	-357.32	0.00	-357.32	3275.65	1637.8	7512.12	3761.64	0.00	0.105
1.2D + 1.0E	-20.90	-0.55	0.00	-47.24	0.00	-47.24	3275.65	1637.8	7512.12	3761.64	0.00	0.019
0.9D + 1.0E	-15.68	-0.55	0.00	-47.13	0.00	-47.13	3275.65	1637.8	7512.12	3761.64	0.00	0.017
1.0D + 1.0W 60 mph Wind	-17.42	-4.12	0.00	-301.89	0.00	-301.89	3275.65	1637.8	7512.12	3761.64	0.00	0.086



Monopole Mat Foundation Design

Date
10/11/2016

Customer Name:	Verizon	EIA/TIA Standard:	EIA-222-G
Site Name:		Structure Height (Ft.):	108.5
Site Number:	CT46140-A-SBA	Engineer Name:	J. Chen
Engr. Number:	26664	Engineer Login ID:	JES

Foundation Info Obtained from:

Drawings/Calculations

Structure Type:

Monopole

Analysis or Design?

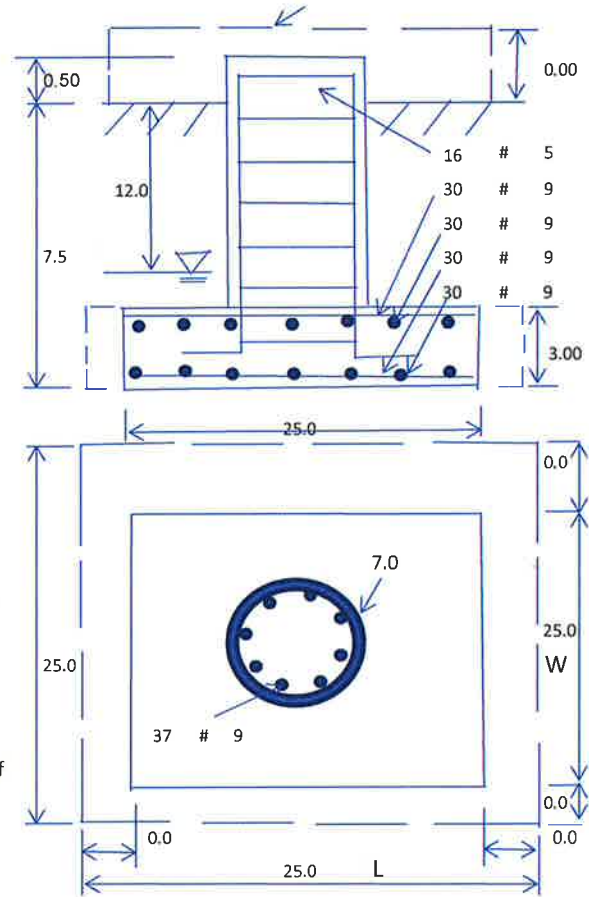
Analysis

Base Reactions (Factored):

Axial Load (Kips):	33.3	Shear Force (Kips):	17.6
Uplift Force (Kips):	0.0	Moment (Kips-ft):	1290.7

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	7.0	Depth of Base BG (ft.):	7.5
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	3.00
Length of Pad (ft.):	25	Width of Pad (ft.):	25
Final Length of pad (ft)	25.0	Final width of pad (ft):	25.0
Control Value for Cell D18:	0	Control Value for Cell F18:	0



Material Properties and Rebar Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	9	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	37	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	30	Qty. of Rebar in Pad (W):	30	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	30	Qty. of Rebar in Pad (W):	30	

Soil Design Parameters:

Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	50.0	Pcf	
Water Table B.G.S. (ft):	12.0	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad: 30
Ultimate Bearing Pressure (psf):	12000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad: 25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	No		Angle from Bottm of Pad: 25
Consider soil hor. resist. for OTM.:	No	Reduction factor on the maximum soil bearing pressure:	1.00		

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75
Total Dry Soil Volume (cu. Ft.):	2639.32	Total Dry Soil Weight (Kips):	290.43
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	290.43	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	2067.42	Total Dry Concrete Weight (Kips):	310.11
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	310.11	Total Vertical Load on Base (Kips):	633.84

Check Soil Capacities:

Calculated Maxium Net Soil Pressure under the base (psf):	1283	<	Allowable Factored Soil Bearing (psf):	9000	0.14	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	7172.4	>	Design Factored Momont (kips-ft):	1432	0.20	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	5.01					OK!

Load/
Capacity
Ratio

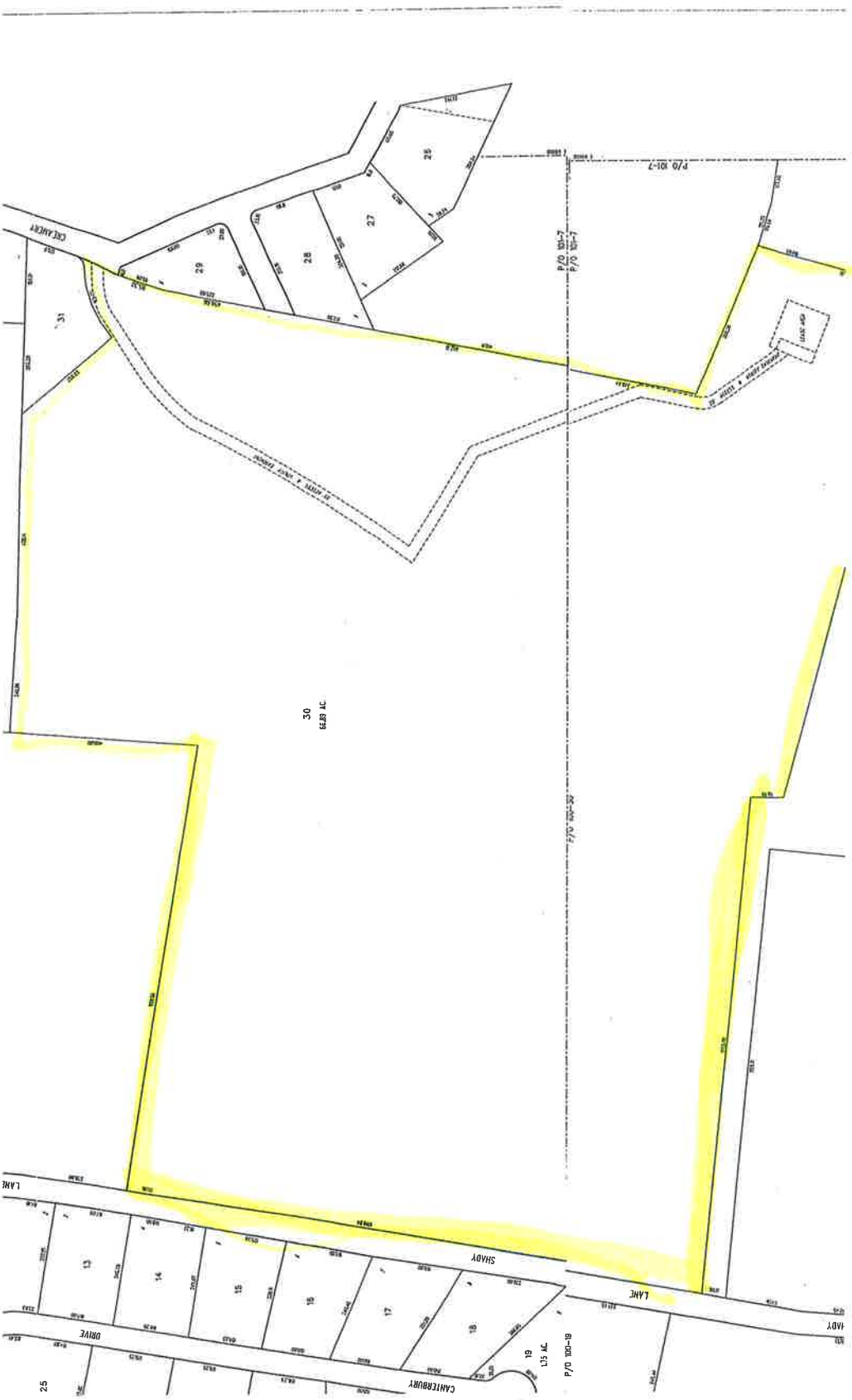
Check the capacities of Reinforcing Concrete:

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:	1.00		
				Load/ Capacity Ratio	
(1) Concrete Pier:					
Vertical Steel Rebar Area (sq. in./each):	1.00	Tie / Stirrup Area (sq. in./each):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	5899.1	> Design Factored Moment (Mu, Kips-Ft)	1378.7	0.23	OK!
Calculated Shear Capacity (Kips):	871.9	> Design Factored Shear (Kips):	17.6	0.02	OK!
Calculated Tension Capacity (Tn, Kips):	1998.0	> Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	7299.3	> Design Factored Axial Load (Pu Kips):	33.3	0.00	OK!
Moment & Axial Strength Combination:	0.23	OK! Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.007	Reinforcement Ratio is satisfied per ACI			

(2).Concrete Pad:

One-Way Design Shear Capacity (L-Direction, Kips):	799.5	> One-Way Factored Shear (L-D. Kips):	131.9	0.17	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	799.5	> One-Way Factored Shear (W-D., Kips)	131.9	0.17	OK!
One-Way Design Shear Capacity (Corner-Corner, Kips):	906.8	> One-Way Factored Shear (C-C, Kips):	110.9	0.12	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0031	OK! Lower Steel Pad Reinf. Ratio (W-Direct	0.0031		
Lower Steel Pad Moment Capacity (L-Direction, Kips-ft):	4220.2	> Moment at Bottom (L-Direct, K-Ft):	415.4	0.10	OK!
Lower Steel Pad Moment Capacity (W-Direction, Kips-ft):	4220.2	> Moment at Bottom (W-Direct, K-Ft):	415.4	0.10	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	5912.9	> Moment at Bottom (C-C Dir, K-Ft):	587.4	0.10	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0031	OK! Upper Steel Reinf. Ratio (W-Direct.):	0.0031		
Upper Steel Pad Moment Capacity (L-Direction, Kips-ft):	4220.2	> Moment at the top (L-Dir Kips-Ft):	136.4	0.03	OK!
Upper Steel Pad Moment Capacity (W-Direction, Kips-ft):	4220.2	> Moment at the top (W-Dir Kips-Ft):	136.4	0.03	OK!
Upper Steel Pad Moment Capacity (Corner-Corner, K-ft):	5912.9	> Moment at the top (C-C Direc, K-Ft):	179.2	0.03	OK!

ATTACHMENT 4



Durham, CT : Commercial Property Record Card

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[[Start a New Search](#)] [[Help with Printing](#)]

Search For Properties

Parcel ID	Name	Street Name	
		CREAMERY RD ▼	<input type="button" value="Search"/> <input type="button" value="Reset"/>

Parcel ID	Card	Routing No	Location	Zoning	State Class	Acres
L0141901	1	100 030	134R CREAMERY RD	FR	200 - n/a	0.230
Living Units						
0						

Owner Information

Lawson William W Jr C/O Sprint Spectrum Lp

Property Picture

[No Picture Available]

Deed Information

Book/Page: 211/01
Deed Date: n/a

Building Information

Building No: 0
Year Built: 0
No of Units: 0
Structure Type:
Grade:
Identical Units: 0

Valuation

Land: \$163,500
Building: \$64,800
Total: \$228,300
Net Assessment: \$159,810

Sales History

Book/Page	Date	Price	Type	Validity
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Out Building Information

Structure Code	Width	Lgth/SqFt	Year	RCNLD
Cell Tower	0	180	0	\$64,800
Tower Tr Tv	0	0	0	\$0

Exterior/Interior Information

Levels Size Use Type Ext. Walls Const. Type Partitions Heating A/C Plumbing Condition Func. Utility Unadj. RCNLD

Building Sketch

<u>Descriptor/Area</u>

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Comments regarding this service should be directed to: jphilip@townofdurhamct.org

