Robinson+Cole

KENNETH C. BALDWIN

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Also admitted in Massachusetts

October 21, 2015

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

Re: **Notice of Exempt Modification – Facility Modification**
289H Mountain Street, Hartford, Connecticut

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless ("Cellco") currently maintains twelve (12) wireless telecommunications antennas at the 80-foot level of the existing 110-foot tower at 289H Mountain Street in Hartford, Connecticut (the "Property"). The tower is owned by American Tower Corporation ("ATC"). The Council approved Cellco's use of the existing tower in 2014. Cellco now intends to modify its facility by replacing six (6) remote radio heads ("RRHs") with six (6) newer model RRHs. Included in Attachment 1 are specifications for Cellco's new RRHs.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Hartford Mayor, Pedro E. Segarra. A copy of this letter is also being sent to the Metropolitan District Commission, the owner of the Property and ATC, 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).

1. The proposed modifications will not result in an increase in the height of the existing tower. The replacement RRHs will be located at the 80-foot level on the 110-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.

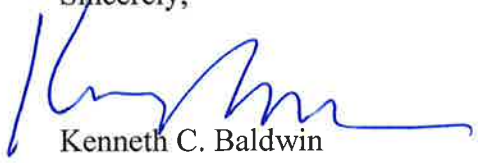
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) safety standard. Far Field Approximation tables for each of Cellco's operating frequencies are included behind Attachment 2. The Far Field calculations demonstrate that Cellco's modified facility will operate well within the RF emissions standards established by the FCC.

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).

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

Sincerely,



Kenneth C. Baldwin

Enclosures
Copy to:
Pedro E. Segarra, Hartford Mayor
Metropolitan District Commission
Heather Douglas Wilkins, ATC
Tim Parks

ATTACHMENT 1

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.

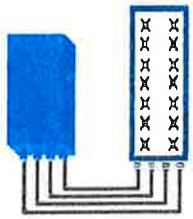
Its compactness and slim design makes the Alcatel-Lucent B13 RRH4x30-4R easy to install close to the antenna: operators can therefore locate this Remote Radio Head where RF design conditions are deemed ideal, minimizing trade-offs between available sites and RF optimum sites, together with reducing the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

Alcatel·Lucent

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.) Volume in L Weight in kg (lb) (w/o mounting HW)	550 x 305 x 230 (21.6" x 12.0" x 9") (with solar shield) 38 (with solar shield) 26 (57.2) (with solar shield)
DC voltage range DC power consumption	-40.5 to -57V at full performance, -38 to -57V with relaxation on power consumption 550W typical @100% RF load (in 2Tx or 4TX mode)
Environmental conditions Wind load (@150km/h or 93mph)	-40°C (-40°F) /+55°C (+131°F) 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

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

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

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

The Alcatel-Lucent RRH2x60-AWS 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-AWS integrates all the latest technologies. This allows to offer best-in-class characteristics.

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

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

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

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

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

OPTIMIZED TCO

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

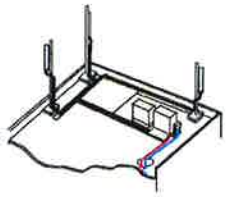
EASY INSTALLATION

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

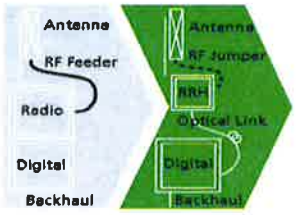
The limited space available in some sites may prevent the installation of traditional single-cabinet BTS equipment. However, many of these sites can host an Alcatel-Lucent RRH2x60-AWS installation, providing more flexible site selection and improved network quality along with greatly reduced installation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

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

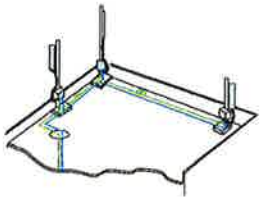
Installation can easily be done by a single person as the Alcatel–Lucent RRH2x60-AWS is compact and weighs about 20 kg, eliminating the need for a crane to hoist the BTS cabinet to the rooftop. A site can be in operation in less than one day.



Macro



RRH for space-constrained cell sites



Distributed

FEATURES

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

BENEFITS

- MIMO LTE operation with only one single unit per sector
- Improved uplink coverage with built-in 4-way receive diversity capability
- RRH can be mounted close to the antenna, eliminating nearly all losses in RF cables and thus reducing power consumption by 50% compared to conventional solutions
- Distributed configurations provide easily deployable and cost-effective solutions, near zero footprint and silent solutions, with minimum impact on the neighborhood, which ease the deployment
- RETA and TMA support without additional hardware thanks to the AISG v2.0 port and the integrated Bias-Tees. Bias-Tees support AISG DC supply and signaling.

TECHNICAL SPECIFICATIONS

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

Dimensions and weights

- HxWxD : 510x285x186mm (27 l with solar shield)
- Weight : 20 kg (44 lbs)

Electrical Data

- Power Supply : -48V DC (-40.5 to -57V)
- Power Consumption (ETSI average traffic load reference) : 250W @2x60W

RF Characteristics

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

Connectivity

- Two CPRI optical ports for daisychaining 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 20km 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 : ETS 300 019-1-4 class 4.1E
- Ingress Protection : IEC 60529 IP65
- Acoustic Noise : Noiseless (natural convection cooling)

Safety and Regulatory Data

- EMC : 3GPP 25113, EN 301 489-1, EN 301 489-23, GR 1089, GR 3108, OET-65
- Safety : IEC60950-1, EN 60825-1, UL, ANSI/NFPA 70, CAN/CSA-C22.2
- Regulatory : FCC Part 15 Class B, CE Mark – European Directive : 2002/95/EC (ROHS); 2002/96/EC (WEEE); 1999/5/EC (R&TTE)
- Health : EN 50385

Alcatel·Lucent

AT THE SPEED OF IDEAS™

ATTACHMENT 2

Far Field Approximation
with downtilt variation

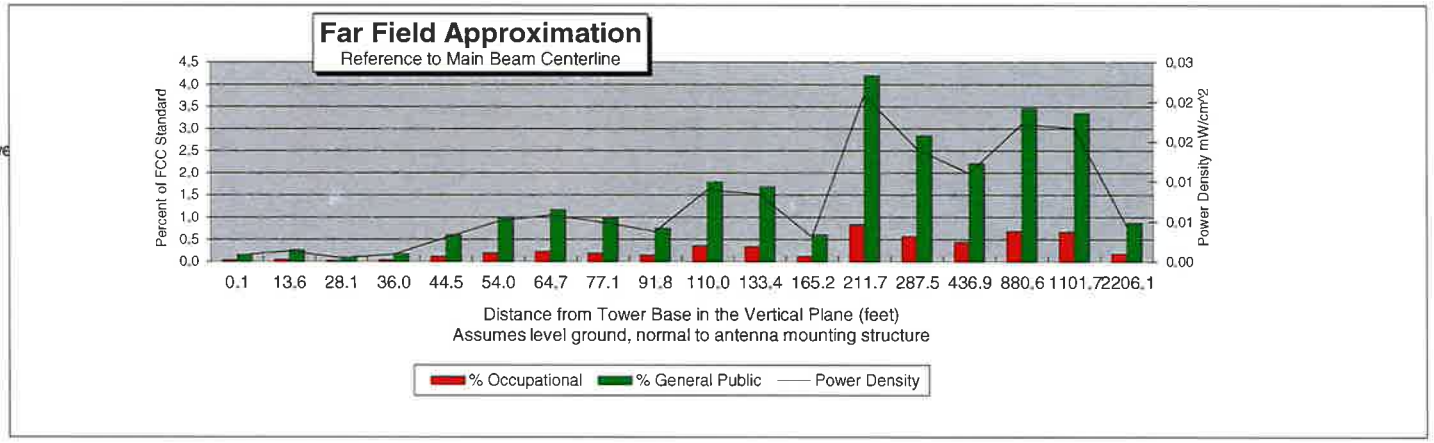
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Hartford South 3, CT
Site #:	
Date:	10/20/15
Name:	Mark Brauer
File Name:	Hartford South 3, CT - FF Powe

Operating Freq. (MHz)	**746.0**
Antenna Height (ft):	**80.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**0.0**
ERP (w):	**2100.0**
Number of Channels	**1**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
Solve for r, dx to antenna	77.0	78.2	82.0	85.0	88.9	94.0	100.6	108.9	119.8	134.3	154.1	182.3	225.2	297.7	443.6	883.9	1104.4	2207.5	
Distance from Antenna Structure Base in Horizontal plane	0.1	13.6	28.1	36.0	44.5	54.0	64.7	77.1	91.8	110.0	133.4	165.2	211.7	287.5	436.9	880.6	1101.7	2206.1	
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2	
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0	
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.02	0.01	0.01	0.02	0.02	0.00	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.1	0.8	0.6	0.4	0.7	0.7	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.6	1.0	1.2	1.0	0.8	1.8	1.7	0.6	4.2	2.8	2.2	3.5	3.4	0.9	

Antenna Type BXA-70063-6CF
Max% 4.20%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

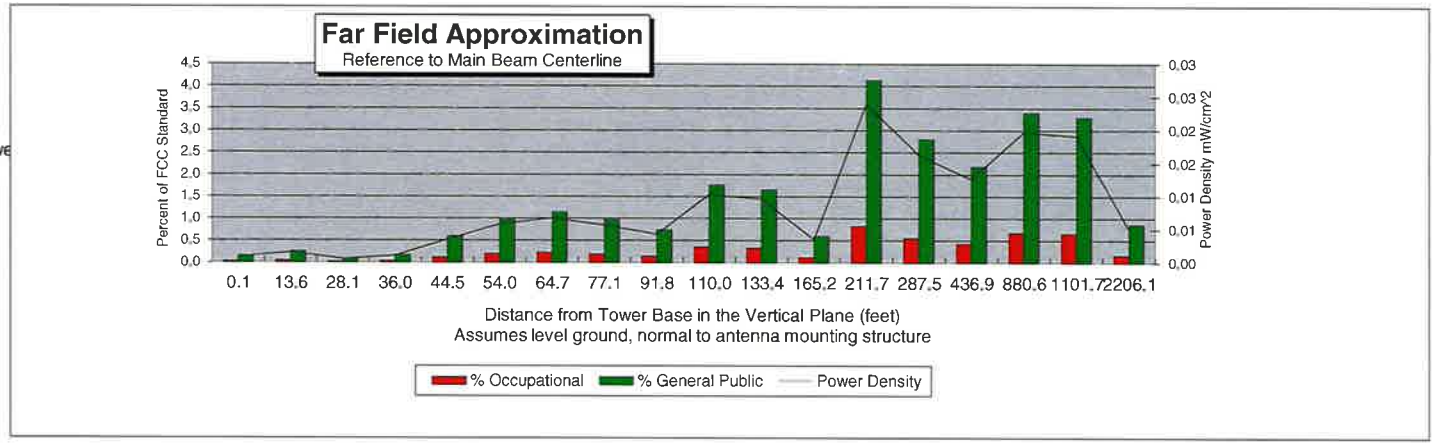
Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

Location:	Hartford South 3, CT
Site #:	
Date:	10/20/15
Name:	Mark Brauer
File Name:	Hartford South 3, CT - FF Powe

Operating Freq. (MHz)	**869.0**
Antenna Height (ft):	**80.0**
Antenna Gain (dBi):	**16.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**3852.0**
Number of Channels	**9**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	77.0	78.2	82.0	85.0	88.9	94.0	100.6	108.9	119.8	134.3	154.1	182.3	225.2	297.7	443.6	883.9	1104.4	2207.5
Distance from Antenna Structure Base in Horizontal plane	0.1	13.6	28.1	36.0	44.5	54.0	64.7	77.1	91.8	110.0	133.4	165.2	211.7	287.5	436.9	880.6	1101.7	2206.1
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.02	0.02	0.01	0.02	0.02	0.01
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.1	0.2	0.2	0.2	0.1	0.4	0.3	0.1	0.8	0.6	0.4	0.7	0.7	0.2
Percent of General Population Standard	0.1	0.3	0.1	0.2	0.6	1.0	1.1	1.0	0.7	1.8	1.7	0.6	4.1	2.8	2.2	3.4	3.3	0.9

Antenna Type BXA-70063-6CF
Max% 4.13%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

Far Field Approximation
with downtilt variation

Estimated Radiated Emission

Single Emitter Far Field Model

Dipole / Wire/ Yagi Antenna Types

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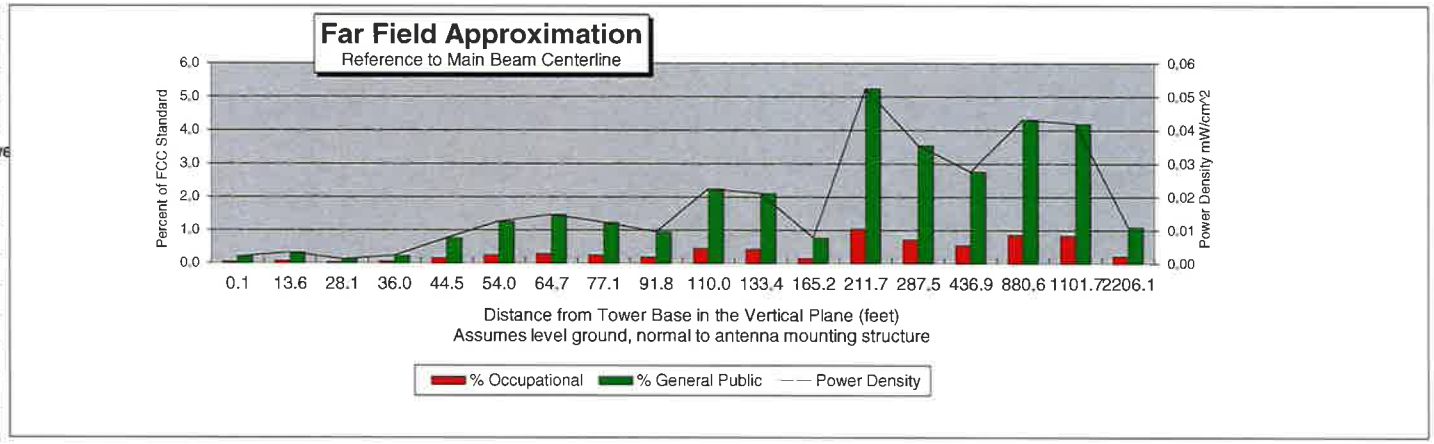
Site #:	
Date:	10/20/15
Name:	Mark Brauer
File Name:	Hartford South 3, CT - FF Powe

Operating Freq. (MHz)	**1970.0**
Antenna Height (ft):	**80.0**
Antenna Gain (dBi):	**18.7**
Antenna Size (in.):	**72.0**
Downtilt (degrees):	**0.0**
Feedline Loss (dB):	**2.0**
Power @ J4 (w):	**5295.0**
Number of Channels	**11**



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0	
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Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.01	0.05	0.04	0.03	0.04	0.04	0.01	
Percent of Occupational Standard	0.0	0.1	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.4	0.4	0.2	1.0	0.7	0.6	0.9	0.8	0.2	
Percent of General Population Standard	0.2	0.3	0.1	0.2	0.8	1.3	1.5	1.2	0.9	2.2	2.1	0.8	5.2	3.6	2.8	4.3	4.2	1.1	

Antenna Type BXA-171063-12CF
Max% 5.24%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
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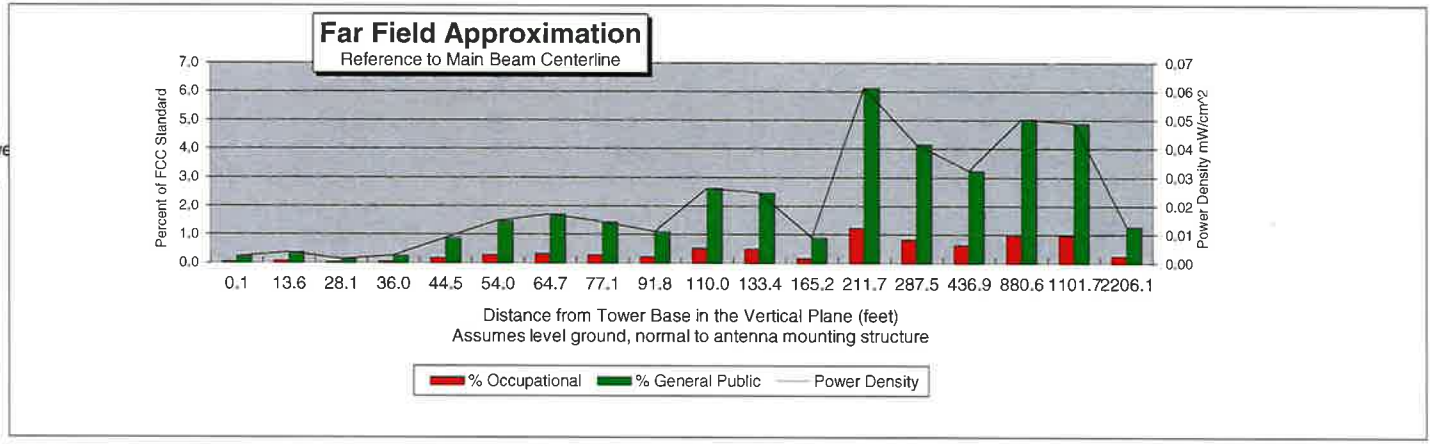
Name:	Mark Brauer
File Name:	Hartford South 3, CT - FF Powe

Operating Freq. (MHz)	2110.0
Antenna Height (ft):	80.0
Antenna Gain (dBi):	19.1
Antenna Size (in.):	72.0
Downtilt (degrees):	0.0
Feedline Loss (dB):	0.0
ERP (w):	3500.0
Number of Channels	1



Calc Angle	90.0	80.0	70.0	65.0	60.0	55.0	50.0	45.0	40.0	35.0	30.0	25.0	20.0	15.0	10.0	5.0	4.0	2.0
Solve for r, dx to antenna	77.0	78.2	82.0	85.0	88.9	94.0	100.6	108.9	119.8	134.3	154.1	182.3	225.2	297.7	443.6	883.9	1104.4	2207.5
Distance from Antenna Structure Base in Horizontal plane	0.1	13.6	28.1	36.0	44.5	54.0	64.7	77.1	91.8	110.0	133.4	165.2	211.7	287.5	436.9	880.6	1101.7	2206.1
Angle from Main Beam (reference to horizontal plane)	90	80	70	65	60	55	50	45	40	35	30	25	20	15	10	5	4	2
dB down from centerline (referenced to centerline)	36.76	34.35	38.52	35.34	29.54	26.8	25.59	25.63	25.99	21.21	20.29	23.24	13.03	12.3	9.92	2	0.2	0
Reflection Coefficient (1 to 4, 2.56 typical)	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56	2.56
Power Density (mW/cm^2)	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.01	0.01	0.03	0.02	0.01	0.06	0.04	0.03	0.05	0.05	0.01
Percent of Occupational Standard	0.0	0.1	0.0	0.1	0.2	0.3	0.3	0.3	0.2	0.5	0.5	0.2	1.2	0.8	0.6	1.0	1.0	0.3
Percent of General Population Standard	0.2	0.4	0.1	0.3	0.9	1.5	1.7	1.4	1.1	2.6	2.5	0.9	6.1	4.1	3.2	5.0	4.9	1.3

Antenna Type BXA-171063-12CF
Max% 6.12%

Instructions:

1) Fill in Site Location, Site number, Date, Name of Person Responsible for Date, and enter File Name to ba saved as.
2) References to J4 refer to a point where the transmission line exits the equipment shelter and proceeds to the antenna(s). There is typically a connector located here where power measurements are made.
3) Enter Antenna Height (in feet to bottom of antenna), Antenna Gain (expressed as dBi, add 2.17 to dBd to obtain dBi), Antenna Size (vertical size in inches), Downtilt (in Degrees, enter zero if none), Feedline loss from J4 to Antenna, and J4 Po
4) From manufacturer's plots, or data sheet, input Angle from mainbeam and dB below mainbeam centerline.
5) Enter Reflection coefficient (2.56 would be typical, 1 for free space)
6) Spreadsheet calculates actual power density, then relates as Occupational or General Population percentage of FCC Standard.
7) An odd distance may be entered in the rightmost column of the lower table.

ATTACHMENT 3

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Structural Analysis Report

Structure	:	**110 ft Monopole**
ATC Site Name	:	**Hrfr - South, CT**
ATC Site Number	:	**302481**
Engineering Number	:	**62757221**
Proposed Carrier	:	**Verizon**
Carrier Site Name	:	**Hartford S3, CT**
Carrier Site Number	:	**N/A**
Site Location	:	**Mountain Road** **Hartford, CT 06106-4121** **41.726569,-72.708169**
County	:	**Hartford**
Date	:	**August 27, 2015**
Max Usage	:	**98%**
Result	:	**Pass**

Reviewed by:
Scott Wirgau, PE
Structural Team Leader

Prepared By:
Joshua J. Ferguson

Joshua J. Ferguson

Aug 27 2015 5:59 PM

COA: PEC.0001553

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Table of Contents

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Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 110 ft monopole to reflect the change in loading by Verizon.

Supporting Documents

Tower Drawings	Mapped by Smith Cullum Site #CT-0017(A), dated June 6, 2001
Foundation Drawing	Girard & Co Engineering Job #39902, dated April 29, 1988
Geotechnical Report	TEP Project #071162.01, dated July 23, 2007
Modifications	ATC Project #42719232, dated January 12, 2009 ATC Project #43595333, dated July 1, 2009 ATC Project #43930034, dated September 15, 2009 ATC Project #44662232, dated March 30, 2010

Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

Basic Wind Speed:	95 mph (3-Second Gust)
Basic Wind Speed w/ Ice:	50 mph (3-Second Gust) w/ 1" radial ice concurrent
Code:	ANSI/TIA-222-G / 2003 IBC w/ 2005 CT Supplement & 2009 CT Amendment
Structure Class:	II
Exposure Category:	B
Topographic Category:	4
Crest Height:	36 ft
Spectral Response:	Ss = 0.18, S_1 = 0.06
Site Class:	D - Stiff Soil

Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

Existing and Reserved Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
110.0	110.0	3	DragonWave Horizon Compact	Side Arms	(6) 5/16" Coax (3) 1/2" Coax (1) 2" Conduit	Clearwire
		1	DragonWave A-ANT-23G-1-C			
		3	NextNet BTS-2500			
		3	Argus LLPX310R			
		2	DragonWave A-ANT-11G-2.5-C			
100.0	102.0	1	Raycap DC6-48-60-18-8F	Platform w/ Handrails	(12) 1 5/8" Coax (2) 0.78" 8 AWG 6 (1) 0.39" Cable (1) 3" Conduit	AT&T Mobility
		6	Ericsson RRUS 11 (Band 12) (55 lb)			
		6	Powerwave 7770.00			
		2	KMW AM-X-CD-16-65-00T-RET			
		1	Andrew SBNH-1D6565C			
	100.0	6	Kathrein 860-10025			
		3	Powerwave TT19-08BP111-001			
		6	Powerwave LGP21401			
89.5	91.0	6	CCI DTMA-1819-DD-12	Low Profile Platform	(18) 1 5/8" Coax	T-Mobile
		3	RFS APXV18-206516S-C			
		3	RFS APX16DWV-16DWV-S-E-ACU			
80.0	80.0	6	Antel BXA-171063-12CF-EDIN-5	Low Profile Platform	(12) 1 5/8" Coax (2) 1 5/8" Hybriflex	Verizon
		2	RFS DB-T1-6Z-8AB-0Z			
		6	Antel BXA-70063-6CF-EDIN-2			
77.0	77.0	1	Scala 840 10212	Side Arms	(1) 3/8" Coax (1) 7/8" Coax	Town Of West Hartford
		1	TX RX Systems 421-86A-10-18-12-N			
73.0	75.0	3	RFS APXV18-206517S-C	Side Arms	(6) 1 5/8" Coax	Metro PCS
70.0	70.0	1	Radio/ODU	Flush	(2) 3/8" Coax (1) 1/4" Coax	Town Of West Hartford
		1	Radio Waves SP2-4.7			
66.0	68.0	1	Scala 840 10212	Side Arm	(1) 7/8" Coax	Town Of West Hartford

Equipment to be Removed

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
80.0	80.0	3	Alcatel-Lucent RRH2x40 (700)	-	-	Verizon
		3	Alcatel-Lucent RRH2x40-AWS			

Proposed Equipment

Elevation[1] (ft)		Qty	Antenna	Mount Type	Lines	Carrier
Mount	RAD					
80.0	80.0	3	Alcatel-Lucent RRH2X60-AWS	Low Profile Platform	-	Verizon
		3	Alcatel-Lucent RRH2x60 700			

[1]Mount elevation is defined as height above bottom of steel structure to the bottom of mount, RAD elevation is defined as center of antenna above ground level (AGL).

Structure Usages

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	38%	Pass
Shaft	98%	Pass
Base Plate	70%	Pass
Flanges	11%	Pass
Reinforcement	94%	Pass

Foundations

Reaction Component	Analysis Reactions	% of Usage
Moment (Kips-Ft)	1,704.9	11%
Axial (Kips)	76.4	17%
Shear (Kips)	24.8	79%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

Foundations and anchorages have been analyzed with a factor of safety greater than or equal to two.

Deflection and Sway*

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
110.0	DragonWave A-ANT-23G-1-C	Clearwire	1.730	1.613
	DragonWave A-ANT-11G-2.5-C			
80.0	Alcatel-Lucent RRH2X60-AWS	Verizon	0.943	1.244
	Alcatel-Lucent RRH2x60 700			
70.0	Radio Waves SP2-4.7	Town of West Hartfor	0.742	1.096

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

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Standard Conditions

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

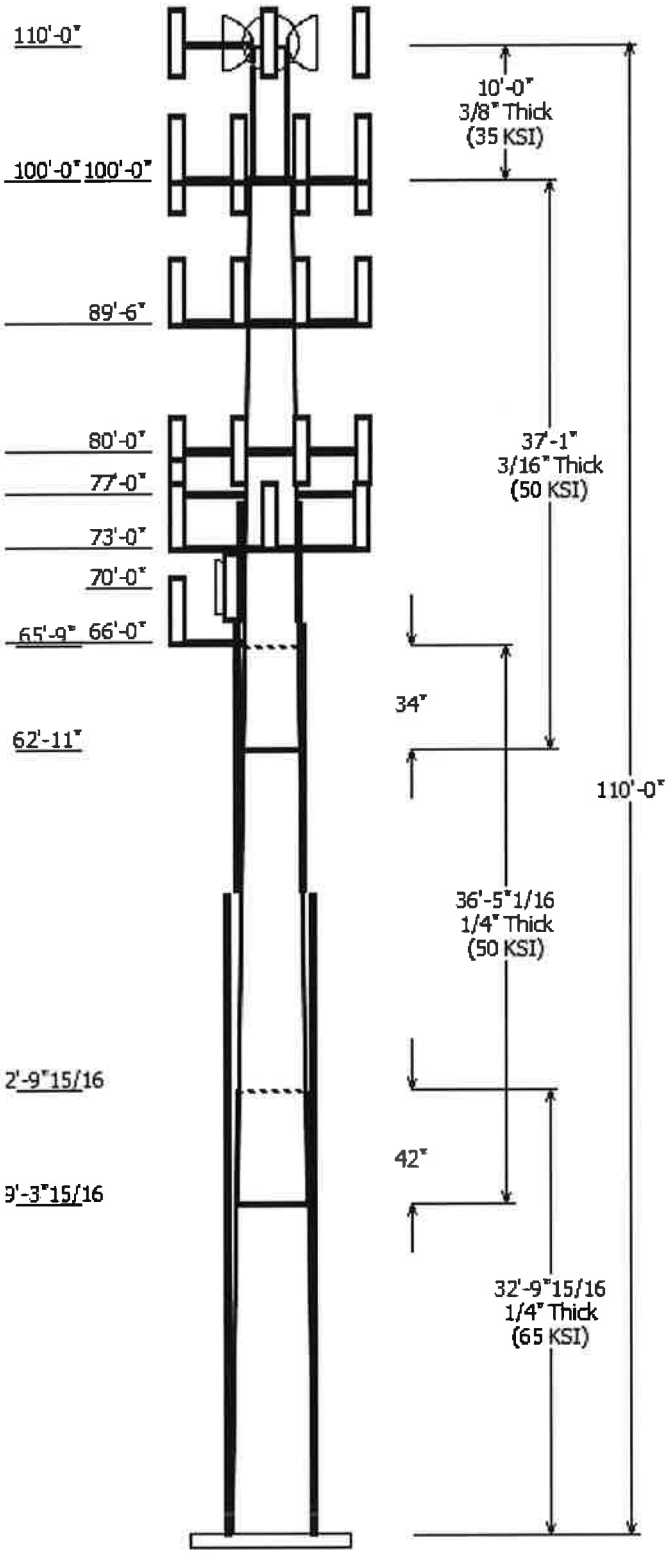
-- Information supplied by the client regarding the structure itself, antenna, mounts and feed line loading on the structure and its components, or other relevant information.

-- Information from drawings in the possession of American Tower Corporation, or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and that their capacity has not significantly changed from the "as new" condition.

Unless explicitly agreed by both the client and American Tower Corporation, all services will be performed in accordance with the current revision of ANSI/TIA -222. The design basic wind speed will be determined based on the minimum basic wind speed as prescribed in ANSI/TIA-222. Although every effort is taken to ensure that the loading considered is adequate to meet the requirements of all applicable regulatory entities, we can provide no assurance to meet any other local and state codes or requirements. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.



Job Information

Pole :	302481	Code:	ANSI/TIA-222-G
Description :	110' ITT Meyer Monopole		
Client :	VERIZON WIRELESS	Struct Class :	II
Location :	Hrfr - South, CT		
Shape :	12 Sides	Exposure :	B
Height :	110.00 (ft)	Topo :	4
Base Elev (ft):	0.00		
Taper:	0.16375 (in/ft)		

Sections Properties

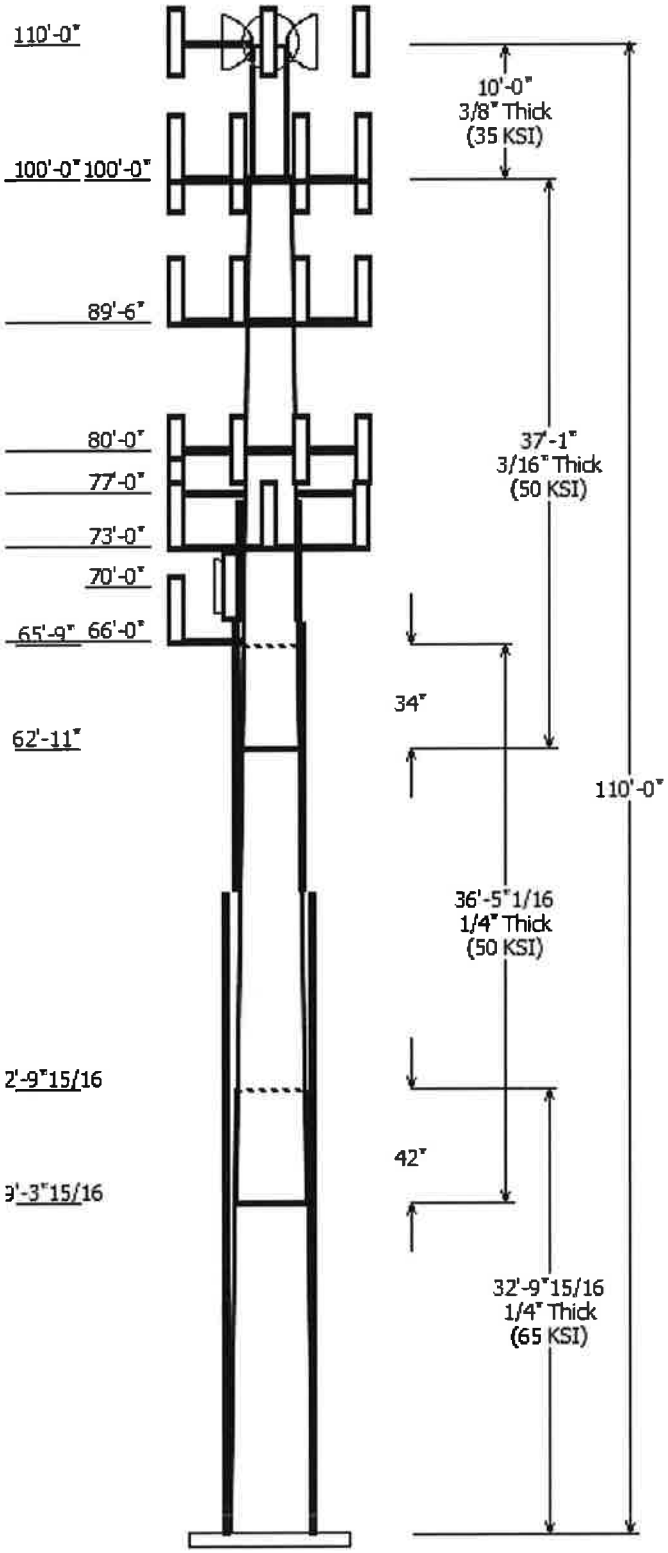
Shaft Section	Length (ft)	Diameter (in) Across Flats Top	Bottom	Thick (in)	Joint Type	Overlap Length (in)	Taper (in/ft)	Steel Grade (ksi)
1	32.830	24.62	30.00	0.250		0.000	0.163751	65
2	36.420	19.73	25.69	0.250	Slip Joint	42.000	0.163751	50
3	37.083	14.50	20.57	0.188	Slip Joint	34.000	0.163751	50
4	10.000	12.75	12.75	0.375	Butt Joint	0.000	0.000000	35

Discrete Appurtenance

Attach Elev (ft)	Force Elev (ft)	Qty	Description
110.000	110.000	1	Side Arms
110.000	110.000	1	DragonWave A-ANT-23G-1-C
110.000	110.000	3	Argus LLPX310R
110.000	110.000	3	NextNet BTS-2500
110.000	110.000	2	DragonWave A-ANT-11G-2.5-C
110.000	110.000	3	DragonWave Horizon Compact
100.000	102.000	6	Powerwave 7770.00
100.000	102.000	1	Andrew SBNH-1D6565C
100.000	102.000	1	Raycap DC6-48-60-18-8F
100.000	102.000	2	KMW AM-X-CD-16-65-00T-RET
100.000	100.000	6	Kathrein 860-10025
100.000	102.000	6	Ericsson RRUS 11 (Band 12) (55
100.000	100.000	1	Flat Platform w/ Handrails
100.000	100.000	3	Powerwave TT19-08BP111-001
100.000	100.000	6	Powerwave LGP21401
89.500	91.000	3	RFS APXV18-206516S-C
89.500	91.000	3	RFS APX16DWV-16DWV-S-E-
89.500	89.500	1	Flat Low Profile Platform
89.500	91.000	6	CCI DTMA-1819-DD-12
80.000	80.000	1	Round Low Profile Platform
80.000	80.000	3	Alcatel-Lucent RRH2x60 700
80.000	80.000	3	Alcatel-Lucent RRH2X60-AWS
80.000	80.000	2	RFS DB-T1-6Z-8AB-0Z
80.000	80.000	6	Antel BXA-70063-6CF-EDIN-2
80.000	80.000	6	Antel BXA-171063-12CF-EDIN-5
77.000	77.000	2	Stand Off
77.000	77.000	1	TX RX Systems 421-86A-10-18-
77.000	77.000	1	Scala 840 10212
73.000	73.000	3	Round Side Arm
73.000	75.000	3	RFS APXV18-206517S-C
70.000	70.000	1	Radio/ODU
70.000	70.000	1	Radio Waves SP2-4.7
66.000	66.000	1	Stand Off
66.000	68.000	1	Scala 840 10212

Linear Appurtenance

Elev (ft) From	To	Description	Exposed To Wind
0.000	66.000	7/8" Coax	Yes
0.000	70.000	1/4" Coax	Yes
0.000	70.000	3/8" Coax	Yes



0.000	73.000	1 5/8" Coax	Yes
0.000	77.000	3/8" Coax	Yes
0.000	77.000	7/8" Coax	Yes
0.000	80.000	1 5/8" Coax	Yes
0.000	80.000	1 5/8" Hybriflex	Yes
0.000	81.000	#20 Dywidag	Yes
0.000	89.500	1 5/8" Coax	Yes
0.000	100.0	0.39" Cable	No
0.000	100.0	0.78" 8 AWG 6	No
0.000	100.0	1 5/8" Coax	No
0.000	100.0	1 5/8" Coax	Yes
0.000	100.0	3" Conduit	No
0.000	110.0	1/2" Coax	Yes
0.000	110.0	2" Conduit	Yes
0.000	110.0	5/16" Coax	Yes

Load Cases

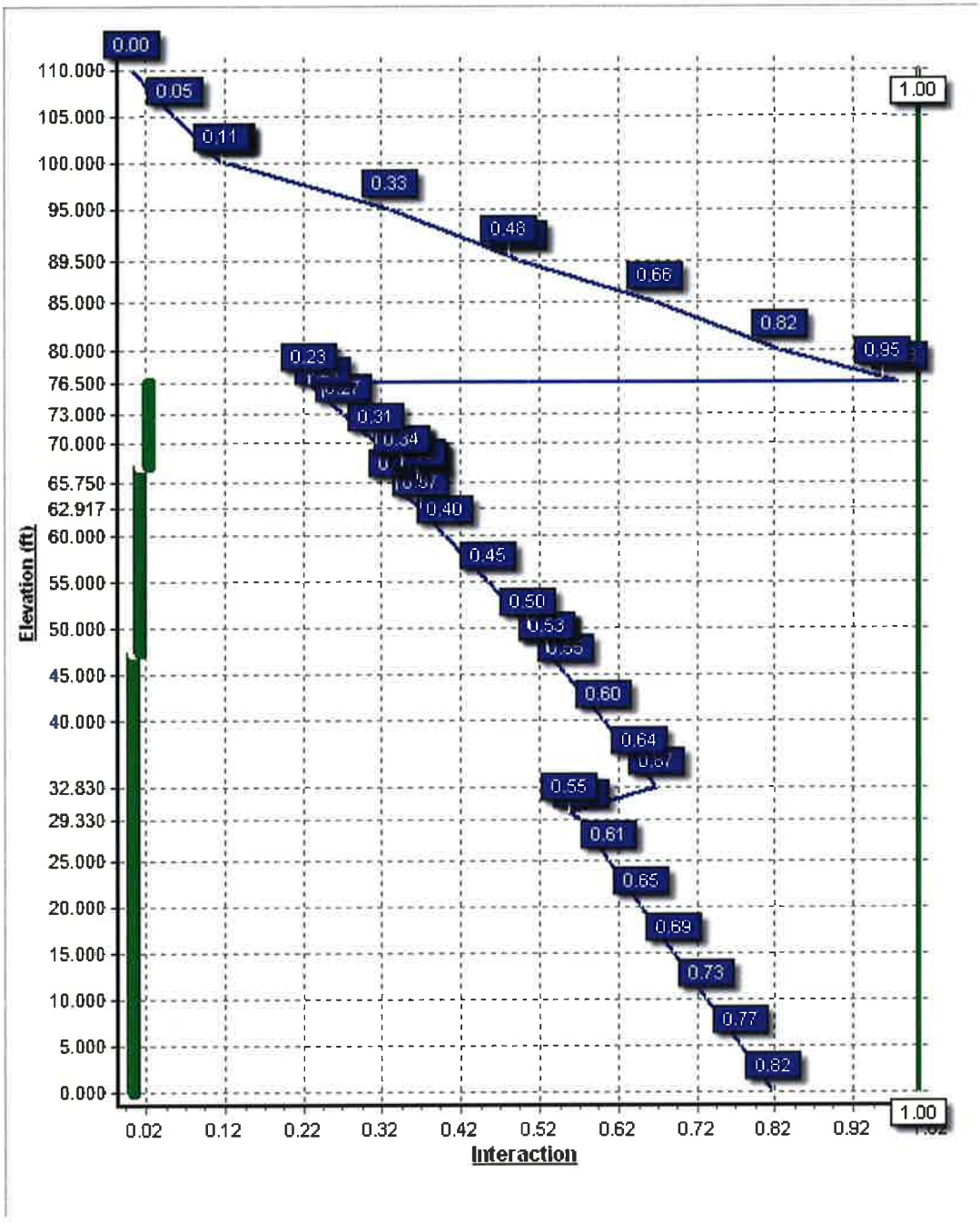
1.2D + 1.6W	95 mph with No Ice
0.9D + 1.6W	95 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 1.00 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal
1.0D + 1.0W	Serviceability 60 mph

Reactions

Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	1704.86	24.80	30.06
0.9D + 1.6W	1675.54	24.71	22.52
1.2D + 1.0Di + 1.0Wi	500.57	6.75	76.45
(1.2 + 0.2Sds) * DL + E ELFM	91.78	1.05	29.86
(1.2 + 0.2Sds) * DL + E EMAM	106.14	1.22	29.85
(0.9 - 0.2Sds) * DL + E ELFM	90.26	1.05	20.76
(0.9 - 0.2Sds) * DL + E EMAM	104.15	1.21	20.76
1.0D + 1.0W	426.44	6.33	25.11

Dish Deflections

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
1.0D + 1.0W	70.00	8.904	1.096
1.0D + 1.0W	110.00	20.762	1.613
1.0D + 1.0W	110.00	20.762	1.613


0.00
0.05
0.11
0.33
0.48
0.66
0.82
0.95
1.00
0.23
0.31
0.40
0.45
0.50
0.60
0.64
0.55
0.61
0.65
0.69
0.73
0.77
0.82
1.00
110.000
105.000
100.000
95.000
89.500
85.000
80.000
76.500
73.000
70.000
65.750
62.917
60.000
55.000
50.000
45.000
40.000
32.830
29.330
25.000
20.000
15.000
10.000
5.000
0.000
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Elevation (ft)
Interaction

Site Number:	**302481**	**Code: ANSI/TIA-222-G**	
Site Name:	**Hrfr - South, CT**	**Engineering Number: 62757221**	**8/27/2015 4:52:35 PM**
Customer:	**VERIZON WIRELESS**		

Analysis Parameters

Location:	**Hartford County, CT**		
Code:	**ANSI/TIA-222-G**	**Height (ft):**	**110**
Shape:	**12 Sides. Sect 4: Round**	**Base Diameter (in):**	**30.00**
Pole Type:	**Custom**	**Top Diameter (in):**	**12.75**
Pole Manfacturer:	**ITT Meyer**	**Taper (in/ft) :**	**0.164**

Ice & Wind Parameters

Structure Class:	**II**	**Design Wind Speed Without Ice:**	**95 mph**
Exposure Catagory:	**B**	**Design Wind Speed With Ice:**	**50 mph**
Topographic Catagory:	**4**	**Operational Wind Speed:**	**60 mph**
Crest Height:	**36.4 ft**	**Design Ice Thickness:**	**0.50 in**

Seismic Parameters

Analysis Method:	**Equivalent Modal Analysis & Equivalent Lateral Force Methods**				
Site Class:	**D - Stiff Soil**				
Period Based on Rayleigh Method (sec):	**2.14**				
T_L (sec):	**6**	**p:**	**1.3**	**C_s:**	**0.032**
S_s:	**0.181**	**S_1:**	**0.064**	**C_s Max:**	**0.032**
F_a:	**1.600**	**F_v:**	**2.400**	**C_s Min:**	**0.030**
S_{ds}:	**0.193**	**S_{d1}:**	**0.102**		

Load Cases

1.2D + 1.6W	**95 mph with No Ice**
0.9D + 1.6W	**95 mph with No Ice (Reduced DL)**
1.2D + 1.0Di + 1.0Wi	**50 mph with 1.00 in Radial Ice**
(1.2 + 0.2Sds) * DL + E ELFM	**Seismic Equivalent Lateral Forces Method**
(1.2 + 0.2Sds) * DL + E EMAM	**Seismic Equivalent Modal Analysis Method**
(0.9 - 0.2Sds) * DL + E ELFM	**Seismic (Reduced DL) Equivalent Lateral Forces Method**
(0.9 - 0.2Sds) * DL + E EMAM	**Seismic (Reduced DL) Equivalent Modal Analysis Method**
1.0D + 1.0W	**Serviceability 60 mph**

Site Number: 302481 Code: ANSI/TIA-222-G

Site Name: Hrfr - South, CT Engineering Number: 62757221 8/27/2015 4:52:35 PM

Customer: VERIZON WIRELESS

Shaft Section Properties

							Bottom						Top						
Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Slip Joint Type	Slip Joint Len (in)	Weight (lb)	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper (in/ft)
1-12	32.830	0.2500	65		0.00	2,434	30.00	0.00	23.95	2705.5	29.47	120.00	24.62	32.83	19.62	1487.9	23.71	98.50	0.163751
2-12	36.420	0.2500	50	Slip	42.00	2,241	25.69	29.33	20.49	1693.2	24.86	102.79	19.73	65.75	15.68	759.9	18.47	78.93	0.163751
3-12	37.083	0.1875	50	Slip	34.00	1,322	20.57	62.92	12.31	652.8	26.72	109.72	14.50	100.00	8.64	225.9	18.04	77.33	0.163751
4-R	10.000	0.3750	35	Butt	0.00	496	12.75	100.00	14.58	279.3	0.00	34.00	12.75	110.00	14.58	279.3	0.00	34.00	0.000000
				Shaft Weight		6,493													

Discrete Appurtenance Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice EPAa (sf)	No Ice Orientation Factor	Ice Weight (lb)	Ice EPAa (sf)	Ice Orientation Factor	Distance From Face (ft)	Vert Ecc (ft)
110.00	Argus LLPX310R	3	28.60	4.290	0.73	178.50	5.481	0.73	0.000	0.000
110.00	DragonWave A-ANT-11G-2.5-	2	47.60	8.670	1.00	213.26	10.914	1.00	0.000	0.000
110.00	DragonWave A-ANT-23G-1-C	1	15.00	1.610	1.00	60.90	2.594	1.00	0.000	0.000
110.00	DragonWave Horizon	3	10.60	0.430	0.50	54.59	0.772	0.50	0.000	0.000
110.00	NextNet BTS-2500	3	35.00	1.820	0.50	115.53	2.551	0.50	0.000	0.000
110.00	Side Arms	1	560.00	8.500	1.00	1,168.26	17.733	1.00	0.000	0.000
100.00	Andrew SBNH-1D6565C	1	60.80	11.450	0.84	418.19	13.597	0.84	0.000	2.000
100.00	Ericsson RRUS 11 (Band 12)	6	55.00	2.520	0.67	165.83	3.374	0.67	0.000	2.000
100.00	Flat Platform w/ Handrails	1	2000.00	42.400	1.00	3,833.54	69.457	1.00	0.000	0.000
100.00	Kathrein 860-10025	6	1.10	0.140	0.50	15.26	0.398	0.50	0.000	0.000
100.00	KMW AM-X-CD-16-65-00T-	2	48.50	8.020	0.79	305.89	9.719	0.79	0.000	2.000
100.00	Powerwave 7770.00	6	35.00	5.510	0.77	220.58	6.897	0.77	0.000	2.000
100.00	Powerwave LGP21401	6	14.10	1.100	0.50	62.42	1.718	0.50	0.000	0.000
100.00	Powerwave TT19-08BP111-	3	16.00	0.640	0.50	56.20	1.018	0.50	0.000	0.000
100.00	Raycap DC6-48-60-18-8F	1	31.80	1.280	1.00	159.37	3.063	1.00	0.000	2.000
89.50	CCI DTMA-1819-DD-12	6	14.30	0.710	0.50	50.48	1.108	0.50	0.000	1.500
89.50	Flat Low Profile Platform	1	1500.00	26.100	1.00	2,330.16	50.563	1.00	0.000	0.000
89.50	RFS APX16DWV-16DWV-S-E-	3	39.60	6.080	0.66	216.46	7.483	0.66	0.000	1.500
89.50	RFS APXV18-206516S-C	3	18.70	3.620	0.77	142.34	4.862	0.77	0.000	1.500
80.00	Alcatel-Lucent RRH2x60 700	3	56.70	2.150	0.67	167.11	2.966	0.67	0.000	0.000
80.00	Alcatel-Lucent RRH2X60-	3	44.00	1.880	0.50	138.50	2.654	0.50	0.000	0.000
80.00	Antel BXA-171063-12CF-EDIN-	6	12.80	4.800	0.88	178.78	6.394	0.88	0.000	0.000
80.00	Antel BXA-70063-6CF-EDIN-2	6	17.00	7.570	0.77	251.70	9.210	0.77	0.000	0.000
80.00	RFS DB-T1-6Z-8AB-0Z	2	44.00	4.800	0.67	235.82	5.932	0.67	0.000	0.000
80.00	Round Low Profile Platform	1	1500.00	21.700	1.00	2,325.79	46.170	1.00	0.000	0.000
77.00	Scala 840 10212	1	6.70	2.170	0.73	93.21	3.043	0.73	0.000	0.000
77.00	Stand Off	2	75.00	2.500	0.90	121.57	3.742	0.90	0.000	0.000
77.00	TX RX Systems 421-86A-10-	1	15.00	2.220	0.67	86.14	3.018	0.67	0.000	0.000
73.00	RFS APXV18-206517S-C	3	26.40	5.170	0.80	187.56	6.766	0.80	0.000	2.000
73.00	Round Side Arm	3	150.00	5.200	0.67	242.90	8.651	0.67	0.000	0.000
70.00	Radio Waves SP2-4.7	1	22.00	5.230	1.00	131.39	6.154	1.00	0.000	0.000
70.00	Radio/ODU	1	30.00	1.600	0.50	115.15	2.296	0.50	0.000	0.000
66.00	Scala 840 10212	1	6.70	2.170	1.00	92.65	3.038	1.00	0.000	2.000
66.00	Stand Off	1	75.00	2.500	1.00	121.35	4.155	1.00	0.000	0.000
	Totals	93	8425.80			22,858.54			Number of Loadings :	34

Linear Appurtenance Properties

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Diameter (in)	Coax Weight (lb/ft)	Flat	Projected Width (in)	Exposed To Wind	Carrier
0.00	110.00	3	1/2" Coax	0.63	0.15	N	0.00	Y	Clearwire
0.00	110.00	1	2" Conduit	2.38	3.65	N	2.38	Y	Clearwire
0.00	110.00	6	5/16" Coax	0.31	0.05	N	0.00	Y	Clearwire

0.00	100.00	1	0.39" Cable	0.39	0.07	N	0.00	N	AT&T Mobility
0.00	100.00	2	0.78" 8 AWG 6	0.78	0.59	N	0.00	N	AT&T Mobility
0.00	100.00	6	1 5/8" Coax	1.98	0.82	N	0.00	N	AT&T Mobility
0.00	100.00	6	1 5/8" Coax	1.98	0.82	N	3.96	Y	AT&T Mobility
0.00	100.00	1	3" Conduit	3.50	7.58	N	0.00	N	AT&T Mobility
0.00	89.50	18	1 5/8" Coax	1.98	0.82	N	5.54	Y	T-Mobile
0.00	81.00	4	#20 Dywidag	3.75	0.00	N	0.00	Y	--
0.00	80.00	12	1 5/8" Coax	1.98	0.82	N	0.00	Y	Verizon
0.00	80.00	2	1 5/8" Hybriflex	1.98	1.30	N	0.00	Y	Verizon
0.00	77.00	1	3/8" Coax	0.44	0.08	N	0.00	Y	Town of W. Hartford
0.00	77.00	1	7/8" Coax	1.09	0.33	N	0.00	Y	Town of W. Hartford
0.00	73.00	6	1 5/8" Coax	1.98	0.82	N	0.00	Y	Metro PCS
0.00	70.00	1	1/4" Coax	0.34	0.06	N	0.00	Y	Town of W. Hartford
0.00	70.00	2	3/8" Coax	0.44	0.08	N	0.00	Y	Town of W. Hartford
0.00	66.00	1	7/8" Coax	1.09	0.33	N	0.00	Y	Town of W. Hartford

Additional Steel

Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Offset (in)	— Intermediate Connections — Description	Spacing (in)	Len (in)	Connectors	Continuation?
0.00	47.50	4	SOL #20 All Thread	80	2.19	6" Angle Bracket	30.0	3.31	5/8" A36 U-Bolt	Yes
47.50	67.50	4	SOL #20 All Thread	80	2.19	6" Angle Bracket	30.0	3.31	5/8" A36 U-Bolt	Yes
67.50	76.50	4	SOL #20 All Thread	80	2.19	6" Angle Bracket	30.0	3.31	5/8" A36 U-Bolt	Yes

Segment Properties (Max Len : 5.ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fy (ksi)	S (in^3)	Z (in^3)	Weight (lb)	Additional Reinforcing Area (in^2)	Additional Reinforcing Ix (in^4)	Additional Reinforcing Weight (lb)
0.00		0.2500	30.000	23.949	2,705.5	29.47	120.00	72.6	174.2	0.0	0.0	19.64	3,346	0.0
5.00		0.2500	29.181	23.290	2,488.2	28.60	116.72	73.5	164.7	0.0	401.9	19.64	3,200	334.0
10.00		0.2500	28.362	22.631	2,282.9	27.72	113.45	74.5	155.5	0.0	390.6	19.64	3,056	334.0
15.00		0.2500	27.544	21.971	2,089.2	26.84	110.17	75.4	146.5	0.0	379.4	19.64	2,916	334.0
20.00		0.2500	26.725	21.312	1,906.7	25.96	106.90	76.4	137.8	0.0	368.2	19.64	2,780	334.0
25.00		0.2500	25.906	20.653	1,735.2	25.09	103.62	77.4	129.4	0.0	357.0	19.64	2,646	334.0
29.33	Bot - Section 2	0.2500	25.197	20.083	1,595.3	24.33	100.79	78.2	122.3	0.0	300.1	19.64	2,533	289.2
30.00		0.2500	25.087	19.994	1,574.4	24.21	100.35	78.3	121.2	0.0	92.3	19.64	2,595	44.8
32.83	Top - Section 1	0.2500	25.124	20.024	1,581.3	24.25	100.50	62.7	121.6	0.0	385.4	19.64	2,522	189.0
35.00		0.2500	24.769	19.738	1,514.5	23.87	99.07	63.0	118.1	0.0	146.8	19.64	2,466	145.0
40.00		0.2500	23.950	19.078	1,367.8	22.99	95.80	63.0	110.3	0.0	330.2	19.64	2,341	334.0
45.00		0.2500	23.131	18.419	1,230.9	22.11	92.52	63.0	102.8	0.0	319.0	19.64	2,218	334.0
47.50	Reinf. Top Reinf	0.2500	22.722	18.090	1,166.0	21.67	90.89	63.0	99.1	0.0	155.3	19.64	2,158	167.0
50.00		0.2500	22.312	17.760	1,103.4	21.23	89.25	63.0	95.5	0.0	152.5	19.64	2,099	167.0
55.00		0.2500	21.494	17.101	985.1	20.36	85.97	63.0	88.5	0.0	296.6	19.64	1,984	334.0
60.00		0.2500	20.675	16.442	875.5	19.48	82.70	63.0	81.8	0.0	285.4	19.64	1,871	334.0
62.92	Bot - Section 3	0.2500	20.197	16.058	815.5	18.97	80.79	63.0	78.0	0.0	161.3	19.64	1,807	194.8
65.00		0.2500	19.856	15.783	774.4	18.60	79.42	63.0	75.3	0.0	199.4	19.64	1,812	139.2
65.75	Top - Section 2	0.1875	20.108	12.027	609.2	26.06	107.24	61.4	58.5	0.0	70.9	19.64	1,795	50.1
66.00		0.1875	20.067	12.003	605.5	26.00	107.03	61.4	58.3	0.0	10.2	19.64	1,790	16.7
67.50	Reinf. Top Reinf	0.1875	19.822	11.854	583.3	25.65	105.72	61.7	56.8	0.0	60.9	19.64	1,758	100.2
70.00		0.1875	19.412	11.607	547.6	25.06	103.53	62.1	54.5	0.0	99.8	19.64	1,704	167.0
73.00		0.1875	18.921	11.310	506.7	24.36	100.91	62.6	51.7	0.0	117.0	19.64	1,642	200.4
75.00		0.1875	18.594	11.113	480.5	23.89	99.17	63.0	49.9	0.0	76.3	19.64	1,600	133.6
76.50	Reinf. Top	0.1875	18.348	10.964	461.6	23.54	97.86	63.0	48.6	0.0	56.3	19.64	1,570	100.2
77.00		0.1875	18.266	10.915	455.3	23.42	97.42	63.0	48.2	0.0	18.6			
80.00		0.1875	17.775	10.618	419.2	22.72	94.80	63.0	45.6	0.0	109.9			
85.00		0.1875	16.956	10.124	363.4	21.55	90.43	63.0	41.4	0.0	176.5			
89.50		0.1875	16.219	9.679	317.5	20.50	86.50	63.0	37.8	0.0	151.6			
90.00		0.1875	16.137	9.630	312.7	20.38	86.07	63.0	37.4	0.0	16.4			
95.00		0.1875	15.319	9.135	267.0	19.21	81.70	63.0	33.7	0.0	159.6			
100.0	Top - Section 3	0.1875	14.500	8.641	225.9	18.04	77.33	63.0	30.1	0.0	151.2			
100.0	Bot - Section 4	0.3750	12.750	14.579	279.3	0.00	34.00	35.0	43.8	57.4				
105.0		0.3750	12.750	14.579	279.3	0.00	34.00	35.0	43.8	57.4	248.0			
110.0		0.3750	12.750	14.579	279.3	0.00	34.00	35.0	43.8	57.4	248.0			
											6,492.7			5,110.2

Site Number: 302481 | Code: ANSI/TIA-222-G |

Site Name: Hrfr - South, CT | Engineering Number: 62757221 | 8/27/2015 4:52:35 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W | 95 mph with No Ice | 24 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		520.0	0.0					0.0	0.0	520.0	0.0	0.0	0.0
5.00		958.5	482.2					287.8	737.5	1,246.3	1,219.7	0.0	0.0
10.00		815.0	468.8					262.9	737.5	1,077.8	1,206.3	0.0	0.0
15.00		704.9	455.3					243.1	737.5	948.0	1,192.8	0.0	0.0
20.00		619.2	441.9					227.5	737.5	846.6	1,179.4	0.0	0.0
25.00		518.1	428.4					214.9	737.5	733.0	1,165.9	0.0	0.0
29.33	Bot - Section 2	261.4	360.1					177.5	638.7	438.9	998.8	0.0	0.0
30.00		175.4	110.8					26.7	98.8	202.1	209.6	0.0	0.0
32.83	Top - Section 1	247.0	462.4					112.1	417.4	359.0	879.8	0.0	0.0
35.00		341.3	176.2					85.4	320.1	426.7	496.3	0.0	0.0
40.00		461.0	396.2					195.2	737.5	656.3	1,133.7	0.0	0.0
45.00		334.6	382.8					193.7	737.5	528.3	1,120.3	0.0	0.0
47.50	Reinf. Top Reinf	216.3	186.3					96.5	368.7	312.7	555.1	0.0	0.0
50.00		314.9	183.0					96.3	368.7	411.2	551.7	0.0	0.0
55.00		407.9	355.9					192.3	737.5	600.2	1,093.4	0.0	0.0
60.00		313.4	342.4					192.3	737.5	505.7	1,079.9	0.0	0.0
62.92	Bot - Section 3	194.3	193.5					112.3	430.2	306.6	623.7	0.0	0.0
65.00		109.8	239.3					80.3	307.3	190.1	546.6	0.0	0.0
65.75	Top - Section 2	38.4	85.1					28.9	110.6	67.4	195.7	0.0	0.0
66.00	Appertunance(s)	66.7	12.3	172.3	0.0	160.3	98.0	9.7	36.9	248.7	147.2	0.0	0.0
67.50	Reinf. Top Reinf	151.0	73.1					58.0	220.7	208.9	293.7	0.0	0.0
70.00	Appertunance(s)	204.2	119.8	223.2	0.0	0.0	62.4	96.8	367.8	524.2	549.9	0.0	0.0
73.00	Appertunance(s)	182.7	140.4	758.3	0.0	739.8	635.0	116.4	440.5	1,057.4	1,215.9	0.0	0.0
75.00		125.8	91.6					77.8	281.9	203.6	373.4	0.0	0.0
76.50	Reinf. Top	71.2	67.6					58.5	211.4	129.7	279.0	0.0	0.0
77.00	Appertunance(s)	122.5	22.3	283.0	0.0	0.0	206.0	19.5	30.4	425.1	258.8	0.0	0.0
80.00	Appertunance(s)	274.4	131.9	3,035.0	0.0	0.0	2,482.7	117.4	180.9	3,426.8	2,795.4	0.0	0.0
85.00		316.5	211.7					196.7	226.8	513.2	438.5	0.0	0.0
89.50	Appertunance(s)	163.0	181.9	1,687.2	0.0	1,035.6	2,112.8	178.2	204.1	2,028.4	2,498.9	0.0	0.0
90.00		172.4	19.7					12.1	13.8	184.5	33.5	0.0	0.0
95.00		306.0	191.6					121.8	138.2	427.8	329.8	0.0	0.0
100.00	Top - Section 3	228.4	181.5	3,526.2	0.0	3,473.0	3,442.6	123.0	138.2	3,877.5	3,762.3	0.0	0.0
105.00		158.2	297.7					0.0	26.2	158.2	323.9	0.0	0.0
110.00	Appertunance(s)	79.5	297.7	1,347.5	0.0	0.0	1,071.4	0.0	26.2	1,427.0	1,395.2	0.0	0.0
								Totals:		25,217.9	30,144.2	0.00	0.00

Site Number: 302481 | Code: ANSI/TIA-222-G |

Site Name: Hrfr - South, CT | Engineering Number: 62757221 | 8/27/2015 4:52:38 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.6W | 95 mph with No Ice | 24 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 1.20

Wind Load Factor : 1.60

Calculated Forces

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 (deg)	Ratio
0.00	-30.06	-24.80	0.00	-1,704.86	0.00	1,704.86	1,564.13	782.07	1,919.99	948.21	0.00	0.00	0.815
5.00	-28.68	-23.74	0.00	-1,580.86	0.00	1,580.86	1,541.15	770.57	1,839.28	908.35	0.21	-0.39	0.772
10.00	-27.34	-22.83	0.00	-1,462.14	0.00	1,462.14	1,517.03	758.51	1,758.81	868.61	0.82	-0.77	0.730
15.00	-26.02	-22.04	0.00	-1,347.97	0.00	1,347.97	1,491.77	745.88	1,678.72	829.05	1.82	-1.14	0.689
20.00	-24.73	-21.32	0.00	-1,237.79	0.00	1,237.79	1,465.38	732.69	1,599.10	789.74	3.22	-1.51	0.647
25.00	-23.46	-20.69	0.00	-1,131.20	0.00	1,131.20	1,437.85	718.92	1,520.08	750.71	4.99	-1.87	0.606
29.33	-22.42	-20.28	0.00	-1,041.62	0.00	1,041.62	1,413.09	706.55	1,452.23	717.20	6.83	-2.17	0.570
30.00	-22.17	-20.12	0.00	-1,028.03	0.00	1,028.03	1,409.19	704.59	1,441.78	712.04	7.14	-2.22	0.554
32.83	-21.25	-19.79	0.00	-971.09	0.00	971.09	1,130.07	565.03	1,157.93	571.86	8.52	-2.41	0.665
35.00	-20.70	-19.42	0.00	-928.15	0.00	928.15	1,119.12	559.56	1,130.16	558.15	9.65	-2.56	0.643
40.00	-19.49	-18.82	0.00	-831.03	0.00	831.03	1,081.75	540.87	1,055.58	521.31	12.50	-2.87	0.598
45.00	-18.33	-18.30	0.00	-736.93	0.00	736.93	1,044.38	522.19	983.54	485.73	15.67	-3.18	0.551
47.50	-17.75	-18.01	0.00	-691.17	0.00	691.17	1,025.69	512.85	948.47	468.41	17.38	-3.32	0.527
47.50	-17.75	-18.01	0.00	-691.17	0.00	691.17	1,025.69	512.85	948.47	468.41	17.38	-3.32	0.527
50.00	-17.16	-17.62	0.00	-646.16	0.00	646.16	1,007.01	503.50	914.04	451.41	19.15	-3.47	0.502
55.00	-16.03	-17.03	0.00	-558.03	0.00	558.03	969.64	484.82	847.09	418.35	22.93	-3.73	0.451
60.00	-14.93	-16.50	0.00	-472.89	0.00	472.89	932.27	466.13	782.69	386.54	26.97	-3.98	0.398
62.92	-14.30	-16.18	0.00	-424.76	0.00	424.76	910.47	455.23	746.30	368.57	29.44	-4.12	0.367
65.00	-13.75	-15.97	0.00	-391.05	0.00	391.05	894.90	447.45	720.83	355.99	31.26	-4.21	0.337
65.75	-13.56	-15.89	0.00	-379.08	0.00	379.08	664.38	332.19	545.54	269.42	31.92	-4.24	0.366
66.00	-13.42	-15.64	0.00	-374.95	0.00	374.95	663.47	331.74	543.67	268.50	32.15	-4.25	0.363
67.50	-13.12	-15.43	0.00	-351.49	0.00	351.49	658.03	329.02	532.49	262.97	33.49	-4.31	0.343
67.50	-13.12	-15.43	0.00	-351.49	0.00	351.49	658.03	329.02	532.49	262.97	33.49	-4.31	0.343
70.00	-12.58	-14.89	0.00	-312.92	0.00	312.92	648.81	324.40	513.97	253.83	35.78	-4.42	0.309
73.00	-11.43	-13.75	0.00	-267.52	0.00	267.52	637.49	318.74	491.98	242.97	38.59	-4.53	0.268
75.00	-11.06	-13.53	0.00	-240.02	0.00	240.02	629.79	314.89	477.45	235.80	40.50	-4.59	0.243
76.50	-10.79	-13.39	0.00	-219.72	0.00	219.72	621.68	310.84	464.95	229.62	41.95	-4.64	0.225
76.50	-10.79	-13.39	0.00	-219.72	0.00	219.72	621.68	310.84	464.95	229.62	41.95	-4.64	0.976
77.00	-10.52	-12.98	0.00	-213.02	0.00	213.02	618.88	309.44	460.75	227.55	42.43	-4.66	0.955
80.00	-7.95	-9.39	0.00	-174.09	0.00	174.09	602.06	301.03	435.93	215.29	45.48	-5.02	0.823
85.00	-7.49	-8.90	0.00	-127.14	0.00	127.14	574.04	287.02	396.08	195.61	51.01	-5.53	0.664
89.50	-5.19	-6.65	0.00	-86.08	0.00	86.08	548.81	274.41	361.85	178.70	56.40	-5.91	0.492
90.00	-5.15	-6.48	0.00	-82.75	0.00	82.75	546.01	273.00	358.14	176.87	57.02	-5.94	0.478
95.00	-4.84	-6.04	0.00	-50.38	0.00	50.38	517.98	258.99	322.11	159.08	63.41	-6.25	0.327
100.00	-1.53	-1.77	0.00	-16.73	0.00	16.73	489.95	244.98	288.00	142.23	70.05	-6.44	0.121
100.00	-1.53	-1.77	0.00	-16.73	0.00	16.73	459.24	229.62	229.69	150.79	70.05	-6.44	0.114
105.00	-1.22	-1.58	0.00	-7.88	0.00	7.88	459.24	229.62	229.69	150.79	76.82	-6.51	0.055
110.00	0.00	-1.43	0.00	0.00	0.00	0.00	459.24	229.62	229.69	150.79	83.64	-6.53	0.000

Site Number: 302481 | Code: ANSI/TIA-222-G |

Site Name: Hrfr - South, CT | Engineering Number: 62757221 | 8/27/2015 4:52:38 PM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W | 95 mph with No Ice (Reduced DL) | 24 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 0.90

Wind Load Factor : 1.60

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		520.0	0.0					0.0	0.0	520.0	0.0	0.0	0.0
5.00		958.5	361.7					287.8	553.1	1,246.3	914.8	0.0	0.0
10.00		815.0	351.6					262.9	553.1	1,077.8	904.7	0.0	0.0
15.00		704.9	341.5					243.1	553.1	948.0	894.6	0.0	0.0
20.00		619.2	331.4					227.5	553.1	846.6	884.5	0.0	0.0
25.00		518.1	321.3					214.9	553.1	733.0	874.4	0.0	0.0
29.33	Bot - Section 2	261.4	270.1					177.5	479.0	438.9	749.1	0.0	0.0
30.00		175.4	83.1					26.7	74.1	202.1	157.2	0.0	0.0
32.83	Top - Section 1	247.0	346.8					112.1	313.1	359.0	659.9	0.0	0.0
35.00		341.3	132.1					85.4	240.1	426.7	372.2	0.0	0.0
40.00		461.0	297.2					195.2	553.1	656.3	850.3	0.0	0.0
45.00		334.6	287.1					193.7	553.1	528.3	840.2	0.0	0.0
47.50	Reinf. Top Reinf	216.3	139.8					96.5	276.6	312.7	416.3	0.0	0.0
50.00		314.9	137.2					96.3	276.6	411.2	413.8	0.0	0.0
55.00		407.9	266.9					192.3	553.1	600.2	820.0	0.0	0.0
60.00		313.4	256.8					192.3	553.1	505.7	809.9	0.0	0.0
62.92	Bot - Section 3	194.3	145.1					112.3	322.6	306.6	467.8	0.0	0.0
65.00		109.8	179.5					80.3	230.5	190.1	409.9	0.0	0.0
65.75	Top - Section 2	38.4	63.8					28.9	83.0	67.4	146.8	0.0	0.0
66.00	Appertunance(s)	66.7	9.2	172.3	0.0	160.3	73.5	9.7	27.7	248.7	110.4	0.0	0.0
67.50	Reinf. Top Reinf	151.0	54.8					58.0	165.5	208.9	220.3	0.0	0.0
70.00	Appertunance(s)	204.2	89.8	223.2	0.0	0.0	46.8	96.8	275.8	524.2	412.4	0.0	0.0
73.00	Appertunance(s)	182.7	105.3	758.3	0.0	739.8	476.3	116.4	330.4	1,057.4	911.9	0.0	0.0
75.00		125.8	68.7					77.8	211.4	203.6	280.1	0.0	0.0
76.50	Reinf. Top	71.2	50.7					58.5	158.6	129.7	209.3	0.0	0.0
77.00	Appertunance(s)	122.5	16.8	283.0	0.0	0.0	154.5	19.5	22.8	425.1	194.1	0.0	0.0
80.00	Appertunance(s)	274.4	98.9	3,035.0	0.0	0.0	1,862.0	117.4	135.6	3,426.8	2,096.6	0.0	0.0
85.00		316.5	158.8					196.7	170.1	513.2	328.9	0.0	0.0
89.50	Appertunance(s)	163.0	136.5	1,687.2	0.0	1,035.6	1,584.6	178.2	153.1	2,028.4	1,874.2	0.0	0.0
90.00		172.4	14.8					12.1	10.4	184.5	25.2	0.0	0.0
95.00		306.0	143.7					121.8	103.7	427.8	247.3	0.0	0.0
100.00	Top - Section 3	212.1	136.1	3,526.2	0.0	3,473.0	2,581.9	123.0	103.7	3,861.3	2,821.7	0.0	0.0
105.00		125.5	223.2					0.0	19.7	125.5	242.9	0.0	0.0
110.00	Appertunance(s)	63.1	223.2	1,347.5	0.0	0.0	803.5	0.0	19.7	1,410.6	1,046.4	0.0	0.0
								Totals:		25,152.7	22,608.1	0.00	0.00

Site Number: 302481 Code: ANSI/TIA-222-G

Site Name: Hrfr - South, CT Engineering Number: 62757221 8/27/2015 4:52:40 PM

Customer: VERIZON WIRELESS

Load Case: 0.9D + 1.6W 95 mph with No Ice (Reduced DL) 24 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 0.90
Wind Load Factor : 1.60

Wind Importance Factor : 1.00

Calculated Forces

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 (deg)	Ratio
0.00	-22.52	-24.71	0.00	-1,675.54	0.00	1,675.54	1,564.13	782.07	1,919.99	948.21	0.00	0.00	0.799
5.00	-21.46	-23.60	0.00	-1,551.99	0.00	1,551.99	1,541.15	770.57	1,839.28	908.35	0.21	-0.38	0.756
10.00	-20.42	-22.65	0.00	-1,433.98	0.00	1,433.98	1,517.03	758.51	1,758.81	868.61	0.80	-0.75	0.714
15.00	-19.40	-21.81	0.00	-1,320.75	0.00	1,320.75	1,491.77	745.88	1,678.72	829.05	1.79	-1.12	0.673
20.00	-18.41	-21.06	0.00	-1,211.71	0.00	1,211.71	1,465.38	732.69	1,599.10	789.74	3.16	-1.48	0.632
25.00	-17.44	-20.40	0.00	-1,106.43	0.00	1,106.43	1,437.85	718.92	1,520.08	750.71	4.90	-1.83	0.591
29.33	-16.65	-19.98	0.00	-1,018.12	0.00	1,018.12	1,413.09	706.55	1,452.23	717.20	6.70	-2.13	0.555
30.00	-16.46	-19.81	0.00	-1,004.73	0.00	1,004.73	1,409.19	704.59	1,441.78	712.04	7.00	-2.18	0.539
32.83	-15.75	-19.47	0.00	-948.67	0.00	948.67	1,130.07	565.03	1,157.93	571.86	8.35	-2.37	0.648
35.00	-15.32	-19.09	0.00	-906.42	0.00	906.42	1,119.12	559.56	1,130.16	558.15	9.46	-2.51	0.626
40.00	-14.41	-18.47	0.00	-810.98	0.00	810.98	1,081.75	540.87	1,055.58	521.31	12.25	-2.81	0.581
45.00	-13.53	-17.95	0.00	-718.64	0.00	718.64	1,044.38	522.19	983.54	485.73	15.36	-3.11	0.535
47.50	-13.09	-17.65	0.00	-673.77	0.00	673.77	1,025.69	512.85	948.47	468.41	17.03	-3.25	0.512
47.50	-13.09	-17.65	0.00	-673.77	0.00	673.77	1,025.69	512.85	948.47	468.41	17.03	-3.25	0.512
50.00	-12.64	-17.26	0.00	-629.66	0.00	629.66	1,007.01	503.50	914.04	451.41	18.77	-3.39	0.488
55.00	-11.78	-16.66	0.00	-543.38	0.00	543.38	969.64	484.82	847.09	418.35	22.46	-3.65	0.438
60.00	-10.96	-16.14	0.00	-460.09	0.00	460.09	932.27	466.13	782.69	386.54	26.41	-3.89	0.386
62.92	-10.48	-15.82	0.00	-413.03	0.00	413.03	910.47	455.23	746.30	368.57	28.83	-4.02	0.355
65.00	-10.07	-15.61	0.00	-380.08	0.00	380.08	894.90	447.45	720.83	355.99	30.61	-4.11	0.326
65.75	-9.92	-15.53	0.00	-368.37	0.00	368.37	664.38	332.19	545.54	269.42	31.26	-4.14	0.354
66.00	-9.82	-15.29	0.00	-364.33	0.00	364.33	663.47	331.74	543.67	268.50	31.47	-4.15	0.351
67.50	-9.59	-15.07	0.00	-341.40	0.00	341.40	658.03	329.02	532.49	262.97	32.79	-4.22	0.331
67.50	-9.59	-15.07	0.00	-341.40	0.00	341.40	658.03	329.02	532.49	262.97	32.79	-4.22	0.331
70.00	-9.20	-14.54	0.00	-303.72	0.00	303.72	648.81	324.40	513.97	253.83	35.02	-4.32	0.298
73.00	-8.35	-13.43	0.00	-259.36	0.00	259.36	637.49	318.74	491.98	242.97	37.77	-4.42	0.258
75.00	-8.07	-13.21	0.00	-232.51	0.00	232.51	629.79	314.89	477.45	235.80	39.64	-4.49	0.234
76.50	-7.87	-13.07	0.00	-212.70	0.00	212.70	621.68	310.84	464.95	229.62	41.05	-4.53	0.217
76.50	-7.87	-13.07	0.00	-212.70	0.00	212.70	621.68	310.84	464.95	229.62	41.05	-4.53	0.941
77.00	-7.67	-12.65	0.00	-206.17	0.00	206.17	618.88	309.44	460.75	227.55	41.53	-4.55	0.920
80.00	-5.79	-9.11	0.00	-168.21	0.00	168.21	602.06	301.03	435.93	215.29	44.50	-4.90	0.792
85.00	-5.45	-8.61	0.00	-122.66	0.00	122.66	574.04	287.02	396.08	195.61	49.90	-5.39	0.637
89.50	-3.76	-6.42	0.00	-82.89	0.00	82.89	548.81	274.41	361.85	178.70	55.16	-5.76	0.471
90.00	-3.73	-6.25	0.00	-79.68	0.00	79.68	546.01	273.00	358.14	176.87	55.76	-5.79	0.458
95.00	-3.51	-5.81	0.00	-48.45	0.00	48.45	517.98	258.99	322.11	159.08	61.98	-6.08	0.312
100.00	-1.11	-1.67	0.00	-15.93	0.00	15.93	489.95	244.98	288.00	142.23	68.45	-6.26	0.114
100.00	-1.11	-1.67	0.00	-15.93	0.00	15.93	459.24	229.62	229.69	150.79	68.45	-6.26	0.108
105.00	-0.88	-1.52	0.00	-7.59	0.00	7.59	459.24	229.62	229.69	150.79	75.04	-6.34	0.052
110.00	0.00	-1.41	0.00	0.00	0.00	0.00	459.24	229.62	229.69	150.79	81.68	-6.36	0.000

Site Number: 302481 | Code: ANSI/TIA-222-G |

Site Name: Hrfr - South, CT | Engineering Number: 62757221 | 8/27/2015 4:52:40 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi — 50 mph with 1.00 in Radial Ice — 24 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.20
Wind Load Factor : 1.00

Ice Dead Load Factor : 1.00

Wind Importance Factor : 1.00
Ice Importance Factor : 1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		102.6	0.0					0.0	0.0	102.6	0.0	0.0	0.0
5.00		190.0	914.1					145.0	2,156.2	335.1	3,070.3	0.0	0.0
10.00		162.9	917.2					129.8	2,263.4	292.7	3,180.6	0.0	0.0
15.00		141.5	895.4					115.2	2,277.9	256.7	3,173.3	0.0	0.0
20.00		124.7	868.1					103.3	2,270.9	228.1	3,139.1	0.0	0.0
25.00		104.7	839.6					94.0	2,258.2	198.7	3,097.8	0.0	0.0
29.33	Bot - Section 2	52.9	704.7					75.4	1,945.0	128.3	2,649.7	0.0	0.0
30.00		35.5	164.7					11.3	300.2	46.8	464.9	0.0	0.0
32.83	Top - Section 1	50.1	685.7					47.1	1,265.6	97.1	1,951.4	0.0	0.0
35.00		69.4	344.7					35.8	968.4	105.2	1,313.1	0.0	0.0
40.00		94.1	771.4					81.5	2,225.1	175.5	2,996.4	0.0	0.0
45.00		68.5	744.8					80.5	2,218.8	149.1	2,963.5	0.0	0.0
47.50	Reinf. Top Reinf	44.5	364.1					40.0	1,107.8	84.5	1,471.9	0.0	0.0
50.00		65.0	357.6					39.9	1,107.1	104.9	1,464.7	0.0	0.0
55.00		84.6	693.2					79.7	2,213.1	164.3	2,906.3	0.0	0.0
60.00		65.3	668.1					79.7	2,213.1	145.0	2,881.1	0.0	0.0
62.92	Bot - Section 3	40.6	379.6					46.6	1,291.6	87.2	1,671.2	0.0	0.0
65.00		23.0	372.5					33.3	923.1	56.3	1,295.6	0.0	0.0
65.75	Top - Section 2	8.1	132.8					12.0	332.4	20.1	465.2	0.0	0.0
66.00	Appertunance(s)	14.0	28.2	45.9	0.0	38.9	305.3	4.0	110.9	64.0	444.4	0.0	0.0
67.50	Reinf. Top Reinf	31.8	167.3					24.1	652.6	55.9	819.9	0.0	0.0
70.00	Appertunance(s)	43.2	274.0	46.8	0.0	0.0	151.4	40.2	1,088.3	130.2	1,513.8	0.0	0.0
73.00	Appertunance(s)	38.7	321.5	195.7	0.0	167.6	1,322.2	48.5	1,264.0	282.9	2,907.8	0.0	0.0
75.00		26.8	210.6					32.4	774.8	59.2	985.4	0.0	0.0
76.50	Reinf. Top	15.2	155.9					24.4	581.5	39.6	737.4	0.0	0.0
77.00	Appertunance(s)	26.3	51.7	71.0	0.0	0.0	606.8	8.1	153.8	105.4	812.3	0.0	0.0
80.00	Appertunance(s)	59.1	303.9	790.2	0.0	0.0	6,510.9	49.0	877.9	898.3	7,692.7	0.0	0.0
85.00		68.7	487.3					82.4	921.5	151.0	1,408.8	0.0	0.0
89.50	Appertunance(s)	35.6	421.2	490.2	0.0	233.7	3,861.5	74.9	798.4	600.6	5,081.1	0.0	0.0
90.00		38.0	46.2					5.1	43.0	43.1	89.2	0.0	0.0
95.00		68.0	445.3					50.9	430.8	118.8	876.1	0.0	0.0
100.00	Top - Section 3	62.7	424.3	891.1	0.0	765.0	8,099.8	51.5	432.2	1,005.3	8,956.2	0.0	0.0
105.00		58.9	504.2					0.0	176.5	58.9	680.7	0.0	0.0
110.00	Appertunance(s)	29.6	505.1	350.3	0.0	0.0	2,611.2	0.0	177.4	379.9	3,293.7	0.0	0.0
								Totals:		6,771.21	76,455.6	0.00	0.00

Site Number: 302481 Code: ANSI/TIA-222-G

Site Name: Hrfr - South, CT Engineering Number: 62757221 8/27/2015 4:52:43 PM

Customer: VERIZON WIRELESS

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 1.00 in Radial Ice 24 Iterations

Gust Response Factor : 1.10 Ice Dead Load Factor : 1.00 Wind Importance Factor : 1.00

Dead Load Factor : 1.20 Ice Importance Factor : 1.00

Wind Load Factor : 1.00

Calculated Forces

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 (deg)	Ratio
0.00	-76.45	-6.75	0.00	-500.57	0.00	500.57	1,564.13	782.07	1,919.99	948.21	0.00	0.00	0.263
5.00	-73.37	-6.55	0.00	-466.84	0.00	466.84	1,541.15	770.57	1,839.28	908.35	0.06	-0.11	0.251
10.00	-70.17	-6.39	0.00	-434.08	0.00	434.08	1,517.03	758.51	1,758.81	868.61	0.24	-0.23	0.238
15.00	-66.99	-6.25	0.00	-402.14	0.00	402.14	1,491.77	745.88	1,678.72	829.05	0.54	-0.34	0.226
20.00	-63.84	-6.12	0.00	-370.91	0.00	370.91	1,465.38	732.69	1,599.10	789.74	0.95	-0.45	0.214
25.00	-60.73	-6.00	0.00	-340.33	0.00	340.33	1,437.85	718.92	1,520.08	750.71	1.48	-0.56	0.201
29.33	-58.08	-5.89	0.00	-314.36	0.00	314.36	1,413.09	706.55	1,452.23	717.20	2.03	-0.65	0.190
30.00	-57.61	-5.88	0.00	-310.42	0.00	310.42	1,409.19	704.59	1,441.78	712.04	2.12	-0.66	0.185
32.83	-55.66	-5.81	0.00	-293.78	0.00	293.78	1,130.07	565.03	1,157.93	571.86	2.53	-0.72	0.223
35.00	-54.34	-5.75	0.00	-281.18	0.00	281.18	1,119.12	559.56	1,130.16	558.15	2.87	-0.76	0.216
40.00	-51.34	-5.62	0.00	-252.42	0.00	252.42	1,081.75	540.87	1,055.58	521.31	3.72	-0.86	0.202
45.00	-48.37	-5.48	0.00	-224.33	0.00	224.33	1,044.38	522.19	983.54	485.73	4.67	-0.95	0.187
47.50	-46.89	-5.41	0.00	-210.63	0.00	210.63	1,025.69	512.85	948.47	468.41	5.18	-1.00	0.180
47.50	-46.89	-5.41	0.00	-210.63	0.00	210.63	1,025.69	512.85	948.47	468.41	5.18	-1.00	0.180
50.00	-45.43	-5.33	0.00	-197.12	0.00	197.12	1,007.01	503.50	914.04	451.41	5.71	-1.04	0.172
55.00	-42.52	-5.16	0.00	-170.49	0.00	170.49	969.64	484.82	847.09	418.35	6.85	-1.12	0.156
60.00	-39.63	-5.00	0.00	-144.67	0.00	144.67	932.27	466.13	782.69	386.54	8.06	-1.20	0.139
62.92	-37.96	-4.90	0.00	-130.09	0.00	130.09	910.47	455.23	746.30	368.57	8.81	-1.24	0.129
65.00	-36.67	-4.83	0.00	-119.88	0.00	119.88	894.90	447.45	720.83	355.99	9.35	-1.27	0.119
65.75	-36.20	-4.80	0.00	-116.25	0.00	116.25	664.38	332.19	545.54	269.42	9.55	-1.28	0.130
66.00	-35.76	-4.74	0.00	-115.02	0.00	115.02	663.47	331.74	543.67	268.50	9.62	-1.28	0.129
67.50	-34.94	-4.68	0.00	-107.91	0.00	107.91	658.03	329.02	532.49	262.97	10.03	-1.30	0.122
67.50	-34.94	-4.68	0.00	-107.91	0.00	107.91	658.03	329.02	532.49	262.97	10.03	-1.30	0.122
70.00	-33.42	-4.53	0.00	-96.22	0.00	96.22	648.81	324.40	513.97	253.83	10.72	-1.33	0.111
73.00	-30.52	-4.19	0.00	-82.46	0.00	82.46	637.49	318.74	491.98	242.97	11.56	-1.36	0.098
75.00	-29.54	-4.12	0.00	-74.07	0.00	74.07	629.79	314.89	477.45	235.80	12.14	-1.39	0.090
76.50	-28.80	-4.07	0.00	-67.89	0.00	67.89	621.68	310.84	464.95	229.62	12.58	-1.40	0.084
76.50	-28.80	-4.07	0.00	-67.89	0.00	67.89	621.68	310.84	464.95	229.62	12.58	-1.40	0.342
77.00	-27.99	-3.97	0.00	-65.86	0.00	65.86	618.88	309.44	460.75	227.55	12.73	-1.40	0.335
80.00	-20.31	-2.93	0.00	-53.94	0.00	53.94	602.06	301.03	435.93	215.29	13.65	-1.52	0.284
85.00	-18.90	-2.78	0.00	-39.31	0.00	39.31	574.04	287.02	396.08	195.61	15.32	-1.67	0.234
89.50	-13.84	-2.04	0.00	-26.56	0.00	26.56	548.81	274.41	361.85	178.70	16.96	-1.79	0.174
90.00	-13.75	-2.01	0.00	-25.54	0.00	25.54	546.01	273.00	358.14	176.87	17.15	-1.80	0.170
95.00	-12.87	-1.88	0.00	-15.50	0.00	15.50	517.98	258.99	322.11	159.08	19.09	-1.90	0.122
100.00	-3.96	-0.57	0.00	-5.34	0.00	5.34	489.95	244.98	288.00	142.23	21.11	-1.95	0.046
100.00	-3.96	-0.57	0.00	-5.34	0.00	5.34	459.24	229.62	229.69	150.79	21.11	-1.95	0.044
105.00	-3.28	-0.49	0.00	-2.47	0.00	2.47	459.24	229.62	229.69	150.79	23.17	-1.98	0.024
110.00	0.00	-0.38	0.00	0.00	0.00	0.00	459.24	229.62	229.69	150.79	25.24	-1.98	0.000

Site Number: 302481 | Code: ANSI/TIA-222-G |

Site Name: Hrfr - South, CT | Engineering Number: 62757221 | 8/27/2015 4:52:43 PM

Customer: VERIZON WIRELESS

Load Case: 1.0D + 1.0W | Serviceability 60 mph | 23 Iterations

Gust Response Factor : 1.10 | Wind Importance Factor : 1.00

Dead Load Factor : 1.00

Wind Load Factor : 1.00

Applied Segment Forces Summary

		Shaft Forces		Discrete Forces				Linear Forces		Sum of Forces			
Seg Elev (ft)	Description	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		129.6	0.0					0.0	0.0	129.6	0.0	0.0	0.0
5.00		239.0	401.9					94.5	614.6	333.5	1,016.4	0.0	0.0
10.00		203.2	390.6					84.6	614.6	287.8	1,005.2	0.0	0.0
15.00		175.7	379.4					76.9	614.6	252.6	994.0	0.0	0.0
20.00		154.4	368.2					69.3	614.6	223.6	982.8	0.0	0.0
25.00		129.2	357.0					63.2	614.6	192.4	971.6	0.0	0.0
29.33	Bot - Section 2	65.2	300.1					50.9	532.2	116.1	832.3	0.0	0.0
30.00		43.7	92.3					7.6	82.4	51.3	174.7	0.0	0.0
32.83	Top - Section 1	61.6	385.4					31.9	347.8	93.4	733.2	0.0	0.0
35.00		85.1	146.8					24.2	266.7	109.3	413.5	0.0	0.0
40.00		114.9	330.2					55.3	614.6	170.3	944.8	0.0	0.0
45.00		83.4	319.0					54.8	614.6	138.2	933.6	0.0	0.0
47.50	Reinf. Top Reinf	53.9	155.3					27.3	307.3	81.2	462.6	0.0	0.0
50.00		78.5	152.5					27.2	307.3	105.7	459.8	0.0	0.0
55.00		101.7	296.6					54.3	614.6	156.0	911.1	0.0	0.0
60.00		78.1	285.4					54.3	614.6	132.4	899.9	0.0	0.0
62.92	Bot - Section 3	48.4	161.3					31.7	358.5	80.2	519.8	0.0	0.0
65.00		27.4	199.4					22.7	256.1	50.1	455.5	0.0	0.0
65.75	Top - Section 2	9.6	70.9					8.2	92.2	17.8	163.1	0.0	0.0
66.00	Appertunance(s)	16.6	10.2	43.0	0.0	40.0	81.7	2.7	30.7	62.3	122.7	0.0	0.0
67.50	Reinf. Top Reinf	37.6	60.9					16.4	183.9	54.0	244.8	0.0	0.0
70.00	Appertunance(s)	50.9	99.8	55.7	0.0	0.0	52.0	27.4	306.5	133.9	458.3	0.0	0.0
73.00	Appertunance(s)	45.5	117.0	189.1	0.0	184.4	529.2	33.0	367.1	267.6	1,013.3	0.0	0.0
75.00		31.4	76.3					22.0	234.9	53.4	311.2	0.0	0.0
76.50	Reinf. Top	17.8	56.3					16.6	176.2	34.3	232.5	0.0	0.0
77.00	Appertunance(s)	30.6	18.6	70.6	0.0	0.0	171.7	5.5	25.3	106.6	215.6	0.0	0.0
80.00	Appertunance(s)	68.4	109.9	756.7	0.0	0.0	2,068.9	33.3	150.7	858.3	2,329.5	0.0	0.0
85.00		78.9	176.5					55.9	189.0	134.7	365.4	0.0	0.0
89.50	Appertunance(s)	40.6	151.6	420.6	0.0	258.2	1,760.7	50.7	170.1	512.0	2,082.4	0.0	0.0
90.00		43.0	16.4					3.0	11.5	46.0	27.9	0.0	0.0
95.00		76.3	159.6					30.4	115.2	106.7	274.8	0.0	0.0
100.00	Top - Section 3	52.9	151.2	879.1	0.0	865.8	2,868.8	30.7	115.2	962.6	3,135.2	0.0	0.0
105.00		31.3	248.0					0.0	21.9	31.3	269.9	0.0	0.0
110.00	Appertunance(s)	15.7	248.0	335.9	0.0	0.0	892.8	0.0	21.9	351.7	1,162.7	0.0	0.0
								Totals:		6,436.98	25,120.1	0.00	0.00

Load Case: 1.0D + 1.0W Serviceability 60 mph 23 Iterations

Gust Response Factor : 1.10
Dead Load Factor : 1.00
Wind Load Factor : 1.00
Wind Importance Factor : 1.00

Calculated Forces

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 (deg)	Ratio
0.00	-25.11	-6.33	0.00	-426.44	0.00	426.44	1,564.13	782.07	1,919.99	948.21	0.00	0.00	0.210
5.00	-24.09	-6.03	0.00	-394.79	0.00	394.79	1,541.15	770.57	1,839.28	908.35	0.05	-0.10	0.199
10.00	-23.07	-5.78	0.00	-364.62	0.00	364.62	1,517.03	758.51	1,758.81	868.61	0.20	-0.19	0.188
15.00	-22.07	-5.56	0.00	-335.71	0.00	335.71	1,491.77	745.88	1,678.72	829.05	0.46	-0.28	0.177
20.00	-21.08	-5.37	0.00	-307.90	0.00	307.90	1,465.38	732.69	1,599.10	789.74	0.80	-0.38	0.166
25.00	-20.11	-5.19	0.00	-281.08	0.00	281.08	1,437.85	718.92	1,520.08	750.71	1.25	-0.47	0.155
29.33	-19.27	-5.09	0.00	-258.59	0.00	258.59	1,413.09	706.55	1,452.23	717.20	1.70	-0.54	0.146
30.00	-19.09	-5.04	0.00	-255.18	0.00	255.18	1,409.19	704.59	1,441.78	712.04	1.78	-0.55	0.142
32.83	-18.36	-4.96	0.00	-240.91	0.00	240.91	1,130.07	565.03	1,157.93	571.86	2.12	-0.60	0.171
35.00	-17.94	-4.86	0.00	-230.16	0.00	230.16	1,119.12	559.56	1,130.16	558.15	2.41	-0.64	0.165
40.00	-16.99	-4.70	0.00	-205.86	0.00	205.86	1,081.75	540.87	1,055.58	521.31	3.12	-0.72	0.153
45.00	-16.06	-4.57	0.00	-182.36	0.00	182.36	1,044.38	522.19	983.54	485.73	3.91	-0.79	0.141
47.50	-15.59	-4.49	0.00	-170.94	0.00	170.94	1,025.69	512.85	948.47	468.41	4.33	-0.83	0.135
47.50	-15.59	-4.49	0.00	-170.94	0.00	170.94	1,025.69	512.85	948.47	468.41	4.33	-0.83	0.135
50.00	-15.13	-4.39	0.00	-159.72	0.00	159.72	1,007.01	503.50	914.04	451.41	4.77	-0.86	0.129
55.00	-14.22	-4.23	0.00	-137.78	0.00	137.78	969.64	484.82	847.09	418.35	5.71	-0.93	0.116
60.00	-13.31	-4.10	0.00	-116.61	0.00	116.61	932.27	466.13	782.69	386.54	6.72	-0.99	0.103
62.92	-12.79	-4.01	0.00	-104.66	0.00	104.66	910.47	455.23	746.30	368.57	7.33	-1.02	0.095
65.00	-12.34	-3.96	0.00	-96.29	0.00	96.29	894.90	447.45	720.83	355.99	7.78	-1.04	0.087
65.75	-12.18	-3.94	0.00	-93.32	0.00	93.32	664.38	332.19	545.54	269.42	7.95	-1.05	0.095
66.00	-12.05	-3.88	0.00	-92.30	0.00	92.30	663.47	331.74	543.67	268.50	8.00	-1.06	0.094
67.50	-11.81	-3.82	0.00	-86.48	0.00	86.48	658.03	329.02	532.49	262.97	8.34	-1.07	0.089
67.50	-11.81	-3.82	0.00	-86.48	0.00	86.48	658.03	329.02	532.49	262.97	8.34	-1.07	0.089
70.00	-11.35	-3.69	0.00	-76.92	0.00	76.92	648.81	324.40	513.97	253.83	8.90	-1.10	0.080
73.00	-10.34	-3.40	0.00	-65.68	0.00	65.68	637.49	318.74	491.98	242.97	9.60	-1.12	0.070
75.00	-10.03	-3.35	0.00	-58.88	0.00	58.88	629.79	314.89	477.45	235.80	10.08	-1.14	0.064
76.50	-9.80	-3.31	0.00	-53.86	0.00	53.86	621.68	310.84	464.95	229.62	10.44	-1.15	0.059
76.50	-9.80	-3.31	0.00	-53.86	0.00	53.86	621.68	310.84	464.95	229.62	10.44	-1.15	0.250
77.00	-9.58	-3.20	0.00	-52.20	0.00	52.20	618.88	309.44	460.75	227.55	10.56	-1.15	0.245
80.00	-7.27	-2.31	0.00	-42.59	0.00	42.59	602.06	301.03	435.93	215.29	11.31	-1.24	0.210
85.00	-6.90	-2.18	0.00	-31.03	0.00	31.03	574.04	287.02	396.08	195.61	12.68	-1.37	0.171
89.50	-4.83	-1.62	0.00	-20.96	0.00	20.96	548.81	274.41	361.85	178.70	14.02	-1.46	0.126
90.00	-4.80	-1.58	0.00	-20.15	0.00	20.15	546.01	273.00	358.14	176.87	14.17	-1.47	0.123
95.00	-4.53	-1.47	0.00	-12.25	0.00	12.25	517.98	258.99	322.11	159.08	15.76	-1.54	0.086
100.00	-1.42	-0.42	0.00	-4.03	0.00	4.03	489.95	244.98	288.00	142.23	17.40	-1.59	0.031
100.00	-1.42	-0.42	0.00	-4.03	0.00	4.03	459.24	229.62	229.69	150.79	17.40	-1.59	0.030
105.00	-1.15	-0.38	0.00	-1.92	0.00	1.92	459.24	229.62	229.69	150.79	19.07	-1.61	0.015
110.00	0.00	-0.35	0.00	0.00	0.00	0.00	459.24	229.62	229.69	150.79	20.76	-1.61	0.000

Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period (S_s):	0.18
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Long-Period Transition Period (T_L):	6
Importance Factor (I_E):	1.00
Site Coefficient F_a:	1.60
Site Coeffiecient F_v:	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.19
Design Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10
Seismic Response Coefficient (C_s):	0.03
Upper Limit C_s	0.03
Lower Limit C_s	0.03
Period based on Rayleigh Method (sec):	2.14
Redundancy Factor (p):	1.30
Seismic Force Distribution Exponent (k):	1.82
Total Unfactored Dead Load:	25.12 k
Seismic Base Shear (E):	1.04 k

Equivalent Modal Forces Analysis

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period (S_s):	0.18
Spectral Response Acceleration at 1.0 Second Period (S_1):	0.06
Importance Factor (I_E):	1.00
Site Coefficient F_a:	1.60
Site Coefficient F_v	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period (S_{ds}):	0.19
Desing Spectral Response Acceleration at 1.0 Second Period (S_{d1}):	0.10
Period Based on Rayleigh Method (sec):	2.14
Redundancy Factor (p):	1.30

Load Case (1.2 + 0.2Sds) * DL + E ELFM — **Seismic Equivalent Lateral Forces Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
33	107.50	270	1.805	1.562	0.986	0.316	74	232
32	102.50	270	1.641	0.911	0.727	0.220	51	232
31	97.50	266	1.485	0.464	0.525	0.140	32	229
30	92.50	275	1.336	0.174	0.369	0.075	18	237
29	89.75	28	1.258	0.067	0.300	0.046	1	24
28	87.25	322	1.189	-0.005	0.247	0.024	7	277
27	82.50	365	1.063	-0.088	0.165	-0.009	-3	315
26	78.50	261	0.963	-0.117	0.114	-0.027	-6	224
25	76.75	44	0.920	-0.121	0.095	-0.031	-1	38
24	75.75	233	0.896	-0.122	0.086	-0.033	-7	200
23	74.00	311	0.855	-0.120	0.071	-0.035	-10	268
22	71.50	484	0.799	-0.112	0.053	-0.036	-15	417
21	68.75	406	0.738	-0.098	0.038	-0.032	-11	350
20	66.75	245	0.696	-0.086	0.029	-0.027	-6	211
19	65.87	41	0.678	-0.080	0.026	-0.025	-1	35
18	65.37	163	0.668	-0.077	0.024	-0.023	-3	140
17	63.96	455	0.639	-0.067	0.020	-0.019	-7	392
16	61.46	520	0.590	-0.049	0.013	-0.009	-4	448
15	57.50	900	0.516	-0.022	0.008	0.007	6	775
14	52.50	911	0.431	0.008	0.006	0.026	20	785
13	48.75	460	0.371	0.027	0.008	0.036	15	396
12	46.25	463	0.334	0.037	0.010	0.042	17	398
11	42.50	934	0.282	0.049	0.014	0.047	38	804
10	37.50	945	0.220	0.060	0.021	0.050	41	814
9	33.91	414	0.180	0.065	0.026	0.050	18	356
8	31.41	733	0.154	0.068	0.030	0.049	31	632
7	29.66	175	0.137	0.069	0.032	0.049	7	150
6	27.16	832	0.115	0.070	0.035	0.048	35	717
5	22.50	972	0.079	0.072	0.040	0.046	39	837
4	17.50	983	0.048	0.071	0.042	0.044	38	847
3	12.50	994	0.024	0.066	0.039	0.041	35	856
2	7.50	1,005	0.009	0.053	0.031	0.034	30	866
1	2.50	1,016	0.001	0.024	0.013	0.017	15	876
DragonWave A-ANT-23G	110.00	15	1.890	1.980	1.140	0.369	5	13

Side Arms	110.00	560	1.890	1.980	1.140	0.369	179	482
DragonWave Horizon C	110.00	32	1.890	1.980	1.140	0.369	10	27
DragonWave A-ANT-11G	110.00	95	1.890	1.980	1.140	0.369	30	82
NextNet BTS-2500	110.00	105	1.890	1.980	1.140	0.369	34	90
Argus LLPX310R	110.00	86	1.890	1.980	1.140	0.369	27	74
Powerwave LGP21401	100.00	85	1.562	0.666	0.620	0.178	13	73
Powerwave TT19-	100.00	48	1.562	0.666	0.620	0.178	7	41
Flat Platform w/ Han	100.00	2,000	1.562	0.666	0.620	0.178	309	1,723
Ericsson RRUS 11 (Ba	100.00	330	1.562	0.666	0.620	0.178	51	284
Kathrein 860-10025	100.00	7	1.562	0.666	0.620	0.178	1	6
KMW AM-X-CD-16-65-00	100.00	97	1.562	0.666	0.620	0.178	15	84
Raycap DC6-48-60-18-	100.00	32	1.562	0.666	0.620	0.178	5	27
Andrew SBNH-1D6565C	100.00	61	1.562	0.666	0.620	0.178	9	52
Powerwave 7770.00	100.00	210	1.562	0.666	0.620	0.178	32	181
CCI DTMA-1819-DD-12	89.50	86	1.251	0.058	0.295	0.044	3	74
Flat Low Profile Pla	89.50	1,500	1.251	0.058	0.295	0.044	57	1,292
RFS APX16DWV-16DWV-	89.50	119	1.251	0.058	0.295	0.044	5	102
RFS APXV18-206516S-C	89.50	56	1.251	0.058	0.295	0.044	2	48
Antel BXA-171063-12C	80.00	77	1.000	-0.110	0.131	-0.021	-1	66
Antel BXA-70063-6CF-	80.00	102	1.000	-0.110	0.131	-0.021	-2	88
RFS DB-T1-6Z-8AB-0Z	80.00	88	1.000	-0.110	0.131	-0.021	-2	76
Alcatel-Lucent RRH2X	80.00	132	1.000	-0.110	0.131	-0.021	-2	114
Alcatel-Lucent RRH2x	80.00	170	1.000	-0.110	0.131	-0.021	-3	147
Round Low Profile Pl	80.00	1,500	1.000	-0.110	0.131	-0.021	-28	1,292
Scala 840 10212	77.00	7	0.926	-0.121	0.098	-0.031	0	6
TX RX Systems 421-86	77.00	15	0.926	-0.121	0.098	-0.031	0	13
Stand Off	77.00	150	0.926	-0.121	0.098	-0.031	-4	129
RFS APXV18-206517S-C	73.00	79	0.832	-0.117	0.064	-0.036	-2	68
Round Side Arm	73.00	450	0.832	-0.117	0.064	-0.036	-14	388
Radio Waves SP2-4.7	70.00	22	0.765	-0.105	0.044	-0.034	-1	19
Radio/ODU	70.00	30	0.765	-0.105	0.044	-0.034	-1	26
Stand Off	66.00	75	0.680	-0.081	0.026	-0.025	-2	65
Scala 840 10212	66.00	7	0.680	-0.081	0.026	-0.025	0	6
		25,120	64.856	19.229	19.185	4.684	1,226	21,638

Load Case (1.2 + 0.2Sds) * DL + E EMAM **Seismic Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
33	107.50	270	1.805	1.562	0.986	0.316	74	232
32	102.50	270	1.641	0.911	0.727	0.220	51	232
31	97.50	266	1.485	0.464	0.525	0.140	32	229
30	92.50	275	1.336	0.174	0.369	0.075	18	237
29	89.75	28	1.258	0.067	0.300	0.046	1	24
28	87.25	322	1.189	-0.005	0.247	0.024	7	277
27	82.50	365	1.063	-0.088	0.165	-0.009	-3	315
26	78.50	261	0.963	-0.117	0.114	-0.027	-6	224
25	76.75	44	0.920	-0.121	0.095	-0.031	-1	38
24	75.75	233	0.896	-0.122	0.086	-0.033	-7	200
23	74.00	311	0.855	-0.120	0.071	-0.035	-10	268
22	71.50	484	0.799	-0.112	0.053	-0.036	-15	417
21	68.75	406	0.738	-0.098	0.038	-0.032	-11	350
20	66.75	245	0.696	-0.086	0.029	-0.027	-6	211
19	65.87	41	0.678	-0.080	0.026	-0.025	-1	35
18	65.37	163	0.668	-0.077	0.024	-0.023	-3	140
17	63.96	455	0.639	-0.067	0.020	-0.019	-7	392
16	61.46	520	0.590	-0.049	0.013	-0.009	-4	448
15	57.50	900	0.516	-0.022	0.008	0.007	6	775
14	52.50	911	0.431	0.008	0.006	0.026	20	785
13	48.75	460	0.371	0.027	0.008	0.036	15	396

12	46.25	463	0.334	0.037	0.010	0.042	17	398
11	42.50	934	0.282	0.049	0.014	0.047	38	804
10	37.50	945	0.220	0.060	0.021	0.050	41	814
9	33.91	414	0.180	0.065	0.026	0.050	18	356
8	31.41	733	0.154	0.068	0.030	0.049	31	632
7	29.66	175	0.137	0.069	0.032	0.049	7	150
6	27.16	832	0.115	0.070	0.035	0.048	35	717
5	22.50	972	0.079	0.072	0.040	0.046	39	837
4	17.50	983	0.048	0.071	0.042	0.044	38	847
3	12.50	994	0.024	0.066	0.039	0.041	35	856
2	7.50	1,005	0.009	0.053	0.031	0.034	30	866
1	2.50	1,016	0.001	0.024	0.013	0.017	15	876
DragonWave A-ANT-23G	110.00	15	1.890	1.980	1.140	0.369	5	13
Side Arms	110.00	560	1.890	1.980	1.140	0.369	179	482
DragonWave Horizon C	110.00	32	1.890	1.980	1.140	0.369	10	27
DragonWave A-ANT-11G	110.00	95	1.890	1.980	1.140	0.369	30	82
NextNet BTS-2500	110.00	105	1.890	1.980	1.140	0.369	34	90
Argus LLPX310R	110.00	86	1.890	1.980	1.140	0.369	27	74
Powerwave LGP21401	100.00	85	1.562	0.666	0.620	0.178	13	73
Powerwave TT19-	100.00	48	1.562	0.666	0.620	0.178	7	41
Flat Platform w/ Han	100.00	2,000	1.562	0.666	0.620	0.178	309	1,723
Ericsson RRUS 11 (Ba	100.00	330	1.562	0.666	0.620	0.178	51	284
Kathrein 860-10025	100.00	7	1.562	0.666	0.620	0.178	1	6
KMW AM-X-CD-16-65-00	100.00	97	1.562	0.666	0.620	0.178	15	84
Raycap DC6-48-60-18-	100.00	32	1.562	0.666	0.620	0.178	5	27
Andrew SBNH-1D6565C	100.00	61	1.562	0.666	0.620	0.178	9	52
Powerwave 7770.00	100.00	210	1.562	0.666	0.620	0.178	32	181
CCI DTMA-1819-DD-12	89.50	86	1.251	0.058	0.295	0.044	3	74
Flat Low Profile Pla	89.50	1,500	1.251	0.058	0.295	0.044	57	1,292
RFS APX16DWV-16DWV-	89.50	119	1.251	0.058	0.295	0.044	5	102
RFS APXV18-206516S-C	89.50	56	1.251	0.058	0.295	0.044	2	48
Antel BXA-171063-12C	80.00	77	1.000	-0.110	0.131	-0.021	-1	66
Antel BXA-70063-6CF-	80.00	102	1.000	-0.110	0.131	-0.021	-2	88
RFS DB-T1-6Z-8AB-0Z	80.00	88	1.000	-0.110	0.131	-0.021	-2	76
Alcatel-Lucent RRH2X	80.00	132	1.000	-0.110	0.131	-0.021	-2	114
Alcatel-Lucent RRH2x	80.00	170	1.000	-0.110	0.131	-0.021	-3	147
Round Low Profile Pl	80.00	1,500	1.000	-0.110	0.131	-0.021	-28	1,292
Scala 840 10212	77.00	7	0.926	-0.121	0.098	-0.031	0	6
TX RX Systems 421-86	77.00	15	0.926	-0.121	0.098	-0.031	0	13
Stand Off	77.00	150	0.926	-0.121	0.098	-0.031	-4	129
RFS APXV18-206517S-C	73.00	79	0.832	-0.117	0.064	-0.036	-2	68
Round Side Arm	73.00	450	0.832	-0.117	0.064	-0.036	-14	388
Radio Waves SP2-4.7	70.00	22	0.765	-0.105	0.044	-0.034	-1	19
Radio/ODU	70.00	30	0.765	-0.105	0.044	-0.034	-1	26
Stand Off	66.00	75	0.680	-0.081	0.026	-0.025	-2	65
Scala 840 10212	66.00	7	0.680	-0.081	0.026	-0.025	0	6
		25,120	64.856	19.229	19.185	4.684	1,226	21,638

Load Case (0.9 - 0.2Sds) * DL + E ELFM — **Seismic (Reduced DL) Equivalent Lateral Forces Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
33	107.50	270	1.805	1.562	0.986	0.316	74	232
32	102.50	270	1.641	0.911	0.727	0.220	51	232
31	97.50	266	1.485	0.464	0.525	0.140	32	229
30	92.50	275	1.336	0.174	0.369	0.075	18	237
29	89.75	28	1.258	0.067	0.300	0.046	1	24
28	87.25	322	1.189	-0.005	0.247	0.024	7	277
27	82.50	365	1.063	-0.088	0.165	-0.009	-3	315
26	78.50	261	0.963	-0.117	0.114	-0.027	-6	224

25	76.75	44	0.920	-0.121	0.095	-0.031	-1	38
24	75.75	233	0.896	-0.122	0.086	-0.033	-7	200
23	74.00	311	0.855	-0.120	0.071	-0.035	-10	268
22	71.50	484	0.799	-0.112	0.053	-0.036	-15	417
21	68.75	406	0.738	-0.098	0.038	-0.032	-11	350
20	66.75	245	0.696	-0.086	0.029	-0.027	-6	211
19	65.87	41	0.678	-0.080	0.026	-0.025	-1	35
18	65.37	163	0.668	-0.077	0.024	-0.023	-3	140
17	63.96	455	0.639	-0.067	0.020	-0.019	-7	392
16	61.46	520	0.590	-0.049	0.013	-0.009	-4	448
15	57.50	900	0.516	-0.022	0.008	0.007	6	775
14	52.50	911	0.431	0.008	0.006	0.026	20	785
13	48.75	460	0.371	0.027	0.008	0.036	15	396
12	46.25	463	0.334	0.037	0.010	0.042	17	398
11	42.50	934	0.282	0.049	0.014	0.047	38	804
10	37.50	945	0.220	0.060	0.021	0.050	41	814
9	33.91	414	0.180	0.065	0.026	0.050	18	356
8	31.41	733	0.154	0.068	0.030	0.049	31	632
7	29.66	175	0.137	0.069	0.032	0.049	7	150
6	27.16	832	0.115	0.070	0.035	0.048	35	717
5	22.50	972	0.079	0.072	0.040	0.046	39	837
4	17.50	983	0.048	0.071	0.042	0.044	38	847
3	12.50	994	0.024	0.066	0.039	0.041	35	856
2	7.50	1,005	0.009	0.053	0.031	0.034	30	866
1	2.50	1,016	0.001	0.024	0.013	0.017	15	876
DragonWave A-ANT-23G	110.00	15	1.890	1.980	1.140	0.369	5	13
Side Arms	110.00	560	1.890	1.980	1.140	0.369	179	482
DragonWave Horizon C	110.00	32	1.890	1.980	1.140	0.369	10	27
DragonWave A-ANT-11G	110.00	95	1.890	1.980	1.140	0.369	30	82
NextNet BTS-2500	110.00	105	1.890	1.980	1.140	0.369	34	90
Argus LLPX310R	110.00	86	1.890	1.980	1.140	0.369	27	74
Powerwave LGP21401	100.00	85	1.562	0.666	0.620	0.178	13	73
Powerwave TT19-	100.00	48	1.562	0.666	0.620	0.178	7	41
Flat Platform w/ Han	100.00	2,000	1.562	0.666	0.620	0.178	309	1,723
Ericsson RRUS 11 (Ba	100.00	330	1.562	0.666	0.620	0.178	51	284
Kathrein 860-10025	100.00	7	1.562	0.666	0.620	0.178	1	6
KMW AM-X-CD-16-65-00	100.00	97	1.562	0.666	0.620	0.178	15	84
Raycap DC6-48-60-18-	100.00	32	1.562	0.666	0.620	0.178	5	27
Andrew SBNH-1D6565C	100.00	61	1.562	0.666	0.620	0.178	9	52
Powerwave 7770.00	100.00	210	1.562	0.666	0.620	0.178	32	181
CCI DTMA-1819-DD-12	89.50	86	1.251	0.058	0.295	0.044	3	74
Flat Low Profile Pla	89.50	1,500	1.251	0.058	0.295	0.044	57	1,292
RFS APX16DWV-16DWV-	89.50	119	1.251	0.058	0.295	0.044	5	102
RFS APXV18-206516S-C	89.50	56	1.251	0.058	0.295	0.044	2	48
Antel BXA-171063-12C	80.00	77	1.000	-0.110	0.131	-0.021	-1	66
Antel BXA-70063-6CF-	80.00	102	1.000	-0.110	0.131	-0.021	-2	88
RFS DB-T1-6Z-8AB-0Z	80.00	88	1.000	-0.110	0.131	-0.021	-2	76
Alcatel-Lucent RRH2X	80.00	132	1.000	-0.110	0.131	-0.021	-2	114
Alcatel-Lucent RRH2x	80.00	170	1.000	-0.110	0.131	-0.021	-3	147
Round Low Profile Pl	80.00	1,500	1.000	-0.110	0.131	-0.021	-28	1,292
Scala 840 10212	77.00	7	0.926	-0.121	0.098	-0.031	0	6
TX RX Systems 421-86	77.00	15	0.926	-0.121	0.098	-0.031	0	13
Stand Off	77.00	150	0.926	-0.121	0.098	-0.031	-4	129
RFS APXV18-206517S-C	73.00	79	0.832	-0.117	0.064	-0.036	-2	68
Round Side Arm	73.00	450	0.832	-0.117	0.064	-0.036	-14	388
Radio Waves SP2-4.7	70.00	22	0.765	-0.105	0.044	-0.034	-1	19
Radio/ODU	70.00	30	0.765	-0.105	0.044	-0.034	-1	26
Stand Off	66.00	75	0.680	-0.081	0.026	-0.025	-2	65
Scala 840 10212	66.00	7	0.680	-0.081	0.026	-0.025	0	6
		25,120	64.856	19.229	19.185	4.684	1,226	21,638

Load Case (0.9 - 0.2Sds) * DL + E EMAM — **Seismic (Reduced DL) Equivalent Modal Analysis Method**

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
33	107.50	270	1.805	1.562	0.986	0.316	74	232
32	102.50	270	1.641	0.911	0.727	0.220	51	232
31	97.50	266	1.485	0.464	0.525	0.140	32	229
30	92.50	275	1.336	0.174	0.369	0.075	18	237
29	89.75	28	1.258	0.067	0.300	0.046	1	24
28	87.25	322	1.189	-0.005	0.247	0.024	7	277
27	82.50	365	1.063	-0.088	0.165	-0.009	-3	315
26	78.50	261	0.963	-0.117	0.114	-0.027	-6	224
25	76.75	44	0.920	-0.121	0.095	-0.031	-1	38
24	75.75	233	0.896	-0.122	0.086	-0.033	-7	200
23	74.00	311	0.855	-0.120	0.071	-0.035	-10	268
22	71.50	484	0.799	-0.112	0.053	-0.036	-15	417
21	68.75	406	0.738	-0.098	0.038	-0.032	-11	350
20	66.75	245	0.696	-0.086	0.029	-0.027	-6	211
19	65.87	41	0.678	-0.080	0.026	-0.025	-1	35
18	65.37	163	0.668	-0.077	0.024	-0.023	-3	140
17	63.96	455	0.639	-0.067	0.020	-0.019	-7	392
16	61.46	520	0.590	-0.049	0.013	-0.009	-4	448
15	57.50	900	0.516	-0.022	0.008	0.007	6	775
14	52.50	911	0.431	0.008	0.006	0.026	20	785
13	48.75	460	0.371	0.027	0.008	0.036	15	396
12	46.25	463	0.334	0.037	0.010	0.042	17	398
11	42.50	934	0.282	0.049	0.014	0.047	38	804
10	37.50	945	0.220	0.060	0.021	0.050	41	814
9	33.91	414	0.180	0.065	0.026	0.050	18	356
8	31.41	733	0.154	0.068	0.030	0.049	31	632
7	29.66	175	0.137	0.069	0.032	0.049	7	150
6	27.16	832	0.115	0.070	0.035	0.048	35	717
5	22.50	972	0.079	0.072	0.040	0.046	39	837
4	17.50	983	0.048	0.071	0.042	0.044	38	847
3	12.50	994	0.024	0.066	0.039	0.041	35	856
2	7.50	1,005	0.009	0.053	0.031	0.034	30	866
1	2.50	1,016	0.001	0.024	0.013	0.017	15	876
DragonWave A-ANT-23G	110.00	15	1.890	1.980	1.140	0.369	5	13
Side Arms	110.00	560	1.890	1.980	1.140	0.369	179	482
DragonWave Horizon C	110.00	32	1.890	1.980	1.140	0.369	10	27
DragonWave A-ANT-11G	110.00	95	1.890	1.980	1.140	0.369	30	82
NextNet BTS-2500	110.00	105	1.890	1.980	1.140	0.369	34	90
Argus LLPX310R	110.00	86	1.890	1.980	1.140	0.369	27	74
Powerwave LGP21401	100.00	85	1.562	0.666	0.620	0.178	13	73
Powerwave TT19-	100.00	48	1.562	0.666	0.620	0.178	7	41
Flat Platform w/ Han	100.00	2,000	1.562	0.666	0.620	0.178	309	1,723
Ericsson RRUS 11 (Ba	100.00	330	1.562	0.666	0.620	0.178	51	284
Kathrein 860-10025	100.00	7	1.562	0.666	0.620	0.178	1	6
KMW AM-X-CD-16-65-00	100.00	97	1.562	0.666	0.620	0.178	15	84
Raycap DC6-48-60-18-	100.00	32	1.562	0.666	0.620	0.178	5	27
Andrew SBNH-1D6565C	100.00	61	1.562	0.666	0.620	0.178	9	52
Powerwave 7770.00	100.00	210	1.562	0.666	0.620	0.178	32	181
CCI DTMA-1819-DD-12	89.50	86	1.251	0.058	0.295	0.044	3	74
Flat Low Profile Pla	89.50	1,500	1.251	0.058	0.295	0.044	57	1,292
RFS APX16DWV-16DWV-	89.50	119	1.251	0.058	0.295	0.044	5	102
RFS APXV18-206516S-C	89.50	56	1.251	0.058	0.295	0.044	2	48
Antel BXA-171063-12C	80.00	77	1.000	-0.110	0.131	-0.021	-1	66
Antel BXA-70063-6CF-	80.00	102	1.000	-0.110	0.131	-0.021	-2	88
RFS DB-T1-6Z-8AB-0Z	80.00	88	1.000	-0.110	0.131	-0.021	-2	76
Alcatel-Lucent RRH2X	80.00	132	1.000	-0.110	0.131	-0.021	-2	114

Alcatel-Lucent RRH2x	80.00	170	1.000	-0.110	0.131	-0.021	-3	147
Round Low Profile Pl	80.00	1,500	1.000	-0.110	0.131	-0.021	-28	1,292
Scala 840 10212	77.00	7	0.926	-0.121	0.098	-0.031	0	6
TX RX Systems 421-86	77.00	15	0.926	-0.121	0.098	-0.031	0	13
Stand Off	77.00	150	0.926	-0.121	0.098	-0.031	-4	129
RFS APXV18-206517S-C	73.00	79	0.832	-0.117	0.064	-0.036	-2	68
Round Side Arm	73.00	450	0.832	-0.117	0.064	-0.036	-14	388
Radio Waves SP2-4.7	70.00	22	0.765	-0.105	0.044	-0.034	-1	19
Radio/ODU	70.00	30	0.765	-0.105	0.044	-0.034	-1	26
Stand Off	66.00	75	0.680	-0.081	0.026	-0.025	-2	65
Scala 840 10212	66.00	7	0.680	-0.081	0.026	-0.025	0	6
		25,120	64.856	19.229	19.185	4.684	1,226	21,638

Analysis Summary

Load Case	Reactions Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Max Usage Elev (ft)	Interaction Ratio
1.2D + 1.6W	24.80	0.00	30.06	0.00	0.00	1704.86	76.50	0.98
0.9D + 1.6W	24.71	0.00	22.52	0.00	0.00	1675.54	76.50	0.94
1.2D + 1.0Di + 1.0Wi	6.75	0.00	76.45	0.00	0.00	500.57	76.50	0.34
(1.2 + 0.2Sds) * DL + E ELFM	1.05	0.00	29.86	0.00	0.00	91.78	76.50	0.08
(1.2 + 0.2Sds) * DL + E EMAM	1.22	0.00	29.85	0.00	0.00	106.14	76.50	0.14
(0.9 - 0.2Sds) * DL + E ELFM	1.05	0.00	20.76	0.00	0.00	90.26	76.50	0.07
(0.9 - 0.2Sds) * DL + E EMAM	1.21	0.00	20.76	0.00	0.00	104.15	76.50	0.13
1.0D + 1.0W	6.33	0.00	25.11	0.00	0.00	426.44	76.50	0.25

Additional Steel Summary

Elev From (ft)	Elev To (ft)	Member	Intermediate Connectors VQ/I (lb/in)	Shear Applied (kips)	Shear phiVn (kips)	Upper Termination Connectors MQ/I (kips)	phiVn (kips)	Num Reqd	Num Actual	Lower Termination Connectors MQ/I (kips)	phiVn (kips)	Num Reqd	Num Actual	Max Member Pu (kip)	phiPn (kip)	Ratio
0.00	47.5	(4) SOL-#20 All Thre	393.5	11.8	16.8	0.0	12.0	0	8	0.0	12.0	0	0	309.4	330.5	0.936
47.5	67.5	(4) SOL-#20 All Thre	431.9	13.0	16.8	0.0	12.0	0	8	0.0	12.0	0	0	183.6	330.5	0.556
67.5	76.5	(4) SOL-#20 All Thre	431.9	13.0	16.8	80.4	12.0	7	8	0.0	12.0	0	0	120.1	330.5	0.364

Base/Flange Plate	Plate Type	***Baseplate***	
	Pole Diameter	30	in
	Pole Thickness	0.25	in
	Plate Length	44	in
	Plate Thickness	2	in
	Plate Fy	60	ksi
	Weld Length	0.1875	in
	ϕ_s Resistance	1598.36	k-in
	Applied	1112.99	k-in
Stiffeners	#	***0***	

Bolts	#	***8***	
	Bolt Circle	44	in
	(R)adial / (S)quare	S	
	Bolt Gap	6	in
	Diameter	2.25	in
	Hole Diameter	2.375	in
	Type	A615-75	
	Fy	75	ksi
	Fu	100	ksi
	ϕ_s Resistance	259.82	k
	Applied	98.93	k
Reinforcement ●	#	***4***	
	DYW. Circle	38.6	in
	Offset Angle	0	°
	Type	#20	
	Diameter	2.5	in
	Fu	100	ksi
	ϕ_s Resistance	392.70	k
	Applied	219.29	k
Extra Bolts O	#	***0***	

Code Rev. ***G***

Moment 1704.9 k-ft

Axial 30.1 k

Date	8/27/2015
Engineer	Joshua J. Ferguson
Site #	302481
Carrier	Verizon

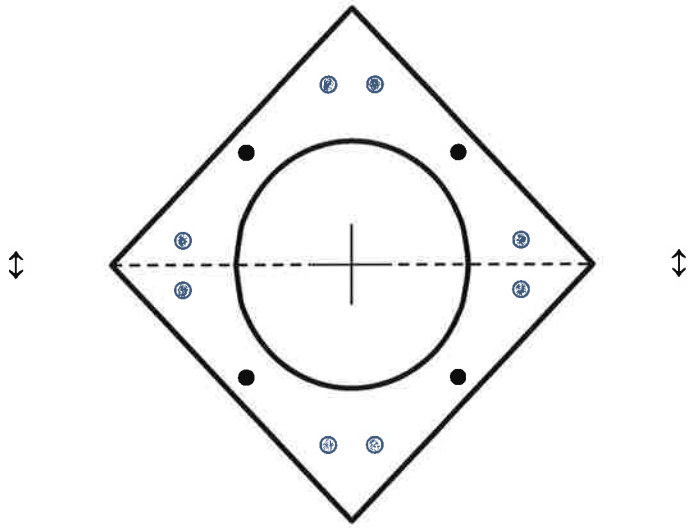


Plate Stress Ratio:

0.70 (Pass)

Bolt Stress Ratio:

0.38 (Pass)

Reinforcement Stress Ratio:

0.56 (Pass)

Base/Flange Plate	Plate Type	*Flange @ 105.0 ft*	
	Pole Diameter	12.75	in
	Pole Thickness	0.375	in
	Plate Diameter	28.5	in
	Plate Thickness	1.5	in
	Plate Fy	36	ksi
	Weld Length	0.25	in
	ϕ_s Resistance	60.83	k-in
	Applied	6.50	k-in
Stiffeners	#	*0*	

Code Rev. **G**

Moment 7.9 k-ft
Axial 1.2 k

Date	8/27/2015
Engineer	Joshua J. Ferguson
Site #	302481
Carrier	Verizon

Required Flange Thickness:
0.49 in OK

Bolts	#	*12*	
	Bolt Circle	26	in
	(R)adial / (S)quare	R	
●	Diameter	1	in
	Hole Diameter	1.0625	in
	Type	A325	
	Fy	92	ksi
	Fu	120	ksi
	ϕ_s Resistance	54.52	k
	Applied	1.11	k
Reinforcement ●	#	*0*	
Extra Bolts O	#	*0*	

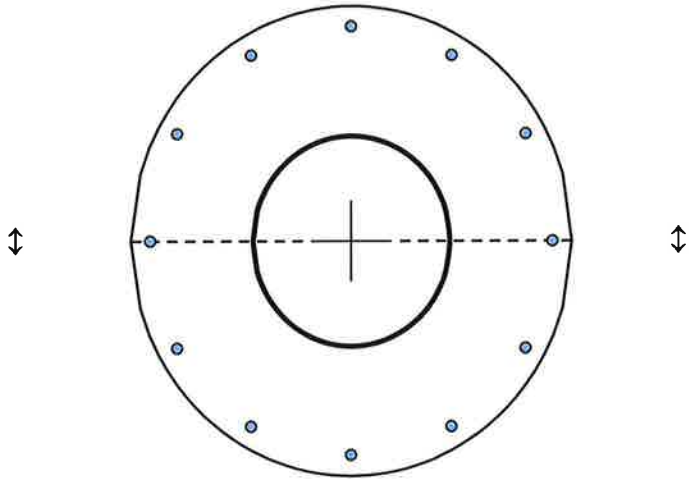


Plate Stress Ratio:
0.11 (Pass)

Bolt Stress Ratio:
0.02 (Pass)

Site Name:	**Hrfr - South, CT**
Site Number:	**302481**
Engineering Number:	**62757221**
Engineer:	**Joshua J. Ferguson**
Date:	**8/27/2015**

Design Base Loads (Factored) - Design per TIA-222-G Standard

Moment (Overturning) (M_u):	1704.9	k-ft
Shear/Leg (V_u):	24.8	k
Compression/Leg (P_u):	30.1	k
Uplift/Leg (T_u):	0.0	k
Tower Type (GT / SST / MP):	MP	

Length / Width of Block:	6.0	ft
Thickness of Block:	6.0	ft
Block Height Above Ground:	0.5	ft
Depth Below Ground Surface to Water Table (w):	99.0	ft
Unit Weight of Concrete:	150.0	pcf
Unit Weight of Soil:	125.0	pcf
Unit Weight of Water:	62.4	pcf
Ultimate Compressive Bearing Pressure:	10000	psf
Capacity Increase (Due to Transient Loads):	1.00	
Pullout Angle:	30.0	degrees
Rod Diameter:	1.00	in
Rod Ultimate Strength:	38	ksi
Rod Net Area:	2.65	in^2
Number of Rods:	18	
Diameter of Cored Hole:	2.00	in
Ultimate Grout / Rock Interface Bond Strength:	200	psi
Ultimate Grout / Rock Anchor Interface Bond Strength:	600	psi
Overall Rod Embedment Length:	72	in
Rod Exposure Above Lock Off Nut in Foundation:	60	in
Rod Embedment Circle:	60	in
Free Stress Length:	0	in
Soil / Concrete Friction Coefficient:	0.44	
Rock Anchor Design Plastic or Elastic:	Elastic	
Ignore Pullout Weight Resistance (Y/N):	Y	
Weight of Concrete (Buoyancy Effect Considered):	32.4	k
Compressive Bearing Resistance:	282.7	k
Pullout Weight / Rod:		k - Ignored
Rock / Grout Bond Strength / Rod:	90.5	k
Grout / Rod Bond Strength / Rod:	135.7	k
Rod Mechanical Strength / Rod:	100.7	k
Soil Strength Reduction Factor (ϕ_s):	0.75	
Factored Nominal Moment Capacity per Leg ($\phi_s M_n$):	2188.9	k
Factored Nominal Uplift Capacity per Leg ($\phi_s T_n$):	1273.2	k
Factored Nominal Compressive Capacity per Leg ($\phi_s P_n$):	212.1	k
Factored Nominal Shear Capacity per Leg ($\phi_s V_n$):	815.7	k
M_u:	1853.7	k-ft
T_u:	0.0	k
P_u:	36.0	k
V_u:	24.8	k
$T_u/\phi_s T_n + M_u/\phi_s M_n$:	0.85	Result: OK
$P_u/\phi_s P_n$:	0.17	Result: OK
$V_u/\phi_s V_n$:	0.03	Result: OK

Caisson Strength Capacity

Concrete Compressive Strength (f'_c):	3000	psi
Vertical Steel Rebar Size #:	11	
Vertical Steel Rebar Area:	1.56	in^2
# of Vertical Steel Rebars:	74	Minimum # of vertical rebar met
Vertical Steel Rebar Yield Strength (F_y):	60	ksi
Horizontal Tie / Stirrup Size #:	4	
Horizontal Tie / Stirrup Area:	0.20	in^2
Horizontal Tie / Stirrup Spacing:	12.0	in
Horizontal Tie / Stirrup Steel Yield Strength (F_y):	40	ksi
Anchor Rod Nut Diameter:	2.02	in
Rebar Cage Diameter:	64.0	in
Strength Bending/Tension Reduction Factor (ϕ_B):	0.90	ACI318-05 - 9.3.2.1
Strength Shear Reduction Factor (ϕ_V):	0.75	ACI318-05 - 9.3.2.3
Strength Compression/Bearing Reduction Factor ($\phi_{P/B}$):	0.65	ACI318-05 - 9.3.2.2
Steel Elastic Modulus:	29000	ksi
Design Moment (M_u):	1853.7	k-ft
Factored Nominal Moment Capacity ($\phi_B M_n$):	16253.8	k-ft - ACI318-05 - 10.2
$M_u/\phi_B M_n$:	0.11	Result: OK
Design Shear (V_u):	319.3	k
Factored Nominal Shear Capacity ($\phi_V V_n$):	402.2	k - ACI318-05 - 11.3.1.1 or 11.5.7.2
$V_u/\phi_V V_n$:	0.79	Result: OK
Design Tension (T_u):	0.0	k
Factored Nominal Tension Capacity ($\phi_T T_n$):	6233.8	k - ACI318-05 - 10.2
$T_u/\phi_T T_n$:	0.00	Result: OK
Design Compression (P_u):	30.1	k
Factored Nominal Compression Capacity ($\phi_P P_n$):	6171.5	k - ACI318-05 - 10.3.6.2
$P_u/\phi_P P_n$:	0.00	Result: OK