



January 11, 2024

Fremont County Administration Building  
615 Macon Avenue Suite 210  
Canon City, CO 81212  
Contact Number 719.276.7360

Fremont County

JAN 17 2024

Planning & Zoning

**Re: Verizon Wireless Application for Modification of CO4 Cotopaxi ATC  
Canon City SUR 12-0004 Mercury Towers**

Dear Planning Division:

Please find attached the items required for the co-location process and applicable exhibits. I look forward to your review and feel free to me at [Mark@q3consulting.com](mailto:Mark@q3consulting.com) or 303.915.3428 with any questions you may have about the Application. I look forward to working with you on this and other future wireless projects.

Regards,

A handwritten signature in blue ink that reads 'Mark Paiz'.

Mark Paiz



FREMONT COUNTY  
COLLOCATION OF ANTENNA ON AN EXISTING TOWER  
APPLICATION

1. Name and Number of Existing SRU Permit NA TBP/ 12-004 / Mercury Towers
2. Name: ATC Address: 10 Presidential Way  
City: Woodburn State: MA Zip Code: 01801  
Telephone #: 781-926-4625 Facsimile # N/A  
Name of Contact: Maggie Girouad Email Address: Maggie.Girouad@americantower.com
3. The Applicant Applying for Collocation is:  
Name: Verizon Wireless Address: 10000 Park Meadows Drive  
City: Lone Tree State: CO Zip Code: 80124  
Telephone #: 303-242-4330 Facsimile # N/A  
Name of Contact: Maureen Lopez Email Address: Maureen.Lopez@verizonwireless.com
4. Property Owner: ATC Address: 10 Presidential Way  
City: Woodburn State: MA Zip Code: 01801  
Telephone #: 781-926-4625 Facsimile #: N/A  
Name of Contact: Maggie Girouad Email Address: Maggie.Girouad@americantower.com
5. Consultant: Q3 Consulting Address: 1670 Newport Street  
City: Denver State: CO Zip Code: 80220  
Telephone #: 303-915-3428 Facsimile # N/A  
Name of Contact: Mark Paiz Email Address: mark@q3consulting.com

**Please read prior to completion of this application**

An application for Special Review Use Permit, instead of a Collocation Application, will be required for the following:

1. An increase in the height of the existing tower;
2. The relocation of an existing tower;
3. The placement of an additional tower on the existing tower site;
4. An attachment of an antenna on an existing non-commercial tower, which is less than one-hundred (100) feet in height.

Any application which is not complete or does not include all minimum submittal requirements will not be accepted by the Fremont County Department of Planning and Zoning (Department).

The applicant shall provide one (1) original document of the application and all of its attachments (*copies of deeds, contracts, leases etcetera are acceptable*) at the time of application submittal. After submittal, the Department will review the application and all attachments and prepare a Department Submittal Deficiency and Comment Letter (D & C Letter), which will list the deficiencies, comments and questions

about the application, which must be addressed by the applicant. The applicant shall provide one (1) original document of all requirements of the D & C letter to the Department.

Attachments can be made to this application to provide expanded narrative for any application item including supportive documentation or evidence for provided application item answers. Please indicate at the application item that there is an attachment and label it as an exhibit with the application item number, a period and the number of the attachment for that item (*as an example, the first attached document providing evidence in support of the answer given at application item number 22 would be marked - Exhibit 22.1, the fifth attached document supporting the narrative provided for application item 22 would be marked - Exhibit 22.5*). **Please label all exhibits in the lower right-hand corner of the page.**

An additional review fee of two-hundred fifty dollars (\$250.00) will be charged to the applicant, if all deficiencies as per the initial D & C Letter are not adequately addressed or provided. Each subsequent D & C Letter, based on resubmitted items, will result in another two-hundred fifty dollar (\$250.00) review fee. All such fees shall be paid along with the deficiency submittal, prior to any further review of the application.

If the application is approved by the Department, with contingencies and the contingencies are not submitted or addressed within six (6) months after approval, an additional fee of one-hundred fifty dollars (\$150.00) will be charged to the applicant for a request for an extension of time to submit the contingencies. All such fees shall be paid along with a written request, explaining the need for extension.

The Department may require additional information at any time during the application process as may be deemed necessary in determining if the application is in compliance with all applicable regulations and to make an informed decision with regard to recommendations, approval or disapproval of the application.

6. The legal description and/or address of the existing site is: All that of Lot 2 McDonald /Cotopaxi School Boundary Adjustment as shown on Plat Reception #624159
7. The type of construction of the existing tower is: Modification to Existing
8. The total height of the existing tower (*with antenna*) is No Change feet.
9. What will be the total height of the tower (*with antenna(s)*) after collocation? No Change feet.
10. The existing tower currently has 12 antennas.
11. After the proposed collocation the tower would house 21 antennas.
12. Please provide documentation from a Licensed Professional Engineer demonstrating that the tower is capable of accommodating the proposed number of antennas. (*Mark as EXHIBIT 13.1*) Attached
13. The existing site contains 1 accessory structures.
14. Will the proposed collocation require additional accessory structures?  Yes ---  No . If yes, please provide how many, the sizes, the heights, the location and the reason such additional structures are necessary (*a new site plan may be required*): Ground based equipment 12x20 Lease Area Site Plan Attached

15. If a design plan addressing materials, colors, textures, screening and landscaping in the design of the tower or antenna was required with the issuance of the original permit, will it be adequate for the proposed collocation?  Yes ---  No If no, it may be required to comply with the original design plan.
16. The existing site contains 4 off-street parking spaces.
17. Will the proposed collocation require additional off-street parking spaces?  Yes ---  No If yes, please provide how many additional spaces will be necessary: \_\_\_\_\_ off-street parking spaces.
18. Was surfacing, lighting and or landscaping of driveways and parking areas required with issuance of the original permit?  Yes ---  No If no, was it waived by the Board?  Yes ---  No
19. Will the surfacing, lighting and or landscaping of driveways and parking areas required with issuance of the original permit be adequate for the proposed collocation?  Yes ---  No Please explain: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
20. Will the existing access to the site be adequate for the proposed collocation?  Yes ---  No If No, what is the proposed access for the proposed collocation? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_
21. Was a stormwater drainage plan required and approved with the issuance of the original permit?  Yes ---  No If yes, will the stormwater drainage plan required and approved with the issuance of the original permit be adequate with the addition of the accessory structures (if any)?  Yes ---  No Please explain: TBD  
 \_\_\_\_\_  
 \_\_\_\_\_
22. Please explain how the existing tower and additional uses meet the minimum requirements of the Federal Aviation Administration. No additional heights requested thus no change to the FAA analysis  
 \_\_\_\_\_  
 \_\_\_\_\_
23. If the existing permit holder is not the site property owner, does the agreement, lease, or the like between the site property owner and the existing permit holder allow the collocation?  Yes ---  No Please show (highlight) in the agreement, lease or the like that grants the permission to collocate. Please See Attached.
24. Please attach a copy of a lease or agreement between the permit holder and the collocation applicant as to right to use of the tower by the collocation applicant, marked as Exhibit 25.1.
25. A submittal fee of \$250.00 must accompany this application (Check # 8987  cash)

**Collocation Applicant's Endorsement:**

By signing this Application, the Applicant, or the agent/representative acting with due authorization on behalf of the Applicant, hereby certifies that all information contained in the application and any attachments to the Application, is true and correct to the best of Applicant's knowledge and belief.

Fremont County hereby advises Applicant that if any material information contained herein is determined to be misleading, inaccurate or false, the Board of Commissioners may take any and all reasonable and appropriate steps to declare actions of the Board regarding the Application to be null and void.

Further the applicant understands that if collocation is approved the applicant must comply with the conditions of the original permit, as issued or as may be amended, and applicable regulations of the Fremont County Zoning Resolution.

Signing this Application is a declaration by the Applicant to conform to all plans, drawings, and commitments submitted with or contained within this Application, provided that the same is in conformance with the Fremont County Zoning Resolution.

MARK PAIZ  
Applicant Printed Name  
[Signature]  
Applicant Signature

Q3 Consulting Inc. v.p.  
Applicant Title & Company Name  
1.10.24  
Date

**Existing Permit Holder's Endorsement:**

By signing this Application, the Permit Holder, or the agent/representative acting with due authorization on behalf of the Permit Holder, hereby certifies that all information contained in the application and any attachments to the Application, is true and correct to the best of Permit Holder's knowledge and belief.

Fremont County hereby advises Permit Holder that if any material information contained herein is determined to be misleading, inaccurate or false, the Board of Commissioners may take any and all reasonable and appropriate steps to declare actions of the Board regarding the Application to be null and void.

Further the existing permit holder understands that if collocation is approved the applicant and existing permit holder must comply with the conditions of the original permit, as issued or as may be amended, and applicable regulations of the Fremont County Zoning Resolution.

Signing this Application is a declaration by the Permit Holder to conform to all plans, drawings, and commitments submitted with or contained within this Application, provided that the same is in conformance with the Fremont County Zoning Resolution.

***THIS SIGNATURE ALSO SERVES AS THE EXISTING PERMIT HOLDERS APPROVAL FOR COLLOCATION.***

\_\_\_\_\_  
Permit Holder Printed Name  
\_\_\_\_\_  
Permit Holder Signature

\_\_\_\_\_  
Permit Holder Title & Company Name  
\_\_\_\_\_  
Date



**AMERICAN TOWER®**  
CORPORATION

**LETTER OF AUTHORIZATION FOR PERMITTING**

**ATC SITE#/NAME/PROJECT: 370593 / Cotopaxi II / OAA787850**

**SITE ADDRESS: 345 County Road 12, CO 81223-8719**

**APN: 394930000007**

**LICENSEE: CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS**

I, Margaret Robinson, Vice President, UST Legal for American Tower\*, owner of the tower facility located at the address identified above (the "Tower Facility"), do hereby authorize CELLCO PARTNERSHIP D/B/A VERIZON WIRELESS, its successors and assigns, and/or its agent, (collectively, the "Licensee") to act as American Tower's non-exclusive agent for the sole purpose of filing and consummating any land-use or building permit application(s) as may be required by the applicable permitting authorities for Licensee's telecommunications' installation.

I understand that these applications may be approved with conditions. The above authorization is limited to the acceptance by Licensee only of conditions related to Licensee's installation and any such conditions of approval or modifications will be Licensee's sole responsibility.

Signature:

Print Name: Margaret Robinson  
Vice President, UST Legal  
American Tower\*

**NOTARY BLOCK**

Commonwealth of MASSACHUSETTS  
County of Middlesex

This instrument was acknowledged before me by Margaret Robinson, Vice President, UST Legal for American Tower\*, personally known to me (or proved to me based on satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

WITNESS my hand and official seal, this 3rd day of January 2024.

NOTARY SEAL



GERARD T. HEFFRON  
Notary Public  
Commonwealth of Massachusetts  
My Commission Expires  
August 9, 2024

Notary Public   
My Commission Expires: August 9<sup>th</sup>, 2024

\*American Tower includes all affiliates and subsidiaries of American Tower Corporation.

Exhibit 23.1  
3 25.1



**AMERICAN TOWER®**  
CORPORATION

## Structural Analysis Report

**Structure** : 129 ft Monopole  
**ATC Asset Name** : Cotopaxi II  
**ATC Asset Number** : 370593  
**Engineering Number** : OAA787850\_C3\_04  
**Proposed Carrier** : VERIZON WIRELESS  
**Carrier Site Name** : CO4 Cotopaxi  
**Carrier Site Number** : 190208  
**Site Location** : 345 Fremont County Road 012  
COTOPAXI, CO 81223-0010  
38.3742° N, 105.691° W  
**County** : Fremont  
**Date** : October 25, 2023  
**Max Usage** : 66%  
**Analysis Result** : Pass

Created By:

Josh Yoder  
Structural Engineer

*Josh Yoder*



Michael Deese

Digitally signed by Michael  
Deese  
Date: 2023.10.25 09:43:18 -04'00'

*Exhibit 13.1*



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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 129 ft Monopole tower to reflect the change in loading by VERIZON WIRELESS.

## Supporting Documents

<b>Tower:</b>	Sabre Job #63640, dated July 26, 2012
<b>Foundation:</b>	Sabre Job #63640, dated July 26, 2012
<b>Geotechnical:</b>	TEP Project #093003, dated July 17, 2012

## 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.

<b>Basic Wind Speed:</b>	90 mph (3-second gust)
<b>Basic Wind Speed w/ Ice:</b>	No Ice Considered
<b>Code(s):</b>	ANSI/TIA-222-G / 2006 IBC
<b>Structure Class:</b>	II
<b>Exposure Category:</b>	C
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Spectral Response:</b>	$S_s = 0.27$ , $S_i = 0.08$
<b>Site Class:</b>	D - Stiff Soil - Default

## 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 reach out to your American Tower contact. If you do not have an American Tower contact and have an Engineering question, please contact [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower asset name, asset number, and engineering number in the subject line for any questions.

**Structure Usages**

Structural Component	Usage	Control	Result
Pole Shaft	65.7%	1.2D + 1.6W	Pass
Serviceability Usage	39.1%	1.0D + 1.0W	Pass
Base Plate @ 0.0 ft	54.5%	Rods	Pass
Mat & Pier	61.4%	Flexure [Steel (Pier)]	Pass

**Maximum Reactions**

Foundation	Moment (k-ft)	Axial (k)	Shear (k)
Monopole Base	1,674.5	24.4	19.0

*\*Reactions shown reflect the results from the Load Case with maximum Moment*

Structure base reactions were analyzed using available geotechnical and foundation information.



**VERIZON WIRELESS Final Loading**

Elev (ft)	Qty	Equipment	Lines
102.7	3	Ericsson Air6449 B41	
100.0	1	Raycap RVZDC-6627-PF-48 (29.5")	(2) 1.75" (44.5mm) Hybrid
	3	Commscope USX6-11W	
	3	Ericsson Radio 4490HP B5 B13	
	3	Ericsson Radio 4890HP B2 B66	
	3	Light Sector Frame	
	6	Commscope NHH-45C-R2B	

Install proposed lines inside the pole shaft.

**Other Existing/Reserved Loading**

Elev (ft)	Qty	Equipment	Lines	Carrier
110.0	1	Low Profile Platform	(1) 0.39" (10mm) Fiber Trunk (2) 0.88" (22.4mm) 8 AWG 6 (6) 7/8" Coax	AT&T MOBILITY
	1	Raycap DC6-48-60-18-8F		
	3	Alcatel-Lucent 9442 RRH2x40-AWS		
	3	Alcatel-Lucent RRH2x40-07-L		
	3	KMW ET-X-UW-70-16-70-18-iR-AT		
	3	Kathrein Scala 800 10766		
	3	Powerwave Allgon TT19-08BP111-001		

*(If table breaks across pages, please see previous page for data in merged cells)*



### **Standard Conditions**

All engineering services performed by ATC Tower Services LLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts, and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of ATC Tower Services LLC

It is the responsibility of the client to ensure that the information provided to ATC Tower Services LLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates, and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and ATC Tower Services LLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. ATC Tower Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

**ANALYSIS PARAMETERS**

Nominal Wind: 90 mph	Ice Wind: 50 mph w/ 0" ice	Service Wind: 60 mph
Structure Class: II	Exposure: C	S <sub>z</sub> : 0.266 S <sub>t</sub> : 0.084
Topo Category: 1		
Structure Height: 129 ft	Base Elevation: 0.00 ft	Structure Type: Taper
Base Diameter: 43.92 in	Base Rotation: 0°	Taper: 0.1980 (in/ft)

**POLE SECTION PROPERTIES**

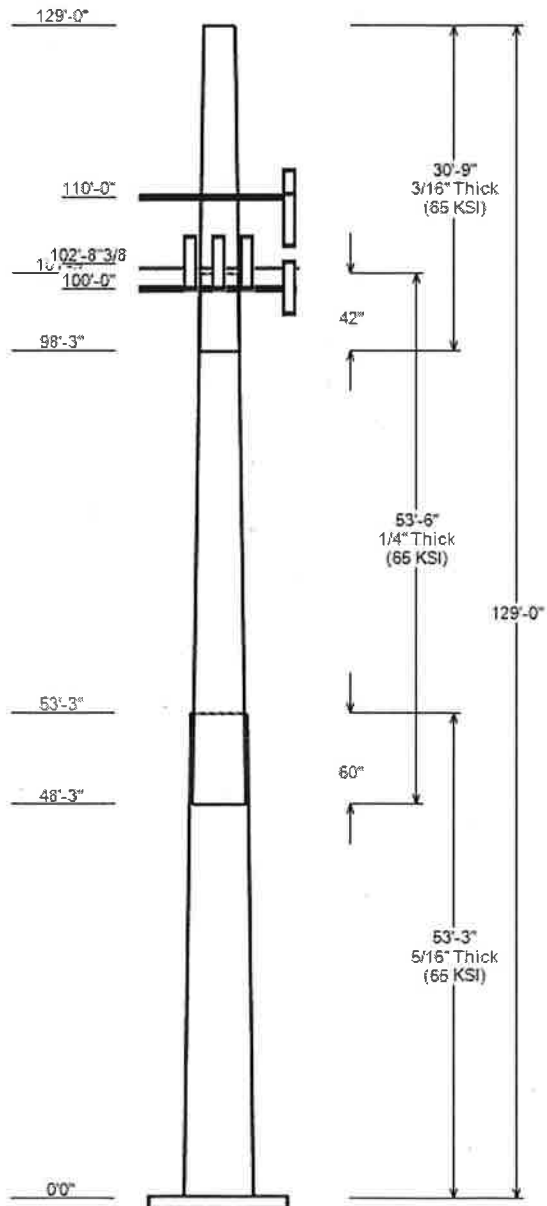
Section	Length (ft)	Flat Diameter (in)		Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
		Top	Bottom					
1	53.250	33.38	43.92	0.312		0.000	18 Sides	65
2	53.500	24.27	34.86	0.250	Slip Joint	60.000	18 Sides	65
3	30.750	19.25	25.34	0.188	Slip Joint	42.000	18 Sides	65

**DISCRETE APPURTENANCE**

Elev (ft)	Description
110.0	(3) Powerwave Allgon TT19-08BP111-
110.0	(1) Raycap DC6-48-60-18-8F
110.0	(3) Alcatel-Lucent RRH2x40-07-L
110.0	(3) Alcatel-Lucent 9442 RRH2x40-AW
110.0	(3) KMW ET-X-UW-70-16-70-18-iR-AT
110.0	(3) Kathrein Scala 800 10766
110.0	(1) Generic Round Low Profile Plat
102.7	(3) Ericsson Air6449 B41
100.0	(3) Ericsson Radio 4890HP B2 B66
100.0	(3) Ericsson Radio 4490HP B5 B13
100.0	(1) Raycap RVZDC-6627-PF-48 (29.5"
100.0	(6) Commscope NHH-45C-R2B
100.0	(3) Generic Flat Light Sector Fram
100.0	(3) Commscope USX6-11W

**LINEAR APPURTENANCE**

Elev To (ft)	Description
112.0	(2) 2" Carflex Non-Metallic Conduit
110.0	(6) 7/8" Coax
110.0	(2) 0.88" (22.4mm) 8 AWG 6
110.0	(1) 0.39" (10mm) Fiber Trunk
100.0	(2) 1.75" (44.5mm) Hybrid



**GLOBAL BASE REACTIONS**

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.6W	1674.55	24.44	18.98
0.9D + 1.6W	1658.94	18.32	18.97
1.2D + 1.0Di + 1.0Wi	384.85	3.89	5.00
(1.2 + 0.2Sds) * DL + E EMAM	60.20	24.65	0.75
(1.2 + 0.2Sds) * DL + E ELFM	93.39	24.65	0.95
(0.9 - 0.2Sds) * DL + E EMAM	59.45	16.55	0.75
(0.9 - 0.2Sds) * DL + E ELFM	92.22	16.55	0.95
1.0D + 1.0W	413.94	20.39	4.72

ANALYSIS PARAMETERS

<b>Location:</b>	Fremont County,CO	<b>Height:</b>	129 ft
<b>Type and Shape:</b>	Taper, 18 Sides	<b>Base Diameter:</b>	43.92 in
<b>Manufacturer:</b>	Sabre	<b>Top Diameter:</b>	19.25 in
		<b>Taper:</b>	0.1980 in/ft
		<b>Rotation:</b>	0.000°

ICE & WIND PARAMETERS

<b>Structure Class:</b>	II	<b>Design Wind Speed:</b>	90 mph
<b>Exposure Category:</b>	C	<b>Design Wind Speed w/ Ice:</b>	50 mph
<b>Topographic Category:</b>	1	<b>Design Ice Thickness:</b>	0.00 in
<b>Crest Height:</b>	0 ft	<b>Service Wind Speed:</b>	60 mph

SEISMIC PARAMETERS

<b>Analysis Method:</b>	Equivalent Modal Analysis & Equivalent Lateral Force Methods		
<b>Site Class:</b>	D - Stiff Soil	<b>Period Based on Rayleigh Method (sec):</b>	1.92
<b>T<sub>L</sub> (sec):</b>	6	<b>P:</b>	1
<b>S<sub>s</sub>:</b>	0.266	<b>S<sub>1</sub>:</b>	0.084
<b>F<sub>a</sub>:</b>	1.587	<b>F<sub>v</sub>:</b>	2.400
<b>S<sub>ds</sub>:</b>	0.281	<b>S<sub>dt</sub>:</b>	0.134
		<b>C<sub>s</sub>:</b>	0.047
		<b>C<sub>s</sub> Max:</b>	0.047
		<b>C<sub>s</sub> Min:</b>	0.030

LOAD CASES

1.2D + 1.6W	90 mph Wind with No Ice
0.9D + 1.6W	90 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph Wind with 0" Radial Ice
(1.2 + 0.2Sds) * DL + E EMAM	Seismic
(1.2 + 0.2Sds) * DL + E ELFM	Seismic
(0.9 - 0.2Sds) * DL + E EMAM	Seismic (Reduced DL)
(0.9 - 0.2Sds) * DL + E ELFM	Seismic (Reduced DL)
1.0D + 1.0W	60 mph Wind with No Ice

SHAFT SECTION PROPERTIES

Section	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Joint Len (in)	Weight (lb)	Bottom						Top							
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Taper (in/ft)	
1-18	53.25	0.3125	65		0.00	6,890	43.92	0,000	43.25	10,391.5	23.37	140.54	33.38	53.25	32.79	4,529.1	17.42	106.80	0.1980	
2-18	53.50	0.2500	65	Slip	60.00	4,235	34.86	48.250	27.47	4,158.1	23.18	139.46	24.27	101.75	19.06	1,389.5	15.71	97.08	0.1980	
3-18	30.75	0.1875	65	Slip	42.00	1,377	25.34	98.250	14.97	1,196.3	22.42	135.14	19.25	129.00	11.34	520.8	16.69	102.67	0.1980	
<b>Total Shaft Weight</b>						<b>12,502</b>														

DISCRETE APPURTENANCE PROPERTIES

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	No Ice			Ice		
					Weight (lb)	EPAa (sf)	Orientation Factor	Weight (lb)	EPAa (sf)	Orientation Factor
110.00	Kathrein Scala 800 10766	3	0.80	-0.600	61.70	11.310	0.68	61.70	11.310	0.68
110.00	KMW ET-X-UW-70-16-70-18-iR-AT	3	0.80	0.000	51.80	10.860	0.68	51.80	10.860	0.68
110.00	Alcatel-Lucent 9442 RRH2x40-AW	3	0.80	1.200	49.00	2.500	0.67	49.00	2.500	0.67
110.00	Alcatel-Lucent RRH2x40-07-L	3	0.80	1.400	52.40	1.705	0.50	52.40	1.705	0.50
110.00	Raycap DC6-48-60-18-8F	1	0.80	1.600	20.00	1.260	1.00	20.00	1.260	1.00
110.00	Powerwave Allgon TT19-08BP111-	3	0.80	-0.700	16.00	0.553	0.50	16.00	0.553	0.50
110.00	Generic Round Low Profile Plat	1	1.00	0.000	1875.00	21.700	1.00	1875.00	21.700	1.00
102.70	Ericsson Air6449 B41	3	0.80	0.000	104.00	5.682	0.63	104.00	5.682	0.63
100.00	Generic Flat Light Sector Fram	3	0.75	0.000	800.00	17.900	0.67	800.00	17.900	0.67
100.00	Commscope NHH-45C-R2B	6	0.80	0.000	81.60	15.892	0.64	81.60	15.892	0.64
100.00	Raycap RVZDC-6627-PF-48 (29.5"	1	0.80	0.000	32.00	4.056	1.00	32.00	4.056	1.00
100.00	Ericsson Radio 4890HP B2 B66	3	0.80	0.000	68.00	2.202	0.67	68.00	2.202	0.67
100.00	Ericsson Radio 4490HP B5 B13	3	0.80	0.000	68.00	2.202	0.67	68.00	2.202	0.67
100.00	Commscope USX6-11W	3	0.80	0.000	198.40	46.625	0.73	198.40	46.625	0.73
<b>Totals</b>		<b>Row Count: 14</b>	<b>39</b>		<b>6,824.50</b>			<b>6,824.50</b>		

LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg): 0.00

Elev From (ft)	Elev To (ft)	Qty	Description	Diameter (in)	Weight (lb/ft)	Flat	Max/Row	Distance Between Rows (in)	Distance Between Cols (in)	Azimuth (deg)	Distance From Face (in)	Exposed To Wind	Carrier
0.00	112.00	2	2" Carflex Non-Metall	2.36	0.68	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	110.00	6	7/8" Coax	1.09	0.33	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	110.00	2	0.88" (22.4mm) 8 AWG	0.88	0.68	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	110.00	1	0.39" (10mm) Fiber Tr	0.39	0.06	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	100.00	2	1.75" (44.5mm) Hybrid	1.75	2.72	N	0	0	0	0	0	N	VERIZON WIRELESS

SEGMENT PROPERTIES

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Fy (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.3125	43.920	43.252	10,391.50	23.37	140.54	73.9	466.0	0.0	0.0
5.00		0.3125	42.930	42.270	9,699.60	22.81	137.38	74.6	445.0	0.0	727.5
10.00		0.3125	41.940	41.288	9,039.20	22.25	134.21	75.2	424.5	0.0	710.8
15.00		0.3125	40.950	40.306	8,409.40	21.70	131.04	75.9	404.5	0.0	694.1
20.00		0.3125	39.960	39.323	7,809.60	21.14	127.87	76.5	384.9	0.0	677.4
25.00		0.3125	38.969	38.341	7,239.00	20.58	124.70	77.2	365.9	0.0	660.7
30.00		0.3125	37.979	37.359	6,696.90	20.02	121.53	77.9	347.3	0.0	644.0
35.00		0.3125	36.989	36.377	6,182.50	19.46	118.37	78.5	329.2	0.0	627.3
40.00		0.3125	35.999	35.395	5,695.20	18.90	115.20	79.2	311.6	0.0	610.6
45.00		0.3125	35.009	34.413	5,234.20	18.34	112.03	79.8	294.5	0.0	593.9
48.25	Bot - Section 2	0.3125	34.365	33.775	4,948.30	17.98	109.97	80.3	283.6	0.0	377.0
50.00		0.3125	34.019	33.431	4,798.80	17.78	108.86	80.5	277.8	0.0	362.8
53.25	Top - Section 1	0.2500	33.875	26.681	3,811.40	22.48	135.50	75	221.6	0.0	664.1
55.00		0.2500	33.529	26.406	3,694.70	22.24	134.11	75.2	217.0	0.0	158.1
60.00		0.2500	32.539	25.620	3,374.70	21.54	130.15	76.1	204.3	0.0	442.6
65.00		0.2500	31.548	24.834	3,073.70	20.84	126.19	76.9	191.9	0.0	429.2
70.00		0.2500	30.558	24.049	2,791.10	20.14	122.23	77.7	179.9	0.0	415.8
75.00		0.2500	29.568	23.263	2,526.40	19.44	118.27	78.5	168.3	0.0	402.5

SEGMENT PROPERTIES

Seg Top Elev (ft)	Description	(Max Length: 5 ft)	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Fy (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
80.00			0.2500	28.578	22.478	2,279.00	18.75	114.31	79.4	157.1	0.0	389.1
85.00			0.2500	27.588	21,692	2,048.30	18.05	110.35	80.2	146.2	0.0	375.7
90.00			0.2500	26.598	20,906	1,833.70	17.35	106.39	81	135.8	0.0	362.4
95.00			0.2500	25.608	20.121	1,634.60	16.65	102.43	81.8	125.7	0.0	349.0
98.25	Bot - Section 3		0.2500	24.964	19.610	1,513.30	16.20	99.86	82.4	119.4	0.0	219.7
100.00			0.2500	24.618	19.335	1,450.50	15.95	98.47	82.6	116.1	0.0	204.5
101.75	Top - Section 2		0.1875	24.646	14,555	1,100.10	21.77	131.45	75.8	87.9	0.0	201.6
102.70			0.1875	24.458	14,443	1,074.90	21.59	130.44	76	86.6	0.0	46.9
105.00			0.1875	24.003	14,172	1,015.50	21.16	128.01	76.5	83.3	0.0	112.0
110.00			0.1875	23.012	13,583	894.10	20.23	122.73	77.6	76.5	0.0	236.1
115.00			0.1875	22.022	12,994	782.70	19.30	117.45	78.7	70.0	0.0	226.1
120.00			0.1875	21.032	12,405	681.00	18.37	112.17	79.8	63.8	0.0	216.1
125.00			0.1875	20.042	11,816	588.50	17.44	106.89	80.9	57.8	0.0	206.0
129.00			0.1875	19.250	11,344	520.80	16.69	102.67	81.8	53.3	0.0	157.6
<b>Total:</b>												<b>12,501.2</b>

CALCULATED FORCES

Load Case: 1.2D + 1.6W

90 mph Wind with No Ice

24 Iterations

Gust Response Factor: 1.10  
 Dead load Factor: 1.20  
 Wind Load Factor: 1.60

Wind Importance Factor: 1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-24.44	-18.98	0	-1,674.55	0.00	1,674.55	2,877.14	1,438.57	5,158.92	2,583.30	0	0	0.657
5.00	-23.43	-18.72	0	-1,579.64	0.00	1,579.64	2,836.81	1,418.41	4,970.30	2,488.84	0.12	-0.22	0.643
10.00	-22.45	-18.47	0	-1,486.02	0.00	1,486.02	2,795.32	1,397.66	4,782.99	2,395.05	0.47	-0.45	0.629
15.00	-21.48	-18.21	0	-1,393.69	0.00	1,393.69	2,752.67	1,376.33	4,597.15	2,301.99	1.06	-0.67	0.613
20.00	-20.54	-17.93	0	-1,302.66	0.00	1,302.66	2,708.85	1,354.43	4,412.91	2,209.73	1.89	-0.9	0.597
25.00	-19.62	-17.65	0	-1,212.99	0.00	1,212.99	2,663.88	1,331.94	4,230.42	2,118.35	2.96	-1.13	0.580
30.00	-18.73	-17.35	0	-1,124.76	0.00	1,124.76	2,617.74	1,308.87	4,049.82	2,027.92	4.27	-1.36	0.562
35.00	-17.86	-17.04	0	-1,038.02	0.00	1,038.02	2,570.45	1,285.22	3,871.26	1,938.51	5.82	-1.59	0.543
40.00	-17.01	-16.73	0	-952.82	0.00	952.82	2,521.99	1,260.99	3,694.87	1,850.18	7.61	-1.82	0.522
45.00	-16.19	-16.46	0	-869.18	0.00	869.18	2,472.36	1,236.18	3,520.80	1,763.02	9.63	-2.05	0.500
48.25	-15.67	-16.29	0	-815.69	0.00	815.69	2,439.49	1,219.74	3,408.97	1,707.02	11.08	-2.2	0.484
50.00	-15.19	-16.13	0	-787.17	0.00	787.17	2,421.58	1,210.79	3,349.20	1,677.09	11.9	-2.28	0.476
53.25	-14.33	-15.94	0	-734.76	0.00	734.76	1,799.94	899.97	2,487.97	1,245.83	13.5	-2.42	0.598
55.00	-14.08	-15.73	0	-706.86	0.00	706.86	1,788.22	894.11	2,446.11	1,224.87	14.4	-2.5	0.585
60.00	-13.44	-15.42	0	-628.19	0.00	628.19	1,753.95	876.98	2,327.32	1,165.39	17.16	-2.76	0.547
65.00	-12.82	-15.09	0	-551.12	0.00	551.12	1,718.53	859.26	2,209.85	1,106.57	20.19	-3.01	0.506
70.00	-12.22	-14.77	0	-475.65	0.00	475.65	1,681.94	840.97	2,093.84	1,048.48	23.47	-3.25	0.461
75.00	-11.64	-14.45	0	-401.80	0.00	401.80	1,644.19	822.10	1,979.43	991.19	26.99	-3.47	0.413
80.00	-11.09	-14.12	0	-329.56	0.00	329.56	1,605.28	802.64	1,866.77	934.77	30.73	-3.68	0.360
85.00	-10.55	-13.80	0	-258.94	0.00	258.94	1,565.21	782.60	1,756.00	879.30	34.68	-3.86	0.302
90.00	-10.05	-13.48	0	-189.94	0.00	189.94	1,523.97	761.99	1,647.25	824.85	38.81	-4.01	0.237
95.00	-9.57	-13.21	0	-122.55	0.00	122.55	1,481.58	740.79	1,540.68	771.49	43.08	-4.14	0.166
98.25	-9.27	-13.04	0	-79.63	0.00	79.63	1,453.40	726.70	1,472.65	737.42	45.91	-4.19	0.115
100.00	-4.85	-5.23	0	-56.82	0.00	56.82	1,436.50	718.25	1,434.91	718.52	47.45	-4.22	0.083
101.75	-4.60	-5.13	0	-47.67	0.00	47.67	992.96	496.48	998.12	499.80	49	-4.23	0.100
102.70	-4.20	-4.62	0	-42.80	0.00	42.80	988.02	494.01	985.47	493.47	49.84	-4.24	0.091
105.00	-4.07	-4.40	0	-32.17	0.00	32.17	975.91	487.95	954.98	478.20	51.89	-4.27	0.072
110.00	-0.90	-0.94	0	-10.15	0.00	10.15	948.72	474.36	889.48	445.40	56.37	-4.29	0.024
115.00	-0.65	-0.64	0	-5.47	0.00	5.47	920.38	460.19	825.16	413.19	60.87	-4.31	0.014
120.00	-0.41	-0.36	0	-2.26	0.00	2.26	890.87	445.43	762.18	381.66	65.38	-4.31	0.006
125.00	-0.18	-0.11	0	-0.45	0.00	0.45	860.20	430.10	700.67	350.86	69.9	-4.32	0.002
129.00	0.00	-0.10	0	0.00	0.00	0.00	834.82	417.41	652.62	326.80	73.51	-4.32	0.000



CALCULATED FORCES

Load Case: 0.9D + 1.6W

90 mph Wind 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

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	-18.32	-18.97	0	-1,658.94	0.00	1,658.94	2,877.14	1,438.57	5,158.92	2,583.30	0	0	0.649
5.00	-17.55	-18.69	0	-1,564.09	0.00	1,564.09	2,836.81	1,418.41	4,970.30	2,488.84	0.12	-0.22	0.635
10.00	-16.79	-18.41	0	-1,470.65	0.00	1,470.65	2,795.32	1,397.66	4,782.99	2,395.05	0.47	-0.44	0.620
15.00	-16.05	-18.13	0	-1,378.60	0.00	1,378.60	2,752.67	1,376.33	4,597.15	2,301.99	1.05	-0.67	0.605
20.00	-15.33	-17.84	0	-1,287.96	0.00	1,287.96	2,708.85	1,354.43	4,412.91	2,209.73	1.87	-0.89	0.589
25.00	-14.63	-17.53	0	-1,198.77	0.00	1,198.77	2,663.88	1,331.94	4,230.42	2,118.35	2.93	-1.12	0.572
30.00	-13.94	-17.22	0	-1,111.10	0.00	1,111.10	2,617.74	1,308.87	4,049.82	2,027.92	4.22	-1.35	0.553
35.00	-13.27	-16.90	0	-1,025.00	0.00	1,025.00	2,570.45	1,285.22	3,871.26	1,938.51	5.76	-1.57	0.534
40.00	-12.63	-16.57	0	-940.50	0.00	940.50	2,521.99	1,260.99	3,694.87	1,850.18	7.53	-1.8	0.514
45.00	-12.00	-16.30	0	-857.63	0.00	857.63	2,472.36	1,236.18	3,520.80	1,763.02	9.53	-2.02	0.491
48.25	-11.61	-16.13	0	-804.66	0.00	804.66	2,439.49	1,219.74	3,408.97	1,707.02	10.96	-2.17	0.476
50.00	-11.24	-15.96	0	-776.43	0.00	776.43	2,421.58	1,210.79	3,349.20	1,677.09	11.77	-2.25	0.468
53.25	-10.59	-15.78	0	-724.56	0.00	724.56	1,799.94	899.97	2,487.97	1,245.83	13.35	-2.39	0.588
55.00	-10.40	-15.56	0	-696.96	0.00	696.96	1,788.22	894.11	2,446.11	1,224.87	14.25	-2.47	0.575
60.00	-9.90	-15.23	0	-619.16	0.00	619.16	1,753.95	876.98	2,327.32	1,165.39	16.97	-2.73	0.537
65.00	-9.43	-14.90	0	-543.01	0.00	543.01	1,718.53	859.26	2,209.85	1,106.57	19.96	-2.97	0.497
70.00	-8.97	-14.57	0	-468.51	0.00	468.51	1,681.94	840.97	2,093.84	1,048.48	23.2	-3.21	0.452
75.00	-8.53	-14.25	0	-395.65	0.00	395.65	1,644.19	822.10	1,979.43	991.19	26.67	-3.43	0.405
80.00	-8.11	-13.92	0	-324.42	0.00	324.42	1,605.28	802.64	1,866.77	934.77	30.37	-3.63	0.352
85.00	-7.70	-13.60	0	-254.82	0.00	254.82	1,565.21	782.60	1,756.00	879.30	34.27	-3.81	0.295
90.00	-7.32	-13.28	0	-186.84	0.00	186.84	1,523.97	761.99	1,647.25	824.85	38.34	-3.96	0.232
95.00	-6.96	-13.01	0	-120.46	0.00	120.46	1,481.58	740.79	1,540.68	771.49	42.56	-4.08	0.161
98.25	-6.74	-12.85	0	-78.19	0.00	78.19	1,453.40	726.70	1,472.65	737.42	45.35	-4.14	0.111
100.00	-3.55	-5.13	0	-55.71	0.00	55.71	1,436.50	718.25	1,434.91	718.52	46.87	-4.16	0.080
101.75	-3.37	-5.03	0	-46.74	0.00	46.74	992.96	496.48	998.12	499.80	48.4	-4.18	0.097
102.70	-3.08	-4.54	0	-41.96	0.00	41.96	988.02	494.01	985.47	493.47	49.23	-4.19	0.088
105.00	-2.98	-4.32	0	-31.52	0.00	31.52	975.91	487.95	954.98	478.20	51.25	-4.21	0.069
110.00	-0.66	-0.92	0	-9.93	0.00	9.93	948.72	474.36	889.48	445.40	55.68	-4.24	0.023
115.00	-0.48	-0.63	0	-5.35	0.00	5.35	920.38	460.19	825.16	413.19	60.12	-4.25	0.013
120.00	-0.30	-0.35	0	-2.20	0.00	2.20	890.87	445.43	762.18	381.66	64.57	-4.26	0.006
125.00	-0.13	-0.11	0	-0.44	0.00	0.44	860.20	430.10	700.67	350.86	69.02	-4.26	0.001
129.00	0.00	-0.10	0	0.00	0.00	0.00	834.82	417.41	652.62	326.80	72.59	-4.26	0.000

CALCULATED FORCES

Load Case: 1.2D + 1.0Di + 1.0Wi			50 mph Wind with 0" Radial Ice								23 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											
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	3.89	-5.00	0	-384.85	0.00	384.85	2,877.14	1,438.57	5,158.92	2,583.30	0	0	0.150
5.00	4.83	-4.87	0	-359.86	0.00	359.86	2,836.81	1,418.41	4,970.30	2,488.84	0.03	-0.05	0.146
10.00	5.74	-4.74	0	-335.52	0.00	335.52	2,795.32	1,397.66	4,782.99	2,395.05	0.11	-0.1	0.142
15.00	6.64	-4.61	0	-311.81	0.00	311.81	2,752.67	1,376.33	4,597.15	2,301.99	0.24	-0.15	0.138
20.00	7.52	-4.48	0	-288.74	0.00	288.74	2,708.85	1,354.43	4,412.91	2,209.73	0.43	-0.2	0.133
25.00	8.38	-4.35	0	-266.33	0.00	266.33	2,663.88	1,331.94	4,230.42	2,118.35	0.67	-0.25	0.129
30.00	9.21	-4.21	0	-244.60	0.00	244.60	2,617.74	1,308.87	4,049.82	2,027.92	0.96	-0.3	0.124
35.00	10.03	-4.07	0	-223.56	0.00	223.56	2,570.45	1,285.22	3,871.26	1,938.51	1.31	-0.35	0.119
40.00	10.83	-3.92	0	-203.23	0.00	203.23	2,521.99	1,260.99	3,694.87	1,850.18	1.71	-0.4	0.114
45.00	11.60	-3.81	0	-183.61	0.00	183.61	2,472.36	1,236.18	3,520.80	1,763.02	2.16	-0.45	0.109
48.25	12.10	-3.73	0	-171.24	0.00	171.24	2,439.49	1,219.74	3,408.97	1,707.02	2.47	-0.48	0.105
50.00	12.55	-3.66	0	-164.70	0.00	164.70	2,421.58	1,210.79	3,349.20	1,677.09	2.65	-0.5	0.103
53.25	13.39	-3.58	0	-152.81	0.00	152.81	1,799.94	899.97	2,487.97	1,245.83	3.01	-0.53	0.130
55.00	13.60	-3.49	0	-146.54	0.00	146.54	1,788.22	894.11	2,446.11	1,224.87	3.2	-0.55	0.127
60.00	14.20	-3.34	0	-129.10	0.00	129.10	1,753.95	876.98	2,327.32	1,165.39	3.8	-0.6	0.119
65.00	14.78	-3.20	0	-112.38	0.00	112.38	1,718.53	859.26	2,209.85	1,106.57	4.46	-0.65	0.110
70.00	15.34	-3.06	0	-96.38	0.00	96.38	1,681.94	840.97	2,093.84	1,048.48	5.17	-0.7	0.101
75.00	15.88	-2.92	0	-81.08	0.00	81.08	1,644.19	822.10	1,979.43	991.19	5.93	-0.74	0.091
80.00	16.41	-2.79	0	-66.48	0.00	66.48	1,605.28	802.64	1,866.77	934.77	6.73	-0.79	0.081
85.00	16.92	-2.65	0	-52.55	0.00	52.55	1,565.21	782.60	1,756.00	879.30	7.57	-0.82	0.071
90.00	17.42	-2.53	0	-39.29	0.00	39.29	1,523.97	761.99	1,647.25	824.85	8.45	-0.85	0.059
95.00	17.90	-2.42	0	-26.66	0.00	26.66	1,481.58	740.79	1,540.68	771.49	9.36	-0.88	0.047
98.25	18.20	-2.36	0	-18.78	0.00	18.78	1,453.40	726.70	1,472.65	737.42	9.97	-0.89	0.038
100.00	4.77	-1.26	0	-14.65	0.00	14.65	1,436.50	718.25	1,434.91	718.52	10.29	-0.9	0.024
101.75	4.52	-1.23	0	-12.44	0.00	12.44	992.96	496.48	998.12	499.80	10.63	-0.9	0.029
102.70	4.14	-1.12	0	-11.27	0.00	11.27	988.02	494.01	985.47	493.47	10.81	-0.91	0.027
105.00	4.00	-1.04	0	-8.70	0.00	8.70	975.91	487.95	954.98	478.20	11.24	-0.91	0.022
110.00	-0.97	-0.32	0	-3.50	0.00	3.50	948.72	474.36	889.48	445.40	12.2	-0.92	0.009
115.00	-0.69	-0.22	0	-1.89	0.00	1.89	920.38	460.19	825.16	413.19	13.17	-0.92	0.005
120.00	-0.43	-0.12	0	-0.77	0.00	0.77	890.87	445.43	762.18	381.66	14.14	-0.93	0.003
125.00	-0.19	-0.04	0	-0.15	0.00	0.15	860.20	430.10	700.67	350.86	15.11	-0.93	0.001
129.00	0.00	-0.04	0	0.00	0.00	0.00	834.82	417.41	652.62	326.80	15.89	-0.93	0.000

CALCULATED FORCES

Load Case: 1.0D + 1.0W		60 mph Wind with No Ice										23 Iterations	
Gust Response Factor: 1.10												Wind Importance Factor 1.00	
Dead load Factor: 1.00													
Wind Load Factor: 1.00													
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-20.39	-4.72	0	-413.94	0.00	413.94	2,877.14	1,438.57	5,158.92	2,583.30	0	0	0.167
5.00	-19.61	-4.65	0	-390.36	0.00	390.36	2,836.81	1,418.41	4,970.30	2,488.84	0.03	-0.06	0.164
10.00	-18.84	-4.58	0	-367.12	0.00	367.12	2,795.32	1,397.66	4,782.99	2,395.05	0.12	-0.11	0.160
15.00	-18.10	-4.51	0	-344.22	0.00	344.22	2,752.67	1,376.33	4,597.15	2,301.99	0.26	-0.17	0.156
20.00	-17.36	-4.44	0	-321.66	0.00	321.66	2,708.85	1,354.43	4,412.91	2,209.73	0.47	-0.22	0.152
25.00	-16.65	-4.37	0	-299.46	0.00	299.46	2,663.88	1,331.94	4,230.42	2,118.35	0.73	-0.28	0.148
30.00	-15.95	-4.29	0	-277.62	0.00	277.62	2,617.74	1,308.87	4,049.82	2,027.92	1.05	-0.34	0.143
35.00	-15.27	-4.21	0	-256.16	0.00	256.16	2,570.45	1,285.22	3,871.26	1,938.51	1.44	-0.39	0.138
40.00	-14.60	-4.13	0	-235.09	0.00	235.09	2,521.99	1,260.99	3,694.87	1,850.18	1.88	-0.45	0.133
45.00	-13.95	-4.07	0	-214.43	0.00	214.43	2,472.36	1,236.18	3,520.80	1,763.02	2.38	-0.51	0.127
48.25	-13.54	-4.02	0	-201.21	0.00	201.21	2,439.49	1,219.74	3,408.97	1,707.02	2.74	-0.54	0.123
50.00	-13.16	-3.98	0	-194.17	0.00	194.17	2,421.58	1,210.79	3,349.20	1,677.09	2.94	-0.56	0.121
53.25	-12.46	-3.94	0	-181.22	0.00	181.22	1,799.94	899.97	2,487.97	1,245.83	3.33	-0.6	0.152
55.00	-12.28	-3.89	0	-174.33	0.00	174.33	1,788.22	894.11	2,446.11	1,224.87	3.56	-0.62	0.149
60.00	-11.79	-3.80	0	-154.91	0.00	154.91	1,753.95	876.98	2,327.32	1,165.39	4.24	-0.68	0.140
65.00	-11.30	-3.72	0	-135.88	0.00	135.88	1,718.53	859.26	2,209.85	1,106.57	4.99	-0.74	0.129
70.00	-10.83	-3.64	0	-117.26	0.00	117.26	1,681.94	840.97	2,093.84	1,048.48	5.8	-0.8	0.118
75.00	-10.38	-3.56	0	-99.05	0.00	99.05	1,644.19	822.10	1,979.43	991.19	6.66	-0.86	0.106
80.00	-9.94	-3.48	0	-81.23	0.00	81.23	1,605.28	802.64	1,866.77	934.77	7.59	-0.91	0.093
85.00	-9.51	-3.40	0	-63.82	0.00	63.82	1,565.21	782.60	1,756.00	879.30	8.56	-0.95	0.079
90.00	-9.10	-3.32	0	-46.80	0.00	46.80	1,523.97	761.99	1,647.25	824.85	9.58	-0.99	0.063
95.00	-8.70	-3.26	0	-30.18	0.00	30.18	1,481.58	740.79	1,540.68	771.49	10.64	-1.02	0.045
98.25	-8.44	-3.22	0	-19.60	0.00	19.60	1,453.40	726.70	1,472.65	737.42	11.34	-1.03	0.032
100.00	-4.33	-1.29	0	-13.97	0.00	13.97	1,436.50	718.25	1,434.91	718.52	11.72	-1.04	0.022
101.75	-4.12	-1.26	0	-11.72	0.00	11.72	992.96	496.48	998.12	499.80	12.1	-1.04	0.028
102.70	-3.76	-1.14	0	-10.52	0.00	10.52	988.02	494.01	985.47	493.47	12.31	-1.05	0.025
105.00	-3.64	-1.08	0	-7.91	0.00	7.91	975.91	487.95	954.98	478.20	12.81	-1.05	0.020
110.00	-0.80	-0.23	0	-2.49	0.00	2.49	948.72	474.36	889.48	445.40	13.92	-1.06	0.006
115.00	-0.58	-0.16	0	-1.34	0.00	1.34	920.38	460.19	825.16	413.19	15.03	-1.06	0.004
120.00	-0.36	-0.09	0	-0.55	0.00	0.55	890.87	445.43	762.18	381.66	16.15	-1.06	0.002
125.00	-0.16	-0.03	0	-0.11	0.00	0.11	860.20	430.10	700.67	350.86	17.26	-1.07	0.000
129.00	0.00	-0.02	0	0.00	0.00	0.00	834.82	417.41	652.62	326.80	18.15	-1.07	0.000

**EQUIVALENT LATERAL FORCES METHOD ANALYSIS**

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

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.266
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.084
Long-Period Transition Period ( $T_L$ - Seconds):	6
Importance Factor ( $I_a$ ):	1.000
Site Coefficient $F_a$ :	1.587
Site Coefficient $F_v$ :	2.400
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.281
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.134
Seismic Response Coefficient ( $C_s$ ):	0.047
Upper Limit $C_s$ :	0.047
Lower Limit $C_s$ :	0.030
Period based on Rayleigh Method (sec):	1.920
Redundancy Factor ( $\rho$ ):	1.000
Seismic Force Distribution Exponent (k):	1.710
Total Unfactored Dead Load:	20.400 k
Seismic Base Shear (E):	0.950 k

**SEISMIC FORCES**

<b>(1.2 + 0.2S<sub>ds</sub>) * DL + E ELFM</b>	<b>Seismic</b>	Height Above Base (ft)	Weight (lb)	$W_z$ (lb-ft)	$C_{vx}$	Horizontal Force (lb)	Vertical Force (lb)
Segment							
31		127	158	622	0.018	18	198
30		122.5	206	764	0.023	22	259
29		117.5	216	746	0.022	21	271
28		112.5	229	734	0.022	21	287
27		107.5	260	771	0.023	22	327
26		103.85	123	344	0.010	10	154
25		102.225	51	140	0.004	4	65
24		100.875	210	559	0.017	16	264
23		99.125	222	574	0.017	16	279
22		96.625	253	625	0.019	18	318
21		92.5	400	918	0.027	26	503
20		87.5	413	862	0.026	24	519
19		82.5	427	805	0.024	23	536
18		77.5	440	746	0.022	21	553
17		72.5	453	686	0.020	19	570
16		67.5	467	625	0.019	18	586
15		62.5	480	564	0.017	16	603
14		57.5	494	502	0.015	14	620
13		54.125	176	161	0.005	5	221
12		51.625	697	590	0.018	17	876
11		49.125	381	296	0.009	8	478
10		46.625	410	292	0.009	8	515
9		42.5	645	392	0.012	11	810
8		37.5	662	324	0.010	9	831
7		32.5	678	260	0.008	7	852
6		27.5	695	201	0.006	6	873
5		22.5	712	146	0.004	4	894
4		17.5	728	97	0.003	3	915
3		12.5	745	56	0.002	2	936
2		7.5	762	24	0.001	1	957
1		2.5	779	4	0.000	0	978
Powerwave Allgon TT19-08BP111-001		110	48	148	0.004	4	60
Raycap DC6-48-60-18-BF		110	20	62	0.002	2	25
Alcatel-Lucent RRH2x40-07-L		110	157	485	0.014	14	197
Alcatel-Lucent 9442 RRH2x40-AWS		110	147	453	0.014	13	185
KMW ET-X-UW-70-16-70-18-iR-AT		110	155	479	0.014	14	195
Kathrein Scala 800 10766		110	185	571	0.017	16	233
Generic Round Low Profile Platform		110	1,875	5,784	0.172	164	2,356
Ericsson Air6449 B41		102.7	312	856	0.026	24	392

Ericsson Radio 4490HP B5 B13	100	204	535	0.016	15	256
Ericsson Radio 4890HP B2 B66	100	204	535	0.016	15	256
Raycap RVZDC-6627-PF-48 (29.5")	100	32	84	0.002	2	40
Commscope NHH-45C-R2B	100	490	1,283	0.038	36	615
Generic Flat Light Sector Frame	100	2,400	6,291	0.188	179	3,015
Commscope USX6-11W	100	595	1,560	0.046	44	748
<b>Totals:</b>		<b>20,396</b>	<b>33,555</b>	<b>1.000</b>	<b>953</b>	<b>25,623</b>

**SEISMIC FORCES**

(0.9 - 0.2Sds) * DL + E ELFM		Seismic (Reduced DL)				
Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
31	127	158	622	0.018	18	133
30	122.5	206	764	0.023	22	174
29	117.5	216	746	0.022	21	182
28	112.5	229	734	0.022	21	193
27	107.5	260	771	0.023	22	219
26	103.85	123	344	0.010	10	104
25	102.225	51	140	0.004	4	43
24	100.875	210	559	0.017	16	177
23	99.125	222	574	0.017	16	188
22	96.625	253	625	0.019	18	213
21	92.5	400	918	0.027	26	337
20	87.5	413	862	0.026	24	349
19	82.5	427	805	0.024	23	360
18	77.5	440	746	0.022	21	371
17	72.5	453	686	0.020	19	383
16	67.5	467	625	0.019	18	394
15	62.5	480	564	0.017	16	405
14	57.5	494	502	0.015	14	416
13	54.125	176	161	0.005	5	148
12	51.625	697	590	0.018	17	588
11	49.125	381	296	0.009	8	321
10	46.625	410	292	0.009	8	346
9	42.5	645	392	0.012	11	544
8	37.5	662	324	0.010	9	558
7	32.5	678	260	0.008	7	572
6	27.5	695	201	0.006	6	586
5	22.5	712	146	0.004	4	600
4	17.5	728	97	0.003	3	615
3	12.5	745	56	0.002	2	629
2	7.5	762	24	0.001	1	643
1	2.5	779	4	0.000	0	657
Powerwave Allgon TT19-08BP111-001	110	48	148	0.004	4	40
Raycap DC6-48-60-18-8F	110	20	62	0.002	2	17
Alcatel-Lucent RRH2x40-07-L	110	157	485	0.014	14	133
Alcatel-Lucent 9442 RRH2x40-AWS	110	147	453	0.014	13	124
KMW ET-X-UW-70-16-70-18-IR-AT	110	155	479	0.014	14	131
Kathrein Scala 800 10766	110	185	571	0.017	16	156
Generic Round Low Profile Platform	110	1,875	5,784	0.172	164	1,582
Ericsson Air6449 B41	102.7	312	856	0.026	24	263
Ericsson Radio 4490HP B5 B13	100	204	535	0.016	15	172
Ericsson Radio 4890HP B2 B66	100	204	535	0.016	15	172
Raycap RVZDC-6627-PF-48 (29.5")	100	32	84	0.002	2	27
Commscope NHH-45C-R2B	100	490	1,283	0.038	36	413
Generic Flat Light Sector Frame	100	2,400	6,291	0.188	179	2,025
Commscope USX6-11W	100	595	1,560	0.046	44	502
<b>Totals:</b>		<b>20,396</b>	<b>33,555</b>	<b>1.000</b>	<b>953</b>	<b>17,208</b>

(1.2 + 0.2Sds) \* DL + E ELFM Seismic

**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 (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-24.65	-0.95	0.00	-93.39	0.00	93.39	2,877.14	1,438.57	5,159	2,583.30	0.00	0.00	0.05

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
5.00	-23.69	-0.96	0.00	-88.62	0.00	88.62	2,836.81	1,418.41	4,970	2,488.84	0.01	-0.01	0.04
10.00	-22.75	-0.96	0.00	-83.82	0.00	83.82	2,795.32	1,397.66	4,783	2,395.05	0.03	-0.03	0.04
15.00	-21.84	-0.96	0.00	-79.01	0.00	79.01	2,752.67	1,376.33	4,597	2,301.99	0.06	-0.04	0.04
20.00	-20.94	-0.96	0.00	-74.19	0.00	74.19	2,708.85	1,354.43	4,413	2,209.73	0.11	-0.05	0.04
25.00	-20.07	-0.96	0.00	-69.37	0.00	69.37	2,663.88	1,331.94	4,230	2,118.35	0.17	-0.06	0.04
30.00	-19.22	-0.96	0.00	-64.56	0.00	64.56	2,617.74	1,308.87	4,050	2,027.92	0.24	-0.08	0.04
35.00	-18.39	-0.95	0.00	-59.77	0.00	59.77	2,570.45	1,285.22	3,871	1,938.51	0.33	-0.09	0.04
40.00	-17.57	-0.94	0.00	-55.01	0.00	55.01	2,521.99	1,260.99	3,695	1,850.18	0.43	-0.10	0.04
45.00	-17.06	-0.94	0.00	-50.30	0.00	50.30	2,472.36	1,236.18	3,521	1,763.02	0.55	-0.12	0.04
48.25	-16.58	-0.93	0.00	-47.25	0.00	47.25	2,439.49	1,219.74	3,409	1,707.02	0.63	-0.13	0.03
50.00	-15.70	-0.91	0.00	-45.63	0.00	45.63	2,421.58	1,210.79	3,349	1,677.09	0.67	-0.13	0.03
53.25	-15.48	-0.91	0.00	-42.66	0.00	42.66	1,799.94	899.97	2,488	1,245.83	0.77	-0.14	0.04
55.00	-14.86	-0.90	0.00	-41.07	0.00	41.07	1,788.22	894.11	2,446	1,224.87	0.82	-0.14	0.04
60.00	-14.26	-0.88	0.00	-36.59	0.00	36.59	1,753.95	876.98	2,327	1,165.39	0.98	-0.16	0.04
65.00	-13.67	-0.87	0.00	-32.17	0.00	32.17	1,718.53	859.26	2,210	1,106.57	1.15	-0.17	0.04
70.00	-13.10	-0.85	0.00	-27.84	0.00	27.84	1,681.94	840.97	2,094	1,048.48	1.34	-0.19	0.03
75.00	-12.55	-0.83	0.00	-23.60	0.00	23.60	1,644.19	822.10	1,979	991.19	1.54	-0.20	0.03
80.00	-12.01	-0.81	0.00	-19.46	0.00	19.46	1,605.28	802.64	1,867	934.77	1.76	-0.21	0.03
85.00	-11.50	-0.78	0.00	-15.43	0.00	15.43	1,565.21	782.60	1,756	879.30	1.98	-0.22	0.03
90.00	-10.99	-0.75	0.00	-11.53	0.00	11.53	1,523.97	761.99	1,647	824.85	2.22	-0.23	0.02
95.00	-10.67	-0.74	0.00	-7.75	0.00	7.75	1,481.58	740.79	1,541	771.49	2.47	-0.24	0.02
98.25	-10.40	-0.72	0.00	-5.36	0.00	5.36	1,453.40	726.70	1,473	737.42	2.63	-0.24	0.01
100.00	-5.20	-0.39	0.00	-4.10	0.00	4.10	1,436.50	718.25	1,435	718.52	2.72	-0.24	0.01
101.75	-5.14	-0.39	0.00	-3.42	0.00	3.42	992.96	496.48	998	499.80	2.81	-0.25	0.01
102.70	-4.59	-0.35	0.00	-3.05	0.00	3.05	988.02	494.01	985	493.47	2.86	-0.25	0.01
105.00	-4.27	-0.33	0.00	-2.25	0.00	2.25	975.91	487.95	955	478.20	2.98	-0.25	0.01
110.00	-0.73	-0.06	0.00	-0.62	0.00	0.62	948.72	474.36	889	445.40	3.24	-0.25	0.00
115.00	-0.46	-0.04	0.00	-0.30	0.00	0.30	920.38	460.19	825	413.19	3.50	-0.25	0.00
120.00	-0.20	-0.02	0.00	-0.09	0.00	0.09	890.87	445.43	762	381.66	3.77	-0.25	0.00
125.00	0.00	0.00	0.00	0.00	0.00	0.00	860.20	430.10	701	350.86	4.03	-0.25	0.00
129.00	0.00	0.00	0.00	0.00	0.00	0.00	834.82	417.41	653	326.80	4.24	-0.25	0.00

(1.2 + 0.2Sds) \* DL + E EMAM Seismic

CALCULATED FORCES

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (fr-kips)	Mu Mx (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-24.65	-0.75	0.00	-60.20	0.00	60.20	2,877.14	1,438.57	5,159	2,583.30	0.00	0.00	0.03
5.00	-23.69	-0.73	0.00	-56.44	0.00	56.44	2,836.81	1,418.41	4,970	2,488.84	0.00	-0.01	0.03
10.00	-22.75	-0.71	0.00	-52.79	0.00	52.79	2,795.32	1,397.66	4,783	2,395.05	0.02	-0.02	0.03
15.00	-21.84	-0.68	0.00	-49.26	0.00	49.26	2,752.67	1,376.33	4,597	2,301.99	0.04	-0.02	0.03
20.00	-20.94	-0.65	0.00	-45.87	0.00	45.87	2,708.85	1,354.43	4,413	2,209.73	0.07	-0.03	0.03
25.00	-20.07	-0.62	0.00	-42.62	0.00	42.62	2,663.88	1,331.94	4,230	2,118.35	0.11	-0.04	0.03
30.00	-19.22	-0.59	0.00	-39.52	0.00	39.52	2,617.74	1,308.87	4,050	2,027.92	0.15	-0.05	0.03
35.00	-18.39	-0.56	0.00	-36.57	0.00	36.57	2,570.45	1,285.22	3,871	1,938.51	0.21	-0.06	0.03
40.00	-17.58	-0.53	0.00	-33.77	0.00	33.77	2,521.99	1,260.99	3,695	1,850.18	0.27	-0.06	0.03
45.00	-17.06	-0.51	0.00	-31.11	0.00	31.11	2,472.36	1,236.18	3,521	1,763.02	0.34	-0.07	0.03
48.25	-16.58	-0.50	0.00	-29.44	0.00	29.44	2,439.49	1,219.74	3,409	1,707.02	0.39	-0.08	0.02
50.00	-15.71	-0.47	0.00	-28.58	0.00	28.58	2,421.58	1,210.79	3,349	1,677.09	0.42	-0.08	0.02
53.25	-15.49	-0.46	0.00	-27.06	0.00	27.06	1,799.94	899.97	2,488	1,245.83	0.48	-0.09	0.03
55.00	-14.87	-0.44	0.00	-26.26	0.00	26.26	1,788.22	894.11	2,446	1,224.87	0.51	-0.09	0.03
60.00	-14.26	-0.43	0.00	-24.05	0.00	24.05	1,753.95	876.98	2,327	1,165.39	0.61	-0.10	0.03
65.00	-13.68	-0.43	0.00	-21.88	0.00	21.88	1,718.53	859.26	2,210	1,106.57	0.72	-0.11	0.03
70.00	-13.11	-0.44	0.00	-19.72	0.00	19.72	1,681.94	840.97	2,094	1,048.48	0.84	-0.12	0.03
75.00	-12.55	-0.45	0.00	-17.54	0.00	17.54	1,644.19	822.10	1,979	991.19	0.97	-0.13	0.03
80.00	-12.02	-0.46	0.00	-15.29	0.00	15.29	1,605.28	802.64	1,867	934.77	1.10	-0.14	0.02
85.00	-11.50	-0.48	0.00	-12.97	0.00	12.97	1,565.21	782.60	1,756	879.30	1.25	-0.15	0.02
90.00	-10.99	-0.49	0.00	-10.58	0.00	10.58	1,523.97	761.99	1,647	824.85	1.41	-0.15	0.02
95.00	-10.68	-0.49	0.00	-8.14	0.00	8.14	1,481.58	740.79	1,541	771.49	1.57	-0.16	0.02
98.25	-10.40	-0.49	0.00	-6.54	0.00	6.54	1,453.40	726.70	1,473	737.42	1.69	-0.17	0.02

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 (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
100.00	-5.20	-0.44	0.00	-5.69	0.00	5.69	1,436.50	718.25	1,435	718.52	1.75	-0.17	0.01
101.75	-5.14	-0.44	0.00	-4.92	0.00	4.92	992.96	496.48	998	499.80	1.81	-0.17	0.02
102.70	-4.59	-0.43	0.00	-4.50	0.00	4.50	988.02	494.01	985	493.47	1.84	-0.17	0.01
105.00	-4.27	-0.41	0.00	-3.52	0.00	3.52	975.91	487.95	955	478.20	1.92	-0.17	0.01
110.00	-0.73	-0.14	0.00	-1.48	0.00	1.48	948.72	474.36	889	445.40	2.11	-0.18	0.00
115.00	-0.46	-0.10	0.00	-0.77	0.00	0.77	920.38	460.19	825	413.19	2.29	-0.18	0.00
120.00	-0.20	-0.05	0.00	-0.26	0.00	0.26	890.87	445.43	762	381.66	2.48	-0.18	0.00
125.00	0.00	0.00	0.00	0.00	0.00	0.00	860.20	430.10	701	350.86	2.67	-0.18	0.00
129.00	0.00	0.00	0.00	0.00	0.00	0.00	834.82	417.41	653	326.80	2.82	-0.18	0.00

(0.9 - 0.2Sds) \* DL + E ELFM Seismic (Reduced DL)

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 (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-16.55	-0.95	0.00	-92.22	0.00	92.22	2,877.14	1,438.57	5,159	2,583.30	0.00	0.00	0.04
5.00	-15.91	-0.96	0.00	-87.45	0.00	87.45	2,836.81	1,418.41	4,970	2,488.84	0.01	-0.01	0.04
10.00	-15.28	-0.96	0.00	-82.67	0.00	82.67	2,795.32	1,397.66	4,783	2,395.05	0.03	-0.02	0.04
15.00	-14.66	-0.96	0.00	-77.88	0.00	77.88	2,752.67	1,376.33	4,597	2,301.99	0.06	-0.04	0.04
20.00	-14.06	-0.96	0.00	-73.09	0.00	73.09	2,708.85	1,354.43	4,413	2,209.73	0.10	-0.05	0.04
25.00	-13.48	-0.95	0.00	-68.30	0.00	68.30	2,663.88	1,331.94	4,230	2,118.35	0.16	-0.06	0.04
30.00	-12.91	-0.95	0.00	-63.54	0.00	63.54	2,617.74	1,308.87	4,050	2,027.92	0.24	-0.08	0.04
35.00	-12.35	-0.94	0.00	-58.79	0.00	58.79	2,570.45	1,285.22	3,871	1,938.51	0.32	-0.09	0.04
40.00	-11.80	-0.93	0.00	-54.09	0.00	54.09	2,521.99	1,260.99	3,695	1,850.18	0.42	-0.10	0.03
45.00	-11.46	-0.93	0.00	-49.43	0.00	49.43	2,472.36	1,236.18	3,521	1,763.02	0.54	-0.11	0.03
48.25	-11.13	-0.92	0.00	-46.42	0.00	46.42	2,439.49	1,219.74	3,409	1,707.02	0.62	-0.12	0.03
50.00	-10.55	-0.90	0.00	-44.82	0.00	44.82	2,421.58	1,210.79	3,349	1,677.09	0.67	-0.13	0.03
53.25	-10.40	-0.90	0.00	-41.89	0.00	41.89	1,799.94	899.97	2,488	1,245.83	0.76	-0.14	0.04
55.00	-9.98	-0.88	0.00	-40.32	0.00	40.32	1,788.22	894.11	2,446	1,224.87	0.81	-0.14	0.04
60.00	-9.58	-0.87	0.00	-35.91	0.00	35.91	1,753.95	876.98	2,327	1,165.39	0.96	-0.16	0.04
65.00	-9.18	-0.85	0.00	-31.57	0.00	31.57	1,718.53	859.26	2,210	1,106.57	1.13	-0.17	0.03
70.00	-8.80	-0.83	0.00	-27.31	0.00	27.31	1,681.94	840.97	2,094	1,048.48	1.32	-0.18	0.03
75.00	-8.43	-0.81	0.00	-23.14	0.00	23.14	1,644.19	822.10	1,979	991.19	1.52	-0.20	0.03
80.00	-8.07	-0.79	0.00	-19.08	0.00	19.08	1,605.28	802.64	1,867	934.77	1.73	-0.21	0.03
85.00	-7.72	-0.77	0.00	-15.13	0.00	15.13	1,565.21	782.60	1,756	879.30	1.95	-0.22	0.02
90.00	-7.38	-0.74	0.00	-11.30	0.00	11.30	1,523.97	761.99	1,647	824.85	2.19	-0.23	0.02
95.00	-7.17	-0.72	0.00	-7.60	0.00	7.60	1,481.58	740.79	1,541	771.49	2.43	-0.24	0.02
98.25	-6.98	-0.70	0.00	-5.26	0.00	5.26	1,453.40	726.70	1,473	737.42	2.59	-0.24	0.01
100.00	-3.49	-0.38	0.00	-4.02	0.00	4.02	1,436.50	718.25	1,435	718.52	2.68	-0.24	0.01
101.75	-3.45	-0.38	0.00	-3.35	0.00	3.35	992.96	496.48	998	499.80	2.77	-0.24	0.01
102.70	-3.08	-0.34	0.00	-2.99	0.00	2.99	988.02	494.01	985	493.47	2.82	-0.24	0.01
105.00	-2.86	-0.32	0.00	-2.21	0.00	2.21	975.91	487.95	955	478.20	2.93	-0.24	0.01
110.00	-0.49	-0.06	0.00	-0.61	0.00	0.61	948.72	474.36	889	445.40	3.19	-0.25	0.00
115.00	-0.31	-0.04	0.00	-0.29	0.00	0.29	920.38	460.19	825	413.19	3.45	-0.25	0.00
120.00	-0.13	-0.02	0.00	-0.09	0.00	0.09	890.87	445.43	762	381.66	3.71	-0.25	0.00
125.00	0.00	0.00	0.00	0.00	0.00	0.00	860.20	430.10	701	350.86	3.96	-0.25	0.00
129.00	0.00	0.00	0.00	0.00	0.00	0.00	834.82	417.41	653	326.80	4.17	-0.25	0.00

(0.9 - 0.2Sds) \* DL + E EMAM Seismic (Reduced DL)

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 (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-16.55	-0.75	0.00	-59.45	0.00	59.45	2,877.14	1,438.57	5,159	2,583.30	0.00	0.00	0.03
5.00	-15.91	-0.73	0.00	-55.70	0.00	55.70	2,836.81	1,418.41	4,970	2,488.84	0.00	-0.01	0.03
10.00	-15.28	-0.70	0.00	-52.05	0.00	52.05	2,795.32	1,397.66	4,783	2,395.05	0.02	-0.02	0.03
15.00	-14.67	-0.67	0.00	-48.54	0.00	48.54	2,752.67	1,376.33	4,597	2,301.99	0.04	-0.02	0.03
20.00	-14.06	-0.65	0.00	-45.16	0.00	45.16	2,708.85	1,354.43	4,413	2,209.73	0.07	-0.03	0.03
25.00	-13.48	-0.61	0.00	-41.94	0.00	41.94	2,663.88	1,331.94	4,230	2,118.35	0.10	-0.04	0.03
30.00	-12.91	-0.58	0.00	-38.86	0.00	38.86	2,617.74	1,308.87	4,050	2,027.92	0.15	-0.05	0.02

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 (kips)	Phi Mn (kips)	Total Deflect (in)	Rotation (deg)	Ratio
35.00	-12.35	-0.55	0.00	-35.94	0.00	35.94	2,570.45	1,285.22	3,871	1,938.51	0.20	-0.06	0.02
40.00	-11.80	-0.52	0.00	-33.17	0.00	33.17	2,521.99	1,260.99	3,695	1,850.18	0.27	-0.06	0.02
45.00	-11.46	-0.51	0.00	-30.55	0.00	30.55	2,472.36	1,236.18	3,521	1,763.02	0.34	-0.07	0.02
48.25	-11.14	-0.49	0.00	-28.91	0.00	28.91	2,439.49	1,219.74	3,409	1,707.02	0.39	-0.08	0.02
50.00	-10.55	-0.46	0.00	-28.05	0.00	28.05	2,421.58	1,210.79	3,349	1,677.09	0.42	-0.08	0.02
53.25	-10.40	-0.45	0.00	-26.57	0.00	26.57	1,799.94	899.97	2,488	1,245.83	0.47	-0.08	0.03
55.00	-9.98	-0.43	0.00	-25.78	0.00	25.78	1,788.22	894.11	2,446	1,224.87	0.50	-0.09	0.03
60.00	-9.58	-0.42	0.00	-23.60	0.00	23.60	1,753.95	876.98	2,327	1,165.39	0.60	-0.10	0.03
65.00	-9.18	-0.42	0.00	-21.48	0.00	21.48	1,718.53	859.26	2,210	1,106.57	0.71	-0.11	0.03
70.00	-8.80	-0.43	0.00	-19.37	0.00	19.37	1,681.94	840.97	2,094	1,048.48	0.82	-0.12	0.02
75.00	-8.43	-0.44	0.00	-17.23	0.00	17.23	1,644.19	822.10	1,979	991.19	0.95	-0.13	0.02
80.00	-8.07	-0.45	0.00	-15.03	0.00	15.03	1,605.28	802.64	1,867	934.77	1.09	-0.13	0.02
85.00	-7.72	-0.47	0.00	-12.77	0.00	12.77	1,565.21	782.60	1,756	879.30	1.23	-0.14	0.02
90.00	-7.38	-0.48	0.00	-10.43	0.00	10.43	1,523.97	761.99	1,647	824.85	1.39	-0.15	0.02
95.00	-7.17	-0.48	0.00	-8.04	0.00	8.04	1,481.58	740.79	1,541	771.49	1.55	-0.16	0.02
98.25	-6.98	-0.48	0.00	-6.47	0.00	6.47	1,453.40	726.70	1,473	737.42	1.66	-0.16	0.01
100.00	-3.49	-0.43	0.00	-5.63	0.00	5.63	1,436.50	718.25	1,435	718.52	1.72	-0.16	0.01
101.75	-3.45	-0.43	0.00	-4.87	0.00	4.87	992.96	496.48	998	499.80	1.78	-0.17	0.01
102.70	-3.08	-0.42	0.00	-4.46	0.00	4.46	988.02	494.01	985	493.47	1.81	-0.17	0.01
105.00	-2.86	-0.40	0.00	-3.49	0.00	3.49	975.91	487.95	955	478.20	1.89	-0.17	0.01
110.00	-0.49	-0.14	0.00	-1.48	0.00	1.48	948.72	474.36	889	445.40	2.07	-0.17	0.00
115.00	-0.31	-0.10	0.00	-0.77	0.00	0.77	920.38	460.19	825	413.19	2.26	-0.17	0.00
120.00	-0.13	-0.05	0.00	-0.26	0.00	0.26	890.87	445.43	762	381.66	2.44	-0.18	0.00
125.00	0.00	0.00	0.00	0.00	0.00	0.00	860.20	430.10	701	350.86	2.62	-0.18	0.00
129.00	0.00	0.00	0.00	0.00	0.00	0.00	834.82	417.41	653	326.80	2.77	-0.18	0.00



ANALYSIS SUMMARY

Load Case	Base Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	18.98	0.00	24.44	0.00	0.00	1674.55	0.00	0.66
0.9D + 1.6W	18.97	0.00	18.32	0.00	0.00	1658.94	0.00	0.65
1.2D + 1.0Di + 1.0Wi	5.00	0.00	18.20	0.00	0.00	384.85	0.00	0.15
(1.2 + 0.2Sds) * DL + E ELFM	0.96	0.00	24.65	0.00	0.00	93.39	0.00	0.04
(1.2 + 0.2Sds) * DL + E EMAM	0.75	0.00	24.65	0.00	0.00	60.20	0.00	0.03
(0.9 - 0.2Sds) * DL + E ELFM	0.96	0.00	16.55	0.00	0.00	92.22	0.00	0.04
(0.9 - 0.2Sds) * DL + E EMAM	0.75	0.00	16.55	0.00	0.00	59.45	0.00	0.03
1.0D + 1.0W	4.72	0.00	20.39	0.00	0.00	413.94	0.00	0.17

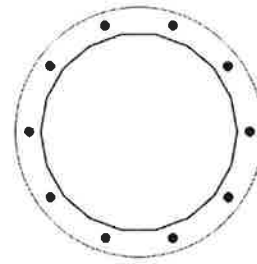
**BASE PLATE ANALYSIS @ 0 FT**

**APPLIED REACTIONS**

Moment (k-ft)	Axial (k)	Shear (k)
1674.55	24.44	18.98

**PLATE PARAMETERS (ID# 23503)**

Width:	56	in
Shape:	Round	
Thickness:	2.5	in
Grade:	A572-50	
Yield Strength:	50	ksi
Tensile Strength:	65	ksi
Rod Detail Type:	d	
Clear Distance:	3	in
Base Weld Size:	0.125	in
Orientation Offset:	-	
Analysis Type:	Plastic	
Neutral Axis:	126	



**ANCHOR ROD PARAMETERS**

Class	Arrangement	Quantity	Diameter (in)	Circle (in)	Grade	F <sub>y</sub> (ksi)	F <sub>u</sub> (ksi)	Spacing (in)	Offset (")
Original [ID#24119]	Radial	10	2.25	50	A615-75	75	100	-	-

**COMPONENT PROPERTIES**

Component	ID	Gross Area (in <sup>2</sup> )	Net Area (in <sup>2</sup> )	Individual Inertia (in <sup>4</sup> )	Moment of Inertia (in <sup>4</sup> )	Threads/in
Pole	43.92"Ø x 0.3125" (18 Sides)	42.5945	-	-	10126.19	-
Bolt Group	Original (10) 2.25"Ø	3.9761	3.2477	0.8393	9119.75	4.5

**REACTION DISTRIBUTION**

Component	ID	Moment M <sub>u</sub> (k-ft)	Axial Load P <sub>u</sub> (k)	Shear V <sub>u</sub> (k)	Moment Factor
Pole	43.92"Ø x 0.3125" (18 Sides)	1674.6	24.44	18.98	1.000
Bolt Group	Original (10) 2.25"Ø	1674.6	-	18.98	1.000

**BASE PLATE BEND LINE ANALYSIS @ 0 FT**

**POLE PROPERTIES**

Flat-to-Flat Diameter:	44.17	in
Point-to-Point Diameter:	44.85	in
Orientation Offset:	-	

Flat Width:	7.788	in
Flat Radians:	0.349	rad

**PLATE PROPERTIES**

Neutral Axis:	126	
Bend Line Limits:	3.281 to 4.259	rad

Bend Line	Chord Length (in)	Additional Length (in)	Section Modulus (in <sup>3</sup> )	Applied Moment M <sub>u</sub> (k-in)	Moment Capacity ΦM <sub>n</sub> (k-in)	Flexure Result M <sub>u</sub> /ΦM <sub>n</sub>
Flats	29.992	0.00	46.862	275.6	2108.8	13.1% <input checked="" type="checkbox"/>
Corners	28.963	0.00	45.254	217.0	2036.4	10.7% <input checked="" type="checkbox"/>
Circumferential	35.214	0.00	55.021	217.0	2476.0	8.8% <input checked="" type="checkbox"/>

**PLASTIC ANCHOR ROD ANALYSIS**

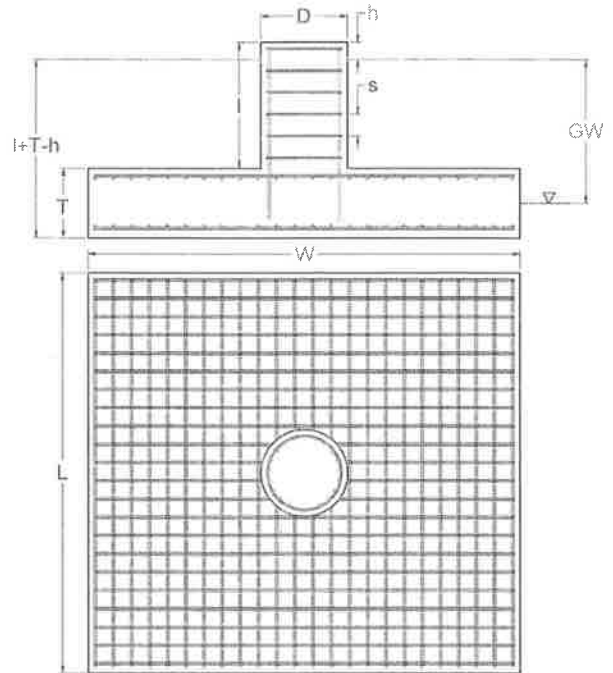
Class	Group Quantity	Rod Diameter (in)	Applied Axial Load P <sub>u</sub> (k)	Applied Shear Load V <sub>u</sub> (k)	Compressive Capacity ΦP <sub>n</sub> (k)	Interaction Result
Original	10	2.25	135.9	2.8	259.8	54.5% <input checked="" type="checkbox"/>

**APPLIED GLOBAL REACTIONS**

Moment (k-ft)	Axial (k)	Shear (k)
1,674.55	24.44	18.98

**FOUNDATION PARAMETERS**

Mat Length:	L	19	ft
Mat Width:	W	19	ft
Mat Thickness:	T	1.5	ft
Base Depth:	L+T-h	6	ft
Pier Shape:		Round	
Pier Diameter:	D	6	ft
Pier Height above Grade:	h	0.5	ft
Concrete Compressive Strength:		4,500	psi
Mat Top Rebar:		(26) #8 bars [60 ksi]	
Mat Bottom Rebar:		(26) #8 bars [60 ksi]	
Pier Vertical Rebar:		(26) #8 bars [60 ksi]	
Pier Rebar Ties:	s	#5 bars @ 12.0" c/c [60 ksi]	
Rebar Clear Cover:		3.0	in
Tower Eccentricity:	ecc	0	ft
Tower Leg Count		1	



**SOIL PARAMETERS**

Water Table Depth [BGL]:	GW		ft
Soil Unit Weight:		135	pcf
Ultimate Skin Friction:		0	psf
Ultimate Bearing Pressure:		24,250	psf
Bearing Pressure Type:		Net	
Coefficient of Shear Friction:		0.5	

**SOIL STRENGTH ANALYSIS**

Soil Strength Reduction Factor, $\Phi_s$	Uplift Strength Reduction Factor, $\Phi_s$	Asset Dead Load Factor	Dead Load Factor
0.75	0.75	0.9	1.2

**SOIL OVERTURNING ANALYSIS**

Design Moment, $M_{u,Design}$ (k-ft)	Nominal Overturning Capacity, $\Phi_m M_n$ (k-ft)	Soil Overturning Usage, $M_{u,Design} / \Phi_m M_n$
1,797.92	2,970.76	60.5%

**SOIL BEARING ANALYSIS**

Net Bearing Pressure, $P_{u,Net}$ (psf)	Nominal Bearing Capacity, $\Phi_b P_n$ (k-ft)	Bearing Pressure Controlling Load Direction	Soil Bearing Usage, $P_{u,net} / \Phi_b P_n$
2,203.00	18,795.00	Diagonal to Pad Edge	11.7%

**SOIL SLIDING SHEAR ANALYSIS**

Applied Shear Force, $V_u$ (k)	Friction Resistance (k)	Passive Pressure (psf)	Passive Pressure Resistance (k)	Nominal Shear Capacity, $\Phi_s V_n$ (k)	Soil Sliding Shear Usage, $V_u / \Phi_s V_n$
18.98	0.00	708.8	20.20	137.00	14.0%

**MAT REINFORCING STEEL STRENGTH ANALYSIS**

Steel Elastic Modulus, E (ksi)	Strength Bending/Tension Reduction Factor, $\Phi_b$	Strength Shear Reduction Factor, $\Phi_v$	Strength Compression Reduction Factor, $\Phi_c$
29,000	0.9	0.75	0.65

**MAT REINFORCING ONE WAY SHEAR ANALYSIS**

One Way Design Shear, $V_u$ (k)	Nominal One Way Shear Capacity, $\Phi_c V_n$ (k)	One Way Shear Controlling Load Direction	Mat One Way Shear Usage, $V_u / \Phi_c V_n$
119.70	313.36	Diagonal to Pad Edge	38.2% <input checked="" type="checkbox"/>

**MAT REINFORCING PUNCHING SHEAR ANALYSIS**

Punching Shear Design Stress, $v_u$ (psi)	Nominal Punching Shear Capacity, $\Phi_c v_n$ (psi)	Mat Punching Shear Usage, $v_u / \Phi_c v_n$
86.8	201.2	43.2% <input checked="" type="checkbox"/>

**MAT REINFORCING MOMENT TRANSFER ANALYSIS**

Moment Transfer Effective Flexural Width, $w_f$ (in)	Neutral Axis Depth (in)	Pier Moment at Joint, $M_{uf}$ (k-in)	Nominal Moment Transfer Capacity, $\Phi M_{sc,f}$ (k-in)	Mat Moment Transfer Usage, $0.6 M_{uf} / \Phi M_{sc,f}$
10.50	1.50	0.00	8,677.6	0.0% <input checked="" type="checkbox"/>

**MAT REINFORCING FLEXURE ANALYSIS – UPPER STEEL**

Factored Moment, $M_u$ (k-ft)	Nominal Flexural Capacity, $\Phi M_n$ (k-ft)	Flexural Steel Controlling Load Direction	Mat Upper Rebar Flexure Usage, $M_u / \Phi M_n$
334.14	1,238.51	Parallel to Pad Edge	27.0% <input checked="" type="checkbox"/>

**MAT REINFORCING FLEXURE ANALYSIS – LOWER STEEL**

Factored Moment, $M_u$ (k-ft)	Nominal Flexural Capacity, $\Phi M_n$ (k-ft)	Flexural Steel Controlling Load Direction	Mat Lower Rebar Flexure Usage, $M_u / \Phi M_n$
713.70	1,238.51	Parallel to Pad Edge	57.6% <input checked="" type="checkbox"/>

**PIER REINFORCING STEEL STRENGTH ANALYSIS**

Rebar Cage Diameter (in)	Steel Elastic Modulus, E (ksi)	Strength Bending/Tension Reduction Factor, $\Phi_b$	Strength Shear Reduction Factor, $\Phi_v$	Strength Compression Reduction Factor, $\Phi_c$
63.75	29,000	0.9	0.75	0.65

**PIER REINFORCING MOMENT ANALYSIS**

Design Moment, $M_u$ (k-ft)	Nominal Moment Capacity, $\Phi_b M_n$ (k-ft)	Bending Reinforcement Ratio	Pier Rebar Flexure Usage, $M_u / \Phi_b M_n$
1,769.45	2,882.20	0.005	61.4% <input checked="" type="checkbox"/>

**PIER REINFORCING COMPRESSION ANALYSIS**

Design Compression, $P_u$ (k)	Nominal Compressive Capacity, $\Phi_p P_n$ (k)	Pier Rebar Compressive Usage, $P_u / \Phi_p P_n$
24.44	8,082.02	0.3% <input checked="" type="checkbox"/>

**PIER REINFORCING SHEAR ANALYSIS**

Design Shear, $V_u$ (k)	Nominal Shear Capacity, $\Phi_v V_n$ (k)	Pier Rebar Shear Usage, $V_u / \Phi_v V_n$
18.98	544.84	3.5% <input checked="" type="checkbox"/>