



STATE OF CONNECTICUT  
CONNECTICUT SITING COUNCIL

Ten Franklin Square, New Britain, CT 06051

Phone: (860) 827-2935 Fax: (860) 827-2950

E-Mail: [siting.council@ct.gov](mailto:siting.council@ct.gov)

Web Site: [portal.ct.gov/csc](http://portal.ct.gov/csc)

**VIA ELECTRONIC MAIL**

October 14, 2022

David Hoogasian  
Project Manager  
Network Building + Consulting, LLC  
100 Apollo Drive, Suite 303  
Chelmsford, MA 01824  
[dhoogasian@nbllc.com](mailto:dhoogasian@nbllc.com)

RE: **TS-DISH-084-220808** – Dish Wireless, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 438 Bridgeport Avenue, Milford, Connecticut

Dear David Hoogasian:

The Connecticut Siting Council (Council) is in receipt of your correspondence of October 13, 2022 submitted in response to the Council's September 13, 2022 notification of an incomplete request for tower sharing with regard to the above-referenced matter.

The submission renders the request for tower sharing complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.  
Sincerely,

A handwritten signature in dark ink, appearing to read "Melanie A. Bachman".

Melanie A. Bachman  
Executive Director

MAB/IN/laf

**From:** David Hoogasian <dhoogasian@nbcllc.com>  
**Sent:** Thursday, October 13, 2022 3:20 PM  
**To:** Fontaine, Lisa <Lisa.Fontaine@ct.gov>  
**Cc:** CSC-DL Siting Council <Siting.Council@ct.gov>  
**Subject:** RE: Council Incomplete Letter - TS-DISH-084-220808 (Bridgeport Ave., Milford)

Good afternoon.

Attached please find the updated structural analysis with a passing figure <100% to complete the above referenced project filing.

One hard copy will be mailed to the CSC office.

Thanks again for your patience.

**David Hoogasian**

*Project Manager*

**NETWORK BUILDING + CONSULTING**

100 Apollo Drive | Suite 303 | Chelmsford, MA | 01824  
M 508.344.3343



**VIA ELECTRONIC MAIL  
VIA FEDEX**

October 13, 2022

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

**RE: TS-DISH-084-220808- Dish Wireless LLC ("DISH") Request of DISH for an Order to Approve the Shared Use of an Existing Tower at 438 Bridgeport Avenue, Milford, CT 06460.**

Dear Ms. Bachman:

To supplement the above referenced Tower Share Request, enclosed please find the requested document to support a proposed antenna mounting height of 93'.

- Passing Structural Analysis <100%

If you have any questions or need any additional information, please do not hesitate to contact me.

Sincerely,

*David Hoogasian*

**David Hoogasian**  
*Project Manager*  
M 508.344.3343  
[dhoogasian@nbcllc.com](mailto:dhoogasian@nbcllc.com)



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*CONNECTICUT SITING COUNCIL*

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Web Site: [portal.ct.gov/csc](http://portal.ct.gov/csc)

**VIA ELECTRONIC MAIL**

September 13, 2022

David Hoogasian  
Project Manager  
Network Building + Consulting, LLC  
100 Apollo Drive, Suite 303  
Chelmsford, MA 01824  
[dhoogasian@nbcllc.com](mailto:dhoogasian@nbcllc.com)

RE: **TS-DISH-084-220808** – Dish Wireless, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 438 Bridgeport Avenue, Milford, Connecticut

Dear David Hoogasian:

The Connecticut Siting Council (Council) received a notice of intent to modify the above-referenced facility on August 8, 2022.

According to Section 16-50j-90 of the Regulations of Connecticut State Agencies, “no tower share application shall be approved until a complete application containing all information deemed relevant by the Council has been filed. Relevant information shall at a minimum include that listed in Section 16-50j-89 of the Regulations of Connecticut State Agencies...”

Staff has reviewed this tower share request for completeness and has identified a deficiency in the Structural Analysis Report provided with the filing. The Structural Analysis Report provided is dated September 20, 2021. The Council had received a request for exempt modification from AT&T for the same facility in June of 2022. The above-referenced tower share request does not include AT&T’s approved equipment; however, the structural analysis included in AT&T’s request for exempt modification does appear to include both AT&T’s equipment and the equipment that Dish is now proposing. Please see AT&T’s exempt modification filing for this facility, which may be found on the Council’s website under the Decisions page in Milford under the filing number EM-CING-084-220627.

Therefore, the tower share request is incomplete at this time. The Council recommends that Dish Wireless provide an updated, passing (<100%) structural analysis for the proposed equipment that includes proposed and approved equipment by AT&T and other entities that are located at this facility and is stamped and signed by a professional engineer duly licensed in the State of Connecticut, on or before October 14, 2022. If additional time is needed to gather the requested information, please submit a written request for an extension of time prior to October 14, 2022. **Please provide an electronic version and one hard copy of the requested information for the incomplete tower share filing to be rendered complete and processed. Please include the Council’s tower share identification number referenced above with the submittal.**

This notice of incompleteness shall have the effect of tolling the Federal Communications Commission (FCC) 60-day timeframe in accordance with Paragraph 217 of the FCC Wireless Infrastructure Report and Order issued on October 21, 2014 (FCC 14-153).

Thank you for your attention to this matter. Should you have any questions, please feel free to contact me at 860-827-2951.

Sincerely,

A handwritten signature in dark ink, appearing to read "Melanie A. Bachman". The signature is fluid and cursive, with a long horizontal stroke at the end.

Melanie A. Bachman  
Executive Director

MAB/IN/emr



**AMERICAN TOWER®**  
CORPORATION

## Structural Analysis Report

**Structure** : 100 ft Monopole  
**ATC Asset Name** : Mlfd - Milford  
**ATC Asset Number** : 302516  
**Engineering Number** : 13702496\_C3\_06  
**Proposed Carrier** : DISH WIRELESS L.L.C.  
**Carrier Site Name** : BOHVN00144A  
**Carrier Site Number** : BOHVN00144A  
**Site Location** : 438 Bridgeport Ave  
Milford, CT 06460-4105  
41.2066, -73.0934  
**County** : New Haven  
**Date** : October 6, 2022  
**Max Usage** : 92%  
**Analysis Result** : Pass

Prepared By:

Dawson Allen  
Structural Engineer I

Reviewed



**COA: PEC.0001553**



**Table of Contents**

Introduction.....3

Supporting Documents.....3

Analysis.....3

Conclusion .....3

Existing/Reserved Loading.....4

Proposed Carrier Final Loading .....4

Structure Usages .....5

Foundation Reactions & Usages.....5

Antenna Deflection, Twist, and Sway.....5

Standard Conditions .....6

Calculations.....Attached

## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 100 ft Monopole tower to reflect the change in loading by DISH WIRELESS L.L.C..

## Supporting Documents

<b>Tower Drawing:</b>	ITT Meyer Specification #AT-8935, Type D, dated April 13, 1984 Mapping by Smith Cullum, SpectraSite #CT-0052, dated May 31, 2002
<b>Foundation Drawing:</b>	Mapping by FDH Project #02-1210, dated January 9, 2003
<b>Geotechnical Report:</b>	AET Job #002GT03, dated January 7, 2003
<b>Modification:</b>	SpectraSite Drawing #CT-0052, dated January 14, 2003 ATC Job #40870132, dated September 28, 2007 American Tower #27094034, dated April 21, 2008

## 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>	120 mph (3-second gust)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-second gust) w/ 1.00" radial ice concurrent
<b>Code(s):</b>	ANSI/TIA-222-H / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	B
<b>Risk Category:</b>	II
<b>Topographic Factor Procedure:</b>	Method 1
<b>Topographic Category:</b>	1
<b>Spectral Response:</b>	$S_s = 0.20, S_i = 0.05$
<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 contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com) Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



**Existing/Reserved Loading**

Elev.*	Qty	Equipment	Lines	Carrier
108.8'	1	10' Omni	-	UNKNOWN
108.0'	3	Ericsson Air 6449 B77D	(2) 0.41" (10.3mm) Fiber (8) 0.78" (19.7mm) 8 AWG 6 (1) 0.92" (23.4mm) Cable (6) 1 1/4" Coax (4) 2" conduit	AT&T MOBILITY
106.0'	1	Raycap DC9-48-60-24-8C-EV		
	2	Commscope WCS-IMFQ-AMT		
	2	Raycap DC6-48-60-18-8F		
	3	CCI DMP65R-BU4D		
	3	Ericsson RRUS 32 B2		
	3	Ericsson RRUS 32 B30		
	3	Ericsson RRUS 32 B66A		
	3	Ericsson RRUS 4449 B5, B12		
	3	Ericsson RRUS 4478 B14		
3	Ericsson RRUS E2 B29			
3	Quintel QD4616-7			
104.0'	3	Ericsson AIR 6419 B77G		
100.0'	3	Side Arm		
	1	Heavy Platform with Handrails		
99.0'	1	Mount Reinforcement		
77.6'	3	Ericsson Radio 4449 B71 B85A	(3) 1 1/4" (1.25"- 31.8mm) Fiber (12) 7/8" Coax	T-MOBILE
73.0'	1	Perfect Vison PV-LLP12M-HR-12-96 Platform w/ PV-PKBK-M Kicker Kit		
	3	Ericsson AIR32 B66Aa/B2a		
	3	Ericsson Air6449 B41		
	3	Ericsson RRUS 4415 B25		
	3	RFS APX16DWV-16DWVS-E-A20		
	3	RFS APXVAARR24_43-U-NA20		
6	Ericsson KRY 112 144/2			

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

*\*Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.*

**Proposed Carrier Final Loading**

Elev.*	Qty	Equipment	Lines	Carrier
93.0'	1	Platform with Handrails	(1) 1.60" (40.6mm) Hybrid	DISH WIRELESS L.L.C.
	1	Raycap RDIDC-9181-PF-48		
	3	Fujitsu TA08025-B604		
	3	Fujitsu TA08025-B605		
	3	JMA Wireless MX08FRO665-21		

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

*\*Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.*

**Structure Usages**

Structural Component	Usage	Pass/Fail
Anchor Rods	17%	Pass
Base Plate	56%	Pass
Shaft	92%	Pass
Reinforcement	90%	Pass

**Foundation Reactions & Usages**

Reaction Component	Analysis Reactions	Usage
Moment (k-ft)	1561.2	74%
Axial (k)	35.4	12%
Shear (k)	20.1	27%

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.

**Antenna Deflection, Twist, and Sway**

Elev.	Antenna	Carrier	Deflection	Twist	Sway [Rotation]
93.0'	Generic Flat Platform with Handrails	DISH WIRELESS L.L.C.	1.053'	N/A	1.270°

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

## **Standard Conditions**

All engineering services performed by A.T. Engineering 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 A.T. Engineering Services LLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering 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 A.T. Engineering 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. A.T. Engineering Services LLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

**ANALYSIS PARAMETERS**

Nominal Wind: 120 mph	Ice Wind: 50 mph w/ 1" ice	Service Wind: 60 mph
Risk Category: II	Exposure: B	S <sub>s</sub> : 0.203 S <sub>i</sub> : 0.053
Topo Category: 1	Topo Factor: Method 1	Topo Feature:
Structure Height: 100 ft	Base Elevation: 0.00 ft	Structure Type: Taper
Base Diameter: 30 in	Base Rotation: 0°	Taper: 0.1640 (in/ft)

**POLE SECTION PROPERTIES**

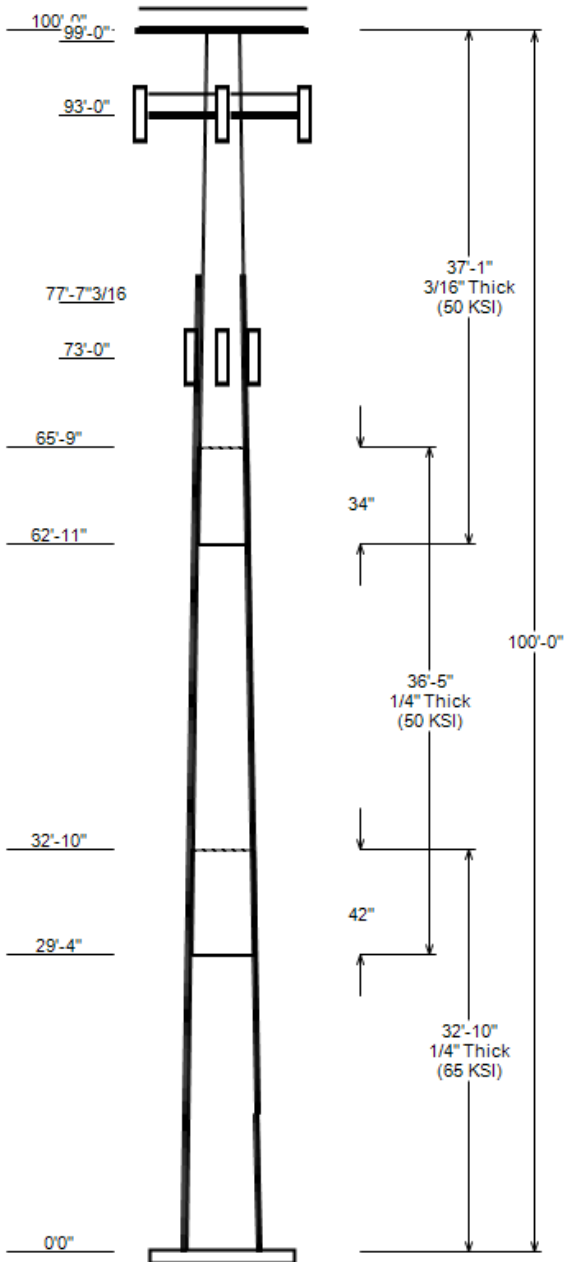
Section	Length (ft)	Flat Diameter (in)		Thick (in)	Joint Type	Joint Length (in)	Pole Shape	Yield Strength (ksi)
		Top	Bottom					
1	32.833	24.62	30.00	0.250		0.000	12 Sides	65
2	36.417	19.73	25.70	0.250	Slip Joint	42.000	12 Sides	50
3	37.083	14.50	20.57	0.188	Slip Joint	34.000	12 Sides	50

**DISCRETE APPURTENANCE**

Elev (ft)	Description
108.8	(1) Generic 10' Omni
108.0	(3) Ericsson Air 6449 B77D
106.0	(2) Commscope WCS-IMFQ-AMT
106.0	(2) Raycap DC6-48-60-18-8F
106.0	(3) Ericsson RRUS 4449 B5, B12
106.0	(3) Ericsson RRUS 4478 B14
106.0	(3) Ericsson RRUS 32 B66A
106.0	(3) Ericsson RRUS 32 B30
106.0	(3) Ericsson RRUS 32 B2
106.0	(3) Ericsson RRUS E2 B29
106.0	(1) Raycap DC9-48-60-24-8C-EV
106.0	(3) CCI DMP65R-BU4D
106.0	(3) Quintel QD4616-7
104.0	(3) Ericsson AIR 6419 B77G
100.0	(3) Generic Flat Side Arm
100.0	(1) Generic Heavy Platform with Ha
99.0	(1) Generic Mount Reinforcement
93.0	(1) Raycap RDIDC-9181-PF-48
93.0	(3) Fujitsu TA08025-B604
93.0	(3) Fujitsu TA08025-B605
93.0	(3) JMA Wireless MX08FRO665-21
93.0	(1) Generic Flat Platform with Han
77.6	(3) Ericsson Radio 4449 B71 B85A
73.0	(6) Ericsson KRY 112 144/2
73.0	(3) Ericsson RRUS 4415 B25
73.0	(3) Ericsson Air6449 B41
73.0	(3) Ericsson AIR32 B66Aa/B2a
73.0	(3) RFS APX16DWV-16DWVS-E-A20
73.0	(3) RFS APXVAARR24_43-U-NA20
73.0	(1) Perfect Vison PV-LLP12M-HR-12-

**LINEAR APPURTENANCE**

Elev To (ft)	Description
106.0	(4) 2" conduit
106.0	(6) 1 1/4" Coax
106.0	(1) 0.92" (23.4mm) Cable
106.0	(8) 0.78" (19.7mm) 8 AWG 6
106.0	(2) 0.41" (10.3mm) Fiber
93.0	(1) 1.60" (40.6mm) Hybrid
85.0	(1) #20 w/ Angle Brackets
85.0	(1) #20 w/ Angle Brackets
85.0	(1) #20 w/ Angle Brackets
85.0	(1) #20 w/ Angle Brackets
73.0	(12) 7/8" Coax
73.0	(3) 1 1/4" (1.25"- 31.8mm) Fiber



**LOAD CASE KEY**

<b>1.2D + 1.0W</b>	120 mph Wind with No Ice
<b>0.9D + 1.0W</b>	120 mph Wind with No Ice (Reduced)
<b>1.2D + 1.0Di + 1.0Wi</b>	50 mph Wind with 1" Radial Ice
<b>1.2D + 1.0Ev + 1.0Eh</b>	Seismic
<b>0.9D - 1.0Ev + 1.0Eh</b>	Seismic (Reduced DL)
<b>1.0D + 1.0W</b>	60 mph Wind with No Ice

**GLOBAL BASE REACTIONS**

Load Case	Moment (kip-ft)	Axial (kip)	Shear (kip)
1.2D + 1.0W	1561.18	35.38	20.07
0.9D + 1.0W	1533.40	26.52	20.04
1.2D + 1.0Di + 1.0Wi	379.14	48.18	4.72
1.2D + 1.0Ev + 1.0Eh	82.07	35.48	0.89
0.9D - 1.0Ev + 1.0Eh	80.12	24.45	0.89
1.0D + 1.0W	345.54	29.53	4.48

ANALYSIS PARAMETERS

<b>Location:</b>	New Haven County,CT	<b>Height:</b>	100 ft
<b>Type and Shape:</b>	Taper, 12 Sides	<b>Base Diameter:</b>	30.00 in
<b>Manufacturer:</b>	ITT Meyer	<b>Top Diameter:</b>	14.50 in
<b>K<sub>d</sub> (non-service):</b>	0.95	<b>Taper:</b>	0.1640 in/ft
<b>K<sub>e</sub>:</b>	1.00	<b>Rotation:</b>	0.000°

ICE & WIND PARAMETERS

<b>Risk Category:</b>	II	<b>Design Wind Speed:</b>	120 mph
<b>Exposure Category:</b>	B	<b>Design Wind Speed w/ Ice:</b>	50 mph
<b>Topo Factor Procedure:</b>	Method 1	<b>Design Ice Thickness:</b>	1.00 in
<b>Topographic Category:</b>	1	<b>Service Wind Speed:</b>	60 mph
<b>Crest Height:</b>	0 ft	<b>HMSL:</b>	77.00 ft

SEISMIC PARAMETERS

<b>Analysis Method:</b>	Equivalent Lateral Force Method		
<b>Site Class:</b>	D - Stiff Soil	<b>Period Based on Rayleigh Method (sec):</b>	2.45
<b>T<sub>L</sub> (sec):</b>	6	<b>P:</b>	1
<b>S<sub>s</sub>:</b>	0.203	<b>S<sub>1</sub>:</b>	0.053
<b>F<sub>a</sub>:</b>	1.600	<b>F<sub>v</sub>:</b>	2.400
<b>S<sub>ds</sub>:</b>	0.217	<b>S<sub>d1</sub>:</b>	0.085
		<b>C<sub>s</sub>:</b>	0.030
		<b>C<sub>s</sub> Max:</b>	0.030
		<b>C<sub>s</sub> Min:</b>	0.030

LOAD CASES

1.2D + 1.0W	120 mph Wind with No Ice
0.9D + 1.0W	120 mph Wind with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph Wind with 1" Radial Ice
1.2D + 1.0Ev + 1.0Eh	Seismic
0.9D - 1.0Ev + 1.0Eh	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)	
1-12	32.83	0.2500	65		0.00	2,434	30.00	-0.003	23.95	2,705.5	29.47	120.00	24.62	32.83	19.62	1,487.8	23.71	98.50	0.1637	
2-12	36.42	0.2500	50	Slip	42.00	2,241	25.70	29.333	20.48	1,693.1	24.86	102.79	19.73	65.75	15.68	759.9	18.47	78.93	0.1637	
3-12	37.08	0.1875	50	Slip	34.00	1,322	20.57	62.917	12.31	652.8	26.72	109.72	14.50	100.00	8.64	225.9	18.04	77.33	0.1637	
<b>Total Shaft Weight</b>						<b>5,997</b>														

DISCRETE APPURTENANCE PROPERTIES

Attach Elev (ft)	Description	Qty	Vert Ecc (ft)	No Ice			Ice			
				Weight (lb)	EPAA (sf)	Orientation Factor	Weight (lb)	EPAA (sf)	Orientation Factor	
108.80	Generic 10' Omni	1	1.00	0.000	25.00	3.000	1.00	73.67	5.308	1.00
108.00	Ericsson Air 6449 B77D	3	0.75	0.000	81.60	4.028	0.65	147.54	4.910	0.65
106.00	CCI DMP65R-BU4D	3	0.75	0.000	67.90	8.280	0.62	183.70	9.578	0.62
106.00	Quintel QD4616-7	3	0.75	0.000	109.00	9.442	0.64	248.15	10.830	0.64
106.00	Raycap DC9-48-60-24-8C-EV	1	0.75	0.000	16.00	4.788	1.00	98.77	5.731	1.00
106.00	Ericsson RRUS E2 B29	3	0.75	0.000	60.00	3.145	0.62	111.86	3.888	0.62
106.00	Ericsson RRUS 32 B30	3	0.75	0.000	60.00	2.743	0.67	107.17	3.493	0.67
106.00	Ericsson RRUS 32 B2	3	0.75	0.000	53.00	2.743	0.67	100.16	3.493	0.67
106.00	Ericsson RRUS 32 B66A	3	0.75	0.000	50.70	2.720	0.67	97.69	3.466	0.67
106.00	Ericsson RRUS 4478 B14	3	0.75	0.000	59.40	2.021	0.67	98.75	2.626	0.67
106.00	Ericsson RRUS 4449 B5, B12	3	0.75	0.000	71.00	1.969	0.50	112.32	2.567	0.50
106.00	Raycap DC6-48-60-18-8F	2	0.75	0.000	20.00	1.260	1.00	53.76	1.682	1.00
106.00	Commscope WCS-IMFQ-AMT	2	0.75	0.000	29.50	0.989	0.50	51.10	1.413	0.50
104.00	Ericsson AIR 6419 B77G	3	0.75	0.000	66.10	3.797	0.65	128.31	4.642	0.65
100.00	Generic Heavy Platform with Ha	1	1.00	0.000	3750.00	59.800	1.00	5475.28	76.628	1.00
100.00	Generic Flat Side Arm	3	1.00	0.000	187.50	6.300	0.67	272.93	8.298	0.67
99.00	Generic Mount Reinforcement	1	1.00	0.000	200.00	7.500	1.00	323.77	12.288	1.00
93.00	JMA Wireless MX08FRO665-21	3	0.75	0.000	64.50	12.489	0.64	227.92	14.276	0.64
93.00	Generic Flat Platform with Han	1	1.00	0.000	2500.00	42.400	1.00	3629.51	55.734	1.00
93.00	Raycap RDIDC-9181-PF-48	1	0.75	0.000	21.90	1.867	1.00	58.08	2.439	1.00
93.00	Fujitsu TA08025-B604	3	0.75	0.000	63.90	1.962	0.50	100.98	2.547	0.50
93.00	Fujitsu TA08025-B605	3	0.75	0.000	75.00	1.962	0.50	114.83	2.547	0.50
77.60	Ericsson Radio 4449 B71 B85A	3	0.75	0.000	75.00	1.650	0.50	112.55	2.180	0.50
73.00	Perfect Vison PV-LLP12M-HR-12-	1	1.00	0.000	2000.00	36.800	1.00	2864.31	52.703	1.00
73.00	RFS APXVAARR24_43-U-NA20	3	0.75	0.000	127.90	20.243	0.63	371.43	22.544	0.63
73.00	RFS APX16DWV-16DWVS-E-A20	3	0.75	0.000	40.70	6.586	0.60	113.17	7.929	0.60
73.00	Ericsson RRUS 4415 B25	3	0.75	0.000	46.00	1.842	0.50	76.42	2.398	0.50
73.00	Ericsson Air6449 B41	3	0.75	0.000	104.00	5.682	0.63	188.54	6.667	0.63
73.00	Ericsson AIR32 B66Aa/B2a	3	0.75	0.000	132.20	6.510	0.71	231.21	7.869	0.71
73.00	Ericsson KRY 112 144/2	6	0.75	0.000	9.70	0.480	0.50	18.51	0.774	0.50
<b>Totals</b>	<b>Row Count: 30</b>	<b>77</b>			<b>13,456.30</b>			<b>22,281.06</b>		

LINEAR APPURTENANCE PROPERTIES

Load Case Azimuth (deg): 65.00

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	106.00	8	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	106.00	6	1 1/4" Coax	1.55	0.63	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	106.00	4	2" conduit	2.38	3.65	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	106.00	2	0.41" (10.3mm) Fiber	0.41	0.09	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	106.00	1	0.92" (23.4mm) Cable	0.92	0.89	N	0	0	0	0	0	N	AT&T MOBILITY
0.00	93.00	1	1.60" (40.6mm) Hybrid	1.6	2.34	N	1	1	1	0	1	Y	DISH WIRELESS L.L.C.
0.00	85.00	1	#20 w/ Angle Brackets	4	4.68	N	1	0	0	180	0	Y	
0.00	85.00	1	#20 w/ Angle Brackets	4	4.68	N	1	0	0	0	0	Y	
0.00	85.00	1	#20 w/ Angle Brackets	4	4.68	N	1	0	0	90	0	Y	
0.00	85.00	1	#20 w/ Angle Brackets	4	4.68	N	1	0	0	270	0	Y	
0.00	73.00	12	7/8" Coax	1.09	0.33	N	2	1	1	30	1	Y	T-MOBILE
0.00	73.00	3	1 1/4" (1.25"- 31.8mm	1.25	1.05	N	2	1	1	35	1	Y	T-MOBILE

ADDITIONAL STEEL

Intermediate Connectors

Elev From (ft)	Elev To (ft)	Qty	Description	Fy (ksi)	Offset (in)	Bracket Type	Spacing (in)	Length (in)	Connectors	Continuation?
0.00	11.25	4	SOL #20 All Thread Bar	80	2.19	6" Angle Bracket	39.50	3.13	5/8" A36 U-Bolt	N
11.25	79.94	4	SOL #20 All Thread Bar	80	2.19	6" Angle Bracket	30.00	3.13	5/8" A36 U-Bolt	Y

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	F'y (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)	Additional Reinforcing		
													Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	Weight (lb)
0.00			0.2500	30.000	23.949	2,705.50	29.47	120.00	72.6	174.2	0.0	0.0	19.640	3,346.80	0.0
5.00			0.2500	29.181	23.290	2,488.20	28.60	116.73	73.5	164.7	0.0	401.9	19.640	3,200.20	334.0
10.00			0.2500	28.363	22.631	2,282.90	27.72	113.45	74.5	155.5	0.0	390.6	19.640	3,056.90	334.0
11.25	Reinf. Top Reinf Bottom		0.2500	28.158	22.466	2,233.40	27.50	112.63	74.7	153.2	0.0	95.9	19.640	3,021.50	83.5
15.00			0.2500	27.544	21.971	2,089.20	26.84	110.18	75.4	146.5	0.0	283.5	19.640	2,916.80	250.5
20.00			0.2500	26.725	21.312	1,906.70	25.96	106.90	76.4	137.8	0.0	368.2	19.640	2,780.10	334.0
25.00			0.2500	25.906	20.653	1,735.20	25.09	103.63	77.4	129.4	0.0	357.0	19.640	2,646.60	334.0
29.33	Bot - Section 2		0.2500	25.197	20.082	1,595.20	24.33	100.79	78.2	122.3	0.0	300.3	19.640	2,533.70	289.5
30.00			0.2500	25.088	19.994	1,574.40	24.21	100.35	78.3	121.2	0.0	91.8	19.640	2,595.60	44.5
32.83	Top - Section 1		0.2500	25.124	20.023	1,581.20	24.25	100.49	62.7	121.6	0.0	385.8	19.640	2,522.10	189.3
35.00			0.2500	24.769	19.738	1,514.50	23.87	99.08	63	118.1	0.0	146.6	19.640	2,466.70	144.7
40.00			0.2500	23.950	19.079	1,367.80	22.99	95.80	63	110.3	0.0	330.2	19.640	2,341.10	334.0
45.00			0.2500	23.131	18.419	1,230.90	22.11	92.53	63	102.8	0.0	319.0	19.640	2,218.80	334.0
50.00			0.2500	22.313	17.760	1,103.40	21.23	89.25	63	95.5	0.0	307.8	19.640	2,099.80	334.0
55.00			0.2500	21.494	17.101	985.10	20.36	85.98	63	88.5	0.0	296.6	19.640	1,984.10	334.0
60.00			0.2500	20.675	16.442	875.50	19.48	82.70	63	81.8	0.0	285.4	19.640	1,871.70	334.0
62.92	Bot - Section 3		0.2500	20.197	16.058	815.50	18.97	80.79	63	78.0	0.0	161.3	19.640	1,807.60	194.8
65.00			0.2500	19.856	15.783	774.40	18.60	79.43	63	75.3	0.0	199.4	19.640	1,812.10	139.2
65.75	Top - Section 2		0.1875	20.108	12.027	609.20	26.06	107.25	61.4	58.5	0.0	70.9	19.640	1,795.80	50.1
70.00			0.1875	19.413	11.607	547.60	25.06	103.53	62.1	54.5	0.0	170.9	19.640	1,704.80	283.9
73.00			0.1875	18.921	11.311	506.70	24.36	100.91	62.6	51.7	0.0	117.0	19.640	1,642.00	200.4
75.00			0.1875	18.594	11.113	480.60	23.89	99.17	63	49.9	0.0	76.3	19.640	1,600.80	133.6
77.60			0.1875	18.168	10.856	448.00	23.28	96.90	63	47.6	0.0	97.2	19.640	1,547.90	173.7
79.94	Reinf. Top		0.1875	17.785	10.624	419.90	22.74	94.85	63	45.6	0.0	85.5	19.640	1,501.20	156.3
80.00			0.1875	17.775	10.618	419.20	22.72	94.80	63	45.6	0.0	2.2			
85.00			0.1875	16.956	10.124	363.40	21.55	90.43	63	41.4	0.0	176.5			
90.00			0.1875	16.138	9.630	312.70	20.38	86.07	63	37.4	0.0	168.0			
93.00			0.1875	15.646	9.333	284.70	19.68	83.45	63	35.2	0.0	96.8			
95.00			0.1875	15.319	9.135	267.00	19.21	81.70	63	33.7	0.0	62.8			
99.00			0.1875	14.664	8.740	233.80	18.28	78.21	63	30.8	0.0	121.7			
100.00			0.1875	14.500	8.641	225.90	18.04	77.33	63	30.1	0.0	29.6			
<b>Totals:</b>												<b>5,996.7</b>	<b>5,340.0</b>		

CALCULATED FORCES

Load Case: 1.2D + 1.0W		120 mph Wind with No Ice											23 Iterations	
Gust Response Factor:		1.10												
Dead load Factor:		1.20												
Wind Load Factor:		1.00												
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio	
0.00	-35.38	-20.07	0.00	-1,561.2	0.00	1,561.18	1,564.13	420.30	1,179.53	948.21	0	0	0.751	
5.00	-34.06	-19.77	0.00	-1,460.8	0.00	1,460.84	1,541.15	408.73	1,115.51	908.35	0.19	-0.36	0.718	
10.00	-32.81	-19.54	0.00	-1,362.0	0.00	1,361.99	1,517.03	397.17	1,053.29	868.61	0.75	-0.71	0.684	
11.25	-32.46	-19.41	0.00	-1,337.6	0.00	1,337.57	1,510.82	394.27	1,038.01	858.70	0.95	-0.8	0.676	
15.00	-31.49	-19.16	0.00	-1,264.8	0.00	1,264.77	1,491.77	385.60	992.85	829.06	1.69	-1.06	0.650	
20.00	-30.23	-18.84	0.00	-1,169.0	0.00	1,168.99	1,465.38	374.03	934.19	789.74	2.99	-1.41	0.615	
25.00	-29.00	-18.53	0.00	-1,074.8	0.00	1,074.79	1,437.85	362.47	877.32	750.71	4.64	-1.75	0.580	
29.33	-27.97	-18.31	0.00	-994.5	0.00	994.51	1,413.08	352.44	829.48	717.18	6.37	-2.04	0.548	
30.00	-27.74	-18.22	0.00	-982.3	0.00	982.30	1,409.19	350.90	822.24	712.04	6.66	-2.08	0.533	
32.83	-26.83	-18.03	0.00	-930.7	0.00	930.68	1,130.05	270.31	634.33	571.84	7.95	-2.27	0.644	
35.00	-26.28	-17.82	0.00	-891.6	0.00	891.62	1,119.12	266.46	616.37	558.15	9.01	-2.41	0.624	

CALCULATED FORCES

40.00	-25.10	-17.44	0.00	-802.5	0.00	802.54	1,081.75	257.56	575.90	521.31	11.7	-2.71	0.584
45.00	-23.95	-17.04	0.00	-715.3	0.00	715.34	1,044.38	248.66	536.82	485.73	14.7	-3	0.541
50.00	-22.81	-16.63	0.00	-630.1	0.00	630.12	1,007.01	239.76	499.10	451.41	18	-3.28	0.496
55.00	-21.70	-16.20	0.00	-547.0	0.00	546.98	969.64	230.87	462.76	418.35	21.57	-3.54	0.449
60.00	-20.62	-15.81	0.00	-466.0	0.00	465.99	932.27	221.97	427.79	386.54	25.41	-3.79	0.399
62.92	-19.99	-15.56	0.00	-419.9	0.00	419.89	910.47	216.78	408.02	368.57	27.77	-3.92	0.369
65.00	-19.45	-15.40	0.00	-387.5	0.00	387.47	894.90	213.07	394.19	355.99	29.5	-4.01	0.341
65.75	-19.25	-15.23	0.00	-375.9	0.00	375.92	664.38	162.37	305.14	269.42	30.13	-4.04	0.373
70.00	-18.43	-14.86	0.00	-311.2	0.00	311.22	648.81	156.70	284.20	253.83	33.8	-4.2	0.318
73.00	-14.03	-10.97	0.00	-266.6	0.00	266.64	637.49	152.69	269.87	242.97	36.48	-4.31	0.272
75.00	-13.67	-10.76	0.00	-244.7	0.00	244.71	629.79	150.02	260.52	235.80	38.3	-4.38	0.253
77.60	-12.94	-10.44	0.00	-216.7	0.00	216.72	615.52	146.55	248.61	225.07	40.71	-4.46	0.229
79.94	-12.53	-10.29	0.00	-192.3	0.00	192.29	602.40	143.43	238.13	215.53	42.91	-4.53	0.207
79.94	-12.53	-10.29	0.00	-192.3	0.00	192.29	602.40	143.43	238.13	215.53	42.91	-4.53	0.918
80.00	-12.49	-10.19	0.00	-191.7	0.00	191.67	602.07	143.35	237.86	215.29	42.97	-4.53	0.916
85.00	-11.95	-9.86	0.00	-140.7	0.00	140.72	574.04	136.68	216.24	195.61	48.03	-5.1	0.745
90.00	-11.55	-9.70	0.00	-91.4	0.00	91.40	546.01	130.00	195.65	176.87	53.62	-5.55	0.543
93.00	-7.84	-6.76	0.00	-62.3	0.00	62.30	529.19	126.00	183.79	166.09	57.17	-5.76	0.393
95.00	-7.71	-6.63	0.00	-48.8	0.00	48.77	517.98	123.33	176.08	159.08	59.6	-5.87	0.324
99.00	-7.24	-6.19	0.00	-22.3	0.00	22.26	495.56	117.99	161.18	145.53	64.59	-6.02	0.170
100.00	0.00	-5.39	0.00	-16.1	0.00	16.07	489.95	116.66	157.55	142.23	65.85	-6.05	0.115



CALCULATED FORCES

Load Case: 0.9D + 1.0W 120 mph Wind with No Ice (Reduced DL) 23 Iterations  
 Gust Response Factor: 1.10  
 Dead load Factor: 0.90  
 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	-26.52	-20.04	0.00	-1,533.4	0.00	1,533.40	1,564.13	420.30	1,179.53	948.21	0	0	0.734
5.00	-25.51	-19.69	0.00	-1,433.2	0.00	1,433.21	1,541.15	408.73	1,115.51	908.35	0.19	-0.35	0.701
10.00	-24.55	-19.42	0.00	-1,334.8	0.00	1,334.78	1,517.03	397.17	1,053.29	868.61	0.74	-0.69	0.668
11.25	-24.27	-19.27	0.00	-1,310.5	0.00	1,310.51	1,510.82	394.27	1,038.01	858.70	0.93	-0.78	0.660
15.00	-23.52	-18.97	0.00	-1,238.2	0.00	1,238.24	1,491.77	385.60	992.85	829.06	1.65	-1.04	0.634
20.00	-22.56	-18.62	0.00	-1,143.4	0.00	1,143.36	1,465.38	374.03	934.19	789.74	2.93	-1.38	0.599
25.00	-21.61	-18.27	0.00	-1,050.3	0.00	1,050.29	1,437.85	362.47	877.32	750.71	4.55	-1.71	0.564
29.33	-20.84	-18.04	0.00	-971.1	0.00	971.13	1,413.08	352.44	829.48	717.18	6.24	-2	0.533
30.00	-20.65	-17.93	0.00	-959.1	0.00	959.11	1,409.19	350.90	822.24	712.04	6.52	-2.04	0.519
32.83	-19.96	-17.73	0.00	-908.3	0.00	908.30	1,130.05	270.31	634.33	571.84	7.79	-2.22	0.625
35.00	-19.54	-17.49	0.00	-869.9	0.00	869.88	1,119.12	266.46	616.37	558.15	8.83	-2.36	0.606
40.00	-18.64	-17.10	0.00	-782.4	0.00	782.41	1,081.75	257.56	575.90	521.31	11.46	-2.65	0.566
45.00	-17.76	-16.68	0.00	-696.9	0.00	696.94	1,044.38	248.66	536.82	485.73	14.4	-2.94	0.525
50.00	-16.90	-16.25	0.00	-613.5	0.00	613.53	1,007.01	239.76	499.10	451.41	17.62	-3.21	0.481
55.00	-16.06	-15.81	0.00	-532.3	0.00	532.27	969.64	230.87	462.76	418.35	21.12	-3.46	0.435
60.00	-15.25	-15.42	0.00	-453.2	0.00	453.22	932.27	221.97	427.79	386.54	24.87	-3.7	0.386
62.92	-14.78	-15.17	0.00	-408.2	0.00	408.25	910.47	216.78	408.02	368.57	27.17	-3.83	0.357
65.00	-14.37	-15.01	0.00	-376.6	0.00	376.63	894.90	213.07	394.19	355.99	28.86	-3.92	0.329
65.75	-14.21	-14.84	0.00	-365.4	0.00	365.37	664.38	162.37	305.14	269.42	29.48	-3.95	0.360
70.00	-13.60	-14.47	0.00	-302.3	0.00	302.32	648.81	156.70	284.20	253.83	33.06	-4.11	0.306
73.00	-10.35	-10.67	0.00	-258.9	0.00	258.90	637.49	152.69	269.87	242.97	35.68	-4.21	0.262
75.00	-10.08	-10.47	0.00	-237.6	0.00	237.57	629.79	150.02	260.52	235.80	37.46	-4.28	0.243
77.60	-9.54	-10.15	0.00	-210.4	0.00	210.35	615.52	146.55	248.61	225.07	39.81	-4.36	0.220
79.94	-9.23	-10.01	0.00	-186.6	0.00	186.59	602.40	143.43	238.13	215.53	41.96	-4.42	0.199
79.94	-9.23	-10.01	0.00	-186.6	0.00	186.59	602.40	143.43	238.13	215.53	41.96	-4.42	0.886
80.00	-9.19	-9.89	0.00	-186.0	0.00	185.99	602.07	143.35	237.86	215.29	42.02	-4.43	0.884
85.00	-8.78	-9.55	0.00	-136.5	0.00	136.54	574.04	136.68	216.24	195.61	46.95	-4.97	0.718
90.00	-8.48	-9.37	0.00	-88.8	0.00	88.81	546.01	130.00	195.65	176.87	52.4	-5.41	0.523
93.00	-5.75	-6.53	0.00	-60.7	0.00	60.69	529.19	126.00	183.79	166.09	55.87	-5.62	0.379
95.00	-5.65	-6.40	0.00	-47.6	0.00	47.63	517.98	123.33	176.08	159.08	58.24	-5.73	0.313
99.00	-5.30	-5.97	0.00	-22.0	0.00	22.04	495.56	117.99	161.18	145.53	63.1	-5.87	0.165
100.00	0.00	-5.39	0.00	-16.1	0.00	16.07	489.95	116.66	157.55	142.23	64.33	-5.9	0.115

CALCULATED FORCES

CALCULATED FORCES													22 Iterations
Load Case: 1.2D + 1.0Di + 1.0Wi			50 mph Wind with 1" Radial Ice										
Gust Response Factor:		1.10	Ice Dead Load Factor		1.00						Ice Importance Factor		1.00
Dead load Factor:		1.20											
Wind Load Factor:		1.00											
Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	Phi Pn (kips)	Phi Vn (kips)	Phi Tn (ft-kips)	Phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-48.18	-4.72	0.00	-379.1	0.00	379.14	1,564.13	420.30	1,179.53	948.21	0	0	0.196
5.00	-46.67	-4.69	0.00	-355.6	0.00	355.56	1,541.15	408.73	1,115.51	908.35	0.05	-0.09	0.188
10.00	-45.14	-4.66	0.00	-332.1	0.00	332.12	1,517.03	397.17	1,053.29	868.61	0.18	-0.17	0.180
11.25	-44.76	-4.65	0.00	-326.3	0.00	326.30	1,510.82	394.27	1,038.01	858.70	0.23	-0.19	0.177
15.00	-43.62	-4.62	0.00	-308.9	0.00	308.88	1,491.77	385.60	992.85	829.06	0.41	-0.26	0.171
20.00	-42.11	-4.58	0.00	-285.8	0.00	285.79	1,465.38	374.03	934.19	789.74	0.73	-0.34	0.162
25.00	-40.61	-4.53	0.00	-262.9	0.00	262.91	1,437.85	362.47	877.32	750.71	1.13	-0.43	0.153
29.33	-39.32	-4.49	0.00	-243.3	0.00	243.28	1,413.08	352.44	829.48	717.18	1.55	-0.5	0.145
30.00	-39.06	-4.48	0.00	-240.3	0.00	240.28	1,409.19	350.90	822.24	712.04	1.62	-0.51	0.142
32.83	-37.99	-4.45	0.00	-227.6	0.00	227.59	1,130.05	270.31	634.33	571.84	1.94	-0.55	0.171
35.00	-37.34	-4.41	0.00	-218.0	0.00	217.95	1,119.12	266.46	616.37	558.15	2.2	-0.59	0.166
40.00	-35.87	-4.34	0.00	-195.9	0.00	195.89	1,081.75	257.56	575.90	521.31	2.85	-0.66	0.155
45.00	-34.42	-4.25	0.00	-174.2	0.00	174.18	1,044.38	248.66	536.82	485.73	3.59	-0.73	0.144
50.00	-32.98	-4.14	0.00	-153.0	0.00	152.95	1,007.01	239.76	499.10	451.41	4.39	-0.8	0.133
55.00	-31.55	-4.01	0.00	-132.3	0.00	132.26	969.64	230.87	462.76	418.35	5.26	-0.86	0.120
60.00	-30.15	-3.89	0.00	-112.2	0.00	112.20	932.27	221.97	427.79	386.54	6.2	-0.92	0.108
62.92	-29.33	-3.81	0.00	-100.9	0.00	100.87	910.47	216.78	408.02	368.57	6.78	-0.95	0.100
65.00	-28.65	-3.75	0.00	-92.9	0.00	92.94	894.90	213.07	394.19	355.99	7.2	-0.98	0.093
65.75	-28.41	-3.71	0.00	-90.1	0.00	90.12	664.38	162.37	305.14	269.42	7.35	-0.98	0.101
70.00	-27.30	-3.58	0.00	-74.4	0.00	74.37	648.81	156.70	284.20	253.83	8.25	-1.02	0.087
73.00	-20.52	-2.64	0.00	-63.6	0.00	63.63	637.49	152.69	269.87	242.97	8.9	-1.05	0.074
75.00	-20.08	-2.59	0.00	-58.3	0.00	58.34	629.79	150.02	260.52	235.80	9.34	-1.07	0.069
77.60	-19.15	-2.51	0.00	-51.6	0.00	51.60	615.52	146.55	248.61	225.07	9.93	-1.08	0.063
79.94	-18.64	-2.46	0.00	-45.7	0.00	45.73	602.40	143.43	238.13	215.53	10.46	-1.1	0.058
79.94	-18.64	-2.46	0.00	-45.7	0.00	45.73	602.40	143.43	238.13	215.53	10.46	-1.1	0.243
80.00	-18.63	-2.45	0.00	-45.6	0.00	45.58	602.07	143.35	237.86	215.29	10.48	-1.1	0.243
85.00	-17.95	-2.36	0.00	-33.3	0.00	33.33	574.04	136.68	216.24	195.61	11.71	-1.24	0.202
90.00	-17.46	-2.32	0.00	-21.5	0.00	21.53	546.01	130.00	195.65	176.87	13.06	-1.34	0.154
93.00	-11.96	-1.62	0.00	-14.6	0.00	14.57	529.19	126.00	183.79	166.09	13.92	-1.39	0.110
95.00	-11.78	-1.59	0.00	-11.3	0.00	11.32	517.98	123.33	176.08	159.08	14.51	-1.42	0.094
99.00	-11.10	-1.47	0.00	-5.0	0.00	4.96	495.56	117.99	161.18	145.53	15.71	-1.45	0.057
100.00	0.00	-1.18	0.00	-3.5	0.00	3.49	489.95	116.66	157.55	142.23	16.02	-1.46	0.025

CALCULATED FORCES

Load Case: 1.0D + 1.0W

60 mph Wind with No Ice

22 Iterations

Gust Response Factor: 1.10  
 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	-29.53	-4.48	0.00	-345.5	0.00	345.54	1,564.13	420.30	1,179.53	948.21	0	0	0.173
5.00	-28.53	-4.41	0.00	-323.1	0.00	323.12	1,541.15	408.73	1,115.51	908.35	0.04	-0.08	0.166
10.00	-27.54	-4.35	0.00	-301.1	0.00	301.07	1,517.03	397.17	1,053.29	868.61	0.17	-0.16	0.158
11.25	-27.29	-4.32	0.00	-295.6	0.00	295.63	1,510.82	394.27	1,038.01	858.70	0.21	-0.18	0.156
15.00	-26.56	-4.26	0.00	-279.4	0.00	279.42	1,491.77	385.60	992.85	829.06	0.37	-0.23	0.150
20.00	-25.59	-4.18	0.00	-258.1	0.00	258.13	1,465.38	374.03	934.19	789.74	0.66	-0.31	0.142
25.00	-24.63	-4.11	0.00	-237.2	0.00	237.21	1,437.85	362.47	877.32	750.71	1.03	-0.39	0.134
29.33	-23.81	-4.06	0.00	-219.4	0.00	219.41	1,413.08	352.44	829.48	717.18	1.41	-0.45	0.127
30.00	-23.64	-4.04	0.00	-216.7	0.00	216.71	1,409.19	350.90	822.24	712.04	1.47	-0.46	0.124
32.83	-22.92	-3.99	0.00	-205.3	0.00	205.28	1,130.05	270.31	634.33	571.84	1.76	-0.5	0.149
35.00	-22.51	-3.94	0.00	-196.6	0.00	196.63	1,119.12	266.46	616.37	558.15	1.99	-0.53	0.144
40.00	-21.58	-3.85	0.00	-176.9	0.00	176.92	1,081.75	257.56	575.90	521.31	2.59	-0.6	0.135
45.00	-20.66	-3.76	0.00	-157.6	0.00	157.65	1,044.38	248.66	536.82	485.73	3.25	-0.66	0.126
50.00	-19.76	-3.67	0.00	-138.8	0.00	138.84	1,007.01	239.76	499.10	451.41	3.98	-0.72	0.115
55.00	-18.86	-3.57	0.00	-120.5	0.00	120.49	969.64	230.87	462.76	418.35	4.77	-0.78	0.105
60.00	-17.98	-3.49	0.00	-102.6	0.00	102.63	932.27	221.97	427.79	386.54	5.62	-0.84	0.094
62.92	-17.47	-3.43	0.00	-92.5	0.00	92.47	910.47	216.78	408.02	368.57	6.14	-0.86	0.087
65.00	-17.02	-3.39	0.00	-85.3	0.00	85.32	894.90	213.07	394.19	355.99	6.52	-0.88	0.080
65.75	-16.86	-3.36	0.00	-82.8	0.00	82.77	664.38	162.37	305.14	269.42	6.66	-0.89	0.088
70.00	-16.18	-3.27	0.00	-68.5	0.00	68.51	648.81	156.70	284.20	253.83	7.47	-0.93	0.075
73.00	-12.31	-2.42	0.00	-58.7	0.00	58.69	637.49	152.69	269.87	242.97	8.06	-0.95	0.064
75.00	-12.01	-2.37	0.00	-53.9	0.00	53.86	629.79	150.02	260.52	235.80	8.46	-0.97	0.060
77.60	-11.40	-2.30	0.00	-47.7	0.00	47.70	615.52	146.55	248.61	225.07	8.99	-0.98	0.054
79.94	-11.05	-2.27	0.00	-42.3	0.00	42.32	602.40	143.43	238.13	215.53	9.48	-1	0.050
79.94	-11.05	-2.27	0.00	-42.3	0.00	42.32	602.40	143.43	238.13	215.53	9.48	-1	0.215
80.00	-11.04	-2.24	0.00	-42.2	0.00	42.18	602.07	143.35	237.86	215.29	9.49	-1	0.215
85.00	-10.64	-2.17	0.00	-31.0	0.00	30.97	574.04	136.68	216.24	195.61	10.61	-1.12	0.177
90.00	-10.34	-2.13	0.00	-20.1	0.00	20.13	546.01	130.00	195.65	176.87	11.84	-1.22	0.133
93.00	-7.04	-1.49	0.00	-13.7	0.00	13.74	529.19	126.00	183.79	166.09	12.63	-1.27	0.096
95.00	-6.93	-1.46	0.00	-10.8	0.00	10.77	517.98	123.33	176.08	159.08	13.17	-1.3	0.081
99.00	-6.51	-1.36	0.00	-5.0	0.00	4.95	495.56	117.99	161.18	145.53	14.27	-1.33	0.047
100.00	0.00	-1.21	0.00	-3.6	0.00	3.60	489.95	116.66	157.55	142.23	14.55	-1.33	0.025

EQUIVALENT LATERAL FORCES METHOD ANALYSIS

(Based on ASCE7-16 Chapters 11, 12 and 15)

Spectral Response Acceleration for Short Period ( $S_S$ ):	0.203
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.053
Long-Period Transition Period ( $T_L$ – Seconds):	6
Importance Factor ( $I_e$ ):	1.000
Site Coefficient $F_a$ :	1.600
Site Coefficient $F_v$ :	2.400
Response Modification Coefficient (R):	1.500
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.217
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.085
Seismic Response Coefficient ( $C_s$ ):	0.030
Upper Limit $C_s$ :	0.030
Lower Limit $C_s$ :	0.030
Period based on Rayleigh Method (sec):	2.450
Redundancy Factor ( $p$ ):	1.000
Seismic Force Distribution Exponent ( $k$ ):	1.980
Total Unfactored Dead Load:	29.540 k
Seismic Base Shear (E):	0.890 k

SEISMIC FORCES

1.2D + 1.0Ev + 1.0Eh	Seismic	Height Above Base (ft)	Weight (lb)	$W_z$ (lb-ft)	$C_{vx}$	Horizontal Force (lb)	Vertical Force (lb)
Segment							
30		99.5	54	476	0.004	3	67
29		97	218	1,840	0.013	12	271
28		94	111	881	0.006	6	138
27		91.5	176	1,324	0.010	9	219
26		87.5	301	2,066	0.015	13	374
25		82.5	403	2,464	0.018	16	501
24		79.97	5	28	0.000	0	6
23		78.77	348	1,942	0.014	13	432
22		76.3	388	2,037	0.015	13	483
21		74	300	1,483	0.011	10	373
20		71.5	474	2,188	0.016	14	590
19		67.875	677	2,819	0.020	18	842
18		65.375	160	619	0.004	4	199
17		63.9583	448	1,656	0.012	11	556
16		61.4583	509	1,740	0.013	11	633
15		57.5	881	2,642	0.019	17	1,095
14		52.5	892	2,236	0.016	14	1,109
13		47.5	903	1,857	0.014	12	1,123
12		42.5	915	1,510	0.011	10	1,137
11		37.5	926	1,193	0.009	8	1,151
10		33.9167	405	428	0.003	3	503
9		31.4167	723	657	0.005	4	899
8		29.6667	171	139	0.001	1	213
7		27.1667	817	557	0.004	4	1,015
6		22.5	953	447	0.003	3	1,184
5		17.5	964	276	0.002	2	1,198
4		13.125	730	118	0.001	1	908
3		10.625	245	26	0.000	0	304
2		7.5	986	53	0.000	0	1,226
1		2.5	998	6	0.000	0	1,240
Generic 10' Omni		100	25	224	0.002	1	31
Ericsson Air 6449 B77D		100	245	2,191	0.016	14	304
Commscope WCS-IMFQ-AMT		100	59	528	0.004	3	73
Raycap DC6-48-60-18-8F		100	40	358	0.003	2	50
Ericsson RRUS 4449 B5, B12		100	213	1,906	0.014	12	265
Ericsson RRUS 4478 B14		100	178	1,595	0.012	10	222
Ericsson RRUS 32 B66A		100	152	1,361	0.010	9	189
Ericsson RRUS 32 B2		100	159	1,423	0.010	9	198

SEISMIC FORCES

1.2D + 1.0Ev + 1.0Eh

Seismic

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
Ericsson RRUS 32 B30	100	180	1,611	0.012	10	224
Ericsson RRUS E2 B29	100	180	1,611	0.012	10	224
Raycap DC9-48-60-24-8C-EV	100	16	143	0.001	1	20
CCI DMP65R-BU4D	100	204	1,823	0.013	12	253
Quintel QD4616-7	100	327	2,927	0.021	19	407
Ericsson AIR 6419 B77G	100	198	1,775	0.013	11	247
Generic Flat Side Arm	100	562	5,034	0.037	32	699
Generic Heavy Platform with Handrails	100	3,750	33,563	0.244	216	4,662
Generic Mount Reinforcement	99	200	1,755	0.013	11	249
Raycap RDIDC-9181-PF-48	93	22	170	0.001	1	27
Fujitsu TA08025-B604	93	192	1,487	0.011	10	238
Fujitsu TA08025-B605	93	225	1,745	0.013	11	280
JMA Wireless MX08FRO665-21	93	194	1,501	0.011	10	241
Generic Flat Platform with Handrails	93	2,500	19,386	0.141	125	3,108
Ericsson Radio 4449 B71 B85A	77.6	225	1,220	0.009	8	280
Ericsson KRY 112 144/2	73	58	280	0.002	2	72
Ericsson RRUS 4415 B25	73	138	663	0.005	4	172
Ericsson Air6449 B41	73	312	1,499	0.011	10	388
Ericsson AIR32 B66Aa/B2a	73	397	1,906	0.014	12	493
RFS APX16DWV-16DWVS-E-A20	73	122	587	0.004	4	152
RFS APXVAARR24_43-U-NA20	73	384	1,844	0.013	12	477
Perfect Vison PV-LLP12M-HR-12-96 Platform w/ PV-PK BK-M Kicker Kit	73	2,000	9,612	0.070	62	2,487
<b>Totals:</b>		<b>29,538</b>	<b>137,437</b>	<b>1.000</b>	<b>886</b>	<b>36,724</b>

SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh

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)
30	99.5	54	476	0.004	3	46
29	97	218	1,840	0.013	12	187
28	94	111	881	0.006	6	95
27	91.5	176	1,324	0.010	9	151
26	87.5	301	2,066	0.015	13	258
25	82.5	403	2,464	0.018	16	345
24	79.97	5	28	0.000	0	4
23	78.77	348	1,942	0.014	13	298
22	76.3	388	2,037	0.015	13	333
21	74	300	1,483	0.011	10	257
20	71.5	474	2,188	0.016	14	406
19	67.875	677	2,819	0.020	18	580
18	65.375	160	619	0.004	4	137
17	63.9583	448	1,656	0.012	11	383
16	61.4583	509	1,740	0.013	11	436
15	57.5	881	2,642	0.019	17	755
14	52.5	892	2,236	0.016	14	764
13	47.5	903	1,857	0.014	12	774
12	42.5	915	1,510	0.011	10	784
11	37.5	926	1,193	0.009	8	793
10	33.9167	405	428	0.003	3	347
9	31.4167	723	657	0.005	4	620
8	29.6667	171	139	0.001	1	147
7	27.1667	817	557	0.004	4	700
6	22.5	953	447	0.003	3	816
5	17.5	964	276	0.002	2	826
4	13.125	730	118	0.001	1	626
3	10.625	245	26	0.000	0	210
2	7.5	986	53	0.000	0	845
1	2.5	998	6	0.000	0	855
Generic 10' Omni	100	25	224	0.002	1	21
Ericsson Air 6449 B77D	100	245	2,191	0.016	14	210

SEISMIC FORCES

0.9D - 1.0Ev + 1.0Eh

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)
Commscope WCS-IMFQ-AMT	100	59	528	0.004	3	51
Raycap DC6-48-60-18-8F	100	40	358	0.003	2	34
Ericsson RRUS 4449 B5, B12	100	213	1,906	0.014	12	182
Ericsson RRUS 4478 B14	100	178	1,595	0.012	10	153
Ericsson RRUS 32 B66A	100	152	1,361	0.010	9	130
Ericsson RRUS 32 B2	100	159	1,423	0.010	9	136
Ericsson RRUS 32 B30	100	180	1,611	0.012	10	154
Ericsson RRUS E2 B29	100	180	1,611	0.012	10	154
Raycap DC9-48-60-24-8C-EV	100	16	143	0.001	1	14
CCI DMP65R-BU4D	100	204	1,823	0.013	12	175
Quintel QD4616-7	100	327	2,927	0.021	19	280
Ericsson AIR 6419 B77G	100	198	1,775	0.013	11	170
Generic Flat Side Arm	100	562	5,034	0.037	32	482
Generic Heavy Platform with Handrails	100	3,750	33,563	0.244	216	3,213
Generic Mount Reinforcement	99	200	1,755	0.013	11	171
Raycap RDIDC-9181-PF-48	93	22	170	0.001	1	19
Fujitsu TA08025-B604	93	192	1,487	0.011	10	164
Fujitsu TA08025-B605	93	225	1,745	0.013	11	193
JMA Wireless MX08FRO665-21	93	194	1,501	0.011	10	166
Generic Flat Platform with Handrails	93	2,500	19,386	0.141	125	2,142
Ericsson Radio 4449 B71 B85A	77.6	225	1,220	0.009	8	193
Ericsson KRY 112 144/2	73	58	280	0.002	2	50
Ericsson RRUS 4415 B25	73	138	663	0.005	4	118
Ericsson Air6449 B41	73	312	1,499	0.011	10	267
Ericsson AIR32 B66Aa/B2a	73	397	1,906	0.014	12	340
RFS APX16DWV-16DWVS-E-A20	73	122	587	0.004	4	105
RFS APXVAARR24_43-U-NA20	73	384	1,844	0.013	12	329
Perfect Vison PV-LLP12M-HR-12-96 Platform w/ PV-PKBK-M Kicker Kit	73	2,000	9,612	0.070	62	1,713
<b>Totals:</b>		<b>29,538</b>	<b>137,437</b>	<b>1.000</b>	<b>886</b>	<b>25,305</b>

1.2D + 1.0Ev + 1.0Eh

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	-35.48	-0.89	0.00	-82.07	0.00	82.07	1,564.13	420.30	1,180	948.21	0.00	0.00	0.05
5.00	-34.26	-0.90	0.00	-77.61	0.00	77.61	1,541.15	408.73	1,116	908.35	0.01	-0.02	0.05
10.00	-33.95	-0.91	0.00	-73.10	0.00	73.10	1,517.03	397.17	1,053	868.61	0.04	-0.04	0.05
11.25	-33.04	-0.91	0.00	-71.96	0.00	71.96	1,510.82	394.27	1,038	858.70	0.05	-0.04	0.05
11.25	-33.04	-0.91	0.00	-71.96	0.00	71.96	1,510.82	394.27	1,038	858.70	0.05	-0.04	0.05
15.00	-31.85	-0.92	0.00	-68.54	0.00	68.54	1,491.77	385.60	993	829.06	0.09	-0.06	0.05
20.00	-30.66	-0.93	0.00	-63.94	0.00	63.94	1,465.38	374.03	934	789.74	0.16	-0.08	0.04
25.00	-29.65	-0.93	0.00	-59.31	0.00	59.31	1,437.85	362.47	877	750.71	0.25	-0.09	0.04
29.33	-29.43	-0.93	0.00	-55.29	0.00	55.29	1,413.08	352.44	829	717.18	0.34	-0.11	0.04
30.00	-28.53	-0.93	0.00	-54.66	0.00	54.66	1,409.19	350.90	822	712.04	0.36	-0.11	0.04
32.83	-28.03	-0.93	0.00	-52.03	0.00	52.03	1,130.05	270.31	634	571.84	0.43	-0.12	0.05
35.00	-26.88	-0.93	0.00	-50.01	0.00	50.01	1,119.12	266.46	616	558.15	0.48	-0.13	0.05
40.00	-25.74	-0.92	0.00	-45.38	0.00	45.38	1,081.75	257.56	576	521.31	0.63	-0.15	0.04
45.00	-24.62	-0.91	0.00	-40.78	0.00	40.78	1,044.38	248.66	537	485.73	0.80	-0.16	0.04
50.00	-23.51	-0.90	0.00	-36.21	0.00	36.21	1,007.01	239.76	499	451.41	0.98	-0.18	0.04
55.00	-22.41	-0.89	0.00	-31.70	0.00	31.70	969.64	230.87	463	418.35	1.17	-0.20	0.04
60.00	-21.78	-0.88	0.00	-27.26	0.00	27.26	932.27	221.97	428	386.54	1.39	-0.21	0.03
62.92	-21.22	-0.87	0.00	-24.71	0.00	24.71	910.47	216.78	408	368.57	1.52	-0.22	0.03
65.00	-21.02	-0.86	0.00	-22.90	0.00	22.90	894.90	213.07	394	355.99	1.61	-0.22	0.03
65.75	-20.18	-0.84	0.00	-22.25	0.00	22.25	664.38	162.37	305	269.42	1.65	-0.22	0.03
70.00	-19.59	-0.83	0.00	-18.66	0.00	18.66	648.81	156.70	284	253.83	1.85	-0.23	0.03
73.00	-14.98	-0.70	0.00	-16.17	0.00	16.17	637.49	152.69	270	242.97	2.00	-0.24	0.02
75.00	-14.50	-0.68	0.00	-14.77	0.00	14.77	629.79	150.02	261	235.80	2.10	-0.25	0.02
77.60	-13.78	-0.66	0.00	-12.99	0.00	12.99	615.52	146.55	249	225.07	2.24	-0.25	0.02
79.94	-13.78	-0.66	0.00	-11.45	0.00	11.45	602.40	143.43	238	215.53	2.36	-0.25	0.02

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
79.94	-13.78	-0.66	0.00	-11.45	0.00	11.45	602.40	143.43	238	215.53	2.36	-0.25	0.08
80.00	-13.28	-0.65	0.00	-11.41	0.00	11.41	602.07	143.35	238	215.29	2.37	-0.25	0.08
85.00	-12.90	-0.64	0.00	-8.17	0.00	8.17	574.04	136.68	216	195.61	2.65	-0.29	0.06
90.00	-12.68	-0.63	0.00	-4.97	0.00	4.97	546.01	130.00	196	176.87	2.97	-0.31	0.05
93.00	-8.65	-0.45	0.00	-3.07	0.00	3.07	529.19	126.00	184	166.09	3.17	-0.32	0.04
95.00	-8.38	-0.44	0.00	-2.17	0.00	2.17	517.98	123.33	176	159.08	3.30	-0.33	0.03
99.00	-8.06	-0.42	0.00	-0.42	0.00	0.42	495.56	117.99	161	145.53	3.58	-0.33	0.02
100.00	0.00	-0.37	0.00	0.00	0.00	0.00	489.95	116.66	158	142.23	3.65	-0.34	0.00

0.9D - 1.0Ev + 1.0Eh Seismic (Reduced DL)

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	-24.45	-0.89	0.00	-80.12	0.00	80.12	1,564.13	420.30	1,180	948.21	0.00	0.00	0.05
5.00	-23.60	-0.90	0.00	-75.67	0.00	75.67	1,541.15	408.73	1,116	908.35	0.01	-0.02	0.05
10.00	-23.39	-0.90	0.00	-71.19	0.00	71.19	1,517.03	397.17	1,053	868.61	0.04	-0.04	0.04
11.25	-22.77	-0.90	0.00	-70.06	0.00	70.06	1,510.82	394.27	1,038	858.70	0.05	-0.04	0.04
11.25	-22.77	-0.90	0.00	-70.06	0.00	70.06	1,510.82	394.27	1,038	858.70	0.05	-0.04	0.04
15.00	-21.94	-0.91	0.00	-66.68	0.00	66.68	1,491.77	385.60	993	829.06	0.09	-0.06	0.04
20.00	-21.13	-0.91	0.00	-62.14	0.00	62.14	1,465.38	374.03	934	789.74	0.15	-0.07	0.04
25.00	-20.43	-0.91	0.00	-57.59	0.00	57.59	1,437.85	362.47	877	750.71	0.24	-0.09	0.04
29.33	-20.28	-0.91	0.00	-53.64	0.00	53.64	1,413.08	352.44	829	717.18	0.33	-0.11	0.04
30.00	-19.66	-0.91	0.00	-53.04	0.00	53.04	1,409.19	350.90	822	712.04	0.35	-0.11	0.04
32.83	-19.31	-0.91	0.00	-50.46	0.00	50.46	1,130.05	270.31	634	571.84	0.42	-0.12	0.04
35.00	-18.52	-0.90	0.00	-48.49	0.00	48.49	1,119.12	266.46	616	558.15	0.47	-0.13	0.04
40.00	-17.74	-0.90	0.00	-43.97	0.00	43.97	1,081.75	257.56	576	521.31	0.61	-0.14	0.04
45.00	-16.96	-0.89	0.00	-39.48	0.00	39.48	1,044.38	248.66	537	485.73	0.77	-0.16	0.04
50.00	-16.20	-0.88	0.00	-35.04	0.00	35.04	1,007.01	239.76	499	451.41	0.95	-0.18	0.03
55.00	-15.44	-0.86	0.00	-30.66	0.00	30.66	969.64	230.87	463	418.35	1.14	-0.19	0.03
60.00	-15.01	-0.85	0.00	-26.36	0.00	26.36	932.27	221.97	428	386.54	1.35	-0.20	0.03
62.92	-14.62	-0.84	0.00	-23.88	0.00	23.88	910.47	216.78	408	368.57	1.47	-0.21	0.03
65.00	-14.49	-0.84	0.00	-22.13	0.00	22.13	894.90	213.07	394	355.99	1.57	-0.22	0.03
65.75	-13.91	-0.82	0.00	-21.50	0.00	21.50	664.38	162.37	305	269.42	1.60	-0.22	0.03
70.00	-13.50	-0.80	0.00	-18.03	0.00	18.03	648.81	156.70	284	253.83	1.80	-0.23	0.03
73.00	-10.32	-0.68	0.00	-15.62	0.00	15.62	637.49	152.69	270	242.97	1.95	-0.23	0.02
75.00	-9.99	-0.66	0.00	-14.26	0.00	14.26	629.79	150.02	261	235.80	2.04	-0.24	0.02
77.60	-9.50	-0.64	0.00	-12.54	0.00	12.54	615.52	146.55	249	225.07	2.18	-0.24	0.02
79.94	-9.49	-0.64	0.00	-11.04	0.00	11.04	602.40	143.43	238	215.53	2.30	-0.25	0.02
79.94	-9.49	-0.64	0.00	-11.04	0.00	11.04	602.40	143.43	238	215.53	2.30	-0.25	0.07
80.00	-9.15	-0.63	0.00	-11.00	0.00	11.00	602.07	143.35	238	215.29	2.30	-0.25	0.07
85.00	-8.89	-0.62	0.00	-7.87	0.00	7.87	574.04	136.68	216	195.61	2.58	-0.28	0.06
90.00	-8.74	-0.61	0.00	-4.79	0.00	4.79	546.01	130.00	196	176.87	2.88	-0.30	0.04
93.00	-5.96	-0.43	0.00	-2.96	0.00	2.96	529.19	126.00	184	166.09	3.08	-0.31	0.03
95.00	-5.77	-0.42	0.00	-2.09	0.00	2.09	517.98	123.33	176	159.08	3.21	-0.32	0.02
99.00	-5.56	-0.41	0.00	-0.41	0.00	0.41	495.56	117.99	161	145.53	3.48	-0.32	0.01
100.00	0.00	-0.37	0.00	0.00	0.00	0.00	489.95	116.66	158	142.23	3.55	-0.32	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 + 1.0W	20.07	0.00	35.38	0.00	0.00	1561.18	79.94	0.92
0.9D + 1.0W	20.04	0.00	26.52	0.00	0.00	1533.40	79.94	0.89
1.2D + 1.0Di + 1.0Wi	4.72	0.00	48.18	0.00	0.00	379.14	79.94	0.24
1.2D + 1.0Ev + 1.0Eh	0.93	0.00	35.48	0.00	0.00	82.07	79.94	0.08
0.9D - 1.0Ev + 1.0Eh	0.91	0.00	24.45	0.00	0.00	80.12	79.94	0.07
1.0D + 1.0W	4.48	0.00	29.53	0.00	0.00	345.54	79.94	0.21

ADDITIONAL STEEL SUMMARY

Elev From (ft)	Elev To (ft)	Member	Intermediate Connectors				Max Member		
			VQ/l (k/in)	Shear Applied (kips)	phiVn (kips)	Ratio	Pu (kip)	phiPn (kip)	Ratio
0.00	11.25	SOL #20 All Thread Bar	317.8	12.6	16.8	0.7467	284.2	314.5	0.9037
11.25	79.94	SOL #20 All Thread Bar	425.8	12.8	16.8	0.7599	266.5	330.5	0.8065

Elev From (ft)	Elev To (ft)	Member	Upper Termination Connectors				Lower Termination Connectors					
			MQ/l (kips)	phiVn (kips)	Number Required	Number Actual	Ratio	MQ/l (kips)	phiVn (kip)	Number Required	Number Actual	Ratio
0.00	11.25	SOL #20 All Thread Bar	0	12	0	0	0.0000	0	12	0	0	0.0000
11.25	79.94	SOL #20 All Thread Bar	72.7282	12	7	12	0.5051	0	12	0	0	0.0000



ASSET: 302516, Mlfd - Milford  
 CUSTOMER: DISH WIRELESS L.L.C.

CODE: ANSI/TIA-222-H  
 PROJECT: 13702496

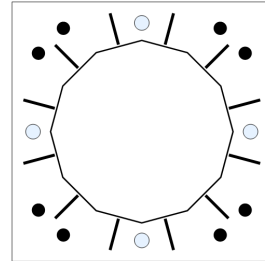
**BASE PLATE ANALYSIS @ 0 FT**

**APPLIED REACTIONS**

Moment (k-ft)	Axial (k)	Shear (k)
1561.18	35.38	20.07

**PLATE PARAMETERS (ID# 15737)**

Width: 44 in  
 Shape: Square  
 Thickness: 2 in  
 Grade: A572-60  
 Yield Strength: 60 ksi  
 Tensile Strength: 75 ksi  
 Clip Length: in  
 Rod Detail Type: c  
 Clear Distance: - in  
 Base Weld Size: 0.125 in  
 Orientation Offset: - °  
 Analysis Type: Elastic  
 Neutral Axis: 317 °



**ANCHOR ROD PARAMETERS**

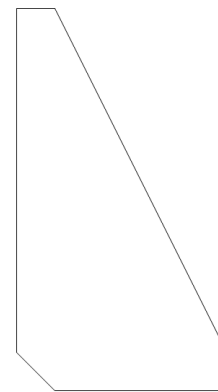
Class	Arrangement	Quantity	Diameter (in)	Circle (in)	Grade	F <sub>y</sub> (ksi)	F <sub>u</sub> (ksi)	Spacing (in)	Offset (°)
Original [ID#16109]	Cluster	8	2.25	44	A615-75	75	100	6	-

**DYWIDAG BAR PARAMETERS**

Quantity	Bar Size	Bar Diameter (in)	F <sub>y</sub> (ksi)	F <sub>u</sub> (ksi)	Bracket Type	Bracket Offset (in)	Circle (in)	Offset (°)
4 [ID# 968]	#20	2.5	80	100	Angle	2.19	36.88	-

**STIFFENER PARAMETERS**

Arrangement: Radial  
 Quantity: 12  
 Height: 10 in  
 Width: 5.5 in  
 Thickness: 0.5 in  
 Notch: 1 in  
 Grade: A36  
 Yield Strength: 36 ksi  
 Tensile Strength: 58 ksi  
 Horizontal Weld Type: Fillet  
 Horizontal Weld Fillet Size: 0.375 in  
 Vertical Weld Fillet Size: 0.375 in  
 Weld Strength: 70 ksi  
 Orientation Offset: - °



ASSET: 302516, Mlfd - Milford  
 CUSTOMER: DISH WIRELESS L.L.C.

CODE: ANSI/TIA-222-H  
 PROJECT: 13702496

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	30"Ø x 0.25" (12 Sides)	23.0996	-	-	2556.06	-
Bolt Group	Original (8) 2.25"Ø	3.9761	3.2477	0.8393	5566.40	4.5
Dywidag Group	(4) #20	4.9087	4.9087	1.9175	3345.94	-
Stiffeners	(12) 10"H x 5.5"W x 0.5"T	2.2500	2.0250	27.7292	3869.95	-

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	30"Ø x 0.25" (12 Sides)	676.1	35.38	20.07	0.433
Bolt Group	Original (8) 2.25"Ø	676.1	-	20.07	0.433
Dywidag Group	(4) #20	885.1	-	-	0.567
Stiffeners	(12) 10"H x 5.5"W x 0.5"T	407.2	-	12.09	0.261

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

**POLE PROPERTIES**

Flat-to-Flat Diameter: 30.12 in  
 Point-to-Point Diameter: 31.19 in  
 Orientation Offset: - °

Flat Width: 8.072 in  
 Flat Radians: 0.524 rad

**PLATE PROPERTIES**

Neutral Axis: 317 °

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	32.100	3.50	35.597	1072.0	1922.3	55.8%
Corners	31.038	2.69	33.727	966.9	1821.3	53.1%

**ELASTIC ANCHOR ROD ANALYSIS**

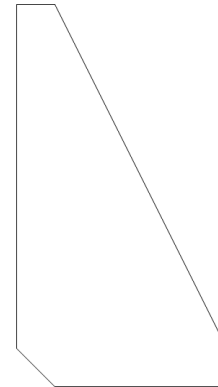
Class	Group Quantity	Rod Diameter (in)	Applied Axial Load P <sub>u</sub> (k)	Applied Shear Load V <sub>u</sub> (k)	Compressive Capacity ΦP <sub>n</sub> (k)	Compressive Result	Interaction Result
Original	8	2.25	99.3	0.5	243.6	0.408	16.6%

**DYWIDAG BAR ANALYSIS**

Group Quantity	Bar Size	Bar Circle (in)	Applied Axial Load P <sub>u</sub> (k)	Compressive Capacity ΦP <sub>n</sub> (k)	Compressive Result P <sub>u</sub> / ΦP <sub>n</sub>
4	#20	36.88	215.1	368.2	58.4%

### BASE PLATE STIFFENER ANALYSIS

Quantity:	12	
Height:	10	in
Width:	5.5	in
Effective Width:	5.500	in
Thickness:	0.5	in
Notch:	1	in
Grade:	A36	
Yield Strength:	36	ksi
Tensile Strength:	58	ksi
Horizontal Weld Type:	Fillet	
Horizontal Weld Fillet Size:	0.375	in
Horizontal Weld Bevel Size:		in
Vertical Weld Fillet Size:	0.375	in
Weld Strength:	70	ksi
Electrode Coefficient:	1.000	



#### PLATE COMPRESSION

Radius of Gyration:	0.144	in <sup>3</sup>
k/r:	41.57	
$4.71 \sqrt{(E/F_y)}$ :	133.68	
Buckling Stress, $F_e$ :	165.64	ksi
Crit. Buckling Stress, $F_{cr}$ :	145.26	ksi
Applied Compression, $P_u$ :	46.12	k
Compressive Capacity, $\Phi P_n$ :	294.16	k
Compressive Result, $P_u/\Phi P_n$ :	7.8%	✓

#### PLATE TENSION

Gross Cross Section:	2.2500	in <sup>2</sup>
Net Cross Section:	2.0250	in <sup>2</sup>
Applied Tension, $T_u$ :	44.59	k
Tensile Capacity, $\Phi T_n$ :	72.90	k
Tension Result, $T_u/\Phi T_n$ :	30.6%	✓

#### VERTICAL WELD TO POLE

Vertical Eccentricity Ratio, $a=e_x/l$ :	0.183	
Spacing Ratio, k:	0.050	
Weld Coefficient, C:	3.670	
Applied Compression, $P_u$ :	46.12	k
Compressive Capacity, $\Phi P_n$ :	165.15	k
Horizontal Eccentricity Ratio, $a=e_x/l$ :	0.333	
Weld Coefficient, C:	2.940	
Applied Shear, $V_u$ :	0.06	k
Shear Capacity, $\Phi V_n$ :	132.30	k
Weld Result, $P_u/\Phi P_n + V_u/\Phi V_n$ :	28.0%	✓

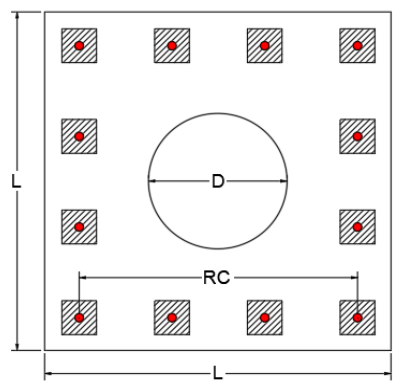
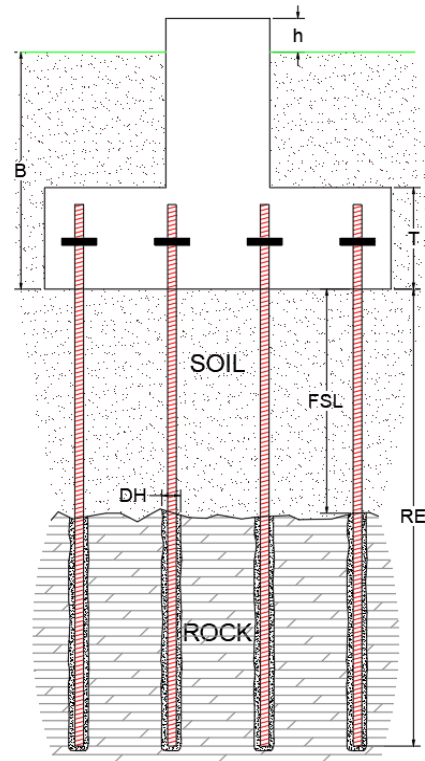
#### HORIZONTAL WELD TO PLATE

Horizontal Eccentricity Ratio, $a=e_x/l$ :	0.167	
Spacing Ratio, k:	0.091	
Weld Coefficient, C:	3.900	
Effective Fillet Size:	0.375	in
Applied Compression, $P_u$ :	46.12	k
Compressive Capacity, $\Phi P_n$ :	96.53	k
Vertical Eccentricity Ratio, $a=e_x/l$ :	0.303	
Weld Coefficient, C:	3.090	
Applied Shear, $V_u$ :	0.06	k
Shear Capacity, $\Phi V_n$ :	76.48	k
Weld Result, $P_u/\Phi P_n + V_u/\Phi V_n$ :	47.9%	✓

Site Name: MLFD - Milford, CT  
 Site Number: 302516  
 Tower Type: 0  
 Design Base Loads (Factored) - Analysis per Standards

## Rock Anchor Group Foundation Analysis

Foundation Parameters		
Include Rebar Analysis?	N	
Include Bearing Plate Analysis?	Y	
Moment (Overturning) ( $M_u$ ):	1561.2	k-ft
Shear/Leg ( $V_u$ ):	20.1	k
Compression/Leg ( $P_u$ ):	35.4	k
Uplift/Leg ( $T_u$ ):	0.0	k
Mat/Pier Height Above Ground [h]:	1.00	ft
Pier Diameter [D]:	8.0	ft
Length / Width of Mat [L]:	8.0	ft
Mat Thickness [T]:	6.50	ft
Base Depth of Mat [B]:	5.50	ft
Water Table Depth (BGL):	99.0	ft
Unit Weight of Concrete:	150	pcf
Unit Weight of Soil at Mat/Pier:	120	pcf
Unit Weight of Water:	62.4	pcf
Unit Weight of Soil Below Water Table:	57.6	pcf
Ultimate Compressive Bearing Pressure:	30,864	psf
Shear Friction Coefficient:	0.20	
Capacity Increase (Due to Transient Loads):	1.000	
Pullout Angle:	45	°
Rod Diameter:	1.00	in
Rod Ultimate Strength:	60	ksi
Rod Net Area:	0.79	in <sup>2</sup>
Number of Rods:	16	
Rod Arrangement:	Square	
If Square: If Square, Grid or Border?	Border	
Number of Rows:	5	
Number of Columns:	5	
Rod Group Width [RC]:	84.0	in
Diameter of Cored Hole [DH]:	3.000	in
Overall Rod Embedment Length [RE]:	78.0	in
Free Stress Length [FSL]:	0.0	in
Ultimate Rod-to-Grout Interface Bond Strength:	150	psi
Ultimate Grout-to-Rock Anchor Interface Bond Strength:	310	psi
Lock Off Load:	0	k
Rock Anchor Design Plastic or Elastic:	Plastic	
Ignore Pullout Weight Resistance (Y/N):	Y	



Capacities & Results		
Soil Strength Reduction Factor ( $\phi_s$ ):	0.75	
Bearing Strength Reduction Factor ( $\phi_b$ ):	0.75	
Factored Nominal Moment Capacity per Leg ( $\phi_s M_n$ ):	2301.3	k
Factored Nominal Uplift Capacity per Leg ( $\phi_s T_n$ ):	80.5	k
Applied Moment, $M_u$ :	1691.6	k-ft
Applied Uplift, $T_u$ :	0.0	k
$T_u/\phi_s T_n + M_u/\phi_s M_n$ :	74%	Pass
Applied Axial, $P_u$ :	59.6	k
Factored Nominal Compressive Capacity per Leg ( $\phi_b P_n$ ):	1163.5	k
$P_u/\phi_b P_n$ :	5%	Pass
Applied Shear, $V_u$ :	20.1	k
Factored Nominal Shear Capacity per Leg ( $\phi_s V_n$ ):	339.3	k
$V_u/\phi_s V_n$ :	6%	Pass

Governing Strengths		
Total Pullout Weight:	0.0	k
Total Grout-to-Rock Bond Strength:	1,764.3	k
Total Rod-to-Grout Bond Strength:	1,215.4	k
Total Rod Mechanical Strength:	754.0	k
Pullout Weight per Rod:	Ignored	k
Rock-to-Grout Bond Strength per Rod:	110.3	k
Rod-to-Grout Bond Strength per Rod:	76.0	k
Rod Mechanical Strength per Rod:	47.1	k



Rod Bearing Plate Design		
Concrete Compressive Strength ( $f'_c$ ):	4,000	psi
Bearing Plate Width:	8	in
Bearing Plate Thickness:	1	in
Bearing Plate Yield Strength:	36	ksi
Critical Length:	6.88	in
Plastic Section Modulus:	1.72	in <sup>3</sup>
Plate Design Moment ( $M_u$ ):	7.48	k-in
Factored Nominal Plate Flexural Resistance ( $\phi_B M_n$ ):	55.69	k-in
Flexure Result:	13%	Pass
Plate Shear Design Load ( $V_u$ ):	26.0	k
Anchor Rod Nut Diameter:	1.58	in
Bearing Plate Pressure:	0.54	ksi
Factored Nominal Plate Shear Resistance ( $\phi_V V_n$ ):	96.2	k
Shear Result:	27%	Pass
Plate Bearing Design Load ( $P_u$ ):	26.0	k
Factored Bearing Plate Capacity of a Single Anchor ( $\phi_B P_n$ ):	218.7	k
Factored Punch Shear Capacity Resisting Plate Load ( $\phi_P P_n$ ):	431.0	k
Bearing Result:	12%	Pass

Recommended Lock Off Load:	19.5	k
Recommended Test Load:	26.0	k
Maximum Allowable Test Load:	37.7	k