Phoenix Partnership

September 3, 2024

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

Re: Notice of Exempt Modification- Facility Modification
68 Groton Long Point Road Groton, CT

Dear Attorney Bachman:

Phoenix Partnership, LLC ("Phoenix") currently owns an existing wireless telecommunications facility at the above referenced address (the "Property"). The facility consists of a tower with Verizon, AT&T, the Town of Groton and Fishers Island Telephone Company (the "Facility"). The Facility was approved under Docket 175 on November 21, 1996.

The Facility is in need of structural upgrades to accommodate the Town's future equipment and future expansion of the Facility.

Please accept this letter as notification pursuant to R.C.S.A. 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A 16-50j-72(b)(2). In accordance with R.C.S.A. 16-50j-73, a copy of this letter is being sent to the John Burt the Town Manager of the Town of Groton also the owner of the Property, Verizon and AT&T.

The planned modifications to the Facility fall withing the parameters as provided for in R.C.S.A 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in height of the Facility.

2. The proposed modifications will not increase any change to the ground mounted equipment and therefore will not extend the site boundary.

3. The proposed modifications will not increase noise levels at the Facility by six decibels or more.

4. The proposed modifications will not change or alter the physical or environmental characteristics of the Facility.

A copy of the structural analysis and structural modification design are attached hereto as Exhibit 1.

A certification of mailing has been sent to the Town of Groton Town Manager, Verizon and AT&T and is attached as Exhibit 2.

Respectfully Submitted,

Keith Coppins

EXHIBIT 1
STRUCTURAL ANALYSIS AND MODIFICATION PLAN

PAUL J. FORD & COMPANY

Report Date: August 6, 2024

Client: Douglas J. Roberts - Architect
ATTN: Douglas Roberts
110 Washington Avenue Fourth Floor
North Haven, CT, 06473
Phone: (203) 234-6368
Email: droberts-architect@outlook.com

Structure: 140 ft Self Support Tower w/ Proposed 10 ft Extension
Site Name: Groton CT
Site Reference #: BOBOS00010A
Site Address: 68 Groton Long Point Rd
City, County, State: Groton, New London, CT
Latitude, Longitude: 41.343546, -72.009661

PJF Project Number: 00024-0082.002.8800

Paul J. Ford and Company is pleased to submit this **Structural Modification Report** to determine the tower stress level.

Analysis Criteria:
This analysis has been performed in accordance with the 2022 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 140 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Proposed Appurtenance Loads:
The structure was analyzed with the proposed loading configuration shown in Table 1 combined with the other considered equipment shown in Table 2 of this report.

Summary of Analysis Results:

Modified Structure:	Pass	99.9%*
Existing Foundation:	Pass	92.5%

*A proposed 10-ft tower extension has been considered in this analysis, bringing the total tower height to 150-ft.

We at Paul J. Ford and Company appreciate the opportunity of providing our continuing professional services to you and Douglas J. Roberts - Architect. If you have any questions or need further assistance on this or any other projects, please give us a call.

Respectfully Submitted By:
Paul J. Ford and Company

Michael Bange, PE
Project Engineer
mbange@pauljford.com

STATE OF CONNECTICUT
THOMAS J. DEHNKE
36041
LICENSED PROFESSIONAL ENGINEER
08/07/2024

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Self Support tower designed by Rohn.

A proposed 10-ft tower extension has been considered in this analysis, bringing the total tower height to 150-ft.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	III
Wind Speed:	140 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
153.0	153.0	1	commscope	VHLP2-18-2WH/D	1	1.60" hybrid
		1	ceragon	IP-50C		
		3	commscope	FFVV-65B-R2_TIA w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		3	samsung telecommunications	RF4450t-71A		
		3	samsung telecommunications	RF4451d-70A		
		1	tower mounts	Rohn 12' Low Profile Platform		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
143.0	143.0	1	raycap	RRFDC-3315-PF-48	2	6x12 hybrid
		1	mounts	Sector Frames (3)		
		6	jma wireless	MX06FRO660-03		
		1	raycap	RVZDC-6627-PF-48		
		3	samsung telecommunications	MT6407-77A		
		3	samsung telecommunications	RF4439D-25A		
		3	samsung telecommunications	RF4440D-13A		
		1	commscope	VHLPX6-11W/A		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
131.0	132.0	6	cci antennas	TPX-070821	12 2 2 1	1 1/4 3/4 2 3/8
	131.0	1	tower mounts	(3) Rohn 12' Sector Mount		
		3	cci antennas	DMP65R-BU4D_TIA w/ Mount Pipe		
		3	ericsson	RADIO 4415		
		3	ericsson	RADIO 4449		
		3	ericsson	RADIO 8843		
		3	powerwave technologies	7770_TIA		
		3	quintel technology	QS66512-2_TIA		
		3	raycap	DC6-48-60-18-8F		
	130.0	3	powerwave technologies	TT19-08BP111-001		
121.0	121.0	1	decibel	DB212-2-C	1	7/8
119.0	119.0	1	decibel	DB212-2-C		
110.0	110.0	1	decibel	DB212-2-C	1	7/8
103.0	103.0	1	decibel	DB212-2-C	1	7/8
101.0	112.3	1	celwave	PD1121	4 2	1 1/4 1 5/8
	111.0	1	celwave	PD340-140		
	107.0	1	decibel	DB810T3-XC		
	101.0	3	tower mounts	Generic 3.5' x 6' sidearm		
	95.0	1	decibel	DB810T3-XC		
	91.0	1	celwave	PD340-140		
	89.8	1	celwave	PD1121		
97.0	97.0	1	decibel	DB225-2-A	1	7/8 (from 104')
96.0	96.0	1	decibel	DB212-1	1	1 1/4
90.0	90.0	1	decibel	DB212-1	1	7/8
83.0	88.5	1	antennae	3" x 10' Omni Whip	2 1	1 5/8 1/2
	83.0	1	miscl	10" x 10" x 6" Junction Box		
		2	tower mounts	Generic 3' x 4' sidearm		
	77.5	2	antennae	3" x 10' Omni Whip		
81.0	81.0	1	dragonwave	Horizon Compact	3	3/8
		1	microwave dishes	3' std w/ HP		
		1	tower mounts	4' x 4.5" Pipe Mount		
78.0	78.0	1	microwave dishes	2 ft w/ HP	1	1/2
		1	tower mounts	4' x 3.5" Std. Pipe Mount		
77.0	77.0	1	miscl	30" x 12" x 6" Panel	2	3/8
		1	tower mounts	Generic 1' x 2' sidearm		
68.0	68.0	1	decibel	DB212-1	1	3/8
67.0	67.0	2	miscl	Obstruction light	1	1/2
66.0	66.0	1	miscl	Camera (30" x 8" x 8")	2 1	3/4 3/8
64.0	64.0	1	miscl	12" x 12" x 6" Junction Box	2	3/4

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
54.0	64.0	2	celwave	PD220	2	7/8
		1	celwave	PD340-140		
	54.0	3	tower mounts	Generic 3.5' x 6' sidearm		
33.0	35.2	1	celwave	BA1012	1	7/8
	33.0	1	tower mounts	Generic 3.5' x 6' sidearm		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
Geotechnical Report	Welti Geotechnical, P.C., 3/28/2024	Groton Police Stat.	Douglas J. Roberts - Architect
Foundation Drawings	PJF, 6/2/1998	35131AE	PJF
Structural Analysis (Structure)	URS, 12/6/2012	36917393	-
Structural Analysis (Loading)	APT, 3/8/2024	CT141_14520	Douglas J. Roberts - Architect
Proposed Modification Drawings	PJF, 8/6/2024	00024-0082.002.8800	-

3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were maintained in accordance with the TIA-222 Standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
3) The antenna feedlines are assumed to be placed as indicated in Appendix B.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J. Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	150 - 140	Leg	Pipe 2.375" x 0.154" (2 STD)	3	-20.92	40.41	51.8	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.276" (2.5 EH)	27	-79.65	83.20	95.7	Pass
T3	120 - 116	Leg	Pipe 3.5" x 0.300" (3 EH)	63	-91.08	119.06	76.5	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T4	116 - 112	Leg	Pipe 3.5" x 0.300" (3 EH)	72	-100.93	119.06	84.8	Pass
T5	112 - 108	Leg	Pipe 3.5" x 0.300" (3 EH)	81	-110.63	119.06	92.9	Pass
T6	108 - 104	Leg	Pipe 3.5" x 0.300" (3 EH)	89	-119.28	131.05	91.0	Pass
T7	104 - 100	Leg	Pipe 3.5" x 0.300" (3 EH)	101	-129.13	131.07	98.5	Pass
T8	100 - 80	Leg	Pipe 4.5" x 0.337" (4 EH)	113	-175.45	175.71	99.9	Pass
T9	80 - 60	Leg	Pipe 5.563" x 0.375" (5 EH)	140	-218.77	239.38	91.4	Pass
T10	60 - 40	Leg	Pipe 6.625" x 0.340" (6 EHS)	161	-264.73	274.77	96.3	Pass
T11	40 - 20	Leg	Pipe 6.625" x 0.432" (6 EH)	182	-307.80	343.09	89.7	Pass
T12	20 - 0	Leg	Pipe 8.625" x 0.375" (8 EHS)	203	-345.01	386.40	89.3	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 1/4	9	5.90	19.42	30.4 74.2 (b)	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 1/4	33	-6.56	24.01	27.3 70.9 (b)	Pass
T3	120 - 116	Diagonal	L 2 x 2 x 1/4	66	-5.81	23.41	24.8 64.2 (b)	Pass
T4	116 - 112	Diagonal	L 2 x 2 x 1/4	75	-5.57	22.60	24.6 60.3 (b)	Pass
T5	112 - 108	Diagonal	L 2 x 2 x 1/4	84	-5.42	21.74	24.9 59.7 (b)	Pass
T6	108 - 104	Diagonal	L 2 x 2 x 1/4	93	-5.70	20.82	27.4 60.3 (b)	Pass
T7	104 - 100	Diagonal	L 2 x 2 x 1/4	105	-5.84	19.85	29.4 61.6 (b)	Pass
T8	100 - 80	Diagonal	L 2 x 2 x 1/4	117	-6.47	12.49	51.8 71.0 (b)	Pass
T9	80 - 60	Diagonal	L 2.5 x 2.5 x 1/4	144	-7.53	15.53	48.5 69.8 (b)	Pass
T10	60 - 40	Diagonal	L 2.5 x 2.5 x 1/4	165	-8.57	12.06	71.1 78.8 (b)	Pass
T11	40 - 20	Diagonal	L 3 x 3 x 1/4	189	-8.97	16.43	54.6 75.5 (b)	Pass
T12	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	210	-11.57	18.39	62.9 76.1 (b)	Pass
T6	108 - 104	Secondary Horizontal	L 2 x 2 x 1/4	97	-2.07	20.24	10.2 17.7 (b)	Pass
T7	104 - 100	Secondary Horizontal	L 2 x 2 x 1/4	109	-2.24	18.87	11.9 19.1 (b)	Pass
T1	150 - 140	Top Girt	C8x11.5	4	0.64	117.55	0.5 1.6 (b)	Pass
T2	140 - 120	Top Girt	C8x11.5	29	-1.38	97.68	1.4 3.5 (b)	Pass
							Summary	
						Leg (T8)	99.9	Pass
						Diagonal (T10)	78.8	Pass
						Secondary Horizontal (T7)	19.1	Pass
						Top Girt (T2)	3.5	Pass
						Bolt Checks	78.8	Pass
						Rating =	99.9	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	70.9	Pass
1	Base Foundation (Structure)	0	37.2	Pass
1	Base Foundation (Soil Interaction)	0	92.5	Pass

Structure Rating (max from all components) =	99.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

The tower and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed per the attached drawings.

STANDARD CONDITIONS FOR FURNISHING OF PROFESSIONAL ENGINEERING SERVICES ON EXISTING STRUCTURES BY PAUL J. FORD AND COMPANY

1) Paul J. Ford and Company has not made a field inspection to verify the tower member sizes or the antenna/coax loading. If the existing conditions are not as represented on these drawings, we should be contacted immediately to evaluate the significance of the deviation.

2) No allowance was made for any damaged, missing, or rusted members. The analysis of this tower assumes that no physical deterioration has occurred in any of the structural components of the tower and that all the tower members have the same load carrying capacity as the day the tower was erected.

3) It is not possible to have all the detailed information to perform a thorough analysis of every structural sub-component of an existing tower. The structural analysis by Paul J. Ford and Company verifies the adequacy of the main structural members of the tower. Paul J. Ford and Company provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc.

4) This tower has been analyzed according to the minimum design wind loads recommended by the Telecommunications Industry Association Standard ANSI/TIA-222-H. If the owner or local or state agencies require a higher design wind load, Paul J. Ford and Company should be made aware of this requirement.

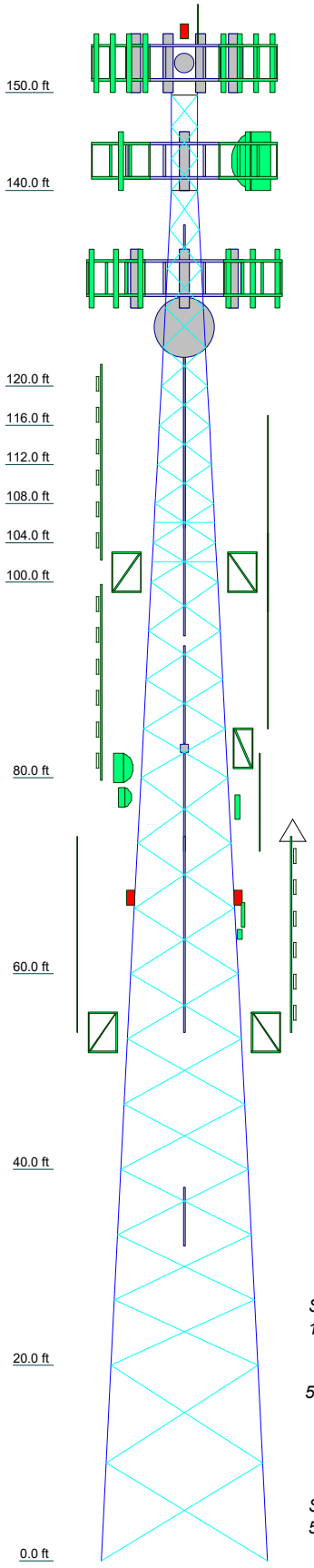
5) The enclosed sketches are a schematic representation of the tower that we have analyzed. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions and for the proper fit and clearance in the field.

6) Miscellaneous items such as antenna mounts etc. have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

APPENDIX A

TNXTOWER OUTPUT

Section	T12	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	Pipe 8.625" x 0.375" (8 EHS)	Pipe 6.625" x 0.432" (6 EH)	Pipe 6.625" x 0.340" (6 EHS)	Pipe 5.563" x 0.375" (5 EH)	Pipe 4.5" x 0.337" (4 EH)	Pipe 3.5" x 0.300" (3 EH)					Pipe 2.875" x 0.276" (2.5 EH)	A
Leg Grade	A572-50			A618-50								A500-50
Diagonals	L 3.5 x 3.5 x 1/4	L 3 x 3 x 1/4	L 2.5 x 2.5 x 1/4			L 2 x 2 x 1/4						L 1.5 x 1.5 x 1/4
Diagonal Grade					A36							A572-50
Top Girts				N.A.							C8x11.5	
Sec. Horizontals	16.9896	14.9896	12.9167	10.9167	8.83333	6.76048	5.34585	5.93125	5.51665	5.10204	4.6875	2.66667
Face Width (ft)												
# Panels @ (ft)	2 @ 10		9 @ 6.66667		4 @ 5						10 @ 4	3 @ 3.25
Weight (K)	16.9	3.6	3.4	2.6	2.3	1.8	0.4	0.4	0.3	0.3	0.3	1.2	0.4



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	Pipe 2.375" x 0.154" (2 STD)		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A618-50	50 ksi	70 ksi
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

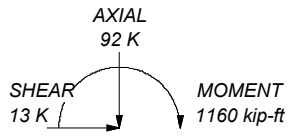
TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 140 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 99.9%

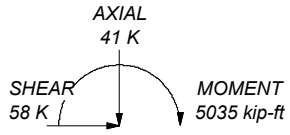
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 356 K
SHEAR: 36 K

UPLIFT: -322 K
SHEAR: 33 K



TORQUE 10 kip-ft
50 mph WIND - 1.00 in ICE



TORQUE 36 kip-ft
REACTIONS - 140 mph WIND

Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job:	***Exg 140 ft SST w/ 10 ft Ext / Groton, CT***		
Project:	***BOBOS00010A (PJF 00024-0082.002.8800)***		
Client: Douglas J. Roberts - Architect	Drawn by: Michael Bange	App'd:	
Code: TIA-222-H	Date: 07/16/24	Scale: NTS	
Path: G:\TOWER\000_Misc\2024\00024-0082_Groton CT\00024-0082.003.8800_SDD\tnx\00024-0082.002.8800.eri		Dwg No. E-1	

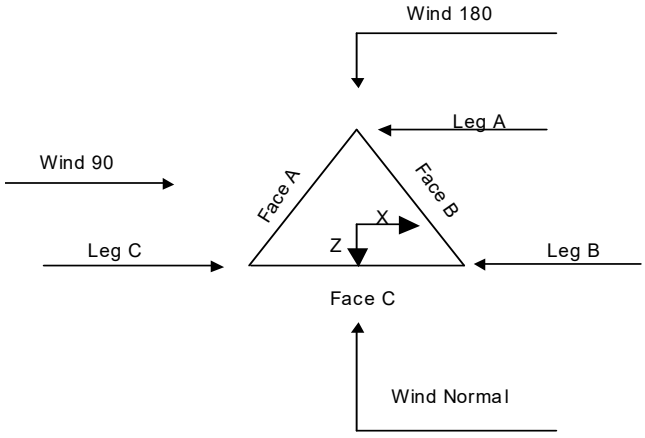
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 150.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 2.67 ft at the top and 16.99 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

- Tower is located in New London County, Connecticut.
- Tower base elevation above sea level: 167.00 ft.
- Basic wind speed of 140 mph.
- Risk Category III.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.00 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Deflections calculated using a wind speed of 60 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Horizontals		Assume Legs Pinned	√	Calculate Redundant Bracing Forces
	Consider Moments - Diagonals		Assume Rigid Index Plate		Ignore Redundant Members in FEA
	Use Moment Magnification	√	Use Clear Spans For Wind Area		SR Leg Bolts Resist Compression
√	Use Code Stress Ratios	√	Use Clear Spans For KL/r		All Leg Panels Have Same Allowable
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		Offset Girt At Foundation
	Escalate Ice		Bypass Mast Stability Checks	√	Consider Feed Line Torque
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Include Angle Block Shear Check
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Use TIA-222-H Bracing Resist. Exemption
√	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-H Tension Splice Exemption
	Leg Bolts Are At Top Of Section		Add IBC .6D+W Combination		Poles
√	Secondary Horizontal Braces Leg	√	Sort Capacity Reports By Component		Include Shear-Torsion Interaction
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Always Use Sub-Critical Flow
	SR Members Have Cut Ends		Treat Feed Line Bundles As Cylinder		Use Top Mounted Sockets
	SR Members Are Concentric		Ignore KL/ry For 60 Deg. Angle Legs		Pole Without Linear Attachments
					Pole With Shroud Or No Appurtenances
					Outside and Inside Corner Radii Are Known



Triangular Tower

Tower Section Geometry

Tower Section	*Tower Elevation*	*Assembly Database*	*Description*	*Section Width*	*Number of Sections*	*Section Length*
	ft			*ft*		*ft*
T1	150.00-140.00			2.67	1	10.00
T2	140.00-120.00			2.67	1	20.00
T3	120.00-116.00			4.69	1	4.00
T4	116.00-112.00			5.10	1	4.00
T5	112.00-108.00			5.52	1	4.00
T6	108.00-104.00			5.93	1	4.00
T7	104.00-100.00			6.35	1	4.00
T8	100.00-80.00			6.76	1	20.00
T9	80.00-60.00			8.83	1	20.00
T10	60.00-40.00			10.92	1	20.00
T11	40.00-20.00			12.92	1	20.00
T12	20.00-0.00			14.99	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	*Tower Elevation*	*Diagonal Spacing*	*Bracing Type*	*Has K Brace End Panels*	*Has Horizontals*	*Top Girt Offset*	*Bottom Girt Offset*
	ft	*ft*				*in*	*in*
T1	150.00-140.00	3.25	X Brace	No	No	3.00	0.00
T2	140.00-120.00	4.00	X Brace	No	No	0.00	0.00
T3	120.00-116.00	4.00	X Brace	No	No	0.00	0.00
T4	116.00-112.00	4.00	X Brace	No	No	0.00	0.00
T5	112.00-108.00	4.00	X Brace	No	No	0.00	0.00
T6	108.00-104.00	4.00	X Brace	No	Yes	0.00	0.00
T7	104.00-100.00	4.00	X Brace	No	Yes	0.00	0.00
T8	100.00-80.00	5.00	X Brace	No	No	0.00	0.00
T9	80.00-60.00	6.67	X Brace	No	No	0.00	0.00
T10	60.00-40.00	6.67	X Brace	No	No	0.00	0.00

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T11	40.00-20.00	6.67	X Brace	No	No	0.00	0.00
T12	20.00-0.00	10.00	X Brace	No	No	0.00	0.00

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Pipe	Pipe 2.375" x 0.154" (2 STD)	A500-50 (50 ksi)	Single Angle	L 1.5 x 1.5 x 1/4	A572-50 (50 ksi)
T2 140.00-120.00	Pipe	Pipe 2.875" x 0.276" (2.5 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T3 120.00-116.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T4 116.00-112.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T5 112.00-108.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T6 108.00-104.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T7 104.00-100.00	Pipe	Pipe 3.5" x 0.300" (3 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T8 100.00-80.00	Pipe	Pipe 4.5" x 0.337" (4 EH)	A618-50 (50 ksi)	Single Angle	L 2 x 2 x 1/4	A36 (36 ksi)
T9 80.00-60.00	Pipe	Pipe 5.563" x 0.375" (5 EH)	A618-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 1/4	A36 (36 ksi)
T10 60.00-40.00	Pipe	Pipe 6.625" x 0.340" (6 EHS)	A618-50 (50 ksi)	Single Angle	L 2.5 x 2.5 x 1/4	A36 (36 ksi)
T11 40.00-20.00	Pipe	Pipe 6.625" x 0.432" (6 EH)	A618-50 (50 ksi)	Single Angle	L 3 x 3 x 1/4	A572-50 (50 ksi)
T12 20.00-0.00	Pipe	Pipe 8.625" x 0.375" (8 EHS)	A618-50 (50 ksi)	Single Angle	L 3.5 x 3.5 x 1/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 150.00-140.00	Channel	C8x11.5	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)
T2 140.00-120.00	Channel	C8x11.5	A36 (36 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 108.00-104.00	Single Angle	L 2 x 2 x 1/4	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)
T7 104.00-100.00	Equal Angle	L 2 x 2 x 1/4	A572-50 (50 ksi)	Single Angle		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
T1 150.00-140.00	0.00	0.25	A572-50 (50 ksi)	1.03	1	1.1	6.00	6.00	36.00
T2 140.00-120.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T3 120.00-116.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T4 116.00-112.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T5 112.00-108.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T6 108.00-104.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T7 104.00-100.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T8 100.00-80.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T9 80.00-60.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T10 60.00-40.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T11 40.00-20.00	0.00	0.25	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00
T12 20.00-0.00	0.00	0.38	A36 (36 ksi)	1.03	1	1.1	6.00	6.00	36.00

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Brace Diags X	K Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft																	
T1 150.00-140.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 140.00-120.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 120.00-116.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 116.00-112.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 112.00-108.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 108.00-104.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 104.00-100.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 100.00-80.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 80.00-60.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 60.00-40.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T11 40.00-20.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
T12 20.00-0.00	Yes	No	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

[1]Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 150.00-140.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T2 140.00-120.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T3 120.00-116.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T4 116.00-112.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 112.00-108.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 108.00-104.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 104.00-100.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 100.00-80.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 80.00-60.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 60.00-40.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T11 40.00-20.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T12 20.00-0.00	0.00	1	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 150.00-140.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T2 140.00-120.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T3 120.00-116.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T4 116.00-112.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T5 112.00-108.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T6 108.00-104.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T7 104.00-100.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T8 100.00-80.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T9 80.00-60.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T10 60.00-40.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75
T11 40.00-20.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T12 20.00-0.00	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75	0.00	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 150.00-140.00	Flange	0.63 A325N	4	0.50 A325N	1	0.63 A325N	3	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T2 140.00-120.00	Flange	0.75 A325N	4	0.63 A325N	1	0.63 A325N	3	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T3 120.00-116.00	Flange	0.88 A325N	0	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T4 116.00-112.00	Flange	0.88 A325N	0	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T5 112.00-108.00	Flange	0.88 A325N	0	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T6 108.00-104.00	Flange	0.88 A325N	0	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.63 A325N	1
T7 104.00-100.00	Flange	0.88 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.63 A325N	1
T8 100.00-80.00	Flange	1.00 A325N	4	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T9 80.00-60.00	Flange	1.00 A325N	6	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T10 60.00-40.00	Flange	1.00 A325N	6	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T11 40.00-20.00	Flange	1.00 A325N	8	0.63 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0
T12 20.00-0.00	Flange	1.00 A354-BC	0	0.75 A325N	1	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0	0.00 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
**** PJF 2016 **********													
1.5" flat Cable Ladder Rail	A	No	No	Af (CaAa)	131.00 - 8.00	0.00	-0.35	2	2	36.00 1.50	1.50		1.80
1.5" flat Cable Ladder Rail	B	No	No	Af (CaAa)	140.00 - 8.00	0.00	-0.35	2	2	36.00 1.50	1.50		1.80

Description	*Face or Leg*	*Allow Shield*	*Exclude From Torque Calculation*	*Component Type*	*Placement ft*	*Face Offset in*	*Lateral Offset (Frac FW)*	*#*	*# Per Row*	*Clear Spacing in*	*Width or Diameter in*	*Perimeter in*	*Weight plf*
1.5" flat Cable Ladder Rail **** ****	C	No	No	Af (CaAa)	140.00 - 8.00	0.00	-0.35	2	2	36.00 1.50	1.50		1.80
**** PJF 2024 ****													
LDF4-50A (1/2" foam)	A	No	No	Ar (CaAa)	140.00 - 8.00	0.00	0	1	1	0.63	0.63		0.15
LDF6-50 (1 1/4" foam)	A	No	No	Ar (CaAa)	131.00 - 8.00	0.00	-0.35	12	12	1.00 0.50	1.55		0.66
RLSS 8AWG DC(3/4")	A	No	No	Ar (CaAa)	131.00 - 8.00	3.00	-0.4	2	2	0.73 0.50	0.73		0.49
2" Conduit (1 1/2" EMT)	A	No	No	Ar (CaAa)	131.00 - 8.00	0.00	-0.43	2	2	1.26 1.74	1.74		1.16
LDF2-50 (3/8" foam) ****	A	No	No	Ar (CaAa)	131.00 - 8.00	0.00	-0.46	1	1	0.44	0.44		0.08
LDF2-50 (3/8" foam)	B	No	No	Ar (CaAa)	81.00 - 8.00	0.00	-0.46	3	3	0.44	0.44		0.08
LDF7-50A (1 5/8" foam)	B	No	No	Ar (CaAa)	83.00 - 8.00	0.00	-0.29	5	5	1.02 1.98	1.98		0.92
LDF7-50A (1 5/8" foam)	B	No	No	Ar (CaAa)	101.00 - 83.00	0.00	-0.39	2	2	1.02 1.98	1.98		0.92
LDF6-50 (1 1/4" foam)	B	No	No	Ar (CaAa)	101.00 - 8.00	0.00	-0.38	4	4	1.45 0.50	1.55		0.66
RLSS 8AWG DC(3/4")	B	No	No	Ar (CaAa)	64.00 - 8.00	0.00	-0.37	4	4	0.73 0.50	0.73		0.49
RLSS 8AWG DC(3/4")	B	No	No	Ar (CaAa)	66.00 - 64.00	0.00	-0.36	2	2	0.73 0.50	0.73		0.49
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	33.00 - 8.00	0.00	-0.35	7	7	1.09	1.09		0.33
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	54.00 - 33.00	0.00	-0.34	6	6	1.09	1.09		0.33
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	90.00 - 54.00	0.00	-0.33	4	4	1.09	1.09		0.33
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	103.00 - 90.00	0.00	-0.32	3	3	1.09	1.09		0.33
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	110.00 - 103.00	0.00	-0.31	2	2	1.09	1.09		0.33
LDF5-50A (7/8" foam)	B	No	No	Ar (CaAa)	121.00 - 110.00	0.00	-0.3	1	1	1.09	1.09		0.33
LDF6-50 (1 1/4" foam)	B	No	No	Ar (CaAa)	96.00 - 8.00	0.00	-0.4	1	1	1.45 0.50	1.55		0.66
LDF4-50A (1/2" foam)	B	No	No	Ar (CaAa)	67.00 - 8.00	0.00	-0.43	3	3	0.63	0.63		0.15
LDF4-50A (1/2" foam)	B	No	No	Ar (CaAa)	83.00 - 67.00	0.00	-0.44	1	1	0.63	0.63		0.15
MLE Hybrid 9Power/18Fiber RL 2(1 5/8) ****	B	No	No	Ar (CaAa)	150.00 - 8.00	0.00	-0.45	1	1	1.63	1.63		1.07
Safety Line 3/8	C	No	No	Ar (CaAa)	140.00 - 0.00	4.00	-0.5	1	1	0.38	0.38		0.22
LDF2-50 (3/8" foam)	C	No	No	Ar (CaAa)	77.00 - 68.00	0.00	-0.38	1	1	0.44	0.44		0.08
LDF2-50 (3/8" foam)	C	No	No	Ar (CaAa)	68.00 - 66.00	0.00	-0.38	3	2	0.44	0.44		0.08
LDF2-50 (3/8" foam)	C	No	No	Ar (CaAa)	66.00 - 8.00	0.00	-0.38	4	2	0.44	0.44		0.08
MLC HYBRID 6X12 LI(1-1/2") ****	C	No	No	Ar (CaAa)	140.00 - 8.00	0.00	-0.35	2	2	1.45 1.55	1.55		1.85

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
EW63(ELLIPTICAL)	B	No	No	Ar (CaAa)	126.00 - 8.00	0.00	-0.47	1	1	2.01	2.01		0.51

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
5/8" x 4' Lightning Rod	B	From Leg	0.00 0 2	0.000	155.00	No Ice 1/2" Ice 1" Ice	0.25 0.66 0.97	0.25 0.66 0.97	0.01 0.01 0.02
Flash Beacon Lighting	A	From Leg	0.00 0 1	0.000	155.00	No Ice 1/2" Ice 1" Ice	2.70 3.10 3.50	2.70 3.10 3.50	0.05 0.07 0.09
****									
(2) MX06FRO660-03_VZW CFD	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	4.73 11.24 11.82	3.54 7.95 8.50	0.08 0.15 0.22
(2) MX06FRO660-03_VZW CFD	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	4.73 11.24 11.82	3.54 7.95 8.50	0.08 0.15 0.22
(2) MX06FRO660-03_VZW CFD	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	4.73 11.24 11.82	3.54 7.95 8.50	0.08 0.15 0.22
MT6407-77A_VZW CFD	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.92 5.81 6.15	1.35 2.15 2.42	0.08 0.11 0.14
MT6407-77A_VZW CFD	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.92 5.81 6.15	1.35 2.15 2.42	0.08 0.11 0.14
MT6407-77A_VZW CFD	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.92 5.81 6.15	1.35 2.15 2.42	0.08 0.11 0.14
RF4439D-25A_VZW CFD	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	1.55 2.37 2.58	1.04 1.63 1.80	0.07 0.09 0.11
RF4439D-25A_VZW CFD	B	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	1.55 2.37 2.58	1.04 1.63 1.80	0.07 0.09 0.11
RF4439D-25A_VZW CFD	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	1.55 2.37 2.58	1.04 1.63 1.80	0.07 0.09 0.11
RF4440D-13A_VZW CFD	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	1.55 2.37 2.58	0.94 1.48 1.65	0.07 0.09 0.11
RF4440D-13A_VZW CFD	B	From Leg	4.00 0	0.000	143.00	No Ice	1.55 2.37	0.94 1.48	0.07 0.09

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			0			1/2" Ice 1" Ice	2.58	1.65	0.11
RF4440D-13A_VZW CFD	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	1.55 2.37 2.58	0.94 1.48 1.65	0.07 0.09 0.11
RRFDC-3315-PF-48_VZW CFD	A	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.17 5.03 5.35	2.41 3.89 4.18	0.11 0.15 0.19
RVZDC-6627-PF-48_VZW CFD	C	From Leg	4.00 0 0	0.000	143.00	No Ice 1/2" Ice 1" Ice	3.17 4.72 5.02	2.41 3.16 3.43	0.03 0.06 0.10
Commscope_MTC397508 3_Sector_(3)	C	None		0.000	143.00	No Ice 1/2" Ice 1" Ice	23.85 34.12 44.39	23.85 34.12 44.39	1.26 1.80 2.35
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QS66512-2_TIA	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.80 7.27 7.72	0.11 0.17 0.23
QS66512-2_TIA	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.80 7.27 7.72	0.11 0.17 0.23
QS66512-2_TIA	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.13 8.59 9.05	6.80 7.27 7.72	0.11 0.17 0.23
7770_TIA	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	0.04 0.07 0.11
7770_TIA	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	0.04 0.07 0.11
7770_TIA	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	5.51 5.87 6.23	2.93 3.27 3.63	0.04 0.07 0.11
DMP65R-BU4D_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.52 8.96 9.42	4.69 5.31 5.93	0.09 0.16 0.23
DMP65R-BU4D_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.52 8.96 9.42	4.69 5.31 5.93	0.09 0.16 0.23
DMP65R-BU4D_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	8.52 8.96 9.42	4.69 5.31 5.93	0.09 0.16 0.23
RADIO 4449	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15
RADIO 4449	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
RADIO 4449	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15
RADIO 8843	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15
RADIO 8843	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15
RADIO 8843	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	3.50 3.74 3.99	2.36 2.57 2.78	0.09 0.11 0.15
RADIO 4415	A	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.87 1.00 1.14	0.05 0.06 0.08
RADIO 4415	B	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.87 1.00 1.14	0.05 0.06 0.08
RADIO 4415	C	From Leg	4.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.86 2.03 2.20	0.87 1.00 1.14	0.05 0.06 0.08
TT19-08BP111-001	A	From Leg	4.00 0 -1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	B	From Leg	4.00 0 -1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
TT19-08BP111-001	C	From Leg	4.00 0 -1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.55 0.65 0.75	0.45 0.53 0.63	0.02 0.02 0.03
(2) TPX-070821	A	From Leg	4.00 0 1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0 1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0 1	0.000	131.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
DC6-48-60-18-8F	A	From Leg	0.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08
DC6-48-60-18-8F	B	From Leg	0.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08
DC6-48-60-18-8F	C	From Leg	0.00 0 0	0.000	131.00	No Ice 1/2" Ice 1" Ice	1.21 1.89 2.11	1.21 1.89 2.11	0.03 0.05 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft²*	*C_AA_A Side* *ft²*	*Weight* *K*
(3) Rohn 12' Sector Mount	C	None		0.000	131.00	No Ice 1/2" Ice 1" Ice	29.82 42.21 54.43	29.82 42.21 54.43	1.67 2.27 3.05
****									
FFVV-65B-R2_TIA w/ Mount Pipe	A	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
FFVV-65B-R2_TIA w/ Mount Pipe	B	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
FFVV-65B-R2_TIA w/ Mount Pipe	C	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	12.51 13.11 13.67	7.41 8.60 9.50	0.10 0.19 0.29
RF4450t-71A	A	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.38 1.52 1.68	0.10 0.12 0.14
RF4450t-71A	B	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.38 1.52 1.68	0.10 0.12 0.14
RF4450t-71A	C	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.38 1.52 1.68	0.10 0.12 0.14
RF4451d-70A	A	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.11 1.25 1.39	0.06 0.08 0.10
RF4451d-70A	B	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.11 1.25 1.39	0.06 0.08 0.10
RF4451d-70A	C	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	1.88 2.05 2.22	1.11 1.25 1.39	0.06 0.08 0.10
RDIDC-9181-PF-48	C	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	2.01 2.19 2.37	1.17 1.31 1.46	0.02 0.04 0.06
IP-50C	A	From Leg	4.00 0 0	0.000	153.00	No Ice 1/2" Ice 1" Ice	1.12 1.25 1.39	0.37 0.46 0.56	0.01 0.02 0.03
Rohn 12' Low Profile Platform	C	None		0.000	153.00	No Ice 1/2" Ice 1" Ice	18.28 23.54 28.53	18.28 23.54 28.53	0.93 1.43 2.07
****									
DB212-2-C	A	From Leg	1.00 0 0	0.000	121.00	No Ice 1/2" Ice 1" Ice	3.10 6.22 9.35	3.10 6.22 9.35	0.03 0.06 0.10
DB212-2-C	C	From Leg	1.00 0 0	0.000	119.00	No Ice 1/2" Ice 1" Ice	3.10 6.22 9.35	3.10 6.22 9.35	0.03 0.06 0.10
DB212-2-C	A	From Leg	1.00 0	0.000	110.00	No Ice	3.10 6.22	3.10 6.22	0.03 0.06

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			0			1/2" Ice	9.35	9.35	0.10
						1" Ice			
DB212-2-C	C	From Leg	1.00	0.000	103.00	No Ice	3.10	3.10	0.03
			0			1/2" Ice	6.22	6.22	0.06
			0			1" Ice	9.35	9.35	0.10
****									
PD340-140	A	From Leg	6.00	0.000	101.00	No Ice	5.36	5.36	0.04
			0			1/2" Ice	8.72	8.72	0.07
			10			1" Ice	12.08	12.08	0.09
PD340-140	A	From Leg	6.00	0.000	101.00	No Ice	5.36	5.36	0.04
			0			1/2" Ice	8.72	8.72	0.07
			-10			1" Ice	12.08	12.08	0.09
DB810T3-XC	B	From Leg	6.00	0.000	101.00	No Ice	3.63	3.63	0.04
			0			1/2" Ice	5.10	5.10	0.06
			6			1" Ice	6.60	6.60	0.10
DB810T3-XC	B	From Leg	6.00	0.000	101.00	No Ice	3.63	3.63	0.04
			0			1/2" Ice	5.10	5.10	0.06
			-6			1" Ice	6.60	6.60	0.10
PD1121	C	From Leg	6.00	0.000	101.00	No Ice	0.41	0.41	0.00
			0			1/2" Ice	1.52	1.52	0.01
			11			1" Ice	2.63	2.63	0.02
PD1121	C	From Leg	6.00	0.000	101.00	No Ice	0.41	0.41	0.00
			0			1/2" Ice	1.52	1.52	0.01
			-11			1" Ice	2.63	2.63	0.02
Generic 3.5' x 6' sidearm	A	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0			1/2" Ice	4.00	7.50	0.45
			0			1" Ice	5.00	9.00	0.50
Generic 3.5' x 6' sidearm	B	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0			1/2" Ice	4.00	7.50	0.45
			0			1" Ice	5.00	9.00	0.50
Generic 3.5' x 6' sidearm	C	From Leg	3.00	0.000	101.00	No Ice	3.00	6.00	0.40
			0			1/2" Ice	4.00	7.50	0.45
			0			1" Ice	5.00	9.00	0.50
****									
DB225-2-A	A	From Leg	1.00	0.000	97.00	No Ice	3.21	3.21	0.07
			0			1/2" Ice	5.78	5.78	0.10
			0			1" Ice	8.35	8.35	0.12
DB212-1	A	From Leg	1.00	0.000	96.00	No Ice	4.50	4.50	0.03
			0			1/2" Ice	8.10	8.10	0.04
			0			1" Ice	11.70	11.70	0.05
DB212-1	B	From Leg	1.00	0.000	90.00	No Ice	4.50	4.50	0.03
			0			1/2" Ice	8.10	8.10	0.04
			0			1" Ice	11.70	11.70	0.05
****									
3" x 10' Omni Whip	A	From Leg	4.00	0.000	83.00	No Ice	3.00	3.00	0.02
			0			1/2" Ice	4.03	4.03	0.04
			6			1" Ice	5.03	5.03	0.07
3" x 10' Omni Whip	A	From Leg	4.00	0.000	83.00	No Ice	3.00	3.00	0.02
			0				4.03	4.03	0.04

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			-6			1/2" Ice	5.03	5.03	0.07
						1" Ice			
3" x 10' Omni Whip	B	From Leg	4.00	0.000	83.00	No Ice	3.00	3.00	0.02
			0			1/2" Ice	4.03	4.03	0.04
			-6			1" Ice	5.03	5.03	0.07
10" x 10" x 6" Junction Box	A	From Leg	0.00	0.000	83.00	No Ice	0.83	0.50	0.00
			0			1/2" Ice	0.95	0.59	0.01
			0			1" Ice	1.07	0.69	0.02
Generic 3' x 4' sidearm	A	From Leg	2.00	0.000	83.00	No Ice	1.50	3.00	0.19
			0			1/2" Ice	3.00	4.00	0.28
			0			1" Ice	4.50	5.00	0.36
Generic 3' x 4' sidearm	B	From Leg	2.00	0.000	83.00	No Ice	1.50	3.00	0.19
			0			1/2" Ice	3.00	4.00	0.28
			0			1" Ice	4.50	5.00	0.36
****									
Horizon Compact	C	From Leg	1.00	0.000	81.00	No Ice	0.72	0.37	0.01
			0			1/2" Ice	0.83	0.45	0.02
			0			1" Ice	0.94	0.54	0.03
4' x 4.5" Pipe Mount	C	From Leg	0.50	0.000	81.00	No Ice	1.06	1.06	0.04
			0			1/2" Ice	1.58	1.58	0.06
			0			1" Ice	1.84	1.84	0.07
4' x 3.5" Std. Pipe Mount	C	From Leg	0.50	0.000	78.00	No Ice	1.03	1.03	0.04
			0			1/2" Ice	1.47	1.47	0.05
			0			1" Ice	1.73	1.73	0.06
****									
30" x 12" x 6" Panel	B	From Leg	1.00	0.000	77.00	No Ice	3.00	1.64	0.03
			0			1/2" Ice	3.24	1.84	0.05
			0			1" Ice	3.48	2.04	0.07
Generic 1' x 2' sidearm	B	From Leg	0.50	0.000	77.00	No Ice	1.00	2.00	0.13
			0			1/2" Ice	2.00	3.00	0.25
			0			1" Ice	3.00	4.00	0.35
****									
DB212-1	B	From Leg	1.00	0.000	68.00	No Ice	4.50	4.50	0.03
			0			1/2" Ice	8.10	8.10	0.04
			0			1" Ice	11.70	11.70	0.05
****									
Obstruction light	B	From Leg	0.50	0.000	67.00	No Ice	0.50	0.50	0.01
			0			1/2" Ice	0.83	0.83	0.02
			0			1" Ice	0.96	0.96	0.03
Obstruction light	C	From Leg	0.50	0.000	67.00	No Ice	0.50	0.50	0.01
			0			1/2" Ice	0.83	0.83	0.02
			0			1" Ice	0.96	0.96	0.03
****									
Camera (30" x 8" x 8")	B	From Leg	1.00	0.000	66.00	No Ice	2.09	2.09	0.08
			0			1/2" Ice	2.30	2.30	0.09
			0			1" Ice	2.51	2.51	0.12
****									
12" x 12" x 8" Junction Box	B	From Leg	0.50	0.000	64.00	No Ice	1.20	0.80	0.02
			0			1/2" Ice	1.34	0.91	0.03
			0				1.48	1.04	0.05

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft ft ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice			
****									
PD220	A	From Leg	6.00 0 10	0.000	54.00	No Ice 1/2" Ice 1" Ice	3.56 7.13 10.70	3.56 7.13 10.70	0.02 0.05 0.07
PD340-140	B	From Leg	6.00 0 10	0.000	54.00	No Ice 1/2" Ice 1" Ice	5.36 8.72 12.08	5.36 8.72 12.08	0.04 0.07 0.09
PD220	C	From Leg	6.00 0 10	0.000	54.00	No Ice 1/2" Ice 1" Ice	3.56 7.13 10.70	3.56 7.13 10.70	0.02 0.05 0.07
Generic 3.5' x 6' sidearm	A	From Leg	3.00 0 0	0.000	54.00	No Ice 1/2" Ice 1" Ice	3.00 4.00 5.00	6.00 7.50 9.00	0.40 0.45 0.50
Generic 3.5' x 6' sidearm	B	From Leg	3.00 0 0	0.000	54.00	No Ice 1/2" Ice 1" Ice	3.00 4.00 5.00	6.00 7.50 9.00	0.40 0.45 0.50
Generic 3.5' x 6' sidearm	C	From Leg	3.00 0 0	0.000	54.00	No Ice 1/2" Ice 1" Ice	3.00 4.00 5.00	6.00 7.50 9.00	0.40 0.45 0.50
****									
BA1012	A	From Leg	6.00 0 2	0.000	33.00	No Ice 1/2" Ice 1" Ice	0.41 1.10 1.79	0.41 1.10 1.79	0.00 0.00 0.01
Generic 3.5' x 6' sidearm	A	From Leg	3.00 0 0	0.000	33.00	No Ice 1/2" Ice 1" Ice	3.00 4.00 5.00	6.00 7.50 9.00	0.40 0.45 0.50
****									
Omni Stabilizer	A	From Leg	3.00 0 0	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.56	1.90 2.73 3.56	0.03 0.04 0.06
Omni Stabilizer	C	From Leg	3.00 0 0	0.000	72.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.56	1.90 2.73 3.56	0.03 0.04 0.06
Omni Stabilizer	B	From Leg	3.00 0 0	0.000	86.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.56	1.90 2.73 3.56	0.03 0.04 0.06
Omni Stabilizer	B	From Leg	3.00 0 0	0.000	114.00	No Ice 1/2" Ice 1" Ice	1.90 2.73 3.56	1.90 2.73 3.56	0.03 0.04 0.06
****									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
VHLPX6-11W-6WH/A	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0 0	32.000		143.00	6.00	No Ice 1/2" Ice 1" Ice	28.27 29.07 29.87	0.19 0.52 0.85
VHLP2-18-2WH/D	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0 0	28.104		153.00	2.16	No Ice 1/2" Ice 1" Ice	3.66 3.95 4.23	0.03 0.05 0.07
3' std w/ HP	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0 0	-88.000		81.00	3.00	No Ice 1/2" Ice 1" Ice	7.07 7.47 7.86	0.10 0.14 0.18
2 ft w/ HP	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0 0	-88.000		78.00	2.00	No Ice 1/2" Ice 1" Ice	3.14 3.41 3.68	0.01 0.06 0.10
****											
VHLP6-6W-6WH/B	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0 0	-53.200		126.00	6.23	No Ice 1/2" Ice 1" Ice	30.51 31.33 32.16	0.28 0.44 0.60

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service

Comb. No.	Description
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	337.92	29.46	-18.16
	Max. H_x	18	337.92	29.46	-18.16
	Max. H_z	7	-302.95	-26.63	16.49
	Min. Vert	7	-302.95	-26.63	16.49
	Min. H_x	7	-302.95	-26.63	16.49
	Min. H_z	18	337.92	29.46	-18.16
Leg B	Max. Vert	10	355.66	-30.96	-18.48
	Max. H_x	23	-321.76	28.18	16.87
	Max. H_z	23	-321.76	28.18	16.87
	Min. Vert	23	-321.76	28.18	16.87
	Min. H_x	10	355.66	-30.96	-18.48
	Min. H_z	10	355.66	-30.96	-18.48
Leg A	Max. Vert	2	343.36	-0.01	34.50
	Max. H_x	20	27.16	4.47	2.05
	Max. H_z	2	343.36	-0.01	34.50
	Min. Vert	15	-304.99	-0.07	-31.04
	Min. H_x	9	-0.37	-4.41	-0.06
	Min. H_z	15	-304.99	-0.07	-31.04

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	33.90	0.00	0.00	-8.21	-0.19	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	40.68	-1.22	-54.88	-4852.46	153.45	-0.77
0.9 Dead+1.0 Wind 0 deg - No Ice	30.51	-1.22	-54.88	-4850.00	153.51	-0.77
1.2 Dead+1.0 Wind 30 deg - No Ice	40.68	23.63	-43.69	-3901.02	-2037.22	-5.69
0.9 Dead+1.0 Wind 30 deg - No Ice	30.51	23.63	-43.69	-3898.56	-2037.17	-5.69
1.2 Dead+1.0 Wind 60 deg - No Ice	40.68	46.10	-25.67	-2227.42	-4035.21	-29.21
0.9 Dead+1.0 Wind 60 deg - No Ice	30.51	46.10	-25.67	-2224.96	-4035.15	-29.21
1.2 Dead+1.0 Wind 90 deg - No Ice	40.68	55.29	1.29	152.70	-4814.91	-34.10
0.9 Dead+1.0 Wind 90 deg - No Ice	30.51	55.29	1.29	155.16	-4814.85	-34.10
1.2 Dead+1.0 Wind 120 deg - No Ice	40.68	49.50	29.35	2587.81	-4318.04	-15.27
0.9 Dead+1.0 Wind 120 deg - No Ice	30.51	49.50	29.35	2590.28	-4317.98	-15.27
1.2 Dead+1.0 Wind 150 deg - No Ice	40.68	26.56	45.35	4081.32	-2400.14	7.53
0.9 Dead+1.0 Wind 150 deg - No Ice	30.51	26.56	45.35	4083.78	-2400.08	7.53

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 180 deg - No Ice	40.68	1.36	52.15	4634.58	-171.01	-1.53
0.9 Dead+1.0 Wind 180 deg - No Ice	30.51	1.36	52.15	4637.04	-170.95	-1.53
1.2 Dead+1.0 Wind 210 deg - No Ice	40.68	-24.07	43.28	3830.71	2093.53	4.80
0.9 Dead+1.0 Wind 210 deg - No Ice	30.51	-24.07	43.28	3833.17	2093.59	4.80
1.2 Dead+1.0 Wind 240 deg - No Ice	40.68	-47.98	27.46	2363.22	4146.38	29.38
0.9 Dead+1.0 Wind 240 deg - No Ice	30.51	-47.98	27.46	2365.68	4146.44	29.38
1.2 Dead+1.0 Wind 270 deg - No Ice	40.68	-55.06	-1.52	-200.10	4785.11	35.92
0.9 Dead+1.0 Wind 270 deg - No Ice	30.51	-55.06	-1.52	-197.64	4785.17	35.92
1.2 Dead+1.0 Wind 300 deg - No Ice	40.68	-47.34	-28.27	-2545.07	4171.25	15.56
0.9 Dead+1.0 Wind 300 deg - No Ice	30.51	-47.34	-28.27	-2542.61	4171.31	15.56
1.2 Dead+1.0 Wind 330 deg - No Ice	40.68	-26.52	-45.44	-4112.53	2396.04	-8.71
0.9 Dead+1.0 Wind 330 deg - No Ice	30.51	-26.52	-45.44	-4110.07	2396.10	-8.71
1.2 Dead+1.0 Ice	92.03	-0.00	-0.00	-33.04	11.41	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	92.03	-0.17	-12.20	-1105.55	32.28	0.19
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	92.03	5.76	-10.37	-937.21	-481.79	-2.82
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	92.03	10.92	-6.18	-557.28	-922.49	-9.62
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	92.03	12.95	0.18	-11.00	-1098.58	-9.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	92.03	11.45	6.72	552.63	-977.96	-2.06
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	92.03	6.18	10.61	905.89	-535.40	1.34
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	92.03	0.19	11.90	1017.45	-11.72	-0.51
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	92.03	-5.83	10.31	864.30	512.41	2.69
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	92.03	-11.12	6.39	510.01	956.27	9.65
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	92.03	-12.92	-0.21	-58.84	1117.45	9.68
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	92.03	-11.21	-6.60	-612.82	985.18	2.10
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	92.03	-6.17	-10.63	-973.55	557.84	-1.50
Dead+Wind 0 deg - Service	33.90	-0.22	-10.35	-909.94	28.04	-0.16
Dead+Wind 30 deg - Service	33.90	4.47	-8.26	-733.55	-380.47	-1.05
Dead+Wind 60 deg - Service	33.90	8.70	-4.85	-421.66	-751.94	-5.36
Dead+Wind 90 deg - Service	33.90	10.42	0.24	21.65	-896.80	-6.25
Dead+Wind 120 deg - Service	33.90	9.32	5.53	475.05	-803.89	-2.78
Dead+Wind 150 deg - Service	33.90	5.01	8.56	753.86	-447.13	1.41
Dead+Wind 180 deg - Service	33.90	0.25	9.85	857.12	-31.56	-0.26
Dead+Wind 210 deg - Service	33.90	-4.56	8.18	707.83	390.52	0.89
Dead+Wind 240 deg - Service	33.90	-9.05	5.18	433.80	772.06	5.39
Dead+Wind 270 deg - Service	33.90	-10.38	-0.28	-43.15	891.02	6.58
Dead+Wind 300 deg - Service	33.90	-8.93	-5.33	-480.00	776.63	2.83

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 330 deg - Service	33.90	-5.01	-8.58	-772.39	446.08	-1.62

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-33.90	0.00	0.00	33.90	0.00	0.000%
2	-1.22	-40.68	-54.88	1.22	40.68	54.88	0.000%
3	-1.22	-30.51	-54.88	1.22	30.51	54.88	0.000%
4	23.63	-40.68	-43.69	-23.63	40.68	43.69	0.000%
5	23.63	-30.51	-43.69	-23.63	30.51	43.69	0.000%
6	46.10	-40.68	-25.67	-46.10	40.68	25.67	0.000%
7	46.10	-30.51	-25.67	-46.10	30.51	25.67	0.000%
8	55.29	-40.68	1.29	-55.29	40.68	-1.29	0.000%
9	55.29	-30.51	1.29	-55.29	30.51	-1.29	0.000%
10	49.50	-40.68	29.35	-49.50	40.68	-29.35	0.000%
11	49.50	-30.51	29.35	-49.50	30.51	-29.35	0.000%
12	26.56	-40.68	45.35	-26.56	40.68	-45.35	0.000%
13	26.56	-30.51	45.35	-26.56	30.51	-45.35	0.000%
14	1.36	-40.68	52.15	-1.36	40.68	-52.15	0.000%
15	1.36	-30.51	52.15	-1.36	30.51	-52.15	0.000%
16	-24.07	-40.68	43.28	24.07	40.68	-43.28	0.000%
17	-24.07	-30.51	43.28	24.07	30.51	-43.28	0.000%
18	-47.98	-40.68	27.46	47.98	40.68	-27.46	0.000%
19	-47.98	-30.51	27.46	47.98	30.51	-27.46	0.000%
20	-55.06	-40.68	-1.52	55.06	40.68	1.52	0.000%
21	-55.06	-30.51	-1.52	55.06	30.51	1.52	0.000%
22	-47.34	-40.68	-28.27	47.34	40.68	28.27	0.000%
23	-47.34	-30.51	-28.27	47.34	30.51	28.27	0.000%
24	-26.52	-40.68	-45.44	26.52	40.68	45.44	0.000%
25	-26.52	-30.51	-45.44	26.52	30.51	45.44	0.000%
26	0.00	-92.03	0.00	0.00	92.03	0.00	0.000%
27	-0.17	-92.03	-12.20	0.17	92.03	12.20	0.000%
28	5.76	-92.03	-10.37	-5.76	92.03	10.37	0.000%
29	10.92	-92.03	-6.18	-10.92	92.03	6.18	0.000%
30	12.95	-92.03	0.18	-12.95	92.03	-0.18	0.000%
31	11.45	-92.03	6.72	-11.45	92.03	-6.72	0.000%
32	6.18	-92.03	10.61	-6.18	92.03	-10.61	0.000%
33	0.19	-92.03	11.90	-0.19	92.03	-11.90	0.000%
34	-5.83	-92.03	10.31	5.83	92.03	-10.31	0.000%
35	-11.12	-92.03	6.39	11.12	92.03	-6.39	0.000%
36	-12.92	-92.03	-0.21	12.92	92.03	0.21	0.000%
37	-11.21	-92.03	-6.60	11.21	92.03	6.60	0.000%
38	-6.17	-92.03	-10.63	6.17	92.03	10.63	0.000%
39	-0.22	-33.90	-10.35	0.22	33.90	10.35	0.000%
40	4.47	-33.90	-8.26	-4.47	33.90	8.26	0.000%
41	8.70	-33.90	-4.85	-8.70	33.90	4.85	0.000%
42	10.42	-33.90	0.24	-10.42	33.90	-0.24	0.000%
43	9.32	-33.90	5.53	-9.32	33.90	-5.53	0.000%
44	5.01	-33.90	8.56	-5.01	33.90	-8.56	0.000%
45	0.25	-33.90	9.85	-0.25	33.90	-9.85	0.000%
46	-4.56	-33.90	8.18	4.56	33.90	-8.18	0.000%
47	-9.05	-33.90	5.18	9.05	33.90	-5.18	0.000%
48	-10.38	-33.90	-0.28	10.38	33.90	0.28	0.000%
49	-8.93	-33.90	-5.33	8.93	33.90	5.33	0.000%
50	-5.01	-33.90	-8.58	5.01	33.90	8.58	0.000%

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	4.78	43	0.366	0.054
T2	140 - 120	4.03	43	0.337	0.047
T3	120 - 116	2.75	43	0.262	0.034
T4	116 - 112	2.53	43	0.248	0.032
T5	112 - 108	2.33	43	0.233	0.030
T6	108 - 104	2.13	43	0.218	0.028
T7	104 - 100	1.96	43	0.203	0.026
T8	100 - 80	1.79	43	0.187	0.025
T9	80 - 60	1.10	43	0.133	0.016
T10	60 - 40	0.60	43	0.092	0.011
T11	40 - 20	0.27	43	0.055	0.007
T12	20 - 0	0.07	43	0.026	0.003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	5/8" x 4' Lightning Rod	43	4.78	0.366	0.054	29629
153.00	VHLP2-18-2WH/D	43	4.78	0.366	0.054	29629
143.00	VHLPX6-11W-6WH/A	43	4.25	0.347	0.049	21321
131.00	QS66512-2_TIA	43	3.41	0.305	0.041	14091
126.00	VHLP6-6W-6WH/B	43	3.10	0.285	0.038	13654
121.00	DB212-2-C	43	2.80	0.266	0.035	13663
119.00	DB212-2-C	43	2.69	0.259	0.034	14461
114.00	Omni Stabilizer	43	2.43	0.241	0.031	15432
110.00	DB212-2-C	43	2.23	0.226	0.029	14689
103.00	DB212-2-C	43	1.91	0.199	0.026	16011
101.00	PD340-140	43	1.83	0.191	0.025	17488
97.00	DB225-2-A	43	1.67	0.176	0.024	19964
96.00	DB212-1	43	1.63	0.173	0.023	20250
90.00	DB212-1	43	1.41	0.156	0.021	21543
86.00	Omni Stabilizer	43	1.28	0.146	0.019	22468
83.00	3" x 10' Omni Whip	43	1.19	0.139	0.017	23217
81.00	3' std w/ HP	43	1.13	0.135	0.017	23750
78.00	2 ft w/ HP	43	1.04	0.128	0.016	24618
77.00	30" x 12" x 6" Panel	43	1.01	0.126	0.015	24927
72.00	Omni Stabilizer	43	0.88	0.116	0.014	26609
68.00	DB212-1	43	0.78	0.108	0.013	28129
67.00	Obstruction light	43	0.76	0.106	0.013	28536
66.00	Camera (30" x 8" x 8")	43	0.73	0.104	0.013	28955
64.00	12" x 12" x 8" Junction Box	43	0.69	0.100	0.012	29830
54.00	PD220	43	0.49	0.081	0.010	32759
33.00	BA1012	43	0.19	0.044	0.006	34339

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	25.88	11	1.972	0.294
T2	140 - 120	21.83	11	1.825	0.256
T3	120 - 116	14.88	11	1.423	0.188
T4	116 - 112	13.70	11	1.345	0.174
T5	112 - 108	12.59	11	1.265	0.163
T6	108 - 104	11.55	11	1.182	0.153
T7	104 - 100	10.58	11	1.098	0.144
T8	100 - 80	9.67	11	1.014	0.136
T9	80 - 60	5.92	11	0.718	0.089
T10	60 - 40	3.26	11	0.500	0.062

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T11	40 - 20	1.45	11	0.300	0.038
T12	20 - 0	0.40	11	0.139	0.016

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
155.00	5/8" x 4' Lightning Rod	11	25.88	1.972	0.294	5598
153.00	VHLP2-18-2WH/D	11	25.88	1.972	0.294	5598
143.00	VHLPX6-11W-6WH/A	11	23.02	1.873	0.267	4027
131.00	QS66512-2_TIA	11	18.49	1.652	0.225	2629
126.00	VHLP6-6W-6WH/B	11	16.78	1.546	0.208	2544
121.00	DB212-2-C	11	15.18	1.443	0.191	2542
119.00	DB212-2-C	11	14.58	1.403	0.184	2689
114.00	Omni Stabilizer	11	13.14	1.305	0.168	2866
110.00	DB212-2-C	11	12.06	1.223	0.158	2724
103.00	DB212-2-C	11	10.34	1.077	0.142	2952
101.00	PD340-140	11	9.89	1.034	0.138	3223
97.00	DB225-2-A	11	9.03	0.956	0.129	3673
96.00	DB212-1	11	8.82	0.938	0.127	3722
90.00	DB212-1	11	7.65	0.844	0.112	3957
86.00	Omni Stabilizer	11	6.92	0.790	0.103	4129
83.00	3" x 10' Omni Whip	11	6.41	0.753	0.096	4269
81.00	3' std w/ HP	11	6.08	0.729	0.091	4368
78.00	2 ft w/ HP	11	5.61	0.695	0.086	4530
77.00	30" x 12" x 6" Panel	11	5.46	0.683	0.084	4587
72.00	Omni Stabilizer	11	4.74	0.628	0.076	4899
68.00	DB212-1	11	4.21	0.585	0.071	5182
67.00	Obstruction light	11	4.09	0.574	0.070	5257
66.00	Camera (30" x 8" x 8")	11	3.96	0.563	0.069	5335
64.00	12" x 12" x 8" Junction Box	11	3.72	0.542	0.067	5498
54.00	PD220	11	2.64	0.437	0.056	6042
33.00	BA1012	11	0.99	0.239	0.030	6338

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	150	Leg	A325N	0.63	4	4.60	20.34	0.226 ✔	1	Bolt Tension
		Diagonal	A325N	0.50	1	6.55	8.84	0.742 ✔	1	Bolt Shear
		Top Girt	A325N	0.63	3	0.21	13.81	0.016 ✔	1	Bolt Shear
T2	140	Leg	A325N	0.75	4	17.77	30.10	0.590 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	6.46	9.11	0.709 ✔	1	Member Block Shear
		Top Girt	A325N	0.63	3	0.46	13.27	0.035 ✔	1	Member Bearing
T3	120	Diagonal	A325N	0.63	1	5.85	9.11	0.642 ✔	1	Member Block Shear
T4	116	Diagonal	A325N	0.63	1	5.49	9.11	0.603 ✔	1	Member Block Shear
T5	112	Diagonal	A325N	0.63	1	5.44	9.11	0.597 ✔	1	Member Block Shear
T6	108	Diagonal	A325N	0.63	1	5.50	9.11	0.603 ✔	1	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T7	104	Secondary Horizontal	A325N	0.63	1	2.07	11.70	0.177 ✔	1	Member Bearing
		Leg	A325N	0.88	4	29.64	41.56	0.713 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	5.61	9.11	0.616 ✔	1	Member Block Shear
T8	100	Secondary Horizontal	A325N	0.63	1	2.24	11.70	0.191 ✔	1	Member Bearing
		Leg	A325N	1.00	4	40.18	54.52	0.737 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	6.47	9.11	0.710 ✔	1	Member Block Shear
T9	80	Leg	A325N	1.00	6	33.30	54.52	0.611 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	7.29	10.44	0.698 ✔	1	Member Bearing
T10	60	Leg	A325N	1.00	6	40.15	54.52	0.736 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	8.22	10.44	0.788 ✔	1	Member Bearing
T11	40	Leg	A325N	1.00	8	34.94	54.52	0.641 ✔	1	Bolt Tension
		Diagonal	A325N	0.63	1	8.83	11.70	0.755 ✔	1	Member Bearing
T12	20	Diagonal	A325N	0.75	1	10.77	14.14	0.761 ✔	1	Member Bearing

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	Pipe 2.375" x 0.154" (2 STD)	10.00	3.25	49.5 K=1.00	1.07	-20.92	40.41	0.518 [1] ✔
T2	140 - 120	Pipe 2.875" x 0.276" (2.5 EH)	20.03	4.01	52.0 K=1.00	2.25	-79.65	83.20	0.957 [1] ✔
T3	120 - 116	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3 K=1.00	3.02	-91.08	119.06	0.765 [1] ✔
T4	116 - 112	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3 K=1.00	3.02	-100.93	119.06	0.848 [1] ✔
T5	112 - 108	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3 K=1.00	3.02	-110.63	119.06	0.929 [1] ✔
T6	108 - 104	Pipe 3.5" x 0.300" (3 EH)	4.01	2.07	21.9 K=1.00	3.02	-119.28	131.05	0.910 [1] ✔
T7	104 - 100	Pipe 3.5" x 0.300" (3 EH)	4.01	2.07	21.8 K=1.00	3.02	-129.13	131.07	0.985 [1] ✔
T8	100 - 80	Pipe 4.5" x 0.337" (4 EH)	20.04	5.01	40.7 K=1.00	4.41	-175.45	175.71	0.999 [1] ✔
T9	80 - 60	Pipe 5.563" x 0.375" (5 EH)	20.04	6.68	43.6 K=1.00	6.11	-218.77	239.38	0.914 [1] ✔
T10	60 - 40	Pipe 6.625" x 0.340" (6 EHS)	20.03	6.68	36.0 K=1.00	6.71	-264.73	274.77	0.963 [1] ✔
T11	40 - 20	Pipe 6.625" x 0.432" (6 EH)	20.04	6.68	36.5 K=1.00	8.40	-307.80	343.09	0.897 [1] ✔
T12	20 - 0	Pipe 8.625" x 0.375" (8 EHS)	20.03	10.02	41.2 K=1.00	9.72	-345.01	386.40	0.893 [1] ✔

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T1	150 - 140	L 1.5 x 1.5 x 1/4	4.20	1.82	86.1 K=1.15	0.69	-6.55	23.24	0.282 [1] ✔
T2	140 - 120	L 2 x 2 x 1/4	6.01	2.86	95.8 K=1.09	0.94	-6.56	24.01	0.273 [1] ✔
T3	120 - 116	L 2 x 2 x 1/4	6.32	2.99	98.8 K=1.08	0.94	-5.81	23.41	0.248 [1] ✔
T4	116 - 112	L 2 x 2 x 1/4	6.65	3.15	102.5 K=1.06	0.94	-5.57	22.60	0.246 [1] ✔
T5	112 - 108	L 2 x 2 x 1/4	6.98	3.32	106.4 K=1.04	0.94	-5.42	21.74	0.249 [1] ✔
T6	108 - 104	L 2 x 2 x 1/4	7.33	3.49	110.4 K=1.03	0.94	-5.70	20.82	0.274 [1] ✔
T7	104 - 100	L 2 x 2 x 1/4	7.68	3.67	114.5 K=1.02	0.94	-5.84	19.85	0.294 [1] ✔
T8	100 - 80	L 2 x 2 x 1/4	9.93	4.78	146.6 K=1.00	0.94	-6.47	12.49	0.518 [1] ✔
T9	80 - 60	L 2.5 x 2.5 x 1/4	12.50	6.06	148.1 K=1.00	1.19	-7.53	15.53	0.485 [1] ✔
T10	60 - 40	L 2.5 x 2.5 x 1/4	14.24	6.88	168.1 K=1.00	1.19	-8.57	12.06	0.711 [1] ✔
T11	40 - 20	L 3 x 3 x 1/4	16.09	7.81	158.3 K=1.00	1.44	-8.97	16.43	0.546 [1] ✔
T12	20 - 0	L 3.5 x 3.5 x 1/4	19.29	9.38	162.2 K=1.00	1.69	-11.57	18.39	0.629 [1] ✔

[1] $P_u / \phi P_n$ controls

Secondary Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
T6	108 - 104	L 2 x 2 x 1/4	6.13	5.60	115.2 K=1.04	0.94	-2.07	20.24	0.102 [1] ✔
T7	104 - 100	L 2 x 2 x 1/4	6.55	6.02	119.3 K=1.01	0.94	-2.24	18.87	0.119 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	C8x11.5	2.67	2.47	47.4 K=1.00	3.38	-0.50	129.06	0.004 [1] ✔
T2	140 - 120	C8x11.5	2.67	2.43	46.6 K=1.00	3.38	-1.38	97.68	0.014 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	Pipe 2.375" x 0.154" (2 STD)	10.00	3.25	49.5	1.07	18.42	48.35	0.381 [1] ✔
T2	140 - 120	Pipe 2.875" x 0.276" (2.5 EH)	20.03	4.01	52.0	2.25	71.07	101.41	0.701 [1] ✔
T3	120 - 116	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3	3.02	82.37	135.72	0.607 [1] ✔
T4	116 - 112	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3	3.02	92.29	135.72	0.680 [1] ✔
T5	112 - 108	Pipe 3.5" x 0.300" (3 EH)	4.01	4.01	42.3	3.02	101.81	135.72	0.750 [1] ✔
T6	108 - 104	Pipe 3.5" x 0.300" (3 EH)	4.01	1.94	20.4	3.02	110.19	135.72	0.812 [1] ✔
T7	104 - 100	Pipe 3.5" x 0.300" (3 EH)	4.01	1.94	20.5	3.02	118.67	135.72	0.874 [1] ✔
T8	100 - 80	Pipe 4.5" x 0.337" (4 EH)	20.04	5.01	40.7	4.41	160.70	198.34	0.810 [1] ✔
T9	80 - 60	Pipe 5.563" x 0.375" (5 EH)	20.04	6.68	43.6	6.11	199.82	275.04	0.727 [1] ✔
T10	60 - 40	Pipe 6.625" x 0.340" (6 EHS)	20.03	6.68	36.0	6.71	240.88	302.10	0.797 [1] ✔
T11	40 - 20	Pipe 6.625" x 0.432" (6 EH)	20.04	6.68	36.5	8.40	279.50	378.22	0.739 [1] ✔
T12	20 - 0	Pipe 8.625" x 0.375" (8 EHS)	20.03	10.02	41.2	9.72	312.43	437.37	0.714 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	L 1.5 x 1.5 x 1/4	4.20	1.82	52.0	0.40	5.90	19.42	0.304 [1] ✔
T2	140 - 120	L 2 x 2 x 1/4	6.01	2.86	58.7	0.56	6.46	24.49	0.264 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T3	120 - 116	L 2 x 2 x 1/4	6.32	2.99	61.2	0.56	5.85	24.49	0.239 [1] ✔
T4	116 - 112	L 2 x 2 x 1/4	6.65	3.15	64.5	0.56	5.49	24.49	0.224 [1] ✔
T5	112 - 108	L 2 x 2 x 1/4	6.98	3.32	67.8	0.56	5.44	24.49	0.222 [1] ✔
T6	108 - 104	L 2 x 2 x 1/4	7.33	3.49	71.2	0.56	5.50	24.49	0.224 [1] ✔
T7	104 - 100	L 2 x 2 x 1/4	7.68	3.67	74.7	0.56	5.61	24.49	0.229 [1] ✔
T8	100 - 80	L 2 x 2 x 1/4	9.93	4.78	96.5	0.56	6.47	24.49	0.264 [1] ✔
T9	80 - 60	L 2.5 x 2.5 x 1/4	12.50	6.06	96.5	0.75	7.29	32.71	0.223 [1] ✔
T10	60 - 40	L 2.5 x 2.5 x 1/4	14.24	6.88	109.2	0.75	8.22	32.71	0.251 [1] ✔
T11	40 - 20	L 3 x 3 x 1/4	16.09	7.81	102.3	0.94	8.83	45.70	0.193 [1] ✔
T12	20 - 0	L 3.5 x 3.5 x 1/4	19.29	9.38	104.7	1.10	10.77	53.79	0.200 [1] ✔

[1] P_u / ϕP_n controls

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T6	108 - 104	L 2 x 2 x 1/4	6.13	5.60	115.1	0.56	2.07	27.44	0.075 [1] ✔
T7	104 - 100	L 2 x 2 x 1/4	6.55	6.02	123.2	0.56	2.24	27.44	0.082 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	C8x11.5	2.67	2.47	47.4	2.41	0.64	117.55	0.005 [1] ✔
T2	140 - 120	C8x11.5	2.67	2.43	46.6	2.41	1.38	104.89	0.013 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
T1	150 - 140	Leg	Pipe 2.375" x 0.154" (2 STD)	3	-20.92	40.41	51.8	Pass
T2	140 - 120	Leg	Pipe 2.875" x 0.276" (2.5 EH)	27	-79.65	83.20	95.7	Pass
T3	120 - 116	Leg	Pipe 3.5" x 0.300" (3 EH)	63	-91.08	119.06	76.5	Pass
T4	116 - 112	Leg	Pipe 3.5" x 0.300" (3 EH)	72	-100.93	119.06	84.8	Pass
T5	112 - 108	Leg	Pipe 3.5" x 0.300" (3 EH)	81	-110.63	119.06	92.9	Pass
T6	108 - 104	Leg	Pipe 3.5" x 0.300" (3 EH)	89	-119.28	131.05	91.0	Pass
T7	104 - 100	Leg	Pipe 3.5" x 0.300" (3 EH)	101	-129.13	131.07	98.5	Pass
T8	100 - 80	Leg	Pipe 4.5" x 0.337" (4 EH)	113	-175.45	175.71	99.9	Pass
T9	80 - 60	Leg	Pipe 5.563" x 0.375" (5 EH)	140	-218.77	239.38	91.4	Pass
T10	60 - 40	Leg	Pipe 6.625" x 0.340" (6 EHS)	161	-264.73	274.77	96.3	Pass
T11	40 - 20	Leg	Pipe 6.625" x 0.432" (6 EH)	182	-307.80	343.09	89.7	Pass
T12	20 - 0	Leg	Pipe 8.625" x 0.375" (8 EHS)	203	-345.01	386.40	89.3	Pass
T1	150 - 140	Diagonal	L 1.5 x 1.5 x 1/4	9	5.90	19.42	30.4 74.2 (b)	Pass
T2	140 - 120	Diagonal	L 2 x 2 x 1/4	33	-6.56	24.01	27.3 70.9 (b)	Pass
T3	120 - 116	Diagonal	L 2 x 2 x 1/4	66	-5.81	23.41	24.8 64.2 (b)	Pass
T4	116 - 112	Diagonal	L 2 x 2 x 1/4	75	-5.57	22.60	24.6 60.3 (b)	Pass
T5	112 - 108	Diagonal	L 2 x 2 x 1/4	84	-5.42	21.74	24.9 59.7 (b)	Pass
T6	108 - 104	Diagonal	L 2 x 2 x 1/4	93	-5.70	20.82	27.4 60.3 (b)	Pass
T7	104 - 100	Diagonal	L 2 x 2 x 1/4	105	-5.84	19.85	29.4 61.6 (b)	Pass
T8	100 - 80	Diagonal	L 2 x 2 x 1/4	117	-6.47	12.49	51.8 71.0 (b)	Pass
T9	80 - 60	Diagonal	L 2.5 x 2.5 x 1/4	144	-7.53	15.53	48.5 69.8 (b)	Pass
T10	60 - 40	Diagonal	L 2.5 x 2.5 x 1/4	165	-8.57	12.06	71.1 78.8 (b)	Pass
T11	40 - 20	Diagonal	L 3 x 3 x 1/4	189	-8.97	16.43	54.6 75.5 (b)	Pass
T12	20 - 0	Diagonal	L 3.5 x 3.5 x 1/4	210	-11.57	18.39	62.9 76.1 (b)	Pass
T6	108 - 104	Secondary Horizontal	L 2 x 2 x 1/4	97	-2.07	20.24	10.2 17.7 (b)	Pass
T7	104 - 100	Secondary Horizontal	L 2 x 2 x 1/4	109	-2.24	18.87	11.9 19.1 (b)	Pass
T1	150 - 140	Top Girt	C8x11.5	4	0.64	117.55	0.5 1.6 (b)	Pass
T2	140 - 120	Top Girt	C8x11.5	29	-1.38	97.68	1.4 3.5 (b)	Pass
							Summary	
						Leg (T8)	99.9	Pass
						Diagonal (T10)	78.8	Pass
						Secondary Horizontal (T7)	19.1	Pass
						Top Girt (T2)	3.5	Pass
						Bolt Checks	78.8	Pass
						RATING =	**99.9**	**Pass**

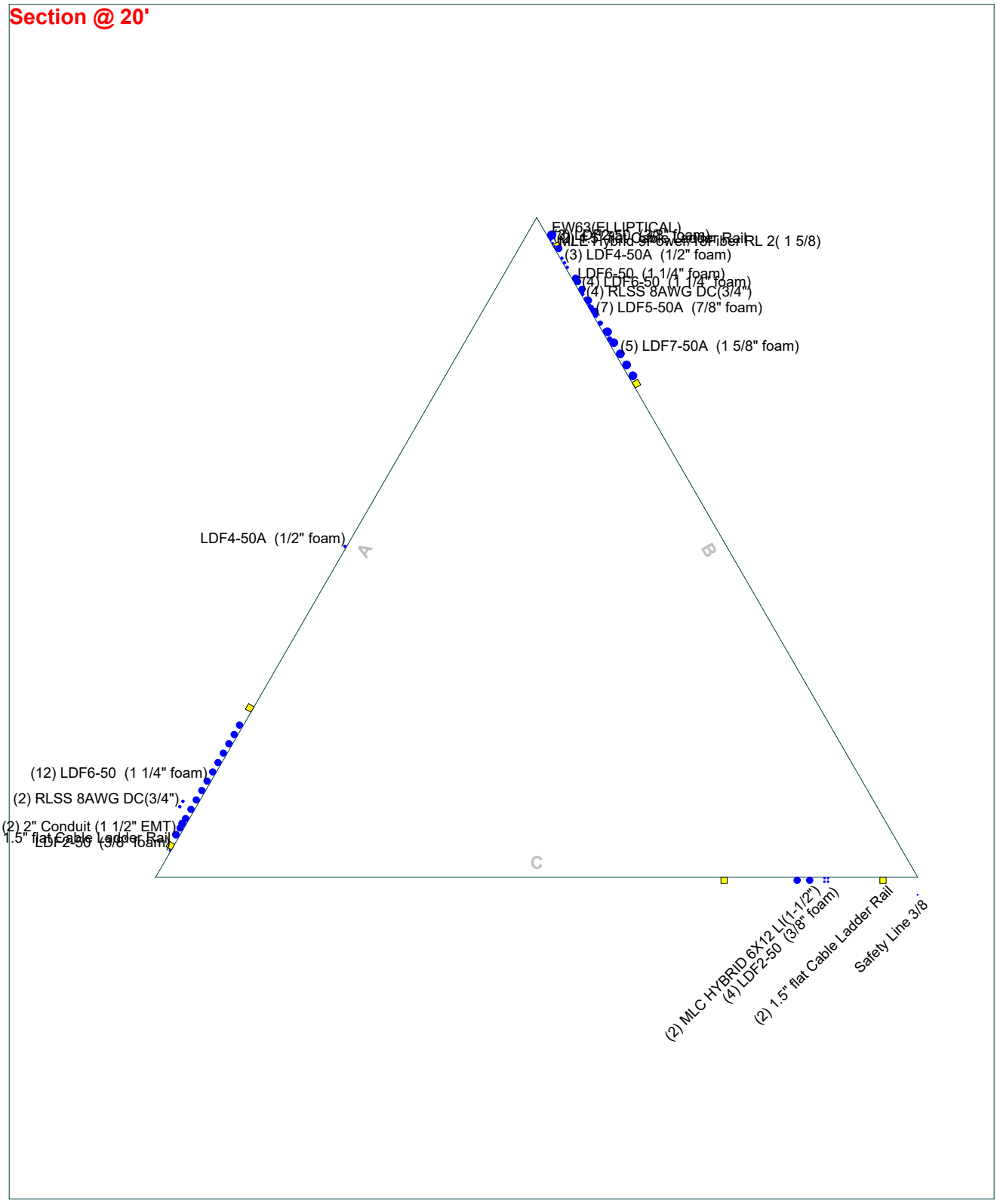
APPENDIX B

BASE LEVEL DRAWING

Feed Line Plan
20'

Round Flat App In Face App Out Face

Section @ 20'



Paul J. Ford and Company
250 E. Broad St., Ste 600
Columbus, OH 43215
Phone: 614-221-6679
FAX:

Job:	***Exg 140 ft SST w/ 10 ft Ext / Groton, CT***		
Project:	***BOBOS00010A (PJF 00024-0082.002.8800)***		
Client: Douglas J. Roberts - Architect		Drawn by: Michael Bange	App'd:
Code: TIA-222-H		Date: 07/16/24	Scale: NTS
Path: G:\TOWER\000_Misc\2024\00024-0082_Groton CT\00024-0082.003.8800_SDD\tnx\00024-0082.002.8800.eri			Dwg No. E-7

APPENDIX C

ADDITIONAL CALCULATIONS

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

By MTB Date 7/16/2024
Project # 00024-0082.002.8800

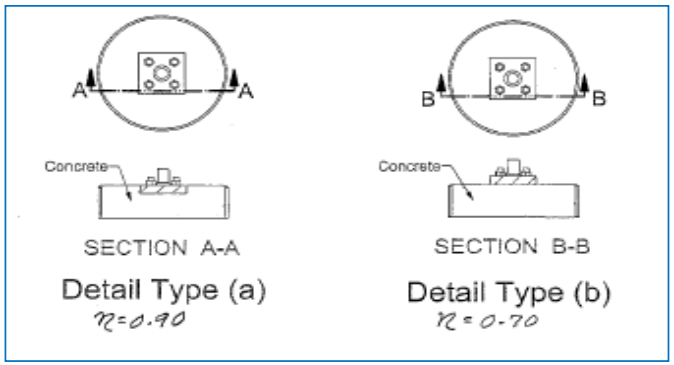
Self-Support Tower Anchor Rod Capacity - TIA-H

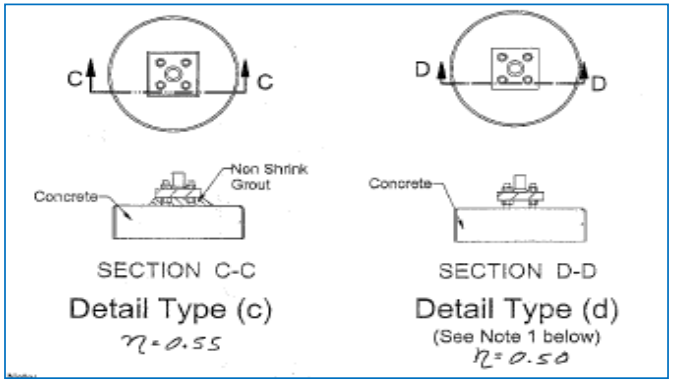
Loads

Compression :	356	kips	Tension :	322	kips	Code:	TIA-H
Comp. Shear :	36	kips	Ten.Shear :	33	kips	Maximum Ratio:	1.00
						Grout f'c ≥ 5000 psi:	

Existing Anchor Rods

Anchor Rod ø :	1	in	I_{ar} :		inches		
Anchor Rod Quantity :	8		Comp. M_u :	0.00	k-in	Ten. M_u :	0.00 k-in
Anchor Rod Grade :	A354 Gr. BC (1/4 to 2-1/2 incl.)		ϕ_c :	0.90			
F_y :	109	ksi	ϕ_v :	0.75			
F_u :	125	ksi	ϕ_f :	0.90			
Threads per Inch	8		$\phi_v R_{nv}$:	294.52	kips		
Net Tensile Area	0.61	in^2					
ϕ_t :	0.75		$\phi_f M_n$:	123.28	k-in		
$\phi_t R_{nt}$:	454.31	kip	$\phi_c R_{nc}$:	616.38	kips		
Anchor Rod Ratio :	0.709		$\phi_c R_{nvc}$:	277.37	kips		





SST Unit Base Foundation

Site # :	BOBOS00010A
Site Name:	Groton CT
App. Number:	
TIA-222 Revision:	H

Top & Bot. Pad Rein. Different?:	☐
Tower Centroid Offset?:	☐
Block Foundation?:	☑
Rectangular Pad?:	☐

Superstructure Analysis Reactions		
Global Moment, **M**:	5034.11	ft-kips
Global Axial, **P**:	40.68	kips
Global Shear, **V**:	57.55	kips
Leg Compression, $\mathbf{P_{comp}}$:	355.66	kips
Leg Comp. Shear, $\mathbf{V_{u\_comp}}$:	36.06	kips
Leg Uplift, $\mathbf{P_{uplift}}$:	321.76	kips
Leg Uplift. Shear, $\mathbf{V_{u\_uplift}}$:	32.84	kips
Tower Height, **H**:	150	ft
Base Face Width, **BW**:	16.99	ft
BP Dist. Above Fdn, $\mathbf{bp_{dist}}$:	2	in
Anchor Bolt Circle, **BC**:	14	in

Foundation Analysis Checks	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	135.97	57.55	**42.3%**	**Pass**
Bearing Pressure (ksf)	12.00	4.99	**41.6%**	**Pass**
*Overturning (kip*ft)*	5731.10	5302.68	**92.5%**	**Pass**
*Pad Flexure (kip*ft)*	6200.35	2305.43	**37.2%**	**Pass**
Pad Shear - 1-way (kips)	1293.26	366.20	**28.3%**	**Pass**
Pad Shear - Comp 2-way (ksi)	0.164	0.034	**20.9%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	4424.55	0.00	**0.0%**	**Pass**
Pad Shear - Tension 2-way (ksi)	0.164	0.031	**18.9%**	**Pass**
*Flexural 2-way (Tension) (kip*ft)*	4424.55	0.00	**0.0%**	**Pass**

Structural Rating:	**37.2%**
Soil Rating:	**92.5%**

Pad Properties		
Depth, **D**:	4.00	ft
Pad Width, $\mathbf{W_1}$:	26.50	ft
Pad Thickness, **T**:	4.50	ft
Pad Rebar Size (Bottom dir. 2), $\mathbf{Sp_2}$:	8	
Pad Rebar Quantity (Bottom dir. 2), $\mathbf{mp_2}$:	36	
Pad Clear Cover, $\mathbf{cc_{pad}}$:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

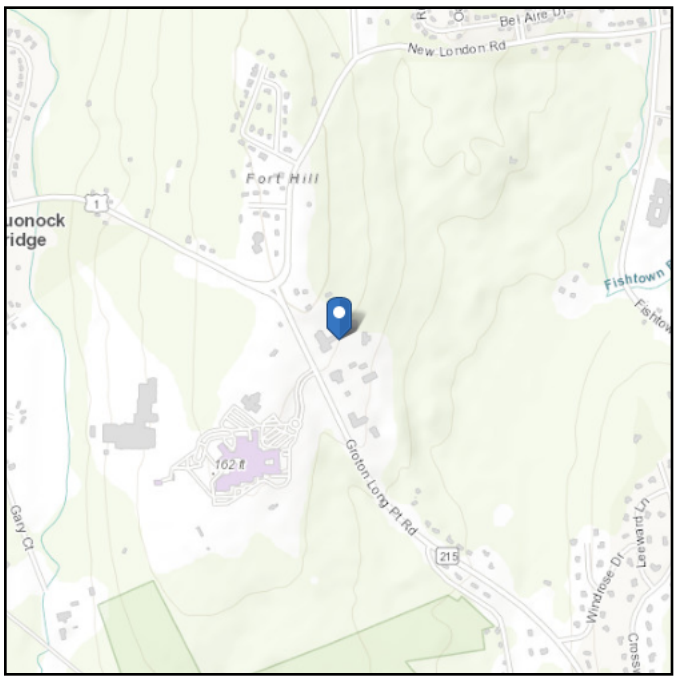
Soil Properties		
Total Soil Unit Weight, γ:	100	pcf
Ultimate Gross Bearing, Qult:	16.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	30	degrees
SPT Blow Count, $\mathbf{N_{blows}}$:		
Base Friction, μ:		
Neglected Depth, **N**:	3.5	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

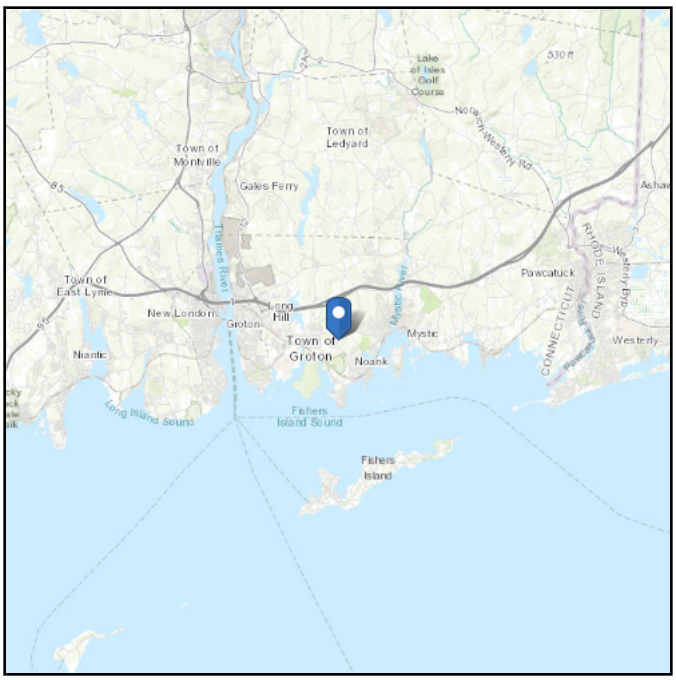
<-- Toggle between Gross and Net

ASCE Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Latitude:**	41.343546
Risk Category:	III	**Longitude:**	-72.009661
Soil Class:	D - Default (see Section 11.4.3)	**Elevation:**	168.93177122602648 ft (NAVD 88)





Wind

Results:

Wind Speed	137 Vmph
10-year MRI	76 Vmph
25-year MRI	87 Vmph
50-year MRI	99 Vmph
100-year MRI	105 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1C and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Tue Apr 23 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 3% probability of exceedance in 50 years (annual exceedance probability = 0.000588, MRI = 1,700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Seismic

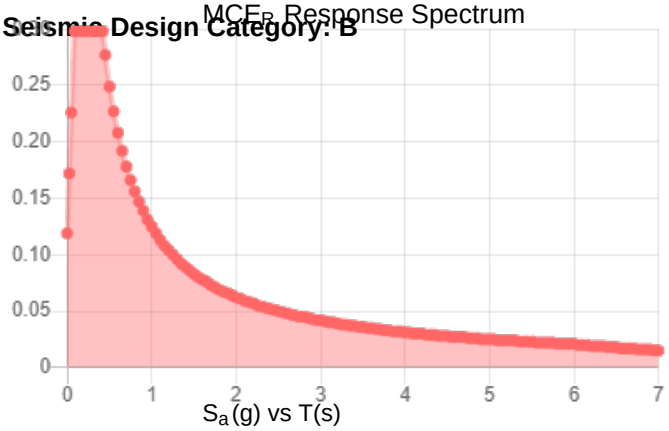
Site Soil Class: D - Default (see Section 11.4.3)

Results:

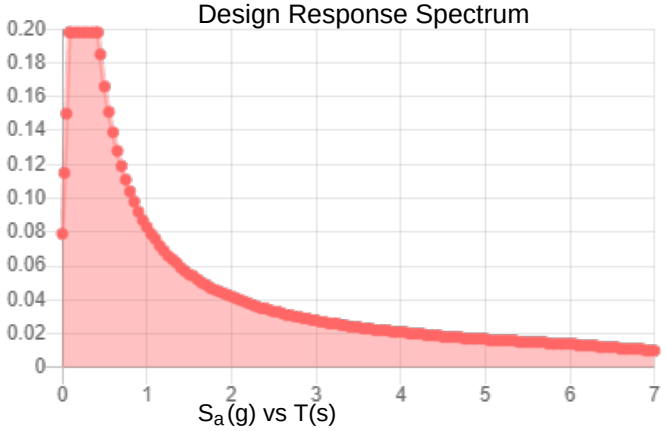
S_S :	0.186	S_{D1} :	0.083
S_1 :	0.052	T_L :	6
F_a :	1.6	PGA :	0.102
F_v :	2.4	PGA_M :	0.163
S_{MS} :	0.298	F_{PGA} :	1.596
S_{M1} :	0.125	I_e :	1.25
S_{DS} :	0.198	C_v :	0.7

Seismic Design Category: B

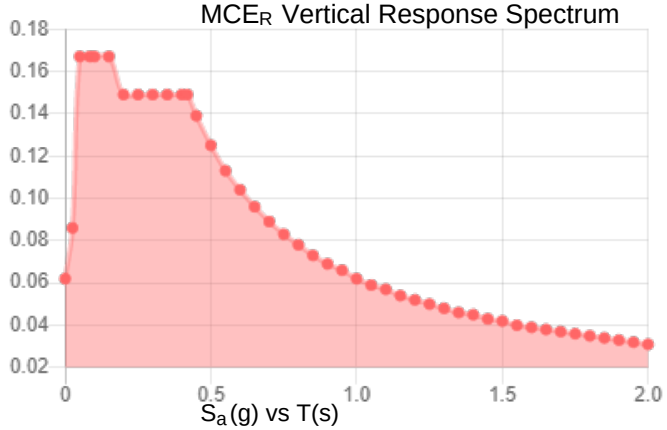
MCE_R Response Spectrum



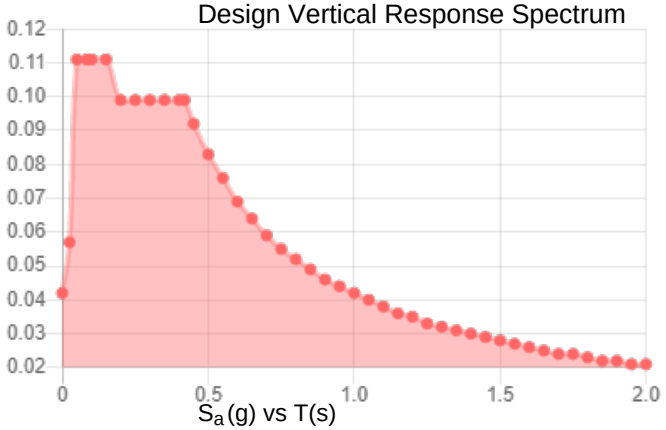
Design Response Spectrum



MCE_R Vertical Response Spectrum



Design Vertical Response Spectrum



Data Accessed: **Tue Apr 23 2024**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Apr 23 2024

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX D

MODIFICATION DRAWINGS

MODIFIED 140' (EXTENDED TO 150') SELF SUPPORT TOWER

5000120848, GROTON CT

68 GROTON LONG POINT RD
GROTON, CONNECTICUT 06340
NEW LONDON COUNTY
LAT: 41° 20' 36.77"; LONG: -72° 00' 34.78"

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DOUGLAS J. ROBERTS - ARCHITECT
110 WASHINGTON AVENUE FOURTH FLOOR NORTH HAVEN, CT 06473
PH: (203) 234-6368

PROJECT CONTACTS

CLIENT:
DOUGLAS J. ROBERTS - ARCHITECT
CONTACT: DOUGLAS ROBERTS AT DROBERTS-ARCHITECT@OUTLOOK.COM
PH: (203) 234-6368

ENGINEER OF RECORD:
PJFTELECOM@PAULJFORD.COM

WIND DESIGN DATA

REFERENCE STANDARD	ANSI/TIA-222-H-2017
LOCAL CODE	2022 CONNECTICUT STATE BUILDING CODE
BASIC WIND SPEED (MPH)	140
ICE THICKNESS (IN)	1
ICE WIND SPEED (MPH)	50
SERVICE WIND SPEED (MPH)	60
RISK CATEGORY	III
EXPOSURE CATEGORY	C
MAXIMUM TOPOGRAPHIC FACTOR, K_{ZT}	1.0

SHEET INDEX

TOWER MANUFACTURER: ROHN
TOWER MANUFACTURER #: 35131AE

QUALIFIED ENGINEERING SERVICES ARE AVAILABLE FROM PAUL J. FORD & COMPANY TO ASSIST CONTRACTORS IN CLASS IV RIGGING PLAN REVIEWS. FOR REQUESTED QUALIFIED ENGINEERING SERVICES, PLEASE CONTACT PJFTELECOM@PAULJFORD.COM .

STATE OF CONNECTICUT
THOMAS J. DEHNERT
36041
LICENSED PROFESSIONAL ENGINEER
08/07/2024

REV	DATE	DESCRIPTION

5000120848, GROTON CT
GROTON, CONNECTICUT
MODIFIED 140' (EXTENDED TO 150') SELF SUPPORT TOWER

PROJECT No:	00024-0082.003.8800
DRAWN BY:	TAN
DESIGNED BY:	MTB
CHECKED BY:	OFH
DATE:	8/6/2024

TITLE SHEET

T-1

00024-0082.003.DWG

POST-MODIFICATION CHECKLIST		
REQUIRED	REPORT ITEM	BRIEF DESCRIPTION
	PRE-CONSTRUCTION	
X	MI CHECKLIST DRAWING	THIS CHECKLIST SHALL BE INCLUDED IN THE MI REPORT
X	EOR APPROVED SHOP DRAWINGS	FABRICATION DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW. THE CONTRACTOR SHALL PROVIDE THE APPROVED SHOP DRAWINGS TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. SEE SHOP DRAWING NOTES.
X	FABRICATION INSPECTION	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR CERTIFIED WELD INSPECTION	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORT (MTR)	MILL CERTIFICATION SHALL BE PROVIDED FOR ALL STEEL WITH A YIELD STRENGTH GREATER THAN 36 KSI AND THIS DOCUMENTATION SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	FABRICATOR NDE INSPECTION	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED WELD INSPECTOR SHALL PERFORM NON-DESTRUCTIVE TESTING AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	NDE REPORT OF MONOPOLE BASE PLATE (AS REQUIRED)	A VISUAL OBSERVATION OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	THE MATERIAL SHIPPING LIST SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
	CONSTRUCTION	
X	CONSTRUCTION INSPECTIONS	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT
NA	FOUNDATION INSPECTIONS	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	CONCRETE COMP. STRENGTH AND SLUMP TESTS	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
NA	POST INSTALLED ANCHOR ROD VERIFICATION	ANCHOR ROD INSTALLATION SHALL INCLUDE VERIFICATION BY LETTER AND PHOTOGRAPHIC DOCUMENTATION.
NA	BASE PLATE GROUT VERIFICATION	A LETTER FROM THE GENERAL CONTRACTOR SHALL BE PROVIDED TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS INSTALLED IN ACCORDANCE WITH INDUSTRY STANDARD FOR INCLUSION IN THE MI REPORT
NA	CONTRACTOR'S CERTIFIED WELD INSPECTION	A CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST AS NECESSARY ALL FIELD WELDS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT. PRE, DURING AND POST WELD INSPECTION IS REQUIRED.
NA	EARTHWORK: LIFT AND DENSITY	FOUNDATION SUB-GRADES SHALL BE INSPECTED AND APPROVED BY A GEOTECHNICAL ENGINEER AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	ON SITE COLD GALVANIZING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON-SITE COLD GALVANIZING WAS APPLIED FOR FIELD PUNCHED/DRILLED HOLES
NA	GUY WIRE TENSION REPORT	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT TO THE MI INSPECTOR INDICATING THE TEMPERATURE AND TENSION IN EVERY GUY CABLE FOR INCLUSION IN THE MI REPORT.
X	GC AS-BUILT DOCUMENTS	THE GENERAL CONTRACTOR SHALL SUBMIT A COPY OF THE CONTRACT DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD DUE TO FIELD CONDITIONS.
NA	MAGNI 565 COATING VERIFICATION	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY MAGNI 565 COATING WAS APPLIED IN ACCORDANCE PER ASTM F1136.
NA	MICROPILE / ROCK ANCHOR	THE GENERAL CONTRACTOR SHALL PROVIDE INSTALLER'S DRILLING AND INSTALLATION LOGS AND QA/QC DOCUMENTATION TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
	POST-CONSTRUCTION	
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTORS REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
NA	POST INSTALLED ANCHOR ROD PULL TESTING	POST INSTALLED ANCHOR RODS SHALL BE TESTED IN ACCORDANCE WITH INDUSTRY STANDARD AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PHOTOGRAPHS	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI WHICH DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
NA	POST INSTALLED MICROPILE / ROCK ANCHOR TESTING	POST INSTALLED ANCHORS SHALL BE TESTED AND INSPECTED IN ACCORDANCE WITH SPECIFICATION STATED ON MICROPILE/ROCK ANCHOR NOTES.
NOTE: X DENOTES A DOCUMENT NEEDED FROM THE CONTRACTOR FOR THE MI REPORT NA DENOTES A DOCUMENT THAT IS NOT REQUIRED FOR THE MI REPORT		

MODIFICATION INSPECTION NOTES:

GENERAL
THE MODIFICATION INSPECTION (MI) IS A VISUAL INSPECTION OF TOWER MODIFICATIONS AND A REVIEW OF CONSTRUCTION INSPECTIONS AND OTHER REPORTS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS, AS DESIGNED BY THE ENGINEER OF RECORD (EOR).

THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, NOR DOES THE MI INSPECTOR TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES.

TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PO IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY.

MI INSPECTOR
THE MI INSPECTOR IS REQUIRED TO CONTACT THE GC AS SOON AS RECEIVING A PO FOR THE MI TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE GC TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS

THE MI INSPECTOR IS RESPONSIBLE FOR COLLECTING ALL GENERAL CONTRACTOR (GC) INSPECTION AND TEST REPORTS, REVIEWING THE DOCUMENTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING THE IN-FIELD INSPECTIONS, AND SUBMITTING THE MI REPORT TO THE OWNER.

GENERAL CONTRACTOR
THE GC IS REQUIRED TO CONTACT THE MI INSPECTOR AS SOON AS RECEIVING A PO FOR THE MODIFICATION INSTALLATION OR TURNKEY PROJECT TO, AT A MINIMUM:

- REVIEW THE REQUIREMENTS OF THE MI CHECKLIST
- WORK WITH THE MI INSPECTOR TO DEVELOP A SCHEDULE TO CONDUCT ON-SITE INSPECTIONS, INCLUDING FOUNDATION INSPECTIONS
- BETTER UNDERSTAND ALL INSPECTION AND TESTING REQUIREMENTS

THE GC SHALL PERFORM AND RECORD THE TEST AND INSPECTION RESULTS IN ACCORDANCE WITH INDUSTRY STANDARD.

RECOMMENDATIONS
THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING A MI REPORT:

- IT IS SUGGESTED THAT THE GC PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLE 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
- THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE-TENSIONING OPERATIONS
- IT MAY BE BENEFICIAL TO INSTALL ALL TOWER MODIFICATIONS PRIOR TO CONDUCTING THE FOUNDATION INSPECTIONS TO ALLOW FOUNDATION AND MI INSPECTION(S) TO COMMENCE WITH ONE SITE VISIT.
- WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON-SITE DURING THE MI TO HAVE ANY DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

CANCELLATION OR DELAYS IN SCHEDULED MI
IF THE GC AND MI INSPECTOR AGREE TO A DATE ON WHICH THE MI WILL BE CONDUCTED, AND EITHER PARTY CANCELS OR DELAYS, THE TOWER OWNER SHALL NOT BE RESPONSIBLE FOR ANY COSTS, FEES, LOSS OF DEPOSITS AND/OR OTHER PENALTIES RELATED TO THE CANCELLATION OR DELAY INCURRED BY EITHER PARTY FOR ANY TIME (E.G. TRAVEL AND LODGING, COSTS OF KEEPING EQUIPMENT ON-SITE, ETC.). IF THE TOWER OWNER CONTRACTS DIRECTLY FOR A THIRD PARTY MI, EXCEPTIONS MAY BE MADE IN THE EVENT THAT THE DELAY/CANCELLATION IS CAUSED BY WEATHER OR OTHER CONDITIONS THAT MAY COMPROMISE THE SAFETY OF THE PARTIES INVOLVED.

CORRECTION OF FAILING MI'S
IF THE MODIFICATION INSTALLATION WOULD FAIL THE MI ("FAILED MI"), THE GC SHALL WORK WITH THE EOR TO COORDINATE A REMEDIATION PLAN IN ONE OF TWO WAYS:

- CORRECT FAILING ISSUES TO COMPLY WITH THE SPECIFICATIONS CONTAINED IN THE ORIGINAL CONTRACT DOCUMENTS AND COORDINATE A SUPPLEMENT MI.
- OR, WITH OWNER'S APPROVAL, THE GC MAY WORK WITH THE EOR TO RE-ANALYZE THE MODIFICATION/REINFORCEMENT USING THE AS-BUILT CONDITION

PHOTOGRAPHS
BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:

- PRE-CONSTRUCTION GENERAL SITE CONDITION
- PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
  - RAW MATERIALS
  - PHOTOS OF ALL CRITICAL DETAILS
  - FOUNDATION MODIFICATIONS
  - WELD PREPARATION
  - BOLT INSTALLATION AND TORQUE
  - FINAL INSTALLED CONDITION
  - SURFACE COATING REPAIR
- POST CONSTRUCTION PHOTOGRAPHS
  - FINAL INFIELD CONDITION

PHOTOS OF ELEVATED MODIFICATIONS TAKEN FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.

THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, PLEASE COORDINATE WITH THE MI.

SHOP DRAWINGS
EOR APPROVED SHOP DRAWINGS CAN BE PROVIDED AS AN ADDITIONAL SCOPE OF SERVICE. IF REQUIRED, PLEASE CONTACT PJF FOR ADDITIONAL INFORMATION.

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250 E Broad St. Ste 600 · Columbus, OH 43215
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5000120848, GROTON CT
GROTON, CONNECTICUT
MODIFIED 140' (EXTENDED TO 150') SELF SUPPORT TOWER

PROJECT No:	00024-0082.003.8800
DRAWN BY:	TAN
DESIGNED BY:	MTB
CHECKED BY:	OFH
DATE:	8/6/2024

MI CHECKLIST AND NOTES

MI-1

STATE OF CONNECTICUT · THOMAS J. DEHN · 36041 · LICENSED PROFESSIONAL ENGINEER
08/07/2024

REV	DATE	DESCRIPTION

00024-0082.003.DWG

GENERAL NOTES:

1. THIS TOWER MODIFICATION DRAWING IS BASED UPON A STRUCTURAL ANALYSIS PERFORMED BY PAUL J. FORD AND COMPANY DATED 8/6/2024.

2. PAUL J. FORD AND COMPANY HAS NOT PERFORMED A FIELD VISIT TO VERIFY THE EXISTING TOWER MEMBER SIZES AND DIMENSIONS. THE MODIFICATIONS SHOWN ON THESE PAGES WERE DEVELOPED USING INFORMATION PROVIDED TO US BY DOUGLAS J ROBERTS - ARCHITECT.

3. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL. IF THE CONTRACTOR DISCOVERS ANY EXISTING CONDITIONS THAT ARE NOT AS REPRESENTED ON THESE DRAWINGS, PAUL J. FORD AND COMPANY SHALL BE CONTACTED IMMEDIATELY TO EVALUATE THE STRUCTURAL SIGNIFICANCE OF THE DEVIATION.

4. PAUL J. FORD AND COMPANY WAS NOT PROVIDED WITH THE EXACT LOCATION OF EVERY EXISTING APPURTENANCE THAT COULD POTENTIALLY INTERFERE WITH THE MODIFICATIONS AS INDICATED ON THESE DRAWINGS. IT IS IMPORTANT THAT THE MODIFICATION MATERIAL BE PLACED IN THE PROPER LOCATION TO BE EFFECTIVE. THIS MAY REQUIRE THE REPOSITIONING OF SOME EXISTING NON-STRUCTURAL ITEMS CURRENTLY ATTACHED TO THE TOWER.

5. THE CONTRACTOR MUST BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED ON THESE DRAWINGS. BY ACCEPTANCE OF THIS PROJECT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED TO DO THIS WORK IN THE JURISDICTION IN WHICH THE WORK IS TO BE PERFORMED.

6. THIS DRAWING DOES NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION METHODS, MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES.

7. THE STRUCTURAL DESIGN OF THE MODIFICATIONS INDICATED ON THESE DRAWINGS IS FOR THE COMPLETED CONDITION ONLY. THE CONTRACTOR SHALL MAKE ADEQUATE PROVISIONS FOR CONSTRUCTION STRESSES AND PROVIDE SUFFICIENT TEMPORARY SHORING AND BRACING AS REQUIRED.

8. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PROGRAMS AND PRECAUTIONS IN CONNECTION WITH THE WORK.

9. INSPECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH LOCAL BUILDING CODES.

CONSTRUCTION NOTES:

1. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION)

2. THESE DRAWINGS REQUIRE THE REMOVAL OF EXISTING ASTM A325 BOLTS. THE EXISTING ASTM A325 BOLTS THAT ARE REMOVED MUST BE REPLACED WITH NEW BOLTS.

3. ANY GALVANIZED SURFACE THAT IS SCRATCHED OR DAMAGED DUE TO THE CONTRACTORS EFFORTS, SHALL BE REPAIRED WITH A COLD GALVANIZING COMPOUND CONFORMING TO ASTM A780.

MATERIAL NOTES:

1. PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE PROPER FIT AND CLEARANCE OF THE REINFORCING MATERIAL IN THE FIELD. THE CONTRACTOR IS EXPECTED TO PERFORM A SITE VISIT BEFORE FABRICATING ANY MATERIAL.

2. ALL STEEL SHALL CONFORM TO THE FOLLOWING (U.N.O.):
   A. PIPE: ASTM A500 GR C (50 KSI YIELD POINT MATERIAL)
   B. ANGLES, PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)
   C. FLANGE PLATES: ASTM A572 GR 50 (50 KSI YIELD POINT MATERIAL)

3. ALL NEW STEEL SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH THE "SPECIFICATION FOR ZINC (HOT GALVANIZED) COATING ON PRODUCTS FABRICATED FROM ROLLED, PRESSED AND FORGED STEEL SHAPES, PLATES BAR, AND STRIP" ASTM A123.

4. ALL BOLTS (EXCEPT U-BOLTS) SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325. USE BEARING TYPE CONNECTIONS. TIGHTEN TO A SNUG TIGHT CONNECTION, UNO.

5. ALL U-BOLTS SHALL CONFORM TO ASTM A307, SAE 429 GR 2. U-BOLTS SHALL MEET REQUIREMENTS OF ASME B18.31.5-2011 BENT BOLTS.

6. ALL BOLTS AND U-BOLTS SHALL BE PROVIDED WITH LOCK-WASHERS, OR LOCK-NUTS, OR PAL-NUTS AND SHALL BE GALVANIZED ACCORDING TO ASTM A153/ASTM153M.

7. ALL HOLES IN THE NEW STEEL MEMBERS SHALL BE SIZED 1/16" LARGER THAN THE BOLT DIAMETER. SLOTTED OR OVERSIZED HOLES ARE NOT PERMITTED, UNO.

8. SHOP OR FIELD WELDED CONNECTIONS SHALL CONFORM TO THE LATEST REVISED CODE OF THE AMERICAN WELDING SOCIETY AWS D1.1 USING E70XX ELECTRODES. PRIOR TO FIELD WELDING, CONTRACTOR SHALL WIRE BRUSH ALL STEEL SURFACES TO BARE METAL AND PREHEAT ALL JOINTS. AFTER FIELD WELDING ALL WELDED SURFACES SHALL BE WIRE BRUSHED AND COATED WITH COLD GALVANIZING COMPOUND.

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5000120848, GROTON CT
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NOTES

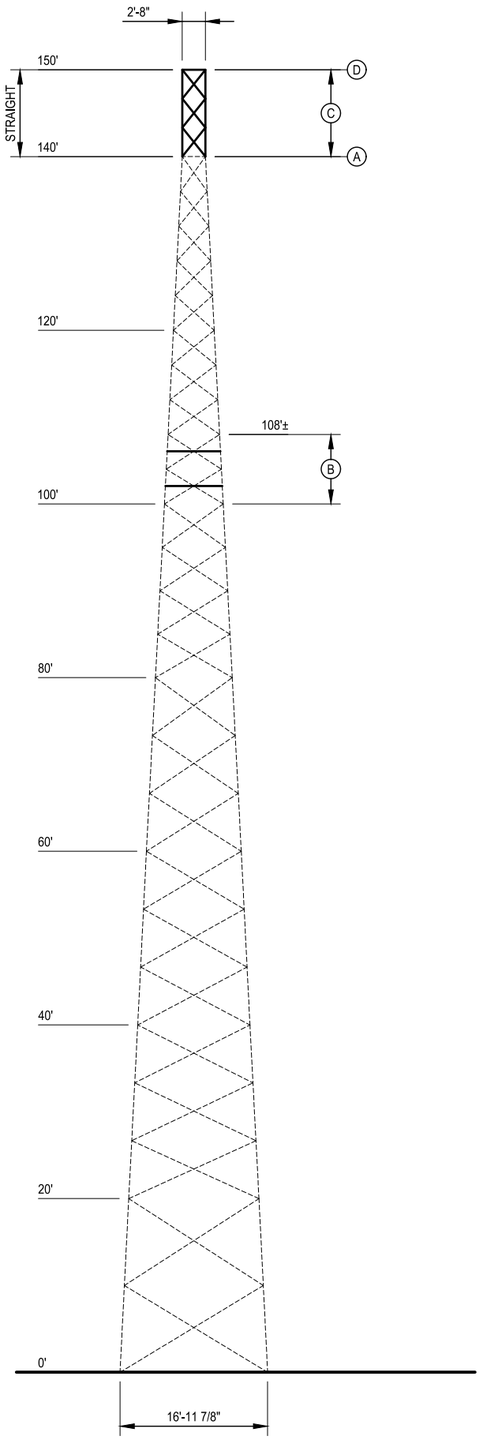
N-1

STATE OF CONNECTICUT · THOMAS J. DEHN · 36041 · LICENSED PROFESSIONAL ENGINEER

08/07/2024

REV	DATE	DESCRIPTION

00024-0082.003.DWG



TOWER ELEVATION 1 / S-1

TOWER MATERIAL LIST

ELEVATION	LEGS	DIAGONALS	HORIZONTALS	BAY SPACING
140' TO 150'	2.375" OD x 0.154" THK	L1 1/2 x 1 1/2 x 1/4	C8 x 11.5	3 BAYS @ 3'-3"
120' TO 140'	2.875" OD x 0.276" THK	L2 x 2 x 1/4	C8 x 11.5	5 BAYS @ 4'-0"
116' TO 120'	3.500" OD x 0.300" THK	L2 x 2 x 1/4	N/A	1 BAYS @ 4'-0"
112' TO 116'	3.500" OD x 0.300" THK	L2 x 2 x 1/4	N/A	1 BAYS @ 4'-0"
108' TO 112'	3.500" OD x 0.300" THK	L2 x 2 x 1/4	N/A	1 BAYS @ 4'-0"
104' TO 108'	3.500" OD x 0.300" THK	L2 x 2 x 1/4	N/A	1 BAYS @ 4'-0"
100' TO 104'	3.500" OD x 0.300" THK	L2 x 2 x 1/4	N/A	1 BAYS @ 4'-0"
80' TO 100'	4.500" OD x 0.337" THK	L2 x 2 x 1/4	N/A	4 BAYS @ 5'-0"
60' TO 80'	5.563" OD x 0.375" THK	L2 1/2 x 2 1/2 x 1/4	N/A	3 BAYS @ 6'-8"
40' TO 60'	6.625" OD x 0.340" THK	L2 1/2 x 2 1/2 x 1/4	N/A	3 BAYS @ 6'-8"
20' TO 40'	6.625" OD x 0.432" THK	L3 x 3 x 1/4	N/A	3 BAYS @ 6'-8"
0' TO 20'	8.625" OD x 0.375" THK	L3 1/2 x 3 1/2 x 1/4	N/A	2 BAYS @ 10'-0"

TOWER MODIFICATION SCHEDULE

	ELEVATION	TOWER MODIFICATION DESCRIPTION	REFERENCE SHEETS
(A)	140'±	REMOVE EXISTING ANTENNA EQUIPMENT, MOUNT, AND TOP INDEX PLATE	S-1
(B)	100'± TO 108'±	INSTALL SECONDARY HORIZONTALS	S-2
(C)	140'± TO 150'±	INSTALL TOWER EXTENSION	S-3 TO S-5
(D)	150'±	REINSTALL EXISTING TOP INDEX PLATE AND MOUNT	S-3

PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSE ONLY AND SHALL NOT BE USED FOR FABRICATION.

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PH: (203) 234-6368

5000120848, GROTON CT

GROTON, CONNECTICUT

MODIFIED 140' (EXTENDED TO 150') SELF SUPPORT TOWER

PROJECT No:	00024-0082.003.8800
DRAWN BY:	TAN
DESIGNED BY:	MTB
CHECKED BY:	OFH
DATE:	8/6/2024

TOWER ELEVATION

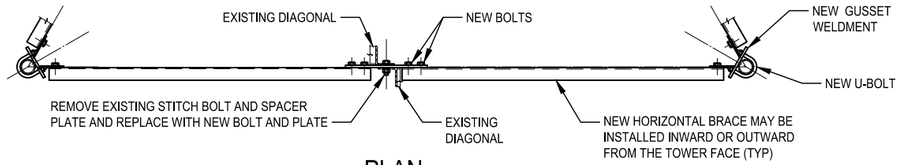
S-1

STATE OF CONNECTICUT · THOMAS J. DEHN · 36041 · LICENSED PROFESSIONAL ENGINEER

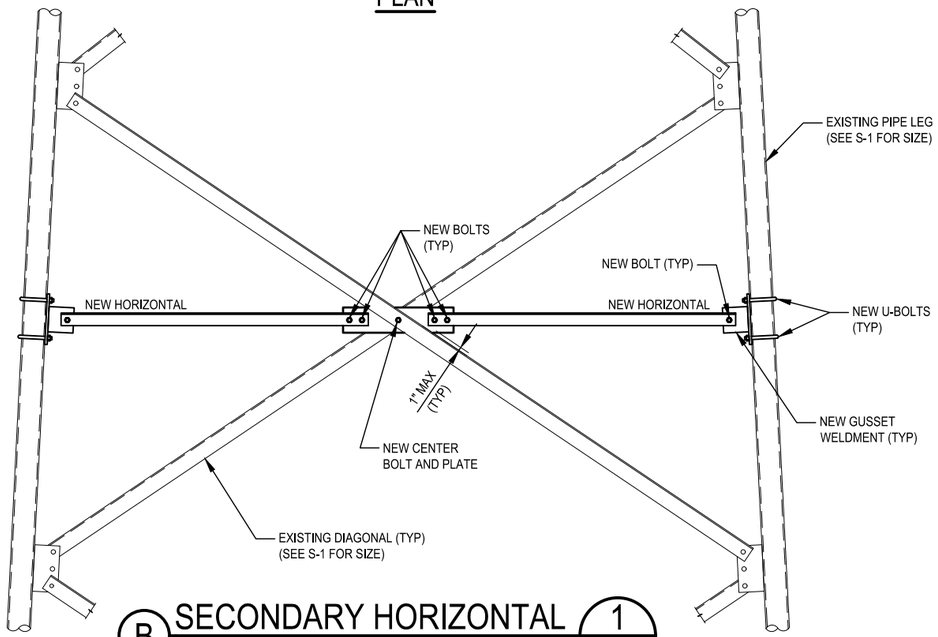
08/07/2024

REV	DATE	DESCRIPTION

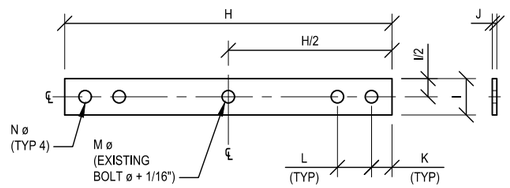
00024-0082.003.DWG



PLAN

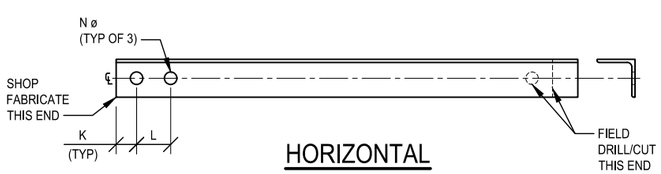


B SECONDARY HORIZONTAL 1 S-2



CENTER PLATE

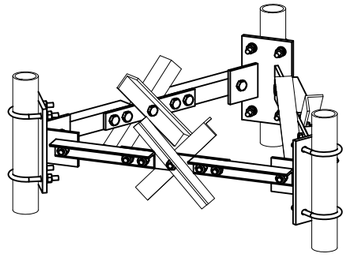
ELEVATION	H (in)	I (in)	J (in)	K (in)	L (in)	M (in)	N (in)
100'± TO 108'±	18	4	1/4	15/16	1 7/8	11/16	11/16



HORIZONTAL

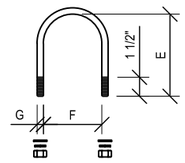
HORIZONTAL AND CENTER PLATE NOTES:

1. FIELD FABRICATION OF THESE PARTS IS PERMITTED.
2. MATCH THE GUSSET / RINGFILL FOR DIMENSION "J".
3. USE BEARING TYPE CONNECTION TO A SNUG TIGHT CONDITION, UNO.



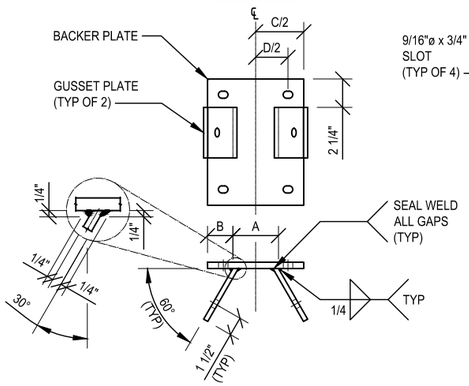
SECONDARY HORIZONTAL

MATERIAL LIST			
ELEVATION	QTY	MATERIAL	LENGTH
100'± TO 108'±	12	SECONDARY HORIZONTAL L2 x 2 x 1/4	3'-11"±
	6	CENTER PLATE 1/4" x 4"	1'-6"±
	6	GUSSET WELDMENT	
	36	5/8"ø BOLTS	1 3/4"
	6	5/8"ø BOLTS	2"
	12	1/2"ø U-BOLTS	

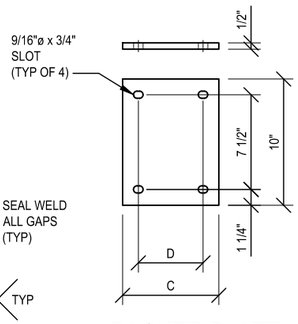


U-BOLT

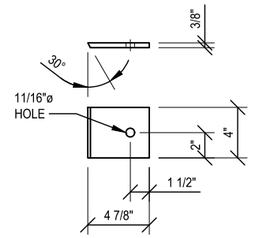
LEG PIPE OD	ASSEMBLY		BACKER PLATE		U-BOLT		
	A (in)	B (in)	C (in)	D (in)	E (in)	F (in)	G (in)
3.5	3	2	7	4 1/8	5 1/2	3 5/8	1/2



GUSSET WELDMENT



BACKER PLATE



GUSSET PLATE
TYPICAL FOR ALL ASSEMBLIES

GUSSET WELDMENT NOTES:

1. ALL HOLES TO BE SHOP FABRICATED, UNLESS NOTED OTHERWISE.
2. TOLERANCES, UNLESS NOTED OTHERWISE: FRACTIONS ± 1/16"
   ANGLES ± 1/2 DEGREE
   DECIMALS ± .010"
3. U-BOLTS SHALL BE SNUG TIGHT.
4. USE 2 U-BOLTS PER ASSEMBLY, COMPLETE WITH NUTS (ASTM A563), WASHERS (ASTM F436), AND LOCK WASHERS.
5. NO FIELD FABRICATION PERMITTED ON THIS PART.
6. STANDARD 9/16"ø HOLES IN PLACE OF SLOTTED HORIZONTAL HOLES ON THE BACKER PLATE ARE PERMITTED.

REV	DATE	DESCRIPTION

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5000120848, GROTON CT
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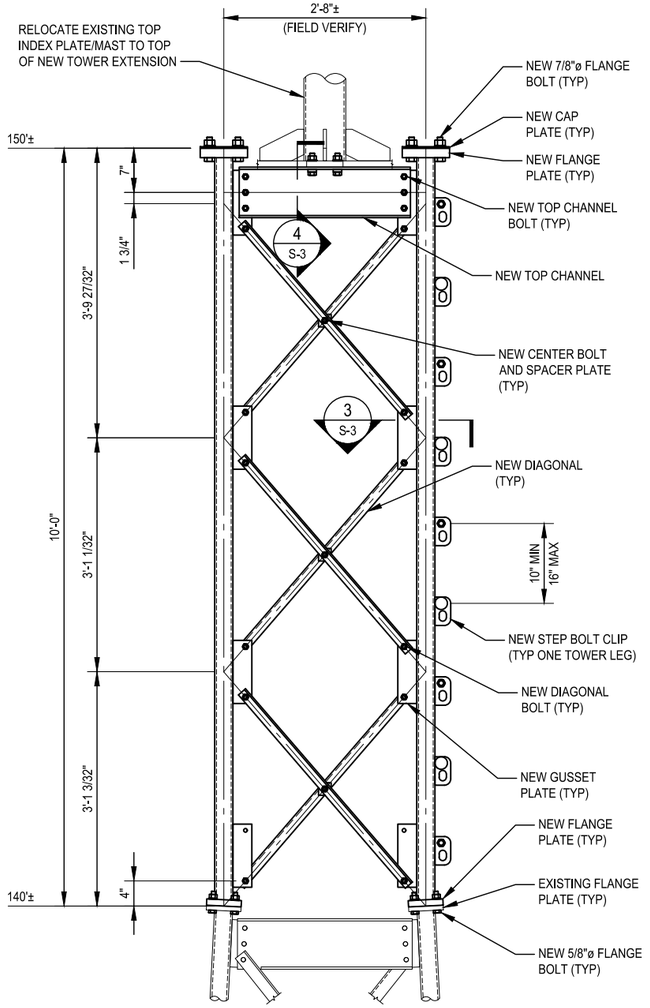
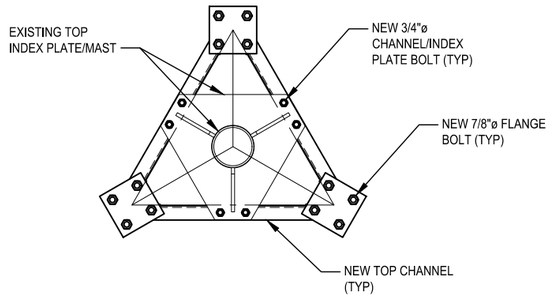
SECONDARY HORIZONTAL REINFORCING

S-2

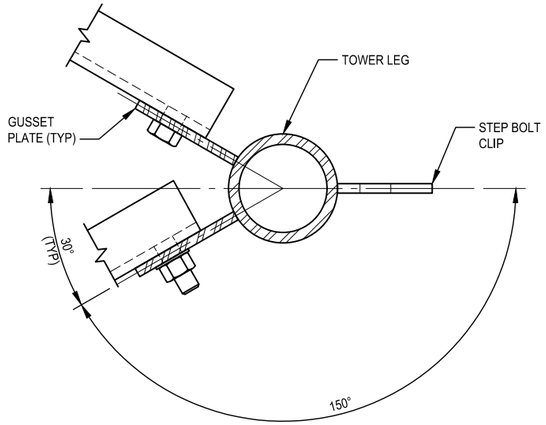
00024-0082.003.DWG



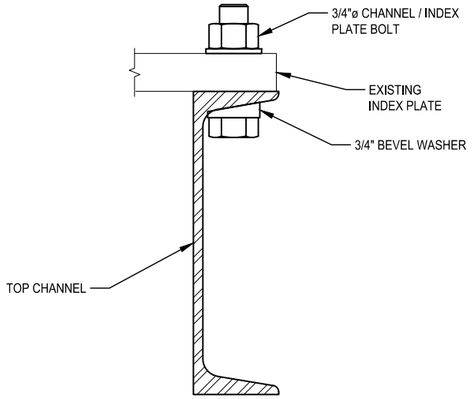
C TOWER EXTENSION 1 S-3



EXTENSION PLAN 2 S-3



SECTION 3 S-3



SECTION 4 S-3

MATERIAL LIST

ELEVATION	QTY	MATERIAL	LENGTH
140'± TO 150'±	3	2.375" OD x 0.154" THK LEG WELDMENT	10'-0"±
	18	DIAGONAL L1 1/2 x 1 1/2 x 1/4	3'-5"±
	3	TOP CHANNEL C8 x 11.5	2'-4"±
	3	CAP PLATE 1/4" x 7 1/2"	0'-7 1/2"
	9	SPACER PLATE 1/4" x 2"	0'-2"±
	18	5/8"ø TOP CHANNEL BOLTS	1 3/4"
	36	1/2"ø DIAGONAL BOLTS	1 1/2"
	9	1/2"ø CENTER BOLTS	1 3/4"
	12	5/8"ø FLANGE BOLTS	1 3/4"
	6	3/4" BEVEL WASHER	
	6	3/4"ø CHANNEL / INDEX PLATE BOLTS	3"
	12	7/8"ø FLANGE BOLTS	3 1/4"

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TOWER EXTENSION

S-3

STATE OF CONNECTICUT · THOMAS J. DEHN · 36041 · LICENSED PROFESSIONAL ENGINEER
08/07/2024

REV	DATE	DESCRIPTION

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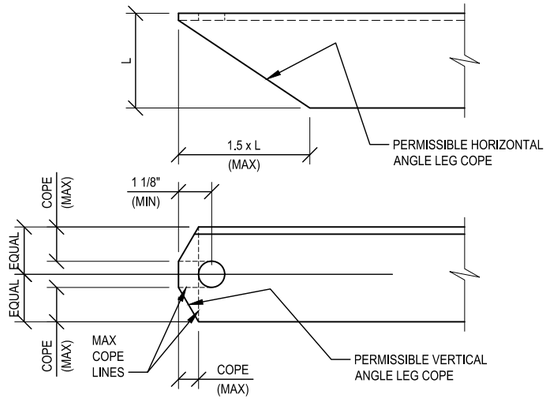
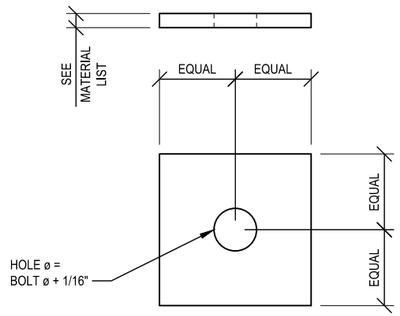
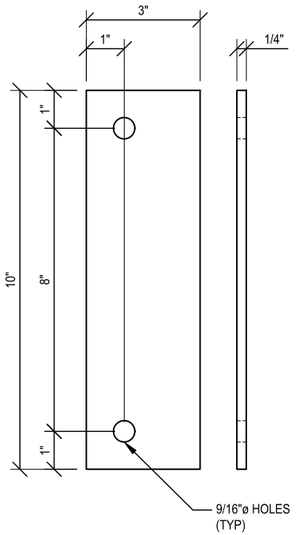


CRITERIA FOR PERMISSIBLE ANGLE COPING

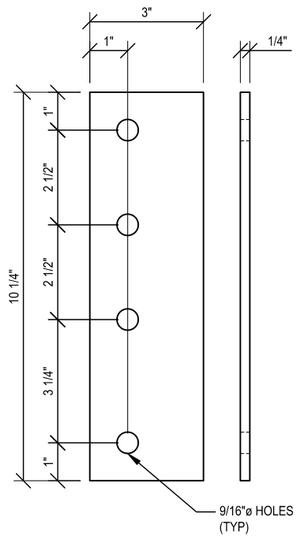
(IF REQUIRED)



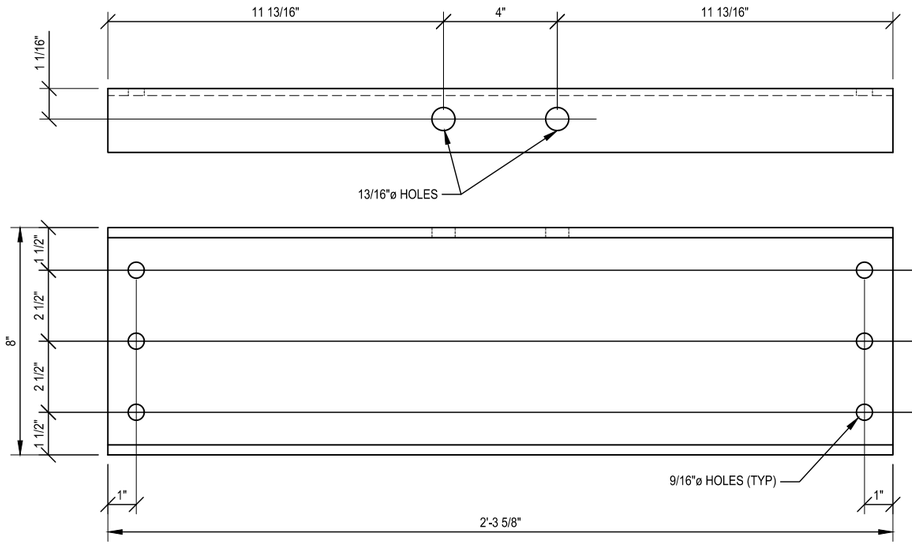
SPACER PLATE



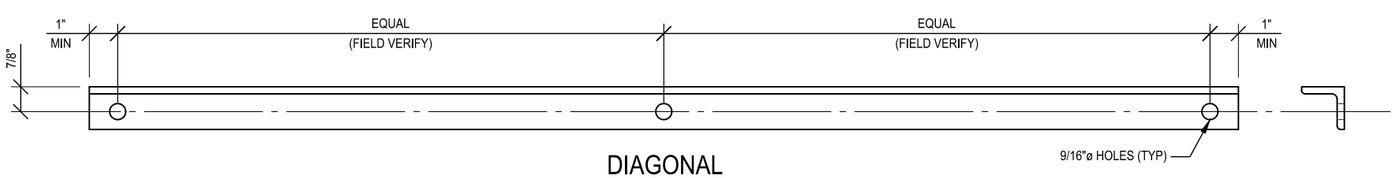
TYPICAL GUSSET PLATE



TOP GUSSET PLATE



TOP CHANNEL



DIAGONAL

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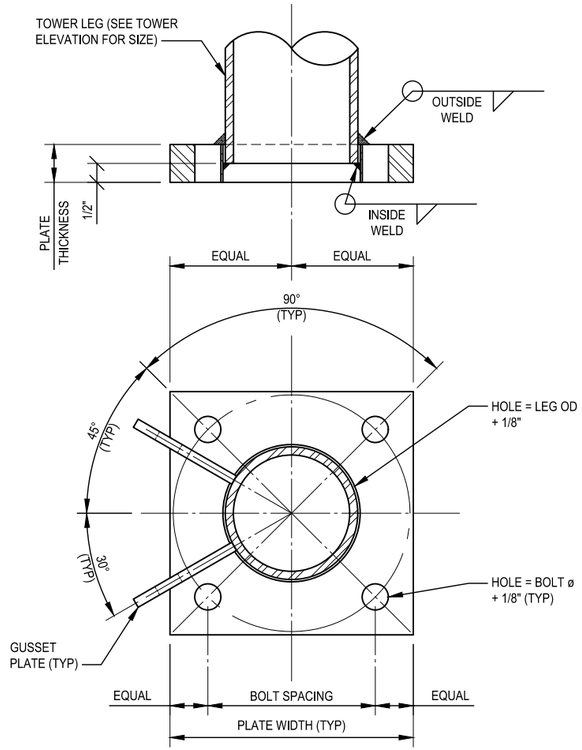
TOWER EXTENSION DETAILS

S-4

STATE OF CONNECTICUT
THOMAS J. DEHNER
36041
LICENSED PROFESSIONAL ENGINEER
08/07/2024

REV	DATE	DESCRIPTION

00024-0082.003.DWG

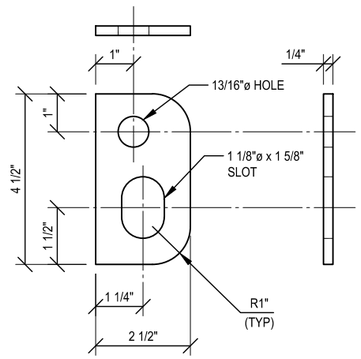


FLANGE DETAIL

(4) BOLT, SEE CHART

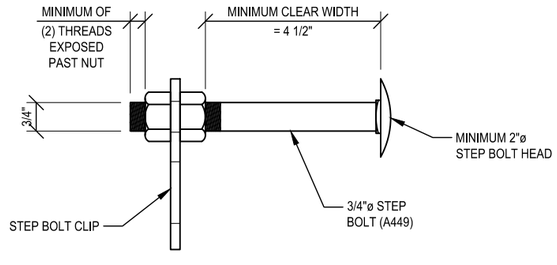
FLANGE PLATE CHART					
ELEVATION	PLATE SIZE	BOLT SPACING	BOLT	OUTSIDE FILLET	INSIDE FILLET
150'	1 1/2" THK x 7 1/2" x 7 1/2"	4 1/2"	(4) 7/8"ø	5/8"	5/16"
140'	1" THK x 5 1/2" x 5 1/2"	3 1/2"	(4) 5/8"ø	7/16"	5/16"

CONTRACTOR SHALL FIELD VERIFY THE EXISTING TOP FLANGE PLATE AND ORIENTATION PRIOR TO FABRICATING ANY MATERIAL.



STEP BOLT CLIP

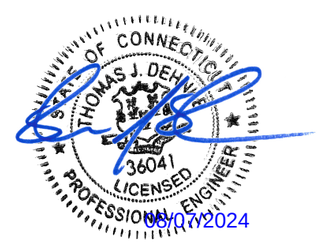
THE GC SHALL ENSURE THAT THE NEW WIRE ROPE DOES NOT MAKE CONTACT WITH TOWER STEEL, MOUNTS, FEEDLINES OR EQUIPMENT. THE WIRE ROPE SHALL BE INSTALLED IN THE MOST DIRECT ROUTE POSSIBLE; IF THIS REQUIRES CONFINING THE WIRE ROPE, THE GC SHALL INSTALL ADDITIONAL ANCHOR POINTS AS NEEDED ABOVE AND BELOW EACH OBSTRUCTION SUCH THAT THERE IS A MAXIMUM 4' SPACING BETWEEN ANCHOR POINTS.



STEP BOLT DETAIL

STEP BOLT NOTES:

1. STEP BOLT CLIP WELDS ARE SUBJECT TO AWS D1.1 AND MUST BE INSPECTED BY A CWI. REFER TO DOCUMENT "ENG-STD-10069 GC CWI REQUIREMENT STANDARD" FOR CWI REQUIREMENTS.
2. STEP BOLT CLIPS SHALL BE SHOP WELDED.
3. STEP BOLT CLIPS SHALL BE WELDED IN PLACE PRIOR TO HOT DIP GALVANIZING THE WELDMENT.
4. CONTRACTOR SHALL USE ALL NEW STEP BOLTS AND HARDWARE.
5. CENTER TO CENTER STAGGERED SPACING SHOULD BE MATCHED TO EXISTING FIELD CONDITIONS. STAGGERED SPACING SHALL BE A MINIMUM OF 10" AND MAXIMUM OF 16", IN THE VERTICAL DIRECTION.
6. STEP BOLT MATERIAL SHALL MEET THE REQUIREMENTS OF ASTM A449 AND SHALL BE TESTED AS FINISHED STEP BOLTS AT TEST FREQUENCY P (PIECE TESTING) OF ASTM A673 TO MEET MINIMUM ABSORBED ENERGY REQUIREMENT AT -20 DEGREES F [-29 DEGREES C] OF 15 FT-LBS [20 J] AVERAGE FOR 3 SPECIMENS AND A MINIMUM OF 12 FT-LBS [16 J] FOR ANY 1 SPECIMEN IN ACCORDANCE WITH ASTM A370.
7. STEP BOLT NUTS SHALL BE TIGHTENED TO A SNUG TIGHT CONDITION AND THEN ONE NUT SHALL BE PRETENSIONED BY ROTATING THE NUT AN ADDITIONAL 1/3 TURN.
8. PLATE AND CLIP BOLT HOLES SHALL BE SHOP DRILLED OR PUNCHED.



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DATE:	8/6/2024

TOWER EXTENSION DETAILS

S-5

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EXHIBIT 2
PROOF OF MAILING

UNITED STATES POSTAL SERVICE®

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647 Camino De Los Mares
Suite 108-228
San Clemente, CA 92673

To: Cuddy + Feder
Attn Lucia Chioccio
45 Hamilton Ave 14th Floor
White Plains, NY 10601

PS Form 3817, April 2007 PSN 7530-02-000-9065

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SAN CLEMENTE, CA
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647 Camino De Los Mares
Suite 108-228
San Clemente, CA 92673

To: Robinson + Cole
Attn Ken Baldwin
One State St.
Hartford, CT 06103

PS Form 3817, April 2007 PSN 7530-02-000-9065

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647 Camino De Los Mares
Suite 108-228
San Clemente, CA 92673

To: Town of Groton
Attn John Burt Town Manager
34 Fort Hill Rd
Groton, CT 06340

PS Form 3817, April 2007 PSN 7530-02-000-9065

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