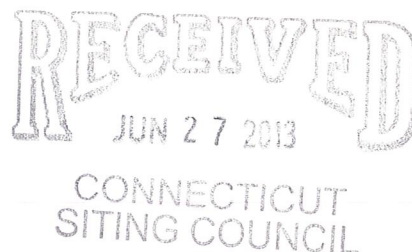


280 Trumbull Street
 Hartford, CT 06103-3597
 Main (860) 275-8200
 Fax (860) 275-8299
 kbaldwin@rc.com
 Direct (860) 275-8345

Also admitted in Massachusetts

June 26, 2013



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

Re: **Notice of Exempt Modification – Facility Modification
 83 Reeds Gap Road, North Branford, Connecticut**

Dear Ms. Bachman:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains twelve (12) wireless telecommunications antennas at the 90-foot level on the existing 92-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s use of this tower in 1986. Cellco now intends to replace one (1) of its existing antennas with one (1) model BXA-70063-6CF LTE antenna at the same 90-foot level. Attached behind Tab 1 are the specifications for Cellco’s replacement antenna.

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 Michael T. Paulhus, Town Manager for the Town of North Branford. A copy of this letter is also being sent to Mary Liska, the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Cellco’s replacement antenna will be located at the 90-foot level on the 92-foot tower.



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Melanie A. Bachman
June 26, 2013
Page 2

2. The proposed modification will not involve any change to ground-mounted equipment and, therefore, will not require the extension of the site boundary.

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

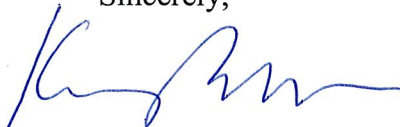
4. The operation of the modified facility will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The tower and its foundation, with certain modifications, can support Cellco's proposed facility modification. (*See* Structural Modification Report attached behind Tab 3).

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

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Michael T. Paulhus, North Branford Town Manager

Mary Liska

Sandy M. Carter

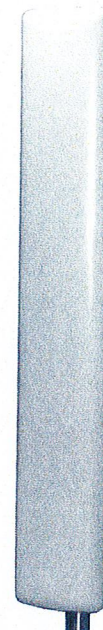


BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

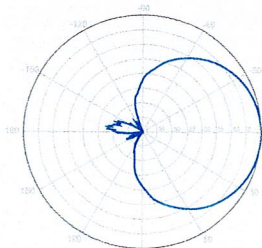
Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.



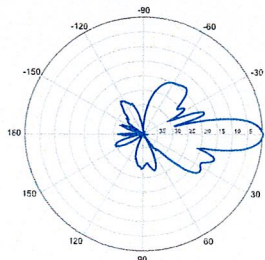
Electrical Characteristics	696-900 MHz		
	696-806 MHz	806-900 MHz	
Frequency bands	696-806 MHz	806-900 MHz	
Polarization	±45°		
Horizontal beamwidth	65°	63°	
Vertical beamwidth	13°	11°	
Gain	14.0 dBd (16.1 dBi)	14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10		
Impedance	50Ω		
VSWR	≤1.35:1		
Upper sidelobe suppression (0°)	-18.3 dB	-18.2 dB	
Front-to-back ratio (+/-30°)	-33.4 dB	-36.3 dB	
Null fill	5% (-26.02 dB)		
Isolation between ports	< -25 dB		
Input power with EDIN connectors	500 W		
Input power with NE connectors	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1804 x 285 x 132 mm	71.0 x 11.2 x 5.2 in	
Depth with z-brackets	172 mm	6.8 in	
Weight without mounting brackets	7.9 kg	17 lbs	
Survival wind speed	> 201 km/hr	> 125 mph	
Wind area	Front: 0.51 m ² Side: 0.24 m ²	Front: 5.5 ft ² Side: 2.6 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 759 N Side: 391 N	Front: 169 lbf Side: 89 lbf	
Mounting Options			
	Part Number	Fits Pipe Diameter	Weight
3-Point Mounting & Downtilt Bracket Kit	36210008	40-115 mm 1.57-4.5 in	6.9 kg 15.2 lbs
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP		

BXA-70063-6CF-EDIN-X



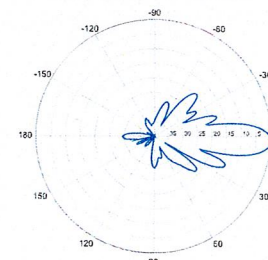
Horizontal | 750 MHz

BXA-70063-6CF-EDIN-0

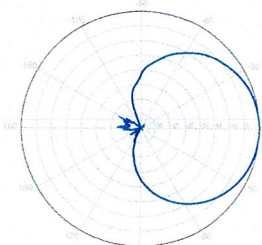


0° | Vertical | 750 MHz

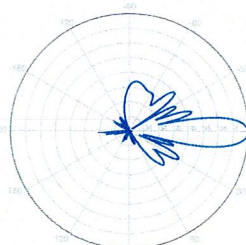
BXA-70063-6CF-EDIN-2



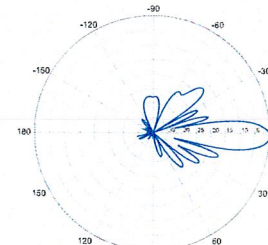
2° | Vertical | 750 MHz



Horizontal | 850 MHz



0° | Vertical | 850 MHz



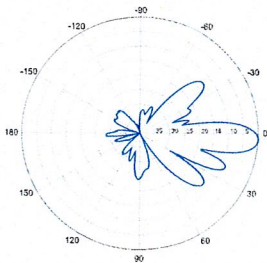
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70063-6CF-EDIN-X

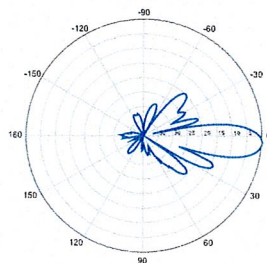
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



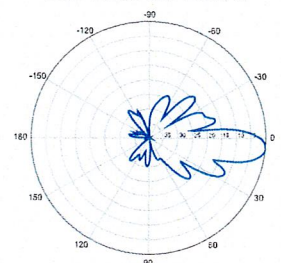
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

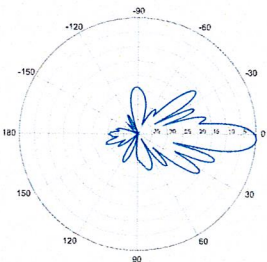


4° | Vertical | 750 MHz

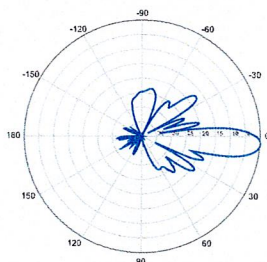
BXA-70063-6CF-EDIN-5



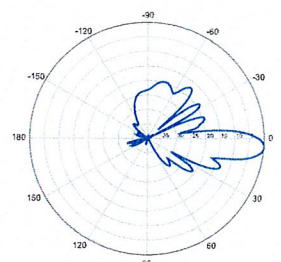
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

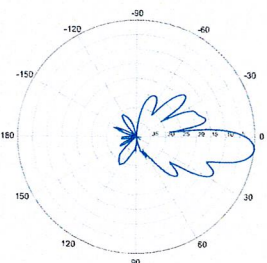


4° | Vertical | 850 MHz



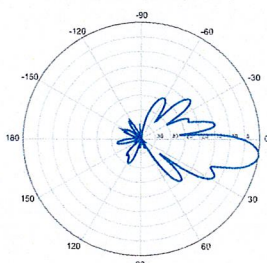
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



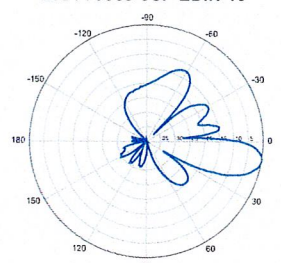
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

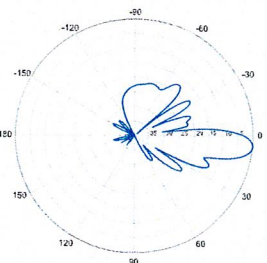


8° | Vertical | 750 MHz

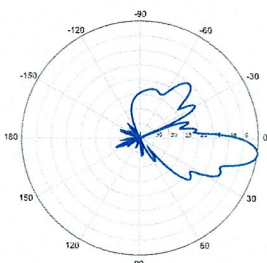
BXA-70063-6CF-EDIN-10



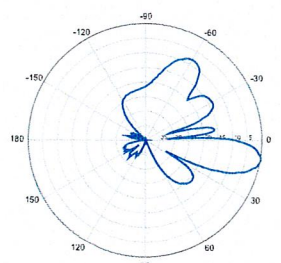
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

Site Name: North Branford Tower Height: Verizon @ 90ft		General	Power	Density				
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total
*AT&T UMTS	2	565	66	0.0933	880	0.5867	1.59%	
*AT&T UMTS	2	875	66	0.1445	1900	1.0000	1.44%	
*AT&T GSM	1	283	66	0.0234	880	0.5867	0.40%	
*AT&T GSM	4	525	66	0.1733	1900	1.0000	1.73%	
*AT&T LTE	1	1313	66	0.1084	734	0.4893	2.21%	
*NB Police Dept	receive only		50		159	0.2000	0.00%	
*NB Police Dept	receive only		50		458	0.3053	0.00%	
*Nextel	9	100	80	0.0506	851	0.5673	8.91%	
Verizon PCS	11	274	90	0.1338	1970	1.0000	13.38%	
Verizon Cellular	9	273	90	0.1091	869	0.5793	18.83%	
Verizon AWS	1	1750	90	0.0777	2145	1.0000	7.77%	
Verizon 700	1	1050	90	0.0466	698	0.4653	10.02%	
								66.29%
* Source: Siting Council								

Date: May 17, 2013

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277



FDH Engineering, Inc
6521 Meridien Drive
Raleigh, NC 27616
919-755-1012

Subject: Structural Modification Report

Carrier Designation: Verizon Wireless Co-Locate
Carrier Site Name: North Branford, CT

Crown Castle Designation:
Crown Castle BU Number: 806386
Crown Castle Site Name: NHV 106 943628
Crown Castle JDE Job Number: 230984
Crown Castle Work Order Number: 597273
Crown Castle Application Number: 185537 Rev. 3

Engineering Firm Designation: FDH Engineering, Inc Project Number: 1332991400

Site Data: 83 REEDS GAP ROAD, NORTH BRANFORD, New Haven County, CT
Latitude 41° 24' 12.47", Longitude -72° 44' 38.9"
92 Foot - Self Support Tower

Dear Darcy Tarr,

FDH Engineering, Inc is pleased to submit this "Structural Modification Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 537194, in accordance with application 185537, revision 3.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC4.7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 Connecticut State Building Code based upon a wind speed of 85 mph fastest mile.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at FDH Engineering, Inc appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Reviewed by:

A handwritten signature in black ink that reads "Ross Alexander".

Ross Alexander, EI
Project Engineer

A handwritten signature in black ink that reads "Christopher M. Murphy".

Christopher M. Murphy, PE
President
CT PE License No. 25842



1) INTRODUCTION

This tower is a 92 ft Self Support tower designed by ROHN in September of 1986. The tower was originally designed for wind zone A per EIA-222-C. The tower was modified in 2002 and 2006 to accommodate additional loading. Modification Drawings have been prepared by FDH Engineering in 2013. Reinforcement consists of the addition of secondary horizontals from 0' to 40' and diagonal swaps from 0' to 13.3' and 60' to 65'. These modifications were considered in this analysis.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90.0	90.0	1	antel	BXA-70063-6CF-2 w/ Mount Pipe	-	-	-

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
91.0	100.0	1	sinclair	SD212D-HF2P4SNM(D00B)	1	1/2	1
	96.0	1	sinclair	SD310-HF2P4SNM	3	7/8	
	91.0	2	crown mounts	Side Arm Mount[SO304-1]			
90.0	90.0	3	antel	BXA-171063-8BF-2 w/ Mount Pipe	12	1-5/8	1
		1	antel	BXA-70063-6CF-2 w/ Mount Pipe			
		1	antel	BXA-70063-6CF-EDIN-5 w/ Mount Pipe			
		2	antel	LPA-80063/6CF w/Mount Pipe			
		4	decibel	DB844G65ZAXY w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
		1	crown mounts	Sector Mount [SM 506-3]			
77.0	77.0	12	allgon	7130.16 w/ Mount Pipe	12	7/8	1
		1	crown mounts	Sector Mount [SM 510-3]			
65.0	66.0	6	powerwave	7770.00 w/ Mount Pipe	12	7/8	1

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
- 5) The tower modifications listed in the FDH Modification Drawings for a 92' Self Support tower dated May 17, 2013 must be installed per reinforcement drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. FDH Engineering, Inc should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
T1	92 - 80	Leg	ROHN 2 STD	1	-7.22	32.30	22.4	Pass
T2	80 - 75	Leg	ROHN 2.5 STD	25	-11.57	50.25	23.0	Pass
T3	75 - 70	Leg	ROHN 2.5 STD	34	-17.69	50.25	35.2	Pass
T4	70 - 65	Leg	ROHN 2.5 STD	43	-24.00	50.25	47.8	Pass
T5	65 - 60	Leg	ROHN 2.5 STD	52	-32.24	50.25	64.2	Pass
T6	60 - 40	Leg	ROHN 2.5 X-STR	64	-60.68	75.42	80.5	Pass
T7	40 - 20	Leg	ROHN 3 X-STR	94	-87.03	105.87	82.2	Pass
T8	20 - 13.3333	Leg	ROHN 3.5 X-STR	126	-95.19	132.23	72.0	Pass
T9	13.3333 - 6.66667	Leg	ROHN 3.5 X-STR	138	-103.45	132.26	78.2	Pass
T10	6.66667 - 1e-006	Leg	ROHN 3.5 X-STR	150	-111.13	132.28	84.0	Pass
T1	92 - 80	Diagonal	L1 1/2x1 1/2x1/8	17	-1.98	3.33	59.4 71.5 (b)	Pass
T2	80 - 75	Diagonal	L1 3/4x1 3/4x1/8	32	-2.81	4.12	68.4 78.3 (b)	Pass
T3	75 - 70	Diagonal	L2x2x1/4	41	-3.65	10.56	34.6 67.0 (b)	Pass
T4	70 - 65	Diagonal	L1 3/4x1 3/4x3/16	50	-3.59	4.91	73.1	Pass
T5	65 - 60	Diagonal	L2x2x1/4	62	-4.75	8.78	54.1 64.8 (b)	Pass
T6	60 - 40	Diagonal	L2x2x1/4	71	-5.13	5.19	98.9	Pass
T7	40 - 20	Diagonal	L2 1/2x2 1/2x3/16	101	-5.27	6.20	85.0 96.2 (b)	Pass
T8	20 - 13.3333	Diagonal	L2 1/2x2 1/2x3/16	131	-5.34	5.73	93.2 97.1 (b)	Pass
T9	13.3333 - 6.66667	Diagonal	L2 1/2x2 1/2x3/8	143	-5.46	9.80	55.8 69.6 (b)	Pass
T10	6.66667 - 1e-006	Diagonal	L2 1/2x2 1/2x3/8	155	-5.55	9.04	61.4 70.7 (b)	Pass
T6	60 - 40	Secondary Horizontal	L2 1/2x2 1/2x1/4	75	-1.05	15.77	6.7 19.2 (b)	Pass
T7	40 - 20	Secondary Horizontal	L2x2x1/4	105	-1.51	5.51	27.4	Pass
T8	20 - 13.3333	Secondary Horizontal	L2x2x1/4	135	-1.65	4.97	33.3	Pass
T9	13.3333 - 6.66667	Secondary Horizontal	L2x2x1/4	147	-1.80	4.47	40.2	Pass

APPENDIX A
TNXTOWER OUTPUT

tnxTower FDH Engineering, Inc 6521 Meridien Drive Raleigh, NC 27616 Phone: 919-755-1012 FAX: 919-755-1031	Job BU# 806386	Page 1 of 25
	Project 1332991400	Date 17:06:16 05/17/13
	Client Crown Castle	Designed by Ross Alexander

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 92.00 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 6.52 ft at the top and 14.70 ft at the base.
 This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

- Tower is located in New Haven County, Connecticut.
- Basic wind speed of 85 mph.
- Nominal ice thickness of 0.7500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.00 pcf.
- A wind speed of 38 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 50 mph.
- Pressures are calculated at each section.
- Stress ratio used in tower member design is 1.333.
- Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

- | | | |
|--|--|--|
| <ul style="list-style-type: none"> Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification √ Use Code Stress Ratios √ Use Code Safety Factors - Guys √ Escalate Ice Always Use Max Kz Use Special Wind Profile √ Include Bolts In Member Capacity Leg Bolts Are At Top Of Section √ Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) Add IBC .6D+W Combination | <ul style="list-style-type: none"> Distribute Leg Loads As Uniform Assume Legs Pinned √ Assume Rigid Index Plate √ Use Clear Spans For Wind Area √ Use Clear Spans For KL/r Retension Guys To Initial Tension √ Bypass Mast Stability Checks √ Use Azimuth Dish Coefficients √ Project Wind Area of Appurt. Autocalc Torque Arm Areas SR Members Have Cut Ends √ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing | <ul style="list-style-type: none"> Treat Feedline Bundles As Cylinder Use ASCE 10 X-Brace Ly Rules √ Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression √ All Leg Panels Have Same Allowable Offset Girt At Foundation √ Consider Feedline Torque √ Include Angle Block Shear Check Poles Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets |
|--|--|--|

tnxTower FDH Engineering, Inc 6521 Meridien Drive Raleigh, NC 27616 Phone: 919-755-1012 FAX: 919-755-1031	Job BU# 806386	Page 3 of 25
	Project 1332991400	Date 17:06:16 05/17/13
	Client Crown Castle	Designed by Ross Alexander

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
T6	60.00-40.00	6.67	X Brace	No	Yes	0.0000	0.0000
T7	40.00-20.00	6.67	X Brace	No	Yes	0.0000	0.0000
T8	20.00-13.33	6.67	X Brace	No	Yes	0.0000	0.0000
T9	13.33-6.67	6.67	X Brace	No	Yes	0.0000	0.0000
T10	6.67-0.00	6.67	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

Tower Elevation	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
ft						
T1 92.00-80.00	Pipe	ROHN 2 STD	A572-50 (50 ksi)	Equal Angle	L1 1/2x1 1/2x1/8	A36 (36 ksi)
T2 80.00-75.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x1/8	A36 (36 ksi)
T3 75.00-70.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T4 70.00-65.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T5 65.00-60.00	Pipe	ROHN 2.5 STD	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T6 60.00-40.00	Pipe	ROHN 2.5 X-STR	A572-50 (50 ksi)	Equal Angle	L2x2x1/4	A36 (36 ksi)
T7 40.00-20.00	Pipe	ROHN 3 X-STR	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T8 20.00-13.33	Pipe	ROHN 3.5 X-STR	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T9 13.33-6.67	Pipe	ROHN 3.5 X-STR	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/8	A36 (36 ksi)
T10 6.67-0.00	Pipe	ROHN 3.5 X-STR	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/8	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
ft						
T1 92.00-80.00	Equal Angle	L2x2x1/8	A36 (36 ksi)	Pipe		A36 (36 ksi)
T5 65.00-60.00	Equal Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)	Pipe		A36 (36 ksi)

Tower Section Geometry (cont'd)

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Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	C _d A _d ft ² /ft	Weight klf
*							

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _d A _d In Face ft ²	C _d A _d Out Face ft ²	Weight K
T1	92.00-80.00	A	23.384	2.500	0.000	0.000	0.28
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	80.00-75.00	A	13.709	1.250	0.000	0.000	0.15
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	75.00-70.00	A	16.979	1.250	0.000	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T4	70.00-65.00	A	16.979	1.250	0.000	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.750	0.000	0.000	0.03
T5	65.00-60.00	A	16.979	1.250	0.000	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	4.165	1.250	0.000	0.000	0.06
T6	60.00-40.00	A	67.917	5.000	0.000	0.000	0.63
		B	0.000	0.000	0.000	0.000	0.00
		C	16.662	5.000	0.000	0.000	0.24
T7	40.00-20.00	A	67.917	5.000	0.000	0.000	0.63
		B	0.000	0.000	0.000	0.000	0.00
		C	16.662	5.000	0.000	0.000	0.24
T8	20.00-13.33	A	22.639	1.667	0.000	0.000	0.21
		B	0.000	0.000	0.000	0.000	0.00
		C	5.554	1.667	0.000	0.000	0.08
T9	13.33-6.67	A	21.507	1.583	0.000	0.000	0.20
		B	0.000	0.000	0.000	0.000	0.00
		C	5.276	1.583	0.000	0.000	0.08
T10	6.67-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A _R ft ²	A _F ft ²	C _d A _d In Face ft ²	C _d A _d Out Face ft ²	Weight K
T1	92.00-80.00	A	0.841	7.723	29.083	0.000	0.000	0.73
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T2	80.00-75.00	A	0.831	3.623	17.583	0.000	0.000	0.40
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T3	75.00-70.00	A	0.824	3.607	22.350	0.000	0.000	0.46
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
T4	70.00-65.00	A	0.817	3.589	22.346	0.000	0.000	0.46
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	1.022	0.000	0.000	0.04

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Feed Line Center of Pressure

Section	Elevation	CP _X	CP _Z	CP _X Ice	CP _Z Ice
	ft	in	in	in	in
T1	92.00-80.00	-7.6785	-5.7743	-4.8056	-3.5857
T2	80.00-75.00	-9.3621	-7.3999	-6.8004	-5.3125
T3	75.00-70.00	-10.2091	-8.4279	-7.8590	-6.3776
T4	70.00-65.00	-10.2650	-8.4427	-7.8401	-6.3293
T5	65.00-60.00	-4.6084	-3.6631	-3.5025	-2.6998
T6	60.00-40.00	-5.5758	-4.4553	-4.3526	-3.3726
T7	40.00-20.00	-5.9972	-4.8208	-4.8234	-3.7649
T8	20.00-13.33	-6.3210	-5.0960	-5.1128	-4.0018
T9	13.33-6.67	-6.3505	-5.1260	-5.1212	-4.0130
T10	6.67-0.00	0.0000	0.0000	0.0000	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A ₁ Front ft ²	C _A A ₁ Side ft ²	Weight K	
SD310-HF2P4SNM	B	From Leg	2.00	0.0000	91.00	No Ice	0.65	0.65	0.01
			0.00			1/2" Ice	2.31	2.31	0.01
			5.00			1" Ice	3.97	3.97	0.01
						2" Ice	7.29	7.29	0.01
						4" Ice	13.93	13.93	0.01
SD212D-HF2P4SNM(D00B)	C	From Leg	2.00	0.0000	91.00	No Ice	4.92	4.92	0.08
			0.00			1/2" Ice	7.60	7.60	0.09
			9.00			1" Ice	10.28	10.28	0.10
						2" Ice	15.64	15.64	0.11
						4" Ice	26.36	26.36	0.15
Side Arm Mount [SO 304-1]	B	From Leg	1.00	0.0000	91.00	No Ice	0.63	0.94	0.02
			0.00			1/2" Ice	1.00	1.45	0.03
			0.00			1" Ice	1.37	1.96	0.04
						2" Ice	2.11	2.98	0.06
						4" Ice	3.59	5.02	0.09
Side Arm Mount [SO 304-1]	C	From Leg	1.00	0.0000	91.00	No Ice	0.63	0.94	0.02
			0.00			1/2" Ice	1.00	1.45	0.03
			0.00			1" Ice	1.37	1.96	0.04
						2" Ice	2.11	2.98	0.06
						4" Ice	3.59	5.02	0.09
* BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	90.00	No Ice	3.18	3.35	0.03
			0.00			1/2" Ice	3.56	3.97	0.06
			0.00			1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
						4" Ice	6.77	8.89	0.49
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	90.00	No Ice	3.18	3.35	0.03
			0.00			1/2" Ice	3.56	3.97	0.06
			0.00			1" Ice	3.96	4.60	0.10
						2" Ice	4.85	5.89	0.19
						4" Ice	6.77	8.89	0.49
BXA-171063-8BF-2 w/	C	From Leg	4.00	0.0000	90.00	No Ice	3.18	3.35	0.03

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Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _A A ₁ Front	C _A A ₁ Side	Weight
			Horz Lateral ft	Vert ft					
Side Arm Mount [SO 301-1]	C	From Leg	1.00	0.0000	59.00	4" Ice 1.15	1.15	0.08	
			0.00			No Ice 1.00	0.90	0.02	
			0.00			1/2" Ice 1.39	1.42	0.03	
						1" Ice 1.78	1.94	0.04	
						2" Ice 2.56	2.98	0.06	
						4" Ice 4.12	5.06	0.10	
	*								
	*								

Load Combinations

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

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft	
T6	60 - 40	Diagonal	Max. Compression	10	-32.24	-0.06	-0.01	
			Max. Mx	10	-32.20	0.14	-0.02	
			Max. My	13	-3.55	-0.03	0.19	
			Max. Vy	6	0.06	0.14	0.00	
			Max. Vx	11	0.06	-0.03	-0.19	
			Max Tension	3	4.69	0.00	0.00	
			Max. Compression	3	-4.75	0.00	0.00	
			Max. Mx	11	2.31	0.02	-0.00	
			Max. My	9	-4.74	-0.01	-0.01	
			Max. Vy	24	0.02	0.02	0.00	
			Max. Vx	9	0.00	0.00	0.00	
			Max Tension	2	0.37	0.00	0.00	
		Top Girt	Max. Compression	4	-0.39	0.00	0.00	
			Max. Mx	14	0.16	-0.07	0.00	
			Max. My	14	0.17	0.00	0.00	
			Max. Vy	14	0.03	0.00	0.00	
			Max. Vx	14	-0.00	0.00	0.00	
			Max Tension	12	51.60	0.09	-0.00	
			Leg	Max. Compression	10	-60.68	-0.16	-0.02
				Max. Mx	10	-60.65	0.28	0.01
				Max. My	11	-4.11	-0.04	-0.31
				Max. Vy	10	-0.15	0.28	0.01
				Max. Vx	11	-0.16	-0.04	-0.31
				Max Tension	3	5.13	0.00	0.00
		Diagonal		Max. Compression	3	-5.14	0.00	0.00
				Max. Mx	10	3.67	0.03	-0.00
				Max. My	9	-5.09	-0.00	-0.00
				Max. Vy	25	0.02	0.03	-0.00
				Max. Vx	15	-0.00	0.00	0.00
				Max Tension	2	1.05	0.00	0.00
Secondary Horizontal	Max. Compression	2	-1.05	0.00	0.00			
	Max. Mx	14	0.16	-0.11	0.00			
	Max. My	14	0.17	0.00	0.00			
	Max. Vy	14	0.04	0.00	0.00			
	Max. Vx	14	-0.00	0.00	0.00			
	Max Tension	12	75.65	0.15	-0.00			
T7	40 - 20	Leg	Max. Compression	10	-87.03	-0.30	-0.01	
			Max. Mx	10	-86.99	0.47	0.01	
			Max. My	11	-5.08	-0.06	-0.55	
			Max. Vy	10	0.23	0.47	0.01	
			Max. Vx	11	0.25	-0.06	-0.55	
			Max Tension	3	5.23	0.00	0.00	
		Diagonal	Max. Compression	3	-5.27	0.00	0.00	
			Max. Mx	23	0.80	0.06	-0.00	
			Max. My	15	-1.87	0.04	0.01	
			Max. Vy	25	0.03	0.06	0.00	
			Max. Vx	15	-0.00	0.00	0.00	
			Max Tension	2	1.51	0.00	0.00	
		Secondary Horizontal	Max. Compression	2	-1.51	0.00	0.00	
			Max. Mx	14	0.19	-0.12	0.00	
			Max. My	14	0.19	0.00	0.00	
			Max. Vy	14	0.04	0.00	0.00	
			Max. Vx	14	-0.00	0.00	0.00	
			Max Tension	12	83.01	0.17	-0.00	
T8	20 - 13.3333	Leg	Max. Compression	2	-95.19	-0.10	0.03	
			Max. Mx	15	-38.16	-0.71	0.00	
			Max. My	11	-5.24	-0.06	-0.55	
			Max. Vy	23	0.31	0.36	0.00	
			Max. Vx	11	-0.25	-0.06	-0.55	
			Max Tension	12	83.01	0.17	-0.00	

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	10	115.14	12.32	-7.48
	Max. H _x	10	115.14	12.32	-7.48
	Max. H _z	4	-100.16	-11.08	6.73
	Min. Vert	4	-100.16	-11.08	6.73
	Min. H _x	4	-100.16	-11.08	6.73
	Min. H _z	10	115.14	12.32	-7.48
Leg B	Max. Vert	6	114.48	-12.49	-7.13
	Max. H _x	12	-100.50	11.25	6.41
	Max. H _z	12	-100.50	11.25	6.41
	Min. Vert	12	-100.50	11.25	6.41
	Min. H _x	6	114.48	-12.49	-7.13
	Min. H _z	6	114.48	-12.49	-7.13
Leg A	Max. Vert	2	115.16	-0.39	14.41
	Max. H _x	11	6.20	1.88	0.50
	Max. H _z	2	115.16	-0.39	14.41
	Min. Vert	8	-100.27	0.36	-12.96
	Min. H _x	5	6.39	-1.89	0.52
	Min. H _z	8	-100.27	0.36	-12.96

Tower Mast Reaction Summary

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 Only	18.46	0.00	0.00	-1.76	3.69	0.00
Dead+Wind 0 deg - No Ice	18.46	0.02	-23.58	-1387.55	2.48	-9.67
Dead+Wind 30 deg - No Ice	18.46	11.51	-19.94	-1183.39	-678.00	-9.80
Dead+Wind 60 deg - No Ice	18.46	19.75	-11.43	-681.00	-1169.45	-7.47
Dead+Wind 90 deg - No Ice	18.46	22.98	-0.02	-2.97	-1357.58	-3.31
Dead+Wind 120 deg - No Ice	18.46	20.39	11.78	690.08	-1193.70	1.78
Dead+Wind 150 deg - No Ice	18.46	11.47	19.92	1178.66	-675.90	6.49
Dead+Wind 180 deg - No Ice	18.46	-0.02	22.82	1354.62	4.90	9.31
Dead+Wind 210 deg - No Ice	18.46	-11.51	19.94	1179.87	685.37	9.80
Dead+Wind 240 deg - No Ice	18.46	-20.41	11.81	692.18	1202.29	7.89
Dead+Wind 270 deg - No Ice	18.46	-22.98	0.02	-0.55	1364.96	3.31
Dead+Wind 300 deg - No Ice	18.46	-19.73	-11.40	-678.90	1175.61	-1.85
Dead+Wind 330 deg - No Ice	18.46	-11.47	-19.92	-1182.18	683.28	-6.49
Dead+Ice+Temp	37.05	0.00	0.00	-5.22	10.22	0.00
Dead+Wind 0 deg+Ice+Temp	37.05	0.00	-7.06	-416.83	10.19	-2.40
Dead+Wind 30 deg+Ice+Temp	37.05	3.27	-5.67	-341.21	-183.35	-2.20
Dead+Wind 60 deg+Ice+Temp	37.05	5.52	-3.19	-195.28	-318.20	-1.53
Dead+Wind 90 deg+Ice+Temp	37.05	6.54	-0.00	-5.24	-376.87	-0.60
Dead+Wind 120 deg+Ice+Temp	37.05	6.10	3.53	200.57	-345.48	0.54
Dead+Wind 150 deg+Ice+Temp	37.05	3.27	5.67	330.75	-183.30	1.60
Dead+Wind 180 deg+Ice+Temp	37.05	-0.00	6.38	374.86	10.25	2.12
Dead+Wind 210 deg+Ice+Temp	37.05	-3.27	5.67	330.78	203.79	2.20
Dead+Wind 240 deg+Ice+Temp	37.05	-6.10	3.53	200.62	365.95	1.87
Dead+Wind 270 deg+Ice+Temp	37.05	-6.54	0.00	-5.19	397.31	0.60
Dead+Wind 300 deg+Ice+Temp	37.05	-5.52	-3.19	-195.23	338.61	-0.59
Dead+Wind 330 deg+Ice+Temp	37.05	-3.27	-5.67	-341.19	203.74	-1.60
Dead+Wind 0 deg - Service	18.46	0.01	-8.16	-481.27	3.27	-3.35
Dead+Wind 30 deg - Service	18.46	3.98	-6.90	-410.63	-232.19	-3.39
Dead+Wind 60 deg - Service	18.46	6.83	-3.95	-236.79	-402.24	-2.58
Dead+Wind 90 deg - Service	18.46	7.95	-0.01	-2.18	-467.34	-1.15
Dead+Wind 120 deg - Service	18.46	7.05	4.07	237.63	-410.63	0.62
Dead+Wind 150 deg - Service	18.46	3.97	6.89	406.69	-231.46	2.24
Dead+Wind 180 deg - Service	18.46	-0.01	7.90	467.57	4.11	3.22

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Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	92 - 80	2.174	35	0.1847	0.0300
T2	80 - 75	1.702	35	0.1775	0.0219
T3	75 - 70	1.511	35	0.1729	0.0182
T4	70 - 65	1.326	35	0.1655	0.0166
T5	65 - 60	1.152	35	0.1563	0.0140
T6	60 - 40	0.985	35	0.1443	0.0126
T7	40 - 20	0.450	35	0.0939	0.0075
T8	20 - 13.3333	0.121	35	0.0452	0.0029
T9	13.3333 - 6.66667	0.057	35	0.0308	0.0015
T10	6.66667 - 1e-006	0.015	27	0.0155	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
91.00	SD310-HF2P4SNM	35	2.135	0.1841	0.0294	190127
90.00	BXA-171063-8BF-2 w/ Mount Pipe	35	2.095	0.1836	0.0288	190127
77.00	(4) 7130.16 w/ Mount Pipe	35	1.587	0.1750	0.0195	53633
65.00	(2) 7770.00 w/ Mount Pipe	35	1.152	0.1563	0.0140	38790
59.00	GPS_A	35	0.953	0.1418	0.0124	22054

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	92 - 80	6.246	10	0.5278	0.0867
T2	80 - 75	4.894	10	0.5085	0.0633
T3	75 - 70	4.345	10	0.4959	0.0527
T4	70 - 65	3.816	10	0.4751	0.0478
T5	65 - 60	3.314	10	0.4488	0.0405
T6	60 - 40	2.834	10	0.4146	0.0364
T7	40 - 20	1.296	2	0.2701	0.0217
T8	20 - 13.3333	0.348	2	0.1302	0.0084
T9	13.3333 - 6.66667	0.163	2	0.0886	0.0043
T10	6.66667 - 1e-006	0.044	2	0.0446	0.0021

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
91.00	SD310-HF2P4SNM	10	6.133	0.5264	0.0849	73463
90.00	BXA-171063-8BF-2 w/ Mount Pipe	10	6.019	0.5249	0.0832	73463
77.00	(4) 7130.16 w/ Mount Pipe	10	4.563	0.5018	0.0564	19306
65.00	(2) 7770.00 w/ Mount Pipe	10	3.314	0.4488	0.0405	13621
59.00	GPS_A	10	2.742	0.4074	0.0357	7713

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	92 - 80	ROHN 2 STD	12.00	4.00	61.0 K=1.00	22.549	1.0745	-7.22	24.23	0.298
T2	80 - 75	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.7040	-11.57	37.70	0.307
T3	75 - 70	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.7040	-17.69	37.70	0.469
T4	70 - 65	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.7040	-24.00	37.70	0.637
T5	65 - 60	ROHN 2.5 STD	5.01	5.01	63.4 K=1.00	22.122	1.7040	-32.24	37.70	0.855
T6	60 - 40	ROHN 2.5 X-STR	20.03	3.47	45.0 K=1.00	25.108	2.2535	-60.68	56.58	1.072
T7	40 - 20	ROHN 3 X-STR	20.03	3.44	36.4 K=1.00	26.333	3.0159	-87.03	79.42	1.096
T8	20 - 13.3333	ROHN 3.5 X-STR	6.68	3.43	31.5 K=1.00	26.968	3.6784	-95.19	99.20	0.960
T9	13.3333 - 6.66667	ROHN 3.5 X-STR	6.68	3.42	31.4 K=1.00	26.973	3.6784	-103.45	99.22	1.043
T10	6.66667 - 1e-006	ROHN 3.5 X-STR	6.68	3.42	31.4 K=1.00	26.978	3.6784	-111.13	99.24	1.120

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	92 - 80	L1 1/2x1 1/2x1/8	7.67	3.62	146.6 K=1.00	6.951	0.3594	-1.98	2.50	0.791
T2	80 - 75	L1 3/4x1 3/4x1/8	8.45	4.13	142.8 K=1.00	7.319	0.4219	-2.81	3.09	0.911
T3	75 - 70	L2x2x1/4	8.86	4.33	133.0 K=1.00	8.448	0.9380	-3.65	7.92	0.461
T4	70 - 65	L1 3/4x1 3/4x3/16	9.28	4.54	158.6 K=1.00	5.934	0.6211	-3.59	3.69	0.975
T5	65 - 60	L2x2x1/4	9.70	4.75	145.9 K=1.00	7.019	0.9380	-4.75	6.58	0.721
T6	60 - 40	L2x2x1/4	12.24	6.18	189.7 K=1.00	4.151	0.9380	-5.13	3.89	1.318
T7	40 - 20	L2 1/2x2 1/2x3/16	13.99	7.02	170.2 K=1.00	5.154	0.9020	-5.27	4.65	1.133
T8	20 - 13.3333	L2 1/2x2 1/2x3/16	14.59	7.30	177.0 K=1.00	4.765	0.9020	-5.34	4.30	1.242
T9	13.3333 - 6.66667	L2 1/2x2 1/2x3/8	15.21	7.61	187.5 K=1.00	4.248	1.7300	-5.46	7.35	0.744
T10	6.66667 - 1e-006	L2 1/2x2 1/2x3/8	15.83	7.92	195.1 K=1.00	3.921	1.7300	-5.55	6.78	0.818

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Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T9	13.3333 - 6.66667	ROHN 3.5 X-STR	6.68	3.42	31.4	30.000	3.6784	90.29	110.35	0.818
T10	6.66667 - 1e-006	ROHN 3.5 X-STR	6.68	3.42	31.4	30.000	3.6784	97.00	110.35	0.879

Diagonal Design Data (Tension)

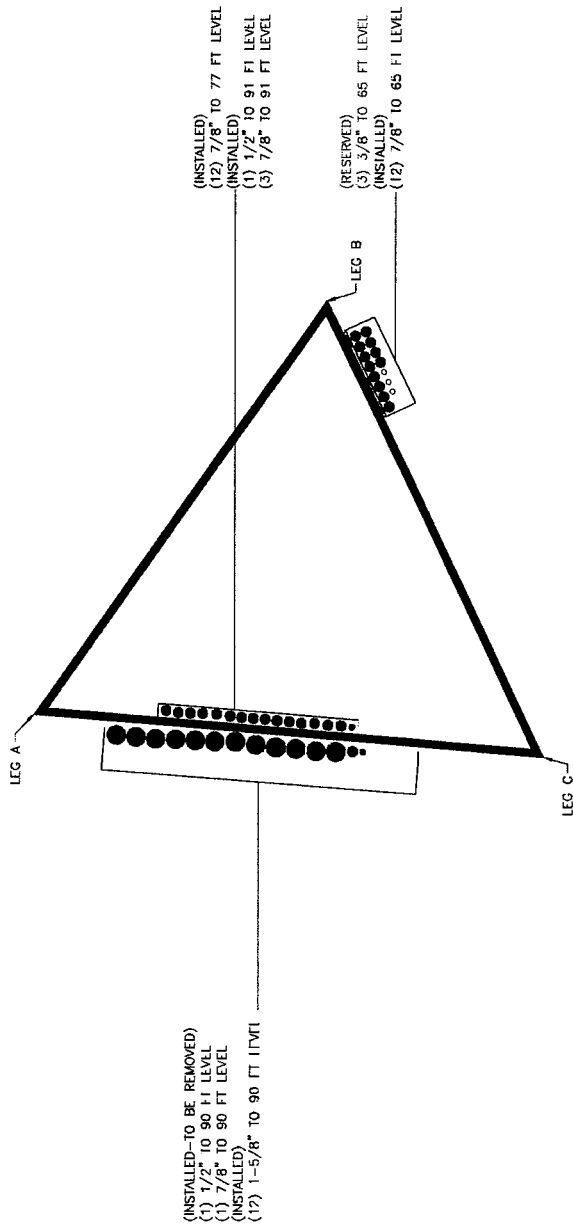
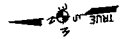
Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	92 - 80	L1 1/2x1 1/2x1/8	7.67	3.62	96.0	29.000	0.2109	1.99	6.12	0.325
T2	80 - 75	L1 3/4x1 3/4x1/8	8.45	4.13	93.1	29.000	0.2578	2.65	7.48	0.354
T3	75 - 70	L2x2x1/4	8.86	4.33	87.4	29.000	0.5863	3.68	17.00	0.216
T4	70 - 65	L1 3/4x1 3/4x3/16	9.28	4.54	103.8	29.000	0.3779	3.56	10.96	0.325
T5	65 - 60	L2x2x1/4	9.70	4.75	95.7	29.000	0.5863	4.69	17.00	0.276
T6	60 - 40	L2x2x1/4	11.12	5.63	111.0	29.000	0.5863	5.13	17.00	0.302
T7	40 - 20	L2 1/2x2 1/2x3/16	13.99	7.02	108.3	29.000	0.5886	5.23	17.07	0.306
T8	20 - 13.3333	L2 1/2x2 1/2x3/16	14.59	7.30	112.6	29.000	0.5886	5.25	17.07	0.308
T9	13.3333 - 6.66667	L2 1/2x2 1/2x3/8	15.21	7.61	121.3	29.000	1.1217	5.39	32.53	0.166
T10	6.66667 - 1e-006	L2 1/2x2 1/2x3/8	15.83	7.92	126.2	29.000	1.1217	5.47	32.53	0.168

Secondary Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T6	60 - 40	L2 1/2x2 1/2x1/4	9.57	9.33	145.6	29.000	0.7753	1.05	22.48	0.047
T7	40 - 20	L2x2x1/4	11.61	11.32	223.0	29.000	0.5629	1.51	16.32	0.093
T8	20 - 13.3333	L2x2x1/4	12.97	12.64	249.0	29.000	0.5629	1.65	16.32	0.101
T9	13.3333 - 6.66667	L2x2x1/4	13.66	13.32	262.6	29.000	0.5629	1.80	16.32	0.110
T10	6.66667 - 1e-006	L2x2x1/4	14.35	14.01	276.1	29.000	0.5629	1.93	16.32	0.118

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Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail
T5	65 - 60	Top Girt	L2 1/2x2 1/2x1/4	56	-0.39	6.84	5.7	Pass
							7.1 (b)	
							Summary	
							Leg (T10)	84.0 Pass
							Diagonal (T6)	98.9 Pass
							Secondary Horizontal (T10)	47.8 Pass
							Top Girt (T5)	7.1 Pass
							Bolt Checks	97.1 Pass
							RATING =	98.9 Pass



(Bearing and Stability Checks) Tool for TIA Rev F or G - Application (MP, SST with unitbase)

Site Data

BU#: 806386
Site Name: NHV 106 943628
App #:

Monopole Base Reaction Forces		
TIA Revision:	F	<--Pull Down
Unfactored DL Axial, PD:	18	kips
Unfactored WL Axial, PW:	0	kips
Unfactored WL Shear, V:	24	kips
Unfactored WL Moment, M:	1388	ft-kips

Enter Load Factors Below:		
For P (DL)	1.2	<---- Enter Factor
For P,V, and M (WL)	1.35	<---- Enter Factor

Load Factor	Shaft Factored Loads	
1.20	1.2D+1.6W, Pu:	21.6 kips
0.90	0.9D+1.6W, Pu:	16.2 kips
1.35	Vu:	32.4 kips
	Mu:	1873.8 ft-kips

Pad & Pier Data		
Base PL Dist. Above Pier:	0	in
Pier Dist. Above Grade:	0	in
Pad Bearing Depth, D:	2	ft
Pad Thickness, T:	3.5	ft
Pad Width=Length, L:	19	ft
Pier Cross Section Shape:	Round	<--Pull Down
Enter Pier Diameter:	0	ft
Concrete Density:	150.0	pcf
Pier Cross Section Area:	0.00	ft^2
Pier Height:	0.00	ft
Soil (above pad) Height:	0.00	ft

1.2D+1.6W Load Combination, Bearing Results:

(No Soil Wedges) [Reaction+Conc+Soil]	295.20	P1="1.2D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil), M1	1920.99	ft-kips

Orthogonal Direction:

ecc1 = M1/P1 = 6.51 ft
 Orthogonal qu= 2.60 ksf
 qu/φ*qn Ratio= **11.54%** Pass

Diagonal Direction:

ecc2 = (0.707M1)/P1 = 4.60 ft
 Diagonal qu= 3.07 ksf
 qu/φ*qn Ratio= **13.67%** Pass

<-- Press Upon Completing All Input

Soil Parameters		
Unit Weight, γ:	105.0	pcf
Ultimate Bearing Capacity, qn:	30.00	ksf
Strength Reduct. factor, φ:	0.75	
Angle of Friction, Φ:	29.0	degrees
Undrained Shear Strength, Cu:	0.00	ksf
Allowable Bearing: φ*qn:	22.50	ksf
Passive Pres. Coeff., Kp	2.88	

Overturning Stability Check

0.9D+1.6W Load Combination, Bearing Results:

Forces/Moments due to Wind and Lateral Soil		
Minimum of (φ*Ultimate Pad Passive Force, Vu):	15.1	kips
Pad Force Location Above D:	1.17	ft
φ(Passive Pressure Moment):	17.61	ft-kips
Factored O.T. M(WL), "1.6W":	1938.6	ft-kips
Factored OT (MW-Msoil), M1	1920.99	ft-kips

(w/ Soil Wedges) [Reaction+Conc+Soil]	221.40	P2="0.9D+1.6W" (Kips)
Factored "1.6W" Overturning Moment (MW-Msoil) - 0.9(M of Wedge + M of Cohesion), M2	1920.99	ft-kips

Orthogonal ecc3 = M2/P2 = 8.68 ft
 Ortho Non Bearing Length, NBL= 17.35 ft
 Orthogonal qu= 7.08 ksf
 Diagonal qu= 4.89 ksf


Resistance due to Foundation Gravity		
Soil Wedge Projection grade, a:	0.00	ft
Sum of Soil Wedges Wt:	0.00	kips
Soil Wedges ecc, K1:	0.00	ft
Ftg+Soil above Pad wt:	228.0	kips
Unfactored (Total ftg-soil Wt):	228.00	kips
1.2D. No Soil Wedges.	295.20	kips
0.9D. With Soil Wedges	221.40	kips

Max Reaction Moment (ft-kips) so that qu=φ*qn = 100% Capacity Rating

Actual M:	1388.00		
M Orthogonal:	1480.58	93.75%	Pass
M Diagonal:	1480.58	93.75%	Pass

Resistance due to Cohesion (Vertical)		
φ*(1/2*Cu)(Total Vert. Planes)	0.00	kips
Cohesion Force Eccentricity, K2	0.00	ft

PREPARED BY:




FOOT MEMBERS DRIVE
PHONE: 818-456-0022
FAX: 918-755-1031

ENGINEERING INNOVATION

PREPARED FOR:



CROWN CASTLE INTERNATIONAL



CHRISTOPHER M. MURPHY, P.E.
CONNECTICUT LICENSE NO. 25842

DRAWN BY: AI
CHECKED BY: SBA
ENG. APPL'D: CMM
PROJECT NO.: 132991400

SUBMITTALS		REV
DATE	DESCRIPTION	0
05/17/13	CONSTRUCTION	0

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SITE NAME:
NHV 106 943628

SITE NUMBER:
806386

SITE ADDRESS:
83 REEDS GAP ROAD
NORTH BRANFORD, CT 06472

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
N-2

COLD GALVANIZATION/SURFACE PREPARATION NOTES:

- CONTRACTOR TO USE ZINCA OR ZRC COLD GALVANIZATION COMPOUNDS OR APPROVED EQUIVALENT.
- PREPARE RUSTED/CORRODED SURFACE FOR TREATMENT ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR TO APPLY (2) COATS OF COLD GALVANIZATION COMPOUND PER MANUFACTURER'S RECOMMENDATIONS. SURFACES MUST BE UTILIZED PER MANUFACTURER'S RECOMMENDATION.
- APPLY ALL COATINGS BY BRUSH IN CALM WIND CONDITIONS. THE USE OF AEROSOL IS NOT PERMITTED.
- IF THE TOWER IS PAINTED, BRUSH PAINT ALL TREATED AREAS TO MATCH TOWER AFTER COLD GALVANIZATION COMPOUND IS ALLOWED TO CURE.

STEEL:

- ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST AISC CODE AND ASTM SPECIFICATIONS.
 - *ALL STEEL ANGLE SHALL BE ASTM A36 (Fy=36KSI) UNLESS OTHERWISE SPECIFIED.
 - *ALL STEEL PLATE SHALL BE ASTM A36 (Fy=36KSI) UNLESS OTHERWISE SPECIFIED.
 - *ALL U-BOLTS TO BE MADE OF ASTM A36 (Fy=36KSI) UNLESS OTHERWISE SPECIFIED.
- ALL CONNECTIONS OF STRUCTURAL STEEL MEMBERS SHALL BE MADE USING SPECIFIED WELDS WITH WELDING ELECTRODES E-70XX OR SPECIFIED HIGH STRENGTH BOLTS TO BE ASTM A325N, THREAD INCLUDED WITH SHEAR PLANE (UNLESS OTHERWISE NOTED).
- ALL BOLTED CONNECTIONS TO BE INSTALLED TO A SNUG-TIGHTENED CONDITION IN ACCORDANCE WITH AISC 13 PART 16.2.
 - *SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS*, SECTION B.1, UNLESS OTHERWISE SPECIFIED. WHEN "X" TYPE BOLTS ARE USED, CONTRACTOR MAY BE REQUIRED TO STACK ADDITIONAL WASHERS TO OBTAIN PROPER SNUG TIGHT INSTALLATION. ALL NUTS SHALL BE HEAVY HEX UNLESS OTHERWISE NOTED.
- ALL STEEL, AFTER FABRICATION, SHALL BE HOT DIPPED GALVANIZED PER ASTM A-123. ALL DAMAGED SURFACES, WELDED AREAS AND UNPROTECTED GALVANIZED MEMBERS OR PARTS (EXISTING OR NEW) SHALL BE REPAIRED AND REFINISHED TO A MINIMUM OF 4 MILS DRY FILM CALVANIZING COMPOUND ACHIEVING A MINIMUM OF 4 MILS DRY FILM PER ASTM A 780.
- ALL SHOP AND FIELD WELDING SHALL BE DONE BY WELDERS WHOSE QUALIFICATIONS SHALL BE IN ACCORDANCE WITH THE AISC STANDARD QUALIFICATION PROCEDURE TO PERFORM THE TYPE OF WORK REQUIRED. CONTRACTOR IS REQUIRED TO PROVIDE FDH ENGINEERING, INC. WITH A PASSING CERTIFIED WELDING INSPECTION FOR ALL WELDS.
- STRUCTURAL STEEL MAY NOT BE TORCH CUT FOR FABRICATION. ALL STEEL FABRICATION MUST FOLLOW AISC STANDARDS.

MISC. NOTES:

- ALL DIMENSIONS ARE PRELIMINARY UNTIL FIELD VERIFIED BY CONTRACTOR. ANY CHANGES MUST BE APPROVED BY ENGINEER OF RECORD IN WRITING PRIOR TO FABRICATION AND INSTALLATION.
- NEW STEEL MEMBERS MUST HAVE SINGLE DRILLED HOLES, SLOTTED HOLES OR DRILLED HOLES ARE NOT ACCEPTABLE MEANS OF FABRICATION.
 - SUBSTITUTES AND/OR EQUALS:

FABRICATION NOTES:

- CONTRACTOR WISHES TO FURNISH OR USE A SUBSTITUTE ITEM OF MATERIAL OR EQUIPMENT, CONTRACTOR SHALL FIRST MAKE WRITTEN APPLICATION TO ENGINEER OF RECORD FOR ACCEPTANCE THEREOF, CERTIFYING THAT THE PROPOSED SUBSTITUTE WILL PERFORM ADEQUATELY THE FUNCTIONS AND ACHIEVE THE RESULTS SPECIFIED IN THE CONTRACT DOCUMENTS. CONTRACTOR SHALL ESTIMATE ALL COSTS OR CREDITS THAT WILL RESULT DIRECTLY OR INDIRECTLY FROM ACCEPTANCE OF SUCH SUBSTITUTE INCLUDING COSTS OF REDESIGN AND CLAIMS OF OTHER CONTRACTORS AFFECTED BY THE RESULTING CHANGE. ALL OF WHICH WILL BE PROPOSED SUBSTITUTE. ENGINEER OF RECORD MAY REQUIRE CONTRACTOR TO FURNISH ADDITIONAL DATA ABOUT THE PROPOSED SUBSTITUTE.

GENERAL NOTES:

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND ORDINANCES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL PERMITS NECESSARY TO COMPLETE THE PROJECT AND ABIDE BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, ELEVATIONS AND EXISTING CONDITIONS AT THE SITE BEFORE ORDERING ANY MATERIALS OR DOING ANY WORK. NO EXTRA CHARGE OR COMPENSATION SHALL BE ALLOWED DUE TO DIFFERENCE BETWEEN ACTUAL DIMENSIONS AND DIMENSIONS SHOWN ON DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DISCREPANCY IN DIMENSION WHICH MAY BE FOUND SHALL BE SUBMITTED TO FDH ENGINEERING FOR CONSIDERATION BEFORE THE CONTRACTOR PROCEEDS WITH THE WORK IN THE AFFECTED AREAS.
- INCORRECTLY FABRICATED, DAMAGED, OTHERWISE MISTING, OR NON-CONFORMING MATERIALS AND CONDITIONS SHALL BE REPORTED TO FDH ENGINEERING PRIOR TO ANY REMEDIAL OR CORRECTIVE ACTION. ALL ACTIONS SHALL REQUIRE FDH ENGINEERING APPROVAL.
- IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR THE DOWNS AFTER THE COMPLETION OF THE PROJECT.
- CONTRACTOR SHALL PROMPTLY REMOVE ANY & ALL DEBRIS FROM SITE AND RESTORE AS BEST AS POSSIBLE TO PRECONSTRUCTION CONDITION.

CONTRACTOR QUALIFICATION NOTES:

- ALL REPAIRS SHALL BE PERFORMED BY A TOWER CONTRACTOR WITH A MINIMUM 5 YEARS EXPERIENCE IN TOWER ERECTION AND MAINTENANCE. CONTRACTOR SHALL BE AWARE OF THE AISC 222-F STRUCTURAL STANDARD FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.
- CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MEANS AND METHODS. SHOULD THE CONTRACTOR REQUIRE DIRECT SERVICES BASED UPON AN AGREED FEE FOR THE WORK REQUIRED.
- ALL SUBMITTAL INFORMATION MUST BE SENT TO FDH ENGINEERING, INC. 6521 MERIDEN DRIVE, RALEIGH NC, 27816. TEL. (919) 755-1032 FAX (919) 755-1031. E-MAIL: INFO@FDH-INC.COM. CONTRACTOR'S FAILURE TO OBTAIN WRITTEN CONSENT WITHOUT RESPONSIBILITY OR LIABILITY FOR DAMAGE (MATERIAL OR PHYSICAL) TOWARDS FDH ENGINEERING, INC.
- ALL CONSTRUCTION TO BE IN ACCORDANCE WITH THE T11-1019-A STANDARD.

JOB SITE SAFETY & NOTES:

- NEITHER THE PROFESSIONAL ACTIVITIES OF FDH ENGINEERING, INC. NOR THE PROFESSIONAL ACTIVITIES OF ANY OF ITS OFFICES AND SUB-CONSULTANTS AT THE CONSTRUCTION SITE SHALL RELIEVE THE GENERAL CONTRACTOR AND OR SUBCONTRACTORS AND ANY OTHER ENTITY OF THEIR OBLIGATIONS, DUTIES AND RESPONSIBILITIES INCLUDING, BUT NOT LIMITED TO, CONSTRUCTION MEANS AND METHODS, SAFETY, INCLUDING THE PROVISION OF NECESSARY FOR PERFORMANCE, SUPERINTENDING OR COORDINATING ALL PORTIONS OF THE WORK OF CONSTRUCTION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ANY HEALTH OR SAFETY REGULATIONS AND ORDINANCES. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR JOB SAFETY, AND WARRANTIES THAT THIS INTENT IS EVIDENT BY ACCEPTING THIS WORK.

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SHEET TITLE
GENERAL NOTES

SHEET NUMBER
N-2

PREPARED BY:
FDH
 ENGINEERING INNOVATION

PREPARED FOR:
CROWN CASTLE INTERNATIONAL

STATE OF CONNECTICUT
 PROFESSIONAL ENGINEER
 No. 25842
 LICENSED 05/17/13
 CHRISTOPHER W. MURPHY
 PROJECT LICENSE NO. 25842

DRAWN BY: AI
 CHECKED BY: SRA
 ENG. APPROV.: CMM
 PROJECT NO.: 1.332991400

DATE	SUBMITTALS	DESCRIPTION	REV
05/17/13	CONSTRUCTION		0

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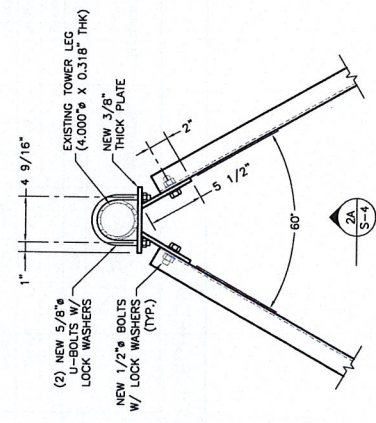
SITE NAME:
 NHV 106 943628

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 806386

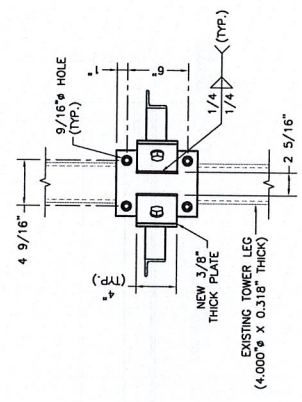
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 NORTH BRANFORD, CT 06472

SHEET TITLE
 SUBHORIZONTAL INSTALLATION
 DETAILS II

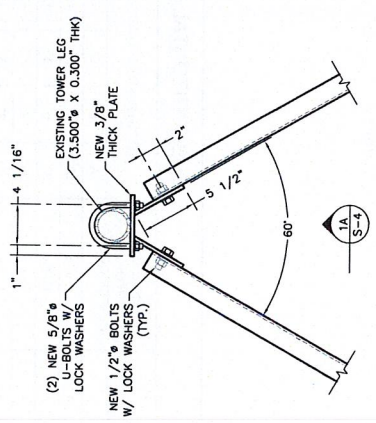
SHEET NUMBER
S-4



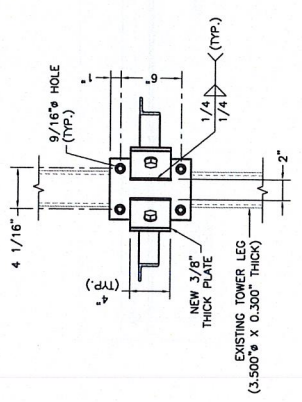
V-BRACKET ASSEMBLY "B"
 PLAN VIEW
 2 S-4
 SCALE: 1" = 1'-0"



V-BRACKET ASSEMBLY "B"
 ELEVATION VIEW
 2A S-4
 SCALE: 1" = 1'-0"



V-BRACKET ASSEMBLY "A"
 PLAN VIEW
 1 S-4
 SCALE: 1" = 1'-0"



V-BRACKET ASSEMBLY "A"
 ELEVATION VIEW
 1A S-4
 SCALE: 1" = 1'-0"