EM-SPRINT-143-130712

Together with Nextel

48 Spruce Street
Oakland, NJ 07436
Phone: (201)-951-3869
Tom Kincaid
Real Estate Consultant

ORIGINAL

RECEIVED
JUL 12 2013
CONNECTICUT
SITING COUNCIL

July 11, 2013

Hand Delivered

Ms. Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 350 Burr Mountain Road, Torrington CT 06790. Known to Sprint Spectrum L.P. as site CT33XC079.

Dear Ms. Roberts:

In order to accommodate technological changes, implement Code Division Multiple Access ("CDMA") and/or Long Term Evolution ("LTE") capabilities, and enhance system performance in the state of Connecticut, Sprint Spectrum L.P. plans to modify the equipment configurations at many of its existing cell sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A. Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and its attachments is being sent to the chief elected official of the municipality in which affected cell site is located.

CDMA employs Spread-Spectrum technology and special coding scheme to allow multiple users to be multiplexed over the same physical channel. LTE is a new high-performance air interface for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

As part of the project the new multi-mode 800/1900 antenna will replace existing antennas. These antennas will provide more flexibility for optimization by allowing fast and easy electrical tilt adjustment from remote location and will enable the transmission of multiple technologies from a single antenna. As Sprint Nextel's network evolves to meet the demands of its customers, it is essential for Sprint Nextel to install modern

equipment and antennas in order to provide reliable wireless voice and data services. The proposed equipment will include multi-mode radios that will allow Sprint Nextel to transmit at different frequencies using different technologies, including LTE technology. Likewise, the proposed antennas are quad-pole multi-band high gain antennas that will allow Sprint to operate using its multiple frequency bands and technologies, including LTE technology. The proposed equipment and antennas will improve the reliability, coverage and capacity of Sprint Nextel's voice and data networks across Sprint Nextel's various FCC licensed frequency bands and significantly increase the data speeds of Sprint Nextel's network by utilizing the latest LTE technology. Without the proposed modifications Sprint Nextel will be unable to provide reliable wireless voice and data service using the latest technologies.

Sprint Spectrum L.P. will have an interim (testing) period during the modification/installation prior to the final configuration. This antenna configuration is shown on the attached drawings of the planned modifications. Also included is the power density calculation reflecting the change in Sprint's operations at the site and documentation of the structural sufficiency of the tower to accommodate the revised antenna configuration.

The changes to the facility do not constitute modification as defined Connecticut General Statues ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed or altered. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for the R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will not be affected.
2. The proposed changes will not extend the site boundaries. There will be no effect on the site compound.
3. The proposed changes will not increase the noise level at the existing facility by 6 decibels or more.
4. Radio Frequency power density may increase due to the use of one or more CDMA transmissions. Moreover, LTE will utilize additional radio frequencies newly licensed by the FCC for cellular mobile communications. However, the changes will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site.

For the foregoing reasons Sprint Spectrum L.P. respectfully submits that the proposed changes at the referenced site constitute exempt modifications under R.C.S.A. Section 16-50j-72(b)(2).

Please feel free to call me at (845)-499-4712 or email JPalumbo@Transcendwireless.com with questions concerning this matter.
Thank you for your consideration.

Sincerely,

Jennifer Palumbo
Real Estate Consultant

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

Sprint Existing Facility

Site ID: CT33XC079

Torrington / O&G Ind. Inc
350 Burr Mountain Road
Torrington, CT 06790

August 30, 2012

21 B Street Burlington, MA 01803 Tel: (781) 273.2500 Fax: (781) 273.3311

EBI Consulting
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August 30, 2012

Sprint
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Re: Emissions Values for Site **CT33XC079 – Torrington / O&G Ind. Inc**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 350 Burr Mountain Road, Torrington, CT, for the purpose of determining whether the emissions from the proposed Sprint equipment upgrades on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of μW/cm2 calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

All results were compared to the FCC (Federal Communications Commission) radio frequency exposure rules, 47 CFR 1.1307(b)(1) – (b)(3), to determine compliance with the Maximum Permissible Exposure (MPE) limits for General Population/Uncontrolled environments as defined below.

General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the cellular band is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 350 Burr Mountain Road, Torrington, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the RFS APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **195.6 feet** above ground level (AGL)
7) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT33XC079 - Torrington / O&G Ind. Inc
Site Addresss	350 Burr Mountain Road, Torrington, CT 06790
Site Type	Monopole

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	195.6	189.6	1/2 "	0.5	0	1386.9474	13.87041	1.38704%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	195.6	189.6	1/2 "	0.5	0	389.96892	3.899952	0.68782%
														Sector total Power Density Value:		2.075%	

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	195.6	189.6	1/2 "	0.5	0	1386.9474	13.87041	1.38704%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	195.6	189.6	1/2 "	0.5	0	389.96892	3.899952	0.68782%
														Sector total Power Density Value:		2.075%	

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	195.6	189.6	1/2 "	0.5	0	1386.9474	13.87041	1.38704%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	195.6	189.6	1/2 "	0.5	0	389.96892	3.899952	0.68782%
														Sector total Power Density Value:		2.075%	

Site Composite MPE %	
Carrier	MPE %
Sprint	6.225%
Pocket	3.400%
T-Mobile	1.780%
Verizon Wireless	10.330%
AT&T	4.370%
Nextel	2.980%
Total Site MPE %	**29.085%**

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Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **6.225% (2.075% from each sector)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **29.085%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

FCC guidelines state that if a site is found to be out of compliance (over allowable thresholds), that carriers over a 5% contribution to the composite value will require measures to bring the site into compliance. For this facility, the composite values calculated were well within the allowable 100% threshold standard per the federal government

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

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Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

PASS
(Shaft, 100% capacity)

June 28, 2013

Mr. Dwayne Lyerly
SBA Communications Corporation
5900 Broken Sound Parkway NW
Boca Raton, FL 33487
(919) 557-0555

Vertical Solutions, Inc.
PO Box 579
Holly Springs, NC 27540
(888) 321-6167
operations@verticalsolutions-inc.com

Subject:	**Rigorous Structural Analysis**
Carrier Designation	**AT&T, Reconfiguration** **Site Number: CT-46138-A-01** **Site Name: Torrington/ OandG Ind. Inc.**
SBA Designation	**Site Number: CT46138-A** **Site Name: Torrington/Oandg Ind Inc**
Engineering Firm Designation	**Vertical Solutions Project: 130499, Revision 0**
Site Data	**Lot 5 Burr Mountain Road, Torrington, Litchfield Co., CT 06790** **Latitude: N41° 52' 23.70"±; Longitude: W073° 05' 18.30"±** **Elevation: 1045 ft±,** **195-ft Self Supporting Pole Structure (Monopole)**

Dear Mr. Lyerly,

To your request, we present our structural analysis.

Our work indicates that with the proposed appurtenance configuration, the tower and foundation **will** satisfy the structural strength requirements of ANSI/TIA-222-F-1996, *Structural Standard for Steel Antenna Towers and Antenna Supporting Structures (*industry standard) and the *2005 Connecticut Building Code* (local building code) for:

- 80-mph fastest mile basic wind speed
- 69-mph fastest mile basic wind speed with 1/2" radial ice

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

We trust you find our work satisfactory. Please do not hesitate to call should you have any questions.

Sincerely,

Kingsley C. Igboanugo, P.E.
Civil Engineer

Reviewed by: JHW

STATE OF CONNECTICUT
MICHAEL L. LASSITER
No. 25064
LICENSED
PROFESSIONAL ENGINEER
06/28/2013

Michael L. Lassiter, S.E., P.E., C.W.I.
Structural Engineer, Civil Engineer, Certified Weld Inspector & President
CT License No.: 25064

Table 1: Existing, Proposed and Reserved Appurtenance Configuration

Elevation (AGL, ft)	Carrier	Mount	Equipment	Coax	Location[1]
191' 6"	Sprint/Nextel (NV)	(3) Stand Off Arms	(6) 76" x 14" x 7" Panels (12) RRUs 24" x 13" x 7" (60 lbs) (3) RRU Filters 24" x 13" x 7" (53 lbs) (12) Combiners 12" x 6" x 2" (10 lbs) (1) GPS	(4) 1 5/8 (1) 1/2	Outside
189' 6"		MC-551050 (Ring Mount)			
185	Verizon	Low Profile Platform	(3) Antel BXA-70063/6CF_2 (3) Antel BXA-171063/8BF_2 (6) Antel LPA-80063/4CF (6) FD9R6004/2C-3L	(12) 1 5/8	Inside
175	***AT&T***	Low Profile Platform	(6) Powerwave 7770 (12) Powerwave LGP21401[2] (6) Powerwave 7020	(12) 1 5/8	Inside
			(3) KMW AM-X-CD-16-65-00T-RET ***(6) Ericsson RRUS11*** ***(1) Raycap DC6-48-60-18-8F***	***(1) 7/16 Fiber[3]*** ***(2) 3/4 DC Power[3]***	***Outside***
161	Sprint/Nextel	Low Profile Platform	(12) Andrew DB846G90A-XY	(12) 1 5/8	Inside
155	T-Mobile (Reserved)	(3) T-Arms	(9) RFS APX16PV-16PVL-E (6) TMAs	(18) 1 5/8	Inside
145	Pocket	Flush	(3) RFS APXV18-206517S-C	(6) 1 5/8	Inside
116' 6"	Fire Department	(3) Side Arms	(1) 14' Omni	(1) 1/2	Inside
115' 6"			(1) 12' Omni	(1) 1/2	Inside
111' 6"			(1) 4' Omni	(1) 1/2	Inside
70' 6"	Sprint/Nextel	(1) Side Arm	(1) GPS	(1) 1/2	Inside
	AT&T	(1) Side Arm	(1) GPS	(1) 1/2	Inside

1 – See QP-P layout for details.
2 – TMAs mounted behind existing antennas.
3 – Coax to be placed inside (1) 3" conduit.

Table 2: Tower Structure Results, Percent Capacity Utilized

Elevation (ft)	Shaft	Result	Connections	Result
196 to 165.25	50	O. K.	-	-
165.25 to 123.58	98	O. K.	-	-
123.58 to 84	99	O. K.	-	-
84 to 45.42	**100**	**O. K.**	-	-
45.42 to 0	91	O. K.	89	O. K.

Table 3: Foundation Results, Percent Capacity Utilized

Component	Design	Analysis	Percent Utilized	Result
Bearing (psi)	12,000	3153	26	O. K.
Overturning (kip-ft)	7881	6976	89	O. K.
Pad Bending (kip-ft)	7348	6775	92	O. K.
Sliding (kip)	123	52	43	O. K.

ASSUMPTIONS

This rigorous structural analysis is based on the theoretical capacity of the members and is not a condition assessment of the tower. This analysis is from information supplied, and therefore, its results are based on and are as accurate as that supplied data. Vertical Solutions, Inc. ("VSI") has made no independent determination, nor is it required to, of its accuracy. The following assumptions were made for this structural analysis.

1. The tower member sizes and shapes are considered accurate as supplied. The material grade is as per data supplied and/or as assumed based on industry standards.
2. The antenna configuration is as supplied and/or as modeled in the analysis. It is assumed to be complete and accurate. All antennas, mounts, coax and waveguides are assumed to be properly installed and supported as per manufacturer requirements.
3. Some assumptions are made regarding antennas and mount sizes and their projected areas based on best interpretation of data supplied and of best knowledge of antenna type and industry practice.
4. All mounts, if applicable, are considered adequate to support the loading. No actual analysis of the mount(s) is performed. This analysis is limited to analyzing the tower only.
5. The soil parameters are as per data supplied or as assumed and stated in the calculations.
6. Foundations are properly designed and constructed to resist the original design loads indicated in the documents provided.
7. The tower and structures have been properly maintained in accordance with TIA Standards and/or with manufacturer's specifications.
8. All welds and connections are assumed to develop at least the member capacity unless determined otherwise and explicitly stated in this report.
9. All prior structural modifications are assumed to be as per data supplied/available and to have been properly installed.
10. Loading interpreted from photos is accurate to ±5' AGL, antenna size accurate to ±3.3 sf, and coax equal to the number of existing antennas without reserve.
11. Documents reviewed and used in this structural analysis were provided by CLIENT.
12. The proposed coax shall be installed per the attached coax layout plan, Sheet QP-P.
13. Leg A is determined per best industry practice.

If any of these assumptions are not valid or have been made in error, this analysis may be affected, and VSI should be allowed to review any new information to determine its effect on the structural integrity of the tower.

DISCLAIMER OF WARRANTIES

Vertical Solutions, Inc. ("VSI") has not performed a detailed site visit to the tower to verify the member sizes or antenna/coax loading. If the existing conditions are not as represented on the tower elevation contained in this report, we should be contacted immediately to evaluate the significance of the discrepancy. This is not a condition assessment of the tower or foundation. This report does not replace a full tower inspection. The tower and foundations are assumed to have been properly fabricated, erected, maintained, in good condition, twist free, and plumb.

The engineering services rendered by VSI in connection with this Rigorous Structural Analysis are limited to a computer analysis of the tower structure and theoretical capacity of its main structural members. All tower components have been assumed to only resist dead loads when no other loads are applied. No allowance was made for any damaged, bent, missing, loose, or rusted members (above and below ground). No allowance was made for loose bolts or cracked welds.

VSI does not analyze the fabrication of the structure (including welding). It is not possible to have all the very detailed information needed to perform a thorough analysis of every structural sub-component and connection of an existing tower. VSI provides a limited scope of service in that we cannot verify the adequacy of every weld, plate connection detail, etc. The purpose of this report is to assess the feasibility of adding appurtenances usually accompanied by transmission lines to the structure.

It is the owner's responsibility to determine the amount of ice accumulation in excess of the specified code recommended amount, if any, that should be considered in the structural analysis.

The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable estimates and should not be used as a precise construction document. Precise modification drawings are obtainable from VSI, but are beyond the scope of this report.

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.

VSI makes no warranties, expressed and/or implied, in connection with this report and disclaim any liability arising from material, fabrication, and erection of this tower. VSI will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any person, firm, or organization as a result of any data or conclusions contained in this report. The maximum liability of VSI pursuant to this report will be limited to the total fee received for preparation of this report.

Attachments:

- Project history
- Proposed coax layout, QP-P
- tnxTower input and output
- Base plate and anchor rod calculations
- Foundation analysis
- Tower Improvement Design Drawings [Construction]

Project History

VSi Project #: 130499, Revision 0
SBA Site Id: CT46138-A
SBA Site Name: Torrington/Oandg Ind Inc

Structure	Issued Date	Document ID	Issued By	Issued To	Description
CT46138-A	11/18/2003	307904_CT46138-A TORRINGTON-OandG IND INC Verizon SLA.pdf	Sprint Spectrum	Verizon	Site Lease Agreement
CT46138-A	6/18/2004	286159_CT46138-A TORRINGTON-OandG IND INC Geotechnical Report - 06-18-2004.pdf	Geotechnical Engineering	McFarland-Johnson, Inc	Geotechnical Investigation
CT46138-A	7/14/2004	307850_CT46138-A TORRINGTON-OandG IND INC Tower Deisgn Calculations - 07-14-2004.pdf	Valmont Microflect	Sprint	Tower Design Calculations
CT46138-A	8/17/2004	307851_CT46138-A TORRINGTON-OandG IND INC Tower and Foundation Design Drawings - 08-17-2004.pdf	Valmont Microflect	Sprint	Tower and Foundation Design Drawings
CT46138-A	10/6/2004	470881_CT46138-A TORRINGTON-OandG IND INC Semaan Structural Analysis Verizon CoLo 10-06-2004.pdf	Semaan Engineering Solutions	Sprint Sites USA	Structural Analysis Report
CT46138-A	10/17/2004	307903_CT46138-A TORRINGTON-OandG IND INC Cingular Wireless SLA.pdf	Sprint Spectrum	Southwestern Bell Mobile Systems	Site Lease Agreement
CT46138-A	5/31/2005	721951_CT46138-A TORRINGTON-OandG IND INC AT&T commencement letter.pdf	Cingular Wireless	Sprint Spectrum	Commencement Notice
CT46138-A	6/10/2005	307902_CT46138-A TORRINGTON-OandG IND INC Sprint SLA.pdf	Sprint Spectrum	Nextel	Site Lease Agreement
CT46138-A	6/10/2005	464181_CT46138-A TORRINGTON-OandG IND INC Nextel Tenant Lease.pdf	Sprint Spectrum	Nextel	Site Lease Agreement
CT46138-A	8/27/2005	307859_CT46138-A TORRINGTON-OandG IND INC Torrington PCHV.pdf			Height Verification Report
CT46138-A	6/8/2006	844325_CT46138-A Torrington-Oandg Ind Inc Verizon Rent Comm Notice.pdf	Sprint	Verizon	Commencement Notice
CT46138-A	3/17/2008	307894_CT46138-A TORRINGTON-OandG IND INC Semaan Structural Analysis Verizon CoLo 03-17-2008.pdf	Semaan Engineering Solutions	Sprint Sites USA	Structural Analysis Report
CT46138-A	7/1/2008	307891_CT46138-A TORRINGTON-OandG IND INC First Amendment to Verizon SLA.pdf	Sprint Spectrum	Verizon	Amendment SLA
CT46138-A	9/15/2008	492320_CT46138-A Torrington-Oandg Ind Inc _Semaan_Structural_Omnipoint_Colocation_20080915.pdf	Semaan Engineering Solutions	Sprint Sites USA	Structural Analysis Report
CT46138-A	9/22/2008	476791_CT46138-A Torrington-Oandg Ind Inc T-Mobile SLA.pdf	Sprint Spectrum	Omnipoint Communications	Site Lease Agreement
CT46138-A	9/23/2008	711889_CT46138-A Torrington-Oandg Ind Inc SLA.pdf	TowerCo	Sprint Spectrum	Site Lease Agreement
CT46138-A	10/20/2008	500357_CT46138-A Torrington-Oandg Ind Inc _Semaan_Structural_Pocket_Colocation_20081020.pdf	Semaan Engineering Solutions	TowerCo	Structural Analysis Report
CT46138-A	10/30/2008	719734_CT46138-A Torrington-Oandg Ind Inc SiteMaster Inspection	SiteMaster	TowerCo	Tower Inspection

Structure	Issued Date	Document ID	Issued By	Issued To	Description
		Report.pdf			Report
CT46138-A	1/13/2009	519657_CT46138-A Torrington-Oandg Ind Inc TMobile Revised Rent Comm Letter.pdf	TowerCo	T-Mobile	Commencement Notice
CT46138-A	1/16/2009	518696_CT46138-A Torrington-Oandg Ind Inc Pocket SLA Fully Executed.pdf	TowerCo	Youghiogheny Communications	Site Lease Agreement
CT46138-A	1/16/2009	714953_CT46138-A Torrington-Oandg Ind Inc Tower Profile.pdf	TowerCo		Tower Profile Drawing
CT46138-A	1/28/2009	521187_CT46138-A Torrington-Oandg Ind Inc _Semaan_Structural_Pocket_Colocation_20090128.pdf	Semaan Engineering Solutions	TowerCo	Structural Analysis Report
CT46138-A	3/16/2009	695574_CT46138-A Torrington-Oandg Ind Inc _Semaan_Structural_Pocket_Colocation_20090316.pdf	Semaan Engineering Solutions	TowerCo	Structural Analysis Report
CT46138-A	5/19/2009	717784_CT46138-A Torrington-Oandg Ind Inc _Torrington-O&G Industries_TEP_Structural_New Cingular_20090519.pdf	Tower Engineering Professionals	Crown Castle USA	Structural Analysis Report
CT46138-A	5/26/2009	844324_CT46138-A Torrington-Oandg Ind Inc Email from Pocket now Metro PCS Confirming Rent Comm Date.pdf	Pocket Communications	TowerCo	Rent Commencement
CT46138-A	8/27/2010	804682_CT46138-A Torrington-Oandg Ind Inc Pocket PCS Clerical Error Amendment.pdf	TowerCo	Youghiogheny Communications	Amendment SLA
CT46138-A	3/3/2011	708811_CT46138-A Torrington-Oandg Ind Inc Site Plan.pdf	TowerCo		Site Plan
CT46138-A	5/23/2011	840483_CT46138-A Torrington-Oandg Ind Inc AT&T CD-s.pdf	SAI Communications	AT&T	Construction Drawings
CT46138-A	12/6/2011	CT46138-A SA Loading.xls	TowerCo	Vertical Solutions	SA Loading
CT46138-A	12/6/2011	Pages+from+307903_CT46138-A+TORRINGTON-OandG+IND+INC+Cingular+Wireless+SLA.pdf	Sprint Spectrum	Southwestern Bell Mobile Systems	Site Lease Agreement
CT46138-A	12/6/2011	Pages+from+476791_CT46138-A+Torrington-Oandg+Ind+Inc++T-Mobile+SLA.pdf	Sprint Spectrum	Omnipoint Communications	Site Lease Agreement
CT46138-A	12/6/2011	Pages+from+518696_CT46138-A+Torrington-Oandg+Ind+Inc++Pocket+SLA+Fully+Executed.pdf	Youghiogheny Communications	TowerCo	Co-location Tenant Application
CT46138-A	12/6/2011	Tower co Torrington CT 1.doc	Verizon	TowerCo	Reconfiguration Tenant Application
CT46138-A	1/26/2012	860830_CT46138-A Torrington-Oandg Ind Inc Verizon 2nd Amendment to SLA Fully Executed.pdf	TowerCo	Cellco	Amendment SLA
CT46138-A	2/6/2012	861400_CT46138-A Torrington-Oandg Ind Inc Verizon 2nd Amendment Rent Commencement Notice.pdf	TowerCo	Verizon	Rent Commencement
CT46138-A	2/17/2012	857469_CT46138-A Torrington-Oandg Ind Inc _Vertical_Structural Analysis_Verizon_Reconfiguration_20120217.pdf	Vertical Solutions	TowerCo	Structural Analysis Report
CT46138-A	5/21/2012	CT33XC079- Sprint Vision Application- towerCo CT46138-A-Ver1.doc	Sprint	TowerCo	Reconfiguration Tenant

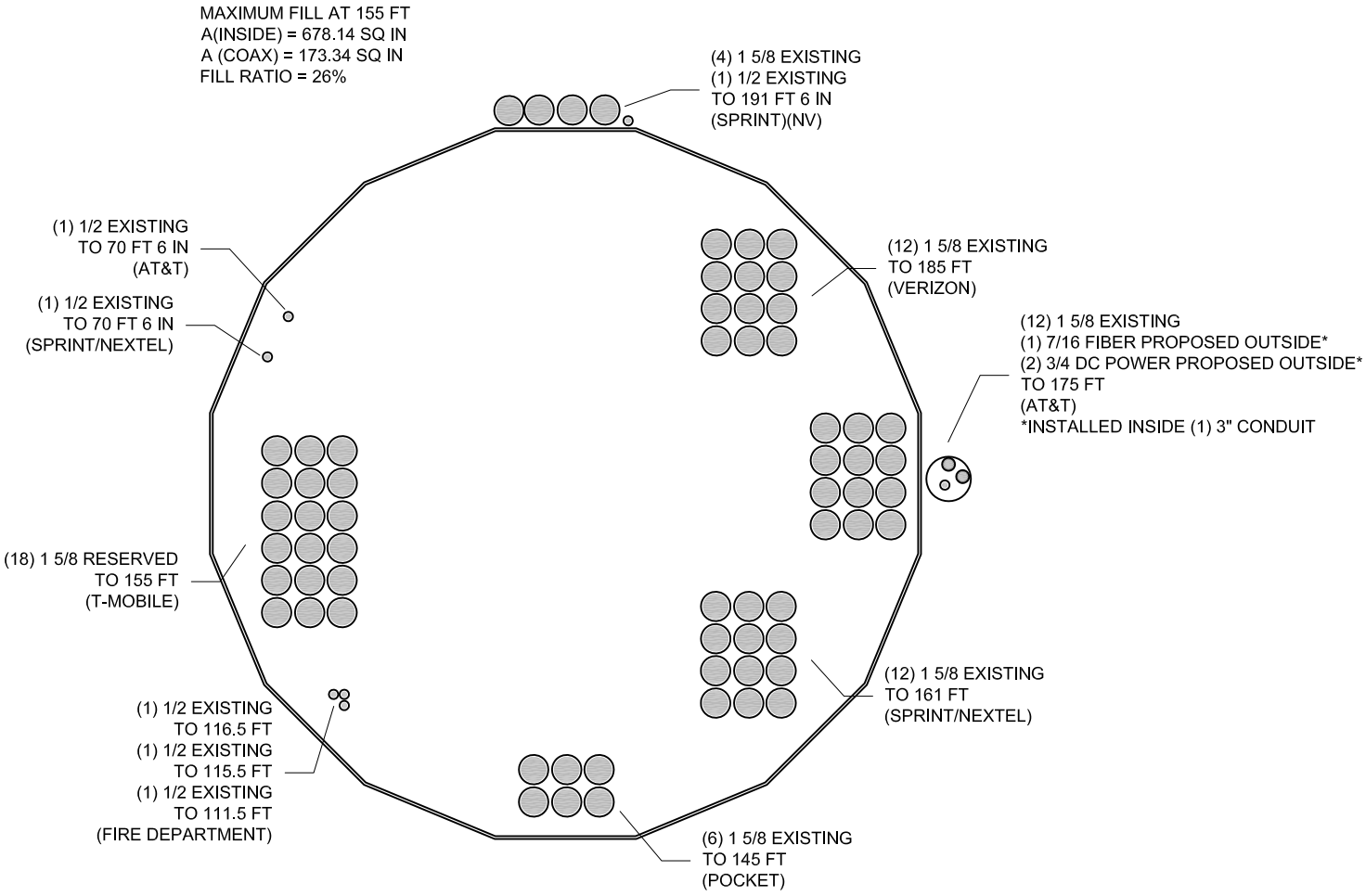
Structure	Issued Date	Document ID	Issued By	Issued To	Description
					Application
CT46138-A	5/23/2012	CT46138-A Sprint Network Vision SA Loading.xls	TowerCo	Vertical Solutions	SA Loading
CT46138-A	5/24/2013	20130524_SAR_CT46138-A_Signed	Vertical Solutions	SBA	Structural Analysis Report
		FDH SAR Here			
		AT&T A&E Dwgs here			

Table Note:

Files name format YYYYMMDD-XXX-ZZZZZZ.pdf

Where:

YYYYMMDD = Year, Month, Day published/issued
XXX=file describer
ZZZZZZ=SBA Site ID



COAX CONFIGURATION PLAN AT 70 FT 6 IN

SCALE: 1" = 1'-0"

PROJECT INFORMATION:

TORRINGTON/O&G IND INC
SITE #: CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(LITCHFIELD COUNTY)

REV	DATE:	Issued For:
0	06/06/13	SBA

DRAWN BY: KCI | CHECKED BY: JHW

SHEET NUMBER: **QP-P**

REVISION: 0

VSI #: 130499

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND
PARKWAY NW
BOCA ROTAN, FL 33487
Office: (919) 557-0555

PLANS PREPARED BY:

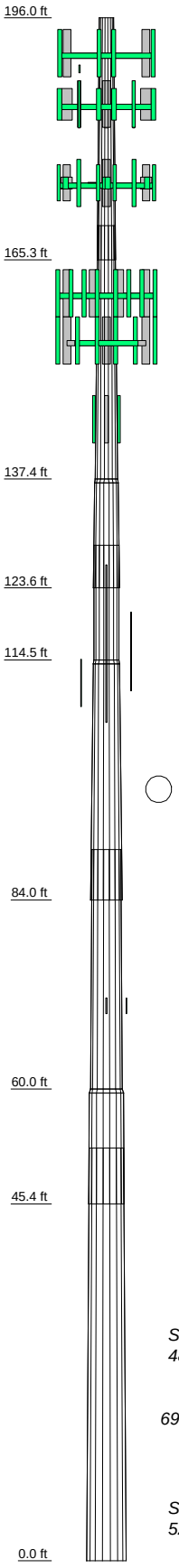
vertical solutions

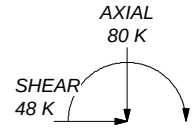
2002 Production Drive
Apex, NC 27539
Office: (888) 321-6167
Fax: (919) 321-1768

Fill Ratio

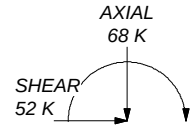
			Group 1			Group 2			Group 3			Group 4			Group 5			Group 6			Group 7			Group 8			Group 9			Group 10			Group 11			Group 12			Group 13			A_{Leeb}	A_{Wleb}	FR	Result
Section Letter	Elevation (ft)	Section #	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	#	Nominal Diameter (in)	Area (in^2)	($in2$)	($in2$)	%	
I	191.5	1	0	1-5/8	0.00	0	1/2	0.00																																0.00	388.50	**0%**	O.K.
H	185	1	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95																													36.95	437.97	**8%**	O.K.
G	175	1	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95																							73.90	519.88	**14%**	O.K.
F	161	2	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95																			110.85	620.88	**18%**	O.K.
E	155	2	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95	18	1-5/8	55.42																166.27	678.14	**25%**	O.K.
D	145	2	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95	18	1-5/8	55.42	6	1-5/8	18.47													184.74	779.18	**24%**	O.K.
C	135	2	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95	18	1-5/8	55.42	6	1-5/8	18.47	0	1-5/8	0.00	0	1/2	0.00									184.74	887.23	**21%**	O.K.
B	116.5	3	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95	18	1-5/8	55.42	6	1-5/8	18.47	0	1-5/8	0.00	0	1/2	0.00	3	1/2	0.92						185.66	887.23	**21%**	O.K.
A	70.5	4	0	1-5/8	0.00	0	1/2	0.00	12	1-5/8	36.95	0	3-in Conduit	0.00	12	1-5/8	36.95	12	1-5/8	36.95	18	1-5/8	55.42	6	1-5/8	18.47	0	1-5/8	0.00	0	1/2	0.00	3	1/2	0.92	1	1/2	0.31	1	1/2	0.31	186.28	1061.99	**18%**	O.K.
Carrier:			Sprint						Verizon			AT&T						Sprint			T-Mobile			Pocket			Landlord Reserved						Fire Department			Sprint			AT&T			Max =		25%	O.K.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	30.750	16	0.188	4.330	21.530	27.980	A572-65	1.5
2	32.130	16	0.281		26.697	33.431		2.9
3	0.500	16	0.359		33.431	36.536		0.1
4	13.400	16	0.345	5.420	36.536	39.350	A572-50	1.9
5	14.520	16	0.375		37.522	40.810	A572-65	2.2
6	0.500	16	0.485		40.810	41.705		0.1
7	30.000	16	0.495	6.420	40.810	47.110	A572-50	7.0
8	30.420	16	0.500		44.772	48.394	A572-65	7.6
9	0.500	16	0.660		48.394	51.499		0.2
10	14.100	16	0.605	7.050	51.499	53.460	A572-50	4.8
11	52.400	16	0.625		51.270	60.000	A572-65	19.6





TORQUE 4 kip-ft
69 mph WIND - 0.500 in ICE



TORQUE 3 kip-ft
REACTIONS - 80 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	191.5
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	191.5
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	191.5
PiROD 13' Low Profile Platform (Sprint)	191.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	189.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	189.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	189.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	189.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	189.5
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	189.5
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	189.5
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	189.5
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	189.5
GPS (Sprint)	189.5
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	189.5
Universal Mount Ring (Sprint)	189.5
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	185
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	185
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	185
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	185
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	185
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	185
(2) FD9R6004/2C-3L (Verizon)	185
(2) FD9R6004/2C-3L (Verizon)	185
(2) FD9R6004/2C-3L (Verizon)	185
(2) Antel LPA-80063/4CF w MP (Verizon)	185
(2) Antel LPA-80063/4CF w MP (Verizon)	185
(2) Antel LPA-80063/4CF w MP (Verizon)	185
PiROD 13' Low Profile Platform (Verizon)	185

TYPE	ELEVATION
PiROD 13' Low Profile Platform (ATT)	175
(2) Powerwave 7770.00 with Mount Pipe (ATT)	175
(2) Powerwave 7770.00 with Mount Pipe (ATT)	175
(2) Powerwave 7770.00 with Mount Pipe (ATT)	175
(4) Powerwave LGP21401 (ATT)	175
(4) Powerwave LGP21401 (ATT)	175
(4) Powerwave LGP21401 (ATT)	175
(2) POWERWAVE 7020 (ATT)	175
(2) POWERWAVE 7020 (ATT)	175
(2) POWERWAVE 7020 (ATT)	175
KMW AM-X-CD-16-65-00T-RET with Mount Pipe (ATT)	175
KMW AM-X-CD-16-65-00T-RET with Mount Pipe (ATT)	175
KMW AM-X-CD-16-65-00T-RET with Mount Pipe (ATT)	175
(2) Ericsson RRUS-11 (ATT)	175
(2) Ericsson RRUS-11 (ATT)	175
(2) Ericsson RRUS-11 (ATT)	175
Raycap DC6-48-60-18-8F (ATT)	175
(4) DB846G90A-XY w/Mount Pipe (Sprint)	161
(4) DB846G90A-XY w/Mount Pipe (Sprint)	161
(4) DB846G90A-XY w/Mount Pipe (Sprint)	161
PiROD 13' Low Profile Platform (Sprint)	161
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	155
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	155
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	155
(2) 12" x 6" x 2" TMA (T-Mobile)	155
(2) 12" x 6" x 2" TMA (T-Mobile)	155
(2) 12" x 6" x 2" TMA (T-Mobile)	155
2' Standoff T-Arm (10' face width) (T-Mobile)	155
2' Standoff T-Arm (10' face width) (T-Mobile)	155
2' Standoff T-Arm (10' face width) (T-Mobile)	155
RFS APXV18-206517S-C w/mp (Pocket)	145
RFS APXV18-206517S-C w/mp (Pocket)	145
RFS APXV18-206517S-C w/mp (Pocket)	145
14' omni (Fire Dept)	116.5
12' Omni w/ MP (Fire Dept)	115.5
4' Omni (Fire Dept)	111.5
4' Side Arm (Fire Dept)	109.5
4' Side Arm (Fire Dept)	109.5
4' Side Arm (Fire Dept)	109.5
GPS (Sprint)	70.5
4' Side Arm (Sprint)	70.5
GPS (ATI)	70.5
4' Side Arm (ATI)	70.5

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi	A572-50	50 ksi	65 ksi

TOWER DESIGN NOTES

1. Tower is located in Litchfield County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 99.9%

vertical solutions
Execute and Deliver

Vertical Solutions Inc
2002 Production Drive
Apex, NC 27539
Phone: (888) 321-6167
FAX: (919) 321-1768

Job: ***CT46138-A***			
Project: ***130499***			
Client: SBA	Drawn by: Kingsley	App'd:	
Code: TIA/EIA-222-F	Date: 06/06/13	Scale: NTS	
Path: L:\2013\0499_TorringtonOandg Ind Inc_CT\Task 1\Models\tmxTower\Final\CT46138-A-ERP.er		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Tower is located in Litchfield County, Connecticut.
Basic wind speed of 80 mph.
Nominal ice thickness of 0.500 in.
Ice density of 56 pcf.
A wind speed of 69 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

	Consider Moments - Legs		Distribute Leg Loads As Uniform		Treat Feedline Bundles As Cylinder
	Consider Moments - Horizontals		Assume Legs Pinned		Use ASCE 10 X-Brace Ly Rules
	Consider Moments - Diagonals		Assume Rigid Index Plate		Calculate Redundant Bracing Forces
	Use Moment Magnification		Use Clear Spans For Wind Area		Ignore Redundant Members in FEA
√	Use Code Stress Ratios		Use Clear Spans For KL/r		SR Leg Bolts Resist Compression
√	Use Code Safety Factors - Guys		Retension Guys To Initial Tension		All Leg Panels Have Same Allowable
	Escalate Ice	√	Bypass Mast Stability Checks		Offset Girt At Foundation
	Always Use Max Kz	√	Use Azimuth Dish Coefficients	√	Consider Feedline Torque
	Use Special Wind Profile	√	Project Wind Area of Appurt.		Include Angle Block Shear Check
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Poles
	Leg Bolts Are At Top Of Section		SR Members Have Cut Ends	√	Include Shear-Torsion Interaction
	Secondary Horizontal Braces Leg		Sort Capacity Reports By Component		Always Use Sub-Critical Flow
	Use Diamond Inner Bracing (4 Sided)		Triangulate Diamond Inner Bracing		Use Top Mounted Sockets
	Add IBC .6D+W Combination				

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	196.000-165.250	30.750	4.330	16	21.530	27.980	0.188	0.750	A572-65 (65 ksi)
L2	165.250-137.450	32.130	0.000	16	26.697	33.431	0.281	1.125	A572-65 (65 ksi)
L3	137.450-136.950	0.500	0.000	16	33.431	36.536	0.359	1.436	A572-50 (50 ksi)
L4	136.950-123.550	13.400	5.420	16	36.536	39.350	0.345	1.380	A572-50 (50 ksi)
L5	123.550-114.450	14.520	0.000	16	37.522	37.705	0.375	1.500	A572-65 (65 ksi)
L6	114.450-113.95	0.500	0.000	16	37.705	40.810	0.485	1.940	A572-50

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
	0								(50 ksi)
L7	113.950-83.950	30.000	6.420	16	40.810	47.110	0.495	1.980	A572-50 (50 ksi)
L8	83.950-59.950	30.420	0.000	16	44.772	48.394	0.500	2.000	A572-65 (65 ksi)
L9	59.950-59.450	0.500	0.000	16	48.394	51.499	0.660	2.640	A572-50 (50 ksi)
L10	59.450-45.350	14.100	7.050	16	51.499	53.460	0.605	2.420	A572-50 (50 ksi)
L11	45.350-0.000	52.400		16	51.270	60.000	0.625	2.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	21.952	12.765	734.585	7.598	10.980	66.900	1480.293	6.312	3.911	20.861
	28.528	16.623	1622.143	9.894	14.270	113.677	3268.847	8.219	5.195	27.706
L2	28.145	23.700	2089.173	9.404	13.615	153.443	4209.978	11.718	4.753	16.899
	34.086	29.742	4128.938	11.801	17.050	242.169	8320.393	14.706	6.093	21.664
L3	34.086	37.874	5233.363	11.774	17.050	306.946	10545.966	18.727	5.938	16.541
	37.252	41.430	6850.104	12.879	18.633	367.626	13803.926	20.485	6.556	18.263
L4	37.252	39.830	6590.614	12.884	18.633	353.700	13281.018	19.694	6.584	19.084
	40.121	42.927	8250.590	13.886	20.069	411.121	16626.103	21.225	7.144	20.708
L5	38.327	44.437	7746.411	13.224	19.136	404.806	15610.112	21.972	6.721	17.922
	38.444	44.656	7861.588	13.289	19.230	408.828	15842.210	22.080	6.757	18.019
L6	38.444	57.585	10078.036	13.250	19.230	524.091	20308.665	28.473	6.538	13.481
	41.610	62.389	12816.514	14.356	20.813	615.791	25827.085	30.848	7.156	14.755
L7	41.610	63.659	13071.043	14.352	20.813	628.020	26339.997	31.476	7.136	14.416
	48.033	73.607	20206.324	16.595	24.026	841.016	40718.596	36.395	8.390	16.949
L8	46.428	70.614	17484.636	15.761	22.834	765.741	35234.010	34.915	7.915	15.829
	49.342	76.391	22136.980	17.050	24.681	896.926	44609.142	37.771	8.635	17.271
L9	49.342	100.499	28928.936	16.993	24.681	1172.116	58295.892	49.692	8.317	12.602
	52.508	107.036	34949.421	18.099	26.264	1330.672	70428.018	52.924	8.935	13.538
L10	52.508	98.223	32141.059	18.118	26.264	1223.746	64768.772	48.566	9.044	14.949
	54.507	102.008	36001.339	18.816	27.265	1320.443	72547.782	50.437	9.435	15.594
L11	53.472	100.972	32717.637	18.029	26.147	1251.275	65930.658	49.926	8.959	14.334
	61.175	118.379	52722.492	21.137	30.600	1722.957	106243.267	58.532	10.696	17.114

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 196.000-165.250				1	1	1		
L2 165.250-137.450				1	1	1		
L3 137.450-136.950				1	1	1		
L4 136.950-123.5				1	1	1		

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
50 L5 123.550-114.4				1	1	1		
50 L6 114.450-113.9				1	1	1		
50 L7 113.950-83.95				1	1	1		
0 L8 83.950-59.950				1	1	1		
L9 59.950-59.450				1	1	1		
L10 59.450-45.350				1	1	1		
L11 45.350-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
LDF7-50A (1-5/8 FOAM) (Sprint)	A	Surface Ar (CaAa)	191.500 - 0.000	4	4	-0.100 0.100	1.980		0.820
LDF4-50A (1/2 FOAM) (Sprint)	A	Surface Ar (CaAa)	191.500 - 0.000	1	1	0.200 0.200	0.630		0.150
3" Conduit (ATT) ***	B	Surface Ar (CaAa)	175.000 - 0.000	1	1	0.000 0.000	3.000		1.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***								
LDF7-50A (1-5/8 FOAM) (Verizon)	C	No	Inside Pole	185.000 - 0.000	12	No Ice 1/2" Ice	0.000 0.000	0.820 0.820
***								
LDF7-50A (1-5/8 FOAM) (ATT)	B	No	Inside Pole	175.000 - 0.000	12	No Ice 1/2" Ice	0.000 0.000	0.820 0.820
3/4" DC Cables (ATT)	B	No	Inside Pole	175.000 - 0.000	2	No Ice 1/2" Ice	0.000 0.000	0.033 0.033
7/16" Fiber (ATT)	B	No	Inside Pole	175.000 - 0.000	1	No Ice 1/2" Ice	0.000 0.000	0.040 0.040
***								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	161.000 - 0.000	12	No Ice 1/2" Ice	0.000 0.000	0.820 0.820

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(Sprint)								
***								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	155.000 - 0.000	18	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
(T-Mobile)								
***								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	145.000 - 0.000	6	No Ice	0.000	0.820
						1/2" Ice	0.000	0.820
(Pocket)								
***								
LDF4P-50A (1/2 FOAM)	C	No	Inside Pole	109.500 - 0.000	3	No Ice	0.000	0.150
(Fire Department)						1/2" Ice	0.000	0.150
***								
LDF4P-50A (1/2 FOAM)	C	No	Inside Pole	70.500 - 0.000	1	No Ice	0.000	0.150
(AT&T)						1/2" Ice	0.000	0.150
LDF4P-50A (1/2 FOAM)	C	No	Inside Pole	70.500 - 0.000	1	No Ice	0.000	0.150
(Sprint)						1/2" Ice	0.000	0.150
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	196.000-165.250	A	0.000	0.000	22.444	0.000	0.090
		B	0.000	0.000	2.925	0.000	0.107
		C	0.000	0.000	0.000	0.000	0.194
L2	165.250-137.450	A	0.000	0.000	23.769	0.000	0.095
		B	0.000	0.000	8.340	0.000	0.304
		C	0.000	0.000	0.000	0.000	0.801
L3	137.450-136.950	A	0.000	0.000	0.427	0.000	0.002
		B	0.000	0.000	0.150	0.000	0.005
		C	0.000	0.000	0.000	0.000	0.020
L4	136.950-123.550	A	0.000	0.000	11.457	0.000	0.046
		B	0.000	0.000	4.020	0.000	0.147
		C	0.000	0.000	0.000	0.000	0.527
L5	123.550-114.450	A	0.000	0.000	7.781	0.000	0.031
		B	0.000	0.000	2.730	0.000	0.100
		C	0.000	0.000	0.000	0.000	0.358
L6	114.450-113.950	A	0.000	0.000	0.427	0.000	0.002
		B	0.000	0.000	0.150	0.000	0.005
		C	0.000	0.000	0.000	0.000	0.020
L7	113.950-83.950	A	0.000	0.000	25.650	0.000	0.103
		B	0.000	0.000	9.000	0.000	0.328
		C	0.000	0.000	0.000	0.000	1.192
L8	83.950-59.950	A	0.000	0.000	20.520	0.000	0.082
		B	0.000	0.000	7.200	0.000	0.263
		C	0.000	0.000	0.000	0.000	0.959
L9	59.950-59.450	A	0.000	0.000	0.427	0.000	0.002
		B	0.000	0.000	0.150	0.000	0.005
		C	0.000	0.000	0.000	0.000	0.020
L10	59.450-45.350	A	0.000	0.000	12.056	0.000	0.048
		B	0.000	0.000	4.230	0.000	0.154
		C	0.000	0.000	0.000	0.000	0.566
L11	45.350-0.000	A	0.000	0.000	38.774	0.000	0.156
		B	0.000	0.000	13.605	0.000	0.496
		C	0.000	0.000	0.000	0.000	1.819

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_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	196.000-165.250	A	0.500	0.000	0.000	51.126	0.000	0.234
		B		0.000	0.000	3.900	0.000	0.128
		C		0.000	0.000	0.000	0.000	0.194
L2	165.250-137.450	A	0.500	0.000	0.000	54.145	0.000	0.248
		B		0.000	0.000	11.120	0.000	0.364
		C		0.000	0.000	0.000	0.000	0.801
L3	137.450-136.950	A	0.500	0.000	0.000	0.974	0.000	0.004
		B		0.000	0.000	0.200	0.000	0.007
		C		0.000	0.000	0.000	0.000	0.020
L4	136.950-123.550	A	0.500	0.000	0.000	26.099	0.000	0.120
		B		0.000	0.000	5.360	0.000	0.175
		C		0.000	0.000	0.000	0.000	0.527
L5	123.550-114.450	A	0.500	0.000	0.000	17.724	0.000	0.081
		B		0.000	0.000	3.640	0.000	0.119
		C		0.000	0.000	0.000	0.000	0.358
L6	114.450-113.950	A	0.500	0.000	0.000	0.974	0.000	0.004
		B		0.000	0.000	0.200	0.000	0.007
		C		0.000	0.000	0.000	0.000	0.020
L7	113.950-83.950	A	0.500	0.000	0.000	58.430	0.000	0.268
		B		0.000	0.000	12.000	0.000	0.393
		C		0.000	0.000	0.000	0.000	1.192
L8	83.950-59.950	A	0.500	0.000	0.000	46.744	0.000	0.214
		B		0.000	0.000	9.600	0.000	0.314
		C		0.000	0.000	0.000	0.000	0.959
L9	59.950-59.450	A	0.500	0.000	0.000	0.974	0.000	0.004
		B		0.000	0.000	0.200	0.000	0.007
		C		0.000	0.000	0.000	0.000	0.020
L10	59.450-45.350	A	0.500	0.000	0.000	27.462	0.000	0.126
		B		0.000	0.000	5.640	0.000	0.184
		C		0.000	0.000	0.000	0.000	0.566
L11	45.350-0.000	A	0.500	0.000	0.000	88.327	0.000	0.405
		B		0.000	0.000	18.140	0.000	0.593
		C		0.000	0.000	0.000	0.000	1.819

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	196.000-165.250	-0.618	-0.508	-0.912	-0.701
L2	165.250-137.450	-0.498	-0.659	-0.835	-0.879
L3	137.450-136.950	-0.516	-0.680	-0.885	-0.930
L4	136.950-123.550	-0.526	-0.693	-0.914	-0.960
L5	123.550-114.450	-0.525	-0.691	-0.912	-0.957
L6	114.450-113.950	-0.530	-0.698	-0.927	-0.972
L7	113.950-83.950	-0.544	-0.714	-0.967	-1.014
L8	83.950-59.950	-0.551	-0.723	-0.990	-1.037
L9	59.950-59.450	-0.558	-0.731	-1.012	-1.059
L10	59.450-45.350	-0.563	-0.737	-1.029	-1.076
L11	45.350-0.000	-0.570	-0.745	-1.052	-1.100

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
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	191.500	No Ice 1/2" Ice	9.830 10.560	5.650 6.360	0.055 0.078
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	191.500	No Ice 1/2" Ice	9.830 10.560	5.650 6.360	0.055 0.078
(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	191.500	No Ice 1/2" Ice	9.830 10.560	5.650 6.360	0.055 0.078
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	1.450 1.710	0.060 0.065
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	1.450 1.710	0.060 0.065
(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	1.450 1.710	0.060 0.065
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	1.450 1.710	0.060 0.065
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	1.450 1.710	0.060 0.065
(2) RRUs 24" x 13" x 7" (60 LBs) (Partially Shielded) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	1.450 1.710	0.060 0.065
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	0.000 0.000	0.053 0.055
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	0.000 0.000	0.053 0.055
RRU Filters 24" x 13" x 7" (53 LBs) (Partially Shielded) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	2.600 2.920	0.000 0.000	0.053 0.055
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.000 0.000	0.010 0.015
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.000 0.000	0.010 0.015
(2) Combiners 12" x 6" x 2" (10LBs) (Shielded) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.000 0.000	0.010 0.015
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	A	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.230 0.350	0.010 0.015

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
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.230 0.350	0.010 0.015
(2) Combiners 12" x 6" x 2" (10LBs) (Partially Shielded) (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.000 0.000	0.230 0.350	0.010 0.015
GPS (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	189.500	No Ice 1/2" Ice	0.200 0.289	0.200 0.289	0.010 0.013
PiROD 13' Low Profile Platform (Sprint)	C	None		0.000	191.500	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765
Universal Mount Ring (Sprint)	C	None		0.000	189.500	No Ice 1/2" Ice	2.250 2.619	2.250 2.619	0.065 0.084
***									
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	A	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.751 8.295	5.180 6.114	0.039 0.093
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	B	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.751 8.295	5.180 6.114	0.039 0.093
Antel BXA-70063/6CF_2 w/ Mount Pipe (Verizon)	C	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.751 8.295	5.180 6.114	0.039 0.093
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	A	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	5.021 5.572	5.281 6.448	0.041 0.084
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	B	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	5.021 5.572	5.281 6.448	0.041 0.084
Antel BXA-171063-8BF_2 with Mount Pipe (Verizon)	C	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	5.021 5.572	5.281 6.448	0.041 0.084
(2) FD9R6004/2C-3L (Verizon)	A	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(2) FD9R6004/2C-3L (Verizon)	B	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(2) FD9R6004/2C-3L (Verizon)	C	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	0.367 0.451	0.085 0.136	0.003 0.005
(2) Antel LPA-80063/4CF w MP (Verizon)	A	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.259 7.734	7.271 7.976	0.038 0.102
(2) Antel LPA-80063/4CF w MP (Verizon)	B	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.259 7.734	7.271 7.976	0.038 0.102
(2) Antel LPA-80063/4CF w MP (Verizon)	C	From Leg	3.000 0.000 0.000	0.000	185.000	No Ice 1/2" Ice	7.259 7.734	7.271 7.976	0.038 0.102
PiROD 13' Low Profile Platform (Verizon)	C	None		0.000	185.000	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765
***									
PiROD 13' Low Profile Platform	C	None		0.000	175.000	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765

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
(ATT)									
***									
(2) Powerwave 7770.00 with Mount Pipe	A	From Leg	3.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	5.981 6.439	4.116 4.769	0.053 0.097
(ATT)									
(2) Powerwave 7770.00 with Mount Pipe	B	From Leg	3.000 0.000 0.000	40.000	175.000	No Ice 1/2" Ice	5.981 6.439	4.116 4.769	0.053 0.097
(ATT)									
(2) Powerwave 7770.00 with Mount Pipe	C	From Leg	3.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	5.981 6.439	4.116 4.769	0.053 0.097
(ATT)									
(4) Powerwave LGP21401	A	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
(ATT)									
(4) Powerwave LGP21401	B	From Leg	2.000 0.000 0.000	40.000	175.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
(ATT)									
(4) Powerwave LGP21401	C	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	0.000 0.000	0.233 0.313	0.014 0.021
(ATT)									
(2) POWERWAVE 7020	A	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	0.400 0.491	0.204 0.279	0.002 0.005
(ATT)									
(2) POWERWAVE 7020	B	From Leg	2.000 0.000 0.000	40.000	175.000	No Ice 1/2" Ice	0.400 0.491	0.204 0.279	0.002 0.005
(ATT)									
(2) POWERWAVE 7020	C	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	0.400 0.491	0.204 0.279	0.002 0.005
(ATT)									
KMW AM-X-CD-16-65-00T-RET with Mount Pipe	A	From Leg	3.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	8.498 9.149	6.304 7.479	0.074 0.136
(ATT)									
KMW AM-X-CD-16-65-00T-RET with Mount Pipe	B	From Leg	3.000 0.000 0.000	40.000	175.000	No Ice 1/2" Ice	8.498 9.149	6.304 7.479	0.074 0.136
(ATT)									
KMW AM-X-CD-16-65-00T-RET with Mount Pipe	C	From Leg	3.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	8.498 9.149	6.304 7.479	0.074 0.136
(ATT)									
(2) Ericsson RRUS-11	A	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	2.942 3.172	1.246 1.412	0.050 0.069
(ATT)									
(2) Ericsson RRUS-11	B	From Leg	2.000 0.000 0.000	40.000	175.000	No Ice 1/2" Ice	2.942 3.172	1.246 1.412	0.050 0.069
(ATT)									
(2) Ericsson RRUS-11	C	From Leg	2.000 0.000 0.000	30.000	175.000	No Ice 1/2" Ice	2.942 3.172	1.246 1.412	0.050 0.069
(ATT)									
Raycap DC6-48-60-18-8F	C	From Leg	1.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice	0.133 0.278	0.133 0.278	0.020 0.037
(ATT)									
***									
(4) DB846G90A-XY w/Mount Pipe	A	From Leg	3.000 0.000 0.000	0.000	161.000	No Ice 1/2" Ice	5.229 5.783	7.529 8.715	0.041 0.095
(Sprint)									

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
(4) DB846G90A-XY w/Mount Pipe (Sprint)	B	From Leg	3.000 0.000 0.000	0.000	161.000	No Ice 1/2" Ice	5.229 5.783	7.529 8.715	0.041 0.095
(4) DB846G90A-XY w/Mount Pipe (Sprint)	C	From Leg	3.000 0.000 0.000	0.000	161.000	No Ice 1/2" Ice	5.229 5.783	7.529 8.715	0.041 0.095
PiROD 13' Low Profile Platform (Sprint)	C	None		0.000	161.000	No Ice 1/2" Ice	15.700 20.100	15.700 20.100	1.300 1.765
***									
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	A	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	7.075 7.639	4.265 5.099	0.062 0.111
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	B	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	7.075 7.639	4.265 5.099	0.062 0.111
(3) APX16PV-16PVL-E w/ 2" Pipe (T-Mobile)	C	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	7.075 7.639	4.265 5.099	0.062 0.111
(2) 12" x 6" x 2" TMA (T-Mobile)	A	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	0.700 0.821	0.233 0.328	0.010 0.014
(2) 12" x 6" x 2" TMA (T-Mobile)	B	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	0.700 0.821	0.233 0.328	0.010 0.014
(2) 12" x 6" x 2" TMA (T-Mobile)	C	From Leg	3.000 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	0.700 0.821	0.233 0.328	0.010 0.014
2' Standoff T-Arm (10' face width) (T-Mobile)	A	From Leg	0.500 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	5.500 6.900	5.500 6.900	0.129 0.170
2' Standoff T-Arm (10' face width) (T-Mobile)	B	From Leg	0.500 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	5.500 6.900	5.500 6.900	0.129 0.170
2' Standoff T-Arm (10' face width) (T-Mobile)	C	From Leg	0.500 0.000 0.000	0.000	155.000	No Ice 1/2" Ice	5.500 6.900	5.500 6.900	0.129 0.170
***									
RFS APXV18-206517S-C w/mp (Pocket)	A	From Leg	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.058 0.100
RFS APXV18-206517S-C w/mp (Pocket)	B	From Leg	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.058 0.100
RFS APXV18-206517S-C w/mp (Pocket)	C	From Leg	0.500 0.000 0.000	0.000	145.000	No Ice 1/2" Ice	5.404 5.960	4.700 5.860	0.058 0.100
***									
14' omni (Fire Dept)	A	From Leg	2.000 0.000 0.000	0.000	116.500	No Ice 1/2" Ice	9.000 10.560	9.000 10.560	0.100 0.170
12' Omni w/ MP (Fire Dept)	B	From Leg	2.000 0.000 0.000	0.000	115.500	No Ice 1/2" Ice	4.600 5.000	4.600 5.000	0.021 0.102
4' Omni (Fire Dept)	C	From Leg	2.000 0.000 0.000	0.000	111.500	No Ice 1/2" Ice	1.000 1.250	1.000 1.250	0.025 0.034

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft 綁 嘮	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4' Side Arm	A	From Leg	0.500	0.000	109.500	No Ice	0.156	1.867	0.250
(Fire Dept)			0.000			1/2" Ice	0.212	2.208	0.265
			0.000						
4' Side Arm	B	From Leg	0.500	0.000	109.500	No Ice	0.156	1.867	0.250
(Fire Dept)			0.000			1/2" Ice	0.212	2.208	0.265
			0.000						
4' Side Arm	C	From Leg	0.500	0.000	109.500	No Ice	0.156	1.867	0.250
(Fire Dept)			0.000			1/2" Ice	0.212	2.208	0.265
			0.000						
***									
GPS	A	From Leg	1.000	0.000	70.500	No Ice	0.304	0.304	0.001
(Sprint)			0.000			1/2" Ice	0.432	0.432	0.004
			0.000						
4' Side Arm	A	From Leg	0.500	0.000	70.500	No Ice	0.156	1.867	0.250
(Sprint)			0.000			1/2" Ice	0.212	2.208	0.265
			0.000						
***									
GPS	B	From Leg	1.000	0.000	70.500	No Ice	0.304	0.304	0.001
(AT&T)			0.000			1/2" Ice	0.432	0.432	0.004
			0.000						
4' Side Arm	B	From Leg	0.500	0.000	70.500	No Ice	0.156	1.867	0.250
(AT&T)			0.000			1/2" Ice	0.212	2.208	0.265
			0.000						

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

Comb. No.	Description
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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	196 - 165.25	60.481	28	2.861	0.002
L2	169.58 - 137.45	44.915	28	2.686	0.002
L3	137.45 - 136.95	28.599	28	2.064	0.001
L4	136.95 - 123.55	28.384	28	2.056	0.001
L5	128.97 - 114.45	25.065	28	1.915	0.001
L6	114.45 - 113.95	19.559	28	1.660	0.001
L7	113.95 - 83.95	19.385	28	1.653	0.001
L8	90.37 - 59.95	12.108	28	1.292	0.001
L9	59.95 - 59.45	5.258	28	0.800	0.000
L10	59.45 - 45.35	5.174	28	0.794	0.000
L11	52.4 - 0	4.072	28	0.698	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.500	(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded)	28	57.780	2.847	0.002	27165
189.500	(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed)	28	56.582	2.840	0.002	18807
185.000	Antel BXA-70063/6CF_2 w/ Mount Pipe	28	53.896	2.822	0.002	11112
175.000	PiROD 13' Low Profile Platform	28	48.020	2.751	0.002	5820
161.000	(4) DB846G90A-XY w/Mount Pipe	28	40.163	2.539	0.002	3504
155.000	(3) APX16PV-16PVL-E w/ 2" Pipe	28	36.986	2.416	0.002	2996
145.000	RFS APXV18-206517S-C w/mp	28	32.022	2.204	0.001	2413
116.500	14' omni	28	20.283	1.692	0.001	2484
115.500	12' Omni w/ MP	28	19.927	1.676	0.001	2451
111.500	4' Omni	28	18.548	1.616	0.001	3621
109.500	4' Side Arm	28	17.879	1.586	0.001	3689
70.500	GPS	28	7.258	0.952	0.001	3200

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	196 - 165.25	154.020	2	7.294	0.007
L2	169.58 - 137.45	114.436	3	6.849	0.006
L3	137.45 - 136.95	72.940	3	5.268	0.005
L4	136.95 - 123.55	72.391	3	5.247	0.005
L5	128.97 - 114.45	63.939	3	4.886	0.004
L6	114.45 - 113.95	49.909	3	4.237	0.004
L7	113.95 - 83.95	49.467	3	4.218	0.004
L8	90.37 - 59.95	30.909	3	3.299	0.003
L9	59.95 - 59.45	13.428	3	2.043	0.002
L10	59.45 - 45.35	13.215	3	2.027	0.002
L11	52.4 - 0	10.402	3	1.784	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
191.500	(2) 76" x 14" x 7" Panel w/ Mount Pipe (Partially Shielded)	2	147.151	7.260	0.007	10980
189.500	(2) RRUs 24" x 13" x 7" (60 LBs) (Fully Exposed)	2	144.104	7.243	0.007	7601
185.000	Antel BXA-70063/6CF_2 w/ Mount Pipe	2	137.276	7.195	0.007	4490
175.000	PiROD 13' Low Profile Platform	2	122.333	7.014	0.007	2349
161.000	(4) DB846G90A-XY w/Mount Pipe	3	102.357	6.476	0.006	1408
155.000	(3) APX16PV-16PVL-E w/ 2" Pipe	3	94.279	6.163	0.006	1202
145.000	RFS APXV18-206517S-C w/mp	3	81.652	5.624	0.005	964
116.500	14' omni	3	51.755	4.319	0.004	985
115.500	12' Omni w/ MP	3	50.848	4.278	0.004	971
111.500	4' Omni	3	47.333	4.125	0.004	1434
109.500	4' Side Arm	3	45.629	4.049	0.004	1460
70.500	GPS	3	18.534	2.432	0.002	1259

Compression Checks

Pole Design Data

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 $\frac{P}{P_a}$
L1	196 - 194.609	TP27.98x21.53x0.188	30.750	0.000	0.0	39.000	12.940	-0.085	504.658	0.000
	194.609 - 193.219					39.000	13.114	-0.171	511.461	0.000
	193.219 -					39.000	13.289	-0.258	518.265	0.000

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 $\frac{P}{P_a}$
	191.828									
	191.828 - 190.438					39.000	13.463	-2.278	525.069	0.004
	190.438 - 189.047					39.000	13.638	-2.479	531.873	0.005
	189.047 - 187.657					39.000	13.812	-2.540	538.677	0.005
	187.657 - 186.266					39.000	13.987	-2.602	545.480	0.005
	186.266 - 184.876					39.000	14.161	-3.890	552.284	0.007
	184.876 - 183.485					39.000	14.336	-3.955	559.088	0.007
	183.485 - 182.095					39.000	14.510	-4.021	565.892	0.007
	182.095 - 180.704					39.000	14.684	-4.089	572.695	0.007
	180.704 - 179.314					39.000	14.859	-4.158	579.499	0.007
	179.314 - 177.923					39.000	15.033	-4.229	586.303	0.007
	177.923 - 176.533					39.000	15.208	-4.302	593.107	0.007
	176.533 - 175.142					39.000	15.382	-4.376	599.911	0.007
	175.142 - 173.752					39.000	15.557	-6.305	606.714	0.010
	173.752 - 172.361					39.000	15.731	-6.386	613.518	0.010
	172.361 - 170.971					39.000	15.906	-6.469	620.322	0.010
	170.971 - 169.58					39.000	16.080	-6.555	627.126	0.010
	169.58 - 165.25					38.432	16.623	-2.884	638.878	0.005
L2	169.58 - 165.25	TP33.431x26.697x0.281	32.130	0.000	0.0	39.000	24.514	-4.265	956.042	0.004
	165.25 - 163.787					39.000	24.789	-7.331	966.772	0.008
	163.787 - 162.324					39.000	25.064	-7.510	977.503	0.008
	162.324 - 160.861					39.000	25.339	-9.008	988.233	0.009
	160.861 - 159.397					39.000	25.615	-9.195	998.964	0.009
	159.397 - 157.934					39.000	25.890	-9.386	1009.690	0.009
	157.934 - 156.471					39.000	26.165	-9.579	1020.420	0.009
	156.471 - 155.008					39.000	26.440	-9.775	1031.150	0.009
	155.008 - 153.545					39.000	26.715	-10.642	1041.890	0.010
	153.545 - 152.082					39.000	26.990	-10.848	1052.620	0.010
	152.082 - 150.618					39.000	27.265	-11.057	1063.350	0.010
	150.618 - 149.155					39.000	27.540	-11.269	1074.080	0.010
	149.155 - 147.692					39.000	27.816	-11.484	1084.810	0.011
	147.692 -					39.000	28.091	-11.702	1095.540	0.011

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 $\frac{P}{P_a}$
	146.229									
	146.229 - 144.766					39.000	28.366	-12.031	1106.270	0.011
	144.766 - 143.303					39.000	28.641	-12.256	1117.000	0.011
	143.303 - 141.839					39.000	28.916	-12.484	1127.730	0.011
	141.839 - 140.376					39.000	29.191	-12.715	1138.460	0.011
	140.376 - 138.913					39.000	29.466	-12.949	1149.190	0.011
	138.913 - 137.45					39.000	29.742	-13.185	1159.920	0.011
L3	137.45 - 136.95 (3)	TP36.536x33.431x0.359	0.500	0.000	0.0	30.000	37.874	-13.216	1136.230	0.012
L4	136.95 - 135.81	TP39.35x36.536x0.345	13.400	0.000	0.0	30.000	40.093	-13.519	1202.800	0.011
	135.81 - 134.67					30.000	40.357	-13.744	1210.710	0.011
	134.67 - 133.53					30.000	40.620	-13.970	1218.610	0.011
	133.53 - 132.39					30.000	40.884	-14.198	1226.520	0.012
	132.39 - 131.25					30.000	41.147	-14.428	1234.420	0.012
	131.25 - 130.11					30.000	41.411	-14.660	1242.330	0.012
	130.11 - 128.97					30.000	41.674	-14.893	1250.230	0.012
	128.97 - 123.55					30.000	42.927	-8.217	1287.810	0.006
L5	128.97 - 123.55	TP37.705x37.522x0.375	14.520	0.000	0.0	39.000	44.519	-8.528	1736.230	0.005
	123.55 - 122.539					39.000	44.534	-16.990	1736.820	0.010
	122.539 - 121.528					39.000	44.549	-17.213	1737.420	0.010
	121.528 - 120.517					39.000	44.564	-17.437	1738.010	0.010
	120.517 - 119.506					39.000	44.580	-17.662	1738.610	0.010
	119.506 - 118.494					39.000	44.595	-17.888	1739.200	0.010
	118.494 - 117.483					39.000	44.610	-18.115	1739.800	0.010
	117.483 - 116.472					39.000	44.625	-18.416	1740.390	0.011
	116.472 - 115.461					39.000	44.641	-18.653	1740.990	0.011
	115.461 - 114.45					39.000	44.656	-18.884	1741.580	0.011
L6	114.45 - 113.95 (6)	TP40.81x37.705x0.485	0.500	0.000	0.0	30.000	57.585	-18.908	1727.550	0.011
L7	113.95 - 112.709	TP47.11x40.81x0.495	30.000	0.000	0.0	30.000	64.071	-19.372	1922.130	0.010
	112.709 - 111.468					30.000	64.482	-19.745	1934.470	0.010
	111.468 - 110.227					30.000	64.894	-20.098	1946.820	0.010
	110.227 - 108.986					30.000	65.305	-21.193	1959.170	0.011
	108.986 - 107.745					30.000	65.717	-21.551	1971.510	0.011
	107.745 - 106.504					30.000	66.129	-21.910	1983.860	0.011
	106.504 - 105.263					30.000	66.540	-22.272	1996.200	0.011
	105.263 - 104.022					30.000	66.952	-22.636	2008.550	0.011

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 $\frac{P}{P_a}$
	104.022 - 102.781					30.000	67.363	-23.003	2020.900	0.011
	102.781 - 101.539					30.000	67.775	-23.371	2033.240	0.011
	101.539 - 100.298					30.000	68.186	-23.741	2045.590	0.012
	100.298 - 99.0574					30.000	68.598	-24.114	2057.930	0.012
	99.0574 - 97.8163					30.000	69.009	-24.488	2070.280	0.012
	97.8163 - 96.5753					30.000	69.421	-24.865	2082.630	0.012
	96.5753 - 95.3342					30.000	69.832	-25.244	2094.970	0.012
	95.3342 - 94.0932					30.000	70.244	-25.625	2107.320	0.012
	94.0932 - 92.8521					30.000	70.656	-26.008	2119.660	0.012
	92.8521 - 91.6111					30.000	71.067	-26.393	2132.010	0.012
	91.6111 - 90.37					30.000	71.479	-26.781	2144.360	0.012
	90.37 - 83.95					30.000	73.607	-15.337	2208.220	0.007
L8	90.37 - 83.95	TP48.394x44.772x0.5	30.420	0.000	0.0	39.000	71.833	-14.919	2801.480	0.005
	83.95 - 82.6868					39.000	72.073	-30.689	2810.840	0.011
	82.6868 - 81.4237					39.000	72.313	-31.095	2820.190	0.011
	81.4237 - 80.1605					39.000	72.552	-31.502	2829.550	0.011
	80.1605 - 78.8974					39.000	72.792	-31.912	2838.900	0.011
	78.8974 - 77.6342					39.000	73.032	-32.323	2848.260	0.011
	77.6342 - 76.3711					39.000	73.272	-32.736	2857.620	0.011
	76.3711 - 75.1079					39.000	73.512	-33.151	2866.970	0.012
	75.1079 - 73.8447					39.000	73.752	-33.567	2876.330	0.012
	73.8447 - 72.5816					39.000	73.992	-33.985	2885.690	0.012
	72.5816 - 71.3184					39.000	74.232	-34.405	2895.040	0.012
	71.3184 - 70.0553					39.000	74.472	-35.323	2904.400	0.012
	70.0553 - 68.7921					39.000	74.712	-35.746	2913.750	0.012
	68.7921 - 67.5289					39.000	74.951	-36.171	2923.110	0.012
	67.5289 - 66.2658					39.000	75.191	-36.598	2932.470	0.012
	66.2658 - 65.0026					39.000	75.431	-37.026	2941.820	0.013
	65.0026 - 63.7395					39.000	75.671	-37.457	2951.180	0.013
	63.7395 - 62.4763					39.000	75.911	-37.889	2960.530	0.013
	62.4763 - 61.2132					39.000	76.151	-38.322	2969.890	0.013
	61.2132 - 59.95					39.000	76.391	-38.757	2979.250	0.013
L9	59.95 - 59.45 (9)	TP51.499x48.394x0.66	0.500	0.000	0.0	30.000	100.499	-38.787	3014.980	0.013

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 $\frac{P}{P_a}$
L10	59.45 - 58.4429	TP53.46x51.499x0.605	14.100	0.000	0.0	30.000	98.493	-39.393	2954.800	0.013
	58.4429 - 57.4357					30.000	98.763	-39.806	2962.910	0.013
	57.4357 - 56.4286					30.000	99.034	-40.221	2971.020	0.014
	56.4286 - 55.4214					30.000	99.304	-40.636	2979.130	0.014
	55.4214 - 54.4143					30.000	99.575	-41.053	2987.240	0.014
	54.4143 - 53.4071					30.000	99.845	-41.472	2995.350	0.014
	53.4071 - 52.4					30.000	100.115	-41.891	3003.460	0.014
	52.4 - 45.35					30.000	102.008	-23.549	3060.230	0.008
L11	52.4 - 45.35	TP60x51.27x0.625	52.400	0.000	0.0	39.000	103.314	-23.626	4029.260	0.006
	45.35 - 42.9632					39.000	104.107	-48.222	4060.180	0.012
	42.9632 - 40.5763					39.000	104.900	-49.262	4091.100	0.012
	40.5763 - 38.1895					39.000	105.693	-50.309	4122.030	0.012
	38.1895 - 35.8026					39.000	106.486	-51.364	4152.950	0.012
	35.8026 - 33.4158					39.000	107.279	-52.426	4183.870	0.013
	33.4158 - 31.0289					39.000	108.072	-53.496	4214.790	0.013
	31.0289 - 28.6421					39.000	108.864	-54.572	4245.710	0.013
	28.6421 - 26.2553					39.000	109.657	-55.657	4276.640	0.013
	26.2553 - 23.8684					39.000	110.450	-56.749	4307.560	0.013
	23.8684 - 21.4816					39.000	111.243	-57.848	4338.480	0.013
	21.4816 - 19.0947					39.000	112.036	-58.955	4369.400	0.013
	19.0947 - 16.7079					39.000	112.829	-60.069	4400.320	0.014
	16.7079 - 14.3211					39.000	113.622	-61.191	4431.250	0.014
	14.3211 - 11.9342					39.000	114.415	-62.320	4462.170	0.014
	11.9342 - 9.54737					39.000	115.207	-63.456	4493.090	0.014
	9.54737 - 7.16053					39.000	116.000	-64.600	4524.010	0.014
	7.16053 - 4.77368					39.000	116.793	-65.751	4554.930	0.014
	4.77368 - 2.38684					39.000	117.586	-66.909	4585.860	0.015
	2.38684 - 0					39.000	118.379	-68.075	4616.780	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	196 - 194.609	TP27.98x21.53x0.188	0.140	0.024	39.000	0.001	0.000	0.000	39.000	0.000
	194.609 - 193.219		0.518	0.088	39.000	0.002	0.000	0.000	39.000	0.000
	193.219 - 191.828		1.145	0.189	39.000	0.005	0.000	0.000	39.000	0.000
	191.828 - 190.438		4.863	0.784	39.000	0.020	0.000	0.000	39.000	0.000
	190.438 - 189.047		11.000	1.728	39.000	0.044	0.000	0.000	39.000	0.000
	189.047 - 187.657		18.209	2.788	39.000	0.071	0.000	0.000	39.000	0.000
	187.657 - 186.266		25.668	3.832	39.000	0.098	0.000	0.000	39.000	0.000
	186.266 - 184.876		33.943	4.943	39.000	0.127	0.000	0.000	39.000	0.000
	184.876 - 183.485		48.190	6.848	39.000	0.176	0.000	0.000	39.000	0.000
	183.485 - 182.095		62.693	8.695	39.000	0.223	0.000	0.000	39.000	0.000
	182.095 - 180.704		77.454	10.487	39.000	0.269	0.000	0.000	39.000	0.000
	180.704 - 179.314		92.475	12.228	39.000	0.314	0.000	0.000	39.000	0.000
	179.314 - 177.923		107.760	13.919	39.000	0.357	0.000	0.000	39.000	0.000
	177.923 - 176.533		123.308	15.562	39.000	0.399	0.000	0.000	39.000	0.000
	176.533 - 175.142		139.124	17.161	39.000	0.440	0.000	0.000	39.000	0.000
	175.142 - 173.752		160.298	19.330	39.000	0.496	0.000	0.000	39.000	0.000
	173.752 - 172.361		182.313	21.498	39.000	0.551	0.000	0.000	39.000	0.000
	172.361 - 170.971		204.598	23.598	39.000	0.605	0.000	0.000	39.000	0.000
	170.971 - 169.58		227.157	25.633	39.000	0.657	0.000	0.000	39.000	0.000
	169.58 - 165.25		123.591	13.047	38.432	0.339	0.000	0.000	38.432	0.000
L2	169.58 - 165.25	TP33.431x26.697x0.281	175.694	12.838	39.000	0.329	0.000	0.000	39.000	0.000
	165.25 - 163.787		324.320	23.172	39.000	0.594	0.000	0.000	39.000	0.000
	163.787 - 162.324		349.674	24.436	39.000	0.627	0.000	0.000	39.000	0.000
	162.324 - 160.861		375.943	25.701	39.000	0.659	0.000	0.000	39.000	0.000
	160.861 - 159.397		408.091	27.300	39.000	0.700	0.000	0.000	39.000	0.000
	159.397 - 157.934		440.568	28.847	39.000	0.740	0.000	0.000	39.000	0.000
	157.934 - 156.471		473.377	30.343	39.000	0.778	0.000	0.000	39.000	0.000
	156.471 - 155.008		506.519	31.792	39.000	0.815	0.000	0.000	39.000	0.000
	155.008 - 153.545		544.540	33.475	39.000	0.858	0.000	0.000	39.000	0.000
	153.545 - 152.082		582.923	35.104	39.000	0.900	0.000	0.000	39.000	0.000
	152.082 -		621.643	36.681	39.000	0.941	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	150.618									
	150.618 - 149.155		660.704	38.207	39.000	0.980	0.000	0.000	39.000	0.000
	149.155 - 147.692		700.108	39.685	39.000	1.018	0.000	0.000	39.000	0.000
	147.692 - 146.229		739.857	41.118	39.000	1.054	0.000	0.000	39.000	0.000
	146.229 - 144.766		780.107	42.514	39.000	1.090	0.000	0.000	39.000	0.000
	144.766 - 143.303		821.508	43.910	39.000	1.126	0.000	0.000	39.000	0.000
	143.303 - 141.839		863.258	45.264	39.000	1.161	0.000	0.000	39.000	0.000
	141.839 - 140.376		905.367	46.578	39.000	1.194	0.000	0.000	39.000	0.000
	140.376 - 138.913		947.825	47.852	39.000	1.227	0.000	0.000	39.000	0.000
	138.913 - 137.45		990.642	49.088	39.000	1.259	0.000	0.000	39.000	0.000
L3	137.45 - 136.95 (3)	TP36.536x33.431x0.359	990.583	38.727	30.000	1.291	0.000	0.000	30.000	0.000
L4	136.95 - 135.81	TP39.35x36.536x0.345	1039.067	34.789	30.000	1.160	0.000	0.000	30.000	0.000
	135.81 - 134.67		1073.008	35.455	30.000	1.182	0.000	0.000	30.000	0.000
	134.67 - 133.53		1107.167	36.109	30.000	1.204	0.000	0.000	30.000	0.000
	133.53 - 132.39		1141.567	36.750	30.000	1.225	0.000	0.000	30.000	0.000
	132.39 - 131.25		1176.183	37.379	30.000	1.246	0.000	0.000	30.000	0.000
	131.25 - 130.11		1211.042	37.996	30.000	1.267	0.000	0.000	30.000	0.000
	130.11 - 128.97		1246.125	38.602	30.000	1.287	0.000	0.000	30.000	0.000
	128.97 - 123.55		714.400	20.852	30.000	0.695	0.000	0.000	30.000	0.000
L5	128.97 - 123.55	TP37.705x37.522x0.375	702.029	20.734	39.000	0.532	0.000	0.000	39.000	0.000
	123.55 - 122.539		1448.850	42.761	39.000	1.096	0.000	0.000	39.000	0.000
	122.539 - 121.528		1481.425	43.693	39.000	1.120	0.000	0.000	39.000	0.000
	121.528 - 120.517		1514.175	44.628	39.000	1.144	0.000	0.000	39.000	0.000
	120.517 - 119.506		1547.100	45.567	39.000	1.168	0.000	0.000	39.000	0.000
	119.506 - 118.494		1580.183	46.510	39.000	1.193	0.000	0.000	39.000	0.000
	118.494 - 117.483		1613.442	47.456	39.000	1.217	0.000	0.000	39.000	0.000
	117.483 - 116.472		1647.192	48.415	39.000	1.241	0.000	0.000	39.000	0.000
	116.472 - 115.461		1681.158	49.380	39.000	1.266	0.000	0.000	39.000	0.000
	115.461 - 114.45		1715.475	50.353	39.000	1.291	0.000	0.000	39.000	0.000
L6	114.45 - 113.95 (6)	TP40.81x37.705x0.485	1715.408	39.277	30.000	1.309	0.000	0.000	30.000	0.000
L7	113.95 -	TP47.11x40.81x0.495	1774.96	33.479	30.000	1.116	0.000	0.000	30.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	112.709		7							
	112.709 - 111.468		1817.60 8	33.844	30.000	1.128	0.000	0.000	30.000	0.000
	111.468 - 110.227		1860.64 2	34.205	30.000	1.140	0.000	0.000	30.000	0.000
	110.227 - 108.986		1904.03 3	34.560	30.000	1.152	0.000	0.000	30.000	0.000
	108.986 - 107.745		1947.81 7	34.911	30.000	1.164	0.000	0.000	30.000	0.000
	107.745 - 106.504		1991.85 8	35.255	30.000	1.175	0.000	0.000	30.000	0.000
	106.504 - 105.263		2036.17 5	35.592	30.000	1.186	0.000	0.000	30.000	0.000
	105.263 - 104.022		2080.75 8	35.923	30.000	1.197	0.000	0.000	30.000	0.000
	104.022 - 102.781		2125.60 8	36.248	30.000	1.208	0.000	0.000	30.000	0.000
	102.781 - 101.539		2170.72 5	36.566	30.000	1.219	0.000	0.000	30.000	0.000
	101.539 - 100.298		2216.11 7	36.879	30.000	1.229	0.000	0.000	30.000	0.000
	100.298 - 99.0574		2261.78 3	37.186	30.000	1.240	0.000	0.000	30.000	0.000
	99.0574 - 97.8163		2307.71 7	37.488	30.000	1.250	0.000	0.000	30.000	0.000
	97.8163 - 96.5753		2353.93 3	37.784	30.000	1.259	0.000	0.000	30.000	0.000
	96.5753 - 95.3342		2400.41 7	38.075	30.000	1.269	0.000	0.000	30.000	0.000
	95.3342 - 94.0932		2447.17 5	38.361	30.000	1.279	0.000	0.000	30.000	0.000
	94.0932 - 92.8521		2494.21 7	38.642	30.000	1.288	0.000	0.000	30.000	0.000
	92.8521 - 91.6111		2541.53 3	38.917	30.000	1.297	0.000	0.000	30.000	0.000
	91.6111 - 90.37		2589.12 5	39.188	30.000	1.306	0.000	0.000	30.000	0.000
	90.37 - 83.95		1474.11 7	21.033	30.000	0.701	0.000	0.000	30.000	0.000
L8	90.37 - 83.95	TP48.394x44.772x0.5	1366.17 5	20.685	39.000	0.530	0.000	0.000	39.000	0.000
	83.95 - 82.6868		2890.67 5	43.474	39.000	1.115	0.000	0.000	39.000	0.000
	82.6868 - 81.4237		2941.30 8	43.941	39.000	1.127	0.000	0.000	39.000	0.000
	81.4237 - 80.1605		2992.19 2	44.405	39.000	1.139	0.000	0.000	39.000	0.000
	80.1605 - 78.8974		3043.32 5	44.865	39.000	1.150	0.000	0.000	39.000	0.000
	78.8974 - 77.6342		3094.70 8	45.322	39.000	1.162	0.000	0.000	39.000	0.000
	77.6342 - 76.3711		3146.34 2	45.775	39.000	1.174	0.000	0.000	39.000	0.000
	76.3711 - 75.1079		3198.22 5	46.225	39.000	1.185	0.000	0.000	39.000	0.000
	75.1079 - 73.8447		3250.36 7	46.672	39.000	1.197	0.000	0.000	39.000	0.000
	73.8447 - 72.5816		3302.75 0	47.115	39.000	1.208	0.000	0.000	39.000	0.000
	72.5816 -		3355.37	47.555	39.000	1.219	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	71.3184		5							
	71.3184 - 70.0553		3408.85 0	48.001	39.000	1.231	0.000	0.000	39.000	0.000
	70.0553 - 68.7921		3462.14 2	48.437	39.000	1.242	0.000	0.000	39.000	0.000
	68.7921 - 67.5289		3515.67 5	48.870	39.000	1.253	0.000	0.000	39.000	0.000
	67.5289 - 66.2658		3569.45 8	49.300	39.000	1.264	0.000	0.000	39.000	0.000
	66.2658 - 65.0026		3623.48 3	49.727	39.000	1.275	0.000	0.000	39.000	0.000
	65.0026 - 63.7395		3677.75 8	50.150	39.000	1.286	0.000	0.000	39.000	0.000
	63.7395 - 62.4763		3732.28 3	50.571	39.000	1.297	0.000	0.000	39.000	0.000
	62.4763 - 61.2132		3787.04 2	50.988	39.000	1.307	0.000	0.000	39.000	0.000
	61.2132 - 59.95		3842.05 0	51.403	39.000	1.318	0.000	0.000	39.000	0.000
L9	59.95 - 59.45 (9)	TP51.499x48.394x0.66	3842.03 3	39.334	30.000	1.311	0.000	0.000	30.000	0.000
L10	59.45 - 58.4429	TP53.46x51.499x0.605	3908.01 7	38.111	30.000	1.270	0.000	0.000	30.000	0.000
	58.4429 - 57.4357		3952.28 3	38.330	30.000	1.278	0.000	0.000	30.000	0.000
	57.4357 - 56.4286		3996.71 7	38.549	30.000	1.285	0.000	0.000	30.000	0.000
	56.4286 - 55.4214		4041.30 0	38.766	30.000	1.292	0.000	0.000	30.000	0.000
	55.4214 - 54.4143		4086.05 0	38.981	30.000	1.299	0.000	0.000	30.000	0.000
	54.4143 - 53.4071		4130.95 0	39.195	30.000	1.306	0.000	0.000	30.000	0.000
	53.4071 - 52.4		4176.00 8	39.408	30.000	1.314	0.000	0.000	30.000	0.000
	52.4 - 45.35		2285.59 2	20.771	30.000	0.692	0.000	0.000	30.000	0.000
L11	52.4 - 45.35	TP60x51.27x0.625	2210.79 2	20.246	39.000	0.519	0.000	0.000	39.000	0.000
	45.35 - 42.9632		4606.71 7	41.544	39.000	1.065	0.000	0.000	39.000	0.000
	42.9632 - 40.5763		4717.77 5	41.901	39.000	1.074	0.000	0.000	39.000	0.000
	40.5763 - 38.1895		4829.55 8	42.249	39.000	1.083	0.000	0.000	39.000	0.000
	38.1895 - 35.8026		4942.07 5	42.588	39.000	1.092	0.000	0.000	39.000	0.000
	35.8026 - 33.4158		5055.31 7	42.919	39.000	1.100	0.000	0.000	39.000	0.000
	33.4158 - 31.0289		5169.28 3	43.241	39.000	1.109	0.000	0.000	39.000	0.000
	31.0289 - 28.6421		5283.97 5	43.555	39.000	1.117	0.000	0.000	39.000	0.000
	28.6421 - 26.2553		5399.39 2	43.862	39.000	1.125	0.000	0.000	39.000	0.000
	26.2553 - 23.8684		5515.52 5	44.160	39.000	1.132	0.000	0.000	39.000	0.000
	23.8684 - 21.4816		5632.37 5	44.452	39.000	1.140	0.000	0.000	39.000	0.000
	21.4816 -		5749.95	44.736	39.000	1.147	0.000	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
	19.0947		0							
	19.0947 - 16.7079		5868.233	45.014	39.000	1.154	0.000	0.000	39.000	0.000
	16.7079 - 14.3211		5987.233	45.284	39.000	1.161	0.000	0.000	39.000	0.000
	14.3211 - 11.9342		6106.950	45.548	39.000	1.168	0.000	0.000	39.000	0.000
	11.9342 - 9.54737		6227.367	45.806	39.000	1.175	0.000	0.000	39.000	0.000
	9.54737 - 7.16053		6348.500	46.058	39.000	1.181	0.000	0.000	39.000	0.000
	7.16053 - 4.77368		6470.341	46.303	39.000	1.187	0.000	0.000	39.000	0.000
	4.77368 - 2.38684		6592.883	46.542	39.000	1.193	0.000	0.000	39.000	0.000
	2.38684 - 0		6716.125	46.776	39.000	1.199	0.000	0.000	39.000	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	196 - 194.609	TP27.98x21.53x0.188	0.186	0.014	26.000	0.001	0.002	0.000	26.000	0.000
	194.609 - 193.219		0.364	0.028	26.000	0.002	0.004	0.000	26.000	0.000
	193.219 - 191.828		0.543	0.041	26.000	0.003	0.006	0.000	26.000	0.000
	191.828 - 190.438		3.402	0.253	26.000	0.020	0.008	0.001	26.000	0.000
	190.438 - 189.047		5.102	0.374	26.000	0.029	0.051	0.004	26.000	0.000
	189.047 - 187.657		5.281	0.382	26.000	0.030	0.061	0.005	26.000	0.000
	187.657 - 186.266		5.462	0.391	26.000	0.030	0.072	0.005	26.000	0.000
	186.266 - 184.876		10.163	0.718	26.000	0.056	0.083	0.006	26.000	0.000
	184.876 - 183.485		10.346	0.722	26.000	0.056	0.094	0.006	26.000	0.000
	183.485 - 182.095		10.532	0.726	26.000	0.056	0.105	0.007	26.000	0.000
	182.095 - 180.704		10.719	0.730	26.000	0.057	0.116	0.008	26.000	0.000
	180.704 - 179.314		10.907	0.734	26.000	0.057	0.127	0.008	26.000	0.000
	179.314 - 177.923		11.097	0.738	26.000	0.057	0.138	0.009	26.000	0.000
	177.923 - 176.533		11.289	0.742	26.000	0.058	0.150	0.009	26.000	0.000
	176.533 - 175.142		11.482	0.746	26.000	0.058	0.161	0.010	26.000	0.000
	175.142 - 173.752		15.750	1.012	26.000	0.079	0.187	0.011	26.000	0.000
	173.752 - 172.361		15.944	1.014	26.000	0.079	0.031	0.002	26.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	172.361 - 170.971		16.140	1.015	26.000	0.079	0.019	0.001	26.000	0.000
	170.971 - 169.58		16.337	1.016	26.000	0.079	0.007	0.000	26.000	0.000
	169.58 - 165.25		7.198	0.433	26.000	0.034	0.031	0.002	26.000	0.000
L2	169.58 - 165.25	TP33.431x26.697x0.281	9.809	0.400	26.000	0.031	0.015	0.001	26.000	0.000
	165.25 - 163.787		17.238	0.695	26.000	0.054	0.059	0.002	26.000	0.000
	163.787 - 162.324		17.461	0.697	26.000	0.054	0.072	0.002	26.000	0.000
	162.324 - 160.861		21.882	0.864	26.000	0.067	0.086	0.003	26.000	0.000
	160.861 - 159.397		22.107	0.863	26.000	0.067	0.099	0.003	26.000	0.000
	159.397 - 157.934		22.333	0.863	26.000	0.067	0.113	0.004	26.000	0.000
	157.934 - 156.471		22.560	0.862	26.000	0.067	0.126	0.004	26.000	0.000
	156.471 - 155.008		22.790	0.862	26.000	0.067	0.140	0.004	26.000	0.000
	155.008 - 153.545		26.142	0.979	26.000	0.076	0.154	0.005	26.000	0.000
	153.545 - 152.082		26.373	0.977	26.000	0.076	0.168	0.005	26.000	0.000
	152.082 - 150.618		26.605	0.976	26.000	0.076	0.183	0.005	26.000	0.000
	150.618 - 149.155		26.839	0.975	26.000	0.076	0.197	0.005	26.000	0.000
	149.155 - 147.692		27.074	0.973	26.000	0.076	0.212	0.006	26.000	0.000
	147.692 - 146.229		27.311	0.972	26.000	0.076	0.226	0.006	26.000	0.000
	146.229 - 144.766		28.203	0.994	26.000	0.077	0.241	0.006	26.000	0.000
	144.766 - 143.303		28.442	0.993	26.000	0.077	0.256	0.007	26.000	0.000
	143.303 - 141.839		28.682	0.992	26.000	0.077	0.271	0.007	26.000	0.000
	141.839 - 140.376		28.924	0.991	26.000	0.077	0.286	0.007	26.000	0.000
	140.376 - 138.913		29.166	0.990	26.000	0.077	0.302	0.007	26.000	0.000
	138.913 - 137.45		29.411	0.989	26.000	0.077	0.317	0.008	26.000	0.000
L3	137.45 - 136.95 (3)	TP36.536x33.431x0.359	29.665	0.783	20.000	0.072	0.323	0.006	20.000	0.000
L4	136.95 - 135.81	TP39.35x36.536x0.345	29.711	0.741	20.000	0.075	0.335	0.005	20.000	0.000
	135.81 - 134.67		29.911	0.741	20.000	0.075	0.348	0.006	20.000	0.000
	134.67 - 133.53		30.111	0.741	20.000	0.075	0.361	0.006	20.000	0.000
	133.53 - 132.39		30.313	0.741	20.000	0.075	0.374	0.006	20.000	0.000
	132.39 - 131.25		30.515	0.742	20.000	0.075	0.387	0.006	20.000	0.000
	131.25 - 130.11		30.717	0.742	20.000	0.075	0.400	0.006	20.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	130.11 - 128.97		30.921	0.742	20.000	0.075	0.413	0.006	20.000	0.000
	128.97 - 123.55		16.372	0.381	20.000	0.039	0.256	0.004	20.000	0.000
L5	128.97 - 123.55	TP37.705x37.522x0.375	15.615	0.351	26.000	0.027	0.220	0.003	26.000	0.000
	123.55 - 122.539		32.182	0.723	26.000	0.056	0.488	0.007	26.000	0.000
	122.539 - 121.528		32.350	0.726	26.000	0.056	0.499	0.007	26.000	0.000
	121.528 - 120.517		32.518	0.730	26.000	0.057	0.510	0.007	26.000	0.000
	120.517 - 119.506		32.685	0.733	26.000	0.057	0.521	0.007	26.000	0.000
	119.506 - 118.494		32.852	0.737	26.000	0.057	0.533	0.008	26.000	0.000
	118.494 - 117.483		33.017	0.740	26.000	0.058	0.544	0.008	26.000	0.000
	117.483 - 116.472		33.546	0.752	26.000	0.058	1.202	0.017	26.000	0.001
	116.472 - 115.461		33.893	0.759	26.000	0.059	1.202	0.017	26.000	0.001
	115.461 - 114.45		34.057	0.763	26.000	0.059	0.572	0.008	26.000	0.000
L6	114.45 - 113.95 (6)	TP40.81x37.705x0.485	34.295	0.596	20.000	0.056	0.577	0.006	20.000	0.000
L7	113.95 - 112.709	TP47.11x40.81x0.495	34.354	0.536	20.000	0.054	0.591	0.005	20.000	0.000
	112.709 - 111.468		34.608	0.537	20.000	0.054	0.681	0.006	20.000	0.000
	111.468 - 110.227		34.821	0.537	20.000	0.054	0.695	0.006	20.000	0.000
	110.227 - 108.986		35.205	0.539	20.000	0.055	0.709	0.006	20.000	0.000
	108.986 - 107.745		35.419	0.539	20.000	0.055	0.723	0.006	20.000	0.000
	107.745 - 106.504		35.634	0.539	20.000	0.054	0.738	0.006	20.000	0.000
	106.504 - 105.263		35.850	0.539	20.000	0.054	0.752	0.006	20.000	0.000
	105.263 - 104.022		36.066	0.539	20.000	0.054	0.766	0.006	20.000	0.000
	104.022 - 102.781		36.283	0.539	20.000	0.054	0.781	0.006	20.000	0.000
	102.781 - 101.539		36.501	0.539	20.000	0.054	0.796	0.006	20.000	0.000
	101.539 - 100.298		36.719	0.539	20.000	0.054	0.811	0.006	20.000	0.000
	100.298 - 99.0574		36.938	0.538	20.000	0.054	0.825	0.007	20.000	0.000
	99.0574 - 97.8163		37.158	0.538	20.000	0.054	0.840	0.007	20.000	0.000
	97.8163 - 96.5753		37.379	0.538	20.000	0.054	0.856	0.007	20.000	0.000
	96.5753 - 95.3342		37.601	0.538	20.000	0.054	0.871	0.007	20.000	0.000
	95.3342 - 94.0932		37.823	0.538	20.000	0.054	0.886	0.007	20.000	0.000
	94.0932 - 92.8521		38.046	0.538	20.000	0.054	0.901	0.007	20.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
	92.8521 - 91.6111		38.269	0.538	20.000	0.054	0.917	0.007	20.000	0.000
	91.6111 - 90.37		38.494	0.539	20.000	0.054	0.932	0.007	20.000	0.000
	90.37 - 83.95		20.953	0.285	20.000	0.029	0.546	0.004	20.000	0.000
L8	90.37 - 83.95	TP48.394x44.772x0.5	18.867	0.263	26.000	0.020	0.468	0.003	26.000	0.000
	83.95 - 82.6868		40.015	0.555	26.000	0.043	1.029	0.007	26.000	0.000
	82.6868 - 81.4237		40.213	0.556	26.000	0.043	1.043	0.007	26.000	0.000
	81.4237 - 80.1605		40.412	0.557	26.000	0.043	1.058	0.008	26.000	0.000
	80.1605 - 78.8974		40.610	0.558	26.000	0.043	1.072	0.008	26.000	0.000
	78.8974 - 77.6342		40.808	0.559	26.000	0.043	1.087	0.008	26.000	0.000
	77.6342 - 76.3711		41.005	0.560	26.000	0.044	1.101	0.008	26.000	0.000
	76.3711 - 75.1079		41.203	0.560	26.000	0.044	1.116	0.008	26.000	0.000
	75.1079 - 73.8447		41.400	0.561	26.000	0.044	1.131	0.008	26.000	0.000
	73.8447 - 72.5816		41.596	0.562	26.000	0.044	1.146	0.008	26.000	0.000
	72.5816 - 71.3184		41.793	0.563	26.000	0.044	1.161	0.008	26.000	0.000
	71.3184 - 70.0553		42.117	0.566	26.000	0.044	1.160	0.008	26.000	0.000
	70.0553 - 68.7921		42.312	0.566	26.000	0.044	1.101	0.007	26.000	0.000
	68.7921 - 67.5289		42.507	0.567	26.000	0.044	1.116	0.007	26.000	0.000
	67.5289 - 66.2658		42.702	0.568	26.000	0.044	1.131	0.008	26.000	0.000
	66.2658 - 65.0026		42.896	0.569	26.000	0.044	1.146	0.008	26.000	0.000
	65.0026 - 63.7395		43.090	0.569	26.000	0.044	1.161	0.008	26.000	0.000
	63.7395 - 62.4763		43.284	0.570	26.000	0.044	1.177	0.008	26.000	0.000
	62.4763 - 61.2132		43.477	0.571	26.000	0.044	1.192	0.008	26.000	0.000
	61.2132 - 59.95		43.670	0.572	26.000	0.044	1.207	0.008	26.000	0.000
L9	59.95 - 59.45 (9)	TP51.499x48.394x0.66	43.785	0.436	20.000	0.041	1.213	0.006	20.000	0.000
L10	59.45 - 58.4429	TP53.46x51.499x0.605	43.903	0.446	20.000	0.045	1.225	0.006	20.000	0.000
	58.4429 - 57.4357		44.059	0.446	20.000	0.045	1.236	0.006	20.000	0.000
	57.4357 - 56.4286		44.215	0.446	20.000	0.045	1.248	0.006	20.000	0.000
	56.4286 - 55.4214		44.370	0.447	20.000	0.045	1.260	0.006	20.000	0.000
	55.4214 - 54.4143		44.526	0.447	20.000	0.045	1.272	0.006	20.000	0.000
	54.4143 - 53.4071		44.681	0.448	20.000	0.045	1.284	0.006	20.000	0.000
	53.4071 - 52.4		44.837	0.448	20.000	0.045	1.296	0.006	20.000	0.000
	52.4 - 45.35		23.736	0.233	20.000	0.024	0.723	0.003	20.000	0.000

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L11	52.4 - 45.35	TP60x51.27x0.625	22.385	0.217	26.000	0.017	0.658	0.003	26.000	0.000
	45.35 - 42.9632		46.412	0.446	26.000	0.035	1.406	0.006	26.000	0.000
	42.9632 - 40.5763		46.719	0.445	26.000	0.035	1.432	0.006	26.000	0.000
	40.5763 - 38.1895		47.025	0.445	26.000	0.035	1.457	0.006	26.000	0.000
	38.1895 - 35.8026		47.330	0.444	26.000	0.035	1.483	0.006	26.000	0.000
	35.8026 - 33.4158		47.635	0.444	26.000	0.035	1.509	0.006	26.000	0.000
	33.4158 - 31.0289		47.939	0.444	26.000	0.035	1.535	0.006	26.000	0.000
	31.0289 - 28.6421		48.243	0.443	26.000	0.034	1.562	0.006	26.000	0.000
	28.6421 - 26.2553		48.546	0.443	26.000	0.034	1.588	0.006	26.000	0.000
	26.2553 - 23.8684		48.848	0.442	26.000	0.034	1.615	0.006	26.000	0.000
	23.8684 - 21.4816		49.150	0.442	26.000	0.034	1.642	0.006	26.000	0.000
	21.4816 - 19.0947		49.450	0.441	26.000	0.034	1.669	0.006	26.000	0.000
	19.0947 - 16.7079		49.751	0.441	26.000	0.034	1.696	0.006	26.000	0.000
	16.7079 - 14.3211		50.050	0.441	26.000	0.034	1.723	0.006	26.000	0.000
	14.3211 - 11.9342		50.349	0.440	26.000	0.034	1.751	0.006	26.000	0.000
	11.9342 - 9.54737		50.647	0.440	26.000	0.034	1.779	0.006	26.000	0.000
	9.54737 - 7.16053		50.944	0.439	26.000	0.034	1.807	0.006	26.000	0.000
	7.16053 - 4.77368		51.241	0.439	26.000	0.034	1.835	0.006	26.000	0.000
	4.77368 - 2.38684		51.537	0.438	26.000	0.034	1.863	0.006	26.000	0.000
	2.38684 - 0		51.832	0.438	26.000	0.034	1.892	0.006	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	196 - 194.609	0.000	0.001	0.000	0.001	0.000	0.001 ✔	1.333	H1-3+VT ✔
	194.609 - 193.219	0.000	0.002	0.000	0.002	0.000	0.003 ✔	1.333	H1-3+VT ✔
	193.219 - 191.828	0.000	0.005	0.000	0.003	0.000	0.005 ✔	1.333	H1-3+VT ✔
	191.828 - 190.438	0.004	0.020	0.000	0.020	0.000	0.025 ✔	1.333	H1-3+VT ✔
	190.438 - 189.047	0.005	0.044	0.000	0.029	0.000	0.049	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	189.047 - 187.657	0.005	0.071	0.000	0.030	0.000	0.076	1.333	H1-3+VT
	187.657 - 186.266	0.005	0.098	0.000	0.030	0.000	0.103	1.333	H1-3+VT
	186.266 - 184.876	0.007	0.127	0.000	0.056	0.000	0.135	1.333	H1-3+VT
	184.876 - 183.485	0.007	0.176	0.000	0.056	0.000	0.183	1.333	H1-3+VT
	183.485 - 182.095	0.007	0.223	0.000	0.056	0.000	0.231	1.333	H1-3+VT
	182.095 - 180.704	0.007	0.269	0.000	0.057	0.000	0.277	1.333	H1-3+VT
	180.704 - 179.314	0.007	0.314	0.000	0.057	0.000	0.322	1.333	H1-3+VT
	179.314 - 177.923	0.007	0.357	0.000	0.057	0.000	0.365	1.333	H1-3+VT
	177.923 - 176.533	0.007	0.399	0.000	0.058	0.000	0.407	1.333	H1-3+VT
	176.533 - 175.142	0.007	0.440	0.000	0.058	0.000	0.448	1.333	H1-3+VT
	175.142 - 173.752	0.010	0.496	0.000	0.079	0.000	0.508	1.333	H1-3+VT
	173.752 - 172.361	0.010	0.551	0.000	0.079	0.000	0.563	1.333	H1-3+VT
	172.361 - 170.971	0.010	0.605	0.000	0.079	0.000	0.617	1.333	H1-3+VT
	170.971 - 169.58	0.010	0.657	0.000	0.079	0.000	0.669	1.333	H1-3+VT
	169.58 - 165.25	0.005	0.339	0.000	0.034	0.000	0.344	1.333	H1-3+VT
L2	169.58 - 165.25	0.004	0.329	0.000	0.031	0.000	0.334	1.333	H1-3+VT
	165.25 - 163.787	0.008	0.594	0.000	0.054	0.000	0.602	1.333	H1-3+VT
	163.787 - 162.324	0.008	0.627	0.000	0.054	0.000	0.635	1.333	H1-3+VT
	162.324 - 160.861	0.009	0.659	0.000	0.067	0.000	0.669	1.333	H1-3+VT
	160.861 - 159.397	0.009	0.700	0.000	0.067	0.000	0.710	1.333	H1-3+VT
	159.397 - 157.934	0.009	0.740	0.000	0.067	0.000	0.750	1.333	H1-3+VT
	157.934 - 156.471	0.009	0.778	0.000	0.067	0.000	0.789	1.333	H1-3+VT
	156.471 - 155.008	0.009	0.815	0.000	0.067	0.000	0.826	1.333	H1-3+VT
	155.008 - 153.545	0.010	0.858	0.000	0.076	0.000	0.870	1.333	H1-3+VT
	153.545 - 152.082	0.010	0.900	0.000	0.076	0.000	0.912	1.333	H1-3+VT
	152.082 - 150.618	0.010	0.941	0.000	0.076	0.000	0.952	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	150.618 - 149.155	0.010	0.980	0.000	0.076	0.000	0.992	1.333	H1-3+VT
	149.155 - 147.692	0.011	1.018	0.000	0.076	0.000	1.030	1.333	H1-3+VT
	147.692 - 146.229	0.011	1.054	0.000	0.076	0.000	1.066	1.333	H1-3+VT
	146.229 - 144.766	0.011	1.090	0.000	0.077	0.000	1.102	1.333	H1-3+VT
	144.766 - 143.303	0.011	1.126	0.000	0.077	0.000	1.138	1.333	H1-3+VT
	143.303 - 141.839	0.011	1.161	0.000	0.077	0.000	1.173	1.333	H1-3+VT
	141.839 - 140.376	0.011	1.194	0.000	0.077	0.000	1.207	1.333	H1-3+VT
	140.376 - 138.913	0.011	1.227	0.000	0.077	0.000	1.240	1.333	H1-3+VT
	138.913 - 137.45	0.011	1.259	0.000	0.077	0.000	1.272	1.333	H1-3+VT
L3	137.45 - 136.95 (3)	0.012	1.291	0.000	0.072	0.000	1.304	1.333	H1-3+VT
L4	136.95 - 135.81	0.011	1.160	0.000	0.075	0.000	1.172	1.333	H1-3+VT
	135.81 - 134.67	0.011	1.182	0.000	0.075	0.000	1.195	1.333	H1-3+VT
	134.67 - 133.53	0.011	1.204	0.000	0.075	0.000	1.216	1.333	H1-3+VT
	133.53 - 132.39	0.012	1.225	0.000	0.075	0.000	1.238	1.333	H1-3+VT
	132.39 - 131.25	0.012	1.246	0.000	0.075	0.000	1.259	1.333	H1-3+VT
	131.25 - 130.11	0.012	1.267	0.000	0.075	0.000	1.280	1.333	H1-3+VT
	130.11 - 128.97	0.012	1.287	0.000	0.075	0.000	1.300	1.333	H1-3+VT
	128.97 - 123.55	0.006	0.695	0.000	0.039	0.000	0.702	1.333	H1-3+VT
L5	128.97 - 123.55	0.005	0.532	0.000	0.027	0.000	0.537	1.333	H1-3+VT
	123.55 - 122.539	0.010	1.096	0.000	0.056	0.000	1.107	1.333	H1-3+VT
	122.539 - 121.528	0.010	1.120	0.000	0.056	0.000	1.131	1.333	H1-3+VT
	121.528 - 120.517	0.010	1.144	0.000	0.057	0.000	1.155	1.333	H1-3+VT
	120.517 - 119.506	0.010	1.168	0.000	0.057	0.000	1.179	1.333	H1-3+VT
	119.506 - 118.494	0.010	1.193	0.000	0.057	0.000	1.204	1.333	H1-3+VT
	118.494 - 117.483	0.010	1.217	0.000	0.058	0.000	1.228	1.333	H1-3+VT
	117.483 - 116.472	0.011	1.241	0.000	0.058	0.001	1.253	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	116.472 - 115.461	0.011	1.266	0.000	0.059	0.001	1.278 ✔	1.333	H1-3+VT ✔
	115.461 - 114.45	0.011	1.291	0.000	0.059	0.000	1.303 ✔	1.333	H1-3+VT ✔
L6	114.45 - 113.95 (6)	0.011	1.309	0.000	0.056	0.000	1.321 ✔	1.333	H1-3+VT ✔
L7	113.95 - 112.709	0.010	1.116	0.000	0.054	0.000	1.127 ✔	1.333	H1-3+VT ✔
	112.709 - 111.468	0.010	1.128	0.000	0.054	0.000	1.139 ✔	1.333	H1-3+VT ✔
	111.468 - 110.227	0.010	1.140	0.000	0.054	0.000	1.151 ✔	1.333	H1-3+VT ✔
	110.227 - 108.986	0.011	1.152	0.000	0.055	0.000	1.164 ✔	1.333	H1-3+VT ✔
	108.986 - 107.745	0.011	1.164	0.000	0.055	0.000	1.175 ✔	1.333	H1-3+VT ✔
	107.745 - 106.504	0.011	1.175	0.000	0.054	0.000	1.187 ✔	1.333	H1-3+VT ✔
	106.504 - 105.263	0.011	1.186	0.000	0.054	0.000	1.198 ✔	1.333	H1-3+VT ✔
	105.263 - 104.022	0.011	1.197	0.000	0.054	0.000	1.209 ✔	1.333	H1-3+VT ✔
	104.022 - 102.781	0.011	1.208	0.000	0.054	0.000	1.220 ✔	1.333	H1-3+VT ✔
	102.781 - 101.539	0.011	1.219	0.000	0.054	0.000	1.231 ✔	1.333	H1-3+VT ✔
	101.539 - 100.298	0.012	1.229	0.000	0.054	0.000	1.242 ✔	1.333	H1-3+VT ✔
	100.298 - 99.0574	0.012	1.240	0.000	0.054	0.000	1.252 ✔	1.333	H1-3+VT ✔
	99.0574 - 97.8163	0.012	1.250	0.000	0.054	0.000	1.262 ✔	1.333	H1-3+VT ✔
	97.8163 - 96.5753	0.012	1.259	0.000	0.054	0.000	1.272 ✔	1.333	H1-3+VT ✔
	96.5753 - 95.3342	0.012	1.269	0.000	0.054	0.000	1.282 ✔	1.333	H1-3+VT ✔
	95.3342 - 94.0932	0.012	1.279	0.000	0.054	0.000	1.292 ✔	1.333	H1-3+VT ✔
	94.0932 - 92.8521	0.012	1.288	0.000	0.054	0.000	1.301 ✔	1.333	H1-3+VT ✔
	92.8521 - 91.6111	0.012	1.297	0.000	0.054	0.000	1.310 ✔	1.333	H1-3+VT ✔
	91.6111 - 90.37	0.012	1.306	0.000	0.054	0.000	1.320 ✔	1.333	H1-3+VT ✔
	90.37 - 83.95	0.007	0.701	0.000	0.029	0.000	0.708 ✔	1.333	H1-3+VT ✔
L8	90.37 - 83.95	0.005	0.530	0.000	0.020	0.000	0.536 ✔	1.333	H1-3+VT ✔
	83.95 - 82.6868	0.011	1.115	0.000	0.043	0.000	1.126 ✔	1.333	H1-3+VT ✔
	82.6868 - 81.4237	0.011	1.127	0.000	0.043	0.000	1.138 ✔	1.333	H1-3+VT ✔

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	81.4237 - 80.1605	0.011	1.139	0.000	0.043	0.000	1.150	1.333	H1-3+VT
	80.1605 - 78.8974	0.011	1.150	0.000	0.043	0.000	1.162	1.333	H1-3+VT
	78.8974 - 77.6342	0.011	1.162	0.000	0.043	0.000	1.174	1.333	H1-3+VT
	77.6342 - 76.3711	0.011	1.174	0.000	0.044	0.000	1.186	1.333	H1-3+VT
	76.3711 - 75.1079	0.012	1.185	0.000	0.044	0.000	1.197	1.333	H1-3+VT
	75.1079 - 73.8447	0.012	1.197	0.000	0.044	0.000	1.209	1.333	H1-3+VT
	73.8447 - 72.5816	0.012	1.208	0.000	0.044	0.000	1.220	1.333	H1-3+VT
	72.5816 - 71.3184	0.012	1.219	0.000	0.044	0.000	1.232	1.333	H1-3+VT
	71.3184 - 70.0553	0.012	1.231	0.000	0.044	0.000	1.243	1.333	H1-3+VT
	70.0553 - 68.7921	0.012	1.242	0.000	0.044	0.000	1.255	1.333	H1-3+VT
	68.7921 - 67.5289	0.012	1.253	0.000	0.044	0.000	1.266	1.333	H1-3+VT
	67.5289 - 66.2658	0.012	1.264	0.000	0.044	0.000	1.277	1.333	H1-3+VT
	66.2658 - 65.0026	0.013	1.275	0.000	0.044	0.000	1.288	1.333	H1-3+VT
	65.0026 - 63.7395	0.013	1.286	0.000	0.044	0.000	1.299	1.333	H1-3+VT
	63.7395 - 62.4763	0.013	1.297	0.000	0.044	0.000	1.310	1.333	H1-3+VT
	62.4763 - 61.2132	0.013	1.307	0.000	0.044	0.000	1.321	1.333	H1-3+VT
	61.2132 - 59.95	0.013	1.318	0.000	0.044	0.000	1.332	1.333	H1-3+VT
L9	59.95 - 59.45 (9)	0.013	1.311	0.000	0.041	0.000	1.324	1.333	H1-3+VT
L10	59.45 - 58.4429	0.013	1.270	0.000	0.045	0.000	1.284	1.333	H1-3+VT
	58.4429 - 57.4357	0.013	1.278	0.000	0.045	0.000	1.292	1.333	H1-3+VT
	57.4357 - 56.4286	0.014	1.285	0.000	0.045	0.000	1.299	1.333	H1-3+VT
	56.4286 - 55.4214	0.014	1.292	0.000	0.045	0.000	1.306	1.333	H1-3+VT
	55.4214 - 54.4143	0.014	1.299	0.000	0.045	0.000	1.314	1.333	H1-3+VT
	54.4143 - 53.4071	0.014	1.306	0.000	0.045	0.000	1.321	1.333	H1-3+VT
	53.4071 - 52.4	0.014	1.314	0.000	0.045	0.000	1.328	1.333	H1-3+VT
	52.4 - 45.35	0.008	0.692	0.000	0.024	0.000	0.700	1.333	H1-3+VT

Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L11	52.4 - 45.35	0.006	0.519	0.000	0.017	0.000	0.525	1.333	H1-3+VT
	45.35 - 42.9632	0.012	1.065	0.000	0.035	0.000	1.077	1.333	H1-3+VT
	42.9632 - 40.5763	0.012	1.074	0.000	0.035	0.000	1.087	1.333	H1-3+VT
	40.5763 - 38.1895	0.012	1.083	0.000	0.035	0.000	1.096	1.333	H1-3+VT
	38.1895 - 35.8026	0.012	1.092	0.000	0.035	0.000	1.105	1.333	H1-3+VT
	35.8026 - 33.4158	0.013	1.100	0.000	0.035	0.000	1.113	1.333	H1-3+VT
	33.4158 - 31.0289	0.013	1.109	0.000	0.035	0.000	1.122	1.333	H1-3+VT
	31.0289 - 28.6421	0.013	1.117	0.000	0.034	0.000	1.130	1.333	H1-3+VT
	28.6421 - 26.2553	0.013	1.125	0.000	0.034	0.000	1.138	1.333	H1-3+VT
	26.2553 - 23.8684	0.013	1.132	0.000	0.034	0.000	1.146	1.333	H1-3+VT
	23.8684 - 21.4816	0.013	1.140	0.000	0.034	0.000	1.153	1.333	H1-3+VT
	21.4816 - 19.0947	0.013	1.147	0.000	0.034	0.000	1.161	1.333	H1-3+VT
	19.0947 - 16.7079	0.014	1.154	0.000	0.034	0.000	1.168	1.333	H1-3+VT
	16.7079 - 14.3211	0.014	1.161	0.000	0.034	0.000	1.175	1.333	H1-3+VT
	14.3211 - 11.9342	0.014	1.168	0.000	0.034	0.000	1.182	1.333	H1-3+VT
	11.9342 - 9.54737	0.014	1.175	0.000	0.034	0.000	1.189	1.333	H1-3+VT
	9.54737 - 7.16053	0.014	1.181	0.000	0.034	0.000	1.196	1.333	H1-3+VT
	7.16053 - 4.77368	0.014	1.187	0.000	0.034	0.000	1.202	1.333	H1-3+VT
	4.77368 - 2.38684	0.015	1.193	0.000	0.034	0.000	1.208	1.333	H1-3+VT
	2.38684 - 0	0.015	1.199	0.000	0.034	0.000	1.214	1.333	H1-3+VT

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	196 - 165.25	Pole	TP27.98x21.53x0.188	1	-6.555	835.959	50.2	Pass
L2	165.25 - 137.45	Pole	TP33.431x26.697x0.281	2	-13.185	1546.173	95.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P_{allow} K	% Capacity	Pass Fail
L3	137.45 - 136.95	Pole	TP36.536x33.431x0.359	3	-13.216	1514.595	97.8	Pass
L4	136.95 - 123.55	Pole	TP39.35x36.536x0.345	4	-14.893	1666.557	97.5	Pass
L5	123.55 - 114.45	Pole	TP37.705x37.522x0.375	5	-18.884	2321.526	97.7	Pass
L6	114.45 - 113.95	Pole	TP40.81x37.705x0.485	6	-18.908	2302.824	99.1	Pass
L7	113.95 - 83.95	Pole	TP47.11x40.81x0.495	7	-26.781	2858.432	99.0	Pass
L8	83.95 - 59.95	Pole	TP48.394x44.772x0.5	8	-38.757	3971.340	99.9	Pass
L9	59.95 - 59.45	Pole	TP51.499x48.394x0.66	9	-38.787	4018.968	99.4	Pass
L10	59.45 - 45.35	Pole	TP53.46x51.499x0.605	10	-41.891	4003.612	99.6	Pass
L11	45.35 - 0	Pole	TP60x51.27x0.625	11	-68.075	6154.167	91.1	Pass
							Summary	
							Pole (L8) 99.9	Pass
						RATING =	**99.9**	**Pass**

Design	0

	Initials	Date
Produced By:	KCI	6/6/2013
Checked By:	JHW	

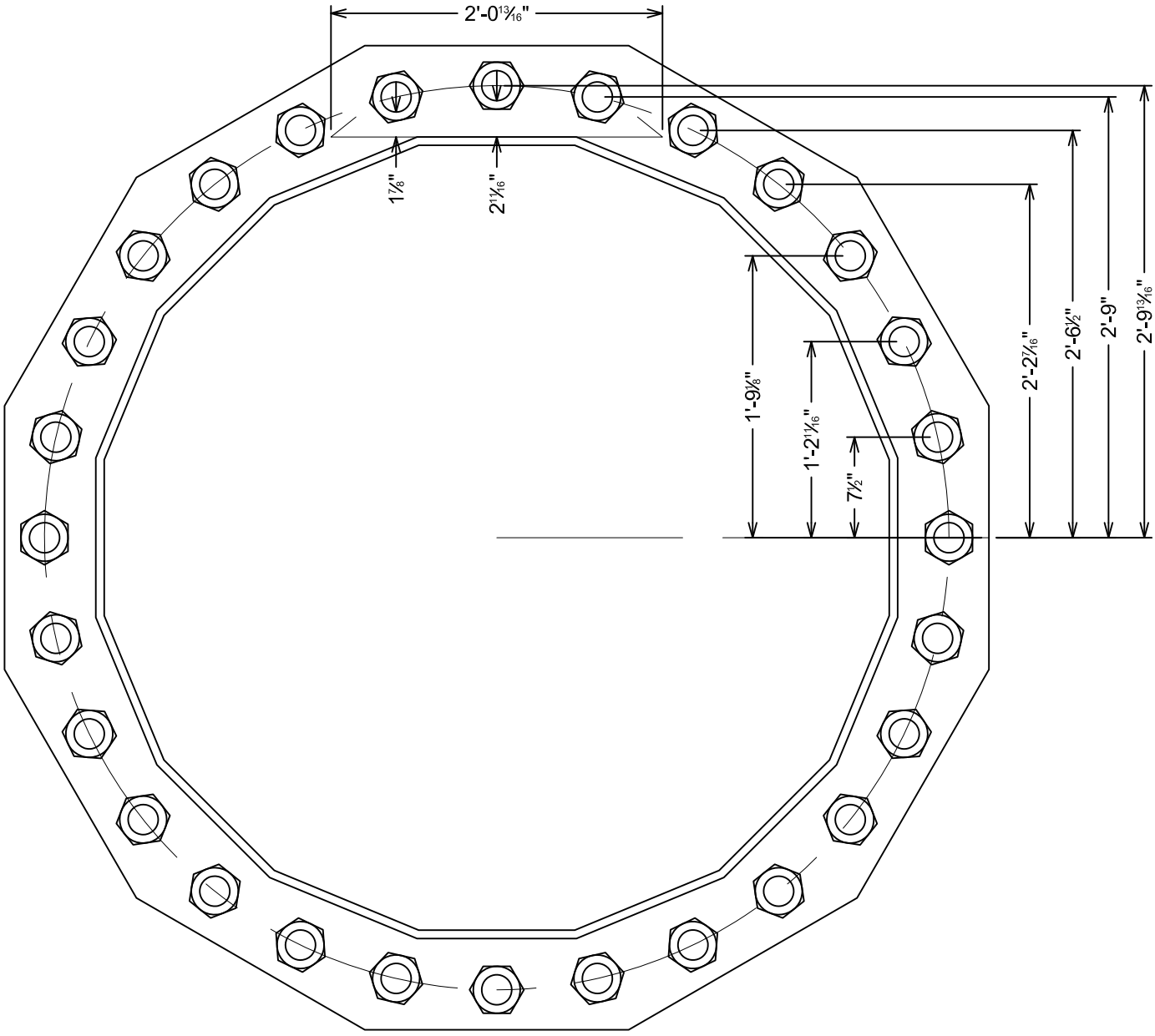
SELF-SUPPORTING POLE STRUCTURE REINFORCEMENT DESIGN, TIA-222-F

VSi Job #	130499	
Client Site Name:	Torrington/Oandg Ind Inc	
Client Site Number:	CT46138-A	
Analysis Company:	Vertical Solutions	
Analysis Date:	06/30/12	
Hole Size Allowance:	0.0625	inches
Allowable Stress Increase	133%	
Design Percentage	100%	
	133%	

Pole Geometry									CT46138-A	130499
Section #	Sides # (12,16,18,0)	Elevation (ft) TOP	Elevation (ft) BOTTOM	Dia Across Flats (in) TOP	Dia Across Flats (in) BOTTOM	Splice (ft)	Thickness (in)	Material Specification	Taper (in/ft)	Length (ft)
1	16	196.0	165.3	21.53	27.98	4.33	0.1875	A572-65	0.210	30.75
2	16	169.6	123.6	26.70	36.35	5.42	0.2810	A572-65	0.210	45.98
3	16	129.0	84.0	34.65	44.11	6.42	0.3750	A572-65	0.210	45.02
4	16	90.4	45.4	42.01	51.46	7.33	0.5000	A572-65	0.210	45.02
5	16	52.7	0.0	48.92	60.00	0.00	0.6250	A572-65	0.210	52.73

vertical solutions

																									CT46138-A	130499
	(ft)	(kip-ft)		Bar # (3,4)	Bar Width (in)	Bar Thickness (in)	Bar Length (in)	OS Number	Flat Width	r_{max}	r_b Pole	r_c	r_t Gross	rt Net	r_{BS}	r_p Bar	r_p Pole	r_v	L_{weld} (in)	L_{plate} (in)	t Model (in)	F_y Model (ksi)	I Model (in^4)	MOI total (in^4)	r_I	D_o Model (in)	t_A Model (in)
G	138	1013.83	2	4	**4.75**	1.5	**24**	**7**	6.07	**92%**	46%	80%	63%	79%	31%	14%	62%	92%	**7**	**31**	0.54	42	8803	8437	**104%**	**34.83**	**0.51**
F	123.6	1429.96	2	4	**4.75**	1.5	**24**	**8**	6.67	**99%**	57%	99%	78%	98%	34%	16%	68%	99%	**8**	**35**	0.62	42	12802	10447	**123%**	**37.85**	**0.57**
E	115	1797.18	3	4	**6.50**	1.5	**18**	**11**	6.74	**88%**	51%	81%	69%	79%	29%	14%	45%	88%	**10**	**46**	0.62	42	14131	15317	**92%**	**39.10**	**0.63**
D	99.5	2257.08	3	4	**6.50**	1.5	**18**	**100**	7.38	**89%**	56%	89%	76%	88%	4%	2%	5%	11%	**11**	**314**	0.62	42	18031	18840	**96%**	**42.35**	**0.63**
C	84	2852.03	3	4	**6.50**	1.5	**18**	**12**	8.03	**100%**	64%	100%	85%	98%	34%	16%	51%	100%	**12**	**51**	0.62	42	22591	22856	**99%**	**45.61**	**0.63**
B	60	3858.71	4	4	**7.25**	1.5	**18**	**13**	8.64	**97%**	60%	95%	81%	91%	33%	15%	37%	97%	**13**	**55**	0.54	42	26023	35775	**73%**	**49.90**	**0.55**
A	45	4492.36	4	4	**7.25**	1.5	**18**	**14**	9.26	**99%**	63%	99%	85%	95%	32%	15%	36%	94%	**14**	**59**	0.54	42	31328	42197	**74%**	**53.04**	**0.55**



BASE PLATE AND ANCHOR ROD LAYOUT

SCALE: 1" = 1'-0"

PROJECT INFORMATION:

TORRINGTON/O&G IND INC
SITE #: CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(LITCHFIELD COUNTY)

0	06/06/13	SBA
REV	DATE:	Issued For:

DRAWN BY: KCI	CHECKED BY: JHW

SHEET NUMBER: **BPL**

REVISION: 0

VSI #: 130499

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND
PARKWAY NW
BOCA ROTAN, FL 33487
Office: (919) 557-0555

PLANS PREPARED BY:

vertical solutions

2002 Production Drive
Apex, NC 27539
Office: (888) 321-6167
Fax: (919) 321-1768

ANCHOR ROD AND BASE PLATE DESIGN, DEFORMATION METHOD (DIFFERENT AREAS)

Input -

$M := 6716 \cdot kip \cdot ft$ = moment at top of base plate

$P := 68 \cdot kip$ = axial load (use zero if base plate is grouted)

$F_y := 60 \cdot ksi$ = yield stress of base plate

$b_{eff} := 24.8125 \cdot in$ = effective width of base plate in flexure

$t := 3 \cdot in$ = thickness of base plate

$ASI := 133 \cdot \%$ = allowable stress increase

Q = quantity of fasteners

d = distance from center

A_{stiff} = gross bolt area

A_{stress} = net tensile area

F_t = allowable tension stress

CONSTANTS:

$psi \equiv \frac{lb}{in^2}$

$ksi \equiv 1000 \cdot psi$

$kip \equiv 1000 \cdot lb$

$$Q := \begin{pmatrix} 2 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 4 \\ 2 \end{pmatrix} \quad d := \begin{pmatrix} 2 \cdot 12 + 9 + \frac{13}{16} \\ 2 \cdot 12 + 9 \\ 2 \cdot 12 + 6 + \frac{1}{2} \\ 2 \cdot 12 + 2 + \frac{7}{16} \\ 1 \cdot 12 + 9 + \frac{1}{8} \\ 1 \cdot 12 + 2 + \frac{11}{16} \\ 7 + \frac{1}{2} \\ 0 \end{pmatrix} \cdot in \quad A_{stiff} := \begin{pmatrix} 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \\ 3.98 \end{pmatrix} in^2 \quad A_{stress} := \begin{pmatrix} 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \\ 3.25 \end{pmatrix} in^2 \quad F_t := \begin{pmatrix} 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \\ 0.6 \cdot 75 \end{pmatrix} \cdot ksi$$

$$\sum \overrightarrow{(Q)} = 28 \qquad sumQAd := \sum \overrightarrow{\left(Q \cdot d^2 \cdot A_{stiff}\right)}$$

$sumQAd = 63809 \cdot in^4$

$$R := \frac{M \cdot \overrightarrow{\left(d \cdot A_{stiff}\right)}}{sumQAd} + \frac{P \cdot A_{stiff}}{\sum \overrightarrow{\left(A_{stiff} \cdot Q\right)}} \qquad f_t := \overrightarrow{\left(\frac{R}{A_{stress}}\right)} \qquad r := \overrightarrow{\left(\frac{f_t}{ASI \cdot F_t}\right)}$$

$$R = \begin{pmatrix} 172.4 \\ 168.3 \\ 155.7 \\ 135.3 \\ 108.6 \\ 76.3 \\ 40.1 \\ 2.4 \end{pmatrix} \cdot kip \qquad f_t = \begin{pmatrix} 53.0 \\ 51.8 \\ 47.9 \\ 41.6 \\ 33.4 \\ 23.5 \\ 12.3 \\ 0.7 \end{pmatrix} \cdot ksi \qquad r = \begin{pmatrix} 89 \\ 87 \\ 80 \\ 70 \\ 56 \\ 39 \\ 21 \\ 1 \end{pmatrix} \cdot \%$$

$$m := \begin{pmatrix} 2 + \frac{11}{16} \\ 1 + \frac{7}{8} \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \cdot in \qquad M_{PL} := \overrightarrow{\left[\left(\frac{Q}{2}\right) \cdot R \cdot m\right]} \qquad M_{PL} = \begin{pmatrix} 38.6 \\ 52.6 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \\ 0.0 \end{pmatrix} \cdot kip \cdot ft \qquad \sum M_{PL} = 1094.5 \cdot kip \cdot in \qquad f_b := \frac{\sum M_{PL}}{\left(\frac{b_{eff} \cdot t^2}{6}\right)}$$

$f_b = 29.4 \cdot ksi$ $\qquad F'_b := ASI \cdot 0.75 \cdot F_y$ $\qquad r_b := \frac{f_b}{F'_b}$ $\qquad r_b = 49 \cdot \%$

$capacity := \max(r, r_b)$ $\qquad capacity = 89 \cdot \%$

VSi Job No.: 130499
Date: 06/10/2013
Calculated by: KCI

PAD FOUNDATION DESIGN FOR SELF-SUPPORTING POLE STRUCTURE: ANSI TIA-222-F

Inputs: Reactions

$M := 6716 \cdot k \cdot ft$ = Overturning moment at top of pier, unfactored

$P := 68 \cdot k$ = Axial load at top of pier unfactored

$V := 52 \cdot k$ = Shear load at top of pier unfactored

CONSTANTS:

$kip \equiv 1000 \cdot lbf$ $\quad pcf \equiv \frac{lb}{ft^3}$

$ksi \equiv \frac{kip}{in^2}$ $\quad psf \equiv \frac{lb}{ft^2}$

$G \equiv 11200 \cdot ksi$

$E \equiv 29000 \cdot ksi$ $\quad k \equiv 1000 \cdot lb$

$\Phi_s \equiv 0.75$

Inputs: Concrete

$B_{pad} := 29 \cdot ft$ = Pad width (and length)

$B_{pier} := 0 \cdot ft$ = Pier diameter

$H := 12 \cdot in$ = Distance from top of pier to top of grade

$z_{pad} := 4 \cdot ft$ = Pad depth

$t_{pad} := 6 \cdot ft$ = Pad thickness

$f'_c := 3000 \cdot psi$ = specified 28-day compressive strength

$\gamma_c := 150 \cdot pcf$ = Density of concrete

$D_{bp} := 8 \cdot ft$ = Width of concrete to be removed

$t_{bp} := 1 \cdot ft$ = Thickness of concrete to be removed

Inputs: Rebar and Anchorage

$d_{tie} := 0 \cdot in$ = diameter of tie in pier

$d_{vert} := 0 \cdot in$ = diameter of verticals in pier

$n_{vert} := 0$ = number of verticals in pier

$d_{hTop} := 1 \cdot in$ = diameter of horizontal bars in top of pad

$n_{hTop} := 31$ = number of horizontal bars in top of pad

$d_{hBot} := 1 \cdot in$ = diameter of horizontal bars in bottom of pad

$n_{hBot} := 31$ = number of horizontal bars in bottom of pad

$cover := 3 \cdot in$ = distanced from outside of concrete to edge of rebar

$BC := 67.68 \cdot in$ = bolt-circle diameter for anchor rods

$d_{template} := 6 \cdot in$ = anchor rod template width

$embed := 50 \cdot in$ = anchor rod embedment

$f_y := 60 \cdot ksi$ = specified minimum yield strength of rebar

Inputs: Strength

$\Phi M_{nBot} := 7348 \cdot k \cdot ft$ = nominal flexural resistance, positive moment [BM-FLEX_MnPadBot.xmcd (A-03)]

$\Phi M_{nTop} := 7348 \cdot k \cdot ft$ = nominal flexural resistance, negative moment [BM-FLEX_MnPadTop.xmcd (A-03)]

Inputs: Soil

$q'_{all} := 12000 \cdot psf$ = Net allowable bearing pressure

$\psi := 0.3$ = coefficient of friction

Ouput: Factored Reactions

$M_u := 1.3 \cdot M$ = Overturning moment at top of pier, factored

$M_u = 8731 \cdot k \cdot ft$

$P_u := 1.3P$ = Axial load at top of pier, factored

$P_u = 88 \cdot k$

$V_u := 1.3V$ = Shear load at top of pier, factored

$V_u = 68 \cdot k$

Output: Dead Loads

$V_{pad} := B_{pad}^{2} \cdot t_{pad} - D_{bp}^{2} \cdot t_{bp}$

$D_{pad} := V_{pad} \cdot \gamma_c$

$D_{pad} = 747.3 \cdot k$

Output: Eccentricity:

$P_{total} := D_{pad} + P$

$P_{total} = 815.3 \cdot k$

$M_{total} := M + V \cdot (H + z_{pad})$

$M_{total} = 6976 \cdot k \cdot ft$

$ecc := \frac{M_{total}}{P_{total}}$

$ecc = 8.56\,ft$

$limit := \frac{B_{pad}}{6}$

$limit = 4.83\,ft$

$X := 3 \cdot \left(\frac{B_{pad}}{2} - ecc \right)$

$X = 17.83\,ft$

Output: Bearing pressures, unfactored (bottom)

$q_{max1} := \frac{P_{total}}{B_{pad}^{2}} + \frac{M_{total}}{\frac{B_{pad}^{3}}{6}}$

$q_{max1} = 2686 \cdot psf$

$q_{max2} := \frac{2 \cdot P_{total}}{3 \cdot B_{pad}^{2} \cdot \left(0.5 - \frac{ecc}{B_{pad}} \right)}$

$q_{max2} = 3153 \cdot psf$

$q_{max} := if\left(ecc > \frac{B_{pad}}{6}, q_{max2}, q_{max1} \right)$

$q_{max} = 3153 \cdot psf$

$q_{min1} := \frac{P_{total}}{B_{pad}^{2}} + \frac{M_{total}}{\frac{B_{pad}^{3}}{6}}$

$q_{min1} = 2686 \cdot psf$

$B_{cant} := \frac{B_{pad} - B_{pier}}{2}$

$B_{cant} = 14.50\,ft$

$q_{pier1} := q_{min1} + (q_{max1} - q_{min1}) \cdot \frac{B_{pad} - B_{cant}}{B_{pad}}$

$q_{pier2} := q_{max} \cdot \left(\frac{X - B_{cant}}{X} \right)$

$q_{pier} := \text{if}\left(ecc < limit, q_{pier1}, \text{if}\left(q_{pier2} > 0, q_{pier2}, 0\right)\right)$ $q_{pier} = 589 \cdot psf$

$q'_{max} := q_{max}$ $q'_{max} = 3153 \cdot psf$

Calculate qu, Bottom

$q_{uMax} := 1.3 \cdot \left(q_{max} - \gamma_c \cdot t_{pad}\right)$ $q_{uMax} = 2929 \cdot psf$

$q_{uPier} := 1.3 \cdot \left(q_{pier} - \gamma_c \, t_{pad}\right)$ $q_{uPier} = -404 \cdot psf$

Calculate qu, Top

$q_{uTop} := 1.3\left(\gamma_c \, t_{pad}\right)$ $q_{uTop} = 1170 \cdot psf$

Calculate shear nominal resistances

$A_{pier} := \frac{\pi \cdot B_{pier}^{2}}{4}$ $A_{pier} = 0 \cdot in^2$

$\Phi V_{cPier} := 0.85 \cdot 2 \cdot \frac{\sqrt{\frac{f'_c}{psi}}}{1000} \cdot \frac{A_{pier}}{in^2} \cdot 1k$ $\Phi V_{cPier} = 0 \cdot k$

$d_{Bot} := t_{pad} - cover - 1.5 \cdot d_{hBot}$ $d_{Bot} = 67.50 \cdot in$

$\Phi V_{cPad} := 0.85 \cdot 2 \cdot \frac{\sqrt{\frac{f'_c}{psi}}}{1000} \left(\frac{B_{pad}}{1 \cdot in} \cdot \frac{d_{Bot}}{1 \cdot in} \right) \cdot 1k$ $\Phi V_{cPad} = 2187 \cdot k$

Calculate Factored Forces in Pad, Postive:

$R_r := \text{if}\left(q_{uPier} > 0 \cdot psf, q_{uPier} \cdot B_{pad} \cdot B_{cant}, 0\right)$ $R_r = 0 \cdot k$

$R_t := \text{if}\left[X < B_{cant}, \frac{1}{2} \cdot q_{uMax} \cdot X \cdot B_{pad}, \frac{1}{2} \cdot \left(q_{uMax} - q_{uPier}\right) \cdot B_{cant} \cdot B_{pad}\right]$ $R_t = 700.89 \cdot k$

$M_{uR} := R_r \cdot \frac{B_{cant}}{2}$

$M_{uT} := \text{if}\left[X > B_{cant}, R_t \cdot \frac{2}{3} \cdot B_{cant}, R_t \cdot \left(B_{cant} - \frac{X}{3}\right)\right]$

$M_{uBot} := M_{uR} + M_{uT}$ $M_{uBot} = 6775 \cdot k \cdot ft$

$V_{uBot} := R_r + R_t$ $V_{uBot} = 701 \cdot k$

Calculate Factored Forces in Pad, Negative:

$M_{uTop} := q_{uTop} \cdot B_{cant} \cdot B_{pad} \cdot \frac{B_{cant}}{2}$ $M_{uTop} = 3567 \cdot k \cdot ft$

$V_{uTop} := q_{uTop} \cdot B_{cant} \cdot B_{pad}$ $V_{uTop} = 492 \cdot k$

Calculate Overturning Stability:

$OTM_{total} := M + V \cdot (H + z_{pad})$ $\quad OTM_{total} = 6976 \cdot k \cdot ft$

$OTM_r := P_{total} \cdot \frac{B_{pad}}{2}$ $\quad OTM_r = 11822 \cdot k \cdot ft$

Calculate Sliding Stability:

$H_{total} := V$ $\quad H_{total} = 52 \cdot k$

$H_r := (D_{pad} + P) \cdot \psi$ $\quad H_r = 245 \cdot k$

Design Checks, Soil:

$r_{q'} := \frac{q'_{max}}{q'_{all}}$ Net Bearing Pressure $\quad r_{q'} = 26 \cdot \%$

$r_{OTM} := \frac{OTM_{total}}{\frac{OTM_r}{1.5}}$ Overturning Stability $\quad r_{OTM} = 89 \cdot \%$

$r_H := \frac{H_{total}}{\frac{H_r}{2.0}}$ Sliding Stability $\quad r_H = 43 \cdot \%$

Design Checks, Pad Structure:

$r_{mBot} := \frac{M_{uBot}}{\Phi M_{nBot}}$ $\quad r_{mBot} = 92 \cdot \%$

$r_{vBot} := \frac{V_{uBot}}{\Phi V_{cPad}}$ $\quad r_{vBot} = 32 \cdot \%$

$r_{mTop} := \frac{M_{uTop}}{\Phi M_{nTop}}$ $\quad r_{mTop} = 49 \cdot \%$

$r_{vTop} := \frac{V_{uTop}}{\Phi V_{cPad}}$ $\quad r_{vTop} = 22 \cdot \%$

Design Checks, Pad Serviceability:

$r_{sPad} := \frac{0.0018 \cdot B_{pad} \cdot t_{pad}}{2 n_{hTop} \cdot \frac{\pi \cdot d_{hTop}^2}{4} + n_{hBot} \cdot \frac{\pi \cdot d_{hBot}^2}{4}}$ $\quad r_{sPad} = 62 \cdot \%$

VSi Job No.:130499
Date: 06/11/2013
Calculated by: KCI

CONCRETE BEAM FLEXURAL DESIGN

Inputs:

$\Phi \equiv 0.9$ = factor for bending

$\beta 1 := 0.85$ = for fc < OR = 4 ksi (ref. Leet Eq. 3.22)

$fy := 60 \cdot ksi$ = steel yield strength (ksi)

$fc := 3 \cdot ksi$ = concrete strength (ksi)

$b := 29ft$ = width of section (in)

$depth := 6 \cdot ft$ = total depth of section (in)

$bardia := 1in$ = diameter of tension reinf. bar (in)

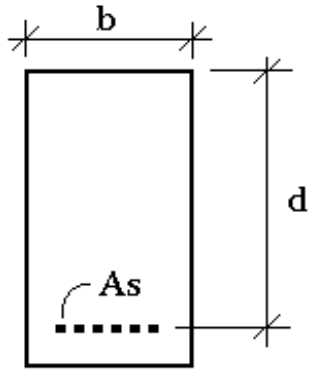
$stirrup := 1 \cdot in$ = diameter of shear stirrups (in)

$clr := 3.0 \cdot in$ = clearance for tension reinf (in)

$Mu := 8731 \cdot ft \cdot kip$ = factored moment on section (in-kip)

Constant:

$psi \equiv \frac{lb}{in^2}$ $ksi \equiv 1000 \cdot psi$ $kip \equiv 1000 \cdot lb$



$d := depth - clr - stirrup - \frac{bardia}{2}$ = depth to center of tension reinf (in) $d = 67.5 \cdot in$

$As_{selected} := (31 \cdot 0.79) \cdot in^2$ = area of steel selected to use in section (1/2 As max ?)

Determine area of steel REQUIRED to carry bending moment:

$A := -\left(\frac{fy^2}{1.7 \cdot b \cdot fc}\right)$ $B := fy \cdot d$ $C := -\left(\frac{Mu}{\Phi}\right)$

$As_{reqd} := \frac{-B + \sqrt{B^2 - 4 \cdot A \cdot C}}{2 \cdot A}$ $As_{reqd} = 29.17 \cdot in^2$ => REQUIRED area of steel for moment

Determine min and max area of steel for section:

$Asb := \frac{0.85 \cdot \beta 1 \cdot fc \cdot b \cdot d}{fy} \cdot \left(\frac{87000 \cdot psi}{87000 \cdot psi + fy}\right)$ $Asb = 502.219 \cdot in^2$ @ Asb = balanced area of steel

$As_{max} := 0.75 \cdot Asb$ $As_{max} = 376.7 \cdot in^2$ => max. area of steel reinf. for section

$As_{min} := .0018 \cdot b \cdot depth$ $As_{min} = 45.1 \cdot in^2$ => min. area of steel reinf. for section

Determine moment capacity using selected As:

$\rho := \frac{As_{selected}}{b \cdot d}$ $\rho = 0.00104$

$Mn := \Phi \cdot \rho \cdot fy \cdot b \cdot d^2 \cdot \left(1 - \frac{\rho \cdot fy}{1.7 \cdot fc}\right)$ $Mn = 88171 \cdot in \cdot kip$ => capacity of section w/ selected As

$Mu = 1 \times 10^5 \cdot kip \cdot in$

$Mn = 7348 \cdot kip \cdot ft$ => capacity of section w/ selected As

VSi Job No.: 130499
Date: 06/10/2013
Calculated by: KCI

SHEAR-FRICTION DESIGN, ACI 318-05 (TOP OF PAD)

$t_{pour1} := 1.0 \cdot ft$ = Thickness of pour over existing pad

$B_{pad} := 29 \cdot ft$ = Existing pad width

$t_{pad} := 5 \cdot ft$ = Existing Pad thickness

$V_{uyBot1} := 701\ kip$ = Vubot from P&P sheet

$B_{pier} := 8 \cdot ft$ = Pier diameter

Calculate Shear Flow for Top Pour on Existing Pad

$$B_{cant} := \frac{B_{pad} - B_{pier}}{2} \qquad B_{cant} = 10.50\ ft$$

$$Q := \left(t_{pour1} \cdot B_{pad}\right) \cdot \left(\frac{t_{pour1}}{2}\right) \qquad Q = 14.50 \cdot ft^3$$

$$I := \frac{1}{12} \cdot B_{pad} \cdot \left(t_{pour1} + t_{pad}\right)^3 \qquad I = 522.00 \cdot ft^4$$

$$q := \frac{V_{uyBot1} \cdot Q}{I} \qquad q = 1.62 \cdot \frac{kip}{in}$$

$$V_{udHoriz} := q \cdot B_{cant} \qquad V_{udHoriz} = 204.5 \cdot kip$$

$V_u := V_{udHoriz}$

$V_u = 204.46 \cdot kip$

Input: Concrete & Reinforcement

$f'_c := 3000 \cdot psi$

$f_y := 60 \cdot ksi$

$n_{vf} := 26$

$d_{vf} := 0.625 \cdot in$

$\mu := 0.6$

Ouput: Shear-friction (11.7.4)

$\phi_v \equiv 0.75$

$$A_{vfReq} := \frac{V_u}{\phi_v \cdot \left(f_y \cdot \mu\right)} \qquad A_{vfReq} = 7.57 \cdot in^2$$

$$A_{vf} := n_{vf} \cdot \left(\frac{d_{vf}^{\ 2} \pi}{4}\right) \qquad A_{vf} = 7.98 \cdot in^2$$

$\phi V_n := \phi_v \cdot A_{vf} \cdot f_y \cdot \mu$ $\qquad \phi V_n = 215.4 \cdot kip$

$r_{vf} := \frac{V_u}{\phi V_n}$ $r_{vf} = 95 \cdot \%$

Ouput: Development Length - Deformed Bars (12.2.2)

$\alpha := 1.0$

$\beta := 1.0$

$\gamma := \begin{cases} 0.8 & \text{if } d_{vf} \le 0.75 \cdot in \\ 1.0 & \text{otherwise} \end{cases}$

$\lambda := 1.0$

$l_{d1} := \begin{cases} \left[\frac{\left(\frac{f_y}{psi} \right) \cdot \alpha \cdot \beta \cdot \gamma \cdot \lambda}{25 \cdot \sqrt{\left(\frac{f'_c}{psi} \right)}} \right] \cdot d_{vf} & \text{if } d_{vf} \le 0.75 \cdot in \\ \left[\frac{\left(\frac{f_y}{psi} \right) \cdot \alpha \cdot \beta \cdot \gamma}{20 \cdot \sqrt{\left(\frac{f'_c}{psi} \right)}} \right] \cdot d_{vf} & \text{otherwise} \end{cases}$ $l_{d1} = 21.91 \cdot in$

Ouput: Development Length - Deformed Bars (12.2.3)

$c := 3.0 \cdot in$

$K_{tr} := 0$

$term := \begin{cases} \left(\frac{c + K_{tr}}{d_{vf}} \right) & \text{if } \left(\frac{c + K_{tr}}{d_{vf}} \right) \le 2.5 \\ 2.5 & \text{otherwise} \end{cases}$

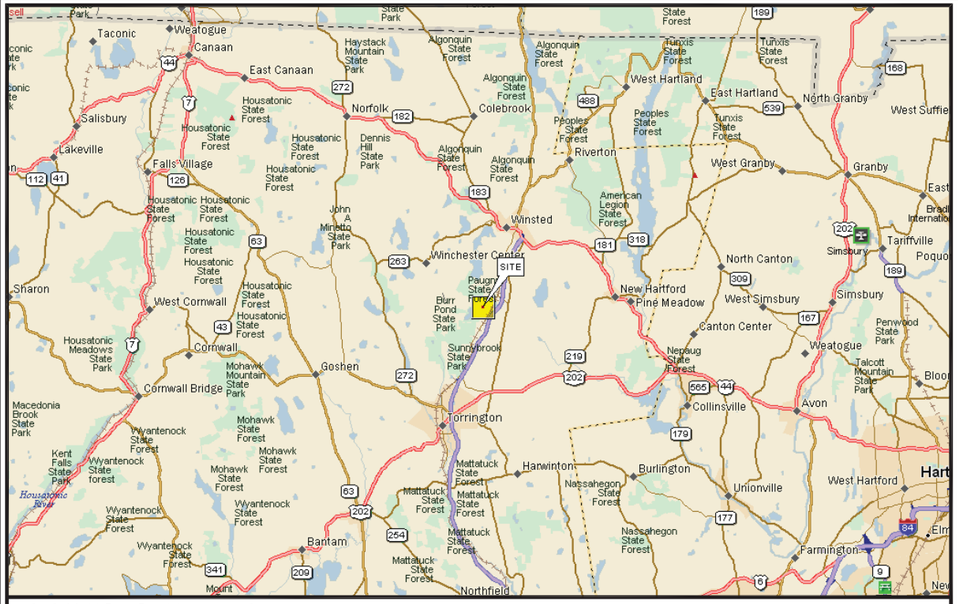
$l_{d2} := \left[\frac{3}{40} \cdot \frac{\frac{f_y}{psi}}{\sqrt{\left(\frac{f'_c}{psi} \right)}} \cdot \frac{\alpha \cdot \beta \cdot \gamma \cdot \lambda}{term} \right] \cdot d_{vf}$ $l_{d2} = 16.43 \cdot in$

Ouput: Development Length - Standard Hooks (12.5.2)

$factor := 0.7$ - applicable factors per 12.5.3 $12 \cdot d_{vf} = 7.50 \cdot in$ $4 \cdot d_{vf} = 2.50 \cdot in$

$l_{dh'} := \left[\left[\frac{0.02 \cdot \beta \cdot \gamma \cdot \frac{f_y}{psi}}{\sqrt{\left(\frac{f'_c}{psi} \right)}} \right] \cdot d_{vf} \right] \cdot factor$ $l_{dh'} = 7.67 \cdot in$

$l_{dh} := \max\left(l_{dh'}, 8 \cdot d_{vf}, 6 \cdot in \right)$ $l_{dh} = 7.67 \cdot in$



PROXIMITY MAP

LOCATION MAP

START AT BRADLEY INTERNATIONAL AIRPORT. GO STRAIGHT (WNW) ON ACCESS RD. IN 0.55 MI KEEP LEFT (SW) ON TO SR 401 (BRADLEY INTL AIRPORT) RAMP. IN 0.44 MI GO STRAIGHT (WNW) ON TO SR 20 (RAINBOW RD) RAMP. IN 5.58 MI TURN RIGHT (NNW) ON TO US 202 (SR 10|SR 20|SR 189|SALMON BROOK ST S). IN 0.02 MI KEEP LEFT (W) ON TO SR 20 (SR 189|N GRANBY RD). IN 3.63 MI KEEP LEFT (WSW) ON TO SR 219 (BARKHAMSTED RD). IN 3.77 MI TURN LEFT (S) ON TO SR 179 (SR 219|E HARTLAND. IN 0.07 MI KEEP RIGHT (SW) ON TO SR 219 (E HARTLAND RD). IN 2.48 MI KEEP RIGHT (W) ON TO SR 318. IN 1.67 MI TURN LEFT (WSW) ON TO SR 181 (SR 318|PLEASANT VALLEY RD). IN 0.72 MI KEEP RIGHT (WSW) ON TO SR 318 (RIPLEY HILL RD). IN 0.73 MI TURN RIGHT (W) ON TO US 44 (NEW HARTFORD RD). IN 3.14 MI TURN LEFT (SSW) ON TO SR 8 RAMP. IN 2.45 MI KEEP RIGHT (SSW) ON TO PINEWOODS RD RAMP 46. IN 0.30 MI TURN RIGHT (NW) ON TO PINEWOODS RD. IN 0.21 MI TURN LEFT (SSW) ON TO WINSTED RD. IN 1.00 MI TURN RIGHT (NW) ON TO BURR MOUNTAIN RD. IN 0.46 MI FINISH AT SITE.

DRIVING DIRECTIONS

PROJECT INFORMATION:

PROJECT NAME:

TORRINGTON/ OANDG IND INC

SITE NUMBER:

CT46138-A

PROJECT LOCATION:

LOT 5 BURR MOUNTAIN ROAD TORRINGTON, CT 06790 (LITCHFIELD COUNTY)

LATITUDE	N41° 52' 23.70"
LONGITUDE	W073° 05' 18.30"
GROUND ELEVATION	1,045'±

2-C CERTIFICATION (REF: SBA)

SITE CONSTRUCTON MANAGER:

NAME	SBA COMMUNICATIONS CORPORATION
ADDRESS	5900 BROKEN SOUND PARKWAY NW
CITY, STATE, ZIP	BOCA RATON, FL 33487-2797
CONTACT	DWAYNE LYERLY
PHONE	(919) 557-0555

SITE APPLICANT:

NAME	NEW CINGULAR WIRELESS PCS, LLC
ADDRESS	46 MILL PLAIN ROAD 2ND FLOOR
CITY, STATE, ZIP	DANBURY, CT 06810
CONTACT	THOMAS SHEVLIN
PHONE	(203) 885-5036

SURVEYOR:

NAME	N/A
ADDRESS	N/A
CITY, STATE, ZIP	N/A
CONTACT	N/A
PHONE	N/A

CIVIL ENGINEER:

NAME	VERTICAL SOLUTIONS
ADDRESS	2002 PRODUCTION DRIVE
CITY, STATE, ZIP	APEX, NC 27539
CONTACT	MIKE LASSITER
PHONE	(888) 321-6167

ELECTRICAL ENGINEER:

NAME	N/A
ADDRESS	N/A
CITY, STATE, ZIP	N/A
CONTACT	N/A
PHONE	N/A

PROPERTY INFORMATION:

NAME	TORRINGTON/OANDG IND INC
ADDRESS	LOT 5 BURR MOUNTAIN ROAD
CITY, STATE, ZIP	TORRINGTON, CT 06790
CONTACT	MICHAEL VILLA
PHONE	(412) 445-4325

UTILITIES:

POWER COMPANY	N/A
CONTACT	N/A
PHONE	N/A
TELEPHONE COMPANY	N/A
CONTACT	N/A
PHONE	N/A
PHONE # NEAR SITE	N/A

CONTACT INFORMATION

PROJECT DESCRIPTION:
STRUCTURAL UPGRADE

TOWER TYPE:
196' SELF SUPPORTING POLE STRUCTURE

AREA OF CONSTRUCTION:
-

PROJECT INFORMATION

NEW ENGLAND ONE CALL
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ONE CALL

SHEET	DESCRIPTION	REV
T-1	TITLE SHEET	1
N-1	PROJECT NOTES	1
N-2	PROJECT NOTES	1
B-1	BILL OF MATERIAL	1
S-1	TOWER ELEVATION AND MODIFICATION SCHEDULE	1
S-2	CONSTRUCTION DETAILS	1
S-3	CONSTRUCTION DETAILS	1
S-4	CONSTRUCTION DETAILS	1
S-5	CONSTRUCTION DETAILS	1
S-6	FABRICATION DETAILS	1

INDEX OF SHEETS

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

TORRINGTON/ OANDG IND INC
CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(NEW HAVEN COUNTY)

PLANS PREPARED BY:

vertical solutions

2002 PRODUCTION DRIVE
APEX, NC 27539
OFFICE: (888) 321-6167
www.verticalsolutions-inc.com

REV	DATE	ISSUED FOR:
1	06-28-13	CONSTRUCTION
0	06-14-13	PERMIT

DRAWN BY:JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: **T-1**

REVISION: 1

VSI #: 130499

SEAL:

June 28, 2013

GENERAL NOTES:

1. ALL REFERENCES TO TOWER OWNER IN THESE DOCUMENTS SHALL BE CONSIDERED AS SBA COMMUNICATIONS CORPORATION OR ITS DESIGNATED REPRESENTATIVE.

2. ALL WORK PRESENTED ON THESE DRAWINGS MUST BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR MUST HAVE CONSIDERABLE EXPERIENCE IN PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE OF CONNECTICUT.

3. THE STRUCTURE IS DESIGNED IN ACCORDANCE WITH ANSI/TIA-222-F-1996, FOR A 80 MPH BASIC WIND SPEED ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE CONNECTICUT BUILDING CODE, 2005 EDITION.

4. UNLESS SHOWN OR NOTED OTHERWISE ON THE CONTRACT DRAWINGS, OR IN THE SPECIFICATIONS, THE FOLLOWING NOTES SHALL APPLY TO THE MATERIALS LISTED HEREIN, AND TO THE PROCEDURES TO BE USED ON THIS PROJECT.

5. ALL PRODUCT MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED EXACTLY AND SHALL SUPERCEDE ANY CONFLICTING NOTES ENCLOSED HEREIN.

6. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE MODIFICATION PROCEDURE AND SEQUENCE TO INSURE THE SAFETY OF THE STRUCTURE AND IT'S COMPONENT PARTS DURING ERECTION AND/OR FIELD MODIFICATIONS. THIS INCLUDES, BUT IS NOT LIMITED TO, THE ADDITION OF TEMPORARY BRACING, GUYS OR TIE-DOWNS THAT MAY BE NECESSARY, SUCH MATERIAL SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE CONTRACTOR AFTER THE COMPLETION OF THE PROJECT.

7. ALL DIMENSIONS, ELEVATIONS, AND EXISTING CONDITIONS SHOWN ON THE DRAWINGS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO BEGINNING ANY MATERIALS ORDERING, FABRICATION OR CONSTRUCTION WORK ON THIS PROJECT. CONTRACTOR SHALL NOT SCALE CONTRACT DRAWINGS IN LIEU OF FIELD VERIFICATION. ANY DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER AND THE OWNER'S ENGINEER. THE DISCREPANCIES MUST BE RESOLVED BEFORE THE CONTRACTOR IS TO PROCEED WITH THE WORK. THE CONTRACT DOCUMENTS DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. OBSERVATION VISITS TO THE SITE BY THE OWNER AND/OR THE ENGINEER SHALL NOT INCLUDE INSPECTION OF THE PROTECTIVE MEASURES AND PROCEDURES.

8. ALL MATERIALS AND EQUIPMENT FURNISHED SHALL BE NEW AND OF GOOD QUALITY, FREE FROM FAULTS AND DEFECTS AND IN COMFORMANCE WITH THE CONTRACT DOCUMENTS. ANY AND ALL SUBSTITUTIONS MUST BE PROPERLY APPROVED AND AUTHORIZED IN WRITING BY THE OWNER AND ENGINEER PRIOR TO INSTALLATION. THE CONTRACTOR SHALL FURNISH SATISFACTORY EVIDENCE AS TO THE KIND AND QUALITY OF THE MATERIALS AND EQUIPMENT BEING SUBSTITUTED.

9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR IS RESPONSIBLE FOR INSURING THAT THIS PROJECT AND RELATED WORK COMPLIES WITH ALL APPLICABLE AND LOCAL, STATE, AND FEDERAL SAFETY CODES AND REGULATIONS GOVERNING THIS WORK.

10. ACCESS TO THE PROPOSED WORK SITE MAY BE RESTRICTED. THE CONTRACTOR SHALL COORDINATE INTENDED CONSTRUCTION ACTIVITY, INCLUDING WORK SCHEDULE AND MATERIALS ACCESS, WITH THE RESIDENT LEASING AGENT FOR APPROVAL.

11. BILL OF MATERIALS AND PART NUMBERS LISTED ON THE CONSTRUCTION DRAWINGS ARE INTENDED TO AID THE CONTRACTOR/OWNER. CONTRACTOR/OWNER SHALL VERIFY PARTS AND QUANTITIES WITH THE MANUFACTURER PRIOR TO BIDDING AND/OR ORDERING MATERIALS.

12. CONTRACTOR SHALL SECURE ALL NECESSARY PERMITS FOR THIS PROJECT FROM ALL APPLICABLE GOVERNING AGENCIES.

13. ALL PERMITS THAT MUST BE OBTAINED ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS.

14. 24 HOURS BEFORE THE BEGINNING OF ANY CONSTRUCTION, THE CONTRACTOR MUST NOTIFY THE APPLICABLE JURISDICTIONAL (STATE, COUNTY OR CITY) ENGINEER.

15. THE CONTRACTOR SHALL REWORK (DRY, SCARIFY, ETC.) ALL MATERIAL NOT SUITABLE FOR SUBGRADE IN ITS PRESENT STATE. IF THE MATERIAL REMAINS UNSUITABLE AFTER REWORKING, THE CONTRACTOR SHALL UNDERCUT THIS MATERIAL AND REPLACE IT WITH APPROVED MATERIAL. IF PAVING IS TO BE DONE, ALL SUBGRADES SHALL BE PROOFROLLED WITH A FULLY LOADED TANDEM AXLE DUMP TRUCK PRIOR TO PAVING. ANY SOFT MATERIAL SHALL BE REWORKED OR REPLACED.

16. THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL PIPES, DITCHES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURE IN OPERABLE CONDITION.

17. ALL MATERIALS AND WORKMANSHIP SHALL BE WARRANTED FOR ONE YEAR FROM ACCEPTANCE DATE.

18. ALL DIMENSIONS SHALL BE VERIFIED WITH THE PLANS (LATEST REVISION) PRIOR TO COMMENCING CONSTRUCTION. THE OWNER SHALL HAVE A SET OF APPROVED PLANS AVAILABLE AT THE SITE AT ALL TIMES WHILE WORK IS BEING PERFORMED. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY GOVERNING AGENCY INSPECTORS.

STRUCTURAL STEEL NOTES:

1. THE FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATION FOR THE MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.

2. UNLESS OTHERWISE NOTED, ALL STRUCTURAL ELEMENTS SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:
   A. ALL SHAPES SHALL BE ASTM A572-50, PLATES A572-65, TUBES A500-C, PIPES A500-C
   B. ALL BOLTS SHALL BE GALVANIZED A325 HIGH STRENGTH BOLTS.
   C. ALL NUTS SHALL BE CARBON AND ALLOY STEEL NUTS.
   D. ALL WASHERS SHALL BE ASTM F436 HARDENED STEEL WASHERS.

3. ALL CONNECTIONS NOT FULLY DETAILED ON THESE PLANS SHALL BE DETAILED BY THE FABRICATOR IN ACCORDANCE WITH AISC SPECIFICATION FOR MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN, 9TH EDITION.

4. HOLES SHALL NOT BE FLAME CUT THRU STEEL UNLESS APPROVED BY THE ENGINEER.

5. HOT-DIP GALVANIZE ALL ITEMS UNLESS OTHERWISE NOTED, AFTER FABRICATION WHERE PRACTICABLE. GALVANIZING: ASTM A123, ASTM A153/153M OR ASTM A653/653M, G90, AS APPLICABLE.

6. REPAIR DAMAGED SURFACES WITH GALVANIZING REPAIR METHOD AND PAINT CONFORMING TO ASTM OR BY APPLICATION OF STICK OR THICK PASTE MATERIAL SPECIFICALLY DESIGNED FOR REPAIR OF GALVANIZING. CLEAN AREAS TO BE REPAIRED AND REMOVE SLAG FROM WELDS. HEAT SURFACES TO WHICH STICK OR PASTE MATERIAL IS APPLIED, WITH A TORCH, TO A TEMPERATURE SUFFICIENT TO MELT THE METALLICS IN STICK OR PASTE; SPREAD MOLTEN MATERIAL UNIFORMLY OVER SURFACES TO BE COATED AND WIPE OFF EXCESS MATERIAL.

7. A NUT LOCKING DEVICE SHALL BE INSTALLED ON ALL PROPOSED AND/OR REPLACED BOLTS.

8. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH TO EXCLUDE THE THREADS FROM THE SHEAR PLANE.

9. ALL PROPOSED AND/OR REPLACED BOLTS SHALL BE OF SUFFICIENT LENGTH SUCH THAT THE END OF THE BOLT BE AT LEAST FLUSH WITH THE FACE OF THE NUT. IT IS NOT PERMITTED FOR THE BOLT END TO BE BELOW THE FACE OF THE NUT AFTER TIGHTENING IS COMPLETED.

10. DO NOT OVER TORQUE ASSEMBLY BOLTS. GALVANIZING ON BOLT NUTS AND STEEL PARTS MAY ACT AS A LUBRICANT, THUS OVER TIGHTENING MAY OCCUR AND MAY CAUSE BOLTS TO CRACK AND SNAP OFF.

BOLT TIGHTENING PROCEDURE:

1. TIGHTEN FLANGE BOLTS BY AISC- "TURN OF THE NUT" METHOD, USING THE CHART BELOW:

BOLT LENGTHS UP TO AND INCLUDING FOUR DIA.

3/4"	BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
7/8"	BOLTS UP TO AND INCLUDING 3.5 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1"	BOLTS UP TO AND INCLUDING 4.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/8"	BOLTS UP TO AND INCLUDING 4.5 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/4"	BOLTS UP TO AND INCLUDING 5.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT
1-1/2"	BOLTS UP TO AND INCLUDING 6.0 LENGTH	+1/3 TURN BEYOND SNUG TIGHT

BOLT LENGTH OVER FOUR DIA. BUT NOT EXCEEDING 8 DIA.

3/4"	BOLTS 4.25 TO 6.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
7/8"	BOLTS 3.75 TO 7.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1"	BOLTS 4.25 TO 8.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/8"	BOLTS 4.75 TO 9.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/4"	BOLTS 5.25 TO 10.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT
1-1/2"	BOLTS 6.25 TO 12.0 INCH LENGTH	+1/2 TURN BEYOND SNUG TIGHT

2. SPLICE BOLTS SUBJECT TO DIRECT TENSION SHALL BE INSTALLED AND TIGHTENED AS PER SECTION 8(d)(1) OF THE AISC MANUAL OF STEEL CONSTRUCTION. THE INSTALLATION PROCEDURE IS PARAPHRASED AS FOLLOWS:

"FASTENERS SHALL BE INSTALLED IN PROPERLY ALIGNED HOLES AND BE TIGHTENED BY ONE OF THE METHODS DESCRIBED IN SUBSECTION 8(d)(1) THROUGH 8(d)(4).

8(d)(1) TURN-OF-THE-NUT TIGHTENING.
BOLTS SHALL BE INSTALLED IN ALL HOLES OF THE CONNECTION AND BROUGHT TO A SNUG TIGHT CONDITION. SNUG TIGHT IS DEFINED AS THE TIGHTNESS THAT EXISTS WHEN THE PLIES OF A JOINT ARE IN FIRM CONTACT. THIS MAY BE OBTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF A MAN USING AN ORDINARY SPUD WRENCH. SNUG TIGHTENING SHALL PROGRESS SYSTEMATICALLY...UNTIL ALL THE BOLTS ARE SIMULTANEOUSLY SNUG TIGHT AND THE CONNECTION IS FULLY COMPACTED. FOLLOWING THIS INITIAL OPERATION ALL BOLTS IN THE CONNECTION SHALL BE TIGHTENED FURTHER BY THE APPLICABLE AMOUNT OF ROTATION SPECIFIED ABOVE. DURING THE TIGHTENING OPERATION THERE SHALL BE NO ROTATION OF THE PART NOT TURNED BY THE WRENCH. TIGHTENING SHALL PROGRESS SYSTEMATICALLY.

BEFORE 1/3 TURN

AFTER 1/3 TURN

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

TORRINGTON/ OANDG IND INC
CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(NEW HAVEN COUNTY)

PLANS PREPARED BY:

vertical solutions

2002 PRODUCTION DRIVE
APEX, NC 27539
OFFICE: (888) 321-6167
www.verticalsolutions-inc.com

REV	DATE	ISSUED FOR:
I	06-28-13	CONSTRUCTION
0	06-14-13	PERMIT

DRAWN BY: JWM/MEA	CHECKED BY: KCI

SHEET TITLE:

PROJECT NOTES

SHEET NUMBER:	REVISION:
N-1	1
	VSI #: 130499

SEAL:

June 28, 2013

APPLICABLE CODES AND STANDARDS

1. ANSI/TIA STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES ANTENNAS, 222-F-1996 EDITION.

2. 2005 CONNECTICUT BUILDING CODE.

3. ACI 318: AMERICAN CONCRETE INSTITUTE, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE, 318-99.

4. CRSI: CONCRETE REINFORCING STEEL INSTITUTE, MANUAL OF STANDARD PRACTICE, LATEST EDITION.

5. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION, LATEST EDITION.

6. AWS: AMERICAN WELDING SOCIETY D1.1, STRUCTURAL WELDING CODE, LATEST EDITION.

STRUCTURAL STEEL

1. ALL DETAILING, FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AISC SPECIFICATIONS, LATEST EDITION.

2. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.

3. ALL U-BOLTS SHALL BE ASTM A307 OR EQUIVALENT, WITH LOCKING DEVICE, UNLESS NOTED OTHERWISE.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY WELDERS CURRENTLY STATE OR AWS CERTIFIED TO THE AWS D1.1 STRUCTURAL WELDING CODE, LATEST EDITION.

2. ALL FIELD WELDING SHALL UTILIZE LOW HYDROGEN ELECTRODES.

3. PRIOR TO FIELD WELDING, GRIND OFF GALVANIZING TO 1/2" BEYOND ALL FIELD WELD SURFACES.

4. ALL FIELD CUT, FIELD WELDED, OR DAMAGED GALVANIZING SURFACES SHALL BE REPAIRED WITH ZINC RICH PAINT (95% ZINC CONTENT) PER ASTM A780.

5. PRIOR TO FIELD WELDING, CONTRACTOR SHALL CLEAR THE INTERIOR OF MONOPOLE OF FLAMMABLE DEBRIS. COAXIAL CABLE SHALL BE SHIFTED AWAY FROM PROXIMITY OF THE WELD AND/OR COVERED WITH A HEAT RESISTANT BLANKET.

PAINT

1. CLEAN AND PAINT PROPOSED STEEL ACCORDING TO FAA ADVISORY CIRCULAR AC 70/7460-1K.

REINFORCEMENT STEEL

1. ALL REINFORCEMENT BARS ARE ASTM A572 GRADE 50, FY = 50 KSI, FU = 65 KSI.

FIELD WELDS

1. ALL FIELD WELDS SHALL BE MADE WITH E70XX WELD RODS.

SPECIAL INSPECTION

1. A QUALIFIED INDEPENDENT TESTING LABORATORY, EMPLOYED BY THE OWNER, SHALL PERFORM INSPECTION AND TESTING IN ACCORDANCE WITH CTBC 2005, SECTION 1704 AS REQUIRED BY PROJECT SPECIFICATIONS FOR THE FOLLOWING CONSTRUCTION WORK:
   a) STRUCTURAL WELDING
   b) HIGH STRENGTH BOLTS

2. THE INSPECTION AGENCY SHALL SUBMIT INSPECTION AND TEST REPORTS TO THE BUILDING DEPARTMENT, THE ENGINEER OF RECORD, AND THE OWNER IN ACCORDANCE WITH CTBC 2005, SECTION 1704. UNLESS THE FABRICATOR IS APPROVED BY THE BUILDING OFFICIAL TO PERFORM SUCH WORK WITHOUT THE SPECIAL INSPECTIONS.

GENERAL NOTES:

1. ALL METHODS, MATERIAL AND WORKMANSHIP SHALL FOLLOW THE DICTATES OF GOOD CONSTRUCTION PRACTICES.
2. ALL WORK INDICATED ON THESE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TOWER AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF RECORD IMMEDIATELY OF ANY INSTALLATION INTERFERENCES. ALL NEW WORK SHALL ACCOMMODATE EXISTING CONDITIONS. DETAILS NOT SPECIFICALLY SHOWN ON THE DRAWINGS SHALL FOLLOW SIMILAR DETAILS FOR THIS JOB.
4. ANY SUBSTITUTIONS MUST CONFORM TO THE REQUIREMENTS OF THE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. ALL SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
5. ANY MANUFACTURED DESIGN ELEMENTS MUST CONFORM TO THE REQUIREMENTS OF THESE NOTES AND SPECIFICATIONS AND SHOULD BE SIMILAR TO THOSE SHOWN. THESE DESIGN ELEMENTS MUST BE STAMPED BY AN ENGINEER PROFESSIONALLY REGISTERED IN THE STATE OF THE PROJECT, AND SUBMITTED TO THE ENGINEER OF RECORD FOR APPROVAL PRIOR TO FABRICATION.
6. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES AND OSHA SAFETY REGULATIONS.
7. THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND EXECUTION OF ALL MISCELLANEOUS SHORING, BRACING, TEMPORARY SUPPORTS, ETC. NECESSARY TO PROVIDE A COMPLETE AND STABLE STRUCTURE AS SHOWN ON THESE DRAWINGS.
8. ANY STEEL WHICH HAS BEEN FIELD CUT OR WELDED SHALL BE COLD GALVANIZED WITH 95% ZINC RICH PAINT PER ASTM A780.
9. CONTRACTOR'S PROPOSED INSTALLATION SHALL NOT INTERFERE, NOR DENY ACCESS TO, ANY EXISTING OPERATIONAL AND SAFETY EQUIPMENT.

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND PARKWAY NW
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(919) 557-0555

PROJECT INFORMATION:

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CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(NEW HAVEN COUNTY)

PLANS PREPARED BY:

vertical solutions

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0	06-14-13	PERMIT

DRAWN BY: JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

PROJECT NOTES

SHEET NUMBER: **N-2**

REVISION: 1

VSI #: 130499

SEAL:

STATE OF CONNECTICUT
MICHAEL L. LASSITER
No. 25064
LICENSED
PROFESSIONAL ENGINEER

June 28, 2013

BILL OF MATERIAL - MONOPOLE REINFORCEMENT

MARK NO.	DESCRIPTION	SIZE	QTY
CONC	4000-PSI MIX	28.8 CY	1
HORIZ-01	HORIZONTAL BAR 01	#9 ASTM A615-60 x 28'-6"	45
HORIZ-02	HORIZONTAL BAR 02	#9 ASTM A615-60 x 10'-0"	36
DOWEL-01	DOWEL BAR 01	#5 ASTM A615-60 x 2'-0"	84
RB-01	REINFORCING BAR 01	A572-50 PL 1 1/2" x 7 1/4" x 15'-0"	4
RB-02	REINFORCING BAR 02	A572-50 PL 1 1/2" x 6 1/2" x 31'-0"	4
RB-03	REINFORCING BAR 03	A572-50 PL 1 1/2" x 4 3/4" x 14'-5"	4
DRAIN	DRAIN PIPE	2 SCH 40 PVC x 11'-0"	4
SB	STITCH BOLT (AJAX)*	20-mmØ - STANDARD LENGTH ONESIDE W/ 30-mmØ SLEEVE	364
-	EPOXY	HILTI RE-500	TBD

NOTES:
1. LABEL BARS WITH BAR #.
2. BARS ARE TO BE ASTM A572 GRADE 50 STEEL & HOT-DIP GALVANIZED.
3. HOLES IN BARS ARE 31mmØ & DIMENSIONED TO CENTERS.
4. BOTTOM OF BARS ON LEFT AS SHOWN.
5. SEE SLEEVE CHART FOR AJAX SLEEVE SIZE AND QUANTITY.

* = A325 1 1/8"Ø MAY BE USED.

BILL OF MATERIAL - AJAX SLEEVE

SLEEVE SIZE	QTY
30-mmØ x 2.5"	64
30-mmØ x 1.875"	64
30-mmØ x 2.25"	56
30-mmØ x 1.75"	100
30-mmØ x 2.031"	36
30-mmØ x 1.656"	44

NOTE:
1. 67'-0"± TOTAL NEEDED.

PLANS PREPARED FOR:

SBA

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BOCA RATON, FL 33487-2797
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DRAWN BY: JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

BILL OF MATERIALS

SHEET NUMBER: **B-1**

REVISION: 1

VSI #: 130499

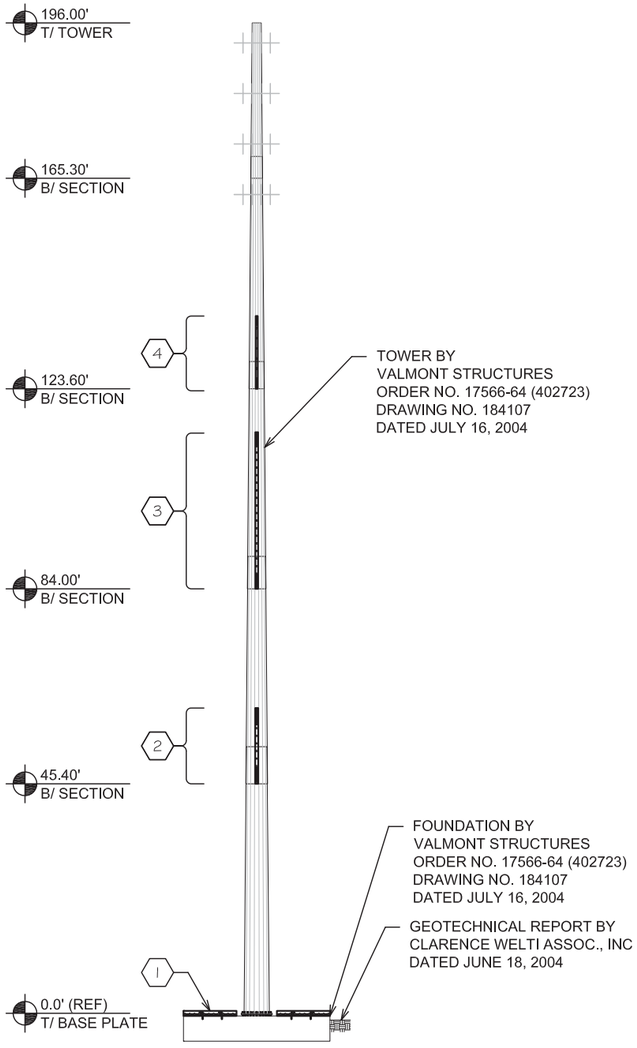
SEAL:

STATE OF CONNECTICUT
MICHAEL L. LASSITER
No. 25064
LICENSED
PROFESSIONAL ENGINEER

June 28, 2013

LEGEND	
A	4.41

STRUCTURE										
SECTION	01		02		03		04		05	
LENGTH (ft)	52.75		45.00		45.00		46.00		30.750	
LAP SPLICE (ft)		7.25		6.41		5.41		A		
NUMBER OF SIDES	16		16		16		16		16	
THICKNESS (in)	0.625		0.500		0.375		0.281		0.188	
TOP DIA (in)	48.921		42.010		34.650		26.697		21.530	
BOTTOM DIA (in)	60.000		51.460		44.110		36.350		27.980	
BASE PLATE	2" x 73.67" (12) SIDED									
ANCHOR RODS	(28) UNC-2A 2 1/4"Ø x 5'-0"									
SHAFT GRADE	ASTM A572-65									



TOWER ELEVATION 5

SCALE: 1" = 30'

MODIFICATION DESIGN PROVISIONS

THIS MODIFICATION DESIGN IS BASED ON VERTICAL SOLUTIONS STRUCTURAL ANALYSIS REPORT, VSI JOB # 130499 REV01, DATED JUNE 28, 2013. THIS REPORT IS BASED ON A SPECIFIC ANTENNA AND COAX CONFIGURATION, SEE THE REPORT FOR ANTENNA AND COAX LOADING. ANY OTHER ANTENNA CONFIGURATION REQUIRES REVIEW BY VERTICAL SOLUTIONS.

CONSTRUCTION INTERFERENCES

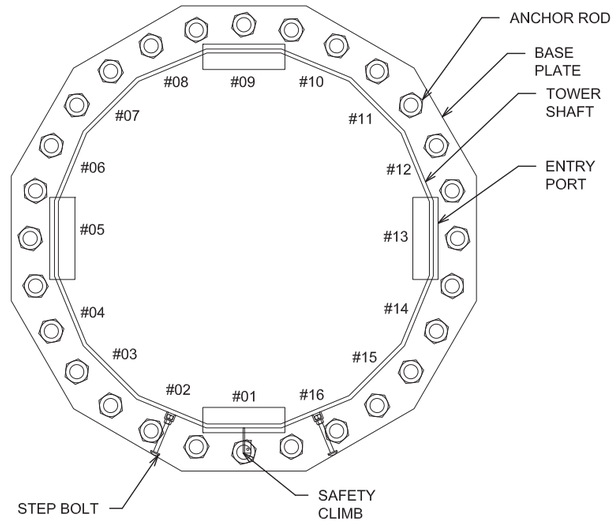
EXISTING AND PROPOSED ANTENNAS, MOUNTS, COAX, AND HAND-HOLE RIMS ARE NOT SHOWN FOR CLARITY.
CONTRACTOR SHALL COORDINATE WITH THE TOWER OWNER WITH RESPECT TO INTERFERENCES TO REINFORCEMENT.
CONTRACTOR SHALL FIELD VERIFY TOWER DIMENSION PRIOR TO FABRICATION.

FIELD VERIFICATION

THE CONTRACTOR SHALL FIELD VERIFY THE STRUCTURE DIMENSIONS, PROPOSED MATERIAL SIZES AND QUANTITIES PRIOR TO PURCHASING, FABRICATION AND ERECTION.

MODIFICATION SCHEDULE

NO.	MODIFICATION DESCRIPTION
1	INSTALL PERIMETER POUR, SEE SHEETS S-2 & S-3.
2	INSTALL (4) REINFORCING BARS, SEE SHEETS S-4.
3	INSTALL (4) REINFORCING BARS, SEE SHEETS S-4.
4	INSTALL (4) REINFORCING BARS, SEE SHEETS S-5.
5	CONTRACTOR SHALL PROVIDE CONSTRUCTION PROGRESS PHOTOS, AS WELL AS PROJECT COMPLETION PHOTOS, ALONG WITH STEEL & CONCRETE CERTIFICATION FOR VERTICAL SOLUTIONS, INC. TO COMPLETE A POST MODIFICATION LETTER. SEE SHEET B-2.



SECTION @ BASE 8.0'

SCALE: 1/2" = 1'-0"

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

TORRINGTON/ OANDG IND INC
CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(NEW HAVEN COUNTY)

PLANS PREPARED BY:

vertical solutions

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1	06-28-13	CONSTRUCTION
0	06-14-13	PERMIT

DRAWN BY:JWM/MEA | CHECKED BY: KCI

SHEET TITLE:
TOWER ELEVATION AND MODIFICATION SCHEDULE

SHEET NUMBER: **S-1**

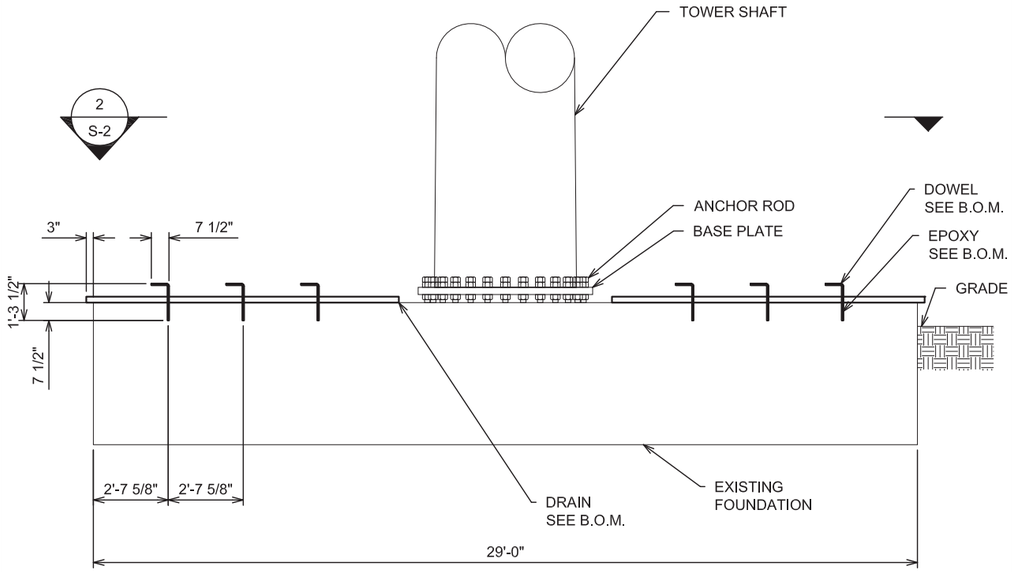
REVISION: 1

VSI #: 130499

SEAL:

June 28, 2013

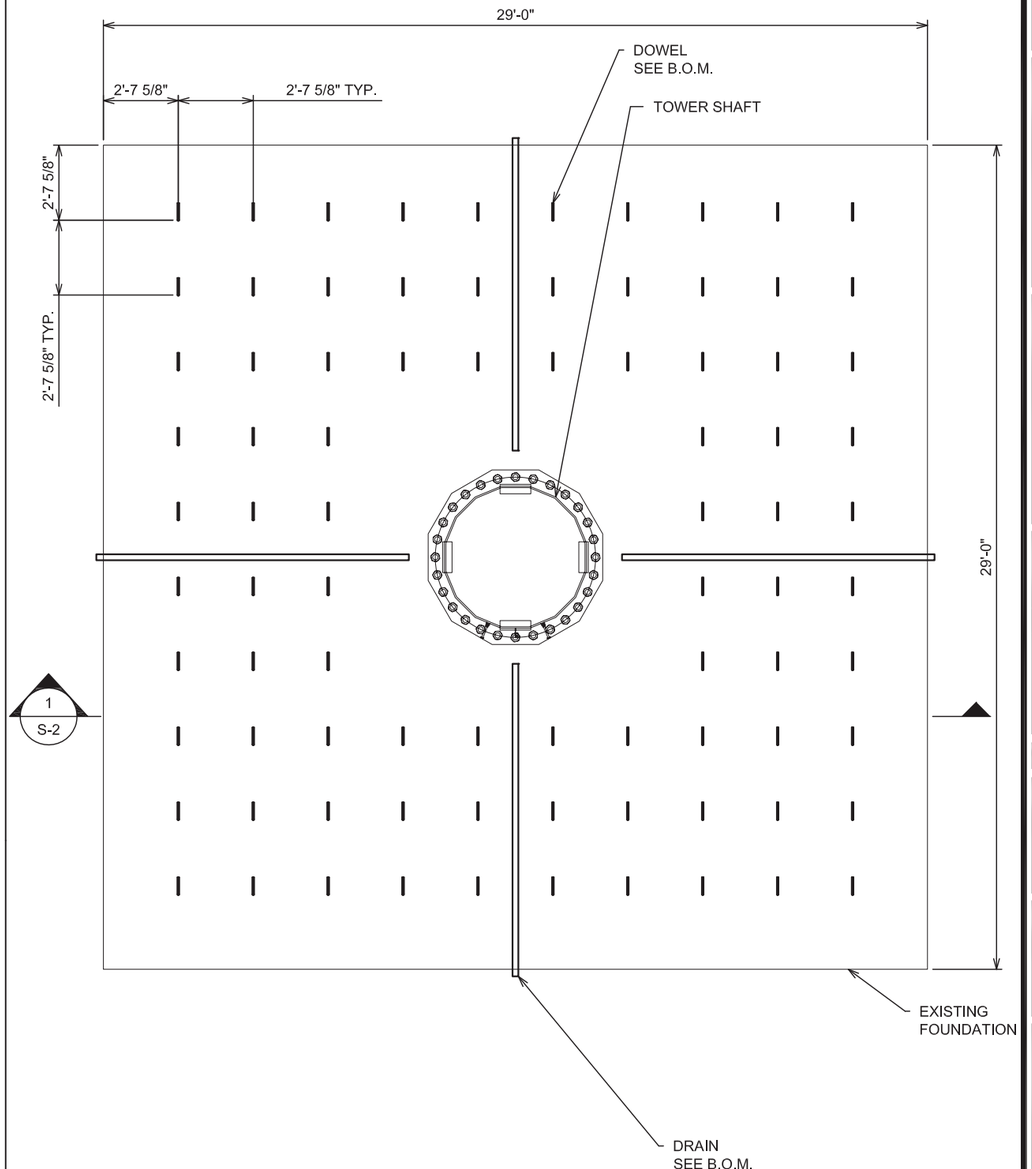
NOTE:
1. HOLES DRILLED INTO FOUNDATION TO BE 3/4"Ø, 7 1/2" MIN INTO EXISTING CONCRETE.
2. HOLES DRILLED INTO CONCRETE TO BE ROUGHENED AND CLEANED.
3. EPOXY TO BE HILTI HIT-RE-500 & INSTALLED IN ACCORDANCE WITH ACI 306R-88 (2002).



1 S-2 FOUNDATION - SECTION ELEVATION

SCALE: 3/16" = 1'-0"

NOTE:
1. HOLES DRILLED INTO FOUNDATION TO BE 3/4"Ø, 7 1/2" MIN INTO EXISTING CONCRETE.
2. HOLES DRILLED INTO CONCRETE TO BE ROUGHENED AND CLEANED.
3. EPOXY TO BE HILTI HIT-RE-500 & INSTALLED IN ACCORDANCE WITH ACI 306R-88 (2002).



2 S-2 FOUNDATION - SECTION PLAN

SCALE: 3/16" = 1'-0"

PLANS PREPARED FOR:

SBA

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SHEET TITLE:

CONSTRUCTION DETAILS

SHEET NUMBER: **S-2**

REVISION: 1

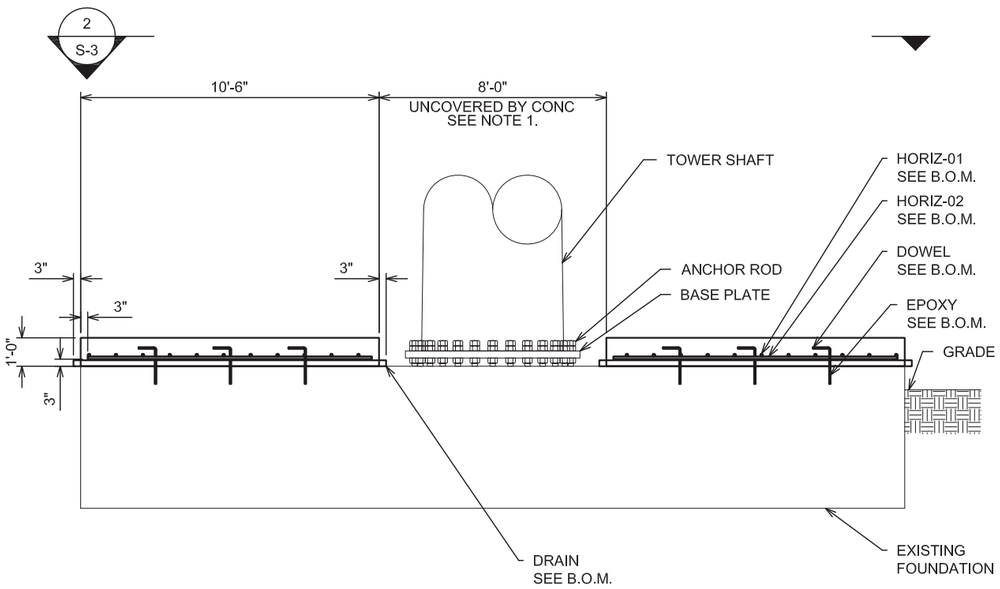
VSI #: 130499

SEAL:

STATE OF CONNECTICUT
MICHAEL L. LASSITER
No. 25064
LICENSED
PROFESSIONAL ENGINEER

June 28, 2013

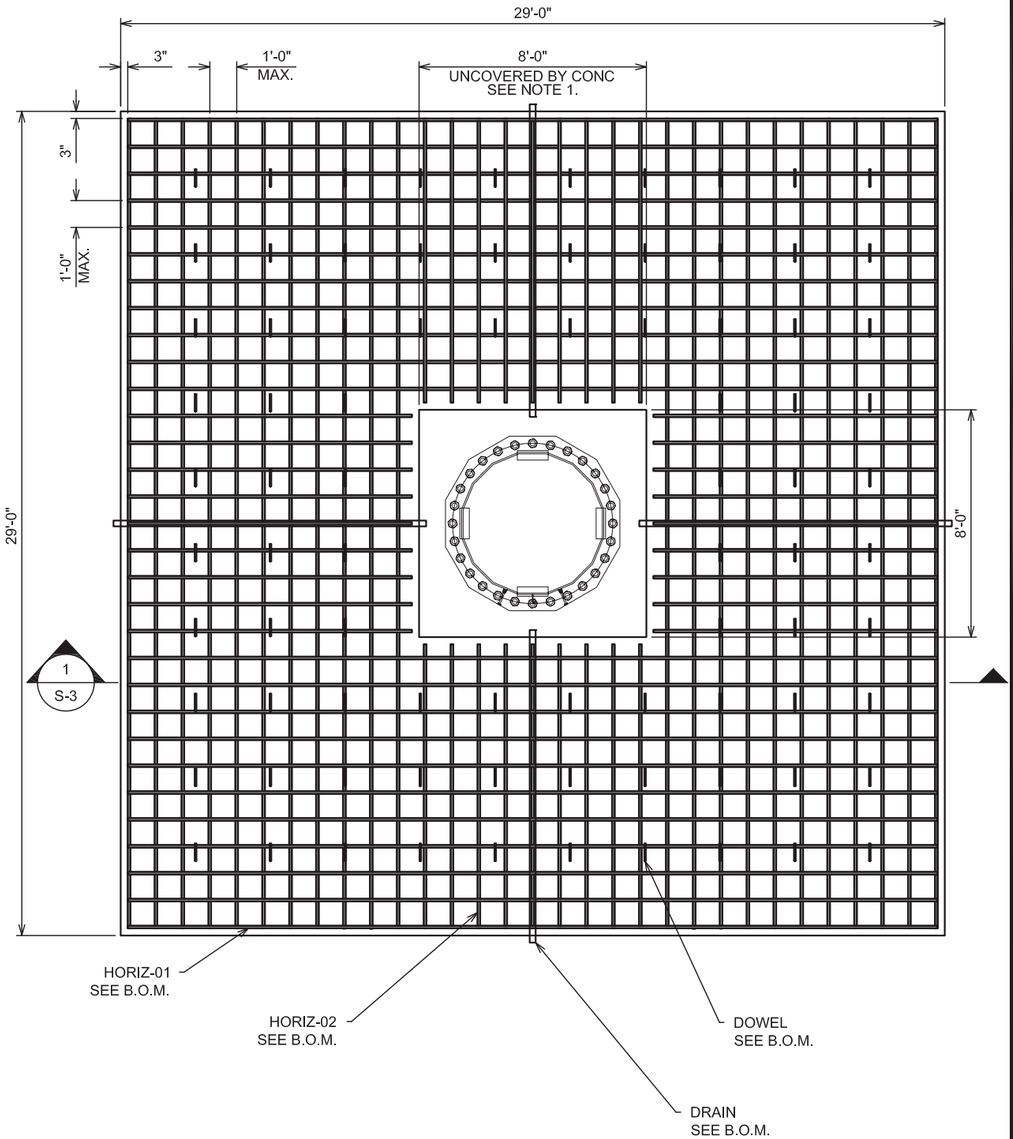
NOTE:
1. CONCRETE POUR SHALL NOT ENCROACH 8'-0" x 8'-0"
FROM CENTER OF TOWER.



1 S-3 FOUNDATION - SECTION ELEVATION

SCALE: 3/16" = 1'-0"

NOTE:
1. CONCRETE POUR SHALL NOT ENCROACH 8'-0" x 8'-0"
FROM CENTER OF TOWER.



2 S-3 FOUNDATION - SECTION PLAN

SCALE: 3/16" = 1'-0"

PLANS PREPARED FOR:

SBA

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(919) 557-0555

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DRAWN BY: JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

CONSTRUCTION DETAILS

SHEET NUMBER: **S-3**

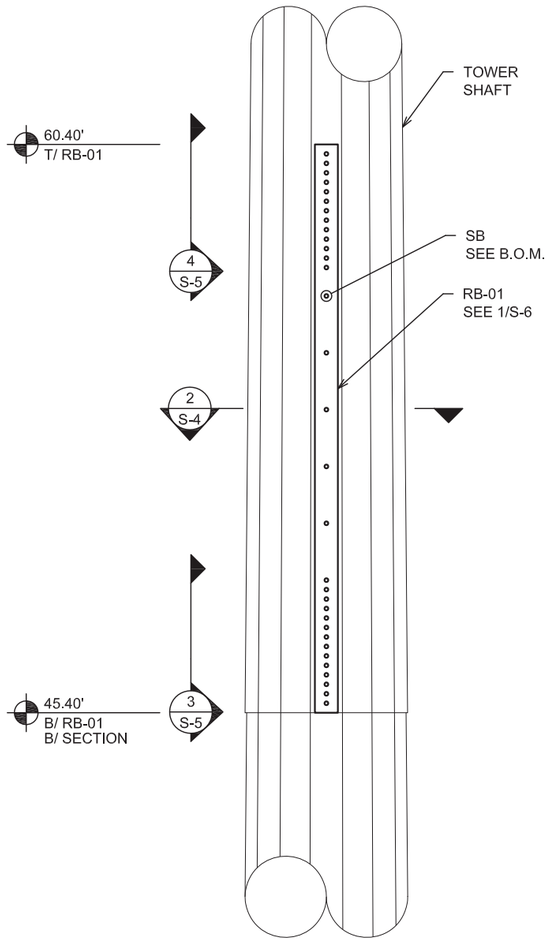
REVISION: 1

VSI #: 130499

SEAL:

June 28, 2013

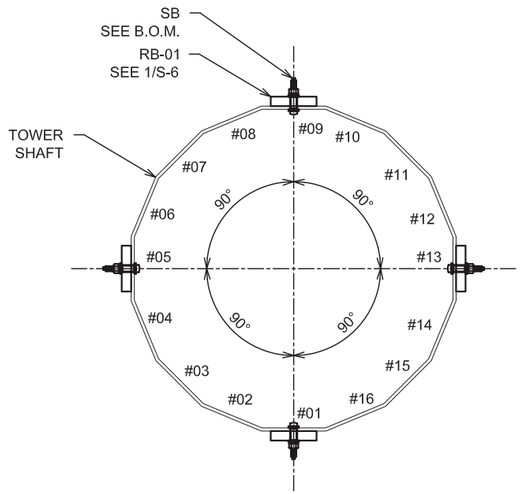
NOTE:
1. VIEW FACING FLAT #01.



1 S-4 SECTION 02 - ELEVATION

SCALE: 1/4" = 1'-0"

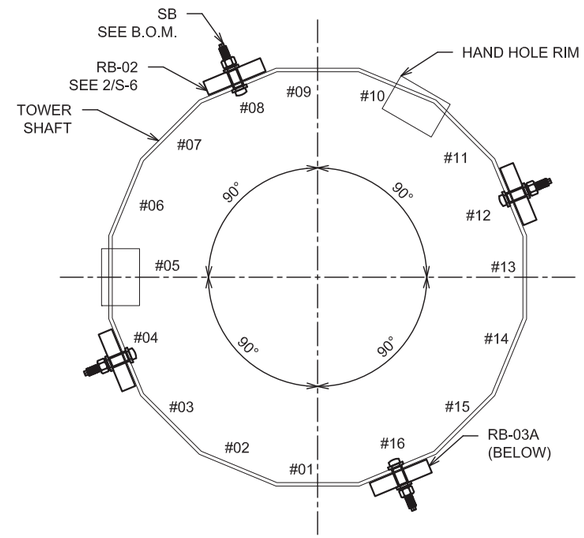
NOTE:
1. #XX DENOTES FLAT NUMBER.



2 S-4 SECTION 02 - PLAN

SCALE: 1/2" = 1'-0"

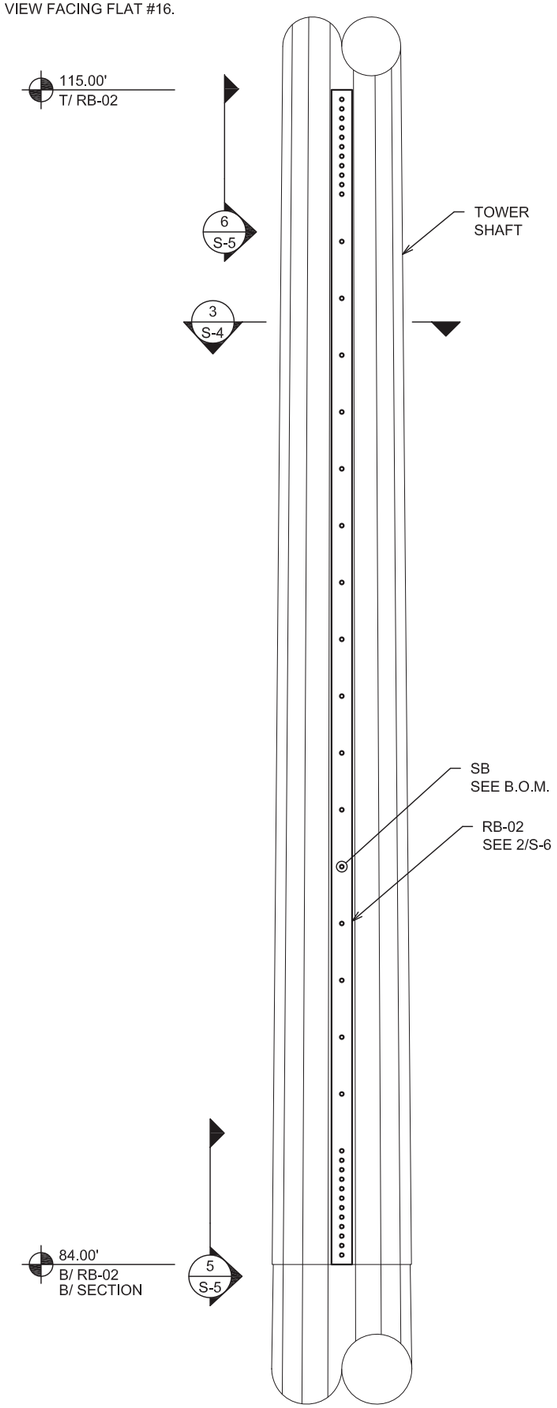
NOTE:
1. #XX DENOTES FLAT NUMBER.



3 S-4 SECTION 03 - PLAN

SCALE: 3/4" = 1'-0"

NOTE:
1. VIEW FACING FLAT #16.



4 S-4 SECTION 03 - ELEVATION

SCALE: 1/4" = 1'-0"

PLANS PREPARED FOR:

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SHEET TITLE:

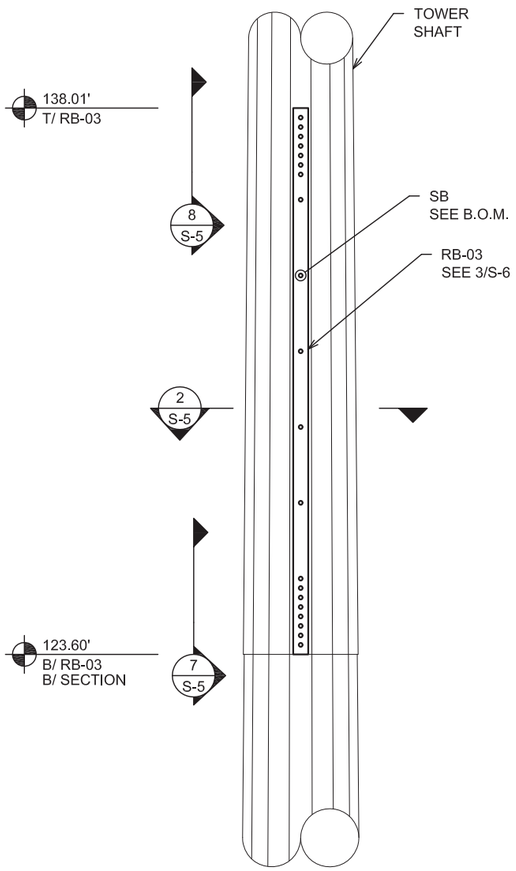
CONSTRUCTION DETAILS

SHEET NUMBER:	REVISION:
S-4	1
	VSI #: 130499

SEAL:

June 28, 2013

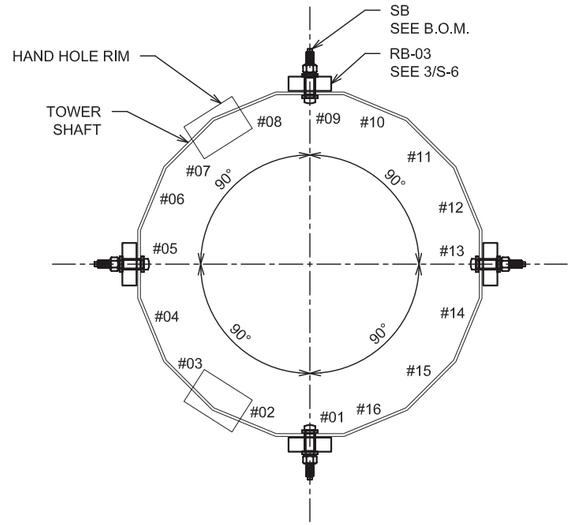
NOTE:
1. VIEW FACING FLAT #13.



1 S-5 SECTION 04 - ELEVATION

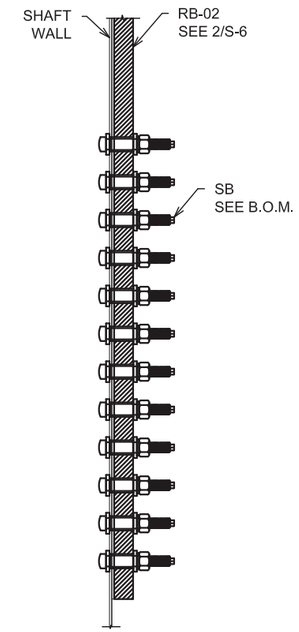
SCALE: 1/4" = 1'-0"

NOTE:
1. #XX DENOTES FLAT NUMBER.



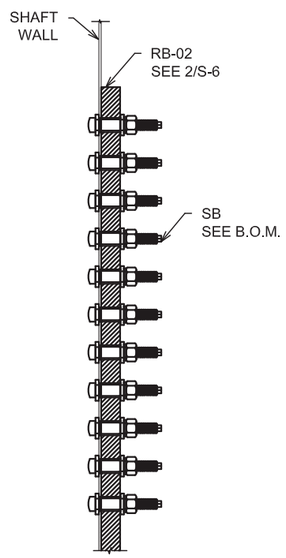
2 S-5 SECTION 04 - PLAN

SCALE: 3/4" = 1'-0"



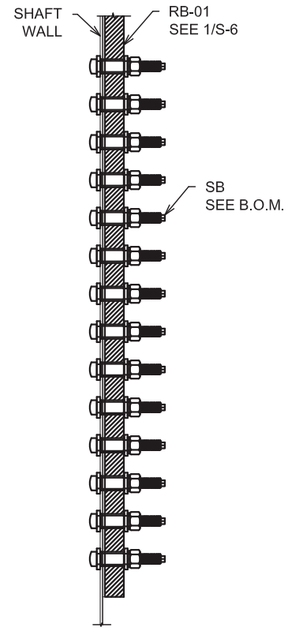
5 S-5 RB-02 BOT TERM

SCALE: 1" = 1'-0"



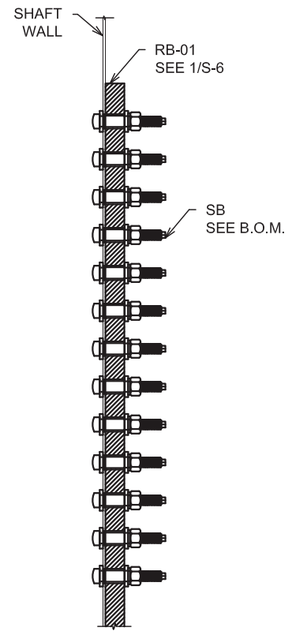
6 S-5 RB-02 TOP TERM

SCALE: 1" = 1'-0"



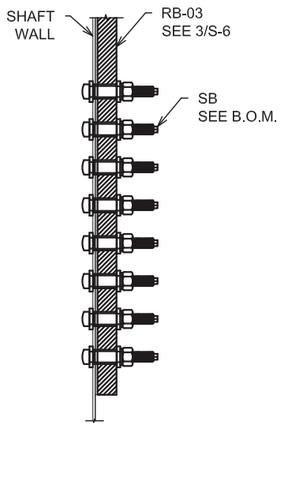
3 S-5 RB-01 BOT TERM

SCALE: 1" = 1'-0"



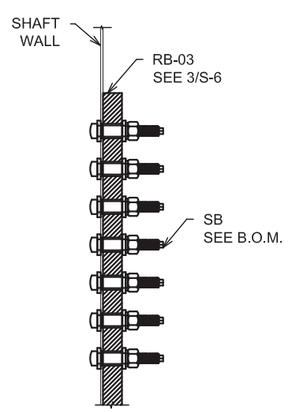
4 S-5 RB-01 TOP TERM

SCALE: 1" = 1'-0"



7 S-5 RB-03 BOT TERM

SCALE: 1" = 1'-0"



8 S-5 RB-03 TOP TERM

SCALE: 1" = 1'-0"

PLANS PREPARED FOR:

SBA

5900 BROKEN SOUND PARKWAY NW
BOCA RATON, FL 33487-2797
(919) 557-0555

PROJECT INFORMATION:

TORRINGTON/ OANDG IND INC

CT46138-A

LOT 5 BURR MOUNTAIN ROAD
TORRINGTON, CT 06790
(NEW HAVEN COUNTY)

PLANS PREPARED BY:

vertical solutions

2002 PRODUCTION DRIVE
APEX, NC 27539
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www.verticalsolutions-inc.com

REV	DATE	ISSUED FOR:
1	06-28-13	CONSTRUCTION
0	06-14-13	PERMIT

DRAWN BY: JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

CONSTRUCTION DETAILS

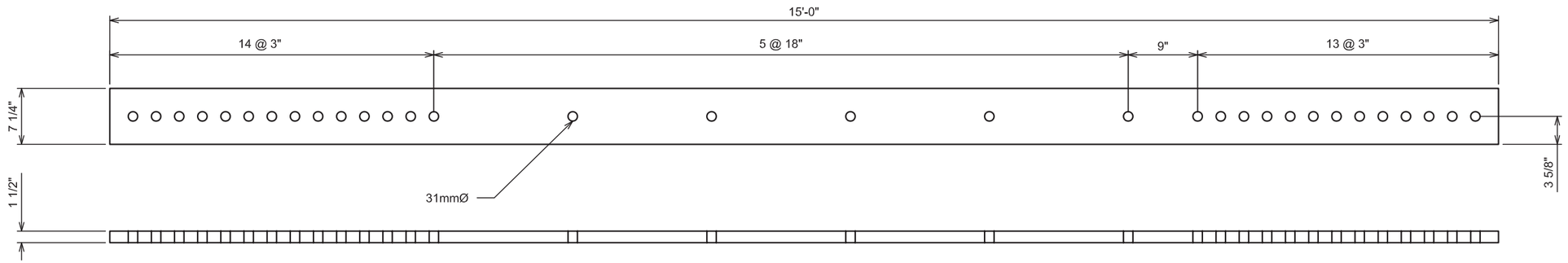
SHEET NUMBER: **S-5**

REVISION: **1**

VSI #: 130499

SEAL:

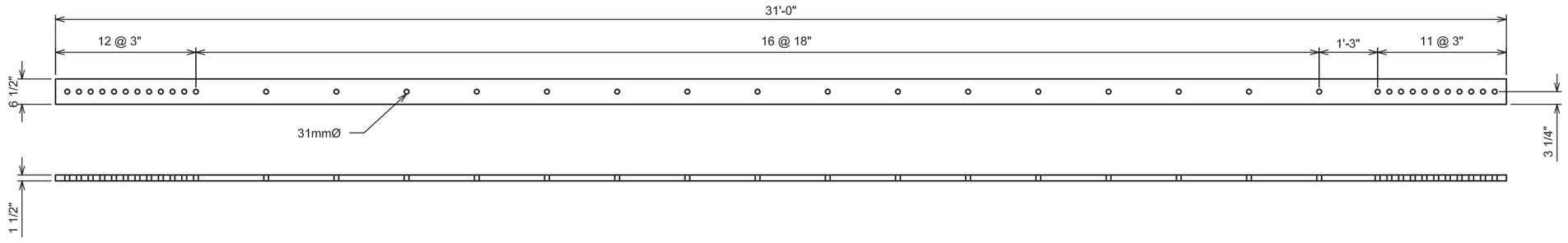
June 28, 2013



1 / S-6

RB-01 DETAIL

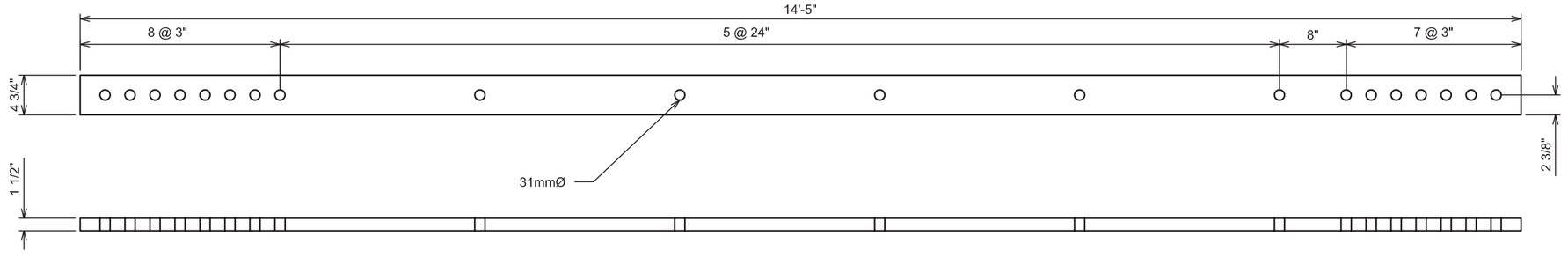
SCALE: 3/4" = 1'-0"



2 / S-6

RB-02 DETAIL

SCALE: 3/8" = 1'-0"



3 / S-6

RB-03 DETAIL

SCALE: 3/4" = 1'-0"

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DRAWN BY:JWM/MEA | CHECKED BY: KCI

SHEET TITLE:

FABRICATION DETAILS

SHEET NUMBER: **S-6**

REVISION: **1**

VSI #: 130499

SEAL:

June 28, 2013