EM-SPRINT-143-130604

218 Wheeler Road

Torrington

Alcatel·Lucent

1 Robbins Road
Westford, MA 01886

July 9, 2014

State of Connecticut
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: Notification of Construction Completion on telecommunication facilities

To whom it may concern:

Alcatel Lucent hereby acknowledges that the list of attached sites have completed construction per the approval granted on the specified date. Please advise if further information is needed..

Very truly yours,

Martha Powers

Martha Powers
Lead Development Manager
Alcatel-Lucent
Sprint Vision Project
1 Robbins Road
Westford, MA 01886

Cc: FST, Siterra

EM/TS #	Address	Town	Sprint ID	Decision Date
EM-SPRINT-062-130912	1065 Wintergreen Avenue	Hamden	CT03XC003	10/15/2013
EM-SPRINT-NEXTEL-060-130118	10 Tanner Marsh Road	Guilford	CT03XC022	2/14/2013
EM-SPRINT-004-130822	181 Montevideo Road	Avon	CT03XC053	9/6/2013
EM-SPRINT-NEXTEL-155-130214A	1358 New Britain Ave.	West Hartford	CT03XC057	3/1/2013
EM-SPRINT-NEXTEL-164-130201	440 Hayden Station Road	Windsor	CT03XC065	3/8/2013
EM-SPRINT-NEXTEL-132-130201	59 McGuire Road	South Windsor	CT03XC066	3/1/2013
EM-SPRINT-NEXTEL-054-130201	299 Paxton Way	Glastonbury	CT03XC081	3/1/2013
EM-SPRINT-NEXTEL-094-130214B	36 Prospect Street	Newington	CT03XC084	3/1/2013
EM-SPRINT-110-130725	10 Sparks Street	Plainville	CT03XC086	8/8/2013
EM-SPRINT-007-130314	260 Beckley Road	Kensington	CT03XC088	4/5/2013
EM-SPRINT-NEXTEL-155-130201	570 New Park Avenue	West Hartford	CT03XC091	3/1/2013
EM-SPRINT-NEXTEL-106-130201	430 Middlesex Turnpike	Old Saybrook	CT03XC102	3/1/2013
EM-SPRINT-NEXTEL-105-130201	30 Short Hills Road	Old Lyme	CT03XC104	3/1/2013
EM-SPRINT-NEXTEL-152-130201	41 Manitock Hill Road	Waterford	CT03XC105	3/1/2013
EM-SPRINT-NEXTEL-045-130201	93 Roxbury Road	East Lyme	CT03XC110	3/1/2013
EM-SPRINT-152-130114	45R Fargo Road	Waterford	CT03XC112	2/14/2013
EM-SPRINT-NEXTEL-027-130201	48 Cow Hill Road	Clinton	CT03XC156	3/1/2013
EM-SPRINT-NEXTEL-082-130201	238 Meridan Road	Middlefield	CT03XC160	3/8/2013
EM-SPRINT-047-130109	160 Plantation Road	East Windsor	CT03XC202	2/7/2013
EM-SPRINT-NEXTEL-077-130214	53 Slater Street	Manchester	CT03XC211	3/1/2013
EM-SPRINT-142-130109	497 Old Post Road	Tolland	CT03XC212	2/7/2013
EM-SPRINT-NEXTEL-042-130222	94 East High Street	East Hampton	CT03XC335	3/8/2013
EM-SPRINT-057-121226	Butternut Hollow Road	Greenwich	CT03XC343	1/11/2013
EM-SPRINT-158-130213	515 Boston Post Road	Westport	CT03XC355	3/1/2013
EM-SPRINT-046-130402	206 Everett Road	Easton	CT03XC362	4/19/2013
EM-SPRINT-085-130322	474 MAIN STREET	MONROE	CT03XC365	4/5/2013
EM-SPRINT-086-131011	57 Cook Drive	Montville	CT03XC365	10/25/2013
EM-SPRINT-118-130322	76 EAST RIDGE	RIDGEFIELD	CT03XC370	4/5/2013
EM-SPRINT-097-131230	20 Barnabas Road	Newtown	CT03XC383	1/21/2014
EM-SPRINT-051-130207	3965 Congress Street	Fairfield	CT03XC385	3/1/2013
EM-SPRINT-NEXTEL-094-130214A	123 Costello Road	Newington	CT23XC555	3/1/2013
EM-SPRINT-119-131008	699 Old Main Street	Rocky Hill	CT23XC556	10/25/2013
EM-SPRINT-077-131008	60 Adams Street	Manchester	CT23XC557	10/25/2013
EM-SPRINT-NEXTEL-080-130123	462 West Main Street	Meriden	CT25XC840	2/14/2013
EM-SPRINT-096-130920	18 Hilltop View Lane	New Milford	CT33XC095	10/4/2013
EM-SPRINT-157-130213	237 Godfrey Road	Weston	CT33XC522	3/1/2013
EM-SPRINT-018-131008	20 Vale Road	Brookfield	CT33XC525	10/25/2013
EM-SPRINT-077-130528	595 Keeney Street	Manchester	CT33XC538	6/14/2013
EM-SPRINT-NEXTEL-129-130214	400 Main Street	Somers	CT33XC554	3/1/2013
EM-SPRINT-047-130322	15 CHAMBERLAIN	BROADBROOK	CT33XC565	4/5/2013
EM-SPRINT-004-130502	277 Huckleberry Road	Avon	CT33XC589	5/17/2013

EM-SPRINT-143-130604	218 Wheeler Road	Torrington	CT33XC592	6/28/2013
EM-SPRINT-140-130724	583 Chapel Street	Thomaston	CT33XC603	8/8/2013
EM-SPRINT-103-130920	Charles Marshall Drive	Norwalk	CT33XC802	10/4/2013
EM-SPRINT-NEXTEL-064-130214	439-455 Homestead Ave.	Hartford	CT43XC805	3/1/2013
EM-SPRINT-064-130311	99 Meadow Street	Hartford	CT43XC806	4/5/2013
EM-SPRINT-083-131127	290 Preston Ave.	Middletown	CT43XC816	12/16/2013
EM-SPRINT-128-130920	530 Bushy Hill Road	Simsbury	CT43XC825	10/4/2013
EM-SPRINT-164-130405A	340 Bloomfield Avenue	Windsor	CT43XC826	4/19/2013
EM-SPRINT-077-130109	239 Middle Turnpike	Manchester	CT43XC827	2/13/2013
EM-SPRINT-165-130118	2-4 Volunteer Drive	Windsor Locks	CT43XC828	2/14/2013
EM-SPRINT-NEXTEL-139-130214	44 Fyler Place	Suffield	CT43XC829	3/8/2013
EM-SPRINT-111-130712	171 Town Hill Road	Plymouth	CT54XC712	7/26/2013
EM-SPRINT-009-130322	38 Spring Hill Road	Bethel	CT54XC749	4/5/2013
EM-SPRINT-154-131011	315 Spencer Plains Road	Westbrook	CT54XC758	10/25/2013
EM-SPRINT-023-130405	14 Canton Springs Road	Canton	CT54XC760	4/19/2013
EM-SPRINT-104-130606	153 Old Salem Road	Norwich	CT54XC775	6/28/2013
EM-SPRINT-164-130405B	99 Day Hill Road	Windsor	CT54XC787	4/19/2013
EM-SPRINT-132-130920	300 Governor's Highway	South Windsor	CT60XC014	10/4/2013
EM-SPRINT-094-130108	605 Willard Avenue	Newington	CT60XC018	1/25/2013
EM-SPRINT-146-130506	197 South Street	Vernon	CT60XC935	5/24/2013
EM-SPRINT-146-130311	777 Talcottville Road	Vernon	CT70XC147	4/5/2013
EM-SPRINT-126-130531	62 Birdseye Road	Shelton	CT73XC004	6/21/2013

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 28, 2013

Tom Kincaid
Sprint
48 Spruce Street
Oakland, NJ 07436

RE: **EM-SPRINT-143-130604 -** Sprint Spectrum notice of intent to modify an existing telecommunications facility located at 218 Wheeler Road, Torrington, Connecticut.

Dear Mr. Kincaid:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated May 30, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Ryan J. Bingham, Mayor, City of Torrington
Martin Connor, City Planner, City of Torrington

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
www.ct.gov/csc

June 5, 2013

The Honorable Ryan J. Bingham
Mayor
City of Torrington
140 Main Street
Torrington, CT 06790-5245

RE: **EM-SPRINT-143-130604** – Sprint Spectrum L.P. notice of intent to modify an existing telecommunications facility located at 218 Wheeler Road, Torrington, Connecticut.

Dear Mayor Bingham:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by June 19, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Martin Connor, City Planner, City of Torrington

EM-SPRINT-143-130604

Sprint

Together with Nextel

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

ORIGINAL

RECEIVED
JUN - 4 2013
CONNECTICUT
SITING COUNCIL

May 30, 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 218 Wheeler Rd, Torrington, CT 06759. Known to Sprint Spectrum L.P. as site CT33XC592.

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: CT33XC592

Upper E. Litchfield / Omnipoint Lefebvre Corp
218 Wheeler Road
Torrington, CT 06759

September 06, 2012

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

EBI Consulting
environmental | engineering | due diligence

September 6, 2012

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

Re: Emissions Values for Site **CT33XC592 - Upper E. Litchfield / Omnipoint Lefebvre Corp**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 218 Wheeler 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 218 Wheeler 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) 3 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 **150.4 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	CT33XC592 - Upper E. Litchfield / Omnipoint Lefebvre Corp
Site Addresss	218 Wheeler Road, Torrington, CT 06759
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	3	60	15.9	150.4	144.4	1/2 "	0.5	0	2080.4211	35.8693	3.58693%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	150.4	144.4	1/2 "	0.5	0	389.96892	6.723596	1.18582%
														Sector total Power Density Value:		4.773%	

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	3	60	15.9	150.4	144.4	1/2 "	0.5	0	2080.4211	35.8693	3.58693%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	150.4	144.4	1/2 "	0.5	0	389.96892	6.723596	1.18582%
														Sector total Power Density Value:		4.773%	

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	3	60	15.9	150.4	144.4	1/2 "	0.5	0	2080.4211	35.8693	3.58693%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	150.4	144.4	1/2 "	0.5	0	389.96892	6.723596	1.18582%
														Sector total Power Density Value:		4.773%	

Site Composite MPE %	
Carrier	MPE %
Sprint	14.318%
T-Mobile	1.730%
Pocket	4.730%
Verizon Wireless	13.670%
AT&T	7.920%
Total Site MPE %	**42.368%**

EBI Consulting
environmental | engineering | due diligence

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 **14.318% (4.773% 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 **42.368%** 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

Date: **May 9, 2013**

GPD GROUP
Glaus, Pyle, Schomer, Burns & DeHaven, Inc.

GPD Group
520 South Main Street, Suite 2531
Akron, OH 44311
(614) 859-1607
dpalkovic@gpdgroup.com

Cheryl Schultz
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6632

Subject: **Structural Analysis Report**

Carrier Designation:
***Sprint PCS* Co-Locate (Interim Loading)**
Carrier Site Number: CT33XC592

Crown Castle Designation:
Crown Castle BU Number: 828540
Crown Castle Site Name: TORRINGTON/RT 8
Crown Castle JDE Job Number: 218596
Crown Castle Work Order Number: 575964
Crown Castle Application Number: 178180 Rev. 1

Engineering Firm Designation:
GPD Group Project Number: 2013775.828540.01

Site Data:
218 Wheeler Road, Torrington, Litchfield County, CT 06790
Latitude *41° 46' 50.232"*, Longitude *-73° 8' 10.147"*
160 Foot – Pirod Monopole Tower

Dear Ms. Cheryl Schultz,

GPD Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 521965, in accordance with application 178180, revision 1.

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

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code requirements based upon a wind speed of 80 mph fastest mile.

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

Respectfully submitted by:

STATE OF CONNECTICUT · JOHN N. KABAK · 28336 · LICENSED PROFESSIONAL ENGINEER

5/9/13

John N. Kabak, P.E.
Connecticut PE#: PEN.0028336

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1) INTRODUCTION

The existing 160 ft Pirod monopole has a round cross section. It has eight major sections connected with flange plates. The structure is galvanized and has no tower lighting.

This tower is a 160 ft. Monopole tower designed by Pirod Manufactures Inc. in November of 2000. The tower was originally designed for a wind speed of 80 mph with ½" radial ice thickness per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28 mph with 0.75 inch ice thickness (in accordance with ASCE 7 ice conditions) and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	3	Alcatel Lucent	800MHZ 2X50W RRH	3	1-1/4	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		3	RFS Celwave	APXVSPP18-C-A20			

Notes:
1) See Appendix B for the proposed coax layout.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	160.0	1		Platform Mount [LP 405-1]	25	1-5/8	
		6	Andrew	ETW190VS12UB			
		1	Andrew	HP4-102			
		12	Andrew	TMBXX-6516-R2M			
150.0	150.0	1		Platform Mount [LP 712-1]			
		9	Decibel	DB980H90A-M	9	1-5/8	
140.0	140.0	1		Platform Mount [LP 303-1]	12	1-5/8	
		3	Antel	BXA-171063/12CF			
		2	Antel	LPA-80063/6CF			
		6	RFS Celwave	FD9R6004/2C-3L			
		4	Swedcom	SC-E 6014 rev2			
		3	Swedcom	SLXW 5512			
130.0	130.0	6	Ericsson	RRUS 11	2 1	3/4 3/8	1
		2	Raycap	DC6-48-60-18-8F			
		3	Kathrein	800 10764			
		1		Platform Mount [LP 304-1]	12	1-5/8	
		6	Powerwave	7770.00			
		6	Powerwave	LGP21403			
		6	Powerwave	LGP21903			
120.0	120.0	1		Pipe Mount [PM 601-3]	6	1-5/8	
		3	RFS Celwave	APXV18-206517-C			

Notes:
1) Reserved Equipment.

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
185	185	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
175	175	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
160	160	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
150	150	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Tower Manufacturer Drawings	Pirod File #: A-117835, dated: 11/02/2000	3463264	CCI Sites
Tower Foundation Drawings	Pirod File #: A-117835, dated: 11/02/2000	3464896	CCI Sites
Geotechnical Report	JGI Project #: 00698G, dated: 10/20/2000	3463255	CCI Sites
Tower Structural Analysis Report	GPD Project #: 2012822.53, dated: 11/19/2012	3463257	CCI Sites

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount sizes, weights, and manufacturers are best estimates based on site photos provided and were determined without the benefit of a site visit by GPD.
6) All member connections and foundation steel reinforcing are assumed designed to meet or exceed the load carrying capacity of the connected member and surrounding soils respectively unless otherwise specified in this report.
7) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package dated 02/11/2013 with any adjustments as noted below.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 140	Pole	P36x3/8	1	-7.84	1325.68	17.0	Pass
L2	140 - 120	Pole	P42x3/8	2	-16.13	1484.55	41.1	Pass
L3	120 - 100	Pole	P48x3/8	3	-21.51	1643.28	60.2	Pass
L4	100 - 80	Pole	P54x3/8	4	-27.16	1801.92	73.7	Pass
L5	80 - 60	Pole	P60x3/8	5	-33.31	1960.48	83.5	Pass
L6	60 - 40	Pole	P60x1/2	6	-41.08	2780.33	76.4	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.91	2780.33	94.9	Pass
L8	20 - 0	Pole	P60x5/8	8	-57.85	3682.44	86.7	Pass
						Summary	ELC:	Load Case 7
						Pole (L7)	94.9	Pass
						Rating =	94.9	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	20	68.9	Pass
1	Flange Plate	20	Adequate	Pass
1	Anchor Rods	0	63.8	Pass
1	Base Plate	0	Adequate	Pass
1	Base Foundation	0	65.7	Pass

Structure Rating (max from all components) =	94.9%

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

4.1) Recommendations

The existing tower and its foundation are sufficient for the proposed loading and do not require modifications.

5) DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a 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 GPD GROUP in connection with this 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.

GPD GROUP 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. GPD GROUP 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 code specified 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 GPD GROUP, but are beyond the scope of this report.

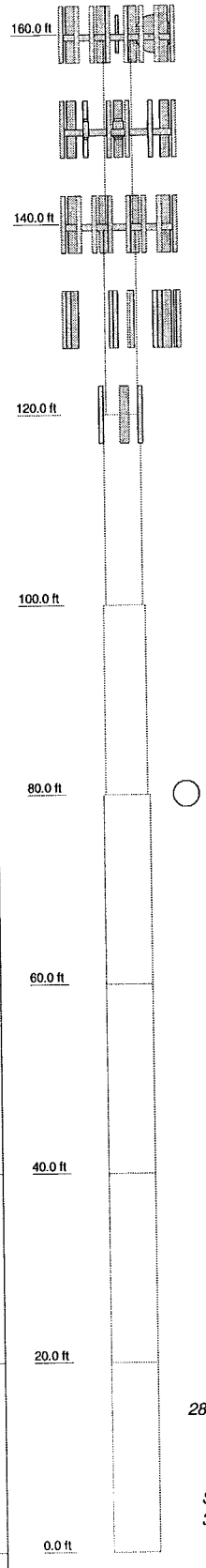
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

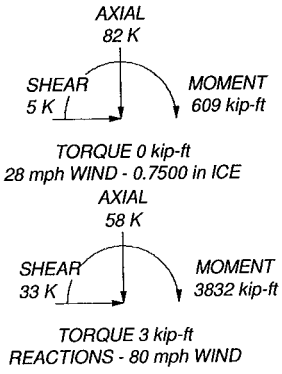
GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP will not be responsible whatsoever for, or on account of, consequential or incidental damages sustained by any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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P36x3/8	20.00	A53-B-42	2.9
2	P42x3/8	20.00		3.3
3	P48x3/8	20.00		3.8
4	P54x3/8	20.00		4.3
5	P60x3/8	20.00		4.8
6	P60x1/2	20.00		6.4
7	P60x1/2	20.00		6.4
8	P60x5/8	20.00		7.9
				39.7





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 405-1]	160	LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
4" x 4' Mount Pipe	160	Platform Mount [LP 303-1]	140
HP4-102	160	(2) RRUS 11	130
(3) DB980H90A-M w/ 5' Mount Pipe	150	(2) RRUS 11	130
(3) DB980H90A-M w/ 5' Mount Pipe	150	(2) RRUS 11	130
(3) DB980H90A-M w/ 5' Mount Pipe	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21903	130
Platform Mount [LP 712-1]	150	(2) LGP21903	130
SLXW 5512 w/ 5' Mount Pipe	140	(2) LGP21903	130
SLXW 5512 w/ 5' Mount Pipe	140	DC6-48-60-18-8F Surge Suppression Unit	130
SLXW 5512 w/ 5' Mount Pipe	140	Platform Mount [LP 304-1]	130
SC-E 6014 rev2 w/ 4' Mount Pipe	140	APXV18-206517-C	120
SC-E 6014 rev2 w/ 4' Mount Pipe	140	APXV18-206517-C	120
(2) SC-E 6014 rev2 w/ 4' Mount Pipe	140	Pipe Mount [PM 601-3]	120
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	140	APXV18-206517-C	120

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 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 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 94.9%

GPD GROUP
Consulting Engineers
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520 S. Main St.
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330)572-2102

Job: TORRINGTON/RT 8 - BU#828540			
Project: 2013775.828540.01			
Client: Crown Castle	Drawn by: Mody Said	App'd:	
Code: TIA/EIA-222-F	Date: 02/15/13	Scale: NTS	
Path:		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 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 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		

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	160.00-140.00	20.00	P36x3/8	A53-B-42 (42 ksi)	
L2	140.00-120.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	120.00-100.00	20.00	P48x3/8	A53-B-42 (42 ksi)	
L4	100.00-80.00	20.00	P54x3/8	A53-B-42 (42 ksi)	
L5	80.00-60.00	20.00	P60x3/8	A53-B-42 (42 ksi)	
L6	60.00-40.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L7	40.00-20.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L8	20.00-0.00	20.00	P60x5/8	A53-B-42 (42 ksi)	

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 160.00-140.00				1	1	1		
L2 140.00-120.00				1	1	1		
L3 120.00-100.00				1	1	1		
L4 100.00-80.00				1	1	1		
L5 80.00-60.00				1	1	1		
L6 60.00-40.00				1	1	1		
L7 40.00-20.00				1	1	1		
L8 20.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	160.00 - 8.00	0.0000	0	25	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	150.00 - 8.00	0.0000	0	9	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	150.00 - 140.00	0.0000	0	1	No Ice	0.15	1.08
								1/2" Ice	0.25	2.33
								1" Ice	0.35	4.18
								2" Ice	0.55	9.73
								4" Ice	0.95	28.15
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	150.00 - 140.00	0.0000	0	2	No Ice	0.00	1.08
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.18
								2" Ice	0.00	9.73
								4" Ice	0.00	28.15
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0	3	No Ice	0.00	1.08
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.18
								2" Ice	0.00	9.73
								4" Ice	0.00	28.15
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0.5	1	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0.5	11	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	130.00 - 8.00	0.0000	0	12	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
FB-L98-002-XXX(3/8)	C	No	Inside Pole	130.00 - 8.00	0.0000	0	1	No Ice	0.00	0.06
								1/2" Ice	0.00	0.06
								1" Ice	0.00	0.06
								2" Ice	0.00	0.06
								4" Ice	0.00	0.06
WR-VG86T(3/4)	C	No	Inside Pole	130.00 - 8.00	0.0000	0	2	No Ice	0.00	0.53
								1/2" Ice	0.00	0.53
								1" Ice	0.00	0.53
								2" Ice	0.00	0.53
								4" Ice	0.00	0.53
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	120.00 - 8.00	0.0000	0	1	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A (1-5/8	A	No	CaAa (Out Of Face)	120.00 - 8.00	0.0000	0	5	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
FOAM)								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
Safety Line 3/8	B	No	CaAa (Out Of Face)	160.00 - 5.00	0.0000	0	1	No Ice	0.04	0.22
								1/2" Ice	0.14	0.75
								1" Ice	0.24	1.28
								2" Ice	0.44	2.34
								4" Ice	0.84	4.46
Climbing Rungs	B	No	CaAa (Out Of Face)	160.00 - 5.00	0.0000	0	1	No Ice	0.13	7.12
								1/2" Ice	0.23	8.24
								1" Ice	0.33	9.97
								2" Ice	0.53	15.26
								4" Ice	0.93	33.18

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	160.00-140.00	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	4.956	0.25
		C	0.000	0.000	0.000	0.000	0.00
L2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	3.416	0.46
		C	0.000	0.000	0.000	3.960	0.21
L3	120.00-100.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.56
		C	0.000	0.000	0.000	3.960	0.22
L4	100.00-80.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.56
		C	0.000	0.000	0.000	3.960	0.22
L5	80.00-60.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.56
		C	0.000	0.000	0.000	3.960	0.22
L6	60.00-40.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.56
		C	0.000	0.000	0.000	3.960	0.22
L7	40.00-20.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.56
		C	0.000	0.000	0.000	3.960	0.22
L8	20.00-0.00	A	0.000	0.000	0.000	2.376	0.31
		B	0.000	0.000	0.000	2.562	0.36
		C	0.000	0.000	0.000	2.376	0.13

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	160.00-140.00	A	0.899	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	13.950	0.40
		C		0.000	0.000	0.000	0.000	0.00
L2	140.00-120.00	A	0.884	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	10.489	0.69
		C		0.000	0.000	0.000	7.497	0.96
L3	120.00-100.00	A	0.867	0.000	0.000	0.000	7.426	0.88
		B		0.000	0.000	0.000	10.349	0.78
		C		0.000	0.000	0.000	7.426	0.96
L4	100.00-80.00	A	0.846	0.000	0.000	0.000	7.344	0.87
		B		0.000	0.000	0.000	10.184	0.77
		C		0.000	0.000	0.000	7.344	0.94
L5	80.00-60.00	A	0.821	0.000	0.000	0.000	7.243	0.85
		B		0.000	0.000	0.000	9.983	0.76
		C		0.000	0.000	0.000	7.243	0.91
L6	60.00-40.00	A	0.788	0.000	0.000	0.000	7.113	0.84
		B		0.000	0.000	0.000	9.723	0.75
		C		0.000	0.000	0.000	7.113	0.88
L7	40.00-20.00	A	0.750	0.000	0.000	0.000	6.960	0.82
		B		0.000	0.000	0.000	9.416	0.74
		C		0.000	0.000	0.000	6.960	0.84
L8	20.00-0.00	A	0.750	0.000	0.000	0.000	4.176	0.49
		B		0.000	0.000	0.000	7.062	0.48
		C		0.000	0.000	0.000	4.176	0.50

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-140.00	0.2973	0.1717	0.7065	0.4079
L2	140.00-120.00	-0.2647	0.3846	-0.2252	0.7356
L3	120.00-100.00	-0.2562	0.1122	-0.2165	0.2872
L4	100.00-80.00	-0.2598	0.1138	-0.2237	0.2920
L5	80.00-60.00	-0.2628	0.1151	-0.2300	0.2943
L6	60.00-40.00	-0.2628	0.1151	-0.2311	0.2880
L7	40.00-20.00	-0.2628	0.1151	-0.2325	0.2806
L8	20.00-0.00	-0.1326	0.0895	-0.0711	0.2246

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 405-1]	C	None				0.0000	160.00	No Ice	20.80	20.80	1.80
								1/2" Ice	28.10	28.10	2.07
								1" Ice	35.40	35.40	2.33
								2" Ice	50.00	50.00	2.86
								4" Ice	79.20	79.20	3.93
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
								1/2" Ice	7.31	5.69	0.10
								1" Ice	7.79	6.38	0.16
								2" Ice	8.77	7.83	0.31
								4" Ice	10.84	11.20	0.71
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
								1/2" Ice	7.31	5.69	0.10
								1" Ice	7.79	6.38	0.16
								2" Ice	8.77	7.83	0.31
								4" Ice	10.84	11.20	0.71
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
								1/2" Ice	7.31	5.69	0.10
								1" Ice	7.79	6.38	0.16
								2" Ice	8.77	7.83	0.31
								4" Ice	10.84	11.20	0.71
(2) ETW190VS12UB	A	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
								1/2" Ice	0.78	0.44	0.02
								1" Ice	0.90	0.54	0.02
								2" Ice	1.17	0.77	0.04
								4" Ice	1.82	1.33	0.10
(2) ETW190VS12UB	B	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
								1/2" Ice	0.78	0.44	0.02
								1" Ice	0.90	0.54	0.02
								2" Ice	1.17	0.77	0.04
								4" Ice	1.82	1.33	0.10
(2) ETW190VS12UB	C	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
								1/2" Ice	0.78	0.44	0.02
								1" Ice	0.90	0.54	0.02
								2" Ice	1.17	0.77	0.04
								4" Ice	1.82	1.33	0.10
4" x 4' Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.00	0.0000	160.00	No Ice	1.21	1.21	0.04
								1/2" Ice	1.47	1.47	0.05
								1" Ice	1.73	1.73	0.06
								2" Ice	2.31	2.31	0.10
								4" Ice	3.73	3.73	0.22
Platform Mount [LP 712-1]	C	None				0.0000	150.00	No Ice	24.53	24.53	1.34
								1/2" Ice	29.94	29.94	1.65
								1" Ice	35.35	35.35	1.96
								2" Ice	46.17	46.17	2.58
									67.81	67.81	3.82

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice			
(3) DB980H90A-M w/ 5' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.80 4.18 4.56 5.36 7.26	3.38 4.05 4.73 6.14 9.21	0.03 0.06 0.10 0.20 0.51
(3) DB980H90A-M w/ 5' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.80 4.18 4.56 5.36 7.26	3.38 4.05 4.73 6.14 9.21	0.03 0.06 0.10 0.20 0.51
(3) DB980H90A-M w/ 5' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.80 4.18 4.56 5.36 7.26	3.38 4.05 4.73 6.14 9.21	0.03 0.06 0.10 0.20 0.51
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
PCS 1900MHz 4x45W-65MHz	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
800MHZ 2X50W RRH	A	From	4.00	0.0000	150.00	No Ice	2.49	2.07	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.93 3.41 4.46	2.27 2.48 2.93 3.93	0.07 0.10 0.16 0.32
800MHZ 2X50W RRH	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ 2X50W RRH	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
Platform Mount [LP 303-1]	C	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
SLXW 5512 w/ 5' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SLXW 5512 w/ 5' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SLXW 5512 w/ 5' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SC-E 6014 rev2 w/ 4' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.01 4.38 5.16 6.84	4.21 4.79 5.39 6.64 9.49	0.03 0.07 0.11 0.22 0.52
SC-E 6014 rev2 w/ 4' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.01 4.38 5.16 6.84	4.21 4.79 5.39 6.64 9.49	0.03 0.07 0.11 0.22 0.52
(2) SC-E 6014 rev2 w/ 4' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice Ice	3.64 4.01 4.38	4.21 4.79 5.39	0.03 0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							1" Ice	5.16	6.64	0.22
							2" Ice	6.84	9.49	0.52
							4" Ice			
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	10.37	10.75	0.06
							1/2" Ice	10.93	11.67	0.15
							1" Ice	11.51	12.60	0.25
							2" Ice	12.69	14.51	0.49
							4" Ice	15.14	18.54	1.09
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	10.37	10.75	0.06
							1/2" Ice	10.93	11.67	0.15
							1" Ice	11.51	12.60	0.25
							2" Ice	12.69	14.51	0.49
							4" Ice	15.14	18.54	1.09
BXA-171063/12CF w/ Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	4.79	5.34	0.05
							1/2" Ice	5.24	6.15	0.09
							1" Ice	5.70	6.96	0.15
							2" Ice	6.64	8.65	0.28
							4" Ice	8.64	12.22	0.67
BXA-171063/12CF w/ Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	4.79	5.34	0.05
							1/2" Ice	5.24	6.15	0.09
							1" Ice	5.70	6.96	0.15
							2" Ice	6.64	8.65	0.28
							4" Ice	8.64	12.22	0.67
BXA-171063/12CF w/ Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	4.79	5.34	0.05
							1/2" Ice	5.24	6.15	0.09
							1" Ice	5.70	6.96	0.15
							2" Ice	6.64	8.65	0.28
							4" Ice	8.64	12.22	0.67
(2) FD9R6004/2C-3L	A	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
							2" Ice	0.75	0.34	0.02
							4" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	B	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
							2" Ice	0.75	0.34	0.02
							4" Ice	1.28	0.74	0.06
(2) FD9R6004/2C-3L	C	From Centroid-Leg	4.00	0.00	0.0000	140.00	No Ice	0.37	0.08	0.00
							1/2" Ice	0.45	0.14	0.01
							1" Ice	0.54	0.20	0.01
							2" Ice	0.75	0.34	0.02
							4" Ice	1.28	0.74	0.06
Platform Mount [LP 304-1]	C	None			0.0000	130.00	No Ice	17.46	17.46	1.35
							1/2" Ice	22.44	22.44	1.62
							1" Ice	27.42	27.42	1.90
							2" Ice	37.38	37.38	2.45
							4" Ice	57.30	57.30	3.55

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" Ice			
(2) RRUS 11	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS 11	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) RRUS 11	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice	3.25	1.37	0.05
						1/2" Ice	3.49	1.55	0.07
						1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
(2) 7770.00 w/ 5' Mount Pipe	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	5.98	4.12	0.05
						1/2" Ice	6.44	4.77	0.10
						1" Ice	6.91	5.43	0.15
						2" Ice	7.87	6.81	0.28
						4" Ice	9.91	9.98	0.64
(2) 7770.00 w/ 5' Mount Pipe	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	5.98	4.12	0.05
						1/2" Ice	6.44	4.77	0.10
						1" Ice	6.91	5.43	0.15
						2" Ice	7.87	6.81	0.28
						4" Ice	9.91	9.98	0.64
(2) 7770.00 w/ 5' Mount Pipe	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	5.98	4.12	0.05
						1/2" Ice	6.44	4.77	0.10
						1" Ice	6.91	5.43	0.15
						2" Ice	7.87	6.81	0.28
						4" Ice	9.91	9.98	0.64
800 10764 w/ 55" Mount Pipe	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	6.33	4.44	0.06
						1/2" Ice	6.77	5.07	0.10
						1" Ice	7.22	5.72	0.16
						2" Ice	8.14	7.10	0.29
						4" Ice	10.08	10.30	0.67
800 10764 w/ 55" Mount Pipe	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	6.33	4.44	0.06
						1/2" Ice	6.77	5.07	0.10
						1" Ice	7.22	5.72	0.16
						2" Ice	8.14	7.10	0.29
						4" Ice	10.08	10.30	0.67
800 10764 w/ 55" Mount Pipe	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice	6.33	4.44	0.06
						1/2" Ice	6.77	5.07	0.10
						1" Ice	7.22	5.72	0.16
						2" Ice	8.14	7.10	0.29
						4" Ice	10.08	10.30	0.67
(2) LGP21403	A	From	3.94	-10.0000	130.00	No Ice	0.00	0.37	0.02

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
		Centroid-Leg	-0.70 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00	0.48 0.60 0.87 1.51	0.02 0.03 0.06 0.14
(2) LGP21403	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.37 0.48 0.60 0.87 1.51	0.02 0.02 0.03 0.06 0.14
(2) LGP21403	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.37 0.48 0.60 0.87 1.51	0.02 0.02 0.03 0.06 0.14
(2) LGP21903	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
DC6-48-60-18-8F Surge Suppression Unit	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.03 0.05 0.07 0.12 0.25
APXV18-206517-C	A	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.04 3.47 3.91 4.81 6.70	0.03 0.05 0.09 0.17 0.40
APXV18-206517-C	B	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.04 3.47 3.91 4.81 6.70	0.03 0.05 0.09 0.17 0.40
APXV18-206517-C	C	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe Mount [PM 601-3]	C	None			0.0000	120.00	1" Ice	7.02	4.81	0.17
							2" Ice	9.12	6.70	0.40
							4" Ice			
							No Ice	4.39	4.39	0.20
							1/2" Ice	5.48	5.48	0.24
								6.57	6.57	0.28
							1" Ice	8.75	8.75	0.36
							2" Ice	13.11	13.11	0.53
							4" Ice			

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP4-102	A	Paraboloid w/Shroud (HP)	From Centroid-Leg	4.00	4.00	0.0000		160.00	4.00	No Ice	12.57	0.08
				4.00						1/2" Ice	13.09	0.15
				0.00						1" Ice	13.61	0.21
										2" Ice	14.65	0.35
										4" Ice	16.72	0.62

Load Combinations

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 140	17.431	33	0.8563	0.0037
L2	140 - 120	13.871	33	0.8346	0.0024
L3	120 - 100	10.491	33	0.7674	0.0017
L4	100 - 80	7.467	33	0.6660	0.0011
L5	80 - 60	4.906	33	0.5493	0.0008
L6	60 - 40	2.846	33	0.4278	0.0005
L7	40 - 20	1.298	33	0.3060	0.0003
L8	20 - 0	0.328	33	0.1517	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
160.00	HP4-102	33	17.431	0.8563	0.0039	109616
150.00	Platform Mount [LP 712-1]	33	15.640	0.8492	0.0032	54808
140.00	Platform Mount [LP 303-1]	33	13.871	0.8346	0.0026	27251
130.00	Platform Mount [LP 304-1]	33	12.147	0.8068	0.0021	17488
120.00	APXV18-206517-C	33	10.491	0.7674	0.0018	12987

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	160 - 140	44.552	8	2.1895	0.0093
L2	140 - 120	35.452	8	2.1334	0.0062
L3	120 - 100	26.813	8	1.9614	0.0042
L4	100 - 80	19.086	8	1.7022	0.0029
L5	80 - 60	12.538	8	1.4040	0.0020
L6	60 - 40	7.274	8	1.0935	0.0013
L7	40 - 20	3.318	8	0.7821	0.0009
L8	20 - 0	0.838	8	0.3879	0.0004

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
160.00	HP4-102	8	44.552	2.1895	0.0102	42722
150.00	Platform Mount [LP 712-1]	8	39.974	2.1710	0.0083	21360
140.00	Platform Mount [LP 303-1]	8	35.452	2.1334	0.0067	10626
130.00	Platform Mount [LP 304-1]	8	31.045	2.0623	0.0055	6842
120.00	APXV18-206517-C	8	26.813	1.9614	0.0045	5090

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	160 - 140 (1)	P36x3/8	20.00	0.00	0.0	23.696	41.9697	-7.84	994.51	0.008
L2	140 - 120 (2)	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-16.13	1113.69	0.014
L3	120 - 100 (3)	P48x3/8	20.00	0.00	0.0	21.972	56.1069	-21.51	1232.77	0.017
L4	100 - 80 (4)	P54x3/8	20.00	0.00	0.0	21.397	63.1755	-27.16	1351.78	0.020
L5	80 - 60 (5)	P60x3/8	20.00	0.00	0.0	20.938	70.2440	-33.31	1470.73	0.023
L6	60 - 40 (6)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-41.08	2085.77	0.020
L7	40 - 20 (7)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-48.91	2085.77	0.023
L8	20 - 0 (8)	P60x5/8	20.00	0.00	0.0	23.696	116.583 0	-57.85	2762.52	0.021

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 $\frac{f_{by}}{F_{by}}$
L1	160 - 140 (1)	P36x3/8	158.41	5.138	23.696	0.217	0.00	0.000	23.696	0.000
L2	140 - 120 (2)	P42x3/8	507.85	12.049	22.711	0.531	0.00	0.000	22.711	0.000
L3	120 - 100 (3)	P48x3/8	949.48	17.189	21.972	0.782	0.00	0.000	21.972	0.000
L4	100 - 80 (4)	P54x3/8	1438.82	20.528	21.397	0.959	0.00	0.000	21.397	0.000
L5	80 - 60 (5)	P60x3/8	1976.04	22.788	20.938	1.088	0.00	0.000	20.938	0.000
L6	60 - 40 (6)	P60x1/2	2558.27	22.266	22.317	0.998	0.00	0.000	22.317	0.000
L7	40 - 20 (7)	P60x1/2	3178.88	27.667	22.317	1.240	0.00	0.000	22.317	0.000
L8	20 - 0 (8)	P60x5/8	3831.53	26.846	23.696	1.133	0.00	0.000	23.696	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	160 - 140 (1)	P36x3/8	10.91	0.520	16.800	0.031	2.81	0.046	11.901	0.004
L2	140 - 120 (2)	P42x3/8	20.20	0.824	16.800	0.049	2.05	0.024	9.661	0.003
L3	120 - 100 (3)	P48x3/8	23.24	0.828	16.800	0.049	2.00	0.018	8.740	0.002
L4	100 - 80 (4)	P54x3/8	25.64	0.812	16.800	0.048	1.95	0.014	8.001	0.002
L5	80 - 60 (5)	P60x3/8	28.02	0.798	16.800	0.047	1.89	0.011	7.394	0.001
L6	60 - 40 (6)	P60x1/2	30.14	0.645	16.800	0.038	1.84	0.008	10.593	0.001
L7	40 - 20 (7)	P60x1/2	31.86	0.682	16.800	0.041	1.80	0.008	10.593	0.001
L8	20 - 0 (8)	P60x5/8	33.36	0.572	16.800	0.034	1.78	0.006	14.001	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P / P_a	Ratio f_{bx} / F_{bx}	Ratio f_{by} / F_{by}	Ratio f_v / F_v	Ratio f_{vt} / F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 140 (1)	0.008	0.217	0.000	0.031	0.004	0.226 ✓	1.333	H1-3+VT ✓
L2	140 - 120 (2)	0.014	0.531	0.000	0.049	0.003	0.548 ✓	1.333	H1-3+VT ✓
L3	120 - 100 (3)	0.017	0.782	0.000	0.049	0.002	0.802 ✓	1.333	H1-3+VT ✓
L4	100 - 80 (4)	0.020	0.959	0.000	0.048	0.002	0.982 ✓	1.333	H1-3+VT ✓
L5	80 - 60 (5)	0.023	1.088	0.000	0.047	0.001	1.113 ✓	1.333	H1-3+VT ✓
L6	60 - 40 (6)	0.020	0.998	0.000	0.038	0.001	1.019 ✓	1.333	H1-3+VT ✓
L7	40 - 20 (7)	0.023	1.240	0.000	0.041	0.001	1.265 ✓	1.333	H1-3+VT ✓
L8	20 - 0 (8)	0.021	1.133	0.000	0.034	0.000	1.155 ✓	1.333	H1-3+VT ✓

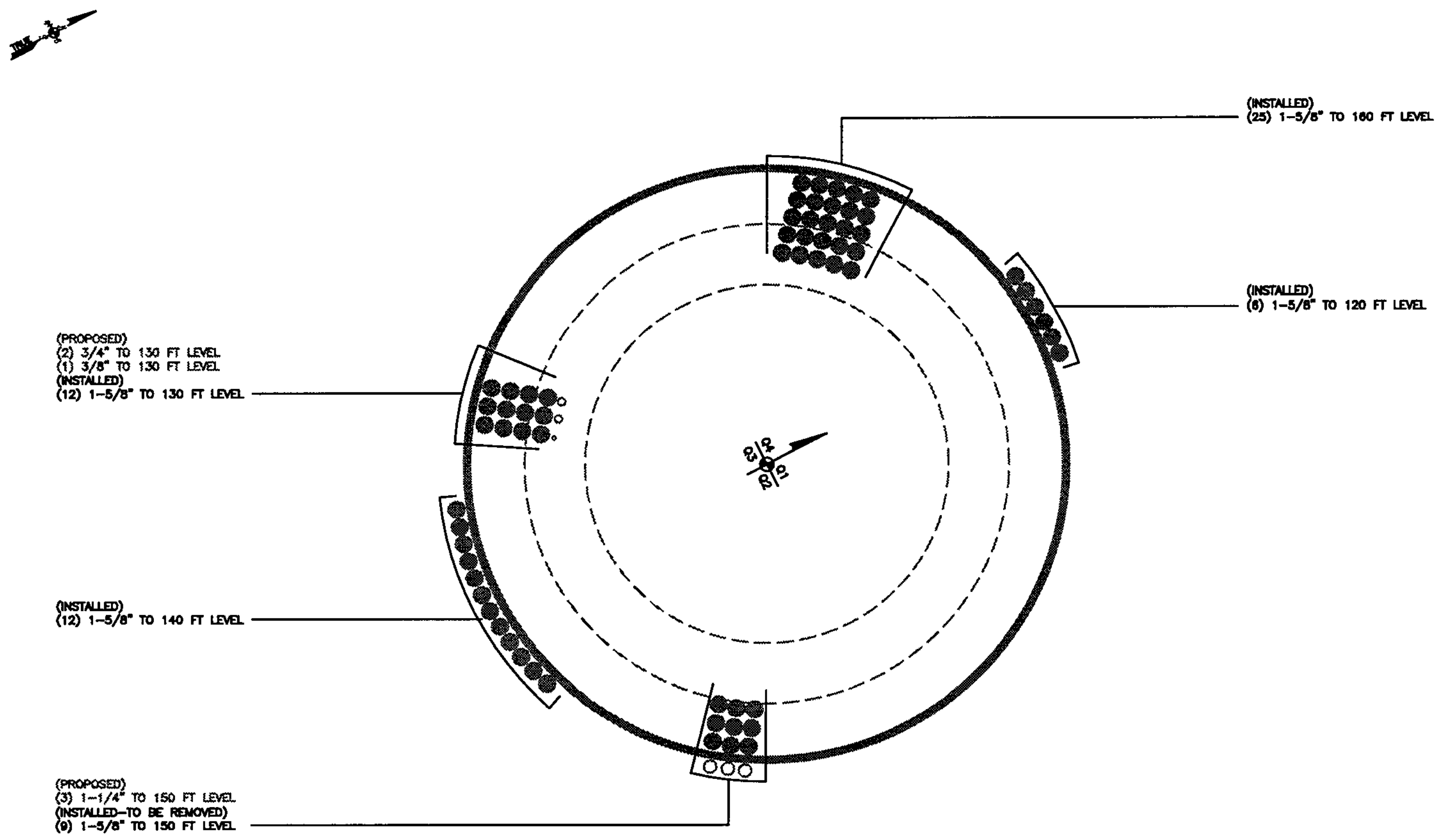
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 140	Pole	P36x3/8	1	-7.84	1325.68	17.0	Pass
L2	140 - 120	Pole	P42x3/8	2	-16.13	1484.55	41.1	Pass
L3	120 - 100	Pole	P48x3/8	3	-21.51	1643.28	60.2	Pass
L4	100 - 80	Pole	P54x3/8	4	-27.16	1801.92	73.7	Pass
L5	80 - 60	Pole	P60x3/8	5	-33.31	1960.48	83.5	Pass
L6	60 - 40	Pole	P60x1/2	6	-41.08	2780.33	76.4	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.91	2780.33	94.9	Pass
L8	20 - 0	Pole	P60x5/8	8	-57.85	3682.44	86.7	Pass

Summary	ELC:	Load Case
		10
Pole (L7)	94.9	Pass
Rating =	94.9	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 828540 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

1	07/08/13	UPDATED PER WORK ORDER 576308	AGT
2	11/08/13	APPLICATION ADDED PER WORK ORDER # 575856/575860	LAN

DRAWN BY: AGT
CHECKED BY:
DRAWING DATE: 02/07/2013

SITE NUMBER:
SITE NAME:

SITE NAME

TORRINGTON/RT 8

BUSINESS UNIT NUMBER

828540

SITE ADDRESS

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING	1" = 1'-0"	1

PLOT DATE: 2/11/2013 FILE NAME: 828540_BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	3178.872	ft-kips
Axial:	48.9118	kips
Shear:	31.8577	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	20

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results		
Maximum Bolt Tension:	43.9 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**61.0%**	Pass

Inner Flange Bolt Results		
Maximum Bolt Tension:	49.6 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**68.9%**	Pass

Bridge Stiffener Results		
Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange	
Moment:	**1399 ft-kips**
Axial:	**24 kips**
Shear:	**24 kips**

Reactions Seen By Inner Flange Bolts	
Moment:	**1779 ft-kips**
Axial:	**24 kips**
Shear:	**24 kips**

Equivalent Bolt Circle	
Equivalent Bolt Circle:	50.1 in

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	2558.265	ft-kips
Axial:	41.0759	kips
Shear:	30.139	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	40

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results

Maximum Bolt Tension:	35.3 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**49.0%**	Pass

Inner Flange Bolt Results

Maximum Bolt Tension:	39.9 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**55.4%**	Pass

Bridge Stiffener Results

Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange

Moment:	**1126 ft-kips**
Axial:	**21 kips**
Shear:	**21 kips**

Reactions Seen By Inner Flange Bolts

Moment:	**1432 ft-kips**
Axial:	**21 kips**
Shear:	**21 kips**

Equivalent Bolt Circle

Equivalent Bolt Circle: 50.1 in

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	1976.037	ft-kips
Axial:	33.3107	kips
Shear:	28.0222	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	*60*

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results

Maximum Bolt Tension:	27.2 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**37.8%**	Pass

Inner Flange Bolt Results

Maximum Bolt Tension:	30.8 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**42.8%**	Pass

Bridge Stiffener Results

Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange

Moment:	**870 ft-kips**
Axial:	**17 kips**
Shear:	**17 kips**

Reactions Seen By Inner Flange Bolts

Moment:	**1106 ft-kips**
Axial:	**17 kips**
Shear:	**17 kips**

Equivalent Bolt Circle

Equivalent Bolt Circle: 50.1 in

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	1976.037	ft-kips
Axial:	33.3107	kips
Shear:	28.0222	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	60

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results

Maximum Bolt Tension:	27.2 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**37.8%**	Pass

Inner Flange Bolt Results

Maximum Bolt Tension:	30.8 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**42.8%**	Pass

Bridge Stiffener Results

Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange

Moment:	**870 ft-kips**
Axial:	**17 kips**
Shear:	**17 kips**

Reactions Seen By Inner Flange Bolts

Moment:	**1106 ft-kips**
Axial:	**17 kips**
Shear:	**17 kips**

Equivalent Bolt Circle

Equivalent Bolt Circle: 50.1 in

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Reactions		
Moment:	1399.3878	ft-kips
Axial:	24.4559	kips
Shear:	24.4559	kips
Exterior Flange Run, T+Q:		kips

Manufacturer:	Pirod

Elevation: 20 feet

Bolt Data			
Qty:	32	Bolt Fu:	105
Diam:	1.25	Bolt Fy:	81
Bolt Material:	A325	Bolt Fty:	44.00
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	43.9 Kips, Ext. T=Interior T
Allowable Tension:	72.0 Kips
Bolt Stress Ratio:	61.0% Pass

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	45.4 Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

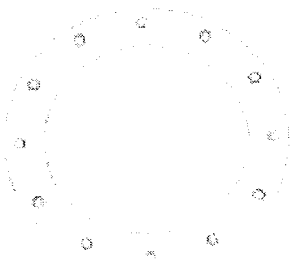
Stiffener Results N/A for Rohn / Pirod

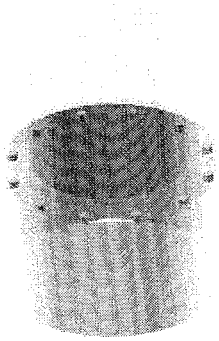
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check:	N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333	

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Reactions		
Moment:	1126.1873	ft-kips
Axial:	20.53795	kips
Shear:	20.53795	kips
Exterior Flange Run, T+Q:		kips

Manufacturer:	Pirod

Elevation: 40 feet

Bolt Data			
Qty:	32	Bolt Fu:	105
Diam:	1.25	Bolt Fy:	81
Bolt Material:	A325	Bolt Fty:	44.00
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	35.3 Kips, Ext. T=Interior T
Allowable Tension:	72.0 Kips
Bolt Stress Ratio:	49.0% Pass

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	36.6 Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

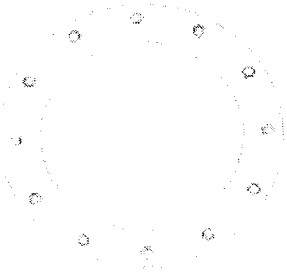
Stiffener Results N/A for Rohn / Pirod

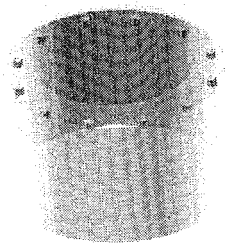
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333	

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Manufacturer:	Pirod

Reactions		
Moment:	869.88179	ft-kips
Axial:	16.65535	kips
Shear:	16.65535	kips
Exterior Flange Run, T+Q:		kips

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	27.2 Kips, Ext. T=Interior T
Allowable Tension:	72.0 Kips
Bolt Stress Ratio:	37.8% Pass

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	28.3 Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	Rohn/Pirod OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

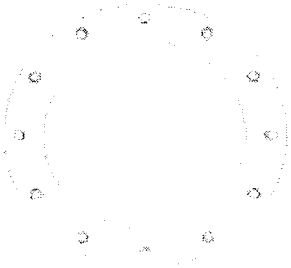
Stiffener Results N/A for Rohn / Pirod

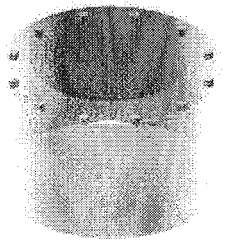
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333	

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	57		

Plate Data		
Diam:	60.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1438.8171	ft-kips
Axial:	27.1556	kips
Shear:	25.6392	kips
Elevation:	80	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

Rigid
Service, ASD
Fty*ASIF

Bolt Tension Capacity, **B**:	46.07 kips	
Max Bolt directly applied T:	24.68 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.474 in	
Min PL "treq" for actual **T w/ Pry**:	0.828 in	
Min PL "t1" for actual **T w/o Pry**:	1.079 in	
T allowable with Prying:	42.01 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	24.68 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	53.6% Pass	

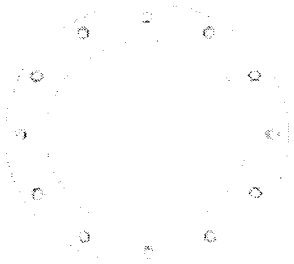
Exterior Flange Plate Results Flexural Check

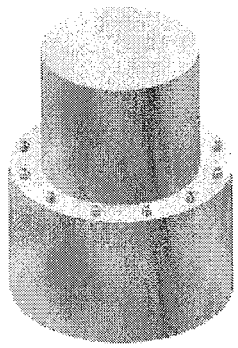
Rigid
Service ASD
0.75*Fy*ASIF
Comp. Y.L. Length: 18.25

Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	43.8% Pass

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	51		

Plate Data		
Diam:	54.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	949.48312	ft-kips
Axial:	21.5123	kips
Shear:	23.2378	kips
Elevation:	100	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	24.23 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.354 in	
Min PL "treq" for actual **T w/ Pry**:	0.743 in	
Min PL "t1" for actual **T w/o Pry**:	0.982 in	
T allowable with Prying:	43.93 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	24.23 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	52.6% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		17.23
Tension Side Stress Ratio, (treq/t)^2:	35.3% Pass	

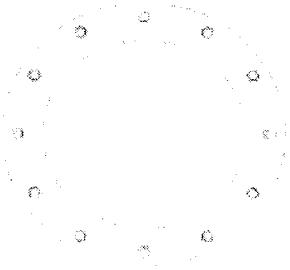
n/a

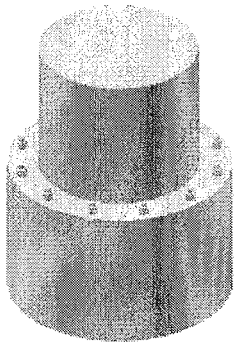
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	507.84693	ft-kips
Axial:	16.1253	kips
Shear:	20.1961	kips
Elevation:	120	feet

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	45		

Plate Data		
Diam:	48.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Flange Bolt Results

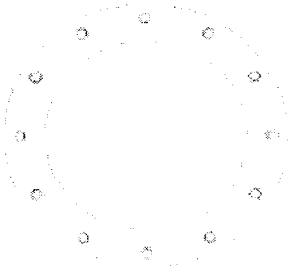
		Rigid
Bolt Tension Capacity, B:	46.07 kips	Service, ASD
Max Bolt directly applied T:	16.42 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.365 in	
Min PL "treq" for actual **T w/ Pry:**	0.617 in	
Min PL "t1" for actual **T w/o Pry:**	0.815 in	
T allowable with Prying:	43.74 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	16.42 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	35.7% Pass	

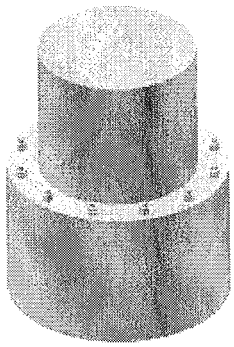
Exterior Flange Plate Results — Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		16.16
Tension Side Stress Ratio, (treq/t)^2:	24.4% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle (in.):	39		

Plate Data		
Diam:	42.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	158.40807	ft-kips
Axial:	7.8438	kips
Shear:	10.9079	kips
Elevation:	140	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

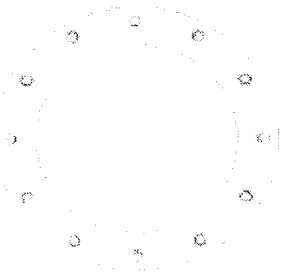
Bolt Tension Capacity, **B**:	46.07 kips	Rigid / Service, ASD / Fty*ASIF
Max Bolt directly applied T:	6.68 Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379 in	
Min PL "treq" for actual **T w/ Pry**:	0.398 in	
Min PL "t1" for actual **T w/o Pry**:	0.525 in	
T allowable with Prying:	43.49 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	6.68 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	14.5% Pass	

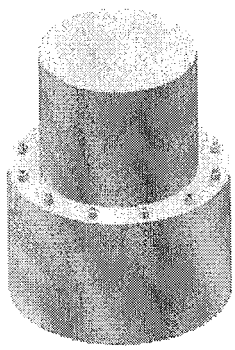
Exterior Flange Plate Results — Flexural Check

Compression Side Plate Stress:	Rohn/Pirod, OK	Rigid / Service ASD / 0.75*Fy*ASIF / Comp. Y.L. Length: 15.00
Allowable Plate Stress:	36.0 ksi	
Compression Plate Stress Ratio:	Rohn/Pirod, OK	
No Prying		
Tension Side Stress Ratio, (treq/t)^2:	10.2% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	*Pirod*

Reactions		
Moment:	3831.5255	ft-kips
Axial:	57.8525	kips
Shear:	33.3632	kips

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	69.75	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	60	in
Thick:	0.625	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Anchor Rod Results

Maximum Rod Tension:	51.7 Kips	Rigid
Allowable Tension:	81.0 Kips	Service, ASD
Anchor Rod Stress Ratio:	63.8% Pass	Fty*ASIF

Base Plate Results

Base Plate Stress:	Flexural Check Rohn/Pirod, OK	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
		Y.L. Length: 29.82

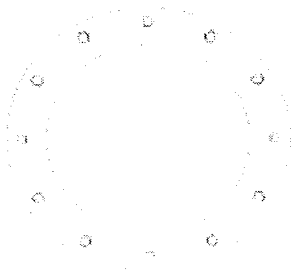
n/a

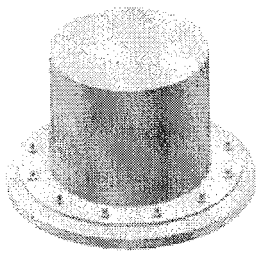
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

GPD GROUP

Mat Foundation Analysis
CCI Site Name: Torrington/RT 8 - BU # 828540
GPD Project Number: 2013775.828540.01

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Square
Reinforcing Known	Yes
Max Capacity	1.1

Tower Reactions		
Moment, M	3831.525461	k-ft
Axial, P	57.8525	k
Shear, V	33.3632	k

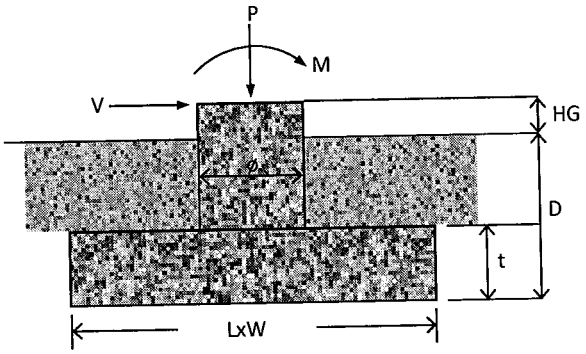
Pad & Pier Geometry		
Pier Width, ø	7	ft
Pad Length, L	28	ft
Pad Width, W	28	ft
Pad Thickness, t	3	ft
Depth, D	5	ft
Height Above Grade, HG	2.5	ft

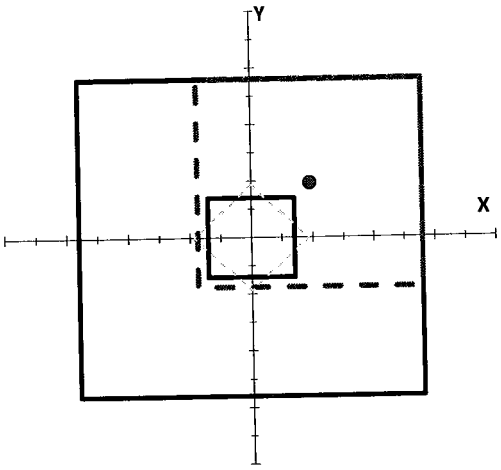
Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	4	ksi
Clear Cover	3	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 7	
Pad Quantity Per Layer	45	
Pier Rebar Size	# 9	
Pier Quantity of Rebar	42	

Soil Properties	
Soil Type	Granular
Soil Unit Weight	125 pcf
Angle of Friction, ø	30 °
Bearing Type	Gross
Ultimate Bearing	16 ksf
Water Table Depth	99 ft
Frost Depth	3.5 ft

Bearing Summary			Load Case
Qxmax	2.14	ksf	0.9D+1.6W
Qymax	2.14	ksf	0.9D+1.6W
Qmax @ 45°	2.50	ksf	0.9D+1.6W
$Q_{(all)\ Gross}$	12.00	ksf	
Controlling Capacity	**20.8%**	**Pass**	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	1.52	≥1.0	0.9D+1.6W
FS(ot)y	1.52	≥1.0	0.9D+1.6W
Controlling Capacity	**65.7%**	**Pass**	





Date: **February 15, 2013**

Cheryl Schultz
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6632

GPD Group
520 South Main Street, Suite 2531
Akron, OH 44311
(614) 859-1607
dpalkovic@gpdgroup.com

Subject: **Structural Analysis Report**

Carrier Designation: ***Sprint PCS* Co-Locate (Final Loading)**
Carrier Site Number: CT33XC592

Crown Castle Designation:
Crown Castle BU Number: 828540
Crown Castle Site Name: TORRINGTON/RT 8
Crown Castle JDE Job Number: 218596
Crown Castle Work Order Number: 575964
Crown Castle Application Number: 178180 Rev. 1

Engineering Firm Designation: **GPD Group Project Number:** 2013775.828540.01

Site Data: **218 Wheeler Road, Torrington, Litchfield County, CT 06790**
Latitude *41° 46' 50.232"*, Longitude *-73° 8' 10.147"*
160 Foot – Pirod Monopole Tower

Dear Ms. Cheryl Schultz,

GPD Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 521965, in accordance with application 178180, revision 1.

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

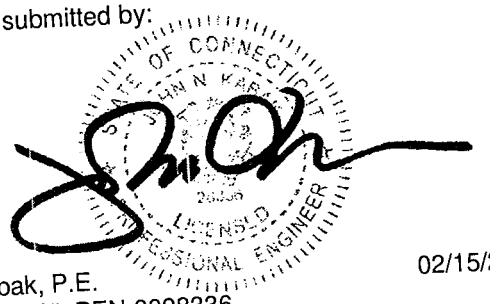
Sufficient Capacity

LC7: Existing + Reserved + Proposed Equipment
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and 2005 CT State Building Code requirements based upon a wind speed of 80 mph fastest mile.

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

Respectfully submitted by:



John N. Kabak, P.E.
Connecticut PE#: PEN.0028336

02/15/2013

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1) INTRODUCTION

The existing 160 ft Pirod monopole has a round cross section. It has eight major sections connected with flange plates. The structure is galvanized and has no tower lighting.

This tower is a 160 ft. Monopole tower designed by Pirod Manufactures Inc. in November of 2000. The tower was originally designed for a wind speed of 80 mph with ½" radial ice thickness per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 28 mph with 0.75 inch ice thickness (in accordance with ASCE 7 ice conditions) and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
150.0	150.0	3	Alcatel Lucent	800MHZ 2X50W RRH	3	1-1/4	1
		3	Alcatel Lucent	PCS 1900MHz 4x45W-65MHz			
		3	RFS Celwave	APXVSPP18-C-A20			

Notes:
1) See Appendix B for the proposed coax layout.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	160.0	1		Platform Mount [LP 405-1]	25	1-5/8	
		6	Andrew	ETW190VS12UB			
		1	Andrew	HP4-102			
		12	Andrew	TMBXX-6516-R2M			
150.0	150.0	1		Platform Mount [LP 712-1]			
		9	Decibel	DB980H90A-M	9	1-5/8	2
140.0	140.0	1		Platform Mount [LP 303-1]	12	1-5/8	
		3	Antel	BXA-171063/12CF			
		2	Antel	LPA-80063/6CF			
		6	RFS Celwave	FD9R6004/2C-3L			
		4	Swedcom	SC-E 6014 rev2			
		3	Swedcom	SLXW 5512			
130.0	130.0	6	Ericsson	RRUS 11	2 1	3/4 3/8	1
		2	Raycap	DC6-48-60-18-8F			
		3	Kathrein	800 10764			
		1		Platform Mount [LP 304-1]	12	1-5/8	
		6	Powerwave	7770.00			
		6	Powerwave	LGP21403			
		6	Powerwave	LGP21903			
120.0	120.0	1		Pipe Mount [PM 601-3]	6	1-5/8	
		3	RFS Celwave	APXV18-206517-C			

Notes:
1) Reserved Equipment.
2) Existing equipment to be removed

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
185	185	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
175	175	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
160	160	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		
150	150	12	EMS	RR65-19	12	1-5/8
		1		16.5' Low Profile Platform		

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
Tower Manufacturer Drawings	Pirod File #: A-117835, dated: 11/02/2000	3463264	CCI Sites
Tower Foundation Drawings	Pirod File #: A-117835, dated: 11/02/2000	3464896	CCI Sites
Geotechnical Report	JGI Project #: 00698G, dated: 10/20/2000	3463255	CCI Sites
Tower Structural Analysis Report	GPD Project #: 2012822.53, dated: 11/19/2012	3463257	CCI Sites

3.1) Analysis Method

tnxTower (version 6.0.4.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Mount sizes, weights, and manufacturers are best estimates based on site photos provided and were determined without the benefit of a site visit by GPD.
6) All member connections and foundation steel reinforcing are assumed designed to meet or exceed the load carrying capacity of the connected member and surrounding soils respectively unless otherwise specified in this report.
7) All equipment model numbers, quantities, and centerline elevations are as provided in the CCI CAD package dated 02/11/2013 with any adjustments as noted below.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	160 - 140	Pole	P36x3/8	1	-7.92	1325.68	16.3	Pass
L2	140 - 120	Pole	P42x3/8	2	-16.06	1484.55	39.6	Pass
L3	120 - 100	Pole	P48x3/8	3	-21.30	1643.28	58.2	Pass
L4	100 - 80	Pole	P54x3/8	4	-26.79	1801.92	71.4	Pass
L5	80 - 60	Pole	P60x3/8	5	-32.79	1960.48	81.2	Pass
L6	60 - 40	Pole	P60x1/2	6	-40.40	2780.33	74.4	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.08	2780.33	92.5	Pass
L8	20 - 0	Pole	P60x5/8	8	-56.92	3682.44	84.5	Pass
						Summary	ELC:	Load Case 7
						Pole (L7)	92.5	Pass
						Rating =	92.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	20	67.1	Pass
1	Flange Plate	20	Adequate	Pass
1	Anchor Rods	0	62.2	Pass
1	Base Plate	0	Adequate	Pass
1	Base Foundation	0	64.1	Pass

Structure Rating (max from all components) =	92.5%

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

4.1) Recommendations

The existing tower and its foundation are sufficient for the proposed loading and do not require modifications.

5) DISCLAIMER OF WARRANTIES

GPD GROUP has not performed a 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 GPD GROUP in connection with this 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.

GPD GROUP 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. GPD GROUP 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 code specified amount, if any, that should be considered in the structural analysis.

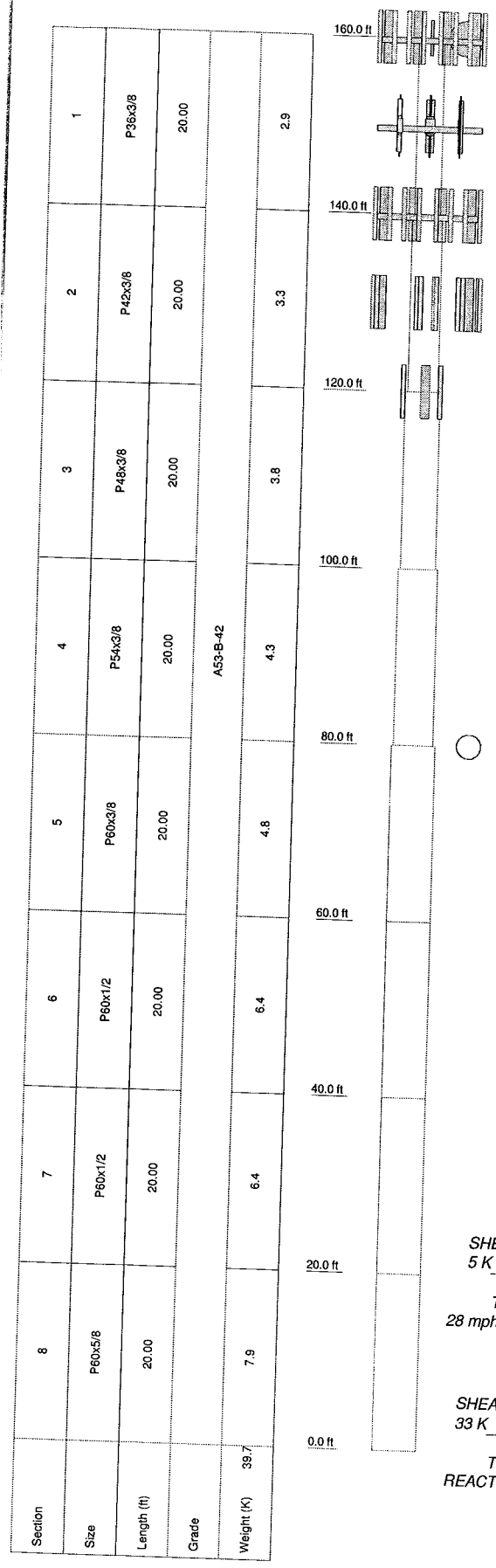
The attached sketches are a schematic representation of the analyzed tower. If any material is fabricated from these sketches, the contractor shall be responsible for field verifying the existing conditions, proper fit, and clearance in the field. Any mentions of structural modifications are reasonable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

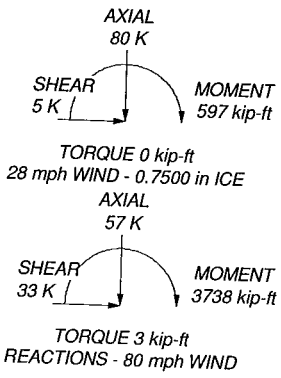
Miscellaneous items such as antenna mounts, etc., have not been designed or detailed as a part of our work. We recommend that material of adequate size and strength be purchased from a reputable tower manufacturer.

GPD GROUP makes no warranties, expressed and/or implied, in connection with this report and disclaims any liability arising from material, fabrication, and erection of this tower. GPD GROUP 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 GPD GROUP pursuant to this report will be limited to the total fee received for preparation of this report.

APPENDIX A

TNXTOWER OUTPUT





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Platform Mount [LP 405-1]	160	LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	160	BXA-171063/12CF w/ Mount Pipe	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
(2) ETW190VS12UB	160	(2) FD9R6004/2C-3L	140
4" x 4' Mount Pipe	160	Platform Mount [LP 303-1]	140
HP4-102	160	(2) RRUS 11	130
(3) 7'x2 1/2" Pipe Mount	150	(2) RRUS 11	130
(3) 7'x2 1/2" Pipe Mount	150	(2) RRUS 11	130
(3) 7'x2 1/2" Pipe Mount	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	(2) 7770.00 w/ 5' Mount Pipe	130
APXVSPP18-C-A20 w/ Mount Pipe	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	800 10764 w/ 55" Mount Pipe	130
PCS 1900MHz 4x45W-65MHz	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21403	130
800MHZ 2X50W RRH	150	(2) LGP21903	130
Platform Mount [LP 712-1]	150	(2) LGP21903	130
SLXW 5512 w/ 5' Mount Pipe	140	(2) LGP21903	130
SLXW 5512 w/ 5' Mount Pipe	140	DC6-48-60-18-8F Surge Suppression Unit	130
SLXW 5512 w/ 5' Mount Pipe	140	Platform Mount [LP 304-1]	130
SC-E 6014 rev2 w/ 4' Mount Pipe	140	APXV18-206517-C	120
SC-E 6014 rev2 w/ 4' Mount Pipe	140	APXV18-206517-C	120
(2) SC-E 6014 rev2 w/ 4' Mount Pipe	140	Pipe Mount [PM 601-3]	120
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	140	APXV18-206517-C	120

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 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 28 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 92.5%

GPD GROUP
Consulting Engineers
GPD Group
520 S. Main St.
Akron, OH 44311
Phone: (330) 572-2100
FAX: (330)572-2102

Job: TORRINGTON/RT 8 - BU#828540		
Project: 2013775.828540.01		
Client: Crown Castle	Drawn by: Mody Said	App'd:
Code: TIA/EIA-222-F	Date: 02/15/13	Scale: NTS
Path:		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 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 28 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		

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	160.00-140.00	20.00	P36x3/8	A53-B-42 (42 ksi)	
L2	140.00-120.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	120.00-100.00	20.00	P48x3/8	A53-B-42 (42 ksi)	
L4	100.00-80.00	20.00	P54x3/8	A53-B-42 (42 ksi)	
L5	80.00-60.00	20.00	P60x3/8	A53-B-42 (42 ksi)	
L6	60.00-40.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L7	40.00-20.00	20.00	P60x1/2	A53-B-42 (42 ksi)	
L8	20.00-0.00	20.00	P60x5/8	A53-B-42 (42 ksi)	

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 160.00-140.00				1	1	1		
L2 140.00-120.00				1	1	1		
L3 120.00-100.00				1	1	1		
L4 100.00-80.00				1	1	1		
L5 80.00-60.00				1	1	1		
L6 60.00-40.00				1	1	1		
L7 40.00-20.00				1	1	1		
L8 20.00-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	Inside Pole	160.00 - 8.00	0.0000	0	25	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	150.00 - 140.00	0.0000	0	1	No Ice	0.15	1.08
								1/2" Ice	0.25	2.33
								1" Ice	0.35	4.18
								2" Ice	0.55	9.73
								4" Ice	0.95	28.15
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	150.00 - 140.00	0.0000	0	2	No Ice	0.00	1.08
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.18
								2" Ice	0.00	9.73
								4" Ice	0.00	28.15
HB114-1-08U4-M5J(1 1/4")	B	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0	3	No Ice	0.00	1.08
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.18
								2" Ice	0.00	9.73
								4" Ice	0.00	28.15
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0.5	1	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	C	No	CaAa (Out Of Face)	140.00 - 8.00	0.0000	0.5	11	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
LDF7-50A (1-5/8 FOAM)	B	No	Inside Pole	130.00 - 8.00	0.0000	0	12	No Ice	0.00	0.82
								1/2" Ice	0.00	0.82
								1" Ice	0.00	0.82
								2" Ice	0.00	0.82
								4" Ice	0.00	0.82
FB-L98-002-XXX(3/8)	C	No	Inside Pole	130.00 - 8.00	0.0000	0	1	No Ice	0.00	0.06
								1/2" Ice	0.00	0.06
								1" Ice	0.00	0.06
								2" Ice	0.00	0.06
								4" Ice	0.00	0.06
WR-VG86T(3/4)	C	No	Inside Pole	130.00 - 8.00	0.0000	0	2	No Ice	0.00	0.53
								1/2" Ice	0.00	0.53
								1" Ice	0.00	0.53
								2" Ice	0.00	0.53
								4" Ice	0.00	0.53
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	120.00 - 8.00	0.0000	0	1	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
								2" Ice	0.60	10.54
								4" Ice	1.00	30.04
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (Out Of Face)	120.00 - 8.00	0.0000	0	5	No Ice	0.00	0.82
								1/2" Ice	0.00	2.33
								1" Ice	0.00	4.46
								2" Ice	0.00	10.54
								4" Ice	0.00	30.04
Safety Line 3/8	B	No	CaAa (Out Of Face)	160.00 - 5.00	0.0000	0	1	No Ice	0.04	0.22
								1/2" Ice	0.14	0.75

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
								1" Ice	0.24	1.28
								2" Ice	0.44	2.34
								4" Ice	0.84	4.46
Climbing Rungs	B	No	CaAa (Out Of Face)	160.00 - 5.00	0.0000	0	1	No Ice	0.13	7.12
								1/2" Ice	0.23	8.24
								1" Ice	0.33	9.97
								2" Ice	0.53	15.26
								4" Ice	0.93	33.18

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	160.00-140.00	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	4.956	0.18
		C	0.000	0.000	0.000	0.000	0.00
L2	140.00-120.00	A	0.000	0.000	0.000	0.000	0.41
		B	0.000	0.000	0.000	3.416	0.31
		C	0.000	0.000	0.000	3.960	0.21
L3	120.00-100.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.41
		C	0.000	0.000	0.000	3.960	0.22
L4	100.00-80.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.41
		C	0.000	0.000	0.000	3.960	0.22
L5	80.00-60.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.41
		C	0.000	0.000	0.000	3.960	0.22
L6	60.00-40.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.41
		C	0.000	0.000	0.000	3.960	0.22
L7	40.00-20.00	A	0.000	0.000	0.000	3.960	0.51
		B	0.000	0.000	0.000	3.416	0.41
		C	0.000	0.000	0.000	3.960	0.22
L8	20.00-0.00	A	0.000	0.000	0.000	2.376	0.31
		B	0.000	0.000	0.000	2.562	0.27
		C	0.000	0.000	0.000	2.376	0.13

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	160.00-140.00	A	0.899	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	13.950	0.33
		C		0.000	0.000	0.000	0.000	0.00
L2	140.00-120.00	A	0.884	0.000	0.000	0.000	0.000	0.41
		B		0.000	0.000	0.000	10.489	0.54
		C		0.000	0.000	0.000	7.497	0.96
L3	120.00-100.00	A	0.867	0.000	0.000	0.000	7.426	0.88
		B		0.000	0.000	0.000	10.349	0.63
		C		0.000	0.000	0.000	7.426	0.96
L4	100.00-80.00	A	0.846	0.000	0.000	0.000	7.344	0.87
		B		0.000	0.000	0.000	10.184	0.62
		C		0.000	0.000	0.000	7.344	0.94
L5	80.00-60.00	A	0.821	0.000	0.000	0.000	7.243	0.85
		B		0.000	0.000	0.000	9.983	0.62
		C		0.000	0.000	0.000	7.243	0.91
L6	60.00-40.00	A	0.788	0.000	0.000	0.000	7.113	0.84
		B		0.000	0.000	0.000	9.723	0.61
		C		0.000	0.000	0.000	7.113	0.88
L7	40.00-20.00	A	0.750	0.000	0.000	0.000	6.960	0.82
		B		0.000	0.000	0.000	9.416	0.59
		C		0.000	0.000	0.000	6.960	0.84
L8	20.00-0.00	A	0.750	0.000	0.000	0.000	4.176	0.49
		B		0.000	0.000	0.000	7.062	0.39
		C		0.000	0.000	0.000	4.176	0.50

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-140.00	0.2973	0.1717	0.7065	0.4079
L2	140.00-120.00	-0.2647	0.3846	-0.2252	0.7356
L3	120.00-100.00	-0.2562	0.1122	-0.2165	0.2872
L4	100.00-80.00	-0.2598	0.1138	-0.2237	0.2920
L5	80.00-60.00	-0.2628	0.1151	-0.2300	0.2943
L6	60.00-40.00	-0.2628	0.1151	-0.2311	0.2880
L7	40.00-20.00	-0.2628	0.1151	-0.2325	0.2806
L8	20.00-0.00	-0.1326	0.0895	-0.0711	0.2246

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Platform Mount [LP 405-1]	C	None			0.0000	160.00	No Ice	20.80	20.80	1.80
							1/2" Ice	28.10	28.10	2.07
							1" Ice	35.40	35.40	2.33
							2" Ice	50.00	50.00	2.86
							4" Ice	79.20	79.20	3.93
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
			0.00				1/2" Ice	7.31	5.69	0.10
							1" Ice	7.79	6.38	0.16
							2" Ice	8.77	7.83	0.31
							4" Ice	10.84	11.20	0.71
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	B	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
			0.00				1/2" Ice	7.31	5.69	0.10
							1" Ice	7.79	6.38	0.16
							2" Ice	8.77	7.83	0.31
							4" Ice	10.84	11.20	0.71
(4) TMBXX-6516-R2M w/ (2"x60") Mount Pipe	C	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	6.85	5.00	0.05
			0.00				1/2" Ice	7.31	5.69	0.10
							1" Ice	7.79	6.38	0.16
							2" Ice	8.77	7.83	0.31
							4" Ice	10.84	11.20	0.71
(2) ETW190VS12UB	A	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
			0.00				1/2" Ice	0.78	0.44	0.02
							1" Ice	0.90	0.54	0.02
							2" Ice	1.17	0.77	0.04
							4" Ice	1.82	1.33	0.10
(2) ETW190VS12UB	B	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
			0.00				1/2" Ice	0.78	0.44	0.02
							1" Ice	0.90	0.54	0.02
							2" Ice	1.17	0.77	0.04
							4" Ice	1.82	1.33	0.10
(2) ETW190VS12UB	C	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	0.66	0.35	0.01
			0.00				1/2" Ice	0.78	0.44	0.02
							1" Ice	0.90	0.54	0.02
							2" Ice	1.17	0.77	0.04
							4" Ice	1.82	1.33	0.10
4" x 4' Mount Pipe	A	From Centroid-Leg	4.00	0.00	0.0000	160.00	No Ice	1.21	1.21	0.04
			0.00				1/2" Ice	1.47	1.47	0.05
							1" Ice	1.73	1.73	0.06
							2" Ice	2.31	2.31	0.10
							4" Ice	3.73	3.73	0.22
Platform Mount [LP 712-1]	C	None			0.0000	150.00	No Ice	24.53	24.53	1.34
							1/2" Ice	29.94	29.94	1.65
							1" Ice	35.35	35.35	1.96
							2" Ice	46.17	46.17	2.58
								67.81	67.81	3.82

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" Ice			
(3) 7'x2 1/2" Pipe Mount	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.01 2.59 3.02 3.90 5.78	2.01 2.59 3.02 3.90 5.78	0.04 0.06 0.07 0.13 0.30
(3) 7'x2 1/2" Pipe Mount	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.01 2.59 3.02 3.90 5.78	2.01 2.59 3.02 3.90 5.78	0.04 0.06 0.07 0.13 0.30
(3) 7'x2 1/2" Pipe Mount	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.01 2.59 3.02 3.90 5.78	2.01 2.59 3.02 3.90 5.78	0.04 0.06 0.07 0.13 0.30
APXVSPP18-C-A20 w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
APXVSPP18-C-A20 w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
APXVSPP18-C-A20 w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.26 8.81 9.36 10.50 12.88	6.71 7.66 8.49 10.20 13.98	0.08 0.14 0.22 0.39 0.87
PCS 1900MHz 4x45W-65MHz	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.61 2.85 3.09 3.61 4.74	2.71 2.95 3.20 3.72 4.86	0.06 0.08 0.11 0.17 0.35
800MHZ 2X50W RRH	A	From	4.00	0.0000	150.00	No Ice	2.49	2.07	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
		Centroid-Leg	0.00 0.00			1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.93 3.41 4.46	2.27 2.48 2.93 3.93	0.07 0.10 0.16 0.32
800MHZ 2X50W RRH	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ 2X50W RRH	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	150.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
Platform Mount [LP 303-1]	C	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.66 18.87 23.08 31.50 48.34	14.66 18.87 23.08 31.50 48.34	1.25 1.48 1.71 2.18 3.10
SLXW 5512 w/ 5' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SLXW 5512 w/ 5' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SLXW 5512 w/ 5' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.70 8.18 8.67 9.67 11.79	6.09 6.82 7.57 9.11 12.47	0.04 0.10 0.17 0.33 0.77
SC-E 6014 rev2 w/ 4' Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.01 4.38 5.16 6.84	4.21 4.79 5.39 6.64 9.49	0.03 0.07 0.11 0.22 0.52
SC-E 6014 rev2 w/ 4' Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.64 4.01 4.38 5.16 6.84	4.21 4.79 5.39 6.64 9.49	0.03 0.07 0.11 0.22 0.52
(2) SC-E 6014 rev2 w/ 4' Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice	3.64 4.01 4.38	4.21 4.79 5.39	0.03 0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	5.16	6.64	0.22
						2" Ice	6.84	9.49	0.52
						4" Ice			
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.37 10.93 11.51 12.69 15.14	10.75 11.67 12.60 14.51 18.54	0.06 0.15 0.25 0.49 1.09
LPA-80063/6CF w/ 2-1/2" x 72" Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.37 10.93 11.51 12.69 15.14	10.75 11.67 12.60 14.51 18.54	0.06 0.15 0.25 0.49 1.09
BXA-171063/12CF w/ Mount Pipe	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.05 0.09 0.15 0.28 0.67
BXA-171063/12CF w/ Mount Pipe	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.05 0.09 0.15 0.28 0.67
BXA-171063/12CF w/ Mount Pipe	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.79 5.24 5.70 6.64 8.64	5.34 6.15 6.96 8.65 12.22	0.05 0.09 0.15 0.28 0.67
(2) FD9R6004/2C-3L	A	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	B	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
(2) FD9R6004/2C-3L	C	From Centroid-Leg	4.00 0.00 0.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.37 0.45 0.54 0.75 1.28	0.08 0.14 0.20 0.34 0.74	0.00 0.01 0.01 0.02 0.06
Platform Mount [LP 304-1]	C	None		0.0000	130.00	No Ice 1/2" Ice Ice 1" Ice 2" Ice	17.46 22.44 27.42 37.38 57.30	17.46 22.44 27.42 37.38 57.30	1.35 1.62 1.90 2.45 3.55

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" Ice			
(2) RRUS 11	A	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) RRUS 11	B	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) RRUS 11	C	From Centroid-Leg	4.00 0.00 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.25 3.49 3.74 4.27 5.43	1.37 1.55 1.74 2.14 3.04	0.05 0.07 0.09 0.15 0.31
(2) 7770.00 w/ 5' Mount Pipe	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.98 6.44 6.91 7.87 9.91	4.12 4.77 5.43 6.81 9.98	0.05 0.10 0.15 0.28 0.64
(2) 7770.00 w/ 5' Mount Pipe	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.98 6.44 6.91 7.87 9.91	4.12 4.77 5.43 6.81 9.98	0.05 0.10 0.15 0.28 0.64
(2) 7770.00 w/ 5' Mount Pipe	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.98 6.44 6.91 7.87 9.91	4.12 4.77 5.43 6.81 9.98	0.05 0.10 0.15 0.28 0.64
800 10764 w/ 55" Mount Pipe	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.33 6.77 7.22 8.14 10.08	4.44 5.07 5.72 7.10 10.30	0.06 0.10 0.16 0.29 0.67
800 10764 w/ 55" Mount Pipe	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.33 6.77 7.22 8.14 10.08	4.44 5.07 5.72 7.10 10.30	0.06 0.10 0.16 0.29 0.67
800 10764 w/ 55" Mount Pipe	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.33 6.77 7.22 8.14 10.08	4.44 5.07 5.72 7.10 10.30	0.06 0.10 0.16 0.29 0.67
(2) LGP21403	A	From	3.94	-10.0000	130.00	No Ice	0.00	0.37	0.02

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
		Centroid-Leg	-0.70 0.00			1/2" Ice	0.00 0.00	0.48 0.60	0.02 0.03
						1" Ice	0.00	0.87	0.06
						2" Ice	0.00	1.51	0.14
						4" Ice			
(2) LGP21403	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.37 0.48 0.60 0.87 1.51	0.02 0.02 0.03 0.06 0.14
(2) LGP21403	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.37 0.48 0.60 0.87 1.51	0.02 0.02 0.03 0.06 0.14
(2) LGP21903	A	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
(2) LGP21903	C	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.00 0.00 0.00 0.00 0.00	0.18 0.25 0.32 0.49 0.94	0.01 0.01 0.02 0.03 0.07
DC6-48-60-18-8F Surge Suppression Unit	B	From Centroid-Leg	3.94 -0.70 0.00	-10.0000	130.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.03 0.05 0.07 0.12 0.25
APXV18-206517-C	A	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.04 3.47 3.91 4.81 6.70	0.03 0.05 0.09 0.17 0.40
APXV18-206517-C	B	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.17 5.62 6.08 7.02 9.12	3.04 3.47 3.91 4.81 6.70	0.03 0.05 0.09 0.17 0.40
APXV18-206517-C	C	From Centroid-Leg	2.50 0.25 0.00	30.0000	120.00	No Ice 1/2" Ice	5.17 5.62 6.08	3.04 3.47 3.91	0.03 0.05 0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	7.02	4.81	0.17
						2" Ice	9.12	6.70	0.40
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.0000	120.00	No Ice	4.39	4.39	0.20
						1/2" Ice	5.48	5.48	0.24
						1" Ice	6.57	6.57	0.28
						2" Ice	8.75	8.75	0.36
						4" Ice	13.11	13.11	0.53

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP4-102	A	Paraboloid w/Shroud (HP)	From Centroid-Leg	4.00 4.00 0.00	0.0000		160.00	4.00	No Ice	12.57	0.08
									1/2" Ice	13.09	0.15
									1" Ice	13.61	0.21
									2" Ice	14.65	0.35
									4" Ice	16.72	0.62

Load Combinations

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

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 140	16.945	33	0.8312	0.0037
L2	140 - 120	13.490	33	0.8100	0.0024
L3	120 - 100	10.208	33	0.7454	0.0017
L4	100 - 80	7.270	33	0.6475	0.0011
L5	80 - 60	4.778	33	0.5345	0.0008
L6	60 - 40	2.773	33	0.4166	0.0005
L7	40 - 20	1.265	33	0.2981	0.0003
L8	20 - 0	0.320	33	0.1480	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
160.00	HP4-102	33	16.945	0.8312	0.0039	113454
150.00	Platform Mount [LP 712-1]	33	15.207	0.8242	0.0032	56727
140.00	Platform Mount [LP 303-1]	33	13.490	0.8100	0.0026	28216
130.00	Platform Mount [LP 304-1]	33	11.816	0.7833	0.0021	18152
120.00	APXV18-206517-C	33	10.208	0.7454	0.0018	13493

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	160 - 140	43.310	8	2.1255	0.0093
L2	140 - 120	34.477	8	2.0707	0.0062
L3	120 - 100	26.089	8	1.9053	0.0042
L4	100 - 80	18.580	8	1.6550	0.0029
L5	80 - 60	12.212	8	1.3662	0.0020
L6	60 - 40	7.087	8	1.0648	0.0013
L7	40 - 20	3.234	8	0.7620	0.0009
L8	20 - 0	0.817	8	0.3782	0.0004

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
160.00	HP4-102	8	43.310	2.1255	0.0102	44201
150.00	Platform Mount [LP 712-1]	8	38.866	2.1072	0.0083	22100
140.00	Platform Mount [LP 303-1]	8	34.477	2.0707	0.0067	10998
130.00	Platform Mount [LP 304-1]	8	30.199	2.0023	0.0055	7101
120.00	APXV18-206517-C	8	26.089	1.9053	0.0045	5287

Compression Checks

Pole Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	F_a	A	Actual P	Allow. P_a	Ratio $\frac{P}{P_a}$
	ft		ft	ft		ksi	in^2	K	K	
L1	160 - 140 (1)	P36x3/8	20.00	0.00	0.0	23.696	41.9697	-7.92	994.51	0.008
L2	140 - 120 (2)	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-16.06	1113.69	0.014
L3	120 - 100 (3)	P48x3/8	20.00	0.00	0.0	21.972	56.1069	-21.30	1232.77	0.017
L4	100 - 80 (4)	P54x3/8	20.00	0.00	0.0	21.397	63.1755	-26.79	1351.78	0.020
L5	80 - 60 (5)	P60x3/8	20.00	0.00	0.0	20.938	70.2440	-32.79	1470.73	0.022
L6	60 - 40 (6)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-40.40	2085.77	0.019
L7	40 - 20 (7)	P60x1/2	20.00	0.00	0.0	22.317	93.4624	-48.08	2085.77	0.023
L8	20 - 0 (8)	P60x5/8	20.00	0.00	0.0	23.696	116.583 0	-56.92	2762.52	0.021

Pole Bending Design Data

Section No.	Elevation	Size	Actual M_x	Actual f_{bx}	Allow. F_{bx}	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y	Actual f_{by}	Allow. F_{by}	Ratio $\frac{f_{by}}{F_{by}}$
	ft		kip-ft	ksi	ksi		kip-ft	ksi	ksi	
L1	160 - 140 (1)	P36x3/8	152.26	4.939	23.696	0.208	0.00	0.000	23.696	0.000
L2	140 - 120 (2)	P42x3/8	489.30	11.609	22.711	0.511	0.00	0.000	22.711	0.000
L3	120 - 100 (3)	P48x3/8	918.37	16.626	21.972	0.757	0.00	0.000	21.972	0.000
L4	100 - 80 (4)	P54x3/8	1395.05	19.903	21.397	0.930	0.00	0.000	21.397	0.000
L5	80 - 60 (5)	P60x3/8	1919.60	22.137	20.938	1.057	0.00	0.000	20.938	0.000
L6	60 - 40 (6)	P60x1/2	2489.20	21.665	22.317	0.971	0.00	0.000	22.317	0.000
L7	40 - 20 (7)	P60x1/2	3097.30	26.957	22.317	1.208	0.00	0.000	22.317	0.000
L8	20 - 0 (8)	P60x5/8	3737.68	26.188	23.696	1.105	0.00	0.000	23.696	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V	Actual f_v	Allow. F_v	Ratio $\frac{f_v}{F_v}$	Actual T	Actual f_{vt}	Allow. F_{vt}	Ratio $\frac{f_{vt}}{F_{vt}}$
	ft		K	ksi	ksi		kip-ft	ksi	ksi	
L1	160 - 140 (1)	P36x3/8	10.30	0.491	16.800	0.029	2.81	0.046	11.901	0.004
L2	140 - 120 (2)	P42x3/8	19.57	0.798	16.800	0.048	2.05	0.024	9.661	0.003
L3	120 - 100 (3)	P48x3/8	22.61	0.806	16.800	0.048	2.00	0.018	8.740	0.002
L4	100 - 80 (4)	P54x3/8	25.01	0.792	16.800	0.047	1.95	0.014	8.001	0.002
L5	80 - 60 (5)	P60x3/8	27.39	0.780	16.800	0.046	1.89	0.011	7.394	0.001
L6	60 - 40 (6)	P60x1/2	29.51	0.631	16.800	0.038	1.84	0.008	10.593	0.001
L7	40 - 20 (7)	P60x1/2	31.24	0.668	16.800	0.040	1.80	0.008	10.593	0.001
L8	20 - 0 (8)	P60x5/8	32.76	0.562	16.800	0.033	1.78	0.006	14.001	0.000

Pole Interaction Design Data

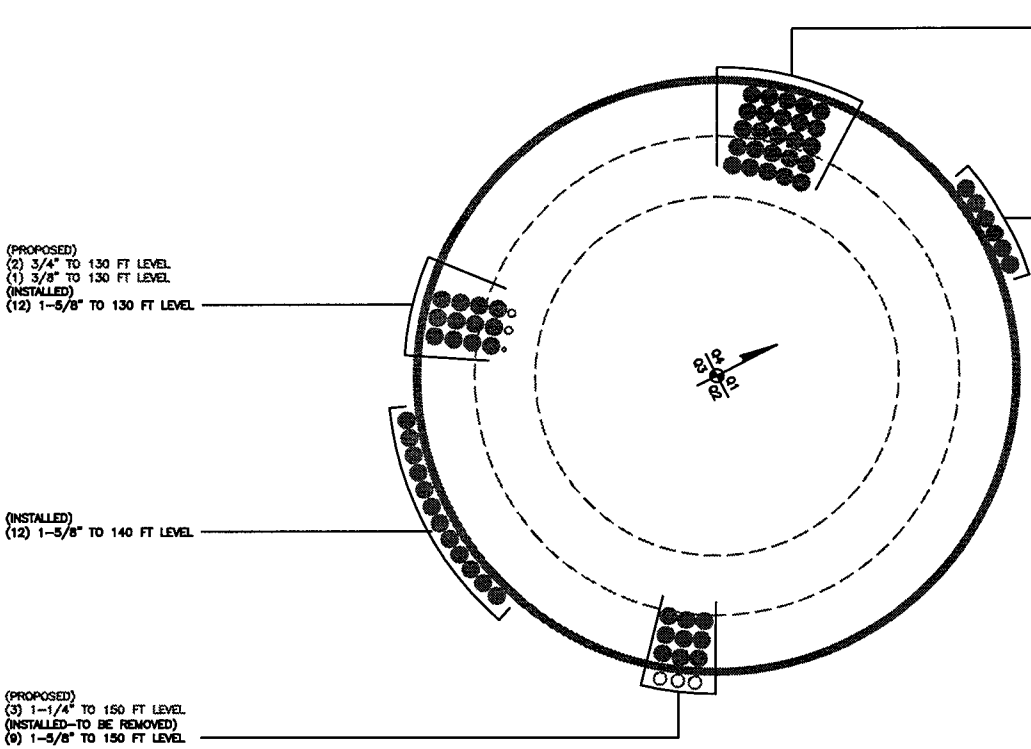
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 140 (1)	0.008	0.208	0.000	0.029	0.004	0.217 ✓	1.333	H1-3+VT ✓
L2	140 - 120 (2)	0.014	0.511	0.000	0.048	0.003	0.528 ✓	1.333	H1-3+VT ✓
L3	120 - 100 (3)	0.017	0.757	0.000	0.048	0.002	0.776 ✓	1.333	H1-3+VT ✓
L4	100 - 80 (4)	0.020	0.930	0.000	0.047	0.002	0.952 ✓	1.333	H1-3+VT ✓
L5	80 - 60 (5)	0.022	1.057	0.000	0.046	0.001	1.082 ✓	1.333	H1-3+VT ✓
L6	60 - 40 (6)	0.019	0.971	0.000	0.038	0.001	0.992 ✓	1.333	H1-3+VT ✓
L7	40 - 20 (7)	0.023	1.208	0.000	0.040	0.001	1.233 ✓	1.333	H1-3+VT ✓
L8	20 - 0 (8)	0.021	1.105	0.000	0.033	0.000	1.127 ✓	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	160 - 140	Pole	P36x3/8	1	-7.92	1325.68	16.3	Pass
L2	140 - 120	Pole	P42x3/8	2	-16.06	1484.55	39.6	Pass
L3	120 - 100	Pole	P48x3/8	3	-21.30	1643.28	58.2	Pass
L4	100 - 80	Pole	P54x3/8	4	-26.79	1801.92	71.4	Pass
L5	80 - 60	Pole	P60x3/8	5	-32.79	1960.48	81.2	Pass
L6	60 - 40	Pole	P60x1/2	6	-40.40	2780.33	74.4	Pass
L7	40 - 20	Pole	P60x1/2	7	-48.08	2780.33	92.5	Pass
L8	20 - 0	Pole	P60x5/8	8	-56.92	3682.44	84.5	Pass
						Summary	ELC:	Load Case 7
						Pole (L7)	92.5	Pass
						Rating =	92.5	Pass

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 828540 TOWER ID: C_BASELEVEL

CROWN REGION ADDRESS

USA

1	07/02/13	UPGRADED PER WORK ORDER 378304
2	11/02/13	APPLICATION ADDED PER WORK ORDER # 378304/378660

DRAWN BY: AGT
CHECKED BY:
DRAWING DATE: 02/07/2013

SITE NUMBER:
SITE NAME:

SITE NAME

TORRINGTON/RT 8

BUSINESS UNIT NUMBER

828540

SITE ADDRESS

218 WHEELER ROAD
TORRINGTON, CT 06790
LITCHFIELD COUNTY
USA

SHEET TITLE

BASE LEVEL

SHEET NUMBER

A1-0

BASE LEVEL DRAWING	1" = 1'-0"	1

PLOT DATE: 2/11/2013 FILE NAME: 828540 BASELEVEL.dwg

APPENDIX C

ADDITIONAL CALCULATIONS

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	3097.298	ft-kips
Axial:	48.0813	kips
Shear:	31.2375	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	20

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results		
Maximum Bolt Tension:	42.8 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**59.4%**	Pass

Inner Flange Bolt Results		
Maximum Bolt Tension:	48.3 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**67.1%**	Pass

Bridge Stiffener Results		
Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange	
Moment:	**1363 ft-kips**
Axial:	**24 kips**
Shear:	**24 kips**

Reactions Seen By Inner Flange Bolts	
Moment:	**1734 ft-kips**
Axial:	**24 kips**
Shear:	**24 kips**

Equivalent Bolt Circle	
Equivalent Bolt Circle:	50.1 in

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	2489.198	ft-kips
Axial:	40.4023	kips
Shear:	29.5091	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	40

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results

Maximum Bolt Tension:	34.3	Kips
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	**47.7%**	Pass

Inner Flange Bolt Results

Maximum Bolt Tension:	38.8	Kips
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	**53.9%**	Pass

Bridge Stiffener Results

Maximum BS Tension:	0.0	Kips
Allowable Tension:	0.0	Kips
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange

Moment:	**1096 ft-kips**
Axial:	**20 kips**
Shear:	**20 kips**

Reactions Seen By Inner Flange Bolts

Moment:	**1393 ft-kips**
Axial:	**20 kips**
Shear:	**20 kips**

Equivalent Bolt Circle

Equivalent Bolt Circle: 50.1 in

Flange Plate Bolts - Rev. F & G

Reactions		
Moment:	1919.603	ft-kips
Axial:	32.7914	kips
Shear:	27.3893	kips

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Flange Plate Height:	60

Outer Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	47	in

Inner Bolt Data		
Qty:	32	
Diam:	1.25	in
Bolt Material:	A325	
Circle:	53	in

Bridge Stiffener Data		
Qty:		
BS Type		
Upper Pole OD:	60	in
Lower Pole OD:		in
Plate OD:	43	in

Shaft Analysis		
ASIF Code:	F	
ASIF Increase:	1.33	
Failure:	105%	

Outer Flange Bolt Results

Maximum Bolt Tension:	26.5 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**36.7%**	Pass

Inner Flange Bolt Results

Maximum Bolt Tension:	29.9 Kips	
Allowable Tension:	72.0 Kips	
Bolt Stress Ratio:	**41.5%**	Pass

Bridge Stiffener Results

Maximum BS Tension:	0.0 Kips	
Allowable Tension:	0.0 Kips	
Bridge Stiffener Stress Ratio:	**0.0%**	Pass
Weld Stress Ratio:	**0%**	Pass

Reactions Seen By Outer Flange

Moment:	**845 ft-kips**
Axial:	**16 kips**
Shear:	**16 kips**

Reactions Seen By Inner Flange Bolts

Moment:	**1075 ft-kips**
Axial:	**16 kips**
Shear:	**16 kips**

Equivalent Bolt Circle

Equivalent Bolt Circle: 50.1 in

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle:	47	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1389.3047	ft-kips
Axial:	24.12845	kips
Shear:	24.12845	kips
Exterior Flange Run, T+Q:		kips

Elevation: 20 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	43.6	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	60.6%	Pass

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	45.1	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

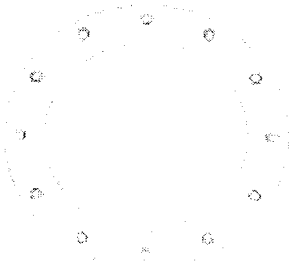
n/a

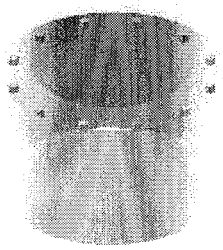
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Manufacturer:	Pirod

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	Bolt Fty: 44.00
N/A:		<-- Disregard	
Circle:	47	in	

Plate Data		
Plate Outer Diam:	59	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.79	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.5	in
Pole Inner Diam:	59	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1116.0566	ft-kips
Axial:	20.28425	kips
Shear:	20.28425	kips
Exterior Flange Run, T+Q:		kips

Elevation: 40 feet

Interior Flange Bolt Results

Maximum Bolt Tension:	35.0 Kips, Ext. T=Interior T
Allowable Tension:	72.0 Kips
Bolt Stress Ratio:	48.6% Pass

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	36.3 Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod OK
Allowable Plate Stress:	36.0 ksi
Plate Stress Ratio:	Rohn/Pirod OK

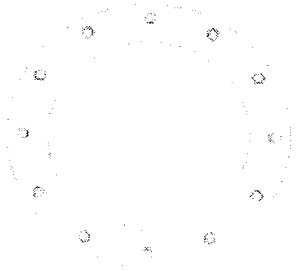
n/a

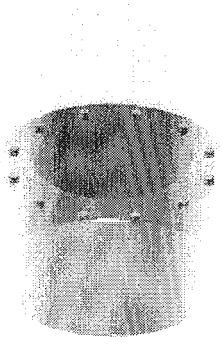
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Manufacturer:	Pirod

Reactions		
Moment:	859.72775	ft-kips
Axial:	16.47155	kips
Shear:	16.47155	kips
Exterior Flange Run, T+Q:		kips

Elevation: 60 feet

Bolt Data			
Qty:	32		
Diam:	1.25	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle:	47	in	

Interior Flange Bolt Results

Maximum Bolt Tension:	26.9	Kips, Ext. T=Interior T
Allowable Tension:	72.0	Kips
Bolt Stress Ratio:	37.4%	Pass

Plate Data		
Plate Outer Diam:	59.25	in
Plate Inner Diam:	43	in (Hole @ Ctr)
Thick:	1.25	in
Grade:	36	ksi
Effective Width:	5.82	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	28.0	Kips, Ext. C= Interior C
Plate Stress:	Rohn/Pirod	OK
Allowable Plate Stress:	36.0	ksi
Plate Stress Ratio:	Rohn/Pirod	OK

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

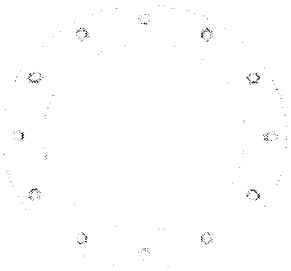
Stiffener Results N/A for Rohn / Pirod

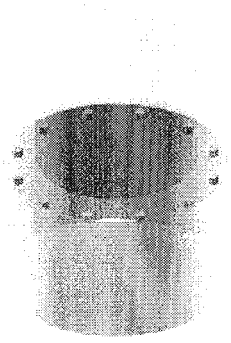
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Pole OuterDiam:	60	in
Thick:	0.375	in
Pole Inner Diam:	59.25	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





Stress Increase Factor		
ASIF:	1.333	

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	48		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	57		

Plate Data		
Diam:	60.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.53	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	54	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	1415.7045	ft-kips
Axial:	26.937	kips
Shear:	25.635631	kips
Elevation:	80	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results | Rigid

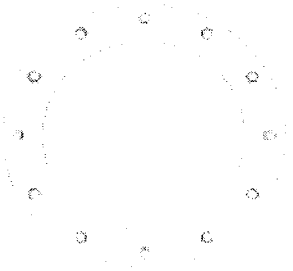
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	24.28 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.474 in	
Min PL "treq" for actual **T w/ Pry**:	0.821 in	
Min PL "t1" for actual **T w/o Pry**:	1.070 in	
T allowable with Prying:	42.01 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	24.28 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	52.7% Pass	

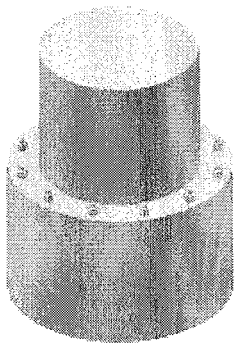
Exterior Flange Plate Results Flexural Check | Rigid

Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		18.25
Tension Side Stress Ratio, (treq/t)^2:	43.1% Pass	

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	926.31178	ft-kips
Axial:	21.4431	kips
Shear:	23.236612	kips
Elevation:	100	feet

Bolt Data			
Qty:	36		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	51		

Plate Data		
Diam:	54.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.19	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Flange Bolt Results

Bolt Tension Capacity, **B**:	46.07 kips	Rigid
Max Bolt directly applied T:	23.62 Kips	Service, ASD
Min. PL "tc" for **B** cap. **w/o** Pry:	1.354 in	Fty*ASIF
Min PL "treq" for actual **T w/ Pry:**	0.734 in	
Min PL "t1" for actual **T w/o Pry:**	0.970 in	
T allowable with Prying:	43.93 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	23.62 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	51.3% Pass	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	Rohn/Pirod, OK	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Compression Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
No Prying		Comp. Y.L. Length:
Tension Side Stress Ratio, (treq/t)^2:	34.5% Pass	17.23

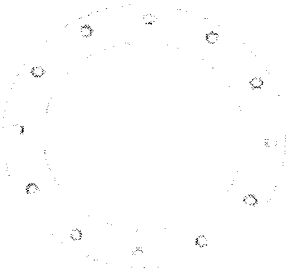
n/a

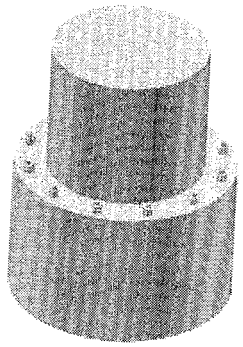
Stiffener Results

Horizontal Weld :	N/A for Rohn / Pirod
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Reactions		
Moment:	485.63151	ft-kips
Axial:	16.2087	kips
Shear:	20.131376	kips
Elevation:	120	feet

Bolt Data			
Qty:	32		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	45		

Plate Data		
Diam:	48.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.12	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	42	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	15.68 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.365 in	
Min PL "treq" for actual **T w/ Pry**:	0.603 in	
Min PL "t1" for actual **T w/o Pry**:	0.796 in	
T allowable with Prying:	43.74 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	15.68 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	34.0% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		16.16
Tension Side Stress Ratio, (treq/t)^2:	23.3% Pass	

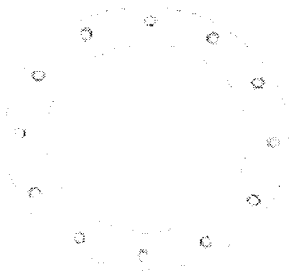
n/a

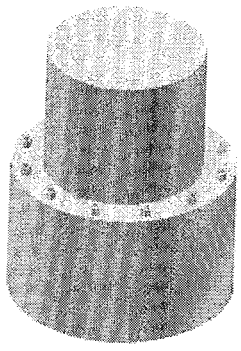
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	Pirod

Bolt Data			
Qty:	28		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	Bolt Fty:
N/A:		<-- Disregard	44.00
Circle (in.):	39		

Plate Data		
Diam:	42.375	in
Thick, t:	1.25	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	4.04	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

Reactions		
Moment:	147.0551	ft-kips
Axial:	7.6981	kips
Shear:	9.7747	kips
Elevation:	140	feet

If No stiffeners, Criteria: AISC ASD <-Only Applcable to Unstiffened Cases

Flange Bolt Results

		Rigid
Bolt Tension Capacity, **B**:	46.07 kips	Service, ASD
Max Bolt directly applied T:	6.19 Kips	Fty*ASIF
Min. PL "tc" for **B** cap. **w/o** Pry:	1.379 in	
Min PL "treq" for actual **T w/ Pry**:	0.383 in	
Min PL "t1" for actual **T w/o Pry**:	0.505 in	
T allowable with Prying:	43.49 kips	0≤α'≤1 case
Prying Force, Q:	0.00 kips	
Total Bolt Tension=T+Q:	6.19 kips	
Prying Bolt Stress Ratio=(T+Q)/(B):	13.4% Pass	

Exterior Flange Plate Results Flexural Check

		Rigid
Compression Side Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Compression Plate Stress Ratio:	Rohn/Pirod, OK	Comp. Y.L. Length:
No Prying		15.00
Tension Side Stress Ratio, (treq/t)^2:	9.4% Pass	

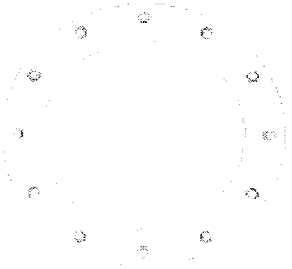
n/a

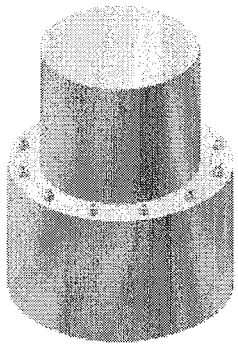
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: *828540*
Site Name: *TORRINGTON RT 8*
App #: *178180 Rev 1*

Pole Manufacturer:	*Pirod*

Reactions		
Moment:	3737.6828	ft-kips
Axial:	56.924	kips
Shear:	32.7568	kips

Anchor Rod Data		
Qty:	52	
Diam:	1.25	in
Rod Material:	Other	
Strength (Fu):	150	ksi
Yield (Fy):	105	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	69.75	in
Thick:	1.25	in
Grade:	36	ksi
Single-Rod B-eff:	3.62	in

Stiffener Data (Welding at both sides)		
Config:	0	*
Weld Type:	Fillet	
Groove Depth:		<-- Disregard
Groove Angle:		<-- Disregard
Fillet H. Weld:	0.375	in
Fillet V. Weld:	0.375	in
Width:	4.5	in
Height:	8	in
Thick:	0.625	in
Notch:	0.5	in
Grade:	36	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	60	in
Thick:	0.625	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffened Cases

Anchor Rod Results

		Rigid
Maximum Rod Tension:	50.4 Kips	Service, ASD
Allowable Tension:	81.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	62.2% Pass	

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	Rohn/Pirod, OK	Service ASD
Allowable Plate Stress:	36.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	Rohn/Pirod, OK	Y.L. Length: 29.82

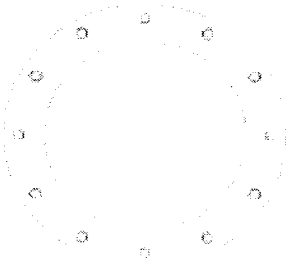
n/a

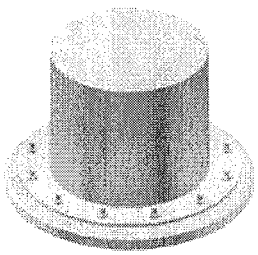
Stiffener Results N/A for Rohn / Pirod

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

GPD GROUP

Mat Foundation Analysis
CCI Site Name: Torrington/RT 8 - BU # 828540
GPD Project Number: 2013775.828540.01

General Info	
Code	TIA/EIA-222-F (LRFD)
Bearing On	Soil
Foundation Type	Mono Pad
Pier Type	Square
Reinforcing Known	Yes
Max Capacity	1.1

Tower Reactions		
Moment, M	3737.682778	k-ft
Axial, P	56.924	k
Shear, V	32.7568	k

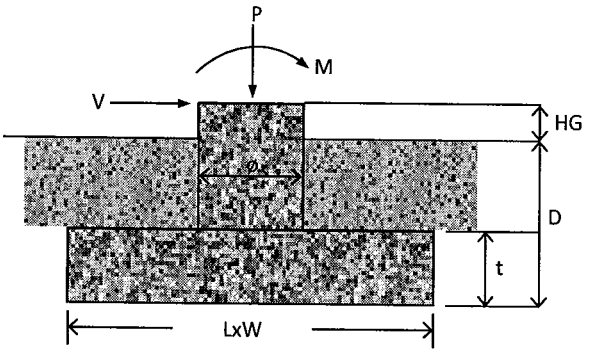
Pad & Pier Geometry		
Pier Width, ø	7	ft
Pad Length, L	28	ft
Pad Width, W	28	ft
Pad Thickness, t	3	ft
Depth, D	5	ft
Height Above Grade, HG	2.5	ft

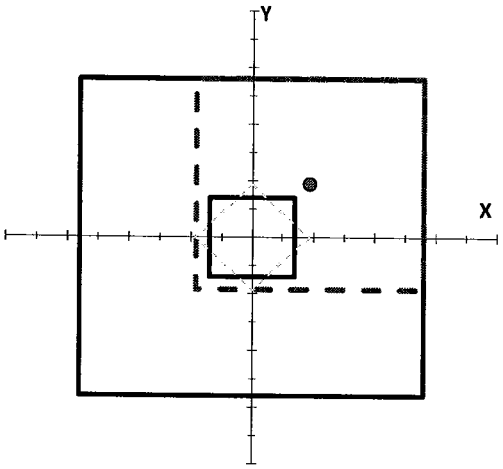
Pad & Pier Reinforcing		
Rebar Fy	60	ksi
Concrete Fc'	4	ksi
Clear Cover	3	in
Reinforced Top & Bottom?	Yes	
Pad Reinforcing Size	# 7	
Pad Quantity Per Layer	45	
Pier Rebar Size	# 9	
Pier Quantity of Rebar	42	

Soil Properties	
Soil Type	Granular
Soil Unit Weight	125 pcf
Angle of Friction, ø	30 °
Bearing Type	Gross
Ultimate Bearing	16 ksf
Water Table Depth	99 ft
Frost Depth	3.5 ft

Bearing Summary			Load Case
Qxmax	2.04	ksf	0.9D+1.6W
Qymax	2.04	ksf	0.9D+1.6W
Qmax @ 45°	2.40	ksf	0.9D+1.6W
$Q_{(all)\ Gross}$	12.00	ksf	
Controlling Capacity	**20.0%**	**Pass**	

Overturning Summary (Required FS=1.0)			Load Case
FS(ot)x	1.56	≥1.0	0.9D+1.6W
FS(ot)y	1.56	≥1.0	0.9D+1.6W
Controlling Capacity	**64.1%**	**Pass**	





Know what's **below.**
Call before you dig.

APPROVALS				
		APPROVED	APPROVED AS NOTED	DISAPPROVED REVISE
SPRINT REPRESENTATIVES	DATE	☐	☐	☐
SPRINT RF ENGINEER	DATE	☐	☐	☐
SITE OWNER	DATE	☐	☐	☐
	DATE	☐	☐	☐

Sprint®

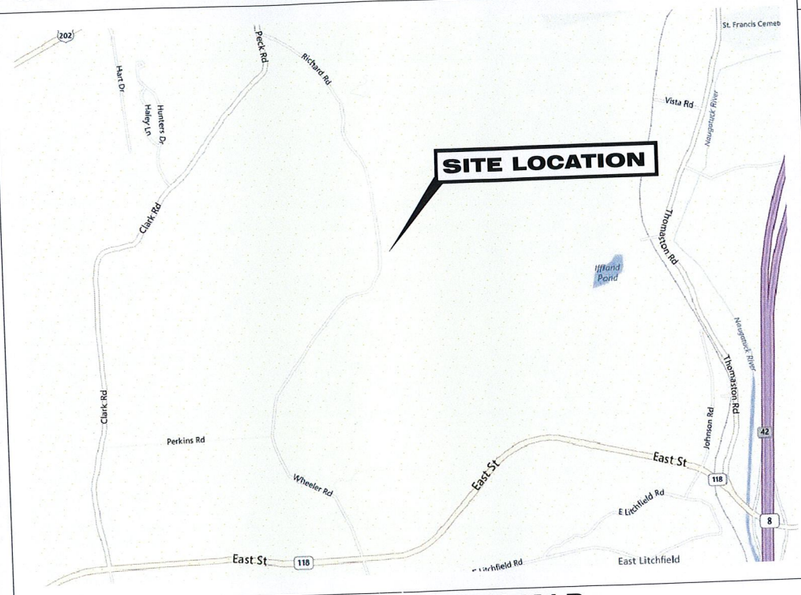
SITE ID: CT33XC592

SITE NAME: E. LITCHFIELD / OMNIPOINT - LEFEBVRE PROP

NETWORK VISION CONSTRUCTION DRAWINGS

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE AND FOUNDATION IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE AND FOUNDATION. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

AERIAL VIEW
SCALE: NTS



LOCATION MAP
SCALE: NTS

DRAWING INDEX

DWG #	DRAWING TITLES
A01	COVER SHEET
C01	GENERAL NOTES 1 OF 2
C01A	GENERAL NOTES 2 OF 2
C02	COMPOUND PLAN
C02A	ELEVATION
C03	EQUIPMENT PLANS
C03A	EQUIPMENT & ANTENNA SPECIFICATIONS
C04	EXISTING ANTENNA PLAN (ALL SECTORS)
C04A	INTERIM ANTENNA PLAN (ALL SECTORS)
C04B	FINAL ANTENNA PLAN (ALL SECTORS)
C05	SITE DETAILS
C06	RF SCHEDULE
C06A	RF DATA SHEET
C07	AAV DRAWINGS - COVER SHEET
C07A	AAV DRAWINGS - SITE PHOTOS
C07B	AAV DRAWINGS - KEY & EQUIPMENT PLAN
C07C	AAV DRAWINGS - DETAILS
E01	ELECTRICAL NOTES
E02	ELECTRICAL & GROUNDING DETAILS

CODES & STANDARDS

These documents are in compliance & all construction to be in accordance with the following codes & standards as applicable:

State Building Code: 2005 Connecticut Supplement

2003 International Building Code
2003 International Residential Code
2003 International Existing Building Code
2003 International Mechanic Code
2003 International Plumbing Code
2003 International Energy Conservation Code (re-adopted with changes)
ICC/ANSI A117.1-2003 Assessible and Usable Buildings and Facilities

2005 National Electrical Code (NFPA-70)

DRIVING DIRECTIONS

1. TAKE 3RD EXIT FROM ROUNDABOUT INTERNATIONAL BLVD ONTO LEISURE LN.
2. TAKE RAMP ONTO STATE HIGHWAY 17 (RT-17 N).
3. CONTINUE ON I-287 N.
4. TAKE THE I-87 S/I-287/NEW YORK STATE THRUWAY SOUTH/TAPPAN ZEE BR/NEW YORK CITY EXIT ONTO NEW YORK STATE THRUWAY SOUTH (I-287 E, I-87 S) (PARTIAL TOLL ROAD).
5. KEEP RIGHT ONTO NEW YORK STATE THRUWAY SOUTH (I-87 S) TOWARD RT-119/SAW MILL PKWY NORTH/SAW MILL PKWY SOUTH/NEW YORK CITY/ELMSFORD.
6. TAKE EXIT #8A/RT-119/SAW MILL PKWY NORTH/ELMSFORD ONTO SAW MILL PKY NORTH, SAW MILL RIVER PKY N TOWARD SAW MILL RIVER PKWY NORTH/KATONAH. 10.3 MI/16.6 KMTAKE LEFT RAMP ONTO I-684 N TOWARD BREWSTER.
7. TAKE EXIT #9E/I-84 E/DANBURY ONTO I-84 E.
8. TAKE EXIT #20/CT-8 N/TORRINGTON TO THE LEFT ONTO CT-8 N.
9. TAKE EXIT #42/CT-118/LITCHFIELD/HARWINTON.
10. TURN LEFT ONTO LITCHFIELD RD (CT-118) TOWARD CT-118 W.
11. TURN RIGHT ONTO WHEELER RD.
12. BEAR LEFT TO STAY ON WHEELER RD.

SITE INFORMATION

BLOCK: TBD
LOT: TBD
MAP: TBD
ZONING CLASSIFICATION: TBD
ZONING JURISDICTION: TBD

PROJECT INFORMATION:

SITE ADDRESS:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

COORDINATES:
LATITUDE: 41.780637
LONGITUDE: -73.136104
DATUM : NAD 83

STRUCTURE HEIGHT:
±160'-0" (TOP OF EXISTING MONOPOLE)

PROJECT DIRECTORY:

PROPERTY OWNER:
LUCILLE LEFERVRE
218 WHEELER ROAD
LITCHFIELD CT 06759
(860) 482-1848

APPLICANT:
SPRINT-NEXTEL
1 INTERNATIONAL BOULEVARD
MAHWAH, NJ 07495

ENGINEER:
KMB DESIGN GROUP, LLC
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
KEITH DRENNAN - PROJECT MANAGER
(732) 280-5623

POWER COMPANY:
CONNECTICUT LIGHT & POWER
P.O. BOX 270
HARTFORD, CT 06141-0270
(800) 286-2000

CONSTRUCTION MANAGER:
TODD AMANN
(914) 715-9363

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
COVER SHEET

SHEET NUMBER:	REV.:
A01	0

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GENERAL CONSTRUCTION NOTES:

1. This set of plans has been prepared for the purposes of municipal and agency review and approval. This set of plans shall not be utilized as construction documents until all drawings have been revised to indicate "ISSUED FOR CONSTRUCTION." Contractor shall e-mail plans@kmbdg.com to ensure that they have the latest set of construction drawings prior to commencing any work whatsoever.
2. ADA compliance: The facility is a normally unoccupied mobile radio facility.
3. These plans are intended to be used to direct the proposed layout. Drawings should not be scaled unless otherwise noted. Plans, elevations and details are intended to show the end result of design. Minor modifications may be required to suit job dimensions or conditions.
4. The contractor shall verify all dimensions and conditions and notify the Project Manager of any discrepancies before starting any work.
5. These plans are designed to reflect observed field conditions. Certain conditions are assumed to comply with general standard construction design methods and principles, and the Contractor shall note that not all areas of structural attachment have been opened or specifically verified. The Contractor is therefore requested to notify the Engineer immediately should encountered field conditions vary from those depicted on the drawings. KMB Design Group, LLC will issue field change direction if required. The Project Manager is referenced on the cover sheet.
6. All equipment and materials shall be installed in accordance with the manufacturer's recommendations unless otherwise noted by the Engineer of Record.
7. The Contractor shall be responsible for all work performed and materials installed to be in strict conformance, as a minimum standard, with all applicable codes, regulations and ordinances having jurisdiction. Electrical systems shall be installed in conformance with the National Electrical Code, and all other local and state jurisdictional codes, ordinances, and with local utility company specifications, whichever is more stringent.
8. The Contractor shall keep contract area clean, hazard free and dispose of all dirt, stumps, stones, rubbish or debris in accordance with all local and environmental laws. No materials or equipment shall be placed anywhere on or in the structure without making adequate provisions to protect existing property. Upon completion, repair any damage that may have occurred during construction. Repair all existing wall surfaces damaged during construction such that they match and blend with adjacent surfaces.
9. The Contractor shall be solely responsible and have control over construction means, methods, techniques, sequences, and procedures.

SPRINT SPECIFICATIONS:

1. Contractor shall ensure that they obtain the latest copy of the following documents from ALU:
   A. Cell Site Installation & De-Installation Services - Attachment G-1
   B. Sprint Integrated Construction Standards for Wireless Sites
   C. Standard Construction Specifications for Wireless Sites
2. Contractor shall notify the Engineer immediately if any of the Sprint standards contradict the standards provided by KMB Design Group, LLC so that the Engineer can provide direction.
3. State, Federal and Local codes prevail.

DIVISION 1 - GENERAL REQUIREMENTS SECTION 01010 SUMMARY OF WORK:

1. The Contractor shall review and become familiar with specifications contained in the bid package prepared by KMB Design Group, LLC and the client. The Contractor shall e-mail plans@kmbdg.com to ensure that they have the latest set of construction drawings prior to commencing any work whatsoever.
2. In the event of a conflict between the bid package specifications and these notes, the provisions of the clients specifications shall take precedence.
3. The Contractor shall visit the site of the proposed work and fully acquaint themselves with the conditions as they exist in order that any restrictions pertaining to the work are understood. All areas and dimensions are indicated on the drawings as accurately as possible, but all conditions shall be verified by each contractor and/or subcontractor at the site. The failure of the contractor to examine or receive any form, instrument or document, or to visit the site shall not relieve the Contractor from any obligation with respect to their quoted price. The submission of a quotation shall acknowledge that the Contractor and their Subcontractors have fully examined the site and know the existing conditions and have made provisions for operating under the conditions as they exist at the site and have included all necessary items.
4. The General Contractor's responsibilities shall include, but not be limited to, construction of the equipment foundation, including electrical service, telephone conduits, grounding system and coordination with local utility companies.
5. The antenna installers responsibilities shall include, but not be limited to, cable tray installation, routing of cables from radio equipment to antennas, associated hardware for securing antenna cables, antenna mounts, determining supplier of antennas, grounding of antennas to grounding system, installing antennas and verifying with Radio Frequency Engineers, the alignment, location, and proper orientation of antennas.
6. The Contractors shall coordinate construction activities with the building Landlord in order to avoid conflicts with current use of the site.
7. The Owner may have work performed under separate contracts, concurrently, with the work of this contract.
8. The General Contractor shall permit access to the project to these contractors to perform their work.
9. The Contractor shall conform to all applicable local, county, state, and federal codes, laws and requirements, including OSHA.
10. The Contractor shall apply and pay for the construction permit, certificate of occupancy and all other required permits or licenses. The Contractor is responsible for obtaining all inspections.
11. Care shall be exercised in protecting the building occupants during the demolition and construction periods of this project. Every effort shall be made to maintain a clean operation. Debris shall not accumulate. All debris will be deposited in a suitable container on a daily basis and shall be emptied on a regular schedule. The location of the container shall be coordinated with the Building Manager.
12. Safety procedures: Attention is directed to federal, state, and local laws, rules and regulations concerning construction safety and health standards. The construction company awarded this project shall ensure all working surroundings and conditions are sanitary, and are not hazardous or dangerous to the health or safety of the work crews or building occupants. Precaution shall be exercised at all times for the protection of persons and property. It is mandatory that the safety provisions of applicable local laws, OSHA regulations and building and construction codes, be observed for all contractors and antenna riggers.
13. The General Contractor must coordinate all roof related work with the Landlord's pre-approved roofer. The General Contractor must confirm the compatibility of all materials and ensure that all existing roof warranties, if any, remain in effect.

SECTION 01613 - DELIVERY, STORAGE AND HANDLING:

1. The Contractor shall be responsible for all procedures and scheduling associated with hoisting, staging, and erecting of materials and equipment to and/or upon the site.
2. All elements of the existing site, i.e. structures, site plantings, etc. shall be protected as necessary from said actions. This work must be done in a safe, secure nondestructive manner for protecting personnel and property.

SECTION 01740 WARRANTIES AND BONDS:

1. The Contractor shall guarantee all labor and materials used in this project for a minimum period of one (1) year commencing from the date of final acceptance by the client. The Contractor is not required to guarantee material supplied by the Owner.
2. Final date of acceptance is deemed as the date that all required state and federal approval have been obtained including, but not limited to:
   A. Final inspection
   B. Certificate of Occupancy
3. Any deficiencies that come evident during this one (1) year period shall be corrected by the Contractor at the Contractor's expense.

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

KMB DESIGN GROUP
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WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
GENERAL NOTES
1 OF 2

SHEET NUMBER:	REV.:
C01	0

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DIVISION 2 - SITE WORK

1. The Contractor shall call utilities prior to the start of construction.

2. All existing active sewer, water, gas, electric, and other utilities where encountered in the work, shall be protected at all times, and where required for the proper execution of the work, shall be relocated as directed by Engineers. Extreme caution should be used by the Contractor when excavating or pier drilling around or near utilities. The Contractor shall provide safety training for the working crew. This will include but not limited to:
   A. Fall protection
   B. Confined space
   C. Electrical safety
   D. Trenching & excavation

3. All site work shall be as indicated on the drawing and stipulated in the specification project summary.

4. If necessary, rubbish, stumps, debris, sticks, stones, and other refuse shall be removed from the site and disposed of legally.

5. The site shall be graded to cause surface water flow away from the equipment shelter and monopole areas.

6. No fill or embankment material shall be placed on frozen ground. Frozen materials, snow or ice shall not be placed in any fill or embankment.

7. The sub grade shall be compacted and brought to a smooth uniform grade prior to finished surface application.

8. All existing inactive sewer, water, gas, electric and other utilities, which interfere with the execution of the work, shall be removed and/or capped, plugged or otherwise discontinued at points which will not interfere with the execution of the work, subject to the approval of engineering.

9. The areas of the Owners property disturbed by the work and not covered by the building or driveway, shall be graded to a uniform slope, fertilized, seeded, and covered with mulch as specified in the specification of landscape work.

10. The Contractor shall minimize disturbance to existing site during construction. Erosion control measures, shall be in conformance with the local guidelines for erosion and sediment control.

11. All back fill shall be compacted to 95% modified proctor density as determined by ASTM standard test procedures.

DIVISION 3 - CONCRETE

1. Design and construction of all concrete elements shall conform to the latest editions of the following applicable codes: ACI 301 "Specifications for Structural Concrete for Buildings"; ACI 318 "Building Code Requirements for Reinforced Concrete".

2. Mix design shall be approved by Owner's representative prior to placing concrete.

3. Concrete shall be normal weight, 6% air entrained (±1.5%) with a maximum 4" slump, and have a minimum 28-day compressive strength of 3000 psi unless otherwise noted.

4. Maximum aggregate size shall be 1".

5. The following materials shall be used:

Portland cement:	ASTM C 150, TYPE I
Reinforcement:	ASTM A 185
Normal weight aggregate:	ASTM C 33
Water:	Drinkable
Admixtures:	Non-chloride containing

6. Reinforcing details shall be in accordance with the latest edition of ACI 315.

7. Reinforcing steel shall conform to ASTM A 615, grade 60, deformed unless noted otherwise. Welded wire fabric shall conform to ASTM A 185 welded steel wire fabric unless noted otherwise. Splices shall be class "B" and all hooks shall be standard, unless otherwise noted.

8. The following minimum concrete cover shall be provided for reinforcing steel unless shown otherwise on drawings:
   - Concrete cast against earth ..... 3"
   - Concrete exposed to earth or weather:

   #6 and larger ..... 2"
   #5 and smaller ..... 1 1/2"
   - Concrete not exposed to earth or weather or not cast against the ground:

   Slab and wall ..... 3/4"
   Beams and columns ..... 1 1/2"

9. A 1" chamfer shall be provided at all exposed edges of concrete, unless otherwise noted, in accordance with ACI 30 section 4.2.4.

10. Installation of concrete anchor, shall be per manufacturers written recommended procedure, the anchor bolt, dowel or rod shall conform to manufacturer's recommendation for embedment depth or as shown on the drawing. No rebar shall be cut without prior engineering approval when drilling holes in concrete.

11. Curing compounds shall conform to ASTM C-309.

12. Admixtures shall conform to the appropriate ASTM standard as referenced in ACI-301.

13. Do not weld or tack weld reinforcing steel.

14. All dowels, anchor bolts, embedded steel, electrical conduits, pipe sleeves, grounds and all other embedded items and formed details shall be in place before start of concrete placement.

15. Locate additional construction joints required to facilitate construction as acceptable to Engineer. Place reinforcement continuously through joint.

16. Reinforcement shall be cold bent whenever bending is required.

17. Place concrete in a uniform manner to prevent the formation of cold joints and other planes of weakness. Vibrate the concrete to fully embed reinforcing. Do not use vibrators to transport concrete thorough chutes or formwork.

18. Do not place concrete in water, ice, or on frozen ground.

19. Do not allow concrete sub base to freeze during concrete curing and setting period, or a minimum of 14 days after placement.

20. For cold -weather and hot-weather concrete placement, conform to applicable ACI codes and recommendations. In either case, materials containing chloride, calcium, salts, etc. shall not be used. Protect fresh concrete from weather for 7 days minimum.

DIVISION 5 - METALS

SECTION 05120 - STRUCTURAL STEEL

1. Codes and specifications:
   A. The fabrication/erection shall conform to the requirements of the following codes and specifications, latest edition, unless otherwise noted:
      - The local building code.
      - AISC-specification for structural steel buildings, allowable stress design, 1989.
      - ASTM A992 structural steel (for all w sections only).
      - ASTM A36 structural steel (all other sections).
      - ASTM A53, type E, grade B, electric resistance welded steel pipe.
      - ASTM 123 zinc (hot-dip galvanized) coatings on iron and steel products.
      - ASTM 153 zinc coated (hot-dip) iron and steel hardware.
      - AWS D1.1 structural welding code.
      - EIA/TIA-222 structural standards for steel antenna towers and antenna supporting structures.

2. Design parameters:
   A. The structural steel antenna mounting frames are designed to provide support for antennas and all hardware and accessories associated with antennas.

3. Fabrication and installation requirements:
   A. The antenna supports, antennas and mounting hardware shall be constructed plumb, level and true.
   B. All structural elements and fasteners shall be galvanized in accordance with ASTM A123 and A153.
   C. Welds should be shop made wherever possible, conforming to AISC specification and AWS requirements. All welds are to be of the size and type indicated. Contractor shall employ a licensed welder and shall provide the engineer with their name and a copy of their license prior to commencing any field welding.
   D. Contractor shall provide fire watch during all welding operations, brazing and soldering and other work requiring the use of an open flame. Two (2) hand held 30 lb fire extinguishers and adequate water supply shall be maintained on site. Fire watch plan shall be submitted to the client for approval prior to welding.
   E. All bolted connections shall be A325 high strength bolts 5/8" diameter minimum size unless otherwise noted. Bolts shall be supplied with flat washers. Bolts shall be tightened in accordance with the AISC snug tight condition, unless otherwise noted.
   F. Protective galvanized coatings which were damaged or removed during erection or transportation shall be restored by painting with zinc-rich primer.
   G. All threaded rods shall be 1/2" diameter A36 steel unless otherwise noted.
   H. Temporary structures for staging and construction shall be capable of withstanding forces specified by the local building code current edition.

4. Inspections:
   A. All structural steel antenna frames, and connections shall be inspected prior to installation of antennas.
   B. All antenna cable trays, supports, channels and clamps shall be inspected prior to installation of antenna cables.
   C. Coordinate all inspections with the client's Construction Manager.
   D. Contractor to make notifications 72 hours prior to any required inspections.

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REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

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SHEET TITLE:
GENERAL NOTES
2 OF 2

SHEET NUMBER:	REV.:
C01A	0

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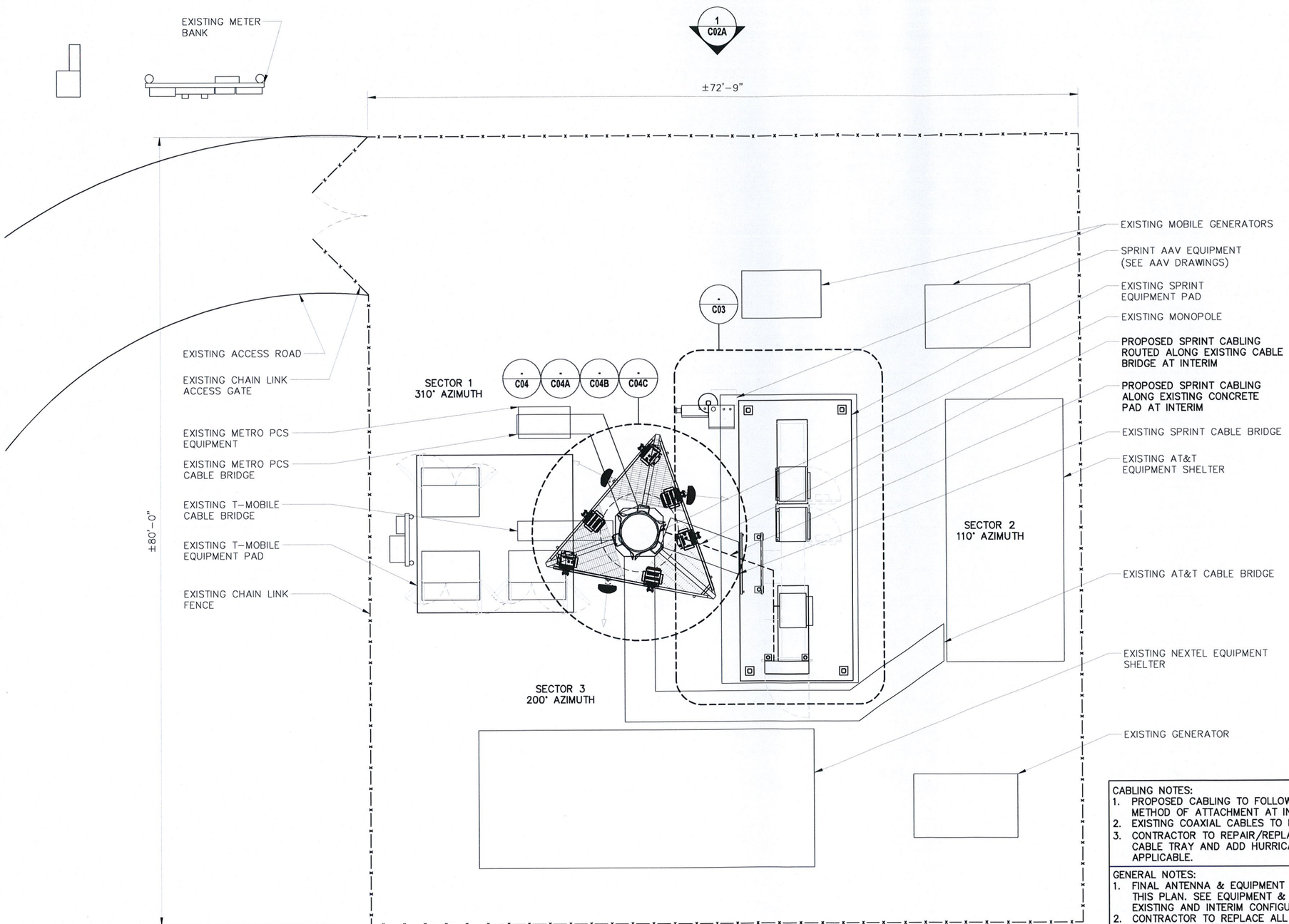

CABLING NOTES:
1. PROPOSED CABLING TO FOLLOW EXISTING ROUTE AND METHOD OF ATTACHMENT AT INTERIM.
2. EXISTING COAXIAL CABLES TO BE REMOVED AT FINAL.
3. CONTRACTOR TO REPAIR/REPLACE ANY MISSING/DAMAGED CABLE TRAY AND ADD HURRICANE STRAPS AS REQUIRED IF APPLICABLE.

GENERAL NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.
2. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED WITH GALVANIZED GROUND BARS. CONTRACTOR SHALL PROVIDE BEFORE & AFTER PHOTOS.
3. CONTRACTOR TO RESTORE ANY RUST AREA TO ORIGINAL CONDITION AND PROTECTIVE COATING TO BE APPLIED.
4. STRUCTURAL ANALYSIS PROVIDED UNDER SEPARATE COVER.
5. PROPOSED SPRINT GPS UNIT TO REPLACE EXISTING GPS AT FINAL.

1 **COMPOUND PLAN**

11x17 SCALE: 1/8" = 1'-0" | 24x36 SCALE: 1/4" = 1'-0"

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0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

KMB DESIGN GROUP
kmbdg.com
1800 ROUTE 34, SUITE 209
WALL, NJ 07719
(732) 280-5623

Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER
CT LICENSE: 26657 5/28/13

PROJECT NUMBER: 332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

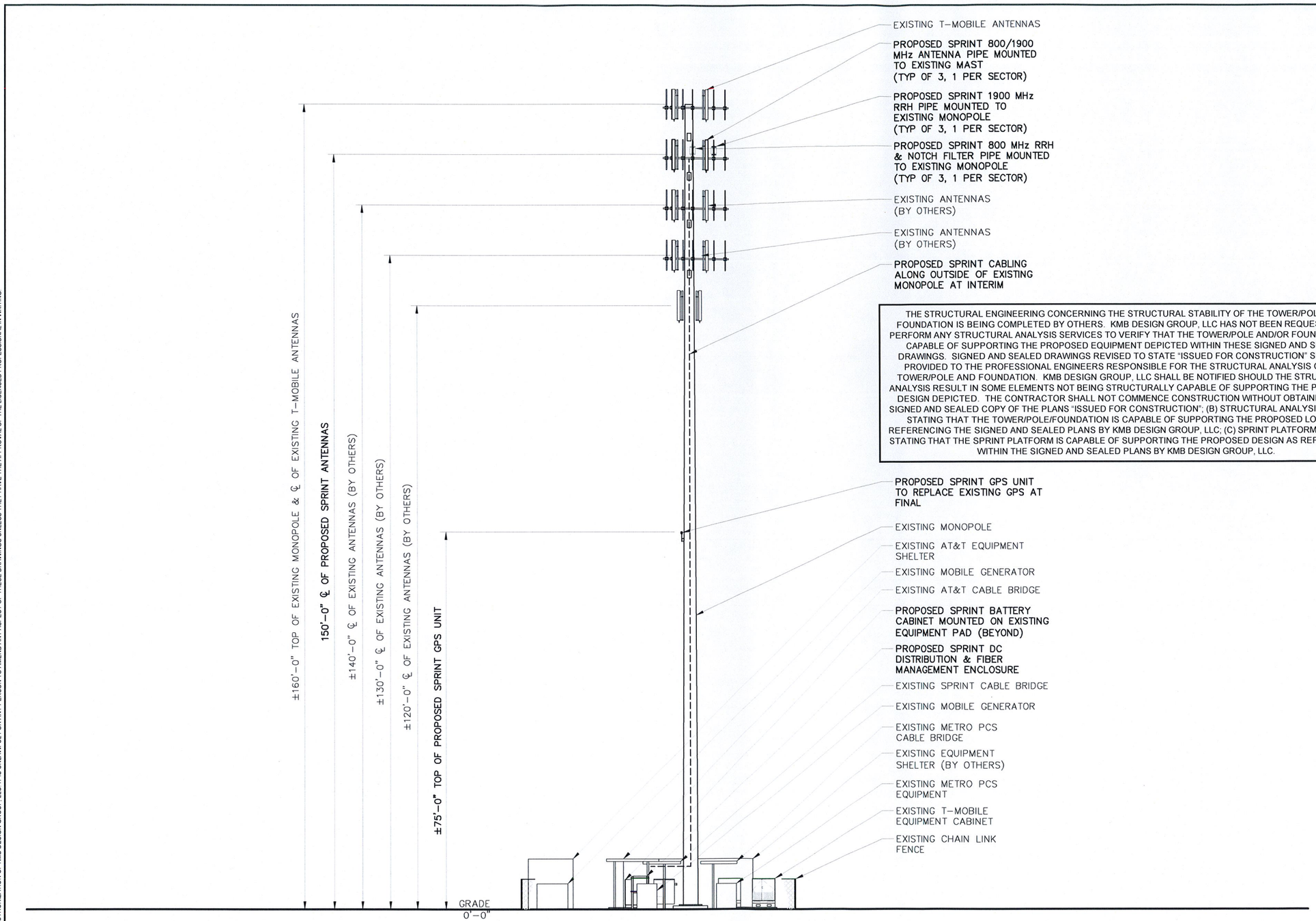
CT33XC592

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: COMPOUND PLAN

SHEET NUMBER: C02 | REV.: 0



THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE AND FOUNDATION IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE AND FOUNDATION. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.

NOTES:
1. FINAL ANTENNA & EQUIPMENT CONFIGURATION SHOWN ON THIS PLAN. SEE EQUIPMENT & ANTENNA PLAN SHEETS FOR EXISTING AND INTERIM CONFIGURATION.

5 0 5 10 20
(IN FEET)

1 **NORTHEAST ELEVATION**

11x17 SCALE: 1" = 20' | 24x36 SCALE: 1" = 10'

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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

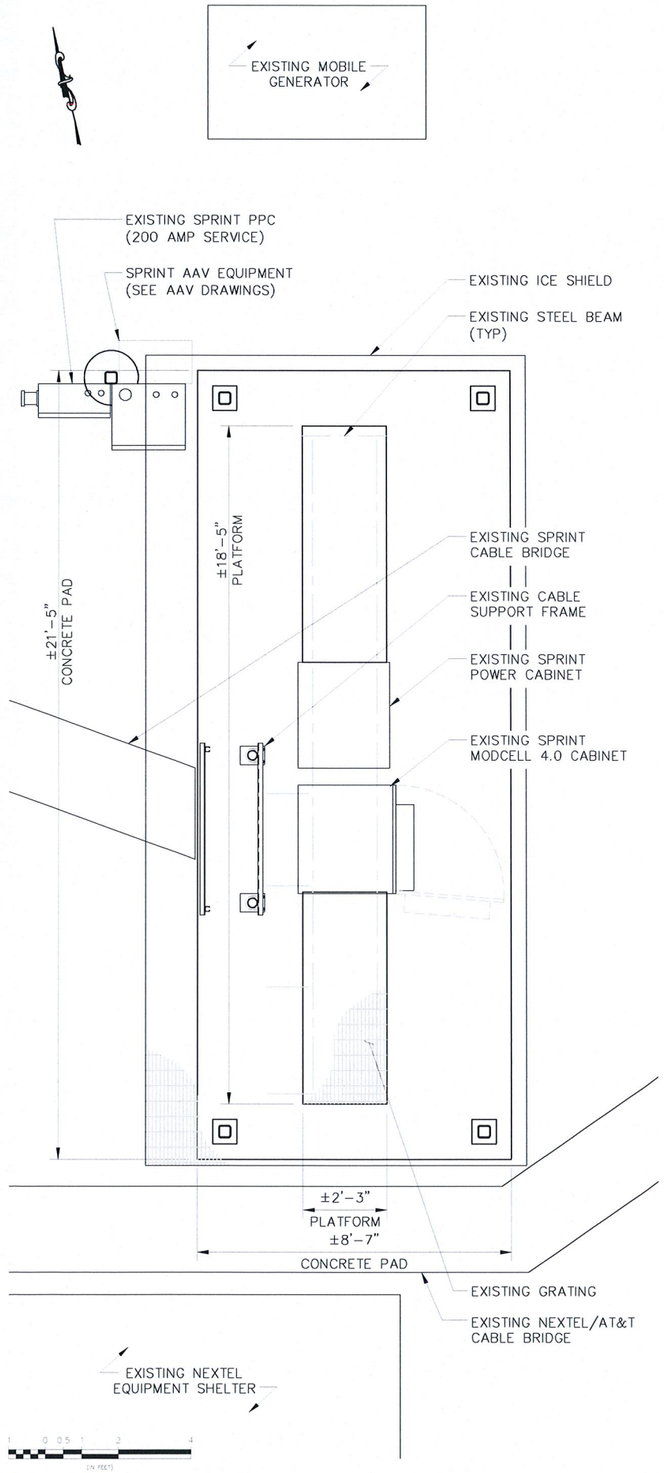
PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
ELEVATION

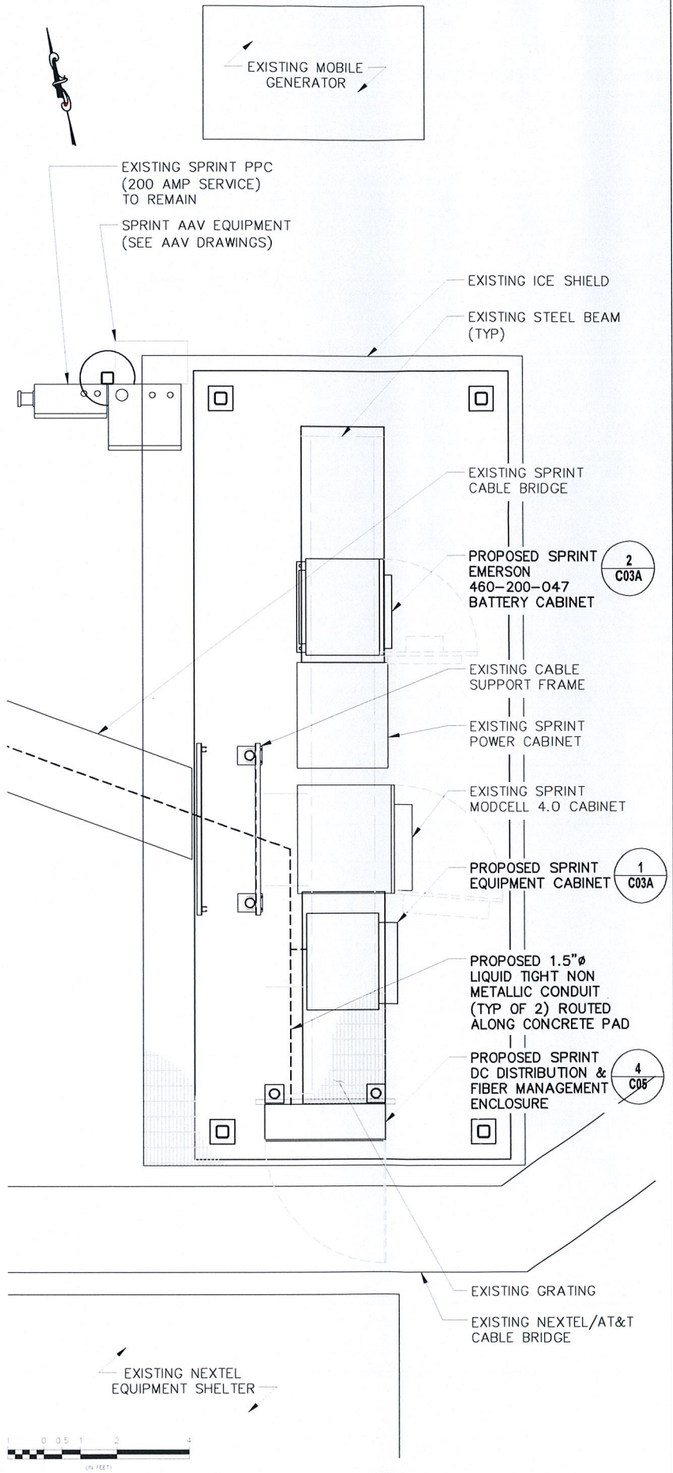
SHEET NUMBER: C02A | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C02A.dwg, 5/28/2013 10:39:04 AM, jford



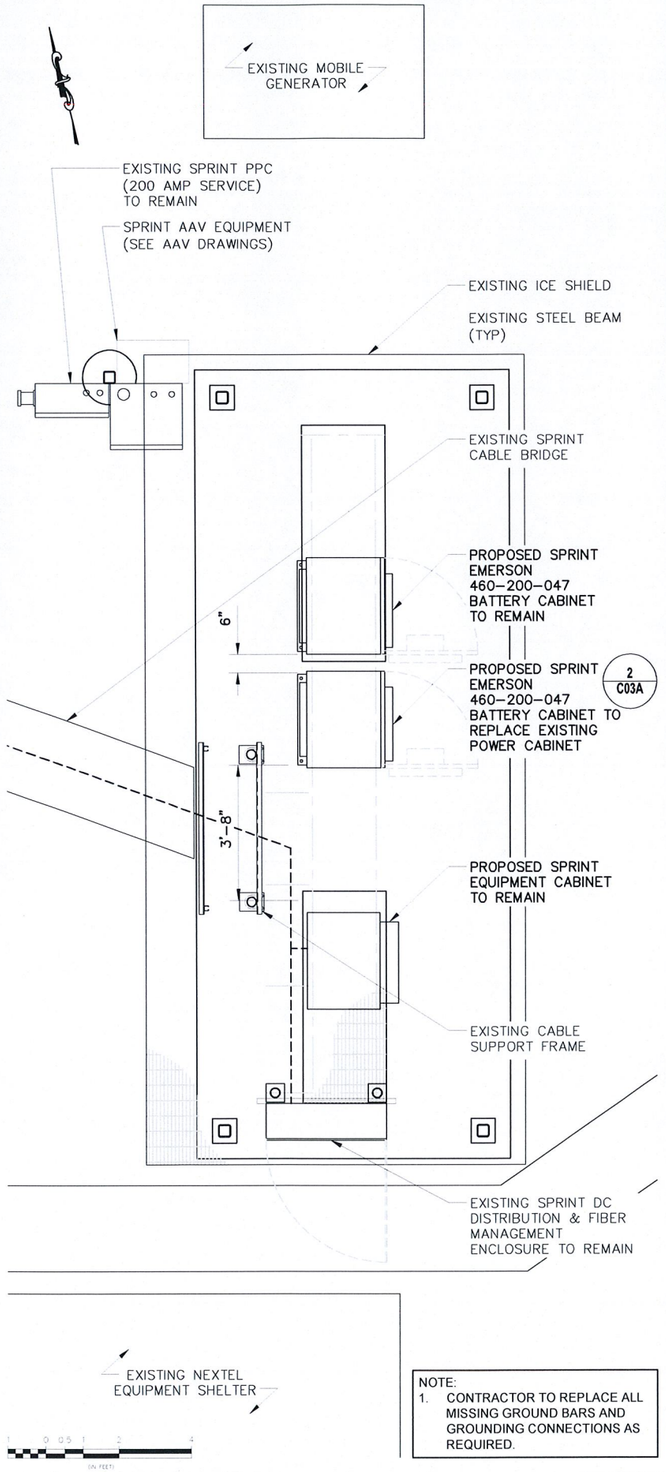
1 **EXISTING EQUIPMENT PLAN**

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



2 **INTERIM EQUIPMENT PLAN**

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



NOTE:
1. CONTRACTOR TO REPLACE ALL MISSING GROUND BARS AND GROUNDING CONNECTIONS AS REQUIRED.

3 **FINAL EQUIPMENT PLAN**

11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"

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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER: **332.1514**

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

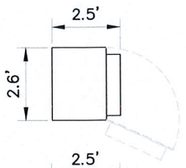
PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

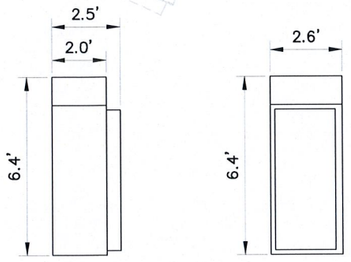
SHEET TITLE: EQUIPMENT PLANS

SHEET NUMBER: C03 | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C03.dwg, 5/28/2013 10:39:10 AM, jford

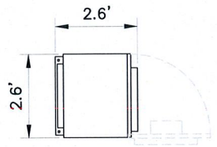


9927
EQUIPMENT CABINET
CABINET WEIGHT: 1020 lbs
FOOTPRINT: 5.3 SF

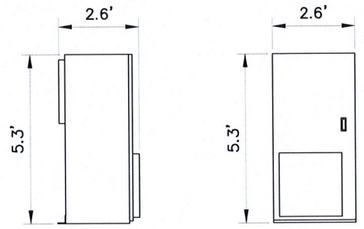


1 EQUIPMENT CABINET SPECIFICATIONS

11x17 SCALE: 3/16" = 1'-0" | 24x36 SCALE: 3/8" = 1'-0"

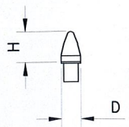


EMERSON BACKUP BATTERY
CABINET (460-200-047)
CABINET WEIGHT: 2640 lbs
FOOTPRINT: 6.0 SF



2 BATTERY CABINET SPECIFICATION

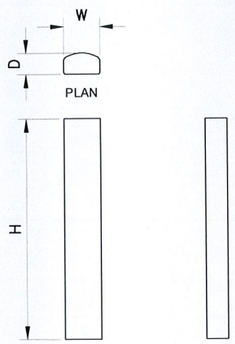
11x17 SCALE: 3/16" = 1'-0" | 24x36 SCALE: 3/8" = 1'-0"



MANUF.: PCTEL
MODEL #: GPS-TMG-HR-26NCM
HEIGHT: 5.0"
DIAMETER: 3.2"
WEIGHT: 0.6 lbs

3 GPS UNIT SPECIFICATIONS

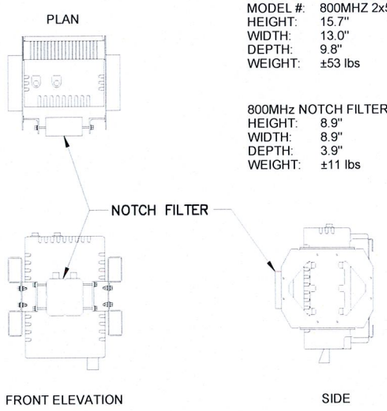
11x17 SCALE: 1/4" = 1'-0" | 24x36 SCALE: 1/2" = 1'-0"



MANUF.: RFS
MODEL: APXVSPP18-C-A20
LENGTH 72.0"
WIDTH: 11.8"
DEPTH: 7.0"
WEIGHT: 64.5 lbs
AREA: 5.9 SF

4

5



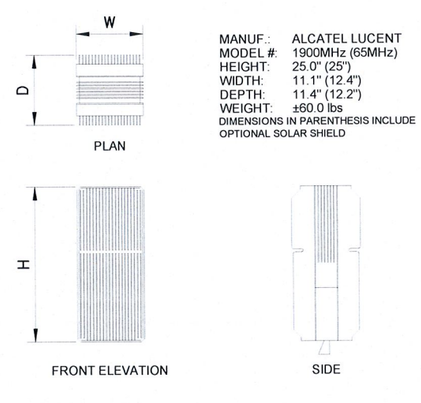
MANUF.: ALCATEL-LUCENT
MODEL #: 800MHZ 2x50W
HEIGHT: 15.7"
WIDTH: 13.0"
DEPTH: 9.8"
WEIGHT: ±53 lbs

800MHz NOTCH FILTER:
HEIGHT: 8.9"
WIDTH: 8.9"
DEPTH: 3.9"
WEIGHT: ±11 lbs

9 RRH SPECIFICATIONS - 800 MHz

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

6



MANUF.: ALCATEL LUCENT
MODEL #: 1900MHz (65MHz)
HEIGHT: 25.0" (25")
WIDTH: 11.1" (12.4")
DEPTH: 11.4" (12.2")
WEIGHT: ±60.0 lbs
DIMENSIONS IN PARENTHESIS INCLUDE OPTIONAL SOLAR SHIELD

10 RRH SPECIFICATIONS - 1900 MHz

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

7 ANTENNA SPECIFICATIONS - 800/1900 MHz

SCALE: NTS

8

11

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PROFESSIONAL ENGINEER
STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

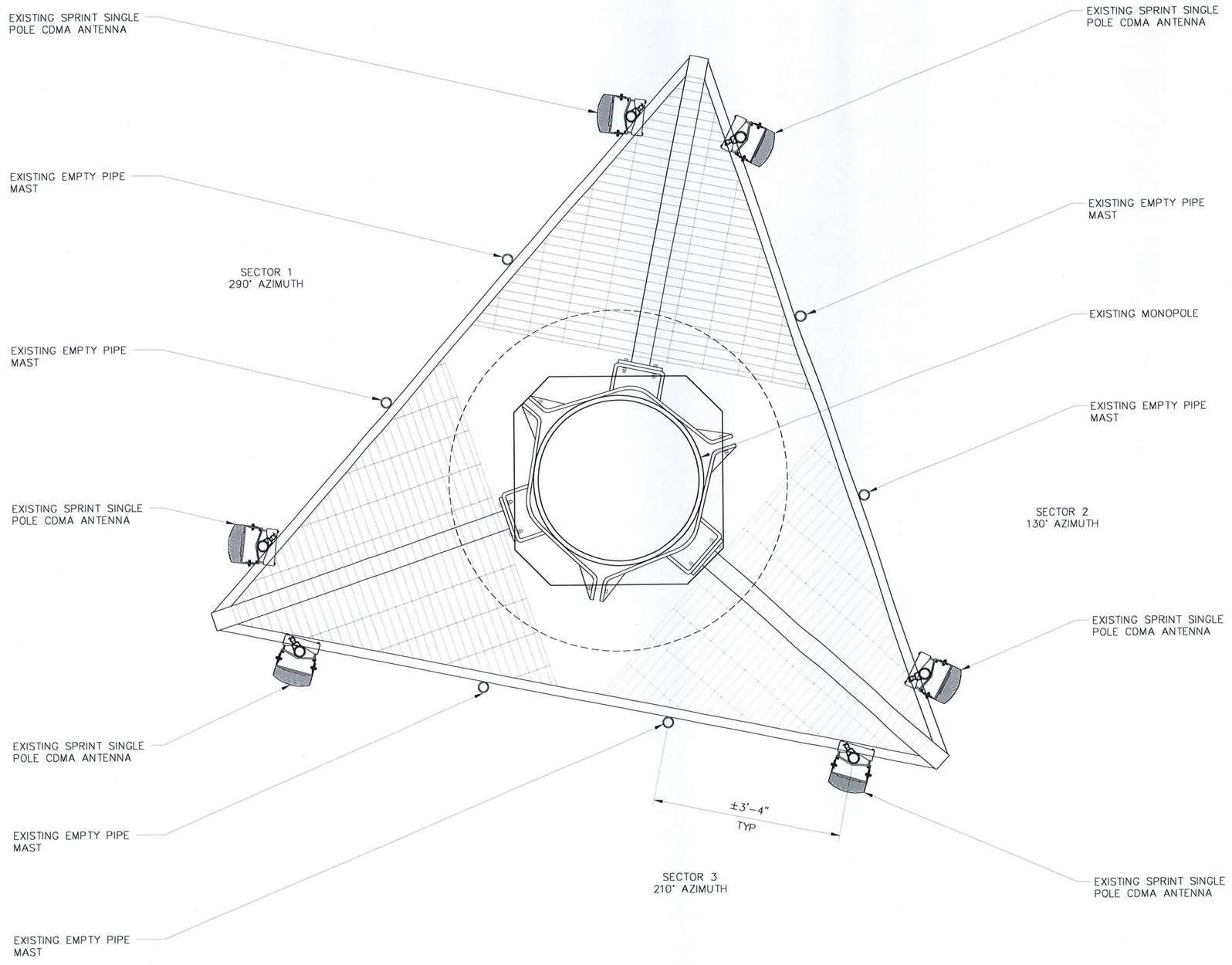
PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
EQUIPMENT & ANTENNA SPECIFICATIONS

SHEET NUMBER: C03A | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C03A.dwg, 5/28/2013 10:39:17 AM, jford



1 **EXISTING ANTENNA PLAN @ ±150'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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CT LICENSE: 26657 5/28/13

PROJECT NUMBER: **332.1514**

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE: NETWORK VISION

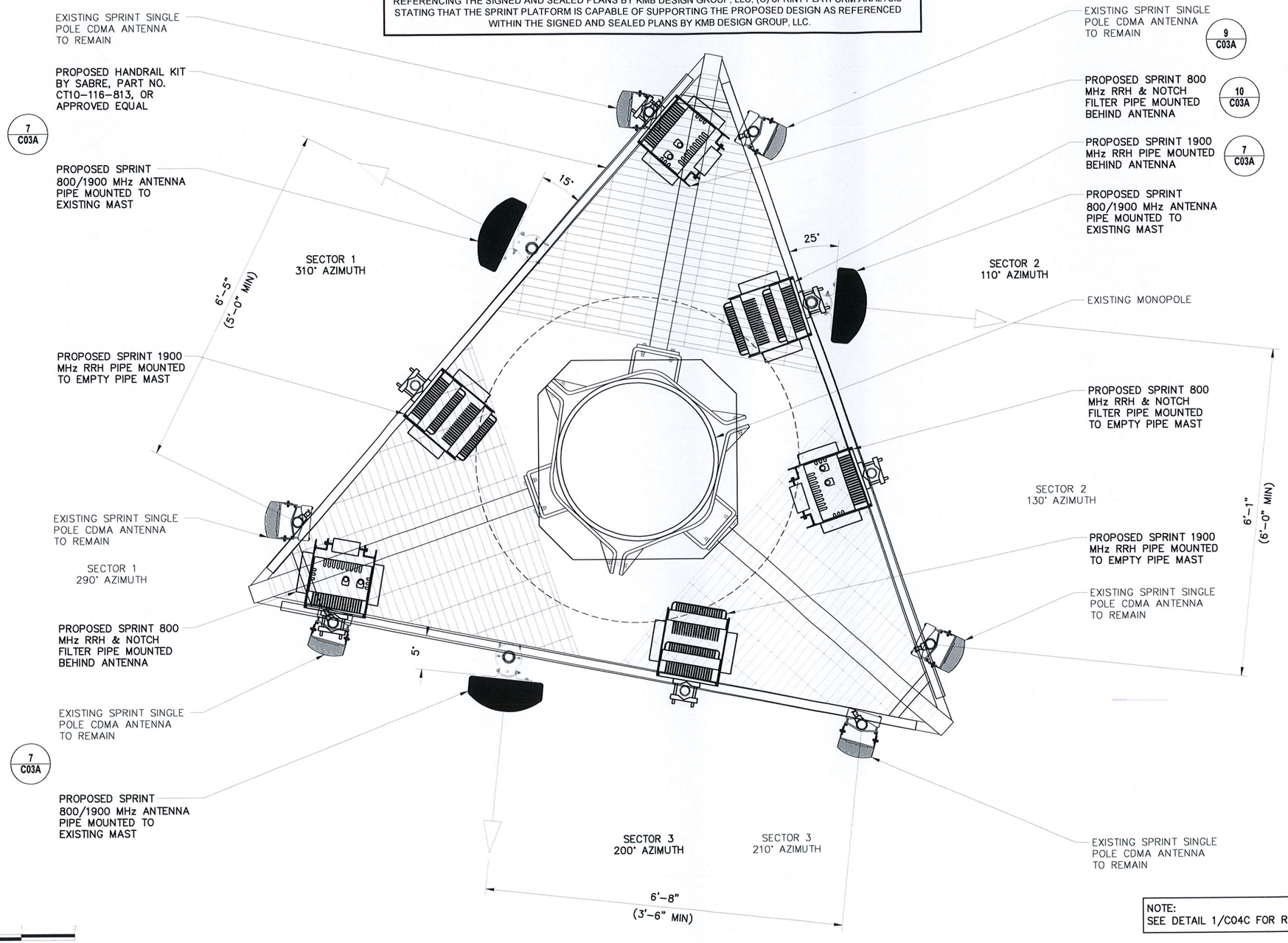
DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: EXISTING ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04 | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C04.dwg, 5/28/2013 10:39:22 AM, jford

THE STRUCTURAL ENGINEERING CONCERNING THE STRUCTURAL STABILITY OF THE TOWER/POLE AND FOUNDATION IS BEING COMPLETED BY OTHERS. KMB DESIGN GROUP, LLC HAS NOT BEEN REQUESTED TO PERFORM ANY STRUCTURAL ANALYSIS SERVICES TO VERIFY THAT THE TOWER/POLE AND/OR FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT DEPICTED WITHIN THESE SIGNED AND SEALED DRAWINGS. SIGNED AND SEALED DRAWINGS REVISED TO STATE "ISSUED FOR CONSTRUCTION" SHALL BE PROVIDED TO THE PROFESSIONAL ENGINEERS RESPONSIBLE FOR THE STRUCTURAL ANALYSIS OF THE TOWER/POLE AND FOUNDATION. KMB DESIGN GROUP, LLC SHALL BE NOTIFIED SHOULD THE STRUCTURAL ANALYSIS RESULT IN SOME ELEMENTS NOT BEING STRUCTURALLY CAPABLE OF SUPPORTING THE PROPOSED DESIGN DEPICTED. THE CONTRACTOR SHALL NOT COMMENCE CONSTRUCTION WITHOUT OBTAINING (A) A SIGNED AND SEALED COPY OF THE PLANS "ISSUED FOR CONSTRUCTION"; (B) STRUCTURAL ANALYSIS REPORT STATING THAT THE TOWER/POLE/FOUNDATION IS CAPABLE OF SUPPORTING THE PROPOSED LOADING REFERENCING THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC; (C) SPRINT PLATFORM ANALYSIS STATING THAT THE SPRINT PLATFORM IS CAPABLE OF SUPPORTING THE PROPOSED DESIGN AS REFERENCED WITHIN THE SIGNED AND SEALED PLANS BY KMB DESIGN GROUP, LLC.



NOTE:
SEE DETAIL 1/C04C FOR RRH MOUNT DETAILS.

1 **INTERIM ANTENNA PLAN @ ±150'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER: **332.1514**

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: INTERIM ANTENNA PLAN (ALL SECTORS)

SHEET NUMBER: C04A | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C04A.dwg, 5/28/2013 10:39:29 AM, jford

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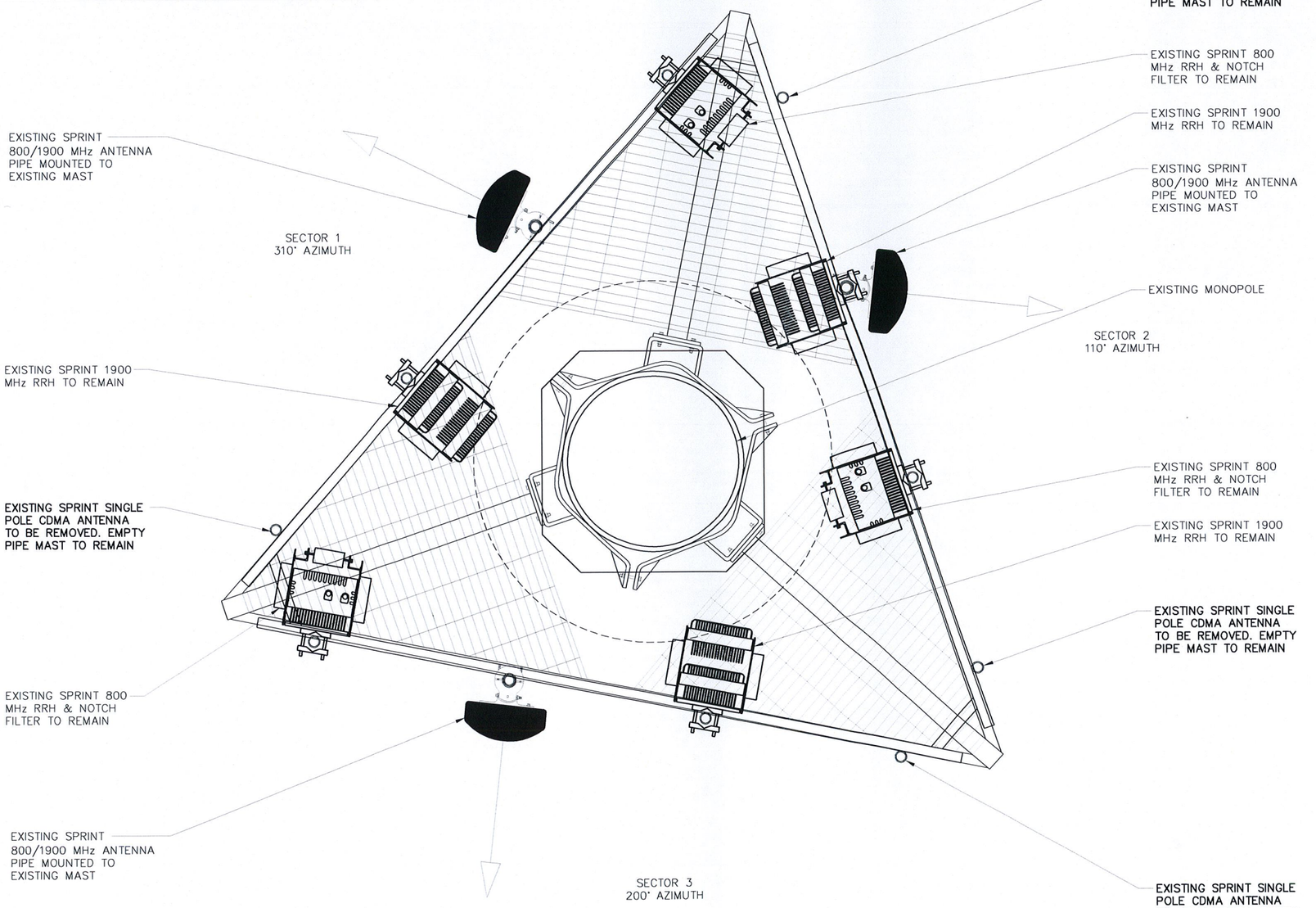

NOTE:
SEE DETAIL 2/C04C FOR RRH MOUNT DETAILS.

1 0 1 2
(IN FEET)

1 **FINAL ANTENNA PLAN @ ±150'-0" AGL (ALL SECTORS)**

11x17 SCALE: 1/2" = 1'-0" | 24x36 SCALE: 1" = 1'-0"

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Stephen A. Bray
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STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

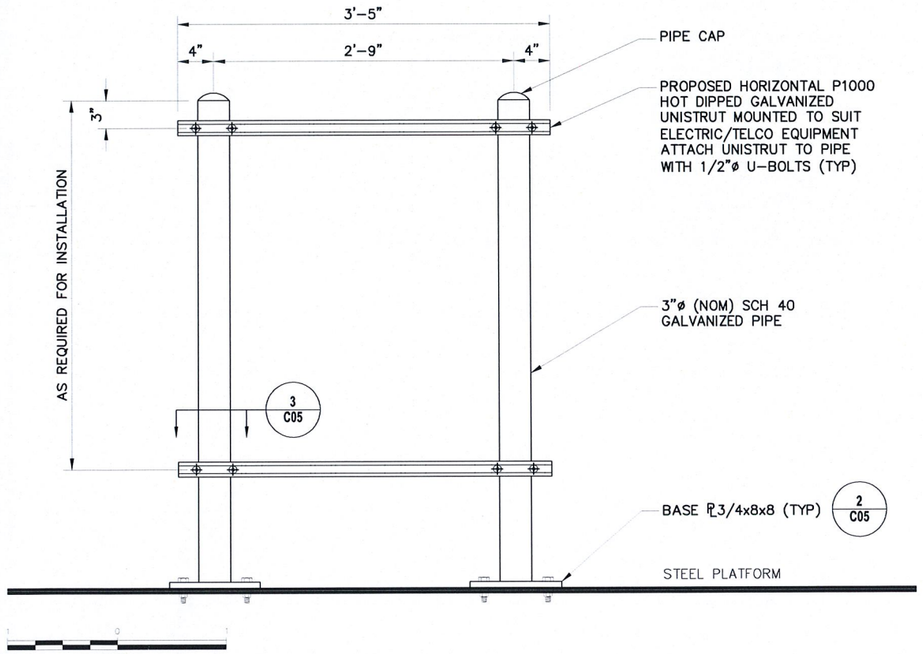
PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
FINAL ANTENNA PLAN
(ALL SECTORS)

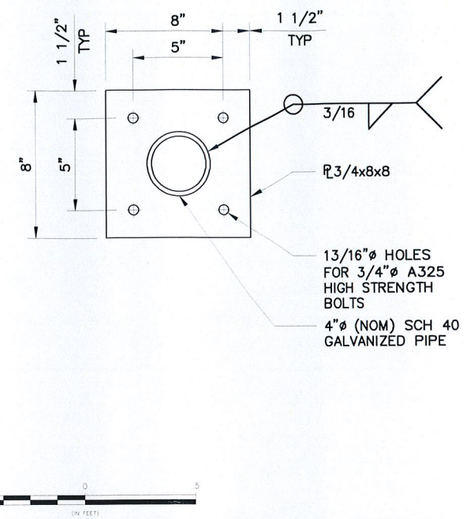
SHEET NUMBER: C04B | REV.: 0

K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514-C04B.dwg, 5/28/2013 10:39:35 AM, jford



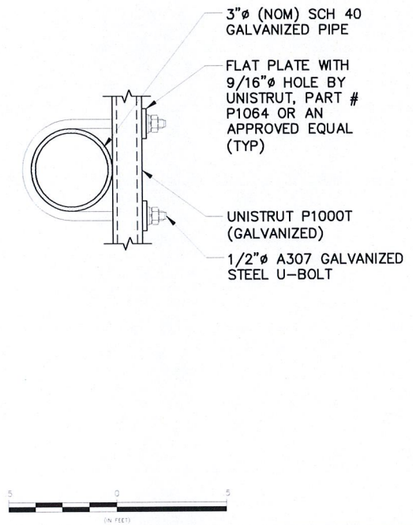
1 **UNISTRUT BACKBOARD ELEVATION**

11x17 SCALE: 3/4" = 1'-0" | 24x36 SCALE: 1 1/2" = 1'-0"



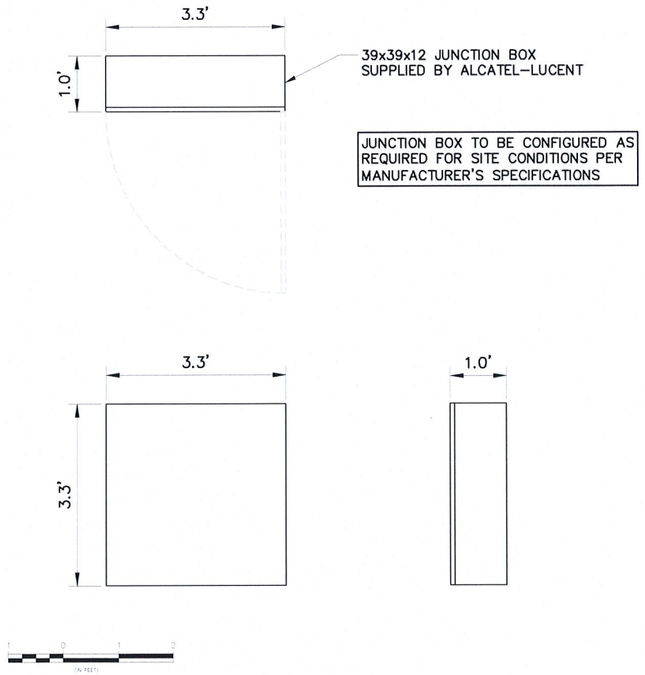
2 **POST BASE DETAIL**

11x17 SCALE: 1 1/2" = 1'-0" | 24x36 SCALE: 3" = 1'-0"



3 **UNISTRUT CONNECTION DETAIL**

11x17 SCALE: 1 1/2" = 1'-0" | 24x36 SCALE: 3" = 1'-0"



4 **DC DISTRIBUTION & FIBER MGMT ENCLOSURE DETAIL**

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"

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0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER
CT LICENSE: 26657 5/28/13

PROJECT NUMBER: **332.1514**

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: SITE DETAILS

SHEET NUMBER: C05 | REV.: 0

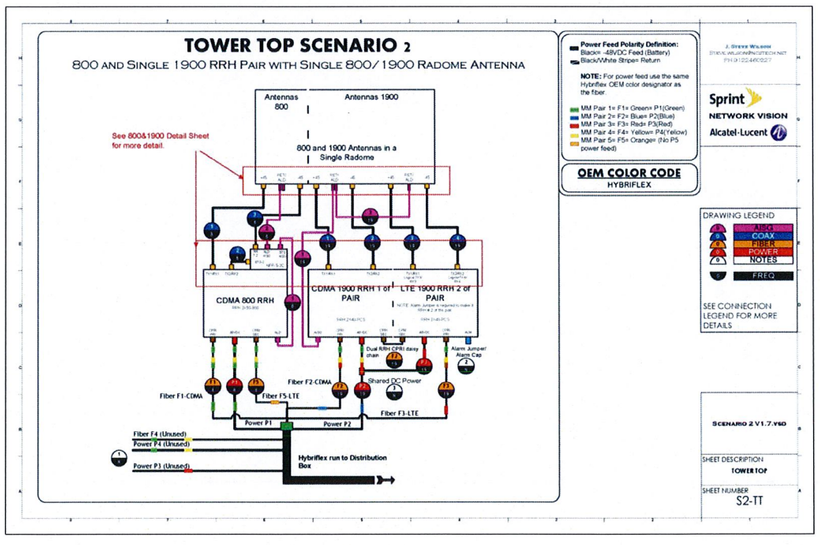
K:\332_Sprint_332.1000_Alcatel-Lucent\332.1514_CT33XC592_218 Wheeler Road\332.1514_CAD\332.1514_Construction\332.1514.C05.dwg, 5/28/2013 10:39:41 AM, jford

FINAL ANTENNA AND CABLE SCHEDULE

SECTOR	ANTENNA	AZIMUTH (DEGREES)	MECHANICAL DT (DEGREES)	ELECTRICAL DT (DEGREES)	RAD CENTER AGL (FT)	ANTENNA MAKE	ANTENNA MODEL	RRH QTY	TOP COAX JUMPER QTY	TOP COAX JUMPER LENGTH (FT)	COMBINER JUMPER QTY	COMBINER JUMPER LENGTH (FT)	NOTCH FILTER JUMPER QTY	NOTCH FILTER JUMPER LENGTH (FT)	HYBRIFLEX LENGTH (FT)
1	–														160
	–														
	800/1900	310	0	800: 0 / 1900: −1	150	RFS	APXVSPP18−C−A20	800: 1 / 1900: 1	6	10	–	–	1	3	
	–														
2	–														160
	800/1900	110	0	800: −6 / 1900: −3	150	RFS	APXVSPP18−C−A20	800: 1 / 1900: 1	6	10	–	–	1	3	
	–														
	–														
3	–														160
	–														
	800/1900	200	0	800: 0 / 1900: 0	150	RFS	APXVSPP18−C−A20	800: 1 / 1900: 1	6	10	–	–	1	3	
	–														

NOTES:
1. DUE TO FIELD MEASUREMENTS AND THE INSTALLATION OF NEW ANTENNAS THAT VARY IN SIZE FROM THE EXISTING ANTENNAS, THE ANTENNA RAD CENTER HAS CHANGED FROM WHAT IS ON RECORD. THE DATABASE MAY NEED TO BE UPDATED TO MATCH THESE PLANS.
2. SOME CABLING MAY CHANGE AT THE TIME OF CONSTRUCTION. CONTRACTOR TO CONFIRM ALL CABLE LENGTHS, TYPE, QUANTITIES, AND CONFIGURATION PRIOR TO CONSTRUCTION.
3. ALL UNUSED POWER AND FIBER MUST BE PROPERLY TERMINATED AND WEATHERPROOFED.

CONTRACTOR TO VERIFY & USE THE LATEST TOWER TOP SCENARIO AS PROVIDED BY ALCATEL−LUCENT CONSTRUCTION MANAGER



ALL SECTORS

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Stephen A. Bray
PROFESSIONAL ENGINEER

STATE OF CONNECTICUT · STEPHEN A. BRAY · No. 26657 · LICENSED PROFESSIONAL ENGINEER

CT LICENSE: 26657 5/28/13

PROJECT NUMBER: **332.1514**

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE: NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: RF SCHEDULE

SHEET NUMBER: C06 REV.: 0

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		Market	Southern Connecticut		
		Cascade ID	CT33XC592		
			SECTOR 1	SECTOR 2	SECTOR 3
1900	1900MHz_Azimuth		310	110	200
	1900_MHz_No_of_Antennas		1	1	1
	1900MHZ_RADCenter(ft)		150	150	150
	1900MHz_Antenna Make		RFS	RFS	RFS
	1900MHz_Antenna Model		APXVSPP18-C-A20	APXVSPP18-C-A20	APXVSPP18-C-A20
	1900MHz_Horizontal_Beamwidth		65	65	65
	1900MHz_Vertical_Beamwidth		5.5	5.5	5.5
	1900MHz_AntennaHeight (ft)		6	6	6
	1900MHz_AntennaGain(dBd)		15.9	15.9	15.9
	1900MHz_E_Tilt		-1	-3	0
	1900MHz _M_Tilt		0	0	0
	1900_Carrier_Forecast_Year_2013		3	3	3
	1900_RRH Manufacturer		ALU	ALU	ALU
	1900_RRH Model		TBD	TBD	TBD
	1900_RRH Count		1	1	1
	1900_RRH Location		Tower-top	Tower-top	Tower-top
	1900 Combiner Model		N/A	N/A	N/A
	1900_Top_Jumper #1_Length (RRH or Combiner-to-Antenna, ft)		10	10	10
	1900_Top_Jumper_Cable_Model (RRH or Combiner-to-Antenna)		LCF12-50J	LCF12-50J	LCF12-50J
	1900_Top_Jumper #2_Length (RRH-to-Combiner, ft)		N/A	N/A	N/A
	1900_Top_Jumper #2_Cable_Model (RRH-to-Combiner)		N/A	N/A	N/A
	1900_Main_Coax_Cable_Length (ft)		N/A	N/A	N/A
	1900_Main_Coax_Cable_Model		N/A	N/A	N/A
	1900_Bottom_Jumper #1_Length (Ground-based-RRH-OR_Combiner-to-Main-Coax, ft)		N/A	N/A	N/A
	1900_Bottom_Jumper #1_Cable_Model (Ground-based-RRH-OR_Combiner-to-Main-Coax)		N/A	N/A	N/A
	1900_Bottom_Jumper #2_Length (Ground-based-Combiner-to-Main-Coax, ft)		N/A	N/A	N/A
	1900_Bottom_Jumper #2_Cable_Model (Ground-based-Combiner-to-Main-Coax)		N/A	N/A	N/A
800	800MHz_Azimuth		310	110	200
	800_MHz_No_of_Antennas		0	0	0
	800MHZ_RADCenter(ft)		150	150	150
	800MHz_AntennaMake		RFS	RFS	RFS
	800MHz_AntennaModel		APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
	800MHz_Horizontal_Beamwidth		65	65	65
	800MHz_Vertical_Beamwidth		11.5	11.5	11.5
	800MHz_AntennaHeight (ft)		6	6	6
	800MHz_AntennaGain (dBd)		13.4	13.4	13.4
	800MHz_E_Tilt		0	-6	0
	800MHz_M_Tilt		0	0	0
	800_RRH Manufacturer		ALU	ALU	ALU
	800_RRH Model		TBD	TBD	TBD
	800_RRH Count		1	1	1
	1900_RRH Location		Tower-top	Tower-top	Tower-top
	800_Top_Jumper #1_Length (RRH or Combiner-to-Antenna, ft)		10	10	10
	800_Top_Jumper_Cable_Model (RRH or Combiner-to-Antenna)		LCF12-50J	LCF12-50J	LCF12-50J
	800_Main_Coax_Cable_Length (ft)		N/A	N/A	N/A
	800_Main_Coax_Cable_Model		N/A	N/A	N/A
	800_Bottom_Jumper #1_Length (Ground-based-RRH-Main-Coax, ft)		N/A	N/A	N/A
	800_Bottom_Jumper #1_Cable_Model (Ground-based-RRH-OR_Combiner-to-Main-Coax)		N/A	N/A	N/A
Comments	0				
	0				
	12/7/2011				

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LITCHFIELD COUNTY

CT33XC592

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DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE: RF DATA SHEET

SHEET NUMBER: C06A REV.: 0

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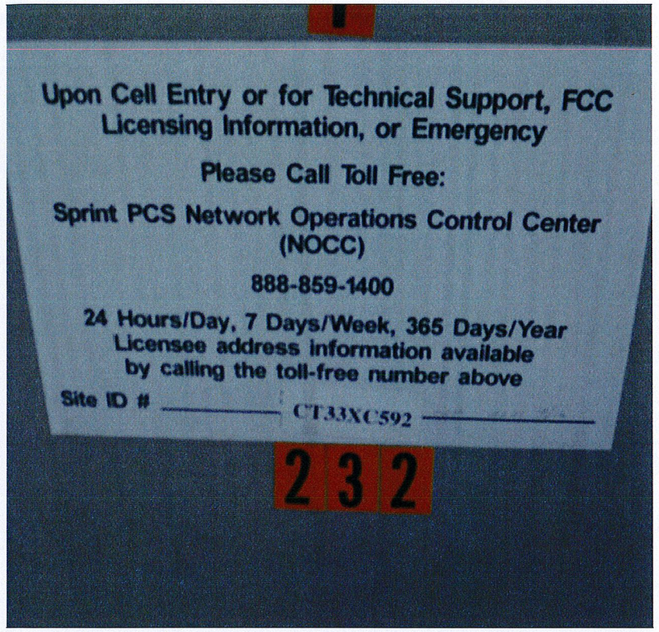
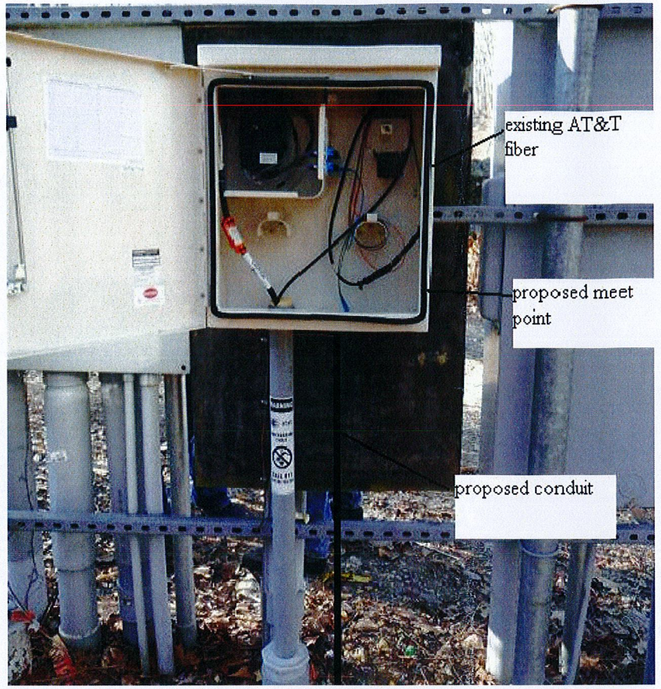


1 EXISTING SIGNAGE

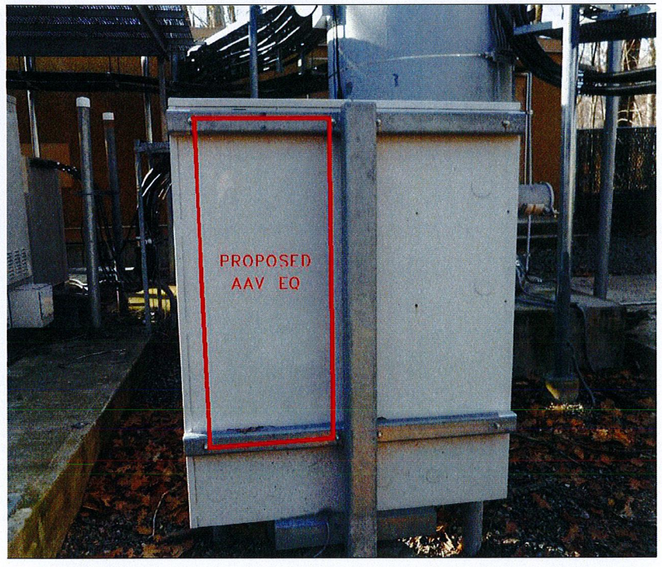


2 PROPOSED MEET POINT

3 EXISTING EQUIPMENT AREA

4 EXISTING TELCO CABINET

5 EXISTING POWER SOURCE



6 PROPOSED NID EQUIPMENT LOCATION

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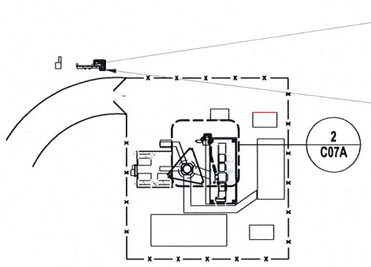
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
AAV DRAWINGS
SITE PHOTOS

SHEET NUMBER: C07 REV: 0



EXISTING AT&T FIBER CABINET (MEET POINT)

PROPOSED 2" RGS A/G (6'). SPRINT TO PROVIDE MULETAPE. AT&T TO PROVIDE FIBER

KEY PLAN 1 C07A

SCALE: NTS

EXISTING 4" U/G (48') PVC CONDUIT. SPRINT TO PROVIDE MULE TAPE. AT&T TO PROVIDE FIBER

EXISTING SPRINT PPC CABINET

EXISTING METRO PCS EQUIPMENT

EXISTING 2" U/G CONDUIT (RGS) (15') FROM TELCO PPC TO BTS. SPRINT TO INSTALL ETHERNET CABLE

EXISTING T-MOBILE EQUIPMENT PAD

EXISTING SPRINT ICE BRIDGE

EXISTING MONOPOLE

EXISTING SPRINT EQUIPMENT PAD

PROPOSED CN3911 ON BACK OF SPRINT TELCO BOX. SPRINT TO INSTALL BACKBOARD BEHIND TELCO PPC. SPRINT TO INSTALL (2) 6x6 JUNCTION BOXES WITH 1-1/4" CONDUIT FOR TRANSITION FROM 2" CONDUIT TO CN3911

PROPOSED 2" FLEX A/G 6' FROM TELCO PPC TO CN3911

PROPOSED -48V/24V DC POWER TO BE ROUTED IN NEW 3/4" FLEX CONDUIT U/G WITH 2 #12 AWG. INSTALL CONDUIT BETWEEN UAM AND MODCELL. CONDUIT DISTANCE IS APPROX. 15'

2 **EQUIPMENT PLAN**

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"

AAV SCOPE OF WORK NOTES:

1. FIBER RUN: PROPOSED AT&T 6 STRAND FIBER AND SPRINT MULE TAPE TO ORIGINATE FROM EXISTING CORNING BOX AND RUN WITHIN NEW 2"ø ABOVE GROUND CONDUIT TO COPPER DEMARK BOX AND RUN IN EXISTING 4" U/G PVC CONDUIT TO NEW CIENA 3911. BACKBOARD INSTALLED BY SPRINT. 52' TOTAL
2. AT&T TO INSTALL CIENA 3911 ON NEW BACKBOARD INSTALLED BY SPRINT
3. PROPOSED ETHERNET CABLE TO CONTINUE FROM PROPOSED CN3911 TO EXISTING SPRINT BTS CABINET (APPROX ±15' TOTAL)
4. POWER RUN: PROPOSED -48V/24V DC POWER TO BE ROUTED IN NEW 3/4" FLEX CONDUIT U/G WITH 2 #12 AWG. INSTALL CONDUIT BETWEEN UAM AND MODCELL.
5. INSTALL NEW 15A, 120V GFCI RECEPTACLE IN 10x10 NEMA 3R ENCLOSURE ON NEW BACKBOARD

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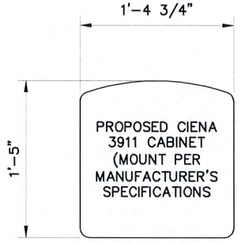
DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

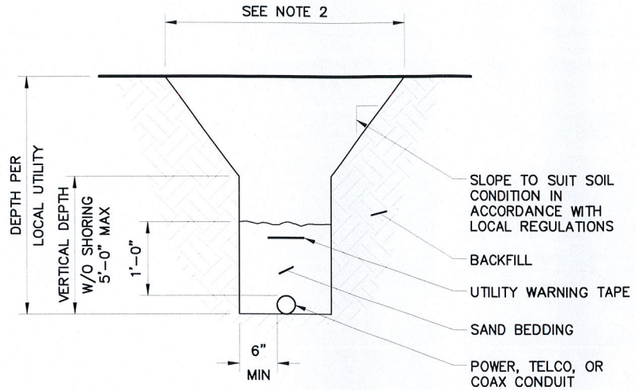
SHEET TITLE:
AAV DRAWINGS
KEY & EQUIPMENT PLAN

SHEET NUMBER: C07A | REV.: 0



1 TYP CIENA 3911 SPECIFICATIONS

SCALE: NTS

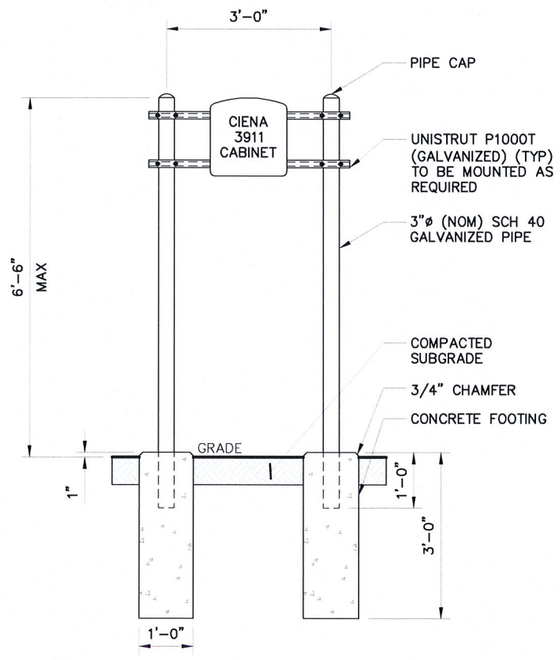


NOTES:

1. DETAIL SHOWN IS FOR ONE CONDUIT. MULTIPLE CONDUITS CAN BE PLACED IN THE SAME TRENCH AS LONG AS A MINIMUM SEPARATION PER THE LOCAL UTILITY COMPANIES IS MAINTAINED. IN ALL CASES THE MINIMUM CENTER TO CENTER SPACING BETWEEN CONDUITS IS 1'-0" (NOT REQUIRED FOR COAX).
2. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.

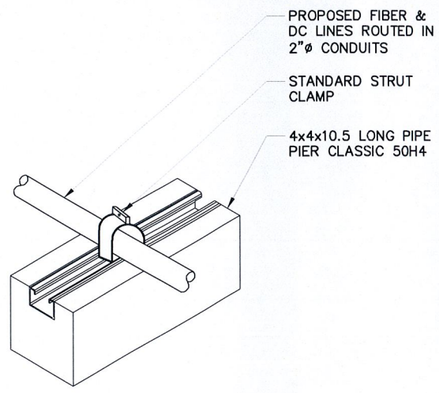
3 TYP TRENCH DETAIL

SCALE: NTS



2 UNISTRUT FRAME DETAIL

11x17 SCALE: 3/8" = 1'-0" | 24x36 SCALE: 3/4" = 1'-0"



4 TYP CONDUIT ALONG CONCRETE DETAIL

SCALE: NTS

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SHEET TITLE: AAV DRAWINGS DETAILS

SHEET NUMBER: C07B | REV.: 0

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GENERAL SPECIFICATIONS

1. Contractor shall verify that the total number of service entrance disconnects in the existing utility company pedestal must not exceed six. If the new service added exceeds this value, contractor must coordinate with the utility company and authority having jurisdiction. Run an additional exclusive and dedicated service lateral set for the new load added to the compound as per NEC Article # 230-2(B)
2. All work should be done in a neat workmanlike manner, left clean and free from defects, and completely operable. The contractor shall provide all equipment as scheduled on the drawings. All materials shall be new and all work and materials shall be guaranteed by the contractor for a period of one (1) year from the date of acceptance by the owner.
3. All work shall be carefully coordinated with the landlord and all trades involved, and the contractor shall provide proper connections, fittings, valves, piping, etc. for all equipment furnished by carrier or other trades involved in this contract.
4. Contractor shall inform the engineer immediately of any conflict discovered before performing any work related to such conflict.
5. Provide all required temporary utilities and pay all associated fees and operating costs.
6. Before submitting this bid, the contractor shall visit the job site to examine and fully acquaint himself with the existing job conditions, paying particular attention to the location of existing conditions to make a complete and operable system without additional cost to the carrier or the engineer.
7. Obtain all permits and approvals from authorities having jurisdiction and paying all fees required.
8. Label all equipment served from Sprint panelboard with phenolic labels sized in relation to usage.
9. Contractor to provide and install engraved label on the Sprint meter socket enclosure.
10. Redlined As-Builts are to be delivered to a Sprint representative.
11. The equipment/protections must be rated for standard of AIC rate higher than incoming equipment and/or utility company AIC rate.

GROUNDING NOTES

1. The subcontractor is responsible for properly sequencing grounding and underground conduit installation as to prevent any loss of continuity in the grounding system or damage to the conduit.
2. All exterior ground conductors shall be #2 AWG solid tinned copper unless otherwise indicated.
3. All ground connections above grade (interior & exterior) shall be formed using high press crimps.
4. All ground connections below grade shall be exothermic (Cadweld).
5. Connections to equipment and enclosures shall be made utilizing two-hole ground lugs with an antioxidant compound.
6. Maximum resistance of the completed ground system shall not exceed 5 Ohms. Testing shall be performed in accordance with technical specification for facility grounding, using fall potential method.
7. Where grounding connections are made to painted metal surfaces shall be scraped clean to bear metal to ensure proper contact. Surfaces shall be restored to match original finishes.
8. Use of 90° bends in the protection grounding conductors shall be avoided when 45° bends can be adequately supported.
9. Ground depth shall be 30" minimum below finished grade, or 6" below frost line, whichever is greater.

ELECTRICAL SYMBOLS		ABBREVIATIONS	
WIRING SYMBOLS		AWG	AMERICAN WIRE GAUGE
	DISCONNECT SWITCH	BCW	BARE COPPER WIRE
M	METER	DWG	DRAWING
	CIRCUIT BREAKER	EMT	ELECTRICAL METALLIC TUBING
	CADWELD TYPE CONNECTION	GEN	GENERATOR
	COMPRESSION TYPE CONNECTION	MGB	MASTER GROUND BAR
	GROUND ROD WITH ACCESS	PVC	RIGID (SCH 40) PVC CONDUIT
	CHEMICAL GROUND ROD	RGS	RIGID GALVANIZED STEEL
	GROUND ROD	RWY	RACEWAY
	CONDUIT TURNING DOWN	TYP	TYPICAL
	CONDUIT TURNING UP		
JB	JUNCTION BOX		
PB	PULL BOX		
	CONDUIT RUNNING ABOVE GRADE		
	CONDUIT RUNNING UNDER GROUND		

ELECTRICAL SPECIFICATIONS

1. General:
   A. The electrical contractor shall furnish all labor,materials, tools, transportation equipment, services and facilities required for the complete, proper and substantial installation of all electrical work. All fixtures, devices, and equipment shown, noted or required on these drawings, and/or contained herein shall be connected from the source of electric power to the final connection, tested and made ready for satisfactory operation.
   B. Service equipment shall be 120/240 VAC, 100 Amp, single phase, unless otherwise directed by the Sprint Construction Manager.
   C. Unless otherwise indicated, the arrangement, position, connections, etc. shown on the drawings shall be taken on a diagram basis. The right is reserved by the engineer to make minor changes in locations and arrangements when required by job development without additional compensation to the contractor.
   D. All work shall conform to the adopted edition of the National Electrical Code and local, state and applicable codes.
   E. When a utility company meter is specified, the contractor shall obtain all associated cut-in cards, inspections, etc., necessary to have the meter set. It is the responsibility of the contractor to meet with utility company prior to construction to verify source of electric service, tap and meter location.
2. Identification:
   A. Provide typewritten directories for panels, indicating use of each branch circuit and designating spare circuits. Handwritten directories are not acceptable.
   B. All panel boards, switches and other equipment enclosures shall bear engraved nameplates as manufactured by Seton Nameplate Corp., or equal lettering to be 1/2" white letters on black background unless noted otherwise.
3. Raceways:
   A. Minimum conduit size shall be 3/4" unless otherwise noted on the drawings.
   B. Exposed raceways shall be run true, plumb, and parallel or perpendicular to building lines.
   C. Conduit routings are schematic. Sub contractor shall install conduits so that access to equipment is not blocked.
4. Wiring Methods:
   A. All feeders shall consist of pulled conductors in conduit. All branch circuits shall consist of pulled conductors in conduit. Except 15 and 20 Ampere 1 pole lighting receptacles, miscellaneous branch circuits concealed above suspended ceilings or within dry walls shall consist of type MC metal clad cable if allowed by code. Connections to communications cabinets and vibrating equipment shall consist of pulled conductors in LFMC, maximum 6' in length.
   B. Conductors shall be continuous from origin to panel or equipment without splices. Where tap splices are necessary and approved, they shall be made with suitable connectors in junction boxes.
   C. Equipment ground conductors shall be provided for all feeders and branch circuits.
   D. The contractor shall conceal all conduit routing passing through finished areas. Conduit routing through unfinished shall be supported as specified in drawings. Unless clearly specified, no conduits shall be routed on exterior surface of buildings.
   E. All conductor terminals shall be U.L. listed for minimum of 75° C.
   F. Provide fire stopping around all conduits at wall and floor penetrations.
   G. Seal all exterior wall penetrations as required.
   H. Underground conduits shall be a minimum of 24" below finished grade. All underground work shall be documented by photograph before any backfill is begun. Photos will be required at time punchlist is performed. Feeders shall be individual conductors in schedule 40 PVC, direct burial conduit. When buried conduits are subject to vehicular traffic, conduits shall be encased in concrete. All sweeps below grade shall be schedule 80 PVC.
   I. All feeders in "damp" or "wet" locations shall consist of individual conductor in rigid galvanized steel or rigid aluminum conduit. Liquid-tight flexible metallic conduit shall be utilized when connecting to equipment cabinets and vibrating equipment. The maximum length for flexible conduit shall be 6'-0".
5. Wiring Devices:
   A. Switches, receptacles and other wiring devices shall be specification grade of type, size and rating indicated on the drawings.
6. Disconnect Switches:
   A. Switches shall be quick-make, quick-break NEMA 1 for indoor use and NEMA 3R for outdoor use as manufactured by General Electric, Square D or equal. Electrical contractor to provide all safety disconnects.
7. Special Requirements:
   A. The electrical contractor shall furnish and install all power and control wiring for equipment contained in contract documents.
   B. All work requiring an outage or interruption of service (power, telephone) shall be scheduled only at such time permitted by owner.
8. Lighting fixtures and lamps:
   A. Lighting fixtures shall be furnished complete with necessary hardware and lamps.
9. Transformers:
   A. Transformers shall be dry type with average temperature rise not to exceed 150° C (115° C)(80° C)
   B. Transformers shall be as manufactured by Square D, General Electric, or Siemens.

The contractor is required to contact the utility companies prior to starting construction. This is necessary to reconfirm that the utility points have remained consistent with the contractor documents:

* Telephone Demarcation Point
* Electrical Service Tap Point
* New Utility Meter Location

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DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
ELECTRICAL
NOTES

SHEET NUMBER:	REV.:
E01	0

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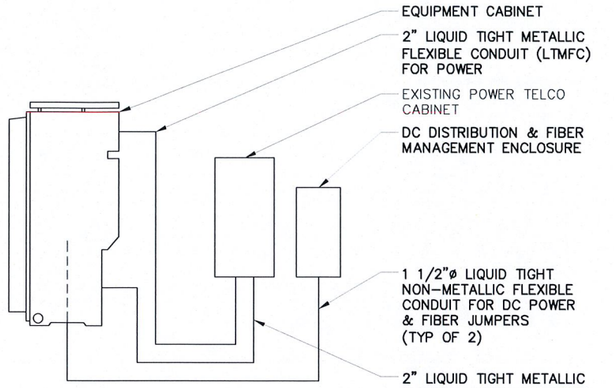
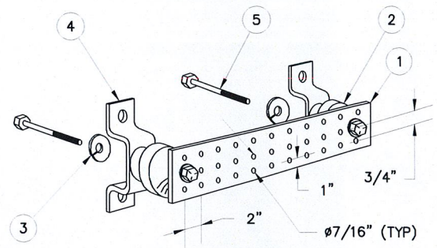


1 PLUMBING SCHEMATIC (IF REQUIRED)

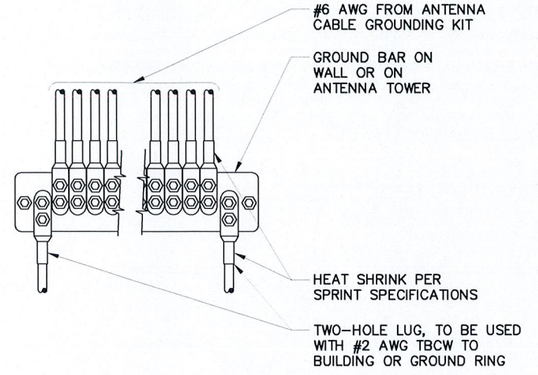
SCALE: NTS



1. GALVANIZED STEEL GROUND BAR, 1/4" x 4" x 20", HAGER PART NO TGBI-14420C OR A.L.T. PART NO. 382227. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4.
3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056.
5. 5/8-11 X 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

2 GROUND BAR DETAIL

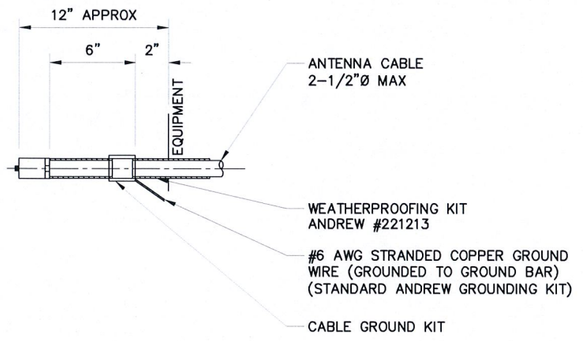
SCALE: NTS



NOTE:
CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS

3 GROUND LUG TO GROUND BAR CONNECTION DETAIL

SCALE: NTS



NOTE:
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

4 CABLE GROUND KIT CONNECTION DETAIL

SCALE: NTS

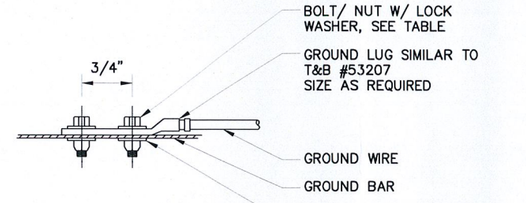
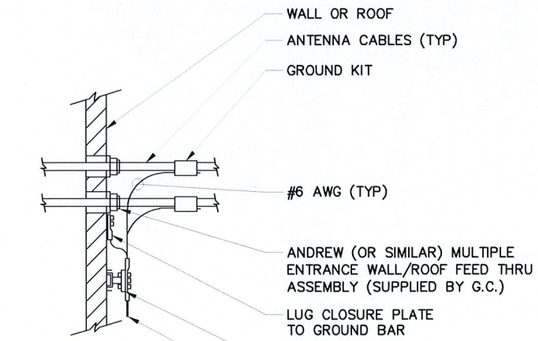


TABLE		
WIRE SIZE	LUG #	BOLT SIZE
#4/0	53212	1/2" – 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#2	53207	1/4" – 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#6	53205	

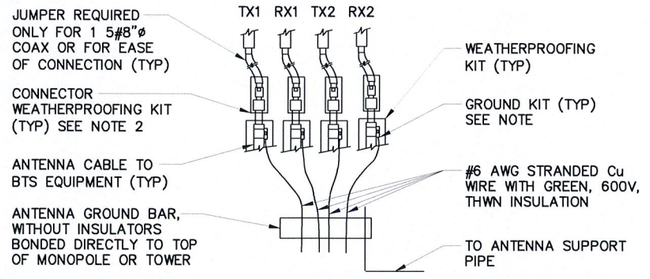
5 GROUND LUG CONNECTION DETAIL

SCALE: NTS



6 CABLE GROUNDING DETAIL

SCALE: NTS



NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.
3. ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH COAX GROUND POINT OR BACK-A-LITE PLATE ON GROUND BAR.

7 GROUND BAR TO GROUND WIRE CONNECTION DETAIL

SCALE: NTS

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Alcatel·Lucent

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
0	05-28-13	ISSUED FOR CONSTRUCTION	JRF	KCD

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Stephen A. Bray
PROFESSIONAL ENGINEER
STATE OF CONNECTICUT STEPHEN A. BRAY No. 26657 LICENSED PROFESSIONAL ENGINEER
CT LICENSE: 26657 5/28/13

PROJECT NUMBER:
332.1514

SITE INFORMATION:
218 WHEELER ROAD
TORRINGTON, CT 06759
LITCHFIELD COUNTY

CT33XC592

PROJECT TYPE:
NETWORK VISION

DRAWN BY:	CHECKED BY:	DATE:
JLS		03-30-12

SHEET TITLE:
ELECTRICAL & GROUNDING DETAILS

SHEET NUMBER:	REV.:
E02	0

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