Cherundolo Consulting

1280 Route 46 West, Suite 9, Parsippany NJ, 07054

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

EM-SPRINT-047-180126

Re: Notice of Exempt Modification Application
232 South Main St, East Windsor CT

Latitude: N41.8771
Longitude: W72.6107

RECEIVED
JAN 26 2018
Connecticut Siting Council

ORIGINAL

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antennas and 3 remote radio units at the 123' centerline level of the existing lattice tower. Sprint proposes to add 3 panel antennas and 6 remote radio unit at 123' centerline on the tower. Sprint further proposes to add 1 hybrid cable and 30 Antenna to RRH jumper cables. Sprint is performing a new high-performance upgrade for cellular mobile communications. It is designed to increase the capacity and speed of mobile telephone networks.

.

Please accept this letter as notification to the Council, pursuant to R.C.S.A. Section 16-50j-73, for 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 is being sent to Robert Maynard First Selectman for the Town of East Windsor as well as Laurie Whitten, Town Planner for the Town of East Windsor and Balch Bridge Street Corporation, owner of the property.

Attached is a summary of the planned modifications, including power density calculations reflecting the change in Sprint's operations at the site. Also included is documentation of the structural sufficiency of the tower with proposed modifications to accommodate the revised antenna configuration as well as the original approval for the site as well as the latest CSC decision, tax sheet and tax map.

Existing Facility

CSC Summary Statement – CT03XC090 – 232 South Main St, East Windsor CT 06088

The Balch Tower facility is located at 232 South Main St, East Windsor CT and is owned by Balch Bridge Street Corporation, the Site coordinates are: N41.8771, W72.6107.

The existing facility consists of a 188' Self Support Lattice Tower. Sprint currently operates wireless communications equipment on a platform on a concrete slab at the facility and has 3 antennas and 3 RRU's mounted on at a centerline of 123' feet.

Statutory Considerations

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

1. The height of the overall structure will be unaffected.

2. The proposed changes will not require an extension of the property boundaries.

3. The proposed additions will not increase the noise level at the existing facility by

six decibels or more, or to levels that exceed state and/or local criteria

4. 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 Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading.

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

Respectfully submitted,

Ryan G Bailey
Charles Cherundolo Consulting
856-625-1596
ryan@mackenzierealtyconsulting.com

Additional Recipients:
Robert Maynard First Selectman for the Town of East Windsor – Via FedEx
Laurie Whitten, Town Planner for the Town of East Windsor - Via FedEx
Balch Bridge Street Corporation, owner of the property – Via FedEx

TOWN OF EAST WINDSOR - PLANNING & ZONING COMMISSION
AUGUST 13, 1996 - PUBLIC HEARING #1271

CONDITIONS OF APPROVAL

BALCH BRIDGE STREET CORPORATION
SPECIAL USE PERMIT - TELECOMMUNICATIONS TOWER
232 SOUTH MAIN STREET
EAST WINDSOR, CONNECTICUT

Motion by: Ed Filipone

Seconded by: Susan Kiss

TO APPROVE the application of Balch Bridge Street Corporation for a Special Use Permit to allow the construction of a 200 foot tall telecommunications tower on property located at 232 South Main Street which is presently zoned B-2 and shown on Assessors Map 33, Block 5, Lot 84-1. This approval is subject to conformance with the reference plans and the following conditions:

Referenced plans:

- "Key Map, Balch Bridge Street Corporation, South Main Street - U.S. Route 5 East Windsor, Connecticut" Sheet 1 of 3, Scale 1'=200' BY J.R. Russo & Associates dated 7-2-96.
- "Balch Bridge Street Corporation, South Main Street - U.S. Route 5 East Windsor, Connecticut" Sheet 2 of 3, Scale 1'=100' BY J.R. Russo & Associates dated 7-2-96.
- "Site Plan, Balch Bridge Street Corporation, South Main Street - U.S. Route 5 East Windsor, Connecticut" Sheet 1 of 3, Scale 1'=200' BY J.R. Russo & Associates dated 7-2-96, revised to 7-30-96.

Conditions to be met prior to signing mylars:

1. The applicant shall submit an agreement for review and approval of the town attorney, to indemnify and hold harmless the Town of East Windsor against any claims that may be made should the proposed tower fall and cause damages to property or individuals. The hold harmless agreement shall be recorded on the land records of the subject property and of the property to the immediate south which is also under the applicant's control.
2. A copy of this approval Motion shall be recorded on the land records.

Conditions to be met prior to the issuance of a Zoning Permit:

3. Two sets of mylars shall be submitted for the signature of the Commission Chairman and Secretary. One set of mylars shall be filed on the land records and another shall be filed in the East Windsor Planning and Zoning Commission office.

Conditions to be met Prior to Certificate of Compliance:

4. All conditions of this approval motion shall be complied with.

BALCH BRIDGE STREET CORPORATION
SPECIAL USE PERMIT - TELECOMMUNICATIONS TOWER
232 SOUTH MAIN STREET
EAST WINDSOR, CONNECTICUT

General Conditions:

5. No work may begin until a Zoning and Building Permit have been issued.

6. Construction of improvements as approved by this special use/site plan approval must commence by August 13, 1997 and all improvements must be completed within 1 year from the start of construction, otherwise approval shall become null and void unless an extension is granted by the Commission.

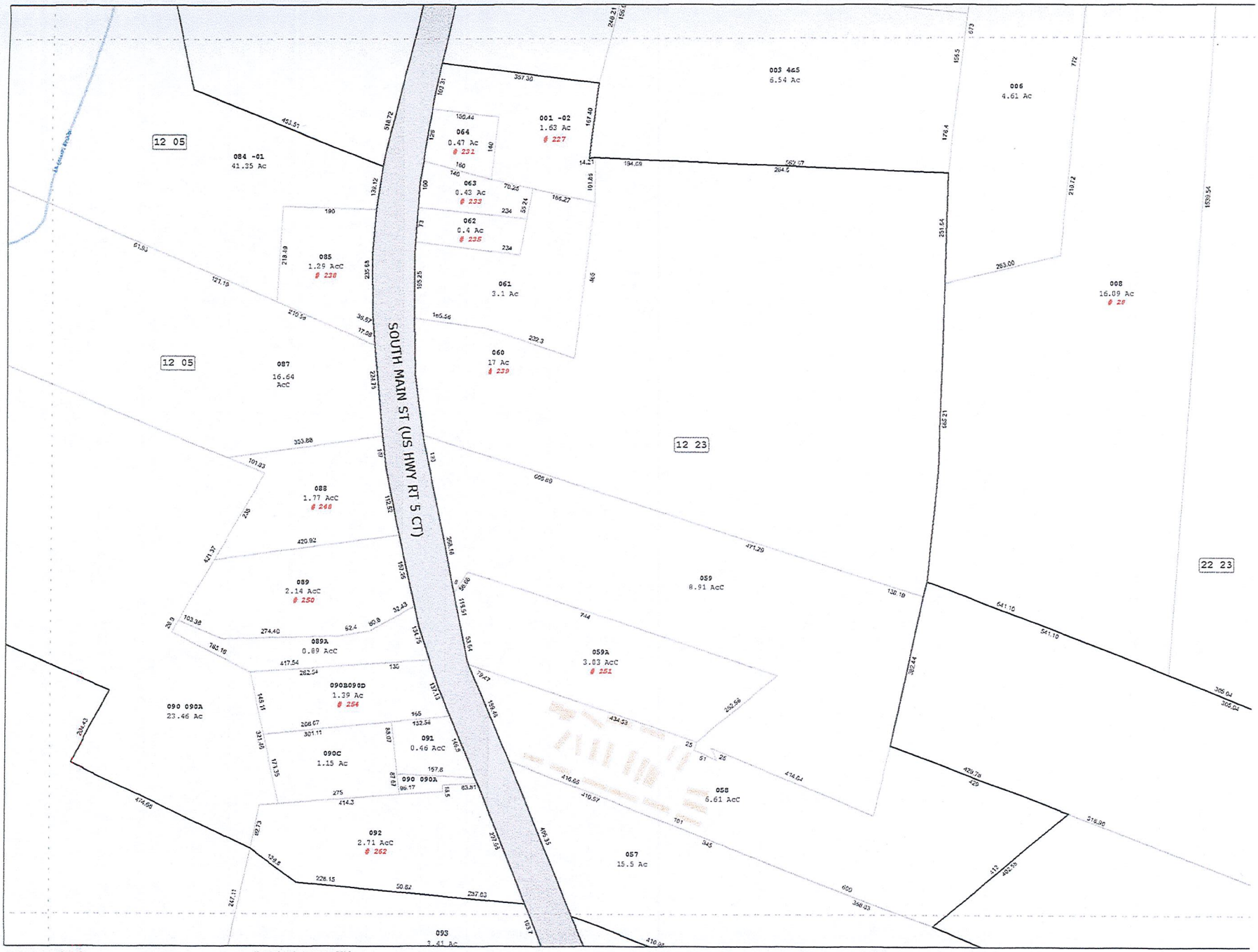
7. This Special Use Permit approval is for the specific use identified in the application. Any changes in use or tenancy require a new zoning permit and may require additional Commission approvals.

8. No structures or buildings other than the tower shall be erected without further Site Plan Review by the Commission.

9. This project shall be constructed and maintained in accordance with the referenced plans. Minor modifications to the approved plans which result in lesser impacts may be allowed subject to staff review and approval.

10. By acceptance of this permit and conditions, the applicant and owner acknowledge the right of Town staff to periodically enter upon the subject property for the purpose of determining compliance with the terms of this approval.

VOTE: In Favor: Unanimous



Map: 012

NEGEO

Map Printed: January, 2016

This map is for informational purposes only. All information is subject to verification by any user. The Town of East Windsor and its mapping contractors assume no legal responsibility for the information contained herein.

TOWN OF EAST WINDSOR, CONNECTICUT

Property Assessment Maps

Revised: October 1, 2015

1 : 100

0 50 100 200 300 400

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

August 15, 2014

Melanie Howlett
HPC Wireless Services
22 Shelter Rock Lane, Building C
Danbury, CT 06811

RE: **EM-SPRINT-047-140728** – Sprint Spectrum, L.P. notice of intent to modify an existing telecommunications facility located at 232 South Main Street, East Windsor, Connecticut.

Dear Ms. Howlett:

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:

- The tower shall be reinforced in accordance with the recommendations in the structural analysis report prepared by All Points Technology dated June 13, 2014 and stamped by Robert Adair;
- Within 45 days following completion of the equipment installation, Sprint shall provide documentation certified by a professional engineer that its installation complied with the recommendations of the structural analysis;
- 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;
- Any nonfunctioning antenna and associated antenna mounting equipment on this facility owned and operated by Sprint shall be removed within 60 days of the date the antenna ceased to function.
- 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 July 25, 2014. 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 by any dimension, increase noise levels at the tower site boundary by six decibels or more, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standards adopted by the Federal Communications Commission pursuant to Section 704 of the Telecommunications Act of 1996 and by the state Department of Energy and

Environmental Protection pursuant to Connecticut 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/RDM/cm

c: The Honorable Denise Sabotka Menard, First Selectman, Town of East Windsor
Laurie Whitten, Town Planner, Town of East Windsor
Balch Bridge Street Corp.

Town of East Windsor
Property Listing Report

Parcel ID 012 05 084 -01

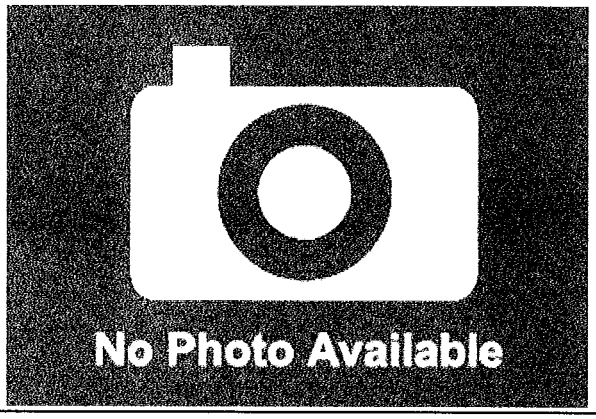
Account

Property Information

Owner	BALCH BRIDGE STREET CORP
Address	232 SOUTH MAIN ST
Mailing Address	P O BOX 678 EAST WINDSOR , CT 060880678
Land Use	- Commercial Vacant Land
Land Class	Commercial
Previous MBL	

Census Tract	4841000
Neighborhood	
Zoning	M-1
Acreage	0
Utilities	
Lot Setting/ Desc	/

Photo



PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings		
Outbuildings		
Improvements		
Extras		
Land		
Total	561000	0
Previous		

Construction Details

Stories	0
Building Style	
Building Use	
Building Condition	
Total Rooms	
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

EXTERIOR WALLS:	
Primary	
Secondary	
INTERIOR WALLS:	
Primary	
Secondary	
FLOORS:	
Primary	
Secondary	
HEATING/AC:	
Heating Type	
Heating Fuel	
AC Type	

BUILDING AREA:	
Effective Building Area	
Gross Building Area	
Total Living Area	0

SALES HISTORY:	
Sale Date	12/01/1979
Sale Price	0
Book/ Page	0115/0840

Report Created On 1/11/2018

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

SPRINT Existing Facility

Site ID: CT03XC090

Balch Tower
236 South Main Street
East Windsor, CT 06088

October 31, 2017

EBI Project Number: 6217004814

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	11.53 %

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

EBI Consulting
environmental | engineering | due diligence

October 31, 2017

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

Emissions Analysis for Site: **CT03XC090 – Balch Tower**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **236 South Main Street, East Windsor, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located 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 $\mu W/cm^2$ 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 population 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 population 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 limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands 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 SPRINT Wireless antenna facility located at **236 South Main Street, East Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. 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 equipment was calculated using the following assumptions:

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

6) 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.

7) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

8) The antennas used in this modeling are the **RFS APXVSPP18-C-A20 and the Commscope DT465B-2XR** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **123 feet** above ground level (AGL) for **Sector A**, **123 feet** above ground level (AGL) for **Sector B** and **123 feet** above ground level (AGL) for Sector C.

10) 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 calculations were done with respect to uncontrolled / general population threshold limits.

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SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20	Make / Model:	RFS APXVSPP18-C-A20
Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd	Gain:	13.4 / 15.9 dBd
Height (AGL):	**123 feet**	Height (AGL):	**123 feet**	Height (AGL):	**123 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	10	Channel Count	10	Channel Count	10
Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts	Total TX Power(W):	220 Watts
ERP (W):	7,537.38	ERP (W):	7,537.38	ERP (W):	7,537.38
Antenna A1 MPE%	**2.25 %**	Antenna B1 MPE%	**2.25 %**	Antenna C1 MPE%	**2.25 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR	Make / Model:	Commscope DT465B-2XR
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**123 feet**	Height (AGL):	**123 feet**	Height (AGL):	**123 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	5,118.23	ERP (W):	5,118.23	ERP (W):	5,118.23
Antenna A2 MPE%	**1.34 %**	Antenna B2 MPE%	**1.34 %**	Antenna C2 MPE%	**1.34 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**3.59 %**
AT&T	1.82 %
MetroPCS	0.42 %
Town	0.18 %
T-Mobile	0.39 %
Nextel	0.24 %
Verizon Wireless	4.89 %
Site Total MPE %:	**11.53 %**

SPRINT Sector A Total:	3.59 %
SPRINT Sector B Total:	3.59 %
SPRINT Sector C Total:	3.59 %
Site Total:	11.53 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Sprint 850 MHz CDMA	1	437.55	123	1.15	850 MHz	567	0.20%
Sprint 850 MHz LTE	2	437.55	123	2.30	850 MHz	567	0.41%
Sprint 1900 MHz (PCS) CDMA	5	622.47	123	8.17	1900 MHz (PCS)	1000	0.82%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	123	8.17	1900 MHz (PCS)	1000	0.82%
Sprint 2500 MHz (BRS) LTE	8	639.78	123	13.44	2500 MHz (BRS)	1000	1.34%
						Total:	**3.59%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	3.59 %
Sector B:	3.59 %
Sector C:	3.59 %
SPRINT Maximum Total (per sector):	3.59 %
Site Total:	11.53 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.53 %** of the allowable FCC established general population 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.

MASER CONSULTING
—CONNECTICUT—

331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
T: 732.383.1950
www.maserconsulting.com

Sprint®

Self-Support Tower Structural Analysis
Rev 0

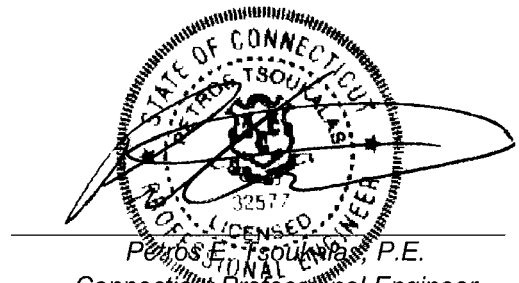
Site Name: Balch Tower
Site ID: CT03XC090

Site Address: 236 South Main Street
East Windsor, CT 06088
Hartford County

Maser Project Number: 17924020A

October 25, 2017

Analysis Type	Self-Support Tower	Foundation
Pass/Fail	Pass	Adequate
Mount Utilization	92.5%	N/A



Panos E. Tsoukalas, P.E.
Connecticut Professional Engineer
PE License # 32577

Objective:

The objective of this report is to determine the capacity of the existing 188' Self-Support tower structure at the subject facility for the final **SPRINT** wireless telecommunications configuration, per the applicable codes and standards.

Introduction:

Maser Consulting Connecticut has performed limited field observations on July 13, 2017 to visually verify the existing condition of the structure from ground and to locate and quantify the existing wireless appurtenances where possible. Maser Consulting Connecticut has reviewed the following documents in completing this report:

- RFDS 111226 provided by Sprint, dated August 15, 2017.
- Construction Drawings prepared by Maser Consulting Connecticut, Project# 17924020A, dated September 27, 2017.
- Previous Structural Analysis report prepared by Fullerton Engineering Consultants, Project# 2016.0200.0010, dated June 6, 2017.
- Previous Structural Analysis report prepared by CENTEK Engineering Consultants, dated August 23, 2016
- Previous Structural Analysis report prepared by EBI Consulting, Project# 62143108, dated May 30, 2014

The existing structure is an existing 188'-0", three-legged, tapered lattice Self-Support tower originally designed and manufactured by ROHN, with a top face width of 6'-7.5" and bottom face width of 25'-0". The manufacturer's drawings and calculations were unavailable for use in this report. The tower geometry, structure member sizes and foundation information were all obtained from the referenced report prepared by Fullerton Engineering Consultants, Project# 2016.0200.0010, dated June 6, 2017. The existing **SPRINT** equipment is supported on existing sector frames at a centerline of approximately 123'-0" above ground level, which will be analyzed under a separate report. This report is based upon this information, as well as the information obtained in the field.

Discrete and Linear Appurtenances:

Maser Consulting Connecticut understands the existing & proposed **SPRINT** loading to be as follows:

- *(3) RFS APXVSPP18-C-A20 Panel Antenna (Existing)*
- **(3) Commscope DT465B-2XR Panel Antenna (Proposed per RFDS)**
- *(3) ALU 1900 RRH (Existing)*
- *(3) ALU 800 RRH (Existing)*
- **(3) ALU TD-RRH8X20-2.5 RRH (Proposed per RFDS)**
- **(3) ALU RRH-2X50-800 RRH (Proposed per RFDS)**
- (3) 1-1/4" Hybrid Cable (Existing)
- **(1) Hybrid Cable (Proposed)**

The overall antenna loading is found in the Appendix A of this report.

Tower Member Information:

See the material Take-Off sheet in appendix A for Self-Support Tower information.

Codes, Standards and Loading:

Maser Consulting Connecticut utilized the following codes and standards:

- 2016 Connecticut State Building Code, Incorporating The 2012 IBC
- Structural Standards for Antenna Supporting Structures and Antennas ANSI/TIA-222-G
    - Basic Wind Speed – 95 mph
    - Service Wind Speed – 60 mph
    - Ice Wind Speed – 40 mph (1.0" Ice)
    - Exposure Category – C
    - Structure Class – II
    - Topographic Category - 1

Analysis Approach & Assumptions:

The analysis approach used in this structural analysis is based on the premise that if the existing Self-Support tower is structurally adequate to support the existing and proposed equipment per the aforementioned codes and standards, or if the increase in the forces in the structure are deemed to be negligible or acceptable, then the proposed equipment can be installed as intended. Tower Numerics, tnx Tower, a tower analysis and design program, designed specifically for the telecommunications industry and for all applicable codes and standards was used for this structural analysis.

The following assumptions were utilized in this report:

- Structural Steel Main Legs Diagonals and Girts are constructed of A572-50 Grade Steel.
- Structural Steel Plate members are constructed of A36 Grade.
- Structural Bolts are assumed to be A325N grade.
- Tower is installed to plumb and is maintained properly without any structural deficiencies or deteriorations to the original design.
- The existing tower foundations are assumed to have been constructed per the original design drawings. As such the calculated foundation capacities are used for comparison to the base reactions of this analysis.
- It is assumed that the telecommunication equipment supports, antenna supports, and existing structure have been designed by a registered licensed professional engineer for the existing loads acting on the structure, as required by all applicable codes, prior to the proposed modifications listed within this report.
- It is assumed that information provided by the client regarding the structure itself, the antenna models, feed lines, and other relevant information is current and correct.
- It is assumed all other existing appurtenances, antennas, cables, etc. belonging to others have been installed and supported per code and per specifications so as not to damage any existing structural support members, and that any contributing loads from adjacent equipment has been taken into consideration for their design.

Calculations:

The calculations are found in Appendix A of this report.

Conclusion:

The existing Self-Support tower was analyzed for the loading in the applicable codes and standards. The tower has been determined to be structurally **ADEQUATE** to support the proposed and existing antennas, based upon the aforementioned assumptions. The self-support tower has been determined to be stressed to a maximum of **92.5%** of its structural capacity with the maximum usage occurring at the diagonals between 0'-20' elevation.

Additionally, the base reactions have been compared to the previous structural analyses. It is assumed that the foundations and capacities noted in the previous structural analysis by Fullerton Engineering are accurate. Based on the comparison of the capacities to the base reactions of this analysis, the existing concrete foundations have been determined to have **ADEQUATE** structural capacity. Therefore, the proposed **SPRINT** installation **CAN** be placed as intended.

Foundation Reaction Comparison:

	Capacity*	Current Reactions	Pass/Fail
Bearing Capacity	9 ksf	2.89 ksf	**Pass**
Uplift	383.92 kips	282.04 kips	**Pass**

* *Capacities were calculated in the structural analysis by* Fullerton Engineering

It should be noted that due to a lack of information Maser Consulting Connecticut did not perform an analysis on the foundation, but a comparison of the capacities summarized in previous analysis with the current forces has been determined. If information is provided then this report can be amended. The conclusions reached by Maser Consulting Connecticut in this evaluation are only applicable for the existing structural members supporting the proposed **SPRINT** telecommunications installation described herein.

We appreciate the opportunity to be of service on this project. If you should have any questions or require any additional information, please do not hesitate to call our office.

Sincerely,
Maser Consulting Connecticut

BQin

Petros E. Tsoukalas, P.E.
Telecommunications Discipline Leader

Bintao Qin, E.I.T.
Structural Engineer

MASER
CONSULTING P.A.

APPENDIX A

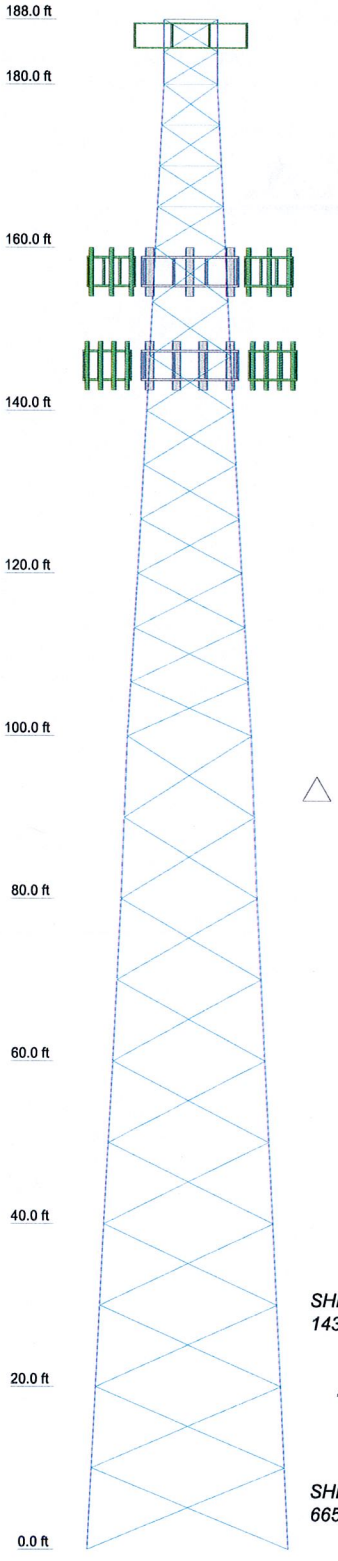
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.
11. TOWER RATING: 92.5%

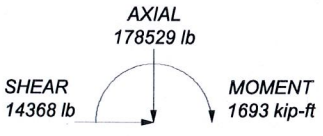
SECTION	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs		ROHN 8 EH	ROHN 8 EHS	ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH	ROHN 4 EH	ROHN 3 EH	Pipe 3.5" x 0.216" (3 STD)	
Leg Grade					A572-50					
Diagonals	L4x4x3/8		L4x4x5/16		L3 1/2x3 1/2x1/4		L3x3x1/4	L2 1/2x2 1/2x1/4	L1 3/4x1 3/4x3/16	
Diagonal Grade				A572-50				A36		
Top Girts					N.A.				L3x3x1/4	
Horizontals				N.A.					L2x2x1/8	N.A.
Face Width (ft)	25	23.05	21	18.83	16.88	15.29	12.79	10.71	8.75	6.63
# Panels @ (ft)			10 @ 10				9 @ 6.66667		4 @ 5	2 @ 4
Weight (lb)	30390.5	5931.6	5230.1	4381.1	3910.8	2813.2	2753.5	2198.1	1550.7	1121.7	498.6



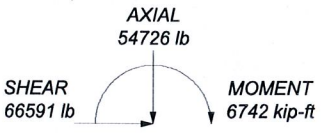
ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 329641 lb
SHEAR: 40213 lb

UPLIFT: -282039 lb
SHEAR: 35489 lb



TORQUE 8 kip-ft
40 mph WIND - 1.0000 in ICE



TORQUE 40 kip-ft
REACTIONS - 95 mph WIND

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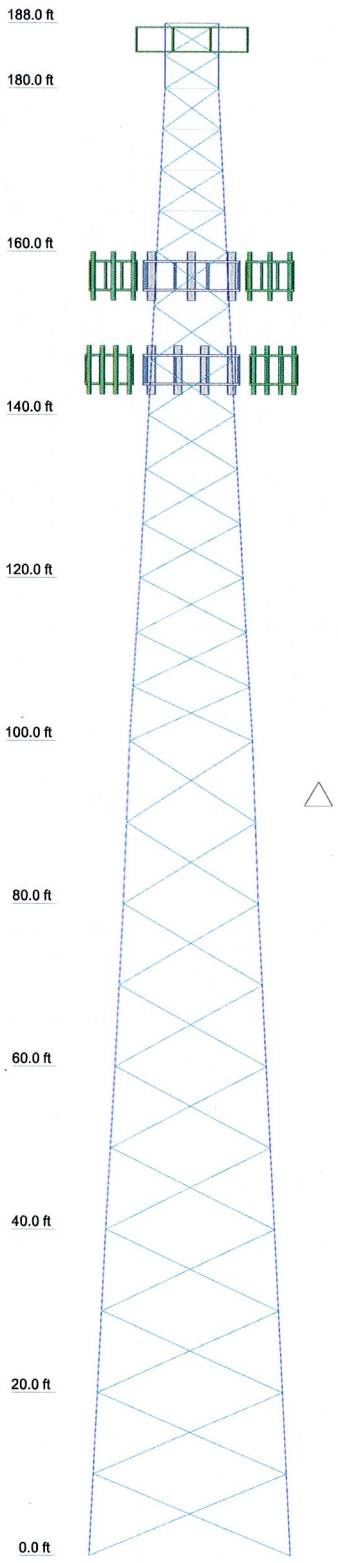
FAX: 732.383.1984
Consulting Engineers

Job: 17924020A			
Project: Balch Tower			
Client: Sprint	Drawn by: BQin	App'd:	
Code: TIA-222-G	Date: 10/25/17	Scale: N	
Path: R:\Projects\2017\17924000(TEMP)\17924020A(TEMP)\Structural\Rev 0\TNX Tower\ACT03XC090.eri		Dwg No.	

Section	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	ROHN 8 EH		ROHN 8 EHS	ROHN 6 EH	ROHN 6 EHS	ROHN 5 EH	ROHN 4 EH	ROHN 3 EH	Pipe 3.5" x 0.216" (3 STD)	
Leg Grade	A572-50									
Diagonals	L4x4x3/8		L4x4x5/16		L3 1/2x3 1/2x1/4	L3x3x1/4		L2 1/2x2 1/2x1/4	L1 3/4x1 3/4x3/16	
Diagonal Grade	A572-50							A36		
Top Girts	N.A.									L3x3x1/4
Horizontals	N.A.								L2x2x1/8	N.A.
Face Width (ft)	25	23.05	21	18.83	16.88	15.29	12.79	10.71	8.75	6.63
# Panels @ (ft)		10 @ 10				9 @ 6.66667			4 @ 5	2 @ 4
Weight (lb)	30390.5	5931.6	5230.1	4381.1	3910.8	2813.2	2753.5	2198.1	1550.7	1121.7	499.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
BCD-87010-EDIN	195	B66A-RRH4x45	145.5
Rohn 14' Platform	186	B66A-RRH4x45	145.5
(2) AM-X-CD-16-65-OOT-RET (ATT)	172	B25 RRH4X30-4R	145.5
(2) AM-X-CD-16-65-OOT-RET (ATT)	172	B25 RRH4X30-4R	145.5
(2) AM-X-CD-16-65-OOT-RET (ATT)	172	B25 RRH4X30-4R	145.5
800-10121 (ATT)	172	RRH 2x60 1900	145.5
800-10121 (ATT)	172	RRH 2x60 1900	145.5
800-10121 (ATT)	172	RRH 2x60 1900	145.5
RRUS-11 (ATT)	172	DB-B1-6C-12AB-0Z	145.5
RRUS-11 (ATT)	172	DB-B1-6C-12AB-0Z	145.5
RRUS-11 (ATT)	172	SitePro VFA10-RRU	145.5
TT19-08BP111-001 (ATT)	172	SitePro VFA10-RRU	145.5
TT19-08BP111-001 (ATT)	172	SitePro VFA10-RRU	145.5
TT19-08BP111-001 (ATT)	172	(3) SBNHH-1D85B	145.5
DTMABP7819VG12A (ATT)	172	(3) SBNHH-1D85B	145.5
DTMABP7819VG12A (ATT)	172	(3) SBNHH-1D85B	145.5
DTMABP7819VG12A (ATT)	172	RRH-2X50-800 (Sprint)	123
DC6-48-06-18-8F (ATT)	172	RRH-2X50-800 (Sprint)	123
RRUS-12 (ATT)	172	RRH-2X50-800 (Sprint)	123
RRUS-12 (ATT)	172	ALU RRH-4X45-1900 (Sprint)	123
RRUS-12 (ATT)	172	ALU RRH-4X45-1900 (Sprint)	123
APX16DWV-16DWVS	157	ALU RRH-4X45-1900 (Sprint)	123
APX16DWV-16DWVS	157	DT465B-2XR Panel Antenna W/M PIPE (Sprint)	123
APX16DWV-16DWVS	157		
(2) TMA	157	DT465B-2XR Panel Antenna W/M PIPE (Sprint)	123
(2) TMA	157		
(2) TMA	157	DT465B-2XR Panel Antenna W/M PIPE (Sprint)	123
Sector Mount	157		
Sector Mount	157	TD-RRH8x20-25 (Sprint)	123
Sector Mount	157	TD-RRH8x20-25 (Sprint)	123
(2) RV90-17-02DP	157	TD-RRH8x20-25 (Sprint)	123
(2) RV90-17-02DP	157	RRH-2X50-800 (Sprint)	123
(2) RV90-17-02DP	157	RRH-2X50-800 (Sprint)	123
BXA-70063-6CF-EDIN-X	145.5	RRH-2X50-800 (Sprint)	123
BXA-70063-6CF-EDIN-X	145.5	APXVSPP18-C-A20 (Sprint)	123
BXA-70063-6CF-EDIN-X	145.5	APXVSPP18-C-A20 (Sprint)	123
B66A-RRH4x45	145.5	APXVSPP18-C-A20 (Sprint)	123

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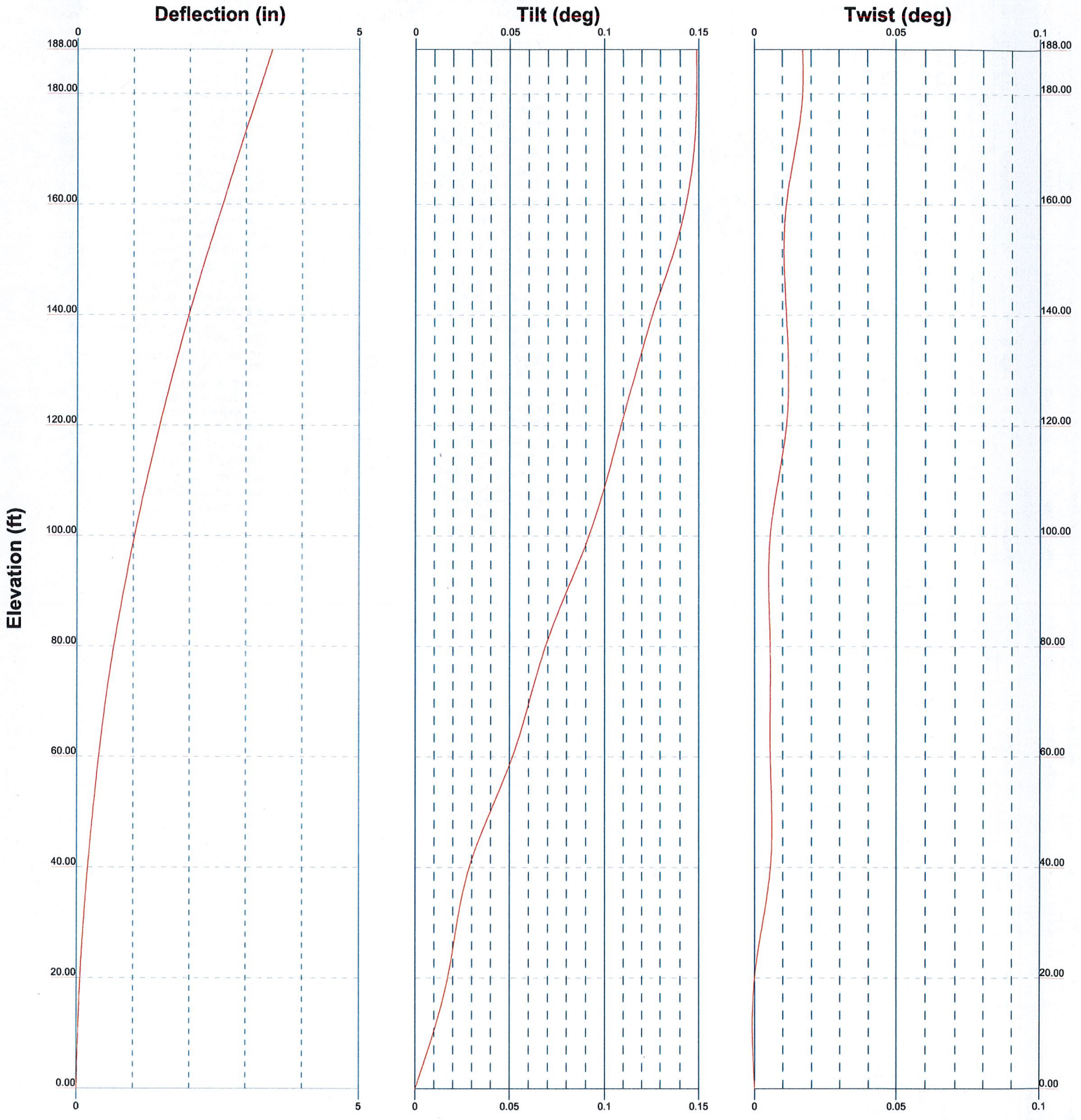
Job: *17924020A*			
Project: *Balch Tower*			
Client: Sprint	Drawn by: BQin	App'd:	
Code: TIA-222-G	Date: 10/25/17	Scale: N	
Path: R:\Projects\2017\17924000\TEMP\17924020A\TEMP\Structural\Rev 0\TNX Tower\CT03XC090.eri		Dwg No.	

TIA-222-G - Service - 60 mph

Maximum Values



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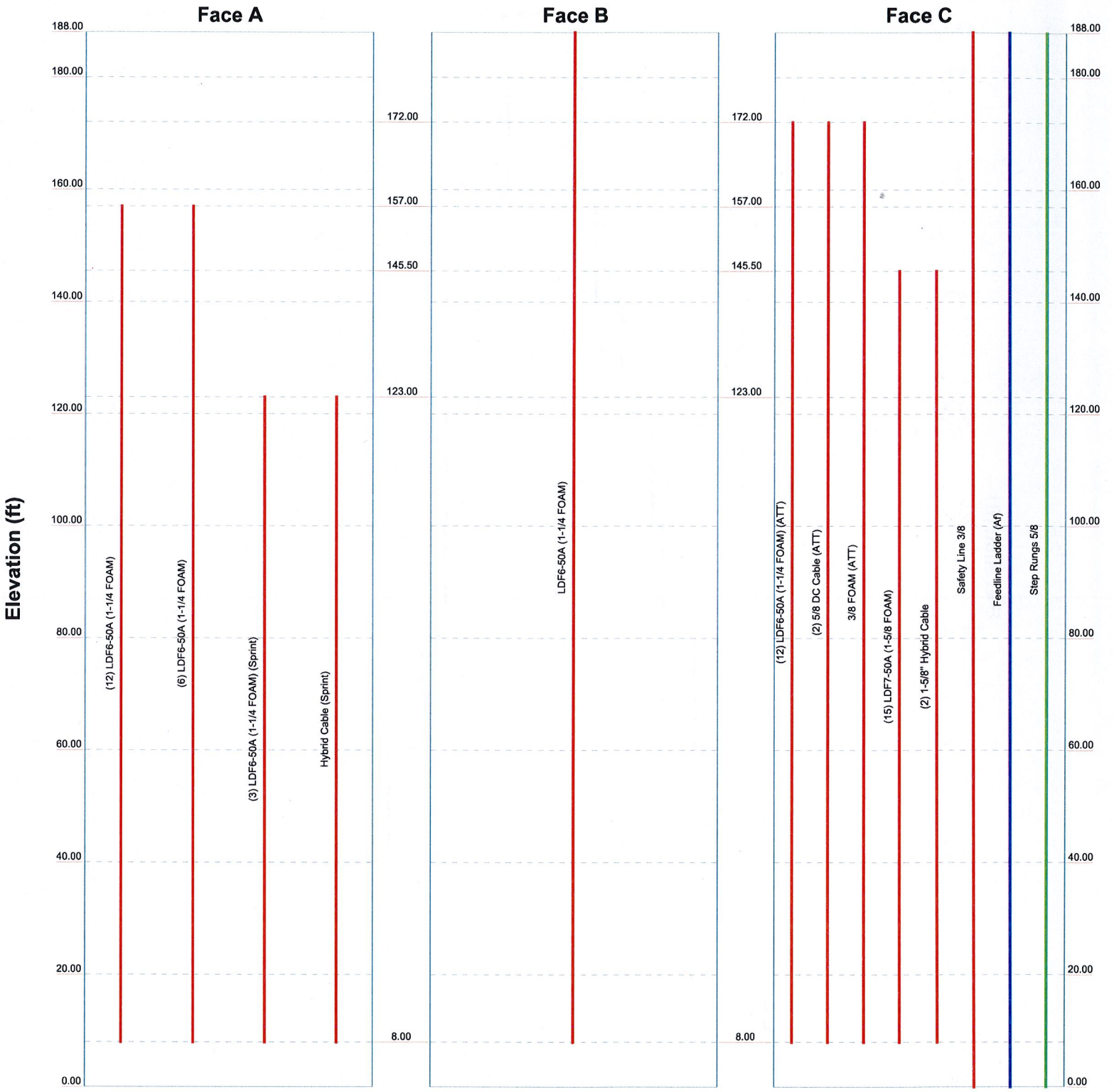
Job: ***17924020A***			
Project: ***Balch Tower***			
Client: Sprint	Drawn by: BQin		App'd:
Code: TIA-222-G	Date: 10/25/17		Scale: N
Path: R:\Projects\2017\17924000(TEMP)\17924020A(TEMP)\Structural\Rev 0\TNX Tower\CT03XC090.eri			Dwg No.

0' - 188'

Round | Flat | App In Face | App Out Face | Truss Leg



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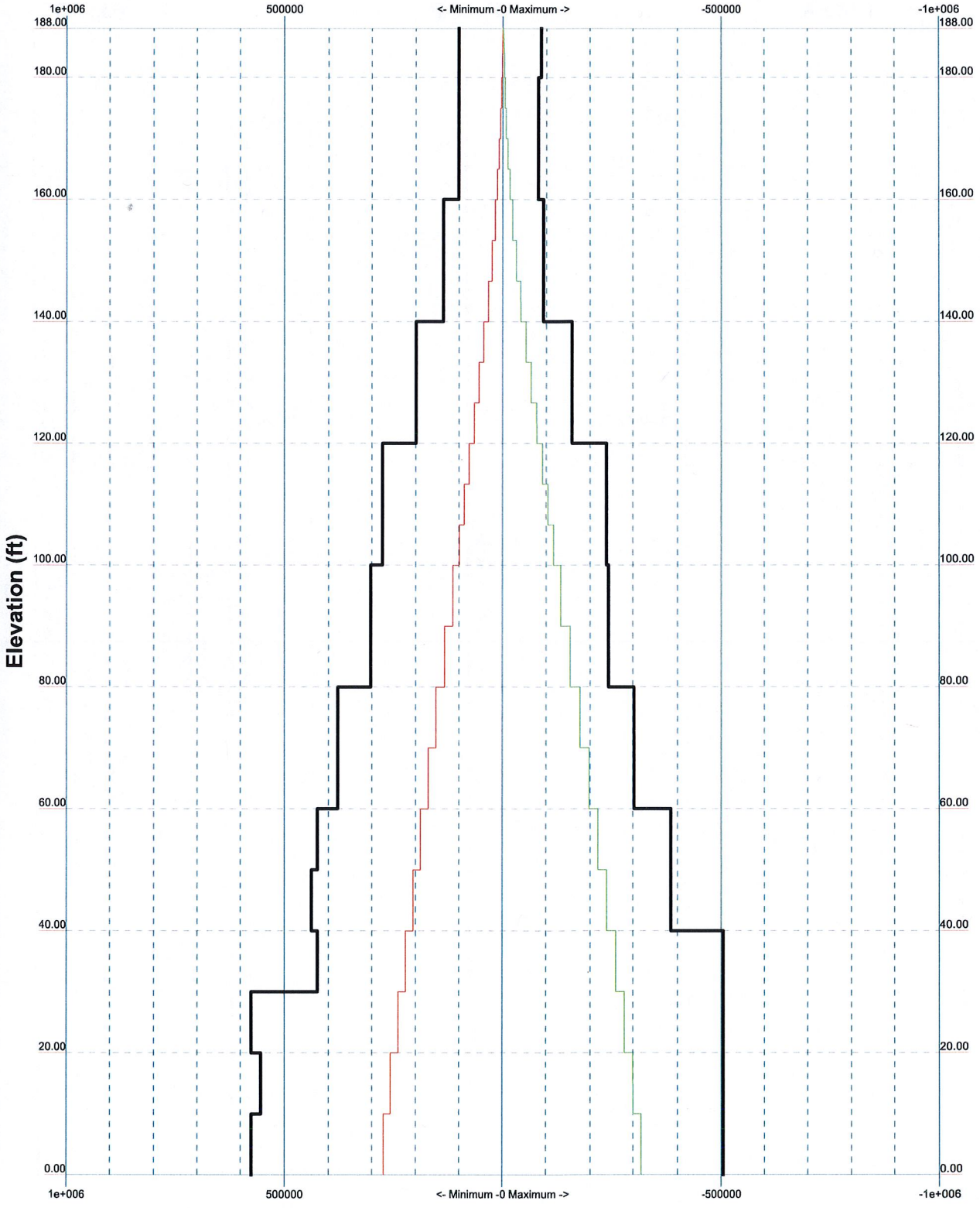
Job: ***17924020A***			
Project: ***Balch Tower***			
Client: Sprint	Drawn by: BQin	App'd:	
Code: TIA-222-G	Date: 10/25/17	Scale: N	
Path: R:\Projects\2017\17924000(TEMP)\17924020A(TEMP)\Structural\Rev 0\TNX Tower\CT03XC090.eri		Dwg No.	

TIA-222-G - 95 mph/40 mph 1.0000 in Ice Exposure C

Leg Capacity ——— **Leg Compression (lb)**



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Job: ***17924020A***			
Project: ***Balch Tower***			
Client: Sprint	Drawn by: BQin		App'd:
Code: TIA-222-G	Date: 10/25/17		Scale: N
Path: R:\Projects\2017\17924000(TEMP)\17924020A(TEMP)\Structural\Rev 0\TNX Tower\CT03XC090.eri			Dwg No.

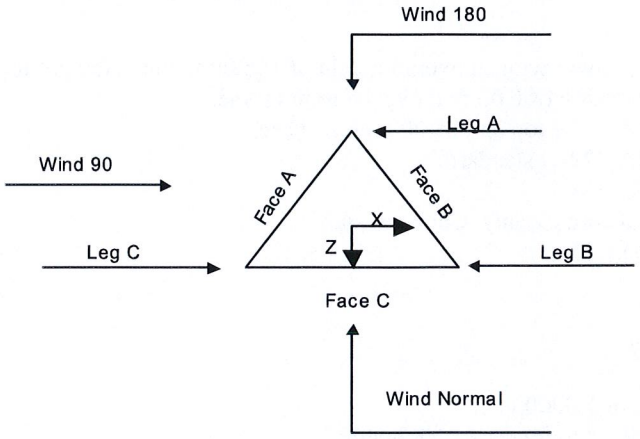
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 188.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 6.63 ft at the top and 25.00 ft at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Horizontals	Assume Legs Pinned	Calculate Redundant Bracing Forces
Consider Moments - Diagonals	Assume Rigid Index Plate	Ignore Redundant Members in FEA
Use Moment Magnification	√ Use Clear Spans For Wind Area	SR Leg Bolts Resist Compression
√ Use Code Stress Ratios	√ Use Clear Spans For KL/r	All Leg Panels Have Same Allowable
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	Offset Girt At Foundation
Escalate Ice	Bypass Mast Stability Checks	√ Consider Feed Line Torque
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Include Angle Block Shear Check
Use Special Wind Profile	Project Wind Area of Appurt.	Use TIA-222-G Bracing Resist. Exemption
√ Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Use TIA-222-G Tension Splice Exemption
Leg Bolts Are At Top Of Section	Add IBC .6D+W Combination	Poles
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Include Shear-Torsion Interaction
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Always Use Sub-Critical Flow
SR Members Have Cut Ends	Treat Feed Line Bundles As Cylinder	Use Top Mounted Sockets
SR Members Are Concentric		



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	188.00-180.00			6.63	1	8.00
T2	180.00-160.00			6.63	1	20.00
T3	160.00-140.00			8.75	1	20.00
T4	140.00-120.00			10.71	1	20.00
T5	120.00-100.00			12.79	1	20.00
T6	100.00-80.00			15.29	1	20.00
T7	80.00-60.00			16.88	1	20.00
T8	60.00-40.00			18.83	1	20.00
T9	40.00-20.00			21.00	1	20.00
T10	20.00-0.00			23.05	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	188.00-180.00	4.00	X Brace	No	No	0.0000	0.0000
T2	180.00-160.00	5.00	X Brace	No	Yes	0.0000	0.0000
T3	160.00-140.00	6.67	X Brace	No	No	0.0000	0.0000
T4	140.00-120.00	6.67	X Brace	No	No	0.0000	0.0000
T5	120.00-100.00	6.67	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T6	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T7	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T8	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T9	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T10	20.00-0.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 188.00-180.00	Pipe	Pipe 3.5" x 0.216" (3 STD)	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T2 180.00-160.00	Pipe	Pipe 3.5" x 0.216" (3 STD)	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)
T3 160.00-140.00	Pipe	ROHN 3 EH	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T4 140.00-120.00	Pipe	ROHN 4 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T5 120.00-100.00	Pipe	ROHN 5 EH	A572-50 (50 ksi)	Single Angle	L3x3x1/4	A572-50 (50 ksi)
T6 100.00-80.00	Pipe	ROHN 6 EHS	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)
T7 80.00-60.00	Pipe	ROHN 6 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T8 60.00-40.00	Pipe	ROHN 8 EHS	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T9 40.00-20.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x5/16	A572-50 (50 ksi)
T10 20.00-0.00	Pipe	ROHN 8 EH	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 180.00-160.00	None	Flat Bar		A36 (36 ksi)	Equal Angle	L2x2x1/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
T1 188.00-180.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 180.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	Single Diags X	Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
ft															
T1 188.00-180.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T2 180.00-160.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T3 160.00-140.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T4 140.00-120.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T5 120.00-100.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T6 100.00-80.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T7 80.00-60.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T8 60.00-40.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T9 40.00-20.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
T10 20.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 188.00-180.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 180.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 188.00-180.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.3750 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 180.00-160.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 160.00-140.00	Flange	0.8750 A325N	4	0.6250 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 140.00-120.00	Flange	1.0000 A325N	4	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 120.00-100.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 100.00-80.00	Flange	1.0000 A325N	6	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 80.00-60.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T8 60.00-40.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 40.00-20.00	Flange	1.0000 A325N	8	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T10 20.00-0.00	Flange	1.0000 A354-BC	10	0.7500 A325N	1	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF6-50A (1-1/4 FOAM)	B	No	Ar (CaAa)	188.00 - 8.00	1.0000	0.38	1	1	1.5500	1.5500		0.66
LDF6-50A (1-1/4 FOAM) (ATT)	C	No	Ar (CaAa)	172.00 - 8.00	1.0000	0.38	12	12	0.7000 1.5500	1.5500		0.66
5/8 DC Cable (ATT)	C	No	Ar (CaAa)	172.00 - 8.00	1.0000	0.31	2	2	1.6250 0.6250	0.8700		0.30
3/8 FOAM (ATT)	C	No	Ar (CaAa)	172.00 - 8.00	1.0000	0.3	1	1	1.7370 0.4000	0.4400		0.08
LDF6-50A (1-1/4 FOAM)	A	No	Ar (CaAa)	157.00 - 8.00	1.0000	-0.4	12	12	0.7000 1.5500	1.5500		0.66
LDF6-50A (1-1/4 FOAM)	A	No	Ar (CaAa)	157.00 - 8.00	2.0000	-0.38	6	6	0.7000 1.5500	1.5500		0.66
LDF7-50A (1-5/8 FOAM)	C	No	Ar (CaAa)	145.50 - 8.00	1.0000	-0.4	15	15	0.2700 1.9800	1.9800		0.82
1-5/8" Hybrid Cable	C	No	Ar (CaAa)	145.50 - 8.00	2.0000	0.49	2	2	0.7000 1.6250	1.9800		0.82
LDF6-50A (1-1/4 FOAM) (Sprint)	A	No	Ar (CaAa)	123.00 - 8.00	1.0000	0.48	3	3	0.7000 1.5500	1.5500		0.66
Hybrid Cable (Sprint)	A	No	Ar (CaAa)	123.00 - 8.00	1.0000	0.48	1	1	0.7000 1.5500	1.5500		0.66
Safety Line 3/8	C	No	Ar (CaAa)	188.00 - 0.00	0.0000	0	1	1	0.3750	0.3750		0.22

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
Feedline Ladder (Af)	C	No	CaAa (In Face)	188.00 - 0.00	1	No Ice	0.50	8.40
						1/2" Ice	0.61	13.50
						1" Ice	0.72	18.60
Step Rungs 5/8	C	No	CaAa (Out Of Face)	188.00 - 0.00	1	No Ice	0.06	0.34
						1/2" Ice	0.16	1.03
						1" Ice	0.26	1.72

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 lb
T1	188.00-180.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	1.240	0.000	5.28
		C	0.000	0.000	4.300	0.480	71.68
T2	180.00-160.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	35.686	1.200	282.40
T3	160.00-140.00	A	0.000	0.000	47.430	0.000	201.96
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	70.823	1.200	427.87
T4	140.00-120.00	A	0.000	0.000	57.660	0.000	245.52
		B	0.000	0.000	3.100	0.000	13.20

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 lb
		C	0.000	0.000	119.630	1.200	630.00
T5	120.00-100.00	A	0.000	0.000	68.200	0.000	290.40
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	119.630	1.200	630.00
T6	100.00-80.00	A	0.000	0.000	68.200	0.000	290.40
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	119.630	1.200	630.00
T7	80.00-60.00	A	0.000	0.000	68.200	0.000	290.40
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	119.630	1.200	630.00
T8	60.00-40.00	A	0.000	0.000	68.200	0.000	290.40
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	119.630	1.200	630.00
T9	40.00-20.00	A	0.000	0.000	68.200	0.000	290.40
		B	0.000	0.000	3.100	0.000	13.20
		C	0.000	0.000	119.630	1.200	630.00
T10	20.00-0.00	A	0.000	0.000	40.920	0.000	174.24
		B	0.000	0.000	1.860	0.000	7.92
		C	0.000	0.000	76.078	1.200	449.68

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 lb
T1	188.00-180.00	A	2.375	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	5.040	0.000	96.39
		C		0.000	0.000	12.322	4.280	355.53
T2	180.00-160.00	A	2.356	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	12.525	0.000	238.10
		C		0.000	0.000	99.017	10.625	2017.03
T3	160.00-140.00	A	2.327	0.000	0.000	106.448	0.000	1853.64
		B		0.000	0.000	12.408	0.000	233.64
		C		0.000	0.000	178.327	10.507	3336.23
T4	140.00-120.00	A	2.294	0.000	0.000	131.274	0.000	2252.64
		B		0.000	0.000	12.276	0.000	228.65
		C		0.000	0.000	267.951	10.375	4844.15
T5	120.00-100.00	A	2.256	0.000	0.000	166.930	0.000	2774.84
		B		0.000	0.000	12.124	0.000	222.99
		C		0.000	0.000	266.507	10.223	4767.00
T6	100.00-80.00	A	2.211	0.000	0.000	165.896	0.000	2720.25
		B		0.000	0.000	11.944	0.000	216.40
		C		0.000	0.000	264.804	10.044	4676.57
T7	80.00-60.00	A	2.156	0.000	0.000	164.633	0.000	2653.94
		B		0.000	0.000	11.725	0.000	208.46
		C		0.000	0.000	262.720	9.824	4566.65
T8	60.00-40.00	A	2.085	0.000	0.000	162.992	0.000	2568.61
		B		0.000	0.000	11.439	0.000	198.37
		C		0.000	0.000	260.014	9.539	4425.05
T9	40.00-20.00	A	1.981	0.000	0.000	160.609	0.000	2446.22
		B		0.000	0.000	11.024	0.000	184.12
		C		0.000	0.000	256.080	9.124	4221.66
T10	20.00-0.00	A	1.775	0.000	0.000	93.539	0.000	1325.69
		B		0.000	0.000	6.120	0.000	94.44
		C		0.000	0.000	159.268	8.299	2569.76

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T1	188.00-180.00	0.1725	1.7174	-0.5874	1.8440
T2	180.00-160.00	-2.9168	3.8199	-2.1143	3.0026
T3	160.00-140.00	-5.8916	5.9819	-4.4462	4.6609
T4	140.00-120.00	-3.2619	7.2751	-3.0865	5.5242
T5	120.00-100.00	-3.6147	6.9859	-3.4075	5.2093
T6	100.00-80.00	-4.0757	7.8891	-3.9449	6.0381
T7	80.00-60.00	-4.3982	8.5223	-4.3201	6.6185
T8	60.00-40.00	-4.6857	9.0886	-4.7193	7.2371
T9	40.00-20.00	-5.1105	9.9208	-5.2040	7.9886
T10	20.00-0.00	-4.5739	9.1420	-5.1804	8.0227

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	LDF6-50A (1-1/4 FOAM)	180.00 - 188.00	0.6000	0.4682
T1	11	Safety Line 3/8	180.00 - 188.00	0.6000	0.4682
T1	12	Feedline Ladder (Af)	180.00 - 188.00	0.6000	0.4682
T2	1	LDF6-50A (1-1/4 FOAM)	160.00 - 180.00	0.6000	0.5138
T2	2	LDF6-50A (1-1/4 FOAM)	160.00 - 172.00	0.6000	0.5138
T2	3	5/8 DC Cable	160.00 - 172.00	0.6000	0.5138
T2	4	3/8 FOAM	160.00 - 172.00	0.6000	0.5138
T2	11	Safety Line 3/8	160.00 - 180.00	0.6000	0.5138
T2	12	Feedline Ladder (Af)	160.00 - 180.00	0.6000	0.5138
T3	1	LDF6-50A (1-1/4 FOAM)	140.00 - 160.00	0.6000	0.6000
T3	2	LDF6-50A (1-1/4 FOAM)	140.00 - 160.00	0.6000	0.6000
T3	3	5/8 DC Cable	140.00 - 160.00	0.6000	0.6000
T3	4	3/8 FOAM	140.00 - 160.00	0.6000	0.6000
T3	5	LDF6-50A (1-1/4 FOAM)	140.00 - 157.00	0.6000	0.6000
T3	6	LDF6-50A (1-1/4 FOAM)	140.00 - 157.00	0.6000	0.6000
T3	7	LDF7-50A (1-5/8 FOAM)	140.00 - 145.50	0.6000	0.6000
T3	8	1-5/8" Hybrid Cable	140.00 - 145.50	0.6000	0.6000
T3	11	Safety Line 3/8	140.00 - 160.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T3	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.6000
T4	1	LDF6-50A (1-1/4 FOAM)	120.00 - 140.00	0.6000	0.6000
T4	2	LDF6-50A (1-1/4 FOAM)	120.00 - 140.00	0.6000	0.6000
T4	3	5/8 DC Cable	120.00 - 140.00	0.6000	0.6000
T4	4	3/8 FOAM	120.00 - 140.00	0.6000	0.6000
T4	5	LDF6-50A (1-1/4 FOAM)	120.00 - 140.00	0.6000	0.6000
T4	6	LDF6-50A (1-1/4 FOAM)	120.00 - 140.00	0.6000	0.6000
T4	7	LDF7-50A (1-5/8 FOAM)	120.00 - 140.00	0.6000	0.6000
T4	8	1-5/8" Hybrid Cable	120.00 - 140.00	0.6000	0.6000
T4	9	LDF6-50A (1-1/4 FOAM)	120.00 - 123.00	0.6000	0.6000
T4	10	Hybrid Cable	120.00 - 123.00	0.6000	0.6000
T4	11	Safety Line 3/8	120.00 - 140.00	0.6000	0.6000
T4	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.6000
T5	1	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	2	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	3	5/8 DC Cable	100.00 - 120.00	0.6000	0.6000
T5	4	3/8 FOAM	100.00 - 120.00	0.6000	0.6000
T5	5	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	6	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	7	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	8	1-5/8" Hybrid Cable	100.00 - 120.00	0.6000	0.6000
T5	9	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T5	10	Hybrid Cable	100.00 - 120.00	0.6000	0.6000
T5	11	Safety Line 3/8	100.00 - 120.00	0.6000	0.6000
T5	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	1	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	2	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	3	5/8 DC Cable	80.00 - 100.00	0.6000	0.6000
T6	4	3/8 FOAM	80.00 - 100.00	0.6000	0.6000
T6	5	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	6	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	7	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	8	1-5/8" Hybrid Cable	80.00 - 100.00	0.6000	0.6000
T6	9	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T6	10	Hybrid Cable	80.00 - 100.00	0.6000	0.6000
T6	11	Safety Line 3/8	80.00 - 100.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	1	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	2	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	3	5/8 DC Cable	60.00 - 80.00	0.6000	0.6000
T7	4	3/8 FOAM	60.00 - 80.00	0.6000	0.6000
T7	5	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	6	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	7	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	8	1-5/8" Hybrid Cable	60.00 - 80.00	0.6000	0.6000
T7	9	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T7	10	Hybrid Cable	60.00 - 80.00	0.6000	0.6000
T7	11	Safety Line 3/8	60.00 - 80.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	1	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	2	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	3	5/8 DC Cable	40.00 - 60.00	0.6000	0.6000
T8	4	3/8 FOAM	40.00 - 60.00	0.6000	0.6000
T8	5	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	6	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	7	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	8	1-5/8" Hybrid Cable	40.00 - 60.00	0.6000	0.6000
T8	9	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T8	10	Hybrid Cable	40.00 - 60.00	0.6000	0.6000
T8	11	Safety Line 3/8	40.00 - 60.00	0.6000	0.6000
T8	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	1	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	2	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	3	5/8 DC Cable	20.00 - 40.00	0.6000	0.6000
T9	4	3/8 FOAM	20.00 - 40.00	0.6000	0.6000
T9	5	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	6	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	7	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	8	1-5/8" Hybrid Cable	20.00 - 40.00	0.6000	0.6000
T9	9	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T9	10	Hybrid Cable	20.00 - 40.00	0.6000	0.6000
T9	11	Safety Line 3/8	20.00 - 40.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	1	LDF6-50A (1-1/4 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	2	LDF6-50A (1-1/4 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	3	5/8 DC Cable	8.00 - 20.00	0.6000	0.6000
T10	4	3/8 FOAM	8.00 - 20.00	0.6000	0.6000
T10	5	LDF6-50A (1-1/4 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	6	LDF6-50A (1-1/4 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	7	LDF7-50A (1-5/8 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	8	1-5/8" Hybrid Cable	8.00 - 20.00	0.6000	0.6000
T10	9	LDF6-50A (1-1/4 FOAM)	8.00 - 20.00	0.6000	0.6000
T10	10	Hybrid Cable	8.00 - 20.00	0.6000	0.6000
T10	11	Safety Line 3/8	0.00 - 20.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	0.00 - 20.00	0.6000	0.6000

Discrete Tower Loads

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 lb
BCD-87010-EDIN	B	From Leg	0.00	0.0000	195.00	No Ice	2.90	2.90	73.00
			0.00			1/2" Ice	4.05	4.05	94.48
			7.50			1" Ice	5.21	5.21	123.19
Rohn 14' Platform	C	None		0.0000	186.00	No Ice	41.00	41.00	2500.00
						1/2" Ice	56.00	56.00	3000.00
						1" Ice	71.00	71.00	3500.00
(2)	A	From Leg	4.00	0.0000	172.00	No Ice	8.02	4.64	48.50
AM-X-CD-16-65-OOT-RET			0.00			1/2" Ice	8.48	5.09	95.00
(ATT)			0.00			1" Ice	8.94	5.54	147.50
(2)	B	From Leg	4.00	0.0000	172.00	No Ice	8.02	4.64	48.50
AM-X-CD-16-65-OOT-RET			0.00			1/2" Ice	8.48	5.09	95.00
(ATT)			0.00			1" Ice	8.94	5.54	147.50
(2)	C	From Leg	4.00	0.0000	172.00	No Ice	8.02	4.64	48.50
AM-X-CD-16-65-OOT-RET			0.00			1/2" Ice	8.48	5.09	95.00
(ATT)			0.00			1" Ice	8.94	5.54	147.50
800-10121	A	From Leg	4.00	0.0000	172.00	No Ice	5.16	3.29	46.30
(ATT)			0.00			1/2" Ice	5.51	3.64	79.21
			0.00			1" Ice	5.87	3.99	116.89
800-10121	B	From Leg	4.00	0.0000	172.00	No Ice	5.16	3.29	46.30
(ATT)			0.00			1/2" Ice	5.51	3.64	79.21
			0.00			1" Ice	5.87	3.99	116.89
800-10121	C	From Leg	4.00	0.0000	172.00	No Ice	5.16	3.29	46.30
(ATT)			0.00			1/2" Ice	5.51	3.64	79.21
			0.00			1" Ice	5.87	3.99	116.89
RRUS-11	A	From Leg	4.00	0.0000	172.00	No Ice	2.52	1.02	55.00
(ATT)			0.00			1/2" Ice	2.72	1.16	74.32
			0.00			1" Ice	2.92	1.30	96.56
RRUS-11	B	From Leg	4.00	0.0000	172.00	No Ice	2.52	1.02	55.00
(ATT)			0.00			1/2" Ice	2.72	1.16	74.32
			0.00			1" Ice	2.92	1.30	96.56
RRUS-11	C	From Leg	4.00	0.0000	172.00	No Ice	2.52	1.02	55.00
(ATT)			0.00			1/2" Ice	2.72	1.16	74.32
			0.00			1" Ice	2.92	1.30	96.56
TT19-08BP111-001	A	From Leg	4.00	0.0000	172.00	No Ice	0.55	0.45	16.00
(ATT)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
TT19-08BP111-001	B	From Leg	4.00	0.0000	172.00	No Ice	0.55	0.45	16.00
(ATT)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
TT19-08BP111-001	C	From Leg	4.00	0.0000	172.00	No Ice	0.55	0.45	16.00
(ATT)			0.00			1/2" Ice	0.65	0.53	21.80
			0.00			1" Ice	0.75	0.63	29.22
DTMABP7819VG12A	A	From Leg	4.00	0.0000	172.00	No Ice	0.98	0.34	19.18
(ATT)			0.00			1/2" Ice	1.10	0.42	26.48
			0.00			1" Ice	1.23	0.51	35.63
DTMABP7819VG12A	B	From Leg	4.00	0.0000	172.00	No Ice	0.98	0.34	19.18
(ATT)			0.00			1/2" Ice	1.10	0.42	26.48
			0.00			1" Ice	1.23	0.51	35.63
DTMABP7819VG12A	C	From Leg	4.00	0.0000	172.00	No Ice	0.98	0.34	19.18
(ATT)			0.00			1/2" Ice	1.10	0.42	26.48
			0.00			1" Ice	1.23	0.51	35.63
DC6-48-06-18-8F	C	From Leg	4.00	0.0000	172.00	No Ice	1.20	1.20	32.00
(ATT)			0.00			1/2" Ice	1.88	1.88	53.81
			0.00			1" Ice	2.09	2.09	78.48
(2) RV90-17-02DP	A	From Leg	4.00	0.0000	157.00	No Ice	4.36	2.00	13.50
			0.00			1/2" Ice	4.70	2.33	36.02
			0.00			1" Ice	5.06	2.68	63.07

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 lb
(2) RV90-17-02DP	B	From Leg	4.00	0.00	0.0000	157.00	No Ice	4.36	2.00	13.50
			0.00	0.00			1/2" Ice	4.70	2.33	36.02
							1" Ice	5.06	2.68	63.07
(2) RV90-17-02DP	C	From Leg	4.00	0.00	0.0000	157.00	No Ice	4.36	2.00	13.50
			0.00	0.00			1/2" Ice	4.70	2.33	36.02
							1" Ice	5.06	2.68	63.07
APX16DWV-16DWVS	A	From Leg	4.00	0.00	0.0000	157.00	No Ice	6.59	2.15	40.70
			0.00	0.00			1/2" Ice	6.96	2.49	74.24
							1" Ice	7.34	2.84	112.65
APX16DWV-16DWVS	B	From Leg	4.00	0.00	0.0000	157.00	No Ice	6.59	2.15	40.70
			0.00	0.00			1/2" Ice	6.96	2.49	74.24
							1" Ice	7.34	2.84	112.65
APX16DWV-16DWVS	C	From Leg	4.00	0.00	0.0000	157.00	No Ice	6.59	2.15	40.70
			0.00	0.00			1/2" Ice	6.96	2.49	74.24
							1" Ice	7.34	2.84	112.65
(2) TMA	A	From Leg	4.00	0.00	0.0000	157.00	No Ice	0.50	0.30	15.00
			0.00	0.00			1/2" Ice	0.59	0.37	19.42
							1" Ice	0.68	0.44	23.84
(2) TMA	B	From Leg	4.00	0.00	0.0000	157.00	No Ice	0.50	0.30	15.00
			0.00	0.00			1/2" Ice	0.59	0.37	19.42
							1" Ice	0.68	0.44	23.84
(2) TMA	C	From Leg	4.00	0.00	0.0000	157.00	No Ice	0.50	0.30	15.00
			0.00	0.00			1/2" Ice	0.59	0.37	19.42
							1" Ice	0.68	0.44	23.84
Sector Mount	A	None			0.0000	157.00	No Ice	9.80	4.90	330.00
							1/2" Ice	14.70	7.35	420.00
							1" Ice	19.60	9.80	510.00
Sector Mount	B	None			0.0000	157.00	No Ice	9.80	4.90	330.00
							1/2" Ice	14.70	7.35	420.00
							1" Ice	19.60	9.80	510.00
Sector Mount	C	None			0.0000	157.00	No Ice	9.80	4.90	330.00
							1/2" Ice	14.70	7.35	420.00
							1" Ice	19.60	9.80	510.00
(3) SBNHH-1D85B	A	From Leg	4.00	0.00	0.0000	145.50	No Ice	8.20	5.42	42.10
			0.00	0.00			1/2" Ice	8.66	5.88	92.74
							1" Ice	9.13	6.35	149.52
(3) SBNHH-1D85B	B	From Leg	4.00	0.00	0.0000	145.50	No Ice	8.20	5.42	42.10
			0.00	0.00			1/2" Ice	8.66	5.88	92.74
							1" Ice	9.13	6.35	149.52
(3) SBNHH-1D85B	C	From Leg	4.00	0.00	0.0000	145.50	No Ice	8.20	5.42	42.10
			0.00	0.00			1/2" Ice	8.66	5.88	92.74
							1" Ice	9.13	6.35	149.52
BXA-70063-6CF-EDIN-X	A	From Leg	4.00	0.00	0.0000	145.50	No Ice	7.57	4.16	17.00
			0.00	0.00			1/2" Ice	8.02	4.60	59.49
							1" Ice	8.47	5.04	107.83
BXA-70063-6CF-EDIN-X	B	From Leg	4.00	0.00	0.0000	145.50	No Ice	7.57	4.16	17.00
			0.00	0.00			1/2" Ice	8.02	4.60	59.49
							1" Ice	8.47	5.04	107.83
BXA-70063-6CF-EDIN-X	C	From Leg	4.00	0.00	0.0000	145.50	No Ice	7.57	4.16	17.00
			0.00	0.00			1/2" Ice	8.02	4.60	59.49
							1" Ice	8.47	5.04	107.83
B66A-RRH4x45	A	From Leg	4.00	0.00	0.0000	145.50	No Ice	2.54	1.61	71.80
			0.00	0.00			1/2" Ice	2.75	1.79	91.92
							1" Ice	2.97	1.98	115.15
B66A-RRH4x45	B	From Leg	4.00	0.00	0.0000	145.50	No Ice	2.54	1.61	71.80
			0.00	0.00			1/2" Ice	2.75	1.79	91.92
							1" Ice	2.97	1.98	115.15

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 lb
B66A-RRH4x45	C	From Leg	4.00		0.0000	145.50	No Ice	2.54	1.61	71.80
			0.00				1/2" Ice	2.75	1.79	91.92
			0.00				1" Ice	2.97	1.98	115.15
B25 RRH4X30-4R	A	From Leg	4.00		0.0000	145.50	No Ice	2.11	1.29	52.90
			0.00				1/2" Ice	2.30	1.45	70.18
			0.00				1" Ice	2.50	1.61	90.27
B25 RRH4X30-4R	B	From Leg	4.00		0.0000	145.50	No Ice	2.11	1.29	52.90
			0.00				1/2" Ice	2.30	1.45	70.18
			0.00				1" Ice	2.50	1.61	90.27
B25 RRH4X30-4R	C	From Leg	4.00		0.0000	145.50	No Ice	2.11	1.29	52.90
			0.00				1/2" Ice	2.30	1.45	70.18
			0.00				1" Ice	2.50	1.61	90.27
RRH 2x60 1900	A	From Leg	4.00		0.0000	145.50	No Ice	1.87	1.18	40.00
			0.00				1/2" Ice	2.05	1.33	55.63
			0.00				1" Ice	2.23	1.48	73.92
RRH 2x60 1900	B	From Leg	4.00		0.0000	145.50	No Ice	1.87	1.18	40.00
			0.00				1/2" Ice	2.05	1.33	55.63
			0.00				1" Ice	2.23	1.48	73.92
RRH 2x60 1900	C	From Leg	4.00		0.0000	145.50	No Ice	1.87	1.18	40.00
			0.00				1/2" Ice	2.05	1.33	55.63
			0.00				1" Ice	2.23	1.48	73.92
DB-B1-6C-12AB-0Z	A	From Leg	4.00		0.0000	145.50	No Ice	2.51	1.65	32.00
			0.00				1/2" Ice	2.71	1.81	54.91
			0.00				1" Ice	2.91	1.99	80.95
DB-B1-6C-12AB-0Z	C	From Leg	4.00		0.0000	145.50	No Ice	2.51	1.65	32.00
			0.00				1/2" Ice	2.71	1.81	54.91
			0.00				1" Ice	2.91	1.99	80.95
SitePro VFA10-RRU	A	None			0.0000	145.50	No Ice	7.53	3.80	310.00
							1/2" Ice	10.77	5.38	370.00
							1" Ice	14.01	6.96	430.00
SitePro VFA10-RRU	B	None			0.0000	145.50	No Ice	7.53	3.80	310.00
							1/2" Ice	10.77	5.38	370.00
							1" Ice	14.01	6.96	430.00
SitePro VFA10-RRU	C	None			0.0000	145.50	No Ice	7.53	3.80	310.00
							1/2" Ice	10.77	5.38	370.00
							1" Ice	14.01	6.96	430.00
APXVSPP18-C-A20 (Sprint)	A	From Leg	4.00		0.0000	123.00	No Ice	8.02	5.81	64.50
			0.00				1/2" Ice	8.48	6.27	116.49
			0.00				1" Ice	8.94	6.73	174.62
APXVSPP18-C-A20 (Sprint)	B	From Leg	4.00		0.0000	123.00	No Ice	8.02	5.81	64.50
			0.00				1/2" Ice	8.48	6.27	116.49
			0.00				1" Ice	8.94	6.73	174.62
APXVSPP18-C-A20 (Sprint)	C	From Leg	4.00		0.0000	123.00	No Ice	8.02	5.81	64.50
			0.00				1/2" Ice	8.48	6.27	116.49
			0.00				1" Ice	8.94	6.73	174.62
RRH-2X50-800 (Sprint)	A	From Leg	4.00		0.0000	123.00	No Ice	1.73	1.33	69.10
			0.00				1/2" Ice	1.90	1.48	86.54
			0.00				1" Ice	2.07	1.64	106.69
RRH-2X50-800 (Sprint)	B	From Leg	4.00		0.0000	123.00	No Ice	1.73	1.33	69.10
			0.00				1/2" Ice	1.90	1.48	86.54
			0.00				1" Ice	2.07	1.64	106.69
RRH-2X50-800 (Sprint)	C	From Leg	4.00		0.0000	123.00	No Ice	1.73	1.33	69.10
			0.00				1/2" Ice	1.90	1.48	86.54
			0.00				1" Ice	2.07	1.64	106.69
ALU RRH-4X45-1900 (Sprint)	A	From Leg	4.00		0.0000	123.00	No Ice	2.50	2.50	69.50
			0.00				1/2" Ice	2.71	2.71	95.23
			0.00				1" Ice	2.93	2.93	124.33

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 lb
ALU RRH-4X45-1900	B	From Leg	4.00	0.0000	123.00	No Ice	2.50	2.50	69.50
(Sprint)			0.00			1/2" Ice	2.71	2.71	95.23
			0.00			1" Ice	2.93	2.93	124.33
ALU RRH-4X45-1900	C	From Leg	4.00	0.0000	123.00	No Ice	2.50	2.50	69.50
(Sprint)			0.00			1/2" Ice	2.71	2.71	95.23
			0.00			1" Ice	2.93	2.93	124.33
DT465B-2XR Panel Antenna	A	From Leg	4.00	0.0000	123.00	No Ice	9.22	7.29	94.90
W/M PIPE			0.00			1/2" Ice	9.69	8.25	168.83
(Sprint)			0.00			1" Ice	10.16	9.08	250.72
DT465B-2XR Panel Antenna	B	From Leg	4.00	0.0000	123.00	No Ice	9.22	7.29	94.90
W/M PIPE			0.00			1/2" Ice	9.69	8.25	168.83
(Sprint)			0.00			1" Ice	10.16	9.08	250.72
DT465B-2XR Panel Antenna	C	From Leg	4.00	0.0000	123.00	No Ice	9.22	7.29	94.90
W/M PIPE			0.00			1/2" Ice	9.69	8.25	168.83
(Sprint)			0.00			1" Ice	10.16	9.08	250.72
TD-RRH8x20-25	A	From Leg	4.00	0.0000	123.00	No Ice	4.03	1.53	76.20
(Sprint)			0.00			1/2" Ice	4.28	1.70	103.25
			0.00			1" Ice	4.54	1.89	133.82
TD-RRH8x20-25	B	From Leg	4.00	0.0000	123.00	No Ice	4.03	1.53	76.20
(Sprint)			0.00			1/2" Ice	4.28	1.70	103.25
			0.00			1" Ice	4.54	1.89	133.82
TD-RRH8x20-25	C	From Leg	4.00	0.0000	123.00	No Ice	4.03	1.53	76.20
(Sprint)			0.00			1/2" Ice	4.28	1.70	103.25
			0.00			1" Ice	4.54	1.89	133.82
RRH-2X50-800	A	From Leg	4.00	0.0000	123.00	No Ice	1.73	1.33	69.10
(Sprint)			0.00			1/2" Ice	1.90	1.48	86.54
			0.00			1" Ice	2.07	1.64	106.69
RRH-2X50-800	B	From Leg	4.00	0.0000	123.00	No Ice	1.73	1.33	69.10
(Sprint)			0.00			1/2" Ice	1.90	1.48	86.54
			0.00			1" Ice	2.07	1.64	106.69
RRH-2X50-800	C	From Leg	4.00	0.0000	123.00	No Ice	1.73	1.33	69.10
(Sprint)			0.00			1/2" Ice	1.90	1.48	86.54
			0.00			1" Ice	2.07	1.64	106.69
RRUS-12	A	From Leg	4.00	0.0000	172.00	No Ice	3.15	1.29	58.00
(ATT)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
RRUS-12	B	From Leg	4.00	0.0000	172.00	No Ice	3.15	1.29	58.00
(ATT)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64
RRUS-12	C	From Leg	4.00	0.0000	172.00	No Ice	3.15	1.29	58.00
(ATT)			0.00			1/2" Ice	3.36	1.44	81.22
			0.00			1" Ice	3.59	1.60	107.64

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice

Comb. No.	Description
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	188 - 180	Leg	Max Tension	15	697.12	-0.00	-0.20
			Max. Compression	31	-3472.09	-0.00	0.00
			Max. Mx	20	-1099.05	-0.35	-0.01
			Max. My	2	-872.77	-0.02	-0.35
			Max. Vy	8	279.79	-0.19	0.02
			Max. Vx	2	-281.84	0.00	0.19
		Diagonal	Max Tension	20	889.01	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	8	-918.51	0.00	0.00
			Max. Mx	28	198.41	0.03	0.00
			Max. My	6	-721.40	0.00	-0.00
			Max. Vy	33	-34.99	0.03	-0.00
			Max. Vx	14	-0.16	0.00	0.00
		Top Girt	Max Tension	19	11.34	0.00	0.00
			Max. Compression	33	-94.46	0.00	0.00
			Max. Mx	26	-82.01	-0.14	0.00
			Max. My	10	-31.59	0.00	-0.00
			Max. Vy	26	84.12	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
T2	180 - 160	Leg	Max Tension	15	11818.40	0.19	-0.00
			Max. Compression	18	-16200.55	0.58	0.01
			Max. Mx	6	3580.21	0.73	-0.00
			Max. My	24	-1870.80	-0.01	-0.75
			Max. Vy	6	599.70	-0.45	-0.00
			Max. Vx	12	604.90	-0.01	-0.42
		Diagonal	Max Tension	9	2486.21	0.00	0.00
			Max. Compression	8	-2630.76	0.00	0.00
			Max. Mx	33	324.75	0.04	-0.01
			Max. My	35	95.65	0.04	0.01
			Max. Vy	32	45.06	0.04	-0.01
			Max. Vx	35	2.67	0.00	0.00
		Horizontal	Max Tension	14	525.06	0.00	0.00
			Max. Compression	19	-390.03	0.00	0.00
			Max. Mx	35	129.82	-0.14	0.00
			Max. My	31	268.95	0.00	0.00
			Max. Vy	35	69.85	0.00	0.00
			Max. Vx	31	-2.14	0.00	0.00
T3	160 - 140	Leg	Max Tension	15	32780.35	-0.56	-0.04
			Max. Compression	18	-41428.50	0.51	0.00
			Max. Mx	6	16320.30	0.92	-0.01
			Max. My	8	-3795.76	-0.03	-0.93
			Max. Vy	6	-1239.56	-0.57	0.00
			Max. Vx	12	-1213.97	-0.01	-0.48
		Diagonal	Max Tension	8	5910.56	0.00	0.00
			Max. Compression	8	-5986.73	0.00	0.00
			Max. Mx	35	1023.66	0.09	-0.01
			Max. My	32	-475.21	0.08	-0.01
			Max. Vy	33	72.49	0.09	0.01
			Max. Vx	35	4.04	0.00	0.00
T4	140 - 120	Leg	Max Tension	15	64723.70	-0.50	-0.02
			Max. Compression	18	-77836.06	0.92	0.02
			Max. Mx	2	-76671.48	0.92	0.02
			Max. My	12	-5740.49	-0.06	-0.78
			Max. Vy	6	559.97	-0.88	-0.02
			Max. Vx	24	-479.84	0.02	0.55
		Diagonal	Max Tension	8	7563.28	0.00	0.00
			Max. Compression	8	-7708.87	0.00	0.00
			Max. Mx	35	1235.59	0.15	-0.02
			Max. My	36	885.47	0.14	0.02
			Max. Vy	34	98.68	0.15	0.02
			Max. Vx	36	5.52	0.00	0.00
T5	120 - 100	Leg	Max Tension	15	98359.37	-0.42	-0.01
			Max. Compression	18	-115990.17	0.41	0.03
			Max. Mx	2	-89418.65	0.92	0.02
			Max. My	12	-8158.27	-0.05	-0.78
			Max. Vy	2	212.72	0.92	0.02
			Max. Vx	12	231.70	-0.05	-0.78
		Diagonal	Max Tension	8	8522.69	0.00	0.00
			Max. Compression	8	-8510.22	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	34	636.11	0.18	-0.03
			Max. My	32	-395.22	0.16	-0.03
			Max. Vy	34	114.04	0.18	-0.03
			Max. Vx	32	-7.38	0.00	0.00
T6	100 - 80	Leg	Max Tension	15	132952.82	-0.55	-0.03
			Max. Compression	18	-154472.62	1.10	0.05
			Max. Mx	2	-152620.78	1.10	0.05
			Max. My	12	-9228.95	-0.03	-0.79
			Max. Vy	2	-176.15	1.10	0.05
			Max. Vx	10	-161.31	-0.31	-0.74
		Diagonal	Max Tension	8	12049.07	0.00	0.00
			Max. Compression	8	-12366.13	0.00	0.00
			Max. Mx	35	2045.49	0.28	-0.03
			Max. My	36	1380.16	0.26	0.03
			Max. Vy	33	140.45	0.28	0.03
			Max. Vx	36	6.23	0.00	0.00
T7	80 - 60	Leg	Max Tension	15	170650.45	-0.51	-0.03
			Max. Compression	18	-197595.11	1.14	0.04
			Max. Mx	2	-195410.13	1.15	0.03
			Max. My	12	-11276.73	-0.08	-0.99
			Max. Vy	2	-187.88	1.15	0.03
			Max. Vx	10	-180.88	-0.33	-0.91
		Diagonal	Max Tension	8	12353.74	0.00	0.00
			Max. Compression	8	-12528.95	0.00	0.00
			Max. Mx	35	2493.32	0.39	-0.05
			Max. My	36	1733.24	0.36	0.05
			Max. Vy	33	181.55	0.39	0.05
			Max. Vx	36	9.36	0.00	0.00
T8	60 - 40	Leg	Max Tension	15	205434.77	-1.24	-0.03
			Max. Compression	18	-238147.09	1.20	0.02
			Max. Mx	29	-6426.91	-1.92	-0.02
			Max. My	12	-13487.78	-0.09	-1.57
			Max. Vy	29	311.66	-1.92	-0.02
			Max. Vx	12	251.18	-0.09	-1.57
		Diagonal	Max Tension	8	12690.93	0.00	0.00
			Max. Compression	8	-12860.44	0.00	0.00
			Max. Mx	33	2135.43	0.45	0.06
			Max. My	31	281.09	0.43	-0.06
			Max. Vy	33	195.68	0.45	0.06
			Max. Vx	31	-10.78	0.00	0.00
T9	40 - 20	Leg	Max Tension	15	239716.97	-1.19	-0.02
			Max. Compression	18	-278745.23	1.73	0.04
			Max. Mx	33	12222.44	-4.82	-0.02
			Max. My	12	-15877.42	-0.10	-1.25
			Max. Vy	29	821.09	-4.82	-0.02
			Max. Vx	12	-180.06	-0.10	-1.25
		Diagonal	Max Tension	8	13897.82	0.00	0.00
			Max. Compression	8	-14168.49	0.00	0.00
			Max. Mx	33	873.54	0.51	0.06
			Max. My	31	-340.56	0.46	-0.07
			Max. Vy	33	203.49	0.48	0.06
			Max. Vx	31	-10.67	0.00	0.00
T10	20 - 0	Leg	Max Tension	15	273732.05	-1.26	-0.01
			Max. Compression	18	-319519.40	-0.00	-0.00
			Max. Mx	35	-135762.76	5.19	-0.04
			Max. My	12	-18556.15	-0.15	-2.57
			Max. Vy	29	-996.05	-4.82	-0.02
			Max. Vx	12	-375.56	-0.15	-2.57
		Diagonal	Max Tension	8	14938.06	0.00	0.00
			Max. Compression	8	-15307.00	0.00	0.00
			Max. Mx	33	-705.91	0.64	-0.08

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	32	-3426.48	0.59	-0.08
			Max. Vy	33	219.65	0.64	-0.08
			Max. Vx	32	-11.55	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	329640.73	35064.21	-19687.81
	Max. H_x	18	329640.73	35064.21	-19687.81
	Max. H_z	5	-243744.41	-25477.45	17876.15
	Min. Vert	7	-279911.87	-30915.72	17348.72
	Min. H_x	7	-279911.87	-30915.72	17348.72
	Min. H_z	18	329640.73	35064.21	-19687.81
Leg B	Max. Vert	10	328472.94	-35273.99	-19283.38
	Max. H_x	23	-280787.54	31138.09	16995.13
	Max. H_z	25	-244621.52	25855.73	17238.76
	Min. Vert	23	-280787.54	31138.09	16995.13
	Min. H_x	10	328472.94	-35273.99	-19283.38
	Min. H_z	10	328472.94	-35273.99	-19283.38
Leg A	Max. Vert	2	326801.86	-454.47	40160.39
	Max. H_x	21	12552.12	4630.78	1159.99
	Max. H_z	2	326801.86	-454.47	40160.39
	Min. Vert	15	-282038.99	417.41	-35486.35
	Min. H_x	9	12551.84	-4648.76	1160.26
	Min. H_z	15	-282038.99	417.41	-35486.35

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	45605.13	-0.00	0.00	27.04	12.13	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	54726.16	-0.01	-66590.52	-6680.52	14.67	-19.51
0.9 Dead+1.6 Wind 0 deg - No Ice	41044.62	-0.00	-66590.51	-6683.82	10.99	-19.50
1.2 Dead+1.6 Wind 30 deg - No Ice	54726.16	31869.24	-55199.13	-5566.62	-3218.09	0.52
0.9 Dead+1.6 Wind 30 deg - No Ice	41044.62	31869.24	-55199.13	-5570.71	-3219.40	0.51
1.2 Dead+1.6 Wind 60 deg - No Ice	54726.16	54375.82	-31393.90	-3158.81	-5513.08	19.05
0.9 Dead+1.6 Wind 60 deg - No Ice	41044.62	54375.82	-31393.90	-3164.65	-5512.72	19.03
1.2 Dead+1.6 Wind 90 deg - No Ice	54726.16	63738.47	-0.00	32.62	-6450.77	33.11
0.9 Dead+1.6 Wind 90 deg - No Ice	41044.62	63738.47	-0.00	24.46	-6449.73	33.08
1.2 Dead+1.6 Wind 120 deg - No Ice	54726.16	57669.08	33295.26	3389.16	-5799.04	40.02
0.9 Dead+1.6 Wind 120 deg -	41044.62	57669.07	33295.25	3378.57	-5798.50	39.98

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
No Ice						
1.2 Dead+1.6 Wind 150 deg - No Ice	54726.16	31869.23	55199.14	5631.74	-3218.02	32.60
0.9 Dead+1.6 Wind 150 deg - No Ice	41044.62	31869.24	55199.13	5619.52	-3219.33	32.56
1.2 Dead+1.6 Wind 180 deg - No Ice	54726.16	0.00	62787.79	6415.33	14.64	18.19
0.9 Dead+1.6 Wind 180 deg - No Ice	41044.62	0.00	62787.79	6402.54	10.98	18.18
1.2 Dead+1.6 Wind 210 deg - No Ice	54726.16	-31869.23	55199.14	5631.71	3247.28	-0.52
0.9 Dead+1.6 Wind 210 deg - No Ice	41044.62	-31869.23	55199.14	5619.49	3241.27	-0.51
1.2 Dead+1.6 Wind 240 deg - No Ice	54726.16	-57669.08	33295.26	3389.11	5828.26	-20.50
0.9 Dead+1.6 Wind 240 deg - No Ice	41044.62	-57669.07	33295.25	3378.53	5820.40	-20.48
1.2 Dead+1.6 Wind 270 deg - No Ice	54726.16	-63738.47	-0.00	32.61	6479.97	-33.11
0.9 Dead+1.6 Wind 270 deg - No Ice	41044.62	-63738.47	-0.00	24.45	6471.62	-33.08
1.2 Dead+1.6 Wind 300 deg - No Ice	54726.16	-54375.82	-31393.90	-3158.78	5542.31	-37.24
0.9 Dead+1.6 Wind 300 deg - No Ice	41044.62	-54375.82	-31393.90	-3164.62	5534.63	-37.20
1.2 Dead+1.6 Wind 330 deg - No Ice	54726.16	-31869.24	-55199.13	-5566.59	3247.36	-32.60
0.9 Dead+1.6 Wind 330 deg - No Ice	41044.62	-31869.24	-55199.13	-5570.68	3241.35	-32.56
1.2 Dead+1.0 Ice+1.0 Temp	178529.11	0.00	-0.00	195.04	135.43	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	178529.11	0.00	-14368.21	-1280.38	135.42	-4.20
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	178529.11	7052.08	-12214.56	-1063.56	-591.24	-0.49
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	178529.11	12138.33	-7008.07	-527.90	-1116.81	3.23
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	178529.11	14104.16	-0.00	195.08	-1317.93	6.13
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	178529.11	12443.24	7184.10	932.76	-1142.35	7.53
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	178529.11	7052.08	12214.56	1453.71	-591.25	6.62
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	178529.11	0.00	14016.14	1641.02	135.43	4.07
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	178529.11	-7052.08	12214.56	1453.70	862.10	0.49
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	178529.11	-12443.24	7184.10	932.82	1413.28	-3.33
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	178529.11	-14104.16	-0.00	195.06	1588.79	-6.13
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	178529.11	-12138.33	-7008.07	-527.91	1387.68	-7.31
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	178529.11	-7052.08	-12214.56	-1063.57	862.12	-6.62
Dead+Wind 0 deg - Service	45605.13	-0.00	-16601.51	-1645.72	12.17	-4.86
Dead+Wind 30 deg - Service	45605.13	7945.24	-13761.56	-1368.14	-793.39	0.13
Dead+Wind 60 deg - Service	45605.13	13556.30	-7826.73	-768.15	-1365.27	4.75
Dead+Wind 90 deg - Service	45605.13	15890.48	-0.00	27.11	-1598.94	8.25
Dead+Wind 120 deg - Service	45605.13	14377.33	8300.76	863.52	-1436.55	9.97
Dead+Wind 150 deg - Service	45605.13	7945.24	13761.56	1422.36	-793.38	8.12
Dead+Wind 180 deg - Service	45605.13	-0.00	15653.47	1617.63	12.16	4.53

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
Dead+Wind 210 deg - Service	45605.13	-7945.24	13761.56	1422.36	817.71	-0.13
Dead+Wind 240 deg - Service	45605.13	-14377.33	8300.76	863.52	1460.87	-5.11
Dead+Wind 270 deg - Service	45605.13	-15890.48	-0.00	27.11	1623.26	-8.25
Dead+Wind 300 deg - Service	45605.13	-13556.30	-7826.73	-768.15	1389.60	-9.28
Dead+Wind 330 deg - Service	45605.13	-7945.24	-13761.56	-1368.15	817.72	-8.12

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	-0.00	-45605.13	0.00	0.00	45605.13	-0.00	0.000%
2	-0.00	-54726.16	-66590.51	0.01	54726.16	66590.52	0.000%
3	-0.00	-41044.62	-66590.51	0.00	41044.62	66590.51	0.000%
4	31869.24	-54726.16	-55199.13	-31869.24	54726.16	55199.13	0.000%
5	31869.24	-41044.62	-55199.13	-31869.24	41044.62	55199.13	0.000%
6	54375.82	-54726.16	-31393.90	-54375.82	54726.16	31393.90	0.000%
7	54375.82	-41044.62	-31393.90	-54375.82	41044.62	31393.90	0.000%
8	63738.47	-54726.16	0.00	-63738.47	54726.16	0.00	0.000%
9	63738.47	-41044.62	0.00	-63738.47	41044.62	0.00	0.000%
10	57669.07	-54726.16	33295.25	-57669.08	54726.16	-33295.26	0.000%
11	57669.07	-41044.62	33295.25	-57669.07	41044.62	-33295.25	0.000%
12	31869.24	-54726.16	55199.13	-31869.23	54726.16	-55199.14	0.000%
13	31869.24	-41044.62	55199.13	-31869.24	41044.62	-55199.13	0.000%
14	-0.00	-54726.16	62787.79	-0.00	54726.16	-62787.79	0.000%
15	-0.00	-41044.62	62787.79	-0.00	41044.62	-62787.79	0.000%
16	-31869.24	-54726.16	55199.13	31869.23	54726.16	-55199.14	0.000%
17	-31869.24	-41044.62	55199.13	31869.23	41044.62	-55199.14	0.000%
18	-57669.07	-54726.16	33295.25	57669.08	54726.16	-33295.26	0.000%
19	-57669.07	-41044.62	33295.25	57669.07	41044.62	-33295.25	0.000%
20	-63738.47	-54726.16	0.00	63738.47	54726.16	0.00	0.000%
21	-63738.47	-41044.62	0.00	63738.47	41044.62	0.00	0.000%
22	-54375.82	-54726.16	-31393.90	54375.82	54726.16	31393.90	0.000%
23	-54375.82	-41044.62	-31393.90	54375.82	41044.62	31393.90	0.000%
24	-31869.24	-54726.16	-55199.13	31869.24	54726.16	55199.13	0.000%
25	-31869.24	-41044.62	-55199.13	31869.24	41044.62	55199.13	0.000%
26	-0.00	-178529.11	0.00	-0.00	178529.11	0.00	0.000%
27	-0.00	-178529.11	-14368.22	-0.00	178529.11	14368.21	0.000%
28	7052.08	-178529.11	-12214.57	-7052.08	178529.11	12214.56	0.000%
29	12138.34	-178529.11	-7008.08	-12138.33	178529.11	7008.07	0.000%
30	14104.17	-178529.11	0.00	-14104.16	178529.11	0.00	0.000%
31	12443.25	-178529.11	7184.11	-12443.24	178529.11	-7184.10	0.000%
32	7052.08	-178529.11	12214.57	-7052.08	178529.11	-12214.56	0.000%
33	-0.00	-178529.11	14016.15	-0.00	178529.11	-14016.14	0.000%
34	-7052.08	-178529.11	12214.57	7052.08	178529.11	-12214.56	0.000%
35	-12443.25	-178529.11	7184.11	12443.24	178529.11	-7184.10	0.000%
36	-14104.17	-178529.11	0.00	14104.16	178529.11	0.00	0.000%
37	-12138.34	-178529.11	-7008.08	12138.33	178529.11	7008.07	0.000%
38	-7052.08	-178529.11	-12214.57	7052.08	178529.11	12214.56	0.000%
39	-0.00	-45605.13	-16601.51	0.00	45605.13	16601.51	0.000%
40	7945.24	-45605.13	-13761.56	-7945.24	45605.13	13761.56	0.000%
41	13556.30	-45605.13	-7826.73	-13556.30	45605.13	7826.73	0.000%
42	15890.48	-45605.13	0.00	-15890.48	45605.13	0.00	0.000%
43	14377.33	-45605.13	8300.76	-14377.33	45605.13	-8300.76	0.000%
44	7945.24	-45605.13	13761.56	-7945.24	45605.13	-13761.56	0.000%
45	-0.00	-45605.13	15653.47	0.00	45605.13	-15653.47	0.000%
46	-7945.24	-45605.13	13761.56	7945.24	45605.13	-13761.56	0.000%
47	-14377.33	-45605.13	8300.76	14377.33	45605.13	-8300.76	0.000%

Load Comb.	Sum of Applied Forces PX lb	PY lb	PZ lb	Sum of Reactions PX lb	PY lb	PZ lb	% Error
48	-15890.48	-45605.13	0.00	15890.48	45605.13	0.00	0.000%
49	-13556.30	-45605.13	-7826.73	13556.30	45605.13	7826.73	0.000%
50	-7945.24	-45605.13	-13761.56	7945.24	45605.13	13761.56	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000250
28	Yes	4	0.00000001	0.00000242
29	Yes	4	0.00000001	0.00000247
30	Yes	4	0.00000001	0.00000259
31	Yes	4	0.00000001	0.00000278
32	Yes	4	0.00000001	0.00000290
33	Yes	4	0.00000001	0.00000299
34	Yes	4	0.00000001	0.00000299
35	Yes	4	0.00000001	0.00000297
36	Yes	4	0.00000001	0.00000291
37	Yes	4	0.00000001	0.00000283
38	Yes	4	0.00000001	0.00000267
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001

49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	3.468	47	0.1513	0.0149
T2	180 - 160	3.213	47	0.1509	0.0148
T3	160 - 140	2.579	47	0.1437	0.0137
T4	140 - 120	1.989	47	0.1278	0.0123
T5	120 - 100	1.470	47	0.1086	0.0104
T6	100 - 80	1.022	47	0.0903	0.0081
T7	80 - 60	0.656	47	0.0693	0.0061
T8	60 - 40	0.383	47	0.0495	0.0046
T9	40 - 20	0.189	47	0.0309	0.0030
T10	20 - 0	0.061	47	0.0159	0.0014

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	BCD-87010-EDIN	47	3.468	0.1513	0.0149	752215
186.00	Rohn 14' Platform	47	3.404	0.1513	0.0149	752215
172.00	(2) AM-X-CD-16-65-OOT-RET	47	2.957	0.1492	0.0145	325842
157.00	(2) RV90-17-02DP	47	2.487	0.1418	0.0135	89835
145.50	(3) SBNHH-1D85B	47	2.145	0.1328	0.0127	69264
123.00	APXVSPP18-C-A20	47	1.543	0.1114	0.0107	69945

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	188 - 180	13.746	18	0.5984	0.0597
T2	180 - 160	12.737	18	0.5965	0.0596
T3	160 - 140	10.230	18	0.5681	0.0550
T4	140 - 120	7.896	18	0.5057	0.0492
T5	120 - 100	5.839	18	0.4300	0.0417
T6	100 - 80	4.062	18	0.3576	0.0324
T7	80 - 60	2.609	18	0.2748	0.0246
T8	60 - 40	1.526	18	0.1964	0.0185
T9	40 - 20	0.754	18	0.1224	0.0122
T10	20 - 0	0.245	18	0.0631	0.0056

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
195.00	BCD-87010-EDIN	18	13.746	0.5984	0.0597	206994
186.00	Rohn 14' Platform	18	13.494	0.5981	0.0598	206994
172.00	(2) AM-X-CD-16-65-OOT-RET	18	11.726	0.5896	0.0583	85883
157.00	(2) RV90-17-02DP	18	9.865	0.5606	0.0542	22894
145.50	(3) SBNHH-1D85B	18	8.512	0.5253	0.0509	17668
123.00	APXVSPP18-C-A20	18	6.130	0.4411	0.0430	17807

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	188	Leg	A325N	0.8750	4	289.34	40589.10	0.007 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	889.01	5811.33	0.153 ✓	1	Member Block Shear
T2	180	Leg	A325N	0.8750	4	2954.60	40589.10	0.073 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	2486.21	5811.33	0.428 ✓	1	Member Block Shear
T3	160	Leg	A325N	0.8750	4	8195.09	40589.10	0.202 ✓	1	Bolt Tension
		Diagonal	A325N	0.6250	1	5910.56	10440.00	0.566 ✓	1	Member Bearing
T4	140	Leg	A325N	1.0000	4	16180.90	53014.40	0.305 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	7563.28	14137.50	0.535 ✓	1	Member Bearing
T5	120	Leg	A325N	1.0000	6	16393.20	53014.40	0.309 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	8522.69	14137.50	0.603 ✓	1	Member Bearing
T6	100	Leg	A325N	1.0000	6	22158.80	53014.40	0.418 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	12049.10	14137.50	0.852 ✓	1	Member Bearing
T7	80	Leg	A325N	1.0000	8	21331.30	53014.40	0.402 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	12529.00	17892.40	0.700 ✓	1	Bolt Shear
T8	60	Leg	A325N	1.0000	8	25679.30	53014.40	0.484 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	12860.40	17892.40	0.719 ✓	1	Bolt Shear
T9	40	Leg	A325N	1.0000	8	29964.60	53014.40	0.565 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	14168.50	17892.40	0.792 ✓	1	Bolt Shear
T10	20	Leg	A354-BC	1.0000	10	27373.20	55223.30	0.496 ✓	1	Bolt Tension
		Diagonal	A325N	0.7500	1	15307.00	17892.40	0.856 ✓	1	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	Pipe 3.5" x 0.216" (3 STD)	8.00	4.00	41.3 K=1.00	2.2285	-3472.09	88548.60	0.039 [1] ✓
T2	180 - 160	Pipe 3.5" x 0.216" (3 STD)	20.04	5.01	51.7 K=1.00	2.2285	-16200.50	82502.90	0.196 [1] ✓
T3	160 - 140	ROHN 3 EH	20.03	6.68	70.5 K=1.00	3.0159	-41428.50	94349.80	0.439 [1] ✓
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3 K=1.00	4.4074	-77836.10	159905.00	0.487 [1] ✓
T5	120 - 100	ROHN 5 EH	20.05	6.68	43.6 K=1.00	6.1120	-115990.00	239326.00	0.485 [1] ✓
T6	100 - 80	ROHN 6 EHS	20.02	10.01	54.0 K=1.00	6.7133	-154473.00	244126.00	0.633 [1] ✓
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8 K=1.00	8.4049	-197595.00	303759.00	0.650 [1] ✓
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2 K=1.00	9.7193	-238147.00	386368.00	0.616 [1] ✓
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-278745.00	505544.00	0.551 [1] ✓
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8 K=1.00	12.7627	-319519.00	505565.00	0.632 [1] ✓

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L1 3/4x1 3/4x3/16	7.74	3.58	125.1 K=1.00	0.6211	-918.51	8824.45	0.104 [1] ✓
T2	180 - 160	L1 3/4x1 3/4x3/16	9.40	4.57	159.5 K=1.00	0.6211	-2630.76	5512.95	0.477 [1] ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.34	6.07	148.4 K=1.00	1.1900	-5986.73	12209.80	0.490 [1] ✓
T4	140 - 120	L3x3x1/4	14.12	6.91	140.0 K=1.00	1.4400	-7708.87	16593.20	0.465 [1] ✓
T5	120 - 100	L3x3x1/4	16.30	7.99	161.9 K=1.00	1.4400	-8510.22	12404.00	0.686 [1] ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.28	9.41	162.8 K=1.00	1.6900	-12366.10	14408.10	0.858 [1] ✓
T7	80 - 60	L4x4x5/16	20.89	10.27	155.9 K=1.00	2.4000	-12529.00	22316.40	0.561 [1] ✓
T8	60 - 40	L4x4x5/16	22.77	11.15	169.2 K=1.00	2.4000	-12860.40	18939.00	0.679 [1] ✓
T9	40 - 20	L4x4x5/16	24.66	12.08	183.3 K=1.00	2.4000	-14168.50	16141.50	0.878 [1] ✓
T10	20 - 0	L4x4x3/8	26.48	12.98	197.6 K=1.00	2.8600	-15307.00	16543.30	0.925 [1] ✓

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	180 - 160	L2x2x1/8	8.22	7.93	193.4 K=0.81	0.4844	-390.03	2926.10	0.133 [1] ✓

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L3x3x1/4	6.63	6.34	125.2 K=0.97	1.4400	-94.46	20438.10	0.005 [1] ✓

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	Pipe 3.5" x 0.216" (3 STD)	8.00	4.00	41.3	2.2285	697.12	100281.00	0.007 [1] ✓
T2	180 - 160	Pipe 3.5" x 0.216" (3 STD)	20.04	5.01	51.7	2.2285	11818.40	100281.00	0.118 [1] ✓
T3	160 - 140	ROHN 3 EH	20.03	6.68	70.5	3.0159	32780.30	135717.00	0.242 [1] ✓
T4	140 - 120	ROHN 4 EH	20.04	6.68	54.3	4.4074	64723.70	198335.00	0.326 [1] ✓
T5	120 - 100	ROHN 5 EH	20.05	6.68	43.6	6.1120	98359.40	275039.00	0.358 [1] ✓
T6	100 - 80	ROHN 6 EHS	20.02	10.01	54.0	6.7133	132953.00	302097.00	0.440 [1] ✓
T7	80 - 60	ROHN 6 EH	20.03	10.02	54.8	8.4049	170650.00	378222.00	0.451 [1] ✓
T8	60 - 40	ROHN 8 EHS	20.04	10.02	41.2	9.7193	205435.00	437369.00	0.470 [1] ✓

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T9	40 - 20	ROHN 8 EH	20.03	10.02	41.8	12.7627	239717.00	574322.00	0.417 [1] ✓
T10	20 - 0	ROHN 8 EH	20.03	10.02	41.8	12.7627	273732.00	574322.00	0.477 [1] ✓

[1] $P_u / \phi P_n$ controls

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	188 - 180	L1 3/4x1 3/4x3/16	7.74	3.58	82.7	0.3604	889.01	15675.30	0.057 [1] ✓
T2	180 - 160	L1 3/4x1 3/4x3/16	9.40	4.57	104.7	0.3604	2486.21	15675.30	0.159 [1] ✓
T3	160 - 140	L2 1/2x2 1/2x1/4	12.34	6.07	96.6	0.7519	5910.56	32706.60	0.181 [1] ✓
T4	140 - 120	L3x3x1/4	14.12	6.91	90.9	0.9159	7563.28	44652.00	0.169 [1] ✓
T5	120 - 100	L3x3x1/4	16.30	7.99	104.8	0.9159	8522.69	44652.00	0.191 [1] ✓
T6	100 - 80	L3 1/2x3 1/2x1/4	19.28	9.41	105.1	1.1034	12049.10	53792.60	0.224 [1] ✓
T7	80 - 60	L4x4x5/16	20.89	10.27	100.7	1.5949	12353.70	77752.40	0.159 [1] ✓
T8	60 - 40	L4x4x5/16	22.77	11.15	109.2	1.5949	12690.90	77752.40	0.163 [1] ✓
T9	40 - 20	L4x4x5/16	24.66	12.08	118.2	1.5949	13897.80	77752.40	0.179 [1] ✓
T10	20 - 0	L4x4x3/8	26.48	12.98	127.9	1.8989	14938.10	92571.70	0.161 [1] ✓

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T2	180 - 160	L2x2x1/8	8.22	7.93	151.9	0.4844	525.06	15693.80	0.033 [1] ✓

[1] $P_u / \phi P_n$ controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	188 - 180	L3x3x1/4	6.63	6.34	81.8	1.4400	11.34	46656.00	0.000 [1] ✓

[1] $P_u / \phi P_n$ controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	188 - 180	Leg	Pipe 3.5" x 0.216" (3 STD)	2	-3472.09	88548.60	3.9	Pass
T2	180 - 160	Leg	Pipe 3.5" x 0.216" (3 STD)	19	-16200.50	82502.90	19.6	Pass
T3	160 - 140	Leg	ROHN 3 EH	58	-41428.50	94349.80	43.9	Pass
T4	140 - 120	Leg	ROHN 4 EH	79	-77836.10	159905.00	48.7	Pass
T5	120 - 100	Leg	ROHN 5 EH	100	-115990.00	239326.00	48.5	Pass
T6	100 - 80	Leg	ROHN 6 EHS	121	-154473.00	244126.00	63.3	Pass
T7	80 - 60	Leg	ROHN 6 EH	136	-197595.00	303759.00	65.0	Pass
T8	60 - 40	Leg	ROHN 8 EHS	151	-238147.00	386368.00	61.6	Pass
T9	40 - 20	Leg	ROHN 8 EH	166	-278745.00	505544.00	55.1	Pass
							56.5 (b)	
T10	20 - 0	Leg	ROHN 8 EH	181	-319519.00	505565.00	63.2	Pass
T1	188 - 180	Diagonal	L1 3/4x1 3/4x3/16	8	-918.51	8824.45	10.4	Pass
							15.3 (b)	
T2	180 - 160	Diagonal	L1 3/4x1 3/4x3/16	35	-2630.76	5512.95	47.7	Pass
T3	160 - 140	Diagonal	L2 1/2x2 1/2x1/4	62	-5986.73	12209.80	49.0	Pass
							56.6 (b)	
T4	140 - 120	Diagonal	L3x3x1/4	83	-7708.87	16593.20	46.5	Pass
							53.5 (b)	
T5	120 - 100	Diagonal	L3x3x1/4	104	-8510.22	12404.00	68.6	Pass
T6	100 - 80	Diagonal	L3 1/2x3 1/2x1/4	125	-12366.10	14408.10	85.8	Pass
T7	80 - 60	Diagonal	L4x4x5/16	140	-12529.00	22316.40	56.1	Pass
							70.0 (b)	
T8	60 - 40	Diagonal	L4x4x5/16	155	-12860.40	18939.00	67.9	Pass
							71.9 (b)	
T9	40 - 20	Diagonal	L4x4x5/16	170	-14168.50	16141.50	87.8	Pass
T10	20 - 0	Diagonal	L4x4x3/8	185	-15307.00	16543.30	92.5	Pass
T2	180 - 160	Horizontal	L2x2x1/8	32	-390.03	2926.10	13.3	Pass
T1	188 - 180	Top Girt	L3x3x1/4	4	-94.46	20438.10	0.6	Pass
							Summary	
						Leg (T7)	65.0	Pass
						Diagonal (T10)	92.5	Pass
						Horizontal (T2)	13.3	Pass
						Top Girt (T1)	0.6	Pass
						Bolt Checks	85.6	Pass
						RATING =	**92.5**	**Pass**

Program Version 7.0.5.1 - 2/1/2016 File:R:/Projects/2017/17924000(TEMP)/17924020A(TEMP)/Structural/Rev 0/TNX Tower/CT03XC090.eri

SITE ID: CT03XC090
SITE NAME: BALCH TOWER

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

DO MACRO PROJECT

SITE INFORMATION

ADDRESS:	236 SOUTH MAIN STREET EAST WINDSOR, CT 06088
JURISDICTION:	TOWN OF EAST WINDSOR
COUNTY :	HARTFORD
PROPERTY OWNER:	BALCH BRIDGE STREET CORPORATION 250 SOUTH MAIN STREET EAST WINDSOR, CT 06088
TOWER OWNER:	NORTHEAST TOWERS, INC 199 BRICKYARD ROAD FARMINGTON, CT 06032 PHONE: 860-677-1999
APPLICANT:	SPRINT 201 STATE ROUTE 17 NORTH RUTHERFORD, NJ 07070
LATITUDE (NAD 83):	N 41.87716388°
LONGITUDE (NAD 83):	W 72.61078055°
CURRENT USE:	UNMANNED TELECOMMUNICATIONS FACILITY
PROPOSED USE:	NO CHANGE
UTILITY COMPANY:	CONNECTICUT LIGHT AND POWER PHONE: 800-922-4455

RF CONFIGURATION

THE CONTRACTOR SHALL OBTAIN THE LATEST RF DATA SHEET AND CONFIRM SAME WITH THE SPRINT CONSTRUCTION MANAGER PRIOR TO START OF CONSTRUCTION.

PROJECT CONTACTS

	NAME:	COMPANY:	PHONE #:
ENGINEER:	JEREMY MCKEON	MASER CONSULTING P.A.	973.398.3110
CONSTRUCTION:	TOM JUPIN	CHERUNDOLO CONSULTING	973.819.9033

STRUCTURAL STATEMENT

THE PROPOSED ANTENNA AND EQUIPMENT INSTALLATION SHALL BE EVALUATED INCLUDING THE NEW LOAD CONDITIONS ON THE SUPPORTING ELEMENTS OF THE EXISTING STRUCTURE. THESE PLANS HAVE BEEN DEVELOPED FOR THE PROPOSED TELECOMMUNICATION FACILITY TO BE OWNED OR LEASED BY SPRINT IN ACCORDANCE WITH THE SCOPE OF WORK PROVIDED BY CHERUNDOLO CONSULTING. MASER HAS INCORPORATED THE SCOPE OF WORK WITHIN THESE PLANS. ELEMENTS OF THE STRUCTURE AFFECTED BY THE SCOPE OF WORK SHALL BE ANALYZED UNDER SEPARATE COVER. MASER ASSUMES NO RESPONSIBILITY FOR ANY ELEMENTS OF THE SITE NOT AFFECTED BY THE SCOPE OR FOR CHANGES TO THE SCOPE OF WORK NOT SPECIFICALLY SHOWN ON THESE DRAWINGS.

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

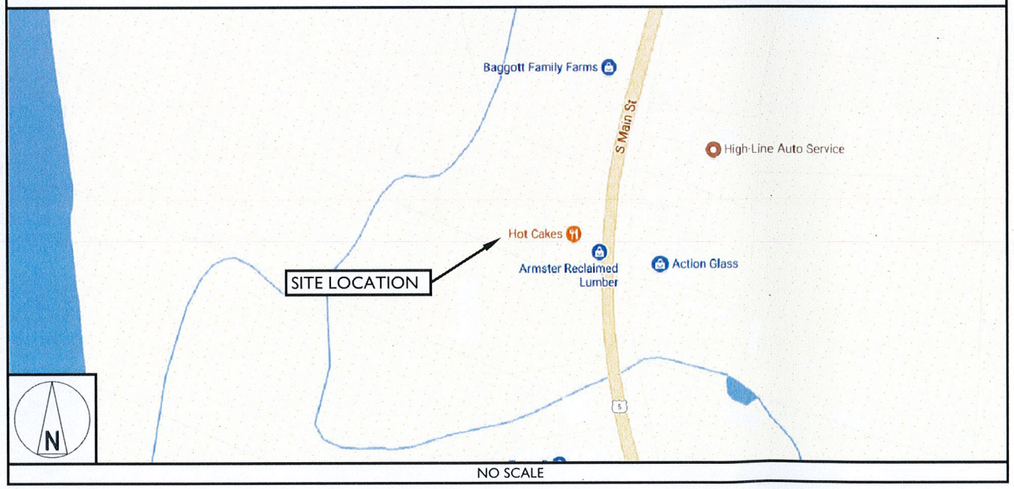
CONSTRUCTION:_____ DATE:_____

LEASING/SITE ACQUISITION: _____ DATE:_____

RF ENGINEERING: _____ DATE:_____

LANDLORD/PROPERTY OWNER: _____ DATE:_____

LOCAL MAP



NO SCALE

DRIVING DIRECTIONS

FROM SPRINT OFFICES, RUTHERFORD, NJ: GET ON NJ-3 E FROM VETERANS BLVD AND SERVICE RD. HEAD SOUTH. SLIGHT LEFT TOWARD VETERANS BLVD. TURN LEFT TOWARD VETERANS BLVD. TURN RIGHT TOWARD VETERANS BLVD. TURN LEFT TOWARD VETERANS BLVD. TURN RIGHT ONTO VETERANS BLVD. TURN RIGHT TO STAY ON VETERANS BLVD. TURN LEFT ONTO SERVICE RD. KEEP RIGHT TO CONTINUE TOWARD NJ-17 N. SLIGHT RIGHT ONTO NJ-17 N. USE THE RIGHT LANE TO MERGE ONTO NJ-3 E VIA THE RAMP TO NEW YORK/NEW JERSEY TURNPIKE. FOLLOW I-95 S TO NJ-33 W/FRANKLIN ST IN EAST WINDSOR. EXIT FROM NJ-133. MERGE ONTO NJ-3 E. TAKE THE EXIT TOWARD NEW JERSEY TURNPIKE. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR TURNPIKE S AND MERGE ONTO I-95 S. USE THE LEFT 2 LANES TO TAKE THE TURNPIKE S EXIT. MERGE ONTO I-95 S. TAKE EXIT 8 FOR NJ-133/HIGHTSTOWN TOWARD NJ-33/FREEHOLD. CONTINUE ONTO NJ-133. USE THE MIDDLE LANE TO STAY ON NJ-133.TAKE THE EXIT TOWARD NJ-33 W/FRANKLIN ST. KEEP LEFT AT THE FORK TO CONTINUE TOWARD NJ-33 W/FRANKLIN ST. CONTINUE ON NJ-33 W/FRANKLIN ST. DRIVE TO S MAIN ST IN HIGHTSTOWN. USE ANY LANE TO TURN LEFT ONTO NJ-33 W/FRANKLIN ST. TURN LEFT ONTO MAXWELL AVE. TURN RIGHT ONTO E WARD ST. TURN LEFT ONTO S MAIN ST. DESTINATION WILL BE ON THE RIGHT

DRAWING INDEX

NYC DOB NUMBER	SHEET TITLE	REV.
T-001.00	TITLE SHEET	0
ANT-001.00	GENERAL NOTES - 1	0
ANT-002.00	GENERAL NOTES - 2	0
ANT-003.00	GENERAL NOTES - 3	0
ANT-004.00	SITE PLAN	0
ANT-005.00	EQUIPMENT PLAN AND ELEVATION	0
ANT-006.00	ANTENNA ORIENTATION PLAN	0
ANT-007.00	DETAILS	0
ANT-008.00	ANTENNA SCHEDULE, WIRING DIAGRAM, BILL OF MATERIALS AND NOTES	0
ANT-009.00	FIBER PLUMBING DIAGRAMS - 1	0
ANT-010.00	FIBER PLUMBING DIAGRAMS - 2	0
ANT-011.00	CABLE COLOR CODING, DC POWER DETAILS & PANEL SCHEDULES	0
ANT-012.00	ELECTRICAL AND GROUNDING NOTES	0
ANT-013.00	GROUNDING SCHEMATIC AND DETAILS	0

APPLICABLE BUILDING CODES & STANDARDS

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES.

1. 2016 CONNECTICUT STATE BUILDING CODE, INCORPORATING THE 2012 INTERNATIONAL BUILDING CODE
2. TIA/EIA-222-G OR LATEST EDITION
3. NFPA 780-LIGHTNING PROTECTION CODE 201
4. 2014 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES MOST RECENT EDITIONS
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

SCOPE OF WORK

SPRINT PROPOSED TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

- INSTALL (3) NEW PANEL ANTENNAS
- INSTALL (6) NEW RRH'S BEHIND NEW ANTENNAS
- INSTALL (30) JUMPER CABLES
- INSTALL (1) HYBRID CABLE

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Fax: 570-842-5592

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ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	17924020A

REV.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
0	10/25/17	ISSUED FOR CONSTRUCTION	JRF	PET
B	09/27/17	REVISED [illegible]	DTS	PET
A	07/24/17	ISSUED FOR CLIENT REVIEW	DTS	PET

PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER: PEN.0032[illegible]
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFFESIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
T-001.00

GENERAL NOTES

1. CONTRACTOR SHALL NOT COMMENCE ANY WORK UNTIL HE OBTAINS, AT HIS OWN EXPENSE, ALL INSURANCE REQUIRED BY SPRINT, THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
2. 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 CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATE "ISSUED FOR CONSTRUCTION.
3. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, LAWS AND REGULATIONS OF ALL MUNICIPALITIES, UTILITIES OR OTHER PUBLIC AUTHORITIES.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS THAT MAY BE REQUIRED BY ANY FEDERAL, STATE, COUNTY OR MUNICIPAL AUTHORITIES.
5. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER, IN WRITING, OF ANY CONFLICTS, ERRORS OR OMISSIONS PRIOR TO THE SUBMISSION OF BIDS FOR PERFORMANCE OF WORK. MINOR OMISSIONS OR ERRORS IN THE BID DOCUMENTS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THIS PROJECT IN ACCORDANCE WITH THE OVERALL INTENT OF THESE DRAWINGS.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING SITE IMPROVEMENTS PRIOR TO COMMENCING DEMOLITION. THE CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED AS A RESULT OF REMOVAL OF THIS FACILITY.
7. THE SCOPE OF WORK FOR THIS PROJECT SHALL INCLUDE PROVIDING ALL MATERIALS, EQUIPMENT AND LABOR AS REQUIRED TO COMPLETE THIS PROJECT. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
8. THE CONTRACTOR SHALL VISIT THE PROJECT SITE PRIOR TO SUBMITTING A BID TO VERIFY THAT THE PROJECT CAN BE REMOVED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
9. THE DEMOLITION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL REMOVAL MEANS AND METHODS. THE DEMOLITION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
10. THE CONTRACTOR IS TO REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. THE CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND RELATED PARTIES. THE SUBCONTRACTOR SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT EFFECTS THEIR WORK.
11. THE CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON THE SITE AT ALL TIMES AND INSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA CONTRACTOR FURNISH 3 SETS OF REDLINE "AS-REMOVED" DRAWINGS TO SPRINT UPON COMPLETION OF THE WORK.
12. REPAIR MATERIALS INSTALLED SHALL MEET REQUIREMENTS OF CONTRACTORS DOCUMENTS. NO SUBSTITUTIONS ARE ALLOWED.
13. THE CONTRACTOR SHALL RECEIVE CLARIFICATION IN WRITING AND SHALL RECEIVE IN WRITING AUTHORIZATION TO PROCEED BEFORE STARTING WORK ON ANY ITEMS NOT CLEARLY DEFINED OR IDENTIFIED BY THE CONTRACT DOCUMENTS.
14. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER OF ALL PRODUCTS OR ITEMS NOTED AS EXISTING WHICH ARE NOT FOUND TO BE IN THE FIELD.
15. DEMOLITION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMEN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST-ACCEPTED PRACTICE. ALL SURFACES SHALL BE REPAIRED TO MATCH THEIR SURROUNDINGS AND PROVIDE WEATHER TIGHT SEAL ON SAME DAY AS REMOVAL.
16. THE CONTRACTOR SHALL COORDINATE HIS WORK AND SCHEDULE HIS ACTIVITIES AND WORKING HOURS IN ACCORDANCE WITH THE REQUIREMENTS OF THE PROPERTY OWNER AND/OR PROPERTY MANAGEMENT COMPANY.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF OTHERS AS IT MAY RELATE TO RADIO EQUIPMENT, ANTENNAS AND ANY OTHER PORTIONS OF THE WORK.
18. THE CONTRACTOR SHALL REPAIR ALL EXISTING SURFACES DAMAGED DURING REMOVAL SUCH THAT THEY MATCH AND BLEND WITH ADJACENT SURFACES.
19. THE CONTRACTOR SHALL KEEP CONTRACT AREA CLEAN, HAZARD FREE AND DISPOSE OF ALL DEBRIS AND RUBBISH. LEAVE PREMISES IN CLEAN CONDITION AND FREE FROM PAINT SPOTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING ALL ITEMS UNTIL COMPLETION OF CONSTRUCTION.
20. BEFORE FINAL ACCEPTANCE OF THE WORK, THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT, TEMPORARY WORKS, UNUSED AND USELESS MATERIALS, RUBBISH AND TEMPORARY STRUCTURES.

TENANT SAFETY NOTES

1. CONSTRUCTION WORK SHALL BE CONFINED TO THE DESIGNATED AREA OF WORK SHOWN, AND WILL NOT CREATE DUST, OR OTHER SUCH INCONVENIENCES TO OTHER UNITS WITHIN THE BUILDING.
2. ALL EXISTING MEANS OF EGRESS FROM THE BUILDING ARE TO BE MAINTAINED CLEAR AND FREE OF ALL OBSTRUCTIONS, SUCH AS BUILDING MATERIALS, TOOLS, ETC.
3. CONSTRUCTION OPERATIONS SHALL NOT INVOLVE UNSCHEDULED INTERRUPTION OF HEATING, GAS, WATER, OR ELECTRICAL SERVICES TO OTHER UNITS OF THE BUILDING.
4. CONSTRUCTION OPERATIONS WILL BE CONFINED TO THE HOURS SET BY THE OWNER, CONDO BOARD, CO-OP BOARD, BUILDING MANAGER OR OTHER APPLICABLE GOVERNING ENTITY.
5. CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY SHORING AND BRACING WHEREVER STRUCTURAL WORK IS INVOLVED.
6. ALL BUILDING MATERIALS IN THE CONSTRUCTION AREA OR IN ANY AREA OF THE BUILDING ARE TO BE SECURED IN A LOCKED AREA. ACCESS TO SUCH AREA IS TO BE CONTROLLED BY THE OWNER AND GENERAL CONTRACTOR.
7. ALL FLAMMABLE MATERIALS ARE TO BE KEPT TIGHTLY SEALED IN THEIR RESPECTIVE MANUFACTURER'S CONTAINERS. SUCH MATERIALS ARE TO BE KEPT AWAY FROM ANY SOURCE OF HEAT.
8. ALL FLAMMABLE MATERIALS ARE TO BE USED AND STORED IN AN ADEQUATELY VENTED SPACE.
9. ALL ELECTRICAL POWER TO BE SHUT-OFF WHERE THERE IS EXPOSED CONDUIT.
10. THE CONTRACTOR SHALL PROVIDE FOR FULLY CHARGED AND OPERABLE FIRE EXTINGUISHERS MADE ACCESSIBLE DURING ALL PHASES OF DEMOLITION AND CONSTRUCTION.

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B	09/27/17	REVISED PER COMMENTS	DTS	PET
A	07/24/17	ISSUED FOR REVIEW	DTS	FEP

STATE OF CONNECTICUT
PETROS P. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER 29350
LICENSED PROFESSIONAL ENGINEER

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984

SHEET TITLE:
GENERAL NOTES - 1

SHEET NUMBER:
ANT-001.00

SECTION 01 100 - SCOPE OF WORK

THE WORK:
THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE CONSTRUCTION DRAWINGS AND ASSOCIATED OUTLINE SPECIFICATIONS AND THE SITE SPECIFIC WORK ORDER, DESCRIBE THE WORK TO BE PERFORMED BY THIS CONSTRUCTION CONTRACTOR (SUPPLIER).

RELATED DOCUMENTS:
A. THE REQUIREMENTS OF EACH SECTION OF THIS SPECIFICATION APPLY TO ALL SECTIONS, INDIVIDUALLY AND COLLECTIVELY.
B. RELATED DOCUMENTS: THE CONTRACTOR SHALL COMPLY WITH THE MOST CURRENT VERSION OF THE FOLLOWING SUPPLEMENTAL REQUIREMENTS FOR INSTALLATION AND TESTING.
1.EN-2012-001: (FIBER OPTIC, DC CABLE, AND DC CIRCUIT BREAKER TAGGING STANDARDS)
2.TS-0200 - (TRANSMISSION ANTENNA LINE ACCEPTANCE STANDARDS)
3.EL-0568: (FIBER TESTING POLICY)
4.NP-312-201: (EXTERIOR GROUNDING SYSTEM TESTING)
5.NP-760-500: ETHERNET, MICROWAVE, TESTING AND ACCEPTANCE

PRECEDENCE:
SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

NATIONALLY RECOGNIZED CODES AND STANDARDS:

THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. GR-1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY -GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
D. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE - "NEC") AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
G. AMERICAN CONCRETE INSTITUTE (ACI)
H. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
I. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
J. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
K. PORTLAND CEMENT ASSOCIATION (PCA)
L. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
M. BRICK INDUSTRY ASSOCIATION (BIA)
N. AMERICAN WELDING SOCIETY (AWS)
O. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
P. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
Q. DOOR AND HARDWARE INSTITUTE (DHI)
R. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
S. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

DEFINITIONS:
A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: "SPRINT"; SPRINT NEXTEL CORPORATION AND IT'S OPERATING ENTITIES.
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR, SUPPLIER, CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. CONSTRUCTION MANAGER - ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT.

SITE FAMILIARITY:
CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

POINT OF CONTACT:
COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

ON-SITE SUPERVISION:
THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

DRAWINGS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.
A. THE JOBSITE DRAWINGS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS-BUILT" DRAWINGS.
B. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

USE OF JOB SITE:
THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

UTILITY SERVICES:
WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

PERMITS/FEES:
WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

CONTRACTOR:
CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:
CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

TEMPORARY UTILITIES AND FACILITIES:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSOR'S OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

ACCESS TO WORK:
THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

DIMENSIONS:
VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

EXISTING CONDITIONS:
NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

FURNISHED MATERIALS:
COMPANY FURNISHED MATERIALS AND EQUIPMENT TO BE INSTALLED BY THE CONTRACTOR (OFIC) IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DOCUMENTS.

RECEIPT OF MATERIAL AND EQUIPMENT:
A. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
B. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY-FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
C. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
D. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF-LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

DELIVERABLES:
A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.
B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S ISSUANCE OF THE WORK ORDER.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

GENERAL REQUIREMENTS FOR CONSTRUCTION:
A. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH. AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.
B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.
C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.
D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

FUNCTIONAL REQUIREMENTS:
A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. CONTRACTOR SHALL TAKE ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.
B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.
C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES
D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE-GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND BACKHAUL (FIBER, COPPER, OR MICROWAVE).
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS, CONDUIT AND BOXES.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H-FRAMES", CABINETS AND PADS AND PLATFORMS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. CONDUCT ALL REQUIRED TESTS AND INSPECTIONS
19. PERFORM, DOCUMENT, AND CLOSE OUT ALL JURISDICTIONAL PERMITTING REQUIREMENTS AND ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
20. PERFORM ALL ADDITIONAL WORK AS IDENTIFIED IN SCOPE OF SERVICES ATTACHED TO THE SUPPLIER AGREEMENT FOR THIS PROJECT. THIS WORK MAY INCLUDE COMMISSIONING, INTEGRATION, SPECIAL WAREHOUSING, REVERSE LOGISTICS ACTIVITIES, ETC. PERFORM COMMISSIONING AND INTEGRATION ACTIVITIES PER APPLICABLE MOPS.

DELIVERABLES:
A. THE CONTRACTOR SHALL PROVIDE ALL REQUIRED TEST REPORTS AND DOCUMENTATION INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
1. PRODUCT SPECIFICATIONS FOR MATERIALS OR SPECIAL CONSTRUCTION IF REQUESTED BY SPRINT
2. ACTUALIZE ALL CONSTRUCTION RELATED MILESTONES IN SITERRA AND COMPLETE ALL ON-LINE FORMS AND COMPLETE DOCUMENT UP-LOADS. UPLOAD ALL REQUIRED CLOSEOUT DOCUMENTS AND FINAL SITE PHOTOS
3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT LEFT ON SITE INSIDE BASE OF MAIN RF CABINET IN A PROTECTIVE POUCH.
4. ALL REQUIRED TEST REPORTS.
5. REQUIRED CLOSEOUT DOCUMENTATION INCLUDING BUT NOT LIMITED TO:
a. ALL JURISDICTIONAL PERMITTING AND OCCUPANCY INFORMATION
b. PDF SCAN OF REDLINES PRODUCED IN THE FIELD
c. ELECTRONIC AS-BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS
d. LIEN WAIVERS
e. FINAL PAYMENT APPLICATION
f. REQUIRED FINAL CONSTRUCTION PHOTOS
g. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
h. LISTS OF SUBCONTRACTORS
B. PROVIDE ADDITIONAL DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. PRE-CONSTRUCTION MEETING NOTES.

SECTION 01 400 - TESTS, INSPECTIONS, SUBMITTALS, AND PROJECT CLOSEOUT

TESTS AND INSPECTIONS:
A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.
B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. COAX SWEEPS AND FIBER TESTS PER TS-0200 (CURRENT VERSION) ANTENNA LINE ACCEPTANCE STANDARDS
2. POST CONSTRUCTION HEIGHT VERIFICATION, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE-FOR-THE-PURPOSE ANTENNA ALIGNMENT TOOL.
3. CONCRETE BREAK TESTS
4. SITE RESISTANCE TO EARTH TEST
5. STRUCTURAL BACKFILL COMPACTION TESTS
6. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
7. ADDITIONAL TESTING AS REQUIRED ELSEWHERE IN THIS SPECIFICATION.

SUBMITTALS:
A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.
B. UPLOAD THE FOLLOWING TO SITERRA AS APPLICABLE INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. CONCRETE MIX-DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. CHEMICAL GROUNDING SYSTEM .
4. REINFORCEMENT CERTIFICATIONS
5. STRUCTURAL BACKFILL TEST RESULTS
6. SWEEP AND FIBER TESTS
7. ANTENNA AZIMUTH AND DOWN-TILT VERIFICATION
8. POST CONSTRUCTION HEIGHT VERIFICATION
9. ADDITIONAL SUBMITTALS MAY BE REQUIRED FOR SPECIAL CONSTRUCTION OR MINOR MATERIALS
C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

TESTING BY THIRD PARTY AGENCY:
A. EMPLOY AN AGENCY OF ENGINEERS AND SCIENTISTS WHO IS REGULARLY ENGAGED IN FIELD AND LABORATORY TESTING AND ANALYSIS. AGENCY SHALL HAVE BEEN IN BUSINESS A MINIMUM OF FIVE YEARS, AND BE LICENSED AS PROFESSIONAL ENGINEERS IN THE STATE WHERE THE PROJECT IS LOCATED. AGENCY IS SUBJECT TO APPROVAL BY COMPANY.
1. AGENCY MUST HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
2. AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
B. REQUIRED THIRD PARTY TESTS:
1. SITE RESISTANCE TO EARTH TEST PER NP-312-201
2. CONCRETE CYLINDER BREAK TESTS FOR TOWER PIER AND ANCHORS PER NATIONALLY RECOGNIZED STANDARDS
3. STRUCTURAL SOILS COMPACTION TESTS PER NATIONALLY RECOGNIZED STANDARDS
4. REBAR PLACEMENT VERIFICATION WITH REPORT
5. TESTING TENSION STUDY FOR ROCK ANCHORS
6. ALL THIRD PARTY TESTS AS REQUIRED BY LOCAL JURISDICTION
C. REQUIRED TESTS BY CONTRACTOR
1. COAX SWEEP TESTS PER SPRINT STANDARD TS-0200
2. FIBER TESTS PER SPRINT STANDARD EL-0568
3. MICROWAVE LINK TESTS PER NP-760-500
4. ANTENNA AZIMUTHS AND DOWN TILT USING ELECTRONIC ALIGNMENT TOOL PER ANTENNA INSTALLATION SPECIFICATION HEREIN.
5. POST CONSTRUCTION HEIGHT VERIFICATION AS REQUIRED HEREWITH IN THE TOWER INSTALLATION SPECIFICATIONS.
6. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED HEREWITH IN THE ASPHALT PAVING SPECIFICATIONS.
7. FIELD QUALITY CONTROL TESTING AS SPECIFIED HEREWITH IN THE CONCRETE PAVING SPECIFICATIONS.
8. TESTING REQUIRED HEREWITH UNDER SPECIFICATIONS FOR AGGREGATE BASE FOR ROADWAYS
9. ALL OTHER TESTS REQUIRED BY LOCAL JURISDICTION
D. INSPECTIONS BY COMPANY: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN INSPECTION ACTIVITIES, FINAL ACCEPTANCE / PUNCH WALK REVIEW, AND/OR AS A RESULT OF TESTING
E. SPRINT RESERVES THE RIGHT TO INSPECT THE CONSTRUCTION SITE AT ANY TIME VIA SITE WALKS AND/OR PHOTO REVIEWS. CONTRACTOR SHALL GIVE SPRINT 24 HOURS NOTICE PRIOR TO THE COMMENCEMENT OF THE FOLLOWING CONSTRUCTION ACTIVITIES AND PHOTOGRAPHS OF THE IN-PROGRESS WORK.
1. GROUNDING SYSTEM AND BURIED UTILITIES INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS, AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS, ASPHALT PAVING, AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE AND POST CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES. PRIOR TO CONSTRUCTION ACTIVITIES AND AFTER CONSTRUCTION IS COMPLETE, PROVIDE PHOTOGRAPHIC DOCUMENTATION OF ROOF, FLASHINGS, AND PARAPETS, BOTH BEFORE AND AFTER CONSTRUCTION IS COMPLETE.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. TOWER TOP AND INACCESSIBLE EQUIPMENT (RRUS, ANTENNAS, AND CABLING): PROVIDE PHOTOS OF THE BACKS OF ALL ANTENNAS, RRUS, COMBINERS, FILTERS, FIBER AND DC CABLING, CABLE COLOR CODING, EQUIPMENT GROUNDING AND CONNECTOR WATER PROOFING INCLUDING NAME PLATE AND SERIAL NUMBER FOR ALL SERIALIZED EQUIPMENT.

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FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	17924020A

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A	07/24/1[illegible]	ISSUED FOR [illegible]	[illegible]	FEP

STATE OF CONNECTICUT
PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER PEN.32527
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFFESIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984

SHEET TITLE:
GENERAL NOTES - 2

SHEET NUMBER:
ANT-002.00

PROJECT CLOSEOUT:

A. FINAL ACCEPTANCE PUNCH WALK AND INSPECTION: AS IDENTIFIED IN THE SCOPE OF SERVICES, SPRINT WILL CONDUCT A FINAL PUNCH WALK OR FINAL DESK TOP PHOTO REVIEW (SITE MODIFICATIONS). PUNCH WALKS MUST BE SCHEDULED IN ADVANCE AS REQUIRED. AT THE PUNCH WALK / REVIEW, SPRINT MAY IDENTIFY CRITICAL DEFICIENCIES WHICH MUST BE CORRECTED PRIOR TO PUTTING SITE ON AIR. MINOR DEFICIENCIES MUST BE CORRECTED WITHIN 30 DAYS EXCEPT AS OTHERWISE REQUIRED. VERIFICATIONS OF CORRECTIONS MAY BE MADE BY COMPANY DURING A REPEAT SITE WALK OR DESK TOP PHOTO REVIEW AT COMPANY'S SOLE DISCRETION.
B. CLOSEOUT DOCUMENTATION: ALL CLOSEOUT DOCUMENTATION AND PHOTOGRAPHS SHALL BE UPLOADED PRIOR TO FINAL ACCEPTANCE. SPRINT WILL REVIEW CLOSEOUT DOCUMENTATION FOR PRESENCE AND CONTENT. CLOSEOUT DOCUMENTATION SHALL INCLUDE BUT IS NOT LIMITED TO THE FOLLOWING AS APPLICABLE:

1. COAX SWEEP TESTS:
2. FIBER TESTS:
3. JURISDICTION FINAL INSPECTION DOCUMENTATION
4. REINFORCEMENT CERTIFICATION (MILL CERTIFICATION)
5. CONCRETE MIX DESIGN AND PRODUCT DATA (TOWER FOUNDATION)
6. LIEN WAIVERS AND RELEASES.
7. POST -CONSTRUCTION HEIGHT VERIFICATION
8. JURISDICTION CERTIFICATE OF OCCUPANCY
9. ELECTRONIC ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
10. STRUCTURAL BACKFILL TEST RESULTS (IF APPLICABLE)
11. CELL SITE UTILITY SETUP
12. AS-BUILT REDLINE CONSTRUCTION DRAWINGS (PDF SCAN OF FIELD MARKS)
13. AS-BUILT CONSTRUCTION DRAWINGS IN DWG AND PDF FORMATS
14. LIST OF SUB CONTRACTORS
15. APPROVED PERMITTING DOCUMENTS
16. FINAL SITE PHOTOS UP-LOADED TO SITERRA. INCLUDE THE FOLLOWING AS APPLICABLE:
    a. TOWER, ANTENNAS, RRUS, AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX/CABLE LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING - TOP AND BOTTOM; PHOTOS OF COAX GROUNDING--TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
    b. ROOF TOPS: PRE-CONSTRUCTION AND POST-CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
    c. SITE LAYOUT - PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
    d. FINISHED UTILITIES: CLOSE-UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE-UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE-UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.

PROJECT PHOTOGRAPHS:

A. PROVIDE PROJECT CLOSEOUT GENERAL ARRANGEMENT PHOTOS OF ALL NEW WORK. THE FOLLOWING LIST REPRESENTS MINIMUM REQUIREMENTS AND MINIMUM QUANTITY. ADDITIONAL PHOTOS MAY BE REQUIRED TO ADEQUATELY DOCUMENT THE WORK.
    1. ASR AND RF MPE SIGNAGE (IF NOT IN PLACE, SUPPLIER NOTIFIES EMS FIELD REPRESENTATIVE)
    2. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR)
    3. BACK OF ANTENNAS AND RRUS (1 EACH SECTOR) CLOSE UP SHOWING WEATHERPROOFING AND GROUNDING (AS REQUIRED). CLOSE-UP OF BACK SIDE OF EACH PERMANENT RRU SHOWING SERIAL NUMBER/BAR CODE.
    4. VIEW (1 EACH SECTOR) ALONG THE AZIMUTH AND TILT OF THE ANTENNAS
    5. TOP OF TOWER FROM GROUND, 1 EACH SECTOR
    6. MAINLINE HYBRID CABLE ROUTE DOWN TOWER SHOWING FASTENERS AND SUPPORT
    7. MAINLINE/HYBRID CABLE ROUTE ALONG ICE BRIDGE OR IN CABLE TRAY SHOWING FASTENERS AND SUPPORT
    8. GROUND MOUNTED RRU RACKS (FRONT AND BACK)
    9. FRONT, SIDE AND BACK ELEVATIONS OF ALL GROUND CABINETS
    10. VIEW OF COMPOUND FROM A DISTANCE
    11. VIEW OF EACH GROUND CABINET (POWER, RF, FIBER SPOOL, PPC POWER, PPC TELCO WITH DOOR OPEN)
    12. BACKHAUL FIBER MEET-ME-POINT AND CONDUIT ROUTE (MICROWAVE INSTALLATION IF NOT FIBER)
    13. AAV NETWORK INTERFACE DEVICE OR MICROWAVE RADIO INSTALLATION

DEFICIENCY CORRECTIONS:

CONTRACTOR IS RESPONSIBLE FOR ALL CORRECTIONS TO DEFICIENCIES IDENTIFIED THROUGH TESTING, REVIEW OF SUBMITTALS, INSPECTIONS AND CLOSEOUT REVIEWS.

SECTION 01 500 - PROJECT REPORTING

WEEKLY REPORTS:

A. CONTRACTOR SHALL REPORT TO SPRINT AT MINIMUM ON A WEEKLY BASIS VIA SITERRA BY UPDATING ALL APPLICABLE POST END KEEPING MILESTONES WITH ACTUAL AND FORECASTED COMPLETION DATES.
B. ADDITIONAL REQUIREMENTS FOR REPORTING MAY BE IDENTIFIED ELSEWHERE OR REQUIRED BY THE SCOPE OF SERVICES OR SPRINTS LOCAL MARKET CONSTRUCTION MANAGER. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.
   PROJECT CONFERENCE CALLS:
   SPRINT MAY HOLD PERIODIC PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.
   FINAL PROJECT ACCEPTANCE: PRIOR TO SPRINTS FINAL PROJECT ACCEPTANCE. ALL REQUIRED MILESTONE ACTUALS MUST BE UPDATED IN SITERRA AND ALL REQUIRED REPORTING TASKS MUST BE COMPLETE.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:

HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN. LENGTH FOR JUMPER SHALL BE 10"-0".

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.
B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.
C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.
    1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE INSTALLED INSIDE MONOPOLE WITH CABLE SUPPORT GRIPS AS REQUIRED BY THE MANUFACTURER.
    2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
        a. FIBER: SUPPORT FIBER BUNDLES USING 1/2 " VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.
        b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.
    3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
    4. CABLE INSTALLATION:
        a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.
        b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
        c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.
    5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.
    6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 (CURRENT VERSION).
    7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.
B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2 " WIDE ELECTRICAL TAPE EXTENDING 2 " BEYOND THE SELF-AMALGAMATING TAPE.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).
B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.
C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. NEW DC CIRCUIT IS REQUIRED IN MMBS CABINET SHALL BE CLEARLY IDENTIFIED AS TO RRU BEING SERVICED.

SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.
B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.
C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:
    1. ALLIED TUBE AND CONDUIT.
    2. B-LINE SYSTEM.
    3. UNISTRUT DIVERSIFIED PRODUCTS.
    4. THOMAS & BETTS.
B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:
    1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
    2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
    3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
    4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
    5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
    6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
    7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
    8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
    9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
    1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
    2. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
B. CABLE TERMINATION FITTINGS FOR CONDUIT
    1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.
    2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.
D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.
E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.
B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO-OX.
C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

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Fax: 570-842-5592

SCALE:	JOB NUMBER:
AS SHOWN	17924020A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
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0	10/25/17	ISSUED FOR CONSTRUCTION	JRF	PET
B	09/27/17	REVISED [illegible]	DTS	PET
A	07/24/17	ISSUED FOR REVIEW	[illegible]	FEP

PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER PEN.[illegible]

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SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984

SHEET TITLE:
GENERAL NOTES - 3

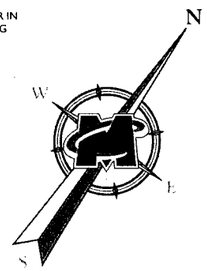
SHEET NUMBER:
ANT-003.00

GENERAL NOTES:

1. SITE INFORMATION OBTAINED FROM THE FOLLOWING:

   A. DRAWINGS ENTITLED "BALCH TOWER", PREPARED BY A SAXON DESIGN GROUP OF TOMS RIVER, NEW JERSEY DATED 07/21/14.

2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



SITE PLAN

SCALE : 1" = 5'
(DO NOT SCALE 11"X17" DRAWINGS)

LEGEND

LIGHT LINE WORK INDICATES EXISTING OBJECTS
HEAVY LINE WORK INDICATED PROPOSED OBJECTS

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B	09/27/17	REVISED PER COMMENTS	DTS	PET
A	07/24/17	ISSUED FOR REVIEW	DTS	PET

STATE OF CONNECTICUT
PETROS E. TSOUKALAS
12984
REGISTERED PROFESSIONAL ENGINEER

PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER LICENSE NUMBER PEN.12984

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
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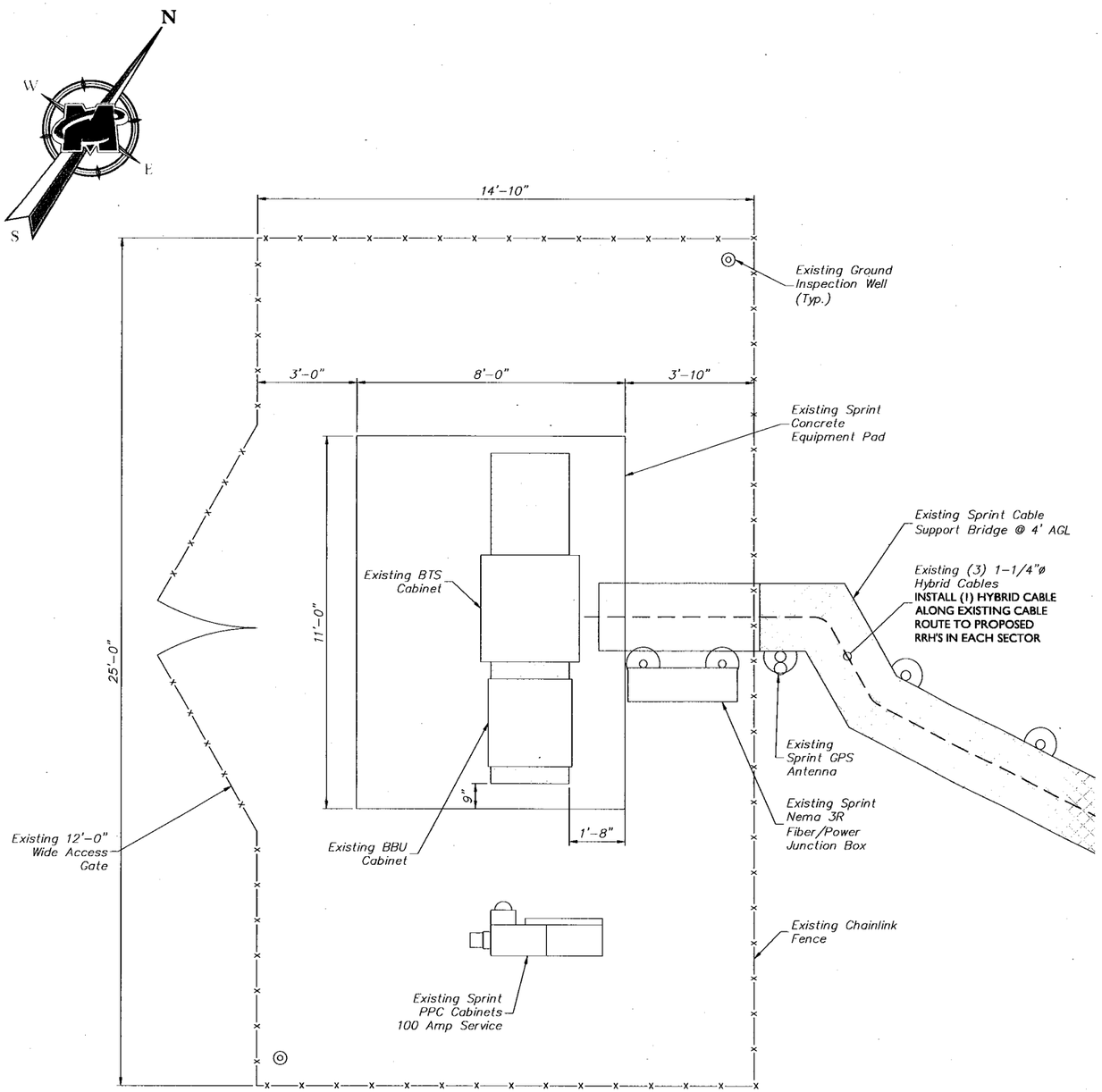
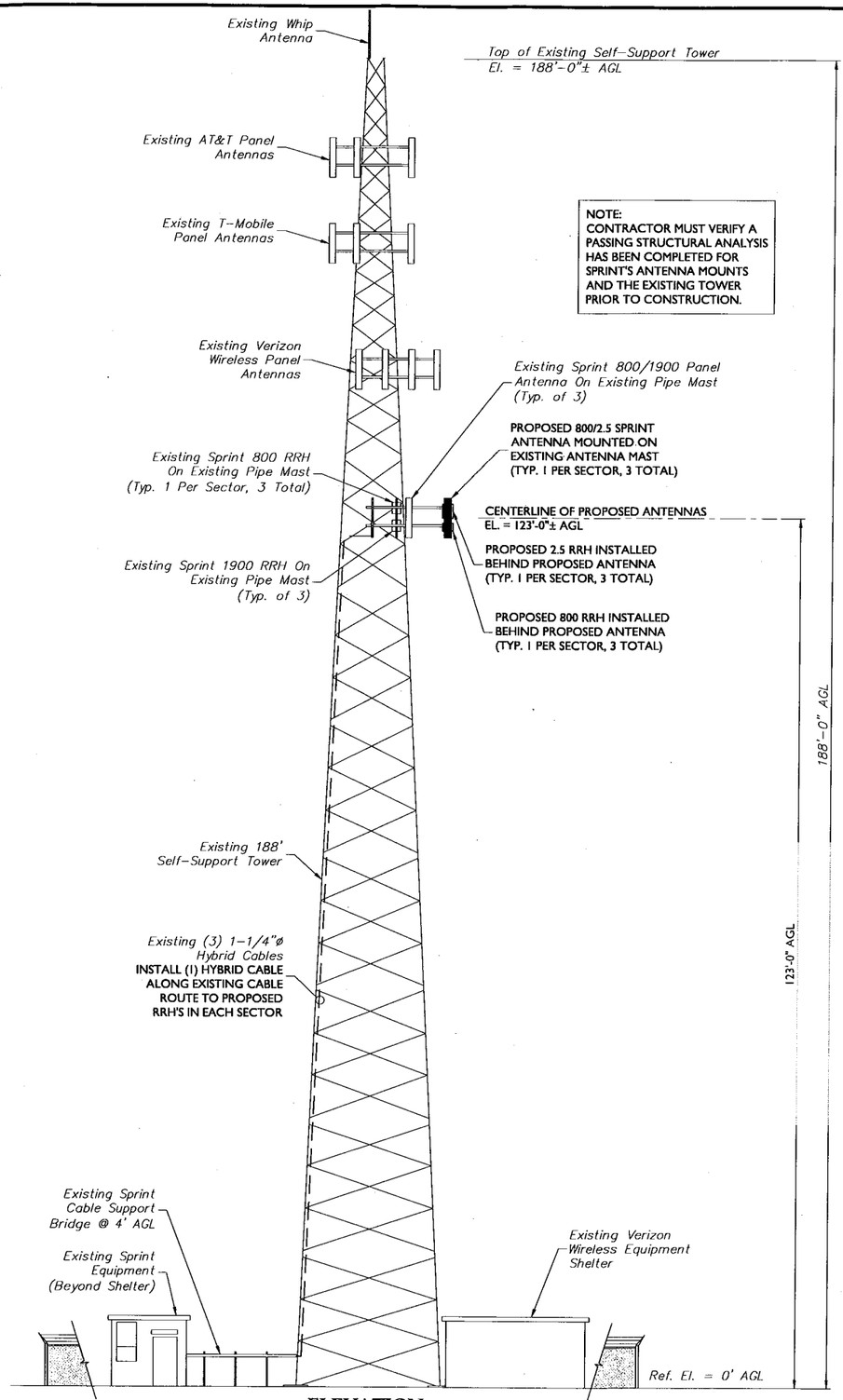
SHEET TITLE :
SITE PLAN

SHEET NUMBER :
ANT-004.00



EQUIPMENT PLAN

SCALE : 1" = 2'
(DO NOT SCALE 11"X17" DRAWINGS)



NOTE:
CONTRACTOR MUST VERIFY A PASSING STRUCTURAL ANALYSIS HAS BEEN COMPLETED FOR SPRINT'S ANTENNA MOUNTS AND THE EXISTING TOWER PRIOR TO CONSTRUCTION.

ELEVATION

SCALE : 1" = 10'
(DO NOT SCALE 11"X17" DRAWINGS)

LEGEND

LIGHT LINE WORK INDICATES EXISTING OBJECTS
HEAVY LINE WORK INDICATED PROPOSED OBJECTS

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A	07/24/17	ISSUED FOR FINAL COMMENTS	JRF	FEP

STATE OF CONNECTICUT
PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER PEN.0021
LICENSED PROFESSIONAL ENGINEER

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
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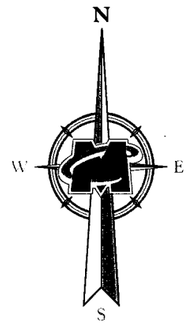
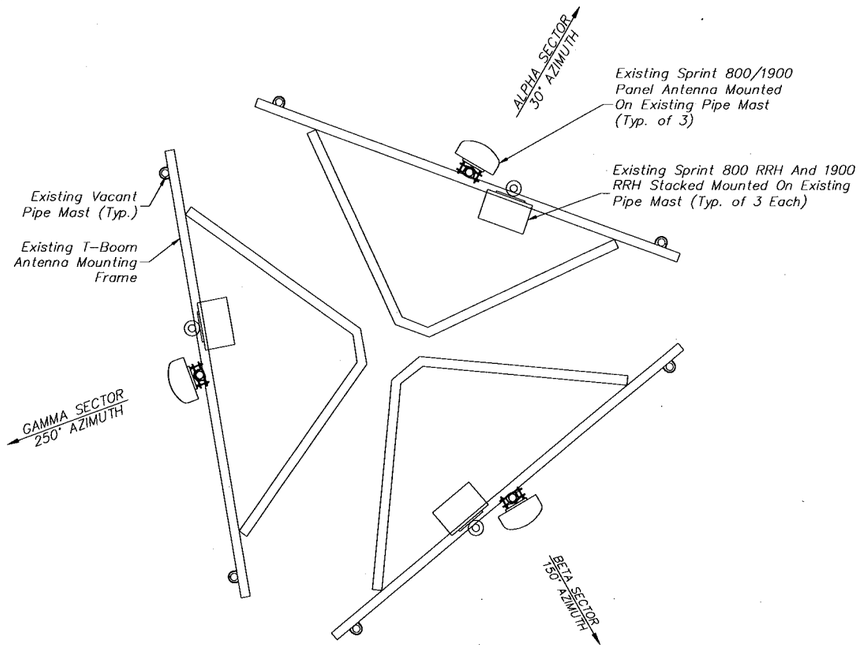
SHEET TITLE :
EQUIPMENT PLAN AND ELEVATION

SHEET NUMBER :
ANT-005.00

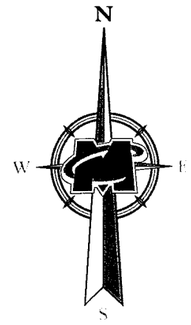




EXISTING ANTENNA LAYOUT

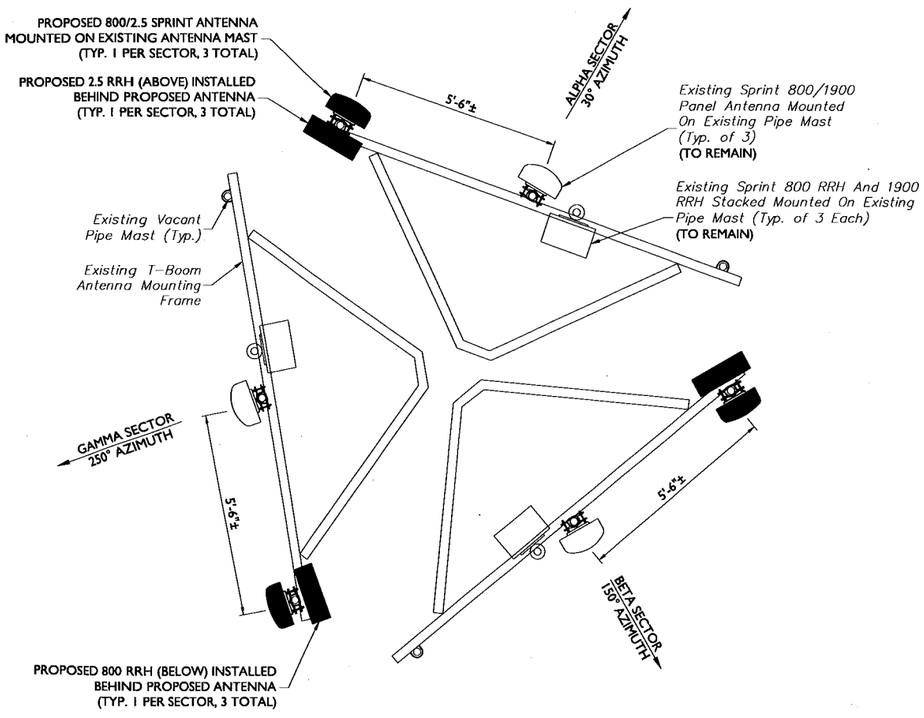
2 0 2 4

SCALE : 1" = 2'
(DO NOT SCALE 11"X17" DRAWINGS)



NOTE:
PROPOSED ANTENNA INSTALLATION MUST MEET SPRINT GUIDELINES FOR SPACING. CONTRACTOR TO VERIFY IN FIELD.

NOTE:
CONTRACTOR MUST VERIFY A PASSING STRUCTURAL ANALYSIS HAS BEEN COMPLETED FOR SPRINT'S ANTENNA MOUNTS AND THE EXISTING TOWER PRIOR TO CONSTRUCTION.



PROPOSED ANTENNA LAYOUT

2 0 2 4

SCALE : 1" = 2'
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STATE OF CONNECTICUT
PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER PEN.21369
LICENSED PROFESSIONAL ENGINEER

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
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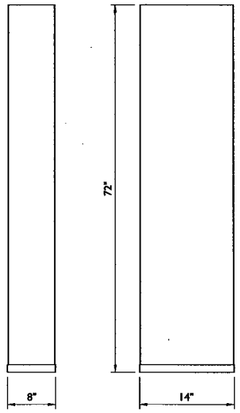
SHEET TITLE :
ANTENNA
ORIENTATION PLANS

SHEET NUMBER :
ANT-006.00

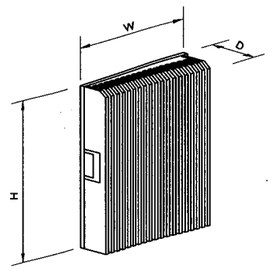


WEIGHT = 58 LBS

COMMSCOPE DT465B-2XR

ANTENNA DETAIL

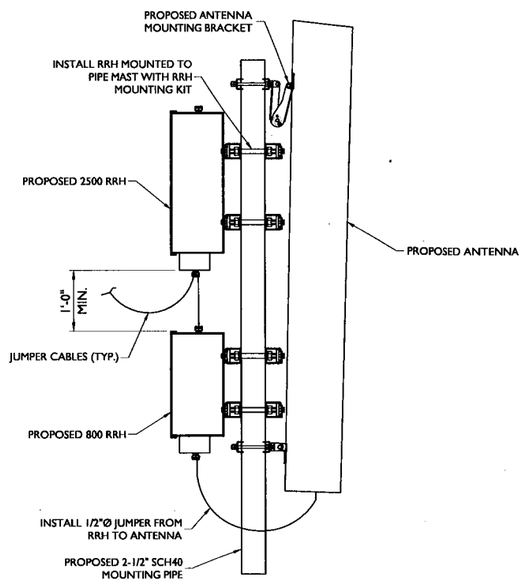
NOT TO SCALE



MODEL:	HEIGHT (H)	WIDTH (W)	DEPTH (D)	WEIGHT
ALU TD-RRH8x20-25	26"	18.6"	6.7"	76.2 LBS
ALU RRH-2x50-800	16"	13"	10"	69.1 LBS

RRH SPECIFICATIONS

NOT TO SCALE



ANTENNA AND RRH MOUNTING DETAIL

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A	07/24/17	ISSUED FOR FINAL	DTS	FEP

CONNECTICUT
PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER PEN.0021
LICENSED ENGINEER

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SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984

SHEET TITLE:
DETAILS - 1

SHEET NUMBER:
ANT-007.00

RF NOTES

1. ACTUAL CABLE LENGTHS SHALL BE DETERMINED PER SITE CONDITION BY SUBCONTRACTOR.
2. THE DESIGN IS BASED ON RF DATA SHEETS, SIGNED AND APPROVED.
3. RADIO SIGNAL CABLE AND RACEWAY SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC, NFPA 70), CHAPTER 8.
4. ALL SPECIFIED MATERIAL FOR EACH LOCATION (E.G., OUTDOORS, INDOORS-OCCUPIED, INDOORS-UNOCCUPIED, PLENUMS, RISER SHAFTS, ETC.) SHALL BE APPROVED, LISTED, OR LABELED AS REQUIRED BY THE NEC.
5. HARDLINE AND JUMPER CABLES SHALL BE SUPPORTED WITH HANGERS AND AT INTERVALS AS REQUIRED BY THE MANUFACTURER FOR 125 mph WIND SPEED AND EXPECTED ICE CONDITIONS. FOR SITES WITH TOWER HEIGHT OVER 300' OR ARE LOCATED IN THE EXTREME WEATHER/OPERATION AREAS, THE WORST CASE SCENARIO FOR 150 mph WIND SPEED AND 1" ICE CONDITION SHOULD BE APPLIED. ALL CABLES SHOULD BE SUPPORTED AT HALF THE DISTANCE OF THE MAXIMUM HANGER SPACING FROM THE CABLE CONNECTOR LOCATION TO THE 1ST HANGER. MANUFACTURER RECOMMENDED CABLE SUPPORT ACCESSORIES SHALL BE USED. PLASTIC CABLE TIES ARE NOT ACCEPTABLE. HANGER STACKING LIMIT SHOULD ALSO REFER TO VENDOR'S RECOMMENDATION.
6. THE OUTDOOR CABLE SUPPORT SYSTEM SHALL BE PROVIDED WITH AN ICE SHIELD TO SUPPORT AND PROTECT ANTENNA CABLE RUNS.
7. DRIP LOOPS SHALL BE REQUIRED ON ALL OUTSIDE CABLES. CABLES SHALL BE SLOPED AWAY FROM THE BUILDING OR OUTDOOR BTS CABINETS TO PREVENT WATER FROM ENTERING THROUGH THE COAXIAL CABLE PORT.
8. ALL FEEDER LINE AND JUMPER CONNECTORS SHALL BE 7/16 DIN CABLE CONNECTORS THAT MEET IP68 STANDARDS.
9. CONNECTORS IN INDOOR APPLICATIONS REQUIRE NO WEATHERPROOFING. OUTDOOR APPLICATIONS REQUIRE WEATHERPROOFING AND THE FOLLOWING PROCEDURES SHOULD BE FOLLOWED:

   RE-ENTERABLE AND RE-SEALABLE PLASTIC ENCLOSURE APPROVED BY CABLE MANUFACTURER AND CONTRACTOR IS RECOMMENDED METHOD TO WEATHERPROOF CONNECTORS.

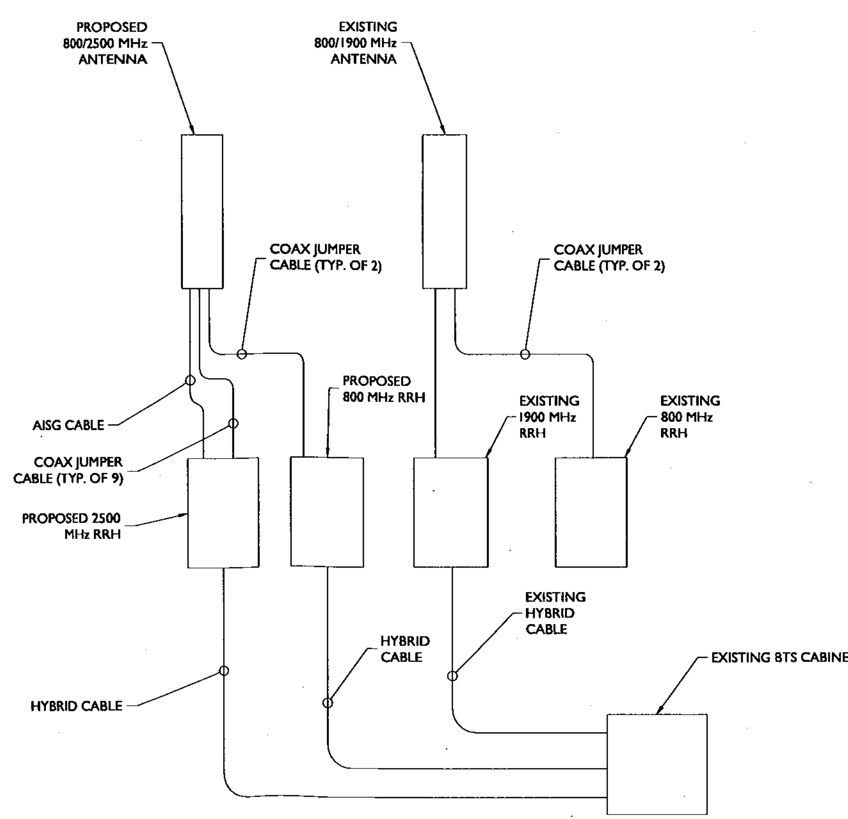
   ALSO ACCEPTABLE IS THE USE OF BUTYL RUBBER WEATHERPROOFING KIT APPROVED BY CABLE MANUFACTURER AND CONTRACTOR. START BUTYL RUBBER TAPE APPROXIMATELY 5 INCHES FROM THE CONNECTOR AND WRAP 2 INCHES TOWARD THE CONNECTOR, THEN REVERSE THE TAPE SO THAT THE STICKY SIDE IS UP. TAPE OVER THE CONNECTOR OR SURGE ARRESTOR UNTIL THREE (3) TO FOUR (4) INCHES BEYOND THE CONNECTOR AND REVERSE AGAIN WITH THE STICKY SIDE DOWN FOR ANOTHER TWO INCHES. FINISH WITH TWO LAYERS OF VINYL TAPE. COLD SHRINK IS STRICTLY PROHIBITED. SELF-BONDING, AMALGAMATING TAPE MAYBE USED AS AN ALTERNATIVE TO BUTYL RUBBER TAPE.
10. ANTENNAS SHALL BE PAINTED, WHEN REQUIRED, BY THE LANDLORD OR AUTHORITY HAVING JURISDICTION IN ACCORDANCE WITH ANTENNA MANUFACTURERS' SURFACE PREPARATION AND PAINTING REQUIREMENTS.
11. CABLE SHIELDS, AND TOWER CONDUITS SHALL BE GROUNDED AT THE TOP OF THE TOWER, WITHIN 10 FEET OF THEIR CONNECTORS, AND AT THE BOTTOM OF THE TOWER ABOUT 6 INCHES BEFORE THEY TURN TOWARD THE FACILITY. THEY SHALL BE GROUNDED AT THE MIDPOINT OF TOWERS THAT ARE BETWEEN 100 FEET AND 200 FEET HIGH, AND AT INTERVALS OF 100 FEET OR LESS ON TOWERS THAT ARE HIGHER THAN 200 FEET.
12. APPROVED GROUNDING KITS, WHICH INCLUDE GROUNDING STRAPS, SHALL BE USED TO GROUND THE COAXIAL CABLE SHIELDS, AND CONDUITS. THE GROUND CONDUCTORS FOR THE KITS AT THE TOP OF THE TOWER, AND IN THE MIDDLE SECTION OF THE TOWER, ARE BONDED DIRECTLY TO TOWER STEEL USING BOLTED, OR APPROVED CLAMP CONNECTIONS. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
13. ALL RADIO SIGNAL CABLE SHALL BE LABELED AND COLOR CODED PER MARKET REQUIREMENTS.
14. ANTENNA FEED LINE SYSTEM SWEEP TESTING SHALL BE PERFORMED AND REPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF PROJECT SPECIFICATIONS. CONTRACTOR WILL NOT ACCEPT A RADIO SIGNAL CABLE INSTALLATION WITH UNSATISFACTORY SWEEP TEST RESULTS.
15. PIM TESTS SHALL BE PERFORMED ON NEW AND MOVED OR MODIFIED COAXIAL CABLE INSTALLATIONS. TEST SHALL BE PERFORMED AND REPORTED IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
16. DC CONNECTORS AT OUTDOOR BIAS-Ts OR DIPLEXER/TRIPLEXER PORTS SHALL BE WEATHERPROOFED PER MANUFACTURER RECOMMENDATIONS.
17. AISG CONNECTIONS DO NOT REQUIRE ADDITIONAL WEATHERPROOFING UNLESS RECOMMENDED BY MANUFACTURER OR BY MARKET REQUIREMENTS.
18. INSTALL ONLY STANDARD RF JUMPER CABLES (e.g. LDF4 OR LCF12) AT TOWER-TOP APPLICATIONS. FLEXIBLE RF CABLES (e.g. FSJ4 OR SCF12) SHALL NOT BE USED.
19. CABLES AND CONNECTORS MUST BE PREPARED AND INSTALLED USING THE TOOLS RECOMMENDED BY THE COAXIAL CABLE MANUFACTURER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT THE CORRECT TOOLS ARE USED FOR THE SIZE AND TYPE OF COAX AND CONNECTOR. ALL ASPECTS OF INSTALLATION OF ALL COAXIAL CABLE SHALL FOLLOW THE CABLE MANUFACTURER'S RECOMMENDATIONS, INCLUDING THOSE FOR PULLING, MOUNTING AND GROUNDING.

PROPOSED ANTENNA CONFIGURATION

SECTOR		PROPOSED ANTENNA	TECH.	ANTENNA STATUS	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)	ANTENNA AZIMUTH	ANT. CL. ELEV (ft.)	ELECTRICAL DOWNTILT	MECHANICAL DOWNTILT
ALPHA	A1	COMMSCOPE DT465B-2XR	800/2500	NEW	72	14	8	58	30°	123'	5°/2°	0°
BETA	B1	COMMSCOPE DT465B-2XR	800/2500	NEW	72	14	8	58	150°	123'	5°/2°	0°
GAMMA	C1	COMMSCOPE DT465B-2XR	800/2500	NEW	72	14	8	58	250°	123'	5°/2°	0°

BILL OF MATERIALS

NUMBER	QUANTITY	DESCRIPTION	MANUFACTURER	MODEL NUMBER
1	3	PANEL ANTENNA	COMMSCOPE	DT465B-2XR
2	3	2500MHZ RRH	ALU	TD-RRH8X20-25
3	3	800MHZ RRH	ALU	RRH-2X50-800
3	180 LF	1-1/4"Ø HYBRID FIBER RISER	ALU	TBD
4	30	1/2"Ø JUMPER CABLE (8' LONG)	TBD	
5	3	0.315"Ø AISG CABLE (8' LONG)	COMMSCOPE	ATCB-B01-006



ANTENNA WIRING DIAGRAM

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B	09/27/17	REVISED [illegible]	DTS	PET
A	07/24/[illegible]	[illegible]	[illegible]	FEP

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SITE ID: CT03XC090

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EAST WINDSOR, CT 06088

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Red Bank, NJ 07701-5699
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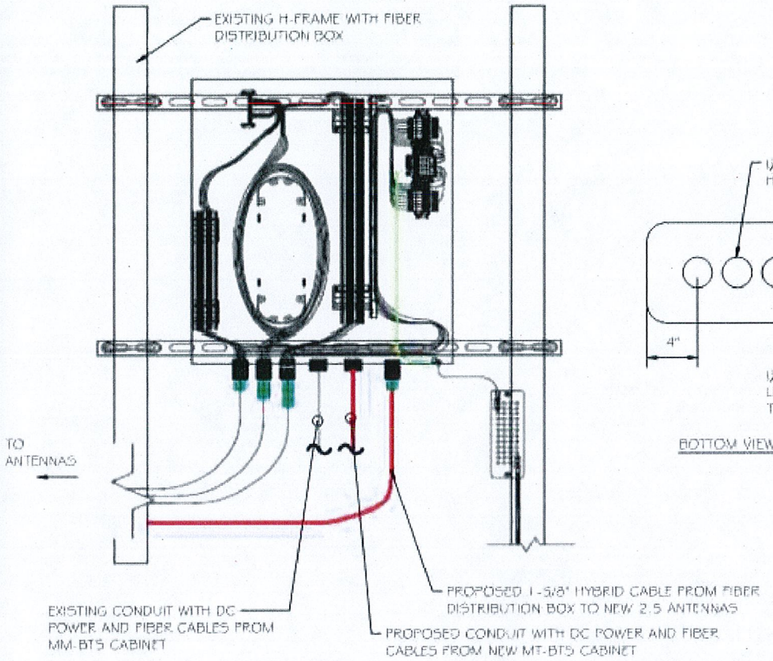
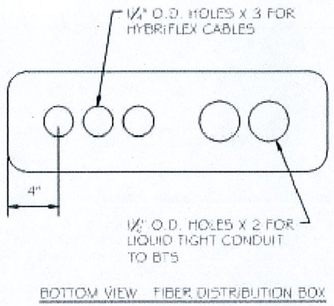
SHEET TITLE:
ANTENNA SCHEDULE, WIRING DIAGRAM, BILL OF MATERIALS AND NOTES

SHEET NUMBER:
ANT-008.00





BOTTOM VIEW - FIBER DISTRIBUTION BOX

TYPICAL FIBER DISTRIBUTION BOX DETAIL

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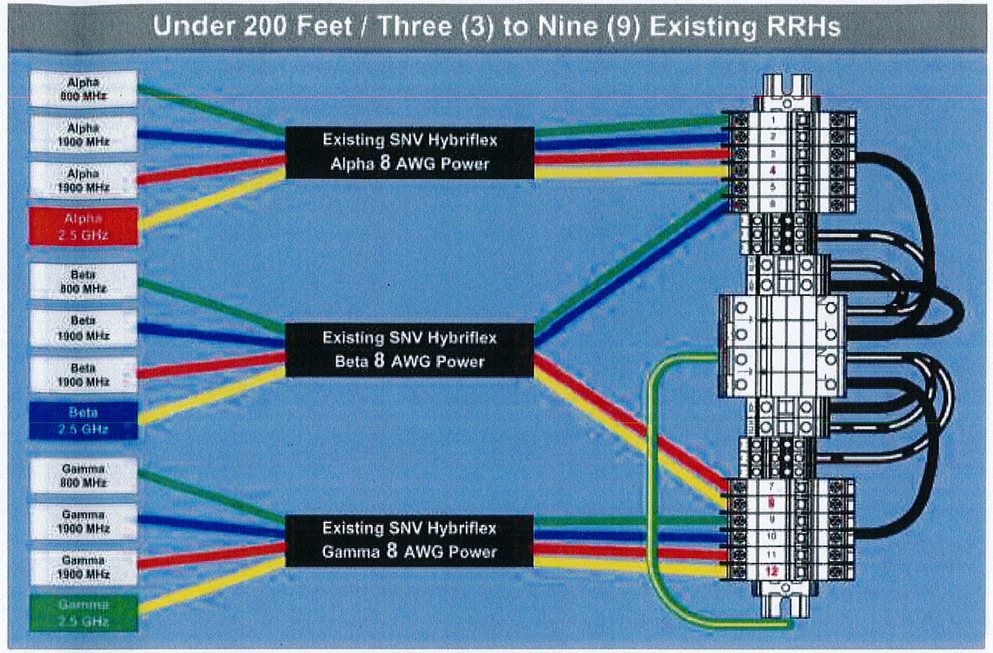

RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL

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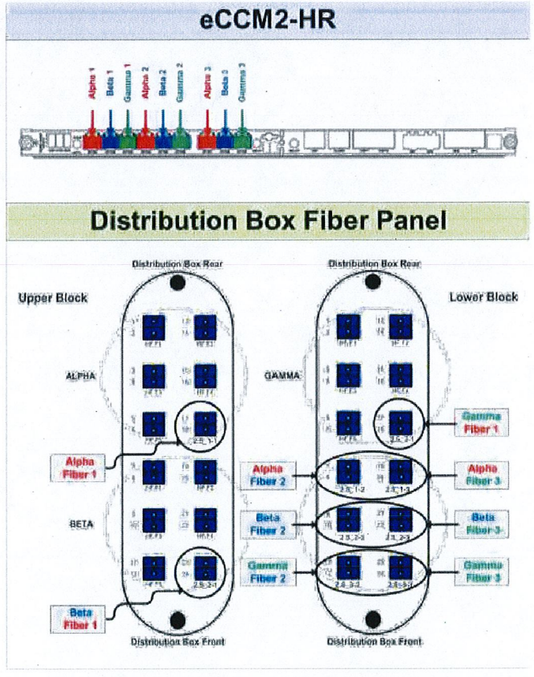

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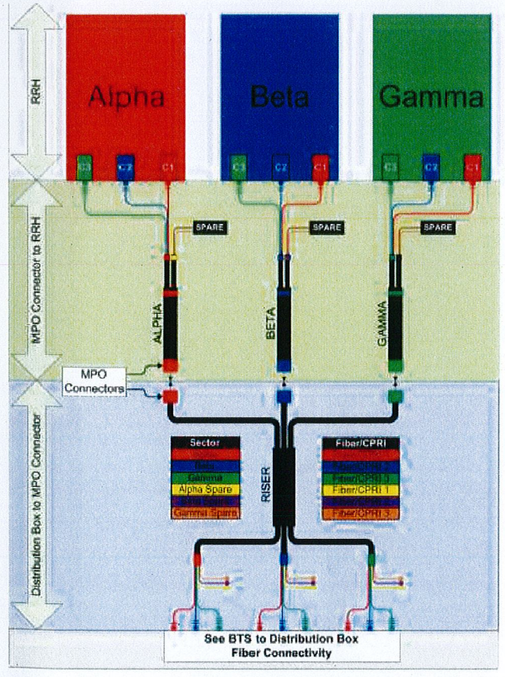

RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL

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12
LICENSED PROFESSIONAL ENGINEER

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LICENSE NUMBER: PEN.0031529

SITE NAME: BALCH TOWER
SITE ID: CT03XC090

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SHEET TITLE:
FIBER PLUMBING DIAGRAMS

SHEET NUMBER:
ANT-009.00

Prepared By	Revision Date	Revision Number
Mark Elliott	August 23, 2017	R4
Approved By	**Approval Date**	
RAN Hardware & Antenna Teams	DRAFT-Macro Generated	

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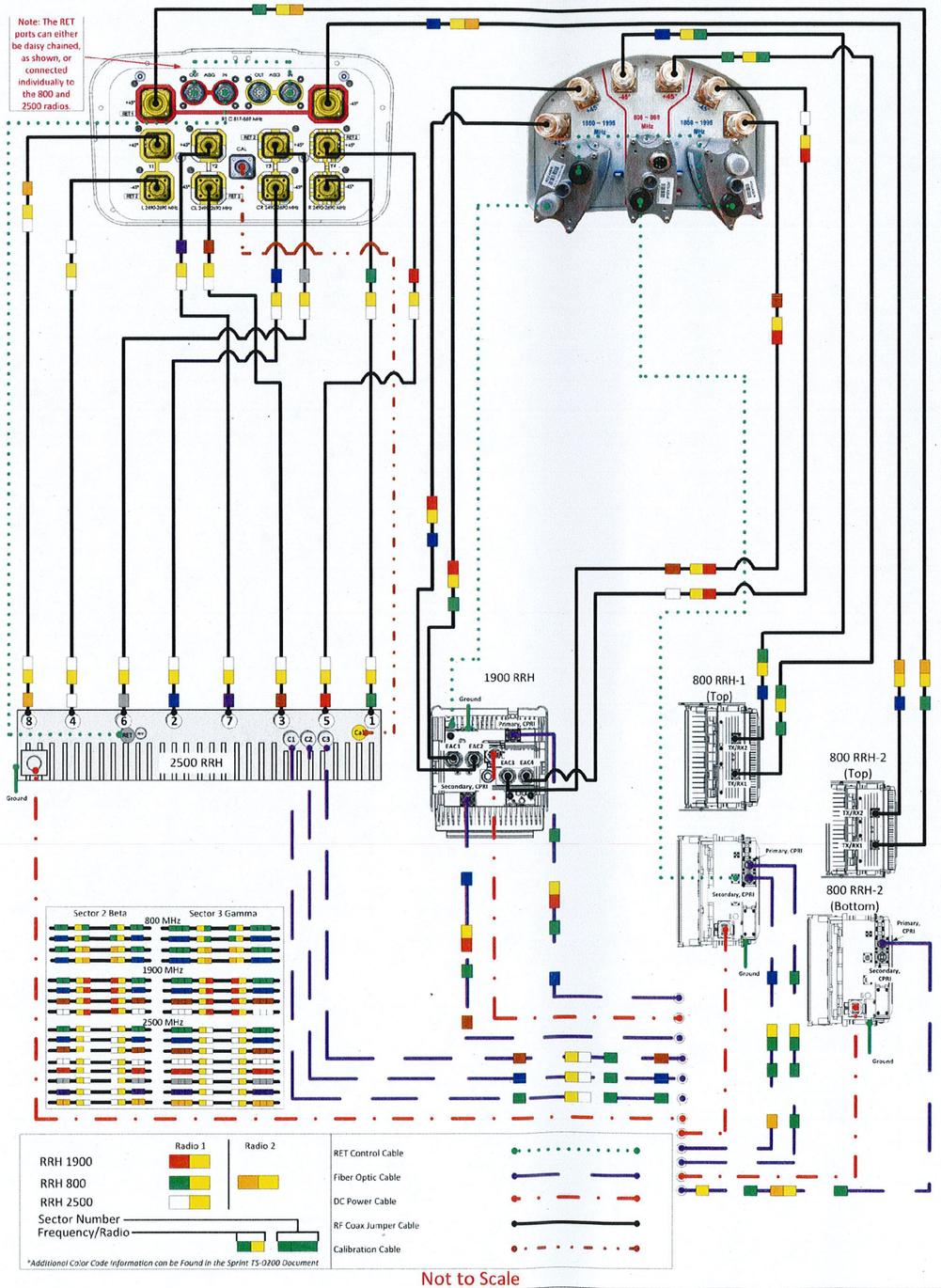
ALU 211 DT465B-2XR & APXVSPP18-C-A20 wo Filters



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SITE ID: CT03XC090

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SHEET TITLE:
FIBER PLUMBING DIAGRAMS

SHEET NUMBER:
ANT-010.00

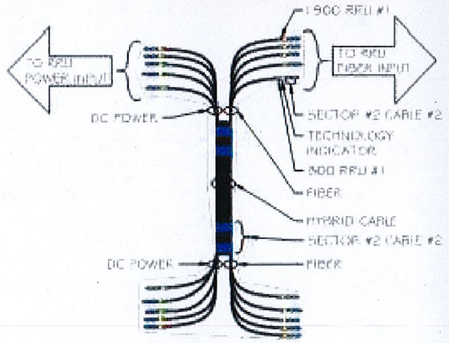
CABLE MARKING NOTES

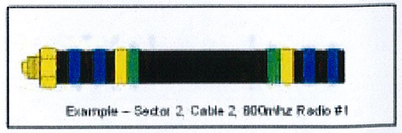
1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
3. A 2" GAP SHALL SEPARATE THE CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
4. THE 2" COLORED TAPE(S) SHALL BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
5. SITES WITH MORE THAN FOUR (4) SECTORS WILL REQUIRE ADDITIONAL RINGS FOR EACH SECTOR, FOLLOWING THE PATTERN. HIGH CAPACITY SITES WILL USE THE SECOND CABLE IDENTIFIED BY BLUE BANDS OF TAPE
6. HYBRID FIBER CABLE SHALL BE SECTOR IDENTIFIED INSIDE THE CABINET ON FREQUENCY BUNDLES, ON THE SEALTITE, ON THE MAIN LINE UPON EXIT OF SEALTITE, AND BEFORE AND AFTER THE BREAKOUT UNIT (MEDUSA), AS WELL AS BEFORE AND AFTER ANY ENTRANCE OR EXIT.
7. HFC "MAIN TRUNK" WILL NOT BE MARKED WITH THE FREQUENCY CODES, AS IT CONTAINS ALL FREQUENCIES.
8. INDIVIDUAL POWER PAIRS AND FIBER BUNDLES SHALL BE LABEL

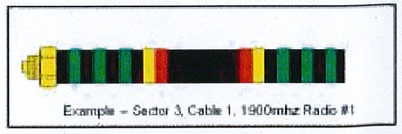
2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	

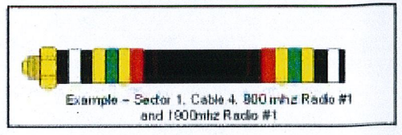
NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange









COLOR CODING CHARTS
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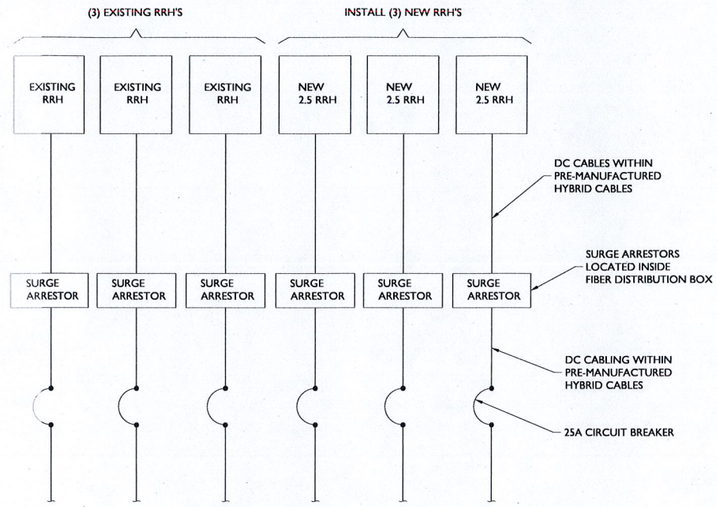

DC ONE-LINE DIAGRAM
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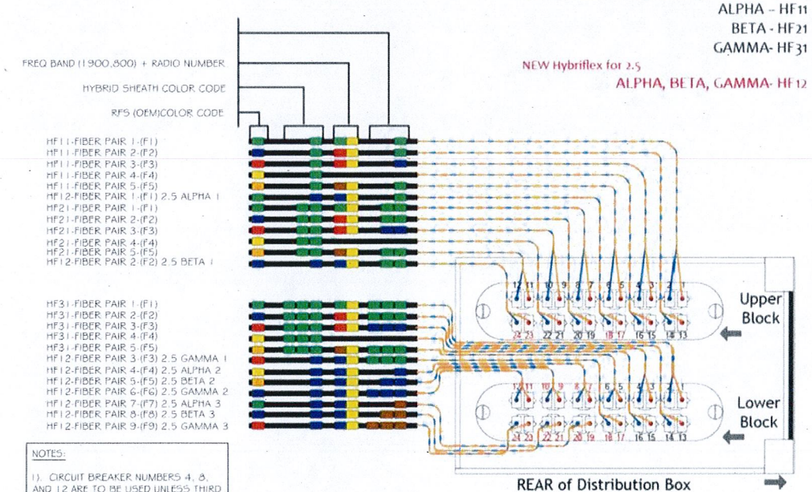
Each sector has separate Hybriflex cable .
Hybriflex cable naming as follows:

ALPHA – HF11
BETA - HF21
GAMMA- HF31

NEW Hybriflex for 2.5
ALPHA, BETA, GAMMA- HF12



NOTES:
1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE
2). USE DC POWER LOOP
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED
4) REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE

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PETROS E. TOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER
LICENSE NUMBER PEN.25271
OFFICIAL ENGINEER

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SITE ID: CT03XC090

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RED BANK OFFICE
331 Newman Springs Road
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SHEET TITLE:
CABLE COLOR CODING, DC POWER DETAILS & PANEL SCHEDULES

SHEET NUMBER:
ANT-011.00

GENERAL REQUIREMENTS:

1. THE WORK TO BE DONE UNDER THIS PROJECT INCLUDES PROVIDING ALL EQUIPMENT, MATERIALS, LABOR AND SERVICES, AND PERFORMING ALL OPERATIONS FOR COMPLETE AND OPERATING SYSTEMS. ANY WORK NOT SPECIFICALLY COVERED BY NECESSARY TO COMPLETE THIS INSTALLATION, SHALL BE PROVIDED. ALL EQUIPMENT AND WIRING TO BE NEW AND PROVIDED UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
2. ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP, SHALL CONFORM TO THE 2011 EDITION OF THE NATIONAL ELECTRIC CODE (NEC) AS WELL AS ALL APPLICABLE LAWS AND REGULATIONS AND REGULATORY BODIES HAVING JURISDICTION OVER THIS WORK.
3. THE TERM "FURNISH" SHALL MEAN TO OBTAIN AND SUPPLY THE JOB SITE. THE TERM "INSTALL" SHALL MEAN TO FIX IN POSITION AND CONNECT FOR USE. THE TERM "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. THE TERM "CONTRACTOR" SHALL MEAN ELECTRICAL CONTRACTOR.
4. ONLY WRITTEN CHANGES AND/OR MODIFICATIONS APPROVED BY THE ENGINEER, CONSULTING ENGINEER OR OWNER'S REPRESENTATIVE WILL BE RECOGNIZED.
5. THE ELECTRICAL CONTRACTOR SHALL SUBMIT, FOR THE ENGINEER'S APPROVAL, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT SPECIFIED.
6. CONTRACTOR SHALL COORDINATE WITH SPECIFICATIONS BY OTHER TRADES.
7. PROVIDE OPERATING AND MAINTENANCE MANUALS, PER SPECIFICATIONS, AND GIVE INSTRUCTIONS TO USER FOR ALL EQUIPMENT AND SYSTEMS PROVIDED UNDER THIS CONTRACT AFTER ALL ARE CLEANED AND OPERATING.
8. KEEP PREMISES FREE FROM RUBBISH. REMOVE ALL ELECTRICAL RUBBISH FROM SITE.
9. ALL WORK SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
10. THE WORK SHALL INCLUDE ALL PANELS, DEVICES, FEEDERS AND BRANCH CIRCUIT WIRING AS REQUIRED FOR THE DISTRIBUTION SYSTEM INDICATED AND CALLED FOR ON THE DRAWINGS. REQUIRED BY SPECIFICATIONS AND AS NECESSARY FOR COMPLETE FUNCTIONAL SYSTEMS PRESENTED AND INTENDED.
11. THE CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR, TOOLS, EQUIPMENT, CONSUMABLES AND SERVICES REQUIRED FOR OBTAINING, DELIVERY, INSTALLATION, CONNECTION, DISCONNECTION, REMOVAL, RELOCATION, REPAIR, REPLACEMENT, TESTING AND COMMISSIONING OF ALL EQUIPMENT AND DEVICES INCLUDED IN OR NECESSARY FOR THE WORK, AS APPLICABLE. THIS INCLUDES SCAFFOLDING, LADDERS, RIGGING, HOISTING, ETC.
12. ELECTRICAL WORK SHALL INCLUDE ALL REQUIRED CUTTING, PATCHING AND THE FULL RESTORATION OF WALL AND FLOOR STRUCTURE AND SURFACES. ALL EQUIPMENT, WALLS, FLOORS, ETC., DISTURBED OR DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER, AT THE CONTRACTORS EXPENSE.
13. BEFORE SUBMITTING HIS BID, THE CONTRACTOR SHALL FULLY ACQUAINT HIMSELF/HERSELF WITH THE JOB CONDITIONS AND DIFFICULTIES THAT WILL PERTAIN TO THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED, WHICH COULD NOT HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
14. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING UTILITIES.
15. UPON COMPLETION OF THE ELECTRICAL WORK, THE CONTRACTOR SHALL TEST THE COMPLETE ELECTRICAL SYSTEM FOR SHORTS, GROUNDS, AND PROPER OPERATION, IN THE PRESENCE OF THE OWNER'S REPRESENTATIVE.
16. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL CLEAN AND ADJUST ALL EQUIPMENT AND LIGHTING AND TEST SYSTEMS TO THE SATISFACTION OF OWNER AND ENGINEER. RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
17. THE CONTRACTOR SHALL FIELD VERIFY DIMENSIONS OF FINISHED CONSTRUCTION PRI9OR TO FABRICATION AND INSTALLATION OF FIXTURES AND EQUIPMENT.
18. EXACT ROUTING OF CONDUITS AND "MC" CABLES SHALL BE DETERMINED IN THE FIELD.
19. IF THE OWNER AND/OR HIS REPRESENTATIVE CONSIDERS ANY WORK TO BE INFERIOR, THE RESPECTIVE CONTRACTOR SHALL REPLACE SAME WITH CONTRACT STANDARD WORK WITHOUT ADDITIONAL CHARGE. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE MANNER. LEFT CLEAN AND FREE FROM DEFECTS, AND COMPLETELY OPERABLE.
20. THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AS SHOWN ON THE DRAWINGS AND/OR AS SPECIFIED. ALL MATERIALS SHALL BE NEW, AND BEAR THE UL LABEL. ALL WORK SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER.
21. DRAWINGS ARE TO BE CONSIDERED DIAGRAMMATIC, AND SHALL BE FOLLOWED AS CLOSELY AS CONDITIONS ALLOW TO COMPLETE THE INTENT OF THE CONTRACT. THE DRAWINGS AND SPECIFICATIONS COMPLIMENT AND VICE VERSA, IS TO BE INCLUDED IN THE SCOPE OF WORK.
22. ALL EQUIPMENT CONNECTIONS SHALL BE INSTALLED PER APPLICABLE SEISMIC REQUIREMENTS.
23. ENGINEER WILL MAKE A FINAL INSPECTION WITH THE OWNER AND CONTRACTOR AND WILL NOTIFY THE CONTRACTOR IN WRITING OF ALL PARTICULARS IN WHICH THIS INSPECTION REVEALS THAT THE WORK IS INCOMPLETE OR DEFECTIVE. THE CONTRACTOR SHALL IMMEDIATELY TAKE SUCH MEASURES AS ARE NECESSARY TO COMPLETE SUCH WORK OR REMEDY SUCH DEFICIENCIES.
24. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, TRENCHING, AND BACKFILL AS REQUIRED FOR ELECTRICAL WORK. BACKFILL SHALL BE SUITABLE MATERIAL PROPERLY COMPACTED TO 95% DENSITY IN EACH LAYER OF SIX (6) INCH DEPTH. CONDUIT SHALL BE MINIMUM 36" BELOW FINISHED GRADE.

PROJECT COORDINATION:

1. THE CONTRACTOR SHALL VERIFY FIELD CONDITIONS AT THE SITE AND NOTIFY THE OWNER OF ANY DISCREPANCIES, PRIOR TO COMMENCING WITH THE WORK.
2. THE CONTRACTOR SHALL REVIEW AND COORDINATE WITH THE DOCUMENTS OF ALL TRADES.
3. THE CONTRACTOR SHALL FURNISH A SCHEDULE INDICATING HIS PORTION OF TIME, WITHIN THE OVERALL SCHEDULE, REQUIRED TO COMPLETE THE WORK, IN CONJUNCTION WITH ALL TRADES. ALL WORK THAT MAY AFFECT OPERATION OF BUILDING SYSTEMS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE.
4. SHUT DOWN OF POWER SHALL BE COORDINATED WITH THE OWNER, ARCHITECT AND PROJECT MANAGER AT LEAST 14 WORKING DAYS PRIOR TO SHUT DOWN. SHUT DOWNS LONGER THAN 2 DAYS SHALL BE COORDINATED WITH THE ABOVE PERSONNEL AT LEAST ONCE A MONTH IN ADVANCE. TEMPORARY POWER FOR CONSTRUCTION SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR FOR SHUT DOWNS OVER 2 DAYS.
5. ALL CONDUITS AND DEVICE BOXES SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR, INCLUDING ALL TECHNOLOGY CONDUITS AND BOXES.
6. INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. TEMPORARY SHUT DOWNS OF ANY SYSTEMS SHALL BE COORDINATED WITH AND APPROVED BY THE OWNER AND ARCHITECT.

PROTECTION OF WORK:

1. EFFECTIVELY PROTECT ALL MATERIALS AND EQUIPMENT FROM ENVIRONMENTAL AND PHYSICAL DAMAGE UNTIL FINAL ACCEPTANCE. CLOSE AND PROTECT ALL OPENINGS DURING CONSTRUCTION. PROVIDE NEW MATERIALS AND EQUIPMENT TO REPLACE ITEMS DAMAGED.

WARRANTIES AND BONDS:

1. ALL MATERIALS, EQUIPMENT AND WORKMANSHIP SHALL BE GUARANTEED IN WRITING FOR A MINIMUM OF ONE YEAR AFTER FINAL ACCEPTANCE BY OWNER.
2. OBTAIN AND DELIVER TO THE OWNER'S REPRESENTATIVE ALL GUARANTEES AND CERTIFICATES OF COMPLIANCE.

PERMITS:

1. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS AND INSPECTION FEES FOR ELECTRICAL WORK.

RACEWAYS:

1. ALL CONDUIT SHALL BE MINIMUM SIZE OF 3/4" FOR POWER CIRCUITS AND CONTROL CIRCUITS EXCEPT WHERE FLEXIBLE CONDUIT IS CALLED FOR ON PROJECT DOCUMENTS. ALL EXTERIOR EXPOSED CONDUIT SHALL BE GRC (GALVANIZED RIGID METAL CONDUIT). ALL UNDERGROUND, IN SLAB OR UNDER SLAB SHALL BE RNC (RIGID NONMETALLIC CONDUIT). CHANGE RIGID METALLIC CONDUIT FOR INTERMEDIATE METALLIC CONDUIT BEFORE EXITING OUT OF CONCRETE OR PENETRATING A WALL, FLOOR OR ROOF. EMT IS ALLOWED IN INTERIOR DRY LOCATIONS WHERE NOT SUBJECT TO DAMAGE.
2. ALL FLEXIBLE CONDUIT IN WET OR DRY AREAS SHALL BE LIQUID TIGHT CONDUIT. NONMETALLIC FLEXIBLE CONDUIT IS SPECIFICALLY PROHIBITED.
3. CONDUIT SHALL BE RUN AT RIGHT ANGLES AND PARALLEL TO BUILDING LINES, SHALL BE NEATLY RACKED AND SECURELY FASTENED. JUNCTION BOXES SHALL BE PROVIDED WHERE REQUIRED TO FACILITATE INSTALLATION OF WIRES.
4. ALL CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN AN APPROVED MANNER.
5. ALL EMPTY RACEWAYS SHALL BE FURNISHED WITH A 200 LB. TEST NYLON DRAG LINE.
6. ARRANGEMENT OF CONDUIT AND EQUIPMENT SHALL BE AS INDICATED, UNLESS MODIFICATION IS REQUIRED TO AVOID INTERFERENCES.
7. FOR CONDUITS CROSSING EXPANSION JOINTS, PROVIDE EXPANSION FITTINGS FOR SIZE 1 1/4" AND LARGER. PROVIDE SECTIONS OF FLEXIBLE CONDUIT WITH GROUNDING JUMPERS FOR SIZES 1" AND SMALLER.
8. THE CONTRACTOR SHALL INSTALL DETECTABLE UNDERGROUND TAPES FOR THE PROTECTION, LOCATION AND IDENTIFICATION OF UNDERGROUND CONDUIT INSTALLATION.
9. EXACT ROUTING OF CONDUITS AND CABLES SHALL BE DETERMINED IN FIELD.

WIRING:

1. ALL WIRE SHALL BE COPPER WITH TYPE THNN/THWN 600 VOLT INSULATION, MINIMUM #12 AWG FOR POWER AND LIGHTING CIRCUITS AND #16 AWG FOR CONTROL CIRCUITS.
2. UNDER NO CIRCUMSTANCES SHALL FEEDERS BE SPLICED.
3. ALL COMPUTER CIRCUITS SHALL HAVE SEPARATE NEUTRAL CONDUCTORS. ALL OTHER CIRCUITS MAY SHARE GROUND AND NEUTRAL CONDUCTORS.
4. WHERE EQUIPMENT, LIGHTING FIXTURES AND WIRING DEVICES ARE SHOWN WITH CIRCUIT NUMBERS ONLY, THE MINIMUM BRANCH CIRCUITING REQUIREMENTS SHALL BE AS FOLLOWS.
5. CONTRACTOR SHALL INCREASE SIZE OF CIRCUIT WIRING/CONDUCTORS TO COMPENSATE FOR VOLTAGE DROP.
6. WIRE SIZES SHALL BE INCREASED TO COMPENSATE FOR VOLTAGE DROP AS FOLLOWS:

GROUNDING:

1. PROVIDE A COMPLETE EQUIPMENT GROUND SYSTEM FOR THE ELECTRICAL SYSTEM AS REQUIRED BY ARTICLE 250, OF THE NEC, AND AS SPECIFIED HEREIN.
2. ALL BRANCH CIRCUITS FOR POWER WIRING SHALL CONTAIN A COPPER GROUND WIRE. NO FLEXIBLE METAL CONDUIT OF ANY KIND OR LENGTH SHALL BE USED AS THE EQUIPMENT GROUNDING CONDUCTOR.
3. THE EQUIPMENT BONDING JUMPER SHALL BE PERMITTED TO BE INSTALLED INSIDE OR OUTSIDE OF A RACEWAY OR ENCLOSURE. WHERE INSTALLED ON OUTSIDE, THE LENGTH OF THE EQUIPMENT BONDING JUMPER SHALL NOT EXCEED 6 FEET AND SHALL BE ROUTED WITH THE RACEWAY OR ENCLOSURE. REFER TO NEC 2011 - 250.102 (E)
4. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE.
5. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE.
6. GROUNDING CONNECTIONS TO GROUND RODS, GROUND RING WIRE, TOWER BASE AND FENCE POSTS SHALL BE EXOTHERMIC ("CADWELDS") UNLESS NOTED OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACES, SPRAY CADWELD WITH GALVANIZING PAINT.
7. GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO-HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDE SCREW SET). CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.
8. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURERS' GROUNDING KITS.
9. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS.
10. INSTALL #2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND #2 BARE TINNED COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED.
11. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELDS") TO GROUND RING. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO-HOLE LUGS.
12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT.
13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PROVIDE PHOTOS TO CARRIER'S CONSTRUCTION MANAGER.
14. ALL GROUND LEADS EXCEPT THOSE TO THE EQUIPMENT ARE TO BE #2/0 TINNED. ALL EXTERIOR GROUND BARS TINNED COPPER.
15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.) PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.
16. ENGAGE IN INDEPENDENTLY ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FALL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY CARRIER REPRESENTATIVE, AND RECORDED ON CARRIER'S "GROUND RESISTANCE TEST" FORM.
17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1' BELOW GRADE AND SEAL TOP WITH SILICONE MATERIAL.
18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTION, APPLY APPROPRIATE ANTI-OXIDIZATION PAINT.
19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING THE BGR SHALL BE BONDED TO THE NEAREST FENCE POST USING (2) RUNS OF #2 BARE TINNED COPPER WIRE.

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713 Clover Lane
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Phone: 973-207-4248
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SCALE:	JOB NUMBER:
AS SHOWN	17924020A

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0	10/25/17	ISSUED FOR CONSTRUCTION	JRF	PET
B	09/27/17	REVISED PER COMMENTS	DTS	PET
A	07/24/17	ISSUED FOR REVIEW	[illegible]	FEP

STATE OF CONNECTICUT
PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER LICENSE NUMBER PEN.[illegible]
LICENSED PROFESSIONAL ENGINEER

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SITE NAME: BALCH TOWER
SITE ID: CT03XC090

236 SOUTH MAIN STREET
EAST WINDSOR, CT 06088

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
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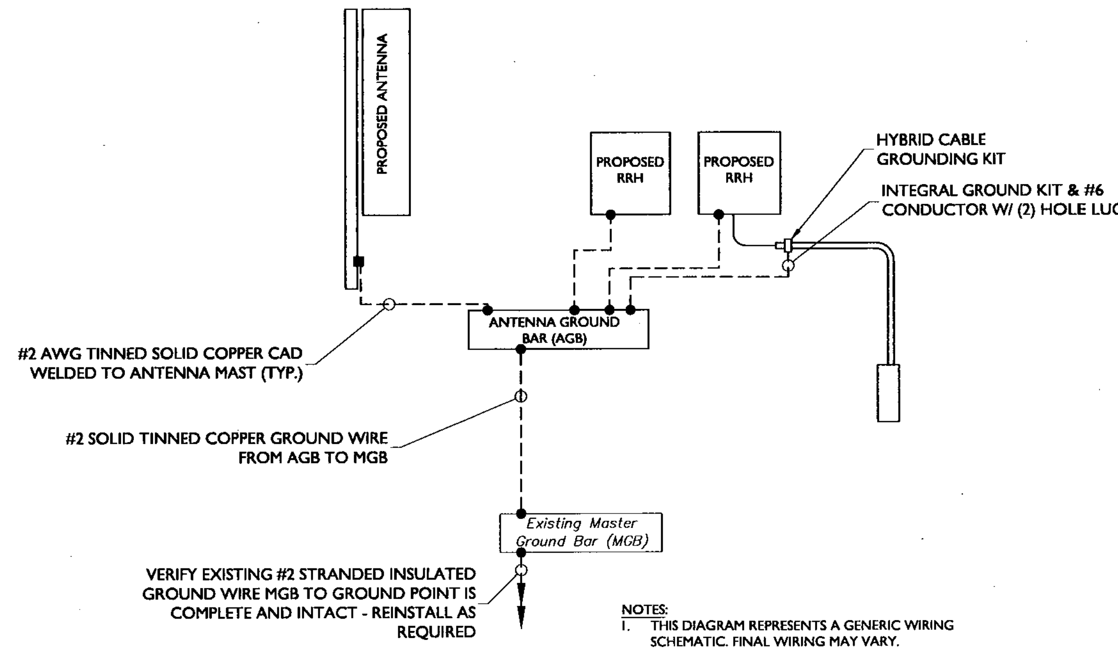
SHEET TITLE:
ELECTRICAL AND GROUNDING NOTES

SHEET NUMBER:
ANT-012.00

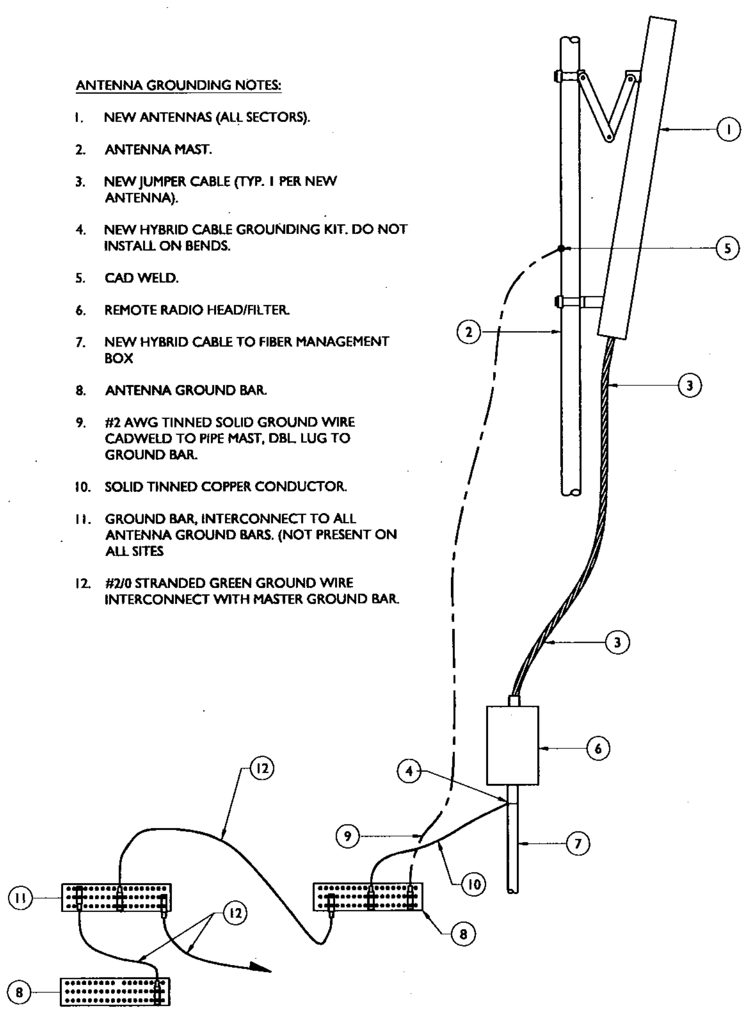
GROUNDING SCHEMATIC
NOT TO SCALE



NOTES:
1. THIS DIAGRAM REPRESENTS A GENERIC WIRING SCHEMATIC. FINAL WIRING MAY VARY.
2. GROUNDING INSTALLATION TYPICAL AT EACH SECTOR.

ANTENNA GROUNDING SCHEMATIC
NOT TO SCALE

ANTENNA GROUNDING NOTES:
1. NEW ANTENNAS (ALL SECTORS).
2. ANTENNA MAST.
3. NEW JUMPER CABLE (TYP. 1 PER NEW ANTENNA).
4. NEW HYBRID CABLE GROUNDING KIT. DO NOT INSTALL ON BENDS.
5. CAD WELD.
6. REMOTE RADIO HEAD/FILTER.
7. NEW HYBRID CABLE TO FIBER MANAGEMENT BOX
8. ANTENNA GROUND BAR.
9. #2 AWG TINNED SOLID GROUND WIRE CADWELD TO PIPE MAST, DBL. LUG TO GROUND BAR.
10. SOLID TINNED COPPER CONDUCTOR.
11. GROUND BAR, INTERCONNECT TO ALL ANTENNA GROUND BARS. (NOT PRESENT ON ALL SITES
12. #2/0 STRANDED GREEN GROUND WIRE INTERCONNECT WITH MASTER GROUND BAR.



TYPICAL GROUND BAR CONNECTION DETAIL
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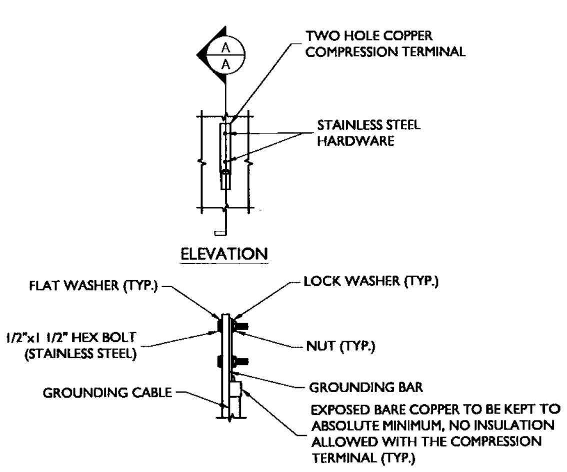
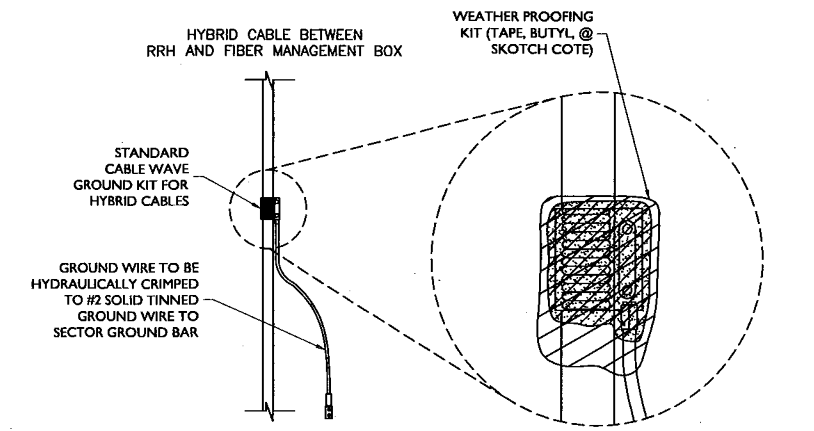
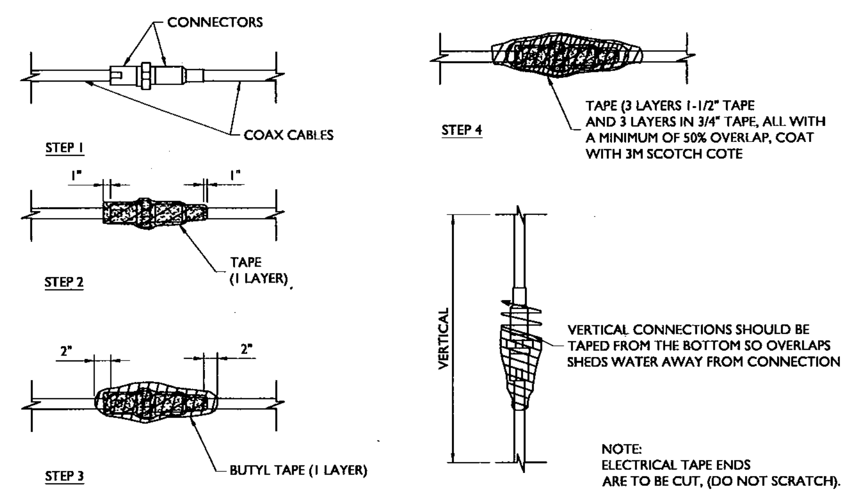
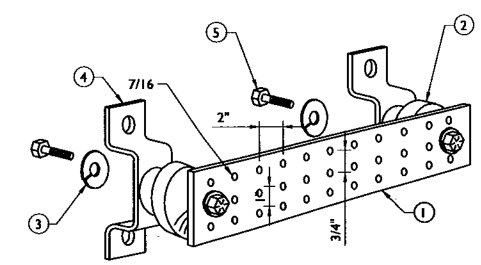


CABLE WRAPPING DETAIL
NOT TO SCALE





GROUND BAR DETAIL
NOT TO SCALE



1. COPPER GROUND BAR, 1/4" X 4" X 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8 OR EQUAL
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5. 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1 OR EQUAL

NOTE: INSULATORS SHALL BE ELIMINATED WHEN BONDING DIRECTLY TO MONOPOLE STRUCTURE. CONNECTION TO MONOPOLE STRUCTURE SHALL BE PER MANUFACTURERS RECOMMENDATIONS.

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PETROS E. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER PEN.[illegible]

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SHEET TITLE:
GROUNDING SCHEMATIC AND DETAILS

SHEET NUMBER:
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