4 Davis Road West, Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
100 Sunset Ridge Drive, East Hartford, CT 06118

June 20, 2018

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), received CT Siting Council approval for an exempt modification on December 18, 2017; EM-SPRINT-043-171129. Sprint subsequently found the need to change some equipment from that specified in the approved EM. Sprint, therefore, will not proceed with the EM approval received on that date and will instead resubmit for a new exempt modification with the revised equipment. Please advise if anything else is required to rescind the original approval, and clear the way for the subsequent resubmittal. Thank you.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrivassoc.com

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

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

Re: Notice of Exempt Modification Application
100 Sunset Ridge Drive, East Hartford, CT 06118

June 20, 2018

Dear Ms. Bachman:

Sprint Spectrum Realty Company, L.P. ("Sprint"), is submitting to the Connecticut Siting Council for a Notice of Exempt Modification for Proposed Modifications to an Existing Telecommunications Facility located at the above-referenced site. Sprint currently maintains 3 existing panel antenna and 2 parabolic dishes at the 100' level of the Tower. Sprint proposes to replace the existing antennas with 3 new panel antennas (1 per sector) and add 3 additional panel antennas (1 per sector). Sprint further proposes to add 9 remote radio units (3 per sector) at 100' tower level as well as 4 hybrid cables and 48 Antenna-RRH jumper cables, a new "growth" cabinet and a PPC. 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.

The Sprint installation was initially approved on 7/28/2006 by the CT Siting Council and a BP was issued by the Town of East Hartford on 7/13/2010. The documents enclosed reflect the reality of all the current installations on the Tower.

If you have any questions, please feel free to contact me.

Thank you,

By: *Paul F. Sagristano*

Paul F. Sagristano
Cherundolo Consulting
917.841.0247
psagristano@lrivassoc.com

4 Davis Road West, Suite 5 – Old Lyme, CT 06371

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

Re: Notice of Exempt Modification Application
100 Sunset Ridge Drive, East Hartford, CT 06118

Lat: N 41.77197
Long: W 72.59044

June 20, 2018

Dear Ms. Bachman:

Sprint currently maintains 3 existing panel antenna and 2 parabolic dishes at the 100' level of the Tower. Sprint proposes to replace the existing antennas with 3 new panel antennas (1 per sector) and add 3 additional panel antennas (1 per sector). Sprint further proposes to add 9 remote radio units (3 per sector) at 100' tower level as well as 4 hybrid cables and 48 Antenna-RRH jumper cables, a new "growth" cabinet and a PPC. 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.

The original building permit was issued by the Town of East Hartford on July 13, 2010.

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 and to Marcia Leclerc the Mayor of East Hartford, as well as Jeffrey Cormier, Town Planner for the Town or East Hartford. This tower is owned by the Town of East Hartford
.
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.

Existing Facility

The Northford facility is located at 100 Sunset Ridge Drive is owned by the Town of East Hartford, the Site coordinates are: N41.77197, W72.59004. The existing facility consists of a 140' 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 2 Parabolic Dishes mounted on at a centerline of 100' feet on the tower.

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,

Paul F. Sagristano

Paul F. Sagristano
Charles Cherundolo Consulting
917-841-0247
psagristano@lrivassoc.com

PFS/mtf

Additional Recipients:
Marcia Leclerc the Mayor of East Hartford- Via Fed Ex
Jeffrey Cormier, Town Planner for the Town or East Hartford – Via Fed Ex

June 25,2018

Dear Customer:

The following is the proof-of-delivery for tracking number 772510283829.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	J.JS	**Delivery location:**	740 MAIN ST EAST HARTFORD, CT 06108
Service type:	FedEx Express Saver	**Delivery date:**	Jun 22, 2018 16:02
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

Tracking number:	772510283829	**Ship date:**	Jun 19, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Hon. Marcia Leclerc, Mayor
Town of East Hartford
740 Main Street
EAST HARTFORD, CT 06108 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT52XC032 CSC to Mayor

Thank you for choosing FedEx.

June 25,2018

Dear Customer:

The following is the proof-of-delivery for tracking number **772510313972**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	J.JEFF	**Delivery location:**	740 MAINX ST EAST HARTFORD, CT 06108
Service type:	FedEx Express Saver	**Delivery date:**	Jun 22, 2018 16:01
Special Handling:	Deliver Weekday Direct Signature Required		

Shipping Information:

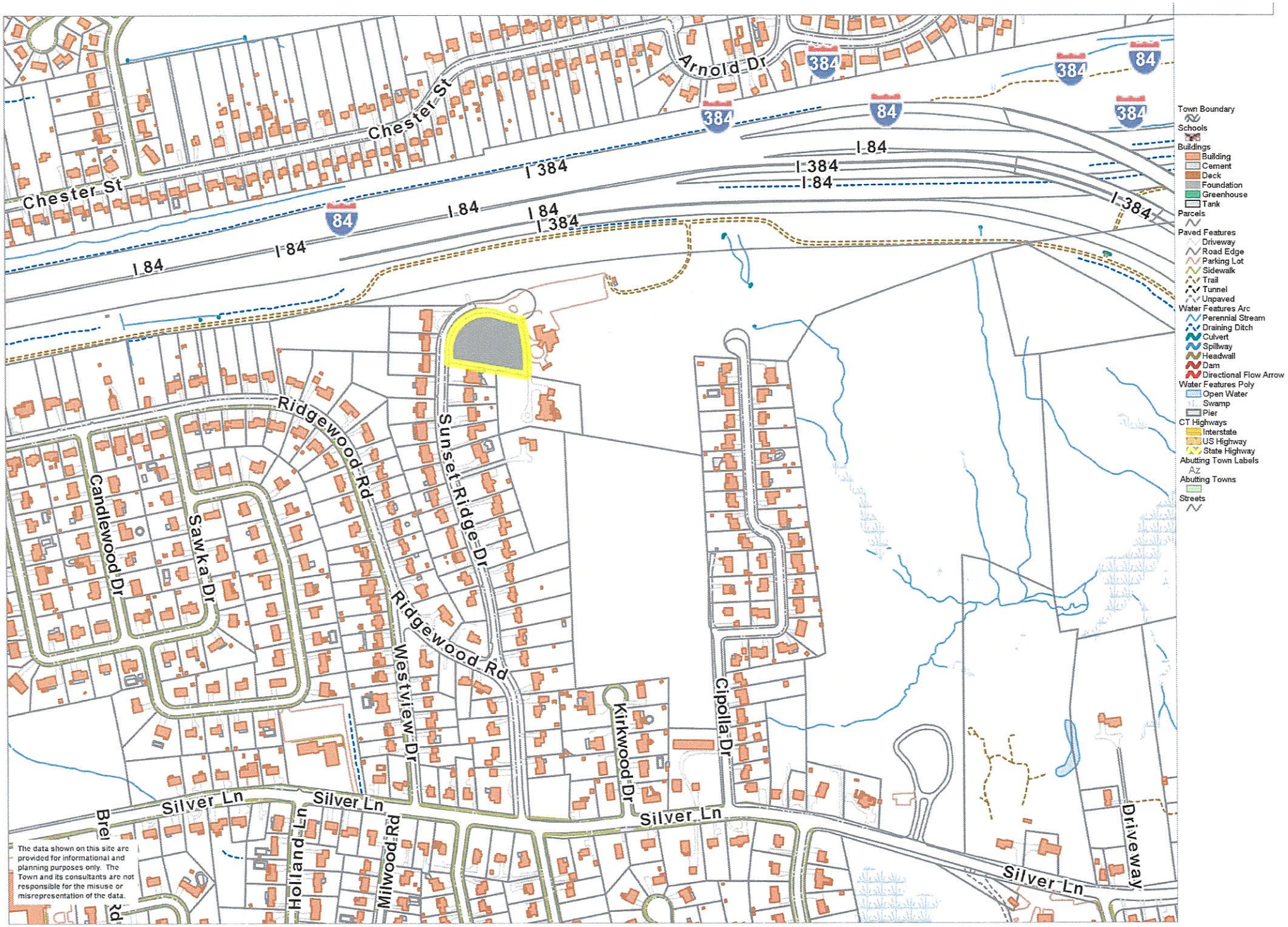
Tracking number:	772510313972	**Ship date:**	Jun 19, 2018
		Weight:	0.5 lbs/0.2 kg

Recipient:
Jeff Cormier - Zoning
Town of East Hartford
740 Main Street
EAST HARTFORD, CT 06108 US

Shipper:
Paul Sagristano
CCC
4 Davis Road West
Suite 5
OLD LYME, CT 06371 US

Reference
CT52XC032 CSC to Zoning

Thank you for choosing FedEx.



0 660 1320 ft

Printed on 11/28/2017 at 11:20 AM

East Hartford MapsOnline

Town of East Hartford Property Summary Report

100 SUNSET RIDGE DR

MAP LOT:	57-134A	**CAMA PID:**	13740
LOCATION:	100 SUNSET RIDGE DR		
OWNER NAME:	TOWN OF EAST HARTFORD / VETERANS MEMORIAL CLUBHSE		

13740 03/24/2016

OWNER OF RECORD
TOWN OF EAST HARTFORD
VETERANS MEMORIAL CLUBHSE
740 MAIN STREET
EAST HARTFORD, CT 06108

LIVING AREA:	6169	**ZONING:**	R2	**ACREAGE:**	1.64

SALES HISTORY

OWNER	BOOK / PAGE	SALE DATE	SALE PRICE
TOWN OF EAST HARTFORD VETERANS MEMORIAL CLUBHSE	159/ 39	01-Jan-1900	$0.00

CURRENT PARCEL ASSESSMENT

TOTAL:	$836,930.00	**IMPROVEMENTS:**	$738,230.00	**LAND:**	$98,700.00

ASSESSING HISTORY

FISCAL YEAR	TOTAL VALUE	IMPROVEMENT VALUE	LAND VALUE
2016	$836,930.00	$738,230.00	$98,700.00
2015	$807,050.00	$708,350.00	$98,700.00
2014	$807,050.00	$708,350.00	$98,700.00
2013	$807,050.00	$708,350.00	$98,700.00
2012	$807,050.00	$708,350.00	$98,700.00

Town of East Hartford Property Summary Report

100 SUNSET RIDGE DR

MAP LOT:	57-134A	**CAMA PID:**	13740
LOCATION:	100 SUNSET RIDGE DR		
OWNER NAME:	TOWN OF EAST HARTFORD / VETERANS MEMORIAL CLUBHSE		

BUILDING # 1

YEAR BUILT	1930	**EXT WALL 1**	Stone/Masonry
STYLE	Cultural Facility	**INT WALLS 1**	Plaster
MODEL	Comm/Ind	**HEAT FUEL**	Other
STORIES	1.0	**HEAT TYPE**	Steam
OCCUPANCY	Exempt	**AC TYPE**	None
ROOF	Drmrs/Ex Gable	**BEDROOMS**	
ROOF COVER	Asphalt	**FULL BATHS**	15
FLOOR COVER 1	Hardwood	**HALF BATHS**	
% BSMT	null	**TOTAL ROOMS**	0
% FIN BSMT	null	**% REC RM**	null
% SEMI FIN BSMT	null	**% ATTIC FINISH**	null
BSMT GARAGE	null	**FIREPLACES**	null

13740 03/24/2016

EXTRA FEATURES

DESCRIPTION	CODE	UNITS
Fin Bsmt	FBM	1567 S.F.
Fireplace	FPL	1 UNITS

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

May 20, 2010

Thomas F. Flynn III
Site Development Project Manager
Maxton Technology Inc.
1296 Blue Hills Avenue
Bloomfield, CT 06002

RE: **EM-CLEARWIRE-043-100326** – Clearwire Corporation notice of intent to modify an existing telecommunications facility located at 112 Sunset Ridge, East Hartford, Connecticut.

Dear Mr. Flynn:

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:

- A revised structural analysis sealed by a Professional Engineer duly licensed in the State of Connecticut and taking into account all three dishes shall be submitted to the Council prior to the antenna and dish installation.

The proposed modifications are to be implemented as specified here and in your notice dated March 25, 2010, including the placement of all necessary equipment and shelters within the tower compound. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/MP/laf

c: The Honorable Melody A. Currey, Mayor, Town of East Hartford
Michael J. Dayton, Town Planner, Town of East Hartford

EM-CLEARWIRE-043-100326

March 25, 2010

S. Derek Phelps, Executive Director
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

ORIGINAL

Re: Notice of Exempt Modification
Clearwire Corporation Notice to make an Exempt Modification to an Existing Facility at 112 Sunset Ridge, East Hartford, CT
Clearwire Site Number CT-HFD-0053

Dear Mr. Phelps,

Pursuant to Conn. Agency Regulations Sections 16-50j-73 and 16-50j-72(b), Clearwire Corporation (Clearwire) hereby gives notice to the Connecticut Siting Council (Council) and the Town of South Windsor, CT. of Clearwire's intent to make an exempt modification to an existing monopole tower (tower) located at 112 Sunset Ridge Road, East Haven, CT. Specifically, Clearwire plans to add three (3) antennas to the tower, one (1) per sector and to add three (3) microwave dishes, one (1) per sector for backhaul at the 100' AGL. Pursuant to the Council's regulations, (Conn. Agency Regulations Section 16-50j-72(b)), Clearwire's plans do not constitute a modification subject to the Council's review because Clearwire will not change the height of the tower, will not extend the boundaries of the compound, will not increase the noise levels at the site and will not increase the total radio frequency electromagnetic radiation power density at the site to levels above applicable standards. A copy of this notice has been sent to Mayor Melody Currie of the Town East Hartford, CT.

Clearwire is currently developing a 4G wireless broadband network to provide high-speed wireless data and VoIP service within the State of Connecticut. Clearwire's 4G service leverages the WiMAX technology to enable enhanced wireless data communications. In order to accomplish the upgrade at this site, Clearwire plans to add three (3) WiMAX antennas, three (3) dishes and to install additional WiMAX related electronic equipment at the base of the tower.

The tower is a 140' monopole located at 112 Sunset Ridge Road, East Hartford, Connecticut (Latitude 41 46 18 N Longitude 72 35 26 W). The tower is owned by the Town of East Hartford. Currently, AT&T, T-Mobile and Pocket are located on the tower, as well as a number of other public service antennas. Presently, Clearwire is not located at the site. Clearwire's base station equipment will be located on the ground next to the pole. A site plan with the tower elevations and site plan specifications is attached.

Clearwire will add three (3) antennas, one (1) to each sector, and mount three (3) microwave dishes, one (1) above each of those antennas. The center line for the microwave dishes will be 100'. Nine coaxial cables will be added to the structure, 2 per antenna and one per microwave dish. These cables will be inside the tower and bundled. To confirm that the tower

can support these changes, Clearwire commissioned Bay State Design Inc. to perform a structural analysis of the tower and the proposed changes. According to that structural dated March 5, 2010 and attached hereto, the structure is sufficient to support the proposed loading and will not need to be modified. The tower, with the additions and the modifications will be at less than 53.5% of its capacity.

Within the existing compound, Clearwire will install one (1) WiMAX radio and power cabinet on the existing pad at the site. The new equipment will be adjacent to the existing tower. Excluding brief, construction related noise during the addition of this equipment, the proposed changes to the tower will not increase noise levels at the site.

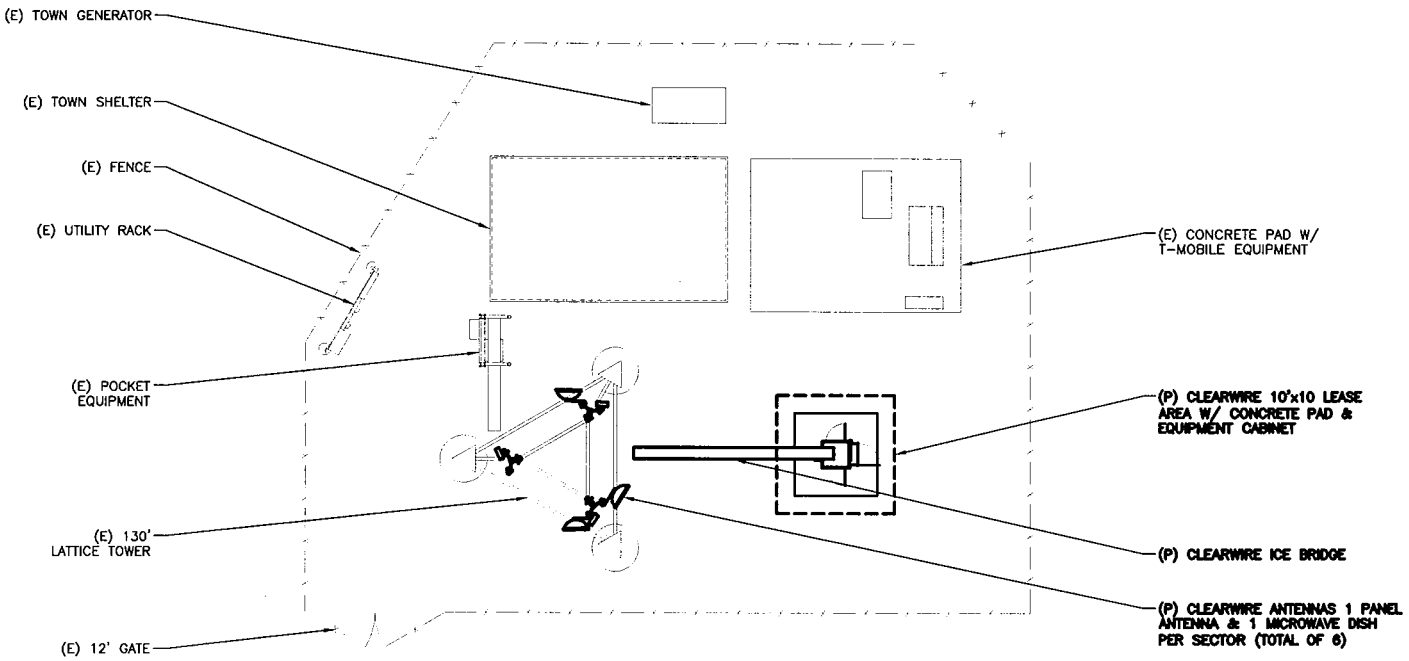
The addition of new WiMAX antennas and microwave dishes will not adversely impact the health and safety of the surrounding community or the people working on the tower. The total radio frequency exposure measured around the base of the tower will be well below the National Council on Radiation Protection and Measurements' (NCRP) standard adopted by the Federal Communications Commission (FCC). The worst case power density analysis for the WiMAX antennas and dishes, measured at the base of the tower, indicates that the WiMAX antennas and dishes will emit .36% of the NCRP's standard for maximum permissible exposure. The cumulative power density analysis indicates that all the antennas on the structure will emit 27.52% of the NRCP's standard for maximum permissible exposure. Therefore, the power density levels will be well below the FCC mandated radio frequency exposure limits in all locations around the base of the tower. The power density analysis is attached.

In conclusion, Clearwire's proposed plan to add three (3) WiMAX antennas, three (3) microwave dishes and the associated base station equipment does not constitute a modification subject to the Council's jurisdiction because Clearwire will not increase the height of the tower, will not extend the boundaries of the compound at the site, will not increase the noise levels at the site and the radio frequency electromagnetic radiation power density will stay within all applicable standards.

Respectfully Submitted

Thomas F. Flynn III
Site Development Project Manager
Maxton Technology Inc.
1296 Blue Hills Avenue
Bloomfield, CT 06002
508-821-6974
Tom.Flynn@maxtontech.com
Agent for Clearwire Corporation

Cc: Mayor Melody Currie
Town of East Hartford



1
L2

(P) = PROPOSED
(E) = EXISTING

COMPOUND PLAN

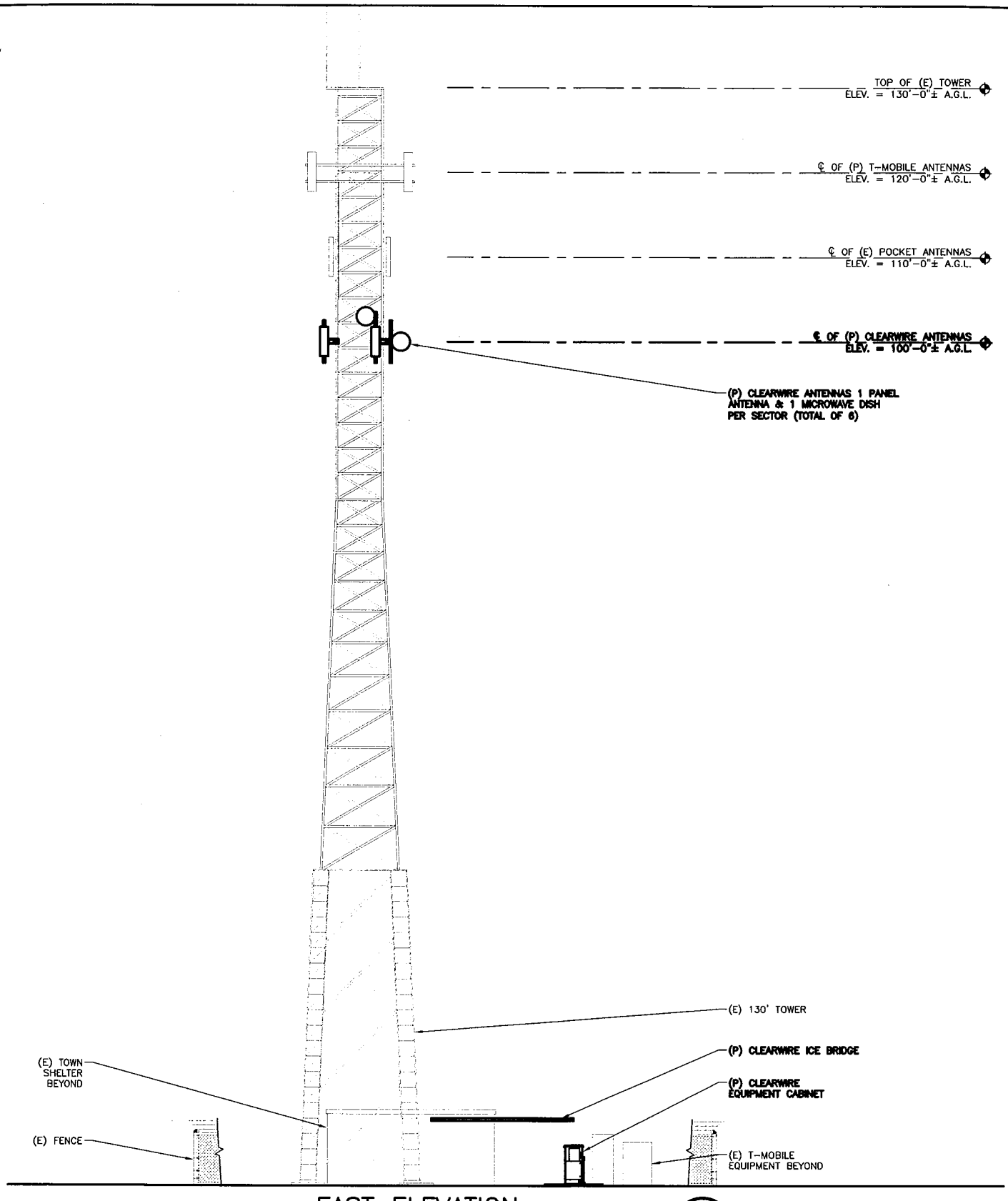
SCALE: N.T.S.

1

MAXTON
BAY STATE DESIGN
241 BOSTON POST RD WEST
MARLBOROUGH, MA. 01752
Phone: 508-229-4100
Fax: 508-485-5321
Bay State Design, Inc.
Architects • Engineers
241 BOSTON POST RD WEST
MARLBOROUGH, MA. 01752
Phone: 508-229-4100
Fax: 508-485-5321

clearwire
5808 LAKE WASHINGTON BLVD.
NE SUITE 300
KIRKLAND, WA 98033

PROJECT LOCATION: SUNSET RIDGE CT-HFD0053D 112 SUNSET RIDGE DRIVE EAST HARTFORD, CT 06118	SITE TYPE: LATTICE TOWER		BSDA PROJ. #: 2908.050
	PROJECT MANAGER: JP	DRAWN BY: NS	SHEET: L1
APPROVED BY:	DATE: 02/22/10	REVISION: 0	



EAST ELEVATION

SCALE: N.T.S.

1

(P) = PROPOSED
(E) = EXISTING

MAXTON
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MARLBOROUGH, MA. 01752
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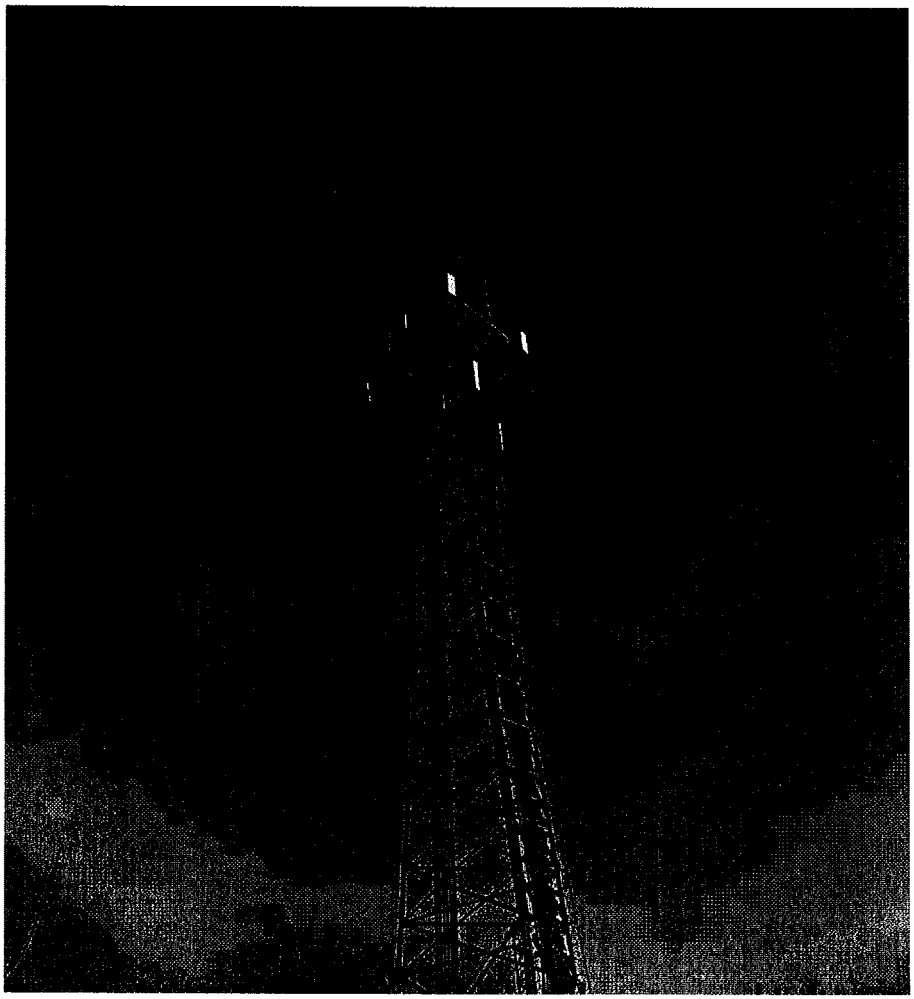
clearwire
5808 LAKE WASHINGTON BLVD.
NE SUITE 300
KIRKLAND, WA 98033

PROJECT LOCATION: SUNSET RIDGE CT-HFD0053D 112 SUNSET RIDGE DRIVE EAST HARTFORD, CT 06118	SITE TYPE: LATTICE TOWER		BSDA PROJ. #: 2908.050
	PROJECT MANAGER: JP	DRAWN BY: NS	SHEET: L2
APPROVED BY:	DATE: 02/22/10	REVISION: 0	

BAY STATE
DESIGN

STRUCTURAL ANALYSIS REPORT



clearwire
wireless broadband

CT-HFD0053D

112 Sunset Ridge Drive
East Hartford, CT

March 5, 2010

Bay State Design, Inc. 241 Boston Post Road Marlborough, MA 01752 TEL: (508) 229-4100 FAX: (508) 485-5321
Architects • Engineers

INTRODUCTION:

The purpose of this analysis is to determine the structural capability of the existing 140'-0" Self Support Tower at 112 Sunset Ridge Drive in East Hartford, CT. Clearwire is proposing to add the following wireless equipment on the tower at an elevation of 100'-0":

3	Kathrein 804 10054 Panel Antenna
3	Samsung WiMAX U-RAS Flexible RRU
1	Andrew VHLP12-18 2'-0" Microwave Dish
1	Andrew VHLP1-23 1'-0" Microwave Dish

In addition, a total of (6) 5/16" ethernet cables (run inside a flexible 2" conduit) and (2) lines of ½" coax will be run on the tower face to the proposed antennas. Coax is to be installed to the same face as the existing Pocket Communications lines.

ASSUMPTIONS:

All engineering services have been performed on the basis that the information used is current and accurate. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from drawings in the possession of Bay State Design, Inc., or generated by field inspections or measurements of the structure.

It is the responsibility of the client to ensure that the information provided to Bay State Design, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, BSD assumes that all structures were constructed in accordance with the drawings / specifications and are in good condition and have not significantly changed from the "as new" condition.

All services were performed to codes specified by the client. BSD does not imply to have met any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are different from the minimum values recommended by code, the client shall specify the exact requirement.

All services are performed in accordance with generally accepted engineering principles and practices. Bay State Design, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information provided.

REFERENCES:

This structural analysis was evaluated using RISA Tower, a general-purpose modeling, analysis, and design program created specifically for communications towers in accordance with the following:

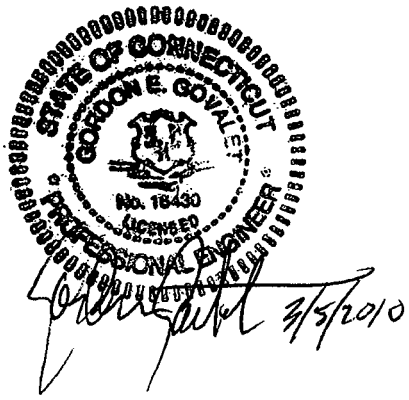
- TIA/EIA 222-F Structural Standards for Steel Antenna Tower and Antenna Supporting Structures
- International Building Code 2003 Edition
- CT State Building Code 2005

Bay State Design, Inc. was provided with a copy of a previous structural analysis for this tower prepared by URS Corporation for Pocket Communications dated 6/9/2009. In addition, the existing tower inventory was verified on a January 22, 2010 site visit conducted by Bay State Design, Inc.

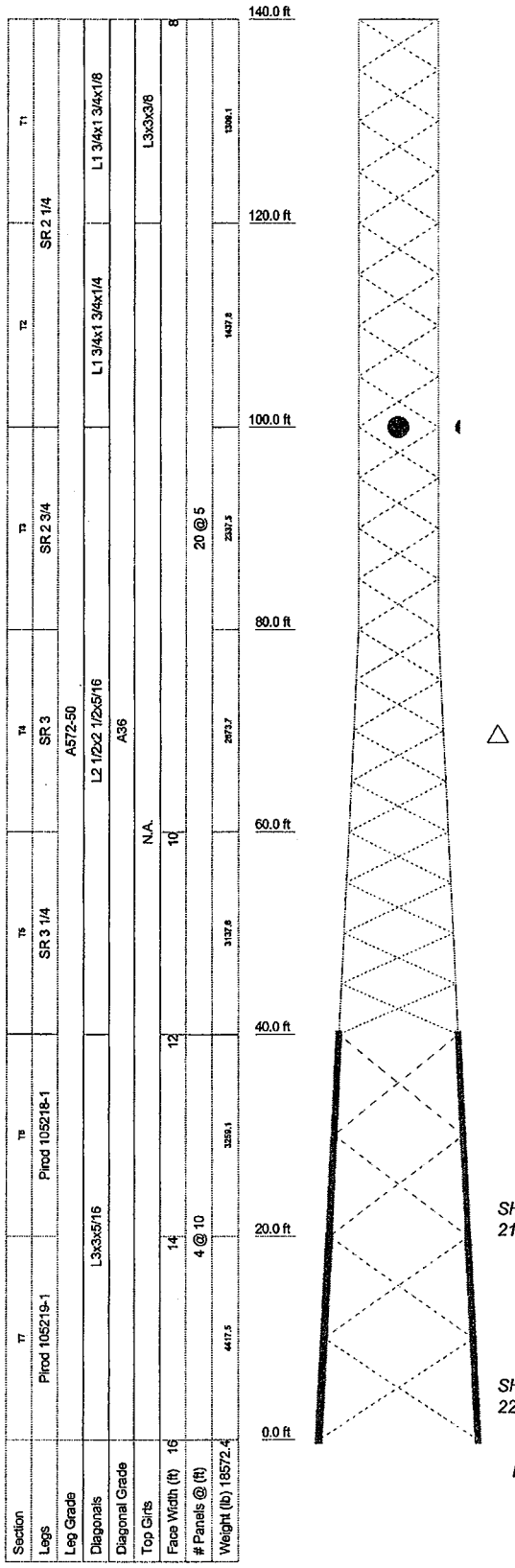
CONCLUSION:

Based on our analysis, Bay State Design, Inc. has concluded the above referenced tower is sufficient to support the proposed Clearwire loading. The tower is rated at 53.5% of its structural capacity.

Bay State Design, Inc. reviewed existing foundation calculations prepared by URS Corporation. A comparison of new reactions to reactions calculated by URS indicates the foundation is adequate to support the proposed loading.



Gordon E. Govalet, P.E.
Vice President
Bay State Design, Inc.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
14' Dipole (Town)	147	(3) RFS-TMA (Sheilded) (T-Mobile)	120
7' Whip (Town)	143	APX16PV-16PVL-C w/Mount (T-Mobile)	120
7' Whip (Town)	143	APXV18-206517S-C w/Mounting Hardware (Pocket)	110
7' Whip (Town)	143	APXV18-206517S-C w/Mounting Hardware (Pocket)	110
3' Stand-Off (Town)	138	APXV18-206517S-C w/Mounting Hardware (Pocket)	110
3' Stand-Off (Town)	138	84010054 (Clearwire)	100
3' Stand-Off (Town)	138	84010054 (Clearwire)	100
20'-4" Bay Dipole (Town)	130	RRU (Clearwire) (Clearwire)	100
20'-4" Bay Dipole (Town)	130	RRU (Clearwire) (Clearwire)	100
20'-4" Bay Dipole (Town)	130	RRU (Clearwire) (Clearwire)	100
APX16PV-16PVL-C w/mount (T-Mobile)	120	2.0 ft. Standoff (Clearwire)	100
APX16PV-16PVL-C w/mount (T-Mobile-)	120	2.0 ft. Standoff (Clearwire)	100
10' Boom Gate w/ 3 2 -3/8" Pipe (Vertical) (T-Mobile)	120	2.0 ft. Standoff (Clearwire)	100
APX16PV-16PVL-C w/Mount (T-Mobile)	120	3"x 5.5' pipe (Clearwire)	100
APX16PV-16PVL-C w/Mount (T-mobile)	120	3"x 5.5' pipe (Clearwire)	100
APX16PV-16PVL-C w/mount (T-Mobile)	120	3"x 5.5' pipe (Clearwire)	100
(3) RFS-TMA (Sheilded) (T-Mobile)	120	Andrew VHLP2 (Clearwire)	100
(3) RFS-TMA (Sheilded) (T-Mobile)	120	Andrew VHLP1 (Clearwire)	100

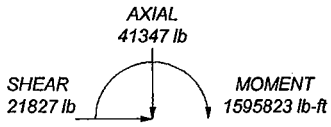
MATERIAL STRENGTH

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

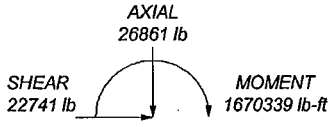
TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 69.00 mph basic wind with 0.50 in ice.
4. Deflections are based upon a 50.00 mph wind.
5. Weld together tower sections have flange connections.
6. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
7. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
8. Welds are fabricated with ER-70S-6 electrodes.
9. TOWER RATING: 53.7%

MAX. CORNER REACTIONS AT BASE:
DOWN: 129497 lb
UPLIFT: -103353 lb
SHEAR: 15731 lb



TORQUE 10114 lb-ft
69.00 mph WIND - 0.50 in ICE



TORQUE 10145 lb-ft
REACTIONS - 80.00 mph WIND

Bay State Design
241 Boston Post Road West
Marlborough, MA 01752
Phone: (508) 229-4100
FAX: (508) 485-5321

Job: ***HFD0053D- 140 ft. Support Tower***			
Project: ***112 Sunset Ridge Road, E. Hartford CT***			
Client: Clearwire	Drawn by: AAP	App'd:	
Code: TIA/EIA-222-F	Date: 03/05/10	Scale: NTS	
Path: N:\AP\HFD0053D E. HARTFORD CT\2-18-10 Proposed Condition of HFD0053D.eri		Dwg No. E-1	

CLEAR™

4400 Carillon Point
Kirkland, WA 98033

To: Maxton
From: Frantz Pierre – Radio Frequency Engineer
Cc: Micah Hawthorne
Subject: Power Density Report for CT-HFD0053
Date: March 25, 2010

---

1. Introduction:

This report is the result of Electromagnetic Field Intensities (EMF – Power Densities) study for the Clearwire broadband antenna installation on a steel lattice tower at 112 Sunset Ridge Drive, East Hartford, CT. This study incorporates the most conservative consideration for determining the practical combined worst case power density levels that would be theoretically encountered from locations surrounding the transmitting location:

2: Discussion:

The following assumptions were used in the calculations:

1) The emissions from Clearwire transmitters are in the (2496 – 2960) Frequency Band
2) The emissions from the Clearwire Microwave dishes are in the 11 GHz Frequency Band
3) The model number for Clearwire Antenna is Argus LLPX310R
4) The model number for the Microwave dish is Andrew VHLP2.5-11 with 30" Diameter.
5) The Clearwire Panel antenna centerline is 100 feet.
6) The Clearwire Microwave dish centerline is 100 feet.
7) The Maximum Transmit power from any Clearwire panel antenna is 251 Watts Effective Isotropic Radiated Power (EiRP) assuming 2 channels per sector.
8) The Maximum Transmit power from any Clearwire Microwave Dish is 346 Watts Effective Isotropic Radiated Power (EiRP) assuming 1 channel per dish.
9) All antennas are simultaneously transmitting and receiving 24 hours per day.
10) The average ground level of the studied area does not change significantly with respect to the transmitting location.

Equations given in "FCC OET Bulletin 65, Edition 97-01" were used with the above information to perform the calculations.

3: Conclusion:

Based on the above worst case assumptions, the power density calculation from the Clearwire antenna installation on a steel lattice tower at 112 Sunset Ridge Drive, East Hartford, CT, is 0.003587 mW/cm^2. This value represents 0.36% of the Maximum Permissible Exposure (MPE) standard of 1 milliwatt per square centimeter (mW/cm^2) set forth in the FCC/ANSI/IEEE C95-1-1991. Furthermore, the proposed antenna location for Clearwire will not interfere with existing public safety communications, AM or FM radio broadcasts, TV, Police Communications, HAM Radio communications or any other signals in the area.

The combined Power Density from all other carriers is 27.16 %. The combined Power Density for this site is 27.52% of the M.P.E. standard.

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

April 1, 2010

The Honorable Melody A. Currey
Mayor
Town of East Hartford
Town Hall
740 Main Street
East Hartford, CT 06108-3114

RE: **EM-CLEARWIRE-043-100326** – Clearwire Corporation notice of intent to modify an existing telecommunications facility located at 112 Sunset Ridge, East Hartford, Connecticut.

Dear Mayor Currey:

The Connecticut Siting Council (Council) received this request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72.

If you have any questions or comments regarding this proposal, please call me or inform the Council by April 15, 2010.

Thank you for your cooperation and consideration.

Very truly yours,

S. Derek Phelps
Executive Director

SDP/jbw

Enclosure: Notice of Intent

c: Michael J. Dayton, Town Planner, Town of East Hartford

TOWN OF EAST HARTFORD
Building Permit

57910

App ID: 57910 **Permit Issued On:** 7/13/2010

App Date: 6/10/2010 **Plan Num:** 2310

Location: 112 Sunset Ridge Dr

Applicant: Flynn Thomas
1296 Blue Hills Ave
Bloomfield, CT 06002

Applicant named above is hereby granted permission to perform work at the address above in accordance with the application and plans approved by the Building Department.

Bonnie Nichols
Authorized Signature

Owner: Town Of East Hartford
740 Main Street
East Hartford , CT 06108

Contractor: Maxton Technology/Clearwire LLC
Flynn Thomas
1296 Blue Hills Ave
Bloomfield, CT 06002

(508) 821-6974
License: 901779 6 /30/2010

Est. Cost: $15,000.00 **Total Fees:** $230.00

Building Use:

Description

Add antennas and base equipment to and existing telecommunications tower.

Cert of Occ ☐

Electric	☐	Elevator	☐	Plumbing	☐
AC	☐	Heating	☐	Sprinkler	☐

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT52XC032

Sunset Ridge
112 Sunset Ridge Drive
East Hartford, CT 06118

May 11, 2018

EBI Project Number: 6218003680

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	18.39 %

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

EBI Consulting
environmental | engineering | due diligence

May 11, 2018

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

Emissions Analysis for Site: **CT52XC032 – Sunset Ridge**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **112 Sunset Ridge Drive, East Hartford, 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.

General population 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), 2500 MHz (BRS) and 11 GHz microwave 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 **112 Sunset Ridge Drive, East Hartford, 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 for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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. This channel has 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) 1 microwave backhaul channel (11 GHz) was considered for Sectors A & C. This channel has a transmit power of 1 Watt.

7) 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.

8) 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 for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

9) The antennas used in this modeling are the **Commscope NNVV-65B-R4 and the Nokia AAHC** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands and two **2-foot parabolic microwave dishes** were modeled for the 11 GHz backhaul channels. 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 for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

10) The antenna mounting height centerlines of the proposed antennas are **100 feet** above ground level (AGL) for **Sector A**, **100 feet** above ground level (AGL) for **Sector B** and **100 feet** above ground level (AGL) for Sector C.

    The antenna mounting height centerlines of the proposed microwave dishes are **100 feet** above ground level (AGL) for **Sector A** and **100 feet** above ground level (AGL) for Sector C

11) 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.

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4	Make / Model:	Commscope NNVV-65B-R4
Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd	Gain:	12.75 / 15.05 dBd
Height (AGL):	**100 feet**	Height (AGL):	**100 feet**	Height (AGL):	**100 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):	6,248.42	ERP (W):	6,248.42	ERP (W):	6,248.42
Antenna A1 MPE%	**2.89 %**	Antenna B1 MPE%	**2.89 %**	Antenna C1 MPE%	**2.89 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC	Make / Model:	Nokia AAHC
Gain:	15.05 dBd	Gain:	15.05 dBd	Gain:	15.05 dBd
Height (AGL):	**100 feet**	Height (AGL):	**100 feet**	Height (AGL):	**100 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%	**2.08 %**	Antenna B2 MPE%	**2.08 %**	Antenna C2 MPE%	**2.08 %**

Microwave Backhaul Data

Antenna Type:	Gain (dBd)	Height (feet AGL):	Frequency Bands	Channel Count	Total TX Power(W)	ERP (W)	MPE %	Sector
2 foot parabolic dish	34 dBd	100	11 GHz	1	1	2511.86	**0.10**	A
2 foot parabolic dish	34 dBd	100	11 GHz	1	1	2511.86	**0.10**	C

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**5.08 %**
T-Mobile	3.74 %
Clearwire	0.09 %
AT&T	6.36 %
Public Works	0.62 %
Fire	0.41 %
Fire Admin	0.41 %
Police Channels 1&2	1.02 %
Parks & Rec	0.17 %
Health	0.25 %
800	0.24 %
Site Total MPE %:	**18.39 %**

SPRINT Sector A Total:	5.08 %
SPRINT Sector B Total:	4.98 %
SPRINT Sector C Total:	5.08 %
Site Total:	18.39 %

Sprint Max Power Values

SPRINT _ Frequency Band / Technology (Sectors A & C)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Sprint 850 MHz CDMA	1	376.73	100	1.53	850 MHz	567	0.27%
Sprint 850 MHz LTE	2	376.73	100	3.07	850 MHz	567	0.55%
Sprint 1900 MHz (PCS) CDMA	5	511.82	100	10.41	1900 MHz (PCS)	1000	1.04%
Sprint 1900 MHz (PCS) LTE	2	1,279.56	100	10.41	1900 MHz (PCS)	1000	1.04%
Sprint 2500 MHz (BRS) LTE	8	639.78	100	20.82	2500 MHz (BRS)	1000	2.08%
Sprint 11 GHz microwave	1	2,511.89	100	1.02	11 GHz	1000	0.10%
						Total:	**5.08%**

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:	5.08 %
Sector B:	4.98 %
Sector C:	5.08 %
SPRINT Maximum Total (Sectors A & C):	5.08 %
Site Total:	18.39 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **18.39 %** 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.

Engineers Planners Surveyors Landscape Architects Environmental Scientists

MASER CONSULTING
— CONNECTICUT —

Lattice Tower & Antenna Mount Structural Analysis

FOR

Sunset Ridge

Site ID: CT52XC032
112 Sunset Ridge Drive
East Hartford, CT 06118
Hartford County

Mount Utilization: 38%
Tower Utilization: 67.7%

April 20, 2018

Prepared For

Sprint
201 State Route 17 North
Rutherford, NJ 07070

Prepared By

Maser Consulting Connecticut
331 Newman Springs Road, Suite 203
Red Bank, NJ 07701
T: 732.383.1950

STATE OF CONNECTICUT
PETROS TSOUKALAS
32577
LICENSED PROFESSIONAL ENGINEER

Petros E. Tsoukalas, P.E.
Geographic Discipline Leader
Connecticut License No. PEN.32577

MC Project No. 17924012A

www.maserconsulting.com

Objective:

The objective of this report is to determine the capacity of the existing 140' self-supported lattice tower structure, and existing antenna support mount at the subject facility for the final wireless telecommunications configuration, per the applicable codes and standards.

Introduction:

Maser Consulting Connecticut has reviewed the following documents in completing this report:

- Previous Opinion Letter (17924012A) performed by Maser Consulting P.A., dated January 30, 2018
- RFDS 63859 provided by Sprint, dated September 7, 2017
- Construction Drawings Prepared by Maser Consulting P.A. dated March 30, 2018
- Previous Structural Analysis report prepared by Hudson Design Group dated, June 10, 2016.
- Previous Construction Drawings prepared by Hudson Design Group dated, May 10, 2016.
- Previous Structural Analysis report prepared by EBI Consulting dated, August 6, 2014.
- Previous Structural Analysis report prepared by Advanced Engineering Group, P.C dated May 4, 2017.
- Previous Tower Analysis prepared by Maser Consulting Connecticut, dated October 23, 2017.

The existing **SPRINT** equipment is supported on an existing 140' self-supporting lattice tower structure. The primary structure is a three-legged lattice tower constructed of pipe and truss legs with angle diagonals and horizontals. The proposed **SPRINT** equipment will be supported on existing antenna support mounts constructed of structural steel antenna support pipes supported by pipes at a centerline of approximately 100'-0" above ground level. This report is based only upon this information, as well as the information obtained in the field.

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
    - Ultimate Wind Speed 123 mph (3 Second Gust)
    - Nominal Wind Speed – 95 mph (3 Second Gust)
    - Exposure Category – B
    - Structural Class – II
    - Topographic Category – 1
    - Ice Wind – 40 mph
    - Ice Thickness – 1"
- Specification for Structural Steel Buildings ANSI/AISC 360-10, American Institute of Steel Construction (AISC)

Loading used in this analysis is found in Appendix A of this report.

Analysis Approach & Assumptions:

The analysis approach used in this structural analysis is based on the premise that if the existing lattice tower and existing antenna support mount are structurally adequate to support the proposed equipment per the codes and standards, or if the increase in the forces in the structure is deemed to be negligible or acceptable, then the proposed equipment can be installed as intended.

The existing tower has been analyzed in 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 existing antenna mounts in all sectors have been modeled in RISA-3D, a comprehensive structural analysis program. The program performs design checks of structures under user specified loads. The user specified loads have been calculated separately based on the requirements of the above referenced codes. The program performs an analysis based on the steel code to determine the adequacy of the members, and produces the reactions at the connection points of the mounts to the existing structure. Additional calculations were then prepared to analyze the mount connection points with the proposed loading conditions.

General Site Design Assumption:

- Structural Steel Main Legs are constructed of A572-50 Grade Steel.
- Structural Steel Angle and 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.
- All engineering services are performed on the basis that the information used is current and correct.
- 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, if any.
- 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 the responsibility of the client to ensure that the information provided to Maser Consulting Connecticut and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that the original design, material production, fabrication, and erection of the existing structure was performed in accordance with accepted industry design standards and in accordance with all applicable codes. Further, it is assumed that the existing structure and appurtenances have been properly maintained in accordance with all applicable codes and manufacturer's specifications and no structural defects and/or deterioration to the structural members has occurred.
- 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.
- All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. Maser Consulting Connecticut is not responsible for the conclusion, opinions, and recommendations made by others based on the information we supply.

Site Specific Design Parameters:

The following design parameters have been utilized in this report:

- *Structural Steel Pipes are constructed of A53 Grade B Steel*
- *Structural Steel Angles, and Plates are constructed of A36 Steel*
- *Hollow Structural Steel Members are constructed of A500 Grade B steel*
- *Analysis based on the antenna mount (SitePro 1 #R5-216) listed in the Previous Opinion Letter*
- *It is assumed that this antenna mount has been installed properly to replace the existing mount.*

Calculations:

The calculations are found in Appendix A of this report.

Conclusion:

Maser Consulting Connecticut has determined the existing antenna support mounts have **ADEQUATE** structural capacity to support the proposed loading. The existing antenna support mounts have been determined to be stressed to a maximum of **38.1%** of its structural capacity with the maximum usage occurring at the pipe mast. Therefore, the proposed **Sprint** installation **CAN** be installed as intended.

The existing lattice 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 lattice tower has been determined to be stressed to a maximum of **67.7%** of its structural capacity with the maximum usage occurring at the lattice pole at 100-120' elevation. The tower legs are determined to be stressed to a maximum usage of **52.4%** of their structural capacity at 60'-80' elevation.

Foundation Reactions Comparison

	Foundation Capacity (kips)	**Current Forces (kips)**	**Pass/Fail**
Mast Axial	473.0	181	(38.27%)Pass
Mast Shear	100.525	29	(28.85%)Pass
Moment	5314 kip*ft	2339 kip*ft	(44%)Pass

The foundation in comparison with the capacities from the previous structural analysis referenced above is observed to be **ADEQUATE**. Therefore, the proposed **SPRINT** installation **CAN** be placed as intended.

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

Petros E. Tsoukalas P.E.
Connecticut Licensed Professional Engineer
License No. PEN.32577

Anthony Bassett
Structural Engineer

\\MTCAD01\Projects\2017\17924000A\17924002A\Structural\Mount Modification\Rev 3\Word

APPENDIX A

Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
Project No.	17924012A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	1
			Version 3.3

1. LOADING SUMMARY

Quantity	Manufacturer	Antenna/ Appurtenance	Status	Sector
3	NOKIA	MAA-AAHC	Proposed	Alpha, Beta, & Gamma
3	COMMSCOPE	NNVV-65B-R4	Proposed	Alpha, Beta, & Gamma
3	ALCATEL-LUCENT	RRH4x45-1900	Proposed	Alpha, Beta, & Gamma
6	ALCATEL-LUCENT	RRH 2x50-800	Proposed	Alpha, Beta, & Gamma
2	OTHER	2ft Dish	Existing	Alpha & Gamma

The worst case loading occurs in the Alpha Sector

Quantity	Manufacturer	Antenna/ Appurtenance	Status
1	NOKIA	MAA-AAHC	Proposed
1	COMMSCOPE	NNVV-65B-R4	Proposed
1	ALCATEL-LUCENT	RRH4x45-1900	Proposed
2	ALCATEL-LUCENT	RRH 2x50-800	Proposed
1	OTHER	2ft Dish	Existing

ANALYSIS AND DESIGN

Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
Project No.	17924012A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	3

I. DESIGN INPUTS

Calculations for gravity and lateral loading on equipment and support mounts are determined as per the ANSI/TIA-222-G Code, Addendum 2

				Reference	Equation
Wind Load Inputs Parameters					
Antenna Centerline	z	100	ft		
Normal Wind Speed (3 sec. Gust):	V	95	mph	Ref. 1, Eqn. 16-33	
Normal Wind Speed with Ice (3 sec. gust):	V_i	40.0	mph	(Figure a5-2a, p. 233)	
	V_s	60.0	mph	(Figure a5-2a, p. 233)	
Design Ice Thickness:	t_i	1.00	in	(Figure A1-2a, p. 233)	
		B		Ref. 3, Section 2.6.5.1	
Structure Class:		II		Ref. 3, Table 2-1	
Gust Effect Factor:	G_h	0.85		Ref. 3, Section 2.6.7	
Wind Directionality Factor:	K_d	0.85		Ref. 3, Table 2-2	
Topographic Category:		1		Ref. 3, Section 2.6.6.2	
Wind Load Coefficients					
Importance Factors:					
Non-Iced:	I	1		Ref. 3, Table 2-3	
Iced:	I_{ice}	1		(Table 2-3, P. 39)	
Exposure Category Coefficients:					
3-s Gust-Speed Power Law Exponent:	α	7.0		Ref. 3, Table 2-4	
Nominal Height of the Atmospheric Boundary Layer:	Z_g	1200	ft	Ref. 3, Table 2-4	
Min. Value for k_z:	Kz_{min}	0.70		Ref. 3, Table 2-4	
Terrain Constant:	K_e	0.90		Ref. 3, Table 2-4	
Velocity Pressure Exposure Coefficient:	K_z	0.988		Ref. 3, Section 2.6.5.2	$=2.01\cdot(z/z_g)^{2/\alpha}$
Topographic Category Coefficients:					
Topographic Constant:	K_t	N/A		Ref. 3, Table 2-5	
Height Attenuation Factor:	f	N/A		Ref. 3, Table 2-5	
Height Reduction Factor:	K_h	N/A		Ref. 3, Section 2.6.6.4	$=e^{(f\cdot z/H)}$
Topographic Factor:	K_{zt}	1.00		Ref.3, Section 2.6.6.4	$=[1+(K_e\cdot K_t/K_h)]^2$
Ice Accumulation:					
Ice Velocity Pressure Exposure Coefficient:	K_{iz}	1.12			$=(z/33)^{0.10}$
Factored Ice Thickness:	t_{iz}	2.23	in	(Section 2.6.8, p. 16)	$=2.0\cdot t_i\cdot I\cdot K_{iz}\cdot K_{zt}$
Ice Density:	ρ_i	56.00	pcf		
Design Wind Pressures:					
Velocity Pressure:	q_z	19.41	psf	Ref. 3, Section 2.6.9.6	$=0.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V^2\cdot I$
Velocity Pressure (With Ice):	q_{zi}	3.44	psf	(Section 2.6.9.6, P. 25)	$=.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V_i^{\,2}\cdot I$
Velocity Pressure (Service):	q_{zs}	7.74	psf	(Section 2.6.9.6, P. 25)	$=.00256\cdot K_z\cdot K_{zt}\cdot K_d\cdot V_i^{\,2}\cdot I$

Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
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II. CALCULATIONS

- ***Wind Load on Appurtenances***

Dimensions and Force Coefficients

Antenna/ Appurtenance	Non-Iced Condition								Iced Condition							
				Equipment					Mounting Pipe			Equipment				
	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$	Length (in)	Diameter (in)	Force Coefficient C_a	Height (in)	Width (in)	Depth (in)	Force Coefficient $C_{a\ Front}$	Force Coefficient $C_{a\ Side}$
MAA-AAHC	63.0	3.500	1.044	25.60	19.70	9.65	1.20	1.21	67.5	8.0	0.833	30.07	24.17	14.12	1.20	1.20
NNVV-65B-R4	96.0	3.500	1.200	72.00	19.60	7.80	1.25	1.47	100.5	8.0	0.925	76.47	24.07	12.27	1.23	1.37
RRH4x45-1900	0.0	0.000	0.000	25.00	12.00	12.00	1.20	1.20	0.0	0.0	0.000	29.47	16.47	16.47	1.20	1.20
RRH 2x50-800	0.0	0.000	0.000	16.00	13.00	10.00	1.20	1.20	0.0	0.0	0.000	20.47	17.47	14.47	1.20	1.20
2ft Dish	0.0	0.000	0.000	24.00	24.00	12.00	1.20	1.20	0.0	0.0	0.000	28.47	28.47	16.47	1.20	1.20

Antenna/ Appurtenance	# of Brackets	Non-Iced Condition				Iced Condition			
		Wind Force (lbs.)		Controlling Wind Force (lbs.)	Gravity (lbs.)	Wind Force (lbs.)		Controlling Wind Force (lbs.)	Gravity (lbs.)
		F_N	F_T			F_N	F_T		
MAA-AAHC	1	85.0	60.5	**85.0**	**103.7**	24.0	19.4	**24.0**	**165.3**
NNVV-65B-R4	2	107.0	70.5	**107.0**	**46.2**	25.3	20.5	**25.3**	**202.9**
RRH4x45-1900	1	41.2	41.2	**41.2**	**69.5**	11.8	11.8	**11.8**	**128.8**
RRH 2x50-800	1	28.6	22.0	**28.6**	**69.1**	8.7	7.2	**8.7**	**86.8**
2ft Dish	1	79.2	39.6	**79.2**	**35.0**	19.8	11.4	**19.8**	**188.3**

**** ALL CALCULATED LOADS ARE PER MOUNTING BRACKET. TO GET THE TOTAL EQUIPMENT LOAD, MULTIPLY THE INDIVIDUAL LOADS BY THE NUMBER OF BRACKETS***

- ***Wind Load on Framing Members***

Member Category	Member Shape	Length (in)	Member Surface	Non-Iced Condition			Iced Condition					
				Exposed Wind Height (in)	Force Coefficient C_a	Wind Load (plf)	Exposed Wind Height (in)	Depth (in)	Length (in)	Force Coefficient C_a	Wind Load (plf)	Ice Weight (plf)
Pipe	Pipe 4.0	72	Round	4.50	1.00	6.18	8.97	8.97	76.47	0.83	1.82	18.38
Pipe	Pipe 3.0	60	Round	3.50	1.03	4.93	7.97	7.97	64.47	0.82	1.60	15.65
Pipe	Pipe 3.0	96	Round	3.50	1.20	5.77	7.97	7.97	100.47	0.92	1.80	15.65
Pipe	Pipe 3.0	63	Round	3.50	1.04	5.02	7.97	7.97	67.47	0.83	1.62	15.65

BASIC EQUATIONS

ANSI/TIA-222-G Reference

Importance Factor:

$$I := \begin{cases} 1.0 & \text{if Class} = \text{"II"} \\ 1.15 & \text{if Class} = \text{"III"} \end{cases}$$

Table 2-3, Pg. 39

Force Coefficient:
(Square)

$$C_{f\_square}(h, w) := \begin{cases} 1.2 & \text{if } \frac{h}{w} \le 2.5 \\ \left[1.2 + \frac{0.2}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[1.4 + \frac{0.6}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 2.0 & \text{otherwise} \end{cases}$$

Table 2-8, P. 42

Force Coefficient:
(Round)

$$C_{f\_round}(h, w) := \begin{cases} 0.7 & \text{if } \frac{h}{w} \le 2.5 \\ \left[0.7 + \frac{0.1}{4.5} \cdot \left(\frac{h}{w} - 2.5\right)\right] & \text{if } \frac{h}{w} > 2.5 \wedge \frac{h}{w} \le 7 \\ \left[0.8 + \frac{0.4}{18} \cdot \left(\frac{h}{w} - 7\right)\right] & \text{if } \frac{h}{w} > 7 \wedge \frac{h}{w} \le 25 \\ 1.2 & \text{otherwise} \end{cases}$$

Table 2-8, P. 42

Terrain Exposure Constants:

Table 2-4, P. 40

$$\alpha := \begin{cases} 7.0 & \text{if Exp} = \text{"B"} \\ 9.5 & \text{if Exp} = \text{"C"} \\ 11.5 & \text{if Exp} = \text{"D"} \end{cases} \quad Z_g := \begin{cases} 1200\text{ft} & \text{if Exp} = \text{"B"} \\ 900\text{ft} & \text{if Exp} = \text{"C"} \\ 700\text{ft} & \text{if Exp} = \text{"D"} \end{cases} \quad K_{zmin} := \begin{cases} 0.70 & \text{if Exp} = \text{"B"} \\ 0.85 & \text{if Exp} = \text{"C"} \\ 1.03 & \text{if Exp} = \text{"D"} \end{cases}$$

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BASIC EQUATIONS

ANSI/TIA-222-G Reference

Velocity Pressure Coefficient:

$$Kz(z) := \left| \begin{array}{l} K_z \leftarrow \max\left[2.01 \cdot \left(\frac{z}{Z_g} \right)^{\frac{2}{\alpha}}, K_{zmin} \right] \\ K_z \leftarrow \min\left(K_z, 2.01 \right) \end{array} \right.$$

$K_z := Kz(z)$ — Section 2.6.5, P. 13

$$Kzt(z) := K_{zt} \leftarrow \left| \begin{array}{l} 1.0 \text{ if Topo = "1"} \\ \text{otherwise} \\ \quad \left| \begin{array}{l} K_e \leftarrow \left| \begin{array}{l} 0.90 \text{ if Exp = "B"} \\ 1.00 \text{ if Exp = "C"} \\ 1.10 \text{ if Exp = "D"} \end{array} \right. \quad \text{Table 2-4 p. 40} \\ K_t \leftarrow \left| \begin{array}{l} 0.43 \text{ if Topo = "2"} \\ 0.53 \text{ if Topo = "3"} \\ 0.72 \text{ if Topo = "4"} \end{array} \right. \quad \text{Table 2-5 p. 40} \\ f \leftarrow \left| \begin{array}{l} 1.25 \text{ if Topo = "2"} \\ 2.00 \text{ if Topo = "3"} \\ 1.50 \text{ if Topo = "4"} \end{array} \right. \quad \text{Table 2-5 p. 40} \\ K_h \leftarrow e^{\left(\frac{f \cdot z}{CH} \right)} \quad \text{Section 2.6.6.4, P. 14} \\ \left(1 + \frac{K_e \cdot K_t}{K_h} \right)^2 \quad \text{Section 2.6.6.4, P. 14} \end{array} \right. \end{array} \right.$$

Section 2.6.6.4, p. 14

$K_{zt} := Kzt(z)$

Velocity Pressure: — Section 2.6.9.6, P. 25

$$q_z := 0.00256 \cdot K_z \cdot K_{zt} \cdot K_d \cdot V^2 \cdot I \cdot psf$$

LOAD EQUATIONS

WIND LOAD

Area (Normal): $AN_{area} = H_{ant} \cdot Want$

Area (Side): $AT_{area} = H_{ant} \cdot Dant$

Force Coefficient (Normal): $C_{fn} = C_{fsquare}(H_{ant}, Want)$

Force Coefficient (Side): $C_{fs} = C_{fsquare}(H_{ant}, Dant)$

Pipe Area (Normal): $AN_p = \max[(L_p - H_{ant}) * Dp, 0]$

Pipe Area (Side): $AT_p = L_p \cdot Dp$

$C_{fp} = C_{fround}(Lp, Dp)$

Normal Effective Projected Area: $E_{pan} = (C_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

$E_{pat} = (C_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

Effective Projected Area: $EPA = max(E_{pan}, Epat)$

Wind Force: $F_{ant} = q_z \cdot Gh \cdot EPA$

ICE DEAD LOAD

Largest Out-to-Out Dimension: $D_{ant} = \sqrt{{D_{ant}}^2 + {W_{ant}}^2}$

Cross Sectional Area of Ice: $A_{ice\_ant} = \pi \cdot tiz \cdot (Dant + tiz)$

Total Ice Dead Load: $DL_{ice\_ant} = \boldsymbol{\rho_i} \cdot (Aice_{\_ant} \cdot Hant)$

ICE WIND LOAD

Dimensions: $H_{i_{ant}} = H_{ant} + 2tiz$

$W_{i_{ant}} = W_{ant} + 2tiz$

$D_{i_{ant}} = D_{ant} + 2tiz$

Area (Normal): $AIN_{area} = H_{i\_ant} \cdot W_{i\_ant}$

Area (Side): $AIT_{area} = H_{i\_ant} \cdot D_{i\_ant}$

Force Coefficient (Normal): $Ci_{fn} = C_{fsquare}(H_{i\_ant}, W_{i\_ant})$

Force Coefficient (Side): $Ci_{fs} = C_{fsquare}(H_{i\_ant}, D_{i\_ant})$

Pipe Area (Normal): $AN_p = \max[(L_{ip} - H_{i\_ant}) * D_{ip}, 0]$

Pipe Area (Side): $AT_p = L_{ip} \cdot Dip$

Force Coefficient (Normal): $C_{fp} = C_{fround}(L_{ip}, D_{ip})$

Normal Effective Projected Area: $E_{pain} = (Ci_{fn} \cdot ANarea) + (Cfp \cdot ANp)$

Side Effective Projected Area: $E_{pait} = (Ci_{fs} \cdot ATarea) + (Cfp \cdot ATp)$

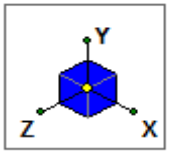
Effective Projected Area: $EPA_i = max(E_{pain}, Epait)$

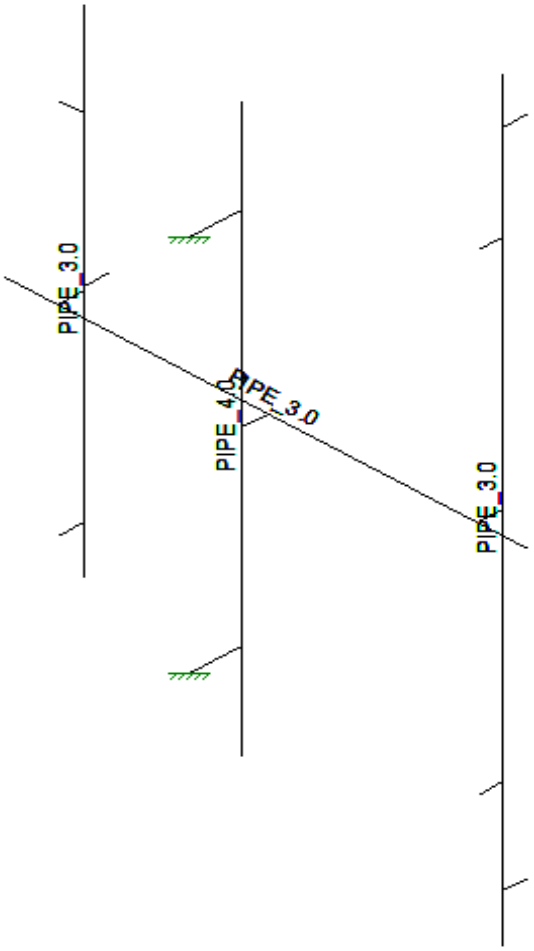
Wind Force: $F_{i\_ant} = q_z \cdot Gh \cdot EPAi$

III. ATTACHMENTS

Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
Project No.	17924012A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	9

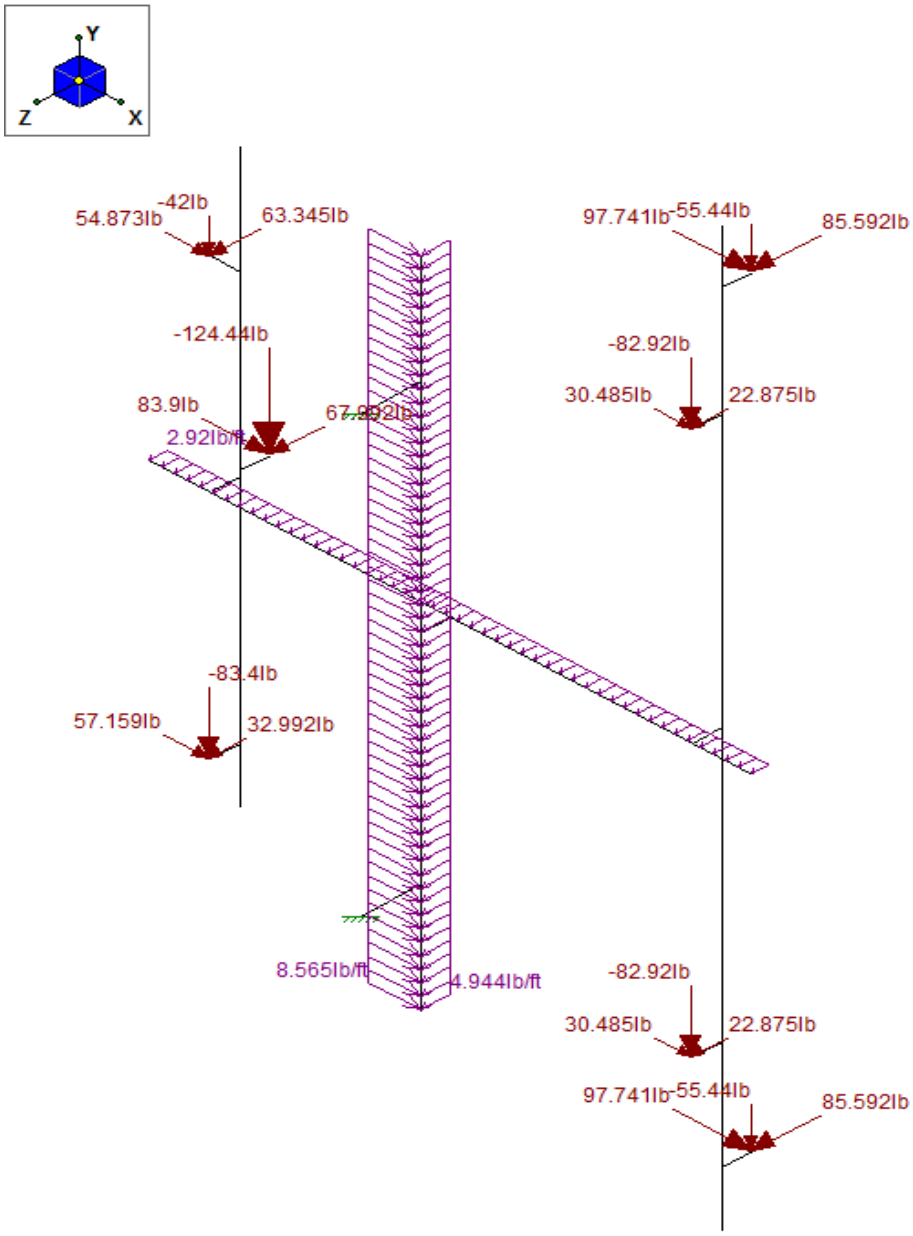
RISA MODEL





Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
Project No.	17924012A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	10

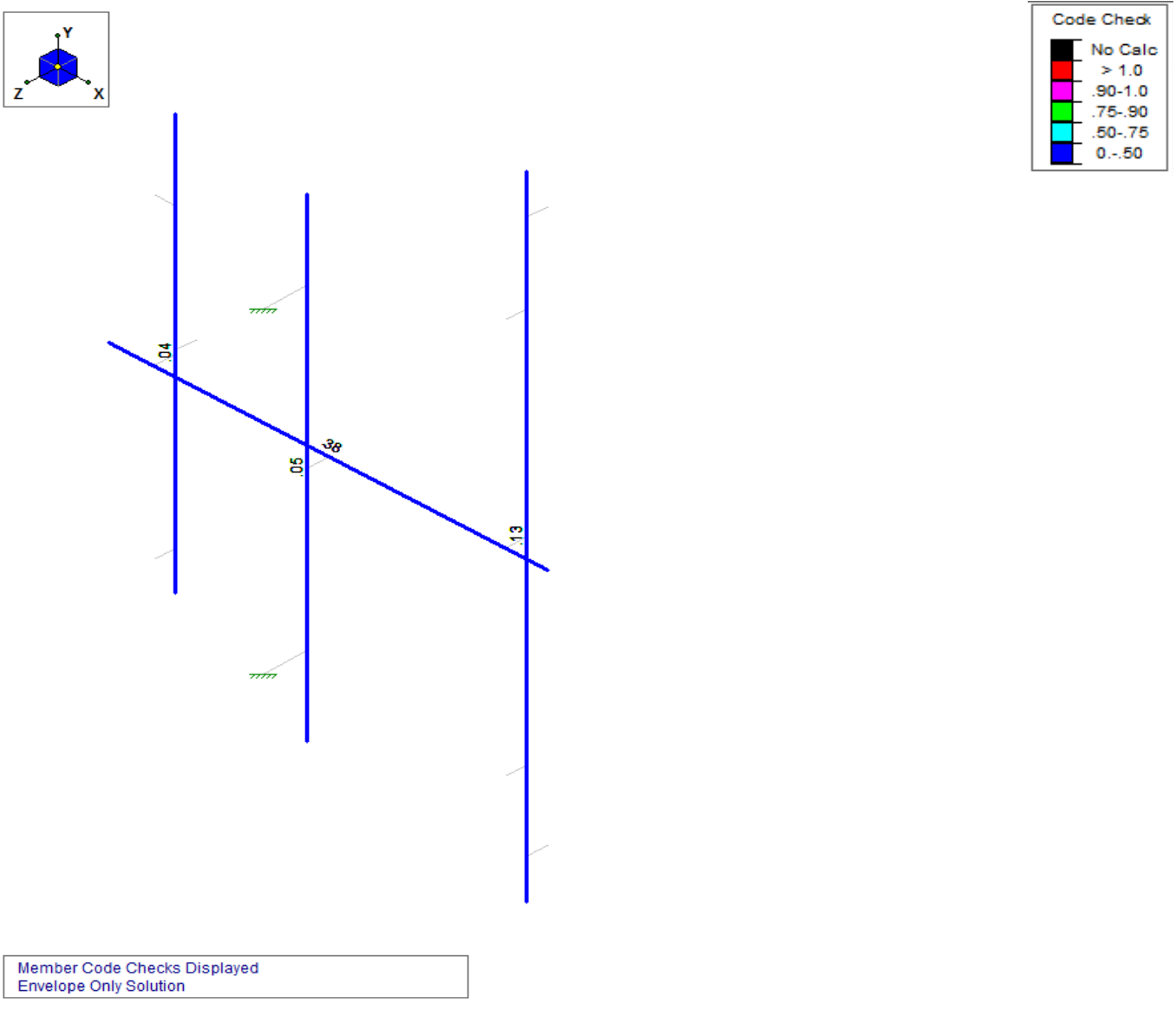
RISA WORST CASE LOADING



Loads: LC 30, 1.2D+1.6W3
Envelope Only Solution

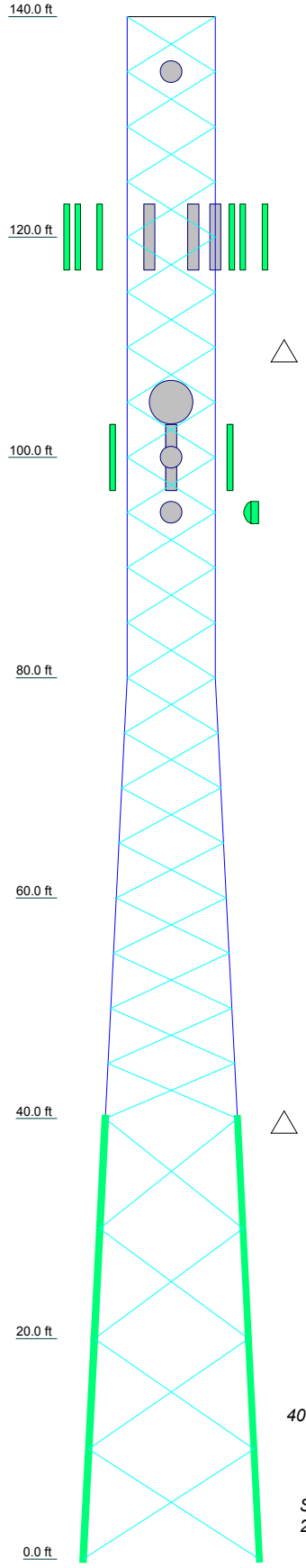
Client:	Sprint	Computed By:	AB
Site Name:	Sunset Ridge	Date:	4/20/2018
Project No.	17924012A	Verified By:	PET
Title:	Antenna Mount Analysis	Page:	11

RISA CODE CHECK



APPENDIX B

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
T4	Pirod 105219		L3x3x5/16			16		19.2
						14	4 @ 10	
T3	Pirod 105218					12		3.5
T2	SR 3 1/4					10	8 @ 5	3.3
T1	SR 3	A572-50	L2 1/2x2 1/2x5/16	A36	N.A.	8		2.8
L3	SR 2 3/4					8	12 @ 5	2.5
L2	SR 2 1/4		L1 3/4x1 3/4x1/4		L3x3x3/8			1.5
L1			L1 3/4x1 3/4x1/8					1.4



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Pirod 4' Side Mount Standoff (1)	138	2.5" 20' Omni Whip Antenna (T-Mobile)	120
Pirod 4' Side Mount Standoff (1)	138	Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	120
Pirod 4' Side Mount Standoff (1)	138	Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	120
2" 8' Omni Whip Antenna	138	80010799	110
2" 8' Omni Whip Antenna	138	80010799	110
2" 8' Omni Whip Antenna	138	80010799	110
2.5" 20' Omni Whip Antenna	138	Pirod 12' T-Frame Sector Mount (1)	110
Pirod 4' Side Mount Standoff (1)	135	Pirod 12' T-Frame Sector Mount (1)	110
VHLP2-11 w/o radome dish	135	Pirod 12' T-Frame Sector Mount (1)	110
Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	120	(2) RRUS-11	110
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	120	(2) RRUS-11	110
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	120	(2) RRUS-11	110
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	120	(2) RRUS 32	110
AIR 32 with 6' pipe (T-Mobile)	120	(2) RRUS 32	110
AIR 32 with 6' pipe (T-Mobile)	120	(2) RRUS 32	110
AIR 32 with 6' pipe (T-Mobile)	120	DC6-48-06-18-8F	110
TMA (T-Mobile)	120	DC6-48-06-18-8F	110
TMA (T-Mobile)	120	DC6-48-06-18-8F	110
TMA (T-Mobile)	120	HP4-102	105
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	120	Site Pro R5-216 (Sprint)	100
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	120	AAHC (Sprint)	100
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	120	AAHC (Sprint)	100
RRUS11 B12 (T-Mobile)	120	AAHC (Sprint)	100
RRUS11 B12 (T-Mobile)	120	NNVV-65B-R4 (Sprint)	100
RRUS11 B12 (T-Mobile)	120	NNVV-65B-R4 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	NNVV-65B-R4 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	ALU RRH-4X45-1900 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	(2) RRH-2X50-800 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	ALU RRH-4X45-1900 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	(2) RRH-2X50-800 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	Site Pro R5-216 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	Site Pro R5-216 (Sprint)	100
7'x2" Antenna Mount Pipe (T-Mobile)	120	VHLP2-11 w/o radome dish	100
2.5" 20' Omni Whip Antenna (T-Mobile)	120	HP2-102	95
2.5" 20' Omni Whip Antenna (T-Mobile)	120	HP2-102	95
2.5" 20' Omni Whip Antenna (T-Mobile)	120	2" 8' Omni Whip Antenna	80
2.5" 20' Omni Whip Antenna (T-Mobile)	120	Pirod 4' Side Mount Standoff (1)	80
2.5" 20' Omni Whip Antenna (T-Mobile)	120	Junction Box (Sprint)	0

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Weld together tower sections have flange connections.
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: 67.7%

ALL REA
ARE FA
MAX. C
DOW
SHEA
UPLIFT
SHEA
AX
139 K

SHEAR 8 K
MOMENT 771 kip-ft

TORQUE 5 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 37 K

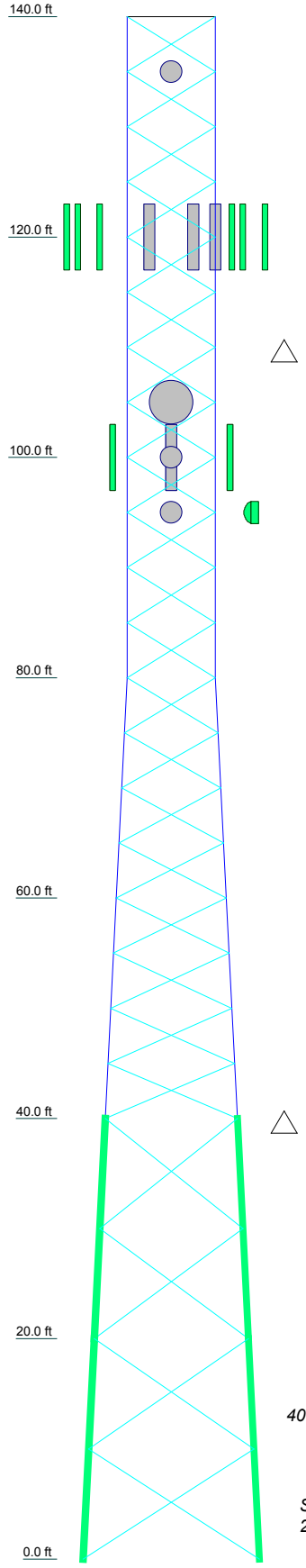
SHEAR 29 K
MOMENT 2339 kip-ft

TORQUE 20 kip-ft
REACTIONS - 95 mph WIND

Maser Consulting PA
400 Valley Road
Mt. Arlington, NJ
Phone: 973398.3110
FAX: 973.398.3199

Job: **17924012A**			
Project: **Sprint**			
Client: Cherundolo	Drawn by: abassett	App'd:	
Code: TIA-222-G	Date: 04/20/18	Scale: NTS	
Path:		Dwg No. E-1	

Section	Legs	Leg Grade	Diagonals	Diagonal Grade	Top Girts	Face Width (ft)	# Panels @ (ft)	Weight (K)
L1	SR 2 1/4	A572-50	L1 3/4x1 3/4x1/8	A36	L3x3x3/8	16	19.2	1.4
L2			L1 3/4x1 3/4x1/4		N.A.	8	12 @ 5	1.5
L3	SR 2 3/4		L2 1/2x2 1/2x5/16			8		2.5
T1	SR 3					10	8 @ 5	2.8
T2	SR 3 1/4					12		3.3
T3	Pirod 105218		L3x3x5/16			14	4 @ 10	3.5
T4	Pirod 105219							4.2



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 95 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Weld together tower sections have flange connections.
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: 67.7%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 181 K
SHEAR: 19 K

UPLIFT: -152 K
SHEAR: 17 K

AXIAL 139 K
SHEAR 8 K *MOMENT 771 kip-ft*
TORQUE 5 kip-ft
40 mph WIND - 1.0000 in ICE

AXIAL 37 K
SHEAR 29 K *MOMENT 2339 kip-ft*
TORQUE 20 kip-ft
REACTIONS - 95 mph WIND

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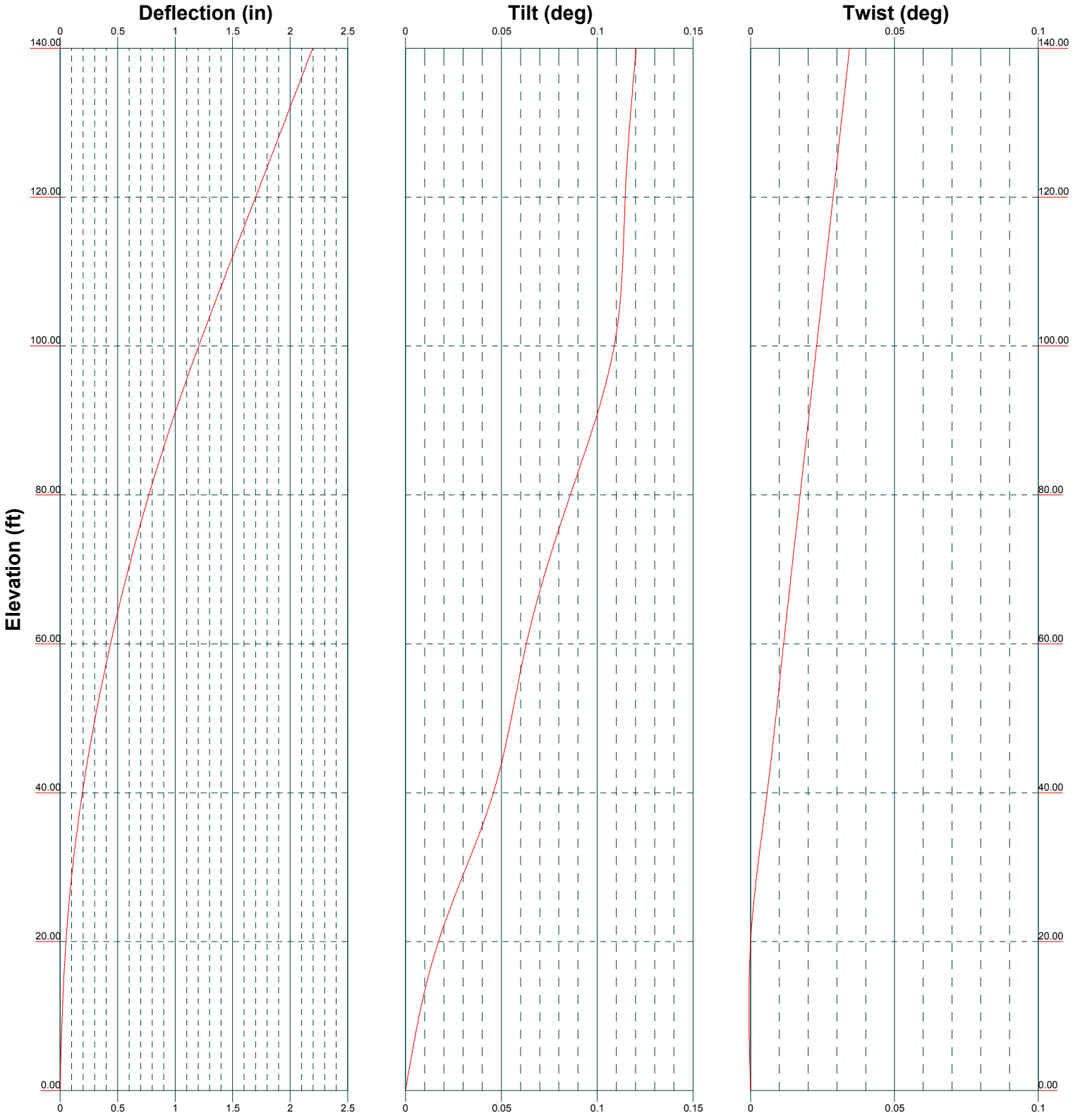
Job: **17924012A**			
Project: ***Sprint***			
Client: Cherundolo	Drawn by: abassett		App'd:
Code: TIA-222-G	Date: 04/20/18		Scale: NTS
Path:			Dwg No. E-1

TIA-222-G - Service - 60 mph

Maximum Values



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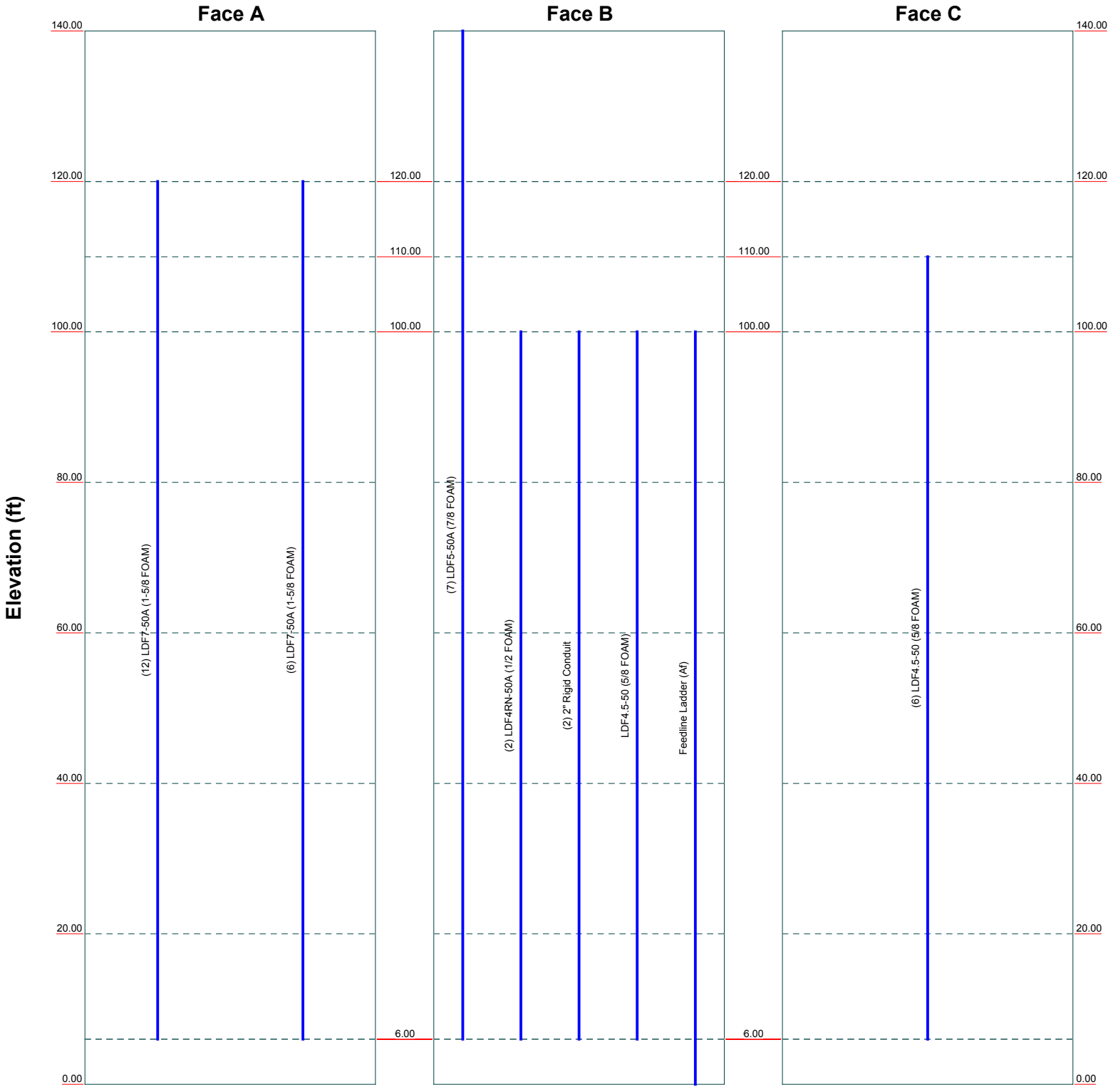
Job: ***17924012A***			
Project: ***Sprint***			
Client: Cherundolo	Drawn by: abassett	App'd:	
Code: TIA-222-G	Date: 04/20/18	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 140'

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



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Job: ***17924012A***			
Project: ***Sprint***			
Client: Cherundolo	Drawn by: abassett	App'd:	
Code: TIA-222-G	Date: 04/20/18	Scale: NTS	
Path:		Dwg No. E-7	

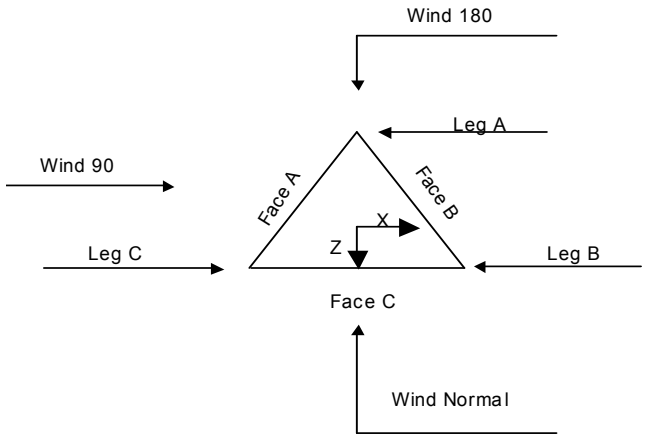
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 140.00 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 8.00 ft at the top and 16.00 ft at the base.
There is a 3 sided latticed pole with a face width of 8.00 ft.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 95 mph.
Structure Class II.
Exposure Category B.
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.
Weld together tower sections have flange connections..
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 latticed pole member design is 1.
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

3 Sided Latticed Pole Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
L1	140.00-120.00			8.00	1	20.00
L2	120.00-100.00			8.00	1	20.00
L3	100.00-80.00			8.00	1	20.00

3 Sided Latticed Pole 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
L1	140.00-120.00	5.00	X Brace	No	No	0.0000	0.0000
L2	120.00-100.00	5.00	X Brace	No	No	0.0000	0.0000
L3	100.00-80.00	5.00	X Brace	No	No	0.0000	0.0000

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
L1 140.00-120.00	Solid Round	2 1/4	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x1/8	A36 (36 ksi)
L2 120.00-100.00	Solid Round	2 1/4	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x1/4	A36 (36 ksi)
L3 100.00-80.00	Solid Round	2 3/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
L1 140.00-120.00	Single Angle	L3x3x3/8	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
L2 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
L3 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
L1 140.00-120.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
L2 120.00-100.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
L3 100.00-80.00	No	No	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

3 Sided Latticed Pole 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
L1 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
L2 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
L3 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

3 Sided Latticed Pole 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.
L1 140.00-120.00	Flange	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
L2 120.00-100.00	Flange	0.6250 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
L3 100.00-80.00	Flange	0.7500 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	80.00-60.00			8.00	1	20.00
T2	60.00-40.00			10.00	1	20.00
T3	40.00-20.00			12.00	1	20.00
T4	20.00-0.00			14.00	1	20.00

Tower Section Geometry *(cont'd)*

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
T1	80.00-60.00	5.00	X Brace	No	No	0.0000	0.0000
T2	60.00-40.00	5.00	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
T3	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T4	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 80.00-60.00	Solid Round	3	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T2 60.00-40.00	Solid Round	3 1/4	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T3 40.00-20.00	Truss Leg	Pirod 105218	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)
T4 20.00-0.00	Truss Leg	Pirod 105219	A572-50 (50 ksi)	Single Angle	L3x3x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 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 ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	No	No	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T4 20.00-0.00	No	No	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
				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	Truss-Leg K Factors: Truss-Legs Used As Leg Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members: Leg Panels	X Brace Diagonals	Z Brace Diagonals
T3 40.00-20.00	1	0.5	0.85	1	0.5	0.85
T4 20.00-0.00	1	0.5	0.85	1	0.5	0.85

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 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
T2 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
T3 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
T4 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 Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T1 80.00-60.00	Flange	0.8750 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 60.00-40.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 40.00-20.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 20.00-0.00	Flange	1.0000 A325N	6	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#		C_AA_A ft^2/ft	Weight plf
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (In Face)	120.00 - 6.00	-2.0000	0.45	12	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
LDF7-50A (1-5/8 FOAM)	A	No	CaAa (In Face)	120.00 - 6.00	-4.0000	0.4	6	No Ice	0.20	0.82
								1/2" Ice	0.30	2.33
								1" Ice	0.40	4.46
LDF5-50A (7/8 FOAM)	B	No	CaAa (In Face)	140.00 - 6.00	-3.0000	-0.4	7	No Ice	0.11	0.33
								1/2" Ice	0.21	1.30
								1" Ice	0.31	2.88
LDF4RN-50A (1/2 FOAM)	B	No	CaAa (In Face)	100.00 - 6.00	2.0000	0.42	2	No Ice	0.06	0.15
								1/2" Ice	0.16	0.84
								1" Ice	0.26	2.14
2" Rigid Conduit	B	No	CaAa (In Face)	100.00 - 6.00	2.0000	0.45	2	No Ice	0.20	2.80
								1/2" Ice	0.30	4.33
								1" Ice	0.40	6.47
LDF4.5-50 (5/8 FOAM)	C	No	CaAa (In Face)	110.00 - 6.00	3.0000	0	6	No Ice	0.09	0.15
								1/2" Ice	0.19	0.99
								1" Ice	0.29	2.43
LDF4.5-50 (5/8 FOAM)	B	No	CaAa (In Face)	100.00 - 6.00	0.0000	0.42	1	No Ice	0.09	0.15
								1/2" Ice	0.19	0.99
								1" Ice	0.29	2.43
Feedline Ladder (Af)	B	No	CaAa (In Face)	100.00 - 0.00	0.0000	0.42	1	No Ice	1.00	8.40
								1/2" Ice	1.20	13.50
								1" Ice	1.40	18.60
Feedline Ladder (Af)	C	No	CaAa (In Face)	0.00 - 0.00	0.0000	0	1	No Ice	1.00	8.40
								1/2" Ice	1.20	13.50
								1" Ice	1.40	18.60

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-120.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	15.260	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
L2	120.00-100.00	A	0.000	0.000	71.280	0.000	0.30
		B	0.000	0.000	15.260	0.000	0.05
		C	0.000	0.000	5.220	0.000	0.01
L3	100.00-80.00	A	0.000	0.000	71.280	0.000	0.30
		B	0.000	0.000	47.520	0.000	0.34
		C	0.000	0.000	10.440	0.000	0.02
T1	80.00-60.00	A	0.000	0.000	71.280	0.000	0.30
		B	0.000	0.000	47.520	0.000	0.34
		C	0.000	0.000	10.440	0.000	0.02
T2	60.00-40.00	A	0.000	0.000	71.280	0.000	0.30
		B	0.000	0.000	47.520	0.000	0.34
		C	0.000	0.000	10.440	0.000	0.02
T3	40.00-20.00	A	0.000	0.000	71.280	0.000	0.30
		B	0.000	0.000	47.520	0.000	0.34
		C	0.000	0.000	10.440	0.000	0.02
T4	20.00-0.00	A	0.000	0.000	49.896	0.000	0.21

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	39.264	0.000	0.29
		C	0.000	0.000	7.308	0.000	0.01

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	140.00-120.00	A	2.294	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	79.489	0.000	1.46
		C		0.000	0.000	0.000	0.000	0.00
L2	120.00-100.00	A	2.256	0.000	0.000	233.703	0.000	4.69
		B		0.000	0.000	78.425	0.000	1.41
		C		0.000	0.000	32.290	0.000	0.56
L3	100.00-80.00	A	2.211	0.000	0.000	230.476	0.000	4.54
		B		0.000	0.000	153.479	0.000	3.07
		C		0.000	0.000	63.505	0.000	1.07
T1	80.00-60.00	A	2.156	0.000	0.000	226.525	0.000	4.34
		B		0.000	0.000	150.601	0.000	2.95
		C		0.000	0.000	62.188	0.000	1.02
T2	60.00-40.00	A	2.085	0.000	0.000	221.388	0.000	4.09
		B		0.000	0.000	146.859	0.000	2.78
		C		0.000	0.000	60.476	0.000	0.94
T3	40.00-20.00	A	1.981	0.000	0.000	213.913	0.000	3.75
		B		0.000	0.000	141.671	0.000	2.56
		C		0.000	0.000	57.984	0.000	0.85
T4	20.00-0.00	A	1.775	0.000	0.000	139.351	0.000	2.31
		B		0.000	0.000	99.841	0.000	1.75
		C		0.000	0.000	37.126	0.000	0.51

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	140.00-120.00	0.2074	-4.2953	0.2688	-5.5672
L2	120.00-100.00	-0.0652	-8.7203	-0.0211	-8.2795
L3	100.00-80.00	2.2285	-4.9235	1.6271	-5.2493
T1	80.00-60.00	2.4359	-5.4693	1.7860	-5.8752
T2	60.00-40.00	2.8454	-6.5414	2.0957	-7.0932
T3	40.00-20.00	3.0691	-7.1730	2.2283	-7.6657
T4	20.00-0.00	3.7089	-6.3465	2.5715	-7.3145

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	3	LDF5-50A (7/8 FOAM)	120.00 -	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L2	1	LDF7-50A (1-5/8 FOAM)	140.00 100.00 - 120.00	0.6000	0.6000
L2	2	LDF7-50A (1-5/8 FOAM)	100.00 - 120.00	0.6000	0.6000
L2	3	LDF5-50A (7/8 FOAM)	100.00 - 120.00	0.6000	0.6000
L2	6	LDF4.5-50 (5/8 FOAM)	100.00 - 110.00	0.6000	0.6000
L3	1	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	2	LDF7-50A (1-5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	3	LDF5-50A (7/8 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	4	LDF4RN-50A (1/2 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	5	2" Rigid Conduit	80.00 - 100.00	0.6000	0.6000
L3	6	LDF4.5-50 (5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	7	LDF4.5-50 (5/8 FOAM)	80.00 - 100.00	0.6000	0.6000
L3	8	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T1	1	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	2	LDF7-50A (1-5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	3	LDF5-50A (7/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	4	LDF4RN-50A (1/2 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	5	2" Rigid Conduit	60.00 - 80.00	0.6000	0.6000
T1	6	LDF4.5-50 (5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	7	LDF4.5-50 (5/8 FOAM)	60.00 - 80.00	0.6000	0.6000
T1	8	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T2	1	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	2	LDF7-50A (1-5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	3	LDF5-50A (7/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	4	LDF4RN-50A (1/2 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	5	2" Rigid Conduit	40.00 - 60.00	0.6000	0.6000
T2	6	LDF4.5-50 (5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	7	LDF4.5-50 (5/8 FOAM)	40.00 - 60.00	0.6000	0.6000
T2	8	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T3	1	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	2	LDF7-50A (1-5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	3	LDF5-50A (7/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	4	LDF4RN-50A (1/2 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	5	2" Rigid Conduit	20.00 - 40.00	0.6000	0.6000
T3	6	LDF4.5-50 (5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	7	LDF4.5-50 (5/8 FOAM)	20.00 - 40.00	0.6000	0.6000
T3	8	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T4	1	LDF7-50A (1-5/8 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	2	LDF7-50A (1-5/8 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	3	LDF5-50A (7/8 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	4	LDF4RN-50A (1/2 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	5	2" Rigid Conduit	6.00 - 20.00	0.6000	0.6000
T4	6	LDF4.5-50 (5/8 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	7	LDF4.5-50 (5/8 FOAM)	6.00 - 20.00	0.6000	0.6000
T4	8	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 K
Pirod 4' Side Mount Standoff (1)	A	From Leg	2.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	0.05 0.09 0.13
Pirod 4' Side Mount Standoff (1)	B	From Leg	2.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	0.05 0.09 0.13
Pirod 4' Side Mount Standoff (1)	C	From Leg	2.00 0.00 0.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	0.05 0.09 0.13
2" 8' Omni Whip Antenna	A	From Leg	4.00 0.00 4.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	1.60 2.42 3.24	1.60 2.42 3.24	0.03 0.04 0.06
2" 8' Omni Whip Antenna	B	From Leg	4.00 0.00 4.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	1.60 2.42 3.24	1.60 2.42 3.24	0.03 0.04 0.06
2" 8' Omni Whip Antenna	C	From Leg	4.00 0.00 4.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	1.60 2.42 3.24	1.60 2.42 3.24	0.03 0.04 0.06
2.5" 20' Omni Whip Antenna	A	From Leg	0.00 0.00 10.00	0.0000	138.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	A	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	B	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1) (T-Mobile)	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	A	From Leg	4.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.41 6.89 7.35	5.69 6.54 7.27	0.11 0.17 0.24
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	B	From Leg	4.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.41 6.89 7.35	5.69 6.54 7.27	0.11 0.17 0.24
AIR 21 B2A/B4P With mount Pipe (T-Mobile)	C	From Leg	4.00 2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.41 6.89 7.35	5.69 6.54 7.27	0.11 0.17 0.24
AIR 32 with 6' pipe (T-Mobile)	A	From Leg	4.00 4.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.81 7.30 7.76	6.14 6.99 7.73	0.15 0.22 0.28
AIR 32 with 6' pipe (T-Mobile)	B	From Leg	4.00 4.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.81 7.30 7.76	6.14 6.99 7.73	0.15 0.22 0.28
AIR 32 with 6' pipe (T-Mobile)	C	From Leg	4.00 4.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.81 7.30 7.76	6.14 6.99 7.73	0.15 0.22 0.28
TMA (T-Mobile)	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.27	0.27 0.34 0.41	0.02 0.02 0.03
TMA (T-Mobile)	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.27	0.27 0.34 0.41	0.02 0.02 0.03
TMA (T-Mobile)	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.00 1.13 1.27	0.27 0.34 0.41	0.02 0.02 0.03

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	A	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	11.54 12.16 12.79	10.80 12.23 13.51	0.15 0.24 0.35
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	B	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	11.54 12.16 12.79	10.80 12.23 13.51	0.15 0.24 0.35
KRC 118 48 Antenna with Pipe Mount (T-Mobile)	C	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	11.54 12.16 12.79	10.80 12.23 13.51	0.15 0.24 0.35
RRUS11 B12 (T-Mobile)	A	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS11 B12 (T-Mobile)	B	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
RRUS11 B12 (T-Mobile)	C	From Leg	4.00 -2.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	2.83 3.04 3.26	1.18 1.33 1.48	0.05 0.07 0.10
7'x2" Antenna Mount Pipe (T-Mobile)	A	From Leg	4.00 -6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe (T-Mobile)	B	From Leg	4.00 -6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe (T-Mobile)	C	From Leg	4.00 -6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe (T-Mobile)	A	From Leg	4.00 6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe (T-Mobile)	B	From Leg	4.00 6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
7'x2" Antenna Mount Pipe (T-Mobile)	C	From Leg	4.00 6.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.66 2.39 2.83	1.66 2.39 2.83	0.03 0.04 0.06
2.5" 20' Omni Whip Antenna (T-Mobile)	A	From Leg	4.00 6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
2.5" 20' Omni Whip Antenna (T-Mobile)	B	From Leg	4.00 6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
2.5" 20' Omni Whip Antenna (T-Mobile)	C	From Leg	4.00 6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
2.5" 20' Omni Whip Antenna (T-Mobile)	A	From Leg	4.00 -6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
2.5" 20' Omni Whip Antenna (T-Mobile)	B	From Leg	4.00 -6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
2.5" 20' Omni Whip Antenna (T-Mobile)	C	From Leg	4.00 -6.00 10.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	5.00 7.03 9.07	5.00 7.03 9.07	0.06 0.10 0.15
Site Pro R5-216 (Sprint)	A	From Leg	1.00 0.00 0.00	0.0000	100.00	No Ice 1/2" Ice 1" Ice	2.72 4.91 7.10	2.72 4.91 7.10	0.05 0.09 0.13

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Site Pro R5-216	B	From Leg	1.00	0.0000	100.00	No Ice	2.72	2.72	0.05
(Sprint)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
Site Pro R5-216	C	From Leg	1.00	0.0000	100.00	No Ice	2.72	2.72	0.05
(Sprint)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
AAHC	A	From Leg	1.50	0.0000	100.00	No Ice	4.20	2.07	0.10
(Sprint)			0.00			1/2" Ice	4.46	2.26	0.14
			0.00			1" Ice	4.72	2.47	0.17
AAHC	B	From Leg	1.50	0.0000	100.00	No Ice	4.20	2.07	0.10
(Sprint)			0.00			1/2" Ice	4.46	2.26	0.14
			0.00			1" Ice	4.72	2.47	0.17
AAHC	C	From Leg	1.50	0.0000	100.00	No Ice	4.20	2.07	0.10
(Sprint)			0.00			1/2" Ice	4.46	2.26	0.14
			0.00			1" Ice	4.72	2.47	0.17
NNVV-65B-R4	A	From Leg	1.50	0.0000	100.00	No Ice	12.75	7.65	0.12
(Sprint)			0.00			1/2" Ice	13.45	8.94	0.21
			0.00			1" Ice	14.12	10.07	0.32
NNVV-65B-R4	B	From Leg	1.50	0.0000	100.00	No Ice	12.75	7.65	0.12
(Sprint)			0.00			1/2" Ice	13.45	8.94	0.21
			0.00			1" Ice	14.12	10.07	0.32
NNVV-65B-R4	C	From Leg	1.50	0.0000	100.00	No Ice	12.75	7.65	0.12
(Sprint)			0.00			1/2" Ice	13.45	8.94	0.21
			0.00			1" Ice	14.12	10.07	0.32
ALU RRH-4X45-1900	A	From Leg	1.50	0.0000	100.00	No Ice	2.50	2.50	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.71	0.10
			0.00			1" Ice	2.93	2.93	0.12
(2) RRH-2X50-800	A	From Leg	1.50	0.0000	100.00	No Ice	1.73	1.33	0.07
(Sprint)			-1.00			1/2" Ice	1.90	1.48	0.09
			0.00			1" Ice	2.07	1.64	0.11
ALU RRH-4X45-1900	B	From Leg	1.50	0.0000	100.00	No Ice	2.50	2.50	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.71	0.10
			0.00			1" Ice	2.93	2.93	0.12
(2) RRH-2X50-800	B	From Leg	1.50	0.0000	100.00	No Ice	1.73	1.33	0.07
(Sprint)			-1.00			1/2" Ice	1.90	1.48	0.09
			0.00			1" Ice	2.07	1.64	0.11
ALU RRH-4X45-1900	C	From Leg	1.50	0.0000	100.00	No Ice	2.50	2.50	0.07
(Sprint)			1.00			1/2" Ice	2.71	2.71	0.10
			0.00			1" Ice	2.93	2.93	0.12
(2) RRH-2X50-800	C	From Leg	1.50	0.0000	100.00	No Ice	1.73	1.33	0.07
(Sprint)			-1.00			1/2" Ice	1.90	1.48	0.09
			0.00			1" Ice	2.07	1.64	0.11
Junction Box	C	From Face	0.50	0.0000	0.00	No Ice	1.20	0.60	0.02
(Sprint)			0.00			1/2" Ice	1.34	0.70	0.03
			0.00			1" Ice	1.48	0.81	0.04
Pirod 4' Side Mount Standoff	A	From Leg	2.00	0.0000	135.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
Pirod 4' Side Mount Standoff	B	From Leg	2.00	0.0000	80.00	No Ice	2.72	2.72	0.05
(1)			0.00			1/2" Ice	4.91	4.91	0.09
			0.00			1" Ice	7.10	7.10	0.13
2" 8' Omni Whip Antenna	A	From Leg	4.00	0.0000	80.00	No Ice	1.60	1.60	0.03
			0.00			1/2" Ice	2.42	2.42	0.04
			4.00			1" Ice	3.24	3.24	0.06
80010799	A	From Leg	4.00	0.0000	110.00	No Ice	15.31	9.21	0.11
			-4.00			1/2" Ice	15.99	9.86	0.20
			0.00			1" Ice	16.65	10.52	0.29

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
80010799	B	From Leg	4.00 -4.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	15.31 15.99 16.65	9.21 9.86 10.52	0.11 0.20 0.29
80010799	C	From Leg	4.00 -4.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	15.31 15.99 16.65	9.21 9.86 10.52	0.11 0.20 0.29
Pirod 12' T-Frame Sector Mount (1)	A	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1)	B	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
Pirod 12' T-Frame Sector Mount (1)	A	From Leg	0.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	13.60 18.40 23.20	13.60 18.40 23.20	0.47 0.60 0.73
(2) RRUS-11	A	From Leg	4.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
(2) RRUS-11	B	From Leg	4.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
(2) RRUS-11	C	From Leg	4.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	2.52 2.72 2.92	1.02 1.16 1.30	0.06 0.07 0.10
(2) RRUS 32	A	From Leg	4.00 -2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.09 0.12 0.15
(2) RRUS 32	B	From Leg	4.00 -2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.09 0.12 0.15
(2) RRUS 32	C	From Leg	4.00 -2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	3.31 3.56 3.81	2.42 2.64 2.86	0.09 0.12 0.15
DC6-48-06-18-8F	A	From Leg	4.00 2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.88 2.09	1.20 1.88 2.09	0.03 0.05 0.08
DC6-48-06-18-8F	B	From Leg	4.00 2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.88 2.09	1.20 1.88 2.09	0.03 0.05 0.08
DC6-48-06-18-8F	C	From Leg	4.00 2.00 0.00	0.0000	110.00	No Ice 1/2" Ice 1" Ice	1.20 1.88 2.09	1.20 1.88 2.09	0.03 0.05 0.08

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2-11 w/o	A	Paraboloid w/o	From	3.50	Worst		135.00	2.00	No Ice	3.14	0.02

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
radome dish		Radome	Leg	0.00					1/2" Ice	3.41	0.03
				0.00					1" Ice	3.68	0.05
HP2-102	A	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		95.00	2.00	No Ice	3.14	0.03
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.67	0.06
HP2-102	B	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		95.00	2.00	No Ice	3.14	0.03
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.67	0.06
VHLP2-11 w/o radome dish	A	Paraboloid w/o Radome	From Leg	3.50	Worst		100.00	2.00	No Ice	3.14	0.02
				0.00					1/2" Ice	3.41	0.03
				0.00					1" Ice	3.68	0.05
HP4-102	A	Paraboloid w/Shroud (HP)	From Leg	3.00	Worst		105.00	4.00	No Ice	12.57	0.08
				0.00					1/2" Ice	13.09	0.15
				0.00					1" Ice	13.61	0.21

Truss-Leg Properties

Section Designation	Area in²	Area Ice in²	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in²
Pirod 105218	2263.4687	6856.2743	0.75	2.41	7.8593	23.8065	7.2158
Pirod 105219	2441.8688	6746.0737	0.94	2.34	8.4787	23.4239	9.4248

Tower Pressures - No Ice

G_H = 0.850 (base tower), 0.850 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	130.00	1.065	21	163.750	A	12.701	7.500	7.500	37.13	0.000	0.000
140.00-120.00					B	12.701	7.500		37.13	15.260	0.000
					C	12.701	7.500		37.13	0.000	0.000
L2	110.00	1.016	20	163.750	A	10.748	7.500	7.500	41.10	71.280	0.000
120.00-100.00					B	10.748	7.500		41.10	15.260	0.000
					C	10.748	7.500		41.10	5.220	0.000
L3	90.00	0.959	19	164.583	A	15.283	9.167	9.167	37.49	71.280	0.000
100.00-80.00					B	15.283	9.167		37.49	47.520	0.000
					C	15.283	9.167		37.49	10.440	0.000
T1 80.00-60.00	70.00	0.892	18	185.006	A	16.695	10.017	10.017	37.50	71.280	0.000
					B	16.695	10.017		37.50	47.520	0.000
					C	16.695	10.017		37.50	10.440	0.000
T2 60.00-40.00	50.00	0.811	16	225.423	A	19.652	10.851	10.851	35.57	71.280	0.000
					B	19.652	10.851		35.57	47.520	0.000
					C	19.652	10.851		35.57	10.440	0.000
T3 40.00-20.00	30.00	0.701	14	282.945	A	15.378	26.241	26.241	63.05	71.280	0.000
					B	15.378	26.241		63.05	47.520	0.000
					C	15.378	26.241		63.05	10.440	0.000
T4 20.00-0.00	10.00	0.7	14	323.362	A	16.830	28.309	28.309	62.72	49.896	0.000
					B	16.830	28.309		62.72	39.264	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	16.830	28.309		62.72	7.308	0.000

Tower Pressure - With Ice

G_H = 0.850 (base tower), 0.850 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	130.00	1.065	4	2.2939	171.396	A	12.701	53.957	22.793	34.19	0.000	0.000
140.00-120.00						B	12.701	53.957		34.19	79.489	0.000
						C	12.701	53.957		34.19	0.000	0.000
L2	110.00	1.016	4	2.2559	171.270	A	10.748	50.250	22.539	36.95	233.703	0.000
120.00-100.00						B	10.748	50.250		36.95	78.425	0.000
						C	10.748	50.250		36.95	32.290	0.000
L3 100.00-80.00	90.00	0.959	3	2.2111	171.954	A	15.283	50.941	23.907	36.10	230.476	0.000
						B	15.283	50.941		36.10	153.479	0.000
						C	15.283	50.941		36.10	63.505	0.000
T1 80.00-60.00	70.00	0.892	3	2.1562	192.203	A	16.695	53.213	24.415	34.92	226.525	0.000
						B	16.695	53.213		34.92	150.601	0.000
						C	16.695	53.213		34.92	62.188	0.000
T2 60.00-40.00	50.00	0.811	3	2.0849	232.382	A	19.652	57.551	24.774	32.09	221.388	0.000
						B	19.652	57.551		32.09	146.859	0.000
						C	19.652	57.551		32.09	60.476	0.000
T3 40.00-20.00	30.00	0.701	2	1.9810	289.557	A	15.378	99.796	79.487	69.02	213.913	0.000
						B	15.378	99.796		69.02	141.671	0.000
						C	15.378	99.796		69.02	57.984	0.000
T4 20.00-0.00	10.00	0.7	2	1.7749	329.286	A	16.830	98.124	78.210	68.04	139.351	0.000
						B	16.830	98.124		68.04	99.841	0.000
						C	16.830	98.124		68.04	37.126	0.000

Tower Pressure - Service

G_H = 0.850 (base tower), 0.850 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	130.00	1.065	8	163.750	A	12.701	7.500	7.500	37.13	0.000	0.000
140.00-120.00					B	12.701	7.500		37.13	15.260	0.000
					C	12.701	7.500		37.13	0.000	0.000
L2	110.00	1.016	8	163.750	A	10.748	7.500	7.500	41.10	71.280	0.000
120.00-100.00					B	10.748	7.500		41.10	15.260	0.000
					C	10.748	7.500		41.10	5.220	0.000
L3	90.00	0.959	8	164.583	A	15.283	9.167	9.167	37.49	71.280	0.000
100.00-80.00					B	15.283	9.167		37.49	47.520	0.000
					C	15.283	9.167		37.49	10.440	0.000
T1 80.00-60.00	70.00	0.892	7	185.006	A	16.695	10.017	10.017	37.50	71.280	0.000
					B	16.695	10.017		37.50	47.520	0.000
					C	16.695	10.017		37.50	10.440	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T2 60.00-40.00	50.00	0.811	6	225.423	A	19.652	10.851	10.851	35.57	71.280	0.000
					B	19.652	10.851		35.57	47.520	0.000
					C	19.652	10.851		35.57	10.440	0.000
T3 40.00-20.00	30.00	0.701	5	282.945	A	15.378	26.241	26.241	63.05	71.280	0.000
					B	15.378	26.241		63.05	47.520	0.000
					C	15.378	26.241		63.05	10.440	0.000
T4 20.00-0.00	10.00	0.7	5	323.362	A	16.830	28.309	28.309	62.72	49.896	0.000
					B	16.830	28.309		62.72	39.264	0.000
					C	16.830	28.309		62.72	7.308	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	21	1	1	16.942	1.03	51.40	C
140.00-120.00			B	0.123	2.872		1	1	16.942			
			C	0.123	2.872		1	1	16.942			
L2	0.35	1.51	A	0.111	2.918	20	1	1	14.984	1.67	83.73	C
120.00-100.00			B	0.111	2.918		1	1	14.984			
			C	0.111	2.918		1	1	14.984			
L3	0.65	2.45	A	0.149	2.777	19	1	1	20.484	2.15	107.59	C
100.00-80.00			B	0.149	2.777		1	1	20.484			
			C	0.149	2.777		1	1	20.484			
T1	0.65	2.81	A	0.144	2.792	18	1	1	22.374	2.09	104.30	C
80.00-60.00			B	0.144	2.792		1	1	22.374			
			C	0.144	2.792		1	1	22.374			
T2	0.65	3.29	A	0.135	2.826	16	1	1	25.796	2.04	101.80	C
60.00-40.00			B	0.135	2.826		1	1	25.796			
			C	0.135	2.826		1	1	25.796			
T3	0.65	3.52	A	0.147	2.782	14	1	1	30.263	1.89	94.58	C
40.00-20.00			B	0.147	2.782		1	1	30.263			
			C	0.147	2.782		1	1	30.263			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	14	1	1	32.869	1.76	87.78	C
			B	0.14	2.81		1	1	32.869			
			C	0.14	2.81		1	1	32.869			
Sum Weight:	3.49	19.17						OTM	833.61 kip-ft	12.62		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	21	0.8	1	14.401	0.90	44.91	C
140.00-120.00			B	0.123	2.872		0.8	1	14.401			
			C	0.123	2.872		0.8	1	14.401			
L2	0.35	1.51	A	0.111	2.918	20	0.8	1	12.834	1.57	78.41	C
120.00-100.00			B	0.111	2.918		0.8	1	12.834			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.111	2.918		0.8	1	12.834			
L3	0.65	2.45	A	0.149	2.777	19	0.8	1	17.428	2.02	100.79	C
100.00-80.00			B	0.149	2.777		0.8	1	17.428			
			C	0.149	2.777		0.8	1	17.428			
T1	0.65	2.81	A	0.144	2.792	18	0.8	1	19.035	1.95	97.35	C
80.00-60.00			B	0.144	2.792		0.8	1	19.035			
			C	0.144	2.792		0.8	1	19.035			
T2	0.65	3.29	A	0.135	2.826	16	0.8	1	21.866	1.89	94.28	C
60.00-40.00			B	0.135	2.826		0.8	1	21.866			
			C	0.135	2.826		0.8	1	21.866			
T3	0.65	3.52	A	0.147	2.782	14	0.8	1	27.187	1.79	89.57	C
40.00-20.00			B	0.147	2.782		0.8	1	27.187			
			C	0.147	2.782		0.8	1	27.187			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	14	0.8	1	29.503	1.65	82.25	C
			B	0.14	2.81		0.8	1	29.503			
			C	0.14	2.81		0.8	1	29.503			
Sum Weight:	3.49	19.17						OTM	771.47 kip-ft	11.75		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	21	0.85	1	15.037	0.93	46.53	C
140.00-120.00			B	0.123	2.872		0.85	1	15.037			
			C	0.123	2.872		0.85	1	15.037			
L2	0.35	1.51	A	0.111	2.918	20	0.85	1	13.372	1.59	79.74	C
120.00-100.00			B	0.111	2.918		0.85	1	13.372			
			C	0.111	2.918		0.85	1	13.372			
L3	0.65	2.45	A	0.149	2.777	19	0.85	1	18.192	2.05	102.49	C
100.00-80.00			B	0.149	2.777		0.85	1	18.192			
			C	0.149	2.777		0.85	1	18.192			
T1	0.65	2.81	A	0.144	2.792	18	0.85	1	19.870	1.98	99.09	C
80.00-60.00			B	0.144	2.792		0.85	1	19.870			
			C	0.144	2.792		0.85	1	19.870			
T2	0.65	3.29	A	0.135	2.826	16	0.85	1	22.849	1.92	96.16	C
60.00-40.00			B	0.135	2.826		0.85	1	22.849			
			C	0.135	2.826		0.85	1	22.849			
T3	0.65	3.52	A	0.147	2.782	14	0.85	1	27.956	1.82	90.82	C
40.00-20.00			B	0.147	2.782		0.85	1	27.956			
			C	0.147	2.782		0.85	1	27.956			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	14	0.85	1	30.344	1.67	83.64	C
			B	0.14	2.81		0.85	1	30.344			
			C	0.14	2.81		0.85	1	30.344			
Sum Weight:	3.49	19.17						OTM	787.01 kip-ft	11.97		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.46	5.60	A	0.389	2.086	4	1	1	46.776	0.46	22.90	C
140.00-120.00			B	0.389	2.086		1	1	46.776			
			C	0.389	2.086		1	1	46.776			
L2	6.67	5.21	A	0.356	2.157	4	1	1	41.822	0.89	44.61	C
120.00-100.00			B	0.356	2.157		1	1	41.822			
			C	0.356	2.157		1	1	41.822			
L3	8.68	6.77	A	0.385	2.094	3	1	1	47.372	1.02*	51.24	C
100.00-80.00			B	0.385	2.094		1	1	47.372			
			C	0.385	2.094		1	1	47.372			
T1	8.31	7.33	A	0.364	2.14	3	1	1	49.756	0.98	48.87	C
80.00-60.00			B	0.364	2.14		1	1	49.756			
			C	0.364	2.14		1	1	49.756			
T2	7.82	8.26	A	0.332	2.214	3	1	1	54.736	0.91	45.39	C
60.00-40.00			B	0.332	2.214		1	1	54.736			
			C	0.332	2.214		1	1	54.736			
T3	7.16	13.73	A	0.398	2.068	2	1	1	78.775	0.85	42.62	C
40.00-20.00			B	0.398	2.068		1	1	78.775			
			C	0.398	2.068		1	1	78.775			
T4 20.00-0.00	4.57	14.07	A	0.349	2.174	2	1	1	77.247	0.69	34.56	C
			B	0.349	2.174		1	1	77.247			
			C	0.349	2.174		1	1	77.247			
Sum Weight:	44.68	60.98			*2.1A_g limit			OTM	396.20 kip-ft	5.80		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.46	5.60	A	0.389	2.086	4	0.8	1	44.236	0.44	22.06	C
140.00-120.00			B	0.389	2.086		0.8	1	44.236			
			C	0.389	2.086		0.8	1	44.236			
L2	6.67	5.21	A	0.356	2.157	4	0.8	1	39.673	0.88	43.91	C
120.00-100.00			B	0.356	2.157		0.8	1	39.673			
			C	0.356	2.157		0.8	1	39.673			
L3	8.68	6.77	A	0.385	2.094	3	0.8	1	44.316	1.02*	51.24	C
100.00-80.00			B	0.385	2.094		0.8	1	44.316			
			C	0.385	2.094		0.8	1	44.316			
T1	8.31	7.33	A	0.364	2.14	3	0.8	1	46.417	0.96	47.93	C
80.00-60.00			B	0.364	2.14		0.8	1	46.417			
			C	0.364	2.14		0.8	1	46.417			
T2	7.82	8.26	A	0.332	2.214	3	0.8	1	50.806	0.89	44.35	C
60.00-40.00			B	0.332	2.214		0.8	1	50.806			
			C	0.332	2.214		0.8	1	50.806			
T3	7.16	13.73	A	0.398	2.068	2	0.8	1	75.700	0.84	41.96	C
40.00-20.00			B	0.398	2.068		0.8	1	75.700			
			C	0.398	2.068		0.8	1	75.700			
T4 20.00-0.00	4.57	14.07	A	0.349	2.174	2	0.8	1	73.881	0.68	33.81	C
			B	0.349	2.174		0.8	1	73.881			
			C	0.349	2.174		0.8	1	73.881			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
Sum Weight:	44.68	60.98			*2.1A_g limit			OTM	389.58 kip-ft	5.71		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	1.46	5.60	A	0.389	2.086	4	0.85	1	44.871	0.45	22.27	C
140.00-120.00			B	0.389	2.086		0.85	1	44.871			
			C	0.389	2.086		0.85	1	44.871			
L2	6.67	5.21	A	0.356	2.157	4	0.85	1	40.210	0.88	44.09	C
120.00-100.00			B	0.356	2.157		0.85	1	40.210			
			C	0.356	2.157		0.85	1	40.210			
L3	8.68	6.77	A	0.385	2.094	3	0.85	1	45.080	1.02*	51.24	C
100.00-80.00			B	0.385	2.094		0.85	1	45.080			
			C	0.385	2.094		0.85	1	45.080			
T1	8.31	7.33	A	0.364	2.14	3	0.85	1	47.252	0.96	48.16	C
80.00-60.00			B	0.364	2.14		0.85	1	47.252			
			C	0.364	2.14		0.85	1	47.252			
T2	7.82	8.26	A	0.332	2.214	3	0.85	1	51.788	0.89	44.61	C
60.00-40.00			B	0.332	2.214		0.85	1	51.788			
			C	0.332	2.214		0.85	1	51.788			
T3	7.16	13.73	A	0.398	2.068	2	0.85	1	76.469	0.84	42.12	C
40.00-20.00			B	0.398	2.068		0.85	1	76.469			
			C	0.398	2.068		0.85	1	76.469			
T4 20.00-0.00	4.57	14.07	A	0.349	2.174	2	0.85	1	74.723	0.68	33.99	C
			B	0.349	2.174		0.85	1	74.723			
			C	0.349	2.174		0.85	1	74.723			
Sum Weight:	44.68	60.98			*2.1A_g limit			OTM	391.24 kip-ft	5.73		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	8	1	1	16.942	0.41	20.50	C
140.00-120.00			B	0.123	2.872		1	1	16.942			
			C	0.123	2.872		1	1	16.942			
L2	0.35	1.51	A	0.111	2.918	8	1	1	14.984	0.67	33.40	C
120.00-100.00			B	0.111	2.918		1	1	14.984			
			C	0.111	2.918		1	1	14.984			
L3	0.65	2.45	A	0.149	2.777	8	1	1	20.484	0.86	42.92	C
100.00-80.00			B	0.149	2.777		1	1	20.484			
			C	0.149	2.777		1	1	20.484			
T1	0.65	2.81	A	0.144	2.792	7	1	1	22.374	0.83	41.60	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
80.00-60.00			B	0.144	2.792		1	1	22.374			
			C	0.144	2.792		1	1	22.374			
T2	0.65	3.29	A	0.135	2.826	6	1	1	25.796	0.81	40.61	C
60.00-40.00			B	0.135	2.826		1	1	25.796			
			C	0.135	2.826		1	1	25.796			
T3	0.65	3.52	A	0.147	2.782	5	1	1	30.263	0.75	37.73	C
40.00-20.00			B	0.147	2.782		1	1	30.263			
			C	0.147	2.782		1	1	30.263			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	5	1	1	32.869	0.70	35.02	C
			B	0.14	2.81		1	1	32.869			
			C	0.14	2.81		1	1	32.869			
Sum Weight:	3.49	19.17						OTM	332.52 kip-ft	5.04		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	8	0.8	1	14.401	0.36	17.91	C
140.00-120.00			B	0.123	2.872		0.8	1	14.401			
			C	0.123	2.872		0.8	1	14.401			
L2	0.35	1.51	A	0.111	2.918	8	0.8	1	12.834	0.63	31.28	C
120.00-100.00			B	0.111	2.918		0.8	1	12.834			
			C	0.111	2.918		0.8	1	12.834			
L3	0.65	2.45	A	0.149	2.777	8	0.8	1	17.428	0.80	40.21	C
100.00-80.00			B	0.149	2.777		0.8	1	17.428			
			C	0.149	2.777		0.8	1	17.428			
T1	0.65	2.81	A	0.144	2.792	7	0.8	1	19.035	0.78	38.83	C
80.00-60.00			B	0.144	2.792		0.8	1	19.035			
			C	0.144	2.792		0.8	1	19.035			
T2	0.65	3.29	A	0.135	2.826	6	0.8	1	21.866	0.75	37.61	C
60.00-40.00			B	0.135	2.826		0.8	1	21.866			
			C	0.135	2.826		0.8	1	21.866			
T3	0.65	3.52	A	0.147	2.782	5	0.8	1	27.187	0.71	35.73	C
40.00-20.00			B	0.147	2.782		0.8	1	27.187			
			C	0.147	2.782		0.8	1	27.187			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	5	0.8	1	29.503	0.66	32.81	C
			B	0.14	2.81		0.8	1	29.503			
			C	0.14	2.81		0.8	1	29.503			
Sum Weight:	3.49	19.17						OTM	307.73 kip-ft	4.69		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.05	1.37	A	0.123	2.872	8	0.85	1	15.037	0.37	18.56	C
140.00-120.00			B	0.123	2.872		0.85	1	15.037			
			C	0.123	2.872		0.85	1	15.037			
L2	0.35	1.51	A	0.111	2.918	8	0.85	1	13.372	0.64	31.81	C
120.00-100.00			B	0.111	2.918		0.85	1	13.372			
			C	0.111	2.918		0.85	1	13.372			
L3	0.65	2.45	A	0.149	2.777	8	0.85	1	18.192	0.82	40.88	C
100.00-80.00			B	0.149	2.777		0.85	1	18.192			
			C	0.149	2.777		0.85	1	18.192			
T1	0.65	2.81	A	0.144	2.792	7	0.85	1	19.870	0.79	39.53	C
80.00-60.00			B	0.144	2.792		0.85	1	19.870			
			C	0.144	2.792		0.85	1	19.870			
T2	0.65	3.29	A	0.135	2.826	6	0.85	1	22.849	0.77	38.36	C
60.00-40.00			B	0.135	2.826		0.85	1	22.849			
			C	0.135	2.826		0.85	1	22.849			
T3	0.65	3.52	A	0.147	2.782	5	0.85	1	27.956	0.72	36.23	C
40.00-20.00			B	0.147	2.782		0.85	1	27.956			
			C	0.147	2.782		0.85	1	27.956			
T4 20.00-0.00	0.50	4.21	A	0.14	2.81	5	0.85	1	30.344	0.67	33.36	C
			B	0.14	2.81		0.85	1	30.344			
			C	0.14	2.81		0.85	1	30.344			
Sum Weight:	3.49	19.17						OTM	313.93 kip-ft	4.77		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	11.38					
Bracing Weight	7.79					
Total Member Self-Weight	19.17			-11.42	-9.52	
Total Weight	30.83			-11.42	-9.52	
Wind 0 deg - No Ice		0.00	-18.05	-1463.16	-9.52	3.64
Wind 30 deg - No Ice		8.69	-15.06	-1228.30	-712.09	-2.86
Wind 60 deg - No Ice		14.87	-8.59	-706.22	-1212.95	-8.40
Wind 90 deg - No Ice		17.38	0.00	-11.42	-1414.65	-11.82
Wind 120 deg - No Ice		15.62	9.02	714.44	-1266.76	-12.35
Wind 150 deg - No Ice		8.69	15.06	1205.46	-712.09	-8.96
Wind 180 deg - No Ice		0.00	17.17	1378.17	-9.52	-3.49
Wind 210 deg - No Ice		-8.69	15.06	1205.46	693.04	2.86
Wind 240 deg - No Ice		-15.62	9.02	714.44	1247.72	8.71
Wind 270 deg - No Ice		-17.38	0.00	-11.42	1395.61	11.82
Wind 300 deg - No Ice		-14.87	-8.59	-706.22	1193.90	11.89
Wind 330 deg - No Ice		-8.69	-15.06	-1228.30	693.04	8.96
Member Ice	41.80					
Total Weight Ice	133.18			-143.50	-43.36	
Wind 0 deg - Ice		0.00	-7.70	-759.85	-43.36	1.32
Wind 30 deg - Ice		3.81	-6.60	-672.98	-349.05	-1.36
Wind 60 deg - Ice		6.58	-3.80	-448.37	-571.40	-3.66
Wind 90 deg - Ice		7.62	0.00	-143.50	-654.74	-4.99
Wind 120 deg - Ice		6.67	3.85	164.67	-577.13	-5.02
Wind 150 deg - Ice		3.81	6.60	385.97	-349.05	-3.64

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 180 deg - Ice		0.00	7.60	466.23	-43.36	-1.31
Wind 210 deg - Ice		-3.81	6.60	385.97	262.34	1.36
Wind 240 deg - Ice		-6.67	3.85	164.67	490.42	3.70
Wind 270 deg - Ice		-7.62	0.00	-143.50	568.03	4.99
Wind 300 deg - Ice		-6.58	-3.80	-448.37	484.69	4.97
Wind 330 deg - Ice		-3.81	-6.60	-672.98	262.34	3.64
Total Weight	30.83			-11.42	-9.52	
Wind 0 deg - Service		0.00	-7.20	-583.95	-2.34	1.45
Wind 30 deg - Service		3.47	-6.01	-490.27	-282.59	-1.14
Wind 60 deg - Service		5.93	-3.43	-282.02	-482.38	-3.35
Wind 90 deg - Service		6.93	0.00	-4.87	-562.84	-4.72
Wind 120 deg - Service		6.23	3.60	284.67	-503.85	-4.92
Wind 150 deg - Service		3.47	6.01	480.53	-282.59	-3.58
Wind 180 deg - Service		0.00	6.85	549.43	-2.34	-1.39
Wind 210 deg - Service		-3.47	6.01	480.53	277.90	1.14
Wind 240 deg - Service		-6.23	3.60	284.67	499.16	3.47
Wind 270 deg - Service		-6.93	0.00	-4.87	558.15	4.72
Wind 300 deg - Service		-5.93	-3.43	-282.02	477.69	4.74
Wind 330 deg - Service		-3.47	-6.01	-490.27	277.90	3.58

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
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

Comb. No.	Description
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 K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	140 - 120	Latticed Pole Leg	Max Tension	7	2.48	0.02	-0.01
			Max. Compression	27	-5.24	0.00	0.03
			Max. Mx	8	-0.36	0.19	-0.00
			Max. My	2	-0.76	0.00	-0.16
			Max. Vy	8	-0.25	-0.12	-0.00
			Max. Vx	13	-0.15	-0.02	-0.08
		Latticed Pole Diagonal	Max Tension	22	1.09	0.00	0.00
			Max. Compression	10	-1.18	0.00	0.00
			Max. Mx	29	-0.14	0.04	0.00
			Max. My	20	-0.55	0.00	-0.00
			Max. Vy	37	-0.04	0.04	-0.00
			Max. Vx	20	0.00	0.00	-0.00
		Latticed Pole Top Girt	Max Tension	3	0.10	0.00	0.00
			Max. Compression	6	-0.14	0.00	0.00
			Max. Mx	36	-0.11	-0.22	0.00
			Max. My	8	-0.01	0.00	0.00
			Max. Vy	36	0.11	0.00	0.00
			Max. Vx	8	-0.00	0.00	0.00
L2	120 - 100	Latticed Pole Leg	Max Tension	7	22.16	0.03	-0.01
			Max. Compression	2	-30.31	0.00	0.13
			Max. Mx	8	-2.43	-0.22	-0.01
			Max. My	4	-2.08	-0.09	0.18
			Max. Vy	8	-1.19	-0.01	-0.11
			Max. Vx	2	1.23	0.00	0.07
		Latticed Pole Diagonal	Max Tension	12	4.68	0.00	0.00
			Max. Compression	24	-4.74	0.00	0.00
			Max. Mx	28	0.47	0.05	0.00
			Max. My	24	-4.04	0.01	-0.01
			Max. Vy	28	-0.04	0.05	0.00
			Max. Vx	24	0.00	0.01	-0.01
L3	100 - 80	Latticed Pole Leg	Max Tension	7	59.78	0.01	0.00
			Max. Compression	2	-72.29	0.01	0.23

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-6.66	-0.29	-0.04
			Max. My	4	-5.19	-0.11	0.26
			Max. Vy	20	0.55	-0.10	0.02
			Max. Vx	2	0.56	0.00	0.13
		Latticed Pole Diagonal	Max Tension	13	6.78	0.00	0.00
			Max. Compression	24	-6.98	0.00	0.00
			Max. Mx	28	0.40	0.09	0.00
			Max. My	8	-5.12	-0.00	0.02
			Max. Vy	28	-0.06	0.09	0.00
			Max. Vx	8	-0.00	-0.00	0.02
T1	80 - 60	Leg	Max Tension	7	88.01	-0.06	0.01
			Max. Compression	2	-104.32	0.10	-0.00
			Max. Mx	2	-81.75	0.23	-0.01
			Max. My	8	-7.59	-0.05	0.29
			Max. Vy	27	0.09	-0.15	0.01
			Max. Vx	8	-0.11	-0.05	0.29
		Diagonal	Max Tension	10	4.94	0.00	0.00
			Max. Compression	10	-5.19	0.00	0.00
			Max. Mx	27	1.20	0.09	0.01
			Max. My	22	-4.11	0.01	-0.02
			Max. Vy	29	0.07	0.08	-0.01
			Max. Vx	22	0.00	0.00	0.00
T2	60 - 40	Leg	Max Tension	7	110.82	-0.10	0.00
			Max. Compression	2	-130.97	0.27	-0.01
			Max. Mx	22	107.67	-0.27	-0.03
			Max. My	8	-9.82	-0.02	0.60
			Max. Vy	33	0.10	-0.25	0.01
			Max. Vx	8	-0.20	-0.02	0.60
		Diagonal	Max Tension	10	4.99	0.00	0.00
			Max. Compression	10	-5.11	0.00	0.00
			Max. Mx	28	-0.00	0.10	0.01
			Max. My	22	-4.64	0.03	-0.01
			Max. Vy	28	0.08	0.10	0.01
			Max. Vx	29	-0.00	0.00	0.00
T3	40 - 20	Leg	Max Tension	7	127.96	-3.41	0.03
			Max. Compression	2	-151.43	3.47	0.00
			Max. Mx	29	5.87	-3.64	0.10
			Max. My	8	-10.47	-0.21	4.56
			Max. Vy	33	0.44	-3.31	0.04
			Max. Vx	8	-0.49	-0.21	4.56
		Diagonal	Max Tension	12	6.11	0.00	0.00
			Max. Compression	12	-6.29	0.00	0.00
			Max. Mx	27	1.76	0.18	0.02
			Max. My	37	-1.41	0.13	-0.02
			Max. Vy	29	0.10	0.17	-0.02
			Max. Vx	37	0.01	0.00	0.00
T4	20 - 0	Leg	Max Tension	7	146.81	-3.23	0.02
			Max. Compression	2	-174.37	0.00	0.00
			Max. Mx	27	-92.63	5.40	0.11
			Max. My	4	-11.43	-0.33	-5.39
			Max. Vy	33	-0.79	-3.31	0.04
			Max. Vx	8	0.63	-0.32	5.38
		Diagonal	Max Tension	23	6.54	0.00	0.00
			Max. Compression	10	-7.31	0.00	0.00
			Max. Mx	29	-0.57	0.20	-0.03
			Max. My	30	-1.90	0.17	0.03
			Max. Vy	28	0.10	0.16	-0.02
			Max. Vx	30	-0.01	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	18	178.93	16.39	-10.05
	Max. H_x	18	178.93	16.39	-10.05
	Max. H_z	7	-152.19	-14.17	8.74
	Min. Vert	7	-152.19	-14.17	8.74
	Min. H_x	7	-152.19	-14.17	8.74
	Min. H_z	18	178.93	16.39	-10.05
Leg B	Max. Vert	10	180.36	-16.30	-10.27
	Max. H_x	23	-151.12	14.05	8.89
	Max. H_z	23	-151.12	14.05	8.89
	Min. Vert	23	-151.12	14.05	8.89
	Min. H_x	10	180.36	-16.30	-10.27
	Min. H_z	10	180.36	-16.30	-10.27
Leg A	Max. Vert	2	181.13	0.23	19.27
	Max. H_x	20	13.30	1.62	1.06
	Max. H_z	2	181.13	0.23	19.27
	Min. Vert	15	-150.54	-0.19	-16.60
	Min. H_x	9	9.96	-1.59	0.79
	Min. H_z	15	-150.54	-0.19	-16.60

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	30.83	-0.00	0.00	-11.42	-9.52	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	36.99	-0.00	-28.81	-2338.98	-11.45	5.87
0.9 Dead+1.6 Wind 0 deg - No Ice	27.74	-0.00	-28.82	-2335.03	-8.59	5.86
1.2 Dead+1.6 Wind 30 deg - No Ice	36.99	13.87	-24.04	-1962.65	-1136.08	-4.57
0.9 Dead+1.6 Wind 30 deg - No Ice	27.74	13.88	-24.06	-1958.79	-1132.98	-4.57
1.2 Dead+1.6 Wind 60 deg - No Ice	36.99	23.72	-13.70	-1126.19	-1938.14	-13.48
0.9 Dead+1.6 Wind 60 deg - No Ice	27.74	23.74	-13.71	-1122.52	-1934.87	-13.47
1.2 Dead+1.6 Wind 90 deg - No Ice	36.99	27.74	0.00	-13.36	-2261.57	-18.98
0.9 Dead+1.6 Wind 90 deg - No Ice	27.74	27.76	0.00	-9.93	-2258.22	-18.97
1.2 Dead+1.6 Wind 120 deg - No Ice	36.99	24.94	14.40	1148.83	-2025.20	-19.84
0.9 Dead+1.6 Wind 120 deg - No Ice	27.74	24.95	14.41	1152.00	-2021.90	-19.82
1.2 Dead+1.6 Wind 150 deg - No Ice	36.99	13.88	24.04	1934.71	-1136.95	-14.42
0.9 Dead+1.6 Wind 150 deg - No Ice	27.74	13.88	24.05	1937.72	-1133.85	-14.40
1.2 Dead+1.6 Wind 180 deg - No Ice	36.99	-0.00	27.41	2211.12	-11.46	-5.63

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 180 deg - No Ice	27.74	-0.00	27.42	2214.07	-8.60	-5.61
1.2 Dead+1.6 Wind 210 deg - No Ice	36.99	-13.88	24.04	1934.73	1114.05	4.57
0.9 Dead+1.6 Wind 210 deg - No Ice	27.74	-13.89	24.05	1937.74	1116.67	4.57
1.2 Dead+1.6 Wind 240 deg - No Ice	36.99	-24.94	14.40	1148.84	2002.32	13.98
0.9 Dead+1.6 Wind 240 deg - No Ice	27.74	-24.95	14.41	1152.02	2004.74	13.96
1.2 Dead+1.6 Wind 270 deg - No Ice	36.99	-27.75	0.00	-13.37	2238.70	18.98
0.9 Dead+1.6 Wind 270 deg - No Ice	27.74	-27.76	0.00	-9.94	2241.08	18.97
1.2 Dead+1.6 Wind 300 deg - No Ice	36.99	-23.72	-13.70	-1126.22	1915.27	19.10
0.9 Dead+1.6 Wind 300 deg - No Ice	27.74	-23.74	-13.71	-1122.55	1917.71	19.08
1.2 Dead+1.6 Wind 330 deg - No Ice	36.99	-13.87	-24.04	-1962.67	1113.19	14.42
0.9 Dead+1.6 Wind 330 deg - No Ice	27.74	-13.88	-24.06	-1958.81	1115.81	14.40
1.2 Dead+1.0 Ice+1.0 Temp	139.34	-0.01	0.02	-146.09	-45.35	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	139.34	-0.00	-7.65	-769.22	-45.67	1.37
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	139.34	3.79	-6.56	-681.56	-354.08	-1.41
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	139.34	6.55	-3.77	-454.92	-578.42	-3.79
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	139.34	7.59	0.01	-147.32	-662.53	-5.18
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	139.34	6.63	3.84	163.52	-583.72	-5.21
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	139.34	3.79	6.58	386.58	-353.81	-3.77
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	139.34	-0.00	7.57	467.47	-45.63	-1.36
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	139.34	-3.80	6.58	386.58	262.53	1.41
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	139.34	-6.63	3.84	163.50	492.45	3.84
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	139.34	-7.59	0.01	-147.15	570.68	5.18
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	139.34	-6.55	-3.77	-454.94	487.08	5.15
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	139.34	-3.80	-6.56	-681.57	262.74	3.77
Dead+Wind 0 deg - Service	30.83	-0.00	-7.18	-590.97	-9.53	1.46
Dead+Wind 30 deg - Service	30.83	3.46	-6.00	-497.19	-289.94	-1.14
Dead+Wind 60 deg - Service	30.83	5.92	-3.42	-288.77	-489.88	-3.36
Dead+Wind 90 deg - Service	30.83	6.92	0.00	-11.41	-570.43	-4.73
Dead+Wind 120 deg - Service	30.83	6.22	3.59	278.34	-511.43	-4.94
Dead+Wind 150 deg - Service	30.83	3.46	6.00	474.30	-290.00	-3.59
Dead+Wind 180 deg - Service	30.83	-0.00	6.84	543.24	-9.53	-1.40
Dead+Wind 210 deg - Service	30.83	-3.46	6.00	474.30	270.94	1.14
Dead+Wind 240 deg - Service	30.83	-6.22	3.59	278.33	492.37	3.48
Dead+Wind 270 deg - Service	30.83	-6.92	0.00	-11.41	551.37	4.73
Dead+Wind 300 deg - Service	30.83	-5.92	-3.42	-288.77	470.83	4.76
Dead+Wind 330 deg - Service	30.83	-3.46	-6.00	-497.20	270.89	3.59

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-30.83	0.00	0.00	30.83	-0.00	0.001%
2	0.00	-36.99	-28.87	0.00	36.99	28.81	0.142%
3	0.00	-27.75	-28.87	0.00	27.74	28.82	0.121%
4	13.91	-36.99	-24.10	-13.87	36.99	24.04	0.149%
5	13.91	-27.75	-24.10	-13.88	27.74	24.06	0.132%
6	23.79	-36.99	-13.74	-23.72	36.99	13.70	0.157%
7	23.79	-27.75	-13.74	-23.74	27.74	13.71	0.141%
8	27.81	-36.99	0.00	-27.74	36.99	-0.00	0.149%
9	27.81	-27.75	0.00	-27.76	27.74	-0.00	0.130%
10	24.99	-36.99	14.44	-24.94	36.99	-14.40	0.141%
11	24.99	-27.75	14.44	-24.95	27.74	-14.41	0.121%
12	13.91	-36.99	24.10	-13.88	36.99	-24.04	0.147%
13	13.91	-27.75	24.10	-13.88	27.74	-24.05	0.129%
14	0.00	-36.99	27.48	0.00	36.99	-27.41	0.154%
15	0.00	-27.75	27.48	0.00	27.74	-27.42	0.139%
16	-13.91	-36.99	24.10	13.88	36.99	-24.04	0.146%
17	-13.91	-27.75	24.10	13.89	27.74	-24.05	0.129%
18	-24.99	-36.99	14.44	24.94	36.99	-14.40	0.139%
19	-24.99	-27.75	14.44	24.95	27.74	-14.41	0.120%
20	-27.81	-36.99	0.00	27.75	36.99	-0.00	0.148%
21	-27.81	-27.75	0.00	27.76	27.74	-0.00	0.129%
22	-23.79	-36.99	-13.74	23.72	36.99	13.70	0.156%
23	-23.79	-27.75	-13.74	23.74	27.74	13.71	0.140%
24	-13.91	-36.99	-24.10	13.87	36.99	24.04	0.149%
25	-13.91	-27.75	-24.10	13.88	27.74	24.06	0.130%
26	0.00	-139.34	-0.00	0.01	139.34	-0.02	0.017%
27	0.00	-139.34	-7.70	0.00	139.34	7.65	0.034%
28	3.81	-139.34	-6.60	-3.79	139.34	6.56	0.033%
29	6.58	-139.34	-3.80	-6.55	139.34	3.77	0.032%
30	7.62	-139.34	0.00	-7.59	139.34	-0.01	0.029%
31	6.67	-139.34	3.85	-6.63	139.34	-3.84	0.028%
32	3.81	-139.34	6.60	-3.79	139.34	-6.58	0.023%
33	0.00	-139.34	7.60	0.00	139.34	-7.57	0.019%
34	-3.81	-139.34	6.60	3.80	139.34	-6.58	0.019%
35	-6.67	-139.34	3.85	6.63	139.34	-3.84	0.023%
36	-7.62	-139.34	0.00	7.59	139.34	-0.01	0.028%
37	-6.58	-139.34	-3.80	6.55	139.34	3.77	0.029%
38	-3.81	-139.34	-6.60	3.80	139.34	6.56	0.032%
39	0.00	-30.83	-7.20	0.00	30.83	7.18	0.047%
40	3.47	-30.83	-6.01	-3.46	30.83	6.00	0.047%
41	5.93	-30.83	-3.43	-5.92	30.83	3.42	0.047%
42	6.93	-30.83	0.00	-6.92	30.83	-0.00	0.046%
43	6.23	-30.83	3.60	-6.22	30.83	-3.59	0.045%
44	3.47	-30.83	6.01	-3.46	30.83	-6.00	0.044%
45	0.00	-30.83	6.85	0.00	30.83	-6.84	0.044%
46	-3.47	-30.83	6.01	3.46	30.83	-6.00	0.043%
47	-6.23	-30.83	3.60	6.22	30.83	-3.59	0.044%
48	-6.93	-30.83	0.00	6.92	30.83	-0.00	0.044%
49	-5.93	-30.83	-3.43	5.92	30.83	3.42	0.045%
50	-3.47	-30.83	-6.01	3.46	30.83	6.00	0.046%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00002135
2	Yes	4	0.00045876	0.00053054
3	Yes	4	0.00033641	0.00039172
4	Yes	4	0.00049071	0.00056791
5	Yes	4	0.00036854	0.00042926
6	Yes	4	0.00051994	0.00060261
7	Yes	4	0.00039721	0.00046329
8	Yes	4	0.00049232	0.00057035
9	Yes	4	0.00037006	0.00043116
10	Yes	4	0.00045999	0.00053219
11	Yes	4	0.00033740	0.00039310
12	Yes	4	0.00049004	0.00056715
13	Yes	4	0.00036845	0.00042879
14	Yes	4	0.00051833	0.00060074
15	Yes	4	0.00039611	0.00046196
16	Yes	4	0.00048994	0.00056708
17	Yes	4	0.00036806	0.00042872
18	Yes	4	0.00045922	0.00053123
19	Yes	4	0.00033686	0.00039236
20	Yes	4	0.00049214	0.00057023
21	Yes	4	0.00037000	0.00043111
22	Yes	4	0.00052025	0.00060313
23	Yes	4	0.00039749	0.00046373
24	Yes	4	0.00049053	0.00056772
25	Yes	4	0.00036875	0.00042916
26	Yes	4	0.00000001	0.00046446
27	Yes	9	0.00088544	0.00068465
28	Yes	9	0.00088887	0.00068487
29	Yes	9	0.00088910	0.00066735
30	Yes	9	0.00087658	0.00062508
31	Yes	8	0.00096992	0.00063971
32	Yes	8	0.00092237	0.00054551
33	Yes	8	0.00000001	0.00047604
34	Yes	8	0.00000001	0.00047845
35	Yes	8	0.00092952	0.00055561
36	Yes	8	0.00097888	0.00064607
37	Yes	9	0.00087829	0.00062779
38	Yes	9	0.00088372	0.00066545
39	Yes	4	0.00000001	0.00043865
40	Yes	4	0.00000001	0.00044627
41	Yes	4	0.00000001	0.00045442
42	Yes	4	0.00000001	0.00044698
43	Yes	4	0.00000001	0.00043792
44	Yes	4	0.00000001	0.00044223
45	Yes	4	0.00000001	0.00044874
46	Yes	4	0.00000001	0.00044091
47	Yes	4	0.00000001	0.00043537
48	Yes	4	0.00000001	0.00044473
49	Yes	4	0.00000001	0.00045296
50	Yes	4	0.00000001	0.00044516

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 120	2.195	39	0.1178	0.0319
L2	120 - 100	1.699	39	0.1167	0.0282
L3	100 - 80	1.205	39	0.1073	0.0228
T1	80 - 60	0.772	39	0.0881	0.0164
T2	60 - 40	0.438	39	0.0647	0.0104
T3	40 - 20	0.194	39	0.0437	0.0054
T4	20 - 0	0.051	39	0.0189	0.0024

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Pirod 4' Side Mount Standoff (1)	39	2.145	0.1178	0.0316	Inf
135.00	VHLP2-11 w/o radome dish	39	2.071	0.1179	0.0311	Inf
120.00	Pirod 12' T-Frame Sector Mount (1)	39	1.699	0.1167	0.0282	371810
110.00	80010799	39	1.449	0.1133	0.0257	177429
105.00	HP4-102	39	1.325	0.1106	0.0243	101336
100.00	VHLP2-11 w/o radome dish	39	1.205	0.1073	0.0228	72687
95.00	HP2-102	39	1.089	0.1033	0.0212	61438
80.00	Pirod 4' Side Mount Standoff (1)	39	0.772	0.0881	0.0164	45015
0.00	Junction Box	0	0.000	0.0000	0.0000	171114

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	140 - 120	8.587	2	0.4568	0.1281
L2	120 - 100	6.662	2	0.4531	0.1132
L3	100 - 80	4.740	2	0.4184	0.0916
T1	80 - 60	3.047	2	0.3454	0.0660
T2	60 - 40	1.732	2	0.2544	0.0416
T3	40 - 20	0.770	2	0.1721	0.0217
T4	20 - 0	0.204	2	0.0746	0.0098

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Pirod 4' Side Mount Standoff (1)	2	8.395	0.4570	0.1268	307125
135.00	VHLP2-11 w/o radome dish	2	8.108	0.4572	0.1248	307125
120.00	Pirod 12' T-Frame Sector Mount (1)	2	6.662	0.4531	0.1132	100240
110.00	80010799	2	5.689	0.4406	0.1033	49513
105.00	HP4-102	2	5.209	0.4308	0.0977	27511
100.00	VHLP2-11 w/o radome dish	2	4.740	0.4184	0.0916	19499
95.00	HP2-102	2	4.287	0.4034	0.0853	16300
80.00	Pirod 4' Side Mount Standoff (1)	2	3.047	0.3454	0.0660	11685

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
0.00	Junction Box	0	0.000	0.0000	0.0000	43404

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
L2	120	Latticed Pole Leg	A325N	0.6250	6	0.88	20.71	0.042 ✔	1	Bolt Tension
L3	100	Latticed Pole Leg	A325N	0.7500	6	5.02	29.82	0.168 ✔	1	Bolt Tension
T1	80	Leg	A325N	0.8750	6	11.43	40.59	0.282 ✔	1	Bolt Tension
T2	60	Leg	A325N	1.0000	6	15.63	53.01	0.295 ✔	1	Bolt Tension
T3	40	Leg	A325N	1.0000	6	19.62	53.01	0.370 ✔	1	Bolt Tension
T4	20	Leg	A325N	1.0000	6	23.04	53.01	0.435 ✔	1	Bolt Tension

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	2 1/4	20.00	5.00	106.7 K=1.00	3.9761	1.00	-5.24	77.87	0.067 [1] ✔
L2	120 - 100	2 1/4	20.00	5.00	106.7 K=1.00	3.9761	1.00	-30.31	77.87	0.389 [1] ✔
L3	100 - 80	2 3/4	20.00	5.00	87.3 K=1.00	5.9396	1.00	-72.29	153.15	0.472 [1] ✔
T1	80 - 60	3	20.03	5.01	80.1 K=1.00	7.0686	1.00	-104.32	198.90	0.524 [1] ✔
T2	60 - 40	3 1/4	20.03	5.01	74.0 K=1.00	8.2958	1.00	-130.97	250.22	0.523 [1] ✔
T3	40 - 20	Pirod 105218	20.03	10.02	32.4 K=1.00	7.2158	1.00	-151.43	300.68	0.504 [1] ✔
T4	20 - 0	Pirod 105219	20.03	10.02	28.4 K=1.00	9.4248	1.00	-174.37	399.87	0.436 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T3	40 - 20	0.5	1.46	119.0	324.71	0.1963	0.50	3.38	0.149 ✔
T4	20 - 0	0.625	1.45	94.4	424.12	0.3068	0.79	6.96	0.114 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	L1 3/4x1 3/4x1/8	9.43	4.61	159.4 K=1.00	0.4219	-1.18	3.75	0.314 [1] ✔
L2	120 - 100	L1 3/4x1 3/4x1/4	9.43	4.61	161.9 K=1.00	0.8125	-4.74	7.00	0.677 [1] ✔
L3	100 - 80	L2 1/2x2 1/2x5/16	9.43	4.58	112.4 K=1.00	1.4600	-6.98	24.31	0.287 [1] ✔
T1	80 - 60	L2 1/2x2 1/2x5/16	10.96	5.48	134.5 K=1.00	1.4600	-4.73	18.24	0.259 [1] ✔
T2	60 - 40	L2 1/2x2 1/2x5/16	12.77	6.37	156.4 K=1.00	1.4600	-4.79	13.48	0.355 [1] ✔
T3	40 - 20	L3x3x5/16	16.80	8.09	164.8 K=1.00	1.7800	-6.29	14.80	0.425 [1] ✔
T4	20 - 0	L3x3x5/16	18.45	8.93	181.9 K=1.00	1.7800	-7.31	12.16	0.602 [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 K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	L3x3x3/8	8.00	7.81	159.7 K=1.00	2.1100	-0.14	18.69	0.007 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	2 1/4	20.00	5.00	106.7	3.9761	2.48	178.92	0.014 [1] ✔
L2	120 - 100	2 1/4	20.00	5.00	106.7	3.9761	22.18	178.92	0.124 [1] ✔
L3	100 - 80	2 3/4	20.00	5.00	87.3	5.9396	59.78	267.28	0.224 [1] ✔
T1	80 - 60	3	20.03	5.01	80.1	7.0686	88.01	318.09	0.277 [1] ✔
T2	60 - 40	3 1/4	20.03	5.01	74.0	8.2958	110.82	373.31	0.297 [1] ✔
T3	40 - 20	Pirod 105218	20.03	10.02	32.4	7.2158	127.96	324.71	0.394 [1] ✔
T4	20 - 0	Pirod 105219	20.03	10.02	28.4	9.4248	146.81	424.12	0.346 [1] ✔

[1] $P_u / \phi P_n$ controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T3	40 - 20	0.5	1.46	119.0	324.71	0.1963	0.50	3.38	0.149 ✔
T4	20 - 0	0.625	1.45	94.4	424.12	0.3068	0.79	6.96	0.114 ✔

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	L1 3/4x1 3/4x1/8	9.43	4.61	101.3	0.4219	1.09	13.67	0.080 [1] ✔
L2	120 - 100	L1 3/4x1 3/4x1/4	9.43	4.61	104.5	0.8125	4.68	26.32	0.178 [1] ✔
L3	100 - 80	L2 1/2x2 1/2x5/16	9.43	4.58	72.3	1.4600	6.78	47.30	0.143 [1] ✔
T1	80 - 60	L2 1/2x2 1/2x5/16	10.08	5.04	79.5	1.4600	4.94	47.30	0.104 [1] ✔
T2	60 - 40	L2 1/2x2 1/2x5/16	12.77	6.37	100.5	1.4600	4.99	47.30	0.105 [1] ✔
T3	40 - 20	L3x3x5/16	16.80	8.09	105.3	1.7800	6.11	57.67	0.106 [1] ✔
T4	20 - 0	L3x3x5/16	18.45	8.93	116.2	1.7800	6.54	57.67	0.113 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	140 - 120	L3x3x3/8	8.00	7.81	102.7	2.1100	0.10	68.36	0.001 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	140 - 120	Latticed Pole Leg	2 1/4	3	-5.24	77.87	6.7	Pass
		Latticed Pole Diagonal	L1 3/4x1 3/4x1/8	9	-1.18	3.75	31.4	Pass
		Latticed Pole Top Girt	L3x3x3/8	5	-0.14	18.69	0.7	Pass
L2	120 - 100	Latticed Pole Leg	2 1/4	33	-30.31	77.87	38.9	Pass
		Latticed Pole Diagonal	L1 3/4x1 3/4x1/4	37	-4.74	7.00	67.7	Pass
L3	100 - 80	Latticed Pole Leg	2 3/4	60	-72.29	153.15	47.2	Pass
		Latticed Pole Diagonal	L2 1/2x2 1/2x5/16	64	-6.98	24.31	28.7	Pass
T1	80 - 60	Leg	3	87	-104.32	198.90	52.4	Pass
		Diagonal	L2 1/2x2 1/2x5/16	90	-4.73	18.24	25.9	Pass
T2	60 - 40	Leg	3 1/4	114	-130.97	250.22	52.3	Pass
		Diagonal	L2 1/2x2 1/2x5/16	117	-4.79	13.48	35.5	Pass
T3	40 - 20	Leg	Pirod 105218	141	-151.43	300.68	50.4	Pass
		Diagonal	L3x3x5/16	144	-6.29	14.80	42.5	Pass
T4	20 - 0	Leg	Pirod 105219	156	-174.37	399.87	43.6	Pass
		Diagonal	L3x3x5/16	159	-7.31	12.16	60.2	Pass
						Summary		
						Latticed Pole Leg (L3)	47.2	Pass
						Latticed Pole Diagonal (L2)	67.7	Pass
						Latticed Pole Top Girt (L1)	0.7	Pass
						Leg (T1)	52.4	Pass
						Diagonal (T4)	60.2	Pass
						Bolt Checks	43.5	Pass
						RATING =	**67.7**	**Pass**

SITE ID: CT52XC032
SITE NAME: SUNSET RIDGE

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

DO MACRO PROJECT

SITE INFORMATION

ADDRESS:	112 SUNSET RIDGE DRIVE EAST HARTFORD, CT 06118
JURISDICTION:	TOWN OF EAST HARTFORD
COUNTY :	HARTFORD
PROPERTY/TOWER OWNER:	TOWN OF EAST HARTFORD 740 MAIN STREET EAST HARTFORD, CT 06108 PROPERTY #: 13744
APPLICANT:	SPRINT 201 STATE ROUTE 17 NORTH RUTHERFORD, NJ 07070
LATITUDE (NAD 83):	N 41.77197°
LONGITUDE (NAD 83):	W 72.59044°
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.

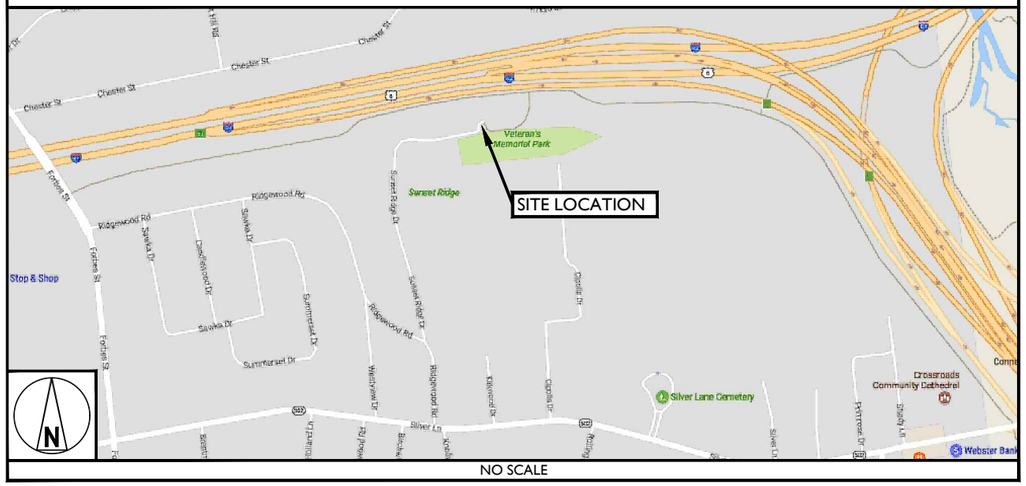
CONSTRUCTION:_____ DATE: _____

LEASING/SITE ACQUISITION: _____ DATE: _____

RF ENGINEERING: _____ DATE: _____

LANDLORD/PROPERTY OWNER: _____ DATE: _____

LOCAL MAP



NO SCALE

DRIVING DIRECTIONS

FROM SPRINT OFFICES, RUTHERFORD, NJ:

TAKE NJ-17 N TO POLIFLY RD/I-80 E/HACKENSACK EXIT. MERGE ONTO TERRACE AVE. CONTINUE ONTO POLIFLY RD. TURN RIGHT ONTO THE RAMP TO NJ TURNPIKE. MERGE ONTO I-80 E. MERGE ONTO I-95 N. FOLLOW SIGNS FOR GW BRIDGE (LOWER LEVEL)/PALISADES PKWY/US-9W. KEEP RIGHT TO STAY ON I-95, FOLLOW SIGNS FOR US-1 N/ US-9 N/ GEORGE WASHINGTON BRIDGE. CONTINUE ONTO US-1 N/ US 9N. USE THE LEFT LANE TO TAKE EXIT 1 TOWARD RIVERSIDE DR. TURN LEFT ONTO RIVERSIDE DR. USE THE LEFT LANE TO TAKE THE H. HUDSON PKWY/ NY-9A N RAMP. MERGE ONTO NY-9A N. CONTINUE ONTO HENRY HUDSON PSY. CONTINUE ONTO SAW MILL RIVER PKWY N. TAKE EXIT 4 FOR CROSS COUNTY PKWY TOWARD HUTCHINSON PKWY. MERGE ONTO HUTCHINSON RIVER PKWY N. CONTINUE ONTO CT-15 N. KEEP LEFT TO STAY ON CT-15 N. TAKE EXIT 68 N-E TO MERGE ONTO I-91 N TOWARD CT-66 E/HARTFORD/MIDDLETOWN. TAKE EXIT 29 TO MERGE ONTO CT-15 N/ US-5 N TOWRD I-84 E/ E HARTFORD/ BOSTON. CONTINUE ONTO CT-15 N. USE THE LEFT 2 LANES TO MERGE ONTO I-84 E TOWARD BOSTON. USE THE RIGHT 2 LANES TO TAKE EXIT 59 FOR I-384 E TOWARD PROVIDENCE. KEEP RIGHT TO CONTINUE ON EXIT 1, FOLLOW SIGNS FOR SPENCER ST. TURN RIGHT ONTO STATE HWY 502/ SILVER LN. TURN RIGHT ONTO RIDGEWOOD RD. SLIGHT RIGHT ONTO SUNSET RIDGE DR. THE DESTINATION WILL BE AT THE REAR OF THE PARKING LOT.

DRAWING INDEX

NYC DOB NUMBER	SHEET TITLE	REV.
T-001.00	TITLE SHEET	2
ANT-001.00	GENERAL NOTES - 1	2
ANT-002.00	GENERAL NOTES - 2	2
ANT-003.00	GENERAL NOTES - 3	2
ANT-004.00	SITE PLAN	2
ANT-005.00	EQUIPMENT PLAN AND ELEVATION	2
ANT-006.00	ANTENNA ORIENTATION PLAN	2
ANT-007.00	DETAILS - 1	2
ANT-008.00	DETAILS - 2	2
ANT-009.00	ANTENNA SCHEDULE, WIRING DIAGRAM, BILL OF MATERIALS AND NOTES	2
ANT-010.00	FIBER PLUMBING DIAGRAMS - 1	2
ANT-011.00	FIBER PLUMBING DIAGRAMS - 2	2
ANT-012.00	CABLE COLOR CODING, DC POWER DETAILS & PANEL SCHEDULES	2
ANT-013.00	ELECTRICAL AND GROUNDING NOTES	2
ANT-014.00	GROUNDING SCHEMATIC AND DETAILS	2

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
- REPLACE (3) EXISTING PANEL ANTENNAS WITH (3) PROPOSED PANEL ANTENNAS
- INSTALL (9) NEW RRH'S
- INSTALL (48) JUMPER CABLES
- INSTALL (4) HYBRID CABLE
- INSTALL (1) ELTEK ECAB GROWTH CABINET
- INSTALL (1) PPC

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201 STATE ROUTE 17 NORTH
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PHONE: (201) 684-4000 FAX: (201) 684-4223

Cherundolo Consulting

Charles Cherundulo Consulting, Inc.
713 Clover Lane
Moscow, PA 18444
Phone: 973-207-4248
Fax: 570-842-5592

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

SCALE :	JOB NUMBER :
AS SHOWN	17924012A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
3	04/10/18	CLIENT COMMENTS	JCM	JKM
2	03/30/18	REVISED PER RFDS	JCM	JKM
1	01/30/18	MOUNT MODIFICATION DESIGN	YMA	JKM
0	10/13/17	ISSUED AS FINAL	DTS	PET
B	09/28/17	REV. PER RFDS	DTS	PET
A	08/07/17	ISSUED FOR REVIEW	AMN	FEP

STATE OF CONNECTICUT
PETROS T. TSOUKALAS
32977
LICENSED PROFESSIONAL ENGINEER

PETROS T. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32977

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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.

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STATE OF CONNECTICUT · PETROS T. SOUKALAS · 32517 · LICENSED PROFESSIONAL ENGINEER

PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32517

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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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SCALE : AS SHOWN
JOB NUMBER : 17924012A

REV	DATE	DESCRIPTION	DRAWN	CHECKED BY
3	04/10/18	CLIENT COMMENTS	JCM	JKM
2	03/30/18	REVISED PER RFDS	JCM	JKM
1	01/30/18	MOUNT MODIFICATION DESIGN	YMA	JKM
0	10/13/17	ISSUED AS FINAL	DTS	PET
B	09/28/17	REV. PER RFDS	DTS	PET
A	08/07/17	ISSUED FOR CONSTRUCTION	AMN	FEP

STATE OF CONNECTICUT
PETROS T. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.38577
HOME OFFICE - NEW JERSEY

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

RED BANK OFFICE
331 Newman Springs Road
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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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STATE OF CONNECTICUT
PETROS T. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.38577
LICENSED PROFESSIONAL ENGINEER

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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

SHEET TITLE :
GENERAL NOTES - 3

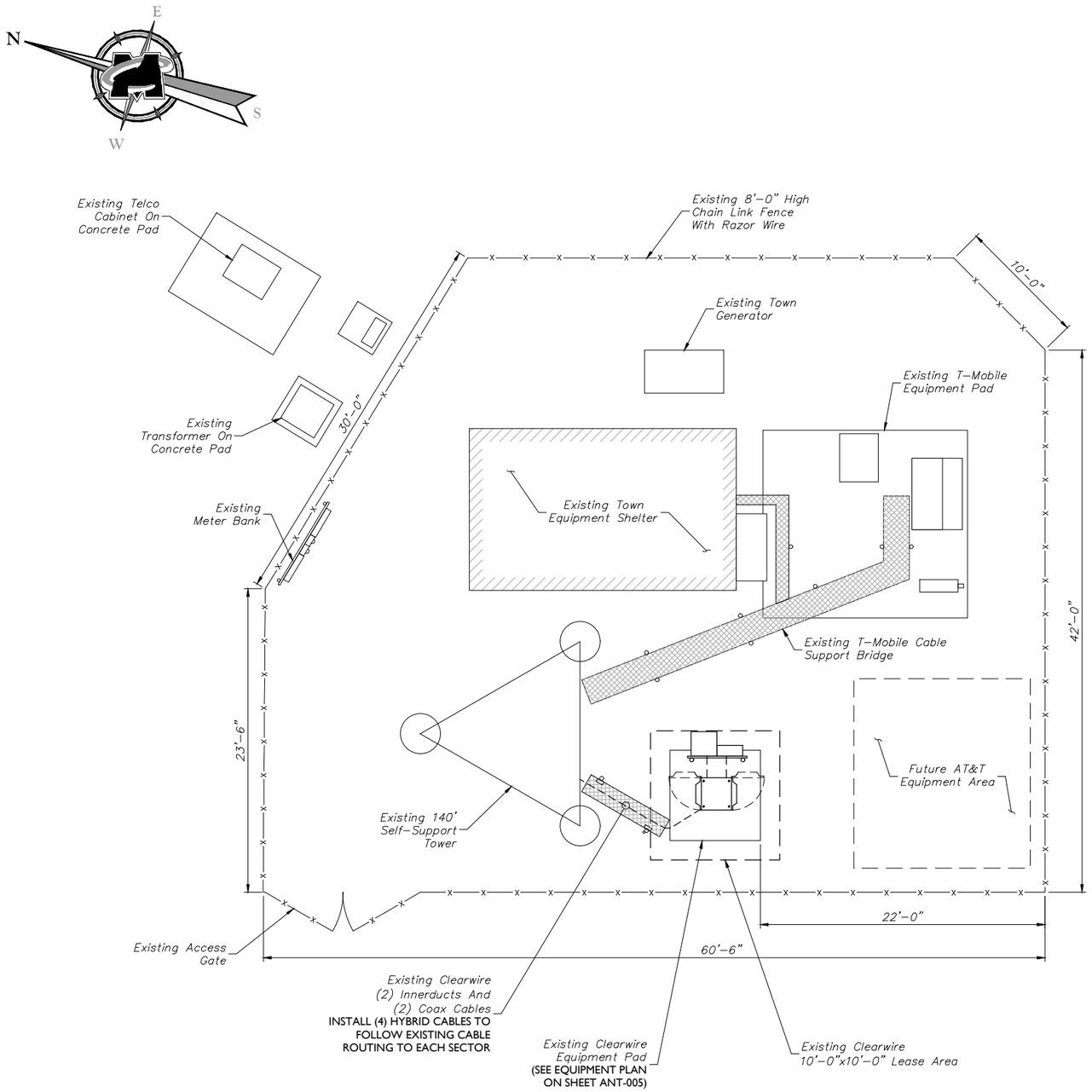
SHEET NUMBER :
ANT-003.00

GENERAL NOTES:

1. SITE INFORMATION OBTAINED FROM THE FOLLOWING:

   A. DRAWINGS ENTITLED "SUNSET RIDGE," PREPARED BY BAY STATE DESIGN, INC. OF MARLBOROUGH, MASSACHUSETTS DATED 05/20/10.

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'
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LEGEND

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

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STATE OF CONNECTICUT
PETROS T. SOUKALAS
29177
LICENSED PROFESSIONAL ENGINEER

PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.29177

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
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SHEET TITLE :
SITE PLAN

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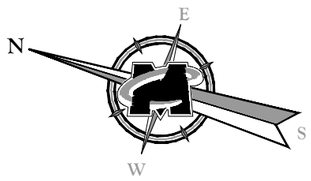
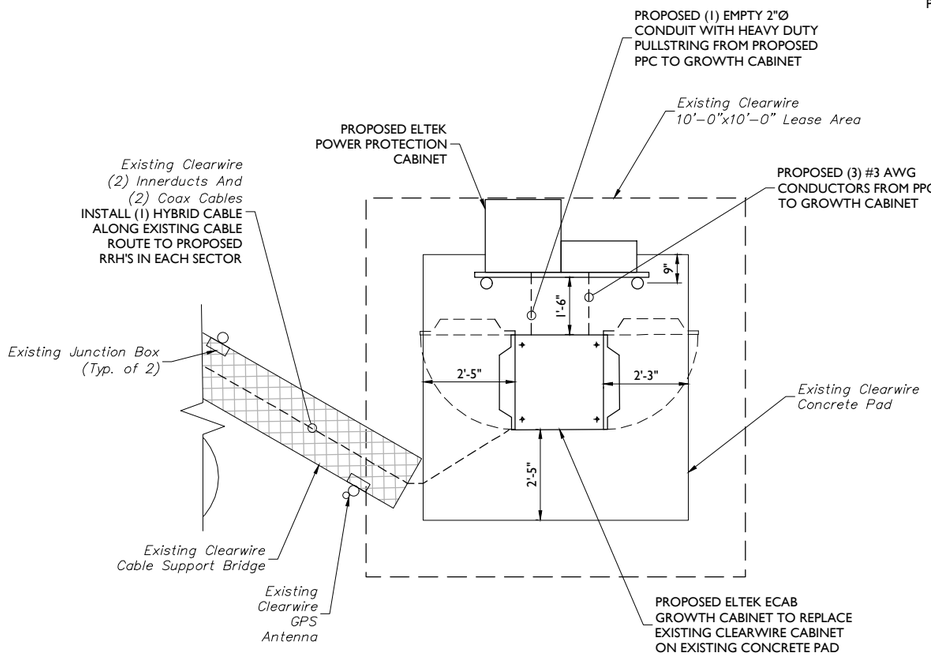
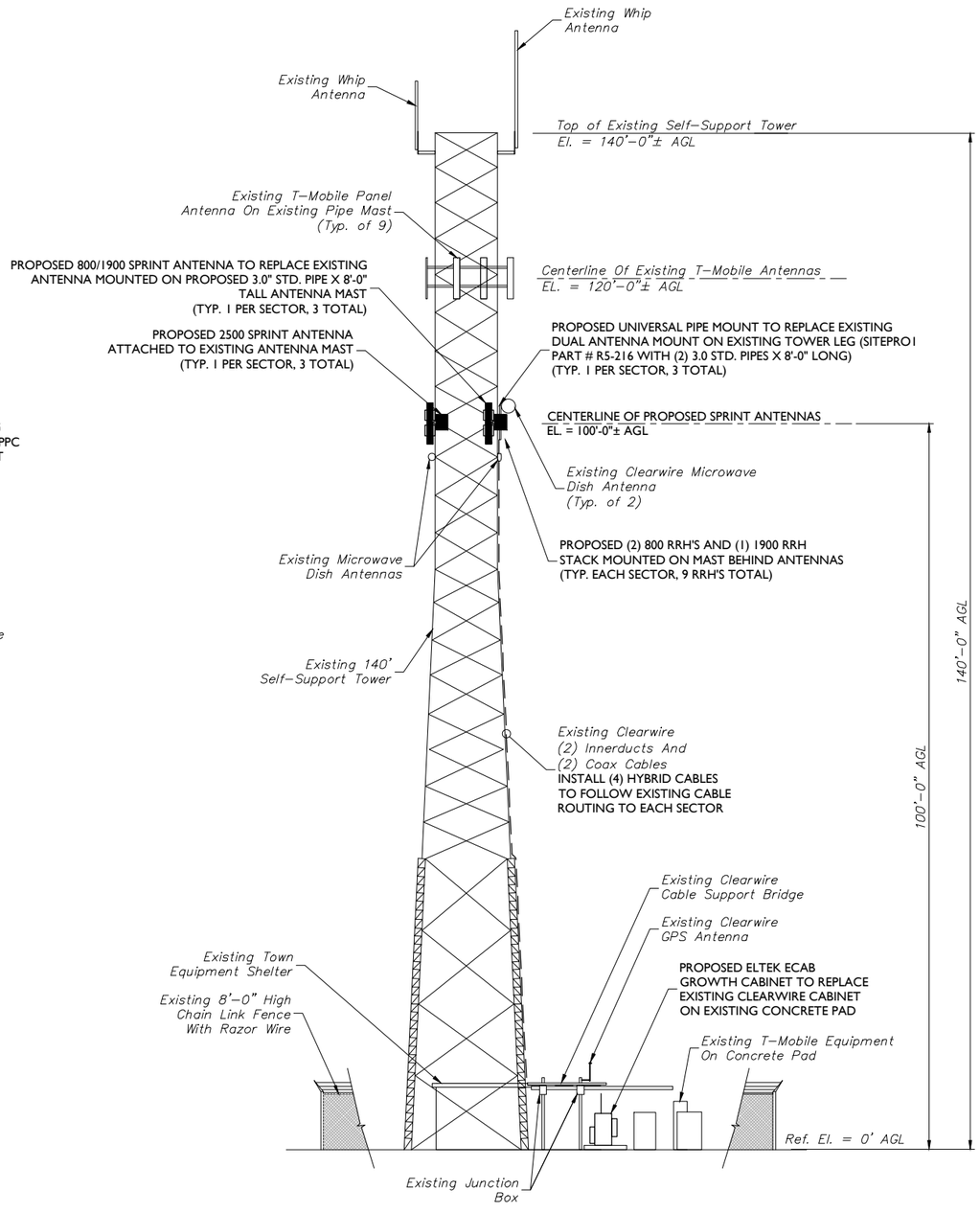




EQUIPMENT PLAN

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



ELEVATION - LOOKING EAST

SCALE : 1" = 10'
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LEGEND

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HEAVY LINE WORK INDICATED PROPOSED OBJECTS

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STATE OF CONNECTICUT — PETROS T. TSOUKALAS — 32977 — LICENSED PROFESSIONAL ENGINEER

PETROS T. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32977

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SITE ID: CT52XC032

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SHEET TITLE :
EQUIPMENT PLAN AND ELEVATION

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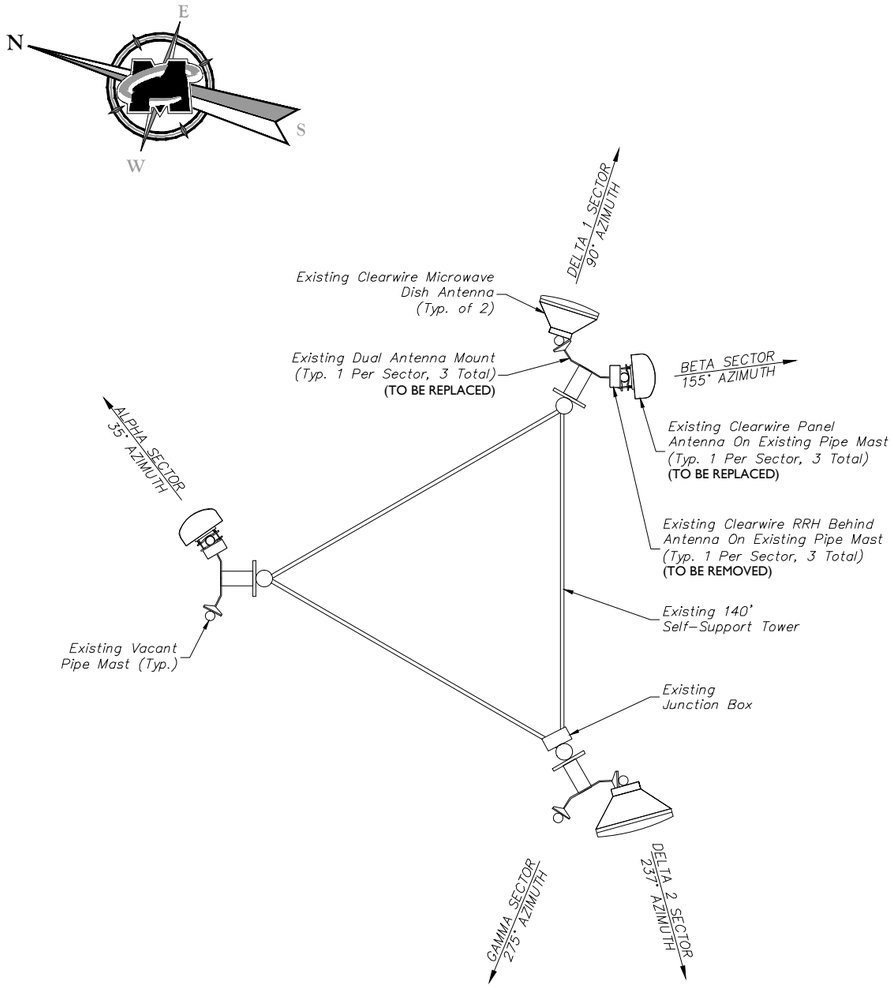
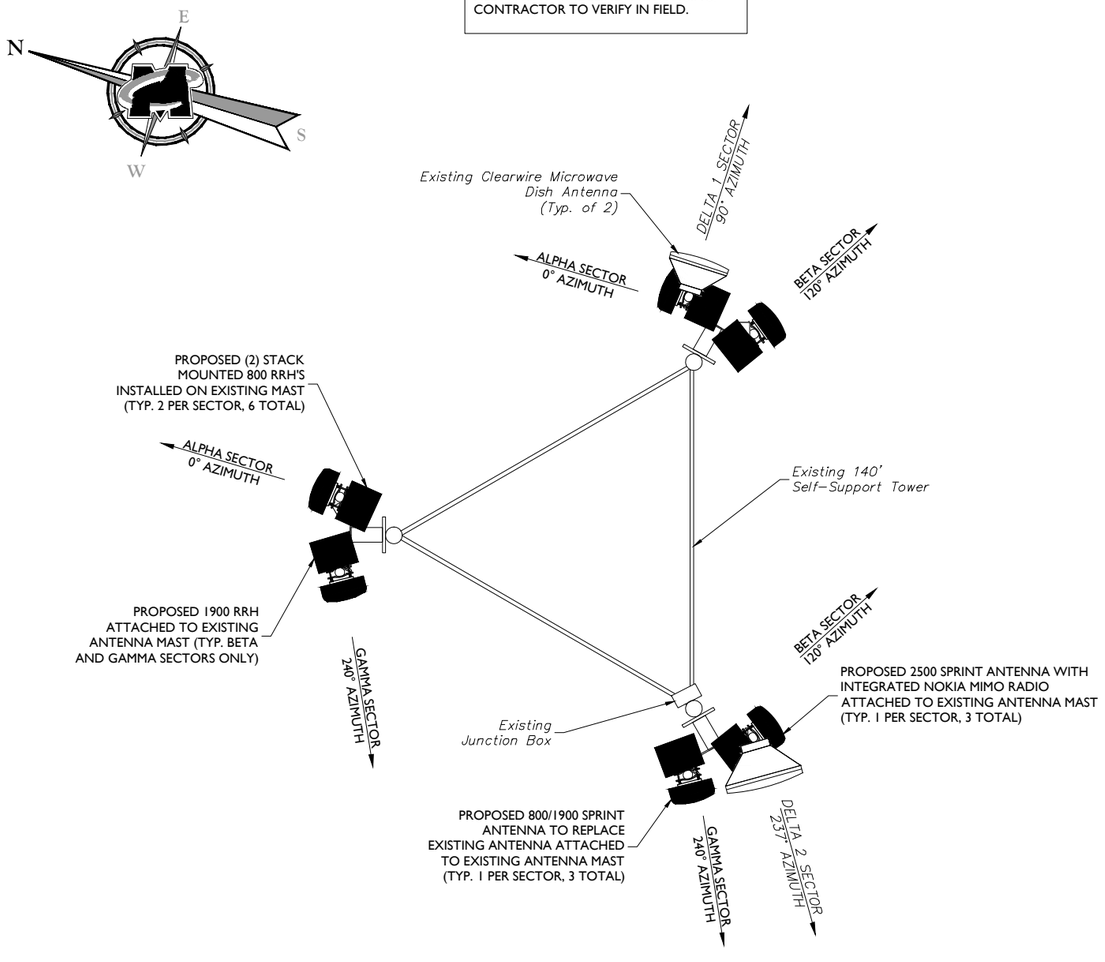


EXISTING ANTENNA LAYOUT

2 1.6 1.2 0.8 0.4 0 1 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.



PROPOSED ANTENNA LAYOUT

2 1.6 1.2 0.8 0.4 0 1 2 4

SCALE : 1" = 2'

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PETROS T. SOUKALAS
29377
LICENSED PROFESSIONAL ENGINEER

PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.29377

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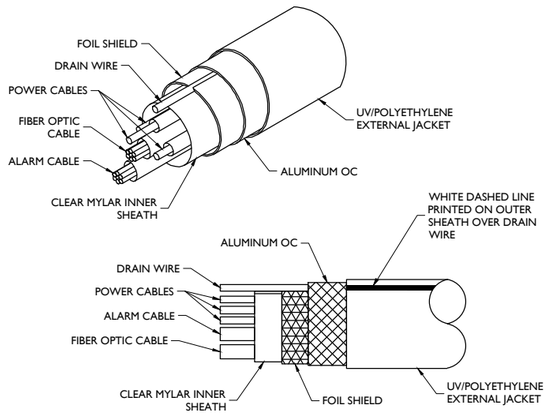
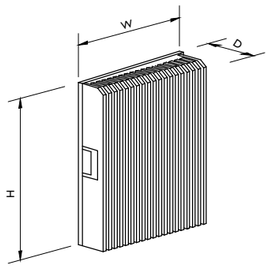
SHEET TITLE :
ANTENNA
ORIENTATION PLANS

SHEET NUMBER :
ANT-006.00

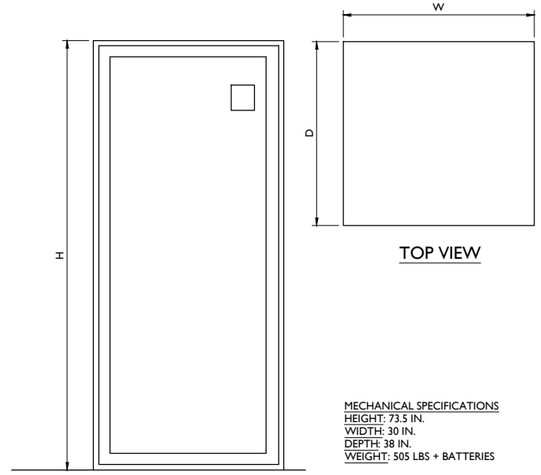


HYBRID CABLE
NOT TO SCALE



MODEL:	HEIGHT (H)	WIDTH (W)	DEPTH (D)	WEIGHT
ALU RRH-4x45-1900	25"	12"	12"	69.5 LBS
ALU RRH-2x50-800	16"	13"	10"	69.1 LBS

RRH SPECIFICATIONS
NOT TO SCALE



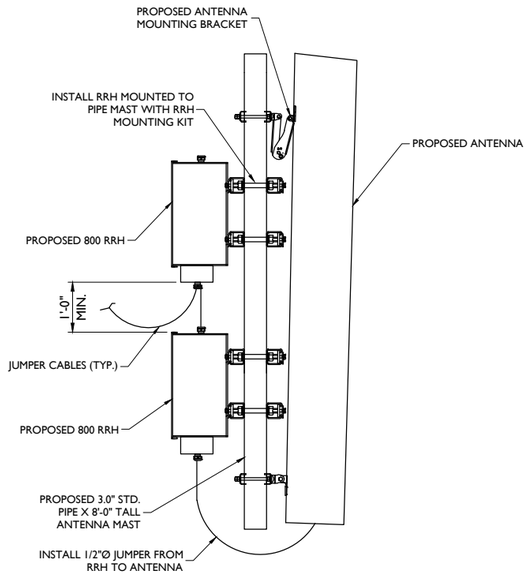
TOP VIEW

FRONT VIEW

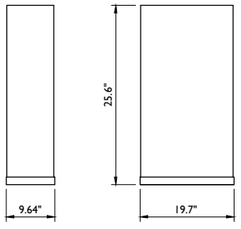
MECHANICAL SPECIFICATIONS
HEIGHT: 73.5 IN.
WIDTH: 30 IN.
DEPTH: 38 IN.
WEIGHT: 505 LBS + BATTERIES

ECAB ELTEK

GROWTH CABINET DETAIL
NOT TO SCALE



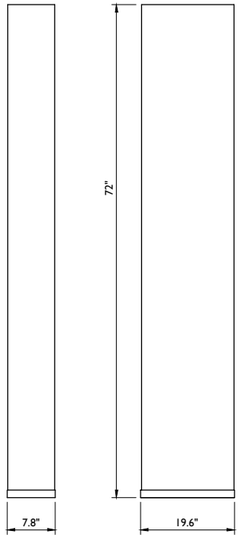
ANTENNA AND RRH MOUNTING DETAIL
NOT TO SCALE



WEIGHT = 103.7 LBS

NOKIA AAHC

ANTENNA DETAIL
NOT TO SCALE



WEIGHT = 84.7 LBS

COMMSCOPE NNVV-65B-R4

ANTENNA DETAIL
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2	03/30/18	REVISED PER RFDS	JCM	JKM
1	01/30/18	MOUNT MODIFICATION DESIGN	YMA	JKM
0	10/13/17	ISSUED AS FINAL	DTS	PET
B	09/28/17	REV. PER RFDS	DTS	PET
A	08/07/17	ISSUED FOR REVIEW	AMN	FEP

STATE OF CONNECTICUT · PETROS T. SOUKALAS · LICENSED PROFESSIONAL ENGINEER · 32517

PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32517

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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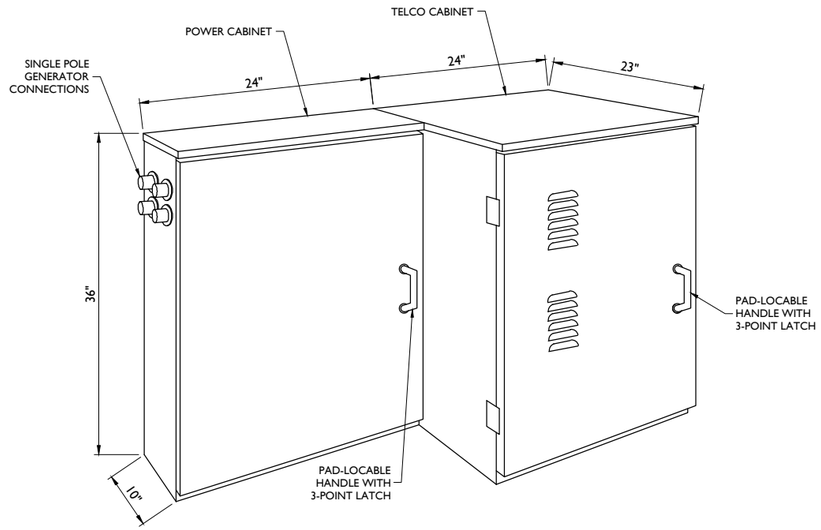
SHEET TITLE :
DETAILS - 1

SHEET NUMBER :
ANT-007.00



ELTEK POWER PROTECTION CABINET DETAIL

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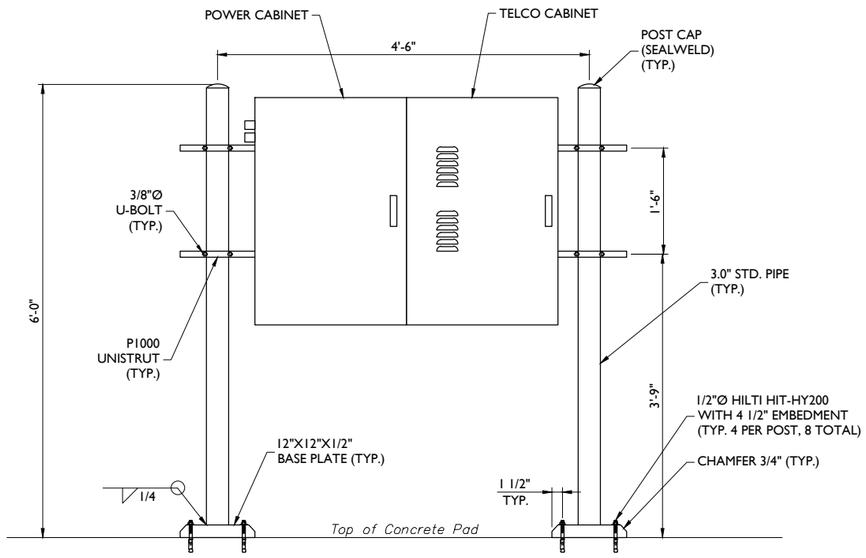

POWER PROTECTION CABINET ON UNISTRUT H-FRAME

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SCALE :	JOB NUMBER :
AS SHOWN	17924012A

REV	DATE	DESCRIPTION	DRWN	CHECKED BY
3	04/10/18	CLIENT COMMENTS	JCM	JKM
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A	08/07/17	ISSUED FOR REVIEW	AMN	FEP

STATE OF CONNECTICUT
PETROS T. SOUKALAS
LICENSED PROFESSIONAL ENGINEER
32511

PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32511

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

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SHEET TITLE :

DETAILS - 2

SHEET NUMBER :

ANT-008.00

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.

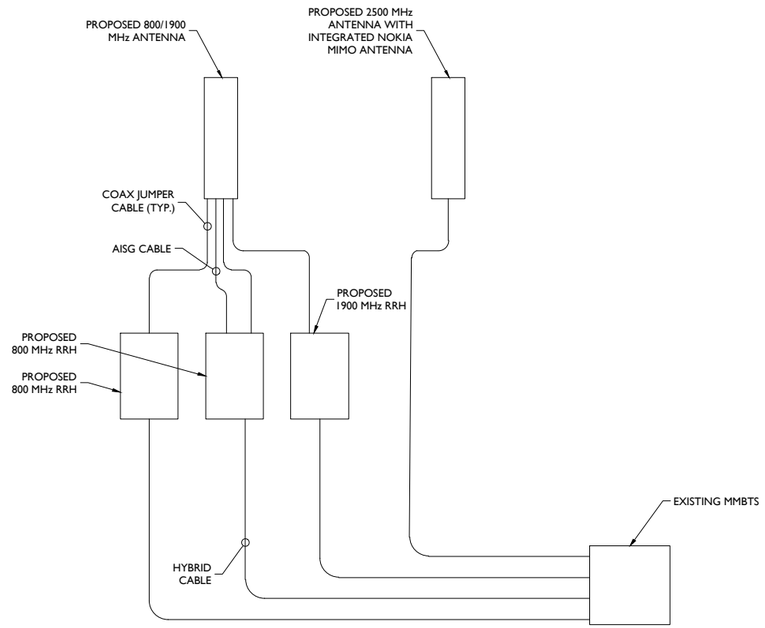
   ALSO ACCEPTABLE IS THE USE OF BUTYL RUBBER WEATHERPROOFING KIT APPROVED BY CABLE MANUFACTURE AND CONTRACTOR. START BUTYL RUBBER TAPE APPROXIMATELY 5 INCHES FROM THE CONNECTOR AND WRAP 2 INCHES TOWARD THE CONNECTOR, THEN REVERSE THE TAPE SO THAT THE STICKY SIDE IS UP. TAPE OVER THE CONNECTOR OR SURGE 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	NOKIA AAHC	2500	REPLACE	25.6	19.7	9.64	103.7	0°	100	2°	N/A
	A2	COMMSCOPE NNVV-65B-R4	800/1900	REPLACE	72	19.6	7.8	84.7	0°	100	3°	N/A
BETA	B1	NOKIA AAHC	2500	REPLACE	25.6	19.7	9.64	103.7	120°	100	2°	N/A
	B2	COMMSCOPE NNVV-65B-R4	800/1900	REPLACE	72	19.6	7.8	84.7	120°	100	3°	N/A
GAMMA	C1	NOKIA AAHC	2500	REPLACE	25.6	19.7	9.64	103.7	240°	100	2°	N/A
	C2	COMMSCOPE NNVV-65B-R4	800/1900	REPLACE	72	19.6	7.8	84.7	240°	100	3°	N/A

BILL OF MATERIALS

NUMBER	QUANTITY	DESCRIPTION	MANUFACTURER	MODEL NUMBER
1	3	PANEL ANTENNA	NOKIA	AAHC
2	3	PANEL ANTENNA	COMMSCOPE	NNVV-65B-R4
3	6	800MHZ RRH	ALU	RRH-2X50-800
4	3	1900MHZ RRH	ALU	RRH-2X50-1900
5	560 LF	1-1/4"Ø HYBRID FIBER RISER	ALU	TBD
6	48	1/2"Ø JUMPER CABLE (8' LONG)	TBD	
7	3	0.315"Ø AISG CABLE (8' LONG)	COMMSCOPE	ATCB-B01-006
8	1	GROWTH CABINET	ELTEK	ECAB
9	1	POWER PROTECTION CABINET	ELTEK	5811122212



ANTENNA WIRING DIAGRAM

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REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY

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PETROS T. SOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32577

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

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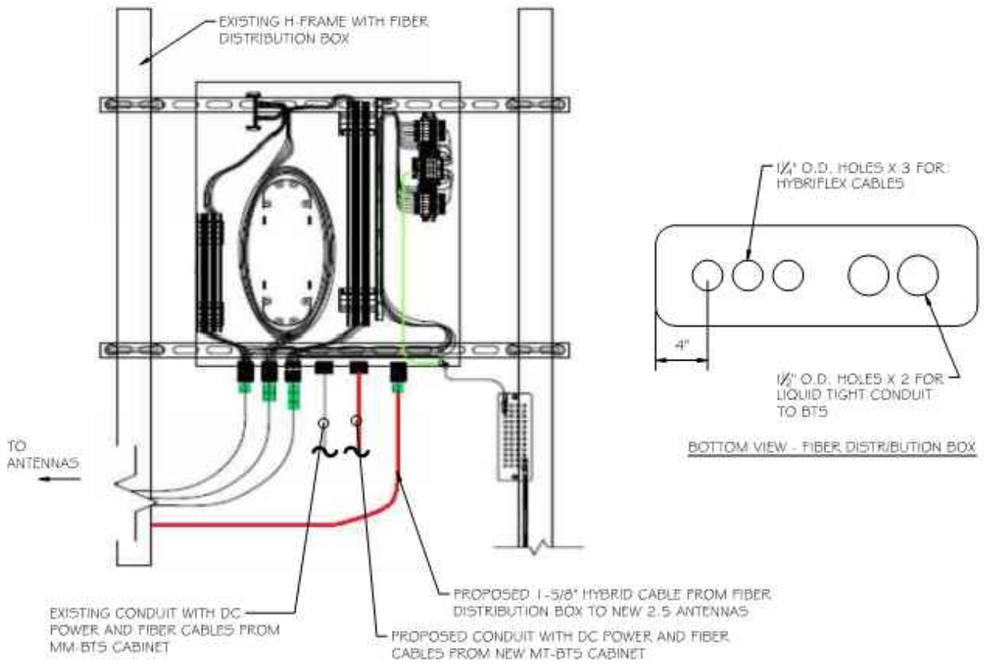
SHEET TITLE
ANTENNA SCHEDULE, WIRING DIAGRAM, BILL OF MATERIALS AND NOTES

SHEET NUMBER :
ANT-009.00



TYPICAL FIBER DISTRIBUTION BOX DETAIL

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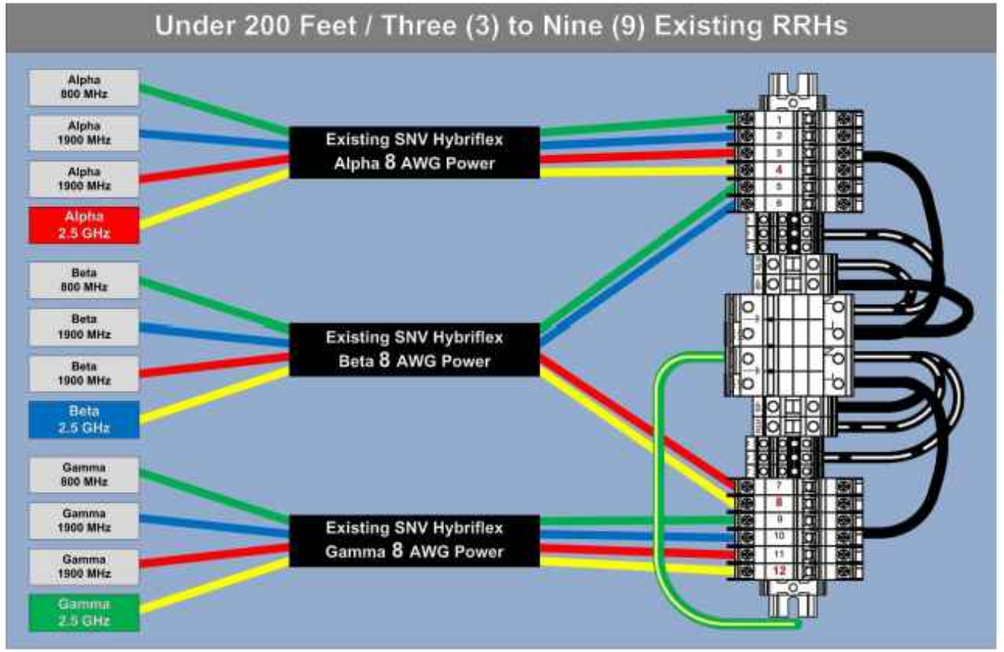

RRH TO DISTRIBUTION BOX POWER CONNECTIVITY DETAIL

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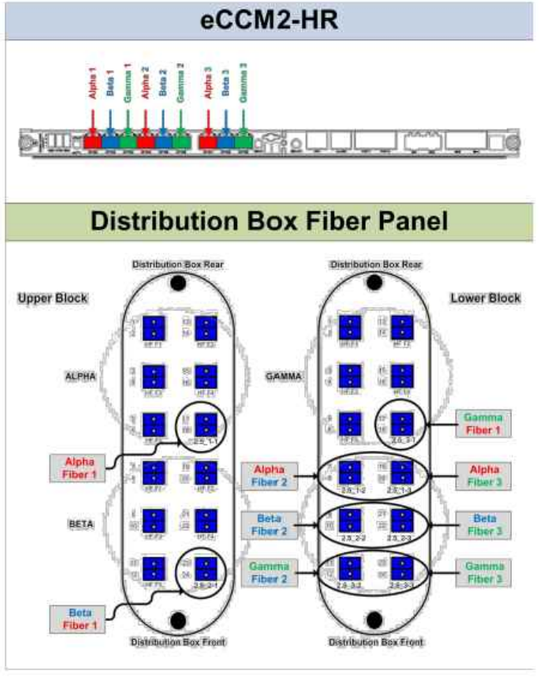

BTS TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL

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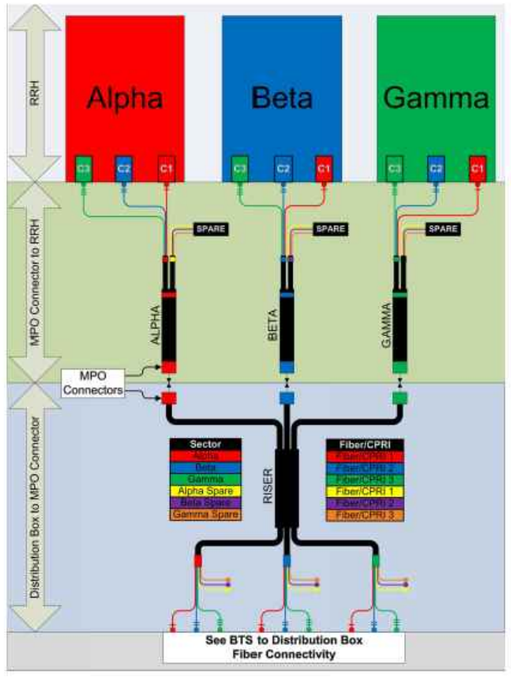

RRH TO DISTRIBUTION BOX FIBER CONNECTIVITY DETAIL

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STATE OF CONNECTICUT — PETROS TSOUKALAS — 32977 — LICENSED PROFESSIONAL ENGINEER

PETROS A. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32977

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SITE ID: CT52XC032

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SHEET TITLE :
FIBER PLUMBING DIAGRAMS - 1

SHEET NUMBER :
ANT-010.00

Prepared By Mark Elliott	Revision Date March 13, 2018	Revision Number R1
Approved By RAN Hardware & Antenna Teams	Approval Date Final-Macro Generated	

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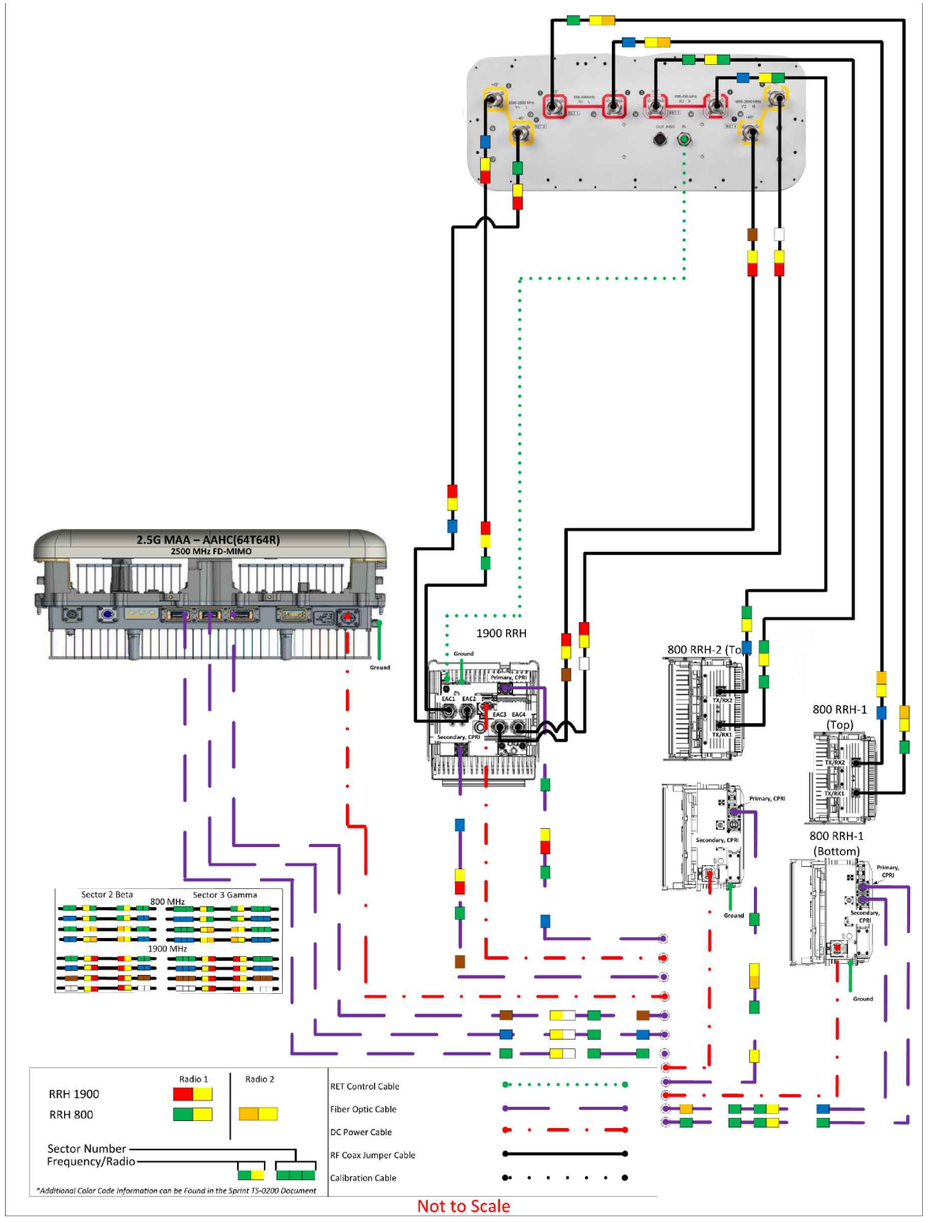

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RF PLUMBING DIAGRAM

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REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY

STATE OF CONNECTICUT
PETROS T. SOUKALAS
32577
LICENSED PROFESSIONAL ENGINEER

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SHEET TITLE :
FIBER PLUMBING DIAGRAMS - 2

SHEET NUMBER :
ANT-011.00

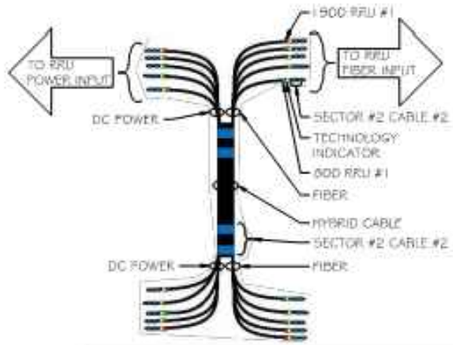
CABLE MARKING NOTES

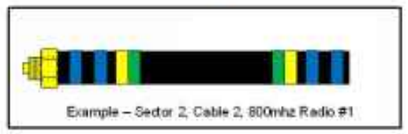
1. ALL CABLES SHALL BE MARKED WITH 2" WIDE, UV STABILIZED, UL APPROVED TAPE.
2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM THE END CONNECTOR, WEATHERPROOFING, OR BREAKOUT UNIT. THERE SHALL BE 1" SPACE BETWEEN EACH RING.
3. A 2" GAP SHALL SEPARATE THE CABLE 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

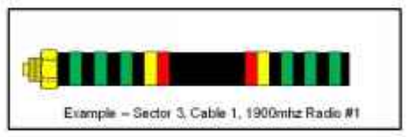
2.5 FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

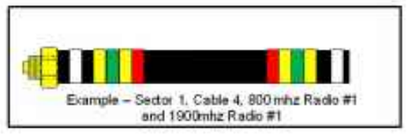
NV FREQUENCY	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

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

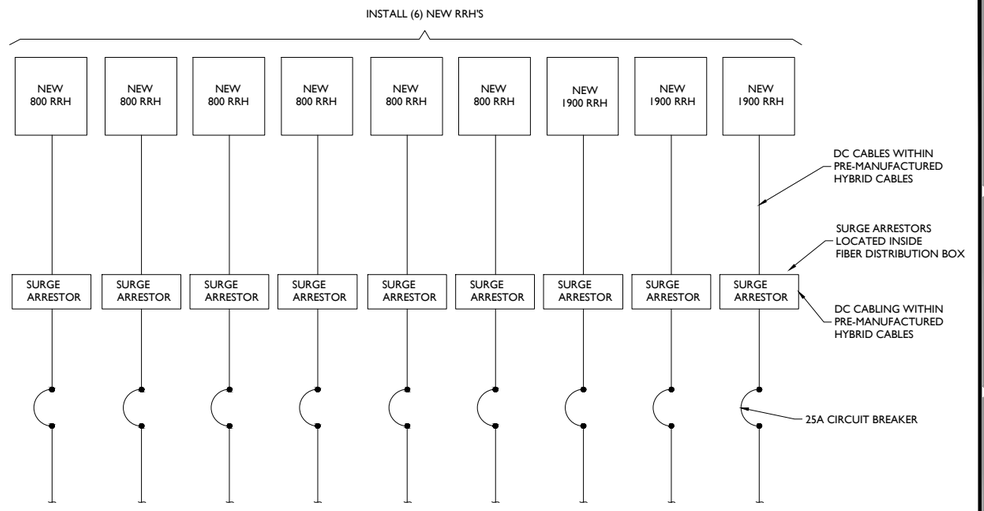








COLOR CODING CHARTS
NOT TO SCALE



DC ONE-LINE DIAGRAM
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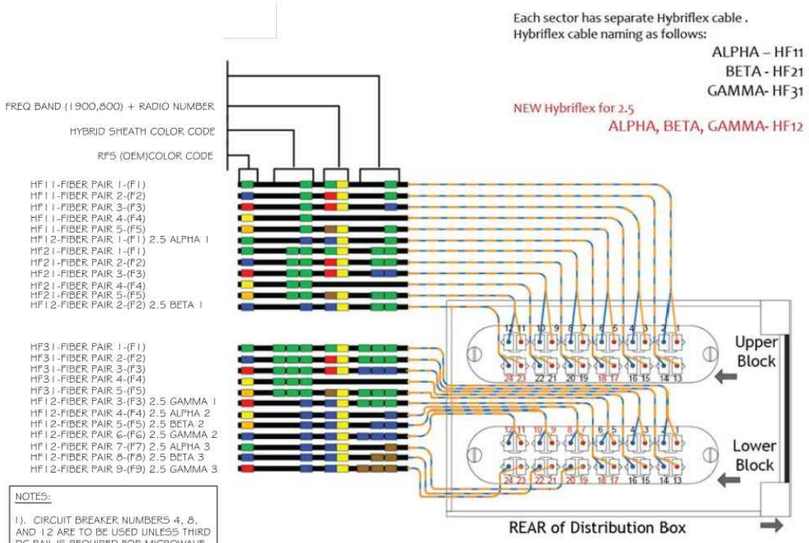

NOTES:
1). CIRCUIT BREAKER NUMBERS 4, 8, AND 12 ARE TO BE USED UNLESS THIRD DC RAIL IS REQUIRED FOR MICROWAVE.
2). USE DC POWER LOOP.
3). ALL UNUSED DC FEEDERS TO BE TERMINATED WITH WIRE NUTS AND TAPED.
4). REMOVE ALL DEBRIS FROM INTERIOR OF FIBER DISTRIBUTION BOX WHEN COMPLETE.

TYPICAL FIBER DISTRIBUTION
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SCALE : AS SHOWN
JOB NUMBER : 17924012A

REV	DATE	DESCRIPTION	DWN	CHECKED BY
3	04/10/18	CLIENT COMMENTS	JCM	JKM
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0	10/13/17	ISSUED AS FINAL	DTS	PET
B	09/28/17	REV. PER RFDS	DTS	PET
A	08/07/17	ISSUED FOR REVIEW	AMN	FEP

STATE OF CONNECTICUT — PETROS T. TSOUKALAS — 32317 — LICENSED ENGINEER
PETROS T. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.32317

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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

SHEET TITLE :
CABLE COLOR CODING, DC POWER DETAILS & PANEL SCHEDULES

SHEET NUMBER :
ANT-012.00

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:

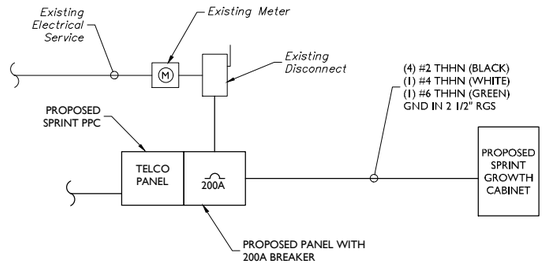
1. ALL CONDUIT SHALL BE MINIMUM SIZE OF 3/4" FOR POWER CIRCUITS AND CONTROL CIRCUITS EXCEPT WHERE FLEXIBLE CONDUIT IS CALLED FOR ON PROJECT DOCUMENTS. ALL EXTERIOR EXPOSED CONDUIT SHALL BE GRC (GALVANIZED RIGID METAL CONDUIT). ALL UNDERGROUND, IN SLAB OR UNDER SLAB SHALL BE RNC (RIGID NONMETALLIC CONDUIT). 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.

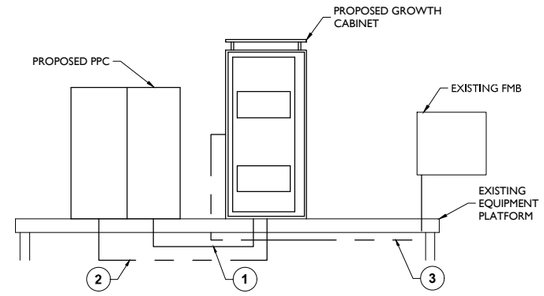


NOTES:

1. SERVICE POWER SHALL BE 240VAC, 200A, 1Ø, 3W OR 208VAC, 200A, 1Ø, 3W.
2. POWER & TELEPHONE CONDUIT INSTALLATION SHALL BE COORDINATED WITH THE UTILITY COMPANIES.
3. CONTRACTOR SHALL INSTALL (1) 100 AMP DUAL POLE BREAKER IN EXISTING PANEL FOR PROPOSED GROWTH CABINET. BREAKER INTERRUPTING RATING SHALL MATCH EXISTING PANEL BOARD.

POWER RISER DIAGRAM

NOT TO SCALE



LEGEND:

1. USE PROPOSED 100A 2 POLE BREAKER IN PROPOSED PPC. INSTALL (3) #3 AWG OR LARGER.
2. CONTRACTOR TO PROVIDE (1) 2" EMPTY CONDUIT W/ HEAVY DUTY PULLSTRING FROM PROPOSED PPC TO BTS
3. CONTRACTOR PROVIDE (2) 1-1/2" L/T FROM FMB TO GROWTH CABINET. (PROVIDED WITH FMB)

EQUIPMENT RISER DIAGRAM DETAIL

NOT TO SCALE

PRELIMINARY ELECTRIC SCHEMATIC SHOWN
PENDING - LOAD STUDY AND VERIFICATION
OF EXISTING SERVICE CAPACITY

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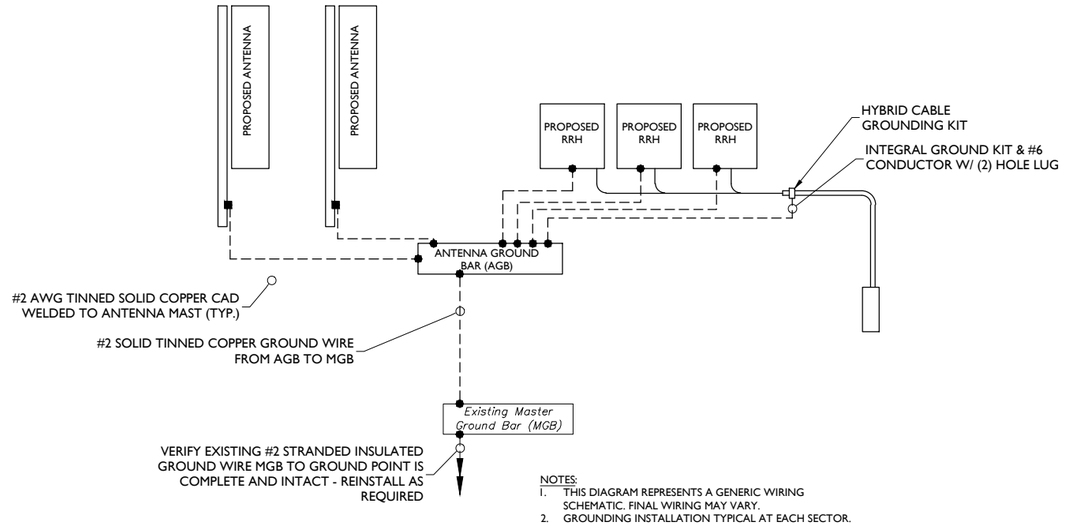
SHEET TITLE:
ELECTRICAL AND GROUNDING NOTES

SHEET NUMBER:
ANT-013.00

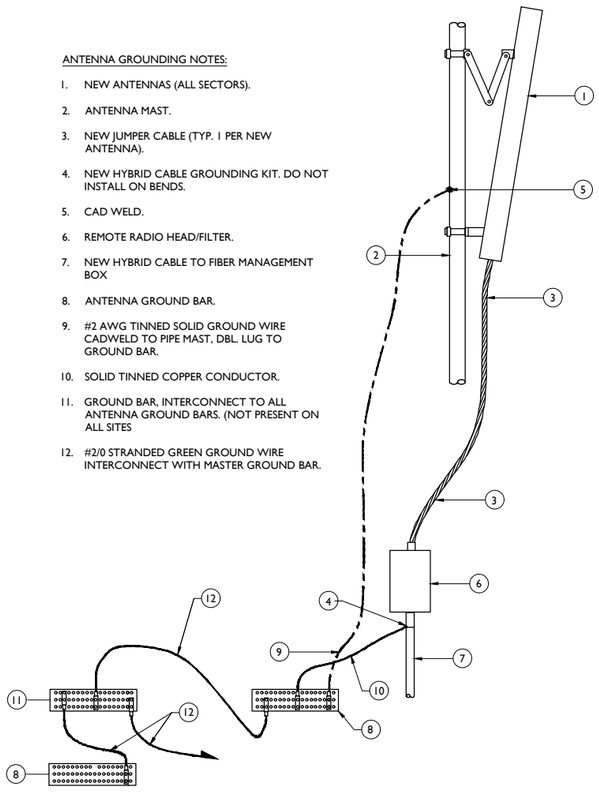


NOTES:
1. THIS DIAGRAM REPRESENTS A GENERIC WIRING SCHEMATIC. FINAL WIRING MAY VARY.
2. GROUNDING INSTALLATION TYPICAL AT EACH SECTOR.

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.



ANTENNA GROUNDING SCHEMATIC
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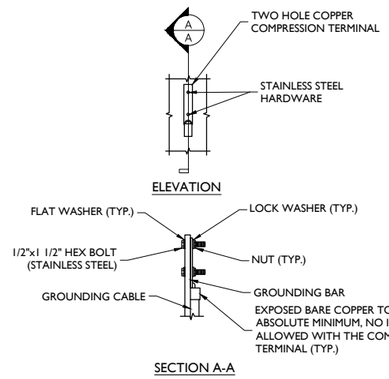
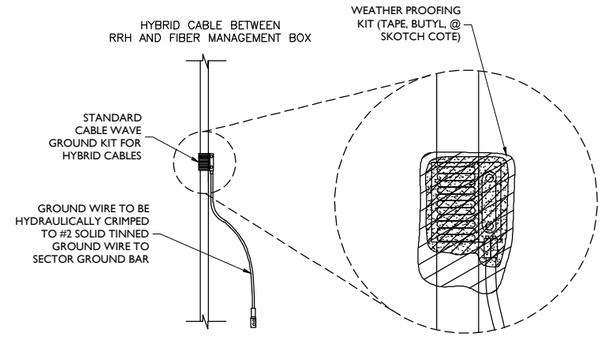
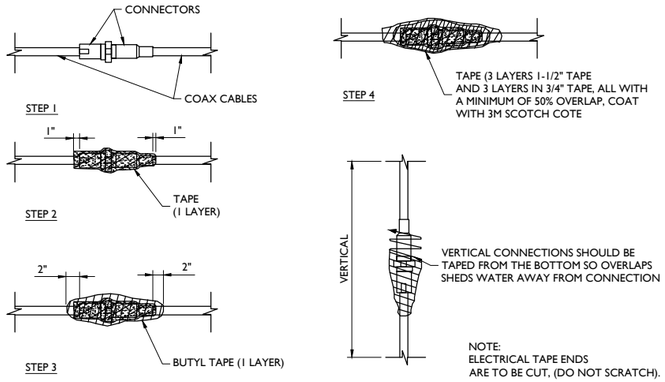


TYPICAL GROUND BAR CONNECTION DETAIL
NOT TO SCALE





CABLE WRAPPING DETAIL
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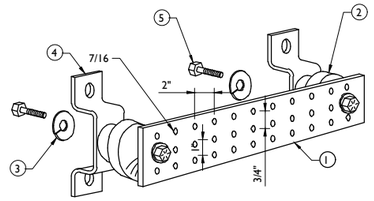

1. COPPER GROUND BAR, 1/4" X 4" X 20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION. (ACTUAL GROUND BAR SIZE WILL VARY BASED ON NUMBER OF GROUND CONNECTIONS)
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3. 5/8" LOCKWASHERS, NEWTON INSTRUMENT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

GROUND BAR DETAIL
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REV	DATE	DESCRIPTION	BY	CHECKED BY
3	04/10/18	CLIENT COMMENTS	JCM	JKM
2	03/30/18	REVISED PER RFDS	JCM	JKM
1	01/30/18	MOUNT MODIFICATION DESIGN	YMA	JKM
0	10/13/17	ISSUED AS FINAL	DTS	PET
B	09/28/17	REV. PER RFDS	DTS	PET
A	08/07/17	ISSUED FOR CONSTRUCTION	AMN	FEP

STATE OF CONNECTICUT
PETROS S. TSOUKALAS
LICENSED PROFESSIONAL ENGINEER
PETROS S. TSOUKALAS
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28574

SITE NAME: SUNSET RIDGE
SITE ID: CT52XC032

112 SUNSET RIDGE DRIVE
EAST HARTFORD, CT 06118

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

SHEET TITLE :
GROUNDING SCHEMATIC AND DETAILS

SHEET NUMBER :
ANT-014.00