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SEP 29 2014
CONNECTICUT
SITING COUNCIL

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

ORIGINAL

RE: TS-CING-004-130627 Notice of Completion of Construction
New Cingular Wireless PCS, LLC (AT&T)
324 Montevideo Road, Avon CT (ATT SITE ID CT1178)

Dear Ms. Bachman:

On behalf of New Cingular Wireless PCS, LLC (AT&T), please accept this letter as our notification of the completion of site construction and the commencement of site operations.

As a condition of approval, AT&T did implement the tower modifications as directed by Centek Engineering Tower Modification Design dated June 11, 2013.

If you have any questions or need any additional information regarding this facility, please do not hesitate to contact me.

Respectfully Submitted,

Eric H. Campbell
SAI Communications
Agent for New Cingular Wireless PCS, LLC (AT&T)
27 Northwestern Drive
Salem, New Hampshire 03079

Cc: Melanie Bachman, CT Siting Council (via email only)
Christine Vergati, Cuddy Feder (via email only)
Tim Burks, SAI (via email only)



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 16, 2014

Peter LaMontagne
Real Estate Consultant
Centerline Communications
95 Ryan Drive, Suite #1
Raynham, MA 02767

RE: **TS-CING-004-130627** - New Cingular Wireless PCS, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 324 Montevideo Road, Avon, Connecticut. **Request to Revise.**

Dear Mr. LaMontagne:

At a public meeting of the Connecticut Siting Council (Council) held on April 15, 2014, the Council approved the requested amendment dated February 26, 2014, to the above-referenced tower share request that was originally approved by the Council on July 11, 2013 with the following conditions:

- Prior to antenna installation, the tower modifications depicted in the Tower Modification Design prepared by Centek Engineering dated June 11, 2013, and stamped by Carlo Centore, shall be implemented; and
- Within 45 days following completion of the antenna installation, AT&T shall provide documentation certified by a professional engineer that its installation complied with the requirements of the structural analysis.

This decision is under the exclusive jurisdiction of the Council. This facility has 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. 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.

This decision applies only to the requested tower share amendment and is not applicable to any other request or construction. Please be advised that the validity of this action shall expire one year from the date of this letter.

The proposed shared use is to be implemented as specified in your tower share request letter dated June 25, 2013, and request for an amendment letter dated February 26, 2014, including the placement of all necessary equipment and shelters within the tower compound.

Very truly yours,

Robert Stein
Chairman

RS/CDM/laf

c: The Honorable Mark W. Zacchio, Chairman, Town of Avon
Brandon Robertson, Town Manager, Town of Avon
Steven V. Kushner, Town Planner, Town of Avon
The Honorable Sydney Schulman, Mayor, Town of Bloomfield
Philip K. Schenck, Jr., Town Manager, Town of Bloomfield
Thomas B. Hooper, Director of Planning, Town of Bloomfield
Talcott Mountain Science Center





New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067

February 26, 2014

Town of Bloomfield
Philip K. Schenck, Jr, Town Manager
800 Bloomfield Ave, 2nd Floor
Bloomfield, CT 06002

**Re: New Cingular Wireless PCS, LLC ("AT&T") Request for Administrative
Approval to the recently approved Tower Share TS-CING-004-130627.
Address: 324 Montevideo Road, Avon, CT. AT&T site number: CT178**

Attention Philip K. Schenck, Jr,

New Cingular Wireless PCS, LLC ("AT&T") intends to modify the telecommunications antennas and associated equipment at the existing telecommunications facility, owned by The Talcott Mountain Center for Student Involvement, Inc. located at 324 Montevideo Road, Avon, CT.

This letter and supporting documentation enclosed is to address AT&T's proposed site modification to the recent Tower Share Approval (TS-CING-004-130627) dated July 12, 2013. The modification includes replacing panel antennas and remote radio units at the existing tower site located at 324 Montevideo Road, Avon, CT and in is outlined below:

The attached letter fully sets forth AT&T's proposal. However, if you have any questions or require any further information on the plans for the site or the Siting Council's procedures, please contact Peter LaMontagne, Real Estate Consultant for AT&T, at (508) 341-7854 or Linda Roberts, Executive Director of the Connecticut Siting Council, at (860) 827-2935.

Sincerely,

Peter LaMontagne
Real Estate Consultant



New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067

February 26, 2014

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

**Re: New Cingular Wireless PCS, LLC ("AT&T") Request for Administrative
Approval to the recently approved Tower Share TS-CING-004-130627.
Address: 324 Montevideo Road, Avon, CT. AT&T site number: CT178**

Attention David Martin,

New Cingular Wireless PCS, LLC ("AT&T") intends to modify their existing telecommunications antennas and associated equipment at an existing multicarrier telecommunications tower located at 324 Montevideo Road, Avon, CT. ("facility").

This letter and supporting documentation enclosed is to address AT&T's proposed site modification to the recent Tower Share Approval (TS-CING-004-130627) dated July 12, 2013. The modification includes replacing panel antennas and remote radio units at the existing tower site located at 324 Montevideo Road, Avon, CT and in is outlined below:

Existing Facility

The facility is located at 324 Montevideo Road, Avon, CT on the north side of Route 44 – Avon Mountain Road. Site coordinates (NAD83) are 41°48'42.45"N and 72°47'55.52"W. The facility is owned by Talcott Mountain Science Center, 324 Montevideo Road, Avon, CT 06001. The existing facility consists of a 60' tall self-supporting Lattice tower with 18' Doppler Radar Dome.

Site Modification and Approved & Final Configuration:

Between the time AT&T received the Tower Share Approval from the CSC and the time AT&T was ready to build the site, the panel antennas and ancillary equipment was changed. The information below outlines the changes from what AT&T was approved for then and what AT&T's final configuration will be.

Approved Equipment Configuration:

- (9) Andrew SBNH-1D6565C Panels
- (3) Ericsson 118 054/1 Panels
- (15) Ericsson RRUS-11
- (3) Surge Arrestors
- (6) DC Lines
- (1) Fiber Trunk
- (3) RET Cables

Final Equipment Configuration:

- (12) CCI Panel Antennas (HPA-65R-BUU-H8)
- (9) Ericsson RRUS (RRUS-11)
- (6) Ericsson RRUS (RRUS-12)
- (3) Ericsson RRUS (RRUS-32)
- (3) Ericsson RRUS (RRUS-E2)
- (6) A-2 Modules
- (4) Surge Suppressors
- (8) DC Cables
- (2) Fiber Trunks
- (3) RET Cables

For your reference and review of the proposed site modification, below is the list of enclosed supporting documents:

1. Tower Share Approval (TS-CING-004-130627) dated 7/12/2013
2. Rev 1 Construction Drawings – Prepared by Centek Engineering dated 01.24.14
3. Rev 2 Structural Analysis – Prepared by Centek Engineering dated 12.13.13
4. Power Density Calculations – 53.16%

For the foregoing reasons, AT&T respectfully submits that the proposed changes at the referenced site constitute an Administrative Review and Approval to amend the recent Tower Share Approval by the Connecticut Siting Council.

Please let me know if you have any questions or require any additional information for your review.

Respectfully yours,

Peter LaMontagne
Real Estate Consultant
Centerline Communications
95 Ryan Dr, Suite #1
Raynham MA 02767

Cell: 508-341-7854

Email: plamontagne@clinellc.com



New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, Connecticut 06067

February 26, 2014

Connecticut Siting Council
10 Franklin Square
New Britain, Connecticut 06051

ORIGINAL

RECEIVED
FEB 28 2014CONNECTICUT
SITING COUNCIL

Re: **New Cingular Wireless PCS, LLC ("AT&T") Request for Administrative Approval to the recently approved Tower Share TS-CING-004-130627.**
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- (3) Ericsson RRUS (RRUS-E2)
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For the foregoing reasons, AT&T respectfully submits that the proposed changes at the referenced site constitute an Administrative Review and Approval to amend the recent Tower Share Approval by the Connecticut Siting Council.

Please let me know if you have any questions or require any additional information for your review.

Respectfully yours,

Peter LaMontagne
Real Estate Consultant
Centerline Communications
95 Ryan Dr, Suite #1
Raynham MA 02767

Cell: 508-341-7854

Email: plamontagne@clinellc.com



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

July 12, 2013

John Lawrence
New Cingular Wireless PCS, LLC
95 Ryan Drive, Suite #1
Raynham, MA 02767

RE: **TS-CING-004-130627**– New Cingular Wireless PCS, LLC request for an order to approve tower sharing at an existing telecommunications facility located at 324 Montevideo Road, Avon, Connecticut.

Dear Mr. Lawrence:

At a public meeting held July 11, 2013, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures with the following conditions:

- Any deviation from the proposed installation as specified in the original tower share request and supporting materials with the Council shall render this decision invalid;
- Any material changes to the proposed installation as specified in the original tower share request and supporting materials filed with the Council shall require an explicit request for modification to the Council pursuant to Connecticut General Statutes § 16-50aa, including 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;
- Not less than 45 days after completion of the proposed installation, the Council shall be notified in writing that the installation has been completed;
- The validity of this action shall expire one year from the date of this letter;
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration; and
- Prior to antenna installation, the reinforcements detailed in Section 4 of the Structural Analysis Report prepared by Centek Engineering dated June 13, 2013, and stamped by Carlo Centore shall be implemented;
- Within 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the structure and foundation do not exceed 100 percent of the post-construction structural rating.

This decision is under the exclusive jurisdiction of the Council. This facility has 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. 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.



This decision applies only to this request for tower sharing and is not applicable to any other request or construction. Please be advised that the validity of this action shall expire one year from the date of this letter.

The proposed shared use is to be implemented as specified in your letter dated February 24, 2011, including the placement of all necessary equipment and shelters within the tower compound.

Thank you for your attention and cooperation.

Very truly yours,

A handwritten signature in blue ink that reads "Robert Stein" followed by the initials "UAB".

Robert Stein
Chairman

RS/CDM/cm

c: The Honorable Mark W. Zacchio, Chairman, Town of Avon
Steven V. Kushner, Town Planner, Town of Avon
Talcott Mountain Science Center



Michael Lawton
SAI Communications
260 Cedar Hill St.
Marlborough, MA 01752
Mike.Lawton@sai-comm.com

February 7, 2014

Connecticut Siting Council

Subject: AT&T Wireless, S1178 – Avon – Talcott Mountain

Dear Connecticut Siting Council:

At the request of AT&T Wireless, SAI Communications has performed an assessment of the RF Power Density at the proposed site located at 324 Montevideo Road, Avon, CT.

Calculations were done in compliance with FCC OET Bulletin 65. This report provides an FCC compliance assessment based on a "worst-case" analysis that all transmitters are simultaneously operating at full power and pointing directly at the ground.

FCC OET Bulletin 65 formula:

$$S = \frac{2.56 * 1.64 * ERP}{4 * \pi * R^2}$$

Transmission Mode	Antenna Centerline AGL (ft)	Frequency (MHz)	Number of Channels	Effective Radiated Power per Channel (Watts)	Power Density (mW/cm ²)	Standard Limits (mW/cm ²)	% MPE (Uncontrolled/ General Public)
AT&T UMTS	70	850	2	500.00	0.0734	0.5667	12.95%
AT&T UMTS	70	1900	2	500.00	0.0734	1	7.34%
AT&T LTE	70	700	2	500.00	0.0734	0.4667	15.73%
AT&T LTE	70	2100	2	500.00	0.0734	1	7.34%
Verizon All Technologies	55	Combined	Combined	Combined	Combined	Combined	9.80%
Total							53.16%

Conclusion: AT&T's proposed antenna installation is calculated to be within 53.16% of FCC Standard for General Public/Uncontrolled Maximum Permissible Exposure (MPE).

Sincerely,

Michael Lawton
SAI Communications

S t r u c t u r a l A n a l y s i s R e p o r t

60-ft Existing Lattice Tower

*Proposed AT&T Mobility
Antenna Upgrade*

AT&T Site Ref: CT1178

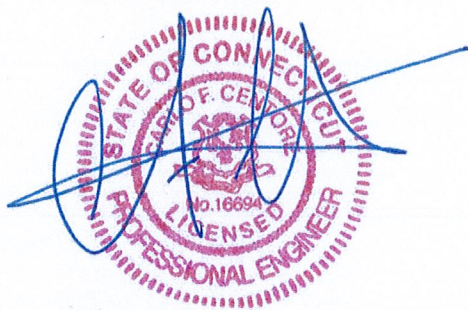
*324 Montevideo Road
Avon, CT*

Centek Project No. 13140.CO1

~~*Date: June 13, 2013*~~

~~*Rev 1: September 18, 2013*~~

Rev 2: December 19, 2013



Prepared for:

**AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067**

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Introduction

The purpose of this report is to summarize the results of the non-linear, P- Δ structural analysis of the antenna upgrade proposed by AT&T Mobility on the existing lattice (tower) located in Avon, CT.

The host tower is a 60-ft, three legged, steel lattice tower. The tower geometry, structure member sizes and foundation information were obtained from a previous structural report prepared by Centek Engineering, Inc. job no.; 12001.CO76 dated October 31, 2012.

Antenna and appurtenance information were obtained from the aforementioned Centek structural report, visual verification conducted by Centek personnel on May 30, 2013 and a RF data sheet.

The tower consists of one (1) tapered and two (2) straight vertical steel sections consisting of ASTM A53-B-35 (35ksi) pipe legs. Diagonal and horizontal lateral support bracing consists of steel angle conforming to ASTM A36 (36ksi) and steel pipe conforming to ASTM A53-B-35 (35ksi). The vertical tower sections are connected by bolted flange plates while the pipe legs and bracing are connected by bolted and welded gusset connections. The tower face width is 7.58-ft at the top and 9.70-ft at the bottom.

AT&T proposes the installation of twelve (12) panel antennas, twenty-one (21) RRH's, six (6) A2's and four (4) surge arrestors mounted within the existing doppler radar dome. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- **UNKNOWN (Existing):**
Antennas: One (1) 18-ft dome mounted to the top of the tower.
Coax Cables: One (1) 7/8" $\varnothing$ cable running on a leg/face of the existing tower as specified in Section 3 of this report.
- **VERIZON WIRELESS (Existing):**
Antennas: One (1) RFS APX75-866514-CT8, one (1) Antel BXA-70080-6CF, two (2) Antel LPA-80063-6CF, two (2) LPA-80080-6CF and four (4) Antel LPA-171063-8CF panel antennas mounted on two (2) 13-ft face mount frames with a RAD center elevation of ± 55 -ft above finished grade.
Coax Cables: Twelve (12) 1-5/8" $\varnothing$ coax cables on a leg/face of the existing tower as specified in Section 3 of this report.
- **AT&T (PROPOSED):**
Antennas: Twelve (12) CCI HPA-65R-BUU-H8 panel antennas, twenty-one (21) Ericsson remote radio units, six (6) Ericsson A2's and four (4) Raycap DC6-48-60-18-8F surge arrestors mounted within the existing doppler radar dome with a RAD center elevation of ± 67 -ft above grade.
Coax Cables: Two (2) fiber trunks (within 2.25" innerducts), eight (8) DC trunks, three (3) RET cables and one (1) #2 THHN ground running on a leg of the existing tower.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All existing coax cables to be installed as indicated in this report.

A n a l y s i s

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower shaft, and the model assumes that the shaft members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (fastest mile) with no ice and a 75% reduction of wind force with ½ inch accumulative ice to determine stresses in members as per guidelines of TIA/EIA-222-F-96 entitled "Structural Standards for Steel Antenna Towers and Antenna Supporting Structures", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Allowable Stress Design (ASD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC¹ and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

T o w e r L o a d i n g

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA/EIA-222-F, gravity loads of the tower structure and its components, and the application of ½" radial ice on the tower structure and its components.

Basic Wind Speed:	Hartford; v = 80 mph (fastest mile)	[Section 16 of TIA/EIA-222-F-96]
	Avon; v = 95 mph (3 second gust) equivalent to v = 77.5 mph (fastest mile)	[Appendix K of the 2005 CT Building Code Supplement]
	TIA-EIA wind speed controls.	
Load Cases:	<u>Load Case 1</u> ; 80 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 2</u> ; 69 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 69 mph wind speed velocity represents 75% of the wind pressure generated by the 80 mph wind speed.	[Section 2.3.16 of TIA/EIA-222-F-96]
	<u>Load Case 3</u> ; Seismic – not checked	[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type

¹ The 2005 Connecticut State Building Code as amended by the 2009 CT State Supplement. (CSBC)

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 5 of the TIA/EIA code with a 1/3 increase per Section 3.1.1.1 of the same code.

- Calculated stresses **with the proposed reinforcements detailed in section 4 of this report** were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **98.6%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T5)	0'-6.3'	98.6%	PASS
Diagonal (T2)	19.5'-39.5'	67.3%	PASS

Foundation and Anchors

The foundation consists of a 3.5-ft thick triangular mat. The tower legs are encased within the concrete mat.

Review of the foundation and anchor design consisted of verification of applied loads obtained from the tower design calculations and code checks of allowable stresses:

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Load Effect	Proposed Tower Reactions
Leg Shear	7 kips
Leg Compression	73 kips
Leg Uplift	64 kips
Base Moment	578 ft-kips
Base Shear	11 kips

- The foundation system was found to be within allowable limits.

Foundation Type	Design Limit	Allowable Limit/FS	Proposed Loading	Result
Triangular Mat Foundation	Bearing Pressure	12.0 ksf ⁽¹⁾	1.34 ksf	PASS
	OM ⁽²⁾	2.0 ⁽³⁾	2.89	PASS

Note 1: Minimum allowable soil bearing pressure taken as 12.0ksf (conservative) for basalt rock.

Note 2: (OM) Denotes overturning moment.

Note 3: Min required Factor of Safety (FS) of 2.0 required per IBC 2003/2005 CSBC Section 3108.4.2.

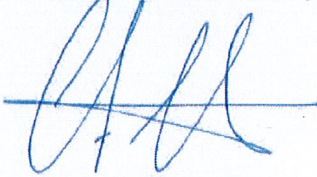
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed antenna modification **with the implementation of the proposed structural modifications in Section 4.0 of this report.**

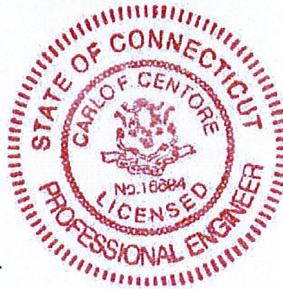
The analysis is based, in part, on the information provided to this office by AT&T Mobility. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

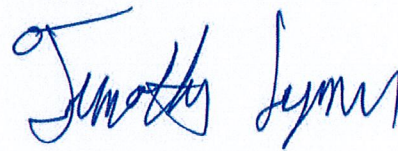
Respectfully Submitted by:



Carlo F. Centore, PE
Principal ~ Structural Engineer



Prepared by:



Timothy J. Lynn, PE
Structural Engineer

*Standard Conditions for Furnishing of
Professional Engineering Services on
Existing Structures*

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

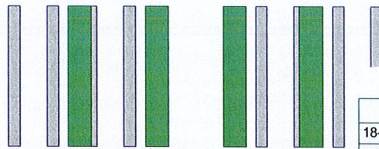
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of CENTEK engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provide to CENTEK engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. CENTEK engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

General Description of Structural Analysis Program

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
18-ft Doppler	68.5	Doppler Platform Support	57
(4) HPA-65R-BUU-H8 (ATI - Proposed)	67	Doppler Platform Support	57
(4) HPA-65R-BUU-H8 (ATI - Proposed)	67	LPA-171063-8CF (Verizon - Existing)	55
(4) HPA-65R-BUU-H8 (ATI - Proposed)	67	LPA-80080-6CF (Verizon - Existing)	55
(4) HPA-65R-BUU-H8 (ATI - Proposed)	67	LPA-80063-6CF (Verizon - Existing)	55
(7) RRUS-11 (ATI - Proposed)	67	LPA-80080-6CF (Verizon - Existing)	55
(7) RRUS-11 (ATI - Proposed)	67	LPA-171063-8CF (Verizon - Existing)	55
(7) RRUS-11 (ATI - Proposed)	67	BXA-70080-6CF (Verizon - Existing)	55
(2) A2 (ATI - Proposed)	67	13-ft Face Mount Frame (Verizon - Existing)	55
(2) A2 (ATI - Proposed)	67	13-ft Face Mount Frame (Verizon - Existing)	55
(2) A2 (ATI - Proposed)	67	LPA-80063-6CF (Verizon - Existing)	55
(4) DC6-48-60-18-8F Surge Arrestor (ATI - Proposed)	67	LPA-171063-8CF (Verizon - Existing)	55
Doppler Platform	60	APX75-866514-CT8 (Verizon - Existing)	55
Doppler Platform Support	57	LPA-171063-8CF (Verizon - Existing)	55

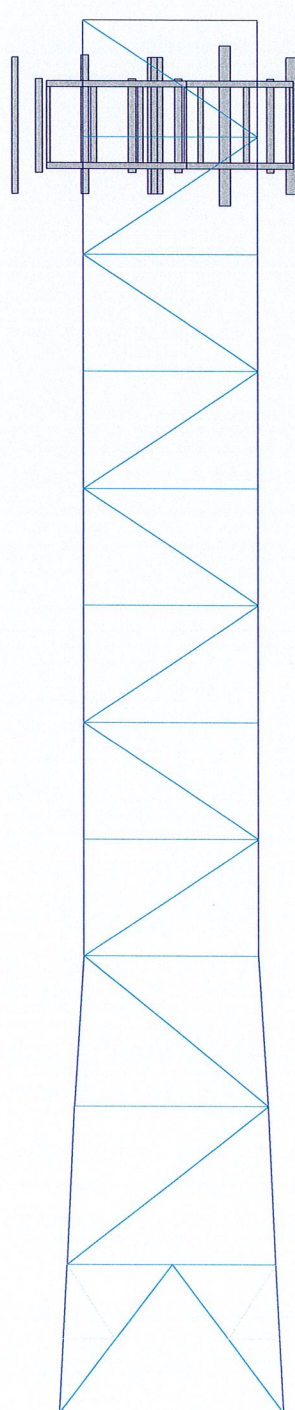
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

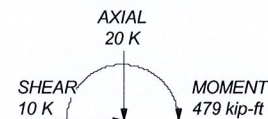
1. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 69 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. TOWER RATING: 98.6%

Section	T1	T2	T3	T4	T5	
Legs	P3.5x.226	A53-B-35	P2x.154	L3x3x1/4	2L2x2x3/16	
Leg Grade	A53-B-35	A53-B-35	P2x.154	L3x3x1/4	A36	
Diagonals	P2.5x.203	A53-B-35	P2x.154	L3x3x1/4	2L2x2x3/16	
Diagonal Grade		A53-B-35	P2x.154	L3x3x1/4	A36	
Top Girts	L3x5x1/4	N.A.	L3x3x1/4	L3x3x1/4	2L2x2x3/16	
Horizontals	L2 1/2x2 1/2x1/4	N.A.	L3x3x1/4	L3x3x1/4	2L2x2x3/16	
Red. Horizontals	N.A.	N.A.	L3x3x1/4	L3x3x1/4	2L2x2x3/16	
Red. Diagonals	N.A.	N.A.	L3x3x1/4	L3x3x1/4	2L2x2x3/16	
Face Width (ft)	7.58333	8 @ 5	1 @ 6.4	1 @ 6.8	1 @ 6.3	
# Panels @ (ft)						
Weight (K)	1.6	1.5	0.4	0.4	0.6	4.5
	59.5 ft	39.5 ft	19.5 ft	13.1 ft	6.3 ft	0.0 ft

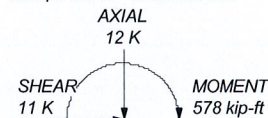


MAX. CORNER REACTIONS AT BASE:

DOWN: 73 K
UPLIFT: -64 K
SHEAR: 7 K



TORQUE 2 kip-ft
69 mph WIND - 0.5000 in ICE



TORQUE 1 kip-ft
REACTIONS - 80 mph WIND

Centek Engineering Inc.

63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 13140.CO2 - CT1178

Project: 60' Lattice Tower - 324 Montevideo Road, Avon, CT

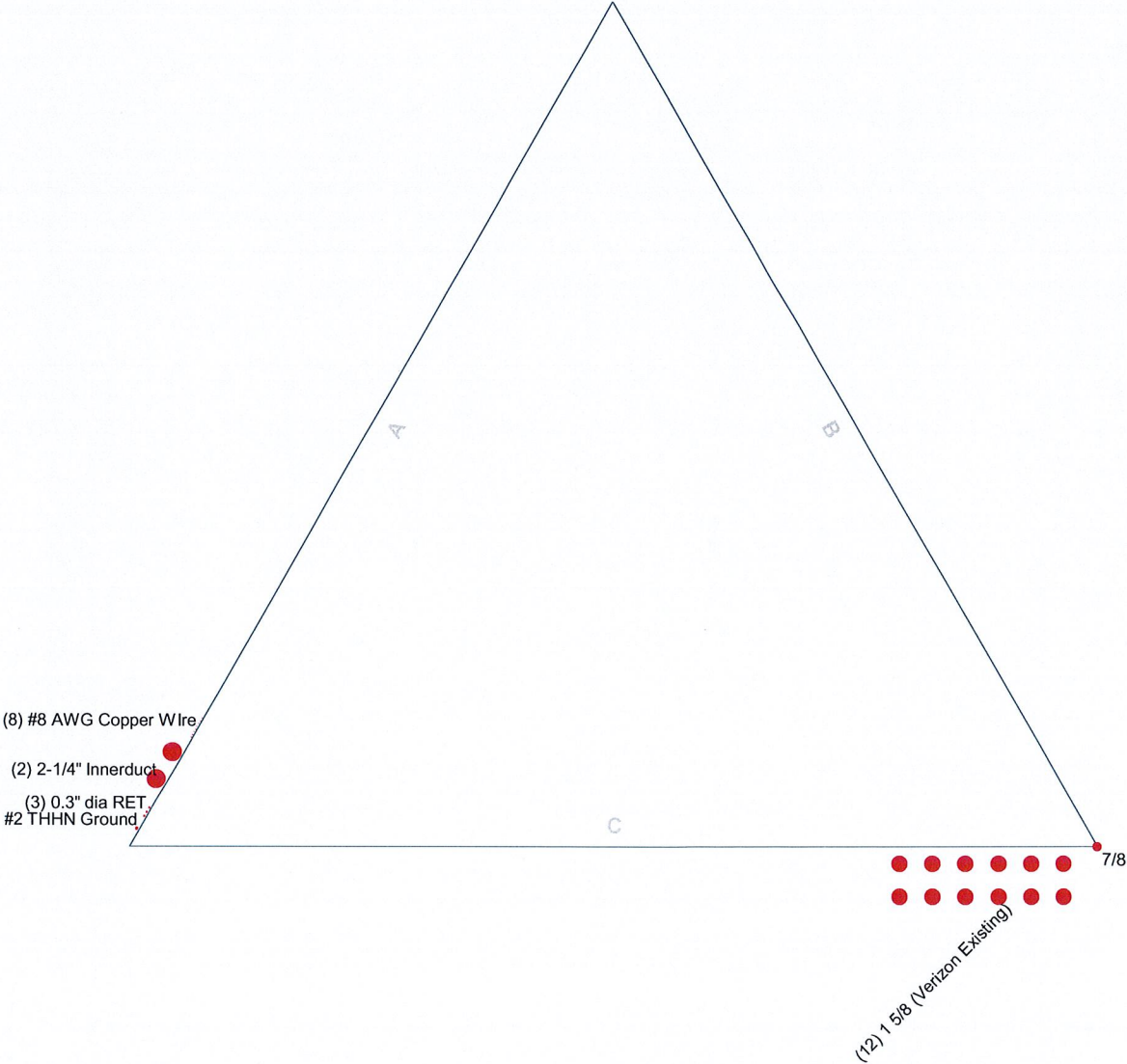
Client: AT&T Mobility Drawn by: T.JL App'd:

Code: TIA/EIA-222-F Date: 12/19/13 Scale: NTS

Path: J:\068114000\131402-AT&T CT1178-324 Montevideo Road\324 Montevideo Road Lattice Tower.dwg Dwg No. E-1

Feedline Plan

Round Flat App In Face App Out Face

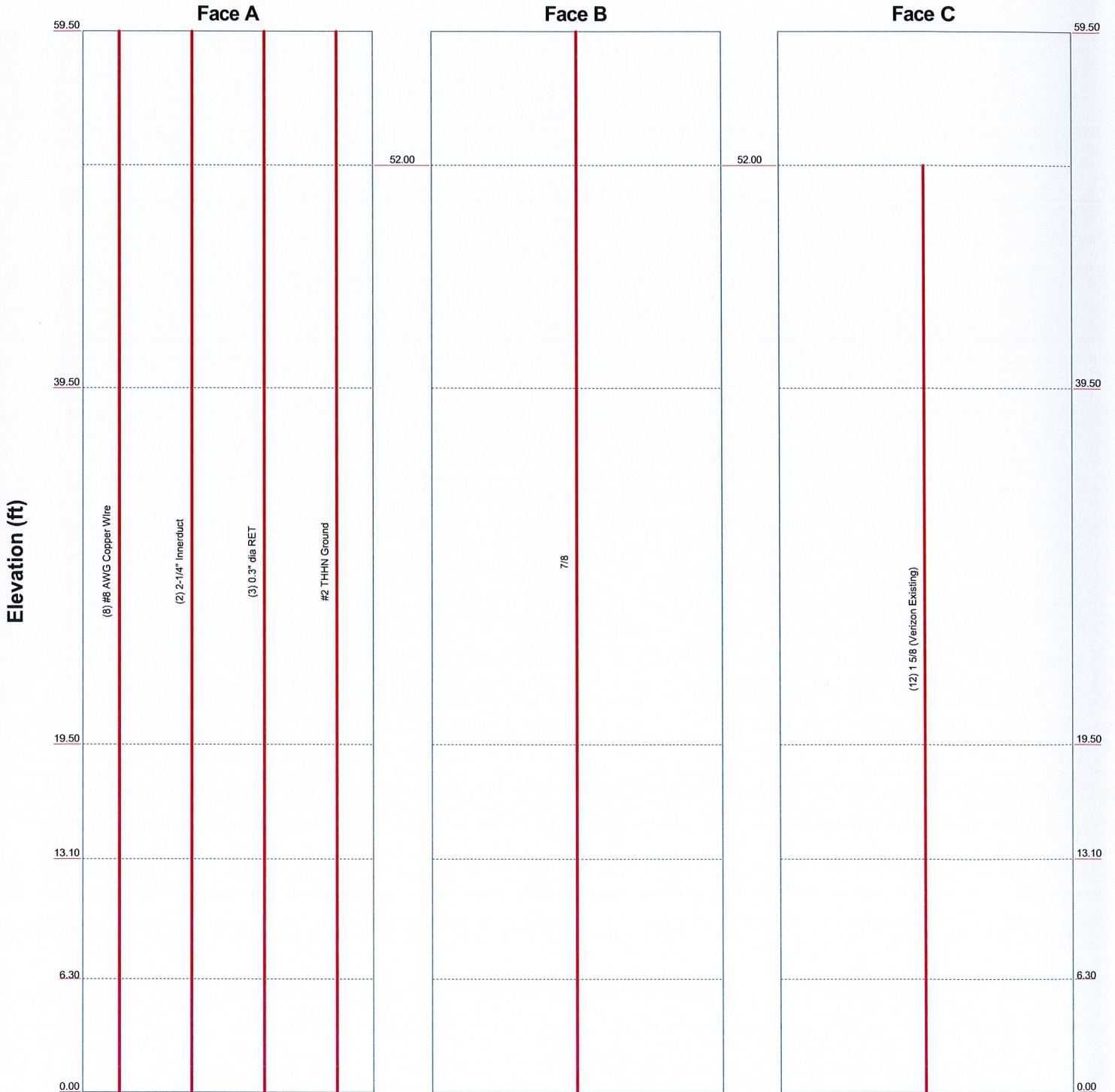


Centek Engineering Inc.		Job: 13140.CO2 - CT1178	
63-2 North Branford Rd.		Project: 60' Lattice Tower - 324 Montevideo Road, Avon, CT	
Branford, CT 06405		Client: AT&T Mobility	Drawn by: T.JL
Phone: (203) 488-0580		Code: TIA/EIA-222-F	Date: 12/19/13
FAX: (203) 488-8587		Path: J:\1314000\W002 - AT&T CT1178 - 35-mhz\Structure\New\210\at&t\60' Lattice Tower.dwg	Scale: NTS
			Dwg No. E-7

Feedline Distribution Chart

0' - 59'6"

Round Flat App In Face App Out Face Truss Leg



Centek Engineering Inc.

63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **13140.CO2 - CT1178**

Project: **60' Lattice Tower - 324 Montevideo Road, Avon, CT**

Client: AT&T Mobility

Drawn by: T.JL

App'd:

Code: TIA/EIA-222-F

Date: 12/19/13

Scale: NTS

Path:

Dwg No. E-7

J:\0041314000\W002 - AT&T CT1178 - Symbury\Branford\Rev 2\120408ERS Feedline Lattice Tower.dwg

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job 13140.CO2 - CT1178	Page 1 of 29
	Project 60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date 18:51:46 12/19/13
	Client AT&T Mobility	Designed by TJL

Tower Input Data

The main tower is a 3x free standing tower with an overall height of 59.50 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 7.58 ft at the top and 9.71 ft at the base.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Basic wind speed of 80 mph.

Nominal ice thickness of 0.5000 in.

Ice density of 56 pcf.

A wind speed of 69 mph is used in combination with ice.

Temperature drop of 50 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

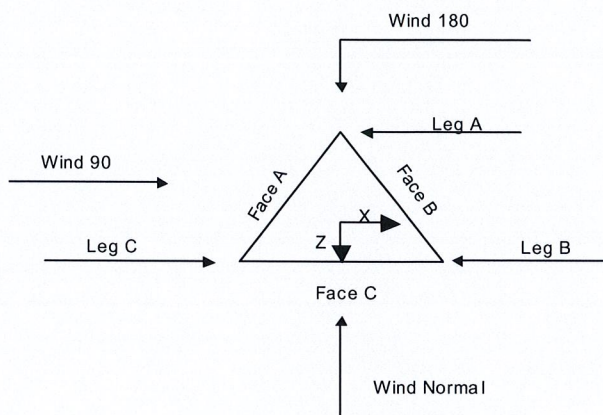
Stress ratio used in tower member design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

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

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	2 of 29
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	Client	AT&T Mobility	Designed by	TJL



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	59.50-39.50			7.58	1	20.00
T2	39.50-19.50			7.58	1	20.00
T3	19.50-13.10			7.58	1	6.40
T4	13.10-6.30			8.28	1	6.80
T5	6.30-0.00			8.97	1	6.30

Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	59.50-39.50	5.00	K Brace Left	No	Yes	0.0000	0.0000
T2	39.50-19.50	5.00	K Brace Left	No	Yes	0.0000	0.0000
T3	19.50-13.10	6.40	K Brace Right	No	Yes	0.0000	0.0000
T4	13.10-6.30	6.80	K Brace Left	No	Yes	0.0000	0.0000
T5	6.30-0.00	6.30	K1 Down	No	Yes	0.0000	0.0000

Tower Section Geometry (cont'd)

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	3 of 29
	Project	60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date	18:51:46 12/19/13
	Client	AT&T Mobility	Designed by	TJL

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 59.50-39.50	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Pipe	P2.5x.203	A53-B-35 (35 ksi)
T2 39.50-19.50	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Pipe	P2.5x.203	A53-B-35 (35 ksi)
T3 19.50-13.10	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Pipe	P2x.154	A53-B-35 (35 ksi)
T4 13.10-6.30	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Pipe	P2x.154	A53-B-35 (35 ksi)
T5 6.30-0.00	Pipe	P3.5x.226	A53-B-35 (35 ksi)	Single Angle	L3x3x3/16	A36 (36 ksi)

Tower 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
T1 59.50-39.50	Single Angle	L3x5x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 59.50-39.50	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T2 39.50-19.50	None	Single Angle		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x1/4	A36 (36 ksi)
T3 19.50-13.10	None	Single Angle		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T4 13.10-6.30	None	Single Angle		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 6.30-0.00	None	Single Angle		A36 (36 ksi)	Double Equal Angle	2L2x2x3/16	A36 (36 ksi)

Tower Section Geometry (cont'd)

Tower Elevation ft	Redundant Bracing Grade	Redundant Type	Redundant Size	K Factor
T5 6.30-0.00	A36 (36 ksi)	Horizontal (1) Diagonal (1)	Single Angle Single Angle	1 1

Designed by
TJL

[illegible]

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	Client	AT&T Mobility	Designed by	TJL

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T1	59.50-39.50	A	11.343	0.000	0.000	0.000	0.17
		B	1.850	0.000	0.000	0.000	0.01
		C	14.225	0.000	0.000	0.000	0.16
T2	39.50-19.50	A	11.343	0.000	0.000	0.000	0.17
		B	1.850	0.000	0.000	0.000	0.01
		C	21.650	0.000	0.000	0.000	0.25
T3	19.50-13.10	A	3.630	0.000	0.000	0.000	0.06
		B	0.592	0.000	0.000	0.000	0.00
		C	6.928	0.000	0.000	0.000	0.08
T4	13.10-6.30	A	3.857	0.000	0.000	0.000	0.06
		B	0.629	0.000	0.000	0.000	0.00
		C	7.361	0.000	0.000	0.000	0.08
T5	6.30-0.00	A	3.573	0.000	0.000	0.000	0.05
		B	0.583	0.000	0.000	0.000	0.00
		C	6.820	0.000	0.000	0.000	0.08

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	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
T1	59.50-39.50	A	0.500	17.177	6.416	0.000	0.000	0.30
		B		3.517	0.000	0.000	0.000	0.03
		C		22.142	0.000	0.000	0.000	0.38
T2	39.50-19.50	A	0.500	17.177	6.416	0.000	0.000	0.30
		B		3.517	0.000	0.000	0.000	0.03
		C		33.317	0.000	0.000	0.000	0.61
T3	19.50-13.10	A	0.500	5.497	2.053	0.000	0.000	0.10
		B		1.125	0.000	0.000	0.000	0.01
		C		10.661	0.000	0.000	0.000	0.20
T4	13.10-6.30	A	0.500	5.840	2.181	0.000	0.000	0.10
		B		1.196	0.000	0.000	0.000	0.01
		C		11.328	0.000	0.000	0.000	0.21
T5	6.30-0.00	A	0.500	5.411	2.021	0.000	0.000	0.10
		B		1.108	0.000	0.000	0.000	0.01
		C		10.495	0.000	0.000	0.000	0.19

Feed Line Shielding

Section	Elevation ft	Face	A_R ft ²	A_R Ice ft ²	A_F ft ²	A_F Ice ft ²
T1	59.50-39.50	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.710	1.751	0.541	0.815
T2	39.50-19.50	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	1.136	2.802	0.825	1.242

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	7 of 29
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	Client	AT&T Mobility	Designed by	TJL

Section	Elevation	Face	A_R	$A_{R_{Ice}}$	A_F	$A_{F_{Ice}}$
	ft		ft ²	ft ²	ft ²	ft ²
T3	19.50-13.10	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.252	0.663	0.248	0.373
T4	13.10-6.30	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.249	0.658	0.248	0.373
T5	6.30-0.00	A	0.000	0.000	0.000	0.000
		B	0.000	0.000	0.000	0.000
		C	0.000	0.679	1.037	1.560

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	$CP_{X_{Ice}}$	$CP_{Z_{Ice}}$
	ft	in	in	in	in
T1	59.50-39.50	-0.0915	5.4545	-0.6849	6.0638
T2	39.50-19.50	1.9161	6.9328	1.3795	7.5148
T3	19.50-13.10	2.2775	7.8327	1.7226	8.4770
T4	13.10-6.30	2.4968	8.4205	1.9145	9.1277
T5	6.30-0.00	1.5677	6.6384	0.7688	7.0145

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horiz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	$C_A A_A$ Front ft ²	$C_A A_A$ Side ft ²	Weight K
18-ft Doppler	C	None		0.0000	68.50	No Ice 203.47 1/2" Ice 205.47	203.47 205.47	2.00 4.40
Doppler Platform	C	None		0.0000	60.00	No Ice 0.00 1/2" Ice 0.00	0.00 0.00	1.00 1.30
Doppler Platform Support	A	None		0.0000	57.00	No Ice 3.17 1/2" Ice 3.87	3.17 3.87	0.10 0.14
Doppler Platform Support	B	None		0.0000	57.00	No Ice 3.17 1/2" Ice 3.87	3.17 3.87	0.10 0.14
Doppler Platform Support	C	None		0.0000	57.00	No Ice 3.17 1/2" Ice 3.87	3.17 3.87	0.10 0.14
13-ft Face Mount Frame (Verizon - Existing)	B	From Face	0.50 0.00 0.00	0.0000	55.00	No Ice 6.50 1/2" Ice 7.80	6.50 7.80	0.30 0.35
13-ft Face Mount Frame (Verizon - Existing)	A	From Face	0.50 0.00 0.00	0.0000	55.00	No Ice 6.50 1/2" Ice 7.80	6.50 7.80	0.30 0.35
LPA-80063-6CF (Verizon - Existing)	B	From Face	0.50 6.00 0.00	0.0000	55.00	No Ice 10.31 1/2" Ice 10.87	9.01 9.55	0.03 0.10
LPA-171063-8CF (Verizon - Existing)	B	From Face	0.50 4.00 0.00	0.0000	55.00	No Ice 3.69 1/2" Ice 4.06	3.69 4.06	0.01 0.04

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	8 of 29
	Project	60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date	18:51:46 12/19/13
	Client	AT&T Mobility	Designed by	TJL

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
APX75-866514-CT8 (Verizon - Existing)	B	From Face	0.50 0.00 0.00	0.0000	55.00	No Ice 1/2" Ice 10.38	4.71 5.21	0.03 0.08
LPA-171063-8CF (Verizon - Existing)	B	From Face	0.50 -4.00 0.00	0.0000	55.00	No Ice 1/2" Ice 4.06	3.69 4.06	0.01 0.04
LPA-80063-6CF (Verizon - Existing)	B	From Face	0.50 -6.00 0.00	0.0000	55.00	No Ice 1/2" Ice 10.87	9.01 9.55	0.03 0.10
LPA-80080-6CF (Verizon - Existing)	A	From Face	0.50 -8.75 0.00	0.0000	55.00	No Ice 1/2" Ice 4.76	9.09 9.64	0.02 0.07
LPA-171063-8CF (Verizon - Existing)	A	From Face	0.50 -6.75 0.00	0.0000	55.00	No Ice 1/2" Ice 4.06	3.69 4.06	0.01 0.04
BXA-70080-6CF (Verizon - Existing)	A	From Face	0.50 -2.75 0.00	0.0000	55.00	No Ice 1/2" Ice 6.22	4.56 5.00	0.02 0.05
LPA-171063-8CF (Verizon - Existing)	A	From Face	0.50 1.25 0.00	0.0000	55.00	No Ice 1/2" Ice 4.06	3.69 4.06	0.01 0.04
LPA-80080-6CF (Verizon - Existing)	A	From Face	0.50 3.25 0.00	0.0000	55.00	No Ice 1/2" Ice 4.76	9.09 9.64	0.02 0.07
(4) HPA-65R-BUU-H8 (AT&T - Proposed)	A	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.07 0.14
(4) HPA-65R-BUU-H8 (AT&T - Proposed)	B	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.07 0.14
(4) HPA-65R-BUU-H8 (AT&T - Proposed)	C	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.07 0.14
(7) RRUS-11 (AT&T - Proposed)	A	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.05 0.07
(7) RRUS-11 (AT&T - Proposed)	B	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.05 0.07
(7) RRUS-11 (AT&T - Proposed)	C	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.05 0.07
(2) A2 (AT&T - Proposed)	A	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.02 0.03
(2) A2 (AT&T - Proposed)	B	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.02 0.03
(2) A2 (AT&T - Proposed)	C	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.02 0.03
(4) DC6-48-60-18-8F Surge Arrestor (AT&T - Proposed)	A	From Face	4.00 0.00 0.00	0.0000	67.00	No Ice 1/2" Ice 0.00	0.00 0.00	0.02 0.04

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Tower Pressures - No Ice

$$G_H = 1.202$$

Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 59.50-39.50	49.50	1.123	18	158.333	A	6.344	32.986	13.333	33.90	0.000	0.000
					B	6.344	23.492		44.69	0.000	0.000
					C	5.802	35.157		32.55	0.000	0.000
T2 39.50-19.50	29.50	1	16	158.333	A	6.042	32.986	13.333	34.16	0.000	0.000
					B	6.042	23.492		45.15	0.000	0.000
					C	5.217	42.156		28.15	0.000	0.000
T3 19.50-13.10	16.30	1	16	52.903	A	1.812	9.847	4.275	36.67	0.000	0.000
					B	1.812	6.809		49.59	0.000	0.000
					C	1.565	12.893		29.57	0.000	0.000
T4 13.10-6.30	9.70	1	16	60.920	A	1.987	10.495	4.541	36.38	0.000	0.000
					B	1.987	7.267		49.07	0.000	0.000
					C	1.739	13.750		29.32	0.000	0.000
T5 6.30-0.00	3.15	1	16	60.936	A	7.126	7.783	4.210	28.24	0.000	0.000
					B	7.126	4.792		35.32	0.000	0.000
					C	6.089	11.029		24.59	0.000	0.000

Tower Pressure - With Ice

$$G_H = 1.202$$

Section Elevation	z	K _Z	q _z	t _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face	C _A A _A Out Face
ft	ft		psf	in	ft ²		ft ²	ft ²	ft ²		ft ²	ft ²
T1 59.50-39.50	49.50	1.123	14	0.5000	160.000	A	12.760	47.460	16.667	27.68	0.000	0.000
						B	6.344	33.799		41.52	0.000	0.000
						C	5.529	50.673		29.66	0.000	0.000
T2 39.50-19.50	29.50	1	12	0.5000	160.000	A	12.457	47.460	16.667	27.82	0.000	0.000
						B	6.042	33.799		41.83	0.000	0.000
						C	4.800	60.797		25.41	0.000	0.000
T3 19.50-13.10	16.30	1	12	0.5000	53.437	A	3.866	14.204	5.344	29.57	0.000	0.000
						B	1.812	9.833		45.89	0.000	0.000
						C	1.440	18.706		26.53	0.000	0.000
T4 13.10-6.30	9.70	1	12	0.5000	61.487	A	4.168	15.159	5.676	29.37	0.000	0.000
						B	1.987	10.515		45.40	0.000	0.000
						C	1.614	19.989		26.28	0.000	0.000
T5 6.30-0.00	3.15	1	12	0.5000	61.462	A	9.147	13.596	5.262	23.14	0.000	0.000
						B	7.126	9.292		32.05	0.000	0.000
						C	5.565	18.001		22.33	0.000	0.000

Tower Pressure - Service

$$G_H = 1.202$$

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Section Elevation	z	K _Z	q _z	A _G	F a c e	A _F	A _R	A _{leg}	Leg %	C _A A _A In Face ft ²	C _A A _A Out Face ft ²
ft	ft		psf	ft ²		ft ²	ft ²	ft ²			
T1 59.50-39.50	49.50	1.123	7	158.333	A	6.344	32.986	13.333	33.90	0.000	0.000
					B	6.344	23.492		44.69	0.000	0.000
					C	5.802	35.157		32.55	0.000	0.000
T2 39.50-19.50	29.50	1	6	158.333	A	6.042	32.986	13.333	34.16	0.000	0.000
					B	6.042	23.492		45.15	0.000	0.000
					C	5.217	42.156		28.15	0.000	0.000
T3 19.50-13.10	16.30	1	6	52.903	A	1.812	9.847	4.275	36.67	0.000	0.000
					B	1.812	6.809		49.59	0.000	0.000
					C	1.565	12.893		29.57	0.000	0.000
T4 13.10-6.30	9.70	1	6	60.920	A	1.987	10.495	4.541	36.38	0.000	0.000
					B	1.987	7.267		49.07	0.000	0.000
					C	1.739	13.750		29.32	0.000	0.000
T5 6.30-0.00	3.15	1	6	60.936	A	7.126	7.783	4.210	28.24	0.000	0.000
					B	7.126	4.792		35.32	0.000	0.000
					C	6.089	11.029		24.59	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	1	1	26.184	1.44	72.08	C
59.50-39.50			B	0.188	2.635	0.588	1	1	20.160			
			C	0.259	2.412	0.604	1	1	27.042			
T2	0.43	1.52	A	0.246	2.448	0.601	1	1	25.866	1.41	70.51	C
39.50-19.50			B	0.187	2.642	0.588	1	1	19.849			
			C	0.299	2.298	0.616	1	1	31.170			
T3	0.14	0.39	A	0.22	2.529	0.595	1	1	7.669	0.44	68.55	C
19.50-13.10			B	0.163	2.724	0.584	1	1	5.786			
			C	0.273	2.369	0.608	1	1	9.405			
T4	0.15	0.42	A	0.205	2.58	0.591	1	1	8.194	0.48	70.41	C
13.10-6.30			B	0.152	2.764	0.582	1	1	6.215			
			C	0.254	2.425	0.603	1	1	10.030			
T5	0.14	0.57	A	0.245	2.454	0.601	1	1	11.800	0.59	94.06	C
6.30-0.00			B	0.196	2.611	0.59	1	1	9.951			
			C	0.281	2.348	0.61	1	1	12.820			
Sum Weight:	1.20	4.48						OTM	126.62 kip-ft	4.36		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	0.825	1	25.073	1.39	69.37	C
59.50-39.50			B	0.188	2.635	0.588	0.825	1	19.050			
			C	0.259	2.412	0.604	0.825	1	26.026			
T2	0.43	1.52	A	0.246	2.448	0.601	0.825	1	24.808	1.37	68.44	C
39.50-19.50			B	0.187	2.642	0.588	0.825	1	18.792			
			C	0.299	2.298	0.616	0.825	1	30.257			
T3	0.14	0.39	A	0.22	2.529	0.595	0.825	1	7.352	0.43	66.55	C

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
19.50-13.10			B	0.163	2.724	0.584	0.825	1	5.468			
			C	0.273	2.369	0.608	0.825	1	9.131			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.825	1	7.846	0.46	68.27	C
			B	0.152	2.764	0.582	0.825	1	5.867			
			C	0.254	2.425	0.603	0.825	1	9.726			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	0.825	1	10.553	0.54	86.24	C
			B	0.196	2.611	0.59	0.825	1	8.704			
			C	0.281	2.348	0.61	0.825	1	11.754			
Sum Weight:	1.20	4.48						OTM	122.22 kip-ft	4.19		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	0.8	1	24.915	1.38	68.98	C
59.50-39.50			B	0.188	2.635	0.588	0.8	1	18.891			
			C	0.259	2.412	0.604	0.8	1	25.881			
T2	0.43	1.52	A	0.246	2.448	0.601	0.8	1	24.657	1.36	68.15	C
39.50-19.50			B	0.187	2.642	0.588	0.8	1	18.641			
			C	0.299	2.298	0.616	0.8	1	30.127			
T3	0.14	0.39	A	0.22	2.529	0.595	0.8	1	7.306	0.42	66.27	C
19.50-13.10			B	0.163	2.724	0.584	0.8	1	5.423			
			C	0.273	2.369	0.608	0.8	1	9.092			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.8	1	7.796	0.46	67.97	C
			B	0.152	2.764	0.582	0.8	1	5.818			
			C	0.254	2.425	0.603	0.8	1	9.682			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	0.8	1	10.374	0.54	85.12	C
			B	0.196	2.611	0.59	0.8	1	8.526			
			C	0.281	2.348	0.61	0.8	1	11.602			
Sum Weight:	1.20	4.48						OTM	121.59 kip-ft	4.17		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	0.85	1	25.232	1.40	69.76	C
59.50-39.50			B	0.188	2.635	0.588	0.85	1	19.208			
			C	0.259	2.412	0.604	0.85	1	26.171			
T2	0.43	1.52	A	0.246	2.448	0.601	0.85	1	24.959	1.37	68.74	C
39.50-19.50			B	0.187	2.642	0.588	0.85	1	18.943			
			C	0.299	2.298	0.616	0.85	1	30.388			
T3	0.14	0.39	A	0.22	2.529	0.595	0.85	1	7.397	0.43	66.84	C
19.50-13.10			B	0.163	2.724	0.584	0.85	1	5.514			
			C	0.273	2.369	0.608	0.85	1	9.170			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.85	1	7.896	0.47	68.58	C

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T5 6.30-0.00	0.14	0.57	B	0.152	2.764	0.582	0.85	1	5.917			
			C	0.254	2.425	0.603	0.85	1	9.769			
			A	0.245	2.454	0.601	0.85	1	10.731	0.55	87.36	C
			B	0.196	2.611	0.59	0.85	1	8.882			
			C	0.281	2.348	0.61	0.85	1	11.906			
Sum Weight:	1.20	4.48						OTM	122.85	4.21		
									kip-ft			

Tower Forces - With Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.72	2.19	A	0.376	2.113	0.642	1	1	43.240	1.51	75.72	A
59.50-39.50			B	0.251	2.435	0.602	1	1	26.694			
			C	0.351	2.169	0.633	1	1	37.601			
T2	0.95	2.11	A	0.374	2.117	0.642	1	1	42.904	1.35	67.42	C
39.50-19.50			B	0.249	2.44	0.602	1	1	26.376			
			C	0.41	2.045	0.656	1	1	44.666			
T3	0.30	0.56	A	0.338	2.199	0.628	1	1	12.790	0.42	65.55	C
19.50-13.10			B	0.218	2.537	0.594	1	1	7.655			
			C	0.377	2.111	0.642	1	1	13.458			
T4 13.10-6.30	0.32	0.60	A	0.314	2.259	0.62	1	1	13.573	0.46	67.17	C
			B	0.203	2.585	0.591	1	1	8.202			
			C	0.351	2.168	0.633	1	1	14.267			
T5 6.30-0.00	0.30	0.89	A	0.37	2.126	0.64	1	1	17.846	0.56	88.93	A
			B	0.267	2.387	0.606	1	1	12.761			
			C	0.383	2.098	0.645	1	1	17.176			
Sum Weight:	2.58	6.36						OTM	127.78	4.30		
									kip-ft			

Tower Forces - With Ice - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.72	2.19	A	0.376	2.113	0.642	0.825	1	41.008	1.44	71.81	A
59.50-39.50			B	0.251	2.435	0.602	0.825	1	25.584			
			C	0.351	2.169	0.633	0.825	1	36.634			
T2	0.95	2.11	A	0.374	2.117	0.642	0.825	1	40.724	1.32	66.15	C
39.50-19.50			B	0.249	2.44	0.602	0.825	1	25.319			
			C	0.41	2.045	0.656	0.825	1	43.826			
T3	0.30	0.56	A	0.338	2.199	0.628	0.825	1	12.114	0.41	64.32	C
19.50-13.10			B	0.218	2.537	0.594	0.825	1	7.338			
			C	0.377	2.111	0.642	0.825	1	13.206			
T4 13.10-6.30	0.32	0.60	A	0.314	2.259	0.62	0.825	1	12.844	0.45	65.84	C
			B	0.203	2.585	0.591	0.825	1	7.854			
			C	0.351	2.168	0.633	0.825	1	13.984			
T5 6.30-0.00	0.30	0.89	A	0.37	2.126	0.64	0.825	1	16.245	0.51	80.96	A

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Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
									kip-ft			

Tower Forces - Service - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 59.50-39.50	0.34	1.58	A	0.248	2.442	0.601	1	1	26.184	0.56	28.16	C
			B	0.188	2.635	0.588	1	1	20.160			
			C	0.259	2.412	0.604	1	1	27.042			
T2 39.50-19.50	0.43	1.52	A	0.246	2.448	0.601	1	1	25.866	0.55	27.54	C
			B	0.187	2.642	0.588	1	1	19.849			
			C	0.299	2.298	0.616	1	1	31.170			
T3 19.50-13.10	0.14	0.39	A	0.22	2.529	0.595	1	1	7.669	0.17	26.78	C
			B	0.163	2.724	0.584	1	1	5.786			
			C	0.273	2.369	0.608	1	1	9.405			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	1	1	8.194	0.19	27.50	C
			B	0.152	2.764	0.582	1	1	6.215			
			C	0.254	2.425	0.603	1	1	10.030			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	1	1	11.800	0.23	36.74	C
			B	0.196	2.611	0.59	1	1	9.951			
			C	0.281	2.348	0.61	1	1	12.820			
Sum Weight:	1.20	4.48						OTM	49.46 kip-ft	1.70		

Tower Forces - Service - Wind 45 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1 59.50-39.50	0.34	1.58	A	0.248	2.442	0.601	0.825	1	25.073	0.54	27.10	C
			B	0.188	2.635	0.588	0.825	1	19.050			
			C	0.259	2.412	0.604	0.825	1	26.026			
T2 39.50-19.50	0.43	1.52	A	0.246	2.448	0.601	0.825	1	24.808	0.53	26.74	C
			B	0.187	2.642	0.588	0.825	1	18.792			
			C	0.299	2.298	0.616	0.825	1	30.257			
T3 19.50-13.10	0.14	0.39	A	0.22	2.529	0.595	0.825	1	7.352	0.17	26.00	C
			B	0.163	2.724	0.584	0.825	1	5.468			
			C	0.273	2.369	0.608	0.825	1	9.131			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.825	1	7.846	0.18	26.67	C
			B	0.152	2.764	0.582	0.825	1	5.867			
			C	0.254	2.425	0.603	0.825	1	9.726			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	0.825	1	10.553	0.21	33.69	C
			B	0.196	2.611	0.59	0.825	1	8.704			
			C	0.281	2.348	0.61	0.825	1	11.754			
Sum Weight:	1.20	4.48						OTM	47.74 kip-ft	1.64		

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Tower Forces - Service - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	0.8	1	24.915	0.54	26.95	C
59.50-39.50			B	0.188	2.635	0.588	0.8	1	18.891			
			C	0.259	2.412	0.604	0.8	1	25.881			
T2	0.43	1.52	A	0.246	2.448	0.601	0.8	1	24.657	0.53	26.62	C
39.50-19.50			B	0.187	2.642	0.588	0.8	1	18.641			
			C	0.299	2.298	0.616	0.8	1	30.127			
T3	0.14	0.39	A	0.22	2.529	0.595	0.8	1	7.306	0.17	25.89	C
19.50-13.10			B	0.163	2.724	0.584	0.8	1	5.423			
			C	0.273	2.369	0.608	0.8	1	9.092			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.8	1	7.796	0.18	26.55	C
			B	0.152	2.764	0.582	0.8	1	5.818			
			C	0.254	2.425	0.603	0.8	1	9.682			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	0.8	1	10.374	0.21	33.25	C
			B	0.196	2.611	0.59	0.8	1	8.526			
			C	0.281	2.348	0.61	0.8	1	11.602			
Sum Weight:	1.20	4.48						OTM	47.50 kip-ft	1.63		

Tower Forces - Service - Wind 90 To Face

Section Elevation	Add Weight	Self Weight	F a c e	e	C _F	R _R	D _F	D _R	A _E	F	w	Ctrl. Face
ft	K	K							ft ²	K	plf	
T1	0.34	1.58	A	0.248	2.442	0.601	0.85	1	25.232	0.54	27.25	C
59.50-39.50			B	0.188	2.635	0.588	0.85	1	19.208			
			C	0.259	2.412	0.604	0.85	1	26.171			
T2	0.43	1.52	A	0.246	2.448	0.601	0.85	1	24.959	0.54	26.85	C
39.50-19.50			B	0.187	2.642	0.588	0.85	1	18.943			
			C	0.299	2.298	0.616	0.85	1	30.388			
T3	0.14	0.39	A	0.22	2.529	0.595	0.85	1	7.397	0.17	26.11	C
19.50-13.10			B	0.163	2.724	0.584	0.85	1	5.514			
			C	0.273	2.369	0.608	0.85	1	9.170			
T4 13.10-6.30	0.15	0.42	A	0.205	2.58	0.591	0.85	1	7.896	0.18	26.79	C
			B	0.152	2.764	0.582	0.85	1	5.917			
			C	0.254	2.425	0.603	0.85	1	9.769			
T5 6.30-0.00	0.14	0.57	A	0.245	2.454	0.601	0.85	1	10.731	0.21	34.12	C
			B	0.196	2.611	0.59	0.85	1	8.882			
			C	0.281	2.348	0.61	0.85	1	11.906			
Sum Weight:	1.20	4.48						OTM	47.99 kip-ft	1.65		

Force Totals

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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	1.63					
Bracing Weight	2.85					
Total Member Self-Weight	4.48			1.50	0.27	
Total Weight	11.86			1.50	0.27	
Wind 0 deg - No Ice		0.16	-11.18	-567.19	-8.40	-0.21
Wind 30 deg - No Ice		5.65	-9.63	-492.07	-289.49	0.44
Wind 45 deg - No Ice		7.89	-7.90	-403.64	-404.58	0.73
Wind 60 deg - No Ice		9.58	-5.63	-287.84	-491.85	0.97
Wind 90 deg - No Ice		11.03	-0.16	-7.17	-564.24	1.28
Wind 120 deg - No Ice		9.60	5.45	278.34	-487.54	1.28
Wind 135 deg - No Ice		7.67	7.67	394.38	-392.32	1.06
Wind 150 deg - No Ice		5.38	9.48	486.40	-274.48	0.83
Wind 180 deg - No Ice		-0.16	10.98	565.15	8.93	0.23
Wind 210 deg - No Ice		-5.65	9.63	495.06	290.02	-0.44
Wind 225 deg - No Ice		-7.89	7.90	406.64	405.11	-0.73
Wind 240 deg - No Ice		-9.75	5.73	293.35	496.74	-1.07
Wind 270 deg - No Ice		-11.03	0.16	10.16	564.77	-1.28
Wind 300 deg - No Ice		-9.43	-5.36	-272.83	483.72	-1.20
Wind 315 deg - No Ice		-7.67	-7.67	-391.38	392.86	-1.06
Wind 330 deg - No Ice		-5.38	-9.48	-483.40	275.01	-0.83
Member Ice	1.88					
Total Weight Ice	19.93			4.24	-0.88	
Wind 0 deg - Ice		0.12	-9.61	-466.38	-7.53	-0.32
Wind 30 deg - Ice		4.83	-8.25	-402.95	-239.64	0.53
Wind 45 deg - Ice		6.75	-6.76	-329.71	-334.59	0.91
Wind 60 deg - Ice		8.21	-4.81	-233.97	-406.54	1.22
Wind 90 deg - Ice		9.46	-0.12	-2.40	-466.89	1.62
Wind 120 deg - Ice		8.26	4.70	233.80	-404.84	1.64
Wind 135 deg - Ice		6.58	6.59	328.80	-325.20	1.37
Wind 150 deg - Ice		4.62	8.13	404.79	-228.13	1.09
Wind 180 deg - Ice		-0.12	9.41	469.16	5.76	0.33
Wind 210 deg - Ice		-4.83	8.25	411.43	237.87	-0.53
Wind 225 deg - Ice		-6.75	6.76	338.19	332.82	-0.91
Wind 240 deg - Ice		-8.38	4.91	245.31	409.72	-1.32
Wind 270 deg - Ice		-9.46	0.12	10.88	465.12	-1.62
Wind 300 deg - Ice		-8.09	-4.60	-222.46	398.13	-1.54
Wind 315 deg - Ice		-6.58	-6.59	-320.31	323.43	-1.37
Wind 330 deg - Ice		-4.62	-8.13	-396.30	226.37	-1.09
Total Weight	11.86			1.50	0.27	
Wind 0 deg - Service		0.06	-4.37	-223.26	-2.92	-0.08
Wind 30 deg - Service		2.21	-3.76	-193.92	-112.72	0.17
Wind 45 deg - Service		3.08	-3.08	-159.38	-157.67	0.29
Wind 60 deg - Service		3.74	-2.20	-114.14	-191.76	0.38
Wind 90 deg - Service		4.31	-0.06	-4.50	-220.04	0.50
Wind 120 deg - Service		3.75	2.13	107.02	-190.08	0.50
Wind 135 deg - Service		3.00	3.00	152.35	-152.89	0.41
Wind 150 deg - Service		2.10	3.70	188.29	-106.85	0.33
Wind 180 deg - Service		-0.06	4.29	219.06	3.85	0.09
Wind 210 deg - Service		-2.21	3.76	191.68	113.66	-0.17
Wind 225 deg - Service		-3.08	3.08	157.14	158.61	-0.29
Wind 240 deg - Service		-3.81	2.24	112.88	194.40	-0.42
Wind 270 deg - Service		-4.31	0.06	2.27	220.98	-0.50
Wind 300 deg - Service		-3.68	-2.09	-108.28	189.32	-0.47
Wind 315 deg - Service		-3.00	-3.00	-154.59	153.82	-0.41
Wind 330 deg - Service		-2.10	-3.70	-190.53	107.79	-0.33

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Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	59.5 - 39.5	Leg	Max Tension	5	23.15	0.30	-0.67
			Max. Compression	13	-28.49	0.79	-0.18
			Max. Mx	6	18.68	-1.03	0.08
			Max. My	3	-23.84	-0.37	0.98
			Max. Vy	14	1.68	-0.15	0.25
		Diagonal	Max. Vx	10	-1.67	0.25	0.44
			Max Tension	11	6.38	0.00	0.00
			Max. Compression	3	-6.46	0.00	0.00
			Max. Mx	20	3.11	0.06	0.00
			Max. My	27	-0.05	0.00	-0.00
		Horizontal	Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	27	0.00	0.00	0.00
			Max Tension	5	0.89	0.00	0.00
			Max. Compression	13	-0.86	0.00	0.00
			Max. Mx	32	0.27	-0.05	0.00
		Top Girt	Max. My	26	0.59	0.00	0.00
			Max. Vy	32	0.02	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
			Max Tension	5	1.95	0.00	0.00
			Max. Compression	13	-1.89	0.00	0.00
T2	39.5 - 19.5	Leg	Max. Mx	18	0.02	-0.07	0.00
			Max. My	24	0.74	0.00	-0.00
			Max. Vy	18	0.04	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Diagonal	Max Tension	5	49.36	0.22	-0.88
			Max. Compression	13	-56.34	0.85	-0.47
			Max. Mx	14	34.52	1.18	0.19
			Max. My	3	-47.58	-0.24	1.14
			Max. Vy	7	0.36	-0.79	-0.45
		Horizontal	Max. Vx	2	-0.34	-0.02	0.98
			Max Tension	11	7.32	0.00	0.00
			Max. Compression	3	-7.40	0.00	0.00
			Max. Mx	20	5.38	0.06	0.00
			Max. My	22	-0.22	0.00	-0.00
T3	19.5 - 13.1	Leg	Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	22	-0.00	0.00	0.00
			Max Tension	5	54.97	0.27	0.57
			Max. Compression	13	-62.45	0.77	0.16
		Diagonal	Max. Mx	6	-52.41	0.88	-0.02
			Max. My	2	-61.52	-0.30	-0.72
			Max. Vy	12	-0.19	0.85	0.09
			Max. Vx	31	-0.16	0.36	0.31
			Max Tension	3	3.68	0.00	0.00
		Horizontal	Max. Compression	6	-3.72	0.00	0.00
			Max. Mx	20	3.17	0.05	0.00
			Max. My	22	-0.37	0.00	-0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	22	0.00	0.00	0.00
T4	13.1 - 6.3	Leg	Max Tension	5	1.51	0.00	0.00
			Max. Compression	13	-1.84	0.00	0.00
			Max. Mx	24	0.68	-0.05	0.00
			Max. My	31	0.83	0.00	0.00
			Max. Vy	24	0.03	0.00	0.00
			Max. Vx	31	-0.00	0.00	0.00
			Max Tension	5	59.01	0.18	-0.57
			Max. Compression	13	-62.45	0.77	0.16

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Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T5	6.3 - 0	Diagonal	Max. Compression	13	-66.95	0.18	-0.26
			Max. Mx	6	49.72	-0.29	-0.16
			Max. My	4	-21.26	-0.10	-0.71
			Max. Vy	15	0.09	-0.25	0.20
			Max. Vx	6	0.20	0.08	-0.57
			Max Tension	6	4.14	0.00	0.00
			Max. Compression	14	-4.16	0.00	0.00
			Max. Mx	29	3.26	0.06	0.00
			Max. My	24	0.22	0.00	-0.00
			Max. Vy	29	-0.02	0.00	0.00
		Horizontal	Max. Vx	24	0.00	0.00	0.00
			Max Tension	13	1.16	0.00	0.00
			Max. Compression	13	-1.16	0.00	0.00
			Max. Mx	18	0.11	-0.07	0.00
			Max. My	25	0.95	0.00	0.00
			Max. Vy	18	0.03	0.00	0.00
			Max. Vx	25	-0.00	0.00	0.00
			Max Tension	5	60.34	0.24	0.46
		Diagonal	Max. Compression	13	-68.79	1.29	0.09
			Max. Mx	13	-68.74	1.29	0.09
			Max. My	6	-58.47	-0.19	-0.73
			Max. Vy	13	-0.53	1.29	0.09
			Max. Vx	5	-0.30	-0.05	-0.71
			Max Tension	6	2.83	0.12	0.00
			Max. Compression	14	-2.89	0.00	0.00
			Max. Mx	13	-1.98	-0.17	-0.00
			Max. My	30	-1.92	-0.13	0.00
			Max. Vy	13	-0.05	0.00	0.00
		Horizontal	Max. Vx	30	-0.00	0.00	0.00
			Max Tension	14	2.66	-0.02	-0.01
			Max. Compression	6	-2.94	-0.02	-0.01
			Max. Mx	5	0.62	-0.06	-0.00
			Max. My	23	-2.65	-0.01	-0.01
			Max. Vy	27	-0.03	-0.04	-0.01
			Max. Vx	23	0.00	0.00	0.00
			Max Tension	13	1.19	0.00	0.00
		Redund Horz 1 Bracing	Max. Compression	13	-1.19	0.00	0.00
			Max. Mx	20	0.90	-0.00	0.00
			Max. My	28	0.92	0.00	0.00
			Max. Vy	31	-0.00	0.00	0.00
			Max. Vx	28	-0.00	0.00	0.00
		Redund Diag 1 Bracing	Max Tension	13	1.00	0.00	0.00
			Max. Compression	13	-1.00	0.00	0.00
			Max. Mx	30	0.87	-0.00	0.00
			Max. My	24	0.33	0.00	0.00
			Max. Vy	30	0.00	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	13	72.66	6.22	-3.44
	Max. H _x	13	72.66	6.22	-3.44

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Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg B	Max. H _z	4	-61.82	-5.31	3.16
	Min. Vert	5	-63.93	-5.61	3.10
	Min. H _x	5	-63.93	-5.61	3.10
	Min. H _z	12	69.96	5.84	-3.45
	Max. Vert	7	70.81	-6.01	-3.45
	Max. H _x	15	-62.20	5.40	3.11
	Max. H _z	16	-59.88	5.13	3.17
	Min. Vert	15	-62.20	5.40	3.11
Leg A	Min. H _x	7	70.81	-6.01	-3.45
	Min. H _z	8	67.91	-5.65	-3.47
	Max. Vert	2	71.50	-0.09	7.02
	Max. H _x	14	2.74	0.63	0.15
	Max. H _z	2	71.50	-0.09	7.02
	Min. Vert	10	-63.37	0.09	-6.33
	Min. H _x	6	4.81	-0.63	0.47
	Min. H _z	10	-63.37	0.09	-6.33

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	11.86	0.00	-0.00	1.50	0.27	0.00
Dead+ Wind 0 deg - No Ice	11.86	0.16	-11.18	-567.93	-8.43	-0.22
Dead+ Wind 30 deg - No Ice	11.86	5.65	-9.63	-492.80	-289.92	0.44
Dead+ Wind 45 deg - No Ice	11.86	7.89	-7.89	-404.26	-405.19	0.73
Dead+ Wind 60 deg - No Ice	11.86	9.58	-5.63	-288.29	-492.60	0.97
Dead+ Wind 90 deg - No Ice	11.86	11.02	-0.16	-7.20	-565.06	1.29
Dead+ Wind 120 deg - No Ice	11.86	9.60	5.45	278.68	-488.17	1.29
Dead+ Wind 135 deg - No Ice	11.86	7.67	7.67	394.95	-392.90	1.06
Dead+ Wind 150 deg - No Ice	11.86	5.38	9.48	487.09	-274.87	0.84
Dead+ Wind 180 deg - No Ice	11.86	-0.16	10.98	566.01	8.96	0.23
Dead+ Wind 210 deg - No Ice	11.86	-5.65	9.63	495.80	290.46	-0.44
Dead+ Wind 225 deg - No Ice	11.86	-7.89	7.89	407.26	405.73	-0.73
Dead+ Wind 240 deg - No Ice	11.86	-9.75	5.73	293.76	497.40	-1.07
Dead+ Wind 270 deg - No Ice	11.86	-11.02	0.16	10.21	565.60	-1.28
Dead+ Wind 300 deg - No Ice	11.86	-9.43	-5.35	-273.22	484.45	-1.20
Dead+ Wind 315 deg - No Ice	11.86	-7.67	-7.67	-391.96	393.43	-1.06
Dead+ Wind 330 deg - No Ice	11.86	-5.38	-9.48	-484.10	275.40	-0.84
Dead+Ice+Temp	19.93	0.00	-0.00	4.26	-0.88	-0.00
Dead+ Wind 0 deg+Ice+Temp	19.93	0.12	-9.61	-467.94	-7.57	-0.32
Dead+ Wind 30 deg+Ice+Temp	19.93	4.83	-8.25	-404.38	-240.50	0.53
Dead+ Wind 45 deg+Ice+Temp	19.93	6.75	-6.76	-330.90	-335.80	0.91
Dead+ Wind 60 deg+Ice+Temp	19.93	8.21	-4.81	-234.83	-408.02	1.23
Dead+ Wind 90 deg+Ice+Temp	19.93	9.46	-0.12	-2.43	-468.54	1.63
Dead+ Wind 120 deg+Ice+Temp	19.93	8.26	4.70	234.57	-406.19	1.65
Dead+ Wind 135 deg+Ice+Temp	19.93	6.58	6.59	329.96	-326.35	1.37
Dead+ Wind 150 deg+Ice+Temp	19.93	4.62	8.13	406.21	-228.93	1.10
Dead+ Wind 180 deg+Ice+Temp	19.93	-0.12	9.41	470.86	5.80	0.32
Dead+ Wind 210 deg+Ice+Temp	19.93	-4.83	8.25	412.90	238.73	-0.53
Dead+ Wind 225 deg+Ice+Temp	19.93	-6.75	6.76	339.42	334.03	-0.91
Dead+ Wind 240 deg+Ice+Temp	19.93	-8.38	4.91	246.15	411.10	-1.32
Dead+ Wind 270 deg+Ice+Temp	19.93	-9.46	0.12	10.95	466.77	-1.63
Dead+ Wind 300 deg+Ice+Temp	19.93	-8.09	-4.60	-223.25	399.56	-1.55
Dead+ Wind 315 deg+Ice+Temp	19.93	-6.58	-6.59	-321.45	324.58	-1.37
Dead+ Wind 330 deg+Ice+Temp	19.93	-4.62	-8.13	-397.70	227.15	-1.10
Dead+ Wind 0 deg - Service	11.86	0.06	-4.37	-220.93	-3.13	-0.08

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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+ Wind 30 deg - Service	11.86	2.21	-3.76	-191.59	-113.09	0.17
Dead+ Wind 45 deg - Service	11.86	3.08	-3.08	-157.00	-158.12	0.29
Dead+ Wind 60 deg - Service	11.86	3.74	-2.20	-111.70	-192.26	0.38
Dead+ Wind 90 deg - Service	11.86	4.31	-0.06	-1.90	-220.56	0.50
Dead+ Wind 120 deg - Service	11.86	3.75	2.13	109.77	-190.53	0.50
Dead+ Wind 135 deg - Service	11.86	2.99	3.00	155.20	-153.31	0.41
Dead+ Wind 150 deg - Service	11.86	2.10	3.70	191.19	-107.21	0.33
Dead+ Wind 180 deg - Service	11.86	-0.06	4.29	222.02	3.67	0.09
Dead+ Wind 210 deg - Service	11.86	-2.21	3.76	194.59	113.63	-0.17
Dead+ Wind 225 deg - Service	11.86	-3.08	3.08	160.00	158.66	-0.29
Dead+ Wind 240 deg - Service	11.86	-3.81	2.24	115.66	194.46	-0.42
Dead+ Wind 270 deg - Service	11.86	-4.31	0.06	4.90	221.10	-0.50
Dead+ Wind 300 deg - Service	11.86	-3.68	-2.09	-105.81	189.40	-0.47
Dead+ Wind 315 deg - Service	11.86	-2.99	-3.00	-152.20	153.85	-0.41
Dead+ Wind 330 deg - Service	11.86	-2.10	-3.70	-188.19	107.74	-0.33

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-11.86	0.00	-0.00	11.86	0.00	0.000%
2	0.16	-11.86	-11.18	-0.16	11.86	11.18	0.005%
3	5.65	-11.86	-9.63	-5.65	11.86	9.63	0.005%
4	7.89	-11.86	-7.90	-7.89	11.86	7.89	0.005%
5	9.58	-11.86	-5.63	-9.58	11.86	5.63	0.005%
6	11.03	-11.86	-0.16	-11.02	11.86	0.16	0.005%
7	9.60	-11.86	5.45	-9.60	11.86	-5.45	0.005%
8	7.67	-11.86	7.67	-7.67	11.86	-7.67	0.005%
9	5.38	-11.86	9.48	-5.38	11.86	-9.48	0.005%
10	-0.16	-11.86	10.98	0.16	11.86	-10.98	0.005%
11	-5.65	-11.86	9.63	5.65	11.86	-9.63	0.005%
12	-7.89	-11.86	7.90	7.89	11.86	-7.89	0.005%
13	-9.75	-11.86	5.73	9.75	11.86	-5.73	0.005%
14	-11.03	-11.86	0.16	11.02	11.86	-0.16	0.005%
15	-9.43	-11.86	-5.36	9.43	11.86	5.35	0.005%
16	-7.67	-11.86	-7.67	7.67	11.86	7.67	0.005%
17	-5.38	-11.86	-9.48	5.38	11.86	9.48	0.005%
18	0.00	-19.93	0.00	-0.00	19.93	0.00	0.000%
19	0.12	-19.93	-9.61	-0.12	19.93	9.61	0.000%
20	4.83	-19.93	-8.25	-4.83	19.93	8.25	0.000%
21	6.75	-19.93	-6.76	-6.75	19.93	6.76	0.000%
22	8.21	-19.93	-4.81	-8.21	19.93	4.81	0.000%
23	9.46	-19.93	-0.12	-9.46	19.93	0.12	0.000%
24	8.26	-19.93	4.70	-8.26	19.93	-4.70	0.000%
25	6.58	-19.93	6.59	-6.58	19.93	-6.59	0.000%
26	4.62	-19.93	8.13	-4.62	19.93	-8.13	0.000%
27	-0.12	-19.93	9.41	0.12	19.93	-9.41	0.000%
28	-4.83	-19.93	8.25	4.83	19.93	-8.25	0.000%
29	-6.75	-19.93	6.76	6.75	19.93	-6.76	0.000%
30	-8.38	-19.93	4.91	8.38	19.93	-4.91	0.000%
31	-9.46	-19.93	0.12	9.46	19.93	-0.12	0.000%
32	-8.09	-19.93	-4.60	8.09	19.93	4.60	0.000%
33	-6.58	-19.93	-6.59	6.58	19.93	6.59	0.000%
34	-4.62	-19.93	-8.13	4.62	19.93	8.13	0.000%
35	0.06	-11.86	-4.37	-0.06	11.86	4.37	0.003%
36	2.21	-11.86	-3.76	-2.21	11.86	3.76	0.003%
37	3.08	-11.86	-3.08	-3.08	11.86	3.08	0.003%

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Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
38	3.74	-11.86	-2.20	-3.74	11.86	2.20	0.003%
39	4.31	-11.86	-0.06	-4.31	11.86	0.06	0.003%
40	3.75	-11.86	2.13	-3.75	11.86	-2.13	0.003%
41	3.00	-11.86	3.00	-2.99	11.86	-3.00	0.003%
42	2.10	-11.86	3.70	-2.10	11.86	-3.70	0.003%
43	-0.06	-11.86	4.29	0.06	11.86	-4.29	0.003%
44	-2.21	-11.86	3.76	2.21	11.86	-3.76	0.003%
45	-3.08	-11.86	3.08	3.08	11.86	-3.08	0.003%
46	-3.81	-11.86	2.24	3.81	11.86	-2.24	0.003%
47	-4.31	-11.86	0.06	4.31	11.86	-0.06	0.003%
48	-3.68	-11.86	-2.09	3.68	11.86	2.09	0.003%
49	-3.00	-11.86	-3.00	2.99	11.86	3.00	0.003%
50	-2.10	-11.86	-3.70	2.10	11.86	3.70	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00098969
3	Yes	4	0.00000001	0.00098036
4	Yes	4	0.00000001	0.00097770
5	Yes	4	0.00000001	0.00097889
6	Yes	4	0.00000001	0.00098832
7	Yes	4	0.00000001	0.00099025
8	Yes	4	0.00000001	0.00098656
9	Yes	4	0.00000001	0.00098143
10	Yes	4	0.00000001	0.00098012
11	Yes	4	0.00000001	0.00098938
12	Yes	4	0.00000001	0.00099218
13	Yes	4	0.00000001	0.00099063
14	Yes	4	0.00000001	0.00098189
15	Yes	4	0.00000001	0.00098038
16	Yes	4	0.00000001	0.00098466
17	Yes	4	0.00000001	0.00098944
18	Yes	4	0.00000001	0.00004487
19	Yes	5	0.00000001	0.00013490
20	Yes	5	0.00000001	0.00013367
21	Yes	5	0.00000001	0.00013330
22	Yes	5	0.00000001	0.00013348
23	Yes	5	0.00000001	0.00013486
24	Yes	5	0.00000001	0.00013527
25	Yes	5	0.00000001	0.00013477
26	Yes	5	0.00000001	0.00013407
27	Yes	5	0.00000001	0.00013387
28	Yes	5	0.00000001	0.00013519
29	Yes	5	0.00000001	0.00013559
30	Yes	5	0.00000001	0.00013540
31	Yes	5	0.00000001	0.00013399
32	Yes	5	0.00000001	0.00013350
33	Yes	5	0.00000001	0.00013402
34	Yes	5	0.00000001	0.00013470
35	Yes	4	0.00000001	0.00096262
36	Yes	4	0.00000001	0.00095904
37	Yes	4	0.00000001	0.00095795
38	Yes	4	0.00000001	0.00095829

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39	Yes	4	0.00000001	0.00096154
40	Yes	4	0.00000001	0.00096215
41	Yes	4	0.00000001	0.00096101
42	Yes	4	0.00000001	0.00095946
43	Yes	4	0.00000001	0.00096008
44	Yes	4	0.00000001	0.00096442
45	Yes	4	0.00000001	0.00096568
46	Yes	4	0.00000001	0.00096501
47	Yes	4	0.00000001	0.00096127
48	Yes	4	0.00000001	0.00095987
49	Yes	4	0.00000001	0.00096112
50	Yes	4	0.00000001	0.00096271

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	59.5 - 39.5	1.289	46	0.1486	0.0038
T2	39.5 - 19.5	0.639	46	0.1262	0.0029
T3	19.5 - 13.1	0.157	46	0.0702	0.0017
T4	13.1 - 6.3	0.068	46	0.0470	0.0070
T5	6.3 - 0	0.006	35	0.0226	0.0006

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
68.50	18-ft Doppler	46	1.289	0.1486	0.0038	123265
67.00	(4) HPA-65R-BUU-H8	46	1.289	0.1486	0.0038	123265
60.00	Doppler Platform	46	1.289	0.1486	0.0038	123265
57.00	Doppler Platform Support	46	1.205	0.1467	0.0040	123265
55.00	13-ft Face Mount Frame	46	1.138	0.1452	0.0042	123265

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	59.5 - 39.5	3.293	13	0.3794	0.0100
T2	39.5 - 19.5	1.633	13	0.3223	0.0097
T3	19.5 - 13.1	0.401	13	0.1792	0.0062
T4	13.1 - 6.3	0.173	13	0.1200	0.0176
T5	6.3 - 0	0.014	13	0.0577	0.0018

Critical Deflections and Radius of Curvature - Design Wind

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Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
68.50	18-ft Doppler	13	3.293	0.3794	0.0100	48254
67.00	(4) HPA-65R-BUU-H8	13	3.293	0.3794	0.0100	48254
60.00	Doppler Platform	13	3.293	0.3794	0.0100	48254
57.00	Doppler Platform Support	13	3.077	0.3747	0.0110	48254
55.00	13-ft Face Mount Frame	13	2.905	0.3707	0.0116	48254

Bolt Design Data

Section No.	Elevation	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Maximum Load per Bolt	Allowable Load	Ratio Load Allowable	Allowable Ratio	Criteria
	ft			in		K	K			
T1	59.5	Leg	A325N	0.8750	4	5.79	26.46	0.219 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	3.23	4.12	0.784 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.5000	1	0.89	4.12	0.215 ✓	1.333	Bolt Shear
		Top Girt	A325N	0.6250	2	0.97	6.44	0.151 ✓	1.333	Bolt Shear
T2	39.5	Leg	A325N	0.8750	4	12.34	26.46	0.466 ✓	1.333	Bolt Tension
		Diagonal	A325N	0.5000	2	3.70	4.12	0.897 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.5000	1	0.98	4.12	0.237 ✓	1.333	Bolt Shear
T3	19.5	Diagonal	A325N	0.7500	1	3.72	9.28	0.401 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.7500	1	1.84	9.28	0.198 ✓	1.333	Bolt Shear
T4	13.1	Diagonal	A325N	0.7500	1	4.16	9.28	0.448 ✓	1.333	Bolt Shear
		Horizontal	A325N	0.5000	1	1.16	4.12	0.282 ✓	1.333	Bolt Shear
T5	6.3	Diagonal	A325N	0.7500	1	2.83	6.80	0.416 ✓	1.333	Member Bearing
		Horizontal	A325N	0.5000	1	2.94	8.25	0.356 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P	Allow. P _a	Ratio P
	ft		ft	ft		ksi	in ²	K	K	P _a
T1	59.5 - 39.5	P3.5x.226	20.00	5.00	44.9 K=1.00	18.319	2.6795	-28.49	49.09	0.580 ✓
T2	39.5 - 19.5	P3.5x.226	20.00	5.00	44.9 K=1.00	18.319	2.6795	-56.34	49.09	1.148 ✓
T3	19.5 - 13.1	P3.5x.226	6.41	6.41	28.8 K=0.50	19.497	2.6795	-62.45	52.24	1.195 ✓
T4	13.1 - 6.3	P3.5x.226	6.81	6.81	30.6 K=0.50	19.377	2.6795	-66.95	51.92	1.289 ✓

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Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T5	6.3 - 0	P3.5x.226	6.31	3.16	28.3 K=1.00	19.526	2.6795	-68.79	52.32	1.315 ✓

Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T1	59.5 - 39.5	P2.5x.203	8.67	8.67	109.8 K=1.00	11.571	1.7040	-6.46	19.72	0.328 ✓
T2	39.5 - 19.5	P2.5x.203	8.67	8.67	109.8 K=1.00	11.571	1.7040	-7.40	19.72	0.375 ✓
T3	19.5 - 13.1	P2x.154	9.81	9.81	149.6 K=1.00	6.676	1.0745	-3.72	7.17	0.519 ✓
T4	13.1 - 6.3	P2x.154	10.60	10.60	161.6 K=1.00	5.722	1.0745	-4.16	6.15	0.677 ✓
T5	6.3 - 0	L3x3x3/16	7.96	7.39	107.2 K=1.14	11.867	1.0900	-2.89	12.94	0.223 ✓

Horizontal Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T1	59.5 - 39.5	L2 1/2x2 1/2x1/4	7.58	7.02	171.6 K=1.00	5.072	1.1900	-0.86	6.04	0.142 ✓
T2	39.5 - 19.5	L2 1/2x2 1/2x1/4	7.58	7.02	171.6 K=1.00	5.072	1.1900	-0.98	6.04	0.162 ✓
T3	19.5 - 13.1	L3x3x1/4	7.58	6.96	141.0 K=1.00	7.506	1.4400	-1.84	10.81	0.170 ✓
T4	13.1 - 6.3	L3x3x1/4	8.28	7.72	156.5 K=1.00	6.100	1.4400	-1.16	8.78	0.132 ✓
T5	6.3 - 0	2L2x2x3/16	8.97	8.41	120.1 K=1.00	10.270	1.4300	-2.94	14.69	0.200 ✓

Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T1	59.5 - 39.5	L3x5x1/4	7.58	6.82	122.1 K=0.99	9.242	1.9400	-1.89	17.93	0.105 ✓

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Redundant Horizontal (1) Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T5	6.3 - 0	L2x2x3/16	2.24	2.08	91.6 K=1.45	14.013	0.7150	-1.19	10.02	0.119 ✓

Redundant Diagonal (1) Design Data (Compression)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T5	6.3 - 0	L2x2x3/16	3.76	3.46	112.7 K=1.07	11.308	0.7150	-1.00	8.09	0.124 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T1	59.5 - 39.5	P3.5x.226	20.00	5.00	44.9	21.000	2.6795	23.15	56.27	0.411 ✓
T2	39.5 - 19.5	P3.5x.226	20.00	5.00	44.9	21.000	2.6795	49.36	56.27	0.877 ✓
T3	19.5 - 13.1	P3.5x.226	6.41	6.41	57.6	21.000	2.6795	54.97	56.27	0.977 ✓
T4	13.1 - 6.3	P3.5x.226	6.81	6.81	61.1	21.000	2.6795	59.01	56.27	1.049 ✓
T5	6.3 - 0	P3.5x.226	6.31	3.16	28.3	21.000	2.6795	60.34	56.27	1.072 ✓

Diagonal Design Data (Tension)

Section No.	Elevation	Size	L	L _u	Kl/r	F _a	A	Actual P K	Allow. P _a K	Ratio P P _a
	ft		ft	ft		ksi	in ²			
T1	59.5 - 39.5	P2.5x.203	8.67	8.67	109.8	21.000	1.7040	6.38	35.79	0.178 ✓
T2	39.5 - 19.5	P2.5x.203	8.67	8.67	109.8	21.000	1.7040	7.32	35.79	0.204 ✓
T3	19.5 - 13.1	P2x.154	9.81	9.81	149.6	21.000	1.0745	3.68	22.57	0.163 ✓

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	13140.CO2 - CT1178	27 of 29
	Project 60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date 18:51:46 12/19/13
	Client AT&T Mobility	Designed by TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T4	13.1 - 6.3	P2x.154	10.60	10.60	161.6	21.000	1.0745	4.14	22.57	0.183 ✓
T5	6.3 - 0	L3x3x3/16	7.96	7.39	98.2	29.000	0.6945	2.83	20.14	0.141 ✓

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	59.5 - 39.5	L2 1/2x2 1/2x1/4	7.58	7.02	113.1	29.000	0.7753	0.89	22.48	0.039 ✓
T2	39.5 - 19.5	L2 1/2x2 1/2x1/4	7.58	7.02	113.1	29.000	0.7753	0.98	22.48	0.043 ✓
T3	19.5 - 13.1	L3x3x1/4	7.58	6.96	93.5	29.000	0.9159	1.51	26.56	0.057 ✓
T4	13.1 - 6.3	L3x3x1/4	8.28	7.72	102.6	29.000	0.9628	1.16	27.92	0.042 ✓
T5	6.3 - 0	2L2x2x3/16	8.97	8.41	123.4	29.000	0.8967	2.66	26.00	0.102 ✓

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T1	59.5 - 39.5	L3x5x1/4	7.58	6.82	101.0	29.000	1.3144	1.95	38.12	0.051 ✓

Redundant Horizontal (1) Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T5	6.3 - 0	L2x2x3/16	2.24	2.08	40.4	21.600	0.7150	1.19	15.44	0.077 ✓

Redundant Diagonal (1) Design Data (Tension)

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	28 of 29
	Project	60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date	18:51:46 12/19/13
	Client	AT&T Mobility	Designed by	TJL

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
T5	6.3 - 0	L2x2x3/16	3.76	3.46	67.3	21.600	0.7150	1.00	15.44	0.065



Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF*P _{allow} K	% Capacity	Pass Fail	
T1	59.5 - 39.5	Lcg	P3.5x.226	1	-28.49	65.43	43.5	Pass	
T2	39.5 - 19.5	Lcg	P3.5x.226	28	-56.34	65.43	86.1	Pass	
T3	19.5 - 13.1	Lcg	P3.5x.226	55	-62.45	69.64	89.7	Pass	
T4	13.1 - 6.3	Lcg	P3.5x.226	64	-66.95	69.21	96.7	Pass	
T5	6.3 - 0	Lcg	P3.5x.226	73	-68.79	69.75	98.6	Pass	
T1	59.5 - 39.5	Diagonal	P2.5x.203	9	-6.46	26.28	24.6	Pass	
							58.8 (b)		
T2	39.5 - 19.5	Diagonal	P2.5x.203	36	-7.40	26.28	28.2	Pass	
							67.3 (b)		
T3	19.5 - 13.1	Diagonal	P2x.154	61	-3.72	9.56	38.9	Pass	
T4	13.1 - 6.3	Diagonal	P2x.154	70	-4.16	8.20	50.8	Pass	
T5	6.3 - 0	Diagonal	L3x3x3/16	77	-2.89	17.24	16.8	Pass	
							31.2 (b)		
T1	59.5 - 39.5	Horizontal	L2 1/2x2 1/2x1/4	24	-0.86	8.05	10.7	Pass	
							16.2 (b)		
T2	39.5 - 19.5	Horizontal	L2 1/2x2 1/2x1/4	31	-0.98	8.05	12.1	Pass	
							17.8 (b)		
T3	19.5 - 13.1	Horizontal	L3x3x1/4	60	-1.84	14.41	12.8	Pass	
							14.9 (b)		
T4	13.1 - 6.3	Horizontal	L3x3x1/4	69	-1.16	11.71	9.9	Pass	
							21.1 (b)		
T5	6.3 - 0	Horizontal	2L2x2x3/16	76	-2.94	19.58	15.0	Pass	
							26.7 (b)		
T1	59.5 - 39.5	Top Girt	L3x5x1/4	4	-1.89	23.90	7.9	Pass	
							11.3 (b)		
T5	6.3 - 0	Redund Horz 1 Bracing	L2x2x3/16	78	-1.19	13.36	8.9	Pass	
T5	6.3 - 0	Redund Diag 1 Bracing	L2x2x3/16	96	-1.00	10.78	9.3	Pass	
							Summary		
							Lcg (T5)	98.6	Pass
							Diagonal (T2)	67.3	Pass
							Horizontal (T5)	26.7	Pass
							Top Girt (T1)	11.3	Pass
							Redund Horz 1 Bracing (T5)	8.9	Pass
							Redund Diag 1 Bracing (T5)	9.3	Pass
							Bolt Checks	67.3	Pass
							RATING =	98.6	Pass

tnxTower Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job	13140.CO2 - CT1178	Page	29 of 29
	Project	60' Lattice Tower - 324 Montevideo Road, Avon, CT	Date	18:51:46 12/19/13
	Client	AT&T Mobility	Designed by	TJL

Program Version 6.0.0.8 - 9/7/2011 File:J:\Jobs\1314000.WI\002 - AT&T CT1178 - Simsbury/Structural/Rev (2)/Calcs/ERI Files/60-ft_Lattice_Tower.eri

Subject:

FOUNDATION REINFORCEMENT
 DESIGN

Location:

Avon, CT

Rev. 2: 12/19/13

Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 13075.CO21

Mat Foundation Analysis:

Input Data:

Tower Data

Overturing Moment =	OM := 578-kips	(User Input from RISATower)
Shear Force =	S _t := 11-kip	(User Input from RISATower)
Axial Force =	WT _t := 12-kip	(User Input from RISATower)
Max Compression Force =	C _t := 73-kip	(User Input from RISATower)
Uplift Force =	U _t := 64-kip	(User Input from RISATower)
Tower Height =	H _t := 59.5-ft	(User Input)
Tower Width =	W _t := 8.97-ft	(User Input)
Tower Position on Foundation (1=offset, 2=centered) =	Pos _t := 2	(User Input)

Mat Data:

Overall Depth of Mat =	D _f := 3.5-ft	(User Input)
Thickness of Mat =	T _f := 3.5-ft	(User Input)
Length of Pier =	L _p := 0ft	(User Input)
Extension of Pier Above Grade =	L _{pag} := 0.0-ft	(User Input)
Diameter of Pier =	d _p := 0.0-ft	(User Input)
Foundation Reinforcement Area =	A _{matrein} := 310.10ft ²	(User Input)
Distance From Center of Compression Leg to Extreme Edge of Proposed Mat =	C _x := 5.75ft	(User Input)
Distance From Tower/Mat Centroid to Front Edge of Proposed Mat =	WT _x := 11.25ft	(User Input)
Distance From Tower/Mat Centroid to Rear Edge of Proposed Mat =	WT _{x2} := 8.38ft	(User Input)
Distance From Center of Uplift Legs to Extreme Edge of Proposed Mat =	U _x := 14.00ft	(User Input)
Section Moment of Area/Inertia of Mat =	I _{mat} := 8120.4ft ⁴	(User Input)
Section Modulus of Mat =	S _{mat} := $\left(\frac{I_{mat}}{WT_x} \right) = 743.03\text{-ft}^3$	(User Input)
Overall Width of Mat From Toe to Rear Edge=	W _f := 19.63-ft	(User Input)
Overall Width of Mat at Toe =	W _{ftoe} := 6.25ft	(User Input)
Overturing Moment Factor of Safety Required =	FS _{reqd} := 2.0	(User Input)

Subject:

FOUNDATION REINFORCEMENT
 DESIGN

Location:

Avon, CT

Rev. 2: 12/19/13

Prepared by: T.J.L. Checked by: C.F.C.
 Job No. 13075.CO21

Material Properties:

Concrete Compressive Strength =	$f_c := 4000\text{-psi}$	(User Input)	
Steel Reinforcement Yield Strength =	$f_y := 60000\text{-psi}$	(User Input)	
Internal Friction Angle of Soil =	$\theta_s := 30\text{-deg}$	(User Input)	
Allowable Soil Bearing Capacity =	$q_s := 12000\text{-psf}$	(User Input)	(Note: Allowable soil bearing pressure may be increased by 1/3rd for transient load effects.)
Unit Weight of Soil =	$\gamma_{\text{soil}} := 0\text{-pcf}$	(User Input)	
Unit Weight of Concrete =	$\gamma_{\text{conc}} := 150\text{-pcf}$	(User Input)	
Foundation Bouyancy =	Bouyancy := 0	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 3.5\text{-ft}$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0\text{-ksf}$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

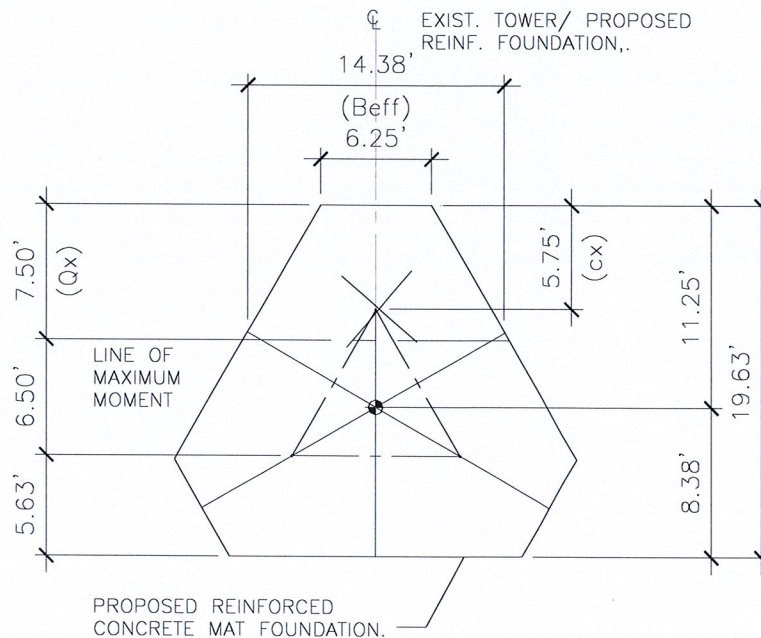
Proposed Mat Reinforcement:

Bar Size =	$BS_{\text{top}} := 7$	(User Input)	(Top of Mat)
Bar Diameter =	$d_{\text{btop}} := 0.875\text{-in}$	(User Input)	(Top of Mat)
Bar Size =	$BS_{\text{bot}} := 7$	(User Input)	(Bottom of Mat)
Bar Diameter =	$d_{\text{bbot}} := 0.875\text{-in}$	(User Input)	(Bottom of Mat)
Clear Cover of Reinforcement =	$Cvr_{\text{Mat}} := 3.0\text{-in}$	(User Input)	
Reinforcement Location Factor =	$\alpha_{\text{Mat}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{\text{Mat}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{\text{Mat}} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{\text{Mat}} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Mat Top Reinforcement Bar Area =	$A_{\text{btop}} := \frac{\pi \cdot d_{\text{btop}}^2}{4} = 0.6\text{-in}^2$
Mat Bottom Reinforcement Bar Area =	$A_{\text{bbot}} := \frac{\pi \cdot d_{\text{bbot}}^2}{4} = 0.6\text{-in}^2$
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\theta_s)}{1 - \sin(\theta_s)} = 3$

Load Factor = $LF := \begin{cases} 1.333 & \text{if } H_t \leq 700\text{-ft} \\ 1.7 & \text{if } H_t \geq 1200\text{-ft} \\ 1.333 + \left(\frac{H_t - 700\text{ft}}{1200\text{ft} - 700\text{ft}} \right) \cdot 0.4 & \text{otherwise} \end{cases} = 1.33$



PLAN

Area: 310.100242
 Perimeter: 67.852540
 Bounding box: X: -11.308757 -- 11.308757
 Y: -8.333333 -- 11.254008
 Centroid: X: 0.000000
 Y: 0.000000
 Moments of inertia: X: 8120.374659
 Y: 8120.374659
 Product of inertia: XY: 0.000000
 Radii of gyration: X: 5.117254
 Y: 5.117254
 Principal moments and X-Y directions about centroid:
 I: 8120.374659 along [0.006003 0.999982]
 J: 8120.374659 along [-0.999982 0.006003]

Proposed Reinforced Foundation Geometry:

Stability of Mat:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{conc}} - 62.4 \text{pcf}, \gamma_{\text{conc}}) = 150 \text{pcf}$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}(\text{Bouyancy} = 1, \gamma_{\text{soil}} - 62.4 \text{pcf}, \gamma_{\text{soil}}) = 0 \text{pcf}$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \text{ksf}$$

$$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = 0 \text{ksf}$$

$$P_{top} := \text{if}[n < (D_f - T_f), P_{pt}, P_{pn}] = 0 \text{ksf}$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 0 \text{ksf}$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 0 \text{ksf}$$

$$T_p := \text{if}[n < (D_f - T_f), T_f, (D_f - n)] = 0$$

$$A_p := W_{ftoe} \cdot T_p = 0$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 0 \text{kip}$$

Volume of Existing Concrete Piers Within Mat =

$$V_{pier} := 3 \cdot \left(T_f \cdot \frac{d_p^2 \cdot \pi}{4} \right) = 0 \text{ft}^3$$

Volume of Proposed Mat =

$$V_{matreinf} := A_{matreinf} \cdot T_f = 1085.35 \text{ft}^3$$

Weight of Concrete Mat =

$$W_{T_c} := V_{matreinf} \cdot \gamma_{\text{conc}} = 162.8 \text{kips}$$

Total Weight of Concrete Mat and Tower =

$$W_{T_{tot}} := W_{T_c} = 162.8 \text{kips}$$

Overtaking Moment =

$$M_{ot} := OM + S_t \cdot (T_f) = 616.5 \text{kip-ft}$$

Required Moment =

$$M_{design} := M_{ot} \cdot FS_{reqd} = 1233 \text{kip-ft}$$

Resisting Moment without Anchors =

$$M_r := (W_{T_{tot}}) \cdot W_{T_x} = 1779 \text{kip-ft}$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 2.89$$

$$\text{OverTurning_Moment_Check} := \text{if}(FS \geq FS_{reqd}, \text{"Okay"}, \text{"Provide Anchorage"})$$

$$\text{OverTurning_Moment_Check} = \text{"Okay"}$$

Reinforced Concrete Mat Shear and Moment Calculations:

$$\text{Mat Dead Load} =$$

$$WT_{\text{tot}} = 162.8 \text{ kips}$$

Equivalent Soil Reaction Occuring at Base of Foundation =

$$Q := C_t + WT_{\text{tot}} - U_t = 171.8 \text{ kips}$$

Summing Moments About Toe of Mat Foundation to Find Distance of Soil Reaction (Qx) =

$$M := \left[(C_t \cdot C_x) + (WT_{\text{tot}} \cdot WT_x) - (U_t \cdot U_x) \right] - S_t \cdot (T_f + L_{\text{pag}}) = 1295.32 \text{ kip-ft}$$

$$Q_x := \frac{M}{Q} = 7.54 \text{ ft}$$

$Q_x > C_x$ Therefore Shear and Moment Calculations Are As Follows:

$$C_x = 5.75 \text{ ft}$$

$$V1_A := -C_t = -73 \text{ kips}$$

$$V2_A := V1_A + Q = 98.8 \text{ kips}$$

$$V3_A := V2_A - WT_{\text{tot}} = -64 \text{ kips}$$

$$V4_A := V3_A + U_t = 0 \text{ kips}$$

$$M1_A := \left[\frac{S_t}{2} \cdot (T_f + L_{\text{pag}}) \right] = -19.25 \text{ kip-ft}$$

$$M_1 := |M1_A| = 19.25 \text{ kip-ft}$$

$$M2_A := M1_A + V1_A \cdot (Q_x - C_x) = -149.89 \text{ kip-ft}$$

$$M_2 := |M2_A| = 149.89 \text{ kip-ft}$$

$$M3_A := M2_A + V2_A \cdot (WT_x - Q_x) = 184.97 \text{ kip-ft}$$

$$M_3 := |M3_A| = 184.97 \text{ kip-ft}$$

$$M4_A := M3_A + V3_A \cdot (U_x - WT_x) = 19.25 \text{ kip-ft}$$

$$M_4 := |M4_A| = 19.25 \text{ kip-ft}$$

$$M5_A := M4_A - \left[\frac{S_t}{2} \cdot (T_f + L_{\text{pag}}) \right] = 0 \text{ kip-ft}$$

$$M_5 := |M5_A| = 0 \text{ kip-ft}$$

$$M_{\text{max}} := \max \begin{pmatrix} M_1 \\ M_2 \\ M_3 \\ M_4 \\ M_5 \\ 0 \\ 0 \\ 0 \end{pmatrix} = 184.97 \text{ kip-ft}$$

Mat Steel Reinforcement Design:

Required Reinforcement for Bending:

Strength Reduction Factor =

$$\phi_m := .90 \quad (\text{ACI-2008 9.3.2.1})$$

Design Moment =

$$M_n := \left(\frac{LF}{\phi_m} \right) \cdot M_{\max} = 273.97 \cdot \text{kip} \cdot \text{ft}$$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot \text{psi} \leq f_c \leq 4000 \cdot \text{psi} \\ 0.65 & \text{if } f_c > 8000 \cdot \text{psi} \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{\text{psi}} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.85 \quad (\text{ACI-2008 10.2.7.3})$$

$$b_{\text{eff}} := 171 \text{ in}$$

$$d := T_f - C_{vr_Mat} - d_{\text{bbot}} = 38.13 \cdot \text{in}$$

(User Input) Effective width taken at point of maximum moment through triangular mat foundation.

$$A_{st} := \frac{M_n}{(0.9 f_y d)} = 1.6 \cdot \text{in}^2$$

$$a := \frac{A_{st} \cdot f_y}{\beta \cdot f_c \cdot b_{\text{eff}}} = 0.16 \cdot \text{in}$$

$$A_{st} := \frac{M_n}{f_y \left(d - \frac{a}{2} \right)} = 1.44 \cdot \text{in}^2$$

$$\rho := \frac{A_{st}}{b_{\text{eff}} d} = 0.00022$$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot \text{psi} \\ .0020 & \text{otherwise} \end{cases} = 0.0018 \quad (\text{ACI -2008 7.12.2.1})$$

Determine Bottom Bars:

$$A_s := \begin{cases} A_{st} & \text{if } \rho > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot b_{\text{eff}} \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 5.87 \cdot \text{in}^2$$

Quantity of Rebar Required =

$$N_{\text{bar}_{\text{reqd}}} := \frac{A_s}{A_{\text{bbot}}} = 9.8 \quad N_{\text{bar}_{\text{prov}}} := 14$$

Rebar Spacing =

$$B_s := \left(\frac{b_{\text{eff}} - 2 \cdot C_{vr_Mat} - d_{\text{bbot}}}{N_{\text{bar}_{\text{prov}}}} \right) - d_{\text{bbot}} = 10.8 \cdot \text{in}$$

(USE #7 @12" o.c. min.)

Area of steel =

$$0.60 \text{ in}^2 \cdot 14 = 8.40 \text{ in}^2$$

Soil Bearing Pressure:

Distance to Kern = $X_k := \frac{W_f}{3} = 6.54$

If Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Distance of Equivalent Soil Reaction From Toe = $a := Q_x = 7.54\text{-ft}$

Eccentricity_Check := if($a > X_k$, "InsideMiddleThird", "OutsideMiddleThird")

Eccentricity_Check = "InsideMiddleThird"

Total Load =

$P_{\text{total}} := Q = 172\text{-kip}$ For Equilibrium Total Soil Reaction Shall Equal Total Downward Dead Load

Maximum Pressure in Mat =

$P_{\text{max}} := \frac{P_{\text{total}}}{A_{\text{matreinforced}}} + \frac{P_{\text{total}}(W_{T_x} - Q_x) \cdot W_{T_x}}{I_{\text{mat}}} = 1.34\text{-ksf}$

Max_Pressure_Check := if($P_{\text{max}} < q_s$, "Okay", "No Good")

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat =

$P_{\text{min}} := \frac{P_{\text{total}}}{A_{\text{matreinforced}}} - \frac{P_{\text{total}}(W_{T_x} - Q_x) \cdot W_{T_x}}{I_{\text{mat}}} = -0.23\text{-ksf}$

Min_Pressure_Check := if($(P_{\text{min}} \geq 0) \cdot (P_{\text{min}} < q_s)$, "Okay", "No Good")

Min_Pressure_Check = "No Good"

If Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced as Follows:-

Distance to Resultant of Pressure Distribution =

$X_p := \frac{P_{\text{max}}}{P_{\text{max}} - P_{\text{min}}} \cdot \frac{1}{3} = 5.58$

Area Under Mat Subjected to Triangular Pressure Distribution =

$A_{\text{pressure}} := a \left(\frac{a}{\tan(60\text{-deg})} \right) + W_{\text{toe}} \cdot (a) = 79.94\text{-ft}^2$

Total Pressure Within Triangular Pressure Diagram =

$P_a := \frac{2 \cdot P_{\text{total}}}{3 \cdot A_{\text{pressure}}} = 1.43\text{-ksf}$

Adjusted Soil Pressure =

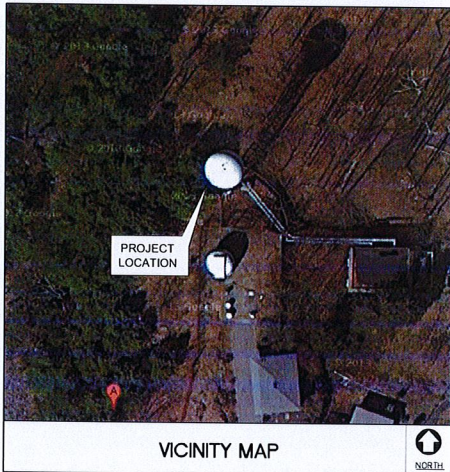
$q_{\text{adj}} := \text{if}(a \leq X_k, P_a, P_{\text{max}}) = 1.34\text{-ksf}$

Pressure_Check := if($q_{\text{adj}} < q_s$, "Okay", "No Good")

Pressure_Check = "Okay"



TOWER MODIFICATION DESIGN
CT1178
324 MONTEVIDEO ROAD
AVON, CT 06001



PROJECT SUMMARY

SITE ADDRESS: 324 MONTEVIDEO ROAD
AVON, CT 06001

PROJECT COORDINATES: LAT: 41°-48'-42.26"N
LON: 72°-47'-55.37"W
ELEV: ±907' AMSL

TOWER OWNER: TALCOTT MOUNTAIN SCIENCE CENTER
324 MONTEVIDEO ROAD
AVON, CT 06001

AT&T CONTACT: CHRIS POLICINSKI
781.708.3736

AT&T SITE NUMBER: CT1178

AT&T SITE NAME: NA

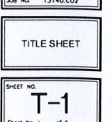
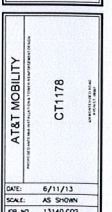
ENGINEER OF RECORD: CENTEK ENGINEERING, INC.
63-2 NORTH BRANFORD ROAD
BRANFORD, CT 06405

CENTEK CONTACT: CARLO F. CENTORE, PE
203.488.0580 ext. 122

SHEET INDEX

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N-2	STRUCTURAL STEEL NOTES	3
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S-1	TOWER ELEVATION & FEEDLINE PLAN	3
S-2	ANTENNA MOUNT DETAILS	3

DESIGNED BY:	TA
DRAWN BY:	TA
CHECKED BY:	GFC
DATE:	6/11/13
SCALE:	AS SHOWN
JOB NO.	13140.005



1. GOVERNING CODE: 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CT STATE BUILDING CODE AND 2009 AMENDMENTS.
2. TIA/EIA-222-F-1996 "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES".
3. DESIGN CRITERIA

WIND LOAD: (TIA/EIA-222-F-1996)
BASIC WIND SPEED (V) = 80 MPH (FASTEST MILE)

WIND LOAD: (2005 CT STATE BUILDING CODE APPENDIX K)
BASIC WIND SPEED (V) = 95 MPH (3-SECOND GUST)
EQUIVALENT TO (V) = 77.5 MPH (FASTEST MILE)

TIA/FIA-222-F-1996 WIND SPEED CONTROLS

1. REFER TO STRUCTURAL ANALYSIS AND REINFORCEMENT DESIGN PREPARED BY CENTEK ENGINEERING, INC., FOR AT&T MOBILITY, DATED 12/19/13.
2. TOWER GEOMETRY AND STRUCTURE MEMBER SIZES WERE OBTAINED FROM A PREVIOUS STRUCTURAL REPORT PREPARED BY CENTEK ENGINEERING PROJECT #12001.C076, DATED OCTOBER 31, 2012.

3. PROVIDE TEMPORARY ANCHORS, GUYING AND/OR BRACING AS REQUIRED TO SAFELY CONDUCT THE WORK.

4. ALL WORK SHALL BE IN ACCORDANCE WITH TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES".

5. THE TOWER STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER REINFORCEMENTS ARE COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO INSURE THE SAFETY OF THE TOWER STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIE-DOWNS, WHICH MIGHT BE NECESSARY.

6. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS SCOPE OF WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.

7. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.

8. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.

9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.

10. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK.

11. TOWER REINFORCING SHALL BE CONDUCTED BY FIELD CREWS EXPERIENCED IN THE ASSEMBLY AND ERECTION OF RADIO ANTENNAS AND SUPPORT STRUCTURES. ALL SAFETY PROCEDURES, RIGGING AND ERECTION METHODS SHALL BE STANDARD TO THE INDUSTRY AND IN COMPLIANCE WITH OSHA

12. EXISTING COAXIAL CABLES AND ALL ACCESSORIES SHALL BE RELOCATED AS NECESSARY AND REINSTALLED BY THE CONTRACTOR WITHOUT INTERRUPTION IN SERVICE WHERE THEY ARE IN CONFLICT WITH TOWER REINFORCEMENT.

13. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

[illegible]

1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD).
2. MATERIAL SPECIFICATIONS
 - A. STRUCTURAL STEEL (W SHAPES)---ASTM A992 (FY = 60 KSI)
 - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A36 (FY = 36 KSI)
 - C. STRUCTURAL STEEL (TOWER REINF. PLATES)---ASTM A572-GR50 (50 KSI)
 - D. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - E. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
 - F. PIPE---ASTM A53 GRADE B (FY = 35 KSI)
3. FASTENER SPECIFICATIONS
 - A. CONNECTION BOLTS---ASTM A325-N, UNLESS OTHERWISE SCHEDULED.
 - B. U-BOLTS---ASTM A307
 - C. ANCHOR RODS---ASTM F1554
 - D. WELDING ELECTRODES---ASTM E70XX FOR A36 & A572-GR50 STEELS, ASTM E80XX FOR A572-GR65 STEEL.
 - E. BLIND BOLTS---AS1252 PROPERTY CLASS 8.8 (Fu=120 KSI).
4. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES, INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
5. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
6. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
7. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
8. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
9. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON-CATALYZED SURFACES WITH A 95% OXIDE ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.

10. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
11. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
12. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING THE SCHEDULED ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
13. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
14. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS OTHERWISE ON THE DRAWINGS.
16. LOCK WASHER ARE NOT PERMITTED FOR A325 BOLTED STEEL ASSEMBLIES.
17. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
18. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
19. FABRICATE BEAMS WITH MILL CAMBER UP.
20. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
21. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

[illegible]

MODIFICATION INSPECTION REPORT REQUIREMENTS

PRE-CONSTRUCTION		DURING CONSTRUCTION		POST-CONSTRUCTION	
SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM	SCHEDULED ITEM	REPORT ITEM
X	EOR MODIFICATION INSPECTION DRAWING	-	FOUNDATIONS	X	MODIFICATION INSPECTOR RECORD REDLINE DRAWING
X	EOR APPROVED SHOP DRAWINGS	-	EARTHWORK: BACKFILL MATERIAL & COMPACTION	-	POST-INSTALLED ANCHOR ROD PULL-OUT TEST
-	EOR APPROVED POST-INSTALLED ANCHOR MP11	-	CONCRETE TESTING	X	PHOTOGRAPHS
-	FABRICATION INSPECTION	X	STEEL INSPECTION		
-	FABRICATOR CERTIFIED WELDER INSPECTION	-	POST INSTALLED ANCHOR ROD VERIFICATION		
X	MATERIAL CERTIFICATIONS	-	BASE PLATE GROUT VERIFICATION		
		-	CONTRACTOR'S CERTIFIED WELD INSPECTION		
		X	ON-SITE COLD GALVANIZING VERIFICATION		
		-	GUY WIRE TENSION REPORT		
		X	CONTRACTOR AS-BUILT REDLINE DRAWINGS		

- NOTES:
1. REFER TO MODIFICATION INSPECTION NOTES FOR ADDITIONAL REQUIREMENTS
 2. "X" DENOTES DOCUMENT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
 3. "-" DENOTES DOCUMENT NOT REQUIRED FOR INCLUSION IN MODIFICATION INSPECTION FINAL REPORT.
 4. EOR - ENGINEER OF RECORD
 5. MP11 - "MANUFACTURER'S PRINTED INSTALLATION GUIDELINES"

GENERAL

1. THE MODIFICATION INSPECTION IS A VISUAL INSPECTION OF STRUCTURAL MODIFICATIONS, TO INCLUDE A REVIEW AND COMPILATION OF SPECIFIED SUBMITTALS AND CONSTRUCTION INSPECTIONS, AS AN ASSURANCE OF COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS PREPARED UNDER THE DIRECTION OF THE ENGINEER OF RECORD (EOR).
2. THE MODIFICATION INSPECTION IS TO CONFIRM INSTALLATION CONFIGURATION AND GENERAL WORKMANSHIP AND IS NOT A REVIEW OF THE MODIFICATION DESIGN. OWNERSHIP OF THE MODIFICATION DESIGN EFFECTIVENESS AND INTENT RESIDES WITH THE ENGINEER OF RECORD.
3. TO ENSURE COMPLIANCE WITH THE MODIFICATION INSPECTION REQUIREMENTS THE GENERAL CONTRACTOR (GC) AND THE MODIFICATION INSPECTOR (MI) COMMENCE COMMUNICATION UPON AUTHORIZATION TO PROCEED BY THE CLIENT. EACH PARTY SHALL BE PROACTIVE IN CONTACTING THE OTHER. THE EOR SHALL BE CONTACTED IF SPECIFIC GC/MI CONTACT INFORMATION IS NOT MADE AVAILABLE.
4. THE GC SHALL PROVIDE THE MI WITH A MINIMUM OF 5 BUSINESS DAYS NOTICE OF IMPENDING INSPECTIONS.
5. WHEN POSSIBLE, THE GC AND MI SHALL BE ON SITE DURING THE MODIFICATION INSPECTION TO HAVE ANY NOTED DEFICIENCIES ADDRESSED DURING THE INITIAL MODIFICATION INSPECTION.

MODIFICATION INSPECTOR (MI)

1. THE MI SHALL CONTACT THE GC UPON AUTHORIZATION BY THE CLIENT TO:
 - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
 - WORK WITH THE GC IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
 - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.
2. THE MI IS RESPONSIBLE FOR COLLECTION OF ALL INSPECTION AND TEST REPORTS, REVIEWING REPORTS FOR ADHERENCE TO THE CONTRACT DOCUMENTS, CONDUCTING ON-SITE INSPECTIONS AND COMPILATION & SUBMISSION OF THE MODIFICATION INSPECTION REPORT TO THE CLIENT AND THE EOR.

GENERAL CONTRACTOR (GC)

1. THE GC IS REQUIRED TO CONTACT THE GC UPON AUTHORIZATION TO PROCEED WITH CONSTRUCTION BY THE CLIENT TO:
 - REVIEW THE MODIFICATION INSPECTION REPORT REQUIREMENTS.
 - WORK WITH THE MI IN DEVELOPMENT OF A SCHEDULE FOR ON-SITE INSPECTIONS.
 - DISCUSS CRITICAL INSPECTIONS AND PROJECT CONCERNS.
2. THE GC IS RESPONSIBLE FOR COORDINATING AND SCHEDULING IN ADVANCE ALL REQUIRED INSPECTIONS AND TESTS WITH THE MI.

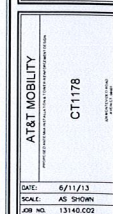
CORRECTION OF FAILING MODIFICATION INSPECTION

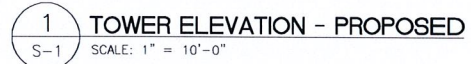
1. SHOULD THE STRUCTURAL MODIFICATION NOT COMPLY WITH THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS, THE GC SHALL WORK WITH THE MODIFICATION INSPECTOR IN A VIABLE REMEDIATION PLAN AS FOLLOWS:
 - CORRECT ALL DEFICIENCIES TO COMPLY WITH THE CONTRACT DOCUMENTS AND COORDINATE WITH THE MI FOR A FOLLOW UP INSPECTION.
 - WITH CLIENT AUTHORIZATION, THE GC MAY WORK WITH THE EOR TO REANALYZE THE MODIFICATION USING THE AS-BUILT CONDITION.

REQUIRED PHOTOGRAPHS

1. THE GC AND MI SHALL AT MINIMUM PHOTO DOCUMENT THE FOLLOWING FOR INCLUSION IN THE MODIFICATION INSPECTION REPORT:
 - PRE-CONSTRUCTION: GENERAL CONDITION OF THE SITE.
 - DURING CONSTRUCTION: RAW MATERIALS, CRITICAL DETAILS, WELD PREPARATION, BOLT INSTALLATION & TORQUE, FINAL INSTALLED CONDITION & SURFACE COATING REPAIRS.
 - POST-CONSTRUCTION: FINAL CONDITION OF THE SITE

DESIGNED BY:	TAL
DRAWN BY:	TAL
CHECKED BY:	CFC
DATE:	8/11/13
SCALE:	AS SHOWN
PROJECT NO.:	13140-000
PROJECT NAME:	13140-000
PROJECT LOCATION:	13140-000
PROJECT DESCRIPTION:	13140-000
PROJECT STATUS:	13140-000
PROJECT CONTACT:	13140-000
PROJECT PHONE:	13140-000
PROJECT FAX:	13140-000
PROJECT EMAIL:	13140-000
PROJECT WEBSITE:	13140-000
PROJECT ADDRESS:	13140-000
PROJECT CITY:	13140-000
PROJECT STATE:	13140-000
PROJECT ZIP:	13140-000
PROJECT COUNTRY:	13140-000
PROJECT REGION:	13140-000
PROJECT DISTRICT:	13140-000
PROJECT SUBDISTRICT:	13140-000
PROJECT WARD:	13140-000
PROJECT PARISH:	13140-000
PROJECT TOWNSHIP:	13140-000
PROJECT COUNTY:	13140-000
PROJECT STATE:	13140-000
PROJECT COUNTRY:	13140-000





DESIGNED BY:	TAL
DRAWN BY:	QFC
CHECK BY:	
DATE:	6/11/13
SCALE:	AS SHOWN
JOB NO.	13140.C002

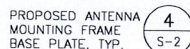
AT&T MOBILITY PROJECT NO. 13140.C002 - TOWER ELEVATION PLAN DATE: 6/11/13 SCALE: AS SHOWN JOB NO. 13140.C002	CT178
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TOWER ELEVATION & FEEDLINE PLAN

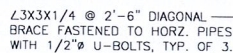
SHEET NO. S-1 SHEET NO. 1 OF 1
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$$\frac{4}{3}$$


3



S-2


$$\frac{Z}{S-2}$$

SHEET NO.
S-2
Sheet No. 5 of 5

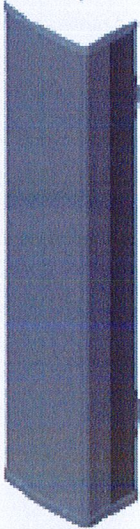
RFS NAME		Section 1 - RFS GENERAL INFORMATION										
ISSUE	CT1330	DATE	12/9/2013	RF DESIGN ENG	Radu Alecsandru		RF PERF ENG					
REVISION	Final	Approved (Y/N)	Y	RF DESIGN PHONE	905.656.606		RF PERF PHONE					
	V02	RF MANAGER	Cameron Syme	RF DESIGN EMAIL	R60-513-7598		RF PERF EMAIL					
INITIATIVE / PROJECT	NSB with 3C UMTS & 700 LTE.											
LTD		139.366	Section 2 - LOCATION INFORMATION									
REGION	NE	FA LOCATION CODE	10141394	LOCATION NAME	Avon - Montevideo Rd		SEARCH PROJECT #	2051257687				
ADDRESS	Montevideo Rd	MARKET CLUSTER	CT	MARKET	NER		SEARCH RING NAME	Avon - Montevideo				
DP CODE		CITY	Avon	STATE	CT		SEARCH RING ID	s1178				
(LATITUDE (D-M-S))	N41° 48' 42" 26"	COUNTY		NASA-ISA			BTX	LONG (DEC DEG.)				
		LONGITUDE (D-M-S)	W73° 47' 55.37"	BAT (DEC DEG.)			BORDER CELL WITH	CONCORD COORD				
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION												
GSM - NO FILING TRIGGERED		Section 3 - LICENSE COVERAGE/FILING INFORMATION										
GSM - FILING FILING NEEDED			GSM LOSS			PCS REDUCED - UPS ZIP						
GSM - MAXIMUM FILING NEEDED			GSM EXT AGMT NEEDED			PCS POPS REDUCED						
STRUCTURE AT&T OWNED?		Section 4 - TOWER/REGULATORY INFORMATION										
ADDITIONAL REGULATORY?			GROUND ELEVATION			STRUCTURE TYPE	MARKET LOCATION 850 MHZ CALL SIGN(S)					
SUB-LEASE REQUEST?			HEIGHT OVERALL			ECC ASN NUMBER	MARKET LOCATION 1900 MHZ CALL SIGN(S)					
LIGHTING TYPE			STRUCTURE HEIGHT				MARKET LOCATION 700 MHZ CALL SIGN(S)					
							MARKET LOCATION AWS MHZ CALL SIGN(S)					
Section 5 - E-911 INFORMATION												
ALPHA	PSAP NAME		PSAP ID		E911 PHASE		MPC SVC PROVIDER		LMU REQUIRED	ESN	DATE LIVE PH1	DATE LIVE PH2
BETA												
GAMMA												
DELTA												
EPSILON												
PSI												
Section 6 - RBS GENERAL INFORMATION												
E-911 SITE ID	1330	COW OR TOY?	No									
CELL SITE TYPE	Sectionized	SITE TYPE	Cellular Network									
RIS LOCATION ID		ORIGINATING CO	Cellular Network									
Section 7 - RBS SPECIFIC INFORMATION												
GSM RBS		UMTS 1st CARRIER RBS		UMTS 2nd CARRIER RBS		UMTS 3rd CARRIER RBS		UMTS 4th CARRIER RBS		LTE RBS		
RSC												
RSC RNC												
LAC												
EQUIPMENT VENDOR		Ericsson		Ericsson								
EQUIPMENT TYPE		6601		6601								
LOCATION												
CABINET LOCATION												
Section 8 - RBS INDIVIDUAL INFORMATION												
CELL ID/BCF	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2nd 850 RBS	UMTS 2nd 1900 RBS	UMTS 3rd 850 RBS	UMTS 3rd 1900 RBS	UMTS 4th 850 RBS	UMTS 4th 1900 RBS	LTE 700 RBS	LTE AWS RBS
CELL COMMON ID			CTU1330	CTU1330	CTU1330	CTU1330	CTU1330	CTU1330				
			CTU1330	CTU1330	CTU1330	CTU1330	CTU1330	CTU1330				
Section 9 - SOFT SECTOR ID												
ALPHA (OR OMNI)	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2nd 850 RBS	UMTS 2nd 1900 RBS	UMTS 3rd 850 RBS	UMTS 3rd 1900 RBS	UMTS 4th 850 RBS	UMTS 4th 1900 RBS	LTE 700 RBS	LTE AWS RBS
BETA			CTV13301	CTV13307	CTV1330A	CTV1330B	CTV1330C	CTV1330D				
GAMMA			CTV13302	CTV13308	CTV1330E	CTV1330F	CTV1330G	CTV1330H				
DELTA			CTV13303	CTV13309	CTV1330I	CTV1330J	CTV1330K	CTV1330L				
EPSILON												
PSI												
Section 10 - CID/SAC												
ALPHA (OR OMNI)	GSM 850 RBS	GSM 1900 RBS	UMTS 850 RBS	UMTS 1900 RBS	UMTS 2nd 850 RBS	UMTS 2nd 1900 RBS	UMTS 3rd 850 RBS	UMTS 3rd 1900 RBS	UMTS 4th 850 RBS	UMTS 4th 1900 RBS	LTE 700 RBS	LTE AWS RBS
BETA			13301	13307								

Section 15A - CURRENT SECTOR/CELL INFORMATION - ALPHA (OR OMNI)					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TV/RX?					
TECHNOLOGY					
FEEDERS (L / TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"XW"XD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (D50/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCP/PA?					
MCFA MODULES					
HAT/PLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJECT POWER CABLE					
ANTENNA SHARING KIT?					
BA5 F700					
DUPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 FDD FOR TMA5					
Section 15B - CURRENT SECTOR/CELL INFORMATION - BETA					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TV/RX?					
TECHNOLOGY					
FEEDERS (L / TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"XW"XD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (D50/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCP/PA?					
MCFA MODULES					
HAT/PLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJECT POWER CABLE					
ANTENNA SHARING KIT?					
BA5 F700					
DUPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 FDD FOR TMA5					
Section 15C - CURRENT SECTOR/CELL INFORMATION - GAMMA					
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)
TV/RX?					
TECHNOLOGY					
FEEDERS (L / TYPE/LENGTH)					
ANTENNA MAKE - MODEL					
ANTENNA VENDOR					
ANTENNA SIZE H"XW"XD"					
ANTENNA WEIGHT					
ANTENNA GAIN					
AZIMUTH					
RADIATION CENTER					
ANTENNA TIP HEIGHT					
MAGNETIC DECLINATION					
ELECTRICAL TILT (D50/850/1900/AWS)					
MECHANICAL DOWNTILT					
SCPA/MCP/PA?					
MCFA MODULES					
HAT/PLATE POWER (Watts)					
ERP (Watts)					
NARROW BAND LLC (QTY/MODEL)					
HYBRID COMBINER (QTY/MODEL)					
TMA/LNA (TYPE/MODEL)					
CURRENT INJECTORS FOR TMA					
CURRENT INJECT POWER CABLE					
ANTENNA SHARING KIT?					
BA5 F700					
DUPLEXER (QTY/MODEL)					
DUPLEXER (QTY/MODEL)					
SURGE ARRESTOR (QTY/MODEL)					
DC BLOCK (QTY/MODEL)					
RET EQUIPMENT (QTY/MODEL)					
1900 FDD FOR TMA5					

Section 15D - CURRENT SECTOR/CELL INFORMATION - DELTA						
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TV/RX?						
TECHNOLOGY						
FEDERERS (E / TYPE/LENGTH)						
ANTENNA MAKE - MODEL						
ANTENNA VENDOR						
ANTENNA SIZE H"XW"XD"						
ANTENNA WEIGHT						
ANTENNA GAIN						
AZIMUTH						
RADIATION CENTER						
ANTENNA TD HEIGHT						
MAGNETIC DECLINATION						
ELECTRICAL TILT (D00/850/1900/AWS)						
MECHANICAL DOWNTILT						
SCPA/MCPAT						
MPA MODULES						
HAT/PLATE POWER (Watts)						
ERP (Watts)						
NARROW BAND LLC (QTY/MODEL)						
HYBRID COMBINER (QTY/MODEL)						
TMA/LNA (TYPE/MODEL)						
CURRENT INJECTORS FOR TMA						
CURRENT INJECT POWER CABLE						
ANTENNA SHARING KIT?						
BAS Filter						
DUPLEXER (QTY/MODEL)						
DUPLEXER (QTY/MODEL)						
SURGE ARRESTOR (QTY/MODEL)						
DC BLOCK (QTY/MODEL)						
RET EQUIPMENT (QTY/MODEL)						
1900 PDU FOR TMAS						
Section 15E - CURRENT SECTOR/CELL INFORMATION - EPSILON						
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TV/RX?						
TECHNOLOGY						
FEDERERS (E / TYPE/LENGTH)						
ANTENNA MAKE - MODEL						
ANTENNA VENDOR						
ANTENNA SIZE H"XW"XD"						
ANTENNA WEIGHT						
ANTENNA GAIN						
AZIMUTH						
RADIATION CENTER						
ANTENNA TD HEIGHT						
MAGNETIC DECLINATION						
ELECTRICAL TILT (D00/850/1900/AWS)						
MECHANICAL DOWNTILT						
SCPA/MCPAT						
MPA MODULES						
HAT/PLATE POWER (Watts)						
ERP (Watts)						
NARROW BAND LLC (QTY/MODEL)						
HYBRID COMBINER (QTY/MODEL)						
TMA/LNA (TYPE/MODEL)						
CURRENT INJECTORS FOR TMA						
CURRENT INJECT POWER CABLE						
ANTENNA SHARING KIT?						
BAS Filter						
DUPLEXER (QTY/MODEL)						
DUPLEXER (QTY/MODEL)						
SURGE ARRESTOR (QTY/MODEL)						
DC BLOCK (QTY/MODEL)						
RET EQUIPMENT (QTY/MODEL)						
1900 PDU FOR TMAS						
Section 15F - CURRENT SECTOR/CELL INFORMATION - ZETA						
ANTENNA CONFIG (FROM BACK):	ANTENNA 1 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 2 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 3 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 4 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	ANTENNA 5 GSM, UMTS (850 / 1900) or LTE (700 / AWS)	
TV/RX?						
TECHNOLOGY						
FEDERERS (E / TYPE/LENGTH)						
ANTENNA MAKE - MODEL						
ANTENNA VENDOR						
ANTENNA SIZE H"XW"XD"						
ANTENNA WEIGHT						
ANTENNA GAIN						
AZIMUTH						
RADIATION CENTER						
ANTENNA TD HEIGHT						
MAGNETIC DECLINATION						
ELECTRICAL TILT (D00/850/1900/AWS)						
MECHANICAL DOWNTILT						
SCPA/MCPAT						
MPA MODULES						
HAT/PLATE POWER (Watts)						
ERP (Watts)						
NARROW BAND LLC (QTY/MODEL)						
HYBRID COMBINER (QTY/MODEL)						
TMA/LNA (TYPE/MODEL)						
CURRENT INJECTORS FOR TMA						
CURRENT INJECT POWER CABLE						
ANTENNA SHARING KIT?						
BAS Filter						
DUPLEXER (QTY/MODEL)						
DUPLEXER (QTY/MODEL)						
SURGE ARRESTOR (QTY/MODEL)						
DC BLOCK (QTY/MODEL)						
RET EQUIPMENT (QTY/MODEL)						
1900 PDU FOR TMAS						

HexPORT Multi-Band ANTENNA

Model HPA-65R-BUU-H6



Hexport Multi-Band Antenna Array

Benefits

- ◆ Includes WCS Band
- ◆ Reduces tower loading
- ◆ Frees up space for tower mounted E-nodes
- ◆ Single radome with six ports
- ◆ All Band design simplifies radio assignments
- ◆ Sharp elevation beam eases network planning

Features

- ◆ High Band Ports include WCS Band
- ◆ Four High Band ports with two Low Band ports in one antenna
- ◆ Sharp elevation beam
- ◆ Excellent elevation side-lobe performance
- ◆ Excellent MIMO performance due to array spacing
- ◆ Excellent PIM Performance
- ◆ A multi-network solution in one radome

Applications

- ◆ 4x4 MIMO on High Band and 2x2 MIMO on Low Band
- ◆ Adding additional capacity without adding additional antennas
- ◆ Adding WCS Band without increasing antenna count

The CCI Hexport Multi-Band Antenna Array is an industry first 6-port antenna with full WCS Band Coverage. With four high band ports and two low band ports, our hexport antenna is ready for 4X4 high band MIMO.

Modern networks demand high performance, consequently CCI has incorporated several new and innovative design techniques to provide an antenna with excellent side-lobe performance, sharp elevation beams, and high front to back ratio.

Multiple networks can now be connected to a single antenna, reducing tower loading and leasing expense, while decreasing deployment time and installation cost.

Full band capability for 700 MHz , Cellular 850 MHz, PCS 1900 MHz, AWS 1710/2170 MHz and WCS 2300 MHz coverage in a single enclosure.

HexPORT Multi-Band ANTENNA

Model HPA-65R-BUU-H6

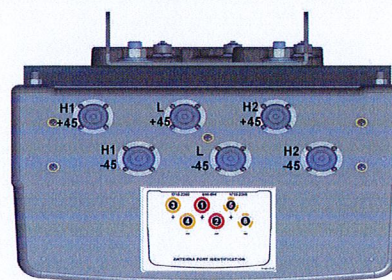
HPA-65R Multi-Band Antenna

Electrical Specifications

Frequency Range	2 X Low Band Ports which cover the full range from 698-894 MHz		4 X High Band Ports which cover the full range from 1710-2360 MHz			
	698-806 MHz	824-894 MHz	1850-1990 MHz	1710-1755/2110-2170 MHz	2305-2360 MHz	
Gain	14.1 dBi	14.8 dBi	16.9 dBi	16.3 dBi	17.2 dBi	17.4 dBi
Azimuth Beamwidth (-3dB)	66°	65°	61°	66°	62°	57°
Elevation Beamwidth (-3dB)	12.5°	10.5°	5.7°	6.3°	5.1°	4.5°
Electrical Downtilt	0° to 10°	0° to 10°	0° to 8°	0° to 8°	0° to 8°	0° to 8°
Elevation Sidelobes (1st Upper)	< -17 dB	< -19 dB	< -19 dB	< -18 dB	< -18 dB	< -17 dB
Front-to-Back Ratio @180°	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB
Front-to-Back Ratio over ± 20°	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB	> 30 dB
Cross-Polar Discrimination (at Peak)	> 25 dB	> 20 dB	> 25 dB	> 25 dB	> 25 dB	> 25 dB
Cross-Polar Discrimination (at ± 60°)	> 17 dB	> 14 dB	> 17 dB	> 17 dB	> 17 dB	> 17 dB
Cross-Polar Port-to-Port Isolation	> 25 dB	> 25 dB	> 26 dB	> 25 dB	> 26 dB	> 26 dB
VSWR	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1	< 1.5:1
Passive Intermodulation (2x20W)	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc	≤ -150dBc
Input Power	500 Watts CW	500 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW	300 Watts CW
Polarization	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°	Dual Pol 45°
Input Impedance	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms	50 Ohms
Lightning Protection	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground	DC Ground

Mechanical Specifications

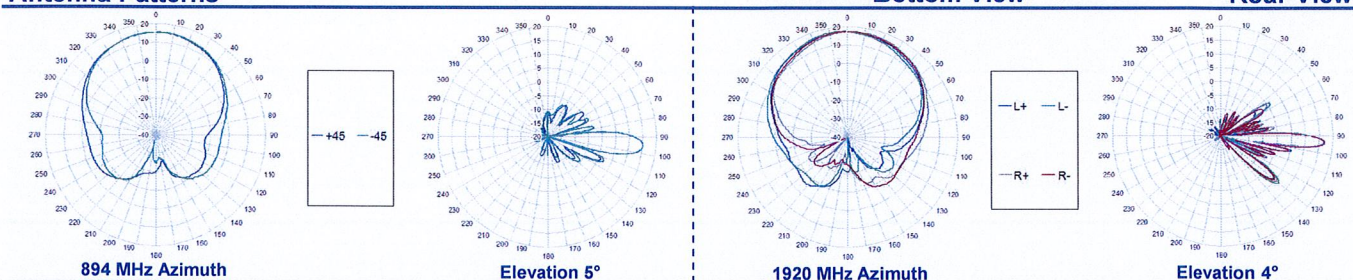
Dimensions (LxWxD)	72.0 x 14.8 x 9.0 inches (1828 x 376 x 229 mm)
Survival Wind Speed	> 150 mph
Front Wind Load	247 lbs (1099 N) @ 100 mph (161 kph)
Side Wind Load	165 lbs (735 N) @ 100 mph (161 kph)
Equivalent Flat Plate Area	9.7 ft ² (0.90 m ²)
Weight (without Mounting)	51 lbs (23 kg)
RET System Weight	5.0 lbs (2.3 kg)
Connector	6; 7-16 DIN female long neck
Mounting Pole	2-5 inches (5-12 cm)



Antenna Patterns*

Bottom View

Rear View



*Typical antenna patterns. For detail information on antenna pattern, please contact us at info@ccipproducts.com. All specifications are subject to change without notice.

RRUS 11

Frequency (AT&T)

- ✓ Band 12 (Lower 700 MHz)
- ✓ Band 4 (AWS, 17/2100 MHz) — 2Q2011

RF Characteristics

- ✓ Output power: 2x30 Watts
- ✓ 2x2 MIMO Capable
- ✓ IBW of 20 MHz
- ✓ Rx Sens.: Better than -105 dBm (5 MHz)

RET/TMA Support

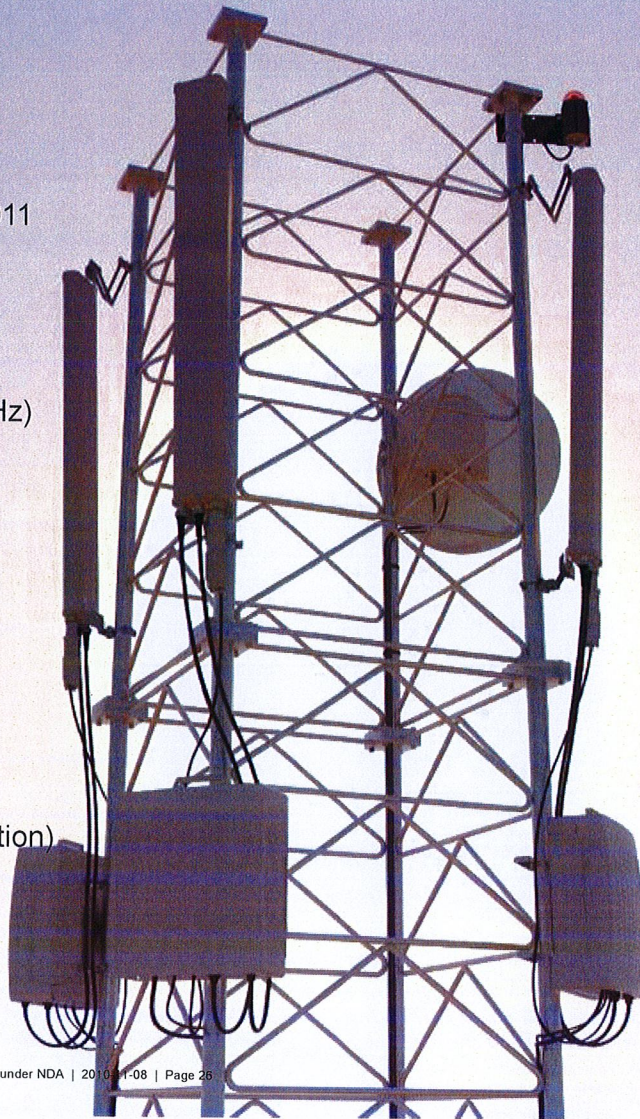
- ✓ AISG 2.0 Compatible
- ✓ Via RET Port and Centre Conductor
- ✓ Cascading
- ✓ 30 VDC Bias

Environmental

- ✓ Self Convection
- ✓ Temperature -40 to 131 F

Power

- ✓ Input voltage: -48 VDC or AC (exemption)
- ✓ Fuse size: 13 – 32 A
 - Recommended: 25 A
- ✓ Power Consumption:
 - Typical 200 Watts
 - Max 310 Watts
 - Excl. RET and TMA load



RRUS 11 Mechanics

Wall and pole mounting brackets

- Reused from RRUW and RRU22
- Vertical Mount Only

Clearing distances:

- Above ≥ 16 in.
- Below ≥ 12 in.
- Side ≥ 0 mm

DC connector

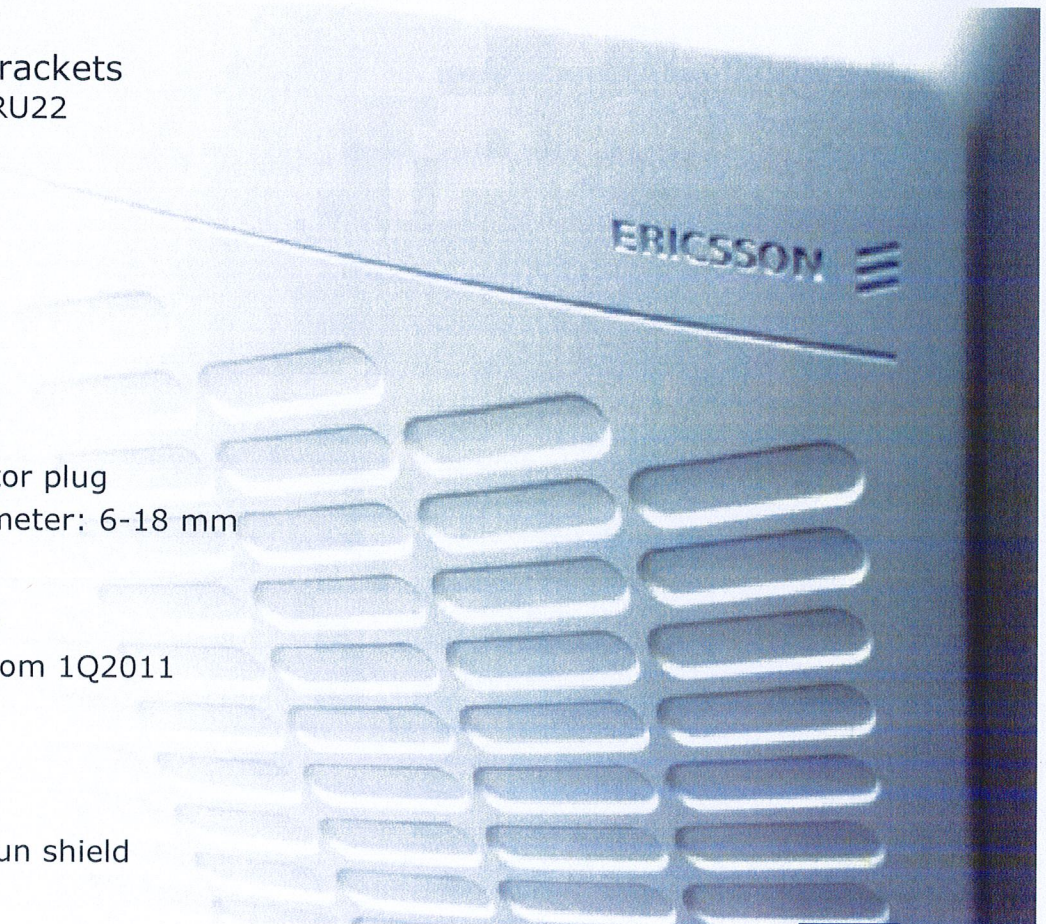
- Bayonet
- Screw terminals in connector plug
- Supported outer cable diameter: 6-18 mm

CPRI connector

- LCD with proprietary cover
- Separate cover available from 1Q2011

Size & Weight

- Band 4: 44 lbs
- Band 12: 50 lbs
- 17.8" x 17.3" x 7.2" incl. sun shield



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POWER

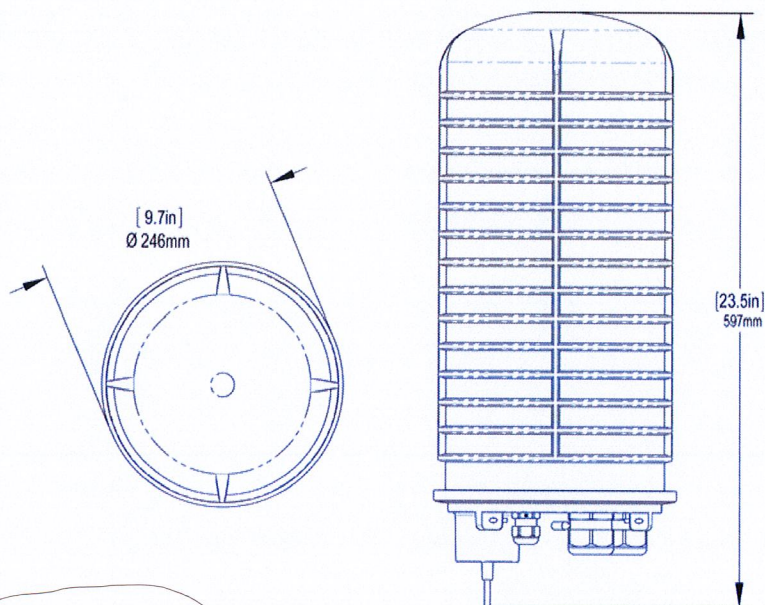
DC6-48-60-18-8F

DC Surge Suppression Solution

The DC6-48-60-18 is a dual chambered, DC surge suppression system for use in multi-circuit, Distributed Antenna Systems. The system will protect up to 6 Remote Radio Heads from voltage surges and lightning, and connect up to 18 fiber pairs. The system is enclosed in a NEMA 4 rated, waterproof enclosure.

FEATURES

- Protects up to 6 Remote Radio Heads, each with its own protection circuit.
- Flexible design allows for installation at the top of a tower for Remote Radio Head protection.
- Includes fiber connections for up to 18 pairs of fiber.
- LED indicators on individual circuits provide visual indication of suppressor status.
- Form 'C' relays allow for remote monitoring of the suppressor status.
- Patented Strikesorb technology provides over 60 kA of surge current capacity per circuit.
- Strikesorb suppression modules are fully recognized to UL 1449-3rd Edition Safety Standard, meeting all intermediate and high current fault requirements to facilitate use in OEM applications.
- Raycap recommends that DC protection system be installed within 2 meters or 6 feet of the radio.
- Dome design is lightweight and aerodynamic providing maximum flexibility for installation on top of towers.



Raycap

DC6-48-60-18-8F

DC Power Surge Protection

Electrical Specifications	
Model Number	DC6-48-60-18-8F
Nominal Operating Voltage	48 VDC
Nominal Discharge Current (I_n)	20 kA 8/20 μ s
Maximum Discharge Current (I_{max}) per NEMA LS-1	60 kA 8/20 μ s
Maximum Continuous Operating Voltage (U_c)	75 VDC
Voltage Protection Rating	400 V

Mechanical Specifications	
Suppression Connection Method	Compression lug, #2-#14 AWG Copper, #2-#12 Aluminum
Fiber Connection Method	LC-LC Single mode duplex
Environmental Rating	IP 68, 7m 72hrs
Operating Temperature	-40° C to + 80° C
Storage Temperature	-70° C to + 80° C
Cold Temperature Cycling	IEC 61300-2-22e -30° C to + 60° C 200 hrs @ 5 psi
Resistance to Aggressive Materials	CEI IEC 61073-2 including acids and bases
UV Protection	ISO 4892-2 Method A Xenon-Arc 2160 hrs
Weight	20 lbs without Mounting Bracket

STANDARDS

Strikesorb modules are compliant to the following Surge Protection Device (SPD) Standards:

- ANSI/UL 1449 - 3rd Edition
- IEEE C62.41
- NEMA LS-1, IEC 61643-1:2005 2nd Edition:2005
- IEC 61643-12
- EN 61643-11:2002 (including A11:2007)



Raycap

G02-00-068 REV 050610



GS-07F-0435V



Certified to
ISO 9001:2000



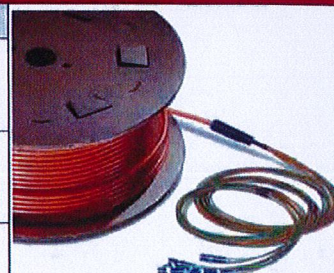
TUV Rheinland
of North America

Raycap, Inc. 806 W. Clearwater Loop • Post Falls • Idaho • 83854 • USA
Phone 208.777.1166 • Toll Free 800.890.2569 • Fax 208.777.4466 • www.raycapsurgeprotection.com

12 PAIR FIBER TRUNK

FTTA fiber trunks are fiber optical cable assemblies connecting base stations and remote radio heads in telecommunication applications. They can be used indoor and outdoor, are UV protected and riser rated. Connectors and fan-out are IP67 protected. This ensures easy handling in an outdoor environment. A pulling sock eases cable hoisting.

Part #	Diameter	Description	QTY
FB-L98B-002-15000 CEQ.32135	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 15 meter length.	Each
FB-L98B-002-30000 CEQ.32194	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 30 meter length.	Each
FB-L98B-002-50000 CEQ.32193	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 50 meter length.	Each
FB-L98B-002-75000 CEQ.32192	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 75 meter length.	Each
FB-L98B-002-100000 CEQ.32191	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 100 meter length.	Each
FB-L98B-002-125000 CEQ.32190	10mm	Preconnect Trunk with UL certified cable 12 channels, 24 fibers, single mode LC Duplex to LC Duplex, OD 10.0mm: 125 meter length.	Each



6 CONDUCTOR (3 PAIR) POWER CABLE

600 Volts Power Cable. UL Approved for direct burial or sunlight applications.

Part #	Diameter	Description	QTY
WR-VG86T CEQ.32182	19.2 mm	RSS 8-AWG 6 - Conductor Unshielded 600 Volts Power Cable -# 8 Tinned Copper (three traced red/black pairs) w/ #10 Bare Ground Wire.	Per FT
WR-VG86ST-BRD CEQ.32181	19.7 mm	RSS 8-AWG 6 - Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 8 Tinned Copper (three traced red/black pairs) w/ #10 Bare Ground Wire.	Per FT

2 CONDUCTOR (SINGLE PAIR) SHIELDED POWER CABLE

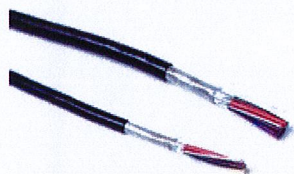
600 Volts Power Cable. UL Approved for direct burial or sunlight applications.

Part #	Diameter	Description	QTY
WR-VG122ST-BRDA CEQ.10224	9.8mm	RSS 12-AWG 2 - Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 12 AWG 65 Strands Tinned Copper (red and black) w/ #12 Bare Ground Wire.	Per FT
WR-VG102ST-BRDA CEQ.10225	11.6mm	RSS 10-AWG 2 - Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 10 AWG 105 Strands Tinned Copper (red and black) w/ #10 Bare Ground Wire.	Per FT
WR-VG82ST-BRDA CEQ.10226	15.4mm	RSS 8-AWG 2 - Flexible Conductor Shielded (Tinned Copper Braid and Aluminum Tape w/ Drain Wire) 600 Volts Power Cable -# 8 AWG 168 Strands Tinned Copper (red and black) w/ #10 Bare Ground Wire.	Per FT

Product Specifications

COMMScope®

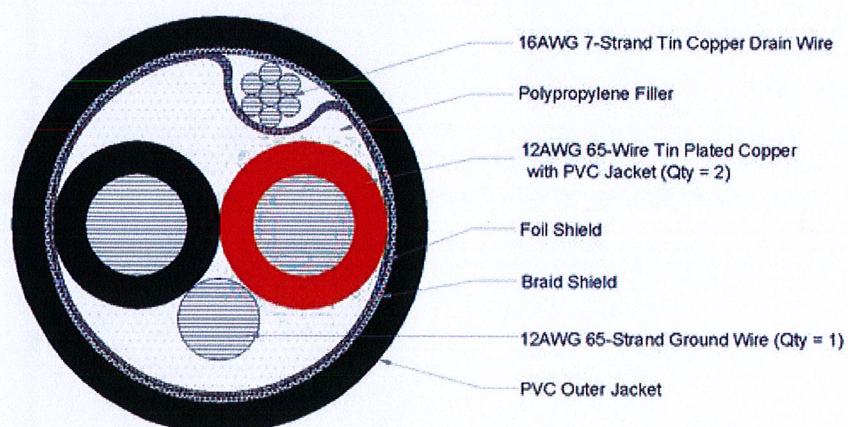
POWERED BY



PWRT-212-S

Remote Radio Head Power Cable, 2 conductor with shield, 12 AWG (3.31 mm²)

Cross Section Drawing



Construction Materials

Construction Type	Non-armored
Conductor Material	Tinned copper
Dielectric Material	PVC
Drain Wire Material	Tinned copper
Filler Material	Polypropylene
Ground Wire Material	Tinned copper
Insulation Material, singles	PVC
Jacket Material	PVC
Outer Shield (Braid) Coverage	65 %
Outer Shield (Braid) Gauge	36 AWG
Outer Shield (Braid) Material	Tinned copper
Outer Shield (Tape) Material	Aluminum/Poly, non-bonded

Dimensions

Cable Weight	0.16 kg/m 0.11 lb/ft
Diameter Over Conductor, singles	2.5654 mm per 65 strand 0.1010 in per 65 strand
Diameter Over Dielectric	3.5814 mm 0.1410 in
Diameter Over Drain Wire	1.5200 mm per 7 strand 0.0598 in per 7 strand
Diameter Over Ground Wire	2.565 mm 0.101 in
Diameter Over Jacket	10.109 mm 0.398 in

Product Specifications

COMMScope®

PWRT-212-S

POWERED BY



Diameter Over Shield (Braid)	7.823 mm		0.308 in
Jacket Thickness	1.143 mm		0.045 in

Electrical Specifications

Conductor dc Resistance	1.68 ohms/kft		5.51 ohms/km
Conductor dc Resistance Note	Maximum value based on a standard condition of 20 °C (68 °F)		
Safety Voltage Rating	600 V		

Environmental Specifications

Environmental Space	UV resistant for outdoor and/or direct burial installations
Operating Temperature	-40 °C to +90 °C (-40 °F to +194 °F)
Safety Standard	NEC Article 336 (Type TC)

General Specifications

Application	Industrial
Cable Type	Power
Jacket Color	Black
Conductor Gauge, singles	12 AWG
Conductor Type, singles	Stranded
Conductors, quantity	2
Drain Wire Gauge	16 AWG
Ground Wire Gauge	12 AWG
Ground Wire Type	Stranded
Jacket Color, singles	Black Red

Regulatory Compliance/Certifications

Agency	Classification
ISO 9001:2008	Designed, manufactured and/or distributed under this quality management system



WIRELESS COMMUNICATIONS FACILITY

CT1178

AVON - MONTEVIDEO ROAD

324 MONTEVIDEO ROAD

AVON, CT

PROJECT SUMMARY

1. THE GENERAL SCOPE OF WORK CONSISTS OF THE FOLLOWING:
 - INSTALLATION OF EQUIPMENT CABINETS WITHIN AN EXISTING $\pm 17'-6"$ x $\pm 8'-0"$ VACANT ROOM IN THE EXISTING MULTI-CARRIER EQUIPMENT SHELTER.
 - INSTALLATION OF A 50KW DIESEL FUELED EMERGENCY POWER GENERATOR ON A CONCRETE PAD ADJACENT TO THE EXISTING MULTI-CARRIER EQUIPMENT SHELTER.
 - INSTALLATION OF TWELVE (12) PANEL ANTENNAS AND ASSOCIATED APPURTENANCES CONCEALED WITHIN THE EXISTING DOPPLER RADAR DOME ON THE EXISTING TOWER WITH A $\pm 70'$ ABOVE GRADE LEVEL (AGL).
2. POWER & TELCO UTILITIES WILL BE ROUTED FROM THE EXISTING UTILITY DEMARCS LOCATED ON THE EXISTING SITE TO THE PROPOSED EQUIPMENT ROOM.

PROJECT INFORMATION

AT&T SITE NUMBER: CT1178
AT&T SITE NAME: AVON - MONTEVIDEO ROAD
SITE ADDRESS: 324 MONTEVIDEO ROAD, AVON, CT
PROPERTY OWNER/LEASOR: TALCOTT MOUNTAIN SCIENCE CENTER
324 MONTEVIDEO ROAD
AVON, CT 06001
LESSEE/APPLICANT: AT&T MOBILITY
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067
ENGINEER: CENTEK ENGINEERING, INC.
63-2 NORTH BRANFORD RD.
BRANFORD, CT 06405
PROJECT COORDINATES (APPROXIMATE):
LATITUDE: $41^{\circ}-48'-42.26''$ N
LONGITUDE: $72^{\circ}-47'-55.37''$ W
GROUND ELEVATION: $907 \pm$ AMSL

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	DESIGN BASIS AND STRUCTURAL SPECIFICATIONS	0
C-1	SITE LOCATION PLAN	1
C-2	PARTIAL SITE PLAN AND ELEVATION	2
C-3	EQUIPMENT ROOM AND SITE DETAILS	0
C-4	ANTENNA CONFIGURATION DETAILS AND RF TABLES	0
M-1	MECHANICAL PLANS, LEGENDS, NOTES AND DETAILS	0
E-1	ELECTRICAL LEGEND AND SCHEDULES	0
E-2	ELECTRICAL RISER DIAGRAM	0
E-3	ELECTRICAL FLOOR PLAN AND NOTES	0
E-4	CABLE TRAY LAYOUT INSTALLATION	0
E-5	GROUNDING PLAN AND NOTES	1
E-6	GROUNDING SCHEMATIC	1
E-7	DETAILS	1
E-8	DETAILS	1
E-9	ELECTRICAL SPECIFICATIONS	0

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2003 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2005 CONNECTICUT SUPPLEMENT AND 2009 AMENDMENTS, INCLUDING THE TIA/EIA-222 REVISION "F" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES," 2005 CONNECTICUT FIRE SAFETY CODE AND 2009 AMENDMENTS, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. THE COMPOUND, TOWER, PRIMARY GROUND RING, ELECTRICAL SERVICE TO THE METER BANK AND TELEPHONE SERVICE TO THE DEMARCATION POINT ARE PROVIDED BY SITE OWNER. AS BUILT FIELD CONDITIONS REGARDING THESE ITEMS SHALL BE CONFIRMED BY THE CONTRACTOR. SHOULD ANY FIELD CONDITIONS PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL NOT PROCEED WITH ANY AFFECTED WORK.
3. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
4. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
5. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
6. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
7. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN "AS-BUILT" SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
8. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
9. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY. MAINTAIN EXISTING BUILDING'S/PROPERTY'S OPERATIONS, COORDINATE WORK WITH BUILDING/PROPERTY OWNER.
10. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
11. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
12. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
13. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE AT&T CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO "EXTRA" WILL BE ALLOWED FOR MISSED ITEMS.
14. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
15. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
16. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
17. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
18. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER THE MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
19. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
20. THE CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1-800-922-4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED PRIOR TO ANY EXCAVATION WORK. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
21. CONTRACTOR SHALL COMPLY WITH OWNERS ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

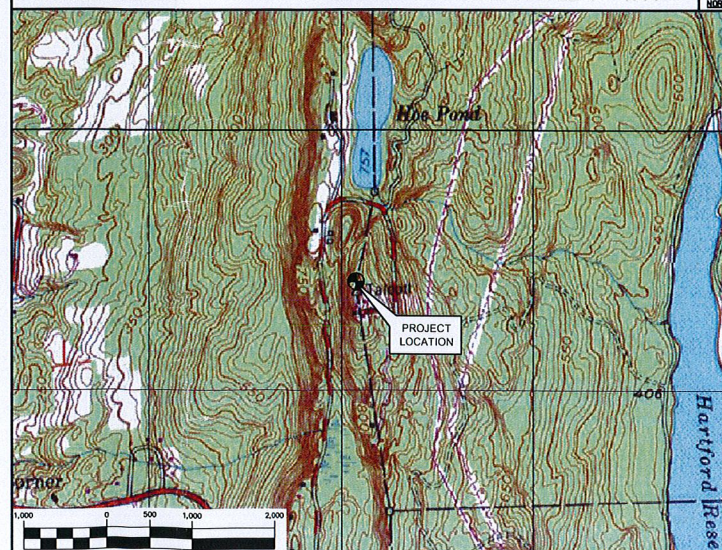
FROM: 500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT TO: 324 MONTEVIDEO ROAD
AVON, CONNECTICUT

1. Get on I-91 N from Capital Blvd
2. Follow I-91 N and US-44 W to Parsons Way in Avon
3. Turn right onto Parsons Way
4. Turn right onto Montevideo Rd

1.1 mi
16.5 mi
0.1 mi
0.8 mi

VICINITY MAP

SCALE: 1" = 1000'



REV.	DATE	DRAWN BY	CHECKED BY	DESCRIPTION
0	01.24.14	DEB	DFC	CONSTRUCTION DOCUMENTS



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AT&T MOBILITY
WIRELESS COMMUNICATIONS FACILITY
SITE NUMBER: CT1178
SITE NAME: AVON - MONTEVIDEO ROAD
324 MONTEVIDEO ROAD
AVON, CT

DATE: 01.14.14
SCALE: AS NOTED
JOB NO. 14002.000

TITLE SHEET

T-1

Sheet No. 1 of 16

DESIGN BASIS

- WIND LOAD: (TIA/EIA-222-F-1996)
BASIC WIND SPEED (V) = 80 MPH (FASTEST MILE)

WIND LOAD: (2005 CT STATE BUILDING CODE APPENDIX K)
BASIC WIND SPEED (V) = 95 MPH (3-SECOND GUST)
EQUIVALENT TO (V) = 77.5 MPH (FASTEST MILE)

TIA/EIA-222-F-1996 WIND SPEED CONTROLS

GENERAL NOTES

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. BEFORE BEGINNING THE WORK, THE CONTRACTOR IS RESPONSIBLE FOR MAKING SUCH INVESTIGATIONS CONCERNING PHYSICAL CONDITIONS (SURFACE AND SUBSURFACE) AT OR CONTIGUOUS TO THE SITE WHICH MAY AFFECT PERFORMANCE AND COST OF THE WORK.
3. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY CONDITIONS WHICH ARE IN CONFLICT OR OTHERWISE NOT CONSISTENT WITH THE CONSTRUCTION DOCUMENTS AND SHALL NOT PROCEED WITH SUCH WORK UNTIL THE CONFLICT IS SATISFACTORILY RESOLVED.
4. THE STRUCTURE IS DESIGNED TO BE SELF-SUPPORTING AND STABLE AFTER THE BUILDING IS COMPLETED. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE BUILDING AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
5. ALL DIMENSIONS, ELEVATIONS, AND OTHER REFERENCES TO EXISTING STRUCTURES, SURFACE, AND SUBSURFACE CONDITIONS ARE APPROXIMATE. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL VERIFY AND COORDINATE ALL DIMENSIONS, ELEVATIONS, ANGLES WITH EXISTING CONDITIONS AND WITH ARCHITECTURAL AND SITE DRAWINGS BEFORE PROCEEDING WITH ANY WORK.
6. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.
7. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR PROVIDING AND MAINTAINING ADEQUATE SHORING, BRACING, AND BARRICADES AS MAY BE REQUIRED FOR THE PROTECTION OF EXISTING PROPERTY, CONSTRUCTION WORKERS, AND FOR PUBLIC SAFETY.
8. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE ENGINEER FOR REVIEW BEFORE FABRICATION AND/OR INSTALLATION IS MADE. SHOP DRAWINGS SHALL INCLUDE ERECTION DRAWINGS AND COMPLETE DETAILS OF CONNECTIONS AS WELL AS MANUFACTURER'S SPECIFICATION DATA WHERE APPROPRIATE. SHOP DRAWINGS SHALL BE CHECKED BY THE CONTRACTOR AND BEAR THE CHECKER'S INITIALS BEFORE BEING SUBMITTED FOR REVIEW.
9. SUBMIT CONCRETE LAYOUT PLAN SHOWING LOCATION OF ALL PROPOSED FOOTINGS, WALLS, GRADE BEAMS, PROPOSED CONSTRUCTION JOINT LOCATIONS, TOP OF FOOTING, WALL AND SLAB ELEVATIONS, STEPPED FOOTING, WALL, AND BEAM POCKET LOCATIONS, WALL OPENINGS AND INVERTS FOR UTILITIES PENETRATING WALLS.
10. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS BEFORE PROCEEDING WITH ANY WORK.
11. WHERE DETAILS ARE NOT INDICATED, THEY SHALL BE CONSIDERED TYPICAL AND APPLY AT SAME AND SIMILAR CONDITIONS.
12. WORK CIVIL AND STRUCTURAL DRAWINGS WITH MECHANICAL AND ELECTRICAL DRAWINGS (WHERE PROVIDED) FOR LOCATIONS OF OPENINGS, RECESSES, BUILT-IN WORK, ETC.

1. CONCRETE CONSTRUCTION SHALL CONFORM TO THE FOLLOWING STANDARDS:

- ACI 111 - STANDARD PRACTICE FOR SELECTING PROPORTIONS FOR NORMAL AND HEAVYWEIGHT CONCRETE.
- ACI 301 - SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
- ACI 302 - GUIDE FOR CONCRETE FLOOR AND SLAB CONSTRUCTION
- ACI 304 - RECOMMENDED PRACTICE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETE.
- ACI 308.1 STANDARD SPECIFICATION FOR COLD WEATHER CONCRETING
- ACI 318 - BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE.
2. CONCRETE SHALL DEVELOP COMPRESSIVE STRENGTH IN 28 DAYS AS FOLLOWS:
- | | |
|--------------------|-----------|
| SLABS ON GRADE | 4,000 PSI |
| ALL OTHER CONCRETE | 3,000 PSI |
3. REINFORCING STEEL SHALL BE 60,000 PSI YIELD STRENGTH.
4. WELDED WIRE FABRIC SHALL CONFORM TO ASTM- A-185.
5. ALL DETAILING, FABRICATION, AND ERECTION OF REINFORCING BARS, UNLESS OTHERWISE NOTED, MUST FOLLOW THE LATEST ACI CODE AND LATEST ACI "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES".
6. CONCRETE COVER OVER REINFORCING SHALL CONFORM TO THE FOLLOWING, UNLESS OTHERWISE SHOWN:
- | | |
|--|--------------|
| SURFACES EXPOSED TO THE WEATHER | 1-1/2 INCHES |
| FORMED SURFACES EXPOSED TO EARTH | 1-1/2 INCHES |
| BOTTOM OF FOOTINGS | 3 INCHES |
| SURFACES NOT EXPOSED TO EARTH OR WEATHER | 1-1/2 INCHES |
7. NO STEEL WIRE, METAL FORM TIES, OR ANY OTHER METAL SHALL REMAIN WITHIN THE REQUIRED COVER OF ANY CONCRETE SURFACE.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. SPLICES SHALL BE WELL STAGGERED. ADDITIONAL BARS AND SPECIAL BENDING DETAILS ARE REQUIRED AT INTERSECTING WALLS AND AT JOINTS. SUCH DETAILS SHALL COMPLY WITH ACI 315 RECOMMENDATIONS UNLESS OTHERWISE SHOWN.
9. NO TACK WELDING OF REINFORCING WILL BE PERMITTED.
10. NO CALCIUM CHLORIDE OR ADMIXTURES CONTAINING MORE THAN 1 % CHLORIDE BY WEIGHT OF ADMIXTURE SHALL BE USED IN THE CONCRETE.
11. UNLESS OTHERWISE NOTED, ALL LAP SPLICES SHALL BE 48 BAR DIAMETERS.
12. SHEAR KEYS (2" x 4"), SEPARATING CONCRETE POURS, SHALL BE PROVIDED IN ALL CONCRETE WALLS AND BETWEEN FOOTINGS AND WALLS.
13. AT ALL OPENINGS IN CONCRETE WALLS AND SUSPENDED SLABS, UNLESS OTHERWISE DETAILED, PROVIDE THE FOLLOWING ADDITIONAL REINFORCING:
- 1 - #4 EACH FACE AT EACH SIDE OF OPENING. EXTEND 2'-0" BEYOND OPENING.
- 1 - #4 x 4'-0" LONG EACH FACE DIAGONALLY AT EACH CORNER.
14. INSPECTION AND TESTING OF CONCRETE WORK SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY, PAID BY THE OWNER, AND APPROVED BY THE ENGINEER. THE INSPECTOR SHALL OBSERVE CONDITION OF SOILS AND FORMWORK BEFORE FOOTINGS ARE PLACED, SIZE, SPACING AND LOCATION OF REINFORCEMENT, AND PLACEMENT OF CONCRETE.
15. THE TESTING COMPANY SHALL ALSO OBTAIN A MINIMUM OF THREE (3) COMPRESSIVE STRENGTH TEST SPECIMENS FOR EACH CONCRETE MIX DESIGN. ONE SPECIMEN TESTED AT 7 DAYS, ONE AT 28 DAYS, AND ONE HELD IN RESERVE FOR FUTURE TESTING, IF NEEDED.
16. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

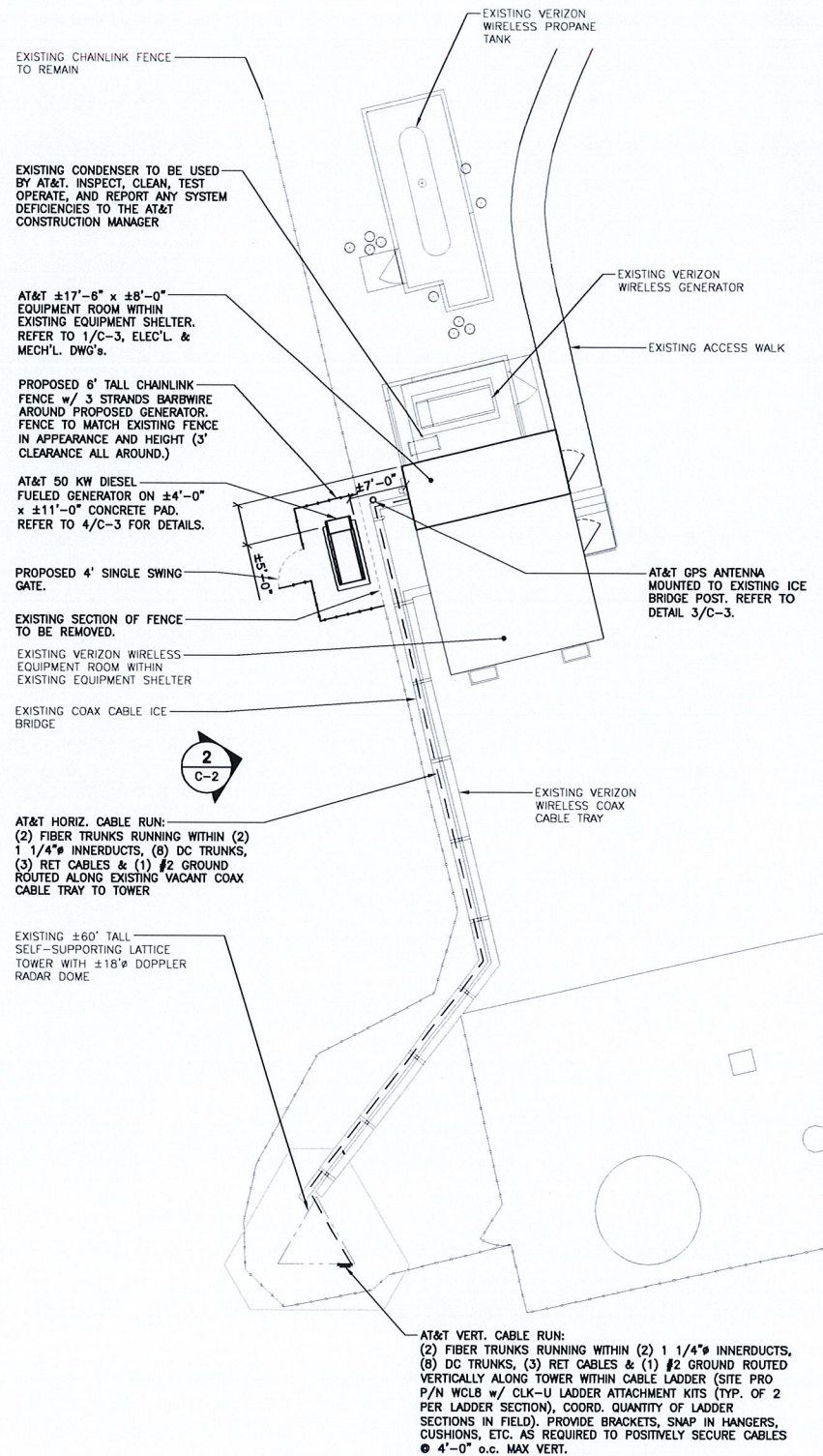
SLAB ON GRADE CONSTRUCTION:

1. PLACE AND COMPACT GRAVEL FILL IN LAYERS NOT TO EXCEED 10" BEFORE COMPACTION. DETERMINE MAXIMUM DRY DENSITY IN ACCORDANCE WITH ASTM D1557 AND MAKE ONE (1) FIELD DENSITY TEST IN ACCORDANCE WITH ASTM D2167 FOR EACH 50 CUBIC YARDS OF COMPACTED FILL, BUT NOT LESS THAN ONE (1) PER LAYER, TO ENSURE COMPACTION TO 95% OF MAXIMUM DRY DENSITY.
2. SAW CUT CONTROL JOINTS 1" $\pm$ WIDE AND TO A DEPTH EQUAL TO 1/4 OF THE SLAB THICKNESS. CONSTRUCTION JOINTS AS REQUIRED SHALL BE KEYPED AND LOCATED AT CONTROL JOINT INTERVALS. ALL CONTROL JOINTS SHALL BE FILLED WITH EUCO EPOXY #600 EPOXY JOINT FILLER AS MANUFACTURED BY EUCLID CHEMICAL CO. OR APPROVED EQUAL.
3. SAW CUT CONTROL JOINTS AT 20'-0" ON CENTER MAXIMUM WITHIN 12 HOURS OF CONCRETE PLACEMENT.
4. SLABS ON GRADE FINISHES: STEEL TROWEL FINISH AS DEFINED IN ACI 301. CURE SLAB WITH SONNEBORN KURE-N-SEAL WB OR APPROVED EQUAL, APPLIED AS RECOMMENDED BY MANUFACTURER.
5. CONSTRUCTION JOINT SPACING IN FOUNDATION WALLS SHALL NOT EXCEED 40 FEET NOR 20 FEET FROM ANY CORNER. JOINTS SHALL BE KEYPED AND HORIZONTAL BARS SHALL EXTEND THRU JOINT AND BE 4B BAR DIAMETER SPLICED.
6. IN REINFORCED CONCRETE WALLS AND FOOTINGS, PROVIDE CORNER DOWELS OF THE SAME SIZE AND AT THE SAME SPACING AS HORIZONTAL REINFORCING. DOWELS SHALL HAVE A 4B BAR DIAMETER SPLICE WITH HORIZONTAL REINFORCING EACH DIRECTION.
7. WHERE FOOTINGS ARE IN CLOSE PROXIMITY TO SUBSURFACE PIPING, TOP OF FOOTING SHALL BE LOWERED TO PROVIDE A MINIMUM OF 8" BELOW INVERT ELEVATION OF PIPING.
8. CONCRETE PIERS (IF PROVIDED): PLACE CONCRETE PIERS AND WALLS TOGETHER, SET PIER STEEL AND EXTEND WALL STEEL THROUGH PIER VERTICAL BARS. PROVIDE DOWELS WITH STANDARD HOOK FROM FOOTINGS AT ALL PIERS. SIZE AND QUANTITY OF DOWELS TO MATCH VERTICAL PIER REINFORCING.
9. PROVIDE CORROSION RESISTANT ACCESSORIES IN ALL EXPOSED CONCRETE.
10. RUB ALL EXPOSED CONCRETE SURFACES SMOOTH AND FINISH WITH CEMENT GROUT.
11. PROVIDE AIR ENTRAINMENT IN ALL EXTERIOR CONCRETE AS WELL AS GARAGE AND PORCH SLABS THAT WILL BE EXPOSED TO DEICING SALTS.

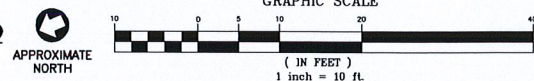
1. ALL STRUCTURAL STEEL IS DESIGNED BY ALLOWABLE STRESS DESIGN (ASD):

- A. STRUCTURAL STEEL (W SHAPES)---ASTM A992, (FY = 50 KSI)
 - B. STRUCTURAL STEEL (OTHER SHAPES)---ASTM A336, (FY = 36 KSI)
 - C. STRUCTURAL HSS (RECTANGULAR SHAPES)---ASTM A500 GRADE B, (FY = 46 KSI)
 - D. STRUCTURAL HSS (ROUND SHAPES)---ASTM A500 GRADE B, (FY = 42 KSI)
 - E. CONNECTION BOLTS---ASTM A325-N
 - F. ANCHOR RODS---ASTM F 1554
 - G. WELDING ELECTRODE---ASTM E 70XX
2. EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE PLANS ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR REVIEW TO THE ENGINEER.
 3. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS SHALL INCLUDE THE FOLLOWING: SECTION PROFILES, SIZES, CONNECTION ATTACHMENTS, REINFORCING, ANCHORAGE, SIZE AND TYPE OF FASTENERS AND ACCESSORIES. INCLUDE ERECTION DRAWINGS, ELEVATIONS AND DETAILS.
 4. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
 6. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
 7. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
 8. FABRICATE BEAMS WITH MILL CAMBER UP.
 9. THE STRUCTURE IS DESIGNED TO BE SELF SUPPORTING AND STABLE AFTER THE WORK IS FULLY COMPLETED.
 10. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
 11. BOLT HOLES SHALL BE PUNCHED OR DRILLED, FLAME CUT HOLES ARE NOT ACCEPTABLE.
 12. LEVEL AND PLUMB INDIVIDUAL MEMBERS OF THE STRUCTURE TO AN ACCURACY OF 1:500, BUT NOT TO EXCEED 1/4" IN THE FULL HEIGHT OF THE COLUMN.
 13. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
 14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
 15. STRUCTURAL CONNECTION BOLTS SHALL CONFORM TO ASTM A325-N. ALL BOLTS SHALL BE 3/4" DIAMETER MINIMUM AND SHALL HAVE A MINIMUM OF TWO BOLTS, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
 16. ALL BOLTED JOINTS SHALL BE SNUG TIGHT (ST) UNLESS OTHERWISE DESIGNATED AS PRETENSIONED (PT) OR SLIP CRITICAL (SC) ON THE DRAWINGS.
 17. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES APPEARANCE AND QUALITY OF WELDS, AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND D1.1 WHERE FILL WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION" 9TH EDITION. AT THE COMPLETION OF WELDING, ALL DAMAGE TO GALVANIZED COATING SHALL BE REPAIRED.
 18. USE PRECAUTIONS & PROCEDURES PER AWS D1.1 WHEN WELDING GALVANIZED METALS.
 19. ALL WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS.
 20. ALL STEEL MATERIAL (EXPOSED TO WEATHER) SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT DIPPED GALVANIZED) COATINGS" ON IRONS AND STEEL PRODUCTS.
 21. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT-DIP) ON IRON AND STEEL HARDWARE".
 22. NOTIFY THE ENGINEER PRIOR TO FIELD CUTTING OR MODIFYING APPROVED FABRICATIONS.
 23. THE ENGINEER SHALL BE NOTIFIED OF ANY INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON CONFORMING MATERIALS OR CONDITIONS TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE ENGINEER REVIEW.
 24. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

AT&T MOBILITY		DATE: 01.14.14	
WIRELESS COMMUNICATIONS FACILITY		SCALE: AS NOTED	
SITE NUMBER: CT1178		JOB NO. 14002.000	
SITE NAME: AVON - MONTEVIDEO ROAD		DESIGN BASIS AND STRUCTURAL SPECIFICATIONS	
324 MONTEVIDEO ROAD AVON, CT		N-1	



1 PARTIAL SITE PLAN - PROPOSED
SCALE: 1" = 10'



AT&T GPS ANTENNA MOUNTED TO EXISTING ICE BRIDGE POST. REFER TO DETAIL 3/C-3.

AT&T 50 KW DIESEL FUELED GENERATOR ON ±4'-0" x ±11'-0" CONCRETE PAD. REFER TO 4/C-3 FOR DETAILS.

EXISTING CONDENSER TO BE USED BY AT&T. INSPECT, CLEAN, TEST OPERATE, AND REPORT ANY SYSTEM DEFICIENCIES TO THE AT&T CONSTRUCTION MANAGER

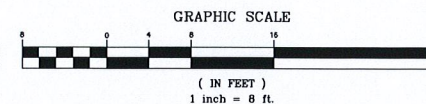
EXISTING VERIZON WIRELESS GENERATOR

AT&T HORIZ. CABLE RUN: (2) FIBER TRUNKS RUNNING WITHIN (2) 1 1/4" INNERDUCTS, (8) DC TRUNKS, (3) RET CABLES & (1) #2 GROUND ROUTED ALONG EXISTING VACANT COAX CABLE TRAY TO TOWER

- TOWER NOTES:**
- EXISTING ±60' TALL SELF-SUPPORTING LATTICE TOWER WITH ±18" DOPPLER RADAR DOME.
 - REFER TO TOWER STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJECT NO. 13140.CO2, DATED 12/19/13 (REV-2) FOR ADDITIONAL REQUIREMENTS AND INFORMATION.
 - TOWER REINFORCEMENT MUST BE COMPLETED PRIOR TO THE AT&T EQUIPMENT UPGRADE. REFER TO STRUCTURAL ANALYSIS REPORT FOR DETAILS.

AT&T VERT. CABLE RUN: (2) FIBER TRUNKS RUNNING WITHIN (2) 1 1/4" INNERDUCTS, (8) DC TRUNKS, (3) RET CABLES & (1) #2 GROUND ROUTED VERTICALLY ALONG TOWER WITHIN CABLE LADDER (SITE PRO P/N WCLB w/ CLK-U LADDER ATTACHMENT KITS (TYP. OF 2 PER LADDER SECTION), COORD. QUANTITY OF LADDER SECTIONS IN FIELD). PROVIDE BRACKETS, SNAP IN HANGERS, CUSHIONS, ETC. AS REQUIRED TO POSITIVELY SECURE CABLES @ 4'-0" o.c. MAX VERT.

2 NORTH ELEVATION - PROPOSED
SCALE: 1/8" = 1'-0"



AT&T PANEL ANTENNAS WITHIN EXISTING DOPPLER RADAR DOME. REFER TO DWG. C-4 FOR LAYOUT & CONFIGURATION.

AT&T ANTENNAS EL. 70' ± A.G.L.

EXISTING VERIZON WIRELESS ANTENNAS EL. 55' ± A.G.L.

LOCATION OF TOWER REINFORCEMENTS REQUIRED PER CENTEK S-1 ENTITLED "TOWER ELEVATION AND FEEDLINE PLAN" CENTEK PROJ. NO. 13140.CO2, DATED 12/19/13 (REV-3). REFER TO AFOREMENTIONED STRUCTURAL SKETCH FOR REQUIREMENTS SPECIFIC TO THIS REINFORCEMENT WORK.

DATE	01.14.14
SCALE	AS NOTED
JOB NO.	14002.000

PARTIAL SITE PLAN AND ELEVATION

C-2

Sheet No. 4 of 16

AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

SITE NUMBER: CT1178

SITE NAME: AVON - MONTEVIDEO ROAD

324 MONTEVIDEO ROAD
AVON, CT

PROFESSIONAL ENGINEER SEAL

at&t

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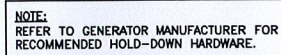


1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT AND COORDINATED WITH AT&T CONSTRUCTION MANAGER.

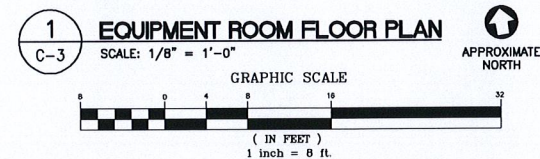
- 3 GPS GROUNDING
C-3 NOT TO SCALE



4000 PSI CONC.



11



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

GRAPHIC SCALE



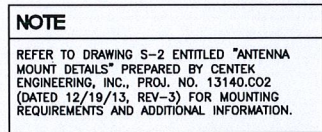
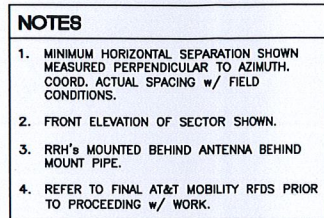
EQUIPMENT ROOM: VCT TO BE INSTALLED OVER EXISTING CONCRETE FLOOR SURFACE IN STRICT ACCORDANCE WITH FLOORING MANUFACTURER'S WRITTEN RECOMMENDATIONS. 4" VINYL BASE TO BE INSTALLED AFTER INSTALLATION OF VCT.



C-3 NOT TO SCALE



C-3 NOT TO SCALE



2 ANTENNA CONFIGURATION ELEVATION
C-4 SCALE: 1/4" = 1'-0" (ALL SECTORS)

1 ANTENNA CONFIGURATION PLAN
C-4 SCALE: 1/4" = 1'-0"



APPROXIMATE
NORTH

RF EQUIPMENT TABLE																					
SECTOR	PANEL ANTENNAS					FILTER	FROM REMOTE RADIO UNIT				REMOTE RADIO UNIT		FROM SURGE SUPPRESSOR				SURGE SUPPRESSOR	FROM SHELTER			
	AZIMUTH	QTY.	MAKE & MODEL	RAD CENTER (AGL)	DOWNTILT	QTY.	COAX QTY.	COAX SIZE	COAX LENGTH	RET QTY.	QTY.	MAKE & MODEL	DC QTY.	DC SIZE	FIBER QTY.	DC & FIBER LENGTH	QUANTITY	DC BUNDLE QTY.	FIBER TRUNK QTY.	FIBER & DC LENGTH	
ALPHA	90°	4	CCI HPA-65R-BUU-H8	70'	0°M 0°/4°E	1	20	1/2" Ø	15' ±	1	9	(3) ERICSSON RRUS-11 (2) ERICSSON RRUS-12 (1) ERICSSON RRUS-32 (1) ERICSSON RRUS-E2 (2) A2 MODULE	7	6MM² PAIR	7	15' ±				200'±	
					0°M 0°/6°E																
BETA	210°	4	CCI HPA-65R-BUU-H8	70'	0°M 0°/4°E	1	20	1/2" Ø	15' ±	1	9	(3) ERICSSON RRUS-11 (2) ERICSSON RRUS-12 (1) ERICSSON RRUS-32 (1) ERICSSON RRUS-E2 (2) A2 MODULE	7	6MM² PAIR	7	15' ±	4	8	2	200'±	
					0°M 0°/6°E																
GAMMA	330°	4	CCI HPA-65R-BUU-H8	70'	0°M 0°/4°E	1	20	1/2" Ø	15' ±	1	9	(3) ERICSSON RRUS-11 (2) ERICSSON RRUS-12 (1) ERICSSON RRUS-32 (1) ERICSSON RRUS-E2 (2) A2 MODULE	7	6MM² PAIR	7	15' ±				200'±	
					0°M 0°/6°E																

RRH LIST						
MODEL	QTY.	W	H	D	WEIGHT	POWER
RRUS-11	9	17.0"	19.7"	7.2"	51 LBS	2x40W
RRUS-12	6	18.5"	18.2"	7.3"	55 LBS	2x60W
RRUS-32	3	29.9"	13.3"	9.5"	77 LBS	4x25W
RRUS-E2	3	29.9"	13.3"	9.5"	77 LBS	4x25W
A2-MODULE	6	12.8"	15.0"	3.5"	15 LBS	N/A

	REVERSE ACTING THERMOSTAT
	HYDROGEN DETECTOR
	EXHAUST FAN
	LOUVER
	MOTORIZED AUTOMATIC DAMPER
	LOCAL ALARM LIGHT

SYMBOL	MAKE	MODEL NUMBER	CFM	VELOCITY FT/MIN	FREE AREA SF	NOM. WIDTH IN	NOM. HEIGHT IN	PD IN. WG	REMARKS
L-1,2	GREENHECK	ESD-603	383	472	.81	18	18	.04	ALL

REMARKS:

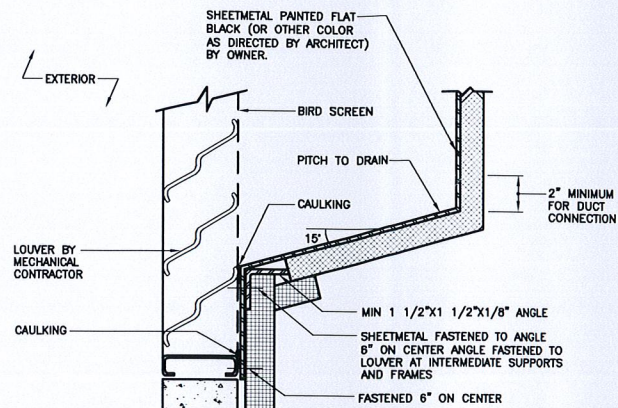
- 1.PROVIDE WITH BIRD SCREEN.
- 2.PROVIDE WITH EXTENDED SILL.
- 3.PROVIDE WITH BAKED ENAMEL FINISH. COLOR TO MATCH EXISTING BUILDING AND BY APPROVED BY OWNER.
- 4.COORDINATE ALL LOUVER SIZES IN FIELD PRIOR TO ORDERING OR INSTALLATION.

SYMBOL	MAKE	MODEL NUMBER	CFM	ESP IN/WG	MOTOR DATA HP-VOLT-PH	DRIVE TYPE	REMARKS
EF-1	GREENHECK	SE1-12-432-E-1	383	.25	1/20-120-1	DIRECT	ALL

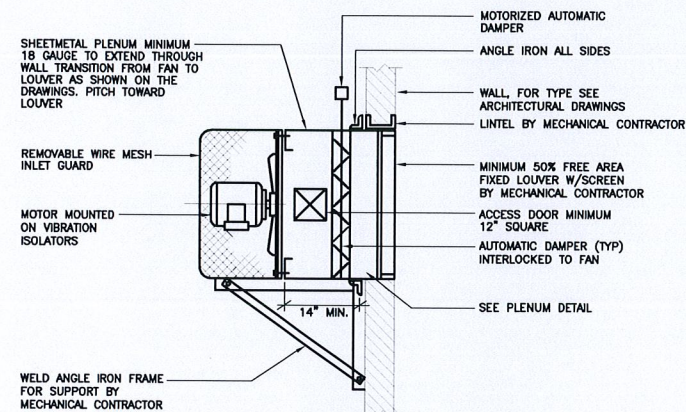
REMARKS:

- 1.PROVIDE SERVICE SWITCH.
- 2.PROVIDE MOTORIZED DAMPER.
- 3.POWER FED FROM INVERTOR CONNECTED TO EMERGENCY BATTERIES.
COORDINATE WITH ELECTRICAL CONTRACTOR.
- 4.PICKUP WALL MOUNT HOUSING, FAN GUARD, GRAVITY BACKDRAFT DAMPER.
- 5.COORDINATE SIZE WITH WALL OPENING.
- 6.COORDINATE LOCATION WITH OTHER TRADES

AFF ABOVE FINISHED FLOOR BTU BRITISH THERMAL UNIT CFM CUBIC FEET PER MINUTE EFM ENTERING AIR TEMPERATURE EF= EXHAUST FAN ESP EXTERNAL STATIC PRESSURE FPM FEET PER MINUTE HP HORSEPOWER KW KILOWATTS LAT LEAVING AIR TEMPERATURE	AHU AIR HANDLING UNIT MBH THERM PER HOUR (THOUSAND) THERMOSTAT TYP TYPICAL V VOLTS W WATTS WGT WEIGHT DB DRY BULB WB WET BULB CP CONTROL PANEL L- LOWER FC FLEX CONNECTION
---	---

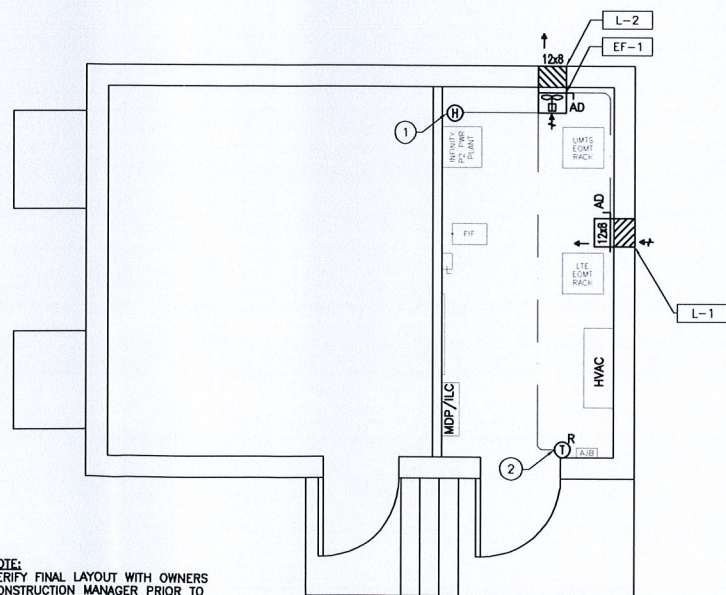


1 PLENUM LOUVER CONNECTION
M-1 N.T.S.



2 PROPELLER FAN (EXHAUST)
M-1 N.T.S.

- ① PROVIDE HYDROGEN DETECTOR AND INTERLOCK WITH EF-1. INTERNAL RELAY SHALL ACTIVATE EXHAUST FAN WHEN HYDROGEN LEVEL IN SPACE REACHES 1% BY VOLUME.
- ② REVERSE ACTING THERMOSTAT SHALL ENERGIZE EXHAUST FAN EF-1 WHEN SPACE TEMPERATURE EXCEEDS 78° F (ADJUSTABLE).



3 MECHANICAL PLAN
M-1 SCALE: 1/4" = 1'-0"



(IN FEET)
1/4 inch = 1 ft.



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AT&T MOBILITY

WIRELESS COMMUNICATIONS FACILITY

SITE NUMBER: CT1178

324 MONTEVIDEO ROAD

DATE: 01.14.14

SCALE: AS NOTED

JOB NO. 14002.00

MECHANICAL PLAN,
LEGENDS, NOTES
& DETAILS

M-1

Sheet No. 7 of 1

LIGHT FIXTURE SCHEDULE					
TYPE	MANUFACTURER CATALOG/MODEL No.	DESCRIPTION	LAMP	MOUNTING	NOTES
A	DAY-BRITE #HWN-332-120	9" WIDE, SURFACE MOUNTED LIGHT FIXTURE WITH ACRYLIC PRISMATIC LENS, T-8 LAMPS AND ELECTRONIC BALLAST	(3)-32W	CEILING	1
B	LUMARK #MH1PT50120TRPE	EXTERIOR CUTOFF LUMINAIRE, DIE-CAST ALUMINUM HOUSING, BRONZE FINISH. HPF BALLAST -20' F. IMPACT RESISTANT TEMPERED GLASS LENS, BUILT-IN PHOTO CONTROL	(1) 50W MH	WALL	1
E	SURE-LITES #CC3-NC-WH-SD	EMERGENCY LIGHT UNIT WITH 90 MINUTE NICKEL CADMIUM BATTERY & SELF-DIAGNOSTIC TESTING FEATURE	(2) 5.4W PAR36	WALL	1
E1	SURE-LITES #CC5-NC-WHSD/6T6WWH	EMERGENCY LIGHT UNIT WITH REMOTE WEATHERPROOF HEADS AND 90 MINUTE NICKEL CADMIUM BATTERY & SELF-DIAGNOSTIC TESTING FEATURE	(2) 5.4W PAR36 (2) 6 WATT HALOGEN	WALL	1
NOTES: 1. PROVIDE ALL THE NECESSARY ACCESSORIES AS REQUIRED TO MOUNT LIGHTING FIXTURES TO CEILING STRUCTURE AS REQUIRED. 2. EXTERIOR LIGHT SHALL BE CONNECTED TO 4HR TIMER SWITCH.					

GENERAL NOTES

- REFER TO CIVIL DRAWINGS FOR ACTUAL LOCATIONS OF STRUCTURES ON SITE.
- COORDINATION, LAYOUT AND FURNISHING OF CONDUIT, CABLE AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL/TELECOMMUNICATIONS SERVICES SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- THE EXACT BUILDING FOUNDATION SIZE AND BUILDING WALL PENETRATIONS FOR UTILITIES SHALL BE CONFIRMED WITH THE BUILDING SPECIFICATIONS AND PLANS PRIOR TO LAYOUT.
- ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
- PROVIDE CADWELD CONNECTION STYLES: THROUGH (CABLE TO CABLE) TYPE "TA"
(CABLE TO SURFACE) TYPE "LA" OR "VS" (PIPE)
(CABLE TO ROD) TYPE "GT" OR "NC"
(CABLE TO CABLE) TYPE "SS"
- EXTEND UTILITY SERVICES TO UTILITY BACKBOARD IN PROPOSED OWNERS EQUIPMENT SHELTER. COORDINATE WITH SHELTER SHOP DRAWINGS FOR LOCATION. OWNER TO COORDINATE ALL UTILITY SERVICES TO NEW EQUIPMENT SHELTER.
- SEE CIVIL SHEETS FOR DETAILS OF FLOOR AND WALL PENETRATIONS.
- ALL CONDUITS SHALL BE PROPERLY ANCHORED ALONG ENTIRE ROUTE.

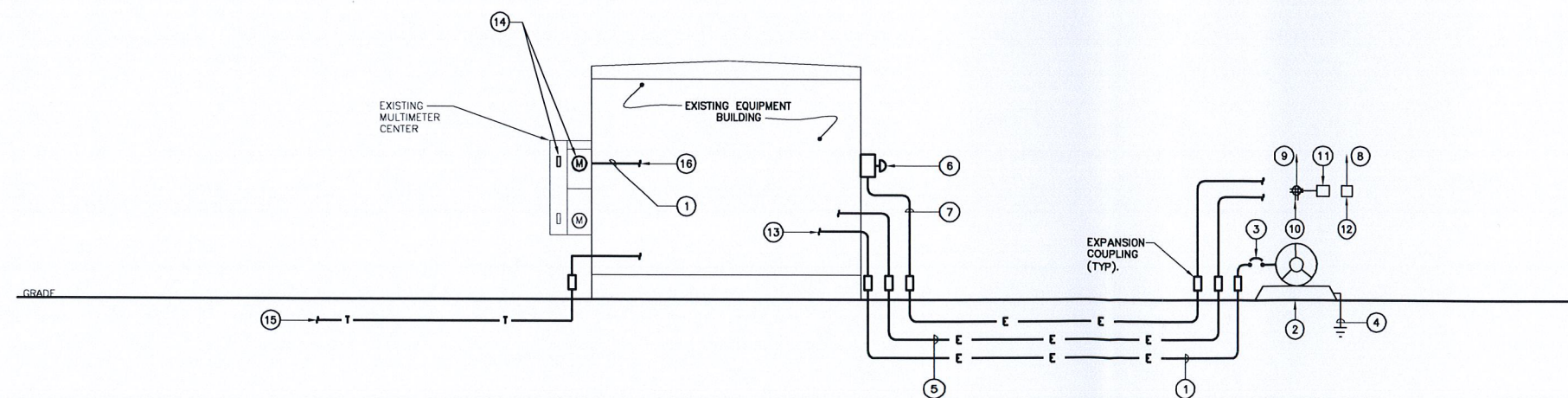
ELECTRICAL ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AFF	ABOVE FINISHED FLOOR
AIC	AMPERE INTERRUPTING CAPACITY
AWG	AMERICAN WIRE GAGE
C	CONDUIT
EGR	EXTERIOR GROUND RING
ETR	EXISTING TO REMAIN
G - GRD	GROUND
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
IGR	INTERIOR GROUND RING MOUNTED 9'-0" ABOVE FINISHED FLOOR
KWH	KILO-WATT-HOUR
MCCB	MOLDED CASE CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
NC	NORMALLY CLOSED
OC	ON CENTER
SA	SURGE ARRESTOR
VM	VOLTAGE MONITOR
WP	WEATHERPROOF
ER	EXISTING TO REMAIN
RR	REMOVE AND RELOCATE
RE	RELOCATED EXISTING

VOLTAGE:	240/120	PHASE:	1	WIRE:	3	PANEL NAME:	MDP						
MAIN BUS:	200	AMPS				TOTAL WATTS, L1	17,922						
MAIN BREAKER:	200	A FRAME		200 A TRIP		TOTAL WATTS, L2	14,992	LOC: EQUIPMENT ROOM					
MOUNTING:	FLUSH	NOTES:				TOTAL WATTS	32,914						
NOTES: A) PANEL SHALL BE 200A, 120/240 VAC, 1P, 3W, 42 KAIC, 200A MCCB, 42 POSITION, DOOR-IN-DOOR, BOLT-ON BREAKERS, METAL DIRECTORY FRAME WITH GLASS/PLASTIC WINDOW, LAMINATED ENGRAVED BAKELITE NAMEPLATE, COPPER EQUIPMENT GROUND KIT, INSULATED COPPER SOLID NEUTRAL BAR. (PANEL SHALL BE INTEGRAL TO COMBINED ATS/LOAD CENTER (INTERSECT M/N: AA1220061-3S PROVIDE WITH DUAL TVSS, ENGINE EXERCISER, AND UTILITY MONITOR OPTIONS))													
B) BRANCH CIRCUIT BREAKER AND CONDUCTOR SIZE BASED ON SPECIFIC EQUIPMENT. CONFIRM ELECTRICAL REQUIREMENTS PRIOR TO INSTALLATION.													
C) ALL BRANCH CIRCUITS SHALL BE ROUTED IN 4" X 4" WIREWAY TO THE FULLEST EXTENT POSSIBLE. CONNECTIONS FROM WIREWAY TO EQUIPMENT AND DEVICES SHALL BE IN GALVANIZED RIGID METAL CONDUIT INDICATED IN SCHEDULE BELOW.													
DIRECTORY	WIRE & CONDUIT	WATTS LOAD		Ckt.	AMPS	L1 L2		AMPS	Ckt.	WATTS LOAD		WIRE & CONDUIT	DIRECTORY
		L1	L2			L1	L2						
RECTIFIER # 1	3/4" C, 2 #8, #8GND	800		1	40/2P			50/2P	2	3,196		1 1/4" C, 3 #4, #4 GND	HVAC #1
RECTIFIER # 2	3/4" C, 2 #8, #8GND	800	800	3	40/2P			50/2P	4		3,196	1 1/4" C, 3 #4, #4 GND	HVAC #2
				5		6	3,196						
RECTIFIER # 3	3/4" C, 2 #8, #8GND	800		7	40/2P			20	8		3,196	3/4" C, 2 #12, #12GND 3/4" C, 2 #12, #12GND	GFCI, BAT CHR BLK HTR
				9		10	2,360						
RECTIFIER # 4	3/4" C, 2 #8, #8GND	800		11	40/2P			20	12		1,000	3/4" C, 2 #12, #12GND 3/4" C, 2 #12, #12GND	INTERIOR RECEPT INTERIOR LIGHTS
				13		14	1,260						
RECTIFIER # 5	3/4" C, 2 #8, #8GND	800		15	40/2P			20	16		200	3/4" C, 2 #12, #12GND	EXTERIOR LIGHTS
				17		18	100						
RECTIFIER # 6	3/4" C, 2 #8, #8GND	800	800	19	40/2P			40/2P	20				RECTIFIER # 11 (optional)
				21		22							
RECTIFIER # 7	3/4" C, 2 #8, #8GND	800		23	40/2P			40/2P	24				RECTIFIER # 12 (optional)
				25		26							
RECTIFIER # 8	3/4" C, 2 #8, #8GND	800		27	40/2P			40/2P	28				RECTIFIER # 13 (optional)
				29		30							
RECTIFIER # 9	3/4" C, 2 #8, #8GND	800		31	40/2P			40/2P	32				RECTIFIER # 14 (optional)
				33		34							
RECTIFIER # 10 (optional)		800	800	35	40/2P			40/2P	36				RECTIFIER # 15 (optional)
				37		38							
EXTERIOR RECEPTACLE	3/4" C, 2 #12, #12GND	360		39	20			20	40		200	3/4" C, 2 #12, #12GND 3/4" C, 2 #12, #12GND	EXHAUST FAN SMOKE DETECTOR
				41		42	250						

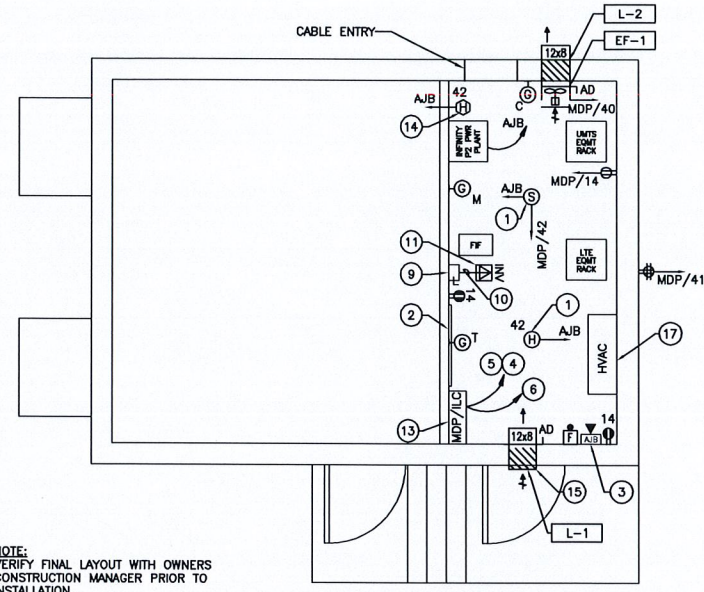
1. CONTRACTOR TO VERIFY ALL CONDUIT ROUTING AND INSTALLATION REQUIREMENTS WITH LOCAL UTILITIES PRIOR TO INSTALLATION.
2. ALL CONDUITS SHALL HAVE EXPANSION COUPLINGS WHERE EXTENDING ABOVE GRADE.
3. ALL UTILITY SUPPLY CONDUITS, CONDUCTORS AND ASSOCIATED EQUIPMENT MUST BE LOCATED WITHIN THE LIMITS OF A UTILITY EASEMENT IF REQUIRED. COORDINATE WITH OWNER FOR ALL EASEMENT DOCUMENTATION.
4. REFER TO SITE UTILITY PLAN.
5. TELEPHONE EQUIPMENT SHOWN APPROXIMATE. COORDINATE WITH TELEPHONE UTILITY COMPANY AND PROVIDE ALL SPECIFIED EQUIPMENT.
6. COORDINATE SERVICE EQUIPMENT INTERRUPTING RATING WITH AVAILABLE FAULT CURRENT FROM UTILITY COMPANY. EQUIPMENT SHALL NOT BE RATED LESS THAN 65 KAIC.
7. ALL TELEPHONE AND ELECTRIC UTILITY WORK MUST BE COORDINATED WITH UTILITY COMPANY, AND ALL EQUIPMENT MUST BE UTILITY COMPANY APPROVED. CONTRACTOR SHALL PROVIDE ALL ELEMENTS NOT PROVIDED BY UTILITY COMPANIES.
8. CONDUCTOR SIZES SHALL NOT BE REDUCED OR SUBSTITUTED WITHOUT ENGINEERS APPROVAL.
9. ALL CONDUCTORS AND CONDUCTOR TERMINATIONS SHALL BE RATED FOR 75° C OPERATION.
10. ALL NEW SERVICE EQUIPMENT SHALL HAVE AIC RATING TO ACCOMMODATED AVAILABLE FAULT CURRENT.
11. COORDINATE ALL PENETRATIONS WITH EXISTING BUILDING ELEMENTS TO AVOID CONFLICTS.

- (1) # 3/0 AWG, (1) # 6 AWG GND, MIN 2" CONDUIT.
- (2) 50KW DIESEL FUELED GENERATOR.
- (3) 200A, 240V, 2P, MAIN CIRCUIT BREAKER AT GENERATOR OUTPUT.
- (4) GROUND GENERATOR PER NEC AND MANUFACTURER'S SPECIFICATIONS.
- (5) 1" CONDUIT WITH CONTROL AND ALARM CONDUCTORS FROM GENERATOR TO TRANSFER SWITCH AND ALARM PANEL IN SHELTER. INSTALL CONDUCTORS AS REQUIRED BY MANUFACTURER.
- (6) REMOTE GENERATOR SHUT OFF SWITCH IN BREAK GLASS ENCLOSURE MOUNTED TO THE EXTERIOR OF THE SHELTER IN LOCATION APPROVED BY LOCAL FIRE MARSHAL. INSTALL ALL REQUIRED SIGNAGE.
- (7) 3/4" CONDUIT AND CONDUCTORS REQUIRED FOR PROPER OPERATION OF EMERGENCY GENERATOR SHUT OFF SWITCH.
- (8) DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM OWNER'S ELECTRIC PANEL TO GENERATOR BLOCK HEATER.
- (9) DEDICATED 20A, 120V, CIRCUIT IN 3/4" CONDUIT FROM OWNER'S ELECTRIC PANEL TO GENERATOR BATTERY CHARGER AND DUPLEX RECEPTACLE.
- (10) DUPLEX GFCI RECEPTACLE IN WEATHERPROOF ENCLOSURE MOUNT IN CONVENIENT LOCATION AT GENERATOR.
- (11) GENERATOR BATTERY CHARGER.
- (12) GENERATOR BLOCK HEATER.
- (13) EXTEND GENERATOR POWER OUTPUT CONDUCTORS TO EMERGENCY LUGS IN INTEGRATED LOAD CENTER.
- (14) PROVIDE 120/240AC, 200 AMP, 1P, 3 WIRE REVENUE METER WITH 200A, 2P, CIRCUIT BREAKER IN PREVIOUS OWNER'S METER AND BREAKER LOCATION. (ALL SERVICE EQUIPMENT MUST BE UTILITY CO. APPROVED).
- (15) (1) 4" CONDUIT FOR TELEPHONE SERVICE. EXTEND FROM UTILITY POLE TO TELCO EQUIPMENT IN SHELTER. PROVIDE ALL CABLES AND CONDUCTORS AS REQUIRED BY OWNER AND TELEPHONE COMPANY. COORDINATE ALL WORK WITH TELEPHONE COMPANY.
- (16) EXTEND TO NORMAL LUGS IN INTEGRATED LOAD CENTER INSIDE SHELTER.

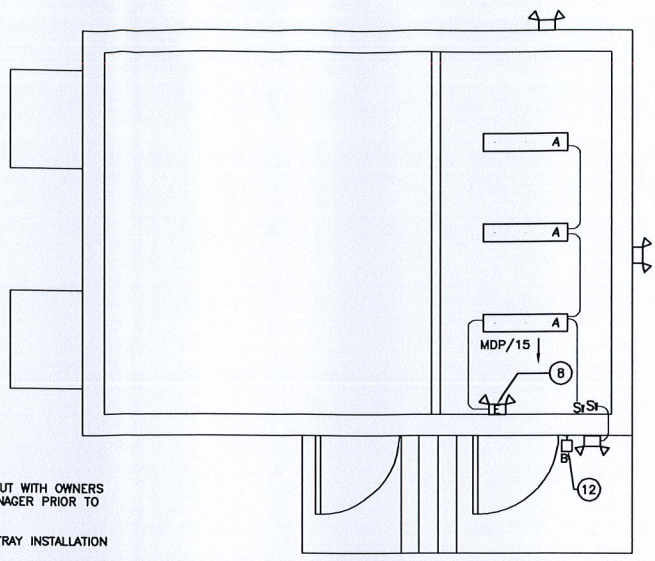
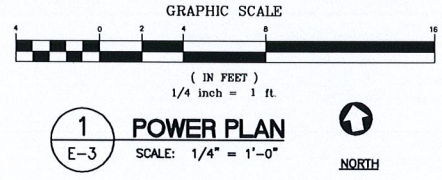


1 ELECTRICAL POWER RISER DIAGRAM
E-2 NOT TO SCALE

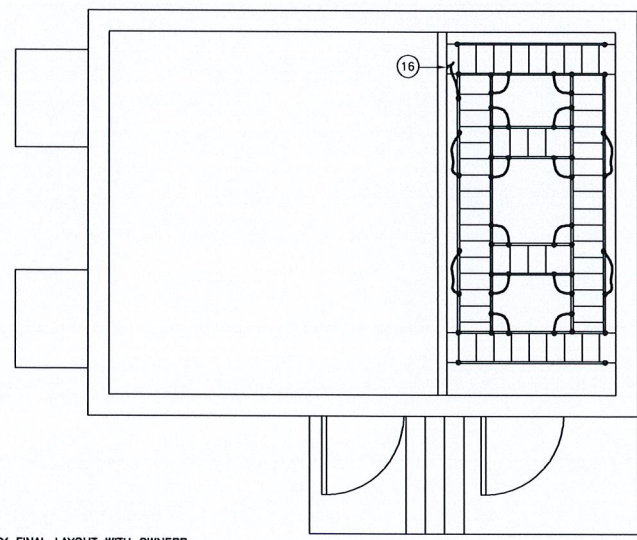
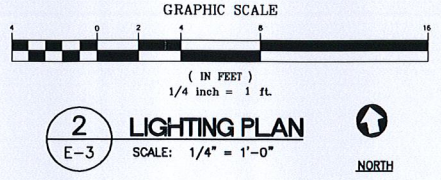
AT&T MOBILITY		SITE NUMBER: CT1178		DATE: 01.14.14	
WIRELESS COMMUNICATIONS FACILITY		SITE NAME: AVON - MONTEVIDEO ROAD		SCALE: AS NOTED	
		324 MONTEVIDEO ROAD AVON, CT		JOB NO. 14002.000	
ELECTRICAL RISER DIAGRAM					
E-2					
Sheet No. 9 of 16					



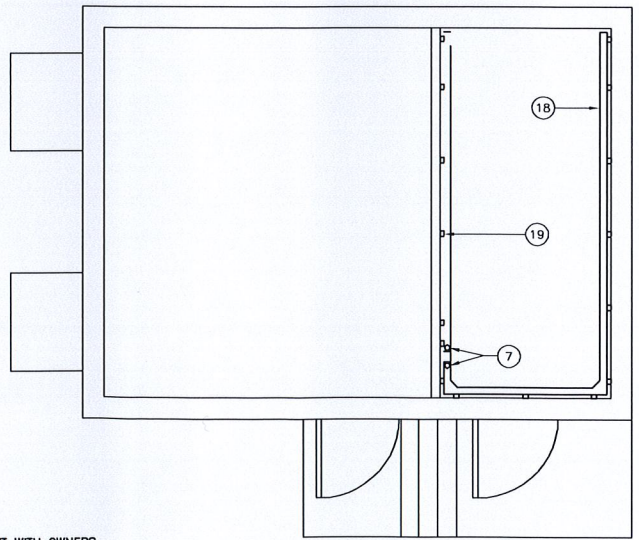
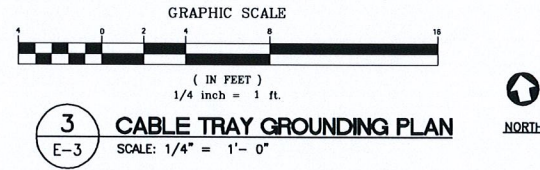
NOTE:
VERIFY FINAL LAYOUT WITH OWNERS
CONSTRUCTION MANAGER PRIOR TO
INSTALLATION.



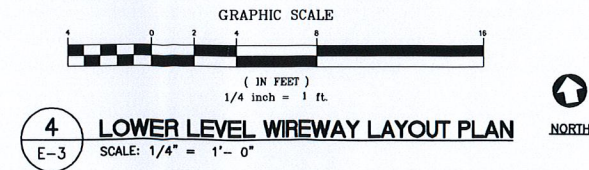
NOTE:
1. VERIFY FINAL LAYOUT WITH OWNERS
CONSTRUCTION MANAGER PRIOR TO
INSTALLATION.
2. REFER TO CABLE TRAY INSTALLATION
DETAILS.
3. COORDINATE LIGHTING LAYOUT WITH CABLE
TRAY LAYOUT TO AVOID CONFLICTS.



NOTE:
1. VERIFY FINAL LAYOUT WITH OWNERS
CONSTRUCTION MANAGER PRIOR TO
INSTALLATION.
2. REFER TO CABLE TRAY INSTALLATION
DETAILS.



NOTE:
VERIFY FINAL LAYOUT WITH OWNERS
CONSTRUCTION MANAGER PRIOR TO
INSTALLATION.



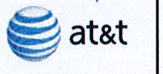
ELECTRICAL WORK NOTES

- SMOKE, HEAT, AND HYDROGEN DETECTOR SHALL BE MOUNTED IN ACCESSIBLE AREA, TYPICAL. DO NOT MOUNT ABOVE CABLE TRAY.
- TELEPHONE BACKBOARD AREA.
- ALARM JUNCTION BOX.
- PROVIDE 6 #8, 1 #8 GROUND FROM PANELBOARD MDP ROUTED THROUGH THE PERIMETER WIREWAY FOR BRANCH CIRCUITS: MDP, 1/3, 5/7 AND 9.11. PROVIDE 20' OF ADDITIONAL WIRING IN 1" FLEXIBLE METAL CONDUIT FOR FINAL TERMINATION BY OWNER.
- PROVIDE 6 #8, 1 #8 GROUND FROM PANELBOARD MDP ROUTED THROUGH THE PERIMETER WIREWAY FOR BRANCH CIRCUITS: MDP, 13/15, 17/19 AND 21/23. PROVIDE 20' OF ADDITIONAL WIRING IN 1" FLEXIBLE METAL CONDUIT FOR FINAL TERMINATION BY OWNER.
- PROVIDE 6 #8, 1 #8 GROUND FROM PANELBOARD MDP ROUTED THROUGH THE PERIMETER WIREWAY FOR BRANCH CIRCUITS: MDP, 25/27, 29/31 AND 33/35. PROVIDE 20' OF ADDITIONAL WIRING IN 1" FLEXIBLE METAL CONDUIT FOR FINAL TERMINATION BY OWNER.
- (2) 3" CONDUITS CONNECTED TO PANELBOARD, MDP FROM WIREWAYS.
- CONNECT EMERGENCY LIGHT BRANCH CIRCUIT WIRING TO LINE SIDE OF LIGHTING CIRCUIT.
- (2) #8 AWG WHIP CABLE TO POWER BOARD.
- BATTERY DISCONNECT.
- 2400 WATT INVERTER (24VDC/120VAC) MANUFACTURED BY TRIPP-LITE MODEL #PV2400FC OR APPROVED EQUAL (TELCO, CARDS AND EXHAUST FAN).
- CONNECT EACH EXTERIOR LIGHT FIXTURE TO A MOTION SENSOR COMPATIBLE WITH FIXTURE AND ADJUST FOR PROPER OPERATION. MOTION SENSOR SHALL BE SAME COLOR AS LIGHT FIXTURE.
- 200A, 240V, 1P, INTEGRATED LOAD CENTER (INTERSECT M/N: AA1220061-3S WITH PROGRAMMABLE ENGINE EXERCISER AND UTILITY VOLTAGE MONITOR.
- HYDROGEN DETECTOR TO INTERFACE WITH EXHAUST FAN CONTROLS. REFER TO MECHANICAL PLANS. LOCATE NEAR BATTERIES.
- COORDINATE WITH MECHANICAL PLANS FOR CONTROL REQUIREMENTS OF EXHAUST FAN AND INTAKE LOUVER.
- BOND CABLE TRAY TO MAIN GROUND BAR.
- EXISTING HVAC UNIT TO REMAIN.
- 4" x 4", TYPE 1 CONTINUOUS SCREW COVER WIREWAY MOUNTED ALONG FRONT, LEFT AND RIGHT SIDE OF ROOM AGAINST CEILING.
- SUPPORT BRACKET/SPACER (TYPICAL) (INSTALL AS REQUIRED).

GENERAL NOTES:

- REFER TO PANEL SCHEDULE ON SHEET E-1 FOR ADDITIONAL INFORMATION.
- ALL EXISTING ELECTRICAL, COMMUNICATIONS, ALARMS, LIGHTING, CONTROLS AND OTHER ELECTRICAL ITEMS EXISTING IN ROOM SHALL BE REMOVED PRIOR TO START OF CONSTRUCTION. ALL CONDUITS PASSING THROUGH ROOM SHALL BE REROUTED OUT SIDE OF ROOM. ROOM SHALL BE COMPLETELY EMPTY OF EXISTING HOUSE ELECTRICAL DEVICES.

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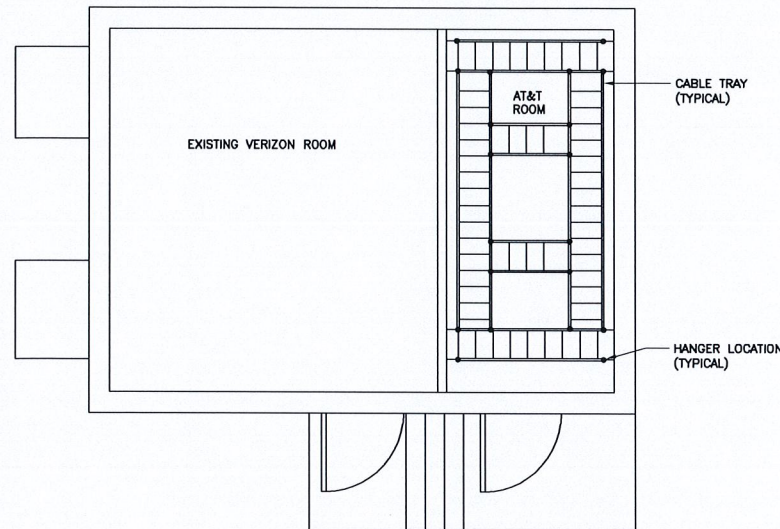
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WIRELESS COMMUNICATIONS FACILITY
SITE NUMBER: CT1178
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324 MONTEVIDEO ROAD
AVON, CT

DATE: 01.14.14
SCALE: AS NOTED
JOB NO. 14002.000

ELECTRICAL
FLOOR PLAN
AND NOTES

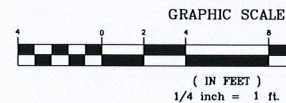
E-3
Sheet No. 10 of 16



NOTE:
VERIFY FINAL LAYOUT WITH OWNERS
CONSTRUCTION MANAGER PRIOR TO
INSTALLATION.

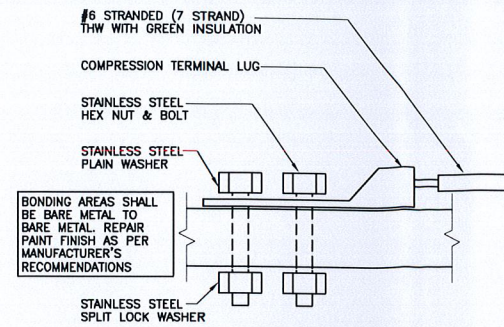
1 CABLE TRAY LAYOUT AND INSTALLATION PLAN

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



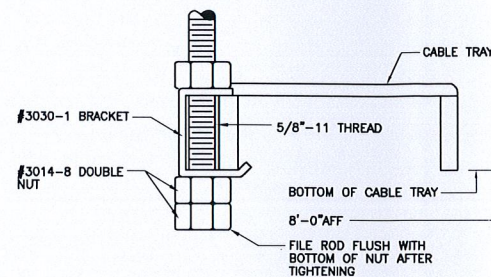
DRAWING NOTES

- CABLE TRAY SHALL BE 18" WIDE, SOLID SIDE BAR, GOLD ANODIZED FINISH, AS MANUFACTURED BY NEWTON INSTRUMENT COMPANY, INC. (919-575-6426). REFER TO DETAIL 2/E-8.
- REFER TO DETAILS 2/E-8 THROUGH 13/E-8 FOR APPLICABLE CABLE TRAY INSTALLATION REQUIREMENTS.
- CABLE TRAY SHALL BE SUPPORTED BY "UNISTRUT," ATTACHED TO SUPPORTING CHANNEL VIA THREADED ROD. PROVIDE ALL SUPPORTS, UNISTRUT, HANGERS, ETC. AS REQUIRED FOR COMPLETE INSTALLATION.
- THREADED ROD SUPPORTS FOR THE CABLE TRAY SHALL BE SPACED NO MORE THAN 48" O.C. ON EACH SIDE. INSTALL BLOCKING BETWEEN JOISTS AS REQUIRED TO SUPPORT STRUT HANGER BRACKETS.
- CABLE TRAY SHALL BE 6" AWAY FROM FINISHED WALLS.
- BOTTOM OF CABLE TRAY SHALL BE 8'-0" A.F.F.
- ADJACENT CABLE TRAYS SHALL BE GROUNDED TOGETHER. REFER TO ELECTRICAL PLAN(S) FOR INTERIOR GROUNDING RING BOND TO CABLE TRAY.
- ALL GROUND CONNECTIONS, CABLE TRAYS SHALL BE COATED WITH AN ANTI-OXIDANT LUBRICANT AFTER BURNISHING AND BEFORE TERMINAL CONNECTIONS ARE MADE.
- CONTRACTOR SHALL FILE SMOOTH EDGES OF CABLE TRAY THAT HAVE BEEN CUT TO LENGTH IN THE FIELD. PAINT MODIFIED CABLE TRAY AS PER MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS.



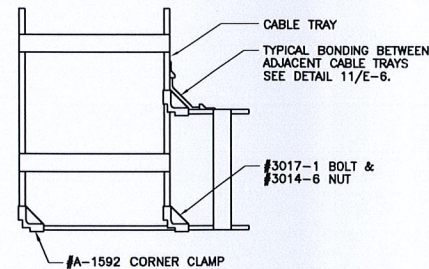
2 LUG CONNECTION ON CABLE TRAY

E-4 N.T.S.



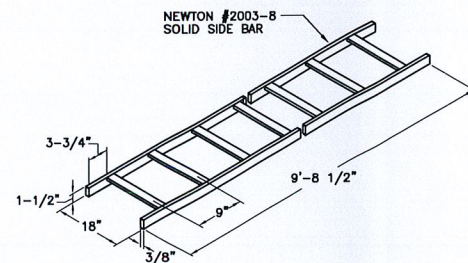
5 SLOTTED TYPE CABLE TRAY HANGER BRACKET (ONE SIDE)

E-4 N.T.S.



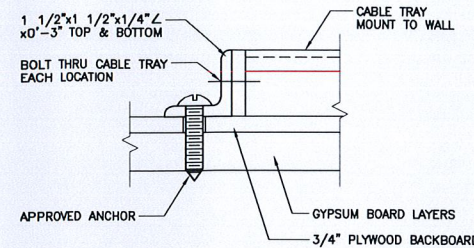
8 MAKING 90° TURN AND JUNCTIONING CABLE TRAY

E-4 N.T.S.



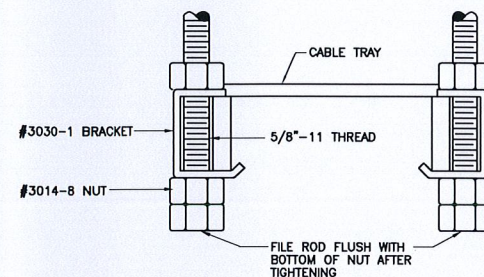
11 TYPICAL CABLE TRAY SECTION

E-4 N.T.S.



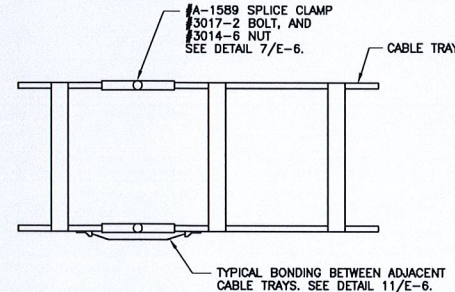
3 WALL TRAY CONNECTION

E-4 N.T.S.



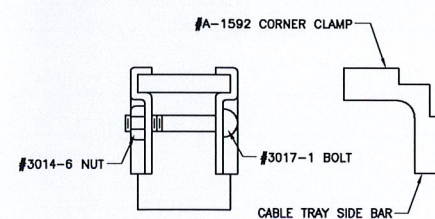
6 SLOTTED TYPE CABLE TRAY HANGER BRACKET (BOTH SIDES)

E-4 N.T.S.



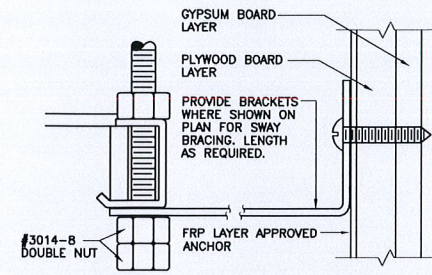
9 CABLE TRAY JUNCTION

E-4 N.T.S.



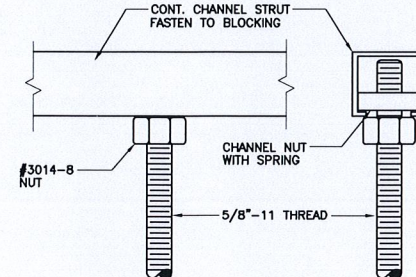
12 JUNCTIONING OF RIGHT ANGLE SIDE BARS

E-4 N.T.S.



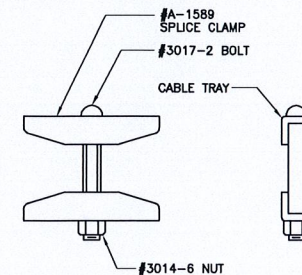
4 CABLE TRAY TO WALL SWAY BRACE

E-4 N.T.S.



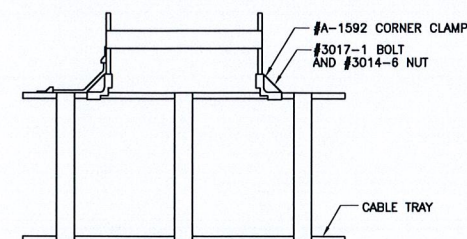
7 STRUT HANGER BRACKET

E-4 N.T.S.



10 JUNCTIONING OF SIDE BARS

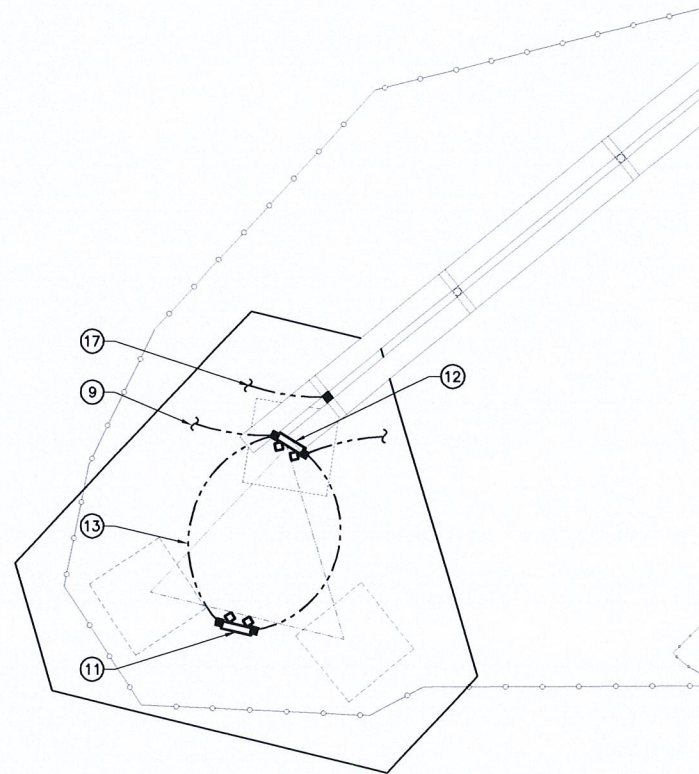
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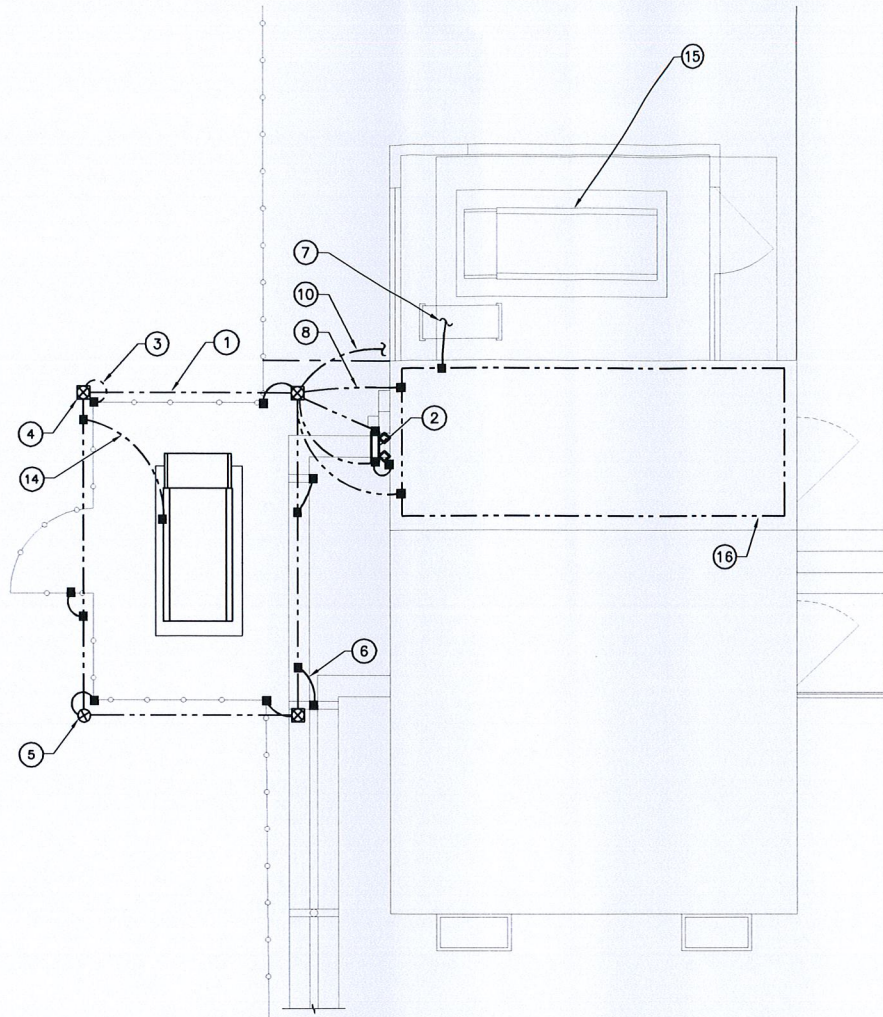
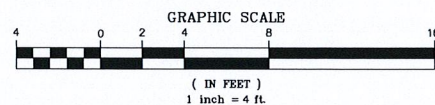
13 CONNECTING TWO CABLE TRAYS BY "T"-JUNCTION

E-4 N.T.S.

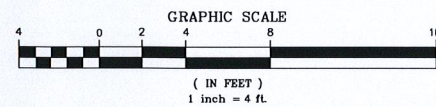
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CEN TEK engineering Centered on Solutions™ (203) 488-0580 (203) 488-8587 Fax 55-2 North Branford Road Branford, CT 06405 www.CentekEng.com						
AT&T MOBILITY WIRELESS COMMUNICATIONS FACILITY SITE NUMBER: CT1178 SITE NAME: AVON - MONTEVIDEO ROAD 324 MONTEVIDEO ROAD AVON, CT						
DATE: 01.14.14 SCALE: AS NOTED JOB NO. 14002.000						
CABLE TRAY LAYOUT INSTALLATION						
E-4 Sheet No. 11 of 16						



2
E-5
COMPOUND GROUNDING PLAN
SCALE: 1/4" = 1'-0"



1
E-5
COMPOUND GROUNDING PLAN
SCALE: 1/4" = 1'-0"



GROUNDING PLAN NOTES

- ① #2 SOLID TINNED BCW GROUND RING (3'-0" FROM OUTSIDE EDGE OF GENERATOR PAD (TYP.).
- ② WAVEPORT GROUND BAR PER DETAILS.
- ③ CONNECT FENCE TO GROUNDING RING (TYP. 4 PLACES).
- ④ GROUNDING ROD WITH ACCESS (TYP.) PER DETAILS.
- ⑤ GROUNDING ROD (TYP.) PER DETAILS.
- ⑥ BOND NEARBY ICE BRIDGE POSTS TO GROUND RING.
- ⑦ BOND HALO GROUND TO EXISTING GENERATOR GROUNDING SYSTEM.
- ⑧ EXTEND GROUND RING PIGTAIL THROUGH SHELTER AND BOND TO HALO GROUND DOWNLEAD. (TYP. 2 PLACES)
- ⑨ BOND GROUND BAR TO EXISTING TOWER GROUND RING (TYP OF 2). CONTRACTOR TO VERIFY LOCATION IN FIELD.
- ⑩ BOND NEW AT&T GENERATOR GROUND RING TO EXISTING GENERATOR GROUNDING SYSTEM.
- ⑪ UPPER TOWER MOUNTED GROUND BAR PER DETAILS.
- ⑫ LOWER TOWER MOUNTED GROUND BAR PER DETAILS.
- ⑬ BOND UPPER TOWER MOUNTED GROUND BAR TO LOWER TOWER MOUNTED GROUND BAR (2 GROUND LEADS) PER DETAILS.
- ⑭ BOND GENERATOR TO GROUND RING PER NEC AND MANUFACTURERS SPECIFICATIONS.
- ⑮ EXISTING GENERATOR TO REMAIN.
- ⑯ INSTALL HALO GROUND NEAR CEILING ALONG PERIMETER OF EQUIPMENT ROOM. COORDINATE WITH GROUNDING SCHEMATIC AND DETAILS FOR ADDITIONAL REQUIREMENTS.
- ⑰ BOND EXISTING ICEBRIDGE POST NEAR TOWER TO TOWER GROUND RING. (IF EXISTING, AND PER SPEC IT SHALL REMAIN).

GENERAL NOTES:

1. EXISTING ONSITE GROUNDING ELEMENTS MAY BE USED, AS APPLICABLE, IF THEY MEET THE REQUIREMENTS SHOWN ON THESE PLANS, ARE IN PROPER WORKING ORDER, AND WITH THE APPROVAL OF THE AT&T CONSTRUCTION MANAGER.
2. COORDINATE ALL GROUNDING WITH CONSTRUCTION MANAGER FOR FINAL APPROVAL.

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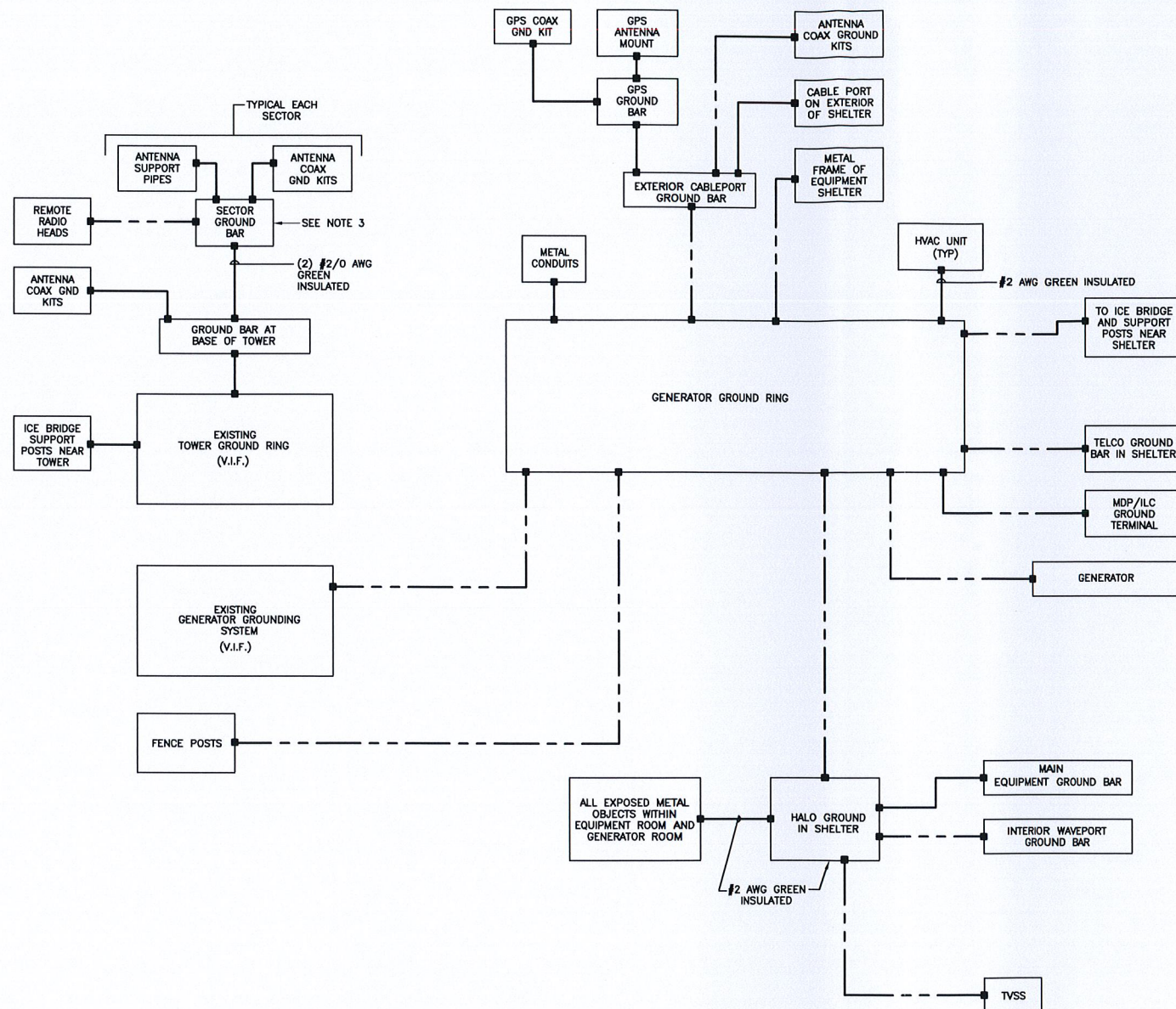
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GROUNDING PLAN
AND NOTES

E-5
Sheet No. 12 of 16



1 SCHEMATIC DIAGRAM-GROUNDING SYSTEM
E-6 NOT TO SCALE

CELLULAR GROUNDING NOTES

OBJECTIVE

PROVIDE A CELLULAR GROUNDING SYSTEM WITH MAXIMUM ALTERNATING CURRENT RESISTANCE OF 5 OHMS BETWEEN ANY POINT ON THE GROUNDING SYSTEM AND REFERENCE GROUND. PROVIDE EXTERIOR GROUNDING SCHEME WITH OWNER'S ENGINEER APPROVAL AS REQUIRED TO ACHIEVE DESIRED MAXIMUM AC RESISTANCE TO GROUND.

TESTING

CONTRACTOR TO PROVIDE AN INDEPENDENT TESTING CONTRACTOR TO DETERMINE THE GROUNDING SYSTEM RESISTANCE BY USE OF THE THREE POINT TEST AND AN AEMC MODEL 4500, OR APPROVED EQUAL. TEST TO BE PERFORMED PRIOR TO CONNECTION OF POWER SUPPLY TO THE CELL SITE AND CONNECTION OF THE GROUNDING SYSTEM TO THE WATER MAIN OR AC SUPPLY AS APPLICABLE.

CONDUCTOR USED FOR CELLULAR GROUNDING SYSTEM

EGR - #2 AWG ANNEALED SOLID TINNED BARE COPPER
IGR - #2 AWG ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION
INTER-BUS EXTENSION (FROM IGR TO EGR) - SEE DETAILS
EXTERNAL BOND CONNECTIONS TO EGR - #2 ANNEALED SOLID TINNED BARE COPPER
INTERIOR BOND CONNECTIONS TO IGR - #6 ANNEALED STRANDED (7 STRAND) 'THW' GREEN COLORED INSULATION

MINIMUM BENDING RADIUS

IGR #2 : 1'-0" NOMINAL AND 8" MINIMUM
EGR #2 : 2'-0" NOMINAL AND 8" MINIMUM
CELLULAR GROUNDING CONDUCTOR SHALL BE AS STRAIGHT AS POSSIBLE WITH MINIMUM 6" BENDING RADIUS.

FASTENER FOR CELLULAR GROUNDING CONDUCTOR

USE NON-METALLIC FASTENER AND STANDOFF 'CLIC' (AVAIL. FROM NEFCO 203-289-0285) TO SURFACE SUPPORT CONDUCTOR 3" AWAY FROM SURFACES.

SPACING OF FASTENERS: 2'-0" O.C. OUTSIDE BUILDING
3'-0" O.C. INSIDE BUILDING

GROUNDING ELECTRODE

GROUNDING ELECTRODE SHALL BE 5/8" DIA. x 10'-0" L. COPPER CLAD STEEL ROD. ADJUST LOCATION OF GROUNDING ELECTRODE IF SOIL CONDITION IS NOT CONDUCTIVE (GRAVEL, SANDY SOIL, ROCKS). SPACE GROUNDING ELECTRODES 20'-0" APART (SPACING MAY BE REDUCED WHERE REQUIRED TO ACCOMMODATE FIELD CONDITIONS BUT SHALL NOT BE LESS THAN 10'-0"). ELECTRODES SHALL BE DRIVEN ONLY WITH PROPER DRIVER SLEEVE TO PREVENT MUSHROOMING TOP OF ROD. WHEN ROCK BOTTOM IS ENCOUNTERED, THE ELECTRODE SHALL BE DRIVEN AT AN OBLIQUE ANGLE NOT TO EXCEED 45° FROM THE VERTICAL AWAY FROM STRUCTURES. TOP OF GROUNDING ELECTRODE SHALL BE MIN. 3'-6" BELOW FINISH GRADE.

CONNECTIONS ABOVE GRADE (MECHANICAL)

COMPRESSION LUG CONNECTOR - 15 TON COMPRESSION, 2 HOLE, LONG BARREL, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V RATED. USE 1/4" Ø BOLT, 3/4" SPACING LUGS TO BOND OBJECTS FROM THE IGR. (CONNECTOR SHALL BE BURNDY HYLUG SERIES OR EQUAL.)

EXOTHERMIC WELD LUG CONNECTOR - 2 HOLE, OFFSET, ELECTRO TINNED PLATED, HIGH CONDUCTIVITY, COPPER 600V. USE 1/2" Ø BOLT, 1-3/4" SPACING LUGS. CONNECTOR SHALL BE CADWELD CONNECTION STYLE (CABLE TO SURFACE) TYPE LA, LUG SIZE 1/8 x 1. EXOTHERMIC WELD TO LUG AS REQUIRED.

C-TAP COMPRESSION CONNECTOR - HIGH CONDUCTIVITY COPPER FOR MAIN TO BRANCH LINE TAPPING. (CONNECTOR SHALL BE BURNDY HYTAP SERIES OR EQUAL.)

MECHANICAL CONNECTIONS

USE MATCHING MANUFACTURER TOOL AND DIE FOR COMPRESSION CONNECTION.

APPLY ANTI-OXIDANT CONDUCTIVITY ENHANCER COMPOUND ON SURFACES THAT ARE COMPRESSED.

SURFACES INTENDED TO BE CONNECTED WITH MECHANICAL CONNECTORS SHALL BE BARE METAL TO BARE METAL. PRIME AND PAINT OVER BONDED AREA TO PREVENT CORROSION.

WHEN BONDING #2 TO #2

EXTERIOR OF BUILDING - USE EXOTHERMIC WELD CONNECTION
INTERIOR OF BUILDING - USE COMPRESSION CONNECTION ON STRANDED CONDUCTORS ONLY.
- USE EXOTHERMIC WELD CONNECTION ON SOLID CONDUCTOR.

WHEN BONDING #2 TO FENCE POST

USE EXOTHERMIC WELD 'CADWELD TYPE VS' CONNECTION TO FENCE POST STEEL SURFACE. TEST WELD FOR POSSIBLE BURN THRU. PATCH WELDED AREA WITH GALVANIZED COATING AS REQUIRED FOR PROPER WELDED PERMANENT BOND. REFER TO MANUFACTURER'S REQUIREMENTS FOR DETAILS

GROUNDING SYSTEM INTERCONNECTION

BOND THE EGR DOWN CONDUCTORS, AND/OR BURIED GROUND RING TO ANY METALLIC OBJECT OR EXISTING GROUNDING SYSTEM WITHIN 6'.

WHEN BONDING #2 TO TOWER GROUND PLATE

TOWER GROUND PLATE SHALL BE 6" x 8" x 1/4" COPPER AND BE MADE AVAILABLE TO TOWER CONTRACTOR TO BE INSTALLED DURING TOWER CONSTRUCTION. USE EXOTHERMIC WELD 'CADWELD TYPE HS' TO TOWER GROUND PLATE TEST WELD FOR POSSIBLE BURN THRU. COORDINATE THE SIZE OF THE MOUNTING HOLE WITH TOWER CONTRACTOR.

METALLIC CONDUITS

BOND ALL STEEL CONDUITS TO PANELS AT POINT OF CONTACT WITH APPROVED GROUNDING BUSHING.

NOTES

- GROUND CONDUCTORS SHOWN SHALL BE #2 AWG BCW UNLESS OTHERWISE NOTED.
- GROUND CABLE TRAY SECTIONS TOGETHER WITH #6 STRANDED GREEN INSULATED JUMPERS.
- ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH A #2 AWG BCW.
- ALL EXPOSED METAL OBJECTS IN SHELTER SHALL BE BONDED TO THE HALO GROUND WITHIN THAT ROOM.
- REFER TO GROUNDING PLAN FOR LOCATION OF GROUNDING DEVICES.
- REFER TO ALL ELECTRICAL AND GROUNDING DETAILS.
- REFER TO COMPOUND GROUNDING PLAN FOR NOTES ON USE OF EXISTING GROUNDING ELEMENTS ONSITE.
- VERIFY ALL SECTIONS OF EXISTING ICE BRIDGE ARE BONDED TOGETHER.
- VERIFY ALL EXISTING ICE BRIDGE POSTS ARE BONDED TO GROUND.

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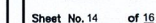
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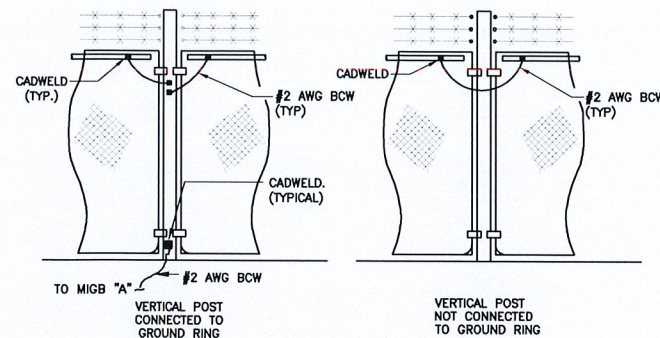
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GROUNDING
SCHEMATIC

E-6

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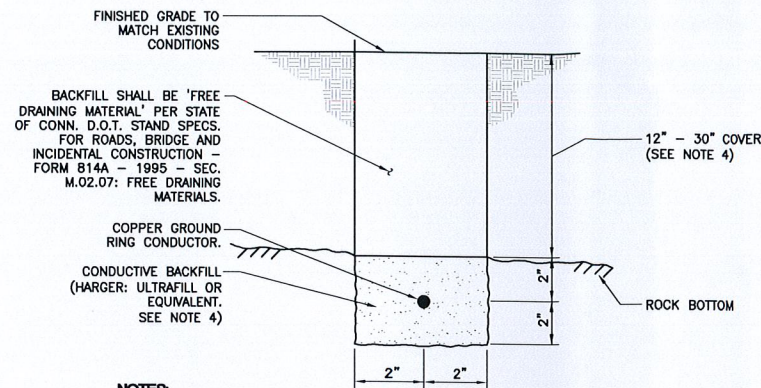




NOTE:

1. VERTICAL POSTS SHALL BE BONDED TO THE RING AT EACH CORNER AND AT EACH GATE POST. AS A MINIMUM ONE VERTICAL POST SHALL BE BONDED TO THE GROUND RING IN EVERY 100 FOOT STRAIGHT RUN OF FENCE.
2. HORIZONTAL POLES SHALL BE BONDED TO EACH OTHER.
3. BOND EACH HORIZONTAL POLE / BRACE TO EACH OTHER AND TO EACH VERTICAL POST THAT IS BONDED TO THE EXTERIOR GROUND RING.

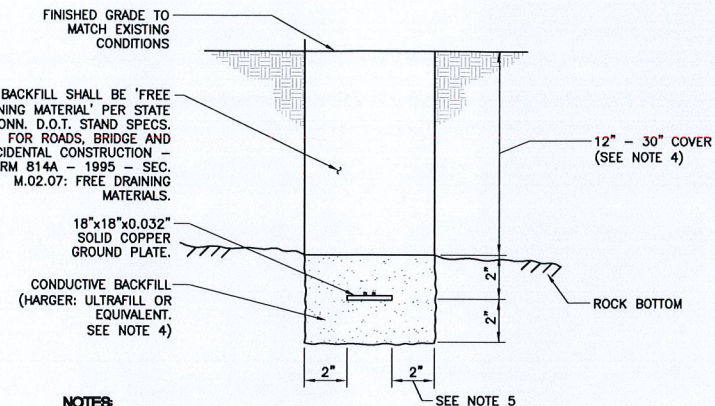
1 GROUND-STD. DETAIL FENCE GROUNDING
E-8 NOT TO SCALE



NOTES:

1. ENGINEER SHALL INSPECT PLACEMENT OF EGR CONDUCTOR PRIOR TO BACKFILLING.
2. MAINTAIN MIN. 2'-0" LINEAR CLEARANCE BETWEEN BACKFILL AND THE FOLLOWING: FOUNDATION, UNDERGROUND PIPING/CONDUIT, UNDERGROUND SERVICES. IN THE CLEARANCE AREAS, USE EARTH BACKFILL INSTEAD.
3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.

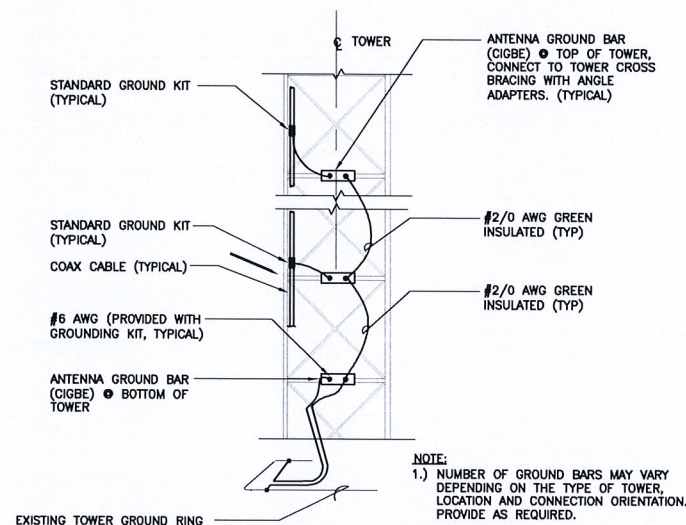
2 EGR TRENCH/BACKFILL DETAIL (SHALLOW TOPSOIL)
E-8 NOT TO SCALE



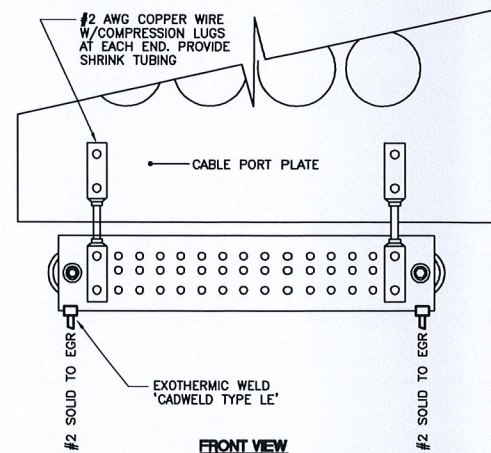
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3. EXERCISE HANDLING AND USE PRECAUTION OF BACKFILL MATERIAL PER MFR'S REQUIREMENTS.
4. FOR LOCATIONS WHERE ROCK BOTTOM DEPTH IS LESS THAN 12" CONDUCTIVE CONCRETE SHALL BE USED INSTEAD OF CONDUCTIVE BACKFILL.
5. PROVIDE MIN 2" CLEARANCE ON ALL SIDES OF GROUND PLATE.

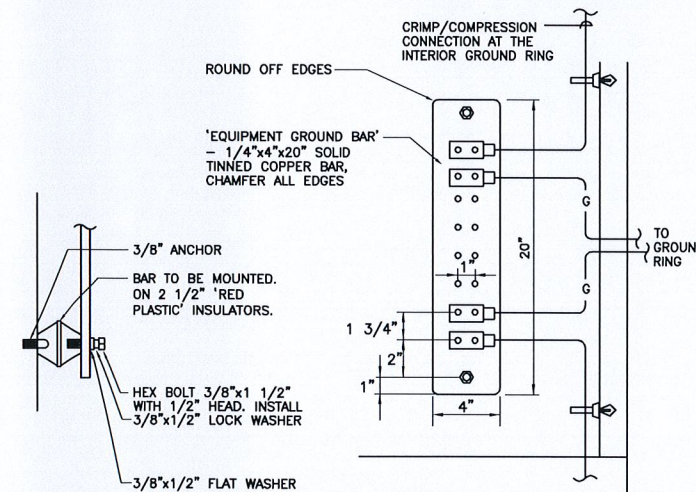
3 GROUND PLATE TRENCH/BACKFILL DETAIL (SHALLOW TOPSOIL)
E-8 NOT TO SCALE



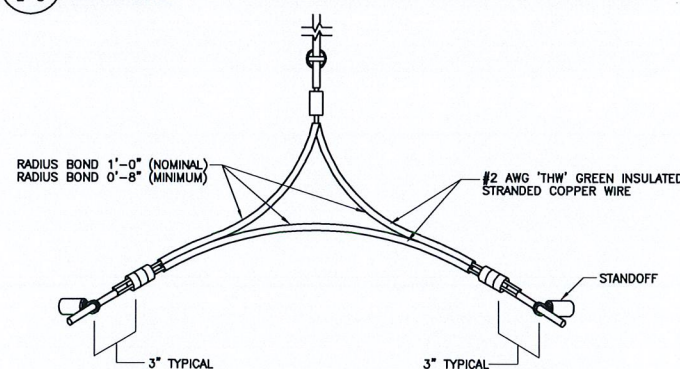
4 ANTENNA CABLE GROUNDING - LATTICE TOWER
E-8 NOT TO SCALE



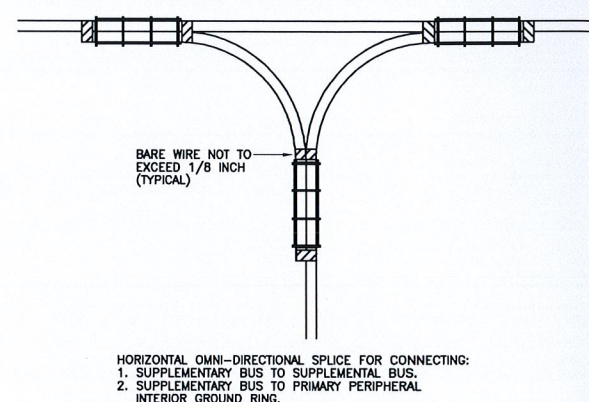
5 CABLEPORT GROUND BAR LUG CONNECTION
E-8 NOT TO SCALE



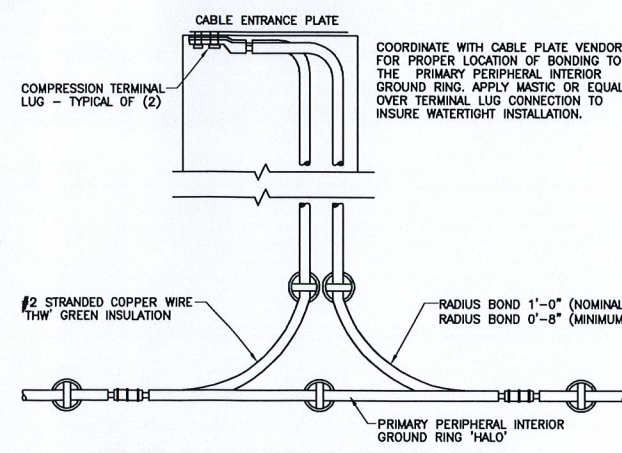
6 EQUIPMENT GROUND BAR DETAIL
E-8 NOT TO SCALE



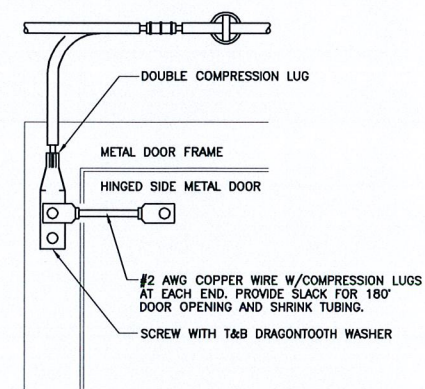
7 ISOMETRIC VIEW OF VERTICAL NONDIRECTIONAL SPLICE FOR CORNER INSTALLATION
E-8 N.T.S.



8 HORIZONTAL NONDIRECTIONAL SPLICE
E-8 N.T.S.



9 BONDING CABLE ENTRANCE PLATE TO PRIMARY PERIPHERAL INTERIOR GROUND RING
E-8 N.T.S.



10 BONDING METAL DOOR FRAME AND DOOR TO INTERIOR GROUNDING RING
E-8 N.T.S.

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DETAILS

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Sheet No. 15 of 16

