Tim Whalen , Site Acquisition
c/o New Cingular Wireless, PCS LLC
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (781) 375 8318
twhalen@clinellc.com

January 10, 2017

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

RE: Notice of Exempt Modification // Site Number: CT2168
23 Wayne Road, Wallingford, CT 06492 (Name: MT TOM WALLINGFORD)
N 41.4627419 // W -072.941881

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains nine (9) antennas at the 78-foot level of the existing 80-foot monopole tower at 23 Wayne Road, Wallingford, CT. The tower is owned by AT&T. The property is owned by Stephen Tripp. AT&T now intends to replace three (3) of its existing antennas with 3 new LTE antennas for its LTE upgrade. These antennas would be installed at the 78-foot level of the tower. AT&T also intends to replace three (3) remote radio units.

The current proposal involves an antenna swap only (three for three); no antennas will be added.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to the office of William W. Dickinson, Jr, Mayor for the Town of Wallingford, as well as the property owner and tower owner, Stephen Tripp.

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

Attached to accommodate this filing are construction drawings dated December 12, 2016 by Centek Engineering, a structural analysis dated November 10, 2016 by Centek Engineering and an Emissions Analysis Report dated November 23, 2016 by EBI Consulting.

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading as shown in the attached structural analysis by Centek Engineering, dated November 10, 2016.

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

_____

Tim Whalen, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (781) 375-8313
twhalen@centerlincommunications.com

Attachments

cc: Office of William W. Dickinson, Jr, Mayor for the Town of Wallingford
New Cingular Wireless PCS, LLC - as tower owner
Stephen Tripp, individual - as property owner

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

80' Existing Lattice Tower

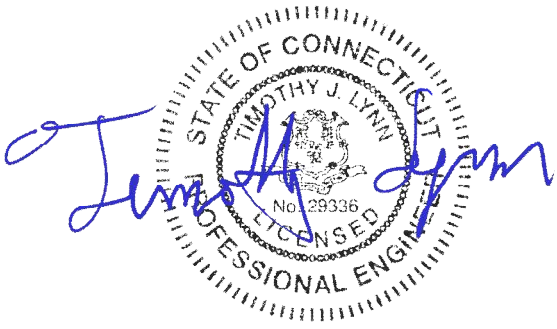
Proposed AT&T Mobility
Antenna Upgrade

AT&T Mobility Site Ref: CT2168

23 Wayne Road
Wallingford, CT

Centek Project No. 16071.55

Date: November 10, 2016



Prepared for:
AT&T Mobility
500 Enterprise Drive, Suite 3A
Rocky Hill, CT 06067

63-2 North Branford Road, Branford, CT 06405 203.488.0580 Fax 203.488.8587 www.CentekEng.com

Table of Contents

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 Wallingford Connecticut.

The host tower is a 80-ft, three legged, lattice tower originally designed and manufactured by PiROD Inc,. ENG. File No. A-111743 dated September 18, 1995. The tower geometry, structure member sizes and foundation information were obtained from a previous structural report prepared by Centek job no. 11118.CO25 dated May 22, 2012.

Antenna and appurtenance inventory were taken from the aforementioned structural report, visual verification from grade by Centek personnel on November 7, 2016 and a RF data sheet.

The tower consists of four (4) vertical sections consisting of solid round pipe legs conforming to ASTM A572 Gr. 50 and solid round lateral and horizontal bracing conforming to ASTM A572 Gr. 50. The vertical tower sections are connected by bolted sleeve connections with the diagonal and horizontal bracing to pipe legs consisting of welded connections. The width of the tower face is 3-ft 6-in at the top and 5-ft 0-in at the bottom.

AT&T proposes the replacement of three (3) panel antennas and three (3) remote radio heads mounted to three (3) frames. 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 and proposed loads considered in the analysis consist of the following:

- UNKNOWN (Existing):
  Antenna: Four (4) flash beacon lights pole mounted to the top of the tower.
- Unknown (Existing):
  Antenna: One (1) 20-ft dipole antenna mounted on a 4”x10-ft pipe to the top of the tower.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 10-ft Omni-directional whip and one (1) 7-ft whip mounted to the AT&T frames.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: Two (2) 2-ft ∅ Microwave dishes leg mounted with a RAD center elevation of ±73-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 7-ft Omni-directional whip, one (1) 8-ft Omni-directional whip and one (1) 4-ft Omni-directional whip mounted on two (2) 6-ft bogner mounts with an elevation of ±65-ft above grade level.
  Coax Cable: See note 1.
- Unknown (Existing):
  Antenna: One (1) 10-ft yagi and one (1) 10-ft Omni-directional whip mounted on two (2) 3-ft side arms with an elevation of ±55-ft above grade level.
  Coax Cable: See note 1.

- AT&T (Existing to Remain):
  Antenna: Three (3) Powerwave 7770 panel antennas, three (3) CCI OPA-65R-LCUU-H6 panel antennas, six (6) Powerwave TT19-08BP111 TMAs, three (3) Ericsson RRUS-11 remote radio heads, three (3) Ericsson RRUS-32 remote radio heads and two (2) Raycap DC6-48-60-18-8F surge arrestors mounted on three (3) frames with a RAD center elevation of ±78-ft above grade level.
  Coax Cable: Twelve (12) 1-5/8" ∅ coax cables, two (2) fiber cables and four (4) dc control cables running on a leg/face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing to Remove):
  Antenna: Three (3) KMW AM-X-CD-16-65 panel antennas and three (3) Ericsson RRUS-11 remote radio heads mounted on three (3) frames with a RAD center elevation of ±78-ft above grade level.
- **AT&T (Proposed):**
  Antenna: Three (3) Qunitel QS66512-2 panel antennas and three (3) Ericsson RRUS-32 remote radio heads mounted on three (3) frames with a RAD center elevation of ±78-ft above grade level.

  Note 1: All coax cables assumed to run to the top of the tower. Total coax cable inventory consists of twenty-eight (28) 7/8" ∅ and six (6) 1-1/4" ∅ cables.

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.
- 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 coax cables should be routed as specified in section 3 of this report.

Analysis

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, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	New Haven; v = 95-115 mph (3-second gust)	*[Annex B of TIA-222-G-2005]*
	Wallingford; v = 97 mph (3 second gust)	*[Appendix N of the 2016 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2016 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2012 International Building Code as amended by the 2016 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Allowable stresses were determined based on Table 4-8 of the TIA code.

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **92.3%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T4)	0.00'-20.00'	92.3%	**PASS**
Diagonal (T4)	0.00'-20.00'	56.6%	**PASS**

Foundation and Anchors

The existing foundation consists of a 14-ft square x 8-ft 3-in thick reinforced concrete mat. The sub grade conditions used in the foundation analysis were derived from the aforementioned structural report. The base of the tower is connected to the foundation by means of (2) 1.75"∅, anchor bolts per leg embedded into the concrete foundation structure.

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

Location	Vector	Proposed Reactions
Base	Shear	**14 kips**
	Compression	**13 kips**
	Moment	**745 kip-ft**
Leg	Shear	**9 kips**
	Uplift	**176 kips**
	Compression	**168 kips**

- The anchor bolts were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Compression and Shear	79.1%	**PASS**

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinforced Concrete Mat	Overturing	1.0	1.85	**PASS**

Note 1: FS denotes Factor of Safety.

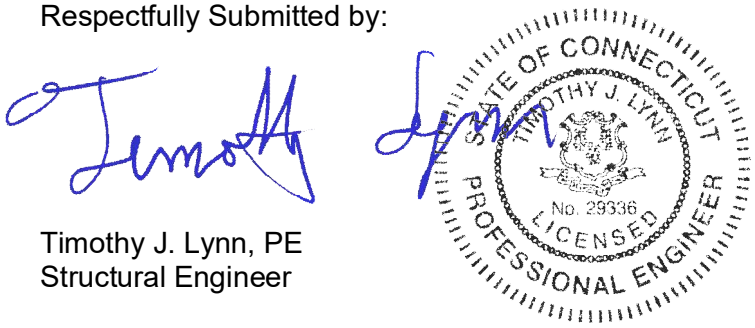
Conclusion

This analysis shows that the subject tower **is adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by AT&T. 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:



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:

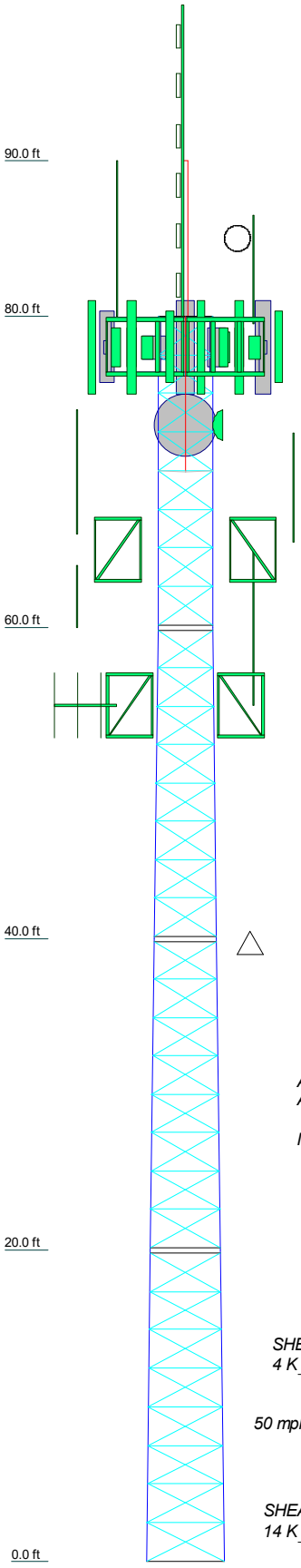
- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided 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

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

RISATower Features:

- RISATower 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.
- RISATower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.



Section	T1	T2	T3	T4	L1
Legs	SR 1 1/2	SR 2	SR 2 1/4	SR 2 1/2	P4x.237
Leg Grade			A572-50		A53-B-35
Diagonals	SR 3/4		SR 7/8		N.A.
Diagonal Grade			A572-50		N.A.
Top Girts	L3 1/2x3 1/2x5/16	SR 7/8	SR 1		N.A.
Bottom Girts	SR 3/4	SR 7/8	SR 1		N.A.
Horizontals	SR 3/4		SR 7/8		N.A.
Face Width (ft)	3.5	4	4.5	5	0.375
# Panels @ (ft)	8 @ 2.47917	16 @ 2.45833		8 @ 2.47917	N.A.
Weight (K)	1.0	1.3	1.5	1.8	0.1

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
20' 8 Bay Di-Pole	90	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	78
10' x 1" Dia Omni	85	DC6-48-60-18-8F Surge Arrestor (ATI - Existing)	78
7' Whip	83	Pirod 10' PCS Frame (1) (ATI - Existing)	78
QS66512-2 (ATI - Proposed)	78	Pirod 10' PCS Frame (1) (ATI - Existing)	78
OPA-65R-LCUU-H6 (ATI - Existing)	78	Pirod 10' PCS Frame (1) (ATI - Existing)	78
7770.00 (ATI - Existing)	78	QS66512-2 (ATI - Proposed)	78
QS66512-2 (ATI - Proposed)	78	OPA-65R-LCUU-H6 (ATI - Existing)	78
OPA-65R-LCUU-H6 (ATI - Existing)	78	7770.00 (ATI - Existing)	78
7770.00 (ATI - Existing)	78	2-ft dish	73
(2) TT19-08BP111-001 TMA (ATI - Existing)	78	4-ft Dish	73
(2) TT19-08BP111-001 TMA (ATI - Existing)	78	7' x 3" Dia Omni	65
(2) TT19-08BP111-001 TMA (ATI - Existing)	78	8' x 3" Dia Omni	65
RRUS-11 (ATI - Existing)	78	4' x 3" DIA Omni	65
RRUS-11 (ATI - Existing)	78	PiROD 6' Heavy Bogner Mount	65
RRUS-11 (ATI - Existing)	78	PiROD 6' Heavy Bogner Mount	65
RRUS-32 (ATI - Existing)	78	10' x 1" Dia Omni	55
RRUS-32 (ATI - Existing)	78	10-ft Yagi	55
RRUS-32 (ATI - Existing)	78	3' Side Mount Standoff	55
RRUS-32 (ATI - Proposed)	78	3' Side Mount Standoff	55
RRUS-32 (ATI - Proposed)	78		
RRUS-32 (ATI - Proposed)	78		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 92.3%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 176 K
SHEAR: 9 K

UPLIFT: -168 K
SHEAR: 8 K

AXIAL 34 K
SHEAR 4 K *MOMENT 232 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 13 K
SHEAR 14 K *MOMENT 745 kip-ft*

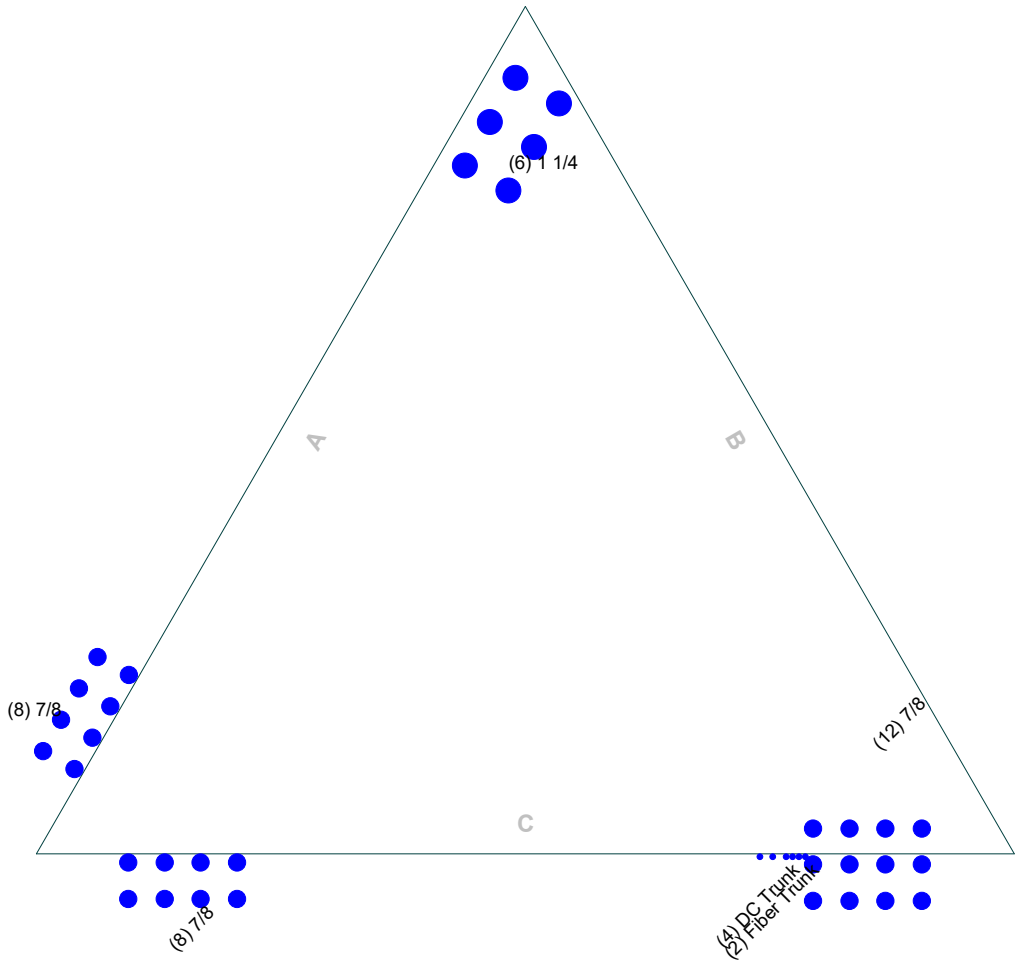
TORQUE 3 kip-ft
REACTIONS - 97 mph WIND

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

Job: *16071.53 - CT2168*		
Project: *80-ft Lattice Tower - 23 Wayne Road Wallingford, CT*		
Client: AT&T Mobility	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 11/10/16	Scale: NTS
Path:		Dwg No. E-1

Feed Line Plan

Round Flat App In Face App Out Face



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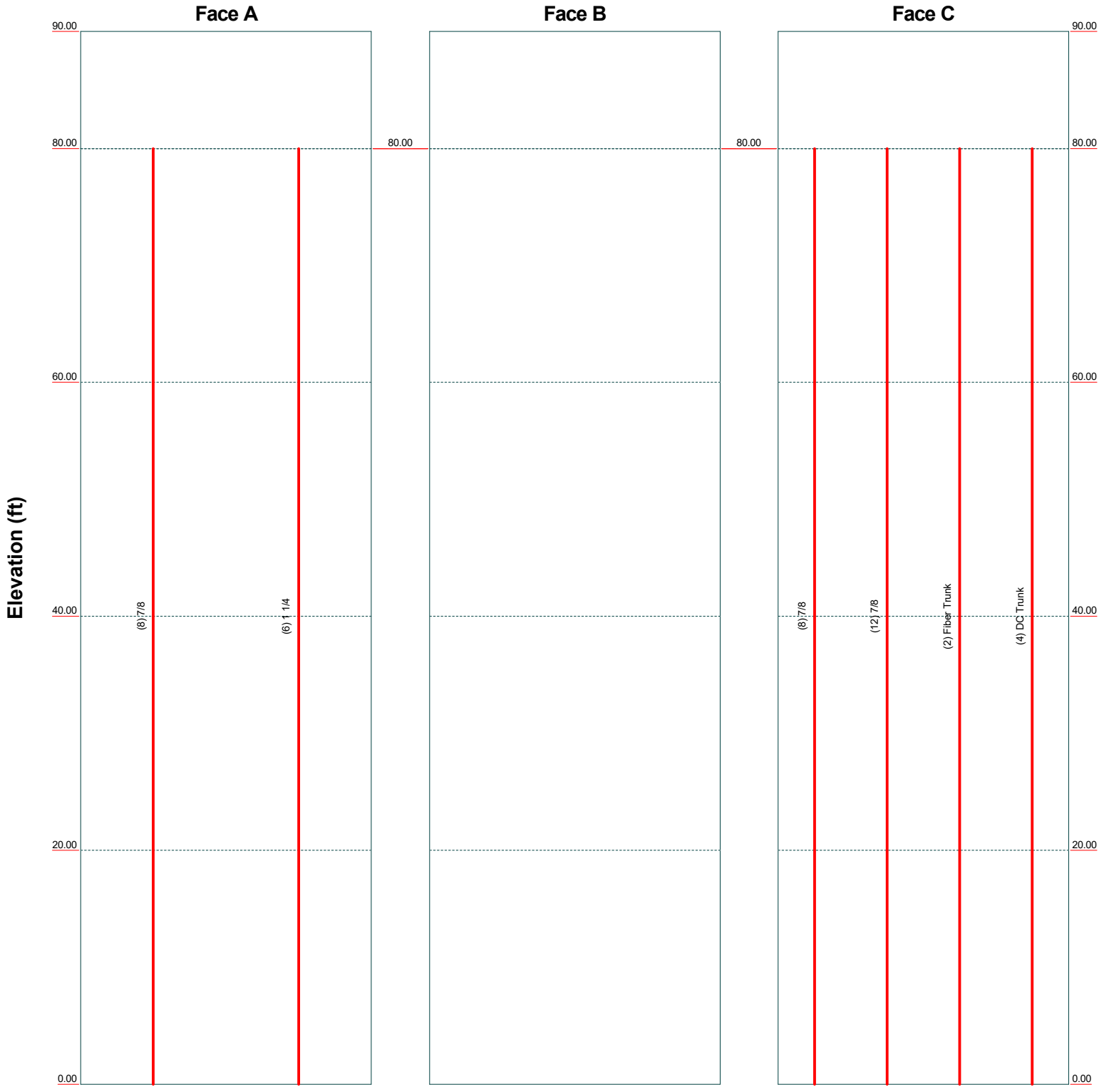
Path:		Dwg No. E-7	

Feed Line Distribution Chart
0' - 90'

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



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Code: TIA-222-G	Date: 11/10/16	Scale: NTS
Path:		Dwg No. E-7

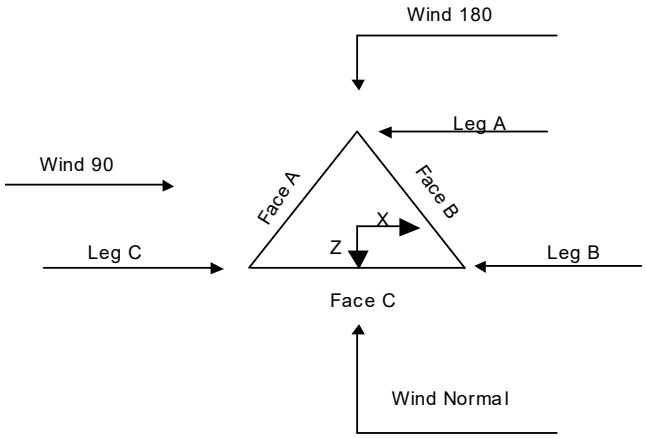
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 90.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 3.50 ft at the top and 5.00 ft at the base.
An index plate is provided at the 3x free standing -tower connection.
There is a pole section.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Fairfield County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 0.7500 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	90.00-80.00	10.00	P4x.237	A53-B-35 (35 ksi)	10.00

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 90.00-80.00				1	1	1			

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	80.00-60.00			3.50	1	20.00
T2	60.00-40.00			3.50	1	20.00
T3	40.00-20.00			4.00	1	20.00
T4	20.00-0.00			4.50	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T1	80.00-60.00	2.48	X Brace	No	Yes	0.0000	2.0000
T2	60.00-40.00	2.46	X Brace	No	Yes	2.0000	2.0000
T3	40.00-20.00	2.46	X Brace	No	Yes	2.0000	2.0000
T4	20.00-0.00	2.48	X Brace	No	Yes	2.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 80.00-60.00	Solid Round	1 1/2	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 60.00-40.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 40.00-20.00	Solid Round	2 1/4	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T4 20.00-0.00	Solid Round	2 1/2	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 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 80.00-60.00	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 60.00-40.00	Solid Round	7/8	A572-50 (50 ksi)	Solid Round	7/8	A572-50 (50 ksi)
T3 40.00-20.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T4 20.00-0.00	Solid Round	1	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 80.00-60.00	None	Flat Bar		A36	Solid Round	3/4	A572-50

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T2 60.00-40.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	7/8	(50 ksi) A572-50 (50 ksi)
T3 40.00-20.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	7/8	(50 ksi) A572-50 (50 ksi)
T4 20.00-0.00	None	Flat Bar		(36 ksi) A36 (36 ksi)	Solid Round	7/8	(50 ksi) A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 20.00-0.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1

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

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
7/8	A	No	Ar (CaAa)	80.00 - 0.00	0.0000	-0.35	8	4	1.1100	1.1100		0.54
7/8	C	No	Ar (CaAa)	80.00 - 0.00	0.0000	0.35	8	4	1.1100	1.1100		0.54
7/8	C	No	Ar (CaAa)	80.00 - 0.00	-1.0000	-0.35	12	4	1.1100	1.1100		0.54
1 1/4	A	No	Ar (CaAa)	80.00 - 0.00	-4.0000	0.38	6	3	1.5500	1.5500		0.66
Fiber Trunk	C	No	Ar (CaAa)	80.00 - 0.00	0.0000	-0.28	2	2	0.4000	0.4000		1.00
DC Trunk	C	No	Ar (CaAa)	80.00 - 0.00	0.0000	-0.26	4	4	0.4000	0.4000		0.11

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.00-80.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T1	80.00-60.00	A	0.000	0.000	36.360	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	49.200	0.000	0.26
T2	60.00-40.00	A	0.000	0.000	36.360	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	49.200	0.000	0.26
T3	40.00-20.00	A	0.000	0.000	36.360	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	49.200	0.000	0.26
T4	20.00-0.00	A	0.000	0.000	36.360	0.000	0.17
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	49.200	0.000	0.26

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	90.00-80.00	A	1.649	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	0.000	0.000	0.00
T1	80.00-60.00	A	1.617	0.000	0.000	65.836	0.000	1.18
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	99.179	0.000	1.61
T2	60.00-40.00	A	1.564	0.000	0.000	65.096	0.000	1.16
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	97.692	0.000	1.57
T3	40.00-20.00	A	1.486	0.000	0.000	64.020	0.000	1.12
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	95.531	0.000	1.51
T4	20.00-0.00	A	1.331	0.000	0.000	61.886	0.000	1.04
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	91.248	0.000	1.40

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	90.00-80.00	0.0000	0.0000	0.0000	0.0000
T1	80.00-60.00	-0.5117	0.8758	-0.2031	0.3721
T2	60.00-40.00	-0.5714	0.9588	-0.2362	0.4253
T3	40.00-20.00	-0.6426	1.0438	-0.2785	0.4873
T4	20.00-0.00	-0.7112	1.1258	-0.3347	0.5724

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	7/8	60.00 - 80.00	0.6000	0.3759
T1	2	7/8	60.00 - 80.00	0.6000	0.3759
T1	3	7/8	60.00 - 80.00	0.6000	0.3759
T1	4	1 1/4	60.00 - 80.00	0.6000	0.3759
T1	5	Fiber Trunk	60.00 - 80.00	0.6000	0.3759
T1	6	DC Trunk	60.00 - 80.00	0.6000	0.3759
T2	1	7/8	40.00 - 60.00	0.6000	0.3930
T2	2	7/8	40.00 - 60.00	0.6000	0.3930
T2	3	7/8	40.00 - 60.00	0.6000	0.3930
T2	4	1 1/4	40.00 - 60.00	0.6000	0.3930
T2	5	Fiber Trunk	40.00 - 60.00	0.6000	0.3930
T2	6	DC Trunk	40.00 - 60.00	0.6000	0.3930
T3	1	7/8	20.00 - 40.00	0.6000	0.4314
T3	2	7/8	20.00 - 40.00	0.6000	0.4314
T3	3	7/8	20.00 - 40.00	0.6000	0.4314
T3	4	1 1/4	20.00 - 40.00	0.6000	0.4314
T3	5	Fiber Trunk	20.00 - 40.00	0.6000	0.4314
T3	6	DC Trunk	20.00 - 40.00	0.6000	0.4314
T4	1	7/8	0.00 - 20.00	0.6000	0.4833
T4	2	7/8	0.00 - 20.00	0.6000	0.4833
T4	3	7/8	0.00 - 20.00	0.6000	0.4833
T4	4	1 1/4	0.00 - 20.00	0.6000	0.4833

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	5	Fiber Trunk	0.00 - 20.00	0.6000	0.4833
T4	6	DC Trunk	0.00 - 20.00	0.6000	0.4833

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
QS66512-2	A	From Leg	2.00	0.0000	78.00	No Ice	8.13	6.80	0.11
(AT&T - Proposed)			5.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
OPA-65R-LCUU-H6	A	From Leg	2.00	0.0000	78.00	No Ice	9.66	5.52	0.07
(AT&T - Existing)			0.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
7770.00	A	From Leg	2.00	0.0000	78.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	B	From Leg	2.00	0.0000	78.00	No Ice	8.13	6.80	0.11
(AT&T - Proposed)			5.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
OPA-65R-LCUU-H6	B	From Leg	2.00	0.0000	78.00	No Ice	9.66	5.52	0.07
(AT&T - Existing)			0.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
7770.00	B	From Leg	2.00	0.0000	78.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
QS66512-2	C	From Leg	2.00	0.0000	78.00	No Ice	8.13	6.80	0.11
(AT&T - Proposed)			5.00			1/2" Ice	8.59	7.27	0.17
			0.00			1" Ice	9.05	7.72	0.23
OPA-65R-LCUU-H6	C	From Leg	2.00	0.0000	78.00	No Ice	9.66	5.52	0.07
(AT&T - Existing)			0.00			1/2" Ice	10.13	5.97	0.13
			0.00			1" Ice	10.61	6.43	0.20
7770.00	C	From Leg	2.00	0.0000	78.00	No Ice	5.51	2.93	0.04
(AT&T - Existing)			-5.00			1/2" Ice	5.87	3.27	0.07
			0.00			1" Ice	6.23	3.63	0.11
(2) TT19-08BP111-001 TMA	A	From Leg	2.00	0.0000	78.00	No Ice	0.55	0.45	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	B	From Leg	2.00	0.0000	78.00	No Ice	0.55	0.45	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
(2) TT19-08BP111-001 TMA	C	From Leg	2.00	0.0000	78.00	No Ice	0.55	0.45	0.02
(AT&T - Existing)			0.00			1/2" Ice	0.65	0.53	0.02
			0.00			1" Ice	0.75	0.63	0.03
RRUS-11	A	From Leg	2.00	0.0000	78.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	B	From Leg	2.00	0.0000	78.00	No Ice	2.57	1.07	0.05
(AT&T - Existing)			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-11	C	From Leg	2.00	0.0000	78.00	No Ice	2.57	1.07	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(AT&T - Existing)			-2.00			1/2" Ice	2.76	1.21	0.07
			0.00			1" Ice	2.97	1.36	0.09
RRUS-32	A	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Existing)			2.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Existing)			2.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Existing)			2.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	A	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Proposed)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	B	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Proposed)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
RRUS-32	C	From Leg	2.00	0.0000	78.00	No Ice	3.31	2.42	0.08
(AT&T - Proposed)			0.00			1/2" Ice	3.56	2.64	0.10
			0.00			1" Ice	3.81	2.86	0.14
DC6-48-60-18-8F Surge	A	From Leg	1.00	0.0000	78.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T - Existing)			0.00			1" Ice	2.29	2.29	0.06
DC6-48-60-18-8F Surge	B	From Leg	1.00	0.0000	78.00	No Ice	1.91	1.91	0.02
Arrestor			0.00			1/2" Ice	2.10	2.10	0.04
(AT&T - Existing)			0.00			1" Ice	2.29	2.29	0.06
Pirod 10' PCS Frame (1)	A	From Leg	1.00	0.0000	78.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
Pirod 10' PCS Frame (1)	B	From Leg	1.00	0.0000	78.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
Pirod 10' PCS Frame (1)	C	From Leg	1.00	0.0000	78.00	No Ice	9.00	9.00	0.25
(AT&T - Existing)			0.00			1/2" Ice	13.20	13.20	0.35
			0.00			1" Ice	17.40	17.40	0.45
20' 8 Bay Di-Pole	C	From Leg	0.00	0.0000	90.00	No Ice	4.00	4.00	0.06
			0.00			1/2" Ice	6.00	6.00	0.10
			0.00			1" Ice	8.00	8.00	0.14
10' x 1" Dia Omni	C	From Leg	2.00	0.0000	85.00	No Ice	1.00	1.00	0.03
			5.00			1/2" Ice	2.02	2.02	0.04
			0.00			1" Ice	3.05	3.05	0.05
7' Whip	B	From Leg	2.00	0.0000	83.00	No Ice	1.74	1.74	0.04
			-5.00			1/2" Ice	2.60	2.60	0.05
			0.00			1" Ice	3.29	3.29	0.08
PiROD 6' Heavy Bogner	C	From Leg	3.00	0.0000	65.00	No Ice	8.20	8.20	0.25
Mount			0.00			1/2" Ice	9.90	9.90	0.33
			0.00			1" Ice	11.60	11.60	0.40
PiROD 6' Heavy Bogner	B	From Leg	3.00	0.0000	65.00	No Ice	8.20	8.20	0.25
Mount			0.00			1/2" Ice	9.90	9.90	0.33
			0.00			1" Ice	11.60	11.60	0.40
7' x 3" Dia Omni	B	From Leg	6.00	0.0000	65.00	No Ice	2.10	2.10	0.02
			0.00			1/2" Ice	2.64	2.64	0.04
			4.00			1" Ice	3.07	3.07	0.06
8' x 3" Dia Omni	C	From Leg	6.00	0.0000	65.00	No Ice	2.40	2.40	0.03
			0.00			1/2" Ice	3.19	3.19	0.04
			5.00			1" Ice	3.67	3.67	0.07
4' x 3" DIA Omni	C	From Leg	6.00	0.0000	65.00	No Ice	1.00	1.00	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	1.25	1.25	0.02
			-3.00			1" Ice	1.50	1.50	0.04
3' Side Mount Standoff	C	From Leg	2.00	0.0000	55.00	No Ice	2.64	2.64	0.04
			0.00			1/2" Ice	3.69	3.69	0.05
			0.00			1" Ice	4.74	4.74	0.06
3' Side Mount Standoff	B	From Leg	2.00	0.0000	55.00	No Ice	2.64	2.64	0.04
			0.00			1/2" Ice	3.69	3.69	0.05
			0.00			1" Ice	4.74	4.74	0.06
10' x 1" Dia Omni	B	From Leg	3.00	0.0000	55.00	No Ice	1.00	1.00	0.03
			0.00			1/2" Ice	2.02	2.02	0.04
			5.00			1" Ice	3.05	3.05	0.05
10-ft Yagi	C	From Leg	3.00	0.0000	55.00	No Ice	5.00	5.00	0.06
			0.00			1/2" Ice	7.50	7.50	0.08
			0.00			1" Ice	10.00	10.00	0.10

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
2-ft dish	B	Paraboloid w/o Radome	From Leg	0.00	Worst		73.00	2.00	No Ice	3.14	0.05
				0.00					1/2" Ice	3.41	0.08
				0.00					1" Ice	3.68	0.10
4-ft Dish	A	Paraboloid w/o Radome	From Leg	0.00	Worst		73.00	4.00	No Ice	3.14	0.10
				0.00					1/2" Ice	3.41	0.10
				0.00					1" Ice	3.68	0.12

Tower Pressures - No Ice

G_H = 0.850 (base tower), 1.350 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 90.00-80.00	85.00	1.223	25	3.750	A	0.000	3.750	3.750	100.00	0.000	0.000
					B	0.000	3.750		100.00	0.000	0.000
					C	0.000	3.750		100.00	0.000	0.000
T1 80.00-60.00	70.00	1.174	24	72.500	A	0.984	10.823	5.000	42.34	36.360	0.000
					B	0.984	10.823		42.34	0.000	0.000
					C	0.984	10.823		42.34	49.200	0.000
T2 60.00-40.00	50.00	1.094	22	78.334	A	0.000	14.018	6.667	47.56	36.360	0.000
					B	0.000	14.018		47.56	0.000	0.000
					C	0.000	14.018		47.56	49.200	0.000
T3 40.00-20.00	30.00	0.982	20	88.750	A	0.000	15.727	7.501	47.69	36.360	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					B	0.000	15.727		47.69	0.000	0.000
					C	0.000	15.727		47.69	49.200	0.000
T4 20.00-0.00	10.00	0.85	17	99.167	A	0.000	17.390	8.334	47.92	36.360	0.000
					B	0.000	17.390		47.92	0.000	0.000
					C	0.000	17.390		47.92	49.200	0.000

Tower Pressure - With Ice

G_H = 0.850 (base tower), 1.350 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 90.00-80.00	85.00	1.223	7	1.6489	6.498	A	0.000	6.498	6.498	100.00	0.000	0.000
						B	0.000	6.498		100.00	0.000	0.000
						C	0.000	6.498		100.00	0.000	0.000
T1 80.00-60.00	70.00	1.174	6	1.6171	77.890	A	0.984	47.627	15.781	32.46	65.836	0.000
						B	0.984	47.627		32.46	0.000	0.000
						C	0.984	47.627		32.46	99.179	0.000
T2 60.00-40.00	50.00	1.094	6	1.5636	83.546	A	0.000	50.717	17.093	33.70	65.096	0.000
						B	0.000	50.717		33.70	0.000	0.000
						C	0.000	50.717		33.70	97.692	0.000
T3 40.00-20.00	30.00	0.982	5	1.4858	93.703	A	0.000	53.284	17.407	32.67	64.020	0.000
						B	0.000	53.284		32.67	0.000	0.000
						C	0.000	53.284		32.67	95.531	0.000
T4 20.00-0.00	10.00	0.85	5	1.3312	103.605	A	0.000	53.533	17.210	32.15	61.886	0.000
						B	0.000	53.533		32.15	0.000	0.000
						C	0.000	53.533		32.15	91.248	0.000

Tower Pressure - Service

G_H = 0.850 (base tower), 1.350 (upper structure)

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 90.00-80.00	85.00	1.223	10	3.750	A	0.000	3.750	3.750	100.00	0.000	0.000
					B	0.000	3.750		100.00	0.000	0.000
					C	0.000	3.750		100.00	0.000	0.000
T1 80.00-60.00	70.00	1.174	9	72.500	A	0.984	10.823	5.000	42.34	36.360	0.000
					B	0.984	10.823		42.34	0.000	0.000
					C	0.984	10.823		42.34	49.200	0.000
T2 60.00-40.00	50.00	1.094	9	78.334	A	0.000	14.018	6.667	47.56	36.360	0.000
					B	0.000	14.018		47.56	0.000	0.000
					C	0.000	14.018		47.56	49.200	0.000
T3 40.00-20.00	30.00	0.982	8	88.750	A	0.000	15.727	7.501	47.69	36.360	0.000
					B	0.000	15.727		47.69	0.000	0.000
					C	0.000	15.727		47.69	49.200	0.000
T4 20.00-0.00	10.00	0.85	7	99.167	A	0.000	17.390	8.334	47.92	36.360	0.000
					B	0.000	17.390		47.92	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	17.390		47.92	49.200	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	0.955	25	1	1	3.750	0.12	12.10	C
90.00-80.00			B	1	0.955		1	1	3.750			
			C	1	0.955		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	24	1	1	7.143	1.52	76.06	C
80.00-60.00			B	0.163	2.725		1	1	7.143			
			C	0.163	2.725		1	1	7.143			
T2	0.43	1.29	A	0.179	2.668	22	1	1	8.006	1.38	69.19	C
60.00-40.00			B	0.179	2.668		1	1	8.006			
			C	0.179	2.668		1	1	8.006			
T3	0.43	1.54	A	0.177	2.674	20	1	1	8.978	1.29	64.40	C
40.00-20.00			B	0.177	2.674		1	1	8.978			
			C	0.177	2.674		1	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	17	1	1	9.923	1.15	57.64	C
			B	0.175	2.68		1	1	9.923			
			C	0.175	2.68		1	1	9.923			
Sum Weight:	1.72	5.73						OTM	236.12 kip-ft	5.47		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	0.955	25	1	1	3.750	0.12	12.10	C
90.00-80.00			B	1	0.955		1	1	3.750			
			C	1	0.955		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	24	0.825	1	6.970	1.51	75.58	C
80.00-60.00			B	0.163	2.725		0.825	1	6.970			
			C	0.163	2.725		0.825	1	6.970			
T2	0.43	1.29	A	0.179	2.668	22	0.825	1	8.006	1.38	69.19	C
60.00-40.00			B	0.179	2.668		0.825	1	8.006			
			C	0.179	2.668		0.825	1	8.006			
T3	0.43	1.54	A	0.177	2.674	20	0.825	1	8.978	1.29	64.40	C
40.00-20.00			B	0.177	2.674		0.825	1	8.978			
			C	0.177	2.674		0.825	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	17	0.825	1	9.923	1.15	57.64	C
			B	0.175	2.68		0.825	1	9.923			
			C	0.175	2.68		0.825	1	9.923			
Sum Weight:	1.72	5.73						OTM	235.45 kip-ft	5.46		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	0.955	25	1	1	3.750	0.12	12.10	C
90.00-80.00			B	1	0.955		1	1	3.750			
			C	1	0.955		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	24	0.8	1	6.946	1.51	75.51	C
80.00-60.00			B	0.163	2.725		0.8	1	6.946			
			C	0.163	2.725		0.8	1	6.946			
T2	0.43	1.29	A	0.179	2.668	22	0.8	1	8.006	1.38	69.19	C
60.00-40.00			B	0.179	2.668		0.8	1	8.006			
			C	0.179	2.668		0.8	1	8.006			
T3	0.43	1.54	A	0.177	2.674	20	0.8	1	8.978	1.29	64.40	C
40.00-20.00			B	0.177	2.674		0.8	1	8.978			
			C	0.177	2.674		0.8	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	17	0.8	1	9.923	1.15	57.64	C
			B	0.175	2.68		0.8	1	9.923			
			C	0.175	2.68		0.8	1	9.923			
Sum Weight:	1.72	5.73						OTM	235.35 kip-ft	5.46		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	0.955	25	1	1	3.750	0.12	12.10	C
90.00-80.00			B	1	0.955		1	1	3.750			
			C	1	0.955		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	24	0.85	1	6.995	1.51	75.65	C
80.00-60.00			B	0.163	2.725		0.85	1	6.995			
			C	0.163	2.725		0.85	1	6.995			
T2	0.43	1.29	A	0.179	2.668	22	0.85	1	8.006	1.38	69.19	C
60.00-40.00			B	0.179	2.668		0.85	1	8.006			
			C	0.179	2.668		0.85	1	8.006			
T3	0.43	1.54	A	0.177	2.674	20	0.85	1	8.978	1.29	64.40	C
40.00-20.00			B	0.177	2.674		0.85	1	8.978			
			C	0.177	2.674		0.85	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	17	0.85	1	9.923	1.15	57.64	C
			B	0.175	2.68		0.85	1	9.923			
			C	0.175	2.68		0.85	1	9.923			
Sum Weight:	1.72	5.73						OTM	235.55 kip-ft	5.46		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.23	A	1	1.2	7	1	1	6.498	0.07	7.00	C
90.00-80.00			B	1	1.2		1	1	6.498			
			C	1	1.2		1	1	6.498			
T1	2.79	2.96	A	0.624	1.791	6	1	1	37.145	0.73	36.60	C
80.00-60.00			B	0.624	1.791		1	1	37.145			
			C	0.624	1.791		1	1	37.145			
T2	2.73	3.17	A	0.607	1.8	6	1	1	37.948	0.67	33.45	C
60.00-40.00			B	0.607	1.8		1	1	37.948			
			C	0.607	1.8		1	1	37.948			
T3	2.63	3.46	A	0.569	1.827	5	1	1	38.596	0.63	31.64	C
40.00-20.00			B	0.569	1.827		1	1	38.596			
			C	0.569	1.827		1	1	38.596			
T4 20.00-0.00	2.45	3.57	A	0.517	1.879	5	1	1	37.160	0.57	28.27	C
			B	0.517	1.879		1	1	37.160			
			C	0.517	1.879		1	1	37.160			
Sum Weight:	10.60	13.40						OTM	115.28 kip-ft	2.67		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.23	A	1	1.2	7	1	1	6.498	0.07	7.00	C
90.00-80.00			B	1	1.2		1	1	6.498			
			C	1	1.2		1	1	6.498			
T1	2.79	2.96	A	0.624	1.791	6	0.825	1	36.973	0.73	36.52	C
80.00-60.00			B	0.624	1.791		0.825	1	36.973			
			C	0.624	1.791		0.825	1	36.973			
T2	2.73	3.17	A	0.607	1.8	6	0.825	1	37.948	0.67	33.45	C
60.00-40.00			B	0.607	1.8		0.825	1	37.948			
			C	0.607	1.8		0.825	1	37.948			
T3	2.63	3.46	A	0.569	1.827	5	0.825	1	38.596	0.63	31.64	C
40.00-20.00			B	0.569	1.827		0.825	1	38.596			
			C	0.569	1.827		0.825	1	38.596			
T4 20.00-0.00	2.45	3.57	A	0.517	1.879	5	0.825	1	37.160	0.57	28.27	C
			B	0.517	1.879		0.825	1	37.160			
			C	0.517	1.879		0.825	1	37.160			
Sum Weight:	10.60	13.40						OTM	115.16 kip-ft	2.67		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.23	A	1	1.2	7	1	1	6.498	0.07	7.00	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
90.00-80.00			B	1	1.2		1	1	6.498			
			C	1	1.2		1	1	6.498			
T1	2.79	2.96	A	0.624	1.791	6	0.8	1	36.948	0.73	36.51	C
80.00-60.00			B	0.624	1.791		0.8	1	36.948			
			C	0.624	1.791		0.8	1	36.948			
T2	2.73	3.17	A	0.607	1.8	6	0.8	1	37.948	0.67	33.45	C
60.00-40.00			B	0.607	1.8		0.8	1	37.948			
			C	0.607	1.8		0.8	1	37.948			
T3	2.63	3.46	A	0.569	1.827	5	0.8	1	38.596	0.63	31.64	C
40.00-20.00			B	0.569	1.827		0.8	1	38.596			
			C	0.569	1.827		0.8	1	38.596			
T4 20.00-0.00	2.45	3.57	A	0.517	1.879	5	0.8	1	37.160	0.57	28.27	C
			B	0.517	1.879		0.8	1	37.160			
			C	0.517	1.879		0.8	1	37.160			
Sum Weight:	10.60	13.40						OTM	115.15 kip-ft	2.67		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.23	A	1	1.2	7	1	1	6.498	0.07	7.00	C
90.00-80.00			B	1	1.2		1	1	6.498			
			C	1	1.2		1	1	6.498			
T1	2.79	2.96	A	0.624	1.791	6	0.85	1	36.998	0.73	36.53	C
80.00-60.00			B	0.624	1.791		0.85	1	36.998			
			C	0.624	1.791		0.85	1	36.998			
T2	2.73	3.17	A	0.607	1.8	6	0.85	1	37.948	0.67	33.45	C
60.00-40.00			B	0.607	1.8		0.85	1	37.948			
			C	0.607	1.8		0.85	1	37.948			
T3	2.63	3.46	A	0.569	1.827	5	0.85	1	38.596	0.63	31.64	C
40.00-20.00			B	0.569	1.827		0.85	1	38.596			
			C	0.569	1.827		0.85	1	38.596			
T4 20.00-0.00	2.45	3.57	A	0.517	1.879	5	0.85	1	37.160	0.57	28.27	C
			B	0.517	1.879		0.85	1	37.160			
			C	0.517	1.879		0.85	1	37.160			
Sum Weight:	10.60	13.40						OTM	115.18 kip-ft	2.67		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	1.2	10	1	1	3.750	0.06	5.82	C
90.00-80.00			B	1	1.2		1	1	3.750			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	1	1.2		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	9	1	1	7.143	0.58	29.10	C
80.00-60.00			B	0.163	2.725		1	1	7.143			
			C	0.163	2.725		1	1	7.143			
T2	0.43	1.29	A	0.179	2.668	9	1	1	8.006	0.53	26.47	C
60.00-40.00			B	0.179	2.668		1	1	8.006			
			C	0.179	2.668		1	1	8.006			
T3	0.43	1.54	A	0.177	2.674	8	1	1	8.978	0.49	24.64	C
40.00-20.00			B	0.177	2.674		1	1	8.978			
			C	0.177	2.674		1	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	7	1	1	9.923	0.44	22.05	C
			B	0.175	2.68		1	1	9.923			
			C	0.175	2.68		1	1	9.923			
Sum Weight:	1.72	5.73						OTM	91.35 kip-ft	2.10		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	1.2	10	1	1	3.750	0.06	5.82	C
90.00-80.00			B	1	1.2		1	1	3.750			
			C	1	1.2		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	9	0.825	1	6.970	0.58	28.92	C
80.00-60.00			B	0.163	2.725		0.825	1	6.970			
			C	0.163	2.725		0.825	1	6.970			
T2	0.43	1.29	A	0.179	2.668	9	0.825	1	8.006	0.53	26.47	C
60.00-40.00			B	0.179	2.668		0.825	1	8.006			
			C	0.179	2.668		0.825	1	8.006			
T3	0.43	1.54	A	0.177	2.674	8	0.825	1	8.978	0.49	24.64	C
40.00-20.00			B	0.177	2.674		0.825	1	8.978			
			C	0.177	2.674		0.825	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	7	0.825	1	9.923	0.44	22.05	C
			B	0.175	2.68		0.825	1	9.923			
			C	0.175	2.68		0.825	1	9.923			
Sum Weight:	1.72	5.73						OTM	91.10 kip-ft	2.10		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	1.2	10	1	1	3.750	0.06	5.82	C
90.00-80.00			B	1	1.2		1	1	3.750			
			C	1	1.2		1	1	3.750			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.43	0.98	A	0.163	2.725	9	0.8	1	6.946	0.58	28.89	C
80.00-60.00			B	0.163	2.725		0.8	1	6.946			
			C	0.163	2.725		0.8	1	6.946			
T2	0.43	1.29	A	0.179	2.668	9	0.8	1	8.006	0.53	26.47	C
60.00-40.00			B	0.179	2.668		0.8	1	8.006			
			C	0.179	2.668		0.8	1	8.006			
T3	0.43	1.54	A	0.177	2.674	8	0.8	1	8.978	0.49	24.64	C
40.00-20.00			B	0.177	2.674		0.8	1	8.978			
			C	0.177	2.674		0.8	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	7	0.8	1	9.923	0.44	22.05	C
			B	0.175	2.68		0.8	1	9.923			
			C	0.175	2.68		0.8	1	9.923			
Sum Weight:	1.72	5.73						OTM	91.06 kip-ft	2.10		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.00	0.11	A	1	1.2	10	1	1	3.750	0.06	5.82	C
90.00-80.00			B	1	1.2		1	1	3.750			
			C	1	1.2		1	1	3.750			
T1	0.43	0.98	A	0.163	2.725	9	0.85	1	6.995	0.58	28.94	C
80.00-60.00			B	0.163	2.725		0.85	1	6.995			
			C	0.163	2.725		0.85	1	6.995			
T2	0.43	1.29	A	0.179	2.668	9	0.85	1	8.006	0.53	26.47	C
60.00-40.00			B	0.179	2.668		0.85	1	8.006			
			C	0.179	2.668		0.85	1	8.006			
T3	0.43	1.54	A	0.177	2.674	8	0.85	1	8.978	0.49	24.64	C
40.00-20.00			B	0.177	2.674		0.85	1	8.978			
			C	0.177	2.674		0.85	1	8.978			
T4 20.00-0.00	0.43	1.81	A	0.175	2.68	7	0.85	1	9.923	0.44	22.05	C
			B	0.175	2.68		0.85	1	9.923			
			C	0.175	2.68		0.85	1	9.923			
Sum Weight:	1.72	5.73						OTM	91.13 kip-ft	2.10		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	2.92					
Bracing Weight	2.81					
Total Member Self-Weight	5.73			2.48	0.34	
Total Weight	10.67			2.48	0.34	

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 0 deg - No Ice		0.00	-8.46	-457.53	0.34	-0.43
Wind 30 deg - No Ice		4.22	-7.32	-395.41	-229.38	0.52
Wind 45 deg - No Ice		5.97	-5.97	-322.32	-324.46	0.95
Wind 60 deg - No Ice		7.31	-4.22	-227.14	-397.38	1.33
Wind 90 deg - No Ice		8.45	0.00	2.48	-459.10	1.78
Wind 120 deg - No Ice		7.32	4.23	232.49	-398.04	1.76
Wind 135 deg - No Ice		5.98	5.98	327.68	-324.86	1.57
Wind 150 deg - No Ice		4.22	7.32	400.37	-229.38	1.26
Wind 180 deg - No Ice		0.00	8.44	461.73	0.34	0.43
Wind 210 deg - No Ice		-4.22	7.32	400.37	230.06	-0.52
Wind 225 deg - No Ice		-5.97	5.97	327.28	325.15	-0.95
Wind 240 deg - No Ice		-7.32	4.23	232.49	398.73	-1.33
Wind 270 deg - No Ice		-8.45	0.00	2.48	459.78	-1.78
Wind 300 deg - No Ice		-7.31	-4.22	-227.14	398.06	-1.76
Wind 315 deg - No Ice		-5.98	-5.98	-322.72	325.54	-1.57
Wind 330 deg - No Ice		-4.22	-7.32	-395.41	230.06	-1.26
Member Ice	7.67					
Total Weight Ice	32.26			7.88	1.70	
Wind 0 deg - Ice		0.00	-4.04	-209.45	1.70	-0.28
Wind 30 deg - Ice		2.02	-3.49	-180.24	-106.92	0.13
Wind 45 deg - Ice		2.85	-2.85	-145.71	-151.90	0.32
Wind 60 deg - Ice		3.49	-2.02	-100.72	-186.40	0.50
Wind 90 deg - Ice		4.03	0.00	7.88	-215.53	0.74
Wind 120 deg - Ice		3.49	2.02	116.55	-186.52	0.78
Wind 135 deg - Ice		2.85	2.85	161.55	-151.97	0.72
Wind 150 deg - Ice		2.02	3.49	196.01	-106.92	0.61
Wind 180 deg - Ice		0.00	4.03	225.08	1.70	0.28
Wind 210 deg - Ice		-2.02	3.49	196.01	110.31	-0.13
Wind 225 deg - Ice		-2.85	2.85	161.48	155.29	-0.32
Wind 240 deg - Ice		-3.49	2.02	116.55	189.91	-0.50
Wind 270 deg - Ice		-4.03	0.00	7.88	218.93	-0.74
Wind 300 deg - Ice		-3.49	-2.02	-100.72	189.80	-0.78
Wind 315 deg - Ice		-2.85	-2.85	-145.78	155.36	-0.72
Wind 330 deg - Ice		-2.02	-3.49	-180.24	110.31	-0.61
Total Weight	10.67			2.48	0.34	
Wind 0 deg - Service		0.00	-3.25	-175.49	0.17	-0.17
Wind 30 deg - Service		1.62	-2.81	-151.59	-88.23	0.20
Wind 45 deg - Service		2.29	-2.29	-123.46	-124.82	0.37
Wind 60 deg - Service		2.81	-1.62	-86.84	-152.88	0.51
Wind 90 deg - Service		3.24	0.00	1.53	-176.63	0.68
Wind 120 deg - Service		2.81	1.62	90.04	-153.14	0.67
Wind 135 deg - Service		2.30	2.30	126.67	-124.97	0.60
Wind 150 deg - Service		1.62	2.81	154.64	-88.23	0.48
Wind 180 deg - Service		0.00	3.24	178.25	0.17	0.17
Wind 210 deg - Service		-1.62	2.81	154.64	88.57	-0.20
Wind 225 deg - Service		-2.29	2.29	126.52	125.16	-0.37
Wind 240 deg - Service		-2.81	1.62	90.04	153.47	-0.51
Wind 270 deg - Service		-3.24	0.00	1.53	176.96	-0.68
Wind 300 deg - Service		-2.81	-1.62	-86.84	153.21	-0.67
Wind 315 deg - Service		-2.30	-2.30	-123.61	125.31	-0.60
Wind 330 deg - Service		-1.62	-2.81	-151.59	88.57	-0.48

Load Combinations

Comb. No.	Description

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service

Comb. No.	Description
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service
66	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	90 - 80	Pole	Max Tension	6	0.00	-0.00	0.00
			Max. Compression	34	-0.69	-0.10	0.69
			Max. Mx	10	-0.26	-3.81	0.24
			Max. My	2	-0.26	-0.04	4.03
			Max. Vy	10	0.57	-3.81	0.24
			Max. Vx	2	-0.57	-0.04	4.03
			Max. Torque	12			0.48
T1	80 - 60	Leg	Max Tension	19	32.99	0.00	0.22
			Max. Compression	24	-36.15	0.26	-0.13
			Max. Mx	26	-31.59	0.27	-0.04
			Max. My	2	-35.33	0.00	0.29
			Max. Vy	26	-2.90	0.27	-0.04
			Max. Vx	2	-3.12	0.00	0.29
		Diagonal	Max Tension	27	3.24	0.00	0.00
			Max. Compression	26	-3.40	0.00	0.00
			Max. Mx	45	0.56	-0.00	0.00
			Max. My	10	-3.39	0.00	0.00
			Max. Vy	45	0.01	-0.00	0.00
			Max. Vx	10	-0.00	0.00	0.00
		Horizontal	Max Tension	18	0.99	0.00	0.00
			Max. Compression	16	-0.78	0.00	0.00
			Max. Mx	34	0.36	0.01	0.00
			Max. My	26	-0.75	0.00	0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Top Girt	Max Tension	41	0.06	0.00	0.00
			Max. Compression	4	-11.04	0.00	0.00
			Max. Mx	34	-0.00	-0.03	0.00
			Max. My	26	-10.19	0.00	-0.00
			Max. Vy	34	0.04	0.00	0.00
			Max. Vx	26	0.00	0.00	0.00
		Bottom Girt	Max Tension	18	1.19	0.00	0.00
			Max. Compression	25	-1.09	0.00	0.00
			Max. Mx	34	0.18	0.01	0.00
			Max. My	26	0.11	0.00	0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Pole Socket	Max Tension	1	0.00	0.00	0.00
			Max. Compression	35	-0.82	0.00	0.00
			Max. Mx	10	-0.29	-2.82	0.22
			Max. My	2	-0.29	-0.04	2.99
			Max. Vy	10	-0.28	-2.82	0.22
			Max. Vx	2	0.30	-0.04	2.99
		Pole Socket Support	Max Tension	12	1.79	0.18	0.06
			Max. Compression	15	-0.89	0.00	0.00
			Max. Mx	42	0.40	0.52	0.26
			Max. My	14	-0.23	0.26	-2.66
			Max. Vy	42	0.26	0.52	0.26
			Max. Vx	14	-1.31	0.26	-2.66

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T2	60 - 40	Leg	Max Tension	19	77.53	0.38	0.01
			Max. Compression	24	-82.28	0.20	0.01
			Max. Mx	24	-36.20	0.72	0.06
			Max. My	4	-2.05	-0.00	-0.48
			Max. Vy	2	-3.63	0.20	0.00
			Max. Vx	30	-2.09	0.05	0.12
		Diagonal	Max Tension	29	3.74	0.00	0.00
			Max. Compression	12	-3.91	0.00	0.00
			Max. Mx	46	0.45	-0.01	-0.00
			Max. My	26	-3.41	0.00	-0.00
			Max. Vy	46	0.01	-0.01	-0.00
			Max. Vx	26	0.00	0.00	-0.00
		Horizontal	Max Tension	18	1.59	0.00	0.00
			Max. Compression	25	-1.38	0.00	0.00
			Max. Mx	34	0.33	0.01	0.00
			Max. My	26	0.10	0.00	0.00
			Max. Vy	34	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Top Girt	Max Tension	2	0.26	0.00	0.00
			Max. Compression	9	-0.16	0.00	0.00
			Max. Mx	34	0.14	0.01	0.00
			Max. My	26	-0.00	0.00	0.00
			Max. Vy	34	-0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Bottom Girt	Max Tension	18	1.47	0.00	0.00
			Max. Compression	25	-1.36	0.00	0.00
			Max. Mx	34	0.18	0.01	0.00
			Max. My	26	0.10	0.00	0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T3	40 - 20	Leg	Max Tension	19	123.12	0.41	0.01
			Max. Compression	24	-129.47	0.26	0.01
			Max. Mx	2	-81.18	0.80	0.01
			Max. My	30	-24.19	0.20	0.47
			Max. Vy	2	-4.21	0.26	0.00
			Max. Vx	30	-2.22	0.07	0.14
		Diagonal	Max Tension	29	4.06	0.00	0.00
			Max. Compression	12	-4.22	0.00	0.00
			Max. Mx	46	0.70	-0.01	0.00
			Max. My	26	-4.02	0.00	-0.00
			Max. Vy	46	0.01	-0.01	0.00
			Max. Vx	26	0.00	0.00	-0.00
		Horizontal	Max Tension	18	1.73	0.00	0.00
			Max. Compression	25	-1.53	0.00	0.00
			Max. Mx	34	0.24	0.02	0.00
			Max. My	26	0.07	0.00	0.00
			Max. Vy	34	0.01	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Top Girt	Max Tension	18	0.34	0.00	0.00
			Max. Compression	25	-0.24	0.00	0.00
			Max. Mx	34	0.17	0.02	0.00
			Max. My	26	-0.01	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Bottom Girt	Max Tension	18	1.57	0.00	0.00
			Max. Compression	25	-1.45	0.00	0.00
			Max. Mx	34	0.14	0.02	0.00
			Max. My	26	0.08	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
T4	20 - 0	Leg	Max Tension	19	164.91	-0.18	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	24	-172.73	-0.00	-0.00
			Max. Mx	2	-128.36	0.95	0.02
			Max. My	32	-3.84	-0.00	0.51
			Max. Vy	2	-4.20	0.95	0.02
			Max. Vx	30	-2.22	0.24	0.51
		Diagonal	Max Tension	29	4.20	0.00	0.00
			Max. Compression	12	-4.40	0.00	0.00
			Max. Mx	46	0.27	-0.01	-0.00
			Max. My	26	-4.29	0.00	-0.00
			Max. Vy	43	-0.01	-0.01	-0.00
			Max. Vx	26	0.00	0.00	-0.00
		Horizontal	Max Tension	18	1.87	0.00	0.00
			Max. Compression	25	-1.64	0.00	0.00
			Max. Mx	34	-0.94	0.02	0.00
			Max. My	30	-0.37	0.00	-0.00
			Max. Vy	34	-0.01	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	18	0.46	0.00	0.00
			Max. Compression	25	-0.36	0.00	0.00
			Max. Mx	34	0.11	0.02	0.00
			Max. My	26	-0.03	0.00	0.00
			Max. Vy	34	-0.02	0.00	0.00
			Max. Vx	26	-0.00	0.00	0.00
		Bottom Girt	Max Tension	34	7.40	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	34	7.40	0.02	0.00
			Max. Vy	34	0.02	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	24	176.34	7.49	-4.04
	Max. H_x	24	176.34	7.49	-4.04
	Max. H_z	37	-36.96	-15.21	8.80
	Min. Vert	9	-167.41	-7.45	4.01
	Min. H_x	38	-38.71	-15.31	8.79
	Min. H_z	22	170.25	7.15	-4.05
Leg B	Max. Vert	12	176.17	-7.53	-3.97
	Max. H_x	48	-39.44	15.34	8.77
	Max. H_z	48	-39.44	15.34	8.77
	Min. Vert	29	-167.54	7.49	3.94
	Min. H_x	12	176.17	-7.53	-3.97
	Min. H_z	12	176.17	-7.53	-3.97
Leg A	Max. Vert	2	175.21	-0.08	8.50
	Max. H_x	25	-82.93	0.28	-4.14
	Max. H_z	2	175.21	-0.08	8.50
	Min. Vert	19	-168.25	0.08	-8.46
	Min. H_x	11	2.67	-0.23	0.13
	Min. H_z	43	-42.08	0.03	-17.69

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	10.67	0.00	0.00	2.49	0.34	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	12.80	-0.00	-13.53	-740.20	0.42	-0.70
0.9 Dead+1.6 Wind 0 deg - No Ice	9.60	-0.00	-13.53	-739.14	0.32	-0.69
1.2 Dead+1.6 Wind 30 deg - No Ice	12.80	6.76	-11.70	-639.82	-370.74	0.85
0.9 Dead+1.6 Wind 30 deg - No Ice	9.60	6.76	-11.70	-639.01	-369.93	0.84
1.2 Dead+1.6 Wind 45 deg - No Ice	12.80	9.56	-9.56	-521.74	-524.37	1.56
0.9 Dead+1.6 Wind 45 deg - No Ice	9.60	9.56	-9.56	-521.22	-523.19	1.55
1.2 Dead+1.6 Wind 60 deg - No Ice	12.80	11.70	-6.76	-367.96	-642.17	2.16
0.9 Dead+1.6 Wind 60 deg - No Ice	9.60	11.70	-6.76	-367.81	-640.70	2.15
1.2 Dead+1.6 Wind 90 deg - No Ice	12.80	13.52	0.00	3.04	-741.88	2.90
0.9 Dead+1.6 Wind 90 deg - No Ice	9.60	13.52	0.00	2.28	-740.16	2.88
1.2 Dead+1.6 Wind 120 deg - No Ice	12.80	11.72	6.76	374.65	-643.22	2.86
0.9 Dead+1.6 Wind 120 deg - No Ice	9.60	11.72	6.76	372.97	-641.75	2.85
1.2 Dead+1.6 Wind 135 deg - No Ice	12.80	9.56	9.56	527.80	-524.34	2.54
0.9 Dead+1.6 Wind 135 deg - No Ice	9.60	9.56	9.56	525.75	-523.16	2.53
1.2 Dead+1.6 Wind 150 deg - No Ice	12.80	6.76	11.70	645.87	-370.71	2.05
0.9 Dead+1.6 Wind 150 deg - No Ice	9.60	6.76	11.70	643.53	-369.91	2.05
1.2 Dead+1.6 Wind 180 deg - No Ice	12.80	-0.00	13.51	744.99	0.42	0.70
0.9 Dead+1.6 Wind 180 deg - No Ice	9.60	-0.00	13.51	742.42	0.32	0.70
1.2 Dead+1.6 Wind 210 deg - No Ice	12.80	-6.76	11.70	645.86	371.55	-0.85
0.9 Dead+1.6 Wind 210 deg - No Ice	9.60	-6.76	11.70	643.52	370.54	-0.84
1.2 Dead+1.6 Wind 225 deg - No Ice	12.80	-9.56	9.56	527.79	525.17	-1.56
0.9 Dead+1.6 Wind 225 deg - No Ice	9.60	-9.56	9.56	525.75	523.78	-1.55
1.2 Dead+1.6 Wind 240 deg - No Ice	12.80	-11.72	6.76	374.64	644.05	-2.16
0.9 Dead+1.6 Wind 240 deg - No Ice	9.60	-11.72	6.76	372.97	642.37	-2.15
1.2 Dead+1.6 Wind 270 deg - No Ice	12.80	-13.52	0.00	3.04	742.71	-2.90
0.9 Dead+1.6 Wind 270 deg - No Ice	9.60	-13.52	0.00	2.28	740.79	-2.88
1.2 Dead+1.6 Wind 300 deg - No Ice	12.80	-11.70	-6.76	-367.95	643.01	-2.86
0.9 Dead+1.6 Wind 300 deg - No Ice	9.60	-11.70	-6.76	-367.81	641.33	-2.85
1.2 Dead+1.6 Wind 315 deg - No Ice	12.80	-9.56	-9.56	-521.74	525.21	-2.54
0.9 Dead+1.6 Wind 315 deg -	9.60	-9.56	-9.56	-521.21	523.82	-2.53

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
No Ice 1.2 Dead+1.6 Wind 330 deg - No Ice	12.80	-6.76	-11.70	-639.81	371.58	-2.05
0.9 Dead+1.6 Wind 330 deg - No Ice	9.60	-6.76	-11.70	-639.00	370.57	-2.05
1.2 Dead+1.0 Ice+1.0 Temp	34.27	0.00	-0.00	8.64	1.81	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	34.27	0.00	-4.04	-214.47	1.82	-0.29
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	34.27	2.02	-3.49	-184.48	-109.70	0.14
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	34.27	2.85	-2.85	-149.03	-155.89	0.34
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	34.27	3.49	-2.02	-102.83	-191.31	0.53
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	34.27	4.03	0.00	8.67	-221.23	0.77
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	34.27	3.49	2.02	120.24	-191.43	0.81
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	34.27	2.85	2.85	166.37	-155.89	0.75
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	34.27	2.02	3.49	201.83	-109.71	0.64
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	34.27	0.00	4.03	231.67	1.81	0.29
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	34.27	-2.02	3.49	201.83	113.33	-0.14
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	34.27	-2.85	2.85	166.37	159.52	-0.34
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	34.27	-3.49	2.02	120.24	195.06	-0.53
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	34.27	-4.03	0.00	8.67	224.86	-0.77
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	34.27	-3.49	-2.02	-102.83	194.95	-0.81
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	34.27	-2.85	-2.85	-149.03	159.52	-0.75
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	34.27	-2.02	-3.49	-184.48	113.34	-0.64
Dead+Wind 0 deg - Service	10.67	0.00	-3.25	-175.97	0.35	-0.17
Dead+Wind 30 deg - Service	10.67	1.62	-2.81	-151.86	-88.78	0.20
Dead+Wind 45 deg - Service	10.67	2.29	-2.29	-123.51	-125.67	0.37
Dead+Wind 60 deg - Service	10.67	2.81	-1.62	-86.58	-153.96	0.52
Dead+Wind 90 deg - Service	10.67	3.24	0.00	2.51	-177.91	0.69
Dead+Wind 120 deg - Service	10.67	2.81	1.62	91.75	-154.22	0.68
Dead+Wind 135 deg - Service	10.67	2.29	2.29	128.53	-125.67	0.61
Dead+Wind 150 deg - Service	10.67	1.62	2.81	156.88	-88.78	0.49
Dead+Wind 180 deg - Service	10.67	-0.00	3.24	180.69	0.35	0.17
Dead+Wind 210 deg - Service	10.67	-1.62	2.81	156.88	89.47	-0.20
Dead+Wind 225 deg - Service	10.67	-2.29	2.29	128.53	126.37	-0.37
Dead+Wind 240 deg - Service	10.67	-2.81	1.62	91.75	154.91	-0.52
Dead+Wind 270 deg - Service	10.67	-3.24	0.00	2.51	178.60	-0.69
Dead+Wind 300 deg - Service	10.67	-2.81	-1.62	-86.58	154.66	-0.68
Dead+Wind 315 deg - Service	10.67	-2.29	-2.29	-123.51	126.37	-0.61
Dead+Wind 330 deg - Service	10.67	-1.62	-2.81	-151.86	89.48	-0.49

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-10.67	0.00	0.00	10.67	0.00	0.000%
2	0.00	-12.80	-13.53	0.00	12.80	13.53	0.000%
3	0.00	-9.60	-13.53	0.00	9.60	13.53	0.000%
4	6.76	-12.80	-11.70	-6.76	12.80	11.70	0.000%
5	6.76	-9.60	-11.70	-6.76	9.60	11.70	0.000%
6	9.56	-12.80	-9.56	-9.56	12.80	9.56	0.000%
7	9.56	-9.60	-9.56	-9.56	9.60	9.56	0.000%
8	11.70	-12.80	-6.76	-11.70	12.80	6.76	0.000%
9	11.70	-9.60	-6.76	-11.70	9.60	6.76	0.000%
10	13.52	-12.80	0.00	-13.52	12.80	-0.00	0.000%
11	13.52	-9.60	0.00	-13.52	9.60	-0.00	0.000%
12	11.72	-12.80	6.76	-11.72	12.80	-6.76	0.000%
13	11.72	-9.60	6.76	-11.72	9.60	-6.76	0.000%
14	9.56	-12.80	9.56	-9.56	12.80	-9.56	0.000%
15	9.56	-9.60	9.56	-9.56	9.60	-9.56	0.000%
16	6.76	-12.80	11.70	-6.76	12.80	-11.70	0.000%
17	6.76	-9.60	11.70	-6.76	9.60	-11.70	0.000%
18	0.00	-12.80	13.51	0.00	12.80	-13.51	0.000%
19	0.00	-9.60	13.51	0.00	9.60	-13.51	0.000%
20	-6.76	-12.80	11.70	6.76	12.80	-11.70	0.000%
21	-6.76	-9.60	11.70	6.76	9.60	-11.70	0.000%
22	-9.56	-12.80	9.56	9.56	12.80	-9.56	0.000%
23	-9.56	-9.60	9.56	9.56	9.60	-9.56	0.000%
24	-11.72	-12.80	6.76	11.72	12.80	-6.76	0.000%
25	-11.72	-9.60	6.76	11.72	9.60	-6.76	0.000%
26	-13.52	-12.80	0.00	13.52	12.80	-0.00	0.000%
27	-13.52	-9.60	0.00	13.52	9.60	-0.00	0.000%
28	-11.70	-12.80	-6.76	11.70	12.80	6.76	0.000%
29	-11.70	-9.60	-6.76	11.70	9.60	6.76	0.000%
30	-9.56	-12.80	-9.56	9.56	12.80	9.56	0.000%
31	-9.56	-9.60	-9.56	9.56	9.60	9.56	0.000%
32	-6.76	-12.80	-11.70	6.76	12.80	11.70	0.000%
33	-6.76	-9.60	-11.70	6.76	9.60	11.70	0.000%
34	0.00	-34.27	0.00	-0.00	34.27	0.00	0.000%
35	0.00	-34.27	-4.04	-0.00	34.27	4.04	0.000%
36	2.02	-34.27	-3.49	-2.02	34.27	3.49	0.000%
37	2.85	-34.27	-2.85	-2.85	34.27	2.85	0.001%
38	3.49	-34.27	-2.02	-3.49	34.27	2.02	0.000%
39	4.03	-34.27	0.00	-4.03	34.27	-0.00	0.000%
40	3.49	-34.27	2.02	-3.49	34.27	-2.02	0.000%
41	2.85	-34.27	2.85	-2.85	34.27	-2.85	0.000%
42	2.02	-34.27	3.49	-2.02	34.27	-3.49	0.000%
43	0.00	-34.27	4.03	-0.00	34.27	-4.03	0.000%
44	-2.02	-34.27	3.49	2.02	34.27	-3.49	0.000%
45	-2.85	-34.27	2.85	2.85	34.27	-2.85	0.000%
46	-3.49	-34.27	2.02	3.49	34.27	-2.02	0.000%
47	-4.03	-34.27	0.00	4.03	34.27	-0.00	0.000%
48	-3.49	-34.27	-2.02	3.49	34.27	2.02	0.000%
49	-2.85	-34.27	-2.85	2.85	34.27	2.85	0.000%
50	-2.02	-34.27	-3.49	2.02	34.27	3.49	0.000%
51	0.00	-10.67	-3.25	0.00	10.67	3.25	0.000%
52	1.62	-10.67	-2.81	-1.62	10.67	2.81	0.000%
53	2.29	-10.67	-2.29	-2.29	10.67	2.29	0.000%
54	2.81	-10.67	-1.62	-2.81	10.67	1.62	0.000%
55	3.24	-10.67	0.00	-3.24	10.67	-0.00	0.000%
56	2.81	-10.67	1.62	-2.81	10.67	-1.62	0.000%
57	2.29	-10.67	2.29	-2.29	10.67	-2.29	0.000%
58	1.62	-10.67	2.81	-1.62	10.67	-2.81	0.001%
59	0.00	-10.67	3.24	0.00	10.67	-3.24	0.000%
60	-1.62	-10.67	2.81	1.62	10.67	-2.81	0.000%
61	-2.29	-10.67	2.29	2.29	10.67	-2.29	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
62	-2.81	-10.67	1.62	2.81	10.67	-1.62	0.000%
63	-3.24	-10.67	0.00	3.24	10.67	-0.00	0.000%
64	-2.81	-10.67	-1.62	2.81	10.67	1.62	0.000%
65	-2.29	-10.67	-2.29	2.29	10.67	2.29	0.000%
66	-1.62	-10.67	-2.81	1.62	10.67	2.81	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00010937
3	Yes	5	0.00000001	0.00010630
4	Yes	5	0.00000001	0.00015700
5	Yes	5	0.00000001	0.00015381
6	Yes	5	0.00000001	0.00016886
7	Yes	5	0.00000001	0.00016608
8	Yes	5	0.00000001	0.00015480
9	Yes	5	0.00000001	0.00015282
10	Yes	5	0.00000001	0.00011160
11	Yes	5	0.00000001	0.00011210
12	Yes	5	0.00000001	0.00014469
13	Yes	5	0.00000001	0.00014722
14	Yes	5	0.00000001	0.00014728
15	Yes	5	0.00000001	0.00015044
16	Yes	5	0.00000001	0.00012862
17	Yes	5	0.00000001	0.00013216
18	Yes	5	0.00000001	0.00007754
19	Yes	5	0.00000001	0.00008195
20	Yes	5	0.00000001	0.00012338
21	Yes	5	0.00000001	0.00012786
22	Yes	5	0.00000001	0.00013957
23	Yes	5	0.00000001	0.00014384
24	Yes	5	0.00000001	0.00013600
25	Yes	5	0.00000001	0.00013972
26	Yes	5	0.00000001	0.00010630
27	Yes	5	0.00000001	0.00010810
28	Yes	5	0.00000001	0.00015215
29	Yes	5	0.00000001	0.00015159
30	Yes	5	0.00000001	0.00016791
31	Yes	5	0.00000001	0.00016646
32	Yes	5	0.00000001	0.00015823
33	Yes	5	0.00000001	0.00015613
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00009081
36	Yes	4	0.00000001	0.00010796
37	Yes	4	0.00000001	0.00011050
38	Yes	4	0.00000001	0.00009996
39	Yes	4	0.00000001	0.00006548
40	Yes	4	0.00000001	0.00007103
41	Yes	4	0.00000001	0.00007290
42	Yes	4	0.00000001	0.00006652
43	Yes	4	0.00000001	0.00005016
44	Yes	4	0.00000001	0.00006379
45	Yes	4	0.00000001	0.00006842
46	Yes	4	0.00000001	0.00006586

47	Yes	4	0.00000001	0.00005964
48	Yes	4	0.00000001	0.00009099
49	Yes	4	0.00000001	0.00010280
50	Yes	4	0.00000001	0.00010323
51	Yes	4	0.00000001	0.00001919
52	Yes	4	0.00000001	0.00003132
53	Yes	4	0.00000001	0.00003439
54	Yes	4	0.00000001	0.00003151
55	Yes	4	0.00000001	0.00001963
56	Yes	4	0.00000001	0.00002619
57	Yes	4	0.00000001	0.00002734
58	Yes	4	0.00000001	0.00002374
59	Yes	4	0.00000001	0.00001153
60	Yes	4	0.00000001	0.00002200
61	Yes	4	0.00000001	0.00002532
62	Yes	4	0.00000001	0.00002412
63	Yes	4	0.00000001	0.00001818
64	Yes	4	0.00000001	0.00003043
65	Yes	4	0.00000001	0.00003346
66	Yes	4	0.00000001	0.00003064

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90 - 80	4.463	51	0.6490	0.0186
T1	80 - 60	3.350	59	0.3246	0.0374
T2	60 - 40	2.016	59	0.2857	0.0374
T3	40 - 20	0.945	59	0.2056	0.0237
T4	20 - 0	0.257	59	0.1051	0.0110

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
90.00	20' 8 Bay Di-Pole	51	4.463	0.6490	0.0200	3696
85.00	10' x 1" Dia Omni	60	3.853	0.4569	0.0289	3696
83.00	7' Whip	59	3.642	0.3900	0.0328	2672
78.00	QS66512-2	59	3.174	0.3003	0.0397	2159
73.00	2-ft dish	59	2.791	0.2705	0.0423	3108
65.00	PiROD 6' Heavy Bogner Mount	59	2.294	0.2769	0.0405	14123
55.00	3' Side Mount Standoff	59	1.737	0.2802	0.0340	26657

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	90 - 80	18.110	2	2.3573	0.0760

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	80 - 60	13.726	18	1.3270	0.1573
T2	60 - 40	8.279	18	1.1672	0.1571
T3	40 - 20	3.892	18	0.8439	0.0995
T4	20 - 0	1.059	18	0.4328	0.0460

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
90.00	20' 8 Bay Di-Pole	2	18.110	2.3573	0.0915	1254
85.00	10' x 1" Dia Omni	24	15.796	1.7654	0.1217	1254
83.00	7' Whip	20	14.926	1.5590	0.1377	906
78.00	QS66512-2	18	13.002	1.2245	0.1666	728
73.00	2-ft dish	18	11.435	1.0996	0.1778	1024
65.00	PiROD 6' Heavy Bogner Mount	18	9.413	1.1281	0.1701	3753
55.00	3' Side Mount Standoff	20	7.137	1.1468	0.1429	7810

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	90 - 80 (1)	P4x.237	10.00	10.00	79.5	3.1741	-0.26	72.35	0.004
T1	80 - 60 (314)	P4x.237	10.00	10.00	79.5 K=1.00	3.1741	-0.35	72.35	0.005

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	90 - 80 (1)	P4x.237	4.03	11.32	0.356	0.00	11.32	0.000
T1	80 - 60 (314)	P4x.237	2.99	11.32	0.265	0.00	11.32	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	90 - 80 (1)	P4x.237	0.57	49.99	0.011	0.14	16.88	0.008
T1	80 - 60 (314)	P4x.237	0.30	49.99	0.006	0.01	16.88	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	90 - 80 (1)	0.004	0.356	0.000	0.011	0.008	0.360 ✔	1.000	4.8.2 ✔
T1	80 - 60 (314)	0.005	0.265	0.000	0.006	0.001	0.269 ✔	1.000	4.8.2 ✔

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	1 1/2	20.00	2.48	79.3 K=1.00	1.7672	-32.69	50.19	0.651 [1]
T2	60 - 40	2	20.00	2.46	59.0 K=1.00	3.1416	-78.57	109.60	0.717 [1]
T3	40 - 20	2 1/4	20.00	2.46	52.4 K=1.00	3.9761	-125.72	146.32	0.859 [1]
T4	20 - 0	2 1/2	20.00	2.48	47.6 K=1.00	4.9087	-172.73	187.16	0.923 [1]

[1] P_u / ϕP_n controls

Leg Bending Design Data (Compression)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	80 - 60	1 1/2	0.00	2.11	0.000	0.00	2.11	0.000
T2	60 - 40	2	0.00	5.00	0.000	0.00	5.00	0.000
T3	40 - 20	2 1/4	0.00	7.12	0.000	0.00	7.12	0.000
T4	20 - 0	2 1/2	0.00	9.77	0.000	0.00	9.77	0.000

Leg Interaction Design Data (Compression)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	80 - 60	1 1/2	0.651	0.000	0.000	0.651 [1] ✔	1.000	4.8.1 ✔
T2	60 - 40	2	0.717	0.000	0.000	0.717 [1] ✔	1.000	4.8.1 ✔
T3	40 - 20	2 1/4	0.859	0.000	0.000	0.859 [1] ✔	1.000	4.8.1 ✔
T4	20 - 0	2 1/2	0.923	0.000	0.000	0.923 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	4.29	2.07	119.1 K=0.90	0.4418	-3.40	7.03	0.484 [1] ✔
T2	60 - 40	7/8	4.67	2.25	111.2 K=0.90	0.6013	-3.91	10.95	0.357 [1] ✔
T3	40 - 20	7/8	5.10	2.46	121.4 K=0.90	0.6013	-4.22	9.22	0.458 [1] ✔
T4	20 - 0	7/8	5.55	2.68	132.2 K=0.90	0.6013	-4.40	7.77	0.566 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	3.50	3.38	151.2 K=0.70	0.4418	-0.78	4.37	0.179 [1] ✔
T2	60 - 40	7/8	3.93	3.77	144.7 K=0.70	0.6013	-1.38	6.49	0.212 [1] ✔
T3	40 - 20	7/8	4.43	4.25	163.1 K=0.70	0.6013	-1.53	5.11	0.299 [1] ✔
T4	20 - 0	7/8	4.94	4.73	181.6 K=0.70	0.6013	-1.64	4.12	0.399 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	L3 1/2x3 1/2x5/16	3.50	3.38	89.3 K=1.52	2.0900	-11.04	44.48	0.248 [1] ✔
T2	60 - 40	7/8	3.50	3.34	128.2 K=0.70	0.6013	-0.16	8.27	0.019 [1] ✔
T3	40 - 20	1	4.00	3.82	128.2 K=0.70	0.7854	-0.24	10.79	0.022 [1] ✔
T4	20 - 0	1	4.50	4.30	144.3 K=0.70	0.7854	-0.36	8.52	0.042 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	3.50	3.38	151.2 K=0.70	0.4418	-1.09	4.37	0.251 [1] ✔
T2	60 - 40	7/8	4.00	3.83	147.0 K=0.70	0.6013	-1.36	6.28	0.216 [1] ✔
T3	40 - 20	1	4.50	4.31	144.8 K=0.70	0.7854	-1.45	8.47	0.172 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	1 1/2	20.00	0.17	5.3	1.7672	32.99	79.52	0.415 [1]
T2	60 - 40	2	20.00	0.17	4.0	3.1416	77.53	141.37	0.548 [1]
T3	40 - 20	2 1/4	20.00	0.17	3.6	3.9761	123.12	178.92	0.688 [1]
T4	20 - 0	2 1/2	20.00	2.48	47.6	4.9087	164.91	220.89	0.747 [1]

[1] P_u / ϕP_n controls

Leg Bending Design Data (Tension)

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
T1	80 - 60	1 1/2	0.00	2.11	0.000	0.00	2.11	0.000
T2	60 - 40	2	0.00	5.00	0.000	0.00	5.00	0.000
T3	40 - 20	2 1/4	0.00	7.12	0.000	0.00	7.12	0.000
T4	20 - 0	2 1/2	0.00	9.77	0.000	0.00	9.77	0.000

Leg Interaction Design Data (Tension)

Section No.	Elevation ft	Size	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
T1	80 - 60	1 1/2	0.415	0.000	0.000	0.415 [1] ✔	1.000	4.8.1 ✔
T2	60 - 40	2	0.548	0.000	0.000	0.548 [1] ✔	1.000	4.8.1 ✔
T3	40 - 20	2 1/4	0.688	0.000	0.000	0.688 [1] ✔	1.000	4.8.1 ✔
T4	20 - 0	2 1/2	0.747	0.000	0.000	0.747 [1] ✔	1.000	4.8.1 ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	4.29	2.07	132.3	0.4418	3.24	19.88	0.163 [1] ✔
T2	60 - 40	7/8	4.67	2.25	123.6	0.6013	3.74	27.06	0.138 [1] ✔
T3	40 - 20	7/8	5.10	2.46	134.9	0.6013	4.06	27.06	0.150 [1] ✔
T4	20 - 0	7/8	5.55	2.68	146.9	0.6013	4.20	27.06	0.155 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	3.50	3.38	216.0	0.4418	0.99	19.88	0.050 [1] ✔
T2	60 - 40	7/8	3.93	3.77	206.7	0.6013	1.59	27.06	0.059 [1] ✔
T3	40 - 20	7/8	4.43	4.25	233.0	0.6013	1.73	27.06	0.064 [1] ✔
T4	20 - 0	7/8	4.94	4.73	259.5	0.6013	1.87	27.06	0.069 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	L3 1/2x3 1/2x5/16	3.50	3.38	37.5	2.0900	0.06	67.72	0.001 [1] ✔
T2	60 - 40	7/8	3.50	3.34	183.1	0.6013	0.26	27.06	0.010 [1] ✔
T3	40 - 20	1	4.00	3.82	183.2	0.7854	0.34	35.34	0.010 [1] ✔
T4	20 - 0	1	4.50	4.30	206.2	0.7854	0.46	35.34	0.013 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	80 - 60	3/4	3.50	3.38	216.0	0.4418	1.19	19.88	0.060 [1] ✔
T2	60 - 40	7/8	4.00	3.83	210.1	0.6013	1.47	27.06	0.054 [1] ✔
T3	40 - 20	1	4.50	4.31	206.8	0.7854	1.57	35.34	0.044 [1] ✔
T4	20 - 0	1	5.00	4.79	230.0	0.7854	7.40	35.34	0.209 [*1] ✔

[*] DL controls
[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	90 - 80	Pole	P4x.237	1	-0.26	72.35	36.0	Pass
T1	80 - 60	Leg	1 1/2	2	-32.69	50.19	65.1	Pass
T2	60 - 40	Leg	2	80	-78.57	109.60	71.7	Pass
T3	40 - 20	Leg	2 1/4	158	-125.72	146.32	85.9	Pass
T4	20 - 0	Leg	2 1/2	236	-172.73	187.16	92.3	Pass
T1	80 - 60	Diagonal	3/4	11	-3.40	7.03	48.4	Pass
T2	60 - 40	Diagonal	7/8	90	-3.91	10.95	35.7	Pass
T3	40 - 20	Diagonal	7/8	168	-4.22	9.22	45.8	Pass
T4	20 - 0	Diagonal	7/8	246	-4.40	7.77	56.6	Pass
T1	80 - 60	Horizontal	3/4	45	-0.78	4.37	17.9	Pass
T2	60 - 40	Horizontal	7/8	96	-1.38	6.49	21.2	Pass
T3	40 - 20	Horizontal	7/8	174	-1.53	5.11	29.9	Pass
T4	20 - 0	Horizontal	7/8	252	-1.64	4.12	39.9	Pass
T1	80 - 60	Top Girt	L3 1/2x3 1/2x5/16	7	-11.04	44.48	24.8	Pass
T2	60 - 40	Top Girt	7/8	84	-0.16	8.27	1.9	Pass
T3	40 - 20	Top Girt	1	162	-0.24	10.79	2.2	Pass
T4	20 - 0	Top Girt	1	240	-0.36	8.52	4.2	Pass
T1	80 - 60	Bottom Girt	3/4	9	-1.09	4.37	25.1	Pass
T2	60 - 40	Bottom Girt	7/8	87	-1.36	6.28	21.6	Pass
T3	40 - 20	Bottom Girt	1	165	-1.45	8.47	17.2	Pass
T4	20 - 0	Bottom Girt	1	243	7.40	35.34	20.9	Pass
T1	80 - 60	Pole Socket	P4x.237	314	-0.35	72.35	26.9	Pass
							Summary	
						Pole (L1)	36.0	Pass
						Leg (T4)	92.3	Pass
						Diagonal (T4)	56.6	Pass
						Horizontal (T4)	39.9	Pass
						Top Girt (T1)	24.8	Pass
						Bottom Girt (T1)	25.1	Pass
						Pole Socket (T1)	26.9	Pass
						RATING =	**92.3**	**Pass**

Element Map

Section No.	Section Elevation ft	Component Type	Element List
L1	90.00-80.00	Pole	1
T1	80.00-60.00	Leg	2-4
		Diagonal	11-16,20-25,29-34,38-43,47-52,56-61,65-70,74-79
		Horizontal	17-19,26-28,35-37,44-46,53-55,62-64,71-73
		Top Girt	5-7
		Bottom Girt	8-10
		Pole Socket	314
		Pole Socket	315-317
		Support	
T2	60.00-40.00	Leg	80-82
		Diagonal	89-94,98-103,107-112,116-121,125-130,134-139,143-148,152-157
		Horizontal	95-97,104-106,113-115,122-124,131-133,140-142,149-151

Section No.	*Section Elevation ft*	*Component Type*	*Element List*
		Top Girt	83-85
		Bottom Girt	86-88
T3	40.00-20.00	Leg	158-160
		Diagonal	167-172,176-181,185-190,194-199,203-208,212-217,221-226,230-235
		Horizontal	173-175,182-184,191-193,200-202,209-211,218-220,227-229
		Top Girt	161-163
		Bottom Girt	164-166
T4	20.00-0.00	Leg	236-238
		Diagonal	245-250,254-259,263-268,272-277,281-286,290-295,299-304,308-313
		Horizontal	251-253,260-262,269-271,278-280,287-289,296-298,305-307
		Top Girt	239-241
		Bottom Girt	242-244
			Total number of elements: 317

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	80-ft Pirod Lattice Tower Wallingford, CT
Rev. 0: 11/10/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16071.55

Anchor Bolt Analysis:

Input Data:

Tower Reactions:

Tension Force =	Tension := 168·kips	(Input From tnxTower)
Compression Force =	Compression := 176·kips	(Input From tnxTower)
Shear Force =	Shear := 9·kips	(Input From tnxTower)

Anchor Bolt Data:

ASTM A36

Number of Anchor Bolts =	N := 2	(User Input)
Bolt Ultimate Strength =	F_u := 80·ksi	(User Input)
Bolt Yield Strength =	F_y := 36·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 1.75·in	(User Input)
Threads per Inch =	n := 5	(User Input)
	η := 0.55	For grouted Base Plate per TIA-222-G Section 4.9.9

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Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 2.405 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 1.899 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 1.555 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.389 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.369 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := \frac{Tension}{N} = 84 \cdot kips$

Maximum Compressive Force = $C_{Max} := \frac{Compression}{N} = 88 \cdot kips$

Maximum Shear Force = $V_{Max} := \frac{Shear}{N} = 4.5 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 121.565 \cdot k$

Bolt % of Capacity = $\frac{\left(C_{Max} + \frac{V_{Max}}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 79.1$

Condition1 = $Condition1 := if\left[\frac{\left(C_{Max} + \frac{V_{Max}}{\eta} \right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed" \right]$

Condition1 = "OK"

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Subject:	FOUNDATION ANALYSIS
Location:	Wallingford, CT
Rev. 0: 11/10/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16071.55

Pier and Mat Foundation Analysis:

Input Data:

Tower Data

Overturning Moment =	$OM := 745 \cdot ft \cdot kips$	(User Input from tnxTower)	
Shear Force =	$S_t := 14 \cdot kip$	(User Input from tnxTower)	
Axial Force =	$WT_t := 13 \cdot kip$	(User Input from tnxTower)	
Max Compression Force =	$C_t := 176 \cdot kip$	(User Input from tnxTower)	
Max Uplift Force =	$U_t := 168 \cdot kip$	(User Input from tnxTower)	
Tower Height =	$H_t := 80 \cdot ft$	(User Input)	
Tower Width =	$W_t := 5 \cdot ft$	(User Input)	
Tower Position on Foundation (1=offset, 2=centered) =	$Pos_t := 2$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 4.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 0 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 8.25 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 14 \cdot ft$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 3000 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Soil Bearing Capacity =	$q_s := 10000 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 2.25 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(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)	
Coefficient of Lateral Soil Pressure =	$K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$		

Pier Reinforcement:

Bar Size =	$BS_{pier} := 0$	(User Input)	
Bar Diameter =	$d_{bpier} := 0 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 0$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 8$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.00 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 15$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 8$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.00 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 15$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 0 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.785 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.785 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Load Factor = $LF := 1$

Stability of Footing:

Adjusted Concrete Unit Weight = $\gamma_c := if(Bouyancy = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}) = 150 \cdot pcf$

Adjusted Soil Unit Weight = $\gamma_s := if(Bouyancy = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}) = 100 \cdot pcf$

Passive Pressure = $P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0.675 \cdot ksf$

$P_{pt} := K_p \cdot \gamma_s \cdot (D_f - T_f) + c \cdot 2 \cdot \sqrt{K_p} = -1.125 \cdot ksf$

$P_{top} := if[n < (D_f - T_f), P_{pt}, P_{pn}] = 0.675 \cdot ksf$

$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.35 \cdot ksf$

$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.012 \cdot ksf$

$T_p := if[n < (D_f - T_f), T_f, (D_f - n)] = 2.25$

$A_p := W_f \cdot T_p = 31.5$

Ultimate Shear = $S_u := P_{ave} \cdot A_p = 31.894 \cdot kip$

Weight of Concrete Pad = $WT_{pad} := \left(W_f^2 \cdot T_f\right) \cdot \gamma_c = 242.55 \cdot kip$

Weight of Concrete Piers = $WT_{pier} := 3 \cdot \left[\left(L_p \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot \gamma_c\right] = 0 \cdot kip$

Total Weight of Concrete = $WT_c := WT_{pad} + WT_{pier} = 243 \cdot kip$

Weight of Soil Above Footing = $WT_{s1} := \left(W_f^2 - 3 \cdot \frac{d_p^2 \cdot \pi}{4}\right) \cdot (L_p - L_{pag}) \cdot \gamma_s = 0 \cdot kip$

Weight of Soil Above Footing = $WT_{s2} := \left[\frac{\tan(\Phi_s) \cdot (L_p - L_{pag})^2}{2} \cdot W_f\right] \cdot \gamma_s = 0 \cdot kip$

Tower Offset = $X_{t1} := \left[\frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{2}\right]$ $X_{t2} := \frac{W_f}{2} - \frac{(W_t \cdot \cos(30 \cdot deg))}{3}$

$X_t := if(Pos_t, X_{t1}, X_{t2}) = 4.835$

$X_{off} := \frac{W_f}{2} - \left[\frac{(W_t \cdot \cos(30 \cdot deg))}{3} + X_t\right] = 0.722$

Resisting Moment = $M_r := (0.9WT_c + 0.75WT_{s1}) \cdot \frac{W_f}{2} + 0.75S_u \cdot \frac{T_f}{3} + 0.75WT_{s2} \cdot \left[W_f + \frac{\tan(\Phi_s) \cdot (L_p - L_{pag})}{3}\right] = 1594 \cdot kip \cdot ft$

Overturning Moment = $M_{ot} := OM + S_t \cdot (L_p + T_f) = 860.5 \cdot kip \cdot ft$

Factor of Safety Actual = $FS := \frac{M_r}{M_{ot}} = 1.85$

Factor of Safety Required = $FS_{req} := 1$

$OverTurning\_Moment\_Check := if(FS \geq FS_{req}, "Okay", "No Good")$

$OverTurning\_Moment\_Check = "Okay"$

Bearing Pressure Caused by Footing:

Total Load = $Load_{tot} := WT_c + WT_{s1} + WT_t = 256 \cdot kip$

Area of the Mat = $A_{mat} := W_f^{\,2} = 196$

Section Modulus of Mat = $S := \frac{W_f^{\,3}}{6} = 457.33 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{Load_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 3.185 \cdot ksf$

$Max\_Pressure\_Check := if\left(P_{max} < 0.75q_s, "Okay", "No Good"\right)$

$Max\_Pressure\_Check = "Okay"$

Minimum Pressure in Mat = $P_{min} := \frac{Load_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.578 \cdot ksf$

$Min\_Pressure\_Check := if\left[\left(P_{min} \geq 0\right) \cdot \left(P_{min} < 0.75q_s\right), "Okay", "No Good"\right]$

$Min\_Pressure\_Check = "No Good"$

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 3.95$

Distance to Kern = $X_k := \frac{W_f}{6} = 2.333$

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

Eccentricity = $e := \frac{M_{ot}}{Load_{tot}} = 3.367$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot Load_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 3.35 \cdot ksf$

$q_{adj} := if\left(P_{min} < 0, P_a, P_{max}\right) = 3.35 \cdot ksf$

$Pressure\_Check := if\left(q_{adj} < 0.75q_s, "Okay", "No Good"\right)$

$Pressure\_Check = "Okay"$

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 95 \cdot in$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := LF \cdot \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1 = 222.853 \cdot kip$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d = 1486 \cdot kip$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 24.9$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 49.2$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 146.8$

Guess Value = $v_u := 1ksf$

(From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{Load_{tot}}{\pi \cdot v_u}$

$v_u := Find\left(v_u\right) = 1.3 \times 10^3 lbf$

$V_u := v_u \cdot d \cdot W_f = 143.9 \cdot kips$

Required Shear Strength = $V_{req} := LF \cdot V_u = 143.9 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 5280 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$$M_{nT} := LF \cdot \left[U_t \cdot \left(W_t \cdot \sin(60 \cdot deg) - \frac{d_p}{2} \right) + S_t \cdot \left(D_f + L_{pag} \right) \right] - WT_t \cdot X_{off} = 781 \cdot ft \cdot k$$

$$M_{nS} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot deg) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot \left[\gamma_s \cdot \left(T_f - T_f \right) \right] \right]$$

$$M_{nC} := -1 \cdot \left[\frac{1}{2} \cdot \left(\frac{W_f}{2} + \frac{W_t}{3} \cdot \cos(30 \cdot deg) - \frac{d_p}{2} \right)^2 \cdot W_t \cdot \left(\gamma_c \cdot T_f \right) \right]$$

Design Moment = $M_n := \frac{M_{nT} + M_{nS} + M_{nC}}{\phi_m} = 622.805 \cdot kips \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\left(\frac{f_c}{psi} - 4000 \right) \cdot 0.5 \right] \right] & \text{otherwise} \end{cases} = 0.85$$ (ACI-200810.2.7.3)

$b_{eff} := W_t \cdot \cos(30 \cdot deg) + d_p = 51.962 \cdot in$

$d := T_f - Cvr_{pad} - d_{bbot} = 95 \cdot in$

$A_s := \frac{M_n}{(f_y \cdot d)} = 1.311 \cdot in^2$

$a := \frac{A_s \cdot f_y}{\beta \cdot f_c \cdot b_{eff}} = 0.594 \cdot in$

$A_s := \frac{M_n}{f_y \cdot \left(d - \frac{a}{2} \right)} = 1.315 \cdot in^2$

$\rho := \frac{A_s}{b_{eff} d} = 0.00027$

Required Reinforcement for Temperature and Shrinkage:

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

Check Bottom Bars:

$$As := \begin{cases} \left(\rho\cdot b_{eff}\, d\right) & \text{if } \left(\rho\cdot b_{eff}\, d\right) > \rho_{sh}\cdot\frac{b_{eff}}{2}\cdot d \\ \rho_{sh}\cdot\frac{b_{eff}}{2}\cdot d & \text{otherwise} \end{cases} = 4.443\cdot in^2$$

$As_{prov} := A_{bbot}\cdot NB_{bot} = 11.8\cdot in^2$

$Pad\_Reinforcement\_Bot := if\left(As_{prov} > As, \text{"Okay"}, \text{"No Good"}\right)$

Pad_Reinforcement_Bot = "Okay"

Check top Bars:

$$As := if\left(\rho \geq \rho_{sh}, A_s, \rho_{sh}\cdot\frac{b_{eff}}{2}\cdot d\right) = 4.4\cdot in^2$$

$As_{prov} := A_{btop}\cdot NB_{top} = 11.8\cdot in^2$

$Pad\_Reinforcement\_Top := if\left(As_{prov} > As, \text{"Okay"}, \text{"No Good"}\right)$

Pad_Reinforcement_Top = "Okay"

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2\cdot Cvr_{pad} - NB_{bot}\cdot d_{bbot}}{NB_{bot} - 1} = 10.5\cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 3\cdot in$$

Transverse Reinforcement Index =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3\cdot f_y\,\alpha_{pad}\cdot\beta_{pad}\cdot\gamma_{pad}\cdot\lambda_{pad}}{40\cdot\sqrt{f_c\cdot psi}\cdot\frac{c + k_{tr}}{d_{bbot}}}\cdot d_{bbot} = 27.4\cdot in$$

Minimum Development Length =

$L_{dbmin} := 12\cdot in$ (ACI-2008 12.2.1)

$L_{dbtCheck} := if\left(L_{dbt} \geq L_{dbmin}, \text{"Use L.dbt"}, \text{"Use L.dbmin"}\right) = \text{"Use L.dbt"}$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{W_t}{2} - Cvr_{pad} = 51\cdot in$$

$Lpad\_Check := if\left(L_{Pad} > L_{dbt}, \text{"Okay"}, \text{"No Good"}\right)$

Lpad_Check = "Okay"

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTU2168	**DATE:**	04/12/2016	**RF DESIGN ENG:**	Mateen MD
ISSUE:	Bronze Standard	**Approved? (Y/N):**	Yes	**RF DESIGN PHONE:**	8602586382
REVISION:	Preliminary	**RF MANAGER:**	Cameron Syme	**RF DESIGN EMAIL:**	mm093q@att.com
INITIATIVE /PROJECT:	LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E // RRUS-32 add, DUS upgrade, XMU add, antenna change.				

RF PERF ENG:		**RFDS PROGRAM TYPE:**	2017 LTE Multi Carrier
RF PERF PHONE:		**RFDS TECHNOLOGY:**	1xBBU RRH Add
RF PERF EMAIL:		**State:**	Final
TRIDENT:		**Status:**	RF Approval
GSM FREQUENCY:	850	**RFDS ID:**	1163252
UMTS FREQUENCY:	850, 1900	**RFDS Version:**	1.00
LTE FREQUENCY:	700, 1900, WCS	**Created By:**	mm093q
		Date Created:	4/12/2016 11:36:37 AM
		Date Updated:	4/13/2016 4:03:49 PM
		Updated By:	mm093q
I-PLAN JOB # 1:	NER-RCTB-16-00564	**IPLAN PRD GRP || SUB GRP #1:**	LTE Multi Carrier || LTE BWE
I-PLAN JOB # 2:		**IPLAN PRD GRP || SUB GRP #2:**	
I-PLAN JOB # 3:		**IPLAN PRD GRP || SUB GRP #3:**	
I-PLAN JOB # 4:		**IPLAN PRD GRP || SUB GRP #4:**	

Section 2 - LOCATION INFORMATION

USID:	4563	**FA LOCATION CODE:**	10035084	**LOCATION NAME:**	MT TOM WALLINGFORD
REGION:	NORTHEAST	**MARKET CLUSTER:**	NEW ENGLAND	**MARKET:**	CONNECTICUT
ADDRESS:	23 WAYNE ROAD	**CITY:**	WALLINGFORD	**STATE:**	CT
ZIP CODE:	06492	**COUNTY:**	NEW HAVEN	**MSA / RSA:**	
LATITUDE (D-M-S):	41d 27m 45.87084s	**LONGITUDE (D-M-S):**	-72d -50m -30.79716s	**LAT (DEC. DEG.):**	41.4627419

DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:

2168 - WALLINGFORD
23 WAYNE RD. WALLINGFORD, CT

ON WAYNE ROAD TO END. TRIPP`S DRIVEWAY AT END. LAST DRIVEWAY ON LEFT TO TOP OF HILL. WE ARE IN COMPOUND BEHIND GARAGE IN WOODEN FENCE AREA.

ACCESS: 24/7 TRACCESS

CONTACT: STEVE TRIPP (203) 786-0052

SECURITY: NONE

POWER COMPANY: WALLINGFORD ELECTRIC (203) 294-2020

FIRE: (203) 265-0333

POLICE: (203) 294-2800

TELCO: AT&T (800)247-2020
2G
ET-244 HCGS718321SN
ET-051 HCGS238700SN
ET-177 HCGS238701SN
ET-235 HCGS713988SN

3G
CBU
IMA 1-1
PP1 HCGS731190SN
PP2 HCGS731191SN
PP3 HCGS747939SN
PP4 HCGS747940SN

ET-MC1
IMA 1-2
PP1 HCGS751503SN
PP2 HCGS751504SN
PP3 HCGS751505SN
PP4 HCGS751506SN
PP5 HCGS761672SN
PP6 HCGS761673SN
PP7 HCGS763601SN
PP8 HCGS763602SN

TRAC - 7082168

ORACLE PTN # 1:		**PACE JOB # 1:**	MRCTB018752
ORACLE PTN # 2:		**PACE JOB # 2:**	
ORACLE PTN # 3:		**PACE JOB # 3:**	
ORACLE PTN # 4:		**PACE JOB # 4:**	
SEARCH RING NAME:			
SEARCH RING ID:		**CASPR INITIATIVE # 1:**	
BTA:		**CASPR INITIATIVE # 2:**	
LONG (DEC. DEG.):	-72.8418881	**CASPR INITIATIVE # 3:**	
BORDER CELL WITH CONTOUR COORD:		**CASPR INITIATIVE # 4:**	
AM STUDY REQ'D (Y/N):	No		
FREQ COORD:			

Section 3 - LICENSE COVERAGE/FILING INFORMATION

CGSA - NO FILING TRIGGERED (Yes/No):	No	**CGSA LOSS:**		**PCS REDUCED - UPS ZIP:**	
CGSA - MINOR FILING NEEDED (Yes/No):	No	**CGSA EXT AGMT NEEDED:**		**PCS POPS REDUCED:**	
CGSA - MAJOR FILING NEEDED (Yes/No):	Yes	**CGSA SCORECARD UPDATED:**			

CGSA CALL SIGNS:	

Section 4 - TOWER/REGULATORY INFORMATION

STRUCTURE AT&T OWNED?:	Yes	**GROUND ELEVATION (ft):**		**STRUCTURE TYPE:**	SELF SUPPORT	**MARKET LOCATION 700 MHz Band:**			
ADDITIONAL REGULATORY?:	Yes	**HEIGHT OVERALL (ft):**	0.00	**FCC ASR NUMBER:**	NR	**MARKET LOCATION 850 MHz Band:**			
SUB-LEASE RIGHTS?:	Yes	**STRUCTURE HEIGHT (ft):**	0.00			**MARKET LOCATION 1900 MHz Band:**			
LIGHTING TYPE:	RED LIGHT ONLY					**MARKET LOCATION AWS Band:**			
						MARKET LOCATION WCS Band:			
						MARKET LOCATION Future Band:			

Section 5 - E-911 INFORMATION - existing

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A **E-911**				INTRADO_MIAMI		0				
SECTOR B				INTRADO_MIAMI		0				
SECTOR C				INTRADO_MIAMI		0				
SECTOR D	WALLINGFORD PD	1408				0				
SECTOR E	WALLINGFORD PD	1408				0				
SECTOR F	WALLINGFORD PD	1408				0				
OMNI										

Section 5 - E-911 INFORMATION - final

	PSAP NAME:	PSAP ID:	E911 PHASE:	MPC SVC PROVIDER:	LMU REQUIRED:	ESRN:	DATE LIVE PH1:	DATE LIVE PH2:		
SECTOR A **E-911**				INTRADO_MIAMI		0				
SECTOR B				INTRADO_MIAMI		0				
SECTOR C				INTRADO_MIAMI		0				
SECTOR D	WALLINGFORD PD	1408				0				
SECTOR E	WALLINGFORD PD	1408				0				
SECTOR F	WALLINGFORD PD	1408				0				
OMNI										

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RBS ID:	128710	128711	172432	229594	366829							
CTS COMMON ID:	049D2168	318D2168	CTU2168	CTV2168	CTL02168							
CELL ID / BCF:	049D2168		CTU2168	CTU2168	CTL02168							
BTA/TID:	049G	049P	318V	318U	318L							
4-DIGIT SITE ID:	2168	2168	2168	2168	2168							
COW OR TOY?:	No	No	No	No	No							
CELL SITE TYPE:												
SITE TYPE:												
BTS LOCATION ID:												
ORIGINATING CO:												
CELLULAR NETWORK:												
OPS DISTRICT:	SOUTH	CT SOUTH-WEST	CT SOUTH-WEST	CT SOUTH-WEST								
RF DISTRICT:	SOUTH											
OPS ZONE:												
RF ZONE:	BCT02 - MIDDLESEX											
BASE STATION TYPE:												
EQUIPMENT NAME:	MT TOM WALLINGFORD	WALLINGFORD- WAYNE RD	MT TOM WALLINGFORD	MT TOM WALLINGFORD	MT TOM WALLINGFORD							
DISASTER PRIORITY:												

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
RBS ID:	128710	128711	172432	229594	366829							
CTS COMMON ID:	049D2168	318D2168	CTU2168	CTV2168	CTL02168							
CELL ID / BCF:	049D2168		CTU2168	CTU2168	CTL02168							
BTA/TID:	049G	049P	318V	318U	318L							
4-DIGIT SITE ID:	2168	2168	2168	2168	2168							
COW OR TOY?:	No	No	No	No	No							
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED							
SITE TYPE:	BTS-CONVENTIONAL	BTS-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL							
BTS LOCATION ID:	GROUND	GROUND	INTERNAL	INTERNAL	INTERNAL							
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR							
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD							
OPS DISTRICT:	CT-South	CT-South	CT-South	CT-South	CT-South							
RF DISTRICT:	NPO Triage	NPO Triage	NPO Triage	NPO Triage	NPO Triage							
OPS ZONE:	NE_CT_S_NHVN_NE_CS	NE_CT_S_NHVN_NE_CS	NE_CT_S_NHVN_NE_CS	NE_CT_S_NHVN_NE_CS	NE_CT_S_NHVN_NE_CS							
RF ZONE:	Hotseat	Hotseat	Hotseat	Hotseat	Hotseat							
BASE STATION TYPE:	BASE	BASE	BASE	OVERLAY	BASE							
EQUIPMENT NAME:	MT TOM WALLINGFORD	WALLINGFORD- WAYNE RD	MT TOM WALLINGFORD	MT TOM WALLINGFORD	MT TOM WALLINGFORD							
DISASTER PRIORITY:	0	0	2	0	3							

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
MSC:												
BSC/RNC/MME POOL ID:	BCT08	BCT08	BRPTCT04CRBR07	BRPTCT04CRBR07	FF01							
LAC:	05008	05008	05988	05988								
RAC:												
EQUIPMENT VENDOR:												
EQUIPMENT TYPE:	ULTRASITE	ULTRASITE										
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:												
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:	0	0	0	0	2168							
PARENT NAME:	BCT08	BCT08	BRPTCT04CRBR07	BRPTCT04CRBR07	FF01							

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS							
MSC:												
BSC/RNC/MME POOL ID:	BCT08	BCT08	BRPTCT04CRBR07	BRPTCT04CRBR07	FF01							
LAC:	05008	05008	05988	05988								
RAC:												
EQUIPMENT VENDOR:	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON							
EQUIPMENT TYPE:	ULTRASITE	ULTRASITE	3206 INDOOR	3206 INDOOR	6601 INDOOR MU							
BASEBAND CONFIGURATION:												
LOCATION:												
CABINET LOCATION:												
MARKET STATE CODE:					CT							
AGPS:	Yes	Yes	Yes	Yes	Yes							
NODE B NUMBER:	0	0	0	0	2168							
PARENT NAME:	MIDDLETOWN-GSM MTSO-BSC-8	MIDDLETOWN-GSM MTSO-BSC-8	BRIDGEPORT RNC07 ERICSSON 3820	BRIDGEPORT RNC07 ERICSSON 3820								

Section 8 - RBS/SECTOR ASSOCIATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS														
CTS Common ID	049D2168	318D2168	CTU2168	CTV2168	CTL02168														
Soft Sector IDs	318G21681		CTU21684	CTV21681	CTL02168_3A_1														
	318G21682		CTU21685	CTV21682	CTL02168_3B_1														
	318G21683		CTU21686	CTV21683	CTL02168_3C_1														
			CTU21687	CTV2168A	CTL02168_7A_1														
			CTU21688	CTV2168B	CTL02168_7B_1														
			CTU21689	CTV2168C	CTL02168_7C_1														
					CTL02168_9A_1														
					CTL02168_9B_1														
					CTL02168_9C_1														

Section 8 - RBS/SECTOR ASSOCIATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	LTE 1ST RBS														
CTS Common ID	049D2168	318D2168	CTU2168	CTV2168	CTL02168														
Soft Sector IDs	318G21681		CTU21684	CTV21681	CTL02168_3A_1														
	318G21682		CTU21685	CTV21682	CTL02168_3B_1														
	318G21683		CTU21686	CTV21683	CTL02168_3C_1														
			CTU21687	CTV2168A	CTL02168_7A_1														
			CTU21688	CTV2168B	CTL02168_7B_1														
			CTU21689	CTV2168C	CTL02168_7C_1														
					CTL02168_9A_1														
					CTL02168_9B_1														
					CTL02168_9C_1														

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																	
USEID (excluding Hard Sector)	4563.850.25G.1	4563.850.3G.1	4563.1900.3G.1	4563.850.3G.2	4563.1900.3G.2																				
SECTOR A SOFT SECTOR ID	318G21681	CTV21681	CTU21687	CTV2168A	CTU21684	CTL02168_7A_1	CTL02168_9A_1	CTL02168_3A_1																	
SECTOR B	318G21682	CTV21682	CTU21688	CTV2168B	CTU21685	CTL02168_7B_1	CTL02168_9B_1	CTL02168_3B_1																	
SECTOR C	318G21683	CTV21683	CTU21689	CTV2168C	CTU21686	CTL02168_7C_1	CTL02168_9C_1	CTL02168_3C_1																	
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																	
USEID (excluding Hard Sector)	4563.850.25G.1	4563.850.3G.1	4563.1900.3G.1	4563.850.3G.2	4563.1900.3G.2																				
SECTOR A SOFT SECTOR ID	318G21681	CTV21681	CTU21687	CTV2168A	CTU21684	CTL02168_7A_1	CTL02168_9A_1	CTL02168_3A_1																	
SECTOR B	318G21682	CTV21682	CTU21688	CTV2168B	CTU21685	CTL02168_7B_1	CTL02168_9B_1	CTL02168_3B_1																	
SECTOR C	318G21683	CTV21683	CTU21689	CTV2168C	CTU21686	CTL02168_7C_1	CTL02168_9C_1	CTL02168_3C_1																	
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 9 - Cell Number - existing

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																	
USEID (excluding Hard Sector)	4563.850.25G.1	4563.850.3G.1	4563.1900.3G.1	4563.850.3G.2	4563.1900.3G.2																				
SECTOR A CELL NUMBER	0	0	0	0	0	15	8	149																	
SECTOR B	0	0	0	0	0	16	9	150																	
SECTOR C	0	0	0	0	0	17	10	151																	
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 9 - Cell Number - final

	GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																	
USEID (excluding Hard Sector)	4563.850.25G.1	4563.850.3G.1	4563.1900.3G.1	4563.850.3G.2	4563.1900.3G.2																				
SECTOR A CELL NUMBER	0	0	0	0	0	15	8	149																	
SECTOR B	0	0	0	0	0	16	9	150																	
SECTOR C	0	0	0	0	0	17	10	151																	
SECTOR D																									
SECTOR E																									
SECTOR F																									
OMNI																									

Section 10 - CID/SAC - existing

		GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																			
SECTOR A	CID/SAC	21681	21681	21687	61681	21684																						
SECTOR B		21682	21682	21688	61682	21685																						
SECTOR C		21683	21683	21689	61683	21686																						
SECTOR D																												
SECTOR E																												
SECTOR F																												
OMNI																												

Section 10 - CID/SAC - final

		GSM 1ST 850	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	LTE 1ST 700	LTE 1ST 1900	LTE 1ST WCS																			
SECTOR A	CID/SAC	21681	21681	21687	61681	21684																						
SECTOR B		21682	21682	21688	61682	21685																						
SECTOR C		21683	21683	21689	61683	21686																						
SECTOR D																												
SECTOR E																												
SECTOR F																												
OMNI																												

Section 15A - CURRENT SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	OPA-65R-LCUU-H6	AM-X-CD-16-65-00T-RET				
ANTENNA VENDOR	POWERWAVE	CCI Products	KMW				
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X7.4	72X11.8X5.9				
ANTENNA WEIGHT	35	73	48.5				
AZIMUTH	150	20	20				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	78	78	78				
ANTENNA TIP HEIGHT	80	81	81				
MECHANICAL DOWNTILT	0	0	0				
FEEDER AMOUNT	2	Fiber + 2 Coax					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Powerwave 7020	Built-in	Built-in				
SURGE ARRESTOR (QTY/MODEL)	2	DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)	1 DC/ Fiber Squid				
DIPLEXER (QTY/MODEL)	2 Kathrein 782-10250	2 Kathrein 782-10250					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1 Powerwave 7070	LTE RRH	RRH Controlled				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Andrew ABT-DFDM-ADBH	1 Polyphaser DAS-HY-NMNF-01S					
PDU FOR TMAS (QTY/MODEL)	1 Powerwave LGP 12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1 RRUS-11				
RRH - 850 band (QTY/MODEL)	1 RRUW						
RRH - 1900 band (QTY/MODEL)	1 RRUW		1 RRUS-11				
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1 RRUS-32					
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE WCS will be 3C at the site with Bronze standard configuration // Replace the GSM antenna with an 6' Octoport antenna and install at POS2 // Add LTE WCS RRUS-32 and install 1 DC Fiber Squid, 2 DC truncks, 1 Fiber trunk // Reuse the Twin TMA from GSM line and connect the RET to the UMTS Antenna, connect GSM 850 to the 850 port of Octoport antenna // Add XMU-R503.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		4563.A.850.3G.1	CTV21681	CTV21681		UMTS 850	7770.00.850.10	13.5	150	10	None	Andrew 7/8 (850)	115				NO		308.32		1	
	PORT 2		4563.A.850.3G.2	CTV21681	CTV2168A		UMTS 850	7770.00.850.10	13.5	150	10	Bottom	Andrew 7/8 (850)	115				NO		308.32		1	
	PORT 3		4563.A.1900.3G.1	CTU21687	CTU21687		UMTS 1900	7770.00.1900.04	15.5	150	4	None	Andrew 7/8 (850)	115				NO		330.37		1	
	PORT 4		4563.A.1900.3G.2	CTU21687	CTU21684		UMTS 1900	7770.00.1900.04	15.5	150	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		1	
ANTENNA POSITION 2	PORT 1		4563.A.850.25G.1	318G21681	318G21681		GSM 850	OPA-65R-LCUU-H6_849MHz_10DT	14.3	20	10	None	Andrew 7/8 (850)	115				YES		308.32		4	
	PORT 3		4563.A.WCS.4G.1	CTL02168_3A_1	CTL02168_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	20	3	TOP	FIBER	0						1227.4392		3	

ANTENNA POSITION 3	**PORT 1**		4563.A.700.4G.1	CTL02168_7A_1	CTL02168_7A_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_13DT	15.6	20	13	Top	FIBER	0						1119.4378		5	
	PORT 3		4563.A.1900.4G.1	CTL02168_9A_1	CTL02168_9A_1		LTE 1900	AM-X-CD-16-65-00T-RET_1930MHz_04DT	17.3	20	4	Top	FIBER	0						2182.7299		5	

Section 15B - CURRENT SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	OPA-65R-LCUU-H6	AM-X-CD-16-65-00T-RET				
ANTENNA VENDOR	POWERWAVE	CCI Products	KMW				
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X7.4	72X11.8X5.9				
ANTENNA WEIGHT	35	73	48.5				
AZIMUTH	270	150	150				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	78	78	78				
ANTENNA TIP HEIGHT	80	81	81				
MECHANICAL DOWNTILT	0	0	0				
FEEDER AMOUNT	2	Fiber + 2 Coax					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Powerwave 7020	Built-in	Built-in				
SURGE ARRESTOR (QTY/MODEL)	2	DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)	1 DC/ Fiber Squid				
DIPLEXER (QTY/MODEL)	2 Kathrein 782-10250	2 Kathrein 782-10250					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1 Powerwave 7070	LTE RRH	RRH Controlled				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Andrew ABT-DFDM-ADBH	1 Polyphaser DAS-HY-NMNF-01S					
PDU FOR TMAS (QTY/MODEL)	1 Powerwave LGP 12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1 RRUS-11				
RRH - 850 band (QTY/MODEL)	1 RRUW						
RRH - 1900 band (QTY/MODEL)	1 RRUW		1 RRUS-11				
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1 RRUS-32					
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE WCS will be 3C at the site with Bronze standard configuration // Replace the GSM antenna with an 6' Octoport antenna and install at POS2 // Add LTE WCS RRUS-32 and install 1 DC Fiber Squid, 2 DC truncks, 1 Fiber trunk // Reuse the Twin TMA from GSM line and connect the RET to the UMTS Antenna, connect GSM 850 to the 850 port of Octoport antenna // Add XMU-R503.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		4563.B.850.3G.1	CTV21682	CTV21682		UMTS 850	7770.00.850.04	13.5	270	4	None	Andrew 7/8 (850)	115				NO		308.32		9	
	PORT 2		4563.B.850.3G.2	CTV21682	CTV2168B		UMTS 850	7770.00.850.04	13.5	270	4	Bottom	Andrew 7/8 (850)	115				NO		308.32		9	
	PORT 3		4563.B.1900.3G.1	CTU21688	CTU21688		UMTS 1900	7770.00.1900.04	15.5	270	4	None	Andrew 7/8 (850)	115				NO		330.37		9	
	PORT 4		4563.B.1900.3G.2	CTU21688	CTU21685		UMTS 1900	7770.00.1900.04	15.5	270	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		9	
ANTENNA POSITION 2	PORT 1		4563.B.850.25G.1	318G21682	318G21682		GSM 850	OPA-65R-LCUU-H6_849MHz_04DT	14.5	150	4	None	Andrew 7/8 (850)	115				YES		308.32		12	
	PORT 3		4563.B.WCS.4G.1	CTL02168_3B_1	CTL02168_3B_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	150	3	TOP	FIBER	0						1227.4392		11	

ANTENNA POSITION 3	**PORT 1**		4563.B.700.4G.1	CTL02168_7B_1	CTL02168_7B_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_04DT	15.6	150	4	Top	FIBER	0						1119.4378		13	
	PORT 3		4563.B.1900.4G.1	CTL02168_9B_1	CTL02168_9B_1		LTE 1900	AM-X-CD-16-65-00T-RET_1930MHz_06DT	17.3	150	6	Top	FIBER	0						2182.7299		13	

Section 15C - CURRENT SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	OPA-65R-LCUU-H6	AM-X-CD-16-65-00T-RET				
ANTENNA VENDOR	POWERWAVE	CCI Products	KMW				
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X7.4	72X11.8X5.9				
ANTENNA WEIGHT	35	73	48.5				
AZIMUTH	20	270	270				
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	78	78	78				
ANTENNA TIP HEIGHT	80	81	81				
MECHANICAL DOWNTILT	0	0	0				
FEEDER AMOUNT	2	Fiber + 2 Coax					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Powerwave 7020	Built-in	Built-in				
SURGE ARRESTOR (QTY/MODEL)	2	DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)	1 DC/ Fiber Squid				
DIPLEXER (QTY/MODEL)	2 Kathrein 782-10250	2 Kathrein 782-10250					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1 Powerwave 7070	LTE RRH	RRH Controlled				
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Andrew ABT-DFDM-ADBH	1 Polyphaser DAS-HY-NMNF-01S					
PDU FOR TMAS (QTY/MODEL)	1 Powerwave LGP 12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)			1 RRUS-11				
RRH - 850 band (QTY/MODEL)	1 RRUW						
RRH - 1900 band (QTY/MODEL)	1 RRUW		1 RRUS-11				
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1 RRUS-32					
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	LTE WCS will be 3C at the site with Bronze standard configuration // Replace the GSM antenna with an 6' Octoport antenna and install at POS2 // Add LTE WCS RRUS-32 and install 1 DC Fiber Squid, 2 DC truncks, 1 Fiber trunk // Reuse the Twin TMA from GSM line and connect the RET to the UMTS Antenna, connect GSM 850 to the 850 port of Octoport antenna // Add XMU-R503.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3							

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		4563.C.850.3G.1	CTV21683	CTV21683		UMTS 850	7770.00.850.10	13.5	20	10	None	Andrew 7/8 (850)	115				NO		308.32		17	
	PORT 2		4563.C.850.3G.2	CTV21683	CTV2168C		UMTS 850	7770.00.850.10	13.5	20	10	Bottom	Andrew 7/8 (850)	115				NO		308.32		17	
	PORT 3		4563.C.1900.3G.1	CTU21689	CTU21689		UMTS 1900	7770.00.1900.04	15.5	20	4	None	Andrew 7/8 (850)	115				NO		330.37		17	
	PORT 4		4563.C.1900.3G.2	CTU21689	CTU21686		UMTS 1900	7770.00.1900.04	15.5	20	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		17	
ANTENNA POSITION 2	PORT 1		4563.C.850.25G.1	318G21683	318G21683		GSM 850	OPA-65R-LCUU-H6_849MHz_10DT	14.3	270	10	None	Andrew 7/8 (850)	115				YES		308.32		20	
	PORT 3		4563.C.WCS.4G.1	CTL02168_3C_1	CTL02168_3C_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	270	3	TOP	FIBER	0						1227.4392		19	

ANTENNA POSITION 3	**PORT 1**		4563.C.700.4G.1	CTL02168_7C_1	CTL02168_7C_1		LTE 700	AM-X-CD-16-65-00T-RET_725MHz_03DT	15.6	270	3	Top	FIBER	0						1119.4378		21	
	PORT 3		4563.C.1900.4G.1	CTL02168_9C_1	CTL02168_9C_1		LTE 1900	AM-X-CD-16-65-00T-RET_1930MHz_04DT	17.3	270	4	Top	FIBER	0						2182.7299		21	

Section 16A - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				20			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				78			
ANTENNA TIP HEIGHT				81			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built-in			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)				RRH Controlled			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-32 B2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		4563.A.1900.4G.1	CTL02168_9A_1	CTL02168_9A_1		LTE 1900	QS66512-2_1930MHz_04DT	16	20	4	Top	FIBER	0									

Section 16B - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				150			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				78			
ANTENNA TIP HEIGHT				81			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built-in			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)				RRH Controlled			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-32 B2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		4563.B.1900.4G.1	CTL02168_9B_1	CTL02168_9B_1		LTE 1900	QS66512-2_1930MHz_06DT	16	150	6	Top	FIBER	0									

Section 16C - NEW/PROPOSED SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
Existing Antenna?							
ANTENNA MAKE - MODEL				QS66512-2			
ANTENNA VENDOR				Quintel			
ANTENNA SIZE (H x W x D)				72X12X9.6			
ANTENNA WEIGHT				111			
AZIMUTH				270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)				78			
ANTENNA TIP HEIGHT				81			
MECHANICAL DOWNTILT				0			
FEEDER AMOUNT							
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)				Built-in			
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)							
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)				RRH Controlled			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)				1	RRUS-32 B2		
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)							
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 4	PORT 3		4563.C.1900.4G.1	CTL02168_9C_1	CTL02168_9C_1		LTE 1900	QS66512-2_1930MHz_04DT	16	270	4	Top	FIBER	0									

Section 17A - FINAL SECTOR/CELL INFORMATION - SECTOR A (OR OMNI)

ANTENNA COMMON FIELDS	ANTENNA POSITION 1		ANTENNA POSITION 2		ANTENNA POSITION 3		ANTENNA POSITION 4		ANTENNA POSITION 5		ANTENNA POSITION 6		ANTENNA POSITION 7	
ANTENNA MAKE - MODEL	7770		OPA-65R-LCUU-H6				QS66512-2							
ANTENNA VENDOR	POWERWAVE		CCI Products				Quintel							
ANTENNA SIZE (H x W x D)	55X11X5		72X14.8X7.4				72X12X9.6							
ANTENNA WEIGHT	35		73				111							
AZIMUTH	150		20				20							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	78		78				78							
ANTENNA TIP HEIGHT	80		81				81							
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		Fiber + 2 Coax											
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)														
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)														
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)														
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020		Built-in				Built-in						
SURGE ARRESTOR (QTY/MODEL)			2	DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)			1	DC/ Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Kathrein 782-10250	2	Kathrein 782-10250										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Powerwave 7070		LTE RRH				RRH Controlled						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	1	Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1	Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)										
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Andrew ABT-DFDM-ADBH	1	Polyphaser DAS-HY-NMNF-01S										
PDU FOR TMAS (QTY/MODEL)	1	Powerwave LGP 12104												
FILTER (QTY/MODEL)														
SQUID (QTY/MODEL)														
FIBER TRUNK (QTY/MODEL)														
DC TRUNK (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)	1	RRUW												
RRH - 1900 band (QTY/MODEL)	1	RRUW					1	RRUS-32 B2						
RRH - AWS band (QTY/MODEL)														
RRH - WCS band (QTY/MODEL)			1	RRUS-32										
Additional RRH #1 - any band (QTY/MODEL)														
Additional RRH #2 - any band (QTY/MODEL)														
Additional Component 1 (QTY/MODEL)														
Additional Component 2 (QTY/MODEL)														
Additional Component 3 (QTY/MODEL)														
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.													
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.													
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1													

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	4563.A.850.3G.1	4563.A.850.3G.1	CTV21681	CTV21681		UMTS 850	7770.00.850.10	13.5	150	10	None	Andrew 7/8 (850)	115				NO		308.32		1	
	PORT 2	4563.A.850.3G.2	4563.A.850.3G.2	CTV21681	CTV2168A		UMTS 850	7770.00.850.10	13.5	150	10	Bottom	Andrew 7/8 (850)	115				NO		308.32		1	
	PORT 3	4563.A.1900.3G.1	4563.A.1900.3G.1	CTU21687	CTU21687		UMTS 1900	7770.00.1900.04	15.5	150	4	None	Andrew 7/8 (850)	115				NO		330.37		2	
	PORT 4	4563.A.1900.3G.2	4563.A.1900.3G.2	CTU21687	CTU21684		UMTS 1900	7770.00.1900.04	15.5	150	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		2	
ANTENNA POSITION 2	PORT 1	4563.A.850.25G.1	4563.A.850.25G.1	318G21681	318G21681		GSM 850	OPA-65R-LCUU-H6_849MHz_10DT	14.3	20	10	None	Andrew 7/8 (850)	115				YES		308.32		3	
	PORT 3	4563.A.WCS.4G.1	4563.A.WCS.4G.1	CTL02168_3A_1	CTL02168_3A_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	20	3	TOP	Andrew 7/8 (850)	115						1227.4392		3	

ANTENNA POSITION 4	**PORT 1**	4563.A.700.4G.1	4563.A.700.4G.1	CTL02168_7A_1	CTL02168_7A_1		LTE 700	QS66512-2_722MHz_13DT	13	20	13	Top	FIBER	0						1475.7065		7	
	PORT 3	4563.A.1900.4G.1	4563.A.1900.4G.1	CTL02168_9A_1	CTL02168_9A_1		LTE 1900	QS66512-2_1930MHz_04DT	16	20	4	Top	FIBER	0						3664.3757		7	

Section 17B - FINAL SECTOR/CELL INFORMATION - SECTOR B

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	OPA-65R-LCUU-H6		QS66512-2			
ANTENNA VENDOR	POWERWAVE	CCI Products		Quintel			
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X7.4		72X12X9.6			
ANTENNA WEIGHT	35	73		111			
AZIMUTH	270	150		150			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	78	78		78			
ANTENNA TIP HEIGHT	80	81		81			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2	Fiber + 2 Coax					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Powerwave 7020	Built-in		Built-in			
SURGE ARRESTOR (QTY/MODEL)		2 DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)		1 DC/ Fiber Squid			
DIPLEXER (QTY/MODEL)	2 Kathrein 782-10250	2 Kathrein 782-10250					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1 Powerwave 7070	LTE RRH		RRH Controlled			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Andrew ABT-DFDM-ADBH	1 Polyphaser DAS-HY-NMNF-01S					
PDU FOR TMAS (QTY/MODEL)	1 Powerwave LGP 12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 RRUS-11			
RRH - 850 band (QTY/MODEL)	1 RRUW						
RRH - 1900 band (QTY/MODEL)	1 RRUW			1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1 RRUS-32					
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	4563.B.850.3G.1	4563.B.850.3G.1	CTV21682	CTV21682		UMTS 850	7770.00.850.04	13.5	270	4	None	Andrew 7/8 (850)	115				NO		308.32		9	
	PORT 2	4563.B.850.3G.2	4563.B.850.3G.2	CTV21682	CTV2168B		UMTS 850	7770.00.850.04	13.5	270	4	Bottom	Andrew 7/8 (850)	115				NO		308.32		9	
	PORT 3	4563.B.1900.3G.1	4563.B.1900.3G.1	CTU21688	CTU21688		UMTS 1900	7770.00.1900.04	15.5	270	4	None	Andrew 7/8 (850)	115				NO		330.37		10	
	PORT 4	4563.B.1900.3G.2	4563.B.1900.3G.2	CTU21688	CTU21685		UMTS 1900	7770.00.1900.04	15.5	270	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		10	
ANTENNA POSITION 2	PORT 1	4563.B.850.25G.1	4563.B.850.25G.1	318G21682	318G21682		GSM 850	OPA-65R-LCUU-H6_849MHz_04DT	14.5	150	4	None	Andrew 7/8 (850)	115				YES		308.32		11	
	PORT 3	4563.B.WCS.4G.1	4563.B.WCS.4G.1	CTL02168_3B_1	CTL02168_3B_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	150	3	TOP	Andrew 7/8 (850)	115						1227.4392		11	

ANTENNA POSITION 4	**PORT 1**	4563.B.700.4G.1	4563.B.700.4G.1	CTL02168_7B_1	CTL02168_7B_1		LTE 700	QS66512-2_722MHz_04DT	13	150	4	Top	FIBER	0						1475.7065		15	
	PORT 3	4563.B.1900.4G.1	4563.B.1900.4G.1	CTL02168_9B_1	CTL02168_9B_1		LTE 1900	QS66512-2_1930MHz_06DT	16	150	6	Top	FIBER	0						3664.3757		15	

Section 17C - FINAL SECTOR/CELL INFORMATION - SECTOR C

ANTENNA COMMON FIELDS	ANTENNA POSITION 1	ANTENNA POSITION 2	ANTENNA POSITION 3	ANTENNA POSITION 4	ANTENNA POSITION 5	ANTENNA POSITION 6	ANTENNA POSITION 7
ANTENNA MAKE - MODEL	7770	OPA-65R-LCUU-H6		QS66512-2			
ANTENNA VENDOR	POWERWAVE	CCI Products		Quintel			
ANTENNA SIZE (H x W x D)	55X11X5	72X14.8X7.4		72X12X9.6			
ANTENNA WEIGHT	35	73		111			
AZIMUTH	20	270		270			
MAGNETIC DECLINATION							
RADIATION CENTER (feet)	78	78		78			
ANTENNA TIP HEIGHT	80	81		81			
MECHANICAL DOWNTILT	0	0		0			
FEEDER AMOUNT	2	Fiber + 2 Coax					
VERTICAL SEPARATION from ANTENNA ABOVE (TIP to TIP)							
VERTICAL SEPARATION from ANTENNA BELOW (TIP to TIP)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to LEFT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from CLOSEST ANTENNA to RIGHT (CENTERLINE to CENTERLINE)							
HORIZONTAL SEPARATION from ANOTHER ANTENNA (which antenna # / # of inches)							
Antenna RET Motor (QTY/MODEL)	2 Powerwave 7020	Built-in		Built-in			
SURGE ARRESTOR (QTY/MODEL)	2	DC/ Fiber Squid (1) + Andrew ABT-DFDM-ADBH (1)		1 DC/ Fiber Squid			
DIPLEXER (QTY/MODEL)	2 Kathrein 782-10250	2 Kathrein 782-10250					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)	1 Powerwave 7070	LTE RRH		RRH Controlled			
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)	1 Pwav TT19-08BP111-001 Twin 1900 w/ 850BP (850)					
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2 Andrew ABT-DFDM-ADBH	1 Polyphaser DAS-HY-NMNF-01S					
PDU FOR TMAS (QTY/MODEL)	1 Powerwave LGP 12104						
FILTER (QTY/MODEL)							
SQUID (QTY/MODEL)							
FIBER TRUNK (QTY/MODEL)							
DC TRUNK (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)				1 RRUS-11			
RRH - 850 band (QTY/MODEL)	1 RRUW						
RRH - 1900 band (QTY/MODEL)	1 RRUW			1 RRUS-32 B2			
RRH - AWS band (QTY/MODEL)							
RRH - WCS band (QTY/MODEL)		1 RRUS-32					
Additional RRH #1 - any band (QTY/MODEL)							
Additional RRH #2 - any band (QTY/MODEL)							
Additional Component 1 (QTY/MODEL)							
Additional Component 2 (QTY/MODEL)							
Additional Component 3 (QTY/MODEL)							
Local Market Note 1	Bronze Standard - LTE 1900 BWE - 1xBBU RRH ADD (2wRx DUS+RUS Upgrade) A3-A4 & E, - Replace the existing LTE BB Antenna with a 6' 12 port Antenna and Install at POS4. - Replace existing LTE RRUS-11 with RRUS-32 B2 and Install on 12 port Antenna. - XMU is already Added in previous job // Add 2nd DUS.						
Local Market Note 2	LTE Alpha antenna mounted on GSM/UMTS Gamma face, LTE Beta antenna mounted on GSM/UMTS Alpha face, LTE Gamma antenna mounted on GSM/UMTS Beta face.						
Local Market Note 3	Baseband Config - 2 DUS + XMU + IDL2DUS-1 - 7A:_:7C:X1P1:X1P2:I2D2 XMU-1 - PA:PA2A:WA:_:PC:PA2C:WC:_:_:_:_:_:_:D1E:D1D DUS-2 - 7B:WB:_:PB:PA2B:I2D1						

PORT SPECIFIC FIELDS	PORT NUMBER	USEID (CSSng)	USEID (Atoll)	ATOLL TXID	ATOLL CELL ID	TX/RX ?	TECHNOLOGY/FREQUENCY	ANTENNA ATOLL	ANTENNA GAIN	ELECTRICAL AZIMUTH	ELECTRICAL TILT	RRH LOCATION (Top/Bottom/Integrated/None)	FEEDERS TYPE	FEEDER LENGTH (feet)	RXAIT KIT MODULE?	TRIPLEXER or LLC (QTY)	TRIPLEXER or LLC (MODEL)	SCPA/MCPA MODULE?	HATCHPLATE POWER (Watts)	ERP (Watts)	Antenna RET Name	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	4563.C.850.3G.1	4563.C.850.3G.1	CTV21683	CTV21683		UMTS 850	7770.00.850.10	13.5	20	10	None	Andrew 7/8 (850)	115				NO		308.32		17	
	PORT 2	4563.C.850.3G.2	4563.C.850.3G.2	CTV21683	CTV2168C		UMTS 850	7770.00.850.10	13.5	20	10	Bottom	Andrew 7/8 (850)	115				NO		308.32		17	
	PORT 3	4563.C.1900.3G.1	4563.C.1900.3G.1	CTU21689	CTU21689		UMTS 1900	7770.00.1900.04	15.5	20	4	None	Andrew 7/8 (850)	115				NO		330.37		18	
	PORT 4	4563.C.1900.3G.2	4563.C.1900.3G.2	CTU21689	CTU21686		UMTS 1900	7770.00.1900.04	15.5	20	4	Bottom	Andrew 7/8 (850)	115				NO		574.12		18	
ANTENNA POSITION 2	PORT 1	4563.C.850.25G.1	4563.C.850.25G.1	318G21683	318G21683		GSM 850	OPA-65R-LCUU-H6_849MHz_10DT	14.3	270	10	None	Andrew 7/8 (850)	115				YES		308.32		19	
	PORT 3	4563.C.WCS.4G.1	4563.C.WCS.4G.1	CTL02168_3C_1	CTL02168_3C_1		LTE WCS	OPA-65R-LCUU-H6_2350MHz_03DT	17.8	270	3	TOP	Andrew 7/8 (850)	115						1227.4392		19	

ANTENNA POSITION 4	**PORT 1**	4563.C.700.4G.1	4563.C.700.4G.1	CTL02168_7C_1	CTL02168_7C_1		LTE 700	QS66512-2_722MHz_03DT	13	270	3	Top	FIBER	0						1475.7065		23	
	PORT 3	4563.C.1900.4G.1	4563.C.1900.4G.1	CTL02168_9C_1	CTL02168_9C_1		LTE 1900	QS66512-2_1930MHz_04DT	16	270	4	Top	FIBER	0						3664.3757		23	

Diagram - Sector	A	Diagram File Name - CT2168_A_B_C_1900BWE_Rev1.vsd					
Atoll Site Name -	CTU2168	Location Name -	MT TOM WALLINGFORD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

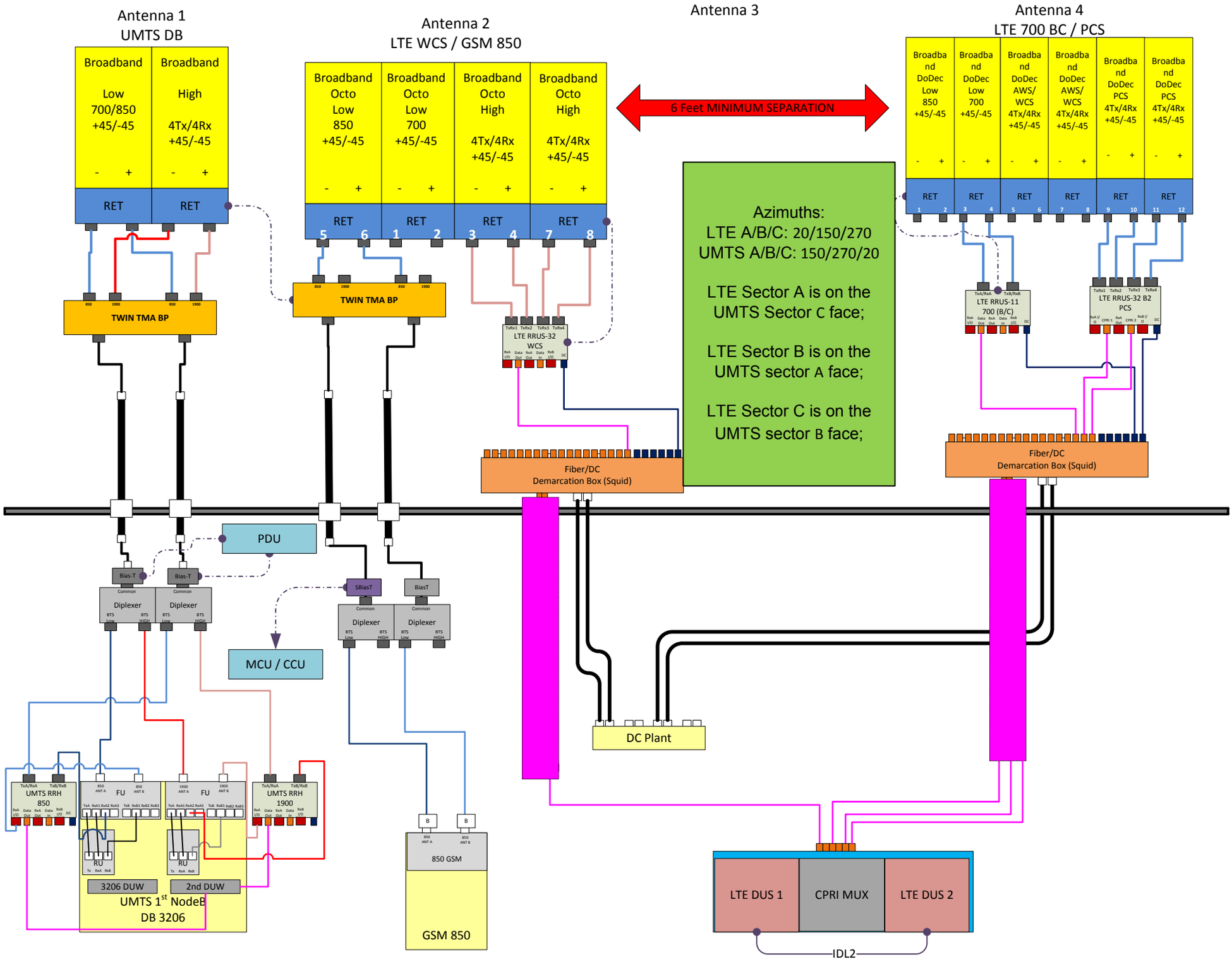


Diagram - Sector	B	Diagram File Name - CT2168_A_B_C_1900BWE_Rev1.vsd					
Atoll Site Name -	CTU2168	Location Name -	MT TOM WALLINGFORD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

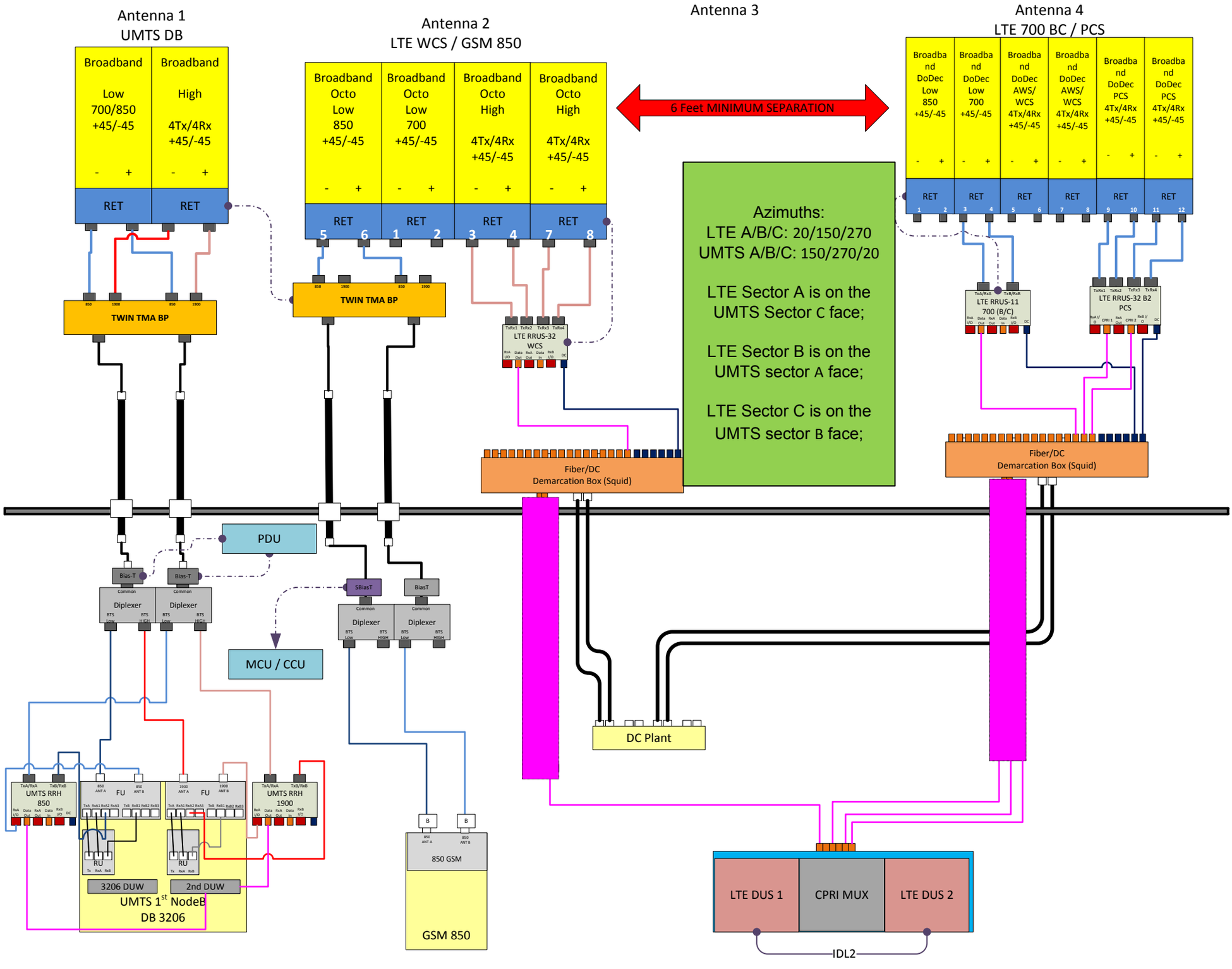
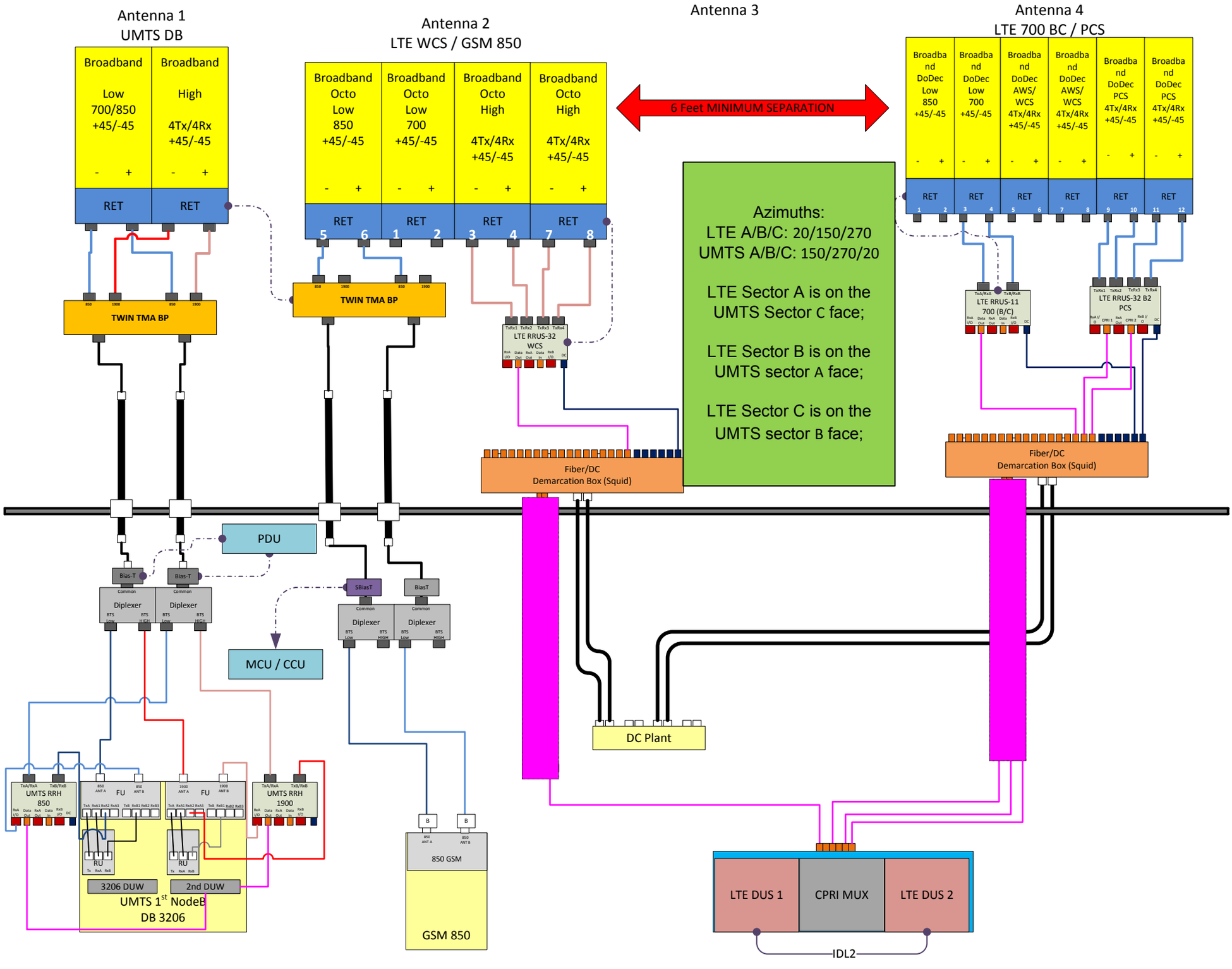


Diagram - Sector	C	Diagram File Name - CT2168_A_B_C_1900BWE_Rev1.vsd					
Atoll Site Name -	CTU2168	Location Name -	MT TOM WALLINGFORD	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



WORKFLOW SUMMARY						
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments
04/13/2016	Preliminary / In Progress	mm093q	Preliminary / Submitted for Approval	AB014M	Promote	LTE 1900BWE Preliminary RFDS
06/09/2016	Preliminary / Submitted for Approval	AB014M	Preliminary / Approved	BG144B	Promote	
10/13/2016	Preliminary / Approved	BG144B	Final / RF Approval	OM636A	Promote	Needs final

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

MultiServ

- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design
- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >159dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers four independent services in a single slim-line antenna. This enables existing antenna network sites to be upgraded constraint free to add new services such as LTE for 700, 850, PCS, AWS and WCS bands with the replacement of one antenna. The QS66512-2 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each set of 4 ports having independent tilt for connection to 2T4R/4T4R services.

Electrical Characteristics	2x Ports 1&2	2x Ports 3&4	4x Ports 5-8			4 Ports 9-12
Operating Frequency (MHz	698-806*	824-894	1695-1780 and 2110-2400			1850-1990
	698-806	824-894	1695-1780	2110-2180	2300-2400	1850-1990
Azimuth beamwidth[1]	67°	64°	68°	63°	58°	69°
Elevation beamwidth[1]	12°	10°	6.5°	5.5°	4.5°	5.5°
Gain[1] (dBi)	13.2	13.5	16.2	16.5	17.0	16.0
Polarization	±45°	±45°	±45° ±45°			±45° ±45°
Electrical down-tilt range	2°-10°	2°-10°	2° – 7°			2° – 7°
Upper SLL (20° > mainbeam)[1]	-17dB	-19dB	-18dB	-18B	-18dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥27dB	≥29dB	≥28dB	≥28dB	≥28dB	≥27dB
Port to Port isolation[1]	≥28dB	≥30dB	≥30dB	≥30dB	≥30dB	≥30dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
X Polar Discrimination (at 0°)	>18dB	>16dB	>20dB	>20dB	>18dB	>20dB
Max Power handling (per any port)	500 watts	500 watts	250 watts			250 watts
Total Composite Power (all ports)	1750 watts					
PIM (3rd Order) (2x43dBm)	>153dBc	>153dBc	>153dBc			>153dBc
XBand PIM (3rd Order) (2x43dBm)			>159dBc			

[1] *Typical Performance across frequency and Downtilt. *Products Ordered after Jan 2016 will be 698-806MHz*

Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	111lbs (50.3kg)
No. of Connectors	12x 4.3-10.0 DIN Female Long Neck
Max Wind Speed	150mph (67m/s)
Equivalent Flat Plate Area	2.96ft² (0.275m²)
Wind Load @160km/h (45m/s)	Front: 587N (132 lbs), Side: 382N (86 lbs)
Operating Temperature	-40°C to +65°C

Fully Integrated RET Characteristics	
AISG Standards	V1.1,V 2.0 and 3GPP
Factory Default	AISG 2.0
Surge immunity	IEC 61000-4-5:2005 4KV(AISG PIN)
Device Type	SRET Type 1
AISG Data rate	9.6 kbps
No of connectors	1in/1out.
Connector type	IEC 60130-9 (Ed 3.0)
MTBF	36,000 Operational moves

All specifications are subject to change without notice. Please contact your Quintel representative for complete information.

Quintel®
New Dimensions in Wireless™

QS66512-2

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-806*MHz / 2x824-894MHz / 4x1850-1990MHz / 4x1695-1780+2110-2400MHz

RET Configuration

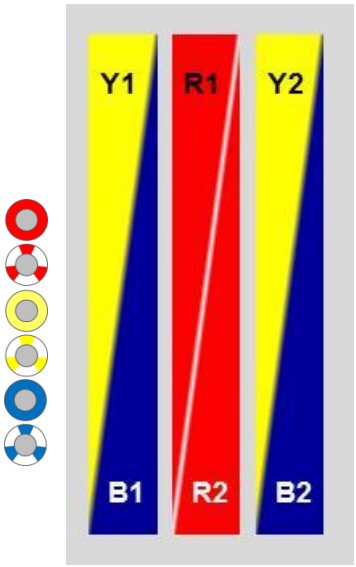
The Quintel MultiServ™ Multiband 12 Port Antenna has the following Array, RF Port and AISG I/O Configurations.

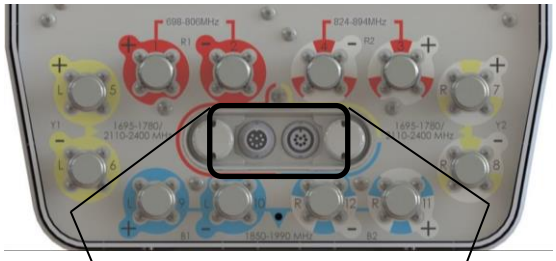
The 12-Port array topology consists of 3 radiating arrays:

R1/R2 – 698-894MHz
Y1/B1 – 1695-2400MHz
Y2/B2 – 1695-2400MHz

RF Connector Port Configuration

	Ports	Freq (MHz)
R1	1-2	698-806
R2	3-4	824-894
Y1	5-6	1695-1780+ 2110-2400
Y2	7-8	1695-1780+ 2110-2400
B1	9-10	1850-1990
B2	11-12	1850-1990





AISG I/O Configuration

RET Device	Band	RF Ports
1	698-806	1-2
2	824-894	3-4
3	AWS/WCS	5-8
4	PCS	9-12

Multiband Optimization

The Quintel MultiServ™ Multiband 12 Port Antenna is an ideal solution for independently optimizing multiple services when rapidly introducing new technologies. Technology agnostic, each pair of ports provides flexibility for existing and future technologies such as CDMA/EVDO, GSM/EDGE, UMTS/HSPA, and LTE and advanced 2T4R and 4T4R MIMO implementations at high-bands.

The tilt of each service is controlled independently via internal RET actuators compliant to AISG1.1, AISG2.0 and 3GPP protocols. The QS66512-2 provides a total of 4 independent tilts:

- 1x(698-806MHz)
- 1x(824-894MHz)
- 1x Left & Right Array (1695-1780 and 2110-2400MHz)
- 1x Left & Right Array (1850-1990MHz)

Design Optimization

All Quintel antennas use the same mechanical mounting brackets thus making maintenance swaps easy and future proof. All Quintel Antennas also have Azimuth patterns optimized with network design and deployment in mind. The 3dB Azimuth beamwidth is ~65° as with most Antennas, but we have optimized how the pattern rolls-off and where the sidelobes emerge such that there is minimal Inter-Sector Interference when 3x sectors are deployed. For interference limited networks, we can deliver 25% more capacity.

The QS66512-2 12-Port antenna has been designed for delivering best in class, maximum PIM performance. This includes using 4.3-10.0 connectors externally and internally for all array diplexing filters used with our QTilt™ technology.

About Quintel

Quintel is a leading innovator in the design, development, and delivery of network-efficient antenna solutions for wireless operators worldwide. The company's products enable global wireless operators to independently deploy and optimize multiple air interfaces or services on a single standard antenna platform. Quintel is the only antenna maker whose products can increase a wireless network's capacity and provide additional services, without increasing the number or size of antennas. Quintel is headquartered in Rochester, New York with additional offices throughout North America and Europe. More information about Quintel is available at www.quintelsolutions.com.

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info@quintelsolutions.com

EBI Consulting
environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: CT2168

Mt. Tom Wallingford
23 Wayne Road
Wallingford, CT 06492

November 23, 2016

EBI Project Number: 6216005516

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	14.78 %

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

EBI Consulting
environmental | engineering | due diligence

November 23, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT2168 – Mt. Tom Wallingford**

EBI Consulting was directed to analyze the proposed AT&T facility located at **23 Wayne Road, Wallingford, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **23 Wayne Road, Wallingford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (2300 MHz (WCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

6) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

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

9) The antennas used in this modeling are the **Powerwave 7770, CCI OPA-65R-LCUU-H6 and the Quintel QS66512-2** for transmission in the 700 MHz, 850 MHz, 1900 MHz (PCS) and 2300 MHz (WCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

10) The antenna mounting height centerlines of the proposed antennas are **78 feet** above ground level (AGL) for **Sector A**, **78 feet** above ground level (AGL) for **Sector B** and **78 feet** above ground level (AGL) for Sector C.

11) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

AT&T Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	**78 feet**	Height (AGL):	**78 feet**	Height (AGL):	**78 feet**
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts	Total TX Power(W):	120 Watts
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**1.92 %**	Antenna B1 MPE%	**1.92 %**	Antenna C1 MPE%	**1.92 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6	Make / Model:	CCI OPA-65R-LCUU-H6
Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd	Gain:	12.45 / 15.45 dBd
Height (AGL):	**78 feet**	Height (AGL):	**78 feet**	Height (AGL):	**78 feet**
Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)	Frequency Bands	850 MHz / 2300 MHz (WCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts	Total TX Power(W):	180 Watts
ERP (W):	5,263.78	ERP (W):	5,263.78	ERP (W):	5,263.78
Antenna A2 MPE%	**4.21 %**	Antenna B2 MPE%	**4.21 %**	Antenna C2 MPE%	**4.21 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd	Gain:	10.85 / 13.85 dBd
Height (AGL):	**78 feet**	Height (AGL):	**78 feet**	Height (AGL):	**78 feet**
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts	Total TX Power(W):	240 Watts
ERP (W):	4,371.36	ERP (W):	4,371.36	ERP (W):	4,371.36
Antenna A3 MPE%	**4.19 %**	Antenna B3 MPE%	**4.19 %**	Antenna C3 MPE%	**4.19 %**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**10.32 %**
PageNet	2.84 %
Land Mobile Radio	1.07 %
Amateur Radio	0.55 %
Site Total MPE %:	**14.78 %**

AT&T Sector A Total:	10.32 %
AT&T Sector B Total:	10.32 %
AT&T Sector C Total:	10.32 %
Site Total:	14.78 %

AT&T _ Frequency Band / Technology per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	414.12	78	5.74	850 MHz	567	1.01%
AT&T 1900 MHz (PCS) UMTS	2	656.33	78	9.10	1900 MHz (PCS)	1000	0.91%
AT&T 850 MHz GSM	2	527.38	78	7.31	850 MHz	567	1.29%
AT&T 2300 MHz (WCS) LTE	2	2,104.51	78	29.19	2300 MHz (WCS)	1000	2.92%
AT&T 700 MHz LTE	2	729.71	78	10.12	700 MHz	467	2.17%
AT&T 1900 MHz (PCS) LTE	2	1,455.97	78	20.19	1900 MHz (PCS)	1000	2.02%
						Total:	10.32%

Summary

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

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector A:	10.32 %
Sector B:	10.32 %
Sector C:	10.32 %
AT&T Maximum Total (per sector):	10.32 %
Site Total:	14.78 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **14.78 %** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

WIRELESS COMMUNICATIONS FACILITY
CT2168 - LTE BWE
MT. TOM WALLINGFORD
23 WAYNE ROAD
WALLINGFORD, CT 06492

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2012 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE, INCLUDING THE TIA-222 REVISION "G" STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES, 2016 CONNECTICUT FIRE SAFETY CODE AND, 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

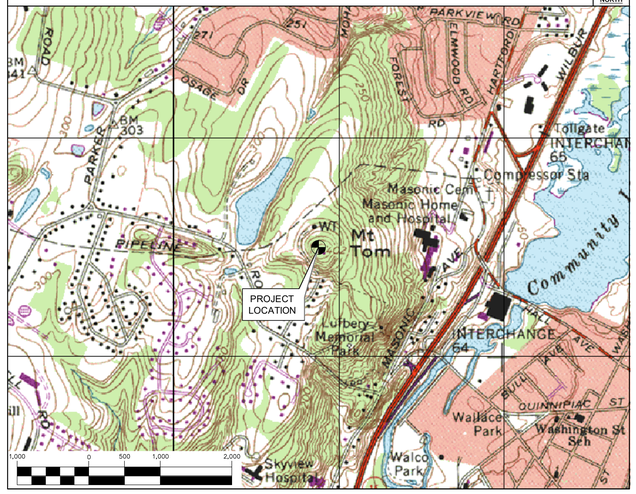
FROM: 500 ENTERPRISE DRIVE, ROCKY HILL, CONNECTICUT
TO: 23 WAYNE ROAD, WALLINGFORD, CONNECTICUT

1.	HEAD NORTHEAST ON ENTERPRISE DR TOWARD CAPITAL BLVD	0.31 MI
2.	TURN LEFT ONTO CAPITAL BLVD	0.27 MI
3.	TURN LEFT ONTO WEST ST	0.30 MI
4.	TURN LEFT TO MERGE ONTO I-91 S TOWARD NEW HAVEN	9.59 MI
5.	MERGE ONTO CT-15 S/WILBUR CROSS PKWY S via EXIT 17 TOWARD E MAIN ST.	6.42 MI
6.	TAKE EXIT 64 TOWARD WALLINGFORD	0.17 MI
7.	TURN LEFT ONTO QUINNIPIAC ST	0.17 MI
8.	QUINNIPIAC ST BECOMES S TURNPIKE RD	0.04 MI
9.	TURN RIGHT ONTO CHESHIRE RD	0.31 MI
10.	TAKE THE 3RD RIGHT ONTO WAYNE RD	0.19 MI
11.	23 WAYNE RD IS ON THE LEFT	

VICINITY MAP

SCALE: 1" = 1000'

NORTH



PROJECT SUMMARY

1. THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:
   A. REMOVE AND REPLACE EXISTING LTE ANTENNA FOR PROPOSED LTE 12 PORT ANTENNA, (1) PER SECTOR.
   B. REMOVE AND REPLACE (3) OF (6) TOTAL RRUS-11'S FOR PROPOSED RRUS-32 B2'S

PROJECT INFORMATION

AT&T SITE NUMBER:	CT2168
AT&T SITE NAME:	MT. TOM WALLINGFORD
SITE ADDRESS:	23 WAYNE ROAD WALLINGFORD, CT 06492
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:	LATITUDE: 41°-27'-45.84" N LONGITUDE: 72°-50'-30.84" W GROUND ELEVATION: ±400' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

SHT. NO.	DESCRIPTION	REV.
T-1	TITLE SHEET	0
N-1	NOTES AND SPECIFICATIONS	0
C-1	PLANS AND ELEVATION	0
C-2	LTE BWE EQUIPMENT DETAILS	0
E-1	TYPICAL ELECTRICAL DETAILS & NOTES	0

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/13/16	CAG	HMR	CONSTRUCTION DOCUMENTS - REV'D PER SACQ COMMENTS
0	11/10/16	KAW/JR	CAG	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION

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MT. TOM WALLINGFORD
CT2168 - LTE BWE
23 WAYNE ROAD
WALLINGFORD, CT 06492

DATE:	10/31/16
SCALE:	AS NOTED
JOB NO.	16071.55

TITLE SHEET

T-1

Sheet No. 1 of 5

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2012 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2016 CT STATE BUILDING CODE AND AMENDMENTS.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 95–115 MPH (3 SECOND GUST)
- RISK CATEGORY: II (BASED ON IBC TABLE 1604.5)
- NOMINAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE B/IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10) PER 2012 INTERNATIONAL BUILDING CODE (IBC) AS MODIFIED BY THE 2016 CONNECTICUT STATE BUILDING CODE.
- SEISMIC LOAD (DOES NOT CONTROL): PER ASCE 7–10 MINIMUM DESIGN LOADS FOR BUILDING AND OTHER STRUCTURES.

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN COMPLIANCE WITH THE GOVERNING BUILDING CODE.
2. 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.
3. 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.
4. DIMENSIONS AND DETAILS SHALL BE CHECKED AGAINST EXISTING FIELD CONDITIONS.
5. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS, SLEEVES AND ANCHOR BOLTS AS REQUIRED BY ALL TRADES.
6. 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.
7. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL NOTIFY THE OWNER 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.
8. THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION. 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.
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 SITE OPERATIONS, COORDINATE WORK WITH NORTHEAST UTILITIES
10. THE STRUCTURE IS DESIGNED TO BE SELF–SUPPORTING AND STABLE AFTER FOUNDATION REMEDIATION WORK IS COMPLETE. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE ERECTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE STRUCTURE AND ITS COMPONENT PARTS DURING ERECTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, TEMPORARY BRACING, GUYS OR TIEDOWNS, WHICH MIGHT BE NECESSARY.
11. 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.
12. SHOP DRAWINGS, CONCRETE MIX DESIGNS, TEST REPORTS, AND OTHER SUBMITTALS PERTAINING TO STRUCTURAL WORK SHALL BE FORWARDED TO THE OWNER 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.
13. NO DRILLING WELDING OR TAPING ON EVERSOURCE OWNED EQUIPMENT.
14. REFER TO DRAWING T1 FOR ADDITIONAL NOTES AND REQUIREMENTS.

STRUCTURAL STEEL

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 A36 (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. PIPE–––ASTM A53 (FY = 35 KSI)
   F. CONNECTION BOLTS–––ASTM A325–N
   G. U–BOLTS–––ASTM A36
   H. ANCHOR RODS–––ASTM F 1554
   I. WELDING ELECTRODE–––ASTM E 70XX

2. 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.
3. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST PROVISIONS OF AISC MANUAL OF STEEL CONSTRUCTION.
4. PROVIDE ALL PLATES, CLIP ANGLES, CLOSURE PIECES, STRAP ANCHORS, MISCELLANEOUS PIECES AND HOLES REQUIRED TO COMPLETE THE STRUCTURE.
5. FIT AND SHOP ASSEMBLE FABRICATIONS IN THE LARGEST PRACTICAL SECTIONS FOR DELIVERY TO SITE.
6. INSTALL FABRICATIONS PLUMB AND LEVEL, ACCURATELY FITTED, AND FREE FROM DISTORTIONS OR DEFECTS.
7. AFTER ERECTION OF STRUCTURES, TOUCHUP ALL WELDS, ABRASIONS AND NON–GALVANIZED SURFACES WITH A 95% ORGANIC ZINC RICH PAINT IN ACCORDANCE WITH ASTM 780.
8. 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.
9. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC COATING (HOT–DIP) ON IRON AND STEEL HARDWARE".
10. 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.
11. CONNECTION ANGLES SHALL HAVE A MINIMUM THICKNESS OF 1/4 INCHES.
12. 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.
13. LOCK WASHER ARE NOT PERMITTED FOR A325 STEEL ASSEMBLIES.
14. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED.
15. MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.
16. FABRICATE BEAMS WITH MILL CAMBER UP.
17. 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.
18. COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.
19. INSPECTION AND TESTING OF ALL WELDING AND HIGH STRENGTH BOLTING SHALL BE PERFORMED BY AN INDEPENDENT TESTING LABORATORY.
20. FOUR COPIES OF ALL INSPECTION TEST REPORTS SHALL BE SUBMITTED TO THE ENGINEER WITHIN TEN (10) WORKING DAYS OF THE DATE OF INSPECTION.

PAINT NOTES

PAINTING SCHEDULE:

1. ANTENNA PANELS:

   A. SHERWIN WILLIAMS POLANE–B
   B. COLOR TO BE MATCHED WITH EXISTING TOWER STRUCTURE.

2. COAXIAL CABLES:

   A. ONE COAT OF DTM BONDING PRIMER (2–5 MILS. DRY FINISH)
   B. TWO COATS OF DTM ACRYLIC PRIMER/FINISH (2.5–5 MILS. DRY FINISH)
   C. COLOR TO BE FIELD MATCHED WITH EXISTING STRUCTURE.

EXAMINATION AND PREPARATION:

1. DO NOT APPLY PAINT IN SNOW, RAIN, FOG OR MIST OR WHEN RELATIVE HUMIDITY EXCEEDS 85%. DO NOT APPLY PAINT TO DAMP OR WET SURFACES.
2. VERIFY THAT SUBSTRATE CONDITIONS ARE READY TO RECEIVE WORK. EXAMINE SURFACE SCHEDULED TO BE FINISHED PRIOR TO COMMENCEMENT OF WORK. REPORT ANY CONDITION THAT MAY POTENTIALLY AFFECT PROPER APPLICATION.
3. TEST SHOP APPLIED PRIMER FOR COMPATIBILITY WITH SUBSEQUENT COVER MATERIALS.
4. PERFORM PREPARATION AND CLEANING PROCEDURE IN STRICT ACCORDANCE WITH COATING MANUFACTURER'S INSTRUCTIONS FOR EACH SUBSTRATE CONDITION.
5. CORRECT DEFECTS AND CLEAN SURFACES WHICH AFFECT WORK OF THIS SECTION. REMOVE EXISTING COATINGS THAT EXHIBIT LOOSE SURFACE DEFECTS.
6. IMPERVIOUS SURFACE: REMOVE MILDEW BY SCRUBBING WITH SOLUTION OF TRI–SODIUM PHOSPHATE AND BLEACH. RINSE WITH CLEAN WATER AND ALLOW SURFACE TO DRY.
7. ALUMINUM SURFACE SCHEDULED FOR PAINT FINISH: REMOVE SURFACE CONTAMINATION BY STEAM OR HIGH–PRESSURE WATER. REMOVE OXIDATION WITH ACID ETCH AND SOLVENT WASHING. APPLY ETCHING PRIMER IMMEDIATELY FOLLOWING CLEANING.
8. FERROUS METALS: CLEAN UNGALVANIZED FERROUS METAL SURFACES THAT HAVE NOT BEEN SHOP COATED; REMOVE OIL, GREASE, DIRT, LOOSE MILL SCALE, AND OTHER FOREIGN SUBSTANCES. USE SOLVENT OR MECHANICAL CLEANING METHODS THAT COMPLY WITH THE STEEL STRUCTURES PAINTING COUNCIL'S (SSPC) RECOMMENDATIONS. TOUCH UP BARE AREAS AND SHOP APPLIED PRIME COATS THAT HAVE BEEN DAMAGED. WIRE BRUSH, CLEAN WITH SOLVENTS RECOMMENDED BY PAINT MANUFACTURER, AND TOUCH UP WITH THE SAME PRIMER AS THE SHOP COAT.
9. GALVANIZED SURFACES: CLEAN GALVANIZED SURFACES WITH NON–PETROLEUM–BASED SOLVENTS SO SURFACE IS FREE OF OIL AND SURFACE CONTAMINANTS. REMOVE PRETREATMENT FROM GALVANIZED SHEET METAL FABRICATED FROM COIL STOCK BY MECHANICAL METHODS.
10. ANTENNA PANELS: REMOVE ALL OIL, DUST, GREASE, DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION. PANELS MUST BE WIPED WITH METHYL ETHYL KETONE (MEK).
11. COAXIAL CABLES: REMOVE ALL OIL, DUST, GREASE. DIRT, AND OTHER FOREIGN MATERIAL TO ENSURE ADEQUATE ADHESION.

CLEANING:

1. COLLECT WASTE MATERIAL, WHICH MAY CONSTITUTE A FIRE HAZARD, PLACE IN CLOSED METAL CONTAINERS AND REMOVE DAILY FROM SITE.

APPLICATION:

1. APPLY PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
2. DO NOT APPLY FINISHES TO SURFACES THAT ARE NOT DRY.
3. APPLY EACH COAT TO UNIFORM FINISH.
4. APPLY EACH COAT OF PAINT SLIGHTLY DARKER THAN PRECEDING COAT UNLESS OTHERWISE APPROVED.
5. SAND METAL LIGHTLY BETWEEN COATS TO ACHIEVE REQUIRED FINISH.
6. VACUUM CLEAN SURFACES FREE OF LOOSE PARTICLES. USE TACK CLOTH JUST PRIOR TO APPLYING NEXT COAT.
7. ALLOW APPLIED COAT TO DRY BEFORE NEXT COAT IS APPLIED.

COMPLETED WORK:

1. SAMPLES: PREPARE 24" X 24" SAMPLE AREA FOR REVIEW.
2. MATCH APPROVED SAMPLES FOR COLOR, TEXTURE AND COVERAGE. REMOVE REFINISH OR REPAINT WORK NOT IN COMPLIANCE WITH SPECIFIED REQUIREMENTS.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/13/16	CAG	HMR	CONSTRUCTION DOCUMENTS – REV'D PER SACQ COMMENTS
0	11/10/16	KAWJR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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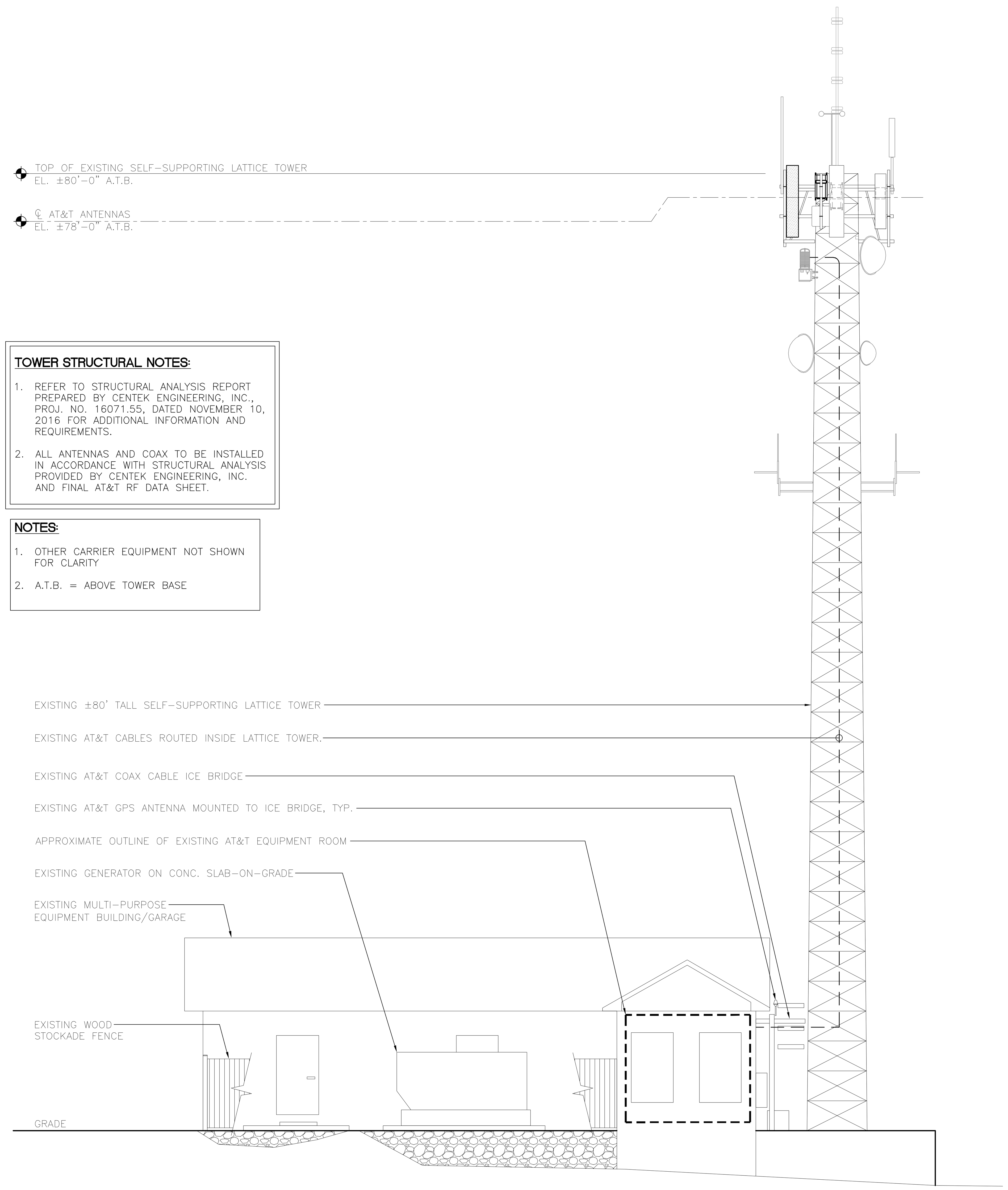
WALLINGFORD, CT 06492

DATE: 10/31/16
SCALE: AS NOTED
JOB NO. 16071.55

NOTES AND SPECIFICATIONS

N–1



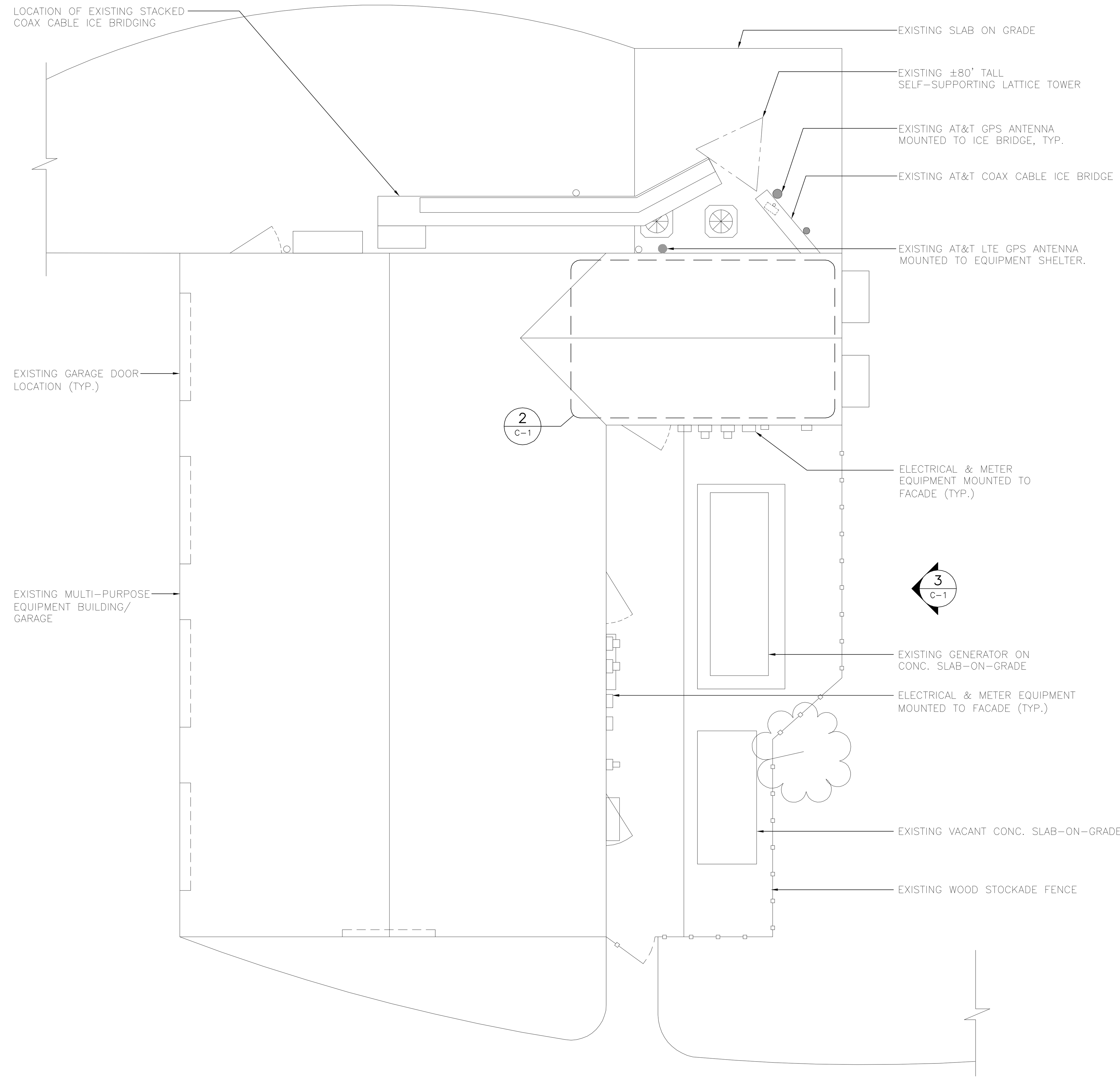
TOWER STRUCTURAL NOTES:

1. REFER TO STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING, INC., PROJ. NO. 16071.55, DATED NOVEMBER 10, 2016 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.
2. ALL ANTENNAS AND COAX TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY CENTEK ENGINEERING, INC. AND FINAL AT&T RF DATA SHEET.

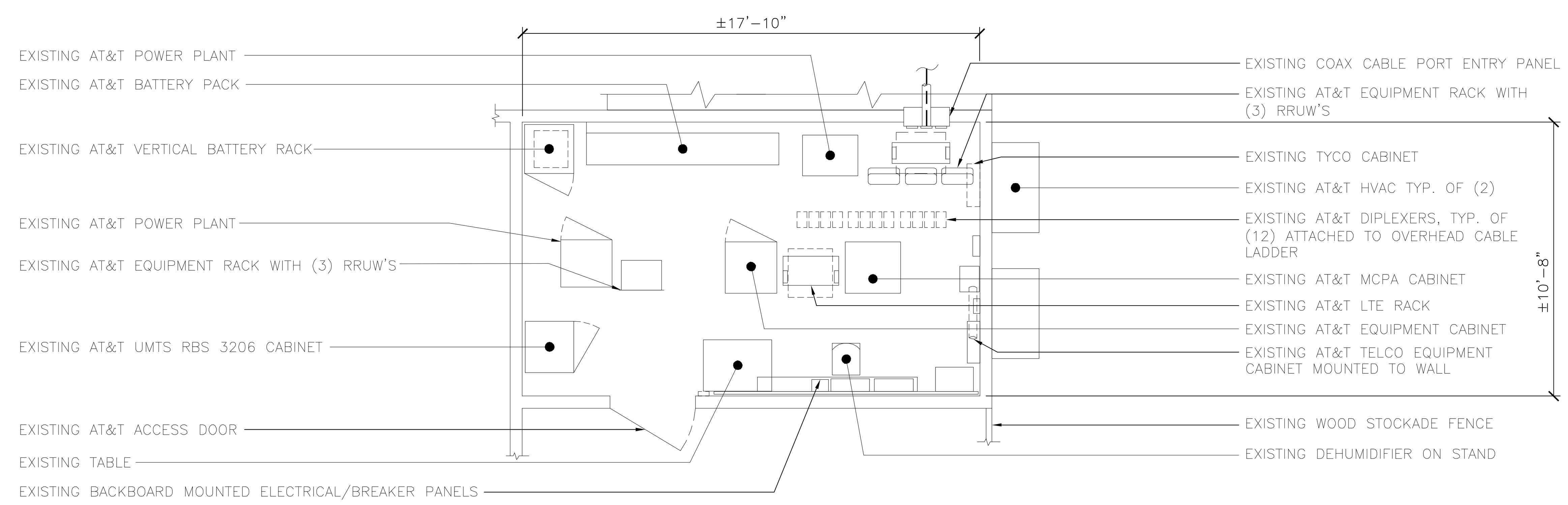
NOTES:

1. OTHER CARRIER EQUIPMENT NOT SHOWN FOR CLARITY
2. A.T.B. = ABOVE TOWER BASE

3 / C-1 NORTH ELEVATION
SCALE: 1" = 6'-0"
GRAPHIC SCALE 6 0 3 6 12 24 (IN FEET) 1 inch = 6 ft.



1 / C-1 COMPOUND PLAN
SCALE: 1" = 5'-0"
APPROX. NORTH
GRAPHIC SCALE 5 0 2.5 5 10 20 (IN FEET) 1 inch = 5 ft.



2 / C-1 EQUIPMENT ROOM FLOOR PLAN
SCALE: 1/4" = 1'-0"
APPROX. NORTH
GRAPHIC SCALE 4 0 2 4 8 16 (IN FEET) 1 inch = 4 ft.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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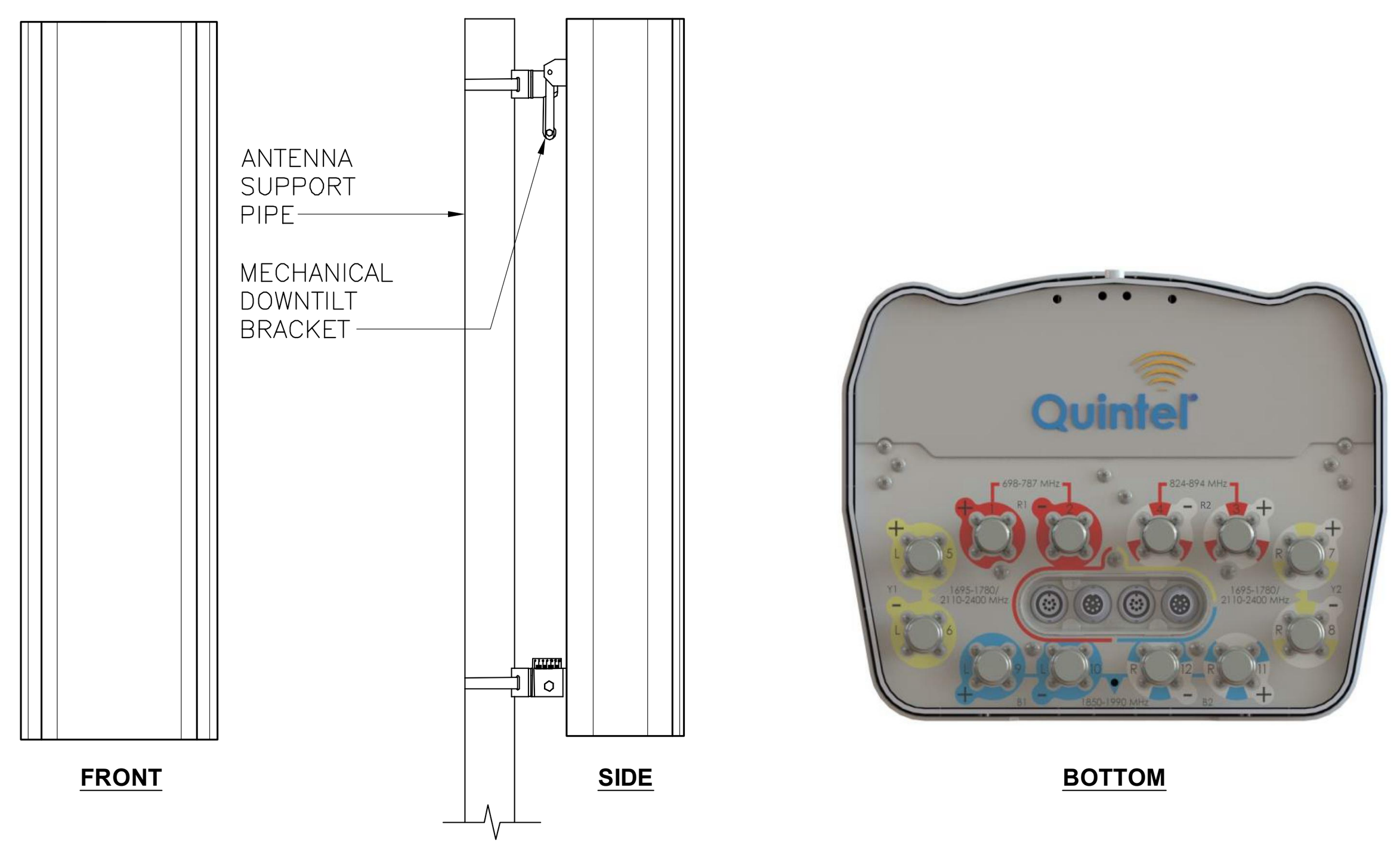
PLANS & ELEVATION

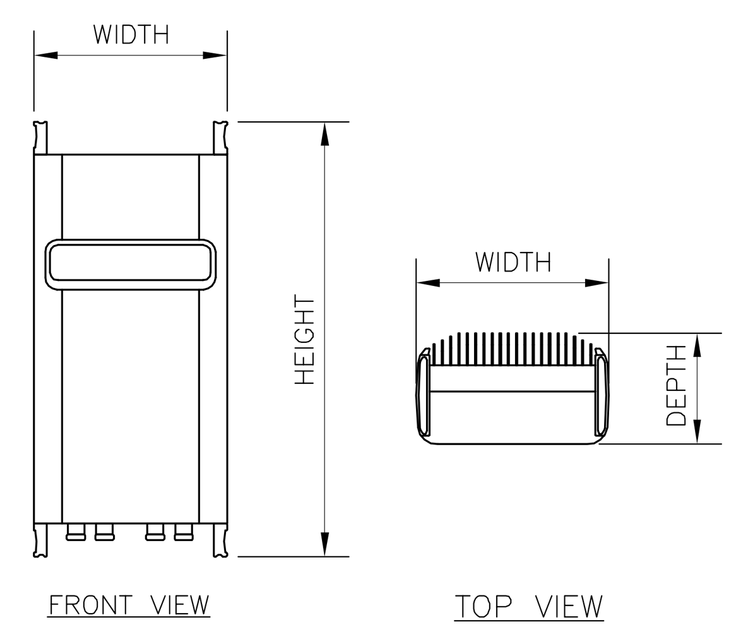
C-1

Sheet No. 3 of 5



ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: QUINTEL MODEL: QS66512-2	72.0"H x 12.0"W x 9.6"D	112.0-LBS

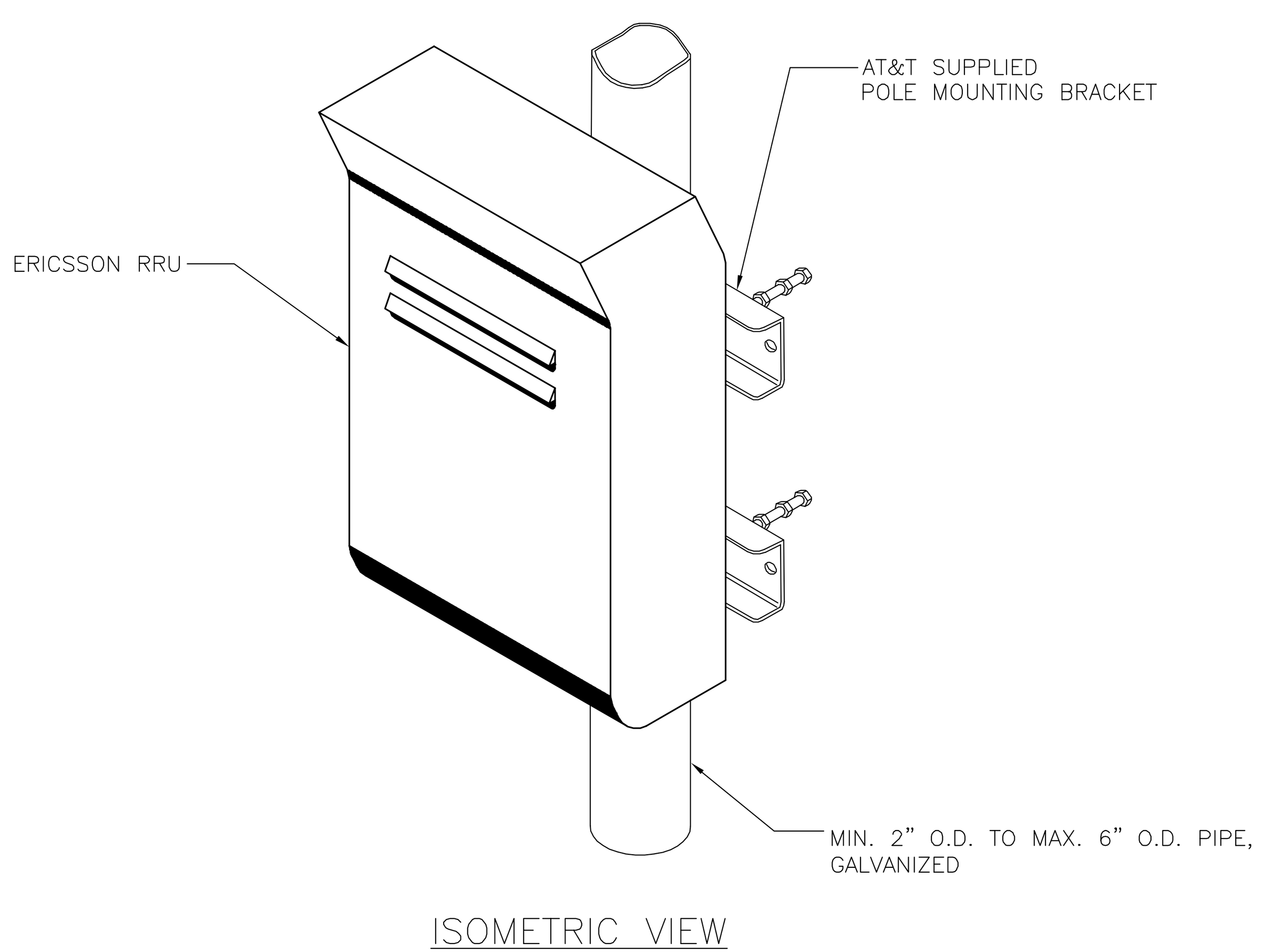
5 PROPOSED ANTENNA DETAIL
C-2
SCALE: 1/2" = 1'-0"



RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RRUS 32 B2	27.17"H x 12.05"W x 7.01"D	52.91 LBS.	ABOVE: 16" MIN. BELOW: 12" MIN. FRONT: 36" MIN.

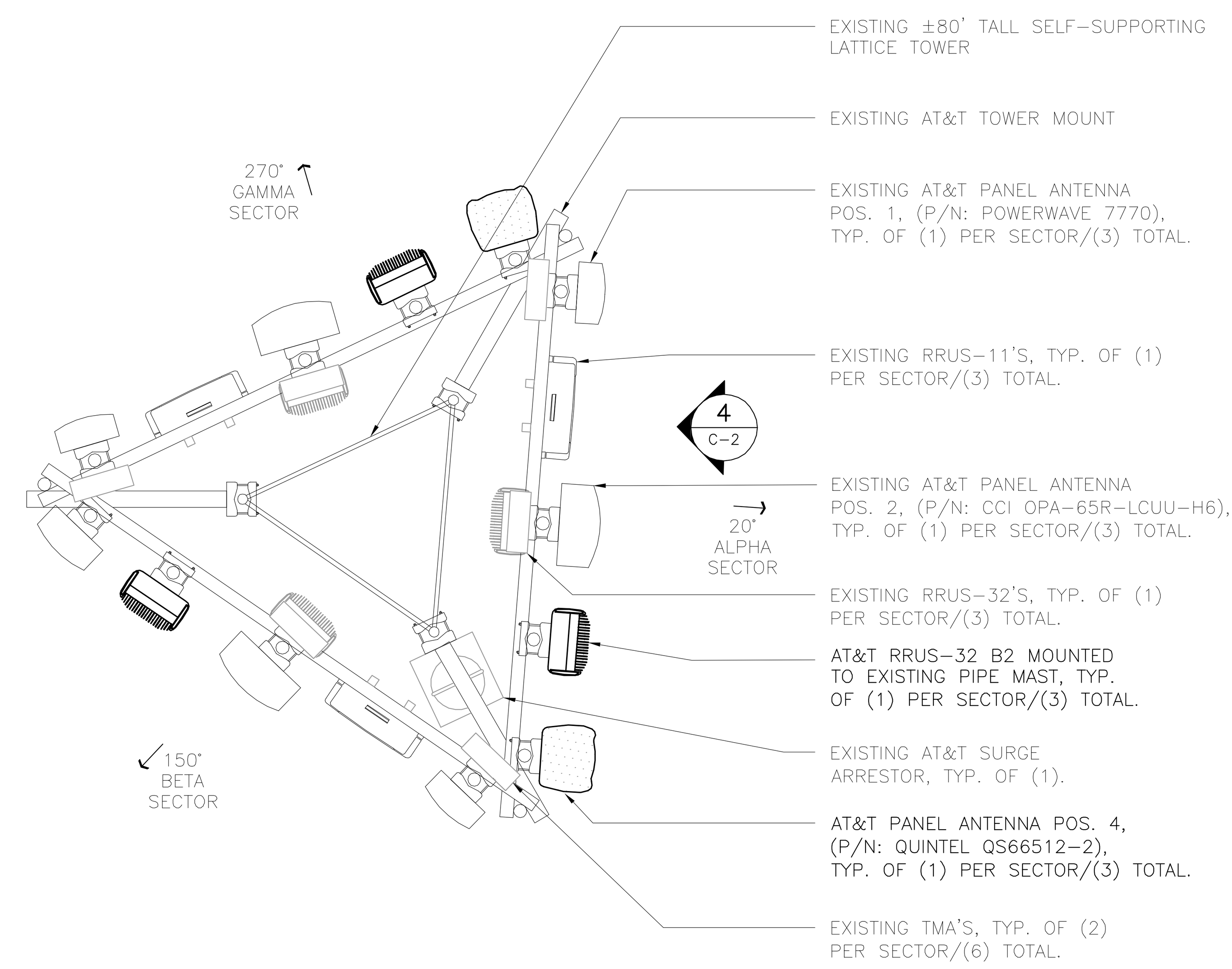
NOTES:
1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH AT&T CONSTRUCTION MANAGER PRIOR TO ORDERING.

6 ERICSSON RRUS 32 B2 DETAIL
C-2
SCALE: 1" = 1'-0"

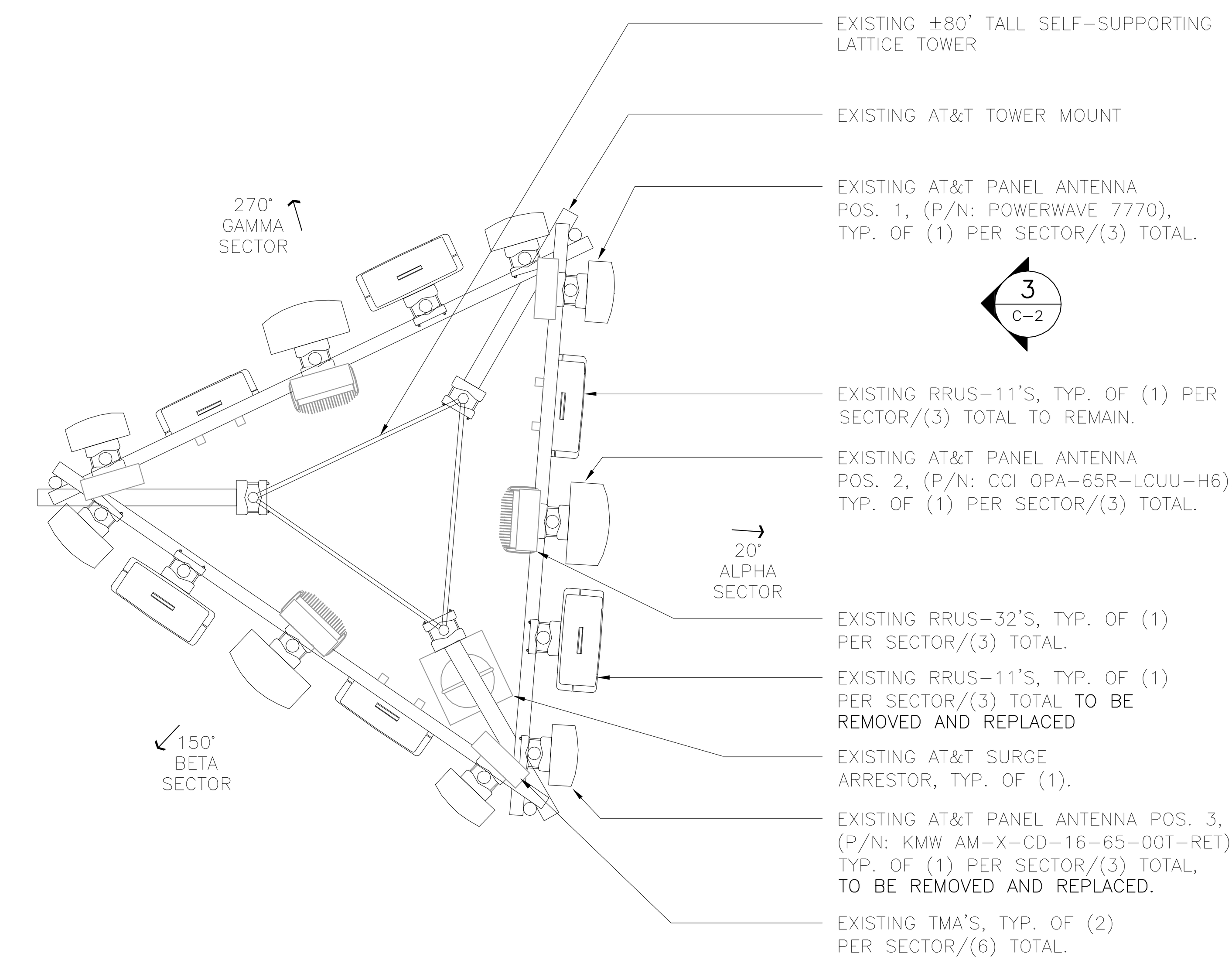


NOTES:
1. AT&T SHALL SUPPLY RRU, AND RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE-MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

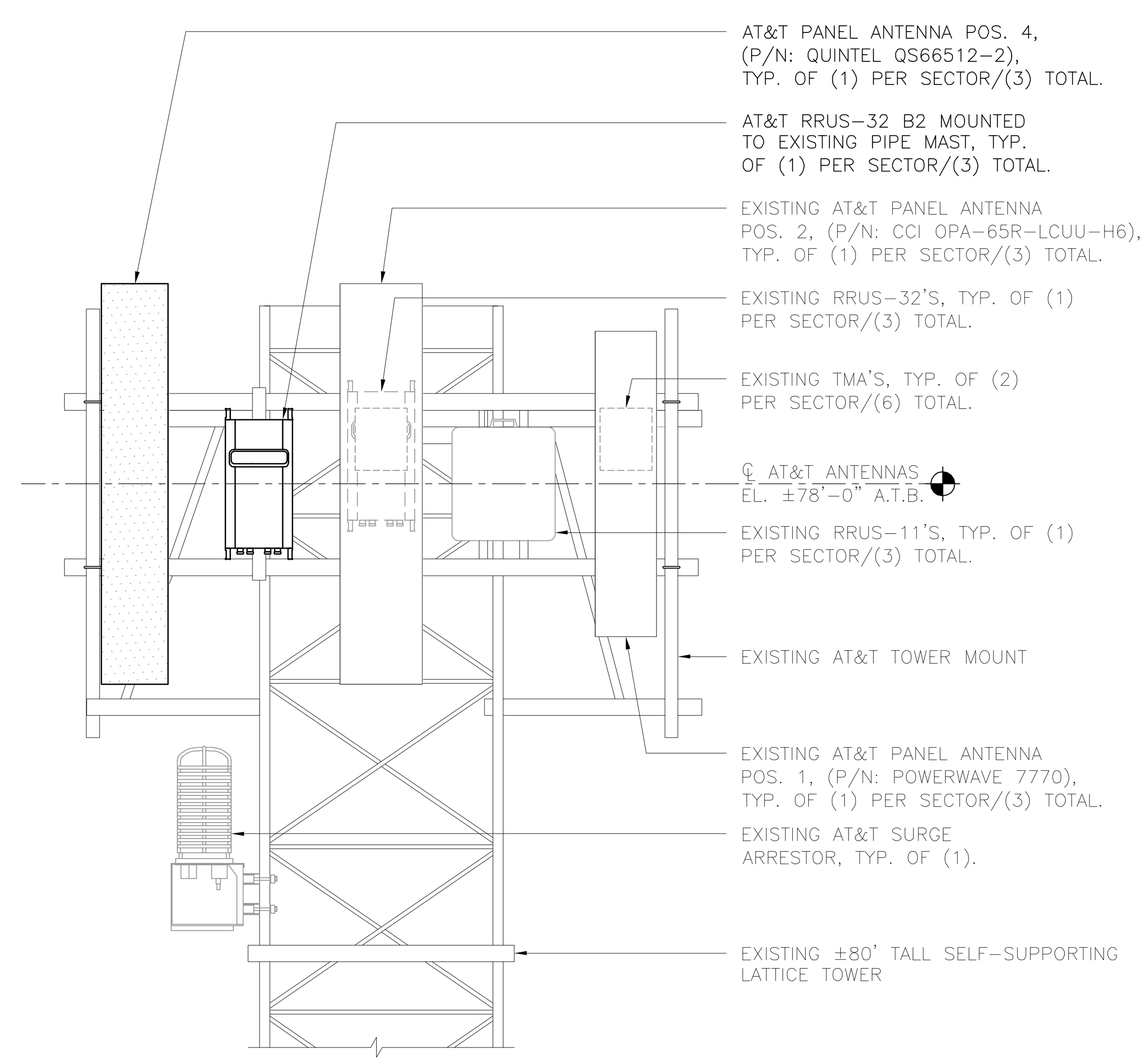
7 TYPICAL RRUS MOUNTING DETAILS
C-2
SCALE: NTS



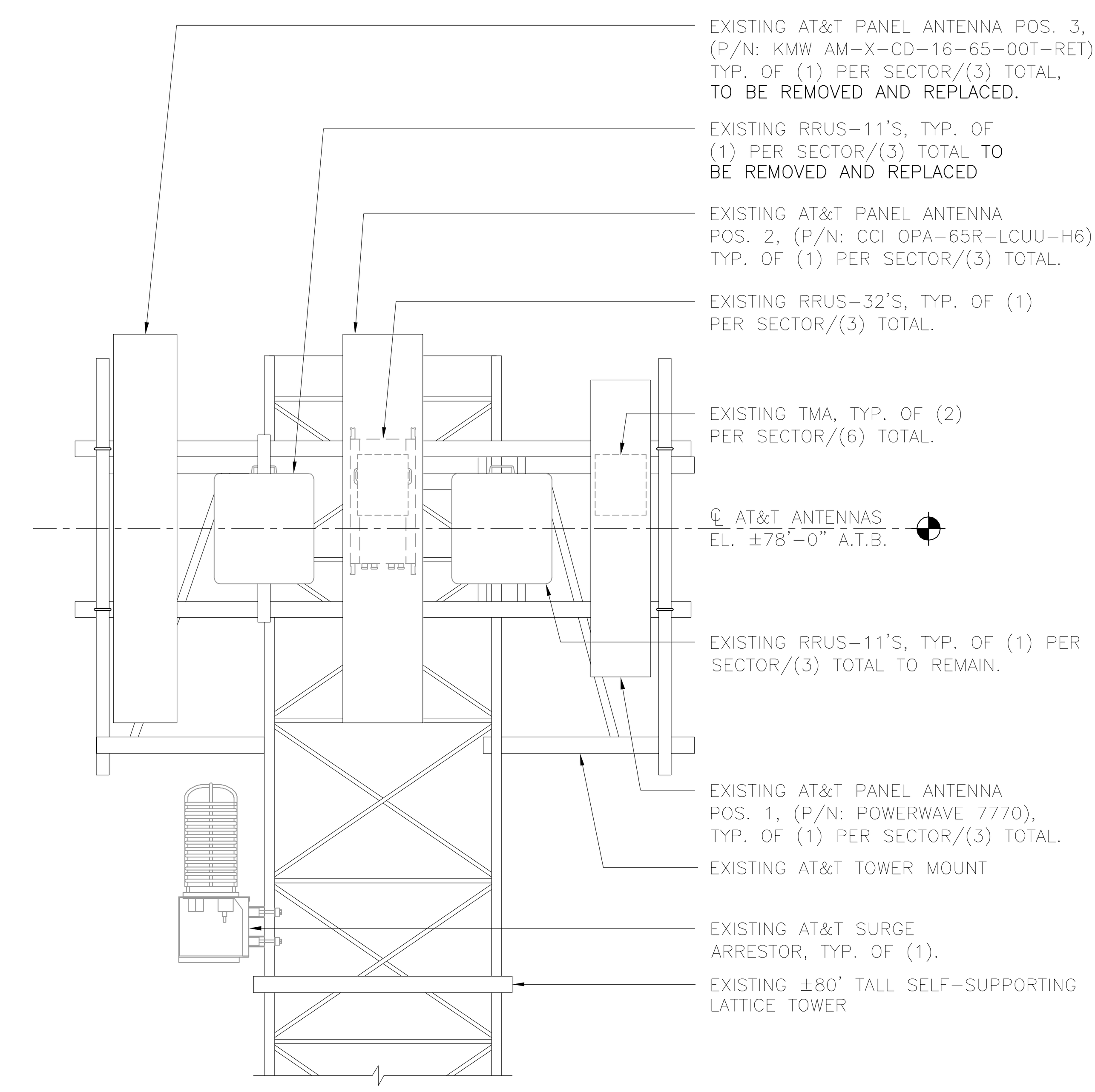
2 PROPOSED ANTENNA PLAN
C-2
SCALE: 1/2" = 1'-0"



1 EXISTING ANTENNA PLAN
C-2
SCALE: 1/2" = 1'-0"



4 PROPOSED ANTENNA ELEVATION
C-2
SCALE: 1/2" = 1'-0"



3 EXISTING ANTENNA ELEVATION
C-2
SCALE: 1/2" = 1'-0"

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
1	12/13/16	CAG	HMR	CONSTRUCTION DOCUMENTS – REV'D PER SACQ COMMENTS
0	11/10/16	KAWJR	CAG	CONSTRUCTION DOCUMENTS – ISSUED FOR CONSTRUCTION

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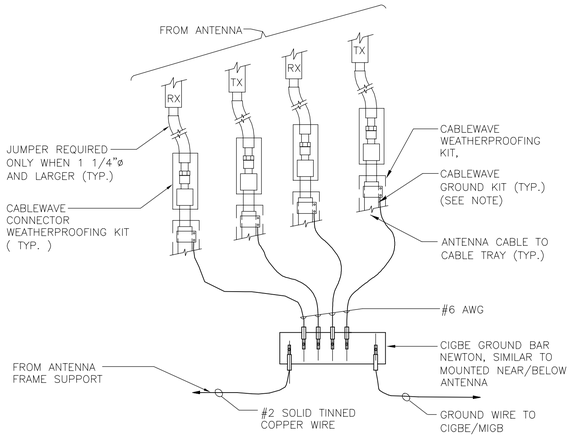
WALLINGFORD, CT 06492

DATE: 10/31/16
SCALE: AS NOTED
JOB NO. 16071.55

LTE BWE EQUIPMENT DETAILS

C-2
Sheet No. 4 of 5

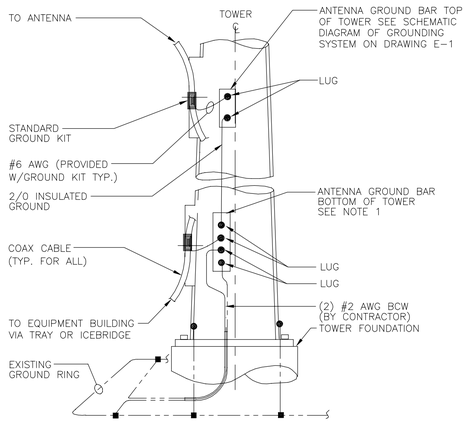


NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE

5 / E-1 CONNECTION OF GROUND WIRES TO GROUND BAR

NOT TO SCALE

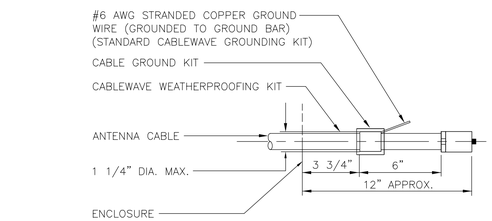


NOTES:

1. NUMBER OF GROUND BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, LOCATION AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
2. A SEPARATE GROUND BAR TO BE USED FOR GPS ANTENNA IF REQUIRED.

2 / E-1 ANTENNA CABLE GROUNDING - TOWER

NOT TO SCALE

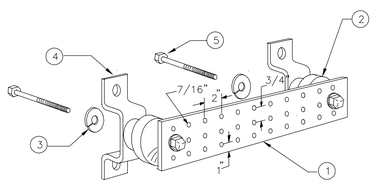


NOTE:

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

4 / E-1 ANTENNA CABLE GROUNDING DETAIL

NOT TO SCALE

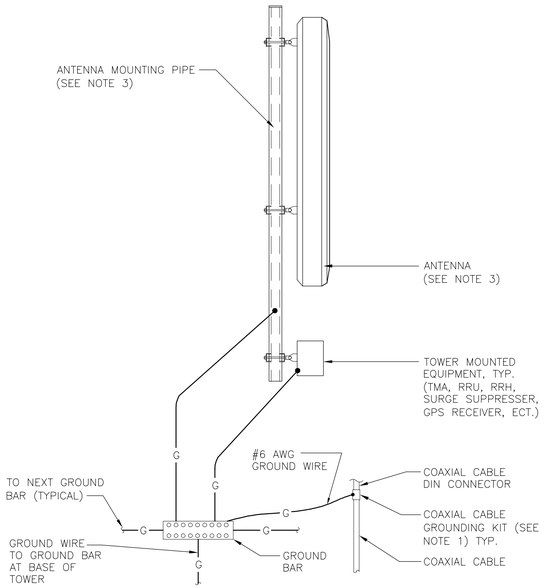


LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x 4"x 20". NEWTON INSTRUMENT CO. HOLE CENTERS TO MATCH NEMA DOUBLE LUG .
2. INSULATORS, NEWTON INSTRUMENT CAT. NO. 2. 3061-4.
3. 3. 5/8" LOCK WASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8.
4. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. 4. CAT NO. A-6056.
5. STAINLESS STEEL SECURITY SCREWS.

3 / E-1 GROUND BAR DETAIL

NOT TO SCALE



NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

1 / E-1 TYPICAL ANTENNA GROUNDING DETAIL

NOT TO SCALE

ELECTRICAL NOTES

1. PRIOR TO START OF CONSTRUCTION CONTRACTOR SHALL COORDINATE WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, AND ALL MANUFACTURER DOCUMENTATION FOR ALL EQUIPMENT TO BE INSTALLED.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH LOCAL BUILDING CODE, NATIONAL ELECTRIC CODE, OWNER AND MANUFACTURER'S SPECIFICATIONS.
3. CONNECT ALL NEW EQUIPMENT TO EXISTING TELCO AS REQUIRED BY MANUFACTURER.
4. MAINTAIN ALL CLEARANCES REQUIRED BY NEC AND EQUIPMENT MANUFACTURER.
5. PRIOR TO INSTALLATION CONTRACTOR SHALL MEASURE EXISTING ELECTRICAL LOAD AND VERIFY EXISTING AVAILABLE CAPACITY FOR PROPOSED INSTALLATION. IF INADEQUATE CAPACITY IS AVAILABLE, CONTRACTOR SHALL COORDINATE WITH LOCAL ELECTRIC UTILITY COMPANY TO UPGRADE EXISTING ELECTRIC SERVICE.
6. CONTRACTOR SHALL INSPECT EXISTING GROUNDING AND LIGHTNING PROTECTION SYSTEM AND ENSURE THAT IT IS IN COMPLIANCE WITH NEC, AND SITE OWNER'S SPECIFICATIONS. THE RESULTS OF THIS INSPECTION SHALL BE PRESENTED TO OWNERS REPRESENTATIVE, AND ANY DEFICIENCIES SHALL BE CORRECTED.
7. ALL TRANSMISSION TOWER SITES CONTAIN AN EXTENSIVE BURIED GROUNDING SYSTEM. ALL GROUNDING WORK MUST BE COORDINATED WITH, AND APPROVED BY, THE TOWER OWNER'S SITE REPRESENTATIVE. ALL OF THE TOWER OWNER'S SPECIFICATIONS MUST BE STRICTLY FOLLOWED.
8. PROVIDE AND INSTALL GROUND KITS FOR ALL NEW COAXIAL CABLES AND BOND TO EXISTING OWNERS GROUNDING SYSTEM PER OWNERS SPECIFICATIONS AND NEC.
9. ALL CONDUCTORS SHALL BE TYPE THWN (INT. APPLICATION) AND XHHW (EXT. APPLICATION), 75 DEGREE C, 600 VOLT INSULATION, SOFT ANNEALED STRANDED COPPER. #10 AWG AND SMALLER SHALL BE SPLICED USING ACCEPTABLE SOLDERLESS PRESSURE CONNECTORS. #8 AWG AND LARGER SHALL BE SPLICED USING COMPRESSION SPLIT-BOLT TYPE CONNECTORS, #12 AWG SHALL BE THE MINIMUM SIZE CONDUCTOR FOR LINE VOLTAGE BRANCH CIRCUITS. REFER TO PANEL SCHEDULE FOR BRANCH CIRCUIT CONDUCTOR SIZE(S). CONDUCTORS SHALL BE COLOR CODED FOR CONSISTENT PHASE IDENTIFICATION:
10. MINIMUM BENDING RADIUS FOR CONDUCTORS SHALL BE 12 TIMES THE LARGEST DIAMETER OF BRANCH CIRCUIT CONDUCTOR.
11. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE MADE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND NATIONAL CODES AND REGULATIONS WHICH MAY APPLY AND NOTHING IN THE DRAWINGS OR SPECIFICATIONS SHALL BE INTERPRETED AS AN INFRINGEMENT OF SUCH CODES OR REGULATIONS.
12. THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR THE COMPLETE INSTALLATION AND COORDINATION OF THE ENTIRE ELECTRICAL SERVICE. ALL ACTIVITIES TO BE COORDINATED THROUGH OWNER'S REPRESENTATIVE, DESIGN ENGINEER AND OTHER AUTHORITIES HAVING JURISDICTION OF TRADES.
13. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND PAY ALL FEES AS MAY BE REQUIRED FOR THE ELECTRICAL WORK AND FOR SCHEDULING OF ALL INSPECTIONS AS MAY BE REQUIRED BY THE LOCAL AUTHORITY.
14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION WITH THE SITE AND/OR BUILDING OWNER FOR NEW AND/OR DEMOLITION WORK INVOLVED.
15. THE CONTRACTOR SHALL GUARANTEE ALL NEW WORK FOR A PERIOD OF ONE YEAR FROM THE ACCEPTANCE DATE BY THE OWNER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING WARRANTIES FROM ALL EQUIPMENT MANUFACTURERS FOR SUBMISSION TO THE OWNER.
16. DRAWINGS INDICATE GENERAL ARRANGEMENT OF WORK INCLUDED IN CONTRACT. CONTRACTOR SHALL WITHOUT EXTRA CHARGE, MAKE MODIFICATIONS TO THE LAYOUT OF THE WORK TO PREVENT CONFLICT WITH WORK OF OTHER TRADES AND FOR THE PROPER INSTALLATION OF WORK. CHECK ALL DRAWINGS AND VISIT JOB SITE TO VERIFY SPACE AND TYPE OF EXISTING CONDITIONS IN WHICH WORK WILL BE DONE, PRIOR TO SUBMITTAL OF BID.
17. ALL NON-CURRENT CARRYING PARTS OF THE ELECTRICAL AND TELEPHONE CONDUIT SYSTEMS SHALL BE MECHANICALLY AND ELECTRICALLY CONNECTED TO PROVIDE AN INDEPENDENT RETURN PATH TO THE EQUIPMENT GROUNDING SOURCES.
18. GROUNDING SYSTEM WILL BE IN ACCORDANCE WITH THE LATEST ACCEPTABLE EDITION OF THE NATIONAL ELECTRICAL CODE AND REQUIREMENTS PER LOCAL INSPECTOR HAVING JURISDICTION.
19. EACH EQUIPMENT GROUND CONDUCTOR SHALL BE SIZED IN ACCORDANCE WITH THE N.E.C. ARTICLE 250-122. (MIN. #12 AWG).
20. CONTRACTOR SHALL PROVIDE A CELLULAR GROUNDING SYSTEM WITH THE MAXIMUM AC RESISTANCE TO GROUND OF 5 OHM BETWEEN ANY POINT ON THE GROUNDING SYSTEM AS MEASURED BY 3-POINT GROUNDING TEST. (REFER TO SECTION 16960).

TESTS BY INDEPENDENT ELECTRICAL TESTING FIRM

A. CONTRACTOR SHALL RETAIN THE SERVICES OF A LOCAL INDEPENDENT ELECTRICAL TESTING FIRM (WITH MINIMUM 5 YEARS COMMERCIAL EXPERIENCE IN THE ELECTRICAL TESTING INDUSTRY) AS SPECIFIED BY OWNER TO PERFORM:

   TEST 1: RESISTANCE TO GROUND TEST ON THE CELLULAR GROUNDING SYSTEM.

   THE TESTING FIRM SHALL INCLUDE THE FOLLOWING INFORMATION WITH THE REPORT:

   1. TESTING PROCEDURE INCLUDING THE MAKE AND MODEL OF TEST EQUIPMENT.
   2. CERTIFICATION OF TESTING EQUIPMENT CALIBRATION WITHIN SIX (6) MONTHS OF DATE OF TESTING. INCLUDE CERTIFICATION LAB ADDRESS AND TELEPHONE NUMBER.
   3. GRAPHICAL DESCRIPTION OF TESTING METHOD ACTUALLY IMPLEMENTED.

B. TESTING SHALL BE PERFORMED IN THE PRESENCE AND TO THE SATISFACTION OF OWNERS CONSTRUCTION REPRESENTATIVE. TESTING DATA SHALL BE INITIALED AND DATED BY THE CONSTRUCTION AND INCLUDED WITH THE WRITTEN REPORT/ANALYSIS.

C. THE CONTRACTOR SHALL FORWARD SIX (6) COPIES OF THE INDEPENDENT ELECTRICAL TESTING FIRM REPORT/ANALYSIS TO ENGINEER A MINIMUM OF TEN (10) WORKING DAYS PRIOR TO THE JOB TURNOVER.

D. CONTRACTOR TO PROVIDE A MINIMUM OF ONE (1) WEEK NOTICE TO OWNER AND ENGINEER FOR ALL TESTS REQUIRING WITNESSING.

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	11/10/16	CAG	HMR	CONSTRUCTION DOCUMENTS - ISSUED FOR CONSTRUCTION
1	12/13/16	KAW/JR	CAG	CONSTRUCTION DOCUMENTS - REV'D PER SACQ COMMENTS

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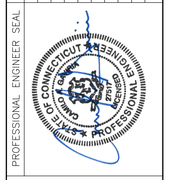

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DATE:	10/31/16
SCALE:	AS NOTED
JOB NO.	16071.55

TYPICAL ELECTRICAL DETAILS & NOTES

E-1

Sheet No. 5 of 5