Michael Gentile, Site Acquisition
c/o New Cingular Wireless, PCS LLC (AT&T)
Centerline Communications, LLC
95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 844-9813
mgentile@clinellc.com

February 18, 2016

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

RE: Notice of Exempt Modification // Site Number: CT2102
5 Perryridge Road, Greenwich, CT (Site Name: Greenwich Perryridge Road Tower)
N 41.0339361 // W -73.63080333

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains nine (9) antennas at the 134 foot level of the existing 164 foot monopole tower at 5 Perryridge Road, Greenwich, CT 06830. The tower is owned by Greenwich Hospital. The property is also owned by Greenwich Hospital. AT&T now intends to replace three (3) of its existing antennas with three (3) new LTE (700/1900 band) antennas for its LTE upgrade. These antennas would be installed at the same 134 foot level of the tower. AT&T also intends to remove three (3) remote radio units and install six (6) remote radio units and three (3) remote radio unit modules, six (6) triplexers, one (1) surge arrestor, two (2) DC power lines and one (1) fiber line. All equipment will be mounted at the 134 foot level except for the proposed surge arrestor, which will be mounted at the 138 foot level.

The current proposal involves an antenna swap only (three for three); no antennas will be added. AT&T was originally approved for six (6) antennas on 9/25/2008 and subsequently approved for three (3) additional antennas and various ancillary equipment on 5/31/2011.

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 Peter Tesei, First Selectman for the Town of Greenwich, as well as the tower owner, Greenwich Hospital and the ground owner, who is also Greenwich Hospital.

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 2/10/2016 by ComEx Consultants, a structural analysis dated 1/21/2016 by Centek Engineering and an Emissions Analysis Report dated 2/9/2016 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.

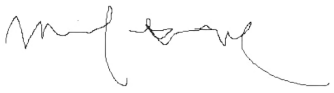
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

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 1/21/2016.

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,



Michael Gentile, Site Acquisition
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95 Ryan Drive, Suite 1
Raynham, MA 02767
Mobile: (508) 844-9813
mgentile@clinellc.com

Attachments

cc: Peter Tesei, First Selectman, Town of Greenwich - as elected official
Greenwich Hospital - as tower owner
Greenwich Hospital - as property owner

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

164-ft Existing EEI Monopole

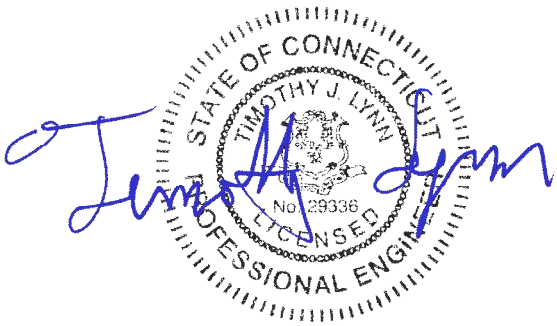
Proposed AT&T Mobility
Antenna Upgrade

AT&T Site Ref: CT2102

5 Perryridge Road
Greenwich, CT

CENTEK Project No. 16002.005

Date: January 21, 2016



Prepared for:

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

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 monopole (tower) owned and operated by Greenwich Hospital located in Greenwich, Connecticut.

The host tower is a 164-ft tall, five-section, eighteen sided, tapered monopole, originally designed and manufactured by Engineered Endeavors Incorporated (EEI); project no. 11030 dated August 21, 2002. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained a previous structural analysis report prepared by Centek; job no; 15001.145, dated January 20, 2016 and a AT&T RF data sheet.

The tower is made up of five (5) tapered vertical sections consisting of A572-65 pole sections. The bottom four (4) vertical tower sections are slip joint connected while the top section is flange connected. The diameter of the pole (flat-flat) is 47.0-in at the top and 76.0-in at the base.

AT&T proposes the removal of three (3) panel antennas and three (3) remote radio heads and the installation of three (3) panel antennas, six (6) remote radio heads and one (1) surge arrestor mounted to the existing low profile platform. Refer to the Antenna and Appurtenance Summary below for a detailed description of the proposed antenna and appurtenance configuration.

Antenna and Appurtenance Summary

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

- TOWN (EXISTING):
  Antennas: One (1) 12-ft Omni-directional whip antenna, two (2) 10-ft Omni-directional whip antennas, two (2) 8-ft Omni-directional whip antennas, one Kathrein Scala 2' square panel and one (1) camera mounted on a PiROD 13-ft low profile platform with an elevation of 164-ft above grade level.
  Coax Cables: Six (6) 1/2" ∅, one (1) 5/8" ∅, three (3) 7/8" ∅ and two (2) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- TOWN (EXISTING):
  Antennas: Two (2) 4 FT Dishes and one (1) 2 Ft Dish mounted on three 4'x4" pipe mounts with a RAD center elevation of 160-ft above grade level.
  Coax Cables: Three (3) 1-1/4" ∅ coax cables running on the inside of the existing tower.
- CLEARWIRE (EXISTING):
  Antennas: Three (3) Argus LLPX310R panel antennas, three (3) Samsung FDD-R6-RRH, two (2) Dragonwave Horizon ODU's and two (2) Dragonwave A-ANT-23-G-2-C dishes mounted on the Sprint 13-ft low profile platform with a RAD center elevation of 154-ft above the existing tower base plate.
  Coax Cables: Two (2) 2" ∅ conduits and two (2) 5/8" ∅ coax cables running on the inside of the existing tower.

- SPRINT (EXISTING):
  Antennas: Two (2) RFS APXVSPP18-C-A20 panel antennas, one (1) Powerwave P40-16-XLPP-RR-A panel antennas, three (3) RFS APXVTM14 panel antennas and one (1) GPS antenna mounted to a low profile platform with a RAD center elevation of 154-ft above the existing tower base plate. Three (3) ALU 1900 MHz RRH's, three (3) ALU 800 MHz RRH's and three (3) ALU TD-RRH-820 remote radio heads mounted on a universal tr-bracket below the existing low profile platform.
  Coax Cables: Six (6) 1-5/8" ∅ Hybriflex cables and one (1) 1/2" ∅ coax cable running on the inside of the existing tower.
- T-MOBILE (EXISTING):
  Antennas: Three (3) RFS APX16PV-16PVL panel antennas, three (3) Andrew LNX-6515DS panel antennas, nine (9) TMA's and three (3) Bias Tee's mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 144-ft above grade level.
  Coax Cables: Twelve (12) 1-5/8" ∅ coax cables inside the monopole and six (6) 1-5/8" ∅ cables on the exterior of the existing tower.
- EVERSOURCE ENERGY (EXISTING):
  Antennas: Two (2) Decibel DB586-Y omni-directional whips (one upright and one inverted), one (1) Telewave ANT150F2 omni-directional whip, one (1) Comprod 531-70HD dipole and one (1) tower top amplifier mounted on a PiROD 13-ft low profile platform with an elevation of 114-ft above grade level.
  Coax Cables: Two (2) 1-5/8" ∅, two (2) 7/8" ∅ and one (1) 1/2" ∅ coax cables running on the inside of the existing tower
  on the inside of the existing tower.
- UNKNOWN (EXISTING):
  Antennas: Three GPS antennas mounted on three (3) standoffs with a RAD center elevation of 50-ft above grade level.
  Coax Cables: Three (3) 7/8" ∅ coax cables running on the exterior of the existing tower.
- VERIZON (EXISTING):
  Antennas: Six (6) Decibel DB844H65E-XY panel antennas, three (3) RYMSA MG D3-800T0 panel antennas, six (6) Andrew SBNHH-1D65B panel antennas, three (3) Alcatel-Lucent RRH2x60-700 remote radio heads, three (3) Alcatel-Lucent RRH2x60-PCS remote radio heads, three (3) Alcatel-Lucent RRH4x45/2x90-AWS remote radio heads, six (6) RFS FD9R6004/2C-3L Diplexers and two (2) Raycap RC2DC-3315-PF-48 main distribution boxes mounted on a 13-ft low profile platform with a RAD center elevation of 124-ft above grade level.
  Coax Cables: Six (6) 1-5/8" ∅ coax cables and two (2) 1-5/8" ∅ fiber cables running inside the monopole.

- AT&T (EXISTING TO REMAIN):
  Antennas: Three (3) Powerwave 7770.00 panel antennas, three (3) Powerwave P65-16-XLH-RR panel antennas, six (6) LGP21401 TMA's and six (6) LGP21901 diplexers mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 134-ft above grade level. Three (3) Ericsson RRUS-11 remote radio heads and one (1) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
  Cables: Twelve (12) 1-5/8" ∅ coax cables, one (1) fiber cable and two (2) dc control cables running on the inside of the existing tower
- AT&T (EXISTING TO REMOVE):
  Antennas: Three (3) Powerwave 7770.00 panel antennas 13-ft low profile platform with a RAD center elevation of 134-ft above grade level. Three (3) Ericsson RRUS-11 remote radio heads mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
- **AT&T (PROPOSED):**
  Antennas: Three (3) Quintel QS66512-3 panel antennas, six (6) CCI TPX-070821 triplexers, three (3) Ericsson RRUS-12 remote radio heads, three (3) Ericsson RRUS-32 remote radio heads and three (3) Ericsson A2 units mounted on a PiROD 13-ft low profile platform with a RAD center elevation of 134-ft above grade level. One (1) Raycap DC6-48-60-18-8F surge arrestor mounted to one (1) universal ring mount with a RAD center elevation of 138-ft above grade level.
  Cables: One (1) fiber cable and two (2) dc control cables running on the inside of the existing tower.

Primary Assumptions Used in the Analysis

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

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

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix K of the CSBC[1] and the wind speed data available in the TIA/EIA-222-F-96 Standard. The higher of the two wind speeds is utilized in preparation on the tower analysis.

Tower Loading

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

Basic Wind Speed:	Fairfield; v = 85 mph (fastest mile)	*[Section 16 of TIA/EIA-222-F-96]*
	Greenwich; v = 100 mph (3 second gust) equivalent to v = 80 mph (fastest mile)	*[Appendix K of the 2005 CT Building Code Supplement]*
	TIA/EIA wind speed controls.	
Load Cases:	Load Case 1; 85 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 2; 74 mph wind speed w/ ½" radial ice plus gravity load – used in calculation of tower stresses. The 74 mph wind speed velocity represents 75% of the wind pressure generated by the 85 mph wind speed.	*[Section 2.3.16 of TIA/EIA-222-F-96]*
	Load Case 3; Seismic – not checked	*[Section 1614.5 of State Bldg. Code 2005] does not control in the design of this structure type*

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

Tower Capacity

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

- Calculated stresses were found to be within allowable limits. In Load Case 1, per tnxTower "Section Capacity Table", this tower was found to be at **50.0%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L5)	1.50'-39.88'	50.0%	**PASS**

- The tower deflection (tilt) was found to be within allowable limits.

Deflection (degrees)	Proposed	Allowable (1)	Result
Tilt	1.47	1.9	**PASS**

(1) Allowable tilt taken from original EEI design documents job no. 11030 dated 8/21/02.

Foundation and Anchors

The existing foundation consists of a 9.0 ∅ x 28.0-ft long reinforced concrete caisson. The sub-grade conditions used in the analysis of the existing foundation were obtained from the aforementioned EEI design report; project no. 11030 dated August 21, 2002. The base of the tower is connected to the foundation by means of (30) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 7-ft 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	46 kips
	Compression	83 kips
	Moment	5220 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Proposed Loading	Result
Reinforced Concrete Caisson	Moment Capacity	65.0%	**PASS**
	Lateral Deflection	0.61 in.(1)	**PASS**

(1) Lateral deflection typically limited to 1.0 in. for monopole tower structures.

- The flange bolts and plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Flange Bolts	Tension	55.9%	**PASS**
Flange Plate	Bending	43.5%	**PASS**

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

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Combined Axial and Bending	51.3%	**PASS**
Base Plate	Bending	40.2%	**PASS**

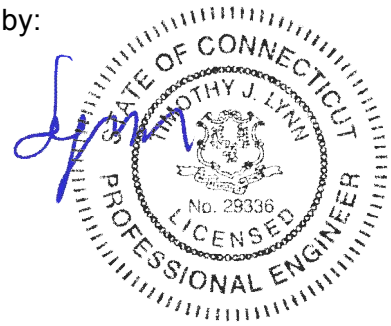
Conclusion

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 Mobilty. 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.

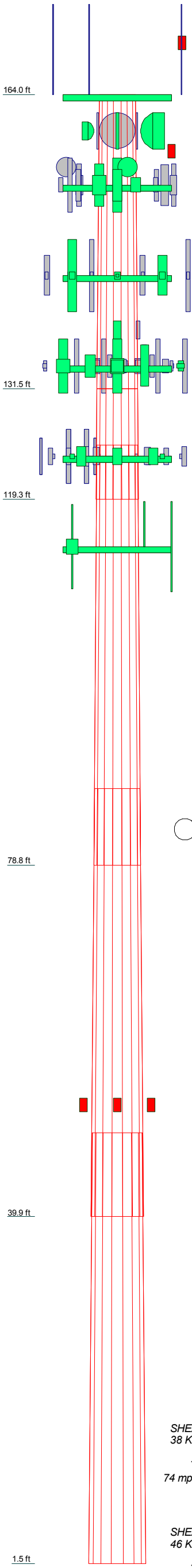
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

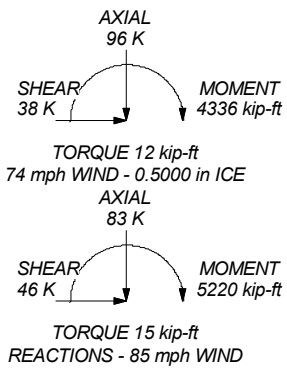
tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

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

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	32.50	18	0.3125		47.0000	53.4200		5.5
2	12.21	18	0.3750	6.00	53.4200	56.1500		2.7
3	46.50	18	0.4375	8.42	54.0585	62.9700		12.8
4	47.33	18	0.5625	9.25	60.4813	69.6600	A572-65	18.5
5	47.63	18	0.5625		66.7412	76.0000		20.5
								60.0





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
12' x 3" Dia Omni (Town Existing)	164	(2) LGP21401 TMA (ATI Existing)	134
8' x 3" Dia Omni (Town Existing)	164	(2) LGP21401 TMA (ATI Existing)	134
2'x2' Panel (Town Existing)	164	(2) LGP21901 Diplexer (ATI Existing)	134
10' x 3" Dia Omni (Town Existing)	164	(2) LGP21901 Diplexer (ATI Existing)	134
10' x 3" Dia Omni (Town Existing)	164	(2) LGP21901 Diplexer (ATI Existing)	134
8' x 3" Dia Omni (Town Existing)	164	(2) TPX-070821 (ATI Proposed)	134
Camera (Town Existing)	164	(2) TPX-070821 (ATI Proposed)	134
Low Profile Platform (Town Existing)	164	(2) TPX-070821 (ATI Proposed)	134
4'x4" Pipe Mount (Town Existing)	160	RRUS-11 (ATI Existing)	134
4'x4" Pipe Mount (Town Existing)	160	RRUS-11 (ATI Existing)	134
4'x4" Pipe Mount (Town Existing)	160	RRUS-11 (ATI Existing)	134
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4 FT DISH (Town Existing)	160	RRUS-12 (ATI Proposed)	134
2 FT DISH (Town Existing)	160	RRUS-12 (ATI Proposed)	134
Horizon ODU (Clearwire Existing)	154	RRUS-32 (ATI Proposed)	134
Horizon ODU (Clearwire Existing)	154	RRUS-32 (ATI Proposed)	134
APXVSPP18-C-A20 (Sprint Existing)	154	RRUS-32 (ATI Proposed)	134
P40-16-XLPP-RR-A (Sprint Existing)	154	A2 (ATI Proposed)	134
APXVSPP18-C-A20 (Sprint Existing)	154	A2 (ATI Proposed)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	A2 (ATI Proposed)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	Low Profile Platform (ATI Existing)	134
FD-RRH 4x45 1900 (Sprint Existing)	154	P65-16-XLH-RR (ATI Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	7770.00 (ATI Existing)	134
FD-RRH 2x50 800 (Sprint Existing)	154	QS66512-3 (ATI Proposed)	134
FD-RRH 2x50 800 (Sprint Existing)	154	7770.00 (ATI Existing)	134
GPS (Sprint Existing)	154	QS66512-3 (ATI Proposed)	134
Low Profile Platform (Sprint Existing)	154	DB844H65E-XY (Verizon Existing)	124
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APXVTM14 (Sprint Existing)	154	SBNHH-1D65B (Verizon Existing)	124
APXVTM14 (Sprint Existing)	154	SBNHH-1D65B (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	DB844H65E-XY (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	DB844H65E-XY (Verizon Existing)	124
TD-RRH8x20-25 (Sprint Existing)	154	MG D3-800TX (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	SBNHH-1D65B (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	SBNHH-1D65B (Verizon Existing)	124
LLPX310R (Clearwire Existing)	154	DB844H65E-XY (Verizon Existing)	124
A-Ant-23G-2-C (Clearwire Existing)	154	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
A-Ant-23G-2-C (Clearwire Existing)	154	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	(2) FD9R6004/2C-3L Diplexer (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	RRH4x45/2x90-AWS (Verizon Existing)	124
Remote Radio Head FD R6 RRH (Clearwire Existing)	151.5	RRH4x45/2x90-AWS (Verizon Existing)	124
Valmont Uni-Tri Bracket (Sprint Existing)	151.5	RRH4x45/2x90-AWS (Verizon Existing)	124
LNX-6515DS (T-Mobile Existing)	144	RRH4x30-B13 (Verizon Existing)	124
(3) TMA 10"x8"x3" (T-Mobile Existing)	144	RRH4x30-B13 (Verizon Existing)	124
(3) TMA 10"x8"x3" (T-Mobile Existing)	144	RRH4x30-B13 (Verizon Existing)	124
(3) TMA 10"x8"x3" (T-Mobile Existing)	144	RRH2x60-PCS (Verizon Existing)	124
Smart Bias T (T-Mobile Existing)	144	RRH2x60-PCS (Verizon Existing)	124
Smart Bias T (T-Mobile Existing)	144	RRH2x60-PCS (Verizon Existing)	124
Smart Bias T (T-Mobile Existing)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
Low Profile Platform (T-Mobile Existing)	144	RC2DC-3315-PF-48 (Verizon Existing)	124
LNX-6515DS (T-Mobile Existing)	144	Low Profile Platform (Verizon Existing)	124
APX16PV-16PVL-E (T-Mobile Existing)	144	DB844H65E-XY (Verizon Existing)	124
LNX-6515DS (T-Mobile Existing)	144	MG D3-800TX (Verizon Existing)	124
APX16PV-16PVL-E (T-Mobile Existing)	144	SBNHH-1D65B (Verizon Existing)	124
APX16PV-16PVL-E (T-Mobile Existing)	144	SBNHH-1D65B (Verizon Existing)	124
DC6-48-60-18-8F Surge Arrestor (ATI Proposed)	138	DB844H65E-XY (Verizon Existing)	124
DC6-48-60-18-8F Surge Arrestor (ATI Existing)	138	DB586-Y (Eversource Existing)	114
Valmont Uni-Tri Bracket (ATI Existing)	138	DB586-Y (Eversource Existing)	114
P65-16-XLH-RR (ATI Existing)	134	ANT150F2 (Eversource Existing)	114
7770.00 (ATI Existing)	134	Tower Top Amplifier (Eversource Existing)	114
QS66512-3 (ATI Proposed)	134	Low Profile Platform	114
P65-16-XLH-RR (ATI Existing)	134	531-70HD (Eversource Existing)	114
(2) LGP21401 TMA (ATI Existing)	134	GPS	51.5
		GPS	51.5
		GPS	51.5

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 74 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 50 mph wind.
4. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
5. Welds are fabricated with ER-70S-6 electrodes.
6. TOWER RATING: 50%

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

Job: 16002.005 - CT2102			
Project: 164' EEI Monopole - 5 Perryridge Rd., Greenwich, CT			
Client: AT&T Mobilty	Drawn by: TJL	App'd:	
Code: TIA/EIA-222-F	Date: 01/21/16	Scale: NTS	
Path:		Dwg No. E-1	

Tower Input Data

There is a pole section.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 85 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 74 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 50 mph.
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
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	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	√ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
√ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
√ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
Escalate Ice	Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	Use Azimuth Dish Coefficients	√ Consider Feedline Torque
Use Special Wind Profile	√ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	√ Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination	Use TIA-222-G Tension Splice Capacity Exemption	

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	164.00-131.50	32.50	0.00	18	47.0000	53.4200	0.3125	1.2500	A572-65 (65 ksi)
L2	131.50-119.29	12.21	6.00	18	53.4200	56.1500	0.3750	1.5000	A572-65 (65 ksi)
L3	119.29-78.79	46.50	8.42	18	54.0585	62.9700	0.4375	1.7500	A572-65 (65 ksi)
L4	78.79-39.88	47.33	9.25	18	60.4813	69.6600	0.5625	2.2500	A572-65 (65 ksi)
L5	39.88-1.50	47.63		18	66.7412	76.0000	0.5625	2.2500	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
									(65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	47.7251	46.3082	12752.5270	16.5741	23.8760	534.1149	25521.8341	23.1585	7.7220	24.71
	54.2441	52.6760	18769.9004	18.8532	27.1374	691.6627	37564.4987	26.3430	8.8519	28.326
L2	54.2441	63.1368	22444.4518	18.8310	27.1374	827.0684	44918.4365	31.5744	8.7419	23.312
	57.0162	66.3862	26091.2194	19.8001	28.5242	914.7047	52216.7704	33.1994	9.2224	24.593
L3	56.0600	74.4594	27047.4669	19.0354	27.4617	984.9157	54130.5236	37.2368	8.7443	19.987
	63.9414	86.8342	42898.2727	22.1990	31.9888	1341.0421	85852.9920	43.4253	10.3127	23.572
L4	63.0724	106.9776	48524.0652	21.2712	30.7245	1579.3269	97111.9796	53.4990	9.6547	17.164
	70.7346	123.3649	74413.8720	24.5296	35.3873	2102.8424	148925.6597	61.6942	11.2702	20.036
L5	69.5966	118.1537	65376.3617	23.4934	33.9045	1928.2498	130838.7474	59.0881	10.7564	19.123
	77.1724	134.6842	96834.1984	26.7803	38.6080	2508.1382	193795.8137	67.3549	12.3860	22.02

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 164.00-131.50				1	1	1		
L2 131.50-119.29				1	1	1		
L3 119.29-78.79				1	1	1		
L4 78.79-39.88				1	1	1		
L5 39.88-1.50				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
1/2	A	No	Inside Pole	164.00 - 4.50	6	No Ice	0.00	0.25
(Town Existing)						1/2" Ice	0.00	0.25
5/8	A	No	Inside Pole	164.00 - 4.50	1	No Ice	0.00	0.40
(Town Existing)						1/2" Ice	0.00	0.40
7/8	A	No	Inside Pole	164.00 - 4.50	3	No Ice	0.00	0.54
(Town Existing)						1/2" Ice	0.00	0.54
1 1/4	A	No	Inside Pole	164.00 - 4.50	5	No Ice	0.00	0.66
(Town Existing)						1/2" Ice	0.00	0.66
1/2	B	No	Inside Pole	154.00 - 7.50	1	No Ice	0.00	0.25
(Sprint Existing)						1/2" Ice	0.00	0.25
2" Rigid Conduit	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	2.80
(Clearwire Existing)						1/2" Ice	0.00	2.80
LDF4.5-50 (5/8 FOAM)	B	No	Inside Pole	154.00 - 7.50	2	No Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
(Clearwire Existing)						1/2" Ice	0.00	0.15
1 5/8	B	No	Inside Pole	144.00 - 4.50	12	No Ice	0.00	1.04
(T-Mobile Existing)						1/2" Ice	0.00	1.04
1 5/8	A	No	Inside Pole	134.00 - 11.50	12	No Ice	0.00	1.04
(AT&T Existing)						1/2" Ice	0.00	1.04
1 5/8	C	No	Inside Pole	124.00 - 7.50	6	No Ice	0.00	1.04
(Verizon Existing)						1/2" Ice	0.00	1.04
RG6-Fiber	A	No	Inside Pole	134.00 - 11.50	1	No Ice	0.00	0.00
(AT&T Existing)						1/2" Ice	0.00	0.00
#8 AWG Copper WIre	A	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.00
(AT&T Existing)						1/2" Ice	0.00	0.00
7/8	B	No	CaAa (Out Of Face)	51.50 - 4.50	3	No Ice	0.11	0.54
						1/2" Ice	0.21	1.52
HYBRIFLEX 1-5/8"	B	No	Inside Pole	154.00 - 7.50	6	No Ice	0.00	1.90
(Sprint Existing)						1/2" Ice	0.00	1.90
HYBRIFLEX 1-5/8"	C	No	Inside Pole	124.00 - 7.50	1	No Ice	0.00	1.90
(Verizon Existing)						1/2" Ice	0.00	1.90
7/8	C	No	Inside Pole	114.00 - 1.50	2	No Ice	0.00	0.54
(Eversource Existing)						1/2" Ice	0.00	0.54
1 5/8	C	No	Inside Pole	114.00 - 1.50	2	No Ice	0.00	1.04
(Eversource Existing)						1/2" Ice	0.00	1.04
1/2	C	No	Inside Pole	114.00 - 1.50	1	No Ice	0.00	0.25
(Eversource Existing)						1/2" Ice	0.00	0.25
1 5/8	B	No	CaAa (Out Of Face)	144.00 - 7.50	1	No Ice	0.20	1.04
(T-Mobile - Existing)						1/2" Ice	0.30	2.55
1 5/8	B	No	CaAa (Out Of Face)	144.00 - 7.50	5	No Ice	0.00	1.04
(T-Mobile - Existing)						1/2" Ice	0.00	2.55
HYBRIFLEX 1-5/8"	C	No	Inside Pole	124.00 - 7.50	1	No Ice	0.00	1.90
(Verizon Existing)						1/2" Ice	0.00	1.90
RG6-Fiber	A	No	Inside Pole	134.00 - 11.50	1	No Ice	0.00	0.00
(AT&T Proposed)						1/2" Ice	0.00	0.00
#8 AWG Copper WIre	A	No	Inside Pole	134.00 - 11.50	2	No Ice	0.00	0.00
(AT&T Proposed)						1/2" Ice	0.00	0.00

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	164.00-131.50	A	0.000	0.000	0.000	0.000	0.25
		B	0.000	0.000	0.000	2.475	0.63
		C	0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.000	0.000	0.000	0.000	0.24
		B	0.000	0.000	0.000	2.418	0.44
		C	0.000	0.000	0.000	0.000	0.05
L3	119.29-78.79	A	0.000	0.000	0.000	0.000	0.78
		B	0.000	0.000	0.000	8.019	1.47
		C	0.000	0.000	0.000	0.000	0.53
L4	78.79-39.88	A	0.000	0.000	0.000	0.000	0.75
		B	0.000	0.000	0.000	11.574	1.43
		C	0.000	0.000	0.000	0.000	0.52
L5	39.88-1.50	A	0.000	0.000	0.000	0.000	0.60
		B	0.000	0.000	0.000	18.193	1.27
		C	0.000	0.000	0.000	0.000	0.46

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	164.00-131.50	A	0.500	0.000	0.000	0.000	0.000	0.25
		B		0.000	0.000	0.000	3.725	0.74
		C		0.000	0.000	0.000	0.000	0.00
L2	131.50-119.29	A	0.500	0.000	0.000	0.000	0.000	0.24
		B		0.000	0.000	0.000	3.639	0.55
		C		0.000	0.000	0.000	0.000	0.05
L3	119.29-78.79	A	0.500	0.000	0.000	0.000	0.000	0.78
		B		0.000	0.000	0.000	12.069	1.84
		C		0.000	0.000	0.000	0.000	0.53
L4	78.79-39.88	A	0.500	0.000	0.000	0.000	0.000	0.75
		B		0.000	0.000	0.000	18.950	1.82
		C		0.000	0.000	0.000	0.000	0.52
L5	39.88-1.50	A	0.500	0.000	0.000	0.000	0.000	0.60
		B		0.000	0.000	0.000	32.044	1.67
		C		0.000	0.000	0.000	0.000	0.46

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	164.00-131.50	0.1010	0.0583	0.1478	0.0853
L2	131.50-119.29	0.2465	0.1423	0.3573	0.2063
L3	119.29-78.79	0.2473	0.1428	0.3593	0.2074
L4	78.79-39.88	0.3715	0.2145	0.5821	0.3361
L5	39.88-1.50	0.5677	0.3278	0.9362	0.5405

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
4'x4" Pipe Mount	A	From Face	0.50	0.0000	160.00	No Ice	1.32	1.32	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
4'x4" Pipe Mount	B	From Face	0.50	0.0000	160.00	No Ice	1.32	1.32	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
4'x4" Pipe Mount	C	From Face	0.50	0.0000	160.00	No Ice	1.32	1.32	0.04
(Town Existing)			0.00			1/2" Ice	1.58	1.58	0.06
			0.00						
12' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	3.60	3.60	0.04
(Town Existing)			-4.00			1/2" Ice	4.83	4.83	0.06
			5.00						
8' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	2.40	2.40	0.03

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
(Town Existing)			4.00 5.00			1/2" Ice	3.19	3.19	0.04
2'x2' Panel	B	From Face	4.00	0.0000	164.00	No Ice	5.60	0.72	0.02
(Town Existing)			4.00 5.00			1/2" Ice	5.92	0.88	0.05
10' x 3" Dia Omni	B	From Face	4.00	0.0000	164.00	No Ice	3.00	3.00	0.03
(Town Existing)			4.00 5.00			1/2" Ice	4.03	4.03	0.05
10' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	3.00	3.00	0.03
(Town Existing)			-4.00 5.00			1/2" Ice	4.03	4.03	0.05
8' x 3" Dia Omni	A	From Face	4.00	0.0000	164.00	No Ice	2.40	2.40	0.03
(Town Existing)			4.00 5.00			1/2" Ice	3.19	3.19	0.04
Camera	C	From Face	4.00	0.0000	164.00	No Ice	3.00	3.00	0.10
(Town Existing)			-4.00 2.00			1/2" Ice	4.00	4.00	0.15
Low Profile Platform	C	None		0.0000	164.00	No Ice	15.70	15.70	1.30
(Town Existing)						1/2" Ice	20.10	20.10	1.76
LLPX310R	A	From Face	3.00	0.0000	154.00	No Ice	4.83	1.95	0.03
(Clearwire Existing)			0.00 0.00			1/2" Ice	5.18	2.21	0.05
LLPX310R	B	From Face	3.00	0.0000	154.00	No Ice	4.83	1.95	0.03
(Clearwire Existing)			0.00 0.00			1/2" Ice	5.18	2.21	0.05
LLPX310R	C	From Face	3.00	0.0000	154.00	No Ice	4.83	1.95	0.03
(Clearwire Existing)			0.00 0.00			1/2" Ice	5.18	2.21	0.05
Remote Radio Head FD R6 RRH	A	From Face	3.00 0.00	0.0000	151.50	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
(Clearwire Existing)			0.00						
Remote Radio Head FD R6 RRH	B	From Face	3.00 0.00	0.0000	151.50	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
(Clearwire Existing)			0.00						
Remote Radio Head FD R6 RRH	C	From Face	3.00 0.00	0.0000	151.50	No Ice 1/2" Ice	1.80 1.99	0.78 0.92	0.03 0.04
(Clearwire Existing)			0.00						
Horizon ODU	A	None		0.0000	154.00	No Ice	0.79	0.17	0.00
(Clearwire Existing)						1/2" Ice	0.91	0.25	0.00
Horizon ODU	C	None		0.0000	154.00	No Ice	0.79	0.17	0.00
(Clearwire Existing)						1/2" Ice	0.91	0.25	0.00
APXVSPP18-C-A20	A	From Face	4.00	0.0000	154.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00 0.00			1/2" Ice	8.81	5.74	0.11
P40-16-XLPP-RR-A	B	From Face	4.00	0.0000	154.00	No Ice	10.50	3.52	0.05
(Sprint Existing)			0.00 0.00			1/2" Ice	10.98	3.87	0.11
APXVSPP18-C-A20	C	From Face	4.00	0.0000	154.00	No Ice	8.26	5.28	0.06
(Sprint Existing)			0.00 0.00			1/2" Ice	8.81	5.74	0.11
FD-RRH 4x45 1900	A	From Face	4.00	0.0000	154.00	No Ice	2.71	2.78	0.06
(Sprint Existing)			2.00 0.00			1/2" Ice	2.94	3.02	0.08
FD-RRH 4x45 1900	B	From Face	4.00	0.0000	154.00	No Ice	2.71	2.78	0.06
(Sprint Existing)			2.00 0.00			1/2" Ice	2.94	3.02	0.08
FD-RRH 4x45 1900	C	From Face	4.00	0.0000	154.00	No Ice	2.71	2.78	0.06

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
(Sprint Existing)			2.00 0.00			1/2" Ice	2.94	3.02	0.08
FD-RRH 2x50 800	A	From Face	4.00	0.0000	154.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			-2.00 0.00			1/2" Ice	2.61	2.46	0.09
FD-RRH 2x50 800	B	From Face	4.00	0.0000	154.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			-2.00 0.00			1/2" Ice	2.61	2.46	0.09
FD-RRH 2x50 800	C	From Face	4.00	0.0000	154.00	No Ice	2.40	2.25	0.06
(Sprint Existing)			-2.00 0.00			1/2" Ice	2.61	2.46	0.09
Valmont Uni-Tri Bracket	A	None		0.0000	151.50	No Ice	1.75	1.75	0.29
(Sprint Existing)						1/2" Ice	1.94	1.94	0.31
GPS	C	From Face	4.00	0.0000	154.00	No Ice	1.00	1.00	0.01
(Sprint Existing)			-6.00 3.00			1/2" Ice	1.50	1.50	0.01
Low Profile Platform	C	None		0.0000	154.00	No Ice	15.70	15.70	1.30
(Sprint Existing)						1/2" Ice	20.10	20.10	1.76
APXVTM14	A	From Face	4.00	0.0000	154.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			2.00 0.00			1/2" Ice	7.35	3.97	0.10
APXVTM14	B	From Face	4.00	0.0000	154.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			2.00 0.00			1/2" Ice	7.35	3.97	0.10
APXVTM14	C	From Face	4.00	0.0000	154.00	No Ice	6.90	3.61	0.06
(Sprint Existing)			2.00 0.00			1/2" Ice	7.35	3.97	0.10
TD-RRH8x20-25	A	From Face	4.00	0.0000	154.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			2.00 0.00			1/2" Ice	5.01	1.92	0.10
TD-RRH8x20-25	B	From Face	4.00	0.0000	154.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			2.00 0.00			1/2" Ice	5.01	1.92	0.10
TD-RRH8x20-25	C	From Face	4.00	0.0000	154.00	No Ice	4.72	1.70	0.07
(Sprint Existing)			2.00 0.00			1/2" Ice	5.01	1.92	0.10
APX16PV-16PVL-E	A	From Face	4.00	0.0000	144.00	No Ice	6.65	1.98	0.05
(T-Mobile Existing)			-5.00 0.00			1/2" Ice	7.08	2.30	0.08
LNX-6515DS	A	From Face	4.00	0.0000	144.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			5.00 0.00			1/2" Ice	12.06	8.29	0.12
APX16PV-16PVL-E	B	From Face	4.00	0.0000	144.00	No Ice	6.65	1.98	0.05
(T-Mobile Existing)			-5.00 0.00			1/2" Ice	7.08	2.30	0.08
LNX-6515DS	B	From Face	4.00	0.0000	144.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			5.00 0.00			1/2" Ice	12.06	8.29	0.12
APX16PV-16PVL-E	C	From Face	4.00	0.0000	144.00	No Ice	6.65	1.98	0.05
(T-Mobile Existing)			-5.00 0.00			1/2" Ice	7.08	2.30	0.08
LNX-6515DS	C	From Face	4.00	0.0000	144.00	No Ice	11.45	7.70	0.06
(T-Mobile Existing)			5.00 0.00			1/2" Ice	12.06	8.29	0.12
(3) TMA 10"x8"x3"	A	From Face	4.00	0.0000	144.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00 0.00			1/2" Ice	0.90	0.38	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
(3) TMA 10"x8"x3"	B	From Face	4.00	0.0000	144.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
(3) TMA 10"x8"x3"	C	From Face	4.00	0.0000	144.00	No Ice	0.78	0.29	0.02
(T-Mobile Existing)			0.00			1/2" Ice	0.90	0.38	0.02
			0.00						
Smart Bias T	A	From Face	4.00	0.0000	144.00	No Ice	0.16	0.08	0.00
(T-Mobile Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
Smart Bias T	B	From Face	4.00	0.0000	144.00	No Ice	0.16	0.08	0.00
(T-Mobile Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
Smart Bias T	C	From Face	4.00	0.0000	144.00	No Ice	0.16	0.08	0.00
(T-Mobile Existing)			0.00			1/2" Ice	0.21	0.12	0.00
			0.00						
Low Profile Platform	C	None		0.0000	144.00	No Ice	15.70	15.70	1.30
(T-Mobile Existing)						1/2" Ice	20.10	20.10	1.76
DC6-48-60-18-8F Surge	B	From Face	0.50	0.0000	138.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T Proposed)			0.00						
DC6-48-60-18-8F Surge	C	From Face	0.50	0.0000	138.00	No Ice	2.23	2.23	0.02
Arrestor			0.00			1/2" Ice	2.45	2.45	0.04
(AT&T Existing)			0.00						
Valmont Uni-Tri Bracket	C	None		0.0000	138.00	No Ice	1.75	1.75	0.29
(AT&T Existing)						1/2" Ice	1.94	1.94	0.31
7770.00	A	From Face	3.00	0.0000	134.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-3.00			1/2" Ice	6.31	3.27	0.07
			0.00						
QS66512-3	A	From Face	3.00	0.0000	134.00	No Ice	8.40	6.80	0.11
(AT&T Proposed)			0.00			1/2" Ice	8.95	7.27	0.17
			0.00						
P65-16-XLH-RR	A	From Face	3.00	0.0000	134.00	No Ice	8.40	4.70	0.06
(AT&T Existing)			6.00			1/2" Ice	8.95	5.15	0.11
			0.00						
7770.00	B	From Face	3.00	0.0000	134.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-3.00			1/2" Ice	6.31	3.27	0.07
			0.00						
QS66512-3	B	From Face	3.00	0.0000	134.00	No Ice	8.40	6.80	0.11
(AT&T Proposed)			0.00			1/2" Ice	8.95	7.27	0.17
			0.00						
P65-16-XLH-RR	B	From Face	3.00	0.0000	134.00	No Ice	8.40	4.70	0.06
(AT&T Existing)			6.00			1/2" Ice	8.95	5.15	0.11
			0.00						
7770.00	C	From Face	3.00	0.0000	134.00	No Ice	5.88	2.93	0.04
(AT&T Existing)			-3.00			1/2" Ice	6.31	3.27	0.07
			0.00						
QS66512-3	C	From Face	3.00	0.0000	134.00	No Ice	8.40	6.80	0.11
(AT&T Proposed)			0.00			1/2" Ice	8.95	7.27	0.17
			0.00						
P65-16-XLH-RR	C	From Face	3.00	0.0000	134.00	No Ice	8.40	4.70	0.06
(AT&T Existing)			6.00			1/2" Ice	8.95	5.15	0.11
			0.00						
(2) LGP21401 TMA	A	From Face	3.00	0.0000	134.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			-2.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LGP21401 TMA	B	From Face	3.00	0.0000	134.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			-2.00			1/2" Ice	1.09	0.48	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						
(2) LGP21401 TMA	C	From Face	3.00	0.0000	134.00	No Ice	0.95	0.37	0.02
(AT&T Existing)			-2.00			1/2" Ice	1.09	0.48	0.02
			0.00						
(2) LGP21901 Diplexer	A	From Face	3.00	0.0000	134.00	No Ice	0.23	0.12	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.30	0.17	0.01
			0.00						
(2) LGP21901 Diplexer	B	From Face	3.00	0.0000	134.00	No Ice	0.23	0.12	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.30	0.17	0.01
			0.00						
(2) LGP21901 Diplexer	C	From Face	3.00	0.0000	134.00	No Ice	0.23	0.12	0.01
(AT&T Existing)			-2.00			1/2" Ice	0.30	0.17	0.01
			0.00						
(2) TPX-070821	A	From Face	3.00	0.0000	134.00	No Ice	0.55	0.12	0.01
(AT&T Proposed)			-2.00			1/2" Ice	0.65	0.17	0.01
			0.00						
(2) TPX-070821	B	From Face	3.00	0.0000	134.00	No Ice	0.55	0.12	0.01
(AT&T Proposed)			-2.00			1/2" Ice	0.65	0.17	0.01
			0.00						
(2) TPX-070821	C	From Face	3.00	0.0000	134.00	No Ice	0.55	0.12	0.01
(AT&T Proposed)			-2.00			1/2" Ice	0.65	0.17	0.01
			0.00						
RRUS-11	A	From Face	0.50	0.0000	134.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	B	From Face	0.50	0.0000	134.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-11	C	From Face	0.50	0.0000	134.00	No Ice	2.99	1.25	0.05
(AT&T Existing)			6.00			1/2" Ice	3.23	1.41	0.07
			0.00						
RRUS-12	A	From Face	0.50	0.0000	134.00	No Ice	3.67	1.49	0.06
(AT&T Proposed)			0.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-12	B	From Face	0.50	0.0000	134.00	No Ice	3.67	1.49	0.06
(AT&T Proposed)			0.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-12	C	From Face	0.50	0.0000	134.00	No Ice	3.67	1.49	0.06
(AT&T Proposed)			0.00			1/2" Ice	3.93	1.67	0.08
			0.00						
RRUS-32	A	From Face	0.50	0.0000	134.00	No Ice	3.87	2.76	0.08
(AT&T Proposed)			3.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS-32	B	From Face	0.50	0.0000	134.00	No Ice	3.87	2.76	0.08
(AT&T Proposed)			3.00			1/2" Ice	4.15	3.02	0.10
			0.00						
RRUS-32	C	From Face	0.50	0.0000	134.00	No Ice	3.87	2.76	0.08
(AT&T Proposed)			3.00			1/2" Ice	4.15	3.02	0.10
			0.00						
A2	A	From Face	0.50	0.0000	134.00	No Ice	2.42	0.54	0.02
(AT&T Proposed)			0.00			1/2" Ice	2.63	0.67	0.03
			0.00						
A2	B	From Face	0.50	0.0000	134.00	No Ice	2.42	0.54	0.02
(AT&T Proposed)			0.00			1/2" Ice	2.63	0.67	0.03
			0.00						
A2	C	From Face	0.50	0.0000	134.00	No Ice	2.42	0.54	0.02
(AT&T Proposed)			0.00			1/2" Ice	2.63	0.67	0.03

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert*	*Azimuth Adjustment*	*Placement*		C_AA_A *Front*	C_AA_A *Side*	*Weight*
			ft *ft* *ft*	°	*ft*		*ft²*	*ft²*	*K*
			0.00						
Low Profile Platform	C	None		0.0000	134.00	No Ice	15.70	15.70	1.30
(AT&T Existing)						1/2" Ice	20.10	20.10	1.76
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
MG D3-800TX	A	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			0.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			4.00			1/2" Ice	8.88	5.79	0.09
			0.00						
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
MG D3-800TX	A	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			0.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			4.00			1/2" Ice	8.88	5.79	0.09
			0.00						
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			-6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
MG D3-800TX	A	From Face	4.00	0.0000	124.00	No Ice	3.45	2.22	0.00
(Verizon Existing)			-4.00			1/2" Ice	3.80	2.55	0.02
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			0.00			1/2" Ice	8.88	5.79	0.09
			0.00						
SBNHH-1D65B	A	From Face	4.00	0.0000	124.00	No Ice	8.33	5.34	0.04
(Verizon Existing)			4.00			1/2" Ice	8.88	5.79	0.09
			0.00						
DB844H65E-XY	A	From Face	4.00	0.0000	124.00	No Ice	2.87	4.20	0.01
(Verizon Existing)			6.00			1/2" Ice	3.18	4.57	0.04
			0.00						
(2) FD9R6004/2C-3L	B	From Face	3.00	0.0000	124.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
(2) FD9R6004/2C-3L	C	From Face	3.00	0.0000	124.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						
(2) FD9R6004/2C-3L	A	From Face	3.00	0.0000	124.00	No Ice	0.37	0.08	0.00
Diplexer			0.00			1/2" Ice	0.45	0.14	0.01
(Verizon Existing)			0.00						

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
RRH4x45/2x90-AWS	A	From Face	4.00	0.0000	124.00	No Ice	3.01	1.91	0.08
(Verizon Existing)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH4x45/2x90-AWS	B	From Face	4.00	0.0000	124.00	No Ice	3.01	1.91	0.08
(Verizon Existing)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH4x45/2x90-AWS	C	From Face	4.00	0.0000	124.00	No Ice	3.01	1.91	0.08
(Verizon Existing)			4.00			1/2" Ice	3.26	2.13	0.10
			0.00						
RRH4x30-B13	A	From Face	4.00	0.0000	124.00	No Ice	2.52	1.89	0.06
(Verizon Existing)			0.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH4x30-B13	B	From Face	4.00	0.0000	124.00	No Ice	2.52	1.89	0.06
(Verizon Existing)			0.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH4x30-B13	C	From Face	4.00	0.0000	124.00	No Ice	2.52	1.89	0.06
(Verizon Existing)			0.00			1/2" Ice	2.74	2.09	0.08
			0.00						
RRH2x60-PCS	A	From Face	4.00	0.0000	124.00	No Ice	2.51	1.55	0.06
(Verizon Existing)			-4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	B	From Face	4.00	0.0000	124.00	No Ice	2.51	1.55	0.06
(Verizon Existing)			-4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RRH2x60-PCS	C	From Face	4.00	0.0000	124.00	No Ice	2.51	1.55	0.06
(Verizon Existing)			-4.00			1/2" Ice	2.73	1.74	0.07
			0.00						
RC2DC-3315-PF-48	A	From Face	1.00	0.0000	124.00	No Ice	3.52	2.29	0.03
(Verizon Existing)			1.00			1/2" Ice	3.77	2.51	0.05
			0.00						
RC2DC-3315-PF-48	B	From Face	1.00	0.0000	124.00	No Ice	3.52	2.29	0.03
(Verizon Existing)			1.00			1/2" Ice	3.77	2.51	0.05
			0.00						
Low Profile Platform	C	None		0.0000	124.00	No Ice	15.70	15.70	1.30
(Verizon Existing)						1/2" Ice	20.10	20.10	1.76
Low Profile Platform	C	None		0.0000	114.00	No Ice	15.70	15.70	1.30
						1/2" Ice	20.10	20.10	1.76
GPS	A	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS	B	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
GPS	C	From Face	1.50	0.0000	51.50	No Ice	1.00	1.00	0.01
			0.00			1/2" Ice	1.50	1.50	0.01
			0.00						
531-70HD	C	From Face	3.00	0.0000	114.00	No Ice	6.00	6.00	0.04
(Eversource Existing)			-6.00			1/2" Ice	6.90	6.90	0.05
			0.00						
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			2.50						
DB586-Y	C	From Face	3.00	0.0000	114.00	No Ice	1.01	1.01	0.01
(Eversource Existing)			5.00			1/2" Ice	1.28	1.28	0.02
			-2.50						
ANT150F2	C	From Face	3.00	0.0000	114.00	No Ice	1.29	1.29	0.02
(Eversource Existing)			-3.00			1/2" Ice	1.60	1.60	0.03

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
Tower Top Amplifier (Eversource Existing)	C	From Face	2.50 3.00 5.00 0.00	0.0000	114.00	No Ice 1/2" Ice	3.11 3.35	1.17 1.34	0.04 0.06

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
4 FT DISH (Town Existing)	A	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	4.00	No Ice 1/2" Ice	12.56 13.09	0.17 0.24
4 FT DISH (Town Existing)	B	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	4.00	No Ice 1/2" Ice	12.56 13.09	0.17 0.24
2 FT DISH (Town Existing)	C	Paraboloid w/Shroud (HP)	From Leg	1.00 0.00 0.00	Worst		160.00	2.00	No Ice 1/2" Ice	3.14 3.41	0.03 0.04
A-Ant-23G-2-C (Clearwire Existing)	A	Paraboloid w/Radome	From Face	3.10 -2.52 2.00	Worst		154.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05
A-Ant-23G-2-C (Clearwire Existing)	C	Paraboloid w/Radome	From Face	3.80 -1.24 2.00	Worst		154.00	2.17	No Ice 1/2" Ice	3.72 4.01	0.03 0.05

Tower Pressures - No Ice

$G_H = 1.690$

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 164.00-131.50	147.53	1.534	28	135.985	A	0.000	135.985	135.985	100.00	0.000	0.000
					B	0.000	135.985		100.00	0.000	2.475
					C	0.000	135.985		100.00	0.000	0.000
L2 131.50-119.29	125.34	1.464	27	55.744	A	0.000	55.744	55.744	100.00	0.000	0.000
					B	0.000	55.744		100.00	0.000	2.418
					C	0.000	55.744		100.00	0.000	0.000
L3 119.29-78.79	98.89	1.368	25	199.426	A	0.000	199.426	199.426	100.00	0.000	0.000
					B	0.000	199.426		100.00	0.000	8.019
					C	0.000	199.426		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	22	213.639	A	0.000	213.639	213.639	100.00	0.000	0.000
					B	0.000	213.639		100.00	0.000	11.574

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	213.639		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	18	231.142	A	0.000	231.142	231.142	100.00	0.000	0.000
					B	0.000	231.142		100.00	0.000	18.193
					C	0.000	231.142		100.00	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.690$

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	147.53	1.534	21	0.5000	138.694	A	0.000	138.694	138.694	100.00	0.000	0.000
164.00-131.50						B	0.000	138.694		100.00	0.000	3.725
						C	0.000	138.694		100.00	0.000	0.000
L2	125.34	1.464	20	0.5000	56.761	A	0.000	56.761	56.761	100.00	0.000	0.000
131.50-119.29						B	0.000	56.761		100.00	0.000	3.639
						C	0.000	56.761		100.00	0.000	0.000
L3 119.29-78.79	98.89	1.368	19	0.5000	202.801	A	0.000	202.801	202.801	100.00	0.000	0.000
						B	0.000	202.801		100.00	0.000	12.069
						C	0.000	202.801		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	16	0.5000	216.881	A	0.000	216.881	216.881	100.00	0.000	0.000
						B	0.000	216.881		100.00	0.000	18.950
						C	0.000	216.881		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	14	0.5000	234.341	A	0.000	234.341	234.341	100.00	0.000	0.000
						B	0.000	234.341		100.00	0.000	32.044
						C	0.000	234.341		100.00	0.000	0.000

Tower Pressure - Service

$G_H = 1.690$

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	147.53	1.534	10	135.985	A	0.000	135.985	135.985	100.00	0.000	0.000
164.00-131.50					B	0.000	135.985		100.00	0.000	2.475
					C	0.000	135.985		100.00	0.000	0.000
L2	125.34	1.464	9	55.744	A	0.000	55.744	55.744	100.00	0.000	0.000
131.50-119.29					B	0.000	55.744		100.00	0.000	2.418
					C	0.000	55.744		100.00	0.000	0.000
L3	98.89	1.368	9	199.426	A	0.000	199.426	199.426	100.00	0.000	0.000
119.29-78.79					B	0.000	199.426		100.00	0.000	8.019
					C	0.000	199.426		100.00	0.000	0.000
L4 78.79-39.88	59.42	1.183	8	213.639	A	0.000	213.639	213.639	100.00	0.000	0.000
					B	0.000	213.639		100.00	0.000	11.574
					C	0.000	213.639		100.00	0.000	0.000
L5 39.88-1.50	20.36	1	6	231.142	A	0.000	231.142	231.142	100.00	0.000	0.000
					B	0.000	231.142		100.00	0.000	18.193
					C	0.000	231.142		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	4.35	133.99	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	1.77	144.88	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	5.88	145.08	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	5.54	142.26	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	5.26	137.18	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	1847.17 kip-ft	22.80		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	4.35	133.99	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	1.77	144.88	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	5.88	145.08	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	5.54	142.26	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	5.26	137.18	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	1847.17 kip-ft	22.80		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	4.35	133.99	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	1.77	144.88	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	5.88	145.08	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	5.54	142.26	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	5.26	137.18	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	1847.17 kip-ft	22.80		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.99	6.49	A	1	0.65	1	1	1	138.694	3.37	103.82	C
164.00-131.50			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			
L2	0.84	3.11	A	1	0.65	1	1	1	56.761	1.39	113.95	C
131.50-119.29			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3	3.14	14.25	A	1	0.65	1	1	1	202.801	4.61	113.75	C
119.29-78.79			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4	3.09	20.14	A	1	0.65	1	1	1	216.881	4.41	113.42	C
78.79-39.88			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.72	22.21	A	1	0.65	1	1	1	234.341	4.32	112.62	C
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	10.78	66.20						OTM	1450.85 kip-ft	18.11		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.99	6.49	A	1	0.65	1	1	1	138.694	3.37	103.82	C
164.00-131.50			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L2	0.84	3.11	A	1	0.65	1	1	1	56.761	1.39	113.95	C
131.50-119.29			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3	3.14	14.25	A	1	0.65	1	1	1	202.801	4.61	113.75	C
119.29-78.79			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4	3.09	20.14	A	1	0.65	1	1	1	216.881	4.41	113.42	C
78.79-39.88			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.72	22.21	A	1	0.65	1	1	1	234.341	4.32	112.62	C
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	10.78	66.20						OTM	1450.85 kip-ft	18.11		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.99	6.49	A	1	0.65	1	1	1	138.694	3.37	103.82	C
164.00-131.50			B	1	0.65	1	1	1	138.694			
			C	1	0.65	1	1	1	138.694			
L2	0.84	3.11	A	1	0.65	1	1	1	56.761	1.39	113.95	C
131.50-119.29			B	1	0.65	1	1	1	56.761			
			C	1	0.65	1	1	1	56.761			
L3	3.14	14.25	A	1	0.65	1	1	1	202.801	4.61	113.75	C
119.29-78.79			B	1	0.65	1	1	1	202.801			
			C	1	0.65	1	1	1	202.801			
L4	3.09	20.14	A	1	0.65	1	1	1	216.881	4.41	113.42	C
78.79-39.88			B	1	0.65	1	1	1	216.881			
			C	1	0.65	1	1	1	216.881			
L5 39.88-1.50	2.72	22.21	A	1	0.65	1	1	1	234.341	4.32	112.62	C
			B	1	0.65	1	1	1	234.341			
			C	1	0.65	1	1	1	234.341			
Sum Weight:	10.78	66.20						OTM	1450.85 kip-ft	18.11		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	1.51	46.36	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	0.61	50.13	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	2.03	50.20	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	1.92	49.22	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	1.82	47.47	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	639.16 kip-ft	7.89		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	1.51	46.36	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	0.61	50.13	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	2.03	50.20	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	1.92	49.22	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	1.82	47.47	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	639.16 kip-ft	7.89		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L1	0.88	5.47	A	1	0.65	1	1	1	135.985	1.51	46.36	C
164.00-131.50			B	1	0.65	1	1	1	135.985			
			C	1	0.65	1	1	1	135.985			
L2	0.73	2.69	A	1	0.65	1	1	1	55.744	0.61	50.13	C
131.50-119.29			B	1	0.65	1	1	1	55.744			
			C	1	0.65	1	1	1	55.744			
L3	2.78	12.76	A	1	0.65	1	1	1	199.426	2.03	50.20	C
119.29-78.79			B	1	0.65	1	1	1	199.426			
			C	1	0.65	1	1	1	199.426			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
L4	2.70	18.55	A	1	0.65	1	1	1	213.639	1.92	49.22	C
78.79-39.88			B	1	0.65	1	1	1	213.639			
			C	1	0.65	1	1	1	213.639			
L5 39.88-1.50	2.32	20.49	A	1	0.65	1	1	1	231.142	1.82	47.47	C
			B	1	0.65	1	1	1	231.142			
			C	1	0.65	1	1	1	231.142			
Sum Weight:	9.41	59.96						OTM	639.16 kip-ft	7.89		

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	59.96					
Bracing Weight	0.00					
Total Member Self-Weight	59.96			0.73	-1.15	
Total Weight	82.83			0.73	-1.15	
Wind 0 deg - No Ice		-0.08	-45.98	-5070.53	1.34	-12.96
Wind 30 deg - No Ice		23.17	-39.78	-4389.86	-2569.82	-15.16
Wind 60 deg - No Ice		40.22	-22.92	-2532.75	-4452.70	-13.30
Wind 90 deg - No Ice		46.48	0.08	3.21	-5142.79	-7.87
Wind 120 deg - No Ice		40.30	23.06	2538.50	-4455.18	-0.34
Wind 150 deg - No Ice		23.31	39.86	4393.80	-2574.12	7.29
Wind 180 deg - No Ice		0.08	45.98	5071.98	-3.63	12.96
Wind 210 deg - No Ice		-23.17	39.78	4391.32	2567.52	15.16
Wind 240 deg - No Ice		-40.22	22.92	2534.20	4450.40	13.30
Wind 270 deg - No Ice		-46.48	-0.08	-1.76	5140.50	7.87
Wind 300 deg - No Ice		-40.30	-23.06	-2537.05	4452.89	0.34
Wind 330 deg - No Ice		-23.31	-39.86	-4392.35	2571.83	-7.29
Member Ice	6.24					
Total Weight Ice	96.12			0.98	-1.82	
Wind 0 deg - Ice		-0.06	-37.89	-4199.86	-0.05	-10.60
Wind 30 deg - Ice		19.08	-32.78	-3636.17	-2127.59	-12.20
Wind 60 deg - Ice		33.11	-18.89	-2097.90	-3685.54	-10.53
Wind 90 deg - Ice		38.27	0.06	2.75	-4256.44	-6.03
Wind 120 deg - Ice		33.17	19.00	2102.93	-3687.31	0.08
Wind 150 deg - Ice		19.19	32.84	3639.90	-2130.66	6.17
Wind 180 deg - Ice		0.06	37.89	4201.81	-3.59	10.60
Wind 210 deg - Ice		-19.08	32.78	3638.12	2123.96	12.20
Wind 240 deg - Ice		-33.11	18.89	2099.86	3681.90	10.53
Wind 270 deg - Ice		-38.27	-0.06	-0.80	4252.80	6.03
Wind 300 deg - Ice		-33.17	-19.00	-2100.98	3683.68	-0.08
Wind 330 deg - Ice		-19.19	-32.84	-3637.94	2127.03	-6.17
Total Weight	82.83			0.73	-1.15	
Wind 0 deg - Service		-0.03	-15.91	-1755.26	1.85	-4.48
Wind 30 deg - Service		8.02	-13.77	-1519.74	-887.83	-5.25
Wind 60 deg - Service		13.92	-7.93	-877.14	-1539.34	-4.60
Wind 90 deg - Service		16.08	0.03	0.35	-1778.13	-2.72
Wind 120 deg - Service		13.94	7.98	877.62	-1540.20	-0.12
Wind 150 deg - Service		8.07	13.79	1519.59	-889.32	2.52
Wind 180 deg - Service		0.03	15.91	1754.25	0.13	4.48
Wind 210 deg - Service		-8.02	13.77	1518.73	889.80	5.25
Wind 240 deg - Service		-13.92	7.93	876.13	1541.31	4.60
Wind 270 deg - Service		-16.08	-0.03	-1.37	1780.10	2.72

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 300 deg - Service		-13.94	-7.98	-878.63	1542.17	0.12
Wind 330 deg - Service		-8.07	-13.79	-1520.60	891.29	-2.52

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	164 - 131.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-21.17	-1.04	-0.78

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	5	-15.56	-361.35	5.51
			Max. My	8	-15.58	5.42	-354.41
			Max. Vy	11	-21.78	360.33	-6.21
			Max. Vx	2	-21.56	-6.30	353.58
			Max. Torque	11			1.16
L2	131.5 - 119.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-23.15	-1.23	-0.89
			Max. Mx	5	-17.27	-499.54	6.67
			Max. My	8	-17.29	6.55	-491.17
			Max. Vy	11	-22.70	498.37	-7.42
			Max. Vx	2	-22.48	-7.53	490.25
			Max. Torque	9			-10.40
L3	119.29 - 78.79	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-44.47	1.70	1.06
			Max. Mx	11	-35.07	1704.27	-4.35
			Max. My	2	-35.09	-4.21	1676.00
			Max. Vy	5	34.98	-1703.75	4.41
			Max. Vx	8	34.47	4.55	-1675.83
			Max. Torque	9			-17.59
L4	78.79 - 39.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-66.23	0.25	0.22
			Max. Mx	5	-55.10	-3143.03	1.09
			Max. My	8	-55.11	1.00	-3095.49
			Max. Vy	5	40.54	-3143.03	1.09
			Max. Vx	8	40.03	1.00	-3095.49
			Max. Torque	9			-15.64
L5	39.88 - 1.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-96.12	-1.82	-0.98
			Max. Mx	5	-82.82	-5219.64	-3.19
			Max. My	8	-82.82	-3.61	-5147.71
			Max. Vy	5	46.51	-5219.64	-3.19
			Max. Vx	8	46.01	-3.61	-5147.71
			Max. Torque	9			-15.44

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	18	96.12	-38.27	-0.06
	Max. H_x	11	82.83	46.48	0.08
	Max. H_z	2	82.83	0.08	45.98
	Max. M_x	2	5146.25	0.08	45.98
	Max. M_z	5	5219.64	-46.48	-0.08
	Max. Torsion	3	15.13	-23.17	39.78
	Min. Vert	30	82.83	-16.08	-0.03
	Min. H_x	5	82.83	-46.48	-0.08
	Min. H_z	8	82.83	-0.08	-45.98
	Min. M_x	8	-5147.71	-0.08	-45.98
	Min. M_z	11	-5217.33	46.48	0.08
	Min. Torsion	9	-15.15	23.17	-39.78

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	82.83	0.00	0.00	0.73	-1.15	0.00
Dead+Wind 0 deg - No Ice	82.83	-0.08	-45.98	-5146.25	1.28	-12.94
Dead+Wind 30 deg - No Ice	82.83	23.17	-39.78	-4455.45	-2608.30	-15.13
Dead+Wind 60 deg - No Ice	82.83	40.22	-22.92	-2570.62	-4519.28	-13.27
Dead+Wind 90 deg - No Ice	82.83	46.48	0.08	3.19	-5219.64	-7.86
Dead+Wind 120 deg - No Ice	82.83	40.30	23.06	2576.34	-4521.73	-0.33
Dead+Wind 150 deg - No Ice	82.83	23.31	39.86	4459.37	-2612.53	7.30
Dead+Wind 180 deg - No Ice	82.83	0.08	45.98	5147.71	-3.61	12.97
Dead+Wind 210 deg - No Ice	82.83	-23.17	39.78	4456.93	2605.97	15.15
Dead+Wind 240 deg - No Ice	82.83	-40.22	22.92	2572.11	4516.96	13.26
Dead+Wind 270 deg - No Ice	82.83	-46.48	-0.08	-1.71	5217.33	7.83
Dead+Wind 300 deg - No Ice	82.83	-40.30	-23.06	-2574.87	4519.42	0.30
Dead+Wind 330 deg - No Ice	82.83	-23.31	-39.86	-4457.91	2610.21	-7.29
Dead+Ice+Temp	96.12	0.00	0.00	0.98	-1.82	0.00
Dead+Wind 0 deg+Ice+Temp	96.12	-0.06	-37.89	-4277.95	-0.09	-10.59
Dead+Wind 30 deg+Ice+Temp	96.12	19.08	-32.78	-3703.81	-2167.21	-12.17
Dead+Wind 60 deg+Ice+Temp	96.12	33.11	-18.89	-2136.98	-3754.11	-10.50
Dead+Wind 90 deg+Ice+Temp	96.12	38.27	0.06	2.71	-4335.59	-6.01
Dead+Wind 120 deg+Ice+Temp	96.12	33.17	19.00	2141.93	-3755.84	0.10
Dead+Wind 150 deg+Ice+Temp	96.12	19.19	32.84	3707.49	-2170.21	6.18
Dead+Wind 180 deg+Ice+Temp	96.12	0.06	37.89	4279.90	-3.55	10.61
Dead+Wind 210 deg+Ice+Temp	96.12	-19.08	32.78	3705.77	2163.57	12.19
Dead+Wind 240 deg+Ice+Temp	96.12	-33.11	18.89	2138.94	3750.48	10.49
Dead+Wind 270 deg+Ice+Temp	96.12	-38.27	-0.06	-0.75	4331.96	5.99
Dead+Wind 300 deg+Ice+Temp	96.12	-33.17	-19.00	-2139.99	3752.21	-0.11
Dead+Wind 330 deg+Ice+Temp	96.12	-19.19	-32.84	-3705.55	2166.57	-6.18
Dead+Wind 0 deg - Service	82.83	-0.03	-15.91	-1780.40	-0.31	-4.48
Dead+Wind 30 deg - Service	82.83	8.02	-13.77	-1541.35	-903.37	-5.24
Dead+Wind 60 deg - Service	82.83	13.92	-7.93	-889.10	-1564.68	-4.59
Dead+Wind 90 deg - Service	82.83	16.08	0.03	1.58	-1807.04	-2.72
Dead+Wind 120 deg - Service	82.83	13.94	7.98	892.03	-1565.52	-0.11
Dead+Wind 150 deg - Service	82.83	8.07	13.79	1543.66	-904.83	2.53
Dead+Wind 180 deg - Service	82.83	0.03	15.91	1781.87	-2.00	4.49
Dead+Wind 210 deg - Service	82.83	-8.02	13.77	1542.82	901.05	5.24
Dead+Wind 240 deg - Service	82.83	-13.92	7.93	890.57	1562.36	4.59
Dead+Wind 270 deg - Service	82.83	-16.08	-0.03	-0.11	1804.73	2.71
Dead+Wind 300 deg - Service	82.83	-13.94	-7.98	-890.57	1563.21	0.11
Dead+Wind 330 deg - Service	82.83	-8.07	-13.79	-1542.20	902.52	-2.53

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-82.83	0.00	0.00	82.83	0.00	0.000%
2	-0.08	-82.83	-45.98	0.08	82.83	45.98	0.000%
3	23.17	-82.83	-39.78	-23.17	82.83	39.78	0.000%
4	40.22	-82.83	-22.92	-40.22	82.83	22.92	0.000%
5	46.48	-82.83	0.08	-46.48	82.83	-0.08	0.000%
6	40.30	-82.83	23.06	-40.30	82.83	-23.06	0.000%
7	23.31	-82.83	39.86	-23.31	82.83	-39.86	0.000%
8	0.08	-82.83	45.98	-0.08	82.83	-45.98	0.000%
9	-23.17	-82.83	39.78	23.17	82.83	-39.78	0.000%
10	-40.22	-82.83	22.92	40.22	82.83	-22.92	0.000%
11	-46.48	-82.83	-0.08	46.48	82.83	0.08	0.000%
12	-40.30	-82.83	-23.06	40.30	82.83	23.06	0.000%
13	-23.31	-82.83	-39.86	23.31	82.83	39.86	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
14	0.00	-96.12	0.00	0.00	96.12	0.00	0.000%
15	-0.06	-96.12	-37.89	0.06	96.12	37.89	0.000%
16	19.08	-96.12	-32.78	-19.08	96.12	32.78	0.000%
17	33.11	-96.12	-18.89	-33.11	96.12	18.89	0.000%
18	38.27	-96.12	0.06	-38.27	96.12	-0.06	0.000%
19	33.17	-96.12	19.00	-33.17	96.12	-19.00	0.000%
20	19.19	-96.12	32.84	-19.19	96.12	-32.84	0.000%
21	0.06	-96.12	37.89	-0.06	96.12	-37.89	0.000%
22	-19.08	-96.12	32.78	19.08	96.12	-32.78	0.000%
23	-33.11	-96.12	18.89	33.11	96.12	-18.89	0.000%
24	-38.27	-96.12	-0.06	38.27	96.12	0.06	0.000%
25	-33.17	-96.12	-19.00	33.17	96.12	19.00	0.000%
26	-19.19	-96.12	-32.84	19.19	96.12	32.84	0.000%
27	-0.03	-82.83	-15.91	0.03	82.83	15.91	0.000%
28	8.02	-82.83	-13.77	-8.02	82.83	13.77	0.000%
29	13.92	-82.83	-7.93	-13.92	82.83	7.93	0.000%
30	16.08	-82.83	0.03	-16.08	82.83	-0.03	0.000%
31	13.94	-82.83	7.98	-13.94	82.83	-7.98	0.000%
32	8.07	-82.83	13.79	-8.07	82.83	-13.79	0.000%
33	0.03	-82.83	15.91	-0.03	82.83	-15.91	0.000%
34	-8.02	-82.83	13.77	8.02	82.83	-13.77	0.000%
35	-13.92	-82.83	7.93	13.92	82.83	-7.93	0.000%
36	-16.08	-82.83	-0.03	16.08	82.83	0.03	0.000%
37	-13.94	-82.83	-7.98	13.94	82.83	7.98	0.000%
38	-8.07	-82.83	-13.79	8.07	82.83	13.79	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00043698
3	Yes	4	0.00000001	0.00059751
4	Yes	4	0.00000001	0.00093834
5	Yes	4	0.00000001	0.00027268
6	Yes	4	0.00000001	0.00061104
7	Yes	4	0.00000001	0.00054431
8	Yes	4	0.00000001	0.00043912
9	Yes	4	0.00000001	0.00097913
10	Yes	4	0.00000001	0.00056667
11	Yes	4	0.00000001	0.00027054
12	Yes	4	0.00000001	0.00062322
13	Yes	4	0.00000001	0.00076350
14	Yes	4	0.00000001	0.00000001
15	Yes	5	0.00000001	0.00002812
16	Yes	5	0.00000001	0.00003551
17	Yes	5	0.00000001	0.00003794
18	Yes	5	0.00000001	0.00002736
19	Yes	5	0.00000001	0.00003530
20	Yes	5	0.00000001	0.00003486
21	Yes	5	0.00000001	0.00002812
22	Yes	5	0.00000001	0.00003835
23	Yes	5	0.00000001	0.00003534
24	Yes	5	0.00000001	0.00002736
25	Yes	5	0.00000001	0.00003532
26	Yes	5	0.00000001	0.00003637

27	Yes	4	0.00000001	0.00006538
28	Yes	4	0.00000001	0.00007209
29	Yes	4	0.00000001	0.00009100
30	Yes	4	0.00000001	0.00004232
31	Yes	4	0.00000001	0.00004131
32	Yes	4	0.00000001	0.00004443
33	Yes	4	0.00000001	0.00006551
34	Yes	4	0.00000001	0.00009819
35	Yes	4	0.00000001	0.00006426
36	Yes	4	0.00000001	0.00004219
37	Yes	4	0.00000001	0.00004262
38	Yes	4	0.00000001	0.00006395

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	11.004	30	0.5084	0.0042
L2	131.5 - 119.29	7.594	30	0.4832	0.0043
L3	125.29 - 78.79	6.973	30	0.4720	0.0043
L4	87.21 - 39.88	3.579	30	0.3589	0.0022
L5	49.13 - 1.5	1.206	30	0.2188	0.0010

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	30	11.004	0.5084	0.0042	226248
160.00	4 FT DISH	30	10.577	0.5069	0.0042	226248
156.00	A-Ant-23G-2-C	30	10.151	0.5052	0.0042	141405
154.00	LLPX310R	30	9.938	0.5043	0.0042	113124
151.50	Remote Radio Head FD R6 RRH	30	9.673	0.5030	0.0042	90499
144.00	APX16PV-16PVL-E	30	8.883	0.4979	0.0042	56562
138.00	DC6-48-60-18-8F Surge Arrestor	30	8.259	0.4920	0.0043	43509
134.00	7770.00	30	7.848	0.4869	0.0043	37660
124.00	DB844H65E-XY	30	6.846	0.4693	0.0043	27282
114.00	Low Profile Platform	30	5.886	0.4448	0.0040	23888
51.50	GPS	30	1.312	0.2284	0.0011	10784

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	164 - 131.5	31.790	5	1.4685	0.0121
L2	131.5 - 119.29	21.939	5	1.3962	0.0124
L3	125.29 - 78.79	20.143	5	1.3638	0.0125
L4	87.21 - 39.88	10.337	5	1.0369	0.0063
L5	49.13 - 1.5	3.484	5	0.6321	0.0030

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

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
164.00	12' x 3" Dia Omni	5	31.790	1.4685	0.0122	78575
160.00	4 FT DISH	5	30.556	1.4642	0.0122	78575
156.00	A-Ant-23G-2-C	5	29.325	1.4595	0.0122	49109
154.00	LLPX310R	5	28.711	1.4568	0.0122	39287
151.50	Remote Radio Head FD R6 RRH	5	27.944	1.4532	0.0122	31429
144.00	APX16PV-16PVL-E	5	25.661	1.4386	0.0123	19643
138.00	DC6-48-60-18-8F Surge Arrestor	5	23.859	1.4216	0.0123	15110
134.00	7770.00	5	22.673	1.4070	0.0124	13077
124.00	DB844H65E-XY	5	19.776	1.3560	0.0125	9456
114.00	Low Profile Platform	5	17.004	1.2852	0.0115	8279
51.50	GPS	5	3.791	0.6599	0.0031	3734

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	32.50	162.50	103.4	13.959	52.6760	-15.56	735.30	0.021
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	12.21	162.50	100.9	14.665	64.7894	-17.27	950.11	0.018
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	46.50	162.50	90.2	18.264	84.5934	-35.07	1545.03	0.023
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	47.33	162.50	81.6	21.155	120.1620	-55.10	2542.07	0.022
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	47.63	162.50	72.8	23.922	134.6840	-82.82	3221.92	0.026

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	164 - 131.5 (1)	TP53.42x47x0.3125	364.44	-6.323	36.775	0.172	0.00	0.000	36.775	0.000
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	503.27	-6.933	39.000	0.178	0.00	0.000	39.000	0.000
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	1704.28	-16.072	39.000	0.412	0.00	0.000	39.000	0.000
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	3143.03	-18.909	39.000	0.485	0.00	0.000	39.000	0.000
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	5219.64	-24.973	39.000	0.640	0.00	0.000	39.000	0.000

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$

Pole Interaction Design Data

Section No.	Elevation ft	Size	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	164 - 131.5 (1)	TP53.42x47x0.3125	0.021	0.172	0.000	0.193 ✔	1.333	H1-3 ✔
L2	131.5 - 119.29 (2)	TP56.15x53.42x0.375	0.018	0.178	0.000	0.196 ✔	1.333	H1-3 ✔
L3	119.29 - 78.79 (3)	TP62.97x54.0585x0.4375	0.023	0.412	0.000	0.435 ✔	1.333	H1-3 ✔
L4	78.79 - 39.88 (4)	TP69.66x60.4813x0.5625	0.022	0.485	0.000	0.507 ✔	1.333	H1-3 ✔
L5	39.88 - 1.5 (5)	TP76x66.7412x0.5625	0.026	0.640	0.000	0.666 ✔	1.333	H1-3 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	164 - 131.5	Pole	TP53.42x47x0.3125	1	-15.56	980.15	14.5	Pass
L2	131.5 - 119.29	Pole	TP56.15x53.42x0.375	2	-17.27	1266.50	14.7	Pass
L3	119.29 - 78.79	Pole	TP62.97x54.0585x0.4375	3	-35.07	2059.52	32.6	Pass
L4	78.79 - 39.88	Pole	TP69.66x60.4813x0.5625	4	-55.10	3388.58	38.0	Pass
L5	39.88 - 1.5	Pole	TP76x66.7412x0.5625	5	-82.82	4294.82	50.0	Pass
							Summary	
						Pole (L5)	50.0	Pass
						RATING =	**50.0**	**Pass**

CENTEK engineering
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Subject:	Flange Bolt and Plate Analysis
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 1/21/16	Prepared by: T.J.L. Checked by: C.F.C. Job No. 16002.005

Flange Bolt and Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 362ft·kips	(Input From tnxTower)
Shear Force =	Shear := 22·kips	(Input From tnxTower)
Axial Force =	Axial := 21.5·kips	(Input From tnxTower)

Flange Bolt Data:

Use ASTM A325

Number of Flange Bolts =	N := 12	(User Input)
Diameter of Bolt Circle =	D_{bc} := 58.00·in	(User Input)
Bolt Ultimate Strength =	F_u := 120·ksi	(User Input)
Bolt Yield Strength =	F_y := 92·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Flange Bolts =	D := 1.00·in	(User Input)

Flange Plate Data:

Use ASTM A36

Plate Yield Strength =	Fy_{bp} := 36.00·ksi	(User Input)
Flange Plate Thickness =	t_{bp} := 1.00·in	(User Input)
Flange Plate Diameter =	D_{bp} := 61.00·in	(User Input)
Outer Pole Diameter =	D_{pole} := 53.42·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 29 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 14.50 \cdot in$ $d_7 = -14.50 \cdot in$

$d_2 = 25.11 \cdot in$ $d_8 = -25.11 \cdot in$

$d_3 = 29.00 \cdot in$ $d_9 = -29.00 \cdot in$

$d_4 = 25.11 \cdot in$ $d_{10} = -25.11 \cdot in$

$d_5 = 14.50 \cdot in$ $d_{11} = -14.50 \cdot in$

$d_6 = 0.00 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 26.7 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 0.00 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 0.00 \cdot in$

$MA_3 = 2.29 \cdot in$ $MA_9 = 0.00 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 0.00 \cdot in$ etc

Effective Width of Plate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 23.6 \cdot in$

Flange Bolt Analysis:

Calculated Flange Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 5.046 \times 10^3 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 0.785 \cdot in^2$

Check Flange Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 23.2 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 41.5 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Gross}} = 55.9 \cdot \%$

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Gross}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Flange Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 14.3 \cdot kips$ $C_7 = -10.7 \cdot kips$

$C_2 = 23.4 \cdot kips$ $C_8 = -19.8 \cdot kips$

$C_3 = 26.8 \cdot kips$ $C_9 = -23.2 \cdot kips$

$C_4 = 23.4 \cdot kips$ $C_{10} = -19.8 \cdot kips$

$C_5 = 14.3 \cdot kips$ $C_{11} = -10.7 \cdot kips$

$C_6 = 1.8 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 15.6 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 35.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 43.5 \cdot \%$

Condition3 = $Condition2 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition2 = "Ok"

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	OM := 5220·ft·kips	(Input From tnxTower)
Shear Force =	Shear := 46·kips	(Input From tnxTower)
Axial Force =	Axial := 83·kips	(Input From tnxTower)

Anchor Bolt Data:

Use ASTM A615 Grade 75

Number of Anchor Bolts =	N := 30	(User Input)
Diameter of Bolt Circle =	D_{bc} := 86.00·in	(User Input)
Bolt "Column" Distance =	l := 3.0·in	(User Input)
Bolt Ultimate Strenght =	F_u := 100·ksi	(User Input)
Bolt Yeild Strenght =	F_y := 75·ksi	(User Input)
Bolt Modulus =	E := 29000·ksi	(User Input)
Diameter of Anchor Bolts =	D := 2.25·in	(User Input)
Threads per Inch =	n := 4.5	(User Input)

Base Plate Data:

Use ASTM A572 GR 60

Plate Yield Strength =	Fy_{bp} := 60·ksi	(User Input)
Base Plate Thickness =	t_{bp} := 3.0·in	(User Input)
Base Plate Diameter =	D_{bp} := 92.00·in	(User Input)
Outer Pole Diameter =	D_{pole} := 76.00·in	(User Input)

Geometric Layout Data:

Distance from Bolts to Centroid of Pole:

Radius of Bolt Circle =: $R_{bc} := \frac{D_{bc}}{2} = 43 \cdot in$

Distance to Bolts = $i := 1 .. N$

$$d_i := \left| \begin{array}{l} \theta \leftarrow 2 \cdot \pi \cdot \left(\frac{i}{N} \right) \\ d \leftarrow R_{bc} \cdot \sin(\theta) \end{array} \right.$$

$d_1 = 8.94 \cdot in$ $d_7 = 42.76 \cdot in$

$d_2 = 17.49 \cdot in$ $d_8 = 42.76 \cdot in$

$d_3 = 25.27 \cdot in$ $d_9 = 40.90 \cdot in$

$d_4 = 31.96 \cdot in$ $d_{10} = 37.24 \cdot in$

$d_5 = 37.24 \cdot in$ $d_{11} = 31.96 \cdot in$

$d_6 = 40.90 \cdot in$ etc.

Critical Distances For Bending in Plate:

Outer Pole Radius = $R_{pole} := \frac{D_{pole}}{2} = 38 \cdot in$

Moment Arms of Bolts about Neutral Axis = $MA_i := if\left(d_i \geq R_{pole}, d_i - R_{pole}, 0in\right)$

$MA_1 = 0.00 \cdot in$ $MA_7 = 4.76 \cdot in$

$MA_2 = 0.00 \cdot in$ $MA_8 = 4.76 \cdot in$

$MA_3 = 0.00 \cdot in$ $MA_9 = 2.90 \cdot in$

$MA_4 = 0.00 \cdot in$ $MA_{10} = 0.00 \cdot in$

$MA_5 = 0.00 \cdot in$ $MA_{11} = 0.00 \cdot in$

$MA_6 = 2.90 \cdot in$ etc

Effective Width of Baseplate for Bending = $B_{eff} := .8 \cdot 2 \cdot \sqrt{\left(\frac{D_{bp}}{2}\right)^2 - \left(\frac{D_{pole}}{2}\right)^2} = 41.5 \cdot in$

Anchor Bolt Analysis:

Calculated Anchor Bolt Properties:

Polar Moment of Inertia = $I_p := \sum_i \left(d_i\right)^2 = 2.773 \times 10^4 \cdot in^2$

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n}\right)^2 = 3.248 \cdot in^2$

Net Diameter = $D_n := \frac{2 \cdot \sqrt{A_n}}{\sqrt{\pi}} = 2.033 \cdot in$

Radius of Gyration of Bolt = $r := \frac{D_n}{4} = 0.508 \cdot in$

Section Modulus of Bolt = $S_x := \frac{\pi \cdot D_n^3}{32} = 0.826 \cdot in^3$

Check Anchor Bolt Tension Force:

Maximum Tensile Force = $T_{Max} := OM \cdot \frac{R_{bc}}{I_p} - \frac{Axial}{N} = 94.3 \cdot kips$

Allowable Tensile Force = $T_{ALL.Gross} := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u\right) = 174.9 \cdot kips$ (1.333 increase allowed per TIA/EIA)

$T_{ALL.Net} := 1.333 \cdot \left(0.60 \cdot A_n \cdot F_y\right) = 194.812 \cdot kips$ (1.333 increase allowed per TIA/EIA)

Bolt Tension % of Capacity = $\frac{T_{Max}}{T_{ALL.Net}} = 48.4 \cdot \%$ Bolts are "upset bolts". Use net area per AISC

Condition1 = $Condition1 := if\left(\frac{T_{Max}}{T_{ALL.Net}} \le 1.00, "OK", "Overstressed"\right)$

Condition1 = "OK"

Check Anchor Bolt Bending Stress:

Maximum Bending Moment = $M_x := \left(\frac{Shear}{N}\right) \cdot l = 0.383 \cdot ft \cdot kips$

Maximum Bending Stress = $f_{bx} := \frac{M_x}{S_x} = 5.6 \cdot ksi$

Allowable Bending Stress = $F_{bx} := 1.333 \cdot 0.6 \cdot F_y = 60 \cdot ksi$ (1.333 increase allowed per TIA/EIA)

Check Combined Stress Requirement:

Per ASCE Manual 72: "If the clearance between the base plate and concrete does not exceed two times the bolt diameter a bending stress analysis of the bolts is NOT normally required.

$$l := \begin{cases} l & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot in$$

$$f_{bx} := \begin{cases} f_{bx} & \text{if } l > 2 \cdot D_n \\ 0 & \text{otherwise} \end{cases} = 0 \cdot ksi$$

Check Anchor Bolt Compression/Combined Stress:

Maximum Compressive Force =

$$C_{Max} := OM \cdot \frac{R_{bc}}{l_p} + \frac{Axial}{N} = 99.9 \cdot kips$$

Maximum Compressive Stress =

$$f_a := \frac{C_{Max}}{A_n} = 30.8 \cdot ksi$$

$$K := 0.65$$

$$C_c := \sqrt{\frac{2 \cdot \pi^2 \cdot E}{F_y}} = 87.364$$

$$F_a := \begin{cases} \dfrac{\left[1 - \dfrac{\left(\frac{K \cdot l}{r}\right)^2}{2 \cdot C_c^{\,2}}\right] \cdot F_y}{\dfrac{5}{3} + \dfrac{3 \cdot \left(\frac{K \cdot l}{r}\right)}{8 \cdot C_c} - \dfrac{\left(\frac{K \cdot l}{r}\right)^3}{8 \cdot C_c^{\,3}}} & \text{if } \dfrac{K \cdot l}{r} \le C_c \\ \dfrac{12 \cdot \pi^2 \cdot E}{23 \cdot \left(\frac{K \cdot l}{r}\right)^2} & \text{if } \dfrac{K \cdot l}{r} > C_c \end{cases} = 45 \cdot ksi$$

Allowable Compressive Stress =

$$F_a := 1.333 \cdot F_a = 60 \cdot ksi$$

(1.333 increase allowed per TIA/EIA)

Combined Stress % of Capacity =

$$\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}}\right) = 51.3 \cdot \%$$

Condition 2 =

$$Condition2 := if\left(\frac{f_a}{F_a} + \frac{f_{bx}}{F_{bx}} \le 1.00, \text{"OK"}, \text{"Overstressed"}\right)$$

Condition2 = "OK"

Base Plate Analysis:

Force from Bolts = $C_i := \frac{OM \cdot d_i}{I_p} + \frac{Axial}{N}$

$C_1 = 23.0 \cdot kips$ $C_7 = 99.4 \cdot kips$

$C_2 = 42.3 \cdot kips$ $C_8 = 99.4 \cdot kips$

$C_3 = 59.9 \cdot kips$ $C_9 = 95.1 \cdot kips$

$C_4 = 74.9 \cdot kips$ $C_{10} = 86.9 \cdot kips$

$C_5 = 86.9 \cdot kips$ $C_{11} = 74.9 \cdot kips$

$C_6 = 95.1 \cdot kips$ etc.

Maximum Bending Stress in Plate = $f_{bp} := \sum_i \frac{6 \cdot C_i \cdot MA_i}{\left(B_{eff} \cdot t_{bp}^2\right)} = 24.1 \cdot ksi$

Allowable Bending Stress in Plate = $F_{bp} := 1.33 \cdot 0.75 \cdot Fy_{bp} = 59.9 \cdot ksi$

Plate Bending Stress % of Capacity = $\frac{f_{bp}}{F_{bp}} = 40.2 \cdot \%$

Condition3 = $Condition3 := if\left(\frac{f_{bp}}{F_{bp}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

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Subject:	CAISSON FOUNDATION
Location:	164-ft EEI Monopole Greenwich, CT
Rev. 0: 1/21/16	Prepared by: TJL Checked by: C.F.C. Job No. 16002.005

Caisson Foundation:

Input Data:

Shear Force =	$S := 46k$	*USER INPUT-FROM tnxTower*
Overturning Moment =	$M := 5220ft \cdot k$	*USER INPUT-FROM tnxTower*
Applied Axial Load =	$A1 := 83k$	*USER INPUT-FROM tnxTower*
Bending Moment =	$Mu := 5463ft \cdot k$	*USER INPUT–FROM LPILE*
Moment Capacity =	$Mn := 12300ft \cdot k$	*USER INPUT–FROM LPILE*
Foundation Diameter =	$d := 9.0ft$	*USER INPUT*
Overall Length of Caisson =	$L_c := 28.0ft$	*USER INPUT*
Depth From Top of Caisson to Grade =	$L_{pag} := 1.0ft$	*USER INPUT*
Number of Rebar =	$n := 33$	*USER INPUT*
Area of Rebar =	$Ar := 1.560in^2$	*USER INPUT*
Rebar Yield Strength =	$fy := 60ksi$	*USER INPUT*
Concrete Comp Strength =	$f'c := 3ksi$	*USER INPUT*

Check Moment Capacity:

Factor of Safety = $FS := \frac{0.9 \cdot Mn}{Mu} = 2$

Factor of Safety Required = $FS_{reqd} := 1.3$

$FOSCheck := if(FS \geq FS_{reqd}, "OK", "NO GOOD")$

FOSCheck = "OK"

LPILE Plus for Windows, Version 5.0 (5.0.47)

Analysis of Individual Piles and Drilled Shafts
Subjected to Lateral Loading Using the p-y Method

This program is licensed to:

TJL
Centek Engineering

Files Used for Analysis

Path to file locations: J:\Jobs\1600200.WI\005_Greenwich Perryride Road Tower - CT2102\Backup Documentation\Foundation\
Name of input data file: Greenwich Hospital Caisson Analysis.lpd
Name of output file: Greenwich Hospital Caisson Analysis.lpo
Name of plot output file: Greenwich Hospital Caisson Analysis.lpp
Name of runtime file: Greenwich Hospital Caisson Analysis.lpr

Time and Date of Analysis

Date: January 21, 2016 Time: 9:38:36

Problem Title

16002.005 - CT2102

Program Options

Units Used in Computations - US Customary Units: Inches, Pounds

Basic Program Options:

Analysis Type 3:
- Computation of Nonlinear Bending Stiffness and Ultimate Bending Moment Capacity with Pile Response Computed Using Nonlinear EI

Computation Options:
- Only internally-generated p-y curves used in analysis
- Analysis does not use p-y multipliers (individual pile or shaft action only)
- Analysis assumes no shear resistance at pile tip
- Analysis for fixed-length pile or shaft only
- Analysis includes computation of foundation stiffness matrix elements
- Output pile response for full length of pile
- Analysis assumes no soil movements acting on pile
- No additional p-y curves to be computed at user-specified depths

Solution Control Parameters:
- Number of pile increments = 100
- Maximum number of iterations allowed = 100
- Deflection tolerance for convergence = 1.0000E-04 in
- Maximum allowable deflection = 1.0000E+02 in

Printing Options:
- Values of pile-head deflection, bending moment, shear force, and soil reaction are printed for full length of pile.
- Printing Increment (spacing of output points) = 8

Pile Structural Properties and Geometry

Pile Length = 336.00 in

Depth of ground surface below top of pile = 12.00 in

Slope angle of ground surface = 0.00 deg.

Structural properties of pile defined using 2 points

Point No.	Point Depth in	Pile Diameter in	Moment of Inertia in**4	Pile Area Sq.in	Modulus of Elasticity lbs/Sq.in
1	0.0000	108.00000	6678285.	9160.9000	3600000.
2	336.0000	108.00000	6678285.	9160.9000	3600000.

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of moment of inertia and modulus of are not used for any computations other than total stress due to combined axial loading and bending.

Soil and Rock Layering Information

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 12.000 in
Distance from top of pile to bottom of layer = 48.000 in
p-y subgrade modulus k for top of soil layer = 20.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 20.000 lbs/in**3

Layer 2 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 48.000 in
Distance from top of pile to bottom of layer = 72.000 in
p-y subgrade modulus k for top of soil layer = 90.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 90.000 lbs/in**3

Layer 3 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 72.000 in
Distance from top of pile to bottom of layer = 132.000 in
p-y subgrade modulus k for top of soil layer = 150.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 150.000 lbs/in**3

Layer 4 is sand, p-y criteria by Reese et al., 1974
Distance from top of pile to top of layer = 132.000 in
Distance from top of pile to bottom of layer = 360.000 in
p-y subgrade modulus k for top of soil layer = 250.000 lbs/in**3
p-y subgrade modulus k for bottom of layer = 250.000 lbs/in**3

(Depth of lowest layer extends 24.00 in below pile tip)

Effective Unit Weight of Soil vs. Depth

Effective unit weight of soil with depth defined using 8 points

Point No.	Depth X in	Eff. Unit Weight lbs/in**3
1	12.00	0.05800
2	48.00	0.05800
3	48.00	0.06900
4	72.00	0.06900
5	72.00	0.06900
6	132.00	0.06900
7	132.00	0.07500
8	360.00	0.07500

Shear Strength of Soils

Shear strength parameters with depth defined using 8 points

Point No.	Depth X in	Cohesion c lbs/in**2	Angle of Friction Deg.	E50 or k_rm	RQD %
1	12.000	0.00000	20.00	------	------
2	48.000	0.00000	20.00	------	------
3	48.000	0.00000	30.00	------	------
4	72.000	0.00000	30.00	------	------
5	72.000	0.00000	35.00	------	------
6	132.000	0.00000	35.00	------	------
7	132.000	0.00000	42.00	------	------
8	360.000	0.00000	42.00	------	------

Notes:

(1) Cohesion = uniaxial compressive strength for rock materials.
(2) Values of E50 are reported for clay strata.
(3) Default values will be generated for E50 when input values are 0.
(4) RQD and k_rm are reported only for weak rock strata.

Loading Type

Static loading criteria was used for computation of p-y curves.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load Case Number 1

Pile-head boundary conditions are Shear and Moment (BC Type 1)
Shear force at pile head = 46000.000 lbs
Bending moment at pile head = 62640000.000 in-lbs
Axial load at pile head = 83000.000 lbs

Non-zero moment at pile head for this load case indicates the pile-head may rotate under the applied pile-head loading, but is not a free-head (zero moment) condition.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Number of sections = 1

Pile Section No. 1

The sectional shape is a circular drilled shaft (bored pile).

Outside Diameter = 108.0000 in

Material Properties:

Compressive Strength of Concrete = 3.000 kip/in**2
Yield Stress of Reinforcement = 60. kip/in**2
Modulus of Elasticity of Reinforcement = 29000. kip/in**2
Number of Reinforcing Bars = 33
Area of Single Bar = 1.56000 in**2
Number of Rows of Reinforcing Bars = 33
Area of Steel = 51.480 in**2
Area of Shaft = 9160.884 in**2
Percentage of Steel Reinforcement = 0.562 percent
Cover Thickness (edge to bar center) = 4.000 in

Unfactored Axial Squash Load Capacity = 26317.78 kip

Distribution and Area of Steel Reinforcement

Row Number	Area of Reinforcement in**2	Distance to Centroidal Axis in
1	1.560	49.943
2	1.560	49.491
3	1.560	48.591
4	1.560	47.250
5	1.560	45.482
6	1.560	43.301
7	1.560	40.729
8	1.560	37.787
9	1.560	34.504
10	1.560	30.908
11	1.560	27.032
12	1.560	22.911
13	1.560	18.583
14	1.560	14.087
15	1.560	9.463
16	1.560	4.753
17	1.560	0.000

18	1.560	-4.753
19	1.560	-9.463
20	1.560	-14.087
21	1.560	-18.583
22	1.560	-22.911
23	1.560	-27.032
24	1.560	-30.908
25	1.560	-34.504
26	1.560	-37.787
27	1.560	-40.729
28	1.560	-43.301
29	1.560	-45.482
30	1.560	-47.250
31	1.560	-48.591
32	1.560	-49.491
33	1.560	-49.943

Axial Thrust Force = 83000.00 lbs

Bending Moment in-lbs	Bending Stiffness lb-in2	Bending Curvature rad/in	Maximum Strain in/in	Neutral Axis Position inches	Max. Concrete Stress psi	Max. Steel Stress psi
11414322.	2.282864E+13	5.000000E-07	0.00002985	59.70751923	91.76359740	806.93785
22713361.	2.271336E+13	0.00000100	0.00005698	56.98147005	173.56484	1534.82027
33889242.	2.259283E+13	0.00000150	0.00008407	56.04763967	253.86920	2261.60879
44949986.	2.247499E+13	0.00000200	0.00011124	55.61870295	333.01637	2990.60005
55888681.	2.235547E+13	0.00000250	0.00013835	55.33852905	410.61091	3717.93746
55888681.	1.862956E+13	0.00000300	0.00008490	28.29897827	252.30137	6581.06182
55888681.	1.596819E+13	0.00000350	0.00009712	27.74932927	287.37055	7733.69483
55888681.	1.397217E+13	0.00000400	0.00010936	27.34067327	322.21221	8885.91247
55888681.	1.241971E+13	0.00000450	0.00012162	27.02603084	356.82559	10037.71236
55888681.	1.117774E+13	0.00000500	0.00013417	26.83327228	392.02209	11180.96373
55888681.	1.016158E+13	0.00000550	0.00014639	26.61582023	425.98955	12333.74370
55888681.	9.314780E+12	0.00000600	0.00015862	26.43721086	459.73206	13486.07116
55888681.	8.598259E+12	0.00000650	0.00017088	26.28849632	493.24882	14637.94312
55888681.	7.984097E+12	0.00000700	0.00018314	26.16328114	526.53896	15789.35742
55888681.	7.451824E+12	0.00000750	0.00019543	26.05688542	559.60181	16940.30973
55888681.	6.986085E+12	0.00000800	0.00020773	25.96579117	592.43651	18090.79758
55888681.	6.575139E+12	0.00000850	0.00022004	25.88731402	625.04232	19240.81705
55888681.	6.209853E+12	0.00000900	0.00023237	25.81936187	657.41838	20390.36533
55888681.	5.883019E+12	0.00000950	0.00024472	25.76028353	689.56384	21539.43948
55888681.	5.588868E+12	0.00001000	0.00025709	25.70876580	721.47803	22688.03433
55888681.	5.322732E+12	0.00001050	0.00026947	25.66373366	753.15996	23836.14834
55888681.	5.080789E+12	0.00001100	0.00028187	25.62431484	784.60882	24983.77762
55888681.	4.859885E+12	0.00001150	0.00029428	25.58979160	815.82387	26130.91738
55888681.	4.657390E+12	0.00001200	0.00030671	25.55955559	846.80405	27277.56636
55888681.	4.471094E+12	0.00001250	0.00031916	25.53311116	877.54876	28423.71773
55888681.	4.299129E+12	0.00001300	0.00033163	25.51002377	908.05692	29569.37038
55888681.	4.139902E+12	0.00001350	0.00034411	25.48992974	938.32762	30714.52067
56905642.	4.064689E+12	0.00001400	0.00035662	25.47252327	968.36018	31859.16254
58816659.	4.056321E+12	0.00001450	0.00036913	25.45753080	998.15350	33003.29411
60725485.	4.048366E+12	0.00001500	0.00038167	25.44472057	1027.70672	34146.91118
62632105.	4.040781E+12	0.00001550	0.00039423	25.43388981	1057.01889	35290.00998
64536515.	4.033532E+12	0.00001600	0.00040680	25.42486471	1086.08920	36432.58504
66438687.	4.026587E+12	0.00001650	0.00041939	25.41748434	1114.91649	37574.63483
68338620.	4.019919E+12	0.00001700	0.00043200	25.41161674	1143.50001	38716.15286
70236298.	4.013503E+12	0.00001750	0.00044462	25.40713960	1171.83875	39857.13539
72131703.	4.007317E+12	0.00001800	0.00045727	25.40394348	1199.93168	40997.57906
74024817.	4.001341E+12	0.00001850	0.00046994	25.40193182	1227.77776	42137.47995
75915632.	3.995560E+12	0.00001900	0.00048262	25.40102094	1255.37609	43276.83265
77804133.	3.989956E+12	0.00001950	0.00049532	25.40113360	1282.72564	44415.63297
81574128.	3.979226E+12	0.00002050	0.00052079	25.40415913	1336.67425	46691.55906
85334687.	3.969055E+12	0.00002150	0.00054633	25.41053528	1389.61535	48965.22055
89085671.	3.959363E+12	0.00002250	0.00057195	25.41986936	1441.54023	51236.58218
92826960.	3.950083E+12	0.00002350	0.00059765	25.43184274	1492.44026	53505.60375
96558435.	3.941161E+12	0.00002450	0.00062343	25.44619149	1542.30664	55772.24317
1.002799E+08	3.932547E+12	0.00002550	0.00064930	25.46268708	1591.12996	58036.46277
1.039545E+08	3.922811E+12	0.00002650	0.00067517	25.47801751	1638.74495	60000.00000
1.068591E+08	3.885784E+12	0.00002750	0.00069939	25.43224508	1682.11908	60000.00000
1.092912E+08	3.834780E+12	0.00002850	0.00072258	25.35358125	1722.59072	60000.00000
1.114123E+08	3.776688E+12	0.00002950	0.00074508	25.25684470	1760.88683	60000.00000
1.135610E+08	3.723312E+12	0.00003050	0.00076860	25.20000011	1800.02423	60000.00000
1.150353E+08	3.651915E+12	0.00003150	0.00079106	25.11301929	1836.39637	60000.00000
1.166051E+08	3.587851E+12	0.00003250	0.00081200	24.98469168	1869.39726	60000.00000
1.179747E+08	3.521634E+12	0.00003350	0.00083237	24.84695917	1900.70865	60000.00000
1.193035E+08	3.458073E+12	0.00003450	0.00085267	24.71499449	1931.16409	60000.00000
1.204592E+08	3.393218E+12	0.00003550	0.00087244	24.57564300	1960.09125	60000.00000
1.216115E+08	3.331821E+12	0.00003650	0.00089224	24.44505912	1988.38710	60000.00000
1.225975E+08	3.269266E+12	0.00003750	0.00091151	24.30687279	2015.19998	60000.00000
1.235703E+08	3.209619E+12	0.00003850	0.00093077	24.17592198	2041.36013	60000.00000
1.244896E+08	3.151636E+12	0.00003950	0.00094988	24.04760081	2066.64765	60000.00000
1.253032E+08	3.093907E+12	0.00004050	0.00096862	23.91663390	2090.80438	60000.00000
1.261140E+08	3.038891E+12	0.00004150	0.00098740	23.79284137	2114.38849	60000.00000
1.268980E+08	2.985836E+12	0.00004250	0.00100612	23.67334253	2137.26841	60000.00000
1.275698E+08	2.932638E+12	0.00004350	0.00102440	23.54940838	2158.99865	60000.00000
1.282389E+08	2.881773E+12	0.00004450	0.00104272	23.43180853	2180.18206	60000.00000

1.288288E+08	2.831402E+12	0.00004550	0.00106470	23.39999861	2205.03779	60000.00000
1.296233E+08	2.787598E+12	0.00004650	0.00108366	23.30448192	2225.63891	60000.00000
1.301569E+08	2.740146E+12	0.00004750	0.00110094	23.17771214	2243.77987	60000.00000
1.306885E+08	2.694607E+12	0.00004850	0.00111826	23.05682284	2261.43238	60000.00000
1.312178E+08	2.650865E+12	0.00004950	0.00113560	22.94146317	2278.59368	60000.00000
1.317450E+08	2.608813E+12	0.00005050	0.00115298	22.83130807	2295.26090	60000.00000
1.322083E+08	2.567152E+12	0.00005150	0.00117003	22.71897715	2311.07969	60000.00000
1.326332E+08	2.526348E+12	0.00005250	0.00118689	22.60740906	2326.21926	60000.00000
1.330562E+08	2.487032E+12	0.00005350	0.00120378	22.50057560	2340.89053	60000.00000
1.334772E+08	2.449124E+12	0.00005450	0.00122070	22.39821929	2355.09085	60000.00000
1.338963E+08	2.412545E+12	0.00005550	0.00123766	22.30010194	2368.81755	60000.00000
1.343133E+08	2.377226E+12	0.00005650	0.00125464	22.20600468	2382.06806	60000.00000
1.346556E+08	2.341836E+12	0.00005750	0.00127117	22.10723072	2394.46013	60000.00000
1.349883E+08	2.307491E+12	0.00005850	0.00128767	22.01143080	2406.35967	60000.00000
1.353191E+08	2.274270E+12	0.00005950	0.00130420	21.91933876	2417.80654	60000.00000
1.359753E+08	2.210981E+12	0.00006150	0.00133735	21.74557990	2439.33271	60000.00000
1.367504E+08	2.153550E+12	0.00006350	0.00137160	21.60000032	2459.59723	60000.00000
1.372794E+08	2.095869E+12	0.00006550	0.00141090	21.54051000	2480.46875	60000.00000
1.377607E+08	2.040900E+12	0.00006750	0.00144201	21.36313015	2494.87517	60000.00000
1.382361E+08	1.989009E+12	0.00006950	0.00147323	21.19756275	2507.65629	60000.00000
1.387054E+08	1.939935E+12	0.00007150	0.00150456	21.04283577	2518.79347	60000.00000
1.391458E+08	1.893140E+12	0.00007350	0.00153577	20.89485186	2528.19857	60000.00000
1.394994E+08	1.847674E+12	0.00007550	0.00156624	20.74492067	2535.74814	60000.00000
1.398474E+08	1.804483E+12	0.00007750	0.00159682	20.60413367	2541.71868	60000.00000
1.401898E+08	1.763393E+12	0.00007950	0.00162751	20.47181815	2546.09207	60000.00000
1.405264E+08	1.724250E+12	0.00008150	0.00165831	20.34737223	2548.84982	60000.00000
1.408572E+08	1.686912E+12	0.00008350	0.00168923	20.23025519	2549.97299	60000.00000
1.411503E+08	1.650881E+12	0.00008550	0.00171994	20.11623770	2545.85447	60000.00000
1.413869E+08	1.615850E+12	0.00008750	0.00175009	20.00106150	2540.88089	60000.00000
1.416209E+08	1.582357E+12	0.00008950	0.00178036	19.89227110	2543.67572	60000.00000
1.416209E+08	1.547770E+12	0.00009150	0.00181170	19.79999882	2547.09008	60000.00000
1.417490E+08	1.516032E+12	0.00009350	0.00185130	19.79999882	2549.59126	60000.00000
1.424324E+08	1.491439E+12	0.00009550	0.00188621	19.75092083	2548.41987	60000.00000
1.426387E+08	1.462962E+12	0.00009750	0.00191564	19.64757639	2544.20559	60000.00000
1.428436E+08	1.435614E+12	0.00009950	0.00194515	19.54927558	2539.97579	60000.00000
1.430384E+08	1.409246E+12	0.00010150	0.00197459	19.45409364	2539.97929	60000.00000
1.431827E+08	1.383408E+12	0.00010350	0.00200316	19.35420281	2543.47045	60000.00000
1.433257E+08	1.358538E+12	0.00010550	0.00203181	19.25888890	2546.22690	60000.00000
1.434675E+08	1.334581E+12	0.00010750	0.00206055	19.16790730	2548.23919	60000.00000
1.436080E+08	1.311489E+12	0.00010950	0.00208937	19.08103269	2549.49764	60000.00000
1.437473E+08	1.289213E+12	0.00011150	0.00211828	18.99805588	2549.99234	60000.00000
1.438830E+08	1.267692E+12	0.00011350	0.00214739	18.91973966	2546.96793	60000.00000
1.440177E+08	1.246906E+12	0.00011550	0.00217658	18.84483200	2543.42689	60000.00000
1.441515E+08	1.226822E+12	0.00011750	0.00220583	18.77299172	2539.87517	60000.00000
1.442847E+08	1.207403E+12	0.00011950	0.00223514	18.70407075	2536.31268	60000.00000
1.444170E+08	1.188617E+12	0.00012150	0.00226451	18.63793391	2535.92826	60000.00000
1.445381E+08	1.170349E+12	0.00012350	0.00229368	18.57227987	2539.53743	60000.00000
1.446297E+08	1.152428E+12	0.00012550	0.00232217	18.50335246	2542.49816	60000.00000
1.447206E+08	1.135064E+12	0.00012750	0.00235072	18.43704182	2544.97568	60000.00000
1.448110E+08	1.118231E+12	0.00012950	0.00237933	18.37323529	2546.96471	60000.00000
1.449006E+08	1.101906E+12	0.00013150	0.00240800	18.31182021	2548.45976	60000.00000
1.449896E+08	1.086065E+12	0.00013350	0.00243674	18.25270003	2549.45533	60000.00000
1.450780E+08	1.070686E+12	0.00013550	0.00246553	18.19577497	2549.94572	60000.00000
1.451645E+08	1.055742E+12	0.00013750	0.00249445	18.14148921	2548.44761	60000.00000
1.452497E+08	1.041217E+12	0.00013950	0.00252349	18.08952409	2545.56500	60000.00000
1.455127E+08	1.014026E+12	0.00014350	0.00258300	18.00000054	2539.54654	60000.00000
1.466286E+08	9.940921E+11	0.00014750	0.00265500	18.00000054	2531.33751	60000.00000
1.476109E+08	9.743296E+11	0.00015150	0.00272700	18.00000054	2536.11274	60000.00000
1.476109E+08	9.492664E+11	0.00015550	0.00279332	17.96349782	2542.87812	60000.00000
1.476109E+08	9.254604E+11	0.00015950	0.00285083	17.87355262	2546.44404	60000.00000
1.476109E+08	9.028191E+11	0.00016350	0.00290743	17.78245515	2548.72067	60000.00000
1.476109E+08	8.812593E+11	0.00016750	0.00296422	17.69681329	2549.86266	60000.00000
1.476109E+08	8.607051E+11	0.00017150	0.00302244	17.62353748	2547.55621	60000.00000
1.476109E+08	8.410879E+11	0.00017550	0.00308145	17.55809587	2542.88879	60000.00000
1.476109E+08	8.223450E+11	0.00017950	0.00314058	17.49623984	2538.20030	60000.00000
1.476109E+08	8.044192E+11	0.00018350	0.00319983	17.43774408	2533.49046	60000.00000
1.476109E+08	7.872583E+11	0.00018750	0.00325920	17.38241225	2528.75864	60000.00000
1.476109E+08	7.708143E+11	0.00019150	0.00331871	17.33006090	2524.00435	60000.00000
1.476109E+08	7.550431E+11	0.00019550	0.00337834	17.28052264	2519.72001	60000.00000
1.476109E+08	7.399044E+11	0.00019950	0.00343918	17.23898274	2526.56916	60000.00000
1.476109E+08	7.253608E+11	0.00020350	0.00350067	17.20229334	2532.71154	60000.00000
1.476109E+08	7.113780E+11	0.00020750	0.00356234	17.16788918	2537.96116	60000.00000
1.476109E+08	6.979240E+11	0.00021150	0.00362365	17.13310522	2542.20165	60000.00000
1.476109E+08	6.849695E+11	0.00021550	0.00368332	17.09195477	2545.30471	60000.00000
1.476109E+08	6.724872E+11	0.00021950	0.00374314	17.05301875	2547.63985	60000.00000
1.476109E+08	6.604516E+11	0.00022350	0.00380312	17.01619738	2549.18881	60000.00000

Unfactored (Nominal) Moment Capacity at Concrete Strain of 0.003 = 147610.93014 in-kip

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Computed Values of Load Distribution and Deflection
for Lateral Loading for Load Case Number 1

Pile-head boundary conditions are Shear and Moment (Pile-head Condition Type 1)

Specified shear force at pile head = 46000.000 lbs
Specified moment at pile head = 62640000.000 in-lbs
Specified axial load at pile head = 83000.000 lbs

Depth X in	Deflect. y in	Moment M lbs-in	Shear V lbs	Slope S Rad.	Total Stress lbs/in**2	Flx. Rig. EI lbs-in**2	Soil Res. p lbs/in	Es*h F/L
0.000	0.608388	6.26E+07	46000.	-0.004241	515.562	4.04E+12	0.000	0.000
26.880	0.500018	6.39E+07	44837.	-0.003820	525.586	4.04E+12	-148.805	999.936
53.760	0.403082	6.50E+07	35631.	-0.003391	534.716	4.03E+12	-881.056	7344.284
80.640	0.317787	6.56E+07	-377.600	-0.002955	539.132	4.03E+12	-1907.964	20173.
107.520	0.244225	6.47E+07	-65242.	-0.002519	532.545	4.03E+12	-2859.480	39340.
134.400	0.182231	6.19E+07	-1.45E+05	-0.002097	509.961	4.04E+12	-3840.544	70813.
161.280	0.131267	5.67E+07	-2.46E+05	-0.001714	467.425	8.87E+12	-3648.585	93392.
188.160	0.086245	4.88E+07	-3.36E+05	-0.001644	403.796	2.24E+13	-2976.753	1.16E+05
215.040	0.042791	3.88E+07	-4.01E+05	-0.001591	323.033	2.25E+13	-1764.508	1.39E+05
241.920	0.000580	2.76E+07	-4.27E+05	-0.001552	232.212	2.26E+13	-27.807	1.61E+05
268.800	-0.040751	1.64E+07	-3.98E+05	-0.001526	141.476	2.28E+13	2228.072	1.84E+05
295.680	-0.081558	6.80E+06	-3.02E+05	-0.001512	64.007	2.28E+13	5007.249	2.06E+05
322.560	-0.122140	8.64E+05	-1.24E+05	-0.001508	16.048	2.28E+13	8319.572	2.29E+05

Please note that because this analysis makes computations of ultimate moment capacity and pile response using nonlinear bending stiffness that the above values of total stress due to combined axial stress and bending may not be representative of actual conditions.

Output Verification:

Computed forces and moments are within specified convergence limits.

Output Summary for Load Case No. 1:

Pile-head deflection = 0.60838779 in
Computed slope at pile head = -0.00424141
Maximum bending moment = 65554959. lbs-in
Maximum shear force = -426595.62973 lbs
Depth of maximum bending moment = 80.64000000 in
Depth of maximum shear force = 241.92000 in
Number of iterations = 61
Number of zero deflection points = 1

Summary of Pile Response(s)

Definition of Symbols for Pile-Head Loading Conditions:

Type 1 = Shear and Moment, y = pile-head displacment in
Type 2 = Shear and Slope, M = Pile-head Moment lbs-in
Type 3 = Shear and Rot. Stiffness, V = Pile-head Shear Force lbs
Type 4 = Deflection and Moment, S = Pile-head Slope, radians
Type 5 = Deflection and Slope, R = Rot. Stiffness of Pile-head in-lbs/rad

Load Type	Pile-Head Condition 1	Pile-Head Condition 2	Axial Load lbs	Pile-Head Deflection in	Maximum Moment in-lbs	Maximum Shear lbs
1	V= 46000.	M= 6.26E+07	83000.0000	0.6083878	6.5555E+07	-426596.

Computed Pile-head Stiffness Matrix Members K22, K23, K32, K33 for Superstructure

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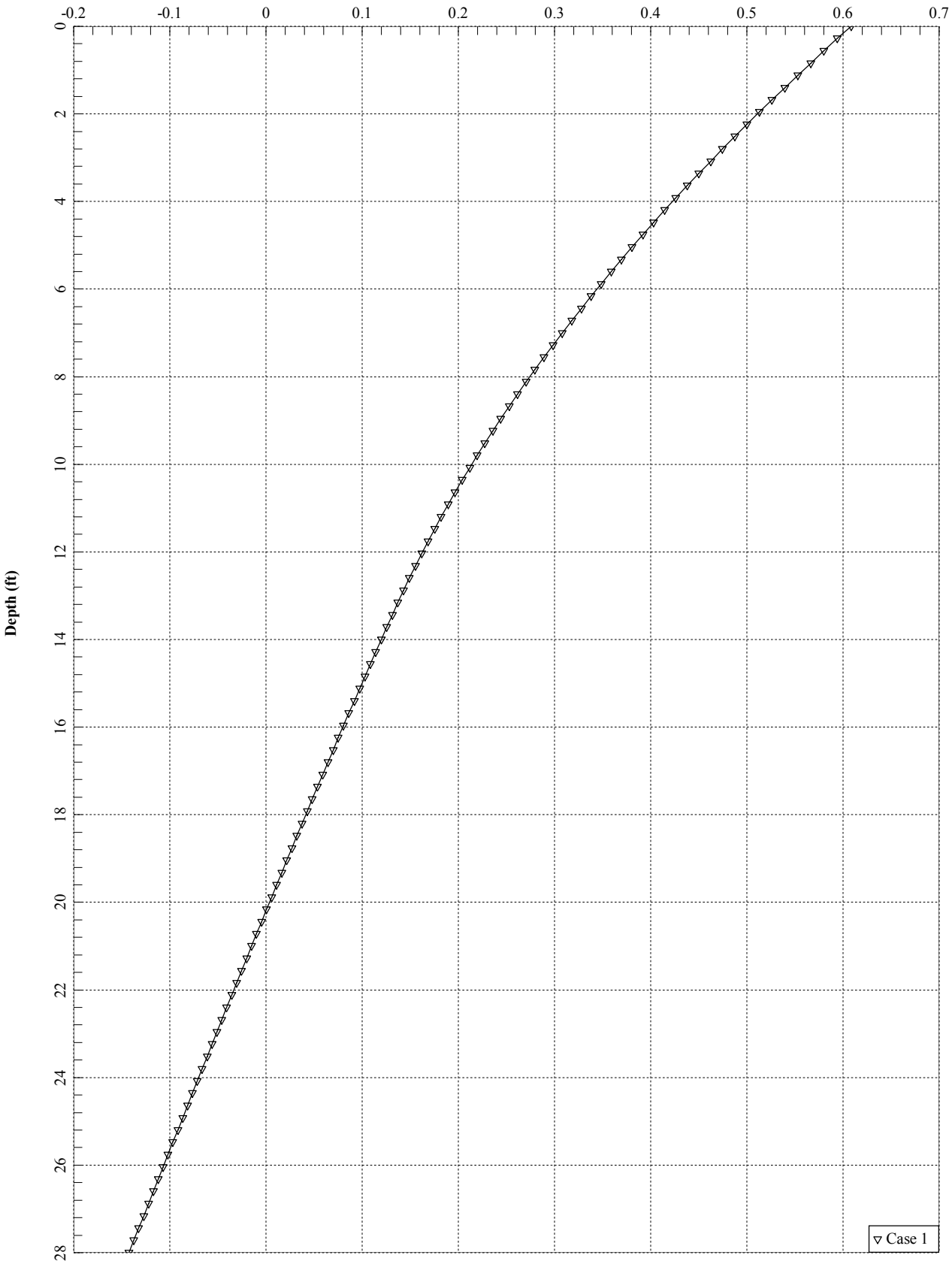
Top y in	Shear React. lbs	Mom. React. in-lbs	K22 lbs/in	K32 in-lbs/in
0.00118858	4600.00007	919589.24062	3870152.	7.736847E+08
0.00357799	13847.37980	2768239.	3870152.	7.736847E+08
0.00567099	21947.57772	4387556.	3870152.	7.736847E+08
0.00715599	27694.75960	5536479.	3870152.	7.736847E+08
0.00830785	32152.62020	6427653.	3870152.	7.736847E+08
0.00924898	35794.95752	7155795.	3870152.	7.736847E+08
0.01004470	38874.50984	7771431.	3870152.	7.736847E+08
0.01073398	41542.13940	8304718.	3870152.	7.736847E+08
0.01134197	43895.15543	8775111.	3870152.	7.736847E+08
0.01188584	46000.00000	9195892.	3870152.	7.736847E+08

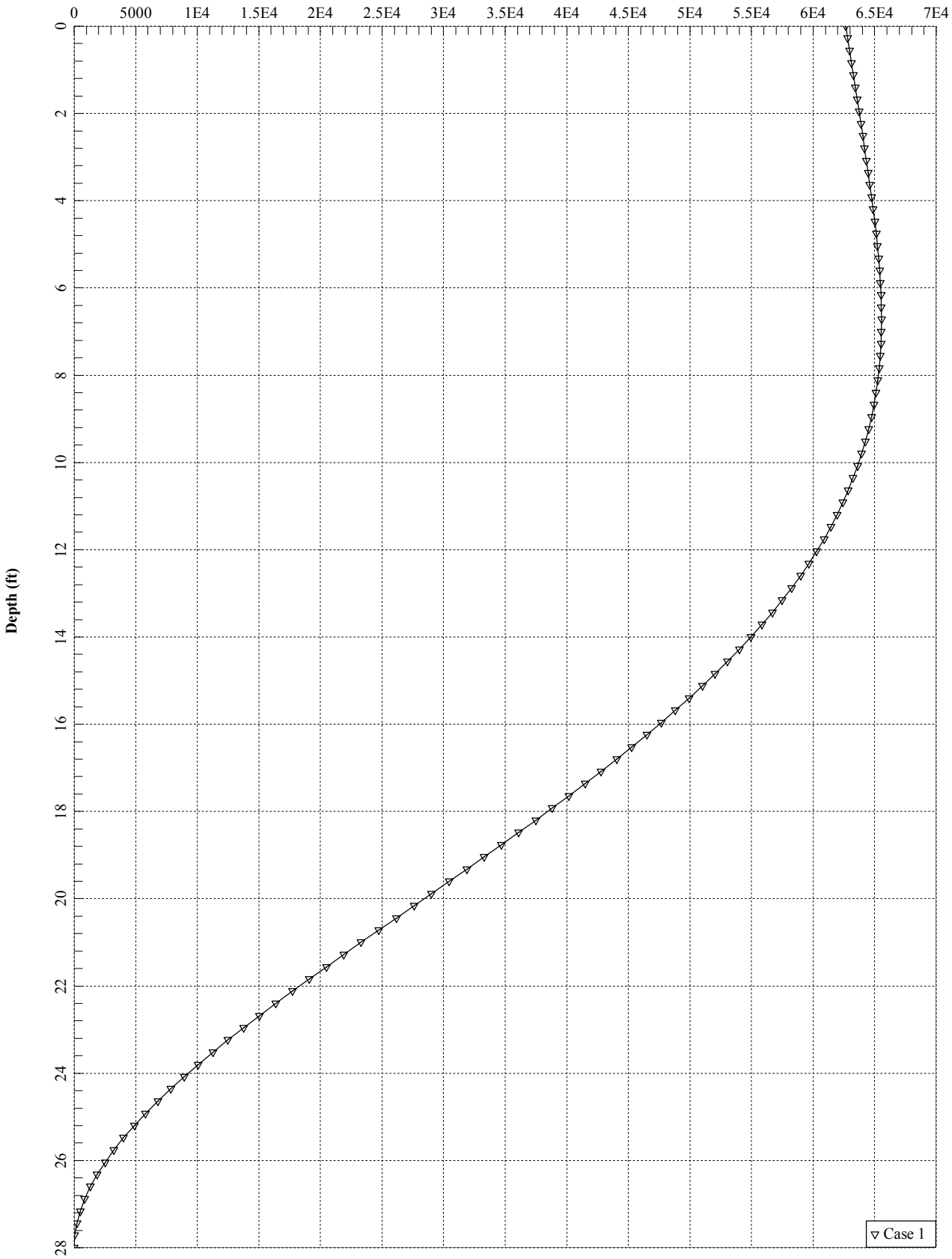
Top Rota. rad	Shear React. lbs	Mom. React. in-lbs	K23 lbs/rad	K33 in-lbs/rad

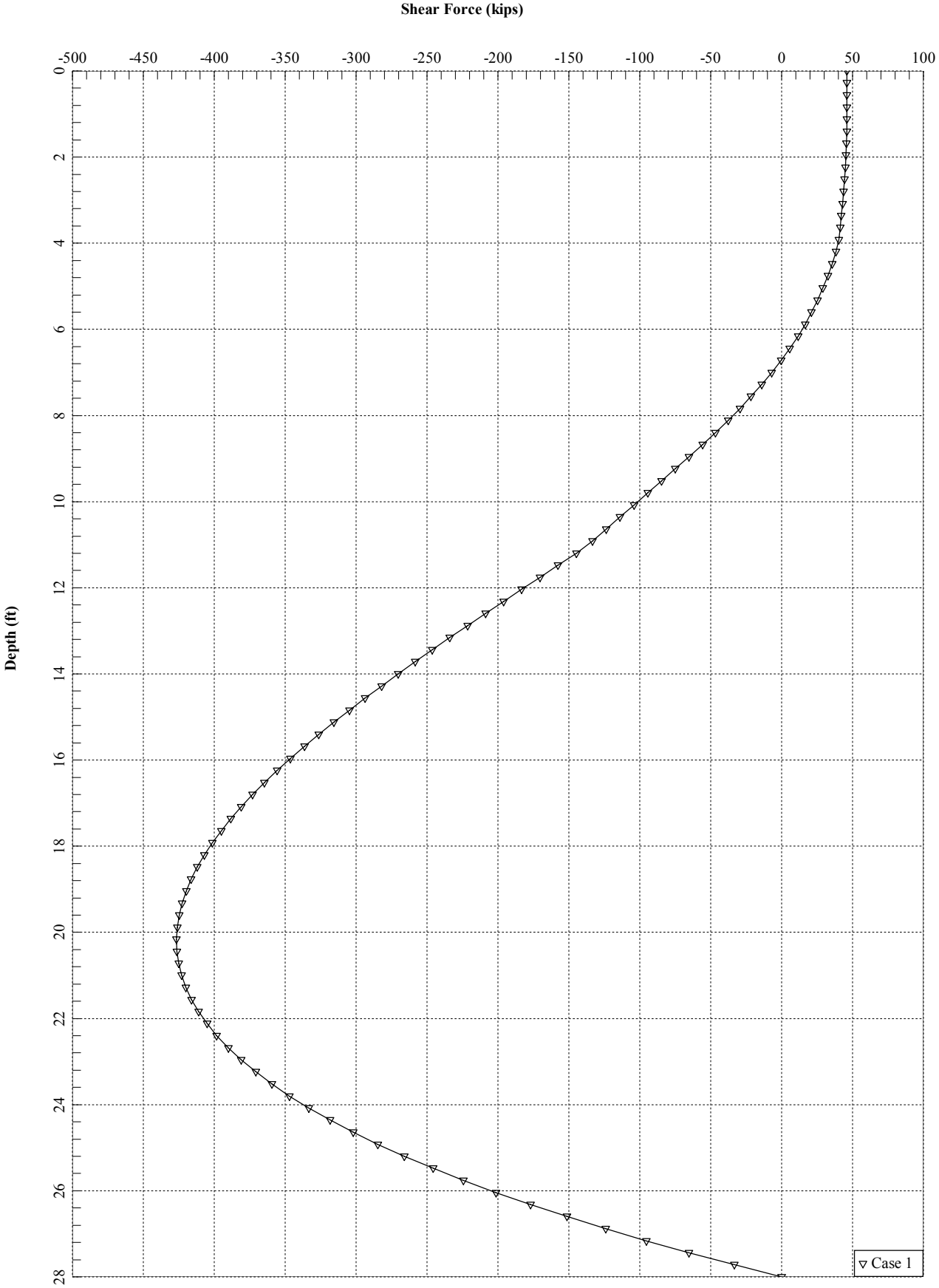
0.00003333	25786.27828	6264000.	7.736847E+08	1.879434E+11
0.00010047	77627.90073	18856519.	7.726507E+08	1.876838E+11
0.00015961	123053.75521	29886875.	7.709665E+08	1.872497E+11
0.00020176	155293.50288	37713038.	7.696903E+08	1.869193E+11
0.00023457	180306.16638	43783481.	7.686572E+08	1.866519E+11
0.00026145	200746.56908	48743394.	7.678251E+08	1.864361E+11
0.00028423	218031.25970	52936941.	7.670954E+08	1.862471E+11
0.00030400	233005.86610	56569557.	7.664769E+08	1.860866E+11
0.00032681	246235.24894	59773751.	7.534537E+08	1.829013E+11
0.00035374	258126.48452	62640000.	7.296965E+08	1.770767E+11

K22 = abs(Shear Reaction/Top y)
K23 = abs(Shear Reaction/Top Rotation)
K32 = abs(Moment Reaction/Top y)
K33 = abs(Moment Reaction/Top Rotation)

The analysis ended normally.


Lateral Deflection (in)
-0.2
-0.1
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Bending Moment (in-kips)
0
5000
1E4
1.5E4
2E4
2.5E4
3E4
3.5E4
4E4
4.5E4
5E4
5.5E4
6E4
6.5E4
7E4
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1


Shear Force (kips)
-500
-450
-400
-350
-300
-250
-200
-150
-100
-50
0
50
100
Depth (ft)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
Case 1

Section 1 - RFDS GENERAL INFORMATION

RFDS NAME:	CTU2102	DATE:	06/30/2014	RF DESIGN ENG:	Renz C. Bautista
ISSUE:	Bronze Standard	Approved? (Y/N):	Yes	RF DESIGN PHONE:	508-271-8396
REVISION:	Final	RF MANAGER:	Cameron Syme	RF DESIGN EMAIL:	cb6561@att.com
INITIATIVE /PROJECT:	LTE 3C - WCS. Bronze Standard.				

RF PERF ENG:		RFDS PROGRAM TYPE:	2016 LTE Next Carrier
RF PERF PHONE:		RFDS TECHNOLOGY:	LTE 3C
RF PERF EMAIL:		State:	Final
TRIDENT:		Status:	Approved
GSM FREQUENCY:	850	RFDS ID:	871350
UMTS FREQUENCY:	850, 1900	RFDS Version:	2.00
LTE FREQUENCY:	700, 1900, WCS	Created By:	cb6561
		Date Created:	9/25/2015 3:27:22 PM
		Date Updated:	11/19/2015 11:24:31 AM
		Updated By:	mm093q
I-PLAN JOB # 1:	NER-RCTB-15-03240	IPLAN PRD GRP || SUB GRP #1:	LTE Next Carrier || LTE 3C
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:	100184	FA LOCATION CODE:	10128691	LOCATION NAME:	GREENWICH PERRYRIDGE RD TWR
REGION:	NORTHEAST	MARKET CLUSTER:	NEW ENGLAND	MARKET:	CONNECTICUT
ADDRESS:	5 PERRYRIDGE ROAD DUP	CITY:	GREENWICH	STATE:	CT
ZIP CODE:	06830	COUNTY:	FAIRFIELD	MSA / RSA:	
LATITUDE (D-M-S):	41d 2m 2.16996s	LONGITUDE (D-M-S):	-73d -37m -50.99988s	LAT (DEC. DEG.):	41.0339361
DIRECTIONS, ACCESS AND EQUIPMENT LOCATION:	CTL02102 FROM ROUTE 15, MERRITT PARKWAY: EXIT 31 NORTH STREET, SOUTH (GREENWICH), TAKE NORTH STREET TO END, APPROX. 4 MILES. TURN RIGHT ON MAPLE AND IMMEDIATE LEFT ON PATTERSON AVE. TAKE 3RD LEFT ONTO PERRYRIDGE ROAD. HOSPITAL ON RIGHT (LESS THEN 1/2 MILE). ACCESS ESCALATION CONTACT: STEVE CARBERY - FACILITIES DIRECTOR (203) 863-3000. WEEKEND SECURITY # 860-863-3230				

ORACLE PTN # 1:	2051A03JM7	PACE JOB # 1:	MRCTB016739
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.):	-73.6308333	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?:	No	GROUND ELEVATION (ft):	0	STRUCTURE TYPE:	MONOPOLE
ADDITIONAL REGULATORY?:	No	HEIGHT OVERALL (ft):	170.00	FCC ASR NUMBER:	
SUB-LEASE RIGHTS?:	No	STRUCTURE HEIGHT (ft):	170.00		
LIGHTING TYPE:	NOT REQUIRED				

MARKET LOCATION 700 MHz Band:	
MARKET LOCATION 850 MHz Band:	
MARKET LOCATION 1900 MHz Band:	
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						0		
SECTOR B						0		
SECTOR C						0		
SECTOR D								
SECTOR E								
SECTOR F								
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						0		
SECTOR B						0		
SECTOR C						0		
SECTOR D								
SECTOR E								
SECTOR F								
OMNI								

Section 6 - RBS GENERAL INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
RBS ID:	243927	243928	243929	243930	324314	379812			362930			
CTS COMMON ID:	321D2102	321P2102	CTU2102	CTV2102	CTU6102	CTV6102			CTL02102			
BTA/TID:	321G	321P	321V	321U	321W	321W			321L			
4-DIGIT SITE ID:	2102	2102	8102	2102	9102	06102			02102			
COW OR TOY?:	No	No	No	No	No	No			No			
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED			SECTORIZED			
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL			MACRO-CONVENTIONAL			
BTS LOCATION ID:	GROUND	GROUND	INTERNAL	INTERNAL	INTERNAL	INTERNAL			INTERNAL			
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR			CINGULAR			
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD	GOLD			GOLD			
OPS DISTRICT:	CT-SOUTH	CT-SOUTH	CT SOUTH-WEST	CT SOUTH-WEST	CT-SOUTH	CT-SOUTH			CT-SOUTH			
RF DISTRICT:	NPO TRIAGE	NPO TRIAGE	NPO TRIAGE	NPO TRIAGE	NPO TRIAGE	NPO TRIAGE			NPO TRIAGE			
OPS ZONE:	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS			NE_CT_S_FRFD_SW_CS			
RF ZONE:	HOTSEAT	HOTSEAT	HOTSEAT	HOTSEAT	HOTSEAT	HOTSEAT			HOTSEAT			
BASE STATION TYPE:	BASE	BASE	OVERLAY	OVERLAY	OVERLAY	OVERLAY			BASE			
EQUIPMENT NAME:	GREENWICH HOSPITAL - MACRO	GREENWICH HOSP MACRO 1900	GREENWICH HOSP MACRO	GREENWICH HOSP MACRO	GREENWICH PERRYRIDGE RD TWR	NM RELO 2557 GREENWICH			GREENWICH PERRYRIDGE RD TWR			
DISASTER PRIORITY:	0	0	0	0	3	3			3			

Section 6 - RBS GENERAL INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
RBS ID:	243927	243928	243929	243930	324314	379812			362930	RFDS_11361248		
CTS COMMON ID:	321D2102	321P2102	CTU2102	CTV2102	CTU6102	CTV6102			CTL02102	CTL06102R		
BTA/TID:	321G	321P	321V	321U	321W	321W			321L	321L		
4-DIGIT SITE ID:	2102	2102	8102	2102	9102	06102			02102	6102		
COW OR TOY?:	No	No	No	No	No	No			No	No		
CELL SITE TYPE:	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED	SECTORIZED			SECTORIZED	SECTORIZED		
SITE TYPE:	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL	MACRO-CONVENTIONAL			MACRO-CONVENTIONAL	MACRO-CONVENTIONAL		
BTS LOCATION ID:	GROUND	GROUND	INTERNAL	INTERNAL	INTERNAL	INTERNAL			INTERNAL	INTERNAL		
ORIGINATING CO:	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR	CINGULAR			CINGULAR	CINGULAR		
CELLULAR NETWORK:	GOLD	GOLD	GOLD	GOLD	GOLD	GOLD			GOLD	GOLD		
OPS DISTRICT:	CT-South	CT-South			CT-South	CT-South			CT-South	CT-South		
RF DISTRICT:	NPO Triage	NPO Triage	NPO Triage	NPO Triage	NPO Triage	NPO Triage			NPO Triage	NPO Triage		
OPS ZONE:	NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS			NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS			NE_CT_S_FRFD_SW_CS	NE_CT_S_FRFD_SW_CS		
RF ZONE:	Hotseat	Hotseat	Hotseat	Hotseat	Hotseat	Hotseat			Hotseat	Hotseat		
BASE STATION TYPE:	BASE	BASE	OVERLAY	OVERLAY	OVERLAY	OVERLAY			BASE	BASE		
EQUIPMENT NAME:	GREENWICH HOSPITAL - MACRO	GREENWICH HOSP MACRO 1900	GREENWICH HOSP MACRO	GREENWICH HOSP MACRO	GREENWICH PERRYRIDGE RD TWR	NM RELO 2557 GREENWICH			GREENWICH PERRYRIDGE RD TWR	GREENWICH PERRYRIDGE RD TWR		
DISASTER PRIORITY:	0	0	0	0	3	3			3	3		

Section 7 - RBS SPECIFIC INFORMATION - existing

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
MSC												
BSC/RNC/MME POOL ID	BRPTCTBSC01	BRPTCTBSC01	BRPTCT04RNC001	BRPTCT04RNC001	BRPTCT04RNC001	BRPTCT04RNC001			FF01			
LAC	05010	05010	05999	05999	05999	05999						
RAC												
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON	ERICSSON			ERICSSON			
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	3206 INDOOR	3206 INDOOR	3206 INDOOR			6601 INDOOR MU			
LOCATION												
CABINET LOCATION												
MARKET STATE CODE									CT			
AGPS	Yes	Yes	Yes	Yes	Yes	Yes			Yes			
NODE B NUMBER	0	0	0	0	0	0			2102			
PARENT NAME	BRIDGEPORT BSC 01	BRIDGEPORT BSC 01	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001			FF01			

Section 7 - RBS SPECIFIC INFORMATION - final

	GSM 1ST RBS	GSM 2ND RBS	UMTS 1ST RBS	UMTS 2ND RBS	UMTS 3RD RBS	UMTS 4TH RBS	UMTS 5TH RBS	UMTS 6TH RBS	LTE 1ST RBS	LTE 2ND RBS	LTE 3RD RBS	LTE 4TH RBS
MSC												
BSC/RNC/MME POOL ID	BRPTCTBSC01	BRPTCTBSC01	BRPTCT04RNC001	BRPTCT04RNC001	BRPTCT04RNC001	BRPTCT04RNC001			FF01	FF01		
LAC	05010	05010	05999	05999	05999	05999						
RAC												
EQUIPMENT VENDOR	NOKIA	NOKIA	ERICSSON	ERICSSON	ERICSSON	ERICSSON			ERICSSON	ERICSSON		
EQUIPMENT TYPE	ULTRASITE	ULTRASITE	3206 INDOOR	3206 INDOOR	3206 INDOOR	3206 INDOOR			6601 INDOOR MU	6601 INDOOR MU		
LOCATION												
CABINET LOCATION												
MARKET STATE CODE									CT	CT		
AGPS	Yes	Yes	Yes	Yes	Yes	Yes			Yes	Yes		
NODE B NUMBER	0	0	0	0	0	0			2102	6102		
PARENT NAME	BRIDGEPORT BSC 01	BRIDGEPORT BSC 01	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001	BRIDGEPORT CT RNC001						

Section 8 - RBS INDIVIDUAL INFORMATION - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
RBS ID:	243927	243928			243930	243929	379812	324314	379812	324314							362930		362930					
CELL ID/BCF:	321D2102	321P2102			CTU2102	CTU2102	CTU6102	CTU2102	CTU6102	CTU2102							CTL02102		CTL02102					
CTS COMMON ID:	321D2102	321P2102			CTV2102	CTU2102	CTV6102	CTU6102	CTV6102	CTU6102							CTL02102		CTL02102					
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
RBS ID:																								
CELL ID/BCF:																								
CTS COMMON ID:																								

Section 8 - RBS INDIVIDUAL INFORMATION - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
RBS ID:	243927	243928			243930	243929	379812	324314	379812	324314							362930		362930		362930			
CELL ID/BCF:	321D2102	321P2102			CTU2102	CTU2102	CTU6102	CTU2102	CTU6102	CTU2102							CTL02102		CTL02102		CTL02102			
CTS COMMON ID:	321D2102	321P2102			CTV2102	CTU2102	CTV6102	CTU6102	CTV6102	CTU6102							CTL02102		CTL02102		CTL02102			
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
RBS ID:																	RFDS_11361248		RFDS_11361534		RFDS_11361568			
CELL ID/BCF:																	CTL06102R		CTL06102R		CTL06102R			
CTS COMMON ID:																	CTL06102R		CTL06102R		CTL06102R			

Section 9 - SOFT SECTOR ID - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	100184.850.25G.1	100184.1900.25G.1			100184.850.3G.1	100184.1900.3G.1	100184.850.3G.2	100184.1900.3G.3	100184.850.3G.3	100184.1900.3G.4							100184.700.4G.1		100184.1900.4G.1					
SECTOR A SOFT SECTOR ID	321G21021				CTV21021	CTU21027	CTV2102A	CTU61024		CTU61027							CTL02102_7A_1		CTL02102_9A_1					
SECTOR B	321G21022	321P21022			CTV21022	CTU21028		CTU61025	CTV2102B	CTU61028							CTL02102_7B_1		CTL02102_9B_1					
SECTOR C	321G21023				CTV21023	CTU21029		CTU61026	CTV2102C	CTU61029							CTL02102_7C_1		CTL02102_9C_1					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																								
SECTOR A SOFT SECTOR ID																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR ID - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	100184.850.25G.1	100184.1900.25G.1			100184.850.3G.1	100184.1900.3G.1	100184.850.3G.2	100184.1900.3G.3	100184.850.3G.3	100184.1900.3G.4							100184.700.4G.1		100184.1900.4G.1		100184.WCS.4G.111			
SECTOR A SOFT SECTOR ID	321G21021				CTV21021	CTU21027	CTV2102A	CTU61024		CTU61027							CTL02102_7A_1		CTL02102_9A_1		CTL02102_3A_1			
SECTOR B	321G21022	321P21022			CTV21022	CTU21028		CTU61025	CTV2102B	CTU61028														
SECTOR C	321G21023				CTV21023	CTU21029		CTU61026	CTV2102C	CTU61029							CTL02102_7C_1		CTL02102_9C_1		CTL02102_3C_1			
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																	100184.700.4G.222		100184.1900.4G.222		100184.WCS.4G.222			
SECTOR A SOFT SECTOR ID																								
SECTOR B																	CTL06102_7B_1		CTL06102_9B_1		CTL06102_3B_1			
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR CELL NUMBER - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	100184.850.25G.1	100184.1900.25G.1			100184.850.3G.1	100184.1900.3G.1	100184.850.3G.2	100184.1900.3G.3	100184.850.3G.3	100184.1900.3G.4							100184.700.4G.1		100184.1900.4G.1					
SECTOR A CELL NUMBER																	15		8					
SECTOR B																	16		9					
SECTOR C																	17		10					
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																								
SECTOR A CELL NUMBER																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 9 - SOFT SECTOR CELL NUMBER - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
USEID (excluding Hard Sector)	100184.850.25G.1	100184.1900.25G.1			100184.850.3G.1	100184.1900.3G.1	100184.850.3G.2	100184.1900.3G.3	100184.850.3G.3	100184.1900.3G.4							100184.700.4G.1		100184.1900.4G.1		100184.WCS.4G.111			
SECTOR A CELL NUMBER																	15		8		149			
SECTOR B																								
SECTOR C																	17		10		151			
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
USEID (excluding Hard Sector)																	100184.700.4G.222		100184.1900.4G.222		100184.WCS.4G.222			
SECTOR A CELL NUMBER																								
SECTOR B																	16		9		150			
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900								
SECTOR A CID/SAC	21021				21021	21027	21024	61024		61027														
SECTOR B	21022	21022			21022	21028		61025	21025	61028														
SECTOR C	21023				21023	21029		61026	21026	61029														
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 10 - CID/SAC - final

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900								
SECTOR A CID/SAC	21021				21021	21027	21024	61024		61027														
SECTOR B	21022	21022			21022	21028		61025	21025	61028														
SECTOR C	21023				21023	21029		61026	21026	61029														
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 11 - CURRENT RADIO COUNTS existing

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 12 - CURRENT T1 COUNTS existing

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet	LTE 3rd Cabinet	LTE 4th Cabinet
# T1s												
LINK PROFILE												
RF COMBINING												
FIBER or ETHERNET?												
Tx Board Model												
Tx Board QTY												
RAX/ECU Board Model												
RAX/ECU Board QTY												
BBU Board Model												
BBU Board QTY												
RRU - location												
FIBER JUMPER												
DC CABLE												
DC/Fiber Dem. Box												
Bundled Fiber Cable												
Bundled DC Cable												

Section 13 - NEW/PROPOSED RADIO COUNTS

	GSM 1ST 850	GSM 1ST 1900	GSM 2ND 850	GSM 2ND 1900	UMTS 1ST 850	UMTS 1ST 1900	UMTS 2ND 850	UMTS 2ND 1900	UMTS 3RD 850	UMTS 3RD 1900	UMTS 4TH 850	UMTS 4TH 1900	UMTS 5TH 850	UMTS 5TH 1900	UMTS 6TH 850	UMTS 6TH 1900	LTE 1ST 700	LTE 1ST 850	LTE 1ST 1900	LTE 1ST AWS	LTE 1ST WCS	LTE 1ST FUTURE		
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								
																	LTE 2ND 700	LTE 2ND 850	LTE 2ND 1900	LTE 2ND AWS	LTE 2ND WCS	LTE 2ND FUTURE		
SECTOR A RADIO COUNTS																								
SECTOR B																								
SECTOR C																								
SECTOR D																								
SECTOR E																								
SECTOR F																								
OMNI																								

Section 14 - NEW/PROPOSED T1 COUNTS

	GSM 1st Cabinet	GSM 2nd Cabinet	UMTS 1st Cabinet	UMTS 2nd Cabinet	UMTS 3rd Cabinet	UMTS 4th Cabinet	UMTS 5th Cabinet	UMTS 6th Cabinet	LTE 1st Cabinet	LTE 2nd Cabinet	LTE 3rd Cabinet	LTE 4th Cabinet
# T1s												
LINK PROFILE												
RF COMBINING												
FIBER or ETHERNET?												
Tx Board Model												
Tx Board QTY												
RAX/ECU Board Model												
RAX/ECU Board QTY												
BBU Board Model												
BBU Board QTY												
RRU - location												
FIBER JUMPER												
DC CABLE												
DC/Fiber Dem. Box												
Bundled Fiber Cable												
Bundled DC Cable												

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	7770.00.850.02				7770.00.850.02		P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE				POWERWAVE		Powerwave							
ANTENNA SIZE (H x W x D)							72X12X6							
ANTENNA WEIGHT							64							
AZIMUTH	0				0		30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134				134		134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0				0		0							
FEEDER AMOUNT	2				2									
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)			2	Powerwave 7020 (DB)		Internal						
SURGE ARRESTOR (QTY/MODEL)							1	Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901			4	Powerwave/LGP 21901								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006			1	Kathrein / 860-10006		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Install and commission RRUS-11 on Antenna 4 for the implementation of LTE 2C 1900."If CSRF exits,remove the CSRF connections & connect it straight."													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		100184.A.850.3G.1	CTV21021			UMTS 850	7770.00.850.02	13.5		2	None	Commscope 1-5/8 (850)	160				NO				
	PORT 2		100184.A.850.3G.2	CTV2102A			UMTS 850	7770.00.850.02	13.5		2	None	Commscope 1-5/8 (850)	160				NO				
	PORT 3		100184.A.1900.3G.1	CTU61027			UMTS 1900	7770.00.1900.00	15.5		0	None	Commscope 1-5/8 (1900)	160				NO				
	PORT 4		100184.A.1900.3G.2	CTU61024			UMTS 1900	7770.00.1900.00	15.5		0	None	Commscope 1-5/8 (1900)	160				NO				
ANTENNA POSITION 3	PORT 1		100184.A.850.25G.1	321G21021			GSM 850	7770.00.850.02	13.5		2	None	Commscope 1-5/8 (850)	160				NO	12.58	111.42		
ANTENNA POSITION 4	PORT 1		100184.A.700.4G.1	CTL02102_7A_1			LTE 700	P65-16-XLH-RR_716MHz_02DT	14.8		2	Top	FIBER	0								
	PORT 3		100184.A.1900.4G.1	CTL02102_9A_1			LTE 1900	P65-16-XLH-RR_1930MHz_03DT	14.93		3	Top	FIBER	0								

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	7770.00.850.04				7770.00.850.04		P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE				POWERWAVE		Powerwave							
ANTENNA SIZE (H x W x D)							72X12X6							
ANTENNA WEIGHT							64							
AZIMUTH	100				100		150							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134				134		134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0				0		0							
FEEDER AMOUNT	2				2									
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)			2	Powerwave 7020 (DB)		Internal						
SURGE ARRESTOR (QTY/MODEL)							1	Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901			4	Powerwave/LGP 21901								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006			1	Kathrein / 860-10006		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Install and commission RRUS-11 on Antenna 4 for the implementation of LTE 2C 1900."If CSRF exits,remove the CSRF connections & connect it straight."													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		100184.B.850.3G.1	CTV21022			UMTS 850	7770.00.850.04	13.5		4	None	Commscope 1-5/8 (850)	160				NO				
	PORT 2		100184.B.850.3G.2	CTV2102B			UMTS 850	7770.00.850.04	13.5		4	None	Commscope 1-5/8 (850)	160				NO				
	PORT 3		100184.B.1900.3G.1	CTU61028			UMTS 1900	7770.00.1900.02	15.5		2	None	Commscope 1-5/8 (1900)	160				NO				
	PORT 4		100184.B.1900.3G.2	CTU61025			UMTS 1900	7770.00.1900.02	15.5		2	None	Commscope 1-5/8 (1900)	160				NO				
ANTENNA POSITION 3	PORT 1		100184.B.850.25G.1	321G21022			GSM 850	7770.00.850.04	13.5		4	None	Commscope 1-5/8 (850)	160				NO	12.58	111.42		
ANTENNA POSITION 4	PORT 1		100184.B.700.4G.1	CTL02102_7B_1			LTE 700	P65-16-XLH-RR_716MHz_08DT	14.8		8	Top	FIBER	0								
	PORT 3		100184.B.1900.4G.1	CTL02102_9B_1			LTE 1900	P65-16-XLH-RR_1930MHz_06DT	14.93		6	Top	FIBER	0								

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	7770.00.850.07				7770.00.850.07		P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE				POWERWAVE		Powerwave							
ANTENNA SIZE (H x W x D)							72X12X6							
ANTENNA WEIGHT							64							
AZIMUTH	250				250		270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134				134		134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0				0		0							
FEEDER AMOUNT	2				2									
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)			2	Powerwave 7020 (DB)		Internal						
SURGE ARRESTOR (QTY/MODEL)							1	Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901			4	Powerwave/LGP 21901								
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006			1	Kathrein / 860-10006		LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)							1	RRUS-11						
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Install and commission RRUS-11 on Antenna 4 for the implementation of LTE 2C 1900."If CSRF exits,remove the CSRF connections & connect it straight."													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1		100184.C.850.3G.1	CTV21023			UMTS 850	7770.00.850.07	13.5		7	None	Commscope 1-5/8 (850)	160				NO				
	PORT 2		100184.C.850.3G.2	CTV2102C			UMTS 850	7770.00.850.07	13.5		7	None	Commscope 1-5/8 (850)	160				NO				
	PORT 3		100184.C.1900.3G.1	CTU61029			UMTS 1900	7770.00.1900.04	15.5		4	None	Commscope 1-5/8 (1900)	160				NO				
	PORT 4		100184.C.1900.3G.2	CTU61026			UMTS 1900	7770.00.1900.04	15.5		4	None	Commscope 1-5/8 (1900)	160				NO				
ANTENNA POSITION 3	PORT 1		100184.C.850.25G.1	321G21023			GSM 850	7770.00.850.07	13.5		7	None	Commscope 1-5/8 (850)	160				NO	12.58	111.42		
ANTENNA POSITION 4	PORT 1		100184.C.700.4G.1	CTL02102_7C_1			LTE 700	P65-16-XLH-RR_716MHz_03DT	14.8		3	Top	FIBER	0								
	PORT 3		100184.C.1900.4G.1	CTL02102_9C_1			LTE 1900	P65-16-XLH-RR_1930MHz_03DT	14.93		3	Top	FIBER	0								

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		QS66512-3					
ANTENNA VENDOR		Quintel					
ANTENNA SIZE (H x W x D)		72.0X12.0X9.6					
ANTENNA WEIGHT		105					
AZIMUTH		30					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		134					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT		0					
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)		Built-in					
SURGE ARRESTOR (QTY/MODEL)		1 DC Fiber Squid					
DIPLEXER (QTY/MODEL)		4 CCi triplexer TPX-070821					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH Conrtolled					
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)		1 RRUS-12+RRUS-A2					
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 Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.						
Local Market Note2							
Local Market Note3							

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3	100184.A.1900.4G.1	100184.A.1900.4G.1	CTL02102_9A_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 4	100184.A.WCS.4G.111	100184.A.WCS.4G.1	CTL02102_3A_1			LTE WCS	QS66512-3_2350MHz_02DT	17.3		2	TOP	FIBER	0		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		QS66512-3					
ANTENNA VENDOR		Quintel					
ANTENNA SIZE (H x W x D)		72.0X12.0X9.6					
ANTENNA WEIGHT		105					
AZIMUTH		150					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		134					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT		0					
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)		Built-in					
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)		4 CCi triplexer TPX-070821					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH Conrtolled					
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)		1 RRUS-12+RRUS-A2					
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 Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.						
Local Market Note2							
Local Market Note3							

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3	100184.B.1900.4G.222	100184.B.1900.4G.1	CTL02102_9B_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 4	100184.B.WCS.4G.222	100184.B.WCS.4G.1	CTL02102_3B_1			LTE WCS	QS66512-3_2350MHz_02DT	14.8		2	TOP	FIBER	0		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		QS66512-3					
ANTENNA VENDOR		Quintel					
ANTENNA SIZE (H x W x D)		72.0X12.0X9.6					
ANTENNA WEIGHT		105					
AZIMUTH		270					
MAGNETIC DECLINATION							
RADIATION CENTER (feet)		134					
ANTENNA TIP HEIGHT							
MECHANICAL DOWNTILT		0					
FEEDER AMOUNT							
Antenna RET Motor (QTY/MODEL)		Built-in					
SURGE ARRESTOR (QTY/MODEL)							
DIPLEXER (QTY/MODEL)		4 CCi triplexer TPX-070821					
DUPLEXER (QTY/MODEL)							
Antenna RET CONTROL UNIT (QTY/MODEL)		RRH Conrtolled					
DC BLOCK (QTY/MODEL)							
TMA/LNA (QTY/MODEL)							
CURRENT INJECTORS FOR TMA (QTY/MODEL)							
PDU FOR TMAS (QTY/MODEL)							
FILTER (QTY/MODEL)							
RRH - 700 band (QTY/MODEL)							
RRH - 850 band (QTY/MODEL)							
RRH - 1900 band (QTY/MODEL)		1 RRUS-12+RRUS-A2					
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 Component1 (QTY/MODEL)							
Additional Component2 (QTY/MODEL)							
Additional Component3 (QTY/MODEL)							
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.						
Local Market Note2							
Local Market Note3							

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 2	PORT 3	100184.C.1900.4G.1	100184.C.1900.4G.1	CTL02102_9C_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 4	100184.C.WCS.4G.111	100184.C.WCS.4G.1	CTL02102_3C_1			LTE WCS	QS66512-3_2350MHz_02DT	17.3		2	TOP	FIBER	0		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	7770.00.850.02		QS66512-3				P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE		Quintel				Powerwave							
ANTENNA SIZE (H x W x D)			72.0X12.0X9.6				72X12X6							
ANTENNA WEIGHT			105				64							
AZIMUTH	0		30				30							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134		134				134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		Fiber + 2 Coax											
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Built-in				Internal						
SURGE ARRESTOR (QTY/MODEL)			1	DC Fiber Squid			1	DC Fiber Squid						
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901	4	CCi triplexer TPX-070821										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)	1	Kathrein / 860-10006	1	RRH Conrtolled				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)	1	LGP12104												
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	100184.A.850.3G.1	100184.A.850.3G.1	CTV21021			UMTS 850	7770.00.850.02	13.5		2	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 2	100184.A.850.3G.2	100184.A.850.3G.2	CTV2102A			UMTS 850	7770.00.850.02	13.5		2	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 3	100184.A.1900.3G.1	100184.A.1900.3G.1	CTU61027			UMTS 1900	7770.00.1900.00	15.5		0	None	Commscope 1-5/8 (1900)	160		0		NO				
	PORT 4	100184.A.1900.3G.3,100184.A.1900.3G.4	100184.A.1900.3G.2	CTU61024		Decom	UMTS 1900	7770.00.1900.00	15.5		0	None	Commscope 1-5/8 (1900)	160		0		NO				
ANTENNA POSITION 2	PORT 1	100184.A.850.25G.1	100184.A.850.25G.1	321G21021			GSM 850	QS66512-3_850MHz_03DT	13.5		2	None	Commscope 1-5/8 (850)	160		0		NO	12.58	111.42		
	PORT 3	100184.A.1900.4G.1	100184.A.1900.4G.1	CTL02102_9A_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 5	100184.A.WCS.4G.111	100184.A.WCS.4G.1	CTL02102_3A_1			LTE WCS	QS66512-3_2350MHz_02DT	17.3		2	TOP	FIBER	0		0						
ANTENNA POSITION 4	PORT 1	100184.A.700.4G.1	100184.A.700.4G.1	CTL02102_7A_1			LTE 700	P65-16-XLH-RR_716MHz_02DT	14.8		2	Top	FIBER	0		0						

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	7770.00.850.04		QS66512-3				P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE		Quintel				Powerwave							
ANTENNA SIZE (H x W x D)			72.0X12.0X9.6				72X12X6							
ANTENNA WEIGHT			105				64							
AZIMUTH	100		150				150							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134		134				134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		Fiber + 2 Coax											
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)		Built-in				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901	4	CCi triplexer TPX-070821										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)			1	RRH Conrtolled				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	100184.B.850.3G.1	100184.B.850.3G.1	CTV21022			UMTS 850	7770.00.850.04	13.5		4	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 2	100184.B.850.3G.3	100184.B.850.3G.2	CTV2102B			UMTS 850	7770.00.850.04	13.5		4	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 3	100184.B.1900.25G.1,100184.B.1900.3G.1	100184.B.1900.3G.1	CTU61028			UMTS 1900	7770.00.1900.02	15.5		2	None	Commscope 1-5/8 (1900)	160		0		NO				
	PORT 4	100184.B.1900.3G.3,100184.B.1900.3G.4	100184.B.1900.3G.2	CTU61025		Decom	UMTS 1900	7770.00.1900.02	15.5		2	None	Commscope 1-5/8 (1900)	160		0		NO				
ANTENNA POSITION 2	PORT 1	100184.B.850.25G.1	100184.B.850.25G.1	321G21022			GSM 850	QS66512-3_850MHz_03DT	13.5		4	None	Commscope 1-5/8 (850)	160		0		NO	12.58	111.42		
	PORT 3	100184.B.1900.4G.222	100184.B.1900.4G.1	CTL02102_9B_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 5	100184.B.WCS.4G.222	100184.B.WCS.4G.1	CTL02102_3B_1			LTE WCS	QS66512-3_2350MHz_02DT	17.3		2	TOP	FIBER	0		0						
ANTENNA POSITION 4	PORT 1	100184.B.700.4G.222	100184.B.700.4G.1	CTL02102_7B_1			LTE 700	P65-16-XLH-RR_716MHz_08DT	14.8		8	Top	FIBER	0		0						

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	7770.00.850.07		QS66512-3				P65-16-XLH-RR							
ANTENNA VENDOR	POWERWAVE		Quintel				Powerwave							
ANTENNA SIZE (H x W x D)			72.0X12.0X9.6				72X12X6							
ANTENNA WEIGHT			105				64							
AZIMUTH	250		270				270							
MAGNETIC DECLINATION														
RADIATION CENTER (feet)	134		134				134							
ANTENNA TIP HEIGHT														
MECHANICAL DOWNTILT	0		0				0							
FEEDER AMOUNT	2		Fiber + 2 Coax											
Antenna RET Motor (QTY/MODEL)	2	Powerwave 7020 (DB)	2	Built-in				Internal						
SURGE ARRESTOR (QTY/MODEL)														
DIPLEXER (QTY/MODEL)	2	Powerwave/LGP 21901	4	CCi triplexer TPX-070821										
DUPLEXER (QTY/MODEL)														
Antenna RET CONTROL UNIT (QTY/MODEL)			1	RRH Conrtolled				LTE RRH						
DC BLOCK (QTY/MODEL)														
TMA/LNA (QTY/MODEL)	2	Pwav LGP21401 Single 1900 w/ 850BP												
CURRENT INJECTORS FOR TMA (QTY/MODEL)	2	Polyphaser 1000860												
PDU FOR TMAS (QTY/MODEL)														
FILTER (QTY/MODEL)														
RRH - 700 band (QTY/MODEL)							1	RRUS-11						
RRH - 850 band (QTY/MODEL)														
RRH - 1900 band (QTY/MODEL)			1	RRUS-12+RRUS-A2										
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 Component1 (QTY/MODEL)														
Additional Component2 (QTY/MODEL)														
Additional Component3 (QTY/MODEL)														
Local Market Note1	Add LTE 3C WCS with RRUS-32 RRH on TOP as Bronze standard Replace GSM Antenna on Pos 2 to 6' QS66512-3 Quintel 12 port Antenna Move and Replace LTE 2C 1900 Radio from Pos 4 to Pos 2 with RRUS-12+RRUS-A2 to join LTE 3C WCS and GSM on Pos 2. Then move position 3(GSM/LTE 1900/WCS) to pos 2 for 6' separation between future LTE carriers. UMTS on pos 1, LTE 700 on position 4. Add 2 CCi triplexer TPX-070821 @ bottom Add 2 CCi triplexer TPX-070821 @ Top Upgrade DUL to DUS 41 // Add 2nd Squid - 1 DC Fiber squid, 2 DC Trunks, 1 Fiber Trunks. Add 2nd DUs 41 and move busiest sector beta on second Node B.													
Local Market Note2														
Local Market Note3														

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)	CABLE NUMBER	CABLE ID (CSSNG)
ANTENNA POSITION 1	PORT 1	100184.C.850.3G.1	100184.C.850.3G.1	CTV21023			UMTS 850	7770.00.850.07	13.5		7	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 2	100184.C.850.3G.3	100184.C.850.3G.2	CTV2102C			UMTS 850	7770.00.850.07	13.5		7	None	Commscope 1-5/8 (850)	160		0		NO				
	PORT 3	100184.C.1900.3G.1	100184.C.1900.3G.1	CTU61029			UMTS 1900	7770.00.1900.04	15.5		4	None	Commscope 1-5/8 (1900)	160		0		NO				
	PORT 4	100184.C.1900.3G.3,100184.C.1900.3G.4	100184.C.1900.3G.2	CTU61026		Decom	UMTS 1900	7770.00.1900.04	15.5		4	None	Commscope 1-5/8 (1900)	160		0		NO				
ANTENNA POSITION 2	PORT 1	100184.C.850.25G.1	100184.C.850.25G.1	321G21023			GSM 850	QS66512-3_850MHz_07DT	13.5		7	None	Commscope 1-5/8 (850)	160		0		NO	12.58	111.42		
	PORT 3	100184.C.1900.4G.1	100184.C.1900.4G.1	CTL02102_9C_1			LTE 1900	QS66512-3_1948MHz_03DT	14.93		3	TOP	FIBER	0		0						
	PORT 5	100184.C.WCS.4G.111	100184.C.WCS.4G.1	CTL02102_3C_1			LTE WCS	QS66512-3_2350MHz_02DT	17.3		2	TOP	FIBER	0		0						
ANTENNA POSITION 4	PORT 1	100184.C.700.4G.1	100184.C.700.4G.1	CTL02102_7C_1			LTE 700	P65-16-XLH-RR_716MHz_03DT	14.8		3	Top	FIBER	0		0						

Diagram - Sector	A	Diagram File Name - CT2102_A_WCS_BrnzStand_Rev2.vsd					
Atoll Site Name -	CTU2102	Location Name -	GREENWICH PERRYRIDGE RD TWR	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

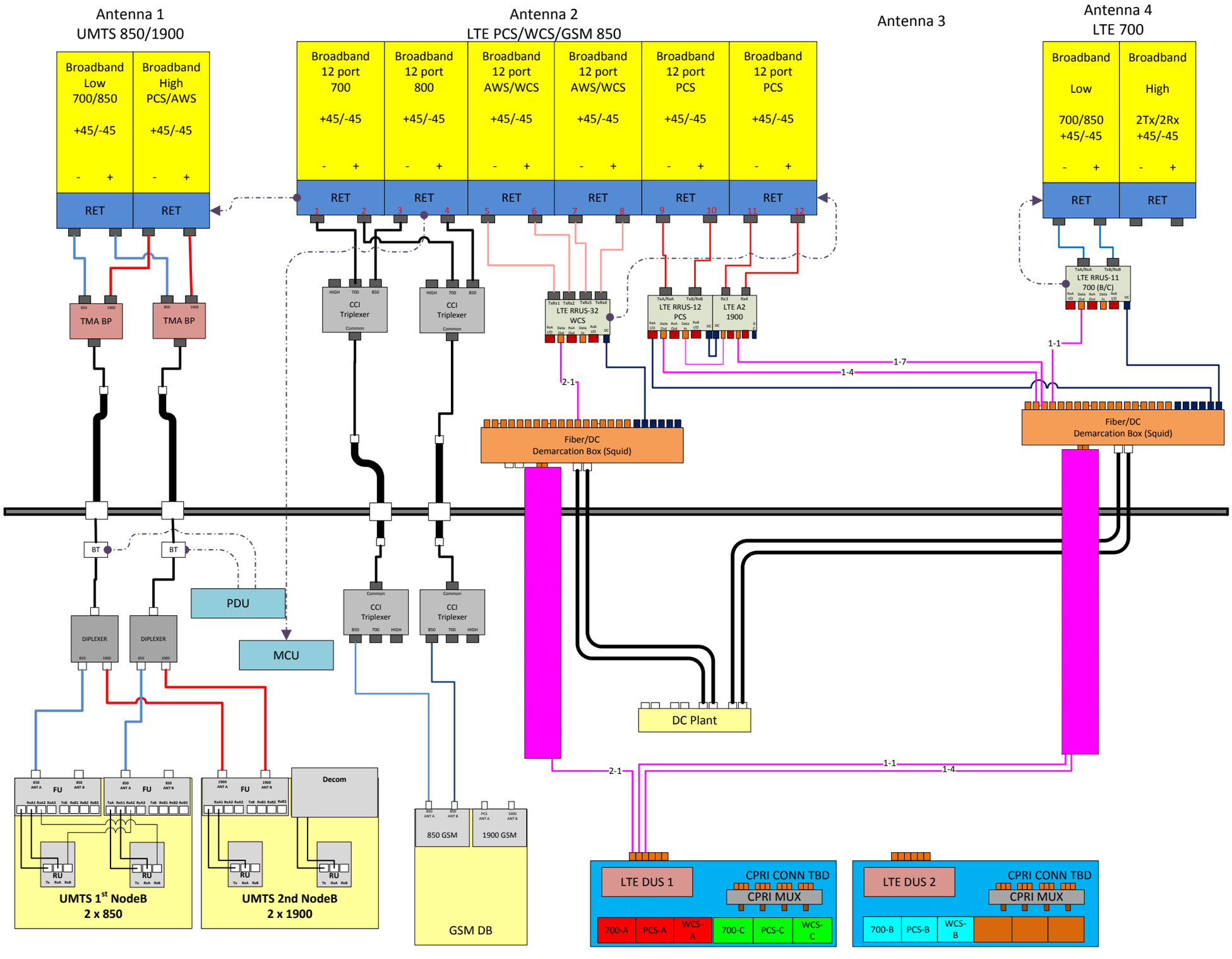


Diagram - Sector	B	Diagram File Name - CT2102_B_WCS_BrnzStand_Rev2.vsd					
Atoll Site Name -	CTU2102	Location Name -	GREENWICH PERRYRIDGE RD TWR	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							

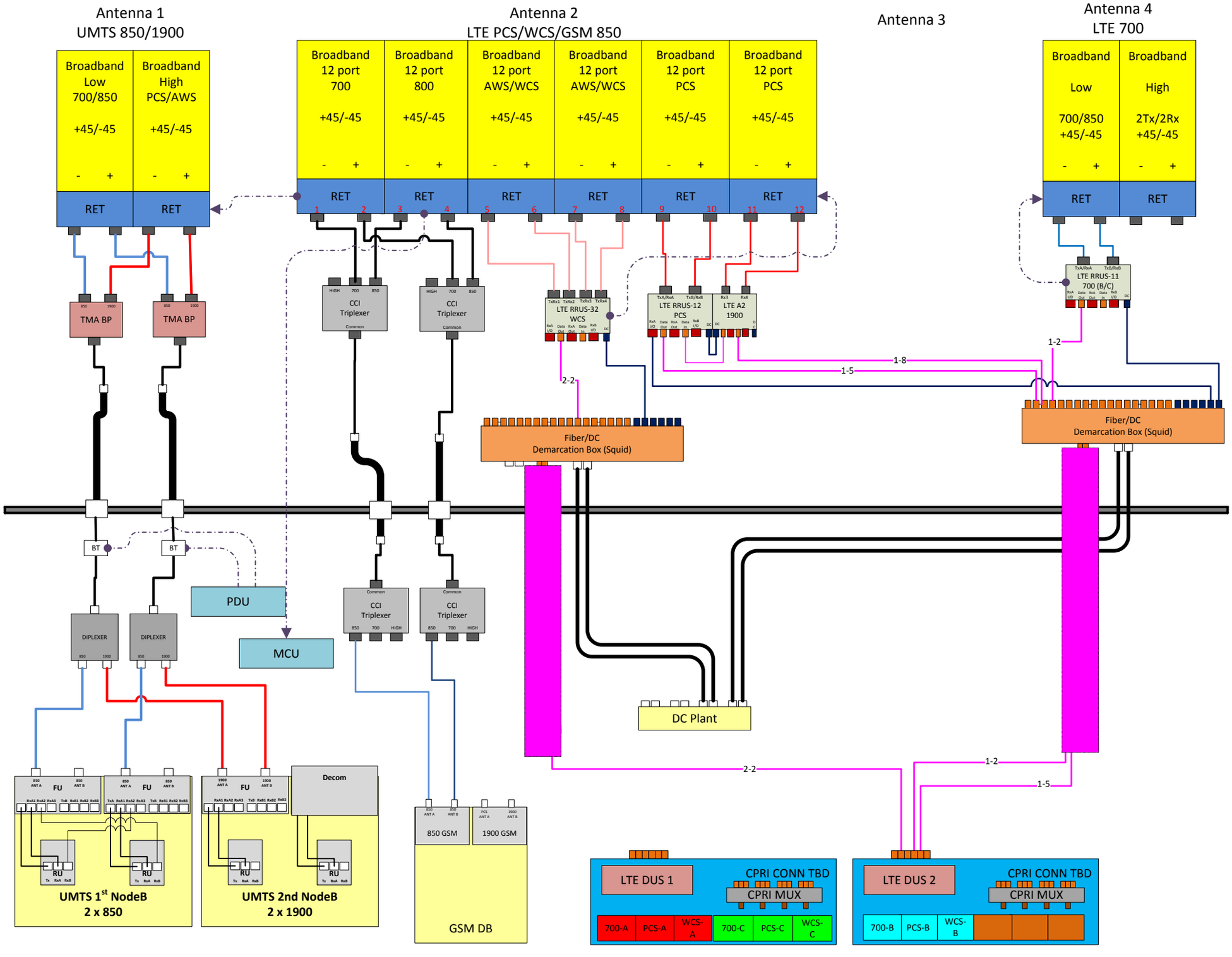
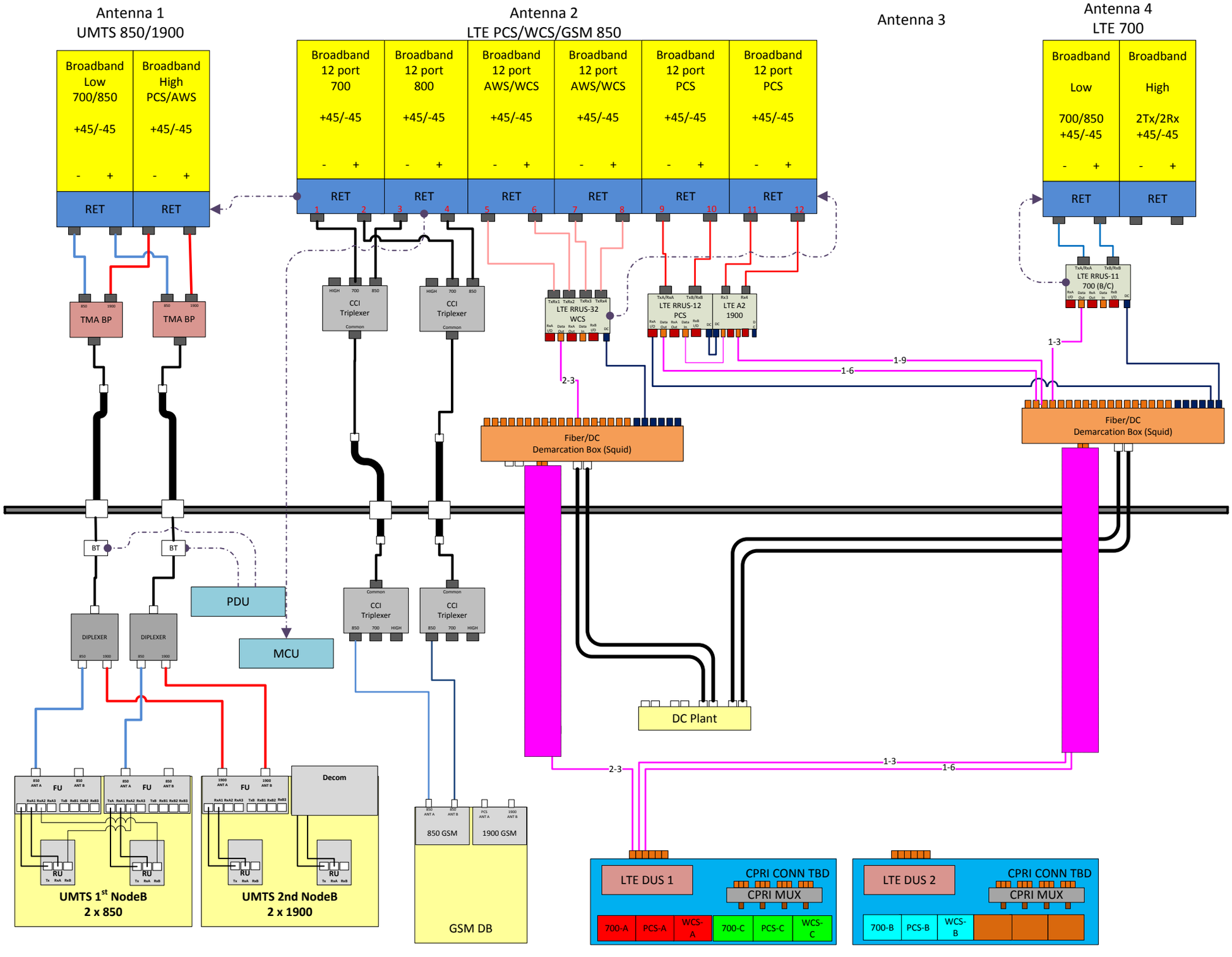


Diagram - Sector	C	Diagram File Name - CT2102_C_WCS_BrnzStand_Rev2.vsd					
Atoll Site Name -	CTU2102	Location Name -	GREENWICH PERRYRIDGE RD TWR	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND
Comments:							



WORKFLOW SUMMARY						
Date	FROM State / Status	FROM ATTUID	TO State / Status	TO ATTUID	Operation	Comments
09/28/2015	Preliminary / In Progress	cb6561	Preliminary / Submitted for Approval	NA515M	Promote	
10/08/2015	Preliminary / Submitted for Approval	NA515M	Preliminary / Approved	BG144B	Promote	
11/17/2015	Preliminary / Approved	BG144B	Final / RF Approval	om636a	Promote	
11/20/2015	Final / RF Approval	om636a	Final / RF Approval	MM093Q	Re-Assign	
11/20/2015	Final / RF Approval	MM093Q	Final / Approved	BG144B	Promote	LTE Final RFDS

Quintel®
New Dimensions in Wireless™

QS66512-3

6ft 65° XXX MultiServ™ 12-Port Antenna

2x698-787MHz / 2x824-894MHz / 2x1850-1990MHz / 2x1850-1990MHz / 2x1695-1780+2110-2400MHz / 2x1695-1780+2110-2400MHz

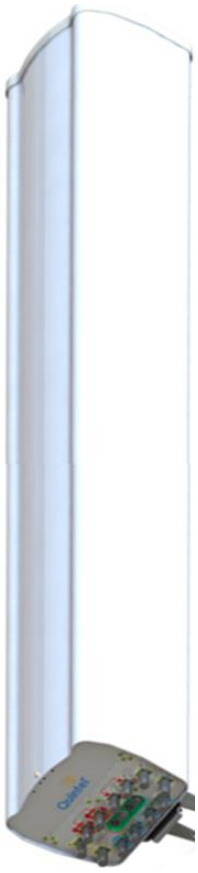
- Provides 12 antenna Ports in a slim-line form factor
- Optimized Azimuth patterns for Min Inter-Sector Interference
- Industry leading Minimal Wind-Load design

- 700, 850, PCS, AWS & WCS bands in one antenna
- AISG & 3GPP compliant internal remote electrical tilt (RET)
- AWS & PCS Cross band PIM >157dBc

The Quintel MultiServ™ Multiband 12 Port Antenna with patented QTilt™ technology uniquely delivers six 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 QS66512-3 also provides 4x1695-1780+2110-2400MHz & 4x1850-1990MHz ports as two side-by-side (CLA-2X) arrays, each array having independent tilt to support independent service, or 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	698-787	824-894	1695-1780 and 2110-2400			1850-1990
	698-787	824-894	1695-1780	2110-2180	2300-2400	1850-1990
Azimuth beamwidth[1]	68°	67°	69°	63°	58°	69°
Elevation beamwidth[1]	12°	10°	6.5°	5.5°	4.5°	5.5°
Gain[1] (dBi)	13.0	13.5	16.0	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°		2° – 7° 2° – 7°
Upper SLL (20° > mainbeam)[1]	-15dB	-15.5dB	-16dB	-16dB	-15dB	-16dB
Front to Back Ratio(180°±10°)[1]	≥26dB	≥30dB	≥27dB	≥28dB	≥28dB	≥27dB
Port to Port isolation[1]	≥28dB	≥30dB	≥28dB	≥30dB	≥30dB	≥30dB
Return loss (VSWR)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB(1.5)	14dB (1.5)	14dB(1.5)
Squint[1]	<±3°	<±3°	<±3°	<±3°	<±4°	<±3°
Tracking[1]	<±2.5dB	<±3dB	<±3dB	<±3dB	<±3dB	<±4dB
X Polar Discrimination (at 0°)	>18dB	>17dB	>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)	>150dBc	>150dBc		>150dBc		>150dBc
XBand PIM (3rd Order) (2x43dBm)				>157dBc		

[1] *Typical Performance across frequency and Downtilt.*



Mechanical Characteristics	
Dimensions	L 72"(1828mm) x W 12"(304mm) x D 9.6"(245mm)
Weight (excl mounting brackets)	112lbs (50.8kg)
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
RET Configuration	RET1 I/O RF Ports 1-4. RET 2 I/O RF Ports 5-12
No of connectors	RET1 1in/1out. RET2 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™

QS66512-3

6ft 65° XXX MultiServ™ 12-Port Antenna

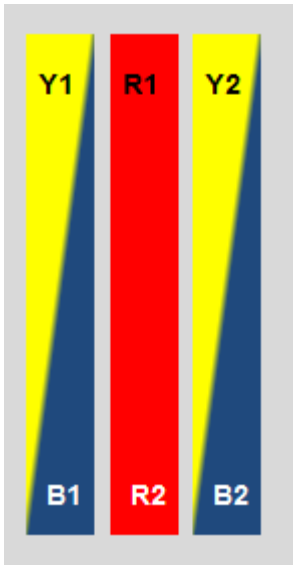
2x698-787MHz / 2x824-894MHz / 2x1850-1990MHz / 2x1850-1990MHz / 2x1695-1780+2110-2400MHz / 2x1695-1780+2110-2400MHz

RET Configuration

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

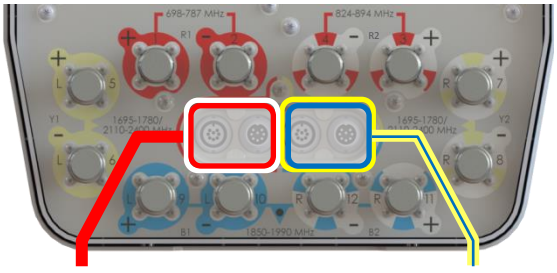
The 12-Port array topology consists of 3 radiating arrays:

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



RF Connector Port Configuration

	Ports	Freq (MHz)
R1	1-2	698-787
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 Control for 700 & 850MHz

RET Device	Band	RF Ports
1	700	1-2
2	850	3-4

AISG I/O Configuration
RET Control for PCS & AWS/WCS

RET Device	Band	RF Ports
1	AWS/WCS	5-6
2	AWS/WCS	7-8
3	PCS	9-10
4	PCS	11-12

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 QS66512-3 provides a total of 6 independent tilts:

- 1x(698-787MHz)
- 1x(824-894MHz)
- 1x Left Array (1695-1780 and 2110-2400MHz)
- 1x Left Array (1850-1990MHz)
- 1x Right Array (1695-1780 and 2110-2400MHz)
- 1x Right Array (1850-1990MHz)

Design Optimization

A particularly powerful characteristic of all Quintel Antennas is that our Azimuth patterns have been optimized with network design and deployment in mind. The 3dB Azimuth beamwidth is ~65° as with most Base Station 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. This means for interference limited networks, where LTE traffic is high, our antennas have been shown to deliver 25% higher capacity.

The QS66512-3 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

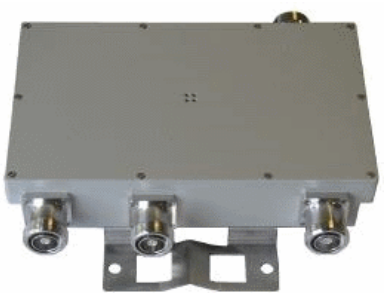
Quintel is a leading innovator in the design, development, and delivery of network-efficient antenna solutions for wireless operators worldwide. The company's products enable global wireless operators to independently deploy and optimize multiple air interfaces or services on a single standard antenna 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.

Tel (Americas): +1 (585) 420-8720
Tel (EMEA): +44 (0)1908 231 362
info@quintelsolutions.com

DATA SHEET

Outdoor Broadband Triplexer

TPX-070821



- Low Loss
- Small, lightweight
- AISG 2.0 compliant from PCS/AWS port to Common port
- Good Isolation
- Good IM
- Lightning protected
- High reliability
- Full 700, 850 MHz, and PCS/AWS (pre-combined) bands

Overview

Communication Components, Inc. Outdoor Broadband Triplexer combines 700 MHz, 850 MHz, and PCS/AWS band Basestation Tx/Rx signals onto a common port. Specifically intended for use in multi-band systems with limited feeder lines, the CCI Triplexer model TPX-070821 facilitates the addition of new technologies including LTE to existing sites while providing a high degree of isolation between systems. By reducing the number of feeder lines, the cost to upgrade a site (tower loading, leasing and installation costs) is reduced.
The CCI Outdoor Broadband Triplexer provides full band performance for each band with low insertion loss, low Intermodulation, and high power handling. Excellent return loss delivers the best match to the antennas and base station, saving precious transmit power. DC and AISG pass-through retains full RET and TMA capability utilizing CCI's AISG suite of products.

Technical Description:

The Outdoor Broadband Triplexer consists of multiple filters to combine (or divide) full band 700 MHz, 850 MHz and PCS/AWS signals. This tower mount unit can be used as either a splitter or combiner to aggregate multiple bands on a common feeder line. All RF ports are DIN 7-16 connectors. The fully weatherproof tower mount unit incorporates a unique intelligent Bias-T architecture which passes the DC and AISG carrier frequency from any of the input ports to the common port while blocking the DC and AISG signals from being re-injected into the other input ports. The unit has internal lightning strike protection using a multi-stage surge protection circuit.
The filters have been designed to minimize insertion loss while maximizing isolation. Particular attention has been given to the intermodulation performance of the Broadband Diplexer to minimize any passive intermodulation products from occurring. All DIN Connectors are fully IP68 rated and the unit body is rated for IP66.

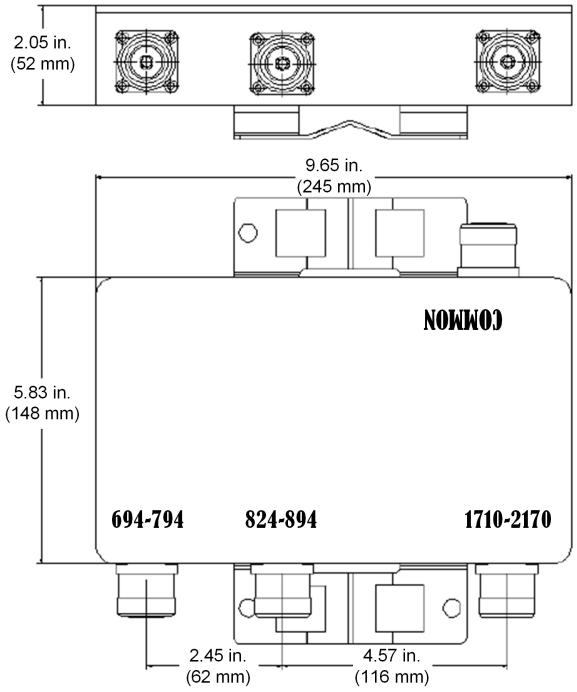
SPECIFICATIONS

Outdoor Broadband Triplexer

TPX-070821

Mechanical

Connectors	4 x 7-16 DIN female long neck
Dimensions (w/o connectors or brackets)(HxWxD)	5.83 x 9.65 x 2.05 in. (148 x 245 x 52 mm)
Weight	7.5 lbs (3.45 kg)
Mounting	Pole/Wall mounting bracket



Outdoor Broadband Triplexer Outline Drawing

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

AT&T Existing Facility

Site ID: CTU2102

Greenwich Perryridge Road Tower
5 Perryridge Road
Greenwich, CT 06830

February 9, 2016

EBI Project Number: 6216000623

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	33.20 %

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

EBI Consulting
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February 9, 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: **CTU2102 – Greenwich Perryridge Road Tower**

EBI Consulting was directed to analyze the proposed AT&T facility located at **5 Perryridge Road, Greenwich, 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 **5 Perryridge Road, Greenwich, 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 (8500 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 (PCS Band – 1900 MHz) 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 (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (WCS Band – 2300 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 (700 MHz) 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 six 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 **Quintel QS66512-3, Powerwave P65-16-XLH-RR and the Powerwave 7770.00** for transmission in the 700 MHz, 850 MHz and1900 MHz (PCS) 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 centerline of the proposed antennas is **134 feet** above ground level (AGL).

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.

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AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 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	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.68**	Antenna B1 MPE%	**0.68**	Antenna C1 MPE%	**0.68**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Quintel QS66512-3	Make / Model:	Quintel QS66512-3	Make / Model:	Quintel QS66512-3
Gain:	11.4 / 12.78 / 15.15 dBd	Gain:	11.4 / 12.78 / 15.15 dBd	Gain:	11.4 / 12.78 / 15.15 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 feet
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	300	Total TX Power(W):	300	Total TX Power(W):	300
ERP (W):	7,032.37	ERP (W):	7,032.37	ERP (W):	7,032.37
Antenna A2 MPE%	**1.92**	Antenna B2 MPE%	**1.92**	Antenna C2 MPE%	**1.92**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR
Gain:	12.45 dBd	Gain:	12.45 dBd	Gain:	12.45 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 feet
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,109.51	ERP (W):	2,109.51	ERP (W):	2,109.51
Antenna A3 MPE%	**0.82**	Antenna B3 MPE%	**0.82**	Antenna C3 MPE%	**0.82**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**3.42 %**
Eversource	20.44 %
Verizon Wireless	3.76 %
MW to Bruce	0.74 %
MW to PD	0.02 %
MW to Putnam	0.74 %
Trunked System	0.22 %
Mutual Aid	0.12 %
CMED	0.08 %
Fire Paging	0.13 %
SP Hotline	0.17 %
Sprint	0.34 %
Clearwire	0.08 %
T-Mobile	2.28 %
Nextel	0.66 %
Site Total MPE %:	**33.20 %**

AT&T Sector 1 Total:	3.42 %
AT&T Sector 2 Total:	3.42 %
AT&T Sector 3 Total:	3.42 %
Site Total:	33.20 %

AT&T _ 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	134	1.82	700	567	0.39 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	134	2.88	1900	1000	0.29 %
AT&T 850 MHz GSM	2	414.12	134	1.82	850	567	0.18 %
AT&T 1900 MHz (PCS) LTE	2	1138.02	134	4.99	1900	1000	0.88 %
AT&T 2300 MHz (WCS) LTE	2	1964.04	134	8.62	2300	1000	0.86 %
AT&T 700 MHz LTE	2	1054.75	134	4.63	700	467	0.82 %
						Total:	5.41 %

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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 1:	3.42 %
Sector 2:	3.42 %
Sector 3 :	3.42 %
AT&T Maximum Total (per sector):	3.42 %
Site Total:	33.20 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **33.20%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

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

AT&T Existing Facility

Site ID: CTU2102

Greenwich Perryridge Road Tower
5 Perryridge Road
Greenwich, CT 06830

February 9, 2016

EBI Project Number: 6216000623

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	33.20 %

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

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February 9, 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: **CTU2102 – Greenwich Perryridge Road Tower**

EBI Consulting was directed to analyze the proposed AT&T facility located at **5 Perryridge Road, Greenwich, 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.

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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.

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Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **5 Perryridge Road, Greenwich, 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 (8500 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 (PCS Band – 1900 MHz) 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 (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (WCS Band – 2300 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 (700 MHz) 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 six 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 **Quintel QS66512-3, Powerwave P65-16-XLH-RR and the Powerwave 7770.00** for transmission in the 700 MHz, 850 MHz and1900 MHz (PCS) 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 centerline of the proposed antennas is **134 feet** above ground level (AGL).

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.

EBI Consulting
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AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00	Make / Model:	Powerwave 7770.00
Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd	Gain:	11.4 / 13.4 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 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	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,140.89	ERP (W):	2,140.89	ERP (W):	2,140.89
Antenna A1 MPE%	**0.68**	Antenna B1 MPE%	**0.68**	Antenna C1 MPE%	**0.68**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	Quintel QS66512-3	Make / Model:	Quintel QS66512-3	Make / Model:	Quintel QS66512-3
Gain:	11.4 / 12.78 / 15.15 dBd	Gain:	11.4 / 12.78 / 15.15 dBd	Gain:	11.4 / 12.78 / 15.15 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 feet
Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)	Frequency Bands	850 MHz / 1900 MHz (PCS) / 2300 MHz (WCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	300	Total TX Power(W):	300	Total TX Power(W):	300
ERP (W):	7,032.37	ERP (W):	7,032.37	ERP (W):	7,032.37
Antenna A2 MPE%	**1.92**	Antenna B2 MPE%	**1.92**	Antenna C2 MPE%	**1.92**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR	Make / Model:	Powerwave P65-16-XLH-RR
Gain:	12.45 dBd	Gain:	12.45 dBd	Gain:	12.45 dBd
Height (AGL):	134 feet	Height (AGL):	134 feet	Height (AGL):	134 feet
Frequency Bands	700 MHz	Frequency Bands	700 MHz	Frequency Bands	700 MHz
Channel Count	2	Channel Count	2	Channel Count	2
Total TX Power(W):	120	Total TX Power(W):	120	Total TX Power(W):	120
ERP (W):	2,109.51	ERP (W):	2,109.51	ERP (W):	2,109.51
Antenna A3 MPE%	**0.82**	Antenna B3 MPE%	**0.82**	Antenna C3 MPE%	**0.82**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**3.42 %**
Eversource	20.44 %
Verizon Wireless	3.76 %
MW to Bruce	0.74 %
MW to PD	0.02 %
MW to Putnam	0.74 %
Trunked System	0.22 %
Mutual Aid	0.12 %
CMED	0.08 %
Fire Paging	0.13 %
SP Hotline	0.17 %
Sprint	0.34 %
Clearwire	0.08 %
T-Mobile	2.28 %
Nextel	0.66 %
Site Total MPE %:	**33.20 %**

AT&T Sector 1 Total:	3.42 %
AT&T Sector 2 Total:	3.42 %
AT&T Sector 3 Total:	3.42 %
Site Total:	33.20 %

AT&T _ 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	134	1.82	700	567	0.39 %
AT&T 1900 MHz (PCS) UMTS	2	656.33	134	2.88	1900	1000	0.29 %
AT&T 850 MHz GSM	2	414.12	134	1.82	850	567	0.18 %
AT&T 1900 MHz (PCS) LTE	2	1138.02	134	4.99	1900	1000	0.88 %
AT&T 2300 MHz (WCS) LTE	2	1964.04	134	8.62	2300	1000	0.86 %
AT&T 700 MHz LTE	2	1054.75	134	4.63	700	467	0.82 %
						Total:	5.41 %

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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 1:	3.42 %
Sector 2:	3.42 %
Sector 3 :	3.42 %
AT&T Maximum Total (per sector):	3.42 %
Site Total:	33.20 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **33.20%** 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.

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