Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

September 15, 2016

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 876316**
AT&T Site ID: CT2014
21 Acorn Road, Branford, CT 06405
Latitude: 41° 17' 35.06"/ Longitude: -72° 45' 46.4"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 108-foot level of the existing 147-foot monopole tower at 21 Acorn Road in Branford, CT. The tower is owned by Crown Castle. The property is owned by the Altrio Investment Group LLC. AT&T now intends to replace three antennas with (3) new antennas. These antennas would be installed at the 108-foot level of the tower. AT&T also intends to replace three (3) RRU11s with three (3) RRU12/A2s.

The Town of Branford could not confirm the original date and conditions of zoning.

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.S.C.A. § 16-50j-73, a copy of this letter is being sent to the Mr. James B. Cosgrove, First-Selectman, Town of Branford, as well as the property owner, and Crown Castle is the tower owner.

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

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

3. The proposed modification 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 Communication Commission safety standard.

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

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

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report
Tab 3: Exhibit-3: General Power Density Table Report (RF Emissions Analysis Report)

cc: Mr. James B. Cosgrove, First-Selectman
Branford Town Hall
1019 Main Street
Branford, CT 06405

Altrio Investment Group LLC
PO Box 622
Branford, CT 06405

21 ACORN RD

Location	21 ACORN RD	**Mblu**	H05/000 003/ 00010/ /
Acct#	008133	**Owner**	ALTRIO INVESTMENT GROUP LLC
Assessment	$634,200	**Appraisal**	$905,900
PID	1176	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$477,600	$428,300	$905,900
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$334,300	$299,900	$634,200

Owner of Record

Owner	ALTRIO INVESTMENT GROUP LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	P O BOX 622 BRANFORD, CT 06405	**Book & Page**	0568/0731
		Sale Date	04/08/1994

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
ALTRIO INVESTMENT GROUP LLC			0568/0731	04/08/1994

Building Information

Building 1 : Section 1

Year Built:	2001
Living Area:	10911
Replacement Cost:	$647,741
Building Percent Good:	67
Replacement Cost Less Depreciation:	$434,000

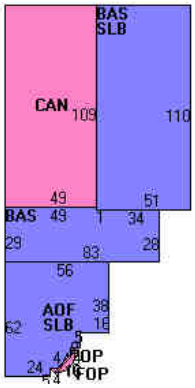
Building Attributes	
Field	**Description**
STYLE	Warehouse
MODEL	Ind/Comm

Building Photo

Grade	B
Stories:	1
Occupancy	1
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	COMM WHS MDL96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	3160
Heat/AC	HEAT/AC SPLIT
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	17
% Comn Wall	0

(http://images.vgsi.com/photos/BranfordCTPhotos//\00\01\93/16.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	7983	7983
AOF	Office	2928	2928
CAN	Canopy	5341	0
FOP	Porch, Open	80	0
SLB	Slab	8538	0
		24870	10911

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR1	SPRINKLERS-WET	13324 S.F.	$8,900	1
SPR2	WET/CONCEALED	2928 S.F.	$2,600	1
A/C	AIR CONDITION	2928 S.F.	$4,300	1

Land

Land Use		Land Line Valuation	
Use Code	3160	**Size (Acres)**	1.56

Description	COMM WHS MDL96	**Frontage**	
Zone	IG-2	**Depth**	
Neighborhood	350	**Assessed Value**	$299,900
Alt Land Appr	No	**Appraised Value**	$428,300
Category			

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	PAVING-ASPHALT			21000 S.F.	$24,300	1
FN3	FENCE-6' CHAIN			500 L.F.	$3,500	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$477,600	$428,300	$905,900
2014	$477,600	$428,300	$905,900
2013	$547,900	$428,300	$976,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$334,300	$299,900	$634,200
2014	$334,300	$299,900	$634,200
2013	$383,500	$299,900	$683,400

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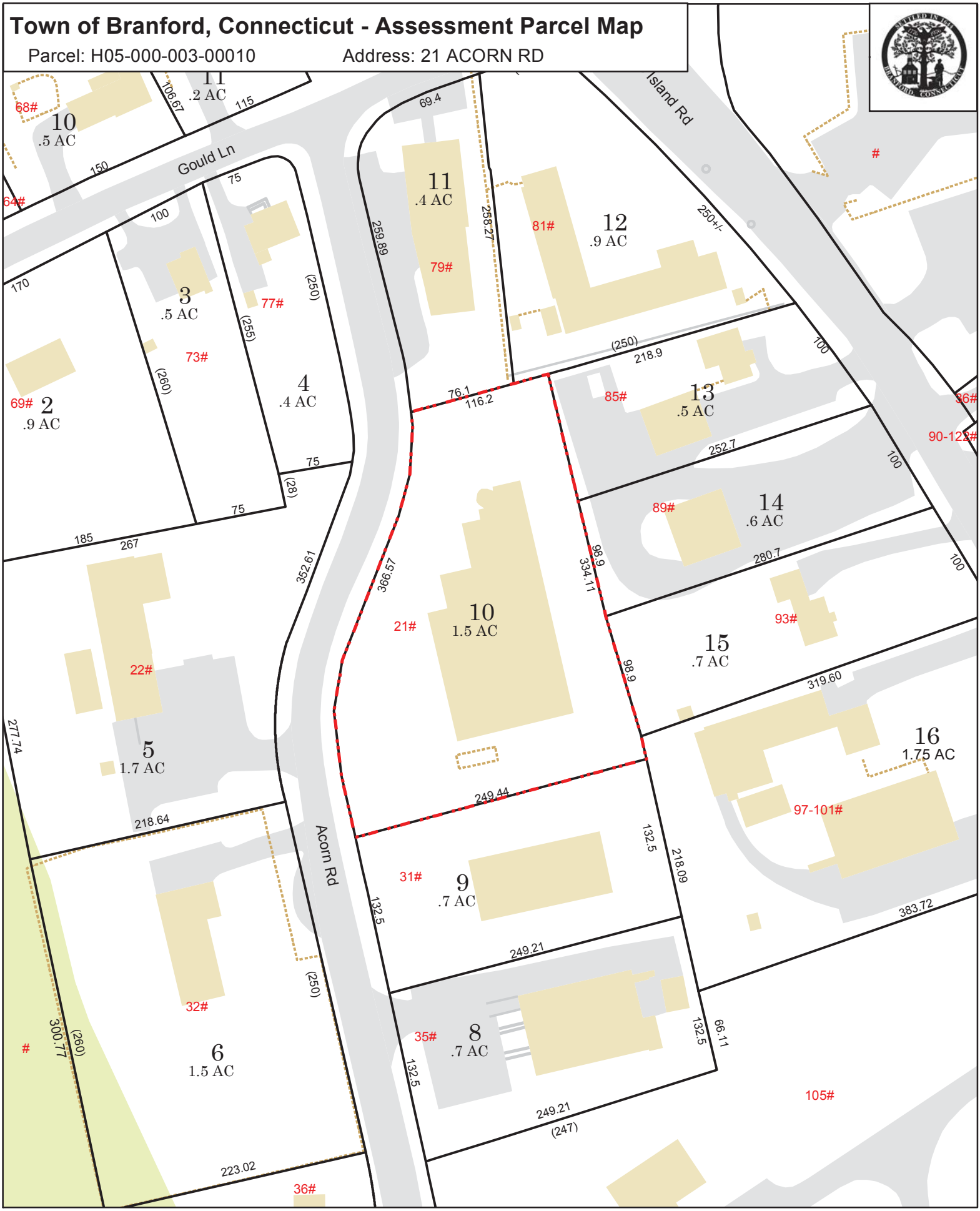
Town of Branford, Connecticut - Assessment Parcel Map

Parcel: H05-000-003-00010 Address: 21 ACORN RD



Approximate Scale: 1 inch = 100 feet

0 20 40 60 80 Feet

Grand List Date October 2015

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

PROJECT:	LTE 2C
SITE NUMBER:	CT02014
FA NUMBER:	10035270
PTN NUMBER:	2051A060BZ
PACE NUMBER:	MRCTB018098
CROWN BU#:	876316
SITE NAME:	BRANFORD - LEETES ISLAND
SITE ADDRESS:	21 ACORN ROAD
	BRANFORD, CT 06405

PROJECT INFORMATION

SITE NAME:	BRANFORD – LEETES ISLAND
SITE NUMBER:	CT02014
SITE ADDRESS:	21 ACORN ROAD BRANFORD, CT 06405
FA NUMBER:	10035270
PTN NUMBER:	2051A060BZ
PACE NUMBER:	MRCTB018098
USID NUMBER:	27039
CROWN BU#:	876316
APPLICANT:	AT&T WIRELESS 550 COCHITUATE ROAD SUITE 550 13 AND 14 FRAMINGHAM, MA 01701
TOWER OWNER:	CROWN CASTLE INTERNATIONAL 12 GILL STREET, SUITE 5800 WOBURN, MA 01801
JURISDICTION:	TOWN OF BRANFORD
COUNTY:	NEW HAVEN
SITE COORDINATES FROM	(RFDS)
LATITUDE:	41.293056°
LONGITUDE:	–72.762884°
GROUND ELEV.:	110'
PROPOSED USE:	TELECOMMUNICATIONS FACILITY
AT&T RF MANAGER:	CAMERON SYME
PHONE:	(508) 596–7146
EMAIL:	cs6970@att.com

PROJECT CONSULTANTS

PROJECT MANAGER:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	RYAN BURGDORFER (508) 665–8005
EMAIL:	Ryan.Burgdorfer@Smartlinkllc.com
SITE AQUISITION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	SHARON KEEFE (978) 930–3918
EMAIL:	Sharon.Keefe@Smartlinkllc.com
ENGINEER/ARCHITECT:	FULLERTON ENGINEERING
ADDRESS:	1100 E. WOODFIELD ROAD, SUITE 500 SCHAUMBURG, IL 60173
CONTACT:	MILEN DIMITROV (847) 908–8439
EMAIL:	MDimitrov@fullertonengineering.com
CONSTRUCTION:	SMARTLINK
ADDRESS:	85 RANGEWAY ROAD, SUITE 102 NORTH BILLERICA, MA 01862
CONTACT:	MARK DONNELLY (617) 515–2080
EMAIL:	mark.donnelly@smartlinkllc.com

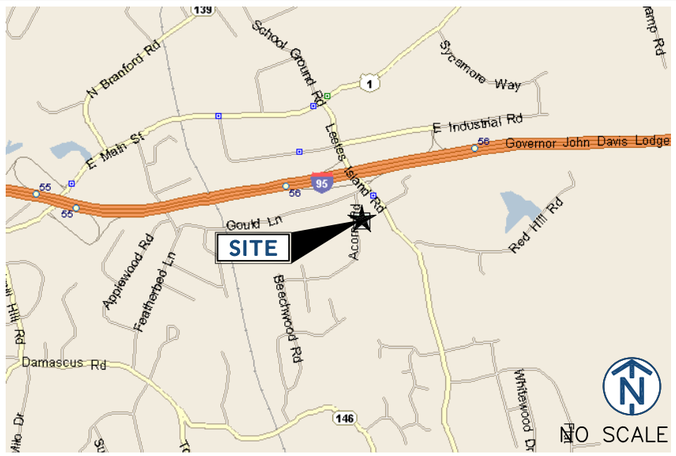
SCOPE OF WORK

LTE 2C WILL BE AT THE SITE WITH BRONZE CONFIGURATION.
PROPOSED 2C PROJECT SCOPE HEREIN BASED ON RFDS ID # 1107883, VERSION v1.00 LAST UPDATED 04/20/16.

- (3) NEW ANTENNAS TO REPLACE (3) EXISTING ANTENNAS
- (3) NEW RRUS–12 W/A2 MODULE
- (1) NEW HANDRAIL KIT
- NEW MOUNT MODIFICATIONS

- CONTRACTOR SHALL FURNISH ALL MATERIAL WITH THE EXCEPTION OF AT&T SUPPLIED MATERIAL.
- ALL MATERIAL SHALL BE INSTALLED BY THE CONTRACTOR, UNLESS STATED OTHERWISE.

SITE LOCATION MAP



DIRECTIONS

SCAN QR CODE FOR LINK
TO SITE LOCATION MAP

APPLICABLE BUILDING CODES AND STANDARDS

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES.

BUILDING CODE:	2003 INTERNATIONAL BUILDING CODE
ELECTRICAL CODE:	2011 NATIONAL ELECTRIC CODE

- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.
- ADA ACCESS REQUIREMENTS ARE NOT REQUIRED.
- THIS FACILITY DOES NOT REQUIRE POTABLE WATER AND WILL NOT PRODUCE ANY SEWAGE

DRAWING INDEX

NOTE: DRAWING SCALES ARE FOR 11"x17" SHEETS UNLESS OTHERWISE NOTED

at&t
550 COCHITUATE ROAD
SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink
1362 MELLON ROAD
SUITE 140
HANOVER, MD 21076

FULLERTON
ENGINEERING · DESIGN
1100 E. WOODFIELD ROAD, SUITE 500
SCHAUMBURG, ILLINOIS 60173
TEL: 847-908-8400
COA# PEC.0001444
www.FullertonEngineering.com

REV	DATE	DESCRIPTION	BY
0	07/14/16	90% REVIEW	KC
1	08/22/16	FOR PERMIT	KC

I HEREBY CERTIFY THAT THESE DRAWING WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE CODES.

SITE NAME
BRANFORD - LEETES ISLAND

SITE NUMBER:
CT02014
CROWN BU# 876316

SITE ADDRESS
21 ACORN ROAD
BRANFORD, CT 06405

SHEET NAME
TITLE SHEET

SHEET NUMBER
T1

THESE DRAWINGS ARE THE PROPERTY OF FULLERTON ENGINEERING CONSULTANTS, INC. IT IS FOR THE EXCLUSIVE USE OF THIS PROJECT. ANY RE-USE OF THIS DRAWING WITHOUT THE EXPRESSED WRITTEN CONSENT OF FULLERTON ENGINEERING CONSULTANTS, INC. IS PROHIBITED.

FEC# 2016.0200. 0018

GENERAL CONSTRUCTION

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR/CM – SMARTLINK
   OWNER – AT&T WIRELESS

2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND AT&T PROJECT SPECIFICATIONS.

3. GENERAL CONTRACTOR SHALL VISIT THE SITE AND SHALL FAMILIARIZE HIMSELF WITH ALL CONDITIONS AFFECTING THE PROPOSED WORK AND SHALL MAKE PROVISIONS. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS, DIMENSIONS, AND CONFIRMING THAT THE WORK MAY BE ACCOMPLISHED AS SHOWN PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO THE COMMENCEMENT OF WORK.

4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. GENERAL CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF WORK.

5. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES, AND APPLICABLE REGULATIONS.

6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

7. PLANS ARE NOT TO BE SCALED. THESE PLANS ARE INTENDED TO BE A DIAGRAMMATIC OUTLINE ONLY UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS OTHERWISE NOTED. SPACING BETWEEN EQUIPMENT IS THE MINIMUM REQUIRED CLEARANCE. THEREFORE, IT IS CRITICAL TO FIELD VERIFY DIMENSIONS, SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF WORK AND PREPARED BY THE ENGINEER PRIOR TO PROCEEDING WITH WORK.

8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

9. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE ENGINEER PRIOR TO PROCEEDING.

10. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF WORK AREA, ADJACENT AREAS AND BUILDING OCCUPANTS THAT ARE LIKELY TO BE AFFECTED BY THE WORK UNDER THIS CONTRACT. WORK SHALL CONFIRM TO ALL OSHA REQUIREMENTS AND THE LOCAL JURISDICTION.

11. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE WORK ACTIVITIES WITH OTHER DISCIPLINES.

12. ERECTION SHALL BE DONE IN A WORKMANLIKE MANNER BY COMPETENT EXPERIENCED WORKMAN IN ACCORDANCE WITH APPLICABLE CODES AND THE BEST ACCEPTED PRACTICE. ALL MEMBERS SHALL BE LAID PLUMB AND TRUE AS INDICATED ON THE DRAWINGS.

13. SEAL PENETRATIONS THROUGH FIRE RATED AREAS WITH UL LISTED MATERIALS APPROVED BY LOCAL JURISDICTION. CONTRACTOR SHALL KEEP AREA CLEAN, HAZARD FREE, AND DISPOSE OF ALL DEBRIS.

14. WORK PREVIOUSLY COMPLETED IS REPRESENTED BY LIGHT SHADED LINES AND NOTES. THE SCOPE OF WORK FOR THIS PROJECT IS REPRESENTED BY DARK SHADED LINES AND NOTES. CONTRACTOR SHALL NOTIFY THE GENERAL CONTRACTOR OF ANY EXISTING CONDITIONS THAT DEVIATE FROM THE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.

15. CONTRACTOR SHALL PROVIDE WRITTEN NOTICE TO THE CONSTRUCTION MANAGER 48 HOURS PRIOR TO COMMENCEMENT OF WORK.

16. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

17. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

18. GENERAL CONTRACTOR SHALL COORDINATE AND MAINTAIN ACCESS FOR ALL TRADES AND CONTRACTORS TO THE SITE AND/OR BUILDING.

19. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF THE SITE FOR THE DURATION OF CONSTRUCTION UNTIL JOB COMPLETION.

20. THE GENERAL CONTRACTOR SHALL MAINTAIN IN GOOD CONDITION ONE COMPLETE SET OF PLANS WITH ALL REVISIONS, ADDENDA, AND CHANGE ORDERS ON THE PREMISES AT ALL TIMES.

21. THE GENERAL CONTRACTOR SHALL PROVIDE PORTABLE FIRE EXTINGUISHERS WITH A RATING OF NOT LESS THAN 2–A OT 2–A:10–B:C AND SHALL BE WITHIN 25 FEET OF TRAVEL DISTANCE TO ALL PORTIONS OF WHERE THE WORK IS BEING COMPLETED DURING CONSTRUCTION.

22. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS SHALL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, AND D) TRENCHING & EXCAVATION.

23. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED, CAPPED, PLUGGED OR OTHERWISE DISCONNECTED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, AS DIRECTED BY THE RESPONSIBLE ENGINEER, AND SUBJECT TO THE APPROVAL OF THE OWNER AND/OR LOCAL UTILITIES.

24. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.

25. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO THE EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE FEDERAL AND LOCAL JURISDICTION FOR EROSION AND SEDIMENT CONTROL.

26. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUNDING. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

27. THE SUBGRADE SHALL BE BROUGHT TO A SMOOTH UNIFORM GRADE AND COMPACTED TO 95 PERCENT STANDARD PROCTOR DENSITY UNDER PAVEMENT AND STRUCTURES AND 80 PERCENT STANDARD PROCTOR DENSITY IN OPEN SPACE. ALL TRENCHES IN PUBLIC RIGHT OF WAY SHALL BE BACKFILLED WITH FLOWABLE FILL OR OTHER MATERIAL PRE–APPROVED BY THE LOCAL JURISDICTION.

28. ALL NECESSARY RUBBISH, STUMPS, DEBRIS, STICKS, STONES, AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF IN A LAWFUL MANNER.

29. ALL BROCHURES, OPERATING AND MAINTENANCE MANUALS, CATALOGS, SHOP DRAWINGS, AND OTHER DOCUMENTS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR AT COMPLETION OF CONSTRUCTION AND PRIOR TO PAYMENT.

30. CONTRACTOR SHALL SUBMIT A COMPLETE SET OF AS–BUILT REDLINES TO THE GENERAL CONTRACTOR UPON COMPLETION OF PROJECT AND PRIOR TO FINAL PAYMENT.

31. CONTRACTOR SHALL LEAVE PREMISES IN A CLEAN CONDITION.

32. THE PROPOSED FACILITY WILL BE UNMANNED AND DOES NOT REQUIRE POTABLE WATER OR SEWER SERVICE, AND IS NOT FOR HUMAN HABITAT (NO HANDICAP ACCESS REQUIRED).

33. OCCUPANCY IS LIMITED TO PERIODIC MAINTENANCE AND INSPECTION, APPROXIMATELY 2 TIMES PER MONTH, BY AT&T TECHNICIANS.

34. NO OUTDOOR STORAGE OR SOLID WASTE CONTAINERS ARE PROPOSED.

35. ALL MATERIAL SHALL BE FURNISHED AND WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST REVISION AT&T MOBILITY GROUNDING STANDARD "TECHNICAL SPECIFICATION FOR CONSTRUCTION OF GSM/GPRS WIRELESS SITES" AND "TECHNICAL SPECIFICATION FOR FACILITY GROUNDING". IN CASE OF A CONFLICT BETWEEN THE CONSTRUCTION SPECIFICATION AND THE DRAWINGS, THE DRAWINGS SHALL GOVERN.

36. CONTRACTORS SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS REQUIRED FOR CONSTRUCTION. IF CONTRACTOR CANNOT OBTAIN A PERMIT, THEY MUST NOTIFY THE GENERAL CONTRACTOR IMMEDIATELY.

37. CONTRACTOR SHALL REMOVE ALL TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.

38. INFORMATION SHOWN ON THESE DRAWINGS WAS OBTAINED FROM SITE VISITS AND/OR DRAWINGS PROVIDED BY THE SITE OWNER. CONTRACTORS SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

39. NO WHITE STROBE LIGHTS ARE PERMITTED. LIGHTING IF REQUIRED, WILL MEET FAA STANDARDS AND REQUIREMENTS.

ANTENNA MOUNTING

40. DESIGN AND CONSTRUCTION OF ANTENNA SUPPORTS SHALL CONFORM TO CURRENT ANSI/TIA–222 OR APPLICABLE LOCAL CODES.

41. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT–DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS NOTED OTHERWISE.

42. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC–COATING (HOT–DIP) ON IRON AND STEEL HARDWARE", UNLESS NOTED OTHERWISE.

43. DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED BY COLD GALVANIZING IN ACCORDANCE WITH ASTM A780.

44. ALL ANTENNA MOUNTS SHALL BE INSTALLED WITH LOCK NUTS, DOUBLE NUTS AND SHALL BE TORQUED TO MANUFACTURER'S RECOMMENDATIONS.

45. CONTRACTOR SHALL INSTALL ANTENNA PER MANUFACTURER'S RECOMMENDATION FOR INSTALLATION AND GROUNDING.

46. ALL UNUSED PORTS ON ANY ANTENNAS SHALL BE TERMINATED WITH A 50–OHM LOAD TO ENSURE ANTENNAS PERFORM AS DESIGNED.

47. PRIOR TO SETTING ANTENNA AZIMUTHS AND DOWNTILTS, ANTENNA CONTRACTOR SHALL CHECK THE ANTENNA MOUNT FOR TIGHTNESS AND ENSURE THAT THEY ARE PLUMB. ANTENNA AZIMUTHS SHALL BE SET FROM TRUE NORTH AND BE ORIENTED WITHIN +/– 5% AS DEFINED BY THE RFDS. ANTENNA DOWNTILTS SHALL BE WITHIN +/– 0.5% AS DEFINED BY THE RFDS. REFER TO ND–00246.

48. JUMPERS FROM THE TMA'S MUST TERMINATE TO OPPOSITE POLARIZATION'S IN EACH SECTOR.

49. CONTRACTOR SHALL RECORD THE SERIAL #, SECTOR, AND POSITION OF EACH ACTUATOR INSTALLED AT THE ANTENNAS AND PROVIDE THE INFORMATION TO AT&T.

50. TMA'S SHALL BE MOUNTED ON PIPE DIRECTLY BEHIND ANTENNAS AS CLOSE TO ANTENNA AS FEASIBLE IN A VERTICAL POSITION.

TORQUE REQUIREMENTS

51. ALL RF CONNECTIONS SHALL BE TIGHTENED BY A TORQUE WRENCH.

52. ALL RF CONNECTIONS, GROUNDING HARDWARE AND ANTENNA HARDWARE SHALL HAVE A TORQUE MARK INSTALLED IN A CONTINUOUS STRAIGHT LINE FROM BOTH SIDES OF THE CONNECTION.
   A. RF CONNECTION BOTH SIDES OF THE CONNECTOR.
   B. GROUNDING AND ANTENNA HARDWARE ON THE NUT SIDE STARTING FROM THE THREADS TO THE SOLID SURFACE. EXAMPLE OF SOLID SURFACE: GROUND BAR, ANTENNA BRACKET METAL.

FIBER & POWER CABLE MOUNTING

53. THE FIBER OPTIC TRUNK CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY. WHEN INSTALLING FIBER OPTIC TRUNK CABLES INTO A CABLE TRAY SYSTEM, THEY SHALL BE INSTALLED INTO AN INTER DUCT AND A PARTITION BARRIER SHALL BE INSTALLED BETWEEN THE 600 VOLT CABLES AND THE INTER DUCT IN ORDER TO SEGREGATE CABLE TYPES. OPTIC FIBER TRUNK CABLES SHALL HAVE APPROVED CABLE RESTRAINTS EVERY (60) SIXTY FEET AND SECURELY FASTENED TO THE CABLE TRAY SYSTEM. NFPA 70 (NEC) ARTICLE 770 RULES SHALL APPLY.

54. THE TYPE TC–ER CABLES SHALL BE INSTALLED INTO CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY AND SHALL BE SECURED AT INTERVALS NOT EXCEEDING (6) SIX FEET. AN EXCEPTION; WHERE TYPE TC–ER CABLES ARE NOT SUBJECT TO PHYSICAL DAMAGE, CABLES SHALL BE PERMITTED TO MAKE A TRANSITION BETWEEN CONDUITS, CHANNEL CABLE TRAYS, OR CABLE TRAY WHICH ARE SERVING UTILIZATION EQUIPMENT OR DEVICES, A DISTANCE (6) SIX FEET SHALL NOT BE EXCEEDED WITHOUT CONTINUOUS SUPPORTING. NFPA 70 (NEC) ARTICLES 336 AND 392 RULES SHALL APPLY.

55. WHEN INSTALLING OPTIC FIBER TRUNK CABLES OR TYPE TC–ER CABLES INTO CONDUITS, NFPA 70 (NEC) ARTICLE 300 RULES SHALL APPLY.

COAXIAL CABLE NOTES

62. TYPES AND SIZES OF THE ANTENNA CABLE ARE BASED ON ESTIMATED LENGTHS. PRIOR TO

    ORDERING CABLE, CONTRACTOR SHALL VERIFY ACTUAL LENGTH BASED ON CONSTRUCTION LAYOUT AND NOTIFY THE PROJECT MANAGER IF ACTUAL LENGTHS EXCEED ESTIMATED LENGTHS.

63. CONTRACTOR SHALL VERIFY THE DOWN–TILT OF EACH ANTENNA WITH A DIGITAL LEVEL.

64. CONTRACTOR SHALL CONFIRM COAX COLOR CODING PRIOR TO CONSTRUCTION.

65. ALL JUMPERS TO THE ANTENNAS FROM THE MAIN TRANSMISSION LINE SHALL BE 1/2" DIA. LDF AND SHALL NOT EXCEED 6'–0".

66. ALL COAXIAL CABLE SHALL BE SECURED TO THE DESIGNED SUPPORT STRUCTURE, IN AN APPROVED MANNER, AT DISTANCES NOT TO EXCEED 4'–0" OC.

67. CONTRACTOR SHALL FOLLOW ALL MANUFACTURER'S RECOMMENDATIONS REGARDING BOTH THE INSTALLATION AND GROUNDING OF ALL COAXIAL CABLES, CONNECTORS, ANTENNAS, AND ALL OTHER EQUIPMENT.

68. CONTRACTOR SHALL GROUND ALL EQUIPMENT. INCLUDING ANTENNAS, RET MOTORS, TMA'S, COAX CABLES, AND RET CONTROL CABLES AS A COMPLETE SYSTEM. GROUNDING SHALL BE EXECUTED BY QUALIFIED WIREMEN IN COMPLIANCE WITH MANUFACTURER'S SPECIFICATION AND RECOMMENDATION.

69. CONTRACTOR SHALL PROVIDE STRAIN–RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES, COAX CABLES, AND RET CONTROL CABLES. CABLE STRAIN–RELIEFS AND CABLE SUPPORTS SHALL BE APPROVED FOR THE PURPOSE. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

70. CONTRACTOR TO VERIFY THAT EXISTING COAX HANGERS ARE STACKABLE SNAP IN HANGERS. IF EXISTING HANGERS ARE NOT STACKABLE SNAP IN HANGERS THE CONTRACTOR SHALL REPLACE EXISTING HANGERS WITH NEW SNAP IN HANGERS IF APPLICABLE.

GENERAL CABLE AND EQUIPMENT NOTES

71. CONTRACTOR SHALL BE RESPONSIBLE TO VERIFY ANTENNA, TMAS, DIPLEXERS, AND COAX CONFIGURATION, MAKE AND MODELS PRIOR TO INSTALLATION.

72. ALL CONNECTIONS FOR HANGERS, SUPPORTS, BRACING, ETC. SHALL BE INSTALLED PER TOWER MANUFACTURER'S RECOMMENDATIONS.

73. CONTRACTOR SHALL REFERENCE THE TOWER STRUCTURAL ANALYSIS/DESIGN DRAWINGS FOR DIRECTIONS ON CABLE DISTRIBUTION/ROUTING.

74. ALL OUTDOOR RF CONNECTORS/CONNECTIONS SHALL BE WEATHERPROOFED, EXCEPT THE RET CONNECTORS, USING BUTYL TAPE AFTER INSTALLATION AND FINAL CONNECTIONS ARE MADE. BUTYL TAPE SHALL HAVE A MINIMUM OF ONE–HALF TAPE WIDTH OVERLAP ON EACH TURN AND EACH LAYER SHALL BE WRAPPED THREE TIMES. WEATHERPROOFING SHALL BE SMOOTH WITHOUT BUCKLING. BUTYL BLEEDING IS NOT ALLOWED.

75. IF REQUIRED TO PAINT ANTENNAS AND/OR COAX:
   A. TEMPERATURE SHALL BE ABOVE 50° F.
   B. PAINT COLOR MUST BE APPROVED BY BUILDING OWNER/LANDLORD.
   C. FOR REGULATED TOWERS, FAA/FCC APPROVED PAINT IS REQUIRED.
   D. DO NOT PAINT OVER COLOR CODING OR ON EQUIPMENT MODEL NUMBERS

76. ALL CABLES SHALL BE GROUNDED WITH COAXIAL CABLE GROUND KITS. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS.
   A. GROUNDING AT THE ANTENNA LEVEL.
   B. GROUNDING AT MID LEVEL, TOWERS WHICH ARE OVER 200'–0", ADDITIONAL CABLE GROUNDING REQUIRED.
   C. GROUNDING AT BASE OF TOWER PRIOR TO TURNING HORIZONTAL.
   D. GROUNDING OUTSIDE THE EQUIPMENT SHELTER AT ENTRY PORT.
   E. GROUNDING INSIDE THE EQUIPMENT SHELTER AT THE ENTRY PORT.

77. ALL PROPOSED GROUND BAR DOWNLEADS ARE TO BE TERMINATED TO THE EXISTING ADJACENT GROUND BAR DOWNLEADS A MINIMUM DISTANCE OF 4'–0" BELOW GROUND BAR. TERMINATIONS MAY BE EXOTHERMIC OR COMPRESSION.

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CROWN BU# 876316

SITE ADDRESS
21 ACORN ROAD
BRANFORD, CT 06405

SHEET NAME
NOTES AND SPECIFICATIONS

SHEET NUMBER
SP1

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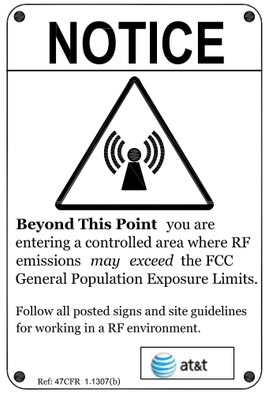
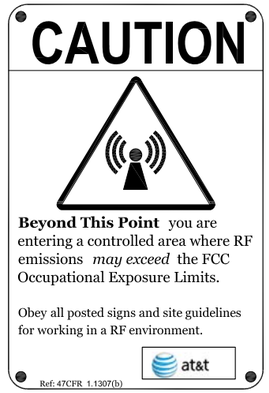
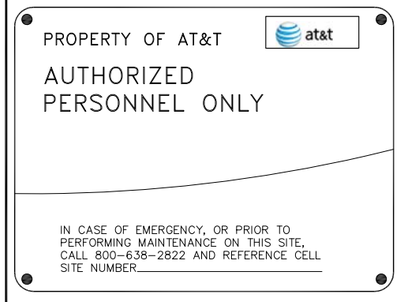




ALERTING SIGNS

ALERTING SIGN



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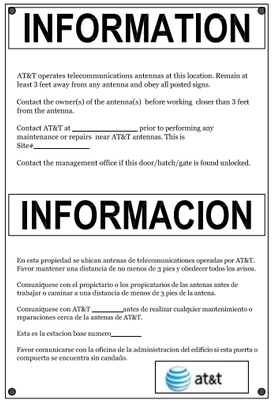

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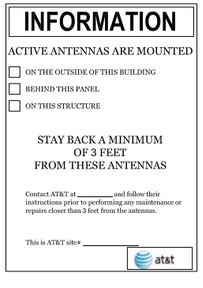

INFO SIGN #2

INFO SIGN #3

ALERTING SIGN (FOR CELL SITE BATTERIES)

ALERTING SIGN (FOR DIESEL FUEL)

ALERTING SIGN (FOR PROPANE)

GENERAL SIGNAGE GUIDELINES

STRUCURE TYPLE	INFO SIGN #1	INFO SIGN #2	INFO SIGN #3	INFO SIGN #4	STRIPING	NOTICE SIGN	CAUTION SIGN
TOWERS							
MONOPOLE/MONOPINE/MONOPALM	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			AT THE HEIGHT OF THE FIRST CLIMBING STEP, MIN 9 FT ABOVE GROUND
SEC TOWERS/TOWERS WITH HIGH VOLTAGE	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	CLIMBING SIDE OF THE TOWER	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
LIGHT POLES/FLAG POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS			
UTILITY WOOD POLES (JPA)	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		IF GP MAX VALUE OF MPE AT ANTENNA LEVEL IS: 0-99%; NOTICE SIGN; OVER 99%: CAUTION SIGN AT NO LESS THAN 3FT BELOW ANTENNA AND 9FT ABOVE GROUND	
MICROCELLS MOUNTED ON NON-JPA POLES	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS	ON THE POLE, NO LESS THAN 3FT BELOW THE ANTENNA AND LESS THAN 9FT ABOVE GROUND	ON BACKSIDE OF ANTENNAS	ENTRANCE GATES, SHELTER DOORS OR ON THE OUTDOOR CABINETS		NOTICE OR CAUTION SIGN AT NO LESS THAN 9FT ABOVE GROUND: ONLY IF THE EXPOSURE EXCEEDS 90% OF THE GENERAL PUBLIC EXPOSURE AT EXPOSURE AT 6FT ABOVE GROUND OR AT OUTSIDE OF SURFACE OF ADJACENT BUILDING	
TOWERS							
AT ALL ACCESS POINTS TO THE ROOF	X			X			
ON ANTENNAS	X		X	X			
CONCEALED ANTENNAS	X	X		X			
ANTENNAS MOUNTED FACING OUTSIDE THE BUILDING	X	X		X			
ANTENNAS ON SUPPORT STRUCTURE	X	X		X			
ROOFVIEW GRAPH						EITHER NOTICE OR CAUTION SIGN (BASED ON ROOFVIEW RESULTS) AT ANTENNA /BARRIER	
RADIATION AREA IS WITHIN 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X			
RADIATION AREA IS BEYOND 3FT FROM ANTENNA	X	ADJACENT TO EACH ANTENNA		X	DIAGONAL, YELLOW STRIPING AS TO ROOFVIEW GRAPH		
CHURCH STEEPLES	ACCESS TO STEEPLE	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO STEEPLE			CAUTION SIGN AT THE ANTENNAS
WATER STATIONS	ACCESS TO LADDER	ADJACENT TO ANTENNAS IF ANTENNAS ARE CONCEALED	ON BACKSIDE OF ANTENNAS	ACCESS TO LADDER			CAUTION SIGN BESIDE INFO SIGN #1, MIN. 9FT ABOVE GROUND

NOTES FOR ROOFTOP SITES:

1. EITHER NOTICE OR CAUTION SIGNS NEED TO BE POSTED AT EACH SECTOR AS CLOSE AS POSSIBLE TO: THE OUTER EDGE OF THE STRIPED OFF AREA OR THE OUTER ANTENNAS OF THE SECTOR
2. IF ROOFVIEWS SHOWS: ONLY BLUE = NOTICE SIGN, BLUE AND YELLOW = CAUTION SIGN, ONLY YELLOW = CAUTION SIGN TO BE INSTALLED
3. SHOULD THE REQUIRED STRIPING AREAS INTERFERE WITH ANY STRUCTURE OR EQUIPMENT (A/C, VENTS, ROOF HATCH, DOORS, OTHER ANTENNAS, DISHES, ETC.). PLEASE NOTIFY AT&T TO MODIFY THE STRIPING AREA, PRIOR TO STARTING THE WORK.

SIGNAGE GUIDELINES CHART

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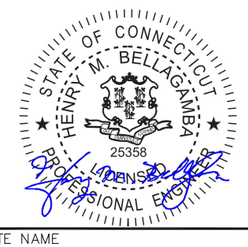

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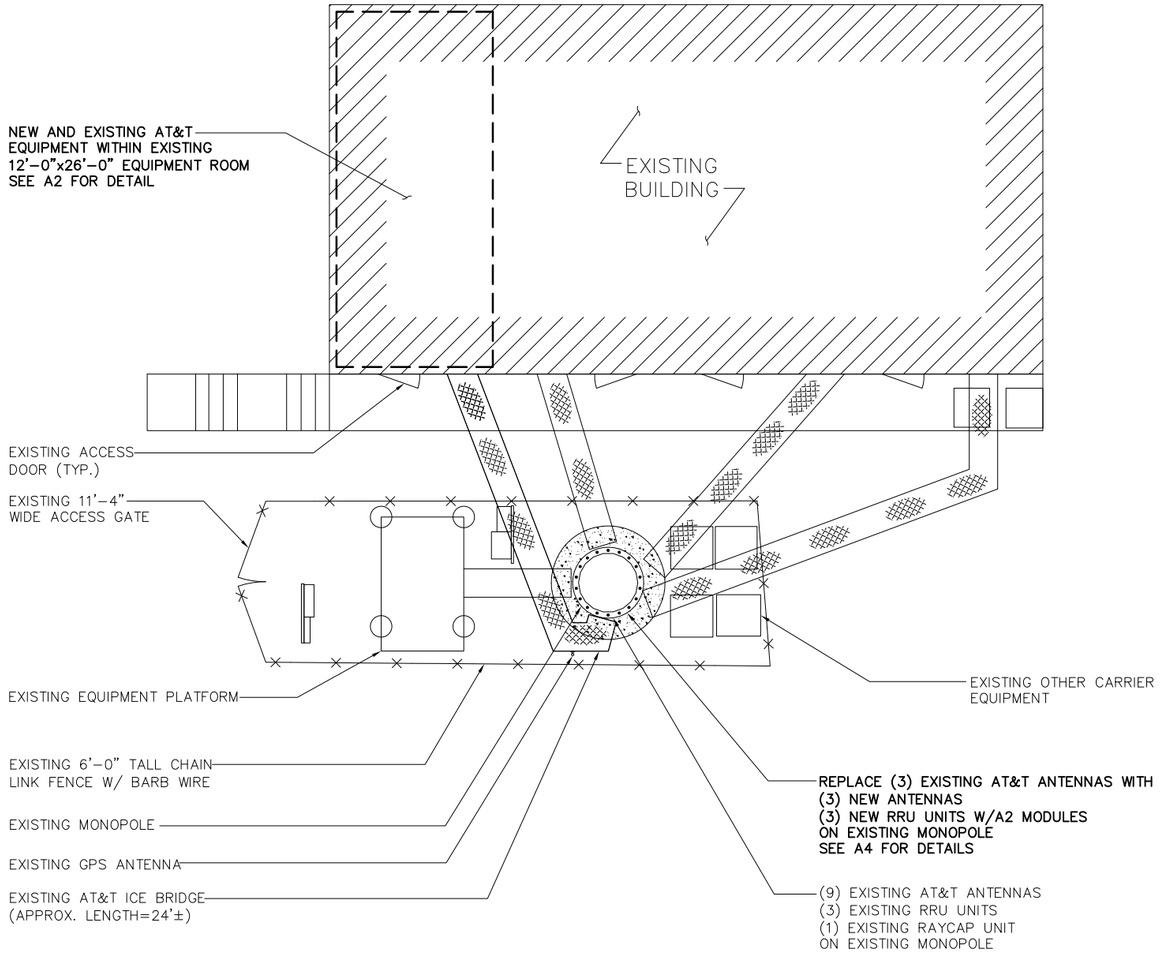
ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
AGL	ABOVE GRADE LEVEL
AMSL	ABOVE MEAN SEA LEVEL
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
BTS	BASE TRANSMISSION STATION
℄	CENTERLINE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CND	CONDUIT
DWG	DRAWING
FT	FOOT(FEET)
EGB	EQUIPMENT GROUND BAR
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ELEV	ELEVATION
EQUIP	EQUIPMENT
(E)	EXISTING
EXT	EXTERIOR
FND	FOUNDATION
F	FIBER
FIF	FACILITY INTERFACE FRAME
GA	GAUGE
GALV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE COMMUNICATION
LTE	LONG TERM EVOLUTION
MAX	MAXIMUM
MCPA	MULTI-CARRIER POWER AMPLIFIER
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MTS	MANUAL TRANSFER SWITCH
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OE/OT	OVERHEAD ELECTRIC/TELCO
PPC	POWER PROTECTION CABINET
PL	PROPERY LINE
RBS	RADIO BASED STATION
RET	REMOTE ELECTRIC TILT
RRU	REMOTE RADIO UNIT
RGS	RIGID GALVANIZED STEEL
IN	INCH(ES)
INT	INTERIOR
LB(S), #	POUND(S)
SF	SQUARE FOOT
STL	STEEL
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UE/UT	UNDERGROUND ELECTRIC/TELCO
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELE-COMMUNICATION SYSTEM
VIF	VERIFY IN FIELD
W/	WITH
XFMR	TRANSFORMER

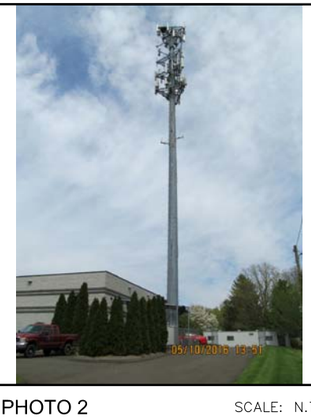
SYMBOLS

- REVISION
- WORK POINT
- UTILITY POLE
- COMPRESSED STONE
- BRICK
- GRAVEL
- CONCRETE
- MASONRY
- EARTH
- STEEL
- CENTERLINE
- PROPERTY LINE
- LEASE LINE
- EASEMENT LINE
- CHAIN LINK FENCE
- WOOD FENCE
- UE — BELOW GRADE ELECTRIC
- UT — BELOW GRADE TELEPHONE
- OE/OT — OVERHEAD ELECTRIC/TELEPHONE
- SECTION REFERENCE (A / S-1)



COMPOUND PLAN — SCALE: 3/32" = 1'-0" — 1

SITE PHOTO 1 — SCALE: N.T.S. — 2



SITE PHOTO 2 — SCALE: N.T.S. — 3

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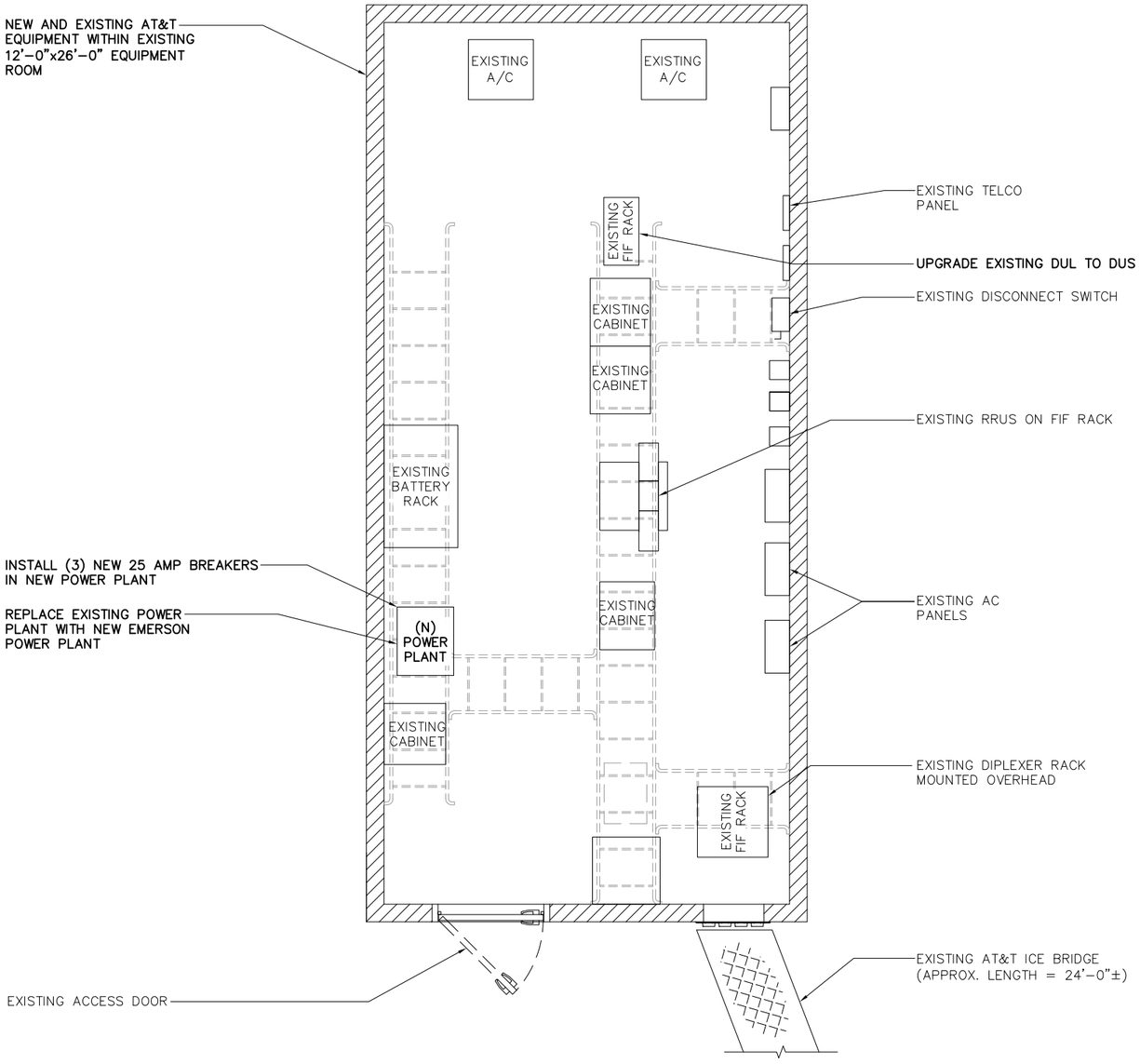

EQUIPMENT PLAN

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

1

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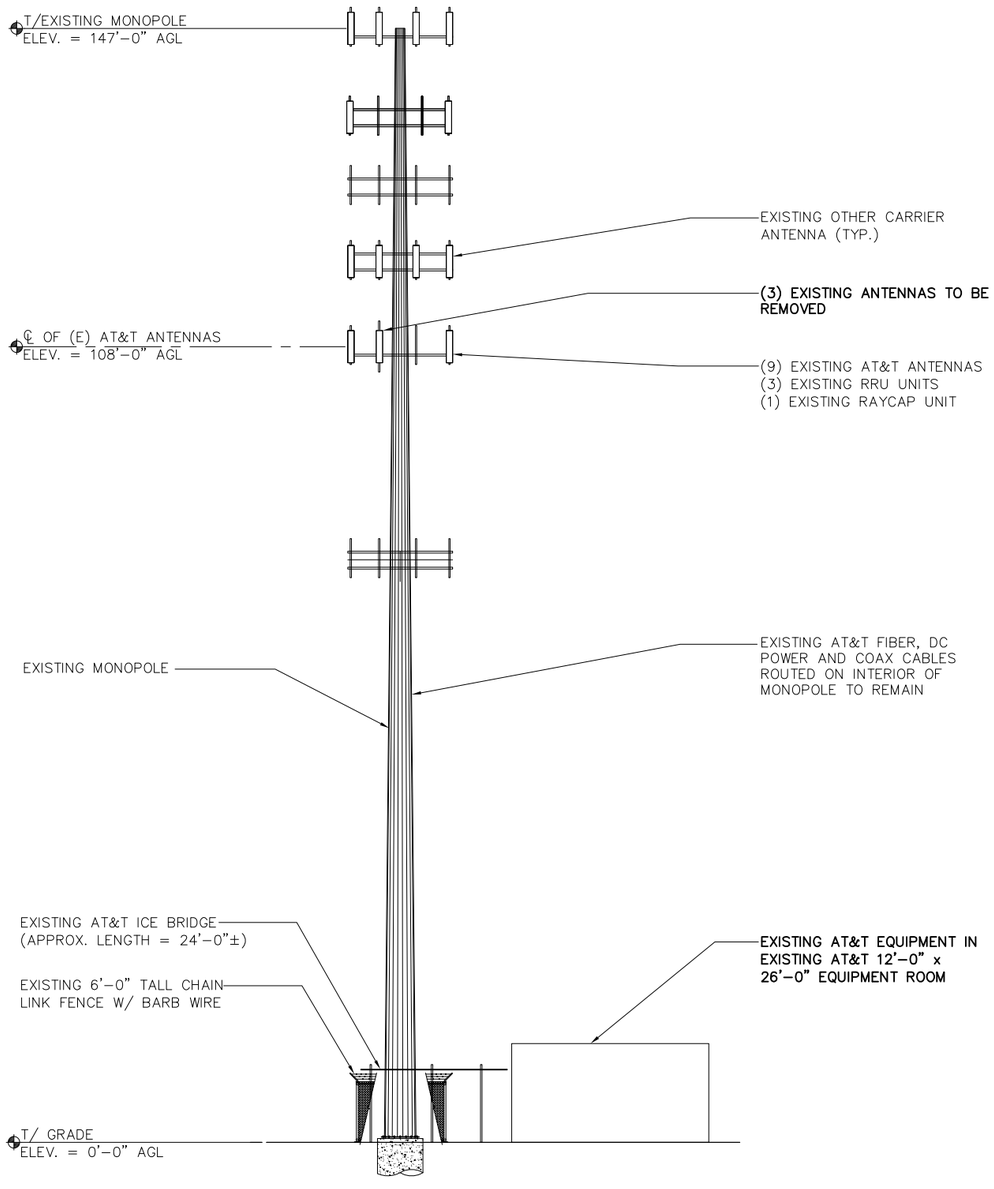
2. CALCULATIONS FOR THE ANTENNA MOUNTS WERE PREPARED BY FULLERTON AND THOSE CALCULATIONS CERTIFY THE CAPACITY OF THE STRUCTURE TO SUPPORT THE NEW EQUIPMENT
3. CABLES NOT SHOWN FOR CLARITY



EXISTING ELEVATION — SCALE: 1" = 20'-0" — 1

NOTES:

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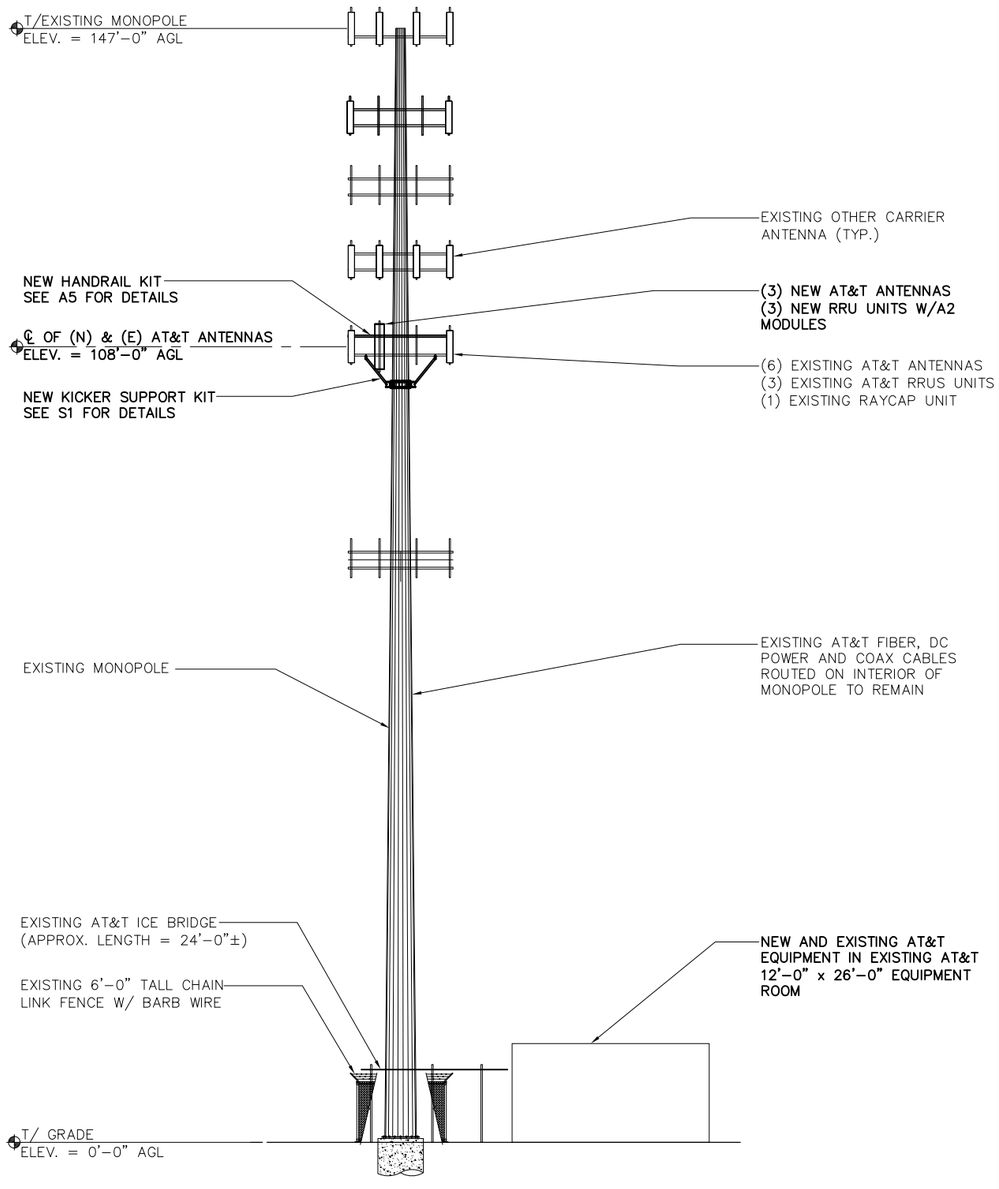
2. TAPE DROP FORMS AND PHOTOGRAPHS TO BE SUBMITTED PER CCI AND AT&T CLOSEOUT REQUIREMENTS.



NEW ELEVATION — SCALE: 1" = 20'-0" — 2

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ELEVATIONS

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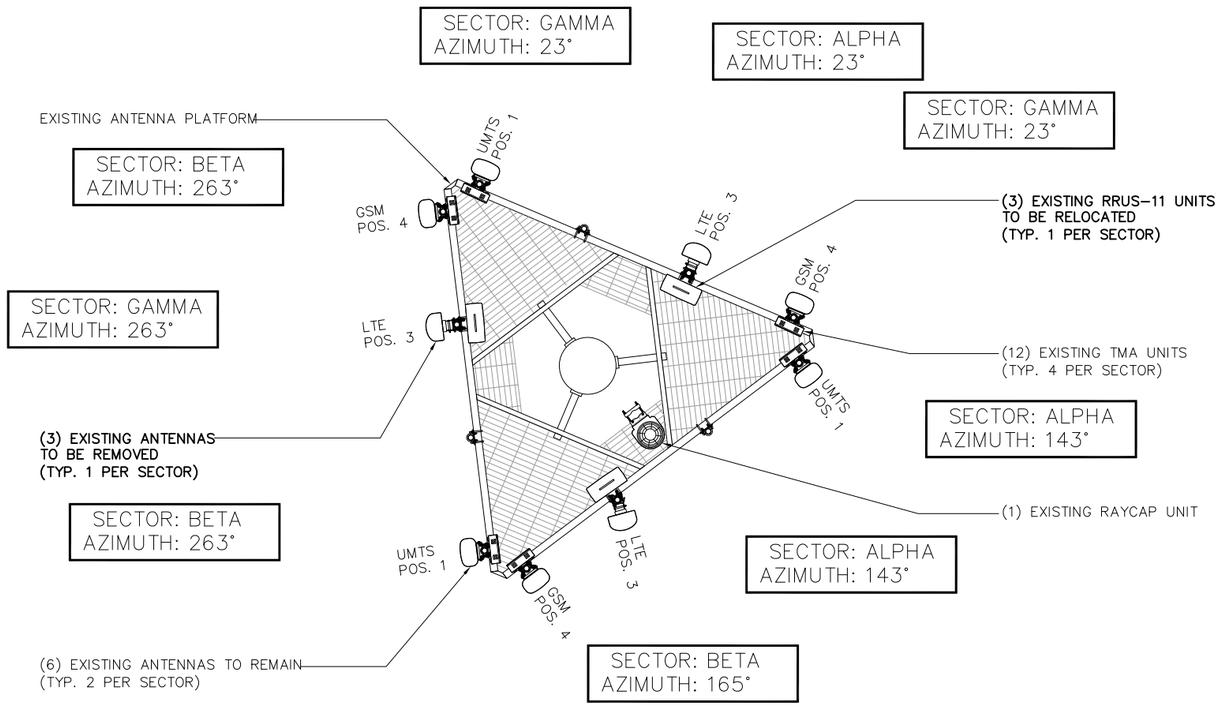
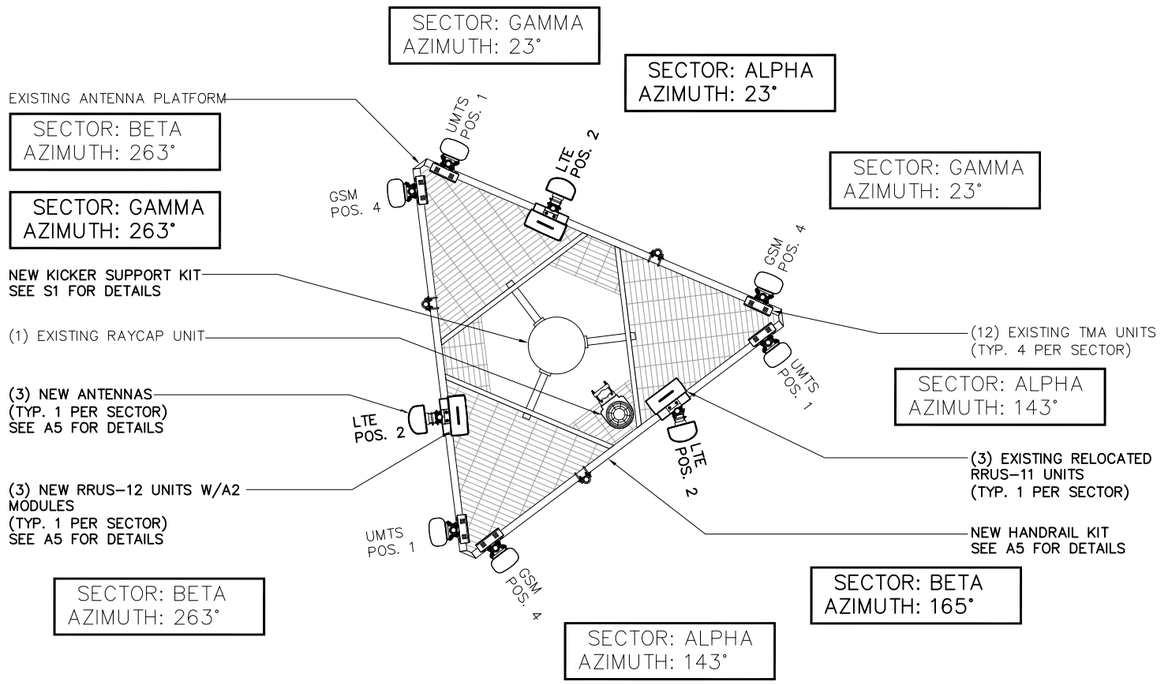


EXISTING ANTENNA PLAN

SCALE: 3/16" = 1'-0" | 1



FINAL ANTENNA PLAN

SCALE: 3/16" = 1'-0" | 2

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SHEET NAME
ANTENNA PLANS

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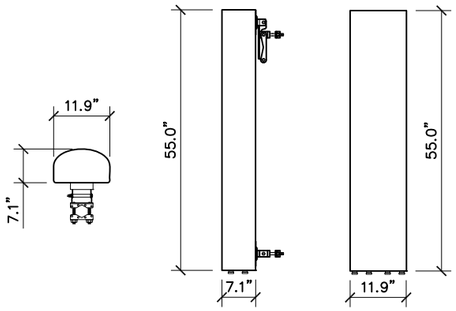


PLAN VIEW SIDE VIEW FRONT VIEW

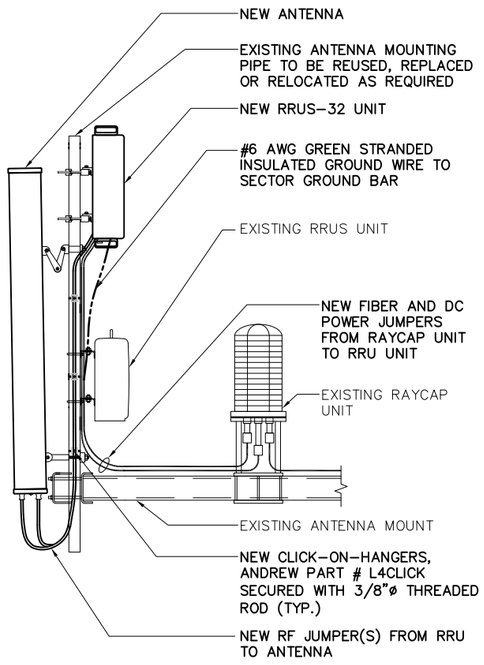
COMMSCOPE – SBNHH–1D65A

ANDREW® TRI–BAND ANTENNA

FREQUENCY RANGE	698–806 MHz
	806–896 MHz
	1710–1880 MHz
	1850–1990 MHz
	1920–2180 MHz
	2300–2360 MHz
ANTENNA	33.5 Lbs
BRACKET	12.3 Lbs
TOTAL WEIGHT	45.8 Lbs

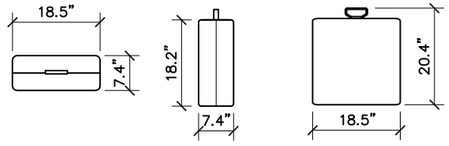
ANTENNA SPEC SCALE: N.T.S. 1

NOT USED SCALE: N.T.S. 2



ANTENNA SCHEMATIC SCALE: N.T.S. 3

NOT USED SCALE: N.T.S. 4



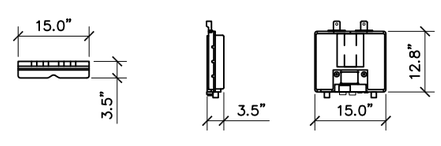
PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON – RRUS 12

WITH SOLAR SHIELD

UNIT WEIGHT 52.2 Lbs

RRU SPEC SCALE: N.T.S. 5



PLAN VIEW SIDE VIEW FRONT VIEW

ERICSSON – RRUS A2 MODULE

UNIT WEIGHT 22 Lbs

A2 BOX SPEC SCALE: N.T.S. 6

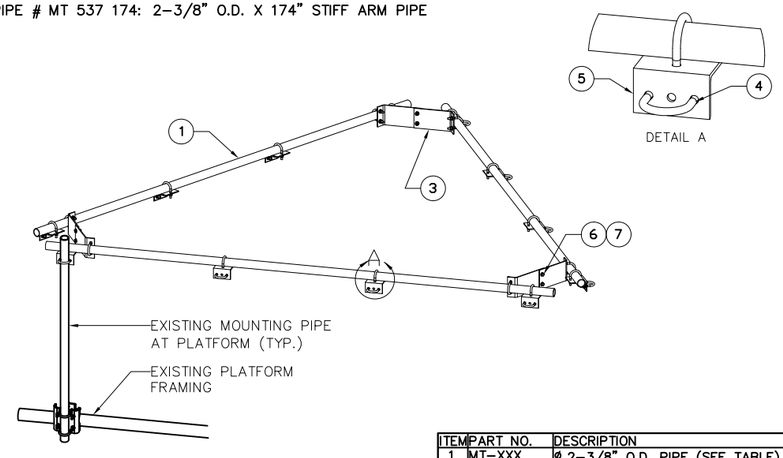
PRODUCT INFORMATION:

MFR: COMMSCOPE

P/N: MT–195 SERIES OR APPROVED EQUIVALENT

PRODUCT:

1. MT195 12
   – PIPE # MT 651 150: 2–3/8" O.D. X 150" STIFF ARM PIPE
2. MT195 14
   – PIPE # MT 537 174: 2–3/8" O.D. X 174" STIFF ARM PIPE



ITEM	PART NO.	DESCRIPTION	QTY.	WEIGHT
1	MT–XXX	ø 2–3/8" O.D. PIPE (SEE TABLE)	3	–
2	MT195HK	HARDWARE KIT (ITEMS 3–7)	1	–
3	MT195.03	END PLATE	6	5.63 LBS
4	GUB–4240	1/2" X 2–1/2" X 4" GALV U–BOLT KIT	30	0.56 LBS
5	XA2020.01	CROSS OVER ANGLE	12	2.66 LBS
6	GB–04145	1/2" X 1–1/2" GALV BOLT KIT	6	0.13 LBS
7	GWF–04	1/2" GALV FLAT WASHER	12	0.02 LBS

HANDRAIL DETAIL SCALE: N.T.S. 7

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REV	DATE	DESCRIPTION	BY
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1	08/22/16	FOR PERMIT	KC

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STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · LICENSED PROFESSIONAL ENGINEER

SITE NAME
BRANFORD - LEETES ISLAND

SITE NUMBER:
CT02014
CROWN BU# 876316

SITE ADDRESS
21 ACORN ROAD
BRANFORD, CT 06405

SHEET NAME
EQUIPMENT DETAILS

SHEET NUMBER
A5

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FEC# 2016.0200. 0018

FINAL ANTENNA CONFIGURATION AND CABLE SCHEDULE
SUPPLIED BY AT&T WIRELESS, FROM RF CONFIG. DATED (04/20/16)

SECTOR	ANTENNA NUMBER	ANTENNA STATUS & TYPE	ANTENNA MODEL NUMBER	ANTENNA VENDOR	TMA/RRU UNIT	AZIMUTH	ANTENNA CL FROM GROUND	CABLE FEEDER TYPE	CABLE FEEDER LENGTH	RAYCAP UNIT
ALPHA	A-1	(E) UMTS ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	143°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	(1) (E) DC6-48-60-18-8F UNIT
								1-1/4"ø LDF7-50A	145'-0"	
	A-2	**(N) LTE 1C/2C ANTENNA**	**SBNHH-1D65A**	**COMMSCOPE**	(1) EXISTING RRUS-11 **AND** **(1) NEW RRUS-12 UNIT W/A2 MODULE**	**23°**	**108'-0"**	(1) EXISTING FIBER CABLE	145'-0"	
								(2) EXISTING DC POWER CABLES	145'-0"	
	A-3	-	-	-	-	-	-	-		
	A-4	(E) GSM ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	143°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	
								1-1/4"ø LDF7-50A	145'-0"	
BETA	B-1	(E) UMTS ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	263°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	
								1-1/4"ø LDF7-50A	145'-0"	
	B-2	**(N) LTE 1C/2C ANTENNA**	**SBNHH-1D65A**	**COMMSCOPE**	(1) EXISTING RRUS-11 **AND** **(1) NEW RRUS-12 UNIT W/A2 MODULE**	**165°**	**108'-0"**	SEE ANTENNA A-2 FOR CABLE TYPE AND LENGTH		
	B-3	-	-	-	-	-	-	-		
	B-4	(E) GSM ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	263°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	
								1-1/4"ø LDF7-50A	145'-0"	
GAMMA	C-1	(E) UMTS ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	23°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	
								1-1/4"ø LDF7-50A	145'-0"	
	C-2	**(N) LTE 1C/2C ANTENNA**	**SBNHH-1D65A**	**COMMSCOPE**	(1) EXISTING RRUS-11 **AND** **(1) NEW RRUS-12 UNIT W/A2 MODULE**	**263°**	**108'-0"**	SEE ANTENNA A-2 FOR CABLE TYPE AND LENGTH		
	C-3	-	-	-	-	-	-	-		
	C-4	(E) GSM ANTENNA	7770	POWERWAVE	(2) EXISTING TMA UNIT(S)	23°	108'-0"	1-1/4"ø LDF7-50A	145'-0"	
								1-1/4"ø LDF7-50A	145'-0"	

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BRANFORD, CT 06405

SHEET NAME
ANTENNA & CABLE CONFIGURATION

SHEET NUMBER
A6

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1. CONTRACTOR IS TO REFER TO AT&T'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION.
2. THE SIZE, HEIGHT, AND DIRECTION OF THE ANTENNAS SHALL BE ADJUSTED TO ACHIEVE THE AZIMUTHS SPECIFIED AND LIMIT SHADOWING AND TO MEET THE SYSTEM REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY THE HEIGHT OF THE ANTENNA WITH THE AT&T WIRELESS PROJECT MANAGER.
4. VERIFY TYPE AND SIZE OF TOWER LEG PRIOR TO ORDERING ANY ANTENNA MOUNT.
5. UNLESS NOTED OTHERWISE THE CONTRACTOR MUST PROVIDE ALL MATERIAL NECESSARY.
6. ANTENNA AZIMUTHS ARE DEGREES OFF OF TRUE NORTH, BEARING CLOCKWISE, IN WHICH ANTENNA FACE IS DIRECTED. ALL ANTENNAS (AND SUPPORTING STRUCTURES AS PRACTICAL) SHALL BE ACCURATELY ORIENTED IN THE SPECIFIED DIRECTION.
7. CONTRACTOR SHALL VERIFY ALL RF INFORMATION PRIOR TO CONSTRUCTION.
8. SWEEP TEST SHALL BE PERFORMED BY GENERAL CONTRACTOR AND SUBMITTED TO AT&T WIRELESS CONSTRUCTION SPECIALIST. TEST SHALL BE PERFORMED PER AT&T WIRELESS STANDARDS.
9. CABLE LENGTHS WERE DETERMINED BASED ON THE DESIGN DRAWING. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK.
10. CONTRACTOR TO USE ROSENBERGER FIBER LINE HANGER COMPONENTS (OR ENGINEER APPROVED EQUAL).

ANTENNA AND CABLING NOTES

SCALE: N.T.S. | 1

RF, DC, & COAX CABLE MARKING LOCATIONS TABLE	
NO	LOCATIONS
1	EACH TOP-JUMPER SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS.
2	EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" WIDE BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH (1) SET OF 3/4" WIDE COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
3	CABLE ENTRY PORT ON THE INTERIOR OF THE SHELTER.
4	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.
5	ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" WIDE BANDS ON EACH END OF THE BOTTOM JUMPER.

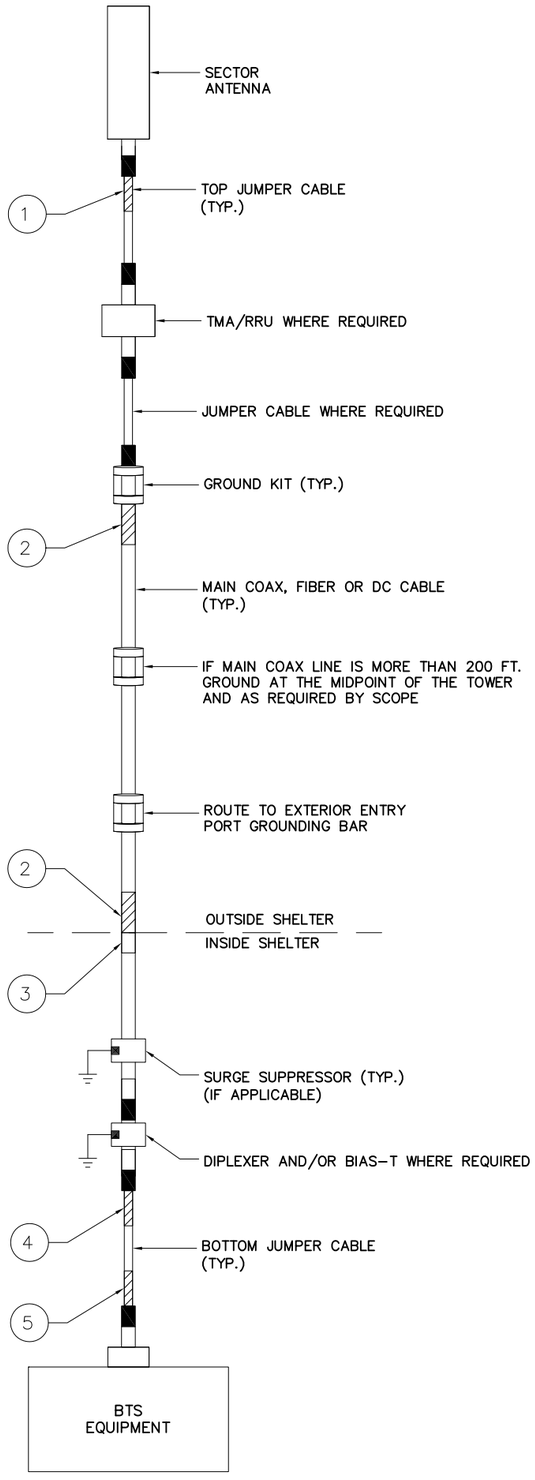
CABLE MARKING DIAGRAM

SCALE: N.T.S. | 2

1. THE ANTENNA SYSTEM COAX SHALL BE LABELED WITH VINYL TAPE.
2. THE STANDARD IS BASED ON EIGHT COLORED TAPES-RED, BLUE, GREEN, YELLOW, ORANGE, BROWN, WHITE, AND VIOLET. THESE TAPES MUST BE 3/4" WIDE & UV RESISTANT SUCH AS SCOTCH 35 VINYL ELECTRICAL COLOR CODING TAPE AND SHOULD BE READILY AVAILABLE TO THE ELECTRICIAN OR CONTRACTOR ON SITE.
3. USING COLOR BANDS ON THE CABLES, MARK ALL RF CABLE BY SECTOR AND CABLE NUMBER AS SHOWN ON "CABLE COLOR CHART".
4. WHEN AN EXISTING COAXIAL LINE THAT IS INTENDED TO BE A SHARED LINE BETWEEN TECHNOLOGIES IS ENCOUNTERED, THE CONTRACTOR SHALL REMOVE THE EXISTING COLOR CODING SCHEME AND REPLACE IT WITH THE COLOR CODING STANDARD. IN THE ABSENCE OF AN EXISTING COLOR CODING AND TAGGING SCHEME, OR WHEN INSTALLING PROPOSED COAXIAL CABLES, THIS GUIDELINE SHALL BE IMPLEMENTED AT THAT SITE REGARDLESS OF TECHNOLOGY.
5. ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) THREE WRAPS OF TAPE AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT SO AS TO AVOID UNRAVELING.
6. ALL COLOR BANDS INSTALLED AT THE TOP OF THE TOWER SHALL BE A MINIMUM OF 3" WIDE, AND SHALL HAVE A MINIMUM OF 3/4" OF SPACE BETWEEN EACH COLOR.
7. ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
8. IF EXISTING CABLES AT THE SITE ALREADY HAVE A COLOR CODING SCHEME AND THEY ARE NOT INTENDED TO BE REUSED OR SHARED WITH THE NEW TECHNOLOGY, THE EXISTING COLOR CODING SCHEME SHALL REMAIN UNTOUCHED.

CABLE MARKING NOTES

SCALE: N.T.S. | 3



CABLE COLOR CODING DIAGRAM

SCALE: N.T.S. | 4

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BRANFORD, CT 06405

SHEET NAME
CABLE NOTES AND COLOR CODING

SHEET NUMBER
A7

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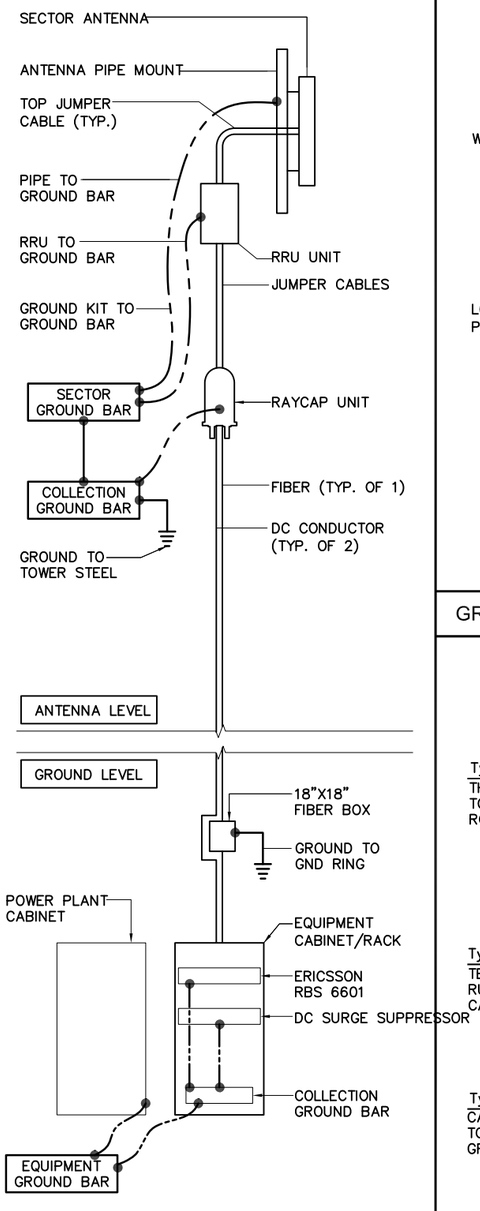
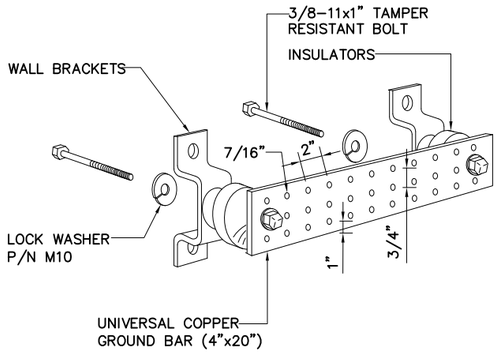
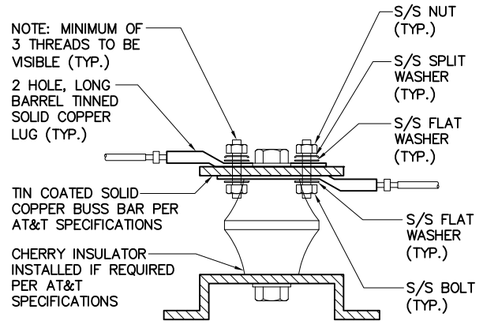


GROUNDING SCHEMATIC SCALE: N.T.S. 1



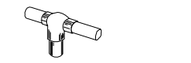
GROUND BAR DETAIL SCALE: N.T.S. 2



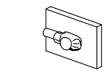
NOTES:

1. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING SPLIT WASHERS.
2. COAT WIRE END WITH ANTI-OXIDATION COMPOUND PRIOR TO INSERTION INTO LUG BARREL AND CRIMPING.
3. APPLY ANTI-OXIDATION COMPOUND BETWEEN ALL LUGS AND BUSS BARS PRIOR TO MATING AND BOLTING.

LUG DETAIL SCALE: N.T.S. 3



Type GT
THROUGH CABLE TO TOP OF GROUND ROD.

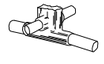


Type VN
HORIZONTAL CABLE TAP TO VERTICAL STEEL SURFACE OR THE SIDE OF HORIZONTAL PIPE

Type VV
THROUGH VERTICAL CABLE TO VERTICAL STEEL SURFACE OR TO THE SIDE OF EITHER HORIZONTAL OR VERTICAL PIPE

Type TA
TEE OF HORIZONTAL RUN AND TAP CABLES.

Type VS
CABLE TAP DOWN AT 45° TO VERTICAL STEEL SURFACE OR SIDE OF HORIZONTAL OR VERTICAL PIPE.



Type XB
CROSS OF HORIZONTAL CABLES. LAPPED AND NOT CUT

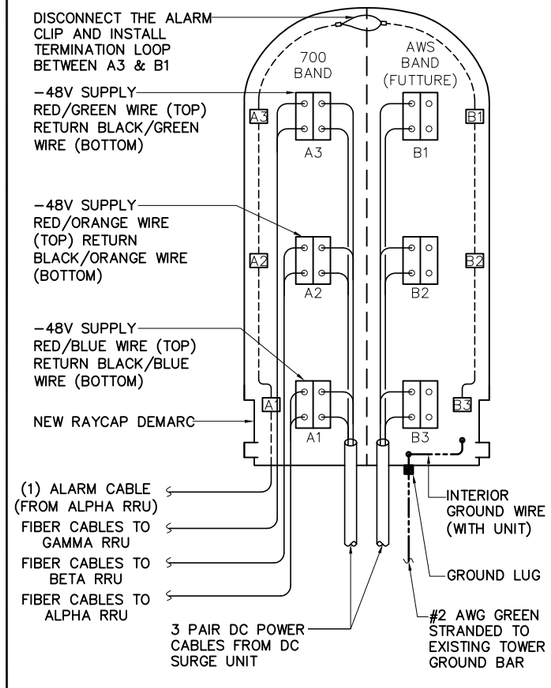
Type GR
CABLE TAP TO TOP OF GROUND ROD

Type HS
HORIZONTAL CABLE TAP TO HORIZONTAL STEEL SURFACE OR PIPE. CABLE OFF SURFACE.

Type GY
THROUGH CABLE TO SIDE OF GROUND ROD

Type NC
THROUGH AND TAP CABLES TO GROUND ROD

EXOTHERMIC WELD DETAILS SCALE: N.T.S. 4



RAYCAP DC POWER AND ALARM DET. SCALE: N.T.S. 5

NOT USED SCALE: N.T.S. 6

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SHEET NAME
GROUNDING DETAILS

SHEET NUMBER
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STRUCTURAL NOTES:

1.0 APPLICABLE CODES

1.1 DESIGN & CONSTRUCTION OF ALL WORK SHALL CONFORM TO THE FOLLOWING CODES:
- 2003 INTERNATIONAL BUILDING CODE
- TIA–222–F

2.0 GENERAL NOTES

2.1 STRUCTURAL DRAWINGS ARE INTENDED TO BE USED WITH DESIGN DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE REQUIREMENTS OF ALL DRAWINGS INTO THEIR SHOP DRAWINGS AND WORK.

2.2 NO CHANGE IN SIZE OR DIMENSION OF STRUCTURAL MEMBERS SHALL BE MADE WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR LIMITING THE AMOUNT OF CONSTRUCTION LOAD IMPOSED UPON STRUCTURAL FRAMING. CONSTRUCTION LOADS SHALL NOT EXCEED THE CAPACITY OF THE FRAMING AT THE TIME THE LOADS ARE IMPOSED.

2.3 THE STRUCTURE IS DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR SHALL FURNISH ALL TEMPORARY BRACING AND/OR SUPPORTS REQUIRED AS THE RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.

2.4 DO NOT SCALE THESE DRAWINGS, USE DIMENSIONS.

2.5 THE CONTRACTOR SHALL INFORM THE ENGINEER IN WRITING OF ANY DEVIATION FROM THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOT BE RELIEVED OF THE RESPONSIBILITY FOR SUCH DEVIATION BY THE ENGINEER'S APPROVAL OF SHOP DRAWINGS, PRODUCT DATA, ETC., UNLESS THE CONTRACTOR HAS SPECIFICALLY INFORMED THE ENGINEER OF SUCH DEVIATION AT THE TIME OF SUBMISSION, AND THE ENGINEER HAS GIVEN WRITTEN APPROVAL TO THE SPECIFIC DEVIATION.

2.6 ALL THINGS WHICH, IN THE OPINION OF THE CONTRACTOR, APPEAR TO BE DEFICIENCIES, OMISSIONS, CONTRADICTIONS AND AMBIGUITIES, IN THE PLANS AND SPECIFICATIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER. PLANS AND/OR SPECIFICATIONS WILL BE CORRECTED, OR A WRITTEN INTERPRETATION OF THE ALLEGED DEFICIENCY, OMISSION, CONTRADICTION OR AMBIGUITY WILL BE MADE BY THE ENGINEER BEFORE THE AFFECTED WORK PROCEEDS.

2.7 ALL EXISTING DIMENSIONS AND CONDITIONS MUST BE FIELD VERIFIED PRIOR TO FABRICATION.

2.8 ALL WORK PRESENTED ON THESE DRAWINGS SHALL BE COMPLETED BY THE CONTRACTOR UNLESS NOTED OTHERWISE. THE CONTRACTOR SHALL BE EXPERIENCED IN THE PERFORMANCE OF WORK SIMILAR TO THAT DESCRIBED HEREIN. BY ACCEPTANCE OF THIS ASSIGNMENT, THE CONTRACTOR IS ATTESTING THAT HE DOES HAVE SUFFICIENT EXPERIENCE AND ABILITY, THAT HE IS KNOWLEDGEABLE OF THE WORK TO BE PERFORMED AND THAT HE IS PROPERLY LICENSED AND PROPERLY REGISTERED TO DO THIS WORK IN THE STATE AND/OR COUNTY IN WHICH IT IS TO BE PERFORMED.

2.9 THE CONTRACTOR SHALL BE RESPONSIBLE FOR INITIATING, MAINTAINING, AND SUPERVISING ALL SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ENSURING THAT ALL CONSTRUCTION PROCEDURES MEET THE REQUIREMENTS OF OSHA, THE OWNER AND OTHER APPLICABLE LOCAL, STATE AND FEDERAL SAFETY REGULATIONS.

3.0 STRUCTURAL STEEL NOTES:

3.1 STRUCTURAL STEEL MATERIALS (HANDRAILS, PLATFORMS, STAIRS, H–FRAMES, ETC.): CONFORM TO THE LATEST EDITION OF APPLICABLE STANDARDS AND TO ALL APPLICABLE CODES AND REQUIREMENTS OF LOCAL AUTHORITIES HAVING JURISDICTION, WHICHEVER IS MORE STRINGENT. ALL STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE LATEST APPLICABLE REQUIREMENTS OF AISC, ASTM, ACI, CRSI, AWS AND ALL OTHER APPLICABLE STANDARDS.

A. ALL STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 UNLESS NOTED ON THE CONSTRUCTION DRAWINGS.
B. ROLLED STEEL SHAPES, PLATES AND BARS SHALL BE NO LESS THAN 3/16 INCHES IN THICKNESS AND SHALL COMPLY WITH ASTM A–36 AS A MINIMUM.
C. STEEL PIPE SHALL COMPLY WITH ASTM A–501 OR ASTM A–53, TYPE E OR S, GRADE B. A–500 GRADE B STEEL MAY BE SUBSTITUTED.
D. GALVANIZED STEEL GRATING SHALL BE A MINIMUM 1–1/4 INCH X 1/8 INCH AT 3/16 INCHES ON CENTER.

3.2 STRUCTURAL STEEL FABRICATION: ALL SHOP FABRICATION AND ASSEMBLY OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH AISC SPECIFICATIONS AND AS INDICATED ON THE DRAWINGS. ALL MATERIALS SHALL BE PROPERLY MARKED FOR FIELD ASSEMBLY AND FOR IDENTIFICATION AS TO THE LOCATION FOR WHICH IT IS INTENDED. MATERIALS SHALL BE FABRICATED AND DELIVERED IN AN ORDER TO EXPEDITE ERECTION AND MINIMIZE FIELD HANDLING OF MATERIALS.

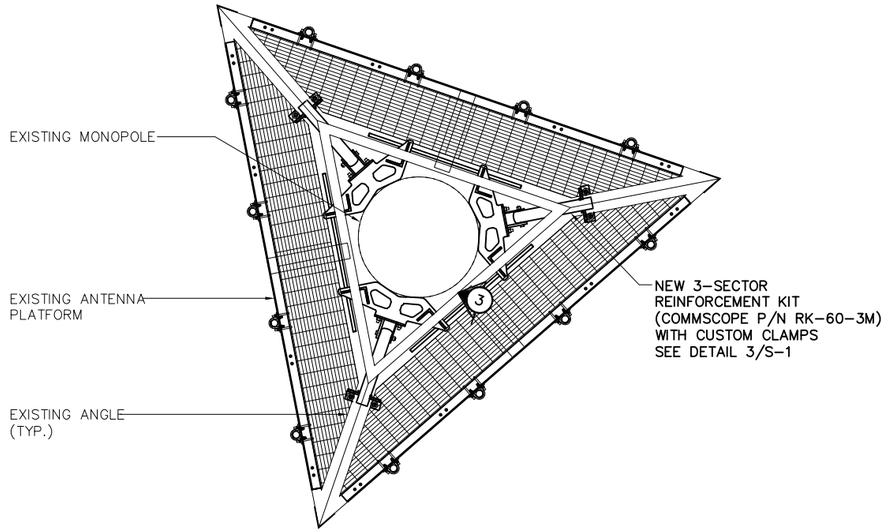
3.3 CONNECTIONS:

A. CONTRACTOR SHALL PROVIDE ALL HARDWARE REQUIRED TO COMPLETE FIELD ERECTION OF STRUCTURE AS INDICATED BY CONTRACT DOCUMENTS OR THESE SPECIFICATIONS.
B. HIGH STRENGTH THREADED FASTENERS SHALL BE INSTALLED IN ACCORDANCE WITH AISC SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A–325 BOLTS. USE A–325N BEARING–TYPE CONNECTION BOLTS UNLESS NOTED OTHERWISE.

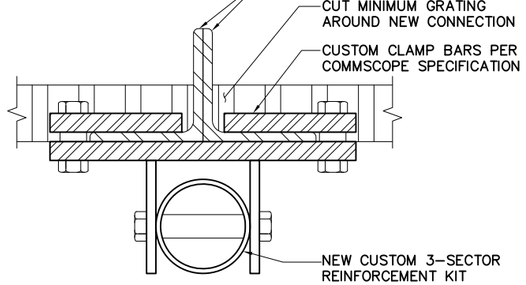
3.4 REPAIR: REPAIR ALL DAMAGED GALVANIZED STEEL WITH "GALVANOX," "DRY GALV," OR "ZINC–IT.", OR APPROVED EQUAL, PER THE MANUFACTURER'S INSTRUCTIONS.

3.5 INSPECTION: ANY DEFICIENCIES IN STRUCTURAL STEEL WORK NOT COMPLYING WITH SPECIFIED REQUIREMENTS ACCORDING TO INSPECTIONS AND TEST RECORDS SHALL BE CORRECTED AT NO ADDITIONAL COST, AND ADDITIONAL TESTS REQUIRED FOR COMPLIANCE OF THE ORIGINAL WORK AND TO INDICATE COMPLIANCE OF CORRECTED WORK SHALL BE AT NO ADDITIONAL COST TO THE COMPANY.

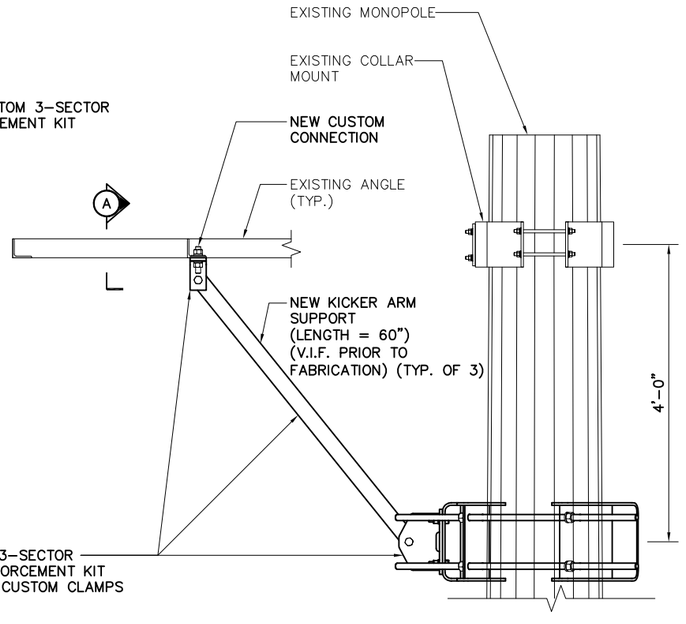
STRUCTURAL NOTES — SCALE: N.T.S. | 1



REINFORCEMENT PLAN — SCALE: 1/4" = 1'–0" | 2



FRONT VIEW
A–A
SCALE: N.T.S.



DETAIL — SCALE: 1/2" = 1'–0" | 3

at&t
550 COCHITUATE ROAD
SUITE 550 13 AND 14
FRAMINGHAM, MA 01701

smartlink
1362 MELLON ROAD
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www.FullertonEngineering.com

REV	DATE	DESCRIPTION	BY
0	07/14/16	90% REVIEW	KC
1	08/22/16	FOR PERMIT	KC

I HEREBY CERTIFY THAT THESE DRAWING WERE PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND CONTROL, AND TO THE BEST OF MY KNOWLEDGE AND BELIEF COMPLY WITH THE REQUIREMENTS OF ALL APPLICABLE CODES.

STATE OF CONNECTICUT · HENRY M. BELLAGAMBA · 25358 · LICENSED PROFESSIONAL ENGINEER

SITE NAME
BRANFORD - LEETES ISLAND

SITE NUMBER:
CT02014
CROWN BU# 876316

SITE ADDRESS
21 ACORN ROAD
BRANFORD, CT 06405

SHEET NAME
ANTENNA MOUNT REINFORCEMENT

SHEET NUMBER
S1

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PAUL J. FORD & COMPANY

Date: **August 10, 2016**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL02014
	Carrier Site Name:	Branford-Leetes Island
Crown Castle Designation:	**Crown Castle BU Number:**	876316
	Crown Castle Site Name:	SECONDINO PROPERTY
	Crown Castle JDE Job Number:	383044
	Crown Castle Work Order Number:	1253799
	Crown Castle Application Number:	348101 Rev. 3
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37516-2026.001.7805
Site Data:	**21 Acorn Road, BRANFORD, New Haven County, CT** **Latitude *41° 17' 35.06"*, Longitude *-72° 45' 46.4"*** **147 Foot - Monopole Tower**	

Dear Debra Elliott,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 914533, in accordance with application 348101, revision 3.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

The mount installed at the 126 ft level must be removed for the determined available structural capacity to be effective.

We at *Paul J Ford and Company* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Respectfully submitted by:

Joshua Johnson, EI
Structural Designer KJS

STATE OF CONNECTICUT
JUSTIN T. KLINE
No. 30301
LICENSED
PROFESSIONAL ENGINEER

8-10-16

tnxTower Report - version 7.0.5.1

PAUL J. FORD & COMPANY

Date: **August 10, 2016**

Debra Elliott
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street, Suite 600
Columbus, OH 43215
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Subject: **Structural Analysis Report**

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Respectfully submitted by:

Joshua Johnson, EI
Structural Designer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 147 ft Monopole tower designed by SUMMIT in August of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements the 2005 Connecticut State Building Code of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 85 mph with no ice, 37.6 mph with 0.75 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
106.0	108.0	3	commscope	SBNHH-1D65A w/ Mount Pipe	-	-	-
		3	ericsson	RRUS12/RRUS A2			
	106.0	1	commscope	MT-195-12 (Handrail)			
		1	commscope	RK-60-3M (Kickers)			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
147.0	147.0	3	alcatel lucent	1900MHz RRH (65MHz)	1 3	5/8 1-1/4	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		3	alcatel lucent	TD-RRH8x20-25			
		9	rfs celwave	ACU-A20-N			
		3	rfs celwave	APXVSPP18-C-A20 w/ Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Pipe			
		1	tower mounts	Platform Mount [LP 1201-1]			
	143.0	1	tower mounts	Miscellaneous (NA507-1)			
135.0	135.0	3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	1 6	1-3/16 1-5/8	1
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		1	tower mounts	T-Arm Mount [TA 601-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
126.0	126.0	1	tower mounts	Platform Mount [LP 712-1]	-	-	3
116.0	116.0	3	alcatel lucent	RRH2X60-PCS	1	1-5/8	2
		3	alcatel lucent	RRH2x60-700			
		3	alcatel lucent	RRH4X45-AWS4 B66			
		3	commscope	HBXX-6517DS-A2M w/ Mount Pipe			
		6	commscope	SBNHH-1D65B w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		2	adc	ClearGain Dual Band 800/1900 MHz	7	1-5/8	1
		2	antel	LPA-80063/6CF w/ Mount Pipe			
		2	antel	LPA-80080/4CF w/ Mount Pipe			
		2	rfs celwave	APL868013 w/ Mount Pipe			
		1	rfs celwave	DB-T1-6Z-8AB-0Z			
		1	tower mounts	Platform Mount [LP 1201-1]			
		3	antel	BXA-171085-8BF-EDIN-2 w/ Mount Pipe	6	1-5/8	3
		3	antel	BXA-171063-12CF-EDIN-2 w/ Mount Pipe			
		3	antel	BXA-70063/6CF-2 w/ Pipe			
		3	alcatel lucent	RRH2x40-AWS			
		6	rfs celwave	FD9R6004/2C-3L			
106.0	108.0	3	ericsson	RRUS-11	-	-	3
		3	kmw	AM-X-CD-14-65-00T-RET w/ Mount Pipe			
		6	powerwave	7770.00 w/ Mount Pipe	1 2 12 1	3/8 7/8 1-1/4 17/64	1
	106.0	3	ericsson	RRUS-11			
		12	powerwave	LGP2140X			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 1201-1]			
76.0	77.0	1	kathreinscala	Kathrein OG-860/1920/GPS-A	-	-	1
		1	lucent	KS24019-L112A			
	76.0	1	tower mounts	Side Arm Mount [SO 701-3]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 12/16/1996	1529736	CCISITES
4-POST-MODIFICATION INSPECTION	PJF, 41708-0180, 03/15/2009	2417887	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit/PJF, 2737/29297-566, 09/29/1997	1632435	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit/PJF, 2737-97/29297-566, 09/29/1997	1632399	CCISITES

3.1) Analysis Method

tnxTower (version 7.0.5.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) Monopole was reinforced in conformance with the referenced modification drawings.

This analysis may be affected if any assumptions are not valid or have been made in error. Paul J Ford and Company should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-9.87	1075.85	60.5	Pass
L2	105 - 89.75	Pole	TP31.2343x28.0034x0.3125	2	-15.99	1471.82	89.3	Pass
L3	89.75 - 88.25	Pole	TP31.4893x31.2343x0.3125	3	-16.21	1464.66	93.1	Pass
L4	88.25 - 86	Pole	TP31.8719x31.4893x0.5085	4	-16.69	2314.39	62.7	Pass
L5	86 - 84.25	Pole	TP32.1695x31.8719x0.5063	5	-17.06	2304.61	65.4	Pass
L6	84.25 - 73.75	Pole	TP33.955x32.1695x0.455	6	-18.32	2207.19	76.8	Pass
L7	73.75 - 42.75	Pole	TP38.601x32.3223x0.537	7	-26.65	2922.04	89.2	Pass
L8	42.75 - 8.25	Pole	TP43.7172x36.6809x0.5757	8	-39.32	3650.30	98.6	Pass
L9	8.25 - 6.25	Pole	TP44.0573x43.7172x0.596	9	-39.99	3777.23	96.5	Pass
L10	6.25 - 0	Pole	TP45.12x44.0573x0.5918	10	-42.08	3837.49	98.4	Pass
							Summary	
						Pole (L8)	98.6	Pass
						RATING =	**98.6**	**Pass**

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	99.3	Pass
1	Base Plate	0	89.3	Pass
1	Base Foundation Structural Steel	0	61.1	Pass
1	Base Foundation Soil Interaction	0	77.9	Pass

Structure Rating (max from all components) =	**99.3%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.

4.1) Recommendations

Remove the 126’ elevation.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in New Haven County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 0.7500 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Deflections calculated using a wind speed of 50 mph.
8) A non-linear (P-delta) analysis was used.
9) Pressures are calculated at each section.
10) Stress ratio used in pole design is 1.333.
11) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	147.00-105.00	42.00	3.75	18	22.0000	29.1410	0.2500	1.0000	A607-60 (60 ksi)
L2	105.00-89.75	19.00	0.00	18	28.0034	31.2343	0.3125	1.2500	A607-60 (60 ksi)
L3	89.75-88.25	1.50	0.00	18	31.2343	31.4893	0.3125	1.2500	Reinf 59.22 ksi (59 ksi)
L4	88.25-86.00	2.25	0.00	18	31.4893	31.8719	0.5085	2.0338	Reinf 57.17 ksi (57 ksi)
L5	86.00-84.25	1.75	0.00	18	31.8719	32.1695	0.5063	2.0252	Reinf 56.63 ksi (57 ksi)
L6	84.25-73.75	10.50	4.25	18	32.1695	33.9550	0.4550	1.8200	Reinf 58.30 ksi (58 ksi)
L7	73.75-42.75	35.25	4.75	18	32.3223	38.6010	0.5370	2.1481	Reinf 57.59 ksi (58 ksi)
L8	42.75-8.25	39.25	0.00	18	36.6809	43.7172	0.5757	2.3026	Reinf 57.90 ksi (58 ksi)
L9	8.25-6.25	2.00	0.00	18	43.7172	44.0573	0.5960	2.3841	Reinf 57.44 ksi (57 ksi)
L10	6.25-0.00	6.25		18	44.0573	45.1200	0.5918	2.3670	Reinf 57.37 ksi (57 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	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	29.5905	22.9250	2417.5313	10.2563	14.8036	163.3067	4838.2436	11.4647	4.6888	18.755
L2	29.0829	27.4659	2660.7626	9.8303	14.2257	187.0387	5325.0263	13.7356	4.3786	14.012
	31.7161	30.6705	3704.9933	10.9772	15.8670	233.5029	7414.8618	15.3382	4.9472	15.831
L3	31.7161	30.6705	3704.9933	10.9772	15.8670	233.5029	7414.8618	15.3382	4.9472	15.831
	31.9751	30.9235	3797.4379	11.0678	15.9966	237.3905	7599.8725	15.4647	4.9921	15.975
L4	31.9751	49.9986	6062.9281	10.9982	15.9966	379.0139	12133.8339	25.0040	4.6472	9.14
	32.3636	50.6160	6290.3368	11.1340	16.1909	388.5095	12588.9506	25.3128	4.7146	9.272
L5	32.3636	50.4045	6264.9089	11.1348	16.1909	386.9390	12538.0613	25.2070	4.7184	9.319
	32.6658	50.8827	6444.9201	11.2404	16.3421	394.3749	12898.3205	25.4462	4.7707	9.423
L6	32.6658	45.8012	5820.0967	11.2587	16.3421	356.1409	11647.8516	22.9049	4.8610	10.684
	34.4788	48.3797	6859.4641	11.8925	17.2491	397.6699	13727.9542	24.1944	5.1753	11.374
L7	33.5896	54.1791	6915.4569	11.2838	16.4197	421.1675	13840.0134	27.0947	4.7436	8.833
	39.1965	64.8813	11876.4096	13.5127	19.6093	605.6516	23768.4465	32.4468	5.8486	10.891
L8	38.1114	65.9695	10864.7624	12.8174	18.6339	583.0648	21743.8209	32.9910	5.4427	9.455
	44.3916	78.8258	18535.2035	15.3152	22.2083	834.6056	37094.7960	39.4204	6.6811	11.606
L9	44.3916	81.5766	19163.9090	15.3080	22.2083	862.9151	38353.0344	40.7960	6.6452	11.149
	44.7369	82.2200	19620.9094	15.4287	22.3811	876.6732	39267.6364	41.1178	6.7051	11.25
L10	44.7369	81.6376	19485.7703	15.4303	22.3811	870.6351	38997.1804	40.8266	6.7126	11.344
	45.8160	83.6336	20950.2650	15.8075	22.9210	914.0221	41928.0969	41.8247	6.8996	11.66

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
HB114-1-0813U4-M5J(1 1/4")	C	No	Inside Pole	147.00 - 0.00	3	No Ice	0.00	1.20
						1/2" Ice	0.00	1.20
						1" Ice	0.00	1.20
						2" Ice	0.00	1.20
						4" Ice	0.00	1.20
HB058-M12-XXXF(5/8")	C	No	CaAa (Out Of Face)	147.00 - 0.00	1	No Ice	0.00	0.24
						1/2" Ice	0.00	1.06
						1" Ice	0.00	2.49
						2" Ice	0.00	7.18
						4" Ice	0.00	23.89
***								
CR 50 1873(1-5/8")	C	No	CaAa (Out Of Face)	135.00 - 0.00	5	No Ice	0.00	0.83
						1/2" Ice	0.00	2.34
						1" Ice	0.00	4.47
						2" Ice	0.00	10.55
						4" Ice	0.00	30.05
561(1-5/8")	C	No	CaAa (Out Of Face)	135.00 - 0.00	1	No Ice	0.16	1.35
						1/2" Ice	0.26	2.65
						1" Ice	0.36	4.56
						2" Ice	0.56	10.21
						4" Ice	0.96	28.84
1.2 Masterline Extreme Hybrid(1 3/16")	C	No	CaAa (Out Of Face)	135.00 - 0.00	1	No Ice	0.00	0.95
						1/2" Ice	0.00	1.99
						1" Ice	0.00	3.64
						2" Ice	0.00	8.77

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						4" Ice	0.00	26.37
***								
LDF7-50A (1-5/8 FOAM)	C	No	Inside Pole	116.00 - 0.00	7	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	C	No	Inside Pole	116.00 - 0.00	1	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
						2" Ice	0.00	1.30
						4" Ice	0.00	1.30
***								
LDF2-50A(3/8")	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
						2" Ice	0.00	0.08
						4" Ice	0.00	0.08
LDF6-50A (1-1/4 FOAM)	C	No	Inside Pole	106.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
2" (Nominal) Conduit	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.72
						1/2" Ice	0.00	0.72
						1" Ice	0.00	0.72
						2" Ice	0.00	0.72
						4" Ice	0.00	0.72
6-8AWG 3 PAIR(7/8")	C	No	Inside Pole	106.00 - 0.00	2	No Ice	0.00	0.68
						1/2" Ice	0.00	0.68
						1" Ice	0.00	0.68
						2" Ice	0.00	0.68
						4" Ice	0.00	0.68
A-DQZNB2Yn1750 N(17/64")	C	No	Inside Pole	106.00 - 0.00	1	No Ice	0.00	0.03
						1/2" Ice	0.00	0.03
						1" Ice	0.00	0.03
						2" Ice	0.00	0.03
						4" Ice	0.00	0.03
***								
Aero MP3-05	C	No	CaAa (Out Of Face)	90.50 - 0.00	1	No Ice	0.35	0.00
						1/2" Ice	0.40	0.00
						1" Ice	0.66	0.00
						2" Ice	0.88	0.00
						4" Ice	1.32	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	147.00-105.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.875	0.44
L2	105.00-89.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	2.739	0.42
L3	89.75-88.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.765	0.04
L4	88.25-86.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.148	0.06
L5	86.00-84.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.893	0.05
L6	84.25-73.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	5.358	0.29

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
L7	73.75-42.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	15.819	0.85
L8	42.75-8.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	17.605	0.95
L9	8.25-6.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	1.021	0.05
L10	6.25-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	3.189	0.17

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	147.00-105.00	A	0.880	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	10.156	1.14
L2	105.00-89.75	A	0.854	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.609	0.76
L3	89.75-88.25	A	0.845	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.363	0.07
L4	88.25-86.00	A	0.843	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	2.040	0.11
L5	86.00-84.25	A	0.840	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.584	0.09
L6	84.25-73.75	A	0.833	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	9.448	0.51
L7	73.75-42.75	A	0.803	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	27.895	1.51
L8	42.75-8.25	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	30.306	1.64
L9	8.25-6.25	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	1.682	0.09
L10	6.25-0.00	A	0.750	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	5.255	0.29

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	147.00-105.00	-0.1487	0.0859	-0.2763	0.1595
L2	105.00-89.75	-0.2185	0.1262	-0.3974	0.2294
L3	89.75-88.25	-0.5546	0.3202	-0.8420	0.4861
L4	88.25-86.00	-0.5555	0.3207	-0.8435	0.4870
L5	86.00-84.25	-0.5565	0.3213	-0.8449	0.4878
L6	84.25-73.75	-0.5593	0.3229	-0.8489	0.4901
L7	73.75-42.75	-0.5662	0.3269	-0.8673	0.5007
L8	42.75-8.25	-0.5761	0.3326	-0.8785	0.5072
L9	8.25-6.25	-0.5817	0.3359	-0.8641	0.4989
L10	6.25-0.00	-0.5829	0.3365	-0.8669	0.5005

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
800 EXTERNAL NOTCH FILTER	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
800 EXTERNAL NOTCH FILTER	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.77 0.89 1.02 1.30 1.97	0.37 0.46 0.56 0.79 1.34	0.01 0.02 0.02 0.04 0.11
(3) ACU-A20-N	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
(3) ACU-A20-N	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.08 0.12 0.17 0.30 0.67	0.14 0.19 0.25 0.40 0.80	0.00 0.00 0.00 0.01 0.04
1900MHz RRH (65MHz)	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.84 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
1900MHz RRH (65MHz)	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice	2.71 2.95 3.20	2.61 2.84 3.09	0.06 0.08 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	3.72	3.61	0.17
						2" Ice	4.86	4.74	0.35
						4" Ice			
1900MHz RRH (65MHz)	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.71 2.95 3.20 3.72 4.86	2.61 2.84 3.09 3.61 4.74	0.06 0.08 0.11 0.17 0.35
800MHZ RRH	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
800MHZ RRH	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.49 2.71 2.93 3.41 4.46	2.07 2.27 2.48 2.93 3.93	0.05 0.07 0.10 0.16 0.32
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
Platform Mount [LP 1201-1]	C	None		0.0000	147.00	No Ice 1/2"	23.10 26.80	23.10 26.80	2.10 2.50

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						Ice	30.50	30.50	2.90
						1" Ice	37.90	37.90	3.70
						2" Ice	52.70	52.70	5.30
						4" Ice			
Miscellaneous (NA507-1)	C	From Leg	0.00 0.00 -4.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.80 6.70 8.60 12.40 20.00	4.80 6.70 8.60 12.40 20.00	0.25 0.29 0.34 0.44 0.64
(2) 2.375" OD x 4' Mount Pipe	A	From Leg	4.00 0.00 -2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
(2) 2.375" OD x 4' Mount Pipe	B	From Leg	4.00 0.00 -2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
(2) 2.375" OD x 4' Mount Pipe	C	From Leg	4.00 0.00 -2.00	0.0000	147.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
***									
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
(2) ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.83 7.35 7.86 8.93 11.18	5.64 6.48 7.26 8.86 12.29	0.11 0.17 0.23 0.38 0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.17	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.82 7.34 7.85 8.92 11.17	5.63 6.47 7.25 8.85 12.28	0.11 0.17 0.23 0.38 0.81
T-Arm Mount [TA 601-3]	C	None		0.0000	135.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.90 14.65 18.40 25.90 40.90	10.90 14.65 18.40 25.90 40.90	0.73 0.93 1.13 1.52 2.32
*** ***									
(2) LPA-80080/4CF w/ Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice	2.86 3.22 3.59 4.45	7.23 7.92 8.63 10.11	0.03 0.08 0.13 0.25

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	6.32	13.34	0.61
						4" Ice			
(2) LPA-80063/6CF w/ Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	10.58 11.24 11.87 13.16 15.87	10.67 11.93 12.91 14.92 19.16	0.05 0.14 0.25 0.48 1.09
(2) APL868013 w/ Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.48 3.88 4.76 6.66	4.92 5.60 6.28 7.71 10.83	0.02 0.06 0.11 0.22 0.54
(2) ClearGain Dual Band 800/1900 MHz	B	From Face	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.54 1.71 1.89 2.27 3.14	0.80 0.94 1.08 1.39 2.11	0.02 0.03 0.05 0.08 0.18
RRH2x60-700	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH4X45-AWS4 B66	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.36 3.62 4.17 5.38	1.76 1.98 2.21 2.69 3.77	0.06 0.08 0.11 0.17 0.33
RRH2X60-PCS	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
HBXX-6517DS-A2M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.30 9.92 11.20 13.86	7.07 8.26 9.18 11.01 15.05	0.07 0.14 0.21 0.39 0.90
RRH2x60-700	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH4X45-AWS4 B66	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.36 3.62 4.17 5.38	1.76 1.98 2.21 2.69 3.77	0.06 0.08 0.11 0.17 0.33
RRH2X60-PCS	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice	2.57 2.79 3.02	2.01 2.22 2.43	0.06 0.08 0.10

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
						1" Ice	3.52	2.89	0.16
						2" Ice	4.61	3.92	0.31
						4" Ice			
HBXX-6517DS-A2M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.30 9.92 11.20 13.86	7.07 8.26 9.18 11.01 15.05	0.07 0.14 0.21 0.39 0.90
RRH2x60-700	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.96 4.27 4.60 5.27 6.72	1.82 2.08 2.36 2.96 4.25	0.06 0.08 0.11 0.17 0.35
RRH4X45-AWS4 B66	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.10 3.36 3.62 4.17 5.38	1.76 1.98 2.21 2.69 3.77	0.06 0.08 0.11 0.17 0.33
RRH2X60-PCS	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.57 2.79 3.02 3.52 4.61	2.01 2.22 2.43 2.89 3.92	0.06 0.08 0.10 0.16 0.31
HBXX-6517DS-A2M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.98 9.65 10.29 11.59 14.32	6.96 8.18 9.14 11.02 15.03	0.07 0.14 0.21 0.40 0.91
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.64 9.30 9.92 11.20 13.86	7.07 8.26 9.18 11.01 15.05	0.07 0.14 0.21 0.39 0.90
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
DB-T1-6Z-8AB-0Z	C	From Leg	4.00 0.00 0.00	0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.60 5.92 6.24 6.91 8.37	2.33 2.56 2.79 3.28 4.37	0.04 0.08 0.12 0.21 0.45
Platform Mount [LP 1201-1]	C	None		0.0000	116.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment ° ft	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	6.71	5.51	0.14
			2.00			Ice	7.22	6.21	0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			2.00			Ice	7.22	6.21	0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00	0.0000	106.00	No Ice	6.22	4.82	0.09
			0.00			1/2"	6.71	5.51	0.14
			2.00			Ice	7.22	6.21	0.21
						1" Ice	8.26	7.67	0.36
						2" Ice	10.48	11.06	0.76
						4" Ice			
(4) LGP2140X	A	From Face	4.00	0.0000	106.00	No Ice	1.26	0.38	0.01
			0.00			1/2"	1.42	0.49	0.02
			0.00			Ice	1.58	0.62	0.03
						1" Ice	1.94	0.89	0.05
						2" Ice	2.75	1.54	0.13
						4" Ice			
(4) LGP2140X	B	From Face	4.00	0.0000	106.00	No Ice	1.26	0.38	0.01
			0.00			1/2"	1.42	0.49	0.02
			0.00			Ice	1.58	0.62	0.03
						1" Ice	1.94	0.89	0.05
						2" Ice	2.75	1.54	0.13
						4" Ice			
(4) LGP2140X	C	From Face	4.00	0.0000	106.00	No Ice	1.26	0.38	0.01
			0.00			1/2"	1.42	0.49	0.02
			0.00			Ice	1.58	0.62	0.03
						1" Ice	1.94	0.89	0.05
						2" Ice	2.75	1.54	0.13
						4" Ice			
DC6-48-60-18-8F	A	From Face	0.50	0.0000	106.00	No Ice	1.47	1.47	0.02
			0.00			1/2"	1.67	1.67	0.04
			0.00			Ice	1.88	1.88	0.06
						1" Ice	2.33	2.33	0.11
						2" Ice	3.38	3.38	0.24
						4" Ice			
RRUS-11	A	From Face	4.00	0.0000	106.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS-11	B	From Face	4.00	0.0000	106.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS-11	C	From Face	4.00	0.0000	106.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
2.375" OD x 4' Mount Pipe	A	From Leg	4.00	0.0000	106.00	No Ice	0.87	0.87	0.02
			0.00			1/2"	1.11	1.11	0.03
			0.00			Ice	1.36	1.36	0.04
						1" Ice	1.90	1.90	0.06
						2" Ice	3.23	3.23	0.16
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
2.375" OD x 4' Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
2.375" OD x 4' Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.87 1.11 1.36 1.90 3.23	0.87 1.11 1.36 1.90 3.23	0.02 0.03 0.04 0.06 0.16
Platform Mount [LP 1201-1]	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	23.10 26.80 30.50 37.90 52.70	23.10 26.80 30.50 37.90 52.70	2.10 2.50 2.90 3.70 5.30
SBNHH-1D65A w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.25 6.71 7.18 8.15 10.20	5.05 5.72 6.43 7.93 11.21	0.06 0.11 0.17 0.31 0.70
SBNHH-1D65A w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.25 6.71 7.18 8.15 10.20	5.05 5.72 6.43 7.93 11.21	0.06 0.11 0.17 0.31 0.70
SBNHH-1D65A w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.25 6.71 7.18 8.15 10.20	5.05 5.72 6.43 7.93 11.21	0.06 0.11 0.17 0.31 0.70
RRUS12/RRUS A2	A	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
RRUS12/RRUS A2	B	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
RRUS12/RRUS A2	C	From Face	4.00 0.00 2.00	0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
RK-60-3M	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.97 1.22 1.48 2.02 3.38	0.97 1.22 1.48 2.02 3.38	0.04 0.04 0.06 0.09 0.19
MT-195-12	C	None		0.0000	106.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.80 6.70 8.60 12.40 20.00	4.80 6.70 8.60 12.40 20.00	0.25 0.29 0.34 0.44 0.64

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
***						4" Ice			
Kathrein OG-860/1920/GPS-A	B	From Face	3.00 0.00 1.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.14 0.23 0.33 0.57 1.17	0.14 0.23 0.33 0.57 1.17	0.00 0.00 0.01 0.02 0.05
KS24019-L112A	C	From Face	3.00 0.00 1.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.10 0.18 0.26 0.42 0.74	0.10 0.18 0.26 0.42 0.74	0.01 0.01 0.01 0.01 0.02
Side Arm Mount [SO 701-3]	C	None		0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.83 3.92 5.01 7.19 11.55	2.83 3.92 5.01 7.19 11.55	0.20 0.24 0.28 0.36 0.53

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 147.00-105.00	125.27	1.464	27	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	4.875
L2 105.00-89.75	97.26	1.362	25	38.046	A	0.000	38.046	38.046	100.00	0.000	0.000
					B	0.000	38.046		100.00	0.000	0.000
					C	0.000	38.046		100.00	0.000	2.739
L3 89.75-88.25	89.00	1.328	25	3.920	A	0.000	3.920	3.920	100.00	0.000	0.000
					B	0.000	3.920		100.00	0.000	0.000
					C	0.000	3.920		100.00	0.000	0.765
L4 88.25-86.00	87.12	1.32	24	5.940	A	0.000	5.940	5.940	100.00	0.000	0.000
					B	0.000	5.940		100.00	0.000	0.000
					C	0.000	5.940		100.00	0.000	1.148
L5 86.00-84.25	85.12	1.311	24	4.670	A	0.000	4.670	4.670	100.00	0.000	0.000
					B	0.000	4.670		100.00	0.000	0.000
					C	0.000	4.670		100.00	0.000	0.893
L6 84.25-73.75	78.95	1.283	24	28.929	A	0.000	28.929	28.929	100.00	0.000	0.000
					B	0.000	28.929		100.00	0.000	0.000
					C	0.000	28.929		100.00	0.000	5.358
L7 73.75-42.75	58.15	1.176	22	92.587	A	0.000	92.587	92.587	100.00	0.000	0.000
					B	0.000	92.587		100.00	0.000	0.000
					C	0.000	92.587		100.00	0.000	15.819
L8 42.75-8.25	25.10	1	19	116.796	A	0.000	116.796	116.796	100.00	0.000	0.000
					B	0.000	116.796		100.00	0.000	0.000
					C	0.000	116.796		100.00	0.000	17.605
L9 8.25-6.25	7.25	1	18	7.315	A	0.000	7.315	7.315	100.00	0.000	0.000
					B	0.000	7.315		100.00	0.000	0.000
					C	0.000	7.315		100.00	0.000	1.021
L10 6.25-0.00	3.11	1	18	23.223	A	0.000	23.223	23.223	100.00	0.000	0.000
					B	0.000	23.223		100.00	0.000	0.000
					C	0.000	23.223		100.00	0.000	3.189

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 147.00-105.00	125.27	1.464	5	0.8802	95.658	A	0.000	95.658	95.658	100.00	0.000	0.000
						B	0.000	95.658		100.00	0.000	0.000
						C	0.000	95.658		100.00	0.000	10.156
L2 105.00-89.75	97.26	1.362	5	0.8539	40.283	A	0.000	40.283	40.283	100.00	0.000	0.000
						B	0.000	40.283		100.00	0.000	0.000
						C	0.000	40.283		100.00	0.000	5.609
L3 89.75-88.25	89.00	1.328	5	0.8448	4.131	A	0.000	4.131	4.131	100.00	0.000	0.000
						B	0.000	4.131		100.00	0.000	0.000
						C	0.000	4.131		100.00	0.000	1.363
L4 88.25-86.00	87.12	1.32	5	0.8427	6.256	A	0.000	6.256	6.256	100.00	0.000	0.000
						B	0.000	6.256		100.00	0.000	0.000
						C	0.000	6.256		100.00	0.000	2.040
L5 86.00-84.25	85.12	1.311	5	0.8403	4.915	A	0.000	4.915	4.915	100.00	0.000	0.000
						B	0.000	4.915		100.00	0.000	0.000
						C	0.000	4.915		100.00	0.000	1.584
L6 84.25-73.75	78.95	1.283	5	0.8328	30.387	A	0.000	30.387	30.387	100.00	0.000	0.000
						B	0.000	30.387		100.00	0.000	0.000
						C	0.000	30.387		100.00	0.000	9.448
L7 73.75-42.75	58.15	1.176	4	0.8028	96.890	A	0.000	96.890	96.890	100.00	0.000	0.000
						B	0.000	96.890		100.00	0.000	0.000
						C	0.000	96.890		100.00	0.000	27.895
L8 42.75-8.25	25.10	1	4	0.7500	121.412	A	0.000	121.412	121.412	100.00	0.000	0.000
						B	0.000	121.412		100.00	0.000	0.000
						C	0.000	121.412		100.00	0.000	30.306
L9 8.25-6.25	7.25	1	4	0.7500	7.565	A	0.000	7.565	7.565	100.00	0.000	0.000
						B	0.000	7.565		100.00	0.000	0.000
						C	0.000	7.565		100.00	0.000	1.682
L10 6.25-0.00	3.11	1	4	0.7500	24.005	A	0.000	24.005	24.005	100.00	0.000	0.000
						B	0.000	24.005		100.00	0.000	0.000
						C	0.000	24.005		100.00	0.000	5.255

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 147.00-105.00	125.27	1.464	9	89.497	A	0.000	89.497	89.497	100.00	0.000	0.000
					B	0.000	89.497		100.00	0.000	0.000
					C	0.000	89.497		100.00	0.000	4.875
L2 105.00-89.75	97.26	1.362	9	38.046	A	0.000	38.046	38.046	100.00	0.000	0.000
					B	0.000	38.046		100.00	0.000	0.000
					C	0.000	38.046		100.00	0.000	2.739
L3 89.75-88.25	89.00	1.328	8	3.920	A	0.000	3.920	3.920	100.00	0.000	0.000
					B	0.000	3.920		100.00	0.000	0.000
					C	0.000	3.920		100.00	0.000	0.765
L4 88.25-86.00	87.12	1.32	8	5.940	A	0.000	5.940	5.940	100.00	0.000	0.000
					B	0.000	5.940		100.00	0.000	0.000
					C	0.000	5.940		100.00	0.000	1.148
L5 86.00-84.25	85.12	1.311	8	4.670	A	0.000	4.670	4.670	100.00	0.000	0.000
					B	0.000	4.670		100.00	0.000	0.000
					C	0.000	4.670		100.00	0.000	0.893
L6 84.25-73.75	78.95	1.283	8	28.929	A	0.000	28.929	28.929	100.00	0.000	0.000
					B	0.000	28.929		100.00	0.000	0.000
					C	0.000	28.929		100.00	0.000	5.358
L7 73.75-42.75	58.15	1.176	7	92.587	A	0.000	92.587	92.587	100.00	0.000	0.000
					B	0.000	92.587		100.00	0.000	0.000
					C	0.000	92.587		100.00	0.000	15.819
L8 42.75-8.25	25.10	1	6	116.796	A	0.000	116.796	116.796	100.00	0.000	0.000
					B	0.000	116.796		100.00	0.000	0.000
					C	0.000	116.796		100.00	0.000	17.605
L9 8.25-6.25	7.25	1	6	7.315	A	0.000	7.315	7.315	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L10 6.25-0.00	3.11	1	6	23.223	B	0.000	7.315		100.00	0.000	0.000
					C	0.000	7.315		100.00	0.000	1.021
					A	0.000	23.223	23.223	100.00	0.000	0.000
					B	0.000	23.223		100.00	0.000	0.000
					C	0.000	23.223		100.00	0.000	3.189

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
15	Dead+Wind 0 deg+Ice
16	Dead+Wind 30 deg+Ice
17	Dead+Wind 60 deg+Ice
18	Dead+Wind 90 deg+Ice
19	Dead+Wind 120 deg+Ice
20	Dead+Wind 150 deg+Ice
21	Dead+Wind 180 deg+Ice
22	Dead+Wind 210 deg+Ice
23	Dead+Wind 240 deg+Ice
24	Dead+Wind 270 deg+Ice
25	Dead+Wind 300 deg+Ice
26	Dead+Wind 330 deg+Ice
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	147 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-19.30	0.76	-0.24
			Max. Mx	11	-9.90	369.55	-2.77
			Max. My	8	-9.92	3.00	-368.16
			Max. Vy	11	-18.20	369.55	-2.77
			Max. Vx	2	-18.05	-2.15	367.94
			Max. Torque	12			-1.44
L2	105 - 89.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-28.94	1.44	-0.54
			Max. Mx	11	-16.02	816.51	-9.18
			Max. My	8	-16.04	9.52	-812.21

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	11	-24.68	816.51	-9.18
			Max. Vx	8	24.53	9.52	-812.21
			Max. Torque	12			-1.44
L3	89.75 - 88.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.22	1.49	-0.57
			Max. Mx	11	-16.24	853.61	-9.68
			Max. My	8	-16.26	10.04	-849.08
			Max. Vy	11	-24.81	853.61	-9.68
			Max. Vx	2	-24.66	-8.86	848.76
			Max. Torque	12			-1.41
L4	88.25 - 86	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-29.79	1.57	-0.61
			Max. Mx	11	-16.72	909.65	-10.45
			Max. My	8	-16.74	10.81	-904.78
			Max. Vy	11	-25.01	909.65	-10.45
			Max. Vx	2	-24.86	-9.60	904.43
			Max. Torque	12			-1.41
L5	86 - 84.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-30.23	1.63	-0.65
			Max. Mx	11	-17.09	953.56	-11.04
			Max. My	8	-17.11	11.41	-948.42
			Max. Vy	11	-25.18	953.56	-11.04
			Max. Vx	2	-25.03	-10.17	948.07
			Max. Torque	12			-1.40
L6	84.25 - 73.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.75	1.85	-0.77
			Max. Mx	11	-18.35	1112.62	-13.16
			Max. My	8	-18.37	13.56	-1106.54
			Max. Vy	11	-25.73	1112.62	-13.16
			Max. Vx	2	-25.58	-12.22	1106.13
			Max. Torque	12			-1.39
L7	73.75 - 42.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.56	2.87	-1.40
			Max. Mx	11	-26.67	1942.52	-23.54
			Max. My	8	-26.69	24.04	-1931.82
			Max. Vy	5	28.46	-1940.79	22.68
			Max. Vx	2	-28.31	-22.18	1931.11
			Max. Torque	12			-1.35
L8	42.75 - 8.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-55.81	4.34	-2.26
			Max. Mx	11	-39.32	3112.88	-36.71
			Max. My	8	-39.33	37.38	-3096.29
			Max. Vy	5	31.05	-3110.44	35.41
			Max. Vx	2	-30.91	-34.74	3095.20
			Max. Torque	11			-1.27
L9	8.25 - 6.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-56.54	4.42	-2.30
			Max. Mx	11	-40.00	3175.06	-37.37
			Max. My	8	-40.00	38.05	-3158.17
			Max. Vy	5	31.16	-3172.58	36.05
			Max. Vx	2	-31.01	-35.37	3157.06
			Max. Torque	11			-1.19
L10	6.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-58.85	4.67	-2.45
			Max. Mx	11	-42.08	3370.91	-39.43
			Max. My	8	-42.08	40.14	-3353.10
			Max. Vy	5	31.53	-3368.30	38.02
			Max. Vx	2	-31.39	-37.31	3351.92
			Max. Torque	11			-1.18

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	58.85	-0.00	0.00
	Max. H_x	11	42.09	31.51	-0.32
	Max. H_z	2	42.09	-0.32	31.37
	Max. M_x	2	3351.92	-0.32	31.37
	Max. M_z	5	3368.30	-31.51	0.32
	Max. Torsion	5	1.16	-31.51	0.32
	Min. Vert	11	42.09	31.51	-0.32
	Min. H_x	5	42.09	-31.51	0.32
	Min. H_z	8	42.09	0.32	-31.37
	Min. M_x	8	-3353.10	0.32	-31.37
	Min. M_z	11	-3370.91	31.51	-0.32
	Min. Torsion	11	-1.17	31.51	-0.32

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	42.09	-0.00	0.00	0.66	1.35	0.00
Dead+Wind 0 deg - No Ice	42.09	0.32	-31.37	-3351.92	-37.31	0.05
Dead+Wind 30 deg - No Ice	42.09	16.03	-27.33	-2922.12	-1717.01	-0.54
Dead+Wind 60 deg - No Ice	42.09	27.45	-15.96	-1709.13	-2936.24	-0.98
Dead+Wind 90 deg - No Ice	42.09	31.51	-0.32	-38.02	-3368.30	-1.16
Dead+Wind 120 deg - No Ice	42.09	27.13	15.41	1643.56	-2897.68	-1.03
Dead+Wind 150 deg - No Ice	42.09	15.48	27.01	2884.96	-1650.03	-0.63
Dead+Wind 180 deg - No Ice	42.09	-0.32	31.37	3353.10	40.14	-0.06
Dead+Wind 210 deg - No Ice	42.09	-16.03	27.33	2923.50	1719.82	0.53
Dead+Wind 240 deg - No Ice	42.09	-27.45	15.96	1710.52	2939.03	0.98
Dead+Wind 270 deg - No Ice	42.09	-31.51	0.32	39.43	3370.91	1.17
Dead+Wind 300 deg - No Ice	42.09	-27.13	-15.41	-1642.16	2900.50	1.04
Dead+Wind 330 deg - No Ice	42.09	-15.48	-27.01	-2883.57	1652.86	0.63
Dead+Ice	58.85	0.00	-0.00	2.45	4.67	-0.00
Dead+Wind 0 deg+Ice	58.85	0.06	-7.43	-817.61	-2.73	-0.04
Dead+Wind 30 deg+Ice	58.85	3.78	-6.47	-711.58	-413.42	-0.14
Dead+Wind 60 deg+Ice	58.85	6.49	-3.77	-414.19	-711.99	-0.20
Dead+Wind 90 deg+Ice	58.85	7.46	-0.06	-5.12	-818.45	-0.20
Dead+Wind 120 deg+Ice	58.85	6.43	3.66	406.03	-704.27	-0.15
Dead+Wind 150 deg+Ice	58.85	3.68	6.41	709.07	-400.04	-0.06
Dead+Wind 180 deg+Ice	58.85	-0.06	7.43	822.81	12.71	0.04
Dead+Wind 210 deg+Ice	58.85	-3.78	6.47	716.79	423.40	0.14
Dead+Wind 240 deg+Ice	58.85	-6.49	3.77	419.39	721.98	0.20
Dead+Wind 270 deg+Ice	58.85	-7.46	0.06	10.33	828.44	0.20
Dead+Wind 300 deg+Ice	58.85	-6.43	-3.66	-400.82	714.26	0.15
Dead+Wind 330 deg+Ice	58.85	-3.68	-6.41	-703.86	410.03	0.06
Dead+Wind 0 deg - Service	42.09	0.11	-10.85	-1160.79	-12.00	0.02
Dead+Wind 30 deg - Service	42.09	5.55	-9.46	-1012.10	-594.04	-0.19
Dead+Wind 60 deg - Service	42.09	9.50	-5.52	-591.79	-1016.52	-0.34
Dead+Wind 90 deg - Service	42.09	10.90	-0.11	-12.72	-1166.01	-0.41
Dead+Wind 120 deg - Service	42.09	9.39	5.33	569.93	-1003.11	-0.36
Dead+Wind 150 deg - Service	42.09	5.36	9.34	1000.07	-570.80	-0.22
Dead+Wind 180 deg - Service	42.09	-0.11	10.85	1162.17	14.83	-0.02
Dead+Wind 210 deg - Service	42.09	-5.55	9.46	1013.48	596.86	0.19
Dead+Wind 240 deg - Service	42.09	-9.50	5.52	593.17	1019.34	0.34
Dead+Wind 270 deg - Service	42.09	-10.90	0.11	14.11	1168.83	0.41
Dead+Wind 300 deg - Service	42.09	-9.39	-5.33	-568.55	1005.93	0.36
Dead+Wind 330 deg - Service	42.09	-5.36	-9.34	-998.68	573.63	0.22

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-42.09	0.00	0.00	42.09	-0.00	0.000%
2	0.32	-42.09	-31.37	-0.32	42.09	31.37	0.002%
3	16.03	-42.09	-27.33	-16.03	42.09	27.33	0.000%
4	27.45	-42.09	-15.96	-27.45	42.09	15.96	0.000%
5	31.51	-42.09	-0.32	-31.51	42.09	0.32	0.002%
6	27.13	-42.09	15.41	-27.13	42.09	-15.41	0.000%
7	15.48	-42.09	27.01	-15.48	42.09	-27.01	0.000%
8	-0.32	-42.09	31.37	0.32	42.09	-31.37	0.005%
9	-16.03	-42.09	27.33	16.03	42.09	-27.33	0.000%
10	-27.45	-42.09	15.96	27.45	42.09	-15.96	0.000%
11	-31.51	-42.09	0.32	31.51	42.09	-0.32	0.005%
12	-27.13	-42.09	-15.41	27.13	42.09	15.41	0.000%
13	-15.48	-42.09	-27.01	15.48	42.09	27.01	0.000%
14	0.00	-58.85	0.00	-0.00	58.85	0.00	0.003%
15	0.06	-58.85	-7.44	-0.06	58.85	7.43	0.002%
16	3.78	-58.85	-6.47	-3.78	58.85	6.47	0.002%
17	6.49	-58.85	-3.77	-6.49	58.85	3.77	0.002%
18	7.46	-58.85	-0.06	-7.46	58.85	0.06	0.002%
19	6.43	-58.85	3.66	-6.43	58.85	-3.66	0.002%
20	3.68	-58.85	6.41	-3.68	58.85	-6.41	0.002%
21	-0.06	-58.85	7.44	0.06	58.85	-7.43	0.002%
22	-3.78	-58.85	6.47	3.78	58.85	-6.47	0.002%
23	-6.49	-58.85	3.77	6.49	58.85	-3.77	0.002%
24	-7.46	-58.85	0.06	7.46	58.85	-0.06	0.002%
25	-6.43	-58.85	-3.66	6.43	58.85	3.66	0.002%
26	-3.68	-58.85	-6.41	3.68	58.85	6.41	0.002%
27	0.11	-42.09	-10.85	-0.11	42.09	10.85	0.006%
28	5.55	-42.09	-9.46	-5.55	42.09	9.46	0.001%
29	9.50	-42.09	-5.52	-9.50	42.09	5.52	0.001%
30	10.90	-42.09	-0.11	-10.90	42.09	0.11	0.006%
31	9.39	-42.09	5.33	-9.39	42.09	-5.33	0.001%
32	5.36	-42.09	9.34	-5.36	42.09	-9.34	0.001%
33	-0.11	-42.09	10.85	0.11	42.09	-10.85	0.006%
34	-5.55	-42.09	9.46	5.55	42.09	-9.46	0.001%
35	-9.50	-42.09	5.52	9.50	42.09	-5.52	0.001%
36	-10.90	-42.09	0.11	10.90	42.09	-0.11	0.006%
37	-9.39	-42.09	-5.33	9.39	42.09	5.33	0.001%
38	-5.36	-42.09	-9.34	5.36	42.09	9.34	0.001%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00002329	0.00007523
3	Yes	18	0.00000001	0.00014358
4	Yes	18	0.00000001	0.00014628
5	Yes	15	0.00002328	0.00012632
6	Yes	18	0.00000001	0.00013407
7	Yes	18	0.00000001	0.00013789
8	Yes	14	0.00005781	0.00012498
9	Yes	18	0.00000001	0.00014548
10	Yes	18	0.00000001	0.00014314
11	Yes	14	0.00005777	0.00007574
12	Yes	18	0.00000001	0.00013894
13	Yes	18	0.00000001	0.00013479
14	Yes	6	0.00000001	0.00001222
15	Yes	14	0.00012516	0.00002877
16	Yes	14	0.00012498	0.00012367
17	Yes	14	0.00012497	0.00013166
18	Yes	14	0.00012514	0.00003204
19	Yes	14	0.00012501	0.00011555
20	Yes	14	0.00012502	0.00012457
21	Yes	14	0.00012516	0.00002895
22	Yes	14	0.00012498	0.00013401

23	Yes	14	0.00012499	0.00012694
24	Yes	14	0.00012516	0.00003035
25	Yes	14	0.00012503	0.00012903
26	Yes	14	0.00012503	0.00011897
27	Yes	13	0.00014699	0.00008643
28	Yes	15	0.00000001	0.00011915
29	Yes	15	0.00000001	0.00012577
30	Yes	13	0.00014697	0.00010738
31	Yes	15	0.00000001	0.00010781
32	Yes	15	0.00000001	0.00011697
33	Yes	13	0.00014699	0.00008286
34	Yes	15	0.00000001	0.00012385
35	Yes	15	0.00000001	0.00011819
36	Yes	13	0.00014698	0.00009091
37	Yes	15	0.00000001	0.00011962
38	Yes	15	0.00000001	0.00010952

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	36.228	35	2.0773	0.0025
L2	108.75 - 89.75	20.408	35	1.7749	0.0023
L3	89.75 - 88.25	13.894	35	1.4531	0.0014
L4	88.25 - 86	13.443	35	1.4202	0.0013
L5	86 - 84.25	12.781	35	1.3882	0.0012
L6	84.25 - 73.75	12.277	35	1.3630	0.0012
L7	78 - 42.75	10.561	35	1.2578	0.0010
L8	47.5 - 8.25	3.963	35	0.7729	0.0005
L9	8.25 - 6.25	0.115	35	0.1330	0.0001
L10	6.25 - 0	0.066	35	0.1008	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	APXVSPP18-C-A20 w/ Mount Pipe	35	36.228	2.0773	0.0027	31327
135.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	35	31.062	2.0056	0.0028	13052
116.00	(2) LPA-80080/4CF w/ Mount Pipe	35	23.207	1.8550	0.0026	5051
106.00	(2) 7770.00 w/ Mount Pipe	35	19.385	1.7400	0.0022	3773
76.00	Kathrein OG-860/1920/GPS-A	35	10.038	1.2236	0.0010	3912

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	147 - 105	104.150	10	5.9764	0.0067
L2	108.75 - 89.75	58.735	10	5.1105	0.0066
L3	89.75 - 88.25	40.009	10	4.1857	0.0039
L4	88.25 - 86	38.711	10	4.0911	0.0037
L5	86 - 84.25	36.807	10	3.9989	0.0036
L6	84.25 - 73.75	35.357	10	3.9263	0.0034
L7	78 - 42.75	30.420	10	3.6237	0.0029
L8	47.5 - 8.25	11.420	10	2.2275	0.0013
L9	8.25 - 6.25	0.331	10	0.3836	0.0002
L10	6.25 - 0	0.190	10	0.2905	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
147.00	APXVSPP18-C-A20 w/ Mount Pipe	10	104.150	5.9764	0.0084	11143
135.00	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	10	89.326	5.7716	0.0084	4642
116.00	(2) LPA-80080/4CF w/ Mount Pipe	10	66.776	5.3404	0.0076	1793
106.00	(2) 7770.00 w/ Mount Pipe	10	55.796	5.0104	0.0065	1337
76.00	Kathrein OG-860/1920/GPS-A	10	28.915	3.5253	0.0028	1370

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	147 - 105 (1)	TP29.141x22x0.25	42.00	0.00	0.0	36.000	22.4191	-9.87	807.09	0.012
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	19.00	0.00	0.0	36.000	30.6705	-15.99	1104.14	0.014
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	1.50	0.00	0.0	35.532	30.9235	-16.21	1098.77	0.015
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	2.25	0.00	0.0	34.302	50.6160	-16.69	1736.23	0.010
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	1.75	0.00	0.0	33.978	50.8827	-17.06	1728.89	0.010
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	10.50	0.00	0.0	34.980	47.3360	-18.32	1655.81	0.011
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	35.25	0.00	0.0	34.554	63.4392	-26.65	2192.08	0.012
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	39.25	0.00	0.0	34.740	78.8258	-39.32	2738.41	0.014
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	2.00	0.00	0.0	34.464	82.2200	-39.99	2833.63	0.014
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	6.25	0.00	0.0	34.422	83.6336	-42.08	2878.84	0.015

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	147 - 105 (1)	TP29.141x22x0.25	371.51	28.551	36.000	0.793	0.00	0.000	36.000	0.000
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	823.30	42.311	36.000	1.175	0.00	0.000	36.000	0.000
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	860.79	43.513	35.532	1.225	0.00	0.000	35.532	0.000
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	917.41	28.336	34.302	0.826	0.00	0.000	34.302	0.000
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	961.77	29.265	33.978	0.861	0.00	0.000	33.978	0.000
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	1122.43	35.391	34.980	1.012	0.00	0.000	34.980	0.000
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	1960.17	40.636	34.554	1.176	0.00	0.000	34.554	0.000
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	3140.48	45.154	34.740	1.300	0.00	0.000	34.740	0.000
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	3203.17	43.845	34.464	1.272	0.00	0.000	34.464	0.000
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	3400.56	44.645	34.422	1.297	0.00	0.000	34.422	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	147 - 105 (1)	TP29.141x22x0.25	18.45	0.823	24.000	0.069	0.91	0.034	24.000	0.001
L2	105 - 89.75 (2)	TP31.2343x28.0034x0.3125	24.93	0.813	24.000	0.068	1.00	0.025	24.000	0.001
L3	89.75 - 88.25 (3)	TP31.4893x31.2343x0.3125	25.06	0.810	23.688	0.068	1.00	0.025	23.688	0.001
L4	88.25 - 86 (4)	TP31.8719x31.4893x0.5085	25.27	0.499	22.868	0.044	1.00	0.015	22.868	0.001
L5	86 - 84.25 (5)	TP32.1695x31.8719x0.5063	25.43	0.500	22.652	0.044	1.00	0.015	22.652	0.001
L6	84.25 - 73.75 (6)	TP33.955x32.1695x0.455	25.99	0.549	23.320	0.047	1.00	0.015	23.320	0.001
L7	73.75 - 42.75 (7)	TP38.601x32.3223x0.537	28.71	0.453	23.036	0.039	0.98	0.010	23.036	0.000
L8	42.75 - 8.25 (8)	TP43.7172x36.6809x0.5757	31.30	0.397	23.160	0.034	0.98	0.007	23.160	0.000
L9	8.25 - 6.25 (9)	TP44.0573x43.7172x0.596	31.40	0.382	22.976	0.033	0.98	0.007	22.976	0.000
L10	6.25 - 0 (10)	TP45.12x44.0573x0.5918	31.77	0.380	22.948	0.033	0.98	0.006	22.948	0.000

Pole Interaction Design Data

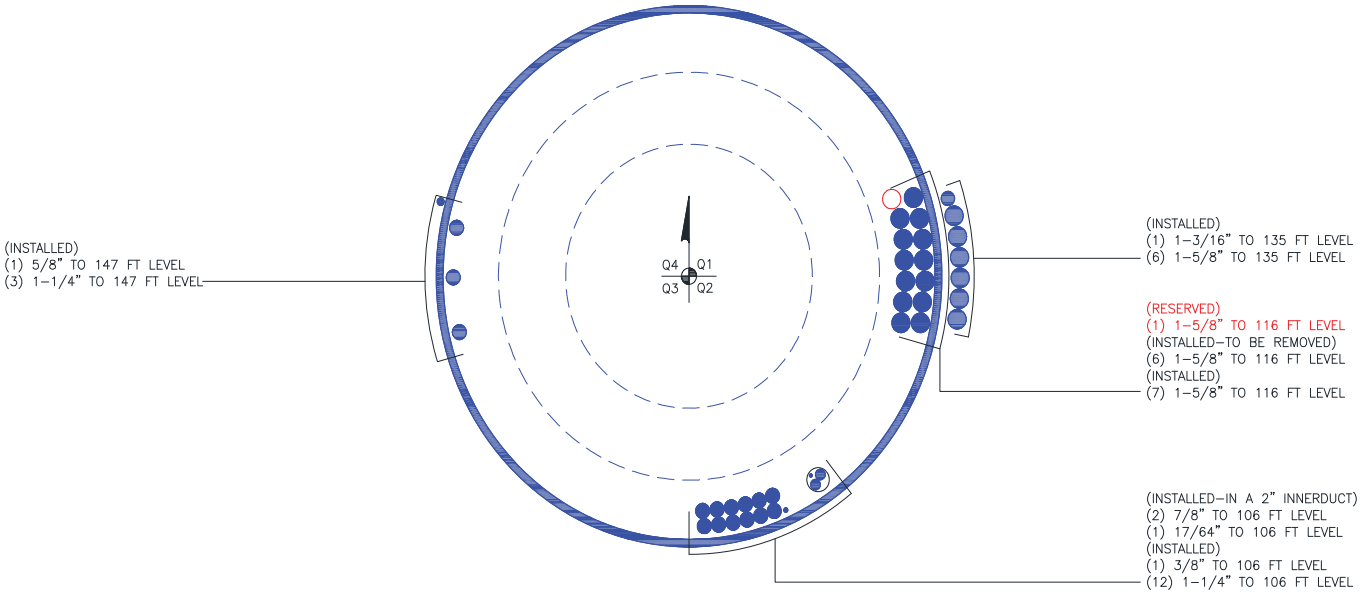
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	147 - 105 (1)	0.012	0.793	0.000	0.069	0.001	0.807 ✔	1.333	H1-3+VT ✔
L2	105 - 89.75 (2)	0.014	1.175	0.000	0.068	0.001	1.191 ✔	1.333	H1-3+VT ✔
L3	89.75 - 88.25 (3)	0.015	1.225	0.000	0.068	0.001	1.241 ✔	1.333	H1-3+VT ✔
L4	88.25 - 86 (4)	0.010	0.826	0.000	0.044	0.001	0.836 ✔	1.333	H1-3+VT ✔
L5	86 - 84.25 (5)	0.010	0.861	0.000	0.044	0.001	0.872 ✔	1.333	H1-3+VT ✔
L6	84.25 - 73.75 (6)	0.011	1.012	0.000	0.047	0.001	1.023 ✔	1.333	H1-3+VT ✔
L7	73.75 - 42.75 (7)	0.012	1.176	0.000	0.039	0.000	1.189 ✔	1.333	H1-3+VT ✔
L8	42.75 - 8.25 (8)	0.014	1.300	0.000	0.034	0.000	1.314 ✔	1.333	H1-3+VT ✔
L9	8.25 - 6.25 (9)	0.014	1.272	0.000	0.033	0.000	1.287 ✔	1.333	H1-3+VT ✔
L10	6.25 - 0 (10)	0.015	1.297	0.000	0.033	0.000	1.312 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	147 - 105	Pole	TP29.141x22x0.25	1	-9.87	1075.85	60.5	Pass
L2	105 - 89.75	Pole	TP31.2343x28.0034x0.3125	2	-15.99	1471.82	89.3	Pass
L3	89.75 - 88.25	Pole	TP31.4893x31.2343x0.3125	3	-16.21	1464.66	93.1	Pass
L4	88.25 - 86	Pole	TP31.8719x31.4893x0.5085	4	-16.69	2314.39	62.7	Pass
L5	86 - 84.25	Pole	TP32.1695x31.8719x0.5063	5	-17.06	2304.61	65.4	Pass
L6	84.25 - 73.75	Pole	TP33.955x32.1695x0.455	6	-18.32	2207.19	76.8	Pass
L7	73.75 - 42.75	Pole	TP38.601x32.3223x0.537	7	-26.65	2922.04	89.2	Pass
L8	42.75 - 8.25	Pole	TP43.7172x36.6809x0.5757	8	-39.32	3650.30	98.6	Pass
L9	8.25 - 6.25	Pole	TP44.0573x43.7172x0.596	9	-39.99	3777.23	96.5	Pass
L10	6.25 - 0	Pole	TP45.12x44.0573x0.5918	10	-42.08	3837.49	98.4	Pass
						Summary		
						Pole (L8)	98.6	Pass
						RATING =	**98.6**	**Pass**

APPENDIX B

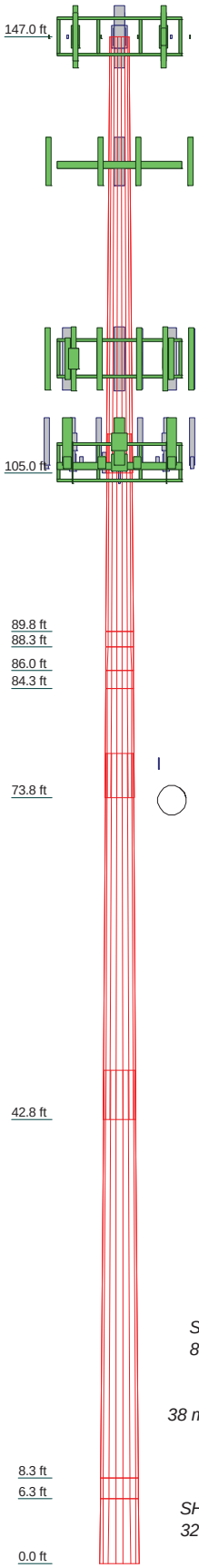
BASE LEVEL DRAWING

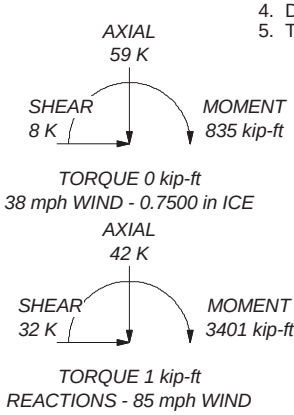


APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5	6	7	8	9	10
Length (ft)	42.00	19.00	1.50	2.25	1.75	10.50	35.25	39.25	2.00	6.25
Number of Sides	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3125	0.3125	0.5000	0.4550	0.5370	0.5757	0.5960	0.5918
Socket Length (ft)										
Top Dia (in)	3.75					4.25	4.75			
Bot Dia (in)	22.0000	28.0034	28.0034	31.0343	31.0343	32.1695	32.3223	36.6809	43.7172	44.0573
Grade	A607-60									
Weight (K)	2.9	1.9	0.2	0.4	0.3	1.7	7.1	9.7	0.6	1.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
APXVSPP18-C-A20 w/ Mount Pipe	147	RRH2X60-PCS	116
APXVSPP18-C-A20 w/ Mount Pipe	147	HBXX-6517DS-A2M w/ Mount Pipe	116
APXVSPP18-C-A20 w/ Mount Pipe	147	(2) SBNHH-1D65B w/ Mount Pipe	116
800 EXTERNAL NOTCH FILTER	147	RRH2x60-700	116
800 EXTERNAL NOTCH FILTER	147	RRH4X45-AWS4 B66	116
800 EXTERNAL NOTCH FILTER	147	RRH2X60-PCS	116
(3) ACU-A20-N	147	HBXX-6517DS-A2M w/ Mount Pipe	116
(3) ACU-A20-N	147	(2) SBNHH-1D65B w/ Mount Pipe	116
(3) ACU-A20-N	147	RRH2x60-700	116
1900MHz RRH (65MHz)	147	RRH4X45-AWS4 B66	116
1900MHz RRH (65MHz)	147	RRH2X60-PCS	116
1900MHz RRH (65MHz)	147	HBXX-6517DS-A2M w/ Mount Pipe	116
800MHZ RRH	147	(2) SBNHH-1D65B w/ Mount Pipe	116
800MHZ RRH	147	DB-T1-6Z-8AB-0Z	116
800MHZ RRH	147	DB-T1-6Z-8AB-0Z	116
APXVTM14-C-120 w/ Mount Pipe	147	Platform Mount [LP 1201-1]	116
APXVTM14-C-120 w/ Mount Pipe	147	(2) 7770.00 w/ Mount Pipe	106
APXVTM14-C-120 w/ Mount Pipe	147	(2) 7770.00 w/ Mount Pipe	106
TD-RRH8x20-25	147	(2) 7770.00 w/ Mount Pipe	106
TD-RRH8x20-25	147	(4) LGP2140X	106
TD-RRH8x20-25	147	(4) LGP2140X	106
Platform Mount [LP 1201-1]	147	(4) LGP2140X	106
Miscellaneous (NA507-1)	147	DC6-48-60-18-8F	106
(2) 2.375" OD x 4' Mount Pipe	147	RRUS-11	106
(2) 2.375" OD x 4' Mount Pipe	147	RRUS-11	106
(2) 2.375" OD x 4' Mount Pipe	147	RRUS-11	106
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	135	2.375" OD x 4' Mount Pipe	106
		2.375" OD x 4' Mount Pipe	106
(2) ERICSSON AIR 21 B2A B4P w/ Mount Pipe	135	2.375" OD x 4' Mount Pipe	106
		Platform Mount [LP 1201-1]	106
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	135	SBNHH-1D65A w/ Mount Pipe	106
		SBNHH-1D65A w/ Mount Pipe	106
(2) ERICSSON AIR 21 B4A B2P w/ Mount Pipe	135	SBNHH-1D65A w/ Mount Pipe	106
T-Arm Mount [TA 601-3]	135	RRUS12/RRUS A2	106
(2) LPA-80080/4CF w/ Mount Pipe	116	RRUS12/RRUS A2	106
(2) LPA-80063/6CF w/ Mount Pipe	116	RRUS12/RRUS A2	106
(2) APL868013 w/ Mount Pipe	116	RK-60-3M	106
(2) ClearGain Dual Band 800/1900 MHz	116	MT-195-12	106
		Kathrein OG-860/1920/GPS-A	76
RRH2x60-700	116	KS24019-L112A	76
RRH4X45-AWS4 B66	116	Side Arm Mount [SO 701-3]	76

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 59.59 ksi	58 ksi	72 ksi
Reinf 59.22 ksi	59 ksi	75 ksi	Reinf 57.90 ksi	58 ksi	73 ksi
Reinf 57.17 ksi	57 ksi	72 ksi	Reinf 57.44 ksi	57 ksi	72 ksi
Reinf 56.63 ksi	57 ksi	71 ksi	Reinf 57.37 ksi	57 ksi	72 ksi
Reinf 58.30 ksi	58 ksi	73 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 98.6%

Paul J. Ford and Company
250 East Broad St., Suite 600
Columbus, Ohio
Phone: 614.221.6679
FAX:

Job: 147 ft Monopole / Secondino Property			
Project: PJF 37516-2026/ BU 876316			
Client: CCI	Drawn by: jjohnson	App'd:	
Code: TIA/EIA-222-F	Date: 08/10/16	Scale: NTS	
Path: G:\TOWER\375_Crown_Castle\2016\37516-2026_876316_Secondino_Property\37516-2026.001.7805_SA_1253799\37516-2026.001.7805.eri		Dwg No. E-1	

Square, Stiffened / Unstiffened Base Plate, Any Rod Material - Rev. F /G

Assumptions: 1) Rod groups at corners. Total # rods divisible by 4. Maximum total # of rods = 48 (12 per Corner).
2) Rod Spacing = Straight Center-to-Center distance between any (2) adjacent rods (same corner)
3) Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *876316*
Site Name: *Secondino Property*
App #:

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	52	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	50	ksi
Clip Distance:	0	in

Stiffener Data (Welding at both sides)		
Configuration:	Unstiffened	
Weld Type:		**
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

Pole Data		
Diam:	45.12	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	3401	ft-kips
Unfactored Axial, P:	42	kips
Unfactored Shear, V:	32	kips

Anchor Rod Results

TIA F --> Maximum Rod Tension	193.6	Kips
Allowable Tension:	195.0	Kips
Anchor Rod Stress Ratio:	99.3%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	44.7	ksi
Allowable PL Bending Stress:	50.0	ksi
Base Plate Stress Ratio:	89.3%	**Pass**

PL Ref. Data
Yield Line (in):
29.83
Max PL Length:
29.83

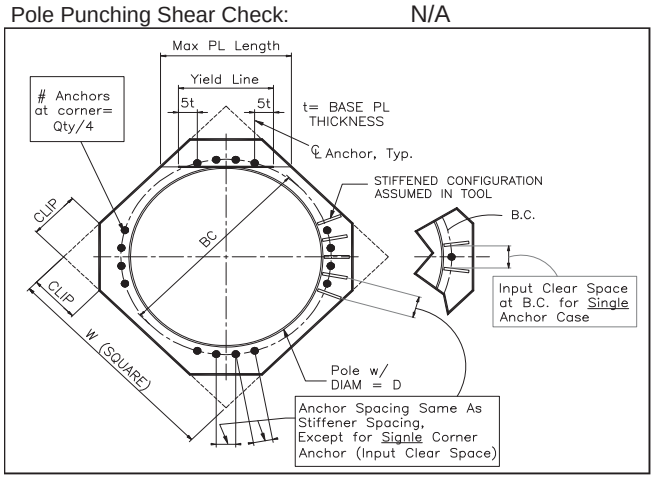
N/A - Unstiffened

Stiffener Results

Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A



** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com

Job Number: 37516-2026.001.7805
Site Number: 876316
Site Name: Secondino Property

By: JRJ
Date: 8/10/2016

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA/EIA-222-F

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	3401.0		k-ft
Shear, V =	32.0		kips
Axial Load, P =	42.0		kips
OTM =	3417.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-02
Seismic Design Category =	D
Reference Standard =	TIA/EIA-222-F
Use 1.3 Load Factor?	Yes
Load Factor =	1.30

Drilled Pier Parameters

Diameter =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	22.5	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	3.29	
Mat Ftdn. Cap Width =		ft
Mat Ftdn. Cap Length =		ft
Depth Below Grade =		ft

	Safety Factor	Φ Factor
Soil Lateral Resistance =	2.00	0.75
Skin Friction =	2.00	0.75
End Bearing =	2.00	0.75
Concrete Wt. Resist Uplift =	1.25	

Load Combinations Checked per TIA/EIA-222-F

1. Ult. Skin Friction/2.00 + Ult. End Bearing/2.00
+ Effective Soil Wt. - Buoyant Conc. Wt. ≥ Comp.
2. Ult. Skin Friction/2.00 + Buoyant Conc. Wt./1.25 ≥ Uplift
3. Ult. Skin Friction/1.50 + Buoyant Conc. Wt./1.50 ≥ Uplift

Steel Parameters

Number of Bars =	32	
Rebar Size =	#11	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	5.00	ft
Depth to Ignore Soil =	3.50	ft
Depth to Full Cohesion =	0	ft
Full Cohesion Starts at?*	Ground	

Above Full Cohesion Lateral Resistance = 4(Cohesion)(Dia)(H)
Below Full Cohesion Lateral Resistance = 8(Cohesion)(Dia)(H)

Direct Embed Pole Shaft Parameters

Dia @ Grade =		in
Dia @ Depth Below Grade =		in
Number of Sides =		
Thickness =		in
Fy =		ksi
Backfill Condition =		

Maximum Capacity Ratios

Maximum Soil Ratio =	100.0%
Maximum Steel Ratio =	100.0%

Note: The drilled pier foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the drilled pier is based the recommendations of the site specific geotechnical report. In the absence of any recommendations, the frost depth at the site or one half of the drilled pier diameter (whichever is greater) shall be ignored.

Define Soil Layers

Note: Cohesion = Undrained Shear Strengh = Unconfined Compressive Strength / 2

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	3	116	0	45	Sand		80		3
2	2	115	0	38	Sand		180		5
3	2	116	0	41	Sand		240		7
4	3	117		45	Sand		380		10
5	5	117		45	Sand		480		15
6	5	117	3250		Clay		1200		20
7	5	117		45	Sand	29050	760		25
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	16.00	ft, from Grade
Bending Moment, M =	3928.84	k-ft, from COR
Resisting Moment, Ma =	5040.33	k-ft, from COR

MOMENT RATIO = 77.9% OK

Shear, V =	32.00	kips
Resisting Shear, Va =	41.05	kips

SHEAR RATIO = 77.9% OK

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	72.60	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, C =	42.00	kips
Allowable Comp. Cap., Ca =	661.22	kips

COMPRESSION RATIO = 6.4% OK

Steel Results (ACI 318-02):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	49.92	sq in
Allowable Min Axial, Pa =	-2073.60	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	6799.77	kips, Where Ma = 0 k-ft

Axial Load, P =	71.00	kips @ 5.25 ft Below Grade
Moment, M =	3560.02	k-ft @ 5.25 ft Below Grade
Allowable Moment, Ma =	5822.35	k-ft

MOMENT RATIO = 61.1% OK

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Moment Capacity of Drilled Concrete Shaft (Caisson) for TIA Rev F or G

Note: Shaft assumed to have ties, not spiral, transverse reinforcing

Site Data

BU#: *876316*
Site Name: *Secondino Property*
App #:

Enter Load Factors Below:		
For M (WL)	1.3	<---- Enter Factor
For P (DL)	1.3	<---- Enter Factor

Pier Properties

Concrete:

Pier Diameter =	7.0	ft
Concrete Area =	5541.8	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.11	ft
Vert. Cage Diameter =	73.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	32	
As Total=	49.92	in^2
A s/ Aconc, Rho:	0.0090	0.90%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:

(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.90%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8839.70	kips
at Mu=(ϕ=0.65)Mn=	5309.39	ft-kips
Max Tu, (φ=0.9) Tn =	2695.68	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	3560.02	ft-kips **(* Note)**
Max. Service Shaft P:	71	kips
Max Axial Force Type:	Comp.	

(*) Note: Max Shaft Superimposed Moment does not necessarily equal to the shaft top reaction moment

Load Factor	Shaft Factored Loads		
1.30	Mu:	4628.026	ft-kips
1.30	Pu:	92.3	kips

Material Properties

Concrete Comp. strength, f'c =	3000	psi
Reinforcement yield strength, Fy =	60	ksi
Reinforcing Modulus of Elasticity, E =	29000	ksi
Reinforcement yield strain =	0.00207	
Limiting compressive strain =	0.003	

ACI 318 Code

Select Analysis ACI Code=	2002

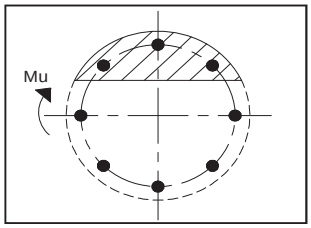
Seismic Properties

Seismic Design Category =	D
Seismic Risk =	**High**

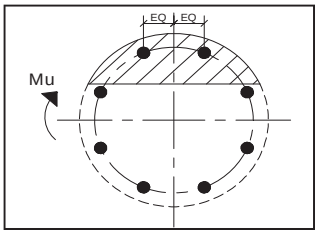
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**17.10**	in
Extreme Steel Strain, ϵt:	**0.0108**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	92.30	kips
Drilled Shaft Moment Capacity, φMn:	**7569.06**	ft-kips
Drilled Shaft Superimposed Mu:	**4628.03**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**61.1%**

SITESAFE
RF COMPLIANCE EXPERTS
A BUSINESS OF FDH VELOCITEL

200 North Glebe Road, Suite 1000, Arlington, VA 22203-3728
703.276.1100 ● 703.276.1169 fax
info@sitesafe.com ● www.sitesafe.com

Smartlink LLC on behalf of AT&T Mobility, LLC
Site FA – 10035270
Site ID – CT2014 (2C)
USID – 27039
Site Name – Branford - Leetes Island
Site Compliance Report

21 Acorn Road
Branford, CT 06405

Latitude: N41-17-34.97
Longitude: W72-45-46.40
Structure Type: Monopole

Report generated date: September 13, 2016
Report by: Sam Cosgrove
Customer Contact: Kristen Smith

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

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Table of Contents

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1 General Site Summary

1.1 Report Summary

AT&T Mobility, LLC	Summary
Access to Antennas Locked?	Yes
RF Sign(s) @ access point(s)	None
RF Sign(s) @ antennas	None
Barrier(s) @ sectors	None
Max cumulative simulated RFE level on the Ground Level	<1% General Public Limit
FCC & AT&T Compliant?	Will Be Compliant

The following documents were provided by the client and were utilized to create this report:

RFDS: NEW-ENGLAND_CONNECTICUT_CTU2014_2016-LTE-Next-Carrier_LTE-2C_mm093q_PTN_...

CD's: 10035270_AE201_160822_CTL02014_REV1.JW appvd 8-25-16

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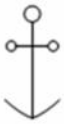
2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- Elevation View

Scale Map Key		
 Existing Sign	Proposed Barrier	GPS Reading
 PROPOSED Proposed Sign	Existing Barrier	 Anchor Point

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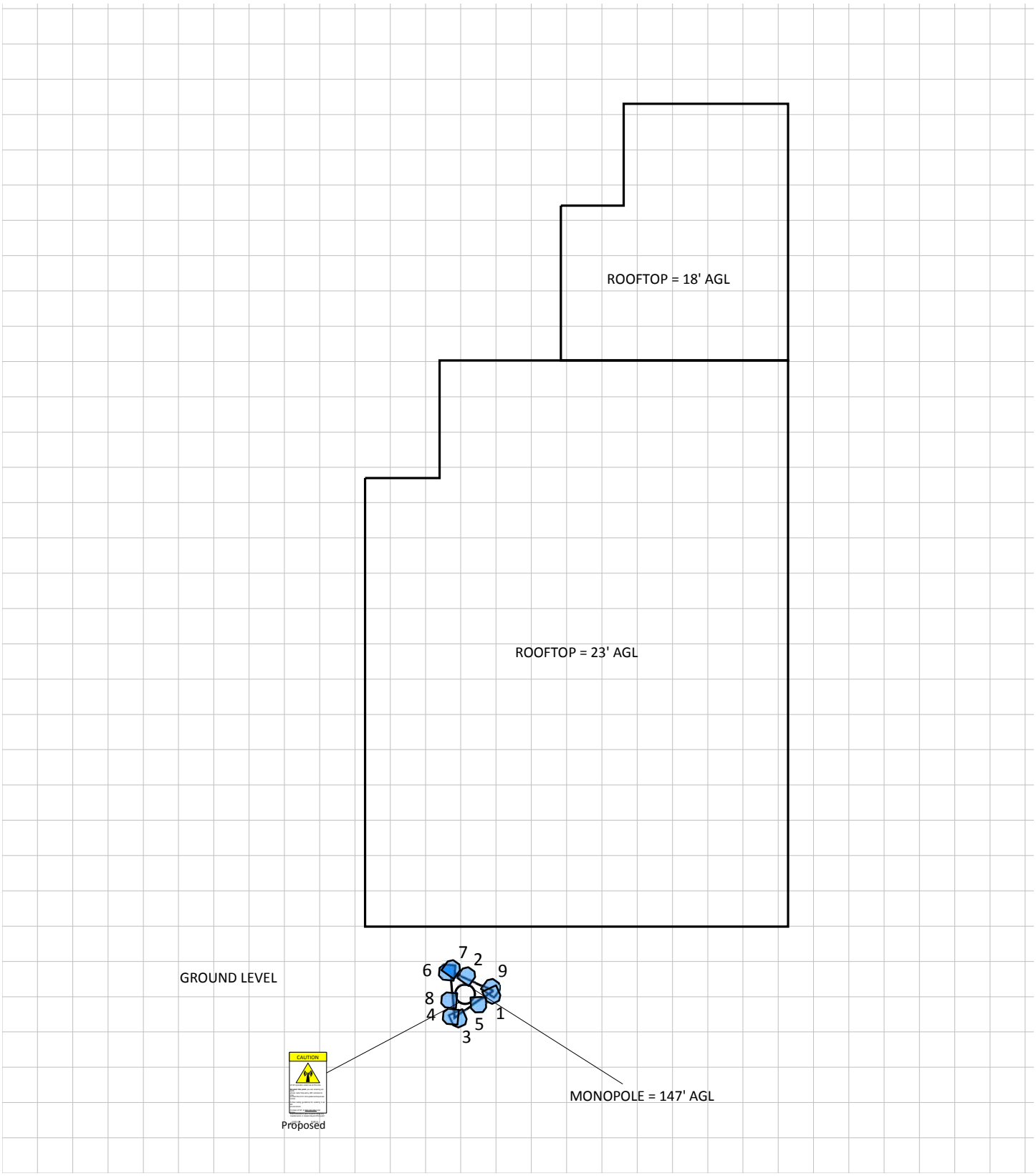
Site Scale Map For: Branford - Leetes Island



(Feet)

0 17.1 34.1

www.sitesafe.com
Site Name:Branford - Leetes Island
9/13/2016 9:31:36 AM

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

3 Antenna Inventory

The following antenna inventory on this and the following page, were obtained by the customer and were utilized to create the site model diagrams:

Ant ID	Operator	Antenna Make & Model	Type	TX Freq (MHz)	Az (Deg)	Hor BW (Deg)	Ant Len (ft)	Ant Gain (dBd)	2G GSM Radio(s)	3G UMTS Radio(s)	4G Radio(s)	Total ERP (Watts)	X	Y	Z (AGL)
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	143	82	4.6	11.51	0	1	0	267.1	117'	65'	102.7'
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	143	86	4.6	13.41	0	1	0	319.9	117'	65'	102.7'
2	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	737	23	66	4.6	11.29	0	0	1	629.5	110.7'	69.9'	102.7'
2	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	1900	23	65	4.6	14.65	0	0	1	2133	110.7'	69.9'	102.7'
3	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	143	82	4.6	11.51	1	0	0	212.3	108.7'	59.1'	102.7'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	263	82	4.6	11.51	0	1	0	287.1	106.7'	59.7'	102.7'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	263	86	4.6	13.41	0	1	0	319.9	106.7'	59.7'	102.7'
5	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	737	165	66	4.6	11.29	0	0	1	629.5	113.6'	62.7'	102.7'
5	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	1900	165	65	4.6	14.65	0	0	1	2133	113.6'	62.7'	102.7'
6	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	263	82	4.6	11.51	1	0	0	134	105.7'	70.7'	102.7'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	23	82	4.6	11.51	0	1	0	287.1	107'	71.7'	102.7'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	23	86	4.6	13.41	0	1	0	319.9	107'	71.7'	102.7'
8	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	737	263	66	4.6	11.29	0	0	1	629.5	106.3'	63.8'	102.7'
8	AT&T MOBILITY LLC (PROPOSED)	Andrew SBNHH-1D65A	Panel	1900	263	65	4.6	14.65	0	0	1	2133	106.3'	63.8'	102.7'
9	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	23	82	4.6	11.51	1	0	0	94.8	116.8'	67'	102.7'

NOTE: X, Y and Z indicate relative position of the bottom of the antenna to the origin location on the site, displayed in the model results diagram. Specifically, the Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. The distance to the bottom of the antenna is calculated by subtracting half of the length of the antenna from the antenna centerline. Effective Radiated Power (ERP) is provided by the operator or based on Sitesafe experience. The values used in the modeling may be greater than are currently deployed. For other operators at this site the use of "Generic" as an antenna model or "Unknown" for a wireless operator means the information with regard to operator, their FCC license and/or antenna information was not available nor could it be secured while on site. Other operator's equipment, antenna models and powers used for modeling are based on obtained information or Sitesafe experience.

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4 Emission Predictions

In the RF Exposure Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main site level. Emissions are calculated appropriately based on the relative height and location of that area to all antennas.

The Antenna Inventory heights are referenced to the same level.

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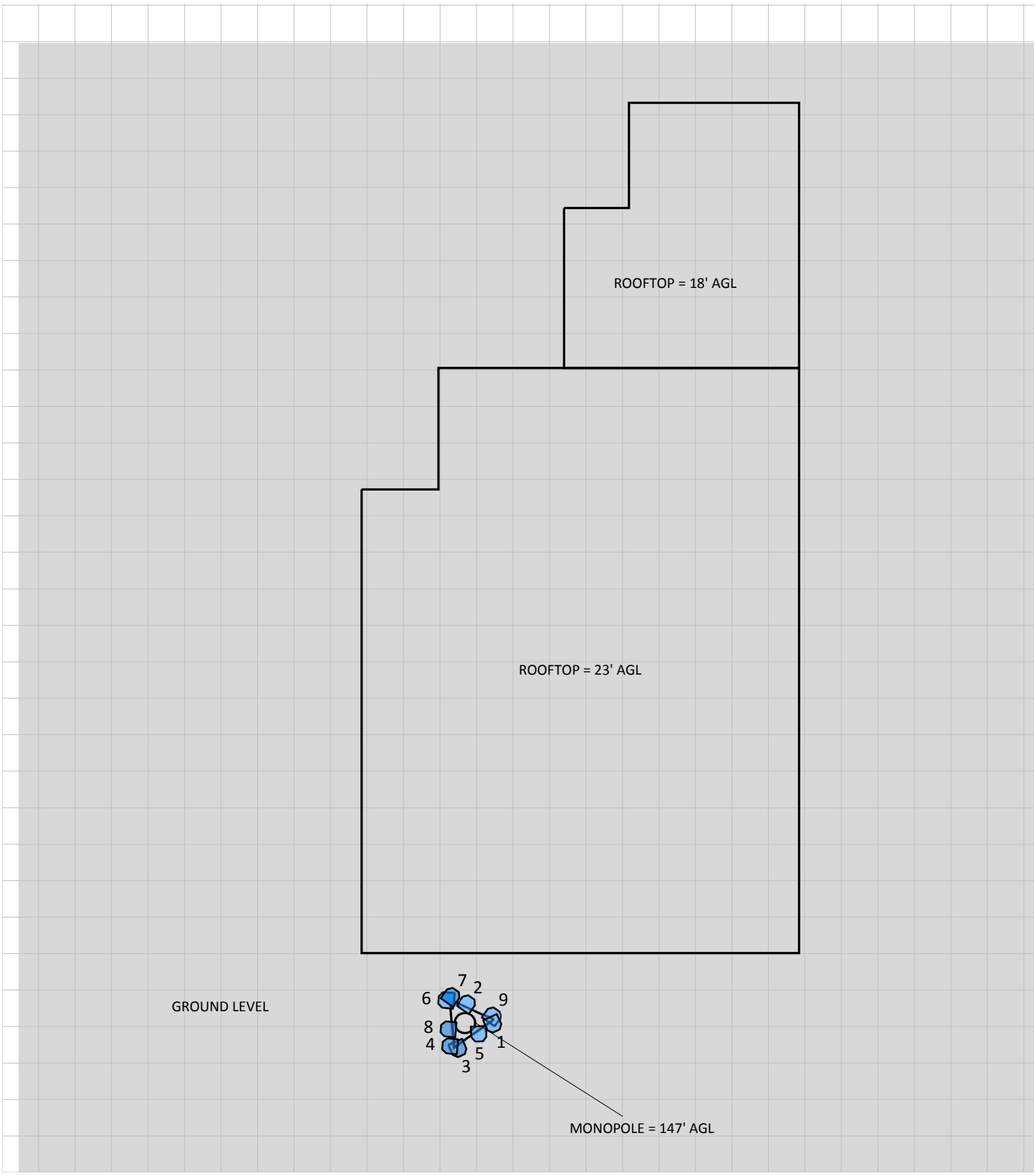
RF Exposure Simulation For: Branford - Leetes Island



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 16.5 33

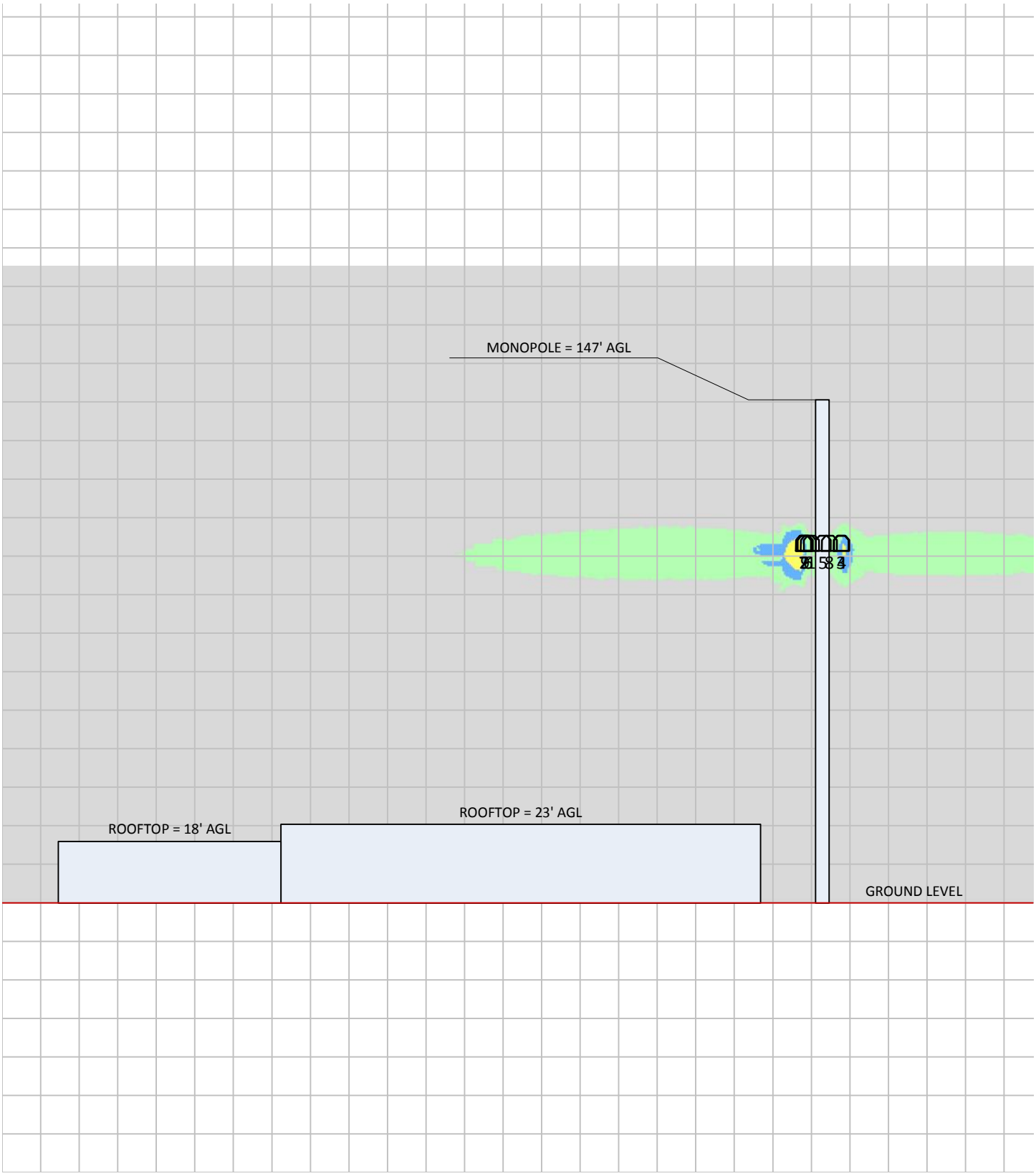
www.sitesafe.com
Site Name:Branford - Leetes Island
9/13/2016 9:29:55 AM

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

SitesafeTC Version:1.0.0.0 - 0.0.0.249
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Branford - Leetes Island
Elevation View



% of FCC Public Exposure Limit
Spatial average 0' - 6'

(Feet)
0 20.1 40.2

www.sitesafe.com
Site Name:Branford - Leetes Island
9/13/2016 9:36:08 AM

>= 5000	>= 500	>= 100	>= 5	< 5

AT&T MOBILITY LLC	VERIZON WIRELESS	T-MOBILE	METROPCS	CRICKET COMMUNICATIONS	CLEARWIRE	SPRINT

SitesafeTC Version:1.0.0.0 - 0.0.0.249
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

5 Site Compliance

5.1 Site Compliance Statement

Upon evaluation of the cumulative RF emission levels from all operators at this site, RF hazard signage and antenna locations, Sitesafe has determined that:

AT&T Mobility, LLC will be compliant when the remediation recommended in Section 5.2 or other appropriate remediation is implemented.

The compliance determination is based on General Public RFE levels derived from theoretical modeling, RF signage placement, proposed antenna inventory and the level of restricted access to the antennas at the site. Any deviation from the AT&T Mobility, LLC's proposed deployment plan could result in the site being rendered non-compliant.

Modeling is used for determining compliance and the percentage of MPE contribution.

5.2 Actions for Site Compliance

Based on FCC regulations, common industry practice, and our understanding of AT&T Mobility, LLC RF Safety Policy requirements, this section provides a statement of recommendations for site compliance. Recommendations have been proposed based on our understanding of existing access restrictions, signage, and an analysis of predicted RFE levels.

AT&T Mobility, LLC will be made compliant if the following changes are implemented:

Site Access Location

Yellow caution 2 sign required near the antenna area.

Note: The monopole is located in a public area, the signage should be installed near the antenna area.

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6 Engineer Certification

The professional engineer whose seal appears on the cover of this document hereby certifies and affirms that:

I am registered as a Professional Engineer in the jurisdiction indicated in the professional engineering stamp on the cover of this document; and

That I am an employee of Sitesafe, Inc., in Arlington, Virginia, at which place the staff and I provide RF compliance services to clients in the wireless communications industry; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission (FCC) as well as the regulations of the Occupational Safety and Health Administration (OSHA), both in general and specifically as they apply to the FCC Guidelines for Human Exposure to Radio-frequency Radiation; and

That I have thoroughly reviewed this Site Compliance Report and believe it to be true and accurate to the best of my knowledge as assembled by and attested to by Sam Cosgrove.

September 13, 2016

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Appendix A – Statement of Limiting Conditions

Sitesafe has provided computer generated model(s) in this Site Compliance Report to show approximate dimensions of the site, and the model is included to assist the reader of the compliance report to visualize the site area, and to provide supporting documentation for Sitesafe's recommendations.

Sitesafe may note in the Site Compliance Report any adverse physical conditions, such as needed repairs, that Sitesafe became aware of during the normal research involved in creating this report. Sitesafe will not be responsible for any such conditions that do exist or for any engineering or testing that might be required to discover whether such conditions exist. Because Sitesafe is not an expert in the field of mechanical engineering or building maintenance, the Site Compliance Report must not be considered a structural or physical engineering report.

Sitesafe obtained information used in this Site Compliance Report from sources that Sitesafe considers reliable and believes them to be true and correct. Sitesafe does not assume any responsibility for the accuracy of such items that were furnished by other parties. When conflicts in information occur between data collected by Sitesafe provided by a second party and data collected by Sitesafe, the data will be used.

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Appendix B – Regulatory Background Information

FCC Rules and Regulations

In 1996, the Federal Communication Commission (FCC) adopted regulations for the evaluating of the effects of RF emissions in 47 CFR § 1.1307 and 1.1310. The guideline from the FCC Office of Engineering and Technology is Bulletin 65 ("OET Bulletin 65"), *Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*, Edition 97-01, published August 1997. Since 1996 the FCC periodically reviews these rules and regulations as per their congressional mandate.

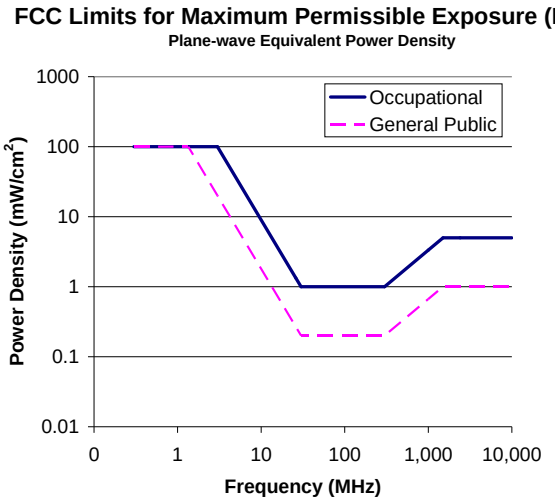
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* areas where workers or the general public may be exposed to Radio Frequency (RF) electromagnetic fields.

Occupational or Controlled limits apply in situations in which persons are exposed as a consequence of their employment and where those persons exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

An area is considered a Controlled environment when access is limited to these aware personnel. Typical criteria are restricted access (i.e. locked or alarmed doors, barriers, etc.) to the areas where antennas are located coupled with proper RF warning signage. A site with Controlled environments is evaluated with Occupational limits.

All other areas are considered Uncontrolled environments. If a site has no access controls or no RF warning signage it is evaluated with General Public limits.

The theoretical modeling of the RF electromagnetic fields has been performed in accordance with OET Bulletin 65. The Maximum Permissible Exposure (MPE) limits utilized in this analysis are outlined in the following diagram:



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Limits for Occupational/Controlled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	($900/f^2$)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

Limits for General Population/Uncontrolled Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm^2)	Averaging Time $\|E\|^2$, $\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	($180/f^2$)*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

OSHA Statement

The General Duty clause of the OSHA Act (Section 5) outlines the occupational safety and health responsibilities of the employer and employee. The General Duty clause in Section 5 states:

(a) Each employer –

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

OSHA has defined Radiofrequency and Microwave Radiation safety standards for workers who may enter hazardous RF areas. Regulation Standards 29 CFR § 1910.147 identify a generic Lock Out Tag Out procedure aimed to control the unexpected energization or start up of machines when maintenance or service is being performed.

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Appendix C – Safety Plan and Procedures

The following items are general safety recommendations that should be administered on a site by site basis as needed by the carrier.

General Maintenance Work: Any maintenance personnel required to work immediately in front of antennas and / or in areas indicated as above 100% of the Occupational MPE limits should coordinate with the wireless operators to disable transmitters during their work activities.

Training and Qualification Verification: All personnel accessing areas indicated as exceeding the General Population MPE limits should have a basic understanding of EME awareness and RF Safety procedures when working around transmitting antennas. Awareness training increases a workers understanding to potential RF exposure scenarios. Awareness can be achieved in a number of ways (e.g. videos, formal classroom lecture or internet based courses).

Physical Access Control: Access restrictions to transmitting antennas locations is the primary element in a site safety plan. Examples of access restrictions are as follows:

- Locked door or gate
- Alarmed door
- Locked ladder access
- Restrictive Barrier at antenna (e.g. Chain link with posted RF Sign)

RF Signage: Everyone should obey all posted signs at all times. RF signs play an important role in properly warning a worker prior to entering into a potential RF Exposure area.

Assume all antennas are active: Due to the nature of telecommunications transmissions, an antenna transmits intermittently. Always assume an antenna is transmitting. Never stop in front of an antenna. If you have to pass by an antenna, move through as quickly and safely as possible thereby reducing any exposure to a minimum.

Maintain a 3 foot clearance from all antennas: There is a direct correlation between the strength of an EME field and the distance from the transmitting antenna. The further away from an antenna, the lower the corresponding EME field is.

Site RF Emissions Diagram: Section 4 of this report contains an RF Diagram that outlines various theoretical Maximum Permissible Exposure (MPE) areas at the site. The modeling is a worst case scenario assuming a duty cycle of 100% for each transmitting antenna at full power. This analysis is based on one of two access control criteria: General Public criteria means the access to the site is uncontrolled and anyone can gain access. Occupational criteria means the access is restricted and only properly trained individuals can gain access to the antenna locations.

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Appendix D – RF Emissions

The RF Emissions Simulation(s) in this report display theoretical spatially averaged percentage of the Maximum Permissible Exposure for all systems at the site unless otherwise noted. These diagrams use modeling as prescribed in OET Bulletin 65 and assumptions detailed in Appendix E.

The key at the bottom of each RF Emissions Simulation indicates percentages displayed referenced to FCC General Public Maximum Permissible Exposure (MPE) limits. Color coding on the diagram is as follows:

- Areas indicated as Gray are predicted to be below 5% of the MPE limits. **Gray represents areas more than 20 times below the most conservative exposure limit**.
- Green represents areas are predicted to be between 5% and 100% of the MPE limits. **Green areas are accessible to anyone**.
- Blue represents areas predicted to exceed the General Public MPE limits but are less than Occupational limits. **Blue areas should be accessible only to RF trained workers**.
- Yellow represents areas predicted to exceed Occupational MPE limits. **Yellow areas should be accessible only to RF trained workers able to assess current exposure levels**.
- Red represents areas predicted to have exposure more than 10 times the Occupational MPE limits. **Red indicates that the RF levels must be reduced prior to access.** An RF Safety Plan is required which outlines how to reduce the RF energy in these areas prior to access.

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Appendix E – Assumptions and Definitions

General Model Assumptions

In this site compliance report, it is assumed that all antennas are operating at **full power at all times**. Software modeling was performed for all transmitting antennas located on the site. Sitesafe has further assumed a 100% duty cycle and maximum radiated power.

The modeling is based on recommendations from the FCC's OET-65 bulletin with the following variances per AT&T guidance. Reflection has not been considered in the modeling, i.e. the reflection factor is 1.0. The near / far field boundary has been set to 1.5 times the aperture height of the antenna and modeling beyond that point is the lesser of the near field cylindrical model and the far field model taking into account the gain of the antenna.

The site has been modeled with these assumptions to show the maximum RF energy density. Areas modeled with exposure greater than 100% of the General Public MPE level may not actually occur, but are shown as a prediction that could be realized. Sitesafe believes these areas to be safe for entry by occupationally trained personnel utilizing appropriate personal protective equipment (in most cases, a personal monitor).

Use of Generic Antennas

For the purposes of this report, the use of "Generic" as an antenna model, or "Unknown" for an operator means the information about a carrier, their FCC license and/or antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of equipment, antenna models, and transmit power to model the site. If more specific information can be obtained for the unknown measurement criteria, Sitesafe recommends remodeling of the site utilizing the more complete and accurate data. Information about similar facilities is used when the service is identified and associated with a particular antenna. If no information is available regarding the transmitting service associated with an unidentified antenna, using the antenna manufacturer's published data regarding the antenna's physical characteristics makes more conservative assumptions.

Where the frequency is unknown, Sitesafe uses the closest frequency in the antenna's range that corresponds to the highest Maximum Permissible Exposure (MPE), resulting in a conservative analysis.

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Definitions

5% Rule – The rules adopted by the FCC specify that, in general, at multiple transmitter sites actions necessary to bring the area into compliance with the guidelines are the shared responsibility of all licensees whose transmitters produce field strengths or power density levels at the area in question in excess of 5% of the exposure limits. In other words, any wireless operator that contributes 5% or greater of the MPE limit in an area that is identified to be greater than 100% of the MPE limit is responsible taking corrective actions to bring the site into compliance.

Compliance – The determination of whether a site is safe or not with regards to Human Exposure to Radio Frequency Radiation from transmitting antennas.

Decibel (dB) – A unit for measuring power or strength of a signal.

Duty Cycle – The percent of pulse duration to the pulse period of a periodic pulse train. Also, may be a measure of the temporal transmission characteristic of an intermittently transmitting RF source such as a paging antenna by dividing average transmission duration by the average period for transmission. A duty cycle of 100% corresponds to continuous operation.

Effective (or Equivalent) Isotropic Radiated Power (EIRP) – The product of the power supplied to the antenna and the antenna gain in a given direction relative to an isotropic antenna.

Effective Radiated Power (ERP) – In a given direction, the relative gain of a transmitting antenna with respect to the maximum directivity of a half wave dipole multiplied by the net power accepted by the antenna from the connecting transmitter.

Gain (of an antenna) – The ratio of the maximum intensity in a given direction to the maximum radiation in the same direction from an isotropic radiator. Gain is a measure of the relative efficiency of a directional antennas as compared to an omni directional antenna.

General Population/Uncontrolled Environment – Defined by the FCC, as an area where exposure to RF energy may occur to persons who are **unaware** of the potential for exposure and who have no control of their exposure. General Population is also referenced as General Public.

Generic Antenna – For the purposes of this report, the use of "Generic" as an antenna model means the antenna information was not provided and could not be obtained while on site. In the event of unknown information, Sitesafe will use our industry specific knowledge of antenna models to select a worst case scenario antenna to model the site.

Isotropic Antenna – An antenna that is completely non-directional. In other words, an antenna that radiates energy equally in all directions.

Maximum Measurement – This measurement represents the single largest measurement recorded when performing a spatial average measurement.

Maximum Permissible Exposure (MPE) – The maximum levels of RF exposure a person may be exposed to without harmful effect and with acceptable safety factor.

Occupational/Controlled Environment – Defined by the FCC, as an area where Radio Frequency Radiation (RFR) exposure may occur to persons who are **aware** of the

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potential for exposure as a condition of employment or specific activity and can exercise control over their exposure.

OET Bulletin 65 – Technical guideline developed by the FCC's Office of Engineering and Technology to determine the impact of Radio Frequency radiation on Humans. The guideline was published in August 1997.

OSHA (Occupational Safety and Health Administration) – Under the Occupational Safety and Health Act of 1970, employers are responsible for providing a safe and healthy workplace for their employees. OSHA's role is to promote the safety and health of America's working men and women by setting and enforcing standards; providing training, outreach and education; establishing partnerships; and encouraging continual process improvement in workplace safety and health. For more information, visit www.osha.gov.

Radio Frequency (RF) – The frequencies of electromagnetic waves which are used for radio communications. Approximately 3 kHz to 300 GHz.

Radio Frequency Exposure (RFE) – The amount of RF power density that a person is or might be exposed to.

Spatial Average Measurement – A technique used to average a minimum of ten (10) measurements taken in a ten (10) second interval from zero (0) to six (6) feet. This measurement is intended to model the average power density an average sized human will be exposed to at a location.

Transmitter Power Output (TPO) – The radio frequency output power of a transmitter's final radio frequency stage as measured at the output terminal while connected to a load.

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Appendix F – References

The following references can be followed for further information about RF Health and Safety.

Sitesafe, Inc.
http://www.sitesafe.com
FCC Radio Frequency Safety
http://www.fcc.gov/encyclopedia/radio-frequency-safety
National Council on Radiation Protection and Measurements (NCRP)
http://www.ncrponline.org
Institute of Electrical and Electronics Engineers, Inc., (IEEE)
http://www.ieee.org
American National Standards Institute (ANSI)
http://www.ansi.org
Environmental Protection Agency (EPA)
http://www.epa.gov/radtown/wireless-tech.html
National Institutes of Health (NIH)
http://www.niehs.nih.gov/health/topics/agents/emf/
Occupational Safety and Health Agency (OSHA)
http://www.osha.gov/SLTC/radiofrequencyradiation/
International Commission on Non-Ionizing Radiation Protection (ICNIRP)
http://www.icnirp.org
World Health Organization (WHO)
http://www.who.int/peh-emf/en/
National Cancer Institute
http://www.cancer.gov/cancertopics/factsheet/Risk/cellphones
American Cancer Society (ACS)
http://www.cancer.org/docroot/PED/content/PED_1_3X_Cellular_Phone_Towers.asp?siteareа=PED
European Commission Scientific Committee on Emerging and Newly Identified Health Risks
http://ec.europa.eu/health/ph_risk/committees/04_scenihr/docs/scenihr_o_022.pdf
Fairfax County, Virginia Public School Survey
http://www.fcps.edu/fts/safety-security/RFEESurvey/
UK Health Protection Agency Advisory Group on Non-ionising Radiation
http://www.hpa.org.uk/webw/HPAweb&HPAwebStandard/HPAweb_C/1317133826368
Norwegian Institute of Public Health
http://www.fhi.no/dokumenter/545eea7147.pdf

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