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

April 13, 2017

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: 876333**
AT&T Site ID: CT1054
10 Sparks Street, Plainville, CT 06062
Latitude: 41° 40' 24.52" / Longitude: -72° 51' 16.17"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 115-foot level of the existing 138-foot monopole tower at 10 Sparks Street in Plainville, CT. The tower and property is owned by Crown Castle. AT&T intends to replace three (3) antennas with three (3) new antennas, replace three (3) RRUs with three (3) new RRU models, and install six (6) triplexers.

The Town of Plainville confirmed the tower was approved in 1996. All approval information must be obtained in person. Correspondence with the town has been attached.

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 Mr. Robert E. Lee, Town Manager, Town of Plainville, 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. Robert E. Lee, Town Manger
Town of Plainville
One Central Square
Plainville, CT 06062

Heartland Plainville LLC
PO Box 311
Bound Brook, NJ 08805

Planning & Zoning
Town of Plainville
One Central Square
Plainville, CT 06062

Hanlon, Dashanna

From: Mark Devoe <devoe@plainville-ct.gov>
Sent: Thursday, April 13, 2017 10:50 AM
To: Hanlon, Dashanna
Cc: Garrett Daigle
Subject: RE: [Town of Plainville CT] Original Zoning - 10 Sparks Street (Sent by Dashanna Hanlon, dashanna.hanlon@crowncastle.com)

Hello Dashanna,

We were able to locate two zoning files for 10 Sparks Street relative to the initial local zoning approvals for the tower in 1996 (SBA), and in 2001 for the addition of a backup generator(Sprint Spectrum). All other approvals beyond those dates were acquired through CSC as modifications or exempt modifications. The files are not available electronically, but you may inspect them during normal business hours and mark whatever information you may require to be copied.

We can then furnish you with an estimate for copying costs.

Mark S. DeVoe, AICP
Director of Planning and Economic Development Town of Plainville | One Central Square | Plainville, CT 06062
(860) 793-0221 Ext. 210 | devoe@plainville-ct.gov

-----Original Message-----
From: vtsdmailer@vt-s.net [mailto:vtsdmailer@vt-s.net]
Sent: Wednesday, April 12, 2017 8:55 PM
To: Mark Devoe <devoe@plainville-ct.gov>
Subject: [Town of Plainville CT] Original Zoning - 10 Sparks Street (Sent by Dashanna Hanlon, dashanna.hanlon@crowncastle.com)

Hello MDeVoe,

Dashanna Hanlon (dashanna.hanlon@crowncastle.com) has sent you a message via your contact form (http://www.plainvillect.com/user/125/contact) at Town of Plainville CT.

If you don't want to receive such e-mails, you can change your settings at http://www.plainvillect.com/user/125/edit.

Message:

Hello,

I have an inquiry regarding original zoning documents for a tower and I am hoping you can provide more information.

We are applying for CSC Zoning Approval for tower modifications and new requirements ask that we procure original zoning documents from the jurisdiction, if possible. However, if these documents are not available, please let me know.

The tower is located at 10 Sparks Street and according to lease documents this was have been approved around 2006– the original lease was signed around this time.

If you have any questions, please don't hesitate to call or e-mail me.

Thank you,
Dashanna

Town of Plainville
Property Listing Report

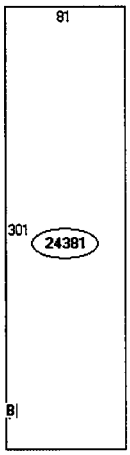
Parcel ID 23-O-05

Account R02784

Property Information

Owner	HEARTLAND-PLAINVILLE LLC
Address	10 SPARKS ST
Mailing Address	P O BOX 311 BOUND BROOK, NJ 08805-0311
Land Use	-
Land Class	C

Census Tract	4206
Neighborhood	811
Zoning	GI
Acreage	1.26
Utilities	
Lot Setting/ Desc	/ LEVEL



Descriptor/Area
A:N/A
24381 sqft
B:CNPY
63 sqft

PARCEL VALUATIONS (Assessed value = 70% of Appraised Value)

	Appraised	Assessed
Buildings	694970	
Outbuildings		
Improvements		
Extras		
Land	107000	
Total	801970	561380
Previous		

Construction Details

Year Built	
Stories	0
Building Style	0
Building Use	0
Building Condition	C
Total Rooms	0
Bedrooms	0
Full Bathrooms	0
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

EXTERIOR WALLS:	
Primary	
Secondary	
INTERIOR WALLS:	
Primary	
Secondary	
FLOORS:	
Primary	
Secondary	
HEATING/AC:	
Heating Type	
Heating Fuel	
AC Type	

BUILDING AREA:

Effective Building Area	
Gross Building Area	
Total Living Area	

SALES HISTORY:

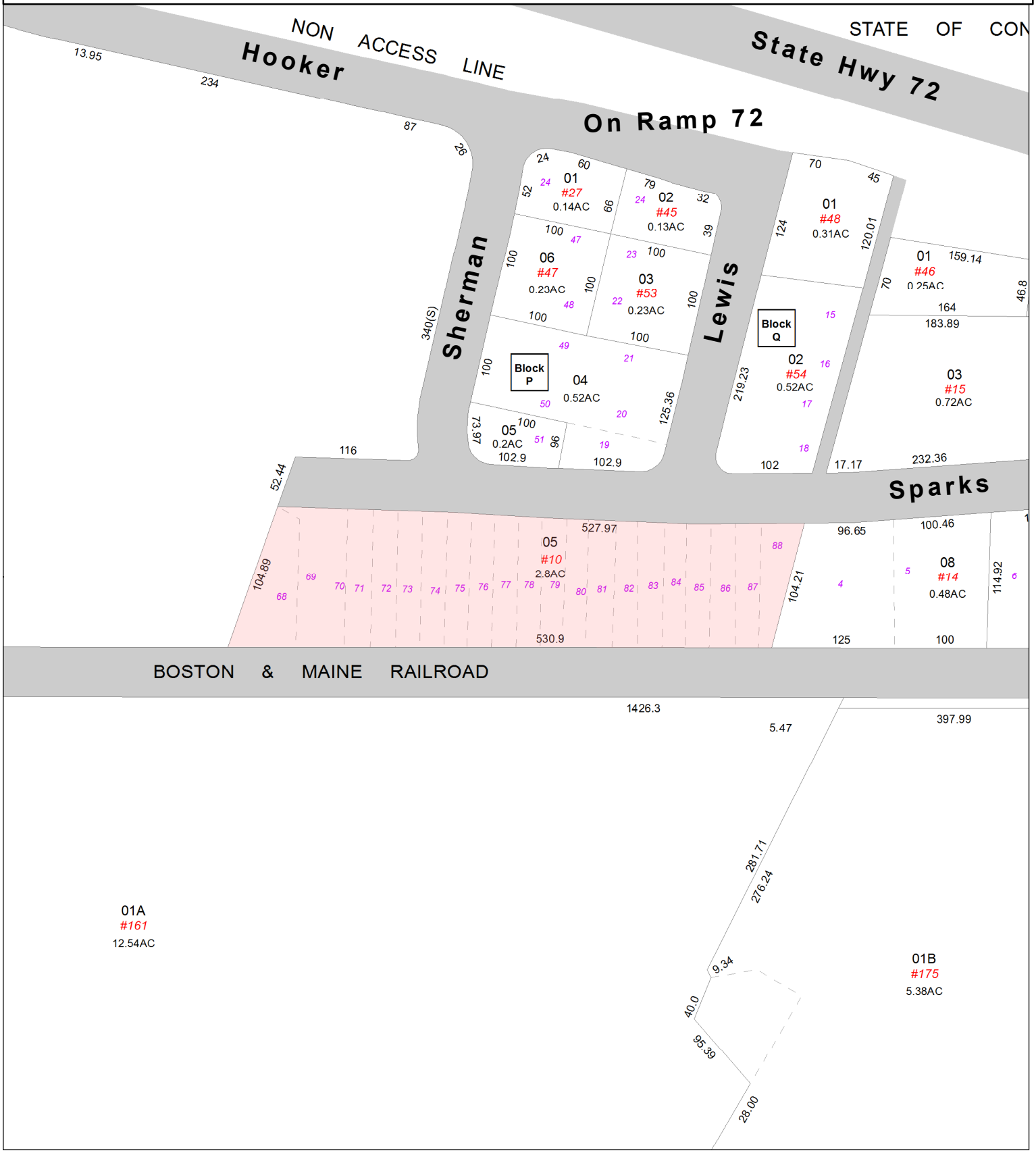
Sale Date	20050114
Sale Price	266000
Book/ Deed	449 534

Report Created On 4/12/2017

Town of Plainville, Connecticut - Assessment Parcel Map

Parcel: 23-O-05

Address: 10 SPARKS ST



0 50 100 150 200

Feet

Approximate Scale: 1 inch = 130 feet

Map Produced February 2017

SITE NAME: PLAINVILLE - SPARKS ST.
FA NUMBER: 10035333
SITE NUMBER: CTL01054
RETROFIT - MRCTB019396
MULTI-CARRIER-MRCTB017018
10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY
CROWN CASTLE SITE NAME: CREATIVE DIMENSIONS
CROWN CASTLE SITE NUMBER: 876333

PROJECT TEAM

CLIENT REPRESENTATIVE

COMPANY: SMARTLINK, LLC
ADDRESS: 85 RANGEWAY ROAD, BUILDING 3, SUITE 102
CITY, STATE, ZIP: NORTH BILLERICA, MA 02862-2105
CONTACT: TODD OLIVER
E-MAIL: TODD.OLIVER@SMARTLINKLLC.COM

SITE ACQUISITION

COMPANY: SMARTLINK, LLC
ADDRESS: 85 RANGEWAY ROAD, BUILDING 3, SUITE 102
CITY, STATE, ZIP: NORTH BILLERICA, MA 02862-2105
CONTACT: TODD OLIVER
PHONE: (774) 369-3613
E-MAIL: TODD.OLIVER@SMARTLINKLLC.COM

ENGINEER

COMPANY: MASER CONSULTING P.A.
ADDRESS: 331 NEWMAN SPRINGS RD., SUITE 203
CITY, STATE, ZIP: RED BANK, NJ 07701-5699
CONTACT: FRANK PAZDEN
PHONE: (973) 398-3110 x4505
E-MAIL: FPAZDEN@MASERCONSULTING.COM

RF ENGINEER

COMPANY: NEW CINGULAR WIRELESS PCS, LLC
ADDRESS: 550 COCHITUATE RD.
CITY, STATE, ZIP: FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
E-MAIL: CS6970@ATT.COM

CONSTRUCTION MANAGER

COMPANY: SMARTLINK, LLC.
ADDRESS: 85 RANGEWAY ROAD, BUILDING 3, SUITE 102
CITY, STATE, ZIP: NORTH BILLERICA, MA 02862-2105
CONTACT: MARK DONNELLY
PHONE: (617) 515-2080
E-MAIL: MARK.DONNELLY@SMARTLINKLLC.COM

SITE INFORMATION

APPLICANT/LESSEE

at&t

NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE RD.
FRAMINGHAM, MA 01701

PROPERTY/TOWER OWNER:

NAME:	CROWN CASTLE
ADDRESS:	12 GILL STREET, SUITE # 5800
CITY, STATE, ZIP:	WOBURN, MA 01801
SITE ID#:	876333
LATITUDE:	41.673461° N
LONGITUDE:	72.854503° W
LAT./LONG. TYPE:	NAD 83
AREA OF CONSTRUCTION:	EXISTING EQUIPMENT SHELTER AND TOWER
ZONING/JURISDICTION:	CITY OF PLAINVILLE
CURRENT USE/PROPOSED USE:	UNMANNED TELECOMMUNICATIONS FACILITY
HANDICAP REQUIREMENTS:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS NOT REQUIRED.
CONSTRUCTION TYPE:	IIB
USE GROUP:	U

VICINITY MAP

CODE COMPLIANCE

ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THE LATEST EDITIONS OF THE FOLLOWING CODES.

1. 2016 CONNECTICUT STATE BUILDING CODE INCORPORATING THE 2012 IBC
2. NATIONAL ELECTRIC CODE 2014
3. NATIONAL FIRE PROTECTION ASSOCIATION 70 - 2015
4. LIGHTNING PROTECTION CODE 201
5. AMERICAN CONCRETE INSTITUTE 318
6. AMERICAN INSTITUTE OF STEEL CONSTRICTION 360-10.
7. EIA/TIA-222 REVISION G
8. TIA 607 FOR GROUNDING
9. INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS 81
10. IEEE C2 LATEST EDITION
11. TELCORDIA GR-1275 12. ANSI T1.311

GENERAL CONTRACTOR NOTES

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

SHEET	DESCRIPTION
T-1	TITLE SHEET
GN-1	GENERAL NOTES
A-1	COMPOUND PLAN AND EQUIPMENT PLAN
A-2	ELEVATION VIEW AND ANTENNA SCHEDULE
A-3	ANTENNA LAYOUTS
A-4	DETAILS - 1
A-5	DETAILS - 2
A-6	RF PLUMBING DIAGRAMS
G-1	GROUNDING DETAILS

PROJECT DESCRIPTION/SCOPE OF WORK

THIS PROJECT WILL BE COMPRISED OF:

- (3) NEW ANTENNAS TO REPLACE (3) EXISTING ANTENNAS, (1) PER SECTOR
- (3) RRUS-32 B2 TO REPLACE (3) EXISTING RRUS-11, (1) PER SECTOR
- (6) NEW TRIPLEXERS, (2) PER SECTOR
- ADD XMU AND IDL2
- ADD HANDRAIL KIT TO MOUNT

PROPOSED PROJECT SCOPE BASED ON RFDS ID#1000703, VERSION 2.00, LAST UPDATED 10/14/16

MASER CONSULTING CONNECTICUT
Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

STATE OF CONNECTICUT — FRANK E. PAZDEN — 30 — LICENSED PROFESSIONAL ENGINEER
FRANK E. PAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.0281

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF THE RESPONSIBLE LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SITE NAME:
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333
10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE:
TITLE SHEET

SHEET NUMBER:
T-1

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5O HMS OR LESS.
4. THE SUBCONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
5. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
6. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
7. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE EQUIPMENT GROUND RING WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK TO BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
10. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
11. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. ALL BENDS SHALL BE MADE WITH 12" RADIUS OR LARGER.
12. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
13. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS EXCEPT FOR GROUND BAR CONNECTION FROM MGB TO OUTSIDE EXTERIOR GROUND SHALL ALL BE CADWELD CONNECTIONS.
14. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
15. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED TO THE TOWER GROUND BAR.
16. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
17. ALL EXTERIOR AND INTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
18. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
19. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
20. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G. NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
21. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/4" IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50.

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR - SMARTLINK
   SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER - AT&T (NEW CINGULAR WIRELESS PCS, LLC)

2. ALL SITE WORK SHALL BE COMPLETED AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
3. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
4. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE 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. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
10. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
11. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY THE RESPONSIBLE ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING & EXCAVATION.
12. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED 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.
13. 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.
14. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
15. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
16. THE SUBGRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
18. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
19. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
20. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
21. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR.
22. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
23. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
24. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS.
25. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
26. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."
27. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
28. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION, ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
29. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN ALERT OF DANGEROUS EXPOSURE LEVELS.

MASER CONSULTING CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t

NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
Know what's below. Call before you dig
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE :	JOB NUMBER :
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

STATE OF CONNECTICUT — FRANK E. PAZDEN — 20911 — LICENSED PROFESSIONAL ENGINEER
FRANK E. PAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.20911

SITE NAME:

PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

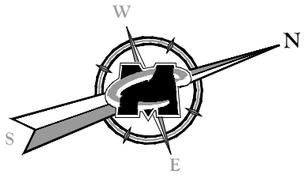
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

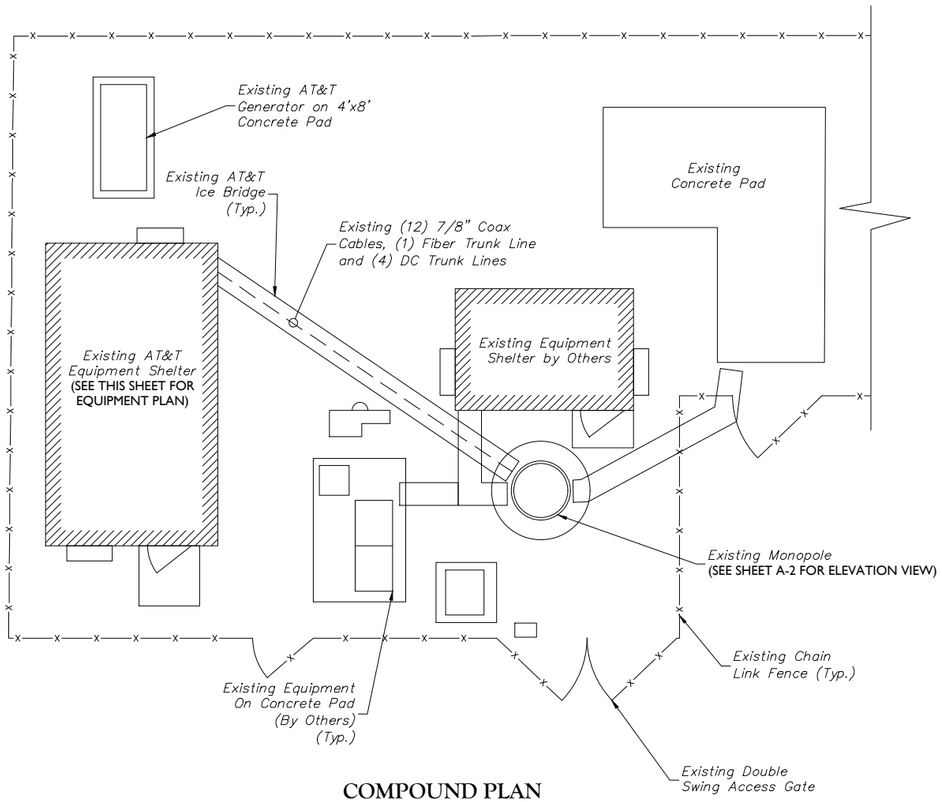
SHEET TITLE :

GENERAL NOTES

SHEET NUMBER :

GN-1





COMPOUND PLAN

GRAPHIC SCALE

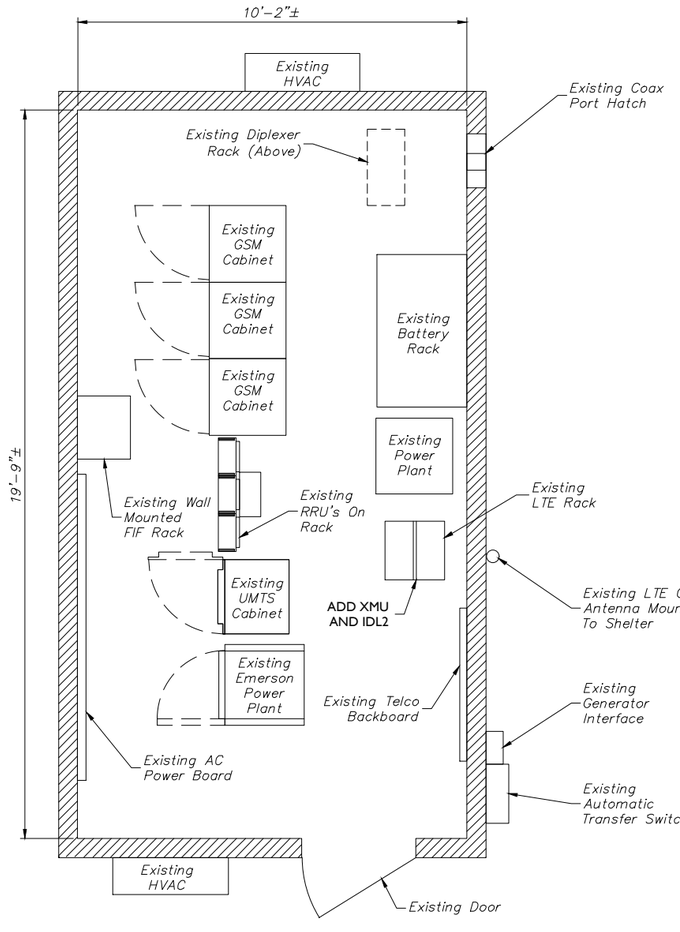
5 0 2.5 5 10

(IN FEET)

SCALE: 1" = 5' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

NOTES:

1. THE CONDUIT ROUTING IS DIAGRAMMATICALLY SHOWN ON THE PLANS AND ARE ONLY APPROXIMATIONS. THE EXACT LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
2. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED LAMICOID NAMEPLATES, INDICATING THE CIRCUITS ORIGINATION AND ALL EQUIPMENT TERMINATIONS.
3. SUBCONTRACTOR SHALL PROVIDE ALL CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETED SYSTEM AND SHALL BE IN COMPLIANCE WITH THE MANUFACTURER'S SPECIFICATIONS.
4. ALL NEW CABLING TO BE ROUTED ON EXISTING CABLE RACKS.
5. ALL INSTALLED GROUND LUGS MUST BE INSPECTION HOLE LUGS.
6. INSTALLED GROUND LEADS MUST TERMINATE AT MGB, NOT HALO.
7. NO OVERLAPPING GROUND HARDWARE.



EQUIPMENT PLAN

GRAPHIC SCALE

2 0 1 2 4

(IN FEET)

SCALE: 1" = 2' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

NOTE:

THESE PLANS WERE DESIGNED WITH THE ASSUMPTION THAT THE PREVIOUS PLANS PREPARED BY MASER CONSULTING CONNECTICUT DATED 02/18/16 WILL BE COMPLETED PRIOR TO THE CURRENT SCOPE OF WORK BEING INSTALLED. ANY CHANGES IN PREVIOUS DESIGN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

MASER CONSULTING CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE: AS SHOWN
JOB NUMBER: 16946027A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED	AJC	FEP

STATE OF CONNECTICUT — FRANK E. PAZDEN — 20 — LICENSED PROFESSIONAL ENGINEER

FRANK E. PAZDEN
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.0018

SITE NAME:
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

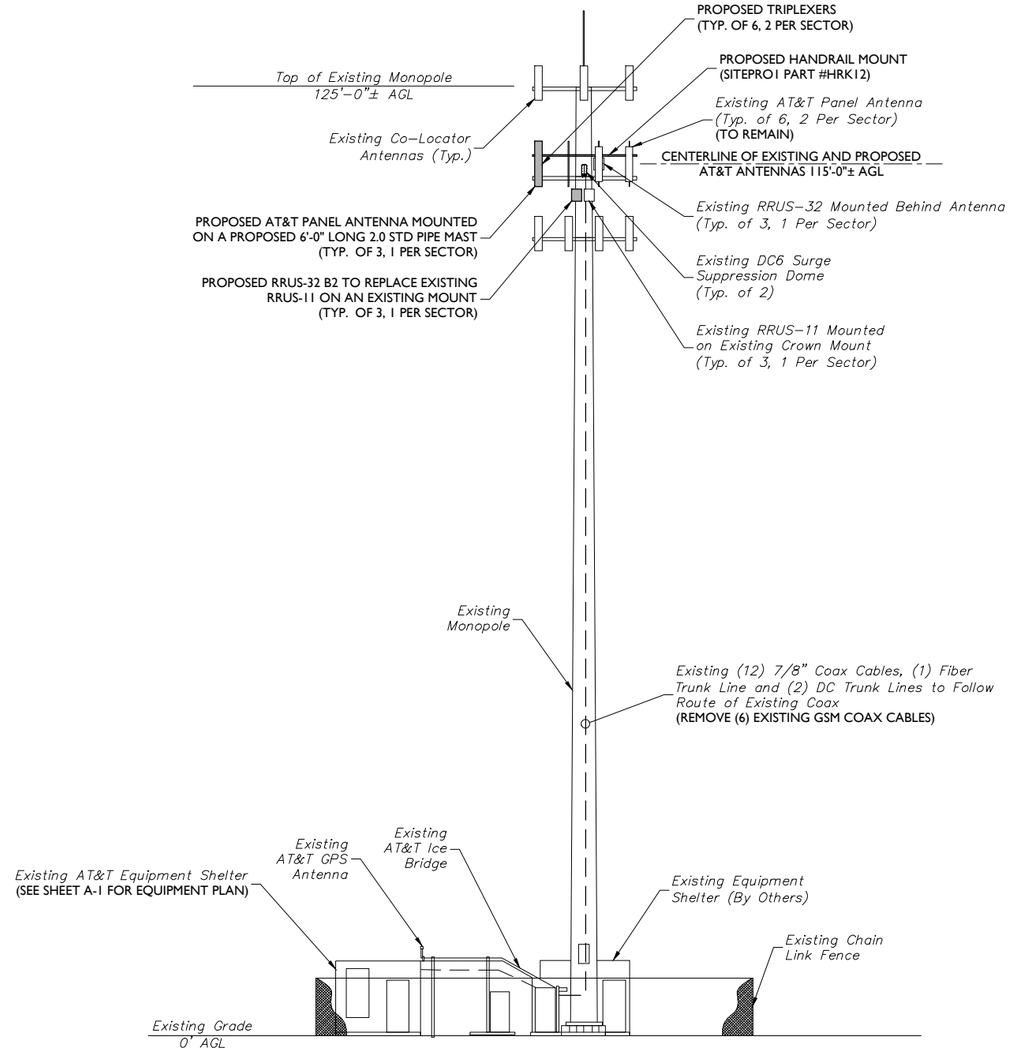
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE:
COMPOUND PLAN AND EQUIPMENT PLAN

SHEET NUMBER:
A-1

NOTE:

ALL EQUIPMENT (ANTENNAS, LINES, ETC.) TO BE INSTALLED IN ACCORDANCE WITH PASSING STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE



ELEVATION VIEW

GRAPHIC SCALE

20 0 10 20 40

(IN FEET)

SCALE: 1" = 20' FOR 24"X36" DRAWINGS
(DO NOT SCALE 11"X17" DRAWINGS)

PROPOSED ANTENNA AND RRUS CONFIGURATION

SECTOR		EXISTING ANTENNA CONFIGURATION	PROPOSED ANTENNA CONFIGURATION	TECHNOLOGY	ANTENNA STATUS	HEIGHT (in)	WIDTH (in)	DEPTH (in)	WEIGHT (lbs)	ANTENNA AZIMUTH	ANT. CL ELEV (ft.)	RRUS CONFIGURATION	STATUS
ALPHA	C1	Powerwave 7770	Powerwave 7770	UMTS/GSM	REMAIN	55.00	11.00	5.00	35.00	13°	115'	-	-
	A2	CCI OPA-65R-LCUU-H8	CCI OPA-65R-LCUU-H8	GSM 850/LTE WCS	REMAIN	92.70	14.40	7.00	88.00	13°	115'	(1) RRUS-32	REMAIN
	A3	KMW AM-X-CD-16-65-OOT-RET	VACANT MAST	-	REMOVE	-	-	-	-	-	-	-	-
	A4	VACANT MAST	QUINTEL QS66512-2	LTE 700/1900	NEW	72.00	12.00	9.60	111.00	13°	115'	(1) RRUS 11 (1) RRUS 32 B2	REMAIN NEW
BETA	A1	Powerwave 7770	Powerwave 7770	UMTS/GSM	REMAIN	55.00	11.00	5.00	35.00	143°	115'	-	-
	B2	CCI OPA-65R-LCUU-H8	CCI OPA-65R-LCUU-H8	GSM 850/LTE WCS	REMAIN	92.70	14.40	7.00	88.00	143°	115'	(1) RRUS-32	REMAIN
	B3	KMW AM-X-CD-16-65-OOT-RET	VACANT MAST	-	REMOVE	-	-	-	-	-	-	-	-
	B4	VACANT MAST	QUINTEL QS66512-2	LTE 700/1900	NEW	72.00	12.00	9.60	111.00	143°	115'	(1) RRUS 11 (1) RRUS 32 B2	REMAIN NEW
GAMMA	B1	Powerwave 7770	Powerwave 7770	UMTS/GSM	REMAIN	55.00	11.00	5.00	35.00	263°	115'	-	-
	C2	CCI OPA-65R-LCUU-H8	CCI OPA-65R-LCUU-H8	GSM 850/LTE WCS	REMAIN	92.70	14.40	7.00	88.00	263°	115'	(1) RRUS-32	REMAIN
	C3	KMW AM-X-CD-16-65-OOT-RET	VACANT MAST	-	REMOVE	-	-	-	-	-	-	-	-
	C4	VACANT MAST	QUINTEL QS66512-2	LTE 700/1900	NEW	72.00	12.00	9.60	111.00	263°	115'	(1) RRUS 11 (1) RRUS 32 B2	REMAIN NEW

ANTENNA SCHEDULE

NOTE:

THESE PLANS WERE DESIGNED WITH THE ASSUMPTION THAT THE PREVIOUS PLANS PREPARED BY MASER CONSULTING CONNECTICUT DATED 02/18/16 WILL BE COMPLETED PRIOR TO THE CURRENT SCOPE OF WORK BEING INSTALLED. ANY CHANGES IN PREVIOUS DESIGN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

STRUCTURAL NOTES:

1. A STRUCTURAL ANALYSIS TO DETERMINE IF THE EXISTING STRUCTURE AND FOUNDATION CAN ADEQUATELY SUPPORT THE PROPOSED LOADING HAS NOT BEEN PREPARED/ANALYZED BY MASER AND IS TO BE PERFORMED BY OTHERS.
2. NO CONSTRUCTION OF THE PROPOSED LOADING SHOWN SHALL PROCEED UNTIL ADEQUACY OF EXISTING STRUCTURE AND FOUNDATION, INCLUDING THE PROPOSED AT&T ANTENNA MOUNTING CONFIGURATION SHOWN HEREIN, HAS BEEN CONFIRMED BY SMARTLINK.
3. THE STRUCTURE ELEVATION IS SHOWN FOR INFORMATIONAL PURPOSES ONLY AND MAY NOT REFLECT AS-BUILT FIELD CONDITIONS FOR ALL EXISTING INVENTORY LOADING/ANTENNAS/APPURTANENCES ON STRUCTURE. REFER TO THE LATEST STRUCTURAL ANALYSIS FOR EXISTING STRUCTURE LOADING AND THE PROPOSED METHOD OF ATTACHMENT OF THE PROPOSED ANTENNAS/CABLES.
4. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, CABLES, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

MASER CONSULTING CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

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

SCALE: AS SHOWN

JOB NUMBER: 16946027A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED	AJC	FEP

STATE OF CONNECTICUT — FRANK E. FAZDEN — PROFESSIONAL ENGINEER

FRANK E. FAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.0018

SITE NAME:

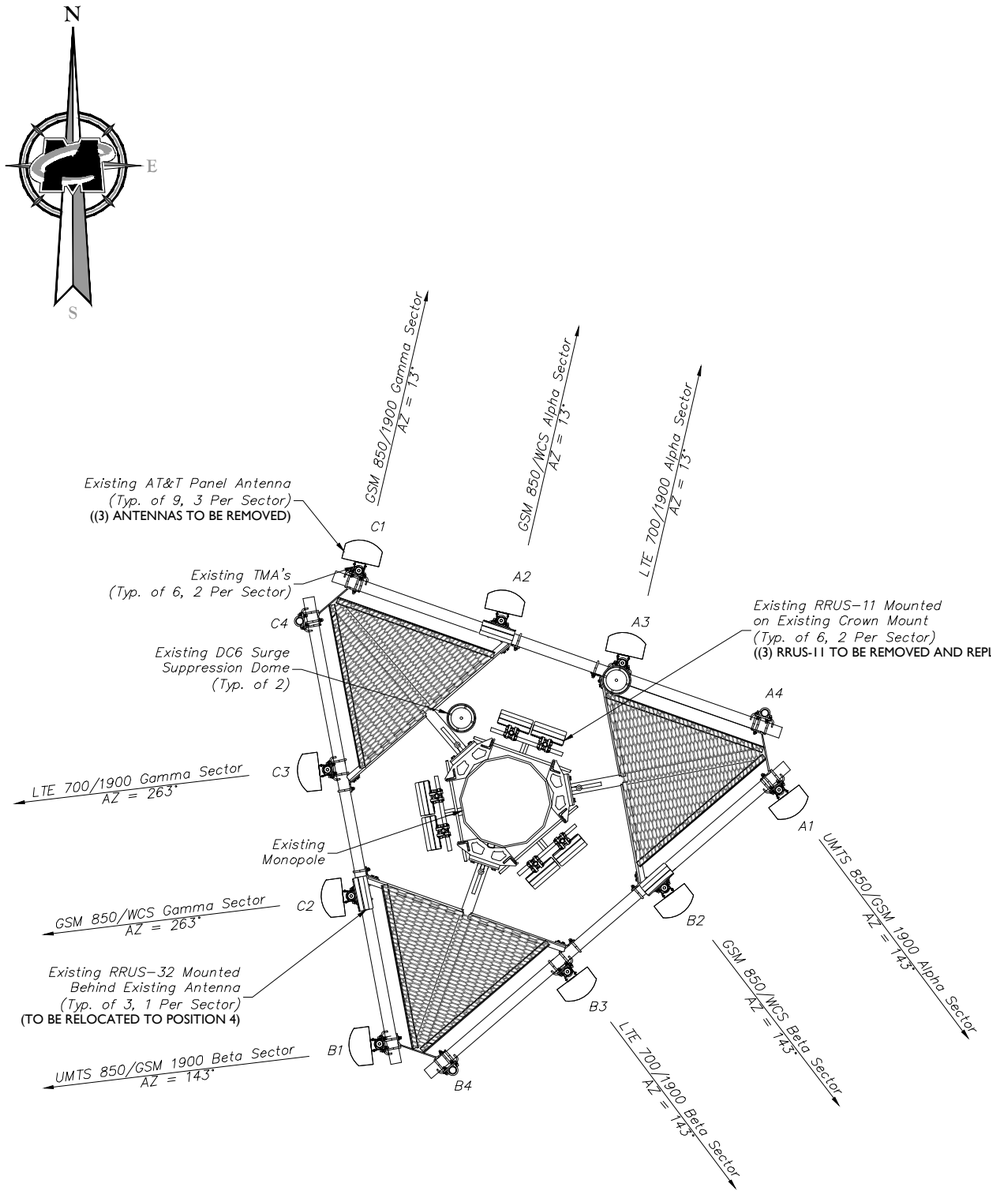
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

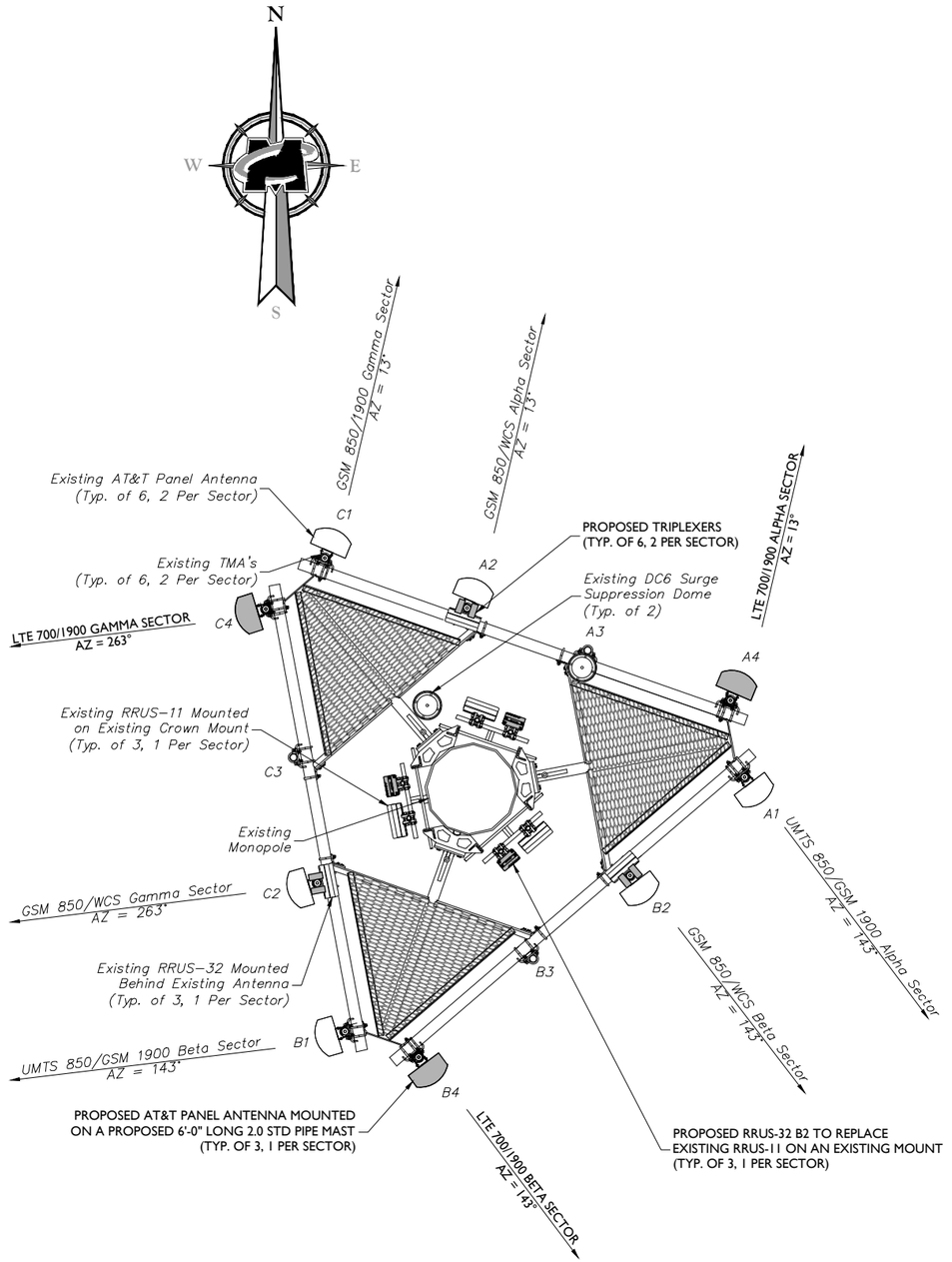
SHEET TITLE:
ELEVATION VIEW AND ANTENNA SCHEDULE

SHEET NUMBER:
A-2



EXISTING - ANTENNA LAYOUT

NOT TO SCALE



PROPOSED - ANTENNA LAYOUT

NOT TO SCALE

NOTE:

THESE PLANS WERE DESIGNED WITH THE ASSUMPTION THAT THE PREVIOUS PLANS PREPARED BY MASER CONSULTING CONNECTICUT DATED 02/18/16 WILL BE COMPLETED PRIOR TO THE CURRENT SCOPE OF WORK BEING INSTALLED. ANY CHANGES IN PREVIOUS DESIGN SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

MASER CONSULTING CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE:	JOB NUMBER:
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

STATE OF CONNECTICUT — FRANK E. FAZDEN — 20 — PROFESSIONAL ENGINEER — LICENSED PROFESSIONAL ENGINEER

FRANK E. FAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.0020

SITE NAME:

PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

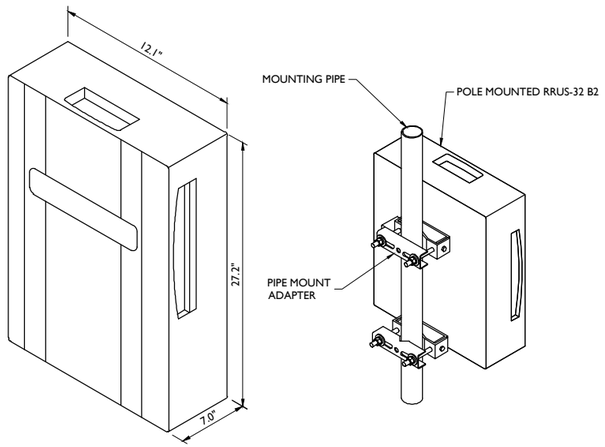
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE:

ANTENNA LAYOUTS

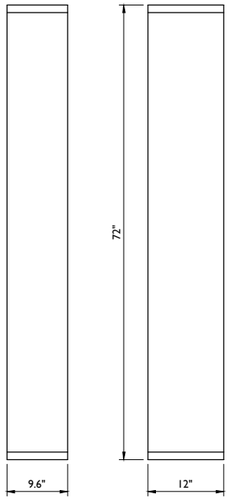
SHEET NUMBER:

A-3



RRUS-32 B2 DIMENSIONS (H X W X D): 27.2" X 12.1" X 7.0" (INCLUDES SUNSHIELD)
WEIGHT: 53 LBS

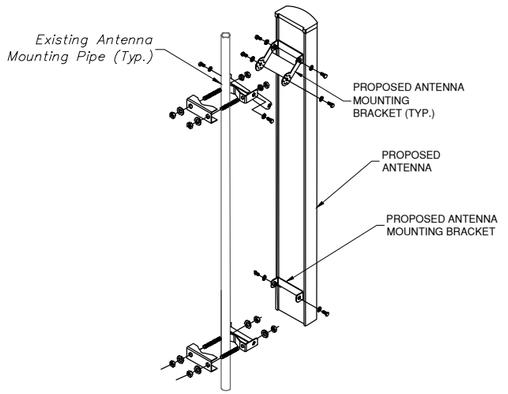
RRUS-32 B2 DETAIL
NOT TO SCALE



WEIGHT = 111 LBS

QUINTEL QS66512-2

ANTENNA DETAIL
NOT TO SCALE



ANTENNA MOUNTING DETAIL
NOT TO SCALE

MASER CONSULTING CONNECTICUT
Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig.
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE :	JOB NUMBER :
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	DRAWN	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

STATE OF CONNECTICUT · FRANK E. FAZDEN · 20 · LICENSED PROFESSIONAL ENGINEER
FRANK E. FAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.20[illegible]

SITE NAME:
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

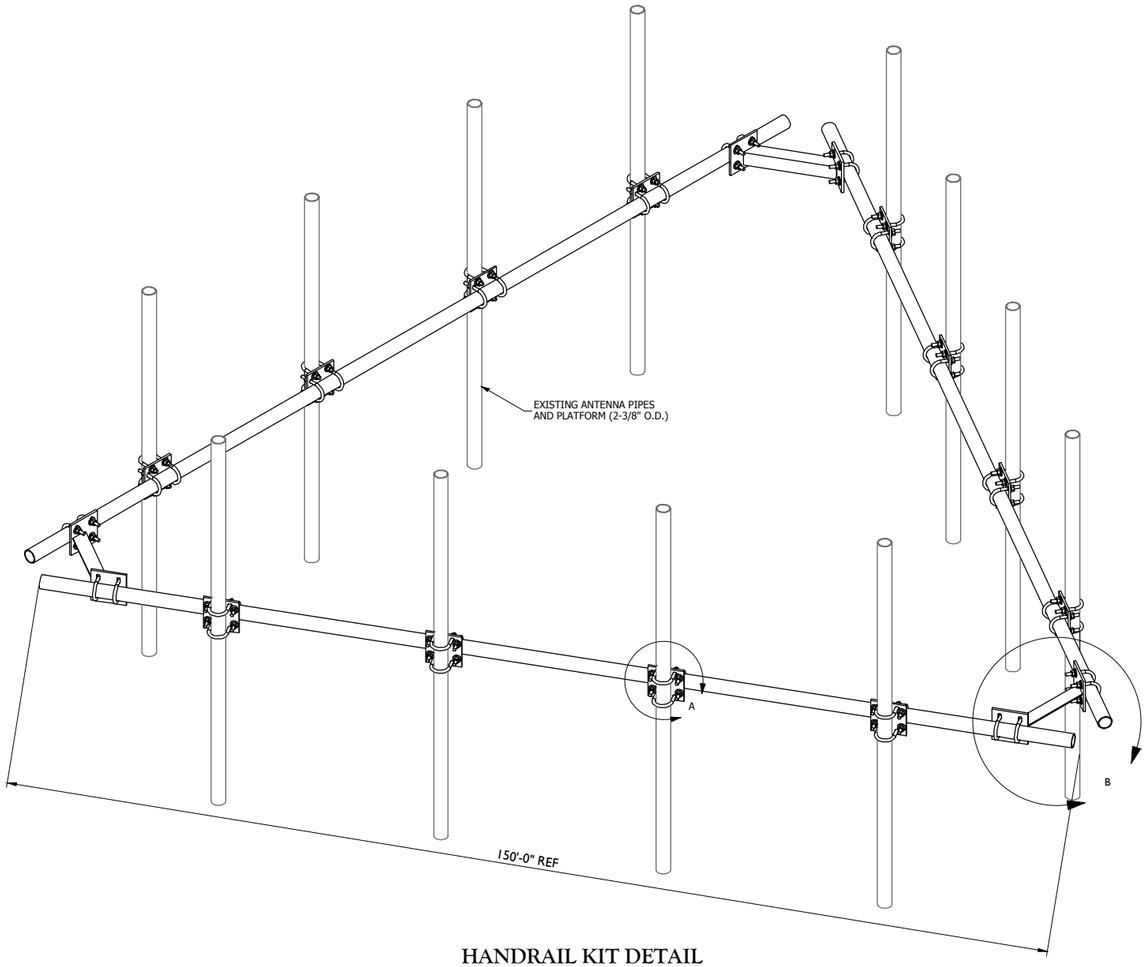
10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

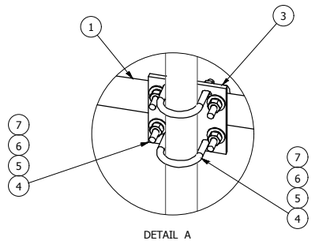
SHEET TITLE :
DETAILS - 1

SHEET NUMBER :
A-4

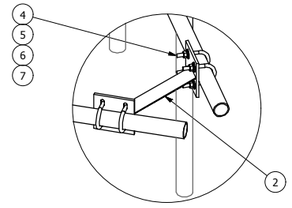
PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	3	P2150	2-3/8" OD X 150" SCH 40 GALVANIZED PIPE	150 in	48.06	144.17
2	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
3	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"		3.71	44.50
4	120	G12FW	1/2" HDG USS FLATWASHER		0.03	4.08
5	60	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.73	43.90
6	120	G12LW	1/2" HDG LOCKWASHER		0.01	1.67
7	120	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	8.58
					TOTAL WT. #	261.72



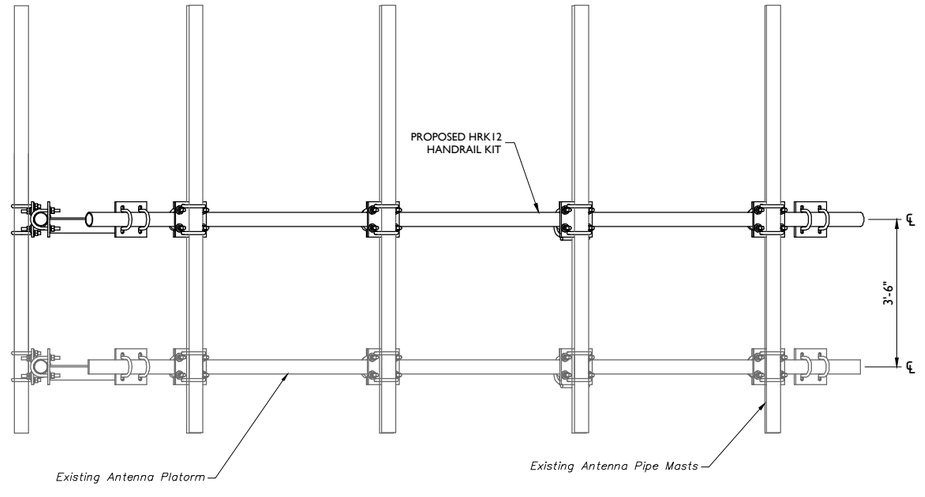
HANDRAIL KIT DETAIL
(SITEPRO 1 PART #HRK12)
NOT TO SCALE



DETAIL A



DETAIL B



ELEVATION VIEW
NOT TO SCALE

MASER CONSULTING
CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig
PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE
FOR STATE SPECIFIC DIRECT PHONE NUMBERS VISIT: WWW.CALL811.COM

SCALE :	JOB NUMBER :
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	BY	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

STATE OF CONNECTICUT
FRANK E. FAZDEN
PROFESSIONAL ENGINEER
LICENSED
FRANK E. FAZDEN
CONNECTICUT LICENSED PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.28

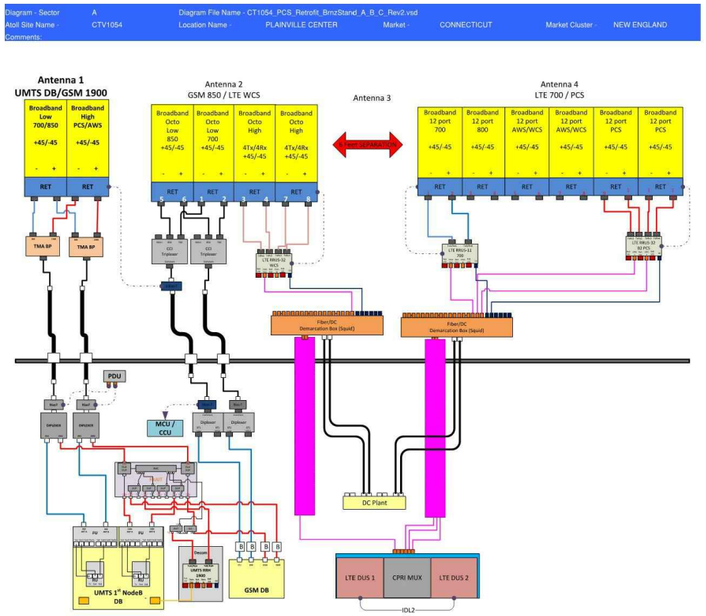
SITE NAME:
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

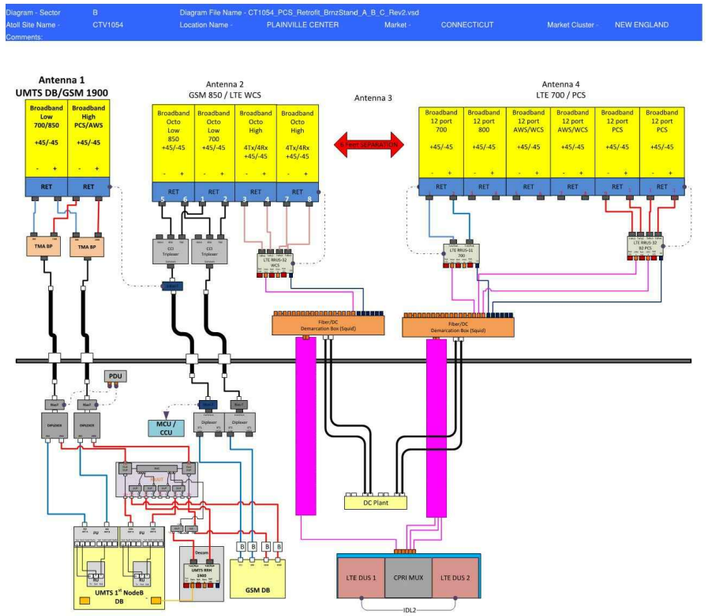
RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE :
DETAILS - 2

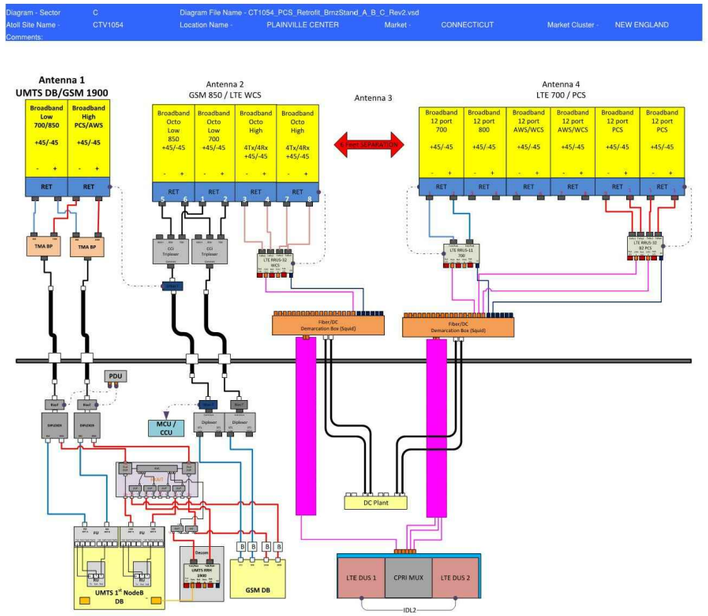
SHEET NUMBER :
A-4



ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR

BASED ON RF ENGINEERING DESIGN ENTITLED "NEW-ENGLAND_CONNECTICUT_CTV1054_2017-Antenna-Modifications_4TXRX_mm093q_2051A04915_10035333_16334_12-23-2015_Final-RF-Approval_v2.00", LAST UPDATED 10/14/16

RF PLUMBING DIAGRAMS

MASER CONSULTING CONNECTICUT

Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

811 Know what's below. Call before you dig

PROTECT YOURSELF
ALL STATES REQUIRE NOTIFICATION OF EXCAVATORS, DESIGNERS, OR ANY PERSON PREPARING TO DISTURB THE EARTH'S SURFACE ANYWHERE IN ANY STATE

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

SCALE :	JOB NUMBER :
AS SHOWN	16946027A

REV	DATE	DESCRIPTION	DRAWN	CHECKED BY
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED	AJC	FEP

STATE OF CONNECTICUT
FRANK E. PAZDEN
CONNECTICUT PROFESSIONAL ENGINEER - LICENSE NUMBER: PEN.0021
PROFESSIONAL ENGINEER

SITE NAME:

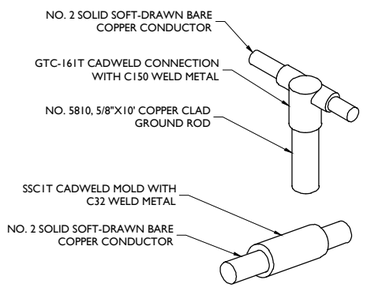
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

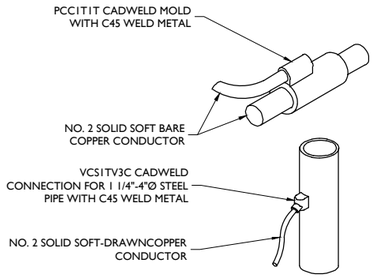
10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

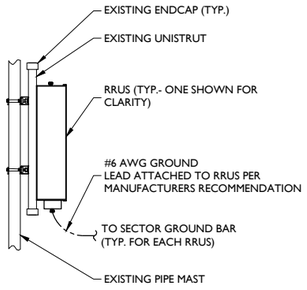
SHEET TITLE :
RF PLUMBING DIAGRAMS

SHEET NUMBER :
A-6

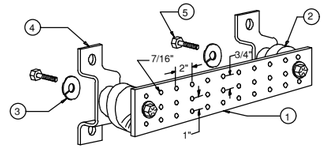




CADWELD DETAILS
NOT TO SCALE



RRH GROUNDING
NOT TO SCALE



LEGEND

1- TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO. CAT. NO. B-6142 OR EQUAL. HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4

3- 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015-8

4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-5056

5- 5/8-11 X 1" HHCS BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012-1

6- EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

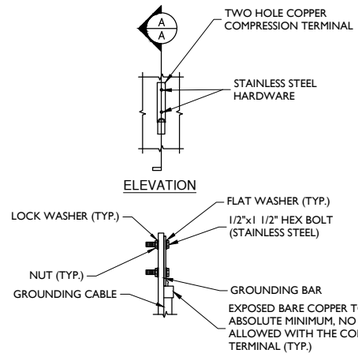
SECTION "P" - SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2)
+24V POWER SUPPLY RETURN BAR (#2)
-48V POWER SUPPLY RETURN BAR (#2)
RECTIFIER FRAMES.

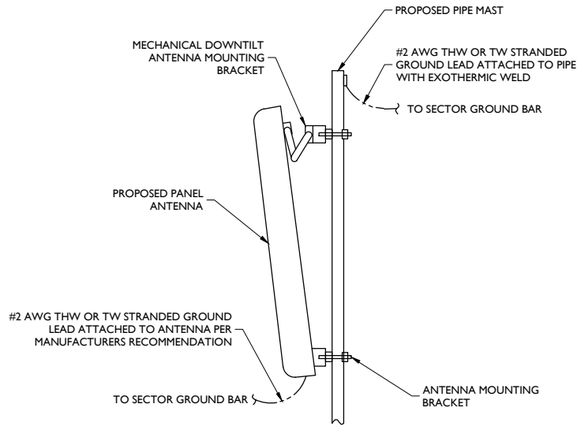
SECTION "A" - SURGE ABSORBERS

INTERIOR GROUND RING (#2)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
BUILDING STEEL (IF AVAILABLE) (#2)

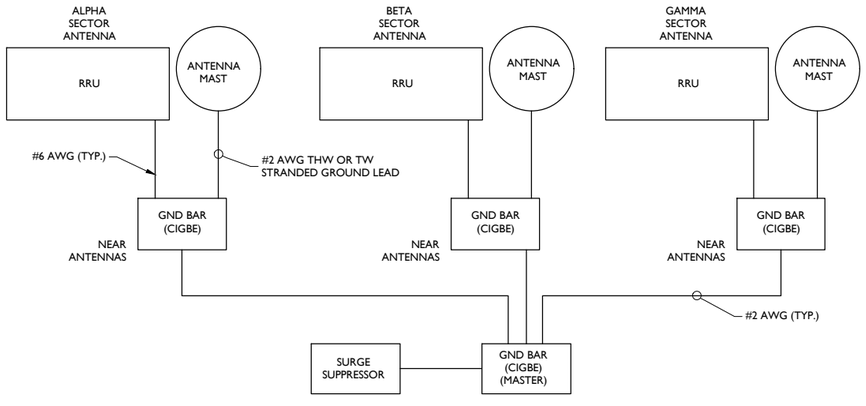
MASTER GROUND BAR
NOT TO SCALE



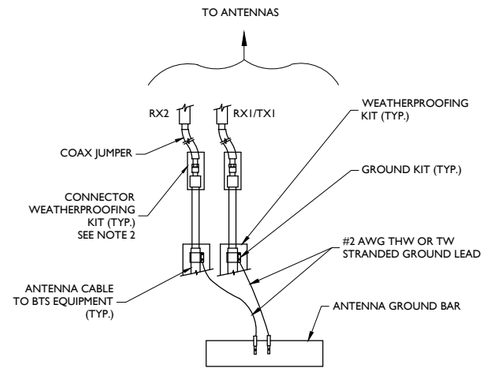
TYPICAL GROUND BAR CONNECTION DETAIL
NOT TO SCALE



ANTENNA GROUNDING
NOT TO SCALE



SCHEMATIC DIAGRAM GROUNDING SYSTEM
NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

TYPICAL GROUND WIRE TO GROUNDING BAR
NOT TO SCALE

MASER CONSULTING CONNECTICUT
Customer Loyalty *through* Client Satisfaction
www.maserconsulting.com
Engineers ■ Planners ■ Surveyors
Landscape Architects ■ Environmental Scientists

smartlink
85 RANGEWAY ROAD
BUILDING 3, SUITE 102
NORTH BILLERICA, MA 02862-2105
TEL: (774) 369-3613

at&t
NEW CINGULAR WIRELESS PCS, LLC
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

SCALE: AS SHOWN
JOB NUMBER: 16946027A

REV	DATE	DESCRIPTION	BY	CHECKED BY
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
4	03/24/17	REVISED PER COMMENTS	RA	FEP
3	02/15/17	REVISED PER STRUCTURAL	RA	FEP
2	01/11/17	REVISED PER COMMENTS	RA	FEP
1	12/29/16	FOR CONSTRUCTION	RA	FEP
0	12/22/16	ISSUED FOR REVIEW	AJC	FEP

SITE NAME:
PLAINVILLE - SPARKS ST.
FA# 10035333
SITE # CTL01054
CROWN SITE # 876333

10 SPARKS STREET
PLAINVILLE, CT 06062
HARTFORD COUNTY

RED BANK OFFICE
331 Newman Springs Road
Suite 203
Red Bank, NJ 07701-5699
Phone: 732.383.1950
Fax: 732.383.1984
email: solutions@maserconsulting.com

SHEET TITLE: GROUNDING DETAILS

SHEET NUMBER: G-1

PJF PAUL J. FORD & COMPANY

Date: **February 09, 2017**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
(585) 899-3445

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL01054
	Carrier Site Name:	Plainville Center
Crown Castle Designation:	**Crown Castle BU Number:**	876333
	Crown Castle Site Name:	CREATIVE DIMENSIONS
	Crown Castle JDE Job Number:	403528
	Crown Castle Work Order Number:	1360234
	Crown Castle Application Number:	366217 Rev. 9
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0330.002.7805
Site Data:	**10 Sparks St., PLAINVILLE, Hartford County, CT** **Latitude *41° 40' 24.52"*, Longitude *-72° 51' 16.17"*** **137 Foot - Monopole Tower**	

Dear Steve Tuttle,

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 999121, in accordance with application 366217, revision 9.

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:

LC4.5: Existing + Proposed Equipment + Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

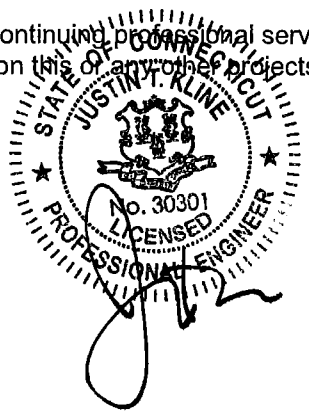
This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1.0 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the referenced drawings 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:

Kyle Thorpe, PE
Project Engineer



2.9.17

tnxTower Report - version 7.0.5.1

PAUL J. FORD & COMPANY

Date: **February 09, 2017**

Steve Tuttle
Crown Castle
8 Parkmeadow Drive
Pittsford, NY 14534
(585) 899-3445

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

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTL01054
	Carrier Site Name:	Plainville Center
Crown Castle Designation:	**Crown Castle BU Number:**	876333
	Crown Castle Site Name:	CREATIVE DIMENSIONS
	Crown Castle JDE Job Number:	403528
	Crown Castle Work Order Number:	1360234
	Crown Castle Application Number:	366217 Rev. 9
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0330.002.7805
Site Data:	**10 Sparks St., PLAINVILLE, Hartford County, CT** **Latitude *41° 40' 24.52"*, Longitude *-72° 51' 16.17"*** **137 Foot - Monopole Tower**	

Dear Steve Tuttle,

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 999121, in accordance with application 366217, revision 9.

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:

LC4.5: Existing + Proposed Equipment + Proposed Modifications **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1.0 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the referenced drawings 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:

Kyle Thorpe, PE
Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 137 ft Monopole tower designed by PITTSBURG MONOPOLE in April of 1997. The tower was originally designed for a wind speed of 85 mph per TIA-222-G.

2) ANALYSIS CRITERIA

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 125 mph converted to a nominal 3-second gust wind speed of 97 mph per Section 1609.3 and Appendix N as required for use in the ANSI/TIA-222-G-2005 Standard, "Structural Standard for Antenna Supporting Structures and Antennas", with ANSI/TIA-222-G-1-2007 and ANSI/TIA-222-G-2-2009 Addenda per Exception #5 of Section 1609.1.1. Risk Category II, Exposure Category C and Topographic Category 1.0 with a maximum Topographic Factor, Kzt, of 1 were used in this analysis.

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
113.0	115.0	6	cci antennas	TPX-070821	-	-	1
		3	ericsson	RRUS 32 B2			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
	113.0	1	Site Pro 1	HRK12 [NA 507-1]			

Notes:
1) Proposed Equipment

Table 2 - Existing 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
124.0	131.0	1	andrew	VHLP1-23	2 (I) 6 (C) 4 (I)	1/2 5/16 1-1/4	1
		1	andrew	VHLP2.5-18			
		2	samsung telecommunications	WIMAX DAP HEAD			
	124.0	3	alcatel lucent	TD-RRH8x20-25			
		3	argus technologies	LLPX310R-V4 w/ Mount Pipe			
		1	rfs celwave	APXV9ERR18-C-A20 w/ Mount Pipe			
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		3	rfs celwave	IBC1900BB-1			
		3	rfs celwave	IBC1900HG-2A			
		3	samsung telecommunications	WIMAX DAP HEAD			
		1	tower mounts	Platform Mount (LP 101-1)			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
122.0	125.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz	-	-	1
	122.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			
		1	tower mounts	Pipe Mount [PM 601-3]			
113.0	115.0	3	ericsson	RRUS-11	-	-	2
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		3	cci antennas	OPA-65R-LCUU-H8 w/ Mount Pipe	1 (C) 2 (C) 1 (I) 2 (I) 12 (I)	3/8 3/4 3/8 3/4 7/8	1
		3	ericsson	RRUS 32 B30			
		3	ericsson	RRUS-11			
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		2	raycap	DC6-48-60-18-8F			
	113.0	1	tower mounts	Platform Mount [LP 601-1]			
92.0	93.0	3	andrew	HBX-6516DS-VTM w/ Mount Pipe	1 (I) 6 (I)	3/8 7/8	1
	92.0	1	tower mounts	T-Arm Mount [TA 602-3]			
50.0	50.0	1	lucent	KS24019-L112A	1 (I)	1/2	1
		1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Equipment To Be Removed
(I) Coax mounted internally and shielded from the wind. See coax layout in Appendix B.
(C) Coax mounted within an internally mounted conduit, shielding the coax from the wind. See coax layout in Appendix B.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welt, P.E., P.C., 07/23/1996	1529723	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 25662.30277, 7/10/2015	5781873	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Hodge Design Associates, M97-0012, 08/07/1997	1616541	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pittsburg Monopole Division, 367, 04/15/1997	1615369	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 67310-0038, 07/01/2010	2680348	CCISITES
PROPOSED REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF, 37517-0330.001.7700, 01/30/2017	6679153	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 modified in conformance with the referenced modification drawings.
5) Monopole will be modified in conformance with the referenced proposed modification drawings.
6) The existing welded flange connection reinforcing at the 40-ft and 80-ft flange were found to be ineffective for the proposed loading. Therefore, we did not consider the existing reinforcing elements in the strength calculations

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 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	137 - 125	Pole	P 12 STD	1	-0.72	459.24	3.9	Pass
L2	125 - 120	Pole	P24x0.375	2	-4.65	876.73	7.1	Pass
L3	120 - 89.25	Pole	P24x0.375	3	-12.88	876.73	85.3	Pass
L4	89.25 - 85.7296	Pole	RPS 24" x 0.49306"	4	-13.52	1081.44	76.9	Pass
L5	85.7296 - 80	Pole	RPS 24" x 0.63122"	5	-14.83	1095.64	90.8	Pass
L6	80 - 65.5	Pole	36" x 0.375"	6	-18.26	1313.82	78.0	Pass
L7	65.5 - 58.6458	Pole	RPS 36" x 0.45838"	7	-19.90	1544.04	74.5	Pass
L8	58.6458 - 57.5	Pole	RPS 36" x 0.60174"	8	-20.25	1833.28	61.5	Pass
L9	57.5 - 49.5	Pole	RPS 36" x 0.50555"	9	-22.45	1592.61	83.9	Pass
L10	49.5 - 40	Pole	RPS 36" x 0.60545"	10	-25.56	1817.12	85.8	Pass
L11	40 - 19.5	Pole	P42x0.5	11	-32.39	2053.42	95.1	Pass
L12	19.5 - 13	Pole	RPS 42" x 0.54732"	12	-34.58	2178.48	95.9	Pass
L13	13 - 1.5	Pole	RPS 42" x 0.63919"	13	-39.00	2390.51	96.9	Pass
L14	1.5 - 0	Pole	RPS 42" x 0.71268"	14	-39.63	2417.68	97.2	Pass
							Summary	
						Pole (L14)	97.2	Pass
						Rating =	97.2	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Connection	120	26.0	Pass
1	Flange Connection	80	97.5	Pass
1	Flange Connection	40	81.3	Pass
1	Anchor Rods	0	82.6	Pass
1	Base Plate	0	51.6	Pass
1	Base Foundation Structural Steel	0	70.5	Pass
1	Base Foundation Soil Interaction	0	27.8	Pass

Structure Rating (max from all components) =	**97.5%**

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

4.1) Recommendations

The monopole and its foundation will have sufficient capacity to carry the proposed loading configuration once the proposed modifications are installed.

- Install the proposed modifications per the referenced drawings.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
Basic wind speed of 97.0 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.00 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50.0 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60.0 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	137.00-125.00	12.00	P 12 STD	A53-B-35 (35 ksi)	
L2	125.00-120.00	5.00	P24x0.375	A53-B-35 (35 ksi)	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L3	120.00-89.25	30.75	P24x0.375	A53-B-35 (35 ksi)	
L4	89.25-85.73	3.52	RPS 24" x 0.49306"	Reinf 33.41 ksi (33 ksi)	
L5	85.73-80.00	5.73	RPS 24" x 0.63122"	Reinf 26.27 ksi (26 ksi)	
L6	80.00-65.50	14.50	36" x 0.375"	A53-B-35 (35 ksi)	
L7	65.50-58.65	6.85	RPS 36" x 0.45838"	Reinf 33.52 ksi (34 ksi)	
L8	58.65-57.50	1.15	RPS 36" x 0.60174"	Reinf 30.44 ksi (30 ksi)	
L9	57.50-49.50	8.00	RPS 36" x 0.50555"	Reinf 31.39 ksi (31 ksi)	
L10	49.50-40.00	9.50	RPS 36" x 0.60545"	Reinf 29.99 ksi (30 ksi)	
L11	40.00-19.50	20.50	P42x0.5	A53-B-35 (35 ksi)	
L12	19.50-13.00	6.50	RPS 42" x 0.54732"	Reinf 33.96 ksi (34 ksi)	
L13	13.00-1.50	11.50	RPS 42" x 0.63919"	Reinf 31.98 ksi (32 ksi)	
L14	1.50-0.00	1.50	RPS 42" x 0.71268"	Reinf 29.06 ksi (29 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 137.00-125.00				1	1	1			
L2 125.00-120.00				1	1	1			
L3 120.00-89.25				1	1	1			
L4 89.25-85.73				1	1	1			
L5 85.73-80.00				1	1	1			
L6 80.00-65.50				1	1	1			
L7 65.50-58.65				1	1	1			
L8 58.65-57.50				1	1	1			
L9 57.50-49.50				1	1	1			
L10 49.50-40.00				1	1	1			
L11 40.00-19.50				1	1	1			
L12 19.50-13.00				1	1	1			
L13 13.00-1.50				1	1	1			
L14 1.50-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF4-50A(1/2)	C	No	Inside Pole	124.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
9207(5/16")	C	No	Inside Pole	124.00 - 0.00	6	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
2" Conduit	C	No	Inside Pole	124.00 - 0.00	2	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
HB114-1-08U4-M5J(1 1/4")	C	No	Inside Pole	124.00 - 0.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	1.08
						1" Ice	0.00	1.08
HB114-21U3M12-XXXF(1-1/4")	C	No	Inside Pole	124.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
***								
LDF5-50A(7/8")	C	No	Inside Pole	113.00 - 0.00	12	No Ice	0.00	0.33
						1/2" Ice	0.00	0.33
						1" Ice	0.00	0.33
FB-L98B-002-75000(3/8")	C	No	Inside Pole	113.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	113.00 - 0.00	4	No Ice	0.00	0.59
						1/2" Ice	0.00	0.59
						1" Ice	0.00	0.59
2" Conduit	C	No	Inside Pole	113.00 - 0.00	1	No Ice	0.00	1.16
						1/2" Ice	0.00	1.16
						1" Ice	0.00	1.16
***								
LDF2-50(3/8")	C	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	0.08
						1/2" Ice	0.00	0.08
						1" Ice	0.00	0.08
FXL 780 PE(7/8)	C	No	Inside Pole	92.00 - 0.00	6	No Ice	0.00	0.25
						1/2" Ice	0.00	0.25
						1" Ice	0.00	0.25
***								
LDF4-50A(1/2")	C	No	Inside Pole	50.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
***								
WT 4x6.5 Step Ladder	C	No	CaAa (Out Of Face)	40.00 - 0.00	1	No Ice	0.67	6.50
						1/2" Ice	0.78	8.75
						1" Ice	0.89	11.34
WT 4x6.5 Step Ladder	C	No	CaAa (Out Of Face)	80.00 - 40.00	1	No Ice	0.67	6.50
						1/2" Ice	0.78	8.75
						1" Ice	0.89	11.34
***								
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	14.50 - 0.00	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	59.00 - 40.25	1	No Ice	0.17	0.00
						1/2" Ice	0.28	0.00
						1" Ice	0.39	0.00
3/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	86.00 - 80.25	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
***								
3/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	20.50 - 0.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
3/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	50.50 - 40.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
3/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	66.50 - 56.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
3/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	90.50 - 80.50	1	No Ice	0.13	0.00
						1/2" Ice	0.24	0.00
						1" Ice	0.35	0.00
1 1/4" Flat Reinforcement	A	No	CaAa (Out Of Face)	44.25 - 35.75	1	No Ice	0.21	28.00
						1/2" Ice	0.32	29.59
						1" Ice	0.43	31.90
1" Flat Reinforcement	A	No	CaAa (Out Of Face)	83.25 - 76.75	1	No Ice	0.17	15.00
						1/2" Ice	0.28	16.80
						1" Ice	0.39	18.60

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***										
LLPX310R-V4 w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	124.00	No Ice	4.44	2.85	0.04
			0.00				1/2" Ice	4.77	3.37	0.08
			0.00				1" Ice	5.10	3.90	0.12
LLPX310R-V4 w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	124.00	No Ice	4.44	2.85	0.04
			0.00				1/2" Ice	4.77	3.37	0.08
			0.00				1" Ice	5.10	3.90	0.12
LLPX310R-V4 w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	124.00	No Ice	4.44	2.85	0.04
			0.00				1/2" Ice	4.77	3.37	0.08
			0.00				1" Ice	5.10	3.90	0.12
WIMAX DAP HEAD	A	From Leg	4.00	0.00	0.000	124.00	No Ice	1.55	0.68	0.03
			0.00				1/2" Ice	1.70	0.80	0.04
			0.00				1" Ice	1.87	0.92	0.06
WIMAX DAP HEAD	B	From Leg	4.00	0.00	0.000	124.00	No Ice	1.55	0.68	0.03
			0.00				1/2" Ice	1.70	0.80	0.04
			0.00				1" Ice	1.87	0.92	0.06
WIMAX DAP HEAD	C	From Leg	4.00	0.00	0.000	124.00	No Ice	1.55	0.68	0.03
			0.00				1/2" Ice	1.70	0.80	0.04
			0.00				1" Ice	1.87	0.92	0.06
WIMAX DAP HEAD	B	From Leg	4.00	0.00	0.000	124.00	No Ice	1.55	0.68	0.03
			0.00				1/2" Ice	1.70	0.80	0.04
			7.00				1" Ice	1.87	0.92	0.06
WIMAX DAP HEAD	C	From Leg	4.00	0.00	0.000	124.00	No Ice	1.55	0.68	0.03
			0.00				1/2" Ice	1.70	0.80	0.04
			7.00				1" Ice	1.87	0.92	0.06
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	124.00	No Ice	8.26	6.95	0.08
			0.00				1/2" Ice	8.82	8.13	0.15
			0.00				1" Ice	9.35	9.02	0.23
APXV9ERR18-C-A20 w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	124.00	No Ice	8.26	7.47	0.09
			0.00				1/2" Ice	8.82	8.66	0.16
			0.00				1" Ice	9.35	9.56	0.24
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	124.00	No Ice	8.26	6.95	0.08
			0.00				1/2" Ice	8.82	8.13	0.15
			0.00				1" Ice	9.35	9.02	0.23

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
IBC1900BB-1	A	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	B	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900BB-1	C	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	A	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	B	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
IBC1900HG-2A	C	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	0.97 1.09 1.22	0.46 0.56 0.66	0.02 0.03 0.04
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	0.000	124.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
Platform Mount (LP 101-1)	C	None		0.000	124.00	No Ice 1/2" Ice 1" Ice	36.21 42.82 49.43	36.21 42.82 49.43	1.50 2.30 3.10
****									
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.00 0.00 3.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.00 0.00 3.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	0.06 0.08 0.11
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.00 0.00 3.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.32 2.53 2.74	2.24 2.44 2.65	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
800MHz 2X50W RRH W/FILTER	A	From Leg	1.00 0.00 0.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	B	From Leg	1.00 0.00 0.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
800MHz 2X50W RRH W/FILTER	C	From Leg	1.00 0.00 0.00	0.000	122.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.93 2.11 2.29	0.06 0.09 0.11
Pipe Mount [PM 601-3]	C	None		0.000	122.00	No Ice 1/2" Ice 1" Ice	4.39 5.48 6.57	4.39 5.48 6.57	0.20 0.24 0.28
***									
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	8.37 8.93 9.46	8.46 9.66 10.55	0.14 0.21 0.30
(2) TPX-070821	A	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	B	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
(2) TPX-070821	C	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	0.47 0.56 0.66	0.10 0.15 0.20	0.01 0.01 0.02
RRUS 32 B2	A	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B2	B	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
RRUS 32 B2	C	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	2.73 2.95 3.18	1.67 1.86 2.05	0.05 0.07 0.10
Miscellaneous [NA 507-1]	C	None		0.000	113.00	No Ice 1/2" Ice 1" Ice	4.80 6.70 8.60	4.80 6.70 8.60	0.25 0.29 0.34
OPA-65R-LCUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.12 0.21 0.32
OPA-65R-LCUU-H8 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.000	113.00	No Ice 1/2" Ice 1" Ice	12.98 13.67 14.36	9.32 10.79 12.24	0.12 0.21 0.32

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
OPA-65R-LCUU-H8 w/ Mount Pipe	C	From Leg	4.00	0.000		113.00	No Ice	12.98	9.32	0.12
			0.00				1/2" Ice	13.67	10.79	0.21
			2.00				1" Ice	14.36	12.24	0.32
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.000		113.00	No Ice	5.81	4.62	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.000		113.00	No Ice	5.81	4.62	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.000		113.00	No Ice	5.81	4.62	0.09
			0.00				1/2" Ice	6.27	5.51	0.14
			2.00				1" Ice	6.70	6.21	0.21
RRUS 32 B30	A	From Leg	4.00	0.000		113.00	No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07
			2.00				1" Ice	3.19	2.05	0.10
RRUS 32 B30	B	From Leg	4.00	0.000		113.00	No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07
			2.00				1" Ice	3.19	2.05	0.10
RRUS 32 B30	C	From Leg	4.00	0.000		113.00	No Ice	2.74	1.67	0.05
			0.00				1/2" Ice	2.96	1.86	0.07
			2.00				1" Ice	3.19	2.05	0.10
RRUS-11	A	From Leg	4.00	0.000		113.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			2.00				1" Ice	3.21	1.50	0.09
RRUS-11	B	From Leg	4.00	0.000		113.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			2.00				1" Ice	3.21	1.50	0.09
RRUS-11	C	From Leg	4.00	0.000		113.00	No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			2.00				1" Ice	3.21	1.50	0.09
(2) LGP21401	A	From Leg	4.00	0.000		113.00	No Ice	1.10	0.35	0.01
			0.00				1/2" Ice	1.24	0.44	0.02
			2.00				1" Ice	1.38	0.54	0.03
(2) LGP21401	B	From Leg	4.00	0.000		113.00	No Ice	1.10	0.35	0.01
			0.00				1/2" Ice	1.24	0.44	0.02
			2.00				1" Ice	1.38	0.54	0.03
(2) LGP21401	C	From Leg	4.00	0.000		113.00	No Ice	1.10	0.35	0.01
			0.00				1/2" Ice	1.24	0.44	0.02
			2.00				1" Ice	1.38	0.54	0.03
DC6-48-60-18-8F	A	From Leg	4.00	0.000		113.00	No Ice	0.92	0.92	0.02
			0.00				1/2" Ice	1.46	1.46	0.04
			2.00				1" Ice	1.64	1.64	0.06
DC6-48-60-18-8F	B	From Leg	4.00	0.000		113.00	No Ice	0.92	0.92	0.02
			0.00				1/2" Ice	1.46	1.46	0.04
			2.00				1" Ice	1.64	1.64	0.06
Platform Mount [LP 601-1]	C	None		0.000		113.00	No Ice	28.47	28.47	1.12
							1/2" Ice	33.59	33.59	1.51
							1" Ice	38.71	38.71	1.91

****

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
HBX-6516DS-VTM w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.000	92.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.000	92.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
HBX-6516DS-VTM w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	0.000	92.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.39	3.24 3.91 4.56	0.03 0.06 0.10
T-Arm Mount [TA 602-3]	C	None		0.000	92.00	No Ice 1/2" Ice 1" Ice	11.59 15.44 19.29	11.59 15.44 19.29	0.77 0.99 1.21
****									
KS24019-L112A	C	From Leg	1.00 0.00 0.00	0.000	50.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
Side Arm Mount [SO 701-1]	C	None		0.000	50.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
***									
Bridge Stiffener (53" x 9" x 1")	A	None		0.000	40.00	No Ice 1/2" Ice 1" Ice	4.47 4.81 5.16	0.74 1.24 1.71	0.11 0.13 0.15
Bridge Stiffener (53" x 9" x 1")	B	None		0.000	40.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.11 0.13 0.15
Bridge Stiffener (53" x 9" x 1")	C	None		0.000	40.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.11 0.13 0.15
Bridge Stiffener (43" x 9.5" x 1")	A	None		0.000	80.00	No Ice 1/2" Ice 1" Ice	3.66 3.95 4.24	0.60 1.01 1.29	0.12 0.13 0.15
Bridge Stiffener (43" x 9.5" x 1")	B	None		0.000	80.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.12 0.13 0.15
Bridge Stiffener (43" x 9.5" x 1")	C	None		0.000	80.00	No Ice 1/2" Ice 1" Ice	0.00 0.00 0.00	0.00 0.00 0.00	0.12 0.13 0.15

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
VHLP2.5-18	B	Paraboloid	From	4.00	0.000		124.00	2.92	No Ice	6.68	0.05

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
		w/Shroud (HP)	Leg	0.00					1/2" Ice	7.07	0.08
				7.00					1" Ice	7.46	0.12
VHLP1-23	C	Paraboloid w/o Radome	From Leg	4.00	0.000		124.00	1.27	No Ice	1.28	0.01
				0.00					1/2" Ice	1.45	0.02
				7.00					1" Ice	1.62	0.03

Tower Pressures - No Ice

G_H = 1.100

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 137.00-125.00	131.00	1.34	31	12.750	A	0.000	12.750	12.750	100.00	0.000	0.000
					B	0.000	12.750		100.00	0.000	0.000
					C	0.000	12.750		100.00	0.000	0.000
L2 125.00-120.00	122.50	1.321	30	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	0.000
L3 120.00-89.25	104.74	1.278	29	61.500	A	0.000	61.500	61.500	100.00	0.000	0.156
					B	0.000	61.500		100.00	0.000	0.000
					C	0.000	61.500		100.00	0.000	0.000
L4 89.25-85.73	87.49	1.231	28	7.041	A	0.000	7.041	7.041	100.00	0.000	0.474
					B	0.000	7.041		100.00	0.000	0.000
					C	0.000	7.041		100.00	0.000	0.000
L5 85.73-80.00	82.86	1.217	28	11.459	A	0.000	11.459	11.459	100.00	0.000	1.880
					B	0.000	11.459		100.00	0.000	0.000
					C	0.000	11.459		100.00	0.000	0.000
L6 80.00-65.50	72.75	1.184	27	43.500	A	0.000	43.500	43.500	100.00	0.000	0.667
					B	0.000	43.500		100.00	0.000	0.000
					C	0.000	43.500		100.00	0.000	9.667
L7 65.50-58.65	62.07	1.145	26	20.563	A	0.000	20.563	20.563	100.00	0.000	0.916
					B	0.000	20.563		100.00	0.000	0.000
					C	0.000	20.563		100.00	0.000	4.570
L8 58.65-57.50	58.07	1.129	26	3.437	A	0.000	3.437	3.437	100.00	0.000	0.334
					B	0.000	3.437		100.00	0.000	0.000
					C	0.000	3.437		100.00	0.000	0.764
L9 57.50-49.50	53.50	1.109	25	24.000	A	0.000	24.000	24.000	100.00	0.000	1.583
					B	0.000	24.000		100.00	0.000	0.000
					C	0.000	24.000		100.00	0.000	5.333
L10 49.50-40.00	44.75	1.069	24	28.500	A	0.000	28.500	28.500	100.00	0.000	3.552
					B	0.000	28.500		100.00	0.000	0.000
					C	0.000	28.500		100.00	0.000	6.333
L11 40.00-19.50	29.75	0.981	22	71.750	A	0.000	71.750	71.750	100.00	0.000	1.010
					B	0.000	71.750		100.00	0.000	0.000
					C	0.000	71.750		100.00	0.000	13.667
L12 19.50-13.00	16.25	0.863	20	22.750	A	0.000	22.750	22.750	100.00	0.000	1.063
					B	0.000	22.750		100.00	0.000	0.000
					C	0.000	22.750		100.00	0.000	4.333
L13 13.00-1.50	7.25	0.85	19	40.250	A	0.000	40.250	40.250	100.00	0.000	3.354
					B	0.000	40.250		100.00	0.000	0.000
					C	0.000	40.250		100.00	0.000	7.667
L14 1.50-0.00	0.75	0.85	19	5.250	A	0.000	5.250	5.250	100.00	0.000	0.375
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.000

Tower Pressure - With Ice

G_H = 1.100

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 137.00-125.00	131.00	1.34	8	2.30	17.341	A	0.000	17.341	17.341	100.00	0.000	0.000
						B	0.000	17.341		100.00	0.000	0.000
						C	0.000	17.341		100.00	0.000	0.000
L2 125.00-120.00	122.50	1.321	8	2.28	11.900	A	0.000	11.900	11.900	100.00	0.000	0.000
						B	0.000	11.900		100.00	0.000	0.000
						C	0.000	11.900		100.00	0.000	0.000
L3 120.00-89.25	104.74	1.278	8	2.24	73.005	A	0.000	73.005	73.005	100.00	0.000	0.780
						B	0.000	73.005		100.00	0.000	0.000
						C	0.000	73.005		100.00	0.000	0.000
L4 89.25-85.73	87.49	1.231	7	2.20	8.334	A	0.000	8.334	8.334	100.00	0.000	2.331
						B	0.000	8.334		100.00	0.000	0.000
						C	0.000	8.334		100.00	0.000	0.000
L5 85.73-80.00	82.86	1.217	7	2.19	13.553	A	0.000	13.553	13.553	100.00	0.000	8.683
						B	0.000	13.553		100.00	0.000	0.000
						C	0.000	13.553		100.00	0.000	0.000
L6 80.00-65.50	72.75	1.184	7	2.16	48.731	A	0.000	48.731	48.731	100.00	0.000	2.711
						B	0.000	48.731		100.00	0.000	0.000
						C	0.000	48.731		100.00	0.000	16.641
L7 65.50-58.65	62.07	1.145	7	2.13	22.996	A	0.000	22.996	22.996	100.00	0.000	4.329
						B	0.000	22.996		100.00	0.000	0.000
						C	0.000	22.996		100.00	0.000	7.814
L8 58.65-57.50	58.07	1.129	7	2.12	3.842	A	0.000	3.842	3.842	100.00	0.000	1.412
						B	0.000	3.842		100.00	0.000	0.000
						C	0.000	3.842		100.00	0.000	1.303
L9 57.50-49.50	53.50	1.109	7	2.10	26.799	A	0.000	26.799	26.799	100.00	0.000	6.248
						B	0.000	26.799		100.00	0.000	0.000
						C	0.000	26.799		100.00	0.000	9.065
L10 49.50-40.00	44.75	1.069	6	2.06	31.765	A	0.000	31.765	31.765	100.00	0.000	13.861
						B	0.000	31.765		100.00	0.000	0.000
						C	0.000	31.765		100.00	0.000	10.686
L11 40.00-19.50	29.75	0.981	6	1.98	78.513	A	0.000	78.513	78.513	100.00	0.000	3.320
						B	0.000	78.513		100.00	0.000	0.000
						C	0.000	78.513		100.00	0.000	22.684
L12 19.50-13.00	16.25	0.863	5	1.86	24.768	A	0.000	24.768	24.768	100.00	0.000	4.375
						B	0.000	24.768		100.00	0.000	0.000
						C	0.000	24.768		100.00	0.000	7.025
L13 13.00-1.50	7.25	0.85	5	1.72	43.544	A	0.000	43.544	43.544	100.00	0.000	12.139
						B	0.000	43.544		100.00	0.000	0.000
						C	0.000	43.544		100.00	0.000	12.059
L14 1.50-0.00	0.75	0.85	5	1.37	5.592	A	0.000	5.592	5.592	100.00	0.000	1.136
						B	0.000	5.592		100.00	0.000	0.000
						C	0.000	5.592		100.00	0.000	1.457

Tower Pressure - Service

G_H = 1.100

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 137.00-125.00	131.00	1.34	10	12.750	A	0.000	12.750	12.750	100.00	0.000	0.000
					B	0.000	12.750		100.00	0.000	0.000
					C	0.000	12.750		100.00	0.000	0.000
L2 125.00-120.00	122.50	1.321	10	10.000	A	0.000	10.000	10.000	100.00	0.000	0.000
					B	0.000	10.000		100.00	0.000	0.000
					C	0.000	10.000		100.00	0.000	0.000
L3 120.00-89.25	104.74	1.278	10	61.500	A	0.000	61.500	61.500	100.00	0.000	0.156
					B	0.000	61.500		100.00	0.000	0.000
					C	0.000	61.500		100.00	0.000	0.000
L4 89.25-85.73	87.49	1.231	10	7.041	A	0.000	7.041	7.041	100.00	0.000	0.474
					B	0.000	7.041		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
					C	0.000	7.041		100.00	0.000	0.000
L5 85.73-80.00	82.86	1.217	10	11.459	A	0.000	11.459	11.459	100.00	0.000	1.880
					B	0.000	11.459		100.00	0.000	0.000
					C	0.000	11.459		100.00	0.000	0.000
L6 80.00-65.50	72.75	1.184	9	43.500	A	0.000	43.500	43.500	100.00	0.000	0.667
					B	0.000	43.500		100.00	0.000	0.000
					C	0.000	43.500		100.00	0.000	9.667
L7 65.50-58.65	62.07	1.145	9	20.563	A	0.000	20.563	20.563	100.00	0.000	0.916
					B	0.000	20.563		100.00	0.000	0.000
					C	0.000	20.563		100.00	0.000	4.570
L8 58.65-57.50	58.07	1.129	9	3.437	A	0.000	3.437	3.437	100.00	0.000	0.334
					B	0.000	3.437		100.00	0.000	0.000
					C	0.000	3.437		100.00	0.000	0.764
L9 57.50-49.50	53.50	1.109	9	24.000	A	0.000	24.000	24.000	100.00	0.000	1.583
					B	0.000	24.000		100.00	0.000	0.000
					C	0.000	24.000		100.00	0.000	5.333
L10 49.50-40.00	44.75	1.069	8	28.500	A	0.000	28.500	28.500	100.00	0.000	3.552
					B	0.000	28.500		100.00	0.000	0.000
					C	0.000	28.500		100.00	0.000	6.333
L11 40.00-19.50	29.75	0.981	8	71.750	A	0.000	71.750	71.750	100.00	0.000	1.010
					B	0.000	71.750		100.00	0.000	0.000
					C	0.000	71.750		100.00	0.000	13.667
L12 19.50-13.00	16.25	0.863	7	22.750	A	0.000	22.750	22.750	100.00	0.000	1.063
					B	0.000	22.750		100.00	0.000	0.000
					C	0.000	22.750		100.00	0.000	4.333
L13 13.00-1.50	7.25	0.85	7	40.250	A	0.000	40.250	40.250	100.00	0.000	3.354
					B	0.000	40.250		100.00	0.000	0.000
					C	0.000	40.250		100.00	0.000	7.667
L14 1.50-0.00	0.75	0.85	7	5.250	A	0.000	5.250	5.250	100.00	0.000	0.375
					B	0.000	5.250		100.00	0.000	0.000
					C	0.000	5.250		100.00	0.000	1.000

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	137 - 125	Pole	Max Tension	20	0.00	0	0
			Max. Compression	26	-1.49	-1	-1
			Max. Mx	8	-0.72	-6	-1
			Max. My	14	-0.73	-1	-5
			Max. Vy	20	-0.95	5	1
			Max. Vx	2	-0.82	1	5
			Max. Torque	4			-1
L2	125 - 120	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-14.94	-1	-1
			Max. Mx	20	-4.64	35	1
			Max. My	14	-4.66	-2	-33
			Max. Vy	20	-7.27	35	1
			Max. Vx	2	-7.12	1	33
			Max. Torque	4			-1
L3	120 - 89.25	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-35.01	-1	-1
			Max. Mx	20	-12.88	451	5
			Max. My	2	-12.90	5	444
			Max. Vy	20	-16.57	451	5
			Max. Vx	2	-16.42	5	444
			Max. Torque	4			-1
L4	89.25 - 85.7296	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-35.85	-1	-1
			Max. Mx	20	-13.52	509	6
			Max. My	2	-13.53	6	502
			Max. Vy	20	-16.79	509	6
			Max. Vx	2	-16.63	6	502
			Max. Torque	4			-1
L5	85.7296 - 80	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-37.54	-1	-1
			Max. Mx	20	-14.83	607	7
			Max. My	2	-14.85	7	599
			Max. Vy	20	-17.25	607	7
			Max. Vx	2	-17.09	7	599
			Max. Torque	4			-1
L6	80 - 65.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-42.90	-1	-1
			Max. Mx	20	-18.26	875	9
			Max. My	2	-18.27	9	865

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-19.54	875	9
			Max. Vx	2	-19.39	9	865
			Max. Torque	4			-1
L7	65.5 - 58.6458	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-45.28	-1	-1
			Max. Mx	20	-19.90	1014	10
			Max. My	2	-19.92	10	1002
			Max. Vy	20	-20.92	1014	10
			Max. Vx	2	-20.76	10	1002
			Max. Torque	4			-1
L8	58.6458 - 57.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-45.75	-1	-1
			Max. Mx	20	-20.25	1038	10
			Max. My	2	-20.27	10	1026
			Max. Vy	20	-21.16	1038	10
			Max. Vx	2	-21.00	10	1026
			Max. Torque	6			-1
L9	57.5 - 49.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-48.85	-1	-1
			Max. Mx	20	-22.45	1214	11
			Max. My	2	-22.46	11	1201
			Max. Vy	20	-22.80	1214	11
			Max. Vx	2	-22.64	11	1201
			Max. Torque	22			1
L10	49.5 - 40	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-52.94	0	-1
			Max. Mx	20	-25.56	1439	12
			Max. My	2	-25.57	12	1425
			Max. Vy	20	-24.64	1439	12
			Max. Vx	2	-24.48	12	1425
			Max. Torque	22			1
L11	40 - 19.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-62.26	0	-1
			Max. Mx	20	-32.39	1973	15
			Max. My	2	-32.40	15	1955
			Max. Vy	20	-27.23	1973	15
			Max. Vx	2	-27.08	15	1955
			Max. Torque	24			2
L12	19.5 - 13	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-65.05	1	-1
			Max. Mx	20	-34.58	2152	16
			Max. My	2	-34.58	16	2134
			Max. Vy	20	-27.91	2152	16
			Max. Vx	2	-27.76	16	2134
			Max. Torque	24			2
L13	13 - 1.5	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-70.44	1	-1
			Max. Mx	20	-39.00	2484	18
			Max. My	2	-39.00	18	2463
			Max. Vy	20	-29.69	2484	18
			Max. Vx	2	-29.54	18	2463
			Max. Torque	24			3
L14	1.5 - 0	Pole	Max Tension	1	0.00	0	0
			Max. Compression	26	-71.16	1	-1
			Max. Mx	20	-39.63	2528	18
			Max. My	2	-39.63	18	2507
			Max. Vy	20	-29.92	2528	18
			Max. Vx	2	-29.77	18	2507
			Max. Torque	24			3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	71.16	0.00	0.00
	Max. H_x	21	29.74	29.90	0.13
	Max. H_z	2	39.65	0.13	29.75
	Max. M_x	2	2507	0.13	29.75
	Max. M_z	8	2520	-29.84	-0.05
	Max. Torsion	24	3	15.05	25.77
	Min. Vert	21	29.74	29.90	0.13
	Min. H_x	8	39.65	-29.84	-0.05
	Min. H_z	14	39.65	-0.12	-29.70
	Min. M_x	14	-2501	-0.12	-29.70
	Min. M_z	20	-2528	29.90	0.13
	Min. Torsion	12	-3	-14.98	-25.70

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	33.04	0.00	0.00	0	0	0
1.2 Dead+1.6 Wind 0 deg - No Ice	39.65	-0.13	-29.75	-2507	18	-2
0.9 Dead+1.6 Wind 0 deg - No Ice	29.74	-0.13	-29.75	-2488	18	-2
1.2 Dead+1.6 Wind 30 deg - No Ice	39.65	14.96	-25.69	-2161	-1265	-1
0.9 Dead+1.6 Wind 30 deg - No Ice	29.74	14.96	-25.69	-2145	-1255	-1
1.2 Dead+1.6 Wind 60 deg - No Ice	39.65	25.88	-14.77	-1239	-2187	0
0.9 Dead+1.6 Wind 60 deg - No Ice	29.74	25.88	-14.77	-1230	-2170	0
1.2 Dead+1.6 Wind 90 deg - No Ice	39.65	29.84	0.05	7	-2520	1
0.9 Dead+1.6 Wind 90 deg - No Ice	29.74	29.84	0.05	7	-2500	1
1.2 Dead+1.6 Wind 120 deg - No Ice	39.65	25.90	14.83	1248	-2189	2
0.9 Dead+1.6 Wind 120 deg - No Ice	29.74	25.90	14.83	1238	-2173	2
1.2 Dead+1.6 Wind 150 deg - No Ice	39.65	14.98	25.70	2163	-1268	3
0.9 Dead+1.6 Wind 150 deg - No Ice	29.74	14.98	25.70	2147	-1258	3
1.2 Dead+1.6 Wind 180 deg - No Ice	39.65	0.12	29.70	2501	-16	2
0.9 Dead+1.6 Wind 180 deg - No Ice	29.74	0.12	29.70	2482	-16	2
1.2 Dead+1.6 Wind 210 deg - No Ice	39.65	-14.83	25.73	2167	1248	1
0.9 Dead+1.6 Wind 210 deg - No Ice	29.74	-14.83	25.73	2150	1239	1
1.2 Dead+1.6 Wind 240 deg - No Ice	39.65	-25.91	14.69	1228	2192	0
0.9 Dead+1.6 Wind 240 deg - No Ice	29.74	-25.91	14.69	1219	2175	0
1.2 Dead+1.6 Wind 270 deg - No Ice	39.65	-29.90	-0.13	-18	2528	-1
0.9 Dead+1.6 Wind 270 deg - No Ice	29.74	-29.90	-0.13	-18	2509	-1
1.2 Dead+1.6 Wind 300 deg - No Ice	39.65	-25.91	-14.93	-1261	2192	-2
0.9 Dead+1.6 Wind 300 deg - No Ice	29.74	-25.91	-14.93	-1251	2175	-2
1.2 Dead+1.6 Wind 330 deg - No Ice	39.65	-15.05	-25.77	-2171	1278	-3

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.6 Wind 330 deg - No Ice	29.74	-15.05	-25.77	-2155	1268	-3
1.2 Dead+1.0 Ice+1.0 Temp	71.16	-0.00	-0.00	1	1	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	71.16	-0.02	-8.87	-823	4	-1
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	71.16	4.46	-7.66	-710	-414	0
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	71.16	7.71	-4.41	-407	-717	0
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	71.16	8.89	0.01	3	-827	0
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	71.16	7.71	4.42	412	-718	0
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	71.16	4.45	7.66	713	-414	1
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	71.16	0.02	8.86	824	-3	1
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	71.16	-4.42	7.67	714	412	0
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	71.16	-7.71	4.39	408	719	0
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	71.16	-8.90	-0.03	-2	830	0
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	71.16	-7.71	-4.44	-412	719	0
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	71.16	-4.47	-7.68	-712	418	-1
Dead+Wind 0 deg - Service	33.04	-0.03	-6.37	-534	4	0
Dead+Wind 30 deg - Service	33.04	3.20	-5.50	-460	-269	0
Dead+Wind 60 deg - Service	33.04	5.54	-3.16	-264	-465	0
Dead+Wind 90 deg - Service	33.04	6.39	0.01	2	-536	0
Dead+Wind 120 deg - Service	33.04	5.54	3.17	266	-466	0
Dead+Wind 150 deg - Service	33.04	3.21	5.50	461	-270	0
Dead+Wind 180 deg - Service	33.04	0.03	6.36	533	-3	0
Dead+Wind 210 deg - Service	33.04	-3.17	5.50	462	266	0
Dead+Wind 240 deg - Service	33.04	-5.54	3.14	262	467	0
Dead+Wind 270 deg - Service	33.04	-6.40	-0.03	-4	539	0
Dead+Wind 300 deg - Service	33.04	-5.54	-3.19	-268	467	0
Dead+Wind 330 deg - Service	33.04	-3.22	-5.51	-462	273	0

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-33.04	0.00	0.00	33.04	-0.00	0.000%
2	-0.13	-39.65	-29.75	0.13	39.65	29.75	0.004%
3	-0.13	-29.74	-29.75	0.13	29.74	29.75	0.007%
4	14.96	-39.65	-25.69	-14.96	39.65	25.69	0.000%
5	14.96	-29.74	-25.69	-14.96	29.74	25.69	0.000%
6	25.88	-39.65	-14.77	-25.88	39.65	14.77	0.000%
7	25.88	-29.74	-14.77	-25.88	29.74	14.77	0.000%
8	29.85	-39.65	0.05	-29.84	39.65	-0.05	0.004%
9	29.85	-29.74	0.05	-29.84	29.74	-0.05	0.007%
10	25.90	-39.65	14.83	-25.90	39.65	-14.83	0.000%
11	25.90	-29.74	14.83	-25.90	29.74	-14.83	0.000%
12	14.98	-39.65	25.70	-14.98	39.65	-25.70	0.000%
13	14.98	-29.74	25.70	-14.98	29.74	-25.70	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0.12	-39.65	29.71	-0.12	39.65	-29.70	0.004%
15	0.12	-29.74	29.71	-0.12	29.74	-29.70	0.007%
16	-14.83	-39.65	25.73	14.83	39.65	-25.73	0.000%
17	-14.83	-29.74	25.73	14.83	29.74	-25.73	0.000%
18	-25.91	-39.65	14.69	25.91	39.65	-14.69	0.000%
19	-25.91	-29.74	14.69	25.91	29.74	-14.69	0.000%
20	-29.90	-39.65	-0.13	29.90	39.65	0.13	0.008%
21	-29.90	-29.74	-0.13	29.90	29.74	0.13	0.007%
22	-25.91	-39.65	-14.93	25.91	39.65	14.93	0.000%
23	-25.91	-29.74	-14.93	25.91	29.74	14.93	0.000%
24	-15.05	-39.65	-25.77	15.05	39.65	25.77	0.000%
25	-15.05	-29.74	-25.77	15.05	29.74	25.77	0.000%
26	0.00	-71.16	0.00	0.00	71.16	0.00	0.002%
27	-0.02	-71.16	-8.87	0.02	71.16	8.87	0.001%
28	4.46	-71.16	-7.66	-4.46	71.16	7.66	0.001%
29	7.71	-71.16	-4.41	-7.71	71.16	4.41	0.001%
30	8.89	-71.16	0.01	-8.89	71.16	-0.01	0.001%
31	7.71	-71.16	4.42	-7.71	71.16	-4.42	0.001%
32	4.46	-71.16	7.66	-4.45	71.16	-7.66	0.001%
33	0.02	-71.16	8.86	-0.02	71.16	-8.86	0.001%
34	-4.42	-71.16	7.67	4.42	71.16	-7.67	0.001%
35	-7.71	-71.16	4.39	7.71	71.16	-4.39	0.001%
36	-8.90	-71.16	-0.03	8.90	71.16	0.03	0.001%
37	-7.71	-71.16	-4.44	7.71	71.16	4.44	0.001%
38	-4.47	-71.16	-7.68	4.47	71.16	7.68	0.001%
39	-0.03	-33.04	-6.37	0.03	33.04	6.37	0.002%
40	3.20	-33.04	-5.50	-3.20	33.04	5.50	0.002%
41	5.54	-33.04	-3.16	-5.54	33.04	3.16	0.002%
42	6.39	-33.04	0.01	-6.39	33.04	-0.01	0.002%
43	5.54	-33.04	3.17	-5.54	33.04	-3.17	0.002%
44	3.21	-33.04	5.50	-3.21	33.04	-5.50	0.002%
45	0.03	-33.04	6.36	-0.03	33.04	-6.36	0.002%
46	-3.17	-33.04	5.50	3.17	33.04	-5.50	0.002%
47	-5.54	-33.04	3.14	5.54	33.04	-3.14	0.002%
48	-6.40	-33.04	-0.03	6.40	33.04	0.03	0.002%
49	-5.54	-33.04	-3.19	5.54	33.04	3.19	0.002%
50	-3.22	-33.04	-5.51	3.22	33.04	5.51	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	15	0.00004910	0.00007869
3	Yes	14	0.00007545	0.00013771
4	Yes	18	0.00000001	0.00013580
5	Yes	18	0.00000001	0.00010375
6	Yes	18	0.00000001	0.00012852
7	Yes	18	0.00000001	0.00009805
8	Yes	15	0.00004908	0.00008419
9	Yes	14	0.00007541	0.00014523
10	Yes	18	0.00000001	0.00013727
11	Yes	18	0.00000001	0.00010479
12	Yes	18	0.00000001	0.00013131
13	Yes	18	0.00000001	0.00010016
14	Yes	15	0.00004911	0.00007313
15	Yes	14	0.00007547	0.00012879
16	Yes	18	0.00000001	0.00012858
17	Yes	18	0.00000001	0.00009817
18	Yes	18	0.00000001	0.00013350
19	Yes	18	0.00000001	0.00010194
20	Yes	14	0.00010789	0.00013003
21	Yes	14	0.00007539	0.00011215
22	Yes	18	0.00000001	0.00013229
23	Yes	18	0.00000001	0.00010084

24	Yes	18	0.00000001	0.00013850
25	Yes	18	0.00000001	0.00010576
26	Yes	6	0.00000001	0.00003170
27	Yes	17	0.00000001	0.00010972
28	Yes	17	0.00000001	0.00013144
29	Yes	17	0.00000001	0.00013119
30	Yes	17	0.00000001	0.00011089
31	Yes	17	0.00000001	0.00013273
32	Yes	17	0.00000001	0.00013198
33	Yes	17	0.00000001	0.00011019
34	Yes	17	0.00000001	0.00013085
35	Yes	17	0.00000001	0.00013126
36	Yes	17	0.00000001	0.00011058
37	Yes	17	0.00000001	0.00013150
38	Yes	17	0.00000001	0.00013169
39	Yes	14	0.00000001	0.00002794
40	Yes	14	0.00000001	0.00003903
41	Yes	14	0.00000001	0.00002509
42	Yes	14	0.00000001	0.00002773
43	Yes	14	0.00000001	0.00003051
44	Yes	14	0.00000001	0.00003196
45	Yes	14	0.00000001	0.00002871
46	Yes	14	0.00000001	0.00002447
47	Yes	14	0.00000001	0.00003528
48	Yes	14	0.00000001	0.00002786
49	Yes	14	0.00000001	0.00002949
50	Yes	14	0.00000001	0.00002817

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	137 - 125	14.99	48	0.913	0.005
L2	125 - 120	12.70	48	0.907	0.003
L3	120 - 89.25	11.75	48	0.905	0.003
L4	89.25 - 85.7296	6.38	48	0.693	0.001
L5	85.7296 - 80	5.88	48	0.653	0.001
L6	80 - 65.5	5.14	48	0.592	0.001
L7	65.5 - 58.6458	3.48	48	0.495	0.001
L8	58.6458 - 57.5	2.80	48	0.446	0.001
L9	57.5 - 49.5	2.70	48	0.440	0.000
L10	49.5 - 40	2.01	48	0.378	0.000
L11	40 - 19.5	1.33	48	0.306	0.000
L12	19.5 - 13	0.32	48	0.156	0.000
L13	13 - 1.5	0.14	48	0.102	0.000
L14	1.5 - 0	0.00	48	0.012	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131.00	VHLP2.5-18	48	13.84	0.909	0.004	133499
124.00	LLPX310R-V4 w/ Mount Pipe	48	12.51	0.907	0.003	80882
122.00	PCS 1900MHz 4x45W-65MHz	48	12.13	0.906	0.003	83966
113.00	QS66512-2 w/ Mount Pipe	48	10.43	0.886	0.003	17093
92.00	HBX-6516DS-VTM w/ Mount Pipe	48	6.79	0.724	0.001	4752
80.00	Bridge Stiffener (43" x 9.5" x 1")	48	5.14	0.592	0.001	7259
50.00	KS24019-L112A	48	2.05	0.382	0.000	7387
40.00	Bridge Stiffener (53" x 9" x 1")	48	1.33	0.306	0.000	8257

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	137 - 125	70.44	20	4.292	0.021
L2	125 - 120	59.68	20	4.272	0.012
L3	120 - 89.25	55.21	20	4.260	0.011
L4	89.25 - 85.7296	29.97	20	3.261	0.003
L5	85.7296 - 80	27.64	22	3.070	0.003
L6	80 - 65.5	24.13	22	2.783	0.003
L7	65.5 - 58.6458	16.33	22	2.325	0.003
L8	58.6458 - 57.5	13.16	22	2.097	0.002
L9	57.5 - 49.5	12.66	22	2.066	0.002
L10	49.5 - 40	9.43	22	1.777	0.002
L11	40 - 19.5	6.22	22	1.438	0.002
L12	19.5 - 13	1.49	22	0.730	0.001
L13	13 - 1.5	0.67	22	0.481	0.001
L14	1.5 - 0	0.01	22	0.054	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
131.00	VHLP2.5-18	20	65.05	4.281	0.016	33819
124.00	LLPX310R-V4 w/ Mount Pipe	20	58.78	4.271	0.012	20186
122.00	PCS 1900MHz 4x45W-65MHz	20	57.00	4.268	0.011	20264
113.00	QS66512-2 w/ Mount Pipe	20	49.00	4.169	0.009	3694
92.00	HBX-6516DS-VTM w/ Mount Pipe	20	31.91	3.404	0.004	1018
80.00	Bridge Stiffener (43" x 9.5" x 1")	22	24.13	2.783	0.003	1548
50.00	KS24019-L112A	22	9.62	1.796	0.002	1574
40.00	Bridge Stiffener (53" x 9" x 1")	22	6.22	1.438	0.002	1759

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	137 - 125 (1)	P 12 STD	12.00	0.00	0.0	14.58	-0.72	459.24	0.002
L2	125 - 120 (2)	P24x0.375	5.00	0.00	0.0	27.83	-4.65	876.73	0.005
L3	120 - 89.25 (3)	P24x0.375	30.75	0.00	0.0	27.83	-12.88	876.73	0.015
L4	89.25 - 85.7296 (4)	RPS 24" x 0.49306"	3.52	0.00	0.0	36.41	-13.52	1081.44	0.012
L5	85.7296 - 80 (5)	RPS 24" x 0.63122"	5.73	0.00	0.0	46.34	-14.83	1095.64	0.014
L6	80 - 65.5 (6)	36" x 0.375"	14.50	0.00	0.0	41.97	-18.26	1313.82	0.014
L7	65.5 - 58.6458 (7)	RPS 36" x 0.45838"	6.85	0.00	0.0	51.18	-19.90	1544.04	0.013
L8	58.6458 - 57.5 (8)	RPS 36" x 0.60174"	1.15	0.00	0.0	66.92	-20.25	1833.28	0.011
L9	57.5 - 49.5 (9)	RPS 36" x 0.50555"	8.00	0.00	0.0	56.37	-22.45	1592.61	0.014
L10	49.5 - 40 (10)	RPS 36" x 0.60545"	9.50	0.00	0.0	67.32	-25.56	1817.12	0.014
L11	40 - 19.5 (11)	P42x0.5	20.50	0.00	0.0	65.19	-32.39	2053.42	0.016

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
L12	19.5 - 13 (12)	RPS 42" x 0.54732"	6.50	0.00	0.0	71.28	-34.58	2178.48	0.016
L13	13 - 1.5 (13)	RPS 42" x 0.63919"	11.50	0.00	0.0	83.06	-39.00	2390.51	0.016
L14	1.5 - 0 (14)	RPS 42" x 0.71268"	1.50	0.00	0.0	92.44	-39.63	2417.68	0.016

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	137 - 125 (1)	P 12 STD	6	151	0.038	0	151	0.000
L2	125 - 120 (2)	P24x0.375	35	539	0.065	0	539	0.000
L3	120 - 89.25 (3)	P24x0.375	451	539	0.837	0	539	0.000
L4	89.25 - 85.7296 (4)	RPS 24" x 0.49306"	510	674	0.755	0	674	0.000
L5	85.7296 - 80 (5)	RPS 24" x 0.63122"	607	679	0.894	0	679	0.000
L6	80 - 65.5 (6)	36" x 0.375"	875	1145	0.765	0	1145	0.000
L7	65.5 - 58.6458 (7)	RPS 36" x 0.45838"	1014	1386	0.732	0	1386	0.000
L8	58.6458 - 57.5 (8)	RPS 36" x 0.60174"	1038	1722	0.603	0	1722	0.000
L9	57.5 - 49.5 (9)	RPS 36" x 0.50555"	1214	1473	0.824	0	1473	0.000
L10	49.5 - 40 (10)	RPS 36" x 0.60545"	1439	1706	0.844	0	1706	0.000
L11	40 - 19.5 (11)	P42x0.5	1974	2113	0.934	0	2113	0.000
L12	19.5 - 13 (12)	RPS 42" x 0.54732"	2153	2285	0.942	0	2285	0.000
L13	13 - 1.5 (13)	RPS 42" x 0.63919"	2484	2609	0.952	0	2609	0.000
L14	1.5 - 0 (14)	RPS 42" x 0.71268"	2529	2648	0.955	0	2648	0.000

Pole Shear Design Data

Section No.	Elevation	Size	Actual V_u	ϕV_n	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u	ϕT_n	Ratio $\frac{T_u}{\phi T_n}$
	ft		K	K		kip-ft	kip-ft	
L1	137 - 125 (1)	P 12 STD	0.91	229.62	0.004	0	230	0.000
L2	125 - 120 (2)	P24x0.375	7.22	438.36	0.016	0	850	0.000
L3	120 - 89.25 (3)	P24x0.375	16.58	438.36	0.038	0	850	0.000
L4	89.25 - 85.7296 (4)	RPS 24" x 0.49306"	16.80	540.72	0.031	0	1038	0.000
L5	85.7296 - 80 (5)	RPS 24" x 0.63122"	17.26	547.82	0.031	0	1040	0.000
L6	80 - 65.5 (6)	36" x 0.375"	19.55	656.91	0.030	1	1930	0.000
L7	65.5 - 58.6458 (7)	RPS 36" x 0.45838"	20.93	772.02	0.027	1	2258	0.000
L8	58.6458 - 57.5 (8)	RPS 36" x 0.60174"	21.17	916.64	0.023	1	2660	0.000
L9	57.5 - 49.5 (9)	RPS 36" x 0.50555"	22.81	796.30	0.029	1	2323	0.000
L10	49.5 - 40 (10)	RPS 36" x 0.60545"	24.64	908.56	0.027	1	2636	0.000
L11	40 - 19.5 (11)	P42x0.5	27.24	1026.71	0.027	2	3509	0.001
L12	19.5 - 13 (12)	RPS 42" x 0.54732"	27.92	1089.24	0.026	2	3714	0.001
L13	13 - 1.5 (13)	RPS 42" x 0.63919"	29.69	1195.25	0.025	2	4058	0.001
L14	1.5 - 0 (14)	RPS 42" x 0.71268"	29.93	1208.84	0.025	2	4090	0.001

Pole Interaction Design Data

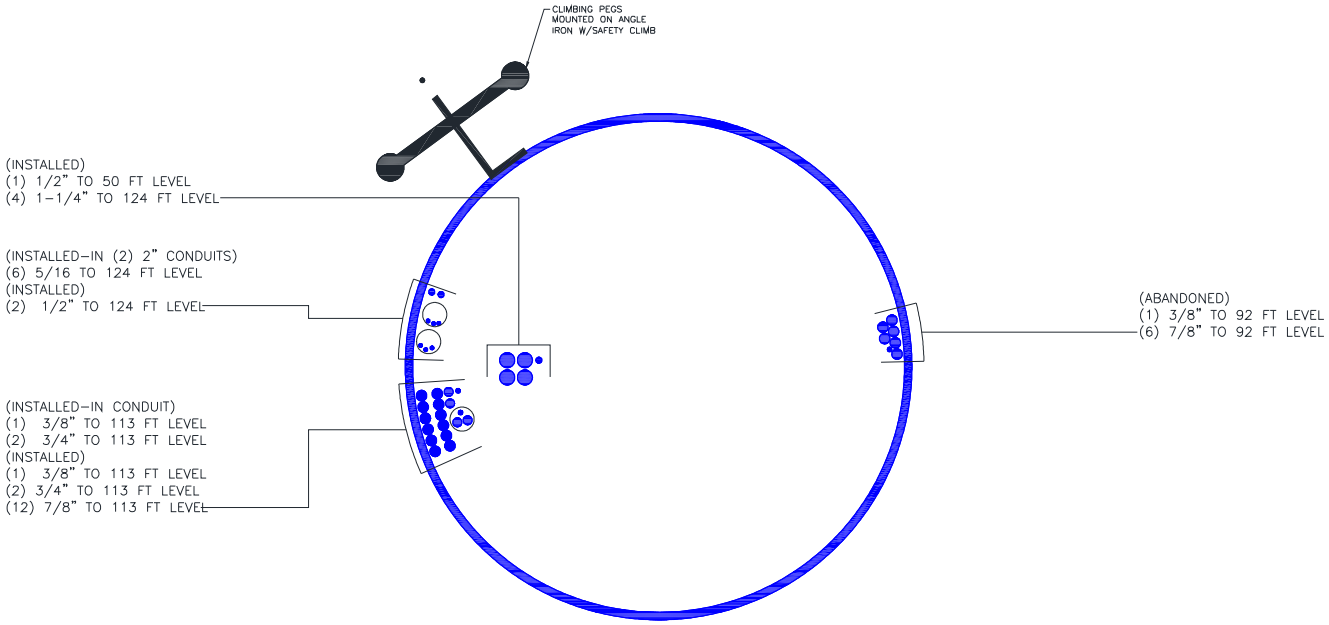
Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	137 - 125 (1)	0.002	0.038	0.000	0.004	0.000	0.039 ✔	1.000	4.8.2 ✔
L2	125 - 120 (2)	0.005	0.065	0.000	0.016	0.000	0.071 ✔	1.000	4.8.2 ✔
L3	120 - 89.25 (3)	0.015	0.837	0.000	0.038	0.000	0.853 ✔	1.000	4.8.2 ✔
L4	89.25 - 85.7296 (4)	0.012	0.755	0.000	0.031	0.000	0.769 ✔	1.000	4.8.2 ✔
L5	85.7296 - 80 (5)	0.014	0.894	0.000	0.031	0.000	0.908 ✔	1.000	4.8.2 ✔
L6	80 - 65.5 (6)	0.014	0.765	0.000	0.030	0.000	0.780 ✔	1.000	4.8.2 ✔
L7	65.5 - 58.6458 (7)	0.013	0.732	0.000	0.027	0.000	0.745 ✔	1.000	4.8.2 ✔
L8	58.6458 - 57.5 (8)	0.011	0.603	0.000	0.023	0.000	0.615 ✔	1.000	4.8.2 ✔
L9	57.5 - 49.5 (9)	0.014	0.824	0.000	0.029	0.000	0.839 ✔	1.000	4.8.2 ✔
L10	49.5 - 40 (10)	0.014	0.844	0.000	0.027	0.000	0.858 ✔	1.000	4.8.2 ✔
L11	40 - 19.5 (11)	0.016	0.934	0.000	0.027	0.001	0.951 ✔	1.000	4.8.2 ✔
L12	19.5 - 13 (12)	0.016	0.942	0.000	0.026	0.001	0.959 ✔	1.000	4.8.2 ✔
L13	13 - 1.5 (13)	0.016	0.952	0.000	0.025	0.001	0.969 ✔	1.000	4.8.2 ✔
L14	1.5 - 0 (14)	0.016	0.955	0.000	0.025	0.001	0.972 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	137 - 125	Pole	P 12 STD	1	-0.72	459.24	3.9	Pass
L2	125 - 120	Pole	P24x0.375	2	-4.65	876.73	7.1	Pass
L3	120 - 89.25	Pole	P24x0.375	3	-12.88	876.73	85.3	Pass
L4	89.25 - 85.7296	Pole	RPS 24" x 0.49306"	4	-13.52	1081.44	76.9	Pass
L5	85.7296 - 80	Pole	RPS 24" x 0.63122"	5	-14.83	1095.64	90.8	Pass
L6	80 - 65.5	Pole	36" x 0.375"	6	-18.26	1313.82	78.0	Pass
L7	65.5 - 58.6458	Pole	RPS 36" x 0.45838"	7	-19.90	1544.04	74.5	Pass
L8	58.6458 - 57.5	Pole	RPS 36" x 0.60174"	8	-20.25	1833.28	61.5	Pass
L9	57.5 - 49.5	Pole	RPS 36" x 0.50555"	9	-22.45	1592.61	83.9	Pass
L10	49.5 - 40	Pole	RPS 36" x 0.60545"	10	-25.56	1817.12	85.8	Pass
L11	40 - 19.5	Pole	P42x0.5	11	-32.39	2053.42	95.1	Pass
L12	19.5 - 13	Pole	RPS 42" x 0.54732"	12	-34.58	2178.48	95.9	Pass
L13	13 - 1.5	Pole	RPS 42" x 0.63919"	13	-39.00	2390.51	96.9	Pass
L14	1.5 - 0	Pole	RPS 42" x 0.71268"	14	-39.63	2417.68	97.2	Pass
						Summary		
						Pole (L14)	97.2	Pass
						RATING =	**97.2**	**Pass**

APPENDIX B

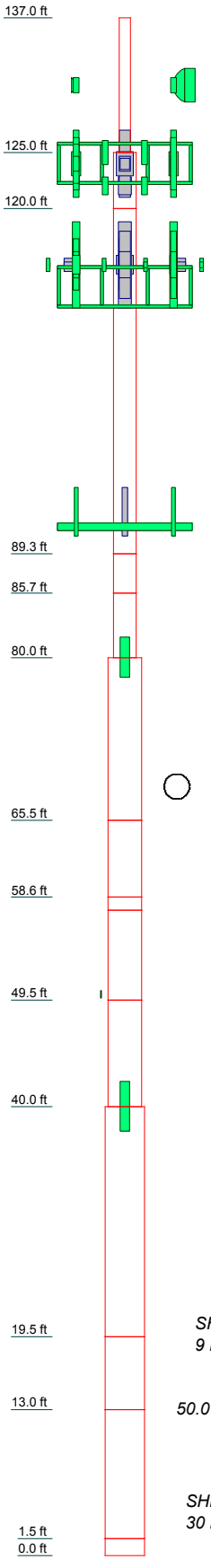
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Size	Length (ft)	Grade	Weight (K)
1	P 12 STD	12.00	A53-B-35	0.6
2	P24x0.375	5.00		0.5
3	P24x0.375	30.75		2.9
4	P24x0.49306"	3.52	Reinf 33.41 ksi	0.4
5	RPS 24" x 0.375"	5.73	Reinf 26.27 ksi	0.9
6	RPS 36" x 0.375"	14.50	A53-B-35	2.1
7	RPS 36" x 0.45838"	6.85	Reinf 33.52 ksi	1.2
8	RPS 36" x 0.50625"	1.15	Reinf 30.44 ksi	0.3
9	RPS 36" x 0.54375"	8.00	Reinf 31.39 ksi	1.5
10	RPS 36" x 0.60547"	9.50	Reinf 29.99 ksi	2.2
11	P42x0.5	20.50	A53-B-35	4.5
12	RPS 42" x 0.54732"	6.50	Reinf 33.96 ksi	1.6
13	RPS 42" x 0.63916"	11.50	Reinf 31.98 ksi	3.3
14	RPS 42" x 0.72582"	1.50	Reinf 29.06 ksi	0.5
				22.4



ALL REACTIONS ARE FACTORED

AXIAL 71 K

SHEAR 9 K *MOMENT 830 kip-ft*

TORQUE 1 kip-ft
50.0 mph WIND - 1.00 in ICE

AXIAL 40 K

SHEAR 30 K *MOMENT 2529 kip-ft*

TORQUE 3 kip-ft
REACTIONS - 97.0 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
LLPX310R-V4 w/ Mount Pipe	124	RRUS 32 B2	113
LLPX310R-V4 w/ Mount Pipe	124	RRUS 32 B2	113
LLPX310R-V4 w/ Mount Pipe	124	RRUS 32 B2	113
WIMAX DAP HEAD	124	Miscellaneous [NA 507-1]	113
WIMAX DAP HEAD	124	OPA-65R-LCUU-H8 w/ Mount Pipe	113
WIMAX DAP HEAD	124	OPA-65R-LCUU-H8 w/ Mount Pipe	113
WIMAX DAP HEAD	124	OPA-65R-LCUU-H8 w/ Mount Pipe	113
WIMAX DAP HEAD	124	7770.00 w/ Mount Pipe	113
APXVSPP18-C-A20 w/ Mount Pipe	124	7770.00 w/ Mount Pipe	113
APXV9ERR18-C-A20 w/ Mount Pipe	124	7770.00 w/ Mount Pipe	113
APXVSPP18-C-A20 w/ Mount Pipe	124	RRUS 32 B30	113
IBC1900BB-1	124	RRUS 32 B30	113
IBC1900BB-1	124	RRUS 32 B30	113
IBC1900BB-1	124	RRUS-11	113
IBC1900HG-2A	124	RRUS-11	113
IBC1900HG-2A	124	RRUS-11	113
IBC1900HG-2A	124	(2) LGP21401	113
APXVTM14-C-120 w/ Mount Pipe	124	(2) LGP21401	113
APXVTM14-C-120 w/ Mount Pipe	124	(2) LGP21401	113
APXVTM14-C-120 w/ Mount Pipe	124	DC6-48-60-18-8F	113
TD-RRH8x20-25	124	DC6-48-60-18-8F	113
TD-RRH8x20-25	124	Platform Mount [LP 601-1]	113
TD-RRH8x20-25	124	QS66512-2 w/ Mount Pipe	113
Platform Mount (LP 101-1)	124	QS66512-2 w/ Mount Pipe	113
VHLP2.5-18	124	HBX-6516DS-VTM w/ Mount Pipe	92
VHLP1-23	124	T-Arm Mount [TA 602-3]	92
PCS 1900MHz 4x45W-65MHz	122	HBX-6516DS-VTM w/ Mount Pipe	92
800MHz 2X50W RRH W/FILTER	122	HBX-6516DS-VTM w/ Mount Pipe	92
800MHz 2X50W RRH W/FILTER	122	Bridge Stiffener (43" x 9.5" x 1")	80
800MHz 2X50W RRH W/FILTER	122	Bridge Stiffener (43" x 9.5" x 1")	80
Pipe Mount [PM 601-3]	122	Bridge Stiffener (43" x 9.5" x 1")	80
PCS 1900MHz 4x45W-65MHz	122	KS24019-L112A	50
PCS 1900MHz 4x45W-65MHz	122	Side Arm Mount [SO 701-1]	50
QS66512-2 w/ Mount Pipe	113	Bridge Stiffener (53" x 9" x 1")	40
(2) TPX-070821	113	Bridge Stiffener (53" x 9" x 1")	40
(2) TPX-070821	113	Bridge Stiffener (53" x 9" x 1")	40
(2) TPX-070821	113		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	60 ksi	Reinf 31.39 ksi	31 ksi	40 ksi
Reinf 33.41 ksi	33 ksi	42 ksi	Reinf 29.99 ksi	30 ksi	38 ksi
Reinf 26.27 ksi	26 ksi	33 ksi	Reinf 33.96 ksi	34 ksi	43 ksi
Reinf 33.52 ksi	34 ksi	42 ksi	Reinf 31.98 ksi	32 ksi	40 ksi
Reinf 30.44 ksi	30 ksi	39 ksi	Reinf 29.06 ksi	29 ksi	37 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97.0 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.0 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.0 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 97.2%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: *138 ft Monopole / Creative Dimensions*			
Project: *PJF 37516-3550 / BU 876333*			
Client: CCI	Drawn by: Kyle Thorpe	App'd:	
Code: TIA-222-G	Date: 02/09/17	Scale: NTS	
Path:		Dwg No. E-1	

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876333*
Site Name: *Creative Dimensions*
App #:

Reactions		
Mu	35	ft-kips
Axial, Pu:	4.65	kips
Shear, Vu:	7.22	kips
Elevation:	120	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
17.89

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	8		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	25		

Plate Data		
Diam:	32	in
Thick, t:	0.75	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.75	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results | Non-Rigid

Bolt Tension Capacity, φ*Tn,**B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.02	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	7.82	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.323	in	
Min PL "treq" for actual **T w/ Pry**:	0.126	in	
Min PL "t1" for actual **T w/o Pry**:	0.165	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	7.82	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	26.0%	**Pass**	

Exterior Flange Plate Results Flexural Check | Non-Rigid

Compression Side Plate Stress:	4.6	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	14.1%	**Pass**	Comp. Y.L. Length:
No Prying			7.00
Tension Side Stress Ratio, (treq/t)^2:	2.8%	**Pass**	

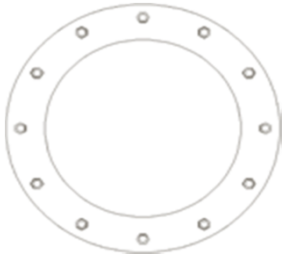
n/a

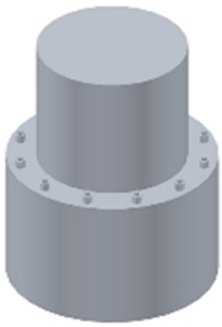
Stiffener Results

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





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** 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
Effective Date: 3/21/2016 Verison 1.3

DATE:	2/9/2017
PROJECT NO:	37517-0330.002.7805
SITE NAME:	CREATIVE DIMENSIONS
SITE NUMBER/BUN:	876333.00
DESCRIPTION:	80ft Flange
OWNER:	CCI
ENGINEER:	KAT

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	80.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	607.00	k-ft
Axial, Puf:	14.80	kips
Shear, Vf:	17.30	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	24.00	36.00	in
Pole Thickness, tp:	0.3750	0.3750	in
Pole Fy:	35	35	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	35.00	35.00	in
Flange Thickness, tf:	1.88	1.88	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	24		
Bolt Diameter:	0.75		in
Bolt Circle:	28.63		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00		degrees
Bolt Area, Ag:	0.4418	0.0000	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	16.32	0.00	kips
Max. Net Tension:	16.05	0.00	kips
Max. Net Compression:	16.59	0.00	kips
Moment to Bolt Circle:	233.58	0.00	k-ft
Axial to Bolt Circle:	6.51	0.00	kips
Shear to Bolt Circle:	17.30	0.00	kips
Equivalent Bolt Circle:	28.63	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition	Existing				
Top Shaft Reinf. Designation	CCI-040075				
Top Shaft Reinf. Thickness	0.75				in
Top Shaft Reinf. Width	3.75				in
Top Shaft Reinf. Term. Bolts	10				
Top Shaft Reinf. Bolt Spacing	3.00				in
Top Shaft Reinf. End Spacing	3.00				in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document	PMI 5781873				
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-045100				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.50				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 1				
Top Bolt Quantity	10				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	10				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00				in
Unbraced Length Override	18.00				in
K	0.80				
Stiffener Circle	37.00				in
Clearance Check	OK				
Qty. Jump Plates	3				in
Location 1	27				deg
Location 2	135				deg
Location 3	272				deg
Location 4					deg
Location 5					deg
Location 6					deg

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com
Effective Date: 3/21/2016 Verison 1.3

DATE:	2/9/2017
PROJECT NO:	37517-0330.002.7805
SITE NAME:	CREATIVE DIMENSIONS
SITE NUMBER/BUN:	876333.00
DESCRIPTION:	80ft Flange
OWNER:	CCI
ENGINEER:	KAT

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	193.77				kips
Hole Diameter	1.19				in
Gross Area (Ag)	4.50				in^2
Net Area (An)	3.31				in^2
b/t Ratio	4.50				
Radius of Gyration (r)	0.29				in
K L / r	49.88				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	51.31				ksi
Nominal Compressive Capacity	207.80				kips
Nominal Tensile Capacity	198.75				kips
Controlling Stress Ratio	97.5%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	19.377				kips
Top Bolt Tension Load (Tu)	13.297				kips
Top Eccentricity (e)	6.500				in
Top Bolt Bearing Capacity (Rn)	45.315				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	47.1%				

Bottom Bolt Shear Load (Vu)	19.377				kips
Bottom Bolt Tension Load (Tu)	1.023				kips
Bottom Eccentricity (e)	0.500				in
Bottom Bolt Bearing Capacity (Rn)	45.315				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	27.5%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	97.5%			
TOP BOLT COMBINED STRESS RATIO	47.1%			
BOTTOM BOLT COMBINED STRESS RATIO	27.5%			

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876333*
Site Name: *Creative Dimensions*
App #:

Reactions		
Mu	233.58	ft-kips
Axial, Pu:	6.51	kips
Shear, Vu:	17.26	kips
Elevation:	80	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
17.89

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	24		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	28.625		

Plate Data		
Diam:	35	in
Thick, t:	1.875	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	3.14	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	24	in
Thick:	0.375	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn, **B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.04	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	16.05	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	1.191	in	
Min PL "treq" for actual **T w/ Pry**:	0.660	in	
Min PL "t1" for actual **T w/o Pry**:	0.870	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	16.05	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	53.4%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	8.0	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	24.7%	**Pass**	Comp. Y.L. Length: 15.60
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	12.4%	**Pass**	

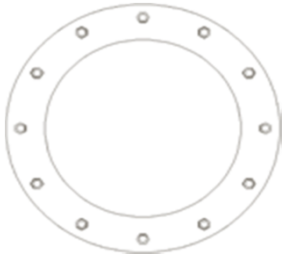
n/a

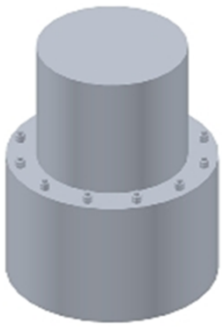
Stiffener Results

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





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876333*
Site Name: *Creative Dimensions*
App #:

Manufacturer:	Other

Reactions		
Moment:	233.58	ft-kips
Axial:	6.51	kips
Shear:	17.26	kips
Exterior Flange Run, T+q:	16.05	kips

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
17.89

Elevation: 80 feet

Bolt Data			
Qty:	24		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	28.625	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	16.1	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	30.0	Kips
Bolt Stress Ratio:	53.4%	**Pass**

Plate Data		
Plate Outer Diam:	35.25	in
Plate Inner Diam:	24.25	in (Hole @ Ctr)
Thick:	1.875	in
Grade:	36	ksi
Effective Width:	4.61	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	16.6	Kips, Ext. Cu=Interior Cu
Plate Stress:	13.6	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	41.8%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

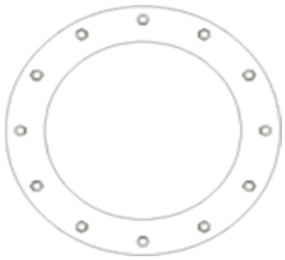
Stiffener Results

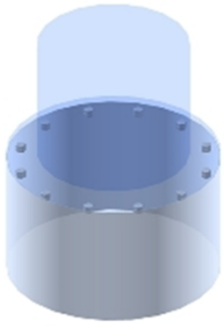
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	36	in
Thick:	0.375	in
Pole Inner Diam:	35.25	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** 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
Effective Date: 3/21/2016 Verison 1.3

DATE:	2/9/2017
PROJECT NO:	37517-0330.002.7805
SITE NAME:	CREATIVE DIMENSIONS
SITE NUMBER/BUN:	876333.00
DESCRIPTION:	40ft Flange
OWNER:	CCI
ENGINEER:	KAT

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

General Parameters & Loading

Flange Elevation:	40.00	ft
TIA Reference Standard:	TIA-222-G	
AISC Manual:	13th Ed. (Black)	
Method:	LRFD	
ASD Stress Increase, ASIF:	1.00	
Moment, Muf:	1439.00	k-ft
Axial, Puf:	25.56	kips
Shear, Vf:	24.64	kips

Pole Parameters

	Upper Pole	Lower Pole	
Number of Sides	Round	Round	
Pole Diameter, Dp:	36.00	42.00	in
Pole Thickness, tp:	0.3750	0.5000	in
Pole Fy:	35	35	ksi
Pole Fu:	60	60	ksi
Flange Diameter, Df:	40.75	40.75	in
Flange Thickness, tf:	1.75	1.75	in

Flange Parameters

Number of Bolt Circles: (1) Bolt Circle

	Bolt Circle 1	Bolt Circle 2	
Qty. Bolts:	52		
Bolt Diameter:	0.75		in
Bolt Circle:	38.50		in
Bolt Spacing:	Symmetric	Symmetric	
Start Angle, for Symmetric:	0.00		degrees
Bolt Area, Ag:	0.4418	0.0000	in^2

	Bolt Circle 1	Bolt Circle 2	
Max. Tension:	16.96	0.00	kips
Max. Net Tension:	16.72	0.00	kips
Max. Net Compression:	17.19	0.00	kips
Moment to Bolt Circle:	707.20	0.00	k-ft
Axial to Bolt Circle:	12.40	0.00	kips
Shear to Bolt Circle:	24.64	0.00	kips
Equivalent Bolt Circle:	38.50	0.00	in

	Thickness	Width	Height
Top Flange Stiffener Parameters			
Bot. Flange Stiffener Parameters			

Shaft Reinforcing Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Condition	Existing				
Top Shaft Reinf. Designation	CCI-040075				
Top Shaft Reinf. Thickness	1.00				in
Top Shaft Reinf. Width	4.88				in
Top Shaft Reinf. Term. Bolts	14				
Top Shaft Reinf. Bolt Spacing	3.00				in
Top Shaft Reinf. End Spacing	3.00				in
Bottom Condition					
Bottom Shaft Reinf. Designation					
Bottom Shaft Reinf. Thickness					in
Bottom Shaft Reinf. Width					in
Bottom Shaft Reinf. Term. Bolts					
Bottom Shaft Reinf. Bolt Spacing					in
Bottom Shaft Reinf. End Spacing					in

Bridge Stiffener Parameters

	Generation 1	Generation 2	Generation 3	Generation 4	
Reference Document	PMI 5781873				
Analysis, Design, New, Ignore	Analysis				
Jump Plate Designation	CCI-065125				
Jump Plate Width Override					in
Jump Plate Thickness Override					in
Clear Distance from Flange	0.63				in
Jump Plate Fy	65				ksi
Jump Plate Fu	80				ksi
Bolt Type	EXISTING AJAX				
Bolt Tension Method	Case 1				
Top Bolt Quantity	14				
Top Bolt Spacing	3.00				in
Top Bolt Edge Distance	3.00				in
Bottom Bolt Quantity	14				
Bottom Bolt Spacing	3.00				in
Bottom Bolt Edge Distance	3.00				in
Unbraced Length	18.00				in
Unbraced Length Override	18.00				in
K	0.80				
Stiffener Circle	43.25				in
Clearance Check	OK				
Qty. Jump Plates	3				in
Location 1	24				deg
Location 2	135				deg
Location 3	248				deg
Location 4					deg
Location 5					deg
Location 6					deg

PAUL J. FORD & COMPANY
250 E Broad St, Ste 600 • Columbus, OH 43215
Phone 614.221.6679 www.pauljford.com
Effective Date: 3/21/2016 Verison 1.3

DATE:	2/9/2017
PROJECT NO:	37517-0330.002.7805
SITE NAME:	CREATIVE DIMENSIONS
SITE NUMBER/BUN:	876333.00
DESCRIPTION:	40ft Flange
OWNER:	CCI
ENGINEER:	KAT

BOLTED FLANGE JUMP ANALYSIS PER TIA-222-G & AISC 13TH ED. (BLACK)

Jump Plate Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Applied Axial Load (Pu)	324.09				kips
Hole Diameter	1.19				in
Gross Area (Ag)	8.13				in^2
Net Area (An)	6.64				in^2
b/t Ratio	5.20				
Radius of Gyration (r)	0.36				in
K L / r	39.91				
Q (Where Qa = 1.0)	1.00				
ASIF Value	1.00				
Critical Stress (Fa or Fcr)	55.87				ksi
Nominal Compressive Capacity	408.54				kips
Nominal Tensile Capacity	398.44				kips
Controlling Stress Ratio	81.3%				

Bolt Analysis

	Generation 1	Generation 2	Generation 3	Generation 4	
Top Bolt Shear Load (Vu)	23.149				kips
Top Bolt Tension Load (Tu)	6.605				kips
Top Eccentricity (e)	3.625				in
Top Bolt Bearing Capacity (Rn)	45.315				kips
Top Bolt Shear Capacity (Vn)	37.000				kips
Top Bolt Tension Capacity (Tn)	30.000				kips
Top Connection Length Reduction	N/a				
Top Bolt Combined Stress Ratio	44.0%				

Bottom Bolt Shear Load (Vu)	23.149				kips
Bottom Bolt Tension Load (Tu)	1.111				kips
Bottom Eccentricity (e)	0.625				in
Bottom Bolt Bearing Capacity (Rn)	60.420				kips
Bottom Bolt Shear Capacity (Vn)	37.000				kips
Bottom Bolt Tension Capacity (Tn)	30.000				kips
Bottom Connection Length Reduction	N/a				
Bottom Bolt Combined Stress Ratio	39.3%				

Analysis Summary

	Generation 1	Generation 2	Generation 3	Generation 4
JUMP PLATE COMBINED STRESS RATIO	81.3%			
TOP BOLT COMBINED STRESS RATIO	44.0%			
BOTTOM BOLT COMBINED STRESS RATIO	39.3%			

Stiffened or Unstiffened, Exterior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876333*
Site Name: *Creative Dimensions*
App #:

Reactions		
Mu	707.2	ft-kips
Axial, Pu:	12.4	kips
Shear, Vu:	24.64	kips
Elevation:	40	feet

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
17.89

Pole Manufacturer:	Other

If No stiffeners, Criteria: TIA G <-Only Applcable to Unstiffened Cases

Bolt Data			
Qty:	52		
Diameter (in.):	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle (in.):	38.5		

Plate Data		
Diam:	40.75	in
Thick, t:	1.75	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	2.17	in

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

Pole Data		
Diam:	36	in
Thick:	0.375	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Rigid
Bolt Tension Capacity, φ*Tn, **B1**:	30.06	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	30.05	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	16.72	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.962	in	
Min PL "treq" for actual **T w/ Pry**:	0.563	in	
Min PL "t1" for actual **T w/o Pry**:	0.718	in	
T allowable w/o Prying:	30.06	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	16.72	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	55.6%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Rigid
Compression Side Plate Stress:	8.2	ksi	TIA G
Allowable Plate Stress:	32.4	ksi	φ*Fy
Compression Plate Stress Ratio:	25.3%	**Pass**	Comp. Y.L. Length: 13.65
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	10.3%	**Pass**	

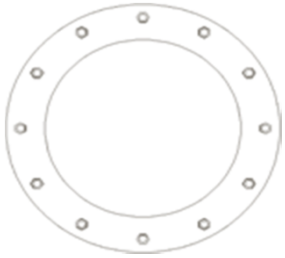
n/a

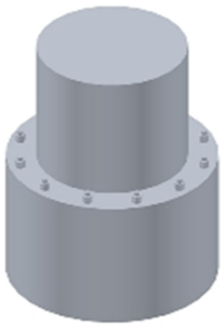
Stiffener Results

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





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

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

Stiffened or Unstiffened, Interior Flange Plate - Any Bolt Material TIA Rev G

Site Data

BU#: *876333*
Site Name: *Creative Dimensions*
App #:

Manufacturer:	Other

Reactions		
Moment:	707.2	ft-kips
Axial:	12.4	kips
Shear:	24.64	kips
Exterior Flange Run, T+q:	16.72	kips

Bolt Threads:
N-Included
Vn=φ(0.45*Ab*Fu)
φ=0.75, φ*Vn (kips):
17.89

Elevation: 40 feet

Bolt Data			
Qty:	52		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	0	<-- Disregard	
N/A:	0	<-- Disregard	
Circle:	38.5	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	16.7	Kips, Ext. Flange Tu+q
Adjusted φ*Tn (due to Vu=Vu/Qty)	30.0	Kips
Bolt Stress Ratio:	55.6%	**Pass**

Plate Data		
Plate Outer Diam:	41	in
Plate Inner Diam:	36.25	in (Hole @ Ctr)
Thick:	1.75	in
Grade:	36	ksi
Effective Width:	2.48	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	17.2	Kips, Ext. Cu=Interior Cu
Plate Stress:	11.3	ksi
Allowable Plate Stress, φ*Fy:	32.4	ksi
Plate Stress Ratio:	35.0%	**Pass**

Stiffener Data (Welding at Both Sides)		
Config:	0	*
Weld Type:	0	
Groove Depth:	0	in **
Groove Angle:	0	degrees
Fillet H. Weld:	0	<-- Disregard
Fillet V. Weld:	0	in
Width:	0	in
Height:	0	in
Thick:	0	in
Notch:	0	in
Grade:	0	ksi
Weld str.:	0	ksi

n/a

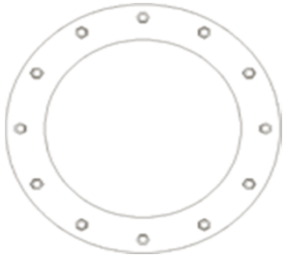
Stiffener Results

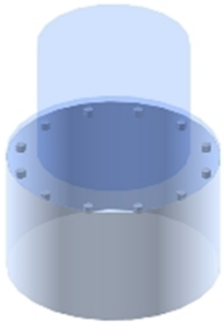
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	42	in
Thick:	0.5	in
Pole Inner Diam:	41	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** 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
v4.4 - Effective 7-12-13

Date: 2/9/2017
PJF Project: 37517-0330.002.7805
Client Ref. # 876333
Site Name: Creative Dimensions
Description: 138ft Monopole
Owner: CCI
Engineer: KAT

Asymmetric Anchor Rod Analysis

Moment =	2529	k-ft	TIA Ref.	G	Location =	Base Plate		
Axial =	40.0	kips	ASIF =	1.0000	η =	0.55	for BP, Rev. G Sect. 4.9.9	
Shear =	30.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G	
Anchor Qty =	28							

**** For Post Installed Anchors: Check anchors for embedment, epoxy/grout bond, and capacity based on proof load. ****

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.000	Other	36	58	9.0	48.00	0.00	3.14	84.83	81.95	86.79	0.00	116.00	74.8%
2	2.000	Other	36	58	27.0	48.00	0.00	3.14	83.02	80.14	84.98	0.00	116.00	73.3%
3	2.000	Other	36	58	45.0	48.00	0.00	3.14	82.35	79.47	84.31	0.00	116.00	72.7%
4	2.000	Other	36	58	63.0	48.00	0.00	3.14	83.42	80.54	85.38	0.00	116.00	73.6%
5	2.000	Other	36	58	81.0	48.00	0.00	3.14	86.04	83.16	88.00	0.00	116.00	75.9%
6	2.000	Other	36	58	99.0	48.00	0.00	3.14	89.36	86.48	91.32	0.00	116.00	78.7%
7	2.000	Other	36	58	117.0	48.00	0.00	3.14	92.27	89.39	94.23	0.00	116.00	81.2%
8	2.000	Other	36	58	135.0	48.00	0.00	3.14	93.81	90.94	95.78	0.00	116.00	82.6%
9	2.000	Other	36	58	153.0	48.00	0.00	3.14	93.48	90.60	95.44	0.00	116.00	82.3%
10	2.000	Other	36	58	171.0	48.00	0.00	3.14	91.29	88.41	93.25	0.00	116.00	80.4%
11	2.000	Other	36	58	189.0	48.00	0.00	3.14	87.82	84.94	89.78	0.00	116.00	77.4%
12	2.000	Other	36	58	207.0	48.00	0.00	3.14	84.08	81.20	86.04	0.00	116.00	74.2%
13	2.000	Other	36	58	225.0	48.00	0.00	3.14	81.26	78.38	83.22	0.00	116.00	71.7%
14	2.000	Other	36	58	243.0	48.00	0.00	3.14	80.26	77.38	82.22	0.00	116.00	70.9%
15	2.000	Other	36	58	261.0	48.00	0.00	3.14	81.22	78.35	83.19	0.00	116.00	71.7%
16	2.000	Other	36	58	279.0	48.00	0.00	3.14	83.50	80.62	85.46	0.00	116.00	73.7%
17	2.000	Other	36	58	297.0	48.00	0.00	3.14	85.97	83.09	87.93	0.00	116.00	75.8%
18	2.000	Other	36	58	315.0	48.00	0.00	3.14	87.63	84.75	89.59	0.00	116.00	77.2%
19	2.000	Other	36	58	333.0	48.00	0.00	3.14	87.90	85.02	89.86	0.00	116.00	77.5%
20	2.000	Other	36	58	351.0	48.00	0.00	3.14	86.78	83.90	88.74	0.00	116.00	76.5%
21							0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
22	2.000	A193 Gr B7	105	125	72.0	54.00	0.00	3.14	94.71	91.83	96.67	0.00	250.00	38.7%
23	2.000	A193 Gr B7	105	125	162.0	54.00	0.00	3.14	103.66	100.79	105.63	0.00	250.00	42.3%
24	2.000	A193 Gr B7	105	125	252.0	54.00	0.00	3.14	90.65	87.77	92.61	0.00	250.00	37.0%
25	2.000	A193 Gr B7	105	125	342.0	54.00	0.00	3.14	98.56	95.68	100.52	0.00	250.00	40.2%
26	2.250	A193 Gr B7	105	125	54.0	54.50	0.00	3.98	118.33	114.69	120.82	0.00	325.00	37.2%
27	2.250	A193 Gr B7	105	125	216.0	54.50	0.00	3.98	118.26	114.62	120.75	0.00	325.00	37.2%
28	2.250	A193 Gr B7	105	125	306.0	54.50	0.00	3.98	125.24	121.60	127.72	0.00	325.00	39.3%
									87.33					

Stiffened or Unstiffened, Ungrouted, Circular Base Plate - Any Rod Material

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data	
BU#:	*876333*
Site Name:	*Creative Dimensions*
App #:	
Pole Manufacturer:	*Other*

Reactions		
Mu:	1847.5	ft-kips
Axial, Pu:	28.8	kips
Shear, Vu:	21.6	kips
Eta Factor, η	0.55	TIA G (Fig. 4-4)

Reactions adjusted to account for aditional anchor rods

Anchor Rod Data		
Qty:	20	
Diam:	2	in
Rod Material:	Other	
Strength (Fu):	58	ksi
Yield (Fy):	36	ksi
Bolt Circle:	48	in

If No stiffeners, Criteria: AISC LRFD <-Only Applcable to Unstiffened Cases

Anchor Rod Results

Max Rod (Cu+ Vu/ή):	95.8	Kips
Allowable Axial, Φ*Fu*Anet:	116.0	Kips
Anchor Rod Stress Ratio:	82.6%	**Pass**

Rigid
AISC LRFD
φ*Tn

Plate Data		
Diam:	54	in
Thick:	2.5	in
Grade:	36	ksi
Single-Rod B-eff:	6.60	in

Base Plate Results Flexural Check

Base Plate Stress:	16.7	ksi
Allowable Plate Stress:	32.4	ksi
Base Plate Stress Ratio:	51.6%	**Pass**

Rigid
AISC LRFD
φ*Fy
Y.L. Length: 23.24

Stiffener Data (Welding at both sides)		
Config:	0	*
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

n/a

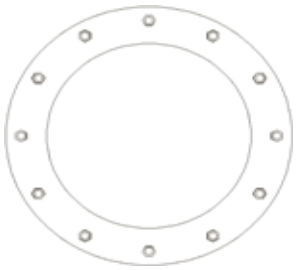
Stiffener Results

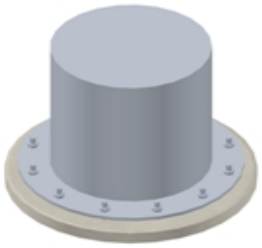
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Diam:	42	in
Thick:	0.5	in
Grade:	35	ksi
# of Sides:	0	"0" IF Round
Fu	60	ksi
Reinf. Fillet Weld	0	"0" if None





* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** 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:	37517-0330.002.7805	**Page:**	1
Site Number:	876333	**By:**	KAT
Site Name:	Creative Dimensions	**Date:**	2/9/2017

DRILLED PIER SOIL AND STEEL ANALYSIS - TIA-222-G

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	2529.0		k-ft
Shear, Vu =	30.0		kips
Axial Load, Pu1 =	40.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	30.0	0.0	kips (from 0.9D + 1.6W)**
OTMu =	2544.0	0.0	k-ft @ Ground

***Axial Load, Pu1 will be used for Soil Compression Analysis.**
****Axial Load, Pu2 will be used for Steel Analysis.**

Safety Factors / Load Factors / Φ Factors

Tower Type =	Monopole DP
ACI Code =	ACI 318-08
Seismic Design Category =	D
Reference Standard =	TIA-222-G
Use 1.3 Load Factor?	No
Load Factor =	1.00

Drilled Pier Parameters

Diameter =	6.5	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	30	ft
fc' =	4	ksi
εc =	0.003	in/in
L / D Ratio =	4.69	
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-222-G

1. (0.75) Ult. Skin Friction + (0.75) Ult. End Bearing + (1.2) Effective Soil Wt. - (1.2) Buoyant Conc. Wt. ≥ Comp.
2. (0.75) Ult. Skin Friction + (0.9) Buoyant Conc. Wt. ≥ Uplift

Steel Parameters

Number of Bars =	16	
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 =	8.00	ft
Depth to Ignore Soil =	3.33	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	36.5	115	0	34	Sand	8000			36.5
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	20.75	ft, from Grade
Bending Moment, Mu =	3166.48	k-ft, from COR
Resisting Moment, ΦMn =	11370.03	k-ft, from COR

MOMENT RATIO = 27.8% OK

Shear, Vu =	30.00	kips
Resisting Shear, ΦVn =	107.72	kips

SHEAR RATIO = 27.8% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	95.63	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	40.00	kips
Comp. Capacity, ΦCn =	154.30	kips

COMPRESSION RATIO = 25.9% OK

Steel Results (ACI 318-08):

Minimum Steel Area =	15.93	sq in
Actual Steel Area =	24.96	sq in
Axial, ΦPn (min) =	-1347.84	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	9182.77	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	60.24	kips @ 6.25 ft Below Grade
Moment, Mu =	2701.11	k-ft @ 6.25 ft Below Grade
Moment, ΦMn =	3832.23	k-ft

MOMENT RATIO = 70.5% OK

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#: *876333*
Site Name: *Creative Dimensions*
App #:

Loads Already Factored		
For M (WL)	1	<----Disregard
For P (DL)	1	<----Disregard

Pier Properties

Concrete:

Pier Diameter =	6.5	ft
Concrete Area =	4778.4	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.61	ft
Vert. Cage Diameter =	67.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0052	0.52%

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

(3)*(Sqrt(f'c)/Fy:	0.0032
200 / Fy:	0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.52%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	9182.77	kips
at Mu=(ϕ=0.65)Mn=	5173.38	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	2701.11	ft-kips **(* Note)**
Max. Factored Shaft Pu:	60.24	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		
1.00	Mu:	2701.11	ft-kips
1.00	Pu:	60.24	kips

Material Properties

Concrete Comp. strength, f'c =	4000	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=	2008

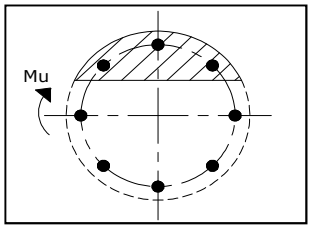
Seismic Properties

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

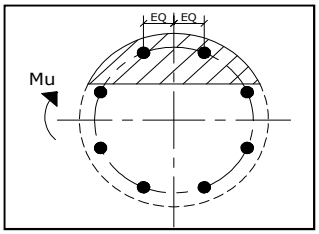
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**10.84**	in
Extreme Steel Strain, ϵt:	**0.0171**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	60.24	kips
Drilled Shaft Moment Capacity, φMn:	**3832.24**	ft-kips
Drilled Shaft Superimposed Mu:	**2701.11**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**70.5%**

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
Site FA – 10035333
Site ID – CT1054 (MC)
Site Name – Plainville Center
Site Compliance Report

10 Sparks Street
Plainville, CT 06062

Latitude: N41-40-24.46
Longitude: W72-51-16.16
Structure Type: Monopole

Report generated date: April 7, 2017
Report by: Michelle Stone
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.

Table of Contents

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 Radio Frequency Exposure (RFE) level on the Ground Level	<1% of 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_CTV1054_2017-Antenna-Modifications_4TXRX_mm093q_2051A04915_10035333_16334_12-23-2015_Final-RF-Approval_v2.00

CD's: 10035333_AE201_170324_CTL01054_Rev4_CD_MC-Retrofit

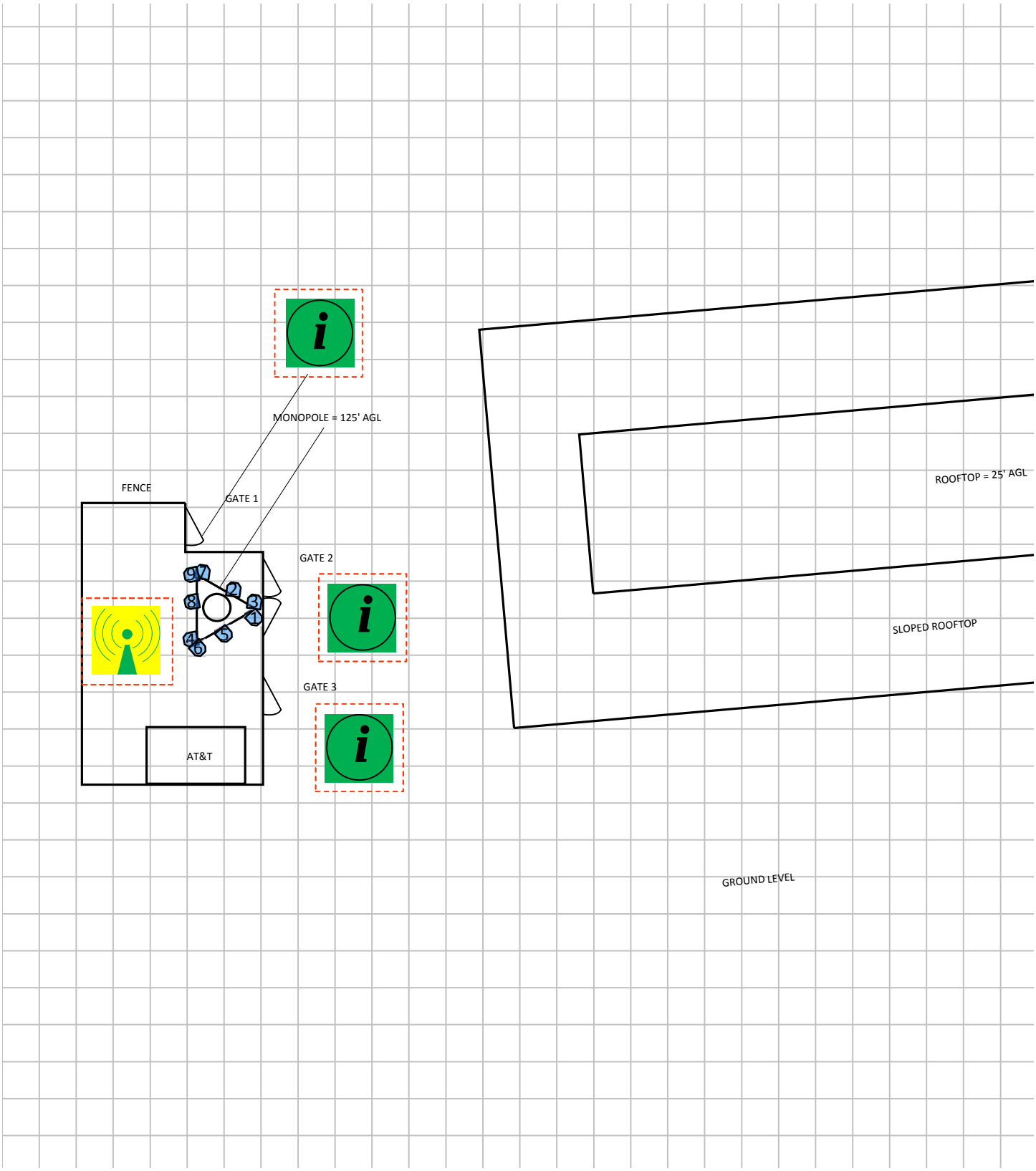
RF Powers Used: AT&T MOBILITY LLC (Proposed)

2 Scale Maps of Site

The following diagrams are included:

- Site Scale Map
- RF Exposure Diagram
- Elevation View

Site Scale Map For: Plainville Center



(Feet)

0 14 27.9

www.sitesafe.com
Site Name:Plainville Center
4/7/2017 9:56:57 AM

Carrier Identification

AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend

Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Info 1 | Info 2

Barrier ——————

Proposed Barriers/ Signs — — — — —

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	1132.6	81.9'	251.6'	112.7'
1	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	143	86	4.6	13.41	0	1	0	1754.2	81.9'	251.6'	112.7'
2	AT&T MOBILITY LLC	CCI Antennas OPA-65R-LCUU-H8	Panel	2300	13	63.7	7.7	14.66	0	0	1	1754.5	77.7'	257.4'	111.1'
3	AT&T MOBILITY LLC (Proposed)	Quintel QS46512-2	Panel	737	13	65	4.3	10.6	0	0	1	688.9	81.9'	254.9'	112.8'
3	AT&T MOBILITY LLC (Proposed)	Quintel QS46512-2	Panel	1900	13	68	4.3	13.15	0	0	1	1239.2	81.9'	254.9'	112.8'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	263	86	4.6	13.41	0	1	0	1754.2	68.9'	247.3'	112.7'
4	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	263	82	4.6	11.51	0	1	0	1132.6	68.9'	247.3'	112.7'
5	AT&T MOBILITY LLC	CCI Antennas OPA-65R-LCUU-H8	Panel	2300	143	63.7	7.7	14.66	0	0	1	1754.5	75.8'	248.3'	111.1'
6	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	737	143	69	6	11.46	0	0	1	839.8	70.5'	245.4'	112'
6	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	1900	143	68	6	14.16	0	0	1	1563.7	70.5'	245.4'	112'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	850	13	82	4.6	11.51	0	1	0	1132.6	71.4'	261'	112.7'
7	AT&T MOBILITY LLC	Powerwave 7770	Panel	1900	13	86	4.6	13.41	0	1	0	1754.2	71.4'	261'	112.7'
8	AT&T MOBILITY LLC	CCI Antennas OPA-65R-LCUU-H8	Panel	2300	263	63.7	7.7	14.66	0	0	1	1754.5	69.2'	254.9'	111.1'
9	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	737	263	69	6	11.46	0	0	1	839.8	69.1'	260.4'	112'
9	AT&T MOBILITY LLC (Proposed)	Quintel QS66512-2	Panel	1900	263	68	6	14.16	0	0	1	1563.7	69.1'	260.4'	112'

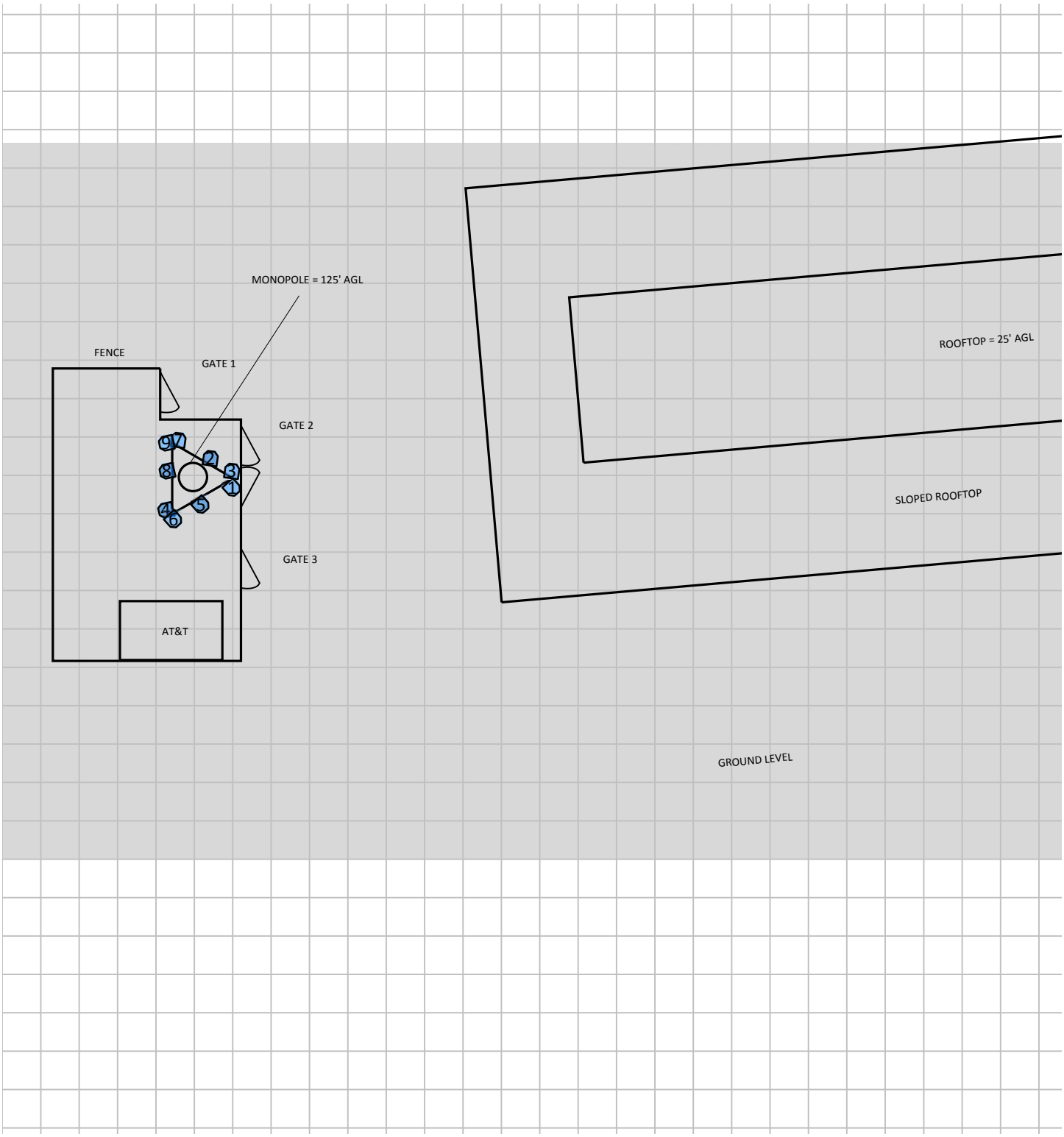
NOTE: X, Y and Z indicate relative position of the bottom of the antenna to the origin location on the site, displayed in the model results diagram. Specifically, the Z reference indicates the bottom of the antenna height above the main site level unless otherwise indicated. The distance to the bottom 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.

4 Emission Predictions

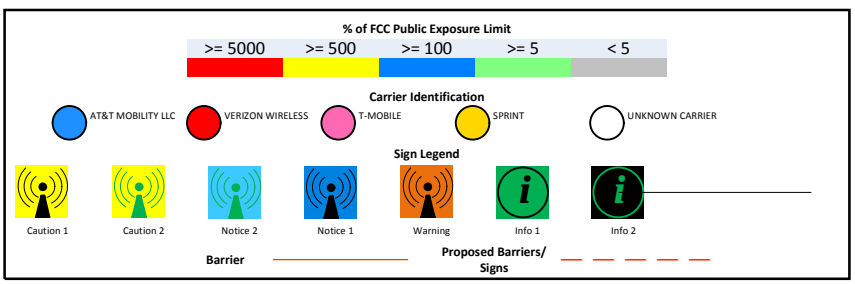
In the RF Exposure Simulations below all heights are reflected with respect to main site level. In most rooftop cases this is the height of the main rooftop and in other cases this can be ground level. Each different height area, rooftop, or platform level is labeled with its height relative to the main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

RF Exposure Simulation For: Plainville Center



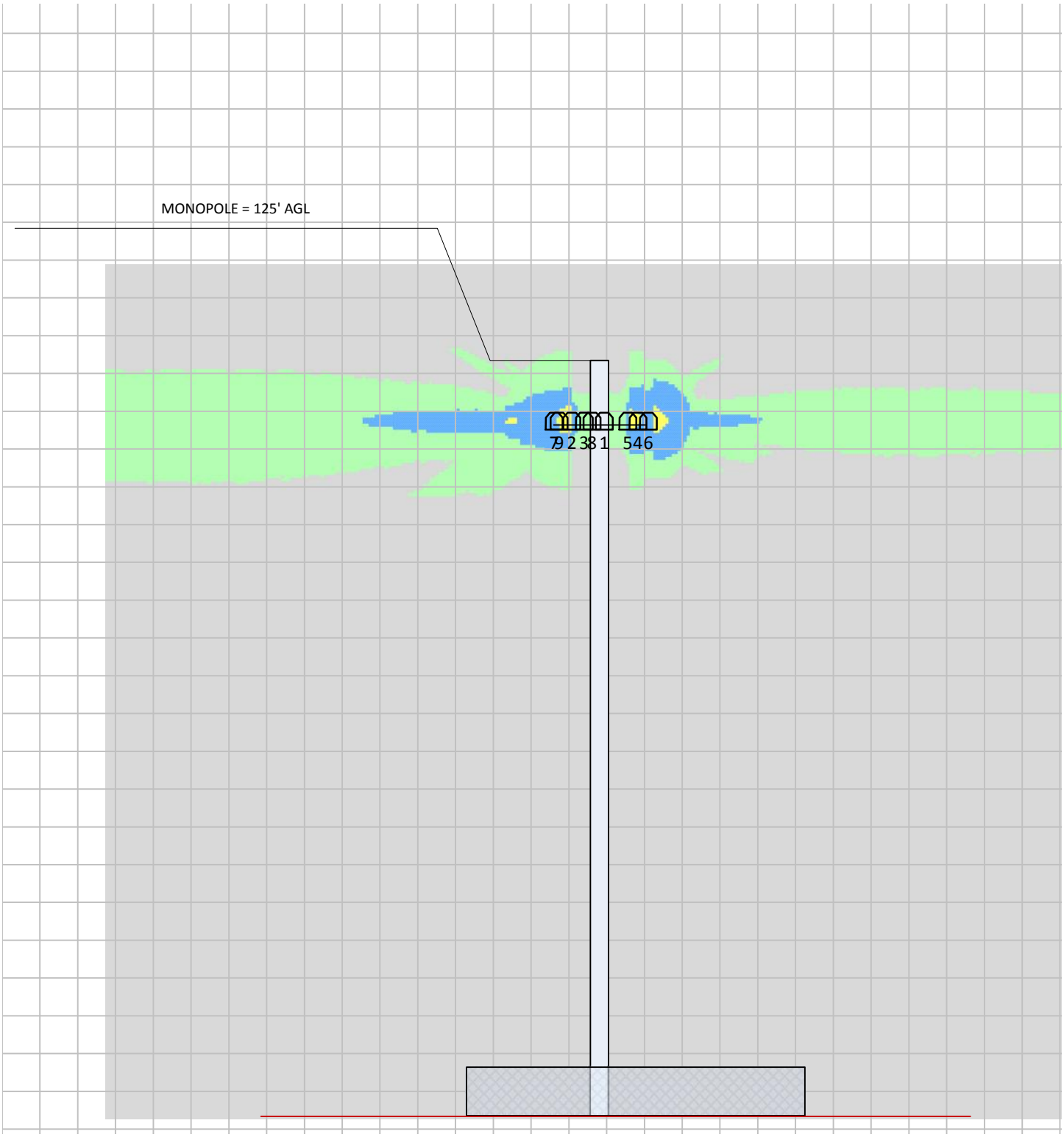
% of FCC Public Exposure Limit
Spatial average 0' - 6'



(Feet)
0 13.8 27.6
www.sitesafe.com
Site Name:Plainville Center
4/7/2017 9:48:27 AM

SitesafeTC Version:1.0.0.0 - 0.0.0.259
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Spatially Averaged

RF Exposure Simulation For: Plainville Center
Elevation View



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

% of FCC Public Exposure Limit
>= 5000 | >= 500 | >= 100 | >= 5 | < 5

Carrier Identification
AT&T MOBILITY LLC | VERIZON WIRELESS | T-MOBILE | SPRINT | UNKNOWN CARRIER

Sign Legend
Caution 1 | Caution 2 | Notice 2 | Notice 1 | Warning | Info 1 | Info 2

Barrier | Proposed Barriers/ Signs

(Feet)
0 12.4 24.8

www.sitesafe.com
Site Name:Plainville Center
4/11/2017 10:05:51 AM

SitesafeTC Version:1.0.0.0 - 0.0.0.259
Sitesafe OET-65 Model
Near Field Boundary: 1.5 * Aperture
Reflection Factor: 1
Single Level (0)

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 SmartLink, 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 Gate 1

Information 1 sign required.

Site Access Gate 2

Information 1 sign required.

Site Access Gate 3

Information 1 sign required.

Monopole Base

Yellow Caution 2 sign required.

6 Reviewer Certification

The reviewer whose signature appears below hereby certifies and affirms:

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 Michelle Stone.

April 7, 2017

Samuel Cosgrove

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.

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.

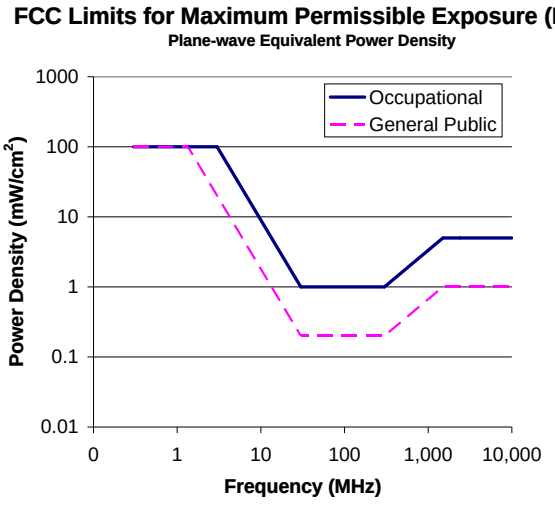
FCC regulations define two separate tiers of exposure limits: Occupational or "Controlled environment" and General Public or "Uncontrolled environment". The General Public limits are generally five times more conservative or restrictive than the Occupational limit. These limits apply to *accessible* 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:



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.

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.

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.

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.

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

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.

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