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

September 20, 2017

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

RE: **Notice of Exempt Modification for Sprint 2.5 Rework Crown Site BU: 876323**
Sprint Site ID: CT03X049
85 Plainfield Ave, West Haven, CT 06516
Latitude: 41° 18′ 4.59″ / Longitude: -72° 58′ 35.20″

Dear Ms. Bachman:

Sprint currently maintains six (6) antennas at the 140-foot level of the existing 148-foot monopole at 85 Plainfield Ave in West Haven, CT. The tower is owned by Crown Castle. The property is owned by the Shirley Frumento. Sprint intends to install three (3) antennas, three (3) RRHs, and one (1) hybrid cable.

This facility was approved by the Connecticut Siting Council in Petition No. 878 on February 19, 2009. This approval included the extension of the tower from 138' to 148' with no conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Edward M. O'Brien, Mayor, City of West Haven, the Department of Planning and Development for the City of West Haven, as well as the property 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, Sprint 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: The Honorable Edward M. O'Brien
City Hall 355 Main Street
3rd Floor
West Haven, CT 06516

Department of Planning and Development
City Hall 355 Main Street
1st Floor
West Haven, CT 06516

Ms. Shirley Frumento
PO Box 175
West Haven, CT 06516

Petition No. 878
Pocket Communications
85 Plainfield Avenue, West Haven
February 19, 2009
Staff Report

On December 15, 2008, the Connecticut Siting Council (Council) received a Petition (Petition) from Youghiogheny Communications-Northeast, LLC d/b/a Pocket Communications (Pocket) for a declaratory ruling that no Certificate of Environmental Compatibility and Public Need is required for the proposed modifications to an existing telecommunications facility located at 85 Plainfield Avenue, West Haven. Specifically, Pocket seeks to extend the 138-foot Crown Castle-owned monopole to 148 feet tall. Pocket would install three flush mounted panel antennas at the 146-foot level of the extended tower.

The total height with appurtenances would be approximately 151 feet tall. A Professional Engineer duly licensed in the State of Connecticut has certified that the tower is structurally adequate to support the proposed loading. The maximum worst case power density would be 32.1 percent of the applicable limit.

Pocket would also install a Nortel CDMA Micro BTS equipment cabinet on an H-frame to be located inside the existing fenced compound.

The site is in a wooded area. To the east is Plainfield Avenue and undeveloped land across the street. To the north and west is open (wooded) space. To the south is a parking lot, Maltby Avenue and a residential neighborhood. There are no wetlands at the site.

The tower is currently visible on portions of Plainfield Avenue, Maltby Street, and Timberland Drive. The tower extension is expected to visible from these areas as well. On January 9, 2009, Pocket submitted a notice to abutting property owners with a deadline for reply of January 23, 2009. To date, Pocket has received two inquiries about the project, but neither were opposed. No abutters have contacted the Council's office with any replies. No comments have been received by the City of West Haven either.

This Petition was field reviewed by Dr. Barbara Bell and Mike Perrone of the Council staff on January 12, 2009. Attorney Carrie Larson from Pullman and Comley, LLC (representing Pocket) and Eric Dahl, site acquisition specialist also attended the field review.

City of West Haven, CT
Property Listing Report

Parcel ID 067-0005-0-CELL

Account 00067597

Property Information

Owner	SPRINT
Co-Owner	
Address	85 PLAINFIELD AVE
Mailing Address	PMB 331 4017 WASHINGTON RD MCMURRAY PA 15317
Land Use	431V TEL REL TW MDL-00
Land Class	I

Vision ID	102768
Census Tract	
Neighborhood	
Zoning Code	
Acreage	0
Utilities	

Photo

Sketch

Primary Construction Details

Actual Year Built	
Effective Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	0

Report Created On 9/11/2017

City of West Haven, CT
Property Listing Report

Parcel ID 067-0005-0-CELL

Account 00067597

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings	0	0
Outbuildings	453600	317520
Improvements	453600	317520
Extras	0	0
Land	0	0
Total	453600	317520

Outbuilding and Extra Items

Description	Units
CELL SHED	360 S.F.
TOWER	2 SITES
FENCE-8' CHAIN	400 L.F.

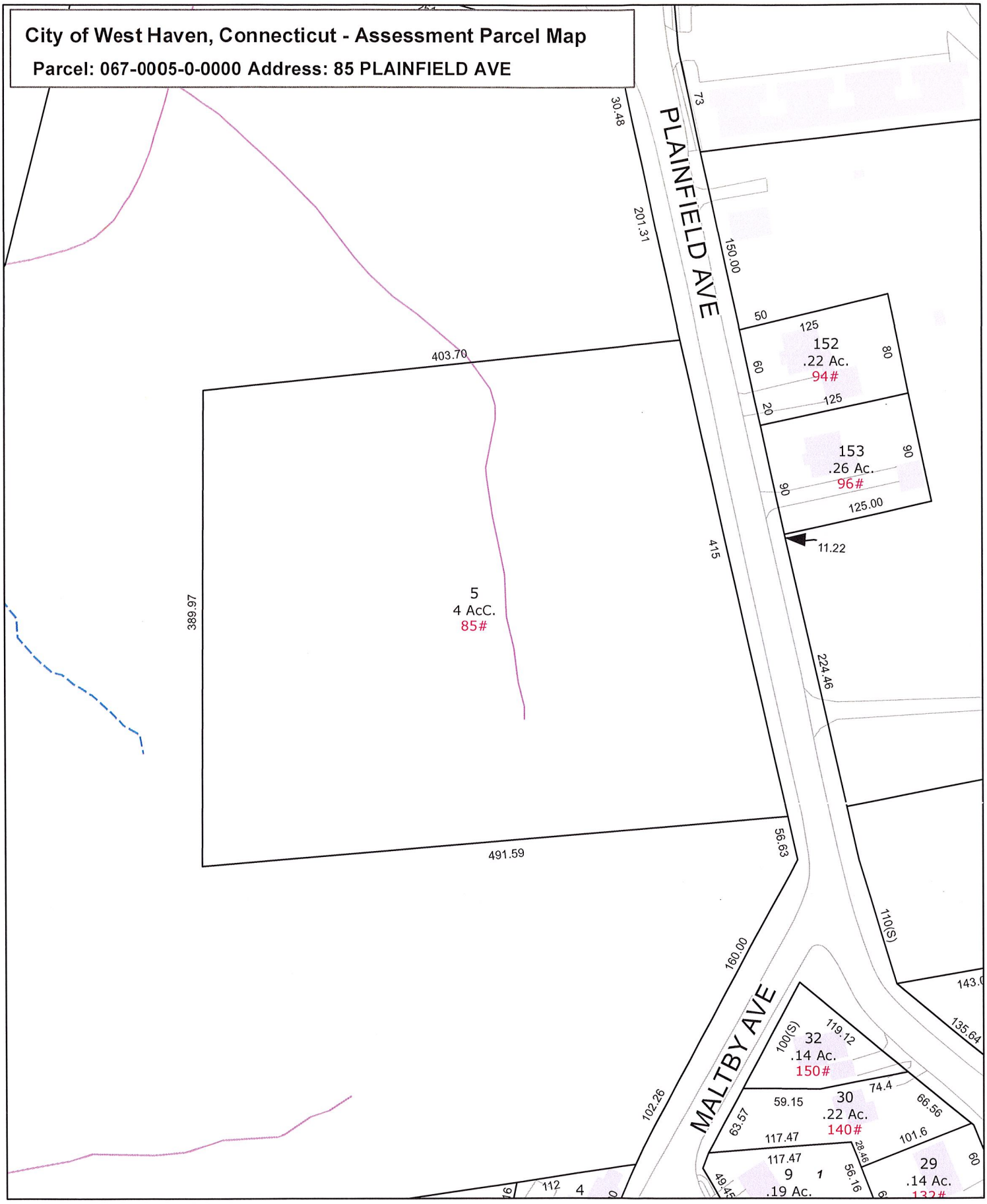
Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
SPRINT	000/ 000		
SPRINT	000/ 000		0

Report Created On 9/11/2017



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

Sprint

2.5 EQUIPMENT DEPLOYMENT

SITE NUMBER:

CT03XC049

SITE NAME:

HILLSIDE

SITE ADDRESS:

85 PLAINFIELD AVE
WEST HAVEN, CT 06516

CROWN ID#: 876323
CROWN SITE NAME: HILLSIDE

APPROVED
By Jason D'Amico at 2:21 pm, Jul 27, 2017

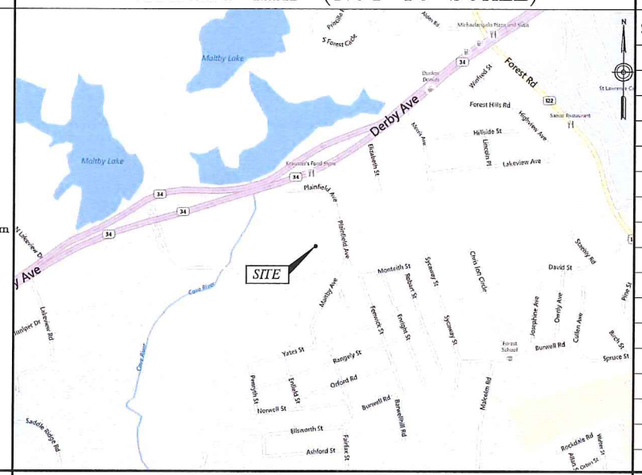
APPROVED
By Susan Vale at 12:39 pm, Dec 18, 2014

SHEET INFORMATION

SITE NUMBER:	CT03XC049
SITE NAME:	HILLSIDE
SITE ADDRESS:	85 PLAINFIELD AVE WEST HAVEN, CT 06516
COUNTY:	NEW HAVEN
COORDINATES: (NAD 83)	41° 18' 4.59"N 72° 58' 35.2"W
GROUND ELEV:	185'± AMSL
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	149'-6"± AGL
STRUCTURE RAD CENTER:	140'-0"± AGL
ZONING CLASSIFICATION:	VACANT LAND
PARCEL ID:	67/5//CELL//

LANDLORD:	CROWN CASTLE USA 2000 CORPORATE DRIVE CANONSBURG, PA
LOCAL POWER COMPANY:	CONNECTICUT LIGHT AND POWER CONTACT CUSTOMER SERVICE (800) 286-2000
APPLICANT:	SPRINT 6580 SPRINT PARKWAY OVERLAND PARK, KANSAS 66251
ENGINEER:	JAMES QUICKSELL (845) 567-6656 EXT. 2835 JQuicksell@tectonicengineering.com
SPRINT CM:	PETER CULBERT Peter.Culbert@sprint.com
CROWN CM:	JASON D'AMICO (860) 209-0104 jason.d'amico@crowncastle.com
AAV:	AT&T

VICINITY MAP (NOT TO SCALE)



SHEET INDEX

SHT. NO.	SHEET DESCRIPTION
T-1	TITLE SHEET
SP-1	GENERAL NOTES
SP-2	GENERAL NOTES
A-1	SITE PLAN
A-2	ELEVATION
A-3	ENLARGED EQUIPMENT LAYOUT PLANS
A-4	ANTENNA LAYOUT PLANS
A-5	RAN WIRING DIAGRAM
A-6	CABLE DETAILS
S-1	EQUIPMENT DETAILS
S-2	EQUIPMENT SCHEMATIC DETAILS
E-1	ELECTRICAL & GROUNDING PLANS
E-2	GROUNDING DETAILS & NOTES

GENERAL NOTES

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED.
   FACILITY HAS NO PLUMBING OR REFRIGERANTS.
   THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATOR REQUIREMENTS.
2. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
3. DEVELOPMENT AND USE OF THIS SITE WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - 2005 STATE OF CONNECTICUT BUILDING CODE.
   - ANSI/TIA/EIA-222-F-1996.
   - NATIONAL ELECTRICAL CODE, LATEST EDITION.

PROJECT DESCRIPTION

1. (1) NEW 2.5 EQUIPMENT RACK INSIDE EXIST MMBTS CABINET.
2. (3) NEW RFS APXVTM14-C-120 ANTENNAS.
3. (3) NEW TD-RRH8x20-25 RRH.
4. (1) NEW 5/8" FIBER CABLE.

AERIAL VIEW (NOT TO SCALE)

APPROVALS

THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND MAY IMPOSE CHANGES OR MODIFICATIONS.

CONSTRUCTION: _____ DATE: _____

LEASING/
SITE ACQUISITION: _____ DATE: _____

LANDLORD/
PROPERTY OWNER: _____ DATE: _____

R.F. ENGINEER: _____ DATE: _____

CALL TOLL FREE FOR CONNECTICUT
1-800-322-4455 OR DIAL 811
CALL TWO FULL WORKING DAYS IN ADVANCE TO LOCATE BURIED UTILITY PIPES AND CABLES

Sprint
2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC
• PLANNING
• ENGINEERING
• SURVEYING
• CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.
1279 Route 300
Newburgh, NY 12550
Phone: (845) 567-6656
Fax: (845) 567-8703
www.tectonicengineering.com

SUBMITTALS

PROJECT NO: 7225.CT03XC049

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	DC
1	12/17/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
12/17/14	[illegible]

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC049

SITE NAME:
HILLSIDE

SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
TITLE SHEET

SHEET NO:
T-1

DIVISION 01000–GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE PROJECT OWNER'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

6. ONCE THE CONTRACTOR HAS RECEIVED AND ACCEPTED THE NOTICE TO PROCEED, CONTRACTOR WILL CONTACT THE CROWN CASTLE CONSTRUCTION MANAGER OF RECORD (NOTED ON THE FIRST PAGE ON THIS CONSTRUCTION DRAWING) A MINIMUM OF 48 HOURS PRIOR TO WORK START. UPON ARRIVAL TO THE JOB SITE, CONTRACTOR CREW IS REQUIRED CALL 1–800–788–7011 TO NOTIFY THE CROWN CASTLE NOC WORK HAS BEGUN.

7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.

9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.

11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.

12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.

13. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT. 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 ARCHITECT/ENGINEER. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR PIER DRILLING AROUND OR NEAR UTILITIES. THE CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT LIMITED TO A) FALL PROTECTION, B) CONFINED SPACE, C) ELECTRICAL SAFETY, D) TRENCHING AND EXCAVATION OF 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 THE POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK SUBJECT TO THE APPROVAL OF THE ARCHITECT/ENGINEER.

14. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.

15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.

16. THE CONTRACTOR SHALL NOTIFY THE THE RF ENGINEER FOR ANTENNA AZIMUTH VERIFICATION (DURING ANTENNA INSTALLATION) PRIOR TO CONDUCTING SWEEP TESTS.

17. THE CONTRACTOR SHALL SUBMIT AT THE END OF THE PROJECT A COMPLETE SET OF AS–BUILT DRAWINGS TO THE CLIENT REPRESENTATIVE.

18. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT EXHIBIT A–STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV. 4.0– 02.15.2011.DOCM.

19. REFER TO: WEATHER PROOFING SPECS: EXCERPT EXH A–WIHRPRF–STD CONSTR SPECS._15720111042l855492.DOCM.

20. REFER TO: COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF

21. REFER TO LATEST DOCUMENTATION REVISION.

DIVISION 03000–CONCRETE

1.03 APPLICABLE STANDARDS (USE LATEST EDITIONS)

A. ACI–301 – SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS.
B. ACI–347 GUIDE TO FORM WORK FOR CONCRETE.
C. ASTM C33– CONCRETE AGGREGATE
D. ASTM C94 – READY MIXED CONCRETE e. ASTM C150 – PORTLAND CEMENT.
E. ASTM C260 – AIR–ENTRAINING ADMIXTURES FOR CONCRETE
F. ASTM C309– LIQUID MEMBRANE FORMING COMPOUNDS FOR CURING CONCRETE.
H. ASTM C494 – CHEMICAL ADMIXTURES FOR CONCRETE
I. ASTM A615– DEFORMED AND PLAIN BILLET–STEEL BARS FOR CONCRETE REINFORCEMENT
J. ASTM A185– STEEL WELDED WIRE FABRIC (PLAIN) FOR CONCRETE REINFORCEMENT

1.04 QUALITY ASSURANCE

CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ARCHITECT/ENGINEER AS DIRECTED BY THE CLIENT'S REPRESENTATIVE.

3.04 SURFACE FINISHES

A. SURFACES AGAINST WHICH BACKFILL OR CONCRETE SHALL BE PLACED REQUIRE NO TREATMENT EXCEPT REPAIR OF DEFECTIVE AREAS.

B. SURFACES THAT WILL BE PERMANENTLY EXPOSED SHALL PRESENT A UNIFORM FINISH PROVIDED BY THE REMOVAL OF FINS AND THE FILLING HOLES AND OTHER IRREGULARITIES WITH DRY PACK GROUT, OR BY SACKING WITH UTILITY OR ORDINARY GROUT.

C. SURFACES THAT WOULD NORMALLY BE LEVEL AND WHICH WILL BE PERMANENTLY EXPOSED TO THE WEATHER SHALL BE SLOPED FOR DRAINAGE. UNLESS ENGINEER'S DESIGN DRAWING SPECIFIES A HORIZONTAL SURFACE OR SURFACES SUCH AS STAIR TREADS, WALLS, CURBS, AND PARAPETS SHALL BE SLOPED APPROXIMATELY 1/4" PER FOOT.

D. SURFACES THAT WILL BE COVERED BY BACKFILL OR CONCRETE SHALL BE SMOOTH SCREENED.

E. EXPOSED SLAB SURFACES SHALL BE CONSOLIDATED, SCREENED, FLOATED, AND STEEL TROWELED. HAND OR POWER–DRIVEN EQUIPMENT MAY BE USED FOR FLOATING. FLOATING SHALL BE STARTED AS SOON AS THE SCREENED SURFACE HAS ATTAINED A STIFFNESS TO PERMIT FINISHING OPERATIONS. OPERATIONS. ALL EDGES MUST HAVE A 3/4" CHAMFER.

1.04 QUALITY ASSURANCE CONCRETE MATERIALS AND OPERATIONS SHALL BE TESTED AND INSPECTED BY THE ENGINEER.

3.05 PATCHING

THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY UPON REMOVAL OF THE FORMS TO OBSERVE CONCRETE SURFACE CONDITIONS. IMPERFECTIONS SHALL BE PATCHED ACCORDING TO THE ENGINEER'S DIRECTION.

3.06 DEFECTIVE CONCRETE

THE CONTRACTOR SHALL NOTIFY OR REPLACE CONCRETE NOT CONFORMING TO REQUIRED LEVELS AND LINES, DETAILS, AND ELEVATIONS AS SPECIFIED IN ACI 301.

3.07 PROTECTION

A. IMMEDIATELY AFTER PLACEMENT. THE CONTRACTOR SHALL PROTECT THE CONCRETE FROM PREMATURE DRYING, EXCESSIVELY HOT OR COLD TEMPERATURES, AND MECHANICAL INJURY. FINISHED WORK SHALL BE PROTECTED.

B. CONCRETE SHALL BE MAINTAINED WITH MINIMAL MOISTURE LOSS AT RELATIVELY CONSTANT TEMPERATURE FOR PERIOD NECESSARY FOR HYDRATION OF CEMENT AND HARDENING OF CONCRETE.

C. ALL CONCRETE SHALL BE WATER CURED PER ACCEPTABLE PRACTICES SPECIFIED BY ACI CODE (LATEST EDITION)

DIVISION 05000 – METALS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. THE WORK CONSISTS OF THE FABRICATION AND INSTALLATION OF ALL MATERIALS TO BE FURNISHED. AND WITHOUT LIMITING THE GENERALITY THEREOF, INCLUDING ALL EQUIPMENT, LABOR AND SERVICES REQUIRED FOR ALL STRUCTURAL STEEL WORK AND ALL ITEMS INCIDENTAL AS SPECIFIED AND AS SHOWN ON THE DRAWINGS:

1. STEEL FRAMING INCLUDING BEAMS, ANGLES, CHANNELS AND PLATES.
2. WELDING AND BOLTING OF ATTACHMENTS.

1.02 REFERENCE STANDARDS

A. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

1. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS IN BUILDING CODES" OR LATEST EDITION.
2. AWS: AMERICAN WELDING SOCIETY CODE OR LATEST EDITION.
3. AISC: AMERICAN INSTITUTE OF STEEL CONSTRUCTION, "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

PART 2 – PRODUCTS

2.01 MATERIALS

A. STRUCTURAL STEEL: SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A36 AND A992 FOR STRUCTURAL STEEL.

ALL PROPOSED STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC CODE AND ASTM SPECIFICATIONS (LATEST EDITION) ALL NEW STEEL SHALL CONFORM TO THE FOLLOWING.

1. STRUCTURAL WIDE FLANGE: ASTM A992 Fy=50KSI.
2. MISCELLANEOUS STEEL (PLATES), CHANNELS, ANGLES, ETC): ASTM A36 (Fy=36KSI).
3. STRUCTURAL TUBING: ASTM A500 Gr. B (Fy=46KSI).
4. STEEL PIPE: ASTM A53 Gr B (Fy=35KSI).

2.02 WELDING

A. ALL WELDING SHALL BE DONE BY CERTIFIED WELDERS. CERTIFICATION DOCUMENTS SHALL BE MADE AVAILABLE FOR ENGINEER'S AND/OR OWNER'S REVIEW IF REQUESTED.

B. WELDING ELECTRODES FOR MANUAL SHIELDED METAL ARC WELDING SHALL CONFORM TO ASTM 1–233, E70 SERIES. BARE ELECTRODES AND GRANULAR FLUX USED IN THE SUBMERGED ARC PROCESS SHALL CONFORM TO AISC SPECIFICATIONS.

C. FIELD WELDING SHALL BE DONE AS PER AWS D1.1 REQUIREMENTS VISUAL INSPECTION IS ACCEPTABLE.

D. STUD WELDING SHALL BE ACCOMPLISHED BY CAPACITOR DISCHARGE (CD) WELDING TECHNIQUE USING CAPACITOR DISCHARGE STUD WELDER.

E. PROVIDE STUD FASTENERS OF MATERIALS AND SIZES SHOWN ON DRAWINGS OR AS RECOMMENDED BY THE MANUFACTURER FOR STRUCTURAL LOADINGS REQUIRED.

F. FOLLOW MANUFACTURERS SPECIFICATIONS AND INSTRUCTIONS TO PROPERLY SELECT AND INSTALL STUD WELDS.

2.03 BOLTING

A. BOLTS SHALL BE CONFORMING TO ASTM A35 HIGH STRENGTH HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4" (MINIMUM) CONFORMING TO ASTM A325, HOT DIP GALVANIZED, ASTM A153 NUTS SHALL BE HEAVY HEX TYPE.

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

D. EXCEPT WHERE SHOWN, ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS TO BE DOUBLE ANGLED CONNECTIONS WITH HIGH STRENGTH BOLTS (THREADS EXCLUDED FROM SHEAR PLANE) AND HARDENED WASHERS.

E. STANDARD, OVERSIZED OR HORIZONTAL SHORT SLOTTED HOLES.

F. SNUG–TIGHT STRENGTH BEARING BOLTS MAY BE USED IN STANDARD HOLES CONFORMING TO ACIS, USING THE TURN OF THE NUT METHOD.

H. FULLY–TENSIONED HIGH STRENGTH (SLIP CRITICAL) SHALL BE USED IN OVERSIZED SLOT HOLES (RESPECTIVE OF SLOT ORIENTATION).

I. ALL BRACED CONNECTION, MOMENT CONNECTION AND CONNECTIONS NOTED AS "SLIP CRITICAL" SHALL BE BE SLIP CRITICAL JOINTS WITH CLASS A SURFACE CONDITIONS, UNLESS OTHERWISE NOTED.

J. EPOXY ANCHOR ASSEMBLIES SHALL BE AS MANUFACTURED BY HILTI OR ENGINEER APPROVED EQUAL, AS FOLLOWS:

BASE MATERIAL	ANCHOR SYSTEM
CONCRETE	HILTI HIT–HY 200
HOLLOW & GROUTED CMU OR BRICK	HILTI HIT–HY 70

2.04 FABRICATION

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS

2.05 FINISH

A. STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. (LATEST EDITION) UNLESS OTHERWISE NOTED.

2.06 PROTECTION

A. UPON COMPLETION OF ERECTION, INSPECT ALL GALVANIZED STEEL AND PAINT ANY FIELD CUTS, WELDS OR GALVANIZED BREAKS WITH (2) COATS OF ZINC–RICH COLD GALVANIZING PAINT.

PART 3 – ERECTION

A. PROVIDE ALL ERECTION, EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION, BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING

C. TEMPORARY BRACING, GUYING, AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SET AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

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SUBMITTALS

PROJECT NO: 7225.CT03XC049

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	DC
1	12/17/14	FOR CONSTRUCTION	DC

DATE	REVIEWED BY
12/17/14	

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC049

SITE NAME:
HILLSIDE

SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
GENERAL NOTES

SHEET NO:
SP–1

DIVISION 13000–SPECIAL CONSTRUCTION ANTENNA INSTALLATION

PART 1 – GENERAL

1.01 WORK INCLUDED

A. ANTENNAS AND HYBRIFLEX CABLES ARE FURNISHED BY CLIENT'S REPRESENTATIVE UNDER SEPARATE CONTRACT. THE CONTRACTOR SHALL ASSIST ANTENNA INSTALLATION CONTRACTOR IN TERMS OF COORDINATION AND SITE ACCESS. ERECTION SUBCONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPERTY.

B. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

C. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

D. INSTALL FURNISHED GALVANIZED STEEL OR ALUMINUM WAVEGUIDE AND PROVIDE PRINTOUT OF THAT RESULT

F. INSTALL HYBRIFLEX CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

G. ANTENNA AND HYBRIFLEX CABLE GROUNDING:

1. ALL EXTERIOR #6 GREEN GROUND WIRE DAISY CHAIN CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE 3221213 OR EQUIVALENT.

2. ALL HYBRIFLEX CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF HYBRIFLEX CABLE (NOT WITHIN BENDS). 1.02 RELATED WORK FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH QOTHER TRADES PRIOR TO BID:

   1. FLASHING OF OPENING INTO OUTSIDE WALLS.
   2. SEALING AND CAULKING ALL OPENINGS.
   3. PAINTING.
   4. CUTTING AND PATCHING.

1.03 REQUIREMENTS OF REGULATOR AGENCIES

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATIONS IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. EIA – ELECTRONIC INDUSTRIES ASSOCIATION RS–22. STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

2. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7480–IH, CONSTRUCTION MARKING AND LIGHTING.

3. FCC – FEDERAL COMMUNICATION COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES

4. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION FOR STRUCTURAL JOINTS USING ASTM 1325 OR A490 BOLTS.

5. NEC – NATIONAL ELECTRIC CODE – ON TOWER LIGHTING KITS.

6. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

7. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

B. LIFE SAFETY CODE NFPA, LATEST EDITION.

DIVISION 13000–EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED: REFER TO SURVEY AND SITE PLAN FOR WORK INCLUDED.

1.02 RELATED WORK

A. CONSTRUCTION OF EQUIPMENT FOUNDATIONS
B. INSTALLATION OF ANTENNA SYSTEM

PART 2 PRODUCTS

2.01 MATERIALS

A. ROAD AND SITE MATERIALS; FILL MATERIAL SHALL BE ACCEPTABLE, SELECT FILL SHALL BE IN ACCORDANCE WITH LOCAL DEPARTMENT OF HIGHWAY AND PUBLIC TRANSPORTATION STANDARD SPECIFICATIONS.

B. SOIL STERILIZER SHALL BE EPA REGISTERED OF LIQUID COMPOSITION AND OF PRE–EMERGENCE DESIGN.

C. SOIL STABILIZER FABRIC SHALL BE MIRAFI OR EQUAL – 600X AT ACCESS ROAD AND COMPOUND.

D. GRAVEL FILL; WELL GRADED, HARD, DURABLE, NATURAL SAND AND GRAVEL, FREE FROM ICE AND SNOW, ROOTS, SOD RUBBISH, AND OTHER DELETERIOUS OR ORGANIC MATTER.

MATERIAL SHALL CONFORM TO THE FOLLOWING GRADATION REQUIREMENTS.

GRAVEL FILL TO BE PLACED IN LIFTS OF 9" MAXIMUM THICKNESS AND 90 % DENSITY. COMPACTED TO 95

E. NO FILL OR EMBANKMENT MATERIALS SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OF EMBANKMENT

2.02 EQUIPMENT

A. COMPACTION SHALL BE ACCOMPLISHED BY MECHANICAL MEANS. LARGER AREAS SHALL BE COMPACTED BY SHEEPS FOOT, VIBRATORY OR RUBBER TIED ROLLERS WEIGHING AT LEAST FIVE TONS. SMALLER AREAS SHALL BE COMPACTED BY POWER–DRIVER, HAND HELD TAMPERS.

B. PRIOR TO OTHER EXCAVATION AND CONSTRUCTION EFFORTS GRUB ORGANIC MATERIAL TO A MINIMUM OF 6" BELOW ORIGINAL GROUND LEVEL.

C. UNLESS OTHERWISE INSTRUCTED BY CLIENT'S REPRESENTATIVE. REMOVE TREES, BRUSH AND DEBRIS FROM THE PROPERTY TO AN AUTHORIZED DISPOSAL LOCATION.

D. PRIOR TO PLACEMENT OF FILL OR BASE MATERIALS, ROLL THE SOIL.

E. WHERE UNSTABLE SOIL CONDITIONS ARE ENCOUNTERED, LINE THE GRUBBED AREAS WITH STABILIZER MAT PRIOR TO PLACEMENT OF FILL OR BASE MATERIAL.

3.03 INSTALLATION

A. THE SITE AND TURNAROUND AREAS SHALL BE AT THE SUB–BASE COURSE ELEVATION PRIOR TO FORMING FOUNDATIONS. GRADE OR FILL THE SITE AND ACCESS ROAD AS REQUIRED TO PRODUCE EVEN DISTRIBUTION OF SPOILS RESULTING FROM FOUNDATION EXCAVATIONS. THE RESULTING GRADE SHALL CORRESPOND WITH SAID SUB–BASE COURSE, ELEVATIONS ARE TO BE CALCULATED FORM FINISHED GRADES OR SLOPES INDICATED.

B. THE ACCESS ROAD SHALL BE BROUGHT TO BASE COURSE ELEVATION PRIOR TO FOUNDATION CONSTRUCTION.

C. DO NOT CREATE DEPRESSIONS WHERE WATER MAY POND.

D. THE CONTRACT INCLUDES ALL NECESSARY GRADING, BANKING, DITCHING AND COMPLETE SURFACE COURSE FOR ACCESS ROAD. ALL ROADS OR ROUTES UTILIZED FOR ACCESS TO PUBLIC THOROUGHFARE IS INCLUDED IN SCOPE OF WORK UNLESS OTHERWISE INDICATED.

E. WHEN IMPROVING AN EXISTING ACCESS ROAD, GRADE THE EXISTING ROAD TO REMOVE ANY ORGANIC MATTER AND SMOOTH THE SURFACE BEFORE PLACING FILL OR STONE.

F. PLACE FILL OR STONE IN 3" MAXIMUM LIFTS AND COMPACT BEFORE PLACING NEXT LIFT.

G. THE FINISH GRADE, INCLUDING TOP SURFACE COURSE, SHALL EXTEND A MINIMUM OF 12" BEYOND THE SITE FENCE AND SHALL COVER THE AREA AS INDICATED.

H. RIPRAP SHALL BE APPLIED TO THE SIDE SLOPES OF ALL FENCED AREAS, PARKING AREAS AND TO ALL OTHER SLOPES GREATER THAN 2:1.

I. RIPRAP SHALL BE APPLIED TO THE SIDES OF DITCHES OR DRAINAGE SWALES AS INDICATED ON PLANS.

J. RIPRAP ENTIRE DITCH FOR 6'–0" IN ALL DIRECTIONS AT CULVERT OPENINGS.

K. SEED, FERTILIZER AND STRAW COVER SHALL BE APPLIED TO ALL OTHER DISTURBED AREAS AND DITCHES, DRAINAGE, SWALES, NOT OTHERWISE RIP–RAPPED.

L. UNDER NO CIRCUMSTANCES SHALL DITCHES, SWALES OR CULVERTS BE PLACED SO THEY DIRECT WATER TOWARDS, OR PERMIT STANDING WATER IMMEDIATELY ADJACENT TO SITE. IF OWNER DESIGNS OR IF DESIGN ELEVATIONS CONFLICT WITH THIS GUIDANCE ADVISE THE OWNER IMMEDIATELY.

M. IF A DITCH LIES WITH SLOPE GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALL IN THE DITCH AT CULVERT ENTRANCES. RIP–RAP THE UPSTREAM SIDE OF THE HEADWALL AS WELL AS THE DITCH FOR 6'–0" ABOVE THE CULVERT.

N. IF A DITCH LIES WITH SLOPES GREATER THAN TEN PERCENT, MOUND DIVERSIONARY HEADWALLS IN THE DITCH FOR 6'–0" ABOVE THE CULVERT ENTRANCE.

O. SEED AND FERTILIZER SHALL BE APPLIED TO SURFACE CONDITIONS WHICH WILL ENCOURAGE ROOTING. RAKE AREAS TO BE SEEDED TO EVEN THE SURFACE AND TO LOOSEN THE SOIL.

P. SOW SEED IN TWO DIRECTIONS IN TWICE THE QUANTITY RECOMMENDED BY THE SEED PRODUCER.

Q. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE GROWTH OF SEEDED AND LANDSCAPED AREAS BY WATERING UP TO THE POINT OF RELEASE FROM THE CONTRACT. CONTINUE TO REWORK BARE AREAS UNTIL COMPLETE COVERAGE IS OBTAINED.

3.04 FIELD QUALITY CONTROL

A. COMPACTION SHALL BE D–1557 FOR SITE WORK AND 95 % MAXIMUM DENSITY UNDER SLAB AREAS. AREAS OF SETTLEMENT WILL BE EXCAVATED AND REFILLED AT CONTRACTOR'S EXPENSE. REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. THE COMPACTION TEST RESULTS SHALL BE AVAILABLE PRIOR TO THE CONCRETE POUR.

3.05 PROTECTION

A. PROTECT SEEDED AREAS FORM EROSION BY SPREADING STRAW TO A UNIFORM LOOSE DEPTH OF 1"–2". STAKE AND TIE DOWN AS REQUIRED. USE OF EROSION CONTROL MESH OR MULCH NET SHALL BE AN ACCEPTABLE ALTERNATIVE.

B. ALL TREES PLACED IN CONJUNCTION WITH A LANDSCAPE CONTRACT SHALL BE WRAPPED, TIED WITH HOSE PROTECTED WIRE AND SECURED TO STAKES EXTENDING 2'–0" INTO THE GROUND ON FOUR SIDES OF THE TREE.

C. ALL EXPOSED AREAS SHALL BE PROTECTED AGAINST WASHOUTS AND SOIL EROSION. STRAW BALES SHALL BE PLACED AT THE INLET APPROACH TO ALL NEW OR EXISTING CULVERTS. REFER TO DETAILS ON DRAWINGS

SYMBOLS	ABBREVIATIONS
— — — G — — — G —	GROUND WIRE
— — — E — — — E —	ELECTRIC
— — — T — — — T —	TELEPHONE
—OHW—OHW—OHW—OHW—OHW—	OVERHEAD WIRE
——— — — ———	PROPERTY LINE
—X———X———X———	CHAIN LINK FENCE
A–1	ANTENNA MARK
(E)	EXISTING
(P)	PROPOSED DETAIL
DET # / SHT #	REFERENCE
	SURFACE ELEVATION

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No. 25406
LICENSED PROFESSIONAL ENGINEER

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CT03XC049

SITE NAME:
HILLSIDE

SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
GENERAL NOTES

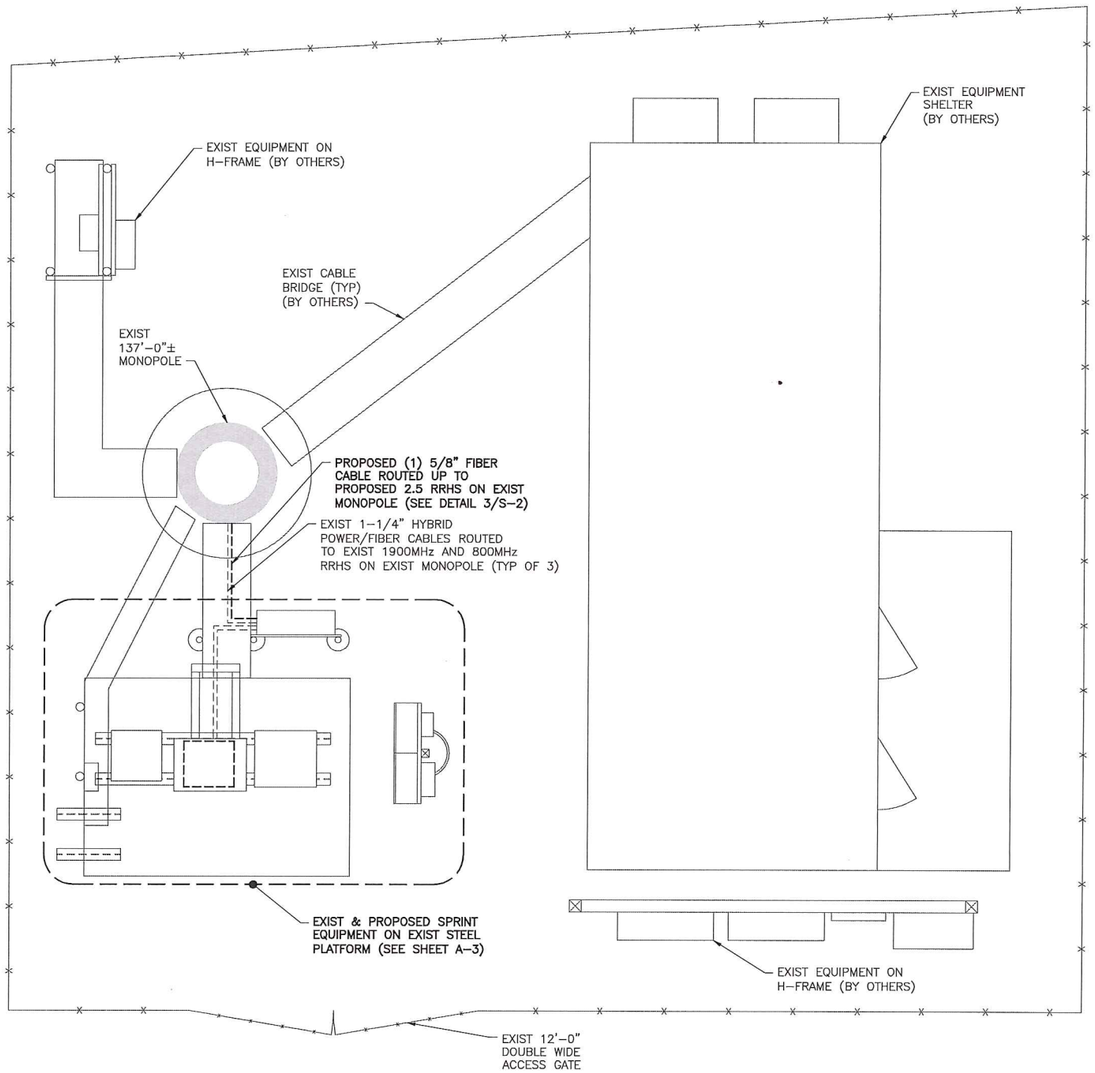
SHEET NO:
SP–2

NORTH NOTE:

NORTH SHOWN HAS BEEN ESTABLISHED USING THE USGS QUADRANGLE 7.5 MINUTE MAPS AND IS APPROXIMATE. VERIFY TRUE NORTH PRIOR TO INSTALLATION OF ANTENNAS.

N

APPROX.



1
A-2

1
A-1 SITE PLAN

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

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SITE PLAN

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A-1

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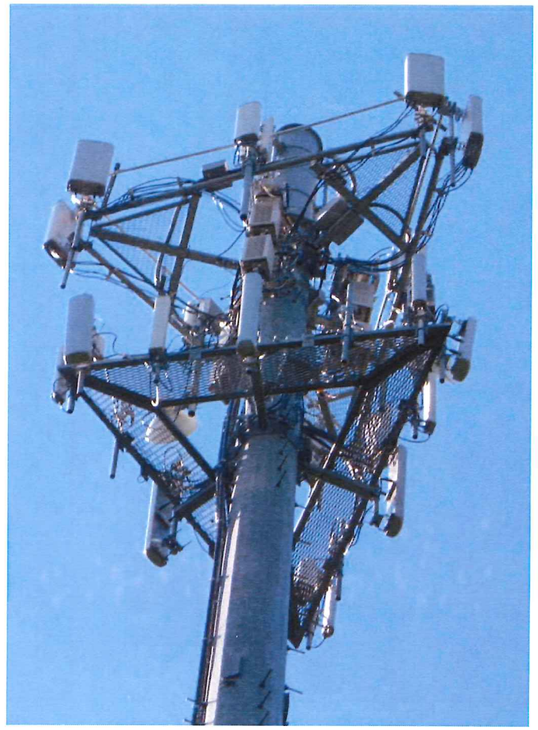
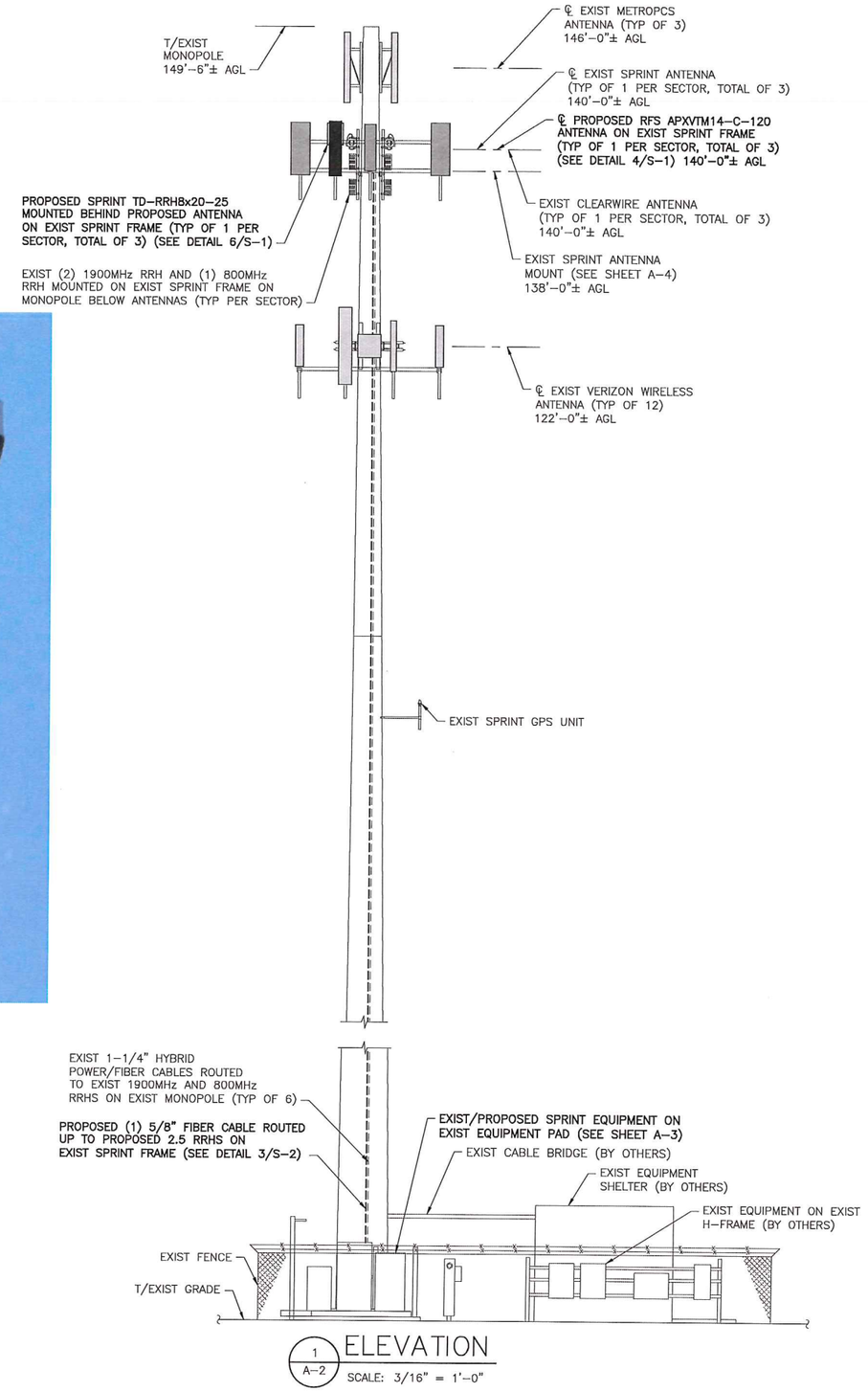
THE EXISTING MOUNT HAS BEEN ANALYZED BY TECTONIC ENGINEERING AND FOUND TO BE ADEQUATE TO SUPPORT THE PROPOSED SPRINT UPGRADE AS DETAILED IN THE STRUCTURAL ANALYSIS EVALUATION LETTER DATED 12/17/14.





1 / A-2 ELEVATION

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

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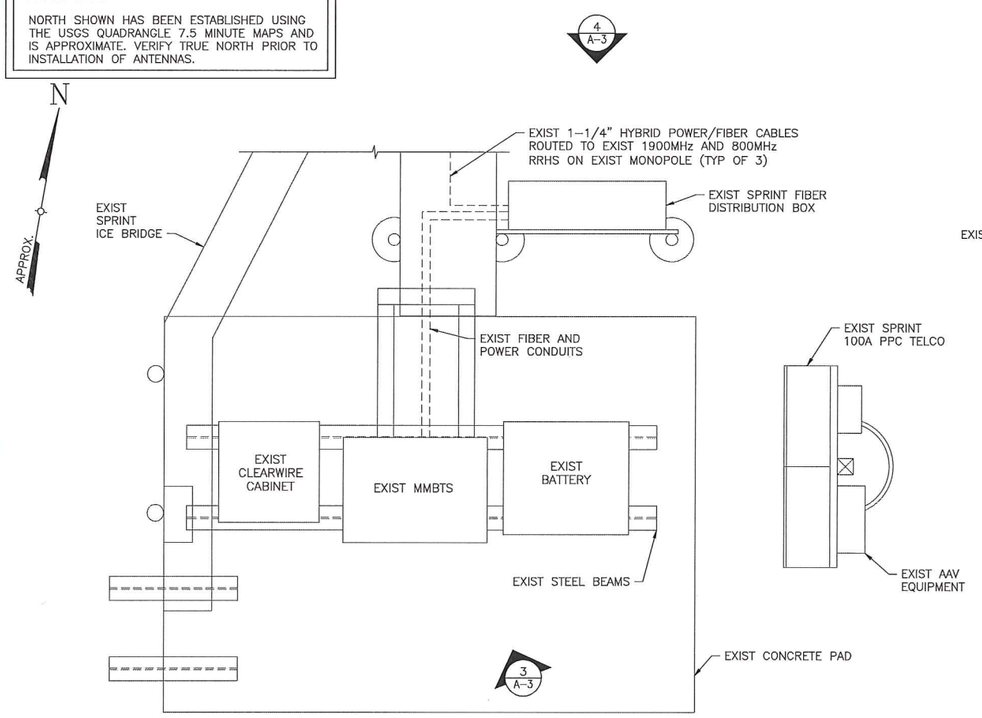
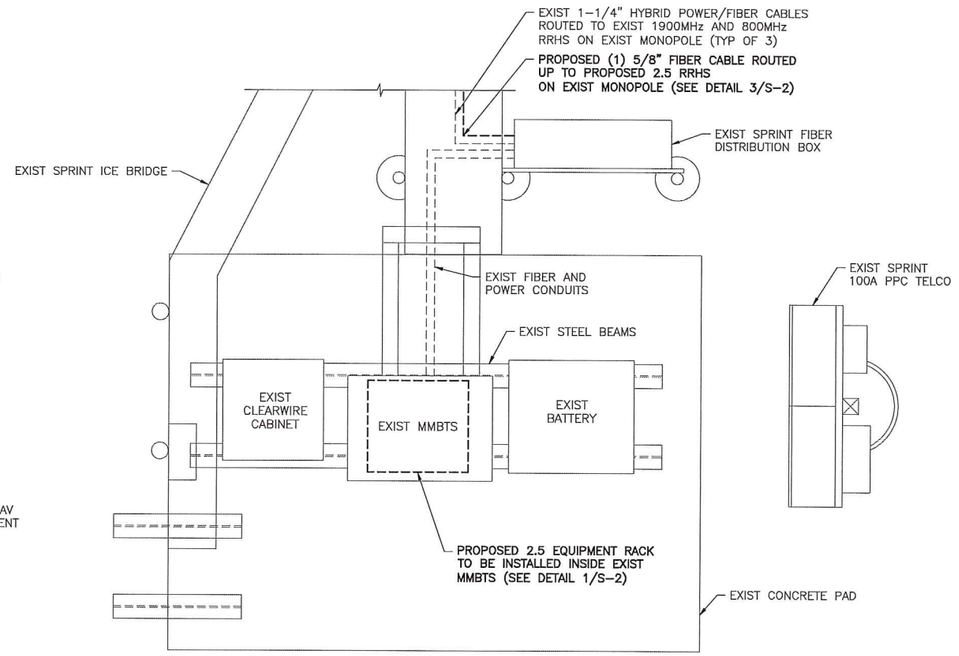


1 A-3 ENLARGED EQUIP. LAYOUT PLAN (EXIST)

SCALE: 3/4" = 1'-0"



2 A-3 ENLARGED EQUIP. LAYOUT PLAN (FINAL)

SCALE: 3/4" = 1'-0"

3 A-3 EXIST EQUIPMENT PAD

SCALE: NTS

4 A-3 EXIST FIBER DISTRIBUTION BOX

SCALE: NTS

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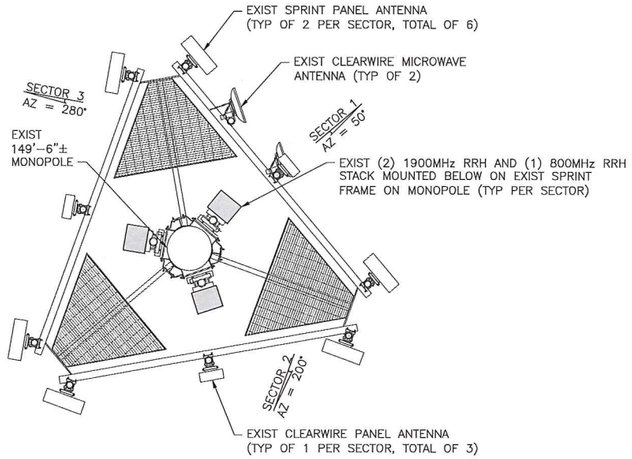
ENLARGED EQUIPMENT LAYOUT PLANS

SHEET NO:
A-3

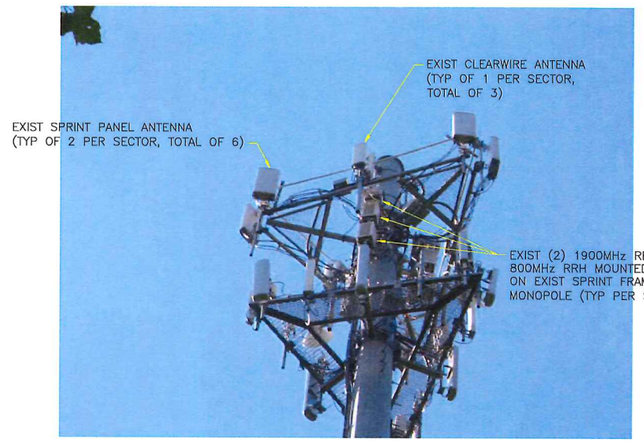
N

APPROX.



1 / A-4 ANTENNA LAYOUT PLAN (EXIST)

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



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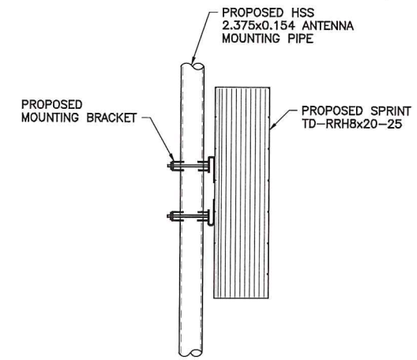
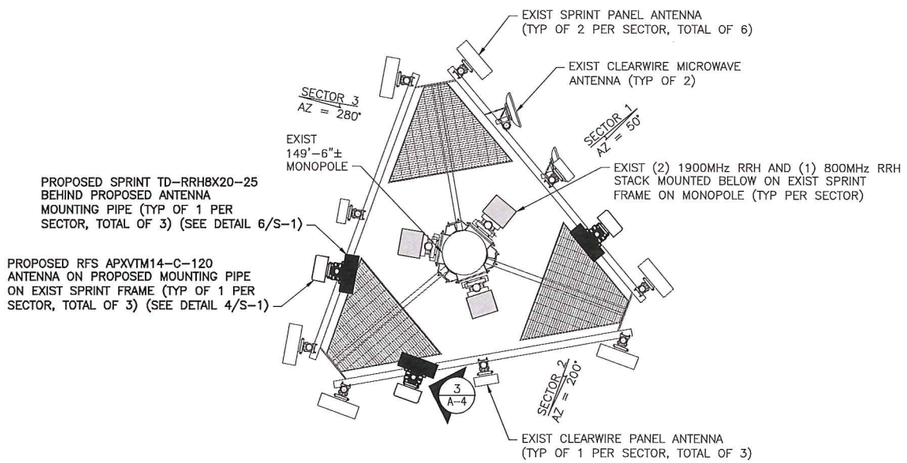


3 / A-4 RRH MOUNTING DETAIL

SCALE: 1 1/2" = 1'-0"



2 / A-4 ANTENNA LAYOUT PLAN (FINAL)

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

ANTENNA DATA

Status	Exist	Proposed
Antenna Manufacturer	KMW	RFS-CEL WAVE
Antenna Model Number	ET-X-TU-42-15-37-18-IR-SP	APXVTM14-C-120
Number of Antennas	6	3
Antenna RAD Center	140'	140'
Antenna Azimuth	50/200/280	50/200/280
Antenna RRH Model Number	1900MHz/800MHz RRHS	2.5GHz RRH-V3
Number of RRH	9	3

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ANTENNA LAYOUT PLANS

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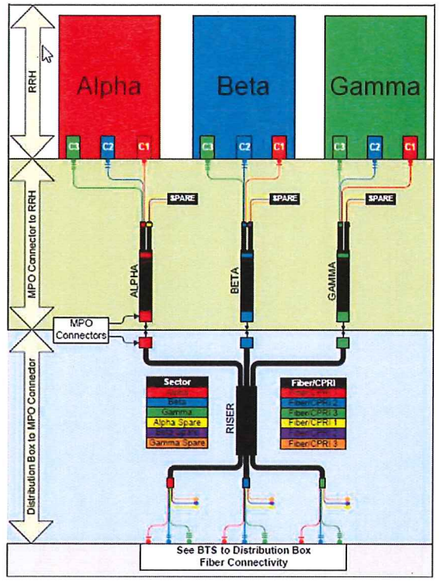
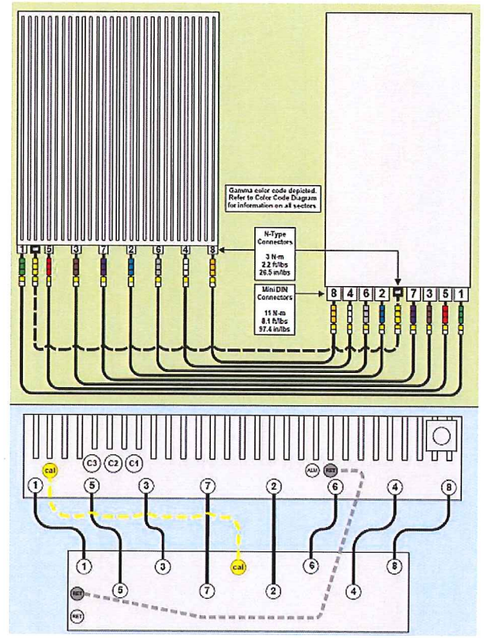
A-4



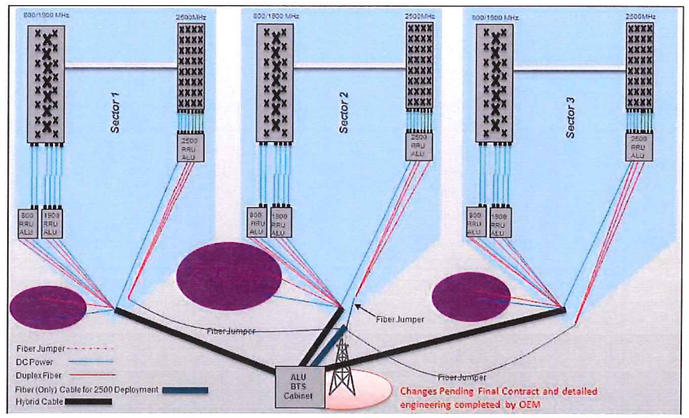
1 / A–5 2.5 CABLE COLOR CODING

SCALE: N.T.S.



2 / A–5 RRH CONNECTIVITY

SCALE: N.T.S.



3 / A–5 RAN WIRING

SCALE: N.T.S.

4 / A–5 CABLE SCENARIO

SCALE: N.T.S.

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12/17/14	SMC

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED
PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC049

SITE NAME:
HILLSIDE

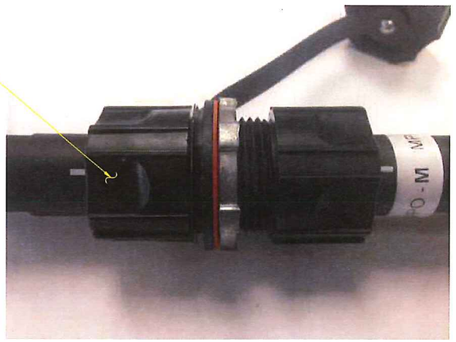
SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
RAN WIRING DIAGRAM

SHEET NO:
A–5

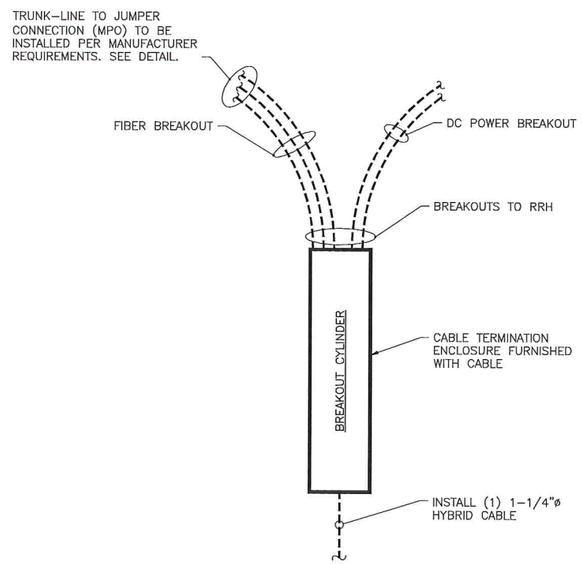
IMPORTANT!! LINE UP WHITE MARKINGS ON JUMPER AND RISER IP-MPO CONNECTOR. PUSH THE WHITE MARK ON THE JUMPER CONNECTOR FLUSH AGAINST THE RED SEAL ON THE RISER CONNECTION

IMPORTANT!! ROTATE THE BAYONET HOUSING CLOCKWISE UNTIL A CLICK SOUND IS HEARD TO EXSURE A GOOD CONNECTION

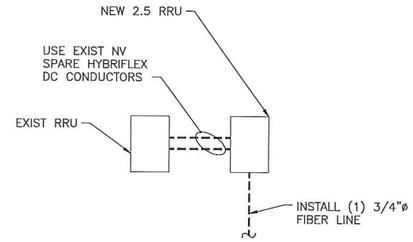


1 / A-6 HYBRIFLEX RISER/JUMPER CONNECTION DETAILS

SCALE: N.T.S.



2.5 HYBRID CABLE W/FIBER & DC FEEDERS



FIBER ONLY TRUNK LINES

2 / A-6 TRUNK LINE DETAILS (TYPICAL)

SCALE: N.T.S.

SPECIAL NOTES: CABLE MARKINGS AT RAD CENTER AND ALL WALL/BLDG. PENETRATIONS

- ALL COLOR CODE TAPE SHALL BE 3M-35 AND SHALL BE INSTALLED USING A MINIMUM OF (3) WRAPS OF TAPE.
- ALL COLOR BANDS INSTALLED AT THE TOWER TOP SHALL BE A MINIMUM OF 3" WIDE AND SHALL HAVE A MINIMUM OF 3/4" OF SPACING BETWEEN EACH COLOR.
- ALL COLOR BANDS INSTALLED AT OR NEAR THE GROUND MAY BE ONLY 3/4" WIDE. EACH TOP-JUMPER SHALL BE COLOR CORDED WITH (1) SET OF 3" WIDE BANDS.
- EACH MAIN COAX SHALL BE COLOR CODED WITH (1) SET OF 3" BANDS NEAR THE TOP-JUMPER CONNECTION AND WITH 3/4" COLOR BANDS JUST PRIOR TO ENTERING THE BTS OR TRANSMITTER BUILDING.
- ALL BOTTOM JUMPERS SHALL BE COLOR CODED WITH (1) SET OF 3/4" BANDS ON EACH END OF THE BOTTOM JUMPER.
- ALL COLOR CODES SHALL BE INSTALLED SO AS TO ALIGN NEATLY WITH ONE ANOTHER FROM SIDE-TO-SIDE.
- EACH COLOR BAND SHALL HAVE A MINIMUM OF (3) WRAPS AND SHALL BE NEATLY TRIMMED AND SMOOTHED OUT AS TO AVOID UNRAVELING.
- X-POLE ANTENNAS SHOULD USE "XX-1" FOR THE "+45" PORT, "XX-2" FOR THE "-45" PORT.
- COLOR BAND #4 REFERS TO THE FREQUENCY BAND: ORANGE=850, VIOLET=1900. USED ON JUMPERS ONLY.
- RF FEEDLINE SHALL BE IDENTIFIED WITH A METAL TAG (STAINLESS OR BRASS) AND STAMPED WITH THE SECTOR, ANTENNA POSITION, AND CABLE NUMBER.
- ANTENNAS MUST BE IDENTIFIED, USING THE SECTOR LETTER AND ANTENNA NUMBER, WITH A BLACK MARKER PRIOR TO INSTALLATION.

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No. 25406
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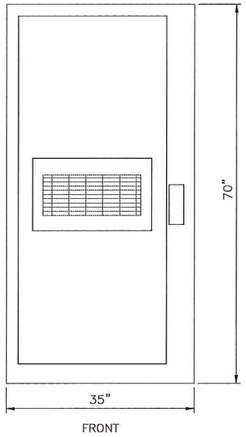
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
CABLE DETAILS

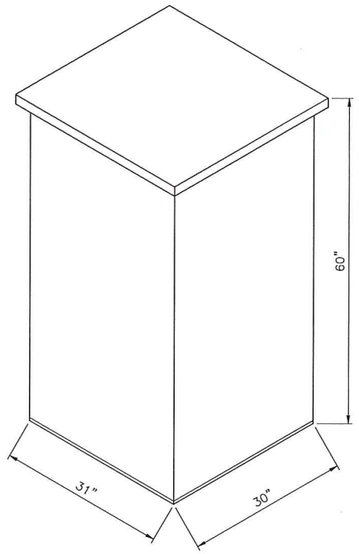
SHEET NO:
A-6



CABINET FRONT 9927 MMBTS MODULAR CELL
SPECIFICATIONS:
HEIGHT: 70" WIDTH: 35" DEPTH: 37.8" WEIGHT: 1090 LBS.

1/S-1 (EXIST) MMBTS CABINET

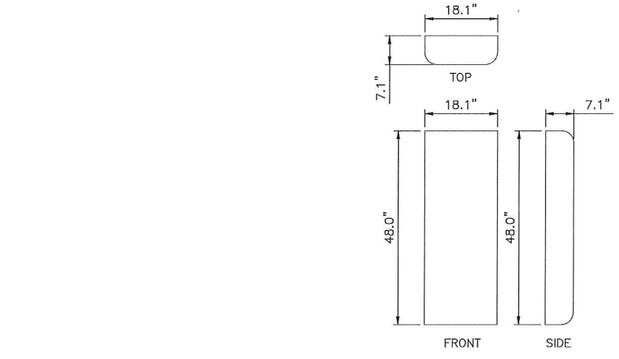
SCALE: 1" = 1'-0"



ANDREW 60ECv2
SPECIFICATIONS:
HEIGHT: 60" WIDTH: 31" DEPTH: 30" WEIGHT: 2430 LBS.

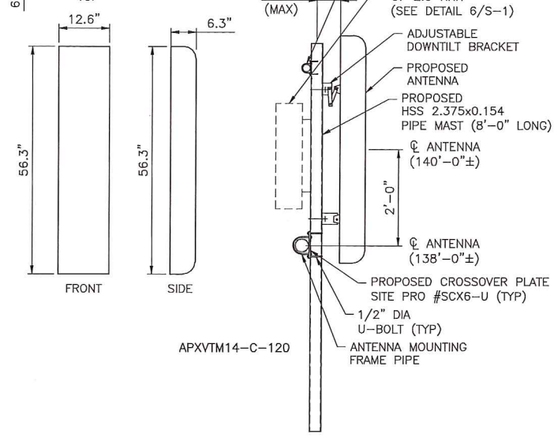
2/S-1 (EXIST) BATTERY CABINET

SCALE: 1" = 1'-0"



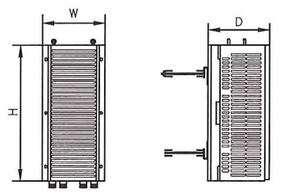
3/S-1 (EXIST) ANTENNA DETAILS

SCALE: 3/4"=1'-0"

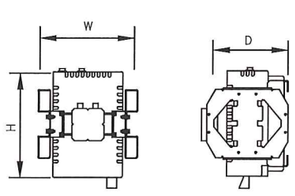


4/S-1 (PROPOSED) ANTENNA DETAIL

SCALE: 3/4"=1'-0"



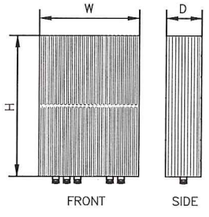
TYPE: 1900 MHz 4x45W MODEL #: RRH 1900 4X45 65MHz HEIGHT: 25.0" WIDTH: 11.1" DEPTH: 11.4" WEIGHT: ±60 LBS.



TYPE: 800 MHz 2x50W MODEL #: FD-RRH-2x50-800 HEIGHT: 19.7" WIDTH: 13" DEPTH: 10.8" WEIGHT: ±53 LBS

5/S-1 (EXIST) RRH DETAILS

SCALE: 1 1/2"=1'-0"



TYPE: 2.5 RRH MODEL #: TD-RRH8x20-25 HEIGHT: 26.1" WIDTH: 18.6" DEPTH: 6.7" WEIGHT: ±70 LBS

6/S-1 (PROPOSED) RRH DETAIL

SCALE: N.T.S.

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STATE OF CONNECTICUT
ANTONIO A. QUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC049

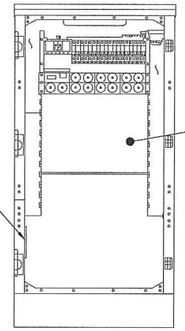
SITE NAME:
HILLSIDE

SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
EQUIPMENT DETAILS

SHEET NO:
S-1

NOTE:
LOCATIONS SHOWN FOR INSTALLATION OF NEW EQUIPMENT IN EXISTING CABINET ARE APPROXIMATE. ACTUAL SPACE AVAILABLE TO BE VERIFIED IN FIELD ON A SITE BY SITE BASIS.



EXIST GROUND BAR TO BE UTILIZED

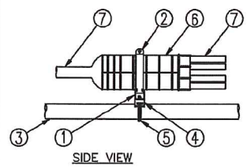
INSTALL NEW 2.5 EQUIPMENT IN EXIST MMBTS CABINET INCLUDING BUT NOT LIMITED TO BASE BAND UNIT, CELL SITE ROUTER AND SURGE ARRESTORS. GROUND EQUIPMENT TO EXIST INTERIOR CABINET GROUND BAR

FRONT ELEVATION
(CABINET INTERIOR)

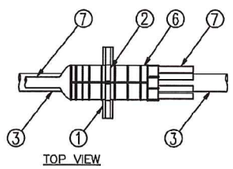
1 / S-2 MMBTS INTERIOR DETAIL

SCALE: N.T.S.

LEGEND:
1. P1000T-HG UNISTRUT, 12" LONG.
2. 6" PIPE HANGER.
3. EXISTING SUPPORT PIPE.
4. NEW STANDOFF BRACKET, ANDREW PART# 30848-4.
5. NEW ROUND MEMBER ADAPTER SIZED FOR EXISTING PIPE SUPPORT.
6. BREAKOUT UNIT.
7. CABLE.



SIDE VIEW



TOP VIEW

2 / S-2 MEDUSA HEAD DETAIL

SCALE: NTS

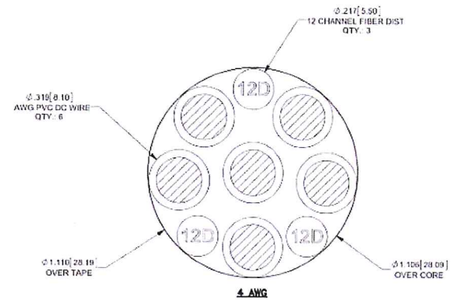
RFS HYBRIFLEX RISER CABLES SCHEDULE

Fiber Only (Existing DC Power)	Hybrid cable MN: HB058-M12-050F 12x multi-mode fiber pairs, Top: Outdoor protected connectors, Bottom:LC Connectors, 5/8 cable, 50ft	50 ft
	MN: HB058-M12-075F	75 ft
	MN: HB058-M12-100F	100 ft
	MN:HB058-M12-125F	125 ft
	MN:HB058-M12-150F	150 ft
	MN:HB058-M12-175F	175 ft
	MN:HB058-M12-200F	200 ft
8 AWG Power	Hybrid cable MN: HB114-08U3M12-050F 3x 8 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable, 50ft	50 ft
	MN: HB114-08U3M12-075F	75 ft
	MN: HB114-08U3M12-100F	100 ft
	MN: HB114-08U3M12-125F	125 ft
	MN: HB114-08U3M12-150F	150 ft
	MN: HB114-08U3M12-175F	175 ft
	MN: HB114-08U3M12-200F	200 ft
6 AWG Power	Hybrid cable MN: HB114-13U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	225 ft
	MN: HB114-13U3M12-250F	250 ft
	MN: HB114-13U3M12-275F	275 ft
	MN: HB114-13U3M12-300F	300 ft
4 AWG Power	Hybrid cable MN: HB114-21U3M12-225F 3x 6 AWG power pairs, 12x multi-mode fiber pairs, Outdoor rated connectors & LC Connectors, 1 1/4 cable,225ft	325 ft
	MN: HB114-21U3M12-350F	350 ft
	MN: HB114-21U3M12-375F	375 ft

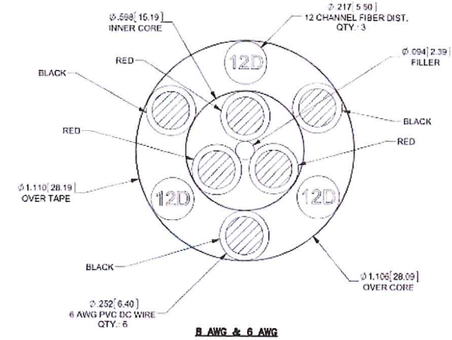
RFS HYBRIFLEX JUMPER CABLE SCHEDULE

Fiber Only	Hybrid Jumper cable MN: HBF012-M3-5F1 5 ft, 3x multi-mode fiber pairs, Outdoor & LC connectors, 1/2 cable	5 ft
	MN: HBF012-M3-10F1	10 ft
	MN: HBF012-M3-15F1	15 ft
	MN: HBF012-M3-20F1	20 ft
	MN: HBF012-M3-25F1	25 ft
	MN: HBF012-M3-30F1	30 ft
8 AWG Power	Hybrid Jumper cable MN: HBF058-08U1M3-5F1 5 ft, 1x 8 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-08U1M3-10F1	10 ft
	MN: HBF058-08U1M3-15F1	15 ft
	MN: HBF058-08U1M3-20F1	20 ft
	MN: HBF058-08U1M3-25F1	25 ft
	MN: HBF058-08U1M3-30F1	30 ft
6 AWG Power	Hybrid Jumper cable MN: HBF058-13U1M3-5F1 5 ft, 1x 6 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 5/8 cable	5 ft
	MN: HBF058-13U1M3-10F1	10 ft
	MN: HBF058-13U1M3-15F1	15 ft
	MN: HBF058-13U1M3-20F1	20 ft
	MN: HBF058-13U1M3-25F1	25 ft
	MN: HBF058-13U1M3-30F1	30 ft
4 AWG Power	Hybrid Jumper cable MN: HBF078-21U1M3-5F1 5 ft, 1x 4 AWG power pair, 3x multi-mode fiber pairs, Outdoor & LC Connectors, 7/8 cable	5 ft
	MN: HBF078-21U1M3-10F1	10 ft
	MN: HBF078-21U1M3-15F1	15 ft
	MN: HBF078-21U1M3-20F1	20 ft
	MN: HBF078-21U1M3-25F1	25 ft
	MN: HBF078-21U1M3-30F1	30 ft

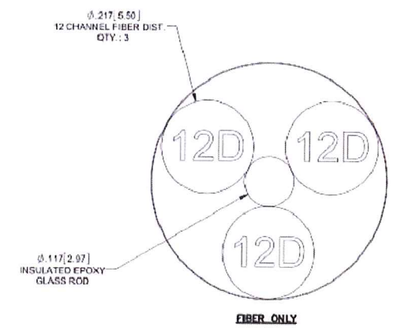
HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE			
MANUF:	RFS		
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	7/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



8 AWG & 6 AWG



FIBER ONLY

3 / S-2 2.5 HYBRID CABLE X-SECTION AND DATA

SCALE: NTS

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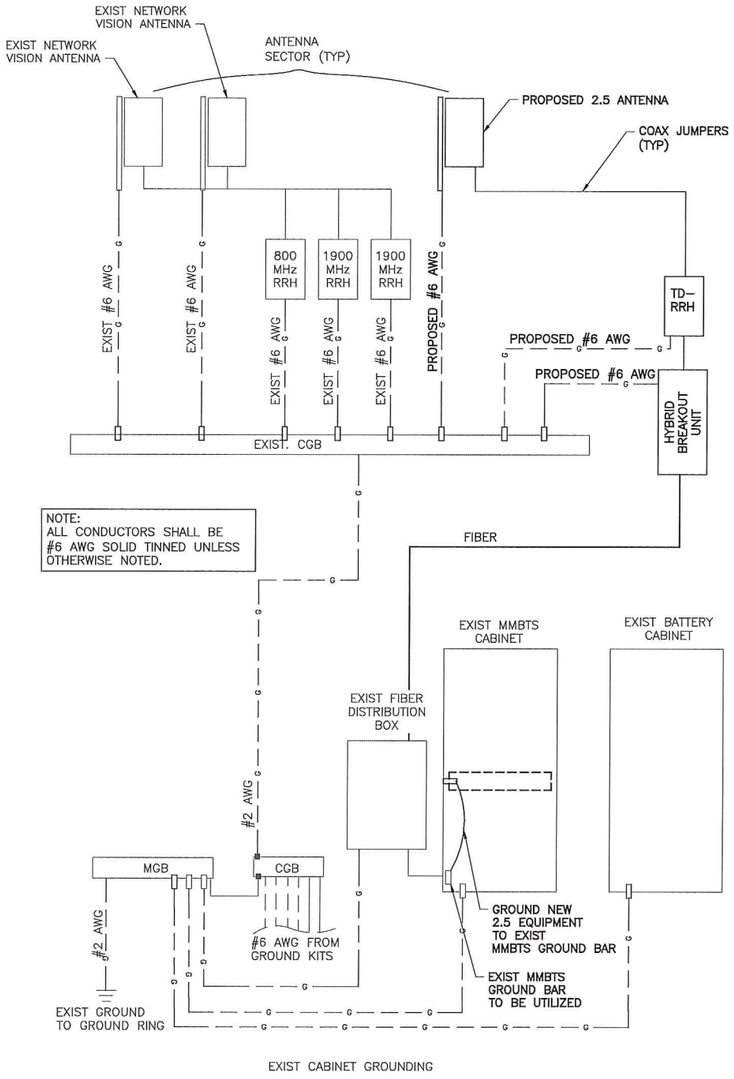
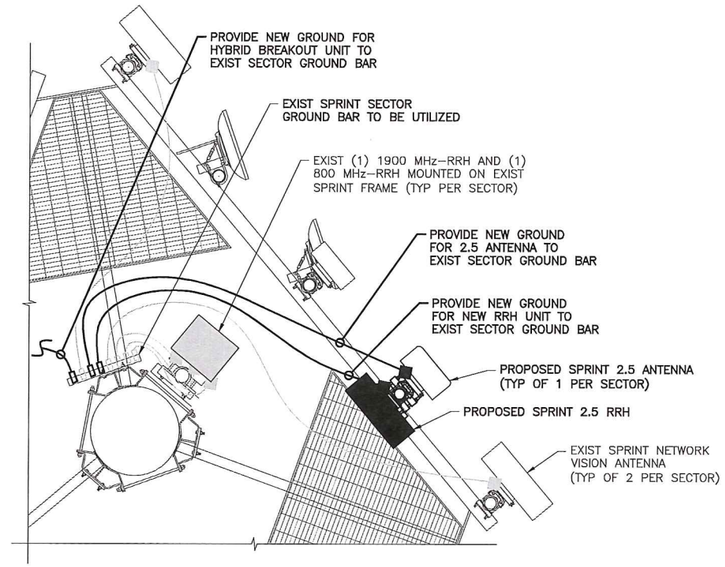
SHEET TITLE:
EQUIPMENT SCHEMATIC DETAILS

SHEET NO:
S-2



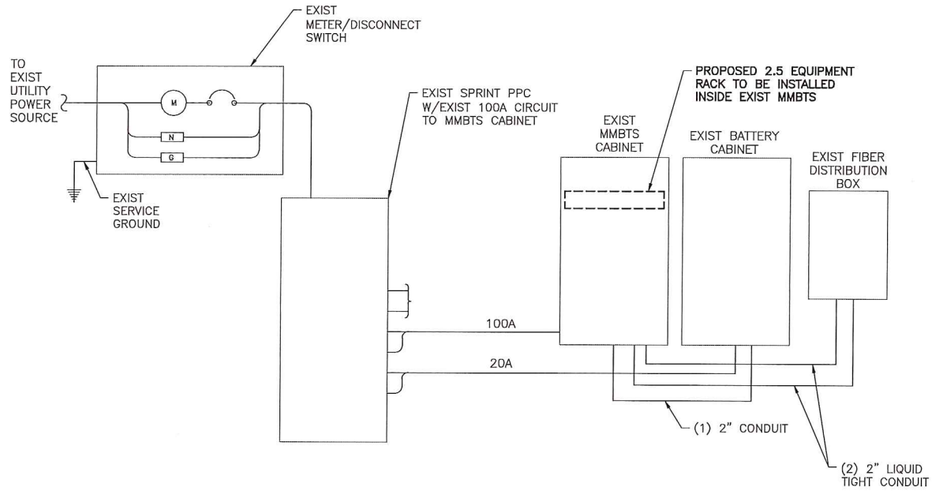
1 / E-1 TYPICAL GROUNDING ONE LINE DIAGRAM

SCALE: NTS



2 / E-1 TYPICAL ANTENNA GROUNDING PLAN

SCALE: NTS



3 / E-1 TYPICAL ELECTRICAL & TELCO PLAN

SCALE: NTS

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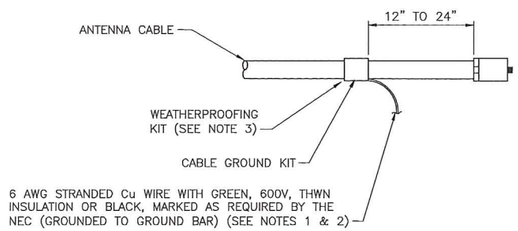
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
ELECTRICAL & GROUNDING PLANS

SHEET NO:
E-1



CONNECTION OF CABLE GROUND KIT TO ANTENNA CABLE

NOTES:

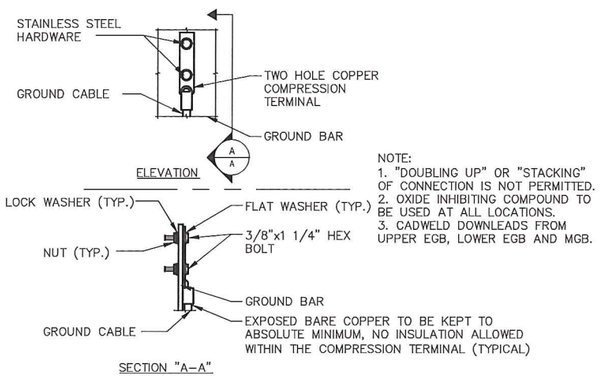
DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.

GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.

WEATHER PROOFING SHALL BE (TYPE AND PART NUMBER) AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER AND APPROVED BY CONTRACTOR.

1 / E-2 CABLE GROUNDING KIT DETAIL

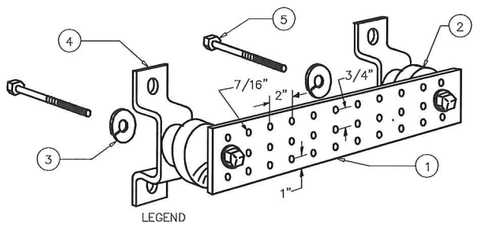
SCALE: N.T.S.



NOTE:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELD DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

2 / E-2 GROUNDING BAR CONN. DETAIL

SCALE: NTS



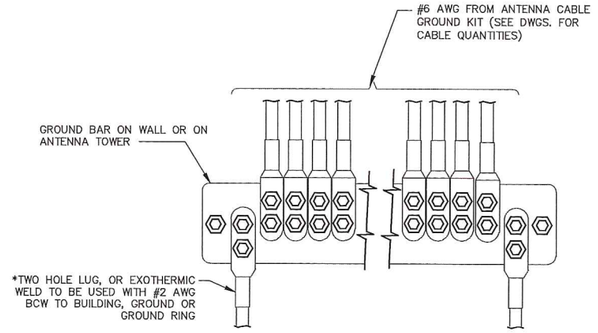
LEGEND

1- COPPER TINNED GROUND BAR, 1/4"X 4"X 20", OR OTHER LENGTH AS REQUIRED, HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION
2- INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061-4 OR EQUAL
3- 5/8" LOCKWASHERS OR EQUAL
4- WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A-6056 OR EQUAL
5- 5/8-11 X 1" H.H.C.S.BOLTS

NOTE:
ALL BOLTS, NUTS, WASHERS AND LOCK WASHERS SHALL BE 18-8 STAINLESS STEEL.

3 / E-2 GROUNDING BAR DETAIL

SCALE: NTS



* - GROUND BARS AT THE BOTTOM OF TOWERS/MONOPOLES SHALL ONLY USE EXOTHERMIC WELDS.

- ATTACH "DO NOT DISCONNECT" LABELS TO GROUND BARS. CAN USE BRASS TAG "DO NOT DISCONNECT" AT EACH HYBRID GROUND POINT OR BACK-A-LITE PLATE LABEL ON GROUND BAR.

- CONNECT SEQUENCE- BOLT/WASHER/NO-OX/GROUND BAR/NO-OX/WASHER/LOCK-WASHER/NUT. THIS IS REPEATED FOR EACH LUG CONNECTION POINT.

4 / E-2 ANTENNA GROUND BAR DETAIL

SCALE: NTS

GROUNDING NOTES:

1. GROUNDING SHALL BE IN ACCORDANCE WITH NEC ARTICLE 250-GROUNDING AND BONDING.
2. ALL GROUND WIRES SHALL BE #2 AWG UNLESS NOTED OTHERWISE.
3. ALL GROUNDING WIRES SHALL PROVIDE A STRAIGHT, DOWNWARD PATH TO GROUND WITH GRADUAL BENDS AS REQUIRED. GROUND WIRES SHALL NOT BE LOOPED OR SHARPLY BENT.
4. EACH EQUIPMENT CABINET SHALL BE CONNECTED TO THE MASTER ISOLATION GROUND BAR (MGB) WITH #2 AWG INSULATED STRANDED COPPER WIRE. EQUIPMENT CABINETS WALL HAVE (2) CONNECTIONS.
5. PROVIDE DEDICATED #2 AWG COPPER GROUND WIRE FROM EACH ANTENNA MOUNTING PIPE TO ASSOCIATED CIGBE.
6. THE CONTRACTOR SHALL VERIFY THAT THE EXISTING GROUND BARS HAVE ENOUGH SPACE/HOLES FOR ADDITIONAL TWO HOLE LUGS.
7. ALL CONDUITS SHALL BE RIGID GALVANIZED STEEL AND SHALL BE PROVIDED WITH GROUNDING BUSHINGS.
8. PROVIDE GROUND CONNECTIONS FOR ALL METALLIC STRUCTURES, ENCLOSURES, RACEWAYS AND OTHER CONDUCTIVE ITEMS ASSOCIATED WITH THE INSTALLATION OF CARRIER'S EQUIPMENT.
9. WHEN CABLE LENGTH IS OVER 20' THE MANUFACTURERS GROUND KIT MUST BE INSTALLED PER THE MANUFACTURERS SPECIFICATIONS.
10. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUNDING.
11. HOME RUN GROUNDS ARE NOT APPROVED BY CROWN CASTLE CONSTRUCTION STANDARDS AND THAT ANTENNA BUSS BARS SHOULD BE INSTALLED DIRECTLY TO TOWER STEEL WITHOUT INSULATORS OR DOWN CONDUCTORS.

PROTECTIVE GROUNDING SYSTEM GENERAL NOTES:

1. AT ALL TERMINATIONS AT EQUIPMENT ENCLOSURES, PANEL, AND FRAMES OF EQUIPMENT AND WHERE EXPOSED FOR GROUNDING. CONDUCTOR TERMINATION SHALL BE PERFORMED UTILIZING TWO HOLE BOLTED TONGUE COMPRESSION TYPE LUGS WITH STAINLESS STEEL SELF-TAPPING SCREWS.
2. ALL CLAMPS AND SUPPORTS USED TO SUPPORT THE GROUNDING SYSTEM CONDUCTORS AND PVC CONDUITS SHALL BE PVC TYPE (NON CONDUCTIVE). DO NOT USE METAL BRACKETS OR SUPPORTS WHICH WOULD FORM A COMPLETE RING AROUND ANY GROUNDING CONDUCTOR.
3. ALL GROUNDING CONNECTIONS SHALL BE COATED WITH A COPPER SHIELD ANTI-CORROSIVE AGENT SUCH AS T&B KOPR SHIELD. VERIFY PRODUCT WITH PROJECT MANAGER.
4. ALL BOLTS, WASHERS, AND NUTS USED ON GROUNDING CONNECTIONS SHALL BE STAINLESS STEEL.
5. INSTALL GROUND BUSHING ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUS IN THE PANEL BOARD.
6. GROUND ANTENNA BASES, FRAMES, CABLE RACKS, AND OTHER METALLIC COMPONENTS WITH #2 INSULATED TINNED STRANDED COPPER GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
7. GROUND HYBRID CABLE SHIELD AT BOTH ENDS USING MANUFACTURER'S GUIDELINES.

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
4. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
5. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THNN INSULATION.
6. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
7. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
8. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
9. GROUNDING SHALL COMPLY WITH NEC ART. 250.
10. GROUND HYBRID CABLE SHIELDS AT 3 LOCATIONS USING MANUFACTURER'S HYBRID CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
11. USE #2 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
12. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
13. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #2 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
14. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
15. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
16. BOND ANTENNA MOUNTING BRACKETS, HYBRID CABLE GROUND KITS, AND RRHs TO EGB PLACED NEAR THE ANTENNA LOCATION.
17. BOND ANTENNA EGB'S AND MGB TO GROUND RING.
18. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULT FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMS MINIMUM RESISTANCE REQUIRED.
19. CONTRACTOR SHALL CONDUCT ANTENNA, HYBRID CABLES, GPS COAX AND RRH RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.
20. CONTRACTOR SHALL CHECK CAPACITY OF EXISTING SERVICE & PANEL ON SITE TO DETERMINE IF CAPACITY EXISTS TO ACCOMMODATE THE ADDED LOAD OF THIS PROJECT. ADVISE ENGINEER OF ANY DISCREPANCY.
21. LOCATION OF ALL OUTLET, BOXES, ETC, AND THE TYPE OF CONNECTION (PLUG OR DIRECT) SHALL BE CONFIRMED WITH THE OWNER'S REPRESENTATIVE PRIOR TO ROUGH-IN.
22. ELECTRICAL CHARACTERISTICS OF ALL EQUIPMENT (NEW AND EXISTING) SHALL BE FIELD VERIFIED WITH THE OWNERS REPRESENTATIVE AND EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN OF CONDUIT AND WIRE. ALL EQUIPMENT SHALL BE PROPERLY CONNECTED ACCORDING TO THE NAMEPLATE DATA FURNISHED ON THE EQUIPMENT.

Sprint

2.5 EQUIPMENT DEPLOYMENT
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251

CROWN CASTLE

TECTONIC • PLANNING • ENGINEERING • SURVEYING • CONSTRUCTION MANAGEMENT

TECTONIC Engineering & Surveying Consultants P.C.

1279 Route 300
Newburgh, NY 12550

Phone: (845) 567-6656
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SUBMITTALS

PROJECT NO: 7225.CT03XC049

NO	DATE	DESCRIPTION	BY
0	06/16/14	FOR COMMENT	DC
1	12/17/14	FOR CONSTRUCTION	DC

DATE	SIGNED BY
12/17/14	

STATE OF CONNECTICUT
ANTONIO A. GUALTIERI
No. 25406
LICENSED PROFESSIONAL ENGINEER

SITE NUMBER:
CT03XC049

SITE NAME:
HILLSIDE

SITE ADDRESS:
85 PLAINFIELD AVE
WEST HAVEN, CT 06516

SHEET TITLE:
GROUNDING DETAILS & NOTES

SHEET NO:
E-2

PAUL J. FORD & COMPANY

Date: **August 2, 2017**

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277
704-405-6607

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

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC049
	Carrier Site Name:	CT03XC049
Crown Castle Designation:	**Crown Castle BU Number:**	876323
	Crown Castle Site Name:	HILLSIDE
	Crown Castle JDE Job Number:	447241
	Crown Castle Work Order Number:	1436933
	Crown Castle Application Number:	397060 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37517-0499.004.7805
Site Data:	**85 Plainfield Ave, WEST HAVEN, New Haven County, CT** **Latitude *41° 18' 4.59"*, Longitude *-72° 58' 35.2"*** **148 Foot - Monopole Tower**	

Dear Charles McGuirt,

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 1064307, in accordance with application 397060, revision 1.

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

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

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 B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 were used in this analysis.

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:

Jason Martin, P.E.
Project Engineer JWM

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

8.3.17

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1) INTRODUCTION

This tower is a 148 ft Monopole tower designed by SUMMIT in June of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F.

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 B and Topographic Category 1 with a maximum Topographic Factor, Kzt, of 1.0 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
138.0	140.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	--
		3	rfs celwave	APXVTM14-C-120			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
146.0	146.0	1	tower mounts	Side Arm Mount [SO 102-3]	6	1-5/8	1
		3	commscope	ATSBT-TOP-MF-4G	1 6	1-3/8 1-5/8	2
		3	ericsson	AIR -32 B2A/B66AA w/ MP			
	144.0	3	commscope	SBNHH-1D65C w/ MP			
138.0	141.0	3	argus	LLPX310R-V1	3 3 2	5/16 1/2 2”C	3
		3	samsung	FDD_R6_RRH			
	140.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		6	powerwave	P40-16-XLPP-RR-A	1 3	5/8 1-1/4	1
	138.0	18	rfs celwave	ACU-A20-N			
	139.0	1	andrew	FPA5150-23PM-1 w/ MP	--	--	3
	138.0	1	tower mounts	Platform Mount [LP 301-1]	--	--	1
	134.0	2	andrew	VHLP2-11			
136.0	136.0	6	alcatel lucent	1900MHz RRH (65MHz)	--	--	1
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER			
		3	alcatel lucent	800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
122.0	122.0	1	rfs celwave	TMA-DB-T1-6Z-8AB-0Z	--	--	1
		1	tower mounts	Side Arm Mount [SO 102-1]			
120.0	126.0	1	gps	GPS_A	1 12	1/2 1-5/8	1
	122.0	3	alcatel lucent	RRH2X40-AWS			
		3	antel	BXA-171063-8BF-EDIN-0 w/ MP			
		2	antel	BXA-80063/4CF w/ MP			
		1	antel	BXA-80063/6CF w/ MP			
		3	commscope	LNX-6514DS-A1M w/ MP			
		2	rfs celwave	FD9R6004/2C-3L			
		3	rymsa	MG D3-800TV w/ MP			
	120.0	1	tower mounts	Platform Mount [LP 1201-1]			
90.0	91.0	1	lucent	KS24019-L112A	1	1/2	1
	90.0	1	tower mounts	Side Arm Mount [SO 701-1]			

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

Table 3 - Design 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)
--	--	--	--	--	--	--

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH, 1205093EG1, 5/31/2012	2134228	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit, 29297-0288, 6/5/1997	1614608	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit, 29297-0288, 6/5/1997	1615021	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PSG, 0801F202-A060140, 02/06/2009	2384593	CCISITES
4-POST-MODIFICATION INSPECTION	SGS, 160788, 05/06/2016	6254609	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 has been reinforced in conformance with the referenced modification documents.
5) The existing monopole shaft has been reinforced using a Crown-approved system in accordance with the above referenced documents. However, in this analysis we found that the existing pole shaft without modifications has adequate capacity according to TIA-222-G-2 (addendum 2) and 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	148 - 138	Pole	TP24x24x0.25	1	-1.43	753.82	5.0	Pass
L2	138 - 90.75	Pole	TP31.924x22x0.25	2	-12.06	1598.87	60.9	Pass
L3	90.75 - 44.75	Pole	TP41.086x30.5839x0.3125	3	-20.88	2547.91	76.9	Pass
L4	44.75 - 0	Pole	TP49.86x39.3583x0.375	4	-35.26	3765.09	78.6	Pass
							Summary	
						Pole (L4)	78.6	Pass
						RATING =	**78.6**	**Pass**

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	83.3	Pass
1	Base Plate	0	64.7	Pass
1	Base Foundation Structural Steel	0	53.4	Pass
1	Base Foundation Soil Interaction	0	61.1	Pass
1	Extension Flange	138	25.4	Pass

Structure Rating (max from all components) =	**83.3%**

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

4.1) Recommendations

The monopole and its foundation have sufficient capacity to carry the proposed loading configuration. No modifications are required at this time.

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:

1) Tower is located in New Haven County, Connecticut.
2) ASCE 7-10 Wind Data is used (wind speeds converted to nominal values).
3) Basic wind speed of 97.00 mph.
4) Structure Class II.
5) Exposure Category B.
6) Topographic Category 1.
7) Crest Height 0.0000 ft.
8) Nominal ice thickness of 0.7500 in.
9) Ice thickness is considered to increase with height.
10) Ice density of 56.00 pcf.
11) A wind speed of 50.00 mph is used in combination with ice.
12) Temperature drop of 50.00 °F.
13) Deflections calculated using a wind speed of 60.00 mph.
14) A non-linear (P-delta) analysis was used.
15) Pressures are calculated at each section.
16) Stress ratio used in pole design is 1.
17) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	148.0000-138.0000	10.0000	0.00	Round	24.0000	24.0000	0.2500		A500-50 (50 ksi)
L2	138.0000-90.7500	47.2500	4.00	18	22.0000	31.9240	0.2500	1.0000	A607-60 (60 ksi)
L3	90.7500-44.7500	50.0000	5.25	18	30.5839	41.0860	0.3125	1.2500	A607-60 (60 ksi)
L4	44.7500-0.0000	50.0000		18	39.3583	49.8600	0.3750	1.5000	A607-60 (60 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.0000	18.6532	1315.3425	8.3974	12.0000	109.6119	2630.6850	9.3210	0.0000	0

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
	24.0000	18.6532	1315.3425	8.3974	12.0000	109.6119	2630.6850	9.3210	0.0000	0
L2	22.3394	17.2586	1031.4832	7.7212	11.1760	92.2945	2064.3237	8.6310	3.4320	13.728
	32.4165	25.1333	3185.6138	11.2443	16.2174	196.4319	6375.4192	12.5690	5.1786	20.714
L3	31.9088	30.0254	3476.0879	10.7463	15.5366	223.7353	6956.7498	15.0156	4.8328	15.465
	41.7198	40.4422	8494.3152	14.4746	20.8717	406.9779	16999.8075	20.2250	6.6811	21.38
L4	41.0851	46.3998	8908.6249	13.8391	19.9940	445.5648	17828.9719	23.2043	6.2671	16.712
	50.6292	58.8995	18222.0135	17.5672	25.3289	719.4165	36468.0040	29.4554	8.1154	21.641

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 148.0000-138.0000				1	1	1			
L2 138.0000-90.7500				1	1	1			
L3 90.7500-44.7500				1	1	1			
L4 44.7500-0.0000				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
***								
MLCH 12x6 AWG(1-3/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	1	No Ice	0.0000	1.72
						1/2" Ice	0.0000	2.89
						1" Ice	0.0000	4.68
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	1	No Ice	0.1960	0.52
						1/2" Ice	0.2960	2.02
						1" Ice	0.3960	4.14
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	5	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	2	No Ice	0.1960	0.52
						1/2" Ice	0.2960	2.02
						1" Ice	0.3960	4.14
AL7-50(1-5/8)	C	No	CaAa (Out Of Face)	146.0000 - 0.0000	4	No Ice	0.0000	0.52
						1/2" Ice	0.0000	2.02
						1" Ice	0.0000	4.14
***								
*								
HB114-21U3M12-XXXF(1-1/4)	C	No	CaAa (Out Of Face)	138.0000 - 0.0000	1	No Ice	0.0000	1.22
						1/2" Ice	0.0000	2.47
						1" Ice	0.0000	4.32
WR-VG82ST-BRDA(5/8)	C	No	Inside Pole	138.0000 - 0.0000	1	No Ice	0.0000	0.31
						1/2" Ice	0.0000	0.31
						1" Ice	0.0000	0.31
HB114-1-0813U4-M5J(1-1/4)	C	No	Inside Pole	138.0000 - 0.0000	3	No Ice	0.0000	1.20
						1/2" Ice	0.0000	1.20
						1" Ice	0.0000	1.20
***								
HB158-1-08U8-S8J18(1-5/8)	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	1	No Ice	0.1980	1.30
						1/2" Ice	0.2980	2.81
						1" Ice	0.3980	4.94
561(1-5/8)	C	No	Inside Pole	120.0000 - 0.0000	11	No Ice	0.0000	1.35
						1/2" Ice	0.0000	1.35
						1" Ice	0.0000	1.35
FSJ4-50B(1/2)	C	No	Inside Pole	120.0000 - 0.0000	1	No Ice	0.0000	0.14
						1/2" Ice	0.0000	0.14
						1" Ice	0.0000	0.14
***								

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	90.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
***								
1" Flat Reinforcement	C	No	CaAa (Out Of Face)	76.0000 - 46.0000	1	No Ice	0.1667	0.00
						1/2" Ice	0.2778	0.00
						1" Ice	0.3889	0.00

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.0000-138.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	4.704	0.06
L2	138.0000-90.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	33.574	1.09
L3	90.7500-44.7500	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	41.156	1.36
L4	44.7500-0.0000	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	35.173	1.32

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	148.0000-138.0000	A	1.737	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	13.041	0.90
L2	138.0000-90.7500	A	1.697	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	91.608	6.42
L3	90.7500-44.7500	A	1.611	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	114.914	6.68
L4	44.7500-0.0000	A	1.439	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	92.839	6.15

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	148.0000-138.0000	-0.4947	0.2856	-0.9428	0.5443
L2	138.0000-90.7500	-0.7015	0.4050	-1.2718	0.7343
L3	90.7500-44.7500	-0.8904	0.5141	-1.6856	0.9732
L4	44.7500-0.0000	-0.8340	0.4815	-1.6453	0.9499

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment ° ft	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
SBNHH-1D65C w/ Mount Pipe	A	From Leg	4.0000 0.00 -2.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	11.8639 12.6856 13.5181	10.0306 11.6489 13.2913	0.09 0.18 0.28
SBNHH-1D65C w/ Mount Pipe	B	From Leg	4.0000 0.00 -2.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	11.8639 12.6856 13.5181	10.0306 11.6489 13.2913	0.09 0.18 0.28
SBNHH-1D65C w/ Mount Pipe	C	From Leg	4.0000 0.00 -2.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	11.8639 12.6856 13.5181	10.0306 11.6489 13.2913	0.09 0.18 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	6.7474 7.2017 7.6475	6.0700 6.8671 7.5828	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	6.7474 7.2017 7.6475	6.0700 6.8671 7.5828	0.15 0.21 0.28
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	6.7474 7.2017 7.6475	6.0700 6.8671 7.5828	0.15 0.21 0.28
ATSBT-TOP-MF-4G	A	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
ATSBT-TOP-MF-4G	B	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
ATSBT-TOP-MF-4G	C	From Leg	4.0000 0.00 0.00	0.0000	146.0000	No Ice 1/2" Ice 1" Ice	0.1736 0.2291 0.2921	0.0949 0.1399 0.1934	0.00 0.00 0.01
Side Arm Mount [SO 102-3]	C	None		0.0000	146.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
APXVTM14-C-120	A	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
APXVTM14-C-120	B	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
APXVTM14-C-120	C	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	6.3424 6.7164 7.0974	3.6074 3.9666 4.3332	0.06 0.10 0.14
TD-RRH8x20-25	A	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
TD-RRH8x20-25	B	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13

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
TD-RRH8x20-25	C	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	4.0455 4.2975 4.5570	1.5345 1.7142 1.9008	0.07 0.10 0.13
(2) P40-16-XLPP-RR-A	A	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.0050 8.3907 8.7833	3.5187 3.8659 4.2204	0.05 0.10 0.15
(2) P40-16-XLPP-RR-A	B	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.0050 8.3907 8.7833	3.5187 3.8659 4.2204	0.05 0.10 0.15
(2) P40-16-XLPP-RR-A	C	From Leg	4.0000 0.00 2.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	8.0050 8.3907 8.7833	3.5187 3.8659 4.2204	0.05 0.10 0.15
(6) ACU-A20-N	A	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(6) ACU-A20-N	B	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
(6) ACU-A20-N	C	From Leg	4.0000 0.00 0.00	0.0000	138.0000	No Ice 1/2" Ice 1" Ice	0.0667 0.1037 0.1481	0.1167 0.1620 0.2148	0.00 0.00 0.00
Platform Mount [LP 301-1]	C	None		0.0000	138.0000	No Ice 1/2" Ice 1" Ice	30.1000 40.8000 51.5000	30.1000 40.8000 51.5000	1.59 2.03 2.47
***									
800MHZ RRH	A	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
800MHZ RRH	B	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
800MHZ RRH	C	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.1342 2.3195 2.5123	1.7730 1.9461 2.1267	0.05 0.07 0.10
(2) 1900MHz RRH (65MHz)	A	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
(2) 1900MHz RRH (65MHz)	B	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
(2) 1900MHz RRH (65MHz)	C	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	2.3218 2.5266 2.7388	2.2360 2.4385 2.6485	0.06 0.08 0.11
800 EXTERNAL NOTCH FILTER	A	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
800 EXTERNAL NOTCH FILTER	B	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
800 EXTERNAL NOTCH FILTER	C	From Leg	2.0000 0.00 0.00	0.0000	136.0000	No Ice 1/2" Ice 1" Ice	0.6601 0.7627 0.8727	0.3211 0.3983 0.4830	0.01 0.02 0.02
Side Arm Mount [SO 102-3]	C	None		0.0000	136.0000	No Ice 1/2" Ice 1" Ice	3.0000 3.4800 3.9600	3.0000 3.4800 3.9600	0.08 0.11 0.14
***									
TMA-DB-T1-6Z-8AB-0Z	C	From Leg	1.0000 0.00 0.00	0.0000	122.0000	No Ice 1/2" Ice 1" Ice	4.8000 5.0704 5.3481	2.0000 2.1926 2.3926	0.04 0.08 0.12
Side Arm Mount [SO 102-1]	C	From Leg	1.0000 0.00 0.00	0.0000	122.0000	No Ice 1/2" Ice 1" Ice	1.5000 1.7400 1.9800	1.5000 1.7500 2.0000	0.03 0.04 0.04
***									
BXA-80063/4CF w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	4.9453 5.3243 5.7120	3.4238 4.0221 4.6369	0.03 0.07 0.12
BXA-80063/4CF w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	4.9453 5.3243 5.7120	3.4238 4.0221 4.6369	0.03 0.07 0.12
BXA-80063/6CF w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	7.8193 8.3705 8.8861	5.4071 6.5581 7.4216	0.04 0.10 0.17
MG D3-800TV w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
MG D3-800TV w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
MG D3-800TV w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.5703 3.9790 4.3870	3.4178 4.1193 4.7842	0.04 0.07 0.11
LNX-6514DS-A1M w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
LNX-6514DS-A1M w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
LNX-6514DS-A1M w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	8.4106 8.9745 9.5048	7.0817 8.2729 9.1847	0.06 0.13 0.21
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	A	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.1789 3.5550 3.9298	3.3530 3.9709 4.5951	0.03 0.06 0.10
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	B	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice	3.1789 3.5550 3.9298	3.3530 3.9709 4.5951	0.03 0.06 0.10
BXA-171063-8BF-EDIN-0 w/ Mount Pipe	C	From Leg	4.0000 0.00 2.00	0.0000	120.0000	No Ice 1/2" Ice	3.1789 3.5550 3.9298	3.3530 3.9709 4.5951	0.03 0.06 0.10

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
RRH2X40-AWS	A	From Leg	4.0000 / 0.00 / 2.00	0.0000	120.0000	No Ice	2.1614	1.4199	0.04
						1/2" Ice	2.3597	1.5903	0.06
						1" Ice	2.5655	1.7676	0.08
RRH2X40-AWS	B	From Leg	4.0000 / 0.00 / 2.00	0.0000	120.0000	No Ice	2.1614	1.4199	0.04
						1/2" Ice	2.3597	1.5903	0.06
						1" Ice	2.5655	1.7676	0.08
RRH2X40-AWS	C	From Leg	4.0000 / 0.00 / 2.00	0.0000	120.0000	No Ice	2.1614	1.4199	0.04
						1/2" Ice	2.3597	1.5903	0.06
						1" Ice	2.5655	1.7676	0.08
FD9R6004/2C-3L	A	From Leg	4.0000 / 0.00 / 2.00	0.0000	120.0000	No Ice	0.3142	0.0762	0.00
						1/2" Ice	0.3862	0.1189	0.01
						1" Ice	0.4656	0.1685	0.01
FD9R6004/2C-3L	B	From Leg	4.0000 / 0.00 / 2.00	0.0000	120.0000	No Ice	0.3142	0.0762	0.00
						1/2" Ice	0.3862	0.1189	0.01
						1" Ice	0.4656	0.1685	0.01
GPS_A	A	From Leg	4.0000 / 0.00 / 6.00	0.0000	120.0000	No Ice	0.2550	0.2550	0.00
						1/2" Ice	0.3205	0.3205	0.00
						1" Ice	0.3934	0.3934	0.01
Platform Mount [LP 1201-1]	C	None		0.0000	120.0000	No Ice	23.1000	23.1000	2.10
						1/2" Ice	26.8000	26.8000	2.50
						1" Ice	30.5000	30.5000	2.90
***									
KS24019-L112A	B	From Leg	3.0000 / 0.00 / 1.00	0.0000	90.0000	No Ice	0.1407	0.1407	0.01
						1/2" Ice	0.1979	0.1979	0.01
						1" Ice	0.2621	0.2621	0.01
Side Arm Mount [SO 701-1]	B	From Leg	3.0000 / 0.00 / 0.00	0.0000	90.0000	No Ice	0.8500	1.6700	0.07
						1/2" Ice	1.1400	2.3400	0.08
						1" Ice	1.4300	3.0100	0.09
***									

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 148.0000-138.0000	143.0000	1.095	25.05	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.704
L2 138.0000-90.7500	113.2725	1.024	23.39	107.801	A	0.000	107.801	107.801	100.00	0.000	0.000
					B	0.000	107.801		100.00	0.000	0.000
					C	0.000	107.801		100.00	0.000	33.574
L3 90.7500-44.7500	67.2910	0.882	20.08	141.122	A	0.000	141.122	141.122	100.00	0.000	0.000
					B	0.000	141.122		100.00	0.000	0.000
					C	0.000	141.122		100.00	0.000	41.156
L4 44.7500-0.0000	21.7726	0.7	16.26	171.009	A	0.000	171.009	171.009	100.00	0.000	0.000
					B	0.000	171.009		100.00	0.000	0.000
					C	0.000	171.009		100.00	0.000	35.173

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 148.0000-138.0000	143.0000	1.095	6.65	1.7369	22.895	A	0.000	22.895	22.895	100.00	0.000	0.000
						B	0.000	22.895		100.00	0.000	0.000
						C	0.000	22.895		100.00	0.000	13.041
L2 138.0000-90.7500	113.2725	1.024	6.21	1.6969	121.164	A	0.000	121.164	121.164	100.00	0.000	0.000
						B	0.000	121.164		100.00	0.000	0.000
						C	0.000	121.164		100.00	0.000	91.608
L3 90.7500-44.7500	67.2910	0.882	5.34	1.6108	154.131	A	0.000	154.131	154.131	100.00	0.000	0.000
						B	0.000	154.131		100.00	0.000	0.000
						C	0.000	154.131		100.00	0.000	114.914
L4 44.7500-0.0000	21.7726	0.7	4.32	1.4389	183.023	A	0.000	183.023	183.023	100.00	0.000	0.000
						B	0.000	183.023		100.00	0.000	0.000
						C	0.000	183.023		100.00	0.000	92.839

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 148.0000-138.0000	143.0000	1.095	8.57	20.000	A	0.000	20.000	20.000	100.00	0.000	0.000
					B	0.000	20.000		100.00	0.000	0.000
					C	0.000	20.000		100.00	0.000	4.704
L2 138.0000-90.7500	113.2725	1.024	8.01	107.801	A	0.000	107.801	107.801	100.00	0.000	0.000
					B	0.000	107.801		100.00	0.000	0.000
					C	0.000	107.801		100.00	0.000	33.574
L3 90.7500-44.7500	67.2910	0.882	6.88	141.122	A	0.000	141.122	141.122	100.00	0.000	0.000
					B	0.000	141.122		100.00	0.000	0.000
					C	0.000	141.122		100.00	0.000	41.156
L4 44.7500-0.0000	21.7726	0.7	5.57	171.009	A	0.000	171.009	171.009	100.00	0.000	0.000
					B	0.000	171.009		100.00	0.000	0.000
					C	0.000	171.009		100.00	0.000	35.173

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

Comb. No.	Description
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
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	148 - 138	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	26	-5.17	0.83	-0.48
			Max. Mx	20	-1.43	22.41	-0.04
			Max. My	14	-1.43	0.06	-22.37
			Max. Vy	20	-3.52	22.41	-0.04
			Max. Vx	14	3.52	0.06	-22.37
			Max. Torque	12			-0.21
L2	138 - 90.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.12	7.92	-4.50
			Max. Mx	20	-12.07	607.47	-2.22
			Max. My	14	-12.08	2.52	-605.14
			Max. Vy	20	-18.12	607.47	-2.22
			Max. Vx	14	18.04	2.52	-605.14
			Max. Torque	24			2.23
L3	90.75 - 44.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.33	15.81	-9.70
			Max. Mx	20	-20.89	1577.76	-6.25
			Max. My	14	-20.89	6.39	-1573.00
			Max. Vy	20	-25.18	1577.76	-6.25
			Max. Vx	14	25.12	6.39	-1573.00
			Max. Torque	24			4.16
L4	44.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.67	25.97	-15.58
			Max. Mx	20	-35.26	2968.86	-10.64
			Max. My	14	-35.26	11.19	-2960.90
			Max. Vy	20	-30.08	2968.86	-10.64
			Max. Vx	14	30.03	11.19	-2960.90
			Max. Torque	24			6.31

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	73.67	-0.00	0.00
	Max. H_x	20	35.29	30.05	-0.07
	Max. H_z	3	26.47	-0.07	29.99
	Max. M_x	2	2957.56	-0.07	29.99
	Max. M_z	8	2964.27	-30.05	0.07
	Max. Torsion	24	6.31	14.96	25.94
	Min. Vert	21	26.47	30.05	-0.07
	Min. H_x	9	26.47	-30.05	0.07
	Min. H_z	15	26.47	0.07	-29.99
	Min. M_x	14	-2960.90	0.07	-29.99
	Min. M_z	20	-2968.86	30.05	-0.07
	Min. Torsion	12	-6.31	-14.96	-25.94

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	29.41	0.00	-0.00	1.33	1.79	-0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	35.29	0.07	-29.99	-2957.56	-6.77	-5.36
0.9 Dead+1.6 Wind 0 deg - No Ice	26.47	0.07	-29.99	-2927.70	-7.24	-5.35
1.2 Dead+1.6 Wind 30 deg - No Ice	35.29	15.09	-26.01	-2565.62	-1488.90	-2.97
0.9 Dead+1.6 Wind 30 deg - No Ice	26.47	15.09	-26.01	-2539.76	-1474.20	-2.97
1.2 Dead+1.6 Wind 60 deg - No Ice	35.29	26.06	-15.06	-1485.74	-2571.48	0.21
0.9 Dead+1.6 Wind 60 deg - No Ice	26.47	26.06	-15.06	-1470.93	-2545.68	0.22
1.2 Dead+1.6 Wind 90 deg - No Ice	35.29	30.05	-0.07	-7.32	-2964.27	3.34
0.9 Dead+1.6 Wind 90 deg - No Ice	26.47	30.05	-0.07	-7.66	-2934.52	3.34
1.2 Dead+1.6 Wind 120 deg - No Ice	35.29	25.99	14.93	1473.53	-2562.56	5.57
0.9 Dead+1.6 Wind 120 deg - No Ice	26.47	25.99	14.93	1458.03	-2536.85	5.57
1.2 Dead+1.6 Wind 150 deg - No Ice	35.29	14.96	25.94	2560.03	-1473.39	6.31
0.9 Dead+1.6 Wind 150 deg - No Ice	26.47	14.96	25.94	2533.39	-1458.84	6.30
1.2 Dead+1.6 Wind 180 deg - No Ice	35.29	-0.07	29.99	2960.90	11.19	5.35
0.9 Dead+1.6 Wind 180 deg - No Ice	26.47	-0.07	29.99	2930.18	10.53	5.35
1.2 Dead+1.6 Wind 210 deg - No Ice	35.29	-15.09	26.01	2568.98	1493.36	2.97
0.9 Dead+1.6 Wind 210 deg - No Ice	26.47	-15.09	26.01	2542.24	1477.50	2.96
1.2 Dead+1.6 Wind 240 deg - No Ice	35.29	-26.06	15.06	1489.08	2575.96	-0.21
0.9 Dead+1.6 Wind 240 deg - No Ice	26.47	-26.06	15.06	1473.41	2549.00	-0.21
1.2 Dead+1.6 Wind 270 deg - No Ice	35.29	-30.05	0.07	10.63	2968.86	-3.34
0.9 Dead+1.6 Wind 270 deg - No Ice	26.47	-30.05	0.07	10.11	2937.84	-3.34
1.2 Dead+1.6 Wind 300 deg - No Ice	35.29	-25.99	-14.93	-1470.24	2567.02	-5.57
0.9 Dead+1.6 Wind 300 deg - No Ice	26.47	-25.99	-14.93	-1455.59	2540.16	-5.57
1.2 Dead+1.6 Wind 330 deg - No Ice	35.29	-14.96	-25.94	-2556.72	1477.82	-6.31
0.9 Dead+1.6 Wind 330 deg	26.47	-14.96	-25.94	-2530.93	1462.13	-6.30

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	73.67	0.00	-0.00	15.58	25.97	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	73.67	0.01	-7.68	-773.87	24.30	-2.35
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	73.67	3.85	-6.66	-668.98	-370.59	-1.31
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	73.67	6.66	-3.85	-380.65	-659.19	0.08
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	73.67	7.68	-0.01	13.86	-764.18	1.46
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	73.67	6.65	3.83	408.85	-657.42	2.44
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	73.67	3.83	6.64	698.48	-367.52	2.77
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	73.67	-0.01	7.68	805.14	27.84	2.35
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	73.67	-3.85	6.66	700.31	422.77	1.31
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	73.67	-6.66	3.85	411.92	711.33	-0.08
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	73.67	-7.68	0.01	17.40	816.32	-1.46
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	73.67	-6.65	-3.83	-377.58	709.56	-2.44
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	73.67	-3.83	-6.64	-667.21	419.66	-2.77
Dead+Wind 0 deg - Service	29.41	0.02	-6.42	-628.41	-0.05	-0.06
Dead+Wind 30 deg - Service	29.41	3.23	-5.57	-544.99	-315.48	-0.01
Dead+Wind 60 deg - Service	29.41	5.58	-3.22	-315.16	-545.88	0.05
Dead+Wind 90 deg - Service	29.41	6.43	-0.02	-0.52	-629.51	0.09
Dead+Wind 120 deg - Service	29.41	5.56	3.19	314.63	-543.97	0.11
Dead+Wind 150 deg - Service	29.41	3.20	5.55	545.85	-312.17	0.10
Dead+Wind 180 deg - Service	29.41	-0.02	6.42	631.18	3.77	0.06
Dead+Wind 210 deg - Service	29.41	-3.23	5.57	547.76	319.20	0.01
Dead+Wind 240 deg - Service	29.41	-5.58	3.22	317.94	549.60	-0.05
Dead+Wind 270 deg - Service	29.41	-6.43	0.02	3.30	633.24	-0.09
Dead+Wind 300 deg - Service	29.41	-5.56	-3.19	-311.85	547.69	-0.11
Dead+Wind 330 deg - Service	29.41	-3.20	-5.55	-543.08	315.89	-0.10

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-29.41	0.00	-0.00	29.41	0.00	0.000%
2	0.07	-35.29	-30.00	-0.07	35.29	29.99	0.002%
3	0.07	-26.47	-30.00	-0.07	26.47	29.99	0.001%
4	15.09	-35.29	-26.01	-15.09	35.29	26.01	0.000%
5	15.09	-26.47	-26.01	-15.09	26.47	26.01	0.000%
6	26.06	-35.29	-15.06	-26.06	35.29	15.06	0.000%
7	26.06	-26.47	-15.06	-26.06	26.47	15.06	0.000%
8	30.05	-35.29	-0.07	-30.05	35.29	0.07	0.003%
9	30.05	-26.47	-0.07	-30.05	26.47	0.07	0.003%
10	25.99	-35.29	14.93	-25.99	35.29	-14.93	0.000%
11	25.99	-26.47	14.93	-25.99	26.47	-14.93	0.000%
12	14.96	-35.29	25.94	-14.96	35.29	-25.94	0.000%
13	14.96	-26.47	25.94	-14.96	26.47	-25.94	0.000%
14	-0.07	-35.29	30.00	0.07	35.29	-29.99	0.002%
15	-0.07	-26.47	30.00	0.07	26.47	-29.99	0.001%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
16	-15.09	-35.29	26.01	15.09	35.29	-26.01	0.000%
17	-15.09	-26.47	26.01	15.09	26.47	-26.01	0.000%
18	-26.06	-35.29	15.06	26.06	35.29	-15.06	0.000%
19	-26.06	-26.47	15.06	26.06	26.47	-15.06	0.000%
20	-30.05	-35.29	0.07	30.05	35.29	-0.07	0.002%
21	-30.05	-26.47	0.07	30.05	26.47	-0.07	0.003%
22	-25.99	-35.29	-14.93	25.99	35.29	14.93	0.000%
23	-25.99	-26.47	-14.93	25.99	26.47	14.93	0.000%
24	-14.96	-35.29	-25.94	14.96	35.29	25.94	0.000%
25	-14.96	-26.47	-25.94	14.96	26.47	25.94	0.000%
26	0.00	-73.67	0.00	-0.00	73.67	0.00	0.001%
27	0.01	-73.67	-7.68	-0.01	73.67	7.68	0.001%
28	3.85	-73.67	-6.66	-3.85	73.67	6.66	0.001%
29	6.66	-73.67	-3.85	-6.66	73.67	3.85	0.001%
30	7.68	-73.67	-0.01	-7.68	73.67	0.01	0.001%
31	6.65	-73.67	3.83	-6.65	73.67	-3.83	0.001%
32	3.83	-73.67	6.64	-3.83	73.67	-6.64	0.001%
33	-0.01	-73.67	7.68	0.01	73.67	-7.68	0.001%
34	-3.85	-73.67	6.66	3.85	73.67	-6.66	0.001%
35	-6.66	-73.67	3.85	6.66	73.67	-3.85	0.001%
36	-7.68	-73.67	0.01	7.68	73.67	-0.01	0.001%
37	-6.65	-73.67	-3.83	6.65	73.67	3.83	0.001%
38	-3.83	-73.67	-6.64	3.83	73.67	6.64	0.001%
39	0.02	-29.41	-6.42	-0.02	29.41	6.42	0.002%
40	3.23	-29.41	-5.57	-3.23	29.41	5.57	0.002%
41	5.58	-29.41	-3.22	-5.58	29.41	3.22	0.002%
42	6.43	-29.41	-0.02	-6.43	29.41	0.02	0.002%
43	5.56	-29.41	3.20	-5.56	29.41	-3.19	0.002%
44	3.20	-29.41	5.55	-3.20	29.41	-5.55	0.002%
45	-0.02	-29.41	6.42	0.02	29.41	-6.42	0.002%
46	-3.23	-29.41	5.57	3.23	29.41	-5.57	0.002%
47	-5.58	-29.41	3.22	5.58	29.41	-3.22	0.002%
48	-6.43	-29.41	0.02	6.43	29.41	-0.02	0.002%
49	-5.56	-29.41	-3.20	5.56	29.41	3.19	0.002%
50	-3.20	-29.41	-5.55	3.20	29.41	5.55	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	17	0.00000001	0.00009836
3	Yes	17	0.00000001	0.00007456
4	Yes	20	0.00000001	0.00013007
5	Yes	20	0.00000001	0.00009080
6	Yes	20	0.00000001	0.00013285
7	Yes	20	0.00000001	0.00009280
8	Yes	16	0.00004256	0.00012595
9	Yes	16	0.00002828	0.00009714
10	Yes	20	0.00000001	0.00013756
11	Yes	20	0.00000001	0.00009629
12	Yes	20	0.00000001	0.00012556
13	Yes	20	0.00000001	0.00008761
14	Yes	17	0.00000001	0.00011777
15	Yes	17	0.00000001	0.00008887
16	Yes	20	0.00000001	0.00013700
17	Yes	20	0.00000001	0.00009565
18	Yes	20	0.00000001	0.00013413
19	Yes	20	0.00000001	0.00009355
20	Yes	17	0.00000001	0.00007939
21	Yes	16	0.00002827	0.00012573
22	Yes	20	0.00000001	0.00012633
23	Yes	20	0.00000001	0.00008812
24	Yes	20	0.00000001	0.00013842
25	Yes	20	0.00000001	0.00009692
26	Yes	13	0.00000001	0.00002683
27	Yes	17	0.00010476	0.00007155

28	Yes	17	0.00010458	0.00011510
29	Yes	17	0.00010457	0.00011943
30	Yes	17	0.00010475	0.00006442
31	Yes	17	0.00010457	0.00013998
32	Yes	17	0.00010461	0.00011911
33	Yes	17	0.00010478	0.00007559
34	Yes	18	0.00000001	0.00007986
35	Yes	17	0.00010458	0.00014624
36	Yes	17	0.00010479	0.00006995
37	Yes	17	0.00010461	0.00012573
38	Yes	17	0.00010457	0.00014867
39	Yes	15	0.00000001	0.00003351
40	Yes	15	0.00000001	0.00007297
41	Yes	15	0.00000001	0.00007366
42	Yes	15	0.00000001	0.00003346
43	Yes	15	0.00000001	0.00007669
44	Yes	15	0.00000001	0.00007083
45	Yes	15	0.00000001	0.00003385
46	Yes	15	0.00000001	0.00007717
47	Yes	15	0.00000001	0.00007669
48	Yes	15	0.00000001	0.00003381
49	Yes	15	0.00000001	0.00007132
50	Yes	15	0.00000001	0.00007697

Maximum Tower Deflections - Service Wind

Section No.	*Elevation ft*	*Horz. Deflection in*	*Gov. Load Comb.*	*Tilt °*	*Twist °*
L1	148 - 138	23.673	47	1.3509	0.0010
L2	138 - 90.75	20.845	47	1.3474	0.0010
L3	94.75 - 44.75	9.838	47	1.0026	0.0005
L4	50 - 0	2.680	47	0.4954	0.0002

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	*Appurtenance*	*Gov. Load Comb.*	*Deflection in*	*Tilt °*	*Twist °*	*Radius of Curvature ft*
146.0000	SBNHH-1D65C w/ Mount Pipe	47	23.105	1.3516	0.0010	37788
138.0000	APXVTM14-C-120	47	20.845	1.3474	0.0010	19505
136.0000	800MHZ RRH	47	20.285	1.3431	0.0010	16899
122.0000	TMA-DB-T1-6Z-8AB-0Z	47	16.464	1.2720	0.0009	9453
120.0000	BXA-80063/4CF w/ Mount Pipe	47	15.936	1.2569	0.0008	8898
90.0000	KS24019-L112A	47	8.839	0.9485	0.0004	5002

Maximum Tower Deflections - Design Wind

Section No.	*Elevation ft*	*Horz. Deflection in*	*Gov. Load Comb.*	*Tilt °*	*Twist °*
L1	148 - 138	110.796	18	6.3339	0.0260
L2	138 - 90.75	97.584	18	6.3177	0.0257
L3	94.75 - 44.75	46.105	18	4.7041	0.0160
L4	50 - 0	12.563	18	2.3236	0.0070

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	*Appurtenance*	*Gov. Load Comb.*	*Deflection in*	*Tilt °*	*Twist °*	*Radius of Curvature ft*
146.0000	SBNHH-1D65C w/ Mount Pipe	18	108.144	6.3370	0.0260	8307
138.0000	APXVTM14-C-120	18	97.584	6.3177	0.0257	4285
136.0000	800MHZ RRH	18	94.968	6.2975	0.0255	3710

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
122.0000	TMA-DB-T1-6Z-8AB-0Z	18	77.103	5.9652	0.0232	2063
120.0000	BXA-80063/4CF w/ Mount Pipe	18	74.634	5.8945	0.0228	1941
90.0000	KS24019-L112A	18	41.426	4.4502	0.0148	1082

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	148 - 138 (1)	TP24x24x0.25	10.0000	0.0000	0.0	18.6532	-1.43	753.82	0.002
L2	138 - 90.75 (2)	TP31.924x22x0.25	47.2500	0.0000	0.0	24.4667	-12.06	1598.87	0.008
L3	90.75 - 44.75 (3)	TP41.086x30.5839x0.3125	50.0000	0.0000	0.0	39.3484	-20.88	2547.91	0.008
L4	44.75 - 0 (4)	TP49.86x39.3583x0.375	50.0000	0.0000	0.0	58.8995	-35.26	3765.09	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	148 - 138 (1)	TP24x24x0.25	22.42	462.45	0.048	0.00	462.45	0.000
L2	138 - 90.75 (2)	TP31.924x22x0.25	608.63	1013.51	0.601	0.00	1013.51	0.000
L3	90.75 - 44.75 (3)	TP41.086x30.5839x0.3125	1581.49	2078.45	0.761	0.00	2078.45	0.000
L4	44.75 - 0 (4)	TP49.86x39.3583x0.375	2975.38	3832.33	0.776	0.00	3832.33	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	148 - 138 (1)	TP24x24x0.25	3.53	375.90	0.009	0.00	736.30	0.000
L2	138 - 90.75 (2)	TP31.924x22x0.25	18.16	799.44	0.023	0.04	2029.50	0.000
L3	90.75 - 44.75 (3)	TP41.086x30.5839x0.3125	25.23	1273.95	0.020	0.21	4161.98	0.000
L4	44.75 - 0 (4)	TP49.86x39.3583x0.375	30.13	1882.55	0.016	0.21	7674.04	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	148 - 138 (1)	0.002	0.048	0.000	0.009	0.000	0.050 ✔	1.000	4.8.2 ✔
L2	138 - 90.75 (2)	0.008	0.601	0.000	0.023	0.000	0.609 ✔	1.000	4.8.2 ✔
L3	90.75 - 44.75 (3)	0.008	0.761	0.000	0.020	0.000	0.769 ✔	1.000	4.8.2 ✔
L4	44.75 - 0 (4)	0.009	0.776	0.000	0.016	0.000	0.786 ✔	1.000	4.8.2 ✔

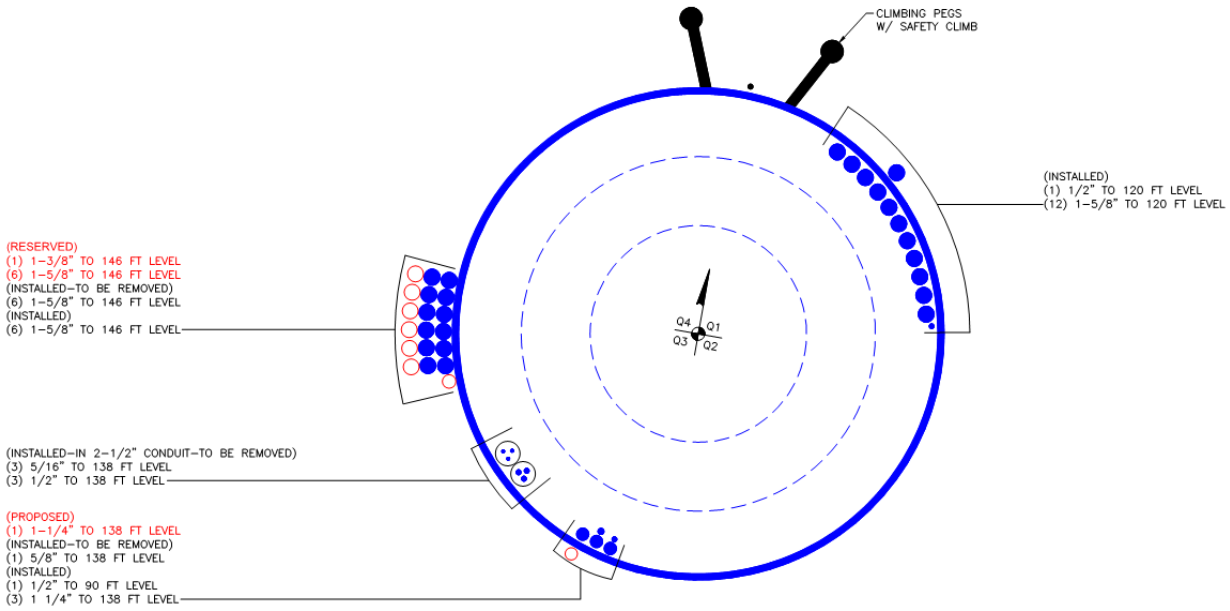
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	148 - 138	Pole	TP24x24x0.25	1	-1.43	753.82	5.0	Pass
L2	138 - 90.75	Pole	TP31.924x22x0.25	2	-12.06	1598.87	60.9	Pass
L3	90.75 - 44.75	Pole	TP41.086x30.5839x0.3125	3	-20.88	2547.91	76.9	Pass
L4	44.75 - 0	Pole	TP49.86x39.3583x0.375	4	-35.26	3765.09	78.6	Pass
							Summary	
						Pole (L4)	78.6	Pass
						RATING =	**78.6**	**Pass**

APPENDIX B

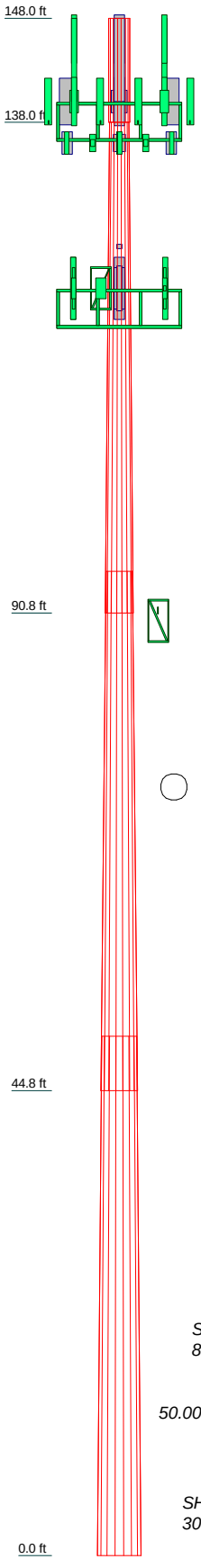
BASE LEVEL DRAWING



APPENDIX C

ADDITIONAL CALCULATIONS

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	10.0000	0	0.2500		24.0000	24.0000	A500-50	0.6
2	47.2500	18	0.2500	4.0000	22.0000	31.9240		3.4
3	50.0000	18	0.3125	5.2500	30.5839	41.0860	A607-60	6.0
4	50.0000	18	0.3750		39.3583	49.8600		9.0
								19.0



ALL REACTIONS ARE FACTORED

AXIAL 74 K

SHEAR 8 K

MOMENT 822 kip-ft

TORQUE 3 kip-ft

50.00 mph WIND - 0.7500 in ICE

AXIAL 35 K

SHEAR 30 K

MOMENT 2975 kip-ft

TORQUE 6 kip-ft

REACTIONS - 97.00 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
SBNHH-1D65C w/ Mount Pipe	146	800 EXTERNAL NOTCH FILTER	136
SBNHH-1D65C w/ Mount Pipe	146	800 EXTERNAL NOTCH FILTER	136
SBNHH-1D65C w/ Mount Pipe	146	Side Arm Mount [SO 102-3]	136
AIR -32 B2A/B66AA w/ Mount Pipe	146	TMA-DB-T1-6Z-8AB-0Z	122
AIR -32 B2A/B66AA w/ Mount Pipe	146	Side Arm Mount [SO 102-1]	122
AIR -32 B2A/B66AA w/ Mount Pipe	146	BXA-80063/4CF w/ Mount Pipe	120
ATSBT-TOP-MF-4G	146	BXA-80063/4CF w/ Mount Pipe	120
ATSBT-TOP-MF-4G	146	BXA-80063/6CF w/ Mount Pipe	120
ATSBT-TOP-MF-4G	146	MG D3-800TV w/ Mount Pipe	120
Side Arm Mount [SO 102-3]	146	MG D3-800TV w/ Mount Pipe	120
APXVTM14-C-120	138	MG D3-800TV w/ Mount Pipe	120
APXVTM14-C-120	138	LNX-6514DS-A1M w/ Mount Pipe	120
APXVTM14-C-120	138	LNX-6514DS-A1M w/ Mount Pipe	120
TD-RRH8x20-25	138	LNX-6514DS-A1M w/ Mount Pipe	120
TD-RRH8x20-25	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
TD-RRH8x20-25	138		
(2) P40-16-XLPP-RR-A	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
(2) P40-16-XLPP-RR-A	138		
(2) P40-16-XLPP-RR-A	138	BXA-171063-8BF-EDIN-0 w/ Mount Pipe	120
(6) ACU-A20-N	138		
(6) ACU-A20-N	138	RRH2X40-AWS	120
(6) ACU-A20-N	138	RRH2X40-AWS	120
Platform Mount [LP 301-1]	138	RRH2X40-AWS	120
800MHZ RRH	136	FD9R6004/2C-3L	120
800MHZ RRH	136	FD9R6004/2C-3L	120
800MHZ RRH	136	GPS_A	120
(2) 1900MHz RRH (65MHz)	136	Platform Mount [LP 1201-1]	120
(2) 1900MHz RRH (65MHz)	136	KS24019-L112A	90
(2) 1900MHz RRH (65MHz)	136	Side Arm Mount [SO 701-1]	90
800 EXTERNAL NOTCH FILTER	136		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A607-60	60 ksi	75 ksi

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 97.00 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50.00 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60.00 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.0000 ft
8. TOWER RATING: 78.6%

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

Job: ***Hillside / West Javen, CT***		
Project: ***PJF 37517-0499 / BU 876323***		
Client: CCI	Drawn by: Jason Martin, P.E.	App'd:
Code: TIA-222-G	Date: 08/03/17	Scale: NTS
Path: G:\TOWER\375_Crown_Castle\2017\37517-0499_876323_HILLSIDE\37517-0499.004.7805_SA_1436933\37517-0499.004.7805 (Adj).eri		Dwg No. E-1

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

Site Data

BU#: *876323*
Site Name: *Hillside*
App #:

Original Top Plate

Reactions		
Moment:	22.42	ft-kips
Axial:	1.43	kips
Shear:	3.53	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Manufacturer: Other

Elevation: 138 feet

Bolt Data			
Qty:	18		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	19	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	3.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	30.1	Kips
Bolt Stress Ratio:	10.2%	**Pass**

Plate Data		
Plate Outer Diam:	21.5	in
Plate Inner Diam:	15	in (Hole @ Ctr)
Thick:	0.75	in
Grade:	50	ksi
Effective Width:	3.79	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	3.2	Kips, Ext. Cu=Interior Cu
Plate Stress:	7.6	ksi
Allowable Plate Stress, φ*Fy:	45.0	ksi
Plate Stress Ratio:	16.8%	**Pass**

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

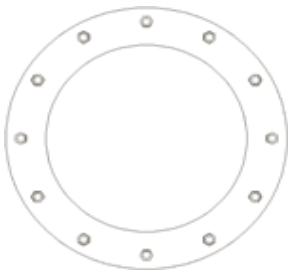
Stiffener Results

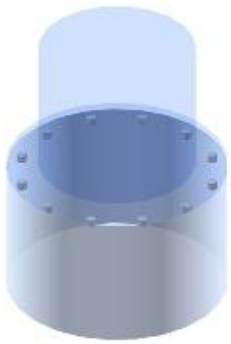
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check: n/a

Pole Data		
Pole OuterDiam:	22	in
Thick:	0.25	in
Pole Inner Diam:	21.5	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round
Fu	75	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

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

Site Data

BU#: *876323*
Site Name: *Hillside*
App #:

Extension Bottom Flange

Reactions		
Mu	22.42	ft-kips
Axial, Pu:	1.43	kips
Shear, Vu:	3.53	kips
Elevation:	138	feet

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
38.88

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	8		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle (in.):	28		

Plate Data		
Diam:	32	in
Thick, t:	0.75	in
Grade (Fy):	50	ksi
Strength, Fu:	65	ksi
Single-Rod B-eff:	9.00	in

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

Pole Data		
Diam:	24	in
Thick:	0.25	in
Grade:	50	ksi
# of Sides:	0	"0" IF Round
Fu	65	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

			Non-Rigid
Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	4.63	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.788	in	
Min PL "treq" for actual **T w/ Pry**:	0.167	in	
Min PL "t1" for actual **T w/o Pry**:	0.229	in	
T allowable with Prying:	52.61	kips	0≤α'≤1 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	4.63	kips	
Prying Bolt Stress Ratio=(Tu+q)/(B):	8.5%	**Pass**	

Exterior Flange Plate Results Flexural Check

			Non-Rigid
Compression Side Plate Stress:	9.4	ksi	TIA G
Allowable Plate Stress:	45.0	ksi	φ*Fy
Compression Plate Stress Ratio:	21.0%	**Pass**	Comp. Y.L. Length:
No Prying			7.50
Tension Side Stress Ratio, (treq/t)^2:	5.0%	**Pass**	

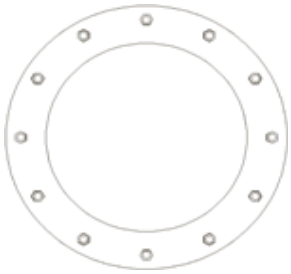
n/a

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#: *876323*
Site Name: *Hillside*
App #:

Flange Spacer Plate

Reactions		
Moment:	22.42	ft-kips
Axial:	1.43	kips
Shear:	3.53	kips
Exterior Flange Run, T+q:		kips

Bolt Threads:
X-Excluded
φVn=φ(0.55*Ab*Fu)
φ=0.75, φ*Vn (kips):
21.87

Manufacturer: Other

Elevation: 138 feet

Bolt Data

Qty:	18		
Diam:	0.75	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:		<-- Disregard	
N/A:		<-- Disregard	
Circle:	19	in	

Interior Flange Bolt Results

Maximum Bolt Tension, Tu:	3.1	Kips, Ext. Tu=Interior Tu
Adjusted φ*Tn (due to Vu=Vu/Qty),	30.1	Kips
Bolt Stress Ratio:	10.2%	**Pass**

Plate Data

Plate Outer Diam:	27.5	in
Plate Inner Diam:	15	in (Hole @ Ctr)
Thick:	1	in
Grade:	50	ksi
Effective Width:	4.80	in

Interior Flange Plate Results Flexural Check

Controlling Bolt Axial Force:	3.2	Kips, Ext. Cu=Interior Cu
Plate Stress:	11.4	ksi
Allowable Plate Stress, φ*Fy:	45.0	ksi
Plate Stress Ratio:	25.4%	**Pass**

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

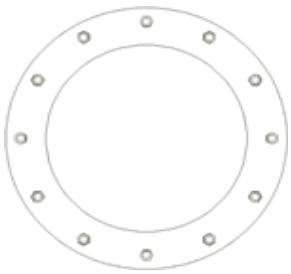
Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

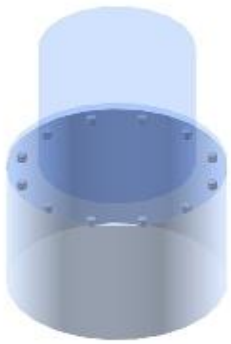
Pole Results

Pole Punching Shear Check: n/a

Pole Data

Pole OuterDiam:	28	in
Thick:	0.25	in
Pole Inner Diam:	27.5	in
Grade:	50	ksi
# of Sides:	0	"0" IF Round
Fu	65	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

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

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

Site Data

BU#: *876323*
Site Name: *Hillside*
App #:

Anchor Rod Data		
Eta Factor, η	0.5	TIA G (Fig. 4-4)
Qty:	12	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	57	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	53	in
Thick:	3	in
Grade:	60	ksi
Clip Distance:	6	in

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

Pole Data		
Diam:	49.86	in
Thick:	0.375	in
Grade:	60	ksi
# of Sides:	18	"0" IF Round

Base Reactions		
TIA Revision:	G	
Factored Moment, Mu:	2975	ft-kips
Factored Axial, Pu:	35	kips
Factored Shear, Vu:	30	kips

Anchor Rod Results

TIA G --> Max Rod (Cu+ Vu/η):	216.7	Kips
Axial Design Strength, Φ*Fu*Anet:	260.0	Kips
Anchor Rod Stress Ratio:	83.3%	**Pass**

Base Plate Results Flexural Check

Base Plate Stress:	34.9	ksi
PL Design Bending Strength, Φ*Fy:	54.0	ksi
Base Plate Stress Ratio:	64.7%	**Pass**

PL Ref. Data
Yield Line (in):
25.09
Max PL Length:
25.09

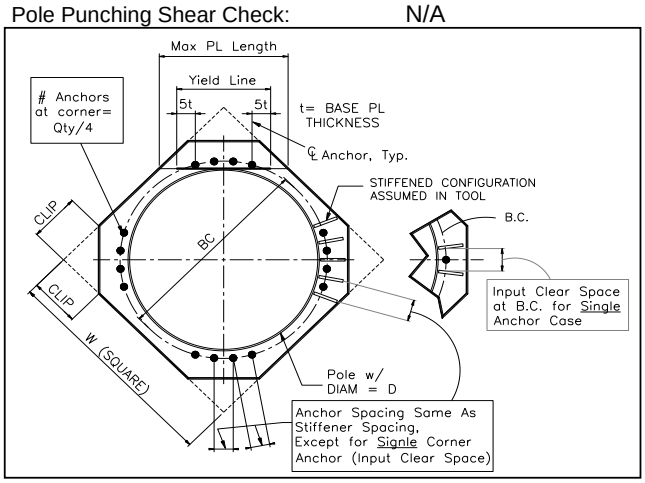
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	N/A



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

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

Job Number: 37517-0499.004.7805
Site Number: 876323
Site Name: Hillside

By: JCM
Date: 8/3/2017

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

Factored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, Mu =	2975.0		k-ft
Shear, Vu =	30.0		kips
Axial Load, Pu1 =	35.0		kips (from 1.2D + 1.6W)*
Axial Load, Pu2 =	26.3	0.0	kips (from 0.9D + 1.6W)**
OTMu =	2990.0	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 =	7	ft
Height Above Grade =	0.5	ft
Depth Below Grade =	21.5	ft
fc' =	3	ksi
εc =	0.003	in/in
L / D Ratio =	3.14	
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 =	38	
Rebar Size =	#9	
Rebar Fy =	60	ksi
Rebar MOE =	29000	ksi
Tie Size =	#5	
Side Clear Cover to Ties =	4	in

Soil Parameters

Water Table Depth =	5.00	ft
Depth to Ignore Soil =	5.00	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	5	115		31	Sand				5
2	3	130		40	Sand				8
3	17	130		42	Sand	11700			25
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	15.48	ft, from Grade
Bending Moment, Mu =	3454.52	k-ft, from COR
Resisting Moment, ΦMn =	5650.94	k-ft, from COR

MOMENT RATIO = 61.1% OK

Shear, Vu =	30.00	kips
Resisting Shear, ΦVn =	49.07	kips

SHEAR RATIO = 61.1% OK

Soil Results: Uplift

Uplift, Tu =	0.00	kips
Uplift Capacity, ΦTn =	78.64	kips

UPLIFT RATIO = 0.0% OK

Soil Results: Compression

Compression, Cu =	35.00	kips
Comp. Capacity, ΦCn =	310.92	kips

COMPRESSION RATIO = 11.3% OK

Steel Results (ACI 318-08):

Minimum Steel Area =	18.47	sq in
Actual Steel Area =	38.00	sq in
Axial, ΦPn (min) =	-2052.00	kips, Where ΦMn = 0 k-ft
Axial, ΦPn (max) =	8483.60	kips, Where ΦMn = 0 k-ft

Axial Load, Pu =	57.86	kips @ 6.00 ft Below Grade
Moment, Mu =	3156.77	k-ft @ 6.00 ft Below Grade
Moment, ΦMn =	5917.09	k-ft

MOMENT RATIO = 53.4% 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#: *876323*
Site Name: *Hillside*
App #:

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

Pier Properties

Concrete:

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

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.14	ft
Vert. Cage Diameter =	73.62	in
Vertical Bar Size =	9	
Bar Diameter =	1.13	in
Bar Area =	1	in^2
Number of Bars =	38	
As Total=	38	in^2
A s/ Aconc, Rho:	0.0069	0.69%

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

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

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.69%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8483.60	kips
at Mu=(ϕ=0.65)Mn=	5130.87	ft-kips
Max Tu, (φ=0.9) Tn =	2052	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	G	
Max. Factored Shaft Mu:	3156.77	ft-kips **(* Note)**
Max. Factored Shaft Pu:	57.86	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:	3156.77	ft-kips
1.00	Pu:	57.86	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code=	2008	

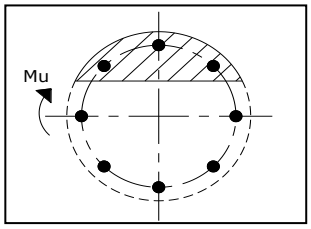
Seismic Properties

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

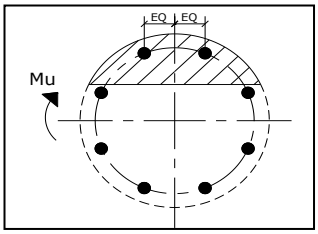
Solve (Run) <-- Press Upon Completing All Input

Results:

Governing Orientation Case: **1**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**14.96**	in
Extreme Steel Strain, ϵt:	**0.0128**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	57.86	kips
Drilled Shaft Moment Capacity, φMn:	**5917.09**	ft-kips
Drilled Shaft Superimposed Mu:	**3156.77**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**53.4%**

EBI Consulting
environmental | engineering | due diligence

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

SPRINT Existing Facility

Site ID: CT03XC049

Hillside
85 Plainfield Avenue
West Haven, CT 06516

August 20, 2017

EBI Project Number: 6217003715

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	7.55 %

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

EBI Consulting
environmental | engineering | due diligence

August 20, 2017

SPRINT
Attn: RF Engineering Manager
1 International Boulevard, Suite 800
Mahwah, NJ 07495

Emissions Analysis for Site: **CT03XC049 – Hillside**

EBI Consulting was directed to analyze the proposed SPRINT facility located at **85 Plainfield Avenue, West Haven, CT**, for the purpose of determining whether the emissions from the Proposed SPRINT Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 850 MHz Band is approximately 567 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2500 MHz (BRS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed SPRINT Wireless antenna facility located at **85 Plainfield Avenue, West Haven, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since SPRINT is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 1 CDMA channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

2) 2 LTE channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

3) 5 CDMA channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 16 Watts per Channel.

4) 2 LTE channels (1900 MHz (PCS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 8 LTE channels (2500 MHz (BRS)) were considered for each sector of the proposed installation. These Channels have a transmit power of 20 Watts per Channel.

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

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

8) The antennas used in this modeling are the **KMW ET-X-TU-42-15-37-18-IR-SP and the RFS APXVTM14-C-I20** for transmission in the 850 MHz, 1900 MHz (PCS) and 2500 MHz (BRS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerlines of the proposed antennas are **140 feet** above ground level (AGL) for **Sector A**, **140 feet** above ground level (AGL) for **Sector B** and **140 feet** above ground level (AGL) for Sector C.

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

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

SPRINT Site Inventory and Power Data by Antenna

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP	Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP	Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP
Gain:	12.9 dBd	Gain:	12.9 dBd	Gain:	12.9 dBd
Height (AGL):	**140 feet**	Height (AGL):	**140 feet**	Height (AGL):	**140 feet**
Frequency Bands	850 MHz	Frequency Bands	850 MHz	Frequency Bands	850 MHz
Channel Count	3	Channel Count	3	Channel Count	3
Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts	Total TX Power(W):	60 Watts
ERP (W):	1,169.91	ERP (W):	1,169.91	ERP (W):	1,169.91
Antenna A1 MPE%	**0.41 %**	Antenna B1 MPE%	**0.41 %**	Antenna C1 MPE%	**0.41 %**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP	Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP	Make / Model:	KMW ET-X-TU-42-15-37-18-IR-SP
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**140 feet**	Height (AGL):	**140 feet**	Height (AGL):	**140 feet**
Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)	Frequency Bands	1900 MHz (PCS)
Channel Count	7	Channel Count	7	Channel Count	7
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A2 MPE%	**1.25 %**	Antenna B2 MPE%	**1.25 %**	Antenna C2 MPE%	**1.25 %**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20	Make / Model:	RFS APXVTM14-C-I20
Gain:	15.9 dBd	Gain:	15.9 dBd	Gain:	15.9 dBd
Height (AGL):	**140 feet**	Height (AGL):	**140 feet**	Height (AGL):	**140 feet**
Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)	Frequency Bands	2500 MHz (BRS)
Channel Count	8	Channel Count	8	Channel Count	8
Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts	Total TX Power(W):	160 Watts
ERP (W):	6,224.72	ERP (W):	6,224.72	ERP (W):	6,224.72
Antenna A3 MPE%	**1.25 %**	Antenna B3 MPE%	**1.25 %**	Antenna C3 MPE%	**1.25 %**

Site Composite MPE%	
Carrier	**MPE%**
SPRINT – Max per sector	**2.91 %**
Verizon Wireless	3.16 %
T-Mobile	1.37 %
Clearwire	0.11 %
Site Total MPE %:	**7.55 %**

SPRINT Sector A Total:	2.91 %
SPRINT Sector B Total:	2.91 %
SPRINT Sector C Total:	2.91 %
Site Total:	7.55 %

SPRINT _ Max Values per Frequency Band / Technology Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Sprint 850 MHz CDMA	1	389.97	140	0.78	850 MHz	567	0.14%
Sprint 850 MHz LTE	2	389.97	140	1.56	850 MHz	567	0.28%
Sprint 1900 MHz (PCS) CDMA	5	622.47	140	6.23	1900 MHz (PCS)	1000	0.62%
Sprint 1900 MHz (PCS) LTE	2	1,556.18	140	6.23	1900 MHz (PCS)	1000	0.62%
Sprint 2500 MHz (BRS) LTE	8	778.09	140	12.46	2500 MHz (BRS)	1000	1.25%
						Total:	**2.91%**

Summary

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

The anticipated maximum composite contributions from the SPRINT facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

SPRINT Sector	Power Density Value (%)
Sector A:	2.91 %
Sector B:	2.91 %
Sector C:	2.91 %
SPRINT Maximum Total (per sector):	2.91 %
Site Total:	7.55 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **7.55 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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