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

October 19, 2018

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

RE: **Notice of Exempt Modification for Sprint DO Macro: 800515**
Sprint Site ID: CT03XC163
49 Wig Hill Rd. Chester, CT 06412
Latitude: 41° 24' 13.93"/ Longitude: -72° 28' 20.28"

Dear Ms. Bachman:

Sprint currently maintains six (6) antennas at the 150-foot level of the existing 150-foot monopole tower at 49 Wig Hill Rd. Chester, CT 06412. The tower is owned by Crown Castle. The property is owned by The Hazel & Bernard Negrelli Trust. Sprint now intends to replace six (6) antennas with six (6) new antennas. These antennas would be installed at the 150-foot level of the tower. Sprint also intends to install twelve (12) RRHs, and swap five (5) existing coax cables with four (4) hybrid cables.

This facility was approved by the Connecticut Siting Council on November 14th 2006.

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 First Selectwoman Lauren Gister, Town of Chester, Building official Ron Rose, Town of Chester, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

For the foregoing reasons, 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

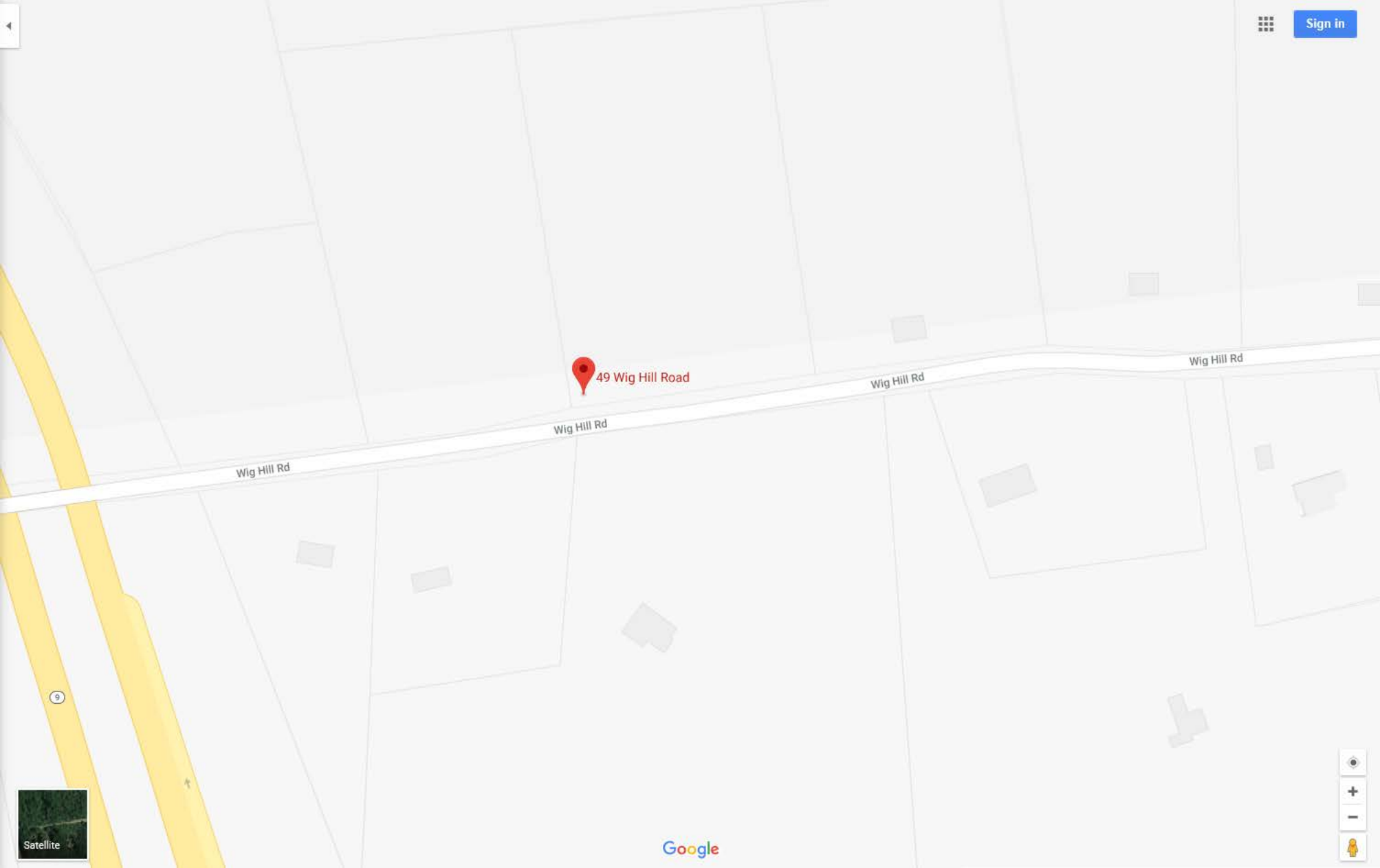
Attachments:

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: First Selectwoman Lauren Gister
203 Middlesex Avenue
Chester, CT 06412

Building Official Ron Rose
203 Middlesex Avenue
Chester, CT 06412

Hazel & Bernard Negrelli Trust
ATTN: Robert & Beth Wood
PO BOX 1175
Truro, MA 02666


Sign in
49 Wig Hill Road
Wig Hill Rd
Wig Hill Rd
Wig Hill Rd
Wig Hill Rd
9
Satellite
Google

The Assessor's office is responsible for the maintenance of records on the ownership of properties. Assessments are computed at 70% of the estimated market value of real property at the time of the last revaluation which was 2013.

Information on the Property Records for the Municipality of Chester was last updated on 10/19/2018.

Parcel Information

Location:	39 WIG HILL RD	Property Use:	Residential	Primary Use:	Residential
Unique ID:	00112800	Map Lot:	8/104	Acres:	23.80
490 Acres:		Zone:	R-2	Volume / Page:	0081/0045
Developers Map / Lot:		Census:	6001		

Value Information

	Appraised Value	Assessed Value
Land	186,948	130,870
Buildings	258,174	180,720

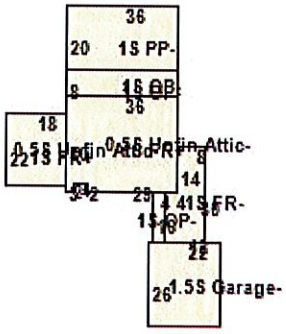
	Appraised Value	Assessed Value
Detached Outbuildings	21,519	15,060
Total	466,641	326,650

Owner's Information

Owner's Data
NEGRELLI BERNARD J TR + HAZEL C TR ROBERT & BETH WOOD PO BOX 1175 TRURO MA 02666

Building 1

8-104 12/23/2012



Building Use:	Single Family	Style:	Cape	Living Area:	1,772
Stories:	1.50	Construction:	Wood Frame	Year Built:	1970

Total Rooms:	6	Bedrooms:	2	Full Baths:	2
Half Baths:	1	Fireplaces:	3	Heating:	FHA
Fuel:	Oil	Cooling Percent:	100%	Basement Area:	1,468
Basement Finished Area:	540	Basement Garages:	0	Roof Material:	Arch Shingles
Siding:	Vinyl	Units:	01		

Special Features

Attached Components

Type:	Year Built:	Area:
Unfinished Attic	1970	536
Unfinished Attic	1970	198
Dormer	1970	15
Frame Garage	1970	858
Paver Patio	1970	720
Open Porch	1970	64
Open Porch	1999	288
Open Porch	1970	288

Detached Outbuildings

Type:	Year Built:	Length:	Width:	Area:
Vinyl Pool	1999			544
Frame Shed	1999			154

Owner History - Sales

Owner Name	Volume	Page	Sale Date	Deed Type	Valid Sale	Sale Price
NEGRELLI BERNARD J TR + HAZEL C TR	0081	0045	02/05/1993		No	$0
NEGRELLI BERNARD J & HAZEL	0036	0365	05/01/1967		No	$0

Sprint

SPRINT SITE NUMBER: CT03XC163
SPRINT SITE NAME: CT CHESTER
SITE TYPE: MONOPOLE
TOWER HEIGHT: 150'-0"

BUSINESS UNIT #: 800515
SITE ADDRESS: 49 WIG HILL ROAD, CHESTER, CT 06412
COUNTY: MIDDLESEX
JURISDICTION: TOWN OF CHESTER

SPRINT DO MACRO UPGRADE

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	CT CHESTER CAC 800515
SITE ADDRESS:	49 WIG HILL ROAD CHESTER, CT 06412
COUNTY:	MIDDLESEX
MAP/PARCEL #:	CHES-128600-00000
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 24' 13.93"
LONGITUDE:	-72° 28' 20.82"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	358 FT.
CURRENT ZONING:	NOT AVAILABLE
JURISDICTION:	TOWN OF CHESTER
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	VB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	NEGRELLI, HAZEL C PO BOX 1175 ATTN: BETH WOOD TRURO, MA 02666
TOWER OWNER:	CROWN ATLANTIC COMPANY LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	SPRINT 6391 SPRINT PARKWAY OVERLAND PARK, KS 66251-2650
CROWN CASTLE USA INC. APPLICATION ID:	396835
ELECTRIC PROVIDER:	CONNECTICUT LIGHT & POWER CO (800) 286-2000
TELCO PROVIDER:	LIGHTOWER (866) 518-5635

PROJECT TEAM

A&E FIRM:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	12 GILL STREET, SUITE 5800 WOBURN, MA 01801
	TRICIA PELON - PROJECT MANAGER (518) 373-3507
	JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104
	JEFF BARBADORA - A&E PROJECT MANAGER JEFF.BARBADORA@CROWNCASTLE.COM (781) 970-0053

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	OVERALL AND ENLARGED SITE PLAN
C-2	FINAL ELEVATION AND ANTENNA PLANS
C-3	ANTENNA AND CABLE SCHEDULE
C-4	EQUIPMENT SPECIFICATIONS
C-5	PLUMBING DIAGRAM
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

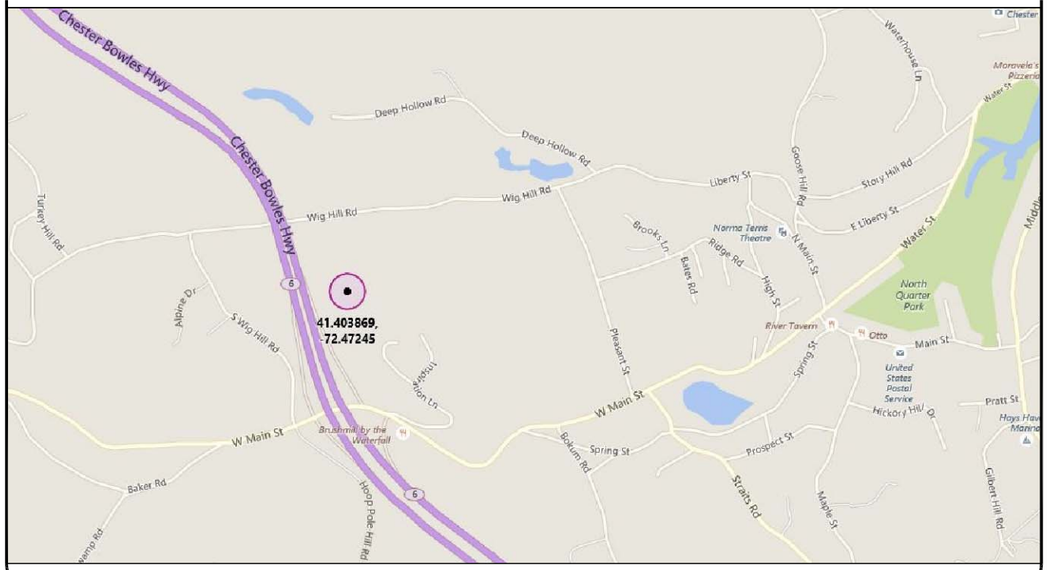
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK
- REMOVE (6) ANTENNAS
- INSTALL (6) ANTENNAS
- REMOVE (5) 1-5/8" COAX
- INSTALL (12) RRHs
- INSTALL (4) 1-1/4" HYBRID CABLES

GROUND SCOPE OF WORK
- REMOVE (3) RRHs

DESIGN PACKAGE BASED ON THE APPLICATION ID: 396835
REVISION: 4

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2016 CT STATE BUILDING CODE/2012 IBC W/ CT AMENDMENTS
MECHANICAL	2016 CT STATE BUILDING CODE/2012 IMC W/ CT AMENDMENTS
ELECTRICAL	2016 CT STATE BUILDING CODE/2014 NEC W/ CT AMENDMENTS

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	ENGINEERED TOWER SOLUTIONS DATED JULY 24, 2018
MOUNT ANALYSIS:	CLS GROUP DATED JUNE 19, 2018

CALL CONNECTICUT ONE CALL 811
(800) 922-4455 CBYD.COM
CALL 2 WORKING DAYS BEFORE YOU DIG!

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

SPRINT SITE NUMBER:
CT03XC163

BU #: **800515**
CT CHESTER CAC 800515

49 WIG HILL ROAD
CHESTER, CT 06412

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	01/12/18	JAS	PRELIMINARY	LMR
B	08/07/18	JAS	PRELIMINARY	LMR
0	09/26/18	JAS	CONSTRUCTION	AJF

DocuSigned by:
BADB068DD9024F4...

STATE OF CONNECTICUT
ANDREW JOSEPH FANDOZZI
No. 30515
LICENSED PROFESSIONAL ENGINEER

9/26/2018 | 5:35:29 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. 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 CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES, SUBCONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
11. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED– NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. AALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA–322 (LATEST EDITION).

SPRINT CONSTRUCTION NOTES

SECTION 01 100 – SCOPE OF WORK

THE WORK:

MUST COMPLY WITH ALL APPLICABLE ADOPTED CODES AND STANDARDS, AND PORTIONS THEREOF. SPRINT METHOD OF PROCEDURE (MOP) AND SPRINT STANDARDS AT THE TIME OF CONSTRUCTION START.

PRECEDENCE:

SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS. INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. ALONG WITH SPRINT CONSTRUCTION MANAGER APPROVAL.

SITE FAMILIARITY:

CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING THEMSELVES WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

ON–SITE SUPERVISION:

THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE:

THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE FUNCTIONING SYSTEM. MODIFICATIONS MAY BE REQUIRED TO SUITE JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

B. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK. DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

C. MARK THE FIELD SET OF DRAWINGS IN RED, DOCUMENTING ANY CHANGES FROM THE CONSTRUCTION DOCUMENTS.

METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION:

CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS. CONTRACTOR IS RESPONSIBLE FOR DISTRIBUTION OF LATEST MOPS.

A. TOP HAT
B. HOW TO INSTALL A NEW CABINET
C. BASE BAND UNIT IN EXISTING UNIT
D. INSTALLATION OF BATTERIES
E. INSTALLATION OF FIBER CABLE
F. INSTALLATION OF RRU'S
G. CABLING
H. TS–0200 REV 5 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.
J. COMMISSIONING MOPS

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

A. COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DRAWINGS.

B. CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT TO ENSURE IT IS PROTECTED AND HANDLED PROPERLY THROUGHOUT THE CONSTRUCTION DURATION.

C. CONTRACTOR IS RESPONSIBLE FOR RECEIPT OF SPRINT FURNISHED EQUIPMENT AT CELL SITE OR CONTRACTORS LOCATION. CONTRACTOR TO COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE. CONTRACTOR MAY BE REQUIRED TO PICK UP MATERIAL AT LOCATION PRESCRIBED BY SPRINT.

SECTION 01 300 – CELL SITE CONSTRUCTION

NOTICE TO PROCEED:

NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF WORK ORDER.

SITE CLEANLINESS:

CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

SECTION 01 400 – SUBMITTALS AND TESTS

ALTERNATIVES:

AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED.

TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTIONS AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS–200 REV 5 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT: PROVIDE AN AUTOMATED REPORT UPLOADED TO SITERRA USING A COMMERCIAL MADE–FOR PURPOSE ELECTRONIC ANTENNA ALIGNMENT TOOL (AAT). INSTALLED AZIMUTH, CENTERLINE AND DOWNTILT MUST CONFORM WITH RF CONFIGURATION DATA.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.
4. ALL TESTING REQUIRED BY APPLICABLE INSTALLATION MOPS.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. AZIMUTH, DOWNTILT, AGL FROM SUNSIGHT INSTRUMENTS – ANTENNA ALIGNMENT TOOL (AAT)
2. SWEEP AND FIBER TESTS.
3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT.
4. ALL AVAILABLE JURISDICTIONAL PERMIT AND OCCUPANCY INFORMATION.
5. PDF SCAN OF REDLINES PRODUCED IN FIELD.
6. A PDF SCAN OF REDLINE MARK–UPS SUITABLE FOR USE IN ELECTRONIC AS–BUILT DRAWING PRODUCTION.
7. LIEN WAIVERS.
8. FINAL PAYMENT APPLICATION.
9. REQUIRED FINAL CONSTRUCTION PHOTOS.
10. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS.
11. APPLICABLE POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINT'S DOCUMENT REPOSITORY OF RECORD).
12. CLOSEOUT PHOTOGRAPHS AND CLOSEOUT CHECKLIST: SPRINT WILL PROVIDE SEPARATE GUIDANCE.

a. PROVIDE PHOTOGRAPHS OF FINAL PROJECT PER THE FOLLOWING LIST. ADDITIONAL PHOTOS MAY BE REQUIRED TO SUPPORT ACCEPTANCE PROCESSES

(i) BACK MAIN FIBER CABLE ROUTE (MINIMUM TWO PHOTOS)
(ii) OF EACH ANTENNA AND RRU
(iii) MANUFACTURERS NAME TAG FOR ALL SERIALIZED EQUIPMENT
(iv) PULL AND DISTRIBUTION BOXES INTERMEDIATE BETWEEN RRU'S AND RBS (DOOR OPEN)
(v) RBS CABINET WITH DOOR OPEN SHOWING MODIFICATIONS
(vi) POWER CABINET, DOORS OPEN, BATTERIES INSTALLED
(vii) BREAK OUT CYLINDERS
(viii) ASR SIGNAGE FOR SPRINT OWNED TOWERS
(ix) RADIATION EXPOSURE WARNING SIGNS
(x) PHOTOGRAPH FROM EACH SECTOR FROM APPROXIMATELY RAD CENTER OF ANY NEW ANTENNA AT HORIZON.

b. LOAD PHOTOS TO SITERRA PROJECT LIBRARY 15. IN 15 CREATE NEW CATEGORY; 2.5 DEPLOYMENT, AND SECTION; PERMANENT CONSTRUCTION. LABEL PHOTOS WITH SITE CASCADE AND VIEW BEING DEPICTED. CAMERAS USED TO TAKE PHOTOS SHALL BE GPS ENABLED SUCH THAT THE GPS COORDINATES ARE INCLUDED IN THE PHOTO MEDIA–FILE INFORMATION.

COMMISSIONING:

PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

INTEGRATION:

PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

SECTION 09 900 – PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH GOVERNING CODES AND REGULATIONS. PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS. DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED PROVIDE PREMIUM GRADE, PROFESSIONAL–QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON–METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTION WHENEVER POSSIBLE.

B. WATER TANKS: TOUCH UP – PREPARE SURFACES TO BE REPAIRED. FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.
2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK. COORDINATE WITH WORK OF OTHER SECTIONS.
3. MATCH APPROVED MOCK–UPS FOR COLOR, TEXTURE, AND PATTERN. RE–COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.
4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX," "DRY GALV," OR "ZINC–IT"."
2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 – ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:

THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:

THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

NV FIBER CABLE:

EXISTING NV FIBER CABLE WILL BE USED AT EACH SITE. CABLE SHALL BE USED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTIONS:

FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12–50, CR 540, OR FXL 540. SUPER–FLEX CABLES ARE NOT ACCEPTABLE JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2" FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MINIMUM LENGTH FOR JUMPER SHALL BE SO AS TO ALLOW FOR THE PROPER BEND RADIUS PER MANUFACTURER OR SPRINT SPECIFICATIONS.

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:

INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:

THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER. ANTENNA HEIGHT, AZIMUTH AND FEED ORIENTATION INFORMATION SHALL BE AS DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL. THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE CONSTRUCTION DRAWINGS.

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

SPRINT SITE NUMBER:
CT03XC163

BU #: **800515**
CT CHESTER CAC 800515

49 WIG HILL ROAD
CHESTER, CT 06412

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	01/12/18	JAS	PRELIMINARY	LMR
B	08/07/18	JAS	PRELIMINARY	LMR
0	09/26/18	JAS	CONSTRUCTION	AJF

DocuSigned by:
[signature]
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STATE OF CONNECTICUT
ANDREW JOSEPH FANDOZZI III
No. 30515
LICENSED
PROFESSIONAL ENGINEER

9/26/2018 | 5:35:29 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

SHEET NUMBER: T-2

REVISION: 0

FIBER CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAT THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADII.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN FIBER CABLES:

a. LATTICE AND GUYED TOWERS:

ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS. HOISTING GRIPS SHOULD BE INSTALLED AT MID-POINT IF CABLE RUN EXCEEDS 200' AS WELL AS TOP SIDE.

b. MONOPOLE:

ALL CABLES SHALL BE PERMANENTLY SUPPORTED WITH HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200' (ONE HOISTING GRIP PER COAX).

2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA). WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES.

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH AT 18" O.C. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL.

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH. ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING OR SECURING JUMPERS SHOULD CONSIST OF STAINLESS STEEL CLIPS, 18" FROM REAR OF CONNECTOR AND 24" THEREAFTER AND AT NO TIME SHALL THEY CONTACT TOWER OR STRUCTURAL STEEL.

4. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE. NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOPE AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURER'S RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.

6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 5.

7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER AND COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION. APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF AMALGAMATING TAPE.

2. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.

3. JMA-WPS SERIES ENCLOSURE.

4. BUTYL AND TAPE, 1 COMPLETE WRAP OF 3/4" PRE-TAPE, BUTYL WRAPPED IN HALF INCH LAP LAYERS, ENDED WITH SHINGLED DOWNWARD 3 WRAPS OF 2" TAPE, 3 WRAPS OF 3/4" TAPE SHINGLED DOWNWARD, FREE OF WRINKLES, BUCKLES AND FLAGGING.

5. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 – INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BUT NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRED BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURER'S INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING:

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE – EN 2012-001, REV 1.

SECTION 26 100 – BASIC ELECTRICAL REQUIREMENTS

SUMMARY:

THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS.

QUALITY ASSURANCE:

A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTING ARE AVAILABLE IN THE INDUSTRY.

B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE NEW USE FOR THIS PROJECT.

C. MATERIALS AND EQUIPMENT: ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS. PROVIDE PRODUCTS BY THE FOLLOWING:

1. ALLIED TUBE AND CONDUIT.
2. B-LINE SYSTEM.
3. UNISTRUT DIVERSIFIED PRODUCTS.
4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS AND CONSTRUCTION FEATURES AS FOLLOWS:

1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL. DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
3. FASTEN BY MEANS OF WOOD SCREWS IN WOOD.
4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
5. CONCRETE INSERTS OR EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.

B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.

C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:

1. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
2. USE VIBRATION AND SHOCK-RESISTANT FASTNERS FOR ATTACHMENTS TO CONCRETE SLABS.

ELECTRICAL IDENTIFICATION:

A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.

B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

SECTION 26 200 – ELECTRICAL MATERIALS AND EQUIPMENT

CONDUIT:

A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR UNDERGROUND RUNS. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED – SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.

B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.

C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.

D. ALL UNDERGROUND CONDUIT OR CONDUIT IN CONCRETE SHOULD BE PVC. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATIONS C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.

E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6-FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRED BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.

F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

HUBS AND BOXES:

A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED HUB SHALL INCLUDE LOCK NUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION

B. CABLE TERMINATION FITTINGS FOR CONDUIT

1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL BY ROXTEC.

2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO – CL2075, OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.

C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.

D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKET COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION, PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.

E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

SUPPLEMENTAL GROUNDING SYSTEM:

A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM TO THE EXTENT INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMET. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS EXCEPT AS OTHERWISE NOTED.

B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO-HOLE SPADES WITH NO-OX.

C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CONSTRUCTION MANAGER FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

EXISTING STRUCTURE:

A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

CONDUIT AND CONDUCTOR INSTALLATION:

A. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

B. CONDUCTORS SHALL BE PULLED IN ACCORDANCE WITH ACCEPTED GOOD PRACTICE.

ADDITIONAL REQUIRED NOTES:

- GC IS RESPONSIBLE FOR HIRING ALL 3RD PARTY SPECIAL INSPECTIONS AS REQUIRED PER MUNICIPALITY
- GC IS RESPONSIBLE FOR VERIFYING ALL FIELD MEASUREMENTS PRIOR TO STARTING CONSTRUCTION
- DO NOT OPEN RRU PACKAGES IN THE RAIN
- NO OPEN FLAME ON SITE
- GC TO ENSURE HYBRIDS ARE SUPPORTED EVERY 3'-0" ON HORIZONTAL AND 4'-0" ON VERTICAL RUNS

Sprint

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CT CHESTER CAC 800515

49 WIG HILL ROAD
CHESTER, CT 06412

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

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DocuSigned by:
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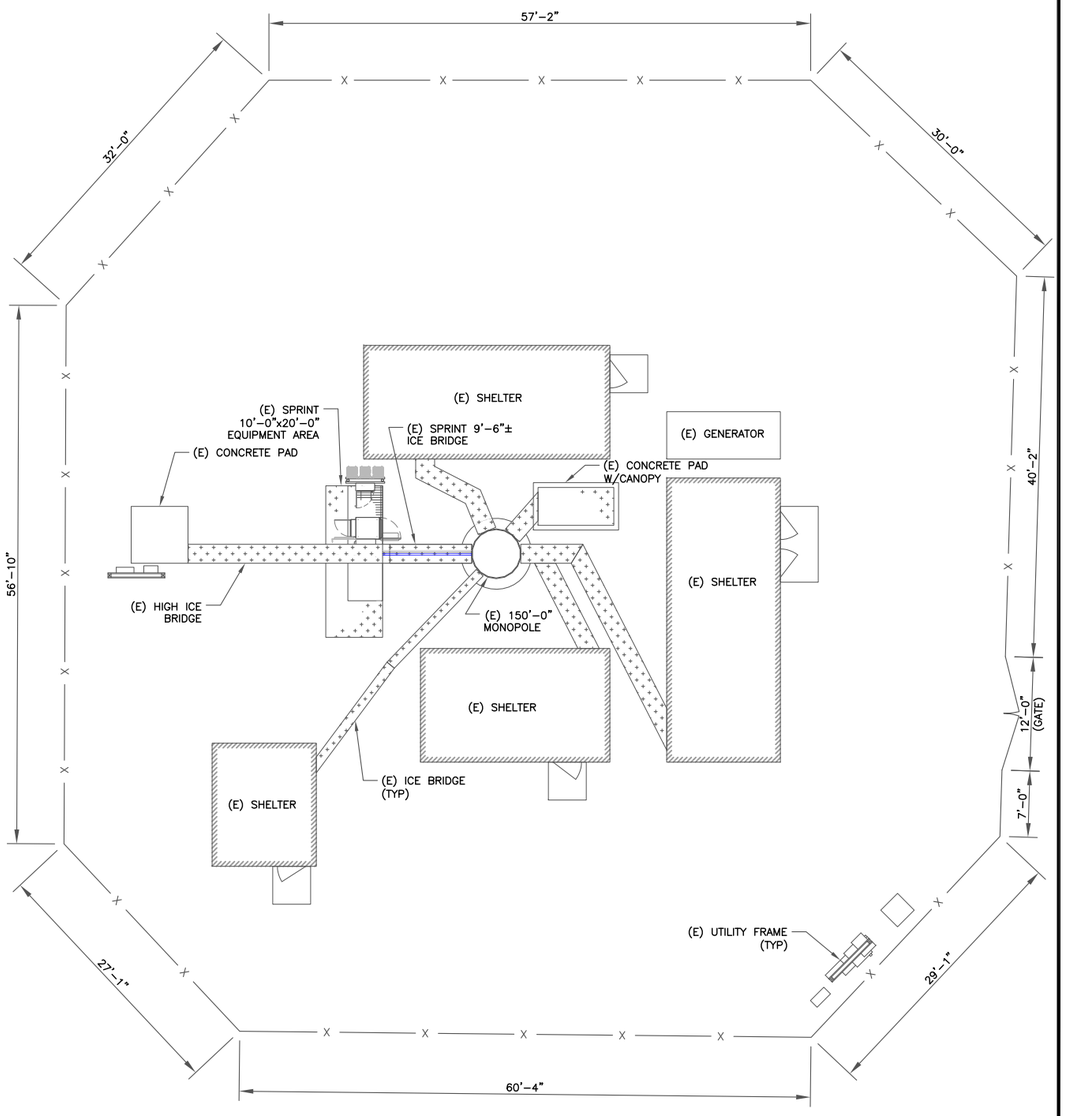
STATE OF CONNECTICUT
ANDREW JOSEPH FANDOZZI III
No. 30515
LICENSED PROFESSIONAL ENGINEER

9/26/2018 | 5:35:29 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

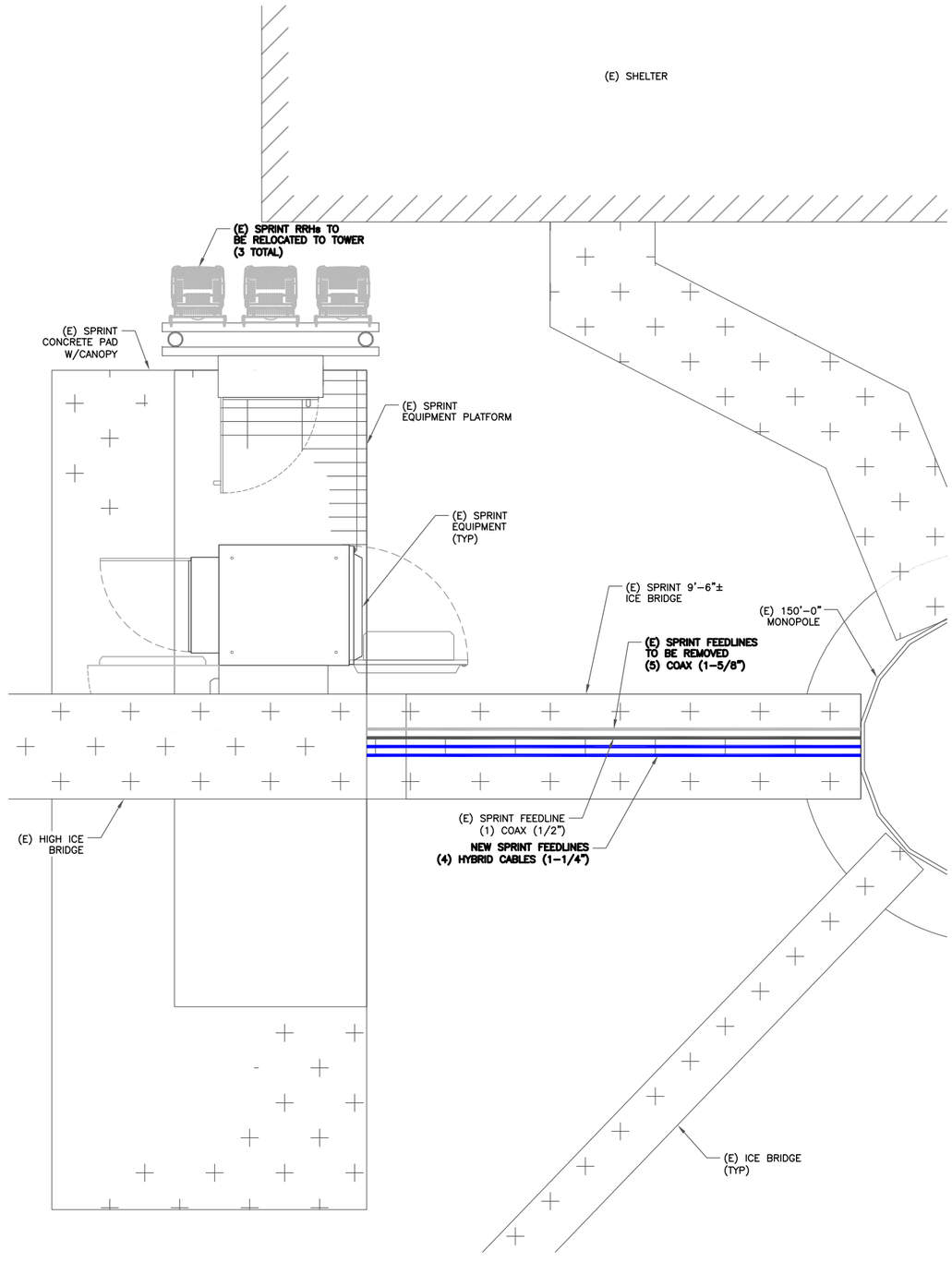
SHEET NUMBER: T-3

REVISION: 0



1 OVERALL SITE PLAN
SCALE: 8' 6' 4' 2' 0 8' 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)

N



2 ENLARGED SITE PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

N

Sprint

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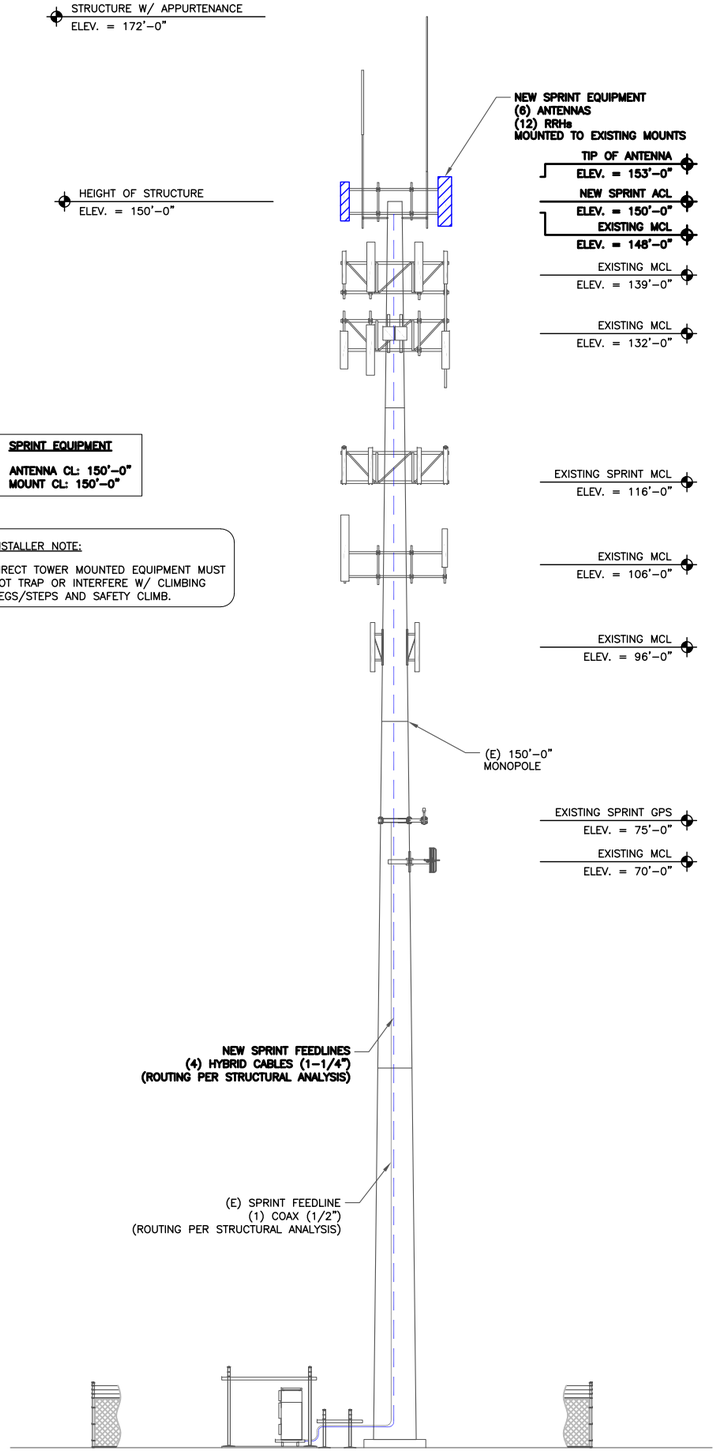


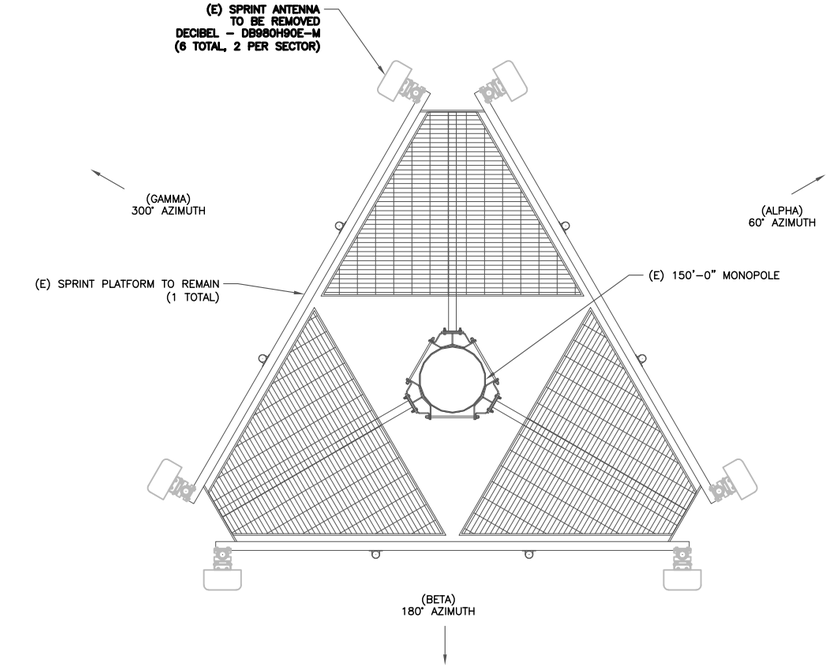
SPRINT EQUIPMENT

ANTENNA CL: 150'-0"
MOUNT CL: 150'-0"

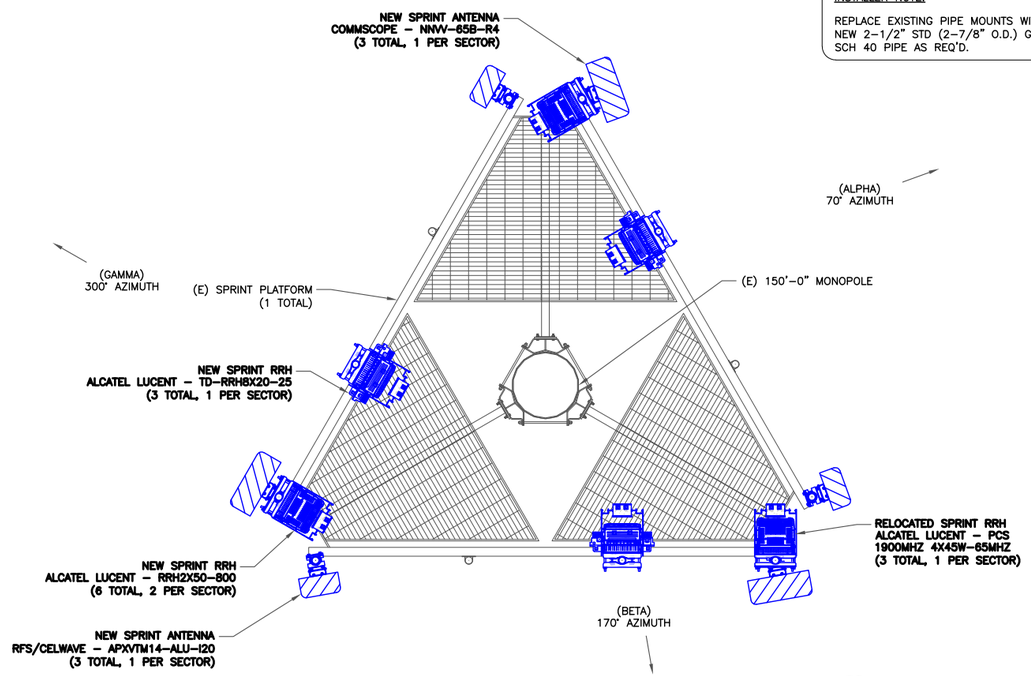
INSTALLER NOTE:

DIRECT TOWER MOUNTED EQUIPMENT MUST NOT TRAP OR INTERFERE W/ CLIMBING PEGS/STEPS AND SAFETY CLIMB.

1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



INSTALLER NOTE:

REPLACE EXISTING PIPE MOUNTS WITH NEW 2-1/2" STD (2-7/8" O.D.) GALV. SCH 40 PIPE AS REQ'D.

3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

Sprint

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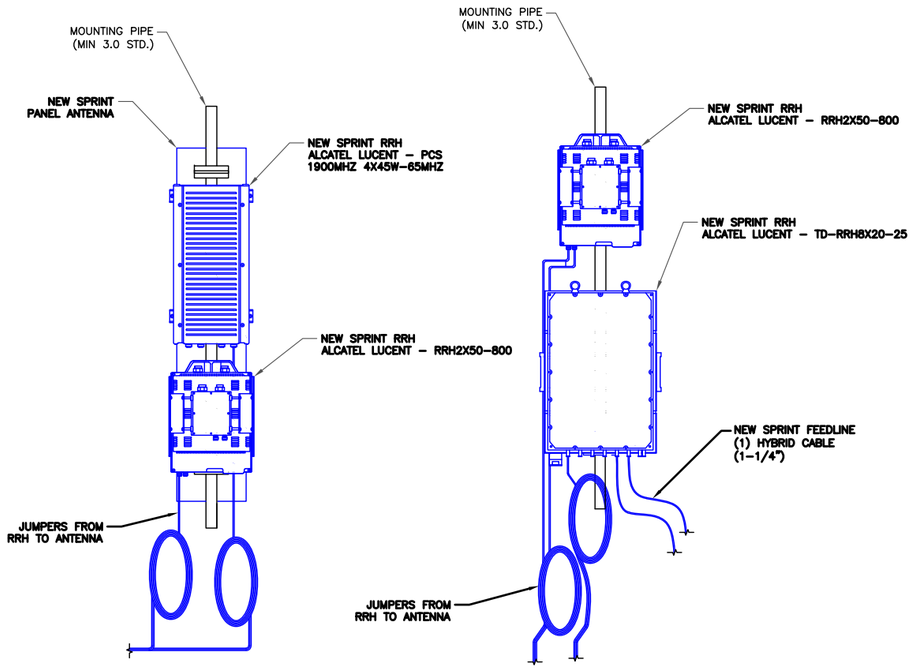
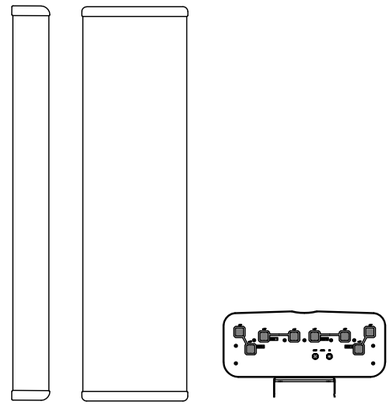
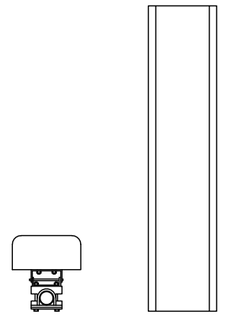


1 ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE



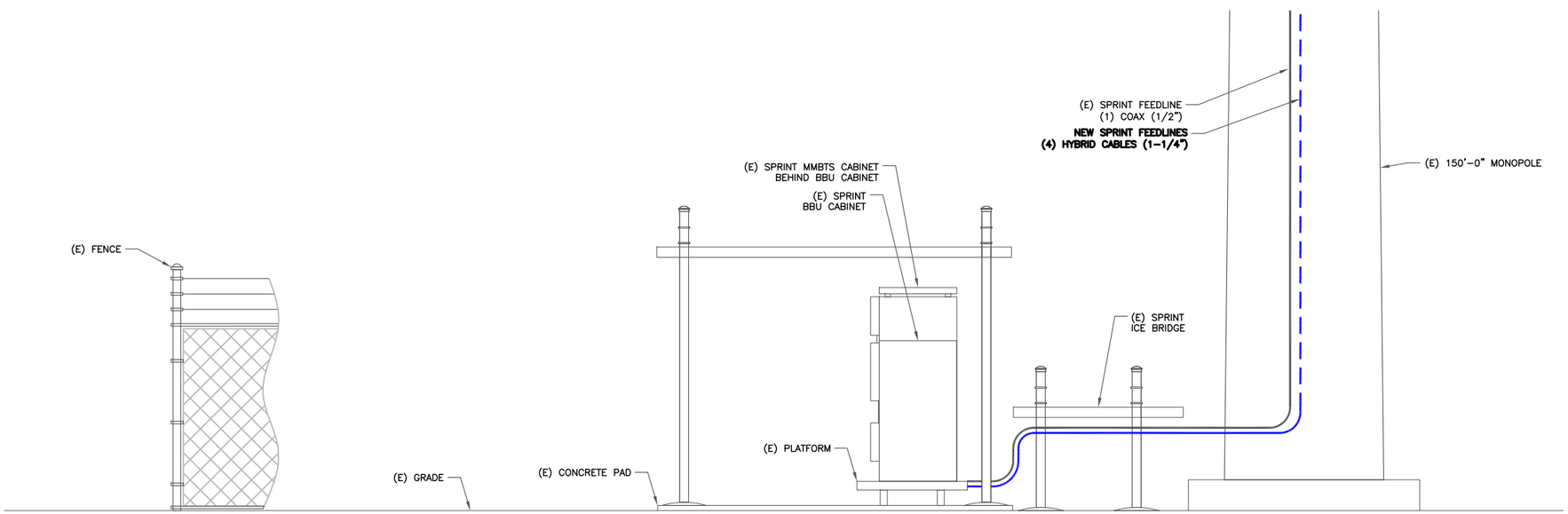
COMMSCOPE – NNVV–65B–R4
WEIGHT (FULLY EQUIPPED): 77.4 LBS
SIZE (HxWxD): 72.0x19.6x7.8 IN.
CONNECTOR TYPE: 4.3–10 FEMALE (8 TOTAL PORTS)

2 COMMSCOPE – NNVV–65B–R4
SCALE: NOT TO SCALE



RFS/CELWAVE – APXVTM14–ALU–I20
WEIGHT (WITHOUT MOUNTING HARDWARE): 56.2 LBS
SIZE (HxWxD): 56.3x12.6x6.3 IN.

3 RFS/CELWAVE – APXVTM14–ALU–I20
SCALE: NOT TO SCALE



4 EQUIPMENT ELEVATION DETAIL
SCALE: NOT TO SCALE

Sprint

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RFS HYBRIFLEX RISER CABLE SCHEDULE

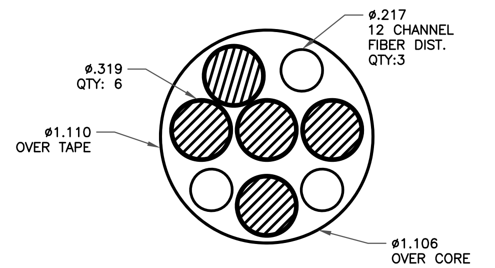
FIBER ONLY (EXISTING DC POWER)	HYBRID CABLE MN: HB058-M12-050F 12X MULTI-MODE FIBER PAIRS, TOP: OUTDOOR PROTECTED CONNECTORS, BOTTOM: LC CONNECTORS, 5/8" CABLE, 50 FT	50 FT
	MN: HB058-M12-075F	75 FT
	MN: HB058-M12-100F	100 FT
	MN: HB058-M12-125F	125 FT
	MN: HB058-M12-150F	150 FT
	MN: HB058-M12-175F	175 FT
	MN: HB058-M12-200F	200 FT
8 AWG POWER	HYBRID CABLE MN: HB114-08U3M12-050F 3X8 AWG POWER PAIRS, 12X MULTI-MODE FIBER PAIRS, OUTDOOR RATED CONNECTORS & LC CONNECTORS, 1-1/4" CABLE, 50 FT	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 3X6 AWG POWER PAIRS, 12X MULTI-MODE FIBER PAIRS, OUTDOOR RATED CONNECTORS & LC CONNECTORS, 1-1/4" CABLE, 225 FT	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: HB114-21U3M12-325F 3X6 AWG POWER PAIRS, 12X MULTI-MODE FIBER PAIRS, OUTDOOR RATED CONNECTORS & LC CONNECTORS, 1-1/4" CABLE, 325 FT	325 FT
	MN: HB114-21U3M12-350F	350 FT
	MN: HB114-21U3M12-375F	375 FT

RFS HYBRIFLEX JUMPER CABLE SCHEDULE

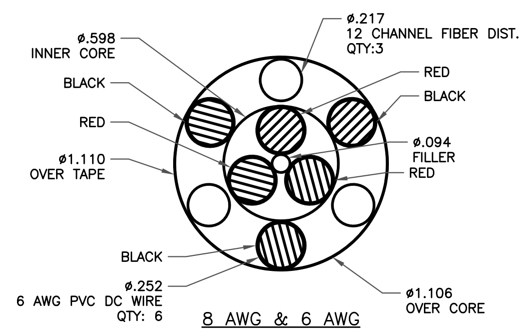
FIBER ONLY	HYBRID JUMPER CABLE MN: HBF012-M3-5F1 5 FT, 3X MULTI-MODE FIBER PAIRS, OUTDOOR & LC CONNECTORS, 1/2" CABLE	5 FT
	MN: HBF012-M3-10F1	10 FT
	MN: HBF012-M3-15F1	15 FT
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
8 AWG POWER	HYBRID JUMPER CABLE MN: HBF058-08U1M3-5F1 5 FT, 1X8 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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
6 AWG POWER	HYBRID JUMPER CABLE MN: HBF058-13U1M3-5F1 5 FT, 1X6 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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	
4 AWG POWER	HYBRID JUMPER CABLE MN: HBF078-21U1M3-5F1 5 FT, 1X4 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
	SPECIAL INSTALLATION NOTE: JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA SHALL NOT EXCEED 15' NOTIFY SPRINT CM OF ANY DISCREPANCY	

HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE
MANUF: RFS/CELWAVE

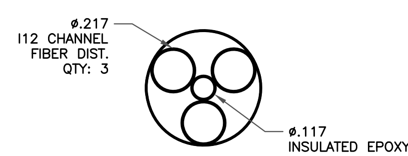
CABLE	LENGTH	DC CONDUCTOR	CABLE DIAMETER
FIBER ONLY	VARIES	USE NV HYBRIFLEX	5/8"
HYBRIFLEX	<200'	8 AWG	1-1/4"
HYBRIFLEX	225-300'	6 AWG	1-1/4"
HYBRIFLEX	325-375'	4 AWG	1-1/4"



4 AWG



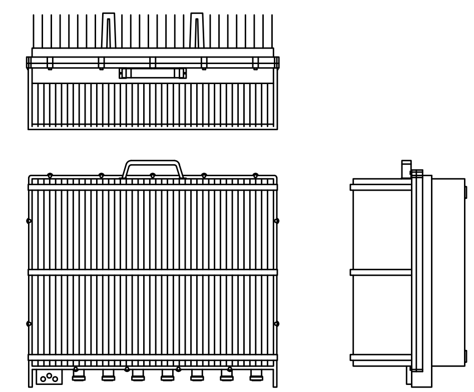
8 AWG & 6 AWG



FIBER ONLY

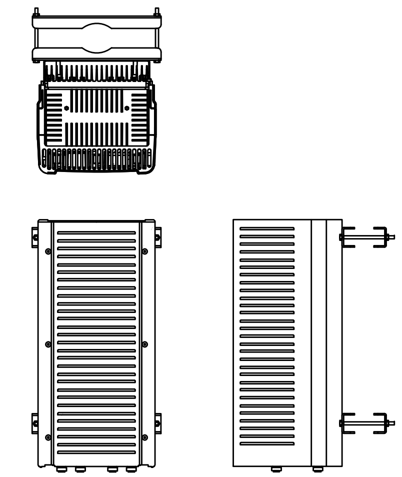
INSTALLER NOTE:
SPRINT CM TO CONFIRM HYBRID/FIBER RISER CABLE & HYBRID/FIBER JUMPER CABLE MODEL NUMBERS BEFORE PREPARING BOM.

1 HYBRID CABLE CROSS SECTION & DATA
SCALE: NOT TO SCALE



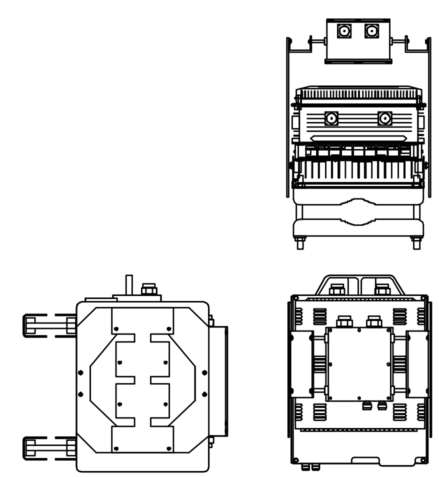
NOKIA – FZHN
WEIGHT(WITHOUT BRACKETS): 55.2 LBS
SIZE (WITHOUT BRACKET): 8.7x17.4x14 IN.

2 NOKIA – FZHn
SCALE: NOT TO SCALE



ALCATEL LUCENT – 1900MHz RRH
WEIGHT: 44.0 LBS
SIZE: 23.0x13.0x17.0 IN.

3 ALCATEL LUCENT – 1900MHz RRH
SCALE: NOT TO SCALE



ALCATEL LUCENT – RRH2x50-800
WEIGHT (WITHOUT BRACKETS): 53.0 LBS
SIZE (WITHOUT BRACKET): 19.70x13.00x10.80 IN.

4 ALCATEL LUCENT – RRH2x50-800
SCALE: NOT TO SCALE

5 NOT USED
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

SPRINT SITE NUMBER:
CT03XC163

BU #: **800515**
CT CHESTER CAC 800515

49 WIG HILL ROAD
CHESTER, CT 06412

EXISTING 150'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	01/12/18	JAS	PRELIMINARY	LMR
B	08/07/18	JAS	PRELIMINARY	LMR
0	09/26/18	JAS	CONSTRUCTION	AJF

DocuSigned by:
8AD8066DD9024F4...

STATE OF CONNECTICUT
ANDREW JOSEPH FANDOZZI III
No. 30515
LICENSED PROFESSIONAL ENGINEER

9/26/2018 | 5:35:29 PM EDT

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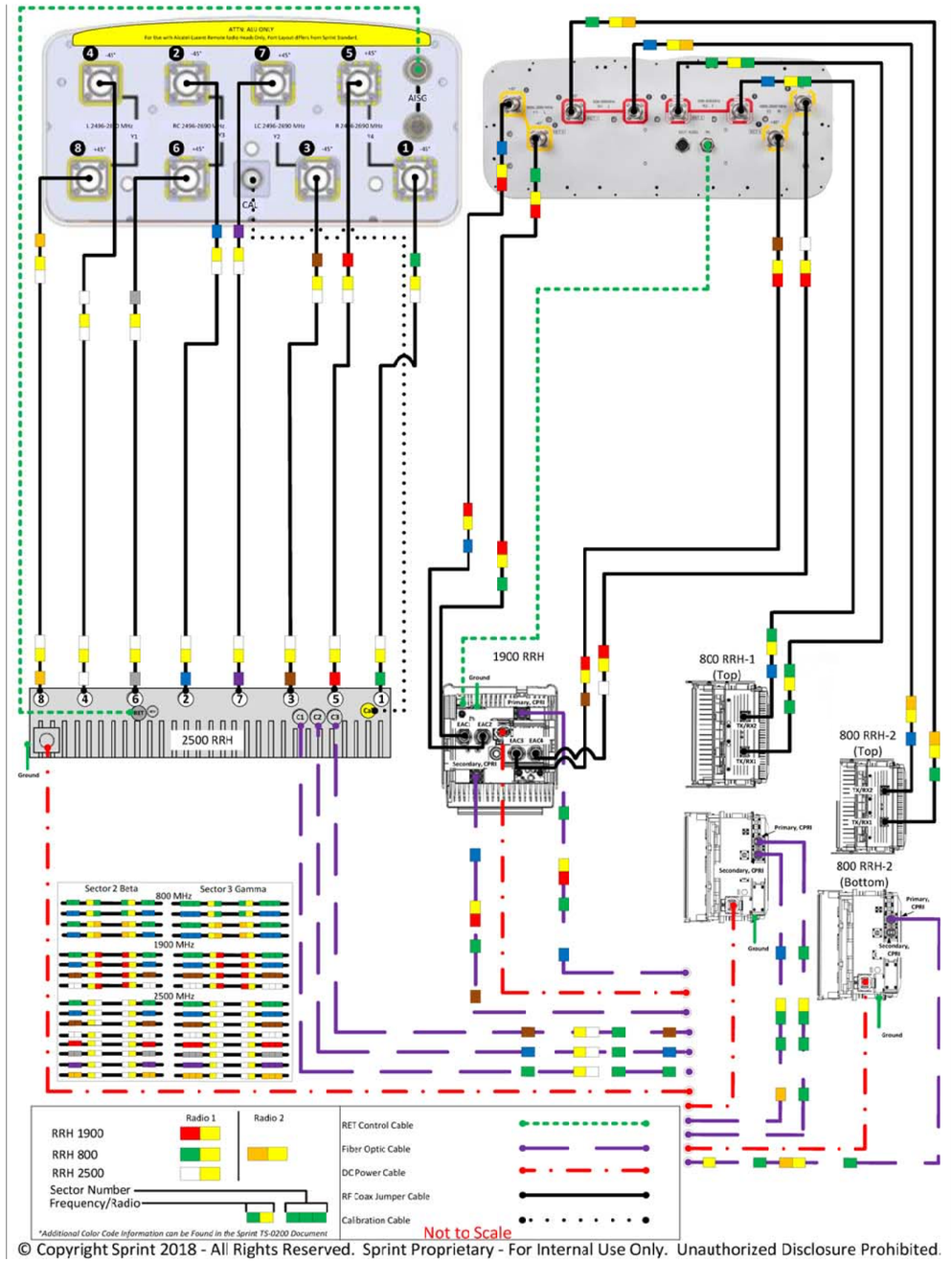
SHEET NUMBER: C-4
REVISION: 0

Prepared By	Revision Date	Revision Number
Mark Elliott	March 24, 2018	R2
Approved By	**Approval Date**	
RAN Hardware & Antenna Teams	Final-Macro Generated	

Sprint

ALU 211 APXVTM14-ALU-I20 & NNVV-65B-R4 wo Filters



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

SPRINT SITE NUMBER:
CT03XC163

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0	09/26/18	JAS	CONSTRUCTION	AJF

DocuSigned by:
BADB086DD9024F4...

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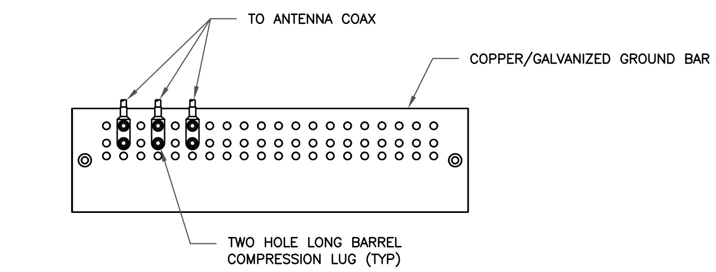
SHEET NUMBER: C-5

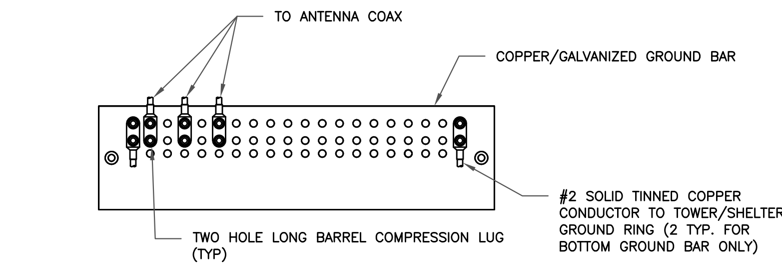
REVISION: 0



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

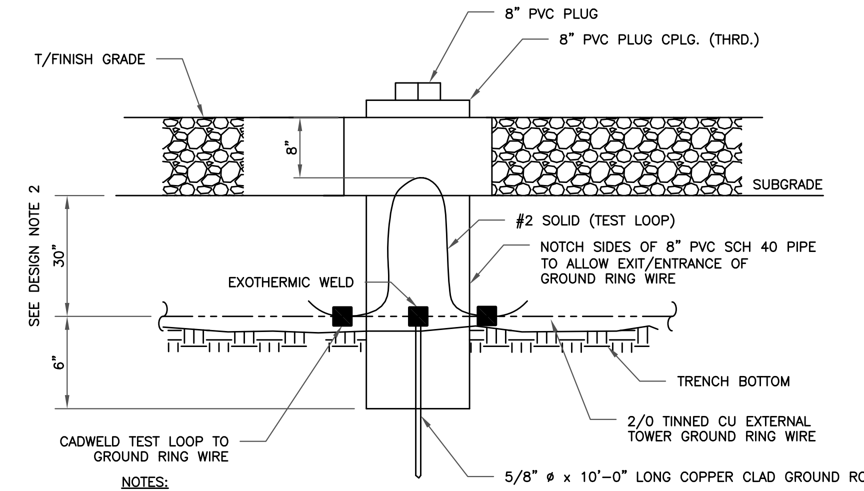
1 ANTENNA GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

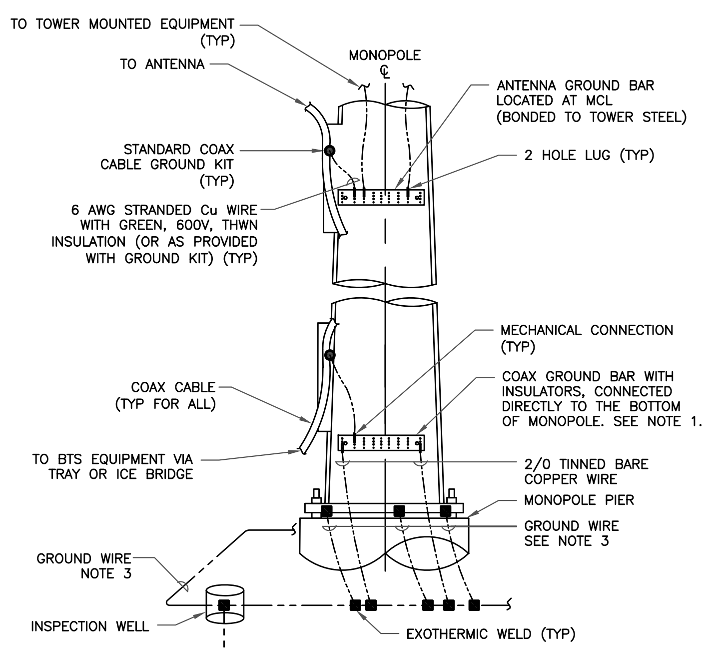
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

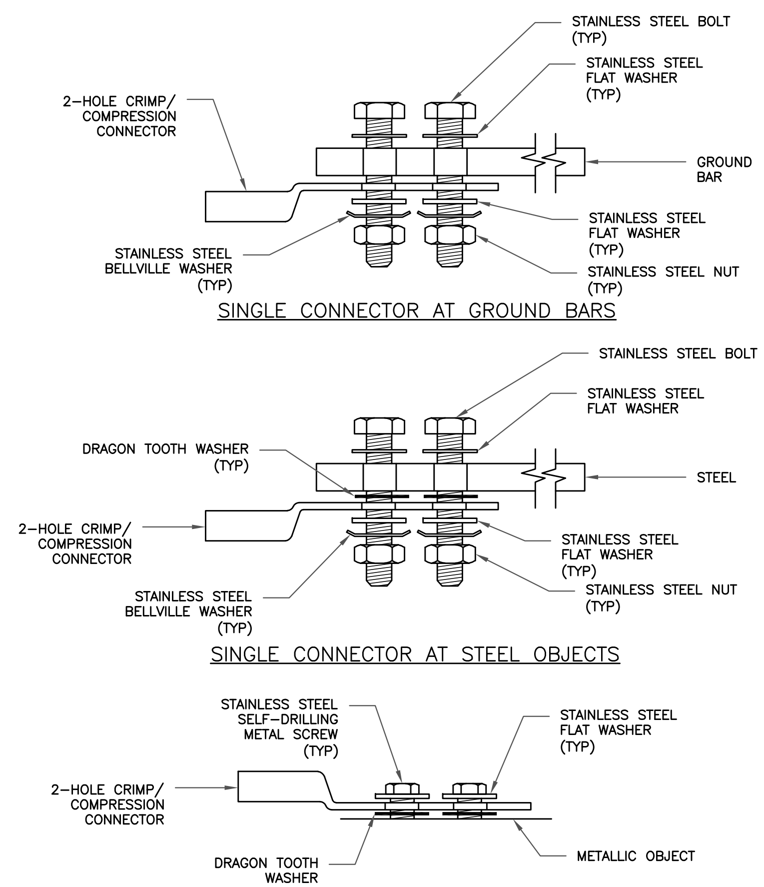
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



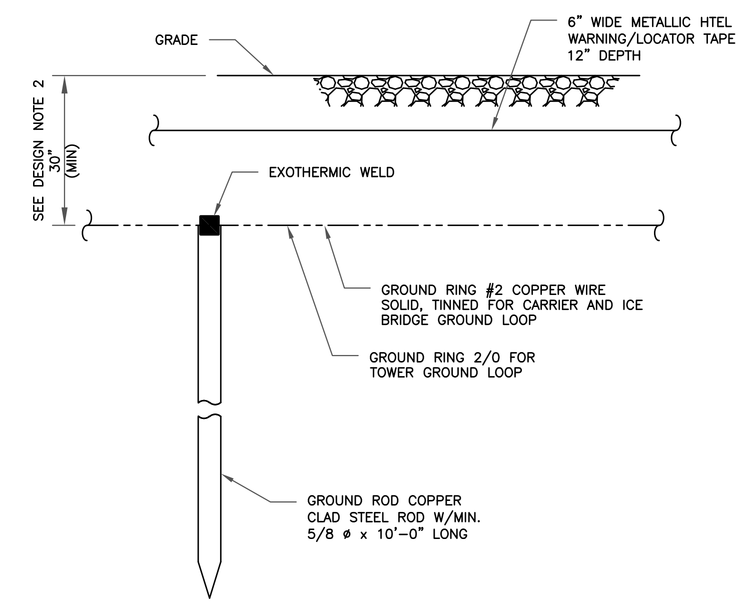
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
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SPRINT SITE NUMBER:
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BU #: **800515**
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49 WIG HILL ROAD
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EXISTING 150'-0" MONOPOLE

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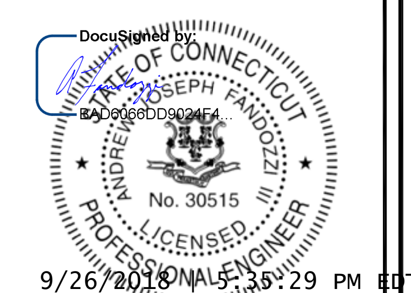
0	09/26/18	JAS	CONSTRUCTION	AJF



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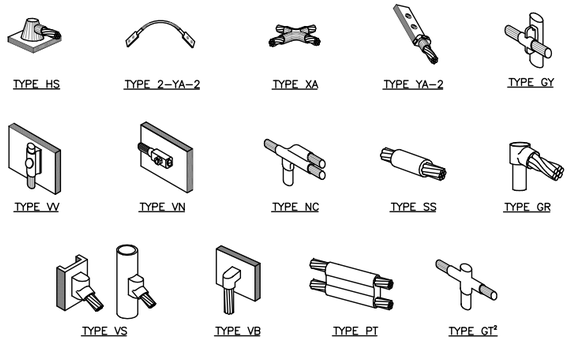
SHEET NUMBER: G-1
REVISION: 0

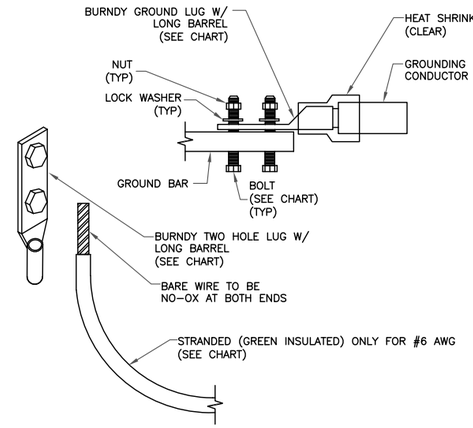


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

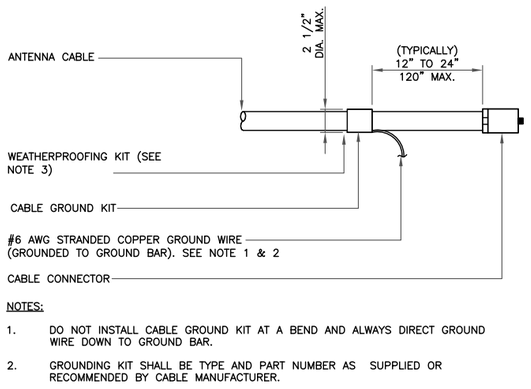
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

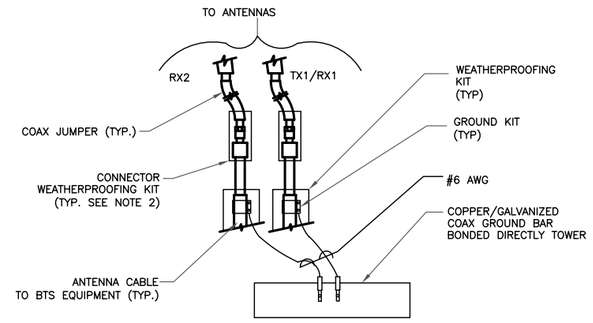
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

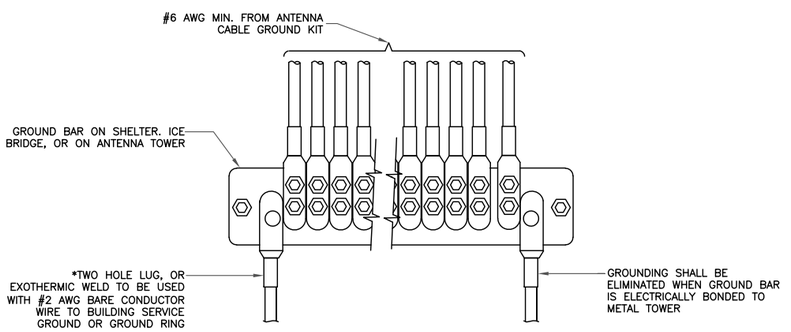
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



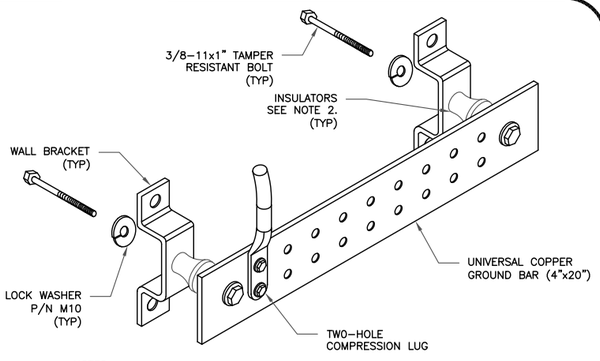
NOTES:

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

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



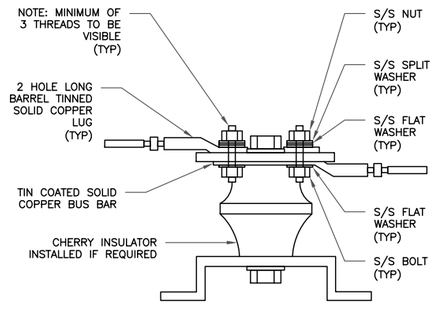
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



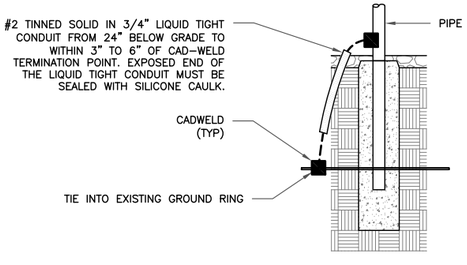
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

Sprint

CROWN CASTLE
12 GILL STREET, SUITE 5800
WOBURN, MA 01801

SPRINT SITE NUMBER:
CT03XC163

BU #: **800515**
CT CHESTER CAC 800515

49 WIG HILL ROAD
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EXISTING 150'-0" MONOPOLE

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0	09/26/18	JAS	CONSTRUCTION	AJF

DocuSigned by:
8AD6066DD9024F4...

STATE OF CONNECTICUT
ANDREW JOSEPH FANDOZZI III
No. 30515
LICENSED PROFESSIONAL ENGINEER

9/26/2018 | 5:35:29 PM EDT

Crown Castle USA Inc. Certificate of Registration #PEC.0001101

SHEET NUMBER: G-2

REVISION: 0

Certificate Of Completion

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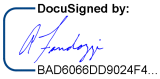
Andrew Fandozzi Andrew.Fandozzi@crowncastle.com Senior Project Engineer Crown Castle Security Level: Email, Account Authentication (None)	DocuSigned by:  BAD6066DD9024F4...	Sent: 9/26/2018 4:14:02 PM Viewed: 9/26/2018 5:34:23 PM Signed: 9/26/2018 5:35:29 PM
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In Person Signer Events	Signature	Timestamp

Editor Delivery Events	Status	Timestamp

Agent Delivery Events	Status	Timestamp

Intermediary Delivery Events	Status	Timestamp

Certified Delivery Events	Status	Timestamp

Carbon Copy Events	Status	Timestamp

Notary Events	Signature	Timestamp

Envelope Summary Events	Status	Timestamps
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Signing Complete	Security Checked	9/26/2018 5:35:29 PM
Completed	Security Checked	9/26/2018 5:35:29 PM

Payment Events	Status	Timestamps

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If you elect to receive documents for execution and various other documents and records from us electronically, you may at any time change your mind and tell us that thereafter you want to receive such documents only in paper format. To withdraw your consent to electronic delivery and execution of documents, use the DocuSign 'Withdraw Consent' form on the signing page of a DocuSign envelope, instead of signing it. Thereafter, you will no longer be able to use the DocuSign system to electronically receive and execute documents or other records from us. You may also send an e-mail to esignature@CrownCastle.com stating that you are withdrawing your consent to electronic delivery and execution of documents through the DocuSign system and stating your e-mail address, name, US Postal Address, and telephone number.

Consequences of withdrawing consent to receive and/or execute documents electronically

If you elect to receive documents for execution and various other documents and other records only in paper format, it will slow the speed at which we can complete the subject transactions because of the increased delivery time.

Documents for execution, and other documents and records may be sent to you electronically

Unless you tell us otherwise in accordance with the procedures described herein, we may provide documents for execution, and other documents and records electronically to you through the DocuSign system during the course of our relationship with you. To reduce the chance of you inadvertently not receiving any document for execution or other document or record, we prefer to provide all documents for execution, and other documents and records by the same method and to the same address that you have given us. If you do not agree with this process, please let us know as described below.

How to contact Crown Castle

You may contact us to let us know of any changes related to contacting you electronically, to request paper copies of documents for execution and other documents and records from us, and to withdraw your prior consent to receive documents for execution and other documents and records electronically as follows:

To contact us by phone call: 724-416-2000
To contact us by email, send messages to: esignature@CrownCastle.com
To contact us by paper mail, send correspondence to
Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317

To advise Crown Castle and DocuSign of your new e-mail address

To let us know of a change to the e-mail address where we should send documents for execution and other documents and records to you, you must send an email message to esignature@CrownCastle.com and state your previous e-mail address and your new e-mail address.

In addition, you must notify DocuSign, Inc. to arrange for your new email address to be reflected in your DocuSign account by following the process for changing e-mail in the DocuSign system.

Required hardware and software

Browsers:	Internet Explorer® 11 (Windows only); Windows Edge Current Version; Mozilla Firefox Current Version; Safari™ (Mac OS only) 6.2 or above; Google Chrome Current Version; **Note** : Pre-release (e.g., beta) versions of operating systems and browsers are not supported.
Mobile Signing:	Apple iOS 7.0 or above; Android 4.0 or above
PDF Reader:	Acrobat® Reader or similar software may be required to view and print PDF files
Screen Resolution:	1024 x 768

Enabled Security Settings:	Allow per session cookies

These minimum requirements are subject to change. If these requirements change, you will be asked to re-accept the disclosure. Pre-release (e.g. beta) versions of operating systems and browsers are not supported.

Acknowledging your access and consent to receive documents electronically

Please confirm that you were able to access this disclosure electronically (which is similar to the manner in which we will deliver documents for execution and other documents and records) and that you were able to print this disclosure on paper or electronically save it for your future reference and access or that you were able to e-mail this disclosure to an address where you will be able to print it on paper or save it for your future reference and access. Further, if you consent to receiving documents for execution and other documents and records in electronic format on the terms described above, please let us know by clicking the “I agree” button below.

By checking the 'I agree' box, I confirm that:

- You can access and read this Electronic Record and Signature Disclosure; and
- As a recipient, you can read, electronically sign and act upon this message, and you agree not to forward it or any other DocuSign e-mail communications. In the event another party needs to be added to the DocuSign communication, you must make a request to the e-mail originator.

BU# 800515

STATE OF CONNECTICUT

CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
Phone: (860) 827-2935 Fax: (860) 827-2950
E-Mail: siting.council@ct.gov
Internet: ct.gov/csc

Daniel F. Caruso
Chairman

November 15, 2006

Richard M. Darin, Executive Director
Valley Shore Emergency Communications, Inc.
315 Spencer Plains Road
State Police Troop F, P.O. Box 497
Westbrook, CT 06498

RE: **TS-VSECI-026-061107** - Valley Shore Emergency Communications, Inc. request for an order to approve tower sharing at an existing telecommunications facility located at 49 Wig Hill Road, Chester, Connecticut.

Dear Mr. Darin:

At a public meeting held November 14, 2006, the Connecticut Siting Council (Council) ruled that the shared use of this existing tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Any additional change to this facility may require an explicit request to this agency pursuant to General Statutes § 16-50aa or notice pursuant to Regulations of Connecticut State Agencies Section 16-50j-73, as applicable. Such request or notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

This decision applies only to this request for tower sharing and is not applicable to any other request or construction. Please be advised that the validity of this action shall expire one year from the date of this letter.

The proposed shared use is to be implemented as specified in your letter dated November 7, 2006, including the placement of all necessary equipment and shelters within the tower compound.

Thank you for your attention and cooperation.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/MP/laf

c: The Honorable Thomas E. Marsh, First Selectman, Town of Chester
Cathy Jefferson, Zoning Enforcement Officer, Town of Chester
Jeffrey W. Barbadora, Crown Atlantic Company LLC
Thomas J. Regan, Esq., Brown Rudnick Berlack Israels LLP
Kenneth C. Baldwin, Esq., Robinson & Cole LLP
Michele G. Briggs, New Cingular Wireless PCS, LLC
Christine Farrell, T-Mobile
Christopher B. Fisher, Esq., Cuddy & Feder LLP

G:\EM\VSECI\Chester\dc111406.DOC

BK - Valley Shore EMS
Doc Type ___ Site ID ___ BUN 800515 Date 11/17/06 ___ COD update

Mount Analysis of Existing Platform w/ Support Rails for Crown Castle
BU #800515 - CT CHESTER CAC 800515

CLS Group Project #42284-CT03XC163-01-MA
June 19, 2018

PROPOSED CARRIER	Sprint
CARRIER SITE	CT03XC163 - CT CHESTER
CCI ORDER #	396835 Rev. #2
MOUNT DESCRIPTION	Existing Platform w/ Support Rails at 150 ft AGL
ANTENNA ELEVATION	Nominal Rad. Elevation of 150 ft AGL
SITE DESCRIPTION	150 ft Monopole
SITE ADDRESS	49 Wig Hill Road, Chester, CT 06412, Middlesex County
GPS COORDINATES	41.403869, -72.47245
ANALYSIS STANDARD	2012 IBC / 2016 Connecticut State Building Code / TIA-222-G
LOADING CRITERIA	130 mph, V_{ult} / 100.7 mph, V_{asd} (3-Second Gust) w/o ice & 50 mph (3-Second Gust) w/ 0.75"

■ **ANALYSIS RESULT:** **Pass**

MEMBER USAGE	**89%**	**Pass**
CONNECTION USAGE	**4%**	**Pass**

Prepared by:
Sanyam Gurme, E.I.

Reviewed by:
Michael Lassiter, P.E.

STATE OF CONNECTICUT MICHAEL LASSITER No. 25064 LICENSED PROFESSIONAL ENGINEER

July 2, 2018

Mount Analysis of Existing Platform w/ Support Rails for Crown Castle
BU #800515 - CT CHESTER CAC 800515

CLS Group Project #42284-CT03XC163-01-MA
June 19, 2018

PROPOSED CARRIER	Sprint
CARRIER SITE	CT03XC163 - CT CHESTER
CCI ORDER #	396835 Rev. #2
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■ **ANALYSIS RESULT:** **Pass**

MEMBER USAGE	**89%**	**Pass**
CONNECTION USAGE	**4%**	**Pass**

Prepared by:
Sanyam Gurme, E.I.

Reviewed by:
Michael Lassiter, P.E.

■ INTRODUCTION

The proposed equipment is to be mounted to the existing Platform w/ Support Rails. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

■ STRUCTURAL DOCUMENTS PROVIDED

STRUCTURAL DATA	Site Photos, dated February 27, 2018
PREVIOUS ANALYSES	Paul J. Ford and Company Project Number: 37517-0421.002.7805 (Revision), dated December 8, 2017
LOADING DATA	CCI Application ID #396835 Rev. #2, dated November 21, 2017

■ ANALYSIS CRITERIA

STANDARD	2012 IBC / 2016 Connecticut State Building Code / TIA-222-G
BASIC WIND SPEED	130 mph, V_{ult} / 100.7 mph, V_{asd} (3-Second Gust)
BASIC WIND SPEED W/ ICE	50 mph (3-Second Gust) w/ 0.75" Radial Ice (Escalating)
EXPOSURE CATEGORY	B
MAX. TOPOGRAPHIC FACTOR, K_{zt}	1.00
RISK CATEGORY	II
MAINTENANCE LIVE LOAD	L_M: 500 lb

■ FINAL EQUIPMENT

ELEVATION (ft)		ANTENNAS	
MOUNT	**RAD.**	**#**	**NAME**
150.0	150.0	3	Commscope NNVV-65B-R4
		3	RFS Celwave APXVTM14-ALU-I20
		3	Alcatel Lucent TD-RRH8x20-25
		3	Alcatel Lucent PCS 1900MHz 4x45W-65MHz
		6	Alcatel Lucent RRH2X50-800

■ RESULTS SUMMARY

COMPONENT	PEAK USAGE	RESULT
Bracing Members	89%	Pass
Platform Base	54%	Pass
Support Rail	51%	Pass
Mount Pipes	30%	Pass
Connections	4%	Pass

■ CONCLUSION AND RECOMMENDATIONS

According to our structural analysis, the mounts have been found to **PASS**. The mounting configuration considered in this analysis is capable of supporting the referenced loading pursuant to applicable standards.

■ ASSUMPTIONS AND CONDITIONS

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, CLS Group should be notified immediately to revise results.

This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.

All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from CLS Group.

All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. CLS Group is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by CLS Group verifies the adequacy of the primary members of the structure. CLS Group provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.

Wind & Ice Loading

Nominal Mount Elevation (AGL), z_{mount}	150 ft	**K_a**	1.00
Nominal Rad Elevation (AGL), z_{rad}	150 ft	**K_d**	0.95
TIA Standard	G	**K_z**	1.11
Basic Wind Speed, V_{ult} (bare)	130 mph	**K_{zt}**	1.00
Basic Wind Speed, V (ice)	50 mph	**I (wind)**	-
Design Ice Thickness, t_i	3/4 in	**t_{iz}**	1.75 in
Exposure Category	B	**G_h**	1.00
Risk Category	II	**q_z (bare)**	45.6 psf
Seismic Response Coeff., C_s	-	**q_z (ice)**	6.7 psf

Live Loading

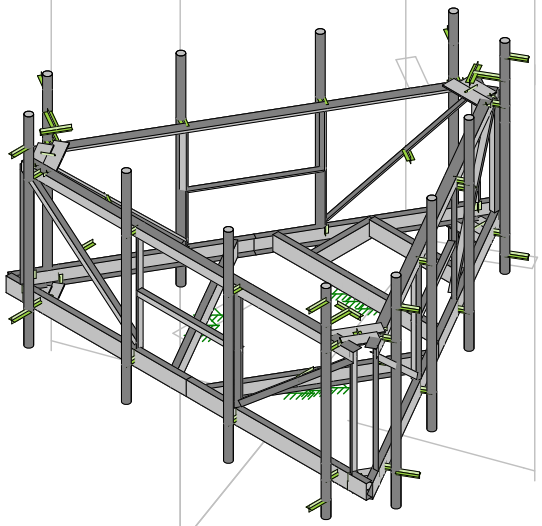
At Mount Pipes, L_M	500 lb
Joint Labels Considered	n113
	n87
	n88
	n112

Member Distributed Loading

Section Set Label	Shape Label	F_A (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Mount Pipe	PIPE_2.375x0.12	10.83	3.96	8.79
Corner Plate	PL3X0.375	22.80	4.39	8.30
Grating Channel	C5x9	38.00	2.82	14.69
Bracing	1.75X1.75X.25	13.30	2.52	8.22
Support Rail	L3x3x5	22.80	2.64	11.61
Corner Plate 2	PL4x0.375	30.40	5.07	9.66
Standoff arm	HSS4x4x4	30.40	2.73	14.58
Mount Pipe (additional)	PIPE_2.0	10.85	3.96	8.80
Connecting rods	sr0.5	2.28	2.69	4.79

Appurtenances

Appurtenance Model	Status	Azimuth Offset (°, ↻)	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		120° Joints		240° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	EPA_A (Bare) (ft^2)		EPA_A (Ice) (ft^2)		F_A (Bare) (lb)		F_A (Ice) (lb)	
					Front	Side	0°	120°	240°		1	2	1	2	1	2							N	T	N	T	N	T	N	T
NNVV-65B-R4				☐			1	1	1		a1	a2	b1	b2	c1	c2	72	19.6	7.8	77.4	Flat	251.80	12.27	5.75	14.94	8.20	559.63	262.23	100.79	55.35
APXVTM14-ALU-I20				☐			1	1	1		a3	a4	b3	b4	c3	c4	56.3	12.6	6.3	56.21	Flat	160.41	6.34	3.61	8.38	5.53	289.25	164.52	56.52	37.31
RRH2X50-800				☑		0.5	2	2	2		r1	r2	rr1	rr2	r11	r22	15.7	13	9.8	52.9	Flat	59.37	1.28	0.85	2.13	1.32	58.47	38.78	14.34	8.90
TD-RRH8x20-25				☐		0.5	1	1	1		r3		rr3		r33		26.1	18.6	6.71	70	Flat	94.77	4.05	0.77	5.45	1.28	184.50	34.99	36.75	8.61
PCS 1900MHz 4x45W-65MHz				☐		0.5	1	1	1		r4		rr4		r44		25.1	11.1	10.7	60	Flat	80.75	2.32	1.12	3.48	1.69	105.89	51.03	23.45	11.40
PD1142-1				☐				1	1				x1		x2		225.6	0.7	0.7	10	Round	99.58	1.32	1.32	8.00	8.00	60.02	60.02	53.97	53.97
DB636-A				☐			1				x3						138.8	2.4	2.4	30	Round	72.55	2.78	2.78	6.88	6.88	126.60	126.60	46.38	46.38
DS4C06F36D-N				☐				1					x4				141	2.4	2.4	70	Round	106.93	2.82	2.82	7.03	7.03	128.61	128.61	47.43	47.43



Envelope Only Solution

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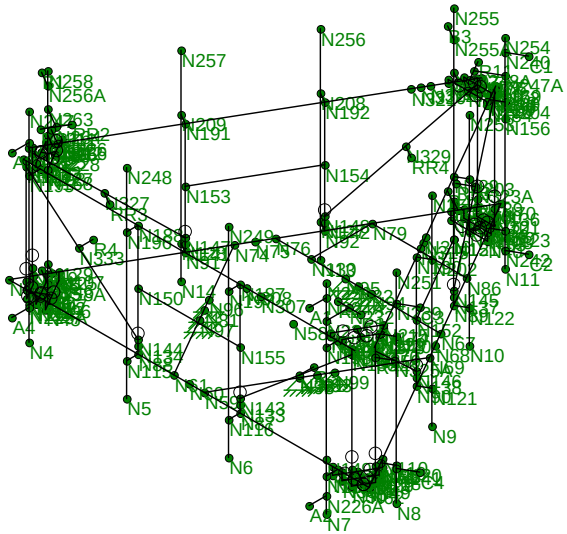
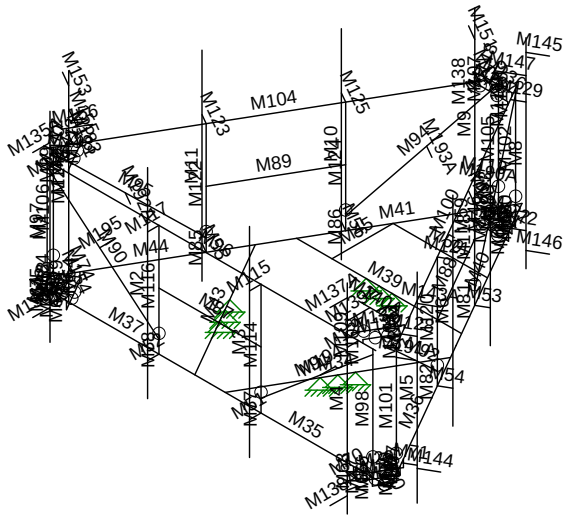
42284-CT03XC163-01-MA	Rendered	42284-CT03XC163-01-MA.r3d



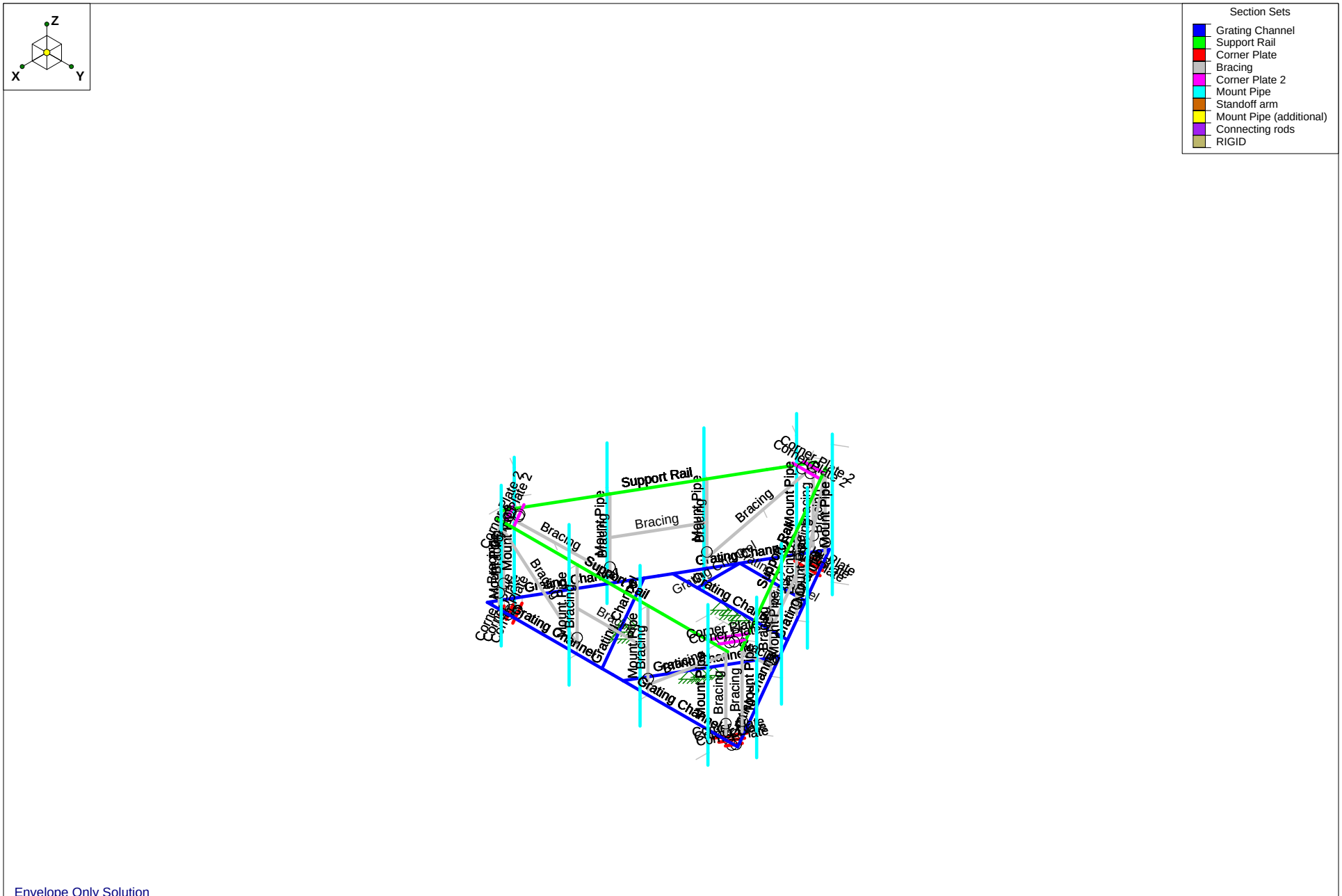
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 2
SVG		June 19, 2018 at 2:35 PM
42284-CT03XC163-01-MA	Joint Labels	42284-CT03XC163-01-MA.r3d



Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 3
SVG		June 19, 2018 at 2:35 PM
42284-CT03XC163-01-MA	Member Labels	42284-CT03XC163-01-MA.r3d



Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 4
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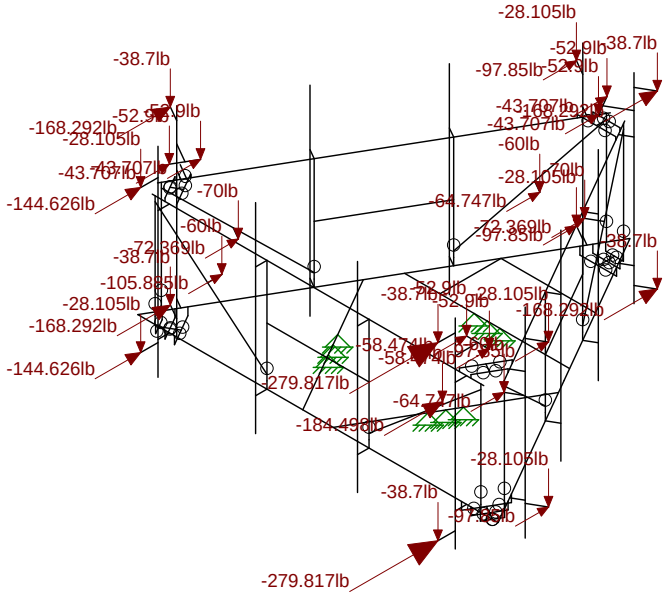
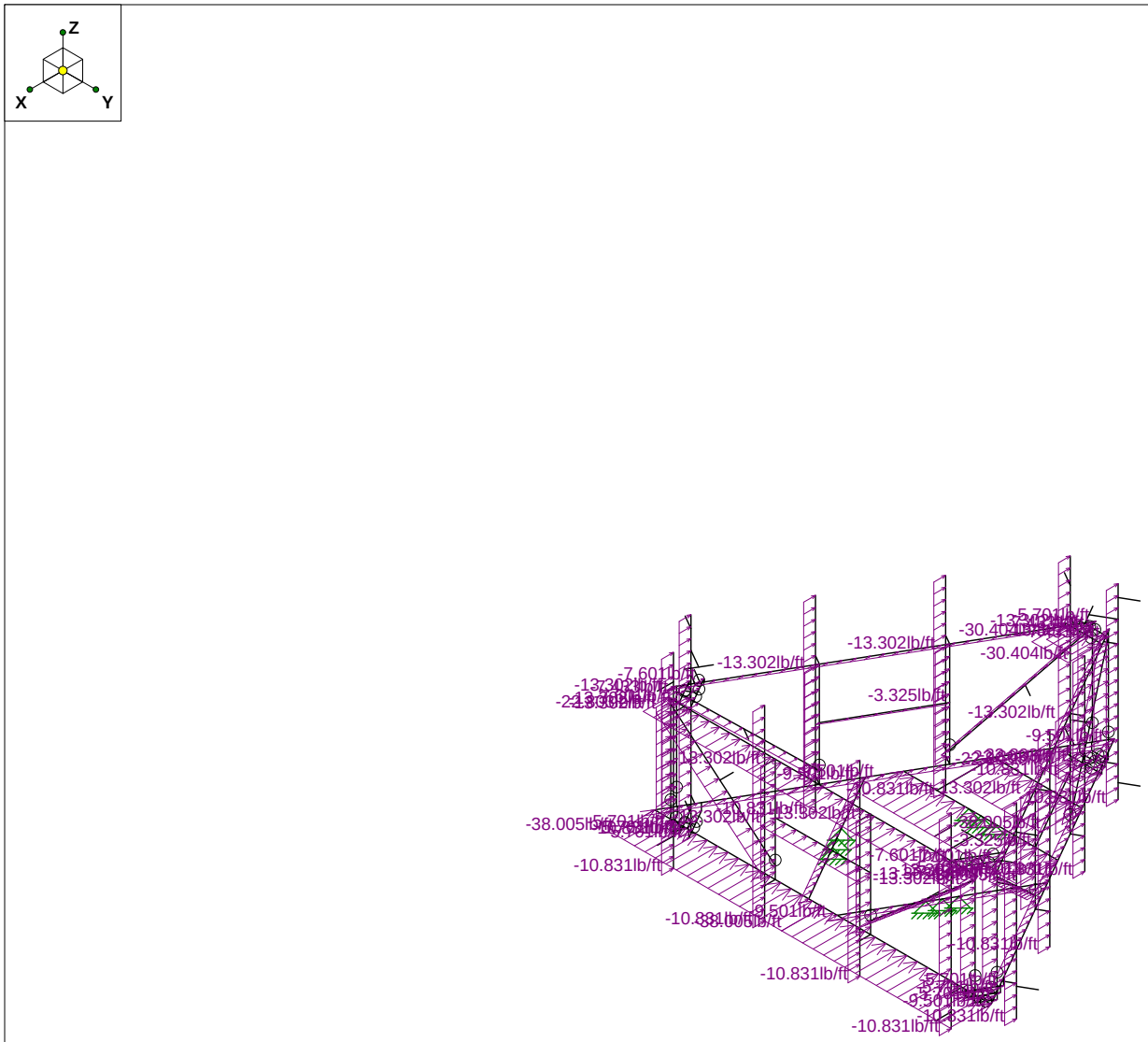
42284-CT03XC163-01-MA	Section Sets	42284-CT03XC163-01-MA.r3d



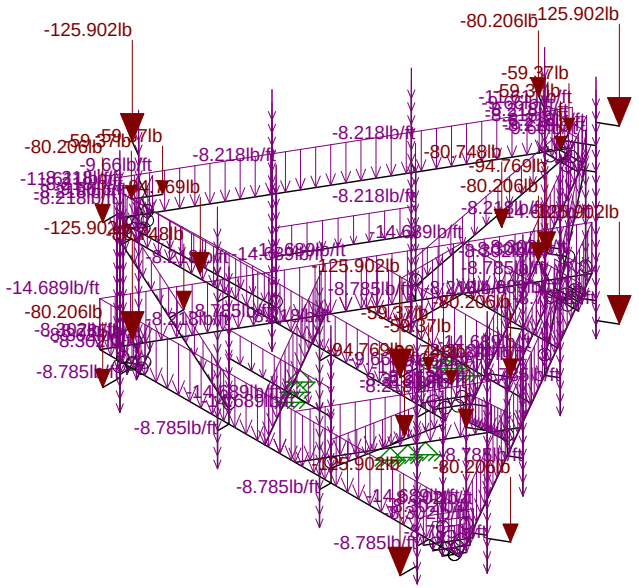
Loads: LC 1, DISPLAY (1.0D + 1.0W_0°)
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 5
SVG		June 19, 2018 at 2:36 PM
42284-CT03XC163-01-MA	Joint Loads - Dead and Normal Wind	42284-CT03XC163-01-MA.r3d



Loads: BLC 4, Structure Wind 0°
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 6
SVG		June 19, 2018 at 2:36 PM
42284-CT03XC163-01-MA	Distributed Load - Normal Wind	42284-CT03XC163-01-MA.r3d



Loads: BLC 2, Ice Dead
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 7
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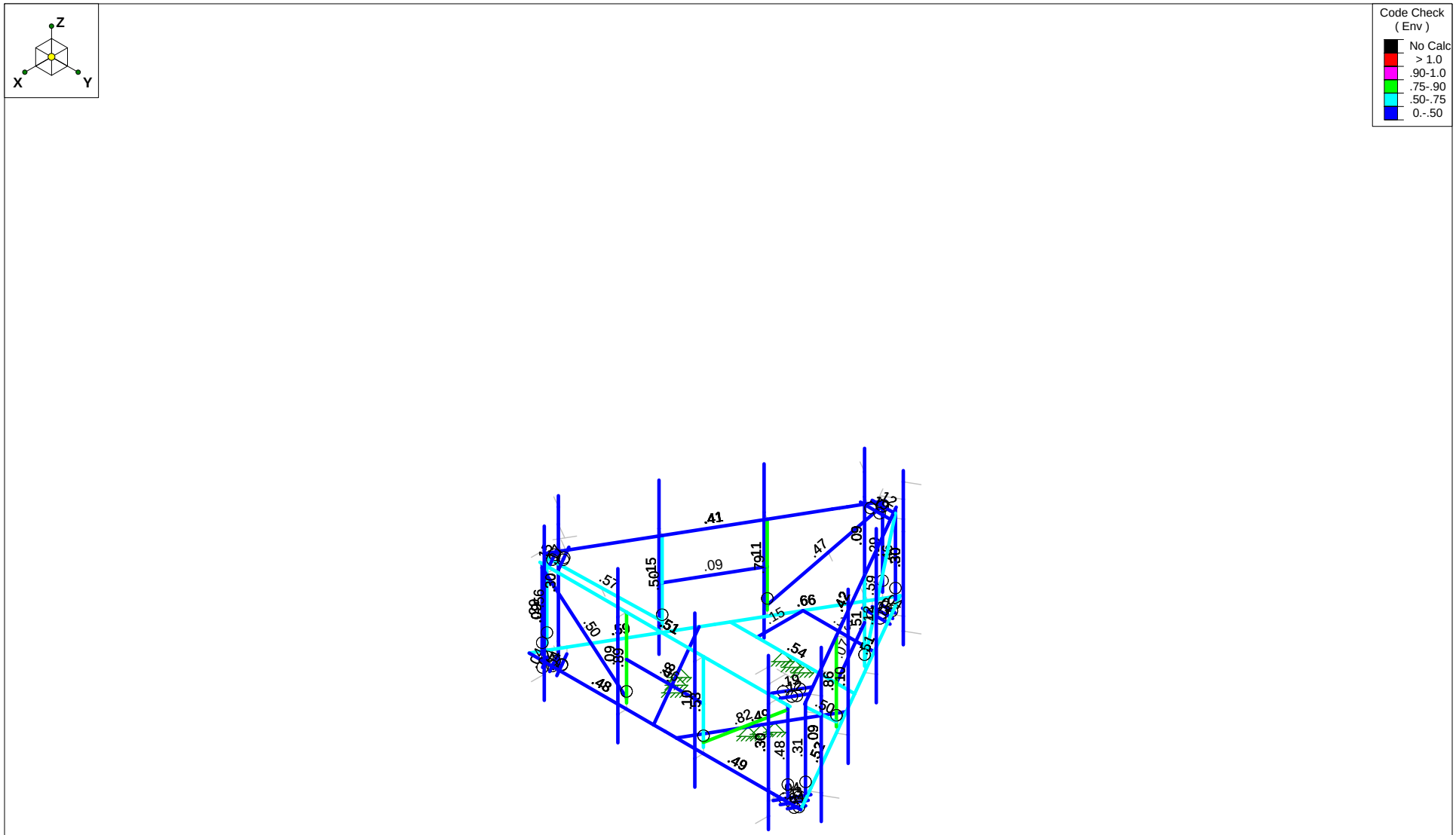
42284-CT03XC163-01-MA	Ice Dead Loads	42284-CT03XC163-01-MA.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 8
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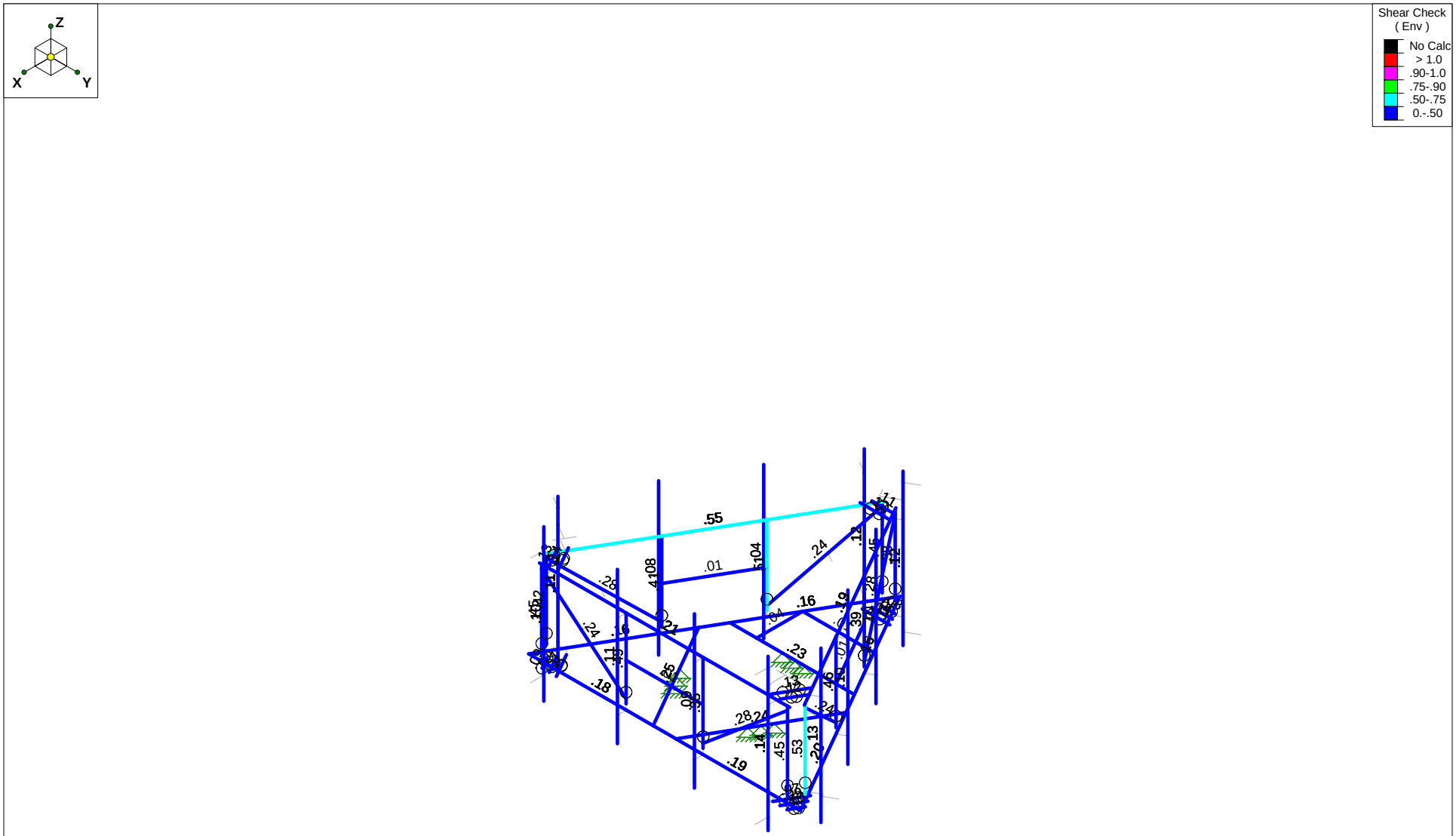

Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

CLS	42284-CT03XC163-CT CHESTER	SK - 9
SVG		June 19, 2018 at 2:37 PM
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Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Dead	DL			-1	28				
2	Ice Dead	RL				28		78		
4	Structure Wind 0°	None						75		
5	Structure Wind 30°	None						156		
6	Structure Wind 45°	None						156		
7	Structure Wind 60°	None						156		
8	Structure Wind 90°	None						67		
9	Structure Wind 120°	None						148		
10	Structure Wind 135°	None						156		
11	Structure Wind 150°	None						116		
12	Structure Wind w/ Ice ...	None						75		
13	Structure Wind w/ Ice ...	None						156		
14	Structure Wind w/ Ice ...	None						156		
15	Structure Wind w/ Ice ...	None						156		
16	Structure Wind w/ Ice ...	None						67		
17	Structure Wind w/ Ice ...	None						148		
18	Structure Wind w/ Ice ...	None						156		
19	Structure Wind w/ Ice ...	None						116		
20	Antenna Wind 0°	None				28				
21	Antenna Wind 30°	None				56				
22	Antenna Wind 45°	None				56				
23	Antenna Wind 60°	None				56				
24	Antenna Wind 90°	None				28				
25	Antenna Wind 120°	None				56				
26	Antenna Wind 135°	None				56				
27	Antenna Wind 150°	None				56				
28	Antenna Wind w/ Ice 0°	None				28				
29	Antenna Wind w/ Ice ...	None				56				
30	Antenna Wind w/ Ice ...	None				56				
31	Antenna Wind w/ Ice ...	None				56				
32	Antenna Wind w/ Ice ...	None				28				
33	Antenna Wind w/ Ice ...	None				56				
34	Antenna Wind w/ Ice ...	None				56				
35	Antenna Wind w/ Ice ...	None				56				
39	Maintenance Live 50...	OL1				1				
40	Maintenance Live 50...	OL2				1				
41	Maintenance Live 50...	OL3				1				
42	Maintenance Live 50...	OL4				1				

Load Combinations

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	DISPLAY (1.0D + 1.0W 0°)	Yes	Y		DL	1	20	1																		
2	1.4D	Yes	Y		DL	1.4																				
3	1.2D + 1.0W 0°	Yes	Y		DL	1.2	4	1	20	1																
4	1.2D + 1.0W_30°	Yes	Y		DL	1.2	5	1	21	1																
5	1.2D + 1.0W 45°	Yes	Y		DL	1.2	6	1	22	1																
6	1.2D + 1.0W_60°	Yes	Y		DL	1.2	7	1	23	1																
7	1.2D + 1.0W 90°	Yes	Y		DL	1.2	8	1	24	1																
8	1.2D + 1.0W_120°	Yes	Y		DL	1.2	9	1	25	1																
9	1.2D + 1.0W 135°	Yes	Y		DL	1.2	10	1	26	1																
10	1.2D + 1.0W_150°	Yes	Y		DL	1.2	11	1	27	1																
11	1.2D + 1.0W 180°	Yes	Y		DL	1.2	4	-1	20	-1																
12	1.2D + 1.0W_210°	Yes	Y		DL	1.2	5	-1	21	-1																
13	1.2D + 1.0W_225°	Yes	Y		DL	1.2	6	-1	22	-1																

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
14	1.2D + 1.0W_240°	Yes	Y		DL	1.2	7	-1	23	-1																
15	1.2D + 1.0W_270°	Yes	Y		DL	1.2	8	-1	24	-1																
16	1.2D + 1.0W_300°	Yes	Y		DL	1.2	9	-1	25	-1																
17	1.2D + 1.0W_315°	Yes	Y		DL	1.2	10	-1	26	-1																
18	1.2D + 1.0W_330°	Yes	Y		DL	1.2	11	-1	27	-1																
19	1.2D + 1.0Di + 1.0Wi_0°	Yes	Y		DL	1.2	12	1	28	1	RL	1														
20	1.2D + 1.0Di + 1.0Wi_30°	Yes	Y		DL	1.2	13	1	29	1	RL	1														
21	1.2D + 1.0Di + 1.0Wi_45°	Yes	Y		DL	1.2	14	1	30	1	RL	1														
22	1.2D + 1.0Di + 1.0Wi_60°	Yes	Y		DL	1.2	15	1	31	1	RL	1														
23	1.2D + 1.0Di + 1.0Wi_90°	Yes	Y		DL	1.2	16	1	32	1	RL	1														
24	1.2D + 1.0Di + 1.0Wi_120°	Yes	Y		DL	1.2	17	1	33	1	RL	1														
25	1.2D + 1.0Di + 1.0Wi_135°	Yes	Y		DL	1.2	18	1	34	1	RL	1														
26	1.2D + 1.0Di + 1.0Wi_150°	Yes	Y		DL	1.2	19	1	35	1	RL	1														
27	1.2D + 1.0Di + 1.0Wi_180°	Yes	Y		DL	1.2	12	-1	28	-1	RL	1														
28	1.2D + 1.0Di + 1.0Wi_210°	Yes	Y		DL	1.2	13	-1	29	-1	RL	1														
29	1.2D + 1.0Di + 1.0Wi_225°	Yes	Y		DL	1.2	14	-1	30	-1	RL	1														
30	1.2D + 1.0Di + 1.0Wi_240°	Yes	Y		DL	1.2	15	-1	31	-1	RL	1														
31	1.2D + 1.0Di + 1.0Wi_270°	Yes	Y		DL	1.2	16	-1	32	-1	RL	1														
32	1.2D + 1.0Di + 1.0Wi_300°	Yes	Y		DL	1.2	17	-1	33	-1	RL	1														
33	1.2D + 1.0Di + 1.0Wi_315°	Yes	Y		DL	1.2	18	-1	34	-1	RL	1														
34	1.2D + 1.0Di + 1.0Wi_330°	Yes	Y		DL	1.2	19	-1	35	-1	RL	1														
35	1.2D + 1.5Lm_1 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.056	20	.056	O...	1.5														
36	1.2D + 1.5Lm_1 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.056	21	.056	O...	1.5														
37	1.2D + 1.5Lm_1 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.056	22	.056	O...	1.5														
38	1.2D + 1.5Lm_1 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.056	23	.056	O...	1.5														
39	1.2D + 1.5Lm_1 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.056	24	.056	O...	1.5														
40	1.2D + 1.5Lm_1 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.056	25	.056	O...	1.5														
41	1.2D + 1.5Lm_1 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.056	26	.056	O...	1.5														
42	1.2D + 1.5Lm_1 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.056	27	.056	O...	1.5														
43	1.2D + 1.5Lm_1 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5														
44	1.2D + 1.5Lm_1 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5														
45	1.2D + 1.5Lm_1 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5														
46	1.2D + 1.5Lm_1 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5														
47	1.2D + 1.5Lm_1 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5														
48	1.2D + 1.5Lm_1 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5														
49	1.2D + 1.5Lm_1 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5														
50	1.2D + 1.5Lm_1 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5														
51	1.2D + 1.5Lm_2 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.056	20	.056	O...	1.5														
52	1.2D + 1.5Lm_2 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.056	21	.056	O...	1.5														
53	1.2D + 1.5Lm_2 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.056	22	.056	O...	1.5														
54	1.2D + 1.5Lm_2 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.056	23	.056	O...	1.5														
55	1.2D + 1.5Lm_2 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.056	24	.056	O...	1.5														
56	1.2D + 1.5Lm_2 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.056	25	.056	O...	1.5														
57	1.2D + 1.5Lm_2 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.056	26	.056	O...	1.5														
58	1.2D + 1.5Lm_2 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.056	27	.056	O...	1.5														
59	1.2D + 1.5Lm_2 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5														
60	1.2D + 1.5Lm_2 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5														
61	1.2D + 1.5Lm_2 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5														
62	1.2D + 1.5Lm_2 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5														
63	1.2D + 1.5Lm_2 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5														
64	1.2D + 1.5Lm_2 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5														
65	1.2D + 1.5Lm_2 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5														
66	1.2D + 1.5Lm_2 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5														
67	1.2D + 1.5Lm_3 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.056	20	.056	O...	1.5														
68	1.2D + 1.5Lm_3 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.056	21	.056	O...	1.5														
69	1.2D + 1.5Lm_3 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.056	22	.056	O...	1.5														
70	1.2D + 1.5Lm_3 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.056	23	.056	O...	1.5														

Load Combinations (Continued)

	Description	Solve	PDelta	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
71	1.2D + 1.5Lm_3 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.056	24	.056	O...	1.5												
72	1.2D + 1.5Lm_3 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.056	25	.056	O...	1.5												
73	1.2D + 1.5Lm_3 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.056	26	.056	O...	1.5												
74	1.2D + 1.5Lm_3 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.056	27	.056	O...	1.5												
75	1.2D + 1.5Lm_3 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
76	1.2D + 1.5Lm_3 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
77	1.2D + 1.5Lm_3 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
78	1.2D + 1.5Lm_3 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
79	1.2D + 1.5Lm_3 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
80	1.2D + 1.5Lm_3 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
81	1.2D + 1.5Lm_3 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
82	1.2D + 1.5Lm_3 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												
83	1.2D + 1.5Lm_4 + 1.0Wm_0°	Yes	Y		DL	1.2	4	.056	20	.056	O...	1.5												
84	1.2D + 1.5Lm_4 + 1.0Wm_30°	Yes	Y		DL	1.2	5	.056	21	.056	O...	1.5												
85	1.2D + 1.5Lm_4 + 1.0Wm_45°	Yes	Y		DL	1.2	6	.056	22	.056	O...	1.5												
86	1.2D + 1.5Lm_4 + 1.0Wm_60°	Yes	Y		DL	1.2	7	.056	23	.056	O...	1.5												
87	1.2D + 1.5Lm_4 + 1.0Wm_90°	Yes	Y		DL	1.2	8	.056	24	.056	O...	1.5												
88	1.2D + 1.5Lm_4 + 1.0Wm_120°	Yes	Y		DL	1.2	9	.056	25	.056	O...	1.5												
89	1.2D + 1.5Lm_4 + 1.0Wm_135°	Yes	Y		DL	1.2	10	.056	26	.056	O...	1.5												
90	1.2D + 1.5Lm_4 + 1.0Wm_150°	Yes	Y		DL	1.2	11	.056	27	.056	O...	1.5												
91	1.2D + 1.5Lm_4 + 1.0Wm_180°	Yes	Y		DL	1.2	4	-.0...	20	-.0...	O...	1.5												
92	1.2D + 1.5Lm_4 + 1.0Wm_210°	Yes	Y		DL	1.2	5	-.0...	21	-.0...	O...	1.5												
93	1.2D + 1.5Lm_4 + 1.0Wm_225°	Yes	Y		DL	1.2	6	-.0...	22	-.0...	O...	1.5												
94	1.2D + 1.5Lm_4 + 1.0Wm_240°	Yes	Y		DL	1.2	7	-.0...	23	-.0...	O...	1.5												
95	1.2D + 1.5Lm_4 + 1.0Wm_270°	Yes	Y		DL	1.2	8	-.0...	24	-.0...	O...	1.5												
96	1.2D + 1.5Lm_4 + 1.0Wm_300°	Yes	Y		DL	1.2	9	-.0...	25	-.0...	O...	1.5												
97	1.2D + 1.5Lm_4 + 1.0Wm_315°	Yes	Y		DL	1.2	10	-.0...	26	-.0...	O...	1.5												
98	1.2D + 1.5Lm_4 + 1.0Wm_330°	Yes	Y		DL	1.2	11	-.0...	27	-.0...	O...	1.5												

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Grating Channel	C5x9	Beam	Channel	A36 Gr.36	Typical	2.64	.624	8.89	.109
2	Support Rail	L3x3x5	Beam	Single Angle	A36 Gr.36	Typical	1.78	1.5	1.5	.06
3	Corner Plate	PL3X0.375	Beam	RECT	A36 Gr.36	Typical	1.125	.013	.844	.049
4	Bracing	1.75X1.75X.25	Beam	Single Angle	A36 Gr.36	Typical	.813	.227	.227	.015
5	Corner Angle	L2x2x4	Beam	Single Angle	A36 Gr.36	Typical	.944	.346	.346	.021
6	Corner Plate 2	PL4x0.375	Beam	RECT	A36 Gr.36	Typical	1.56	.02	2.08	.074
7	Mount Pipe	PIPE_2.375x0.12	Beam	Pipe	A36 Gr.36	Typical	.85	.542	.542	1.084
8	Standoff arm	HSS4x4x4	Beam	Tube	A36 Gr.36	Typical	3.37	7.8	7.8	12.8
9	Mount Pipe (additi...	PIPE_2.0	Beam	Tube	A53 Gr.B	Typical	1.02	.627	.627	1.25
10	Connecting rods	sr0.5	Beam	Tube	A36 Gr.36	Typical	.196	.003	.003	.006

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Mount Pipe	70			Lbyy						Lateral
2	M2	Mount Pipe	70			Lbyy						Lateral
3	M3	Mount Pipe	70			Lbyy						Lateral
4	M4	Mount Pipe	70			Lbyy						Lateral
5	M5	Mount Pipe	70			Lbyy						Lateral
6	M6	Mount Pipe	70			Lbyy						Lateral
7	M7	Mount Pipe	70			Lbyy						Lateral
8	M8	Mount Pipe	70			Lbyy						Lateral
9	M9	Mount Pipe	70			Lbyy						Lateral
10	M10	Mount Pipe	70			Lbyy						Lateral
11	M11	Mount Pipe	70			Lbyy						Lateral
12	M12	Mount Pipe	70			Lbyy						Lateral
13	M19	Corner Plate	9.5			Lbyy						Lateral
14	M20	Corner Plate	9.5			Lbyy						Lateral
15	M21	Corner Plate	9.5			Lbyy						Lateral
16	M22	Corner Plate	6.2			Lbyy						Lateral
17	M23	Corner Plate	12.8			Lbyy						Lateral
18	M25	Corner Plate	6.2			Lbyy						Lateral
19	M26	Corner Plate	12.8			Lbyy						Lateral
20	M28	Corner Plate	6.2			Lbyy						Lateral
21	M29	Corner Plate	12.8			Lbyy						Lateral
22	M34	Grating Cha...	57.697			Lbyy						Lateral
23	M35	Grating Cha...	63			Lbyy						Lateral
24	M36	Grating Cha...	63			Lbyy						Lateral
25	M37	Grating Cha...	63			Lbyy						Lateral
26	M39	Grating Cha...	57.697			Lbyy						Lateral
27	M40	Grating Cha...	63			Lbyy						Lateral
28	M41	Grating Cha...	63			Lbyy						Lateral
29	M43	Grating Cha...	57.697			Lbyy						Lateral
30	M44	Grating Cha...	63			Lbyy						Lateral
31	M45	Grating Cha...	21.389			Lbyy						Lateral
32	M50	Grating Cha...	33			Lbyy						Lateral
33	M87	Bracing	35.7			Lbyy			.65	.65		Lateral
34	M88	Bracing	35.7			Lbyy			.65	.65		Lateral
35	M89	Bracing	35.7			Lbyy			.65	.65		Lateral
36	M90	Bracing	51.042			Lbyy			.65	.65		Lateral
37	M91	Bracing	51.042			Lbyy						Lateral
38	M92	Bracing	51.042			Lbyy			.65	.65		Lateral
39	M93	Bracing	51.042			Lbyy			.65	.65		Lateral
40	M94	Bracing	51.042			Lbyy			.65	.65		Lateral
41	M95	Bracing	51.042			Lbyy			.65	.65		Lateral
42	M96	Support Rail	116		39.15	Lbyy						Lateral
43	M97	Bracing	36.5			Lbyy			.65	.8		Lateral
44	M98	Bracing	36.5			Lbyy			.8	.65		Lateral
45	M100	Support Rail	116		39.15	Lbyy						Lateral
46	M101	Bracing	36.5			Lbyy			.65	.8		Lateral
47	M102	Bracing	36.5			Lbyy			.8	.65		Lateral
48	M104	Support Rail	116		39.15	Lbyy						Lateral
49	M105	Bracing	36.5			Lbyy			.65	.8		Lateral
50	M106	Bracing	36.5			Lbyy			.8	.65		Lateral
51	M114	Bracing	36.5	19		Lbyy			.65	.8		Lateral
52	M116	Bracing	36.5		19	Lbyy			.8	.65		Lateral
53	M118	Bracing	36.5	19		Lbyy			.65	.8		Lateral
54	M120	Bracing	36.5		19	Lbyy			.8	.65		Lateral
55	M122	Bracing	36.5	19		Lbyy			.65	.8		Lateral
56	M124	Bracing	36.5		19	Lbyy			.8	.65		Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
57	M132	Corner Plat...	9.5			Lbyy						Lateral
58	M133	Corner Plat...	13.5			Lbyy						Lateral
59	M136	Corner Plat...	9.5			Lbyy						Lateral
60	M137	Corner Plat...	13.5			Lbyy						Lateral
61	M140	Corner Plat...	9.5			Lbyy						Lateral
62	M141	Corner Plat...	13.5			Lbyy						Lateral
63	M165A	Standoff arm	48			Lbyy						Lateral
64	M166A	Standoff arm	48			Lbyy						Lateral
65	M167A	Standoff arm	48			Lbyy						Lateral
66	M168A	Standoff arm	48			Lbyy						Lateral
67	M169	Standoff arm	48			Lbyy						Lateral
68	M171	Mount Pipe ...	126			Lbyy						Lateral
69	M173	Mount Pipe ...	126			Lbyy						Lateral
70	M175	Mount Pipe ...	126			Lbyy						Lateral
71	M177	Mount Pipe ...	126			Lbyy						Lateral
72	M179	Mount Pipe ...	126			Lbyy						Lateral
73	M181	Connecting ...	25.647			Lbyy						Lateral
74	M182	Connecting ...	25.647			Lbyy						Lateral
75	M185	Connecting ...	28.624			Lbyy						Lateral
76	M186	Connecting ...	28.624			Lbyy						Lateral
77	M188	Connecting ...	14.186			Lbyy						Lateral
78	M189	Connecting ...	14.186			Lbyy						Lateral

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N284	max	191.333	11	519.166	15	627.458	27	3170.002	7	-467.295	3	1638.173	15
2		min	-264.16	1	-519.465	7	186.106	1	-2646.552	15	-1925.895	28	-1671.325	7
3	N290A	max	182.218	28	118.158	22	768.671	14	1881.347	6	597.7	7	625.595	27
4		min	-183.776	1	-159.427	30	-511.905	6	-2621.078	14	-858.294	15	-682.067	1
5	N286A	max	162.482	3	170.252	21	385.736	21	1831.499	27	1507.087	33	707.133	11
6		min	-184.197	11	-148.063	29	100.224	1	-399.898	18	-1229.1	10	-693.245	18
7	N288	max	137.229	10	241.112	9	467.104	32	319.587	4	1827.788	20	870.3	16
8		min	-189.366	1	-241.772	17	118.363	8	-835.38	11	-320.757	11	-847.324	9
9	N81	max	1556.254	14	2662.298	6	2031.153	5	0	1	0	1	0	1
10		min	-1537.078	6	-2695.512	14	-7108.357	28	0	1	0	1	0	1
11	N82	max	3174.72	11	5.344	12	3428.962	11	0	1	0	1	0	1
12		min	-3183.877	3	-5.344	4	-7703.959	3	0	1	0	1	0	1
13	N93	max	1278.822	8	2214.985	8	2879.587	16	0	1	0	1	0	1
14		min	-1261.686	16	-2185.305	16	-7652.728	24	0	1	0	1	0	1
15	N94	max	2080.332	3	2458.995	18	8845.49	6	0	1	0	1	0	1
16		min	-2077.253	11	-2442.293	10	-6010.264	14	0	1	0	1	0	1
17	N95	max	2621.053	4	3515.564	13	8097.953	16	0	1	0	1	0	1
18		min	-2644.971	12	-3515.75	5	-5040.985	8	0	1	0	1	0	1
19	N96	max	3979.424	5	666.401	15	7694.279	17	0	1	0	1	0	1
20		min	-3979.118	13	-644.724	7	-4922.555	9	0	1	0	1	0	1
21	N97	max	1300.484	16	2813.912	14	9729.025	11	0	1	0	1	0	1
22		min	-1297.528	8	-2808.454	7	-6831.752	3	0	1	0	1	0	1
23	N98	max	1439.815	5	2806.942	15	9497.608	11	0	1	0	1	0	1
24		min	-1451.141	14	-2800.652	7	-6504.945	3	0	1	0	1	0	1
25	N99	max	3181.357	3	618.886	15	8627.046	6	0	1	0	1	0	1
26		min	-3155.708	11	-631.218	7	-5783.552	14	0	1	0	1	0	1
27	Totals:	max	7003.492	3	7062.013	15	8975.942	19						
28		min	-7003.477	11	-7062	7	2732.827	1						

Envelope AISC 14th(360-10): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	Dir	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
1	M116	1.75X1.7...	.886	34.599	10	.494	36.5	z	10	17909...	26325	512.686	1177....	...	H2-1
2	M120	1.75X1.7...	.864	34.599	4	.465	36.5	z	4	17909...	26325	512.686	1177....	...	H2-1
3	M91	1.75X1.7...	.816	24.458	12	.282	0	z	21	8209....	26325	512.686	1139....	...	H2-1
4	M124	1.75X1.7...	.791	34.599	15	.506	36.5	z	15	17909...	26325	512.686	1177....	...	H2-1
5	M179	PIPE_2.0	.775	122.063	7	.052	60.375		11	8922....	32130	1871....	1871....	...	H1-1b
6	M41	C5x9	.660	57.75	5	.160	63	z	12	35337...	85536	1909....	11853	...	H1-1b
7	M44	C5x9	.589	5.25	13	.160	0	z	12	35337...	85536	1909....	11853	...	H1-1b
8	M93	1.75X1.7...	.588	24.458	6	.281	0	z	31	16010...	26325	512.686	1142....	...	H2-1
9	M95	1.75X1.7...	.566	24.458	17	.284	0	z	31	16010...	26325	512.686	1147....	...	H2-1
10	M106	1.75X1.7...	.563	0	18	.420	1.521	z	3	17909...	26325	512.686	1177....	...	H2-1
11	M39	C5x9	.535	33.657	3	.227	24.642	y	6	40751...	85536	1909....	11853	...	H1-1b
12	M114	1.75X1.7...	.526	34.599	12	.355	36.5	y	12	23786...	26325	512.686	1151....	1	H2-1
13	M36	C5x9	.524	57.75	3	.201	53.813	y	12	35337...	85536	1909....	11853	...	H1-1b
14	M40	C5x9	.514	5.25	3	.160	10.5	y	15	35337...	85536	1909....	11853	...	H1-1b
15	M96	L3x3x5	.512	82.167	3	.210	111.167	y	3	10157...	57672	2014....	4062....	...	H2-1
16	M118	1.75X1.7...	.509	34.599	7	.391	35.359	y	7	23786...	26325	512.686	1151....	1	H2-1
17	M92	1.75X1.7...	.501	24.458	5	.241	0	y	27	16010...	26325	512.686	1147....	...	H2-1
18	M122	1.75X1.7...	.500	34.599	18	.410	34.599	y	18	23786...	26325	512.686	1151....	1	H2-1
19	M90	1.75X1.7...	.499	51.042	9	.241	0	y	32	16010...	26325	512.686	1177....	...	H2-1
20	M34	C5x9	.488	24.041	9	.245	24.642	y	11	40751...	85536	1909....	11853	...	H1-1b
21	M35	C5x9	.488	5.25	13	.188	9.188	y	4	35337...	85536	1909....	11853	...	H1-1b
22	M37	C5x9	.483	57.75	14	.180	57.094	y	10	35337...	85536	1909....	11853	...	H1-1b
23	M98	1.75X1.7...	.481	0	12	.452	1.521	z	14	17909...	26325	512.686	1177....	...	H2-1
24	M43	C5x9	.480	33.657	13	.254	33.056	y	11	40751...	85536	1909....	11853	...	H1-1b
25	M94	1.75X1.7...	.466	51.042	14	.239	0	y	22	16010...	26325	512.686	1177....	...	H2-1
26	M102	1.75X1.7...	.464	0	6	.381	1.521	z	8	17909...	26325	512.686	1177....	...	H2-1
27	M100	L3x3x5	.419	39.875	13	.192	111.167	y	14	10157...	57672	2014....	3998....	...	H2-1
28	M104	L3x3x5	.414	12.083	6	.552	108.75	z	25	10157...	57672	2014....	4273....	...	H2-1
29	M101	1.75X1.7...	.312	0	3	.530	1.521	y	3	20413...	26325	512.686	1177....	...	H2-1
30	M12	PIPE_2....	.300	51.042	8	.106	50.313		9	18376...	27543...	1649....	1649....	...	H1-1b
31	M4	PIPE_2....	.300	51.042	3	.139	50.313		12	18376...	27543...	1649....	1649....	...	H1-1b
32	M8	PIPE_2....	.300	51.042	14	.120	50.313		15	18376...	27543...	1649....	1649....	...	H1-1b
33	M105	1.75X1.7...	.293	0	15	.451	1.521	y	14	20413...	26325	512.686	1177....	...	H2-1
34	M97	1.75X1.7...	.286	0	8	.455	1.521	y	8	20413...	26325	512.686	1177....	...	H2-1
35	M133	PL4x0.375	.189	13.5	18	.127	13.5	y	3	23914...	50544	410.4	4212	...	H1-1b
36	M137	PL4x0.375	.185	13.5	12	.117	13.5	y	14	23914...	50544	410.4	4212	...	H1-1b
37	M141	PL4x0.375	.174	0	11	.140	0	y	10	23914...	50544	410.4	4212	...	H1-1b
38	M45	C5x9	.153	21.389	4	.041	10.917	y	19	77249...	85536	1909....	11853	...	H1-1b
39	M140	PL4x0.375	.151	4.75	3	.128	4.75	y	7	34891...	50544	410.4	4212	...	H1-1b
40	M11	PIPE_2....	.148	11.667	5	.081	11.667		15	18376...	27543...	1649....	1649....	...	H1-1b
41	M169	HSS4x4x4	.135	0	7	.136	0	z	7	10361...	109188	12663	12663	...	H1-1b
42	M50	C5x9	.125	33	4	.013	19.594	y	32	67113...	85536	1909....	11853	...	H1-1b
43	M136	PL4x0.375	.122	4.75	11	.115	4.75	y	14	34891...	50544	410.4	4212	...	H1-1b
44	M132	PL4x0.375	.116	4.75	17	.122	4.75	y	3	34891...	50544	410.4	4212	...	H1-1b
45	M7	PIPE_2....	.115	11.667	10	.104	11.667		4	18376...	27543...	1649....	1649....	...	H1-1b
46	M10	PIPE_2....	.107	11.667	13	.044	11.667		15	18376...	27543...	1649....	1649....	...	H1-1b
47	M6	PIPE_2....	.098	11.667	18	.096	11.667		7	18376...	27543...	1649....	1649....	...	H1-1b
48	M3	PIPE_2....	.096	11.667	15	.086	11.667		10	18376...	27543...	1649....	1649....	...	H1-1b
49	M2	PIPE_2....	.094	11.667	7	.107	50.313		11	18376...	27543...	1649....	1649....	...	H1-1b
50	M89	1.75X1.7...	.090	0	3	.013	0	y	5	20640...	26325	512.686	1177....	...	H2-1
51	M5	PIPE_2....	.088	51.042	6	.134	50.313		4	18376...	27543...	1649....	1649....	...	H1-1b
52	M9	PIPE_2....	.088	51.042	16	.117	50.313		15	18376...	27543...	1649....	1649....	...	H1-1b
53	M1	PIPE_2....	.088	51.042	11	.103	50.313		10	18376...	27543...	1649....	1649....	...	H1-1b
54	M88	1.75X1.7...	.070	0	7	.015	0	y	11	20640...	26325	512.686	1177....	...	H2-1
55	M87	1.75X1.7...	.062	35.7	8	.014	0	y	14	20640...	26325	512.686	1177....	...	H2-1
56	M25	PL3X0.3...	.040	3.1	10	.088	3.1	y	18	30669...	36450	284.766	2278....	...	H1-1b

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	Dir	LC	phi*Pn...	phi*Pn...	phi*M...	phi*M...	...	Eqn
57	M29	PL3X0.3...	.039	6.4	3	.074	6.4	y	12	17460.5	36450	284.766	2278....	...	H1-1b
58	M22	PL3X0.3...	.039	3.1	7	.081	3.1	y	7	30669...	36450	284.766	2278....	...	H1-1b
59	M28	PL3X0.3...	.037	3.1	5	.102	3.1	y	4	30669...	36450	284.766	2278....	...	H1-1b
60	M26	PL3X0.3...	.037	6.4	10	.067	6.4	y	11	17460.5	36450	284.766	2278....	...	H1-1b
61	M23	PL3X0.3...	.030	6.4	7	.054	6.4	y	7	17460.5	36450	284.766	2278....	...	H1-1b
62	M20	PL3X0.3...	.025	4.75	3	.085	4.75	y	12	24301...	36450	284.766	2278....	...	H1-1b
63	M19	PL3X0.3...	.023	4.75	8	.072	0	y	10	24301...	36450	284.766	2278....	...	H1-1b
64	M21	PL3X0.3...	.019	4.75	14	.063	4.75	y	7	24301...	36450	284.766	2278....	...	H1-1b

CLS Group
Bolt Strength Check
AISC 14th Edition (360-10)

Member/Node Number	Load Comb.	Tensile Load, T_u (kips)	Shear Load, V_u (kips)	Bolt Diameter (in)	Number of Bolts	Shear Planes per Bolt	Bolt Tensile Strength, F_{nt} (ksi)	Bolt Shear Strength, F_{nv} (ksi)	Connected Member Thickness (in)	Connected Member Edge Clear Distance (in)	Connected Member Ultimate Strength, F_u (ksi)	Bolt Tensile Usage	Bolt Shear Usage	Member Bearing Usage
M35 (Platform base connection in the middle)	15	0.092	2.019	0.75	3	1	90	54	0.5	0.75	58	**0%**	**4%**	**3%**

Date: **July 24, 2018**

Charles McGuirt
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Engineered Tower Solutions
2624 Leighton Ridge Dr., Suite 100
Wake Forest, NC 27587
(919) 782-2710

Subject: Structural Analysis Report

Carrier Designation:	***Sprint PCS* Co-Locate**	
	Carrier Site Number:	CT03XC163
	Carrier Site Name:	CT CHESTER
Crown Castle Designation:	**Crown Castle BU Number:**	800515
	Crown Castle Site Name:	CT CHESTER CAC 800515
	Crown Castle JDE Job Number:	447466
	Crown Castle Work Order Number:	1602083
	Crown Castle Application Number:	396835 Rev. 4
Engineering Firm Designation:	**Engineered Tower Solutions Project Number:**	183224.14
Site Data:	**49 Wig Hill Road, Chester, Middlesex County, CT**	
	Latitude *41° 24' 13.93"*, Longitude *-72° 28' 20.82"*	
	150 Foot - Monopole Tower	

Dear Charles McGuirt,

Engineered Tower Solutions 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 1221008, in accordance with application 396835, revision 4.

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 130 mph converted to a nominal 3-second gust wind speed of 101 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B with a topographic factor of 1 and Risk Category II were used in this analysis.

All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at *Engineered Tower Solutions* 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.

Structural analysis prepared by:

J. Scott Hilgoe, PE - Senior Structural Engineer

Respectfully submitted by:

F. Geoff Bost, PE - Owner / President

STATE OF CONNECTICUT
FREDERIC BOST
PEN.0029529
LICENSED
PROFESSIONAL ENGINEER

7/24/18

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by Engineered Endeavors, INC. in August of 1998. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by GPD in February of 2005. Reinforcement consists of the addition of baseplate stiffeners.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 101 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B with topographic category 1 and crest height of 0 feet.

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
150.0	150.0	3	Alcatel Lucent	PCS 1900MHZ 4X45W-65MHZ	4	1-1/4	-
		6	Alcatel Lucent	RRH2X50-800			
		3	Alcatel Lucent	TD-RRH8X20-25			
		3	Commscope	NNVV-65B-R4			
		3	RFS Celwave	APXVTM14-ALU-I20			

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
150.0	152.0	6	Decibel	DB980H90E-M	6	1-5/8	3
	150.0	1	Tower Mounts	Platform Mount (LP 101-1)	-	-	1
148.0	162.0	1	DBSpectra	DS4C06F36D-N	1	7/8	2
	163.0	1	RFS Celwave	PD1142-1	4	7/8	1
	159.0	1	Decibel	DB636-A			
		1	RFS Celwave	PD1142-1			
	148.0	1	Tower Mounts	Side Arm Mount [SO 701-1]			
		1	Tower Mounts	Side Arm Mount [SO 701-3]			
139.0	142.0	3	Alcatel Lucent	B13 RRH 4X30	2	1-1/4	2
		3	Alcatel Lucent	B66A RRH4X45			
		6	Antel	LPA-80080-4CF-EDIN-0			
		6	Commscope	SBNHH-1D65B (No Mount Pipe)			
		2	RFS Celwave	DB-B1-6C-12AB-0Z			
		6	RFS Celwave	FD9R6004/2C-3L	12	1-5/8	1
	139.0	1	Tower Mounts	Platform Mount (LP 101-1)	3	13/16	
134.0	134.0	3	Ericsson	TME-RRUS-11	12	1-1/4	1
		1	Tower Mounts	Side Arm Mount [SO 102-3]	1	7/8	
132.0	142.0	1	Decibel	DB810KE-YP	1	3/8	

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	132.0	1	Andrew	DBXNH-6565B-R2M	2 1	7/16 2" Conduit	
		3	Ericsson	RRUS 12			
		3	Kathrein	782 10253			
		2	KMW Communications	AM-X-CD-16-65-00T-RET			
		6	Powerwave Technologies	7020.00			
		6	Powerwave Technologies	7770.00			
		6	Powerwave Technologies	LGP21401			
		8	Powerwave Technologies	LGP21901			
		1	Raycap	DC6-48-60-18-8F			
		1	Tower Mounts	Platform Mount (LP 101-1)			
116.0	120.0	2	GPS	GPS_A	12 2	1-1/4 1/2	4
	118.0	12	Allgon	7120.16			
	116.0	1	Tower Mounts	Platform Mount (LP 101-1)			
106.0	108.0	3	Commscope	ATBT-BOTTOM-24V	12	1-5/8	1
		3	Commscope	LNX-6515DS-VTM			
		3	RFS Celwave	APX18-206516L			
	106.0	1	Tower Mounts	Platform Mount (LP 101-1)			
96.0	96.0	3	RFS Celwave	APXV18-206517LS w/ Mount Pipe	6	1-1/4	1
		1	Tower Mounts	Side Arm Mount [SO 104-3]			
75.0	75.0	1	GPS	GPS_RESERVED	1	1/2	1
		1	Tower Mounts	Side Arm Mount [SO 701-1]			
70.0	70.0	1	Kathrein	PR-950	1	WEP65	1
		1	Tower Mounts	Side Arm Mount [SO 104-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment to be removed. Not considered in this analysis.
4) Abandoned Equipment. Considered in this analysis.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti, 10/27/1998	2301672	CCISITES
4-POST-MODIFICATION INSPECTION	GPD, 2006185.04, 10/05/2006	1285403	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 4123 Rev. 1, 04/25/1999 & TEP, 081974, 07/31/2008 (Mapping)	671930	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 4123, 08/07/1998	671925	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD, 2005078.33, 02/24/2005	1037702	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. Engineered Tower Solutions should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 122.92	Pole	TP28.83x21x0.1875	1	-10.12	1072.37	45.8	Pass
L2	122.92 - 84.26	Pole	TP39.51x27.2493x0.375	2	-22.88	3320.64	46.5	Pass
L3	84.26 - 41.55	Pole	TP50.99x37.1855x0.4375	3	-37.34	4873.49	51.2	Pass
L4	41.55 - 0	Pole	TP62x48.1364x0.5	4	-60.26	6834.14	48.8	Pass
							Summary	
						Pole (L3)	51.2	Pass
						Rating =	51.2	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	47.0	Pass
1	Base Plate	0	34.2	Pass
1	Base Foundation	0	62.3	Pass
1	Base Foundation Soil Interaction	0	50.6	Pass

Structure Rating (max from all components) =	**62.3%**

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

4.1) Recommendations

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

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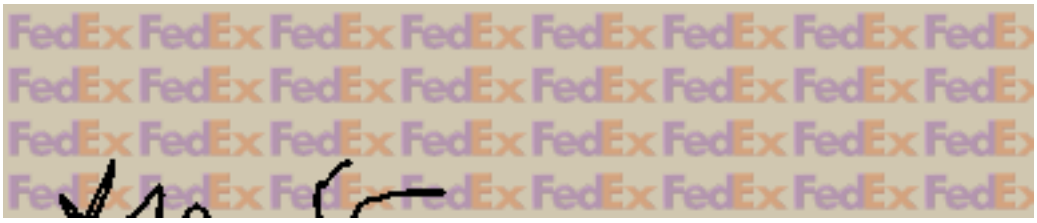
The following is the proof-of-delivery for tracking number **773525168332**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	S.ETCHAN	**Delivery location:**	203 MIDDLESEX AVE CHESTER, CT 06412
Service type:	FedEx Standard Overnight	**Delivery date:**	Oct 22, 2018 14:19
Special Handling:	Deliver Weekday		



Shipping Information:

Tracking number:	773525168332	**Ship date:**	Oct 19, 2018
		Weight:	1.0 lbs/0.5 kg

Recipient:
Ron Rose
Town of Chester
203 Middlesex Ave.
CHESTER, CT 06412 US

Shipper:
Kristian McKay
3530 Toringdon Way
STE 300
CHARLOTTE, NC 28277 US

Reference 1766.6680

Thank you for choosing FedEx.

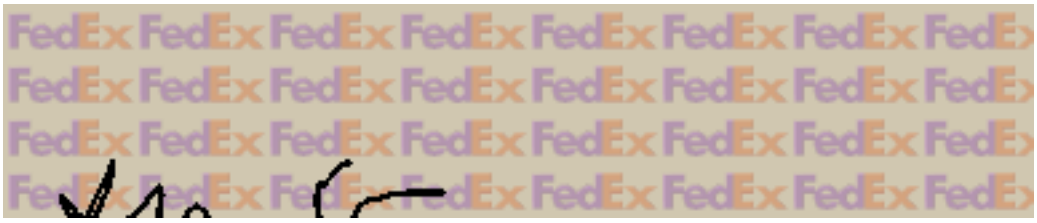
October 23,2018

Dear Customer:

The following is the proof-of-delivery for tracking number **773525161923**.

Delivery Information:

Status:	Delivered	**Delivered to:**	Receptionist/Front Desk
Signed for by:	S.ETCHAN	**Delivery location:**	203 MIDDLESEX AVE CHESTER, CT 06412
Service type:	FedEx Standard Overnight	**Delivery date:**	Oct 22, 2018 14:19
Special Handling:	Deliver Weekday		



Shipping Information:

Tracking number:	773525161923	**Ship date:**	Oct 19, 2018
		Weight:	1.0 lbs/0.5 kg

Recipient:
Laren Gister
Town of Chester
203 Middlesex Ave.
CHESTER, CT 06412 US

Shipper:
Kristian McKay
3530 Toringdon Way
STE 300
CHARLOTTE, NC 28277 US

Reference 1766.6680

Thank you for choosing FedEx.