HPC Wireless Services
46 Mill Plain Rd.
Floor 2
Danbury, CT, 06811
P.: 203.797.1112

August 25, 2014

VIA EMAIL AND OVERNIGHT DELIVERY

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

RE: Sprint Spectrum, L.P. – Notice of Exempt Modification
1065 Wintergreen Avenue, Hamden, CT (aka 142 Baldwin Drive, New Haven, CT)

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Sprint Spectrum, L.P. ("Sprint"). Sprint is undertaking modifications to certain existing sites in its Connecticut network in order to implement updated technology. In order to do so, Sprint will modify antenna and equipment configurations at a number of existing sites. Please accept this letter and attachments as notification, pursuant to R.C.S.A. Section 16-50j-73, of construction which constitutes an exempt modification pursuant to R.C.S.A Section 16-50j-72(b)(2). In compliance with R.C.S.A. Section 16-50j-73, a copy of this letter and attachments is being sent to the Mayor of Hamden.

Sprint plans to modify the existing facility at 1065 Wintergreen Avenue, owned by the Connecticut State Police (coordinates 41°20'43.64"N, -72°58'14.67"W). Attached are drawings depicting the planned changes, and documentation of the structural sufficiency of the tower (subject to the proposed tower modifications as indicated in SK-1 of the structural analysis) to accommodate the revised antenna configuration. Also included is a power density calculation reflecting the modification to Sprint's operations at the site.

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") Section 16-50i(d) because the general physical characteristics of the facility will not be significantly changed. Rather, the planned changes to the facility fall squarely within those activities explicitly provided for in R.C.S.A. Section 16-50j-72(b)(2).

1. The height of the overall structure will be unaffected. Sprint proposes to add three (3) antennas and three (3) remote radio heads, all at a centerline height of approximately 72' above the tower base. Additionally, Sprint will install twenty-seven (27) jumper cables, three (3) RET control cables and one (1) new hybrid cable.

2. The proposed changes will not extend the site boundaries. Sprint will install additional batteries and new rectifiers in existing cabinets. Thus, there will be no effect on the site compound or Sprint's leased area.

3. The proposed changes will not increase the noise level at the existing facility by six decibels or more. The incremental effect of the proposed changes will be negligible.

4. The changes to the facility will not increase the calculated "worst case" power density for the combined operations at the site to a level at or above the applicable standard for uncontrolled environments as calculated for a mixed frequency site. As indicated in the attached power density calculations, Sprint's operations at the site will result in a power density of 5.61%; the combined site operations will result in a total power density of 35.04%.

Please feel free to call me with any questions or concerns regarding this matter. Thank you for your consideration.

Respectfully submitted,

Eric Dahl, Consultant
edahl@comcast.net
860-227-1975

Attachments

cc: Honorable Scott D. Jackson, Mayor, Town of Hamden
State of CT, Dept. of Public Safety, Division of State Police, Property Owner

Sprint

PROJECT: 2.5 EQUIPMENT DEPLOYMENT

SITE NAME: WEST ROCK RIDGE - CT STATE POLICE

SITE CASCADE: CT03XC003

SITE ADDRESS: 1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

SITE TYPE: SELF SUPPORT TOWER

MARKET: SOUTHERN CONNECTICUT

SITE INFORMATION

PROPERTY OWNER:
STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC SAFETY,
DIVISION OF STATE POLICE
1111 COUNTRY CLUB ROAD
MIDDLETOWN, CT 06457

LATITUDE:
41.345432°

LONGITUDE:
-72.970711°

COUNTY:
NEW HAVEN

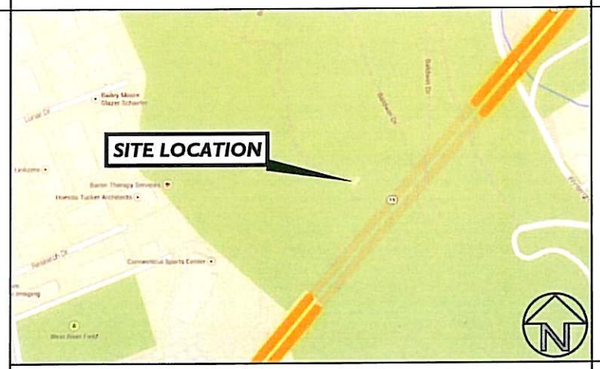
ZONING DISTRICT:
CITY OF NEW HAVEN
CONNECTICUT SITING COUNCIL

AAV PROVIDER:
AT&T

POWER COMPANY:
CONNECTICUT LIGHT AND POWER
PHONE # 800-922-4455

SPRINT CONSTRUCTION MANAGER:
GARY WOOD
860-940-9168
GARY.WOOD@SPRINT.COM

AREA MAP



LOCATION MAP

PROJECT DISCRIPTION

SPRINT PROPOSED TO MODIFY AN EXISTING UNMANNED TELECOMMUNICATIONS FACILITY.

INSTALL (1) NEW BBU IN EXISTING MMBTS CABINET

INSTALL (3) NEW RECTIFIERS IN EXISTING MMBTS CABINET

INSTALL (8) NEW BATTERIES IN EXISTING BBU CABINET

INSTALL (3) NEW PANEL ANTENNAS

INSTALL (3) NEW RRH'S NEAR ANTENNA

INSTALL (27) NEW JUMPER CABLES

INSTALL (1) NEW FIBER CABLE

APPLICABLE CODES

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.

1. INTERNATIONAL BUILDING CODE (2012 IBC)
2. TIA-EIA-222-G OR LATEST EDITION
3. NFPA 780 - LIGHTNING PROTECTION CODE
4. 2011 NATIONAL ELECTRIC CODE OR LATEST EDITION
5. ANY OTHER NATIONAL OR LOCAL APPLICABLE CODES MOST RECENT EDITIONS.
6. CT BUILDING CODE
7. LOCAL BUILDING CODE
8. CITY/COUNTY ORDINANCES

SHEET INDEX

DWG.	DESCRIPTION	REV.
T-1	COVER SHEET	00
SP-1	SPRINT SPECIFICATIONS (SHEET 1 OF 3)	00
SP-2	SPRINT SPECIFICATIONS (SHEET 2 OF 3)	00
SP-3	SPRINT SPECIFICATIONS (SHEET 3 OF 3)	00
A-1	SITE PLAN	00
A-2	BUILDING ELEVATION AND CABLE PLAN	00
A-3	ANTENNA PLAN AND MOUNTING DETAILS	00
A-4	RF DATA SHEET AND EQUIPMENT INFORMATION	00
A-5	WIRING DIAGRAMS	00
A-6	RF DATA SHEET	00
A-7	EQUIPMENT SPECIFICATIONS	00
E-1	ONE-LINE DIAGRAM	00
G-1	GROUNDING DETAILS	00

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KLR	MLB
00	3-19-14	INITIAL SUBMISSION	CM	KLR

Sprint
6580 SPRINT PARKWAY
OVERLAND PARK, KANSAS 66251
(517) 436-7466

A SAXON DESIGN GROUP
244 RIVERS EDGE LANE
TOMS RIVER, NJ 08755
(732) 678-0155

ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L. BOHLINGER · 20405 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE:

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP35

CLIENT ID No: CT03XC003

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
COVER SHEET

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: T-1

24"x36" SHEETS - SIGN & SEAL AREA

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 – SCOPE OF WORK

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT CONSTRUCTION STANDARDS FOR WIRELESS SITES, CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 PRECEDENCE: SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE. NOTIFY SPRINT CONSTRUCTION MANAGER IF THIS OCCURS.

1.4 NATIONALLY RECOGNIZED CODES AND STANDARDS:

A. THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL AND LOCAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
1. GR–78–CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
2. GR–1089 CORE, ELECTROMAGNETIC COMPATIBILITY AND ELECTRICAL SAFETY –GENERIC CRITERIA FOR NETWORK TELECOMMUNICATIONS EQUIPMENT.
3. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC") AND NFPA 101 (LIFE SAFETY CODE).
4. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM)
5. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE)
6. AMERICAN CONCRETE INSTITUTE (ACI)
7. AMERICAN WIRE PRODUCERS ASSOCIATION (AWPA)
8. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
9. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
10. PORTLAND CEMENT ASSOCIATION (PCA)
11. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
12. BRICK INDUSTRY ASSOCIATION (BIA)
13. AMERICAN WELDING SOCIETY (AWS)
14. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
15. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
16. DOOR AND HARDWARE INSTITUTE (DHI)
17. OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)
18. APPLICABLE BUILDING CODES INCLUDING UNIFORM BUILDING CODE, SOUTHERN BUILDING CODE, BOCA, AND THE INTERNATIONAL BUILDING CODE.

1.5 DEFINITIONS:

A. WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B. COMPANY: SPRINT CORPORATION
C. ENGINEER: SYNONYMOUS WITH ARCHITECT & ENGINEER AND "A&E". THE DESIGN PROFESSIONAL HAVING PROFESSIONAL RESPONSIBILITY FOR DESIGN OF THE PROJECT.
D. CONTRACTOR: CONSTRUCTION CONTRACTOR; CONSTRUCTION VENDOR; INDIVIDUAL OR ENTITY WHO AFTER EXECUTION OF A CONTRACT IS BOUND TO ACCOMPLISH THE WORK.
E. THIRD PARTY VENDOR OR AGENCY: A VENDOR OR AGENCY ENGAGED SEPARATELY BY THE COMPANY, A&E, OR CONTRACTOR TO PROVIDE MATERIALS OR TO ACCOMPLISH SPECIFIC TASKS RELATED TO BUT NOT INCLUDED IN THE WORK.
F. OFCI: OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT.
G. CONSTRUCTION MANAGER – ALL PROJECTS RELATED COMMUNICATION TO FLOW THROUGH SPRINT REPRESENTATIVE IN CHARGE OF PROJECT...

1.6 SITE FAMILIARITY: CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE SPRINT CONSTRUCTION MANAGER PRIOR TO THE COMMENCEMENT OF WORK. NO COMPENSATION WILL BE AWARDED BASED ON CLAIM OF LACK OF KNOWLEDGE OR FIELD CONDITIONS.

1.7 POINT OF CONTACT: COMMUNICATION BETWEEN SPRINT AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE SPRINT CONSTRUCTION MANAGER APPOINTED TO MANAGE THE PROJECT FOR SPRINT.

1.8 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. THE CONTRACTOR SHALL EMPLOY A COMPETENT SUPERINTENDENT WHO SHALL BE IN ATTENDANCE AT THE SITE AT ALL TIMES DURING PERFORMANCE OF THE WORK.

1.9 DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE: THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS, STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. THE JOBSITE DRAWINGS, SPECIFICATIONS AND DETAILS SHALL BE CLEARLY MARKED DAILY IN RED PENCIL WITH ANY CHANGES IN CONSTRUCTION OVER WHAT IS DEPICTED IN THE DOCUMENTS. AT CONSTRUCTION COMPLETION, THIS JOBSITE MARKUP SET SHALL BE DELIVERED TO THE COMPANY OR COMPANY'S DESIGNATED REPRESENTATIVE TO BE FORWARDED TO THE COMPANY'S A&E VENDOR FOR PRODUCTION OF "AS–BUILT" DRAWINGS.
B. DETAILS ARE INTENDED TO SHOW DESIGN INTENT. MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK.
C . DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE. SPACING BETWEEN EQUIPMENT IS THE REQUIRED CLEARANCE. SHOULD THERE BE ANY QUESTIONS REGARDING THE CONTRACT DOCUMENTS, EXISTING CONDITIONS AND/OR DESIGN INTENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CLARIFICATION FROM THE SPRINT CONSTRUCTION MANAGER PRIOR TO PROCEEDING WITH THE WORK.

1.10 USE OF JOB SITE: THE CONTRACTOR SHALL CONFINE ALL CONSTRUCTION AND RELATED OPERATIONS INCLUDING STAGING AND STORAGE OF MATERIALS AND EQUIPMENT, PARKING, TEMPORARY FACILITIES, AND WASTE STORAGE TO THE LEASE PARCEL UNLESS OTHERWISE PERMITTED BY THE CONTRACT DOCUMENTS.

1.11 UTILITIES SERVICES: WHERE NECESSARY TO CUT EXISTING PIPES, ELECTRICAL WIRES, CONDUITS, CABLES, ETC., OF UTILITY SERVICES, OR OF FIRE PROTECTION OR COMMUNICATIONS SYSTEMS, THEY SHALL BE CUT AND CAPPED AT SUITABLE PLACES OR WHERE SHOWN. ALL SUCH ACTIONS SHALL BE COORDINATED WITH THE UTILITY COMPANY INVOLVED:

1.12 PERMITS / FEES: WHEN REQUIRED THAT A PERMIT OR CONNECTION FEE BE PAID TO A PUBLIC UTILITY PROVIDER FOR NEW SERVICE TO THE CONSTRUCTION PROJECT, PAYMENT OF SUCH FEE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

1.13 CONTRACTOR SHALL TAKE ALL MEASURES AND PROVIDE ALL MATERIAL NECESSARY FOR PROTECTING EXISTING EQUIPMENT AND PROPERTY.

1.14 METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION: CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING 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 HYBRID CABLE
F. INSTALLATION OF RRH'S
G. CABLING
H. TS–0200 REV 4 – ANTENNA LINE ACCEPTANCE STANDARDS
I. SPRINT CELL SITE ENGINEERING NOTICE – EN 2012–001, REV 1.
J. COMMISSIONING MOPS
K. SPRINT CELL SITE ENGINEERING NOTICE – EN–2013–002
L. SPRINT ENGINEERING LETTER – EL–0504
M. SPRINT ENGINEERING LETTER – EL–0568
N. SPRINT TECHNICAL SPECIFICATION – TS–0193

1.15 USE OF ELECTRONIC PROJECT MANAGEMENT SYSTEMS:

A. CONTRACTOR WILL UTILIZE ITS BEST EFFORTS TO WORK WITH SPRINT ELECTRONIC PROJECT MANAGEMENT SYSTEMS. CONTRACTOR UNDERSTANDS THAT SUFFICIENT INTERNET ACCESS, EQUIVALENT TO "BROADBAND" OR BETTER, IS REQUIRED TO TIMELY AND EFFECTIVELY UTILIZE SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS AND AGREES TO MAINTAIN APPROPRIATE CONNECTIONS FOR CONTRACTOR'S STAFF AND OFFICES THAT ARE COMPATIBLE WITH SPRINT DATA AND DOCUMENT MANAGEMENT SYSTEMS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 TEMPORARY UTILITIES AND FACILITIES: THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY UTILITIES AND FACILITIES NECESSARY EXCEPT AS OTHERWISE INDICATED IN THE CONSTRUCTION DOCUMENTS. TEMPORARY UTILITIES AND FACILITIES INCLUDE POTABLE WATER, HEAT, HVAC, ELECTRICITY, SANITARY FACILITIES, WASTE DISPOSAL FACILITIES, AND TELEPHONE/COMMUNICATION SERVICES. PROVIDE TEMPORARY UTILITIES AND FACILITIES IN ACCORDANCE WITH OSHA AND THE AUTHORITY HAVING JURISDICTION. CONTRACTOR MAY UTILIZE THE COMPANY ELECTRICAL SERVICE IN THE COMPLETION OF THE WORK WHEN IT BECOMES AVAILABLE. USE OF THE LESSORS OR SITE OWNER'S UTILITIES OR FACILITIES IS EXPRESSLY FORBIDDEN EXCEPT AS OTHERWISE ALLOWED IN THE CONTRACT DOCUMENTS.

3.2 ACCESS TO WORK: THE CONTRACTOR SHALL PROVIDE ACCESS TO THE JOB SITE FOR AUTHORIZED COMPANY PERSONNEL AND AUTHORIZED REPRESENTATIVES OF THE ARCHITECT/ENGINEER DURING ALL PHASES OF THE WORK.

3.3 TESTING: REQUIREMENTS FOR TESTING BY THIS CONTRACTOR SHALL BE AS INDICATED HEREWITH, ON THE CONSTRUCTION DRAWINGS, AND IN THE INDIVIDUAL SECTIONS OF THESE SPECIFICATIONS. SHOULD COMPANY CHOOSE TO ENGAGE ANY THIRD–PARTY TO CONDUCT ADDITIONAL TESTING, THE CONTRACTOR SHALL COOPERATE WITH AND PROVIDE A WORK AREA FOR COMPANY'S TEST AGENCY.

3.4 DIMENSIONS: VERIFY DIMENSIONS INDICATED ON DRAWINGS WITH FIELD DIMENSIONS BEFORE FABRICATION OR ORDERING OF MATERIALS. DO NOT SCALE DRAWINGS.

3.5 EXISTING CONDITIONS: NOTIFY THE SPRINT CONSTRUCTION MANAGER OF EXISTING CONDITIONS DIFFERING FROM THOSE INDICATED ON THE DRAWINGS. DO NOT REMOVE OR ALTER STRUCTURAL COMPONENTS WITHOUT PRIOR WRITTEN APPROVAL FROM THE ARCHITECT AND ENGINEER.

SECTION 01 200 – COMPANY FURNISHED MATERIAL AND EQUIPMENT

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 RECEIPT OF MATERIAL AND EQUIPMENT:

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

B. THE CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT AND UPON RECEIPT SHALL:
1. ACCEPT DELIVERIES AS SHIPPED AND TAKE RECEIPT.
2. VERIFY COMPLETENESS AND CONDITION OF ALL DELIVERIES.
3. TAKE RESPONSIBILITY FOR EQUIPMENT AND PROVIDE INSURANCE PROTECTION AS REQUIRED IN AGREEMENT.
4. RECORD ANY DEFECTS OR DAMAGES AND WITHIN TWENTY–FOUR HOURS AFTER RECEIPT, REPORT TO SPRINT OR ITS DESIGNATED PROJECT REPRESENTATIVE OF SUCH.
5. PROVIDE SECURE AND NECESSARY WEATHER PROTECTED WAREHOUSING.
6. COORDINATE SAFE AND SECURE TRANSPORTATION OF MATERIAL AND EQUIPMENT, DELIVERING AND OFF–LOADING FROM CONTRACTOR'S WAREHOUSE TO SITE.

3.2 DELIVERABLES:

A. COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

B. IF APPLICABLE, COMPLETE LOST/STOLEN/DAMAGED DOCUMENTATION REPORT AS NECESSARY IN ACCORDANCE WITH COMPANY PRACTICE, AND AS DIRECTED BY COMPANY.

C. UPLOAD DOCUMENTATION INTO SPRINT SITE MANAGEMENT SYSTEM (SMS) AND/OR PROVIDE HARD COPY DOCUMENTATION AS REQUESTED.

SECTION 01 300 – CELL SITE CONSTRUCTION

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 NOTICE TO PROCEED:

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

B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 FUNCTIONAL REQUIREMENTS:

A. THE ACTIVITIES DESCRIBED IN THIS PARAGRAPH REPRESENT MINIMUM ACTIONS AND PROCESSES REQUIRED TO SUCCESSFULLY COMPLETE THE WORK. THE ACTIVITIES DESCRIBED ARE NOT EXHAUSTIVE, AND CONTRACTOR SHALL TAKE ANY AND ALL ACTIONS AS NECESSARY TO SUCCESSFULLY COMPLETE THE CONSTRUCTION OF A FULLY FUNCTIONING WIRELESS FACILITY AT THE SITE IN ACCORDANCE WITH COMPANY PROCESSES.

B. SUBMIT SPECIFIC DOCUMENTATION AS INDICATED HEREIN, AND OBTAIN REQUIRED APPROVALS WHILE THE WORK IS BEING PERFORMED.

C. MANAGE AND CONDUCT ALL FIELD CONSTRUCTION SERVICE RELATED ACTIVITIES

D. PROVIDE CONSTRUCTION ACTIVITIES TO THE EXTENT REQUIRED BY THE CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. PERFORM ANY REQUIRED SITE ENVIRONMENTAL MITIGATION.
2. PREPARE GROUND SITES; PROVIDE DE–GRUBBING; AND ROUGH AND FINAL GRADING, AND COMPOUND SURFACE TREATMENTS.
3. MANAGE AND CONDUCT ALL ACTIVITIES FOR INSTALLATION OF UTILITIES INCLUDING ELECTRICAL AND TELCO BACKHAUL.
4. INSTALL UNDERGROUND FACILITIES INCLUDING UNDERGROUND POWER AND COMMUNICATIONS CONDUITS, AND UNDERGROUND GROUNDING SYSTEM.
5. INSTALL ABOVE GROUND GROUNDING SYSTEMS.
6. PROVIDE NEW HVAC INSTALLATIONS AND MODIFICATIONS.
7. INSTALL "H–FRAMES", CABINETS AND SHELTERS AS INDICATED.
8. INSTALL ROADS, ACCESS WAYS, CURBS AND DRAINS AS INDICATED.
9. ACCOMPLISH REQUIRED MODIFICATION OF EXISTING FACILITIES.
10. PROVIDE ANTENNA SUPPORT STRUCTURE FOUNDATIONS.
11. PROVIDE SLABS AND EQUIPMENT PLATFORMS.
12. INSTALL COMPOUND FENCING, SIGHT SHIELDING, LANDSCAPING AND ACCESS BARRIERS.
13. PERFORM INSPECTION AND MATERIAL TESTING AS REQUIRED HEREINAFTER.
14. CONDUCT SITE RESISTANCE TO EARTH TESTING AS REQUIRED HEREINAFTER
15. INSTALL FIXED GENERATOR SETS AND OTHER STANDBY POWER SOLUTIONS.
16. INSTALL TOWERS, ANTENNA SUPPORT STRUCTURES AND PLATFORMS ON EXISTING TOWERS AS REQUIRED.
17. INSTALL CELL SITE RADIOS, MICROWAVE, GPS, COAXIAL MAINLINE, ANTENNAS, CROSS BAND COUPLERS, TOWER TOP AMPLIFIERS, LOW NOISE AMPLIFIERS AND RELATED EQUIPMENT.
18. PERFORM, DOCUMENT, AND CLOSE OUT ANY CONSTRUCTION CONTROL DOCUMENTS THAT MAY BE REQUIRED BY GOVERNMENT AGENCIES AND LANDLORDS.
19. PERFORM ANTENNAL AND COAX SWEEP TESTING AND MAKE ANY AND ALL NECESSARY CORRECTIONS.
20. REMAIN ON SITE MOBILIZED THROUGHOUT HAND–OFF AND INTEGRATION TO ASSIST AS NEEDED UNTIL SITE IS DEEMED SUBSTANTIALLY COMPLETE AND PLACED "ON AIR."

3.2 GENERAL REQUIREMENTS FOR CIVIL CONSTRUCTION:

A. 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.

B. EQUIPMENT ROOMS SHALL AT ALL TIMES BE MAINTAINED "BROOM CLEAN" AND CLEAR OF DEBRIS.

C. CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
1. IN THE EVENT CONTRACTOR ENCOUNTERS ANY HAZARDOUS CONDITION WHICH HAS NOT BEEN ABATED OR OTHERWISE MITIGATED, CONTRACTOR AND ALL OTHER PERSONS SHALL IMMEDIATELY STOP WORK IN THE AFFECTED AREA AND NOTIFY COMPANY IN WRITING. THE WORK IN THE AFFECTED AREA SHALL NOT BE RESUMED EXCEPT BY WRITTEN NOTIFICATION BY COMPANY.
2. CONTRACTOR AGREES TO USE CARE WHILE ON THE SITE AND SHALL NOT TAKE ANY ACTION THAT WILL OR MAY RESULT IN OR CAUSE THE HAZARDOUS CONDITION TO BE FURTHER RELEASED IN THE ENVIRONMENT, OR TO FURTHER EXPOSE INDIVIDUALS TO THE HAZARD.

D. CONTRACTOR'S ACTIVITIES SHALL BE RESTRICTED TO THE PROJECT LIMITS. SHOULD AREAS OUTSIDE THE PROJECT LIMITS BE AFFECTED BY CONTRACTOR'S ACTIVITIES, CONTRACTOR SHALL IMMEDIATELY RETURN THEM TO ORIGINAL CONDITION

E. CONDUCT TESTING AS REQUIRED HEREIN.

3.3 DELIVERABLES:

A. CONTRACTOR SHALL REVIEW, APPROVE, AND SUBMIT TO SPRINT SHOP DRAWINGS, PRODUCT DATA, SAMPLES, AND SIMILAR SUBMITTALS AS REQUIRED HEREINAFTER

B. PROVIDE DOCUMENTATION INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING. DOCUMENTATION SHALL BE FORWARDED IN ORIGINAL FORMAT AND/OR UPLOADED INTO SMS.
1. ALL CORRESPONDENCE AND PRELIMINARY CONSTRUCTION REPORTS.
2. PROJECT PROGRESS REPORTS.
3. CIVIL CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
4. ELECTRICAL SERVICE COMPLETION DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
5. LINES AND ANTENNA INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
6. POWER INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
7. TELCO READY DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
8. PPC (OR SHELTER) INSTALL DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
9. TOWER CONSTRUCTION START DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
10. TOWER CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
11. BTS AND RADIO EQUIPMENT DELIVERED AT SITE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
12. NETWORK OPERATIONS HANDOFF CHECKLIST (HOC WALK) COMPLETE (UPLOAD FORM IN SMS)
13. CIVIL CONSTRUCTION COMPLETE DATE (POPULATE FIELD IN SMS AND/OR FORWARD NOTIFICATION).
14. SITE CONSTRUCTION PROGRESS PHOTOS UNLOADED INTO SMS.

CONTINUE SHEET SP–2

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KLR	MLB
00	3-19-14	INITIAL SUBMISSION	CM	KLR

Sprint

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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT – MICHAEL L BOHLINGER – 20405 – LICENSED PROFESSIONAL ENGINEER

SIGNATURE:

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP35

CLIENT ID No: CT03XC003

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:

WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE

SPRINT SPECIFICATIONS
(SHEET 1 OF 3)

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE:	3-19-14
PROJECT No:	ASDGSP35
DRAWING BY:	CD
CHK BY:	
DWG No.:	SP-1

24"x36" SHEETS - SIGN & SEAL AREA

CONTINUED FROM SP-1:

SECTION 01 400 – SUBMITTALS, TESTS, AND INSPECTIONS

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

1.3 SUBMITTALS:

A. THE WORK IN ALL ASPECTS SHALL COMPLY WITH THE CONSTRUCTION DRAWINGS AND THESE SPECIFICATIONS.

B. SUBMIT THE FOLLOWING TO COMPANY REPRESENTATIVE FOR APPROVAL.
1. CONCRETE MIX–DESIGNS FOR TOWER FOUNDATIONS, ANCHORS PIERS, AND CONCRETE PAVING.
2. CONCRETE BREAK TESTS AS SPECIFIED HEREIN.
3. SPECIAL FINISHES FOR INTERIOR SPACES, IF ANY.
4. ALL EQUIPMENT AND MATERIALS SO IDENTIFIED ON THE CONSTRUCTION DRAWINGS.
5. CHEMICAL GROUNDING DESIGN.

C. ALTERNATES: AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINT'S CONSTRUCTION MANAGER FOR APPROVAL PRIOR TO BEING SHIPPED TO SITE. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED. SUBMITTAL FOR APPROVAL SHALL INCLUDE A STATEMENT OF COST REDUCTION PROPOSED FOR USE OF ALTERNATE PRODUCT.

1.4 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–0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.
2. AGL, AZIMUTH AND DOWNTILT USING ELECTRONIC COMMERCIAL MADE–FOR–THE–PURPOSE ANTENNA ALIGNMENT TOOL.
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.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING;
1. AZIMUTH, DOWNTILT, AGL – UPLOAD REPORT FROM ANTENNA ALIGNMENT TOOL TO SITERRA TASK 465. INSTALLED AZIMUTH, DOWNTILT, AND AGL MUST CONFORM TO THE RF DATA SHEETS. SWEEP AND FIBER TESTS
2. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
3. ALL AVAILABLE JURISDICTIONAL INFORMATION
4. PDF SCAN OF REDLINES PRODUCED IN FIELD
5. ELECTRONIC AS–BUILT DRAWINGS IN AUTOCAD AND PDF FORMATS. ANY FIELD CHANGE MUST BE REFLECTED BY MODIFYING THE PLANS, ELEVATIONS, AND DETAILS IN THE DRAWING SETS. GENERAL NOTES INDICATING MODIFICATIONS WILL NOT BE ACCEPTED. CHANGES SHALL BE HIGHLIGHTED AS "CLOUDS" IDENTIFIED AS THE "AS–BUILT" CONDITION.
6. LIEN WAIVERS
7. FINAL PAYMENT APPLICATION
8. REQUIRED FINAL CONSTRUCTION PHOTOS
9. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS
10. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD).

1.5 COMMISSIONING: PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

1.6 INTEGRATION: PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REQUIREMENTS FOR TESTING:

A. THIRD PARTY TESTING AGENCY: WHEN THE USE OF A THIRD PARTY INDEPENDENT TESTING AGENCY IS REQUIRED, THE AGENCY THAT IS SELECTED MUST PERFORM SUCH WORK ON A REGULAR BASIS IN THE STATE WHERE THE PROJECT IS LOCATED AND HAVE A THOROUGH UNDERSTANDING OF LOCAL AVAILABLE MATERIALS, INCLUDING THE SOIL, ROCK, AND GROUNDWATER CONDITIONS.
1. THE THIRD PARTY TESTING AGENCY IS TO BE FAMILIAR WITH THE APPLICABLE REQUIREMENTS FOR THE TESTS TO BE DONE, EQUIPMENT TO BE USED, AND ASSOCIATED HEALTH AND SAFETY ISSUES.
2. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.
3. EXPERIENCE IN SOILS, CONCRETE, MASONRY, AGGREGATE, AND ASPHALT TESTING USING ASTM, AASJTO, AND OTHER METHODS IS NEEDED.

3.2 REQUIRED TESTS:

A. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. CONCRETE CYLINDER BREAK TESTS FOR THE TOWER AND ANCHOR FOUNDATIONS AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
2. ASPHALT ROADWAY COMPACTED THICKNESS, SURFACE SMOOTHNESS, AND COMPACTED DENSITY TESTING AS SPECIFIED IN SECTION: HOT MIX ASPHALT PAVING.
3. FIELD QUALITY CONTROL TESTING AS SPECIFIED IN SECTION: PORTLAND CEMENT CONCRETE PAVING.
4. TESTING REQUIRED UNDER SECTION: AGGREGATE BASE FOR ACCESS ROADS, PADS AND ANCHOR LOCATIONS
5. STRUCTURAL BACKFILL COMPACTION TESTS FOR THE TOWER FOUNDATION.
6. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.
7. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS.
8. GROUNDING AT ANTENNA MASTS FOR GPS AND ANTENNAS
9. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

3.3 REQUIRED INSPECTIONS:

A. SCHEDULE INSPECTIONS WITH COMPANY REPRESENTATIVE.

B. CONDUCT INSPECTIONS INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
1. GROUNDING SYSTEM INSTALLATION PRIOR TO EARTH CONCEALMENT DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
2. FORMING FOR CONCRETE AND REBAR PLACEMENT PRIOR TO POUR DOCUMENTED WITH DIGITAL PHOTOGRAPHS BY CONTRACTOR, APPROVED BY A&E OR SPRINT REPRESENTATIVE.
3. COMPACTION OF BACKFILL MATERIALS; AGGREGATE BASE FOR ROADS, PADS, AND ANCHORS; ASPHALT PAVING; AND SHAFT BACKFILL FOR CONCRETE AND WOOD POLES, BY INDEPENDENT THIRD PARTY AGENCY.
4. PRE– AND POST–CONSTRUCTION ROOFTOP AND STRUCTURAL INSPECTIONS ON EXISTING FACILITIES.
5. TOWER ERECTION SECTION STACKING AND PLATFORM ATTACHMENT DOCUMENTED BY DIGITAL PHOTOGRAPHS BY THIRD PARTY AGENCY.
6. ANTENNA AZIMUTH , DOWN TILT AND PER SUNLIGHT TOOL SUNSIGHT INSTRUMENTS – ANTENNALIGN ALIGNMENT TOOL (AAT)
7. VERIFICATION DOCUMENTED WITH THE ANTENNA CHECKLIST REPORT, BY A&E, SITE DEVELOPMENT REP, OR RF REP.
8. FINAL INSPECTION CHECKLIST AND HANDOFF WALK (HOC.). SIGNED FORM SHOWING ACCEPTANCE BY FIELD OPS IS TO BE UPLOADED INTO SMS.
9. COAX SWEEP AND FIBER TESTING DOCUMENTS SUBMITTED VIA SMS FOR RF APPROVAL.
10. SCAN–ABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
11. ALL AVAILABLE JURISDICTIONAL INFORMATION
12. PDF SCAN OF REDLINES PRODUCED IN FIELD

E. THE 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.

F. CONSTRUCTION INSPECTIONS AND CORRECTIVE MEASURES SHALL BE DOCUMENTED BY THE CONTRACTOR WITH WRITTEN REPORTS AND PHOTOGRAPHS. PHOTOGRAPHS MUST BE DIGITAL AND OF SUFFICIENT QUALITY TO CLEARLY SHOW THE SITE CONSTRUCTION. PHOTOGRAPHS MUST CLEARLY IDENTIFY THE PHOTOGRAPHED ITEM AND BE LABELED WITH THE SITE CASCADE NUMBER, SITE NAME, DESCRIPTION, AND DATE.

3.4 DELIVERABLES: TEST AND INSPECTION REPORTS AND CLOSEOUT DOCUMENTATION SHALL BE UPLOADED TO THE SMS AND/OR FORWARDED TO SPRINT FOR INCLUSION INTO THE PERMANENT SITE FILES.

A. THE FOLLOWING TEST AND INSPECTION REPORTS SHALL BE PROVIDED AS APPLICABLE.
1. CONCRETE MIX AND CYLINDER BREAK REPORTS.
2. STRUCTURAL BACKFILL COMPACTION REPORTS.
3. SITE RESISTANCE TO EARTH TEST.
4. ANTENNA AZIMUTH AND DOWN TILT VERIFICATION
5. TOWER ERECTION INSPECTIONS AND MEASUREMENTS DOCUMENTING TOWER INSTALLED PER SUPPLIER'S REQUIREMENTS AND THE APPLICABLE SECTIONS HEREIN.
6. COAX CABLE SWEEP TESTS PER COMPANY'S "ANTENNA LINE ACCEPTANCE STANDARDS".

B. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES THE FOLLOWING;
1. TEST WELLS AND TRENCHES: PHOTOGRAPHS OF ALL TEST WELLS; PHOTOGRAPHS SHOWING ALL OPEN EXCAVATIONS AND TRENCHING PRIOR TO BACKFILLING SHOWING A TAPE MEASURE VISIBLE IN THE EXCAVATIONS INDICATING DEPTH.
2. CONDUITS, CONDUCTORS AND GROUNDING: PHOTOGRAPHS SHOWING TYPICAL INSTALLATION OF CONDUCTORS AND CONNECTORS; PHOTOGRAPHS SHOWING TYPICAL BEND RADIUS OF INSTALLED GROUND WIRES AND GROUND ROD SPACING;
3. CONCRETE FORMS AND REINFORCING: CONCRETE FORMING AT TOWER AND EQUIPMENT/SHELTER PAD/FOUNDATIONS – PHOTOGRAPHS SHOWING ALL REINFORCING STEEL, UTILITY AND CONDUIT STUB OUTS; PHOTOGRAPHS SHOWING CONCRETE POUR OF SHELTER SLAB/FOUNDATION, TOWER FOUNDATION AND GUY ANCHORS WITH VIBRATOR IN USE; PHOTOGRAPHS SHOWING EACH ANCHOR ON GUYED TOWERS, BEFORE CONCRETE POUR.
4. TOWER, ANTENNAS AND MAINLINE: INSPECTION AND PHOTOGRAPHS OF SECTION STACKING; INSPECTION AND PHOTOGRAPHS OF PLATFORM COMPONENT ATTACHMENT POINTS; PHOTOGRAPHS OF TOWER TOP GROUNDING; PHOTOS OF TOWER COAX LINE COLOR CODING AT THE TOP AND AT GROUND LEVEL; INSPECTION AND PHOTOGRAPHS OF OPERATIONAL OF TOWER LIGHTING, AND PLACEMENT OF FAA REGISTRATION SIGN; PHOTOGRAPHS SHOWING ADDITIONAL GROUNDING POINTS FOR TOWERS GREATER THAN 200 FEET.; PHOTOS OF ANTENNA GROUND BAR, EQUIPMENT GROUND BAR, AND MASTER GROUND BAR; PHOTOS OF GPS ANTENNA(S); PHOTOS OF EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA; PHOTOS OF COAX WEATHERPROOFING – TOP AND BOTTOM; PHOTOS OF COAX GROUNDING––TOP AND BOTTOM; PHOTOS OF ANTENNA AND MAST GROUNDING; PHOTOS OF COAX CABLE ENTRY INTO SHELTER; PHOTOS OF PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
5. ROOF TOPS: PRE–CONSTRUCTION AND POST–CONSTRUCTION VISUAL INSPECTION AND PHOTOGRAPHS OF THE ROOF AND INTERIOR TO DETERMINE AND DOCUMENT CONDITIONS; ROOF TOP CONSTRUCTION INSPECTIONS AS REQUIRED BY THE JURISDICTION; PHOTOGRAPHS OF CABLE TRAY AND/OR ICE BRIDGE; PHOTOGRAPHS OF DOGHOUSE/CABLE EXIT FROM ROOF;
6. SITE LAYOUT – PHOTOGRAPHS OF THE OVERALL COMPOUND, INCLUDING EQUIPMENT PLATFORM FROM ALL FOUR CORNERS.
7. FINISHED UTILITIES: CLOSE–UP PHOTOGRAPHS OF THE PPC BREAKER PANEL; CLOSE–UP PHOTOGRAPH OF THE INSIDE OF THE TELCO PANEL AND NIU; CLOSE–UP PHOTOGRAPH OF THE POWER METER AND DISCONNECT; PHOTOS OF POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE; PHOTOGRAPHS AT METER BOX AND/OR FACILITY DISTRIBUTION PANEL.
8. REQUIRED MATERIALS CERTIFICATIONS: CONCRETE MIX DESIGNS; MILL CERTIFICATION FOR ALL REINFORCING AND STRUCTURAL STEEL; AND ASPHALT PAVING MIX DESIGN.
9. ANY AND ALL SUBMITTALS BY THE JURISDICTION OR COMPANY.

SECTION 01 500 – PROJECT REPORTING

PART 1 – GENERAL

1.1 THE WORK: THESE STANDARD CONSTRUCTION SPECIFICATIONS IN CONJUNCTION WITH THE OTHER CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THIS SECTION APPLY TO ALL SECTIONS IN THIS SPECIFICATION.

B. SPRINT "STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES" ARE INCLUDED IN AND MADE A PART OF THESE SPECIFICATIONS HEREWITH.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 WEEKLY REPORTS:

A. CONTRACTOR SHALL PROVIDE SPRINT WITH WEEKLY REPORTS SHOWING PROJECT STATUS. THIS STATUS REPORT FORMAT WILL BE PROVIDED TO THE CONTRACTOR BY SPRINT. THE REPORT WILL CONTAIN SITE ID NUMBER, THE MILESTONES FOR EACH SITE, INCLUDING THE BASELINE DATE, ESTIMATED COMPLETION DATE AND ACTUAL COMPLETION DATE.

B. REPORT INFORMATION WILL BE TRANSMITTED TO SPRINT VIA ELECTRONIC MEANS AS REQUIRED. THIS INFORMATION WILL PROVIDE A BASIS FOR PROGRESS MONITORING AND PAYMENT.

3.2 PROJECT CONFERENCE CALLS:

A. SPRINT MAY HOLD WEEKLY PROJECT CONFERENCE CALLS. CONTRACTOR WILL BE REQUIRED TO COMMUNICATE SITE STATUS, MILESTONE COMPLETIONS AND UPCOMING MILESTONE PROJECTIONS, AND ANSWER ANY OTHER SITE STATUS QUESTIONS AS NECESSARY.

3.3 PROJECT TRACKING IN SMS:

A. CONTRACTOR SHALL PROVIDE SCHEDULE UPDATES AND PROJECTIONS IN THE SMS SYSTEM ON A WEEKLY BASIS.

3.4 ADDITIONAL REPORTING:

A. ADDITIONAL OR ALTERNATE REPORTING REQUIREMENTS MAY BE ADDED TO THE REPORT AS DETERMINED TO BE REASONABLY NECESSARY BY COMPANY.

3.5 PROJECT PHOTOGRAPHS:

A. FILE DIGITAL PHOTOGRAPHS OF COMPLETED SITE IN JPEG FORMAT IN THE SMS PHOTO LIBRARY FOR THE RESPECTIVE SITE. PHOTOGRAPHS SHALL BE CLEARLY LABELED WITH SITE NUMBER, NAME AND DESCRIPTION, AND SHALL INCLUDE AT A MINIMUM THE FOLLOWING AS APPLICABLE:
1. SHELTER AND TOWER OVERVIEW.
2. TOWER FOUNDATION(S) – FORMS AND STEEL BEFORE POUR (EACH ANCHOR ON GUYED TOWERS).
3. TOWER FOUNDATION(S) POUR WITH VIBRATOR IN USE (EACH ANCHOR ON GUYED TOWERS).
4. TOWER STEEL AS BEING INSTALLED INTO HOLE (SHOW ANCHOR STEEL ON GUYED TOWERS).
5. PHOTOS OF TOWER SECTION STACKING.
6. CONCRETE TESTING / SAMPLES.
7. PLACING OF ANCHOR BOLTS IN TOWER FOUNDATION.
8. BUILDING/WATER TANK FROM ROAD FOR TENANT IMPROVEMENTS OR COMMENTS.
9. SHELTER FOUNDATION––FORMS AND STEEL BEFORE POURING.
10. SHELTER FOUNDATION POUR WITH VIBRATOR IN USE.
11. COAX CABLE ENTRY INTO SHELTER.
12. PLATFORM MECHANICAL CONNECTIONS TO TOWER/MONOPOLE.
13. ROOFTOP PRE AND POST CONSTRUCTION PHOTOS TO INCLUDE PENETRATIONS AND INTERIOR CEILING.
14. PHOTOS OF TOWER TOP COAX LINE COLOR CODING AND COLOR CODING AT GROUND LEVEL.
15. PHOTOS OF ALL APPROPRIATE COMPANY OR REGULATORY SIGNAGE.
16. PHOTOS OF EQUIPMENT BOLT DOWN INSIDE SHELTER.
17. POWER AND TELCO ENTRANCE TO COMPANY ENCLOSURE AND POWER AND TELCO SUPPLY LOCATIONS INCLUDING METER/DISCONNECT.
18. ELECTRICAL TRENCH(S) WITH ELECTRICAL / CONDUIT BEFORE BACKFILL.
19. ELECTRICAL TRENCH(S) WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
20. TELCO TRENCH WITH TELEPHONE / CONDUIT BEFORE BACKFILL.
21. TELCO TRENCH WITH FOIL–BACKED TAPE BEFORE FURTHER BACKFILL.
22. SHELTER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
23. TOWER GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
24. FENCE GROUND–RING TRENCH WITH GROUND–WIRE BEFORE BACKFILL (SHOW ALL CAD WELDS AND BEND RADII).
25. ALL BTS GROUND CONNECTIONS.
26. ALL GROUND TEST WELLS.
27. ANTENNA GROUND BAR AND EQUIPMENT GROUND BAR.
28. ADDITIONAL GROUNDING POINTS ON TOWERS ABOVE 200'.
29. HVAC UNITS INCLUDING CONDENSERS ON SPLIT SYSTEMS.
30. GPS ANTENNAS.
31. CABLE TRAY AND/OR WAVEGUIDE BRIDGE.
32. DOGHOUSE/CABLE EXIT FROM ROOF.
33. EACH SECTOR OF ANTENNAS; ONE PHOTOGRAPH LOOKING AT THE SECTOR AND ONE FROM BEHIND SHOWING THE PROJECTED COVERAGE AREA.
34. MASTER BUS BAR.
35. TELCO BOARD AND NIU.
36. ELECTRICAL DISTRIBUTION WALL.
37. CABLE ENTRY WITH SURGE SUPPRESSION.
38. ENTRANCE TO EQUIPMENT ROOM.
39. COAX WEATHERPROOFING––TOP AND BOTTOM OF TOWER.
40. COAX GROUNDING –TOP AND BOTTOM OF TOWER.
41. ANTENNA AND MAST GROUNDING.
42. LANDSCAPING – WHERE APPLICABLE.

3.6 FINAL PROJECT ACCEPTANCE: COMPLETE ALL REQUIRED REPORTING TASKS PER CONTRACT, CONTRACT DOCUMENTS OR THE SPRINT INTEGRATED CONSTRUCTION STANDARDS FOR WIRELESS SITES AND UPLOAD INTO SITERRA.

SECTION 07 500 – ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:
THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING ONTO THE ROOF OR BUILDING–MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

A. PRE–CONSTRUCTION ROOF PHOTOS: COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD. AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA.) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

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.

CONTINUE SHEET SP–3

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KJR	MLB
00	3-19-14	INITIAL SUBMISSION	CM	KJR

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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L. BOHLINGER · 18995 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE:

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
SPRINT SPECIFICATIONS
(SHEET 2 OF 3)

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE:	3-19-14
PROJECT No:	ASDGSP35
DRAWING BY:	CD
CHK BY:	
DWG No.:	SP-2

24"x36" SHEETS - SIGN & SEAL AREA

CONTINUED FROM SP-2:

MATERIALS:

A. MANUFACTURERS: BENJAMIN MOORE, ICI DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. 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 INSTRUCTIONS WHENEVER POSSIBLE.

B. ROOF TOP CONSTRUCTION: 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 HEADS AND CABLE INSTALLATION

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

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

HYBRID CABLE:
HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:
FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRH'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 RRH'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPERFLEX OUTDOORS. JUMPERS SHALL BE FACTORY FABRICATED IN APPROPRIATE LENGTHS WITH A MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS

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 A 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 DRAWINGS.

HYBRID CABLES 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 THAN 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 HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.
2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBTS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:
   a. FIBER: SUPPORT FIBER BUNDLES USING ¾" VELCRO STRAPS OF THE REQUIRED LENGTH @ 18" OC. 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 JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.
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 ENVELOP AS INDICATED ON THE DRAWINGS. AVOID TWISTING AND CROSSOVERS.
   c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES 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 4.
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 & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.
1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING. PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.
2. 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.
3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.
4. 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 BY 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 REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS 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 11 800 - INSTALLATION OF MULTIMODAL BASE TRANSCIEVER STATIONS (MMBTS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBTS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY 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 REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS

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 ON 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:

D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.

E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS 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 ENCASED RUNS IN CONCRETE. 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. 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 SPECIFICATION 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 REQUIRE 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 LOCKNUT 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.
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 GASKETED 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 AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.

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 CM 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.

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KLR	MLB
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(732) 679-0155

ENGINEER'S LICENSE

MICHAEL L BOHLINGER

STATE OF CONNECTICUT · MICHAEL L BOHLINGER · LICENSED · PROFESSIONAL ENGINEER

SIGNATURE: _____ DATE: 3/29/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

SITE INFORMATION:

WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE

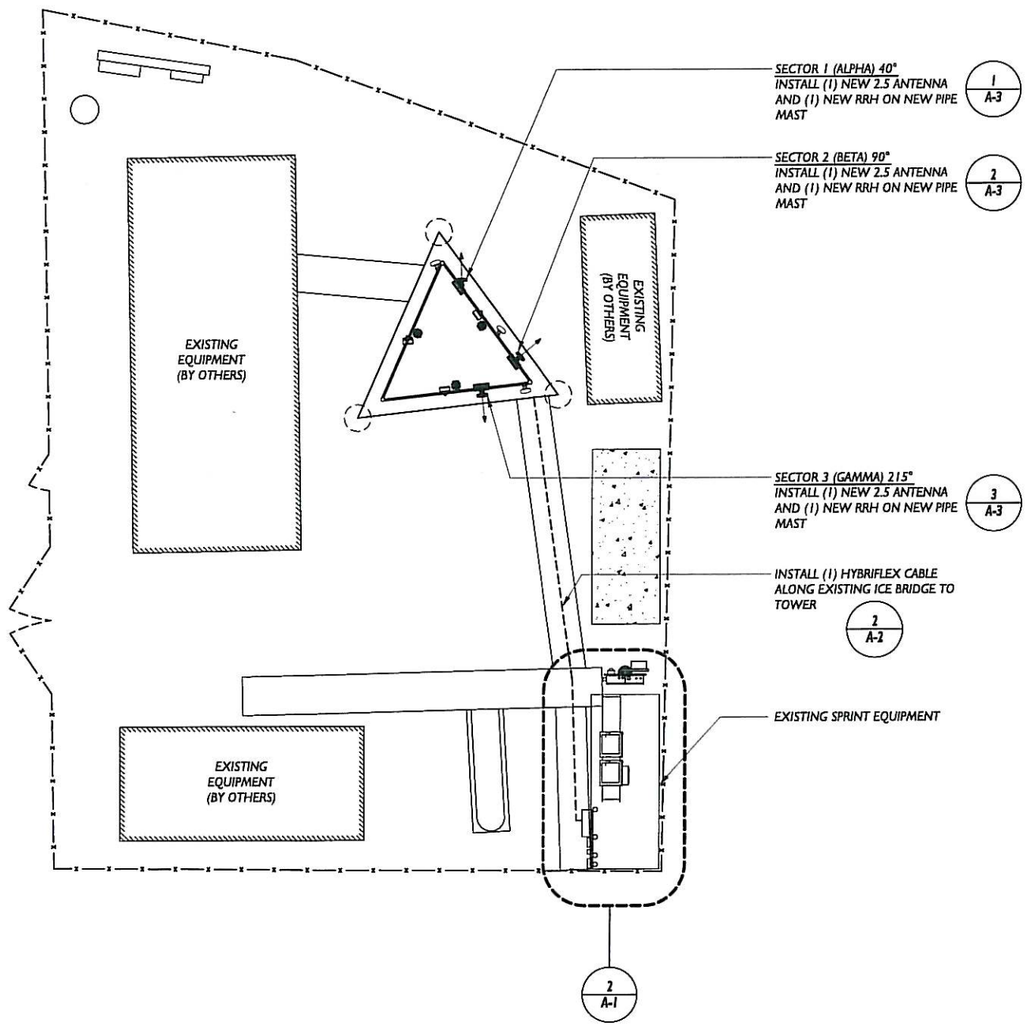
SPRINT SPECIFICATIONS
(SHEET 3 OF 3)

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE:	3-19-14
PROJECT No:	ASDGSP35
DRAWING BY:	CD
CHK BY:	
DWG No.:	SP-3

24"x36" SHEETS - SIGN & SEAL AREA

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

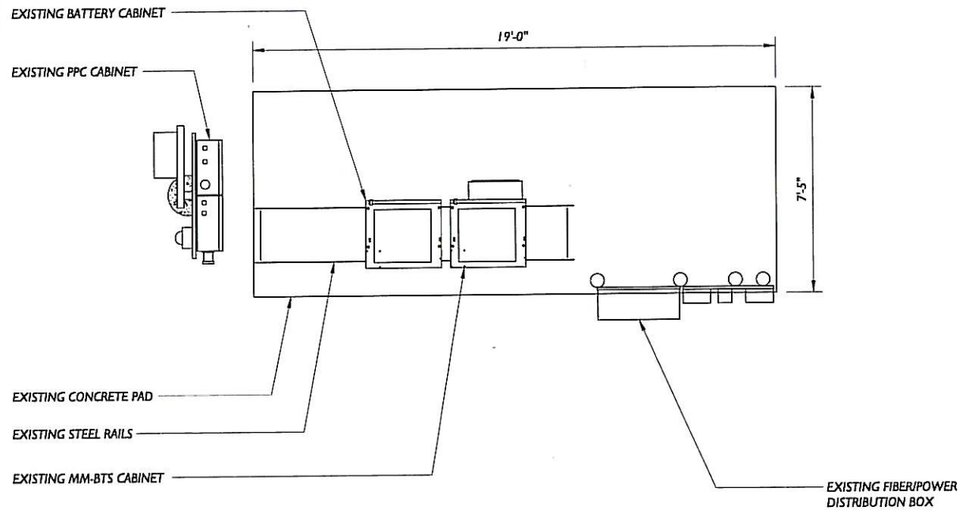


OVERALL SITE PLAN

SCALE: 11"x17" : 1/16"= 1'-0" | 24"x36" : 1/8"= 1'-0"

1

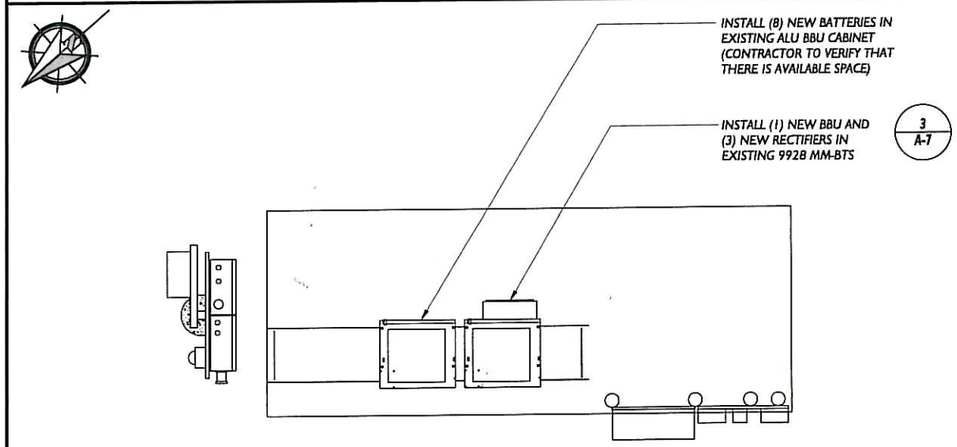
NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.



EXISTING SPRINT EQUIPMENT PLAN

SCALE: 11"x17" : 3/16" = 1'-0" | 24"x36" : 3/8" = 1'-0"

2



PROPOSED SPRINT EQUIPMENT PLAN

SCALE: 11"x17" : 3/16" = 1'-0" | 24"x36" : 3/8" = 1'-0"

3

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KLR	MLB
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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER
STATE OF CONNECTICUT · MICHAEL L BOHLINGER · 20405 · LICENSED PROFESSIONAL ENGINEER
SIGNATURE
PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

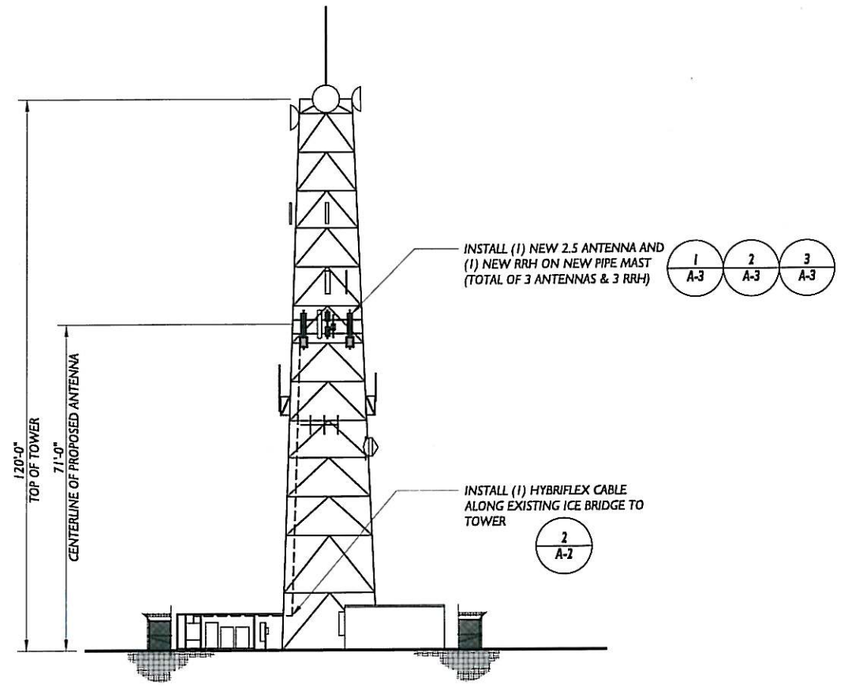
DRAWING TITLE
SITE PLAN

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-1

24"x36" SHEETS - SIGN & SEAL AREA

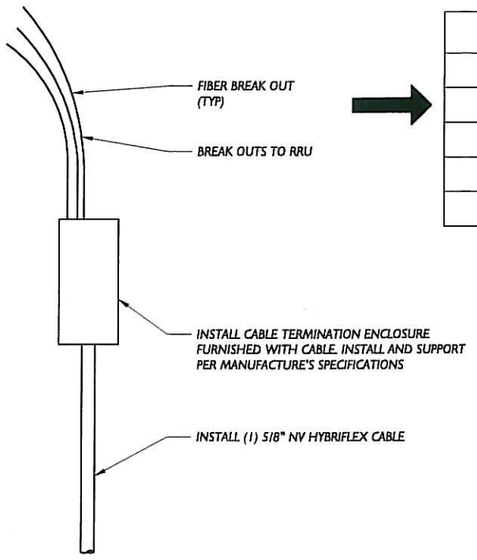
NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.



ELEVATION

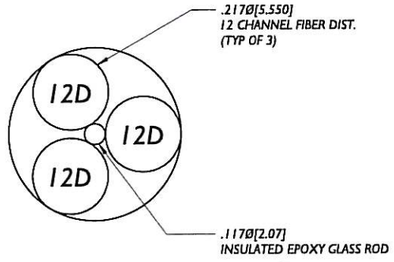
SCALE: 11"x17" : 1/32" = 1'-0" | 24"x36" : 1/16" = 1'-0"

1



HYBRID CABLE DC CONDUCTOR SIZE GUIDELINE

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



HYBRID BREAK OUT DETAIL

SCALE: 11"x17" : NTS | 24"x36" : NTS

2

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
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ENGINEER'S LICENSE

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STATE OF CONNECTICUT
MICHAEL L BOHLINGER
PROFESSIONAL ENGINEER
SIGNATURE:
PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

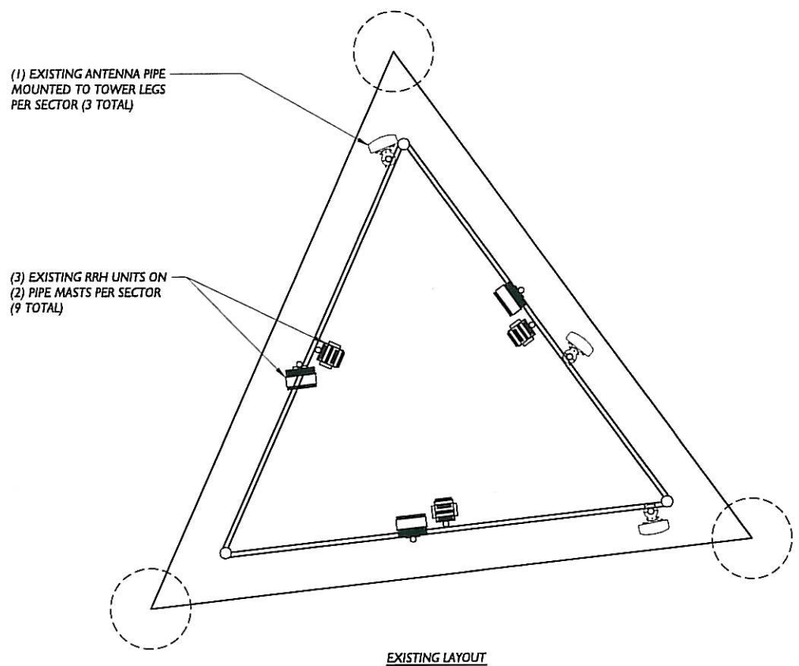
SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
BUILDING ELEVATION
AND CABLE PLAN

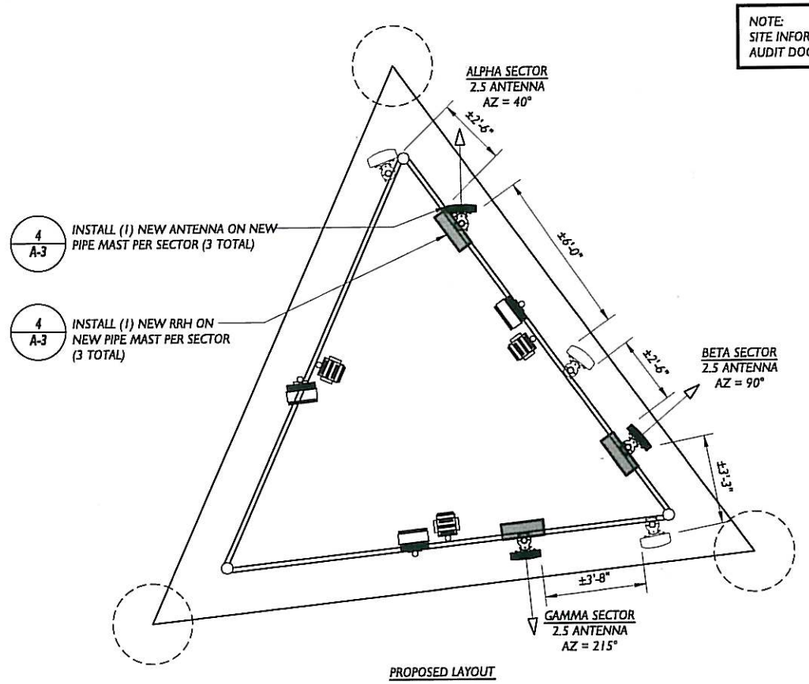
MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-2

24"x36" SHEETS - SIGN & SEAL AREA



EXISTING LAYOUT



PROPOSED LAYOUT

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

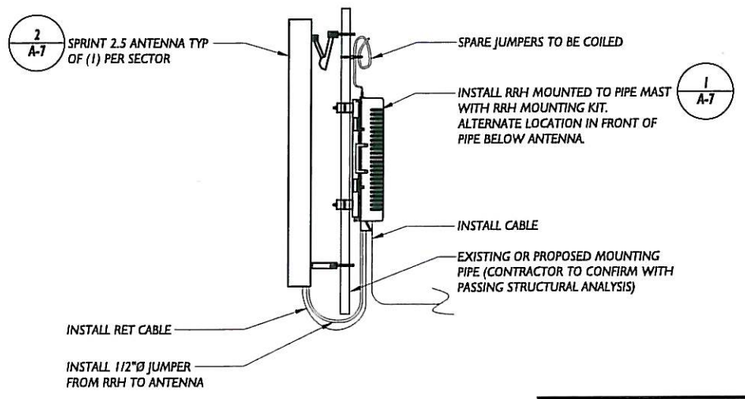
EXISTING AND PROPOSED LAYOUTS

SCALE: 11"x17" : 3/16" = 1'-0" | 24"x36" : 3/8" = 1'-0"

1

NOTE:
1. CUT DC CONDUCTORS TO LENGTH.
2. COIL FIBER CABLE AND SECURE TO SIDE OF RRH.
3. DO NOT EXCEED BEND RADIUS.
4. JUMPERS FROM 2.5 RRH TO 2.5 ANTENNA CAN NOT EXCEED 15'. NOTIFY SPRINT CM OF ANY DISCREPANCY.

NOTE:
STRUCTURAL ANALYSIS TO BE PROVIDED BY OTHERS



NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

ANTENNA AND RRH MOUNTING DETAIL

SCALE: 11"x17" : NTS | 24"x36" : NTS

4

REV.	DATE	REVISION DESCRIPTION	DRAWN BY	CHKD. BY
01	4-28-14	REVISED PER CLIENT COMMENTS	KLR	MLB
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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT * MICHAEL L. BOHLINGER * 20405 LICENSED PROFESSIONAL ENGINEER

SIGNATURE: 4/28/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP35

CLIENT ID No: CT03XC003

DESIGN TYPE: 2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
ANTENNA PLAN
AND MOUNTING DETAILS

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-3

24"x36" SHEETS - SIGN & SEAL AREA

NOTE:
GENERAL CONTRACTOR TO VERIFY CURRENT RFDS PRIOR TO CONSTRUCTION START.

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

Sprint

RFDS Sheet

General Site Information

Site ID	CT03XC003	Equipment Vendor	ALU
Market	Southern Connecticut	Lattitude	41.345432
Region	EAST	Longitude	-72.970711
MLA	N/A	LL SITE ID	N/A
Structure Type	SELF SUPPORT TOWER		
BTS Type	N/A		
Solution ID		Sitema SR Equipment type	N/A
		Equipment Vendor	ALU

Incramental Power Draw needed by added Equipment: 0

Base Equipment

BBU Kit	ALU BBU KIT	Top Hat	NONE
BBU Kit Qty	1	Top Hat Qty	N/A
Growth Cabinet	NONE	Top Hat Dimensions	N/A
Growth Cabinet Qty	N/A	Top Hat Weight (lbs)	N/A
Growth Cabinet Dimensions	N/A		
Growth Cabinet Weight	N/A		

RF Path Information

RRH	TD-RRH8x20-25
RRH Qty	3
RRH Dimensions	26.1in x 18.6 x 6.7 in
RRH Weight. lbs.	70
RRH Mount Weight. Lbs.	TBD
Power and Fiber Cable	ALU Fiber Only
Cable Qty	1
Weight per foot. Lbs.	0.12
Diameter. Inches.	0.7
Length Ft.	85.2 (calculated as antenna height plus 20%)
Coax Jumper	Coax Jumper. Mfg TBD.
Coax Jumper Qty	27
Coax Jumper Length. Feet.	8
Coax Jumper Weight	TBD
Coax Jumper Diameter. Inches	0.5
AISG Cable	Commscope ATCB-B01-006
AISG Cable Qty	3
AISG Diameter. Inches.	0.315
AISG Cable length.	8
Weight of entire AISG cable. Lbs.	1.9

Antenna Sector Information

	Sector 1	Sector 2	Sector 3
Antenna make/model	RFS APXVTM14-C-I20	RFS APXVTM14-C-I20	RFS APXVTM14-C-I20
Antenna qty	1	1	1
Antenna Dimensions. Inches	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3	56.3 x 12.6 x 6.3
Antenna Weight. Lbs	56	56	56
Antenna Mounting Kit Weight. Lbs.	11 (estimate)	11 (estimate)	11 (estimate)
CL Height	71	71	71
Antenna Azimuth	40	90	215
Antenna Mechanical Downtilt	0	0	0
Antenna etilt	-2	-2	-2

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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L BOHLINGER · 25405 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No: ASDGSP35

CLIENT ID No: CT03XC003

DESIGN TYPE: 2.5 GHz

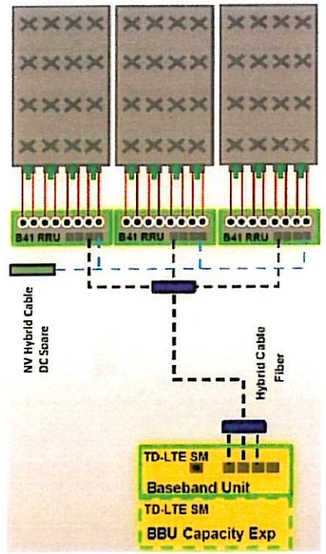
SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
RF DATA SHEET AND EQUIPMENT INFORMATION

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

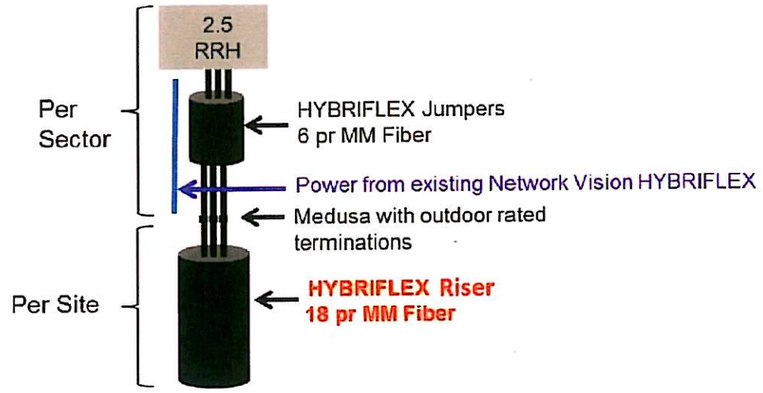
DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-4

24"x36" SHEETS - SIGN & SEAL AREA

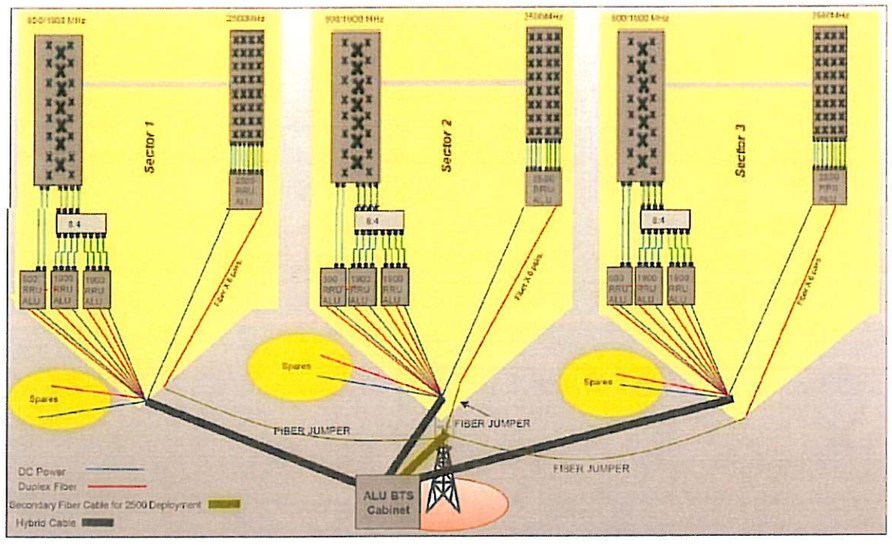


ALU 2500MHz ALU SCENARIO 1 | SCALE 11"x17" : NTS / 24"x36" : NTS | 1

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.



RFS 2500MHz ALU SCENARIO 1 | SCALE 11"x17" : NTS / 24"x36" : NTS | 2



RAN WIRING DIAGRAM: ALU EQUIPMENT | SCALE 11"x17" : NTS / 24"x36" : NTS | 3

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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L BOHLINGER · LICENSED PROFESSIONAL ENGINEER

SIGNATURE: 3/29/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
WIRING DIAGRAMS

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-5

24"x36" SHEETS - SIGN & SEAL AREA

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

NV CABLES					
BAND	INDICATOR		PORT	COLOR
800-1	YEL	GRN	NV-1	GRN
1900-1	YEL	RED	NV-2	BLU
1900-2	YEL	BRN	NV-3	BRN
1900-3	YEL	BLU	NV-4	WHT
1900-4	YEL	SLT	NV-5	RED
800-2	YEL	ORG	NV-6	SLT
SPARE	YEL	WHT	NV-7	PPL
2500	YEL	PPL	NV-8	ORG

HYBRID	
HYBRID	COLOR
1	GRN
2	BLU
3	BRN
4	WHT
5	RED
6	SLT
7	PPL
8	ORG

2.5 Band		
2500 Radio 1		COLOR
YEL	WHT	GRN
YEL	WHT	BLU
YEL	WHT	BRN
YEL	WHT	WHT
YEL	WHT	RED
YEL	WHT	SLT
YEL	WHT	PPL
YEL	WHT	ORG

FIGURE 19.1 CABLE COLOR CODE

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

NOTES

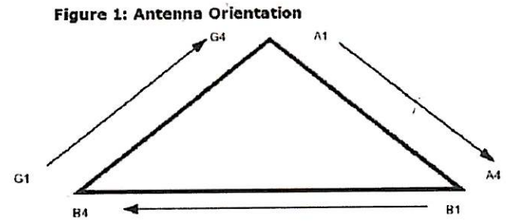
1. All cables shall be marked at the top and bottom with 2" colored tape, stencil tag colored tape, or colored heat shrink tubing
2. Colored tape may be obtained from Graybar Electronic. UV stabilized tape or heat shrink are preferred.
3. The first ring shall be closest to the end of the cable, and there shall be a 1" space between each ring.
4. The cable color code shall be applied in accordance to Table 19-1.
   A. Table 19-1 only shows 3 sectors, but additional sectors are easily supported by adding the appropriate number of colored rings to the cable color code.
5. After the cable color code is applied, the frequency color code, Table 19-2, must be applied for the specific frequency band in use on a given line.
   A. 2" gap shall separate the cable color code from the frequency color code.
   B. The 2" color rings for the frequency code shall be placed next to each other with no spaces.
6. Wrap 2" colored tape a minimum of 3 times around the coax, and keep the tape in the same area as much as possible. This will allow removal of tape that fades or discolors due to weather.
7. Examples of the cable and frequency color codes are shown in Figure 19-1 and Figure 19-2.

FIGURE 19.2 COLOR CODE

FREQUENC	INDICATOR	ID
800-1	YEL	GRN
1900-1	YEL	RED
1900-2	YEL	BRN
1900-3	YEL	BLU
1900-4	YEL	SLT
800-1	YEL	ORG
RESERVED	YEL	WHT
RESERVED	YEL	PPL

FREQUENCY	INDICATOR		ID
2500 -1	YEL	WHT	GRN
2500 -2	YEL	WHT	RED
2500 -3	YEL	WHT	BRN
2500 -4	YEL	WHT	BLU
2500 -5	YEL	WHT	SLT
2500 -6	YEL	WHT	ORG
2500 -7	YEL	WHT	WHT
2500 -8	YEL	WHT	PPL

Figure 1: Antenna Orientation



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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L. BOHLINGER · 20405 · PROFESSIONAL ENGINEER

SIGNATURE: 3/19/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
RF DATA SHEET

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

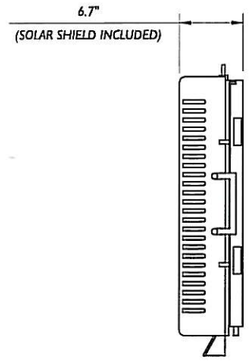
DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: A-6

24"x36" SHEETS - SIGN & SEAL AREA

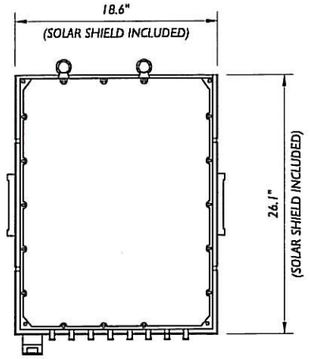
SCALE 11"x17" : NTS
24"x36" : NTS

1

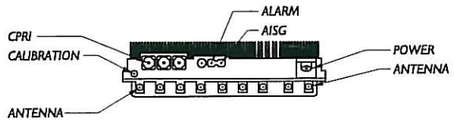
CABLE MARKING DIAGRAM



SIDE VIEW



FRONT VIEW



PLAN VIEW

TD-RRH8x20-25 REMOTE RADIO HEAD

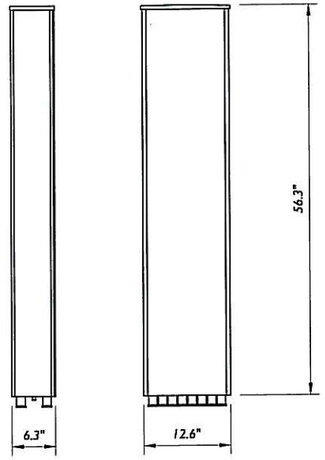
DIMENSIONS:	26.1"x18.6"x6.7"
WEIGHT:	60 LBS (WITH HARDWARE)

2.5 RRHS DETAIL

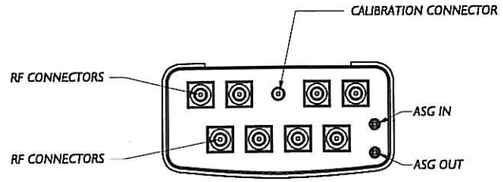
SCALE: 11"x17" : NTS; 24"x36" : NTS

1

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.



SIDE VIEW FRONT VIEW



PLAN VIEW

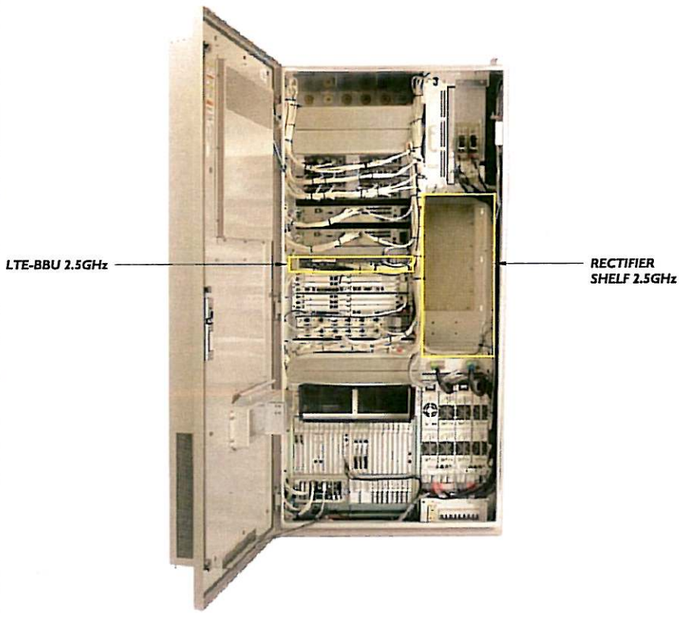
RFS APXVTM14-C-120 PANEL ANTENNA

DIMENSIONS:	53.3"x12.6"x6.3"
WEIGHT:	56 LBS (WITH HARDWARE)
FREQUENCY RANGE:	806-869 MHz 1850-1995 MHz

2.5 ANTENNA DETAIL

SCALE: 11"x17" : NTS; 24"x36" : NTS

2



2.5 EQUIP. IN EXISTING CABINET

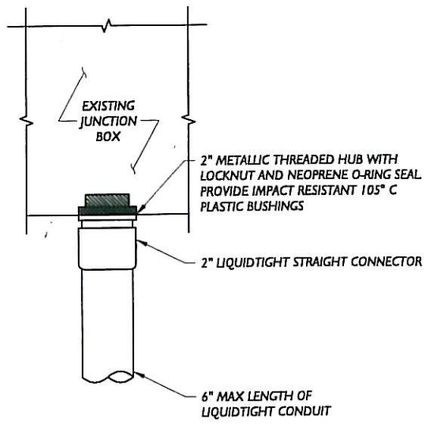
SCALE: 11"x17" : NTS; 24"x36" : NTS

3

EXISTING BBU CABINET

SCALE: 11"x17" : NTS; 24"x36" : NTS

4



JUNCTION BOX PENETRATION

SCALE: 11"x17" : NTS; 24"x36" : NTS

5

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ENGINEER'S LICENSE

MICHAEL L. BOHLINGER
STATE OF CONNECTICUT · MICHAEL L BOHLINGER · REGISTERED PROFESSIONAL ENGINEER
SIGNATURE: 3/19/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:	ASDGSP35
CLIENT ID No:	CT03XC003
DESIGN TYPE:	2.5 GHz
SITE INFORMATION:	WEST ROCK RIDGE - CT STATE POLICE 1065 WINTERGREEN AVENUE HAMDEN, CT 06514
DRAWING TITLE	EQUIPMENT SPECIFICATIONS

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE:	3-19-14
PROJECT No:	ASDGSP35
DRAWING BY:	CD
CHK BY:	
DWG No.:	A-7

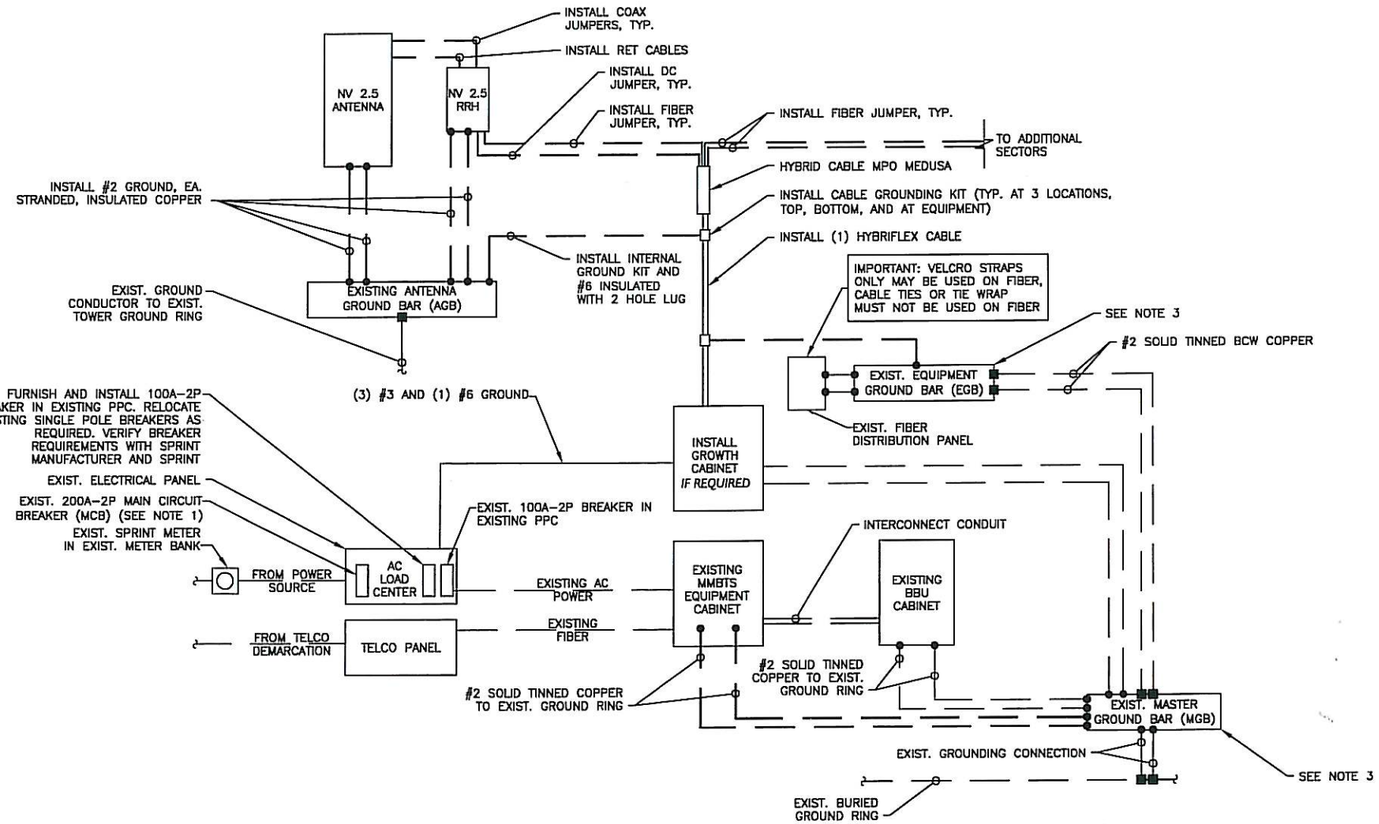
24"x36" SHEETS - SIGN & SEAL AREA

SPECIAL WORK NOTE:

1. G.C. TO FURNISH AND INSTALL ALL COMPONENTS TO UPGRADE EXISTING ELECTRICAL SERVICE, CONDUIT, CONDUCTOR, PPC AND MCB IN ACCORDANCE WITH SPRINT CONSTRUCTION STANDARDS NV 2.5 ADDENDUM "ENGINEERING NOTICE 2013-002 (POWER UPGRADES) REV.0"
2. G.C. TO FURNISH AND INSTALL UPGRADE THE EXISTING MMBTS BREAKER, CONDUCTOR, AND CONDUIT TO A MINIMUM NEC RATING FOR A 100-AMP, 240V CIRCUIT.
3. FOR NEW OR REPAIRED GROUNDING EQUIPMENT, REFER TO SPRINT GROUNDING STANDARDS AND FOLLOWING (SUPPLEMENTS):
   -ANTI-THEFT UPDATE TO SPRINT GROUNDING DATED 08-24-12
   -SPRINT ENGINEERING LETTER EL-0504 DATED 04-20-12

NOTE:
MAXIMUM LENGTH OF LIQUID TIGHT CONDUIT IS TO BE 6 FEET

SYMBOL LEGEND
- (X) SPECIAL WORK NOTE
- ■ EXOTHERMIC CONNECTION
- ● MECHANICAL CONNECTION
- □ CABLE GROUNDING KIT



ELECTRICAL ONE-LINE DIAGRAM

SCALE	11"x17" : NTS 24"x36" : NTS	1

ELECTRICAL NOTES

1) ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.

2) THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT ROUTING WITH LOCAL UTILITY COMPANIES AND SPRINT CONSTRUCTION MANAGER.

3) ALL CONDUITS ROUTED BELOW GRADE SHALL TRANSITION TO RIGID GALVANIZED ELBOWS WITH RIGID GALVANIZED STEEL CONDUIT ABOVE GRADE.

4) ALL METAL CONDUITS SHALL BE PROVIDED WITH GROUNDING BUSHINGS.

5) GENERAL CONTRACTOR SHALL PROVIDE ALL DIRECT BURIED CONDUITS WITH PLASTIC WARNING TAPE IDENTIFYING CONTENTS. TAPE COLORS SHALL BE ORANGE FOR TELEPHONE AND RED FOR ELECTRIC.

6) ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.

7) THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIALS DESCRIBED BY DRAWINGS AND SPECIFICATIONS INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.

8) GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.

9) ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.

10) BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.

11) ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THIN INSULATION.

12) RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.

13) RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.

14) FIBER OPTIC CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 770-OPTICAL FIBER CABLES AND RACEWAYS.

15) COMMUNICATIONS CIRCUITS SHALL BE IN ACCORDANCE WITH NEC ARTICLE 800-COMMUNICATIONS SYSTEMS.

NOTE:
SITE INFORMATION AND PLANS ARE BASED UPON 2.5 AUDIT DOCUMENTATION PROVIDED BY THE SPRINT.

ELECTRICAL NOTES

SCALE	11"x17" : NTS 24"x36" : NTS	2

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(732) 678-0155

ENGINEER'S LICENSE

MICHAEL L. BOHLINGER

STATE OF CONNECTICUT · MICHAEL L BOHLINGER · 20405 · LICENSED PROFESSIONAL ENGINEER

SIGNATURE: DATE: 3/21/14

PROFESSIONAL ENGINEER
CONNECTICUT LICENSE No. 20405

ASDG PROJECT No:
ASDGSP35

CLIENT ID No:
CT03XC003

DESIGN TYPE:
2.5 GHz

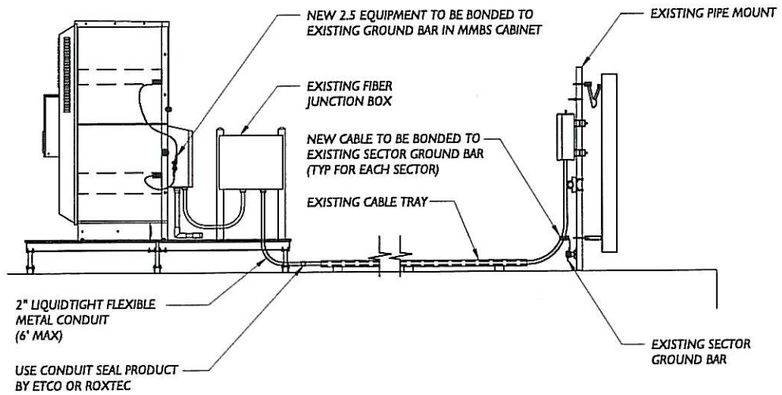
SITE INFORMATION:
WEST ROCK RIDGE - CT STATE POLICE
1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
ONE-LINE DIAGRAM

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: E-1

24"x36" SHEETS - SIGN & SEAL AREA



TYPICAL EQUIPMENT GROUNDING SCHEMATIC

SCALE: 11"x17" : NTS; 24"x36" : NTS

1

NOTE:
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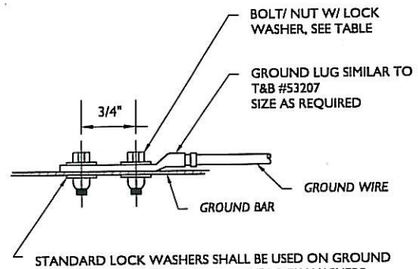


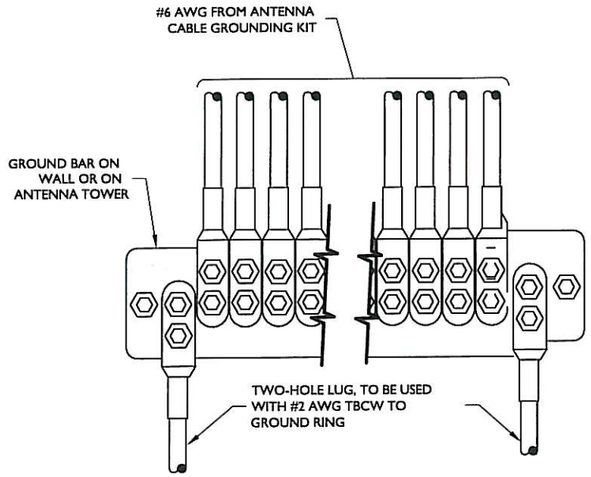
STANDARD LOCK WASHERS SHALL BE USED ON GROUND BARS, SSERRATED "DRAGON TOOTH" LOCK WASHERS SHALL BE USED ON CONNECTIONS TO BUILDING STEEL AND MISCELLANEOUS METALS.

TABLE		
WIRE SIZE	LUG #	BOLT SIZE
#4/0	53212	1/2" – 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#2	53207	1/4" – 20 NC x 1/2" S.S. BOLT & NUT W/ LOCK WASHERS
#6	53205	

GROUND LUG CONNECTION

SCALE: 11"x17" : NTS; 24"x36" : NTS

2



NOTE CONTRACTOR TO UTILIZE KOPR-SHIELD (THOMAS & BETTS) ON ALL LUG CONNECTIONS

GROUND LUG CONNECTION TO GROUND BAR

SCALE: 11"x17" : NTS; 24"x36" : NTS

3

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1065 WINTERGREEN AVENUE
HAMDEN, CT 06514

DRAWING TITLE
GROUNDING DETAILS

MICHAEL L. BOHLINGER
CT LICENSE No. 20405

24"x36" SHEETS - SIGN & SEAL AREA

DATE: 3-19-14
PROJECT No: ASDGSP35
DRAWING BY: CD
CHK BY:
DWG No: G-1

EBI Consulting
environmental | engineering | due diligence

RADIO FREQUENCY FCC REGULATORY COMPLIANCE MAXIMUM PERMISSIBLE EXPOSURE (MPE) ASSESSMENT

Sprint Existing Facility

Site ID: CT03XC003

West Rock Ridge - CT State Police

1065 Wintergreen Avenue
Hamden, CT 06514

(a.k.a. 142 Baldwin Drive, New Haven, CT 06519)

June 5, 2014

EBI Project Number: 62143251

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

EBI Consulting
environmental | engineering | due diligence

June 5, 2014

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

Re: Radio Frequency Maximum Permissible Exposure (MPE) Assessment for Site:
CT03XC003 - West Rock Ridge - CT State Police

Site Total: 35.04% - MPE% in full compliance

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 1065 Wintergreen Avenue, Hamden, CT, for the purpose of determining whether the radio frequency (RF) exposure levels from the proposed Sprint equipment upgrades on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed upgrades to the existing Sprint Wireless antenna facility located at 1065 Wintergreen Avenue, Hamden, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

For all calculations, all emissions were calculated using the following assumptions:

1) 2 channels in the 1900 MHz Band were considered for each sector of the proposed installation.
2) 1 channel in the 800 MHz Band was considered for each sector of the proposed installation
3) 2 channels in the 2500 MHz Band were considered for each sector of the proposed installation.
4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
5) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufactures supplied specifications minus 10 dB was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the RFS APXVSPP18-C-A20 and the RFS APXVTM14-C-I20. This is based on feedback from the carrier with regards to anticipated antenna selection. The RFS APXVSPP18-C-A20 has a 15.9 dBd gain value at its main lobe at 1900 MHz and 13.4 dBd at its main lobe for 850 MHz. The RFS APXVTM14-C-I20 has a 15.9 dBd gain value at its main lobe at 2500 MHz. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
7) The antenna mounting height centerline for the proposed antennas is **72 feet** above ground level (AGL).
8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

All calculation were done with respect to uncontrolled / general public threshold limits

Site ID	CT03XC003 - West Rock Ridge - CT State Police
Site Addresss	1065 Wintergreen Avenue, Hamden, CT, 06514
Site Type	Self Support Tower

Sector 1

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	0.57%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	72	66	1/2 "	0.5	3	19.54	0.28%
1B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	1.01%
														Sector total Power Density Value:		1.87%

Sector 2

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	0.57%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	72	66	1/2 "	0.5	3	19.54	0.28%
2B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	1.01%
														Sector total Power Density Value:		1.87%

Sector 3

Antenna Number	Antenna Make	Antenna Model	Radio Type	Frequency Band	Technology	Power Out Per Channel (Watts)	Number of Channels	Composite Power	Antenna Gain (10 db reduction)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss (dB)	ERP	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	0.57%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	3.4	72	66	1/2 "	0.5	3	19.54	0.28%
3B	RFS	APXVTMM14-C-120	RRH	2500 MHz	CDMA / LTE	20	2	40	5.9	72	66	1/2 "	0.5	3	69.51	1.01%
														Sector total Power Density Value:		1.87%

Site Composite MPE %	
Carrier	MPE %
Sprint	5.61%
AT&T	8.00%
CTT	1.73%
CSP	3.17%
T-Mobile	0.38%
DOT	1.40%
FBI	8.50%
IRS	3.35%
OEM	2.90%
Total Site MPE %	**35.04%**

EBI Consulting
environmental | engineering | due diligence

Summary

All calculations performed for this analysis yielded results that were well within the allowable limits for general public Maximum Permissible Exposure (MPE) to radio frequency energy.

The anticipated Maximum Composite contributions from the Sprint facility are **5.61% (1.87% from sector 1, 1.87% from sector 2 and 1.87% from sector 3)** of the allowable FCC established general public limit considering all three sectors simultaneously sampled at the ground level.

The anticipated composite MPE value for this site assuming all carriers present is **35.04%** of the allowable FCC established general public limit sampled at 6 feet above ground level. This total composite site value is based upon MPE values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

DETAILED STRUCTURAL ANALYSIS AND EVALUATION OF AN EXISTING 120' SELF-SUPPORT LATTICE TOWER FOR NEW ANTENNA ARRANGEMENT

Site I.D.: CT03XC003
Site Name: New Haven - State Police Tower #27
Address: 142 Baldwin Drive, New Haven, CT
(aka 1065 Wintergreen Avenue, Hamden, CT)

prepared for

Sprint

1 International Blvd.
Suite 800
Mahwah, NJ 07495

prepared by

URS

URS CORPORATION
500 ENTERPRISE DRIVE, SUITE 3B
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TEL. 860-529-8882

36928689.00000
HPC-073 (Rev. 1)

July 27, 2014

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY

This report summarizes the structural analysis of the existing 120' self-supporting lattice tower structure located at 142 Baldwin Drive, New Haven; (aka 1065 Wintergreen Avenue, Hamden), Connecticut. The analysis was conducted in accordance with the 2005 Connecticut State Building Code, the TIA/EIA-222-F standard, and the Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) and 90 mph (fastest mile) concurrent with 0.5" ice. Twist (rotation) and sway (deflection) were determined in accordance with Connecticut State Police Requirements for a wind velocity of 90 mph (fastest mile) concurrent with 0.5" ice. The antenna loading considered in the analysis consists of all existing and proposed antennas, transmission lines, and ancillary items as outlined in the Introduction of this report.

The proposed Sprint antenna modification is listed below:

Proposed Antenna and Mount	Carrier	Antenna Center Elevation
Install: **(3) RFS APXVTM14-C-1 20 Panel Antennas** **(3) TD-RRH8x20-25 RRH Units** **(27) Antenna Jumper Cables** **(3) Commscope ATCB-B01-006 AISG Ret Control Cables** **(1) ALU Hybriflex Cable**	**Sprint (Proposed)**	**@ 72'**

The results of an initial analysis indicated the tower foundation did not have sufficient capacity to support the proposed loadings without modification. The required modifications is shown in SK-1. **Once the modifications are performed, the tower, anchor bolts, and foundation are considered structurally adequate with the wind loading classification specified above and all the existing and proposed antenna loading. No installation of new antennas or equipment shall occur until the modifications have been completed.**

The tower deflection (sway) is 0.3389 degrees, and the tower rotation (twist) is 0.1258 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for combined deflection (sway) and rotation (twist).**

1. EXECUTIVE SUMMARY - *continued*

This analysis is based on:

1) The tower structure's theoretical capacity, not including any assessment of the condition of the tower.
2) Tower geometry and structural member sizes utilized in the preparation of this report were obtained from manufacturer's original design documents prepared by Stainless, Inc. report number 358810, noted as revision B, dated March 3, 1995.
3) Previous tower reinforcement and structural analysis performed by URS Corporation, on behalf of AT&T, project number CTK-003 / 36939367, signed and sealed September 20, 2012.
4) Previous structural analysis performed by URS Corporation, project number TWS-009 / 36922446, signed and sealed July 17, 2013.
5) Antenna inventory provided by Connecticut State Police via e-mail on February 8, 2014.
6) Previous structural analysis performed by URS Corporation, project number HPC-069 / 36922446, signed and sealed March 19, 2014.
7) Antenna and mount configuration as specified within Section 2 and 6 of this report.
8) Coax cable orientation as specified in section 6 of this report.

This report is only valid as per the assumptions and data utilized in this report for antenna inventory, mounts and associated cables. The user of this report shall field verify the assumption of the antenna and mount configuration as well as the physical condition of the tower. Notify the engineer in writing immediately if any of the information in this report is found to be other than specified.

If you should have any questions, please call.

Sincerely,

URS Corporation

Richard A. Sambor, P.E.
Senior Structural Engineer

RAS/mcd

2. INTRODUCTION

The subject tower is located at 142 Baldwin Drive, New Haven; (aka 1065 Wintergreen Avenue, Hamden), Connecticut. The structure is an existing 120' self supporting steel tapered lattice tower, designed and manufactured by Stainless, Inc.

The inventory is summarized in the table below:

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 4' Lightning Rod	Tower (existing)	18' Pipe Mast on Top of Tower	138'	---
(1) RFS Celwave PD1142 -2B Omni	DOT – 1 (existing)	(3) Side Arms	120'	(1) 7/8"
(1) RFS Celwave PD458 Omni	CTT – 2 (existing)		120'	(1) 7/8"
(2) Katherein OGT9-806 Omni	CSP 8 & 9 (existing)		120'	(2) 1-5/8"
(1) 6' Dipole	CSP – 52 (existing)		120'	(1) 1-1/4"
(3) 6' Microwave Dishes	CSP – 69,70 & 71 (future)		120'	---
(3) SC479-HF1DF (1) TTA Unit	CSP 65 – 68 (existing)		120'	(3) 1-5/8" (1) 1/2"
(1) 6' Microwave Dish	CSP - 6 (existing)	(3) Dish Mounts	116'	(1) WE65
(1) 6' Microwave Dish	CSP - 4 (existing)		115'	(1) WE65
(1) 6' Microwave Dish	CSP - 7 (existing)		111'	(1) WE65
(1) Filter/Diplexer	CSP – 62 (existing)	(2) Side Arms	110'	(1) 1/2"
(1) Kathrein AP13-850/065 panel antennas	CSP – 41 (existing)		110'	(1) 1-5/8"
(1) SC479-HF1LDF	CSP – 54 (existing)		110'	(1) 1-5/8"
(3) SC479-HF1LDF (1) TTA Unit	CSP – 59 – 62 (existing)		110'	(3) 1-5/8" (1) 1/2"
(1) AP13-850/065/ADT	CSP – 42 (existing)	Leg Mounted	105'	(1) 1-5/8"
(1) Filter/Diplexer	DEHMS – 43 (existing)	Leg Mounted	105'	---
(2) Katherein OGT9-806 Omni	CSP 10 & 11 (existing)	(2) Pipe Mounts	103'	(2) 1-5/8"
(1) RFS Celwave PD458 Omni	CTT – 3 (existing)	Leg Mounted	100'	(1) 7/8"

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(3) Ericsson AIR21 B2A|B4P Panel Antennas (3) Ericsson AIR21 B4A|B2P Panel Antennas (3) (AWS) TMA Units	T-Mobile (Proposed)	(3) T-Arm Mounts	95'	(6) 1 5/8" (1) 1 1/4" F.O. Cable (2) Fiber Optic Cables
(1) 20' 4-Bay Dipole	USS – 24 (existing)	Side Arm	90'	(1) 7/8"
(1) RFS Celwave PD1142 -2B Omni	DEHMS – 26 (existing)	Side Arm	85'	(1) 7/8"
(1) 3' Yagi antenna	CSP – 14 (existing)	Leg Mounted	85'	(1) 7/8"
(4) SBNH-1D6565C (2A & 2B) (2) AM-X-CD-16-65-00T (2C) (6) TMAs (12) Diplexers	AT&T (existing)	Frame Mount	80'	(8) 1-1/4" (4) 1-1/4"
(1) 20' 4-Bay Dipole	USS – 12 (existing)	Leg Mounted	78'	(1) 7/8"
(3) RFS APXVTM14-C-1 20 Panel Antennas (3) TD-RRH8x20-25 RRH Units (27) Antenna Jumper Cables	**Sprint (Proposed)**	See Below	**72'**	**(3) Commscope ATCB-B01-006 AISG Ret Control Cables (1) ALU Hybriflex 1-1/4" Coax**
(3) RFS APXVSPP18-C-A20 (6) ALU RRH 4X45 65MHz (3) ALU RRH 800 MHz 2x50W (3) 800 MHz NOTCH FILTER (3) 1900 RRH COMBINER	Sprint (existing)	Pipe Mounts on existing Frame	72'	(3) HYBRIFLEX 1 -1/4" Coax
(1) 2' Microwave Panel	NHVN – 57 (existing)	Leg Mounted	70'	(1) CAT5
(1) DB212	DEHMS – 47 (existing)	(2) Stand-offs	60'	(1) 7/8"
(1) DB803M-Y	CSP – 53 (existing)		60'	(1) 1/2"
(1) GPS	AT&T – 25 (existing)		60'	(1) 7/8"
(1) GPS	Sprint – 18 (existing)		60'	(1) 1/2"
(1) BA6312 Omni	NHVN – 45 (existing)		60'	(1) 7/8"
(1) 4' Whip	NHVN – 46 (existing)		60'	(1) 7/8"
(1) 20' Dipole	USS – 13 (existing)	2' Side Arm	56'	(1) 7/8"
(1) Decibel DB-264	CSP – 5 (existing)	Leg Mounted	55'	(1) 7/8"
(1) 1' Microwave Panel	NHVN – 58 (existing)	Leg Mounted	50'	(1) CAT5

Antenna Type	*Carrier*	*Mount*	*Antenna Centerline Elevation*	*Cable*
(1) 4' Dish	NHVN – 44 (existing)	3' Side Arm	40'	(2) 1/2"
(1) 3' Microwave Panel	FBI –51 (existing)	Leg Mount	40'	(1) 1/2"
(1) 1' Whip	FBI – 50 (existing)	Leg Mount	35'	(1) 1/2"
(1) 3' Whip	CSP – 48 (existing)	Leg Mount	30'	(1) 1/2"

Notes: Refer to coax feed-line plan within Section 6 of this report for coax locations.

This structural analysis of the communications tower was performed by URS Corporation (URS) for Sprint. The purpose of this analysis was to investigate the structural integrity of the reinforced tower with its existing, future and proposed antenna loads. This analysis was conducted to evaluate twist (rotation), sway (deflection), and stress on the tower and the effect of forces.

3. ANALYSIS METHODOLOGY AND LOADING CONDITIONS

The structural analysis was done in accordance with the 2005 Connecticut State Building Code, TIA/EIA-222-F - Structural Standard for Steel Antenna Towers and Antenna Supporting Structures, and the American Institute of Steel Construction (AISC) Manual of Steel Construction - Allowable Stress Design (ASD).

The analysis was conducted using TNX Tower 6.1.3.1. Two load conditions were evaluated as shown below which were compared to allowable stresses according to AISC and TIA/EIA.

Load Condition 1 = 90 mph (fastest mile) Wind Load + Tower Dead Load
Load Condition 2 = 90 mph (fastest mile) Wind Load (with ice) + Ice Load + Tower Dead Load

The TIA/EIA standard permits a one-third increase in allowable stresses for towers and monopoles less than 700 feet tall. For the purposes of this analysis, in computing the load capacity the allowable stresses of the tower members were increased by one-third.

4. FINDINGS AND EVALUATION

The combined axial and bending stresses on the tower structure were evaluated to compare with the allowable stress in accordance with AISC. The results of an initial analysis indicated that the tower foundation required modification. The required modifications is shown in SK-1 located in Section 6 of this report. This analysis indicated that once these modifications are performed, the tower, anchor bolts and foundation are considered structurally adequate with the wind load classification specified above and the proposed antenna loading. The table below summarizes the critical members for each tower component.

The tower deflection (sway) is 0.3389 degrees, and the tower rotation (twist) is 0.1258 degrees. These figures are within the Connecticut State Police specification of 0.75 degrees for deflection (sway) and rotation (twist).

Tower Base Reactions:

Base Reactions	Proposed Tower Reactions
Axial Load (kips)	52
Shear per Leg (kips)	32
Total Shear (kips)	57
Uplift per Leg (kips)	210
Comp.per Leg (kips)	251
O.T. Moment (ft-kips)	4250

For detailed proposed tower reactions, see drawing no. E-1 in section 6 of this report.

Tower Component Stress vs. Capacity Summary:

Component/ (Section No.)	Existing Component Size	Controlling Component/Elevation	Stress (% capacity)	Pass/Fail
Tower Leg (T8)	P5x0.4	Compression/25'-50'	86.7 %	**Pass**
Diagonal (T5)	2L2 1/2x2/3/16	Compression/83.333'-91.667'	90.9 %	**Pass**
Horizontal (T7)	L3x3x1/4	Compression/50'-75'	86.5 %	**Pass**
Top Girt (T8)	L3x3x1/4	Compression/25'-50'	97.0 %	**Pass**
Inner Bracing (T8)	L2-1/2x2x3/16	Compression/25'-50'	7.5 %	**Pass**
Bolt Checks	(1) 3/4" A325X Diagonal Bolt	Member Bearing/50'	79.6 %	**Pass**
Anchor Bolts	1 1/2" dia. A36	Tension & Shear	92 %	**Pass**
Foundation	Rock Anchors	Tension	74 %	**Pass**

Tower Deflection (Sway) and Rotation (Twist) at the top of the tower (degrees):

Description	Current	Allowable
Tower Sway (degrees)	0.3389	N/A
Tower Twist (degrees)	0.1258	
Total (degrees)	0.4647	0.750

5. CONCLUSIONS AND RECOMMENDATIONS

The results of an initial analysis indicated the tower foundation did not have sufficient capacity to support the proposed loadings without modification. The required modifications is shown in SK-1. **Once the modifications are performed, the tower, anchor bolts, and foundation are considered structurally adequate with the wind loading classification specified above and all the existing and proposed antenna loading. No installation of new antennas or equipment shall occur until the modifications have been completed.**

The tower deflection (sway) is 0.3389 degrees, and the tower rotation (twist) is 0.1258 degrees with a wind velocity of 90 mph concurrent with 0.5" ice. **The tower deflection and rotation are within the Connecticut State Police specification of 0.75 degrees for combined deflection (sway) and rotation (twist).**

Limitations/Assumptions:

This report is based on the following:

1. Tower inventory as listed in this report.
2. Tower is properly installed and maintained.
3. All members are as specified in the original design documents and are in good condition.
4. All required members are in place.
5. All bolts are in place and are properly tightened.
6. Tower is in plumb condition.
7. All member protective coatings are in good condition.
8. All tower members were properly designed, detailed, fabricated, and installed and have been properly maintained since erection.
9. Foundations were properly constructed to support original design loads as specified in the original design documents.

URS is not responsible for any modifications completed prior to or hereafter in which URS is not or was not directly involved. Modifications include but are not limited to:

A. Adding antennas
B. Removing/replacing antennas
C. Adding coaxial cables

URS hereby states that this document represents the entire report and that it assumes no liability for any factual changes that may occur after the date of this report. All representations, recommendations, and conclusions are based upon information contained and set forth herein. If you are aware of any information which conflicts with that which is contained herein, or you are aware of any defects arising from original design, material, fabrication, or erection deficiencies, you should disregard this report and immediately contact URS. URS disclaims all liability for any representation, recommendation, or conclusion not expressly stated herein.

Ongoing and Periodic Inspection and Maintenance:

After the Contractor has successfully completed the installation and the work has been accepted, the owner will be responsible for the ongoing and periodic inspection and maintenance of the tower.

The owner shall refer to TIA/EIA-222-F for recommendations for maintenance and inspection. The frequency of the inspection and maintenance intervals is to be determined by the owner based upon actual site and environmental conditions. It is recommended that a complete and thorough inspection of the entire tower structural system be performed at least yearly and more frequently as conditions warrant. According to TIA/EIA-222-F section 14.1, Note 1: It is recommended that the structure be inspected after severe wind and/or ice storms or other extreme loading condition.

6. DRAWINGS AND DATA

TOWER REINFORCING DRAWING SK-1

GENERAL CONSTRUCTION NOTES

1. ALL WORK SHALL COMPLY WITH THE CONNECTICUT STATE BUILDING AND LIFE SAFETY CODES, SUPPLEMENTS AND AMENDMENTS.
2. CONTRACTOR IS TO REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUB-CONTRACTORS AND ALL RELATED PARTIES. THE SUB-CONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD-OUT WITH ALL FINISHES, STRUCTURAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON DRAWINGS OR WRITTEN IN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, AND ELECTRICAL. SUB-CONTRACTORS SHALL PAY FOR THEIR PERMITS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND ENSURE THE DISTRIBUTION OF NEW DRAWINGS TO SUB-CONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. CONTRACTOR SHALL FURNISH 'AS-BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. INSTALLATION OF THIS WIRELESS COMMUNICATIONS EQUIPMENT SITE REQUIRES WORK IN THE IMMEDIATE VICINITY OF EXISTING TELECOMMUNICATION SYSTEMS. THE CONTRACTOR SHALL PROVIDE AND COORDINATE THE METHODS OF PROTECTION WITH THE VARIOUS TELECOMMUNICATION CARRIERS.
8. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUB-CONTRACTORS FOR ANY CONDITION PER MFR'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR ARCHITECT.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON-SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
10. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ARCHITECT FOR REVIEW. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTAL TO THE ARCHITECT FOR REVIEW.
11. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA. SUBMIT TO THE ARCHITECT ANY DISCREPANCIES FROM THE DRAWINGS.
12. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING TOWER AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
13. CONTRACTOR TO CONTACT "CALL BEFORE YOU DIG" AT 1-800-922-4455 TO VERIFY AND IDENTIFY THE EXACT LOCATIONS OF ALL UNDERGROUND UTILITIES AND OBSTRUCTIONS IDENTIFIED PRIOR TO COMMENCING WORK IN THE CONTRACT AREA.
14. CONTRACTOR SHALL COMPLY WITH OWNER ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
15. EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE DOCUMENTS ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FILED MEASUREMENTS ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REVERENCE ONLY.
16. CONTRACTOR TO VERIFY REQUIRED CLEARANCES INCLUDING BUT NOT LIMITED TO EXISTING BUILDINGS, EQUIPMENT PADS AND SHELTERS PRIOR TO COMMENCING WORK.
17. THE OMISSION OF ANY MATERIAL THAT WAS SHOWN ON THE CONTRACT DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR OF PROVIDING THE SAME.
18. STRUCTURE IS DESIGNED TO BE LEVEL AND PLUMB, SELF-SUPPORTING AND STABLE AFTER WORK IS COMPLETED.
19. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE DURING CONSTRUCTION. THE CONTRACTOR SHALL BE AWARE OF WEATHER AND WIND CONDITIONS AND NOT PERFORM TOWER MEMBER REPLACEMENT IN A WIND.

STRUCTURAL NOTES

STRUCTURAL STEEL MATERIAL:

STRUCTURAL PLATES ASTM A36
STEEL BEAMS, CHANNELS & ANGLES ASTM A36

MODIFICATIONS SHOWN ARE FOR EACH FACE OR LEG UNLESS NOTED OTHERWISE

UNLESS OTHERWISE NOTED, ALL STEEL WILL BE GALVANIZED IN ACCORDANCE WITH ASTM 123 AFTER FABRICATION. TOUCH UP ALL DAMAGED GALVANIZED STEEL WITH APPROVED COLD ZINC, "GALVANOX", "DRY GALV", "ZINC-IT", OR APPROVED EQUIVALENT, IN ACCORDANCE WITH MANUFACTURERS GUIDELINES. TOUCH-UP DAMAGED NON GALVANIZED STEEL WITH SAME PAINT APPLIED IN SHOP OR FIELD.

EXISTING DIMENSIONS OF STRUCTURE SHOWN ON THESE DOCUMENTS ARE NOT GUARANTEED. CONTRACTOR SHALL TAKE FIELD DIMENSIONS AS NECESSARY TO ASSURE PROPER FIT OF ALL FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENT ARE SUBMITTED FOR REVIEW, DIMENSIONS ARE PROVIDED FOR THE ENGINEER'S REFERENCE ONLY.

ALL WELDING SHALL BE DONE BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS STANDARDS, USING E70XX ELECTRODES UNLESS OTHERWISE NOTED. WHERE WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZES PER "PREQUALIFIED WELDED JOINTS" TABLES IN AISC "MANUAL OF STEEL CONSTRUCTION", NINTH EDITION.

IF WELDING GALVANIZED MATERIALS, USE PRECAUTIONS & PROCEDURES PER AWS D1.1.

MILL BEARING ENDS OF COLUMNS, STIFFENERS, AND OTHER BEARING SURFACES TO TRANSFER LOAD OVER ENTIRE CROSS SECTION.

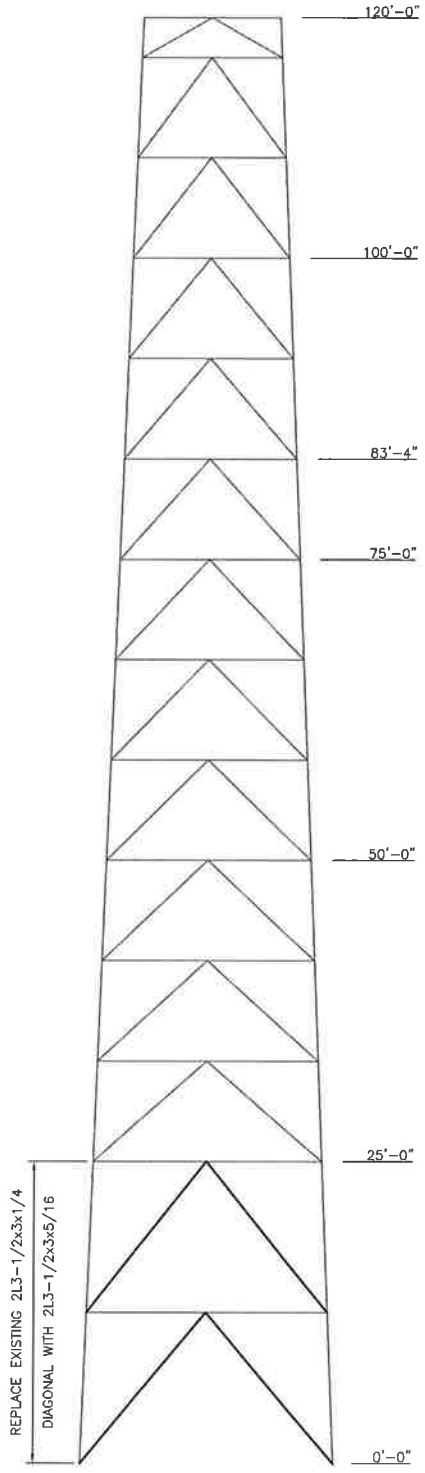
CONNECTIONS / FIELD ASSEMBLY:

COMMENCEMENT OF STRUCTURAL STEEL WORK WITHOUT NOTIFYING THE ENGINEER OF ANY DISCREPANCIES WILL BE CONSIDERED ACCEPTANCE OF PRECEDING WORK.

BOLT REQUIREMENTS:

BOLTED CONNECTIONS REMOVED DURING CONSTRUCTION SHALL BE REPLACED IN KIND AND BOLTS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325-X.

BOLTED CONNECTIONS SHALL BE TIGHTENED TO SNUG TIGHT AS DEFINED BY THE AISC, SPECIFICALLY THE SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS.



1 / SK-1 TOWER ELEVATION
SCALE: N.T.S.

SITE ID NO:	36928697
Designed by:	MCD
Drawn by:	PD
Checked by:	ICA
Approved by:	RAS

URS CORPORATION AES
500 ENTERPRISE DRIVE
ROCKY HILL, CONNECTICUT
860-529-8882

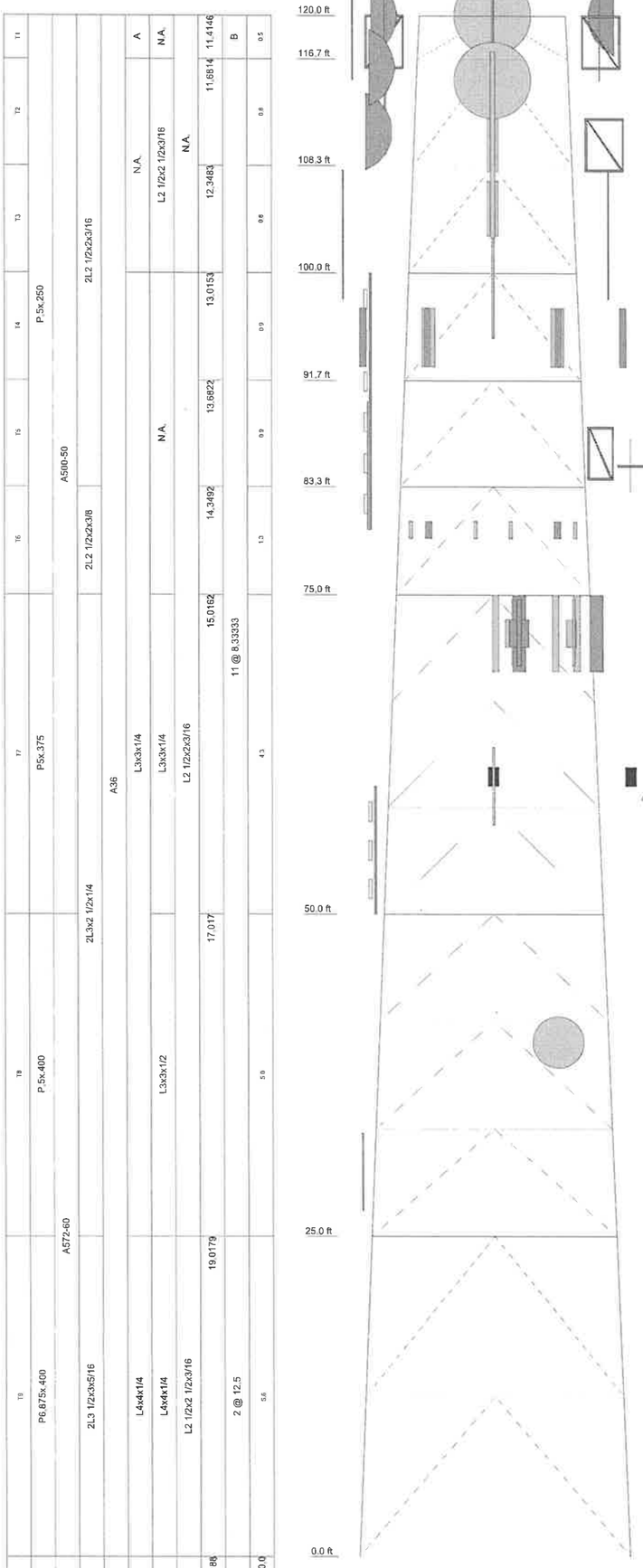
Sprint

SITE ADDRESS:
120' State Police Tower
Tower #27
142 BALDWIN DRIVE
NEW HAVEN, CONNECTICUT

REV.	DATE:	DESCRIPTION

Scale:
Date: 05/01/14
Job No.HPC 074
File No.
Dwg. No. SK-1
Dwg. 1 of 2

TNX TOWER INPUT/OUTPUT SUMMARY



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4' (Tower)	138	Mount (ATT)	80
16'x2.5" Pipe Mount (Tower)	128	Mount (ATT)	80
1142-2B (DOT - 1)	120	(4) Diplexer (ATT)	80
PD458-1 (CTT - 2)	120	(4) Diplexer (ATT)	80
OGT9-806 (CSP - 9)	120	(4) Diplexer (ATT)	80
OGT9-806 (CSP - 8)	120	(2) SBNH-1D6565C (ATT)	80
SC479-HF1LDF (CSP - 59)	120	(2) SBNH-1D6565C (ATT)	80
6' Dipole (CSP - 52)	120	VHF150 (USS - 12)	78
(2) SC479-HF1LDF (CSP - 55_56)	120	1900 RRH COMBINER (Sprint)	72
Filter/Diplexer (CSP - 62)	120	1900 RRH COMBINER (Sprint)	72
6FT DISH (CSP - 69)	120	APXVSPP18-C-A20 (Sprint)	72
6FT DISH (CSP - 70)	120	APXVSPP18-C-A20 (Sprint)	72
6FT DISH (CSP - 71)	120	APXVSPP18-C-A20 (Sprint)	72
6' Side-Arm	118	(2) ALU RRH 1900 4X45 65MHz (Sprint)	72
6' Side-Arm	118	(2) ALU RRH 1900 4X45 65MHz (Sprint)	72
6' Side-Arm	118	(2) ALU RRH 1900 4X45 65MHz (Sprint)	72
PA6-65AC (CSP - 6)	116	ALU RRH 800 MHz 2x50W (Sprint)	72
6'x4" Pipe Mount (Dish Mount)	116	ALU RRH 800 MHz 2x50W (Sprint)	72
PA6-65AC (CSP - 4)	115	ALU RRH 800 MHz 2x50W (Sprint)	72
10'0"x4" Pipe Mount (Dish Mount)	115	APXVTM14-C-1 20 (Sprint)	72
PA6-65AC (CSP - 7)	111	TD-RRH8x20-25 (Sprint)	72
6'x4" Pipe Mount (Dish Mount)	111	APXVTM14-C-1 20 (Sprint)	72
6' Side-Arm	110	TD-RRH8x20-25 (Sprint)	72
SC479-HF1LDF (CSP - 59)	110	APXVTM14-C-1 20 (Sprint)	72
SC479-HF1LDF (CSP - 54)	110	TD-RRH8x20-25 (Sprint)	72
Filter/Diplexer (CSP - 62)	110	5'3"x4" Pipe Mount (Sprint)	72
SC479-HF1LDF (CSP - 65)	110	5'3"x4" Pipe Mount (Sprint)	72
AP13-850/065/ADT w/Mount Pipe (CSP - 41)	110	5'3"x4" Pipe Mount (Sprint)	72
(2) SC479-HF1LDF (CSP - 60_61)	110	800 MHz NOTCH FILTER (Sprint)	72
6' Side-Arm	110	1900 RRH COMBINER (Sprint)	72
AP13-850/065/ADT w/Mount Pipe (CSP - 42)	105	Mount (Sprint/Nextel)	72
Diplexer (DEHMS - 43)	105	Mount (Sprint/Nextel)	72
OGT9-806 (CSP - 11)	103	Mount (Sprint/Nextel)	72
OGT9-806 (CSP - 10)	103	800 MHz NOTCH FILTER (Sprint)	72
3'4"x4" Pipe Mount (CSP - 11)	103	800 MHz NOTCH FILTER (Sprint)	72
3'4"x4" Pipe Mount (CSP - 10)	103	2' Microwave Panel (NHVN - 57)	70
PD458-1 (CTT - 3)	100	DB212-1 (DEHMS - 47)	60
EUSF10-U (T-Mobile)	95	DB803M-Y (CSP - 53)	60
EUSF10-U (T-Mobile)	95	Mount (ATT)	60
EUSF10-U (T-Mobile)	95	GPS (Sprint/Nextel - 18)	60
(2) AIR B2A/B4P (T-Mobile)	95	Mount (Sprint/Nextel)	60
(2) AIR B2A/B4P (T-Mobile)	95	BA6312 (NHVN - 45)	60
(2) AIR B2A/B4P (T-Mobile)	95	4' Whip (NHVN - 46)	60
TMA (T-Mobile)	95	GPS (ATT - 25)	60
TMA (T-Mobile)	95	2' Sidearm	56
TMA (T-Mobile)	95	Mount	56
20' 4-Bay Dipole (USS - 24)	90	VHF150 (USS - 13)	56
Mount	88	DB264-A (CSP - 5)	55
Mount	86	1' Microwave Panel (NHVN - 58)	50
3' Yagi (CSP - 14)	85	3' Side arm	44
PD1142-2B (DEHMS - 26)	85	5'0"x3" Pipe Mount	44
(2) AM-X-CD-16-65-00T-RET (6') (ATT)	80	4 FT DISH (NHVN - 44)	40
(2) TMA (ATT)	80	3' Panel (FBI - 51)	40
(2) TMA (ATT)	80	1' Omni (FBI - 50)	35
(2) TMA (ATT)	80	4' Whip (CSP - 48)	30
Mount (ATT)	80		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L2 1/2x2 1/2x3/16	B	1 @ 3.33333

MATERIAL STRENGTH

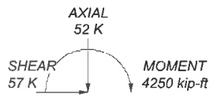
GRADE	Fy	Fu	GRADE	Fy	Fu
A500-50	50 ksi	62 ksi	A572-60	60 ksi	75 ksi
A36	36 ksi	58 ksi			

TOWER DESIGN NOTES

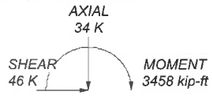
1. Tower designed for a 90 mph basic wind in accordance with the TIA/EIA-222-F Standard.
2. Tower is also designed for a 90 mph basic wind with 0.50 in ice.
3. Deflections are based upon a 90 mph wind.
4. TOWER RATING: 97%

MAX. CORNER REACTIONS AT BASE:
DOWN: 251 K
SHEAR: 32 K

UPLIFT: -210 K
SHEAR: 29 K



TORQUE 88 kip-ft
90 mph WIND - 0.5000 in ICE



TORQUE 64 kip-ft
REACTIONS - 90 mph WIND

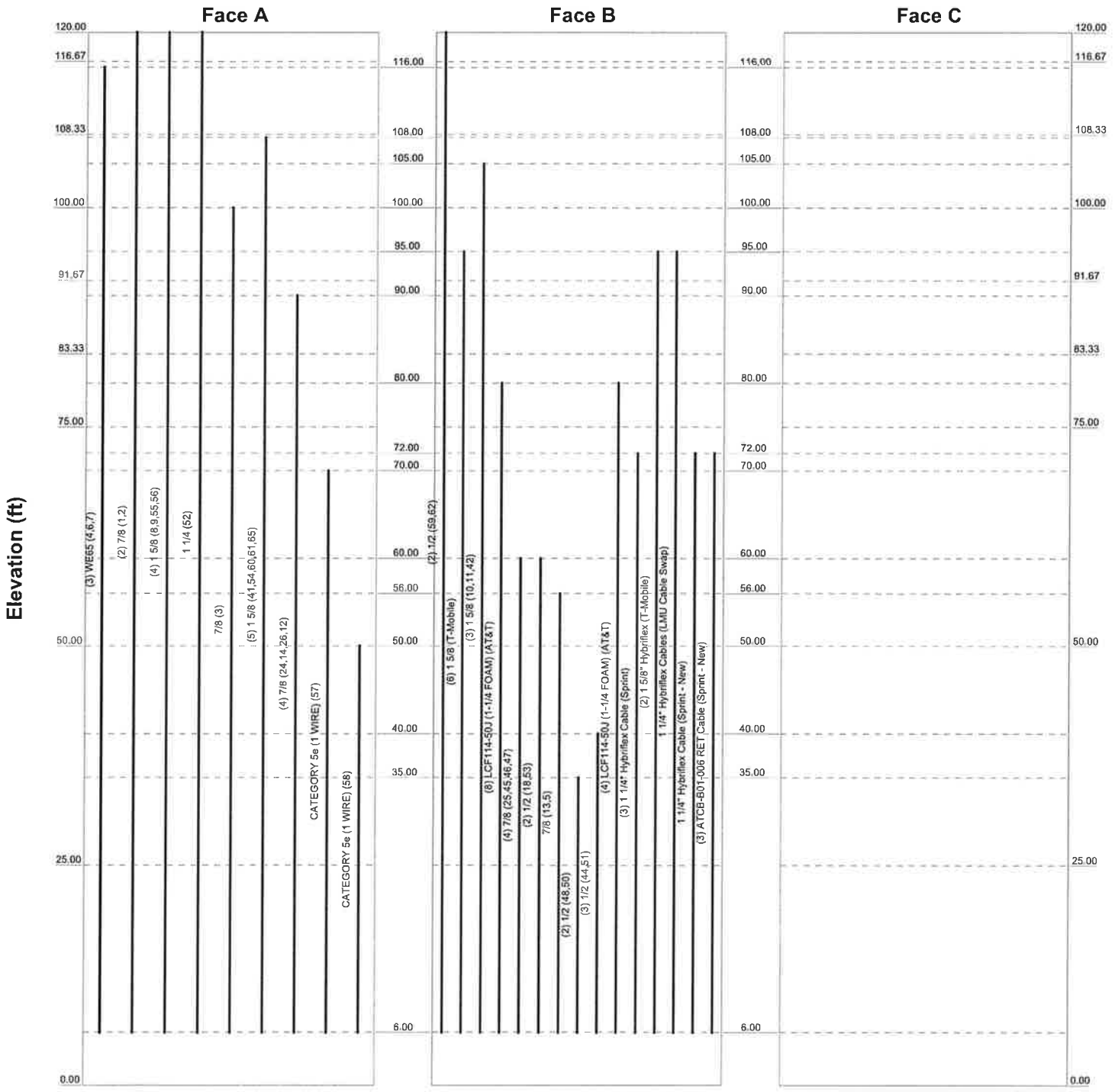
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job:	*120' Self-Supporting Lattice Tower*
Project:	*Connecticut State Police Tower - West Rock*
Client: Sprint / HPC-073 Rev.1	Drawn by: MCD App'd:
Code: TIA/EIA-222-F	Date: 07/27/14 Scale: NTS
Path:	Dwg No. E-1

TNX TOWER FEEDLINE DISTRIBUTION CHART

Feed Line Distribution Chart
0' - 120'

_____ Round _____ Flat _____ App In Face _____ App Out Face _____ Truss Leg



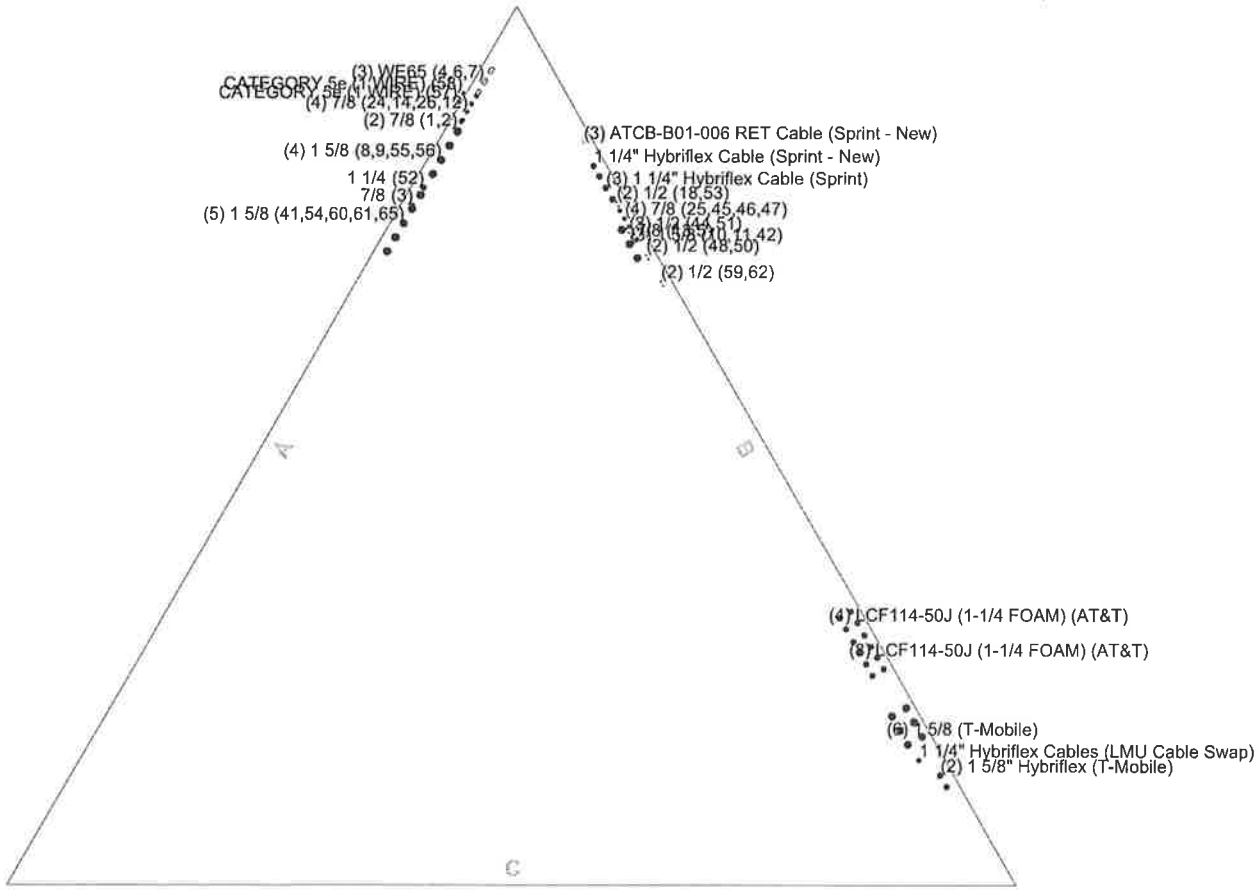
URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job:	***120' Self-Supporting Lattice Tower***		
Project:	***Connecticut State Police Tower - West Rock***		
Client: Sprint / HPC-073 Rev.1		Drawn by: MCD	App'd:
Code: TIA/EIA-222-F		Date: 07/27/14	Scale: NTS
Path:			Dwg No. E-7

TNX TOWER FEEDLINE PLAN

Feed Line Plan

_____ Round _____ Flat _____ App In Face App Out Face

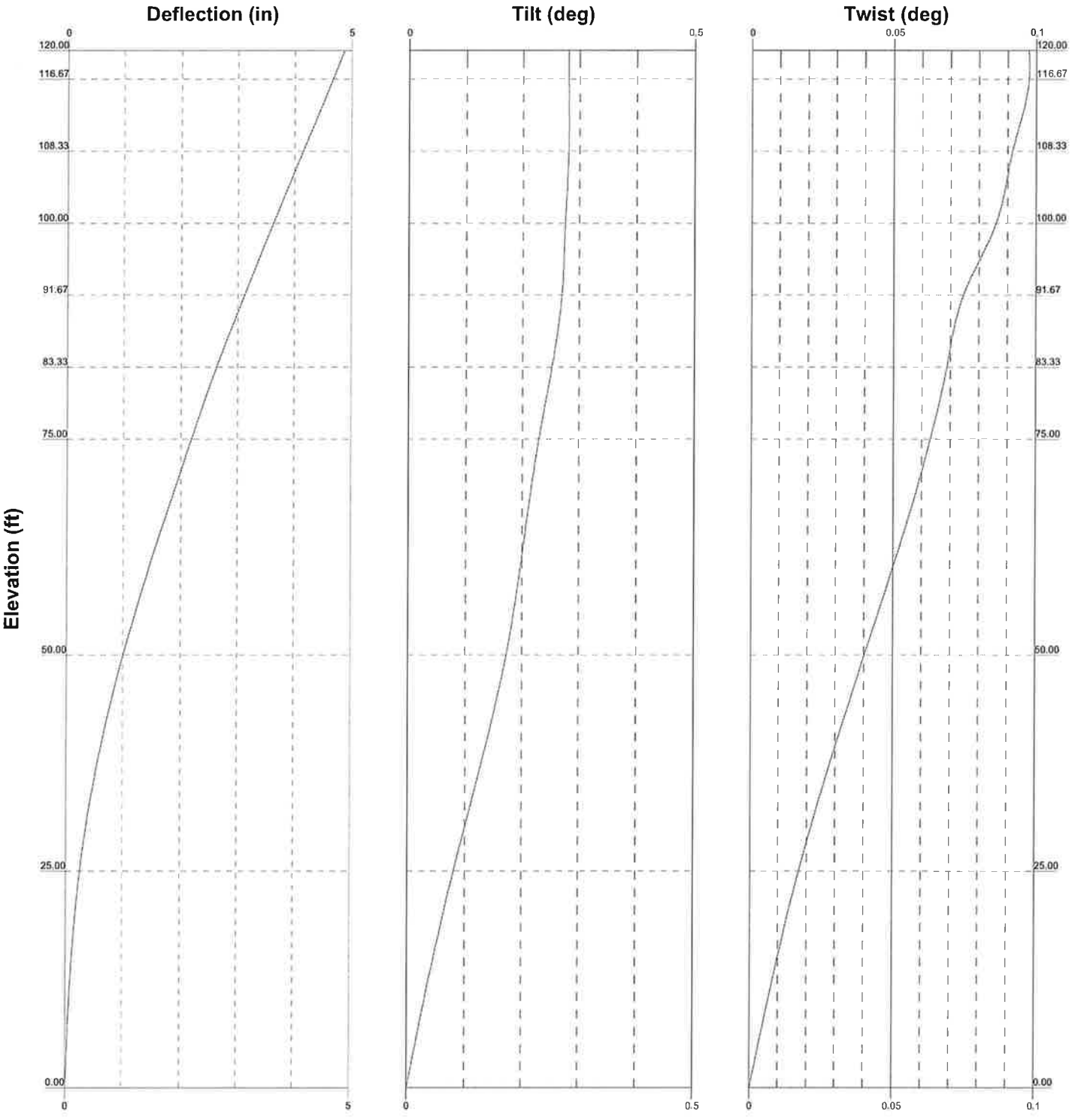


URS Corporation 500 Enterprise Drive, Suite 3B Rocky Hill, CT 06067 Phone: 860-529-8882 FAX: 860-529-3991	Job: **120' Self-Supporting Lattice Tower**		
	Project: **Connecticut State Police Tower - West Rock**		
	Client: Sprint / HPC-073 Rev.1	Drawn by: MCD	App'd:
	Code: TIA/EIA-222-F	Date: 07/27/14	Scale: NTS
	Path:		Dwg No. E-7

TNX DEFLECTION, TILT AND TWIST

TIA/EIA-222-F - Service - 90 mph

Maximum Values



URS Corporation
500 Enterprise Drive, Suite 3B
Rocky Hill, CT 06067
Phone: 860-529-8882
FAX: 860-529-3991

Job: *120' Self-Supporting Lattice Tower*			
Project: *Connecticut State Police Tower - West Rock*			
Client: Sprint / HPC-073 Rev.1	Drawn by: MCD	App'd:	
Code: TIA/EIA-222-F	Date: 07/27/14	Scale: NTS	
Path:		Dwg No. E-5	

TNX TOWER DETAILED OUTPUT

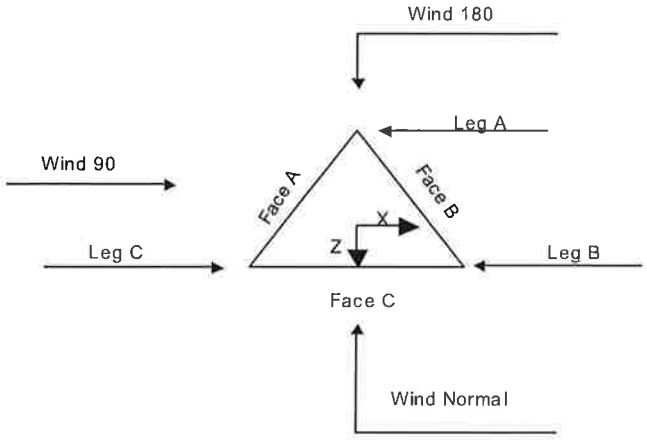
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 120.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 11.41 ft at the top and 21.02 ft at the base.
This tower is designed using the TIA/EIA-222-F standard.
The following design criteria apply:

Basic wind speed of 90 mph.
Nominal ice thickness of 0.5000 in.
Ice density of 56 pcf.
A wind speed of 90 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 90 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.333.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	120.00-116.67			11.41	1	3.33
T2	116.67-108.33			11.68	1	8.33
T3	108.33-100.00			12.35	1	8.33
T4	100.00-91.67			13.02	1	8.33
T5	91.67-83.33			13.68	1	8.33
T6	83.33-75.00			14.35	1	8.33
T7	75.00-50.00			15.02	1	25.00
T8	50.00-25.00			17.02	1	25.00
T9	25.00-0.00			19.02	1	25.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	120.00-116.67	3.33	K Brace Down	No	Yes	0.0000	0.0000
T2	116.67-108.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T3	108.33-100.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T4	100.00-91.67	8.33	K Brace Down	No	Yes	0.0000	0.0000
T5	91.67-83.33	8.33	K Brace Down	No	Yes	0.0000	0.0000
T6	83.33-75.00	8.33	K Brace Down	No	Yes	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T7	75.00-50.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T8	50.00-25.00	8.33	K Brace Down	No	Yes	0.0000	0.0000
T9	25.00-0.00	12.50	K Brace Down	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 120.00-116.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T2 116.67-108.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T3 108.33-100.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T4 100.00-91.67	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/16	A36 (36 ksi)
T6 83.33-75.00	Pipe	P.5x.250	A500-50 (50 ksi)	Double Angle	2L2 1/2x2x3/8	A36 (36 ksi)
T7 75.00-50.00	Pipe	P5x.375	A500-50 (50 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T8 50.00-25.00	Pipe	P.5x.400	A572-60 (60 ksi)	Double Angle	2L3x2 1/2x1/4	A36 (36 ksi)
T9 25.00-0.00	Pipe	P6.875x.400	A572-60 (60 ksi)	Double Angle	2L3 1/2x3x5/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 120.00-116.67	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T4 100.00-91.67	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T5 91.67-83.33	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T6 83.33-75.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T7 75.00-50.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T8 50.00-25.00	Single Angle	L3x3x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)
T9 25.00-0.00	Single Angle	L4x4x1/4	A36 (36 ksi)	Solid Round		A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 120.00-116.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T2 116.67-108.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 108.33-100.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 100.00-91.67	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T5 91.67-83.33	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T6 83.33-75.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T7 75.00-50.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/4	A36 (36 ksi)
T8 50.00-25.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L3x3x1/2	A36 (36 ksi)
T9 25.00-0.00	None	Flat Bar		A36 (36 ksi)	Single Angle	L4x4x1/4	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T4 100.00-91.67	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T5 91.67-83.33	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T6 83.33-75.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T7 75.00-50.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T8 50.00-25.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2x3/16	A36 (36 ksi)
T9 25.00-0.00	Solid Round		A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
T1 120.00-116.67	0.00	0.0000	A36 (36 ksi)	1	1	1	Mid-Pt	36.0000
T2	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
116.67-108.33			(36 ksi)					
T3	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
108.33-100.00			(36 ksi)					
T4	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
100.00-91.67			(36 ksi)					
T5 91.67-83.33	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
			(36 ksi)					
T6 83.33-75.00	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
			(36 ksi)					
T7 75.00-50.00	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
			(36 ksi)					
T8 50.00-25.00	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
			(36 ksi)					
T9 25.00-0.00	0.00	0.0000	A36	1	1	1	Mid-Pt	36.0000
			(36 ksi)					

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1	Yes	Yes	1	1	1	1	1	1	1	1
120.00-116.67				1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1
116.67-108.33				1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1
108.33-100.00				1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1
100.00-91.67				1	1	1	1	1	1	1
T5	Yes	Yes	1	1	1	1	1	1	1	1
91.67-83.33				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
83.33-75.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
75.00-50.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
50.00-25.00				1	1	1	1	1	1	1
T9 25.00-0.00	Yes	Yes	1	1	1	1	1	1	1	1
				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 120.00-116.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 116.67-108.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 108.33-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 100.00-91.67	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 91.67-83.33	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 83.33-75.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 75.00-50.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 50.00-25.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 25.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 120.00-116.67	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T2 116.67-108.33	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T3 108.33-100.00	Flange	0.0000 A325X	0	0.7500 A325X	1	0.6250 A325X	0	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T4 100.00-91.67	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T5 91.67-83.33	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.0000 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T6 83.33-75.00	Flange	0.7500 A325X	0	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T7 75.00-50.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T8 50.00-25.00	Flange	0.7500 A325X	6	0.7500 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0
T9 25.00-0.00	Flange	1.0000 A325X	8	1.0000 A325X	1	0.6250 A325X	2	0.6250 A325X	0	0.6250 A325N	0	0.6250 A325X	2	0.6250 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
WE65 (4,6,7) 7/8	A	Yes	Af (CfAe)	116.00 - 6.00	-2.0000	0.42	3	3	1.5836	1.5836	5.1284	0.53
	A	Yes	Ar (CfAe)	120.00 - 6.00	-2.0000	0.37	2	2	1.1100	1.1100		0.54

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
(1,2)												
1 5/8	A	Yes	Ar (CfAe)	120.00 - 6.00	-2.0000	0.34	4	4	1.9800	1.9800		1.04
(8,9,55,56)												
1 1/4	A	Yes	Ar (CfAe)	120.00 - 6.00	-2.0000	0.3	1	1	1.5500	1.5500		0.66
(52)												
7/8	A	Yes	Ar (CfAe)	100.00 - 6.00	-2.0000	0.28	1	1	1.1100	1.1100		0.54
(3)												
1 5/8	A	Yes	Ar (CfAe)	108.00 - 6.00	-2.0000	0.26	5	5	1.9800	1.9800		1.04
(41,54,60,61,65)												
1/2	B	Yes	Ar (CfAe)	120.00 - 6.00	-2.0000	-0.19	2	2	0.5800	0.5800		0.25
(59,62)												
1 5/8	B	Yes	Ar (CfAe)	95.00 - 6.00	-5.0000	0.31	6	3	1.9800	1.9800		1.04
(T-Mobile)												
1 5/8	B	Yes	Ar (CfAe)	105.00 - 6.00	-3.5000	-0.24	3	3	1.9800	1.9800		1.04
(10,11,42)												
LCF114-50J	B	Yes	Ar (CfAe)	80.00 - 6.00	-4.5000	0.23	8	4	1.5800	1.5800		0.70
(1-1/4 FOAM)												
(AT&T)												
7/8	B	Yes	Ar (CfAe)	60.00 - 6.00	-2.0000	-0.26	4	4	1.1100	1.1100		0.54
(25,45,46,47)												
1/2	B	Yes	Ar (CfAe)	60.00 - 6.00	-2.0000	-0.28	2	2	0.5800	0.5800		0.25
(18,53)												
7/8	B	Yes	Ar (CfAe)	56.00 - 6.00	-2.0000	-0.24	1	1	1.1100	1.1100		0.54
(13,5)												
1/2	B	Yes	Ar (CfAe)	35.00 - 6.00	-2.0000	-0.22	2	2	0.5800	0.5800		0.25
(48,50)												
1/2	B	Yes	Ar (CfAe)	40.00 - 6.00	-3.0000	-0.25	3	3	0.5800	0.5800		0.25
(44,51)												
7/8	A	Yes	Ar (CfAe)	90.00 - 6.00	-2.0000	0.39	4	4	1.1100	1.1100		0.54
(24,14,26,12)												
CATEGORY	A	Yes	Ar (CfAe)	70.00 - 6.00	0.0000	0.39	1	1	1.0000	1.0000		0.21
5e (1 WIRE)												
(57)												
CATEGORY	A	Yes	Ar (CfAe)	50.00 - 6.00	0.0000	0.4	1	1	1.0000	1.0000		0.21
5e (1 WIRE)												
(58)												
LCF114-50J	B	Yes	Ar (CfAe)	80.00 - 6.00	-4.5000	0.19	4	2	1.5800	1.5800		0.70
(1-1/4 FOAM)												
(AT&T)												
1 1/4"	B	Yes	Ar (CfAe)	72.00 - 6.00	-2.0000	-0.3	3	3	1.6250	1.6250		1.60
Hybriflex												
Cable												
(Sprint)												
1 5/8"	B	Yes	Ar (CfAe)	95.00 - 6.00	-2.0000	0.375	2	2	1.6250	1.6250		0.21
Hybriflex												
(T-Mobile)												
1 1/4"	B	Yes	Ar (CfAe)	95.00 - 6.00	-5.0000	0.345	1	1	1.2500	1.2500		0.42
Hybriflex												
Cables												
(LMU Cable												
Swap)												
1 1/4"	B	Yes	Ar (CfAe)	72.00 - 6.00	-2.0000	-0.325	1	1	1.6250	1.6250		1.60
Hybriflex												
Cable												
(Sprint - New)												
ATCB-B01-00	B	Yes	Ar (CfAe)	72.00 - 6.00	-2.0000	-0.35	3	3	0.3150	0.3150		0.07
6 RET Cable												
(Sprint - New)												

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	3.247	0.000	0.000	0.000	0.02
		B	0.322	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	8.118	3.035	0.000	0.000	0.06
		B	0.806	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	14.718	3.299	0.000	0.000	0.10
		B	3.281	0.000	0.000	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	15.764	3.299	0.000	0.000	0.11
		B	7.831	0.000	0.000	0.000	0.05
		C	0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	18.231	3.299	0.000	0.000	0.12
		B	12.181	0.000	0.000	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	18.847	3.299	0.000	0.000	0.13
		B	16.131	0.000	0.000	0.000	0.13
		C	0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	58.208	9.897	0.000	0.000	0.39
		B	75.162	0.000	0.000	0.000	0.65
		C	0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	60.708	9.897	0.000	0.000	0.40
		B	88.923	0.000	0.000	0.000	0.74
		C	0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	46.138	7.522	0.000	0.000	0.30
		B	69.785	0.000	0.000	0.000	0.57
		C	0.000	0.000	0.000	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	120.00-116.67	A	0.500	5.192	0.000	0.000	0.000	0.05
		B		0.439	0.322	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
T2	116.67-108.33	A	0.500	12.979	4.313	0.000	0.000	0.17
		B		1.097	0.806	0.000	0.000	0.01
		C		0.000	0.000	0.000	0.000	0.00
T3	108.33-100.00	A	0.500	22.912	4.688	0.000	0.000	0.28
		B		4.822	0.806	0.000	0.000	0.05
		C		0.000	0.000	0.000	0.000	0.00
T4	100.00-91.67	A	0.500	24.792	4.688	0.000	0.000	0.29
		B		11.872	0.806	0.000	0.000	0.14
		C		0.000	0.000	0.000	0.000	0.00
T5	91.67-83.33	A	0.500	29.481	4.688	0.000	0.000	0.33
		B		18.722	0.806	0.000	0.000	0.24
		C		0.000	0.000	0.000	0.000	0.00
T6	83.33-75.00	A	0.500	30.653	4.688	0.000	0.000	0.34
		B		25.172	0.806	0.000	0.000	0.36
		C		0.000	0.000	0.000	0.000	0.00
T7	75.00-50.00	A	0.500	95.292	14.064	0.000	0.000	1.05

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		119.482	5.693	0.000	0.000	1.69
		C		0.000	0.000	0.000	0.000	0.00
T8	50.00-25.00	A	0.500	100.292	14.064	0.000	0.000	1.09
		B		141.594	11.325	0.000	0.000	1.94
		C		0.000	0.000	0.000	0.000	0.00
T9	25.00-0.00	A	0.500	76.222	10.689	0.000	0.000	0.83
		B		110.113	11.178	0.000	0.000	1.51
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Shielding

Section	Elevation ft	Face	A_R ft^2	A_R Ice ft^2	A_F ft^2	A_F Ice ft^2
T1	120.00-116.67	A	0.000	0.279	0.437	0.698
		B	0.000	0.041	0.043	0.102
		C	0.000	0.000	0.000	0.000
T2	116.67-108.33	A	0.000	0.480	0.747	1.201
		B	0.000	0.051	0.054	0.127
		C	0.000	0.000	0.000	0.000
T3	108.33-100.00	A	0.000	0.743	1.182	1.856
		B	0.000	0.148	0.215	0.369
		C	0.000	0.000	0.000	0.000
T4	100.00-91.67	A	0.000	0.777	1.323	2.094
		B	0.000	0.327	0.543	0.880
		C	0.000	0.000	0.000	0.000
T5	91.67-83.33	A	0.000	0.883	1.471	2.381
		B	0.000	0.495	0.832	1.334
		C	0.000	0.000	0.000	0.000
T6	83.33-75.00	A	0.000	0.899	1.491	2.427
		B	0.000	0.648	1.086	1.749
		C	0.000	0.000	0.000	0.000
T7	75.00-50.00	A	0.000	2.707	4.962	8.120
		B	0.000	3.040	5.477	9.121
		C	0.000	0.000	0.000	0.000
T8	50.00-25.00	A	0.000	2.738	4.981	8.214
		B	0.000	3.596	6.273	10.787
		C	0.000	0.000	0.000	0.000
T9	25.00-0.00	A	0.000	1.520	3.405	5.615
		B	0.000	2.083	4.428	7.696
		C	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	120.00-116.67	-0.7056	-6.7622	-0.9046	-7.2131
T2	116.67-108.33	-1.2256	-13.6796	-1.5276	-14.8249
T3	108.33-100.00	-2.1078	-20.0463	-2.4317	-21.4405
T4	100.00-91.67	0.7016	-19.8024	0.6622	-21.2162
T5	91.67-83.33	3.9884	-19.9086	4.2164	-21.5783

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
T6	83.33-75.00	6.6251	-19.7416	7.1515	-21.3431
T7	75.00-50.00	8.6885	-22.9923	9.4434	-24.9792
T8	50.00-25.00	10.1801	-28.6828	10.7681	-30.6221
T9	25.00-0.00	9.0544	-25.4957	10.0442	-28.5644

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8x4' (Tower)	C	None		0.00	0.0000	138.00	No Ice	0.25	0.25	0.03
							1/2" Ice	0.66	0.66	0.03
16'x2.5" Pipe Mount (Tower)	C	None		0.00	0.0000	128.00	No Ice	4.00	4.00	0.09
							1/2" Ice	4.80	4.80	0.09
1142-2B (DOT - 1)	B	From Leg	6.00	0.00	0.0000	120.00	No Ice	1.12	1.12	0.01
			0.00				1/2" Ice	2.54	2.54	0.02
PD458-1 (CTT - 2)	A	From Leg	0.00	0.00	0.0000	120.00	No Ice	2.88	2.88	0.02
			0.00				1/2" Ice	4.34	4.34	0.05
OGT9-806 (CSP - 9)	B	From Leg	3.00	0.00	0.0000	120.00	No Ice	3.00	3.00	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
OGT9-806 (CSP - 8)	C	From Leg	6.00	0.00	0.0000	120.00	No Ice	3.00	3.00	0.03
			0.00				1/2" Ice	4.03	4.03	0.05
SC479-HF1LDF (CSP - 59)	C	From Leg	3.00	0.00	0.0000	120.00	No Ice	5.06	5.06	0.03
			0.00				1/2" Ice	6.54	6.54	0.07
6' Dipole (CSP - 52)	A	From Leg	6.00	0.00	0.0000	120.00	No Ice	2.70	2.70	0.02
			0.00				1/2" Ice	3.70	3.70	0.07
(2) SC479-HF1LDF (CSP - 55 & 56)	C	From Leg	1.00	0.00	0.0000	120.00	No Ice	5.06	5.06	0.03
			0.00				1/2" Ice	6.54	6.54	0.07
Filter/Diplexer (CSP - 62)	B	From Leg	0.50	0.00	0.0000	120.00	No Ice	3.15	1.05	0.02
			0.00				1/2" Ice	3.39	1.21	0.04
6' Side-Arm	A	From Leg	3.00	0.00	0.0000	118.00	No Ice	13.04	14.60	0.14
			0.00				1/2" Ice	18.07	19.40	0.15
6' Side-Arm	B	From Leg	3.00	0.00	0.0000	118.00	No Ice	13.04	14.60	0.14
			0.00				1/2" Ice	18.07	19.40	0.15
6' Side-Arm	C	From Leg	3.00	0.00	0.0000	118.00	No Ice	13.04	14.60	0.14
			0.00				1/2" Ice	18.07	19.40	0.15
6'x4" Pipe Mount (Dish Mount)	C	From Leg	0.50	0.00	0.0000	116.00	No Ice	2.09	2.09	0.05
			0.00				1/2" Ice	2.46	2.46	0.07
10'0"x4" Pipe Mount (Dish Mount)	A	From Leg	0.50	0.00	0.0000	115.00	No Ice	4.50	4.50	0.11
							1/2" Ice	5.24	5.24	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
6'x4" Pipe Mount	C	From Leg	0.50	0.0000	111.00	No Ice	2.09	2.09	0.05
(Dish Mount)			0.00			1/2" Ice	2.46	2.46	0.07
			0.00						
Filter/Diplexer	A	From Leg	0.50	0.0000	110.00	No Ice	3.15	1.05	0.02
(CSP - 62)			0.00			1/2" Ice	3.39	1.21	0.04
			0.00						
AP13-850/065/ADT w/Mount Pipe	A	From Leg	1.00	0.0000	110.00	No Ice	5.61	3.92	0.04
			0.00			1/2" Ice	6.30	4.96	0.09
(CSP - 41)			0.00						
SC479-HF1LDF	A	From Leg	1.00	0.0000	110.00	No Ice	5.06	5.06	0.03
(CSP - 54)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
(2) SC479-HF1LDF	A	From Leg	1.00	0.0000	110.00	No Ice	5.06	5.06	0.03
(CSP - 60 & 61)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
SC479-HF1LDF	B	From Leg	1.00	0.0000	110.00	No Ice	5.06	5.06	0.03
(CSP - 65)			0.00			1/2" Ice	6.54	6.54	0.07
			0.00						
6' Side-Arm	A	From Leg	3.00	0.0000	110.00	No Ice	13.04	14.60	0.14
			0.00			1/2" Ice	18.07	19.40	0.15
			0.00						
6' Side-Arm	B	From Leg	3.00	0.0000	110.00	No Ice	13.04	14.60	0.14
			0.00			1/2" Ice	18.07	19.40	0.15
			0.00						
AP13-850/065/ADT w/Mount Pipe	A	From Leg	1.00	0.0000	105.00	No Ice	5.61	3.92	0.04
			0.00			1/2" Ice	6.30	4.96	0.09
(CSP - 42)			0.00						
Diplexer	A	From Leg	1.00	0.0000	105.00	No Ice	0.47	0.12	0.01
(DEHMS - 43)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
OGT9-806	B	From Leg	3.00	0.0000	103.00	No Ice	2.15	2.15	0.02
(CSP - 11)			0.00			1/2" Ice	3.25	3.25	0.03
			0.00						
OGT9-806	C	From Leg	6.00	0.0000	103.00	No Ice	2.15	2.15	0.02
(CSP - 10)			0.00			1/2" Ice	3.25	3.25	0.03
			0.00						
3'4"x4" Pipe Mount	B	From Leg	3.00	0.0000	103.00	No Ice	1.05	1.05	0.04
(CSP - 11)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00						
3'4"x4" Pipe Mount	C	From Leg	6.00	0.0000	103.00	No Ice	1.05	1.05	0.04
(CSP - 10)			0.00			1/2" Ice	1.27	1.27	0.05
			0.00						
PD458-1	A	From Leg	6.00	0.0000	100.00	No Ice	2.88	2.88	0.02
(CTT - 3)			0.00			1/2" Ice	4.34	4.34	0.05
			0.00						
20' 4-Bay Dipole	C	From Leg	3.00	0.0000	90.00	No Ice	4.00	4.00	0.06
(USS - 24)			0.00			1/2" Ice	6.00	6.00	0.10
			0.00						
Mount	C	From Leg	1.50	0.0000	88.00	No Ice	0.77	0.77	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00						
Mount	B	From Leg	1.50	0.0000	86.00	No Ice	5.65	5.65	0.11
			0.00			1/2" Ice	7.58	7.58	0.14
			0.00						
3' Yagi	B	From Leg	3.00	0.0000	85.00	No Ice	1.80	1.80	0.01
(CSP - 14)			0.00			1/2" Ice	3.24	3.24	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00						
PD1142-2B	C	From Leg	3.00	0.0000	85.00	No Ice	0.98	0.98	0.02
(DEHMS - 26)			0.00			1/2" Ice	2.39	2.39	0.03
			0.00						
(2) SBNH-1D6565C	A	From Face	0.50	0.0000	80.00	No Ice	11.41	7.70	0.06
(ATT)			0.00			1/2" Ice	12.02	8.29	0.13
			0.00						
(2) SBNH-1D6565C	B	From Face	0.50	0.0000	80.00	No Ice	11.41	7.70	0.06
(ATT)			0.00			1/2" Ice	12.02	8.29	0.13
			0.00						
(2)	C	From Face	0.50	0.0000	80.00	No Ice	8.26	4.64	0.05
AM-X-CD-16-65-00T-RET			0.00			1/2" Ice	8.81	5.09	0.10
(6')			0.00						
(ATT)									
(2) TMA	A	From Face	0.25	0.0000	80.00	No Ice	1.06	0.45	0.02
(ATT)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
(2) TMA	B	From Face	0.25	0.0000	80.00	No Ice	1.06	0.45	0.02
(ATT)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
(2) TMA	C	From Face	0.25	0.0000	80.00	No Ice	1.06	0.45	0.02
(ATT)			0.00			1/2" Ice	1.21	0.57	0.03
			0.00						
Mount	A	From Face	0.50	0.0000	80.00	No Ice	7.86	7.86	0.24
(ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
Mount	B	From Face	0.50	0.0000	80.00	No Ice	7.86	7.86	0.24
(ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
Mount	C	From Face	0.50	0.0000	80.00	No Ice	7.86	7.86	0.24
(ATT)			0.00			1/2" Ice	10.66	10.66	0.34
			0.00						
(4) Diplexer	A	From Face	0.25	0.0000	80.00	No Ice	0.47	0.12	0.01
(ATT)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
(4) Diplexer	B	From Face	0.25	0.0000	80.00	No Ice	0.47	0.12	0.01
(ATT)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
(4) Diplexer	C	From Face	0.25	0.0000	80.00	No Ice	0.47	0.12	0.01
(ATT)			0.00			1/2" Ice	0.56	0.17	0.01
			0.00						
VHF150	A	From Leg	2.00	0.0000	78.00	No Ice	1.38	0.94	0.02
(USS - 12)			0.00			1/2" Ice	1.65	1.28	0.02
			0.00						
Mount	A	From Face	0.50	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint/Nextel)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
Mount	B	From Face	0.50	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint/Nextel)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
Mount	C	From Face	0.50	0.0000	72.00	No Ice	9.73	9.73	0.31
(Sprint/Nextel)			0.00			1/2" Ice	13.12	13.12	0.42
			0.00						
APXVSPP18-C-A20	A	From Face	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06
(Sprint)			8.00			1/2" Ice	8.81	5.74	0.11
			0.00						
APXVSPP18-C-A20	B	From Face	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(Sprint)			2.00 0.00			1/2" Ice	8.81	5.74	0.11
APXVSPP18-C-A20	C	From Face	0.00	0.0000	72.00	No Ice	8.26	5.28	0.06
(Sprint)			-8.00 0.00			1/2" Ice	8.81	5.74	0.11
(2) ALU RRH 1900 4X45	A	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
(Sprint)			0.50						
(2) ALU RRH 1900 4X45	B	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
(Sprint)			0.50						
(2) ALU RRH 1900 4X45	C	From Face	0.00	0.0000	72.00	No Ice	2.71	2.98	0.07
65MHz			0.00			1/2" Ice	2.95	3.35	0.10
(Sprint)			0.50						
ALU RRH 800 MHz 2x50W	A	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
(Sprint)			0.00 3.00			1/2" Ice	2.19	2.17	0.09
ALU RRH 800 MHz 2x50W	B	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
(Sprint)			0.00 3.00			1/2" Ice	2.19	2.17	0.09
ALU RRH 800 MHz 2x50W	C	From Face	0.00	0.0000	72.00	No Ice	2.00	1.89	0.06
(Sprint)			0.00 3.00			1/2" Ice	2.19	2.17	0.09
800 MHz NOTCH FILTER	A	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
(Sprint)			0.00 3.00			1/2" Ice	0.99	0.65	0.02
800 MHz NOTCH FILTER	B	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
(Sprint)			0.00 3.00			1/2" Ice	0.99	0.65	0.02
800 MHz NOTCH FILTER	C	From Face	0.00	0.0000	72.00	No Ice	0.87	0.49	0.01
(Sprint)			0.00 3.00			1/2" Ice	0.99	0.65	0.02
1900 RRH COMBINER	A	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
(Sprint)			0.00 0.50			1/2" Ice	1.48	0.56	0.05
1900 RRH COMBINER	B	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
(Sprint)			0.00 0.50			1/2" Ice	1.48	0.56	0.05
1900 RRH COMBINER	C	From Face	0.00	0.0000	72.00	No Ice	1.31	0.42	0.04
(Sprint)			0.00 0.50			1/2" Ice	1.48	0.56	0.05
2' Microwave Panel	B	From Leg	1.00	0.0000	70.00	No Ice	5.60	1.40	0.05
(NHVN - 57)			0.00 0.00			1/2" Ice	5.92	1.60	0.08
GPS	A	From Leg	3.00	0.0000	60.00	No Ice	1.00	1.00	0.01
(Sprint/Nextel - 18)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
Mount	A	From Leg	1.50	0.0000	60.00	No Ice	2.72	2.72	0.05
(Sprint/Nextel)			0.00 0.00			1/2" Ice	4.91	4.91	0.09
BA6312	A	From Leg	3.00	0.0000	60.00	No Ice	0.45	0.45	0.00
(NHVN - 45)			0.00 0.00			1/2" Ice	1.09	1.09	0.01
4' Whip	A	From Leg	1.00	0.0000	60.00	No Ice	1.13	1.13	0.03
(NHVN - 46)			0.00 0.00			1/2" Ice	1.50	1.50	0.04
GPS	B	From Leg	3.00	0.0000	60.00	No Ice	1.00	1.00	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(ATT - 25)			0.00 0.00			1/2" Ice	1.50	1.50	0.01
Mount (ATT)	B	From Leg	1.50 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	2.72 4.91	2.72 4.91	0.05 0.09
DB212-1 (DEHMS - 47)	A	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	4.40 8.42	4.40 8.42	0.03 0.07
DB803M-Y (CSP - 53)	C	From Leg	1.00 0.00 0.00	0.0000	60.00	No Ice 1/2" Ice	0.50 0.68	0.50 0.68	0.00 0.01
2' Sidearm	A	From Leg	1.00 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	3.90 4.40	3.90 4.40	0.09 0.10
Mount	C	From Leg	1.50 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	1.63 2.45	1.63 2.45	0.03 0.40
VHF150 (USS - 13)	A	From Leg	2.00 0.00 0.00	0.0000	56.00	No Ice 1/2" Ice	1.38 1.65	0.94 1.28	0.02 0.02
DB264-A (CSP - 5)	C	From Leg	1.00 0.00 0.00	0.0000	55.00	No Ice 1/2" Ice	3.16 5.69	3.16 5.69	0.04 0.05
1' Microwave Panel (NHVN - 58)	A	From Leg	1.00 0.00 0.00	0.0000	50.00	No Ice 1/2" Ice	1.40 1.56	0.70 0.82	0.01 0.02
5'0"x3" Pipe Mount	A	From Face	1.50 5.00 0.00	0.0000	44.00	No Ice 1/2" Ice	1.36 1.67	1.36 1.67	0.03 0.04
3' Side arm	A	From Leg	1.50 0.00 0.00	0.0000	44.00	No Ice 1/2" Ice	5.90 6.60	5.90 6.60	0.13 0.15
3' Panel (FBI - 51)	A	From Leg	1.00 0.00 0.00	0.0000	40.00	No Ice 1/2" Ice	4.20 4.52	2.10 2.38	0.05 0.08
1' Omni (FBI - 50)	A	From Leg	1.00 0.00 0.00	0.0000	35.00	No Ice 1/2" Ice	0.20 0.29	0.20 0.29	0.01 0.01
4' Whip (CSP - 48)	C	From Leg	1.00 0.00 0.00	0.0000	30.00	No Ice 1/2" Ice	1.13 1.50	1.13 1.50	0.03 0.04
EUSF10-U (T-Mobile)	A	From Leg	0.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	8.91 12.66	3.67 5.24	0.41 0.51
EUSF10-U (T-Mobile)	C	From Leg	0.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	8.91 12.66	3.67 5.24	0.41 0.51
EUSF10-U (T-Mobile)	B	From Leg	0.50 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	8.91 12.66	3.67 5.24	0.41 0.51
(2) AIR B2A/B4P (T-Mobile)	A	From Leg	1.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	6.42 6.86	4.22 4.64	0.08 0.12
(2) AIR B2A/B4P (T-Mobile)	B	From Leg	1.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	6.42 6.86	4.22 4.64	0.08 0.12
(2) AIR B2A/B4P	C	From Leg	1.00	0.0000	95.00	No Ice	6.42	4.22	0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(T-Mobile)			0.00 0.00			1/2" Ice	6.86	4.64	0.12
TMA (T-Mobile)	A	From Leg	1.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
TMA (T-Mobile)	B	From Leg	1.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
TMA (T-Mobile)	C	From Leg	1.00 0.00 0.00	0.0000	95.00	No Ice 1/2" Ice	1.00 1.50	1.00 1.50	0.01 0.02
APXVTM14-C-1 20 (Sprint)	B	From Face	0.50 -5.00 0.00	0.0000	72.00	No Ice 1/2" Ice	6.90 7.35	4.34 4.74	0.07 0.11
TD-RRH8x20-25 (Sprint)	B	From Face	0.00 -5.00 0.00	0.0000	72.00	No Ice 1/2" Ice	4.32 4.60	1.41 1.61	0.07 0.09
APXVTM14-C-1 20 (Sprint)	B	From Face	0.50 4.50 0.00	0.0000	72.00	No Ice 1/2" Ice	6.90 7.35	4.34 4.74	0.07 0.11
TD-RRH8x20-25 (Sprint)	B	From Face	0.00 4.50 0.00	0.0000	72.00	No Ice 1/2" Ice	4.32 4.60	1.41 1.61	0.07 0.09
APXVTM14-C-1 20 (Sprint)	C	From Face	0.50 -2.00 0.00	0.0000	72.00	No Ice 1/2" Ice	6.90 7.35	4.34 4.74	0.07 0.11
TD-RRH8x20-25 (Sprint)	C	From Face	0.00 -2.00 0.00	0.0000	72.00	No Ice 1/2" Ice	4.32 4.60	1.41 1.61	0.07 0.09
5'3"x4" Pipe Mount (Sprint)	B	From Face	0.25 -5.00 0.00	0.0000	72.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
5'3"x4" Pipe Mount (Sprint)	B	From Face	0.25 4.50 0.00	0.0000	72.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
5'3"x4" Pipe Mount (Sprint)	C	From Face	0.25 -2.00 0.00	0.0000	72.00	No Ice 1/2" Ice	1.88 2.21	1.88 2.21	0.06 0.07
SC479-HF1LDF (CSP - 59)	A	From Leg	1.00 0.00 0.00	0.0000	110.00	No Ice 1/2" Ice	5.06 6.54	5.06 6.54	0.03 0.07

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
4 FT DISH (NHVN - 44)	A	Paraboloid w/Radome	From Leg	1.50 5.00	0.0000		40.00	4.00	No Ice 1/2" Ice	12.57 13.10	0.14 0.28

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight K
				0.00							
PA6-65AC	A	Paraboloid w/o	From	2.00	30.0000		115.00	6.00	No Ice	28.27	0.09
(CSP - 4)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	C	Paraboloid w/o	From	2.00	-30.0000		116.00	6.00	No Ice	28.27	0.09
(CSP - 6)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
PA6-65AC	C	Paraboloid w/o	From	2.00	60.0000		111.00	6.00	No Ice	28.27	0.09
(CSP - 7)		Radome	Leg	0.00					1/2" Ice	29.05	0.24
				0.00							
6FT DISH	A	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.30	0.44
(CSP - 69)		Radome	Leg	0.00					1/2" Ice	29.05	0.59
				0.00							
6FT DISH	B	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.30	0.44
(CSP - 70)		Radome	Leg	0.00					1/2" Ice	29.05	0.59
				0.00							
6FT DISH	C	Paraboloid w/o	From	2.00	0.0000		120.00	6.00	No Ice	28.30	0.44
(CSP - 71)		Radome	Leg	0.00					1/2" Ice	29.05	0.59
				0.00							

Tower Pressures - No Ice

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg % %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	118.33	1.44	30	39.883	A	4.557	6.028	2.781	26.27	0.000	0.000
120.00-116.67					B	4.950	3.103		34.53	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2	112.50	1.42	29	103.599	A	8.811	15.070	6.952	29.11	0.000	0.000
116.67-108.33					B	6.469	7.757		48.87	0.000	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3	104.17	1.389	29	109.157	A	8.868	21.670	6.952	22.76	0.000	0.000
108.33-100.00					B	6.536	10.232		41.46	0.000	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4	95.83	1.356	28	114.715	A	9.482	22.716	6.952	21.59	0.000	0.000
100.00-91.67					B	6.963	14.782		31.97	0.000	0.000
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	120.273	A	9.594	25.182	6.952	19.99	0.000	0.000
					B	6.934	19.132		26.67	0.000	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.284	27	125.831	A	9.836	25.799	6.952	19.51	0.000	0.000
					B	6.942	23.082		23.15	0.000	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	412.014	A	33.380	81.412	23.204	20.21	0.000	0.000
					B	22.968	98.366		19.12	0.000	0.000
					C	28.445	23.204		44.93	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	460.861	A	36.030	81.564	20.856	17.74	0.000	0.000
					B	24.840	109.778		15.49	0.000	0.000
					C	31.113	20.856		40.13	0.000	0.000
T9 25.00-0.00	12.50	1	21	514.792	A	35.143	74.815	28.676	26.08	0.000	0.000
					B	26.598	98.462		22.93	0.000	0.000
					C	31.026	28.676		48.03	0.000	0.000

Tower Pressure - With Ice

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 120.00-116.67	118.33	1.44	30	0.5000	40.161	A	4.295	10.247	3.337	22.95	0.000	0.000
						B	5.213	5.732		30.49	0.000	0.000
						C	4.994	5.334		32.31	0.000	0.000
T2 116.67-108.33	112.50	1.42	29	0.5000	104.294	A	9.635	23.450	8.342	25.21	0.000	0.000
						B	7.201	11.998		43.45	0.000	0.000
						C	6.523	10.951		47.74	0.000	0.000
T3 108.33-100.00	104.17	1.389	29	0.5000	109.852	A	9.583	33.213	8.342	19.49	0.000	0.000
						B	7.187	15.717		36.42	0.000	0.000
						C	6.751	11.043		46.88	0.000	0.000
T4 100.00-91.67	95.83	1.356	28	0.5000	115.410	A	10.100	35.149	8.342	18.44	0.000	0.000
						B	7.432	22.680		27.70	0.000	0.000
						C	7.506	11.135		44.75	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	0.5000	120.968	A	10.072	39.825	8.342	16.72	0.000	0.000
						B	7.238	29.455		22.74	0.000	0.000
						C	7.766	11.227		43.92	0.000	0.000
T6 83.33-75.00	79.17	1.284	27	0.5000	126.526	A	10.289	41.075	8.342	16.24	0.000	0.000
						B	7.084	35.846		19.43	0.000	0.000
						C	8.028	11.321		43.11	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	0.5000	414.099	A	34.389	129.442	27.375	16.71	0.000	0.000
						B	25.018	153.299		15.35	0.000	0.000
						C	28.445	36.857		41.92	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	0.5000	462.946	A	36.963	132.951	25.027	14.73	0.000	0.000
						B	31.651	173.396		12.21	0.000	0.000
						C	31.113	35.398		37.63	0.000	0.000
T9 25.00-0.00	12.50	1	21	0.5000	516.877	A	36.099	115.961	32.848	21.60	0.000	0.000
						B	34.508	149.289		17.87	0.000	0.000
						C	31.026	41.259		45.44	0.000	0.000

Tower Pressure - Service

$G_H = 1.149$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 120.00-116.67	118.33	1.44	30	39.883	A	4.557	6.028	2.781	26.27	0.000	0.000
					B	4.950	3.103		34.53	0.000	0.000
					C	4.994	2.781		35.77	0.000	0.000
T2 116.67-108.33	112.50	1.42	29	103.599	A	8.811	15.070	6.952	29.11	0.000	0.000
					B	6.469	7.757		48.87	0.000	0.000
					C	6.523	6.952		51.59	0.000	0.000
T3 108.33-100.00	104.17	1.389	29	109.157	A	8.868	21.670	6.952	22.76	0.000	0.000
					B	6.536	10.232		41.46	0.000	0.000
					C	6.751	6.952		50.73	0.000	0.000
T4 100.00-91.67	95.83	1.356	28	114.715	A	9.482	22.716	6.952	21.59	0.000	0.000
					B	6.963	14.782		31.97	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	7.506	6.952		48.08	0.000	0.000
T5 91.67-83.33	87.50	1.321	27	120.273	A	9.594	25.182	6.952	19.99	0.000	0.000
					B	6.934	19.132		26.67	0.000	0.000
					C	7.766	6.952		47.23	0.000	0.000
T6 83.33-75.00	79.17	1.284	27	125.831	A	9.836	25.799	6.952	19.51	0.000	0.000
					B	6.942	23.082		23.15	0.000	0.000
					C	8.028	6.952		46.41	0.000	0.000
T7 75.00-50.00	62.50	1.2	25	412.014	A	33.380	81.412	23.204	20.21	0.000	0.000
					B	22.968	98.366		19.12	0.000	0.000
					C	28.445	23.204		44.93	0.000	0.000
T8 50.00-25.00	37.50	1.037	22	460.861	A	36.030	81.564	20.856	17.74	0.000	0.000
					B	24.840	109.778		15.49	0.000	0.000
					C	31.113	20.856		40.13	0.000	0.000
T9 25.00-0.00	12.50	1	21	514.792	A	35.143	74.815	28.676	26.08	0.000	0.000
					B	26.598	98.462		22.93	0.000	0.000
					C	31.026	28.676		48.03	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	1	1	8.209	0.67	202.16	A
120.00-116.67			B	0.202	2.59	0.591	1	1	6.783			
			C	0.195	2.613	0.589	1	1	6.632			
T2	0.07	0.77	A	0.231	2.497	0.597	1	1	17.810	1.50	180.51	A
116.67-108.33			B	0.137	2.819	0.58	1	1	10.966			
			C	0.13	2.846	0.579	1	1	10.546			
T3	0.12	0.78	A	0.28	2.351	0.61	1	1	22.085	1.72	206.17	A
108.33-100.00			B	0.154	2.758	0.582	1	1	12.491			
			C	0.126	2.864	0.578	1	1	10.769			
T4	0.16	0.92	A	0.281	2.349	0.61	1	1	23.343	1.77	212.55	A
100.00-91.67			B	0.19	2.631	0.588	1	1	15.659			
			C	0.126	2.862	0.578	1	1	11.525			
T5	0.21	0.94	A	0.289	2.325	0.613	1	1	25.022	1.83	219.79	A
91.67-83.33			B	0.217	2.541	0.594	1	1	18.298			
			C	0.122	2.876	0.578	1	1	11.782			
T6	0.26	1.30	A	0.283	2.342	0.611	1	1	25.596	1.83	220.03	A
83.33-75.00			B	0.239	2.472	0.599	1	1	20.769			
			C	0.119	2.889	0.577	1	1	12.041			
T7	1.04	4.33	A	0.279	2.354	0.61	1	1	83.008	5.59	223.53	A
75.00-50.00			B	0.294	2.311	0.614	1	1	83.388			
			C	0.125	2.864	0.578	1	1	41.857			
T8	1.13	4.95	A	0.255	2.422	0.603	1	1	85.229	5.28	211.16	B
50.00-25.00			B	0.292	2.317	0.614	1	1	92.191			
			C	0.113	2.913	0.576	1	1	43.136			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	1	1	79.528	5.02	200.78	B
			B	0.243	2.459	0.6	1	1	85.685			
			C	0.116	2.901	0.577	1	1	47.568			
Sum Weight:	3.90	20.03						OTM	1513.08 kip-ft	25.22		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.825	1	7.412	0.61	182.52	A
120.00-116.67			B	0.202	2.59	0.591	0.825	1	5.917			
			C	0.195	2.613	0.589	0.825	1	5.759			
T2	0.07	0.77	A	0.231	2.497	0.597	0.825	1	16.268	1.37	164.88	A
116.67-108.33			B	0.137	2.819	0.58	0.825	1	9.833			
			C	0.13	2.846	0.579	0.825	1	9.404			
T3	0.12	0.78	A	0.28	2.351	0.61	0.825	1	20.533	1.60	191.68	A
108.33-100.00			B	0.154	2.758	0.582	0.825	1	11.348			
			C	0.126	2.864	0.578	0.825	1	9.588			
T4	0.16	0.92	A	0.281	2.349	0.61	0.825	1	21.684	1.65	197.44	A
100.00-91.67			B	0.19	2.631	0.588	0.825	1	14.441			
			C	0.126	2.862	0.578	0.825	1	10.211			
T5	0.21	0.94	A	0.289	2.325	0.613	0.825	1	23.343	1.71	205.04	A
91.67-83.33			B	0.217	2.541	0.594	0.825	1	17.084			
			C	0.122	2.876	0.578	0.825	1	10.423			
T6	0.26	1.30	A	0.283	2.342	0.611	0.825	1	23.875	1.71	205.24	A
83.33-75.00			B	0.239	2.472	0.599	0.825	1	19.554			
			C	0.119	2.889	0.577	0.825	1	10.636			
T7	1.04	4.33	A	0.279	2.354	0.61	0.825	1	77.166	5.24	209.77	B
75.00-50.00			B	0.294	2.311	0.614	0.825	1	79.369			
			C	0.125	2.864	0.578	0.825	1	36.879			
T8	1.13	4.95	A	0.255	2.422	0.603	0.825	1	78.924	5.03	201.20	B
50.00-25.00			B	0.292	2.317	0.614	0.825	1	87.844			
			C	0.113	2.913	0.576	0.825	1	37.691			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.825	1	73.378	4.75	189.87	B
			B	0.243	2.459	0.6	0.825	1	81.030			
			C	0.116	2.901	0.577	0.825	1	42.139			
Sum Weight:	3.90	20.03						OTM	1411.27 kip-ft	23.67		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.8	1	7.298	0.60	179.72	A
120.00-116.67			B	0.202	2.59	0.591	0.8	1	5.793			
			C	0.195	2.613	0.589	0.8	1	5.634			
T2	0.07	0.77	A	0.231	2.497	0.597	0.8	1	16.047	1.36	162.65	A
116.67-108.33			B	0.137	2.819	0.58	0.8	1	9.672			
			C	0.13	2.846	0.579	0.8	1	9.241			
T3	0.12	0.78	A	0.28	2.351	0.61	0.8	1	20.311	1.58	189.61	A
108.33-100.00			B	0.154	2.758	0.582	0.8	1	11.184			
			C	0.126	2.864	0.578	0.8	1	9.419			
T4	0.16	0.92	A	0.281	2.349	0.61	0.8	1	21.446	1.63	195.29	A
100.00-91.67			B	0.19	2.631	0.588	0.8	1	14.267			
			C	0.126	2.862	0.578	0.8	1	10.024			
T5	0.21	0.94	A	0.289	2.325	0.613	0.8	1	23.103	1.69	202.93	A
91.67-83.33			B	0.217	2.541	0.594	0.8	1	16.911			
			C	0.122	2.876	0.578	0.8	1	10.228			
T6	0.26	1.30	A	0.283	2.342	0.611	0.8	1	23.629	1.69	203.12	A
83.33-75.00			B	0.239	2.472	0.599	0.8	1	19.380			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.119	2.889	0.577	0.8	1	10.435			
T7	1.04	4.33	A	0.279	2.354	0.61	0.8	1	76.332	5.21	208.25	B
75.00-50.00			B	0.294	2.311	0.614	0.8	1	78.794			
			C	0.125	2.864	0.578	0.8	1	36.168			
T8	1.13	4.95	A	0.255	2.422	0.603	0.8	1	78.023	4.99	199.78	B
50.00-25.00			B	0.292	2.317	0.614	0.8	1	87.223			
			C	0.113	2.913	0.576	0.8	1	36.913			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.8	1	72.500	4.71	188.32	B
			B	0.243	2.459	0.6	0.8	1	80.365			
			C	0.116	2.901	0.577	0.8	1	41.363			
Sum Weight:	3.90	20.03						OTM	1397.43 kip-ft	23.45		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.85	1	7.526	0.62	185.33	A
120.00-116.67			B	0.202	2.59	0.591	0.85	1	6.041			
			C	0.195	2.613	0.589	0.85	1	5.883			
T2	0.07	0.77	A	0.231	2.497	0.597	0.85	1	16.488	1.39	167.11	A
116.67-108.33			B	0.137	2.819	0.58	0.85	1	9.995			
			C	0.13	2.846	0.579	0.85	1	9.567			
T3	0.12	0.78	A	0.28	2.351	0.61	0.85	1	20.755	1.61	193.75	A
108.33-100.00			B	0.154	2.758	0.582	0.85	1	11.511			
			C	0.126	2.864	0.578	0.85	1	9.757			
T4	0.16	0.92	A	0.281	2.349	0.61	0.85	1	21.921	1.66	199.60	A
100.00-91.67			B	0.19	2.631	0.588	0.85	1	14.615			
			C	0.126	2.862	0.578	0.85	1	10.399			
T5	0.21	0.94	A	0.289	2.325	0.613	0.85	1	23.583	1.73	207.15	A
91.67-83.33			B	0.217	2.541	0.594	0.85	1	17.258			
			C	0.122	2.876	0.578	0.85	1	10.617			
T6	0.26	1.30	A	0.283	2.342	0.611	0.85	1	24.121	1.73	207.35	A
83.33-75.00			B	0.239	2.472	0.599	0.85	1	19.727			
			C	0.119	2.889	0.577	0.85	1	10.836			
T7	1.04	4.33	A	0.279	2.354	0.61	0.85	1	78.001	5.28	211.28	B
75.00-50.00			B	0.294	2.311	0.614	0.85	1	79.943			
			C	0.125	2.864	0.578	0.85	1	37.590			
T8	1.13	4.95	A	0.255	2.422	0.603	0.85	1	79.825	5.07	202.62	B
50.00-25.00			B	0.292	2.317	0.614	0.85	1	88.465			
			C	0.113	2.913	0.576	0.85	1	38.469			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.85	1	74.257	4.79	191.43	B
			B	0.243	2.459	0.6	0.85	1	81.695			
			C	0.116	2.901	0.577	0.85	1	42.914			
Sum Weight:	3.90	20.03						OTM	1425.11 kip-ft	23.88		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.06	0.69	A	0.362	2.144	0.637	1	1	10.821	0.80	238.83	A
120.00-116.67			B	0.273	2.372	0.608	1	1	8.698			
			C	0.257	2.416	0.604	1	1	8.214			
T2	0.18	1.12	A	0.317	2.251	0.621	1	1	24.205	1.84	221.16	A
116.67-108.33			B	0.184	2.65	0.587	1	1	14.247			
			C	0.168	2.708	0.584	1	1	12.922			
T3	0.33	1.14	A	0.39	2.085	0.647	1	1	31.085	2.14	257.33	A
108.33-100.00			B	0.209	2.568	0.592	1	1	16.495			
			C	0.162	2.728	0.583	1	1	13.193			
T4	0.44	1.34	A	0.392	2.08	0.648	1	1	32.891	2.21	265.22	A
100.00-91.67			B	0.261	2.405	0.605	1	1	21.147			
			C	0.162	2.73	0.583	1	1	14.001			
T5	0.58	1.38	A	0.412	2.04	0.657	1	1	36.229	2.33	279.15	A
91.67-83.33			B	0.303	2.287	0.617	1	1	25.409			
			C	0.157	2.746	0.583	1	1	14.307			
T6	0.71	1.74	A	0.406	2.052	0.654	1	1	37.154	2.33	279.93	A
83.33-75.00			B	0.339	2.197	0.629	1	1	29.620			
			C	0.153	2.761	0.582	1	1	14.616			
T7	2.75	5.89	A	0.396	2.073	0.65	1	1	118.504	7.28	291.23	B
75.00-50.00			B	0.431	2.007	0.665	1	1	126.895			
			C	0.158	2.743	0.583	1	1	49.921			
T8	3.02	6.61	A	0.367	2.133	0.639	1	1	121.879	7.25	290.10	B
50.00-25.00			B	0.443	1.985	0.67	1	1	147.834			
			C	0.144	2.795	0.581	1	1	51.662			
T9 25.00-0.00	2.34	7.28	A	0.294	2.312	0.614	1	1	107.315	6.65	265.84	B
			B	0.356	2.159	0.634	1	1	129.230			
			C	0.14	2.809	0.58	1	1	54.955			
Sum Weight:	10.40	27.19						OTM	1935.04 kip-ft	32.83		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.06	0.69	A	0.362	2.144	0.637	0.825	1	10.070	0.74	222.24	A
120.00-116.67			B	0.273	2.372	0.608	0.825	1	7.786			
			C	0.257	2.416	0.604	0.825	1	7.340			
T2	0.18	1.12	A	0.317	2.251	0.621	0.825	1	22.519	1.71	205.75	A
116.67-108.33			B	0.184	2.65	0.587	0.825	1	12.987			
			C	0.168	2.708	0.584	0.825	1	11.781			
T3	0.33	1.14	A	0.39	2.085	0.647	0.825	1	29.408	2.03	243.45	A
108.33-100.00			B	0.209	2.568	0.592	0.825	1	15.237			
			C	0.162	2.728	0.583	0.825	1	12.012			
T4	0.44	1.34	A	0.392	2.08	0.648	0.825	1	31.123	2.09	250.97	A
100.00-91.67			B	0.261	2.405	0.605	0.825	1	19.846			
			C	0.162	2.73	0.583	0.825	1	12.687			
T5	0.58	1.38	A	0.412	2.04	0.657	0.825	1	34.466	2.21	265.57	A
91.67-83.33			B	0.303	2.287	0.617	0.825	1	24.143			
			C	0.157	2.746	0.583	0.825	1	12.948			
T6	0.71	1.74	A	0.406	2.052	0.654	0.825	1	35.354	2.22	266.36	A
83.33-75.00			B	0.339	2.197	0.629	0.825	1	28.381			
			C	0.153	2.761	0.582	0.825	1	13.211			
T7	2.75	5.89	A	0.396	2.073	0.65	0.825	1	112.486	7.03	281.18	B
75.00-50.00			B	0.431	2.007	0.665	0.825	1	122.517			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.158	2.743	0.583	0.825	1	44.943			
T8	3.02	6.61	A	0.367	2.133	0.639	0.825	1	115.411	6.98	279.23	B
50.00-25.00			B	0.443	1.985	0.67	0.825	1	142.295			
			C	0.144	2.795	0.581	0.825	1	46.218			
T9 25.00-0.00	2.34	7.28	A	0.294	2.312	0.614	0.825	1	100.998	6.34	253.42	B
			B	0.356	2.159	0.634	0.825	1	123.191			
			C	0.14	2.809	0.58	0.825	1	49.526			
Sum Weight:	10.40	27.19						OTM	1842.00 kip-ft	31.35		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.06	0.69	A	0.362	2.144	0.637	0.8	1	9.962	0.73	219.87	A
120.00-116.67			B	0.273	2.372	0.608	0.8	1	7.655			
			C	0.257	2.416	0.604	0.8	1	7.215			
T2	0.18	1.12	A	0.317	2.251	0.621	0.8	1	22.278	1.70	203.55	A
116.67-108.33			B	0.184	2.65	0.587	0.8	1	12.807			
			C	0.168	2.708	0.584	0.8	1	11.618			
T3	0.33	1.14	A	0.39	2.085	0.647	0.8	1	29.168	2.01	241.47	A
108.33-100.00			B	0.209	2.568	0.592	0.8	1	15.057			
			C	0.162	2.728	0.583	0.8	1	11.843			
T4	0.44	1.34	A	0.392	2.08	0.648	0.8	1	30.871	2.07	248.93	A
100.00-91.67			B	0.261	2.405	0.605	0.8	1	19.661			
			C	0.162	2.73	0.583	0.8	1	12.500			
T5	0.58	1.38	A	0.412	2.04	0.657	0.8	1	34.214	2.20	263.63	A
91.67-83.33			B	0.303	2.287	0.617	0.8	1	23.962			
			C	0.157	2.746	0.583	0.8	1	12.754			
T6	0.71	1.74	A	0.406	2.052	0.654	0.8	1	35.097	2.20	264.42	A
83.33-75.00			B	0.339	2.197	0.629	0.8	1	28.204			
			C	0.153	2.761	0.582	0.8	1	13.010			
T7	2.75	5.89	A	0.396	2.073	0.65	0.8	1	111.626	6.99	279.74	B
75.00-50.00			B	0.431	2.007	0.665	0.8	1	121.892			
			C	0.158	2.743	0.583	0.8	1	44.232			
T8	3.02	6.61	A	0.367	2.133	0.639	0.8	1	114.487	6.94	277.68	B
50.00-25.00			B	0.443	1.985	0.67	0.8	1	141.504			
			C	0.144	2.795	0.581	0.8	1	45.440			
T9 25.00-0.00	2.34	7.28	A	0.294	2.312	0.614	0.8	1	100.096	6.29	251.65	B
			B	0.356	2.159	0.634	0.8	1	122.328			
			C	0.14	2.809	0.58	0.8	1	48.750			
Sum Weight:	10.40	27.19						OTM	1828.71 kip-ft	31.14		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.06	0.69	A	0.362	2.144	0.637	0.85	1	10.177	0.75	224.61	A
120.00-116.67			B	0.273	2.372	0.608	0.85	1	7.916			
			C	0.257	2.416	0.604	0.85	1	7.465			
T2	0.18	1.12	A	0.317	2.251	0.621	0.85	1	22.760	1.73	207.96	A
116.67-108.33			B	0.184	2.65	0.587	0.85	1	13.167			
			C	0.168	2.708	0.584	0.85	1	11.944			
T3	0.33	1.14	A	0.39	2.085	0.647	0.85	1	29.647	2.05	245.43	A
108.33-100.00			B	0.209	2.568	0.592	0.85	1	15.417			
			C	0.162	2.728	0.583	0.85	1	12.180			
T4	0.44	1.34	A	0.392	2.08	0.648	0.85	1	31.376	2.11	253.01	A
100.00-91.67			B	0.261	2.405	0.605	0.85	1	20.032			
			C	0.162	2.73	0.583	0.85	1	12.875			
T5	0.58	1.38	A	0.412	2.04	0.657	0.85	1	34.718	2.23	267.51	A
91.67-83.33			B	0.303	2.287	0.617	0.85	1	24.323			
			C	0.157	2.746	0.583	0.85	1	13.142			
T6	0.71	1.74	A	0.406	2.052	0.654	0.85	1	35.611	2.24	268.30	A
83.33-75.00			B	0.339	2.197	0.629	0.85	1	28.558			
			C	0.153	2.761	0.582	0.85	1	13.412			
T7	2.75	5.89	A	0.396	2.073	0.65	0.85	1	113.346	7.07	282.62	B
75.00-50.00			B	0.431	2.007	0.665	0.85	1	123.143			
			C	0.158	2.743	0.583	0.85	1	45.654			
T8	3.02	6.61	A	0.367	2.133	0.639	0.85	1	116.335	7.02	280.78	B
50.00-25.00			B	0.443	1.985	0.67	0.85	1	143.087			
			C	0.144	2.795	0.581	0.85	1	46.995			
T9 25.00-0.00	2.34	7.28	A	0.294	2.312	0.614	0.85	1	101.901	6.38	255.20	B
			B	0.356	2.159	0.634	0.85	1	124.053			
			C	0.14	2.809	0.58	0.85	1	50.301			
Sum Weight:	10.40	27.19						OTM	1855.29 kip-ft	31.57		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	1	1	8.209	0.67	202.16	A
120.00-116.67			B	0.202	2.59	0.591	1	1	6.783			
			C	0.195	2.613	0.589	1	1	6.632			
T2	0.07	0.77	A	0.231	2.497	0.597	1	1	17.810	1.50	180.51	A
116.67-108.33			B	0.137	2.819	0.58	1	1	10.966			
			C	0.13	2.846	0.579	1	1	10.546			
T3	0.12	0.78	A	0.28	2.351	0.61	1	1	22.085	1.72	206.17	A
108.33-100.00			B	0.154	2.758	0.582	1	1	12.491			
			C	0.126	2.864	0.578	1	1	10.769			
T4	0.16	0.92	A	0.281	2.349	0.61	1	1	23.343	1.77	212.55	A
100.00-91.67			B	0.19	2.631	0.588	1	1	15.659			
			C	0.126	2.862	0.578	1	1	11.525			
T5	0.21	0.94	A	0.289	2.325	0.613	1	1	25.022	1.83	219.79	A
91.67-83.33			B	0.217	2.541	0.594	1	1	18.298			
			C	0.122	2.876	0.578	1	1	11.782			
T6	0.26	1.30	A	0.283	2.342	0.611	1	1	25.596	1.83	220.03	A
83.33-75.00			B	0.239	2.472	0.599	1	1	20.769			
			C	0.119	2.889	0.577	1	1	12.041			
T7	1.04	4.33	A	0.279	2.354	0.61	1	1	83.008	5.59	223.53	A
75.00-50.00			B	0.294	2.311	0.614	1	1	83.388			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
			C	0.125	2.864	0.578	1	1	41.857			
T8	1.13	4.95	A	0.255	2.422	0.603	1	1	85.229	5.28	211.16	B
50.00-25.00			B	0.292	2.317	0.614	1	1	92.191			
			C	0.113	2.913	0.576	1	1	43.136			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	1	1	79.528	5.02	200.78	B
			B	0.243	2.459	0.6	1	1	85.685			
			C	0.116	2.901	0.577	1	1	47.568			
Sum Weight:	3.90	20.03						OTM	1513.08 kip-ft	25.22		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.825	1	7.412	0.61	182.52	A
120.00-116.67			B	0.202	2.59	0.591	0.825	1	5.917			
			C	0.195	2.613	0.589	0.825	1	5.759			
T2	0.07	0.77	A	0.231	2.497	0.597	0.825	1	16.268	1.37	164.88	A
116.67-108.33			B	0.137	2.819	0.58	0.825	1	9.833			
			C	0.13	2.846	0.579	0.825	1	9.404			
T3	0.12	0.78	A	0.28	2.351	0.61	0.825	1	20.533	1.60	191.68	A
108.33-100.00			B	0.154	2.758	0.582	0.825	1	11.348			
			C	0.126	2.864	0.578	0.825	1	9.588			
T4	0.16	0.92	A	0.281	2.349	0.61	0.825	1	21.684	1.65	197.44	A
100.00-91.67			B	0.19	2.631	0.588	0.825	1	14.441			
			C	0.126	2.862	0.578	0.825	1	10.211			
T5	0.21	0.94	A	0.289	2.325	0.613	0.825	1	23.343	1.71	205.04	A
91.67-83.33			B	0.217	2.541	0.594	0.825	1	17.084			
			C	0.122	2.876	0.578	0.825	1	10.423			
T6	0.26	1.30	A	0.283	2.342	0.611	0.825	1	23.875	1.71	205.24	A
83.33-75.00			B	0.239	2.472	0.599	0.825	1	19.554			
			C	0.119	2.889	0.577	0.825	1	10.636			
T7	1.04	4.33	A	0.279	2.354	0.61	0.825	1	77.166	5.24	209.77	B
75.00-50.00			B	0.294	2.311	0.614	0.825	1	79.369			
			C	0.125	2.864	0.578	0.825	1	36.879			
T8	1.13	4.95	A	0.255	2.422	0.603	0.825	1	78.924	5.03	201.20	B
50.00-25.00			B	0.292	2.317	0.614	0.825	1	87.844			
			C	0.113	2.913	0.576	0.825	1	37.691			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.825	1	73.378	4.75	189.87	B
			B	0.243	2.459	0.6	0.825	1	81.030			
			C	0.116	2.901	0.577	0.825	1	42.139			
Sum Weight:	3.90	20.03						OTM	1411.27 kip-ft	23.67		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.8	1	7.298	0.60	179.72	A
120.00-116.67			B	0.202	2.59	0.591	0.8	1	5.793			
			C	0.195	2.613	0.589	0.8	1	5.634			
T2	0.07	0.77	A	0.231	2.497	0.597	0.8	1	16.047	1.36	162.65	A
116.67-108.33			B	0.137	2.819	0.58	0.8	1	9.672			
			C	0.13	2.846	0.579	0.8	1	9.241			
T3	0.12	0.78	A	0.28	2.351	0.61	0.8	1	20.311	1.58	189.61	A
108.33-100.00			B	0.154	2.758	0.582	0.8	1	11.184			
			C	0.126	2.864	0.578	0.8	1	9.419			
T4	0.16	0.92	A	0.281	2.349	0.61	0.8	1	21.446	1.63	195.29	A
100.00-91.67			B	0.19	2.631	0.588	0.8	1	14.267			
			C	0.126	2.862	0.578	0.8	1	10.024			
T5	0.21	0.94	A	0.289	2.325	0.613	0.8	1	23.103	1.69	202.93	A
91.67-83.33			B	0.217	2.541	0.594	0.8	1	16.911			
			C	0.122	2.876	0.578	0.8	1	10.228			
T6	0.26	1.30	A	0.283	2.342	0.611	0.8	1	23.629	1.69	203.12	A
83.33-75.00			B	0.239	2.472	0.599	0.8	1	19.380			
			C	0.119	2.889	0.577	0.8	1	10.435			
T7	1.04	4.33	A	0.279	2.354	0.61	0.8	1	76.332	5.21	208.25	B
75.00-50.00			B	0.294	2.311	0.614	0.8	1	78.794			
			C	0.125	2.864	0.578	0.8	1	36.168			
T8	1.13	4.95	A	0.255	2.422	0.603	0.8	1	78.023	4.99	199.78	B
50.00-25.00			B	0.292	2.317	0.614	0.8	1	87.223			
			C	0.113	2.913	0.576	0.8	1	36.913			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.8	1	72.500	4.71	188.32	B
			B	0.243	2.459	0.6	0.8	1	80.365			
			C	0.116	2.901	0.577	0.8	1	41.363			
Sum Weight:	3.90	20.03						OTM	1397.43 kip-ft	23.45		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft²	F K	w plf	Ctrl. Face
T1	0.02	0.45	A	0.265	2.392	0.606	0.85	1	7.526	0.62	185.33	A
120.00-116.67			B	0.202	2.59	0.591	0.85	1	6.041			
			C	0.195	2.613	0.589	0.85	1	5.883			
T2	0.07	0.77	A	0.231	2.497	0.597	0.85	1	16.488	1.39	167.11	A
116.67-108.33			B	0.137	2.819	0.58	0.85	1	9.995			
			C	0.13	2.846	0.579	0.85	1	9.567			
T3	0.12	0.78	A	0.28	2.351	0.61	0.85	1	20.755	1.61	193.75	A
108.33-100.00			B	0.154	2.758	0.582	0.85	1	11.511			
			C	0.126	2.864	0.578	0.85	1	9.757			
T4	0.16	0.92	A	0.281	2.349	0.61	0.85	1	21.921	1.66	199.60	A
100.00-91.67			B	0.19	2.631	0.588	0.85	1	14.615			
			C	0.126	2.862	0.578	0.85	1	10.399			
T5	0.21	0.94	A	0.289	2.325	0.613	0.85	1	23.583	1.73	207.15	A
91.67-83.33			B	0.217	2.541	0.594	0.85	1	17.258			
			C	0.122	2.876	0.578	0.85	1	10.617			
T6	0.26	1.30	A	0.283	2.342	0.611	0.85	1	24.121	1.73	207.35	A
83.33-75.00			B	0.239	2.472	0.599	0.85	1	19.727			
			C	0.119	2.889	0.577	0.85	1	10.836			
T7	1.04	4.33	A	0.279	2.354	0.61	0.85	1	78.001	5.28	211.28	B
75.00-50.00			B	0.294	2.311	0.614	0.85	1	79.943			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	R_R	D_F	D_R	A_E ft^2	F K	w plf	Ctrl. Face
			C	0.125	2.864	0.578	0.85	1	37.590			
T8	1.13	4.95	A	0.255	2.422	0.603	0.85	1	79.825	5.07	202.62	B
50.00-25.00			B	0.292	2.317	0.614	0.85	1	88.465			
			C	0.113	2.913	0.576	0.85	1	38.469			
T9 25.00-0.00	0.87	5.59	A	0.214	2.551	0.593	0.85	1	74.257	4.79	191.43	B
			B	0.243	2.459	0.6	0.85	1	81.695			
			C	0.116	2.901	0.577	0.85	1	42.914			
Sum Weight:	3.90	20.03						OTM	1425.11 kip-ft	23.88		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	6.83					
Bracing Weight	13.20					
Total Member Self-Weight	20.03			-22.76	-10.05	
Total Weight	33.69			-22.76	-10.05	
Wind 0 deg - No Ice		0.74	-45.70	-3541.36	-92.87	9.19
Wind 30 deg - No Ice		22.56	-37.67	-2905.77	-1772.52	-26.45
Wind 45 deg - No Ice		31.76	-30.30	-2333.13	-2491.62	-36.15
Wind 60 deg - No Ice		38.14	-21.65	-1692.09	-2970.57	-44.98
Wind 90 deg - No Ice		43.69	-1.44	-195.68	-3369.79	-62.04
Wind 120 deg - No Ice		38.87	22.52	1697.93	-2980.59	-55.15
Wind 135 deg - No Ice		30.04	31.51	2425.31	-2291.41	-39.38
Wind 150 deg - No Ice		20.63	38.76	2985.12	-1542.29	-26.23
Wind 180 deg - No Ice		0.34	44.06	3387.29	-48.62	5.94
Wind 210 deg - No Ice		-21.32	38.49	2951.37	1600.41	26.21
Wind 225 deg - No Ice		-30.77	31.37	2406.04	2352.26	34.89
Wind 240 deg - No Ice		-39.11	23.51	1808.08	2987.54	50.47
Wind 270 deg - No Ice		-43.24	0.74	52.41	3299.94	64.30
Wind 300 deg - No Ice		-36.61	-21.16	-1637.25	2780.24	54.86
Wind 315 deg - No Ice		-29.85	-30.64	-2374.75	2258.66	43.64
Wind 330 deg - No Ice		-21.03	-37.92	-2936.22	1581.23	34.50
Member Ice	7.16					
Total Weight Ice	52.23			-50.87	-19.50	
Wind 0 deg - Ice		0.76	-57.25	-4364.52	-104.07	15.72
Wind 30 deg - Ice		28.39	-47.73	-3626.94	-2185.49	-32.85
Wind 45 deg - Ice		40.01	-38.50	-2926.42	-3072.40	-48.40
Wind 60 deg - Ice		48.23	-27.45	-2121.03	-3678.64	-62.27
Wind 90 deg - Ice		55.32	-1.47	-227.91	-4182.78	-85.96
Wind 120 deg - Ice		48.88	28.29	2066.75	-3678.63	-79.07
Wind 135 deg - Ice		38.26	39.75	2966.88	-2867.52	-60.59
Wind 150 deg - Ice		26.42	48.85	3653.98	-1950.02	-43.50
Wind 180 deg - Ice		0.36	55.70	4163.81	-59.66	-0.16
Wind 210 deg - Ice		-27.13	48.56	3618.78	1990.49	32.60
Wind 225 deg - Ice		-38.99	39.60	2946.32	2910.96	47.10
Wind 240 deg - Ice		-49.12	29.30	2179.02	3666.89	67.98
Wind 270 deg - Ice		-54.87	0.76	25.96	4092.67	88.27
Wind 300 deg - Ice		-46.66	-26.96	-2065.59	3465.25	78.67
Wind 315 deg - Ice		-38.06	-38.86	-2969.93	2815.42	64.95
Wind 330 deg - Ice		-26.83	-47.98	-3658.75	1971.50	51.99
Total Weight	33.69			-22.76	-10.05	
Wind 0 deg - Service		0.74	-45.70	-3525.61	-85.11	9.19

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 30 deg - Service		22.56	-37.67	-2890.03	-1764.76	-26.45
Wind 45 deg - Service		31.76	-30.30	-2317.39	-2483.86	-36.15
Wind 60 deg - Service		38.14	-21.65	-1676.34	-2962.81	-44.98
Wind 90 deg - Service		43.69	-1.44	-179.93	-3362.03	-62.04
Wind 120 deg - Service		38.87	22.52	1713.68	-2972.83	-55.15
Wind 135 deg - Service		30.04	31.51	2441.06	-2283.66	-39.38
Wind 150 deg - Service		20.63	38.76	3000.87	-1534.54	-26.23
Wind 180 deg - Service		0.34	44.06	3403.03	-40.86	5.94
Wind 210 deg - Service		-21.32	38.49	2967.12	1608.17	26.21
Wind 225 deg - Service		-30.77	31.37	2421.79	2360.02	34.89
Wind 240 deg - Service		-39.11	23.51	1823.83	2995.30	50.47
Wind 270 deg - Service		-43.24	0.74	68.15	3307.70	64.30
Wind 300 deg - Service		-36.61	-21.16	-1621.50	2788.00	54.86
Wind 315 deg - Service		-29.85	-30.64	-2359.01	2266.42	43.64
Wind 330 deg - Service		-21.03	-37.92	-2920.47	1588.99	34.50

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 45 deg - No Ice
5	Dead+Wind 60 deg - No Ice
6	Dead+Wind 90 deg - No Ice
7	Dead+Wind 120 deg - No Ice
8	Dead+Wind 135 deg - No Ice
9	Dead+Wind 150 deg - No Ice
10	Dead+Wind 180 deg - No Ice
11	Dead+Wind 210 deg - No Ice
12	Dead+Wind 225 deg - No Ice
13	Dead+Wind 240 deg - No Ice
14	Dead+Wind 270 deg - No Ice
15	Dead+Wind 300 deg - No Ice
16	Dead+Wind 315 deg - No Ice
17	Dead+Wind 330 deg - No Ice
18	Dead+Ice+Temp
19	Dead+Wind 0 deg+Ice+Temp
20	Dead+Wind 30 deg+Ice+Temp
21	Dead+Wind 45 deg+Ice+Temp
22	Dead+Wind 60 deg+Ice+Temp
23	Dead+Wind 90 deg+Ice+Temp
24	Dead+Wind 120 deg+Ice+Temp
25	Dead+Wind 135 deg+Ice+Temp
26	Dead+Wind 150 deg+Ice+Temp
27	Dead+Wind 180 deg+Ice+Temp
28	Dead+Wind 210 deg+Ice+Temp
29	Dead+Wind 225 deg+Ice+Temp
30	Dead+Wind 240 deg+Ice+Temp
31	Dead+Wind 270 deg+Ice+Temp
32	Dead+Wind 300 deg+Ice+Temp
33	Dead+Wind 315 deg+Ice+Temp
34	Dead+Wind 330 deg+Ice+Temp
35	Dead+Wind 0 deg - Service
36	Dead+Wind 30 deg - Service

Comb. No.	Description
37	Dead+Wind 45 deg - Service
38	Dead+Wind 60 deg - Service
39	Dead+Wind 90 deg - Service
40	Dead+Wind 120 deg - Service
41	Dead+Wind 135 deg - Service
42	Dead+Wind 150 deg - Service
43	Dead+Wind 180 deg - Service
44	Dead+Wind 210 deg - Service
45	Dead+Wind 225 deg - Service
46	Dead+Wind 240 deg - Service
47	Dead+Wind 270 deg - Service
48	Dead+Wind 300 deg - Service
49	Dead+Wind 315 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	120 - 116.667	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	30	-1.34	1.10	-0.50
			Max. Mx	27	-0.77	-1.24	-0.51
			Max. My	27	-1.24	0.53	-1.64
			Max. Vy	27	0.79	-1.24	-0.51
			Max. Vx	26	0.86	0.16	-1.51
		Diagonal	Max Tension	31	1.73	0.00	0.00
			Max. Compression	31	-1.92	0.00	0.00
			Max. Mx	20	1.46	0.04	0.00
			Max. My	30	-0.13	0.00	-0.00
			Max. Vy	20	-0.02	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	32	1.93	0.02	0.01
			Max. Compression	24	-2.04	0.02	0.01
			Max. Mx	27	-0.85	0.03	0.00
			Max. My	34	1.77	0.02	0.01
			Max. Vy	27	0.02	0.03	0.00
			Max. Vx	34	-0.00	0.00	0.00
T2	116.667 - 108.333	Leg	Max Tension	15	0.55	-0.79	-0.05
			Max. Compression	19	-4.14	0.78	0.09
			Max. Mx	24	-2.82	-1.27	0.01
			Max. My	27	-2.08	0.53	1.88
			Max. Vy	24	-1.15	0.89	0.06
			Max. Vx	27	-1.69	0.53	-1.64
		Diagonal	Max Tension	20	6.86	0.00	0.00
			Max. Compression	20	-7.02	0.00	0.00
			Max. Mx	20	6.86	0.07	0.00
			Max. My	30	0.27	0.00	-0.00
			Max. Vy	20	0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	27	4.60	0.00	0.00
			Max. Compression	19	-4.11	0.03	0.01
			Max. Mx	32	0.06	0.03	0.01
			Max. My	27	0.01	0.02	0.01
			Max. Vy	32	0.02	0.03	0.01
			Max. Vx	27	-0.00	0.00	0.00
T3	108.333 - 100	Leg	Max Tension	22	7.24	-0.86	-0.20
			Max. Compression	19	-12.96	0.46	0.01

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	27	6.83	-0.91	-0.18
			Max. My	27	-7.29	0.26	-1.22
			Max. Vy	27	-0.21	-0.91	-0.18
			Max. Vx	31	-0.30	-0.11	-1.12
		Diagonal	Max Tension	28	9.22	0.00	0.00
			Max. Compression	28	-9.39	0.00	0.00
			Max. Mx	20	9.21	0.07	0.00
			Max. My	30	0.90	0.00	-0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Horizontal	Max Tension	27	6.15	0.00	0.00
			Max. Compression	30	-5.69	0.00	0.00
			Max. Mx	22	0.11	0.03	0.01
			Max. My	27	0.01	0.03	0.02
			Max. Vy	22	0.02	0.03	0.01
			Max. Vx	27	-0.00	0.00	0.00
T4	100 - 91.6667	Leg	Max Tension	22	17.67	-0.48	0.18
			Max. Compression	19	-25.54	0.56	-0.01
			Max. Mx	27	16.07	1.07	0.01
			Max. My	31	-4.04	-0.04	1.12
			Max. Vy	27	0.54	-0.62	0.01
			Max. Vx	31	0.59	-0.04	-0.64
		Diagonal	Max Tension	28	10.30	0.00	0.00
			Max. Compression	28	-10.54	0.00	0.00
			Max. Mx	20	10.28	0.08	0.00
			Max. My	30	1.08	0.00	-0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	28	6.61	0.04	-0.00
			Max. Compression	28	-6.55	0.04	-0.00
			Max. Mx	22	0.38	0.06	0.02
			Max. My	19	0.37	0.03	-0.02
			Max. Vy	22	0.03	0.06	0.02
			Max. Vx	19	0.00	0.03	-0.02
		Inner Bracing	Max Tension	28	0.11	0.00	0.00
			Max. Compression	28	-0.11	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.10	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T5	91.6667 - 83.3333	Leg	Max Tension	22	28.47	-0.62	0.01
			Max. Compression	19	-38.55	0.76	-0.02
			Max. Mx	27	27.50	-0.78	0.01
			Max. My	23	-8.76	0.00	0.86
			Max. Vy	32	0.21	-0.77	-0.09
			Max. Vx	20	0.25	-0.01	-0.74
		Diagonal	Max Tension	28	11.47	0.00	0.00
			Max. Compression	28	-11.73	0.00	0.00
			Max. Mx	20	11.45	0.08	0.00
			Max. My	30	1.14	0.00	-0.00
			Max. Vy	20	-0.03	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	28	7.58	0.05	-0.00
			Max. Compression	28	-7.50	0.05	-0.00
			Max. Mx	22	0.35	0.07	0.02
			Max. My	19	0.46	0.03	-0.02
			Max. Vy	22	0.04	0.07	0.02
			Max. Vx	30	0.00	0.03	-0.02
		Inner Bracing	Max Tension	28	0.13	0.00	0.00
			Max. Compression	28	-0.13	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.12	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T6	83.3333 - 75	Leg	Max Tension	22	41.11	-0.77	0.07
			Max. Compression	19	-53.72	1.36	-0.12
			Max. Mx	27	39.47	-1.48	0.13
			Max. My	23	-11.05	-0.04	1.57
			Max. Vy	27	-0.60	-0.78	0.01
			Max. Vx	23	0.68	0.00	0.86
		Diagonal	Max Tension	28	12.72	0.00	0.00
			Max. Compression	28	-13.07	0.00	0.00
			Max. Mx	20	12.69	0.14	0.00
			Max. My	30	1.12	0.00	-0.01
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	30	0.00	0.00	0.00
		Top Girt	Max Tension	28	8.63	0.05	-0.00
			Max. Compression	28	-8.54	0.05	-0.00
			Max. Mx	22	0.26	0.08	0.02
			Max. My	19	0.68	0.02	-0.02
			Max. Vy	22	0.04	0.08	0.02
			Max. Vx	19	0.00	0.02	-0.02
		Inner Bracing	Max Tension	28	0.15	0.00	0.00
			Max. Compression	28	-0.15	0.00	0.00
			Max. Mx	18	-0.00	-0.03	0.00
			Max. My	19	0.13	0.00	-0.00
			Max. Vy	18	-0.02	0.00	0.00
			Max. Vx	19	-0.00	0.00	0.00
T7	75 - 50	Leg	Max Tension	22	88.37	-0.38	0.16
			Max. Compression	19	-110.56	0.34	0.00
			Max. Mx	27	53.68	-1.48	0.13
			Max. My	28	-8.56	-0.07	-1.70
			Max. Vy	22	-0.99	-1.48	0.08
			Max. Vx	31	-1.07	-0.08	-1.57
		Diagonal	Max Tension	28	16.33	0.00	0.00
			Max. Compression	28	-16.72	0.00	0.00
			Max. Mx	20	16.25	0.16	0.00
			Max. My	24	1.61	0.00	0.01
			Max. Vy	20	-0.05	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	28	11.84	0.00	0.00
			Max. Compression	28	-11.69	0.07	-0.00
			Max. Mx	22	1.02	0.09	0.02
			Max. My	30	1.78	0.04	-0.03
			Max. Vy	22	0.04	0.09	0.02
			Max. Vx	30	0.00	0.04	-0.03
		Top Girt	Max Tension	28	10.32	0.06	-0.00
			Max. Compression	29	-10.25	0.06	0.01
			Max. Mx	22	-0.12	0.08	0.02
			Max. My	30	2.17	0.04	-0.03
			Max. Vy	22	0.04	0.08	0.02
			Max. Vx	30	0.00	0.04	-0.03
		Inner Bracing	Max Tension	29	0.18	0.00	0.00
			Max. Compression	29	-0.18	0.00	0.00
			Max. Mx	18	-0.00	-0.04	0.00
			Max. My	19	0.01	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T8	50 - 25	Leg	Max Tension	22	141.38	-0.59	0.11
			Max. Compression	19	-172.06	0.45	-0.03
			Max. Mx	27	137.09	-0.59	0.04

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. My	23	-20.07	-0.02	0.70
			Max. Vy	27	-0.21	-0.51	0.07
			Max. Vx	24	0.32	-0.27	0.66
		Diagonal	Max Tension	34	17.30	0.00	0.00
			Max. Compression	34	-17.84	0.00	0.00
			Max. Mx	20	17.09	0.19	0.00
			Max. My	24	2.18	0.00	0.01
			Max. Vy	20	-0.06	0.00	0.00
			Max. Vx	24	-0.00	0.00	0.00
		Horizontal	Max Tension	34	13.26	0.00	0.00
			Max. Compression	25	-13.15	0.15	0.00
			Max. Mx	22	1.57	0.20	0.02
			Max. My	30	2.11	0.07	-0.03
			Max. Vy	22	0.08	0.20	0.02
			Max. Vx	30	0.00	0.07	-0.03
		Top Girt	Max Tension	28	12.27	0.07	-0.00
			Max. Compression	28	-12.13	0.07	-0.00
			Max. Mx	22	1.07	0.10	0.02
			Max. My	30	1.85	0.04	-0.03
			Max. Vy	22	0.04	0.10	0.02
			Max. Vx	30	0.00	0.04	-0.03
		Inner Bracing	Max Tension	28	0.21	0.00	0.00
			Max. Compression	28	-0.21	0.00	0.00
			Max. Mx	18	-0.00	-0.05	0.00
			Max. My	19	0.18	0.00	-0.00
			Max. Vy	18	0.02	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00
T9	25 - 0	Leg	Max Tension	22	184.55	-0.75	0.19
			Max. Compression	19	-222.34	0.00	-0.00
			Max. Mx	30	-187.33	1.43	-0.21
			Max. My	23	-26.05	0.34	1.31
			Max. Vy	30	0.21	1.43	-0.21
			Max. Vx	23	0.31	0.34	1.31
		Diagonal	Max Tension	34	22.07	0.00	0.00
			Max. Compression	34	-22.69	0.00	0.00
			Max. Mx	34	22.07	0.37	0.00
			Max. My	30	-2.77	0.00	0.01
			Max. Vy	34	-0.09	0.00	0.00
			Max. Vx	24	0.00	0.00	0.00
		Horizontal	Max Tension	33	14.38	0.00	0.00
			Max. Compression	25	-14.42	0.11	0.01
			Max. Mx	22	2.02	0.19	0.04
			Max. My	30	-0.75	-0.01	-0.05
			Max. Vy	22	0.07	0.19	0.04
			Max. Vx	30	0.01	-0.01	-0.05
		Top Girt	Max Tension	34	13.70	0.13	-0.00
			Max. Compression	25	-13.71	0.15	0.01
			Max. Mx	22	1.51	0.22	0.04
			Max. My	30	2.24	0.03	-0.05
			Max. Vy	22	0.07	0.22	0.04
			Max. Vx	30	0.01	0.03	-0.05
		Inner Bracing	Max Tension	25	0.24	0.00	0.00
			Max. Compression	25	-0.24	0.00	0.00
			Max. Mx	18	-0.01	-0.07	0.00
			Max. My	19	0.20	0.00	-0.00
			Max. Vy	18	-0.03	0.00	0.00
			Max. Vx	19	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Leg C	Max. Vert	30	245.35	26.52	-17.56
	Max. H_x	30	245.35	26.52	-17.56
	Max. H_z	21	-203.29	-22.83	16.75
	Min. Vert	22	-209.84	-24.28	15.96
	Min. H_x	22	-209.84	-24.28	15.96
	Min. H_z	29	230.96	24.25	-17.63
Leg B	Max. Vert	24	242.82	-26.07	-17.58
	Max. H_x	32	-198.14	23.22	15.90
	Max. H_z	33	-192.23	21.77	16.80
	Min. Vert	32	-198.14	23.22	15.90
	Min. H_x	24	242.82	-26.07	-17.58
	Min. H_z	25	229.46	-23.78	-17.85
Leg A	Max. Vert	19	250.82	0.37	31.84
	Max. H_x	31	15.99	9.46	0.64
	Max. H_z	19	250.82	0.37	31.84
	Min. Vert	27	-205.30	-0.03	-29.06
	Min. H_x	23	29.97	-9.41	1.92
	Min. H_z	27	-205.30	-0.03	-29.06

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	33.69	0.00	0.00	-22.76	-10.05	0.00
Dead+Wind 0 deg - No Ice	33.69	0.74	-45.70	-3456.28	-93.03	9.21
Dead+Wind 30 deg - No Ice	33.69	22.56	-37.67	-2835.72	-1732.19	-26.46
Dead+Wind 45 deg - No Ice	33.69	31.76	-30.30	-2276.41	-2435.11	-36.18
Dead+Wind 60 deg - No Ice	33.69	38.14	-21.65	-1652.46	-2901.88	-45.01
Dead+Wind 90 deg - No Ice	33.69	43.69	-1.44	-196.10	-3288.91	-62.09
Dead+Wind 120 deg - No Ice	33.69	38.87	22.52	1655.22	-2906.81	-55.22
Dead+Wind 135 deg - No Ice	33.69	30.04	31.51	2368.70	-2234.62	-39.45
Dead+Wind 150 deg - No Ice	33.69	20.63	38.76	2915.18	-1501.62	-26.28
Dead+Wind 180 deg - No Ice	33.69	0.34	44.06	3307.92	-48.66	5.91
Dead+Wind 210 deg - No Ice	33.69	-21.32	38.49	2881.36	1559.87	26.21
Dead+Wind 225 deg - No Ice	33.69	-30.77	31.37	2349.37	2295.60	34.91
Dead+Wind 240 deg - No Ice	33.69	-39.11	23.51	1765.54	2913.79	50.51
Dead+Wind 270 deg - No Ice	33.69	-43.24	0.74	52.40	3218.96	64.36
Dead+Wind 300 deg - No Ice	33.69	-36.61	-21.16	-1597.53	2711.23	54.92
Dead+Wind 315 deg - No Ice	33.69	-29.85	-30.64	-2318.11	2201.76	43.69
Dead+Wind 330 deg - No Ice	33.69	-21.03	-37.92	-2866.22	1540.59	34.54
Dead+Ice+Temp	52.23	0.00	0.00	-50.86	-19.49	-0.00
Dead+Wind 0 deg+Ice+Temp	52.23	0.76	-57.25	-4248.73	-104.30	15.75
Dead+Wind 30 deg+Ice+Temp	52.23	28.39	-47.73	-3530.44	-2129.93	-32.88
Dead+Wind 45 deg+Ice+Temp	52.23	40.01	-38.50	-2848.15	-2994.38	-48.46
Dead+Wind 60 deg+Ice+Temp	52.23	48.23	-27.45	-2066.25	-3583.60	-62.36
Dead+Wind 90 deg+Ice+Temp	52.23	55.32	-1.47	-228.57	-4071.36	-86.08
Dead+Wind 120 deg+Ice+Temp	52.23	48.88	28.29	2008.52	-3578.19	-79.21
Dead+Wind 135 deg+Ice+Temp	52.23	38.26	39.75	2888.64	-2789.16	-60.74
Dead+Wind 150 deg+Ice+Temp	52.23	26.42	48.85	3557.54	-1894.01	-43.62
Dead+Wind 180 deg+Ice+Temp	52.23	0.36	55.70	4053.93	-59.74	-0.21
Dead+Wind 210 deg+Ice+Temp	52.23	-27.13	48.56	3522.23	1934.63	32.62
Dead+Wind 225 deg+Ice+Temp	52.23	-38.99	39.60	2868.01	2832.74	47.18
Dead+Wind 240 deg+Ice+Temp	52.23	-49.12	29.30	2121.02	3566.47	68.07

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 270 deg+Ice+Temp	52.23	-54.87	0.76	25.87	3981.09	88.41
Dead+Wind 300 deg+Ice+Temp	52.23	-46.66	-26.96	-2010.71	3369.76	78.81
Dead+Wind 315 deg+Ice+Temp	52.23	-38.06	-38.86	-2891.78	2736.84	65.07
Dead+Wind 330 deg+Ice+Temp	52.23	-26.83	-47.98	-3562.35	1915.48	52.09
Dead+Wind 0 deg - Service	33.69	0.74	-45.70	-3456.28	-93.03	9.21
Dead+Wind 30 deg - Service	33.69	22.56	-37.67	-2835.72	-1732.19	-26.46
Dead+Wind 45 deg - Service	33.69	31.76	-30.30	-2276.41	-2435.11	-36.18
Dead+Wind 60 deg - Service	33.69	38.14	-21.65	-1652.46	-2901.88	-45.01
Dead+Wind 90 deg - Service	33.69	43.69	-1.44	-196.10	-3288.91	-62.09
Dead+Wind 120 deg - Service	33.69	38.87	22.52	1655.22	-2906.81	-55.22
Dead+Wind 135 deg - Service	33.69	30.04	31.51	2368.70	-2234.62	-39.45
Dead+Wind 150 deg - Service	33.69	20.63	38.76	2915.18	-1501.62	-26.28
Dead+Wind 180 deg - Service	33.69	0.34	44.06	3307.92	-48.66	5.91
Dead+Wind 210 deg - Service	33.69	-21.32	38.49	2881.36	1559.87	26.21
Dead+Wind 225 deg - Service	33.69	-30.77	31.37	2349.37	2295.60	34.91
Dead+Wind 240 deg - Service	33.69	-39.11	23.51	1765.54	2913.79	50.51
Dead+Wind 270 deg - Service	33.69	-43.24	0.74	52.40	3218.96	64.36
Dead+Wind 300 deg - Service	33.69	-36.61	-21.16	-1597.53	2711.23	54.92
Dead+Wind 315 deg - Service	33.69	-29.85	-30.64	-2318.11	2201.76	43.69
Dead+Wind 330 deg - Service	33.69	-21.03	-37.92	-2866.22	1540.59	34.54

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-33.69	0.00	0.00	33.69	0.00	0.000%
2	0.74	-33.69	-45.70	-0.74	33.69	45.70	0.000%
3	22.56	-33.69	-37.67	-22.56	33.69	37.67	0.000%
4	31.76	-33.69	-30.30	-31.76	33.69	30.30	0.000%
5	38.14	-33.69	-21.65	-38.14	33.69	21.65	0.000%
6	43.69	-33.69	-1.44	-43.69	33.69	1.44	0.000%
7	38.87	-33.69	22.52	-38.87	33.69	-22.52	0.000%
8	30.04	-33.69	31.51	-30.04	33.69	-31.51	0.000%
9	20.63	-33.69	38.76	-20.63	33.69	-38.76	0.000%
10	0.34	-33.69	44.06	-0.34	33.69	-44.06	0.000%
11	-21.32	-33.69	38.49	21.32	33.69	-38.49	0.000%
12	-30.77	-33.69	31.37	30.77	33.69	-31.37	0.000%
13	-39.11	-33.69	23.51	39.11	33.69	-23.51	0.000%
14	-43.24	-33.69	0.74	43.24	33.69	-0.74	0.000%
15	-36.61	-33.69	-21.16	36.61	33.69	21.16	0.000%
16	-29.85	-33.69	-30.64	29.85	33.69	30.64	0.000%
17	-21.03	-33.69	-37.92	21.03	33.69	37.92	0.000%
18	0.00	-52.23	0.00	0.00	52.23	0.00	0.000%
19	0.76	-52.23	-57.25	-0.76	52.23	57.25	0.000%
20	28.39	-52.23	-47.73	-28.39	52.23	47.73	0.000%
21	40.01	-52.23	-38.50	-40.01	52.23	38.50	0.000%
22	48.23	-52.23	-27.45	-48.23	52.23	27.45	0.000%
23	55.32	-52.23	-1.47	-55.32	52.23	1.47	0.000%
24	48.88	-52.23	28.29	-48.88	52.23	-28.29	0.000%
25	38.26	-52.23	39.75	-38.26	52.23	-39.75	0.000%
26	26.42	-52.23	48.85	-26.42	52.23	-48.85	0.000%
27	0.36	-52.23	55.70	-0.36	52.23	-55.70	0.000%
28	-27.13	-52.23	48.56	27.13	52.23	-48.56	0.000%
29	-38.99	-52.23	39.60	38.99	52.23	-39.60	0.000%
30	-49.12	-52.23	29.30	49.12	52.23	-29.30	0.000%
31	-54.87	-52.23	0.76	54.87	52.23	-0.76	0.000%
32	-46.66	-52.23	-26.96	46.66	52.23	26.96	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
33	-38.06	-52.23	-38.86	38.06	52.23	38.86	0.000%
34	-26.83	-52.23	-47.98	26.83	52.23	47.98	0.000%
35	0.74	-33.69	-45.70	-0.74	33.69	45.70	0.000%
36	22.56	-33.69	-37.67	-22.56	33.69	37.67	0.000%
37	31.76	-33.69	-30.30	-31.76	33.69	30.30	0.000%
38	38.14	-33.69	-21.65	-38.14	33.69	21.65	0.000%
39	43.69	-33.69	-1.44	-43.69	33.69	1.44	0.000%
40	38.87	-33.69	22.52	-38.87	33.69	-22.52	0.000%
41	30.04	-33.69	31.51	-30.04	33.69	-31.51	0.000%
42	20.63	-33.69	38.76	-20.63	33.69	-38.76	0.000%
43	0.34	-33.69	44.06	-0.34	33.69	-44.06	0.000%
44	-21.32	-33.69	38.49	21.32	33.69	-38.49	0.000%
45	-30.77	-33.69	31.37	30.77	33.69	-31.37	0.000%
46	-39.11	-33.69	23.51	39.11	33.69	-23.51	0.000%
47	-43.24	-33.69	0.74	43.24	33.69	-0.74	0.000%
48	-36.61	-33.69	-21.16	36.61	33.69	21.16	0.000%
49	-29.85	-33.69	-30.64	29.85	33.69	30.64	0.000%
50	-21.03	-33.69	-37.92	21.03	33.69	37.92	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00000001
3	Yes	4	0.00000001	0.00000001
4	Yes	4	0.00000001	0.00000001
5	Yes	4	0.00000001	0.00000001
6	Yes	4	0.00000001	0.00000001
7	Yes	4	0.00000001	0.00000001
8	Yes	4	0.00000001	0.00000001
9	Yes	4	0.00000001	0.00000001
10	Yes	4	0.00000001	0.00000001
11	Yes	4	0.00000001	0.00000001
12	Yes	4	0.00000001	0.00000001
13	Yes	4	0.00000001	0.00000001
14	Yes	4	0.00000001	0.00000001
15	Yes	4	0.00000001	0.00000001
16	Yes	4	0.00000001	0.00000001
17	Yes	4	0.00000001	0.00000001
18	Yes	4	0.00000001	0.00000001
19	Yes	4	0.00000001	0.00000001
20	Yes	4	0.00000001	0.00000001
21	Yes	4	0.00000001	0.00000001
22	Yes	4	0.00000001	0.00000001
23	Yes	4	0.00000001	0.00000001
24	Yes	4	0.00000001	0.00000001
25	Yes	4	0.00000001	0.00000001
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001

34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001
38	Yes	4	0.00000001	0.00000001
39	Yes	4	0.00000001	0.00000001
40	Yes	4	0.00000001	0.00000001
41	Yes	4	0.00000001	0.00000001
42	Yes	4	0.00000001	0.00000001
43	Yes	4	0.00000001	0.00000001
44	Yes	4	0.00000001	0.00000001
45	Yes	4	0.00000001	0.00000001
46	Yes	4	0.00000001	0.00000001
47	Yes	4	0.00000001	0.00000001
48	Yes	4	0.00000001	0.00000001
49	Yes	4	0.00000001	0.00000001
50	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	4.870	35	0.2804	0.0964
T2	116.667 - 108.333	4.668	35	0.2806	0.0976
T3	108.333 - 100	4.146	35	0.2806	0.0938
T4	100 - 91.6667	3.621	35	0.2764	0.0849
T5	91.6667 - 83.3333	3.113	35	0.2668	0.0764
T6	83.3333 - 75	2.624	35	0.2520	0.0681
T7	75 - 50	2.185	35	0.2315	0.0628
T8	50 - 25	1.003	35	0.1747	0.0414
T9	25 - 0	0.247	35	0.0820	0.0190

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	35	4.870	0.2804	0.0964	31035
128.00	16'x2.5" Pipe Mount	35	4.870	0.2804	0.0964	31035
120.00	6FT DISH	35	4.870	0.2804	0.0964	31035
118.00	6' Side-Arm	35	4.749	0.2805	0.0973	31035
116.00	PA6-65AC	35	4.627	0.2807	0.0977	31035
115.00	PA6-65AC	35	4.565	0.2807	0.0976	31035
111.00	PA6-65AC	35	4.315	0.2809	0.0959	50804
110.00	Filter/Diplexer	35	4.252	0.2808	0.0952	61004
105.00	AP13-850/065/ADT w/Mount Pipe	35	3.935	0.2796	0.0904	105478
103.00	OGT9-806	35	3.809	0.2785	0.0882	58462
100.00	PD458-1	35	3.621	0.2764	0.0849	40529
95.00	EUSF10-U	35	3.314	0.2712	0.0798	58618
90.00	20' 4-Bay Dipole	35	3.012	0.2643	0.0746	38610
88.00	Mount	35	2.893	0.2611	0.0725	23957
86.00	Mount	35	2.776	0.2575	0.0705	17061
85.00	3' Yagi	35	2.718	0.2556	0.0695	15410
80.00	(2) SBNH-1D6565C	35	2.444	0.2441	0.0657	18868
78.00	VHF150	35	2.339	0.2390	0.0645	28320

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
72.00	Mount	35	2.033	0.2246	0.0608	73188
70.00	2' Microwave Panel	35	1.932	0.2202	0.0593	57137
60.00	GPS	35	1.443	0.1995	0.0509	25121
56.00	2' Sidearm	35	1.260	0.1905	0.0472	20521
55.00	DB264-A	35	1.215	0.1881	0.0462	19623
50.00	1' Microwave Panel	35	1.003	0.1747	0.0414	16376
44.00	5'0"x3" Pipe Mount	35	0.772	0.1551	0.0358	14719
40.00	4 FT DISH	35	0.634	0.1404	0.0321	13922
35.00	1' Omni	35	0.481	0.1210	0.0276	13041
30.00	4' Whip	35	0.352	0.1012	0.0232	12264

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	120 - 116.667	5.909	19	0.3389	0.1258
T2	116.667 - 108.333	5.665	19	0.3391	0.1274
T3	108.333 - 100	5.038	19	0.3390	0.1232
T4	100 - 91.6667	4.404	19	0.3340	0.1121
T5	91.6667 - 83.3333	3.791	19	0.3227	0.1014
T6	83.3333 - 75	3.200	19	0.3053	0.0907
T7	75 - 50	2.668	19	0.2808	0.0840
T8	50 - 25	1.231	19	0.2126	0.0560
T9	25 - 0	0.306	19	0.1002	0.0259

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
138.00	Lightning Rod 5/8x4'	19	5.909	0.3389	0.1258	27466
128.00	16'x2.5" Pipe Mount	19	5.909	0.3389	0.1258	27466
120.00	6FT DISH	19	5.909	0.3389	0.1258	27466
118.00	6' Side-Arm	19	5.763	0.3390	0.1269	27466
116.00	PA6-65AC	19	5.616	0.3391	0.1275	27466
115.00	PA6-65AC	19	5.541	0.3392	0.1275	27466
111.00	PA6-65AC	19	5.240	0.3394	0.1257	41399
110.00	Filter/Diplexer	19	5.165	0.3393	0.1248	48476
105.00	AP13-850/065/ADT w/Mount Pipe	19	4.783	0.3378	0.1191	104861
103.00	OGT9-806	19	4.631	0.3366	0.1163	52033
100.00	PD458-1	19	4.404	0.3340	0.1121	35083
95.00	EUSF10-U	19	4.034	0.3280	0.1057	51789
90.00	20' 4-Bay Dipole	19	3.669	0.3198	0.0991	33469
88.00	Mount	19	3.525	0.3160	0.0964	20430
86.00	Mount	19	3.384	0.3117	0.0938	14436
85.00	3' Yagi	19	3.314	0.3094	0.0926	13012
80.00	(2) SBNH-1D6565C	19	2.982	0.2958	0.0877	15884
78.00	VHF150	19	2.855	0.2898	0.0862	23859
72.00	Mount	19	2.483	0.2725	0.0814	61765
70.00	2' Microwave Panel	19	2.360	0.2673	0.0796	48128
60.00	GPS	19	1.767	0.2425	0.0685	21087

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
56.00	2' Sidearm	19	1.544	0.2317	0.0636	17217
55.00	DB264-A	19	1.490	0.2288	0.0624	16462
50.00	1' Microwave Panel	19	1.231	0.2126	0.0560	13718
44.00	5'0"x3" Pipe Mount	19	0.949	0.1890	0.0485	12255
40.00	4 FT DISH	19	0.781	0.1712	0.0436	11544
35.00	1' Omni	19	0.594	0.1477	0.0375	10764
30.00	4' Whip	19	0.435	0.1237	0.0316	10083

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	120	Diagonal	A325X	0.7500	1	1.73	12.23	0.141 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	1.02	8.16	0.125 ✓	1.333	Member Bearing
T2	116.667	Diagonal	A325X	0.7500	1	6.86	12.23	0.561 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	2.30	8.16	0.282 ✓	1.333	Member Bearing
T3	108.333	Diagonal	A325X	0.7500	1	9.22	12.23	0.754 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	3.07	8.16	0.377 ✓	1.333	Member Bearing
T4	100	Leg	A325X	0.7500	6	2.94	19.44	0.152 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	10.30	12.23	0.842 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	3.31	9.20	0.359 ✓	1.333	Bolt Shear
T5	91.6667	Diagonal	A325X	0.7500	1	11.47	12.23	0.938 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	3.79	9.20	0.412 ✓	1.333	Bolt Shear
T6	83.3333	Diagonal	A325X	0.7500	1	12.72	24.47	0.520 ✓	1.333	Member Bearing
		Top Girt	A325X	0.6250	2	4.31	9.20	0.469 ✓	1.333	Bolt Shear
T7	75	Leg	A325X	0.7500	6	9.11	19.44	0.469 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	16.33	16.31	1.001 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	5.92	9.20	0.643 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	5.16	9.20	0.561 ✓	1.333	Bolt Shear
T8	50	Leg	A325X	0.7500	6	17.64	19.44	0.907 ✓	1.333	Bolt Tension
		Diagonal	A325X	0.7500	1	17.30	16.31	1.061 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	6.63	9.20	0.720 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	6.13	9.20	0.667 ✓	1.333	Bolt Shear
T9	25	Leg	A325X	1.0000	8	19.86	34.56	0.575 ✓	1.333	Bolt Tension
		Diagonal	A325X	1.0000	1	22.07	27.19	0.812 ✓	1.333	Member Bearing
		Horizontal	A325X	0.6250	2	7.21	9.20	0.784 ✓	1.333	Bolt Shear
		Top Girt	A325X	0.6250	2	6.86	9.20	0.745 ✓	1.333	Bolt Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	P.5x.250	3.34	3.34	23.8 K=1.00	27.884	3.7306	-1.14	104.03	0.011* ✔
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-4.14	85.05	0.049 ✔
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-12.96	85.05	0.152 ✔
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-25.54	85.05	0.300 ✔
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-38.55	85.05	0.453 ✔
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5 K=1.00	22.798	3.7306	-53.72	85.05	0.632 ✔
T7	75 - 50	P5x.375	25.03	8.34	54.4 K=1.00	23.645	6.1120	-110.56	144.52	0.765 ✔
T8	50 - 25	P.5x.400	25.03	8.34	61.3 K=1.00	25.746	5.7805	-172.06	148.83	1.156 ✔
T9	25 - 0	P6.875x.400	25.03	12.51	65.5 K=1.00	24.741	8.1367	-222.34	201.31	1.104 ✔

* DL controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	107.0 K=1.14	12.069	1.6200	-1.92	19.55	0.098 ✔
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	148.1 K=1.00	6.805	1.6200	-7.02	11.02	0.636 ✔
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	151.4 K=1.00	6.517	1.6200	-9.39	10.56	0.889 ✔
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	154.7 K=1.00	6.240	1.6200	-10.54	10.11	1.042 ✔
T5	91.6667 - 83.3333	2L2 1/2x2x3/16	11.00	10.41	158.1 K=1.00	5.975	1.6200	-11.73	9.68	1.212 ✔
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	166.2 K=1.00	5.407	3.0900	-13.07	16.71	0.782 ✔
T7	75 - 50	2L3x2 1/2x1/4	11.91	11.32	143.7 K=1.00	7.232	2.6300	-16.72	19.02	0.879 ✔
T8	50 - 25	2L3x2 1/2x1/4	12.65	12.10	153.6 K=1.00	6.328	2.6300	-17.84	16.64	1.072 ✔
T9	25 - 0	2L3 1/2x3x5/16	16.33	15.56	169.7 K=1.00	5.186	3.8700	-22.69	20.07	1.130

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
										✔

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	10.87	149.3 K=0.89	6.699	0.9020	-4.11	6.04	0.679 ✔
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	11.54	155.6 K=0.87	6.166	0.9020	-5.69	5.56	1.023 ✔
T7	75 - 50	L3x3x1/4	16.35	7.75	145.6 K=0.93	7.042	1.4400	-11.69	10.14	1.153 ✔
T8	50 - 25	L3x3x1/2	18.35	8.77	165.6 K=0.92	5.448	2.7500	-13.15	14.98	0.878 ✔
T9	25 - 0	L4x4x1/4	20.02	9.52	134.3 K=0.93	8.281	1.9400	-14.42	16.06	0.898 ✔

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	10.60	146.8 K=0.90	6.932	0.9020	-2.04	6.25	0.326 ✔
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	116.9 K=0.95	10.722	1.4400	-6.55	15.44	0.425 ✔
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	122.8 K=0.94	9.880	1.4400	-7.50	14.23	0.527 ✔
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	128.6 K=0.94	9.024	1.4400	-8.54	13.00	0.658 ✔
T7	75 - 50	L3x3x1/4	15.02	7.10	134.5 K=0.93	8.260	1.4400	-10.25	11.89	0.862 ✔
T8	50 - 25	L3x3x1/4	17.02	8.08	151.4 K=0.92	6.517	1.4400	-12.13	9.38	1.293 ✔
T9	25 - 0	L4x4x1/4	19.02	9.10	128.8 K=0.94	9.002	1.9400	-13.71	17.46	0.785 ✔

Inner Bracing Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	182.9	4.465	0.8090	-0.11	3.61	0.031

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
					K=1.00					✓
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	192.3 K=1.00	4.040	0.8090	-0.13	3.27	0.040 ✓
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	201.6 K=1.00	3.673	0.8090	-0.15	2.97	0.050 ✓
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	211.0 K=1.00	3.354	0.8090	-0.18	2.71	0.065 ✓
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	239.1 K=1.00	2.612	0.8090	-0.21	2.11	0.099 ✓
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	230.5 K=1.00	2.810	0.9020	-0.24	2.53	0.094 ✓

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	116.667 - 108.333	P.5x.250	8.34	8.34	59.5	30.000	3.7306	0.55	111.92	0.005 ✓
T3	108.333 - 100	P.5x.250	8.34	8.34	59.5	30.000	3.7306	7.24	111.92	0.065 ✓
T4	100 - 91.6667	P.5x.250	8.34	8.34	59.5	30.000	3.7306	17.67	111.92	0.158 ✓
T5	91.6667 - 83.3333	P.5x.250	8.34	8.34	59.5	30.000	3.7306	28.47	111.92	0.254 ✓
T6	83.3333 - 75	P.5x.250	8.34	8.34	59.5	30.000	3.7306	41.11	111.92	0.367 ✓
T7	75 - 50	P5x.375	25.03	8.34	54.4	30.000	6.1120	88.37	183.36	0.482 ✓
T8	50 - 25	P.5x.400	25.03	8.34	61.3	36.000	5.7805	141.38	208.10	0.679 ✓
T9	25 - 0	P6.875x.400	25.03	12.51	65.5	36.000	8.1367	184.55	292.92	0.630 ✓

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	2L2 1/2x2x3/16	6.73	6.21	98.5	29.000	0.9689	1.73	28.10	0.061 ✓
T2	116.667 - 108.333	2L2 1/2x2x3/16	10.37	9.75	152.3	29.000	0.9689	6.86	28.10	0.244 ✓

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T3	108.333 - 100	2L2 1/2x2x3/16	10.58	9.97	155.5	29.000	0.9689	9.22	28.10	0.328
T4	100 - 91.6667	2L2 1/2x2x3/16	10.78	10.18	158.8	29.000	0.9689	10.30	28.10	0.366
T5	91.6667 - 83.3333	2L2 1/2x2x3/16	11.00	10.41	162.2	29.000	0.9689	11.47	28.10	0.408
T6	83.3333 - 75	2L2 1/2x2x3/8	11.22	10.64	170.4	29.000	1.8253	12.72	52.93	0.240
T7	75 - 50	2L3x2 1/2x1/4	11.91	11.32	147.1	29.000	1.6444	16.33	47.69	0.342
T8	50 - 25	2L3x2 1/2x1/4	12.65	12.10	157.1	29.000	1.6444	17.30	47.69	0.363
T9	25 - 0	2L3 1/2x3x5/16	16.33	15.56	173.3	29.000	2.3752	22.07	68.88	0.320

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T2	116.667 - 108.333	L2 1/2x2 1/2x3/16	11.68	10.87	173.7	29.000	0.5710	4.60	16.56	0.278
T3	108.333 - 100	L2 1/2x2 1/2x3/16	12.35	11.54	184.0	29.000	0.5710	6.15	16.56	0.371
T7	75 - 50	L3x3x1/4	16.35	7.75	102.5	29.000	0.9394	11.84	27.24	0.435
T8	50 - 25	L3x3x1/2	18.35	8.77	119.8	29.000	1.7813	13.26	51.66	0.257
T9	25 - 0	L4x4x1/4	20.02	9.52	93.3	29.000	1.3144	14.38	38.12	0.377

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T1	120 - 116.667	L2 1/2x2 1/2x3/16	11.41	10.60	169.6	29.000	0.5710	1.93	16.56	0.117
T4	100 - 91.6667	L3x3x1/4	13.02	6.10	81.3	29.000	0.9394	6.61	27.24	0.243
T5	91.6667 - 83.3333	L3x3x1/4	13.68	6.43	85.6	29.000	0.9394	7.58	27.24	0.278
T6	83.3333 - 75	L3x3x1/4	14.35	6.77	89.9	29.000	0.9394	8.63	27.24	0.317
T7	75 - 50	L3x3x1/4	15.02	7.10	94.2	29.000	0.9394	10.32	27.24	0.379
T8	50 - 25	L3x3x1/4	17.02	8.08	106.8	29.000	0.9394	12.27	27.24	0.450

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T9	25 - 0	L4x4x1/4	19.02	9.10	89.3	29.000	1.3144	13.70	38.12	0.359

Inner Bracing Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
T4	100 - 91.6667	L2 1/2x2x3/16	6.51	6.51	130.2	21.600	0.8090	0.11	17.47	0.006
T5	91.6667 - 83.3333	L2 1/2x2x3/16	6.84	6.84	136.9	21.600	0.8090	0.13	17.47	0.007
T6	83.3333 - 75	L2 1/2x2x3/16	7.17	7.17	143.6	21.600	0.8090	0.15	17.47	0.008
T7	75 - 50	L2 1/2x2x3/16	7.51	7.51	150.2	21.600	0.8090	0.18	17.47	0.010
T8	50 - 25	L2 1/2x2x3/16	8.51	8.51	170.2	21.600	0.8090	0.21	17.47	0.012
T9	25 - 0	L2 1/2x2 1/2x3/16	9.51	9.51	146.7	21.600	0.9020	0.24	19.48	0.012

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T1	120 - 116.667	Leg	P.5x.250	1	-1.14	104.03	2.5	Pass
T2	116.667 - 108.333	Leg	P.5x.250	15	-4.14	113.37	3.7	Pass
T3	108.333 - 100	Leg	P.5x.250	27	-12.96	113.37	11.4	Pass
T4	100 - 91.6667	Leg	P.5x.250	39	-25.54	113.37	22.5	Pass
T5	91.6667 - 83.3333	Leg	P.5x.250	54	-38.55	113.37	34.0	Pass
T6	83.3333 - 75	Leg	P.5x.250	69	-53.72	113.37	47.4	Pass
T7	75 - 50	Leg	P5x.375	84	-110.56	192.64	57.4	Pass
T8	50 - 25	Leg	P.5x.400	123	-172.06	198.39	86.7	Pass
T9	25 - 0	Leg	P6.875x.400	162	-222.34	268.35	82.9	Pass
T1	120 - 116.667	Diagonal	2L2 1/2x2x3/16	7	-1.92	26.06	7.4 10.6 (b)	Pass
T2	116.667 - 108.333	Diagonal	2L2 1/2x2x3/16	23	-7.02	14.69	47.7	Pass
T3	108.333 - 100	Diagonal	2L2 1/2x2x3/16	36	-9.39	14.07	66.7	Pass
T4	100 - 91.6667	Diagonal	2L2 1/2x2x3/16	48	-10.54	13.47	78.2	Pass
T5	91.6667 - 83.3333	Diagonal	2L2 1/2x2x3/16	63	-11.73	12.90	90.9	Pass
T6	83.3333 - 75	Diagonal	2L2 1/2x2x3/8	78	-13.07	22.27	58.7	Pass
T7	75 - 50	Diagonal	2L3x2 1/2x1/4	96	-16.72	25.35	66.0 75.1 (b)	Pass
T8	50 - 25	Diagonal	2L3x2 1/2x1/4	132	-17.84	22.18	80.4	Pass
T9	25 - 0	Diagonal	2L3 1/2x3x5/16	171	-22.69	26.75	84.8	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
T2	116.667 - 108.333	Horizontal	L2 1/2x2 1/2x3/16	22	-4.11	8.05	51.0	Pass
T3	108.333 - 100	Horizontal	L2 1/2x2 1/2x3/16	34	-5.69	7.41	76.7	Pass
T7	75 - 50	Horizontal	L3x3x1/4	94	-11.69	13.52	86.5	Pass
T8	50 - 25	Horizontal	L3x3x1/2	130	-13.15	19.97	65.9	Pass
T9	25 - 0	Horizontal	L4x4x1/4	169	-14.42	21.41	67.4	Pass
T1	120 - 116.667	Top Girt	L2 1/2x2 1/2x3/16	4	-2.04	8.34	24.5	Pass
T4	100 - 91.6667	Top Girt	L3x3x1/4	42	-6.55	20.58	31.8	Pass
T5	91.6667 - 83.3333	Top Girt	L3x3x1/4	57	-7.50	18.96	39.5	Pass
T6	83.3333 - 75	Top Girt	L3x3x1/4	72	-8.54	17.32	49.3	Pass
T7	75 - 50	Top Girt	L3x3x1/4	87	-10.25	15.85	64.7	Pass
T8	50 - 25	Top Girt	L3x3x1/4	126	-12.13	12.51	97.0	Pass
T9	25 - 0	Top Girt	L4x4x1/4	164	-13.71	23.28	58.9	Pass
T4	100 - 91.6667	Inner Bracing	L2 1/2x2x3/16	50	-0.11	4.81	2.4	Pass
T5	91.6667 - 83.3333	Inner Bracing	L2 1/2x2x3/16	66	-0.13	4.36	3.0	Pass
T6	83.3333 - 75	Inner Bracing	L2 1/2x2x3/16	80	-0.15	3.96	3.7	Pass
T7	75 - 50	Inner Bracing	L2 1/2x2x3/16	119	-0.18	3.62	4.9	Pass
T8	50 - 25	Inner Bracing	L2 1/2x2x3/16	158	-0.21	2.82	7.5	Pass
T9	25 - 0	Inner Bracing	L2 1/2x2 1/2x3/16	184	-0.24	3.38	7.0	Pass
							Summary	
						Leg (T8)	86.7	Pass
						Diagonal (T5)	90.9	Pass
						Horizontal (T7)	86.5	Pass
						Top Girt (T8)	97.0	Pass
						Inner Bracing (T8)	7.5	Pass
						Bolt Checks	79.6	Pass
						RATING =	**97.0**	**Pass**

ANCHOR BOLT ANALYSIS

ANCHOR BOLT ANALYSIS

Input Data

Max Corner Reactions:

Uplift:	Uplift := 210·kips	*user input*
Shear:	Shear := 32·kips	*user input*
Compression:	Compression := 251·kips	*user input*

Anchor Bolt Data:

Use ASTM A36 (actual material strength unknown therefore assume min design values)

Number of Anchor Bolts = N	N := 6	*user input*	
Bolt Ultimate Strength:	F_u := 58·ksi	*user input*	
Bolt Yield Strength:	Fy := 36·ksi	*user input*	
Bolt Modulus:	E := 29000·ksi	*user input*	
Thickness of Anchor Bolts	D := 1.5in	*user input*	
Threads per Inch:	n := 6.0	*user input*	
Coefficient of Friction:	μ := 0.55	*user input*	(for baseplate with grout ASCE 10-97)

Anchor Bolt Area:

Gross Area of Bolt:

$$A_g := \frac{\pi}{4} \cdot D^2 \qquad A_g = 1.767 \cdot in^2$$

Net Area of Bolt:

$$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 \qquad A_n = 1.405 \cdot in^2$$

Check Tensile Forces:

Maximum Tensile Force (Gross Area):

$$AllowableTension := 1.333 \cdot \left(0.33 \cdot A_g \cdot F_u \right) \qquad AllowableTension = 45.1 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Maximum Tensile Force (Net Area):

$$F_{net.area} := 1.333 \cdot \left(0.60 \cdot A_n \cdot Fy \right) \qquad F_{net.area} = 40.5 \cdot kips$$

Note: 1.333 increase allowed per TIA/EIA

Applied Tension:

$$MaxTension := \frac{Uplift}{N} \qquad MaxTension = 35.0 \cdot kips$$

Check Stresses:

$$\frac{MaxTension}{F_{net.area}} = 0.87$$

$$Condition1 := if\left(\frac{MaxTension}{F_{net.area}} \le 1.00, "OK", "Overstressed" \right)$$

$$Condition1 = "OK"$$

Check Anchor Bolt Area:

Based on the ASCE 10-97 Design of Latticed Steel Transmission Structures

Required Area:

$$A_{s1} := \frac{Uplift}{Fy} + \frac{Shear}{\mu \cdot 0.85 \cdot Fy} \qquad A_{s1} = 7.7 \cdot in^2$$

$$A_{s2} := \left| \frac{Shear - (0.3 \cdot Compression)}{\mu \cdot 0.85 \cdot Fy} \right| \qquad A_{s2} = 2.6 \cdot in^2$$

Provided Area:

$$A_{sprovided} := A_n \cdot N \qquad A_{sprovided} = 8.4 \cdot in^2$$

$$Condition2 := if\left(\frac{A_{s1}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s1}}{A_{sprovided}} = 0.92$$

Condition2 = "OK"

$$Condition3 := if\left(\frac{A_{s2}}{A_{sprovided}} \le 1.00, "OK", "Overstressed" \right) \qquad \frac{A_{s2}}{A_{sprovided}} = 0.31$$

Condition3 = "OK"

FOUNDATION ANALYSIS

URS

Job	120' Stainless Tower - New Haven, CT	Project No.	HPC-073	Page	of
Description	Foundation with Rock Anchors	Computed by	MCD	Sheet 1	of 4
		Checked by		Date 07/27/14	Date

FOUNDATION CHECK

INPUT DATA

Max Pier Reactions:

Uplift:	$Uplift := 210\,kips$	*user input*
Shear:	$Shear := 32\,kips$	*user input*
Compression:	$Compression := 251\,kips$	*user input*

Structure

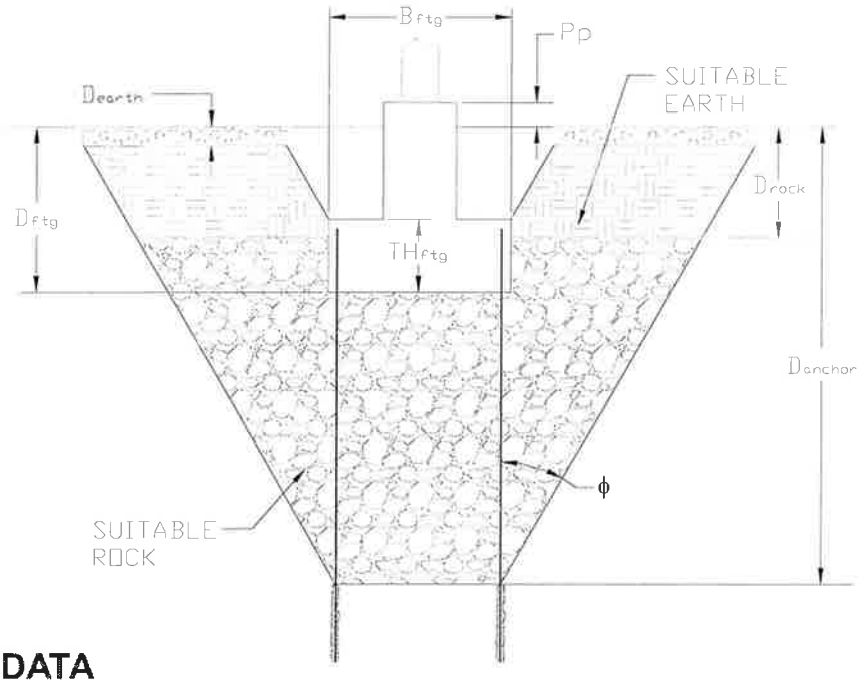
Footing Width:	$B_{ftg} := 6ft$	*user input*
Footing Length:	$L_{ftg} := 6ft$	*user input*
Footing Thickness:	$TH_{ftg} := 2.5ft$	*user input*

Depths:

Depth to Bottom of Footing: (from grade line)	$D_{ftg} := 4.0ft$	*user input*
Depth to Suitable Rock: (from grade line)	$D_{rock} := 2.0ft$	*user input*
Depth to Suitable Earth: (from grade line)	$D_{earth} := 0ft$	*user input*
Anchor Depth:	$D_{anchor} := 24.0ft$	*user input*

Soil Properties:

Internal Friction Angle:	$\phi := 45deg$	*user input*
Unit Weight of Earth:	$\gamma_{earth} := 100\frac{lb}{ft^3}$	*user input*
Unit Weight of Rock:	$\gamma_{rock} := 178\frac{lb}{ft^3}$	*user input*
Allowable Bearing:	$Bearing := 50000\,psf$	*user input*
Pier Projection Above Grade:	$P_p := 0.5\,ft$	*user input*



ROCK ANCHOR DATA

Anchors:

Number of Anchors (along width):	$NW_{anchor} := 2$	*user input*
Number of Anchors (along length):	$NL_{anchor} := 2$	*user input*
Hole Diameter:	$hole_d := 2.5in$	*user input*
Allowable Bond Stress:	$\sigma_{bond} := 100 \cdot psi$	*user input*
Anchor Spacing* (along length):	$SL_{anchor} := 3ft$	*user input*
Anchor Spacing* (along width):	$SW_{anchor} := 3ft$	*user input*
Rock Anchor Yield Strength:	$Fy_{anchor} := 150ksi$	*user input*
Rock Anchor Diameter:	$Anchor_{Dia} := 1.00in$	*user input*

Check Tensile Forces:

Force (per anchor):

$$P_{design} := \frac{Uplift}{NW_{anchor} + NL_{anchor}} \qquad P_{design} = 52.50 \cdot kips$$

Rock Anchor Allowble Tension:

$$T_{allowable} := \frac{0.6 \cdot Fy_{anchor} \cdot Anchor_{Dia}^{2} \cdot \pi}{4} \qquad T_{allowable} = 70.69 \cdot kips$$

$$TensionCheck := if\left(\frac{P_{design}}{T_{allowable}} \le 1.00, "OK", "Overstressed"\right) \qquad \frac{P_{design}}{T_{allowable}} = 0.74$$

TensionCheck = "OK"

CALCULATE RESISTANCE

Intermediate Dimensions:

Suitable Earth Height: $H := D_{rock} - D_{earth}$ $H = 2.00\,ft$

Suitable Rock Height: $Z := D_{anchor} - D_{earth} - D_{rock}$ $Z = 22.00\,ft$

Total Anchor Width: $W := (NW_{anchor} - 1)\cdot SW_{anchor}$ $W = 3.00\,ft$

Total Anchor Length: $L := (NL_{anchor} - 1)\cdot SL_{anchor}$ $L = 3.00\,ft$

Earth Above Footing: $PD := D_{ftg} - D_{earth} - TH_{ftg}$ $PD = 1.50\,ft$

Volumes:

Gross Volume:

$GV_1 := W\cdot L\cdot (Z + H)$ $GV_1 = 216.00\cdot ft^3$

$GV_2 := \left[\frac{1}{2}\cdot (Z + H)\cdot \tan(\phi)\cdot (Z + H)\right]\cdot (W + L)\cdot 2$ $GV_2 = 3456.00\cdot ft^3$

$GV_3 := \frac{1}{3}\cdot \pi\cdot [(Z + H)\cdot \tan(\phi)]^2\cdot (Z + H)$ $GV_3 = 14476.46\cdot ft^3$

$GV := GV_1 + GV_2 + GV_3$ $GV = 18148.46\cdot ft^3$

Rock Volume:

$RV_1 := W\cdot L\cdot (H)$ $RV_1 = 18.00\cdot ft^3$

$RV_2 := \left[\frac{1}{2}\cdot (Z)\cdot \tan(\phi)\cdot (Z)\right]\cdot (W + L)\cdot 2$ $RV_2 = 2904.00\cdot ft^3$

$RV_3 := \frac{1}{3}\cdot \pi\cdot [(Z)\cdot \tan(\phi)]^2\cdot (Z)$ $RV_3 = 11150.56\cdot ft^3$

$RV := RV_1 + RV_2 + RV_3$ $RV = 14072.56\cdot ft^3$

Volume of Neglect Above Footing:

$NV_1 := B_{ftg}\cdot L_{ftg}\cdot H$ $NV_1 = 72.00\cdot ft^3$

$NV_2 := \left[\frac{1}{2}\cdot (PD)\cdot \tan(\phi)\cdot (PD)\right]\cdot (B_{ftg} + L_{ftg})\cdot 2$ $NV_2 = 27.00\cdot ft^3$

$NV_3 := \frac{1}{3}\cdot \pi\cdot [(PD)\cdot \tan(\phi)]^2\cdot (PD)$ $NV_3 = 3.53\cdot ft^3$

$NV := NV_1 + NV_2 + NV_3$ $NV = 102.53\cdot ft^3$

Total Suitable Earth Volume: $EV := GV - RV - NV$ $EV = 3973.37\cdot ft^3$

Resisting Forces:

Resisting Rock Force: $F_{rock} := RV \cdot \gamma_{rock}$ $F_{rock} = 2504.92 \cdot kips$

Resisting Earth Force: $F_{earth} := EV \cdot \gamma_{earth}$ $F_{earth} = 397.34 \cdot kips$

Total Resisting Force: $F_{total} := F_{rock} + F_{earth}$ $F_{total} = 2902.25 \cdot kips$

Check Uplift:

$$Condition1 := if\left(\frac{F_{total}}{Uplift} \geq 2.00, "OK", "Overstressed"\right) \qquad \frac{F_{total}}{Uplift} = 13.82$$

Condition1 = "OK"

Embedment Length:

$$L_b := \frac{P_{design}}{\pi \cdot hole_d \cdot \sigma_{bond}} \qquad L_b = 5.57\,ft$$

$$Condition2 := if\left(\frac{Z}{L_b} \geq 2.00, "OK", "Overstressed"\right) \qquad \frac{Z}{L_b} = 3.95$$

Condition2 = "OK"

Check Bearing (with Post tension Force included):

$$MaxBearing := \left[\frac{Compression + \left(NW_{anchor} + NL_{anchor}\right)\left(P_{design}\right)}{B_{ftg} \cdot L_{ftg}}\right] + \frac{Shear \cdot \left(D_{ftg} + P_p\right)}{\left(\frac{B_{ftg} \cdot L_{ftg}^{\,2}}{6}\right)} \qquad MaxBearing = 16805.56 \cdot psf$$

$$Condition3 := if\left(\frac{MaxBearing}{Bearing} \leq 1.00, "OK", "Overstressed"\right) \qquad \frac{MaxBearing}{Bearing} = 0.34$$

Condition3 = "OK"