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

May 17, 2013

Jeff Barbadora
Crown Castle
3530 Torrington Way, Suite 300
Charlotte, NC 28277

RE: **EM-SPRINT-NEXTEL-007-130429** – Sprint Nextel notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Highway, Berlin, Connecticut.

Dear Mr. Barbadora:

The Connecticut Siting Council (Council) hereby acknowledges your notice to modify this existing telecommunications facility, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies with the following conditions:

- Prior to antenna installation, Sprint shall provide monopole shaft reinforcing from 0' to 5' as recommended in the Structural Analysis Report prepared by Paul J. Ford and Company dated February 27, 2013, and stamped by Joseph Jacobs;
- Within 45 days following completion of the antenna installation, a signed letter from a Professional Engineer duly licensed in the State of Connecticut shall be submitted to the Council to certify that the recommended modifications have been completed and the structure and foundation do not exceed 100 percent of the post-construction structural rating;
- Any deviation from the proposed modification as specified in this notice and supporting materials with the Council shall render this acknowledgement invalid;
- Any material changes to this modification as proposed shall require the filing of a new notice with the Council;
- Within 45 days after completion of construction, the Council shall be notified in writing that construction has been completed;
- The validity of this action shall expire one year from the date of this letter; and
- The applicant may file a request for an extension of time beyond the one year deadline provided that such request is submitted to the Council not less than 60 days prior to the expiration;

The proposed modifications including the placement of all necessary equipment and shelters within the tower compound are to be implemented as specified here and in your notice dated April 25, 2013. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to an existing facility site that would not increase tower height, extend the boundaries of the tower site, increase noise levels at the tower site boundary by six decibels, and increase the total radio frequencies electromagnetic radiation power density measured at the tower site boundary to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. This facility has also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on this tower.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73.

Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Thank you for your attention and cooperation.

Very truly yours,

Melanie A. Bachman
Acting Executive Director

MAB/CDM/cm

c: The Honorable Adam P. Salina, Mayor, Town of Berlin
Arthur Simonian, Town Engineer, Town of Berlin

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May 1, 2013

The Honorable Adam P. Salina
Mayor
Town of Berlin
240 Kensington Road
Kensington, CT 06037

RE: **EM-SPRINT-NEXTEL-007-130429** – Sprint Nextel notice of intent to modify an existing telecommunications facility located at 1684 Chamberlain Highway, Berlin, Connecticut.

Dear Mayor Salina:

The Connecticut Siting Council (Council) received a request to modify an existing telecommunications facility, pursuant to Regulations of Connecticut State Agencies Section 16-50j-72, a copy of which has already been provided to you.

If you have any questions or comments regarding the proposal, please call me or inform the Council by May 15, 2013.

Thank you for your cooperation and consideration.

Very truly yours,

Melanie Bachman
Acting Executive Director

MB/cm

c: Arthur Simonian, Town Engineer, Town of Berlin

Crown Castle
3530 Toringdon Way
Suite 300
Charlotte, NC 28277

Tel: 704-405-6600

www.crowncastle.com

ORIGINAL

April 25, 2013

EM-SPRINT-NEXTEL-007-130429

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051

RE: **Sprint Nextel-Exempt Modification - Crown Site BU: 876382**
Sprint Nextel Site ID: CT33XC536
Located at: 1684 Chamberlain Hwy, Berlin, CT 06037

Dear Ms. Roberts:

This letter and exhibits are submitted on behalf of Sprint Nextel (Sprint). Sprint is making modifications to certain existing sites in its Connecticut system in order to implement their network vision technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter and exhibits is being sent to The Honorable Adam P. Salina, Mayor for the Town of Berlin.

Sprint plans to modify the existing wireless communications facility owned by Crown Castle and located at **1684 Chamberlain Hwy, Berlin, CT 06037**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to Sprint's operations at the site (Exhibit-3).

The changes to the facility do not constitute a modification as defined in Connecticut General Statutes ("C.G.S.") § 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 the R.C.S.A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing tower. Sprint's replacement antennas will be located at the same elevation on the existing tower.

2. Although the proposed modifications will involve replacing the ground-mounted equipment, the proposed change will not require the extension of the site boundaries.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) emissions at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative General Power Density table report for Sprint's modified facility is included as Exhibit-3.

5. A Structural Modification Report confirming that the tower and foundation can support Sprint's proposed modifications is included as Exhibit-2.

For the foregoing reasons, Sprint respectfully submits the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Jeff Barbadora
Property Specialist

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

CC: The Honorable Adam P. Salina, Mayor, Town of Berlin

Exhibit – 1

Full Construction Drawings, Stamped & Sealed

(Insert A&E Drawings Complete – FST Task 25.0)

SHEET INDEX

DRIVING DIRECTIONS

DEPART FROM SPRINT:
1 INTERNATIONAL BLVD MAHWAH, NJ 07430

1. HEAD NORTH ON INTERNATIONAL BLVD/PARK ST TOWARD QUEENSLAND RD. CONTINUE TO FOLLOW INTERNATIONAL BLVD.
2. TAKE THE 3RD RIGHT ONTO PARK LN.
3. CONTINUE STRAIGHT ONTO LEISURE LN.
4. CONTINUE ONTO NJ-17 N.
5. TAKE THE NEW JERSEY 17 N/INTERSTATE 287 N EXIT TOWARD INTERSTATE 87/NORTH Y. THRUWAY.
6. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-287 N/I-87/NJ-17 N/N Y. THRUWAY AND MERGE ONTO I-287 N/NJ-17 N.
ENTERING NEW YORK.
7. KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR I-87 S/I-287/TAPPAN ZEE BR/NEW YORK CITY/NEW YORK THRUWAY AND MERGE ONTO I-287 E/I-87 S.
CONTINUE TO FOLLOW I-87 S.
8. TAKE EXIT 8A FOR NY-119/SAW MILL PKWY N TOWARD ELMSFORD.
9. KEEP LEFT AT THE FORK AND MERGE ONTO SAW MILL RIVER PARKWAY N.
10. TAKE THE EXIT TOWARD I-684 N.
0.7 MI
11. KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR I-684/BREWSTER AND MERGE ONTO I-684 N.
12. TAKE EXIT 9E FOR INTERSTATE 84 E TOWARD DANBURY.
13. MERGE ONTO I-84 E.
ENTERING CONNECTICUT.
14. SLIGHT RIGHT TO STAY ON I-84 E.
15. TAKE EXIT 27 TO MERGE ONTO I-691 E TOWARD MERIDEN.
16. TAKE EXIT 5 FOR CT-71/CHAMBERLAIN HWY TOWARD KENSINGTON.
17. TURN LEFT ONTO CT-71 N/CHAMBERLAIN HWY.
18. TURN LEFT ONTO ORCHARD RD.
DESTINATION WILL BE ON THE RIGHT.

Sprint

NETWORK VISION MMBTS LAUNCH

NORTHERN CONNECTICUT MARKET

SPRINT SITE NAME

BERLIN / LAVIANA ORCHARD

CROWN CASTLE SITE NAME

BERLIN / LAVIANA ORCHARD

SPRINT SITE NUMBER

CT33XC536

CROWN CASTLE NUMBER

876382

SITE ADDRESS
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

STRUCTURE TYPE

MONOPOLE

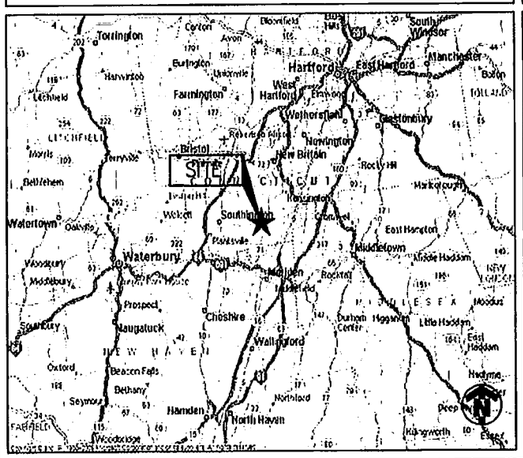
OWNER AND TENANT MAY, FROM TIME TO TIME AT TENANT'S OPTION, REPLACE THIS EXHIBIT WITH AND EXHIBIT SETTING FORTH THE LEGAL DESCRIPTION OF THE SITE, OR WITH ENGINEERED OR AS-BUILT DRAWING DEPICTING THE SITE OR ILLUSTRATING STRUCTURAL MODIFICATIONS OR CONSTRUCTION PLANS OF THE SITE. ANY VISUAL OR TEXTUAL REPRESENTATION OF THE EQUIPMENT LOCATED WITHIN THE SITE CONTAINED IN THESE OTHER DOCUMENTS IS ILLUSTRATIVE ONLY, AND DOES NOT LIMIT THE RIGHTS OF SPRINT AS PROVIDED FOR IN THE AGREEMENT. THE LOCATIONS OF ANY ACCESS AND UTILITY EASEMENTS ARE ILLUSTRATIVE ONLY. ACTUAL LOCATIONS MAY BE DETERMINED BY TENANT AND/ OR THE SERVICING UTILITY COMPANY IN COMPLIANCE WITH LOCAL LAWS AND REGULATIONS.

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

PROJECT SUMMARY

SITE NAME:	BERLIN / LAVIANA ORCHARD	
SITE NO.:	CT33XC536	
SITE ADDRESS:	1684 CHAMBERLAIN HIGHWAY BERLIN, CT 06037	
COUNTY:	HARTFORD	
SITE COORDINATES:		
LATITUDE:	41° 35' 23.07" N	(NAD 83)
LONGITUDE:	72° 48' 20.00" W	(NAD 83)
GROUND ELEV.:	±326'	(AMSL)
JURISDICTION:	CONNECTICUT SITING COUNCIL	
LANDLORD:	CROWN ATLANTIC COMPANY LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (704) 405-6555	
APPLICANT:	SPRINT 1 INTERNATIONAL BLVD. MAHWAH, NJ 07495	
PROJECT MANAGER:	ALCATEL LUCENT 1 ROBBINS ROAD WESTFORD, MA 01886	
CONTACT:	ISAM ELHALWANI (617) 851-6133	
CONSTRUCTION MANAGER:	MIKE CALLAHAN (860) 919-7278 (CELL)	
ENGINEER:	INFINIGY 11 HERBERT DRIVE LATHAM, NY 12110	
CONTACT:	PAUL FANOS (518) 690-0790	
TELCO PROVIDER:	AT&T (800) 288-2020	
POWER PROVIDER:	CONNECTICUT LIGHT AND POWER (860) 947-2000	
BUILDING CODE:	2003 INTERNATIONAL BUILDING CODE 2005 CONNECTICUT BUILDING CODE W/ 2009 AMENDMENT UNIFORM MECHANICAL CODE UNIFORM PLUMBING CODE LOCAL BUILDING CODE CITY/COUNTY ORDINANCES	
ELECTRICAL CODE:	2005 NATIONAL ELECTRICAL CODE	

VICINITY MAP



PROJECT TEAM

ALCATEL·LUCENT

1 ROBBINS ROAD
WESTFORD, MA 01886

PROJECT MANAGER

INFINIGY Design. Build. Deliver.

11 Herbert Drive
Latham, NY 12110
OFFICE #: (518) 690-0790
FAX #: (518) 690-0793

ENGINEER

SCOPE OF WORK:

- HANDICAP ACCESS REQUIREMENTS ARE NOT REQUIRED
- FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
- FACILITY HAS NO PLUMBING OR REFRIGERANTS
- THIS FACILITY SHALL MEET OR EXCEED ALL FAA AND FCC REGULATORY REQUIREMENTS
- ALL NEW MATERIAL SHALL BE FURNISHED AND INSTALLED BY CONTRACTOR UNLESS NOTED OTHERWISE. CABINETS, ANTENNAS/RRU AND CABLES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
- INSTALL NEW ANTENNAS/RRH'S ON EXISTING TOWER
- INSTALL NEW BTS OR RETROFIT EXISTING BTS IN EXISTING EQUIPMENT AREA
- REMOVE EXISTING CDMA ANTENNAS AND COAX CABLES
- REPLACE EXISTING BATTERY CABINET WITH NEW BATTERY CABINET IF REQUIRED
- REPLACE EXISTING GPS IF REQUIRED

ENGINEER'S LICENSE

CERTIFICATION STATEMENT:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF CONNECTICUT.

LICENSED ENGINEER – STATE OF CONNECTICUT

APPROVALS

ALU CONST.		DATE
ALU RF		DATE
ALU LEASING/SITE ACQ.		DATE
IN-MARKET CONSTRUCTION LEAD		DATE
SITE OWNER	NAME/COMPANY: TITLE:	DATE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED
PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IS A VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No.	Submittal / Revision	App'd	Date
2	REVISED PER COMMENTS	AHS	4/15/13
1	REVISED PER COMMENTS	AHS	3/21/13
0	ISSUED FOR REVIEW	AHS	12/3/12

Drawn: AHS Date: 12/3/12
Designed: AD Date: 12/3/12
Checked: AGF Date: 12/3/12

Project Number
294-055

Project Title
BERLIN / LAVIANA ORCHARD
CT33XC536
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
4/15/13

Drawing Title
TITLE SHEET

Drawing Number
T1

GENERAL NOTES

PART 1 – GENERAL REQUIREMENTS

1.1 THE WORK SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF, INCLUDED BUT NOT LIMITED TO THE FOLLOWING:
A. GR-63-CORE NEBS REQUIREMENTS: PHYSICAL PROTECTION
B. GR-78-CORE GENERIC REQUIREMENTS FOR THE PHYSICAL DESIGN AND MANUFACTURE OF TELECOMMUNICATIONS EQUIPMENT.
C. NATIONAL FIRE PROTECTION ASSOCIATION CODES AND STANDARDS (NFPA) INCLUDING NFPA 70 (NATIONAL ELECTRICAL CODE – "NEC").
D. AND NFPA 101 (LIFE SAFETY CODE).
E. AMERICAN SOCIETY FOR TESTING OF MATERIALS (ASTM).
F. INSTITUTE OF ELECTRONIC AND ELECTRICAL ENGINEERS (IEEE).

1.2 DEFINITIONS:
A: WORK: THE SUM OF TASKS AND RESPONSIBILITIES IDENTIFIED IN THE CONTRACT DOCUMENTS.
B: COMPANY: SPRINT NEXTEL 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.

1.3 POINT OF CONTACT: COMMUNICATION BETWEEN THE COMPANY AND THE CONTRACTOR SHALL FLOW THROUGH THE SINGLE COMPANY SITE DEVELOPMENT SPECIALIST OR OTHER PROJECT COORDINATOR APPOINTED TO MANAGE THE PROJECT FOR THE COMPANY.

1.4 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.

1.5 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 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.

1.6 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.

1.7 NOTICE TO PROCEED:
A. NO WORK SHALL COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED.
B. UPON RECEIVING NOTICE TO PROCEED, CONTRACTOR SHALL FULLY PERFORM ALL WORK NECESSARY TO PROVIDE SPRINT NEXTEL WITH AN OPERATIONAL WIRELESS FACILITY.

PART 2 – EXECUTION

2.1 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.

2.2 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.

2.3 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.

2.4 COMPANY FURNISHED MATERIAL AND EQUIPMENT: ALL HANDLING, STORAGE AND INSTALLATION OF COMPANY FURNISHED MATERIAL AND EQUIPMENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS AND WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
A. CONTRACTOR SHALL PROCURE ALL OTHER REQUIRED WORK RELATED MATERIALS NOT PROVIDED BY SPRINT NEXTEL TO SUCCESSFULLY CONSTRUCT A WIRELESS FACILITY.

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

2.6 EXISTING CONDITIONS: NOTIFY THE COMPANY REPRESENTATIVE 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.

PART 3 – RECEIPT OF MATERIAL & EQUIPMENT

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

PART 4 – GENERAL REQUIREMENTS FOR CONSTRUCTION

4.1 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.

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

4.3 CONTRACTOR SHALL TAKE ALL REASONABLE PRECAUTIONS TO DISCOVER AND LOCATE ANY HAZARDOUS CONDITION.
A. 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.
B. 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.

4.4 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.

4.5 CONDUCT TESTING AS REQUIRED HEREIN.

PART 5 – TESTS AND INSPECTIONS

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

B. CONTRACTOR SHALL COORDINATE TEST AND INSPECTION SCHEDULES WITH COMPANY'S REPRESENTATIVE WHO MUST BE ON SITE TO WITNESS SUCH TESTS AND INSPECTIONS.

C. 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.

D. 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.
E. SITE RESISTANCE TO EARTH TESTING PER EXHIBIT: CELL SITE GROUNDING SYSTEM DESIGN.

F. ANTENNA AND COAX SWEEP TESTS PER EXHIBIT: ANTENNA TRANSMISSION LINE ACCEPTANCE STANDARDS. HYBERFLEX TESTING NOT LIMITED TO COAX SWEEPS.

G. ALL OTHER TESTS REQUIRED BY COMPANY OR JURISDICTION.

PART 6 – TRENCHING AND BACKFILLING

6.1 TRENCHING AND BACKFILLING: THE CONTRACTOR SHALL PERFORM ALL EXCAVATION OF EVERY DESCRIPTION AND OF WHATEVER SUBSTANCES ENCOUNTERED, TO THE DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR AS OTHERWISE SPECIFIED.

A. PROTECTION OF EXISTING UTILITIES: THE CONTRACTOR SHALL CHECK WITH THE LOCAL UTILITIES AND THE RESPECTIVE UTILITY LOCATOR COMPANIES PRIOR TO STARTING EXCAVATION OPERATIONS IN EACH RESPECTIVE AREA TO ASCERTAIN THE LOCATIONS OF KNOWN UTILITY LINES. THE LOCATIONS, NUMBER AND TYPES OF EXISTING UTILITY LINES DETAILED ON THE CONSTRUCTION DRAWINGS ARE APPROXIMATE AND DO NOT REPRESENT EXACT INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL LINES DAMAGED DURING EXCAVATION AND ALL ASSOCIATED OPERATIONS. ALL UTILITY LINES UNCOVERED DURING THE EXCAVATION OPERATIONS, SHALL BE PROTECTED FROM DAMAGE DURING EXCAVATION AND ASSOCIATED OPERATIONS. ALL REPAIRS SHALL BE APPROVED BY THE UTILITY COMPANY.

B. HAND DIGGING: UNLESS APPROVED IN WRITING OTHERWISE, ALL DIGGING WITHIN AN EXISTING CELL SITE COMPOUND IS TO BE DONE BY HAND.

C. DURING EXCAVATION, MATERIAL SUITABLE FOR BACKFILLING SHALL BE STOCKPILED IN AN ORDERLY MANNER A SUFFICIENT DISTANCE FROM THE BANKS OF THE TRENCH TO AVOID OVERLOADING AND TO PREVENT SLIDES OR CAVE-INS. ALL EXCAVATED MATERIALS NOT REQUIRED OR SUITABLE FOR BACKFILL SHALL BE REMOVED AND DISPOSED OF AT THE CONTRACTOR'S EXPENSE.

D. GRADING SHALL BE DONE AS MAY BE NECESSARY TO PREVENT SURFACE WATER FROM FLOWING INTO TRENCHES OR OTHER EXCAVATIONS, AND ANY WATER ACCUMULATING THEREIN SHALL BE REMOVED BY PUMPING OR BY OTHER APPROVED METHOD.

E. SHEETING AND SHORING SHALL BE DONE AS NECESSARY FOR THE PROTECTION OF THE WORK AND FOR THE SAFETY OF PERSONNEL. UNLESS OTHERWISE INDICATED, EXCAVATION SHALL BE BY OPEN CUT, EXCEPT THAT SHORT SECTIONS OF A TRENCH MAY BE TUNNELED IF, THE CONDUIT CAN BE SAFELY AND PROPERLY INSTALLED AND BACKFILL CAN BE PROPERLY TAMPED IN SUCH TUNNEL SECTIONS. EARTH EXCAVATION SHALL COMPRISE ALL MATERIALS AND SHALL INCLUDE CLAY, SILT, SAND, MUCK, GRAVEL, HARDPAN, LOOSE SHALE, AND LOOSE STONE.

F. TRENCHES SHALL BE OF NECESSARY WIDTH FOR THE PROPER LAYING OF THE CONDUIT OR CABLE, AND THE BANKS SHALL BE AS NEARLY VERTICAL AS PRACTICABLE. THE BOTTOM OF THE TRENCHES SHALL BE ACCURATELY GRADED TO PROVIDE UNIFORM BEARING AND SUPPORT FOR EACH SECTION OF THE CONDUIT OR CABLE ON UNDISTURBED SOIL AT EVERY POINT ALONG ITS ENTIRE LENGTH. EXCEPT WHERE ROCK IS ENCOUNTERED, CARE SHALL BE TAKEN NOT TO EXCAVATE BELOW THE DEPTHS INDICATED. WHERE ROCK EXCAVATIONS ARE NECESSARY, THE ROCK SHALL BE EXCAVATED TO A MINIMUM OVER DEPTH OF 6 INCHES BELOW THE TRENCH DEPTHS INDICATED ON THE CONSTRUCTION DRAWINGS OR SPECIFIED. OVER DEPTHS IN THE ROCK EXCAVATION AND UNAUTHORIZED OVER DEPTHS SHALL BE THOROUGHLY BACK FILLED AND TAMPED TO THE APPROPRIATE GRADE. WHENEVER WET OR OTHERWISE UNSTABLE SOIL THAT IS INCAPABLE OF PROPERLY SUPPORTING THE CONDUIT OR CABLE IS ENCOUNTERED IN THE BOTTOM OF THE TRENCH, SUCH SOLID SHALL BE REMOVED TO A MINIMUM OVER DEPTH OF 6 INCHES AND THE TRENCH BACKFILLED TO THE PROPER GRADE WITH EARTH OF OTHER SUITABLE MATERIAL, AS HEREINAFTER SPECIFIED.

G. BACKFILLING OF TRENCHES. TRENCHES SHALL NOT BE BACKFILLED UNTIL ALL SPECIFIED TESTS HAVE BEEN PERFORMED AND ACCEPTED. WHERE COMPACTED BACKFILL IS NOT INDICATED THE TRENCHES SHALL BE CAREFULLY BACKFILLED WITH SELECT MATERIAL SUCH AS EXCAVATED SOILS THAT ARE FREE OF ICE, SNOW, ROOTS, SOD, RUBBISH OR STONES, DEPOSITED IN 6 INCH LAYERS AND THOROUGHLY AND CAREFULLY RAMMED UNTIL THE CONDUIT OR CABLE HAS A COVER OF NOT LESS THAN 1 FOOT. THE REMAINDER OF THE BACKFILL MATERIAL SHALL BE GRANULAR IN NATURE AND SHALL NOT CONTAIN ICE, SNOW ROOTS, SOD, RUBBISH, OR STONES OF 2-1/2 INCH MAXIMUM DIMENSION. BACKFILL SHALL BE CAREFULLY PLACED IN THE TRENCH AND IN 1 FOOT LAYERS AND EACH LAYER TAMPED. SETTLING THE BACKFILL WITH WATER WILL BE PERMITTED. THE SURFACE SHALL BE GRADED TO A REASONABLE UNIFORMITY AND THE MOUNDING OVER THE TRENCHES LEFT IN A UNIFORM AND NEAT CONDITION.

PROJECT INFORMATION

THIS IS AN UNMANNED AND RESTRICTED ACCESS EQUIPMENT FACILITY AND WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNALS FOR THE PURPOSE OF PROVIDING PUBLIC WIRELESS COMMUNICATIONS SERVICE.

NO POTABLE WATER SUPPLY IS TO BE PROVIDED AT THIS LOCATION.

NO WASTE WATER WILL BE GENERATED AT THIS LOCATION.

NO SOLID WASTE WILL BE GENERATED AT THIS LOCATION.

SPRINT MAINTENANCE CREW (TYPICALLY ONE PERSON) WILL MAKE AN AVERAGE OF ONE TRIP PER MONTH AT ONE HOUR PER VISIT.

LEGEND

SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	NON-FUSIBLE DISCONNECT SWITCH
F	FUSIBLE DISCONNECT SWITCH
	SURFACE MOUNTED PANEL BOARD
T	TRANSFORMER
M	KILOWATT HOUR METER
JB	JUNCTION BOX
PB	PULL BOX TO NEC/TELCO STANDARDS
	UNDERGROUND UTILITIES
#	DENOTES REFERENCE NOTE
	EXOTHERMIC WELD CONNECTION
	MECHANICAL CONNECTION
OR	GROUND ROD
OR	GROUND ROD WITH INSPECTION SLEEVE
	GROUND BAR
	PIN AND SLEEVE RECEPTACLE
	120AC DUPLEX RECEPTACLE
G	GROUND CONDUCTOR
#	REPRESENTS DETAIL NUMBER
#	REF. DRAWING NUMBER

ABBREVIATIONS

CIGBE	COAX ISOLATED GROUND BAR EXTERNAL
MIGB	MASTER ISOLATED GROUND BAR
SST	SELF SUPPORTING TOWER
GPS	GLOBAL POSITIONING SYSTEM
TYP.	TYPICAL
DWG	DRAWING
BCW	BARE COPPER WIRE
BFG	BELOW FINISH GRADE
PVC	POLYVINYL CHLORIDE
CAB	CABINET
C	CONDUIT
SS	STAINLESS STEEL
G	GROUND
AWG	AMERICAN WIRE GAUGE
RGS	RIGID GALVANIZED STEEL
AHJ	AUTHORITY HAVING JURISDICTION
TTLNA	TOWER TOP LOW NOISE AMPLIFIER
UNO	UNLESS NOTED OTHERWISE
EMT	ELECTRICAL METALLIC TUBING
AGL	ABOVE GROUND LEVEL

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

UNAUTHORIZED ALTERATION OR ADDITION TO THIS DOCUMENT IN VIOLATION OF APPLICABLE STATE AND/OR LOCAL LAWS

No	Submittal / Revision	Appd	Date
2	REVISED PER COMMENTS	AHS	4/15/13
1	REVISED PER COMMENTS	AHS	3/21/13
0	ISSUED FOR REVIEW	AHS	12/3/12

Drawn: AHS Date: 12/3/12
Designed: AJD Date: 12/3/12
Checked: ADF Date: 12/3/12

Project Number 294-055

Project Title
BERLIN / LAVIANA
ORCHARD
CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

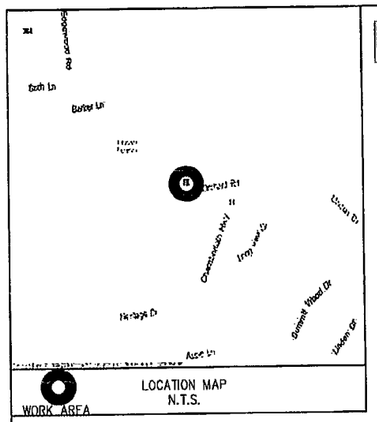
Prepared For
Sprint VISION

Drawing Scale: AS NOTED
Date: 4/15/13

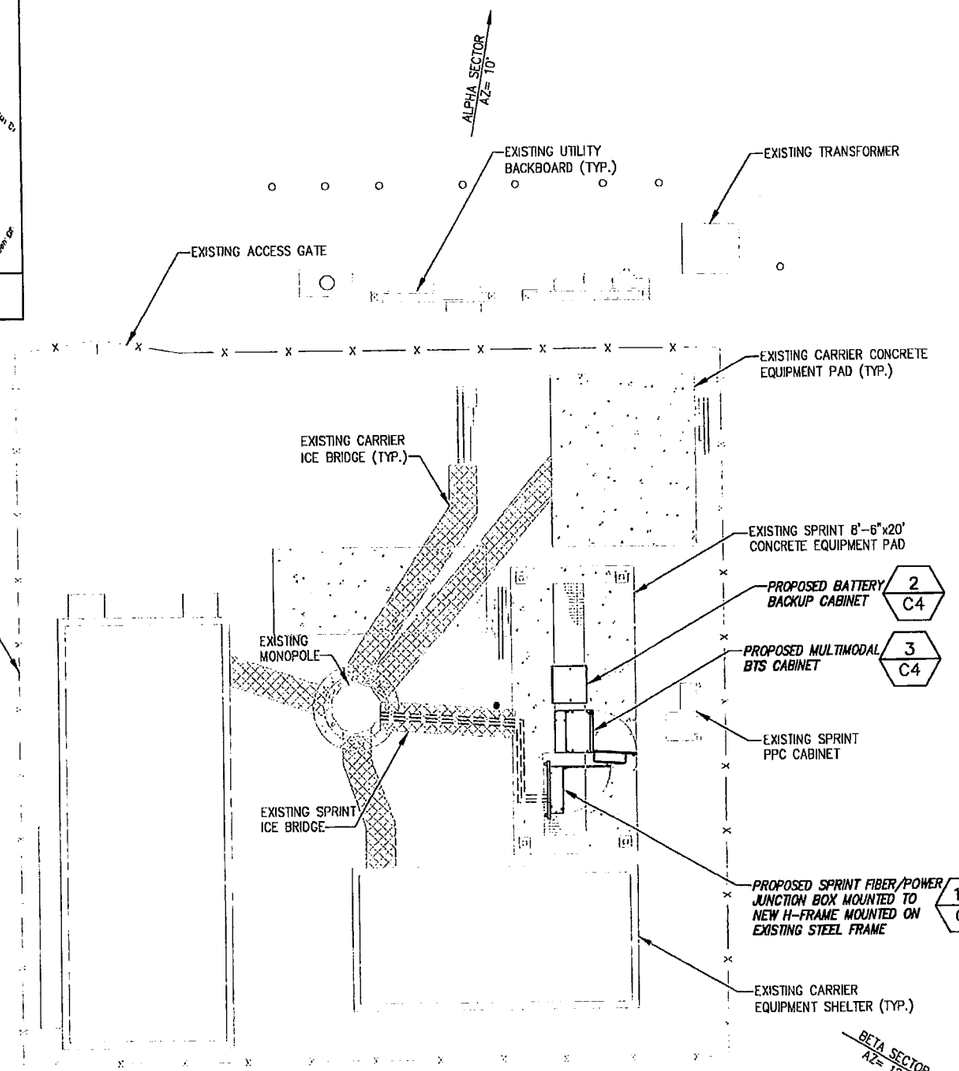
Drawing Title
GENERAL NOTES

Drawing Number
C1

INFORMATION CONTAINED WITHIN DRAWINGS ARE BASED ON PROVIDED INFORMATION.



LOCATION MAP
N.T.S.



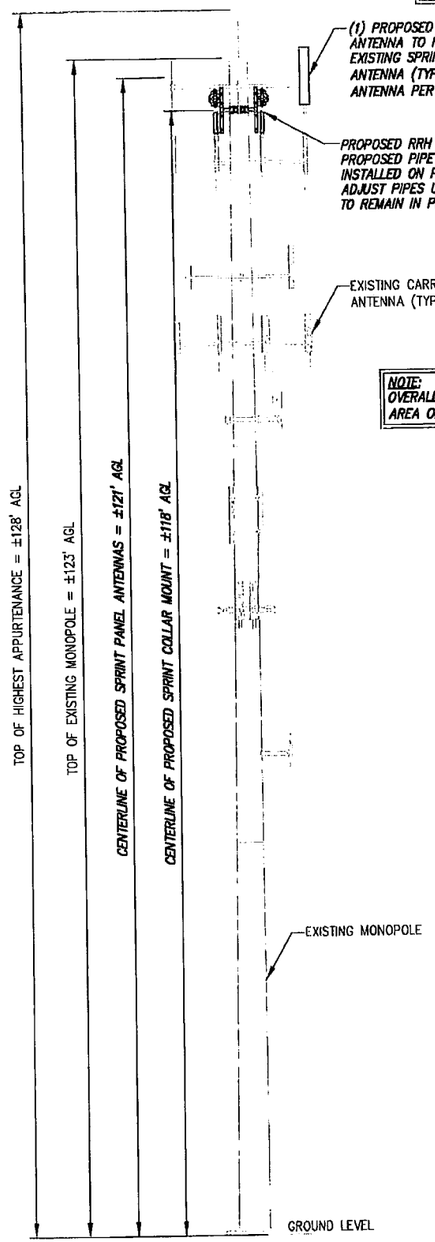
1 COMPOUND SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE
10' 5' 0 5' 10'
SCALE (11x17): 1" = 10'-0"
SCALE (22x34): 1" = 5'-0"

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS-SPRINT DOCUMENT: "EXHIBIT A - STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 - 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A - WTHRPRF - STD CONSTR SPECS._15720111042185542 9.DOCM"
3. REFER TO: "COLOR CODING-SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09-08-11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

FOR ADDITIONAL STRUCTURAL INFORMATION SEE STRUCTURAL ANALYSIS COMPLETED BY PAUL J. FORD DATED: 2/27/13



2 SITE ELEVATION
NOT TO SCALE

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Design. Build. Deliver.
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Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

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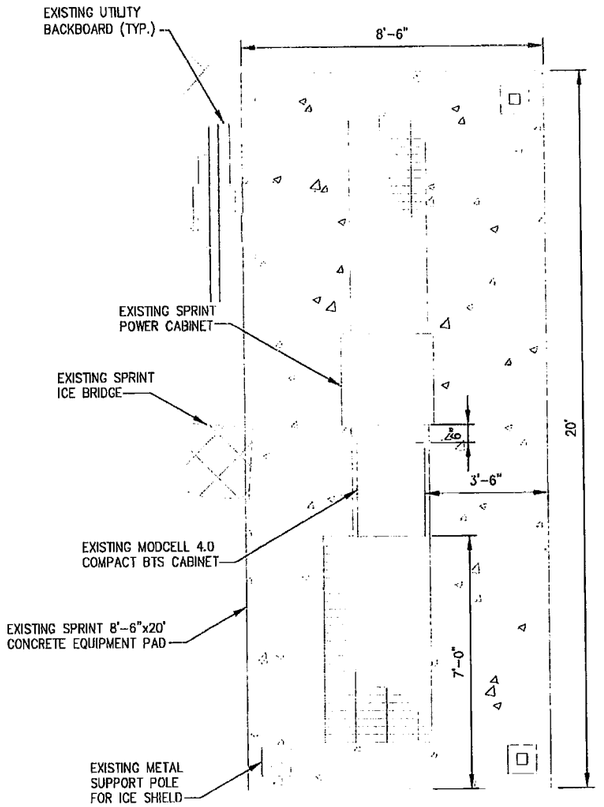
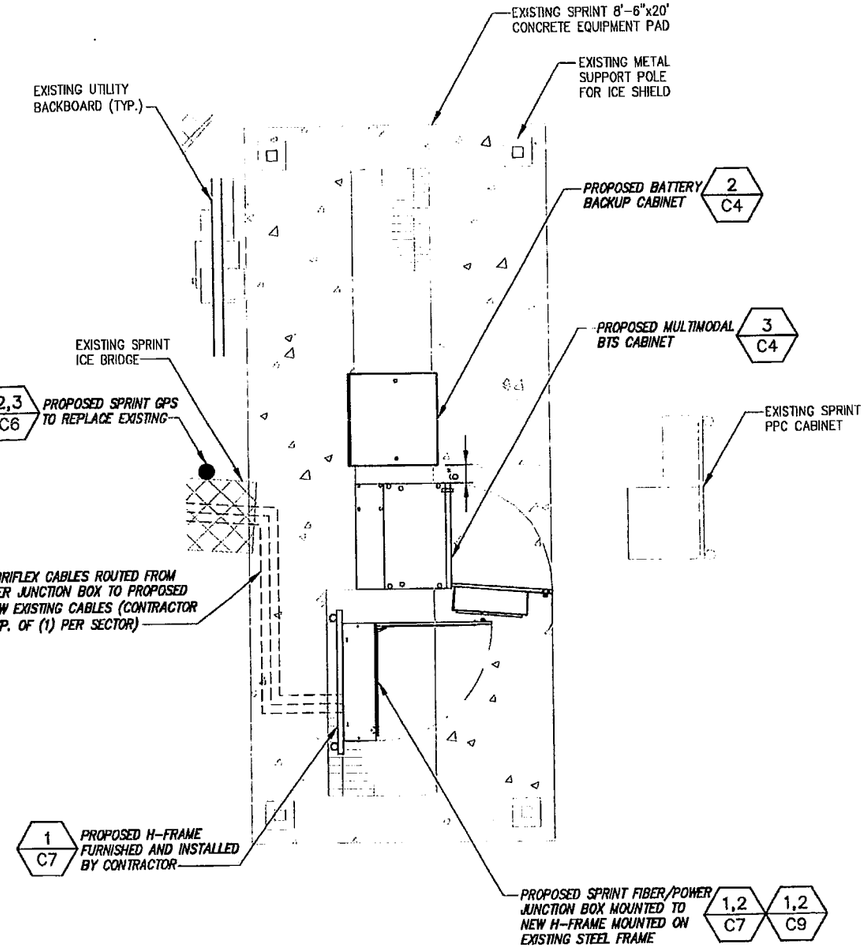
Prepared For
Sprint VISION

Drawing Scale:
AS NOTED
Date:
4/15/13

Drawing Title
COMPOUND SITE PLAN & ELEVATION

Drawing Number
C2





CALLED NORTH

1 -- EQUIPMENT SITE PLAN (EXISTING)
SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

CALLED NORTH

2 -- EQUIPMENT SITE PLAN (FINAL/PERMANENT)
SCALE: AS NOTED

GRAPHIC SCALE

4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.

NOTE:
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3. REFER TO: "COLOR CODING-SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09-08-11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

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Design. Build. Deliver.
11 Herbert Drive
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Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
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BERLIN, CT 06037

Prepared For

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Drawing Scale: AS NOTED
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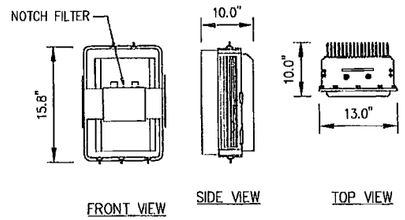
Drawing Title

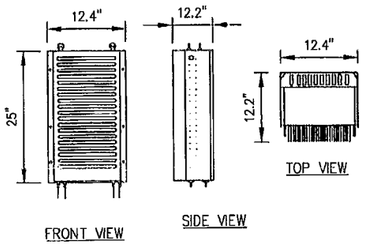
EQUIPMENT SITE PLANS

Drawing Number

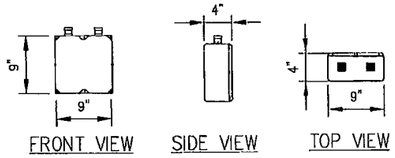
C3



800 MHz RRH
(ALU)
WEIGHT = 53 LBS.



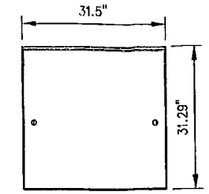
1900 MHz RRH
(ALU)
WEIGHT = 60 LBS.
(INCLUDING OPTIONAL SOLAR SHIELD)



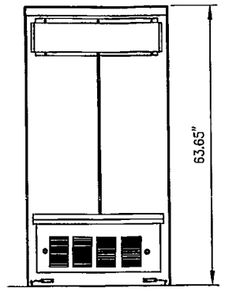
850 MHZ NOTCH FILTERS
WEIGHT = 11 LBS.

NOTE:
REFER TO R.F. SYSTEM SCHEDULE FOR EXACT RRH SPECIFICATIONS AND QUANTITIES.

1 RRH EQUIPMENT DETAILS
NOT TO SCALE

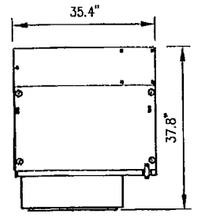


TOP VIEW

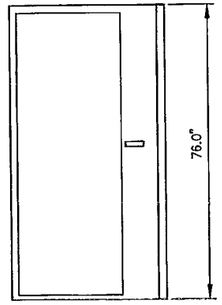


REAR VIEW

2 BATTERY CABINET PROFILE
NOT TO SCALE



TOP VIEW

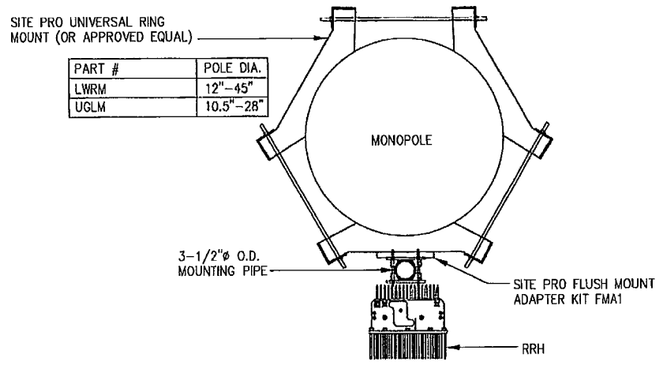


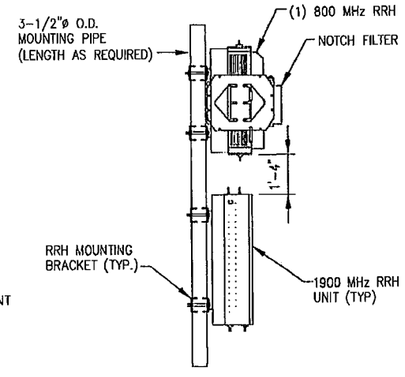
FRONT VIEW

3 BTS CABINET PROFILE
NOT TO SCALE

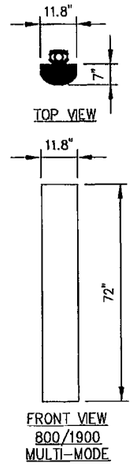
DESIGN CRITERIA:

2009 INTERNATIONAL BUILDING CODE W/ STATE MODIFICATION	
WIND SPEED (ASCE-7-05)	90 MPH
EXPOSURE B	
IMPORTANCE FACTOR	1.0
SEISMIC SITE CLASS	D
Ss=0.152 S1=0.050	
SEISMIC IMPORTANCE FACTOR	1.0
SEISMIC DESIGN CATEGORY	B
9928 MM BTS CABINET WEIGHT:	1074 LBS.
EMERSON BATTERY CABINET SPECIFICATIONS:	
(31.29"x31.5"x63.65")	
WEIGHTS:	
SHIPPING WEIGHT:	600 LBS.
LIFT WEIGHT:	540 LBS.
TOTAL WEIGHT:	2640 LBS (WITH BATTERIES)
INDIVIDUAL BATTERY WEIGHT:	105 LBS
(DO NOT LIFT WITH BATTERIES IN CABINET)	
MATERIAL SPECIFICATIONS	
C-, M-, AND ANGLE SHAPES:	ASTM A36
HIGH-STRENGTH BOLTS:	ASTM A325SC OR (A325N)
STRUCTURAL WF SHAPES:	ASTM A572-GR50
TUBE STEEL & PIPE COLUMNS:	ASTM A500, GRADE B
WELDING ELECTRODES:	E70XX
W - SHAPES:	ASTM A992, GRADE 50
U-BOLTS:	ASTM A36





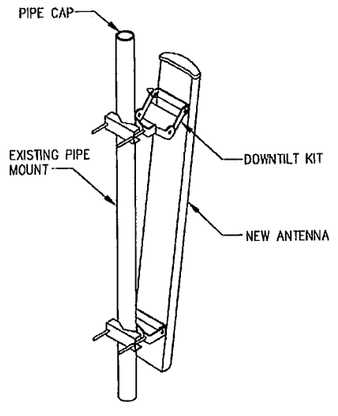
4 RRH MOUNTING DETAIL (TYP.)
NOT TO SCALE



FRONT VIEW
800/1900
MULTI-MODE

RFS ANTENNA
P/N: APXVSPP18-C-A20

5 ANTENNA DETAILS
NOT TO SCALE



6 PANEL ANTENNA
MOUNT DETAIL
NOT TO SCALE

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Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

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1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For

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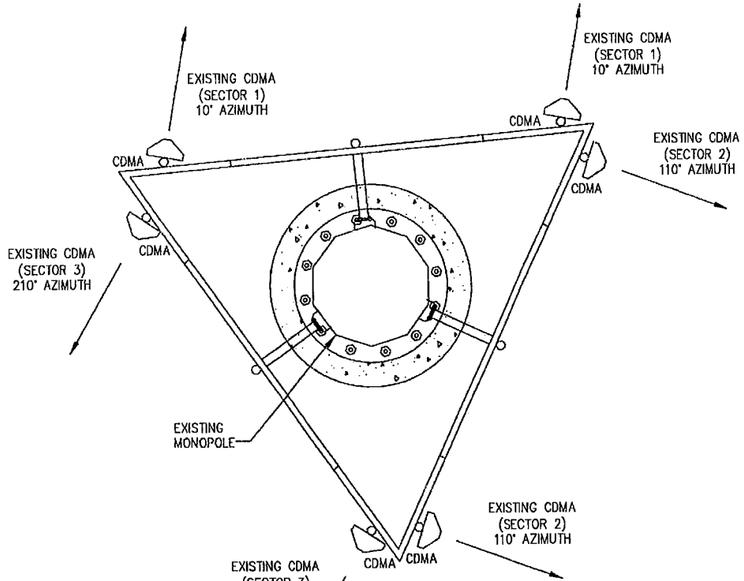
4/16/13

Drawing Title

EQUIPMENT DETAILS

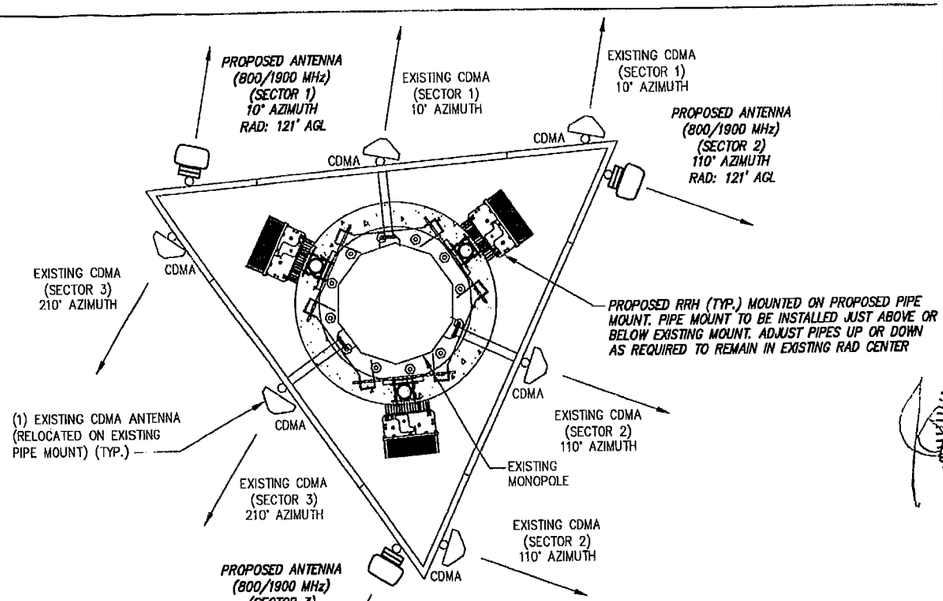
Drawing Number

C4



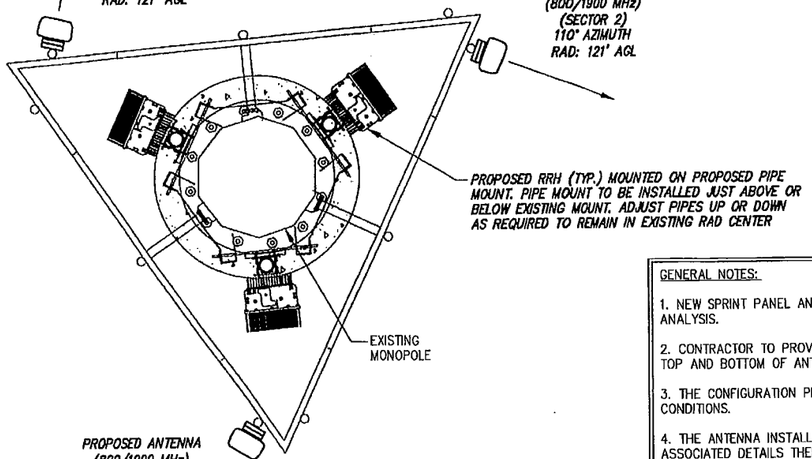
1 ANTENNA CONFIGURATION (EXISTING)
NOT TO SCALE

CALLED NORTH



2 ANTENNA CONFIGURATION (INTERIM/TEMPORARY)
NOT TO SCALE

CALLED NORTH



3 ANTENNA CONFIGURATION (FINAL/PERMANENT)
NOT TO SCALE

CALLED NORTH

NOTE:
CONTRACTOR TO VERIFY A PASSING SIGNED AND SEALED ANTENNA MOUNT/PLATFORM STRUCTURAL ANALYSIS HAS BEEN COMPLETED FOR INTERIM AND FINAL RF CONFIGURATION. NO ANTENNA MOUNT/PLATFORM MODIFICATIONS SHOULD COMMENCE OR INSTALLATION OF ANTENNAS, RRH OR TOWER MOUNTED EQUIPMENT WITHOUT VERIFYING THE MOUNT/PLATFORM ANALYSIS HAS BEEN COMPLETED FOR THE SPECIFIC LOADING. ADDITIONALLY ALL MOUNTS, ANTENNA AND COAX TO BE INSTALLED IN ACCORDANCE WITH TOWER STRUCTURAL ANALYSIS PROVIDED BY CROWN CASTLE.

NOTE:
REQUIRED PIPE MOUNTS TO BE SUPPLIED BY CONTRACTOR.

FOR ADDITIONAL STRUCTURAL INFORMATION SEE STRUCTURAL ANALYSIS COMPLETED BY PAUL J. FORD DATED: 2/27/13

RRH NOTES:

- SEE PAGE C4 FOR RRH MOUNTING INFORMATION (TYP. ALL SECTORS).
- REFER TO RF SCHEDULE ON SHEET C8 FOR RRH UNIT SPECS AND QUANTITIES.

GENERAL NOTES:

1. NEW SPRINT PANEL ANTENNAS TO MEET RF DESIGN REQUIREMENTS PER EBTS, PER APPROVED STRUCTURAL ANALYSIS.
2. CONTRACTOR TO PROVIDE EXISTING ANTENNA VERIFICATION AND TO INCLUDE MOUNTING HEIGHT, RAD CENTER, TOP AND BOTTOM OF ANTENNAS.
3. THE CONFIGURATION PLANS ARE FOR CONCEPTUAL PURPOSES ONLY. CONTRACTOR TO VERIFY FIELD CONDITIONS.
4. THE ANTENNA INSTALLATION SHALL BE DONE IN ACCORDANCE WITH THE STRUCTURAL ANALYSIS AND ASSOCIATED DETAILS THEREIN. CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES PRIOR TO WORK ON THE STRUCTURE.
5. CONTRACTOR SHALL VERIFY NEW PARTS BEFORE ORDERING.
6. REFER TO SHEET C4 & C8 FOR ANTENNA SPECS.
7. CONTRACTOR TO USE PROPER TORQUE WHEN INSTALLING AND TIGHTENING CONNECTORS TO INSURE PROPER FIT.
8. ALL HYBRID CABLES SHALL BE MARKED WITHIN 24" OF THE END OF EACH CABLE WITH 2" WIDE VINYL TAPE. THIS INCLUDES ALL JUMPERS AND MAIN LINE HYBRID CABLES.
9. CDMA ANTENNAS SHALL NOT BE REMOVED UNTIL ALL NEW MULTI-MODE ANTENNAS ARE INSTALLED AND ON-AIR.

INFINIGY Design. Build. Deliver.
11 Herbert Drive
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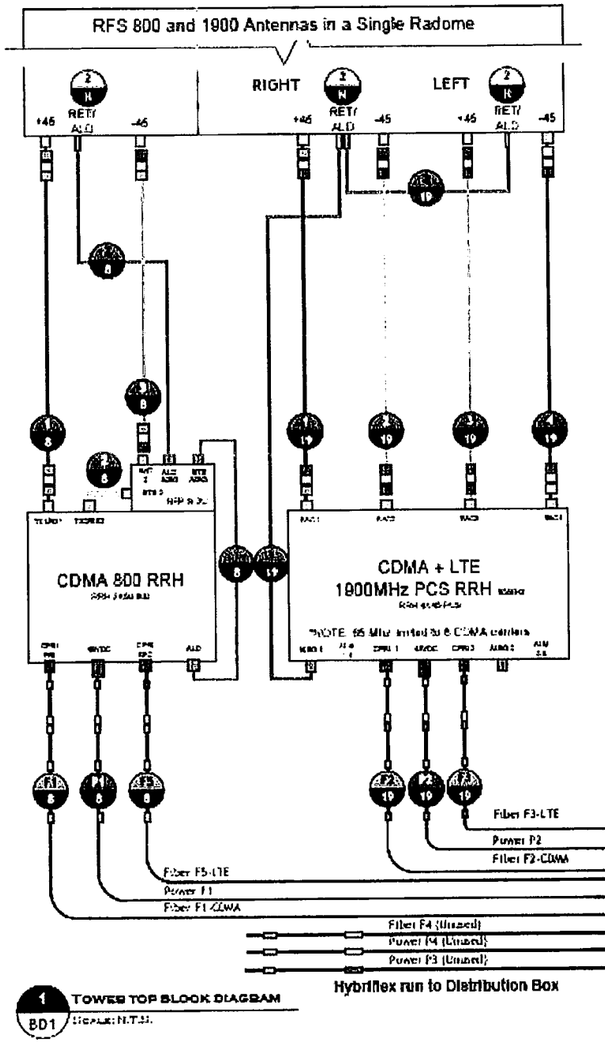
Drawing Title

ANTENNA PLANS

Drawing Number

C5



1 BD1 TOWER TOP BLOCK DIAGRAM
SCALE: N.T.S.

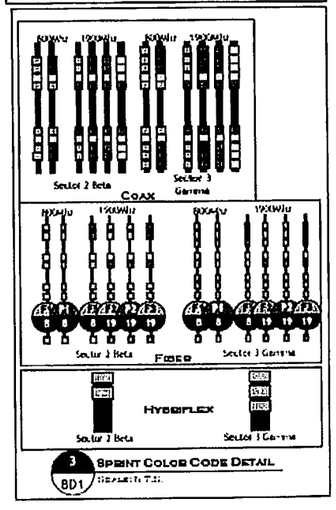
Power Feed Polarity Definition:
IF wires are BLACK AND BLACK/ WHITE STRIPE:
- Black= -48VDC Feed (Battery)
- Black/White Stripe= Return

IF wires are RED AND BLACK:
- Red= -48VDC Feed (Battery)
- Black= Return

NOTE: For power feed use the same Hybriflex OEM color designator as the fiber.

- MM Pair 1= F1= Green= P1(Green)
- MM Pair 2= F2= Blue= P2(Blue)
- MM Pair 3= F3= Red= P3(Red)
- MM Pair 4= F4= Yellow= P4(Yellow)
- MM Pair 5= F5= Orange= (No P5 power feed)

2 BD1 HYBRIFLEX OEM COLOR CODE
SCALE: N.T.S.



3 BD1 SPRINT COLOR CODE DETAIL
SCALE: N.T.S.

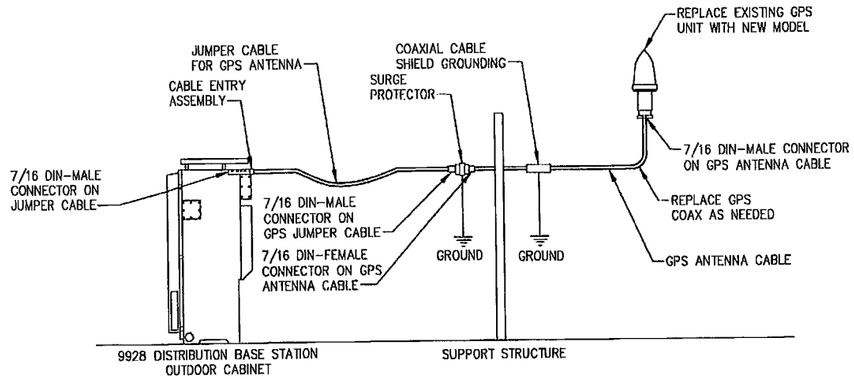
SCENARIO 124 v2.3

1 ANTENNA CABLE RISER DIAGRAM
NOT TO SCALE

INSTALLER VERIFY LATEST PLUMBING/WIRING DIAGRAMS, PRIOR TO INSTALLATION.

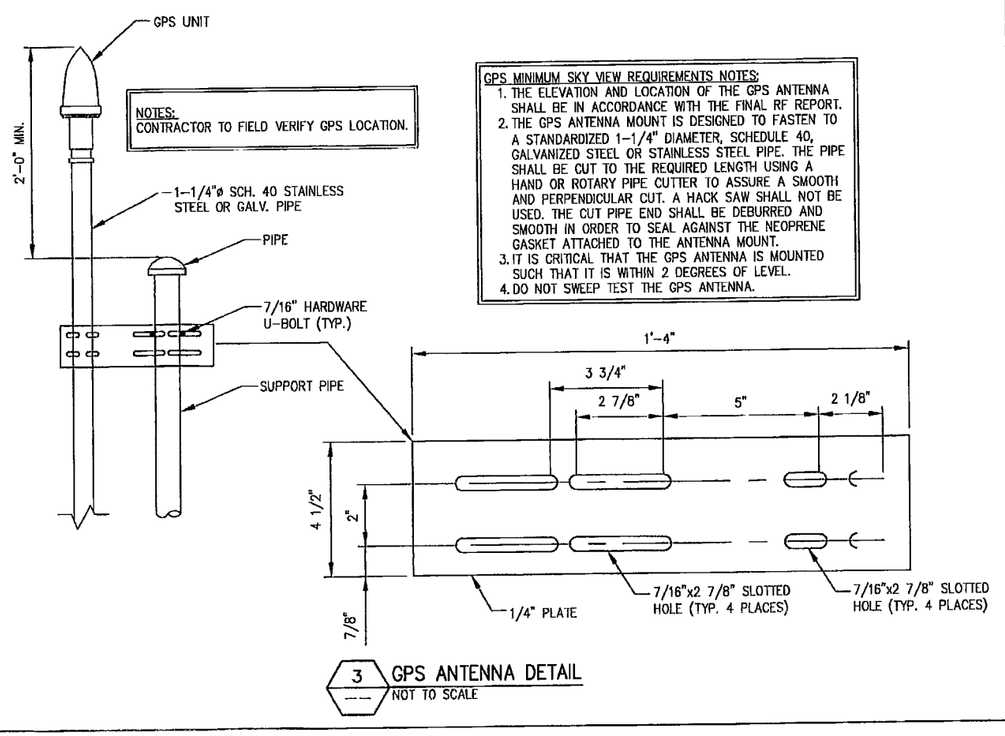
WEATHERPROOFING CONNECTORS AND GROUND KIT NOTES;
1. ALL CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED USING BUTYL RUBBER WEATHERPROOFING AND TAPE, THIS INSTALLATION MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION OR PER THE FOLLOWING INSTRUCTIONS (WHICHEVER IS GREATER).
2. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE ENCOMPASSED INTO COLD SHRINK AND COMPLETELY WRAPPED WITH 2 IN. WIDE ELECTRICAL TAPE OVERLAPPING EACH ROW BY APPROXIMATELY ½" AND EXTENDING PAST THE CONNECTION BY TWO INCHES AND DISCUSSED BELOW; OR
3. THE COAXIAL ABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH LAYERS OR ELECTRICAL/BUTYL RUBBER/ELECTRICAL TAPE AS DISCUSSED BELOW OR;
4. THE COAXIAL CABLE CONNECTION OR GROUND KIT CAN BE WRAPPED WITH TWO LAYERS OF 1.5 INCH WIDE SELF-AMALGAMATING TAPE COVERED WITH TWO LAYERS OF ELECTRICAL TAPE.

RRH JUMPER NOTES;
1. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS LESS THAN 10'-0" USE A 1/2" JUMPER.
2. FOR DISTANCES BETWEEN RRH'S AND ANTENNAS GREATER THAN 10'-0" USE A 7/8" JUMPER.



NOTE:
THE GPS SURGE NEEDS TO BE INSTALLED AWAY FROM AND SEPARATE FROM THE MMBTS CABINET (PER THE SITE PREP GUIDE)
- THE JUMPERS ARE DESIGNED TO BE INSTALLED BEFORE/AFTER THE GPS SURGE.
- THE GPS SURGE NEED TO BE CONNECTED TO THE GROUND SYSTEM, VIA A GROUND LEAD.

2 GPS UNIT DETAIL
NOT TO SCALE



NOTES:
CONTRACTOR TO FIELD VERIFY GPS LOCATION.

GPS MINIMUM SKY VIEW REQUIREMENTS NOTES;
1. THE ELEVATION AND LOCATION OF THE GPS ANTENNA SHALL BE IN ACCORDANCE WITH THE FINAL RF REPORT.
2. THE GPS ANTENNA MOUNT IS DESIGNED TO FASTEN TO A STANDARDIZED 1-1/4" DIAMETER, SCHEDULE 40, GALVANIZED STEEL OR STAINLESS STEEL PIPE. THE PIPE SHALL BE CUT TO THE REQUIRED LENGTH USING A HAND OR ROTARY PIPE CUTTER TO ASSURE A SMOOTH AND PERPENDICULAR CUT. A HACK SAW SHALL NOT BE USED. THE CUT PIPE END SHALL BE DEBURRED AND SMOOTH IN ORDER TO SEAL AGAINST THE NEOPRENE GASKET ATTACHED TO THE ANTENNA MOUNT.
3. IT IS CRITICAL THAT THE GPS ANTENNA IS MOUNTED SUCH THAT IT IS WITHIN 2 DEGREES OF LEVEL.
4. DO NOT SWEEP TEST THE GPS ANTENNA.

3 GPS ANTENNA DETAIL
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT JOHN S. STEVENS 24705 LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	App'd	Date
2	REVISED PER COMMENTS	AHS	4/15/13
1	REVISED PER COMMENTS	AHS	3/31/13
0	ISSUED FOR REVIEW	AHS	12/3/12

Drawn: AHS Date: 12/3/12
Designed: AJD Date: 12/3/12
Checked: AGF Date: 12/3/12

Project Number 294-055

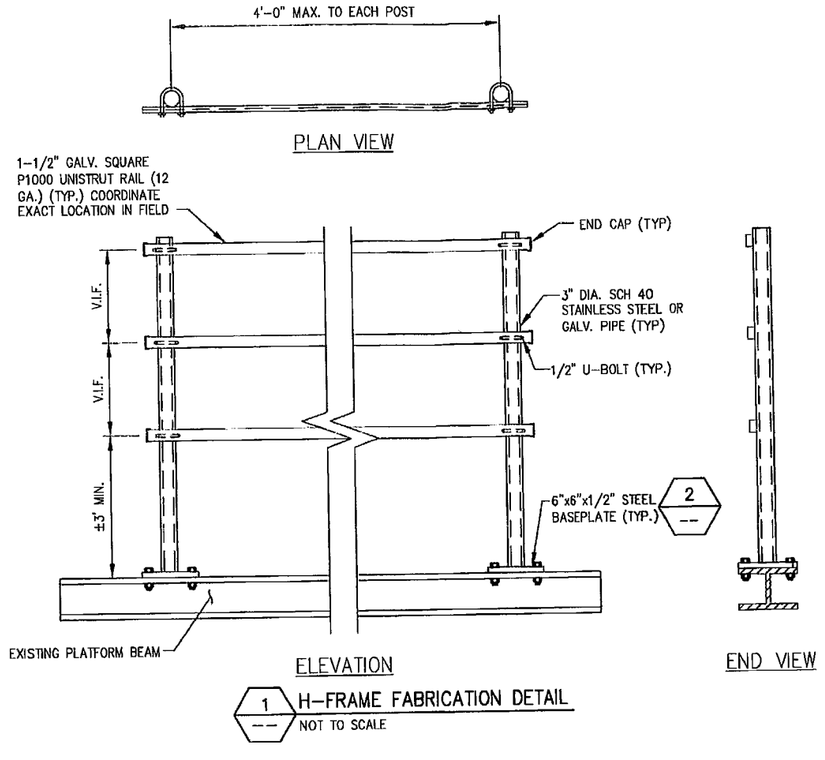
Project Title
BERLIN / LAVIANA ORCHARD CT33XC536
1684 CHAMBERLAIN HIGHWAY BERLIN, CT 06037

Prepared For
Sprint VISION

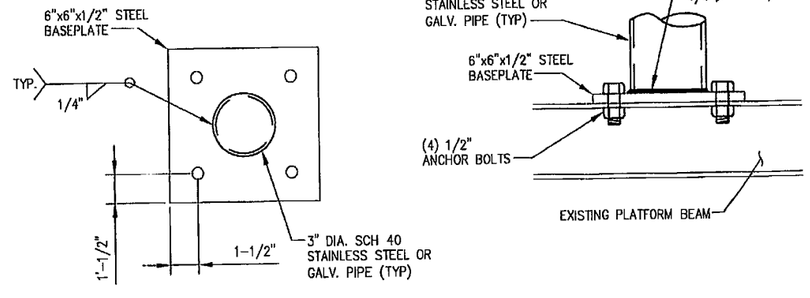
Drawing Scale: AS NOTED
Date: 4/15/13

Drawing Title
ANTENNA CABLE RISER AND GPS DETAILS

Drawing Number
C6



1 H-FRAME FABRICATION DETAIL
NOT TO SCALE



2 SUPPORT POST MOUNTING DETAIL
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	Appv'd	Date
2	REVISED PER COMMENTS	ANS	4/15/13
1	REVISED PER COMMENTS	ANS	3/21/13
0	ISSUED FOR REVIEW	ANS	12/3/12

Drawn: ANS Date: 12/3/12
Designed: AJD Date: 12/3/12
Checked: ASF Date: 12/3/12

Project Number
294-055

Project Title

BERLIN / LAVIANA
ORCHARD
CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For

Sprint VISION

Drawing Scale:
AS NOTED

Date:
4/15/13

Drawing Title

EQUIPMENT DETAILS

Drawing Number

C7

	Market	Northern Connecticut		
	Cascade ID	CT33XC536		
		SECTOR 1	SECTOR 2	SECTOR 3
	Split sector present	No	No	No
1900	1900MHz_Azimuth	10	110	210
	1900MHz_No_of_Antennas	1	1	1
	1900MHz_RADCenter(ft)	120	120	120
	1900MHz_Antenna Make	RFS	RFS	RFS
	1900MHz_Antenna Model	APXVSPP18-C-A20	APXVSPP18-C-A20	APXVSPP18-C-A20
	1900MHz_Horizontal_Beamwidth	65	65	65
	1900MHz_Vertical_Beamwidth	5.5	5.5	5.5
	1900MHz_AntennaHeight (ft)	6	6	6
	1900MHz_AntennaGain(dBd)	15.9	15.9	15.9
	1900MHz_E_Tilt	-1	-3	0
	1900MHz _M_Tilt	0	0	0
	1900MHz_Carrier_Forecast_Year_2013	2	2	2
	1900MHz_RRH Manufacturer	ALU	ALU	ALU
	1900MHz_RRH Model	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz	RRH 1900 4X45 65MHz
	1900MHz_RRH Count	1	1	1
	1900MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	1900MHz Combiner Model	No Combiner Required	No Combiner Required	No Combiner Required
	1900MHz_Top_Jumper #1_Length (RRH or Combiner-to-Antenna for TT or Main Coax to	10	10	10
	1900MHz_Top_Jumper #1_Cable_Model (RRH or Combiner-to-Antenna for TT or Main Coax	LCF12-50J	LCF12-50J	LCF12-50J
	1900MHz_Top_Jumper #2_Length (RRH to Combiner for TT if applicable, ft)	N/A	N/A	N/A
	1900MHz_Top_Jumper #2_Cable_Model (RRH to Combiner for TT if applicable)	N/A	N/A	N/A
	1900MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
	1900MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #1_Length (Ground based RRH to Combiner-OR-Main Coax, ft)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #1_Cable_Model (Ground based RRH to Combiner-OR-Main Coax)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #2_Length (Ground based-Combiner to Main Coax, ft)	N/A	N/A	N/A
	1900MHz_Bottom_Jumper #2_Cable_Model (Ground based-Combiner to Main Coax)	N/A	N/A	N/A
800	800MHz_Azimuth	10	110	210
	800MHz_No_of_Antennas	0	0	0
	800MHz_RADCenter(ft)	120	120	120
	800MHz_AntennaMake	RFS	RFS	RFS
	800MHz_AntennaModel	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)	APXVSPP18-C-A20 (Shared w/1900)
	800MHz_Horizontal_Beamwidth	65	65	65
	800MHz_Vertical_Beamwidth	11.5	11.5	11.5
	800MHz_AntennaHeight (ft)	6	6	6
	800MHz_AntennaGain (dBd)	13.4	13.4	13.4
	800MHz_E_Tilt	-3	-8	0
	800MHz_M_Tilt	0	0	0
	800MHz_RRH Manufacturer	ALU	ALU	ALU
	800MHz_RRH Model	800 MHz RRH 2x50W	800 MHz RRH 2x50W	800 MHz RRH 2x50W
	800MHz_RRH Count	1	1	1
	800MHz_RRH Location	Top of the Pole/Tower	Top of the Pole/Tower	Top of the Pole/Tower
	800_Top_Jumper #1_Length (RRH to Antenna for TT or Main Coax to Antenna for GM)	10	10	10
	800_Top_Jumper_Cable_Model (RRH to Antenna for TT or Main Coax to Antenna for GM)	LCF12-50J	LCF12-50J	LCF12-50J
	800MHz_Main_Coax_Cable_Length (ft)	N/A	N/A	N/A
	800MHz_Main_Coax_Cable_Model	N/A	N/A	N/A
	800_Bottom_Jumper #1_Length (Ground based RRH to Main Coax)	N/A	N/A	N/A
	800_Bottom_Jumper #1_Cable_Model (Ground based RRH to Main Coax)	N/A	N/A	N/A
	Plumbing Scenario *	124	124	124
Comments	* If plumbing scenario does not match the material received, please contact your Construction Manager			
	11/9/2012			

NOTE:
RFDS SHOWN PROVIDED BY SPRINT DATED 11/9/12.

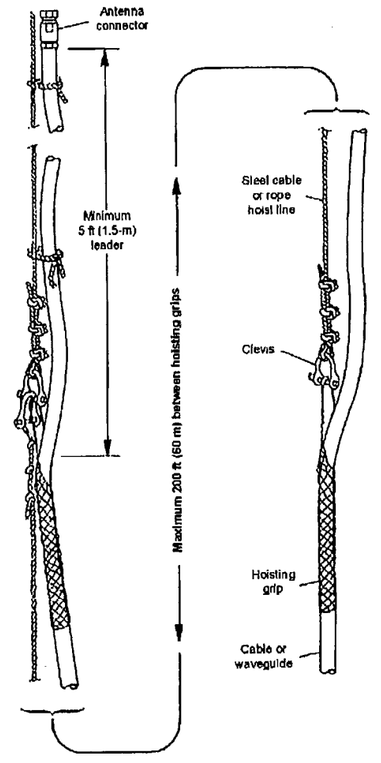
NOTE:
COORDINATE RF ANTENNA INSTALLATION WITH FINAL SPRINT RFDS. COORDINATE RF MW DISH (IF APPLICABLE) INSTALLATION WITH FINAL SPRINT RFDS.

1 SPRINT RFDS
NOT TO SCALE

CHECK FST FOR LATEST VERSION OF RFDS

NOTE:
1. REFER TO: CONSTRUCTION STANDARDS–SPRINT DOCUMENT: "EXHIBIT A – STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES REV 4.0 – 02.15.2011.DOCM"
2. REFER TO: "WEATHERPROOFING SPECS: EXCERPT EXH A – WTHRPRF – STD CONSTR SPECS._15720111042185542 9.DOCM"
3. REFER TO: "COLOR CODING–SPRINT NEXTEL ANT AND LINE COLOR CODING (DRAFT) V3 09–08–11.PDF"
4. CONTRACTOR TO VERIFY LATEST REV AND DATE PRIOR TO CONSTRUCTION.

1. DO NOT USE ONE HOISTING GRIP FOR HOISTING TWO OR MORE CABLES OR CABLE TRAYS. THIS CAN CAUSE THE HOISTING GRIP TO BREAK OR THE CABLES OR WAVE– GUIDES TO FALL.
2. DO NOT USE THE HOISTING GRIP FOR LOWERING CABLE OR CABLE TRAY. SNAGGING OF THE CABLE OR CABLE TRAY MAY LOOSEN THE GRIP AND POSSIBLY CAUSE THE CABLE TO CABLE TRAY TO SWAY OR FALL.
3. DO NOT REUSE HOISTING GRIPS. USED GRIPS MAY HAVE LOST ELASTICITY, STRETCHED, OR BECOME WEAKENED. REUSING A GRIP CAN CAUSE THE CABLE OR CABLE TRAY TO SLIP, BREAK, OR FALL.
4. USE HOISTING GRIPS AT INTERVALS OF NO MORE THAN 200 FT (60 M).
5. MAKE SURE THAT THE PROPER HOISTING GRIP IS USED FOR THE CABLE OR CABLE TRAY BEING INSTALLED. SLIPPAGE OR INSUFFICIENT GRIPPING STRENGTH WILL RESULT IF YOU ARE USING THE WRONG HOISTING GRIP.



2 HOIST GRIP DETAIL
NOT TO SCALE

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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ORCHARD
CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For

Sprint VISION

Drawing Scale:
AS NOTED

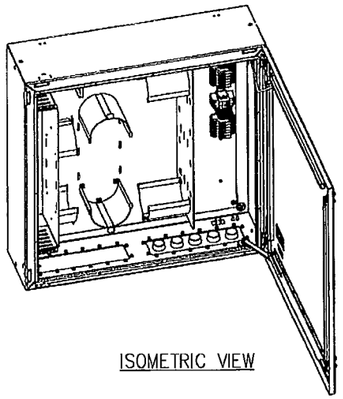
Date:
4/15/13

Drawing Title

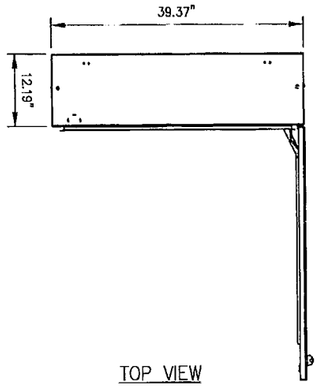
RF AND CABLE DETAILS

Drawing Number

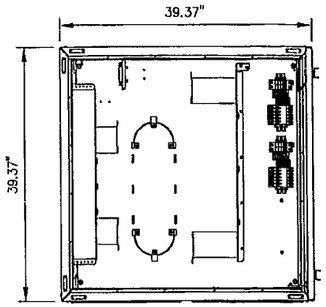
C8



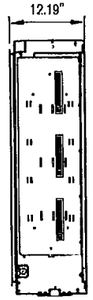
ISOMETRIC VIEW



TOP VIEW

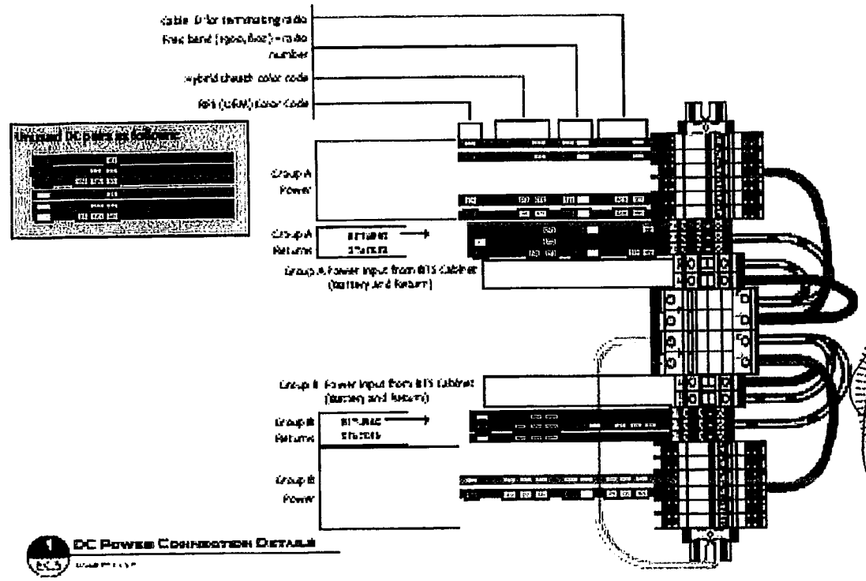


FRONT VIEW

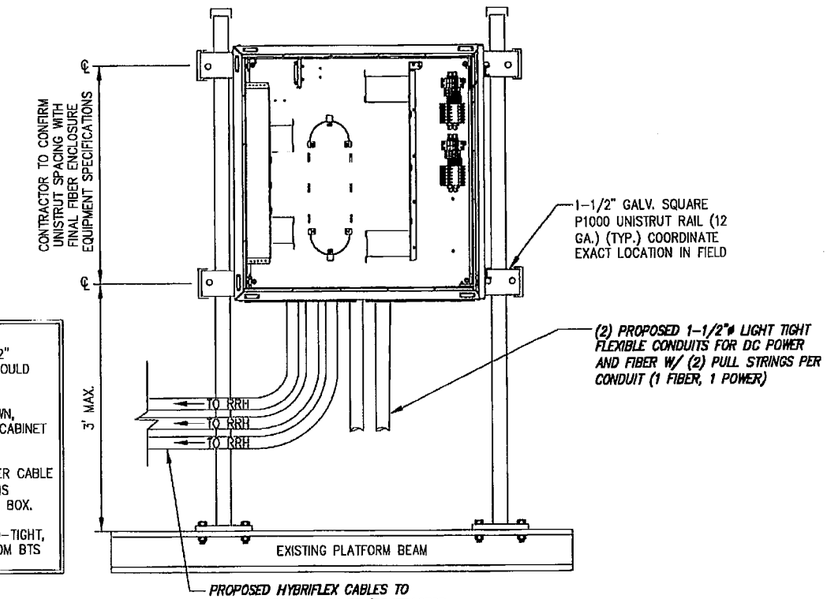


SIDE VIEW

1 DISTRIBUTION BOX DETAIL
NOT TO SCALE



DC POWER CONNECTION DETAILS
NOT TO SCALE



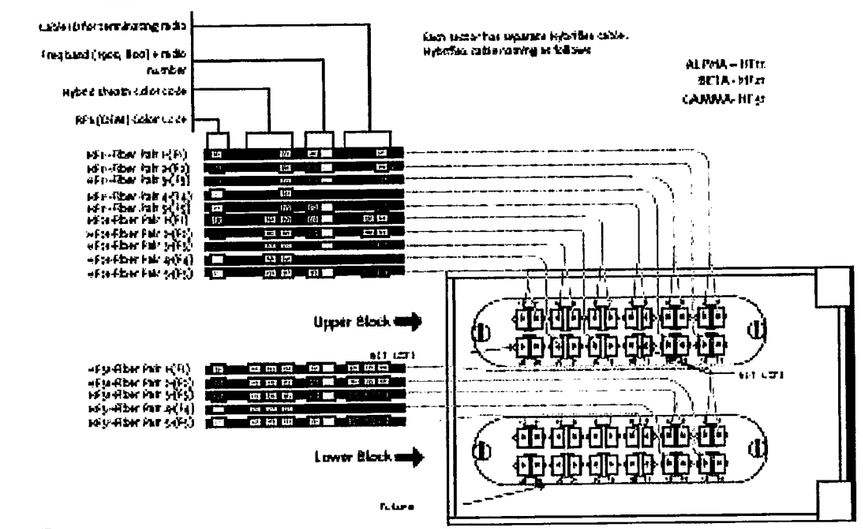
NOTE:
- DISTRIBUTION BOX IS KITTED WITH 50' OF 1-1/2" LIQUID-TIGHT CONDUIT AND CONNECTORS. THIS SHOULD BE:
* SPLIT IN HALF,
* TERMINATED TO THE DISTRIBUTION BOX AS SHOWN,
* RAN TO AND COILED AS CLOSE TO WHERE THE CABINET IS GOING TO BE MOUNTED AS POSSIBLE.

- DISTRIBUTION BOX IS KITTED WITH 2 AWG, POWER CABLE 35' x 2EA. RUNS RED AND 2EA. RUNS BLACK. THIS SHOULD BE COILED AND LEFT INSIDE DISTRIBUTION BOX.

- BTS INSTALLATION TEAM WILL TERMINATE LIQUID-TIGHT, RUN THE FIBER JUMPERS AND POWER CABLES FROM BTS CABINET TO DISTRIBUTION BOX.

NOTE:
1. ANCHORS AND UNISTRUT CHANNEL SHALL HAVE HOT-DIPPED GALVANIZED FINISH.
2. MOUNT FIBER AND POWER DISTRIBUTION BOX WITH FOUR (4) 1/4"ø UNISTRUT BOLTING HARDWARE AND SPRING NUTS.

2 TYPICAL DISTRIBUTION BOX ON H-FRAME DETAIL
NOT TO SCALE



FIBER CONNECTION DETAILS
NOT TO SCALE

SCENARIO 124 v2.3

3 FIBER & DC CONNECTION DETAILS
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

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Project Number
284-055

Project Title
BERLIN / LAVIANA
ORCHARD
CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For
Sprint
VISION

Drawing Scale:
AS NOTED

Date:
4/15/13

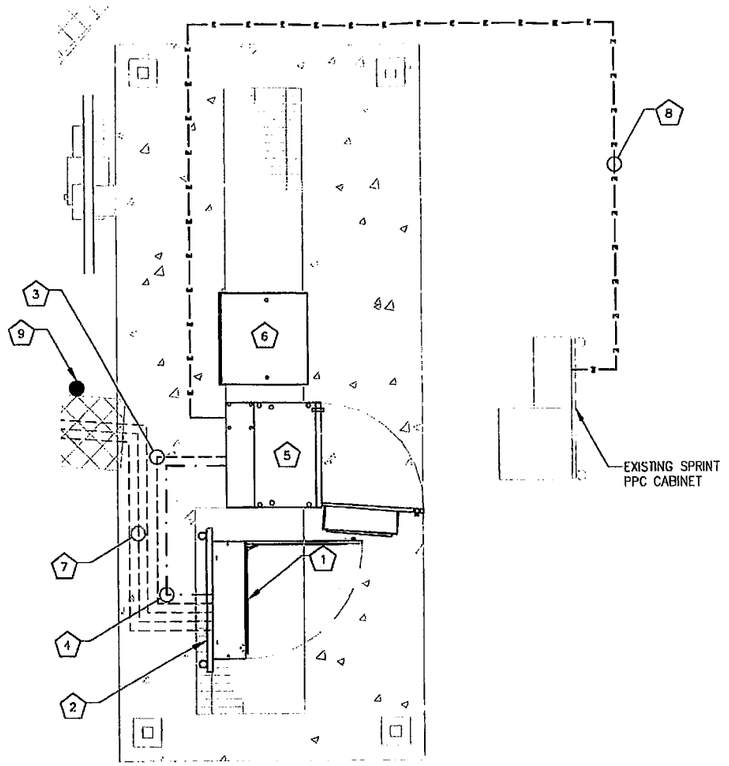
Drawing Title
FIBER DISTRIBUTION BOX DETAILS

Drawing Number
C9

CODED NOTES:

1. PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO NEW H-FRAME
2. PROPOSED H-FRAME FURNISHED AND INSTALLED BY CONTRACTOR
3. PROPOSED 1-1/2" LIQUID TIGHT CONDUIT WITH PULL-STRING FOR TELCO FROM FIBER JUNCTION BOX TO RADIO EQUIPMENT CABINET, 7'
4. PROPOSED 1-1/2" LIQUID TIGHT CONDUIT WITH PULL-STRING FOR DC POWER FROM FIBER JUNCTION BOX TO RADIO EQUIPMENT CABINET, 6'
5. PROPOSED MULTIMODAL BTS CABINET
6. PROPOSED BATTERY BACKUP CABINET
7. PROPOSED HYBRIFELX CABLES ROUTED FROM PROPOSED FIBER JUNCTION BOX TO PROPOSED RRH TO FOLLOW EXISTING CABLES (CONTRACTOR TO VERIFY) (TYP. OF (1) PER SECTOR)
8. PROPOSED 2"ø CONDUIT ROUTED FROM BTS TO EXISTING PPC CABINET
9. PROPOSED SPRINT GPS TO REPLACE EXISTING

NOTE:
CONTRACTOR SHALL NOT STACK THE HYBRIFLEX CABLES ON TOP OF THE EXISTING COAXIAL CABLES AS TO PREVENT THE COAXIAL CABLES FROM BEING REMOVED.



CALLED NORTH

1 — UTILITY SITE PLAN
SCALE: AS NOTED

GRAPHIC SCALE
4' 2' 0 2' 4'
SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

ELECTRICAL NOTES:

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (N.E.C.), AND APPLICABLE LOCAL CODES
2. GROUNDING SHALL COMPLY WITH THE ARTICLE 250 OF NATIONAL ELECTRICAL CODE.
3. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED.
4. ALL WIRES SHALL BE AWG MIN #12 THHN COPPER UNLESS NOTED.
5. CONDUCTORS SHALL BE INSTALLED IN SCHEDULE 40 PVC CONDUIT UNLESS NOTED OTHERWISE.
6. LABEL SPRINT SERVICE DISCONNECTS WITH SWITCH AND PPC CABINET WITH ENGRAVED LAMACOID LABELS, LETTERS 1" IN HEIGHT.
7. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 8" RADIUS.
8. ENGAGE AN INDEPENDENT TESTING FIRM TO TEST AND VERIFY THAT RESISTANCE DOES NOT EXCEED 10 OHMS TO GROUND. TEST GROUND RING RESISTANCE PRIOR TO MAKING FINAL GROUND CONNECTIONS TO INFRASTRUCTURE AND EQUIPMENT. GROUNDING AND OTHER OPERATIONAL TESTING SHALL BE WITNESSED BY SPRINTS REPRESENTATIVE.
9. PROVIDE PULL BOXES AND JUNCTION BOXES WHERE REQUIRED SO THAT CONDUIT BENDS DO NOT EXCEED 360 DEGREES.
10. OBTAIN PERMITS AND PAY FEES RELATED TO ELECTRICAL WORK PERFORMED ON THIS PROJECT. DELIVER COPIES OF ALL PERMITS TO SPRINT REPRESENTATIVE.
11. SCHEDULE AND ATTEND INSPECTIONS RELATED TO ELECTRICAL WORK REQUIRED BY JURISDICTION HAVING AUTHORITY. CORRECT AND PAY FOR ANY WORK REQUIRED TO PASS ANY FAILED INSPECTION.
12. REDLINED AS-BUILTS ARE TO BE DELIVERED TO A SPRINT REPRESENTATIVE.
13. PROVIDE TWO COPIES OF OPERATION AND MAINTENANCE MANUALS IN THREE-RING BINDER.
14. FURNISH AND INSTALL THE COMPLETE ELECTRICAL SERVICE, TELCO CONDUIT, AND THE COMPLETE GROUNDING SYSTEM.
15. ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH ALL APPLICABLE BUILDING CODES AND LOCAL ORDINANCES, INSTALLED IN A NEAT MANNER AND SHALL BE SUBJECT TO APPROVAL BY A SPRINT REPRESENTATIVE.
16. CONDUCT A PRE-CONSTRUCTION SITE VISIT AND VERIFY EXISTING SITE CONDITIONS AFFECTING THIS WORK. REPORT ANY OMISSIONS OR DISCREPANCIES FOR CLARIFICATION PRIOR TO THE START OF CONSTRUCTION.
17. PROTECT ADJACENT STRUCTURES AND FINISHES FROM DAMAGE, REPAIR TO ORIGINAL CONDITION ANY DAMAGED AREA.
18. REMOVE DEBRIS ON A DAILY BASIS. DEBRIS NOT REMOVED IN A TIMELY FASHION WILL BE REMOVED BY OTHERS AND THE RESPONSIBLE SUBCONTRACTOR SHALL BE CHARGED ACCORDINGLY. REMOVAL OF DEBRIS SHALL BE COORDINATED WITH THE OWNER'S REPRESENTATIVE. DEBRIS SHALL BE REMOVED FROM THE PROPERTY AND DISPOSED OF LEGALLY.
19. UPON COMPLETION OF WORK, THE SITE SHALL BE CLEAN AND FREE OF DUST AND FINGERPRINTS.
20. PRIOR TO ANY TRENCHING, CONTACT LOCAL UTILITY TO VERIFY LOCATION OF ANY EXISTING BURIED SERVICE CONDUITS.
21. DOCUMENT GROUND RING INSTALLATION AND CONNECTIONS TO IT WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PRESENT PHOTO ARCHIVE A SITE "PUNCH LIST" WALK TO SPRINT'S REPRESENTATIVE.

NOTE:
INFINIGY ENGINEERING HAS NOT CONDUCTED AN ELECTRICAL LOAD STUDY FOR THIS SITE. CONTRACTOR IS TO VERIFY EXISTING ELECTRICAL LOADS PRIOR TO CONSTRUCTION TO ENSURE THERE IS AMPLE SERVICE AVAILABLE TO ACCOMMODATE THE EXISTING AND PROPOSED EQUIPMENT.

UNDERGROUND SERVICE ALERT
CALL TOLL FREE
1-800-922-4455
THREE WORKING DAYS BEFORE YOU DIG

NOTES:
CONTRACTOR TO USE EXISTING SPARE CONDUITS, IF AVAILABLE. CONDUIT SIZES MUST BE EQUAL TO OR GREATER THAN THAT ALLOWED BY CODE.

EXISTING ALARMS NEED TO BE RE-ROUTED AND VERIFIED IN PROPER WORKING CONDITION WHEN NEW MMBTS EQUIPMENT IS INSTALLED.

REMAINING GROUND LEADS FROM REMOVED CABINETS TO BE COILED (NOT ON WALKING SURFACE).

REMAINING UNUSED CONDUITS FROM EXISTING CABINETS TO BE COVERED WITH WATERPROOF CAPS (NOT DUCT TAPE).

EXISTING PANELBOARD

PANEL RATING: 120/240V, 60 HZ, 1ø, 200A

BUS AMPS L1	BUS AMPS L2	LOAD	POLES	AMPS	BUS	AMPS	POLES	LOAD	BUS AMPS L1	BUS AMPS L2
		PCS EQUIP.	2	100	1-7	--	2	SURGE ARRESTOR		
					2-8					
		SERVICE LIGHT	1	--	3-9	*100*	*2*	*MM BTS*		
		SERVICE PLUG	1	--	4-10					
					5-11	--	1	TELCO PLUG		
		FAN	1	--	6-12					

NOTE:
CONTRACTOR IS TO ENSURE THE INSTALLATION INSTRUCTIONS FOR EACH CABINET ARE FOLLOWED AND THAT THE MANUFACTURER'S REQUIREMENTS ARE MET.

2 — EXISTING PANELBOARD SCHEDULE
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (518) 690-0790
Fax # (518) 690-0793

STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24705 — LICENSED PROFESSIONAL ENGINEER

No.	Submittal / Revision	Appd	Date
2	REVISED PER COMMENTS	AHS	4/15/13
1	REVISED PER COMMENTS	AHS	3/21/13
0	ISSUED FOR REVIEW	AHS	12/3/12

Drawn: AHS Date: 12/3/12
Designed: AJD Date: 12/3/12
Checked: AGF Date: 12/3/12

Project Number: 294-055

Project Title:
BERLIN / LAVIANA ORCHARD
CT33XC536
1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

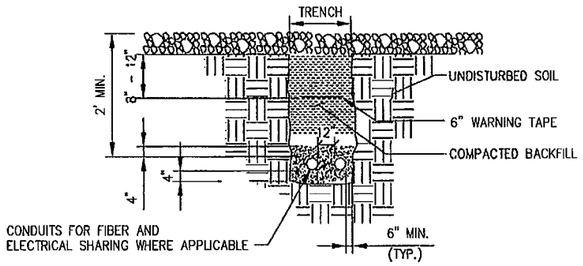
Prepared For: Sprint VISION

Drawing Scale: AS NOTED
Date: 4/15/13

Drawing Title:
UTILITY SITE PLAN

Drawing Number:
E1

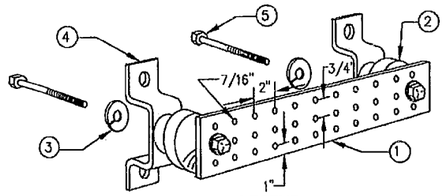
GROUNDING NOTES:
IN ADDITION TO POWER SERVICE GROUNDING AS REQUIRED BY NEC. CONTRACTOR SHALL BE RESPONSIBLE TO COORD AND INSTALL ALL SURGE AND LIGHTING PROTECTION GROUNDING AS REQUIRED AND SPECIFIED BY SPRINT.



– SEPARATION DIMENSIONS MUST BE VERIFIED WITH LOCAL UTILITY CO. REQUIREMENTS.

*HAND DIG INSIDE COMPOUND

1 — UTILITY TRENCH DETAIL
NOT TO SCALE

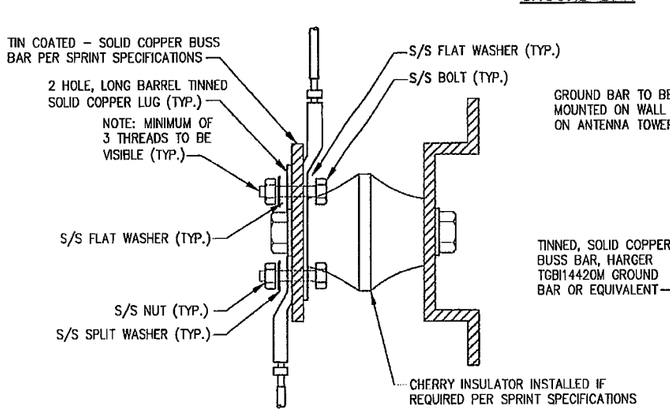


LEGEND

1. TINNED COPPER GROUND BAR, 1/4"x4"x20", NEWTON INSTRUMENT CO., HARGER TGBI14420M, OR EQUIVALENT. HOLE CENTERS TO MATCH
2. NEMA DOUBLE LUG CONFIGURATION.
3. INSULATORS, NEWTON INSTRUMENT CO. CAT. NO. 3061–4 OR HARGER EQUIVALENT.
4. 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8 OR EQUIVALENT.
5. WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT. NO. A–6056 OR HARGER EQUIVALENT.
6. 5/8–11"x1" H.H.C.S. BOLTS, NEWTON INSTRUMENT CO. CAT. NO. 3012–1 OR HARGER EQUIVALENT.

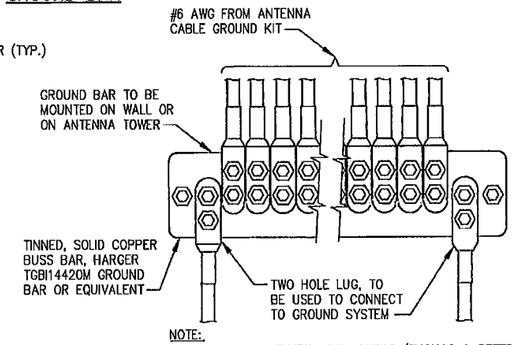
NOTE:
1) ALL MOUNTING HARDWARE CAN ALSO BE USED ON 6", 12", 18", ETC. GROUND BARS.
2) ENTIRE ESSEMBLY AVAILABLE FROM NEWTON INSTRUMENT CO. CAT. NO. 2106060010 OR AS HARGER TGBI14420M.

GROUND BAR



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

GROUND LUG



NOTE:
CONTRACTOR TO UTILIZE KORP–SHIELD (THOMAS & BETTS) OR EQUIVALENT ON ALL LUG CONNECTIONS

ANTENNA GROUND BAR

2 — GROUND BAR DETAILS
NOT TO SCALE

INFINIGY Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (516) 690-0790
Fax # (516) 690-0793

STATE OF CONNECTICUT
JOHN S. STEVENS
No. 24705
LICENSED PROFESSIONAL ENGINEER

No.	Submittal / Revision	App'd	Date
2	REVISED PER COMMENTS	AHS	4/15/13
1	REVISED PER COMMENTS	AHS	3/21/13
0	ISSUED FOR REVIEW	AHS	12/3/12

Drawn: AHS Date: 12/3/12
Designed: AJD Date: 12/3/12
Checked: ASF Date: 12/3/12

Project Number
284-055

Project Title
BERLIN / LAVIANA ORCHARD CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For
Sprint VISION

Drawing Scale:
AS NOTED

Date:
4/15/13

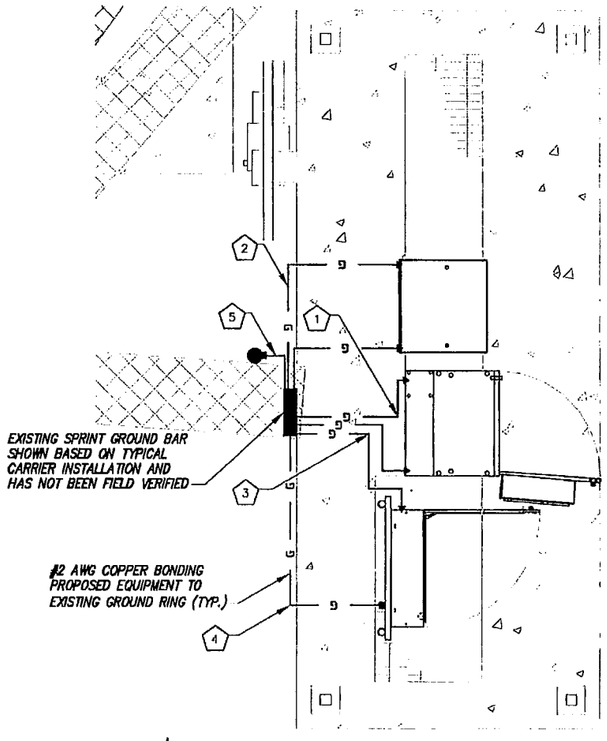
Drawing Title
DETAILS

Drawing Number
E2

CODED NOTES:

1. PROPOSED MULTIMODAL BTS CABINET
2. PROPOSED BATTERY BACKUP CABINET
3. PROPOSED SPRINT FIBER/POWER JUNCTION BOX MOUNTED TO NEW H-FRAME
4. PROPOSED H-FRAME FURNISHED AND INSTALLED BY CONTRACTOR
5. PROPOSED SPRINT GPS TO REPLACE EXISTING

SYMBOL	
⊗	COPPER GROUND ROD
▸	CONNECT PER MANUFACTURER SPECS
■	CADWELD CONNECTION
•	MECHANICAL CONNECTION
▬	GROUND BAR



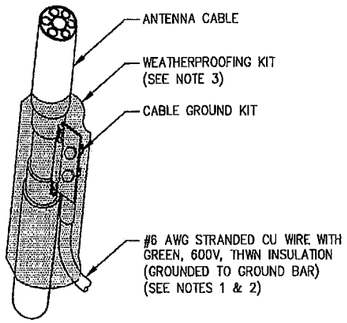
1 — EQUIPMENT GROUNDING PLAN
SCALE: AS NOTED

GRAPHIC SCALE

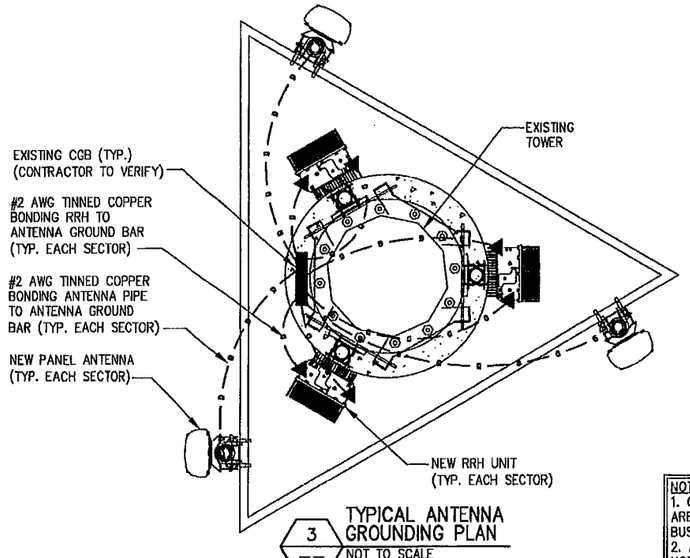
4' 2' 0 2' 4'

SCALE (11x17): 1" = 4'-0"
SCALE (22x34): 1" = 2'-0"

NOTES:
1) DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2) GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3) WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.



2 — CONNECTION OF GROUND KIT TO ANTENNA CABLE
NOT TO SCALE



3 — TYPICAL ANTENNA GROUNDING PLAN
NOT TO SCALE

NOTES:
1. CONTRACTOR TO VERIFY EXISTING LUG SPACES ARE AVAILABLE ON GROUND BAR. ADD ADDITIONAL BUS BAR IF NO LUG SPACES ARE AVAILABLE.
2. ANTENNA GROUNDING CONNECTIONS SHOWN ARE NOT EXACT TO THIS SITE. FOR EXACT ANTENNA LAYOUT REFER TO ANTENNA CONFIGURATION SHEET.

GROUNDING NOTES:

1. ALL DOWN CONDUCTORS AND GROUND RING AND CONDUCTOR SHALL BE #2 AWG, SOLID, BARE, TINNED COPPER, UNO. ALL CONNECTIONS TO GROUND RING SHALL BE EXOTHERMICALLY WELDED. CONDUCTOR SHALL BE A MINIMUM DEPTH BELOW GRADE OF 30 INCHES OR TO THE LEDGE. MINIMUM BEND RADIUS SHALL BE 8 INCHES. CONDUCTOR SHALL BE AT LEAST 24 INCHES FROM ANY FOUNDATION, UNO.
2. WHERE MECHANICAL CONDUCTOR CONNECTIONS ARE SPECIFIED, BOLTED, COMPRESSION-TYPE CLAMPS OR SPLIT-BOLT TYPE CONNECTORS SHALL BE USED.
3. GRIND OFF GALVANIZING IN AFFECTED AREA. EXOTHERMICALLY WELD #2 CONDUCTOR AT 6 INCHES ABOVE GRADE R FOUNDATION, WHICHEVER IS HIGHER. COLD-GALV AFTER. EXOTHERMICALLY WELD OTHER END TO THE GROUND.
4. GROUND CONDUCTORS ON EXTERIOR WALL OF SHELTER SHALL BE ENCASED IN PVC CONDUIT TO GRADE. MOUNT PVC WITH GALVANIZED "C" CLAMPS. SEAL TOP ENDS.
5. FOLLOWING COMPLETION OF WORK, CONDUCT GROUND TEST. SUBMIT WRITTEN TEST TO CONSTRUCTION MANAGER AND PROJECT MANAGER.
6. ALL GROUNDING WORK SHALL COMPLY WITH CARRIER(S) STANDARDS.
7. GROUNDING REQUIREMENTS SHOWN ON THIS PLAN ARE FOR ITEMS THAT ARE LOCATED NEAR GRADE LEVEL AND THAT NEED TO BE TIED TO THE BELOW GRADE GROUND RING.
8. UNLESS NOTED OTHERWISE, ALL GROUNDING SHALL BE IN ACCORDANCE WITH SPRINT'S SSEQ DOCUMENTS 3.018.02.004 "BONDING, GROUNDING AND TRANSIENT PROTECTION FOR CELL SITES", AND 3.018.10.002 "SITE RESISTANCE TO EARTH TESTING". ALL GROUNDING SHALL ALSO COMPLY WITH ALL STATE AND LOCAL CODES, AND THE NATIONAL ELECTRICAL CODE (NEC).
9. UNLESS NOTED OTHERWISE, ALL GROUNDING CONNECTIONS SHALL BE MADE BY AN EXOTHERMIC WELD.
10. RESISTANCE TO EARTH TESTING IS REQUIRED PER SPRINT STANDARDS ON ALL NEW SITES.
11. REFER TO "ANTI-THEFT UPDATE TO SPRINT GROUNDING 082412.PDF" FOR GUIDELINE TO SUSPECTED OR ACTUAL THEFT OF GROUND RING.

INFINIGY
Design. Build. Deliver.
11 Herbert Drive
Latham, NY 12110
Office # (516) 690-0790
Fax # (516) 690-0793

STATE OF CONNECTICUT — JOHN S. STEVENS — No. 24105 — LICENSED PROFESSIONAL ENGINEER

No	Submittal / Revision	App'd	Date
2	REVISED PER COMMENTS	ANS	4/15/13
1	REVISED PER COMMENTS	ANS	3/21/13
0	ISSUED FOR REVIEW	ANS	12/3/12

Drawn: ANS Date: 12/3/12
Designed: ASD Date: 12/3/12
Checked: ASF Date: 12/3/12

Project Number: 284-055

Project Title:
BERLIN / LAVIANA
ORCHARD
CT33XC536

1684 CHAMBERLAIN HIGHWAY
BERLIN, CT 06037

Prepared For: Sprint VISION

Drawing Scale: AS NOTED
Date: 4/15/13

Drawing Title:
GROUNDING PLAN AND DETAILS

Drawing Number:
E3

Exhibit – 2

General Power Density Table – (RF Emissions Analysis Report)

(Insert MPE Certification – FST Task 37.5)

EBI Consulting
environmental | engineering | due diligence

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

Sprint Existing Facility

Site ID: CT33XC536

Berlin / Laviana Orchard
1684 Chamberlain Highway
Kensington, CT 06037

January 2, 2013

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

EBI Consulting
environmental | engineering | due diligence

January 2, 2013

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

Re: Emissions Values for Site: **CT33XC536 – Berlin / Laviana Orchard**

EBI Consulting was directed to analyze the proposed upgrades to the existing Sprint facility located at 1684 Chamberlain Highway, Kensington, CT, for the purpose of determining whether the emissions 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 is approximately 567 $\mu W/cm^2$, and the general population exposure limit for the PCS band 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 1684 Chamberlain Highway, Kensington, CT, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario. Actual values seen from this site will be dramatically less than those shown in this report. 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 CDMA Carriers (1900 MHz) were considered for each sector of the proposed installation.
2) 1 CDMA Carrier (850 MHz) was considered for each sector of the proposed installation
3) 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.
4) For the following calculations the sample point was the top of a six foot person standing at the base of the tower. The actual gain in this direction was used per the manufactures supplied specifications.
5) The antenna used in this modeling is the APXVSPP18-C-A20. This is based on feedback from the carrier with regards to anticipated antenna selection. This antenna 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. All calculations were performed assuming the main lobe of the antenna was focused at the base of the tower to present a worst case scenario.

6) The antenna mounting height centerline of the proposed antennas is **121 feet** above ground level (AGL)
7) 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	CT33XC536 - Berlin / Laviana Orchard
Site Addresss	1684 Chamberlain Highway, Kensington, CT, 06037
Site Type	Monopole

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
1a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	121	115	1/2 "	0.5	0	1386.9474	37.70251	3.77025%
1a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	121	115	1/2 "	0.5	0	389.96892	10.60084	1.86964%
															Sector total Power Density Value:		5.640%

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
2a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	121	115	1/2 "	0.5	0	1386.9474	37.70251	3.77025%
2a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	121	115	1/2 "	0.5	0	389.96892	10.60084	1.86964%
															Sector total Power Density Value:		5.640%

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 in direction of sample point (dBd)	Antenna Height (ft)	analysis height	Cable Size	Cable Loss (dB)	Additional Loss	ERP	Power Density Value	Power Density Percentage
3a	RFS	APXVSPP18-C-A20	RRH	1900 MHz	CDMA / LTE	20	2	40	15.9	121	115	1/2 "	0.5	0	1386.9474	37.70251	3.77025%
3a	RFS	APXVSPP18-C-A20	RRH	850 MHz	CDMA / LTE	20	1	20	13.4	121	115	1/2 "	0.5	0	389.96892	10.60084	1.86964%
															Sector total Power Density Value:		5.640%

Site Composite MPE %	
Carrier	MPE %
Sprint	16.920%
Town	0.500%
MetroPCS	12.100%
Clearwire	1.280%
Nextel	4.470%
T-Mobile	9.580%
Verizon Wireless	5.720%
AT&T	9.160%
Total Site MPE %	**59.730%**

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 exposure to RF Emissions.

The anticipated Maximum Composite contributions from the Sprint facility are **16.920% (5.640% from each sector)** 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 **59.730%** of the allowable FCC established general public limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions

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

Scott Heffernan
RF Engineering Director

EBI Consulting
21 B Street
Burlington, MA 01803

Exhibit – 3

Structural Modification Report

(Insert SA– FST Task 9.8)

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **February 27, 2013**

Marianne Dunst
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6580

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
(614) 221-6679
kthorpe@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate – Interim Loading**	
	Carrier Site Number:	CT33XC536
	Carrier Site Name:	CT33XC536
Crown Castle Designation:	**Crown Castle BU Number:**	876382
	Crown Castle Site Name:	BERLIN / LAVIANA ORCHARD
	Crown Castle JDE Job Number:	190532
	Crown Castle Work Order Number:	541161
	Crown Castle Application Number:	165641 Rev. 2
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1129 R1 A **(Revised Model)**
Site Data:	**1684 Chamberlain Highway, BERLIN, Hartford County, CT** **Latitude *41° 35' 23.07"*, Longitude *-72° 48' 19.2"*** **123 Foot - Monopole Tower**	

Dear Marianne Dunst,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 498128, in accordance with application 165641, revision 2.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer

tnxTower Report - version 6.0.3.0

FEB 2 7 2013

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **February 27, 2013**

Marianne Dunst
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6580

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
(614) 221-6679
kthorpe@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate – Interim Loading**	
	Carrier Site Number:	CT33XC536
	Carrier Site Name:	CT33XC536
Crown Castle Designation:	**Crown Castle BU Number:**	876382
	Crown Castle Site Name:	BERLIN / LAVIANA ORCHARD
	Crown Castle JDE Job Number:	190532
	Crown Castle Work Order Number:	541161
	Crown Castle Application Number:	165641 Rev. 2
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1129 R1 A **(Revised Model)**
Site Data:	**1684 Chamberlain Highway, BERLIN, Hartford County, CT**	
	Latitude *41° 35' 23.07"*, Longitude *-72° 48' 19.2"*	
	123 Foot - Monopole Tower	

Dear Marianne Dunst,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 498128, in accordance with application 165641, revision 2.

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

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

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 123 ft Monopole tower designed by SUMMIT in July of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Vertical Solutions, in October of 2008. The reinforcement consists of shaft reinforcing from 0' to 59'-6" and (4) post installed anchor rods with brackets.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	121.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3 (E)	1-1/4	1
118.0	118.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-1]			

Notes:
1) Proposed equipment
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
120.0	121.0	6	decibel	DB980H65T2E-M w/Mount Pipe	6 (I)	1-1/4	4
	120.0	1	tower mounts	Platform Mount [LP 712-1]	-	-	1
112.0	113.0	12	decibel	DB844H90E-XY w/Mount Pipe	12 (I)	7/8	1
	112.0	1	tower mounts	Platform Mount [LP 713-1]			
100.0	101.0	3	remec	S20057A1	-	-	3
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ mount pipe	6 (I)	1-5/8	2
		3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
		3	ems wireless	RR65-18-02DP w/ Mount Pipe	6 (I)	1-5/8	1
	100.0	1	tower mounts	T-Arm Mount [TA 602-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
93.0	94.0	2	antel	BXA-171063-8BF-2 w/ Mount Pipe	12 (I)	1-5/8	1
		1	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		4	rfs celwave	APL866513-42T0 w/ Mount Pipe			
		2	rfs celwave	APL868013-42T0 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	93.0	1	tower mounts	Platform Mount [LP 712-1]			
75.0	75.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	2 (E) 4 (I)	1-5/8 1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
65.0	66.0	6	powerwave technologies	P65-15-XLH-RR w/ Mount Pipe	1 (I) 2 (I) 6 (I) 6 (E)	3/8 3/4 1-5/8 1-5/8	1
		6	powerwave technologies	TT19-08BP111-001			
	65.0	6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	T-Arm Mount [TA 702-3]			
50.0	51.0	1	lucent	KS24019-L112A	1 (I)	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 702-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
4) Equipment To Be Removed within 6 months, considered in this analysis
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.
(I) Coax to be mounted internally and shielded from the wind. See coax layout in Appendix B.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 05/05/2000	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29200-0802, 06/06/2000	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29200-0802, 06/06/2000	1629384	CCISITES
4-POST MOD BPSA	Vertical Solutions, 080828.04, 12/11/2008	2611098	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.38	782.55	73.7	Pass
L2	82.25 - 57.75	Pole	TP31.4152x27.2139x0.25	2	-13.55	1285.62	95.7	Pass
L3	57.75 - 40.75	Pole	TP33.966x31.4152x0.4476	3	-16.27	1796.16	86.4	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.4332x0.4682	4	-20.40	1984.24	97.2	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.4871	5	-28.02	2507.53	101.4	Fail
							Summary	
						Pole (L5)	101.4	Fail
						Rating =	101.4	Fail

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	89.3	Pass
1	Base Plate	0	66.2	Pass
1	Base Foundation Structural Steel	0	81.5	Pass
1,3	Base Foundation Soil Interaction	0	66.6	Pass
	Structure Rating (all components) =		101.4	

Notes:

1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between post-installed anchors and existing anchors.
3) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

4.1) Recommendations

Provide monopole shaft reinforcing from 0' to 5'.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80.00 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 37.60 mph is used in combination with ice.
Deflections calculated using a wind speed of 50.00 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline 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	
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		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	123.0000-82.2500	40.7500	3.50	18	22.0000	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L2	82.2500-57.7500	28.0000	0.00	18	27.2139	31.4152	0.2500	1.0000	A607-65 (65 ksi)
L3	57.7500-40.7500	17.0000	4.25	18	31.4152	33.9660	0.4476	1.7902	Reinf 48.08 ksi (48 ksi)
L4	40.7500-29.7500	15.2500	0.00	18	32.4332	35.1164	0.4682	1.8729	Reinf 48.18 ksi (48 ksi)
L5	29.7500-0.0000	29.7500		18	35.1164	39.5800	0.4871	1.9485	Reinf 51.87 ksi (52 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	28.5477	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
L2	28.1670	21.3958	1965.3100	9.5722	13.8246	142.1599	3933.2059	10.6999	4.3496	17.399
	31.8998	24.7296	3034.5518	11.0636	15.9589	190.1476	6073.0965	12.3671	5.0891	20.356
L3	31.8998	43.9913	5329.9163	10.9935	15.9589	333.9771	10666.8458	21.9998	4.7414	10.594
	34.4900	47.6148	6758.4488	11.8990	17.2547	391.6868	13525.7906	23.8119	5.1903	11.597
L4	33.6928	47.5051	6132.3325	11.3476	16.4761	372.1966	12272.7341	23.7571	4.8842	10.431
	35.6581	51.4928	7809.8692	12.3001	17.8391	437.7945	15630.0149	25.7513	5.3564	11.44
L5	35.6581	53.5420	8111.8238	12.2934	17.8391	454.7210	16234.3213	26.7761	5.3231	10.928
	40.1906	60.4435	11670.2972	13.8780	20.1066	580.4201	23355.9504	30.2275	6.1087	12.54

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 123.0000-82.2500				1	1	1		
L2 82.2500-57.7500				1	1	1		
L3 57.7500-40.7500				1	1	1		
L4 40.7500-29.7500				1	1	1		
L5 29.7500-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF6-50A(1-1/4")	C	No	Inside Pole	120.0000 - 0.0000	6	No Ice	0.0000	0.66
						1/2" Ice	0.0000	0.66
						1" Ice	0.0000	0.66
						2" Ice	0.0000	0.66
						4" Ice	0.0000	0.66
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	2	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 75.0000	1	No Ice	0.1540	1.08
						1/2" Ice	0.2540	2.33
						1" Ice	0.3540	4.18
						2" Ice	0.5540	9.73
						4" Ice	0.9540	28.15
***								
LDF5-50A(7/8")	C	No	Inside Pole	112.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
***								

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF7-50A(1-5/8")	C	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
AL7-50(1 5/8)	C	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.52
						1/2" Ice	0.0000	0.52
						1" Ice	0.0000	0.52
						2" Ice	0.0000	0.52
						4" Ice	0.0000	0.52
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	93.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
AVA7-50(1-5/8)	C	No	Inside Pole	75.0000 - 0.0000	4	No Ice	0.0000	0.70
						1/2" Ice	0.0000	0.70
						1" Ice	0.0000	0.70
						2" Ice	0.0000	0.70
						4" Ice	0.0000	0.70
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.0000	0.70
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.38
						2" Ice	0.0000	10.50
						4" Ice	0.0000	30.07
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.2010	0.70
						1/2" Ice	0.3010	2.23
						1" Ice	0.4010	4.38
						2" Ice	0.6010	10.50
						4" Ice	1.0010	30.07
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	65.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	65.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A(1-5/8")	C	No	Inside Pole	65.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
FB-L98B-002-75000(3/8")	C	No	Inside Pole	65.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	65.0000 - 0.0000	2	No Ice	0.0000	0.59
						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
						2" Ice	0.0000	0.59
						4" Ice	0.0000	0.59
***								
LDF4-50A(1/2")	C	No	Inside Pole	50.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
********** ********								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	59.5000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						2" Ice	0.6528	0.00
						4" Ice	1.0972	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Azimuth Adjustment ° Vert ft	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
3/4" x 8 ft lightning rod	C	None	0.0000	123.0000	No Ice	0.6000	0.6000	0.01
					1/2" Ice	1.4146	1.4146	0.02
					1" Ice	2.2458	2.2458	0.03
					2" Ice	3.6690	3.6690	0.07
					4" Ice	5.7417	5.7417	0.21
***								
(2) DB980H65T2E-M w/Mount Pipe	A	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	4.2736	3.8569	0.03
					1/2" Ice	4.8609	4.9465	0.07
					1" Ice	5.3717	5.7499	0.12
					2" Ice	6.4188	7.3903	0.23
					4" Ice	8.8560	10.8711	0.59
(2) DB980H65T2E-M w/Mount Pipe	B	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	4.2736	3.8569	0.03
					1/2" Ice	4.8609	4.9465	0.07
					1" Ice	5.3717	5.7499	0.12
					2" Ice	6.4188	7.3903	0.23
					4" Ice	8.8560	10.8711	0.59
(2) DB980H65T2E-M w/Mount Pipe	C	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	4.2736	3.8569	0.03
					1/2" Ice	4.8609	4.9465	0.07
					1" Ice	5.3717	5.7499	0.12
					2" Ice	6.4188	7.3903	0.23
					4" Ice	8.8560	10.8711	0.59
2.375" OD x 5' Mount Pipe	A	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	1.1875	1.1875	0.02
					1/2" Ice	1.4956	1.4956	0.03
					1" Ice	1.8071	1.8071	0.04
					2" Ice	2.4580	2.4580	0.08
					4" Ice	3.9194	3.9194	0.20
2.375" OD x 5' Mount Pipe	B	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	1.1875	1.1875	0.02
					1/2" Ice	1.4956	1.4956	0.03
					1" Ice	1.8071	1.8071	0.04
					2" Ice	2.4580	2.4580	0.08
					4" Ice	3.9194	3.9194	0.20
2.375" OD x 5' Mount Pipe	C	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	1.1875	1.1875	0.02
					1/2" Ice	1.4956	1.4956	0.03
					1" Ice	1.8071	1.8071	0.04
					2" Ice	2.4580	2.4580	0.08
					4" Ice	3.9194	3.9194	0.20
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	8.4975	6.9458	0.08
					1/2" Ice	9.1490	8.1266	0.15
					1" Ice	9.7672	9.0212	0.22
					2" Ice	11.0311	10.8440	0.41
					4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.0000 0.00 1.00	120.0000	No Ice	8.4975	6.9458	0.08
					1/2" Ice	9.1490	8.1266	0.15
					1" Ice	9.7672	9.0212	0.22
					2" Ice	11.0311	10.8440	0.41
					4" Ice	13.6786	14.8507	0.91

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
						4" Ice			
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.9458 8.1266 9.0212 10.8440 14.8507	0.08 0.15 0.22 0.41 0.91
Platform Mount [LP 712-1]	C	None		0.0000	120.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	24.5300 29.9400 35.3500 46.1700 67.8100	24.5300 29.9400 35.3500 46.1700 67.8100	1.34 1.65 1.96 2.58 3.82
**									
800MHz 2X50W RRH W/FILTER	A	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	B	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
800MHz 2X50W RRH W/FILTER	C	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.4014 2.6131 2.8335 3.3002 4.3372	2.2536 2.4602 2.6753 3.1316 4.1479	0.06 0.09 0.11 0.17 0.34
PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.7087 2.9477 3.1953 3.7164 4.8623	2.6111 2.8475 3.0925 3.6084 4.7439	0.06 0.08 0.11 0.17 0.35
Side Arm Mount [SO 102-1]	C	None		0.0000	118.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.5000 1.7400 1.9800 2.4600 3.4200	1.5000 1.7500 2.0000 2.5000 3.5000	0.03 0.04 0.04 0.07 0.11
**									
(4) DB844H90E-XY w/Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	112.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.5792 4.2014 4.7281 5.8573 8.2671	5.3958 6.4912 7.3017 8.9600 12.4914	0.04 0.08 0.13 0.25 0.62
(4) DB844H90E-XY w/Mount Pipe	B	From Face	4.0000 0.00	0.0000	112.0000	No Ice 1/2"	3.5792 4.2014	5.3958 6.4912	0.04 0.08

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			Ice	4.7281	7.3017	0.13
						1" Ice	5.8573	8.9600	0.25
						2" Ice	8.2671	12.4914	0.62
						4" Ice			
(4) DB844H90E-XY w/Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	112.0000	No Ice	3.5792	5.3958	0.04
						1/2" Ice	4.2014	6.4912	0.08
						Ice	4.7281	7.3017	0.13
						1" Ice	5.8573	8.9600	0.25
						2" Ice	8.2671	12.4914	0.62
						4" Ice			
Platform Mount [LP 713-1]	C	None		0.0000	112.0000	No Ice	31.2700	31.2700	1.51
						1/2" Ice	39.6800	39.6800	1.93
						Ice	48.0900	48.0900	2.35
						1" Ice	64.9100	64.9100	3.19
						2" Ice	98.5500	98.5500	4.86
						4" Ice			
***									
APX16DWV-16DWV-S-E-A20 w/ mount pipe	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	7.4657	3.4938	0.06
						1/2" Ice	7.9944	4.2631	0.11
						Ice	8.5176	4.9598	0.16
						1" Ice	9.5949	6.4031	0.30
						2" Ice	11.8728	9.4897	0.68
						4" Ice			
APX16DWV-16DWV-S-E-A20 w/ mount pipe	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	7.4657	3.4938	0.06
						1/2" Ice	7.9944	4.2631	0.11
						Ice	8.5176	4.9598	0.16
						1" Ice	9.5949	6.4031	0.30
						2" Ice	11.8728	9.4897	0.68
						4" Ice			
APX16DWV-16DWV-S-E-A20 w/ mount pipe	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	7.4657	3.4938	0.06
						1/2" Ice	7.9944	4.2631	0.11
						Ice	8.5176	4.9598	0.16
						1" Ice	9.5949	6.4031	0.30
						2" Ice	11.8728	9.4897	0.68
						4" Ice			
ATMAA1412D-1A20	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	1.1667	0.4667	0.01
						1/2" Ice	1.3136	0.5747	0.02
						Ice	1.4691	0.6914	0.03
						1" Ice	1.8062	0.9506	0.06
						2" Ice	2.5840	1.5728	0.14
						4" Ice			
ATMAA1412D-1A20	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	1.1667	0.4667	0.01
						1/2" Ice	1.3136	0.5747	0.02
						Ice	1.4691	0.6914	0.03
						1" Ice	1.8062	0.9506	0.06
						2" Ice	2.5840	1.5728	0.14
						4" Ice			
ATMAA1412D-1A20	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	1.1667	0.4667	0.01
						1/2" Ice	1.3136	0.5747	0.02
						Ice	1.4691	0.6914	0.03
						1" Ice	1.8062	0.9506	0.06
						2" Ice	2.5840	1.5728	0.14
						4" Ice			
ATMPP1412D-1CWA	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	1.1672	0.4159	0.01
						1/2" Ice	1.3174	0.5298	0.02
						Ice	1.4762	0.6523	0.03
						1" Ice	1.8197	0.9232	0.05
						2" Ice	2.6105	1.5688	0.13
						4" Ice			
ATMPP1412D-1CWA	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice	1.1672	0.4159	0.01
						1/2" Ice	1.3174	0.5298	0.02
						Ice	1.4762	0.6523	0.03
						1" Ice	1.8197	0.9232	0.05
						2" Ice	2.6105	1.5688	0.13
						4" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
ATMPP1412D-1CWA	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1672 1.3174 1.4762 1.8197 2.6105	0.4159 0.5298 0.6523 0.9232 1.5688	0.01 0.02 0.03 0.05 0.13
RR65-18-02DP w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
RR65-18-02DP w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
RR65-18-02DP w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
T-Arm Mount [TA 602-3]	C	None		0.0000	100.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	11.5900 15.4400 19.2900 26.9900 42.3900	11.5900 15.4400 19.2900 26.9900 42.3900	0.77 0.99 1.21 1.64 2.50
***									
(2) APL866513-42T0 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	4.5308 4.9675 5.4135 6.3370 8.3197	4.9208 5.5962 6.2837 7.7123 10.8330	0.03 0.08 0.13 0.25 0.60
(2) APL866513-42T0 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	4.5308 4.9675 5.4135 6.3370 8.3197	4.9208 5.5962 6.2837 7.7123 10.8330	0.03 0.08 0.13 0.25 0.60
(2) APL868013-42T0 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	2.8667 3.1769 3.5173 4.2691 5.8765	3.7333 4.1006 4.4765 5.2543 6.9136	0.02 0.05 0.07 0.15 0.35
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	5.3988 5.8435 6.2986 7.2405 9.2612	3.6927 4.2947 4.9133 6.2583 9.2851	0.03 0.07 0.12 0.23 0.58
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice 2" Ice 4" Ice	5.3988 5.8435 6.2986 7.2405 9.2612	3.6927 4.2947 4.9133 6.2583 9.2851	0.03 0.07 0.12 0.23 0.58
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice 1/2" Ice Ice 1" Ice	5.3988 5.8435 6.2986 7.2405	3.6927 4.2947 4.9133 6.2583	0.03 0.07 0.12 0.23

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
							2" Ice	9.2612	9.2851	0.58
							4" Ice			
BXA-171063-8BF-2 w/ Mount Pipe	A	From Face	4.0000	0.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
				1.00			1/2" Ice	3.5550	3.9709	0.06
								3.9637	4.5951	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
BXA-171063-8BF-2 w/ Mount Pipe	B	From Face	4.0000	0.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
				1.00			1/2" Ice	3.5550	3.9709	0.06
								3.9637	4.5951	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Face	4.0000	0.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
				1.00			1/2" Ice	3.5550	3.9709	0.06
								3.9637	4.5951	0.10
							1" Ice	4.8533	5.8933	0.19
							2" Ice	6.7671	8.8855	0.49
							4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.0000	0.00	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
				1.00			1/2" Ice	0.4506	0.1362	0.01
								0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2808	0.7396	0.06
							4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.0000	0.00	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
				1.00			1/2" Ice	0.4506	0.1362	0.01
								0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2808	0.7396	0.06
							4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.00	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
				1.00			1/2" Ice	0.4506	0.1362	0.01
								0.5433	0.1965	0.01
							1" Ice	0.7546	0.3430	0.02
							2" Ice	1.2808	0.7396	0.06
							4" Ice			
Platform Mount [LP 712-1]	C	None			0.0000	93.0000	No Ice	24.5300	24.5300	1.34
							1/2" Ice	29.9400	29.9400	1.65
								35.3500	35.3500	1.96
							1" Ice	46.1700	46.1700	2.58
							2" Ice	67.8100	67.8100	3.82
							4" Ice			
***										
APXV18-206517S-C w/ Mount Pipe	A	From Face	1.0000	0.00	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
				0.00			1/2" Ice	5.9597	5.8600	0.09
								6.4808	6.7338	0.15
							1" Ice	7.5467	8.5150	0.28
							2" Ice	9.9193	12.2774	0.68
							4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Face	1.0000	0.00	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
				0.00			1/2" Ice	5.9597	5.8600	0.09
								6.4808	6.7338	0.15
							1" Ice	7.5467	8.5150	0.28
							2" Ice	9.9193	12.2774	0.68
							4" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Face	1.0000	0.00	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
				0.00			1/2" Ice	5.9597	5.8600	0.09
								6.4808	6.7338	0.15
							1" Ice	7.5467	8.5150	0.28
							2" Ice	9.9193	12.2774	0.68
							4" Ice			
Pipe Mount [PM 601-3]	C	None			0.0000	75.0000	No Ice	4.3900	4.3900	0.20
							1/2" Ice	5.4800	5.4800	0.24

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice	13.1100	13.1100	0.53
						4" Ice			
***									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.4975 9.1490 9.7672 11.0311 13.6786	6.3042 7.4790 8.3676 10.1785 14.0237	0.07 0.14 0.21 0.38 0.87
(2) RRUS-11	C	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(2) RRUS-11	B	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(2) RRUS-11	A	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
DC6-48-60-18-8F	A	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
(2) P65-15-XLH-RR w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) TT19-08BP111-001	A	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	B	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	C	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
T-Arm Mount [TA 702-3]	C	None		0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6400 6.5500 7.4600 9.2800 12.9200	5.6400 6.5500 7.4600 9.2800 12.9200	0.34 0.43 0.52 0.70 1.06
***									
KS24019-L112A	C	From Face	2.0000 0.00 1.00	0.0000	50.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.1556 0.2247 0.3025 0.4840 0.9506	0.1556 0.2247 0.3025 0.4840 0.9506	0.01 0.01 0.01 0.02 0.06
Side Arm Mount [SO 702-1]	C	None		0.0000	50.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.0000 1.0000 1.0000 1.0000 1.0000	1.4300 2.0500 2.6700 3.9100 6.3900	0.03 0.04 0.05 0.07 0.12

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg % 	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 123.0000-82.2500	102.0855	1.381	22.58	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	5.813
L2 82.2500-57.7500	69.7462	1.238	20.29	60.387	A	0.000	60.387	60.387	100.00	0.000	0.000
					B	0.000	60.387		100.00	0.000	0.000
					C	0.000	60.387		100.00	0.000	6.384
L3 57.7500-40.7500	49.1395	1.12	18.36	46.312	A	0.000	46.312	46.312	100.00	0.000	0.000
					B	0.000	46.312		100.00	0.000	0.000
					C	0.000	46.312		100.00	0.000	10.325
L4 40.7500-29.7500	35.1980	1.019	16.69	31.303	A	0.000	31.303	31.303	100.00	0.000	0.000
					B	0.000	31.303		100.00	0.000	0.000
					C	0.000	31.303		100.00	0.000	6.681
L5 29.7500-	14.5787	1	16.38	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
0.0000					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	18.068

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 123.0000-82.2500	102.0855	1.381	4.99	1.1451	92.867	A	0.000	92.867	92.867	100.00	0.000	0.000
						B	0.000	92.867		100.00	0.000	0.000
						C	0.000	92.867		100.00	0.000	14.459
L2 82.2500-57.7500	69.7462	1.238	4.48	1.0940	65.063	A	0.000	65.063	65.063	100.00	0.000	0.000
						B	0.000	65.063		100.00	0.000	0.000
						C	0.000	65.063		100.00	0.000	14.101
L3 57.7500-40.7500	49.1395	1.12	4.06	1.0489	49.284	A	0.000	49.284	49.284	100.00	0.000	0.000
						B	0.000	49.284		100.00	0.000	0.000
						C	0.000	49.284		100.00	0.000	21.420
L4 40.7500-29.7500	35.1980	1.019	3.69	1.0078	33.226	A	0.000	33.226	33.226	100.00	0.000	0.000
						B	0.000	33.226		100.00	0.000	0.000
						C	0.000	33.226		100.00	0.000	13.860
L5 29.7500-0.0000	14.5787	1	3.62	1.0000	97.551	A	0.000	97.551	97.551	100.00	0.000	0.000
						B	0.000	97.551		100.00	0.000	0.000
						C	0.000	97.551		100.00	0.000	36.580

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 123.0000-82.2500	102.0855	1.381	8.82	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	5.813
L2 82.2500-57.7500	69.7462	1.238	7.93	60.387	A	0.000	60.387	60.387	100.00	0.000	0.000
					B	0.000	60.387		100.00	0.000	0.000
					C	0.000	60.387		100.00	0.000	6.384
L3 57.7500-40.7500	49.1395	1.12	7.17	46.312	A	0.000	46.312	46.312	100.00	0.000	0.000
					B	0.000	46.312		100.00	0.000	0.000
					C	0.000	46.312		100.00	0.000	10.325
L4 40.7500-29.7500	35.1980	1.019	6.52	31.303	A	0.000	31.303	31.303	100.00	0.000	0.000
					B	0.000	31.303		100.00	0.000	0.000
					C	0.000	31.303		100.00	0.000	6.681
L5 29.7500-0.0000	14.5787	1	6.40	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000
					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	18.068

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	29.768	36	2.0509	0.0016

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	85.75 - 57.75	14.651	36	1.6716	0.0013
L3	57.75 - 40.75	6.501	36	1.0351	0.0006
L4	45 - 29.75	4.025	36	0.8155	0.0004
L5	29.75 - 0	1.771	36	0.5653	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	3/4" x 8 ft lightning rod	36	29.768	2.0509	0.0016	21715
120.0000	(2) DB980H65T2E-M w/Mount Pipe	36	28.474	2.0336	0.0016	21715
118.0000	800MHz 2X50W RRH W/FILTER	36	27.613	2.0219	0.0016	21715
112.0000	(4) DB844H90E-XY w/Mount Pipe	36	25.047	1.9836	0.0016	9870
100.0000	APX16DWV-16DWV-S-E-A20 w/ mount pipe	36	20.070	1.8801	0.0015	4720
93.0000	(2) APL866513-42T0 w/ Mount Pipe	36	17.323	1.7924	0.0014	3618
75.0000	APXV18-206517S-C w/ Mount Pipe	36	11.087	1.4351	0.0010	2611
65.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	36	8.247	1.1940	0.0008	2381
50.0000	KS24019-L112A	36	4.925	0.8959	0.0005	3461

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	75.952	11	5.2350	0.0040
L2	85.75 - 57.75	37.403	11	4.2679	0.0033
L3	57.75 - 40.75	16.604	11	2.6437	0.0016
L4	45 - 29.75	10.282	11	2.0830	0.0011
L5	29.75 - 0	4.524	11	1.4442	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	3/4" x 8 ft lightning rod	11	75.952	5.2350	0.0040	8628
120.0000	(2) DB980H65T2E-M w/Mount Pipe	11	72.653	5.1910	0.0040	8628
118.0000	800MHz 2X50W RRH W/FILTER	11	70.458	5.1610	0.0040	8628
112.0000	(4) DB844H90E-XY w/Mount Pipe	11	63.914	5.0635	0.0040	3921
100.0000	APX16DWV-16DWV-S-E-A20 w/ mount pipe	11	51.223	4.7996	0.0038	1873
93.0000	(2) APL866513-42T0 w/ Mount Pipe	11	44.219	4.5759	0.0036	1434
75.0000	APXV18-206517S-C w/ Mount Pipe	11	28.309	3.6644	0.0026	1031
65.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	11	21.061	3.0492	0.0020	938
50.0000	KS24019-L112A	11	12.579	2.2883	0.0012	1360

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	40.7500	0.0000	0.0	36.000	16.3072	-8.38	587.06	0.014
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	28.0000	0.0000	0.0	39.000	24.7296	-13.55	964.45	0.014
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	17.0000	0.0000	0.0	28.848	46.7089	-16.27	1347.46	0.012
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	15.2500	0.0000	0.0	28.908	51.4928	-20.40	1488.55	0.014
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871 H1-3+VT (1.35 CR) - 5	29.7500	0.0000	0.0	31.122	60.4435	-28.02	1881.12	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	320.02	34.793	36.000	0.966	0.00	0.000	36.000	0.000
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	778.94	49.158	39.000	1.260	0.00	0.000	39.000	0.000
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	1032.47	32.879	28.848	1.140	0.00	0.000	28.848	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	1351.10	37.034	28.908	1.281	0.00	0.000	28.908	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871	2011.38	41.585	31.122	1.336	0.00	0.000	31.122	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	14.36	0.881	24.000	0.073	0.43	0.023	24.000	0.001
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	19.42	0.785	26.000	0.060	0.53	0.016	26.000	0.001
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	20.35	0.436	19.232	0.045	0.49	0.008	19.232	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	21.36	0.415	19.272	0.043	0.46	0.006	19.272	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871	23.01	0.381	20.748	0.037	0.39	0.004	20.748	0.000

Pole Interaction Design Data

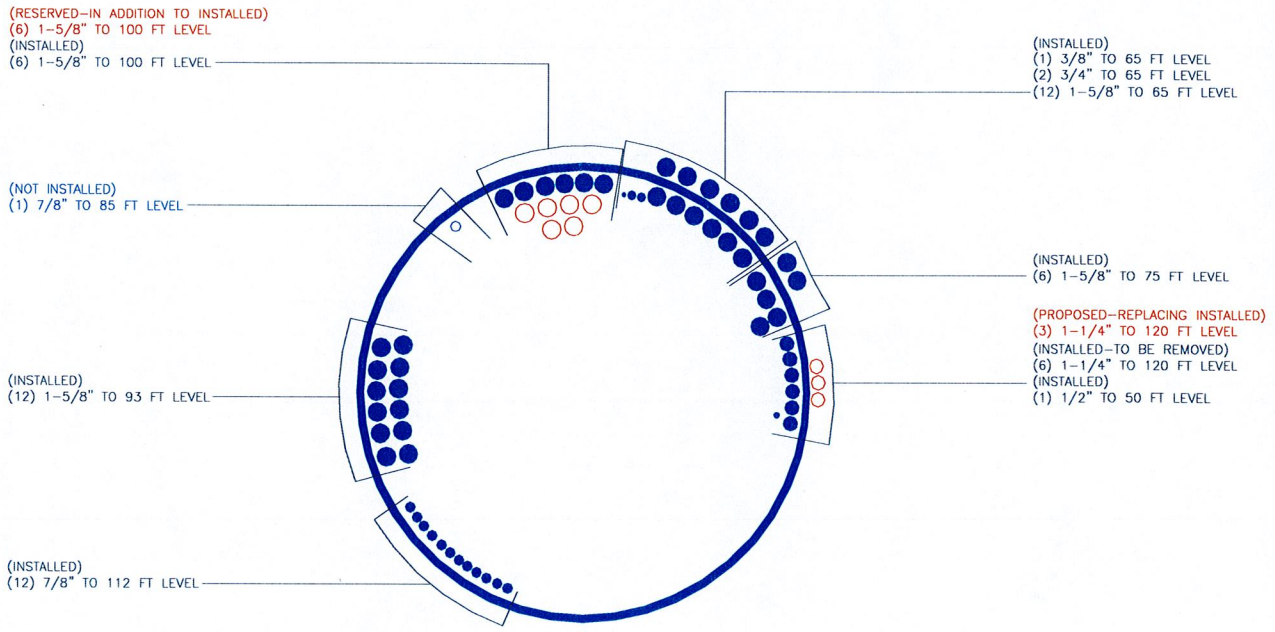
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	123 - 82.25 (1)	0.014	0.966	0.000	0.073	0.001	0.982 ✔	1.333	H1-3+VT ✔
L2	82.25 - 57.75 (2)	0.014	1.260	0.000	0.060	0.001	1.275 ✔	1.333	H1-3+VT ✔
L3	57.75 - 40.75 (3)	0.012	1.140	0.000	0.045	0.000	1.152 ✔	1.333	H1-3+VT ✔
L4	40.75 - 29.75 (4)	0.014	1.281	0.000	0.043	0.000	1.295 ✔	1.333	H1-3+VT ✔
L5	29.75 - 0 (5)	0.015	1.336	0.000	0.037	0.000	**1.351** ✘	1.333	H1-3+VT ✘

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.38	782.55	73.7	Pass
L2	82.25 - 57.75	Pole	TP31.4152x27.2139x0.25	2	-13.55	1285.62	95.7	Pass
L3	57.75 - 40.75	Pole	TP33.966x31.4152x0.4476	3	-16.27	1796.16	86.4	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.4332x0.4682	4	-20.40	1984.24	97.2	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.4871	5	-28.02	2507.53	101.4	Fail ✘
							Summary	
						Pole (L5)	101.4	Fail ✘
						RATING =	**101.4**	**Fail** ✘

APPENDIX B

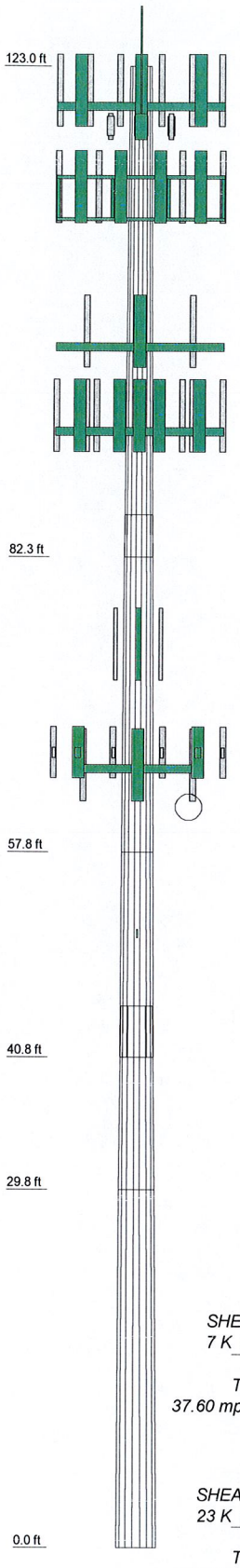
BASE LEVEL DRAWING

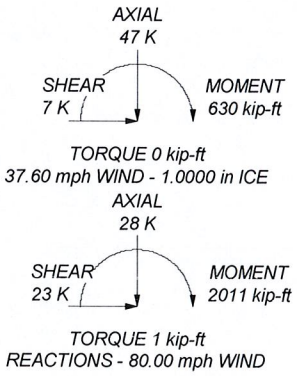


APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5
Length (ft)	40.7500	28.0000	17.0000	15.2500	29.7500
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.4476	0.4682	0.4871
Socket Length (ft)	3.5000		4.2500		
Top Dia (in)	22.0000	27.2139	31.4152	32.4332	35.1164
Bot Dia (in)	28.1140	31.4152	33.9660	35.1164	39.5800
Grade	A607-60		A607-65	Reinf 48.08 ksi	Reinf 48.18 ksi / Reinf 51.87 ksi
Weight (K)	2.1	2.2	2.6	2.6	5.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3/4" x 8 ft lightning rod	123	(2) APL866513-42T0 w/ Mount Pipe	93
(2) DB980H65T2E-M w/Mount Pipe	120	(2) APL868013-42T0 w/ Mount Pipe	93
(2) DB980H65T2E-M w/Mount Pipe	120	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
(2) DB980H65T2E-M w/Mount Pipe	120		
2.375" OD x 5' Mount Pipe	120	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
2.375" OD x 5' Mount Pipe	120		
2.375" OD x 5' Mount Pipe	120	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
APXVSPP18-C-A20 w/ Mount Pipe	120		
APXVSPP18-C-A20 w/ Mount Pipe	120	BXA-171063-8BF-2 w/ Mount Pipe	93
APXVSPP18-C-A20 w/ Mount Pipe	120	BXA-171063-8BF-2 w/ Mount Pipe	93
Platform Mount [LP 712-1]	120	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	93
800MHz 2X50W RRH W/FILTER	118	(2) FD9R6004/2C-3L	93
800MHz 2X50W RRH W/FILTER	118	(2) FD9R6004/2C-3L	93
800MHz 2X50W RRH W/FILTER	118	(2) FD9R6004/2C-3L	93
PCS 1900MHz 4x45W-65MHz	118	Platform Mount [LP 712-1]	93
PCS 1900MHz 4x45W-65MHz	118	APXV18-206517S-C w/ Mount Pipe	75
PCS 1900MHz 4x45W-65MHz	118	APXV18-206517S-C w/ Mount Pipe	75
Side Arm Mount [SO 102-1]	118	APXV18-206517S-C w/ Mount Pipe	75
(4) DB844H90E-XY w/Mount Pipe	112	Pipe Mount [PM 601-3]	75
(4) DB844H90E-XY w/Mount Pipe	112	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
(4) DB844H90E-XY w/Mount Pipe	112		
Platform Mount [LP 713-1]	112	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100		
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100	(2) RRUS-11	65
ATMAA1412D-1A20	100	(2) RRUS-11	65
ATMAA1412D-1A20	100	(2) RRUS-11	65
ATMAA1412D-1A20	100	DC6-48-60-18-8F	65
ATMPP1412D-1CWA	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
ATMPP1412D-1CWA	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
ATMPP1412D-1CWA	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
RR65-18-02DP w/ Mount Pipe	100	(2) TT19-08BP111-001	65
RR65-18-02DP w/ Mount Pipe	100	(2) TT19-08BP111-001	65
RR65-18-02DP w/ Mount Pipe	100	(2) TT19-08BP111-001	65
T-Arm Mount [TA 602-3]	100	T-Arm Mount [TA 702-3]	65
(2) APL866513-42T0 w/ Mount Pipe	93	KS24019-L112A	50
		Side Arm Mount [SO 702-1]	50

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 48.18 ksi	48 ksi	61 ksi
A607-65	65 ksi	80 ksi	Reinf 51.87 ksi	52 ksi	65 ksi
Reinf 48.08 ksi	48 ksi	61 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 101.4%

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
Phone: (614) 221-6679
FAX: (614) 448-4118

Job: *Ex. 123-ft Monopole / Berlin/Laviana Orchard*		
Project: *BU#876382 / PJF# 37513-0616 BP*		
Client: Crown Castle	Drawn by: Kyle Thorpe	App'd:
Code: TIA/EIA-222-F	Date: 02/27/13	Scale: NTS
Path: G:\TOWER\375 Crown Castle\37513-0616 BU 876382\DWG\541161 BU 876382- R1\Revised\A37512-1129 R1 A_Revised.eri		Dwg No. E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

v4.1 - Effective 7-3-12

Date: 2/27/2013
PJF Project: 37512-1129 R1 A (Revised)
Client Ref. # BU 876382
Site Name: Berlin, CT
Description: 123' MP
Owner: CCI
Engineer: KAT

Asymmetric Anchor Rod Analysis

Moment =	2011	k-ft	TIA Ref.	F	Location =	Base Plate	
Axial =	28.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	23.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	12						

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	37.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
2	2.250	#18J A615 Gr 75	75	100	52.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
3	2.250	#18J A615 Gr 75	75	100	127.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
4	2.250	#18J A615 Gr 75	75	100	142.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
5	2.250	#18J A615 Gr 75	75	100	217.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
6	2.250	#18J A615 Gr 75	75	100	232.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
7	2.250	#18J A615 Gr 75	75	100	307.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
8	2.250	#18J A615 Gr 75	75	100	322.5	46.00	0.00	3.98	174.05	169.38	169.38	0.00	195.00	86.9%
9	2.250	#18J A615 Gr 75	75	100	0.0	47.25	0.00	3.98	178.72	174.05	174.05	0.00	195.00	89.3%
10	2.250	#18J A615 Gr 75	75	100	90.0	47.25	0.00	3.98	178.72	174.05	174.05	0.00	195.00	89.3%
11	2.250	#18J A615 Gr 75	75	100	180.0	47.25	0.00	3.98	178.72	174.05	174.05	0.00	195.00	89.3%
12	2.250	#18J A615 Gr 75	75	100	270.0	47.25	0.00	3.98	178.72	174.05	174.05	0.00	195.00	89.3%
								47.76						

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

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

Site Data

BU#: *876382*
Site Name: *Berlin/Laviana Orchard*
App #:

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	46	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	44	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	5	in

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

Pole Data		
Diam:	39.58	in
Thick:	0.2812	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1316.5	ft-kips
Unfactored Axial, P:	17.7	kips
Unfactored Shear, V:	15.3	kips

Reactions modified to account for additional anchor rods

Anchor Rod Results

TIA F --> Maximum Rod Tension	169.5 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	86.9% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	36.4 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	66.2% **Pass**

PL Ref. Data
Yield Line (in): 22.65
Max PL Length: 22.65

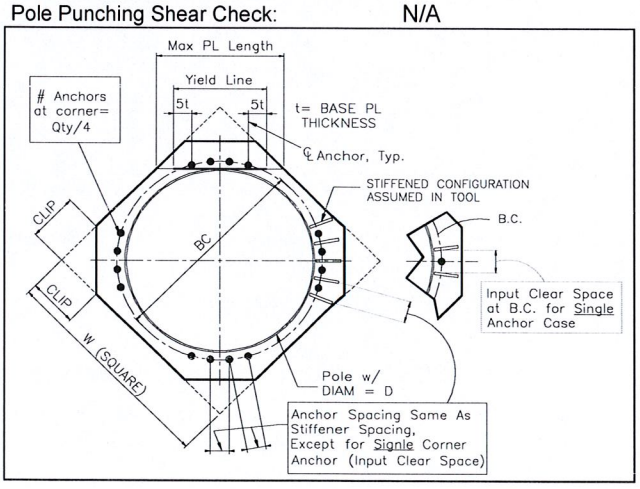
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

PAUL J. FORD AND COMPANY
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250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

Job Number:	37512-1129 R1 A (REVISED)	**Page:**	1
Site Number:	876382	**By:**	KAT
Site Name:	Berlin/Laviana Orchard	**Date:**	2/27/2013

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	2011.0		k-ft
Shear, V =	23.0		kips
Axial Load, P =	28.0		kips
OTM =	2022.5	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	6 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	20 ft
fc' =	3 ksi
εc =	0.003 in/in
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

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

Load Combinations Checked per TIA/EIA-222-F

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

Steel Parameters

Number of Bars =	16
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	15.00 ft
Depth to Ignore Soil =	3.33 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?	Ground

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

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	5	135		38	Sand				5
2	10	135		38	Sand		600		15
3	5	135		38	Sand	40000	600		20
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	14.37	ft, from Grade	
Bending Moment, M =	2353.03	k-ft, from COR	
Resisting Moment, Ma =	3532.02	k-ft, from COR	
MOMENT RATIO =	**66.6%**	**OK**	
Shear, V =	23.00	kips	
Resisting Shear, Va =	34.52	kips	
SHEAR RATIO =	**66.6%**	**OK**	

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	62.50	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, C =	28.00	kips
Allowable Comp. Cap., Ca =	639.71	kips
COMPRESSION RATIO =	**4.4%**	**OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	13.57	sq in
Actual Steel Area =	24.96	sq in
Allowable Min Axial, Pa =	-1036.80	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	4726.51	kips, Where Ma = 0 k-ft
Axial Load, P =	49.21	kips @ 4.50 ft Below Grade
Moment, M =	2117.34	k-ft @ 4.50 ft Below Grade
Allowable Moment, Ma =	2598.27	k-ft
MOMENT RATIO =	**81.5%**	**OK**

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

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

Site Data

BU#: *876382*
Site Name: *Berlin/Laviana Orchard*
App #:

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

Pier Properties

Concrete:

Pier Diameter =	6.0	ft
Concrete Area =	4071.5	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.11	ft
Vert. Cage Diameter =	61.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0061	0.61%

ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.61%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	6144.47	kips
at Mu=(ϕ=0.65)Mn=	3164.92	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Maximum Shaft Superimposed Forces

TIA Revision:	F	
Max. Service Shaft M:	2117.34	ft-kips **(* Note)**
Max. Service Shaft P:	49.21	kips
Max Axial Force Type:	Comp.	

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

Load Factor	**Shaft Factored Loads**		
1.30	Mu:	2752.542	ft-kips
1.30	Pu:	63.973	kips

Material Properties

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

ACI 318 Code

Select Analysis ACI Code= 2002

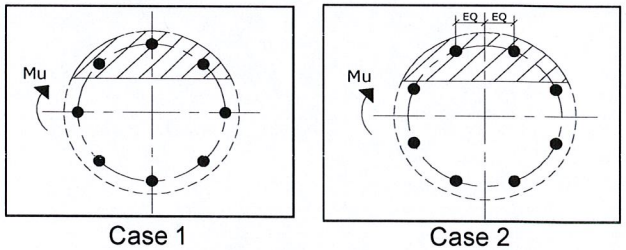
Seismic Properties

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

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

Results:

Governing Orientation Case: **2**



Case 1 Case 2

Dist. From Edge to Neutral Axis: **12.64** in
Extreme Steel Strain, εt: **0.0127**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	63.97	kips
Drilled Shaft Moment Capacity, φMn:	**3377.76**	ft-kips
Drilled Shaft Superimposed Mu:	**2752.54**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**81.5%**

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708

Date: **February 27, 2013**

Marianne Dunst
Crown Castle USA Inc.
3530 Toringdon Way Suite 300
Charlotte, NC 28277
(704) 405-6580

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
(614) 221-6679
kthorpe@pjfweb.com

Subject: **Structural Analysis Report**

Carrier Designation:	***Sprint PCS* Co-Locate – Final Loading**	
	Carrier Site Number:	CT33XC536
	Carrier Site Name:	CT33XC536
Crown Castle Designation:	**Crown Castle BU Number:**	876382
	Crown Castle Site Name:	BERLIN / LAVIANA ORCHARD
	Crown Castle JDE Job Number:	190532
	Crown Castle Work Order Number:	541161
	Crown Castle Application Number:	165641 Rev. 2
Engineering Firm Designation:	**Paul J. Ford and Company Project Number:**	37512-1129 R1 B **(Revised Model)**
Site Data:	**1684 Chamberlain Highway, BERLIN, Hartford County, CT** **Latitude *41° 35' 23.07"*, Longitude *-72° 48' 19.2"*** **123 Foot - Monopole Tower**	

Dear Marianne Dunst,

Paul J. Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 498128, in accordance with application 165641, revision 2.

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

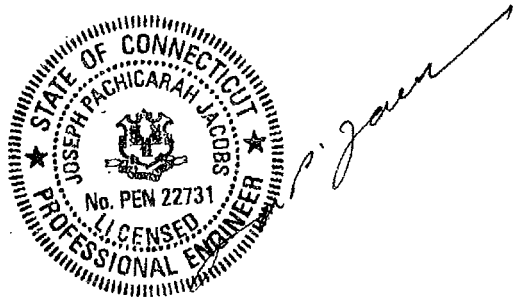
LC7: Existing + Reserved + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The structural analysis was performed for this tower in accordance with the requirements of the 2005 Connecticut Building Code and the TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

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

Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer



tnxTower Report - version 6.0.3.0

FEB 2 7 2013

PAUL J. FORD AND COMPANY
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Respectfully submitted by:

Kyle Thorpe, E.I.
Structural Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 123 ft Monopole tower designed by SUMMIT in July of 2000. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F. The tower has been modified per reinforcement drawings prepared by Vertical Solutions, in October of 2008. The reinforcement consists of shaft reinforcing from 0' to 59'-6" and (4) post installed anchor rods with brackets.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Notes
120.0	121.0	3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3 (E)	1-1/4	1
118.0	118.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-	1
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
		1	tower mounts	Side Arm Mount [SO 102-1]			

Notes:
1) Proposed equipment
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Notes
120.0	121.0	6	decibel	DB980H65T2E-M w/Mount Pipe	6 (I)	1-1/4	3
	120.0	1	tower mounts	Platform Mount [LP 712-1]	-	-	1
112.0	113.0	12	decibel	DB844H90E-XY w/Mount Pipe	12 (I)	7/8	1
	112.0	1	tower mounts	Platform Mount [LP 713-1]			
100.0	101.0	3	remec	S20057A1	-	-	3
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/ mount pipe	6 (I)	1-5/8	2
		3	rfs celwave	ATMAA1412D-1A20			
		3	rfs celwave	ATMPP1412D-1CWA			
		3	ems wireless	RR65-18-02DP w/ Mount Pipe	6 (I)	1-5/8	1
	100.0	1	tower mounts	T-Arm Mount [TA 602-3]			

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
93.0	94.0	2	antel	BXA-171063-8BF-2 w/ Mount Pipe	12 (I)	1-5/8	1
		1	antel	BXA-171085-8BF-EDIN-0 w/ Mount Pipe			
		3	antel	BXA-70063-4CF-EDIN-X w/ Mount Pipe			
		4	rfs celwave	APL866513-42T0 w/ Mount Pipe			
		2	rfs celwave	APL868013-42T0 w/ Mount Pipe			
		6	rfs celwave	FD9R6004/2C-3L			
	93.0	1	tower mounts	Platform Mount [LP 712-1]			
75.0	75.0	3	rfs celwave	APXV18-206517S-C w/ Mount Pipe	2 (E) 4 (I)	1-5/8 1-5/8	1
		1	tower mounts	Pipe Mount [PM 601-3]			
65.0	66.0	6	powerwave technologies	P65-15-XLH-RR w/ Mount Pipe	1 (I) 2 (I) 6 (I) 6 (E)	3/8 3/4 1-5/8 1-5/8	1
		6	powerwave technologies	TT19-08BP111-001			
	65.0	6	ericsson	RRUS-11			
		3	kmw communications	AM-X-CD-16-65-00T-RET w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	T-Arm Mount [TA 702-3]			
50.0	51.0	1	lucent	KS24019-L112A	1 (I)	1/2	1
	50.0	1	tower mounts	Side Arm Mount [SO 702-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed
(E) Coax to be mounted externally and exposed to the wind. See coax layout in Appendix B.
(I) Coax to be mounted internally and shielded from the wind. See coax layout in Appendix B.

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, 05/05/2000	1629353	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	PJF, 29200-0802, 06/06/2000	1629413	CCISITES
4-TOWER MANUFACTURER DRAWINGS	PJF, 29200-0802, 06/06/2000	1629384	CCISITES
4-POST MOD BPSA	Vertical Solutions, 080828.04, 12/11/2008	2611098	CCISITES

3.1) Analysis Method

tnxTower (version 6.0.3.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.22	782.55	65.4	Pass
L2	82.25 - 57.75	Pole	TP31.4152x27.2139x0.25	2	-13.23	1285.62	87.7	Pass
L3	57.75 - 40.75	Pole	TP33.966x31.4152x0.4476	3	-15.88	1796.16	79.9	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.4332x0.4682	4	-19.92	1984.24	90.4	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.4871	5	-27.36	2507.53	95.1	Pass
							Summary	
						Pole (L5)	95.1	Pass
						RATING =	95.1	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	0	83.7	Pass
1	Base Plate	0	62.2	Pass
1	Base Foundation Structural Steel	0	76.6	Pass
1,3	Base Foundation Soil Interaction	0	62.7	Pass
	Structure Rating (max from all components) =			95.1%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Worst case scenario between post-installed anchors and existing anchors.
3) According to the procedures prescribed and agreed to by the Crown Castle Engineering Foundation Committee, held in January 2010, the existing caisson foundation was analyzed using the methodology in the software 'PLS-Caisson' (Version 8.10, or newer, by Power Line Systems, Inc.). Per the methods in PLS-Caisson, the soil reactions of cohesive soils are calculated using 8CD independent of the depth of the soil layer. The depth of soil to be ignored at the top of the caisson is the greater of the geotechnical report's recommendation, the frost depth of the site or half of the caisson diameter.

4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the existing, reserved, and proposed loads. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

Tower is located in Hartford County, Connecticut.
Basic wind speed of 80.00 mph.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56.00 pcf.
A wind speed of 37.60 mph is used in combination with ice.
Deflections calculated using a wind speed of 50.00 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.333.
Local bending stresses due to climbing loads, feedline 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	
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		

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	123.0000-82.2500	40.7500	3.50	18	22.0000	28.1140	0.1875	0.7500	A607-60 (60 ksi)
L2	82.2500-57.7500	28.0000	0.00	18	27.2139	31.4152	0.2500	1.0000	A607-65 (65 ksi)
L3	57.7500-40.7500	17.0000	4.25	18	31.4152	33.9660	0.4476	1.7902	Reinf 48.08 ksi (48 ksi)
L4	40.7500-29.7500	15.2500	0.00	18	32.4332	35.1164	0.4682	1.8729	Reinf 48.18 ksi (48 ksi)
L5	29.7500-0.0000	29.7500		18	35.1164	39.5800	0.4871	1.9485	Reinf 51.87 ksi (52 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	22.3394	12.9812	780.3007	7.7434	11.1760	69.8193	1561.6281	6.4918	3.5420	18.891
	28.5477	16.6198	1637.5523	9.9139	14.2819	114.6592	3277.2593	8.3115	4.6181	24.63
L2	28.1670	21.3958	1965.3100	9.5722	13.8246	142.1599	3933.2059	10.6999	4.3496	17.399
	31.8998	24.7296	3034.5518	11.0636	15.9589	190.1476	6073.0965	12.3671	5.0891	20.356
L3	31.8998	43.9913	5329.9163	10.9935	15.9589	333.9771	10666.8458	21.9998	4.7414	10.594
	34.4900	47.6148	6758.4488	11.8990	17.2547	391.6868	13525.7906	23.8119	5.1903	11.597
L4	33.6928	47.5051	6132.3325	11.3476	16.4761	372.1966	12272.7341	23.7571	4.8842	10.431
	35.6581	51.4928	7809.8692	12.3001	17.8391	437.7945	15630.0149	25.7513	5.3564	11.44
L5	35.6581	53.5420	8111.8238	12.2934	17.8391	454.7210	16234.3213	26.7761	5.3231	10.928
	40.1906	60.4435	11670.2972	13.8780	20.1066	580.4201	23355.9504	30.2275	6.1087	12.54

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
L1 123.0000-82.2500				1	1	1		
L2 82.2500-57.7500				1	1	1		
L3 57.7500-40.7500				1	1	1		
L4 40.7500-29.7500				1	1	1		
L5 29.7500-0.0000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 0.0000	2	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.0000	1.08
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.18
						2" Ice	0.0000	9.73
						4" Ice	0.0000	28.15
HB114-1-08U4-M5J(1 1/4")	C	No	CaAa (Out Of Face)	120.0000 - 75.0000	1	No Ice	0.1540	1.08
						1/2" Ice	0.2540	2.33
						1" Ice	0.3540	4.18
						2" Ice	0.5540	9.73
						4" Ice	0.9540	28.15
***								
LDF5-50A(7/8")	C	No	Inside Pole	112.0000 - 0.0000	12	No Ice	0.0000	0.33
						1/2" Ice	0.0000	0.33
						1" Ice	0.0000	0.33
						2" Ice	0.0000	0.33
						4" Ice	0.0000	0.33
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
AL7-50(1 5/8)	C	No	Inside Pole	100.0000 - 0.0000	6	No Ice	0.0000	0.52
						1/2" Ice	0.0000	0.52
						1" Ice	0.0000	0.52
						2" Ice	0.0000	0.52
						4" Ice	0.0000	0.52
***								
LDF7-50A(1-5/8")	C	No	Inside Pole	93.0000 - 0.0000	12	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
***								
AVA7-50(1-5/8)	C	No	Inside Pole	75.0000 - 0.0000	4	No Ice	0.0000	0.70
						1/2" Ice	0.0000	0.70
						1" Ice	0.0000	0.70
						2" Ice	0.0000	0.70
						4" Ice	0.0000	0.70
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.0000	0.70
						1/2" Ice	0.0000	2.23
						1" Ice	0.0000	4.38
						2" Ice	0.0000	10.50
						4" Ice	0.0000	30.07
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	75.0000 - 0.0000	1	No Ice	0.2010	0.70
						1/2" Ice	0.3010	2.23
						1" Ice	0.4010	4.38
						2" Ice	0.6010	10.50
						4" Ice	1.0010	30.07
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	65.0000 - 0.0000	1	No Ice	0.1980	0.82
						1/2" Ice	0.2980	2.33
						1" Ice	0.3980	4.46
						2" Ice	0.5980	10.54
						4" Ice	0.9980	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	65.0000 - 0.0000	5	No Ice	0.0000	0.82
						1/2" Ice	0.0000	2.33
						1" Ice	0.0000	4.46
						2" Ice	0.0000	10.54
						4" Ice	0.0000	30.04
LDF7-50A(1-5/8")	C	No	Inside Pole	65.0000 - 0.0000	6	No Ice	0.0000	0.82
						1/2" Ice	0.0000	0.82
						1" Ice	0.0000	0.82
						2" Ice	0.0000	0.82
						4" Ice	0.0000	0.82
FB-L98B-002-75000(3/8")	C	No	Inside Pole	65.0000 - 0.0000	1	No Ice	0.0000	0.06
						1/2" Ice	0.0000	0.06
						1" Ice	0.0000	0.06
						2" Ice	0.0000	0.06
						4" Ice	0.0000	0.06
WR-VG86ST-BRD(3/4)	C	No	Inside Pole	65.0000 - 0.0000	2	No Ice	0.0000	0.59
						1/2" Ice	0.0000	0.59
						1" Ice	0.0000	0.59
						2" Ice	0.0000	0.59
						4" Ice	0.0000	0.59
***								
LDF4-50A(1/2")	C	No	Inside Pole	50.0000 - 0.0000	1	No Ice	0.0000	0.15
						1/2" Ice	0.0000	0.15
						1" Ice	0.0000	0.15
						2" Ice	0.0000	0.15
						4" Ice	0.0000	0.15
********** ********								
1 1/4" Flat Reinforcement	C	No	CaAa (Out Of Face)	59.5000 - 0.0000	1	No Ice	0.2083	0.00
						1/2" Ice	0.3194	0.00
						1" Ice	0.4306	0.00
						2" Ice	0.6528	0.00
						4" Ice	1.0972	0.00

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
3/4" x 8 ft lightning rod	C	None		0.0000	123.0000	No Ice	0.6000	0.6000	0.01
						1/2" Ice	1.4146	1.4146	0.02
						1" Ice	2.2458	2.2458	0.03
						2" Ice	3.6690	3.6690	0.07
						4" Ice	5.7417	5.7417	0.21
***									
2.375" OD x 5' Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	1.1875	1.1875	0.02
						1/2" Ice	1.4956	1.4956	0.03
						1" Ice	1.8071	1.8071	0.04
						2" Ice	2.4580	2.4580	0.08
						4" Ice	3.9194	3.9194	0.20
2.375" OD x 5' Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	1.1875	1.1875	0.02
						1/2" Ice	1.4956	1.4956	0.03
						1" Ice	1.8071	1.8071	0.04
						2" Ice	2.4580	2.4580	0.08
						4" Ice	3.9194	3.9194	0.20
2.375" OD x 5' Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	1.1875	1.1875	0.02
						1/2" Ice	1.4956	1.4956	0.03
						1" Ice	1.8071	1.8071	0.04
						2" Ice	2.4580	2.4580	0.08
						4" Ice	3.9194	3.9194	0.20
APXVSPP18-C-A20 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	120.0000	No Ice	8.4975	6.9458	0.08
						1/2" Ice	9.1490	8.1266	0.15
						1" Ice	9.7672	9.0212	0.22
						2" Ice	11.0311	10.8440	0.41
						4" Ice	13.6786	14.8507	0.91
Platform Mount [LP 712-1]	C	None		0.0000	120.0000	No Ice	24.5300	24.5300	1.34
						1/2" Ice	29.9400	29.9400	1.65
						1" Ice	35.3500	35.3500	1.96
						2" Ice	46.1700	46.1700	2.58
						4" Ice	67.8100	67.8100	3.82
**									
800MHz 2X50W RRH W/FILTER	A	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09
						1" Ice	2.8335	2.6753	0.11
						2" Ice	3.3002	3.1316	0.17
						4" Ice	4.3372	4.1479	0.34
800MHz 2X50W RRH W/FILTER	B	From Face	2.0000 0.00 0.00	0.0000	118.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09
						1" Ice	2.8335	2.6753	0.11
						2" Ice	3.3002	3.1316	0.17
						4" Ice	4.3372	4.1479	0.34
800MHz 2X50W RRH W/FILTER	C	From Face	2.0000 0.00	0.0000	118.0000	No Ice	2.4014	2.2536	0.06
						1/2" Ice	2.6131	2.4602	0.09

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
			0.00				Ice	2.8335	2.6753	0.11
							1" Ice	3.3002	3.1316	0.17
							2" Ice	4.3372	4.1479	0.34
							4" Ice			
PCS 1900MHz 4x45W-65MHz	A	From Face	2.0000		0.0000	118.0000	No Ice	2.7087	2.6111	0.06
			0.00				1/2"	2.9477	2.8475	0.08
			0.00				Ice	3.1953	3.0925	0.11
							1" Ice	3.7164	3.6084	0.17
							2" Ice	4.8623	4.7439	0.35
							4" Ice			
PCS 1900MHz 4x45W-65MHz	B	From Face	2.0000		0.0000	118.0000	No Ice	2.7087	2.6111	0.06
			0.00				1/2"	2.9477	2.8475	0.08
			0.00				Ice	3.1953	3.0925	0.11
							1" Ice	3.7164	3.6084	0.17
							2" Ice	4.8623	4.7439	0.35
							4" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Face	2.0000		0.0000	118.0000	No Ice	2.7087	2.6111	0.06
			0.00				1/2"	2.9477	2.8475	0.08
			0.00				Ice	3.1953	3.0925	0.11
							1" Ice	3.7164	3.6084	0.17
							2" Ice	4.8623	4.7439	0.35
							4" Ice			
Side Arm Mount [SO 102-1]	C	None			0.0000	118.0000	No Ice	1.5000	1.5000	0.03
							1/2"	1.7400	1.7500	0.04
							Ice	1.9800	2.0000	0.04
							1" Ice	2.4600	2.5000	0.07
							2" Ice	3.4200	3.5000	0.11
							4" Ice			
**										
(4) DB844H90E-XY w/Mount Pipe	A	From Face	4.0000		0.0000	112.0000	No Ice	3.5792	5.3958	0.04
			0.00				1/2"	4.2014	6.4912	0.08
			1.00				Ice	4.7281	7.3017	0.13
							1" Ice	5.8573	8.9600	0.25
							2" Ice	8.2671	12.4914	0.62
							4" Ice			
(4) DB844H90E-XY w/Mount Pipe	B	From Face	4.0000		0.0000	112.0000	No Ice	3.5792	5.3958	0.04
			0.00				1/2"	4.2014	6.4912	0.08
			1.00				Ice	4.7281	7.3017	0.13
							1" Ice	5.8573	8.9600	0.25
							2" Ice	8.2671	12.4914	0.62
							4" Ice			
(4) DB844H90E-XY w/Mount Pipe	C	From Face	4.0000		0.0000	112.0000	No Ice	3.5792	5.3958	0.04
			0.00				1/2"	4.2014	6.4912	0.08
			1.00				Ice	4.7281	7.3017	0.13
							1" Ice	5.8573	8.9600	0.25
							2" Ice	8.2671	12.4914	0.62
							4" Ice			
Platform Mount [LP 713-1]	C	None			0.0000	112.0000	No Ice	31.2700	31.2700	1.51
							1/2"	39.6800	39.6800	1.93
							Ice	48.0900	48.0900	2.35
							1" Ice	64.9100	64.9100	3.19
							2" Ice	98.5500	98.5500	4.86
							4" Ice			
***										
APX16DWV-16DWV-S-E-A20 w/ mount pipe	A	From Face	4.0000		0.0000	100.0000	No Ice	7.4657	3.4938	0.06
			0.00				1/2"	7.9944	4.2631	0.11
			1.00				Ice	8.5176	4.9598	0.16
							1" Ice	9.5949	6.4031	0.30
							2" Ice	11.8728	9.4897	0.68
							4" Ice			
APX16DWV-16DWV-S-E-A20 w/ mount pipe	B	From Face	4.0000		0.0000	100.0000	No Ice	7.4657	3.4938	0.06
			0.00				1/2"	7.9944	4.2631	0.11
			1.00				Ice	8.5176	4.9598	0.16
							1" Ice	9.5949	6.4031	0.30
							2" Ice	11.8728	9.4897	0.68

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
						4" Ice			
APX16DWV-16DWV-S-E-A20 w/ mount pipe	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.4657 7.9944 8.5176 9.5949 11.8728	3.4938 4.2631 4.9598 6.4031 9.4897	0.06 0.11 0.16 0.30 0.68
ATMAA1412D-1A20	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1667 1.3136 1.4691 1.8062 2.5840	0.4667 0.5747 0.6914 0.9506 1.5728	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1667 1.3136 1.4691 1.8062 2.5840	0.4667 0.5747 0.6914 0.9506 1.5728	0.01 0.02 0.03 0.06 0.14
ATMAA1412D-1A20	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1667 1.3136 1.4691 1.8062 2.5840	0.4667 0.5747 0.6914 0.9506 1.5728	0.01 0.02 0.03 0.06 0.14
ATMPP1412D-1CWA	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1672 1.3174 1.4762 1.8197 2.6105	0.4159 0.5298 0.6523 0.9232 1.5688	0.01 0.02 0.03 0.05 0.13
ATMPP1412D-1CWA	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1672 1.3174 1.4762 1.8197 2.6105	0.4159 0.5298 0.6523 0.9232 1.5688	0.01 0.02 0.03 0.05 0.13
ATMPP1412D-1CWA	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.1672 1.3174 1.4762 1.8197 2.6105	0.4159 0.5298 0.6523 0.9232 1.5688	0.01 0.02 0.03 0.05 0.13
RR65-18-02DP w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
RR65-18-02DP w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
RR65-18-02DP w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	100.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.5931 5.0883 5.5778 6.5876 8.7306	3.3194 4.0888 4.7844 6.2255 9.3076	0.03 0.07 0.11 0.22 0.56
T-Arm Mount [TA 602-3]	C	None		0.0000	100.0000	No Ice 1/2" Ice 1" Ice	11.5900 15.4400 19.2900 26.9900	11.5900 15.4400 19.2900 26.9900	0.77 0.99 1.21 1.64

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	42.3900	42.3900	2.50
						4" Ice			
***									
(2) APL866513-42T0 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	4.5308	4.9208	0.03
						1/2" Ice	4.9675	5.5962	0.08
							5.4135	6.2837	0.13
						1" Ice	6.3370	7.7123	0.25
						2" Ice	8.3197	10.8330	0.60
						4" Ice			
(2) APL866513-42T0 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	4.5308	4.9208	0.03
						1/2" Ice	4.9675	5.5962	0.08
							5.4135	6.2837	0.13
						1" Ice	6.3370	7.7123	0.25
						2" Ice	8.3197	10.8330	0.60
						4" Ice			
(2) APL868013-42T0 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	2.8667	3.7333	0.02
						1/2" Ice	3.1769	4.1006	0.05
							3.5173	4.4765	0.07
						1" Ice	4.2691	5.2543	0.15
						2" Ice	5.8765	6.9136	0.35
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	5.3988	3.6927	0.03
						1/2" Ice	5.8435	4.2947	0.07
							6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	5.3988	3.6927	0.03
						1/2" Ice	5.8435	4.2947	0.07
							6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-70063-4CF-EDIN-X w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	5.3988	3.6927	0.03
						1/2" Ice	5.8435	4.2947	0.07
							6.2986	4.9133	0.12
						1" Ice	7.2405	6.2583	0.23
						2" Ice	9.2612	9.2851	0.58
						4" Ice			
BXA-171063-8BF-2 w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
BXA-171063-8BF-2 w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
BXA-171085-8BF-EDIN-0 w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	3.1789	3.3530	0.03
						1/2" Ice	3.5550	3.9709	0.06
							3.9637	4.5951	0.10
						1" Ice	4.8533	5.8933	0.19
						2" Ice	6.7671	8.8855	0.49
						4" Ice			
(2) FD9R6004/2C-3L	A	From Face	4.0000 0.00 1.00	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	0.01
							0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	B	From Face	4.0000 0.00	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
						1/2" Ice	0.4506	0.1362	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
			1.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
(2) FD9R6004/2C-3L	C	From Face	4.0000	0.0000	93.0000	No Ice	0.3665	0.0846	0.00
			0.00			1/2"	0.4506	0.1362	0.01
			1.00			Ice	0.5433	0.1965	0.01
						1" Ice	0.7546	0.3430	0.02
						2" Ice	1.2808	0.7396	0.06
						4" Ice			
Platform Mount [LP 712-1]	C	None		0.0000	93.0000	No Ice	24.5300	24.5300	1.34
						1/2"	29.9400	29.9400	1.65
						Ice	35.3500	35.3500	1.96
						1" Ice	46.1700	46.1700	2.58
						2" Ice	67.8100	67.8100	3.82
						4" Ice			
***									
APXV18-206517S-C w/ Mount Pipe	A	From Face	1.0000	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.09
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	B	From Face	1.0000	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.09
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
APXV18-206517S-C w/ Mount Pipe	C	From Face	1.0000	0.0000	75.0000	No Ice	5.4042	4.7000	0.05
			0.00			1/2"	5.9597	5.8600	0.09
			0.00			Ice	6.4808	6.7338	0.15
						1" Ice	7.5467	8.5150	0.28
						2" Ice	9.9193	12.2774	0.68
						4" Ice			
Pipe Mount [PM 601-3]	C	None		0.0000	75.0000	No Ice	4.3900	4.3900	0.20
						1/2"	5.4800	5.4800	0.24
						Ice	6.5700	6.5700	0.28
						1" Ice	8.7500	8.7500	0.36
						2" Ice	13.1100	13.1100	0.53
						4" Ice			
***									
AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Face	4.0000	0.0000	65.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2"	9.1490	7.4790	0.14
			0.00			Ice	9.7672	8.3676	0.21
						1" Ice	11.0311	10.1785	0.38
						2" Ice	13.6786	14.0237	0.87
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	B	From Face	4.0000	0.0000	65.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2"	9.1490	7.4790	0.14
			0.00			Ice	9.7672	8.3676	0.21
						1" Ice	11.0311	10.1785	0.38
						2" Ice	13.6786	14.0237	0.87
						4" Ice			
AM-X-CD-16-65-00T-RET w/ Mount Pipe	C	From Face	4.0000	0.0000	65.0000	No Ice	8.4975	6.3042	0.07
			0.00			1/2"	9.1490	7.4790	0.14
			0.00			Ice	9.7672	8.3676	0.21
						1" Ice	11.0311	10.1785	0.38
						2" Ice	13.6786	14.0237	0.87
						4" Ice			
(2) RRUS-11	C	From Face	4.0000	0.0000	65.0000	No Ice	3.2486	1.3726	0.05
			0.00			1/2"	3.4905	1.5510	0.07
			0.00			Ice	3.7411	1.7380	0.09
						1" Ice	4.2682	2.1381	0.15
						2" Ice	5.4260	3.0418	0.31

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
						4" Ice			
(2) RRUS-11	B	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
(2) RRUS-11	A	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.2486 3.4905 3.7411 4.2682 5.4260	1.3726 1.5510 1.7380 2.1381 3.0418	0.05 0.07 0.09 0.15 0.31
DC6-48-60-18-8F	A	From Face	4.0000 0.00 0.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.4667 1.6667 1.8778 2.3333 3.3778	1.4667 1.6667 1.8778 2.3333 3.3778	0.02 0.04 0.06 0.11 0.24
(2) P65-15-XLH-RR w/ Mount Pipe	A	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe	B	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65
(2) P65-15-XLH-RR w/ Mount Pipe	C	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	6.0666 6.5095 6.9621 7.8961 9.8876	4.1885 4.8037 5.4357 6.8365 9.9536	0.06 0.10 0.16 0.29 0.65
(2) TT19-08BP111-001	A	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	B	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
(2) TT19-08BP111-001	C	From Face	4.0000 0.00 1.00	0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.6362 0.7474 0.8672 1.1328 1.7678	0.5156 0.6187 0.7304 0.9796 1.5819	0.02 0.02 0.03 0.05 0.12
T-Arm Mount [TA 702-3]	C	None		0.0000	65.0000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.6400 6.5500 7.4600 9.2800 12.9200	5.6400 6.5500 7.4600 9.2800 12.9200	0.34 0.43 0.52 0.70 1.06
***									
KS24019-L112A	C	From Face	2.0000 0.00 1.00	0.0000	50.0000	No Ice 1/2" Ice Ice	0.1556 0.2247 0.3025	0.1556 0.2247 0.3025	0.01 0.01 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
Side Arm Mount [SO 702-1]	C	None		0.0000	50.0000	1" Ice	0.4840	0.4840	0.02
						2" Ice	0.9506	0.9506	0.06
						4" Ice			
						No Ice	1.0000	1.4300	0.03
						1/2" Ice	1.0000	2.0500	0.04
						1" Ice	1.0000	2.6700	0.05
						2" Ice	1.0000	3.9100	0.07
						4" Ice	1.0000	6.3900	0.12

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 123.0000-82.2500	102.0855	1.381	22.58	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	5.813
L2 82.2500-57.7500	69.7462	1.238	20.29	60.387	A	0.000	60.387	60.387	100.00	0.000	0.000
					B	0.000	60.387		100.00	0.000	0.000
					C	0.000	60.387		100.00	0.000	6.384
L3 57.7500-40.7500	49.1395	1.12	18.36	46.312	A	0.000	46.312	46.312	100.00	0.000	0.000
					B	0.000	46.312		100.00	0.000	0.000
					C	0.000	46.312		100.00	0.000	10.325
L4 40.7500-29.7500	35.1980	1.019	16.69	31.303	A	0.000	31.303	31.303	100.00	0.000	0.000
					B	0.000	31.303		100.00	0.000	0.000
					C	0.000	31.303		100.00	0.000	6.681
L5 29.7500-0.0000	14.5787	1	16.38	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000
					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	18.068

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 123.0000-82.2500	102.0855	1.381	4.99	1.1451	92.867	A	0.000	92.867	92.867	100.00	0.000	0.000
						B	0.000	92.867		100.00	0.000	0.000
						C	0.000	92.867		100.00	0.000	14.459
L2 82.2500-57.7500	69.7462	1.238	4.48	1.0940	65.063	A	0.000	65.063	65.063	100.00	0.000	0.000
						B	0.000	65.063		100.00	0.000	0.000
						C	0.000	65.063		100.00	0.000	14.101
L3 57.7500-40.7500	49.1395	1.12	4.06	1.0489	49.284	A	0.000	49.284	49.284	100.00	0.000	0.000
						B	0.000	49.284		100.00	0.000	0.000
						C	0.000	49.284		100.00	0.000	21.420
L4 40.7500-29.7500	35.1980	1.019	3.69	1.0078	33.226	A	0.000	33.226	33.226	100.00	0.000	0.000
						B	0.000	33.226		100.00	0.000	0.000
						C	0.000	33.226		100.00	0.000	13.860
L5 29.7500-	14.5787	1	3.62	1.0000	97.551	A	0.000	97.551	97.551	100.00	0.000	0.000

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
0.0000						B	0.000	97.551		100.00	0.000	0.000
						C	0.000	97.551		100.00	0.000	36.580

Tower Pressure - Service

$G_H = 1.690$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 123.0000-82.2500	102.0855	1.381	8.82	85.089	A	0.000	85.089	85.089	100.00	0.000	0.000
					B	0.000	85.089		100.00	0.000	0.000
					C	0.000	85.089		100.00	0.000	5.813
L2 82.2500-57.7500	69.7462	1.238	7.93	60.387	A	0.000	60.387	60.387	100.00	0.000	0.000
					B	0.000	60.387		100.00	0.000	0.000
					C	0.000	60.387		100.00	0.000	6.384
L3 57.7500-40.7500	49.1395	1.12	7.17	46.312	A	0.000	46.312	46.312	100.00	0.000	0.000
					B	0.000	46.312		100.00	0.000	0.000
					C	0.000	46.312		100.00	0.000	10.325
L4 40.7500-29.7500	35.1980	1.019	6.52	31.303	A	0.000	31.303	31.303	100.00	0.000	0.000
					B	0.000	31.303		100.00	0.000	0.000
					C	0.000	31.303		100.00	0.000	6.681
L5 29.7500-0.0000	14.5787	1	6.40	92.592	A	0.000	92.592	92.592	100.00	0.000	0.000
					B	0.000	92.592		100.00	0.000	0.000
					C	0.000	92.592		100.00	0.000	18.068

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	27.377	36	1.8601	0.0016
L2	85.75 - 57.75	13.594	36	1.5375	0.0013
L3	57.75 - 40.75	6.064	36	0.9621	0.0006
L4	45 - 29.75	3.760	36	0.7601	0.0004
L5	29.75 - 0	1.657	36	0.5281	0.0003

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	3/4" x 8 ft lightning rod	36	27.377	1.8601	0.0016	24957
120.0000	2.375" OD x 5' Mount Pipe	36	26.200	1.8465	0.0016	24957
118.0000	800MHz 2X50W RRH W/FILTER	36	25.418	1.8372	0.0016	24957
112.0000	(4) DB844H90E-XY w/Mount Pipe	36	23.083	1.8067	0.0016	11343
100.0000	APX16DWV-16DWV-S-E-A20 w/ mount pipe	36	18.550	1.7202	0.0015	5424
93.0000	(2) APL866513-42T0 w/ Mount Pipe	36	16.042	1.6443	0.0014	4158
75.0000	APXV18-206517S-C w/ Mount Pipe	36	10.313	1.3253	0.0010	2925
65.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	36	7.685	1.1069	0.0008	2617
50.0000	KS24019-L112A	36	4.598	0.8343	0.0005	3761

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	123 - 82.25	69.878	11	4.7494	0.0040
L2	85.75 - 57.75	34.714	11	3.9267	0.0033
L3	57.75 - 40.75	15.491	11	2.4576	0.0016
L4	45 - 29.75	9.606	11	1.9418	0.0011
L5	29.75 - 0	4.233	11	1.3494	0.0007

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
123.0000	3/4" x 8 ft lightning rod	11	69.878	4.7494	0.0040	9889
120.0000	2.375" OD x 5' Mount Pipe	11	66.877	4.7149	0.0040	9889
118.0000	800MHz 2X50W RRH W/FILTER	11	64.879	4.6912	0.0040	9889
112.0000	(4) DB844H90E-XY w/Mount Pipe	11	58.925	4.6133	0.0040	4494
100.0000	APX16DWV-16DWV-S-E-A20 w/ mount pipe	11	47.359	4.3929	0.0038	2147
93.0000	(2) APL866513-42T0 w/ Mount Pipe	11	40.960	4.1990	0.0036	1645
75.0000	APXV18-206517S-C w/ Mount Pipe	11	26.339	3.3849	0.0026	1153
65.0000	AM-X-CD-16-65-00T-RET w/ Mount Pipe	11	19.630	2.8275	0.0020	1030
50.0000	KS24019-L112A	11	11.746	2.1313	0.0012	1477

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	40.7500	0.0000	0.0	36.000	16.3072	-8.22	587.06	0.014
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	28.0000	0.0000	0.0	39.000	24.7296	-13.23	964.45	0.014
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	17.0000	0.0000	0.0	28.848	46.7089	-15.88	1347.46	0.012
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	15.2500	0.0000	0.0	28.908	51.4928	-19.92	1488.55	0.013
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871	29.7500	0.0000	0.0	31.122	60.4435	-27.36	1881.12	0.015

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	283.69	30.843	36.000	0.857	0.00	0.000	36.000	0.000
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	713.28	45.014	39.000	1.154	0.00	0.000	39.000	0.000
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	953.57	30.366	28.848	1.053	0.00	0.000	28.848	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	1256.46	34.440	28.908	1.191	0.00	0.000	28.908	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871	1886.86	39.010	31.122	1.253	0.00	0.000	31.122	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	123 - 82.25 (1)	TP28.114x22x0.1875	13.31	0.816	24.000	0.068	0.43	0.023	24.000	0.001
L2	82.25 - 57.75 (2)	TP31.4152x27.2139x0.25	18.38	0.743	26.000	0.057	0.53	0.016	26.000	0.001
L3	57.75 - 40.75 (3)	TP33.966x31.4152x0.4476	19.32	0.414	19.232	0.043	0.49	0.008	19.232	0.000
L4	40.75 - 29.75 (4)	TP35.1164x32.4332x0.4682	20.33	0.395	19.272	0.041	0.46	0.006	19.272	0.000
L5	29.75 - 0 (5)	TP39.58x35.1164x0.4871	22.03	0.364	20.748	0.035	0.39	0.004	20.748	0.000

Pole Interaction Design Data

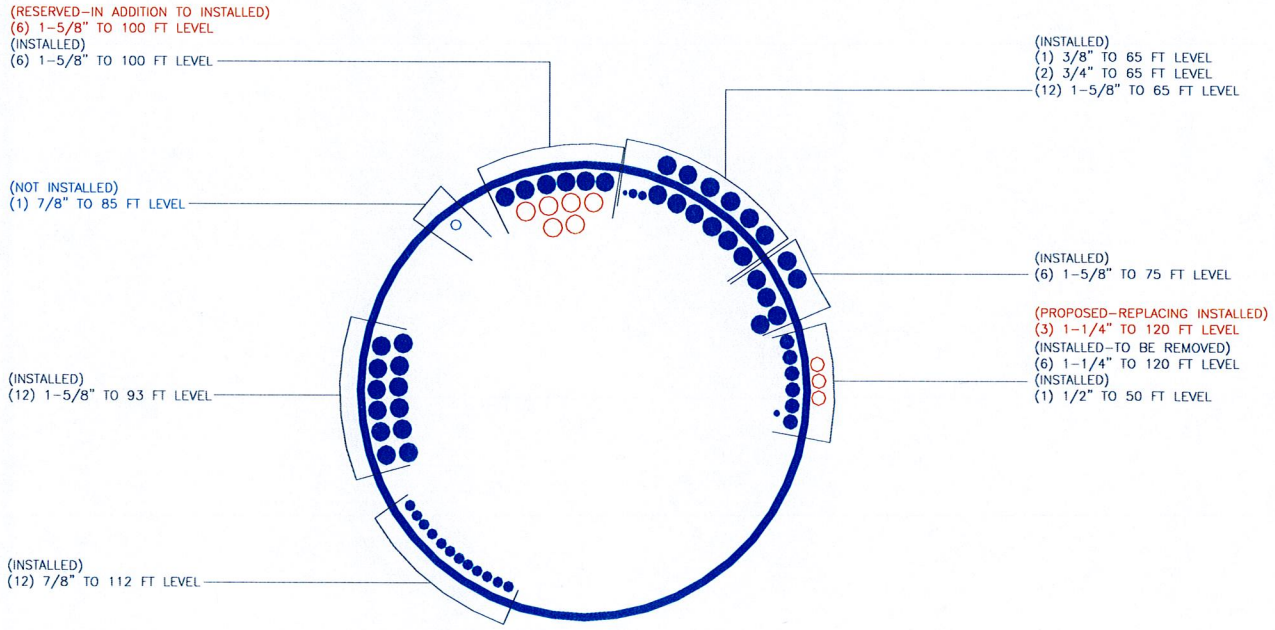
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	123 - 82.25 (1)	0.014	0.857	0.000	0.068	0.001	0.872 ✔	1.333	H1-3+VT ✔
L2	82.25 - 57.75 (2)	0.014	1.154	0.000	0.057	0.001	1.169 ✔	1.333	H1-3+VT ✔
L3	57.75 - 40.75 (3)	0.012	1.053	0.000	0.043	0.000	1.065 ✔	1.333	H1-3+VT ✔
L4	40.75 - 29.75 (4)	0.013	1.191	0.000	0.041	0.000	1.205 ✔	1.333	H1-3+VT ✔
L5	29.75 - 0 (5)	0.015	1.253	0.000	0.035	0.000	1.268 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	123 - 82.25	Pole	TP28.114x22x0.1875	1	-8.22	782.55	65.4	Pass
L2	82.25 - 57.75	Pole	TP31.4152x27.2139x0.25	2	-13.23	1285.62	87.7	Pass
L3	57.75 - 40.75	Pole	TP33.966x31.4152x0.4476	3	-15.88	1796.16	79.9	Pass
L4	40.75 - 29.75	Pole	TP35.1164x32.4332x0.4682	4	-19.92	1984.24	90.4	Pass
L5	29.75 - 0	Pole	TP39.58x35.1164x0.4871	5	-27.36	2507.53	95.1	Pass
						Summary		
						Pole (L5)	95.1	Pass
						RATING =	**95.1**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

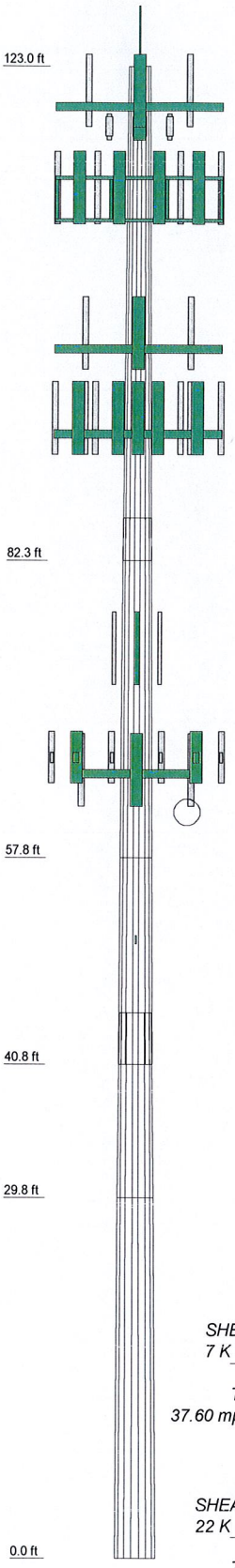


APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4	5
Length (ft)	40.7500	28.0000	17.0000	15.2500	29.7500
Number of Sides	18	18	18	18	18
Thickness (in)	0.1875	0.2500	0.4476	0.4682	0.4871
Socket Length (ft)	3.5000		4.2500		
Top Dia (in)	22.0000	27.2139	31.4152	32.4332	35.1164
Bot Dia (in)	28.1140	31.4152	33.9660	35.1164	39.5800
Grade	A607-60	A607-65	Reinf 48.08 ksi	Reinf 48.18 ksi	Reinf 51.87 ksi
Weight (K)	2.1	2.2	2.6	2.6	5.8

Total Weight (K) 15.2



AXIAL
46 K

SHEAR
7 K

MOMENT
588 kip-ft

TORQUE 0 kip-ft
37.60 mph WIND - 1.0000 in ICE

AXIAL
27 K

SHEAR
22 K

MOMENT
1887 kip-ft

TORQUE 1 kip-ft
REACTIONS - 80.00 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
3/4" x 8 ft lightning rod	123	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
2.375" OD x 5' Mount Pipe	120	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
2.375" OD x 5' Mount Pipe	120	BXA-70063-4CF-EDIN-X w/ Mount Pipe	93
2.375" OD x 5' Mount Pipe	120	BXA-171063-8BF-2 w/ Mount Pipe	93
APXVSPP18-C-A20 w/ Mount Pipe	120	BXA-171063-8BF-2 w/ Mount Pipe	93
APXVSPP18-C-A20 w/ Mount Pipe	120	BXA-171085-8BF-EDIN-0 w/ Mount Pipe	93
APXVSPP18-C-A20 w/ Mount Pipe	120	(2) FD9R6004/2C-3L	93
Platform Mount [LP 712-1]	120	(2) FD9R6004/2C-3L	93
800MHz 2X50W RRH W/FILTER	118	(2) FD9R6004/2C-3L	93
800MHz 2X50W RRH W/FILTER	118	Platform Mount [LP 712-1]	93
800MHz 2X50W RRH W/FILTER	118	APXV18-206517S-C w/ Mount Pipe	75
PCS 1900MHz 4x45W-65MHz	118	APXV18-206517S-C w/ Mount Pipe	75
PCS 1900MHz 4x45W-65MHz	118	APXV18-206517S-C w/ Mount Pipe	75
PCS 1900MHz 4x45W-65MHz	118	Pipe Mount [PM 601-3]	75
Side Arm Mount [SO 102-1]	118	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
(4) DB844H90E-XY w/Mount Pipe	112	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
(4) DB844H90E-XY w/Mount Pipe	112	AM-X-CD-16-65-00T-RET w/ Mount Pipe	65
(4) DB844H90E-XY w/Mount Pipe	112	(2) RRUS-11	65
Platform Mount [LP 713-1]	112	(2) RRUS-11	65
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100	(2) RRUS-11	65
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100	DC6-48-60-18-8F	65
APX16DWV-16DWV-S-E-A20 w/ mount pipe	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
ATMAA1412D-1A20	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
ATMAA1412D-1A20	100	(2) P65-15-XLH-RR w/ Mount Pipe	65
ATMAA1412D-1A20	100	(2) TT19-08BP111-001	65
ATMPP1412D-1CWA	100	(2) TT19-08BP111-001	65
ATMPP1412D-1CWA	100	(2) TT19-08BP111-001	65
ATMPP1412D-1CWA	100	T-Arm Mount [TA 702-3]	65
RR65-18-02DP w/ Mount Pipe	100	KS24019-L112A	50
RR65-18-02DP w/ Mount Pipe	100	Side Arm Mount [SO 702-1]	50
RR65-18-02DP w/ Mount Pipe	100		
T-Arm Mount [TA 602-3]	100		
(2) APL866513-42T0 w/ Mount Pipe	93		
(2) APL866513-42T0 w/ Mount Pipe	93		
(2) APL868013-42T0 w/ Mount Pipe	93		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-60	60 ksi	75 ksi	Reinf 48.18 ksi	48 ksi	61 ksi
A607-65	65 ksi	80 ksi	Reinf 51.87 ksi	52 ksi	65 ksi
Reinf 48.08 ksi	48 ksi	61 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80.00 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 37.60 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50.00 mph wind.
5. TOWER RATING: 95.1%

Paul J. Ford and Company
250 East Broad Street, Suite 1500
Columbus, Ohio 43215
Phone: (614) 221-6679
FAX: (614) 448-4118

Job:	***Ex. 123-ft Monopole / Berlin/Laviana Orchard***		
Project:	***BU#876382 / PJF# 37513-0616 BP***		
Client: Crown Castle	Drawn by: Kyle Thorpe	App'd:	
Code: TIA/EIA-222-F	Date: 02/27/13	Scale: NTS	
Path: G:\TOWER\375_Crown_Castle\2012\37512-1129 BU 876382\WO 541161 BU 876382 - R1\Revised\BU37512-1129 R1 B_Revised.eri		Dwg No. E-1	

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 1500 • Columbus, Ohio 43215-3708
Phone 614-221-6679 • Fax 614-448-4105 • www.PJFweb.com

v4.1 - Effective 7-3-12

Date: 2/27/2013
PJF Project: 37512-1129 R1 B (Revised)
Client Ref. # BU 876382
Site Name: Berlin, CT
Description: 123' MP
Owner: CCI
Engineer: KAT

Asymmetric Anchor Rod Analysis

Moment =	1887	k-ft	TIA Ref.	F	Location =	Base Plate	
Axial =	27.0	kips	ASIF =	1.3333	η =	N/A	for BP, Rev. G Sect. 4.9.9
Shear =	22.0	kips	Max Ratio =	100.0%	Threads =	N/A	for FP, Rev. G
Anchor Qty =	12						

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

Item	Nominal Anchor Dia, in	Spec	Fy, ksi	Fu, ksi	Location, degrees	Anchor Circle, in	Area Override, in^2	Area, in^2	Max Net Compression, kips	Max Net Tension, kips	Load for Capacity Calc, kips	Capacity Override, kips	Capacity, kips	Capacity Ratio
1	2.250	#18J A615 Gr 75	75	100	37.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
2	2.250	#18J A615 Gr 75	75	100	52.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
3	2.250	#18J A615 Gr 75	75	100	127.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
4	2.250	#18J A615 Gr 75	75	100	142.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
5	2.250	#18J A615 Gr 75	75	100	217.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
6	2.250	#18J A615 Gr 75	75	100	232.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
7	2.250	#18J A615 Gr 75	75	100	307.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
8	2.250	#18J A615 Gr 75	75	100	322.5	46.00	0.00	3.98	163.38	158.88	158.88	0.00	195.00	81.5%
9	2.250	#18J A615 Gr 75	75	100	0.0	47.25	0.00	3.98	167.76	163.26	163.26	0.00	195.00	83.7%
10	2.250	#18J A615 Gr 75	75	100	90.0	47.25	0.00	3.98	167.76	163.26	163.26	0.00	195.00	83.7%
11	2.250	#18J A615 Gr 75	75	100	180.0	47.25	0.00	3.98	167.76	163.26	163.26	0.00	195.00	83.7%
12	2.250	#18J A615 Gr 75	75	100	270.0	47.25	0.00	3.98	167.76	163.26	163.26	0.00	195.00	83.7%
								47.76						

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

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

Site Data

BU#: *876382*
Site Name: *Berlin/Laviana Orchard*
App #:

Anchor Rod Data		
Qty:	8	
Diam:	2.25	in
Rod Material:	A615-J	
Yield, Fy:	75	ksi
Strength, Fu:	100	ksi
Bolt Circle:	46	in
Anchor Spacing:	6	in

Plate Data		
W=Side:	44	in
Thick:	2.75	in
Grade:	55	ksi
Clip Distance:	5	in

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

Pole Data		
Diam:	39.58	in
Thick:	0.2812	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round

Stress Increase Factor		
ASD ASIF:	1.333	

Base Reactions		
TIA Revision:	F	
Unfactored Moment, M:	1235.3	ft-kips
Unfactored Axial, P:	18.0	kips
Unfactored Shear, V:	14.7	kips

Reactions modified to account for additional anchor rods

Anchor Rod Results

TIA F --> Maximum Rod Tension	158.9 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	81.5% **Pass**

Base Plate Results Flexural Check

Base Plate Stress:	34.2 ksi
Allowable PL Bending Stress:	55.0 ksi
Base Plate Stress Ratio:	62.2% **Pass**

PL Ref. Data
Yield Line (in): 22.65
Max PL Length: 22.65

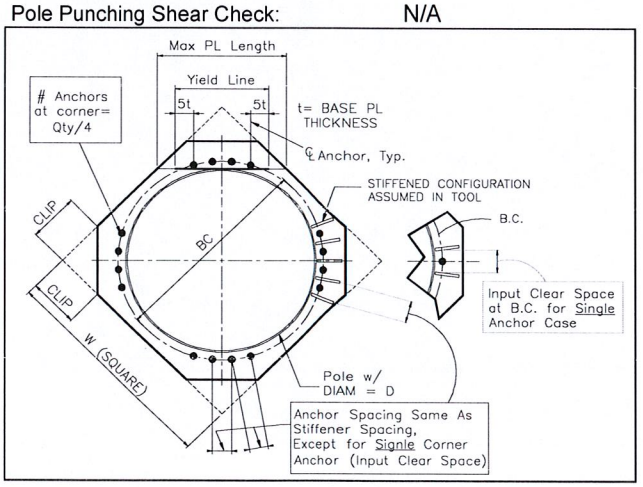
N/A - Unstiffened

Stiffener Results

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

Pole Results

Pole Punching Shear Check: N/A



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

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Job Number:	37512-1129 R1 B (REVISED)	**Page:**	1
Site Number:	876382	**By:**	KAT
Site Name:	Berlin/Laviana Orchard	**Date:**	2/27/2013

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

Unfactored Base Reactions from RISA

	Comp. (+)	Tension (-)	
Moment, M =	1887.0		k-ft
Shear, V =	22.0		kips
Axial Load, P =	27.0		kips
OTM =	1898.0	0.0	k-ft @ Ground

Safety Factors / Load Factors / Φ Factors

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

Drilled Pier Parameters

Diameter =	6 ft
Height Above Grade =	0.5 ft
Depth Below Grade =	20 ft
fc' =	3 ksi
εc =	0.003 in/in
Mat Ftdn. Cap Width =	ft
Mat Ftdn. Cap Length =	ft
Depth Below Grade =	ft

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

Load Combinations Checked per TIA/EIA-222-F

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

Steel Parameters

Number of Bars =	16
Rebar Size =	#11
Rebar Fy =	60 ksi
Rebar MOE =	29000 ksi
Tie Size =	#5
Side Clear Cover to Ties =	4 in

Soil Parameters

Water Table Depth =	15.00 ft
Depth to Ignore Soil =	3.33 ft
Depth to Full Cohesion =	0 ft
Full Cohesion Starts at?	Ground

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

Direct Embed Pole Shaft Parameters

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

Maximum Capacity Ratios

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

Define Soil Layers

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

Layer	Thickness ft	Unit Weight pcf	Cohesion psf	Friction Angle degrees	Soil Type	Ultimate End Bearing psf	Comp. Ult. Skin Friction psf	Tension Ult. Skin Friction psf	Depth ft
1	5	135		38	Sand				5
2	10	135		38	Sand		600		15
3	5	135		38	Sand	40000	600		20
4									
5									
6									
7									
8									
9									
10									
11									
12									

Soil Results: Overturning

Depth to COR =	14.37	ft, from Grade	
Bending Moment, M =	2214.25	k-ft, from COR	
Resisting Moment, Ma =	3532.16	k-ft, from COR	
MOMENT RATIO =	**62.7%**	**OK**	
Shear, V =	22.00	kips	
Resisting Shear, Va =	35.09	kips	
SHEAR RATIO =	**62.7%**	**OK**	

Soil Results: Uplift

Uplift, T =	0.00	kips
Allowable Uplift Cap., Ta =	62.50	kips
UPLIFT RATIO =	**0.0%**	**OK**

Soil Results: Compression

Compression, C =	27.00	kips
Allowable Comp. Cap., Ca =	639.71	kips
COMPRESSION RATIO =	**4.2%**	**OK**

Steel Results (ACI 318-02):

Minimum Steel Area =	13.57	sq in
Actual Steel Area =	24.96	sq in
Allowable Min Axial, Pa =	-1036.80	kips, Where Ma = 0 k-ft
Allowable Max Axial, Pa =	4726.51	kips, Where Ma = 0 k-ft
Axial Load, P =	48.21	kips @ 4.50 ft Below Grade
Moment, M =	1988.85	k-ft @ 4.50 ft Below Grade
Allowable Moment, Ma =	2596.26	k-ft
MOMENT RATIO =	**76.6%**	**OK**

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

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

Site Data

BU#: *876382*
Site Name: *Berlin/Laviana Orchard*
App #:

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

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	1988.85	ft-kips (* Note)
Max. Service Shaft P:	48.21	kips
Max Axial Force Type:	Comp.	

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	2585.505	ft-kips
1.30	Pu:	62.673	kips

Pier Properties

Concrete:

Pier Diameter =	6.0	ft
Concrete Area =	4071.5	in^2

Reinforcement:

Clear Cover to **Tie**=	4.00	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	5.11	ft
Vert. Cage Diameter =	61.34	in
Vertical Bar Size =	11	
Bar Diameter =	1.41	in
Bar Area =	1.56	in^2
Number of Bars =	16	
As Total=	24.96	in^2
A s/ Aconc, Rho:	0.0061	0.61%

Material Properties

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

ACI 318 Code

Select Analysis ACI Code= 2002

Seismic Properties

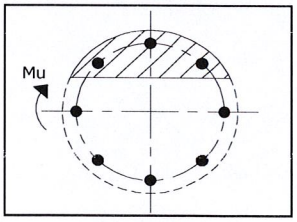
Seismic Design Category = D
Seismic Risk = **High**

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

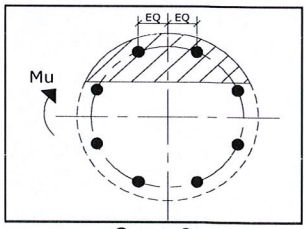
ACI 10.5 , ACI 21.10.4, and IBC 1810.
Min As for Flexural, Tension Controlled, Shafts:
(3)*(Sqrt(f'c)/Fy: 0.0027
200 / Fy: 0.0033

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis: **12.63** in
Extreme Steel Strain, εt: **0.0127**
εt > 0.0050, Tension Controlled
Reduction Factor,φ: **0.900**

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.61%	OK

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	6144.47	kips
at Mu=(ϕ=0.65)Mn=	3164.92	ft-kips
Max Tu, (φ=0.9) Tn =	1347.84	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	62.67	kips
Drilled Shaft Moment Capacity, φMn:	**3375.16**	ft-kips
Drilled Shaft Superimposed Mu:	**2585.51**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**76.6%**