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

February 1, 2016

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

RE: **Notice of Exempt Modification for AT&T/ LTE 3C Crown Site BU: 876326**
AT&T Site ID: CT5140
440 Hayden Station Road, Windsor, CT 06095
Latitude: 41° 53' 52.2" / Longitude: -72° 38' 38.7"

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 92-foot level of the existing 96-foot monopole at 440 Hayden Station Road in Windsor, CT. The tower and property is owned by the Crown Castle. AT&T now intends to replace three (3) antennas with three (3) new 700 MHz antennas. These antennas would be installed at the 92-foot level of the tower. AT&T also intends to install three (3) RRU12s and three (3) A2s.

This facility was approved by the Windsor Zoning Board of Appeals on September 18, 1996. This approval included no conditional statements.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.S.C.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Donald S. Trinks, Mayor, Town of Windsor, as well as the property owner, and Crown Castle is the tower owner.

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

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

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

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

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

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

For the foregoing reasons, AT&T respectfully submits that the proposed modifications to the above-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2). Please send approval/rejection letter to Attn: Jeffrey Barbadora.

Sincerely,

Jeffrey Barbadora
Real Estate Specialist
12 Gill Street, Suite 5800, Woburn, MA 01801
781-729-0053
Jeff.Barbadora@crowncastle.com

Attachments:

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

cc: The Honorable Donald S. Trinks, Mayor, Town of Windsor
Town of Windsor
275 Broad Street
Windsor, CT 06095

SITE 065 ZONING HAYDEN STATION

TOWN OF WINDSOR • CONNECTICUT
FIRST IN STATE • FIRST IN SERVICE • FIRST IN VALUE

October 3, 1996

Sprint Spectrum L.P.
C/O John Stevens
450 Murdock Road
Meriden, Connecticut 06450

Subject: 440 Hayden Station Road
Variance Request

Dear Mr. Stevens,

The Windsor Zoning Board of Appeals at it's business meeting following the public hearing held at 7:00 P.M. on Wednesday September 18, 1996, approved your request for a variance of Section 3.4.2F(I).

In accordance with Public Act 75-317 of the Connecticut General Statutes, the enclosed form must be **filed with the Town Clerk** of Windsor before said grant becomes effective. There is a filing fee of $10.00. The paperwork must be filed by the record owner of the property within six months, according to Section 6.6 of the Zoning Board of Appeals By Laws, or the grant is null and void.

Very truly yours,

Helene H. Shay
Secretary
WINDSOR ZONING BOARD OF APPEALS

Encl.

Certified Mail No. P 433 581 779

275 Broad Street • Windsor, Connecticut 06095-2994
FAX: (860) 285-1909 http://www.state.ct.us/MUNIC/WINDSOR/windsor.htm

WINDSOR ZONING BOARD OF APPEALS

I, Helene H. Shay, Secretary of the Windsor Zoning Board of Appeals, hereby certify that on Wednesday, September 18, 1996, the Zoning Board of Appeals of the Town of Windsor granted to:

Owner of Record: Jeffrey R. Wannamaker
(The Coast Distribution System, Inc.)

Located at: 440 Hayden Station Road

and more particularly bounded and described as follows:

Map No. 49, Block No. 471, Lot No. 109
in Volume 998, Page 108

the following variances to the Windsor Zoning Regulations:

Section 3.4.2F(1) - Parking Reduction
for Erection of Tower Antenna

Dated at Windsor, Connecticut, this 3rd day of October, 1996.

Helene H. Shay, Secretary
Windsor Zoning Board of Appeals

Received for the Record:

TOP SECTION TO BE FILLED IN BY Z.B.A. CLERK: clerk's name Karen

within 500' of other town? No date submitted 8.27.96

fee amount $110.00. date sign given 8.27.96

receipt number # 1874 official date rec'd 8.27.96

(APPLICANT, DO NOT WRITE ABOVE THIS LINE)

ZONING VARIANCE APPLICATION

1.1)) PROPERTY INFORMATION ((

79 Lamberton Road, Windsor — Street Address

I-1 — Zone

43	108	5	642	151
Map No.	Block No.	Lot No.	Volume No.	Page No.

1.2)) OWNER INFORMATION ((

Jerome M. Scharr

Name(s) as they appear on the deed of record

40 East Newberry Road — Street Address; Bloomfield — City; CT — State; 06002 — Zip

1.3)) APPLICANT INFORMATION ((

Sprint Spectrum, L.P. c/o John Stevens

Name of applicant

450 Murdock Ave. — Street Address; Meriden — City; CT — State; 06450 — Zip

1.4 Applicant's interest in the subject parcel? Lessee
(such as owner, agent, lessee, optionee, tenant)

1.5 Phone no. where applicant can be reached in the daytime 203-238-6910

1.6 Were any variances ever requested for this parcel in the past? No

1.7 Does the subject parcel have any existing non-conformities? No
(if so, describe them briefly)

1.8 Is the subject parcel vacant? No
(if not vacant, what is the parcel's existing use? Business Use - golfing range currently operating on the parcel.

2.1 Complete the following table only for "SIZE VARIANCES", or "DISTANCE VARIANCES", or "LOCATION VARIANCES"...

ZONING REGULATION SECTION NO. #1	DISTANCE REQUIRED BY REGULATIONS #2	LOCATION OF VARIANCE (side?, front?, rear?) #3	DISTANCE REQUESTED BY APPLICANT #4	NET AMOUNT OF VARIANCE (#2 - #4 = #5) #5
10.5.10C	240'	side	10'	230'
10.5.10C	240"	rear	5' approx.	235' approx.

2.2 For all other types of variances, state the Section Number of the Zoning Regulations and describe precisely what is being requested...

2.3 (FIRST TEST) How is this request in HARMONY with the intent of the Zoning Regulations?...

The requested set back variances will permit reasonable development of industrially zoned land with a compatible use which recognizes and promotes the public health, safety and welfare purposes of the regulations.

2.4 (SECOND TEST) How are the Zoning Regulations restricting the use of the subject parcel in a manner different than similarly-zoned parcels throughout Town? (In other words: What is the LEGAL HARDSHIP?)

The purpose of the distance requirements is to provide a safety area should the tower fall. Although current construction techniques make such fall zones unnecessary, this parcel's unique characteristics make the imposition of the regulations a hardship. Wetlands and water courses to the west of the site make development within the fall zone a highly regulated activity while the Terry Steam complex to the north precludes development there.

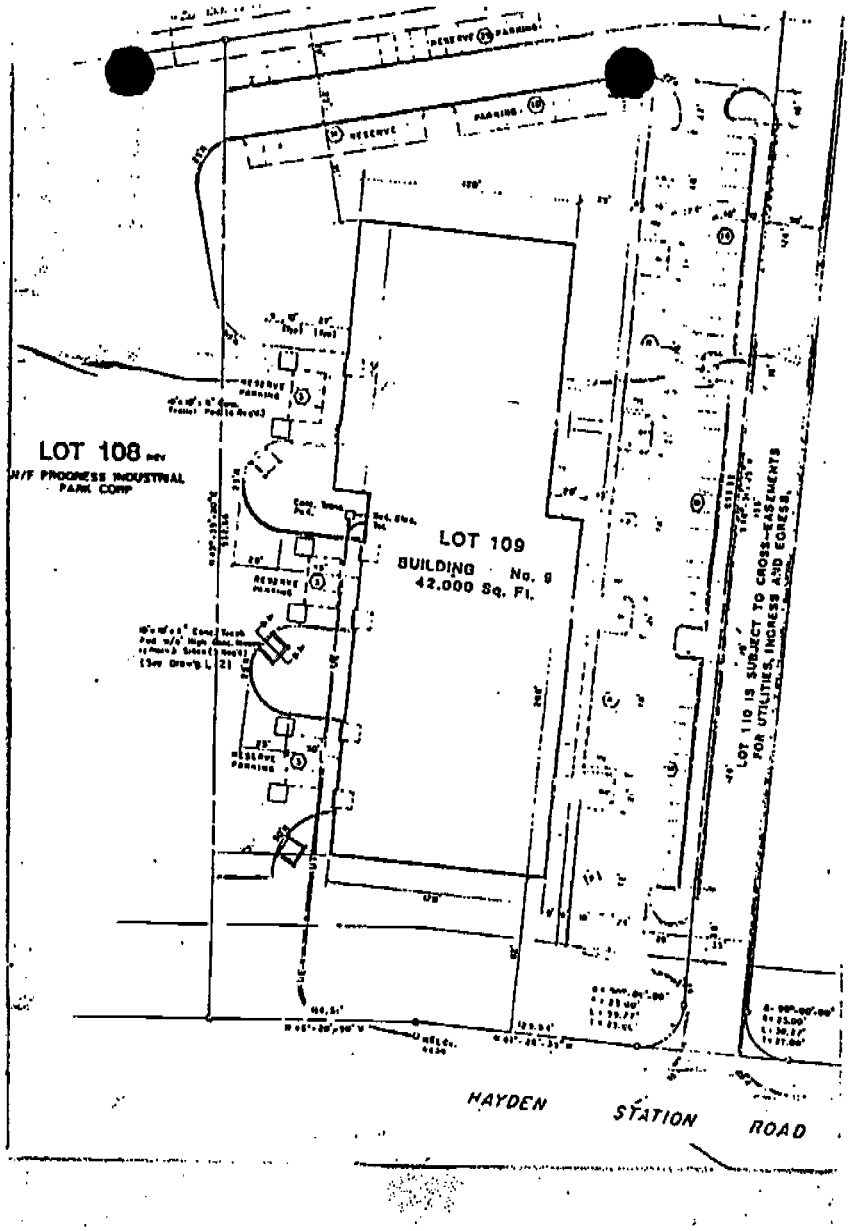
3.1 List the names and addresses of ALL abutting landowners.

You MUST include ANY parcel which has ANY part of it within 100 feet of the subject parcel.

You MUST include these parcels even if they are separated from the subject parcel by streets, roads, rights-of-way, rivers, streams, buildings, railroad tracks, or anything else.

NAME	ADDRESS
ALL ON MAP 43 Wilkos, Walter Block-106 Lot-4	295 Pigeon Hill Rd.
Wilkos, Theodore Block 106 Lot-4A	337 Pigeon Hill Rd.
Caesar, Carolyn Block-106 Lot-5	321 Pigeon Hill Rd.
Dresser-Rand Co. Block-108 Lot 1A	Baron Stenben Place, Corning, NY 14830
Dudack Ignatz Block-108 Lot 6	400 Pigeon Hill Rd.
80 and 82 Lamberton Rd. LP c/o Farley Co. Block-109 Lot 43B	100 Pearl St. Hartford, CT 06103
Caesar, Carolyn Block-109 Lot 45	280 Pigeon Hill Rd.

4.1 USE THIS PAGE TO INCLUDE ANY OTHER INFORMATION WHICH CAN NOT FIT ANYWHERE ELSE ON THIS APPLICATION.



5.1 (PLOT PLAN) YOU MUST SUBMIT 10 COPIES OF A SURVEYOR'S PLOT PLAN OF THE SUBJECT PARCEL. THE PLOT PLAN MUST SHOW:

- ...ALL PROPOSED ADDITIONS OR CHANGES WITH DOTTED LINES
- ...ALL RELEVANT DIMENSIONS
- ...A NORTH ARROW
- ...THE SCALE OF THE DRAWING
- ...A PROPER LABEL WITH THE STREET ADDRESS

IF YOUR VARIANCE REQUEST IS FOR ANY DIMENSIONAL REQUIREMENT, SUCH AS A SET-BACK FROM A PROPERTY LINE, THE SURVEYOR'S PLOT PLAN MUST BE CERTIFIED TO BE ACCURATE TO AT LEAST AN "A-2" QUALITY STANDARD.

R E A D T H E F O L L O W I N G S T A T E M E N T S
B E F O R E S I G N I N G :

5.2 IT IS THE APPLICANT'S RESPONSIBILITY TO BE AWARE OF THE HEARING DATE.

5.3 THE APPLICANT MAY WITHDRAW THIS APPLICATION AT ANY TIME. IF EXPENSES HAVE BEEN INCURRED THE FEE WILL NOT BE REFUNDED.

5.4 IF A VARIANCE IS GRANTED, IT WILL NOT BECOME EFFECTIVE UNTIL THE APPLICANT FILES A CERTIFIED COPY OF THE VARIANCE WITH THE TOWN CLERK.

5.5 THE APPLICANT MUST POST THE SUPPLIED PLACARD SIGN ON THE SUBJECT PARCEL (not on a public utility pole!) AT LEAST 10 DAYS PRIOR TO THE HEARING...AND...MUST REMOVE IT 5 DAYS AFTER THE HEARING (or else the variance may be nullified).

5.6 THIS IS THE APPLICANT'S APPLICATION ONLY. THE STAFF IS NOT PERMITTED TO HELP COMPLETE THE APPLICATION. THE APPLICANT ASSUMES SOLE RESPONSIBILITY FOR ITS COMPLETENESS AND ACCURACY.

(COMPLETE EVERYTHING BELOW THIS LINE IN THE PRESENCE OF A NOTARY)

The undersigned applicant assumes sole responsibility for the completeness and accuracy of this application and, further, acknowledges that he/she has read and understands the above statements numbered 5.2 through 5.6:

(Applicant's Signature) _____

(To be filled in by Notary) On this date August 22, 1990, the above-signed applicant did personally appear before me and proved to my satisfaction to be the person who is herein referred to as the applicant; in witness whereof I hereunto set my hand and seal:

(Notary's Signature) _____
(And Seal)

THOMAS F. FLYNN III
Commissioner of
The Superior Court

My Commission Expires: _____

PROJECT INFORMATION

SCOPE OF WORK:
- REMOVE (1) ANTENNA PER SECTOR (TOTAL OF 3 ANTENNAS)
- INSTALL (1) ANTENNA PER SECTOR (TOTAL OF 3 NEW ANTENNAS)
- ADD (1) RRH PER SECTOR (TOTAL OF 3 NEW RRHs)
- ADD (1) A-2 MODULE PER SECTOR (TOTAL OF 3 NEW A-2 MODULES)

SITE ADDRESS:	440 HAYDEN STATION ROAD WINDSOR, CT 06095
LATITUDE: LONGITUDE:	41.8977919 41° 53' 52.05"N -72.6449989 72° 38' 41.99"W
USID:	4547
TOWER OWNER:	TBD
TYPE OF SITE:	MONOPOLE/INDOOR EQUIPMENT
TOWER HEIGHT:	85'-0"±
RAD CENTER:	92'-0"±
CURRENT USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY
PROPOSED USE:	UNMANNED WIRELESS TELECOMMUNICATIONS FACILITY

at&t MOBILITY

FA CODE: 10071329
SITE NUMBER: CT5140
SITE NAME: WINDSOR BREAKNECK
BUN#: 876326

PROJECT TEAM

CLIENT REPRESENTATIVE
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

SITE ACQUISITION:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ZONING:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: DAVID COOPER
PHONE: 617-639-4908
EMAIL: dcooper@empiretelecomm.com

ENGINEERING:
COMPANY: COM-EX CONSULTANTS, LLC
ADDRESS: 115 ROUTE 46, SUITE E39, MOUNTAIN LAKES, NJ 07046
CONTACT: NICHOLAS D. BARILE, P.E.
PHONE: 862-209-4300
EMAIL: nbarile@comexconsultants.com

RF ENGINEER:
COMPANY: AT&T MOBILITY - NEW ENGLAND
ADDRESS: 550 COCHITUATE ROAD, SUITE 550 13 & 14, FRAMINGHAM, MA 01701
CONTACT: CAMERON SYME
PHONE: 508-596-7146
EMAIL: cs6970@att.com

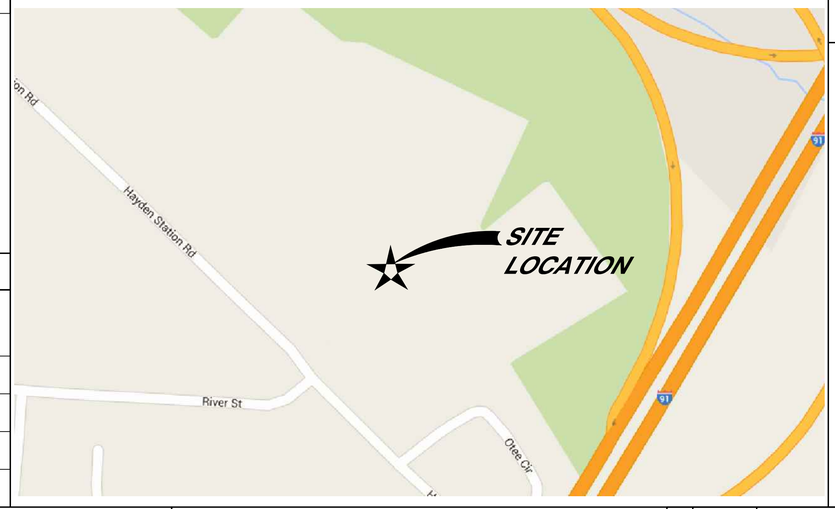
CONSTRUCTION MANAGEMENT:
COMPANY: EMPIRE TELECOM
ADDRESS: 16 ESQUIRE ROAD, BILLERICA, MA 01821
CONTACT: GRZEGORZ "GREG" DORMAN
PHONE: 484-683-1750
EMAIL: gdorman@empiretelecomm.com

DRAWING INDEX

		REV.
T-1	TITLE SHEET	0
GN-1	GROUNDING & GENERAL NOTES	0
A-1	COMPOUND LAYOUTS	0
A-2	EQUIPMENT LAYOUTS	0
A-3	ANTENNA LAYOUTS & ELEVATIONS	0
A-4	DETAILS	0
A-5	ANTENNA MOUNTING DETAILS	0
G-1	GROUNDING DETAILS	0

VICINITY MAP

FROM ROCKY HILL, HEAD SOUTHWEST ON CONCRIB LN. TURN LEFT ONTO SOLO DR. TURN RIGHT ONTO GILBERT AVE. TURN RIGHT ONTO STATE HWY 411. TURN LEFT TO MERGE ONTO I-91 N. TAKE EXIT 39-41 FOR KENEDY RD TOWARD CENTER ST. CONTINUE ONTO ARCHER RD. TURN LEFT ONTO HAYDEN STATION RD. SITE WILL BE ON RIGHT.



GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY, AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

APPROVALS

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

DISCIPLINE:	NAME:	DATE:
SITE ACQUISITION:		
CONSTRUCTION MANAGER:		
AT&T PROJECT MANAGER:		

CONNECTICUT ONE CALL SYSTEM, INC. 1-800-922-4455 STOP - CALL BEFORE YOU DIG!

CONNECTICUT LAW REQUIRES
TWO WORKING DAYS NOTICE PRIOR TO
ANY EARTH MOVING ACTIVITIES BY
CALLING 800-922-4455 OR DIAL 811

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5140
SITE NAME: WINDSOR BREAKNECK
440 HAYDEN STATION ROAD
WINDSOR, CT 06095
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL: STATE OF CONNECTICUT, NICHOLAS D. BARILE, LICENSED PROFESSIONAL ENGINEER, PROFESSIONAL ENGINEER, CT LICENSE NO. 28643

AT&T

DRAWING TITLE: TITLE SHEET

JOB NUMBER	DRAWING NUMBER	REV
15145-EMP	T-1	0

GROUNDING NOTES:

1. THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE-SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.

2. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES'S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471-000-3PS-EG00-0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.

4. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

5. EACH BTS CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; 2 AWG STRANDED COPPER FOR OUTDOOR BTS.

6. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

7. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

11. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

12. GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON-METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

13. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV-G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM EIGHT FEET (8') TO TEN FEET (10').

14. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE ½" OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID TINNED COPPER GROUND WIRE, PER NEC 250.50.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   - CONTRACTOR – EMPIRE TELECOM
   - SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   - OWNER – AT&T MOBILITY
   - OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

6. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

7. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

8. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR

9. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

10. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

11. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.

12. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.

13. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

14. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy=36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

15. CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741-000-3APS-A00Z-00002, "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T MOBILITY SITES."

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

19. SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.
   - INTERNATIONAL BUILDING CODE: IBC 2009 WITH LOCAL & COUNTY AMENDMENTS
   - NATIONAL ELECTRICAL CODE: NEC 2011 WITH LOCAL & COUNTY AMENDMENTS
   - FIRE/LIFE SAFETY CODE: NFPA-101 2009 WITH LOCAL & COUNTY AMENDMENTS

20. SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:
   - AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
   - AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, THIRTEENTH EDITION
   - AMERICAN SOCIETY OF TESTING OF MATERIALS, ASTM
   - TELECOMMUNICATIONS INDUSTRY ASSOCIATION (ANSI/TIA-222-G-1), STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
   - TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS
   - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, OSHA
   - INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVELY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT
   - TELCORDIA GR-1503, COAXIAL CABLE CONNECTIONS

21. FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.

22. INFORMATION SHOWN ON THIS SET OF PLANS TAKEN FROM DRAWINGS PREPARED BY HUDSON DESIGN GROUP FOR A RECENT UPGRADE DATED 04/05/2012. CONTRACTOR TO NOTIFY DESIGN ENGINEER OF ANY DISCREPANCIES PRIOR TO COMMENCEMENT OF CONSTRUCTION.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5140
SITE NAME: WINDSOR BREAKNECK
440 HAYDEN STATION ROAD
WINDSOR, CT 06095
HARTFORD COUNTY

at&t MOBILITY
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

NO.	DATE	REVISIONS	BY	CHK	APP'D
0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:
STATE OF CONNECTICUT
DOUGLAS G. BIBBY
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
GROUNDING NOTES & GENERAL NOTES

JOB NUMBER	DRAWING NUMBER	REV
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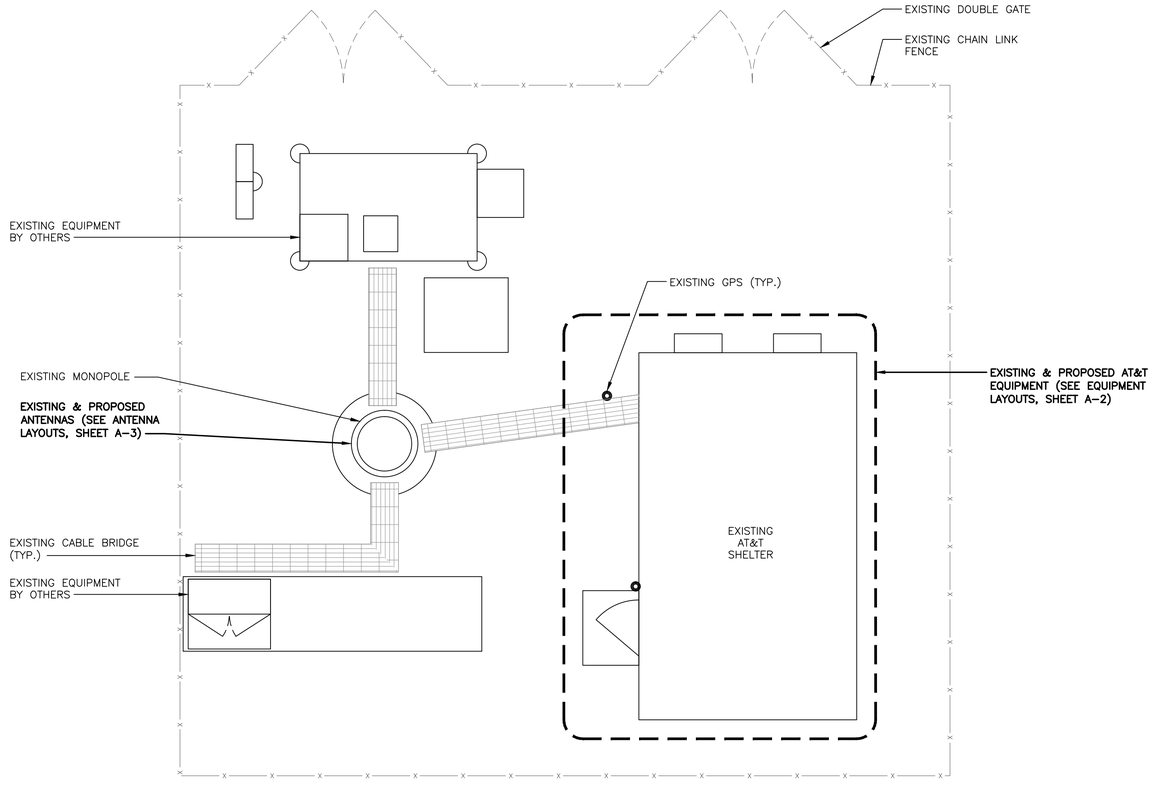

NORTH

COMPOUND LAYOUT

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

0 2 4 8

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

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

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0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

STATE OF CONNECTICUT
NICHOLAS G. BYRON
LICENSED PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
COMPOUND LAYOUT

JOB NUMBER	DRAWING NUMBER	REV
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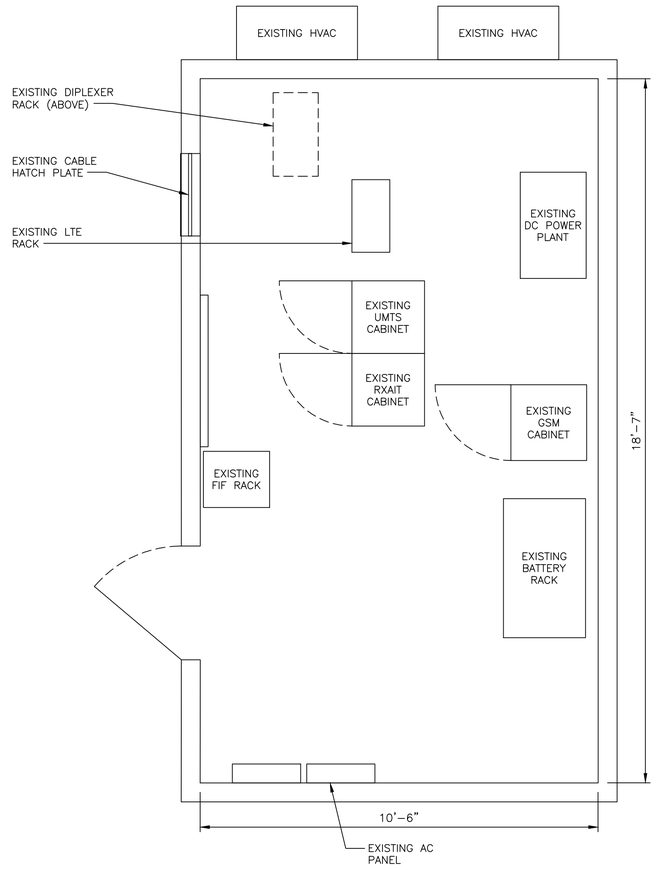

NOTE:
NO GROUND EQUIPMENT CHANGES ARE PROPOSED UNDER THIS SCOPE OF WORK. EXISTING GROUND EQUIPMENT CONFIGURATION TO REMAIN.

EXISTING EQUIPMENT LAYOUT

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

2 0 1 2 4 8

(IN FEET)
1/2 inch = 1 Foot

NORTH

COM EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

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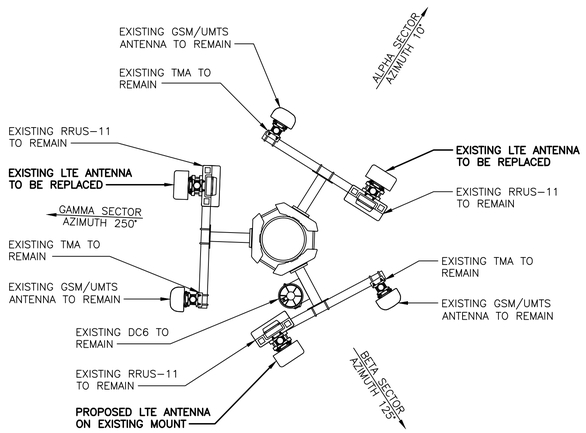
SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:
STATE OF CONNECTICUT
DOUGLAS D. BRAY
No. 23643
LICENSED PROFESSIONAL ENGINEER
PROFESSIONAL ENGINEER
CT LICENSE NO. 23643

AT&T

DRAWING TITLE:
EQUIPMENT LAYOUTS

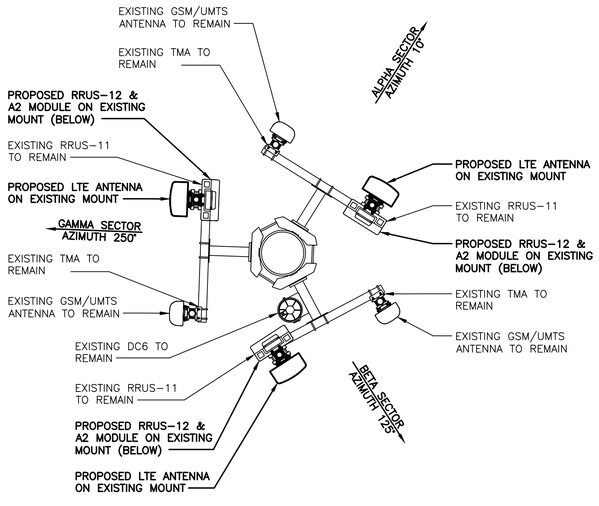
JOB NUMBER	DRAWING NUMBER	REV.
15145-EMP	A-2	0



NORTH

EXISTING ANTENNA LAYOUT

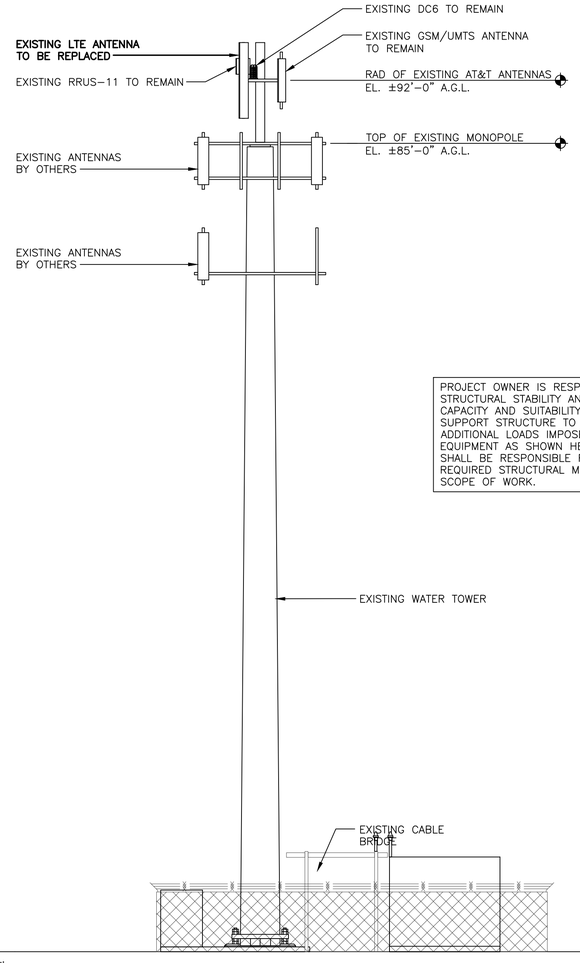
SCALE: N.T.S.



NORTH

PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.



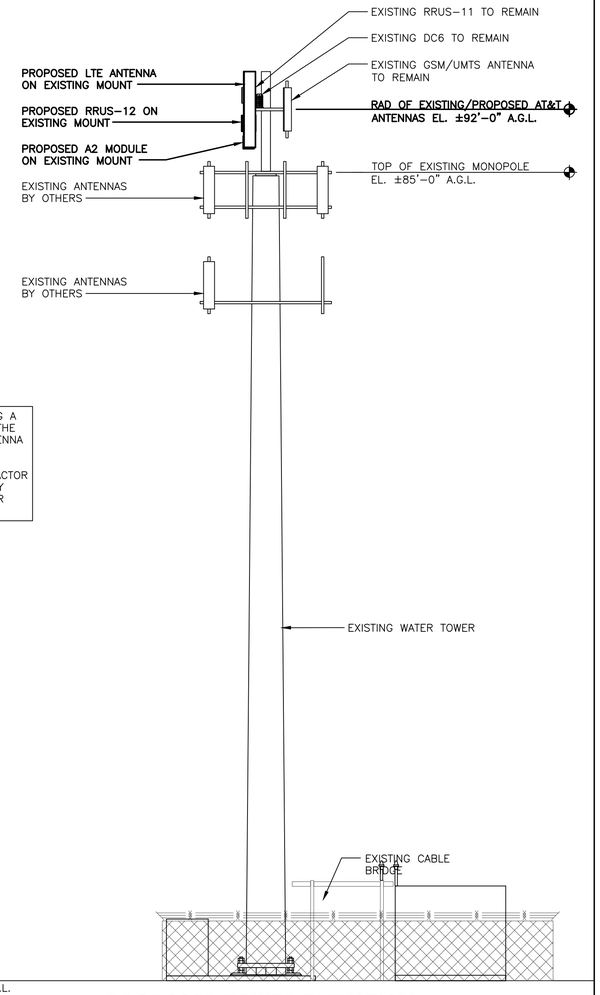
PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

EXISTING TOWER ELEVATION

SCALE: 1/8" = 1'–0"

0 4 8 16

GRAPHIC SCALE: 1/8"=1'–0"



PROPOSED TOWER ELEVATION

SCALE: 1/8" = 1'–0"

0 4 8 16

GRAPHIC SCALE: 1/8"=1'–0"

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115 ROUTE 46
SUITE E39
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16 ESQUIRE ROAD
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0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL: STATE OF CONNECTICUT · DOUGLAS E. BARD · LICENSE NO. 20843 · PROFESSIONAL ENGINEER · CT · 8643

AT&T

DRAWING TITLE:
ANTENNA LAYOUTS & ELEVATIONS

JOB NUMBER	DRAWING NUMBER	REV
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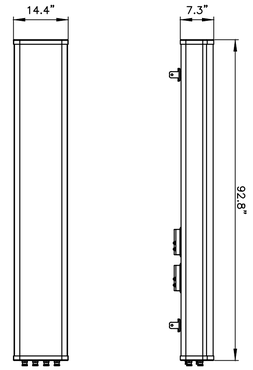


FRONT VIEW

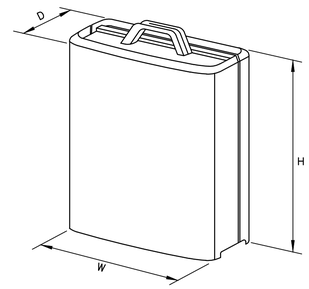
SIDE VIEW

BOTTOM VIEW

MANUFACTURER	CCI
MODEL	HPA-65R-LCUU-H8
WEIGHT	53 LBS

LTE ANTENNA DETAIL

SCALE: N.T.S.



MODEL	L x W x H	WEIGHT
* RRUS-11	19.69" x 16.97" x 7.17"	50.7 LBS
RRUS-12	19.69" x 16.97" x 7.17"	50.7 LBS

* DENOTES EXISTING

RRUS DETAIL

SCALE: N.T.S.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

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16 ESQUIRE ROAD
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0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

DRAWING TITLE:
DETAILS

JOB NUMBER	DRAWING NUMBER	REV
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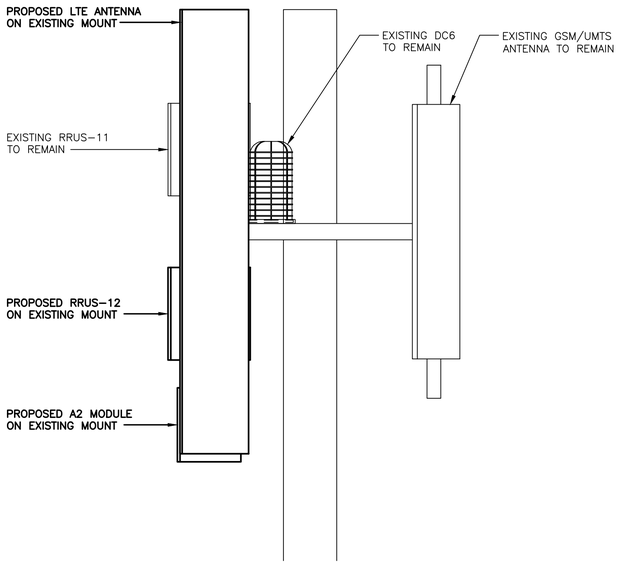
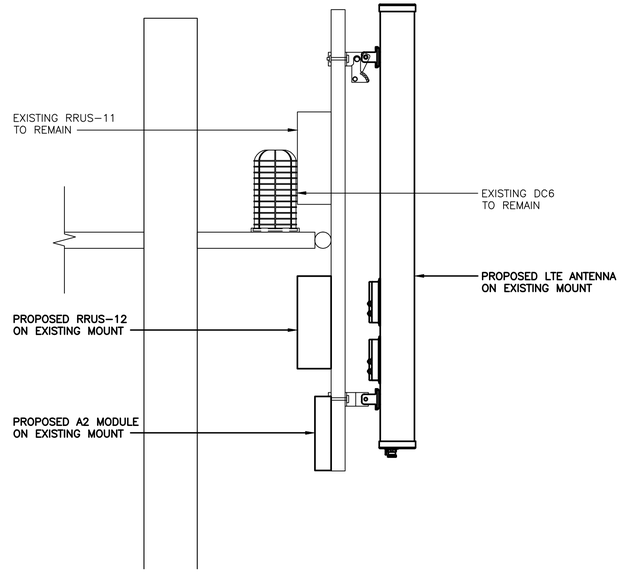


PROPOSED ANTENNA MOUNTING DETAIL (FRONT VIEW)

SCALE: N.T.S.



PROPOSED ANTENNA MOUNTING DETAIL (SIDE VIEW)

SCALE: N.T.S.

EXISTING ANTENNA SCHEDULE				
SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	A2	POWERWAVE	P65–17–XLH–RR	96"x12"x6"
BETA	B1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	B2	POWERWAVE	P65–17–XLH–RR	96"x12"x6"
GAMMA	C1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	C2	POWERWAVE	P65–17–XLH–RR	96"x12"x6"

FINAL ANTENNA SCHEDULE				
SECTOR	POSITION	MAKE	MODEL	SIZE (INCHES)
ALPHA	A1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	A2	**CCI**	**HPA–65R–BUU–H8**	**92.4"x14.8"x7.4"**
BETA	B1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	B2	**CCI**	**HPA–65R–BUU–H8**	**92.4"x14.8"x7.4"**
GAMMA	C1	KATHREIN	800 10121	54.5"x10.3"x5.9"
	C2	**CCI**	**HPA–65R–BUU–H8**	**92.4"x14.8"x7.4"**

PROPOSED RRU SCHEDULE					
SECTOR	MAKE	MODEL	SIZE (INCHES)	ADDITIONAL COMPONENT	SIZE (INCHES)
ALPHA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS–12**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
BETA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS–12**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**
GAMMA	ERICSSON	RRUS–11 (EXISTING)	19.7"x16.9"x7.2"		
	ERICSSON	**RRUS–12**	**19.7"x16.9"x7.2"**	**ERICSSON A2 MODULE**	**16.4"x15.2"x3.4"**

PROJECT OWNER IS RESPONSIBLE FOR PROVIDING A STRUCTURAL STABILITY ANALYSIS TO DETERMINE THE CAPACITY AND SUITABILITY OF THE EXISTING ANTENNA SUPPORT STRUCTURE TO SAFELY CARRY ALL ADDITIONAL LOADS IMPOSED BY THE PROPOSED EQUIPMENT AS SHOWN HEREIN. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR INCORPORATING ANY REQUIRED STRUCTURAL MODIFICATIONS INTO THEIR SCOPE OF WORK.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
FAX: 862.209.4301

EMPIRE telecom
16 ESQUIRE ROAD
BILLERICA, MA 01821

SITE NUMBER: CT5140
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440 HAYDEN STATION ROAD
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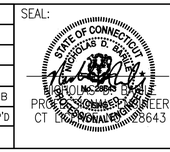
0	1/29/16	ISSUED AS FINAL	JW	NDB	NDB

SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

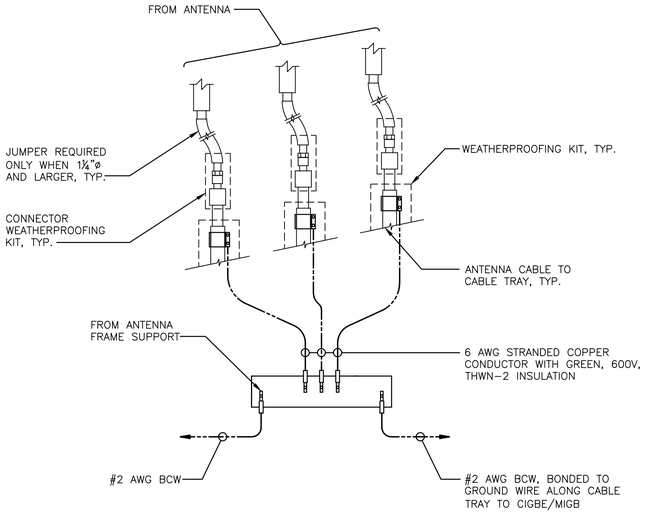


PROFESSIONAL ENGINEER
CT LICENSE NO. 28643

AT&T

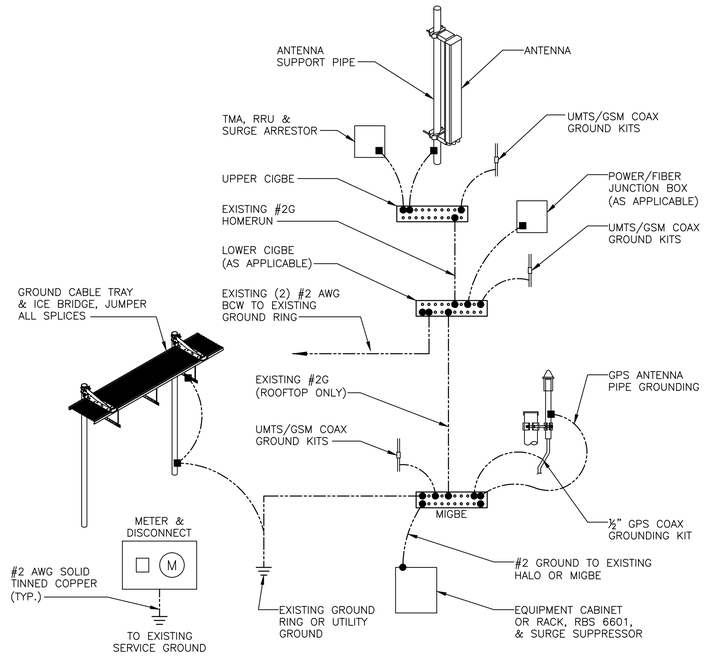
DRAWING TITLE:
ANTENNA MOUNTING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15145–EMP	A–5	0



GROUND WIRE TO GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



GROUNDING RISER DIAGRAM

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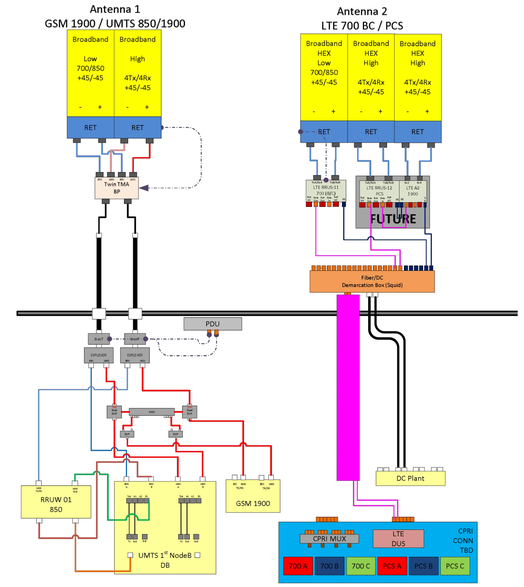
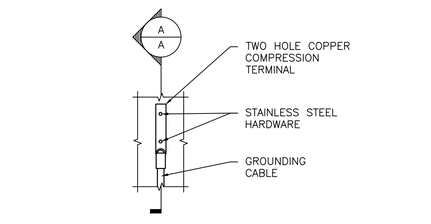
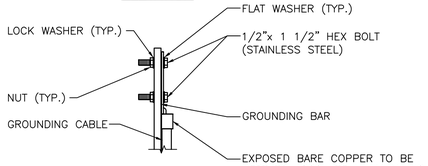


TYPICAL PLUMBING DIAGRAM (PER SECTOR)

SCALE: N.T.S.



ELEVATION



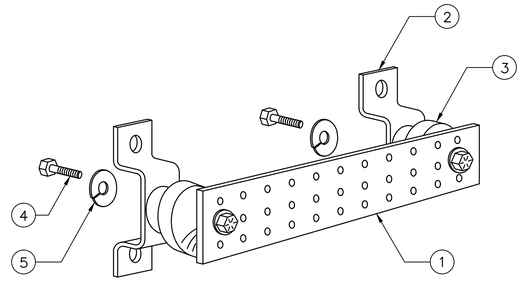
SECTION "A–A"

NOTE:

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

TYPICAL GROUND BAR CONNECTION DETAIL

SCALE: N.T.S.



ITEM NO.	QTY.	DESCRIPTION
1	1	SOLID GROUND BAR (20"x 4"x ¼")
2	2	WALL MOUNTING BRACKET
3	2	INSULATORS
4	4	⅝"–11x1" H.H.C.S.
5	4	⅝" LOCK WASHER

NOTES:

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

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

SECTION "A" – SURGE ABSORBERS
- INTERIOR GROUND RING (#2)
- EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2)
- METALLIC COLD WATER PIPE (IF AVAILABLE) (#2)
- BUILDING STEEL (IF AVAILABLE) (#2)

GROUND BAR DETAIL

SCALE: N.T.S.

COM-EX Consultants
115 ROUTE 46
SUITE E39
MOUNTAIN LAKES, NJ 07046
PHONE: 862.209.4300
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SCALE: AS SHOWN | DESIGNED BY: JW | DRAWN BY: JW

SEAL:

AT&T

DRAWING TITLE:
GROUNDING DETAILS

JOB NUMBER	DRAWING NUMBER	REV
15145–EMP	G–1	0

Date: **December 09, 2015**

Rebecca Klein
Crown Castle
525 Alderman Lane
Fort Mill, SC 29715

Aero Solutions LLC
5500 Flatiron Parkway
Boulder, CO 80302
720-304-6882

Subject: **Structural Analysis Report**

Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5140
	Carrier Site Name:	Windsor Breakneck
Crown Castle Designation:	**Crown Castle BU Number:**	876326
	Crown Castle Site Name:	HAYDEN STATION
	Crown Castle JDE Job Number:	358481
	Crown Castle Work Order Number:	1162495
	Crown Castle Application Number:	322776 Rev. 1
Engineering Firm Designation:	**Aero Solutions LLC Project Number:**	003-15-0733
Site Data:	**440 Hayden Station Road, WINDSOR, Hartford County, CT** **Latitude *41° 53' 52.2"*, Longitude *-72° 38' 38.7"*** **96 Foot - Monopole Tower**	

Dear Rebecca Klein,

Aero Solutions LLC 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 852551, in accordance with application 322776, revision 1.

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

LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

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

We at *Aero Solutions LLC* appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Amit Singhal

Respectfully submitted by:

Shraddha Dharia, P.E.
Structural Engineer
CT PE#: PEN0028187
Expires: 1/31/2016

STATE OF CONNECTICUT
SHRADDHA A. DHARIA
No. 28187
LICENSED
PROFESSIONAL ENGINEER

12.11.2015

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 96 ft Monopole tower designed by ROHN in January of 1997. The tower was originally designed for a wind speed of 80 mph per TIA/EIA-222-F.

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
92.0	92.0	3	cci antennas	HPA-65R-BUU-H8 w/ Mount Pipe	6	1-5/8"	
		1	ericsson	RRUS-11			
		3	ericsson	RRUS12/RRUS A2			

Table 2 - Existing Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
92.0	92.0	2	ericsson	RRUS-11	6 1	1-5/8" 3/8"	1
		4	ericsson	RRUS-11			2
		3	kathrein	800 10121 w/ Mount Pipe	2	3/4"	1
		6	powerwave technologies	LGP21401			
		3	powerwave technologies	P65-17-XLH-RR w/ Mount Pipe			2
		1	raycap	DC6-48-60-18-8F			1
		1	tower mounts	T-Arm Mount [TA 702-3]			
83.0	86.0	1	andrew	VHLP2-180	4 6 1 3	1/2" 5/16" 5/8" 1 1/4"	1
		2	dragonwave	A-ANT-11G-4-C			
		3	dragonwave	Horizon DUO			
	83.0	3	alcatel lucent	TD-RRH8x20-25			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 502-1]			
	82.0	3	kathrein	840 10045 w/ Mount Pipe			
		3	samsung telecommunications	WIMAX DAP HEAD			
79.0	80.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER			1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
	79.0	1	tower mounts	Side Arm Mount [SO 102-3)			
	77.0	3	alcatel lucent	PCS 1900MHz 4x45W-65MHz			
75.0	77.0	3	commscope	E15S08P80	12 1	7/8" 1-5/8"	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
	75.0	1	tower mounts	Platform Mount [LP 304-1]			
57.0	58.0	1	gps	GPS_A	1	1/2"	1
	57.0	1	tower mounts	4.5' x 2" horizontal mount pipe			

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

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
85	85	12	swedcom	ALP9212	12	1 5/8
75	75	12	swedcom	ALP9212	12	1 5/8
60	60	12	swedcom	ALP9212	12	1 5/8

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clough, Harbor, & Associates LLP	1530918	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn, Inc.	1640630	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn, Inc.	1639483	CCISITES
4-TOWER STRUCTURAL ANALYSIS REPORTS	FDH Engineering, Inc.	3357566	CCISITES

3.1) Analysis Method

tnxTower (version 6.1.4.1), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.

2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Tower extension geometry was taken from the previous analysis
6) The flange connection details at 85' are unknown; this connection was not included in this analysis.

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

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	96 - 85	Pole	P12x.5	1	-2.76	538.65	24.3	Pass
L2	85 - 65	Pole	P42x3/8	2	-10.97	1484.55	22.1	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-18.18	1643.28	49.3	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-27.41	2356.76	60.3	Pass
							Summary	
						Pole (L4)	60.3	Pass
						Rating =	60.3	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	61.5	Pass
1	Base Plate	0	60.2	Pass
1	Base Foundation	0	40.6	Pass
1	Base Foundation Soil Interaction	0	17.5	Pass
1	Flange Plate	32.5	49.0	Pass
1	Flange Plate	65	21.9	Pass
1	Flange Plate	85	Unknown	Unknown

Structure Rating (max from all components) =	**61.5%**

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

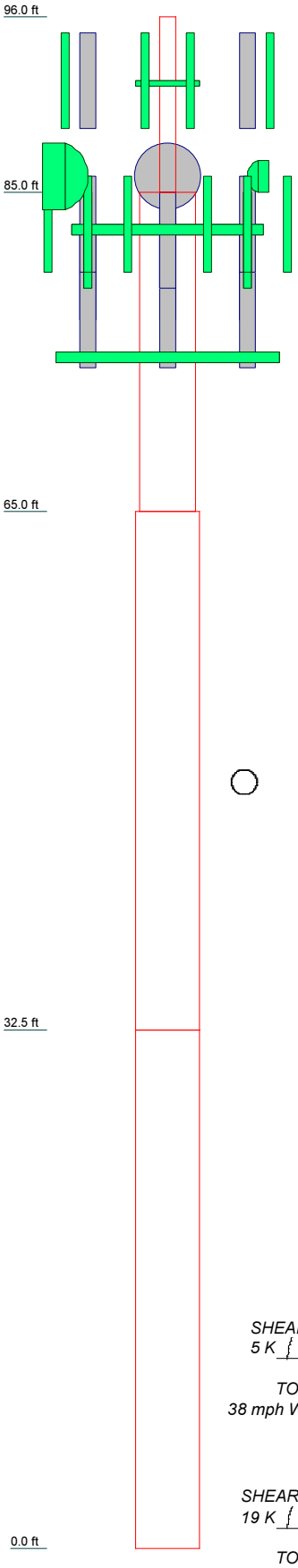
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P12x.5	11.00	A53-B-35	0.7
2	P42x3/8	20.00	A53-B-42	3.3
3	P48x3/8	32.50		6.2
4	P48x1/2	32.50		8.3
				18.5



DESIGNED APPURTENANCE LOADING

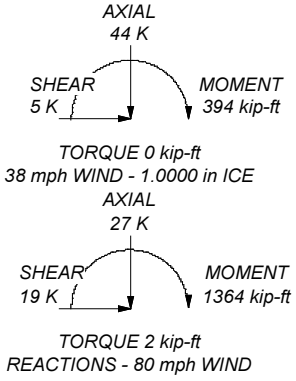
TYPE	ELEVATION	TYPE	ELEVATION
800 10121 w/ Mount Pipe	92	APXVTM14-C-120 w/ Mount Pipe	83
800 10121 w/ Mount Pipe	92	APXVTM14-C-120 w/ Mount Pipe	83
800 10121 w/ Mount Pipe	92	APXVTM14-C-120 w/ Mount Pipe	83
(2) LGP21401	92	TD-RRH8x20-25	83
(2) LGP21401	92	TD-RRH8x20-25	83
(2) LGP21401	92	TD-RRH8x20-25	83
P65-17-XLH-RR w/ Mount Pipe	92	Platform Mount [LP 502-1]	83
P65-17-XLH-RR w/ Mount Pipe	92	A-ANT-11G-4-C	83
P65-17-XLH-RR w/ Mount Pipe	92	VHLP2-180	83
DC6-48-60-18-8F	92	A-ANT-11G-4-C	83
(2) RRUS-11	92	PCS 1900MHz 4x45W-65MHz	79
RRUS-11	92	PCS 1900MHz 4x45W-65MHz	79
RRUS-11	92	PCS 1900MHz 4x45W-65MHz	79
RRUS-11	92	Pipe Mount 2 x 4'	79
RRUS-11	92	Pipe Mount 2 x 4'	79
HPA-65R-BUU-H8 w/ Mount Pipe	92	Pipe Mount 2 x 4'	79
RRUS-11	92	Side Arm Mount [SO 102-3]	79
RRUS12/RRUS A2	92	800MHz 2X50W RRH W/FILTER	79
HPA-65R-BUU-H8 w/ Mount Pipe	92	800MHz 2X50W RRH W/FILTER	79
RRUS12/RRUS A2	92	800MHz 2X50W RRH W/FILTER	79
HPA-65R-BUU-H8 w/ Mount Pipe	92	E15S08P80	75
RRUS12/RRUS A2	92	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	75
T-Arm Mount [TA 702-3]	92	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	75
840 10045 w/ Mount Pipe	83	E15S08P80	75
840 10045 w/ Mount Pipe	83	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	75
840 10045 w/ Mount Pipe	83	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	75
WIMAX DAP HEAD	83	Platform Mount [LP 304-1]	75
WIMAX DAP HEAD	83	E15S08P80	75
WIMAX DAP HEAD	83	ERICSSON AIR 21 B2A B4P w/ Mount Pipe	75
Horizon DUO	83	ERICSSON AIR 21 B4A B2P w/ Mount Pipe	75
Horizon DUO	83	4.5' x 2" horizontal mount pipe	57
Horizon DUO	83	GPS_A	57
12"x12"x6" Junction Box	83		
Pipe Mount 2 x 6'	83		
Pipe Mount 2 x 6'	83		
Pipe Mount 2 x 6'	83		
APXVSPP18-C-A20 w/ Mount Pipe	83		
APXVSPP18-C-A20 w/ Mount Pipe	83		
APXVSPP18-C-A20 w/ Mount Pipe	83		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-35	35 ksi	63 ksi	A53-B-42	42 ksi	63 ksi

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 60.3%



Aero Solutions LLC
5500 Flatiron Parkway
Boulder, CO 80302
Phone: 720-304-6882
FAX: -

Job: ***BU# 876326***			
Project: ***Existing 95' Monopole***			
Client: Crown Castle	Drawn by: ASinghal		App'd:
Code: TIA/EIA-222-F	Date: 12/09/15		Scale: NTS
Path: P:\004_CCI_SITES\876326 HAYDEN STATION\003-15-0733\Engineering\Aero Calculations\Working RISA\876326 HAYDEN STATION.eri			Dwg No. E-1

Tower Input Data

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

3) Tower is located in Hartford County, Connecticut.
4) Basic wind speed of 80 mph.
5) Nominal ice thickness of 1.0000 in.
6) Ice thickness is considered to increase with height.
7) Ice density of 56 pcf.
8) A wind speed of 38 mph is used in combination with ice.
9) Temperature drop of 50 °F.
10) Deflections calculated using a wind speed of 50 mph.
11) A non-linear (P-delta) analysis was used.
12) Pressures are calculated at each section.
13) Stress ratio used in pole design is 1.333.
14) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Pole Size*	*Pole Grade*	*Socket Length* *ft*
L1	96.00-85.00	11.00	P12x.5	A53-B-35 (35 ksi)	
L2	85.00-65.00	20.00	P42x3/8	A53-B-42 (42 ksi)	
L3	65.00-32.50	32.50	P48x3/8	A53-B-42 (42 ksi)	
L4	32.50-0.00	32.50	P48x1/2	A53-B-42 (42 ksi)	

Tower Elevation *ft*	*Gusset Area (per face)* ft^2	*Gusset Thickness* *in*	*Gusset Grade*	*Adjust. Factor* A_f	*Adjust. Factor* A_r	*Weight Mult.*	*Double Angle Stitch Bolt Spacing Diagonals* *in*	*Double Angle Stitch Bolt Spacing Horizontals* *in*
L1 96.00-				1	1	1		

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
85.00								
L2 85.00-65.00				1	1	1		
L3 65.00-32.50				1	1	1		
L4 32.50-0.00				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
***										

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
LDF7-50A(1-5/8")	B	No	Inside Pole	92.00 - 8.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
FB-L98B-002-75000(3/8")	B	No	Inside Pole	92.00 - 8.00	1	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	B	No	Inside Pole	92.00 - 8.00	2	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
						2" Ice	0.00	0.58
						4" Ice	0.00	0.58
LDF7-50A(1-5/8)	B	No	CaAa (Out Of Face)	83.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
LDF7-50A(1-5/8)	B	No	CaAa (Out Of Face)	92.00 - 83.00	1	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8)	B	No	CaAa (Out Of Face)	92.00 - 83.00	5	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
2" Rigid Conduit	B	No	Inside Pole	92.00 - 0.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
*								
ATCB-B01-001(5/16)	A	No	Inside Pole	83.00 - 2.00	6	No Ice	0.00	0.07
						1/2" Ice	0.00	0.07
						1" Ice	0.00	0.07
						2" Ice	0.00	0.07
						4" Ice	0.00	0.07

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF4-50A(1/2")	A	No	Inside Pole	83.00 - 2.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
FSJ4-50B(1/2")	A	No	CaAa (Out Of Face)	83.00 - 2.00	3	No Ice	0.00	0.14
						1/2" Ice	0.00	0.14
						1" Ice	0.00	0.14
						2" Ice	0.00	0.14
						4" Ice	0.00	0.14
HB114-1-08U4-M5J(1 1/4")	A	No	CaAa (Out Of Face)	83.00 - 2.00	3	No Ice	0.00	1.08
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
HB058-M12-XXXF(5/8")	A	No	CaAa (Out Of Face)	83.00 - 2.00	1	No Ice	0.00	0.24
						1/2" Ice	0.00	0.00
						1" Ice	0.00	0.00
						2" Ice	0.00	0.00
						4" Ice	0.00	0.00
2" Rigid Conduit	A	No	Inside Pole	83.00 - 2.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	2.80
						1" Ice	0.00	2.80
						2" Ice	0.00	2.80
						4" Ice	0.00	2.80
2" Rigid Conduit	A	No	CaAa (Out Of Face)	83.00 - 2.00	1	No Ice	0.00	2.80
						1/2" Ice	0.00	4.33
						1" Ice	0.00	6.47
						2" Ice	0.00	12.57
						4" Ice	0.00	32.12
*								
AVA5-50(7/8)	C	No	Inside Pole	75.00 - 2.00	6	No Ice	0.00	0.30
						1/2" Ice	0.00	0.30
						1" Ice	0.00	0.30
						2" Ice	0.00	0.30
						4" Ice	0.00	0.30
AVA5-50(7/8)	C	No	CaAa (Out Of Face)	75.00 - 2.00	1	No Ice	0.11	0.30
						1/2" Ice	0.21	1.28
						1" Ice	0.31	2.87
						2" Ice	0.51	7.88
						4" Ice	0.91	25.23
AVA5-50(7/8)	C	No	CaAa (Out Of Face)	75.00 - 2.00	5	No Ice	0.00	0.30
						1/2" Ice	0.00	1.28
						1" Ice	0.00	2.87
						2" Ice	0.00	7.88
						4" Ice	0.00	25.23
AVA7-50(1-5/8)	C	No	CaAa (Out Of Face)	75.00 - 2.00	1	No Ice	0.20	0.70
						1/2" Ice	0.30	2.23
						1" Ice	0.40	4.38
						2" Ice	0.60	10.50
						4" Ice	1.00	30.07
*								
LDF4-50A(1/2")	C	No	Inside Pole	57.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	1.386	0.10

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.00
L2	85.00-65.00	A	0.000	0.000	0.000	0.000	0.18
		B	0.000	0.000	0.000	0.396	0.28
		C	0.000	0.000	0.000	3.112	0.04
L3	65.00-32.50	A	0.000	0.000	0.000	0.000	0.33
		B	0.000	0.000	0.000	0.000	0.45
		C	0.000	0.000	0.000	10.114	0.14
L4	32.50-0.00	A	0.000	0.000	0.000	0.000	0.31
		B	0.000	0.000	0.000	0.000	0.40
		C	0.000	0.000	0.000	9.492	0.14

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	96.00-85.00	A	1.129	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	2.966	0.28
		C		0.000	0.000	0.000	0.000	0.00
L2	85.00-65.00	A	1.104	0.000	0.000	0.000	0.000	0.20
		B		0.000	0.000	0.000	0.837	0.79
		C		0.000	0.000	0.000	7.526	0.27
L3	65.00-32.50	A	1.049	0.000	0.000	0.000	0.000	0.34
		B		0.000	0.000	0.000	0.000	1.22
		C		0.000	0.000	0.000	23.750	0.82
L4	32.50-0.00	A	1.000	0.000	0.000	0.000	0.000	0.31
		B		0.000	0.000	0.000	0.000	1.11
		C		0.000	0.000	0.000	21.692	0.72

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	96.00-85.00	0.1463	0.0845	0.2448	0.1413
L2	85.00-65.00	-0.1680	0.1253	-0.3707	0.2676
L3	65.00-32.50	-0.3751	0.2166	-0.7741	0.4469
L4	32.50-0.00	-0.3536	0.2041	-0.7174	0.4142

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
800 10121 w/ Mount Pipe	A	From Leg	2.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.69 6.18 6.68 7.70 9.86	4.60 5.35 6.05 7.53 10.83	0.07 0.11 0.17 0.30 0.68
800 10121 w/ Mount Pipe	B	From Leg	2.00 0.00 0.00	5.0000	92.00	No Ice 1/2" Ice 1" Ice	5.69 6.18 6.68 7.70	4.60 5.35 6.05 7.53	0.07 0.11 0.17 0.30

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	9.86	10.83	0.68
						4" Ice			
800 10121 w/ Mount Pipe	C	From Leg	2.00	10.0000	92.00	No Ice	5.69	4.60	0.07
			0.00			1/2"	6.18	5.35	0.11
			0.00			Ice	6.68	6.05	0.17
						1" Ice	7.70	7.53	0.30
						2" Ice	9.86	10.83	0.68
						4" Ice			
(2) LGP21401	A	From Leg	2.00	10.0000	92.00	No Ice	1.29	0.36	0.01
			0.00			1/2"	1.45	0.48	0.02
			0.00			Ice	1.61	0.60	0.03
						1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
						4" Ice			
(2) LGP21401	B	From Leg	2.00	5.0000	92.00	No Ice	1.29	0.36	0.01
			0.00			1/2"	1.45	0.48	0.02
			0.00			Ice	1.61	0.60	0.03
						1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
						4" Ice			
(2) LGP21401	C	From Leg	2.00	10.0000	92.00	No Ice	1.29	0.36	0.01
			0.00			1/2"	1.45	0.48	0.02
			0.00			Ice	1.61	0.60	0.03
						1" Ice	1.97	0.87	0.05
						2" Ice	2.79	1.52	0.14
						4" Ice			
P65-17-XLH-RR w/ Mount Pipe	A	From Leg	2.00	10.0000	92.00	No Ice	11.70	8.94	0.09
			0.00			1/2"	12.42	10.45	0.18
			0.00			Ice	13.15	11.99	0.27
						1" Ice	14.64	14.31	0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
P65-17-XLH-RR w/ Mount Pipe	B	From Leg	2.00	5.0000	92.00	No Ice	11.70	8.94	0.09
			0.00			1/2"	12.42	10.45	0.18
			0.00			Ice	13.15	11.99	0.27
						1" Ice	14.64	14.31	0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
P65-17-XLH-RR w/ Mount Pipe	C	From Leg	2.00	10.0000	92.00	No Ice	11.70	8.94	0.09
			0.00			1/2"	12.42	10.45	0.18
			0.00			Ice	13.15	11.99	0.27
						1" Ice	14.64	14.31	0.50
						2" Ice	17.91	19.14	1.13
						4" Ice			
DC6-48-60-18-8F	A	From Leg	2.00	10.0000	92.00	No Ice	2.57	2.57	0.02
			0.00			1/2"	2.80	2.80	0.04
			0.00			Ice	3.04	3.04	0.07
						1" Ice	3.54	3.54	0.13
						2" Ice	4.66	4.66	0.30
						4" Ice			
(2) RRUS-11	A	From Leg	2.00	10.0000	92.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS-11	B	From Leg	2.00	5.0000	92.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09
						1" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS-11	B	From Leg	2.00	5.0000	92.00	No Ice	3.26	1.38	0.05
			0.00			1/2"	3.50	1.56	0.07
			0.00			Ice	3.75	1.74	0.09

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" Ice	4.28	2.15	0.15
						2" Ice	5.44	3.05	0.31
						4" Ice			
RRUS-11	C	From Leg	2.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.26 3.50 3.75 4.28 5.44	1.38 1.56 1.74 2.15 3.05	0.05 0.07 0.09 0.15 0.31
RRUS-11	C	From Leg	2.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.26 3.50 3.75 4.28 5.44	1.38 1.56 1.74 2.15 3.05	0.05 0.07 0.09 0.15 0.31
HPA-65R-BUU-H8 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.53 14.34 15.14 16.71 19.95	9.58 11.05 12.50 14.75 19.46	0.10 0.20 0.30 0.55 1.22
RRUS-11	A	From Leg	4.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.26 3.50 3.75 4.28 5.44	1.38 1.56 1.74 2.15 3.05	0.05 0.07 0.09 0.15 0.31
RRUS12/RRUS A2	A	From Leg	4.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
HPA-65R-BUU-H8 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	5.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.53 14.34 15.14 16.71 19.95	9.58 11.05 12.50 14.75 19.46	0.10 0.20 0.30 0.55 1.22
RRUS12/RRUS A2	B	From Leg	4.00 0.00 0.00	5.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
HPA-65R-BUU-H8 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	13.53 14.34 15.14 16.71 19.95	9.58 11.05 12.50 14.75 19.46	0.10 0.20 0.30 0.55 1.22
RRUS12/RRUS A2	C	From Leg	4.00 0.00 0.00	10.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.67 3.92 4.19 4.74 5.96	2.14 2.35 2.56 3.02 4.03	0.07 0.10 0.13 0.20 0.40
T-Arm Mount [TA 702-3]	C	None		0.0000	92.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.64 6.55 7.46 9.28 12.92	5.64 6.55 7.46 9.28 12.92	0.34 0.43 0.52 0.70 1.06
****									
840 10045 w/ Mount Pipe	A	From Leg	4.00	40.0000	83.00	No Ice	5.41	2.39	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	5.83	2.92	0.09
			-1.00			Ice	6.26	3.47	0.13
						1" Ice	7.16	4.61	0.23
						2" Ice	9.09	7.32	0.53
						4" Ice			
840 10045 w/ Mount Pipe	B	From Leg	4.00	40.0000	83.00	No Ice	5.41	2.39	0.05
			0.00			1/2"	5.83	2.92	0.09
			-1.00			Ice	6.26	3.47	0.13
						1" Ice	7.16	4.61	0.23
						2" Ice	9.09	7.32	0.53
						4" Ice			
840 10045 w/ Mount Pipe	C	From Leg	4.00	40.0000	83.00	No Ice	5.41	2.39	0.05
			0.00			1/2"	5.83	2.92	0.09
			-1.00			Ice	6.26	3.47	0.13
						1" Ice	7.16	4.61	0.23
						2" Ice	9.09	7.32	0.53
						4" Ice			
WIMAX DAP HEAD	A	From Leg	4.00	40.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			-1.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
WIMAX DAP HEAD	B	From Leg	4.00	40.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			-1.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
WIMAX DAP HEAD	C	From Leg	4.00	40.0000	83.00	No Ice	1.80	0.78	0.03
			0.00			1/2"	1.99	0.92	0.04
			-1.00			Ice	2.18	1.07	0.06
						1" Ice	2.59	1.39	0.09
						2" Ice	3.51	2.14	0.20
						4" Ice			
Horizon DUO	A	From Leg	4.00	-10.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2"	0.65	0.43	0.01
			3.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
Horizon DUO	B	From Leg	4.00	-40.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2"	0.65	0.43	0.01
			3.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
Horizon DUO	C	From Leg	4.00	20.0000	83.00	No Ice	0.55	0.34	0.01
			0.00			1/2"	0.65	0.43	0.01
			3.00			Ice	0.76	0.52	0.02
						1" Ice	1.00	0.73	0.04
						2" Ice	1.60	1.25	0.10
						4" Ice			
12"x12"x6" Junction Box	A	From Leg	4.00	0.0000	83.00	No Ice	1.40	0.70	0.03
			0.00			1/2"	1.56	0.82	0.04
			1.00			Ice	1.73	0.95	0.05
						1" Ice	2.09	1.24	0.08
						2" Ice	2.92	1.91	0.18
						4" Ice			
Pipe Mount 2 x 6'	A	From Leg	4.00	40.0000	83.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice	4.70	4.70	0.23
						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
Pipe Mount 2 x 6'	B	From Leg	4.00 0.00 0.00	40.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
Pipe Mount 2 x 6'	C	From Leg	4.00 0.00 0.00	40.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.43 1.92 2.29 3.06 4.70	1.43 1.92 2.29 3.06 4.70	0.02 0.03 0.05 0.09 0.23
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	45.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	90.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	85.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	8.50 9.15 9.77 11.03 13.68	6.95 8.13 9.02 10.84 14.85	0.08 0.15 0.23 0.41 0.91
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	45.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	90.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	85.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.13 7.66 8.18 9.26 11.53	4.96 5.75 6.47 8.01 11.41	0.08 0.13 0.19 0.34 0.75
TD-RRH8x20-25	A	From Leg	4.00 0.00 0.00	45.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	B	From Leg	4.00 0.00 0.00	90.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40
TD-RRH8x20-25	C	From Leg	4.00 0.00 0.00	85.0000	83.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.72 5.01 5.32 5.95 7.31	1.70 1.92 2.15 2.62 3.68	0.07 0.10 0.13 0.20 0.40

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			
Platform Mount [LP 502-1]	C	None		0.0000	83.00	No Ice	32.35	32.35	0.93
						1/2" Ice	45.67	45.67	1.19
						1" Ice	58.99	58.99	1.46
						2" Ice	85.63	85.63	2.00
						4" Ice	138.91	138.91	3.07
***									
800MHz 2X50W RRH W/FILTER	A	From Leg	1.50 0.00 1.00	45.0000	79.00	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09
						1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
800MHz 2X50W RRH W/FILTER	B	From Leg	1.50 0.00 1.00	90.0000	79.00	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09
						1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
800MHz 2X50W RRH W/FILTER	C	From Leg	1.50 0.00 1.00	85.0000	79.00	No Ice	2.40	2.25	0.06
						1/2" Ice	2.61	2.46	0.09
						1" Ice	2.83	2.68	0.11
						2" Ice	3.30	3.13	0.17
						4" Ice	4.34	4.15	0.34
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.50 0.00 -2.00	45.0000	79.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.50 0.00 -2.00	90.0000	79.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.50 0.00 -2.00	85.0000	79.00	No Ice	2.71	2.61	0.06
						1/2" Ice	2.95	2.85	0.08
						1" Ice	3.20	3.09	0.11
						2" Ice	3.72	3.61	0.17
						4" Ice	4.86	4.74	0.35
Pipe Mount 2 x 4'	A	From Leg	1.50 0.00 0.00	45.0000	79.00	No Ice	0.87	0.87	0.01
						1/2" Ice	1.11	1.11	0.02
						1" Ice	1.36	1.36	0.03
						2" Ice	1.90	1.90	0.06
						4" Ice	3.23	3.23	0.16
Pipe Mount 2 x 4'	B	From Leg	1.50 0.00 0.00	90.0000	79.00	No Ice	0.87	0.87	0.01
						1/2" Ice	1.11	1.11	0.02
						1" Ice	1.36	1.36	0.03
						2" Ice	1.90	1.90	0.06
						4" Ice	3.23	3.23	0.16
Pipe Mount 2 x 4'	C	From Leg	1.50 0.00 0.00	85.0000	79.00	No Ice	0.87	0.87	0.01
						1/2" Ice	1.11	1.11	0.02
						1" Ice	1.36	1.36	0.03
						2" Ice	1.90	1.90	0.06
						4" Ice	3.23	3.23	0.16
Side Arm Mount [SO 102-3)	C	None		0.0000	79.00	No Ice	3.00	3.00	0.08
						1/2" Ice	3.48	3.48	0.11
							3.96	3.96	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	4.92	4.92	0.20
						2" Ice	6.84	6.84	0.32
						4" Ice			
***									
E15S08P80	A	From Leg	4.00	60.0000	75.00	No Ice	0.89	0.36	0.01
			0.00			1/2" Ice	1.02	0.46	0.02
			2.00			1" Ice	1.16	0.57	0.02
						2" Ice	1.47	0.81	0.04
						4" Ice	2.18	1.41	0.11
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00	60.0000	75.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			2.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00	60.0000	75.00	No Ice	6.81	5.63	0.11
			0.00			1/2" Ice	7.33	6.47	0.17
			2.00			1" Ice	7.85	7.24	0.23
						2" Ice	8.91	8.85	0.38
						4" Ice	11.16	12.27	0.81
E15S08P80	B	From Leg	4.00	60.0000	75.00	No Ice	0.89	0.36	0.01
			0.00			1/2" Ice	1.02	0.46	0.02
			2.00			1" Ice	1.16	0.57	0.02
						2" Ice	1.47	0.81	0.04
						4" Ice	2.18	1.41	0.11
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00	60.0000	75.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			2.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00	60.0000	75.00	No Ice	6.81	5.63	0.11
			0.00			1/2" Ice	7.33	6.47	0.17
			2.00			1" Ice	7.85	7.24	0.23
						2" Ice	8.91	8.85	0.38
						4" Ice	11.16	12.27	0.81
E15S08P80	C	From Leg	4.00	60.0000	75.00	No Ice	0.89	0.36	0.01
			0.00			1/2" Ice	1.02	0.46	0.02
			2.00			1" Ice	1.16	0.57	0.02
						2" Ice	1.47	0.81	0.04
						4" Ice	2.18	1.41	0.11
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	60.0000	75.00	No Ice	6.83	5.64	0.11
			0.00			1/2" Ice	7.35	6.48	0.17
			2.00			1" Ice	7.86	7.26	0.23
						2" Ice	8.93	8.86	0.38
						4" Ice	11.18	12.29	0.81
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00	60.0000	75.00	No Ice	6.81	5.63	0.11
			0.00			1/2" Ice	7.33	6.47	0.17
			2.00			1" Ice	7.85	7.24	0.23
						2" Ice	8.91	8.85	0.38
						4" Ice	11.16	12.27	0.81
Platform Mount [LP 304-1]	C	None		0.0000	75.00	No Ice	17.46	17.46	1.35
						1/2" Ice	22.44	22.44	1.62
						1" Ice	27.42	27.42	1.90
						2" Ice	37.38	37.38	2.45
						4" Ice	57.30	57.30	3.55
***									

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
GPS_A	B	From Leg	3.00 0.00 1.00	50.0000	57.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.30 0.37 0.46 0.65 1.15	0.30 0.37 0.46 0.65 1.15	0.00 0.00 0.01 0.02 0.08
4.5' x 2" horizontal mount pipe	B	From Leg	0.00 0.00 0.00	50.0000	57.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.02 0.05 0.09 0.20 0.56	0.02 0.05 0.09 0.20 0.56	0.03 0.03 0.03 0.04 0.06
***									

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
A-ANT-11G-4-C	A	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	-10.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.08 14.63 15.19 16.31 18.55	0.12 0.20 0.27 0.42 0.72
VHLP2-180	B	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	-40.0000		83.00	2.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.14 3.41 3.68 4.21 5.28	0.03 0.04 0.06 0.09 0.16
A-ANT-11G-4-C	C	Paraboloid w/Shroud (HP)	From Leg	4.00 0.00 3.00	20.0000		83.00	4.23	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	14.08 14.63 15.19 16.31 18.55	0.12 0.20 0.27 0.42 0.72
***											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp

Comb. No.	Description
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	96 - 85	Pole	Max Tension	5	0.00	-0.00	-0.00
			Max. Compression	14	-6.28	0.78	1.10
			Max. Mx	11	-2.76	34.32	0.36
			Max. My	2	-2.76	0.08	34.18
			Max. Vy	5	5.86	-33.74	0.62
			Max. Vx	8	5.81	0.58	-33.38
			Max. Torque	13			0.99
L2	85 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-20.70	0.24	0.91
			Max. Mx	5	-10.98	-266.70	3.24
			Max. My	8	-10.97	4.62	-269.01
			Max. Vy	5	13.95	-266.70	3.24
			Max. Vx	8	14.12	4.62	-269.01
			Max. Torque	13			1.92
L3	65 - 32.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-31.38	-0.16	-0.37
			Max. Mx	5	-18.18	-765.36	7.60
			Max. My	8	-18.18	11.62	-773.10
			Max. Vy	5	16.64	-765.36	7.60
			Max. Vx	8	16.82	11.62	-773.10
			Max. Torque	13			1.99
L4	32.5 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-43.72	-0.52	-1.48
			Max. Mx	5	-27.41	-1343.21	11.96
			Max. My	8	-27.41	18.61	-1356.39
			Max. Vy	5	18.88	-1343.21	11.96
			Max. Vx	8	19.06	18.61	-1356.39
			Max. Torque	13			2.07

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	14	43.72	-0.00	-0.00
	Max. H_x	11	27.42	18.79	-0.08
	Max. H_z	2	27.42	-0.22	18.90
	Max. M_x	2	1345.87	-0.22	18.90
	Max. M_z	5	1343.21	-18.87	0.13
	Max. Torsion	13	2.07	9.34	16.26
	Min. Vert	5	27.42	-18.87	0.13
	Min. H_x	5	27.42	-18.87	0.13
	Min. H_z	8	27.42	0.22	-19.05
	Min. M_x	8	-1356.39	0.22	-19.05
	Min. M_z	11	-1335.35	18.79	-0.08
	Min. Torsion	7	-1.79	-9.43	-16.36

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	27.42	0.00	-0.00	-1.08	-0.11	0.00
Dead+Wind 0 deg - No Ice	27.42	0.22	-18.90	-1345.87	-18.61	-1.62
Dead+Wind 30 deg - No Ice	27.42	9.67	-16.45	-1172.75	-691.37	-0.19
Dead+Wind 60 deg - No Ice	27.42	16.43	-9.68	-692.94	-1170.15	-0.21
Dead+Wind 90 deg - No Ice	27.42	18.87	-0.13	-11.96	-1343.21	0.31
Dead+Wind 120 deg - No Ice	27.42	16.31	9.44	670.82	-1160.35	1.43
Dead+Wind 150 deg - No Ice	27.42	9.43	16.36	1162.85	-671.08	1.79
Dead+Wind 180 deg - No Ice	27.42	-0.22	19.05	1356.39	18.61	1.53
Dead+Wind 210 deg - No Ice	27.42	-9.58	16.56	1179.62	683.91	0.37
Dead+Wind 240 deg - No Ice	27.42	-16.28	9.71	693.54	1157.23	0.10
Dead+Wind 270 deg - No Ice	27.42	-18.79	0.08	5.25	1335.35	-0.14
Dead+Wind 300 deg - No Ice	27.42	-16.20	-9.32	-662.63	1150.84	-1.30
Dead+Wind 330 deg - No Ice	27.42	-9.34	-16.26	-1155.77	663.34	-2.07
Dead+Ice+Temp	43.72	0.00	0.00	1.48	-0.52	0.00
Dead+Wind 0 deg+Ice+Temp	43.72	0.05	-5.35	-387.07	-4.42	-0.38
Dead+Wind 30 deg+Ice+Temp	43.72	2.73	-4.65	-336.38	-199.17	-0.06
Dead+Wind 60 deg+Ice+Temp	43.72	4.65	-2.72	-196.95	-338.52	-0.09
Dead+Wind 90 deg+Ice+Temp	43.72	5.35	-0.02	-0.52	-389.25	0.03
Dead+Wind 120 deg+Ice+Temp	43.72	4.63	2.68	196.14	-336.79	0.31
Dead+Wind 150 deg+Ice+Temp	43.72	2.68	4.64	338.11	-195.32	0.41
Dead+Wind 180 deg+Ice+Temp	43.72	-0.05	5.39	393.11	3.41	0.36
Dead+Wind 210 deg+Ice+Temp	43.72	-2.71	4.68	341.54	196.41	0.11
Dead+Wind 240 deg+Ice+Temp	43.72	-4.62	2.73	200.61	334.46	0.06
Dead+Wind 270 deg+Ice+Temp	43.72	-5.33	0.01	2.41	386.41	0.01
Dead+Wind 300 deg+Ice+Temp	43.72	-4.61	-2.65	-190.66	333.55	-0.28
Dead+Wind 330 deg+Ice+Temp	43.72	-2.66	-4.61	-332.88	192.48	-0.48
Dead+Wind 0 deg - Service	27.42	0.08	-7.39	-526.79	-7.34	-0.63
Dead+Wind 30 deg - Service	27.42	3.78	-6.43	-459.12	-270.33	-0.08
Dead+Wind 60 deg - Service	27.42	6.42	-3.78	-271.54	-457.50	-0.08
Dead+Wind 90 deg - Service	27.42	7.38	-0.05	-5.34	-525.18	0.12
Dead+Wind 120 deg - Service	27.42	6.38	3.69	261.56	-453.67	0.56
Dead+Wind 150 deg - Service	27.42	3.69	6.40	453.91	-262.40	0.70
Dead+Wind 180 deg -	27.42	-0.09	7.45	529.57	7.20	0.60

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Service						
Dead+Wind 210 deg - Service	27.42	-3.75	6.47	460.46	267.28	0.14
Dead+Wind 240 deg - Service	27.42	-6.36	3.80	270.45	452.32	0.04
Dead+Wind 270 deg - Service	27.42	-7.34	0.03	1.38	521.97	-0.06
Dead+Wind 300 deg - Service	27.42	-6.33	-3.64	-259.70	449.82	-0.51
Dead+Wind 330 deg - Service	27.42	-3.65	-6.35	-452.48	259.24	-0.81

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.00	-27.42	0.00	0.00	27.42	0.00	0.000%
2	0.22	-27.42	-18.90	-0.22	27.42	18.90	0.001%
3	9.67	-27.42	-16.45	-9.67	27.42	16.45	0.001%
4	16.43	-27.42	-9.68	-16.43	27.42	9.68	0.000%
5	18.88	-27.42	-0.13	-18.87	27.42	0.13	0.003%
6	16.31	-27.42	9.44	-16.31	27.42	-9.44	0.000%
7	9.43	-27.42	16.36	-9.43	27.42	-16.36	0.001%
8	-0.22	-27.42	19.05	0.22	27.42	-19.05	0.001%
9	-9.58	-27.42	16.56	9.58	27.42	-16.56	0.000%
10	-16.28	-27.42	9.71	16.28	27.42	-9.71	0.001%
11	-18.79	-27.42	0.08	18.79	27.42	-0.08	0.003%
12	-16.20	-27.42	-9.33	16.20	27.42	9.32	0.001%
13	-9.34	-27.42	-16.26	9.34	27.42	16.26	0.000%
14	0.00	-43.72	0.00	-0.00	43.72	-0.00	0.000%
15	0.05	-43.72	-5.35	-0.05	43.72	5.35	0.000%
16	2.73	-43.72	-4.65	-2.73	43.72	4.65	0.000%
17	4.65	-43.72	-2.72	-4.65	43.72	2.72	0.000%
18	5.35	-43.72	-0.02	-5.35	43.72	0.02	0.000%
19	4.63	-43.72	2.68	-4.63	43.72	-2.68	0.000%
20	2.68	-43.72	4.64	-2.68	43.72	-4.64	0.000%
21	-0.05	-43.72	5.39	0.05	43.72	-5.39	0.000%
22	-2.71	-43.72	4.68	2.71	43.72	-4.68	0.000%
23	-4.62	-43.72	2.73	4.62	43.72	-2.73	0.000%
24	-5.33	-43.72	0.01	5.33	43.72	-0.01	0.000%
25	-4.61	-43.72	-2.65	4.61	43.72	2.65	0.000%
26	-2.66	-43.72	-4.61	2.66	43.72	4.61	0.000%
27	0.08	-27.42	-7.39	-0.08	27.42	7.39	0.002%
28	3.78	-27.42	-6.43	-3.78	27.42	6.43	0.002%
29	6.42	-27.42	-3.78	-6.42	27.42	3.78	0.002%
30	7.38	-27.42	-0.05	-7.38	27.42	0.05	0.002%
31	6.38	-27.42	3.69	-6.38	27.42	-3.69	0.002%
32	3.69	-27.42	6.40	-3.69	27.42	-6.40	0.002%
33	-0.09	-27.42	7.45	0.09	27.42	-7.45	0.002%
34	-3.75	-27.42	6.47	3.75	27.42	-6.47	0.002%
35	-6.36	-27.42	3.80	6.36	27.42	-3.80	0.002%
36	-7.34	-27.42	0.03	7.34	27.42	-0.03	0.002%
37	-6.33	-27.42	-3.64	6.33	27.42	3.64	0.002%
38	-3.65	-27.42	-6.35	3.65	27.42	6.35	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00007650

3	Yes	9	0.00000001	0.00014174
4	Yes	10	0.00000001	0.00003751
5	Yes	8	0.00000001	0.00012981
6	Yes	10	0.00000001	0.00004462
7	Yes	9	0.00000001	0.00011872
8	Yes	9	0.00000001	0.00008140
9	Yes	10	0.00000001	0.00003809
10	Yes	9	0.00000001	0.00014000
11	Yes	8	0.00000001	0.00012757
12	Yes	9	0.00000001	0.00011499
13	Yes	10	0.00000001	0.00005018
14	Yes	6	0.00000001	0.00000001
15	Yes	10	0.00000001	0.00006304
16	Yes	10	0.00000001	0.00006476
17	Yes	10	0.00000001	0.00006481
18	Yes	10	0.00000001	0.00006317
19	Yes	10	0.00000001	0.00006430
20	Yes	10	0.00000001	0.00006435
21	Yes	10	0.00000001	0.00006370
22	Yes	10	0.00000001	0.00006502
23	Yes	10	0.00000001	0.00006443
24	Yes	10	0.00000001	0.00006279
25	Yes	10	0.00000001	0.00006356
26	Yes	10	0.00000001	0.00006372
27	Yes	8	0.00000001	0.00007746
28	Yes	8	0.00000001	0.00005893
29	Yes	8	0.00000001	0.00006210
30	Yes	8	0.00000001	0.00006363
31	Yes	8	0.00000001	0.00007922
32	Yes	8	0.00000001	0.00006538
33	Yes	8	0.00000001	0.00007733
34	Yes	8	0.00000001	0.00006346
35	Yes	8	0.00000001	0.00005835
36	Yes	8	0.00000001	0.00006305
37	Yes	8	0.00000001	0.00005918
38	Yes	8	0.00000001	0.00009305

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	4.554	28	0.3670	0.0018
L2	85 - 65	3.727	28	0.3298	0.0013
L3	65 - 32.5	2.389	28	0.3004	0.0009
L4	32.5 - 0	0.679	28	0.1828	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
92.00	800 10121 w/ Mount Pipe	28	4.249	0.3520	0.0017	36519
86.00	A-ANT-11G-4-C	28	3.800	0.3325	0.0015	19391
83.00	840 10045 w/ Mount Pipe	28	3.583	0.3252	0.0015	18225
79.00	800MHz 2X50W RRH W/FILTER	28	3.304	0.3182	0.0014	20749
75.00	E15S08P80	28	3.034	0.3131	0.0013	24842
57.00	GPS_A	28	1.897	0.2823	0.0009	22543

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	96 - 85	11.636	9	0.9349	0.0046
L2	85 - 65	9.531	9	0.8428	0.0033
L3	65 - 32.5	6.111	9	0.7682	0.0023
L4	32.5 - 0	1.738	9	0.4677	0.0010

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
92.00	800 10121 w/ Mount Pipe	9	10.859	0.8974	0.0043	14589
86.00	A-ANT-11G-4-C	9	9.717	0.8492	0.0039	7743
83.00	840 10045 w/ Mount Pipe	9	9.164	0.8315	0.0037	7267
79.00	800MHz 2X50W RRH W/FILTER	9	8.451	0.8141	0.0035	8246
75.00	E15S08P80	9	7.761	0.8011	0.0032	9844
57.00	GPS_A	9	4.852	0.7216	0.0022	8819

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	96 - 95	P12x.5	11.00	0.00	0.0	21.000	19.2423	-0.11	404.09	0.000 *
	95 - 94					21.000	19.2423	-0.22	404.09	0.001 *
	94 - 93					21.000	19.2423	-0.22	404.09	0.001
	93 - 92					21.000	19.2423	-0.30	404.09	0.001
	92 - 91					21.000	19.2423	-2.06	404.09	0.005
	91 - 90					21.000	19.2423	-2.13	404.09	0.005
	90 - 89					21.000	19.2423	-2.20	404.09	0.005
	89 - 88					21.000	19.2423	-2.28	404.09	0.006
	88 - 87					21.000	19.2423	-2.35	404.09	0.006
	87 - 86					21.000	19.2423	-2.43	404.09	0.006
	86 - 85					21.000	19.2423	-2.76	404.09	0.007
L2	85 - 84	P42x3/8	20.00	0.00	0.0	22.711	49.0383	-2.95	1113.69	0.003
	84 - 83					22.711	49.0383	-3.14	1113.69	0.003
	83 - 82					22.711	49.0383	-5.24	1113.69	0.005
	82 - 81					22.711	49.0383	-5.43	1113.69	0.005
	81 - 80					22.711	49.0383	-5.62	1113.69	0.005
	80 - 79					22.711	49.0383	-5.82	1113.69	0.005
	79 - 78					22.711	49.0383	-6.47	1113.69	0.006
	78 - 77					22.711	49.0383	-6.66	1113.69	0.006
	77 - 76					22.711	49.0383	-6.85	1113.69	0.006
	76 - 75					22.711	49.0383	-7.04	1113.69	0.006
	75 - 74					22.711	49.0383	-9.24	1113.69	0.008
	74 - 73					22.711	49.0383	-9.43	1113.69	0.008
	73 - 72					22.711	49.0383	-9.63	1113.69	0.009
	72 - 71					22.711	49.0383	-9.82	1113.69	0.009
	71 - 70					22.711	49.0383	-10.01	1113.69	0.009
	70 - 69					22.711	49.0383	-10.20	1113.69	0.009
	69 - 68					22.711	49.0383	-10.39	1113.69	0.009
	68 - 67					22.711	49.0383	-10.59	1113.69	0.010
	67 - 66					22.711	49.0383	-10.78	1113.69	0.010
	66 - 65					22.711	49.0383	-10.97	1113.69	0.010
L3	65 - 63.375	P48x3/8	32.50	0.00	0.0	21.972	56.1069	-11.33	1232.77	0.009
	63.375 - 61.75					21.972	56.1069	-11.68	1232.77	0.009

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 $\frac{P}{P_a}$
	61.75 - 60.125					21.972	56.1069	-12.04	1232.77	0.010
	60.125 - 58.5					21.972	56.1069	-12.40	1232.77	0.010
	58.5 - 56.875					21.972	56.1069	-12.79	1232.77	0.010
	56.875 - 55.25					21.972	56.1069	-13.14	1232.77	0.011
	55.25 - 53.625					21.972	56.1069	-13.50	1232.77	0.011
	53.625 - 52					21.972	56.1069	-13.86	1232.77	0.011
	52 - 50.375					21.972	56.1069	-14.22	1232.77	0.012
	50.375 - 48.75					21.972	56.1069	-14.58	1232.77	0.012
	48.75 - 47.125					21.972	56.1069	-14.94	1232.77	0.012
	47.125 - 45.5					21.972	56.1069	-15.29	1232.77	0.012
	45.5 - 43.875					21.972	56.1069	-15.65	1232.77	0.013
	43.875 - 42.25					21.972	56.1069	-16.01	1232.77	0.013
	42.25 - 40.625					21.972	56.1069	-16.37	1232.77	0.013
	40.625 - 39					21.972	56.1069	-16.73	1232.77	0.014
	39 - 37.375					21.972	56.1069	-17.10	1232.77	0.014
	37.375 - 35.75					21.972	56.1069	-17.46	1232.77	0.014
	35.75 - 34.125					21.972	56.1069	-17.82	1232.77	0.014
	34.125 - 32.5					21.972	56.1069	-18.18	1232.77	0.015
L4	32.5 - 30.875	P48x1/2	32.50	0.00	0.0	23.696	74.6128	-18.64	1768.01	0.011
	30.875 - 29.25					23.696	74.6128	-19.10	1768.01	0.011
	29.25 - 27.625					23.696	74.6128	-19.56	1768.01	0.011
	27.625 - 26					23.696	74.6128	-20.02	1768.01	0.011
	26 - 24.375					23.696	74.6128	-20.48	1768.01	0.012
	24.375 - 22.75					23.696	74.6128	-20.94	1768.01	0.012
	22.75 - 21.125					23.696	74.6128	-21.40	1768.01	0.012
	21.125 - 19.5					23.696	74.6128	-21.86	1768.01	0.012
	19.5 - 17.875					23.696	74.6128	-22.32	1768.01	0.013
	17.875 - 16.25					23.696	74.6128	-22.78	1768.01	0.013
	16.25 - 14.625					23.696	74.6128	-23.24	1768.01	0.013
	14.625 - 13					23.696	74.6128	-23.70	1768.01	0.013
	13 - 11.375					23.696	74.6128	-24.17	1768.01	0.014
	11.375 - 9.75					23.696	74.6128	-24.63	1768.01	0.014
	9.75 - 8.125					23.696	74.6128	-25.09	1768.01	0.014
	8.125 - 6.5					23.696	74.6128	-25.56	1768.01	0.014
	6.5 - 4.875					23.696	74.6128	-26.02	1768.01	0.015
	4.875 - 3.25					23.696	74.6128	-26.48	1768.01	0.015
	3.25 - 1.625					23.696	74.6128	-26.95	1768.01	0.015
	1.625 - 0					23.696	74.6128	-27.41	1768.01	0.016

* DL controls

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	96 - 95	P12x.5	0.01	0.002	23.100	0.000	0.00	0.000	23.100	0.000
	95 - 94		0.02	0.005	23.100	0.000	0.00	0.000	23.100	0.000
	94 - 93		0.14	0.029	23.100	0.001	0.00	0.000	23.100	0.000
	93 - 92		0.24	0.050	23.100	0.002	0.00	0.000	23.100	0.000
	92 - 91		5.07	1.072	23.100	0.046	0.00	0.000	23.100	0.000
	91 - 90		9.69	2.051	23.100	0.089	0.00	0.000	23.100	0.000
	90 - 89		14.34	3.035	23.100	0.131	0.00	0.000	23.100	0.000
	89 - 88		19.03	4.026	23.100	0.174	0.00	0.000	23.100	0.000
	88 - 87		23.74	5.022	23.100	0.217	0.00	0.000	23.100	0.000
	87 - 86		28.47	6.025	23.100	0.261	0.00	0.000	23.100	0.000
	86 - 85		34.32	7.263	23.100	0.314	0.00	0.000	23.100	0.000
L2	85 - 84	P42x3/8	40.13	0.952	22.711	0.042	0.00	0.000	22.711	0.000
	84 - 83		46.10	1.094	22.711	0.048	0.00	0.000	22.711	0.000
	83 - 82		55.79	1.324	22.711	0.058	0.00	0.000	22.711	0.000
	82 - 81		65.86	1.562	22.711	0.069	0.00	0.000	22.711	0.000
	81 - 80		76.01	1.803	22.711	0.079	0.00	0.000	22.711	0.000
	80 - 79		86.24	2.046	22.711	0.090	0.00	0.000	22.711	0.000
	79 - 78		96.98	2.301	22.711	0.101	0.00	0.000	22.711	0.000

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 $\frac{f_{by}}{F_{by}}$
	78 - 77		108.11	2.565	22.711	0.113	0.00	0.000	22.711	0.000
	77 - 76		119.33	2.831	22.711	0.125	0.00	0.000	22.711	0.000
	76 - 75		130.63	3.099	22.711	0.136	0.00	0.000	22.711	0.000
	75 - 74		146.80	3.483	22.711	0.153	0.00	0.000	22.711	0.000
	74 - 73		160.28	3.803	22.711	0.167	0.00	0.000	22.711	0.000
	73 - 72		173.84	4.125	22.711	0.182	0.00	0.000	22.711	0.000
	72 - 71		187.49	4.448	22.711	0.196	0.00	0.000	22.711	0.000
	71 - 70		201.21	4.774	22.711	0.210	0.00	0.000	22.711	0.000
	70 - 69		215.01	5.101	22.711	0.225	0.00	0.000	22.711	0.000
	69 - 68		228.90	5.431	22.711	0.239	0.00	0.000	22.711	0.000
	68 - 67		242.86	5.762	22.711	0.254	0.00	0.000	22.711	0.000
	67 - 66		256.91	6.095	22.711	0.268	0.00	0.000	22.711	0.000
	66 - 65		271.03	6.430	22.711	0.283	0.00	0.000	22.711	0.000
L3	65 - 63.375	P48x3/8	294.16	5.325	21.972	0.242	0.00	0.000	21.972	0.000
	63.375 - 61.75		317.59	5.750	21.972	0.262	0.00	0.000	21.972	0.000
	61.75 - 60.125		341.25	6.178	21.972	0.281	0.00	0.000	21.972	0.000
	60.125 - 58.5		365.14	6.610	21.972	0.301	0.00	0.000	21.972	0.000
	58.5 - 56.875		389.28	7.047	21.972	0.321	0.00	0.000	21.972	0.000
	56.875 - 55.25		413.65	7.489	21.972	0.341	0.00	0.000	21.972	0.000
	55.25 - 53.625		438.24	7.934	21.972	0.361	0.00	0.000	21.972	0.000
	53.625 - 52		463.06	8.383	21.972	0.382	0.00	0.000	21.972	0.000
	52 - 50.375		488.11	8.837	21.972	0.402	0.00	0.000	21.972	0.000
	50.375 - 48.75		513.37	9.294	21.972	0.423	0.00	0.000	21.972	0.000
	48.75 - 47.125		538.85	9.755	21.972	0.444	0.00	0.000	21.972	0.000
	47.125 - 45.5		564.55	10.220	21.972	0.465	0.00	0.000	21.972	0.000
	45.5 - 43.875		590.46	10.690	21.972	0.487	0.00	0.000	21.972	0.000
	43.875 - 42.25		616.59	11.163	21.972	0.508	0.00	0.000	21.972	0.000
	42.25 - 40.625		642.92	11.639	21.972	0.530	0.00	0.000	21.972	0.000
	40.625 - 39		669.46	12.120	21.972	0.552	0.00	0.000	21.972	0.000
	39 - 37.375		696.20	12.604	21.972	0.574	0.00	0.000	21.972	0.000
	37.375 - 35.75		723.15	13.092	21.972	0.596	0.00	0.000	21.972	0.000
	35.75 - 34.125		750.30	13.583	21.972	0.618	0.00	0.000	21.972	0.000
	34.125 - 32.5		777.64	14.078	21.972	0.641	0.00	0.000	21.972	0.000
L4	32.5 - 30.875	P48x1/2	805.18	11.019	23.696	0.465	0.00	0.000	23.696	0.000
	30.875 - 29.25		832.91	11.398	23.696	0.481	0.00	0.000	23.696	0.000
	29.25 - 27.625		860.83	11.780	23.696	0.497	0.00	0.000	23.696	0.000
	27.625 - 26		888.93	12.165	23.696	0.513	0.00	0.000	23.696	0.000
	26 - 24.375		917.23	12.552	23.696	0.530	0.00	0.000	23.696	0.000
	24.375 - 22.75		945.71	12.942	23.696	0.546	0.00	0.000	23.696	0.000
	22.75 - 21.125		974.38	13.334	23.696	0.563	0.00	0.000	23.696	0.000
	21.125 - 19.5		1003.23	13.729	23.696	0.579	0.00	0.000	23.696	0.000
	19.5 - 17.875		1032.27	14.126	23.696	0.596	0.00	0.000	23.696	0.000
	17.875 - 16.25		1061.49	14.526	23.696	0.613	0.00	0.000	23.696	0.000
	16.25 - 14.625		1090.89	14.929	23.696	0.630	0.00	0.000	23.696	0.000
	14.625 - 13		1120.47	15.333	23.696	0.647	0.00	0.000	23.696	0.000
	13 - 11.375		1150.24	15.741	23.696	0.664	0.00	0.000	23.696	0.000
	11.375 - 9.75		1180.18	16.150	23.696	0.682	0.00	0.000	23.696	0.000
	9.75 - 8.125		1210.3	16.563	23.696	0.699	0.00	0.000	23.696	0.000

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 $\frac{f_{by}}{F_{by}}$
			1							
	8.125 - 6.5		1240.60	16.977	23.696	0.716	0.00	0.000	23.696	0.000
	6.5 - 4.875		1271.08	17.394	23.696	0.734	0.00	0.000	23.696	0.000
	4.875 - 3.25		1301.72	17.814	23.696	0.752	0.00	0.000	23.696	0.000
	3.25 - 1.625		1332.55	18.235	23.696	0.770	0.00	0.000	23.696	0.000
	1.625 - 0		1363.54	18.660	23.696	0.787	0.00	0.000	23.696	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	96 - 95	P12x.5	0.00	0.000	14.000	0.000	0.00	0.000	14.000	0.000
	95 - 94		0.00	0.000	14.000	0.000	0.00	0.000	14.000	0.000
	94 - 93		0.09	0.009	14.000	0.001	0.00	0.000	14.000	0.000
	93 - 92		0.12	0.012	14.000	0.001	0.00	0.000	14.000	0.000
	92 - 91		4.61	0.479	14.000	0.034	0.33	0.035	14.000	0.002
	91 - 90		4.64	0.482	14.000	0.034	0.33	0.035	14.000	0.002
	90 - 89		4.67	0.485	14.000	0.035	0.33	0.035	14.000	0.002
	89 - 88		4.70	0.488	14.000	0.035	0.33	0.035	14.000	0.002
	88 - 87		4.72	0.491	14.000	0.035	0.33	0.035	14.000	0.002
	87 - 86		4.75	0.494	14.000	0.035	0.33	0.035	14.000	0.002
	86 - 85		5.77	0.600	14.000	0.043	0.69	0.073	14.000	0.005
L2	85 - 84	P42x3/8	5.85	0.239	16.800	0.014	0.69	0.008	12.473	0.001
	84 - 83		6.05	0.247	16.800	0.015	0.55	0.007	12.473	0.001
	83 - 82		10.01	0.408	16.800	0.024	0.26	0.003	12.473	0.000
	82 - 81		10.11	0.412	16.800	0.025	0.14	0.002	12.473	0.000
	81 - 80		10.19	0.415	16.800	0.025	0.14	0.002	12.473	0.000
	80 - 79		10.27	0.419	16.800	0.025	0.14	0.002	12.473	0.000
	79 - 78		11.09	0.452	16.800	0.027	0.15	0.002	12.473	0.000
	78 - 77		11.17	0.456	16.800	0.027	0.15	0.002	12.473	0.000
	77 - 76		11.25	0.459	16.800	0.027	0.15	0.002	12.473	0.000
	76 - 75		11.33	0.462	16.800	0.028	0.15	0.002	12.473	0.000
	75 - 74		13.44	0.548	16.800	0.033	0.15	0.002	12.473	0.000
	74 - 73		13.52	0.551	16.800	0.033	0.15	0.002	12.473	0.000
	73 - 72		13.60	0.555	16.800	0.033	0.15	0.002	12.473	0.000
	72 - 71		13.68	0.558	16.800	0.033	0.15	0.002	12.473	0.000
	71 - 70		13.76	0.561	16.800	0.033	0.15	0.002	12.473	0.000
	70 - 69		13.84	0.564	16.800	0.034	0.15	0.002	12.473	0.000
	69 - 68		13.92	0.568	16.800	0.034	0.15	0.002	12.473	0.000
	68 - 67		14.00	0.571	16.800	0.034	0.15	0.002	12.473	0.000
	67 - 66		14.08	0.574	16.800	0.034	0.15	0.002	12.473	0.000
	66 - 65		14.16	0.577	16.800	0.034	0.15	0.002	12.473	0.000
L3	65 - 63.375	P48x3/8	14.35	0.512	16.800	0.030	0.33	0.003	11.284	0.000
	63.375 - 61.75		14.50	0.517	16.800	0.031	0.33	0.003	11.284	0.000
	61.75 - 60.125		14.64	0.522	16.800	0.031	0.34	0.003	11.284	0.000
	60.125 - 58.5		14.78	0.527	16.800	0.031	0.34	0.003	11.284	0.000
	58.5 - 56.875		14.94	0.532	16.800	0.032	0.34	0.003	11.284	0.000
	56.875 - 55.25		15.08	0.537	16.800	0.032	0.29	0.003	11.284	0.000
	55.25 - 53.625		15.21	0.542	16.800	0.032	0.30	0.003	11.284	0.000
	53.625 - 52		15.35	0.547	16.800	0.033	0.30	0.003	11.284	0.000
	52 - 50.375		15.49	0.552	16.800	0.033	0.30	0.003	11.284	0.000
	50.375 - 48.75		15.62	0.557	16.800	0.033	0.30	0.003	11.284	0.000
	48.75 - 47.125		15.76	0.562	16.800	0.033	0.31	0.003	11.284	0.000

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 $\frac{f_{vt}}{F_{vt}}$
	47.125 - 45.5		15.89	0.566	16.800	0.034	0.31	0.003	11.284	0.000
	45.5 - 43.875		16.02	0.571	16.800	0.034	0.31	0.003	11.284	0.000
	43.875 - 42.25		16.15	0.576	16.800	0.034	0.31	0.003	11.284	0.000
	42.25 - 40.625		16.28	0.580	16.800	0.035	0.32	0.003	11.284	0.000
	40.625 - 39		16.41	0.585	16.800	0.035	0.32	0.003	11.284	0.000
	39 - 37.375		16.53	0.589	16.800	0.035	0.32	0.003	11.284	0.000
	37.375 - 35.75		16.65	0.594	16.800	0.035	0.32	0.003	11.284	0.000
	35.75 - 34.125		16.78	0.598	16.800	0.036	0.33	0.003	11.284	0.000
	34.125 - 32.5		16.90	0.602	16.800	0.036	0.33	0.003	11.284	0.000
L4	32.5 - 30.875	P48x1/2	17.01	0.456	16.800	0.027	0.33	0.002	16.167	0.000
	30.875 - 29.25		17.13	0.459	16.800	0.027	0.33	0.002	16.167	0.000
	29.25 - 27.625		17.25	0.462	16.800	0.028	0.33	0.002	16.167	0.000
	27.625 - 26		17.36	0.465	16.800	0.028	0.34	0.002	16.167	0.000
	26 - 24.375		17.48	0.469	16.800	0.028	0.34	0.002	16.167	0.000
	24.375 - 22.75		17.60	0.472	16.800	0.028	0.34	0.002	16.167	0.000
	22.75 - 21.125		17.71	0.475	16.800	0.028	0.34	0.002	16.167	0.000
	21.125 - 19.5		17.82	0.478	16.800	0.028	0.34	0.002	16.167	0.000
	19.5 - 17.875		17.94	0.481	16.800	0.029	0.35	0.002	16.167	0.000
	17.875 - 16.25		18.05	0.484	16.800	0.029	0.35	0.002	16.167	0.000
	16.25 - 14.625		18.16	0.487	16.800	0.029	0.35	0.002	16.167	0.000
	14.625 - 13		18.27	0.490	16.800	0.029	0.35	0.002	16.167	0.000
	13 - 11.375		18.38	0.493	16.800	0.029	0.35	0.002	16.167	0.000
	11.375 - 9.75		18.49	0.496	16.800	0.030	0.36	0.002	16.167	0.000
	9.75 - 8.125		18.60	0.499	16.800	0.030	0.36	0.002	16.167	0.000
	8.125 - 6.5		18.71	0.502	16.800	0.030	0.36	0.002	16.167	0.000
	6.5 - 4.875		18.82	0.504	16.800	0.030	0.36	0.002	16.167	0.000
	4.875 - 3.25		18.93	0.507	16.800	0.030	0.36	0.002	16.167	0.000
	3.25 - 1.625		19.03	0.510	16.800	0.030	0.37	0.003	16.167	0.000
	1.625 - 0		19.14	0.513	16.800	0.031	0.37	0.003	16.167	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	96 - 95	0.000	0.000	0.000	0.000	0.000	0.000	1.000	H1-3+VT ✔
	95 - 94	0.001	0.000	0.000	0.000	0.000	0.001	1.000	H1-3+VT ✔
	94 - 93	0.001	0.001	0.000	0.001	0.000	0.002	1.333	H1-3+VT ✔
	93 - 92	0.001	0.002	0.000	0.001	0.000	0.003	1.333	H1-3+VT ✔
	92 - 91	0.005	0.046	0.000	0.034	0.002	0.053	1.333	H1-3+VT ✔
	91 - 90	0.005	0.089	0.000	0.034	0.002	0.095	1.333	H1-3+VT ✔
	90 - 89	0.005	0.131	0.000	0.035	0.002	0.138	1.333	H1-3+VT ✔
	89 - 88	0.006	0.174	0.000	0.035	0.002	0.181	1.333	H1-3+VT ✔

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
	88 - 87	0.006	0.217	0.000	0.035	0.002	0.225 ✔	1.333	H1-3+VT ✔
	87 - 86	0.006	0.261	0.000	0.035	0.002	0.268 ✔	1.333	H1-3+VT ✔
	86 - 85	0.007	0.314	0.000	0.043	0.005	0.324 ✔	1.333	H1-3+VT ✔
L2	85 - 84	0.003	0.042	0.000	0.014	0.001	0.045 ✔	1.333	H1-3+VT ✔
	84 - 83	0.003	0.048	0.000	0.015	0.001	0.051 ✔	1.333	H1-3+VT ✔
	83 - 82	0.005	0.058	0.000	0.024	0.000	0.064 ✔	1.333	H1-3+VT ✔
	82 - 81	0.005	0.069	0.000	0.025	0.000	0.074 ✔	1.333	H1-3+VT ✔
	81 - 80	0.005	0.079	0.000	0.025	0.000	0.085 ✔	1.333	H1-3+VT ✔
	80 - 79	0.005	0.090	0.000	0.025	0.000	0.096 ✔	1.333	H1-3+VT ✔
	79 - 78	0.006	0.101	0.000	0.027	0.000	0.108 ✔	1.333	H1-3+VT ✔
	78 - 77	0.006	0.113	0.000	0.027	0.000	0.120 ✔	1.333	H1-3+VT ✔
	77 - 76	0.006	0.125	0.000	0.027	0.000	0.132 ✔	1.333	H1-3+VT ✔
	76 - 75	0.006	0.136	0.000	0.028	0.000	0.144 ✔	1.333	H1-3+VT ✔
	75 - 74	0.008	0.153	0.000	0.033	0.000	0.163 ✔	1.333	H1-3+VT ✔
	74 - 73	0.008	0.167	0.000	0.033	0.000	0.177 ✔	1.333	H1-3+VT ✔
	73 - 72	0.009	0.182	0.000	0.033	0.000	0.191 ✔	1.333	H1-3+VT ✔
	72 - 71	0.009	0.196	0.000	0.033	0.000	0.206 ✔	1.333	H1-3+VT ✔
	71 - 70	0.009	0.210	0.000	0.033	0.000	0.220 ✔	1.333	H1-3+VT ✔
	70 - 69	0.009	0.225	0.000	0.034	0.000	0.235 ✔	1.333	H1-3+VT ✔
	69 - 68	0.009	0.239	0.000	0.034	0.000	0.250 ✔	1.333	H1-3+VT ✔
	68 - 67	0.010	0.254	0.000	0.034	0.000	0.264 ✔	1.333	H1-3+VT ✔
	67 - 66	0.010	0.268	0.000	0.034	0.000	0.279 ✔	1.333	H1-3+VT ✔
	66 - 65	0.010	0.283	0.000	0.034	0.000	0.294 ✔	1.333	H1-3+VT ✔
L3	65 - 63.375	0.009	0.242	0.000	0.030	0.000	0.253 ✔	1.333	H1-3+VT ✔
	63.375 - 61.75	0.009	0.262	0.000	0.031	0.000	0.272 ✔	1.333	H1-3+VT ✔
	61.75 - 60.125	0.010	0.281	0.000	0.031	0.000	0.292 ✔	1.333	H1-3+VT ✔
	60.125 - 58.5	0.010	0.301	0.000	0.031	0.000	0.312 ✔	1.333	H1-3+VT ✔
	58.5 - 56.875	0.010	0.321	0.000	0.032	0.000	0.332 ✔	1.333	H1-3+VT ✔
	56.875 - 55.25	0.011	0.341	0.000	0.032	0.000	0.353 ✔	1.333	H1-3+VT ✔
	55.25 - 53.625	0.011	0.361	0.000	0.032	0.000	0.373 ✔	1.333	H1-3+VT ✔

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
	53.625 - 52	0.011	0.382	0.000	0.033	0.000	0.394 ✔	1.333	H1-3+VT ✔
	52 - 50.375	0.012	0.402	0.000	0.033	0.000	0.415 ✔	1.333	H1-3+VT ✔
	50.375 - 48.75	0.012	0.423	0.000	0.033	0.000	0.436 ✔	1.333	H1-3+VT ✔
	48.75 - 47.125	0.012	0.444	0.000	0.033	0.000	0.457 ✔	1.333	H1-3+VT ✔
	47.125 - 45.5	0.012	0.465	0.000	0.034	0.000	0.479 ✔	1.333	H1-3+VT ✔
	45.5 - 43.875	0.013	0.487	0.000	0.034	0.000	0.500 ✔	1.333	H1-3+VT ✔
	43.875 - 42.25	0.013	0.508	0.000	0.034	0.000	0.522 ✔	1.333	H1-3+VT ✔
	42.25 - 40.625	0.013	0.530	0.000	0.035	0.000	0.544 ✔	1.333	H1-3+VT ✔
	40.625 - 39	0.014	0.552	0.000	0.035	0.000	0.566 ✔	1.333	H1-3+VT ✔
	39 - 37.375	0.014	0.574	0.000	0.035	0.000	0.589 ✔	1.333	H1-3+VT ✔
	37.375 - 35.75	0.014	0.596	0.000	0.035	0.000	0.611 ✔	1.333	H1-3+VT ✔
	35.75 - 34.125	0.014	0.618	0.000	0.036	0.000	0.634 ✔	1.333	H1-3+VT ✔
	34.125 - 32.5	0.015	0.641	0.000	0.036	0.000	0.657 ✔	1.333	H1-3+VT ✔
L4	32.5 - 30.875	0.011	0.465	0.000	0.027	0.000	0.476 ✔	1.333	H1-3+VT ✔
	30.875 - 29.25	0.011	0.481	0.000	0.027	0.000	0.493 ✔	1.333	H1-3+VT ✔
	29.25 - 27.625	0.011	0.497	0.000	0.028	0.000	0.509 ✔	1.333	H1-3+VT ✔
	27.625 - 26	0.011	0.513	0.000	0.028	0.000	0.525 ✔	1.333	H1-3+VT ✔
	26 - 24.375	0.012	0.530	0.000	0.028	0.000	0.542 ✔	1.333	H1-3+VT ✔
	24.375 - 22.75	0.012	0.546	0.000	0.028	0.000	0.559 ✔	1.333	H1-3+VT ✔
	22.75 - 21.125	0.012	0.563	0.000	0.028	0.000	0.576 ✔	1.333	H1-3+VT ✔
	21.125 - 19.5	0.012	0.579	0.000	0.028	0.000	0.593 ✔	1.333	H1-3+VT ✔
	19.5 - 17.875	0.013	0.596	0.000	0.029	0.000	0.610 ✔	1.333	H1-3+VT ✔
	17.875 - 16.25	0.013	0.613	0.000	0.029	0.000	0.627 ✔	1.333	H1-3+VT ✔
	16.25 - 14.625	0.013	0.630	0.000	0.029	0.000	0.644 ✔	1.333	H1-3+VT ✔
	14.625 - 13	0.013	0.647	0.000	0.029	0.000	0.661 ✔	1.333	H1-3+VT ✔
	13 - 11.375	0.014	0.664	0.000	0.029	0.000	0.679 ✔	1.333	H1-3+VT ✔
	11.375 - 9.75	0.014	0.682	0.000	0.030	0.000	0.696 ✔	1.333	H1-3+VT ✔
	9.75 - 8.125	0.014	0.699	0.000	0.030	0.000	0.714 ✔	1.333	H1-3+VT ✔
	8.125 - 6.5	0.014	0.716	0.000	0.030	0.000	0.732 ✔	1.333	H1-3+VT ✔
	6.5 - 4.875	0.015	0.734	0.000	0.030	0.000	0.750 ✔	1.333	H1-3+VT ✔

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
	4.875 - 3.25	0.015	0.752	0.000	0.030	0.000	0.768 ✔	1.333	H1-3+VT ✔
	3.25 - 1.625	0.015	0.770	0.000	0.030	0.000	0.786 ✔	1.333	H1-3+VT ✔
	1.625 - 0	0.016	0.787	0.000	0.031	0.000	0.804 ✔	1.333	H1-3+VT ✔

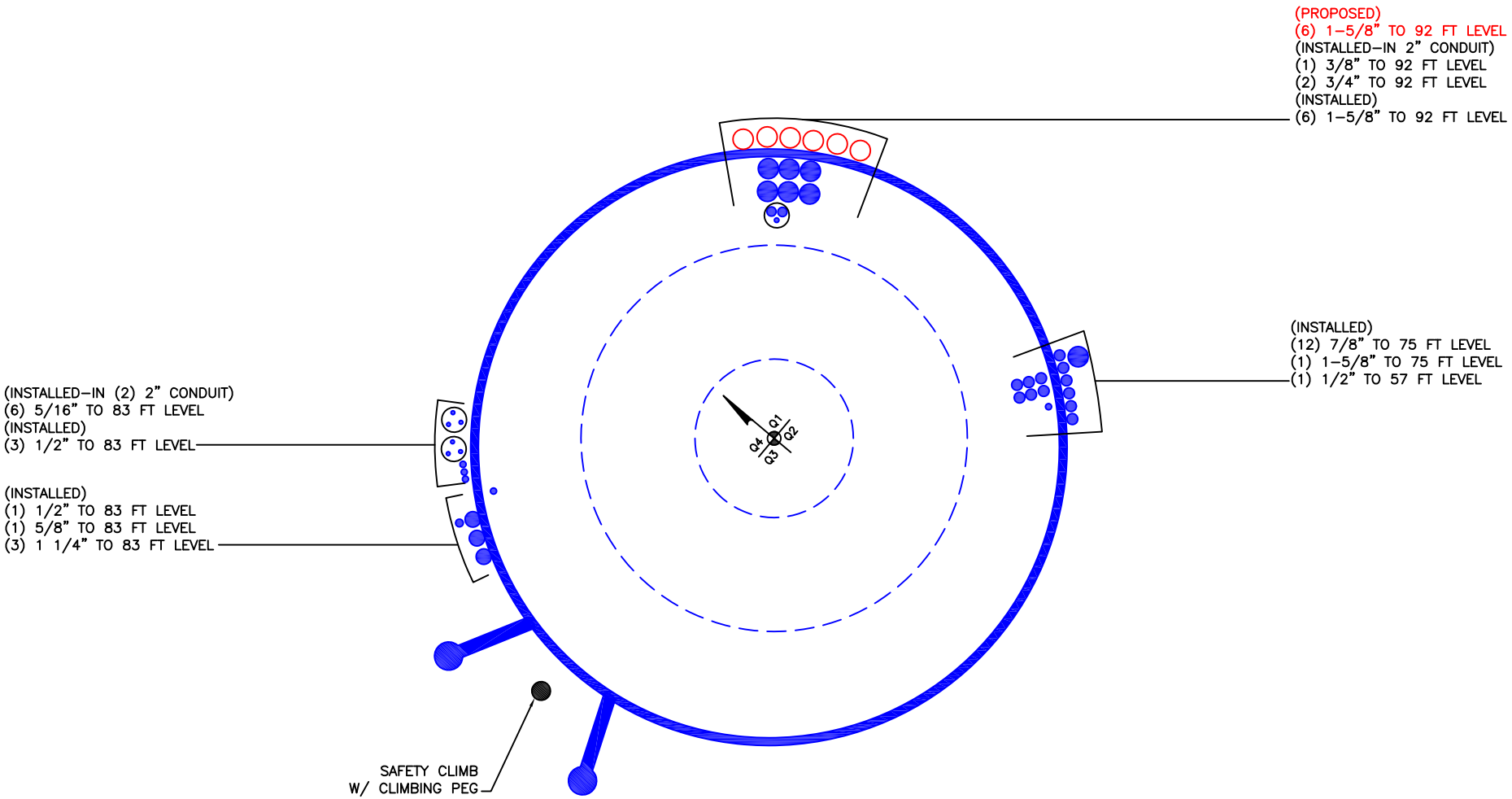
* DL controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	96 - 85	Pole	P12x.5	1	-2.76	538.65	24.3	Pass
L2	85 - 65	Pole	P42x3/8	2	-10.97	1484.55	22.1	Pass
L3	65 - 32.5	Pole	P48x3/8	3	-18.18	1643.28	49.3	Pass
L4	32.5 - 0	Pole	P48x1/2	4	-27.41	2356.76	60.3	Pass
							Summary	
						Pole (L4)	60.3	Pass
						RATING =	**60.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(PROPOSED)
(6) 1–5/8" TO 92 FT LEVEL
(INSTALLED–IN 2" CONDUIT)
(1) 3/8" TO 92 FT LEVEL
(2) 3/4" TO 92 FT LEVEL
(INSTALLED)
(6) 1–5/8" TO 92 FT LEVEL
(INSTALLED)
(12) 7/8" TO 75 FT LEVEL
(1) 1–5/8" TO 75 FT LEVEL
(1) 1/2" TO 57 FT LEVEL
(INSTALLED–IN (2) 2" CONDUIT)
(6) 5/16" TO 83 FT LEVEL
(INSTALLED)
(3) 1/2" TO 83 FT LEVEL
(INSTALLED)
(1) 1/2" TO 83 FT LEVEL
(1) 5/8" TO 83 FT LEVEL
(3) 1 1/4" TO 83 FT LEVEL
Q1
Q2
Q3
Q4
SAFETY CLIMB
W/ CLIMBING PEG

APPENDIX C

ADDITIONAL CALCULATIONS

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

Site Data

BU#: *876326*
Site Name: *HAYDEN STATION*
App #: *322776 R1*

Pole Manufacturer:	Rohn

Reactions		
Moment:	777.64154	ft-kips
Axial:	18.1794	kips
Shear:	16.898218	kips
Elevation:	32.5	feet

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffe

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	53.5		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.54	in

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

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	57	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

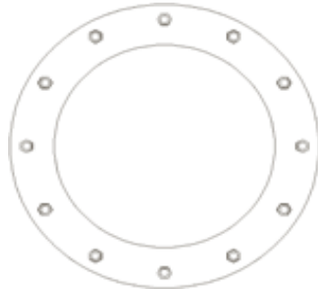
Flange Bolt Results

Bolt Tension Capacity, **B**:	103.65	kips
Max Bolt directly applied T:	33.98	Kips
Min. PL "tc" for **B** cap. **w/o** Pry:	2.141	in
Min PL "treq" for actual **T w/ Pry**:	0.915	in
Min PL "t1" for actual **T w/o Pry**:	1.226	in
T allowable with Prying:	98.85	kips
Prying Force, Q:	0.00	kips
Total Bolt Tension=T+Q:	33.98	kips
Prying Bolt Stress Ratio=(T+Q)/(B):	32.8%	**Pass**

Exterior Flange Plate Results	Flexural Check
Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	21.0% **Pass**

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

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

Site Data

BU#: *876326*
Site Name: *HAYDEN STATION*
App #: *322776 R1*

Pole Manufacturer:	Rohn

Reactions		
Moment:	271.02991	ft-kips
Axial:	10.9724	kips
Shear:	14.158035	kips
Elevation:	65	feet

If No stiffeners, Criteria:	AISC ASD	<-Only Applcable to Unstiffe

Bolt Data			
Qty:	20		
Diameter (in.):	1.5	Bolt Fu:	105
Bolt Material:	A325	Bolt Fy:	81
N/A:	100	<-- Disregard	Bolt Fty:
N/A:	75	<-- Disregard	44.00
Circle (in.):	53.5		

Plate Data		
Diam:	59	in
Thick, t:	2	in
Grade (Fy):	36	ksi
Strength, Fu:	58	ksi
Single-Rod B-eff:	7.54	in

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

Pole Data		
Diam:	48	in
Thick:	0.375	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	57	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

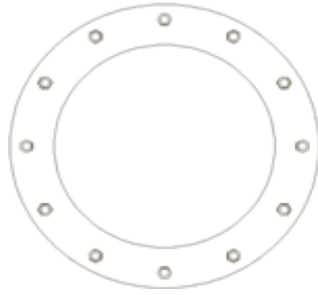
Flange Bolt Results

Bolt Tension Capacity, **B**:	103.65	kips
Max Bolt directly applied T:	11.61	Kips
Min. PL "tc" for **B** cap. **w/o** Pry:	2.141	in
Min PL "treq" for actual **T w/ Pry**:	0.535	in
Min PL "t1" for actual **T w/o Pry**:	0.717	in
T allowable with Prying:	98.85	kips
Prying Force, Q:	0.00	kips
Total Bolt Tension=T+Q:	11.61	kips
Prying Bolt Stress Ratio=(T+Q)/(B):	11.2%	**Pass**

Exterior Flange Plate Results	Flexural Check
Compression Side Plate Stress:	Rohn/Pirod, OK
Allowable Plate Stress:	36.0 ksi
Compression Plate Stress Ratio:	Rohn/Pirod, OK
No Prying	
Tension Side Stress Ratio, (treq/t)^2:	7.2% **Pass**

n/a

Stiffener Results	N/A for Rohn / Pirod
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A
Pole Results	
Pole Punching Shear Check:	N/A



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

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

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

TIA Rev F

Site Data

BU#:	*876326*
Site Name:	*HAYDEN STATION*
App #:	*322776 R1*
Pole Manufacturer:	*Rohn*

Reactions		
Moment:	1363.5393	ft-kips
Axial:	27.4122	kips
Shear:	19.139358	kips

Anchor Rod Data		
Qty:	20	
Diam:	1.5	in
Rod Material:	Other	
Strength (Fu):	125	ksi
Yield (Fy):	109	ksi
Bolt Circle:	53.5	in

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

Anchor Rod Results

Maximum Rod Tension:	59.8 Kips	Rigid
Allowable Tension:	97.2 Kips	Service, ASD
Anchor Rod Stress Ratio:	61.5% **Pass**	Fty*ASIF

Plate Data		
Diam:	59	in
Thick:	2	in
Grade:	36	ksi
Single-Rod B-eff:	7.54	in

Base Plate Results Flexural Check

Base Plate Stress:	Rohn/Pirod, OK	Rigid
Allowable Plate Stress:	36.0 ksi	Service ASD
Base Plate Stress Ratio:	Rohn/Pirod, OK	0.75*Fy*ASIF
		Y.L. Length: 23.63

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

n/a

Stiffener Results N/A for Rohn / Pirod

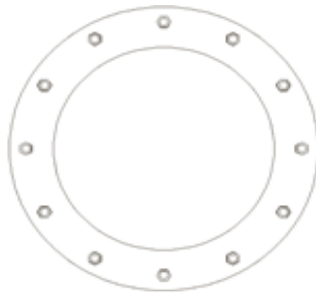
Horizontal Weld :	N/A
Vertical Weld:	N/A
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	N/A
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	N/A
Plate Comp. (AISC Bracket):	N/A

Pole Results

Pole Punching Shear Check: N/A

Pole Data		
Diam:	48	in
Thick:	0.5	in
Grade:	42	ksi
# of Sides:	0	"0" IF Round
Fu	57	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	



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

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

AeroSolutions LLC
Optimizing Your Tower Infrastructure

Site Number	876326
Site Name	HAYDEN STATION

Caisson Analysis

Pier Properties		
Moment	1364	kip-ft
Shear	19	kip
Pier Diameter	7.0	ft
Height Above Grade	0.50	ft
Depth Below Grade	30.00	ft
Donut Diameter		ft
Donut Depth		ft

Analysis Properties		
TIA Code	F	
Soil Safety Factor	2.00	
Water Table Depth	26.0	ft
Ignored Soil Depth	3.5	ft
Cohesion Based on	PLS Caisson	
Max Soil Capacity	100%	

Soil Properties

Layer	Top of Soil Layer (ft)	Layer Thickness (ft)	Bottom of Soil Layer (ft)	Soil Unit Weight (pcf)	Cohesion (psf)	Friction Angle (degrees)
Soil.Layer	*Soil.Top*	*Soil.Thick*	*Soil.Bottom*	*Soil.Weight*	*Soil.Cohesion*	*Soil.Phi*
1	0.00	43.5	43.50	120	0	32
2						
3						
4						
5						
6						
7						
8						
9						
10						

Critical Depths Below Grade		
Rotation Axis	21.88	ft
Zero Shear	8.10	ft

Results		
Soil Capacity	17.5%	**OK**
Max Pier Moment	1490	kip-ft

Moment At User Defined Depths Below Grade			
	kip-ft		kip-ft
	kip-ft		kip-ft

V1.0

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#: *876326*
Site Name: *HAYDEN STATION*
App #: *322776 R1*

Maximum Shaft Superimposed Forces		
TIA Revision:	F	
Max. Service Shaft M:	1489.934	ft-kips **(* Note)**
Max. Service Shaft P:	27.4122	kips
Max Axial Force Type:	Comp.	

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

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

Load Factor	Shaft Factored Loads		
1.30	Mu:	1936.914	ft-kips
1.30	Pu:	35.63586	kips

Pier Properties

Concrete:

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

Reinforcement:

Clear Cover to **Tie**=	4.74	in
Horiz. **Tie** Bar Size=	5	
Vert. Cage Diameter =	6.00	ft
Vert. Cage Diameter =	72.00	in
Vertical Bar Size =	10	
Bar Diameter =	1.27	in
Bar Area =	1.27	in^2
Number of Bars =	24	
As Total=	30.48	in^2
A s/ Aconc, Rho:	0.0055	0.55%

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**	

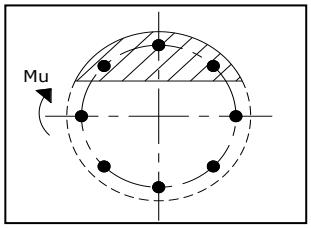
Solve (Run) <-- Press Upon Completing All Input

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

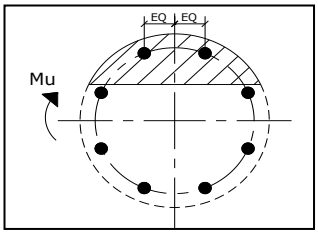
(3)*(Sqrt(f'c)/Fy:	0.0027
200 / Fy:	0.0033

Results:

Governing Orientation Case: **2**



Case 1



Case 2

Dist. From Edge to Neutral Axis:	**13.62**	in
Extreme Steel Strain, ϵt:	**0.0141**	
	ϵt > 0.0050, Tension Controlled	
Reduction Factor,φ:	**0.900**	

Minimum Rho Check:

Actual Req'd Min. Rho:	0.33%	Flexural
Provided Rho:	0.55%	**OK**

Ref. Shaft Max Axial Capacities, ϕ Max(Pn or Tn):		
Max Pu = (φ=0.65) Pn.		
Pn per ACI 318 (10-2)	8258.95	kips
at Mu=(ϕ=0.65)Mn=	4988.31	ft-kips
Max Tu, (φ=0.9) Tn =	1645.92	kips
at Mu=ϕ=(0.90)Mn=	0.00	ft-kips

Output Note: Negative Pu=Tension

For Axial Compression, φ Pn = Pu:	35.64	kips
Drilled Shaft Moment Capacity, φMn:	**4777.02**	ft-kips
Drilled Shaft Superimposed Mu:	**1936.91**	ft-kips

(Mu/φMn, Drilled Shaft Flexure CSR:	**40.5%**

[illegible]

[illegible]

[illegible]

January 7, 2016

EBI Project Number: 6616000023

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general public allowable limit:	8.53 %

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January 7, 2016

AT&T Mobility – New England
Attn: Cameron Syme, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 06040

Emissions Analysis for Site: **CT5140 – Windsor**

EBI Consulting was directed to analyze the proposed AT&T facility located at **440 Hayden Station Road, Windsor, CT**, for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general 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 limits for the 700 and 850 MHz Bands are approximately 467 $\mu W/cm^2$ and 567 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 2300 MHz (WCS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at **440 Hayden Station Road, Windsor, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. For this report the sample point is the top of a 6 foot person standing at the base of the tower.

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

1) 2 UMTS channels (850 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 UMTS channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

3) 2 GSM channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 2 LTE channels (700 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 LTE channels (PCS Band – 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

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

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

8) The antennas used in this modeling are the **CCI HPA-65R-BUU-H8 and the Kathrein 800-10121** for transmission in the 700 MHz, 850 MHz and 1900 MHz (PCS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

9) The antenna mounting height centerline of the proposed antennas is **92 feet** above ground level (AGL).

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

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

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	**1**	Antenna #:	**1**	Antenna #:	**1**
Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd	Gain:	11.45 / 14.35 dBd
Height (AGL):	92 feet	Height (AGL):	92 feet	Height (AGL):	92 feet
Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)	Frequency Bands	850 MHz / 1900 MHz (PCS)
Channel Count	6	Channel Count	6	Channel Count	6
Total TX Power(W):	180	Total TX Power(W):	180	Total TX Power(W):	180
ERP (W):	4,195.06	ERP (W):	4,195.06	ERP (W):	4,195.06
Antenna A1 MPE%	**2.31**	Antenna B1 MPE%	**2.31**	Antenna C1 MPE%	**2.31**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8	Make / Model:	CCI HPA-65R-BUU-H8
Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd	Gain:	13.15 / 14.95 dBd
Height (AGL):	928 feet	Height (AGL):	928 feet	Height (AGL):	928 feet
Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)	Frequency Bands	700 MHz / 1900 MHz (PCS)
Channel Count	4	Channel Count	4	Channel Count	4
Total TX Power(W):	240	Total TX Power(W):	240	Total TX Power(W):	240
ERP (W):	6,229.75	ERP (W):	6,229.75	ERP (W):	6,229.75
Antenna A2 MPE%	**4.40**	Antenna B2 MPE%	**4.40**	Antenna C2 MPE%	**4.40**

Site Composite MPE%	
Carrier	**MPE%**
AT&T – Max per sector	**6.71 %**
T-Mobile	0.06 %
Clearwire	0.27 %
Sprint	1.49 %
Site Total MPE %:	**8.53 %**

AT&T Sector 1 Total:	6.71 %
AT&T Sector 2 Total:	6.71 %
AT&T Sector 3 Total:	6.71 %
Site Total:	8.53 %

AT&T _ Per Sector	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
AT&T 850 MHz UMTS	2	418.92	92	4.07	850	567	0.72 %
AT&T 1900 MHz (PCS) UMTS	2	816.81	92	7.94	1900	1000	0.79 %
AT&T 1900 MHz (PCS) GSM	2	816.81	92	7.94	1900	1000	0.79 %
AT&T 700 MHz LTE	2	1239.23	92	12.05	700	467	2.58 %
AT&T 1900 MHz (PCS) LTE	2	1875.65	92	18.23	1900	1000	1.82 %
						Total:	6.71 %

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Summary

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

The anticipated maximum composite contributions from the AT&T facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general public exposure to RF Emissions are shown here:

AT&T Sector	Power Density Value (%)
Sector 1:	6.25 %
Sector 2:	6.25 %
Sector 3 :	6.25 %
AT&T Maximum Total (per sector):	6.25 %
Site Total:	8.53 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.53%** 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