STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL
Ten Franklin Square, New Britain, CT 06051
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VIA ELECTRONIC MAIL

May 31, 2018

Mark Roberts
QC Development
P.O. Box 916
Storrs, CT 06268

RE: **EM-CING-057-180403** - New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 363 Riversville Road, Greenwich, Connecticut.

Dear Mr. Roberts:

The Connecticut Siting Council (Council) is in receipt of your email correspondence of May 30, 2018 submitted in response to the Council's April 12, 2018 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

The submission renders the request for exempt modification complete and the Council will process the request in accordance with the Federal Communications Commission 60-day timeframe.

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MB/CMW/jmb

From: Mark Roberts [mailto:mark.roberts@qcdevelopment.net]
Sent: Wednesday, May 30, 2018 5:42 PM
To: CSC-DL Siting Council <Siting.Council@ct.gov>
Cc: Mark Roberts <mark.roberts@qcdevelopment.net>
Subject: RE: Incomplete - EM-CING-057-180403 - Riversville Rd.
Importance: High

Hello – in response to your incomplete letter of 4/12/18, please see the attached Mount Analysis along with a revised Tower Structural and revised CDs which include the required mount modifications.

Please let me know if you have any further questions.

Thanks

Mark Roberts
QC Development
860-670-9068

PROJECT INFORMATION

SCOPE OF WORK:	TOWER – REPLACE (3) GSM ANTENNAS WITH (3) 12–PORT QUINTEL ANTENNAS. INSTALL (3) RRUS–4426 AWS & (3) RRUS–32 WCS ON TOWER. SWAP DIPLEXER FOR LOW BAND COMBINER. ADD DC/FIBER SQUID & ASSOCIATED CABLING. EQUIPMENT SHELTER – REPLACE BB WITH 5216. REUSE EXISTING XMU
SITE ADDRESS:	363 RIVERSVILLE RD GREENWICH, CT 06831
LATITUDE:	41° 03' 59.57" N (NAD 83)*
LONGITUDE:	73° 40' 17.10" W (NAD 83)* * PER AT&T RFDS
JURISDICTION:	TOWN OF GREENWICH, CT
CURRENT USE:	COMMERCIAL BUILDING/TELECOMMUNICATIONS FACILITY
PROPOSED USE:	COMMERCIAL BUILDING/TELECOMMUNICATIONS FACILITY
NAME OF APPLICANT:	AT&T MOBILITY 500 ENTERPRISE DRIVE SUITE 3A ROCKY HILL, CT 06067

at&t Mobility

SITE NAME: GREENWICH NORTH
SITE NO.: CT2130 3C/4C
PACE NO.: MRCTB027619 (3C) / MRCTB027654 (4C)

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THIS DOCUMENT WAS DEVELOPED TO REFLECT A SPECIFIC SITE AND ITS SITE CONDITIONS AND IS NOT TO BE USED FOR ANOTHER SITE OR WHEN OTHER CONDITIONS PERTAIN. REUSE OF THIS DOCUMENT IS AT THE SOLE RISK OF THE USER.

STRUCTURAL NOTE:

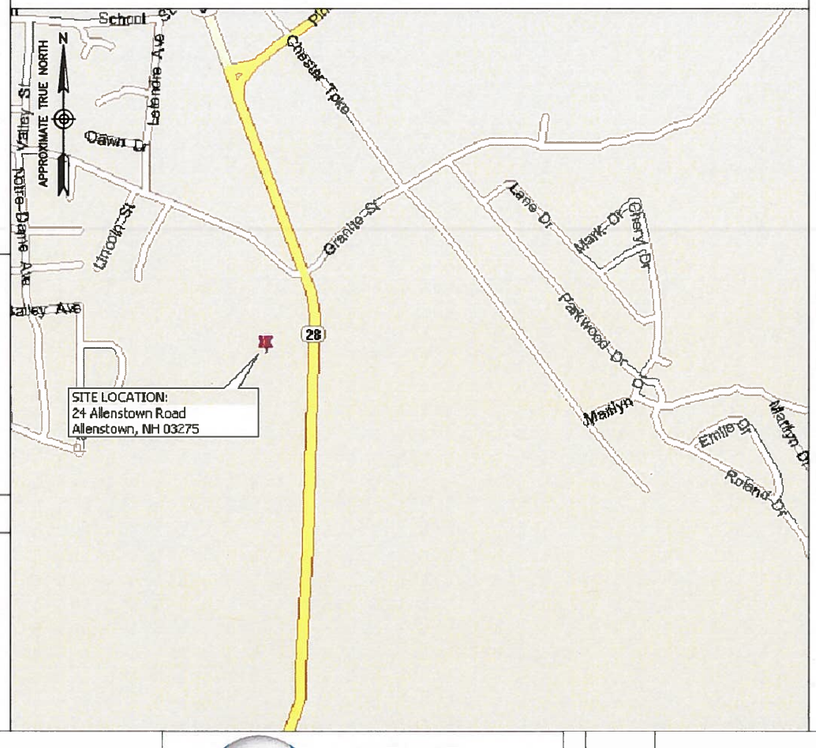
1. AS REQUIRED UNDER TIA/EIA 222G – STANDARD, SAI COMMUNICATIONS SHALL PROVIDE A STRUCTURAL ANALYSIS OF THE TOWER PREPARED BY A LICENSED CONNECTICUT STRUCTURAL ENGINEER CERTIFYING THAT, THE EXISTING TOWER AND ANY REQUIRED IMPROVEMENTS AND REINFORCEMENTS HAVE SUFFICIENT CAPACITY TO SUPPORT ALL EXISTING AND PROPOSED ANTENNAS, SUPPORTS AND APPURTENANCES AND COMPLIES WITH THE CURRENT CONNECTICUT STATE BUILDING CODE AND EIA/TIA CRITERIA. THE CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ANY IMPROVEMENTS AND REINFORCEMENTS REQUIRED BY THE STRUCTURAL ANALYSIS CERTIFICATION ARE PROPERLY INSTALLED PRIOR TO THE ADDITION OF ANTENNAS, SUPPORTS AND APPURTENANCES PROPOSED ON THESE DRAWINGS OR OTHERWISE NOTED IN THE STRUCTURAL ANALYSIS.

CONTACT INFORMATION

CONTACT	CONTACT	COMPANY	PHONE NO.
ENGINEERING:	BENJAMIN REVETTE, P.E.	DEWBERRY	(617) 531–0800
SAI:	ANGIE BRUCE	SAI COMMUNICATIONS	(603) 952–8468

VICINITY MAP

DIRECTIONS: TAKE I–91 S TO EXIT 17 AND MERGE ONTO CT–15 S. TAKE EXIT 28 FROM CT–15 S. TURN RIGHT ONTO ROUND HILL ROAD. TURN LEFT ONTO PORCHUCK ROAD. TURN LEFT ONTO RIVERSVILLE ROAD. FOLLOW TO BOY SCOUT CAMP. MAKE LEFT INTO CAMP. DRIVE SLOW THRU CAMP. MAKE RIGHT AT SMALL BRIDGE. FOLLOW TO MONOPOLE IN BACK OF THE CAMP UP THE HILL.



APPLICABLE BUILDING CODES AND STANDARDS

CONTRACTOR'S WORK SHALL COMPLY WITH PROJECT STANDARD NOTES, SYMBOLS AND DETAILS (SEE DRAWING INDEX FOR STANDARD NOTES AND DETAILS INCLUDED WITH TYPICAL DRAWING PACKAGE). CONTRACTOR 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.

BUILDING CODE:
INTERNATIONAL BUILDING CODE (IBC) & CONNECTICUT AMENDMENTS

ELECTRICAL CODE:
NATIONAL ELECTRICAL CODE (NEC)

CONTRACTOR'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, ASD, NINTH EDITION
TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222–G, STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES:
TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS

INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM
IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT

IEEE C62.41, RECOMMENDED PRACTICES ON SURGE VOLTAGES IN LOW VOLTAGE AC POWER CIRCUITS (FOR LOCATION CATEGORY "C3" AND "HIGH SYSTEM EXPOSURE")

TELCORDIA GR–1503, COAXIAL CABLE CONNECTIONS

ANSI T1.311, FOR TELECOM – DC POWER SYSTEMS – TELECOM, ENVIRONMENTAL PROTECTION

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.

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SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

GREENWICH NORTH 3C/4C
SITE NO. CT2130

363 RIVERSVILLE RD.
GREENWICH, CT 06831

at&t Mobility
500 ENTERPRISE DRIVE
SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	05/30/18	ISSUED FOR SUBMITTAL	JCM	SCA	BBR
1	05/25/18	ISSUED FOR SUBMITTAL	JCM	SCA	BBR
0	02/12/18	ISSUED FOR SUBMITTAL	JCM	DAS	BBR
A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN | DESIGNED BY: SMC | DRAWN BY: NMS

STATE OF CONNECTICUT
BENJAMIN B. REVETTE
PROFESSIONAL ENGINEER

AT&T MOBILITY
ROCKY HILL, CT

TITLE SHEET

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	T01	2

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – SAI COMMUNICATIONS
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY
   OEM – ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR 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 PROJECT MANAGEMENT.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. CONTRACTOR 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.
4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
5. DRAWINGS PROVIDED HERE ARE NOT TO SCALE UNLESS OTHERWISE NOTED AND ARE INTENDED TO SHOW OUTLINE ONLY.
6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY PROJECT MANAGEMENT.
9. CONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. CONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. CONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH PROJECT MANAGEMENT.
10. THE CONTRACTOR SHALL PROTECT EXISTING & PROPOSED IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.
11. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF 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.
12. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
14. CONTRACTOR SHALL NOTIFY DEWBERRY 48 HOURS IN ADVANCE OF POURING CONCRETE, OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS & POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEER REVIEW.
15. CONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. CONTRACTOR SHALL NOTIFY PROJECT MANAGEMENT OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY CONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17. SINCE THE CELL SITE IS 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 ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
18. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.

SITE WORK GENERAL NOTES:

1. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
2. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC, AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES, AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO:
   A) FALL PROTECTION
   B) CONFINED SPACE
   C) ELECTRICAL SAFETY
   D) TRENCHING & EXCAVATION.
3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.
4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES, TOP SOIL AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
5. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, OWNER AND/OR LOCAL UTILITIES.
6. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION.
7. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE AT&T SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE TRANSMISSION EQUIPMENT AND TOWER AREAS.
9. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.
10. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION, SEE SOIL COMPACTION NOTES.
11. THE AREAS OF THE OWNER'S PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION.
12. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL JURISDICTION'S GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

CONCRETE AND REINFORCING STEEL NOTES:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000 PSI) MAY BE USED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE (UNO). SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.
4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF.....1 1/2 IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....3/4 IN.
   BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
7. CONCRETE CYLINDER TEST IS NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC 1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TESTS PERFORMED AT THE SUPPLIER'S PLANT,
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
   FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.
8. AS AN ALTERNATIVE TO ITEM 7, TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.
9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS UNLESS NOTED OTHERWISE. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE PERFORMED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".
2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION". PAINTED SURFACES SHALL BE TOUCHED UP.
3. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE 3/4"Ø CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" DIA. ASTM A 307 BOLTS UNLESS NOTED OTHERWISE.
5. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO MANUFACTURER'S RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY RAMSET/REDHEAD OR APPROVED EQUAL.
6. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL.
7. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION & TOPSOIL EXPOSE UNDISTURBED NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.
2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.
3. AS AN ALTERNATIVE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.
4. COMPACTED SUBBASE SHALL BE UNIFORM & LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING 1" SIEVE.
5. AS AN ALTERNATIVE TO ITEMS 2 AND 3 PROOFROLL THE SUBGRADE SOILS WITH 5 PASSES OF A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). ANY SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL, AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUM, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, AT&T ANTENNA PLATFORM LOCATION AND ANTENNAS TO BE REPLACED.
2. COORDINATION OF WORK:
   CONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH PROJECT MANAGEMENT.
3. CABLE LADDER RACK:
   CONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO ANY NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.
2. CONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO NEW BTS EQUIPMENT. CONTRACTOR SHALL SUBMIT MODIFICATIONS TO PROJECT MANAGEMENT FOR APPROVAL.
3. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.
4. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
5. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.
6. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.
7. EACH END OF EVERY POWER, POWER PHASE CONDUCTOR (I.E., HOTS), GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
8. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).
9. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
10. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
11. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL.) PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
13. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (SIZE 6 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
14. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
15. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (SIZE 14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90°C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
16. ALL POWER AND POWER GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
17. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
18. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
19. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
20. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
21. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
22. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
23. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
24. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
25. CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
26. CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
27. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
28. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
29. METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
30. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
31. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM PROJECT MANAGEMENT BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
32. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

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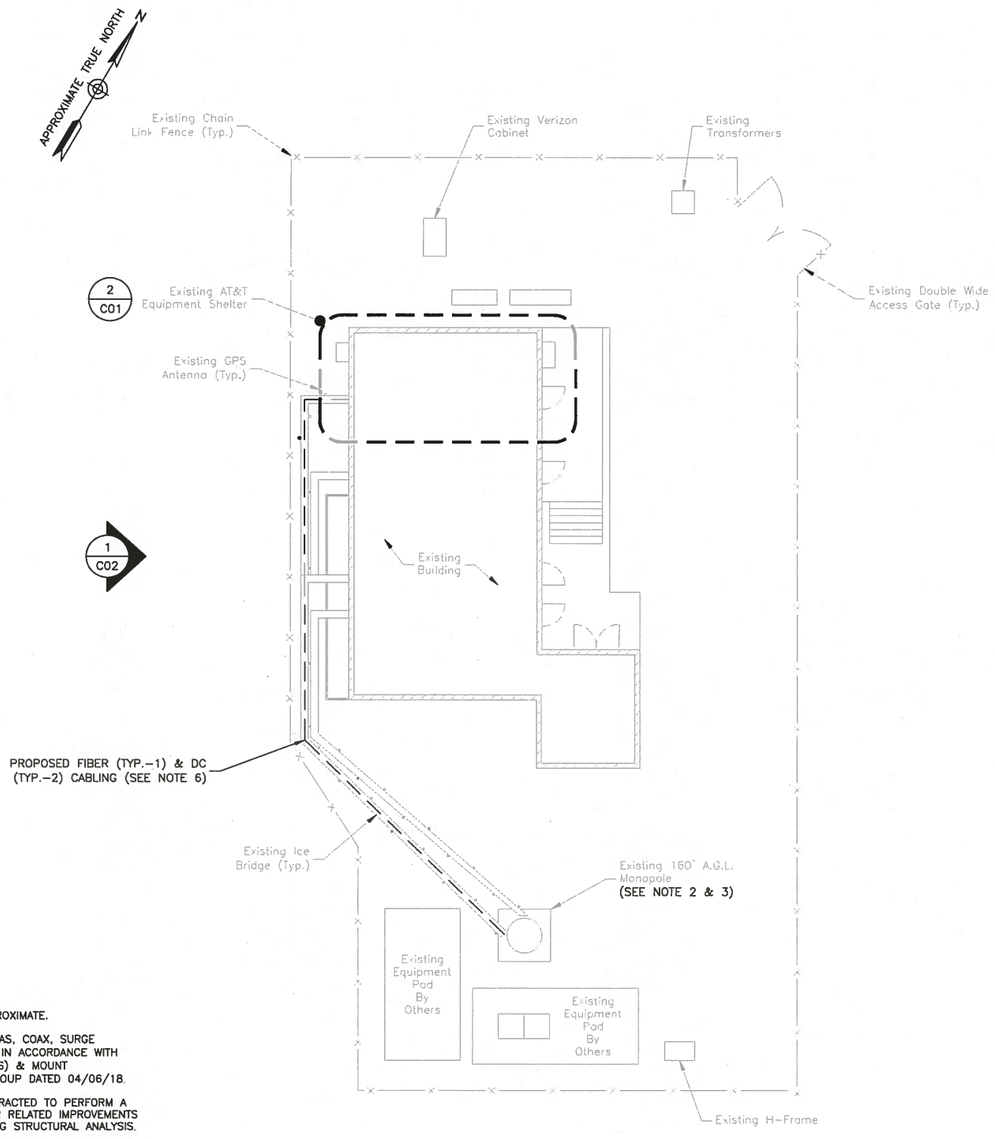
A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN | DESIGNED BY: SMC | DRAWN BY: NMS

AT&T MOBILITY
ROCKY HILL, CT

GENERAL NOTES

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	G01	2

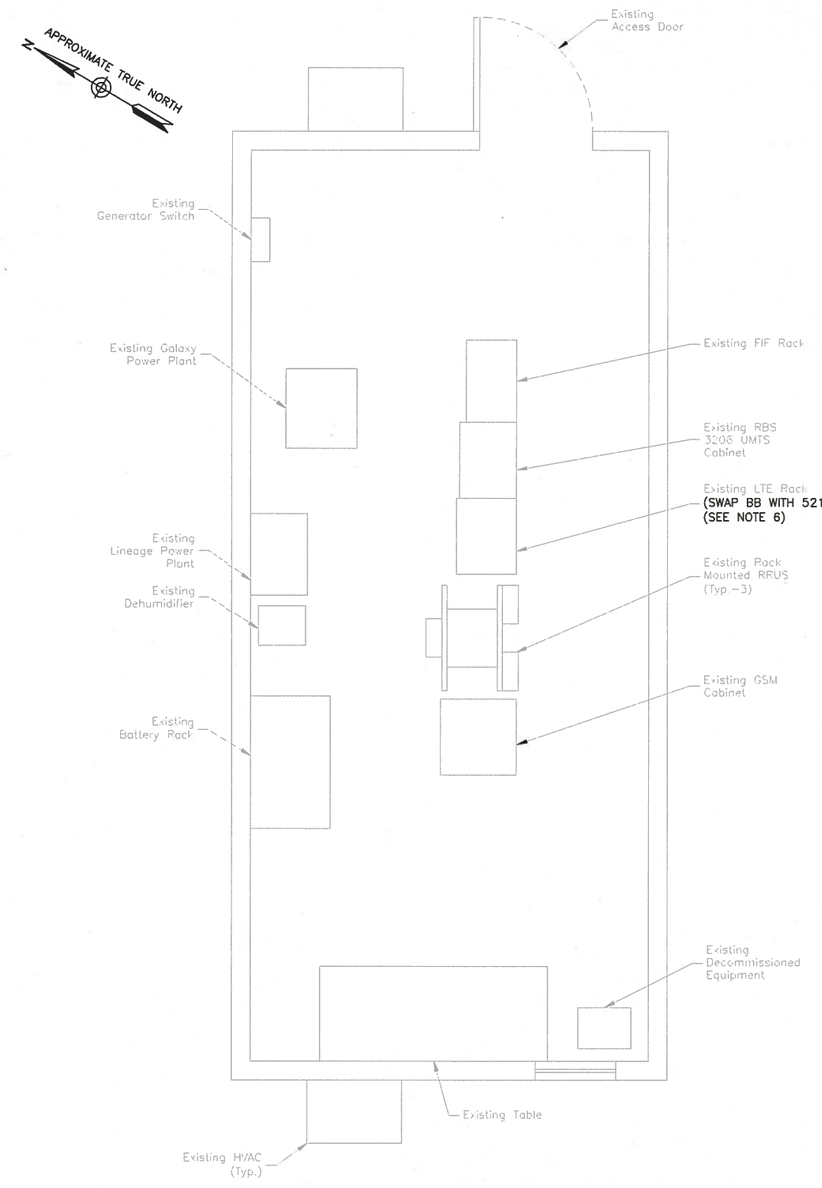


PROPOSED SITE PLAN

1

SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

0' 10' 20'



PROPOSED SHELTER PLAN

2

SCALE: 1"=4' FOR 11"x17"
1"=2' FOR 22"x34"

0' 2' 4'

NOTES:

1. NORTH ARROW & ELEVATIONS SHOWN AS APPROXIMATE.
2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS (BY OTHERS) & MOUNT STRUCTURAL ANALYSIS BY HUDSON DESIGN GROUP DATED 04/06/18.
3. DEWBERRY WAS NOT PROVIDED WITH OR CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER. TOWER RELATED IMPROVEMENTS ARE NOT TO BE INSTALLED WITHOUT A PASSING STRUCTURAL ANALYSIS. SEE STRUCTURAL NOTE ON SHEET T01.
4. ALL MOUNT MODIFICATIONS ARE TO BE MADE IN ACCORDANCE WITH REV.-1 MOUNT MODIFICATION DESIGN DRAWINGS BY HUDSON DESIGN GROUP DATED 05/08/18.
5. NOT ALL EXISTING/PROPOSED INFORMATION SHOWN FOR CLARITY.
6. EQUIPMENT MODIFICATION SCOPE:

TOWER – REPLACE (3) GSM ANTENNAS WITH (3) 12-PORT QUINTEL ANTENNAS. INSTALL (3) RRUS-4426 AWS & (3) RRUS-32 WCS ON TOWER. SWAP DIPLEXER FOR LOW BAND COMBINER. ADD DC/FIBER SQUID & ASSOCIATED CABLING.

EQUIPMENT SHELTER – REPLACE BB WITH 5216. REUSE EXISTING XMU.

7. ANTENNA SPACING REQUIREMENTS:
   - 6'-0" MINIMUM SEPARATION BETWEEN LTE ANTENNAS

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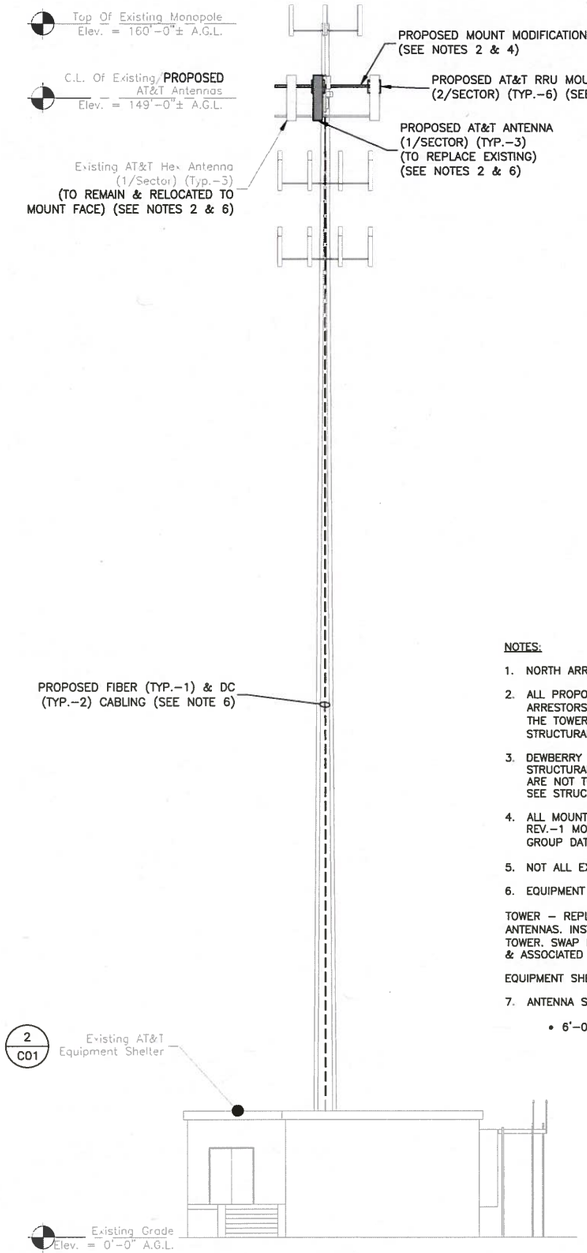
LICENSED PROFESSIONAL ENGINEER

AT&T MOBILITY
ROCKY HILL, CT

PROPOSED SITE & SHELTER PLANS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C01	2

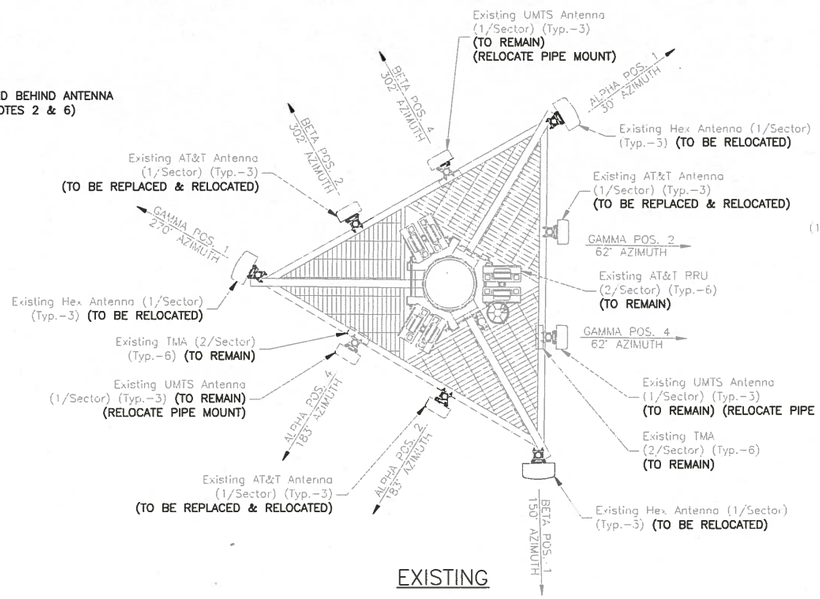


PROPOSED ELEVATION

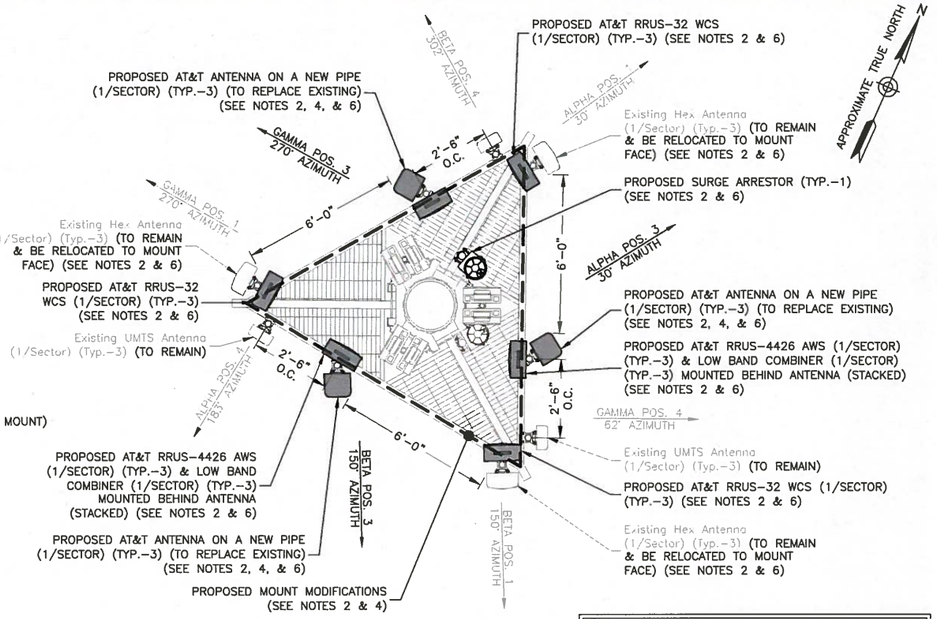
SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

1

0' 10' 20'



EXISTING



PROPOSED

MOUNT NOTE
CONTRACTOR TO CONFIRM ANTENNA AZIMUTHS AND ALIGNMENT WITH EXISTING PLATFORM IN THE FIELD PRIOR TO CONSTRUCTION. ROTATE EXISTING ANTENNA MOUNTS TO MINIMIZE SKEW OF PROPOSED LTE ANTENNAS AS REQUIRED. VERIFY WITH AT&T C.M. AND R.F. PRIOR TO COMMENCING MOUNT ALTERATIONS.

ANTENNA ORIENTATION PLANS

SCALE: N.T.S.

2

NOTES:

1. NORTH ARROW & ELEVATIONS SHOWN AS APPROXIMATE.
2. ALL PROPOSED EQUIPMENT INCLUDING ANTENNAS, COAX, SURGE ARRESTORS, RRU'S, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS (BY OTHERS) & MOUNT STRUCTURAL ANALYSIS BY HUDSON DESIGN GROUP DATED 04/06/18.
3. DEWBERRY WAS NOT PROVIDED WITH OR CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THIS TOWER. TOWER RELATED IMPROVEMENTS ARE NOT TO BE INSTALLED WITHOUT A PASSING STRUCTURAL ANALYSIS. SEE STRUCTURAL NOTE ON SHEET T01.
4. ALL MOUNT MODIFICATIONS ARE TO BE MADE IN ACCORDANCE WITH REV.-1 MOUNT MODIFICATION DESIGN DRAWINGS BY HUDSON DESIGN GROUP DATED 05/08/18.
5. NOT ALL EXISTING/PROPOSED INFORMATION SHOWN FOR CLARITY.
6. EQUIPMENT MODIFICATION SCOPE:

TOWER – REPLACE (3) GSM ANTENNAS WITH (3) 12-PORT QUINTEL ANTENNAS. INSTALL (3) RRUS-4426 AWS & (3) RRUS-32 WCS ON TOWER. SWAP DIPLEXER FOR LOW BAND COMBINER. ADD DC/FIBER SQUID & ASSOCIATED CABLING.

EQUIPMENT SHELTER – REPLACE BB WITH 5216. REUSE EXISTING XMU.

7. ANTENNA SPACING REQUIREMENTS:
   - 6'-0" MINIMUM SEPARATION BETWEEN LTE ANTENNAS

FINAL EQUIPMENT CONFIGURATION

SECTOR	BAND	ANTENNA	SIZE (INCHES) (LxWxD)	RAD. CENTER	AZIMUTH	TMA	RRU	SIZE (INCHES) (LxWxD)	FEEDERS	FIBER
ALPHA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	30°	–	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	–	–
	–	–	–	–	–	–	–	–	–	–
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	30°	–	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	183°	(E) LGP21401 (E) LGP21401	–	–	E (2)	–
BETA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	150°	–	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	–	–
	–	–	–	–	–	–	–	–	–	–
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	150°	–	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	302°	(E) LGP21401 (E) LGP21401	–	–	E (2)	–
GAMMA	LTE 700/WCS	(E) CCI HPA-65R-BUU-H6	72.0x14.8x9.0	149'±	270°	–	(P) RRUS-32 WCS (E) RRUS-11	27.2 x 12.1 x 7.0 19.7 x 17.0 x 7.2	–	–
	–	–	–	–	–	–	–	–	–	–
	LTE 1900/AWS	(P) QUINTEL Q566512-2	72.0x12.0x9.6	149'±	270°	–	(P) RRUS-4426 B66 (E) RRUS-32 B6	15.0 x 13.2 x 5.8 27.2 x 12.1 x 7.0	E (2)	P (1)
	UMTS 850	(E) POWERWAVE 7770	55.0x11.0x5.0	149'±	62°	(E) LGP21401 (E) LGP21401	–	–	E (2)	–

FINAL EQUIPMENT CONFIGURATION

SCALE: N.T.S.

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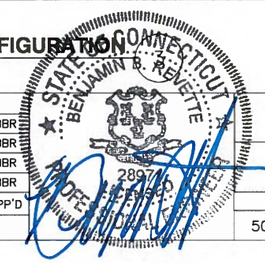

AT&T MOBILITY
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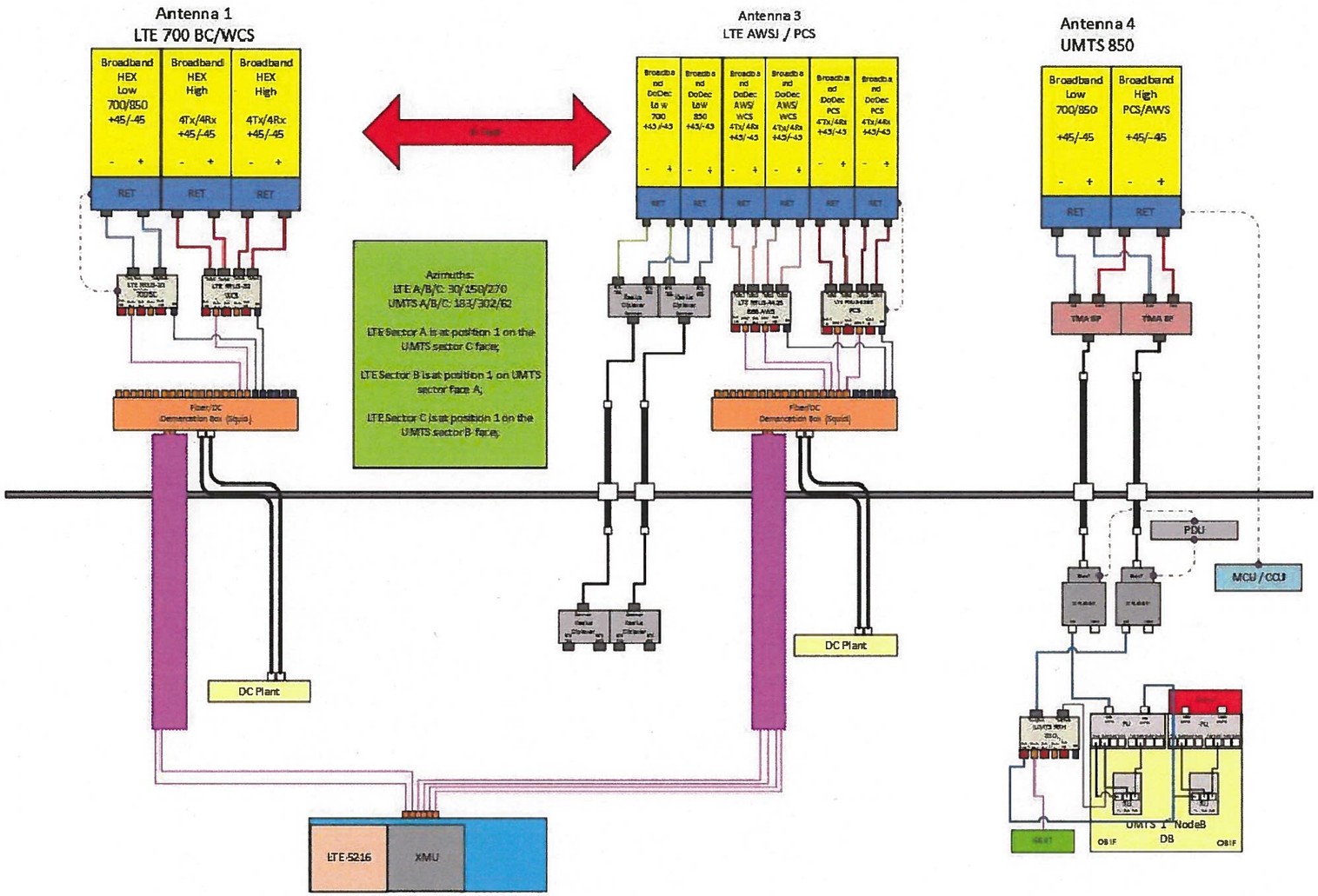
ANTENNA ORIENTATION PLANS & CONSTRUCTION DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C02	2



EQUIPMENT PLUMBING DIAGRAM (1)
SCALE: N.T.S.

NOTES:

1. EQUIPMENT PLUMBING DIAGRAM PER RFDS VERSION 1 DATED 04/19/17.
2. CONTRACTOR TO VERIFY FINAL EQUIPMENT CONFIGURATION AND SEPARATIONS WITH AT&T PRIOR TO CONSTRUCTION.

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STATE OF CONNECTICUT
BENJAMIN B. REVETTE
PROFESSIONAL ENGINEER

AT&T MOBILITY
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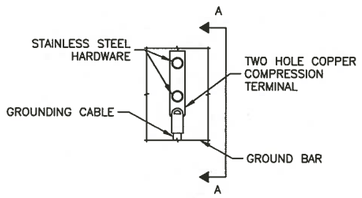
EQUIPMENT PLUMBING DIAGRAM

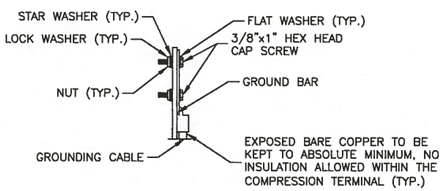
DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	C03	2

GROUNDING NOTES:

1. THE CONTRACTOR 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 CONTRACTOR 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. ALL AVAILABLE GROUNDING ELECTRODES SHALL BE CONNECTED TOGETHER IN ACCORDANCE WITH THE NEC.
3. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. USE OF OTHER METHODS MUST BE PRE-APPROVED BY CONTRACTOR IN WRITING.
4. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS ON TOWER SITES AND 10 OHMS OR LESS ON ROOFTOP SITES. WHEN ADDING ELECTRODES, CONTRACTOR SHALL MAINTAIN A MINIMUM DISTANCE BETWEEN THE ADDED ELECTRODE AND ANY OTHER EXISTING ELECTRODE EQUAL TO THE BURIED LENGTH OF THE ROD. IDEALLY, CONTRACTOR SHALL STRIVE TO KEEP THE SEPARATION DISTANCE EQUAL TO TWICE THE BURIED LENGTH OF THE RODS.
5. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT.
6. 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 AND UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
7. 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 TRANSMISSION EQUIPMENT.
8. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED. BACK-TO-BACK CONNECTIONS ON OPPOSITE SIDES OF THE GROUND BUS ARE PERMITTED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED. IN ALL CASES, BENDS SHALL BE MADE WITH A MINIMUM BEND RADIUS OF 8 INCHES.
11. EACH INTERIOR TRANSMISSION CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH 6 AWG STRANDED, GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRE UNLESS NOTED OTHERWISE IN THE DETAILS. EACH OUTDOOR CABINET FRAME/PLINTH SHALL BE DIRECTLY CONNECTED TO THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER WIRE UNLESS NOTED OTHERWISE IN THE DETAILS.
12. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING, SHALL BE 2 AWG SOLID TIN-PLATED COPPER UNLESS OTHERWISE INDICATED.
13. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE. CONNECTIONS TO ABOVE GRADE UNITS SHALL BE MADE WITH EXOTHERMIC WELDS WHERE PRACTICAL OR WITH 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS. HIGH PRESSURE CRIMP CONNECTORS MAY ONLY BE USED WITH WRITTEN PERMISSION FROM CENTERLINE COMMUNICATIONS COMMUNICATIONS MARKET REPRESENTATIVE.
14. EXOTHERMIC WELDS SHALL BE PERMITTED ON TOWERS ONLY WITH THE EXPRESS APPROVAL OF THE TOWER MANUFACTURER OR THE CONTRACTORS STRUCTURAL ENGINEER.
15. ALL WIRE TO WIRE GROUND CONNECTIONS TO THE INTERIOR GROUND RING SHALL BE FORMED USING HIGH PRESS CRIMPS OR SPLIT BOLT CONNECTORS WHERE INDICATED IN THE DETAILS.
16. ON ROOFTOP SITES WHERE EXOTHERMIC WELDS ARE A FIRE HAZARD COPPER COMPRESSION CAP CONNECTORS MAY BE USED FOR WIRE TO WIRE CONNECTORS. 2 HOLE MECHANICAL TYPE BRASS CONNECTORS WITH STAINLESS STEEL HARDWARE, INCLUDING SET SCREWS SHALL BE USED FOR CONNECTION TO ALL ROOFTOP TRANSMISSION EQUIPMENT AND STRUCTURAL STEEL.
17. COAX BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR USING TWO-HOLE MECHANICAL TYPE BRASS CONNECTORS AND STAINLESS STEEL HARDWARE.
18. APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
19. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
20. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
21. BOND ALL METALLIC OBJECTS WITHIN 6 FT OF THE BURIED GROUND RING WITH 2 AWG SOLID TIN-PLATED COPPER GROUND CONDUCTOR. DURING EXCAVATION FOR NEW GROUND CONDUCTORS, IF EXISTING GROUND CONDUCTORS ARE ENCOUNTERED, BOND EXISTING GROUND CONDUCTORS TO NEW CONDUCTORS.
22. 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 WITH LISTED BONDING FITTINGS.



ELEVATION

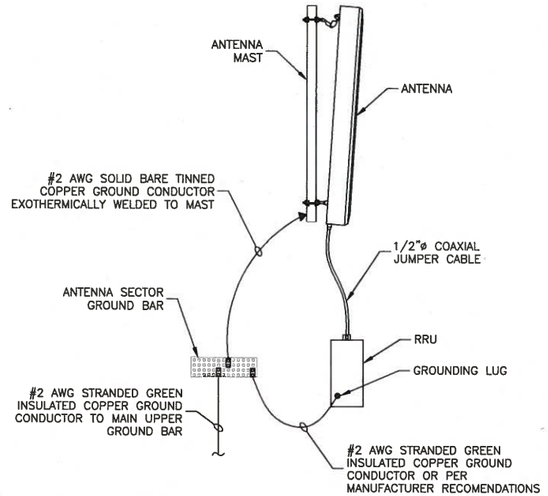


NOTES:

1. DOUBLING UP OR STACKING OF CONNECTIONS IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.

TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL 1

SCALE: N.T.S.



NOTES:

1. VERIFY EXISTING GROUNDING SYSTEM IS INSTALLED PER AT&T STANDARDS.
2. BOND NEW EQUIPMENT INTO EXISTING GROUND SYSTEM IN ACCORDANCE WITH AT&T STANDARDS & MANUFACTURER RECOMMENDATIONS.

TYPICAL ANTENNA/RRU GROUNDING DETAIL 2

SCALE: N.T.S

Dewberry®
Dewberry Engineers Inc.
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10TH FLOOR
BOSTON, MA 02210
PHONE: 617.695.3400
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SAI
12 INDUSTRIAL WAY
SALEM, NH 03079

GREENWICH NORTH 3C/4C
SITE NO. CT2130

363 RIVERSVILLE RD.
GREENWICH, CT 06831

at&t Mobility
500 ENTERPRISE DRIVE
SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
2	05/30/18	ISSUED FOR SUBMITTAL	JCM	SCA	BBR
1	05/25/18	ISSUED FOR SUBMITTAL	JCM	SCA	BBR
0	02/12/18	ISSUED FOR SUBMITTAL	JCM	DAS	BBR
A	02/12/18	ISSUED FOR REVIEW	JCM	DAS	BBR

SCALE: AS SHOWN | DESIGNED BY: SMC | DRAWN BY: NMS

STATE OF CONNECTICUT
BENJAMIN B. REVETTE
PROFESSIONAL ENGINEER
2007

AT&T MOBILITY
ROCKY HILL, CT

GROUNDING DETAILS

DEWBERRY NO.	DRAWING NUMBER	REV
50019239/50083740	E01	2

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-70 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

GENERAL: WHERE APPLICATION IS MADE FOR CONSTRUCTION, THE OWNER OR THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE ACTING AS THE OWNER'S AGENT SHALL EMPLOY ONE OR MORE APPROVED AGENCIES TO PERFORM INSPECTIONS DURING CONSTRUCTION ON THE TYPES OF WORK LISTED IN THE INSPECTION CHECKLIST ABOVE.

THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND ENGINEERS OF RECORD INVOLVED IN THE DESIGN OF THE PROJECT ARE PERMITTED TO ACT AS THE APPROVED AGENCY AND THEIR PERSONNEL ARE PERMITTED TO ACT AS THE SPECIAL INSPECTOR FOR THE WORK DESIGNED BY THEM, PROVIDED THOSE PERSONNEL MEET THE QUALIFICATION REQUIREMENTS.

STATEMENT OF SPECIAL INSPECTIONS: THE APPLICANT SHALL SUBMIT A STATEMENT OF SPECIAL INSPECTIONS PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IN ACCORDANCE WITH SECTION 107.1 AS A CONDITION FOR ISSUANCE. THIS STATEMENT SHALL BE IN ACCORDANCE WITH SECTION 1705.

REPORT REQUIREMENT: SPECIAL INSPECTORS SHALL KEEP RECORDS OF INSPECTIONS. THE SPECIAL INSPECTOR SHALL FURNISH INSPECTION REPORTS TO THE BUILDING OFFICIAL, AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. REPORTS SHALL INDICATE THAT WORK INSPECTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECTED, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE. A FINAL REPORT DOCUMENTING REQUIRED SPECIAL INSPECTIONS SHALL BE SUBMITTED.

SPECIAL INSPECTION CHECKLIST

CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
BEFORE CONSTRUCTION	
N/A	ENGINEER OF RECORD APPROVED SHOP DRAWINGS [1]
N/A	MATERIAL SPECIFICATIONS REPORT [2]
N/A	FABRICATOR NDE INSPECTION
N/A	PACKING SLIPS [3]
ADDITIONAL TESTING AND INSPECTIONS:	
DURING CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	STEEL INSPECTIONS
N/A	HIGH STRENGTH BOLT INSPECTIONS
N/A	HIGH WIND ZONE INSPECTIONS [4]
N/A	FOUNDATION INSPECTIONS
N/A	CONCRETE COMP. STRENGTH, SLUMP TESTS AND PLACEMENT
N/A	POST INSTALLED ANCHOR VERIFICATION [5]
N/A	GROUT VERIFICATION
N/A	CERTIFIED WELD INSPECTION
N/A	EARTHWORK: LIFT AND DENSITY
N/A	ON SITE COLD GALVANIZING VERIFICATION
N/A	GUY WIRE TENSION REPORT
ADDITIONAL TESTING AND INSPECTIONS:	
AFTER CONSTRUCTION	
CONSTRUCTION/INSTALLATION INSPECTIONS AND TESTING REQUIRED (COMPLETED BY ENGINEER OF RECORD)	REPORT ITEM
REQUIRED	MODIFICATION INSPECTOR REDLINE OR RECORD DRAWINGS [6]
N/A	POST INSTALLED ANCHOR PULL-OUT TESTING
REQUIRED	PHOTOGRAPHS
ADDITIONAL TESTING AND INSPECTIONS:	

NOTES:

1. REQUIRED FOR ANY NEW SHOP FABRICATED FRP OR STEEL.
2. PROVIDED BY MANUFACTURER, REQUIRED IF HIGH STRENGTH BOLTS OR STEEL.
3. PROVIDED BY GENERAL CONTRACTOR; PROOF OF MATERIALS.
4. HIGH WIND ZONE INSPECTION CATB 120MPH OR CAT C,D 110MPH INSPECT FRAMING OF WALLS, ANCHORING, FASTENING SCHEDULE.
5. ADHESIVE FOR REBAR AND ANCHORS SHALL HAVE BEEN TESTED IN ACCORDANCE WITH ACI 355.4 AND ICC-ES AC308 FOR CRACKED CONCRETE AND SEISMIC APPLICATIONS. DESIGN ADHESIVE BOND STRENGTH HAS BEEN BASED ON ACI 355.4 TEMPERATURE CATEGORY B WITH INSTALLATIONS INTO DRY HOLES DRILLED USING A CARBIDE BIT INTO CRACKED CONCRETE THAT HAS CURED FOR AT LEAST 21 DAYS. ADHESIVE ANCHORS REQUIRING CERTIFIED INSTALLATIONS SHALL BE INSTALLED BY A CERTIFIED ADHESIVE ANCHOR INSTALLER PER ACI 318-11 D.9.2.2. INSTALLATIONS REQUIRING CERTIFIED INSTALLERS SHALL BE INSPECTED PER ACI 318-11 D.8.2.4.
6. AS REQUIRED; FOR ANY FIELD CHANGES TO THE ITEMS IN THIS TABLE.

NOTES:

1. ALL CONNECTIONS TO BE SHOP WELDED & FIELD BOLTED USING 3/4"ø A325-X BOLTS, UNLESS OTHERWISE NOTIFIED.
2. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED BEFORE ORDERING MATERIAL.
3. SHOP DRAWING ENGINEER REVIEW & APPROVAL REQUIRED PRIOR TO STEEL FABRICATION.
4. VERIFICATION OF EXISTING ROOF CONSTRUCTION IS REQUIRED PRIOR TO THE INSTALLATION OF THE ROOF PLATFORM. ENGINEER OF RECORD IS TO APPROVE EXISTING CONDITIONS IN ORDER TO MOVE FORWARD.
5. CENTERLINE OF PROPOSED STEEL PLATFORM SUPPORT COLUMNS TO BE CENTRALLY LOCATED OVER THE EXISTING BUILDING COLUMNS.
6. EXISTING BRICK MASONRY COLUMNS/BEARING TO BE REPAIRED/REPLACED AT ALL PROPOSED PLATFORM SUPPORT POINTS. ENGINEER OF RECORD TO REVIEW AND APPROVE.

HUDSON Design Group LLC
45 BEECHWOOD DRIVE
NORTH ANDOVER, MA 01845
TEL: (978) 557-5553
FAX: (978) 336-5586

12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT2130
SITE NAME: GREENWICH NORTH

363 RIVERVILLE ROAD
GREENWICH, CT 06831
FAIRFIELD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	05/08/18	ISSUED FOR CONSTRUCTION	MR	AT	DJC

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT
DEREK J. CREASEY
No. 29251
LICENSED PROFESSIONAL ENGINEER

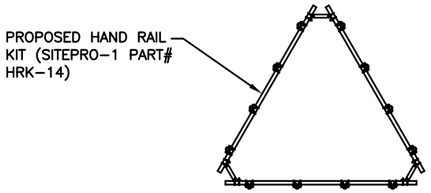
AT&T

STRUCTURAL NOTES
(LTE-3C/4C)

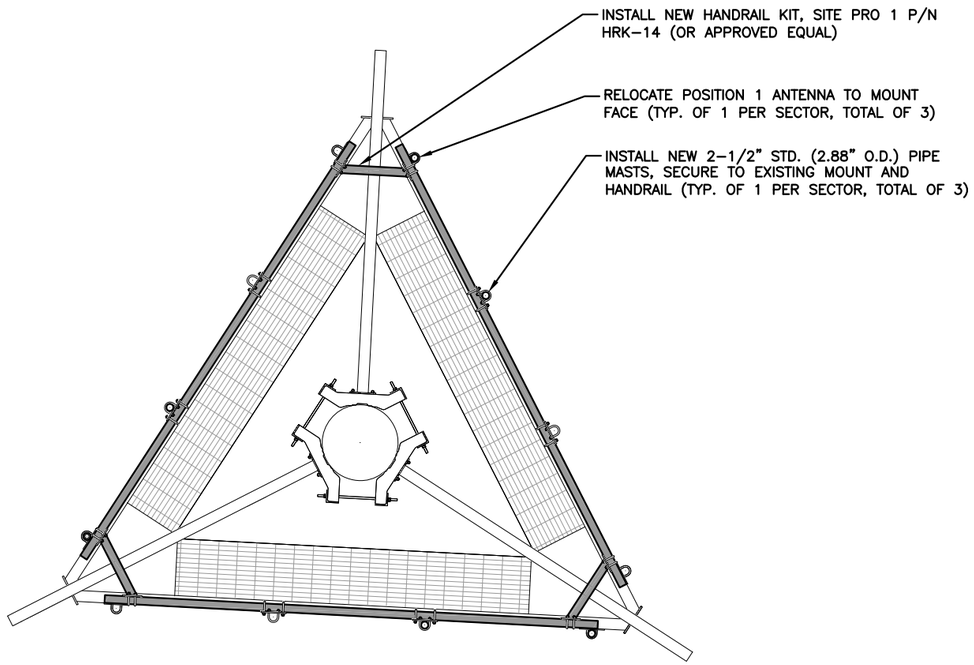
SITE NUMBER	DRAWING NUMBER	REV
CT2130	SN-1	0

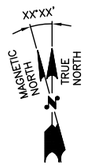
NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC.
DATED: APRIL 6, 2018



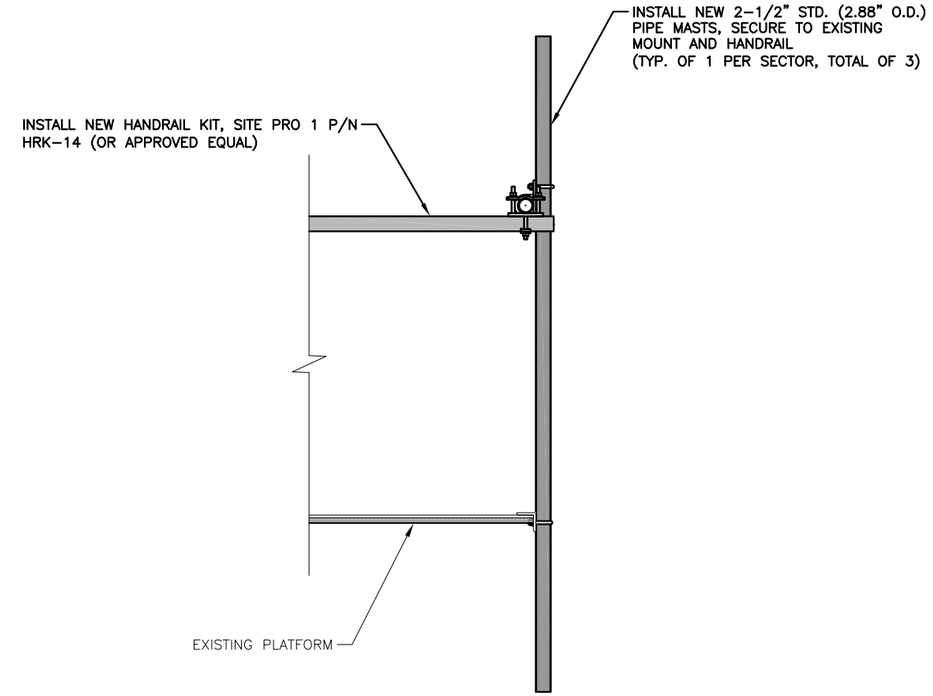
PROPOSED HANDRAIL KIT (1 / S-1)
SCALE: N.T.S





PROPOSED REINFOCEMENT PLAN (2 / S-1)
22x34 SCALE: 1/2"=1'-0"
11x17 SCALE: 1/4"=1'-0"

0 1'-0" 2'-0" 4'-0" 6'-0"



PROPOSED MOUNT MODIFICATIONS DETAIL (3 / S-1)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"

0 0'-6" 1'-0" 2'-0" 3'-0"

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12 INDUSTRIAL WAY
SALEM, NH 03079

SITE NUMBER: CT2130
SITE NAME: GREENWICH NORTH

363 RIVERVILLE ROAD
GREENWICH, CT 06831
FAIRFIELD COUNTY

at&t
500 ENTERPRISE DRIVE, SUITE 3A
ROCKY HILL, CT 06067

NO.	DATE	REVISIONS	BY	CHK	APP'D
1	05/08/18	ISSUED FOR CONSTRUCTION	MR	AT	DJC

SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: MR

STATE OF CONNECTICUT
DEREK J. CREASEY
No. 29051
LICENSED PROFESSIONAL ENGINEER

AT&T

STRUCTURAL DETAILS
(LTE-3C/4C)

SITE NUMBER	DRAWING NUMBER	REV
CT2130	S-1	0

April 6, 2018

SAI Communications
12 Industrial Way
Salem NH, 03079

RE:		
	Site Number:	CT2130 (LTE 3C-4C)
	FA Number:	10034990
	PACE Number:	MRCTB027619
	PT Number:	2051A0ETZ9
	Site Name:	Greenwich North
	Site Address:	363 Riversville Road Greenwich, CT 06831

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by SAI Communications to perform a mount analysis on the existing AT&T antenna mount to determine its capability of supporting the following equipment loading:

- (3) HPA-65R-BUU-H6 Antennas (72.0"x14.8"x9.0" – Wt. = 51 lbs. /each)
- (3) 7770 Antennas (55.0"x11.0"x5.0" – Wt. = 35 lbs. /each)
- (3) RRUS-11 RRH's (19.7"x17.0"x7.2" – Wt. = 51 lbs. /each) (tower mounted)
- (3) RRUS-32 B2 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each) (tower mounted)
- (6) LGP21401 TMA's (14.4"x9.0"x2.7" – Wt. = 19 lbs. /each)
- (1) Squid Surge Arrestor (24.0"x9.7"ø – Wt. = 33 lbs. /each) (tower mounted)
- **(3) QS66512-2 Antennas (72.0"x12.0"x9.6" – Wt. = 111 lbs. /each)**
- **(3) RRUS-32 RRH's (27.2"x12.1"x7.0" – Wt. = 60 lbs. /each)**
- **(3) 4426 B66 RRH's (15.0"x13.2"x5.8" – Wt. = 49 lbs. /each)**
- **(1) Squid Surge Arrestor (24.0"x9.7"ø – Wt. = 33 lbs. /each) (tower mounted)**

**Proposed Loading Shown in Bold.*

No original structural design documents or fabrication drawings were available for the existing mount. A mount analysis report prepared by Trylon dated November 14, 2016 was available for our use. AT&T provided photos from a ground audit of the existing AT&T antenna mounts that was conducted on December 28, 2017.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-G, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures and the International Building Code 2012 with 2005 Connecticut Supplement with 2016 Amendments, and AT&T Mount Technical Directive – R5.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. A max basic wind speed of 110 mph and a max basic wind speed with ice of 50 mph were used to perform this analysis per TIA-222-G, Appendix B.
- HDG considers this site to be exposure category B; tower is located in an urban/suburban and wooded area with numerous closely spaced obstructions.
- HDG considers this site to be topographic category 1; tower is located in flat terrain.
- This mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 1.
- The sector frame has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our analysis, we have determined that the existing antenna mount **IS NOT CAPABLE** of supporting the proposed antenna installation. HDG recommends the following modifications:

- **Relocate position 1 antenna to mount face (typ. of 1 per sector, total of 3).**
- **Install new handrail kit, SitePro1 P/N HRK-14 (or approved equal).**
- **Install new 2.5" std. (2.88" O.D.) pipe mast, secure to existing mount and new handrail (typ. of 1 per sector, total of 3).**

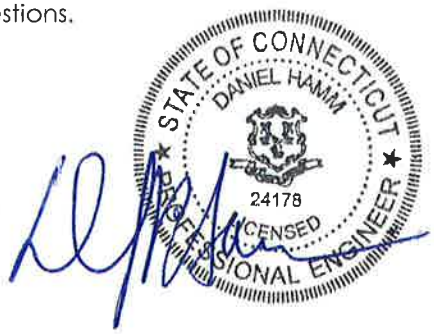
	Member	Controlling Load Case	Stress Ratio	Pass/Fail
Existing Mount Rating	13	LC2	147%	**FAIL**
Proposed Mount Rating	14	LC3	91%	**PASS**

This determination was based on the following limitations and assumptions:

1. HDG is not responsible for any modifications completed prior to and hereafter which HDG was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The existing mount has been adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to AT&T's mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. HDG performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
Hudson Design Group LLC



Michael Cabral
Structural Dept. Head

Daniel P. Hamm, PE
Principal

FIELD PHOTOS:

p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 413.588.8139 f: 413.517.0590 a: 116 Pleasant Street, Ste 302, Easthampton, MA 01027

HUDSON
Design Group LLC

Wind & Ice
Calculations

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN **Checked By:** MSC

HUDSON Design Group LLC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

		z=	150 (ft)
		z_g=	1200 (ft)
K_z=	**1.110**	α=	7.0

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_e
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.4 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_e\ K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}=	**#DIV/0!**	K_h=	#DIV/0!
		K_e=	0 (from Table 2-4)
(If Category 1 then K_{zt} =1.0)		K_t=	0 (from Table 2-5)
		f=	0 (from Table 2-5)
Category=	1	z=	150
		H=	0 (Ht. of the crest above surrounding terrain)
		K_{zt}=	1.00
		K_{iz} =	1.16 (from Sec. 2.6.8)

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN Checked By: MSC

HUDSON Design Group LLC

2.6.7 Gust Effect Factor

2.6.7.1 Self Supporting Lattice Structures

Gh = 1.0 Latticed Structures > 600 ft

Gh = 0.85 Latticed Structures 450 ft or less

Gh = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	160	Gh=	0.85

2.6.7.2 Guyed Masts Gh= 0.85

2.6.7.3 Pole Structures Gh= 1.1

2.6.9 Appurtenances Gh= 1.0

2.6.7.4 Structures Supported on Other Structures
(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

Gh=	1.35	**Gh=**	**1.00**

2.6.9.2 Design Wind Force on Appurtenances

$F = q_z * Gh * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_d * V_{max}^2 * I$

q_z=	**32.65**	K_z=	1.110
$q_{z\,(ice)}$=	**6.75**	K_{zt}=	1.0
		K_d=	0.95
		V_{max}=	110
		$V_{max\,(ice)}$=	50
		I=	1.0

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN Checked By: MSC

HUDSON Design Group LLC

Determine Ca:

Table 2-8

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Round	C < 32 (Subcritical)	0.7	0.8	1.2
	32 ≤ C ≤ 64 (Transitional)	$3.76/(C^{0.485})$	$3.37/(C^{0.415})$	$38.4/(C^{-1.0})$
	C > 64 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **0.75 in** **Angle =** **0 (deg)** **Equivalent Angle =** **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.86	1.31	**315**	**73**
QS66512-2 Antenna	72.0	12.0	9.6	6.00	6.00	1.36	**266**	**63**
7770 Antenna	55.0	11.0	5.0	4.20	5.00	1.31	**180**	**43**
RRUS-32 RRH	27.2	12.1	7.0	2.29	2.25	1.20	**90**	**22**
RRUS-32 RRH (Shielded)	27.2	0.0	7.0	0.00	0.00	1.20	**0**	**0**
4426 B66 RRH	15.0	13.2	5.8	1.38	1.14	1.20	**54**	**14**
4426 B66 RRH (Shielded)	15.0	1.2	5.8	0.13	12.50	1.58	**6**	**3**
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	**12**	**4**
Squid Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	**37**	**9**

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WIND LOADS

Angle = 30 (deg)

Ice Thickness = 0.75 in.

Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	315	211	289
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	266	222	255
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	180	96	159
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	90	54	81
RRUS-32 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	48	54	50
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	54	24	46
4426 B66 RRH (Shielded)	15.0	6.6	5.8	0.69	0.60	2.27	2.59	1.20	1.20	27	24	26
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	12	35	18

WIND LOADS WITH ICE:

HPA-65R-BUU-H6 Antenna	73.5	16.3	10.5	8.32	5.36	4.51	7.00	1.29	1.40	72	51	67
QS66512-2 Antenna	73.5	13.5	11.1	6.89	5.67	5.44	6.62	1.33	1.38	62	53	60
7770 Antenna	56.5	12.5	6.5	4.90	2.55	4.52	8.69	1.29	1.46	43	25	38
RRUS-32 RRH	28.7	13.6	8.5	2.71	1.69	2.11	3.38	1.20	1.24	22	14	20
RRUS-32 RRH (Shielded)	28.7	6.8	8.5	1.36	1.69	4.22	3.38	1.28	1.24	12	14	12
4426 B66 RRH	16.5	14.7	7.3	1.68	0.84	1.12	2.26	1.20	1.20	14	7	12
4426 B66 RRH (Shielded)	16.5	7.4	7.3	0.84	0.84	2.24	2.26	1.20	1.20	7	7	7
LGP21401 TMA	15.9	4.2	10.5	0.46	1.16	3.79	1.51	1.26	1.20	4	9	5

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WIND LOADS

Angle = 60 (deg)

Ice Thickness = 0.75 in.

Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	315	211	237
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	266	222	233
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	180	96	117
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	90	54	63
RRUS-32 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	68	54	58
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	54	24	31
4426 B66 RRH (Shielded)	15.0	9.9	5.8	1.03	0.60	1.52	2.59	1.20	1.20	40	24	28
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	12	35	29

WIND LOADS WITH ICE:

HPA-65R-BUU-H6 Antenna	73.5	16.3	10.5	8.32	5.36	4.51	7.00	1.29	1.40	72	51	56
QS66512-2 Antenna	73.5	13.5	11.1	6.89	5.67	5.44	6.62	1.33	1.38	62	53	55
7770 Antenna	56.5	12.5	6.5	4.90	2.55	4.52	8.69	1.29	1.46	43	25	29
RRUS-32 RRH	28.7	13.6	8.5	2.71	1.69	2.11	3.38	1.20	1.24	22	14	16
RRUS-32 RRH (Shielded)	28.7	10.2	8.5	2.03	1.69	2.81	3.38	1.21	1.24	17	14	15
4426 B66 RRH	16.5	14.7	7.3	1.68	0.84	1.12	2.26	1.20	1.20	14	7	8
4426 B66 RRH (Shielded)	16.5	11.0	7.3	1.26	0.84	1.50	2.26	1.20	1.20	10	7	8
LGP21401 TMA	15.9	4.2	10.5	0.46	1.16	3.79	1.51	1.26	1.20	4	9	8

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WIND LOADS

Angle =	90	(deg)	Ice Thickness =	0.75	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	315	211	211
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	266	222	222
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	180	96	96
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	90	54	54
RRUS-32 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	54	54
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	54	24	24
4426 B66 RRH (Shielded)	15.0	1.2	5.8	0.13	0.60	12.50	2.59	1.58	1.20	6	24	24
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	12	35	35

WIND LOADS WITH ICE:

HPA-65R-BUU-H6 Antenna	73.5	16.3	10.5	8.32	5.36	4.51	7.00	1.29	1.40	72	51	51
QS66512-2 Antenna	73.5	13.5	11.1	6.89	5.67	5.44	6.62	1.33	1.38	62	53	53
7770 Antenna	56.5	12.5	6.5	4.90	2.55	4.52	8.69	1.29	1.46	43	25	25
RRUS-32 RRH	28.7	13.6	8.5	2.71	1.69	2.11	3.38	1.20	1.24	22	14	14
RRUS-32 RRH (Shielded)	28.7	1.5	8.5	0.30	1.69	19.13	3.38	1.80	1.24	4	14	14
4426 B66 RRH	16.5	14.7	7.3	1.68	0.84	1.12	2.26	1.20	1.20	14	7	7
4426 B66 RRH (Shielded)	16.5	2.7	7.3	0.31	0.84	6.11	2.26	1.36	1.20	3	7	7
LGP21401 TMA	15.9	4.2	10.5	0.46	1.16	3.79	1.51	1.26	1.20	4	9	9

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WIND LOADS

Angle =	120	(deg)	Ice Thickness =	0.75	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	**315**	**211**	**237**
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	**266**	**222**	**233**
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	**180**	**96**	**117**
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	**90**	**54**	**63**
RRUS-32 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	**68**	**54**	**58**
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	**54**	**24**	**31**
4426 B66 RRH (Shielded)	15.0	9.9	5.8	1.03	0.60	1.52	2.59	1.20	1.20	**40**	**24**	**28**
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	**12**	**35**	**29**

WIND LOADS WITH ICE:

HPA-65R-BUU-H6 Antenna	73.5	16.3	10.5	8.32	5.36	4.51	7.00	1.29	1.40	**72**	**51**	**56**
QS66512-2 Antenna	73.5	13.5	11.1	6.89	5.67	5.44	6.62	1.33	1.38	**62**	**53**	**55**
7770 Antenna	56.5	12.5	6.5	4.90	2.55	4.52	8.69	1.29	1.46	**43**	**25**	**29**
RRUS-32 RRH	28.7	13.6	8.5	2.71	1.69	2.11	3.38	1.20	1.24	**22**	**14**	**16**
RRUS-32 RRH (Shielded)	28.7	10.2	8.5	2.03	1.69	2.81	3.38	1.21	1.24	**17**	**14**	**15**
4426 B66 RRH	16.5	14.7	7.3	1.68	0.84	1.12	2.26	1.20	1.20	**14**	**7**	**8**
4426 B66 RRH (Shielded)	16.5	11.0	7.3	1.26	0.84	1.50	2.26	1.20	1.20	**10**	**7**	**8**
LGP21401 TMA	15.9	4.2	10.5	0.46	1.16	3.79	1.51	1.26	1.20	**4**	**9**	**8**

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WIND LOADS

Angle =	150	(deg)	Ice Thickness =	0.75	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	315	211	289
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	266	222	255
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	180	96	159
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	90	54	81
RRUS-32 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	48	54	50
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	54	24	46
4426 B66 RRH (Shielded)	15.0	6.6	5.8	0.69	0.60	2.27	2.59	1.20	1.20	27	24	26
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	12	35	18

WIND LOADS WITH ICE:

HPA-65R-BUU-H6 Antenna	73.5	16.3	10.5	8.32	5.36	4.51	7.00	1.29	1.40	72	51	67
QS66512-2 Antenna	73.5	13.5	11.1	6.89	5.67	5.44	6.62	1.33	1.38	62	53	60
7770 Antenna	56.5	12.5	6.5	4.90	2.55	4.52	8.69	1.29	1.46	43	25	38
RRUS-32 RRH	28.7	13.6	8.5	2.71	1.69	2.11	3.38	1.20	1.24	22	14	20
RRUS-32 RRH (Shielded)	28.7	6.8	8.5	1.36	1.69	4.22	3.38	1.28	1.24	12	14	12
4426 B66 RRH	16.5	14.7	7.3	1.68	0.84	1.12	2.26	1.20	1.20	14	7	12
4426 B66 RRH (Shielded)	16.5	7.4	7.3	0.84	0.84	2.24	2.26	1.20	1.20	7	7	7
LGP21401 TMA	15.9	4.2	10.5	0.46	1.16	3.79	1.51	1.26	1.20	4	9	5

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2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

		z=	150 (ft)
		z_g=	1200 (ft)
K_z=	**1.110**	α=	7.0

$Kzmin \leq Kz \leq 2.01$

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_e
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.4 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_e K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}=	**#DIV/0!**

K_h=	#DIV/0!	
K_e=	0	(from Table 2-4)
K_t=	0	(from Table 2-5)
f=	0	(from Table 2-5)
z=	150	
H=	0	(Ht. of the crest above surrounding terrain)
K_{zt}=	1.00	
K_{iz} =	1.16	(from Sec. 2.6.8)

(If Category 1 then K_{zt} =1.0)

Category=	1

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2.6.7 Gust Effect Factor

2.6.7.1 Self Supporting Lattice Structures

Gh = 1.0 Latticed Structures > 600 ft

Gh = 0.85 Latticed Structures 450 ft or less

Gh = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	160	Gh=	0.85

2.6.7.2 Guyed Masts Gh= 0.85

2.6.7.3 Pole Structures Gh= 1.1

2.6.9 Appurtenances Gh= 1.0

2.6.7.4 Structures Supported on Other Structures
(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

Gh=	1.35	**Gh=**	**1.00**

2.6.9.2 Design Wind Force on Appurtenances

$F = q_z * Gh * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_d * V_{max}^2 * I$

		K_z=	1.110
		K_{zt}=	1.0
q_z=	**2.43**	K_d=	0.95
$q_{z\,(ice)}$=	**6.75**	V_{max}=	30
		$V_{max\,(ice)}$=	50
		I=	1.0

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95

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Determine Ca:

Table 2-8

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Round	C < 32 (Subcritical)	0.7	0.8	1.2
	32 ≤ C ≤ 64 (Transitional)	$3.76/(C^{0.485})$	$3.37/(C^{0.415})$	$38.4/(C^{1.0})$
	C > 64 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **0.75 in** | **Angle =** **0 (deg)** | **Equivalent Angle =** **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.86	1.31	**23**	**73**
QS66512-2 Antenna	72.0	12.0	9.6	6.00	6.00	1.36	**20**	**63**
7770 Antenna	55.0	11.0	5.0	4.20	5.00	1.31	**13**	**43**
RRUS-32 RRH	27.2	12.1	7.0	2.29	2.25	1.20	**7**	**22**
RRUS-32 RRH (Shielded)	27.2	0.0	7.0	0.00	0.00	1.20	**0**	**0**
4426 B66 RRH	15.0	13.2	5.8	1.38	1.14	1.20	**4**	**14**
4426 B66 RRH (Shielded)	15.0	1.2	5.8	0.13	12.50	1.58	**1**	**3**
LGP21401 TMA	14.4	2.7	9.0	0.27	5.33	1.33	**1**	**4**
Squid Surge Arrestor	24.0	9.7	9.7	1.62	2.47	0.70	**3**	**9**

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WIND LOADS

Angle = 30 (deg)

Ice Thickness = 0.75 in.

Equivalent Angle = 210 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs)	Force (lbs)	Force (lbs)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	23	16	22
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	17	19
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	12
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.92	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	4	2	3
4426 B66 RRH (Shielded)	15.0	6.6	5.8	0.69	0.60	2.27	2.59	1.20	1.20	2	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

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WIND LOADS

Angle = 60 (deg)

Ice Thickness = 0.75 in.

Equivalent Angle = 240 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	23	16	18
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	17	17
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	9
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	4	2	2
4426 B66 RRH (Shielded)	15.0	9.9	5.8	1.03	0.60	1.52	2.59	1.20	1.20	3	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	0.75	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	23	16	16
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	17	17
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	7
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
RRUS-32 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	4	4
4426 B66 RRH	15.0	13.2	5.8	1.98	0.60	1.14	2.59	1.20	1.20	4	2	2
4426 B66 RRH (Shielded)	15.0	1.2	5.8	0.13	0.60	12.50	2.59	1.58	1.20	0	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	3

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle = 120 (deg)

Ice Thickness = 0.75 in.

Equivalent Angle = 300 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	23	16	18
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	17	17
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	9
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	5	4	4
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	4	2	2
4426 B66 RRH (Shielded)	15.0	9.9	5.8	1.03	0.60	1.52	2.59	1.20	1.20	3	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	2

Date: 4/6/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN Checked By: MSC

HUDSON Design Group LLC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	0.75	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
HPA-65R-BUU-H6 Antenna	72.0	14.8	9.0	7.40	4.50	4.86	8.00	1.31	1.43	23	16	22
QS66512-2 Antenna	72.0	12.0	9.6	6.00	4.80	6.00	7.50	1.36	1.42	20	17	19
7770 Antenna	55.0	11.0	5.0	4.20	1.91	5.00	11.00	1.31	1.53	13	7	12
RRUS-32 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
4426 B66 RRH	15.0	13.2	5.8	1.38	0.60	1.14	2.59	1.20	1.20	4	2	3
4426 B66 RRH (Shielded)	15.0	6.6	5.8	0.69	0.60	2.27	2.59	1.20	1.20	2	2	2
LGP21401 TMA	14.4	2.7	9.0	0.27	0.90	5.33	1.60	1.33	1.20	1	3	1

Date: 2/8/2018
Project Name: Greenwich North
Project Number: CT2130
Designed By: JN **Checked By:** MSC

HUDSON Design Group LLC

ICE WEIGHT CALCULATIONS

Thickness of ice (in): 0.75
* Density of ice used = 56 PCF

HPA-65R-BUU-H6 Antenna

Weight of ice based on total radial SF area:		
Height (in):	72.0	
Width (in):	14.8	
Depth (in):	9.0	
Total weight of ice on object:		90 lbs
Weight of object:	51 lbs	
Combined weight of ice and object:		141 lbs

QS66512-2 Antenna

Weight of ice based on total radial SF area:		
Height (in):	72.0	
Width (in):	12.0	
Depth (in):	9.6	
Total weight of ice on object:		81 lbs
Weight of object:	111 lbs	
Combined weight of ice and object:		192 lbs

7770 Antenna

Weight of ice based on total radial SF area:		
Height (in):	55.0	
Width (in):	11.0	
Depth (in):	5.0	
Total weight of ice on object:		45 lbs
Weight of object:	35 lbs	
Combined weight of ice and object:		80 lbs

RRUS-32 RRH

Weight of ice based on total radial SF area:		
Height (in):	27.2	
Width (in):	12.1	
Depth (in):	7.0	
Total weight of ice on object:		29 lbs
Weight of object:	60 lbs	
Combined weight of ice and object:		89 lbs

4426 B66 RRH

Weight of ice based on total radial SF area:		
Height (in):	15.0	
Width (in):	13.2	
Depth (in):	5.8	
Total weight of ice on object:		18 lbs
Weight of object:	49 lbs	
Combined weight of ice and object:		67 lbs

LGP21401 TMA

Weight of ice based on total radial SF area:		
Height (in):	14.4	
Width (in):	9.0	
Depth (in):	2.7	
Total weight of ice on object:		9 lbs
Weight of object:	16 lbs	
Combined weight of ice and object:		25 lbs

Squid Surge Arrestor

Weight of ice based on total radial SF area:		
Depth (in):	24.0	
Diameter(in):	9.7	
Total weight of ice on object:		25 lbs
Weight of object:	33 lbs	
Combined weight of ice and object:		58 lbs

HSS 4x4x1/4

Weight of ice based on total radial SF area:		
Height (in):	4.0	
Width (in):	4.0	
Depth (in):	12.0	
Total weight of ice on object:		7 lbs/ft

L 2-1/x2-1/2x1/4

Weight of ice based on total radial SF area:		
Height (in):	2.5	
Width (in):	2.5	
Depth (in):	12.0	
Total weight of ice on object:		5 lbs/ft

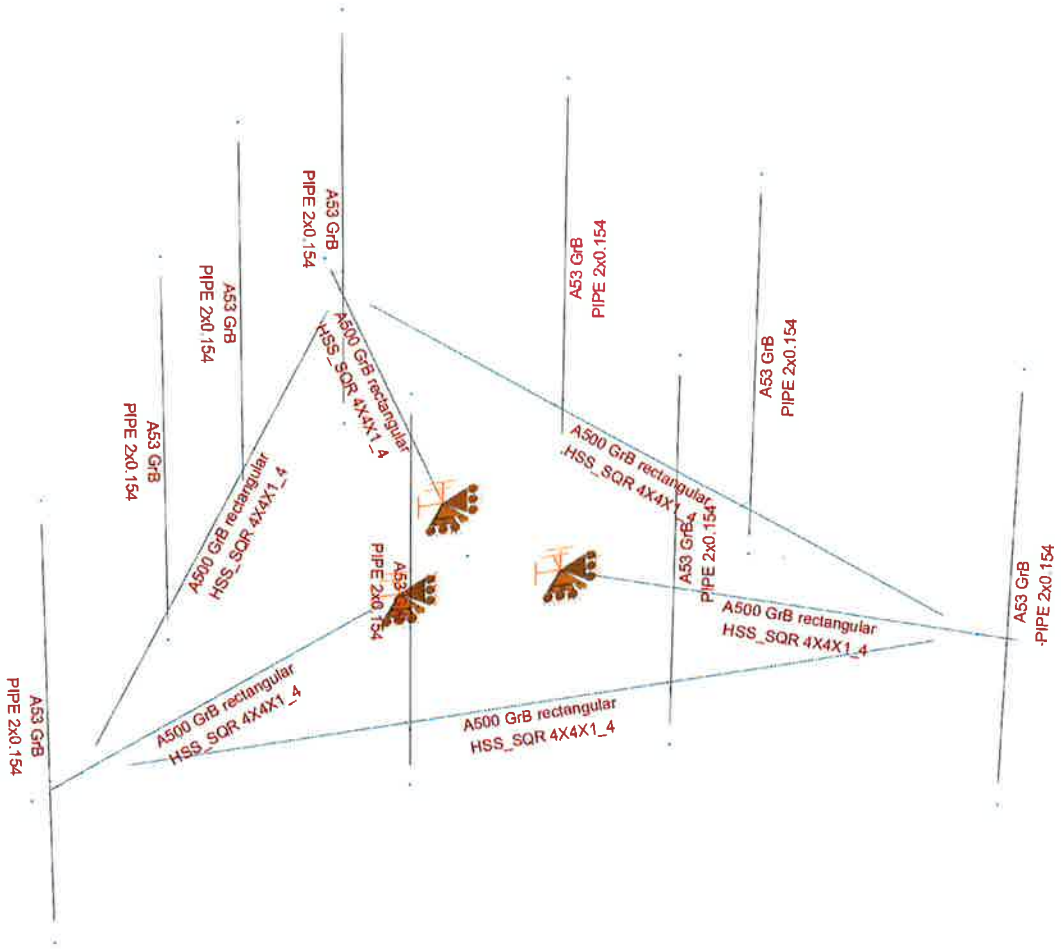
2.0" Pipe

Per foot weight of ice:		
diameter (in):	2.38	
Per foot weight of ice on object:		2 lbs/ft

HUDSON
Design Group LLC

Mount Calculations
(Existing Conditions)


Y
X
Z


A53 GrB
PIPE 2x0.154
A500 GrB rectangular
HSS_SQR 4X4X1_4
Y
X
Z

Bentley **Hewlett-Packard Company**

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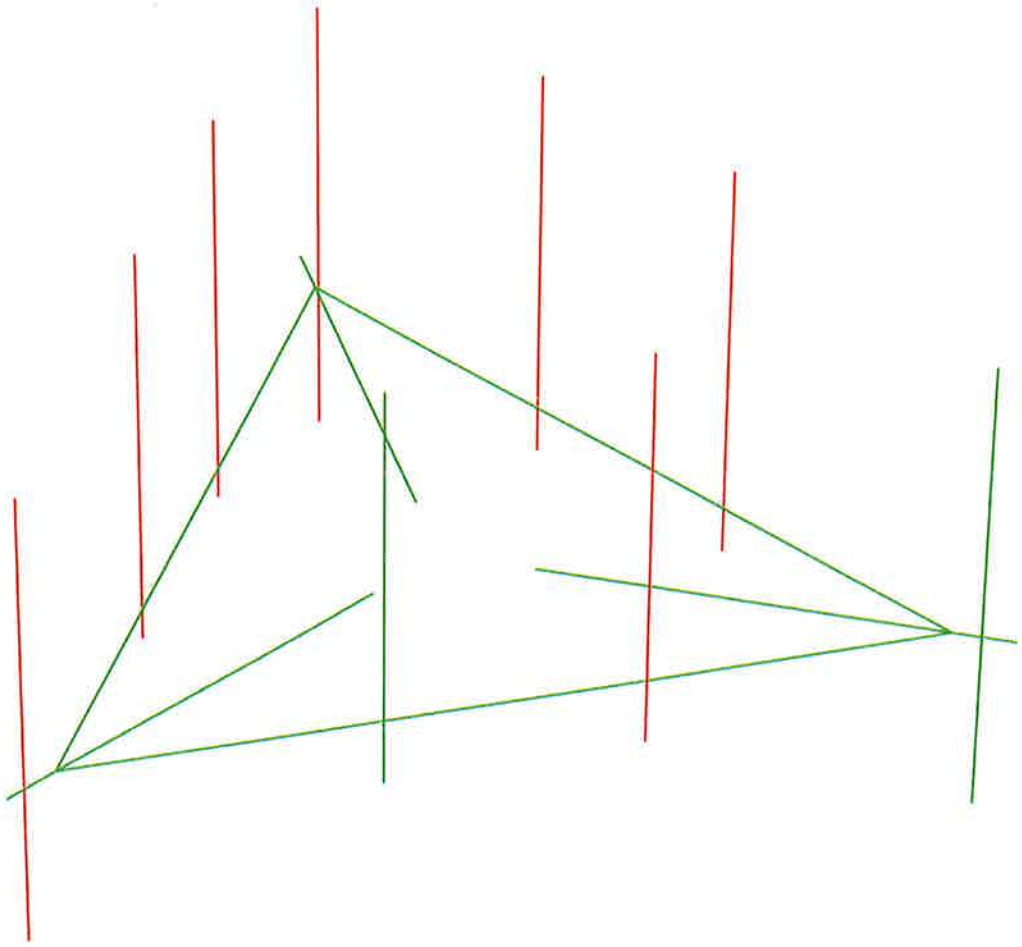
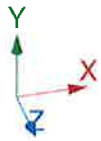
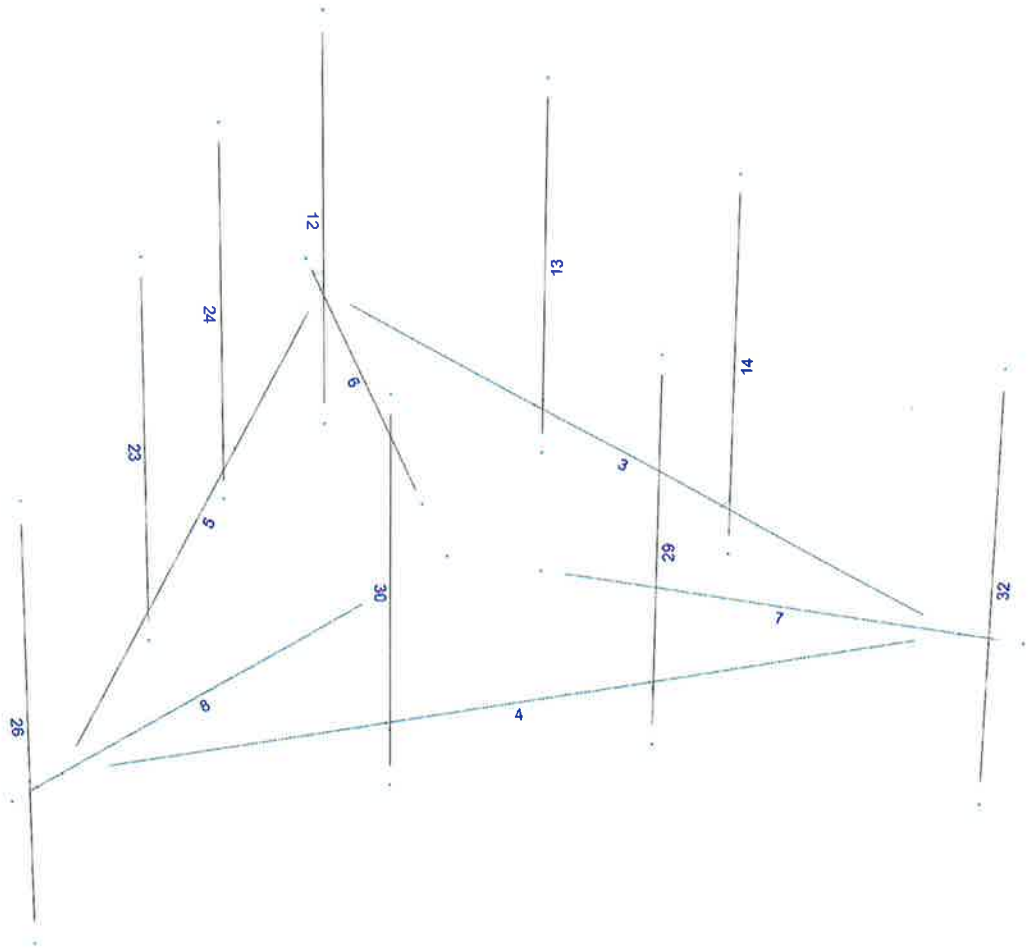
Design status

- Not designed
- Error on design
- Design O.K.
- With warnings



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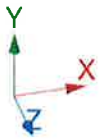
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Load data

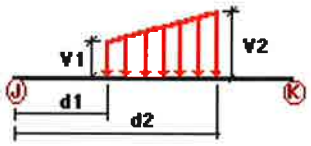
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
W0	Wind Load 0/60deg	No	WIND
W30	Wind Load 30/90deg	No	WIND
Di	Ice Load	No	LL
Wi0	Ice Wind Load 0/60deg	No	WIND
Wi30	Ice Wind Load 30/90deg	No	WIND
WL0	WL 30 mph 0/60deg	No	WIND
WL30	WL 30 mph 30/90deg	No	WIND
LL1	250 lb Live Load	No	LL
LL2	500 lb Live Load	No	LL
W180	-W0	Yes	
W210	-W30	Yes	
Wi180	-Wi0	Yes	
Wi210	-Wi30	Yes	
WL180	-WL0	Yes	
WL210	-WL30	Yes	

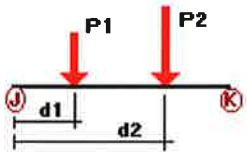
Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
DL	3	y	-0.01	0.00	0.00	No	0.00	No
	4	y	-0.01	0.00	0.00	No	0.00	No
	5	y	-0.01	0.00	0.00	No	0.00	No
	6	y	-0.01	-0.01	1.00	No	3.50	No
	7	y	-0.01	-0.01	1.00	No	3.50	No
	8	y	-0.01	-0.01	1.00	No	3.50	No
W0	3	z	-0.022	0.00	0.00	No	0.00	No
	4	z	-0.022	0.00	0.00	No	0.00	No
	5	z	-0.022	0.00	0.00	No	0.00	No
W30	3	x	-0.022	0.00	0.00	No	0.00	No
	5	x	-0.022	0.00	0.00	No	0.00	No
Di	3	y	-0.007	0.00	0.00	No	0.00	No
	4	y	-0.007	0.00	0.00	No	0.00	No

5	y	-0.007	0.00	0.00	No	0.00	No
6	y	-0.007	0.00	0.00	No	0.00	No
7	y	-0.007	0.00	0.00	No	0.00	No
8	y	-0.007	0.00	0.00	No	0.00	No
12	y	-0.002	0.00	0.00	No	0.00	No
13	y	-0.002	0.00	0.00	No	0.00	No
23	y	-0.002	0.00	0.00	No	0.00	No
24	y	-0.002	0.00	0.00	No	0.00	No
14	y	-0.002	0.00	0.00	No	0.00	No
26	y	-0.002	0.00	0.00	No	0.00	No
29	y	-0.002	0.00	0.00	No	0.00	No
30	y	-0.002	0.00	0.00	No	0.00	No
32	y	-0.002	0.00	0.00	No	0.00	No

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
DL	12	y	-0.026	0.50	No
		y	-0.026	5.50	No
		y	-0.06	3.00	No
	13	y	-0.056	0.50	No
		y	-0.056	5.50	No
		y	-0.049	4.00	No
	23	y	-0.056	0.50	No
		y	-0.056	5.50	No
		y	-0.049	4.00	No
	24	y	-0.018	0.50	No
		y	-0.018	4.50	No
		y	-0.038	4.00	No
	14	y	-0.018	0.50	No
		y	-0.018	4.50	No
		y	-0.038	4.00	No
	26	y	-0.026	0.50	No
		y	-0.026	5.50	No
		y	-0.06	3.00	No
	29	y	-0.056	0.50	No
		y	-0.056	5.50	No
		y	-0.049	4.00	No
	30	y	-0.018	0.50	No
		y	-0.018	4.50	No
		y	-0.038	4.00	No
	32	y	-0.026	0.50	No
		y	-0.026	5.50	No
		y	-0.06	3.00	No
W0	12	z	-0.119	0.50	No
		z	-0.119	5.50	No
		z	-0.058	3.00	No
	13	z	-0.117	0.50	No
		z	-0.117	5.50	No

		z	-0.028	4.00	No
	23	z	-0.117	0.50	No
		z	-0.117	5.50	No
		z	-0.028	4.00	No
	24	z	-0.059	0.50	No
		z	-0.059	4.50	No
		z	-0.029	4.00	No
	14	z	-0.059	0.50	No
		z	-0.059	4.50	No
		z	-0.029	4.00	No
	26	z	-0.119	0.50	No
		z	-0.119	5.50	No
		z	-0.058	3.00	No
	29	z	-0.133	0.50	No
		z	-0.133	5.50	No
		z	-0.006	4.00	No
	30	z	-0.09	0.50	No
		z	-0.09	4.50	No
	32	z	-0.158	0.50	No
		z	-0.158	5.50	No
W30	12	x	-0.145	0.50	No
		x	-0.145	5.50	No
		x	-0.05	3.00	No
	13	x	-0.128	0.50	No
		x	-0.128	5.50	No
		x	-0.046	4.00	No
	23	x	-0.128	0.50	No
		x	-0.128	5.50	No
		x	-0.046	4.00	No
	24	x	-0.08	0.50	No
		x	-0.08	4.50	No
		x	-0.018	4.00	No
	14	x	-0.08	0.50	No
		x	-0.08	4.50	No
		x	-0.018	4.00	No
	26	x	-0.145	0.50	No
		x	-0.145	5.50	No
		x	-0.05	3.00	No
	29	x	-0.112	0.50	No
		x	-0.112	5.50	No
		x	-0.024	4.00	No
	30	x	-0.048	0.50	No
		x	-0.048	4.50	No
		x	-0.035	4.00	No
	32	x	-0.106	0.50	No
		x	-0.106	5.50	No
		x	-0.054	3.00	No
Di	12	y	-0.045	0.50	No
		y	-0.045	5.50	No
		y	-0.029	3.00	No
	13	y	-0.041	0.50	No
		y	-0.041	5.50	No
		y	-0.018	4.00	No
	23	y	-0.041	0.50	No
		y	-0.041	5.50	No
		y	-0.018	4.00	No
	24	y	-0.023	0.50	No
		y	-0.023	4.50	No
		y	-0.018	4.00	No
	14	y	-0.023	0.50	No

		y	-0.023	4.50	No
		y	-0.018	4.00	No
	26	y	-0.045	0.50	No
		y	-0.045	5.50	No
		y	-0.029	3.00	No
	29	y	-0.041	0.50	No
		y	-0.041	5.50	No
		y	-0.018	4.00	No
	30	y	-0.023	0.50	No
		y	-0.023	4.50	No
		y	-0.018	4.00	No
	32	y	-0.045	0.50	No
		y	-0.045	5.50	No
		y	-0.029	3.00	No
Wi0	12	z	-0.029	0.50	No
		z	-0.029	5.50	No
		z	-0.016	3.00	No
	13	z	-0.028	0.50	No
		z	-0.028	5.50	No
		z	-0.008	4.00	No
	23	z	-0.028	0.50	No
		z	-0.028	5.50	No
		z	-0.008	4.00	No
	24	z	-0.015	0.50	No
		z	-0.015	4.50	No
		z	-0.008	4.00	No
	14	z	-0.015	0.50	No
		z	-0.015	4.50	No
		z	-0.008	4.00	No
	26	z	-0.029	0.50	No
		z	-0.029	5.50	No
		z	-0.016	3.00	No
	29	z	-0.032	0.50	No
		z	-0.032	5.50	No
		z	-0.014	4.00	No
	30	z	-0.022	0.50	No
		z	-0.022	4.50	No
		z	-0.004	4.00	No
	32	z	-0.037	0.50	No
		z	-0.037	5.50	No
		z	-0.014	3.00	No
Wi30	12	x	-0.034	0.50	No
		x	-0.034	5.50	No
		x	-0.02	3.00	No
	13	x	-0.03	0.50	No
		x	-0.03	5.50	No
		x	-0.012	4.00	No
	23	x	-0.03	0.50	No
		x	-0.03	5.50	No
		x	-0.012	4.00	No
	24	x	-0.02	0.50	No
		x	-0.02	4.50	No
		x	-0.005	4.00	No
	14	x	-0.02	0.50	No
		x	-0.02	4.50	No
		x	-0.005	4.00	No
	26	x	-0.034	0.50	No
		x	-0.034	5.50	No
		x	-0.02	3.00	No
	29	x	-0.027	0.50	No

		x	-0.027	5.50	No
		x	-0.007	4.00	No
	30	x	-0.013	0.50	No
		x	-0.013	4.50	No
		x	-0.009	4.00	No
	32	x	-0.026	0.50	No
		x	-0.026	5.50	No
		x	-0.014	3.00	No
WL0	12	z	-0.009	0.50	No
		z	-0.009	5.50	No
		z	-0.004	3.00	No
	13	z	-0.009	0.50	No
		z	-0.009	5.50	No
		z	-0.002	4.00	No
	23	z	-0.009	0.50	No
		z	-0.009	5.50	No
		z	-0.002	4.00	No
	24	z	-0.005	0.50	No
		z	-0.005	4.50	No
		z	-0.002	4.00	No
	14	z	-0.005	0.50	No
		z	-0.005	4.50	No
		z	-0.002	4.00	No
	26	z	-0.009	0.50	No
		z	-0.009	5.50	No
		z	-0.004	3.00	No
	29	z	-0.01	0.50	No
		z	-0.01	5.50	No
		z	-0.001	4.00	No
	30	z	-0.007	0.50	No
		z	-0.007	4.50	No
	32	z	-0.012	0.50	No
		z	-0.012	5.50	No
WL30	12	x	-0.011	0.50	No
		x	-0.011	5.50	No
		x	-0.004	3.00	No
	13	x	-0.01	0.50	No
		x	-0.01	5.50	No
		x	-0.002	4.00	No
	23	x	-0.01	0.50	No
		x	-0.01	5.50	No
		x	-0.002	4.00	No
	24	x	-0.006	0.50	No
		x	-0.006	4.50	No
		x	-0.001	4.00	No
	14	x	-0.006	0.50	No
		x	-0.006	4.50	No
		x	-0.001	4.00	No
	26	x	-0.011	0.50	No
		x	-0.011	5.50	No
		x	-0.004	3.00	No
	29	x	-0.009	0.50	No
		x	-0.009	5.50	No
		x	-0.002	4.00	No
	30	x	-0.004	0.50	No
		x	-0.004	4.50	No
		x	-0.003	4.00	No
	32	x	-0.008	0.50	No
		x	-0.008	5.50	No
		x	-0.004	3.00	No

LL1	7	y	-0.25	100.00	Yes
LL2	32	y	-0.50	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
W0	Wind Load 0/60deg	No	0.00	0.00	0.00
W30	Wind Load 30/90deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wi0	Ice Wind Load 0/60deg	No	0.00	0.00	0.00
Wi30	Ice Wind Load 30/90deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0/60deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30/90deg	No	0.00	0.00	0.00
LL1	250 lb Live Load	No	0.00	0.00	0.00
LL2	500 lb Live Load	No	0.00	0.00	0.00
W180	-W0	Yes	0.00	0.00	0.00
W210	-W30	Yes	0.00	0.00	0.00
Wi180	-Wi0	Yes	0.00	0.00	0.00
Wi210	-Wi30	Yes	0.00	0.00	0.00
WL180	-WL0	Yes	0.00	0.00	0.00
WL210	-WL30	Yes	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
W0	0.00	0.00	0.00
W30	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wi0	0.00	0.00	0.00
Wi30	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
W180	0.00	0.00	0.00
W210	0.00	0.00	0.00
Wi180	0.00	0.00	0.00
Wi210	0.00	0.00	0.00
WL180	0.00	0.00	0.00
WL210	0.00	0.00	0.00

Bentley Hewlett-Packard Company

Current Date: 4/6/2018 9:52 AM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2130\CT2130 (LTE 3C-4C).etz\

Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30
LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.6LL1
LC16=1.2DL+1.6WL0+LL2
LC17=1.2DL+1.6WL30+LL2
LC18=1.2DL-1.6WL0+LL2
LC19=1.2DL-1.6WL30+LL2

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	**3**	LC1 at 100.00%	**0.38**	**OK**	Eq. H1-1b
			LC10 at 100.00%	0.23	OK	
			LC11 at 0.00%	0.23	OK	
			LC12 at 0.00%	0.22	OK	
			LC13 at 100.00%	0.14	OK	
			LC14 at 100.00%	0.10	OK	
			LC15 at 100.00%	0.14	OK	
			LC16 at 0.00%	0.18	OK	
			LC17 at 0.00%	0.20	OK	
			LC18 at 0.00%	0.21	OK	
			LC19 at 0.00%	0.21	OK	
			LC2 at 100.00%	0.37	OK	Eq. H1-1b
			LC3 at 0.00%	0.33	OK	
			LC4 at 0.00%	0.35	OK	Eq. H1-1b
			LC5 at 100.00%	0.35	OK	
			LC6 at 100.00%	0.34	OK	
			LC7 at 0.00%	0.29	OK	
			LC8 at 0.00%	0.32	OK	
			LC9 at 100.00%	0.23	OK	
		4	LC1 at 0.00%	0.31	OK	
			LC10 at 100.00%	0.23	OK	
			LC11 at 0.00%	0.21	OK	
			LC12 at 0.00%	0.23	OK	
			LC13 at 0.00%	0.14	OK	
			LC14 at 0.00%	0.10	OK	
			LC15 at 0.00%	0.14	OK	
			LC16 at 0.00%	0.20	OK	
			LC17 at 0.00%	0.18	OK	
			LC18 at 0.00%	0.20	OK	

	LC19 at 0.00%	0.21	OK	
	LC2 at 100.00%	**0.41**	**OK**	Eq. H1-1b
	LC3 at 0.00%	0.27	OK	
	LC4 at 0.00%	0.39	OK	Eq. H1-1b
	LC5 at 0.00%	0.27	OK	
	LC6 at 100.00%	0.38	OK	
	LC7 at 0.00%	0.23	OK	
	LC8 at 0.00%	0.35	OK	
	LC9 at 0.00%	0.22	OK	
5	LC1 at 100.00%	**0.39**	**OK**	Eq. H1-1b
	LC10 at 0.00%	0.22	OK	
	LC11 at 0.00%	0.23	OK	
	LC12 at 100.00%	0.23	OK	
	LC13 at 0.00%	0.14	OK	
	LC14 at 0.00%	0.10	OK	
	LC15 at 0.00%	0.14	OK	
	LC16 at 100.00%	0.15	OK	
	LC17 at 0.00%	0.15	OK	
	LC18 at 0.00%	0.15	OK	
	LC19 at 100.00%	0.15	OK	
	LC2 at 0.00%	0.36	OK	Eq. H1-1b
	LC3 at 0.00%	0.32	OK	
	LC4 at 100.00%	0.37	OK	
	LC5 at 100.00%	0.36	OK	
	LC6 at 0.00%	0.32	OK	
	LC7 at 0.00%	0.29	OK	
	LC8 at 100.00%	0.33	OK	
	LC9 at 100.00%	0.23	OK	
6	LC1 at 100.00%	**0.71**	**OK**	Eq. H1-1b
	LC10 at 100.00%	0.52	OK	
	LC11 at 100.00%	0.46	OK	
	LC12 at 100.00%	0.52	OK	
	LC13 at 100.00%	0.36	OK	
	LC14 at 100.00%	0.27	OK	
	LC15 at 100.00%	0.36	OK	
	LC16 at 100.00%	0.36	OK	
	LC17 at 100.00%	0.34	OK	
	LC18 at 100.00%	0.31	OK	
	LC19 at 100.00%	0.34	OK	
	LC2 at 100.00%	0.50	OK	
	LC3 at 14.58%	0.13	OK	
	LC4 at 100.00%	0.50	OK	
	LC5 at 100.00%	0.63	OK	
	LC6 at 100.00%	0.41	OK	
	LC7 at 87.50%	0.10	OK	
	LC8 at 100.00%	0.41	OK	
	LC9 at 100.00%	0.57	OK	
7	LC1 at 14.58%	0.30	OK	
	LC10 at 100.00%	0.47	OK	
	LC11 at 100.00%	0.55	OK	
	LC12 at 100.00%	0.56	OK	
	LC13 at 100.00%	0.36	OK	
	LC14 at 100.00%	0.27	OK	
	LC15 at 100.00%	0.36	OK	
	LC16 at 100.00%	0.62	OK	
	LC17 at 100.00%	0.60	OK	
	LC18 at 100.00%	0.64	OK	
	LC19 at 100.00%	0.65	OK	
	LC2 at 14.58%	0.16	OK	
	LC3 at 100.00%	0.61	OK	
	LC4 at 100.00%	**0.71**	**OK**	Eq. H1-1b

		LC5 at 14.58%	0.25	OK	
		LC6 at 14.58%	0.11	OK	
		LC7 at 100.00%	0.52	OK	
		LC8 at 100.00%	0.62	OK	
		LC9 at 100.00%	0.49	OK	
	8	LC1 at 14.58%	0.29	OK	
		LC10 at 100.00%	0.56	OK	
		LC11 at 100.00%	0.55	OK	
		LC12 at 100.00%	0.47	OK	
		LC13 at 100.00%	0.36	OK	
		LC14 at 100.00%	0.27	OK	
		LC15 at 100.00%	0.36	OK	
		LC16 at 100.00%	0.32	OK	
		LC17 at 100.00%	0.36	OK	
		LC18 at 100.00%	0.35	OK	
		LC19 at 100.00%	0.31	OK	
		LC2 at 100.00%	**0.71**	**OK**	Eq. H1-1b
		LC3 at 100.00%	0.60	OK	
		LC4 at 14.58%	0.20	OK	
		LC5 at 14.58%	0.24	OK	
		LC6 at 100.00%	0.62	OK	
		LC7 at 100.00%	0.51	OK	
		LC8 at 14.58%	0.15	OK	
		LC9 at 100.00%	0.49	OK	
PIPE 2x0.154	**12**	LC1 at 59.38%	1.07	N.G.	
		LC10 at 59.38%	0.21	OK	
		LC11 at 59.38%	0.18	OK	
		LC12 at 59.38%	0.21	OK	
		LC13 at 59.38%	0.01	OK	
		LC14 at 59.38%	0.01	OK	
		LC15 at 59.38%	0.01	OK	
		LC16 at 59.38%	0.08	OK	
		LC17 at 59.38%	0.10	OK	
		LC18 at 59.38%	0.08	OK	
		LC19 at 59.38%	0.10	OK	
		LC2 at 59.38%	1.24	N.G.	
		LC3 at 59.38%	1.07	N.G.	
		LC4 at 59.38%	**1.24**	**N.G.**	Eq. H1-1b
		LC5 at 59.38%	1.07	N.G.	
		LC6 at 59.38%	1.24	N.G.	
		LC7 at 59.38%	1.07	N.G.	
		LC8 at 59.38%	1.24	N.G.	
		LC9 at 59.38%	0.18	OK	
	13	LC1 at 84.38%	1.30	N.G.	
		LC10 at 84.38%	0.23	OK	
		LC11 at 84.38%	0.21	OK	
		LC12 at 84.38%	0.23	OK	
		LC13 at 84.38%	0.02	OK	
		LC14 at 84.38%	0.01	OK	
		LC15 at 84.38%	0.02	OK	
		LC16 at 84.38%	0.10	OK	
		LC17 at 84.38%	0.12	OK	
		LC18 at 84.38%	0.10	OK	
		LC19 at 84.38%	0.12	OK	
		LC2 at 84.38%	**1.47**	**N.G.**	Eq. H1-1b
		LC3 at 84.38%	1.30	N.G.	
		LC4 at 84.38%	1.47	N.G.	
		LC5 at 84.38%	1.29	N.G.	
		LC6 at 84.38%	1.47	N.G.	
		LC7 at 84.38%	1.29	N.G.	
		LC8 at 84.38%	1.47	N.G.	

	LC9 at 84.38%	0.21	OK	
23	LC1 at 84.38%	1.30	N.G.	
	LC10 at 84.38%	0.23	OK	
	LC11 at 84.38%	0.21	OK	
	LC12 at 84.38%	0.23	OK	
	LC13 at 84.38%	0.02	OK	
	LC14 at 84.38%	0.01	OK	
	LC15 at 84.38%	0.02	OK	
	LC16 at 84.38%	0.10	OK	
	LC17 at 84.38%	0.12	OK	
	LC18 at 84.38%	0.10	OK	
	LC19 at 84.38%	0.12	OK	
	LC2 at 84.38%	**1.47**	**N.G.**	Eq. H1-1b
	LC3 at 84.38%	1.30	N.G.	
	LC4 at 84.38%	1.47	N.G.	
	LC5 at 84.38%	1.29	N.G.	
	LC6 at 84.38%	1.47	N.G.	
	LC7 at 84.38%	1.29	N.G.	
	LC8 at 84.38%	1.47	N.G.	
	LC9 at 84.38%	0.21	OK	
24	LC1 at 84.38%	0.81	OK	
	LC10 at 84.38%	0.17	OK	
	LC11 at 84.38%	0.13	OK	
	LC12 at 84.38%	0.17	OK	
	LC13 at 84.38%	0.01	OK	
	LC14 at 84.38%	0.01	OK	
	LC15 at 84.38%	0.01	OK	
	LC16 at 84.38%	0.07	OK	
	LC17 at 84.38%	0.08	OK	
	LC18 at 84.38%	0.07	OK	
	LC19 at 84.38%	0.08	OK	
	LC2 at 84.38%	**1.02**	**N.G.**	Eq. H1-1b
	LC3 at 84.38%	0.81	OK	
	LC4 at 84.38%	1.02	N.G.	
	LC5 at 84.38%	0.81	OK	
	LC6 at 84.38%	1.02	N.G.	
	LC7 at 84.38%	0.81	OK	
	LC8 at 84.38%	1.02	N.G.	
	LC9 at 84.38%	0.13	OK	
14	LC1 at 84.38%	0.81	OK	
	LC10 at 84.38%	0.17	OK	
	LC11 at 84.38%	0.13	OK	
	LC12 at 84.38%	0.17	OK	
	LC13 at 84.38%	0.01	OK	
	LC14 at 84.38%	0.01	OK	
	LC15 at 84.38%	0.01	OK	
	LC16 at 84.38%	0.07	OK	
	LC17 at 84.38%	0.08	OK	
	LC18 at 84.38%	0.07	OK	
	LC19 at 84.38%	0.08	OK	
	LC2 at 84.38%	**1.02**	**N.G.**	Eq. H1-1b
	LC3 at 84.38%	0.81	OK	
	LC4 at 84.38%	1.02	N.G.	
	LC5 at 84.38%	0.81	OK	
	LC6 at 84.38%	1.02	N.G.	
	LC7 at 84.38%	0.81	OK	
	LC8 at 84.38%	1.02	N.G.	
	LC9 at 84.38%	0.13	OK	
26	LC1 at 59.38%	1.07	N.G.	
	LC10 at 59.38%	0.21	OK	

	LC11 at 59.38%	0.18	OK	
	LC12 at 59.38%	0.21	OK	
	LC13 at 59.38%	0.01	OK	
	LC14 at 59.38%	0.01	OK	
	LC15 at 59.38%	0.01	OK	
	LC16 at 59.38%	0.08	OK	
	LC17 at 59.38%	0.10	OK	
	LC18 at 59.38%	0.08	OK	
	LC19 at 59.38%	0.10	OK	
	LC2 at 59.38%	1.24	N.G.	
	LC3 at 59.38%	1.07	N.G.	
	LC4 at 59.38%	**1.24**	**N.G.**	Eq. H1-1b
	LC5 at 59.38%	1.07	N.G.	
	LC6 at 59.38%	1.24	N.G.	
	LC7 at 59.38%	1.07	N.G.	
	LC8 at 59.38%	1.24	N.G.	
	LC9 at 59.38%	0.18	OK	
29	LC1 at 84.38%	**1.02**	**N.G.**	Eq. H1-1b
	LC10 at 84.38%	0.15	OK	
	LC11 at 84.38%	0.18	OK	
	LC12 at 84.38%	0.15	OK	
	LC13 at 84.38%	0.02	OK	
	LC14 at 84.38%	0.01	OK	
	LC15 at 84.38%	0.02	OK	
	LC16 at 84.38%	0.09	OK	
	LC17 at 84.38%	0.08	OK	
	LC18 at 84.38%	0.09	OK	
	LC19 at 84.38%	0.08	OK	
	LC2 at 84.38%	0.90	OK	
	LC3 at 84.38%	1.02	N.G.	
	LC4 at 84.38%	0.90	OK	
	LC5 at 84.38%	1.01	N.G.	
	LC6 at 84.38%	0.90	OK	
	LC7 at 84.38%	1.01	N.G.	
	LC8 at 84.38%	0.90	OK	
	LC9 at 84.38%	0.18	OK	
30	LC1 at 84.38%	**0.79**	**OK**	Eq. H1-1b
	LC10 at 84.38%	0.09	OK	
	LC11 at 84.38%	0.13	OK	
	LC12 at 84.38%	0.09	OK	
	LC13 at 84.38%	0.01	OK	
	LC14 at 84.38%	0.01	OK	
	LC15 at 84.38%	0.01	OK	
	LC16 at 84.38%	0.07	OK	
	LC17 at 84.38%	0.05	OK	
	LC18 at 84.38%	0.07	OK	
	LC19 at 84.38%	0.05	OK	
	LC2 at 84.38%	0.51	OK	
	LC3 at 84.38%	0.79	OK	
	LC4 at 84.38%	0.51	OK	
	LC5 at 84.38%	0.79	OK	
	LC6 at 84.38%	0.51	OK	
	LC7 at 84.38%	0.79	OK	
	LC8 at 84.38%	0.51	OK	
	LC9 at 84.38%	0.13	OK	
32	LC1 at 59.38%	**0.87**	**OK**	Eq. H1-1b
	LC10 at 59.38%	0.12	OK	
	LC11 at 59.38%	0.16	OK	
	LC12 at 59.38%	0.12	OK	
	LC13 at 59.38%	0.01	OK	
	LC14 at 59.38%	0.01	OK	

LC15 at 59.38%	0.01	OK
LC16 at 59.38%	0.10	OK
LC17 at 59.38%	0.08	OK
LC18 at 59.38%	0.10	OK
LC19 at 59.38%	0.08	OK
LC2 at 59.38%	0.71	OK
LC3 at 59.38%	0.87	OK
LC4 at 59.38%	0.71	OK
LC5 at 59.38%	0.87	OK
LC6 at 59.38%	0.70	OK
LC7 at 59.38%	0.87	OK
LC8 at 59.38%	0.70	OK
LC9 at 59.38%	0.16	OK

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
9	-9.69E-05	0.00	-8.0828	0
10	6.9999	0.00	4.0415	0
15	-7.00	0.00	4.0413	0
16	7.866	0.00	4.5413	0
17	-1.299	0.00	0.75	0
18	0.00	0.00	-1.50	0
19	1.299	0.00	0.75	0
20	0.00	0.00	-9.0828	0
21	-7.8659	0.00	4.5415	0
36	4.694	-1.00	-0.3525	0
37	2.6524	-1.00	-3.8888	0
38	4.694	6.00	-0.3525	0
39	2.6524	6.00	-3.8888	0
41	0.1799	-3.00	-8.5712	0
42	0.1799	5.00	-8.5712	0
59	-2.6523	-1.00	-3.8889	0
60	-4.694	-1.00	-0.3526	0
61	-2.6523	6.00	-3.8889	0
62	-4.694	6.00	-0.3526	0
65	-7.5129	-3.00	4.1298	0
66	-7.5129	5.00	4.1298	0

71	-2.0417	-1.00	4.2414	0
72	2.0416	-1.00	4.2414	0
73	-2.0417	6.00	4.2414	0
74	2.0416	6.00	4.2414	0
77	7.333	-3.00	4.4414	0
78	7.333	5.00	4.4414	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
17	1	1	1	1	1	1
18	1	1	1	1	1	1
19	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
3	10	9		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
4	10	15		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
5	15	9		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
6	20	18		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
7	16	19		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
8	21	17		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
12	42	41		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
13	39	37		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
23	62	60		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
24	61	59		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
14	38	36		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
26	66	65		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
29	74	72		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
30	73	71		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
32	78	77		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

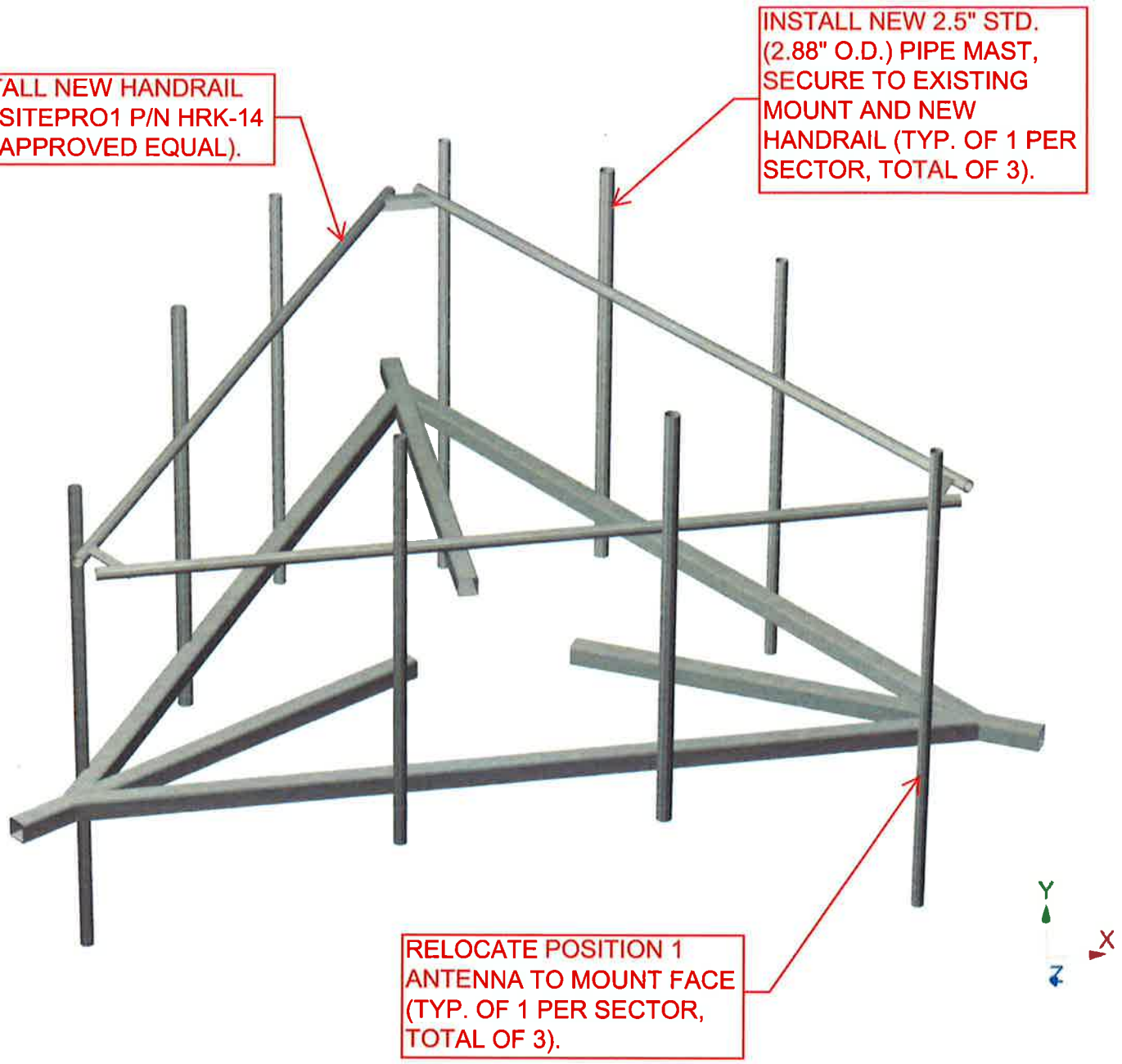
Orientation of local axes

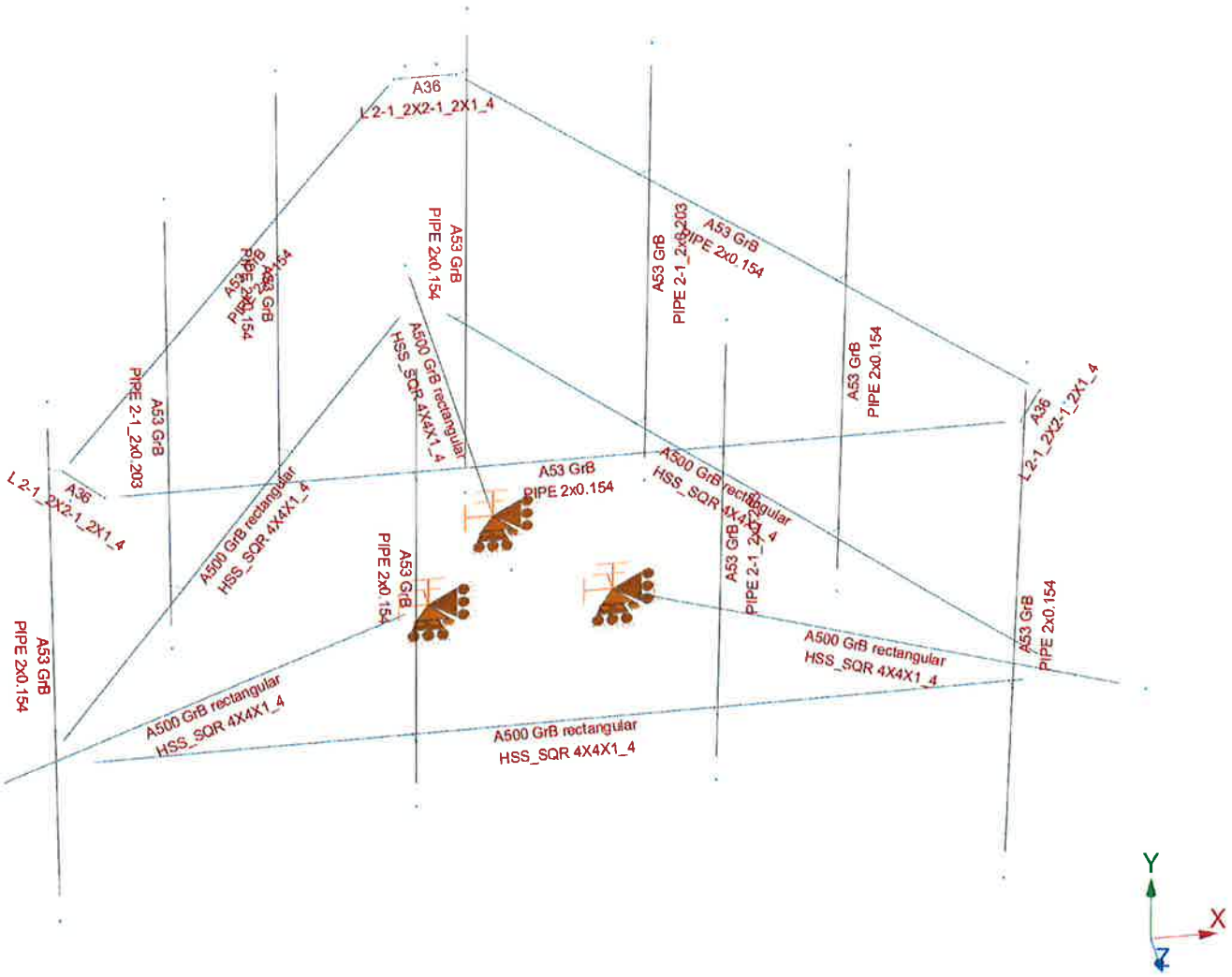
Member	Rotation [Deg]	Axes23	NX	NY	NZ
12	0.00	2	-0.50	0.00	-0.866
13	0.00	2	-0.50	0.00	-0.866
23	0.00	2	-0.50	0.00	0.866
24	0.00	2	-0.50	0.00	0.866
14	0.00	2	-0.50	0.00	-0.866
26	0.00	2	-0.50	0.00	0.866

HUDSON
Design Group LLC

Mount Calculations
(Proposed Conditions)

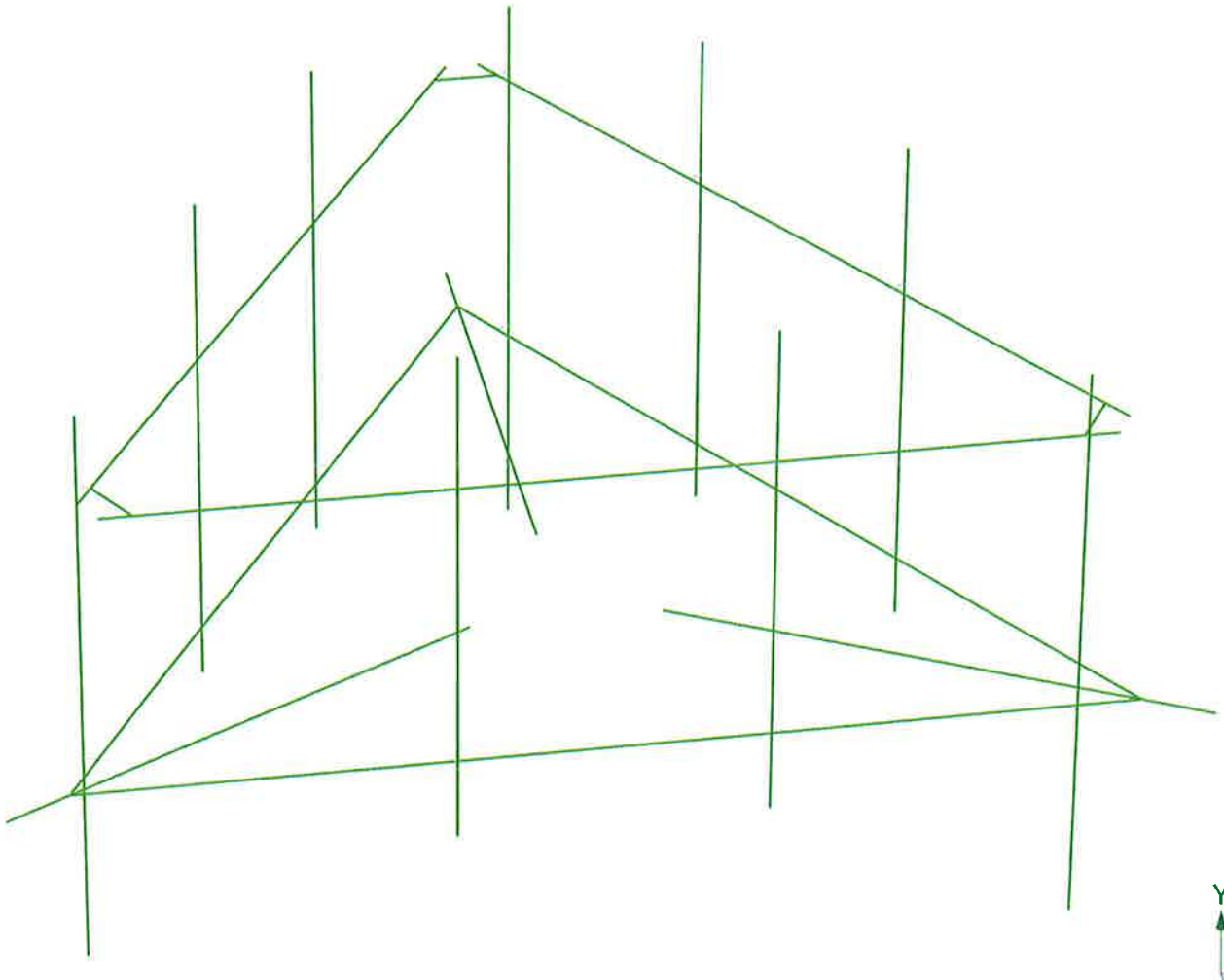
Bentley Hewlett-Packard Company
Current Date: 4/6/2018 9:54 AM
Units system: English
File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT2130\CT2130 (LTE 3C-4C) (MOD).etz\

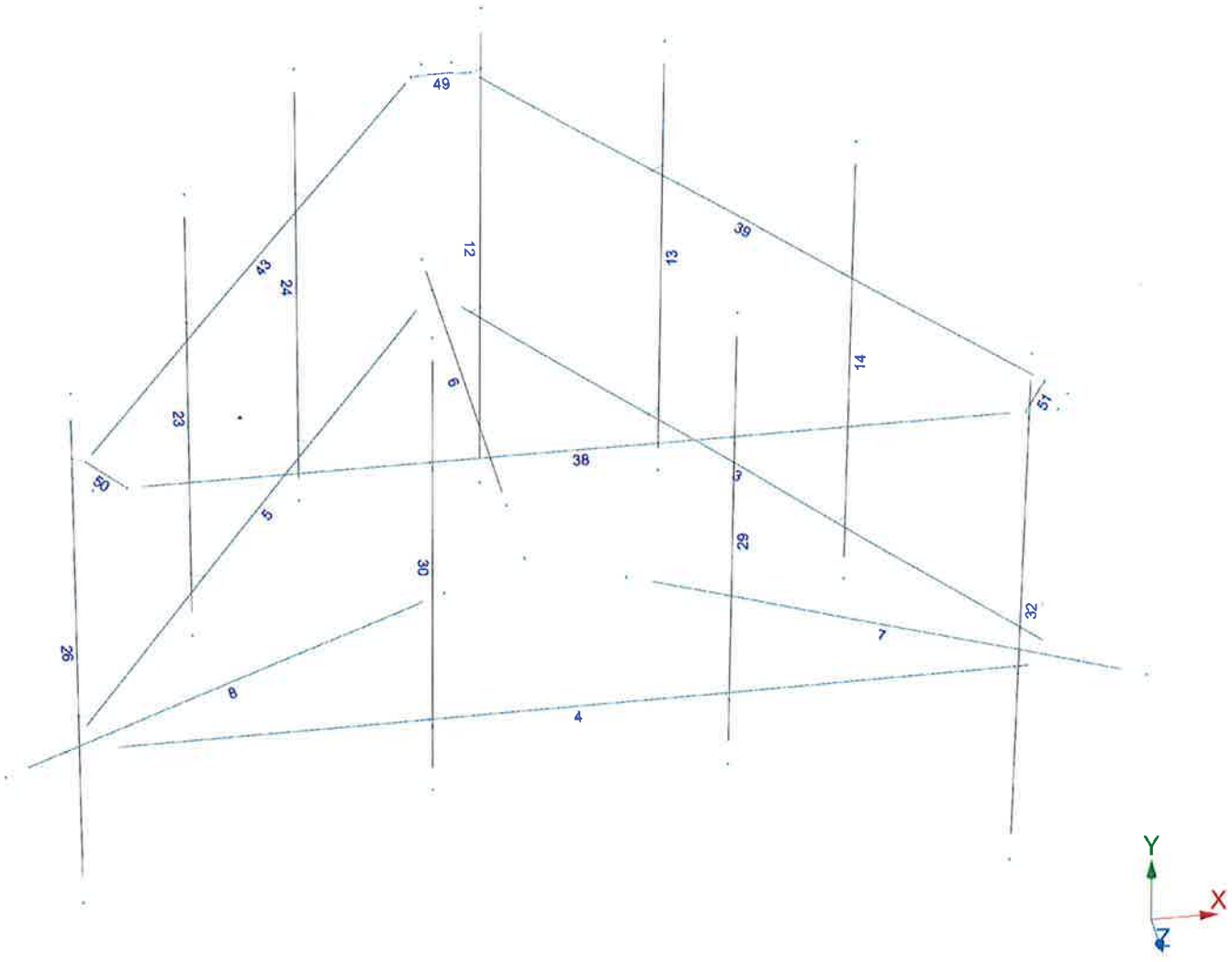



A36
L2-1_2X2-1_2X1_4
A53 GrB
PIPE 2x0.154
A53 GrB
PIPE 2-1_2x0.203
A500 GrB rectangular
HSS_SQR 4X4X1_4
A36
L2-1_2X2-1_2X1_4
Y
X
Z

Design status

- Not designed
- Error on design
- Design O.K.
- With warnings

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Current Date: 4/6/2018 9:54 AM
Units system: English
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Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

LC1=1.2DL+1.6W0
LC2=1.2DL+1.6W30
LC3=1.2DL-1.6W0
LC4=1.2DL-1.6W30
LC5=0.9DL+1.6W0
LC6=0.9DL+1.6W30
LC7=0.9DL-1.6W0
LC8=0.9DL-1.6W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC14=0.9DL
LC15=1.2DL+1.6LL1
LC16=1.2DL+1.6WL0+LL2
LC17=1.2DL+1.6WL30+LL2
LC18=1.2DL-1.6WL0+LL2
LC19=1.2DL-1.6WL30+LL2

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	HSS_SQR 4X4X1_4	**3**	LC1 at 100.00%	**0.36**	**OK**	Eq. H1-1b
			LC10 at 100.00%	0.25	OK	
			LC11 at 100.00%	0.23	OK	
			LC12 at 100.00%	0.22	OK	
			LC13 at 100.00%	0.16	OK	
			LC14 at 100.00%	0.12	OK	
			LC15 at 100.00%	0.16	OK	
			LC16 at 0.00%	0.18	OK	
			LC17 at 0.00%	0.19	OK	
			LC18 at 0.00%	0.20	OK	
			LC19 at 0.00%	0.19	OK	
			LC2 at 100.00%	0.33	OK	
			LC3 at 0.00%	0.28	OK	
			LC4 at 0.00%	0.36	OK	Eq. H1-1b
			LC5 at 100.00%	0.32	OK	
			LC6 at 100.00%	0.29	OK	
			LC7 at 0.00%	0.24	OK	
			LC8 at 0.00%	0.32	OK	
			LC9 at 100.00%	0.24	OK	
		4	LC1 at 0.00%	0.31	OK	
			LC10 at 0.00%	0.23	OK	
			LC11 at 0.00%	0.24	OK	
			LC12 at 0.00%	0.24	OK	Eq. H1-1b
			LC13 at 0.00%	0.16	OK	
			LC14 at 0.00%	0.12	OK	
			LC15 at 0.00%	0.16	OK	
			LC16 at 0.00%	0.24	OK	
			LC17 at 0.00%	0.23	OK	
			LC18 at 0.00%	0.22	OK	

	LC19 at 0.00%	0.24	OK	
	LC2 at 100.00%	**0.38**	**OK**	Eq. H1-1b
	LC3 at 0.00%	0.32	OK	
	LC4 at 0.00%	0.34	OK	Eq. H1-1b
	LC5 at 0.00%	0.27	OK	
	LC6 at 100.00%	0.34	OK	
	LC7 at 0.00%	0.28	OK	
	LC8 at 0.00%	0.30	OK	
	LC9 at 0.00%	0.25	OK	
5	LC1 at 100.00%	**0.38**	**OK**	Eq. H1-1b
	LC10 at 0.00%	0.24	OK	
	LC11 at 0.00%	0.25	OK	
	LC12 at 0.00%	0.24	OK	
	LC13 at 0.00%	0.16	OK	
	LC14 at 0.00%	0.12	OK	
	LC15 at 0.00%	0.16	OK	
	LC16 at 0.00%	0.16	OK	
	LC17 at 0.00%	0.16	OK	
	LC18 at 0.00%	0.17	OK	
	LC19 at 0.00%	0.17	OK	
	LC2 at 0.00%	0.37	OK	Eq. H1-1b
	LC3 at 0.00%	0.26	OK	
	LC4 at 100.00%	0.31	OK	
	LC5 at 100.00%	0.35	OK	
	LC6 at 0.00%	0.33	OK	
	LC7 at 0.00%	0.22	OK	
	LC8 at 100.00%	0.28	OK	
	LC9 at 100.00%	0.22	OK	
6	LC1 at 100.00%	**0.81**	**OK**	Eq. H1-1b
	LC10 at 100.00%	0.54	OK	
	LC11 at 100.00%	0.47	OK	
	LC12 at 100.00%	0.54	OK	
	LC13 at 100.00%	0.37	OK	
	LC14 at 100.00%	0.28	OK	
	LC15 at 100.00%	0.37	OK	
	LC16 at 100.00%	0.37	OK	
	LC17 at 100.00%	0.35	OK	
	LC18 at 100.00%	0.31	OK	
	LC19 at 100.00%	0.35	OK	
	LC2 at 100.00%	0.53	OK	
	LC3 at 15.63%	0.12	OK	
	LC4 at 100.00%	0.52	OK	
	LC5 at 100.00%	0.71	OK	
	LC6 at 100.00%	0.44	OK	
	LC7 at 100.00%	0.16	OK	
	LC8 at 100.00%	0.43	OK	
	LC9 at 100.00%	0.59	OK	
7	LC1 at 15.63%	0.32	OK	
	LC10 at 100.00%	0.48	OK	
	LC11 at 100.00%	0.57	OK	
	LC12 at 100.00%	0.58	OK	
	LC13 at 100.00%	0.37	OK	
	LC14 at 100.00%	0.28	OK	
	LC15 at 100.00%	0.37	OK	
	LC16 at 100.00%	0.59	OK	
	LC17 at 100.00%	0.57	OK	
	LC18 at 100.00%	0.61	OK	
	LC19 at 100.00%	0.62	OK	
	LC2 at 15.63%	0.16	OK	
	LC3 at 100.00%	0.66	OK	
	LC4 at 100.00%	**0.79**	**OK**	Eq. H1-1b

		LC5 at 15.63%	0.26	OK	
		LC6 at 100.00%	0.13	OK	
		LC7 at 100.00%	0.57	OK	
		LC8 at 100.00%	0.70	OK	
		LC9 at 100.00%	0.51	OK	
	8	LC1 at 15.63%	0.31	OK	
		LC10 at 100.00%	0.58	OK	
		LC11 at 100.00%	0.56	OK	
		LC12 at 100.00%	0.48	OK	
		LC13 at 100.00%	0.37	OK	
		LC14 at 100.00%	0.28	OK	
		LC15 at 100.00%	0.37	OK	
		LC16 at 100.00%	0.35	OK	
		LC17 at 100.00%	0.39	OK	
		LC18 at 100.00%	0.38	OK	
		LC19 at 100.00%	0.34	OK	
		LC2 at 100.00%	**0.77**	**OK**	Eq. H1-1b
		LC3 at 100.00%	0.65	OK	
		LC4 at 15.63%	0.20	OK	
		LC5 at 15.63%	0.25	OK	
		LC6 at 100.00%	0.68	OK	
		LC7 at 100.00%	0.56	OK	
		LC8 at 40.63%	0.14	OK	
		LC9 at 100.00%	0.50	OK	
L 2-1_2X2-1_2X1_4	**49**	LC1 at 100.00%	**0.37**	**OK**	Eq. H2-1
		LC10 at 0.00%	0.07	OK	
		LC11 at 100.00%	0.04	OK	
		LC12 at 100.00%	0.09	OK	
		LC13 at 100.00%	0.05	OK	
		LC14 at 100.00%	0.04	OK	
		LC15 at 100.00%	0.05	OK	
		LC16 at 100.00%	0.08	OK	
		LC17 at 0.00%	0.06	OK	
		LC18 at 100.00%	0.04	OK	
		LC19 at 100.00%	0.06	OK	
		LC2 at 0.00%	0.31	OK	Eq. H3-8
		LC3 at 0.00%	0.28	OK	
		LC4 at 100.00%	0.28	OK	
		LC5 at 100.00%	0.36	OK	
		LC6 at 0.00%	0.30	OK	
		LC7 at 0.00%	0.28	OK	
		LC8 at 100.00%	0.29	OK	
		LC9 at 100.00%	0.12	OK	
	50	LC1 at 0.00%	0.36	OK	
		LC10 at 100.00%	0.13	OK	
		LC11 at 100.00%	0.10	OK	
		LC12 at 0.00%	0.05	OK	
		LC13 at 100.00%	0.05	OK	
		LC14 at 100.00%	0.04	OK	
		LC15 at 100.00%	0.05	OK	
		LC16 at 100.00%	0.07	OK	
		LC17 at 100.00%	0.10	OK	
		LC18 at 100.00%	0.08	OK	
		LC19 at 100.00%	0.05	OK	
		LC2 at 100.00%	**0.45**	**OK**	Eq. H2-1
		LC3 at 0.00%	0.41	OK	Eq. H2-1
		LC4 at 100.00%	0.35	OK	
		LC5 at 0.00%	0.36	OK	
		LC6 at 100.00%	0.44	OK	
		LC7 at 0.00%	0.41	OK	
		LC8 at 100.00%	0.36	OK	

		LC9 at 100.00%	0.06	OK	
	51	LC1 at 0.00%	0.29	OK	Eq. H3-8
		LC10 at 100.00%	0.05	OK	
		LC11 at 100.00%	0.12	OK	
		LC12 at 100.00%	0.11	OK	
		LC13 at 100.00%	0.05	OK	
		LC14 at 100.00%	0.04	OK	
		LC15 at 100.00%	0.05	OK	
		LC16 at 100.00%	0.06	OK	
		LC17 at 100.00%	0.06	OK	
		LC18 at 100.00%	0.09	OK	
		LC19 at 100.00%	0.09	OK	
		LC2 at 0.00%	0.40	OK	
		LC3 at 100.00%	0.35	OK	Eq. H2-1
		LC4 at 0.00%	**0.46**	**OK**	Eq. H2-1
		LC5 at 0.00%	0.28	OK	
		LC6 at 0.00%	0.41	OK	
		LC7 at 100.00%	0.34	OK	
		LC8 at 0.00%	0.45	OK	
		LC9 at 0.00%	0.06	OK	
PIPE 2-1_2x0.203	**13**	LC1 at 85.42%	0.64	OK	
		LC10 at 85.42%	0.15	OK	
		LC11 at 85.42%	0.15	OK	
		LC12 at 85.42%	0.05	OK	
		LC13 at 85.42%	0.04	OK	
		LC14 at 85.42%	0.03	OK	
		LC15 at 85.42%	0.04	OK	
		LC16 at 85.42%	0.04	OK	
		LC17 at 85.42%	0.07	OK	
		LC18 at 85.42%	0.10	OK	
		LC19 at 85.42%	0.04	OK	
		LC2 at 85.42%	**0.73**	**OK**	Eq. H1-1b
		LC3 at 85.42%	0.70	OK	
		LC4 at 85.42%	0.66	OK	
		LC5 at 85.42%	0.64	OK	
		LC6 at 85.42%	0.72	OK	
		LC7 at 85.42%	0.69	OK	
		LC8 at 85.42%	0.67	OK	
		LC9 at 85.42%	0.09	OK	
	23	LC1 at 85.42%	0.65	OK	
		LC10 at 85.42%	0.05	OK	
		LC11 at 85.42%	0.15	OK	
		LC12 at 85.42%	0.15	OK	
		LC13 at 85.42%	0.04	OK	
		LC14 at 85.42%	0.03	OK	
		LC15 at 85.42%	0.04	OK	
		LC16 at 85.42%	0.06	OK	
		LC17 at 85.42%	0.04	OK	
		LC18 at 85.42%	0.10	OK	
		LC19 at 85.42%	0.09	OK	
		LC2 at 85.42%	0.65	OK	
		LC3 at 85.42%	**0.72**	**OK**	Eq. H1-1b
		LC4 at 85.42%	0.71	OK	
		LC5 at 85.42%	0.66	OK	
		LC6 at 85.42%	0.65	OK	
		LC7 at 85.42%	0.71	OK	
		LC8 at 85.42%	0.70	OK	
		LC9 at 85.42%	0.08	OK	
	29	LC1 at 85.42%	0.47	OK	Eq. H1-1b
		LC10 at 85.42%	0.12	OK	

		LC11 at 85.42%	0.03	OK	
		LC12 at 85.42%	0.12	OK	
		LC13 at 85.42%	0.04	OK	
		LC14 at 85.42%	0.03	OK	
		LC15 at 85.42%	0.04	OK	
		LC16 at 85.42%	0.09	OK	
		LC17 at 85.42%	0.09	OK	
		LC18 at 85.42%	0.03	OK	
		LC19 at 85.42%	0.08	OK	
		LC2 at 85.42%	0.54	OK	
		LC3 at 85.42%	0.41	OK	
		LC4 at 85.42%	**0.56**	**OK**	Eq. H1-1b
		LC5 at 85.42%	0.46	OK	
		LC6 at 85.42%	0.53	OK	
		LC7 at 85.42%	0.41	OK	
		LC8 at 85.42%	0.55	OK	
		LC9 at 85.42%	0.12	OK	
PIPE 2x0.154	**12**	LC1 at 60.42%	0.43	OK	
		LC10 at 60.42%	0.22	OK	
		LC11 at 60.42%	0.28	OK	
		LC12 at 60.42%	0.19	OK	
		LC13 at 60.42%	0.14	OK	
		LC14 at 60.42%	0.10	OK	
		LC15 at 60.42%	0.14	OK	
		LC16 at 60.42%	0.11	OK	
		LC17 at 60.42%	0.16	OK	
		LC18 at 60.42%	0.19	OK	
		LC19 at 60.42%	0.14	OK	
		LC2 at 60.42%	0.56	OK	
		LC3 at 60.42%	**0.67**	**OK**	Eq. H1-1b
		LC4 at 60.42%	0.55	OK	
		LC5 at 60.42%	0.46	OK	
		LC6 at 60.42%	0.55	OK	
		LC7 at 60.42%	0.64	OK	
		LC8 at 60.42%	0.55	OK	
		LC9 at 60.42%	0.13	OK	
	24	LC1 at 85.42%	0.71	OK	
		LC10 at 29.17%	0.05	OK	
		LC11 at 85.42%	0.14	OK	
		LC12 at 85.42%	0.21	OK	
		LC13 at 85.42%	0.06	OK	
		LC14 at 85.42%	0.05	OK	
		LC15 at 85.42%	0.06	OK	
		LC16 at 85.42%	0.10	OK	
		LC17 at 85.42%	0.03	OK	
		LC18 at 85.42%	0.09	OK	
		LC19 at 85.42%	0.13	OK	
		LC2 at 85.42%	0.76	OK	
		LC3 at 85.42%	0.73	OK	
		LC4 at 85.42%	**0.87**	**OK**	Eq. H1-1b
		LC5 at 85.42%	0.71	OK	
		LC6 at 85.42%	0.77	OK	
		LC7 at 85.42%	0.73	OK	
		LC8 at 85.42%	0.86	OK	
		LC9 at 85.42%	0.14	OK	
	14	LC1 at 85.42%	0.79	OK	
		LC10 at 85.42%	0.14	OK	
		LC11 at 85.42%	0.21	OK	
		LC12 at 85.42%	0.08	OK	
		LC13 at 85.42%	0.06	OK	
		LC14 at 85.42%	0.05	OK	

	LC15 at 85.42%	0.06	OK	
	LC16 at 85.42%	0.07	OK	
	LC17 at 85.42%	0.10	OK	
	LC18 at 85.42%	0.12	OK	
	LC19 at 85.42%	0.05	OK	
	LC2 at 85.42%	0.73	OK	
	LC3 at 85.42%	**0.91**	**OK**	Eq. H1-1b
	LC4 at 85.42%	0.70	OK	
	LC5 at 85.42%	0.80	OK	
	LC6 at 85.42%	0.72	OK	
	LC7 at 85.42%	0.89	OK	
	LC8 at 85.42%	0.70	OK	
	LC9 at 85.42%	0.08	OK	
26	LC1 at 60.42%	0.53	OK	
	LC10 at 60.42%	0.13	OK	
	LC11 at 60.42%	0.18	OK	
	LC12 at 60.42%	0.28	OK	
	LC13 at 60.42%	0.14	OK	
	LC14 at 60.42%	0.10	OK	
	LC15 at 60.42%	0.14	OK	
	LC16 at 60.42%	0.18	OK	
	LC17 at 60.42%	0.13	OK	
	LC18 at 60.42%	0.15	OK	
	LC19 at 60.42%	0.20	OK	
	LC2 at 60.42%	0.38	OK	
	LC3 at 60.42%	0.55	OK	
	LC4 at 60.42%	**0.63**	**OK**	Eq. H1-1b
	LC5 at 60.42%	0.53	OK	
	LC6 at 60.42%	0.41	OK	
	LC7 at 60.42%	0.55	OK	
	LC8 at 60.42%	0.60	OK	
	LC9 at 60.42%	0.23	OK	
30	LC1 at 85.42%	0.53	OK	
	LC10 at 85.42%	0.19	OK	
	LC11 at 85.42%	0.05	OK	
	LC12 at 85.42%	0.12	OK	
	LC13 at 85.42%	0.07	OK	
	LC14 at 85.42%	0.05	OK	
	LC15 at 85.42%	0.07	OK	
	LC16 at 85.42%	0.09	OK	
	LC17 at 85.42%	0.10	OK	
	LC18 at 85.42%	0.03	OK	
	LC19 at 85.42%	0.08	OK	
	LC2 at 85.42%	**0.77**	**OK**	Eq. H1-1b
	LC3 at 85.42%	0.44	OK	
	LC4 at 85.42%	0.64	OK	
	LC5 at 85.42%	0.52	OK	
	LC6 at 85.42%	0.75	OK	
	LC7 at 85.42%	0.44	OK	
	LC8 at 85.42%	0.66	OK	
	LC9 at 85.42%	0.16	OK	
32	LC1 at 60.42%	0.45	OK	
	LC10 at 60.42%	0.26	OK	
	LC11 at 60.42%	0.14	OK	
	LC12 at 60.42%	0.15	OK	
	LC13 at 60.42%	0.14	OK	
	LC14 at 60.42%	0.10	OK	
	LC15 at 60.42%	0.14	OK	
	LC16 at 60.42%	0.29	OK	
	LC17 at 60.42%	0.30	OK	
	LC18 at 60.42%	0.25	OK	

	LC19 at 60.42%	0.24	OK	
	LC2 at 60.42%	**0.54**	**OK**	Eq. H1-1b
	LC3 at 60.42%	0.32	OK	
	LC4 at 60.42%	0.39	OK	
	LC5 at 60.42%	0.42	OK	
	LC6 at 60.42%	0.51	OK	
	LC7 at 60.42%	0.32	OK	
	LC8 at 60.42%	0.38	OK	
	LC9 at 60.42%	0.25	OK	
38	LC1 at 66.25%	0.32	OK	
	LC10 at 33.75%	0.11	OK	
	LC11 at 66.25%	0.10	OK	
	LC12 at 66.25%	0.09	OK	
	LC13 at 96.25%	0.04	OK	
	LC14 at 96.25%	0.03	OK	
	LC15 at 96.25%	0.04	OK	
	LC16 at 3.75%	0.07	OK	
	LC17 at 33.75%	0.10	OK	
	LC18 at 33.75%	0.09	OK	
	LC19 at 66.25%	0.07	OK	
	LC2 at 3.75%	0.56	OK	
	LC3 at 66.25%	0.40	OK	Eq. H1-1b
	LC4 at 3.75%	0.54	OK	
	LC5 at 66.25%	0.32	OK	
	LC6 at 3.75%	**0.56**	**OK**	Eq. H1-1b
	LC7 at 66.25%	0.39	OK	
	LC8 at 3.75%	0.54	OK	Eq. H1-1b
	LC9 at 3.75%	0.06	OK	
39	LC1 at 3.75%	0.48	OK	
	LC10 at 96.25%	0.04	OK	
	LC11 at 33.75%	0.09	OK	
	LC12 at 33.75%	0.11	OK	
	LC13 at 33.75%	0.04	OK	
	LC14 at 33.75%	0.03	OK	
	LC15 at 33.75%	0.04	OK	
	LC16 at 66.25%	0.10	OK	
	LC17 at 66.25%	0.06	OK	
	LC18 at 3.75%	0.08	OK	
	LC19 at 33.75%	0.09	OK	
	LC2 at 35.00%	0.40	OK	
	LC3 at 3.75%	0.48	OK	
	LC4 at 33.75%	0.45	OK	Eq. H1-1b
	LC5 at 3.75%	0.48	OK	
	LC6 at 35.00%	0.40	OK	
	LC7 at 3.75%	**0.48**	**OK**	Eq. H1-1b
	LC8 at 33.75%	0.44	OK	
	LC9 at 66.25%	0.11	OK	
43	LC1 at 35.00%	0.50	OK	Eq. H1-1b
	LC10 at 66.25%	0.11	OK	
	LC11 at 66.25%	0.07	OK	
	LC12 at 3.75%	0.08	OK	
	LC13 at 33.75%	0.04	OK	
	LC14 at 33.75%	0.03	OK	
	LC15 at 33.75%	0.04	OK	
	LC16 at 33.75%	0.08	OK	
	LC17 at 66.25%	0.07	OK	
	LC18 at 66.25%	0.04	OK	
	LC19 at 3.75%	0.06	OK	
	LC2 at 66.25%	**0.50**	**OK**	Eq. H1-1b
	LC3 at 3.75%	0.47	OK	
	LC4 at 33.75%	0.43	OK	

LC5 at 35.00%	0.49	OK	
LC6 at 66.25%	0.49	OK	
LC7 at 3.75%	0.47	OK	Eq. H1-1b
LC8 at 33.75%	0.44	OK	
LC9 at 33.75%	0.12	OK	

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
1	0.00	0.00	0.00	0
9	-9.69E-05	0.00	-8.0828	0
10	6.9999	0.00	4.0415	0
15	-7.00	0.00	4.0413	0
16	7.866	0.00	4.5413	0
17	-1.299	0.00	0.75	0
18	0.00	0.00	-1.50	0
19	1.299	0.00	0.75	0
20	0.00	0.00	-9.0828	0
21	-7.8659	0.00	4.5415	0
36	4.694	-1.00	-0.3525	0
37	2.6524	-1.00	-3.8888	0
38	4.694	6.00	-0.3525	0
39	2.6524	6.00	-3.8888	0
41	0.624	-3.00	-7.4021	0
42	0.624	5.00	-7.4021	0
59	-2.6523	-1.00	-3.8889	0
60	-4.694	-1.00	-0.3526	0
61	-2.6523	6.00	-3.8889	0
62	-4.694	6.00	-0.3526	0
65	-6.7224	-3.00	3.1606	0
66	-6.7224	5.00	3.1606	0

71	-2.0417	-1.00	4.2414	0
72	2.0416	-1.00	4.2414	0
73	-2.0417	6.00	4.2414	0
74	2.0416	6.00	4.2414	0
77	6.0984	-3.00	4.2415	0
78	6.0984	5.00	4.2415	0
89	6.0984	4.00	4.0415	0
95	0.4507	4.00	-7.3021	0
102	-6.5499	4.00	3.2606	0
109	6.7745	4.00	3.6511	0
110	6.5491	4.00	3.2608	0
111	-6.5492	4.00	4.0413	0
112	-6.0985	4.00	4.0414	0
113	-6.775	4.00	3.651	0
114	6.5491	4.00	4.0415	0
115	0.2253	4.00	-7.6925	0
116	-0.2255	4.00	-7.6925	0
117	-0.4508	4.00	-7.3021	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
17	1	1	1	1	1	1
18	1	1	1	1	1	1
19	1	1	1	1	1	1

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
3	10	9		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
4	10	15		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
5	15	9		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
6	20	18		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
7	16	19		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
8	21	17		HSS_SQR 4X4X1_4	A500 GrB rectangular	0.00	0.00	0.00
12	42	41		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
13	39	37		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
23	62	60		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
24	61	59		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
14	38	36		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
26	66	65		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
29	74	72		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
30	73	71		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
32	78	77		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
38	114	111		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
39	115	109		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
43	113	116		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
49	95	117		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00
50	102	112		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00
51	89	110		L 2-1_2X2-1_2X1_4	A36	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
12	0.00	2	-0.50	0.00	-0.866
13	0.00	2	-0.50	0.00	-0.866
23	0.00	2	-0.50	0.00	0.866
24	0.00	2	-0.50	0.00	0.866
14	0.00	2	-0.50	0.00	-0.866
26	0.00	2	-0.50	0.00	0.866
49	90.00	0	0.00	0.00	0.00
50	90.00	0	0.00	0.00	0.00
51	90.00	0	0.00	0.00	0.00

Date: **May 07, 2018**

Cheryl Schultz
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277

Crown Castle
2000 Corporate Dr
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT2130
	Carrier Site Name:	GREENWICH NORTH
Crown Castle Designation:	**Crown Castle BU Number:**	841290
	Crown Castle Site Name:	GREENWICH NORTH
	Crown Castle JDE Job Number:	478488
	Crown Castle Work Order Number:	1568951
	Crown Castle Order Number:	421390 Rev. 1
Engineering Firm Designation:	**Crown Castle Project Number:**	1568951
Site Data:	**363 RIVERSVILLE ROAD, GREENWICH, Fairfield County, CT** **Latitude *41° 3' 58.6"*, Longitude *-73° 40' 17.4"*** **160 Foot - Monopole Tower**	

Dear Cheryl Schultz,

Crown Castle 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 1568951, in accordance with order 421390, revision 1.

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

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

This analysis has been performed in accordance with the 2016 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 120 mph converted to a nominal 3-second gust wind speed of 93 mph per Section 1609.3 and Appendix N as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. Exposure Category B and Risk Category II were used in this analysis.

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

We at *Crown Castle* 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: Tyler Ho, E.I.T. / VDL

Respectfully submitted by:

Maham Barimani, P.E.
Senior Project Engineer

tnxTower Report - version 7.0.5.1

STATE OF CONNECTICUT
MAHAM BARIMANI
30501
LICENSED
PROFESSIONAL ENGINEER

05-08-2018

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in April of 2003. The tower was originally designed for a wind speed of 85 mph per TIA/EIA-222-F.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA-222-G Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a 3-second gust wind speed of 93 mph with no ice, 50 mph with 0.75 inch ice thickness and 60 mph under service loads, exposure category B.

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
149.0	152.0	1	site pro 1	HRK-14 Handrail Kit	4 2	3/4 3/8	-
	149.0	3	tower mounts	2.5” STD Pipe Mast			
		3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe			
		3	ericsson	RADIO 4426			
		3	ericsson	RRUS 32			
		3	kaelus	DBC0061F1V51-2			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8C			
		1	raycap	DC6-48-60-18-8F			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
160.0	163.0	3	commscope	LNX-6515DS-VTM w/ Mount Pipe	13	1-5/8	1
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe			
		3	ericsson	ERICSSON AIR 21 B4A B2P w/ Mount Pipe			
		3	ericsson	RRUS 11 B12			
		3	rfs celwave	ATMAA1412D-1A20			
	160.0	1	tower mounts	Platform Mount [LP 1201-1]			
153.0	153.0	-	-	-	2	3/8	3
		3	ericsson	RRUS 11	-	-	1
		3	ericsson	RRUS 32 B2			
		1	tower mounts	Side Arm Mount [SO 102-3]			
149.0	149.0	2	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	2 1 1	7/8 3/8 Conduit	3
		3	powerwave technologies	7770.00 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8F			
		3	powerwave technologies	7770.00 w/ Mount Pipe	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
		12	powerwave technologies	LGP21401			
		1	tower mounts	Platform Mount [LP 1201-1]			
140.0	142.0	3	alcatel lucent	B13 RRH 4X30	2	1-5/8	2
		3	alcatel lucent	RRH2X60-AWS			
		3	amphenol	QUAD656C0000G w/ Mount Pipe			
		3	amphenol	WWX063X19G00 w/ Mount Pipe			
		1	commscope	RC2DC-3315-PF-48			
		3	alcatel lucent	RRH2X60-PCS	18	1-5/8	1
		3	amphenol	WWX063X19G00 w/ Mount Pipe			
		1	commscope	RC2DC-3315-PF-48			
		2	decibel	DB844H80E-XY w/ Mount Pipe			
		4	rfs celwave	APL868013-42T0 w/ Mount Pipe			
	140.0	1	tower mounts	Platform Mount [LP 1201-1]			
120.0	123.0	1	tower mounts	Miscellaneous [NA 510-1]	-	-	1
	122.0	3	alcatel lucent	TD-RRH8x20-25	1	1-1/4	2
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe	3 2	1-1/4 1/2	1
	120.0	1	tower mounts	Platform Mount [LP 1201-1]			
119.0	122.0	3	alcatel lucent	1900MHz RRH	-	-	1
		3	alcatel lucent	800MHZ RRH			
	119.0	1	tower mounts	Side Arm Mount [SO 102-3]			
72.0	73.0	2	gps	GPS_A	1	1/2	1
	72.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment
2) Reserved Equipment
3) Equipment To Be Removed; Not Considered In This Analysis

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)
160	160	3	-	Panel Antenna	-	-
150	150	12	allgon	ALP 11011	-	-
140	140	12	allgon	ALP 11011	-	-
130	130	12	allgon	ALP 11011	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	WEI Geotechnical Engineers	5121535	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	WEI Geotechnical Engineers (Mapping)	4468638	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors, Inc.	5121537	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

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

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle 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	160 - 152	Pole	TP30.62x29x0.1875	1	-4.74	1135.55	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-22.22	1934.28	41.6	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-30.29	2892.94	54.5	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-44.67	5028.09	47.5	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-64.90	6604.55	47.9	Pass
							Summary	
						Pole (L3)	54.5	Pass
						Rating =	54.5	Pass

Table 6 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	152.0	9.7	Pass
	Flange Plate		7.3	Pass
1	Anchor Rods	0	44.8	Pass
	Base Plate		52.7	Pass
1	Base Foundation (Structural)	0	70.0	Pass
	Base Foundation (Soil Interaction)		39.7	Pass

Structure Rating (max from all components) =	70.0%

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

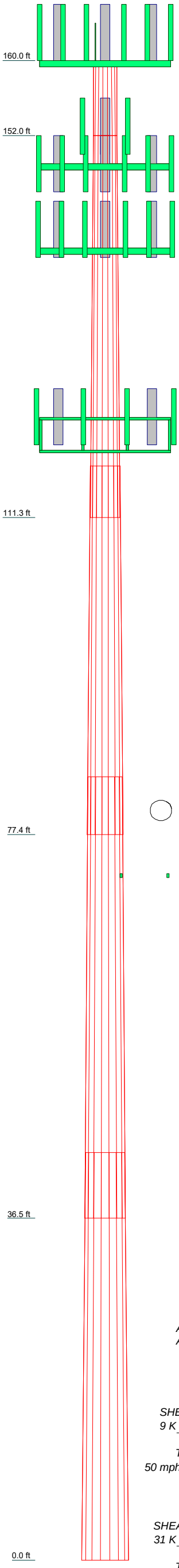
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	8.00	18	0.1875		29.0000	30.6200		0.5
2	40.71	18	0.2500	5.42	30.6200	38.8600		3.8
3	39.29	18	0.3125	6.17	37.2630	45.0900	A572-65	5.4
4	47.13	18	0.4375	7.08	43.2359	52.6200		10.6
5	43.54	18	0.5000		50.3353	59.0000		12.7



ALL REACTIONS ARE FACTORED

AXIAL 103 K
SHEAR 9 K
MOMENT 1120 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 0.7500 in ICE

AXIAL 65 K
SHEAR 31 K
MOMENT 3722 kip-ft
TORQUE 0 kip-ft
REACTIONS - 93 mph WIND

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod 5/8x4'	160	7770.00 w/ Mount Pipe	149
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	Platform Mount [LP 1201-1]	149
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) APL868013-42T0 w/ Mount Pipe	140
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	160	(2) APL868013-42T0 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	WWX063X19G00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	WWX063X19G00 w/ Mount Pipe	140
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	160	WWX063X19G00 w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	(2) DB844H80E-XY w/ Mount Pipe	140
LNX-6515DS-VTM w/ Mount Pipe	160	RRH2X60-PCS	140
LNX-6515DS-VTM w/ Mount Pipe	160	RRH2X60-PCS	140
ATMAA1412D-1A20	160	RRH2X60-PCS	140
ATMAA1412D-1A20	160	RC2DC-3315-PF-48	140
ATMAA1412D-1A20	160	WWX063X19G00 w/ Mount Pipe	140
RRUS 11 B12	160	WWX063X19G00 w/ Mount Pipe	140
RRUS 11 B12	160	WWX063X19G00 w/ Mount Pipe	140
RRUS 11 B12	160	QUAD656C0000G w/ Mount Pipe	140
Platform Mount [LP 1201-1]	160	QUAD656C0000G w/ Mount Pipe	140
6' x 2" Mount Pipe	160	QUAD656C0000G w/ Mount Pipe	140
6' x 2" Mount Pipe	160	B13 RRH 4X30	140
6' x 2" Mount Pipe	160	B13 RRH 4X30	140
RRUS 32 B2	153	B13 RRH 4X30	140
RRUS 32 B2	153	RRH2X60-AWS	140
RRUS 32 B2	153	RRH2X60-AWS	140
RRUS 11	153	RRH2X60-AWS	140
RRUS 11	153	RC2DC-3315-PF-48	140
RRUS 11	153	Platform Mount [LP 1201-1]	140
6' x 2" Mount Pipe	153	Miscellaneous [NA 510-1]	123
6' x 2" Mount Pipe	153	APXVSPP18-C-A20 w/ Mount Pipe	120
6' x 2" Mount Pipe	153	APXVSPP18-C-A20 w/ Mount Pipe	120
Side Arm Mount [SO 102-3]	153	APXVTM14-ALU-I20 w/ Mount Pipe	120
Miscellaneous [NA 510-1]	152	APXVTM14-ALU-I20 w/ Mount Pipe	120
7770.00 w/ Mount Pipe	149	APXVTM14-ALU-I20 w/ Mount Pipe	120
7770.00 w/ Mount Pipe	149	TD-RRH8x20-25	120
(4) LGP21401	149	TD-RRH8x20-25	120
(4) LGP21401	149	TD-RRH8x20-25	120
(4) LGP21401	149	TD-RRH8x20-25	120
(4) LGP21401	149	APXVSPP18-C-A20 w/ Mount Pipe	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	Platform Mount [LP 1201-1]	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
HPA-65R-BUU-H6 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
QS66512-2 w/ Mount Pipe	149	(2) 6' x 2" Mount Pipe	120
QS66512-2 w/ Mount Pipe	149	800MHZ RRH	119
QS66512-2 w/ Mount Pipe	149	800MHZ RRH	119
RRUS 32	149	800MHZ RRH	119
RRUS 32	149	1900MHz RRH	119
RRUS 32	149	1900MHz RRH	119
RADIO 4426	149	1900MHz RRH	119
RADIO 4426	149	(2) 2' x 2" Pipe Mount	119
RADIO 4426	149	(2) 2' x 2" Pipe Mount	119
DBC0061F1V51-2	149	(2) 2' x 2" Pipe Mount	119
DBC0061F1V51-2	149	Side Arm Mount [SO 102-3]	119
DBC0061F1V51-2	149	Side Arm Mount [SO 701-1]	72
DC6-48-60-18-8F	149	(2) GPS_A	72
DC6-48-60-18-8C	149		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-G Standard.
3. Tower designed for a 93 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 54.5%

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Dr.
Canonsburg, PA 15317
Phone: (724) 416 - 2000
FAX:

Job: **BU 841290**			
Project: **WO 1568951**			
Client: Crown Castle	Drawn by: vlarson		App'd:
Code: TIA-222-G	Date: 05/07/18		Scale: NTS
Path: R:\SA Models - Letters\Work Area\THo\WIP\841290 WO 1568951\QA_VDL\841290.eri			Dwg No. E-1

Tower Input Data

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

1) Tower is located in Fairfield County, Connecticut.
2) Basic wind speed of 93 mph.
3) Structure Class II.
4) Exposure Category B.
5) Topographic Category 1.
6) Crest Height 0.00 ft.
7) Nominal ice thickness of 0.7500 in.
8) Ice thickness is considered to increase with height.
9) Ice density of 56 pcf.
10) A wind speed of 50 mph is used in combination with ice.
11) Temperature drop of 50 °F.
12) Deflections calculated using a wind speed of 60 mph.
13) A non-linear (P-delta) analysis was used.
14) Pressures are calculated at each section.
15) Stress ratio used in pole design is 1.
16) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation*	*Section Length*	*Splice Length*	*Number of Sides*	*Top Diameter*	*Bottom Diameter*	*Wall Thickness*	*Bend Radius*	*Pole Grade*
	ft	*ft*	*ft*		*in*	*in*	*in*	*in*	
L1	160.00-152.00	8.00	0.00	18	29.0000	30.6200	0.1875	0.7500	A572-65 (65 ksi)
L2	152.00-111.29	40.71	5.42	18	30.6200	38.8600	0.2500	1.0000	A572-65 (65 ksi)
L3	111.29-77.42	39.29	6.17	18	37.2630	45.0900	0.3125	1.2500	A572-65 (65 ksi)
L4	77.42-36.46	47.13	7.08	18	43.2359	52.6200	0.4375	1.7500	A572-65 (65 ksi)
L5	36.46-0.00	43.54		18	50.3353	59.0000	0.5000	2.0000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	29.4474	17.1470	1798.4090	10.2284	14.7320	122.0750	3599.1844	8.5751	4.7740	25.461
	31.0924	18.1111	2119.1346	10.8035	15.5550	136.2353	4241.0576	9.0573	5.0591	26.982
L2	31.0924	24.0986	2808.1400	10.7814	15.5550	180.5302	5619.9750	12.0516	4.9491	19.796
	39.4595	30.6370	5770.1059	13.7066	19.7409	292.2922	11547.8043	15.3214	6.3994	25.597
L3	38.9342	36.6502	6321.9882	13.1174	18.9296	333.9740	12652.2950	18.3286	6.0083	19.226
	45.7856	44.4137	11250.5543	15.8960	22.9057	491.1679	22515.9125	22.2111	7.3858	23.635
L4	45.1503	59.4309	13753.2024	15.1934	21.9638	626.1754	27524.5016	29.7211	6.8395	15.633
	53.4317	72.4619	24928.5533	18.5248	26.7310	932.5723	49889.9082	36.2378	8.4911	19.408
L5	52.5425	79.0886	24815.6300	17.6915	25.5703	970.4855	49663.9131	39.5518	7.9790	15.958
	59.9102	92.8395	40140.4258	20.7675	29.9720	1339.2642	80333.6694	46.4286	9.5040	19.008

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.00-152.00				1	1	1			
L2 152.00-111.29				1	1	1			
L3 111.29-77.42				1	1	1			
L4 77.42-36.46				1	1	1			
L5 36.46-0.00				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)	A	No	Inside Pole	160.00 - 0.00	12	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
MLE Hybrid 9Power/18Fiber RL 2(1-5/8)	A	No	Inside Pole	160.00 - 0.00	1	No Ice	0.00	1.07
						1/2" Ice	0.00	1.07
						1" Ice	0.00	1.07
***								
***								
LDF7-50A(1-5/8)	A	No	Inside Pole	149.00 - 0.00	12	No Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft²/ft	Weight plf
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	A	No	Inside Pole	149.00 - 0.00	2	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	A	No	Inside Pole	149.00 - 0.00	4	No Ice	0.00	0.58
						1/2" Ice	0.00	0.58
						1" Ice	0.00	0.58
***								
LDF7-50A(1-5/8)	A	No	Inside Pole	140.00 - 0.00	18	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	Inside Pole	140.00 - 0.00	2	No Ice	0.00	1.30
						1/2" Ice	0.00	1.30
						1" Ice	0.00	1.30
***								
LDF4-50A(1/2)	C	No	Inside Pole	120.00 - 0.00	2	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB114-1-05U3-S3J(1-1/4)	C	No	Inside Pole	120.00 - 0.00	3	No Ice	0.00	0.90
						1/2" Ice	0.00	0.90
						1" Ice	0.00	0.90
LDF4-50A(1/2)	C	No	Inside Pole	73.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
HB114-21U3M12-XXXF(1-1/4)	C	No	Inside Pole	120.00 - 0.00	1	No Ice	0.00	1.22
						1/2" Ice	0.00	1.22
						1" Ice	0.00	1.22
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	160.00-152.00	A	0.000	0.000	0.000	0.000	0.09
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	0.000	0.000	0.000	0.000	1.41
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.04
L3	111.29-77.42	A	0.000	0.000	0.000	0.000	1.37
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.14
L4	77.42-36.46	A	0.000	0.000	0.000	0.000	1.66
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.18
L5	36.46-0.00	A	0.000	0.000	0.000	0.000	1.48
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.16

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft²	A_F ft²	C_AA_A In Face ft²	C_AA_A Out Face ft²	Weight K
L1	160.00-152.00	A	1.752	0.000	0.000	0.000	0.000	0.09
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.00
L2	152.00-111.29	A	1.722	0.000	0.000	0.000	0.000	1.41
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.04
L3	111.29-77.42	A	1.666	0.000	0.000	0.000	0.000	1.37

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.14
L4	77.42-36.46	A	1.584	0.000	0.000	0.000	0.000	1.66
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.18
L5	36.46-0.00	A	1.410	0.000	0.000	0.000	0.000	1.48
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.16

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	160.00-152.00	0.0000	0.0000	0.0000	0.0000
L2	152.00-111.29	0.0000	0.0000	0.0000	0.0000
L3	111.29-77.42	0.0000	0.0000	0.0000	0.0000
L4	77.42-36.46	0.0000	0.0000	0.0000	0.0000
L5	36.46-0.00	0.0000	0.0000	0.0000	0.0000

Shielding Factor Ka

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

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Lightning Rod 5/8x4'	C	From Leg	0.00 / 0.00 / 0.0000	160.00	No Ice	0.25	0.25	0.03
			0.00 / 2.00 /		1/2" Ice	0.66	0.66	0.03
					1" Ice	0.97	0.97	0.04
160								
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	A	From Leg	4.00 / 0.00 / 0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00 / 3.00 /		1/2" Ice	6.78	6.43	0.17
					1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	B	From Leg	4.00 / 0.00 / 0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00 / 3.00 /		1/2" Ice	6.78	6.43	0.17
					1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B4A B2P w/ Mount Pipe	C	From Leg	4.00 / 0.00 / 0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00 / 3.00 /		1/2" Ice	6.78	6.43	0.17
					1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.00 / 0.00 / 0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00 / 3.00 /		1/2" Ice	6.78	6.43	0.17
					1" Ice	7.21	7.13	0.23
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.00 / 0.00 / 0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00 /		1/2"	6.78	6.43	0.17

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.00	0.0000	160.00	No Ice	6.33	5.64	0.11
			0.00			1/2"	6.78	6.43	0.17
			3.00			Ice	7.21	7.13	0.23
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	A	From Leg	4.00	0.0000	160.00	No Ice	11.68	9.84	0.08
			0.00			1/2"	12.40	11.37	0.17
			3.00			Ice	13.14	12.91	0.27
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	B	From Leg	4.00	0.0000	160.00	No Ice	11.68	9.84	0.08
			0.00			1/2"	12.40	11.37	0.17
			3.00			Ice	13.14	12.91	0.27
						1" Ice			
LNX-6515DS-VTM w/ Mount Pipe	C	From Leg	4.00	0.0000	160.00	No Ice	11.68	9.84	0.08
			0.00			1/2"	12.40	11.37	0.17
			3.00			Ice	13.14	12.91	0.27
						1" Ice			
ATMAA1412D-1A20	A	From Leg	4.00	0.0000	160.00	No Ice	0.41	1.00	0.01
			0.00			1/2"	0.50	1.13	0.02
			3.00			Ice	0.59	1.26	0.03
						1" Ice			
ATMAA1412D-1A20	B	From Leg	4.00	0.0000	160.00	No Ice	0.41	1.00	0.01
			0.00			1/2"	0.50	1.13	0.02
			3.00			Ice	0.59	1.26	0.03
						1" Ice			
ATMAA1412D-1A20	C	From Leg	4.00	0.0000	160.00	No Ice	0.41	1.00	0.01
			0.00			1/2"	0.50	1.13	0.02
			3.00			Ice	0.59	1.26	0.03
						1" Ice			
RRUS 11 B12	A	From Leg	4.00	0.0000	160.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			3.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	B	From Leg	4.00	0.0000	160.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			3.00			Ice	3.26	1.48	0.10
						1" Ice			
RRUS 11 B12	C	From Leg	4.00	0.0000	160.00	No Ice	2.83	1.18	0.05
			0.00			1/2"	3.04	1.33	0.07
			3.00			Ice	3.26	1.48	0.10
						1" Ice			
Platform Mount [LP 1201-1]	C	None		0.0000	160.00	No Ice	23.10	23.10	2.10
						1/2"	26.80	26.80	2.50
						Ice	30.50	30.50	2.90
						1" Ice			
6' x 2" Mount Pipe	A	From Leg	4.00	0.0000	160.00	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			
6' x 2" Mount Pipe	B	From Leg	4.00	0.0000	160.00	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			
6' x 2" Mount Pipe	C	From Leg	4.00	0.0000	160.00	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			
153									
RRUS 32 B2	A	From Leg	1.50	0.0000	153.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	B	From Leg	1.50	0.0000	153.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07

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			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 32 B2	C	From Leg	1.50	0.0000	153.00	No Ice	2.73	1.67	0.05
			0.00			1/2"	2.95	1.86	0.07
			0.00			Ice	3.18	2.05	0.10
						1" Ice			
RRUS 11	A	From Leg	1.50	0.0000	153.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
						1" Ice			
RRUS 11	B	From Leg	1.50	0.0000	153.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
						1" Ice			
RRUS 11	C	From Leg	1.50	0.0000	153.00	No Ice	2.78	1.19	0.05
			0.00			1/2"	2.99	1.33	0.07
			0.00			Ice	3.21	1.49	0.09
						1" Ice			
6' x 2" Mount Pipe	A	From Leg	1.00	0.0000	153.00	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			
6' x 2" Mount Pipe	B	From Leg	1.00	0.0000	153.00	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			
6' x 2" Mount Pipe	C	From Leg	1.00	0.0000	153.00	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			
Side Arm Mount [SO 102-3]	C	None		0.0000	153.00	No Ice	3.00	3.00	0.08
						1/2"	3.48	3.48	0.11
						Ice	3.96	3.96	0.14
						1" Ice			
149									
7770.00 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
7770.00 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	No Ice	5.75	4.25	0.06
			0.00			1/2"	6.18	5.01	0.10
			0.00			Ice	6.61	5.71	0.16
						1" Ice			
(4) LGP21401	A	From Leg	4.00	0.0000	149.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
(4) LGP21401	B	From Leg	4.00	0.0000	149.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
(4) LGP21401	C	From Leg	4.00	0.0000	149.00	No Ice	1.10	0.21	0.01
			0.00			1/2"	1.24	0.27	0.02
			0.00			Ice	1.38	0.35	0.03
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16

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			Ice	11.01	10.21	0.25
						1" Ice			
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	No Ice	9.90	8.11	0.08
			0.00			1/2"	10.47	9.30	0.16
			0.00			Ice	11.01	10.21	0.25
						1" Ice			
QS66512-2 w/ Mount Pipe	A	From Leg	4.00	0.0000	149.00	No Ice	8.37	8.46	0.14
			0.00			1/2"	8.93	9.66	0.21
			0.00			Ice	9.46	10.55	0.30
						1" Ice			
QS66512-2 w/ Mount Pipe	B	From Leg	4.00	0.0000	149.00	No Ice	8.37	8.46	0.14
			0.00			1/2"	8.93	9.66	0.21
			0.00			Ice	9.46	10.55	0.30
						1" Ice			
QS66512-2 w/ Mount Pipe	C	From Leg	4.00	0.0000	149.00	No Ice	8.37	8.46	0.14
			0.00			1/2"	8.93	9.66	0.21
			0.00			Ice	9.46	10.55	0.30
						1" Ice			
RRUS 32	A	From Leg	4.00	0.0000	149.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	B	From Leg	4.00	0.0000	149.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RRUS 32	C	From Leg	4.00	0.0000	149.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.08	1.97	0.08
			0.00			Ice	3.32	2.17	0.10
						1" Ice			
RADIO 4426	A	From Leg	4.00	0.0000	149.00	No Ice	1.64	0.73	0.05
			0.00			1/2"	1.80	0.84	0.06
			0.00			Ice	1.97	0.97	0.08
						1" Ice			
RADIO 4426	B	From Leg	4.00	0.0000	149.00	No Ice	1.64	0.73	0.05
			0.00			1/2"	1.80	0.84	0.06
			0.00			Ice	1.97	0.97	0.08
						1" Ice			
RADIO 4426	C	From Leg	4.00	0.0000	149.00	No Ice	1.64	0.73	0.05
			0.00			1/2"	1.80	0.84	0.06
			0.00			Ice	1.97	0.97	0.08
						1" Ice			
DBC0061F1V51-2	A	From Leg	4.00	0.0000	149.00	No Ice	0.41	0.43	0.03
			0.00			1/2"	0.50	0.52	0.03
			0.00			Ice	0.59	0.61	0.04
						1" Ice			
DBC0061F1V51-2	B	From Leg	4.00	0.0000	149.00	No Ice	0.41	0.43	0.03
			0.00			1/2"	0.50	0.52	0.03
			0.00			Ice	0.59	0.61	0.04
						1" Ice			
DBC0061F1V51-2	C	From Leg	4.00	0.0000	149.00	No Ice	0.41	0.43	0.03
			0.00			1/2"	0.50	0.52	0.03
			0.00			Ice	0.59	0.61	0.04
						1" Ice			
DC6-48-60-18-8F	A	From Leg	4.00	0.0000	149.00	No Ice	0.79	0.79	0.02
			0.00			1/2"	1.27	1.27	0.04
			0.00			Ice	1.45	1.45	0.05
						1" Ice			
DC6-48-60-18-8C	B	From Leg	4.00	0.0000	149.00	No Ice	2.74	2.74	0.03
			0.00			1/2"	2.96	2.96	0.05
			0.00			Ice	3.20	3.20	0.08
						1" Ice			
Miscellaneous [NA 510-1]	C	None		0.0000	152.00	No Ice	6.00	6.00	0.26
						1/2"	8.50	8.50	0.34
						Ice	11.00	11.00	0.42

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
Platform Mount [LP 1201-1]	C	None		0.0000	149.00	1" Ice No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
140									
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	0.02 0.06 0.11
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	3.10 3.48 3.85	4.80 5.42 6.04	0.02 0.06 0.11
WWX063X19G00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
WWX063X19G00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
WWX063X19G00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
(2) DB844H80E-XY w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	3.30 3.67 4.03	4.80 5.42 6.04	0.03 0.07 0.12
RRH2X60-PCS	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RRH2X60-PCS	C	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	2.20 2.39 2.59	1.72 1.90 2.09	0.06 0.08 0.10
RC2DC-3315-PF-48	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	3.79 4.04 4.30	2.51 2.72 2.94	0.03 0.06 0.10
WWX063X19G00 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
WWX063X19G00 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
WWX063X19G00 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	8.84 9.41 9.96	7.28 8.50 9.47	0.06 0.13 0.21
QUAD656C0000G w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice 1" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28
QUAD656C0000G w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	140.00	1" Ice No Ice 1/2" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28

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			
QUAD656C0000G w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	13.48 14.10 14.68	7.33 8.55 9.50	0.08 0.17 0.28
B13 RRH 4X30	A	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
B13 RRH 4X30	B	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
B13 RRH 4X30	C	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	2.06 2.24 2.43	1.32 1.48 1.64	0.06 0.07 0.09
RRH2X60-AWS	A	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-AWS	B	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-AWS	C	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RC2DC-3315-PF-48	C	From Leg	4.00 0.00 2.00	0.0000	140.00	No Ice 1/2" Ice 1" Ice	3.79 4.04 4.30	2.51 2.72 2.94	0.03 0.06 0.10
Platform Mount [LP 1201-1]	C	None		0.0000	140.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
120									
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	8.26 8.82 9.35	6.95 8.13 9.02	0.08 0.15 0.23
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	6.58 7.03 7.47	4.96 5.75 6.47	0.08 0.13 0.19
TD-RRH8x20-25	A	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13

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			
TD-RRH8x20-25	B	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
TD-RRH8x20-25	C	From Leg	4.00 0.00 2.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	4.05 4.30 4.56	1.53 1.71 1.90	0.07 0.10 0.13
Miscellaneous [NA 510-1]	C	None		0.0000	123.00	No Ice 1/2" Ice 1" Ice	6.00 8.50 11.00	6.00 8.50 11.00	0.26 0.34 0.42
Platform Mount [LP 1201-1]	C	None		0.0000	120.00	No Ice 1/2" Ice 1" Ice	23.10 26.80 30.50	23.10 26.80 30.50	2.10 2.50 2.90
(2) 6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
(2) 6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
(2) 6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	120.00	No Ice 1/2" Ice 1" Ice	1.43 1.92 2.29	1.43 1.92 2.29	0.02 0.03 0.05
119									
800MHZ RRH	A	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	B	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
800MHZ RRH	C	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.13 2.32 2.51	1.77 1.95 2.13	0.05 0.07 0.10
1900MHz RRH	A	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	B	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
1900MHz RRH	C	From Leg	1.50 0.00 3.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	2.49 2.70 2.91	3.26 3.48 3.72	0.04 0.08 0.11
(2) 2' x 2" Pipe Mount	A	From Leg	1.00 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	0.02 0.05 0.09	0.02 0.05 0.09	0.01 0.01 0.01
(2) 2' x 2" Pipe Mount	B	From Leg	1.00 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice 1" Ice	0.02 0.05 0.09	0.02 0.05 0.09	0.01 0.01 0.01
(2) 2' x 2" Pipe Mount	C	From Leg	1.00 0.00 0.00	0.0000	119.00	No Ice 1/2" Ice	0.02 0.05 0.09	0.02 0.05 0.09	0.01 0.01 0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Side Arm Mount [SO 102-3]	C	None		0.0000	119.00	1" Ice No Ice 1/2" Ice 1" Ice	3.00 3.48 3.96	3.00 3.48 3.96	0.08 0.11 0.14
72									
Side Arm Mount [SO 701-1]	B	None		0.0000	72.00	No Ice 1/2" Ice 1" Ice	0.85 1.14 1.43	1.67 2.34 3.01	0.07 0.08 0.09
(2) GPS_A	B	From Leg	3.00 0.00 1.00	0.0000	72.00	No Ice 1/2" Ice 1" Ice	0.26 0.32 0.39	0.26 0.32 0.39	0.00 0.00 0.01
***									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service

Comb. No.	Description
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	160 - 152	Pole	Max Tension	26	0.00	0.00	0.00
			Max. Compression	26	-11.02	0.06	-0.04
			Max. Mx	20	-4.74	49.76	-0.02
			Max. My	14	-4.74	0.04	-49.75
			Max. Vy	20	-5.93	49.76	-0.02
			Max. Vx	2	-5.93	0.03	49.70
			Max. Torque	24			0.02
L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.15	0.31	0.43
			Max. Mx	20	-22.22	602.78	-0.59
			Max. My	2	-22.22	-0.47	603.06
			Max. Vy	20	-22.24	602.78	-0.59
			Max. Vx	2	-22.26	-0.47	603.06
			Max. Torque	17			0.40
L3	111.29 - 77.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.31	0.31	0.43
			Max. Mx	20	-30.30	1383.48	-1.40
			Max. My	2	-30.30	-1.29	1384.25
			Max. Vy	20	-24.84	1383.48	-1.40
			Max. Vx	2	-24.85	-1.29	1384.25
			Max. Torque	21			-0.11
L4	77.42 - 36.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.83	0.15	0.34
			Max. Mx	20	-44.67	2442.99	-2.38
			Max. My	2	-44.67	-2.27	2444.37
			Max. Vy	20	-27.91	2442.99	-2.38
			Max. Vx	2	-27.92	-2.27	2444.37
			Max. Torque	13			0.12
L5	36.46 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-102.53	0.15	0.34
			Max. Mx	20	-64.90	3717.78	-3.42
			Max. My	2	-64.90	-3.31	3719.80
			Max. Vy	20	-30.52	3717.78	-3.42
			Max. Vx	2	-30.54	-3.31	3719.80
			Max. Torque	13			0.12

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	102.53	-0.00	9.23
	Max. H_x	20	64.91	30.49	-0.02
	Max. H_z	2	64.91	-0.02	30.51

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_x	2	3719.80	-0.02	30.51
	Max. M_z	8	3717.47	-30.49	0.02
	Max. Torsion	13	0.12	-15.23	-26.41
	Min. Vert	11	48.68	-26.40	-15.23
	Min. H_x	8	64.91	-30.49	0.02
	Min. H_z	14	64.91	0.02	-30.51
	Min. M_x	14	-3719.72	0.02	-30.51
	Min. M_z	20	-3717.78	30.49	-0.02
	Min. Torsion	25	-0.12	15.23	26.41

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	54.09	0.00	0.00	-0.03	0.12	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	64.91	0.02	-30.51	-3719.80	-3.31	0.09
0.9 Dead+1.6 Wind 0 deg - No Ice	48.68	0.02	-30.51	-3681.41	-3.31	0.09
1.2 Dead+1.6 Wind 30 deg - No Ice	64.91	15.27	-26.43	-3223.19	-1861.66	0.05
0.9 Dead+1.6 Wind 30 deg - No Ice	48.68	15.27	-26.43	-3189.91	-1842.49	0.05
1.2 Dead+1.6 Wind 60 deg - No Ice	64.91	26.42	-15.27	-1862.93	-3221.15	-0.01
0.9 Dead+1.6 Wind 60 deg - No Ice	48.68	26.42	-15.27	-1843.69	-3187.94	-0.01
1.2 Dead+1.6 Wind 90 deg - No Ice	64.91	30.49	-0.02	-3.50	-3717.47	-0.06
0.9 Dead+1.6 Wind 90 deg - No Ice	48.68	30.49	-0.02	-3.46	-3679.16	-0.07
1.2 Dead+1.6 Wind 120 deg - No Ice	64.91	26.40	15.23	1856.85	-3217.69	-0.10
0.9 Dead+1.6 Wind 120 deg - No Ice	48.68	26.40	15.23	1837.70	-3184.52	-0.11
1.2 Dead+1.6 Wind 150 deg - No Ice	64.91	15.23	26.41	3219.66	-1855.67	-0.12
0.9 Dead+1.6 Wind 150 deg - No Ice	48.68	15.23	26.41	3186.44	-1836.56	-0.12
1.2 Dead+1.6 Wind 180 deg - No Ice	64.91	-0.02	30.51	3719.72	3.62	-0.10
0.9 Dead+1.6 Wind 180 deg - No Ice	48.68	-0.02	30.51	3681.35	3.54	-0.10
1.2 Dead+1.6 Wind 210 deg - No Ice	64.91	-15.27	26.43	3223.11	1861.97	-0.05
0.9 Dead+1.6 Wind 210 deg - No Ice	48.68	-15.27	26.43	3189.85	1842.71	-0.05
1.2 Dead+1.6 Wind 240 deg - No Ice	64.91	-26.42	15.27	1862.85	3221.46	0.01
0.9 Dead+1.6 Wind 240 deg - No Ice	48.68	-26.42	15.27	1843.63	3188.17	0.01
1.2 Dead+1.6 Wind 270 deg - No Ice	64.91	-30.49	0.02	3.42	3717.78	0.07
0.9 Dead+1.6 Wind 270 deg - No Ice	48.68	-30.49	0.02	3.40	3679.38	0.07
1.2 Dead+1.6 Wind 300 deg - No Ice	64.91	-26.40	-15.23	-1856.93	3218.00	0.11
0.9 Dead+1.6 Wind 300 deg - No Ice	48.68	-26.40	-15.23	-1837.76	3184.75	0.11
1.2 Dead+1.6 Wind 330 deg - No Ice	64.91	-15.23	-26.41	-3219.73	1855.98	0.12
0.9 Dead+1.6 Wind 330 deg - No Ice	48.68	-15.23	-26.41	-3186.49	1836.78	0.12
1.2 Dead+1.0 Ice+1.0 Temp	102.53	0.00	0.00	-0.34	0.15	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	102.53	0.00	-9.23	-1119.93	-0.52	0.02
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	102.53	4.62	-8.00	-970.30	-559.96	0.01
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	102.53	7.99	-4.62	-560.78	-969.31	-0.01
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	102.53	9.23	-0.00	-1.10	-1118.88	-0.02
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	102.53	7.99	4.61	558.75	-968.61	-0.03
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	102.53	4.61	7.99	968.79	-558.74	-0.03
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	102.53	-0.00	9.23	1119.13	0.88	-0.02
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	102.53	-4.62	8.00	969.49	560.32	-0.01
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	102.53	-7.99	4.62	559.97	969.67	0.01
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	102.53	-9.23	0.00	0.30	1119.25	0.02
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	102.53	-7.99	-4.61	-559.56	968.97	0.03
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	102.53	-4.61	-7.99	-969.60	559.11	0.03
Dead+Wind 0 deg - Service	54.09	0.01	-7.10	-860.46	-0.67	0.02
Dead+Wind 30 deg - Service	54.09	3.55	-6.15	-745.59	-430.54	0.01
Dead+Wind 60 deg - Service	54.09	6.15	-3.56	-430.94	-745.00	-0.00
Dead+Wind 90 deg - Service	54.09	7.10	-0.01	-0.83	-859.81	-0.02
Dead+Wind 120 deg - Service	54.09	6.14	3.55	429.49	-744.20	-0.02
Dead+Wind 150 deg - Service	54.09	3.54	6.15	744.72	-429.15	-0.03
Dead+Wind 180 deg - Service	54.09	-0.01	7.10	860.40	0.93	-0.02
Dead+Wind 210 deg - Service	54.09	-3.55	6.15	745.52	430.79	-0.01
Dead+Wind 240 deg - Service	54.09	-6.15	3.56	430.88	745.26	0.00
Dead+Wind 270 deg - Service	54.09	-7.10	0.01	0.77	860.06	0.02
Dead+Wind 300 deg - Service	54.09	-6.14	-3.55	-429.56	744.45	0.02
Dead+Wind 330 deg - Service	54.09	-3.54	-6.15	-744.79	429.40	0.03

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-54.09	0.00	0.00	54.09	0.00	0.000%
2	0.02	-64.91	-30.51	-0.02	64.91	30.51	0.000%
3	0.02	-48.68	-30.51	-0.02	48.68	30.51	0.000%
4	15.27	-64.91	-26.43	-15.27	64.91	26.43	0.000%
5	15.27	-48.68	-26.43	-15.27	48.68	26.43	0.000%
6	26.42	-64.91	-15.27	-26.42	64.91	15.27	0.000%
7	26.42	-48.68	-15.27	-26.42	48.68	15.27	0.000%
8	30.49	-64.91	-0.02	-30.49	64.91	0.02	0.000%
9	30.49	-48.68	-0.02	-30.49	48.68	0.02	0.000%
10	26.40	-64.91	15.23	-26.40	64.91	-15.23	0.000%
11	26.40	-48.68	15.23	-26.40	48.68	-15.23	0.000%
12	15.23	-64.91	26.41	-15.23	64.91	-26.41	0.000%
13	15.23	-48.68	26.41	-15.23	48.68	-26.41	0.000%
14	-0.02	-64.91	30.51	0.02	64.91	-30.51	0.000%
15	-0.02	-48.68	30.51	0.02	48.68	-30.51	0.000%
16	-15.27	-64.91	26.43	15.27	64.91	-26.43	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
17	-15.27	-48.68	26.43	15.27	48.68	-26.43	0.000%
18	-26.42	-64.91	15.27	26.42	64.91	-15.27	0.000%
19	-26.42	-48.68	15.27	26.42	48.68	-15.27	0.000%
20	-30.49	-64.91	0.02	30.49	64.91	-0.02	0.000%
21	-30.49	-48.68	0.02	30.49	48.68	-0.02	0.000%
22	-26.40	-64.91	-15.23	26.40	64.91	15.23	0.000%
23	-26.40	-48.68	-15.23	26.40	48.68	15.23	0.000%
24	-15.23	-64.91	-26.41	15.23	64.91	26.41	0.000%
25	-15.23	-48.68	-26.41	15.23	48.68	26.41	0.000%
26	0.00	-102.53	0.00	0.00	102.53	0.00	0.000%
27	0.00	-102.53	-9.23	-0.00	102.53	9.23	0.000%
28	4.62	-102.53	-8.00	-4.62	102.53	8.00	0.000%
29	7.99	-102.53	-4.62	-7.99	102.53	4.62	0.000%
30	9.23	-102.53	-0.00	-9.23	102.53	0.00	0.000%
31	7.99	-102.53	4.61	-7.99	102.53	-4.61	0.000%
32	4.61	-102.53	7.99	-4.61	102.53	-7.99	0.000%
33	-0.00	-102.53	9.23	0.00	102.53	-9.23	0.000%
34	-4.62	-102.53	8.00	4.62	102.53	-8.00	0.000%
35	-7.99	-102.53	4.62	7.99	102.53	-4.62	0.000%
36	-9.23	-102.53	0.00	9.23	102.53	-0.00	0.000%
37	-7.99	-102.53	-4.61	7.99	102.53	4.61	0.000%
38	-4.61	-102.53	-7.99	4.61	102.53	7.99	0.000%
39	0.01	-54.09	-7.10	-0.01	54.09	7.10	0.000%
40	3.55	-54.09	-6.15	-3.55	54.09	6.15	0.000%
41	6.15	-54.09	-3.56	-6.15	54.09	3.56	0.000%
42	7.10	-54.09	-0.01	-7.10	54.09	0.01	0.000%
43	6.14	-54.09	3.55	-6.14	54.09	-3.55	0.000%
44	3.54	-54.09	6.15	-3.54	54.09	-6.15	0.000%
45	-0.01	-54.09	7.10	0.01	54.09	-7.10	0.000%
46	-3.55	-54.09	6.15	3.55	54.09	-6.15	0.000%
47	-6.15	-54.09	3.56	6.15	54.09	-3.56	0.000%
48	-7.10	-54.09	0.01	7.10	54.09	-0.01	0.000%
49	-6.14	-54.09	-3.55	6.14	54.09	3.55	0.000%
50	-3.54	-54.09	-6.15	3.54	54.09	6.15	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00030684
3	Yes	4	0.00000001	0.00015294
4	Yes	5	0.00000001	0.00084116
5	Yes	5	0.00000001	0.00040163
6	Yes	5	0.00000001	0.00084073
7	Yes	5	0.00000001	0.00040145
8	Yes	4	0.00000001	0.00030464
9	Yes	4	0.00000001	0.00015091
10	Yes	5	0.00000001	0.00083410
11	Yes	5	0.00000001	0.00039837
12	Yes	5	0.00000001	0.00083818
13	Yes	5	0.00000001	0.00040045
14	Yes	4	0.00000001	0.00029227
15	Yes	4	0.00000001	0.00013941
16	Yes	5	0.00000001	0.00084010
17	Yes	5	0.00000001	0.00040106
18	Yes	5	0.00000001	0.00084018
19	Yes	5	0.00000001	0.00040111
20	Yes	4	0.00000001	0.00029093
21	Yes	4	0.00000001	0.00013813
22	Yes	5	0.00000001	0.00083833
23	Yes	5	0.00000001	0.00040048
24	Yes	5	0.00000001	0.00083460
25	Yes	5	0.00000001	0.00039854
26	Yes	4	0.00000001	0.00000001

27	Yes	5	0.00000001	0.00041329
28	Yes	5	0.00000001	0.00050820
29	Yes	5	0.00000001	0.00050826
30	Yes	5	0.00000001	0.00041254
31	Yes	5	0.00000001	0.00050602
32	Yes	5	0.00000001	0.00050647
33	Yes	5	0.00000001	0.00041256
34	Yes	5	0.00000001	0.00050780
35	Yes	5	0.00000001	0.00050758
36	Yes	5	0.00000001	0.00041295
37	Yes	5	0.00000001	0.00050791
38	Yes	5	0.00000001	0.00050762
39	Yes	4	0.00000001	0.00005423
40	Yes	4	0.00000001	0.00026243
41	Yes	4	0.00000001	0.00026216
42	Yes	4	0.00000001	0.00005415
43	Yes	4	0.00000001	0.00025845
44	Yes	4	0.00000001	0.00026214
45	Yes	4	0.00000001	0.00005417
46	Yes	4	0.00000001	0.00026152
47	Yes	4	0.00000001	0.00026165
48	Yes	4	0.00000001	0.00005413
49	Yes	4	0.00000001	0.00026249
50	Yes	4	0.00000001	0.00025893

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	16.802	46	0.9156	0.0002
L2	152 - 111.29	15.274	46	0.9079	0.0002
L3	116.71 - 77.42	8.990	46	0.7532	0.0001
L4	83.59 - 36.46	4.508	46	0.5118	0.0000
L5	43.54 - 0	1.226	46	0.2532	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	46	16.802	0.9156	0.0002	61049
153.00	RRUS 32 B2	46	15.464	0.9093	0.0002	44028
152.00	Miscellaneous [NA 510-1]	46	15.274	0.9079	0.0002	38847
149.00	7770.00 w/ Mount Pipe	46	14.704	0.9025	0.0002	29233
140.00	(2) APL868013-42T0 w/ Mount Pipe	46	13.022	0.8763	0.0001	17156
123.00	Miscellaneous [NA 510-1]	46	10.019	0.7929	0.0001	9639
120.00	APXVSPP18-C-A20 w/ Mount Pipe	46	9.522	0.7744	0.0001	8954
119.00	800MHZ RRH	46	9.358	0.7681	0.0001	8766
72.00	Side Arm Mount [SO 701-1]	46	3.312	0.4314	0.0000	8145

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	72.693	16	3.9651	0.0007
L2	152 - 111.29	66.081	16	3.9318	0.0007

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L3	116.71 - 77.42	38.901	16	3.2620	0.0003
L4	83.59 - 36.46	19.505	16	2.2159	0.0001
L5	43.54 - 0	5.304	16	1.0955	0.0001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.00	Lightning Rod 5/8x4'	16	72.693	3.9651	0.0007	14258
153.00	RRUS 32 B2	16	66.905	3.9379	0.0007	10279
152.00	Miscellaneous [NA 510-1]	16	66.081	3.9318	0.0007	9067
149.00	7770.00 w/ Mount Pipe	16	63.619	3.9085	0.0007	6816
140.00	(2) APL868013-42T0 w/ Mount Pipe	16	56.344	3.7953	0.0006	3996
123.00	Miscellaneous [NA 510-1]	16	43.350	3.4337	0.0003	2242
120.00	APXVSPP18-C-A20 w/ Mount Pipe	16	41.199	3.3539	0.0003	2082
119.00	800MHZ RRH	16	40.494	3.3264	0.0003	2038
72.00	Side Arm Mount [SO 701-1]	16	14.327	1.8675	0.0001	1885

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	8.00	0.00	0.0	18.1111	-4.74	1135.55	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.71	0.00	0.0	29.7665	-22.22	1934.28	0.011
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	39.29	0.00	0.0	43.1945	-30.29	2892.94	0.010
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	47.13	0.00	0.0	70.5044	-44.67	5028.09	0.009
L5	36.46 - 0 (5)	TP59x50.3353x0.5	43.54	0.00	0.0	92.8395	-64.90	6604.55	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 152 (1)	TP30.62x29x0.1875	49.77	711.82	0.070	0.00	711.82	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	603.50	1493.86	0.404	0.00	1493.86	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	1385.28	2592.38	0.534	0.00	2592.38	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	2446.10	5245.66	0.466	0.00	5245.66	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	3722.28	7939.54	0.469	0.00	7939.54	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 152 (1)	TP30.62x29x0.1875	5.93	567.77	0.010	0.00	1425.37	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	22.27	967.14	0.023	0.03	2991.37	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.3125	24.87	1446.47	0.017	0.03	5191.10	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.2359x0.4375	27.94	2514.05	0.011	0.05	10504.17	0.000
L5	36.46 - 0 (5)	TP59x50.3353x0.5	30.55	3302.27	0.009	0.05	15898.50	0.000

Pole Interaction Design Data

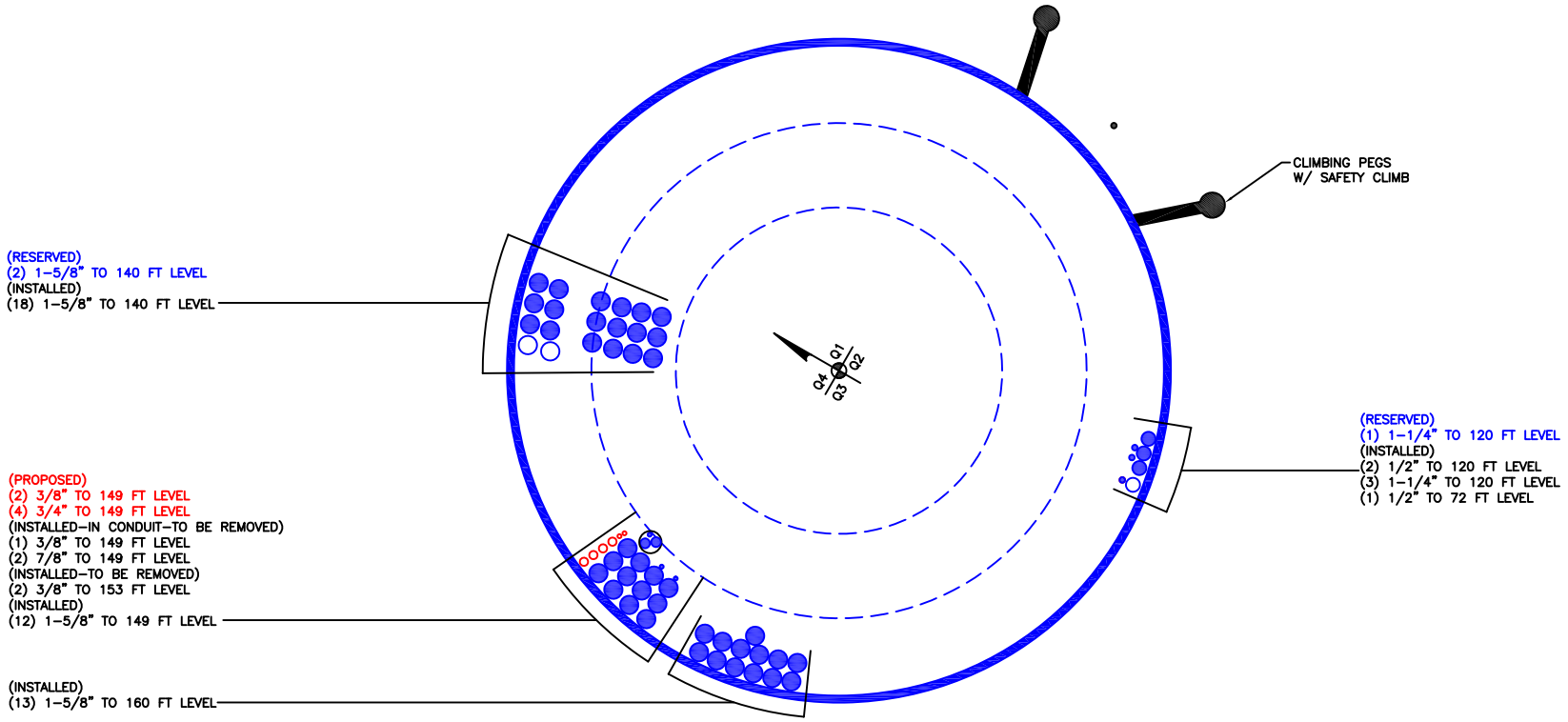
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.070	0.000	0.010	0.000	0.074	1.000	4.8.2
L2	152 - 111.29 (2)	0.011	0.404	0.000	0.023	0.000	0.416	1.000	4.8.2
L3	111.29 - 77.42 (3)	0.010	0.534	0.000	0.017	0.000	0.545	1.000	4.8.2
L4	77.42 - 36.46 (4)	0.009	0.466	0.000	0.011	0.000	0.475	1.000	4.8.2
L5	36.46 - 0 (5)	0.010	0.469	0.000	0.009	0.000	0.479	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	160 - 152	Pole	TP30.62x29x0.1875	1	-4.74	1135.55	7.4	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-22.22	1934.28	41.6	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.3125	3	-30.29	2892.94	54.5	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.2359x0.4375	4	-44.67	5028.09	47.5	Pass
L5	36.46 - 0	Pole	TP59x50.3353x0.5	5	-64.90	6604.55	47.9	Pass
							Summary	
						Pole (L3)	54.5	Pass
						RATING =	**54.5**	**Pass**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 841290 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

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

TIA Rev G Assumption: Clear space between bottom of leveling nut and top of concrete **not** exceeding (1)*(Rod Diameter)

Site Data

BU#: *841290*
Site Name: *GREENWICH NORTH*
App #: *421390 Rev. 1*

Pole Manufacturer:	*Other*

Reactions		
Mu:	3722	ft-kips
Axial, Pu:	65	kips
Shear, Vu:	31	kips
Eta Factor, ɳ	0.5	TIA G (Fig. 4-4)

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

Anchor Rod Data		
Qty:	24	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	67	in

Plate Data		
Diam:	73	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	7.80	in

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

Pole Data		
Diam:	59	in
Thick:	0.5	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Anchor Rod Results

		Rigid
Max Rod (Cu+ Vu/ɳ):	116.4 Kips	AISC LRFD
Allowable Axial, Φ*Fu*Anet:	260.0 Kips	φ*Tn
Anchor Rod Stress Ratio:	44.8% **Pass**	

Base Plate Results

	Flexural Check	Rigid
Base Plate Stress:	28.5 ksi	AISC LRFD
Allowable Plate Stress:	54.0 ksi	φ*Fy
Base Plate Stress Ratio:	52.7% **Pass**	Y.L. Length: 31.75

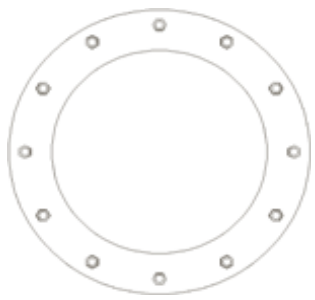
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check:	n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

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

Site Data

BU#: *841290*
Site Name: *GREENWICH NORTH*
App #: *421390 Rev. 1*

Reactions		
Mu	49.77	ft-kips
Axial, Pu:	4.74	kips
Shear, Vu:	5.93	kips
Elevation:	152	feet

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

Pole Manufacturer:	Other

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

Bolt Data			
Qty:	12		
Diameter (in.):	1	Bolt Fu:	120
Bolt Material:	A325	Bolt Fy:	92
N/A:	100	<-- Disregard	
N/A:	75	<-- Disregard	
Circle (in.):	35		

Plate Data		
Diam:	38	in
Thick, t:	1	in
Grade (Fy):	60	ksi
Strength, Fu:	75	ksi
Single-Rod B-eff:	8.10	in

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

Pole Data		
Diam:	30.62	in
Thick:	0.1875	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Flange Bolt Results

Bolt Tension Capacity, φ*Tn,**B1**:	54.54	kips	Rigid: φ*Tn
Adjusted φ*Tn (due to Vu=Vu/Qty), **B**:	54.54	kips	φTn[(1-(Vu/φVn)^2]^0.5
Max Bolt directly applied Tu:	5.29	Kips	
Min. PL "tc" for **B** cap. **w/o** Pry:	0.825	in	
Min PL "treq" for actual **T w/ Pry**:	0.188	in	
Min PL "t1" for actual **T w/o Pry**:	0.257	in	
T allowable w/o Prying:	54.54	kips	α'<0 case
Prying Force, q:	0.00	kips	
Total Bolt Tension=Tu+q:	5.29	kips	
Non-Prying Bolt Stress Ratio, Tu/B:	9.7%	**Pass**	

Exterior Flange Plate Results Flexural Check

Compression Side Plate Stress:	4.0	ksi	Rigid: TIA G
Allowable Plate Stress:	54.0	ksi	φ*Fy
Compression Plate Stress Ratio:	7.3%	**Pass**	Comp. Y.L. Length: 16.95
No Prying			
Tension Side Stress Ratio, (treq/t)^2:	3.5%	**Pass**	

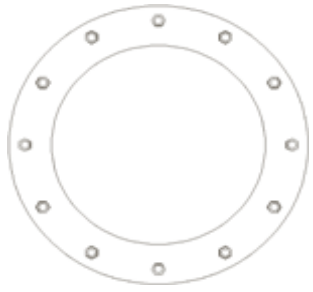
n/a

Stiffener Results

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

Pole Results

Pole Punching Shear Check: n/a



* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt
** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes

Pier and Pad Foundation

BU # :	841290
Site Name:	GREENWICH NOF
App. Number:	421390 Rev. 1

TIA-222 Revision:	G
Tower Type:	Monopole

Block Foundation?: ☐

Superstructure Analysis Reactions

Compression, P_{comp}:	65	kips
Base Shear, Vu_comp:	31	kips
Moment, M_u:	3722	ft-kips
Tower Height, **H**:	160	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7.0	ft
Ext. Above Grade, **E**:	0.50	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	22	
Pier Tie/Spiral Size, **St**:	4	
Pier Tie/Spiral Quantity, **mt**:	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	4	in

Pad Properties

Depth, **D**:	9.5	ft
Pad Width, **W**:	25.0	ft
Pad Thickness, **T**:	4.5	ft
Pad Rebar Size, **Sp**:	10	
Pad Rebar Quantity, **mp**:	23	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60000	psi
Concrete Compressive Strength, **F'c**:	4000	psi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	120	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	16	
Base Friction, μ:	0.2	
Neglected Depth, **N**:	5.00	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, **gw**:	None	ft

<--Toggle between Gross and Net

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	376.03	31.00	**8.2%**	**Pass**
Bearing Pressure (ksf)	22.50	3.73	**16.6%**	**Pass**
*Overturning (kip*ft)*	10166.18	4039.10	**39.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	5557.69	3892.50	**70.0%**	**Pass**
Pier Compression (kip)	31187.52	113.51	**0.4%**	**Pass**
*Pad Flexure (kip*ft)*	6340.37	1320.24	**20.8%**	**Pass**
Pad Shear - 1-way (kips)	1397.27	168.33	**12.0%**	**Pass**
Pad Shear - 2-way (ksi)	0.19	0.02	**10.3%**	**Pass**

Soil Rating:	**39.7%**
Structural Rating:	**70.0%**

CCISeismic - Design Category

Per *2012/2015 IBC*

Site BU:	841290
Work Order:	1568951
Application:	421390 Rev. 1

	Degrees	Minutes	Seconds		
Site Latitude =	41	3	58.60	0.0000	degrees
Site Longitude =	-73	40	17.39	0.0000	degrees
Ground Supported Structure =	Yes				
Structure Class =	II				*(Table 2-1)*
Site Class =	D - Stiff Soil				*(Table 2-11)*

Spectral response acceleration short periods, S_S =	0.259	USGS Seismic Tool
Spectral response acceleration 1 s period, S_1 =	0.070	

Importance Factor, I =	1.0	*(Table 2-3)*
Acceleration-based site coefficient, F_a =	1.6	*(Table 2-12)*
Velocity-based site coefficient, F_v =	2.4	*(Table 2-13)*

Design spectral response acceleration short period, S_{DS} =	0.275	*(2.7.6)*
Design spectral response acceleration 1 s period, S_{D1} =	0.112	*(2.7.6)*

Seismic Design Category - Short Period Response =	B	*ASCE 7-05 Table 11.6-1*
Seismic Design Category - 1s Period Response =	B	*ASCE 7-05 Table 11.6-2*

Worst Case Seismic Design Category =	B	*ASCE 7-05 Tables 11.6-1 and 6-2*