Crown Castle
3530 Toringdon Way Suite 300
Charlotte NC 28277

Tel (704) 405-6600

May 20, 2015

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

RE: **T-Mobile-Exempt Modification - Crown Site BU: 876390**
T-Mobile Site ID: CT11511A
Located at: 116 Grant Hill Road, Brooklyn, CT 06234

Dear Ms. Bachman:

Per our discussion, T-Mobile/Crown Castle will be resubmitting one hard copy of the original package to your office so you can place this information in the file. As discussed, the scope of work has been revised to reflect running the coax cables on the outside of the telecommunications pole.

This letter and exhibits are submitted on behalf of T-Mobile. T-Mobile is making modifications to certain existing sites in its Connecticut system in order to implement their 700MHz technology. Please accept this letter and exhibits as notification, pursuant to § 16-50j-73 of the Regulations of Connecticut State Agencies ("R.C.S.A."), of construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In compliance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to The Honorable Richard Ives, First Selectman for the Town of Brooklyn, and Dawna G. and Jean-Paul Bernier, Property Owners.

T-Mobile plans to modify the existing wireless communications facility owned by Crown Castle and located at **116 Grant Hill Road, Brooklyn, CT 06234**. Attached are a compound plan and elevation depicting the planned changes (Exhibit-1), and documentation of the structural sufficiency of the structure to accommodate the revised antenna configuration (Exhibit-2). Also included is a power density table report reflecting the modification to T-Mobile's operations at the site (Exhibit-3).

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

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

2. There will be no proposed modifications to the ground and no extension of boundaries.

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

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

5. A Structural Modification Report confirming that the tower and foundation can support T-Mobile's proposed modifications is included as Exhibit-2.

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

Sincerely,

Kimberly Myl
Real Estate Specialist

Enclosure

Tab 1: Exhibit-1: Compound plan and elevation depicting the planned changes
Tab 2: Exhibit-2: Structural Modification Report

cc: The Honorable Richard Ives, First Selectman
4 Wolf Den Road
P.O. Box 356
Brooklyn, CT 06234

Dawna G. and Jean-Paul Bernier
116 Grant Hill Road
Brooklyn, CT 06234

Helton, Heather (Contractor)

From: Bachman, Melanie <Melanie.Bachman@ct.gov>
Sent: Wednesday, May 20, 2015 11:55 AM
To: Myl, Kimberly (Contractor)
Subject: FW: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

Good morning, Ms. Myl.

My sincerest apologies, but our analyst was mistaken when he indicated the structural analyses were the same, as I suspected since the size of the structural analyses (468 KB and 1 MB) were different.

Please submit one hard copy original of the package to our office when you have a chance so that we can place this information in the file.

Thank you very much for your patience and understanding.

Have a great day!

Melanie

Melanie A. Bachman
Staff Attorney/Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
860-827-2951

From: Cunliffe, Fred
Sent: Wednesday, May 20, 2015 11:16 AM
To: Bachman, Melanie; Walsh, Christina
Subject: RE: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

Melanie,

I spoke to you about this filing yesterday afternoon and what appeared to be the same structural analysis was submitted twice.

I double checked with Christina who picked up on an added assumption #6 that covers the external mount of cables.
It would be helpful if using a previous document to note the change and initial and date for full transparency.
The engineer would be responsible for speaking to the validity of the analysis.

The document does state the structure is capable of supporting the load and I would accept it for the files.

I hope you have not asked for the SA yet.

First time filing:

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Monopole was reinforced in conformance with the referenced modification drawings.

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

Revised filing with coax outside the tower.

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculatin wind loads as allowed by TIA/EIA-222-F.
5) Monopole was reinforced in conformance with the referenced modification drawings.
6) If the proposed feedlines are installed external to the monopole the tower capacity will be 97.6%.

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

Fred Cunliffe
Siting Analyst Supervisor
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
website:ct.gov/csc
email:fred.cunliffe@ct.gov
desk-860.827.2939
fax-860.827.2950

From: Bachman, Melanie
Sent: Tuesday, May 19, 2015 4:01 PM

To: Walsh, Christina; Cunliffe, Fred
Subject: RE: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

That was exactly what Mark Richard described to me. Thank you very much.

Melanie A. Bachman
Staff Attorney/Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
860-827-2951

From: Walsh, Christina
Sent: Tuesday, May 19, 2015 3:59 PM
To: Bachman, Melanie; Cunliffe, Fred
Subject: RE: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

I'll defer to Fred since he reviews the T-Mobile filings but it looks like with the coax outside the tower would be 97.6 percent of its capacity so it passes. I would think it would be fine to place the revision in the file.

CHRISTINA WALSH
SITING ANALYST SUPERVISOR
CONNECTICUT SITING COUNCIL
TEN FRANKLIN SQUARE
NEW BRITAIN, CT 06051
TEL: 860-827-2944

www.ct.gov/csc

From: Bachman, Melanie
Sent: Tuesday, May 19, 2015 3:06 PM
To: Cunliffe, Fred; Walsh, Christina
Subject: FW: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

This is the exempt mod that T-Mobile had issues with on-site during construction. Please review the materials when you have a chance and let me know if this should be resubmitted or if this should be placed in the file.

Thanks.

Melanie A. Bachman
Staff Attorney/Acting Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
860-827-2951

From: Myl, Kimberly (Contractor) [mailto:Kimberly.Myl.Contractor@crowncastle.com]
Sent: Tuesday, May 19, 2015 2:39 PM
To: Bachman, Melanie
Subject: T-Mobile # CT11511A - 116 Grant Hill Road, Brooklyn, CT

Ms. Bachman:

T-Mobile previously received CSC approval on 03/31/15. Since then T-Mobile revised their scope of work to run the coax cables on the outside of the telecommunications tower. I have attached the previous approval from your office, the revised construction drawings and revised structural analysis. Can you kindly advise if resubmission to the CSC is required?

Please let me know if you have any questions or need additional information. Thank you.

KIMBERLY MYL
Real Estate Specialist
T: (201) 236-9069 | M: (201) 993-3697

CROWN CASTLE
1200 MacArthur Blvd, Suite 200
Mahwah, NJ 07430

T-MOBILE NORTHEAST LLC

T-MOBILE SITE #: CT11511A
CROWN CASTLE BU #: 876390
SITE NAME: HAMPTON/BERNIER
116 GRANT HILL ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

VICINITY MAP

FROM PARSIPPANY, NJ:

DEPART SYLVAN WAY AND TAKE I-80 E TO I-95 N. TAKE EXIT 27A FOR CONNECTICUT 25/CONNECTICUT 8 TOWARD TRUMBULL/WATERBURY. CONTINUE ONTO CT-25 N/CT-8 N. KEEP RIGHT AT THE FORK TO CONTINUE ON CT-8 N,. TAKE EXIT 9 TO MERGE ONTO CT-15 N/MERRITT PKWY TOWARD CT-15. TAKE EXIT 68 N-E TO MERGE ONTO I-91 N TOWARD CT-66 E/HARTFORD/MIDDLETOWN. TAKE EXIT 29 TO MERGE ONTO CT-15 N/US-5 N TOWARD I-84 E/E HARTFORD/BOSTON. TAKE THE EXIT ON THE LEFT ONTO I-84 E TOWARD BOSTON. TAKE EXIT 59 FOR I-384 E TOWARD PROVIDENCE. CONTINUE ONTO US-44 E/US-6 E. KEEP RIGHT TO CONTINUE ON US-6 E, FOLLOW SIGNS FOR PROVIDENCE/WILLIMANTIC. TURN LEFT ONTO US-6 E/STATE RTE 6 E. TURN LEFT ONTO CHERRY HILL RD. TURN LEFT ONTO GRANT HILL RD. SITE WILL BE ON THE RIGHT.

ENGINEER
DEWBERRY ENGINEERS INC.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054

CONTACT: BRYAN HUFF
PHONE #: (973) 576-0147

CONSTRUCTION
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CONTACT: PATRICIA PELON
PHONE #: (518) 373-3507

CONSULTANT TEAM

SITE NAME:
HAMPTON/BERNIER

SITE NUMBER:
CT11511A

TOWER OWNER:
CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

APPLICANT/DEVELOPER:
T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

COORDINATES:
LATITUDE: 41°-47'-30.53" N (NAD83)
LONGITUDE: 72°-00'-53.27" W (NAD83)
(PER CROWN CASTLE)

CONFIGURATION
704G

PROJECT SUMMARY

SITE ADDRESS:
116 GRANT HILL ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

PROJECT DIRECTORY

- INSTALL (3) NEW ANTENNAS.
- INSTALL (3) NEW BIAS TEES.
- INSTALL (6) NEW LINES OF COAX ALONG MONOPOLE EXTERIOR.
- INSTALL (1) NEW BBU CABINET AT GRADE.

SCOPE OF WORK

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.

A.D.A. COMPLIANCE:
FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION.

SHT. NO.	DESCRIPTION
T-1	TITLE SHEET
G-1	GENERAL NOTES
C-1	COMPOUND PLAN & EQUIPMENT PLANS
C-2	ANTENNA LAYOUTS & ELEVATIONS
C-3	CONSTRUCTION DETAILS
E-1	GROUNDING NOTES & DETAILS

SHEET INDEX

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11511A
HAMPTON/BERNIER

CONSTRUCTION DRAWINGS

1	05/14/15	REVISED PER COMMENTS
0	03/06/15	ISSUED AS FINAL
A	03/02/15	ISSUED FOR REVIEW

Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50072408

SITE ADDRESS:

116 GRANT HILL ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE

TITLE SHEET

SHEET NUMBER

T-1

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   PROJECT MANAGEMENT – CROWN CASTLE
   CONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE
   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 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.

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 T–MOBILE 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.

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 THE 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.

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.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
   CONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE 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 THE NEW BTS LOCATION.
4. GROUNDING OF ALL EQUIPMENT AND ANTENNAS IS NOT CONSIDERED PART OF THE SCOPE OF THIS PROJECT AND IS THE RESPONSIBILITY OF THE OWNER AND CONTRACTOR AT THE TIME OF CONSTRUCTION. ALL EQUIPMENT AND ANTENNAS TO BE INSTALLED AND GROUNDED IN ACCORDANCE WITH GOVERNING BUILDING CODE, MANUFACTURER RECOMMENDATIONS AND OWNER SPECIFICATIONS.

T-Mobile
T–MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11511A
HAMPTON/BERNIER

CONSTRUCTION DRAWINGS

1	05/14/15	REVISED PER COMMENTS
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A	03/02/15	ISSUED FOR REVIEW

Dewberry
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50072408
SITE ADDRESS:	

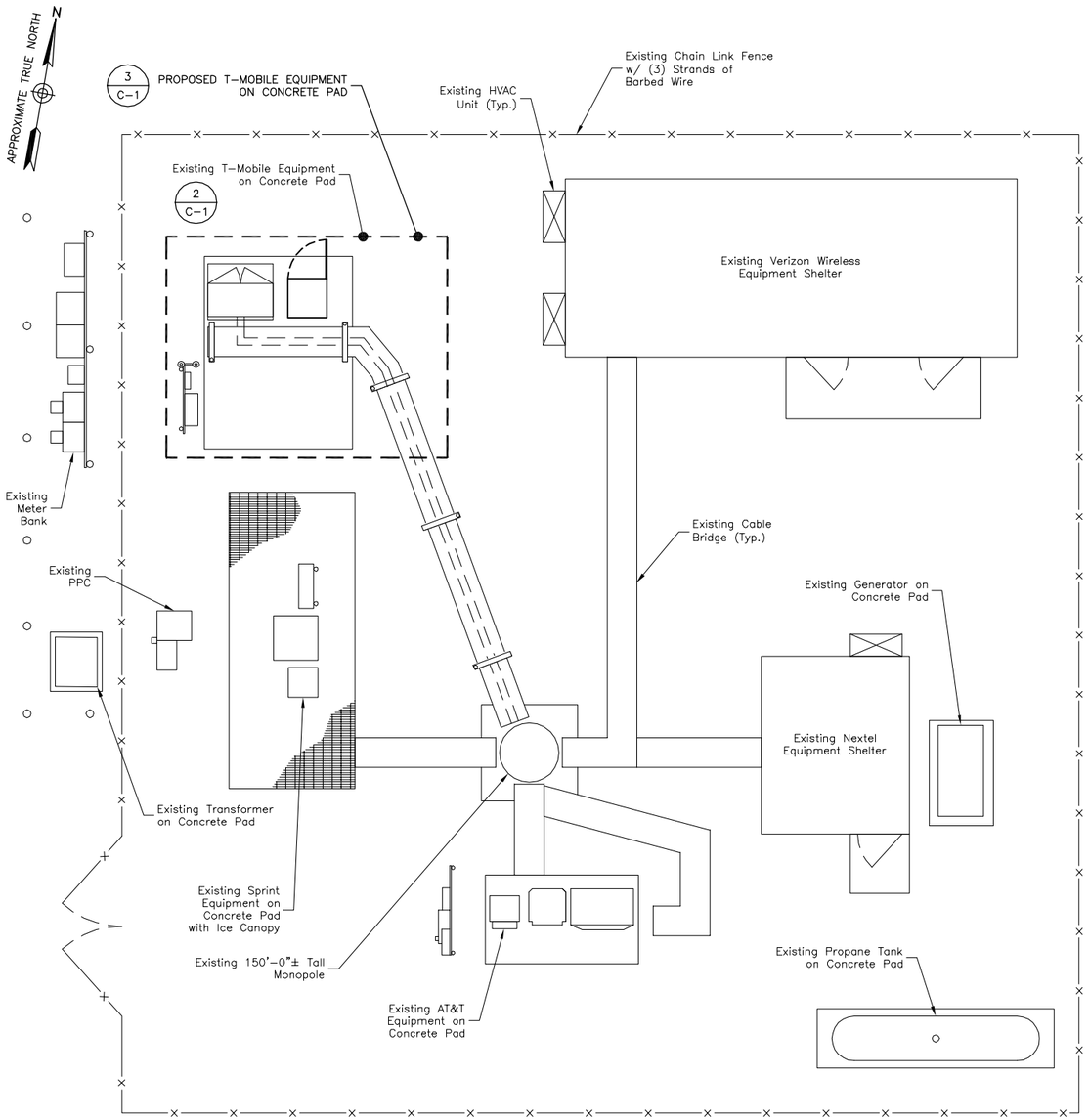
116 GRANT HILL ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

G–1



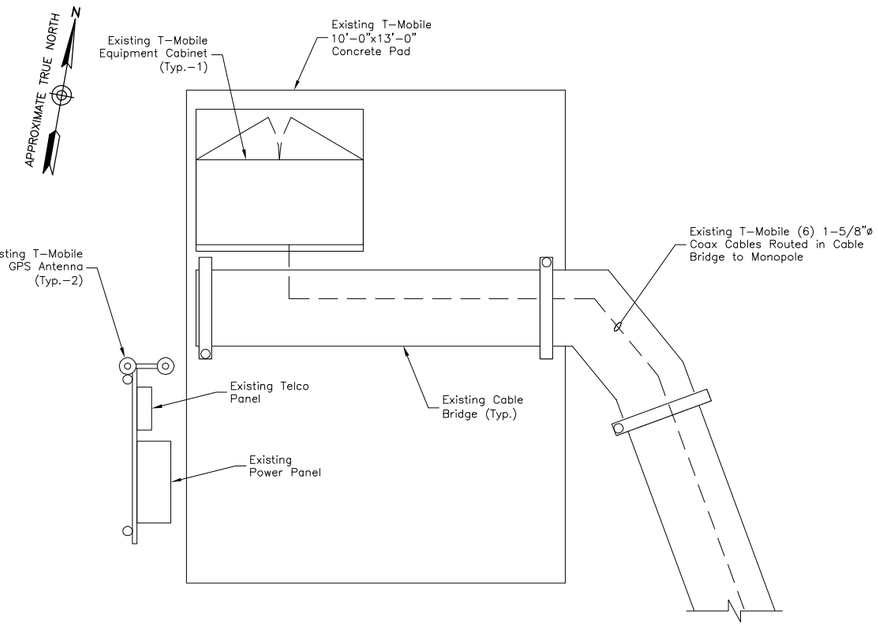
COMPOUND PLAN 1

SCALE: 1"=10' FOR 11"x17"
1"=5' FOR 22"x34"

0' 5' 10'

NOTES:

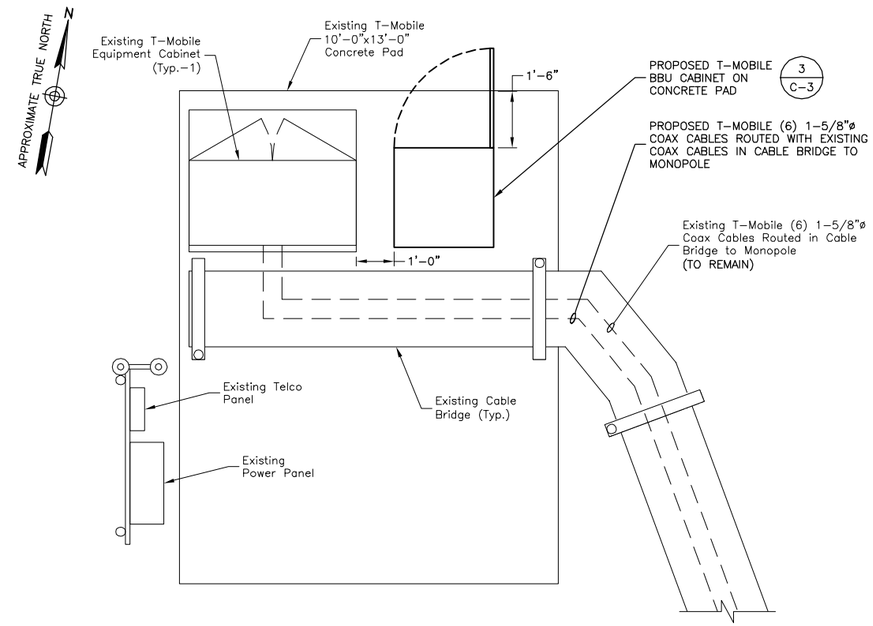
1. NORTH ARROW SHOWN AS APPROXIMATE.
2. NOT ALL INFORMATION IS SHOWN FOR CLARITY.
3. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J FORD AND COMPANY DATED FEBRUARY 6, 2015.



EXISTING EQUIPMENT PLAN 2

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

0' 1' 2' 4'



PROPOSED EQUIPMENT PLAN 3

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

0' 1' 2' 4'

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600 PARSIPPANY ROAD
SUITE 301
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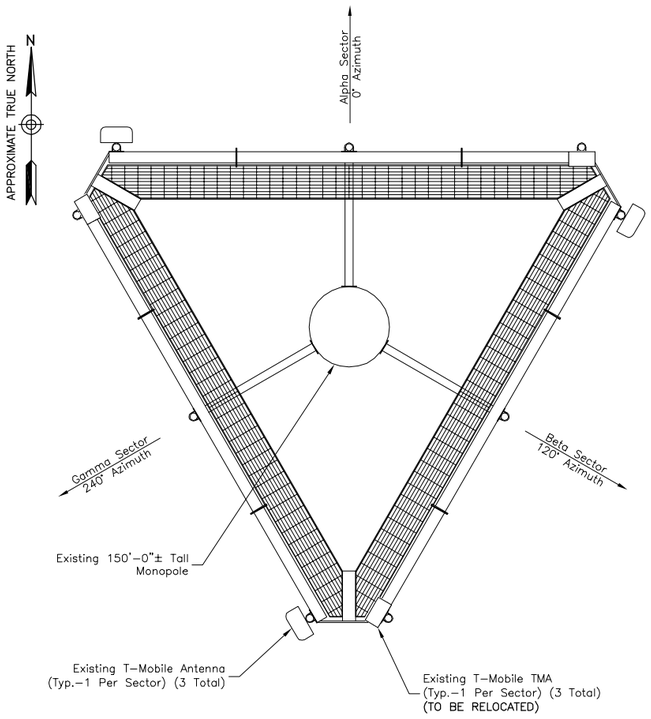
SHEET TITLE

COMPOUND PLAN & EQUIPMENT PLANS

SHEET NUMBER

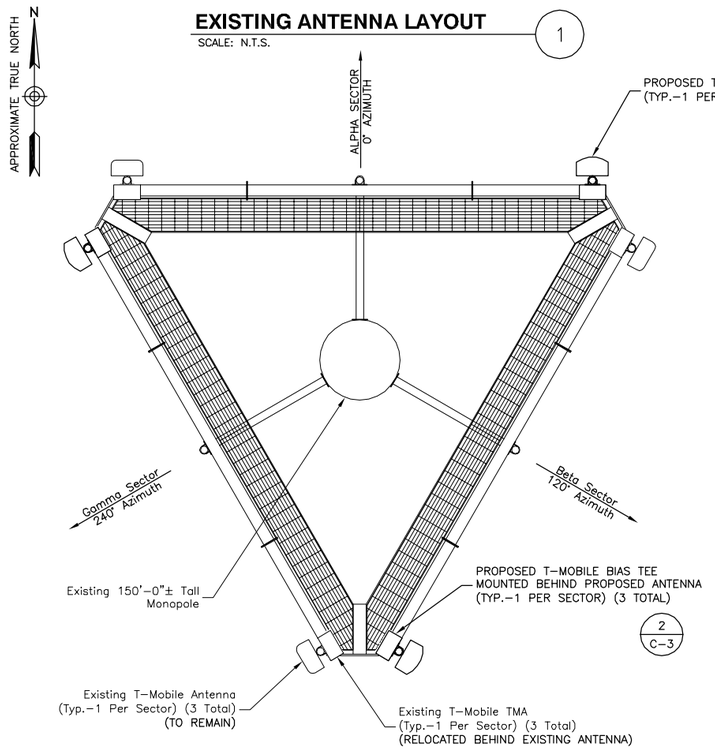
C-1



EXISTING ANTENNA LAYOUT

SCALE: N.T.S.

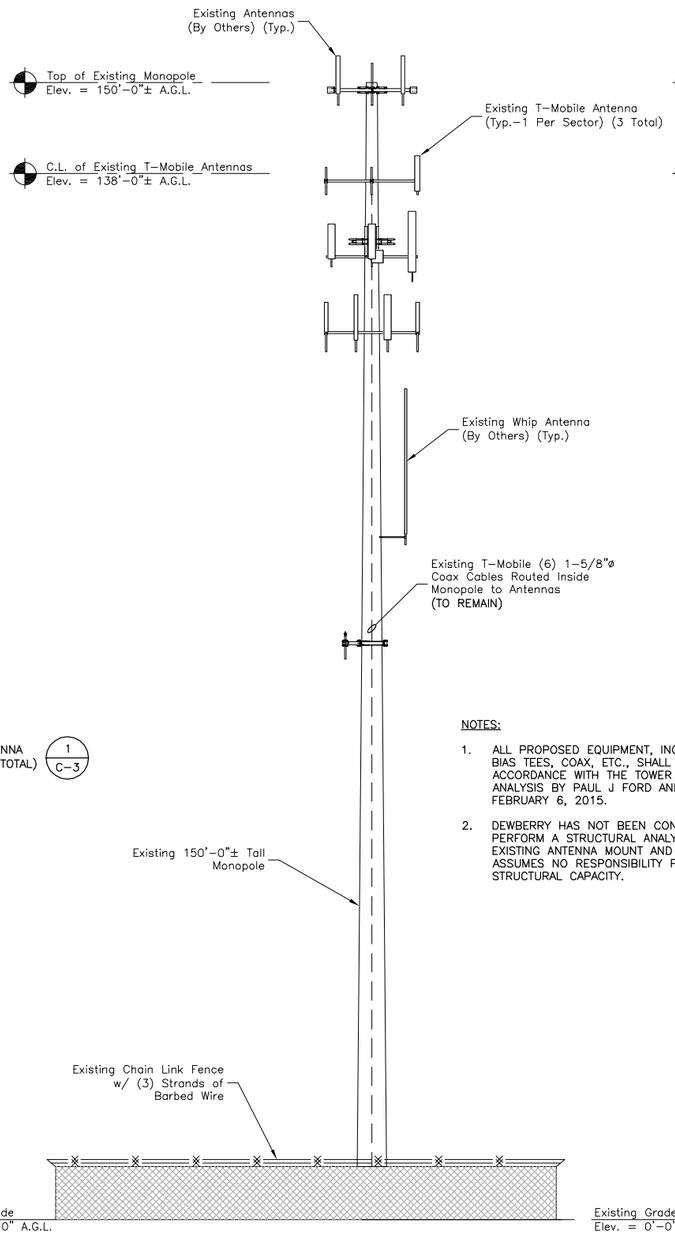
1



PROPOSED ANTENNA LAYOUT

SCALE: N.T.S.

2



EXISTING ELEVATION

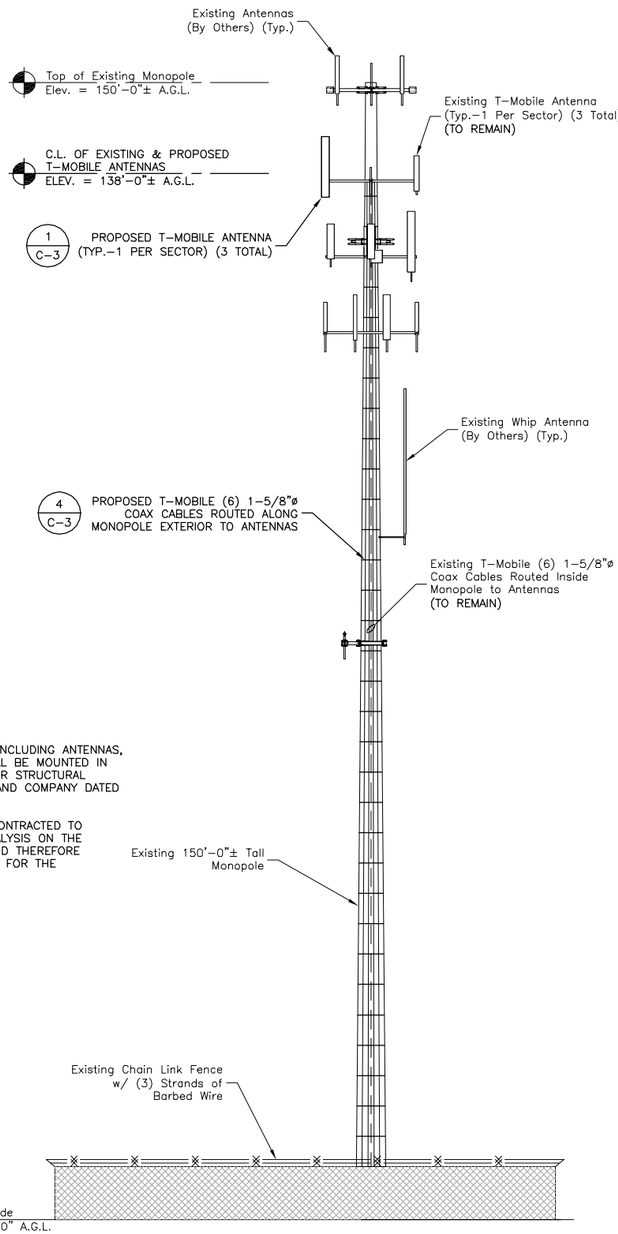
SCALE: 1"=20' FOR 11"x17"
1"=10' FOR 22"x34"

3

0' 10' 20'

NOTES:

1. ALL PROPOSED EQUIPMENT, INCLUDING ANTENNAS, BIAS TEES, COAX, ETC., SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS BY PAUL J FORD AND COMPANY DATED FEBRUARY 6, 2015.
2. DEWBERRY HAS NOT BEEN CONTRACTED TO PERFORM A STRUCTURAL ANALYSIS ON THE EXISTING ANTENNA MOUNT AND THEREFORE ASSUMES NO RESPONSIBILITY FOR THE STRUCTURAL CAPACITY.



PROPOSED ELEVATION

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

4

0' 10' 20'

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4 SYLVAN WAY
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PARSIPPANY, NJ 07054
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116 GRANT HILL ROAD
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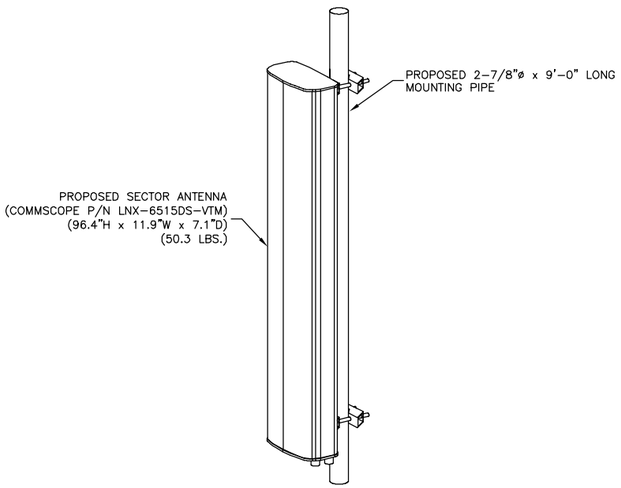
SHEET TITLE

ANTENNA LAYOUTS & ELEVATIONS

SHEET NUMBER

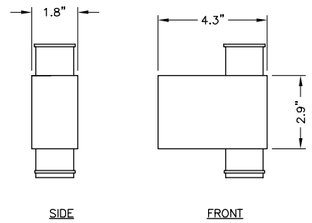
C-2



NOTES:

1. MOUNT ANTENNAS PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND ANTENNAS AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED ANTENNAS WITH THE LATEST RFDS.

ISOMETRIC ANTENNA DETAIL 1
SCALE: N.T.S.

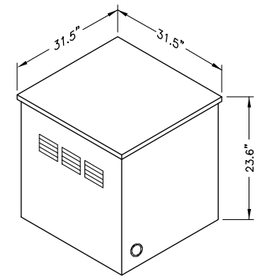


ANDREW ATBT-BOTTOM-24V

NOTES:

1. MOUNT EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS.
2. GROUND EQUIPMENT AND MOUNTS PER MANUFACTURER'S RECOMMENDATIONS AND T-MOBILE STANDARDS.
3. CONFIRM REQUIRED EQUIPMENT WITH THE LATEST RFDS.

BIAS TEE DETAIL 2
SCALE: N.T.S.



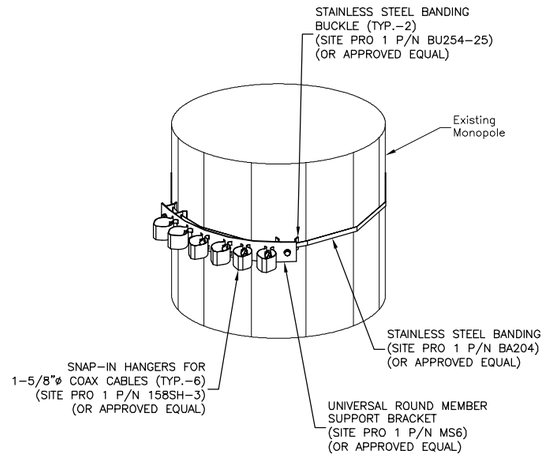
ALCATEL-LUCENT EZBFo BATTERY BACKUP SYSTEM

MATERIAL:	ANCHOR:
CONCRETE	3/8"ø HILTI KWIK BOLT 3 W/2-1/2" MIN. EMBED.
STRUCTURAL STEEL	1/2"ø STRUCTURAL BOLTS

NOTE:

1. CONTRACTOR SHALL ANCHOR CABINET IN ACCORDANCE WITH MANUFACTURER RECOMMENDATIONS.

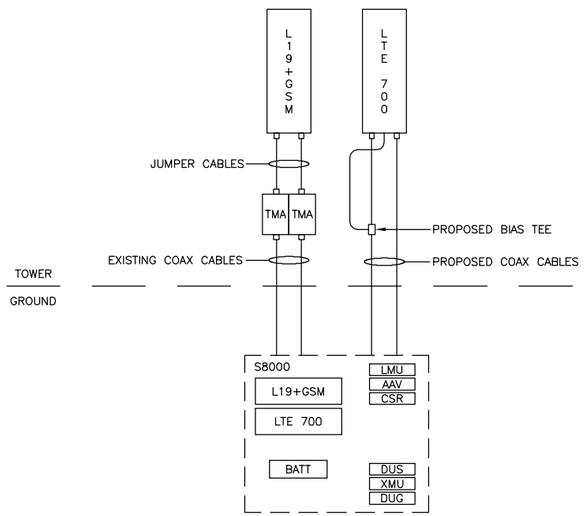
BBU CABINET DETAIL 3
SCALE: N.T.S.



NOTES:

1. SUPPORT BRACKETS SHALL BE SPACED AT 4'-0" C-C MAX.
2. COAX CABLES SHALL BE INSTALLED NEXT TO VERIZON WIRELESS CABLES ON MONOPOLE EXTERIOR.

COAX SUPPORT DETAIL 4
SCALE: N.T.S.



SITE CONFIGURATION 704G 5
SCALE: N.T.S.

DESIGN CONFIGURATION

	ANTENNAS		COAX		COAX LENGTH
	EXISTING	PROPOSED	EXISTING	PROPOSED	
ALPHA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1-5/8"ø	(2) 1-5/8"ø	188'-0"
	–	COMMSCOPE LNX-6515DS-VTM			
BETA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1-5/8"ø	(2) 1-5/8"ø	188'-0"
	–	COMMSCOPE LNX-6515DS-VTM			
GAMMA	EMS RR90-17-02DP	EXISTING TO REMAIN	(2) 1-5/8"ø	(2) 1-5/8"ø	188'-0"
	–	COMMSCOPE LNX-6515DS-VTM			

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SHEET TITLE

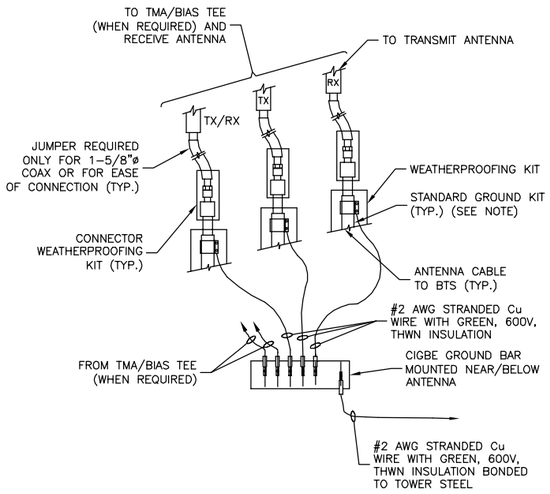
CONSTRUCTION DETAILS

SHEET NUMBER

C-3

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 ENGINEER 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 THE ENGINEER 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 T-MOBILE 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.

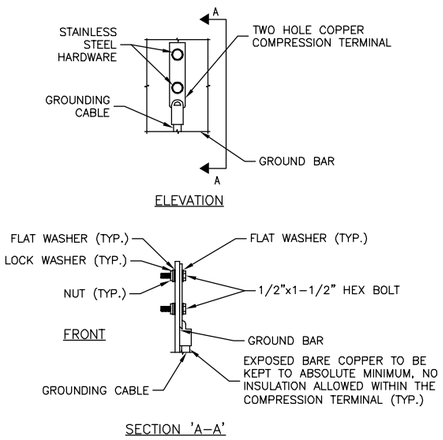


NOTE:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO CIGBE.

CONNECTION OF GROUND WIRES TO GROUNDING BAR (CIGBE)

SCALE: N.T.S. — 1

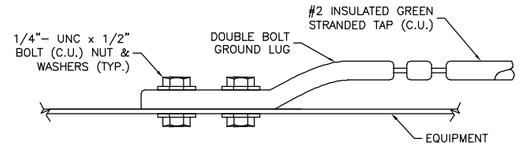


NOTES:

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

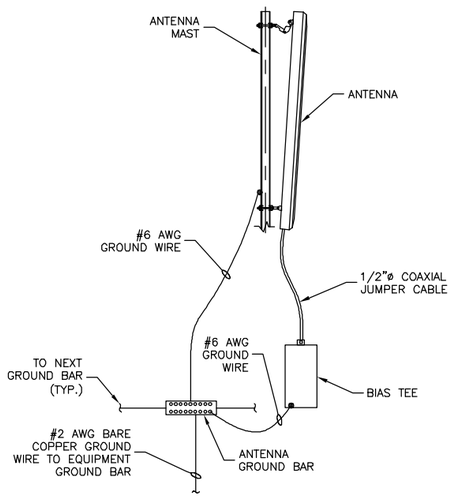
TYPICAL GROUND BAR MECHANICAL CONNECTION DETAIL

SCALE: N.T.S. — 2



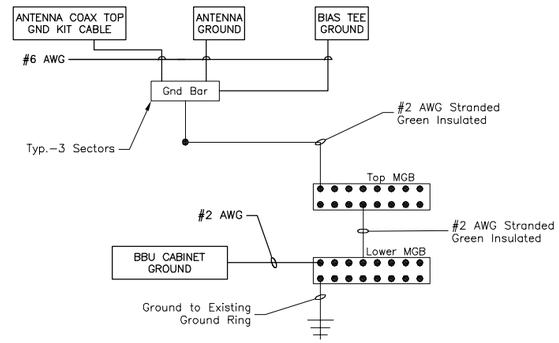
CONNECTION TO EQUIPMENT DETAIL

SCALE: N.T.S. — 3



TYPICAL ANTENNA GROUNDING DETAIL

SCALE: N.T.S — 4



NOTES:

1. BOND ANTENNA GROUNDING KIT CABLE TO TOP CIGBE
2. BOND ANTENNA GROUNDING KIT CABLE TO BOTTOM CIGBE.
3. SCHEMATIC GROUNDING DIAGRAM IS TYPICAL FOR EACH SECTOR.
4. VERIFY EXISTING GROUND SYSTEM IS INSTALLED PER T-MOBILE STANDARDS.

SCHEMATIC GROUNDING DIAGRAM

SCALE: N.T.S. — 5

T-MOBILE NORTHEAST LLC
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE

CROWN CASTLE
3 CORPORATE PARK DRIVE, SUITE 101
CLIFTON PARK, NY 12065

CT11511A
HAMPTON/BERNIER

CONSTRUCTION DRAWINGS

1	05/14/15	REVISED PER COMMENTS
0	03/06/15	ISSUED AS FINAL
A	03/02/15	ISSUED FOR REVIEW

Dewberry
Dewberry Engineers Inc.
600 PARSIPPANY ROAD
SUITE 301
PARSIPPANY, NJ 07054
PHONE: 973.739.9400
FAX: 973.739.9710

JIANG YU, P.E.
CONNECTICUT LICENSE NO. 0023222

DRAWN BY:	JC
REVIEWED BY:	BSH
CHECKED BY:	GHN
PROJECT NUMBER:	50066258
JOB NUMBER:	50072408
SITE ADDRESS:	

116 GRANT HILL ROAD
BROOKLYN, CT 06234
WINDHAM COUNTY

SHEET TITLE

GROUNDING NOTES & DETAILS

SHEET NUMBER

E-1

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **February 06, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
614.221.6679

Subject: **Structural Analysis Report**

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11511A
	Carrier Site Name:	CT512/SBA - S Brooklyn
Crown Castle Designation:	**Crown Castle BU Number:**	876390
	Crown Castle Site Name:	HAMPTON / BERNIER
	Crown Castle JDE Job Number:	322232
	Crown Castle Work Order Number:	1004926
	Crown Castle Application Number:	282531 Rev. 1
Engineering Firm Designation:	**Paul J Ford and Company Project Number:**	37515-0481.001.7805
Site Data:	**116 Grant Hill Rd., BROOKLYN, Windham County, CT** **Latitude *41° 47' 30.53"*, Longitude *-72° 0' 53.27"*** **150 Foot - Monopole Tower**	

Dear Holly Haas,

Paul J Ford and Company is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 753343, in accordance with application 282531, revision 1.

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

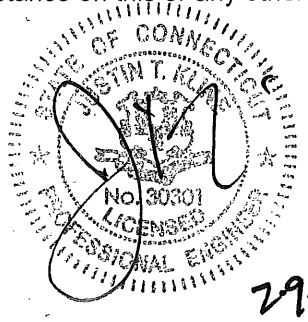
LC5: Existing + Proposed Equipment **Sufficient Capacity**
Note: See Table I and Table II for the proposed and existing loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and the 2005 CT State Building Code with 2009 amendment based upon a wind speed of 85 mph fastest mile.

We at *Paul J Ford and Company* 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.

Respectfully submitted by:

Joshua Frybarger, E.I.T.
Structural Designer



2-9-15

PAUL J. FORD AND COMPANY
STRUCTURAL ENGINEERS
250 East Broad Street • Suite 600 • Columbus, Ohio 43215-3708

Date: **February 06, 2015**

Holly Haas
Crown Castle
3530 Toringdon Way Suite 300
Charlotte, NC 28277

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
614.221.6679

Subject: Structural Analysis Report

Carrier Designation:	***T-Mobile* Co-Locate**	
	Carrier Site Number:	CT11511A
	Carrier Site Name:	CT512/SBA - S Brooklyn
Crown Castle Designation:	**Crown Castle BU Number:**	876390
	Crown Castle Site Name:	HAMPTON / BERNIER
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We at *Paul J Ford and Company* 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.

Respectfully submitted by:

Joshua Frybarger, E.I.T.
Structural Designer

TABLE OF CONTENTS

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
90.0	100.0	1	dbspectra	DS9A09F36D-N	2 1	1 1/4 1/2	1
	90.0	1	bird technologies group	TTA-429-94C-08179			
		1	tower mounts	Side Arm Mount [SO 308-1]			
76.0	77.0	1	lucent	KS24019-L112A	1	1/2	1
	76.0	1	tower mounts	Side Arm Mount [SO 701-1]			

Notes:
1) Existing Equipment

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	CSA, 99900.05, 8/9/99	1615347	CCISITES
4-POST-MODIFICATION INSPECTION	TEP, 072655, 1/23/09	2383064	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	EEI, 6459, 2/22/00	1615410	CCISITES
4-TOWER MANUFACTURER DRAWINGS	EEI, 6459, 2/22/00	1533003	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	TEP, 072655, 5/15/05	2255030	CCISITES

3.1) Analysis Method

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

3.2) Assumptions

1) Tower and structures were built in accordance with the manufacturer's specifications.
2) The tower and structures have been maintained in accordance with the manufacturer's specification.
3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.
5) Monopole was reinforced in conformance with the referenced modification drawings.
6) If the proposed feedlines are installed external to the monopole the tower capacity will be 97.6%.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	150 - 123.29	Pole	TP22.9x17x0.1875	1	-6.26	679.32	44.5	Pass
L2	123.29 - 88.88	Pole	TP30x21.7696x0.3125	2	-12.08	1483.15	82.0	Pass
L3	88.88 - 43.8	Pole	TP39.2x28.4504x0.375	3	-21.17	2329.31	93.7	Pass
L4	43.8 - 0	Pole	TP48x37.2689x0.4375	4	-34.88	3433.55	87.9	Pass
							Summary	
						Pole (L3)	93.7	Pass
						Rating =	93.7	Pass

Table 5 - Tower Component Stresses vs. Capacity

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	77.5	Pass
1	Base Plate	0	64.3	Pass
1	Base Foundation Structural Steel	0	87.0	Pass
1	Base Foundation Soil Interaction	0	74.6	Pass

Structure Rating (max from all components) =	**93.7%**

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

APPENDIX A

TNXTOWER OUTPUT

Tower Input Data

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

1) Tower is located in Windham County, Connecticut.
2) Basic wind speed of 85 mph.
3) Nominal ice thickness of 1.0000 in.
4) Ice thickness is considered to increase with height.
5) Ice density of 56.00 pcf.
6) A wind speed of 38 mph is used in combination with ice.
7) Temperature drop of 50 °F.
8) Deflections calculated using a wind speed of 50 mph.
9) A non-linear (P-delta) analysis was used.
10) Pressures are calculated at each section.
11) Stress ratio used in pole design is 1.333.
12) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	150.00-123.29	26.71	3.42	18	17.0000	22.9000	0.1875	0.7500	A572-65 (65 ksi)
L2	123.29-88.88	37.83	4.25	18	21.7696	30.0000	0.3125	1.2500	A572-65 (65 ksi)
L3	88.88-43.80	49.33	5.42	18	28.4504	39.2000	0.3750	1.5000	A572-65 (65 ksi)
L4	43.80-0.00	49.22		18	37.2689	48.0000	0.4375	1.7500	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	17.2623	10.0055	357.3078	5.9684	8.6360	41.3742	715.0858	5.0037	2.6620	14.197
	23.2533	13.5168	880.9281	8.0629	11.6332	75.7253	1763.0154	6.7597	3.7004	19.735

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
L2	22.8609	21.2827	1237.9542	7.6173	11.0589	111.9416	2477.5374	10.6434	3.2814	10.501
	30.4628	29.4463	3278.8026	10.5391	15.2400	215.1445	6561.9196	14.7259	4.7300	15.136
L3	29.8297	33.4167	3327.7547	9.9668	14.4528	230.2502	6659.8882	16.7115	4.3473	11.593
	39.8047	46.2115	8800.5544	13.7829	19.9136	441.9369	17612.6889	23.1101	6.2392	16.638
L4	39.0438	51.1450	8765.5168	13.0752	18.9326	462.9852	17542.5674	25.5774	5.7893	13.233
	48.7405	66.0465	18876.2818	16.8847	24.3840	774.1257	37777.4015	33.0295	7.6780	17.55

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")	C	No	Inside Pole	149.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
AVA7-50(1-5/8)	C	No	Inside Pole	137.00 - 0.00	6	No Ice	0.00	0.70
						1/2" Ice	0.00	0.70
						1" Ice	0.00	0.70
						2" Ice	0.00	0.70
						4" Ice	0.00	0.70
LDF7-50A(1-5/8")	C	No	Inside Pole	137.00 - 0.00	6	No Ice	0.00	0.82
						1/2" Ice	0.00	0.82
						1" Ice	0.00	0.82
						2" Ice	0.00	0.82
						4" Ice	0.00	0.82
***								
2" Diameter Schedule 80 Pipe	C	No	Inside Pole	127.00 - 0.00	1	No Ice	0.00	5.02
						1/2" Ice	0.00	5.02
						1" Ice	0.00	5.02
						2" Ice	0.00	5.02
						4" Ice	0.00	5.02
LDF6-50A(1-1/4")	C	No	Inside Pole	127.00 - 0.00	12	No Ice	0.00	0.66
						1/2" Ice	0.00	0.66
						1" Ice	0.00	0.66
						2" Ice	0.00	0.66
						4" Ice	0.00	0.66
FB-L98B-002-75000(3/8")	C	No	Inside Pole	127.00 - 0.00	3	No Ice	0.00	0.06
						1/2" Ice	0.00	0.06
						1" Ice	0.00	0.06
						2" Ice	0.00	0.06
						4" Ice	0.00	0.06
***								
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	117.00 - 0.00	2	No Ice	0.20	0.82
						1/2" Ice	0.30	2.33
						1" Ice	0.40	4.46
						2" Ice	0.60	10.54
						4" Ice	1.00	30.04
LDF7-50A(1-5/8")	C	No	CaAa (Out Of Face)	117.00 - 0.00	16	No Ice	0.00	0.82
						1/2" Ice	0.00	2.33
						1" Ice	0.00	4.46
						2" Ice	0.00	10.54
						4" Ice	0.00	30.04
***								
LDF6-50A(1-1/4")	C	No	CaAa (Out Of Face)	90.00 - 0.00	2	No Ice	0.00	0.66
						1/2" Ice	0.00	1.91
						1" Ice	0.00	3.78
						2" Ice	0.00	9.33
						4" Ice	0.00	27.78
LDF4-50A(1/2")	C	No	CaAa (Out Of Face)	90.00 - 0.00	1	No Ice	0.00	0.15
						1/2" Ice	0.00	0.84
						1" Ice	0.00	2.14
						2" Ice	0.00	6.58
						4" Ice	0.00	22.78
***								
LDF4-50A(1/2")	C	No	Inside Pole	76.00 - 0.00	1	No Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
						1/2" Ice	0.00	0.15
						1" Ice	0.00	0.15
						2" Ice	0.00	0.15
						4" Ice	0.00	0.15

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.29	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.30
L2	123.29-88.88	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	11.136	1.35
L3	88.88-43.80	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	17.852	1.96
L4	43.80-0.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	17.345	1.91

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-123.29	A	1.185	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.30
L2	123.29-88.88	A	1.150	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	24.467	3.78
L3	88.88-43.80	A	1.086	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	38.582	6.13
L4	43.80-0.00	A	1.000	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	36.378	5.61

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	150.00-123.29	0.0000	0.0000	0.0000	0.0000
L2	123.29-88.88	-0.3758	0.2169	-0.6697	0.3866
L3	88.88-43.80	-0.4518	0.2608	-0.8136	0.4697
L4	43.80-0.00	-0.4635	0.2676	-0.8424	0.4863

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
(2) DB980H90E-M w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.000	149.00	No Ice 1/2" Ice 1" Ice	4.04 4.50 4.95	3.62 4.48 5.22	0.03 0.07 0.11

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	B	From Face	4.00	0.00	0.000	149.00	No Ice	4.04	3.62	0.03
			0.00				1/2" Ice	4.50	4.48	0.07
			2.00				1" Ice	4.95	5.22	0.11
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
(2) DB980H90E-M w/ Mount Pipe	C	From Face	4.00	0.00	0.000	149.00	No Ice	4.04	3.62	0.03
			0.00				1/2" Ice	4.50	4.48	0.07
			2.00				1" Ice	4.95	5.22	0.11
							2" Ice	5.87	6.74	0.22
							4" Ice	8.05	10.00	0.55
6' x 2" Mount Pipe	A	From Face	4.00	0.00	0.000	149.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			2.00				1" Ice	2.29	2.29	0.05
							2" Ice	3.06	3.06	0.09
							4" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	B	From Face	4.00	0.00	0.000	149.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			2.00				1" Ice	2.29	2.29	0.05
							2" Ice	3.06	3.06	0.09
							4" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	C	From Face	4.00	0.00	0.000	149.00	No Ice	1.43	1.43	0.02
			0.00				1/2" Ice	1.92	1.92	0.03
			2.00				1" Ice	2.29	2.29	0.05
							2" Ice	3.06	3.06	0.09
							4" Ice	4.70	4.70	0.23
Platform Mount [LP 712-1]	C	None			0.000	149.00	No Ice	24.53	24.53	1.34
							1/2" Ice	29.94	29.94	1.65
							1" Ice	35.35	35.35	1.96
							2" Ice	46.17	46.17	2.58
							4" Ice	67.81	67.81	3.82
8-ft Ladder	C	None			0.000	147.00	No Ice	7.07	7.07	0.04
							1/2" Ice	9.73	9.73	0.07
							1" Ice	11.19	11.19	0.08
							2" Ice	13.98	13.98	0.11
							4" Ice	18.89	18.89	0.15
***										
LNX-6515DS-VTM w/ Mount Pipe	A	From Face	4.00	0.00	0.000	137.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			1.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	B	From Face	4.00	0.00	0.000	137.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			1.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
LNX-6515DS-VTM w/ Mount Pipe	C	From Face	4.00	0.00	0.000	137.00	No Ice	11.68	9.84	0.08
			0.00				1/2" Ice	12.40	11.37	0.17
			1.00				1" Ice	13.14	12.91	0.27
							2" Ice	14.60	15.27	0.51
							4" Ice	17.87	20.14	1.15
ATBT-BOTTOM-24V	A	From Face	4.00	0.00	0.000	137.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00
			1.00				1" Ice	0.23	0.17	0.01
							2" Ice	0.38	0.30	0.01
							4" Ice	0.77	0.67	0.04
ATBT-BOTTOM-24V	B	From Face	4.00	0.00	0.000	137.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00
			1.00				1" Ice	0.23	0.17	0.01
							2" Ice	0.38	0.30	0.01
							4" Ice	0.77	0.67	0.04
ATBT-BOTTOM-24V	C	From Face	4.00	0.00	0.000	137.00	No Ice	0.12	0.08	0.00
			0.00				1/2" Ice	0.17	0.12	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			1" Ice	0.23	0.17	0.01
						2" Ice	0.38	0.30	0.01
						4" Ice	0.77	0.67	0.04
RR90-17-02DP w/ Mount Pipe	A	From Face	4.00	0.000	137.00	No Ice	4.59	3.32	0.03
			0.00			1/2" Ice	5.09	4.09	0.07
			1.00			1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
RR90-17-02DP w/ Mount Pipe	B	From Face	4.00	0.000	137.00	No Ice	4.59	3.32	0.03
			0.00			1/2" Ice	5.09	4.09	0.07
			1.00			1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
RR90-17-02DP w/ Mount Pipe	C	From Face	4.00	0.000	137.00	No Ice	4.59	3.32	0.03
			0.00			1/2" Ice	5.09	4.09	0.07
			1.00			1" Ice	5.58	4.78	0.12
						2" Ice	6.59	6.23	0.22
						4" Ice	8.73	9.31	0.56
KRY 112 71/2	A	From Face	4.00	0.000	137.00	No Ice	0.68	0.51	0.01
			0.00			1/2" Ice	0.80	0.62	0.02
			1.00			1" Ice	0.93	0.74	0.03
						2" Ice	1.22	1.01	0.05
						4" Ice	1.90	1.65	0.11
KRY 112 71/2	B	From Face	4.00	0.000	137.00	No Ice	0.68	0.51	0.01
			0.00			1/2" Ice	0.80	0.62	0.02
			1.00			1" Ice	0.93	0.74	0.03
						2" Ice	1.22	1.01	0.05
						4" Ice	1.90	1.65	0.11
KRY 112 71/2	C	From Face	4.00	0.000	137.00	No Ice	0.68	0.51	0.01
			0.00			1/2" Ice	0.80	0.62	0.02
			1.00			1" Ice	0.93	0.74	0.03
						2" Ice	1.22	1.01	0.05
						4" Ice	1.90	1.65	0.11
6' x 2" Mount Pipe	A	From Face	4.00	0.000	137.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	B	From Face	4.00	0.000	137.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
6' x 2" Mount Pipe	C	From Face	4.00	0.000	137.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
						2" Ice	3.06	3.06	0.09
						4" Ice	4.70	4.70	0.23
Platform Mount [LP 1201-1]	C	None		0.000	137.00	No Ice	23.10	23.10	2.10
						1/2" Ice	26.80	26.80	2.50
						1" Ice	30.50	30.50	2.90
						2" Ice	37.90	37.90	3.70
						4" Ice	52.70	52.70	5.30
***									
TME-RRUS-11	A	From Face	2.00	0.000	129.00	No Ice	3.25	1.37	0.05
			0.00			1/2" Ice	3.49	1.55	0.07
			-2.00			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
TME-RRUS-11	B	From Face	2.00	0.000	129.00	No Ice	3.25	1.37	0.05
			0.00			1/2" Ice	3.49	1.55	0.07
			-2.00			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
TME-RRUS-11	C	From Face	2.00	0.000	129.00	No Ice	3.25	1.37	0.05

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	3.49	1.55	0.07
			-2.00			1" Ice	3.74	1.74	0.09
						2" Ice	4.27	2.14	0.15
						4" Ice	5.43	3.04	0.31
4' x 2" Pipe Mount	A	From Face	2.00	0.000	129.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
						2" Ice	1.81	1.81	0.07
						4" Ice	3.11	3.11	0.17
4' x 2" Pipe Mount	B	From Face	2.00	0.000	129.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
						2" Ice	1.81	1.81	0.07
						4" Ice	3.11	3.11	0.17
4' x 2" Pipe Mount	C	From Face	2.00	0.000	129.00	No Ice	0.79	0.79	0.03
			0.00			1/2" Ice	1.03	1.03	0.04
			0.00			1" Ice	1.28	1.28	0.04
						2" Ice	1.81	1.81	0.07
						4" Ice	3.11	3.11	0.17
T-Arm Mount [TA 702-3]	C	None		0.000	129.00	No Ice	5.64	5.64	0.34
						1/2" Ice	6.55	6.55	0.43
						1" Ice	7.46	7.46	0.52
						2" Ice	9.28	9.28	0.70
						4" Ice	12.92	12.92	1.06
***									
(2) 7770.00 w/ Mount Pipe	A	From Face	4.00	0.000	127.00	No Ice	6.22	4.82	0.09
			0.00			1/2" Ice	6.71	5.51	0.14
			2.00			1" Ice	7.22	6.21	0.21
						2" Ice	8.26	7.67	0.36
						4" Ice	10.48	11.06	0.76
(2) 7770.00 w/ Mount Pipe	B	From Face	4.00	0.000	127.00	No Ice	6.22	4.82	0.09
			0.00			1/2" Ice	6.71	5.51	0.14
			2.00			1" Ice	7.22	6.21	0.21
						2" Ice	8.26	7.67	0.36
						4" Ice	10.48	11.06	0.76
(2) 7770.00 w/ Mount Pipe	C	From Face	4.00	0.000	127.00	No Ice	6.22	4.82	0.09
			0.00			1/2" Ice	6.71	5.51	0.14
			2.00			1" Ice	7.22	6.21	0.21
						2" Ice	8.26	7.67	0.36
						4" Ice	10.48	11.06	0.76
AM-X-CD-17-65-00T-RET w/ Mount Pipe	A	From Face	4.00	0.000	127.00	No Ice	11.55	8.94	0.09
			0.00			1/2" Ice	12.27	10.45	0.18
			2.00			1" Ice	13.00	11.99	0.27
						2" Ice	14.45	14.31	0.50
						4" Ice	17.71	19.14	1.12
AM-X-CD-17-65-00T-RET w/ Mount Pipe	B	From Face	4.00	0.000	127.00	No Ice	11.55	8.94	0.09
			0.00			1/2" Ice	12.27	10.45	0.18
			2.00			1" Ice	13.00	11.99	0.27
						2" Ice	14.45	14.31	0.50
						4" Ice	17.71	19.14	1.12
AM-X-CD-17-65-00T-RET w/ Mount Pipe	C	From Face	4.00	0.000	127.00	No Ice	11.55	8.94	0.09
			0.00			1/2" Ice	12.27	10.45	0.18
			2.00			1" Ice	13.00	11.99	0.27
						2" Ice	14.45	14.31	0.50
						4" Ice	17.71	19.14	1.12
(2) LGP13519	A	From Face	4.00	0.000	127.00	No Ice	0.34	0.21	0.01
			0.00			1/2" Ice	0.42	0.28	0.01
			2.00			1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	0.07
(2) LGP13519	B	From Face	4.00	0.000	127.00	No Ice	0.34	0.21	0.01
			0.00			1/2" Ice	0.42	0.28	0.01
			2.00			1" Ice	0.51	0.36	0.01
						2" Ice	0.73	0.55	0.02
						4" Ice	1.25	1.03	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
(2) LGP13519	C	From Face	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.34 0.42 0.51 0.73 1.25	0.21 0.28 0.36 0.55 1.03	0.01 0.01 0.01 0.02 0.07
(2) LGP 17201	A	From Face	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.52 0.64 0.77 1.06 1.73	0.03 0.04 0.06 0.09 0.19
(2) LGP 17201	B	From Face	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.52 0.64 0.77 1.06 1.73	0.03 0.04 0.06 0.09 0.19
(2) LGP 17201	C	From Face	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.95 2.13 2.33 2.75 3.69	0.52 0.64 0.77 1.06 1.73	0.03 0.04 0.06 0.09 0.19
DC6-48-60-18-8F	B	From Face	4.00 0.00 2.00	0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.47 1.67 1.88 2.33 3.38	1.47 1.67 1.88 2.33 3.38	0.02 0.04 0.06 0.11 0.24
T-Arm Mount [TA 602-3]	C	None		0.000	127.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	11.59 15.44 19.29 26.99 42.39	11.59 15.44 19.29 26.99 42.39	0.77 0.99 1.21 1.64 2.50
***									
(2) LPA-80080/4CF w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.08 0.13 0.25 0.61
(2) LPA-80080/4CF w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.08 0.13 0.25 0.61
(2) LPA-80080/4CF w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	2.86 3.22 3.59 4.45 6.32	7.23 7.92 8.63 10.11 13.34	0.03 0.08 0.13 0.25 0.61
BXA-70063-6CF-2 w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-2 w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-70063-6CF-2 w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.97 8.61 9.22 10.46 13.07	5.80 6.95 7.82 9.60 13.37	0.04 0.10 0.17 0.34 0.80
BXA-171085-12CF-EDIN-2 w/ Mount Pipe	A	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.03 5.58 6.10 7.17	5.29 6.46 7.35 9.15	0.04 0.09 0.14 0.27

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						4" Ice	9.44	12.95	0.68
BXA-171085-12CF-EDIN-2 w/ Mount Pipe	B	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.03 5.58 6.10 7.17 9.44	5.29 6.46 7.35 9.15 12.95	0.04 0.09 0.14 0.27 0.68
BXA-171085-12CF-EDIN-2 w/ Mount Pipe	C	From Face	4.00 0.00 2.00	0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.03 5.58 6.10 7.17 9.44	5.29 6.46 7.35 9.15 12.95	0.04 0.09 0.14 0.27 0.68
Platform Mount [LP 304-1]	C	None		0.000	117.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	17.46 22.44 27.42 37.38 57.30	17.46 22.44 27.42 37.38 57.30	1.35 1.62 1.90 2.45 3.55
***									
DS9A09F36D-N	A	From Leg	6.00 0.00 10.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	5.76 7.71 9.68 13.67 20.51	5.76 7.71 9.68 13.67 20.51	0.05 0.09 0.14 0.29 0.73
TTA-429-94C-08179	A	From Face	3.00 0.00 0.00	0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.17 1.34 1.52 1.91 2.79	1.17 1.34 1.52 1.91 2.79	0.01 0.02 0.04 0.07 0.17
Side Arm Mount [SO 308-1]	A	None		0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.98 1.70 2.42 3.86 6.74	3.03 5.22 7.41 11.79 20.55	0.05 0.08 0.10 0.16 0.26
3'4"x4" Pipe Mount	A	None		0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.05 1.27 1.52 2.08 3.33	1.05 1.27 1.52 2.08 3.33	0.04 0.05 0.06 0.10 0.21
8' x 2" Sch 40 Pipe Mount	A	None		0.000	90.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.90 2.73 3.40 4.40 6.50	1.90 2.73 3.40 4.40 6.50	0.03 0.04 0.06 0.12 0.30
***									
KS24019-L112A	C	From Face	4.00 0.00 1.00	0.000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.16 0.22 0.30 0.48 0.95	0.16 0.22 0.30 0.48 0.95	0.01 0.01 0.01 0.02 0.06
Side Arm Mount [SO 701-1]	C	From Face	2.00 0.00 0.00	0.000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.85 1.14 1.43 2.01 3.17	1.67 2.34 3.01 4.35 7.03	0.07 0.08 0.09 0.12 0.18

Tower Pressures - No Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft^2	Face	A_F ft^2	A_R ft^2	A_{leg} ft^2	Leg %	C_AA_A In Face ft^2	C_AA_A Out Face ft^2
L1 150.00-123.29	135.99	1.499	27.72	44.405	A	0.000	44.405	44.405	100.00	0.000	0.000
					B	0.000	44.405		100.00	0.000	0.000
					C	0.000	44.405		100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L2 123.29-88.88	105.47	1.394	25.75	75.291	A	0.000	75.291	75.291	100.00	0.000	0.000
					B	0.000	75.291		100.00	0.000	0.000
					C	0.000	75.291		100.00	0.000	11.136
L3 88.88-43.80	65.82	1.218	22.41	128.809	A	0.000	128.809	128.809	100.00	0.000	0.000
					B	0.000	128.809		100.00	0.000	0.000
					C	0.000	128.809		100.00	0.000	17.852
L4 43.80-0.00	21.09	1	18.50	157.772	A	0.000	157.772	157.772	100.00	0.000	0.000
					B	0.000	157.772		100.00	0.000	0.000
					C	0.000	157.772		100.00	0.000	17.345

Tower Pressure - With Ice

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150.00-123.29	135.99	1.499	5.42	1.1852	49.682	A	0.000	49.682	49.682	100.00	0.000	0.000
						B	0.000	49.682		100.00	0.000	0.000
						C	0.000	49.682		100.00	0.000	0.000
L2 123.29-88.88	105.47	1.394	5.04	1.1496	82.089	A	0.000	82.089	82.089	100.00	0.000	0.000
						B	0.000	82.089		100.00	0.000	0.000
						C	0.000	82.089		100.00	0.000	24.467
L3 88.88-43.80	65.82	1.218	4.38	1.0864	137.447	A	0.000	137.447	137.447	100.00	0.000	0.000
						B	0.000	137.447		100.00	0.000	0.000
						C	0.000	137.447		100.00	0.000	38.582
L4 43.80-0.00	21.09	1	3.62	1.0000	165.703	A	0.000	165.703	165.703	100.00	0.000	0.000
						B	0.000	165.703		100.00	0.000	0.000
						C	0.000	165.703		100.00	0.000	36.378

Tower Pressure - Service

G_H = 1.690

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1 150.00-123.29	135.99	1.499	9.59	44.405	A	0.000	44.405	44.405	100.00	0.000	0.000
					B	0.000	44.405		100.00	0.000	0.000
					C	0.000	44.405		100.00	0.000	0.000
L2 123.29-88.88	105.47	1.394	8.91	75.291	A	0.000	75.291	75.291	100.00	0.000	0.000
					B	0.000	75.291		100.00	0.000	0.000
					C	0.000	75.291		100.00	0.000	11.136
L3 88.88-43.80	65.82	1.218	7.75	128.809	A	0.000	128.809	128.809	100.00	0.000	0.000
					B	0.000	128.809		100.00	0.000	0.000
					C	0.000	128.809		100.00	0.000	17.852
L4 43.80-0.00	21.09	1	6.40	157.772	A	0.000	157.772	157.772	100.00	0.000	0.000
					B	0.000	157.772		100.00	0.000	0.000
					C	0.000	157.772		100.00	0.000	17.345

Load Combinations

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

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 123.29	Pole	Max Tension	8	0.00	0.00	0.00
			Max. Compression	14	-14.84	-0.21	0.13
			Max. Mx	5	-6.26	-133.11	0.05
			Max. My	2	-6.26	-0.05	133.07
			Max. Vy	11	-12.91	132.94	0.05
			Max. Vx	8	12.91	-0.05	-132.97
			Max. Torque	7			0.33
L2	123.29 - 88.88	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-26.56	2.57	-1.43
			Max. Mx	11	-12.08	709.51	-0.10
			Max. My	8	-12.09	0.32	-709.36
			Max. Vy	11	-19.44	709.51	-0.10
			Max. Vx	8	19.44	0.32	-709.36
			Max. Torque	5			1.68
L3	88.88 - 43.8	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-41.49	8.89	-4.06
			Max. Mx	11	-21.17	1668.66	-0.55
			Max. My	8	-21.17	1.22	-1667.06
			Max. Vy	11	-23.54	1668.66	-0.55
			Max. Vx	8	23.51	1.22	-1667.06
			Max. Torque	5			1.99
L4	43.8 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	14	-61.43	16.73	-8.57
			Max. Mx	11	-34.88	2913.18	-1.26
			Max. My	8	-34.88	2.45	-2909.43
			Max. Vy	11	-26.93	2913.18	-1.26
			Max. Vx	8	26.90	2.45	-2909.43
			Max. Torque	5			1.65

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	23	61.43	6.05	-3.49
	Max. H_x	11	34.91	26.90	0.00
	Max. H_z	2	34.91	0.00	26.87
	Max. M_x	2	2906.95	0.00	26.87
	Max. M_z	5	2908.29	-26.90	0.00
	Max. Torsion	5	1.56	-26.90	0.00
	Min. Vert	1	34.91	0.00	0.00
	Min. H_x	5	34.91	-26.90	0.00
	Min. H_z	8	34.91	0.00	-26.87
	Min. M_x	8	-2909.43	0.00	-26.87
	Min. M_z	11	-2913.18	26.90	0.00
	Min. Torsion	11	-1.56	26.90	0.00

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	34.91	0.00	0.00	1.21	2.37	0.00
Dead+Wind 0 deg - No Ice	34.91	-0.00	-26.87	-2906.95	2.45	-0.26
Dead+Wind 30 deg - No Ice	34.91	13.45	-23.27	-2517.34	-1452.93	-1.01
Dead+Wind 60 deg - No Ice	34.91	23.29	-13.43	-1452.85	-2518.33	-1.48
Dead+Wind 90 deg - No Ice	34.91	26.90	-0.00	1.26	-2908.29	-1.56
Dead+Wind 120 deg - No Ice	34.91	23.29	13.43	1455.36	-2518.32	-1.22
Dead+Wind 150 deg - No Ice	34.91	13.45	23.27	2519.83	-1452.91	-0.55
Dead+Wind 180 deg - No Ice	34.91	-0.00	26.87	2909.43	2.45	0.26
Dead+Wind 210 deg - No Ice	34.91	-13.45	23.27	2519.82	1457.82	1.01
Dead+Wind 240 deg - No Ice	34.91	-23.29	13.43	1455.35	2523.21	1.48
Dead+Wind 270 deg - No Ice	34.91	-26.90	-0.00	1.26	2913.18	1.56
Dead+Wind 300 deg - No Ice	34.91	-23.29	-13.43	-1452.84	2523.23	1.22
Dead+Wind 330 deg - No Ice	34.91	-13.45	-23.27	-2517.33	1457.83	0.55
Dead+Ice+Temp	61.43	-0.00	0.00	8.57	16.73	-0.00
Dead+Wind 0 deg+Ice+Temp	61.43	-0.00	-6.98	-793.74	16.77	-0.14
Dead+Wind 30 deg+Ice+Temp	61.43	3.50	-6.04	-686.25	-384.91	-0.36
Dead+Wind 60 deg+Ice+Temp	61.43	6.05	-3.49	-392.57	-678.96	-0.49
Dead+Wind 90 deg+Ice+Temp	61.43	6.99	0.00	8.60	-786.59	-0.49
Dead+Wind 120 deg+Ice+Temp	61.43	6.05	3.49	409.76	-678.96	-0.36
Dead+Wind 150 deg+Ice+Temp	61.43	3.50	6.04	703.43	-384.91	-0.13
Dead+Wind 180 deg+Ice+Temp	61.43	-0.00	6.98	810.92	16.77	0.13
Dead+Wind 210 deg+Ice+Temp	61.43	-3.50	6.04	703.43	418.45	0.36
Dead+Wind 240 deg+Ice+Temp	61.43	-6.05	3.49	409.76	712.50	0.49
Dead+Wind 270 deg+Ice+Temp	61.43	-6.99	0.00	8.60	820.13	0.49
Dead+Wind 300 deg+Ice+Temp	61.43	-6.05	-3.49	-392.57	712.51	0.36
Dead+Wind 330 deg+Ice+Temp	61.43	-3.50	-6.04	-686.24	418.46	0.13
Dead+Wind 0 deg - Service	34.91	-0.00	-9.30	-1007.00	2.46	-0.09
Dead+Wind 30 deg - Service	34.91	4.65	-8.05	-871.92	-502.11	-0.35
Dead+Wind 60 deg - Service	34.91	8.06	-4.65	-502.88	-871.47	-0.52
Dead+Wind 90 deg - Service	34.91	9.31	-0.00	1.25	-1006.67	-0.55
Dead+Wind 120 deg - Service	34.91	8.06	4.65	505.37	-871.47	-0.43
Dead+Wind 150 deg - Service	34.91	4.65	8.05	874.42	-502.11	-0.19
Dead+Wind 180 deg - Service	34.91	-0.00	9.30	1009.49	2.46	0.09
Dead+Wind 210 deg - Service	34.91	-4.65	8.05	874.42	507.02	0.35
Dead+Wind 240 deg - Service	34.91	-8.06	4.65	505.37	876.39	0.52
Dead+Wind 270 deg - Service	34.91	-9.31	-0.00	1.25	1011.58	0.55
Dead+Wind 300 deg - Service	34.91	-8.06	-4.65	-502.88	876.39	0.43
Dead+Wind 330 deg - Service	34.91	-4.65	-8.05	-871.92	507.02	0.19

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.00	-34.91	0.00	0.00	34.91	0.00	0.000%
2	0.00	-34.91	-26.87	0.00	34.91	26.87	0.000%
3	13.45	-34.91	-23.27	-13.45	34.91	23.27	0.000%
4	23.29	-34.91	-13.43	-23.29	34.91	13.43	0.000%
5	26.90	-34.91	0.00	-26.90	34.91	0.00	0.000%
6	23.29	-34.91	13.43	-23.29	34.91	-13.43	0.000%
7	13.45	-34.91	23.27	-13.45	34.91	-23.27	0.000%
8	0.00	-34.91	26.87	0.00	34.91	-26.87	0.000%
9	-13.45	-34.91	23.27	13.45	34.91	-23.27	0.000%
10	-23.29	-34.91	13.43	23.29	34.91	-13.43	0.000%
11	-26.90	-34.91	0.00	26.90	34.91	0.00	0.000%
12	-23.29	-34.91	-13.43	23.29	34.91	13.43	0.000%
13	-13.45	-34.91	-23.27	13.45	34.91	23.27	0.000%
14	0.00	-61.43	0.00	0.00	61.43	-0.00	0.000%
15	0.00	-61.43	-6.98	0.00	61.43	6.98	0.000%
16	3.50	-61.43	-6.04	-3.50	61.43	6.04	0.000%
17	6.05	-61.43	-3.49	-6.05	61.43	3.49	0.000%
18	6.99	-61.43	0.00	-6.99	61.43	-0.00	0.000%
19	6.05	-61.43	3.49	-6.05	61.43	-3.49	0.000%
20	3.50	-61.43	6.04	-3.50	61.43	-6.04	0.000%
21	0.00	-61.43	6.98	0.00	61.43	-6.98	0.000%
22	-3.50	-61.43	6.04	3.50	61.43	-6.04	0.000%
23	-6.05	-61.43	3.49	6.05	61.43	-3.49	0.000%
24	-6.99	-61.43	0.00	6.99	61.43	-0.00	0.000%
25	-6.05	-61.43	-3.49	6.05	61.43	3.49	0.000%
26	-3.50	-61.43	-6.04	3.50	61.43	6.04	0.000%
27	0.00	-34.91	-9.30	0.00	34.91	9.30	0.000%
28	4.65	-34.91	-8.05	-4.65	34.91	8.05	0.000%
29	8.06	-34.91	-4.65	-8.06	34.91	4.65	0.000%
30	9.31	-34.91	0.00	-9.31	34.91	0.00	0.000%
31	8.06	-34.91	4.65	-8.06	34.91	-4.65	0.000%
32	4.65	-34.91	8.05	-4.65	34.91	-8.05	0.000%
33	0.00	-34.91	9.30	0.00	34.91	-9.30	0.000%
34	-4.65	-34.91	8.05	4.65	34.91	-8.05	0.000%
35	-8.06	-34.91	4.65	8.06	34.91	-4.65	0.000%
36	-9.31	-34.91	0.00	9.31	34.91	0.00	0.000%
37	-8.06	-34.91	-4.65	8.06	34.91	4.65	0.000%
38	-4.65	-34.91	-8.05	4.65	34.91	8.05	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	0.00059467
3	Yes	6	0.00000001	0.00009868
4	Yes	6	0.00000001	0.00010145
5	Yes	5	0.00000001	0.00006887
6	Yes	6	0.00000001	0.00009779
7	Yes	6	0.00000001	0.00010093
8	Yes	4	0.00000001	0.00059519
9	Yes	6	0.00000001	0.00010084
10	Yes	6	0.00000001	0.00009808
11	Yes	5	0.00000001	0.00006891
12	Yes	6	0.00000001	0.00010177
13	Yes	6	0.00000001	0.00009862
14	Yes	4	0.00000001	0.00006913
15	Yes	5	0.00000001	0.00037683
16	Yes	5	0.00000001	0.00065525
17	Yes	5	0.00000001	0.00067185
18	Yes	5	0.00000001	0.00037422
19	Yes	5	0.00000001	0.00067286
20	Yes	5	0.00000001	0.00067830
21	Yes	5	0.00000001	0.00038282

22	Yes	5	0.00000001	0.00071817
23	Yes	5	0.00000001	0.00070197
24	Yes	5	0.00000001	0.00038741
25	Yes	5	0.00000001	0.00070187
26	Yes	5	0.00000001	0.00069467
27	Yes	4	0.00000001	0.00014109
28	Yes	5	0.00000001	0.00017890
29	Yes	5	0.00000001	0.00018844
30	Yes	4	0.00000001	0.00029670
31	Yes	5	0.00000001	0.00017660
32	Yes	5	0.00000001	0.00018673
33	Yes	4	0.00000001	0.00014148
34	Yes	5	0.00000001	0.00018738
35	Yes	5	0.00000001	0.00017830
36	Yes	4	0.00000001	0.00029801
37	Yes	5	0.00000001	0.00019034
38	Yes	5	0.00000001	0.00017970

Maximum Tower Deflections - Service Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	150 - 123.29	41.81	36	2.476	0.003
L2	126.71 - 88.88	30.02	36	2.300	0.003
L3	93.13 - 43.8	15.69	36	1.688	0.002
L4	49.22 - 0	4.14	35	0.790	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
149.00	(2) DB980H90E-M w/ Mount Pipe	36	41.30	2.471	0.003	19223
147.00	8-ft Ladder	36	40.26	2.460	0.003	19223
137.00	LNX-6515DS-VTM w/ Mount Pipe	36	35.13	2.398	0.003	7393
129.00	TME-RRUS-11	36	31.13	2.326	0.003	4595
127.00	(2) 7770.00 w/ Mount Pipe	36	30.16	2.304	0.003	4262
117.00	(2) LPA-80080/4CF w/ Mount Pipe	36	25.46	2.161	0.003	3606
90.00	DS9A09F36D-N	36	14.58	1.621	0.002	2733
76.00	KS24019-L112A	35	10.14	1.323	0.002	2662

Maximum Tower Deflections - Design Wind

Section No.	Elevation	Horz. Deflection	Gov. Load Comb.	Tilt	Twist
	ft	in		°	°
L1	150 - 123.29	120.12	11	7.120	0.008
L2	126.71 - 88.88	86.27	11	6.615	0.008
L3	93.13 - 43.8	45.12	11	4.856	0.007
L4	49.22 - 0	11.92	11	2.274	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
149.00	(2) DB980H90E-M w/ Mount Pipe	11	118.63	7.105	0.008	6873
147.00	8-ft Ladder	11	115.66	7.073	0.008	6873
137.00	LNX-6515DS-VTM w/ Mount Pipe	11	100.94	6.895	0.008	2642
129.00	TME-RRUS-11	11	89.47	6.690	0.008	1640

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
127.00	(2) 7770.00 w/ Mount Pipe	11	86.68	6.625	0.008	1520
117.00	(2) LPA-80080/4CF w/ Mount Pipe	11	73.20	6.214	0.008	1281
90.00	DS9A09F36D-N	11	41.93	4.663	0.007	963
76.00	KS24019-L112A	11	29.18	3.807	0.005	934

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	F_a ksi	A in^2	Actual P K	Allow. P_a K	Ratio $\frac{P}{P_a}$
L1	150 - 123.29 (1)	TP22.9x17x0.1875	26.71	0.00	0.0	39.00	13.0672	-6.26	509.62	0.012
L2	123.29 - 88.88 (2)	TP30x21.7696x0.3125	37.83	0.00	0.0	39.00	28.5292	-12.08	1112.64	0.011
L3	88.88 - 43.8 (3)	TP39.2x28.4504x0.375	49.33	0.00	0.0	39.00	44.8057	-21.17	1747.42	0.012
L4	43.8 - 0 (4)	TP48x37.2689x0.4375	49.22	0.00	0.0	39.00	66.0465	-34.88	2575.81	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M_x kip-ft	Actual f_{bx} ksi	Allow. F_{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M_y kip-ft	Actual f_{by} ksi	Allow. F_{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	150 - 123.29 (1)	TP22.9x17x0.1875	133.12	22.58	39.00	0.579	0.00	0.00	39.00	0.000
L2	123.29 - 88.88 (2)	TP30x21.7696x0.3125	709.55	42.18	39.00	1.081	0.00	0.00	39.00	0.000
L3	88.88 - 43.8 (3)	TP39.2x28.4504x0.375	1668.66	48.21	39.00	1.236	0.00	0.00	39.00	0.000
L4	43.8 - 0 (4)	TP48x37.2689x0.4375	2913.18	45.16	39.00	1.158	0.00	0.00	39.00	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f_v ksi	Allow. F_v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f_{vt} ksi	Allow. F_{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	150 - 123.29 (1)	TP22.9x17x0.1875	12.91	0.99	26.00	0.076	0.00	0.00	26.00	0.000
L2	123.29 - 88.88 (2)	TP30x21.7696x0.3125	19.44	0.68	26.00	0.052	0.00	0.00	26.00	0.000
L3	88.88 - 43.8 (3)	TP39.2x28.4504x0.375	23.54	0.53	26.00	0.040	1.66	0.02	26.00	0.001
L4	43.8 - 0 (4)	TP48x37.2689x0.4375	26.93	0.41	26.00	0.031	1.56	0.01	26.00	0.000

Pole Interaction Design Data

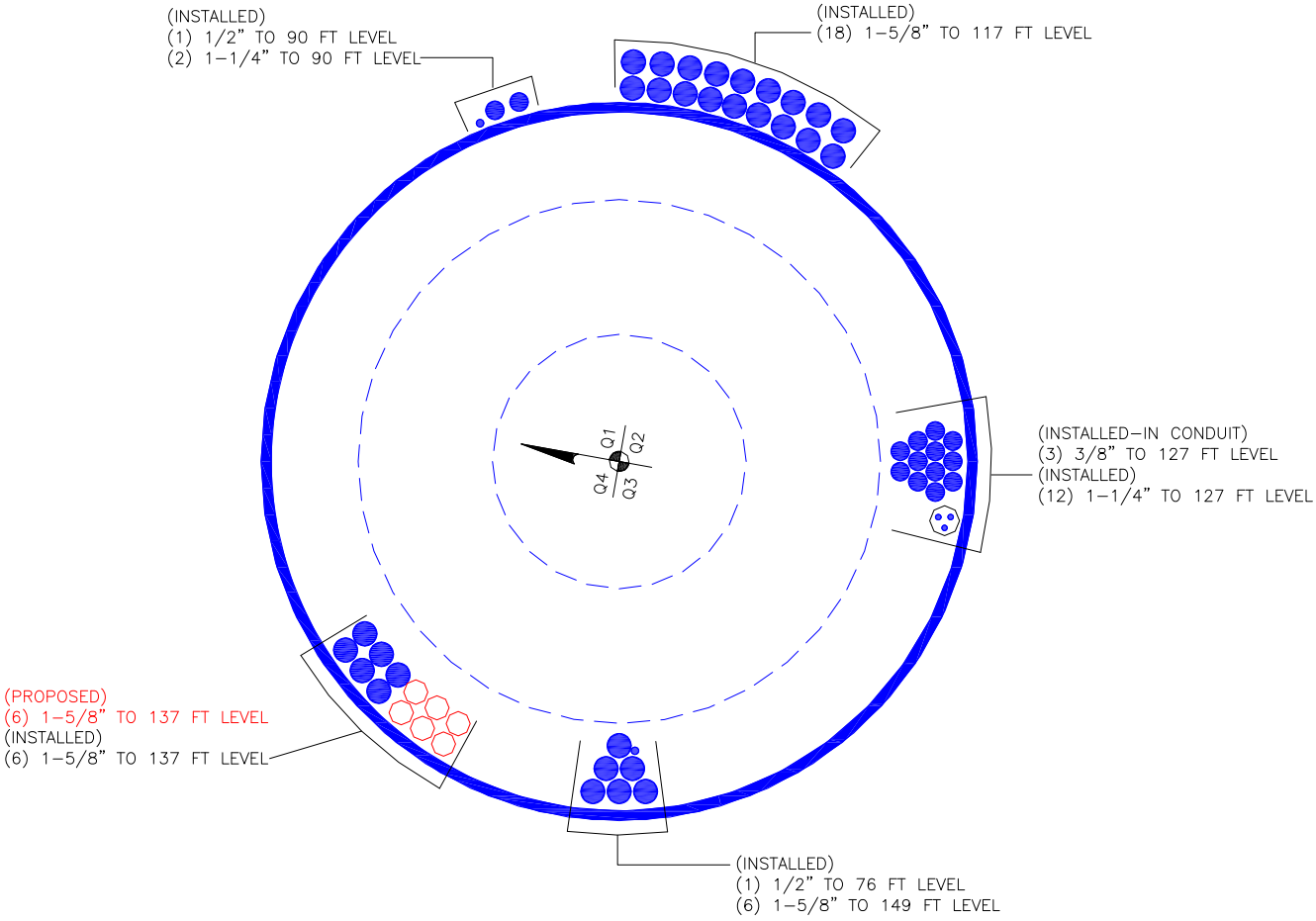
Section No.	Elevation ft	Ratio $\frac{P}{P_a}$	Ratio $\frac{f_{bx}}{F_{bx}}$	Ratio $\frac{f_{by}}{F_{by}}$	Ratio $\frac{f_v}{F_v}$	Ratio $\frac{f_{vt}}{F_{vt}}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 123.29 (1)	0.012	0.579	0.000	0.076	0.000	0.593 ✔	1.333	H1-3+VT ✔
L2	123.29 - 88.88 (2)	0.011	1.081	0.000	0.052	0.000	1.093 ✔	1.333	H1-3+VT ✔
L3	88.88 - 43.8 (3)	0.012	1.236	0.000	0.040	0.001	1.249 ✔	1.333	H1-3+VT ✔
L4	43.8 - 0 (4)	0.014	1.158	0.000	0.031	0.000	1.172 ✔	1.333	H1-3+VT ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$SF*P_{allow}$ K	% Capacity	Pass Fail
L1	150 - 123.29	Pole	TP22.9x17x0.1875	1	-6.26	679.32	44.5	Pass
L2	123.29 - 88.88	Pole	TP30x21.7696x0.3125	2	-12.08	1483.15	82.0	Pass
L3	88.88 - 43.8	Pole	TP39.2x28.4504x0.375	3	-21.17	2329.31	93.7	Pass
L4	43.8 - 0	Pole	TP48x37.2689x0.4375	4	-34.88	3433.55	87.9	Pass
							Summary	
						Pole (L3)	93.7	Pass
						RATING =	**93.7**	**Pass**

APPENDIX B

BASE LEVEL DRAWING

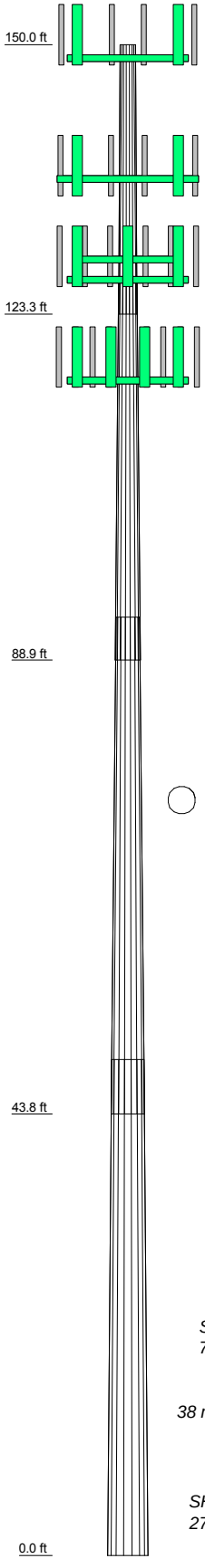


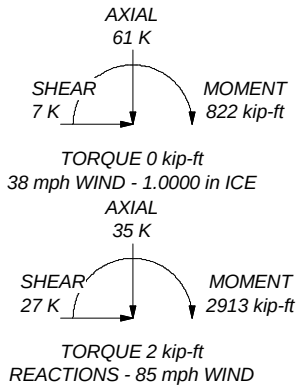
APPENDIX C

ADDITIONAL CALCULATIONS

Section	1	2	3	4
Length (ft)	26.71	37.83	49.33	49.22
Number of Sides	18	18	18	18
Thickness (in)	0.1875	0.3125	0.3750	0.4375
Socket Length (ft)	3.42	4.25	5.42	
Top Dia (in)	17.0000	21.7696	28.4504	37.2689
Bot Dia (in)	22.9000	30.0000	39.2000	48.0000
Grade	A572-65			
Weight (K)	1.1	3.3	6.7	9.8

20.8





DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
(2) DB980H90E-M w/ Mount Pipe	149	AM-X-CD-17-65-00T-RET w/ Mount Pipe	127
(2) DB980H90E-M w/ Mount Pipe	149	AM-X-CD-17-65-00T-RET w/ Mount Pipe	127
(2) DB980H90E-M w/ Mount Pipe	149	AM-X-CD-17-65-00T-RET w/ Mount Pipe	127
6' x 2" Mount Pipe	149	(2) LGP13519	127
6' x 2" Mount Pipe	149	(2) LGP13519	127
6' x 2" Mount Pipe	149	(2) LGP13519	127
Platform Mount [LP 712-1]	149	(2) LGP 17201	127
8-ft Ladder	147	(2) LGP 17201	127
LNX-6515DS-VTM w/ Mount Pipe	137	(2) LGP 17201	127
LNX-6515DS-VTM w/ Mount Pipe	137	DC6-48-60-18-8F	127
LNX-6515DS-VTM w/ Mount Pipe	137	T-Arm Mount [TA 602-3]	127
ATBT-BOTTOM-24V	137	(2) LPA-80080/4CF w/ Mount Pipe	117
ATBT-BOTTOM-24V	137	(2) LPA-80080/4CF w/ Mount Pipe	117
ATBT-BOTTOM-24V	137	(2) LPA-80080/4CF w/ Mount Pipe	117
RR90-17-02DP w/ Mount Pipe	137	BXA-70063-6CF-2 w/ Mount Pipe	117
RR90-17-02DP w/ Mount Pipe	137	BXA-70063-6CF-2 w/ Mount Pipe	117
RR90-17-02DP w/ Mount Pipe	137	BXA-70063-6CF-2 w/ Mount Pipe	117
KRY 112 71/2	137	BXA-171085-12CF-EDIN-2 w/ Mount Pipe	117
KRY 112 71/2	137	BXA-171085-12CF-EDIN-2 w/ Mount Pipe	117
KRY 112 71/2	137	BXA-171085-12CF-EDIN-2 w/ Mount Pipe	117
6' x 2" Mount Pipe	137	Platform Mount [LP 304-1]	117
6' x 2" Mount Pipe	137	DS9A09F36D-N	90
6' x 2" Mount Pipe	137	TTA-429-94C-08179	90
Platform Mount [LP 1201-1]	137	Side Arm Mount [SO 308-1]	90
TME-RRUS-11	129	3'4"x4" Pipe Mount	90
TME-RRUS-11	129	8' x 2" Sch 40 Pipe Mount	90
TME-RRUS-11	129	KS24019-L112A	76
4' x 2" Pipe Mount	129	Side Arm Mount [SO 701-1]	76
4' x 2" Pipe Mount	129		
4' x 2" Pipe Mount	129		
T-Arm Mount [TA 702-3]	129		
(2) 7770.00 w/ Mount Pipe	127		
(2) 7770.00 w/ Mount Pipe	127		
(2) 7770.00 w/ Mount Pipe	127		

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Windham County, Connecticut.
2. Tower designed for a 85 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 93.7%

Paul J Ford and Company
250 E. Broad Street Suite 600
Columbus, OH 43215
Phone: 614.221.6679
FAX: 614.448.4105

Job: ***150' MP;Brooklyn, CT; Hampton/Bernier***			
Project: ***PJF 37515-0481 (BU 876390)***			
Client: Crown Castle	Drawn by: Joshua Frybarger	App'd:	
Code: TIA/EIA-222-F	Date: 02/09/15	Scale: NTS	
Path: G:\TOWER\375_Crown_Castle\2015\37515-0481_876390_HAMPTON-BERNIER\37515-0481.001.7805_SA_100492\37515-0481.001.7805.eri		Dwg No. E-1	

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

TIA Rev F

Site Data	
BU#:	
Site Name:	
App #:	
Pole Manufacturer:	*Other*

Reactions		
Moment:	2913	ft-kips
Axial:	35	kips
Shear:	27	kips

Anchor Rod Data		
Qty:	16	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	57	in

Plate Data		
Diam:	63	in
Thick:	2	in
Grade:	60	ksi
Single-Rod B-eff:	9.52	in

Stiffener Data (Welding at both sides)		
Config:	1	*
Weld Type:	Groove	
Groove Depth:	0.375	in **
Groove Angle:	45	degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:	0.375	in
Width:	7	in
Height:	18	in
Thick:	0.75	in
Notch:	0.75	in
Grade:	50	ksi
Weld str.:	70	ksi

Pole Data		
Diam:	48	in
Thick:	0.4375	in
Grade:	65	ksi
# of Sides:	18	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor		
ASIF:	1.333	

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

Anchor Rod Results

		Stiffened
Maximum Rod Tension:	151.1 Kips	Service, ASD
Allowable Tension:	195.0 Kips	Fty*ASIF
Anchor Rod Stress Ratio:	77.5% **Pass**	

Base Plate Results

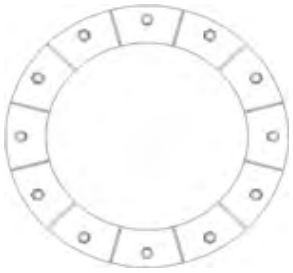
	Flexural Check	Stiffened
Base Plate Stress:	40.3 ksi	Service, ASD
Allowable Plate Stress:	60.0 ksi	0.75*Fy*ASIF
Base Plate Stress Ratio:	67.2% **Pass**	Y.L. Length: N/A, Roark

Stiffener Results

Horizontal Weld :	56.8% **Pass**
Vertical Weld:	44.1% **Pass**
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	19.2% **Pass**
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	57.4% **Pass**
Plate Comp. (AISC Bracket):	64.3% **Pass**

Pole Results

Pole Punching Shear Check:	11.4% **Pass**



* 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

Foundation Loads:

Pole weight or tower leg compression =	35	(kips)
Horizontal load at top of pier =	27	(kips)
Overturning moment at top of pier=	2913	(ft-kips)

Design criteria:

Safety factor against overturning =	1.5	

Soil Properties:

Soil density =	125	(pcf)
Allowable soil bearing =	8	(ksf)
Depth to water table =	13	(ft)

Dimensions:

Pier shape (round or square)	S	("R" or "S")
Pier width =	6.5	(ft)
Pier height above grade =	1	(ft)
depth to bottom of footing =	5	(ft)
Footing thickness =	3	(ft)
Footing width =	25.25	(ft)
Footing length =	25.25	(ft)

Concrete:

Concrete strength =	4	(ksi)
Rebar strength =	60	(ksi)
ultimate load factor =	1.3	

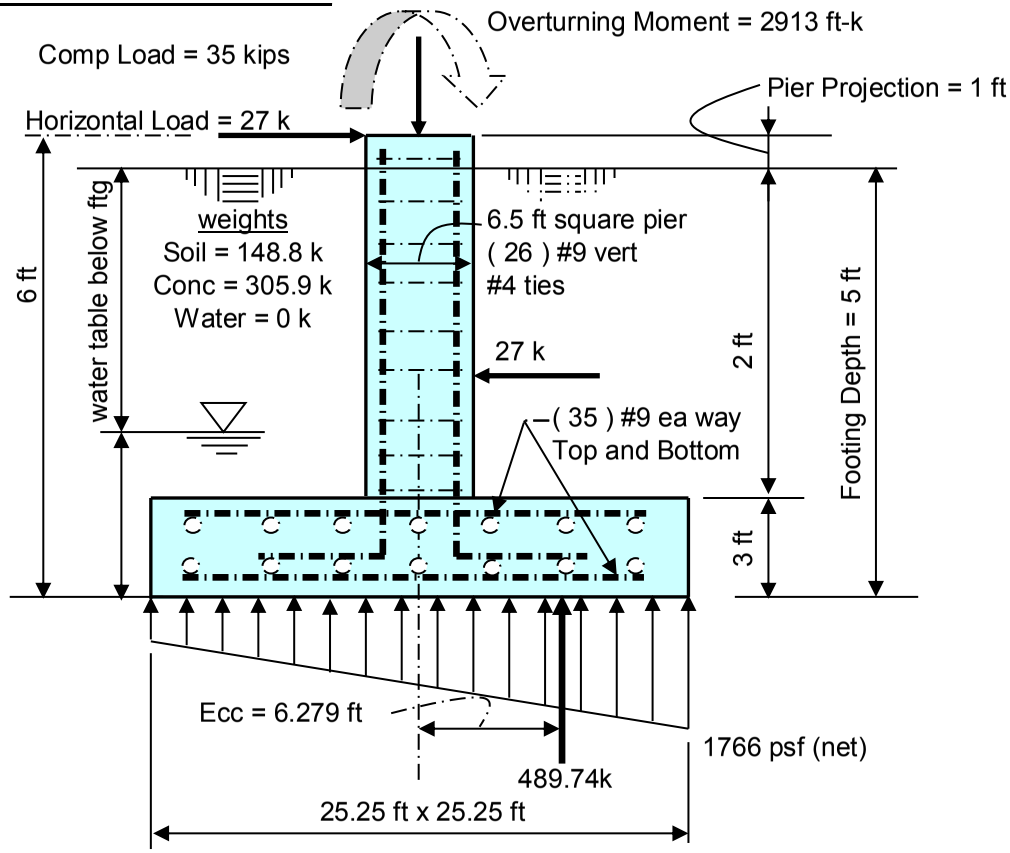
Reinforcing Steel:

	Pad	
minimum cover over rebar =	3	inches
size of pad rebar =	#9	bar
quantity of pad rebar =	35	(ea direction)

Reinforcing Steel:

	Pier	
size of vert rebar in pier=	#9	bar
vertical rebar quantity =	26	
size of pier ties =	#4	bar
minimum cover over rebar =	3	inches

Total volume of concrete = 75.5 cu yd



Summary of analysis results	
Maximum Net Soil Bearing = 1.766 ksf Allowable Net Soil Bearing = 8 ksf **Soil Bearing Stress Ratio = 0.22 Okay**	Ult Bending Shear Capacity = 126 psi Ult Bending Shear Stress = 30 psi **Bending Shear Stress Ratio = 0.24 Okay**
Ftg Overturning Resistance = 6183 ft-kips Overturning Moment = 3075 ft-kips Required Overturning Safety Factor = 1.5 Overturning Safety Factor = 2.011 **Ratio = 0.75 Okay**	Pad Bending Moment Capacity= 4771 ft-k Pad Bending Moment = 1447 ft-k **Bending Moment Stress Ratio = 0.3 OK**

General Information:
==========
File Name: g:\tower\375_crown_castle\2015\37515-0481_876390_hampton-berni...\37515-0481.001.7805.col
Project: 37515-0481.001.7805
Column: Engineer: JJF
Code: ACI 318-05 Units: English

Run Option: Investigation Slenderness: Not considered
Run Axis: X-axis Column Type: Structural

Material Properties:
==========
f'c = 4 ksi fy = 60 ksi
Ec = 3605 ksi Es = 29000 ksi
Ultimate strain = 0.003 in/in
Beta1 = 0.85

Section:
========
Rectangular: Width = 78 in Depth = 78 in

Gross section area, Ag = 6084 in^2
Ix = 3.08459e+006 in^4 Iy = 3.08459e+006 in^4
rx = 22.5167 in ry = 22.5167 in
Xo = 0 in Yo = 0 in

Reinforcement:
==========
Bar Set: ASTM A615

Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)	Size	Diam (in)	Area (in^2)
# 3	0.38	0.11	# 4	0.50	0.20	# 5	0.63	0.31
# 6	0.75	0.44	# 7	0.88	0.60	# 8	1.00	0.79
# 9	1.13	1.00	# 10	1.27	1.27	# 11	1.41	1.56
# 14	1.69	2.25	# 18	2.26	4.00			

Confinement: Tied; #4 ties with #10 bars, #4 with larger bars.
phi(a) = 0.8, phi(b) = 0.9, phi(c) = 0.65

Layout: Circular
Pattern: All Sides Equal (Cover to transverse reinforcement)
Total steel area: As = 27.00 in^2 at rho = 0.44% (Note: rho < 0.50%)
Minimum clear spacing = 6.98 in

27 #9 Cover = 3 in

Factored Loads and Moments with Corresponding Capacities:
==========

No.	Pu kip	Mux k-ft	PhiMnx k-ft	PhiMn/Mu	NA depth in	Dt depth in	eps_t	Phi
1	35.00	3892.20	4472.47	1.149	6.06	73.70	0.03360	0.900

*** End of output ***