



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

June 24, 2020

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

**RE: Notice of Exempt Modification for AT&T - 806358**  
**1432 Old Waterbury Road, Southbury, CT 06488**  
**Latitude: 41° 29' 36.92" / Longitude: -73° 9' 54.98"**

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 193-foot mount on the existing 226-foot Monopole Tower, located at 1432 Old Waterbury Road, Southbury, CT. The tower and property are owned by Crown Castle. AT&T now intends to add three (3) antennas to their existing configuration. The new antennas will be installed at the 129-ft level of the tower. AT&T is also proposing tower mount modification pursuant to the enclosed Mount Analysis.

The facility was approved by the Connecticut Siting Council in Docket No. 88 on March 3, 1988. The approval was given with conditions which this exempt modification follows.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Jeff Manville, First Selectman for the Town of Southbury, Kathy Castagnetta, Land Use Administrator, and Crown Castle is both the tower and property owner.

1. The proposed modifications will not result in an increase in the height of the existing tower.
2. The proposed modifications will not require the extension of the site boundary.
3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.
5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

Melanie A. Bachman

Page 2

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

Anne Marie Zsamba  
Site Acquisition Specialist  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065  
(201) 236-9224  
AnneMarie.Zsamba@crowncastle.com

Attachments

cc:

The Honorable Jeff Manville, First Selectman (*via email only to selectman@southbury-ct.gov*)  
Southbury Town Hall  
501 Main Street South  
Southbury, CT 06488

Kathy Castagnetta, AICP, Land Use Administrator  
(*via email only to landuseadmin@southbury-ct.gov*)  
Southbury Town Hall  
501 Main Street South  
Southbury, CT 06488

Crown Castle, Tower & Property Owner

**From:** [Zsamba, Anne Marie](mailto:Zsamba, Anne Marie)  
**To:** [landuseadmin@southbury-ct.gov](mailto:landuseadmin@southbury-ct.gov)  
**Subject:** Notice of Exempt Modification - 1432 Old Waterbury Road - AT&T - 806358  
**Date:** Wednesday, June 24, 2020 3:06:00 PM  
**Attachments:** [EM-AT&T-1432 OLD WATERBURY RD SOUTHBURY-806358\\_notice.pdf](#)

---

Dear Ms. Castagnetta:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today June 24, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,  
Anne Marie Zsamba

**ANNE MARIE ZSAMBA**  
Site Acquisition Specialist  
T: (201) 236-9224  
M: (518) 350-3639  
F: (724) 416-6112

**CROWN CASTLE**  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065  
[CrownCastle.com](http://CrownCastle.com)

**From:** [Zsamba, Anne Marie](mailto:Zsamba, Anne Marie)  
**To:** [selectman@southbury-ct.gov](mailto:selectman@southbury-ct.gov)  
**Subject:** Notice of Exempt Modification - 1432 Old Waterbury Road - AT&T - 806358  
**Date:** Wednesday, June 24, 2020 3:06:00 PM  
**Attachments:** [EM-AT&T-1432 OLD WATERBURY RD SOUTHBURY-806358\\_notice.pdf](#)

---

Dear First Selectman Manville:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council, today June 24, 2020.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,  
Anne Marie Zsamba

**ANNE MARIE ZSAMBA**  
Site Acquisition Specialist  
T: (201) 236-9224  
M: (518) 350-3639  
F: (724) 416-6112

**CROWN CASTLE**  
3 Corporate Park Drive, Suite 101  
Clifton Park, NY 12065  
[CrownCastle.com](http://CrownCastle.com)



# Exhibit A

## **Original Facility Approval**

DOCKET NO. 88 - AN APPLICATION OF : CONNECTICUT SITING  
METRO MOBILE CTS OF NEW HAVEN, INC.,  
FOR A CERTIFICATE OF ENVIRONMENTAL :  
COMPATIBILITY AND PUBLIC NEED FOR : COUNCIL  
CELLULAR TELEPHONE ANTENNAS AND  
ASSOCIATED EQUIPMENT IN THE TOWN OF :  
SOUTHBURY, CONNECTICUT : MARCH 3, 1988

D E C I S I O N A N D O R D E R

Pursuant to the forgoing opinion, the Connecticut Siting Council hereby directs that a Certificate of Environmental Compatibility and Public Need as provided by Section 16-50k of the General Statutes of Connecticut (CGS) be issued to Metro Mobile CTS of New Haven, Inc. for the construction, operation, and maintenance of a cellular telephone tower site and associated equipment at the "M/A-Southbury" alternative site on Old Waterbury Road in the Town of Southbury, Connecticut. The "M-Southbury" site on Luther Drive is hereby denied.

The facility shall be constructed, operated, and maintained as specified in the Council's record in this matter, and subject to the following conditions:

1. The monopole tower at the Southbury site shall be no taller than necessary to provide the proposed service, and in no event shall exceed a total height of 243 feet, including antennas and associated equipment, or violate the air space of Oxford Airport as determined by the Federal Aviation Administration (FAA).
2. The facility shall be constructed in accordance with all applicable federal, state, and municipal laws and regulations.
3. Unless necessary to comply with condition number 2, above, no lights shall be installed on this tower.

4. The Certificate Holder shall prepare a development and management (D&M) plan for the Southbury site in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. The D&M plan shall provide for permanent evergreen screening around the outside perimeter of the eight-foot chain link fence which will surround the site. The D&M shall also document the final height of the tower as approved by the FAA.
5. The Certificate Holder or its successor shall notify the Council if and when directional antennas or any equipment other than that listed in this application is added to this facility.
6. The Certificate Holder or its successor shall permit public or private entities to share space on the Southbury tower for due consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
7. If this facility does not provide or permanently ceases to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment in this application shall be dismantled and removed or reapplication for any new use shall be made to the Council before any such new use is made.

8. The Certificate Holder shall comply with any future radio frequency (RF) standards promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facility granted in this Decision and Order shall be brought into compliance with such standards.
9. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the issuance of this Decision and Order, or within three years of the completion of any appeal taken in this Decision and Order.

Pursuant to CGS Section 16-50p, we hereby direct that a copy of this Decision and Order be served on each person listed below. A notice of the issuance shall be published in the Waterbury Republican and Newtown Bee.

By this Decision and Order, the Council disposes of the legal rights, duties, and privileges of each party named or admitted to the proceeding in accordance with Section 16-50j-17 of the Regulations of State Agencies.

The parties or intervenors to this proceeding are:

Metro Mobile CTS of  
New Haven, Inc.  
50 Rockland Road  
South Norwalk, CT 06854

(applicant)

Mr. Howard L. Slater, Esq. (its representative)  
Ms. Jennifer Young Gaudet  
Byrne, Slater, Sandler,  
Shulman & Rouse, P.C.  
330 Main Street  
P.O. Box 3216  
Hartford, CT 06103

Fleishman and Walsh, P.C. (party)  
1725 N Street, N.W.  
Washington, D.C. 20036

SNET Cellular, Inc. (intervenor)  
Peter J. Tyrrell, Esq.  
227 Church Street  
New Haven, CT 06506

Dennis Roberts (intervenor)  
Martha J. Roberts  
306 Luther Drive  
Southbury, CT 06488

Carol A. Herskowitz (intervenor)  
First Selectman  
Town of Southbury  
Town Hall  
501 Main Street South  
Southbury, CT 06488

Duncan M. Graham (party)  
Executive Director  
Council of Governments  
Of The Central Naugatuck Valley  
20 East Main Street  
Waterbury, CT 06702

1033E

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in Docket 88 or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 3rd day of March, 1988.

<u>Council Members</u>	<u>Vote Cast</u>
<u><i>Gloria Dibble Pond</i></u> Gloria Dibble Pond Chairperson	Yes
<u><i>Roland A. Miller</i></u> Commissioner Peter Boucher Designee: Roland Miller	Yes
<u><i>Brian J. Emerick</i></u> Commissioner Leslie Carothers Designee: Brian Emerick	Yes
<u>Owen L. Clark</u>	Absent
<u><i>Fred J. Doocy</i></u> Fred J. Doocy	Yes
<u><i>Mortimer A. Gelston</i></u> Mortimer A. Gelston	Yes
<u><i>James G. Horsfall</i></u> James G. Horsfall	Yes
<u><i>William H. Smith</i></u> William H. Smith	Yes
<u>Colin C. Tait</u>	Absent

# Exhibit B

## Property Card



# Town of Southbury, CT

## Property Listing Report

Map Block Lot

46-8-10A-?

Building #

Section #

Account

00537703

### Property Information

Property Location	1432 OLD WATERBURY ROAD #?
Owner	CROWN ATLANTIC CO LLC
Co-Owner	4017 WASHINGTON RD
Mailing Address	P M BOX 353 MCMURRAY PA 15317
Land Use	300 Ind Land
Land Class	I
Zoning Code	M-2
Census Tract	3411

Street Index	
Acreage	0
Utilities	
Lot Setting/Desc	
Additional Info	

### Photo



### Sketch

### Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Interior Floors 1	
Interior Floors 2	
Percent Good	
Total Rooms	
Basement Garages	
Occupancy	
Building Grade	
Foundation	

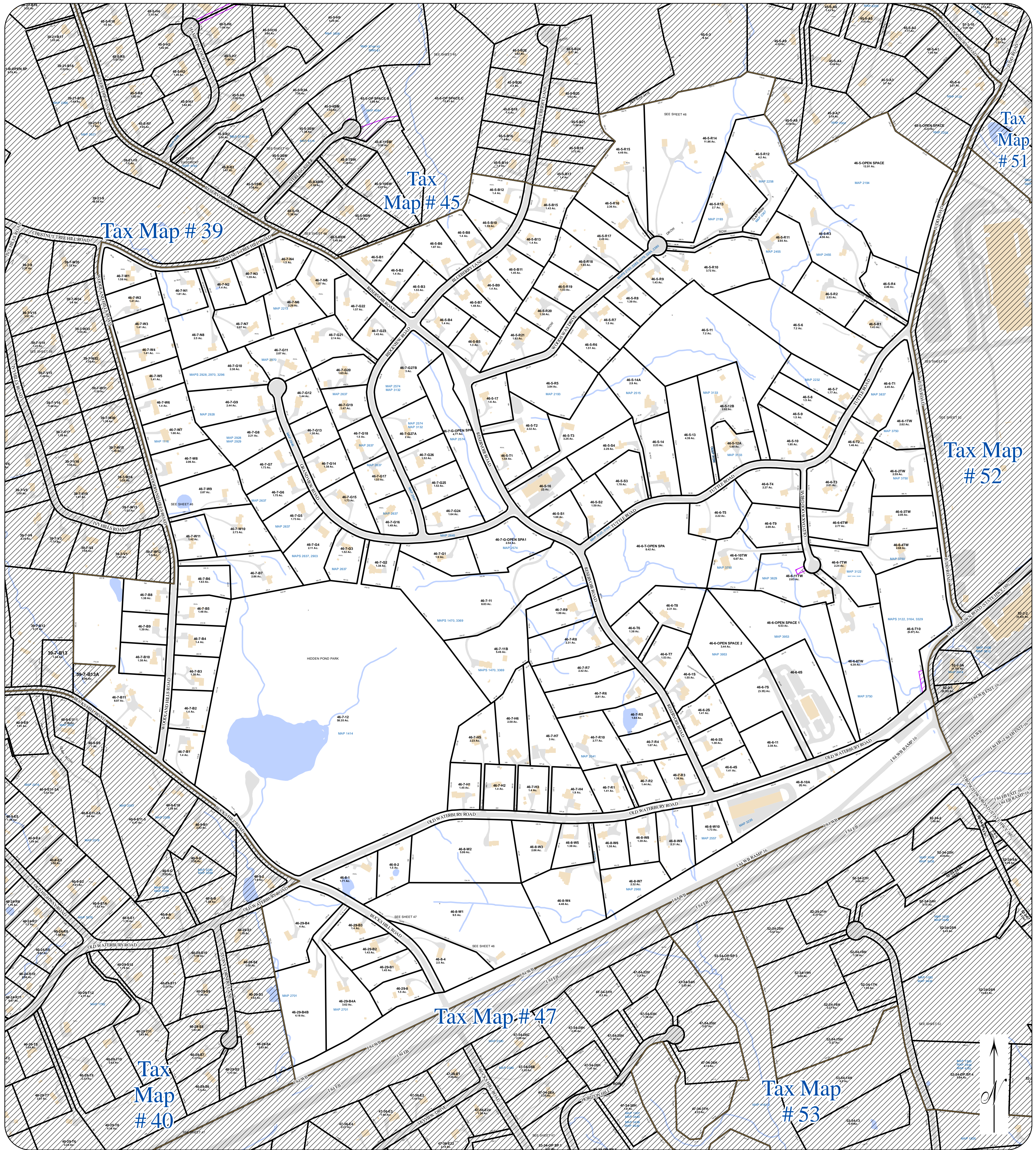
Bedrooms	
Full Bathrooms	
Half Bathrooms	
Extra Fixtures	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	
AC Percent	
PLN FPL	
DET FPL	
Gas Fireplace	

Exterior Walls	
Exterior Walls 2	
Interior Walls	
Interior Walls 2	
Heating Type	
Heating Fuel	
Sq. Ft. Basement	
Fin BSMT Quality	
Percent Basement	
Basement Access	
% Attic Finished	
LF Dormer	









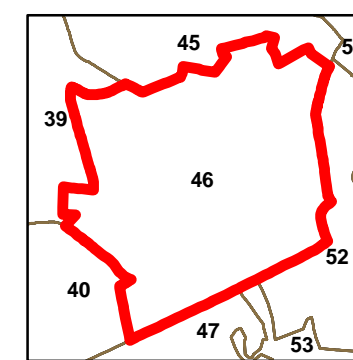
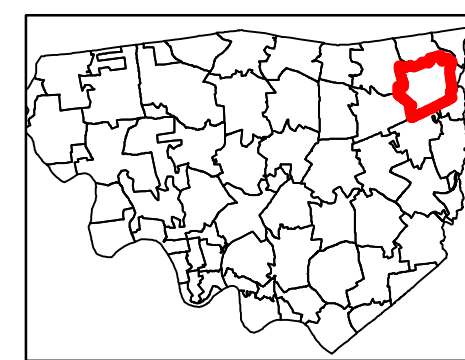
SHEET NO. 46

- Tax Map Grid
- Townline
- Historic Parcel Line
- Misc. Easements
- Parcels
- Pavement
- Decks
- Rivers / Streams
- Buildings
- Lakes / Ponds



## Town of Southbury, CT Assessor Tax Map

1 inch = 350 feet



SHEET NO. 46

MAP DATE : GL October 2018

THIS MAP HAS BEEN COMPILED FROM RECORDED SURVEYS, DEED DIMENSIONS AND OTHER SOURCES OF INFORMATION. THE DELINEATION OF BOUNDARY LINES IS APPROXIMATE. THIS MAP SHOULD NOT BE RELIED UPON FOR PROPERTY CONVEYANCES.

Print Date: August 2019





# Exhibit C

## **Construction Drawings**



**AT&T SITE NUMBER:** CTL02087  
**AT&T SITE NAME:** PRESTON HILL  
**AT&T FA CODE:** 10035332  
**AT&T PACE NUMBER:** MRCTB045218, MRCTB045187 & MRCTB045276  
**SITE TYPE:** MONOPOLE

**BUSINESS UNIT #:** 806358  
**SITE ADDRESS:** 1432 OLD WATERBURY RD  
**SOUTHBURY, CT 06488**  
**COUNTY:** NEW HAVEN  
**TOWER HEIGHT:** 225.79'  
**PROJECT:** AT&T LTE 6C, 7C & 4TXRX



**SITE INFORMATION**

CROWN CASTLE USA INC. NHV 109 943107  
 SITE NAME: 1432 OLD WATERBURY RD  
 SOUTHBURY, CT 06488  
 COUNTY: NEW HAVEN  
 AREA OF CONSTRUCTION: EXISTING  
 LATITUDE: 41.4935750  
 LONGITUDE: -73.1652769  
 LAT/LONG TYPE: NAD83  
 OCCUPANCY CLASSIFICATION: U  
 TYPE OF CONSTRUCTION: IIB  
 A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION  
 TOWER OWNER: CROWN CASTLE  
 2000 CORPORATE DRIVE  
 CANONSBURG, PA 15317  
 CARRIER/APPLICANT: AT&T MOBILITY  
 ONE AT&T WAY  
 BEDMINSTER, NJ 07921  
 CROWN CASTLE USA INC.  
 APPLICATION ID: 509320

**DRAWING INDEX**

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN
C-2	EQUIPMENT PLAN
C-3	TOWER ELEVATIONS
C-4	ANTENNA ORIENTATION
C-5	ANTENNA SCHEDULE
C-6	ANTENNA AND RRH SPECS.
C-7	ANTENNA AND RRH DETAIL
C-8	PLUMBING DIAGRAM
C-9	COLOR CODE STANDARD
G-1	GROUNDING DETAILS
G-2	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11x17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

**PROJECT DESCRIPTION**

THE PURPOSE OF THIS PROJECT IS TO PROPOSE AN ANTENNA MODIFICATION ON AN EXISTING WIRELESS SITE.

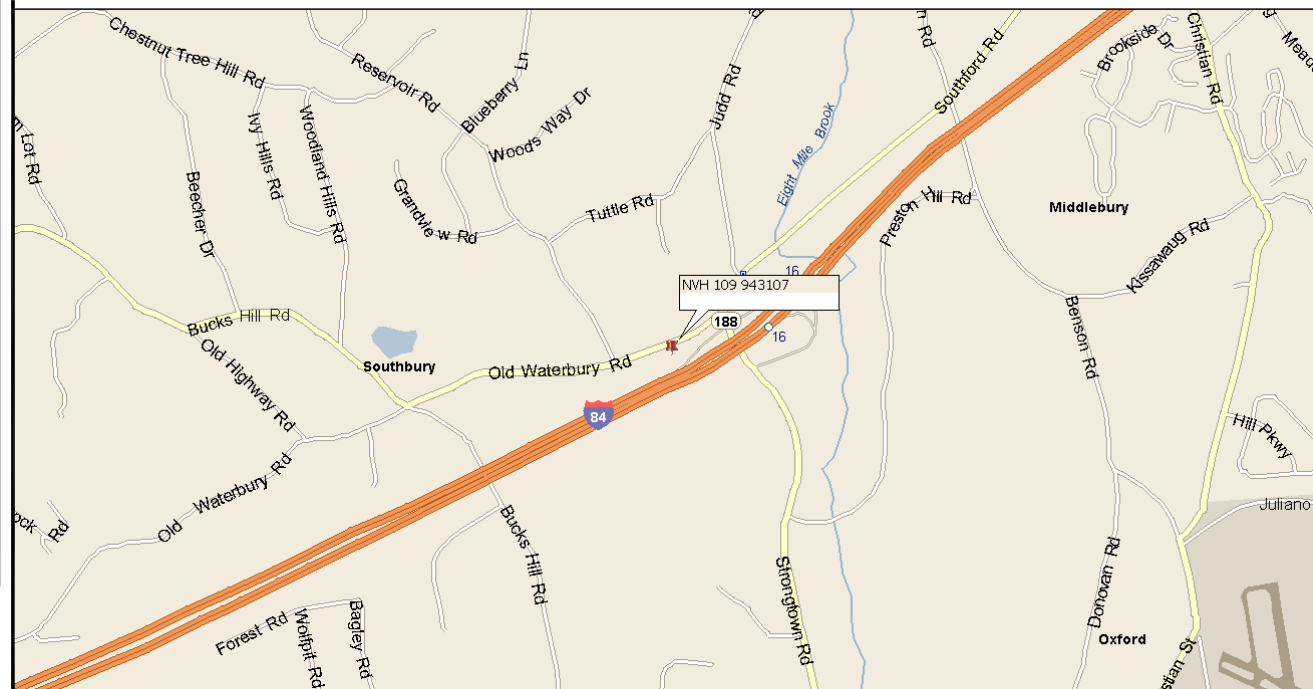
- TOWER SCOPE OF WORK**
- REMOVE (1) PLATFORM MOUNT.
  - RELOCATE (3) KATHREIN 800 10121 ANTENNAS.
  - RELOCATE (3) KATHREIN 800 10798 ANTENNAS.
  - RELOCATE (3) CCI OPA-65R-LCUU-H6 ANTENNAS.
  - RELOCATE (3) CCI DTMAP7819VG12A TMA.
  - RELOCATE (3) KATHREIN 860 10025 TMAS.
  - RELOCATE (3) KAELUS DB0061F1V51-2 DIPLEXERS.
  - RELOCATE (2) RAYCAP DC6-48-60-18-8F SURGE SUPPRESSORS.
  - RELOCATE (3) ERICSSON RRUS-11 B12 RRHS.
  - RELOCATE (3) ERICSSON RRUS-426 B66 RRHS.
  - INSTALL (3) SABRE C10857333C SECTOR MOUNTS.
  - INSTALL (3) CCI OPA-65R-LCUU-H6 ANTENNAS.
  - INSTALL (6) APTDC-BDFDM-DB DIPLEXERS.
  - INSTALL (3) ERICSSON RRUS-4478 B14 RRH.
  - INSTALL (3) ERICSSON RRUS-32 B2 RRH.
  - INSTALL (3) ERICSSON RRUS-E2 B29 RRH.
  - INSTALL (1) RAYCAP DC6-48-60-8-8F SURGE SUPPRESSOR.
  - INSTALL (2) ROSENBERGER LEONI WR-VG82ST-BRDA.

- GROUND SCOPE OF WORK**
- REMOVE (1) XMU
  - INSTALL (1) BB6630 + (1) IDLE

DESIGN PACKAGE BASED ON THE RFDS  
 REVISION: PRELIMINARY  
 DATE: 2/26/20

DESIGN PACKAGE BASED ON THE APPLICATION  
 ID: 509320  
 REVISION: 0

**LOCATION MAP**



NO SCALE

**APPLICABLE CODES/REFERENCE DOCUMENTS**

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2018 CT SBC (2015 IBC)
MECHANICAL	2018 CT SBC (2015 IBC)
ELECTRICAL	2017 NEC

**REFERENCE DOCUMENTS:**

- STRUCTURAL ANALYSIS: BLACK & VEATCH  
MARCH 27, 2020
- MOUNT ANALYSIS: HUDSON DESIGN GROUP LLC  
MARCH 23, 2020

NOTE: PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER



CALL CONNECTICUT ONE CALL  
 (800) 922-4455  
 CALL 3 WORKING DAYS  
 BEFORE YOU DIG!



AT&T SITE NUMBER:  
**CTL02087**

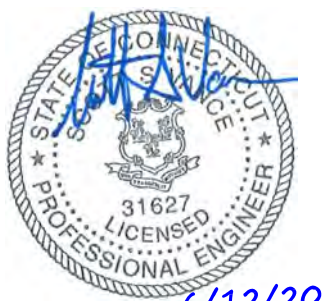
BU #: 806358  
 NHV 109 943107

1432 OLD  
 WATERBURY RD  
 SOUTHBURY, CT 06488

EXISTING 225.79'  
 MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
 PEC.0001564  
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**T-1** **0**



**SITE WORK GENERAL NOTES:**

1. THE SUBCONTRACTOR 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 SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR 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 AND EXCAVATION.
3. ALL SITE WORK TO COMPLY WITH QAS-STD-10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE" AND LATEST VERSION OF TIA 1019 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
4. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS.
5. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
6. 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.
7. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE.
8. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS 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.
11. THE AREAS OF THE OWNERS 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 AS SPECIFIED ON THE PROJECT SPECIFICATIONS.
12. SUBCONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
13. NOTICE TO PROCEED- NO WORK TO COMMENCE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF A PURCHASE ORDER.
14. ALL CONSTRUCTION MEANS AND METHODS, INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN STANDARD CED-STD-10253 INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH THE ANSI/TIA-322 (LATEST EDITION).

**STRUCTURAL STEEL NOTES:**

1. ALL STEEL WORK SHALL BE PAINTED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND IN ACCORDANCE WITH ASTM A36 UNLESS OTHERWISE NOTED.
2. BOLTED CONNECTIONS SHALL BE ASTM A325 BEARING TYPE (3/4") CONNECTIONS AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE.
3. NON-STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE 5/8" ASTM A307 BOLTS UNLESS NOTED OTHERWISE.
4. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHOR, SHALL BE PER MANUFACTURER'S 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.

**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 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. SLAB FOUNDATION DESIGN ASSUMING ALLOWABLE SOIL BEARING PRESSURE OF 2000 PSF.
3. REINFORCING STEEL SHALL CONFORM TO ASTM A615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. 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 WALLS.....3/4 IN.  
 BEAMS AND COLUMNS.....1 1/2 IN.
5. A CHAMFER 3/4" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

**MASONRY NOTES:**

1. HOLLOW CONCRETE MASONRY UNITS SHALL MEET A.S.T.M. SPECIFICATION C90, GRADE N. TYPE 1. THE SPECIFIED DESIGN COMPRESSIVE STRENGTH OF CONCRETE MASONRY (F'm) SHALL BE 1500 PSI.
2. MORTAR SHALL MEET THE PROPERTY SPECIFICATION OF A.S.T.M. C270 TYP. "S" MORTAR AND SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 2000 PSI.
3. GROUT SHALL MEET A.S.T.M. SPECIFICATION C475 AND HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI.
4. CONCRETE MASONRY SHALL BE LAID IN RUNNING (COMMON) BOND.
5. WALL SHALL RECEIVE TEMPORARY BRACING. TEMPORARY BRACING SHALL NOT BE REMOVED UNTIL GROUT IS FULLY CURED.

**GENERAL NOTES:**

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:  
 CONTRACTOR- GENERAL CONTRACTOR (CONSTRUCTION)  
 SUBCONTRACTOR- AT&T  
 CARRIER- CROWN CASTLE USA INC.  
 TOWER OWNER- CROWN CASTLE USA INC.  
 OEM- ORIGINAL EQUIPMENT MANUFACTURER
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR AND CROWN CASTLE USA INC.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO SCALE AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR AND CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWINGS.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR 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. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

**ABBREVIATIONS AND SYMBOLS:**

**ABBREVIATIONS:**

- AGL ABOVE GRADE LEVEL
- BTS BASE TRANSCIEVER STATION
- EXISTING EXISTING
- MIN. MINIMUM
- REF REFERENCE
- RF RADIO FREQUENCY
- T.B.D. TO BE DETERMINED
- T.B.R. TO BE RESOLVED
- TYP TYPICAL
- REQ REQUIRED
- EGR EQUIPMENT GROUND RING
- AWG AMERICAN WIRE GAUGE
- MCB MASTER GROUND BAR
- EG EQUIPMENT GROUND
- BCW BARE COPPER WIRE
- SIAD SMART INTEGRATED ACCESS DEVICE
- GEN GENERATOR
- IGR INTERIOR GROUND RING (HALO)
- RBS RADIO BASE STATION

**SYMBOLS:**

- SOLID GROUND BUS BAR
- SOLID NEUTRAL BUS BAR
- SUPPLEMENTAL GROUND CONDUCTOR
- 2-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- SINGLE-POLE THERMAL-MAGNETIC CIRCUIT BREAKER
- CHEMICAL GROUND ROD
- TEST WELL
- DISCONNECT SWITCH
- METER
- EXOTHERMIC WELD (CADWELD) (UNLESS OTHERWISE NOTED)
- MECHANICAL CONNECTION
- GROUNDING WIRE

**ELECTRICAL INSTALLATION NOTES:**

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC. HILTI EPOXY ANCHORS ARE REQUIRED BY CROWN CASTLE USA INC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
5. CABLES SHALL NOT BE ROUTED THROUGH LADDER-STYLE CABLE TRAY RUNGS.
6. 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" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH PLASTIC TAPE PER COLOR SCHEDULE. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (I.E. PANEL BOARD AND CIRCUIT ID'S).
8. PANEL BOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
10. POWER, CONTROL AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#14 AWG OR LARGER), 600V, OIL RESISTANT THHN OR THWN-2, CLASS B STRANDED COPPER CABLE RATED FOR 90° C (WET & DRY) OPERATION LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED UNLESS OTHERWISE SPECIFIED.
11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#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.
12. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 AWG OR LARGER), 600 V, 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.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. 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.
16. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT) OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
21. WIREWAYS SHALL BE EPOXY-COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER).
22. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHIN ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
23. 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.
24. 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.
25. 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.
26. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
27. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
28. INSTALL PLASTIC LABEL ON THE METER CENTER TO SHOW "AT&T".
29. ALL CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

**GREENFIELD GROUNDING NOTES:**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OFF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE SUBCONTRACTOR 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 AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDING AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, 6 AWG STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 AWG SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 AWG SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
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.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (I.E. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 FT. OF MAIN GROUND WIRES WITH 1-#2 AWG TIN-PLATED COPPER GROUND CONDUCTOR.
19. 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., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 TINNED SOLID IN 3/4" LIQUID TIGHT CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE LIQUID TIGHT CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

NEC INSULATOR COLOR CODE		
DESCRIPTION	PHASE/CODE LETTER	WIRE COLOR
240/120 1Ø	LEG 1	BLACK
	LEG 2	RED
AC NEUTRAL	N	WHITE
GROUND (EGC)	G	GREEN
VDC POS	+	*RED-POLARITY MARK AT TERMINATION
VDC NEG	-	*BLACK-POLARITY MARK AT TERMINATION
240V OR 208V, 3Ø	PHASE A	BLACK
	PHASE B	RED(ORG. IF HI LEG)
	PHASE C	BLUE
480V, 3Ø	PHASE A	BROWN
	PHASE B	ORANGE OR PURPLE
	PHASE C	YELLOW

\* SEE NEC 210.5(C)(1) AND (2)



ONE AT&T WAY  
BEDMINSTER, NJ 07921



3200 HORIZON DRIVE, SUITE 150  
KING OF PRUSSIA, PA 19406



1717 S. BOULDER  
SUITE 300  
TULSA, OK 74119  
PH: (918) 587-4630  
www.btgrp.com

AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHURY, CT 06488

EXISTING 225.79'  
MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **T-2** REVISION: **0**

**T-2** **0**

ONE AT&T WAY  
BEDMINSTER, NJ 07921



3200 HORIZON DRIVE, SUITE 150  
KING OF PRUSSIA, PA 19406



1717 S. BOULDER  
SUITE 300  
TULSA, OK 74119  
PH: (918) 587-4630  
www.btgrp.com

AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC

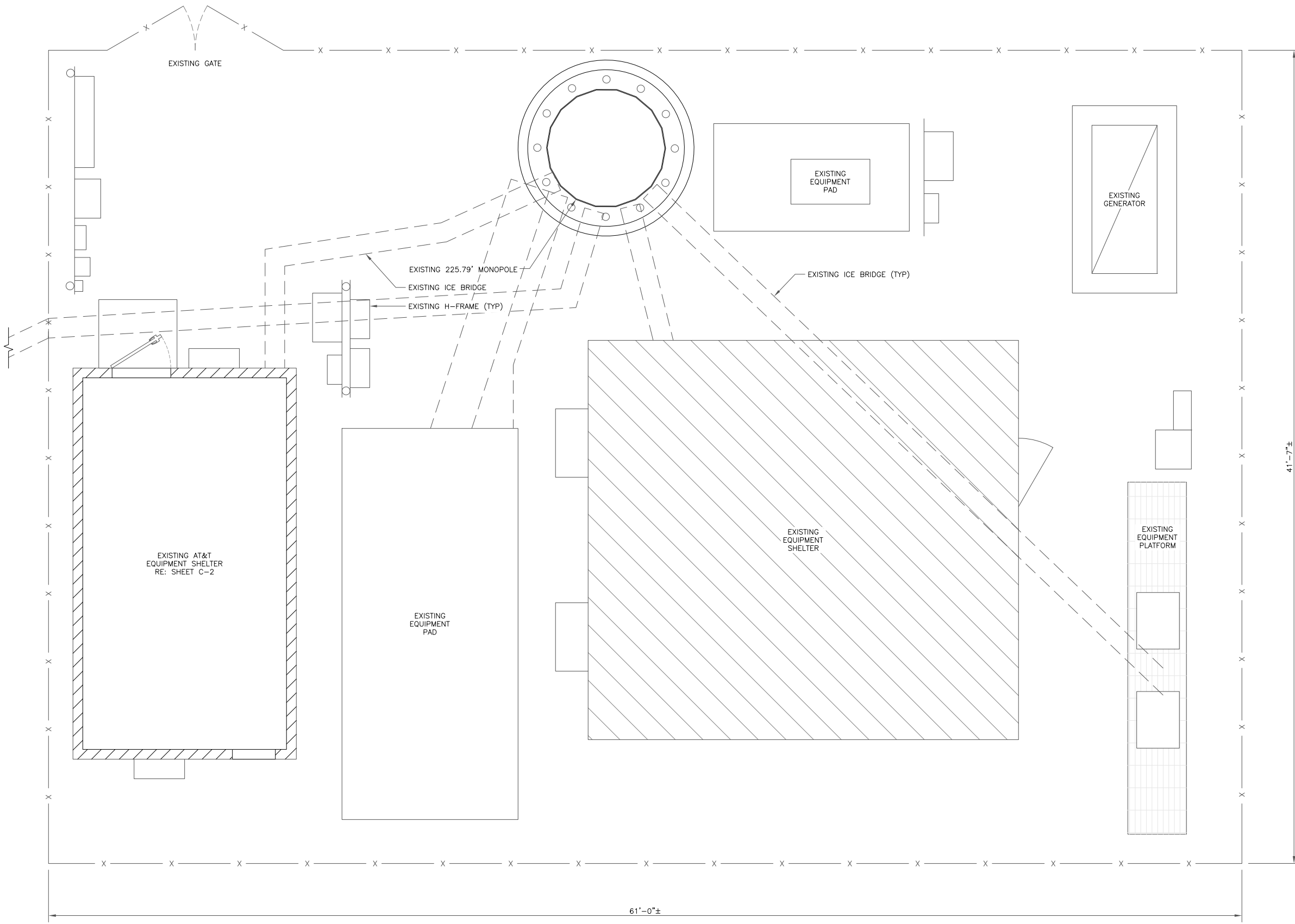


B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**C-1** **0**



1 SITE PLAN  
SCALE: 3/8"=1'-0" (FULL SIZE)  
3/16"=1'-0" (11x17)



142310.001.01\_806358\_NHV\_109\_943107.dwg - Sheet:C-1 - User: rcorson - Jun 12, 2020 - 10:41am

ONE AT&T WAY  
BEDMINSTER, NJ 07921



3200 HORIZON DRIVE, SUITE 150  
KING OF PRUSSIA, PA 19406



1717 S. BOULDER  
SUITE 300  
TULSA, OK 74119  
PH: (918) 587-4630  
www.btgrp.com

AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC

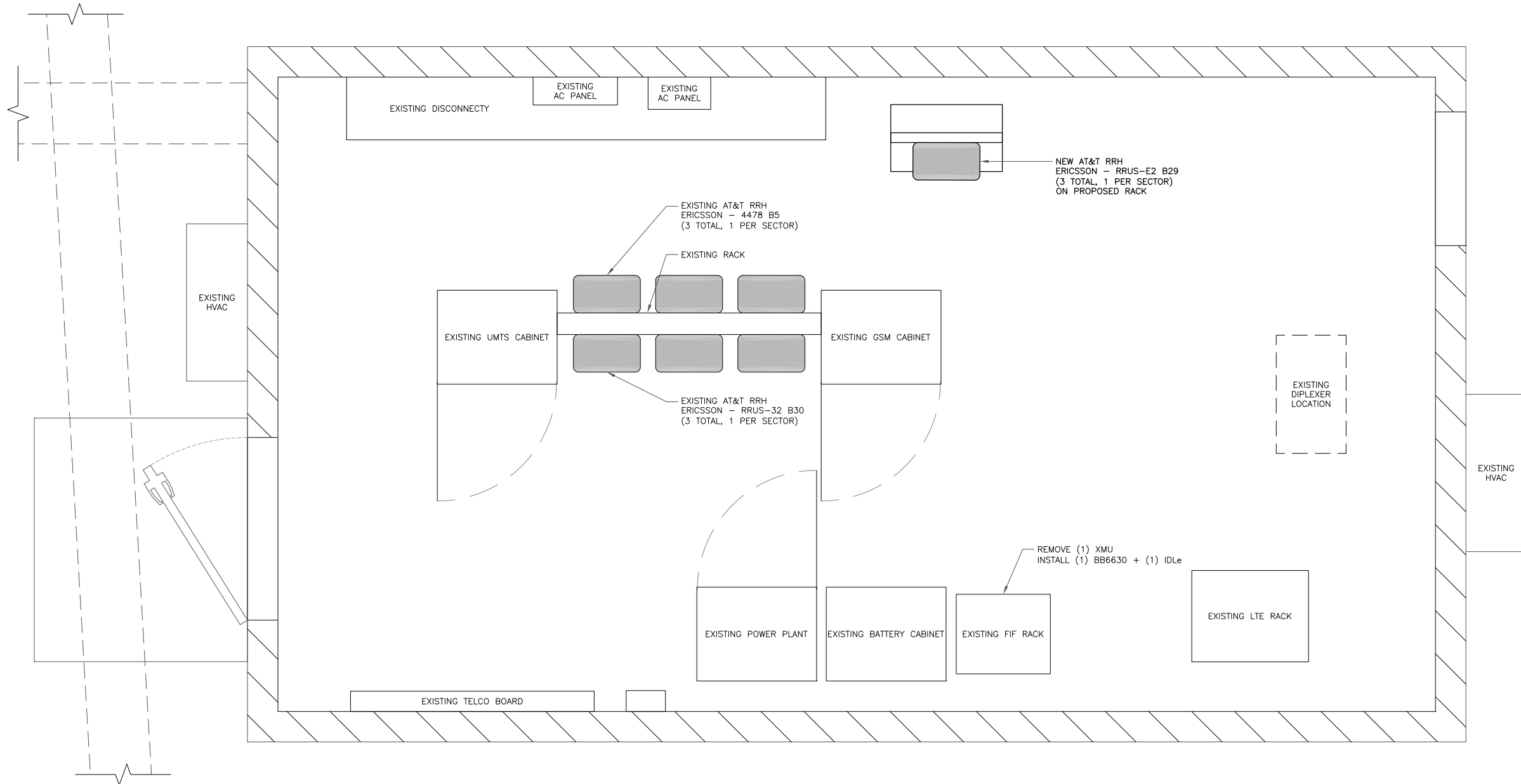


B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

C-2 0

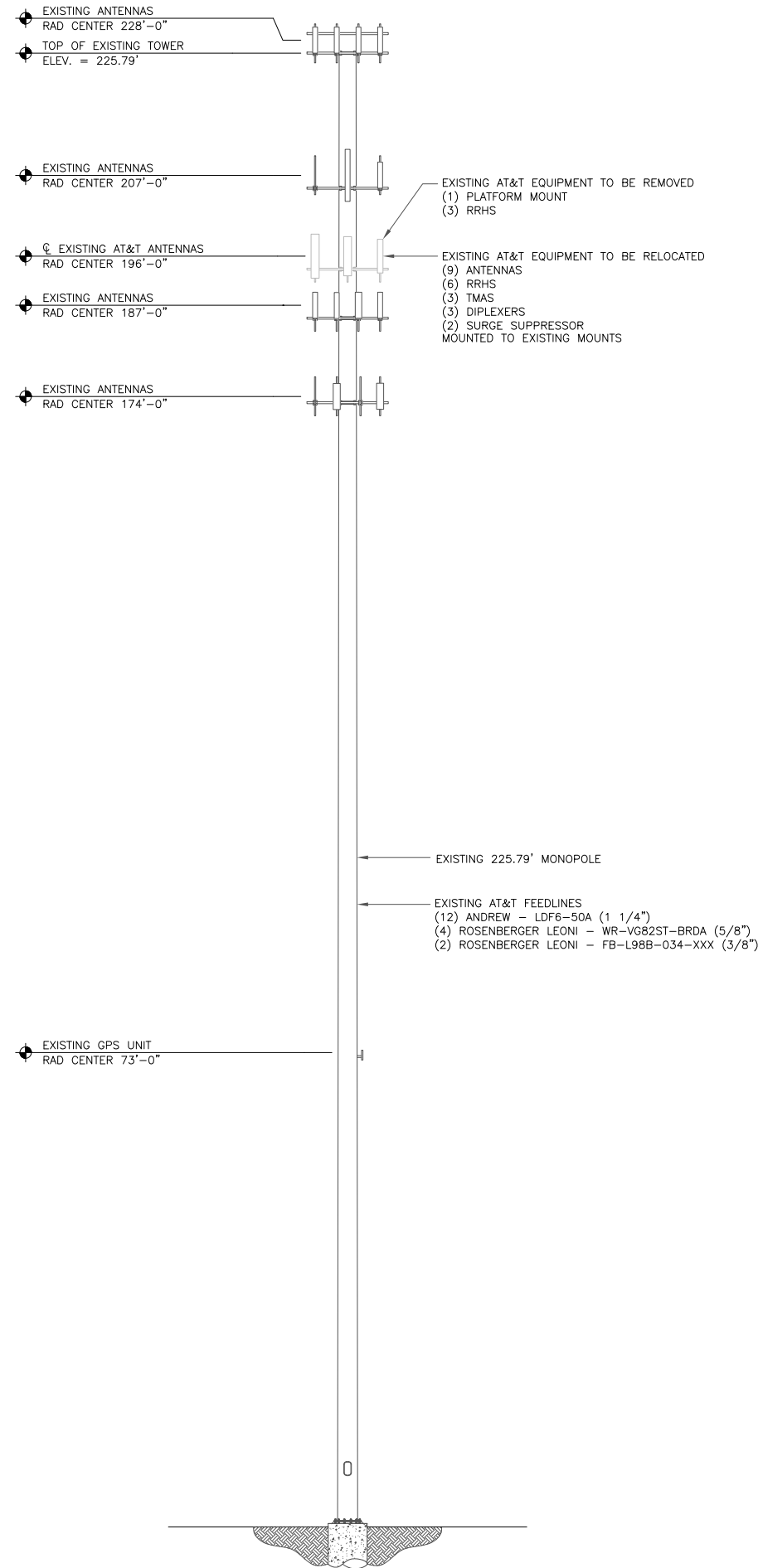


1 EXISTING EQUIPMENT PLAN  
SCALE: 1" = 6'-0" (FULL SIZE)  
3/4" = 1'-0" (11x17)  
3/8" = 1'-0" (11x17)



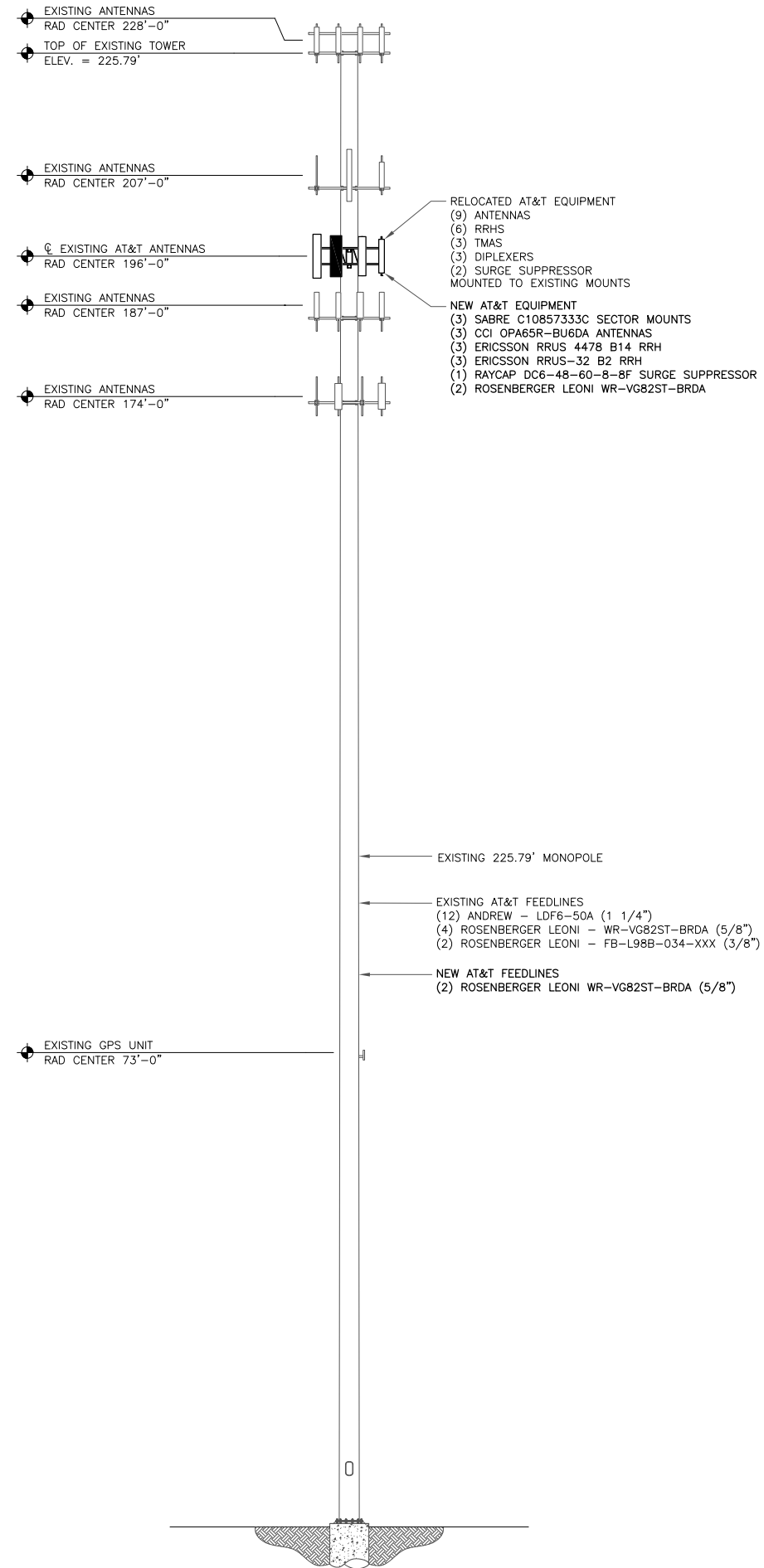


**AT&T EQUIPMENT**  
 ANTENNA CL: 196'-0"  
 MOUNT CL: 193'-0"



1 EXISTING ELEVATION  
 SCALE: NOT TO SCALE

**AT&T EQUIPMENT**  
 ANTENNA CL: 196'-0"  
 MOUNT CL: 193'-0"



2 FINAL ELEVATION  
 SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

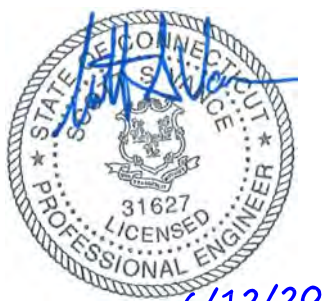
BU #: 806358  
 NHV 109 943107

1432 OLD  
 WATERBURY RD  
 SOUTHURY, CT 06488

EXISTING 225.79'  
 MONOPOLE

**ISSUED FOR:**

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
 PEC.0001564  
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
 UNLESS THEY ARE ACTING UNDER THE DIRECTION  
 OF A LICENSED PROFESSIONAL ENGINEER,  
 TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-3** REVISION: **0**





AT&T SITE NUMBER:  
**CTL02087**

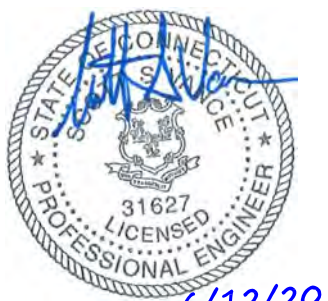
BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

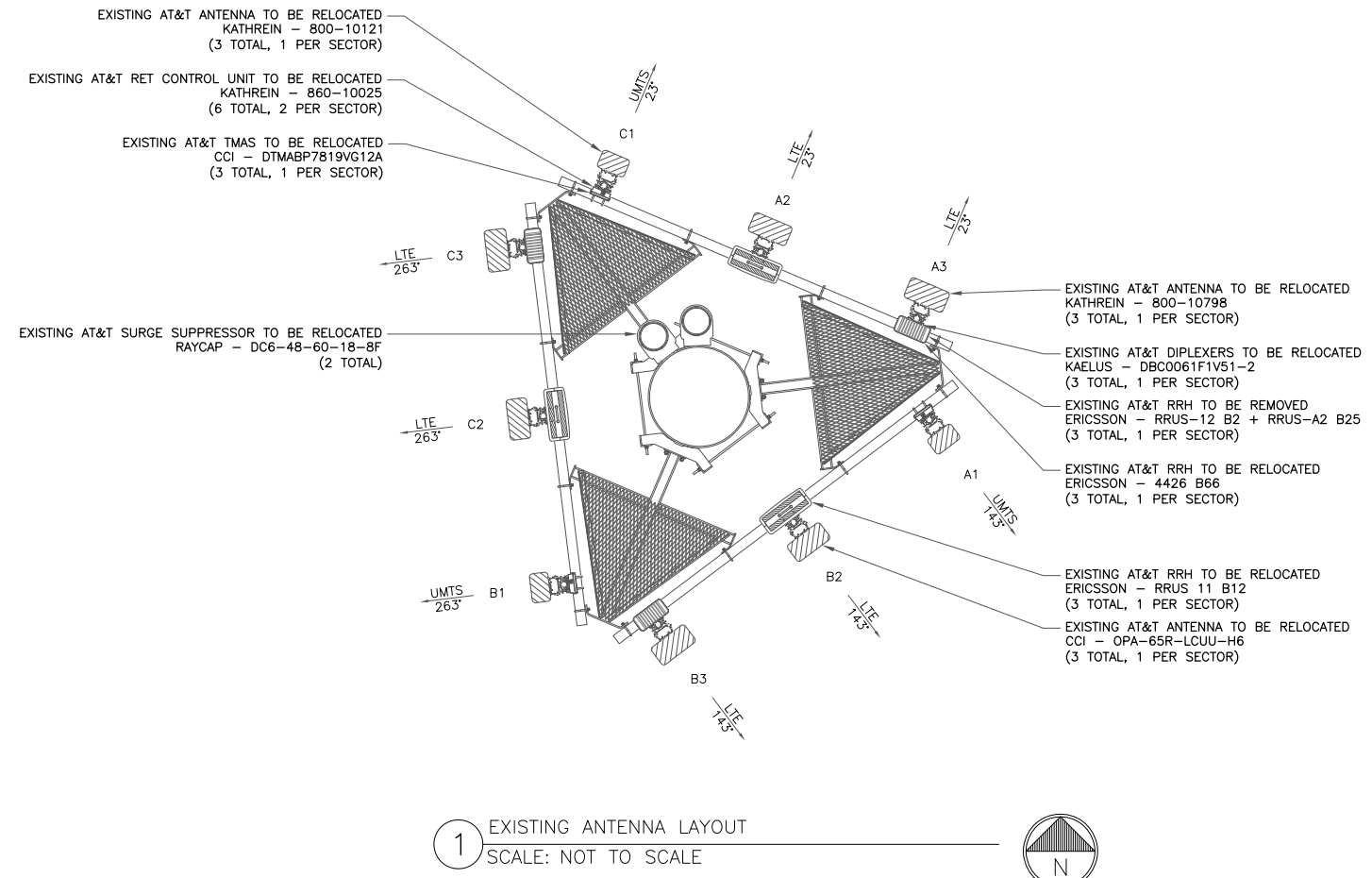
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



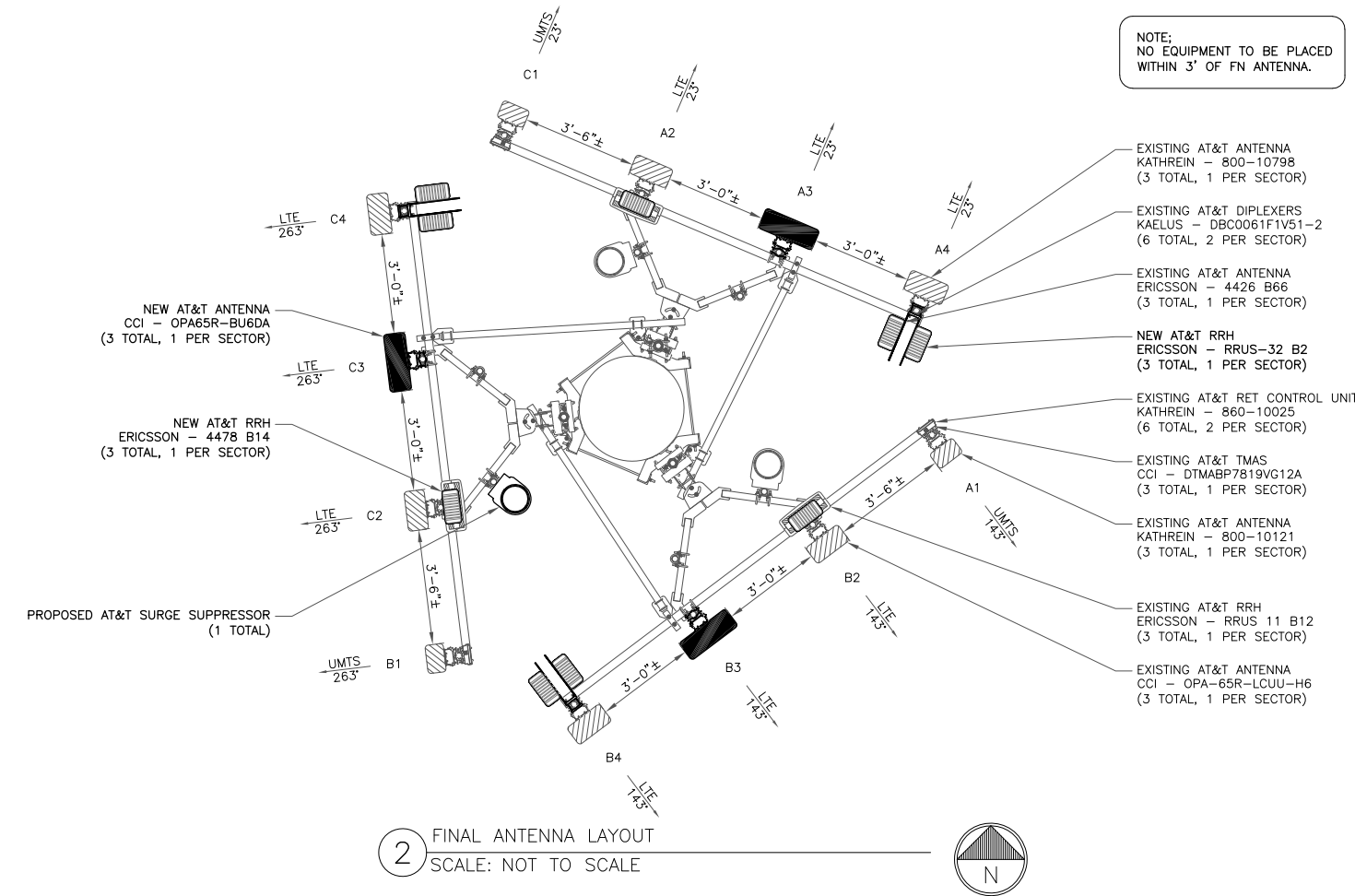
B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-4** REVISION: **0**



1 EXISTING ANTENNA LAYOUT  
SCALE: NOT TO SCALE



NOTE:  
NO EQUIPMENT TO BE PLACED  
WITHIN 3' OF FN ANTENNA.

2 FINAL ANTENNA LAYOUT  
SCALE: NOT TO SCALE

142310.001.01\_806358\_NHV\_109\_943107.dwg - Sheet: C-4 - User: rcorson - Jun 12, 2020 - 10:41am



AT&T SITE NUMBER:  
**CTL02087**

BU #: **806358**  
NHV **109 943107**

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

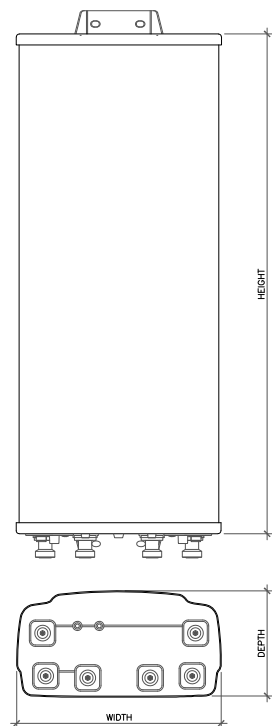
**C-5** **0**

### FINAL ANTENNA AND COAXIAL CABLE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	RAYCAP	DC (WR-VG86ST-BRD) FIBER CABLES (FB-L98B-034-XXXXXX)	RRHS	DIPLEXER	RET CABLE
ALPHA SECTOR																
A1	UMTS	EXISTING	143°	KATHREIN 800-10121	196'-0"	0°	4'	1 1/4"	248'-0"	2	(1) DTMABP7819V G12A	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	(2) LGP 21901 (SHELTER)	Y
A2	LTE	EXISTING	23°	CCI OPA-65R-LCUU-H6	196'-0"	0°	6'/3'	-	-	-	-			(1) RRUS-11 B12 (1) RRU-32 B30 (SHELTER)	-	Y
A3	LTE	NEW	23°	CCI OPA65R-BU6DA	196'-0"	0°	6'	-	-	-	-			(1) 4478 B14	-	Y
A4	LTE	EXISTING	23°	KATHREIN 800-10798	196'-0"	0°	6'/6'/5'/5'/3'/5'	1 1/4"	248'-0"	2	-			(1) RRUS-E2 B29 (SHELTER) (1) 4478 B5 (SHELTER) (1) RRUS-32 B2 (1) 4426 B66	(2) DBC0061F1V51-2 (1 AT SHELTER)	Y
BETA SECTOR																
B1	UMTS	EXISTING	263°	KATHREIN 800-10121	196'-0"	0°	6'	1 1/4"	248'-0"	2	(1) DTMABP7819V G12A	DC6-48-60-18-8F	(1) FIBER (2) DC LINES	-	(2) LGP 21901 (SHELTER)	Y
B2	LTE	EXISTING	143°	CCI OPA-65R-LCUU-H6	196'-0"	0°	4'/3'	-	-	-	-			(1) RRUS-11 B12 (1) RRU-32 B30	-	Y
B3	LTE	NEW	143°	CCI OPA65R-BU6DA	196'-0"	0°	4'	-	-	-	-			(1) 4478 B14	-	Y
B4	LTE	EXISTING	143°	KATHREIN 800-10798	196'-0"	0°	4'/4'/3'/3'/3'/3'	1 1/4"	248'-0"	2	-			(1) RRUS-E2 B29 (1) 4478 B5 (1) RRUS-32 B2 (1) 4426 B66	(2) DBC0061F1V51-2 (1 AT SHELTER)	Y
GAMMA SECTOR																
C1	UMTS	EXISTING	23°	KATHREIN 800-10121	196'-0"	0°	4'	1 1/4"	248'-0"	2	(1) DTMABP7819V G12A	DC6-48-60-18-8F	(2) DC LINES	-	(2) LGP 21901 (SHELTER)	Y
C2	LTE	EXISTING	263°	CCI OPA-65R-LCUU-H6	196'-0"	0°	6'/3'	-	-	-	-			(1) RRUS-11 B12 (1) RRU-32 B30	-	Y
C3	LTE	NEW	263°	CCI OPA65R-BU6DA	196'-0"	0°	6'	-	-	-	-			(1) 4478 B14	-	Y
C4	LTE	EXISTING	263°	KATHREIN 800-10798	196'-0"	0°	6'/6'/5'/5'/3'/5'	1 1/4"	248'-0"	2	-			(1) RRUS-E2 B29 (1) 4478 B5 (1) RRUS-32 B2 (1) 4426 B66	(2) DBC0061F1V51-2 (1 AT SHELTER)	Y

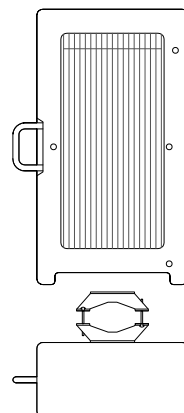
NOTE: BOLD DENOTES NEW EQUIPMENT

1 FINAL ANTENNA AND COAXIAL CABLE SCHEDULE  
SCALE: NOT TO SCALE



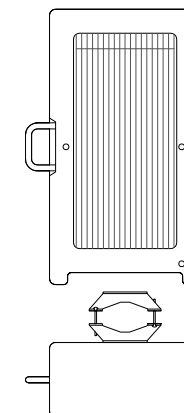
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
OPA65R-BU6DA	71.2"	21"	7.8"	60.2 lbs

1 ANTENNA DETAIL  
SCALE: NOT TO SCALE



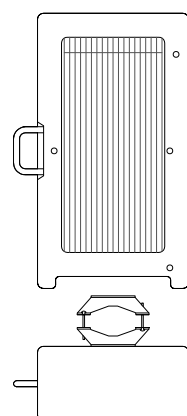
ERICSSON - 4478 B14  
WEIGHT (FULLY EQUIPPED): 59.4 LBS  
SIZE (HxWxD): 18.10x13.40x8.26 IN.

2 RRH DETAIL  
SCALE: NOT TO SCALE



ERICSSON - RRUS-E2 B29  
WEIGHT (FULLY EQUIPPED): 59.0 LBS  
SIZE (HxWxD): 20.4x18.5x7.5 IN.

3 RRH DETAIL  
SCALE: NOT TO SCALE

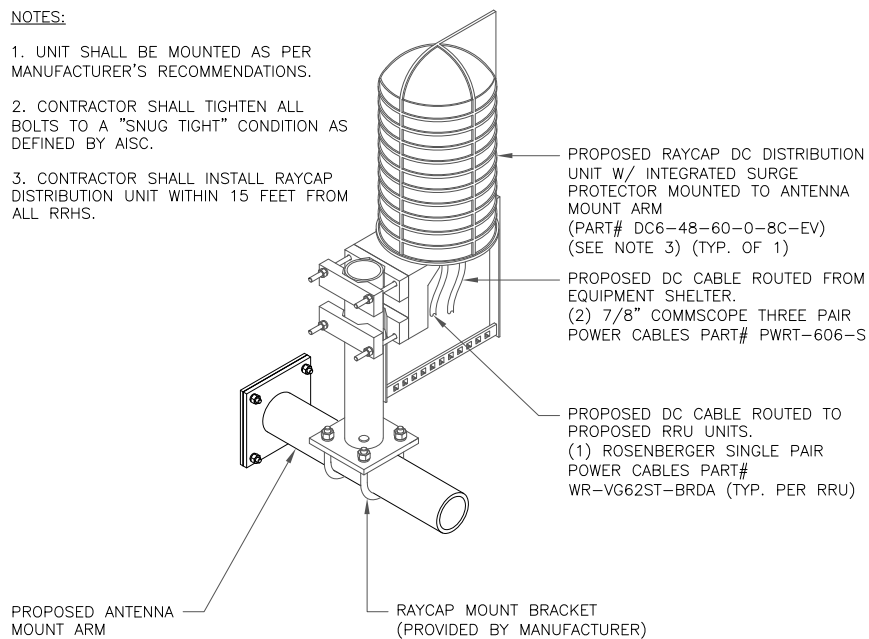


ERICSSON - RRUS-32 B2  
WEIGHT (FULLY EQUIPPED): 55.12 LBS  
SIZE (HxWxD): 27.6x12.45x7.41 IN.

3 RRH DETAIL  
SCALE: NOT TO SCALE

NOTES:

- UNIT SHALL BE MOUNTED AS PER MANUFACTURER'S RECOMMENDATIONS.
- CONTRACTOR SHALL TIGHTEN ALL BOLTS TO A "SNUG TIGHT" CONDITION AS DEFINED BY AISC.
- CONTRACTOR SHALL INSTALL RAYCAP DISTRIBUTION UNIT WITHIN 15 FEET FROM ALL RRHS.



PROPOSED ANTENNA MOUNT ARM

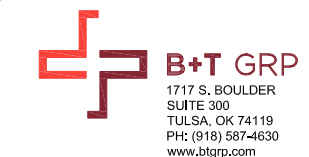
RAYCAP MOUNT BRACKET (PROVIDED BY MANUFACTURER)

PROPOSED RAYCAP DC DISTRIBUTION UNIT W/ INTEGRATED SURGE PROTECTOR MOUNTED TO ANTENNA MOUNT ARM (PART# DC6-48-60-0-8C-EV) (SEE NOTE 3) (TYP. OF 1)

PROPOSED DC CABLE ROUTED FROM EQUIPMENT SHELTER. (2) 7/8" COMMSCOPE THREE PAIR POWER CABLES PART# PWRT-606-S

PROPOSED DC CABLE ROUTED TO PROPOSED RRU UNITS. (1) ROSENBERGER SINGLE PAIR POWER CABLES PART# WR-VG62ST-BRDA (TYP. PER RRU)

4 SURGE SUPPRESSOR DETAIL  
SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

BU #: **806358**  
NHV **109 943107**

1432 OLD WATERBURY RD  
SOUTHURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

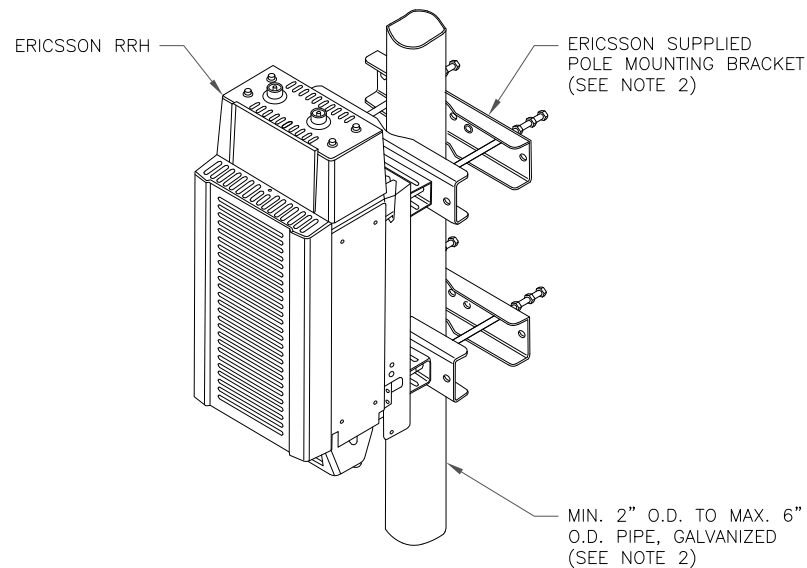
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

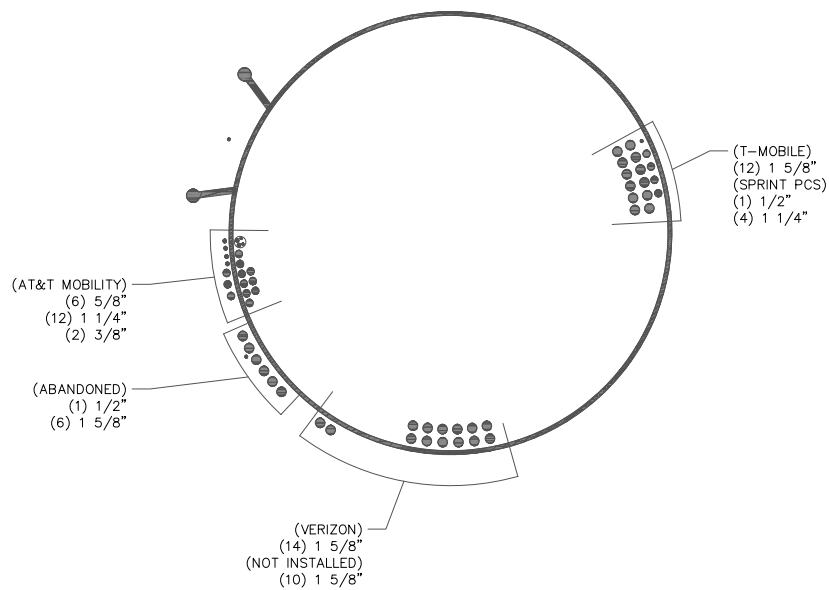
**C-6** **0**

NOTES:

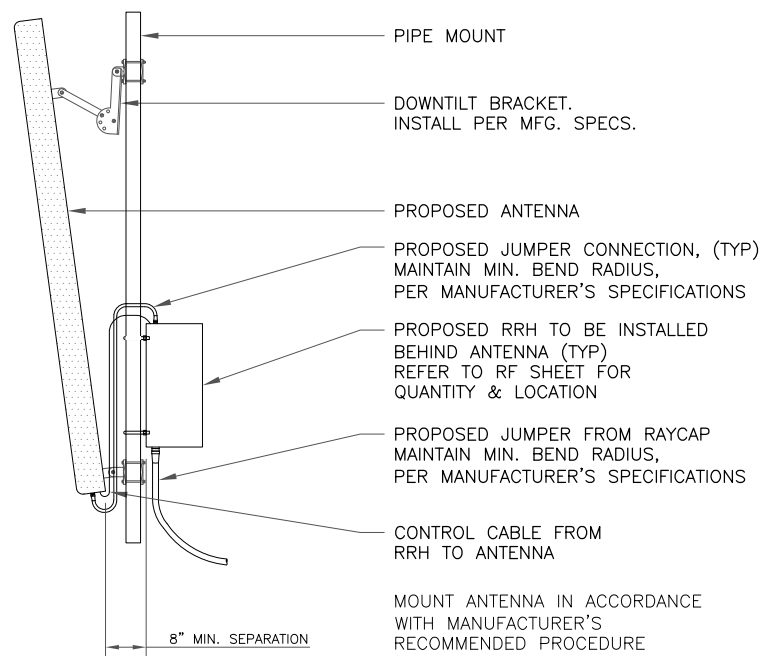
- ERICSSON VIA AT&T SUPPLIES RRH, RRH POLE-MOUNTING BRACKET. SUBCONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRH POLE-MOUNTING BRACKET. ERICSSON INSTALLS RRH AND MAKES CABLE TERMINATIONS.
- FOR POLE DIAMETERS FROM 6" TO 15", ERICSSON CAN SUPPLY A PAIR OF POLE MOUNTING METAL BANDS WITH BOLTING WELDMENT.
- NO PAINTING OF THE RRH OR SOLAR SHIELD IS ALLOWED



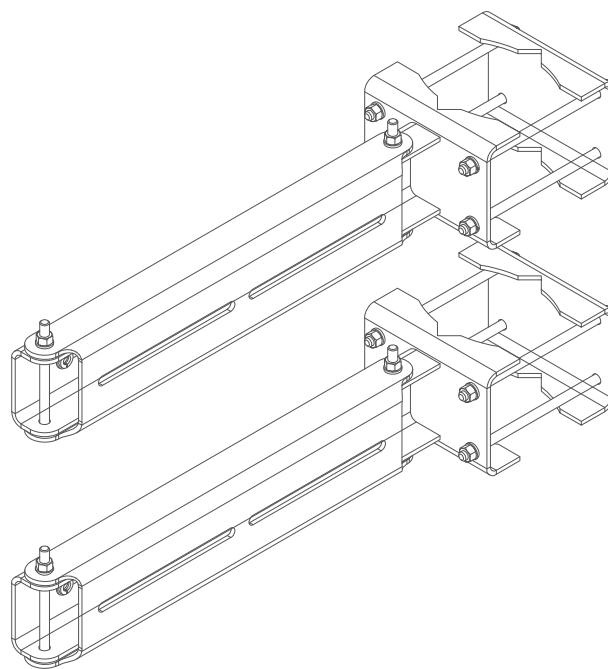
1 RRH MOUNTING DETAIL  
SCALE: NOT TO SCALE



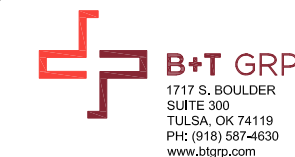
2 BASE LEVEL DRAWING  
SCALE: NOT TO SCALE



3 ANTENNA MOUNTING DETAIL  
SCALE: NOT TO SCALE



4 VALMONT - RRUDSM  
SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

BU #: **806358**  
**NHV 109 943107**

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



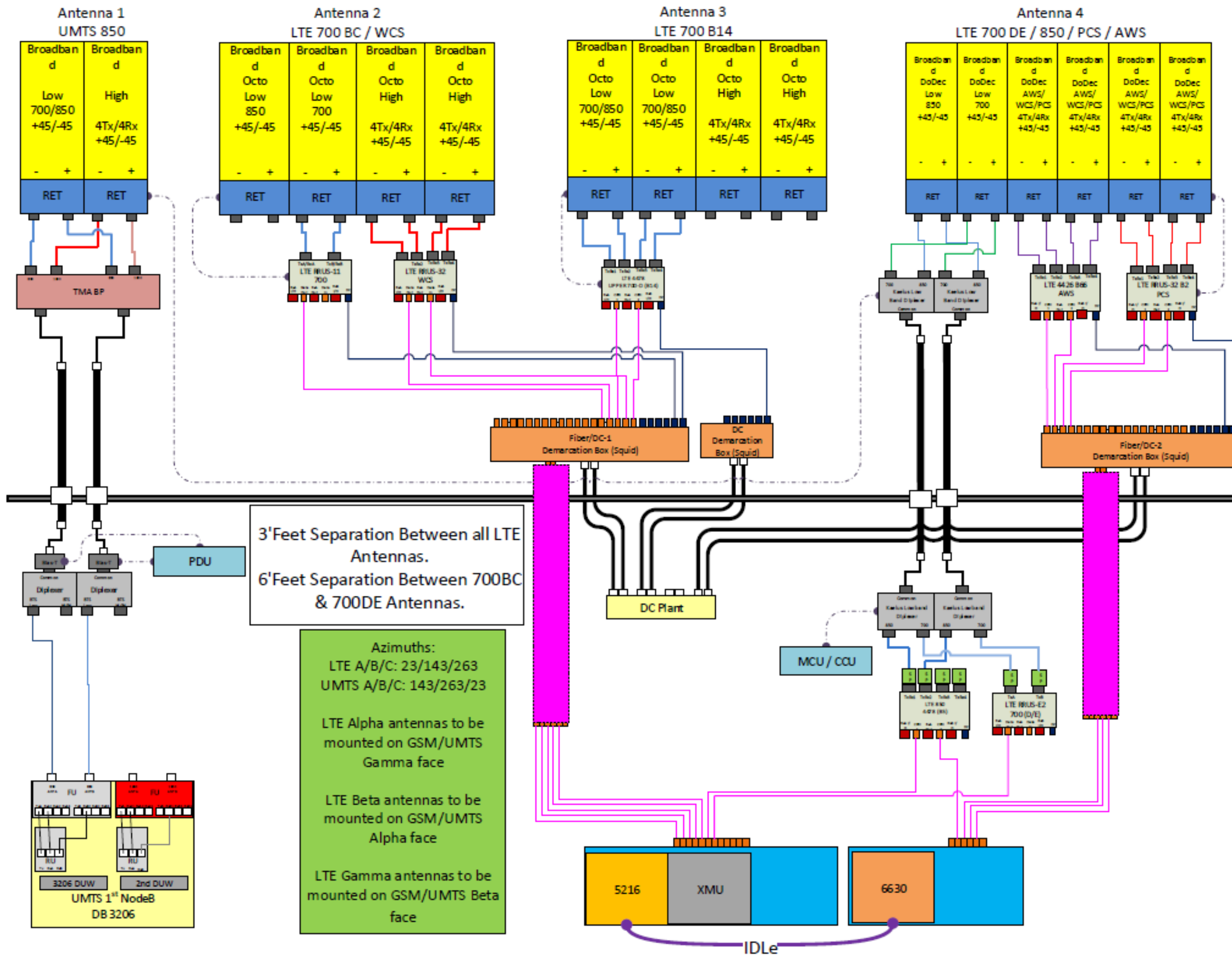
B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON,  
UNLESS THEY ARE ACTING UNDER THE DIRECTION  
OF A LICENSED PROFESSIONAL ENGINEER,  
TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**C-7** **0**





3' Feet Separation Between all LTE Antennas.  
6' Feet Separation Between 700BC & 700DE Antennas.

Azimuths:  
LTE A/B/C: 23/143/263  
UMTS A/B/C: 143/263/23

LTE Alpha antennas to be mounted on GSM/UMTS Gamma face

LTE Beta antennas to be mounted on GSM/UMTS Alpha face

LTE Gamma antennas to be mounted on GSM/UMTS Beta face

1 PLUMBING DIAGRAM  
SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



6/12/20

B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **C-8** REVISION: **0**

142310.001.01\_806358\_NHV\_109\_943107.dwg - Sheet: C-8 - User: rcorson - Jun 12, 2020 - 10:42am

SECTOR	TECHNOLOGY	FREQUENCY BAND	COLOR CODE - SECTOR DESIGNATION FOR SECTOR SPLIT	COLOR CODE - SECTOR (AMOUNT OF BANDS BASED ON POSITION)	COLOR CODE - FREQUENCY	45 + COAX	45 - COAX
A	LTE	700 (B/C)	BLANK	GREEN	VIOLET	YELLOW	BLANK
A	LTE	850 - 2ND BLOCK	BLANK	GREEN	YELLOW	YELLOW	BLANK
A	LTE	1900 (PCS)	BLANK	GREEN	RED	YELLOW	BLANK
A	LTE	1900 (PCS) - 2ND BLOCK	BLANK	GREEN	RED	YELLOW	BLANK
A	LTE	2100 (AWS)	BLANK	GREEN	ORANGE	YELLOW	BLANK
A	LTE	2100 (AWS) - 2ND BLOCK	BLANK	GREEN	ORANGE	YELLOW	BLANK
A	LTE	2300 (WCS)	BLANK	GREEN	SLATE	YELLOW	BLANK
A	LTE	2300 (WCS) - 2ND BLOCK	BLANK	GREEN	BROWN	YELLOW	BLANK
A	LTE	2300 (WCS) - SW REPEATER	BLANK	GREEN	BROWN	YELLOW	BLANK
A	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	GREEN	VIOLET	SLATE	BLANK
A	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	GREEN	VIOLET	SLATE	BLANK
A	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	GREEN	YELLOW	SLATE	BLANK
A - SPLIT	LTE	700 (B/C)	GREEN	ORANGE	VIOLET	YELLOW	BLANK
A - SPLIT	LTE	850	GREEN	ORANGE	YELLOW	YELLOW	BLANK
A - SPLIT	LTE	850 - 2ND BLOCK	GREEN	ORANGE	YELLOW	YELLOW	BLANK
A - SPLIT	LTE	1900 (PCS)	ORANGE	ORANGE	RED	YELLOW	BLANK
A - SPLIT	LTE	1900 (PCS) - 2ND BLOCK	ORANGE	ORANGE	RED	YELLOW	BLANK
A - SPLIT	LTE	2100 (AWS)	ORANGE	ORANGE	ORANGE	YELLOW	BLANK
A - SPLIT	LTE	2100 (AWS) - 2ND BLOCK	ORANGE	ORANGE	ORANGE	YELLOW	BLANK
A - SPLIT	LTE	2300 (WCS)	ORANGE	ORANGE	SLATE	YELLOW	BLANK
A - SPLIT	LTE	2300 (WCS) - 2ND BLOCK	ORANGE	ORANGE	BROWN	YELLOW	BLANK
A - SPLIT	LTE	2300 (WCS) - SW REPEATER	ORANGE	ORANGE	BROWN	YELLOW	BLANK
A - SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	ORANGE	ORANGE	BROWN	YELLOW	BLANK
A - SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	ORANGE	ORANGE	VIOLET	SLATE	BLANK
A - SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	ORANGE	ORANGE	YELLOW	SLATE	BLANK
B	LTE	700 (B/C)	BLANK	BLUE	VIOLET	YELLOW	BLANK
B	LTE	850	BLANK	BLUE	YELLOW	YELLOW	BLANK
B	LTE	850 - 2ND BLOCK	BLANK	BLUE	YELLOW	YELLOW	BLANK
B	LTE	1900 (PCS)	BLANK	BLUE	RED	YELLOW	BLANK
B	LTE	1900 (PCS) - 2ND BLOCK	BLANK	BLUE	RED	YELLOW	BLANK
B	LTE	2100 (AWS)	BLANK	BLUE	ORANGE	YELLOW	BLANK
B	LTE	2100 (AWS) - 2ND BLOCK	BLANK	BLUE	ORANGE	YELLOW	BLANK
B	LTE	2300 (WCS)	BLANK	BLUE	SLATE	YELLOW	BLANK
B	LTE	2300 (WCS) - 2ND BLOCK	BLANK	BLUE	BROWN	YELLOW	BLANK
B	LTE	2300 (WCS) - SW REPEATER	BLANK	BLUE	BROWN	YELLOW	BLANK
B	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	BLUE	VIOLET	SLATE	BLANK
B	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	BLUE	VIOLET	SLATE	BLANK
B	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	BLUE	YELLOW	SLATE	BLANK
B - SPLIT	LTE	700 (B/C)	BLANK	BLUE	VIOLET	YELLOW	BLANK
B - SPLIT	LTE	850	BLANK	BLUE	YELLOW	YELLOW	BLANK
B - SPLIT	LTE	850 - 2ND BLOCK	BLANK	BLUE	YELLOW	YELLOW	BLANK
B - SPLIT	LTE	1900 (PCS)	BLANK	BLUE	RED	YELLOW	BLANK
B - SPLIT	LTE	1900 (PCS) - 2ND BLOCK	BLANK	BLUE	RED	YELLOW	BLANK
B - SPLIT	LTE	2100 (AWS)	BLANK	BLUE	ORANGE	YELLOW	BLANK
B - SPLIT	LTE	2100 (AWS) - 2ND BLOCK	BLANK	BLUE	ORANGE	YELLOW	BLANK
B - SPLIT	LTE	2300 (WCS)	BLANK	BLUE	SLATE	YELLOW	BLANK
B - SPLIT	LTE	2300 (WCS) - 2ND BLOCK	BLANK	BLUE	BROWN	YELLOW	BLANK
B - SPLIT	LTE	2300 (WCS) - SW REPEATER	BLANK	BLUE	BROWN	YELLOW	BLANK
B - SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	BLUE	VIOLET	SLATE	BLANK
B - SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	BLUE	VIOLET	SLATE	BLANK
B - SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	BLUE	YELLOW	SLATE	BLANK
C	LTE	700 (B/C)	BLANK	WHITE	YELLOW	YELLOW	BLANK
C	LTE	850	BLANK	WHITE	YELLOW	YELLOW	BLANK
C	LTE	850 - 2ND BLOCK	BLANK	WHITE	YELLOW	YELLOW	BLANK
C	LTE	1900 (PCS)	BLANK	WHITE	RED	YELLOW	BLANK
C	LTE	1900 (PCS) - 2ND BLOCK	BLANK	WHITE	RED	YELLOW	BLANK
C	LTE	2100 (AWS)	BLANK	WHITE	ORANGE	YELLOW	BLANK
C	LTE	2100 (AWS) - 2ND BLOCK	BLANK	WHITE	ORANGE	YELLOW	BLANK
C	LTE	2300 (WCS)	BLANK	WHITE	SLATE	YELLOW	BLANK
C	LTE	2300 (WCS) - 2ND BLOCK	BLANK	WHITE	BROWN	YELLOW	BLANK
C	LTE	2300 (WCS) - SW REPEATER	BLANK	WHITE	BROWN	YELLOW	BLANK
C	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	WHITE	VIOLET	SLATE	BLANK
C	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	WHITE	VIOLET	SLATE	BLANK
C	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	WHITE	YELLOW	SLATE	BLANK
C - SPLIT	LTE	700 (B/C)	BLANK	WHITE	VIOLET	YELLOW	BLANK
C - SPLIT	LTE	850	BLANK	WHITE	VIOLET	YELLOW	BLANK
C - SPLIT	LTE	850 - 2ND BLOCK	BLANK	WHITE	VIOLET	YELLOW	BLANK
C - SPLIT	LTE	1900 (PCS)	BLANK	WHITE	RED	YELLOW	BLANK
C - SPLIT	LTE	1900 (PCS) - 2ND BLOCK	BLANK	WHITE	RED	YELLOW	BLANK
C - SPLIT	LTE	2100 (AWS)	BLANK	WHITE	ORANGE	YELLOW	BLANK
C - SPLIT	LTE	2100 (AWS) - 2ND BLOCK	BLANK	WHITE	ORANGE	YELLOW	BLANK
C - SPLIT	LTE	2300 (WCS)	BLANK	WHITE	SLATE	YELLOW	BLANK
C - SPLIT	LTE	2300 (WCS) - 2ND BLOCK	BLANK	WHITE	BROWN	YELLOW	BLANK
C - SPLIT	LTE	2300 (WCS) - SW REPEATER	BLANK	WHITE	BROWN	YELLOW	BLANK
C - SPLIT	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	WHITE	VIOLET	SLATE	BLANK
C - SPLIT	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	WHITE	VIOLET	SLATE	BLANK
C - SPLIT	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	WHITE	YELLOW	SLATE	BLANK
D	LTE	700 (B/C)	BLANK	ORANGE	VIOLET	YELLOW	BLANK
D	LTE	850	BLANK	ORANGE	YELLOW	YELLOW	BLANK
D	LTE	850 - 2ND BLOCK	BLANK	ORANGE	YELLOW	YELLOW	BLANK
D	LTE	1900 (PCS)	BLANK	ORANGE	RED	YELLOW	BLANK
D	LTE	1900 (PCS) - 2ND BLOCK	BLANK	ORANGE	RED	YELLOW	BLANK
D	LTE	2100 (AWS)	BLANK	ORANGE	ORANGE	YELLOW	BLANK
D	LTE	2100 (AWS) - 2ND BLOCK	BLANK	ORANGE	ORANGE	YELLOW	BLANK
D	LTE	2300 (WCS)	BLANK	ORANGE	SLATE	YELLOW	BLANK
D	LTE	2300 (WCS) - 2ND BLOCK	BLANK	ORANGE	BROWN	YELLOW	BLANK
D	LTE	2300 (WCS) - SW REPEATER	BLANK	ORANGE	BROWN	YELLOW	BLANK
D	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	ORANGE	VIOLET	SLATE	BLANK
D	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	ORANGE	VIOLET	SLATE	BLANK
D	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	ORANGE	YELLOW	SLATE	BLANK
E	LTE	700 (B/C)	BLANK	BROWN	YELLOW	YELLOW	BLANK
E	LTE	850	BLANK	BROWN	YELLOW	YELLOW	BLANK
E	LTE	850 - 2ND BLOCK	BLANK	BROWN	YELLOW	YELLOW	BLANK
E	LTE	1900 (PCS)	BLANK	BROWN	RED	YELLOW	BLANK
E	LTE	1900 (PCS) - 2ND BLOCK	BLANK	BROWN	RED	YELLOW	BLANK
E	LTE	2100 (AWS)	BLANK	BROWN	ORANGE	YELLOW	BLANK
E	LTE	2100 (AWS) - 2ND BLOCK	BLANK	BROWN	ORANGE	YELLOW	BLANK
E	LTE	2300 (WCS)	BLANK	BROWN	SLATE	YELLOW	BLANK
E	LTE	2300 (WCS) - 2ND BLOCK	BLANK	BROWN	BROWN	YELLOW	BLANK
E	LTE	2300 (WCS) - SW REPEATER	BLANK	BROWN	BROWN	YELLOW	BLANK
E	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	BROWN	VIOLET	SLATE	BLANK
E	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	BROWN	VIOLET	SLATE	BLANK
E	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	BROWN	YELLOW	SLATE	BLANK
F	LTE	700 (B/C)	BLANK	ORANGE	YELLOW	YELLOW	BLANK
F	LTE	850	BLANK	ORANGE	YELLOW	YELLOW	BLANK
F	LTE	850 - 2ND BLOCK	BLANK	ORANGE	YELLOW	YELLOW	BLANK
F	LTE	1900 (PCS)	BLANK	ORANGE	RED	YELLOW	BLANK
F	LTE	1900 (PCS) - 2ND BLOCK	BLANK	ORANGE	RED	YELLOW	BLANK
F	LTE	2100 (AWS)	BLANK	ORANGE	ORANGE	YELLOW	BLANK
F	LTE	2100 (AWS) - 2ND BLOCK	BLANK	ORANGE	ORANGE	YELLOW	BLANK
F	LTE	2300 (WCS)	BLANK	ORANGE	SLATE	YELLOW	BLANK
F	LTE	2300 (WCS) - 2ND BLOCK	BLANK	ORANGE	BROWN	YELLOW	BLANK
F	LTE	2300 (WCS) - SW REPEATER	BLANK	ORANGE	BROWN	YELLOW	BLANK
F	LTE	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BLANK	ORANGE	VIOLET	SLATE	BLANK
F	LTE	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BLANK	ORANGE	VIOLET	SLATE	BLANK
F	LTE	8500 / 700 D/E (DUAL RRH)	BLANK	ORANGE	YELLOW	SLATE	BLANK

NOTE 1: PRODUCTS ARE ONLY TO BE USED WHEN ADEQUATE PHYSICAL SPACE EXISTS FOR PROPER INSTALLATION.

NOTE 2: HEAT SHRINK MAY ONLY BE USED AT GROUND LEVEL OR ROOFTOP SITES WHEN APPLIED WITH A HEAT GUN. USE ON TOWERS OR INSTALLING WITH AN OPEN FLAME DEVICE, SUCH AS A TORCH, IS PROHIBITED DUE TO POTENTIAL DAMAGE TO CONNECTORS AND CABLES. HEAT SHRINK IS NOT ALLOWED ON CONNECTIONS TO TOWER TOP EQUIPMENT EVEN IF THE HEAT SHRINK IS APPLIED ON THE GROUND PRIOR TO INSTALLING THE EQUIPMENT ON THE TOWER TOP.

NOTE 3: HEAT SHRINK IS NOT TO BE USED ON RET/AISG CONNECTORS FOUND ON RF DEVICES (RRH/RRU, ANTENNAS, ETC.), DUE TO POSSIBLE DAMAGE BEING CAUSED TO THE DEVICE. IT MAY BE USED ON CONNECTORS ATTACHED TO RET SURGE PROTECTORS.

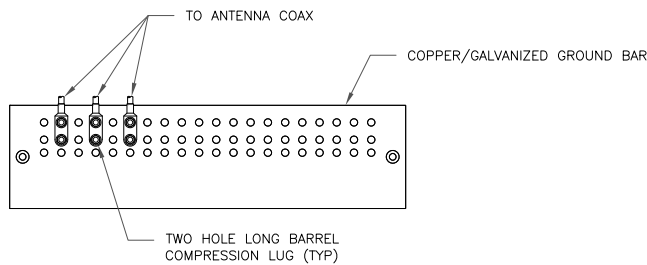
NOTE 4: WHEN GAMMA ELECTRONICS COLD SHRINK IS USED ON FULLY THREADED DIN CONNECTORS THE THREADS MUST HAVE EITHER ROSENBERGER THREAD ADAPTER OR BUTYL APPLIED PRIOR TO THE COLD SHRINK BEING INSTALLED. REFER TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS INCLUDED WITH THE PRODUCT FOR DETAILS.

TABLE 1: E/ PA / S. NJ / DE - COAX COLOR CODE

SECTOR	FREQUENCY BAND	DC TRUCK / DC JUMPER / FIRST FIBER JUMPER			
		ALPHA	BETA	GAMMA	DELTA
	700 (B/C)	GREEN	ORANGE	BLANK	BLANK
	850	GREEN	ORANGE	BLANK	BLANK
	850 - 2ND BLOCK	GREEN	ORANGE	BLANK	BLANK
	1900 (PCS)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) - 2ND BLOCK	BROWN	BROWN	BLANK	BLANK
	2100 (AWS)	WHITE	WHITE	BLANK	BLANK
	2100 (AWS) - 2ND BLOCK	WHITE	WHITE	BLANK	BLANK
	2300 (WCS)	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS) - 2ND BLOCK	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS) - SW REPEATER	BROWN	BROWN	BLANK	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	8500 / 700 D/E (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	700 (B/C)	YELLOW	SLATE	BLANK	BLANK
	850	YELLOW	SLATE	BLANK	BLANK
	850 - 2ND BLOCK	YELLOW	SLATE	BLANK	BLANK
	1900 (PCS)	RED	RED	BLANK	BLANK
	1900 (PCS) - 2ND BLOCK	RED	RED	BLANK	BLANK
	2100 (AWS)	ORANGE	ORANGE	BLANK	BLANK
	2100 (AWS) - 2ND BLOCK	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS)	BROWN	BROWN	BLANK	BLANK
	2300 (WCS) - 2ND BLOCK	BROWN	BROWN	BLANK	BLANK
	2300 (WCS) - SW REPEATER	BROWN	BROWN	BLANK	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	8500 / 700 D/E (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	700 (B/C)	WHITE	YELLOW	BLANK	BLANK
	850	WHITE	YELLOW	BLANK	BLANK
	850 - 2ND BLOCK	WHITE	YELLOW	BLANK	BLANK
	1900 (PCS)	RED	RED	BLANK	BLANK
	1900 (PCS) - 2ND BLOCK	RED	RED	BLANK	BLANK
	2100 (AWS)	ORANGE	ORANGE	BLANK	BLANK
	2100 (AWS) - 2ND BLOCK	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS)	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - 2ND BLOCK	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - SW REPEATER	BROWN	BROWN	BLANK	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	8500 / 700 D/E (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	700 (B/C)	VIOLET	SLATE	BLANK	BLANK
	850	VIOLET	SLATE	BLANK	BLANK
	850 - 2ND BLOCK	VIOLET	SLATE	BLANK	BLANK
	1900 (PCS)	RED	ORANGE	BLANK	BLANK
	1900 (PCS) - 2ND BLOCK	RED	ORANGE	BLANK	BLANK
	2100 (AWS)	ORANGE	ORANGE	BLANK	BLANK
	2100 (AWS) - 2ND BLOCK	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS)	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - 2ND BLOCK	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - SW REPEATER	BROWN	BROWN	BLANK	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	8500 / 700 D/E (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	700 (B/C)	YELLOW	SLATE	BLANK	BLANK
	850	YELLOW	SLATE	BLANK	BLANK
	850 - 2ND BLOCK	YELLOW	SLATE	BLANK	BLANK
	1900 (PCS)	RED	ORANGE	BLANK	BLANK
	1900 (PCS) - 2ND BLOCK	RED	ORANGE	BLANK	BLANK
	2100 (AWS)	ORANGE	ORANGE	BLANK	BLANK
	2100 (AWS) - 2ND BLOCK	ORANGE	ORANGE	BLANK	BLANK
	2300 (WCS)	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - 2ND BLOCK	SLATE	SLATE	BLANK	BLANK
	2300 (WCS) - SW REPEATER	BROWN	BROWN	BLANK	BLANK
	700 (B/C) / 700 FIRSTNET (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	1900 (PCS) / 2100 (AWS) (DUAL RRH)	BROWN	BROWN	BLANK	BLANK
	8500 / 700 D/E (DUAL RRH)	BROWN	BROWN	BLANK	BLANK

WEATHERPROOFING PRODUCT APPLICATION TABLE

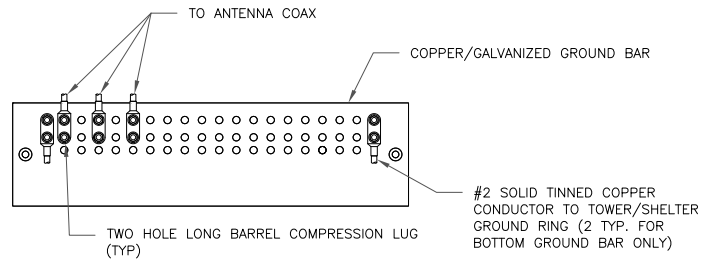




**NOTES:**

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL.

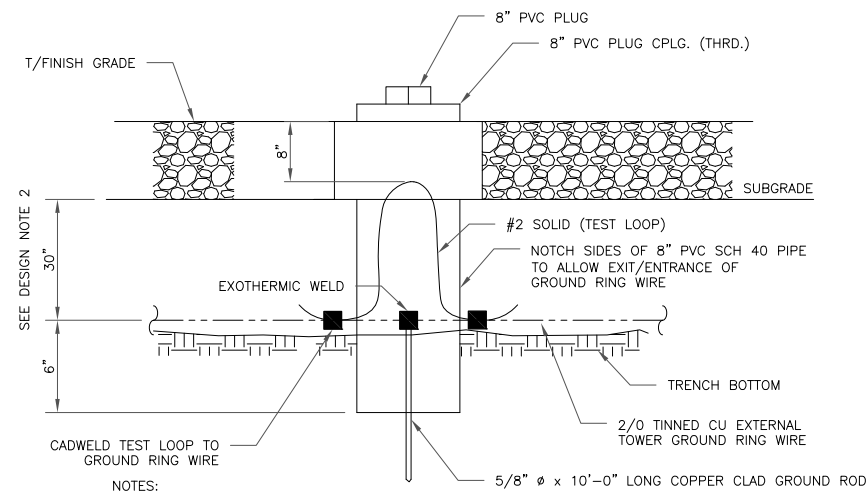
1 ANTENNA GROUND BAR DETAIL  
SCALE: NOT TO SCALE



**NOTES:**

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

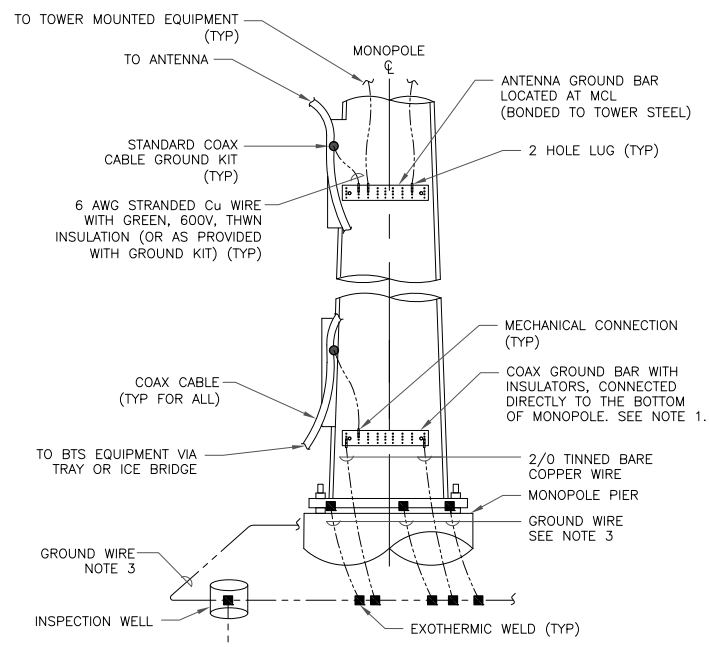
2 TOWER/SHELTER GROUND BAR DETAIL  
SCALE: NOT TO SCALE



**NOTES:**

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D).

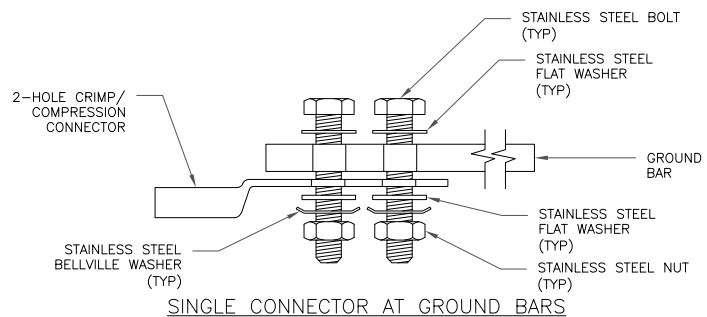
3 INSPECTION WELL DETAIL  
SCALE: NOT TO SCALE



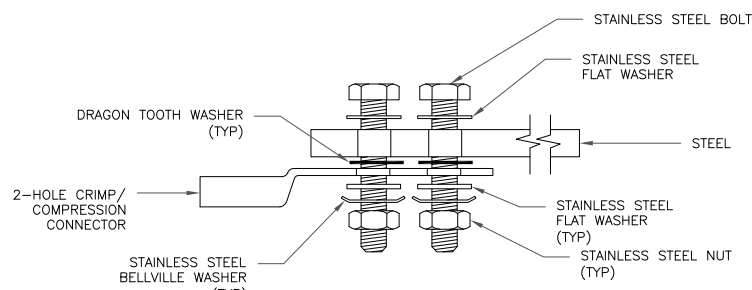
**NOTES:**

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

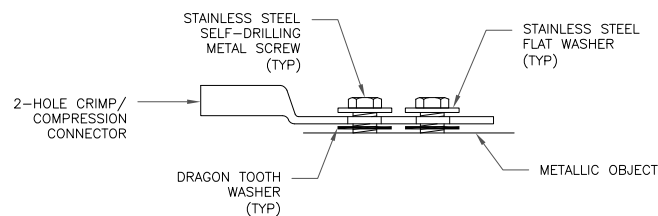
4 TYPICAL ANTENNA CABLE GROUNDING  
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

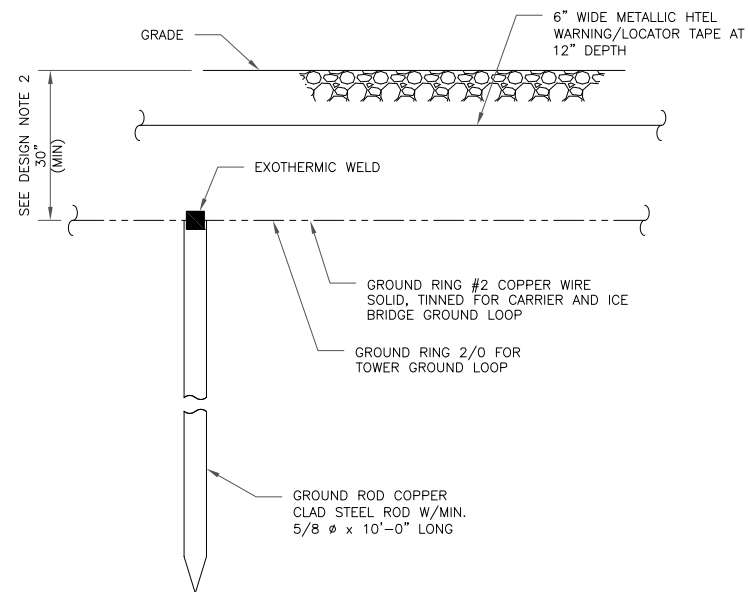


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

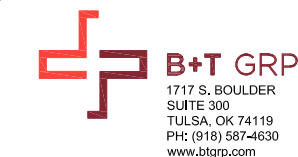
5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS  
SCALE: NOT TO SCALE



**NOTES:**

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL.
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D).

6 GROUND ROD DETAIL  
SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
NHV 109 943107

1432 OLD  
WATERBURY RD  
SOUTHBURY, CT 06488

EXISTING 225.79'  
MONOPOLE

**ISSUED FOR:**

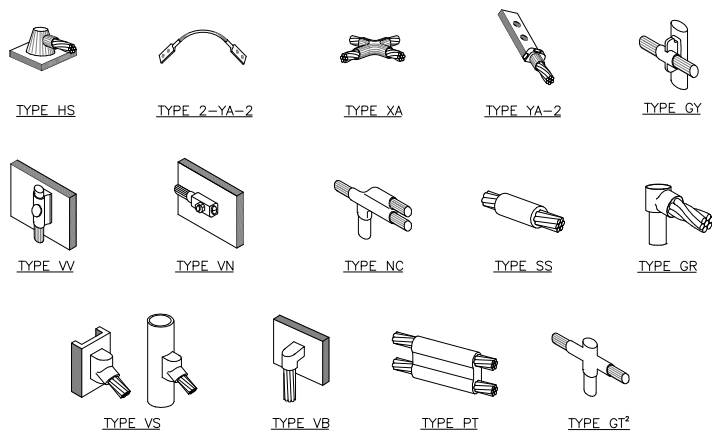
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



B&T ENGINEERING, INC.  
PEC.0001564  
Expires 2/10/21

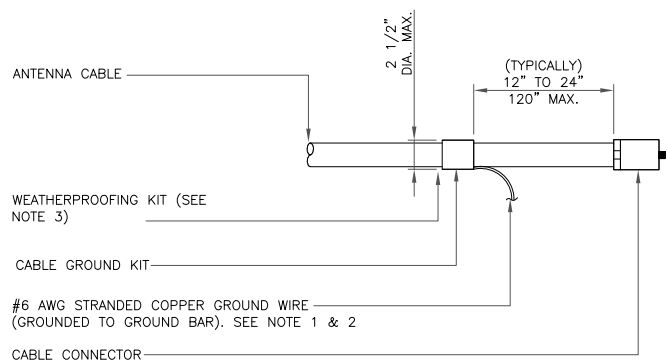
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: **G-1** REVISION: **0**



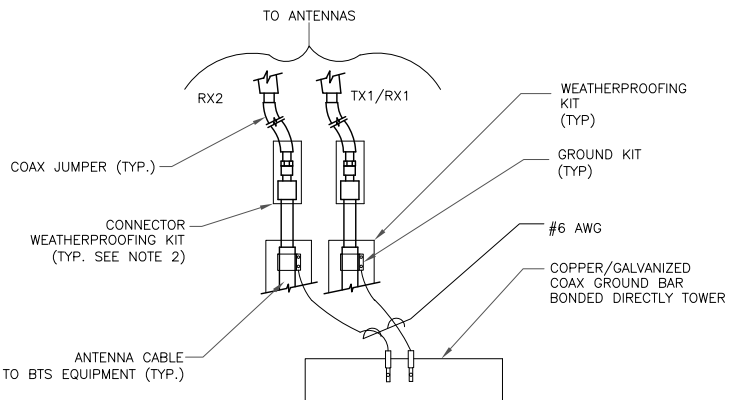
**NOTE:**  
 1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.  
 2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

**1 CADWELD GROUNDING CONNECTIONS**  
 SCALE: NOT TO SCALE



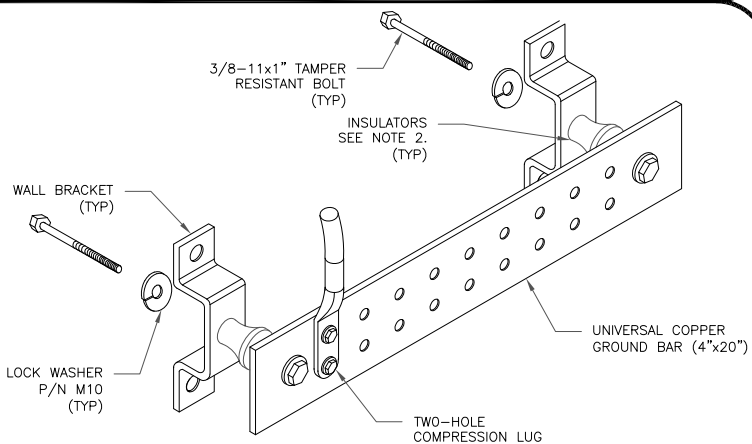
**NOTES:**  
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.  
 2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.  
 3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

**3 CABLE GROUND KIT CONNECTION**  
 SCALE: NOT TO SCALE



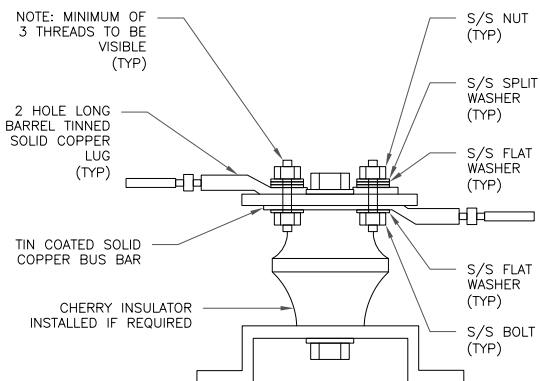
**NOTES:**  
 1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.  
 2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

**4 GROUND CABLE CONNECTION**  
 SCALE: NOT TO SCALE



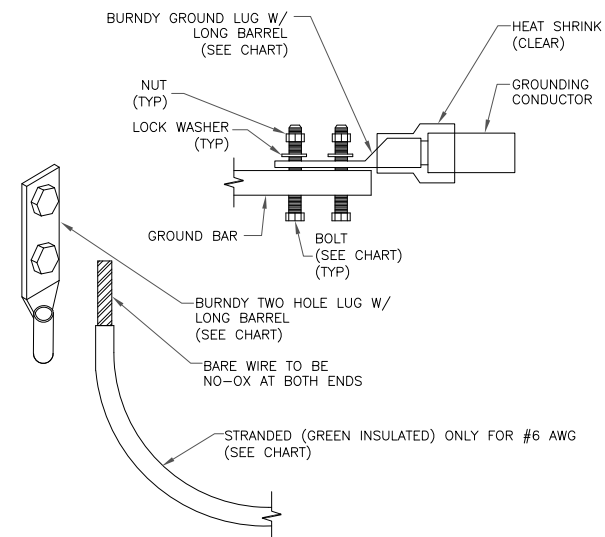
**NOTES:**  
 1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY OAS-STD-10091, NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.  
 2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL. USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

**6 GROUND BAR DETAIL**  
 SCALE: NOT TO SCALE



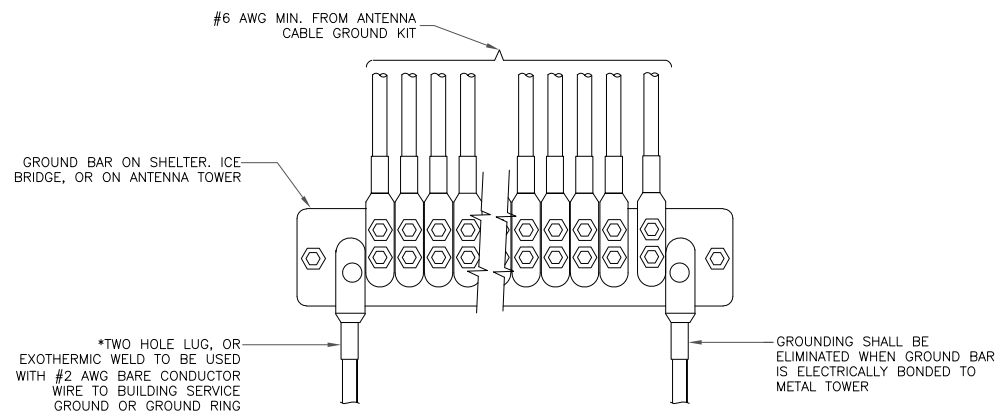
**7 LUG DETAIL**  
 SCALE: NOT TO SCALE

WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT

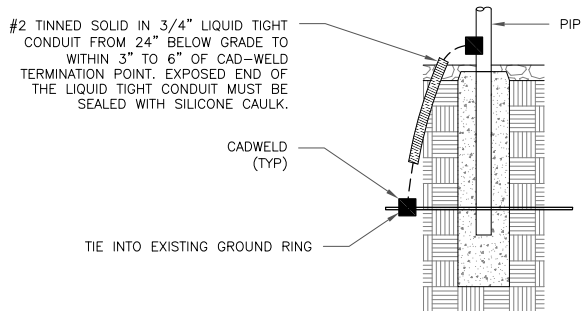


**NOTES:**  
 1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

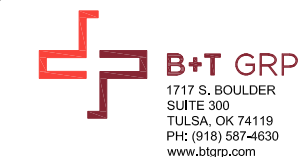
**2 MECHANICAL LUG CONNECTION**  
 SCALE: NOT TO SCALE



**5 GROUNDWIRE INSTALLATION**  
 SCALE: NOT TO SCALE



**8 TRANSITIONING GROUND DETAIL**  
 SCALE: NOT TO SCALE



AT&T SITE NUMBER:  
**CTL02087**

BU #: 806358  
 NHV 109 943107

1432 OLD  
 WATERBURY RD  
 SOUTHURY, CT 06488

EXISTING 225.79'  
 MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	6/12/20	GEH	CONSTRUCTION	RMC



6/12/20

B&T ENGINEERING, INC.  
 PEC.0001564  
 Expires 2/10/21

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER: REVISION:

**G-2** **0**

142310.001\_01\_806358\_NHV\_109\_943107.dwg - Sheet:G-2 - User: rcorson - Jun 12, 2020 - 10:42am



# Exhibit D

## **Structural Analysis Report**

Date: **March 27, 2020**

Cheryl Schultz  
Crown Castle  
6325 Ardrey Kell RddSuite 600  
Charlotte, NC 28277



Black & Veatch Corp.  
6800 W. 115th St., Suite 2292  
Overland Park, KS 66211  
(913) 458-6909

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Co-Locate**  
**Carrier Site Number:** 14207  
**Carrier Site Name:** PRESTON HILL

**Crown Castle Designation:** **Crown Castle BU Number:** 806358  
**Crown Castle Site Name:** NHV 109 943107  
**Crown Castle JDE Job Number:** 596313  
**Crown Castle Work Order Number:** 1835088  
**Crown Castle Order Number:** 509320 Rev. 0

**Engineering Firm Designation:** **Black & Veatch Corp. Project Number:** 400087

**Site Data:** **1432 Old Waterbury Road, Southbury, New Haven County, CT**  
**Latitude 41° 29' 36.92", Longitude -73° 9' 54.98"**  
**225.79 Foot - Monopole Tower**

Dear Cheryl Schultz,

*Black & Veatch Corp.* is pleased to submit this “**Structural Analysis Report**” to determine the structural integrity of the above mentioned tower.

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: Proposed Equipment Configuration

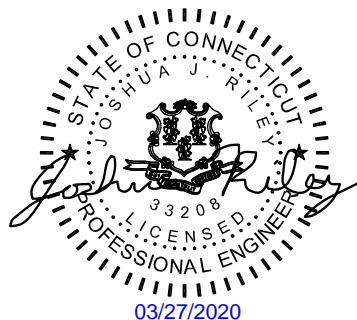
**Sufficient Capacity – 67.8%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Kochakorn Mokaranurak / Thunwa Chalermyan

Respectfully submitted by:

Joshua J. Riley, P.E.  
Professional Engineer



## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

Table 2 - Other Considered Equipment

### 3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Table 5 - Tower Component Stresses vs. Capacity - LC5

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Base Level Drawing

### 7) APPENDIX C

Additional Calculations

## 1) INTRODUCTION

This tower is a 225.79 ft Monopole tower designed by Engineered Endeavors, Inc.

The tower has been modified multiple times in the past to accommodate additional loading.

The tower has been modified per reinforcement drawings by Vertical Structures Inc. in January of 2007. Reinforcement consists of addition of 28 base plate stiffeners. Refer Post Rework Inspection Report prepared by Vertical Structures Inc. This modification has been considered effective in this analysis.

The tower was later reinforced per reinforcement drawings by Tower Engineering Professionals. in March of 2013. Reinforcement consists of addition of flat plates at flats 1,7 and 13 between the elevation 124' to 134'. Refer Post Modification Inspection Report prepared by Tower Engineering Professionals. This modification has been considered ineffective in this analysis.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	120 mph
<b>Exposure Category:</b>	C
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.500 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	60 mph

**Table 1 - Proposed Equipment Configuration**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
193.0	195.0	3	cci antennas	DTMABP7819VG12A	2 6 12 1	3/8 5/8 1-1/4 conduit
		3	cci antennas	OPA-65R-LCUU-H6 w/ Mount Pipe		
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 11 B12		
		3	ericsson	RRUS 32 B2_CCIV2		
		3	ericsson	RRUS 4426 B66		
		3	ericsson	RRUS 4478 B14_CCIV2		
		3	ericsson	WCS RRUS-32-B30		
		3	kaelus	DBC0061F1V51-2		
		3	kathrein	800 10121 w/ Mount Pipe		
		3	kathrein	80010798 w/ Mount Pipe		
		6	kathrein	860 10025		
		3	raycap	DC6-48-60-18-8F		
	193.0	3	sabre	C10857333C [SM 504-3]		

**Table 2 - Other Considered Equipment**

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
228.0	229.0	3	alcatel lucent	B13 RRH 4X30	14	1-5/8
		3	alcatel lucent	B4 RRH2X60-4R		
		6	antel	LPA-80080/6CF w/ Mount Pipe		
		6	commscope	SBNHH-1D65B w/ Mount Pipe		
		2	raycap	RRFDC-3315-PF-48		
	12	rfs celwave	FD9R6004/2C-3L			
	228.0	1	cci tower mounts (v2.1)	Platform Mount (10' LP 101-1)		
1		cci tower mounts (v2.1)	Side Arm Mount [SO 203-3]			
205.0	207.0	3	commscope	ATSBT-TOP-MF-4G	12	1-5/8
		3	commscope	LNx-6515DS-A1M w/ Mount Pipe		
		3	ericsson	KRY 112 489/2		
		3	rfs celwave	APXV18-206516S-C-A20 w/ Mount Pipe		
	205.0	1	cci tower mounts (v2.1)	Platform Mount [LP 712-1]		
185.0	187.0	3	decibel	978QNB120E-M w/ Mount Pipe	6	1/2 1-5/8
		6	ems wireless	FV90-16-02DP w/ Mount Pipe		
		3	nokia	CS72993.07		
		3	rfs celwave	APXV18-206517S-C w/ Mount Pipe		
	185.0	1	cci tower mounts (v2.1)	Platform Mount [LP 712-1]		
173.0	173.0	3	alcatel lucent	1900MHz RRH (65MHz)	-	-
		3	alcatel lucent	800 EXTERNAL NOTCH FILTER		
		3	alcatel lucent	800MHZ RRH		
		1	cci tower mounts (v2.1)	Side Arm Mount [SO 102-3]		
		9	rfs celwave	ACU-A20-N		
172.0	174.0	3	alcatel lucent	TD-RRH8x20-25	4	1-1/4
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
	172.0	1	cci tower mounts (v2.1)	Platform Mount [LP 1201-1]		
72.0	73.0	1	gps	GPS_A	1	1/2
	72.0	1	cci tower mounts (v2.1)	Side Arm Mount [SO 701-1]		

### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	East Coast Drilling & Boring Inc.	217688	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavours Inc.	821496	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavours Inc.	821494	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures Inc.	1276594	CCISITES
4-POST-MODIFICATION INSPECTION	Vertical Structures Inc.	1863184	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Vertical Structures Inc.	4062841	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals.	4062849	CCISITES

#### 3.1) Analysis Method

tnxTower (version 8.0.5.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

#### 3.2) Assumptions

- 1) Tower and structures were maintained in accordance with the TIA-222 standard.
- 2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

### 4) ANALYSIS RESULTS

**Table 4 - Section Capacity (Summary) (Monopole Tower)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	225.79 - 197.75	Pole	TP28.6563x21.5x0.1875	1	-6.56	1002.63	38.7	Pass
L2	197.75 - 162.72	Pole	TP37.0938x27.24x0.375	2	-23.84	2589.87	43.3	Pass
L3	162.72 - 120.09	Pole	TP47.1563x35.0487x0.4375	3	-37.56	3846.58	55.5	Pass
L4	120.09 - 79	Pole	TP56.6563x44.6591x0.5	4	-55.03	5287.53	56.2	Pass
L5	79 - 38.93	Pole	TP65.7813x53.7414x0.5625	5	-77.19	6910.69	53.8	Pass
L6	38.93 - 0	Pole	TP74.5x62.4529x0.5625	6	-108.54	8108.48	58.4	Pass
							Summary	
						Pole (L6)	58.4	Pass
						Rating =	58.4	Pass

**Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC5**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.1	Pass
	Base Plate		39.2	Pass
	Base plate stiffeners		44.7	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	67.8	Pass

<b>Structure Rating (max from all components) =</b>	<b>67.8%</b>
---	--------------

Notes:

- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity. Rating per TIA-222-H Section 15.5.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

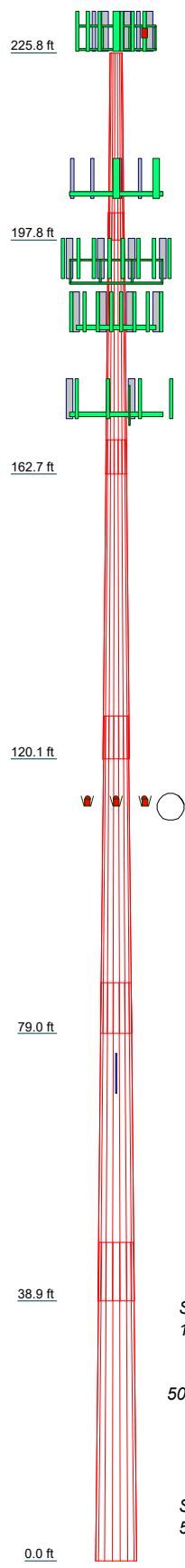
**4.1) Recommendations**

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

**APPENDIX A**  
**TNXTOWER OUTPUT**



Section	1	2	3	4	5	6
Length (ft)	28.04	38.11	47.77	47.49	47.65	47.65
Number of Sides	18	18	18	18	18	18
Thickness (in)	0.1875	0.3750	0.4375	0.5000	0.5625	0.5625
Socket Length (ft)	4.08	5.14	6.40	7.58	8.72	8.72
Top Dia (in)	21.5000	27.2400	35.0487	44.6591	53.7414	62.4529
Bot Dia (in)	28.6563	37.0938	47.1563	56.6563	65.7813	74.5000
Grade	A572-65					
Weight (K)	1.4	5.0	9.2	12.9	17.1	19.7



**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 58.4%

ALL REACTIONS ARE FACTORED

AXIAL 167 K  
 SHEAR 15 K      MOMENT 2383 kip-ft  
 TORQUE 1 kip-ft  
 50 mph WIND - 1.5000 in ICE

AXIAL 109 K  
 SHEAR 52 K      MOMENT 8110 kip-ft  
 TORQUE 3 kip-ft  
 REACTIONS - 120 mph WIND

 <b>BLACK &amp; VEATCH</b> Building a world of difference.®	<b>Black &amp; Veatch Corp.</b> 6800 W. 115th St., Suite 2292 Overland Park, KS 66211 Phone: (913) 458-6909 FAX:		Job: <b>NHV 109 943107 (BU# 806358)</b> Project: <b>400087 (806358.1835088)</b>
	Client: Crown Castle Code: TIA-222-H Path:	Drawn by: Thunwa Chalermyan Date: 03/27/20	App'd: Scale: NTS Dwg No. E-1

## Tower Input Data

The tower is a monopole.  
 This tower is designed using the TIA-222-H standard.  
 The following design criteria apply:

- 1) Tower is located in New Haven County, Connecticut.
- 2) Tower base elevation above sea level: 666.00 ft.
- 3) Basic wind speed of 120 mph.
- 4) Risk Category II.
- 5) Exposure Category C.
- 6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 7) Topographic Category: 1.
- 8) Crest Height: 0.00 ft.
- 9) Nominal ice thickness of 1.5000 in.
- 10) Ice thickness is considered to increase with height.
- 11) Ice density of 56 pcf.
- 12) A wind speed of 50 mph is used in combination with ice.
- 13) Temperature drop of 50 °F.
- 14) Deflections calculated using a wind speed of 60 mph.
- 15) A non-linear (P-delta) analysis was used.
- 16) Pressures are calculated at each section.
- 17) Stress ratio used in pole design is 1.05.
- 18) Tower analysis based on target reliabilities in accordance with Annex S.
- 19) Load Modification Factors used:  $K_{es}(F_w) = 0.95$ ,  $K_{es}(t_i) = 0.85$ .
- 20) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

## Options

Consider Moments - Legs Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification Use Code Stress Ratios Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
--	---	---

## Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	225.79-197.75	28.04	4.08	18	21.5000	28.6563	0.1875	0.7500	A572-65 (65 ksi)

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
L2	197.75-162.72	39.11	5.14	18	27.2400	37.0938	0.3750	1.5000	A572-65 (65 ksi)
L3	162.72-120.09	47.77	6.40	18	35.0487	47.1563	0.4375	1.7500	A572-65 (65 ksi)
L4	120.09-79.00	47.49	7.58	18	44.6591	56.6563	0.5000	2.0000	A572-65 (65 ksi)
L5	79.00-38.93	47.65	8.72	18	53.7414	65.7813	0.5625	2.2500	A572-65 (65 ksi)
L6	38.93-0.00	47.65		18	62.4529	74.5000	0.5625	2.2500	A572-65 (65 ksi)

### Tapered Pole Properties

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	21.8027	12.6836	727.8616	7.5659	10.9220	66.6418	1456.6810	6.3430	3.4540	18.421
	29.0694	16.9425	1734.8057	10.1064	14.5574	119.1702	3471.8941	8.4728	4.7135	25.139
L2	28.6462	31.9760	2915.6455	9.5371	13.8379	210.6999	5835.1275	15.9911	4.1342	11.025
	37.6081	43.7045	7444.5646	13.0352	18.8436	395.0707	14898.9250	21.8564	5.8685	15.649
L3	36.8448	48.0620	7274.0008	12.2870	17.8048	408.5427	14557.5728	24.0356	5.3986	12.34
	47.8162	64.8748	17889.4123	16.5852	23.9554	746.7807	35802.3639	32.4436	7.5295	17.21
L4	46.9127	70.0806	17265.3834	15.6765	22.6868	761.0307	34553.4851	35.0469	6.9800	13.96
	57.4531	89.1200	35506.5661	19.9355	28.7814	1233.6647	71059.8527	44.5685	9.0915	18.183
L5	56.4284	94.9442	33922.1987	18.8785	27.3006	1242.5436	67889.0330	47.4811	8.4685	15.055
	66.7093	116.4399	62572.6159	23.1527	33.4169	1872.4856	125227.5665	58.2310	10.5875	18.822
L6	65.5682	110.4976	53473.3716	21.9711	31.7261	1685.4698	107017.1048	55.2593	10.0017	17.781
	75.5625	132.0062	91171.9378	26.2478	37.8460	2409.0244	182463.8419	66.0156	12.1220	21.55

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 225.79- 197.75				1	1	1			
L2 197.75- 162.72				1	1	1			
L3 162.72- 120.09				1	1	1			
L4 120.09- 79.00				1	1	1			
L5 79.00- 38.93				1	1	1			
L6 38.93-0.00				1	1	1			

### Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Componen t Type	Placement ft	Total Number	Number Per Row	Start/En d Position	Width or Diamete r in	Perimete r in	Weight plf
-------------	--------	--	-----------------------	-----------------	-----------------	-------------------	---------------------------	--------------------------------	---------------------	---------------

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
Safety Line 3/8	A	No	Surface Ar (CaAa)	225.79 - 0.00	1	1	-0.090 -0.080	0.3750		0.22
HB158-1-08U8-S8J18(1-5/8)	C	No	Surface Ar (CaAa)	225.79 - 0.00	2	2	0.220 0.280	1.9800		1.30
(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-BRDA(5/8)	A	No	Surface Ar (CaAa)	193.00 - 0.00	5	5	-0.443 -0.300	1.5500		0.60
***										
LDF4-50A(1/2)	C	No	Surface Ar (CaAa)	185.00 - 0.00	1	1	0.475 0.486	0.6250		0.15
LDF7-50A(1-5/8)	C	No	Surface Ar (CaAa)	185.00 - 0.00	6	6	0.285 0.500	1.9800		0.82
***										
PL1x6 Reinforcement - Wind Area/Weight	A	No	Surface Af (CaAa)	134.00 - 124.00	1	1	0.000 0.000	6.0000	14.0000	20.41
PL1x6 Reinforcement - Wind Area/Weight	B	No	Surface Af (CaAa)	134.00 - 124.00	1	1	0.000 0.000	6.0000	14.0000	20.41
PL1x6 Reinforcement - Wind Area/Weight	C	No	Surface Af (CaAa)	134.00 - 124.00	1	1	0.000 0.000	6.0000	14.0000	20.41
***										

### Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
***									
561(1-5/8)	C	No	No	Inside Pole	225.79 - 0.00	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.35 1.35 1.35 1.35
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	205.00 - 0.00	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.82 0.82 0.82 0.82
AVA7-50(1-5/8)	C	No	No	Inside Pole	205.00 - 0.00	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.70 0.70 0.70 0.70
***									
2" innerduct conduit	C	No	No	Inside Pole	193.00 - 0.00	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.20 0.20 0.20 0.20
LDF6-50A(1-1/4)	C	No	No	Inside Pole	193.00 - 0.00	9	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.60 0.60 0.60 0.60
WR-VG82ST-BRDA(5/8)	C	No	No	Inside Pole	193.00 - 0.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.31 0.31 0.31 0.31
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	193.00 - 0.00	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.06 0.06 0.06 0.06
***									
HB114-1-0813U4-M5J(1-1/4)	C	No	No	Inside Pole	172.00 - 0.00	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	1.20 1.20 1.20 1.20
HB114-21U3M12-XXXF(1-1/4)	C	No	No	Inside Pole	172.00 - 0.00	1	No Ice 1/2" Ice	0.00 0.00	1.22 1.22

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C <sub>A</sub> A <sub>A</sub> ft <sup>2</sup> /ft	Weight plf
							1" Ice	0.00	1.22
							2" Ice	0.00	1.22
***									
LDF4-50A(1/2)	C	No	No	Inside Pole	72.00 - 0.00	1	No Ice	0.00	0.15
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
							2" Ice	0.00	0.15
***									

**Feed Line/Linear Appurtenances Section Areas**

Tower Section	Tower Elevation ft	Face	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	225.79-197.75	A	0.000	0.000	1.052	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	11.104	0.000	0.59
L2	197.75-162.72	A	0.000	0.000	24.781	0.000	0.10
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	41.733	0.000	1.33
L3	162.72-120.09	A	0.000	0.000	43.758	0.000	0.34
		B	0.000	0.000	9.121	0.000	0.20
		C	0.000	0.000	79.312	0.000	2.09
L4	120.09-79.00	A	0.000	0.000	33.386	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	67.655	0.000	1.81
L5	79.00-38.93	A	0.000	0.000	32.557	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	65.975	0.000	1.77
L6	38.93-0.00	A	0.000	0.000	31.631	0.000	0.13
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	64.098	0.000	1.72

**Feed Line/Linear Appurtenances Section Areas - With Ice**

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A <sub>R</sub> ft <sup>2</sup>	A <sub>F</sub> ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> In Face ft <sup>2</sup>	C <sub>A</sub> A <sub>A</sub> Out Face ft <sup>2</sup>	Weight K
L1	225.79-197.75	A	1.535	0.000	0.000	9.660	0.000	0.11
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	24.640	0.000	0.85
L2	197.75-162.72	A	1.510	0.000	0.000	53.022	0.000	0.65
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	80.651	0.000	2.19
L3	162.72-120.09	A	1.474	0.000	0.000	82.613	0.000	1.19
		B		0.000	0.000	10.743	0.000	0.32
		C		0.000	0.000	142.885	0.000	3.60
L4	120.09-79.00	A	1.423	0.000	0.000	68.600	0.000	0.82
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	126.321	0.000	3.12
L5	79.00-38.93	A	1.351	0.000	0.000	65.982	0.000	0.77
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	121.761	0.000	3.00
L6	38.93-0.00	A	1.211	0.000	0.000	62.836	0.000	0.71
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	116.324	0.000	2.84

### Feed Line Center of Pressure

Section	Elevation	$CP_x$	$CP_z$	$CP_x$ Ice	$CP_z$ Ice
	ft	in	in	in	in
L1	225.79-197.75	-1.5790	2.2607	-2.1401	1.8726
L2	197.75-162.72	-6.6406	4.7032	-5.8324	3.7342
L3	162.72-120.09	-7.3222	5.2697	-6.8432	4.5101
L4	120.09-79.00	-9.0208	6.4882	-8.1867	5.3972
L5	79.00-38.93	-9.6122	6.9108	-8.8740	5.8583
L6	38.93-0.00	-10.0838	7.2478	-9.4018	6.2232

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

### Shielding Factor $K_a$

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	$K_a$ No Ice	$K_a$ Ice
L1	1	Safety Line 3/8	197.75 - 225.79	1.0000	1.0000
L1	4	HB158-1-08U8-S8J18(1-5/8)	197.75 - 225.79	1.0000	1.0000
L1	16	(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-BRDA(5/8)	197.75 - 193.00	1.0000	1.0000
L1	18	LDF4-50A(1/2)	197.75 - 185.00	1.0000	1.0000
L1	19	LDF7-50A(1-5/8)	197.75 - 185.00	1.0000	1.0000
L2	1	Safety Line 3/8	162.72 - 197.75	1.0000	1.0000
L2	4	HB158-1-08U8-S8J18(1-5/8)	162.72 - 197.75	1.0000	1.0000
L2	16	(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-BRDA(5/8)	162.72 - 193.00	1.0000	1.0000
L2	18	LDF4-50A(1/2)	162.72 - 185.00	1.0000	1.0000
L2	19	LDF7-50A(1-5/8)	162.72 - 185.00	1.0000	1.0000
L2	26	PL1x6 Reinforcement - Wind Area/Weight	162.72 - 134.00	1.0000	1.0000
L2	27	PL1x6 Reinforcement - Wind Area/Weight	162.72 - 134.00	1.0000	1.0000
L2	28	PL1x6 Reinforcement - Wind Area/Weight	162.72 - 134.00	1.0000	1.0000
L3	1	Safety Line 3/8	120.09 - 162.72	1.0000	1.0000
L3	4	HB158-1-08U8-S8J18(1-5/8)	120.09 - 162.72	1.0000	1.0000
L3	16	(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-BRDA(5/8)	120.09 - 162.72	1.0000	1.0000
L3	18	LDF4-50A(1/2)	120.09 - 162.72	1.0000	1.0000
L3	19	LDF7-50A(1-5/8)	120.09 - 162.72	1.0000	1.0000
L4	1	Safety Line 3/8	79.00 - 120.09	1.0000	1.0000
L4	4	HB158-1-08U8-S8J18(1-5/8)	79.00 - 120.09	1.0000	1.0000
L4	16	(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-	79.00 - 120.09	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
L4	18	BRDA(5/8) LDF4-50A(1/2)	79.00 - 120.09	1.0000	1.0000
L4	19	LDF7-50A(1-5/8)	79.00 - 120.09	1.0000	1.0000
L5	1	Safety Line 3/8	38.93 - 79.00	1.0000	1.0000
L5	4	HB158-1-08U8-S8J18(1-5/8)	38.93 - 79.00	1.0000	1.0000
L5	16	(3)LDF6-50A(1-1/4)+(4)WR-VG82ST-BRDA(5/8)	38.93 - 79.00	1.0000	1.0000
L5	18	LDF4-50A(1/2)	38.93 - 79.00	1.0000	1.0000
L5	19	LDF7-50A(1-5/8)	38.93 - 79.00	1.0000	1.0000

### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
Lightning Rod 5/8"x5'	C	From Leg	4.00 0.00 2.00	0.0000	226.00	No Ice	0.31	0.31	0.01
						1/2" Ice	0.83	0.83	0.01
						Ice	1.32	1.32	0.02
						1" Ice	1.96	1.96	0.04
						2" Ice			
Flash Beacon Lighting	B	From Leg	4.00 0.00 2.00	0.0000	226.00	No Ice	2.70	2.70	0.05
						1/2" Ice	3.10	3.10	0.07
						Ice	3.50	3.50	0.09
						1" Ice	4.30	4.30	0.13
						2" Ice			
Beacon side markers	A	From Face	3.00 0.00 0.00	0.0000	113.00	No Ice	0.93	0.93	0.02
						1/2" Ice	1.07	1.07	0.03
						Ice	1.21	1.21	0.03
						1" Ice	1.49	1.49	0.04
						2" Ice			
Beacon side markers	B	From Face	3.00 0.00 0.00	0.0000	113.00	No Ice	0.93	0.93	0.02
						1/2" Ice	1.07	1.07	0.03
						Ice	1.21	1.21	0.03
						1" Ice	1.49	1.49	0.04
						2" Ice			
Beacon side markers	C	From Face	3.00 0.00 0.00	0.0000	113.00	No Ice	0.93	0.93	0.02
						1/2" Ice	1.07	1.07	0.03
						Ice	1.21	1.21	0.03
						1" Ice	1.49	1.49	0.04
						2" Ice			
*** Platform Mount (10' LP 101-1)	C	None		0.0000	228.00	No Ice	29.86	29.86	1.25
						1/2" Ice	34.15	34.15	1.93
						Ice	38.81	38.81	2.72
						1" Ice	50.38	50.38	4.59
						2" Ice			
Side Arm Mount [SO 203-3]	C	None		0.0000	228.00	No Ice	6.68	6.68	0.38
						1/2" Ice	8.05	8.05	0.46
						Ice	9.55	9.55	0.57
						1" Ice	12.80	12.80	0.87
						2" Ice			

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub>		Weight	
			Horz	Lateral			Front	Side		
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K	
Transition Ladder	C	From Leg	2.00		0.0000	228.00	No Ice	6.00	6.00	0.16
			0.00				1/2"	8.00	8.00	0.24
			-2.00				Ice	10.00	10.00	0.32
							1" Ice	14.00	14.00	0.48
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			-1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			-1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			-1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	A	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	B	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
SBNHH-1D65B w/ Mount Pipe	C	From Leg	3.00		0.0000	228.00	No Ice	4.09	3.30	0.07
			1.67				1/2"	4.49	3.68	0.13
			1.00				Ice	4.89	4.07	0.20
							1" Ice	5.72	4.87	0.39
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	A	From Leg	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			5.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	B	From Leg	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			5.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	C	From Leg	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			5.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	A	From Face	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			0.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	B	From Face	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			0.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			
LPA-80080/6CF w/ Mount Pipe	C	From Face	3.00		0.0000	228.00	No Ice	4.56	10.26	0.05
			0.00				1/2"	5.11	11.43	0.11
			1.00				Ice	5.61	12.31	0.19
							1" Ice	6.65	14.13	0.36
							2" Ice			



Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
			ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
B4 RRH2X60-4R	A	From Leg	3.00	0.0000	228.00	No Ice	3.36	2.00	0.06
			0.00	1/2"		3.61	2.24	0.08	
			1.00	Ice		3.88	2.48	0.10	
				1" Ice		4.42	2.97	0.17	
				2" Ice					
B4 RRH2X60-4R	B	From Leg	3.00	0.0000	228.00	No Ice	3.36	2.00	0.06
			0.00	1/2"		3.61	2.24	0.08	
			1.00	Ice		3.88	2.48	0.10	
				1" Ice		4.42	2.97	0.17	
				2" Ice					
B4 RRH2X60-4R	C	From Leg	3.00	0.0000	228.00	No Ice	3.36	2.00	0.06
			0.00	1/2"		3.61	2.24	0.08	
			1.00	Ice		3.88	2.48	0.10	
				1" Ice		4.42	2.97	0.17	
				2" Ice					
B13 RRH 4X30	A	From Leg	3.00	0.0000	228.00	No Ice	2.06	1.32	0.06
			0.00	1/2"		2.24	1.48	0.07	
			1.00	Ice		2.43	1.64	0.09	
				1" Ice		2.84	2.00	0.14	
				2" Ice					
B13 RRH 4X30	B	From Leg	3.00	0.0000	228.00	No Ice	2.06	1.32	0.06
			0.00	1/2"		2.24	1.48	0.07	
			1.00	Ice		2.43	1.64	0.09	
				1" Ice		2.84	2.00	0.14	
				2" Ice					
B13 RRH 4X30	C	From Leg	3.00	0.0000	228.00	No Ice	2.06	1.32	0.06
			0.00	1/2"		2.24	1.48	0.07	
			1.00	Ice		2.43	1.64	0.09	
				1" Ice		2.84	2.00	0.14	
				2" Ice					
(4) FD9R6004/2C-3L	A	From Leg	3.00	0.0000	228.00	No Ice	0.31	0.08	0.00
			0.00	1/2"		0.39	0.12	0.01	
			1.00	Ice		0.47	0.17	0.01	
				1" Ice		0.65	0.29	0.02	
				2" Ice					
(4) FD9R6004/2C-3L	B	From Leg	3.00	0.0000	228.00	No Ice	0.31	0.08	0.00
			0.00	1/2"		0.39	0.12	0.01	
			1.00	Ice		0.47	0.17	0.01	
				1" Ice		0.65	0.29	0.02	
				2" Ice					
(4) FD9R6004/2C-3L	C	From Leg	3.00	0.0000	228.00	No Ice	0.31	0.08	0.00
			0.00	1/2"		0.39	0.12	0.01	
			1.00	Ice		0.47	0.17	0.01	
				1" Ice		0.65	0.29	0.02	
				2" Ice					
RRFDC-3315-PF-48	B	From Leg	3.00	0.0000	228.00	No Ice	3.71	2.19	0.02
			0.00	1/2"		3.95	2.39	0.05	
			1.00	Ice		4.20	2.61	0.09	
				1" Ice		4.72	3.05	0.17	
				2" Ice					
RRFDC-3315-PF-48	C	From Leg	3.00	0.0000	228.00	No Ice	3.71	2.19	0.02
			0.00	1/2"		3.95	2.39	0.05	
			1.00	Ice		4.20	2.61	0.09	
				1" Ice		4.72	3.05	0.17	
				2" Ice					
***									
Platform Mount [LP 712-1]	C	None		0.0000	205.00	No Ice	24.56	24.56	1.34
				1/2"		27.92	27.92	1.91	
				Ice		31.27	31.27	2.55	
				1" Ice		37.98	37.98	3.97	
				2" Ice					
Transition Ladder	B	From Face	2.00	0.0000	205.00	No Ice	6.00	6.00	0.16
			0.00	1/2"		8.00	8.00	0.24	
			-2.00	Ice		10.00	10.00	0.32	
				1" Ice		14.00	14.00	0.48	

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
APXV18-206516S-C-A20 w/ Mount Pipe	A	From Face	3.00 -6.00 2.00	0.0000	205.00	2" Ice			
						No Ice	2.55	2.15	0.04
						1/2"	2.96	2.55	0.07
						Ice	3.38	2.96	0.11
						1" Ice	4.26	3.83	0.21
APXV18-206516S-C-A20 w/ Mount Pipe	B	From Face	3.00 -6.00 2.00	0.0000	205.00	2" Ice			
						No Ice	2.55	2.15	0.04
						1/2"	2.96	2.55	0.07
						Ice	3.38	2.96	0.11
						1" Ice	4.26	3.83	0.21
APXV18-206516S-C-A20 w/ Mount Pipe	C	From Face	3.00 -6.00 2.00	0.0000	205.00	2" Ice			
						No Ice	2.55	2.15	0.04
						1/2"	2.96	2.55	0.07
						Ice	3.38	2.96	0.11
						1" Ice	4.26	3.83	0.21
LNX-6515DS-A1M w/ Mount Pipe	A	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	5.31	4.27	0.08
						1/2"	5.80	4.75	0.17
						Ice	6.30	5.24	0.26
						1" Ice	7.33	6.24	0.49
LNX-6515DS-A1M w/ Mount Pipe	B	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	5.31	4.27	0.08
						1/2"	5.80	4.75	0.17
						Ice	6.30	5.24	0.26
						1" Ice	7.33	6.24	0.49
LNX-6515DS-A1M w/ Mount Pipe	C	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	5.31	4.27	0.08
						1/2"	5.80	4.75	0.17
						Ice	6.30	5.24	0.26
						1" Ice	7.33	6.24	0.49
KRY 112 489/2	A	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.56	0.37	0.02
						1/2"	0.66	0.45	0.02
						Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
KRY 112 489/2	B	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.56	0.37	0.02
						1/2"	0.66	0.45	0.02
						Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
KRY 112 489/2	C	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.56	0.37	0.02
						1/2"	0.66	0.45	0.02
						Ice	0.76	0.54	0.03
						1" Ice	1.00	0.75	0.05
ATSBT-TOP-MF-4G	A	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.17	0.09	0.00
						1/2"	0.23	0.14	0.00
						Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
ATSBT-TOP-MF-4G	B	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.17	0.09	0.00
						1/2"	0.23	0.14	0.00
						Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
ATSBT-TOP-MF-4G	C	From Face	3.00 0.00 2.00	0.0000	205.00	2" Ice			
						No Ice	0.17	0.09	0.00
						1/2"	0.23	0.14	0.00
						Ice	0.29	0.19	0.01
						1" Ice	0.44	0.32	0.01
***									
Sabre C10857333C [SM 504-3]	C	None		0.0000	193.00	No Ice	31.05	31.05	1.71
						1/2"	43.83	43.83	2.33
						Ice	56.44	56.44	3.14

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C <sub>AA</sub> Front	C <sub>AA</sub> Side	Weight
			Horz	Lateral					
Transition Ladder	C	From Leg	2.00	0.0000	193.00	1" Ice	81.28	81.28	5.36
						2" Ice			
						No Ice	6.00	6.00	0.16
						1/2" Ice	8.00	8.00	0.24
						Ice	10.00	10.00	0.32
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	193.00	1" Ice	14.00	14.00	0.48
						2" Ice			
						No Ice	12.25	6.05	0.09
						1/2" Ice	13.00	6.71	0.18
						Ice	13.76	7.39	0.27
OPA65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	193.00	1" Ice	15.34	8.79	0.51
						2" Ice			
						No Ice	12.25	6.05	0.09
						1/2" Ice	13.00	6.71	0.18
						Ice	13.76	7.39	0.27
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.00	0.0000	193.00	1" Ice	15.34	8.79	0.51
						2" Ice			
						No Ice	12.25	6.05	0.09
						1/2" Ice	13.00	6.71	0.18
						Ice	13.76	7.39	0.27
800 10121 w/ Mount Pipe	A	From Leg	4.00	0.0000	193.00	1" Ice	15.34	8.79	0.51
						2" Ice			
						No Ice	3.60	2.95	0.07
						1/2" Ice	4.00	3.34	0.11
						Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00	0.0000	193.00	1" Ice	5.29	4.59	0.30
						2" Ice			
						No Ice	3.60	2.95	0.07
						1/2" Ice	4.00	3.34	0.11
						Ice	4.42	3.74	0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00	0.0000	193.00	1" Ice	5.29	4.59	0.30
						2" Ice			
						No Ice	3.60	2.95	0.07
						1/2" Ice	4.00	3.34	0.11
						Ice	4.42	3.74	0.17
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.00	0.0000	193.00	1" Ice	5.29	4.59	0.30
						2" Ice			
						No Ice	9.19	6.21	0.11
						1/2" Ice	9.94	6.93	0.18
						Ice	10.71	7.66	0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.00	0.0000	193.00	1" Ice	12.30	9.17	0.45
						2" Ice			
						No Ice	9.19	6.21	0.11
						1/2" Ice	9.94	6.93	0.18
						Ice	10.71	7.66	0.26
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.00	0.0000	193.00	1" Ice	12.30	9.17	0.45
						2" Ice			
						No Ice	9.19	6.21	0.11
						1/2" Ice	9.94	6.93	0.18
						Ice	10.71	7.66	0.26
80010798 w/ Mount Pipe	A	From Leg	4.00	0.0000	193.00	1" Ice	12.30	9.17	0.45
						2" Ice			
						No Ice	7.79	4.90	0.11
						1/2" Ice	8.40	5.47	0.19
						Ice	9.02	6.06	0.27
80010798 w/ Mount Pipe	B	From Leg	4.00	0.0000	193.00	1" Ice	10.30	7.26	0.48
						2" Ice			
						No Ice	7.79	4.90	0.11
						1/2" Ice	8.40	5.47	0.19
						Ice	9.02	6.06	0.27
80010798 w/ Mount Pipe	C	From Leg	4.00	0.0000	193.00	1" Ice	10.30	7.26	0.48
						2" Ice			
						No Ice	7.79	4.90	0.11
						1/2" Ice	8.40	5.47	0.19
						Ice	9.02	6.06	0.27

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
DTMABP7819VG12A	A	From Leg	4.00	0.0000	193.00		1" Ice	10.30	7.26	0.48
							2" Ice	0.98	0.34	0.02
							No Ice	1.10	0.42	0.03
							1/2" Ice	1.23	0.51	0.04
							1" Ice	1.52	0.71	0.06
DTMABP7819VG12A	B	From Leg	4.00	0.0000	193.00		2" Ice	0.98	0.34	0.02
							No Ice	1.10	0.42	0.03
							1/2" Ice	1.23	0.51	0.04
							1" Ice	1.52	0.71	0.06
							2" Ice	0.98	0.34	0.02
DTMABP7819VG12A	C	From Leg	4.00	0.0000	193.00		No Ice	0.98	0.34	0.02
							1/2" Ice	1.10	0.42	0.03
							Ice	1.23	0.51	0.04
							1" Ice	1.52	0.71	0.06
							2" Ice	0.98	0.34	0.02
WCS RRUS-32-B30	A	From Leg	4.00	0.0000	193.00		No Ice	3.31	2.42	0.08
							1/2" Ice	3.56	2.64	0.10
							Ice	3.81	2.86	0.14
							1" Ice	4.33	3.32	0.21
							2" Ice	3.31	2.42	0.08
WCS RRUS-32-B30	B	From Leg	4.00	0.0000	193.00		No Ice	3.31	2.42	0.08
							1/2" Ice	3.56	2.64	0.10
							Ice	3.81	2.86	0.14
							1" Ice	4.33	3.32	0.21
							2" Ice	3.31	2.42	0.08
WCS RRUS-32-B30	C	From Leg	4.00	0.0000	193.00		No Ice	3.31	2.42	0.08
							1/2" Ice	3.56	2.64	0.10
							Ice	3.81	2.86	0.14
							1" Ice	4.33	3.32	0.21
							2" Ice	3.31	2.42	0.08
(2) 860 10025	A	From Leg	4.00	0.0000	193.00		No Ice	0.14	0.12	0.00
							1/2" Ice	0.20	0.17	0.00
							Ice	0.26	0.23	0.01
							1" Ice	0.41	0.38	0.01
							2" Ice	0.14	0.12	0.00
(2) 860 10025	B	From Leg	4.00	0.0000	193.00		No Ice	0.14	0.12	0.00
							1/2" Ice	0.20	0.17	0.00
							Ice	0.26	0.23	0.01
							1" Ice	0.41	0.38	0.01
							2" Ice	0.14	0.12	0.00
(2) 860 10025	C	From Leg	4.00	0.0000	193.00		No Ice	0.14	0.12	0.00
							1/2" Ice	0.20	0.17	0.00
							Ice	0.26	0.23	0.01
							1" Ice	0.41	0.38	0.01
							2" Ice	0.14	0.12	0.00
RRUS 4478 B14_CCIV2	A	From Leg	4.00	0.0000	193.00		No Ice	2.02	1.25	0.06
							1/2" Ice	2.20	1.40	0.08
							Ice	2.39	1.55	0.10
							1" Ice	2.78	1.89	0.15
							2" Ice	2.02	1.25	0.06
RRUS 4478 B14_CCIV2	B	From Leg	4.00	0.0000	193.00		No Ice	2.02	1.25	0.06
							1/2" Ice	2.20	1.40	0.08
							Ice	2.39	1.55	0.10
							1" Ice	2.78	1.89	0.15
							2" Ice	2.02	1.25	0.06
RRUS 4478 B14_CCIV2	C	From Leg	4.00	0.0000	193.00		No Ice	2.02	1.25	0.06
							1/2" Ice	2.20	1.40	0.08
							Ice	2.39	1.55	0.10
							1" Ice	2.78	1.89	0.15
							2" Ice	2.02	1.25	0.06
RRUS 32 B2_CCIV2	A	From Leg	4.00	0.0000	193.00		No Ice	2.86	1.78	0.06
							1/2" Ice	3.09	1.97	0.08
							Ice	3.32	2.17	0.10

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>A</sub> A <sub>Front</sub>	C <sub>A</sub> A <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
RRUS 32 B2_CCIV2	B	From Leg	4.00	0.0000	193.00		1" Ice	3.81	2.59	0.16
							2" Ice	2.86	1.78	0.06
							No Ice	3.09	1.97	0.08
							1/2" Ice	3.32	2.17	0.10
RRUS 32 B2_CCIV2	C	From Leg	4.00	0.0000	193.00		1" Ice	3.81	2.59	0.16
							2" Ice	2.86	1.78	0.06
							No Ice	3.09	1.97	0.08
							1/2" Ice	3.32	2.17	0.10
DBC0061F1V51-2	A	From Leg	4.00	0.0000	193.00		1" Ice	3.81	2.59	0.16
							2" Ice	2.86	1.78	0.06
							No Ice	0.43	0.41	0.03
							1/2" Ice	0.51	0.50	0.03
DBC0061F1V51-2	B	From Leg	4.00	0.0000	193.00		Ice	0.61	0.59	0.04
							1" Ice	0.81	0.79	0.06
							2" Ice	0.43	0.41	0.03
							No Ice	0.51	0.50	0.03
DBC0061F1V51-2	C	From Leg	4.00	0.0000	193.00		Ice	0.61	0.59	0.04
							1" Ice	0.81	0.79	0.06
							2" Ice	0.43	0.41	0.03
							No Ice	0.51	0.50	0.03
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	193.00		Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice	0.92	0.92	0.02
							No Ice	1.46	1.46	0.04
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	193.00		Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice	0.92	0.92	0.02
							No Ice	1.46	1.46	0.04
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	193.00		Ice	1.64	1.64	0.06
							1" Ice	2.04	2.04	0.11
							2" Ice	0.92	0.92	0.02
							No Ice	1.46	1.46	0.04
RRUS 11 B12	A	From Leg	4.00	0.0000	193.00		Ice	3.26	1.48	0.10
							1" Ice	3.71	1.83	0.15
							2" Ice	2.83	1.18	0.05
							No Ice	3.04	1.33	0.07
RRUS 11 B12	B	From Leg	4.00	0.0000	193.00		Ice	3.26	1.48	0.10
							1" Ice	3.71	1.83	0.15
							2" Ice	2.83	1.18	0.05
							No Ice	3.04	1.33	0.07
RRUS 11 B12	C	From Leg	4.00	0.0000	193.00		Ice	3.26	1.48	0.10
							1" Ice	3.71	1.83	0.15
							2" Ice	2.83	1.18	0.05
							No Ice	3.04	1.33	0.07
RRUS 4426 B66	A	From Leg	4.00	0.0000	193.00		Ice	1.97	0.97	0.13
							1" Ice	2.33	1.24	0.17
							2" Ice	1.64	0.73	0.10
							No Ice	1.80	0.84	0.11
RRUS 4426 B66	B	From Leg	4.00	0.0000	193.00		Ice	1.97	0.97	0.13
							1" Ice	2.33	1.24	0.17
							2" Ice	1.64	0.73	0.10
							No Ice	1.80	0.84	0.11

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment	Placement	C <sub>AA</sub> <sub>Front</sub>	C <sub>AA</sub> <sub>Side</sub>	Weight
			Horz	Lateral	Vert					
			ft	ft	ft	°	ft	ft <sup>2</sup>	ft <sup>2</sup>	K
RRUS 4426 B66	C	From Leg	4.00	0.0000	193.00		1" Ice	2.33	1.24	0.17
							2" Ice	1.64	0.73	0.10
							No Ice	1.80	0.84	0.11
							1/2" Ice	1.97	0.97	0.13
							1" Ice	2.33	1.24	0.17
*** Platform Mount [LP 712-1]	C	None		0.0000	185.00		2" Ice			
							No Ice	24.56	24.56	1.34
							1/2"	27.92	27.92	1.91
							Ice	31.27	31.27	2.55
							1" Ice	37.98	37.98	3.97
Transition Ladder	C	From Leg	2.00	0.0000	185.00		2" Ice			
							No Ice	6.00	6.00	0.16
							1/2"	8.00	8.00	0.24
							Ice	10.00	10.00	0.32
							1" Ice	14.00	14.00	0.48
APXV18-206517S-C w/ Mount Pipe	A	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	3.79	3.16	0.05
							1/2"	4.38	3.75	0.09
							Ice	4.99	4.35	0.15
							1" Ice	6.25	5.59	0.28
APXV18-206517S-C w/ Mount Pipe	B	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	3.79	3.16	0.05
							1/2"	4.38	3.75	0.09
							Ice	4.99	4.35	0.15
							1" Ice	6.25	5.59	0.28
APXV18-206517S-C w/ Mount Pipe	C	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	3.79	3.16	0.05
							1/2"	4.38	3.75	0.09
							Ice	4.99	4.35	0.15
							1" Ice	6.25	5.59	0.28
978QNB120E-M w/ Mount Pipe	A	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	8.79	4.25	0.06
							1/2"	9.33	5.01	0.11
							Ice	9.87	5.71	0.18
							1" Ice	10.97	7.16	0.33
978QNB120E-M w/ Mount Pipe	B	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	8.79	4.25	0.06
							1/2"	9.33	5.01	0.11
							Ice	9.87	5.71	0.18
							1" Ice	10.97	7.16	0.33
978QNB120E-M w/ Mount Pipe	C	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	8.79	4.25	0.06
							1/2"	9.33	5.01	0.11
							Ice	9.87	5.71	0.18
							1" Ice	10.97	7.16	0.33
FV90-16-02DP w/ Mount Pipe	A	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	4.47	2.92	0.04
							1/2"	5.08	3.50	0.07
							Ice	5.70	4.10	0.11
							1" Ice	7.01	5.35	0.22
FV90-16-02DP w/ Mount Pipe	B	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	4.47	2.92	0.04
							1/2"	5.08	3.50	0.07
							Ice	5.70	4.10	0.11
							1" Ice	7.01	5.35	0.22
FV90-16-02DP w/ Mount Pipe	C	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	4.47	2.92	0.04
							1/2"	5.08	3.50	0.07
							Ice	5.70	4.10	0.11
							1" Ice	7.01	5.35	0.22
FV90-16-02DP w/ Mount Pipe	A	From Leg	3.00	0.0000	185.00		2" Ice			
							No Ice	4.47	2.92	0.04
							1/2"	5.08	3.50	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
			2.00			Ice 5.70	4.10	0.11
						1" Ice 7.01	5.35	0.22
						2" Ice		
FV90-16-02DP w/ Mount Pipe	B	From Leg	3.00	0.0000	185.00	No Ice 4.47	2.92	0.04
			6.00			1/2" 5.08	3.50	0.07
			2.00			Ice 5.70	4.10	0.11
						1" Ice 7.01	5.35	0.22
						2" Ice		
FV90-16-02DP w/ Mount Pipe	C	From Leg	3.00	0.0000	185.00	No Ice 4.47	2.92	0.04
			6.00			1/2" 5.08	3.50	0.07
			2.00			Ice 5.70	4.10	0.11
						1" Ice 7.01	5.35	0.22
						2" Ice		
CS72993.07	A	From Leg	3.00	0.0000	185.00	No Ice 1.23	0.39	0.02
			0.00			1/2" 1.36	0.48	0.03
			2.00			Ice 1.51	0.59	0.04
						1" Ice 1.83	0.81	0.06
						2" Ice		
CS72993.07	B	From Leg	3.00	0.0000	185.00	No Ice 1.23	0.39	0.02
			0.00			1/2" 1.36	0.48	0.03
			2.00			Ice 1.51	0.59	0.04
						1" Ice 1.83	0.81	0.06
						2" Ice		
CS72993.07	C	From Leg	3.00	0.0000	185.00	No Ice 1.23	0.39	0.02
			0.00			1/2" 1.36	0.48	0.03
			2.00			Ice 1.51	0.59	0.04
						1" Ice 1.83	0.81	0.06
						2" Ice		
***								
Side Arm Mount [SO 102-3]	C	None		0.0000	173.00	No Ice 3.60	3.60	0.07
						1/2" 4.18	4.18	0.11
						Ice 4.75	4.75	0.14
						1" Ice 5.90	5.90	0.20
						2" Ice		
6'x2" Mount Pipe	A	From Leg	0.50	0.0000	173.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		
6'x2" Mount Pipe	B	From Leg	0.50	0.0000	173.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		
6'x2" Mount Pipe	C	From Leg	0.50	0.0000	173.00	No Ice 1.43	1.43	0.02
			0.00			1/2" 1.92	1.92	0.03
			0.00			Ice 2.29	2.29	0.05
						1" Ice 3.06	3.06	0.09
						2" Ice		
800 EXTERNAL NOTCH FILTER	A	From Leg	1.00	0.0000	173.00	No Ice 0.66	0.32	0.01
			0.00			1/2" 0.76	0.40	0.02
			0.00			Ice 0.87	0.48	0.02
						1" Ice 1.11	0.67	0.04
						2" Ice		
800 EXTERNAL NOTCH FILTER	B	From Leg	1.00	0.0000	173.00	No Ice 0.66	0.32	0.01
			0.00			1/2" 0.76	0.40	0.02
			0.00			Ice 0.87	0.48	0.02
						1" Ice 1.11	0.67	0.04
						2" Ice		
800 EXTERNAL NOTCH FILTER	C	From Leg	1.00	0.0000	173.00	No Ice 0.66	0.32	0.01
			0.00			1/2" 0.76	0.40	0.02
			0.00			Ice 0.87	0.48	0.02
						1" Ice 1.11	0.67	0.04
						2" Ice		
(3) ACU-A20-N	A	From Leg	1.00	0.0000	173.00	No Ice 0.07	0.12	0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K	
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice	0.26	0.34	0.01
						2" Ice			
(3) ACU-A20-N	B	From Leg	1.00	0.0000	173.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice	0.26	0.34	0.01
						2" Ice			
(3) ACU-A20-N	C	From Leg	1.00	0.0000	173.00	No Ice	0.07	0.12	0.00
			0.00			1/2"	0.10	0.16	0.00
			0.00			Ice	0.15	0.21	0.00
						1" Ice	0.26	0.34	0.01
						2" Ice			
1900MHz RRH (65MHz)	A	From Leg	1.00	0.0000	173.00	No Ice	2.32	2.24	0.06
			0.00			1/2"	2.53	2.44	0.08
			0.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
1900MHz RRH (65MHz)	B	From Leg	1.00	0.0000	173.00	No Ice	2.32	2.24	0.06
			0.00			1/2"	2.53	2.44	0.08
			0.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
1900MHz RRH (65MHz)	C	From Leg	1.00	0.0000	173.00	No Ice	2.32	2.24	0.06
			0.00			1/2"	2.53	2.44	0.08
			0.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
800MHZ RRH	A	From Leg	1.00	0.0000	173.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			0.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
800MHZ RRH	B	From Leg	1.00	0.0000	173.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			0.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
800MHZ RRH	C	From Leg	1.00	0.0000	173.00	No Ice	2.13	1.77	0.05
			0.00			1/2"	2.32	1.95	0.07
			0.00			Ice	2.51	2.13	0.10
						1" Ice	2.92	2.51	0.16
						2" Ice			
***									
Platform Mount [LP 1201-1]	C	None		0.0000	172.00	No Ice	18.38	18.38	2.10
						1/2"	22.11	22.11	2.65
						Ice	25.87	25.87	3.26
						1" Ice	33.47	33.47	4.66
						2" Ice			
6'x2" Mount Pipe	A	From Leg	4.00	0.0000	172.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	B	From Leg	4.00	0.0000	172.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			
6'x2" Mount Pipe	C	From Leg	4.00	0.0000	172.00	No Ice	1.43	1.43	0.02
			0.00			1/2"	1.92	1.92	0.03
			0.00			Ice	2.29	2.29	0.05
						1" Ice	3.06	3.06	0.09
						2" Ice			



Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft		C <sub>AA</sub> Front ft <sup>2</sup>	C <sub>AA</sub> Side ft <sup>2</sup>	Weight K
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.00 -7.00 2.00	0.0000	172.00	No Ice	4.09	2.86	0.08
						1/2" Ice	4.48	3.23	0.13
						Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.00 -7.00 2.00	0.0000	172.00	No Ice	4.09	2.86	0.08
						1/2" Ice	4.48	3.23	0.13
						Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.00 -7.00 2.00	0.0000	172.00	No Ice	4.09	2.86	0.08
						1/2" Ice	4.48	3.23	0.13
						Ice	4.88	3.61	0.19
						1" Ice	5.71	4.40	0.33
						2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.00 2.33 2.00	0.0000	172.00	No Ice	4.60	4.01	0.10
						1/2" Ice	5.05	4.45	0.16
						Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.00 2.33 2.00	0.0000	172.00	No Ice	4.60	4.01	0.10
						1/2" Ice	5.05	4.45	0.16
						Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.00 2.33 2.00	0.0000	172.00	No Ice	4.60	4.01	0.10
						1/2" Ice	5.05	4.45	0.16
						Ice	5.50	4.89	0.23
						1" Ice	6.44	5.82	0.42
						2" Ice			
TD-RRH8x20-25	A	From Leg	4.00 0.00 2.00	0.0000	172.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8x20-25	B	From Leg	4.00 0.00 2.00	0.0000	172.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
TD-RRH8x20-25	C	From Leg	4.00 0.00 2.00	0.0000	172.00	No Ice	4.05	1.53	0.07
						1/2" Ice	4.30	1.71	0.10
						Ice	4.56	1.90	0.13
						1" Ice	5.10	2.30	0.20
						2" Ice			
*** Side Arm Mount [SO 701-1]	A	From Leg	0.00 0.00 0.00	0.0000	72.00	No Ice	0.85	1.67	0.07
						1/2" Ice	1.14	2.34	0.08
						Ice	1.43	3.01	0.09
						1" Ice	2.01	4.35	0.12
						2" Ice			
GPS_A	A	From Leg	3.00 0.00 1.00	0.0000	72.00	No Ice	0.26	0.26	0.00
						1/2" Ice	0.32	0.32	0.00
						Ice	0.39	0.39	0.01
						1" Ice	0.56	0.56	0.02
						2" Ice			
***									

**Load Combinations**

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

### Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	225.79 - 197.75	Pole	Max Tension	26	0.00	-0.00	0.00
			Max. Compression	26	-19.78	-0.30	-1.26
			Max. Mx	8	-6.56	-237.27	-0.23
			Max. My	14	-6.57	-0.15	-235.13
			Max. Vy	20	-12.48	236.77	-0.23
			Max. Vx	14	12.40	-0.15	-235.13
			Max. Torque	8			-1.38
L2	197.75 - 162.72	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L3	162.72 - 120.09	Pole	Max. Compression	26	-57.92	3.72	-3.92
			Max. Mx	20	-23.84	1009.60	-1.42
			Max. My	14	-23.85	0.69	-1005.11
			Max. Vy	20	-31.31	1009.60	-1.42
			Max. Vx	14	31.22	0.69	-1005.11
			Max. Torque	2			3.46
			Max Tension	1	0.00	0.00	0.00
L4	120.09 - 79	Pole	Max. Compression	26	-77.00	5.43	-6.71
			Max. Mx	20	-37.56	2412.21	-2.03
			Max. My	14	-37.57	1.06	-2404.52
			Max. Vy	20	-36.49	2412.21	-2.03
			Max. Vx	14	36.41	1.06	-2404.52
			Max. Torque	2			3.45
			Max Tension	1	0.00	0.00	0.00
L5	79 - 38.93	Pole	Max. Compression	26	-100.09	7.24	-9.80
			Max. Mx	20	-55.03	3980.85	-2.73
			Max. My	14	-55.04	1.42	-3970.19
			Max. Vy	20	-41.98	3980.85	-2.73
			Max. Vx	14	41.89	1.42	-3970.19
			Max. Torque	2			3.44
			Max Tension	1	0.00	0.00	0.00
L6	38.93 - 0	Pole	Max. Compression	26	-128.20	8.97	-12.47
			Max. Mx	20	-77.19	5722.69	-3.31
			Max. My	14	-77.20	1.79	-5708.20
			Max. Vy	20	-47.30	5722.69	-3.31
			Max. Vx	14	47.18	1.79	-5708.20
			Max. Torque	2			3.43
			Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-166.63	11.21	-16.46
			Max. Mx	20	-108.54	8110.30	-4.35
			Max. My	14	-108.54	2.26	-8090.93
			Max. Vy	20	-52.48	8110.30	-4.35
			Max. Vx	14	52.37	2.26	-8090.93
			Max. Torque	2			3.43

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	166.63	-0.00	0.00
	Max. H <sub>x</sub>	21	81.42	52.43	-0.00
	Max. H <sub>z</sub>	2	108.56	0.00	52.32
	Max. M <sub>x</sub>	2	8082.25	0.00	52.32
	Max. M <sub>z</sub>	8	8105.71	-52.43	0.00
	Max. Torsion	2	3.43	0.00	52.32
	Min. Vert	21	81.42	52.43	-0.00
	Min. H <sub>x</sub>	9	81.42	-52.43	-0.00
	Min. H <sub>z</sub>	14	108.56	0.00	-52.32
	Min. M <sub>x</sub>	14	-8090.93	0.00	-52.32
	Min. M <sub>z</sub>	20	-8110.30	52.43	0.00
	Min. Torsion	14	-3.43	0.00	-52.32

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	90.47	0.00	-0.00	3.40	1.80	0.00
1.2 Dead+1.0 Wind 0 deg -	108.56	-0.00	-52.32	-8082.25	2.26	-3.43

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
No Ice						
0.9 Dead+1.0 Wind 0 deg - No Ice	81.42	-0.00	-52.31	-7976.49	1.67	-3.41
1.2 Dead+1.0 Wind 30 deg - No Ice	108.56	26.22	-45.31	-6999.58	-4052.68	-2.75
0.9 Dead+1.0 Wind 30 deg - No Ice	81.42	26.22	-45.31	-6908.40	-3999.80	-2.75
1.2 Dead+1.0 Wind 60 deg - No Ice	108.56	45.41	-26.16	-4039.34	-7021.04	-1.34
0.9 Dead+1.0 Wind 60 deg - No Ice	81.42	45.41	-26.16	-3987.18	-6929.02	-1.36
1.2 Dead+1.0 Wind 90 deg - No Ice	108.56	52.43	-0.00	4.35	-8105.71	0.42
0.9 Dead+1.0 Wind 90 deg - No Ice	81.42	52.43	0.00	3.21	-8000.00	0.40
1.2 Dead+1.0 Wind 120 deg - No Ice	108.56	45.41	26.16	4048.04	-7021.03	2.06
0.9 Dead+1.0 Wind 120 deg - No Ice	81.42	45.41	26.16	3993.59	-6929.01	2.04
1.2 Dead+1.0 Wind 150 deg - No Ice	108.56	26.22	45.31	7008.27	-4052.67	3.17
0.9 Dead+1.0 Wind 150 deg - No Ice	81.42	26.22	45.31	6914.80	-3999.79	3.15
1.2 Dead+1.0 Wind 180 deg - No Ice	108.56	-0.00	52.32	8090.93	2.26	3.43
0.9 Dead+1.0 Wind 180 deg - No Ice	81.42	-0.00	52.31	7982.89	1.67	3.41
1.2 Dead+1.0 Wind 210 deg - No Ice	108.56	-26.22	45.31	7008.30	4057.20	2.77
0.9 Dead+1.0 Wind 210 deg - No Ice	81.42	-26.22	45.31	6914.83	4003.13	2.77
1.2 Dead+1.0 Wind 240 deg - No Ice	108.56	-45.41	26.16	4048.07	7025.60	1.36
0.9 Dead+1.0 Wind 240 deg - No Ice	81.42	-45.41	26.16	3993.62	6932.38	1.37
1.2 Dead+1.0 Wind 270 deg - No Ice	108.56	-52.43	-0.00	4.35	8110.30	-0.42
0.9 Dead+1.0 Wind 270 deg - No Ice	81.42	-52.43	0.00	3.21	8003.38	-0.40
1.2 Dead+1.0 Wind 300 deg - No Ice	108.56	-45.41	-26.16	-4039.37	7025.61	-2.08
0.9 Dead+1.0 Wind 300 deg - No Ice	81.42	-45.41	-26.16	-3987.20	6932.39	-2.06
1.2 Dead+1.0 Wind 330 deg - No Ice	108.56	-26.22	-45.31	-6999.61	4057.21	-3.18
0.9 Dead+1.0 Wind 330 deg - No Ice	81.42	-26.22	-45.31	-6908.42	4003.14	-3.16
1.2 Dead+1.0 Ice+1.0 Temp	166.63	0.00	-0.00	16.46	11.21	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	166.63	0.00	-14.81	-2343.22	11.55	-0.96
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	166.63	7.42	-12.83	-2027.02	-1171.05	-0.67
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	166.63	12.86	-7.41	-1163.13	-2036.77	-0.20
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	166.63	14.84	-0.00	16.95	-2353.64	0.32
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	166.63	12.86	7.41	1197.17	-2036.99	0.76
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	166.63	7.42	12.83	2061.15	-1171.18	1.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	166.63	0.00	14.81	2377.13	11.55	0.96
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	166.63	-7.42	12.83	2061.16	1194.29	0.67
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	166.63	-12.86	7.41	1197.18	2060.11	0.20
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	166.63	-14.84	-0.00	16.95	2376.76	-0.32
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	166.63	-12.86	-7.41	-1163.27	2060.11	-0.76

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 330	166.63	-7.42	-12.83	-2027.25	1194.29	-1.00
deg+1.0 Ice+1.0 Temp						
Dead+Wind 0 deg - Service	90.47	0.00	-12.32	-1886.38	1.90	-0.82
Dead+Wind 30 deg - Service	90.47	6.17	-10.67	-1633.17	-945.71	-0.66
Dead+Wind 60 deg - Service	90.47	10.69	-6.16	-941.39	-1639.40	-0.32
Dead+Wind 90 deg - Service	90.47	12.34	-0.00	3.60	-1893.31	0.10
Dead+Wind 120 deg - Service	90.47	10.69	6.16	948.59	-1639.40	0.49
Dead+Wind 150 deg - Service	90.47	6.17	10.67	1640.37	-945.71	0.75
Dead+Wind 180 deg - Service	90.47	0.00	12.32	1893.58	1.90	0.82
Dead+Wind 210 deg - Service	90.47	-6.17	10.67	1640.37	949.51	0.66
Dead+Wind 240 deg - Service	90.47	-10.69	6.16	948.59	1643.21	0.32
Dead+Wind 270 deg - Service	90.47	-12.34	-0.00	3.60	1897.12	-0.10
Dead+Wind 300 deg - Service	90.47	-10.69	-6.16	-941.39	1643.21	-0.49
Dead+Wind 330 deg - Service	90.47	-6.17	-10.67	-1633.17	949.51	-0.76

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-90.47	0.00	-0.00	90.47	0.00	0.000%
2	0.00	-108.56	-52.32	0.00	108.56	52.32	0.004%
3	0.00	-81.42	-52.32	0.00	81.42	52.31	0.006%
4	26.22	-108.56	-45.31	-26.22	108.56	45.31	0.000%
5	26.22	-81.42	-45.31	-26.22	81.42	45.31	0.000%
6	45.41	-108.56	-26.16	-45.41	108.56	26.16	0.000%
7	45.41	-81.42	-26.16	-45.41	81.42	26.16	0.000%
8	52.44	-108.56	0.00	-52.43	108.56	0.00	0.008%
9	52.44	-81.42	0.00	-52.43	81.42	-0.00	0.006%
10	45.41	-108.56	26.16	-45.41	108.56	-26.16	0.000%
11	45.41	-81.42	26.16	-45.41	81.42	-26.16	0.000%
12	26.22	-108.56	45.31	-26.22	108.56	-45.31	0.000%
13	26.22	-81.42	45.31	-26.22	81.42	-45.31	0.000%
14	0.00	-108.56	52.32	0.00	108.56	-52.32	0.004%
15	0.00	-81.42	52.32	0.00	81.42	-52.31	0.006%
16	-26.22	-108.56	45.31	26.22	108.56	-45.31	0.000%
17	-26.22	-81.42	45.31	26.22	81.42	-45.31	0.000%
18	-45.41	-108.56	26.16	45.41	108.56	-26.16	0.000%
19	-45.41	-81.42	26.16	45.41	81.42	-26.16	0.000%
20	-52.44	-108.56	0.00	52.43	108.56	0.00	0.008%
21	-52.44	-81.42	0.00	52.43	81.42	-0.00	0.006%
22	-45.41	-108.56	-26.16	45.41	108.56	26.16	0.000%
23	-45.41	-81.42	-26.16	45.41	81.42	26.16	0.000%
24	-26.22	-108.56	-45.31	26.22	108.56	45.31	0.000%
25	-26.22	-81.42	-45.31	26.22	81.42	45.31	0.000%
26	0.00	-166.63	0.00	-0.00	166.63	0.00	0.000%
27	0.00	-166.63	-14.82	-0.00	166.63	14.81	0.001%
28	7.42	-166.63	-12.83	-7.42	166.63	12.83	0.001%
29	12.86	-166.63	-7.41	-12.86	166.63	7.41	0.001%
30	14.85	-166.63	0.00	-14.84	166.63	0.00	0.001%
31	12.86	-166.63	7.41	-12.86	166.63	-7.41	0.001%
32	7.42	-166.63	12.83	-7.42	166.63	-12.83	0.001%
33	0.00	-166.63	14.82	-0.00	166.63	-14.81	0.001%
34	-7.42	-166.63	12.83	7.42	166.63	-12.83	0.001%
35	-12.86	-166.63	7.41	12.86	166.63	-7.41	0.001%
36	-14.85	-166.63	0.00	14.84	166.63	0.00	0.001%
37	-12.86	-166.63	-7.41	12.86	166.63	7.41	0.001%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
38	-7.42	-166.63	-12.83	7.42	166.63	12.83	0.001%
39	0.00	-90.47	-12.32	-0.00	90.47	12.32	0.002%
40	6.17	-90.47	-10.67	-6.17	90.47	10.67	0.002%
41	10.69	-90.47	-6.16	-10.69	90.47	6.16	0.002%
42	12.35	-90.47	0.00	-12.34	90.47	0.00	0.002%
43	10.69	-90.47	6.16	-10.69	90.47	-6.16	0.002%
44	6.17	-90.47	10.67	-6.17	90.47	-10.67	0.002%
45	0.00	-90.47	12.32	-0.00	90.47	-12.32	0.002%
46	-6.17	-90.47	10.67	6.17	90.47	-10.67	0.002%
47	-10.69	-90.47	6.16	10.69	90.47	-6.16	0.002%
48	-12.35	-90.47	0.00	12.34	90.47	0.00	0.002%
49	-10.69	-90.47	-6.16	10.69	90.47	6.16	0.002%
50	-6.17	-90.47	-10.67	6.17	90.47	10.67	0.002%

### Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	17	0.00006203	0.00009334
3	Yes	16	0.00008087	0.00014684
4	Yes	21	0.00000001	0.00013138
5	Yes	21	0.00000001	0.00009647
6	Yes	21	0.00000001	0.00013468
7	Yes	21	0.00000001	0.00009899
8	Yes	16	0.00012112	0.00009426
9	Yes	16	0.00008083	0.00008219
10	Yes	21	0.00000001	0.00013639
11	Yes	21	0.00000001	0.00010018
12	Yes	21	0.00000001	0.00013115
13	Yes	21	0.00000001	0.00009622
14	Yes	17	0.00006202	0.00009346
15	Yes	16	0.00008086	0.00014699
16	Yes	21	0.00000001	0.00013656
17	Yes	21	0.00000001	0.00010031
18	Yes	21	0.00000001	0.00013355
19	Yes	21	0.00000001	0.00009795
20	Yes	16	0.00012112	0.00009433
21	Yes	16	0.00008082	0.00008224
22	Yes	21	0.00000001	0.00013191
23	Yes	21	0.00000001	0.00009683
24	Yes	21	0.00000001	0.00013685
25	Yes	21	0.00000001	0.00010061
26	Yes	13	0.00000001	0.00001512
27	Yes	18	0.00012448	0.00010995
28	Yes	18	0.00012425	0.00014888
29	Yes	18	0.00012425	0.00015000
30	Yes	18	0.00012448	0.00011022
31	Yes	19	0.00006725	0.00008678
32	Yes	19	0.00006727	0.00008483
33	Yes	18	0.00012452	0.00011190
34	Yes	19	0.00006727	0.00008777
35	Yes	19	0.00006727	0.00008717
36	Yes	18	0.00012453	0.00011169
37	Yes	19	0.00006727	0.00008459
38	Yes	19	0.00006726	0.00008646
39	Yes	16	0.00009951	0.00002513
40	Yes	16	0.00009936	0.00003998
41	Yes	16	0.00009936	0.00004605
42	Yes	16	0.00009951	0.00002338
43	Yes	16	0.00009936	0.00004914
44	Yes	16	0.00009937	0.00003951
45	Yes	16	0.00009952	0.00002527
46	Yes	16	0.00009937	0.00004974
47	Yes	16	0.00009937	0.00004332

48	Yes	16	0.00009952	0.00002344
49	Yes	16	0.00009937	0.00004065
50	Yes	16	0.00009936	0.00005060

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	225.79 - 197.75	37.808	47	1.6652	0.0049
L2	201.83 - 162.72	29.789	47	1.5009	0.0033
L3	167.86 - 120.09	19.904	47	1.2431	0.0019
L4	126.49 - 79	10.708	47	0.8552	0.0009
L5	86.58 - 38.93	4.838	47	0.5323	0.0004
L6	47.65 - 0	1.469	47	0.2781	0.0002

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	Platform Mount (10' LP 101-1)	47	37.808	1.6652	0.0049	33238
226.00	Lightning Rod 5/8"x5'	47	37.808	1.6652	0.0049	33238
205.00	Platform Mount [LP 712-1]	47	30.815	1.5229	0.0034	8008
193.00	Sabre C10857333C [SM 504-3]	47	27.024	1.4387	0.0030	6859
185.00	Platform Mount [LP 712-1]	47	24.636	1.3802	0.0027	6791
173.00	Side Arm Mount [SO 102-3]	47	21.268	1.2863	0.0021	6693
172.00	Platform Mount [LP 1201-1]	47	20.999	1.2781	0.0021	6684
113.00	Beacon side markers	47	8.418	0.7370	0.0007	6744
72.00	Side Arm Mount [SO 701-1]	47	3.310	0.4319	0.0003	8085

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	225.79 - 197.75	161.548	20	7.1110	0.0208
L2	201.83 - 162.72	127.350	20	6.4182	0.0138
L3	167.86 - 120.09	85.136	20	5.3194	0.0081
L4	126.49 - 79	45.816	20	3.6610	0.0037
L5	86.58 - 38.93	20.698	20	2.2781	0.0018
L6	47.65 - 0	6.283	20	1.1897	0.0008

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
228.00	Platform Mount (10' LP 101-1)	20	161.548	7.1110	0.0208	8041
226.00	Lightning Rod 5/8"x5'	20	161.548	7.1110	0.0208	8041
205.00	Platform Mount [LP 712-1]	20	131.724	6.5114	0.0145	1934
193.00	Sabre C10857333C [SM 504-3]	20	115.548	6.1541	0.0125	1649
185.00	Platform Mount [LP 712-1]	20	105.355	5.9050	0.0112	1628
173.00	Side Arm Mount [SO 102-3]	20	90.965	5.5042	0.0090	1596
172.00	Platform Mount [LP 1201-1]	20	89.815	5.4690	0.0088	1594
113.00	Beacon side markers	20	36.016	3.1550	0.0029	1585

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
72.00	Side Arm Mount [SO 701-1]	20	14.159	1.8484	0.0013	1892

### Compression Checks

### Pole Design Data

Section No.	Elevation	Size	L	L <sub>u</sub>	Kl/r	A	P <sub>u</sub>	φP <sub>n</sub>	Ratio P <sub>u</sub> / φP <sub>n</sub>
	ft		ft	ft		in <sup>2</sup>	K	K	
L1	225.79 - 197.75 (1)	TP28.6563x21.5x0.1875	28.04	0.00	0.0	16.3228	-6.56	954.88	0.007
L2	197.75 - 162.72 (2)	TP37.0938x27.24x0.375	39.11	0.00	0.0	42.1631	-23.84	2466.54	0.010
L3	162.72 - 120.09 (3)	TP47.1563x35.0487x0.4375	47.77	0.00	0.0	62.6223	-37.56	3663.41	0.010
L4	120.09 - 79 (4)	TP56.6563x44.6591x0.5	47.49	0.00	0.0	86.0810	-55.03	5035.74	0.011
L5	79 - 38.93 (5)	TP65.7813x53.7414x0.5625	47.65	0.00	0.0	112.5060	-77.19	6581.61	0.012
L6	38.93 - 0 (6)	TP74.5x62.4529x0.5625	47.65	0.00	0.0	132.0060	-108.54	7722.36	0.014

### Pole Bending Design Data

Section No.	Elevation	Size	M <sub>ux</sub>	φM <sub>nx</sub>	Ratio M <sub>ux</sub> / φM <sub>nx</sub>	M <sub>uy</sub>	φM <sub>ny</sub>	Ratio M <sub>uy</sub> / φM <sub>ny</sub>
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	225.79 - 197.75 (1)	TP28.6563x21.5x0.1875	237.27	596.72	0.398	0.00	596.72	0.000
L2	197.75 - 162.72 (2)	TP37.0938x27.24x0.375	1009.61	2275.65	0.444	0.00	2275.65	0.000
L3	162.72 - 120.09 (3)	TP47.1563x35.0487x0.4375	2412.21	4220.02	0.572	0.00	4220.02	0.000
L4	120.09 - 79 (4)	TP56.6563x44.6591x0.5	3980.86	6883.95	0.578	0.00	6883.95	0.000
L5	79 - 38.93 (5)	TP65.7813x53.7414x0.5625	5722.69	10359.42	0.552	0.00	10359.42	0.000
L6	38.93 - 0 (6)	TP74.5x62.4529x0.5625	8110.30	13554.17	0.598	0.00	13554.17	0.000

### Pole Shear Design Data

Section No.	Elevation	Size	Actual V <sub>u</sub>	φV <sub>n</sub>	Ratio V <sub>u</sub> / φV <sub>n</sub>	Actual T <sub>u</sub>	φT <sub>n</sub>	Ratio T <sub>u</sub> / φT <sub>n</sub>
	ft		K	K		kip-ft	kip-ft	
L1	225.79 - 197.75 (1)	TP28.6563x21.5x0.1875	12.48	286.46	0.044	1.00	688.08	0.001
L2	197.75 - 162.72 (2)	TP37.0938x27.24x0.375	31.31	739.96	0.042	0.65	2295.53	0.000
L3	162.72 - 120.09 (3)	TP47.1563x35.0487x0.4375	36.49	1099.02	0.033	0.65	4340.41	0.000
L4	120.09 - 79 (4)	TP56.6563x44.6591x0.5	41.98	1510.72	0.028	0.65	7176.21	0.000
L5	79 - 38.93 (5)	TP65.7813x53.7414x0.5625	47.30	1974.48	0.024	0.42	10896.33	0.000



Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L6	38.93 - 0 (6)	TP74.5x62.4529x0.5625	52.48	2316.71	0.023	0.42	15000.83	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	225.79 - 197.75 (1)	0.007	0.398	0.000	0.044	0.001	0.407	1.050	4.8.2
L2	197.75 - 162.72 (2)	0.010	0.444	0.000	0.042	0.000	0.455	1.050	4.8.2
L3	162.72 - 120.09 (3)	0.010	0.572	0.000	0.033	0.000	0.583	1.050	4.8.2
L4	120.09 - 79 (4)	0.011	0.578	0.000	0.028	0.000	0.590	1.050	4.8.2
L5	79 - 38.93 (5)	0.012	0.552	0.000	0.024	0.000	0.565	1.050	4.8.2
L6	38.93 - 0 (6)	0.014	0.598	0.000	0.023	0.000	0.613	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	225.79 - 197.75	Pole	TP28.6563x21.5x0.1875	1	-6.56	1002.63	38.7	Pass
L2	197.75 - 162.72	Pole	TP37.0938x27.24x0.375	2	-23.84	2589.87	43.3	Pass
L3	162.72 - 120.09	Pole	TP47.1563x35.0487x0.4375	3	-37.56	3846.58	55.5	Pass
L4	120.09 - 79	Pole	TP56.6563x44.6591x0.5	4	-55.03	5287.53	56.2	Pass
L5	79 - 38.93	Pole	TP65.7813x53.7414x0.5625	5	-77.19	6910.69	53.8	Pass
L6	38.93 - 0	Pole	TP74.5x62.4529x0.5625	6	-108.54	8108.48	58.4	Pass
Summary								
Pole (L6)							58.4	Pass
<b>RATING =</b>							<b>58.4</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



CLIMBING PEGS  
W/ SAFETY CLIMB

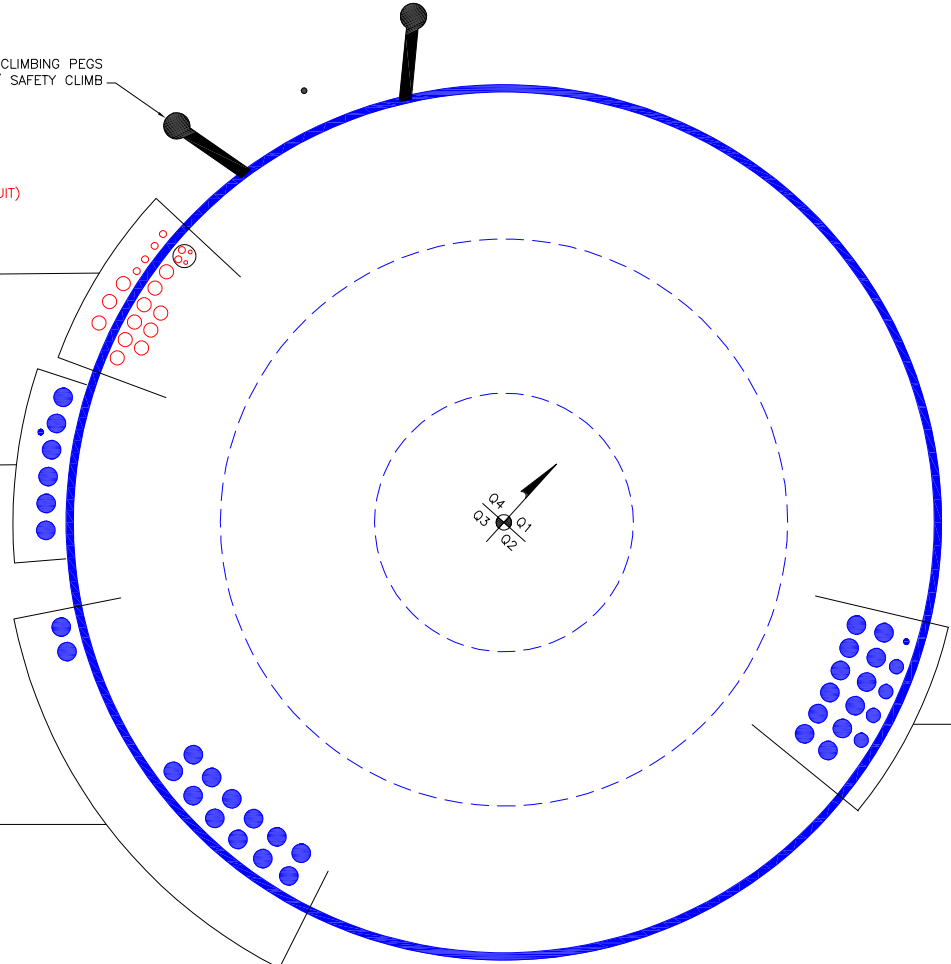
(PROPOSED EQUIPMENT CONFIGURATION - IN CONDUIT)  
(2) 3/8" TO 193 FT LEVEL  
(2) 5/8" TO 193 FT LEVEL  
(PROPOSED EQUIPMENT CONFIGURATION)  
(4) 5/8" TO 193 FT LEVEL  
(12) 1-1/4" TO 193 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(1) 1/2" TO 185 FT LEVEL  
(6) 1-5/8" TO 185 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(14) 1-5/8" TO 228 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(12) 1-5/8" TO 205 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(1) 1/2" TO 72 FT LEVEL  
(4) 1-1/4" TO 172 FT LEVEL



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**

# Monopole Base Plate Connection

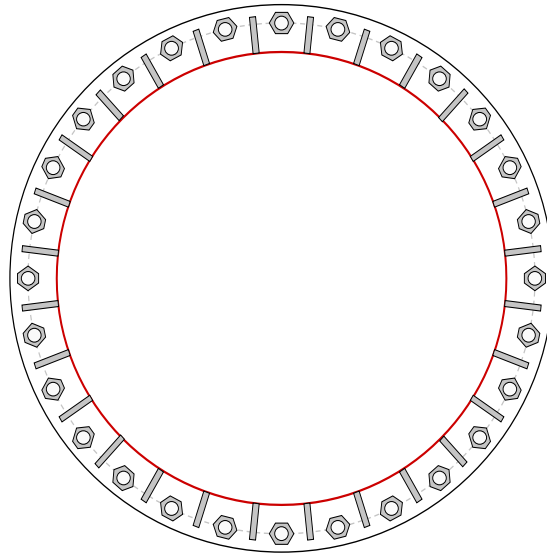


Site Info	
BU #	806358
Site Name	NHV 109 943107
Order #	509320 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$I_{ar}$ (in)	1.5625

Applied Loads	
Moment (kip-ft)	8110.30
Axial Force (kips)	108.54
Shear Force (kips)	52.48

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data	
(28) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 84" BC	

Base Plate Data	
90" OD x 2.5" Plate (A871-60; $F_y=60$ ksi, $F_u=75$ ksi)	

Stiffener Data	
(28) 18"H x 6"W x 1"T, Notch: 1"	
plate: $F_y=50$ ksi ; weld: $F_y=70$ ksi	
horiz. weld: 0.5" groove, 45° dbl bevel, 0.5" fillet	
vert. weld: 0.5" fillet	


Pole Data	
74.5" x 0.5625" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)	

Anchor Rod Summary			<i>(units of kips, kip-in)</i>
$Pu_c = 169.34$	$\phi Pn_c = 268.39$	<b>Stress Rating</b>	
$Vu = 1.87$	$\phi Vn = 120.77$	<b>60.1%</b>	
$Mu = n/a$	$\phi Mn = n/a$	<b>Pass</b>	

Base Plate Summary		
Max Stress (ksi):	22.25	(Roark's Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	<b>39.2%</b>	<b>Pass</b>

Stiffener Summary		
Horizontal Weld:	<b>44.4%</b>	<b>Pass</b>
Vertical Weld:	<b>28.0%</b>	<b>Pass</b>
Plate Flexure+Shear:	<b>10.2%</b>	<b>Pass</b>
Plate Tension+Shear:	<b>44.7%</b>	<b>Pass</b>
Plate Compression:	<b>43.6%</b>	<b>Pass</b>

Pole Summary		
Punching Shear:	<b>6.9%</b>	<b>Pass</b>

 <b>BLACK &amp; VEATCH</b> Building a world of difference. 6800 W. 115th St., Suite 2292 Overland Park, KS 66211 Phone: (913) 458-6909	<b>Client:</b>	Crown Castle	<b>Design:</b>	Kochakorn
	<b>Project:</b>	400087 (806358.1835088)	<b>Date:</b>	3/27/2020
	<b>Site:</b>	NHV 109 943107	<b>Verify:</b>	Thunwa
	<b>Title:</b>	Foundation Design Reaction Comparison	<b>Date:</b>	3/27/2020
			<b>Code:</b>	TIA-222-H

Template Version 1.8

**FOUNDATION ANALYSIS:**

**Original Tower Design Reactions:**

Drilled Caisson:

Shear:	68.6	Kip
Overturning moment:	11392.8	Kip-ft

Note: Design reactions are multiplied by 1.35 for comparison as allowed by TIA-222-H Section 15.6.2.

**TnxTower Reactions:**

Drilled Caisson:

Shear:	52.5	Kip
Overturning moment:	8110.3	Kip-ft

**Stress Ratio:**

Drilled Caisson:

Shear:	<b>72.9%</b>
Overturning moment:	<b>67.8%</b>

Note: Ratings per TIA-222-H Section 15.5.

**Conclusion:**

**When the calculated reactions are compared to the original design reactions, the existing foundation is considered to have been designed and constructed with adequate capacity to support the existing and proposed loads.**

**Controlling Foundation Stress Ratio:**

**67.8%**

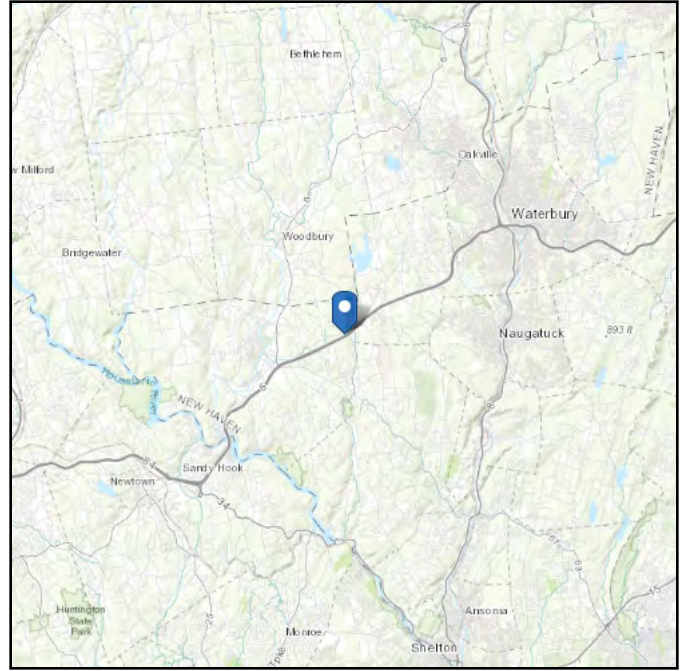
Note: Although the stress ratio for shear is greater than the stress ratio for overturning moment, the moment reaction is the governing criteria for a monopole drilled shaft foundation.

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

**Standard:** ASCE/SEI 7-10  
**Risk Category:** II  
**Soil Class:** D - Stiff Soil

**Elevation:** 666.03 ft (NAVD 88)  
**Latitude:** 41.493589  
**Longitude:** -73.165272



## Wind

### Results:

Wind Speed:	119 Vmph	*120 per Local Jurisdiction
10-year MRI	76 Vmph	
25-year MRI	86 Vmph	
50-year MRI	91 Vmph	
100-year MRI	98 Vmph	

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

**Date Accessed:** Thu Mar 26 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

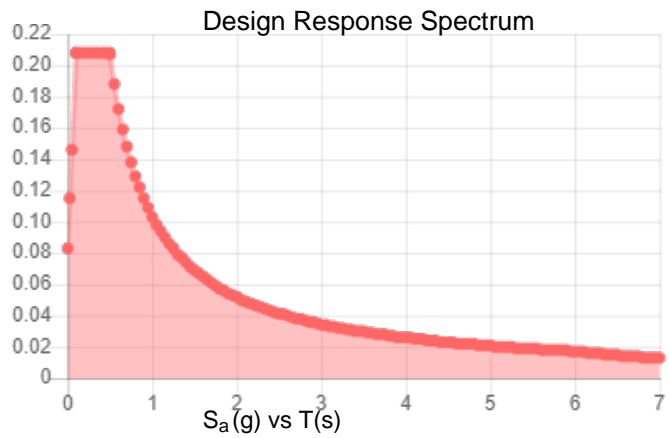
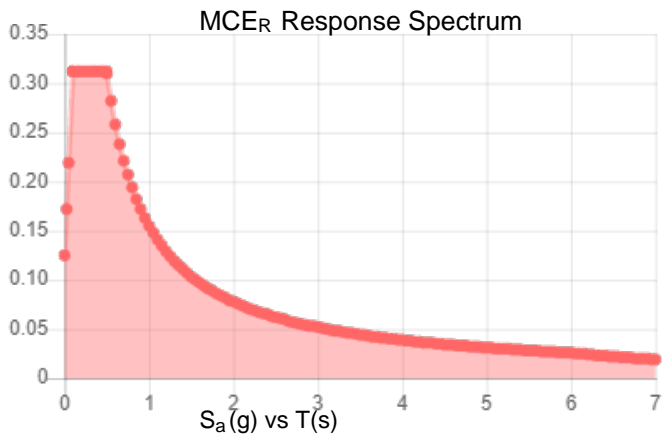
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.195	$S_{DS}$ :	0.208
$S_1$ :	0.065	$S_{D1}$ :	0.103
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.102
$S_{MS}$ :	0.312	PGA <sub>M</sub> :	0.163
$S_{M1}$ :	0.155	F <sub>PGA</sub> :	1.595
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Thu Mar 26 2020

**Date Source:**

USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.



## Ice

---

**Results:**

Ice Thickness: 0.75 in.  
Concurrent Temperature: 15 F  
Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Thu Mar 26 2020

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

---

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

# Exhibit E

## **Mount Analysis**

Date: March 10, 2020  
March 23, 2020 (Rev. 1)



**HUDSON**  
Design Group LLC

Darcy Tarr  
Crown Castle  
2000 Corporate Drive  
Canonsburg, PA 15317  
(724) 416-2000

Hudson Design Group LLC  
45 Beechwood Drive  
N. Andover, MA 01845  
(978) 557-5553

**Subject:** Mount Analysis Report

**Carrier Designation:** AT&T Equipment Change-Out  
Carrier Site Number: 10035332  
Carrier Site Name: PRESTON HILL

**Crown Castle Designation:** Crown Castle BU Number: 806358  
Crown Castle Site Name: NHV 109 943107  
Crown Castle JDE Job Number: 596313  
Crown Castle Order Number: 509320, Revision 0

**Engineering Firm Designation:** Hudson Design Group LLC Report Designation: 5291315

**Site Data:** 1432 Old Waterbury Road, Southbury, New Haven, CT, 06488  
Latitude 41°29'36.92" Longitude -73°9'54.98"

**Structure Information:** Tower Height & Type: 226 ft Monopole  
Mount Elevation: 193 ft  
Mount Type: 14 ft Sector Mount

Dear Darcy Tarr,

Hudson Design Group LLC is pleased to submit this "Mount Analysis Report" to determine the structural integrity of AT&T's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

**Sector Mount (typical)**

**\*Sufficient**

**\*Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

The analysis has been performed in accordance with the TIA-222-H Standard based upon an ultimate 3-second gust wind speed of 116 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: HDG  
Respectfully Submitted by:

Michael Cabral  
Vice President  
(978) 557-5553 x 231  
MCabral@hudsondesigngroupllc.com



Daniel P. Hamm, P.E.  
Principal

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Proposed Equipment Configuration

### 3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity

4.1) Recommendations

### 5) APPENDIX A

Wire Frame and Rendered Models

### 6) APPENDIX B

Software Input Calculations

### 7) APPENDIX C

Software Analysis Output

### 8) APPENDIX D

Additional Calculations

## 1) INTRODUCTION

This is a 14' Sector Mount designed by Sabre Industries Towers and Poles.

## 2) ANALYSIS CRITERIA

<b>Building Code:</b>	2015 IBC
<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Ultimate Wind Speed:</b>	116 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor at Base:</b>	1.03
<b>Topographic Factor at Mount:</b>	0.98
<b>Ice Thickness:</b>	1.21 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Seismic <math>S_s</math>:</b>	0.198
<b>Seismic <math>S_1</math>:</b>	0.065
<b>Live Loading Wind Speed:</b>	30 mph
<b>Man Live Load at Mid/End-Points:</b>	250 lb
<b>Man Live Load at Mount Pipes:</b>	500 lb

**Table 1 - Proposed Equipment Configuration**

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
193	195	3	CCI Antennas	OPA-65R-LCUU-H6	14' Sector Mount
		3	CCI Antennas	OPA65R-BU6D	
		3	Kathrein	800 10121	
		3	Kathrein	80010798	
		3	CCI Antennas	DTMABP7819VG12A	
		3	Ericsson	RRUS 11 B12	
		3	Ericsson	RRUS 32 B2_CCIV2	
		3	Ericsson	RRUS 4426 B66	
		3	Ericsson	RRUS 4478 B14_CCIV2	
		3	Ericsson	WCS RRUS-32-B30	
		3	Kaelus	DBC0061F1V51-2	
		6	Kathrein	860 10025	
3	Raycap	DC6-48-60-18-8F			

## 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Reference	Source
RFDS	AT&T	-	ON FILE

### 3.1) Analysis Method

RAM Elements (Version 14.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B).

**3.2) Assumptions**

- 1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
- 2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
- 3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
- 4) Steel grades have been assumed as follows, unless noted otherwise:
 

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Hudson Design Group LLC should be notified to determine the effect on the structural integrity of the antenna mounting system.

**4) ANALYSIS RESULTS**

**Table 3(a) - Mount Component Stresses vs. Capacity (Sector Mount, Alpha Sector)**

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Members	3	193	50	Pass
1	Standoff Members	13	193	73	Pass
	Mount-to-Tower Connection	-	193	20	Pass

**Table 3(b) - Mount Component Stresses vs. Capacity (Sector Mount, Beta Sector)**

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Members	3	193	50	Pass
1	Standoff Members	13	193	73	Pass
	Mount-to-Tower Connection	-	193	20	Pass

**Table 3(c) - Mount Component Stresses vs. Capacity (Sector Mount, Gamma Sector)**

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Members	3	193	50	Pass
1	Standoff Members	13	193	73	Pass
	Mount-to-Tower Connection	-	193	20	Pass

<b>Structure Rating (max from all components) =</b>	<b>73%</b>
---	------------

Notes:

- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) All sectors are typical

**Table 4 - Tieback Connection Data Table**

Tower Connection Node No.	Existing / Proposed	Resultant End Reaction (lb)	Connected Member Type	Connected Member Size	Member Compressive Capacity (lb) <sup>3</sup>	Notes
51	Proposed	1577	Pipe	2" Std	11,130	2

Notes:

- 1) Tieback connection point is within 25% of either end of the connected tower member
- 2) Tieback connection point is NOT within 25% of either end of the connected tower member
- 3) Reduced member compressive capacity according to CED-STD-10294 *Standard for Installation of Mounts and Appurtenances*

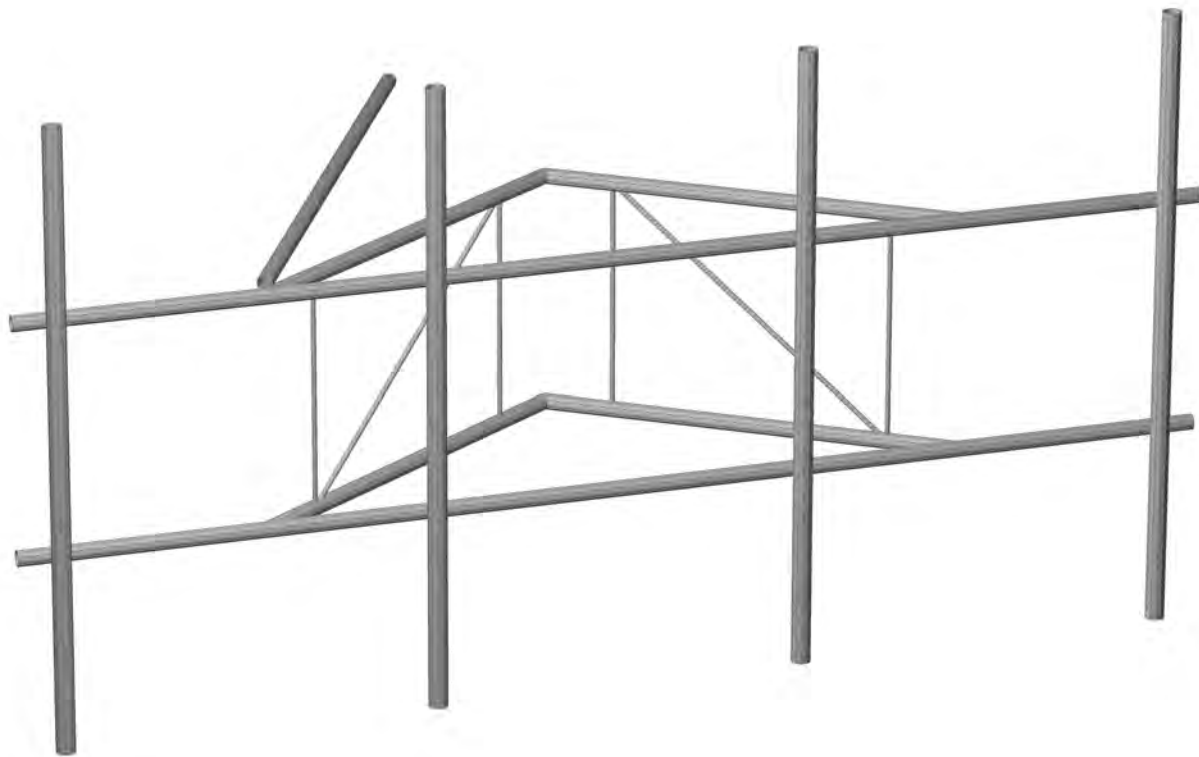
**4.1) Recommendations**

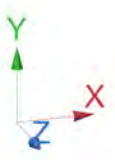
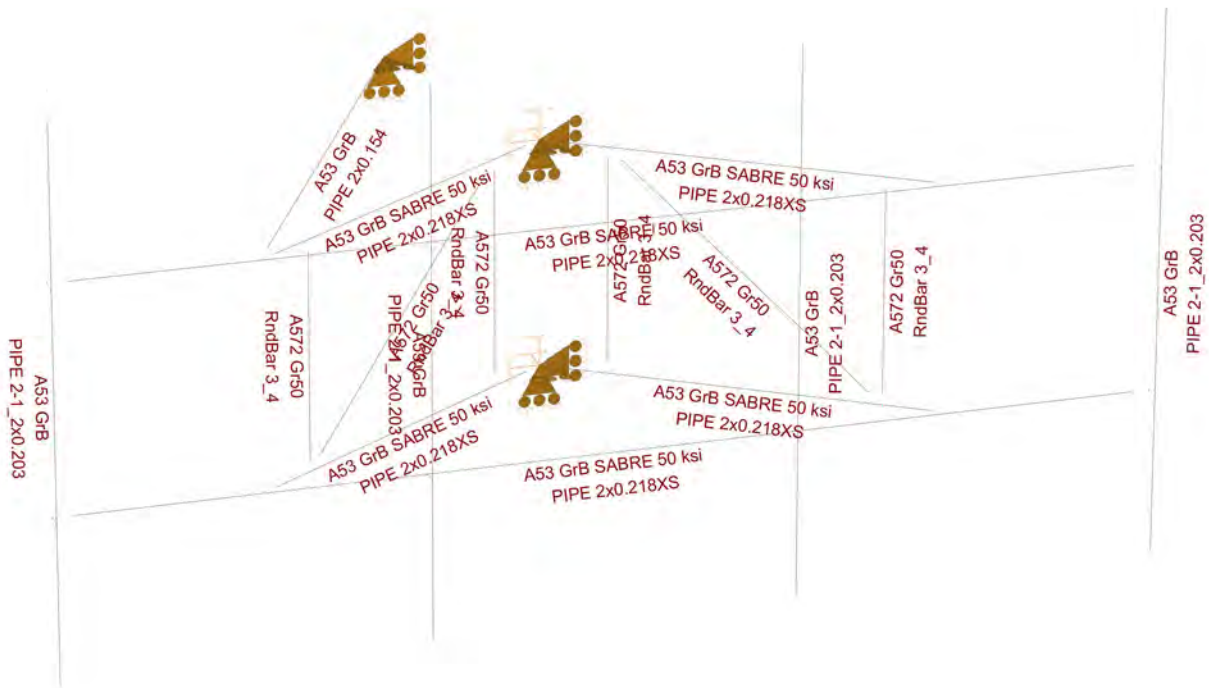
The existing mount does not have sufficient capacity to carry the proposed loading configuration. In order for the results of this analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

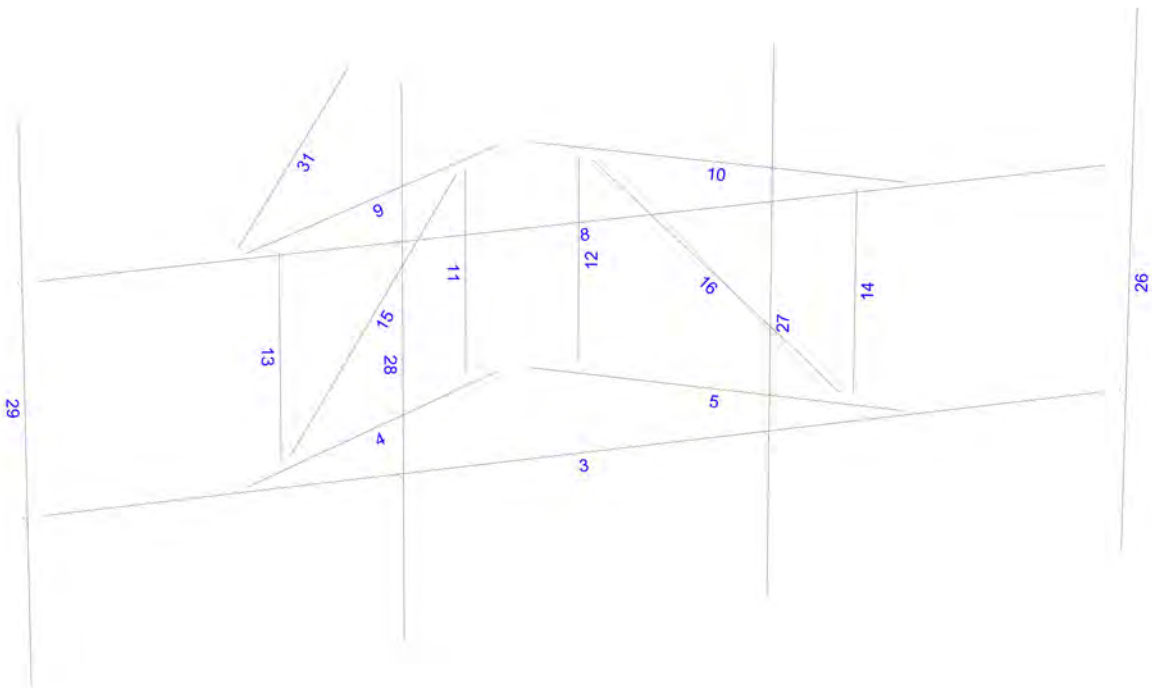
- **Install new Sabre Industries Towers and Poles C10857333C antenna mounts (typ. of 1 per sector, total of 3).**

**APPENDIX A**  
**WIRE FRAME AND RENDERED MODELS**









**APPENDIX B**  
**SOFTWARE INPUT CALCULATIONS**

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**2.6.5.2 Velocity Pressure Coeff:**

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

$K_z =$  **1.196**

$z =$  195 (ft)  
 $z_g =$  1200 (ft)  
 $\alpha =$  7.0

$K_{zmin} \leq K_z \leq 2.01$

**Table 2-4**

Exposure	$Z_g$	$\alpha$	$K_{zmin}$	$K_c$
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

**2.6.6.2 Topographic Factor:**

**Table 2-5**

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

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

$K_h = e^{(fz/H)}$

$K_{zt} =$  **1.0277176**

$K_h =$  34.655434

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

$K_c =$  0.9 (from Table 2-4)

$K_t =$  0.53 (from Table 2-5)

$f =$  2 (from Table 2-5)

$z =$  195

$z_s =$  670 (Mean elevation of base of structure above sea level)

$H =$  110 (Ht. of the crest above surrounding terrain)

$K_{zt} =$  1.03 (from 2.6.6.2.1)

$K_e =$  0.98 (from 2.6.8)

Category = **3**

**2.6.10 Design Ice Thickness**

Max Ice Thickness =

$t_i =$  1.00 in

Importance Factor =

$I =$  1.0 (from Table 2-3)

$K_{iz} =$  1.19 (from Sec. 2.6.10)

$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$

$t_{iz} =$  1.21 in

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**2.6.9 Gust Effect Factor**

2.6.9.1 Self Supporting Lattice Structures

$G_h = 1.0$  Latticed Structures > 600 ft

$G_h = 0.85$  Latticed Structures 450 ft or less

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

$h = 226$   $G_h = 0.85$

2.6.9.2 Guyed Masts  $G_h = 0.85$

2.6.9.3 Pole Structures  $G_h = 1.1$

2.6.9 Appurtenances  $G_h = 1.0$

2.6.9.4 Structures Supported on Other Structures

(Cantilevered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5))

$G_h = 1.35$   $G_h = 1.00$

**2.6.11.2 Design Wind Force on Appurtenances**

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

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

$q_z =$	<b>39.26</b>
$q_{z(ice)} =$	<b>7.29</b>
$q_{z(30)} =$	<b>2.63</b>

$K_z =$	1.196 (from 2.6.5.2)
$K_{zt} =$	1.0 (from 2.6.6.2.1)
$K_s =$	1.0 (from 2.6.7)
$K_e =$	0.98 (from 2.6.8)
$K_d =$	<b>0.95</b> (from Table 2-2)
$V_{max} =$	116 mph (Ultimate Wind Speed)
$V_{max(ice)} =$	50 mph
$V_{30} =$	30 mph

**Table 2-2**

Structure Type	Wind Direction Probability Factor, $K_d$
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



Determine Ca:

**Table 2-9**

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r <sub>s</sub> ) ≥ 0.85	1.4 - 4.0(r <sub>s</sub> ) ≥ 0.90	2.0 - 6.0(r <sub>s</sub> ) ≥ 1.25
Round	<b>C &lt; 39</b> (Subcritical)	0.7	0.8	1.2
	<b>39 ≤ C ≤ 78</b> (Transitional)	4.14/(C <sup>0.485</sup> )	3.66/(C <sup>0.415</sup> )	46.8/(C <sup>1.0</sup> )
	<b>C &gt; 78</b> (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.  
 (Aspect ratio is independent of the spacing between support points of a linear appurtenance,  
 Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.21 in**      **Angle = 0 (deg)**      **Equivalent Angle = 180 (deg)**

<u>Appurtenances</u>	<u>Height</u>	<u>Width</u>	<u>Depth</u>	<u>Flat Area</u>	<u>Aspect Ratio</u>	<u>Ca</u>	<u>Force (lbs)</u>	<u>Force (lbs) (w/ Ice)</u>	<u>Force (lbs) (30 mph)</u>
800-10121 Antenna	54.5	10.3	5.9	3.90	5.29	1.32	203	49	14
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	4.86	1.31	379	85	25
800-10798 Antenna	78.5	14.8	6.7	8.07	5.30	1.32	420	93	28
OPA65R-BU6D Antenna	71.2	21.0	7.8	10.38	3.39	1.24	505	108	34
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.74	1.21	47	13	3
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	5.47	1.33	26	9	2
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	3.89	1.26	65	18	4
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	7.77	1.43	37	13	2
4426 B66 RRH	14.9	5.8	13.2	0.60	2.57	1.20	28	9	2
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	5.14	1.32	16	6	1
4478 B14 RRH	18.1	8.3	13.4	1.04	2.18	1.20	49	13	3
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	4.36	1.28	26	9	2
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	2.25	1.20	108	26	7
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	0.00	1.20	0	0	0
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.96	1.20	39	11	3
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	1.29	1.20	16	5	1
DC6 Surge Arrestor	31.3	11.0	11.0	2.39	2.85	0.70	66	16	4

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**WIND LOADS**

Angle = 30 (deg)

Ice Thickness = 1.21 in.

Equivalent Angle = 210 (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	203	129	184
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	379	217	339
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	420	223	371
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	505	223	435
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	47	110	62
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	26	110	47
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	65	108	76
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	37	108	55
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	28	64	37
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	5.14	1.13	1.32	1.20	16	64	28
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	49	79	57
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	26	79	40
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	108	65	97
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	58	65	60
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	39	13	33
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	16	17	16

**WIND LOADS WITH ICE:**

800-10121 Antenna	56.9	12.7	8.3	5.02	3.28	4.48	6.85	1.29	1.39	47	33	44
OPA-65R-LCUU-H6 Antenna	74.4	17.2	9.8	8.89	5.07	4.32	7.58	1.28	1.42	83	52	75
800-10798 Antenna	80.9	17.2	9.1	9.67	5.12	4.70	8.88	1.30	1.46	92	55	82
OPA65R-BUGD Antenna	73.6	23.4	10.2	11.97	5.22	3.14	7.21	1.23	1.41	107	54	94
RRUS-11 B12 RRH	22.1	9.6	19.4	1.48	2.98	2.30	1.14	1.20	1.20	13	26	16
RRUS-11 B12 RRH (Shielded)	22.1	4.8	19.4	0.74	2.98	4.60	1.14	1.29	1.20	7	26	12
RRUS-32 B2 RRH	29.6	9.4	14.5	1.94	2.98	3.15	2.04	1.23	1.20	17	26	20
RRUS-32 B2 RRH (Shielded)	29.6	4.7	14.5	0.97	2.98	6.29	2.04	1.37	1.20	10	26	14
4426 B66 RRH	17.3	8.2	15.6	0.99	1.88	2.11	1.11	1.20	1.20	9	16	11
4426 B66 RRH (Shielded)	17.3	4.1	15.6	0.49	1.88	4.22	1.11	1.28	1.20	5	16	8
4478 B14 RRH	20.5	10.7	15.8	1.53	2.25	1.91	1.30	1.20	1.20	13	20	15
4478 B14 RRH (Shielded)	20.5	5.4	15.8	0.76	2.25	3.83	1.30	1.26	1.20	7	20	10
RRUS-32 B30 RRH	29.6	14.5	9.4	2.98	1.94	2.04	3.15	1.20	1.23	26	17	24
RRUS-32 B30 RRH (Shielded)	29.6	7.3	9.4	1.49	1.94	4.08	3.15	1.27	1.23	14	17	15
DTMABP7819VG12A TMA	13.1	13.5	6.2	1.23	0.57	0.97	2.11	1.20	1.20	11	5	9
DBC0062F2VF2-2 Diplexer	10.4	8.6	8.9	0.62	0.64	1.21	1.17	1.20	1.20	5	6	5

**WIND LOADS AT 30 MPH:**

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	14	9	12
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	25	14	23
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	28	15	25
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	34	15	29
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	3	7	4
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	2	7	3
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	5
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	2	7	4
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	4	2
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	5.14	1.13	1.32	1.20	1	4	2
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	2	5	3
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	2
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	1	1	1



Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**WIND LOADS**

Angle = **60** (deg)      Ice Thickness = **1.21** in.      Equivalent Angle = **240** (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	203	129	148
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	379	217	257
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	420	223	272
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	505	223	293
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	47	110	94
RRUS-11 B12 RRH (Shielded)	19.7	5.4	17.0	0.74	2.33	3.65	1.16	1.25	1.20	36	110	91
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	65	108	97
RRUS-32 B2 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	51	108	94
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	28	64	55
4426 B66 RRH (Shielded)	14.9	4.4	13.2	0.45	1.37	3.43	1.13	1.24	1.20	22	64	54
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	49	79	72
4478 B14 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	37	79	69
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	108	65	76
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	82	65	70
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	39	13	20
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	16	17	17

**WIND LOADS WITH ICE:**

800-10121 Antenna	56.9	12.7	8.3	5.02	3.28	4.48	6.85	1.29	1.39	47	33	37
OPA-65R-LCUU-H6 Antenna	74.4	17.2	9.8	8.89	5.07	4.32	7.58	1.28	1.42	83	52	60
800-10798 Antenna	80.9	17.2	9.1	9.67	5.12	4.70	8.88	1.30	1.46	92	55	64
OPA65R-BUGD Antenna	73.6	23.4	10.2	11.97	5.22	3.14	7.21	1.23	1.41	107	54	67
RRUS-11 B12 RRH	22.1	9.6	19.4	1.48	2.98	2.30	1.14	1.20	1.20	13	26	23
RRUS-11 B12 RRH (Shielded)	22.1	7.2	19.4	1.11	2.98	3.07	1.14	1.23	1.20	10	26	22
RRUS-32 B2 RRH	29.6	9.4	14.5	1.94	2.98	3.15	2.04	1.23	1.20	17	26	24
RRUS-32 B2 RRH (Shielded)	29.6	7.1	14.5	1.45	2.98	4.19	2.04	1.28	1.20	14	26	23
4426 B66 RRH	17.3	8.2	15.6	0.99	1.88	2.11	1.11	1.20	1.20	9	16	14
4426 B66 RRH (Shielded)	17.3	6.2	15.6	0.74	1.88	2.81	1.11	1.21	1.20	7	16	14
4478 B14 RRH	20.5	10.7	15.8	1.53	2.25	1.91	1.30	1.20	1.20	13	20	18
4478 B14 RRH (Shielded)	20.5	8.0	15.8	1.14	2.25	2.55	1.30	1.20	1.20	10	20	17
RRUS-32 B30 RRH	29.6	14.5	9.4	2.98	1.94	2.04	3.15	1.20	1.23	26	17	20
RRUS-32 B30 RRH (Shielded)	29.6	10.9	9.4	2.24	1.94	2.72	3.15	1.21	1.23	20	17	18
DTMABP7819VG12A TMA	13.1	13.5	6.2	1.23	0.57	0.97	2.11	1.20	1.20	11	5	6
DBC0062F2VF2-2 Diplexer	10.4	8.6	8.9	0.62	0.64	1.21	1.17	1.20	1.20	5	6	6

**WIND LOADS AT 30 MPH:**

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	14	9	10
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	25	14	17
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	28	15	18
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	34	15	20
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	3	7	6
RRUS-11 B12 RRH (Shielded)	19.7	5.4	17.0	0.74	2.33	3.65	1.16	1.25	1.20	2	7	6
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	6
RRUS-32 B2 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	3	7	6
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	4	4
4426 B66 RRH (Shielded)	14.9	4.4	13.2	0.45	1.37	3.43	1.13	1.24	1.20	1	4	4
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4478 B14 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	3	5	5
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	6	4	5
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	1	1	1

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**WIND LOADS**

Angle = **90** (deg)      Ice Thickness = **1.21** in.      Equivalent Angle = **270** (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	203	129	129
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	379	217	217
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	420	223	223
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	505	223	223
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	47	110	110
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	26	110	110
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	65	108	108
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	0.00	2.25	1.20	1.20	31	108	108
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	28	64	64
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	0.00	1.13	1.20	1.20	14	64	64
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	49	79	79
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	0.00	1.35	1.20	1.20	25	79	79
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	108	65	65
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	65	65
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	39	13	13
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	16	17	17

**WIND LOADS WITH ICE:**

800-10121 Antenna	56.9	12.7	8.3	5.02	3.28	4.48	6.85	1.29	1.39	47	33	33
OPA-65R-LCUU-H6 Antenna	74.4	17.2	9.8	8.89	5.07	4.32	7.58	1.28	1.42	83	52	52
800-10798 Antenna	80.9	17.2	9.1	9.67	5.12	4.70	8.88	1.30	1.46	92	55	55
OPA65R-BUGD Antenna	73.6	23.4	10.2	11.97	5.22	3.14	7.21	1.23	1.41	107	54	54
RRUS-11 B12 RRH	22.1	9.6	19.4	1.48	2.98	2.30	1.14	1.20	1.20	13	26	26
RRUS-11 B12 RRH (Shielded)	22.1	6.0	19.4	0.92	2.98	3.68	1.14	1.25	1.20	8	26	26
RRUS-32 B2 RRH	29.6	9.4	14.5	1.94	2.98	3.15	2.04	1.23	1.20	17	26	26
RRUS-32 B2 RRH (Shielded)	29.6	5.9	14.5	1.22	2.98	5.01	2.04	1.31	1.20	12	26	26
4426 B66 RRH	17.3	8.2	15.6	0.99	1.88	2.11	1.11	1.20	1.20	9	16	16
4426 B66 RRH (Shielded)	17.3	5.3	15.6	0.64	1.88	3.26	1.11	1.23	1.20	6	16	16
4478 B14 RRH	20.5	10.7	15.8	1.53	2.25	1.91	1.30	1.20	1.20	13	20	20
4478 B14 RRH (Shielded)	20.5	6.6	15.8	0.93	2.25	3.13	1.30	1.23	1.20	8	20	20
RRUS-32 B30 RRH	29.6	14.5	9.4	2.98	1.94	2.04	3.15	1.20	1.23	26	17	17
RRUS-32 B30 RRH (Shielded)	29.6	2.4	9.4	0.50	1.94	12.28	3.15	1.58	1.23	6	17	17
DTMABP7819VG12A TMA	13.1	13.5	6.2	1.23	0.57	0.97	2.11	1.20	1.20	11	5	5
DBC0062F2VF2-2 Diplexer	10.4	8.6	8.9	0.62	0.64	1.21	1.17	1.20	1.20	5	6	6

**WIND LOADS AT 30 MPH:**

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	14	9	9
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	25	14	14
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	28	15	15
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	34	15	15
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	3	7	7
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	2	7	7
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	7
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	0.00	2.25	1.20	1.20	2	7	7
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	4	4
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	0.00	1.13	1.20	1.20	1	4	4
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	0.00	1.35	1.20	1.20	2	5	5
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	4
RRUS-32 B30 RRH (Shielded)	27.2	0.0	7.0	0.00	1.32	0.00	3.89	1.20	1.26	0	4	4
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	1	1	1

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**WIND LOADS**

Angle = **120** (deg)      Ice Thickness = **1.21** in.      Equivalent Angle = **300** (deg)

**WIND LOADS WITH NO ICE:**

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	203	129	148
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	379	217	257
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	420	223	272
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	505	223	293
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	47	110	94
RRUS-11 B12 RRH (Shielded)	19.7	5.4	17.0	0.74	2.33	3.65	1.16	1.25	1.20	36	110	91
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	65	108	97
RRUS-32 B2 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	51	108	94
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	28	64	55
4426 B66 RRH (Shielded)	14.9	4.4	13.2	0.45	1.37	3.43	1.13	1.24	1.20	22	64	54
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	49	79	72
4478 B14 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	37	79	69
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	108	65	76
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	82	65	70
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	39	13	20
DBC0062F2V2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	16	17	17

**WIND LOADS WITH ICE:**

800-10121 Antenna	56.9	12.7	8.3	5.02	3.28	4.48	6.85	1.29	1.39	47	33	37
OPA-65R-LCUU-H6 Antenna	74.4	17.2	9.8	8.89	5.07	4.32	7.58	1.28	1.42	83	52	60
800-10798 Antenna	80.9	17.2	9.1	9.67	5.12	4.70	8.88	1.30	1.46	92	55	64
OPA65R-BUGD Antenna	73.6	23.4	10.2	11.97	5.22	3.14	7.21	1.23	1.41	107	54	67
RRUS-11 B12 RRH	22.1	9.6	19.4	1.48	2.98	2.30	1.14	1.20	1.20	13	26	23
RRUS-11 B12 RRH (Shielded)	22.1	7.2	19.4	1.11	2.98	3.07	1.14	1.23	1.20	10	26	22
RRUS-32 B2 RRH	29.6	9.4	14.5	1.94	2.98	3.15	2.04	1.23	1.20	17	26	24
RRUS-32 B2 RRH (Shielded)	29.6	7.1	14.5	1.45	2.98	4.19	2.04	1.28	1.20	14	26	23
4426 B66 RRH	17.3	8.2	15.6	0.99	1.88	2.11	1.11	1.20	1.20	9	16	14
4426 B66 RRH (Shielded)	17.3	6.2	15.6	0.74	1.88	2.81	1.11	1.21	1.20	7	16	14
4478 B14 RRH	20.5	10.7	15.8	1.53	2.25	1.91	1.30	1.20	1.20	13	20	18
4478 B14 RRH (Shielded)	20.5	8.0	15.8	1.14	2.25	2.55	1.30	1.20	1.20	10	20	17
RRUS-32 B30 RRH	29.6	14.5	9.4	2.98	1.94	2.04	3.15	1.20	1.23	26	17	20
RRUS-32 B30 RRH (Shielded)	29.6	10.9	9.4	2.24	1.94	2.72	3.15	1.21	1.23	20	17	18
DTMABP7819VG12A TMA	13.1	13.5	6.2	1.23	0.57	0.97	2.11	1.20	1.20	11	5	6
DBC0062F2V2-2 Diplexer	10.4	8.6	8.9	0.62	0.64	1.21	1.17	1.20	1.20	5	6	6

**WIND LOADS AT 30 MPH:**

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	14	9	10
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	25	14	17
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	28	15	18
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	34	15	20
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	3	7	6
RRUS-11 B12 RRH (Shielded)	19.7	5.4	17.0	0.74	2.33	3.65	1.16	1.25	1.20	2	7	6
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	6
RRUS-32 B2 RRH (Shielded)	27.2	5.3	12.1	0.99	2.29	5.18	2.25	1.32	1.20	3	7	6
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	4	4
4426 B66 RRH (Shielded)	14.9	4.4	13.2	0.45	1.37	3.43	1.13	1.24	1.20	1	4	4
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	5
4478 B14 RRH (Shielded)	18.1	6.2	13.4	0.78	1.68	2.91	1.35	1.22	1.20	3	5	5
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	5
RRUS-32 B30 RRH (Shielded)	27.2	9.1	7.0	1.71	1.32	3.00	3.89	1.22	1.26	6	4	5
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	1
DBC0062F2V2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	1	1	1

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



WIND LOADS

Angle = 150 (deg)      Ice Thickness = 1.21 in.      Equivalent Angle = 330 (deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	203	129	184
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	379	217	339
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	420	223	371
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	505	223	435
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	47	110	62
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	26	110	47
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	65	108	76
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	37	108	55
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	28	64	37
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	5.14	1.13	1.32	1.20	16	64	28
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	49	79	57
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	26	79	40
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	108	65	97
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	58	65	60
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	39	13	33
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	16	17	16

WIND LOADS WITH ICE:

800-10121 Antenna	56.9	12.7	8.3	5.02	3.28	4.48	6.85	1.29	1.39	47	33	44
OPA-65R-LCUU-H6 Antenna	74.4	17.2	9.8	8.89	5.07	4.32	7.58	1.28	1.42	83	52	75
800-10798 Antenna	80.9	17.2	9.1	9.67	5.12	4.70	8.88	1.30	1.46	92	55	82
OPA65R-BUGD Antenna	73.6	23.4	10.2	11.97	5.22	3.14	7.21	1.23	1.41	107	54	94
RRUS-11 B12 RRH	22.1	9.6	19.4	1.48	2.98	2.30	1.14	1.20	1.20	13	26	16
RRUS-11 B12 RRH (Shielded)	22.1	4.8	19.4	0.74	2.98	4.60	1.14	1.29	1.20	7	26	12
RRUS-32 B2 RRH	29.6	9.4	14.5	1.94	2.98	3.15	2.04	1.23	1.20	17	26	20
RRUS-32 B2 RRH (Shielded)	29.6	4.7	14.5	0.97	2.98	6.29	2.04	1.37	1.20	10	26	14
4426 B66 RRH	17.3	8.2	15.6	0.99	1.88	2.11	1.11	1.20	1.20	9	16	11
4426 B66 RRH (Shielded)	17.3	4.1	15.6	0.49	1.88	4.22	1.11	1.28	1.20	5	16	8
4478 B14 RRH	20.5	10.7	15.8	1.53	2.25	1.91	1.30	1.20	1.20	13	20	15
4478 B14 RRH (Shielded)	20.5	5.4	15.8	0.76	2.25	3.83	1.30	1.26	1.20	7	20	10
RRUS-32 B30 RRH	29.6	14.5	9.4	2.98	1.94	2.04	3.15	1.20	1.23	26	17	24
RRUS-32 B30 RRH (Shielded)	29.6	7.3	9.4	1.49	1.94	4.08	3.15	1.27	1.23	14	17	15
DTMABP7819VG12A TMA	13.1	13.5	6.2	1.23	0.57	0.97	2.11	1.20	1.20	11	5	9
DBC0062F2VF2-2 Diplexer	10.4	8.6	8.9	0.62	0.64	1.21	1.17	1.20	1.20	5	6	5

WIND LOADS AT 30 MPH:

800-10121 Antenna	54.5	10.3	5.9	3.90	2.23	5.29	9.24	1.32	1.47	14	9	12
OPA-65R-LCUU-H6 Antenna	72.0	14.8	7.4	7.40	3.70	4.86	9.73	1.31	1.49	25	14	23
800-10798 Antenna	78.5	14.8	6.7	8.07	3.65	5.30	11.72	1.32	1.56	28	15	25
OPA65R-BUGD Antenna	71.2	21.0	7.8	10.38	3.86	3.39	9.13	1.24	1.47	34	15	29
RRUS-11 B12 RRH	19.7	7.2	17.0	0.99	2.33	2.74	1.16	1.21	1.20	3	7	4
RRUS-11 B12 RRH (Shielded)	19.7	3.6	17.0	0.49	2.33	5.47	1.16	1.33	1.20	2	7	3
RRUS-32 B2 RRH	27.2	7.0	12.1	1.32	2.29	3.89	2.25	1.26	1.20	4	7	5
RRUS-32 B2 RRH (Shielded)	27.2	3.5	12.1	0.66	2.29	7.77	2.25	1.43	1.20	2	7	4
4426 B66 RRH	14.9	5.8	13.2	0.60	1.37	2.57	1.13	1.20	1.20	2	4	2
4426 B66 RRH (Shielded)	14.9	2.9	13.2	0.30	1.37	5.14	1.13	1.32	1.20	1	4	2
4478 B14 RRH	18.1	8.3	13.4	1.04	1.68	2.18	1.35	1.20	1.20	3	5	4
4478 B14 RRH (Shielded)	18.1	4.2	13.4	0.52	1.68	4.36	1.35	1.28	1.20	2	5	3
RRUS-32 B30 RRH	27.2	12.1	7.0	2.29	1.32	2.25	3.89	1.20	1.26	7	4	6
RRUS-32 B30 RRH (Shielded)	27.2	6.1	7.0	1.14	1.32	4.50	3.89	1.29	1.26	4	4	4
DTMABP7819VG12A TMA	10.7	11.1	3.8	0.82	0.28	0.96	2.82	1.20	1.21	3	1	2
DBC0062F2VF2-2 Diplexer	8.0	6.2	6.5	0.34	0.36	1.29	1.23	1.20	1.20	1	1	1

Date: 3/23/2020  
 Project Name: NHV 109 943107  
 Project No.: 806358  
 Designed By: JN Checked By: MSC



**ICE WEIGHT CALCULATIONS**

Thickness of ice: 1.21 in.  
 Density of ice: 56 pcf

**800-10121 Antenna**

Weight of ice based on total radial SF area:  
 Height (in): 54.5  
 Width (in): 10.3  
 Depth (in): 5.9  
 Total weight of ice on object: 88 lbs  
 Weight of object: 47.0 lbs  
**Combined weight of ice and object: 135 lbs**

**OPA-65R-LCUU-H6 Antenna**

Weight of ice based on total radial SF area:  
 Height (in): 72.0  
 Width (in): 14.8  
 Depth (in): 7.4  
 Total weight of ice on object: 157 lbs  
 Weight of object: 73.0 lbs  
**Combined weight of ice and object: 230 lbs**

**800-10798 Antenna**

Weight of ice based on total radial SF area:  
 Height (in): 78.5  
 Width (in): 14.8  
 Depth (in): 6.7  
 Total weight of ice on object: 169 lbs  
 Weight of object: 87.0 lbs  
**Combined weight of ice and object: 256 lbs**

**OPA65R-BU6D Antenna**

Weight of ice based on total radial SF area:  
 Height (in): 71.2  
 Width (in): 21.0  
 Depth (in): 7.8  
 Total weight of ice on object: 207 lbs  
 Weight of object: 64.0 lbs  
**Combined weight of ice and object: 271 lbs**

**RRUS-11 B12 RRH**

Weight of ice based on total radial SF area:  
 Height (in): 19.7  
 Width (in): 17.0  
 Depth (in): 7.2  
 Total weight of ice on object: 48 lbs  
 Weight of object: 51.0 lbs  
**Combined weight of ice and object: 99 lbs**

**RRUS-32 B2 RRH**

Weight of ice based on total radial SF area:  
 Height (in): 27.2  
 Width (in): 12.1  
 Depth (in): 7.0  
 Total weight of ice on object: 51 lbs  
 Weight of object: 60.0 lbs  
**Combined weight of ice and object: 111 lbs**

**4426 B66 RRH**

Weight of ice based on total radial SF area:  
 Height (in): 14.9  
 Width (in): 13.2  
 Depth (in): 5.8  
 Total weight of ice on object: 29 lbs  
 Weight of object: 49.0 lbs  
**Combined weight of ice and object: 78 lbs**

**4478 B14 RRH**

Weight of ice based on total radial SF area:  
 Height (in): 18.1  
 Width (in): 13.4  
 Depth (in): 8.3  
 Total weight of ice on object: 38 lbs  
 Weight of object: 60.0 lbs  
**Combined weight of ice and object: 98 lbs**

**RRUS-32 B30 RRH**

Weight of ice based on total radial SF area:  
 Height (in): 27.2  
 Width (in): 12.1  
 Depth (in): 7.0  
 Total weight of ice on object: 51 lbs  
 Weight of object: 60.0 lbs  
**Combined weight of ice and object: 111 lbs**

**DTMABP7819VG12A TMA**

Weight of ice based on total radial SF area:  
 Height (in): 10.7  
 Width (in): 11.1  
 Depth (in): 3.8  
 Total weight of ice on object: 17 lbs  
 Weight of object: 20.0 lbs  
**Combined weight of ice and object: 37 lbs**

**DBC0062F2VF2-2 Diplexer**

Weight of ice based on total radial SF area:  
 Height (in): 8.0  
 Width (in): 6.2  
 Depth (in): 6.5  
 Total weight of ice on object: 10 lbs  
 Weight of object: 26.0 lbs  
**Combined weight of ice and object: 36 lbs**

**DC6 Surge Arrestor**

Weight of ice based on total radial SF area:  
 Height (in): 31.3  
 Width (in): 11.0  
 Depth (in): 11.0  
 Total weight of ice on object: 65 lbs  
 Weight of object: 32.8 lbs  
**Combined weight of ice and object: 97 lbs**

**3/4" Round Bar**

Per foot weight of ice:  
 diameter (in): 0.75  
**Per foot weight of ice on object: 3 plf**

**2" pipe**

Per foot weight of ice:  
 diameter (in): 2.38  
**Per foot weight of ice on object: 5 plf**

**2-1/2" pipe**

Per foot weight of ice:  
 diameter (in): 2.88  
**Per foot weight of ice on object: 6 plf**

## Load data

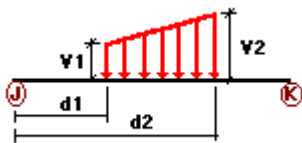
### GLOSSARY

Comb : Indicates if load condition is a load combination

### Load Conditions

Condition	Description	Comb.	Category
D	Dead Load	No	DL
Wo	Wind Load (NO ICE)	No	WIND
W30	WL 30deg	No	WIND
W60	WL 60deg	No	WIND
W90	WL 90deg	No	WIND
W120	WL 120deg	No	WIND
W150	WL 150deg	No	WIND
Di	Ice Load	No	LL
WI0	WL ICE 0deg	No	WIND
WI30	WL ICE 30deg	No	WIND
WI60	WL ICE 60deg	No	WIND
WI90	WL ICE 90deg	No	WIND
WI120	WL ICE 120deg	No	WIND
WI150	WL ICE 150deg	No	WIND
WL0	WL 30 mph 0deg	No	WIND
WL30	WL 30 mph 30deg	No	WIND
WL60	WL 30 mph 60deg	No	WIND
WL90	WL 30 mph 90deg	No	WIND
WL120	WL 30 mph 120deg	No	WIND
WL150	WL 30 mph 150deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load Right End of Mount	No	LL
LL3	250 lb Live Load Left End of Mount	No	LL
LLa1	500 lb Live Load Antenna 1	No	LL
LLa2	500 lb Live Load Antenna 2	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL
LLa4	500 lb Live Load Antenna 4	No	LL

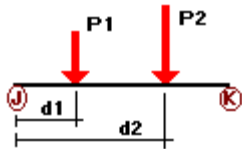
### Distributed force on members



Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%	
Wo	3	z	-0.009	0.00	0.00	No	0.00	No	
	4	z	-0.009	0.00	0.00	No	0.00	No	
	5	z	-0.009	0.00	0.00	No	0.00	No	
	8	z	-0.009	0.00	0.00	No	0.00	No	
	9	z	-0.009	0.00	0.00	No	0.00	No	
	10	z	-0.009	0.00	0.00	No	0.00	No	
	11	z	-0.003	0.00	0.00	No	0.00	No	
	12	z	-0.003	0.00	0.00	No	0.00	No	
	13	z	-0.003	0.00	0.00	No	0.00	No	
	14	z	-0.003	0.00	0.00	No	0.00	No	
	15	z	-0.003	0.00	0.00	No	0.00	No	
	16	z	-0.003	0.00	0.00	No	0.00	No	
	W30	31	z	-0.009	0.00	0.00	No	0.00	No
		3	z	-0.009	0.00	0.00	No	0.00	No
		4	z	-0.009	0.00	0.00	No	0.00	No
		5	z	-0.009	0.00	0.00	No	0.00	No
8		z	-0.009	0.00	0.00	No	0.00	No	
9		z	-0.009	0.00	0.00	No	0.00	No	
10		z	-0.009	0.00	0.00	No	0.00	No	
11		z	-0.003	0.00	0.00	No	0.00	No	
12		z	-0.003	0.00	0.00	No	0.00	No	
13		z	-0.003	0.00	0.00	No	0.00	No	
W60	14	z	-0.003	0.00	0.00	No	0.00	No	
	15	z	-0.003	0.00	0.00	No	0.00	No	
	16	z	-0.003	0.00	0.00	No	0.00	No	
	31	z	-0.009	0.00	0.00	No	0.00	No	
	3	x	-0.009	0.00	0.00	No	0.00	No	
	4	x	-0.009	0.00	0.00	No	0.00	No	
	5	x	-0.009	0.00	0.00	No	0.00	No	
	8	x	-0.009	0.00	0.00	No	0.00	No	
	9	x	-0.009	0.00	0.00	No	0.00	No	
	10	x	-0.009	0.00	0.00	No	0.00	No	
	11	x	-0.003	0.00	0.00	No	0.00	No	
	12	x	-0.003	0.00	0.00	No	0.00	No	
	13	x	-0.003	0.00	0.00	No	0.00	No	
	14	x	-0.003	0.00	0.00	No	0.00	No	
	15	x	-0.003	0.00	0.00	No	0.00	No	
	16	x	-0.003	0.00	0.00	No	0.00	No	
W90	26	x	-0.011	0.00	0.00	No	0.00	No	
	27	x	-0.011	0.00	0.00	No	0.00	No	
	28	x	-0.011	0.00	0.00	No	0.00	No	
	29	x	-0.011	0.00	0.00	No	0.00	No	
	31	x	-0.009	0.00	0.00	No	0.00	No	
	4	x	-0.009	0.00	0.00	No	0.00	No	
	5	x	-0.009	0.00	0.00	No	0.00	No	
	9	x	-0.009	0.00	0.00	No	0.00	No	
	10	x	-0.009	0.00	0.00	No	0.00	No	
	11	x	-0.003	0.00	0.00	No	0.00	No	
	12	x	-0.003	0.00	0.00	No	0.00	No	
	13	x	-0.003	0.00	0.00	No	0.00	No	
	14	x	-0.003	0.00	0.00	No	0.00	No	
	15	x	-0.003	0.00	0.00	No	0.00	No	
	16	x	-0.003	0.00	0.00	No	0.00	No	
	26	x	-0.011	0.00	0.00	No	0.00	No	
W120	27	x	-0.011	0.00	0.00	No	0.00	No	
	28	x	-0.011	0.00	0.00	No	0.00	No	
	29	x	-0.011	0.00	0.00	No	0.00	No	
	31	x	-0.009	0.00	0.00	No	0.00	No	
	3	x	-0.009	0.00	0.00	No	0.00	No	
	4	x	-0.009	0.00	0.00	No	0.00	No	

	5	x	-0.009	0.00	0.00	No	0.00	No
	8	x	-0.009	0.00	0.00	No	0.00	No
	9	x	-0.009	0.00	0.00	No	0.00	No
	10	x	-0.009	0.00	0.00	No	0.00	No
	11	x	-0.003	0.00	0.00	No	0.00	No
	12	x	-0.003	0.00	0.00	No	0.00	No
	13	x	-0.003	0.00	0.00	No	0.00	No
	14	x	-0.003	0.00	0.00	No	0.00	No
	15	x	-0.003	0.00	0.00	No	0.00	No
	16	x	-0.003	0.00	0.00	No	0.00	No
	26	x	-0.011	0.00	0.00	No	0.00	No
	27	x	-0.011	0.00	0.00	No	0.00	No
	28	x	-0.011	0.00	0.00	No	0.00	No
	29	x	-0.011	0.00	0.00	No	0.00	No
	31	x	-0.009	0.00	0.00	No	0.00	No
W150	3	z	0.009	0.00	0.00	No	0.00	No
	4	z	0.009	0.00	0.00	No	0.00	No
	5	z	0.009	0.00	0.00	No	0.00	No
	8	z	0.009	0.00	0.00	No	0.00	No
	9	z	0.009	0.00	0.00	No	0.00	No
	10	z	0.009	0.00	0.00	No	0.00	No
	11	z	0.003	0.00	0.00	No	0.00	No
	12	z	0.003	0.00	0.00	No	0.00	No
	13	z	0.003	0.00	0.00	No	0.00	No
	14	z	0.003	0.00	0.00	No	0.00	No
	15	z	0.003	0.00	0.00	No	0.00	No
	16	z	0.003	0.00	0.00	No	0.00	No
	31	z	0.009	0.00	0.00	No	0.00	No
Di	3	y	-0.005	0.00	0.00	No	0.00	No
	4	y	-0.005	0.00	0.00	No	0.00	No
	5	y	-0.005	0.00	0.00	No	0.00	No
	8	y	-0.005	0.00	0.00	No	0.00	No
	9	y	-0.005	0.00	0.00	No	0.00	No
	10	y	-0.005	0.00	0.00	No	0.00	No
	11	y	-0.003	0.00	0.00	No	0.00	No
	12	y	-0.003	0.00	0.00	No	0.00	No
	13	y	-0.003	0.00	0.00	No	0.00	No
	14	y	-0.003	0.00	0.00	No	0.00	No
	15	y	-0.003	0.00	0.00	No	0.00	No
	16	y	-0.003	0.00	0.00	No	0.00	No
	26	y	-0.006	0.00	0.00	No	0.00	No
	27	y	-0.006	0.00	0.00	No	0.00	No
	28	y	-0.006	0.00	0.00	No	0.00	No
	29	y	-0.006	0.00	0.00	No	0.00	No
	31	y	-0.005	0.00	0.00	No	0.00	No

### Concentrated forces on members





Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%	
-----						
D	26	y	-0.024	2.00	No	
		y	-0.024	6.00	No	
		y	-0.02	4.00	No	
	27	y	-0.037	1.50	No	
		y	-0.037	6.50	No	
		y	-0.051	4.00	No	
		y	-0.06	4.00	No	
		y	-0.044	1.50	No	
	28	y	-0.044	6.50	No	
		y	-0.049	4.00	No	
		y	-0.06	4.00	No	
		y	-0.026	6.00	No	
		y	-0.032	1.50	No	
	29	y	-0.032	6.50	No	
		y	-0.06	4.00	No	
y		-0.06	4.00	No		
Wo	26	z	-0.102	2.00	No	
		z	-0.102	6.00	No	
		z	-0.19	1.50	No	
	27	z	-0.19	6.50	No	
		z	-0.026	4.00	No	
		z	-0.037	4.00	No	
		z	-0.21	1.50	No	
		z	-0.21	6.50	No	
	28	z	-0.016	4.00	No	
		z	-0.026	4.00	No	
		z	-0.253	1.50	No	
		z	-0.253	6.50	No	
		z	-0.253	6.50	No	
	W30	26	3	-0.093	2.00	No
			3	-0.093	6.00	No
3			-0.033	4.00	No	
27		3	-0.17	1.50	No	
		3	-0.17	6.50	No	
		3	-0.055	4.00	No	
		3	-0.186	1.50	No	
		3	-0.186	6.50	No	
28		3	-0.04	4.00	No	
		3	-0.016	6.00	No	
		3	-0.218	1.50	No	
		3	-0.218	6.50	No	
		3	-0.06	4.00	No	
W60		26	3	-0.074	2.00	No
			3	-0.074	6.00	No
	3		-0.02	4.00	No	
	27	3	-0.129	1.50	No	
		3	-0.129	6.50	No	
		3	-0.097	4.00	No	
		3	-0.137	1.50	No	
		3	-0.137	6.50	No	
	28	3	-0.069	4.00	No	
		3	-0.017	6.00	No	
		3	-0.147	1.50	No	
		3	-0.147	6.50	No	
		3	-0.07	4.00	No	
	W90	26	x	-0.065	2.00	No
			x	-0.065	6.00	No
x			-0.013	4.00	No	
27		x	-0.109	1.50	No	
		x	-0.109	6.50	No	
		x	-0.11	4.00	No	
		x	-0.11	4.00	No	
		x	-0.112	1.50	No	

		x	-0.112	6.50	No
		x	-0.079	4.00	No
		x	-0.017	6.00	No
	29	x	-0.112	1.50	No
		x	-0.112	6.50	No
		x	-0.065	4.00	No
W120	26	2	-0.074	2.00	No
		2	-0.074	6.00	No
		2	-0.02	4.00	No
	27	2	-0.129	1.50	No
		2	-0.129	6.50	No
		2	-0.097	4.00	No
	28	2	-0.137	1.50	No
		2	-0.137	6.50	No
		2	-0.069	4.00	No
		2	-0.017	6.00	No
	29	2	-0.147	1.50	No
		2	-0.147	6.50	No
		2	-0.07	4.00	No
W150	26	2	-0.093	2.00	No
		2	-0.093	6.00	No
		2	-0.033	4.00	No
	27	2	-0.17	1.50	No
		2	-0.17	6.50	No
		2	-0.055	4.00	No
	28	2	-0.186	1.50	No
		2	-0.186	6.50	No
		2	-0.04	4.00	No
		2	-0.016	6.00	No
	29	2	-0.218	1.50	No
		2	-0.218	6.50	No
		2	-0.06	4.00	No
Di	26	y	-0.044	2.00	No
		y	-0.044	6.00	No
		y	-0.017	4.00	No
	27	y	-0.079	1.50	No
		y	-0.079	6.50	No
		y	-0.048	4.00	No
		y	-0.051	4.00	No
	28	y	-0.085	1.50	No
		y	-0.085	6.50	No
		y	-0.029	4.00	No
		y	-0.038	4.00	No
		y	-0.01	6.00	No
	29	y	-0.104	1.50	No
		y	-0.104	6.50	No
		y	-0.051	4.00	No
W10	26	z	-0.025	2.00	No
		z	-0.025	6.00	No
	27	z	-0.043	1.50	No
		z	-0.043	6.50	No
		z	-0.009	4.00	No
		z	-0.013	4.00	No
	28	z	-0.047	1.50	No
		z	-0.047	6.50	No
		z	-0.006	4.00	No
		z	-0.009	4.00	No
	29	z	-0.055	1.50	No
		z	-0.055	6.50	No
W130	26	3	-0.022	2.00	No

		3	-0.022	6.00	No
		3	-0.009	4.00	No
	27	3	-0.038	1.50	No
		3	-0.038	6.50	No
		3	-0.014	4.00	No
	28	3	-0.042	1.50	No
		3	-0.042	6.50	No
		3	-0.01	4.00	No
		3	-0.005	6.00	No
	29	3	-0.047	1.50	No
		3	-0.047	6.50	No
		3	-0.015	4.00	No
WI60	26	3	-0.019	2.00	No
		3	-0.019	6.00	No
		3	-0.006	4.00	No
	27	3	-0.031	1.50	No
		3	-0.031	6.50	No
		3	-0.023	4.00	No
	28	3	-0.032	1.50	No
		3	-0.032	6.50	No
		3	-0.017	4.00	No
		3	-0.006	6.00	No
	29	3	-0.034	1.50	No
		3	-0.034	6.50	No
		3	-0.018	4.00	No
WI90	26	x	-0.017	2.00	No
		x	-0.017	6.00	No
		x	-0.005	4.00	No
	27	x	-0.027	1.50	No
		x	-0.027	6.50	No
		x	-0.026	4.00	No
	28	x	-0.028	1.50	No
		x	-0.028	6.50	No
		x	-0.02	4.00	No
		x	-0.006	6.00	No
	29	x	-0.027	1.50	No
		x	-0.027	6.50	No
		x	-0.017	4.00	No
WI120	26	2	-0.019	2.00	No
		2	-0.019	6.00	No
		2	-0.006	4.00	No
	27	2	-0.031	1.50	No
		2	-0.031	6.50	No
		2	-0.023	4.00	No
	28	2	-0.032	1.50	No
		2	-0.032	6.50	No
		2	-0.017	4.00	No
		2	-0.006	6.00	No
	29	2	-0.034	1.50	No
		2	-0.034	6.50	No
		2	-0.018	4.00	No
WI150	26	2	-0.022	2.00	No
		2	-0.022	6.00	No
		2	-0.009	4.00	No
	27	2	-0.038	1.50	No
		2	-0.038	6.50	No
		2	-0.014	4.00	No
	28	2	-0.042	1.50	No
		2	-0.042	6.50	No
		2	-0.01	4.00	No

		2	-0.005	6.00	No
	29	2	-0.047	1.50	No
		2	-0.047	6.50	No
		2	-0.015	4.00	No
WL0	26	z	-0.007	2.00	No
		z	-0.007	6.00	No
	27	z	-0.013	1.50	No
		z	-0.013	6.50	No
		z	-0.002	4.00	No
		z	-0.002	4.00	No
	28	z	-0.015	1.50	No
		z	-0.015	6.50	No
		z	-0.001	4.00	No
		z	-0.002	4.00	No
	29	z	-0.017	1.50	No
		z	-0.017	6.50	No
WL30	26	3	-0.007	2.00	No
		3	-0.007	6.00	No
		3	-0.002	4.00	No
	27	3	-0.012	1.50	No
		3	-0.012	6.50	No
		3	-0.004	4.00	No
	28	3	-0.013	1.50	No
		3	-0.013	6.50	No
		3	-0.003	4.00	No
		3	-0.001	6.00	No
	29	3	-0.015	1.50	No
		3	-0.015	6.50	No
		3	-0.004	4.00	No
WL60	26	3	-0.005	2.00	No
		3	-0.005	6.00	No
		3	-0.001	4.00	No
	27	3	-0.009	1.50	No
		3	-0.009	6.50	No
		3	-0.006	4.00	No
	28	3	-0.01	1.50	No
		3	-0.01	6.50	No
		3	-0.005	4.00	No
		3	-0.001	6.00	No
	29	3	-0.01	1.50	No
		3	-0.01	6.50	No
		3	-0.005	4.00	No
WL90	26	x	-0.005	2.00	No
		x	-0.005	6.00	No
		x	-0.001	4.00	No
	27	x	-0.008	1.50	No
		x	-0.008	6.50	No
		x	-0.007	4.00	No
	28	x	-0.008	1.50	No
		x	-0.008	6.50	No
		x	-0.005	4.00	No
		x	-0.001	6.00	No
	29	x	-0.008	1.50	No
		x	-0.008	6.50	No
		x	-0.004	4.00	No
WL120	26	2	-0.005	2.00	No
		2	-0.005	6.00	No
		2	-0.001	4.00	No
	27	2	-0.009	1.50	No
		2	-0.009	6.50	No

		2	-0.006	4.00	No
	28	2	-0.01	1.50	No
		2	-0.01	6.50	No
		2	-0.005	4.00	No
		2	-0.001	6.00	No
	29	2	-0.01	1.50	No
		2	-0.01	6.50	No
		2	-0.005	4.00	No
WL150	26	2	-0.007	2.00	No
		2	-0.007	6.00	No
		2	-0.002	4.00	No
	27	2	-0.012	1.50	No
		2	-0.012	6.50	No
		2	-0.004	4.00	No
	28	2	-0.013	1.50	No
		2	-0.013	6.50	No
		2	-0.003	4.00	No
		2	-0.001	6.00	No
	29	2	-0.015	1.50	No
		2	-0.015	6.50	No
		2	-0.004	4.00	No
LL1	3	y	-0.25	7.50	No
LL2	3	y	-0.25	15.00	No
LL3	3	y	-0.25	0.00	No
LLa1	26	y	-0.50	4.00	No
LLa2	27	y	-0.50	4.00	No
LLa3	28	y	-0.50	4.00	No
LLa4	29	y	-0.50	4.00	No

### Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
D	Dead Load	No	0.00	-1.00	0.00
Wo	Wind Load (NO ICE)	No	0.00	0.00	0.00
W30	WL 30deg	No	0.00	0.00	0.00
W60	WL 60deg	No	0.00	0.00	0.00
W90	WL 90deg	No	0.00	0.00	0.00
W120	WL 120deg	No	0.00	0.00	0.00
W150	WL 150deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
WI0	WL ICE 0deg	No	0.00	0.00	0.00
WI30	WL ICE 30deg	No	0.00	0.00	0.00
WI60	WL ICE 60deg	No	0.00	0.00	0.00
WI90	WL ICE 90deg	No	0.00	0.00	0.00
WI120	WL ICE 120deg	No	0.00	0.00	0.00
WI150	WL ICE 150deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30deg	No	0.00	0.00	0.00
WL60	WL 30 mph 60deg	No	0.00	0.00	0.00
WL90	WL 30 mph 90deg	No	0.00	0.00	0.00
WL120	WL 30 mph 120deg	No	0.00	0.00	0.00
WL150	WL 30 mph 150deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load Right End of Mount	No	0.00	0.00	0.00

LL3	250 lb Live Load Left End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00
LLa4	500 lb Live Load Antenna 4	No	0.00	0.00	0.00

---

### Earthquake (Dynamic analysis only)

---

Condition	a/g	Ang. [Deg]	Damp. [%]
D	0.00	0.00	0.00
Wo	0.00	0.00	0.00
W30	0.00	0.00	0.00
W60	0.00	0.00	0.00
W90	0.00	0.00	0.00
W120	0.00	0.00	0.00
W150	0.00	0.00	0.00
Di	0.00	0.00	0.00
WI0	0.00	0.00	0.00
WI30	0.00	0.00	0.00
WI60	0.00	0.00	0.00
WI90	0.00	0.00	0.00
WI120	0.00	0.00	0.00
WI150	0.00	0.00	0.00
WL0	0.00	0.00	0.00
WL30	0.00	0.00	0.00
WL60	0.00	0.00	0.00
WL90	0.00	0.00	0.00
WL120	0.00	0.00	0.00
WL150	0.00	0.00	0.00
LL1	0.00	0.00	0.00
LL2	0.00	0.00	0.00
LL3	0.00	0.00	0.00
LLa1	0.00	0.00	0.00
LLa2	0.00	0.00	0.00
LLa3	0.00	0.00	0.00
LLa4	0.00	0.00	0.00

---



Current Date: 3/23/2020 11:35 AM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\CROWN CASTLE\806358\AT&T\Rev.1\806358 (Rev.1).retx

## Geometry data

### GLOSSARY

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

### Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
2	7.50	0.00	0.00	0
3	-7.50	0.00	0.00	0
8	-4.40	0.00	0.00	0
9	4.40	0.00	0.00	0
10	0.00	0.00	-3.00	0
11	-3.6667	0.00	-0.50	0
12	3.6667	0.00	-0.50	0
13	0.7333	0.00	-2.50	0
14	-0.7333	0.00	-2.50	0
16	7.50	3.00	0.00	0
17	-7.50	3.00	0.00	0
22	-4.40	3.00	0.00	0
23	4.40	3.00	0.00	0
24	0.00	3.00	-3.00	0
25	-3.6667	3.00	-0.50	0
26	3.6667	3.00	-0.50	0
27	0.7333	3.00	-2.50	0
28	-0.7333	3.00	-2.50	0
33	-7.00	5.50	0.20	0
34	7.00	5.50	0.20	0
35	-7.00	-2.50	0.20	0

36	7.00	-2.50	0.20	0
42	2.33	5.50	0.20	0
43	2.33	-2.50	0.20	0
48	-2.33	5.50	0.20	0
49	-2.33	-2.50	0.20	0
51	-1.00	3.00	-6.50	0

### Restraints

Node	TX	TY	TZ	RX	RY	RZ
10	1	1	1	1	1	1
24	1	1	1	1	1	1
51	1	1	1	0	0	0

### Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	Ig factor
3	3	2		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
4	8	10		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
5	9	10		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
8	17	16		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
9	22	24		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
10	23	24		PIPE 2x0.218XS	A53 GrB SABRE 50...	0.00	0.00	0.00
11	14	28		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
12	27	13		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
13	25	11		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
14	12	26		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
15	28	11		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
16	27	12		RndBar 3_4	A572 Gr50	0.00	0.00	0.00
26	34	36		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
27	42	43		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
28	48	49		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
29	33	35		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
31	22	51		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

### Orientation of local axes

Member	Rotation [Deg]	Axis23	NX	NY	NZ
12	315.00	0	0.00	0.00	0.00
26	315.00	0	0.00	0.00	0.00
27	315.00	0	0.00	0.00	0.00
28	315.00	0	0.00	0.00	0.00
29	315.00	0	0.00	0.00	0.00



## Rigid end offsets

---

Member	DJX	DJY	DJZ	DKX	DKY	DKZ
	[in]	[in]	[in]	[in]	[in]	[in]
31	0.00	2.00	0.00	0.00	2.00	0.00

---

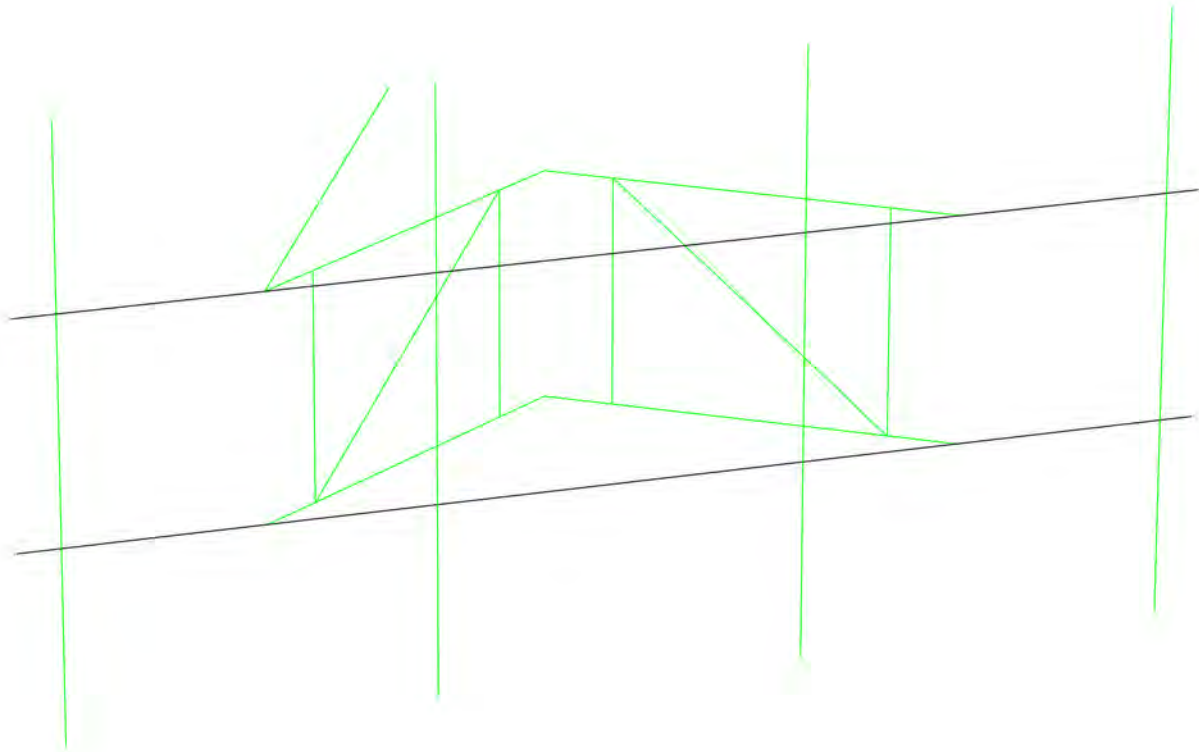
## Hinges

---

Member	Node-J				Node-K				TOR	AXL	Axial rigidity
	M33	M22	V3	V2	M33	M22	V3	V2			
15	0	0	0	0	0	0	0	0	0	0	Tension only
16	0	0	0	0	0	0	0	0	0	0	Tension only

---

**APPENDIX C**  
**SOFTWARE ANALYSIS OUTPUT**





Current Date: 3/23/2020 11:35 AM

Units system: English

File name: W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\CROWN CASTLE\806358\AT&T\Rev.1\806358 (Rev.1).retx

## Steel Code Check

Report: Summary - For all selected load conditions

### Load conditions to be included in design :

LC1=1.2D+Wo  
LC2=1.2D+W30  
LC3=1.2D+W60  
LC4=1.2D+W90  
LC5=1.2D+W120  
LC6=1.2D+W150  
LC7=1.2D-Wo  
LC8=1.2D-W30  
LC9=1.2D-W60  
LC10=1.2D-W90  
LC11=1.2D-W120  
LC12=1.2D-W150  
LC13=0.9D+Wo  
LC14=0.9D+W30  
LC15=0.9D+W60  
LC16=0.9D+W90  
LC17=0.9D+W120  
LC18=0.9D+W150  
LC19=0.9D-Wo  
LC20=0.9D-W30  
LC21=0.9D-W60  
LC22=0.9D-W90  
LC23=0.9D-W120  
LC24=0.9D-W150  
LC25=1.2D+Di+Wl0  
LC26=1.2D+Di+Wl30  
LC27=1.2D+Di+Wl60  
LC28=1.2D+Di+Wl90  
LC29=1.2D+Di+Wl120  
LC30=1.2D+Di+Wl150  
LC31=1.2D+Di-Wl0  
LC32=1.2D+Di-Wl30  
LC33=1.2D+Di-Wl60  
LC34=1.2D+Di-Wl90  
LC35=1.2D+Di-Wl120  
LC36=1.2D+Di-Wl150  
LC38=1.2D+1.5LL1  
LC39=1.2D+1.5LL2  
LC40=1.2D+1.5LL3  
LC41=1.2D+Wl0+1.5LLa1  
LC42=1.2D+Wl30+1.5LLa1  
LC43=1.2D+Wl60+1.5LLa1  
LC44=1.2D+Wl90+1.5LLa1  
LC45=1.2D+Wl120+1.5LLa1  
LC46=1.2D+Wl150+1.5LLa1  
LC47=1.2D-Wl0+1.5LLa1  
LC48=1.2D-Wl30+1.5LLa1  
LC49=1.2D-Wl60+1.5LLa1  
LC50=1.2D-Wl90+1.5LLa1  
LC51=1.2D-Wl120+1.5LLa1  
LC52=1.2D-Wl150+1.5LLa1  
LC53=1.2D+Wl0+1.5LLa2

LC54=1.2D+WL30+1.5LLa2  
 LC55=1.2D+WL60+1.5LLa2  
 LC56=1.2D+WL90+1.5LLa2  
 LC57=1.2D+WL120+1.5LLa2  
 LC58=1.2D+WL150+1.5LLa2  
 LC59=1.2D-WL0+1.5LLa2  
 LC60=1.2D-WL30+1.5LLa2  
 LC61=1.2D-WL60+1.5LLa2  
 LC62=1.2D-WL90+1.5LLa2  
 LC63=1.2D-WL120+1.5LLa2  
 LC64=1.2D-WL150+1.5LLa2  
 LC65=1.2D+WL0+1.5LLa3  
 LC66=1.2D+WL30+1.5LLa3  
 LC67=1.2D+WL60+1.5LLa3  
 LC68=1.2D+WL90+1.5LLa3  
 LC69=1.2D+WL120+1.5LLa3  
 LC70=1.2D+WL150+1.5LLa3  
 LC71=1.2D-WL0+1.5LLa3  
 LC72=1.2D-WL30+1.5LLa3  
 LC73=1.2D-WL60+1.5LLa3  
 LC74=1.2D-WL90+1.5LLa3  
 LC75=1.2D-WL120+1.5LLa3  
 LC76=1.2D-WL150+1.5LLa3  
 LC77=1.2D+WL0+1.5LLa4  
 LC78=1.2D+WL30+1.5LLa4  
 LC79=1.2D+WL60+1.5LLa4  
 LC80=1.2D+WL90+1.5LLa4  
 LC81=1.2D+WL120+1.5LLa4  
 LC82=1.2D+WL150+1.5LLa4  
 LC83=1.2D-WL0+1.5LLa4  
 LC84=1.2D-WL30+1.5LLa4  
 LC85=1.2D-WL60+1.5LLa4  
 LC86=1.2D-WL90+1.5LLa4  
 LC87=1.2D-WL120+1.5LLa4  
 LC88=1.2D-WL150+1.5LLa4

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	<b>PIPE 2-1_2x0.203</b>	<b>26</b>	LC1 at 66.67%	0.06	OK	
			LC10 at 31.25%	0.11	OK	
			LC11 at 31.25%	0.09	OK	
			LC12 at 31.25%	0.08	OK	
			LC13 at 66.67%	0.06	OK	
			LC14 at 66.67%	0.07	OK	
			LC15 at 66.67%	0.06	OK	
			LC16 at 31.25%	0.05	OK	
			LC17 at 31.25%	0.05	OK	
			LC18 at 31.25%	0.05	OK	
			LC19 at 66.67%	0.05	OK	
			LC2 at 66.67%	0.07	OK	
			LC20 at 31.25%	0.08	OK	
			LC21 at 31.25%	0.09	OK	
			LC22 at 31.25%	0.09	OK	
			LC23 at 31.25%	0.08	OK	
			LC24 at 31.25%	0.06	OK	
			LC25 at 31.25%	0.09	OK	
			LC26 at 31.25%	0.08	OK	
			LC27 at 31.25%	0.08	OK	
			LC28 at 66.67%	0.08	OK	
			LC29 at 31.25%	0.08	OK	
			LC3 at 66.67%	0.07	OK	
			LC30 at 66.67%	0.08	OK	
			LC31 at 31.25%	0.09	OK	
			LC32 at 31.25%	0.10	OK	
			LC33 at 31.25%	0.10	OK	

LC34 at 31.25%	0.10	OK
LC35 at 31.25%	0.09	OK
LC36 at 31.25%	0.09	OK
LC38 at 66.67%	0.03	OK
LC39 at 66.67%	0.24	OK
LC4 at 31.25%	0.06	OK
LC40 at 31.25%	0.06	OK
LC41 at 31.25%	0.36	OK
LC42 at 31.25%	0.36	OK
LC43 at 31.25%	0.36	OK
LC44 at 31.25%	0.36	OK
LC45 at 31.25%	0.36	OK
LC46 at 31.25%	0.36	OK
LC47 at 31.25%	0.37	OK
LC48 at 31.25%	<b>0.37</b>	<b>OK</b>
LC49 at 31.25%	0.37	OK
LC5 at 31.25%	0.06	OK
LC50 at 31.25%	0.37	OK
LC51 at 31.25%	0.37	OK
LC52 at 31.25%	0.37	OK
LC53 at 66.67%	0.04	OK
LC54 at 66.67%	0.04	OK
LC55 at 31.25%	0.04	OK
LC56 at 31.25%	0.04	OK
LC57 at 31.25%	0.04	OK
LC58 at 31.25%	0.04	OK
LC59 at 31.25%	0.04	OK
LC6 at 31.25%	0.05	OK
LC60 at 31.25%	0.04	OK
LC61 at 31.25%	0.04	OK
LC62 at 31.25%	0.04	OK
LC63 at 31.25%	0.04	OK
LC64 at 66.67%	0.04	OK
LC65 at 66.67%	0.03	OK
LC66 at 66.67%	0.03	OK
LC67 at 31.25%	0.03	OK
LC68 at 31.25%	0.03	OK
LC69 at 31.25%	0.03	OK
LC7 at 31.25%	0.06	OK
LC70 at 31.25%	0.03	OK
LC71 at 31.25%	0.03	OK
LC72 at 31.25%	0.03	OK
LC73 at 31.25%	0.03	OK
LC74 at 31.25%	0.03	OK
LC75 at 31.25%	0.03	OK
LC76 at 31.25%	0.03	OK
LC77 at 31.25%	0.07	OK
LC78 at 31.25%	0.06	OK
LC79 at 31.25%	0.07	OK
LC8 at 31.25%	0.09	OK
LC80 at 31.25%	0.07	OK
LC81 at 31.25%	0.07	OK
LC82 at 31.25%	0.07	OK
LC83 at 31.25%	0.07	OK
LC84 at 31.25%	0.07	OK
LC85 at 31.25%	0.07	OK
LC86 at 31.25%	0.07	OK
LC87 at 31.25%	0.07	OK
LC88 at 31.25%	0.07	OK
LC9 at 31.25%	0.10	OK

Eq. H1-1b

27

LC1 at 66.67%	0.14	OK
LC10 at 31.25%	0.14	OK
LC11 at 31.25%	0.08	OK

Eq. H1-1b

LC12 at 66.67%	0.08	OK
LC13 at 66.67%	0.13	OK
LC14 at 31.25%	0.20	OK
LC15 at 31.25%	0.21	OK
LC16 at 31.25%	0.21	OK
LC17 at 31.25%	0.15	OK
LC18 at 31.25%	0.12	OK
LC19 at 68.75%	0.11	OK
LC2 at 31.25%	0.21	OK
LC20 at 31.25%	0.14	OK
LC21 at 31.25%	0.15	OK
LC22 at 31.25%	0.15	OK
LC23 at 31.25%	0.09	OK
LC24 at 68.75%	0.07	OK
LC25 at 31.25%	0.08	OK
LC26 at 31.25%	0.11	OK
LC27 at 31.25%	0.10	OK
LC28 at 31.25%	0.10	OK
LC29 at 31.25%	0.09	OK
LC3 at 31.25%	<b>0.22</b>	<b>OK</b>
LC30 at 31.25%	0.09	OK
LC31 at 31.25%	0.07	OK
LC32 at 31.25%	0.06	OK
LC33 at 31.25%	0.06	OK
LC34 at 66.67%	0.05	OK
LC35 at 66.67%	0.06	OK
LC36 at 66.67%	0.06	OK
LC38 at 66.67%	0.12	OK
LC39 at 31.25%	0.04	OK
LC4 at 31.25%	0.22	OK
LC40 at 66.67%	0.02	OK
LC41 at 66.67%	0.06	OK
LC42 at 66.67%	0.06	OK
LC43 at 66.67%	0.06	OK
LC44 at 66.67%	0.05	OK
LC45 at 31.25%	0.06	OK
LC46 at 31.25%	0.06	OK
LC47 at 31.25%	0.06	OK
LC48 at 31.25%	0.05	OK
LC49 at 31.25%	0.05	OK
LC5 at 31.25%	0.16	OK
LC50 at 66.67%	0.05	OK
LC51 at 66.67%	0.05	OK
LC52 at 66.67%	0.06	OK
LC53 at 31.25%	0.12	OK
LC54 at 31.25%	0.12	OK
LC55 at 31.25%	0.12	OK
LC56 at 31.25%	0.12	OK
LC57 at 31.25%	0.12	OK
LC58 at 31.25%	0.12	OK
LC59 at 31.25%	0.11	OK
LC6 at 31.25%	0.13	OK
LC60 at 66.67%	0.10	OK
LC61 at 66.67%	0.10	OK
LC62 at 66.67%	0.10	OK
LC63 at 31.25%	0.11	OK
LC64 at 66.67%	0.11	OK
LC65 at 31.25%	0.14	OK
LC66 at 31.25%	0.15	OK
LC67 at 31.25%	0.15	OK
LC68 at 31.25%	0.14	OK
LC69 at 31.25%	0.14	OK
LC7 at 68.75%	0.11	OK
LC70 at 31.25%	0.14	OK

Eq. H1-1b

Eq. H1-1b

LC71 at 31.25%	0.13	OK
LC72 at 31.25%	0.12	OK
LC73 at 31.25%	0.13	OK
LC74 at 31.25%	0.13	OK
LC75 at 31.25%	0.13	OK
LC76 at 31.25%	0.13	OK
LC77 at 31.25%	0.04	OK
LC78 at 66.67%	0.03	OK
LC79 at 66.67%	0.04	OK
LC8 at 31.25%	0.13	OK
LC80 at 66.67%	0.04	OK
LC81 at 66.67%	0.04	OK
LC82 at 66.67%	0.04	OK
LC83 at 31.25%	0.05	OK
LC84 at 31.25%	0.06	OK
LC85 at 31.25%	0.05	OK
LC86 at 31.25%	0.05	OK
LC87 at 31.25%	0.05	OK
LC88 at 31.25%	0.05	OK
LC9 at 31.25%	0.14	OK

28

---

LC1 at 66.67%	0.13	OK
LC10 at 31.25%	0.24	OK
LC11 at 31.25%	0.18	OK
LC12 at 31.25%	0.15	OK
LC13 at 68.75%	0.13	OK
LC14 at 31.25%	0.14	OK
LC15 at 31.25%	0.15	OK
LC16 at 31.25%	0.15	OK
LC17 at 31.25%	0.10	OK
LC18 at 31.25%	0.09	OK
LC19 at 68.75%	0.13	OK
LC2 at 31.25%	0.13	OK
LC20 at 31.25%	0.22	OK
LC21 at 31.25%	0.23	OK
LC22 at 31.25%	0.22	OK
LC23 at 31.25%	0.17	OK
LC24 at 31.25%	0.14	OK
LC25 at 66.67%	0.09	OK
LC26 at 66.67%	0.07	OK
LC27 at 66.67%	0.07	OK
LC28 at 66.67%	0.07	OK
LC29 at 66.67%	0.08	OK
LC3 at 31.25%	0.14	OK
LC30 at 66.67%	0.08	OK
LC31 at 31.25%	0.10	OK
LC32 at 31.25%	0.13	OK
LC33 at 31.25%	0.12	OK
LC34 at 31.25%	0.12	OK
LC35 at 31.25%	0.11	OK
LC36 at 31.25%	0.11	OK
LC38 at 66.67%	0.13	OK
LC39 at 66.67%	0.02	OK
LC4 at 31.25%	0.14	OK
LC40 at 31.25%	0.04	OK
LC41 at 31.25%	0.04	OK
LC42 at 31.25%	0.04	OK
LC43 at 31.25%	0.04	OK
LC44 at 31.25%	0.04	OK
LC45 at 31.25%	0.04	OK
LC46 at 31.25%	0.04	OK
LC47 at 31.25%	0.03	OK
LC48 at 66.67%	0.03	OK
LC49 at 66.67%	0.03	OK



LC5 at 31.25%	0.09	OK
LC50 at 66.67%	0.03	OK
LC51 at 66.67%	0.03	OK
LC52 at 66.67%	0.03	OK
LC53 at 31.25%	0.14	OK
LC54 at 31.25%	0.13	OK
LC55 at 31.25%	0.13	OK
LC56 at 31.25%	0.14	OK
LC57 at 31.25%	0.14	OK
LC58 at 31.25%	0.14	OK
LC59 at 31.25%	0.15	OK
LC6 at 31.25%	0.10	OK
LC60 at 31.25%	0.16	OK
LC61 at 31.25%	0.15	OK
LC62 at 31.25%	0.15	OK
LC63 at 31.25%	0.15	OK
LC64 at 31.25%	0.15	OK
LC65 at 31.25%	0.12	OK
LC66 at 31.25%	0.11	OK
LC67 at 31.25%	0.11	OK
LC68 at 31.25%	0.11	OK
LC69 at 31.25%	0.12	OK
LC7 at 31.25%	0.13	OK
LC70 at 31.25%	0.12	OK
LC71 at 31.25%	0.13	OK
LC72 at 31.25%	0.13	OK
LC73 at 31.25%	0.13	OK
LC74 at 31.25%	0.13	OK
LC75 at 31.25%	0.13	OK
LC76 at 31.25%	0.13	OK
LC77 at 66.67%	0.06	OK
LC78 at 66.67%	0.06	OK
LC79 at 66.67%	0.06	OK
LC8 at 31.25%	0.23	OK
LC80 at 66.67%	0.05	OK
LC81 at 66.67%	0.05	OK
LC82 at 31.25%	0.05	OK
LC83 at 31.25%	0.05	OK
LC84 at 66.67%	0.05	OK
LC85 at 66.67%	0.05	OK
LC86 at 66.67%	0.06	OK
LC87 at 66.67%	0.06	OK
LC88 at 66.67%	0.06	OK
LC9 at 31.25%	<b>0.24</b>	<b>OK</b>

Eq. H1-1b

29

---

LC1 at 68.75%	0.15	OK
LC10 at 68.75%	0.09	OK
LC11 at 66.67%	0.10	OK
LC12 at 66.67%	0.12	OK
LC13 at 68.75%	0.15	OK
LC14 at 31.25%	0.15	OK
LC15 at 31.25%	0.15	OK
LC16 at 31.25%	0.14	OK
LC17 at 31.25%	0.13	OK
LC18 at 31.25%	0.13	OK
LC19 at 31.25%	0.15	OK
LC2 at 31.25%	0.17	OK
LC20 at 31.25%	0.11	OK
LC21 at 31.25%	0.09	OK
LC22 at 68.75%	0.09	OK
LC23 at 66.67%	0.09	OK
LC24 at 66.67%	0.11	OK
LC25 at 31.25%	0.18	OK
LC26 at 31.25%	0.19	OK

LC27 at 31.25%	0.19	OK	
LC28 at 31.25%	0.19	OK	
LC29 at 31.25%	0.19	OK	
LC3 at 31.25%	0.16	OK	
LC30 at 31.25%	0.19	OK	
LC31 at 31.25%	0.17	OK	
LC32 at 66.67%	0.16	OK	
LC33 at 31.25%	0.16	OK	
LC34 at 66.67%	0.16	OK	
LC35 at 31.25%	0.16	OK	
LC36 at 66.67%	0.16	OK	
LC38 at 31.25%	0.06	OK	
LC39 at 31.25%	0.09	OK	
LC4 at 31.25%	0.16	OK	
LC40 at 66.67%	0.26	OK	
LC41 at 31.25%	0.09	OK	
LC42 at 31.25%	0.10	OK	
LC43 at 31.25%	0.10	OK	
LC44 at 31.25%	0.10	OK	
LC45 at 31.25%	0.10	OK	
LC46 at 31.25%	0.10	OK	
LC47 at 31.25%	0.09	OK	
LC48 at 31.25%	0.09	OK	
LC49 at 31.25%	0.09	OK	
LC5 at 31.25%	0.15	OK	
LC50 at 31.25%	0.09	OK	
LC51 at 31.25%	0.09	OK	
LC52 at 31.25%	0.09	OK	
LC53 at 31.25%	0.06	OK	
LC54 at 31.25%	0.06	OK	
LC55 at 31.25%	0.06	OK	
LC56 at 31.25%	0.06	OK	
LC57 at 31.25%	0.06	OK	
LC58 at 31.25%	0.06	OK	
LC59 at 31.25%	0.05	OK	
LC6 at 31.25%	0.14	OK	
LC60 at 66.67%	0.05	OK	
LC61 at 31.25%	0.05	OK	
LC62 at 66.67%	0.05	OK	
LC63 at 31.25%	0.05	OK	
LC64 at 66.67%	0.05	OK	
LC65 at 66.67%	0.05	OK	
LC66 at 31.25%	0.05	OK	
LC67 at 31.25%	0.05	OK	
LC68 at 31.25%	0.05	OK	
LC69 at 31.25%	0.05	OK	
LC7 at 31.25%	0.16	OK	
LC70 at 31.25%	0.05	OK	
LC71 at 31.25%	0.05	OK	
LC72 at 31.25%	0.04	OK	
LC73 at 31.25%	0.04	OK	
LC74 at 66.67%	0.05	OK	
LC75 at 66.67%	0.05	OK	
LC76 at 66.67%	0.05	OK	
LC77 at 31.25%	0.39	OK	
LC78 at 31.25%	<b>0.40</b>	<b>OK</b>	Eq. H1-1b
LC79 at 31.25%	0.40	OK	
LC8 at 31.25%	0.12	OK	
LC80 at 31.25%	0.40	OK	
LC81 at 31.25%	0.39	OK	
LC82 at 31.25%	0.40	OK	
LC83 at 31.25%	0.39	OK	
LC84 at 31.25%	0.38	OK	
LC85 at 31.25%	0.39	OK	

PIPE 2x0.154

31

LC86 at 31.25%	0.39	OK
LC87 at 31.25%	0.39	OK
LC88 at 31.25%	0.39	OK
LC9 at 31.25%	0.09	OK
-----		
LC1 at 100.00%	0.15	OK
LC10 at 100.00%	0.26	OK
LC11 at 93.75%	0.17	OK
LC12 at 100.00%	0.10	OK
LC13 at 100.00%	0.15	OK
LC14 at 100.00%	0.31	OK
LC15 at 100.00%	<b>0.32</b>	<b>OK</b>
LC16 at 100.00%	0.29	OK
LC17 at 100.00%	0.19	OK
LC18 at 100.00%	0.11	OK
LC19 at 0.00%	0.13	OK
LC2 at 100.00%	0.31	OK
LC20 at 100.00%	0.27	OK
LC21 at 100.00%	0.28	OK
LC22 at 100.00%	0.26	OK
LC23 at 93.75%	0.17	OK
LC24 at 100.00%	0.10	OK
LC25 at 0.00%	0.11	OK
LC26 at 0.00%	0.13	OK
LC27 at 0.00%	0.12	OK
LC28 at 0.00%	0.11	OK
LC29 at 0.00%	0.10	OK
LC3 at 100.00%	0.32	OK
LC30 at 0.00%	0.11	OK
LC31 at 0.00%	0.11	OK
LC32 at 0.00%	0.12	OK
LC33 at 0.00%	0.11	OK
LC34 at 0.00%	0.11	OK
LC35 at 0.00%	0.10	OK
LC36 at 0.00%	0.10	OK
LC38 at 0.00%	0.05	OK
LC39 at 0.00%	0.06	OK
LC4 at 100.00%	0.29	OK
LC40 at 0.00%	0.07	OK
LC41 at 0.00%	0.07	OK
LC42 at 0.00%	0.07	OK
LC43 at 0.00%	0.07	OK
LC44 at 0.00%	0.07	OK
LC45 at 0.00%	0.06	OK
LC46 at 0.00%	0.06	OK
LC47 at 0.00%	0.06	OK
LC48 at 0.00%	0.06	OK
LC49 at 0.00%	0.06	OK
LC5 at 100.00%	0.19	OK
LC50 at 0.00%	0.07	OK
LC51 at 0.00%	0.07	OK
LC52 at 0.00%	0.07	OK
LC53 at 0.00%	0.05	OK
LC54 at 0.00%	0.06	OK
LC55 at 0.00%	0.05	OK
LC56 at 0.00%	0.05	OK
LC57 at 0.00%	0.05	OK
LC58 at 0.00%	0.05	OK
LC59 at 0.00%	0.05	OK
LC6 at 100.00%	0.11	OK
LC60 at 0.00%	0.05	OK
LC61 at 0.00%	0.05	OK
LC62 at 0.00%	0.05	OK
LC63 at 0.00%	0.05	OK

Eq. H1-1b

LC64 at 0.00%	0.05	OK
LC65 at 0.00%	0.08	OK
LC66 at 0.00%	0.08	OK
LC67 at 0.00%	0.08	OK
LC68 at 0.00%	0.08	OK
LC69 at 0.00%	0.08	OK
LC7 at 0.00%	0.14	OK
LC70 at 0.00%	0.07	OK
LC71 at 0.00%	0.08	OK
LC72 at 0.00%	0.08	OK
LC73 at 0.00%	0.08	OK
LC74 at 0.00%	0.08	OK
LC75 at 0.00%	0.08	OK
LC76 at 0.00%	0.08	OK
LC77 at 0.00%	0.10	OK
LC78 at 0.00%	0.10	OK
LC79 at 0.00%	0.10	OK
LC8 at 100.00%	0.27	OK
LC80 at 0.00%	0.10	OK
LC81 at 0.00%	0.10	OK
LC82 at 0.00%	0.10	OK
LC83 at 0.00%	0.10	OK
LC84 at 0.00%	0.11	OK
LC85 at 0.00%	0.10	OK
LC86 at 0.00%	0.10	OK
LC87 at 0.00%	0.10	OK
LC88 at 0.00%	0.10	OK
LC9 at 100.00%	0.28	OK

Eq. H1-1b

**PIPE 2x0.218XS**

**3**

---

LC1 at 20.54%	0.36	With warnings
LC10 at 20.54%	0.15	With warnings
LC11 at 20.54%	0.27	With warnings
LC12 at 20.54%	0.32	With warnings
LC13 at 20.54%	0.33	With warnings
LC14 at 21.43%	0.24	With warnings
LC15 at 21.43%	0.19	With warnings
LC16 at 79.46%	0.12	With warnings
LC17 at 21.43%	0.20	With warnings
LC18 at 21.43%	0.28	With warnings
LC19 at 21.43%	0.49	With warnings
LC2 at 21.43%	0.27	With warnings
LC20 at 21.43%	0.34	With warnings
LC21 at 21.43%	0.26	With warnings
LC22 at 20.54%	0.12	With warnings
LC23 at 20.54%	0.24	With warnings
LC24 at 20.54%	0.30	With warnings
LC25 at 21.43%	0.28	With warnings
LC26 at 21.43%	0.27	With warnings
LC27 at 21.43%	0.27	With warnings
LC28 at 21.43%	0.24	With warnings
LC29 at 21.43%	0.23	With warnings
LC3 at 21.43%	0.22	With warnings
LC30 at 21.43%	0.23	With warnings
LC31 at 21.43%	0.24	With warnings
LC32 at 21.43%	0.23	With warnings
LC33 at 21.43%	0.23	With warnings
LC34 at 21.43%	0.24	With warnings
LC35 at 21.43%	0.27	With warnings
LC36 at 21.43%	0.27	With warnings
LC38 at 21.43%	0.17	With warnings
LC39 at 79.46%	0.22	With warnings
LC4 at 79.46%	0.14	With warnings
LC40 at 20.54%	0.24	With warnings
LC41 at 79.46%	0.35	With warnings

LC42 at 79.46%	0.35	With warnings	Eq. H1-1b
LC43 at 79.46%	0.35	With warnings	
LC44 at 79.46%	0.34	With warnings	
LC45 at 79.46%	0.34	With warnings	
LC46 at 96.43%	0.34	With warnings	
LC47 at 96.43%	0.34	With warnings	Eq. H1-1b
LC48 at 96.43%	0.34	With warnings	
LC49 at 96.43%	0.34	With warnings	
LC5 at 21.43%	0.22	With warnings	
LC50 at 79.46%	0.34	With warnings	
LC51 at 79.46%	0.34	With warnings	
LC52 at 79.46%	0.34	With warnings	
LC53 at 78.57%	0.24	With warnings	
LC54 at 78.57%	0.24	With warnings	
LC55 at 78.57%	0.24	With warnings	
LC56 at 78.57%	0.23	With warnings	
LC57 at 78.57%	0.23	With warnings	
LC58 at 78.57%	0.23	With warnings	
LC59 at 78.57%	0.22	With warnings	
LC6 at 21.43%	0.30	With warnings	
LC60 at 78.57%	0.22	With warnings	
LC61 at 78.57%	0.22	With warnings	
LC62 at 78.57%	0.23	With warnings	
LC63 at 78.57%	0.23	With warnings	
LC64 at 78.57%	0.23	With warnings	
LC65 at 21.43%	0.26	With warnings	
LC66 at 21.43%	0.26	With warnings	
LC67 at 21.43%	0.26	With warnings	
LC68 at 21.43%	0.25	With warnings	
LC69 at 21.43%	0.24	With warnings	
LC7 at 21.43%	<b>0.50</b>	<b>With warnings</b>	Eq. H1-1a
LC70 at 21.43%	0.24	With warnings	
LC71 at 21.43%	0.24	With warnings	
LC72 at 21.43%	0.24	With warnings	
LC73 at 21.43%	0.24	With warnings	
LC74 at 21.43%	0.25	With warnings	
LC75 at 21.43%	0.26	With warnings	
LC76 at 21.43%	0.26	With warnings	
LC77 at 20.54%	0.38	With warnings	Eq. H1-1b
LC78 at 20.54%	0.37	With warnings	
LC79 at 20.54%	0.37	With warnings	
LC8 at 21.43%	0.36	With warnings	
LC80 at 20.54%	0.36	With warnings	
LC81 at 3.57%	0.35	With warnings	
LC82 at 3.57%	0.35	With warnings	
LC83 at 3.57%	0.35	With warnings	
LC84 at 20.54%	0.35	With warnings	
LC85 at 20.54%	0.36	With warnings	
LC86 at 20.54%	0.36	With warnings	
LC87 at 20.54%	0.37	With warnings	
LC88 at 20.54%	0.38	With warnings	
LC9 at 21.43%	0.28	With warnings	

4

---

LC1 at 100.00%	0.15	OK	
LC10 at 100.00%	0.27	OK	Eq. H1-1b
LC11 at 100.00%	0.24	OK	
LC12 at 100.00%	0.20	OK	
LC13 at 100.00%	0.12	OK	
LC14 at 100.00%	0.17	OK	
LC15 at 100.00%	0.17	OK	
LC16 at 100.00%	0.17	OK	
LC17 at 100.00%	0.15	OK	
LC18 at 0.00%	0.12	OK	
LC19 at 0.00%	0.13	OK	

LC2 at 100.00%	0.20	OK
LC20 at 100.00%	0.21	OK
LC21 at 100.00%	0.23	OK
LC22 at 100.00%	0.24	OK
LC23 at 100.00%	0.21	OK
LC24 at 100.00%	0.17	OK
LC25 at 100.00%	0.21	OK
LC26 at 100.00%	0.22	OK
LC27 at 100.00%	0.22	OK
LC28 at 100.00%	0.22	OK
LC29 at 100.00%	0.21	OK
LC3 at 100.00%	0.20	OK
LC30 at 100.00%	0.22	OK
LC31 at 100.00%	0.22	OK
LC32 at 100.00%	0.24	OK
LC33 at 100.00%	0.24	OK
LC34 at 100.00%	0.24	OK
LC35 at 100.00%	0.23	OK
LC36 at 100.00%	0.24	OK
LC38 at 100.00%	0.14	OK
LC39 at 100.00%	0.12	OK
LC4 at 100.00%	0.20	OK
LC40 at 100.00%	0.19	OK
LC41 at 100.00%	0.13	OK
LC42 at 100.00%	0.13	OK
LC43 at 100.00%	0.13	OK
LC44 at 100.00%	0.13	OK
LC45 at 100.00%	0.13	OK
LC46 at 100.00%	0.13	OK
LC47 at 100.00%	0.12	OK
LC48 at 100.00%	0.12	OK
LC49 at 100.00%	0.12	OK
LC5 at 100.00%	0.17	OK
LC50 at 100.00%	0.12	OK
LC51 at 100.00%	0.12	OK
LC52 at 100.00%	0.12	OK
LC53 at 100.00%	0.14	OK
LC54 at 100.00%	0.13	OK
LC55 at 100.00%	0.13	OK
LC56 at 100.00%	0.13	OK
LC57 at 100.00%	0.14	OK
LC58 at 100.00%	0.13	OK
LC59 at 100.00%	0.14	OK
LC6 at 100.00%	0.14	OK
LC60 at 100.00%	0.15	OK
LC61 at 100.00%	0.15	OK
LC62 at 100.00%	0.15	OK
LC63 at 100.00%	0.15	OK
LC64 at 100.00%	0.15	OK
LC65 at 100.00%	0.23	OK
LC66 at 100.00%	0.23	OK
LC67 at 100.00%	0.23	OK
LC68 at 100.00%	0.23	OK
LC69 at 100.00%	0.23	OK
LC7 at 0.00%	0.14	OK
LC70 at 100.00%	0.23	OK
LC71 at 100.00%	0.23	OK
LC72 at 100.00%	0.22	OK
LC73 at 100.00%	0.22	OK
LC74 at 100.00%	0.22	OK
LC75 at 100.00%	0.23	OK
LC76 at 100.00%	0.22	OK
LC77 at 16.67%	<b>0.30</b>	<b>OK</b>
LC78 at 16.67%	0.30	OK

Eq. H1-1b

LC79 at 16.67%	0.30	OK
LC8 at 100.00%	0.24	OK
LC80 at 16.67%	0.30	OK
LC81 at 16.67%	0.29	OK
LC82 at 16.67%	0.29	OK
LC83 at 16.67%	0.29	OK
LC84 at 16.67%	0.29	OK
LC85 at 16.67%	0.29	OK
LC86 at 16.67%	0.30	OK
LC87 at 16.67%	0.30	OK
LC88 at 16.67%	0.30	OK
LC9 at 100.00%	0.26	OK

5

LC1 at 100.00%	0.14	OK
LC10 at 100.00%	0.19	OK
LC11 at 100.00%	0.17	OK
LC12 at 100.00%	0.16	OK
LC13 at 100.00%	0.12	OK
LC14 at 100.00%	0.21	OK
LC15 at 100.00%	0.23	OK
LC16 at 100.00%	0.21	OK
LC17 at 100.00%	0.16	OK
LC18 at 100.00%	0.13	OK
LC19 at 100.00%	0.08	OK
LC2 at 100.00%	0.23	OK
LC20 at 100.00%	0.15	OK
LC21 at 100.00%	0.17	OK
LC22 at 100.00%	0.17	OK
LC23 at 100.00%	0.14	OK
LC24 at 100.00%	0.13	OK
LC25 at 100.00%	0.17	OK
LC26 at 100.00%	0.18	OK
LC27 at 100.00%	0.17	OK
LC28 at 100.00%	0.17	OK
LC29 at 100.00%	0.16	OK
LC3 at 100.00%	0.25	OK
LC30 at 100.00%	0.16	OK
LC31 at 100.00%	0.17	OK
LC32 at 100.00%	0.19	OK
LC33 at 100.00%	0.19	OK
LC34 at 100.00%	0.19	OK
LC35 at 100.00%	0.18	OK
LC36 at 100.00%	0.18	OK
LC38 at 100.00%	0.12	OK
LC39 at 100.00%	0.16	OK
LC4 at 100.00%	0.23	OK
LC40 at 100.00%	0.10	OK
LC41 at 16.67%	0.28	OK
LC42 at 16.67%	<b>0.28</b>	<b>OK</b>
LC43 at 16.67%	0.28	OK
LC44 at 16.67%	0.28	OK
LC45 at 16.67%	0.28	OK
LC46 at 16.67%	0.28	OK
LC47 at 16.67%	0.28	OK
LC48 at 16.67%	0.27	OK
LC49 at 16.67%	0.28	OK
LC5 at 100.00%	0.18	OK
LC50 at 16.67%	0.28	OK
LC51 at 16.67%	0.28	OK
LC52 at 16.67%	0.28	OK
LC53 at 100.00%	0.20	OK
LC54 at 100.00%	0.20	OK
LC55 at 100.00%	0.20	OK
LC56 at 100.00%	0.20	OK

Eq. H1-1b

Eq. H1-1b

LC57 at 100.00%	0.20	OK
LC58 at 100.00%	0.20	OK
LC59 at 100.00%	0.21	OK
LC6 at 100.00%	0.15	OK
LC60 at 100.00%	0.21	OK
LC61 at 100.00%	0.21	OK
LC62 at 100.00%	0.21	OK
LC63 at 100.00%	0.21	OK
LC64 at 100.00%	0.21	OK
LC65 at 100.00%	0.13	OK
LC66 at 100.00%	0.13	OK
LC67 at 100.00%	0.13	OK
LC68 at 100.00%	0.13	OK
LC69 at 100.00%	0.12	OK
LC7 at 100.00%	0.10	OK
LC70 at 100.00%	0.12	OK
LC71 at 100.00%	0.12	OK
LC72 at 100.00%	0.11	OK
LC73 at 100.00%	0.11	OK
LC74 at 100.00%	0.11	OK
LC75 at 100.00%	0.12	OK
LC76 at 100.00%	0.12	OK
LC77 at 100.00%	0.10	OK
LC78 at 100.00%	0.09	OK
LC79 at 100.00%	0.09	OK
LC8 at 100.00%	0.16	OK
LC80 at 100.00%	0.09	OK
LC81 at 100.00%	0.10	OK
LC82 at 100.00%	0.10	OK
LC83 at 100.00%	0.10	OK
LC84 at 100.00%	0.10	OK
LC85 at 100.00%	0.10	OK
LC86 at 100.00%	0.10	OK
LC87 at 100.00%	0.10	OK
LC88 at 100.00%	0.10	OK
LC9 at 100.00%	0.18	OK

8

---

LC1 at 20.54%	0.35	With warnings
LC10 at 20.54%	0.20	With warnings
LC11 at 21.43%	0.21	With warnings
LC12 at 20.54%	0.26	With warnings
LC13 at 20.54%	0.33	With warnings
LC14 at 20.54%	0.26	With warnings
LC15 at 21.43%	0.24	With warnings
LC16 at 21.43%	0.30	With warnings
LC17 at 21.43%	0.39	With warnings
LC18 at 21.43%	0.42	With warnings
LC19 at 20.54%	0.39	With warnings
LC2 at 20.54%	0.28	With warnings
LC20 at 20.54%	0.38	With warnings
LC21 at 20.54%	0.32	With warnings
LC22 at 20.54%	0.18	With warnings
LC23 at 21.43%	0.19	With warnings
LC24 at 20.54%	0.25	With warnings
LC25 at 21.43%	0.22	With warnings
LC26 at 21.43%	0.22	With warnings
LC27 at 21.43%	0.23	With warnings
LC28 at 21.43%	0.26	With warnings
LC29 at 21.43%	0.28	With warnings
LC3 at 21.43%	0.26	With warnings
LC30 at 21.43%	0.29	With warnings
LC31 at 21.43%	0.30	With warnings
LC32 at 21.43%	0.28	With warnings
LC33 at 21.43%	0.28	With warnings



LC34 at 21.43%	0.26	With warnings	
LC35 at 21.43%	0.23	With warnings	
LC36 at 21.43%	0.23	With warnings	
LC38 at 21.43%	0.18	With warnings	
LC39 at 78.57%	0.19	With warnings	
LC4 at 21.43%	0.32	With warnings	
LC40 at 21.43%	0.22	With warnings	
LC41 at 96.43%	0.28	With warnings	
LC42 at 79.46%	0.29	With warnings	
LC43 at 79.46%	0.29	With warnings	
LC44 at 79.46%	0.29	With warnings	
LC45 at 79.46%	0.29	With warnings	
LC46 at 79.46%	0.30	With warnings	Eq. H1-1b
LC47 at 79.46%	0.29	With warnings	
LC48 at 79.46%	0.29	With warnings	
LC49 at 79.46%	0.29	With warnings	
LC5 at 21.43%	0.42	With warnings	
LC50 at 96.43%	0.29	With warnings	
LC51 at 96.43%	0.29	With warnings	
LC52 at 96.43%	0.29	With warnings	
LC53 at 78.57%	0.23	With warnings	
LC54 at 78.57%	0.24	With warnings	
LC55 at 78.57%	0.24	With warnings	
LC56 at 78.57%	0.25	With warnings	
LC57 at 78.57%	0.25	With warnings	
LC58 at 78.57%	0.25	With warnings	
LC59 at 78.57%	0.25	With warnings	
LC6 at 21.43%	<b>0.45</b>	<b>With warnings</b>	Eq. H1-1a
LC60 at 78.57%	0.24	With warnings	
LC61 at 78.57%	0.24	With warnings	
LC62 at 78.57%	0.24	With warnings	
LC63 at 78.57%	0.23	With warnings	
LC64 at 78.57%	0.23	With warnings	
LC65 at 21.43%	0.25	With warnings	
LC66 at 21.43%	0.25	With warnings	
LC67 at 21.43%	0.26	With warnings	
LC68 at 21.43%	0.26	With warnings	
LC69 at 21.43%	0.27	With warnings	
LC7 at 20.54%	0.41	With warnings	Eq. H1-1b
LC70 at 21.43%	0.27	With warnings	
LC71 at 21.43%	0.28	With warnings	
LC72 at 21.43%	0.27	With warnings	
LC73 at 21.43%	0.27	With warnings	
LC74 at 21.43%	0.26	With warnings	
LC75 at 21.43%	0.25	With warnings	
LC76 at 21.43%	0.25	With warnings	
LC77 at 3.57%	0.30	With warnings	
LC78 at 3.57%	0.30	With warnings	Eq. H1-1b
LC79 at 3.57%	0.30	With warnings	
LC8 at 20.54%	0.40	With warnings	
LC80 at 20.54%	0.31	With warnings	
LC81 at 20.54%	0.32	With warnings	
LC82 at 20.54%	0.33	With warnings	
LC83 at 20.54%	0.34	With warnings	
LC84 at 20.54%	0.33	With warnings	
LC85 at 20.54%	0.33	With warnings	
LC86 at 20.54%	0.32	With warnings	
LC87 at 20.54%	0.31	With warnings	
LC88 at 20.54%	0.31	With warnings	
LC9 at 20.54%	0.34	With warnings	

9

---

LC1 at 16.67%	0.12	OK
LC10 at 100.00%	0.20	OK
LC11 at 0.00%	0.20	OK

LC12 at 0.00%	0.18	OK
LC13 at 16.67%	0.10	OK
LC14 at 16.67%	0.14	OK
LC15 at 16.67%	0.13	OK
LC16 at 100.00%	0.13	OK
LC17 at 100.00%	0.14	OK
LC18 at 100.00%	0.12	OK
LC19 at 0.00%	0.13	OK
LC2 at 16.67%	0.15	OK
LC20 at 0.00%	0.22	OK
LC21 at 0.00%	0.21	OK
LC22 at 0.00%	0.19	OK
LC23 at 0.00%	0.18	OK
LC24 at 0.00%	0.16	OK
LC25 at 100.00%	0.24	OK
LC26 at 100.00%	0.24	OK
LC27 at 100.00%	0.24	OK
LC28 at 100.00%	0.25	OK
LC29 at 100.00%	0.25	OK
LC3 at 16.67%	0.15	OK
LC30 at 100.00%	0.25	OK
LC31 at 100.00%	0.25	OK
LC32 at 100.00%	0.25	OK
LC33 at 100.00%	0.24	OK
LC34 at 100.00%	0.24	OK
LC35 at 100.00%	0.24	OK
LC36 at 100.00%	0.24	OK
LC38 at 100.00%	0.16	OK
LC39 at 100.00%	0.11	OK
LC4 at 100.00%	0.16	OK
LC40 at 100.00%	0.20	OK
LC41 at 100.00%	0.10	OK
LC42 at 100.00%	0.10	OK
LC43 at 100.00%	0.10	OK
LC44 at 100.00%	0.10	OK
LC45 at 100.00%	0.10	OK
LC46 at 100.00%	0.10	OK
LC47 at 100.00%	0.10	OK
LC48 at 100.00%	0.10	OK
LC49 at 100.00%	0.10	OK
LC5 at 100.00%	0.17	OK
LC50 at 100.00%	0.10	OK
LC51 at 100.00%	0.10	OK
LC52 at 100.00%	0.10	OK
LC53 at 100.00%	0.15	OK
LC54 at 100.00%	0.15	OK
LC55 at 100.00%	0.15	OK
LC56 at 100.00%	0.15	OK
LC57 at 100.00%	0.15	OK
LC58 at 100.00%	0.16	OK
LC59 at 100.00%	0.15	OK
LC6 at 100.00%	0.15	OK
LC60 at 100.00%	0.15	OK
LC61 at 100.00%	0.15	OK
LC62 at 100.00%	0.15	OK
LC63 at 100.00%	0.15	OK
LC64 at 100.00%	0.15	OK
LC65 at 100.00%	0.23	OK
LC66 at 100.00%	0.23	OK
LC67 at 100.00%	0.23	OK
LC68 at 100.00%	0.23	OK
LC69 at 100.00%	0.23	OK
LC7 at 0.00%	0.15	OK
LC70 at 100.00%	0.23	OK

LC71 at 100.00%	0.23	OK
LC72 at 100.00%	0.23	OK
LC73 at 100.00%	0.23	OK
LC74 at 100.00%	0.23	OK
LC75 at 100.00%	0.23	OK
LC76 at 100.00%	0.23	OK
LC77 at 100.00%	0.27	OK
LC78 at 100.00%	0.27	OK
LC79 at 100.00%	0.27	OK
LC8 at 0.00%	0.23	OK
LC80 at 100.00%	0.27	OK
LC81 at 100.00%	0.27	OK
LC82 at 100.00%	<b>0.27</b>	<b>OK</b>
LC83 at 100.00%	0.27	OK
LC84 at 100.00%	0.27	OK
LC85 at 100.00%	0.27	OK
LC86 at 100.00%	0.27	OK
LC87 at 100.00%	0.27	OK
LC88 at 100.00%	0.27	OK
LC9 at 0.00%	0.23	OK

Eq. H1-1b

Eq. H1-1b

10

---

LC1 at 100.00%	0.11	OK
LC10 at 100.00%	0.11	OK
LC11 at 100.00%	0.11	OK
LC12 at 100.00%	0.11	OK
LC13 at 100.00%	0.09	OK
LC14 at 100.00%	0.12	OK
LC15 at 100.00%	0.14	OK
LC16 at 100.00%	0.14	OK
LC17 at 100.00%	0.13	OK
LC18 at 100.00%	0.13	OK
LC19 at 100.00%	0.08	OK
LC2 at 100.00%	0.14	OK
LC20 at 100.00%	0.07	OK
LC21 at 100.00%	0.08	OK
LC22 at 100.00%	0.08	OK
LC23 at 100.00%	0.08	OK
LC24 at 100.00%	0.09	OK
LC25 at 100.00%	0.19	OK
LC26 at 100.00%	0.20	OK
LC27 at 100.00%	0.20	OK
LC28 at 100.00%	0.20	OK
LC29 at 100.00%	0.20	OK
LC3 at 100.00%	0.16	OK
LC30 at 100.00%	0.20	OK
LC31 at 100.00%	0.19	OK
LC32 at 100.00%	0.18	OK
LC33 at 100.00%	0.18	OK
LC34 at 100.00%	0.18	OK
LC35 at 100.00%	0.18	OK
LC36 at 100.00%	0.18	OK
LC38 at 100.00%	0.14	OK
LC39 at 100.00%	0.17	OK
LC4 at 100.00%	0.17	OK
LC40 at 100.00%	0.09	OK
LC41 at 16.67%	0.23	OK
LC42 at 16.67%	0.23	OK
LC43 at 16.67%	0.23	OK
LC44 at 16.67%	0.23	OK
LC45 at 16.67%	0.23	OK
LC46 at 16.67%	<b>0.23</b>	<b>OK</b>
LC47 at 16.67%	0.23	OK
LC48 at 16.67%	0.23	OK
LC49 at 16.67%	0.23	OK

Eq. H1-1b

LC5 at 100.00%	0.16	OK
LC50 at 16.67%	0.23	OK
LC51 at 16.67%	0.23	OK
LC52 at 16.67%	0.23	OK
LC53 at 100.00%	0.22	OK
LC54 at 100.00%	0.22	OK
LC55 at 100.00%	0.22	OK
LC56 at 100.00%	0.22	OK
LC57 at 100.00%	0.22	OK
LC58 at 100.00%	0.22	OK
LC59 at 100.00%	0.22	OK
LC6 at 100.00%	0.15	OK
LC60 at 100.00%	0.22	OK
LC61 at 100.00%	0.22	OK
LC62 at 100.00%	0.22	OK
LC63 at 100.00%	0.22	OK
LC64 at 100.00%	0.22	OK
LC65 at 100.00%	0.14	OK
LC66 at 100.00%	0.14	OK
LC67 at 100.00%	0.14	OK
LC68 at 100.00%	0.14	OK
LC69 at 100.00%	0.14	OK
LC7 at 100.00%	0.11	OK
LC70 at 100.00%	0.14	OK
LC71 at 100.00%	0.14	OK
LC72 at 100.00%	0.13	OK
LC73 at 100.00%	0.13	OK
LC74 at 100.00%	0.13	OK
LC75 at 100.00%	0.13	OK
LC76 at 100.00%	0.13	OK
LC77 at 100.00%	0.09	OK
LC78 at 100.00%	0.09	OK
LC79 at 100.00%	0.09	OK
LC8 at 100.00%	0.09	OK
LC80 at 100.00%	0.09	OK
LC81 at 100.00%	0.09	OK
LC82 at 100.00%	0.09	OK
LC83 at 100.00%	0.09	OK
LC84 at 100.00%	0.09	OK
LC85 at 100.00%	0.09	OK
LC86 at 100.00%	0.09	OK
LC87 at 100.00%	0.09	OK
LC88 at 100.00%	0.09	OK
LC9 at 100.00%	0.10	OK

**RndBar 3\_4**

**11**

---

LC1 at 0.00%	0.18	OK
LC10 at 0.00%	0.28	OK
LC11 at 0.00%	0.26	OK
LC12 at 0.00%	0.26	OK
LC13 at 0.00%	0.13	OK
LC14 at 0.00%	0.11	OK
LC15 at 0.00%	0.10	OK
LC16 at 0.00%	0.11	OK
LC17 at 0.00%	0.12	OK
LC18 at 0.00%	0.13	OK
LC19 at 0.00%	0.17	OK
LC2 at 0.00%	0.16	OK
LC20 at 0.00%	0.20	OK
LC21 at 0.00%	0.23	OK
LC22 at 0.00%	0.20	OK
LC23 at 0.00%	0.18	OK
LC24 at 0.00%	0.17	OK
LC25 at 0.00%	0.42	OK
LC26 at 0.00%	0.41	OK

LC27 at 0.00%	0.42	OK	
LC28 at 0.00%	0.42	OK	
LC29 at 0.00%	0.42	OK	
LC3 at 0.00%	0.15	OK	
LC30 at 0.00%	0.42	OK	
LC31 at 0.00%	0.43	OK	
LC32 at 100.00%	0.44	OK	
LC33 at 100.00%	0.44	OK	
LC34 at 100.00%	0.44	OK	
LC35 at 0.00%	0.43	OK	
LC36 at 100.00%	0.43	OK	
LC38 at 0.00%	0.27	OK	
LC39 at 0.00%	0.18	OK	
LC4 at 0.00%	0.16	OK	
LC40 at 0.00%	0.37	OK	
LC41 at 0.00%	0.17	OK	
LC42 at 0.00%	0.17	OK	
LC43 at 0.00%	0.17	OK	
LC44 at 0.00%	0.17	OK	
LC45 at 0.00%	0.17	OK	
LC46 at 0.00%	0.17	OK	
LC47 at 0.00%	0.18	OK	
LC48 at 0.00%	0.18	OK	
LC49 at 0.00%	0.18	OK	
LC5 at 0.00%	0.17	OK	
LC50 at 0.00%	0.18	OK	
LC51 at 0.00%	0.18	OK	
LC52 at 0.00%	0.18	OK	
LC53 at 0.00%	0.26	OK	
LC54 at 0.00%	0.26	OK	
LC55 at 0.00%	0.26	OK	
LC56 at 0.00%	0.26	OK	
LC57 at 0.00%	0.26	OK	
LC58 at 0.00%	0.26	OK	
LC59 at 0.00%	0.27	OK	
LC6 at 0.00%	0.19	OK	
LC60 at 0.00%	0.27	OK	
LC61 at 0.00%	0.27	OK	
LC62 at 0.00%	0.27	OK	
LC63 at 0.00%	0.27	OK	
LC64 at 0.00%	0.27	OK	
LC65 at 0.00%	0.41	OK	
LC66 at 0.00%	0.40	OK	
LC67 at 0.00%	0.40	OK	
LC68 at 100.00%	0.41	OK	
LC69 at 100.00%	0.41	OK	
LC7 at 100.00%	0.26	OK	
LC70 at 100.00%	0.41	OK	
LC71 at 100.00%	0.41	OK	
LC72 at 100.00%	0.41	OK	Eq. H1-1a
LC73 at 100.00%	0.41	OK	
LC74 at 100.00%	0.41	OK	
LC75 at 100.00%	0.41	OK	
LC76 at 0.00%	0.41	OK	
LC77 at 100.00%	0.52	OK	
LC78 at 100.00%	0.52	OK	
LC79 at 100.00%	0.52	OK	
LC8 at 100.00%	0.27	OK	
LC80 at 100.00%	0.52	OK	
LC81 at 100.00%	0.52	OK	
LC82 at 100.00%	0.52	OK	
LC83 at 100.00%	0.52	OK	
LC84 at 100.00%	<b>0.53</b>	<b>OK</b>	Eq. H1-1a
LC85 at 100.00%	0.53	OK	

	LC86 at 100.00%	0.53	OK
	LC87 at 100.00%	0.52	OK
	LC88 at 100.00%	0.52	OK
	LC9 at 0.00%	0.28	OK
-----			
12	LC1 at 100.00%	0.18	OK
	LC10 at 100.00%	0.13	OK
	LC11 at 100.00%	0.14	OK
	LC12 at 100.00%	0.15	OK
	LC13 at 100.00%	0.14	OK
	LC14 at 100.00%	0.16	OK
	LC15 at 100.00%	0.16	OK
	LC16 at 100.00%	0.15	OK
	LC17 at 100.00%	0.14	OK
	LC18 at 100.00%	0.13	OK
	LC19 at 100.00%	0.10	OK
	LC2 at 100.00%	0.20	OK
	LC20 at 100.00%	0.08	OK
	LC21 at 100.00%	0.08	OK
	LC22 at 100.00%	0.09	OK
	LC23 at 100.00%	0.10	OK
	LC24 at 100.00%	0.11	OK
	LC25 at 100.00%	0.32	OK
	LC26 at 100.00%	0.32	OK
	LC27 at 100.00%	0.32	OK
	LC28 at 100.00%	0.32	OK
	LC29 at 100.00%	0.32	OK
	LC3 at 100.00%	0.20	OK
	LC30 at 100.00%	0.32	OK
	LC31 at 100.00%	0.31	OK
	LC32 at 100.00%	0.30	OK
	LC33 at 100.00%	0.31	OK
	LC34 at 100.00%	0.31	OK
	LC35 at 100.00%	0.31	OK
	LC36 at 100.00%	0.31	OK
	LC38 at 100.00%	0.20	OK
	LC39 at 100.00%	0.32	OK
	LC4 at 100.00%	0.19	OK
	LC40 at 100.00%	0.14	OK
	LC41 at 0.00%	0.48	OK
	LC42 at 0.00%	<b>0.48</b>	<b>OK</b>
	LC43 at 0.00%	0.48	OK
	LC44 at 0.00%	0.48	OK
	LC45 at 0.00%	0.48	OK
	LC46 at 0.00%	0.48	OK
	LC47 at 0.00%	0.48	OK
	LC48 at 0.00%	0.47	OK
	LC49 at 0.00%	0.48	OK
	LC5 at 100.00%	0.18	OK
	LC50 at 0.00%	0.48	OK
	LC51 at 0.00%	0.48	OK
	LC52 at 0.00%	0.48	OK
	LC53 at 100.00%	0.36	OK
	LC54 at 100.00%	0.36	OK
	LC55 at 100.00%	0.36	OK
	LC56 at 100.00%	0.36	OK
	LC57 at 100.00%	0.36	OK
	LC58 at 100.00%	0.36	OK
	LC59 at 100.00%	0.35	OK
	LC6 at 100.00%	0.17	OK
	LC60 at 100.00%	0.35	OK
	LC61 at 100.00%	0.35	OK
	LC62 at 100.00%	0.35	OK
	LC63 at 100.00%	0.36	OK

Eq. H1-1a

LC64 at 100.00%	0.36	OK
LC65 at 100.00%	0.20	OK
LC66 at 100.00%	0.20	OK
LC67 at 100.00%	0.20	OK
LC68 at 100.00%	0.20	OK
LC69 at 100.00%	0.20	OK
LC7 at 100.00%	0.14	OK
LC70 at 100.00%	0.20	OK
LC71 at 100.00%	0.19	OK
LC72 at 100.00%	0.19	OK
LC73 at 100.00%	0.19	OK
LC74 at 100.00%	0.19	OK
LC75 at 100.00%	0.19	OK
LC76 at 100.00%	0.19	OK
LC77 at 100.00%	0.13	OK
LC78 at 100.00%	0.13	OK
LC79 at 100.00%	0.13	OK
LC8 at 100.00%	0.12	OK
LC80 at 100.00%	0.13	OK
LC81 at 100.00%	0.13	OK
LC82 at 100.00%	0.13	OK
LC83 at 100.00%	0.13	OK
LC84 at 100.00%	0.13	OK
LC85 at 100.00%	0.13	OK
LC86 at 100.00%	0.13	OK
LC87 at 100.00%	0.13	OK
LC88 at 100.00%	0.13	OK
LC9 at 100.00%	0.12	OK

13

---

LC1 at 100.00%	0.28	OK
LC10 at 100.00%	0.35	OK
LC11 at 100.00%	0.34	OK
LC12 at 100.00%	0.33	OK
LC13 at 100.00%	0.16	OK
LC14 at 100.00%	0.11	OK
LC15 at 0.00%	0.11	OK
LC16 at 0.00%	0.11	OK
LC17 at 100.00%	0.12	OK
LC18 at 100.00%	0.13	OK
LC19 at 100.00%	0.18	OK
LC2 at 100.00%	0.17	OK
LC20 at 0.00%	0.28	OK
LC21 at 0.00%	0.29	OK
LC22 at 0.00%	0.29	OK
LC23 at 100.00%	0.27	OK
LC24 at 100.00%	0.26	OK
LC25 at 100.00%	0.56	OK
LC26 at 100.00%	0.55	OK
LC27 at 100.00%	0.55	OK
LC28 at 100.00%	0.55	OK
LC29 at 100.00%	0.55	OK
LC3 at 100.00%	0.17	OK
LC30 at 100.00%	0.55	OK
LC31 at 100.00%	0.56	OK
LC32 at 100.00%	0.57	OK
LC33 at 100.00%	0.57	OK
LC34 at 100.00%	0.57	OK
LC35 at 100.00%	0.57	OK
LC36 at 100.00%	0.57	OK
LC38 at 100.00%	0.35	OK
LC39 at 100.00%	0.24	OK
LC4 at 100.00%	0.16	OK
LC40 at 100.00%	0.49	OK
LC41 at 100.00%	0.23	OK

LC42 at 100.00%	0.20	OK	
LC43 at 100.00%	0.20	OK	
LC44 at 100.00%	0.20	OK	
LC45 at 100.00%	0.20	OK	
LC46 at 100.00%	0.20	OK	
LC47 at 100.00%	0.23	OK	
LC48 at 100.00%	0.24	OK	
LC49 at 100.00%	0.24	OK	
LC5 at 100.00%	0.18	OK	
LC50 at 100.00%	0.24	OK	
LC51 at 100.00%	0.24	OK	
LC52 at 100.00%	0.24	OK	
LC53 at 100.00%	0.32	OK	
LC54 at 100.00%	0.32	OK	
LC55 at 100.00%	0.32	OK	
LC56 at 100.00%	0.32	OK	
LC57 at 100.00%	0.32	OK	
LC58 at 100.00%	0.32	OK	
LC59 at 100.00%	0.32	OK	
LC6 at 100.00%	0.19	OK	
LC60 at 100.00%	0.33	OK	
LC61 at 100.00%	0.33	OK	
LC62 at 100.00%	0.33	OK	
LC63 at 100.00%	0.32	OK	
LC64 at 100.00%	0.33	OK	
LC65 at 100.00%	0.48	OK	
LC66 at 100.00%	0.48	OK	
LC67 at 100.00%	0.48	OK	
LC68 at 100.00%	0.48	OK	
LC69 at 100.00%	0.48	OK	
LC7 at 0.00%	0.29	OK	
LC70 at 100.00%	0.48	OK	
LC71 at 100.00%	0.49	OK	
LC72 at 100.00%	0.49	OK	
LC73 at 100.00%	0.49	OK	
LC74 at 100.00%	0.49	OK	
LC75 at 100.00%	0.49	OK	
LC76 at 100.00%	0.49	OK	
LC77 at 100.00%	0.69	OK	Eq. H1-1a
LC78 at 100.00%	0.68	OK	
LC79 at 100.00%	0.68	OK	
LC8 at 0.00%	0.34	OK	
LC80 at 100.00%	0.68	OK	
LC81 at 100.00%	0.68	OK	
LC82 at 100.00%	0.68	OK	
LC83 at 100.00%	0.73	OK	
LC84 at 100.00%	<b>0.73</b>	<b>OK</b>	Eq. H1-1a
LC85 at 100.00%	0.73	OK	
LC86 at 100.00%	0.73	OK	
LC87 at 100.00%	0.73	OK	
LC88 at 100.00%	0.73	OK	
LC9 at 100.00%	0.35	OK	

14

---

LC1 at 0.00%	0.26	OK	
LC10 at 0.00%	0.14	OK	
LC11 at 0.00%	0.16	OK	
LC12 at 0.00%	0.17	OK	
LC13 at 0.00%	0.16	OK	
LC14 at 0.00%	0.18	OK	
LC15 at 100.00%	0.18	OK	
LC16 at 100.00%	0.18	OK	
LC17 at 0.00%	0.15	OK	
LC18 at 0.00%	0.13	OK	
LC19 at 0.00%	0.10	OK	



LC2 at 0.00%	0.31	OK	
LC20 at 0.00%	0.09	OK	
LC21 at 100.00%	0.10	OK	
LC22 at 100.00%	0.10	OK	
LC23 at 0.00%	0.11	OK	
LC24 at 0.00%	0.13	OK	
LC25 at 0.00%	0.39	OK	
LC26 at 0.00%	0.39	OK	
LC27 at 0.00%	0.39	OK	
LC28 at 0.00%	0.39	OK	
LC29 at 0.00%	0.38	OK	
LC3 at 100.00%	0.31	OK	
LC30 at 0.00%	0.38	OK	
LC31 at 0.00%	0.37	OK	
LC32 at 0.00%	0.37	OK	
LC33 at 0.00%	0.37	OK	
LC34 at 0.00%	0.37	OK	
LC35 at 0.00%	0.38	OK	
LC36 at 0.00%	0.38	OK	
LC38 at 100.00%	0.29	OK	
LC39 at 0.00%	0.42	OK	
LC4 at 100.00%	0.29	OK	
LC40 at 0.00%	0.15	OK	
LC41 at 0.00%	0.66	OK	
LC42 at 0.00%	<b>0.66</b>	<b>OK</b>	Eq. H1-1a
LC43 at 0.00%	0.66	OK	
LC44 at 0.00%	0.66	OK	
LC45 at 0.00%	0.61	OK	
LC46 at 0.00%	0.61	OK	
LC47 at 0.00%	0.61	OK	
LC48 at 0.00%	0.61	OK	
LC49 at 0.00%	0.61	OK	
LC5 at 0.00%	0.19	OK	
LC50 at 0.00%	0.61	OK	
LC51 at 0.00%	0.62	OK	
LC52 at 0.00%	0.62	OK	Eq. H1-1a
LC53 at 0.00%	0.43	OK	
LC54 at 0.00%	0.43	OK	
LC55 at 0.00%	0.43	OK	
LC56 at 0.00%	0.43	OK	
LC57 at 0.00%	0.43	OK	
LC58 at 0.00%	0.43	OK	
LC59 at 0.00%	0.42	OK	
LC6 at 0.00%	0.18	OK	
LC60 at 0.00%	0.42	OK	
LC61 at 0.00%	0.42	OK	
LC62 at 0.00%	0.42	OK	
LC63 at 0.00%	0.43	OK	
LC64 at 0.00%	0.42	OK	
LC65 at 0.00%	0.26	OK	
LC66 at 0.00%	0.27	OK	
LC67 at 0.00%	0.27	OK	
LC68 at 0.00%	0.27	OK	
LC69 at 0.00%	0.26	OK	
LC7 at 0.00%	0.14	OK	
LC70 at 0.00%	0.26	OK	
LC71 at 0.00%	0.26	OK	
LC72 at 0.00%	0.25	OK	
LC73 at 0.00%	0.25	OK	
LC74 at 0.00%	0.26	OK	
LC75 at 0.00%	0.26	OK	
LC76 at 0.00%	0.26	OK	
LC77 at 0.00%	0.14	OK	
LC78 at 0.00%	0.14	OK	

LC79 at 0.00%	0.14	OK
LC8 at 0.00%	0.13	OK
LC80 at 0.00%	0.14	OK
LC81 at 0.00%	0.14	OK
LC82 at 0.00%	0.14	OK
LC83 at 0.00%	0.14	OK
LC84 at 0.00%	0.14	OK
LC85 at 0.00%	0.14	OK
LC86 at 0.00%	0.14	OK
LC87 at 0.00%	0.14	OK
LC88 at 0.00%	0.14	OK
LC9 at 100.00%	0.13	OK

15

---

LC1 at 100.00%	0.13	OK
LC10 at 100.00%	0.11	OK
LC11 at 100.00%	0.10	OK
LC12 at 100.00%	0.13	OK
LC13 at 100.00%	0.11	OK
LC14 at 100.00%	0.10	OK
LC15 at 0.00%	0.07	OK
LC16 at 0.00%	0.07	OK
LC17 at 0.00%	0.07	OK
LC18 at 100.00%	0.07	OK
LC19 at 100.00%	0.08	OK
LC2 at 100.00%	0.12	OK
LC20 at 0.00%	0.10	OK
LC21 at 100.00%	0.10	OK
LC22 at 0.00%	0.09	OK
LC23 at 0.00%	0.09	OK
LC24 at 100.00%	0.10	OK
LC25 at 0.00%	0.19	OK
LC26 at 0.00%	0.19	OK
LC27 at 0.00%	0.19	OK
LC28 at 0.00%	0.19	OK
LC29 at 0.00%	0.19	OK
LC3 at 100.00%	0.09	OK
LC30 at 0.00%	0.19	OK
LC31 at 0.00%	0.19	OK
LC32 at 0.00%	0.19	OK
LC33 at 0.00%	0.19	OK
LC34 at 0.00%	0.19	OK
LC35 at 0.00%	0.19	OK
LC36 at 0.00%	0.19	OK
LC38 at 0.00%	0.12	OK
LC39 at 0.00%	0.08	OK
LC4 at 100.00%	0.08	OK
LC40 at 0.00%	0.17	OK
LC41 at 0.00%	0.08	OK
LC42 at 0.00%	0.08	OK
LC43 at 0.00%	0.08	OK
LC44 at 0.00%	0.08	OK
LC45 at 0.00%	0.08	OK
LC46 at 0.00%	0.08	OK
LC47 at 0.00%	0.08	OK
LC48 at 0.00%	0.08	OK
LC49 at 0.00%	0.08	OK
LC5 at 0.00%	0.08	OK
LC50 at 0.00%	0.08	OK
LC51 at 0.00%	0.08	OK
LC52 at 0.00%	0.08	OK
LC53 at 0.00%	0.11	OK
LC54 at 0.00%	0.11	OK
LC55 at 0.00%	0.11	OK
LC56 at 0.00%	0.11	OK

LC57 at 0.00%	0.11	OK
LC58 at 0.00%	0.11	OK
LC59 at 0.00%	0.11	OK
LC6 at 100.00%	0.09	OK
LC60 at 0.00%	0.11	OK
LC61 at 0.00%	0.11	OK
LC62 at 0.00%	0.11	OK
LC63 at 0.00%	0.11	OK
LC64 at 0.00%	0.11	OK
LC65 at 0.00%	0.17	OK
LC66 at 0.00%	0.17	OK
LC67 at 0.00%	0.17	OK
LC68 at 0.00%	0.17	OK
LC69 at 0.00%	0.17	OK
LC7 at 100.00%	0.10	OK
LC70 at 0.00%	0.17	OK
LC71 at 0.00%	0.17	OK
LC72 at 0.00%	0.17	OK
LC73 at 0.00%	0.17	OK
LC74 at 0.00%	0.17	OK
LC75 at 0.00%	0.17	OK
LC76 at 0.00%	0.17	OK
LC77 at 100.00%	0.31	OK
LC78 at 100.00%	0.31	OK
LC79 at 100.00%	0.31	OK
LC8 at 0.00%	0.11	OK
LC80 at 100.00%	0.31	OK
LC81 at 100.00%	0.31	OK
LC82 at 100.00%	0.31	OK
LC83 at 100.00%	0.31	OK
LC84 at 100.00%	<b>0.32</b>	<b>OK</b>
LC85 at 100.00%	0.31	OK
LC86 at 100.00%	0.31	OK
LC87 at 100.00%	0.31	OK
LC88 at 100.00%	0.31	OK
LC9 at 100.00%	0.12	OK

Eq. H1-1a

16

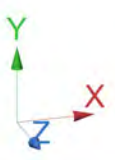
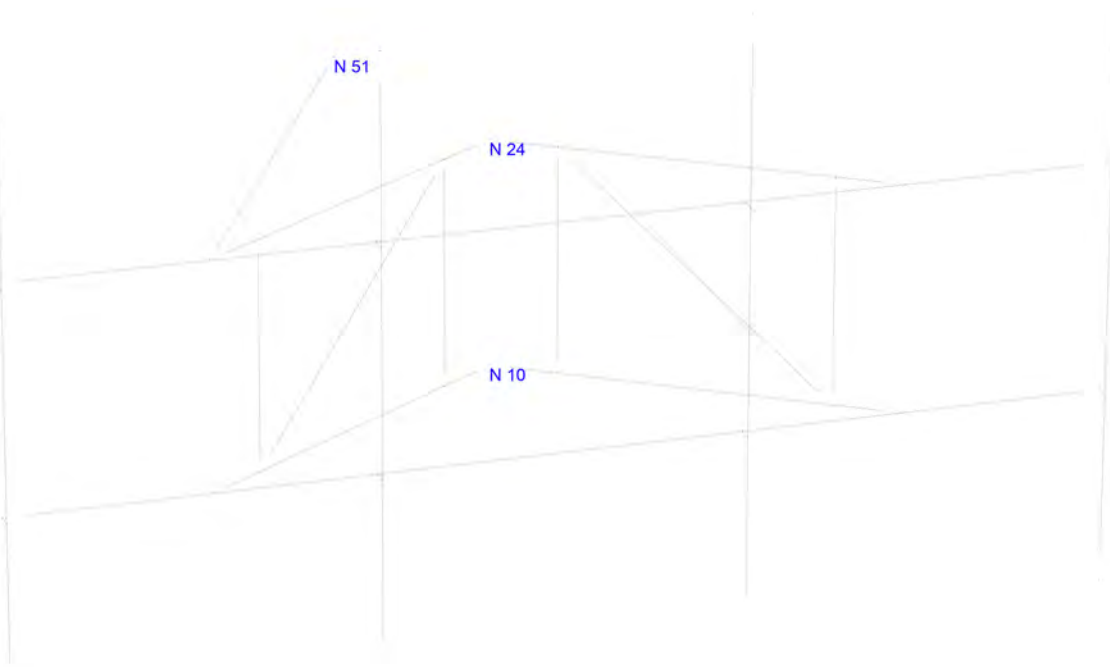
---

LC1 at 100.00%	0.11	OK
LC10 at 0.00%	0.07	OK
LC11 at 100.00%	0.07	OK
LC12 at 100.00%	0.10	OK
LC13 at 100.00%	0.09	OK
LC14 at 100.00%	0.09	OK
LC15 at 0.00%	0.09	OK
LC16 at 0.00%	0.09	OK
LC17 at 0.00%	0.08	OK
LC18 at 0.00%	0.07	OK
LC19 at 100.00%	0.05	OK
LC2 at 100.00%	0.11	OK
LC20 at 50.00%	0.05	OK
LC21 at 0.00%	0.06	OK
LC22 at 0.00%	0.06	OK
LC23 at 0.00%	0.06	OK
LC24 at 100.00%	0.08	OK
LC25 at 0.00%	0.14	OK
LC26 at 0.00%	0.14	OK
LC27 at 0.00%	0.14	OK
LC28 at 0.00%	0.14	OK
LC29 at 0.00%	0.14	OK
LC3 at 0.00%	0.10	OK
LC30 at 0.00%	0.14	OK
LC31 at 100.00%	0.13	OK
LC32 at 100.00%	0.13	OK
LC33 at 100.00%	0.13	OK

LC34 at 100.00%	0.13	OK
LC35 at 100.00%	0.13	OK
LC36 at 100.00%	0.13	OK
LC38 at 0.00%	0.10	OK
LC39 at 0.00%	0.15	OK
LC4 at 0.00%	0.10	OK
LC40 at 0.00%	0.06	OK
LC41 at 100.00%	0.29	OK
LC42 at 100.00%	<b>0.29</b>	<b>OK</b>
LC43 at 100.00%	0.29	OK
LC44 at 100.00%	0.29	OK
LC45 at 100.00%	0.29	OK
LC46 at 100.00%	0.29	OK
LC47 at 100.00%	0.29	OK
LC48 at 100.00%	0.29	OK
LC49 at 100.00%	0.29	OK
LC5 at 0.00%	0.09	OK
LC50 at 100.00%	0.29	OK
LC51 at 100.00%	0.29	OK
LC52 at 100.00%	0.29	OK
LC53 at 0.00%	0.15	OK
LC54 at 0.00%	0.15	OK
LC55 at 0.00%	0.15	OK
LC56 at 0.00%	0.15	OK
LC57 at 0.00%	0.15	OK
LC58 at 0.00%	0.15	OK
LC59 at 0.00%	0.15	OK
LC6 at 0.00%	0.08	OK
LC60 at 0.00%	0.15	OK
LC61 at 0.00%	0.15	OK
LC62 at 0.00%	0.15	OK
LC63 at 0.00%	0.15	OK
LC64 at 0.00%	0.15	OK
LC65 at 0.00%	0.09	OK
LC66 at 0.00%	0.09	OK
LC67 at 0.00%	0.09	OK
LC68 at 0.00%	0.09	OK
LC69 at 0.00%	0.09	OK
LC7 at 0.00%	0.07	OK
LC70 at 0.00%	0.09	OK
LC71 at 0.00%	0.09	OK
LC72 at 0.00%	0.09	OK
LC73 at 0.00%	0.09	OK
LC74 at 0.00%	0.09	OK
LC75 at 0.00%	0.09	OK
LC76 at 0.00%	0.09	OK
LC77 at 100.00%	0.06	OK
LC78 at 100.00%	0.06	OK
LC79 at 100.00%	0.06	OK
LC8 at 100.00%	0.06	OK
LC80 at 100.00%	0.06	OK
LC81 at 100.00%	0.06	OK
LC82 at 100.00%	0.06	OK
LC83 at 100.00%	0.06	OK
LC84 at 100.00%	0.06	OK
LC85 at 100.00%	0.06	OK
LC86 at 100.00%	0.06	OK
LC87 at 100.00%	0.06	OK
LC88 at 100.00%	0.06	OK
LC9 at 0.00%	0.07	OK

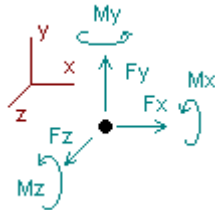
Eq. H1-1a

**APPENDIX D**  
**ADDITIONAL CALCUATIONS**



## Analysis result

### Reactions



Direction of positive forces and moments

Node	Forces [Kip]			Moments [Kip*ft]		
	FX	FY	FZ	MX	MY	MZ
<b>Condition LC1=1.2D+Wo</b>						
10	-0.23152	0.56847	2.15557	-0.23962	0.16063	0.03509
24	0.62112	0.69807	-0.75715	-0.28690	-0.02011	0.03170
51	-0.38960	0.02925	0.73676	0.00000	0.00000	0.00000
SUM	0.00000	1.29580	2.13517	-0.52653	0.14052	0.06679
<b>Condition LC2=1.2D+W30</b>						
10	0.27040	0.55046	1.92272	-0.22708	0.52789	0.10870
24	1.62498	0.69586	-1.84760	-0.30020	0.10019	0.12648
51	-0.80786	0.04948	1.53259	0.00000	0.00000	0.00000
SUM	1.08753	1.29580	1.60770	-0.52728	0.62808	0.23518
<b>Condition LC3=1.2D+W60</b>						
10	0.41918	0.54242	1.57910	-0.22630	0.59898	0.11287
24	1.84729	0.70394	-2.26695	-0.29522	0.16163	0.13539
51	-0.80858	0.04944	1.56961	0.00000	0.00000	0.00000
SUM	1.45790	1.29580	0.88176	-0.52152	0.76061	0.24825
<b>Condition LC4=1.2D+W90</b>						
10	0.52995	0.54225	1.12628	-0.22082	0.59862	0.09867
24	1.86241	0.70835	-2.56651	-0.29762	0.20057	0.12035
51	-0.73623	0.04520	1.44023	0.00000	0.00000	0.00000
SUM	1.65613	1.29580	0.00000	-0.51844	0.79918	0.21902
<b>Condition LC5=1.2D+W120</b>						
10	0.45929	0.55173	0.66210	-0.21863	0.44198	0.04828
24	1.46383	0.71308	-2.47770	-0.29590	0.19938	0.06120
51	-0.46522	0.03099	0.93384	0.00000	0.00000	0.00000
SUM	1.45790	1.29580	-0.88176	-0.51453	0.64136	0.10948

Condition **LC6=1.2D+W150**

10	0.32768	0.55838	0.30523	-0.22286	0.29664	0.01464
24	1.04453	0.71727	-2.44995	-0.28783	0.14200	0.01937
51	-0.28468	0.02014	0.53701	0.00000	0.00000	0.00000
-----						
SUM	1.08753	1.29580	-1.60770	-0.51069	0.43864	0.03401

Condition **LC7=1.2D-Wo**

10	-0.14609	0.58232	0.00911	-0.22774	-0.17285	-0.10609
24	-0.24686	0.72853	-1.39989	-0.27958	0.05168	-0.12772
51	0.39295	-0.01505	-0.74439	0.00000	0.00000	0.00000
-----						
SUM	0.00000	1.29580	-2.13517	-0.50732	-0.12117	-0.23381

Condition **LC8=1.2D-W30**

10	-0.64800	0.60033	0.24196	-0.24029	-0.54011	-0.17970
24	-1.25073	0.73074	-0.30944	-0.26628	-0.06863	-0.22250
51	0.81120	-0.03527	-1.54022	0.00000	0.00000	0.00000
-----						
SUM	-1.08753	1.29580	-1.60770	-0.50657	-0.60874	-0.40220

Condition **LC9=1.2D-W60**

10	-0.79679	0.60837	0.58558	-0.24107	-0.61120	-0.18387
24	-1.47303	0.72267	0.10990	-0.27126	-0.13007	-0.23140
51	0.81192	-0.03524	-1.57725	0.00000	0.00000	0.00000
-----						
SUM	-1.45790	1.29580	-0.88176	-0.51232	-0.74127	-0.41528

Condition **LC10=1.2D-W90**

10	-0.90756	0.60854	1.03840	-0.24655	-0.61084	-0.16968
24	-1.48815	0.71825	0.40947	-0.26886	-0.16900	-0.21637
51	0.73958	-0.03099	-1.44786	0.00000	0.00000	0.00000
-----						
SUM	-1.65613	1.29580	0.00000	-0.51541	-0.77984	-0.38604

Condition **LC11=1.2D-W120**

10	-0.83689	0.59906	1.50257	-0.24874	-0.45421	-0.11928
24	-1.08957	0.71352	0.32066	-0.27058	-0.16781	-0.15722
51	0.46857	-0.01678	-0.94147	0.00000	0.00000	0.00000
-----						
SUM	-1.45790	1.29580	0.88176	-0.51932	-0.62202	-0.27650

Condition **LC12=1.2D-W150**

10	-0.70528	0.59241	1.85944	-0.24451	-0.30886	-0.08564
24	-0.67027	0.70933	0.29290	-0.27865	-0.11043	-0.11539
51	0.28803	-0.00594	-0.54464	0.00000	0.00000	0.00000
-----						
SUM	-1.08753	1.29580	1.60770	-0.52316	-0.41929	-0.20103

Condition **LC13=0.9D+Wo**

10	-0.18432	0.42462	1.88498	-0.18120	0.16216	0.04396
24	0.57434	0.51975	-0.48752	-0.21609	-0.02406	0.04370
51	-0.39002	0.02748	0.73771	0.00000	0.00000	0.00000
-----						
SUM	0.00000	0.97185	2.13517	-0.39730	0.13810	0.08766



Condition <b>LC14=0.9D+W30</b>						
10	0.31760	0.40661	1.65213	-0.16866	0.52942	0.11758
24	1.57820	0.51754	-1.57797	-0.22939	0.09625	0.13848
51	-0.80827	0.04770	1.53354	0.00000	0.00000	0.00000
-----						
SUM	1.08753	0.97185	1.60770	-0.39805	0.62567	0.25606
Condition <b>LC15=0.9D+W60</b>						
10	0.46639	0.39857	1.30851	-0.16788	0.60051	0.12175
24	1.80051	0.52561	-1.99731	-0.22441	0.15769	0.14739
51	-0.80900	0.04767	1.57057	0.00000	0.00000	0.00000
-----						
SUM	1.45790	0.97185	0.88176	-0.39229	0.75820	0.26913
Condition <b>LC16=0.9D+W90</b>						
10	0.57715	0.39840	0.85570	-0.16240	0.60014	0.10755
24	1.81563	0.53003	-2.29688	-0.22681	0.19662	0.13235
51	-0.73665	0.04342	1.44119	0.00000	0.00000	0.00000
-----						
SUM	1.65613	0.97185	0.00000	-0.38921	0.79676	0.23990
Condition <b>LC17=0.9D+W120</b>						
10	0.50649	0.40788	0.39152	-0.16021	0.44351	0.05715
24	1.41704	0.53476	-2.20807	-0.22509	0.19543	0.07321
51	-0.46564	0.02921	0.93479	0.00000	0.00000	0.00000
-----						
SUM	1.45790	0.97185	-0.88176	-0.38530	0.63894	0.13036
Condition <b>LC18=0.9D+W150</b>						
10	0.37488	0.41453	0.03465	-0.16444	0.29816	0.02352
24	0.99775	0.53895	-2.18032	-0.21702	0.13805	0.03137
51	-0.28510	0.01836	0.53796	0.00000	0.00000	0.00000
-----						
SUM	1.08753	0.97185	-1.60770	-0.38146	0.43622	0.05488
Condition <b>LC19=0.9D-W0</b>						
10	-0.09889	0.43847	-0.26148	-0.16932	-0.17133	-0.09721
24	-0.29365	0.55020	-1.13026	-0.20877	0.04773	-0.11572
51	0.39253	-0.01682	-0.74344	0.00000	0.00000	0.00000
-----						
SUM	0.00000	0.97185	-2.13517	-0.37809	-0.12359	-0.21293
Condition <b>LC20=0.9D-W30</b>						
10	-0.60080	0.45649	-0.02863	-0.18187	-0.53858	-0.17083
24	-1.29751	0.55241	-0.03981	-0.19547	-0.07258	-0.21050
51	0.81078	-0.03705	-1.53927	0.00000	0.00000	0.00000
-----						
SUM	-1.08753	0.97185	-1.60770	-0.37734	-0.61116	-0.38133
Condition <b>LC21=0.9D-W60</b>						
10	-0.74959	0.46452	0.31500	-0.18264	-0.60968	-0.17500
24	-1.51982	0.54434	0.37953	-0.20045	-0.13401	-0.21940
51	0.81151	-0.03701	-1.57629	0.00000	0.00000	0.00000
-----						
SUM	-1.45790	0.97185	-0.88176	-0.38309	-0.74369	-0.39440

Condition **LC22=0.9D-W90**

10	-0.86036	0.46470	0.76781	-0.18813	-0.60931	-0.16080
24	-1.53494	0.53992	0.67910	-0.19805	-0.17295	-0.20437
51	0.73916	-0.03277	-1.44691	0.00000	0.00000	0.00000
-----						
SUM	-1.65613	0.97185	0.00000	-0.38618	-0.78226	-0.36517

Condition **LC23=0.9D-W120**

10	-0.78969	0.45521	1.23199	-0.19031	-0.45268	-0.11040
24	-1.13635	0.53519	0.59029	-0.19977	-0.17176	-0.14522
51	0.46815	-0.01856	-0.94052	0.00000	0.00000	0.00000
-----						
SUM	-1.45790	0.97185	0.88176	-0.39009	-0.62444	-0.25562

Condition **LC24=0.9D-W150**

10	-0.65808	0.44856	1.58886	-0.18608	-0.30733	-0.07677
24	-0.71706	0.53100	0.56253	-0.20784	-0.11438	-0.10338
51	0.28761	-0.00771	-0.54369	0.00000	0.00000	0.00000
-----						
SUM	-1.08753	0.97185	1.60770	-0.39393	-0.42171	-0.18015

Condition **LC25=1.2D+Di+W10**

10	-0.53514	1.09644	2.27364	-0.43818	-0.00742	-0.07678
24	0.61056	1.36061	-2.03591	-0.52995	0.02652	-0.10732
51	-0.07542	0.02124	0.13926	0.00000	0.00000	0.00000
-----						
SUM	0.00000	2.47829	0.37700	-0.96813	0.01910	-0.18410

Condition **LC26=1.2D+Di+W130**

10	-0.42075	1.09203	2.21725	-0.43530	0.08094	-0.05873
24	0.84577	1.36011	-2.30081	-0.53303	0.05465	-0.08427
51	-0.17683	0.02614	0.33175	0.00000	0.00000	0.00000
-----						
SUM	0.24819	2.47829	0.24819	-0.96833	0.13559	-0.14301

Condition **LC27=1.2D+Di+W160**

10	-0.43412	1.09280	2.19848	-0.43525	0.06127	-0.06424
24	0.79303	1.36102	-2.25803	-0.53295	0.05141	-0.09088
51	-0.14536	0.02446	0.27310	0.00000	0.00000	0.00000
-----						
SUM	0.21355	2.47829	0.21355	-0.96821	0.11268	-0.15512

Condition **LC28=1.2D+Di+W190**

10	-0.40277	1.09234	2.08853	-0.43377	0.06695	-0.06598
24	0.81239	1.36200	-2.34881	-0.53367	0.06151	-0.09249
51	-0.13762	0.02395	0.26028	0.00000	0.00000	0.00000
-----						
SUM	0.27200	2.47829	0.00000	-0.96743	0.12846	-0.15848

Condition **LC29=1.2D+Di+W120**

10	-0.42527	1.09465	1.97524	-0.43326	0.02643	-0.07845
24	0.71011	1.36314	-2.32511	-0.53316	0.05988	-0.10719
51	-0.07129	0.02049	0.13632	0.00000	0.00000	0.00000
-----						
SUM	0.21355	2.47829	-0.21355	-0.96642	0.08632	-0.18564

Condition **LC30=1.2D+Di+W1150**

10	-0.40885	1.09452	1.95853	-0.43266	0.03239	-0.07803
24	0.73205	1.36315	-2.35099	-0.53374	0.06306	-0.10618
51	-0.07500	0.02061	0.14426	0.00000	0.00000	0.00000
SUM	0.24819	2.47829	-0.24819	-0.96640	0.09545	-0.18421

Condition **LC31=1.2D+Di-W10**

10	-0.51828	1.09988	1.88774	-0.43378	-0.07092	-0.10453
24	0.44472	1.36551	-2.12765	-0.53188	0.04312	-0.13848
51	0.07356	0.01290	-0.13708	0.00000	0.00000	0.00000
SUM	0.00000	2.47829	-0.37700	-0.96566	-0.02780	-0.24301

Condition **LC32=1.2D+Di-W130**

10	-0.63267	1.10429	1.94413	-0.43666	-0.15928	-0.12258
24	0.20951	1.36600	-1.86275	-0.52879	0.01498	-0.16153
51	0.17496	0.00799	-0.32957	0.00000	0.00000	0.00000
SUM	-0.24819	2.47829	-0.24819	-0.96545	-0.14430	-0.28411

Condition **LC33=1.2D+Di-W160**

10	-0.61930	1.10353	1.96289	-0.43671	-0.13961	-0.11707
24	0.26225	1.36509	-1.90553	-0.52887	0.01823	-0.15492
51	0.14350	0.00967	-0.27091	0.00000	0.00000	0.00000
SUM	-0.21355	2.47829	-0.21355	-0.96558	-0.12138	-0.27199

Condition **LC34=1.2D+Di-W190**

10	-0.65064	1.10399	2.07284	-0.43819	-0.14529	-0.11533
24	0.24289	1.36411	-1.81474	-0.52816	0.00812	-0.15331
51	0.13575	0.01019	-0.25810	0.00000	0.00000	0.00000
SUM	-0.27200	2.47829	0.00000	-0.96635	-0.13717	-0.26863

Condition **LC35=1.2D+Di-W1120**

10	-0.62815	1.10167	2.18613	-0.43870	-0.10478	-0.10286
24	0.34517	1.36297	-1.83845	-0.52866	0.00976	-0.13861
51	0.06943	0.01364	-0.13414	0.00000	0.00000	0.00000
SUM	-0.21355	2.47829	0.21355	-0.96737	-0.09502	-0.24147

Condition **LC36=1.2D+Di-W1150**

10	-0.64456	1.10181	2.20284	-0.43930	-0.11073	-0.10328
24	0.32323	1.36296	-1.81257	-0.52808	0.00657	-0.13962
51	0.07314	0.01352	-0.14208	0.00000	0.00000	0.00000
SUM	-0.24819	2.47829	0.24819	-0.96738	-0.10416	-0.24290

Condition **LC38=1.2D+1.5LL1**

10	-0.18822	0.73219	1.38325	-0.32909	-0.00240	-0.03677
24	0.18487	0.93276	-1.37611	-0.40572	0.02128	-0.04973
51	0.00336	0.00585	-0.00714	0.00000	0.00000	0.00000
SUM	0.00000	1.67080	0.00000	-0.73481	0.01888	-0.08650

Condition <b>LC39=1.2D+1.5LL2</b>						
10	0.65204	0.72907	1.44089	-0.24237	0.12252	0.08783
24	-0.67472	0.93723	-1.39561	-0.31479	0.00215	0.11605
51	0.02268	0.00450	-0.04528	0.00000	0.00000	0.00000
-----						
SUM	0.00000	1.67080	0.00000	-0.55716	0.12467	0.20388
Condition <b>LC40=1.2D+1.5LL3</b>						
10	-1.02729	0.72953	1.44015	-0.24278	-0.12533	-0.16420
24	1.04208	0.93728	-1.46823	-0.31484	0.04549	-0.21946
51	-0.01479	0.00399	0.02808	0.00000	0.00000	0.00000
-----						
SUM	0.00000	1.67080	0.00000	-0.55762	-0.07984	-0.38366
Condition <b>LC41=1.2D+WL0+1.5LLa1</b>						
10	1.38765	0.89742	1.90118	-0.26627	0.18548	0.18570
24	-1.39118	1.14324	-1.77967	-0.35380	-0.01561	0.24949
51	0.00354	0.00515	-0.01051	0.00000	0.00000	0.00000
-----						
SUM	0.00000	2.04580	0.11100	-0.62006	0.16988	0.43519
Condition <b>LC42=1.2D+WL30+1.5LLa1</b>						
10	1.42289	0.89616	1.88595	-0.26541	0.21061	0.19078
24	-1.32107	1.14309	-1.85414	-0.35470	-0.00747	0.25604
51	-0.02545	0.00655	0.04456	0.00000	0.00000	0.00000
-----						
SUM	0.07637	2.04580	0.07637	-0.62011	0.20314	0.44683
Condition <b>LC43=1.2D+WL60+1.5LLa1</b>						
10	1.41641	0.89643	1.87749	-0.26537	0.20329	0.18875
24	-1.34154	1.14342	-1.84004	-0.35467	-0.00865	0.25359
51	-0.01405	0.00594	0.02336	0.00000	0.00000	0.00000
-----						
SUM	0.06081	2.04580	0.06081	-0.62005	0.19464	0.44233
Condition <b>LC44=1.2D+WL90+1.5LLa1</b>						
10	1.42477	0.89644	1.84634	-0.26500	0.20322	0.18777
24	-1.33973	1.14371	-1.86069	-0.35484	-0.00600	0.25255
51	-0.00904	0.00565	0.01435	0.00000	0.00000	0.00000
-----						
SUM	0.07600	2.04580	0.00000	-0.61984	0.19722	0.44032
Condition <b>LC45=1.2D+WL120+1.5LLa1</b>						
10	1.41934	0.89713	1.81431	-0.26486	0.19129	0.18403
24	-1.36976	1.14408	-1.85150	-0.35471	-0.00636	0.24814
51	0.01123	0.00458	-0.02362	0.00000	0.00000	0.00000
-----						
SUM	0.06081	2.04580	-0.06081	-0.61957	0.18493	0.43217
Condition <b>LC46=1.2D+WL150+1.5LLa1</b>						
10	1.42662	0.89695	1.80677	-0.26459	0.19571	0.18473
24	-1.35713	1.14406	-1.86816	-0.35497	-0.00467	0.24916
51	0.00688	0.00479	-0.01498	0.00000	0.00000	0.00000
-----						
SUM	0.07637	2.04580	-0.07637	-0.61955	0.19104	0.43389

Condition **LC47=1.2D-WL0+1.5LLa1**

10	1.39345	0.89867	1.78710	-0.26496	0.16212	0.17618
24	-1.44830	1.14483	-1.79231	-0.35436	-0.01134	0.23874
51	0.05485	0.00229	-0.10579	0.00000	0.00000	0.00000
SUM	0.00000	2.04580	-0.11100	-0.61932	0.15079	0.41493

Condition **LC48=1.2D-WL30+1.5LLa1**

10	1.35821	0.89993	1.80233	-0.26581	0.13700	0.17110
24	-1.51841	1.14498	-1.71783	-0.35345	-0.01947	0.23219
51	0.08384	0.00089	-0.16086	0.00000	0.00000	0.00000
SUM	-0.07637	2.04580	-0.07637	-0.61927	0.11753	0.40329

Condition **LC49=1.2D-WL60+1.5LLa1**

10	1.36469	0.89966	1.81079	-0.26585	0.14432	0.17314
24	-1.49794	1.14464	-1.73193	-0.35348	-0.01829	0.23465
51	0.07244	0.00150	-0.13967	0.00000	0.00000	0.00000
SUM	-0.06081	2.04580	-0.06081	-0.61933	0.12602	0.40778

Condition **LC50=1.2D-WL90+1.5LLa1**

10	1.35633	0.89965	1.84194	-0.26623	0.14438	0.17412
24	-1.49975	1.14436	-1.71128	-0.35331	-0.02094	0.23568
51	0.06743	0.00179	-0.13065	0.00000	0.00000	0.00000
SUM	-0.07600	2.04580	0.00000	-0.61954	0.12344	0.40980

Condition **LC51=1.2D-WL120+1.5LLa1**

10	1.36175	0.89896	1.87397	-0.26636	0.15632	0.17785
24	-1.46972	1.14398	-1.72047	-0.35345	-0.02058	0.24010
51	0.04716	0.00286	-0.09269	0.00000	0.00000	0.00000
SUM	-0.06081	2.04580	0.06081	-0.61981	0.13574	0.41795

Condition **LC52=1.2D-WL150+1.5LLa1**

10	1.35448	0.89914	1.88151	-0.26664	0.15190	0.17715
24	-1.48236	1.14401	-1.70381	-0.35319	-0.02228	0.23908
51	0.05151	0.00266	-0.10132	0.00000	0.00000	0.00000
SUM	-0.07637	2.04580	0.07637	-0.61982	0.12962	0.41623

Condition **LC53=1.2D+WL0+1.5LLa2**

10	0.31899	0.90915	1.80360	-0.42350	-0.05719	0.06282
24	-0.28620	1.12758	-1.75286	-0.50302	0.02917	0.07976
51	-0.03279	0.00906	0.06026	0.00000	0.00000	0.00000
SUM	0.00000	2.04580	0.11100	-0.92651	-0.02803	0.14258

Condition **LC54=1.2D+WL30+1.5LLa2**

10	0.35423	0.90790	1.78837	-0.42264	-0.03207	0.06791
24	-0.21609	1.12744	-1.82734	-0.50392	0.03730	0.08631
51	-0.06177	0.01046	0.11533	0.00000	0.00000	0.00000
SUM	0.07637	2.04580	0.07637	-0.92656	0.00523	0.15421

Condition **LC55=1.2D+WL60+1.5LLa2**

10	0.34775	0.90817	1.77991	-0.42261	-0.03939	0.06587
24	-0.23656	1.12777	-1.81323	-0.50389	0.03612	0.08385
51	-0.05038	0.00986	0.09414	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	0.06081	-0.92650	-0.00326	0.14972

Condition **LC56=1.2D+WL90+1.5LLa2**

10	0.35611	0.90818	1.74876	-0.42223	-0.03945	0.06489
24	-0.23475	1.12806	-1.83388	-0.50406	0.03877	0.08282
51	-0.04536	0.00957	0.08513	0.00000	0.00000	0.00000
SUM	0.07600	2.04580	0.00000	-0.92629	-0.00068	0.14771

Condition **LC57=1.2D+WL120+1.5LLa2**

10	0.35069	0.90887	1.71673	-0.42209	-0.05139	0.06115
24	-0.26478	1.12843	-1.82470	-0.50393	0.03841	0.07840
51	-0.02509	0.00850	0.04716	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	-0.06081	-0.92602	-0.01298	0.13956

Condition **LC58=1.2D+WL150+1.5LLa2**

10	0.35796	0.90869	1.70919	-0.42182	-0.04697	0.06185
24	-0.25215	1.12841	-1.84135	-0.50419	0.04011	0.07942
51	-0.02944	0.00870	0.05580	0.00000	0.00000	0.00000
SUM	0.07637	2.04580	-0.07637	-0.92601	-0.00686	0.14127

Condition **LC59=1.2D-WL0+1.5LLa2**

10	0.32479	0.91041	1.68952	-0.42219	-0.08055	0.05331
24	-0.34332	1.12918	-1.76550	-0.50358	0.03344	0.06901
51	0.01853	0.00621	-0.03502	0.00000	0.00000	0.00000
SUM	0.00000	2.04580	-0.11100	-0.92577	-0.04712	0.12231

Condition **LC60=1.2D-WL30+1.5LLa2**

10	0.28955	0.91166	1.70474	-0.42304	-0.10568	0.04822
24	-0.41343	1.12932	-1.69102	-0.50267	0.02530	0.06246
51	0.04752	0.00481	-0.09009	0.00000	0.00000	0.00000
SUM	-0.07637	2.04580	-0.07637	-0.92572	-0.08038	0.11068

Condition **LC61=1.2D-WL60+1.5LLa2**

10	0.29603	0.91140	1.71320	-0.42308	-0.09836	0.05026
24	-0.39296	1.12899	-1.70513	-0.50270	0.02648	0.06491
51	0.03612	0.00541	-0.06889	0.00000	0.00000	0.00000
SUM	-0.06081	2.04580	-0.06081	-0.92578	-0.07188	0.11517

Condition **LC62=1.2D-WL90+1.5LLa2**

10	0.28767	0.91139	1.74436	-0.42346	-0.09829	0.05124
24	-0.39477	1.12870	-1.68448	-0.50253	0.02383	0.06595
51	0.03110	0.00571	-0.05988	0.00000	0.00000	0.00000
SUM	-0.07600	2.04580	0.00000	-0.92599	-0.07446	0.11719

Condition **LC63=1.2D-WL120+1.5LLa2**

10	0.29310	0.91069	1.77638	-0.42360	-0.08636	0.05497
24	-0.36474	1.12833	-1.69366	-0.50267	0.02419	0.07036
51	0.01084	0.00677	-0.02191	0.00000	0.00000	0.00000
SUM	-0.06081	2.04580	0.06081	-0.92626	-0.06217	0.12533

Condition **LC64=1.2D-WL150+1.5LLa2**

10	0.28582	0.91087	1.78392	-0.42387	-0.09078	0.05428
24	-0.37738	1.12835	-1.67701	-0.50241	0.02250	0.06934
51	0.01519	0.00657	-0.03055	0.00000	0.00000	0.00000
SUM	-0.07637	2.04580	0.07637	-0.92628	-0.06828	0.12362

Condition **LC65=1.2D+WL0+1.5LLa3**

10	-0.70043	0.91384	1.79749	-0.42551	0.08183	-0.12853
24	0.70968	1.12803	-1.69990	-0.50134	0.01938	-0.17076
51	-0.00925	0.00393	0.01341	0.00000	0.00000	0.00000
SUM	0.00000	2.04580	0.11100	-0.92685	0.10121	-0.29929

Condition **LC66=1.2D+WL30+1.5LLa3**

10	-0.66519	0.91258	1.78227	-0.42466	0.10696	-0.12345
24	0.77979	1.12789	-1.77437	-0.50225	0.02752	-0.16420
51	-0.03823	0.00533	0.06848	0.00000	0.00000	0.00000
SUM	0.07637	2.04580	0.07637	-0.92690	0.13447	-0.28765

Condition **LC67=1.2D+WL60+1.5LLa3**

10	-0.67167	0.91285	1.77381	-0.42462	0.09964	-0.12549
24	0.75932	1.12822	-1.76027	-0.50222	0.02634	-0.16666
51	-0.02684	0.00473	0.04728	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	0.06081	-0.92684	0.12598	-0.29215

Condition **LC68=1.2D+WL90+1.5LLa3**

10	-0.66331	0.91286	1.74265	-0.42424	0.09957	-0.12647
24	0.76113	1.12851	-1.78092	-0.50239	0.02899	-0.16769
51	-0.02182	0.00443	0.03827	0.00000	0.00000	0.00000
SUM	0.07600	2.04580	0.00000	-0.92663	0.12855	-0.29416

Condition **LC69=1.2D+WL120+1.5LLa3**

10	-0.66874	0.91355	1.71063	-0.42411	0.08764	-0.13020
24	0.73110	1.12888	-1.77174	-0.50225	0.02862	-0.17211
51	-0.00156	0.00337	0.00030	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	-0.06081	-0.92636	0.11626	-0.30231

Condition **LC70=1.2D+WL150+1.5LLa3**

10	-0.66146	0.91337	1.70309	-0.42383	0.09206	-0.12950
24	0.74374	1.12886	-1.78839	-0.50251	0.03032	-0.17109
51	-0.00591	0.00357	0.00894	0.00000	0.00000	0.00000
SUM	0.07637	2.04580	-0.07637	-0.92635	0.12238	-0.30059

Condition **LC71=1.2D-WL0+1.5LLa3**

10	-0.69463	0.91509	1.68341	-0.42420	0.05847	-0.13805
24	0.65256	1.12963	-1.71254	-0.50190	0.02365	-0.18150
51	0.04207	0.00108	-0.08188	0.00000	0.00000	0.00000
-----						
SUM	0.00000	2.04580	-0.11100	-0.92611	0.08212	-0.31955

Condition **LC72=1.2D-WL30+1.5LLa3**

10	-0.72987	0.91635	1.69864	-0.42506	0.03335	-0.14313
24	0.58245	1.12977	-1.63806	-0.50100	0.01552	-0.18805
51	0.07105	-0.00032	-0.13695	0.00000	0.00000	0.00000
-----						
SUM	-0.07637	2.04580	-0.07637	-0.92606	0.04886	-0.33119

Condition **LC73=1.2D-WL60+1.5LLa3**

10	-0.72339	0.91608	1.70710	-0.42510	0.04066	-0.14110
24	0.60292	1.12944	-1.65216	-0.50103	0.01669	-0.18560
51	0.05966	0.00028	-0.11575	0.00000	0.00000	0.00000
-----						
SUM	-0.06081	2.04580	-0.06081	-0.92612	0.05736	-0.32670

Condition **LC74=1.2D-WL90+1.5LLa3**

10	-0.73175	0.91607	1.73825	-0.42547	0.04073	-0.14012
24	0.60111	1.12915	-1.63152	-0.50086	0.01405	-0.18456
51	0.05464	0.00057	-0.10674	0.00000	0.00000	0.00000
-----						
SUM	-0.07600	2.04580	0.00000	-0.92633	0.05478	-0.32468

Condition **LC75=1.2D-WL120+1.5LLa3**

10	-0.72633	0.91538	1.77028	-0.42561	0.05266	-0.13638
24	0.63114	1.12878	-1.64070	-0.50099	0.01441	-0.18015
51	0.03437	0.00164	-0.06877	0.00000	0.00000	0.00000
-----						
SUM	-0.06081	2.04580	0.06081	-0.92660	0.06707	-0.31653

Condition **LC76=1.2D-WL150+1.5LLa3**

10	-0.73360	0.91556	1.77782	-0.42588	0.04824	-0.13708
24	0.61851	1.12880	-1.62405	-0.50073	0.01271	-0.18117
51	0.03872	0.00144	-0.07741	0.00000	0.00000	0.00000
-----						
SUM	-0.07637	2.04580	0.07637	-0.92661	0.06096	-0.31825

Condition **LC77=1.2D+WL0+1.5LLa4**

10	-1.76656	0.90105	1.89619	-0.26818	-0.15420	-0.25739
24	1.80837	1.14360	-1.86564	-0.35286	0.07439	-0.34880
51	-0.04181	0.00115	0.08045	0.00000	0.00000	0.00000
-----						
SUM	0.00000	2.04580	0.11100	-0.62105	-0.07981	-0.60619

Condition **LC78=1.2D+WL30+1.5LLa4**

10	-1.73131	0.89979	1.88096	-0.26733	-0.12908	-0.25231
24	1.87848	1.14345	-1.94012	-0.35377	0.08253	-0.34224
51	-0.07080	0.00255	0.13552	0.00000	0.00000	0.00000
-----						
SUM	0.07637	2.04580	0.07637	-0.62110	-0.04655	-0.59455



Condition **LC79=1.2D+WL60+1.5LLa4**

10	-1.73780	0.90006	1.87250	-0.26729	-0.13640	-0.25435
24	1.85801	1.14378	-1.92601	-0.35374	0.08135	-0.34470
51	-0.05940	0.00195	0.11432	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	0.06081	-0.62103	-0.05505	-0.59905

Condition **LC80=1.2D+WL90+1.5LLa4**

10	-1.72943	0.90007	1.84135	-0.26691	-0.13646	-0.25533
24	1.85982	1.14407	-1.94666	-0.35391	0.08400	-0.34573
51	-0.05439	0.00166	0.10531	0.00000	0.00000	0.00000
SUM	0.07600	2.04580	0.00000	-0.62082	-0.05247	-0.60106

Condition **LC81=1.2D+WL120+1.5LLa4**

10	-1.73486	0.90077	1.80932	-0.26678	-0.14840	-0.25906
24	1.82979	1.14444	-1.93748	-0.35377	0.08364	-0.35015
51	-0.03412	0.00059	0.06734	0.00000	0.00000	0.00000
SUM	0.06081	2.04580	-0.06081	-0.62055	-0.06476	-0.60921

Condition **LC82=1.2D+WL150+1.5LLa4**

10	-1.72759	0.90059	1.80178	-0.26650	-0.14398	-0.25837
24	1.84243	1.14442	-1.95413	-0.35403	0.08533	-0.34913
51	-0.03847	0.00079	0.07598	0.00000	0.00000	0.00000
SUM	0.07637	2.04580	-0.07637	-0.62054	-0.05865	-0.60749

Condition **LC83=1.2D-WL0+1.5LLa4**

10	-1.76075	0.90231	1.78211	-0.26687	-0.17756	-0.26691
24	1.75125	1.14519	-1.87828	-0.35343	0.07866	-0.35954
51	0.00950	-0.00170	-0.01483	0.00000	0.00000	0.00000
SUM	0.00000	2.04580	-0.11100	-0.62030	-0.09890	-0.62645

Condition **LC84=1.2D-WL30+1.5LLa4**

10	-1.79600	0.90356	1.79734	-0.26773	-0.20269	-0.27199
24	1.68114	1.14534	-1.80380	-0.35252	0.07053	-0.36609
51	0.03849	-0.00310	-0.06990	0.00000	0.00000	0.00000
SUM	-0.07637	2.04580	-0.07637	-0.62025	-0.13216	-0.63809

Condition **LC85=1.2D-WL60+1.5LLa4**

10	-1.78952	0.90329	1.80580	-0.26777	-0.19537	-0.26996
24	1.70161	1.14500	-1.81791	-0.35255	0.07171	-0.36364
51	0.02709	-0.00250	-0.04871	0.00000	0.00000	0.00000
SUM	-0.06081	2.04580	-0.06081	-0.62031	-0.12366	-0.63360

Condition **LC86=1.2D-WL90+1.5LLa4**

10	-1.79788	0.90328	1.83695	-0.26814	-0.19530	-0.26898
24	1.69980	1.14472	-1.79726	-0.35238	0.06906	-0.36260
51	0.02208	-0.00220	-0.03969	0.00000	0.00000	0.00000
SUM	-0.07600	2.04580	0.00000	-0.62052	-0.12624	-0.63158

Condition **LC87=1.2D-WL120+1.5LLa4**

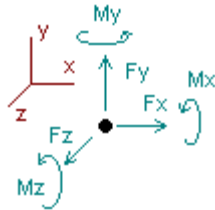
10	-1.79245	0.90259	1.86898	-0.26828	-0.18337	-0.26524
24	1.72983	1.14435	-1.80644	-0.35252	0.06942	-0.35819
51	0.00181	-0.00114	-0.00173	0.00000	0.00000	0.00000
-----						
SUM	-0.06081	2.04580	0.06081	-0.62079	-0.11395	-0.62343

Condition **LC88=1.2D-WL150+1.5LLa4**

10	-1.79972	0.90277	1.87652	-0.26855	-0.18779	-0.26594
24	1.71720	1.14437	-1.78979	-0.35226	0.06772	-0.35921
51	0.00616	-0.00134	-0.01037	0.00000	0.00000	0.00000
-----						
SUM	-0.07637	2.04580	0.07637	-0.62081	-0.12006	-0.62515

### Envelope for nodal reactions

Note.- **Ic** is the controlling load condition



*Direction of positive forces and moments*

Envelope of nodal reactions for :

- LC1=1.2D+Wo
- LC2=1.2D+W30
- LC3=1.2D+W60
- LC4=1.2D+W90
- LC5=1.2D+W120
- LC6=1.2D+W150
- LC7=1.2D-Wo
- LC8=1.2D-W30
- LC9=1.2D-W60
- LC10=1.2D-W90
- LC11=1.2D-W120
- LC12=1.2D-W150
- LC13=0.9D+Wo
- LC14=0.9D+W30
- LC15=0.9D+W60
- LC16=0.9D+W90
- LC17=0.9D+W120
- LC18=0.9D+W150
- LC19=0.9D-Wo
- LC20=0.9D-W30
- LC21=0.9D-W60
- LC22=0.9D-W90
- LC23=0.9D-W120
- LC24=0.9D-W150
- LC25=1.2D+Di+W10
- LC26=1.2D+Di+W30
- LC27=1.2D+Di+W60
- LC28=1.2D+Di+W90
- LC29=1.2D+Di+W120

LC30=1.2D+Di+W1150  
LC31=1.2D+Di-W10  
LC32=1.2D+Di-W130  
LC33=1.2D+Di-W160  
LC34=1.2D+Di-W190  
LC35=1.2D+Di-W1120  
LC36=1.2D+Di-W1150  
LC38=1.2D+1.5LL1  
LC39=1.2D+1.5LL2  
LC40=1.2D+1.5LL3  
LC41=1.2D+WL0+1.5LLa1  
LC42=1.2D+WL30+1.5LLa1  
LC43=1.2D+WL60+1.5LLa1  
LC44=1.2D+WL90+1.5LLa1  
LC45=1.2D+WL120+1.5LLa1  
LC46=1.2D+WL150+1.5LLa1  
LC47=1.2D-WL0+1.5LLa1  
LC48=1.2D-WL30+1.5LLa1  
LC49=1.2D-WL60+1.5LLa1  
LC50=1.2D-WL90+1.5LLa1  
LC51=1.2D-WL120+1.5LLa1  
LC52=1.2D-WL150+1.5LLa1  
LC53=1.2D+WL0+1.5LLa2  
LC54=1.2D+WL30+1.5LLa2  
LC55=1.2D+WL60+1.5LLa2  
LC56=1.2D+WL90+1.5LLa2  
LC57=1.2D+WL120+1.5LLa2  
LC58=1.2D+WL150+1.5LLa2  
LC59=1.2D-WL0+1.5LLa2  
LC60=1.2D-WL30+1.5LLa2  
LC61=1.2D-WL60+1.5LLa2  
LC62=1.2D-WL90+1.5LLa2  
LC63=1.2D-WL120+1.5LLa2  
LC64=1.2D-WL150+1.5LLa2  
LC65=1.2D+WL0+1.5LLa3  
LC66=1.2D+WL30+1.5LLa3  
LC67=1.2D+WL60+1.5LLa3  
LC68=1.2D+WL90+1.5LLa3  
LC69=1.2D+WL120+1.5LLa3  
LC70=1.2D+WL150+1.5LLa3  
LC71=1.2D-WL0+1.5LLa3  
LC72=1.2D-WL30+1.5LLa3  
LC73=1.2D-WL60+1.5LLa3  
LC74=1.2D-WL90+1.5LLa3  
LC75=1.2D-WL120+1.5LLa3  
LC76=1.2D-WL150+1.5LLa3  
LC77=1.2D+WL0+1.5LLa4  
LC78=1.2D+WL30+1.5LLa4  
LC79=1.2D+WL60+1.5LLa4  
LC80=1.2D+WL90+1.5LLa4  
LC81=1.2D+WL120+1.5LLa4  
LC82=1.2D+WL150+1.5LLa4  
LC83=1.2D-WL0+1.5LLa4  
LC84=1.2D-WL30+1.5LLa4  
LC85=1.2D-WL60+1.5LLa4  
LC86=1.2D-WL90+1.5LLa4  
LC87=1.2D-WL120+1.5LLa4  
LC88=1.2D-WL150+1.5LLa4

Node		Forces						Moments					
		Fx [Kip]	lc	Fy [Kip]	lc	Fz [Kip]	lc	Mx [Kip*ft]	lc	My [Kip*ft]	lc	Mz [Kip*ft]	lc
10	Max	1.427	LC46	1.104	LC32	2.274	LC25	-0.16021	LC17	0.60051	LC15	0.19078	LC42
	Min	-1.800	LC88	0.398	LC16	-0.261	LC19	-0.43930	LC36	-0.61120	LC9	-0.27199	LC84
24	Max	1.878	LC78	1.366	LC32	0.679	LC22	-0.19547	LC20	0.20057	LC4	0.25604	LC42
	Min	-1.535	LC22	0.518	LC14	-2.567	LC4	-0.53374	LC30	-0.17295	LC22	-0.36609	LC84
51	Max	0.812	LC9	0.049	LC2	1.571	LC15	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.809	LC15	-0.037	LC20	-1.577	LC9	0.00000	LC1	0.00000	LC1	0.00000	LC1

Date: 3/23/2020  
Project Name: NHV 109 943107  
Project No.: 806358  
Designed By: JN      Checked By: MSC



**CHECK CONNECTION CAPACITY (Worst Case) - Standoff**

**Reference:** AISC Steel Construction Manual 14th Edition (ASD)

**Bolt Type =**                      **A307 5/8"** Threaded Rod

**Allowable Tensile Load =**

$$F_{Tall} = 6903 \text{ lbs.}$$

**Allowable Shear Load =**

$$F_{vall} = 4142 \text{ lbs.}$$

**No. of Supports =**                      **1**

**No. of Bolts / Support =**                      **4**

Node	Tensile Forces	Shear Forces	Tension Design	Shear Design	Tension/Shear Ratio	PASS/FAIL
N10	2274	1104	8.24%	6.66%	14.90%	PASS
N24	2567	1366	9.30%	8.25%	17.54%	PASS

Date: 3/23/2020  
Project Name: NHV 109 943107  
Project No.: 806358  
Designed By: JN      Checked By: MSC



**CHECK CONNECTION CAPACITY (Worst Case) - Tieback**

**Reference:** AISC Steel Construction Manual 14th Edition (ASD)

**Bolt Type =**                      A36 1/2" Threaded Rod

**Allowable Tensile Load =**

$$F_{Tall} = 4271 \text{ lbs.}$$

**Allowable Shear Load =**

$$F_{vall} = 2562 \text{ lbs.}$$

**No. of Supports =**                      1

**No. of Bolts / Support =**                      2

Node	Tensile Forces	Shear Forces	Tension Design	Shear Design	Tension/Shear Ratio	PASS/FAIL
N51	1577	49	18.46%	0.96%	19.42%	PASS

# Exhibit F

## **Power Density/RF Emissions Report**



# RF EMISSIONS COMPLIANCE REPORT

## Crown Castle on behalf of AT&T Mobility, LLC

Crown Castle Site Name: NHV 109 943107  
Crown Castle Site BU: 806358  
AT&T Mobility, LLC Site FA #: 10035332  
1432 Old Waterbury Road  
Southbury, CT  
3/24/2020

### Report Status:

**AT&T Mobility, LLC is Compliant**



Michael Fischer, P.E.  
Registered Professional Engineer (Electrical)  
Connecticut License Number 33928  
Expires January 31, 2021

Signed 25 March 2020

Prepared By:

Site Safe, LLC



Engineering Statement in Re:  
Electromagnetic Energy Analysis  
Crown Castle  
Southbury, CT

My signature on the cover of this document indicates:

That I am registered as a Professional Engineer in the jurisdiction indicated; and

That I have extensive professional experience in the wireless communications engineering industry; and

That I am an employee of Site Safe, LLC in Vienna, Virginia; and

That I am thoroughly familiar with the Rules and Regulations of the Federal Communications Commission ("the FCC" and "the FCC Rules") both in general and specifically as they apply to the FCC's Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields; and

That the technical information serving as the basis for this report was supplied by Crown Castle on behalf of AT&T Mobility, LLC (see attached Site Summary and Carrier documents) and that AT&T Mobility, LLC's installation involves communications equipment, antennas and associated technical equipment at a location referred to as "NHV 109 943107" ("the site"); and

That AT&T Mobility, LLC proposes to operate at the site with transmit antennas listed in the carrier summary and with a maximum effective radiated power as specified by AT&T Mobility, LLC and shown on the worksheet and that worst-case 100% duty cycle has been assumed; and

That this analysis has been performed with the assumption that the ground immediately surrounding the tower is primarily flat or falling; and

That at this time, the FCC requires that certain licensees address specific levels of radio frequency energy to which workers or members of the public might possibly be exposed (at §1.1307(b) of the FCC Rules); and

That such consideration of possible exposure of humans to radio frequency energy must utilize the standards set by the FCC, which is the federal agency having jurisdiction over communications facilities; and

That the FCC rules define two tiers of permissible exposure guidelines: 1) "uncontrolled environments," which defines situations in which persons may not be aware of (the "general public"), or may not be able to control their exposure to a transmission facility; and 2) "controlled environments," which defines situations in which persons are aware of their potential for exposure (industry personnel); and

That this statement specifically addresses the uncontrolled environment (which is more conservative than the controlled environment) and the limit set forth in the FCC rules for licensees of AT&T Mobility, LLC's operating frequencies as shown on the attached antenna worksheet; and

That when applying the uncontrolled environment standards, the predicted Maximum Power Density at two meters above ground level from the proposed AT&T Mobility, LLC operation is

no more than 0.987% of the maximum permissible exposure limits in any accessible area on the ground; and

That it is understood per FCC Guidelines and OET 65 Appendix A, that regardless of the existent radio frequency environment, only those licensees whose contributions exceed 5% of the exposure limit pertinent to their operation(s) bear any responsibility for bringing any non-compliant area(s) into compliance; and

That when applying the uncontrolled environment standards, the cumulative predicted energy density from the proposed operation is no more than 2.721% of the maximum in any accessible area up to two meters above the ground per OET 65; and

That the calculations provided in this report are based on data provided by the client and antenna pattern data supplied by the antenna manufacturer, in accordance with FCC guidelines listed in OET 65. Horizontal and vertical antenna patterns are combined for modeling purposes to accurately reflect the energy two meters above ground level where on-axis energy refers to maximum energy two meters above the ground along the azimuth of the antenna and where area energy refers to the maximum energy anywhere two meters above the ground regardless of the antenna azimuth, accounting for cumulative energy from multiple antennas for the carrier(s) and frequency range(s) indicated; and

That the Occupational Safety and Health Administration has policies in place which address worker safety in and around communications sites, thus individual companies will be responsible for their employees' training regarding radio frequency safety; and

In summary, it is stated here that the proposed operation at the site will not result in exposure of the public to excessive levels of radio frequency energy as defined in the FCC Rules and Regulations, specifically 47 CFR 1.1307(b), and that AT&T Mobility, LLC's proposed operation is completely compliant.

Finally, it is stated that access to the tower should be restricted to communication industry professionals and approved contractor personnel trained in radio frequency safety and that this instant analysis addresses exposure levels at two meters above ground level and does not address exposure levels on the tower or in the immediate proximity of the antennas.

**Crown Castle  
NHV 109 943107  
Site Summary**

Carrier	Area Maximum Percentage MPE
AT&T Mobility, LLC	0.170 %
AT&T Mobility, LLC	0.110 %
AT&T Mobility, LLC	0.214 %
AT&T Mobility, LLC	0.045 %
AT&T Mobility, LLC	0.341 %
AT&T Mobility, LLC (Proposed)	0.107 %
Sprint	0.199 %
Sprint	0.129 %
Sprint	0.129 %
Sprint	0.099 %
T-Mobile	0.251 %
T-Mobile	0.153 %
T-Mobile	0.185 %
Verizon Wireless	0.163 %
Verizon Wireless	0.132 %
Verizon Wireless	0.190 %
Verizon Wireless	0.104 %
 <b>Composite Site MPE:</b>	 <b>2.721 %</b>

**AT&T Mobility, LLC**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 2100 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.69663  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.16966 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10798	195	23	6084	0.944603	0.094460	1.631379	0.163138
Kathrein-Scala	800-10798	195	143	6084	0.944603	0.094460	1.631379	0.163138
Kathrein-Scala	800-10798	195	263	6084	0.944603	0.094460	1.631379	0.163138

**AT&T Mobility, LLC**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 1900 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.09935  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.10994 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10798	195	23	3751	0.576097	0.057610	1.060133	0.106013
Kathrein-Scala	800-10798	195	143	3751	0.576097	0.057610	1.060133	0.106013
Kathrein-Scala	800-10798	195	263	3751	0.576097	0.057610	1.060133	0.106013

**AT&T Mobility, LLC  
NHV 109 943107  
Carrier Summary**

**Frequency:** 2300 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 2.14211  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.21421 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	OPA-65R-LCUU-H6	195	23	3206	1.789306	0.178931	2.123650	0.212365
CCI Antennas	OPA-65R-LCUU-H6	195	143	3206	1.789306	0.178931	2.123650	0.212365
CCI Antennas	OPA-65R-LCUU-H6	195	263	3206	1.789306	0.178931	2.123650	0.212365

**AT&T Mobility, LLC**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 737 MHz  
Maximum Permissible Exposure (MPE): 491.33  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 0.22333  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.04545 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI Antennas	OPA-65R-LCUU-H6	195	23	942	0.175396	0.035698	0.204856	0.041694
CCI Antennas	OPA-65R-LCUU-H6	195	143	942	0.175396	0.035698	0.204856	0.041694
CCI Antennas	OPA-65R-LCUU-H6	195	263	942	0.175396	0.035698	0.204856	0.041694

**AT&T Mobility, LLC**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 850 MHz  
Maximum Permissible Exposure (MPE): 566.67  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.93108  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.34078 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Kathrein-Scala	800-10121	195	23	521	0.132051	0.023303	0.201430	0.035546
Kathrein-Scala	800-10798	195	23	3192	1.485310	0.262113	1.826627	0.322346
Kathrein-Scala	800-10121	195	143	521	0.132051	0.023303	0.201430	0.035546
Kathrein-Scala	800-10798	195	143	3192	1.485310	0.262113	1.826627	0.322346
Kathrein-Scala	800-10121	195	263	521	0.132051	0.023303	0.201430	0.035546
Kathrein-Scala	800-10798	195	263	3192	1.485310	0.262113	1.826627	0.322346



**AT&T Mobility, LLC (Proposed)**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 763 MHz  
Maximum Permissible Exposure (MPE): 508.67  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 0.54265  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.10668 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
CCI	OPA65R-BU6D	195	23	2450	0.496726	0.097653	0.510013	0.100265
CCI	OPA65R-BU6D	195	143	2450	0.496726	0.097653	0.510013	0.100265
CCI	OPA65R-BU6D	195	263	2450	0.496726	0.097653	0.510013	0.100265

**Sprint**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 2500 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.98710  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.19871 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXVTM14-C-I20	174	20	6168	0.735794	0.073579	1.380609	0.138061
RFS	APXVTM14-C-I20	174	130	6168	0.735794	0.073579	1.380609	0.138061
RFS	APXVTM14-C-I20	174	260	6168	0.735794	0.073579	1.380609	0.138061

**Sprint**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 1990 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.29396  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.12940 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXVSPP18-C-A20	174	20	3804	0.607159	0.060716	1.113921	0.111392
RFS	APXVSPP18-C-A20	174	130	3804	0.607159	0.060716	1.113921	0.111392
RFS	APXVSPP18-C-A20	174	260	3804	0.607159	0.060716	1.113921	0.111392

**Sprint**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 1900 MHz  
Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 1.29396  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.12940 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXVSPP18-C-A20	174	20	3804	0.607159	0.060716	1.113921	0.111392
RFS	APXVSPP18-C-A20	174	130	3804	0.607159	0.060716	1.113921	0.111392
RFS	APXVSPP18-C-A20	174	260	3804	0.607159	0.060716	1.113921	0.111392

**Sprint**  
**NHV 109 943107**  
**Carrier Summary**

Frequency: 862 MHz  
Maximum Permissible Exposure (MPE): 574.67  $\mu\text{W}/\text{cm}^2$   
Maximum power density at ground level: 0.56817  $\mu\text{W}/\text{cm}^2$   
Highest percentage of Maximum Permissible Exposure: 0.09887 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXVSPP18-C-A20	174	20	2168	0.503334	0.087587	0.510023	0.088751
RFS	APXVSPP18-C-A20	174	130	2168	0.503334	0.087587	0.510023	0.088751
RFS	APXVSPP18-C-A20	174	260	2168	0.503334	0.087587	0.510023	0.088751

**T-Mobile  
NHV 109 943107  
Carrier Summary**

Frequency: 700 MHz  
 Maximum Permissible Exposure (MPE): 466.67  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 1.17019  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.25075 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
ANDREW	LNX-6515DS-VTM	207	50	4572	0.602756	0.129162	0.616063	0.132013
ANDREW	LNX-6515DS-VTM	207	150	4572	0.602756	0.129162	0.616063	0.132013
ANDREW	LNX-6515DS-VTM	207	240	4572	0.602756	0.129162	0.616063	0.132013

**T-Mobile  
NHV 109 943107  
Carrier Summary**

**Frequency:** 2100 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 1.53108  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.15311 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXV18-206516S-C	207	50	6825	0.753542	0.075354	0.878267	0.087827
RFS	APXV18-206516S-C	207	150	6825	0.753542	0.075354	0.878267	0.087827
RFS	APXV18-206516S-C	207	240	6825	0.753542	0.075354	0.878267	0.087827

**T-Mobile  
NHV 109 943107  
Carrier Summary**

**Frequency:** 1900 MHz  
**Maximum Permissible Exposure (MPE):** 1000  $\mu\text{W}/\text{cm}^2$   
**Maximum power density at ground level:** 1.85165  $\mu\text{W}/\text{cm}^2$   
**Highest percentage of Maximum Permissible Exposure:** 0.18516 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
RFS	APXV18-206516S-C	207	50	6825	0.715861	0.071586	1.251035	0.125104
RFS	APXV18-206516S-C	207	150	6825	0.715861	0.071586	1.251035	0.125104
RFS	APXV18-206516S-C	207	240	6825	0.715861	0.071586	1.251035	0.125104



**Verizon Wireless  
NHV 109 943107  
Carrier Summary**

Frequency: 850 MHz  
 Maximum Permissible Exposure (MPE): 566.67  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 0.92304  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.16289 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
Antel	LPA-80080-6CF	229	30	4019	0.498568	0.087983	0.760977	0.134290
Antel	LPA-80080-6CF	229	150	4019	0.498568	0.087983	0.760977	0.134290
Antel	LPA-80080-6CF	229	270	4019	0.498568	0.087983	0.760977	0.134290

**Verizon Wireless  
NHV 109 943107  
Carrier Summary**

Frequency: 2100 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 1.31624  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.13162 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
ANDREW	SBNHH-1D65B	229	30	5154	0.808116	0.080812	1.256366	0.125637
ANDREW	SBNHH-1D65B	229	150	5154	0.808116	0.080812	1.256366	0.125637
ANDREW	SBNHH-1D65B	229	270	5154	0.808116	0.080812	1.256366	0.125637

**Verizon Wireless  
NHV 109 943107  
Carrier Summary**

Frequency: 1900 MHz  
 Maximum Permissible Exposure (MPE): 1000  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 1.90461  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.19046 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
ANDREW	SBNHH-1D65B	229	30	4583	1.449673	0.144967	1.877921	0.187792
ANDREW	SBNHH-1D65B	229	150	4583	1.449673	0.144967	1.877921	0.187792
ANDREW	SBNHH-1D65B	229	270	4583	1.449673	0.144967	1.877921	0.187792

**Verizon Wireless  
NHV 109 943107  
Carrier Summary**

Frequency: 751 MHz  
 Maximum Permissible Exposure (MPE): 500.67  $\mu\text{W}/\text{cm}^2$   
 Maximum power density at ground level: 0.52269  $\mu\text{W}/\text{cm}^2$   
 Highest percentage of Maximum Permissible Exposure: 0.10440 %

Antenna Make	Model	Height (feet)	Orientation (degrees true)	ERP (Watts)	On Axis		Area	
					Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE	Max Power Density ( $\mu\text{W}/\text{cm}^2$ )	Percent of MPE
ANDREW	SBNHH-1D65B	229	30	2043	0.274261	0.054779	0.441378	0.088158
ANDREW	SBNHH-1D65B	229	150	2043	0.274261	0.054779	0.441378	0.088158
ANDREW	SBNHH-1D65B	229	270	2043	0.274261	0.054779	0.441378	0.088158