**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE

January 28, 2020

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

**Regarding: Notice of Exempt Modification – AT&T Site CT1003**
**Address: 391 Niederwerfer Road, South Windsor, CT 06074**

Dear Ms. Bachman:

New Cingular Wireless, PCS, LLC ("AT&T") currently maintains a wireless telecommunications facility ("Facility") at a 75' Monopole at the above-referenced address (the "Tower"). The Tower is owned by American Tower Corporation.

AT&T desires to modify its Facility by swapping (6) antennas and (3) remote radio units as well as add (3) remote radio units and (1) surge arrestor with accompanying DC power and fiber lines, as more particularly described and detailed in the enclosed Construction Drawings prepared by Hudson Design Group LLC, dated September 16, 2019 and last revised January 13, 2020. Enclosed please also find a Mount Analysis prepared by Hudson Design Group LLC, dated November 21, 2019 and revised January 13, 2020. The centerline height of the existing and proposed antennas will be at 73 feet.

The Tower was approved by the Connecticut Siting Council on May 15, 1984 in the attached Decision as Docket No. 40. Enclosed please also find a copy of the AT&T approved modification from August 7, 2007 under file no. EM-CING-048-077-132-151-151-070717. I was unable to locate or pull from the Council's website, the most recent exempt modification request which is under file no. EM-AT&T-132-120427 nor was I able to pull any documents from the Town of South Windsor, CT city clerk website related to the approval of the Tower.

Please accept this letter as notification pursuant to R.C.S.A §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 the following individuals: The Honorable Andrew Paterna, Mayor, Town of South Windsor; Pamela A. Olivia, Zoning Enforcement Officer, Town of South Windsor; Bart Pacekonis, Chairman of the Planning and Zoning Commission, Town of South Windsor; American Tower Corporation, as Tower Owner; and Carolcliff Hill LLC, as the property owner at the above referenced address. Enclosed please find the property card and a GIS map for the above-referenced address.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2). Specifically:

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

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

3. The proposed modifications 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 modified facility will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. *Please see the RF Emissions Analysis Report for AT&T's modified facility enclosed herewith.*

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

6. The existing structure and its foundation can support the proposed loading. *Please see the Structural Analysis Report dated January 21, 2020 and prepared by American Tower Corporation.*

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

Sincerely,

Patricia Nowak
Site Acquisition Consultant
Centerline Communications, LLC
750 West Center Street, Suite 301
West Bridgewater, MA 02379
pnowak@clinellc.com

Enclosures:
Exhibit 1 – Construction Drawings
Exhibit 2 – Mount Analysis Report
Exhibit 3 – CSC Decisions
Exhibit 4 – Property Card and GIS Map
Exhibit 5 – RF Emissions Analysis Report
Exhibit 6 – Structural Analysis

cc: The Honorable Andrew Paterna, Mayor, Town of South Windsor
Pamela A. Olivia, Zoning Enforcement Officer, Town of South Windsor
Bart Pacekonis, Chairman of the Planning and Zoning Comm, Town of South Windsor
American Tower Corporation, as Tower Owner
Carolcliff Hill LLC, as the property owner

# EXHIBIT 1

## PROJECT INFORMATION

| | |
|---|---|
| SCOPE OF WORK: | ITEMS TO BE MOUNTED ON THE EXISTING MONOPOLE:<br>• NEW AT&T ANTENNAS: DMP65R-BU6DA (TYP. OF 2 PER SECTOR, TOTAL OF 6).<br>• NEW AT&T RRUS: 4449 B5/B12 (850/700) (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br>• NEW AT&T RRUS: 8843 B2/B66A (AWS/PCS) (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br>• NEW AT&T ANTENNA MOUNT: SITEPRO1 P/N VFA12-M3-WLL (TOTAL OF 1).<br>• NEW AT&T DC & FIBER SURGE ARRESTOR DC6-48-60-18-8C-EV (TOTAL OF 1) WITH (2) DC POWER & (1) FIBER RUN.<br>• EXISTING CLIMBING CABLE (TO BE RELOCATED BELOW NEW ANTENNA FRAME).<br><br>ITEMS TO BE MOUNTED AT EQUIPMENT LOCATION:<br>• REPLACE BBU WITH (2) 6630.<br>• ADD (1) XMU, ADD (1) IDLe.<br>• ADD (1) HOME RUN UMTS RET.<br>• ADD (1) FIBER MANAGEMENT BOX.<br>• ADD (1) DC 12.<br><br>ITEMS TO BE REMOVED:<br>• EXISTING AT&T ANTENNAS: 7770 (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br>• EXISTING AT&T ANTENNAS: AM-X-CD-16-65-00T-RET (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br>• EXISTING AT&T RRUS-11 B12 (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br>• EXISTING AT&T ANTENNA PLATFORM MOUNT.<br>• EXISTING AT&T TOWER EXTENSION.<br>• EXISTING AT&T TMAS: CG1900W850BP (TYP. OF 1 PER SECTOR, TOTAL OF 3).<br><br>ITEMS TO REMAIN:<br>• (3) ANTENNAS, (3) TMA'S (1) SURGE ARRESTOR, (6) COAX CABLES, (2) DC POWER & (1) FIBER. |
| SITE ADDRESS: | 391 NIEDERWERFER ROAD<br>SOUTH WINDSOR, CT 06074 |
| LATITUDE: | 41.863548° N, 41° 51' 48.77" N |
| LONGITUDE: | 72.523055° W, 72° 31' 22.99" W |
| TYPE OF SITE: | MONOPOLE / EQUIPMENT SHELTER |
| STRUCTURE HEIGHT: | 76'-0"± |
| RAD CENTER: | 73'-0"± |
| CURRENT USE: | TELECOMMUNICATIONS FACILITY |
| PROPOSED USE: | TELECOMMUNICATIONS FACILITY |

## DRAWING INDEX

| SHEET NO. | DESCRIPTION | REV. |
|---|---|---|
| T-1 | TITLE SHEET | 2 |
| GN-1 | GENERAL NOTES | 2 |
| A-1 | COMPOUND & EQUIPMENT PLANS | 2 |
| A-2 | ANTENNA LAYOUTS & ELEVATION | 2 |
| A-3 | DETAILS | 2 |
| G-1 | GROUNDING DETAILS | 2 |
| RF-1 | RF PLUMBING DIAGRAM | 2 |

**ATC SITE NAME: SOUTH WINDSOR**
**ATC SITE #: 302474**

# SITE NUMBER: CT1003

# SITE NAME: SOUTH WINDSOR

# FA CODE: 10034966

# PACE ID: MRCTB040813, MRCTB040424, MRCTB040666

# PROJECT: LTE 2C_3C_4C 2020 UPGRADE

## VICINITY MAP

**DIRECTIONS TO SITE:**

1003 SOUTH WINDSOR I-84 TO EXIT 62 BUCKLAND ROAD. TURN LEFT & TRAVEL APPROXIMATELY 2.5 MILES AT INTERSECTION, CROSS OVER RT 30 ONTO RT. 194. CONTINUE TO 1ST LIGHT AND TURN RIGHT ONTO RT. 74. CONTINUE THRU CAUTION LITE & 2 STOP SIGNS APPROXIMATELY 2.5 MILES. AT 2ND STOP SIGN, TURN LEFT ONTO NIEDERWERFER ROAD. ACCESS ROAD .6 MILES ON LEFT AT FOX RUN NURSERY DRIVEWAY. ENTER DRIVEWAY. STAY RIGHT. DROP THE CHAIN LINK AND FOLLOW DIRT ROAD UP TO THE SITE.


## GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF AT&T. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSES OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.
2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.
3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE AT&T MOBILITY REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.
4. CONSTRUCTION DRAWINGS ARE VALID FOR SIX MONTHS AFTER ENGINEER OF RECORD'S STAMPED AND SIGNED SUBMITTAL DATE LISTED HEREIN.

**72 HOURS**

CALL
BEFORE YOU DIG
CALL TOLL FREE 1-800-922-4455
OR CALL 811

**UNDERGROUND SERVICE ALERT**

STATE OF CONNECTICUT · DANIEL P. HAMM · No.24178 · LICENSED PROFESSIONAL ENGINEER


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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379


**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY


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


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | DPH | |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

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

AT&T

TITLE SHEET
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | T-1 | 2 |

## GROUNDING NOTES

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

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

3. THE SUBCONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81 STANDARDS) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

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

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

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

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

8. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO GROUND BAR.

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

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

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

12. ALL NEW STRUCTURES WITH A FOUNDATION AND/OR FOOTING HAVING 20 FT. OR MORE OF 1/2 IN. OR GREATER ELECTRICALLY CONDUCTIVE REINFORCING STEEL MUST HAVE IT BONDED TO THE GROUND RING USING AN EXOTHERMIC WELD CONNECTION USING #2 AWG SOLID BARE TINNED COPPER GROUND WIRE, PER NEC 250.50

## GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

   CONTRACTOR – CENTERLINE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – AT&T MOBILITY

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

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

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

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

6. "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 CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.

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

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.

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

14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.

15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCH UP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.

16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF AT&T SITES."

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

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

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

20. **APPLICABLE BUILDING CODES:**
    SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

    **BUILDING CODE: IBC 2015 WITH 2018 CT STATE BUILDING CODE AMENDMENTS**
    **ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE (NFPA 70-2017)**

    SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS:

    **AMERICAN CONCRETE INSTITUTE (ACI) 318; BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE;**

    **AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;**

    **TELECOMMUNICATIONS INDUSTRY ASSOCIATION (TIA) 222-H, STRUCTURAL STANDARDS FOR STEEL**

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

## ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AGL | ABOVE GRADE LEVEL | EQ | EQUAL | REQ | REQUIRED |
| AWG | AMERICAN WIRE GAUGE | GC | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| BBU | BATTERY BACKUP UNIT | GRC | GALVANIZED RIGID CONDUIT | TBD | TO BE DETERMINED |
| BTCW | BARE TINNED SOLID COPPER WIRE | MGB | MASTER GROUND BAR | TBR | TO BE REMOVED |
| BGR | BURIED GROUND RING | MIN | MINIMUM | TBRR | TO BE REMOVED AND REPLACED |
| BTS | BASE TRANSCEIVER STATION | P | PROPOSED | TYP | TYPICAL |
| E | EXISTING | NTS | NOT TO SCALE | UG | UNDER GROUND |
| EGB | EQUIPMENT GROUND BAR | RAD | RADIATION CENTER LINE (ANTENNA) | VIF | VERIFY IN FIELD |
| EGR | EQUIPMENT GROUND RING | REF | REFERENCE | | |


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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379


**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

**391 NIEDERWERFER ROAD**
**SOUTH WINDSOR, CT 06074**
**HARTFORD COUNTY**


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


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | AT | DPH |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

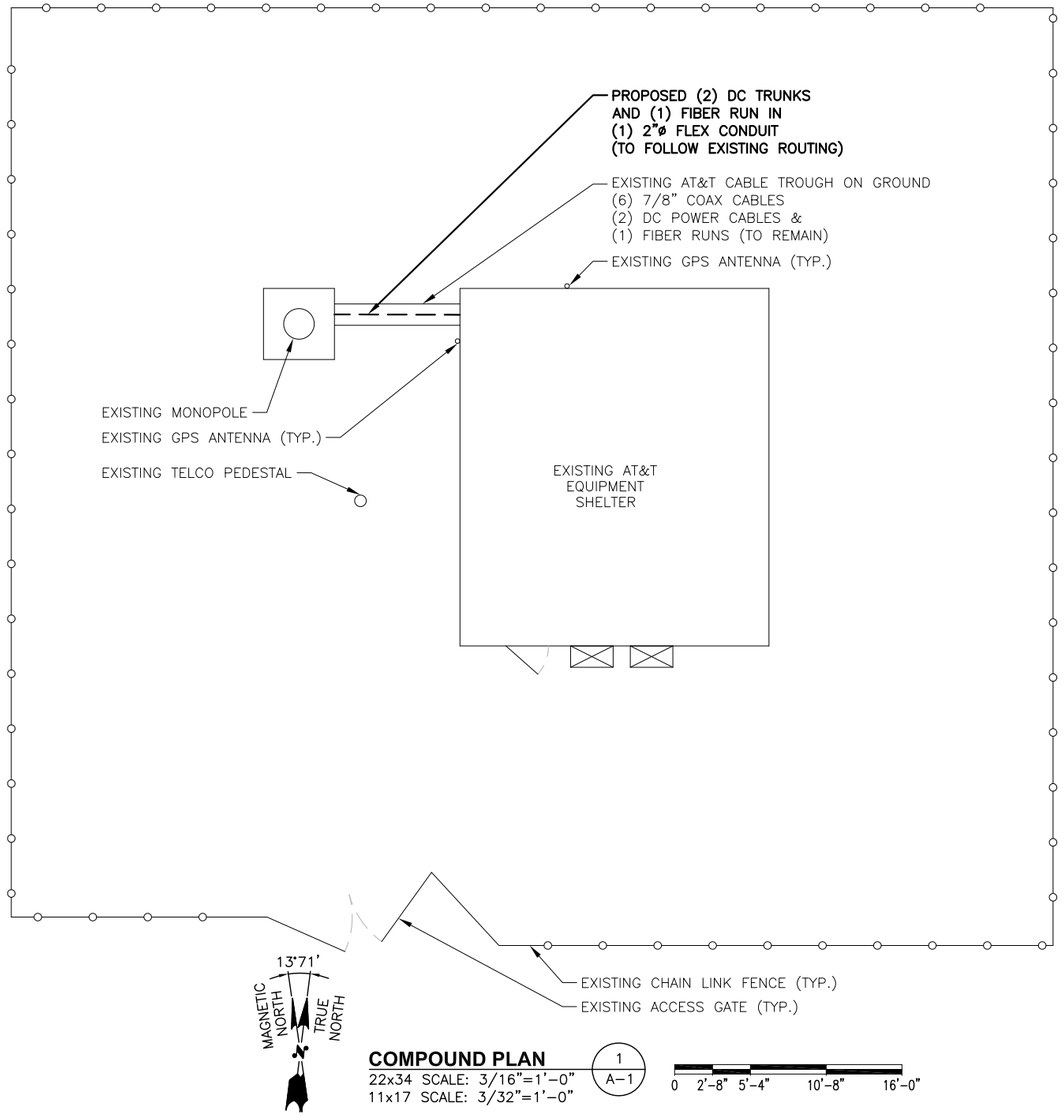
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RP

STATE OF CONNECTICUT · DANIEL P. HAMM · No. 24178 · LICENSED PROFESSIONAL ENGINEER

AT&T

GENERAL NOTES
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | GN-1 | 2 |

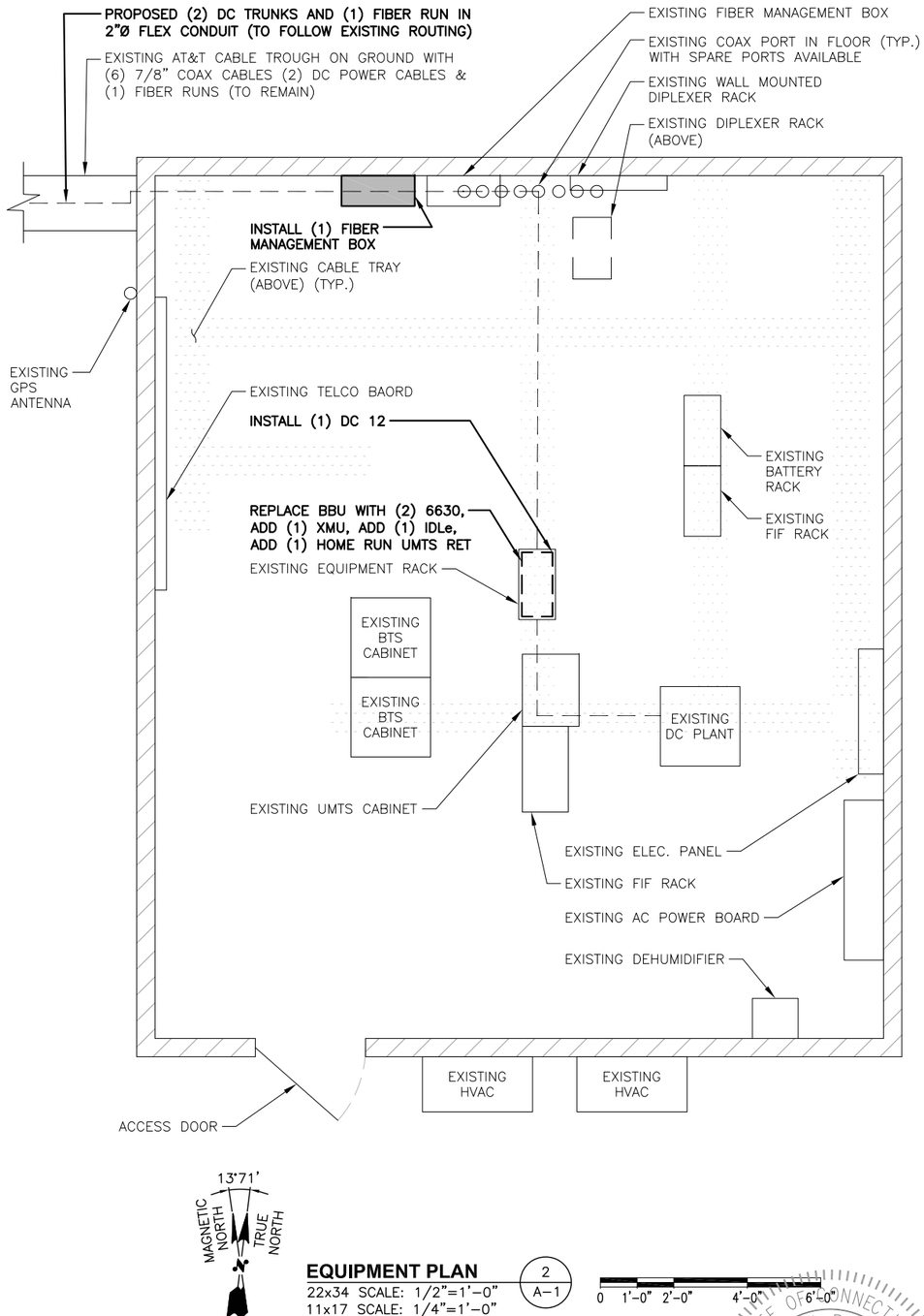



## COMPOUND PLAN

22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

1 / A-1

0 2'-8" 5'-4" 10'-8" 16'-0"




## EQUIPMENT PLAN

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

2 / A-1

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

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

ALL ANTENNAS AND LINES TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY ATC AND FINAL AT&T RF DATA SHEET.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC. (REV. 2)
DATED: JANUARY 13, 2020

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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY

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

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | DPH | |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

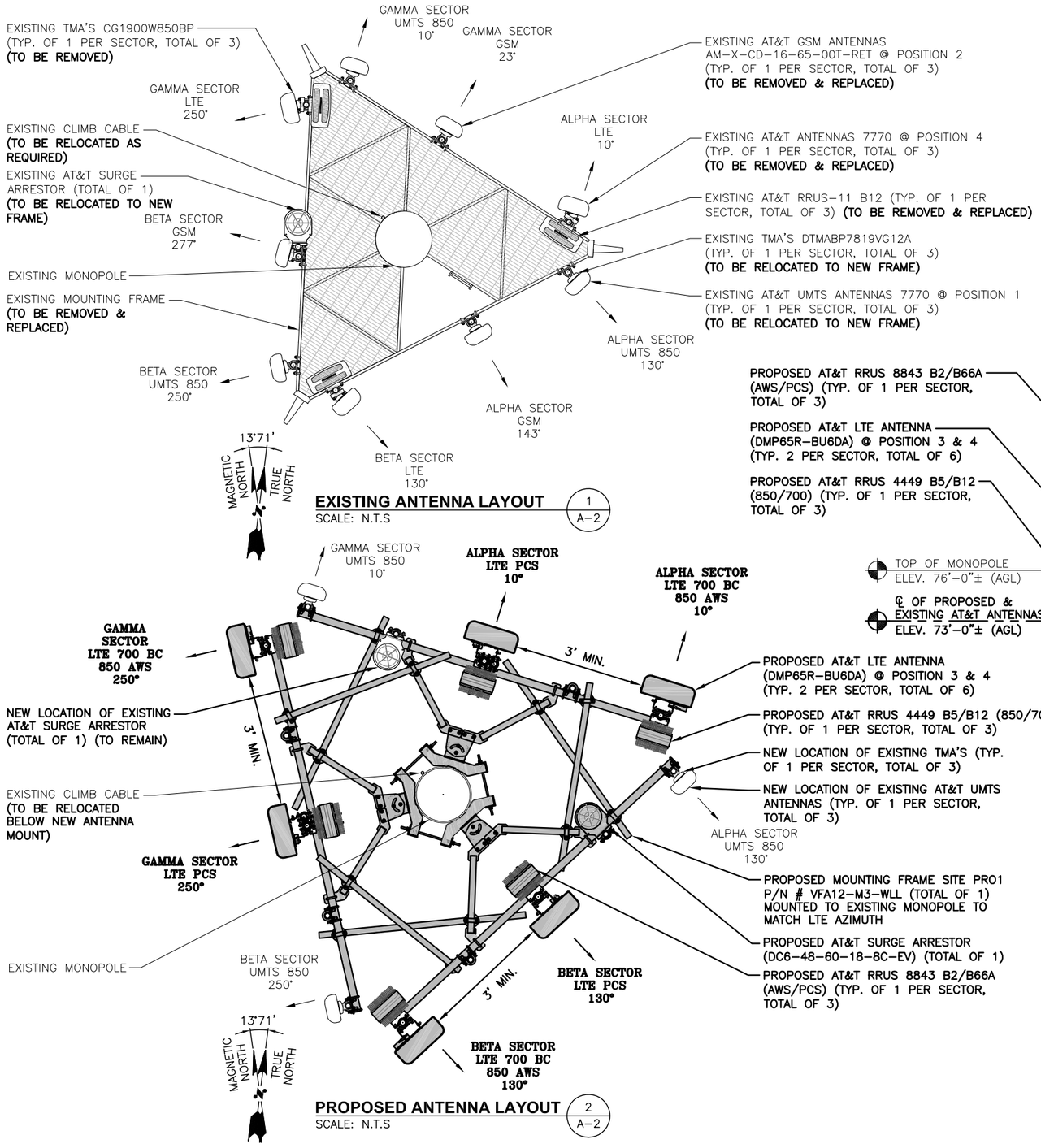
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RP

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

COMPOUND & EQUIPMENT PLANS
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | A-1 | 2 |




## EXISTING ANTENNA LAYOUT

SCALE: N.T.S

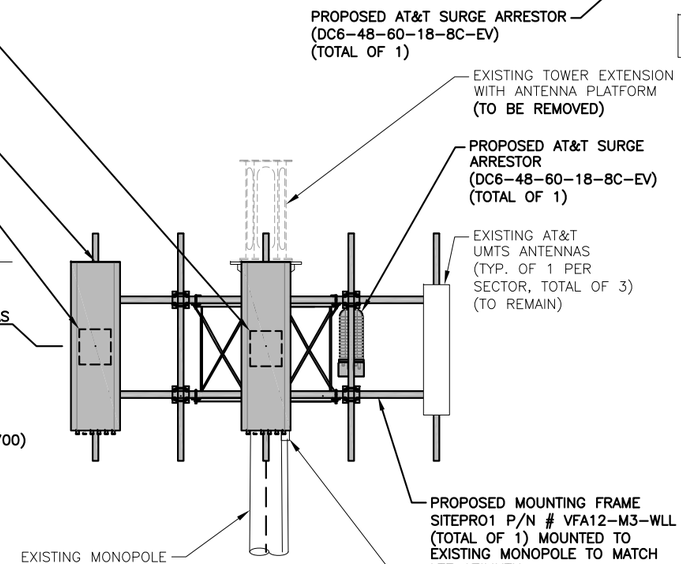
(1 / A-2)




## PROPOSED ANTENNA LAYOUT

SCALE: N.T.S

(2 / A-2)

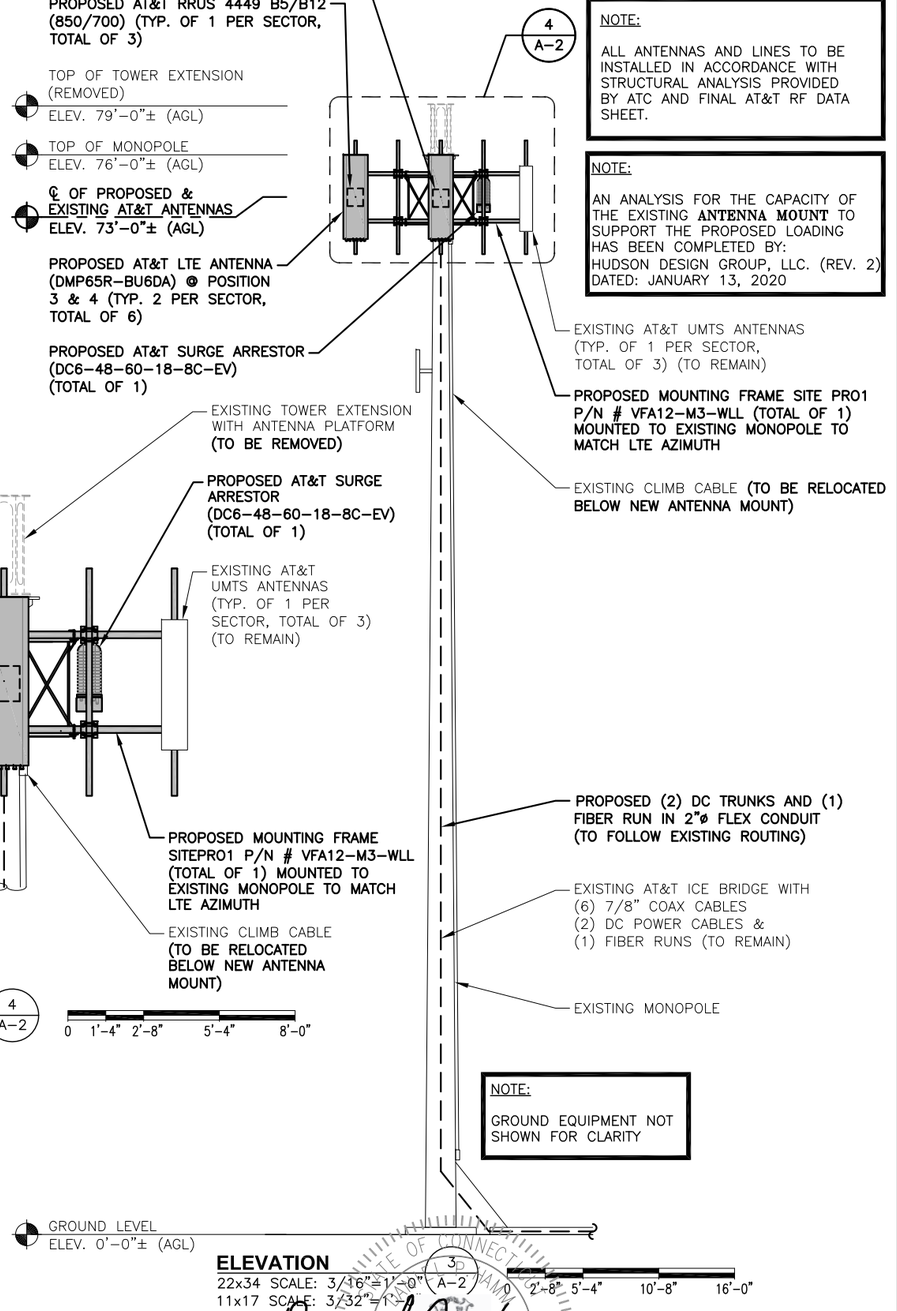



## ELEVATION

22x34 SCALE: 3/8"=1'-0"
11x17 SCALE: 3/16"=1'-0"

(4 / A-2)

0 1'-4" 2'-8" 5'-4" 8'-0"




## ELEVATION

22x34 SCALE: 3/16"=1'-0"
11x17 SCALE: 3/32"=1'-0"

(3 / A-2)

0 2'-8" 5'-4" 10'-8" 16'-0"

NOTE:

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

NOTE:

ALL ANTENNAS AND LINES TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY ATC AND FINAL AT&T RF DATA SHEET.

NOTE:

AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: HUDSON DESIGN GROUP, LLC. (REV. 2) DATED: JANUARY 13, 2020

NOTE:

GROUND EQUIPMENT NOT SHOWN FOR CLARITY

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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY

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

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | AT | DPH |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

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

STATE OF CONNECTICUT — DANIEL P. HAMM — No. 24178 — LICENSED PROFESSIONAL ENGINEER

AT&T

ANTENNA LAYOUTS & ELEVATION
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | A-2 | 2 |

## ANTENNA SCHEDULE

| SECTOR | EXISTING/ PROPOSED | BAND | ANTENNA | SIZE (INCHES) (L x W x D) | ANTENNA ℄ HEIGHT | AZIMUTH | TMA/ DIPLEXER | RRU | SIZE (INCHES) (L x W x D) | FEEDER | RAYCAP |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A1 | EXISTING | UMTS 850 | 7770 | 55X11X5 | 73'-0"± | 130° | (1)(E) DTMABP7819VG12A (2)(E)(G) 782-10250 | - | - | (2)7/8 COAX | (E) (1) RAYCAP DC6-48-60-18-8F |
| A2 | - | ---- | - | - | - | - | - | - | - | - | |
| **A3** | **PROPOSED** | **LTE PCS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **10°** | - | **(P)(1) 8843 B2/B66A (AWS/PCS)** | **14.9X13.2X10.9** | - | |
| **A4** | **PROPOSED** | **LTE 700 BC 850 AWS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **10°** | - | **(P)(1) 4449 B5/B12 (850/700)** | **17.9X13.9X9.44** | - | |
| B1 | EXISTING | UMTS 850 | 7770 | 55X11X5 | 73'-0"± | 250° | (1)(E) DTMABP7819VG12A (2)(E)(G) 782-10250 | - | - | (2)7/8 COAX | (P) (1) RAYCAP DC6-48-60-18-8C-EV |
| B2 | - | ---- | - | - | - | - | - | - | - | - | |
| **B3** | **PROPOSED** | **LTE PCS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **130°** | - | **(P)(1) 8843 B2/B66A (AWS/PCS)** | **14.9X13.2X10.9** | - | |
| **B4** | **PROPOSED** | **LTE 700 BC 850 AWS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **130°** | - | **(P)(1) 4449 B5/B12 (850/700)** | **17.9X13.9X9.44** | - | |
| C1 | EXISTING | UMTS 850 | 7770 | 55X11X5 | 73'-0"± | 10° | (1)(E) DTMABP7819VG12A (2)(E)(G) 782-10250 | - | - | (2)7/8 COAX | |
| C2 | - | ---- | - | - | - | - | - | - | - | - | |
| **C3** | **PROPOSED** | **LTE PCS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **250°** | - | **(P)(1) 8843 B2/B66A (AWS/PCS)** | **14.9X13.2X10.9** | - | |
| **C4** | **PROPOSED** | **LTE 700 BC 850 AWS** | **DMP65R-BU6DA** | **71.2X20.7X7.7** | **73'-0"±** | **250°** | - | **(P)(1) 4449 B5/B12 (850/700)** | **17.9X13.9X9.44** | - | |

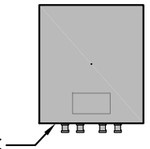
**FINAL ANTENNA SCHEDULE** (1 / A-3)
SCALE: N.T.S

## RRU CHART

| QUANTITY | MODEL | SIZE (L x W x D) |
|---|---|---|
| P(3) | 4449 (850/700) | 17.9"X13.9"X9.44" |
| P(3) | 8843 (AWS/PCS) | 14.9"x13.2"x10.9" |

**NOTE:**
MOUNT PER MANUFACTURER'S SPECIFICATIONS

NOTE:
SEE RFDS FOR RRH FREQUENCY AND MODEL NUMBER



PROPOSED RRU REFER TO THE FINAL RFDS AND CHART FOR QUANTITY, MODEL AND DIMENSIONS

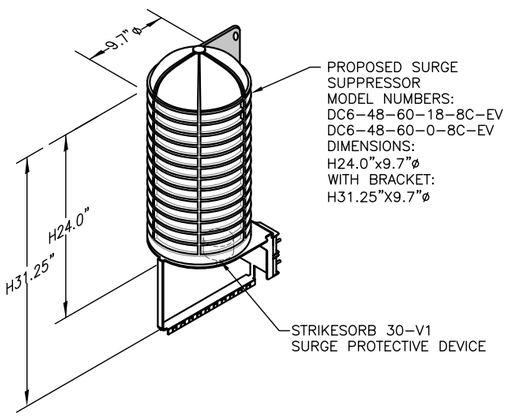
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

**PROPOSED RRUS DETAIL** (2 / A-3)
SCALE: N.T.S

NOTE:
REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.

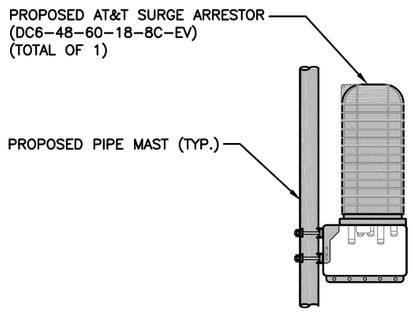
NOTE:
ALL ANTENNAS AND LINES TO BE INSTALLED IN ACCORDANCE WITH STRUCTURAL ANALYSIS PROVIDED BY ATC AND FINAL AT&T RF DATA SHEET.

NOTE:
AN ANALYSIS FOR THE CAPACITY OF THE EXISTING **ANTENNA MOUNT** TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY:
HUDSON DESIGN GROUP, LLC. (REV. 2) DATED: JANUARY 13, 2020

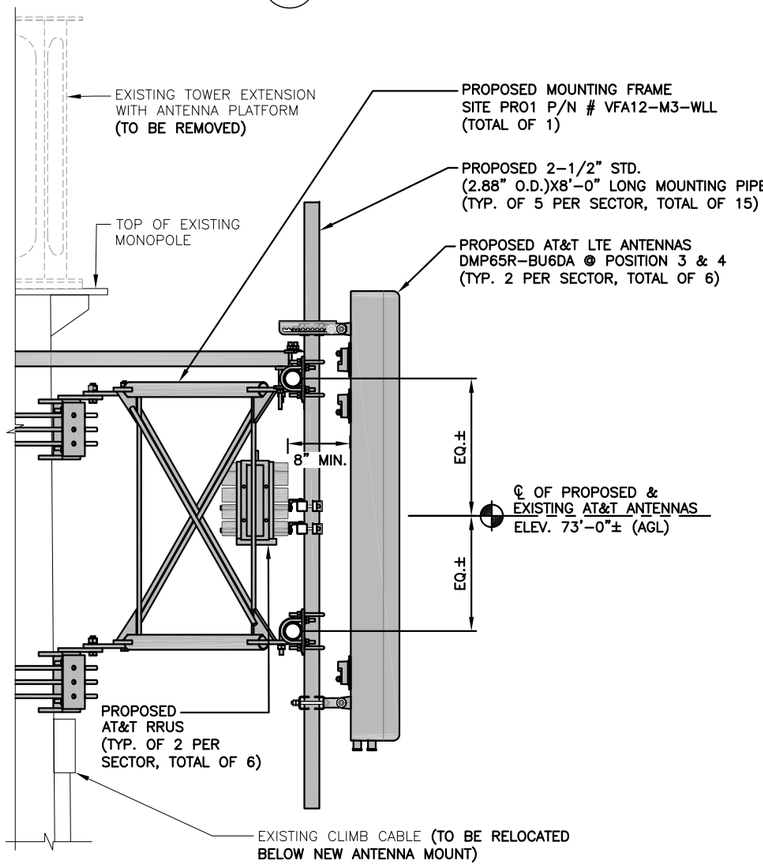



NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

**DC SURGE SUPPRESSOR DETAIL** (3 / A-3)
SCALE: N.T.S




**PROPOSED SURGE ARESTOR MOUNTING DETAIL** (4 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"




**PROPOSED LTE ANTENNA MOUNTING DETAIL** (5 / A-3)
22x34 SCALE: 1"=1'-0"
11x17 SCALE: 1/2"=1'-0"
0 0'-6" 1'-0" 2'-0" 3'-0"


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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379


**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY


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


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | TR | DPH |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

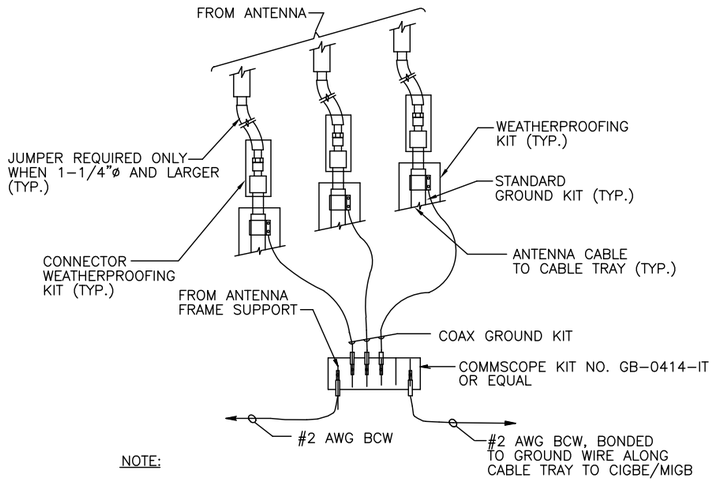
SCALE: AS SHOWN | DESIGNED BY: AT | DRAWN BY: RP

STATE OF CONNECTICUT DANIEL P. HAMM No.24178 LICENSED PROFESSIONAL ENGINEER

AT&T

DETAILS
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | A-3 | 2 |

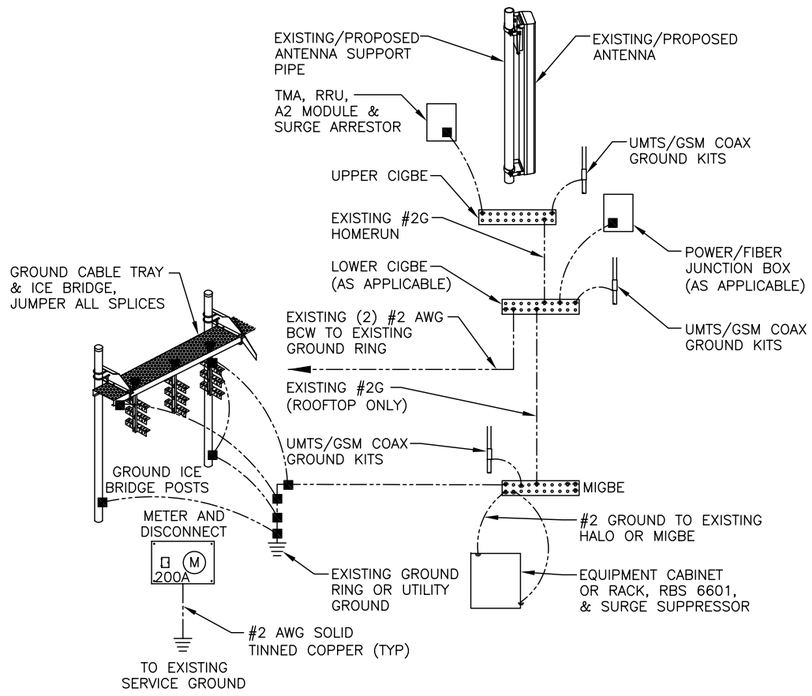



NOTE:

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

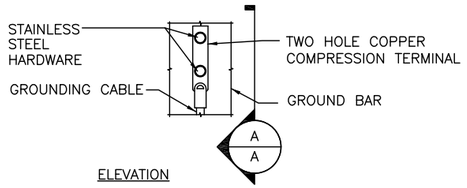
## GROUND WIRE TO GROUND BAR CONNECTION DETAIL (1 / G-1)

SCALE: N.T.S




## GROUNDING RISER DIAGRAM (2 / G-1)

SCALE: N.T.S




NOTES:

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

## TYPICAL GROUND BAR CONNECTION DETAIL (3 / G-1)

SCALE: N.T.S

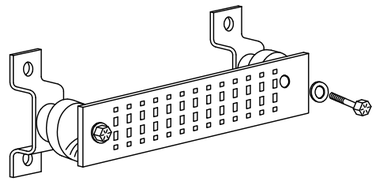
EACH GROUND CONDUCTOR TERMINATING ON ANY GROUND BAR SHALL HAVE AN IDENTIFICATION TAG ATTACHED AT EACH END THAT WILL IDENTIFY ITS ORIGIN AND DESTINATION.

SECTION "P" – SURGE PRODUCERS

CABLE ENTRY PORTS (HATCH PLATES) (#2 AWG)
GENERATOR FRAMEWORK (IF AVAILABLE) (#2 AWG)
TELCO GROUND BAR
COMMERCIAL POWER COMMON NEUTRAL/GROUND BOND (#2 AWG)
+24V POWER SUPPLY RETURN BAR (#2 AWG)
-48V POWER SUPPLY RETURN BAR (#2 AWG)
RECTIFIER FRAMES.

SECTION "A" – SURGE ABSORBERS

INTERIOR GROUND RING (#2 AWG)
EXTERNAL EARTH GROUND FIELD (BURIED GROUND RING) (#2 AWG)
METALLIC COLD WATER PIPE (IF AVAILABLE) (#2 AWG)
BUILDING STEEL (IF AVAILABLE) (#2 AWG)



## GROUND BAR - DETAIL (AS REQUIRED) (4 / G-1)

SCALE: N.T.S

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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379

**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY

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

| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | AT | DPH |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

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

STATE OF CONNECTICUT
DANIEL P. HAMM
No. 24178
LICENSED PROFESSIONAL ENGINEER

AT&T

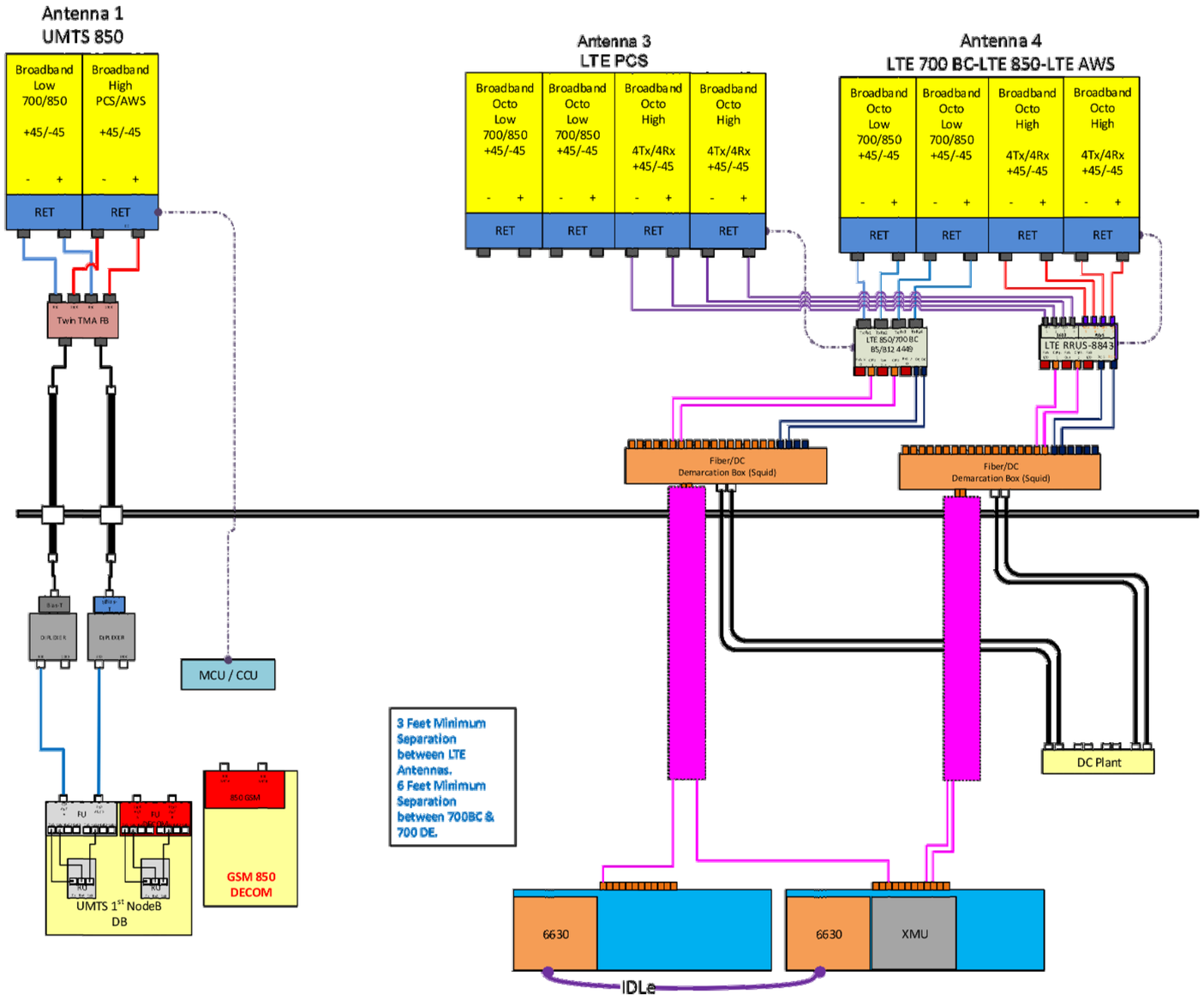
GROUNDING DETAILS
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | G-1 | 2 |

Diagram - Sector A | Diagram File Name - CT1003_A_B_C_LTE MULTI CARRIER_Rev.1.vsd

Atoll Site Name - CT1003 | Location Name - SOUTH WINDSOR | Market - CONNECTICUT | Market Cluster - NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest field notice - Antenna_Radio Connection Drawings Playbook v6.0_Ericsson"




**RF PLUMBING DIAGRAM** (1 / RF–1)
SCALE: N.T.S

**NOTE:**
1. CONTRACTOR TO CONFIRM ALL PARTS.
2. INSTALL ALL EQUIPMENT TO MANUFACTURER'S RECOMMENDATIONS

**NOTE:**

REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.


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

CENTERLINE COMMUNICATIONS
750 WEST CENTER STREET, SUITE #301
WEST BRIDGEWATER, MA 02379


**SITE NUMBER: CT1003**
**SITE NAME: SOUTH WINDSOR**
**ATC SITE # ID: 302474**

391 NIEDERWERFER ROAD
SOUTH WINDSOR, CT 06074
HARTFORD COUNTY


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


| NO. | DATE | REVISIONS | BY | CHK | APP'D |
|---|---|---|---|---|---|
| 2 | 01/13/20 | ISSUED FOR CONSTRUCTION | VP | AT | DPH |
| 1 | 01/10/20 | ISSUED FOR CONSTRUCTION | RP/TR | AT | DPH |
| 0 | 10/01/19 | ISSUED FOR ZONING | RP | AT | DPH |
| A | 09/16/19 | ISSUED FOR REVIEW | RP | AT | DPH |

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

AT&T

RF PLUMBING DIAGRAM
LTE 2C_3C_4C 2020 UPGRADE

| SITE NUMBER | DRAWING NUMBER | REV |
|---|---|---|
| CT1003 | RF–1 | 2 |

EXHIBIT 2

November 21, 2019
December 10, 2019 (Rev. 1)
**January 13, 2020 (Rev. 2)**

CENTERLINE COMMUNICATIONS at&t

Centerline Communications
750 West Center Street, Suite #301
West Bridgewater, MA 02379

| RE: | | |
|---|---|---|
| | Site Number: | CT1003 (LTE 2C/3C/4C) |
| | FA Number: | 10034966 |
| | PACE Number: | MRCTB040854 |
| | PT Number: | 2051A0PQQX |
| | Site Name: | SOUTH WINDSOR |
| | Site Address: | 391 Niederwerfer Road<br>Hartford, CT 06074 |

To Whom It May Concern:

Hudson Design Group LLC (HDG) has been authorized by Centerline Communications to perform a mount analysis on the existing AT&T antenna/RRH mounts to determine their capability of supporting the following additional loading:

- (3) 7770 Antennas (55.0"x11.0"x5.0" - Wt. = 35 lbs. /each)
- (3) DTMABP7819VG12A TMA's (10.7"x11.1"x3.8" - Wt. = 20 lbs. /each)
- (1) Squid Surge Arrestor (24.0"x9.7" Φ – Wt. = 33 lbs.)
- **(6) DMP65R-BU6DA Antennas (71.2"x20.7"x7.7" – Wt. = 80 lbs. /each)**
- **(3) B2/B66A 8843 RRH's (14.9"x13.2"x10.9" – Wt. = 72 lbs. /each)**
- **(3) B5/B12 4449 RRH's (14.9"x13.2"x10.4" – Wt. = 73 lbs. /each)**
- **(1) Squid Surge Arrestor (24.0"x9.7" Φ – Wt. = 33 lbs.)**

**Proposed equipment shown in bold*

Mount fabrication drawings prepared by SitePro1 P/N VFA12-M3-WLL, dated May 3, 2018 were used to perform this analysis.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2015 with 2018 Connecticut State Building Code, and AT&T Mount Technical Directive – R13.
- HDG considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix N of the Connecticut State Building Code, the max basic wind speed for this site is equal to 125 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.5 in. An escalated ice thickness of 1.62 in was used for this analysis.
- HDG considers this site to be exposure category C; tower is located near large, flat, open, terrain/grasslands.
- HDG considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.
- The mount has been analyzed with load combinations consisting of 250 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 2.
- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

Based on our evaluation, we have determined that the New SitePro1 VFA12-M3-WLL mounts **ARE CAPABLE** of supporting the proposed installation.

| | Component | Controlling Load Case | Stress Ratio | Pass/Fail |
|---|---|---|---|---|
| Proposed (LTE 2C/3C/4C) Mount Rating | 226 | LC2 | 70% | **PASS** |

**Reference Documents:**

- Fabrication drawings prepared by SitePro1 P/N VFA12- M3- WLL, dated May 3, 2018.

**FIELD PHOTOS:**
*Note: Existing mount to be removed and replaced.






p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 203.208.3919 f: 203.234.6398 a: 110 Washington Avenue, 4th Floor, North Haven CT 06473

This determination was based on the following limitations and assumptions:

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

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

Respectfully Submitted,
Hudson Design Group LLC

Michael Cabral
Vice President

STATE OF CONNECTICUT
DANIEL HAMM
24178
LICENSED
PROFESSIONAL ENGINEER

Daniel P. Hamm, PE
Principal






p: 978.557.5553 f: 978.336.5586 a: 45 Beechwood Drive, N. Andover, MA 01845
p: 203.208.3919 f: 203.234.6398 a: 110 Washington Avenue, 4th Floor, North Haven CT 06473

HUDSON
Design Group LLC

# Wind & Ice
# Calculations

**Date:** 1/13/2020
**Project Name:** SOUTH WINDSOR
**Project No.:** CT1003
**Designed By:** RL **Checked By:** MSC

HUDSON Design Group LLC

## 2.6.5.2 Velocity Pressure Coeff:

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

| | | |
|---|---|---|
| z= | 73 | (ft) |
| $z_g$= | 900 | (ft) |
| α= | 9.5 | |

**$K_z$= 1.184**

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

**Table 2-4**

| Exposure | $Z_g$ | α | $K_{zmin}$ | $K_c$ |
|---|---|---|---|---|
| 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 |

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

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

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

| | | |
|---|---|---|
| $K_h$= | #DIV/0! | |
| $K_c$= | 1.0 | (from Table 2-4) |
| $K_t$= | 0 | (from Table 2-5) |
| f= | 0 | (from Table 2-5) |
| z= | 73 | |
| $z_s$= | 420 | (Mean elevation of base of structure above sea level) |
| H= | 0 | (Ht. of the crest above surrounding terrain) |
| $K_{zt}$= | 1.00 | (from 2.6.6.2.1) |
| $K_e$= | 0.98 | (from 2.6.8) |

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

Category= 1

## 2.6.10 Design Ice Thickness

Max Ice Thickness =
Importance Factor =

| | | |
|---|---|---|
| $t_i$ = | 1.50 | in |
| I= | 1.0 | (from Table 2-3) |
| $K_{iz}$ = | 1.08 | (from Sec. 2.6.10) |

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

$t_{iz}$ = 1.62 in

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

**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= | 79 | $G_h$= | 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*

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

| | | | |
|---|---|---|---|
| $G_h$= | 1.35 | **Gh=** | **1.00** |

**2.6.11.2 Design Wind Force on Appurtenances**

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

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

| | | | | |
|---|---|---|---|---|
| | | $K_z$= | 1.184 | (from 2.6.5.2) |
| | | $K_{zt}$= | 1.0 | (from 2.6.6.2.1) |
| | | $K_s$= | 1.0 | (from 2.6.7) |
| **$q_z$=** | **44.33** | $K_e$= | 0.98 | (from 2.6.8) |
| **$q_{z\ (ice)}$=** | **7.09** | $K_d$= | 0.95 | (from Table 2-2) |
| **$q_{z\ (30)}$=** | **2.55** | $V_{max}$= | 125 | mph (Ultimate Wind Speed) |
| | | $V_{max\ (ice)}$= | 50 | mph |
| | | $V_{30}$= | 30 | mph |

**Table 2-2**

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

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

**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($r_s$) ≥ 0.85 | 1.4 - 4.0($r_s$) ≥ 0.90 | 2.0 - 6.0($r_s$) ≥ 1.25 |
| Round | C < 39 (Subcritical) | 0.7 | 0.8 | 1.2 |
| | 39 ≤ C ≤ 78 (Transitional) | $4.14/(C^{0.485})$ | $3.66/(C^{0.415})$ | $46.8/(C^{1.0})$ |
| | C > 78 (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 =** **1.62** in | **Angle =** **0 (deg)** | **Equivalent Angle =** **180 (deg)**

| Appurtenances | Height | Width | Depth | Flat Area | Aspect Ratio | Ca | Force (lbs) | Force (lbs) (w/ Ice) | Force (lbs) (30 mph) |
|---|---|---|---|---|---|---|---|---|---|
| **7770 Antenna** | 55.0 | 11.0 | 5.0 | 4.20 | 5.00 | 1.31 | **244** | **54** | **14** |
| **DMP65R-BU6DA Antenna** | 71.2 | 20.7 | 7.7 | 10.24 | 3.44 | 1.24 | **563** | **109** | **32** |
| **B2/B66A 8843 RRH** | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.20 | **73** | **18** | **4** |
| **B2/B66A 8843 RRH (Shielded)** | 14.9 | 0.0 | 10.9 | 0.00 | 0.00 | 1.20 | **0** | **3** | **0** |
| **B5/B12 4449 RRH** | 14.9 | 13.2 | 10.4 | 1.37 | 1.13 | 1.20 | **73** | **18** | **4** |
| **B5/B12 4449 RRH (Shielded)** | 14.9 | 0.0 | 10.4 | 0.00 | 0.00 | 1.20 | **0** | **3** | **0** |
| **DTMABP7819VG12A TMA** | 10.7 | 11.1 | 3.8 | 0.82 | 0.96 | 1.20 | **44** | **12** | **3** |
| **Surge Arrestor** | 24.0 | 9.7 | 9.7 | 1.62 | 2.47 | 0.70 | **50** | **12** | **3** |
| **PL 3-1/2x5/8** | 3.5 | 0.5 | | 0.01 | 7.00 | 1.20 | **1** | | |
| **PL 11-1/4x5/8** | 11.3 | 0.5 | | 0.04 | 22.50 | 1.20 | **2** | | |
| **5/8" Round Bar** | 0.6 | 12.0 | | 0.05 | 0.05 | 1.20 | **3** | | |
| **3/4" Round Bar** | 0.8 | 12.0 | | 0.06 | 0.06 | 1.20 | **3** | | |
| **2" Pipe** | 2.4 | 12.0 | | 0.20 | 0.20 | 1.20 | **11** | | |
| **2-1/2" Pipe** | 2.9 | 12.0 | | 0.24 | 0.24 | 1.20 | **13** | | |

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

## WIND LOADS

| Angle = | 30 | (deg) | Ice Thickness = | 1.62 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 244 | 130 | 216 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 563 | 249 | 485 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 73 | 60 | 69 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 6.6 | 10.9 | 0.68 | 1.13 | 2.26 | 1.37 | 1.20 | 1.20 | 36 | 60 | 42 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 73 | 57 | 69 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 6.6 | 10.4 | 0.68 | 1.08 | 2.26 | 1.43 | 1.20 | 1.20 | 36 | 57 | 42 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 44 | 15 | 37 |

**WIND LOADS WITH ICE:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 58.2 | 14.2 | 8.2 | 5.76 | 3.34 | 4.09 | 7.06 | 1.27 | 1.40 | 52 | 33 | 47 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.38 | 5.66 | 3.11 | 6.80 | 1.23 | 1.39 | 108 | 56 | 95 |
| B2/B66A 8843 RRH | 18.1 | 16.4 | 14.1 | 2.07 | 1.78 | 1.10 | 1.28 | 1.20 | 1.20 | 18 | 15 | 17 |
| B2/B66A 8843 RRH (Shielded) | 18.1 | 8.2 | 14.1 | 1.04 | 1.78 | 2.21 | 1.28 | 1.20 | 1.20 | 9 | 15 | 10 |
| B5/B12 4449 RRH | 18.1 | 16.4 | 13.6 | 2.07 | 1.72 | 1.10 | 1.33 | 1.20 | 1.20 | 18 | 15 | 17 |
| B5/B12 4449 RRH (Shielded) | 18.1 | 8.2 | 13.6 | 1.04 | 1.72 | 2.21 | 1.33 | 1.20 | 1.20 | 9 | 15 | 10 |
| DTMABP7819VG12A TMA | 13.9 | 14.3 | 7.0 | 1.39 | 0.68 | 0.97 | 1.98 | 1.20 | 1.20 | 12 | 6 | 10 |

**WIND LOADS AT 30 MPH:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 14 | 7 | 12 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 32 | 14 | 28 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 4 | 3 | 4 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 6.6 | 10.9 | 0.68 | 1.13 | 2.26 | 1.37 | 1.20 | 1.20 | 2 | 3 | 2 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 4 | 3 | 4 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 6.6 | 10.4 | 0.68 | 1.08 | 2.26 | 1.43 | 1.20 | 1.20 | 2 | 3 | 2 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 3 | 1 | 2 |

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

## WIND LOADS

| Angle = | 60 | (deg) | Ice Thickness = | 1.62 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 244 | 130 | 158 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 563 | 249 | 328 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 73 | 60 | 63 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 9.9 | 10.9 | 1.02 | 1.13 | 1.51 | 1.37 | 1.20 | 1.20 | 54 | 60 | 59 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 73 | 57 | 61 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 9.9 | 10.4 | 1.02 | 1.08 | 1.51 | 1.43 | 1.20 | 1.20 | 54 | 57 | 57 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 44 | 15 | 22 |

**WIND LOADS WITH ICE:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 58.2 | 14.2 | 8.2 | 5.76 | 3.34 | 4.09 | 7.06 | 1.27 | 1.40 | 52 | 33 | 38 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.38 | 5.66 | 3.11 | 6.80 | 1.23 | 1.39 | 108 | 56 | 69 |
| B2/B66A 8843 RRH | 18.1 | 16.4 | 14.1 | 2.07 | 1.78 | 1.10 | 1.28 | 1.20 | 1.20 | 18 | 15 | 16 |
| B2/B66A 8843 RRH (Shielded) | 18.1 | 12.3 | 14.1 | 1.55 | 1.78 | 1.47 | 1.28 | 1.20 | 1.20 | 13 | 15 | 15 |
| B5/B12 4449 RRH | 18.1 | 16.4 | 13.6 | 2.07 | 1.72 | 1.10 | 1.33 | 1.20 | 1.20 | 18 | 15 | 15 |
| B5/B12 4449 RRH (Shielded) | 18.1 | 12.3 | 13.6 | 1.55 | 1.72 | 1.47 | 1.33 | 1.20 | 1.20 | 13 | 15 | 14 |
| DTMABP7819VG12A TMA | 13.9 | 14.3 | 7.0 | 1.39 | 0.68 | 0.97 | 1.98 | 1.20 | 1.20 | 12 | 6 | 7 |

**WIND LOADS AT 30 MPH:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 14 | 7 | 9 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 32 | 14 | 19 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 4 | 3 | 4 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 9.9 | 10.9 | 1.02 | 1.13 | 1.51 | 1.37 | 1.20 | 1.20 | 3 | 3 | 3 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 4 | 3 | 4 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 9.9 | 10.4 | 1.02 | 1.08 | 1.51 | 1.43 | 1.20 | 1.20 | 3 | 3 | 3 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 3 | 1 | 1 |

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

## WIND LOADS

| Angle = | 90 | (deg) | Ice Thickness = | 1.62 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 244 | 130 | 130 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 563 | 249 | 249 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 73 | 60 | 60 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 0.0 | 10.9 | 0.00 | 1.13 | 0.00 | 1.37 | 1.20 | 1.20 | 0 | 60 | 60 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 73 | 57 | 57 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 0.0 | 10.4 | 0.00 | 1.08 | 0.00 | 1.43 | 1.20 | 1.20 | 0 | 57 | 57 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 44 | 15 | 15 |

**WIND LOADS WITH ICE:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 58.2 | 14.2 | 8.2 | 5.76 | 3.34 | 4.09 | 7.06 | 1.27 | 1.40 | 52 | 33 | 33 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.38 | 5.66 | 3.11 | 6.80 | 1.23 | 1.39 | 108 | 56 | 56 |
| B2/B66A 8843 RRH | 18.1 | 16.4 | 14.1 | 2.07 | 1.78 | 1.10 | 1.28 | 1.20 | 1.20 | 18 | 15 | 15 |
| B2/B66A 8843 RRH (Shielded) | 18.1 | 3.2 | 14.1 | 0.41 | 1.78 | 5.59 | 1.28 | 1.34 | 1.20 | 4 | 15 | 15 |
| B5/B12 4449 RRH | 18.1 | 16.4 | 13.6 | 2.07 | 1.72 | 1.10 | 1.33 | 1.20 | 1.20 | 18 | 15 | 15 |
| B5/B12 4449 RRH (Shielded) | 18.1 | 3.2 | 13.6 | 0.41 | 1.72 | 5.59 | 1.33 | 1.34 | 1.20 | 4 | 15 | 15 |
| DTMABP7819VG12A TMA | 13.9 | 14.3 | 7.0 | 1.39 | 0.68 | 0.97 | 1.98 | 1.20 | 1.20 | 12 | 6 | 6 |

**WIND LOADS AT 30 MPH:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 14 | 7 | 7 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 32 | 14 | 14 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 4 | 3 | 3 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 0.0 | 10.9 | 0.00 | 1.13 | 0.00 | 1.37 | 1.20 | 1.20 | 0 | 3 | 3 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 4 | 3 | 3 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 0.0 | 10.4 | 0.00 | 1.08 | 0.00 | 1.43 | 1.20 | 1.20 | 0 | 3 | 3 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 3 | 1 | 1 |

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

## WIND LOADS

| Angle = | 120 | (deg) | Ice Thickness = | 1.62 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 244 | 130 | 158 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 563 | 249 | 328 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 73 | 60 | 63 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 9.9 | 10.9 | 1.02 | 1.13 | 1.51 | 1.37 | 1.20 | 1.20 | 54 | 60 | 59 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 73 | 57 | 61 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 9.9 | 10.4 | 1.02 | 1.08 | 1.51 | 1.43 | 1.20 | 1.20 | 54 | 57 | 57 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 44 | 15 | 22 |

**WIND LOADS WITH ICE:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 58.2 | 14.2 | 8.2 | 5.76 | 3.34 | 4.09 | 7.06 | 1.27 | 1.40 | 52 | 33 | 38 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.38 | 5.66 | 3.11 | 6.80 | 1.23 | 1.39 | 108 | 56 | 69 |
| B2/B66A 8843 RRH | 18.1 | 16.4 | 14.1 | 2.07 | 1.78 | 1.10 | 1.28 | 1.20 | 1.20 | 18 | 15 | 16 |
| B2/B66A 8843 RRH (Shielded) | 18.1 | 12.3 | 14.1 | 1.55 | 1.78 | 1.47 | 1.28 | 1.20 | 1.20 | 13 | 15 | 15 |
| B5/B12 4449 RRH | 18.1 | 16.4 | 13.6 | 2.07 | 1.72 | 1.10 | 1.33 | 1.20 | 1.20 | 18 | 15 | 15 |
| B5/B12 4449 RRH (Shielded) | 18.1 | 12.3 | 13.6 | 1.55 | 1.72 | 1.47 | 1.33 | 1.20 | 1.20 | 13 | 15 | 14 |
| DTMABP7819VG12A TMA | 13.9 | 14.3 | 7.0 | 1.39 | 0.68 | 0.97 | 1.98 | 1.20 | 1.20 | 12 | 6 | 7 |

**WIND LOADS AT 30 MPH:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 14 | 7 | 9 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 32 | 14 | 19 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 4 | 3 | 4 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 9.9 | 10.9 | 1.02 | 1.13 | 1.51 | 1.37 | 1.20 | 1.20 | 3 | 3 | 3 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 4 | 3 | 4 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 9.9 | 10.4 | 1.02 | 1.08 | 1.51 | 1.43 | 1.20 | 1.20 | 3 | 3 | 3 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 3 | 1 | 1 |

Date: 1/13/2020
Project Name: SOUTH WINDSOR
Project No.: CT1003
Designed By: RL Checked By: MSC

HUDSON Design Group LLC

## WIND LOADS

| Angle = | 150 | (deg) | Ice Thickness = | 1.62 | 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 244 | 130 | 216 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 563 | 249 | 485 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 73 | 60 | 69 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 6.6 | 10.9 | 0.68 | 1.13 | 2.26 | 1.37 | 1.20 | 1.20 | 36 | 60 | 42 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 73 | 57 | 69 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 6.6 | 10.4 | 0.68 | 1.08 | 2.26 | 1.43 | 1.20 | 1.20 | 36 | 57 | 42 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 44 | 15 | 37 |

**WIND LOADS WITH ICE:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 58.2 | 14.2 | 8.2 | 5.76 | 3.34 | 4.09 | 7.06 | 1.27 | 1.40 | 52 | 33 | 47 |
| DMP65R-BU6DA Antenna | 74.4 | 23.9 | 10.9 | 12.38 | 5.66 | 3.11 | 6.80 | 1.23 | 1.39 | 108 | 56 | 95 |
| B2/B66A 8843 RRH | 18.1 | 16.4 | 14.1 | 2.07 | 1.78 | 1.10 | 1.28 | 1.20 | 1.20 | 18 | 15 | 17 |
| B2/B66A 8843 RRH (Shielded) | 18.1 | 8.2 | 14.1 | 1.04 | 1.78 | 2.21 | 1.28 | 1.20 | 1.20 | 9 | 15 | 10 |
| B5/B12 4449 RRH | 18.1 | 16.4 | 13.6 | 2.07 | 1.72 | 1.10 | 1.33 | 1.20 | 1.20 | 18 | 15 | 17 |
| B5/B12 4449 RRH (Shielded) | 18.1 | 8.2 | 13.6 | 1.04 | 1.72 | 2.21 | 1.33 | 1.20 | 1.20 | 9 | 15 | 10 |
| DTMABP7819VG12A TMA | 13.9 | 14.3 | 7.0 | 1.39 | 0.68 | 0.97 | 1.98 | 1.20 | 1.20 | 12 | 6 | 10 |

**WIND LOADS AT 30 MPH:**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7770 Antenna | 55.0 | 11.0 | 5.0 | 4.20 | 1.91 | 5.00 | 11.00 | 1.31 | 1.53 | 14 | 7 | 12 |
| DMP65R-BU6DA Antenna | 71.2 | 20.7 | 7.7 | 10.24 | 3.81 | 3.44 | 9.25 | 1.24 | 1.47 | 32 | 14 | 28 |
| B2/B66A 8843 RRH | 14.9 | 13.2 | 10.9 | 1.37 | 1.13 | 1.13 | 1.37 | 1.20 | 1.20 | 4 | 3 | 4 |
| B2/B66A 8843 RRH (Shielded) | 14.9 | 6.6 | 10.9 | 0.68 | 1.13 | 2.26 | 1.37 | 1.20 | 1.20 | 2 | 3 | 2 |
| B5/B12 4449 RRH | 14.9 | 13.2 | 10.4 | 1.37 | 1.08 | 1.13 | 1.43 | 1.20 | 1.20 | 4 | 3 | 4 |
| B5/B12 4449 RRH (Shielded) | 14.9 | 6.6 | 10.4 | 0.68 | 1.08 | 2.26 | 1.43 | 1.20 | 1.20 | 2 | 3 | 2 |
| DTMABP7819VG12A TMA | 10.7 | 11.1 | 3.8 | 0.82 | 0.28 | 0.96 | 2.82 | 1.20 | 1.21 | 3 | 1 | 2 |

**Date:** 1/13/2020
**Project Name:** SOUTH WINDSOR
**Project No.:** CT1003
**Designed By:** RL **Checked By:** MSC

HUDSON Design Group LLC

## ICE WEIGHT CALCULATIONS

Thickness of ice: 1.62 in.
Density of ice: 56 pcf

### 7770 Antenna

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 55.0 | |
| Width (in): | 11.0 | |
| Depth (in): | 5.0 | |
| Total weight of ice on object: | | 124 lbs |
| Weight of object: | 35.0 lbs | |
| Combined weight of ice and object: | | 159 lbs |

### DMP65R-BU6DA Antenna

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 71.2 | |
| Width (in): | 20.7 | |
| Depth (in): | 7.7 | |
| Total weight of ice on object: | | 278 lbs |
| Weight of object: | 80.0 lbs | |
| Combined weight of ice and object: | | 358 lbs |

### B2/B66A 8843 RRH

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 14.9 | |
| Width (in): | 13.2 | |
| Depth (in): | 10.9 | |
| Total weight of ice on object: | | 46 lbs |
| Weight of object: | 72.0 lbs | |
| Combined weight of ice and object: | | 118 lbs |

### B5/B12 4449 RRH

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 14.9 | |
| Width (in): | 13.2 | |
| Depth (in): | 10.4 | |
| Total weight of ice on object: | | 45 lbs |
| Weight of object: | 73.0 lbs | |
| Combined weight of ice and object: | | 118 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: | | 24 lbs |
| Weight of object: | 20.0 lbs | |
| Combined weight of ice and object: | | 44 lbs |

### Squid Surge Arrestor

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Depth (in): | 24.0 | |
| Diameter(in): | 9.7 | |
| Total weight of ice on object: | | 45 lbs |
| Weight of object: | 33 lbs | |
| Combined weight of ice and object: | | 78 lbs |

### PL 11-1/4x5/8

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 11.25 | |
| Width (in): | 0.625 | |
| Per foot weight of ice on object: | | 26 plf |

### PL 3-1/2x5/8

Weight of ice based on total radial SF area:

| | | |
|---|---|---|
| Height (in): | 3.5 | |
| Width (in): | 0.625 | |
| Per foot weight of ice on object: | | 10 plf |

### 5/8" Round Bar

Per foot weight of ice:

| | | |
|---|---|---|
| diameter (in): | 0.625 | |
| Per foot weight of ice on object: | | 4 plf |

### 3/4" Round Bar

Per foot weight of ice:

| | | |
|---|---|---|
| diameter (in): | 0.75 | |
| Per foot weight of ice on object: | | 5 plf |

### 2" pipe

Per foot weight of ice:

| | | |
|---|---|---|
| diameter (in): | 2.38 | |
| Per foot weight of ice on object: | | 8 plf |

### 2-1/2" pipe

Per foot weight of ice:

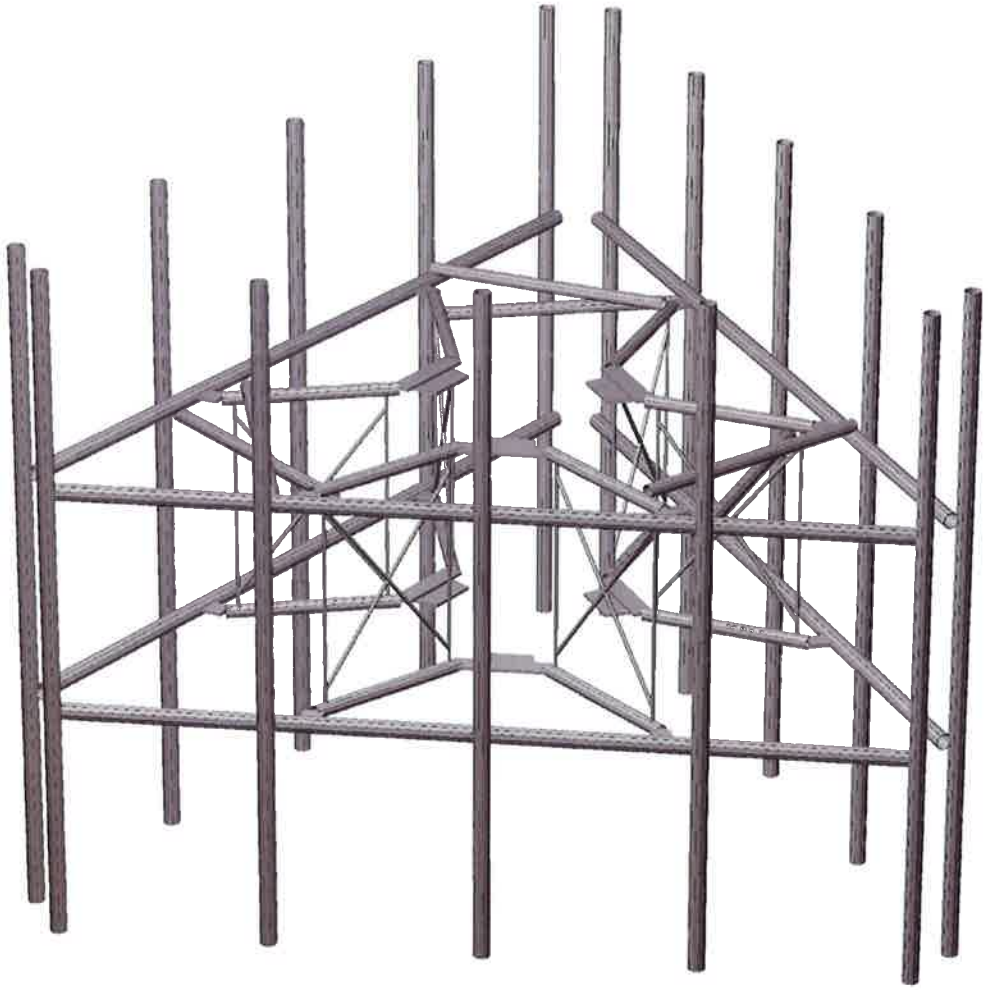
| | | |
|---|---|---|
| diameter (in): | 2.88 | |
| Per foot weight of ice on object: | | 9 plf |

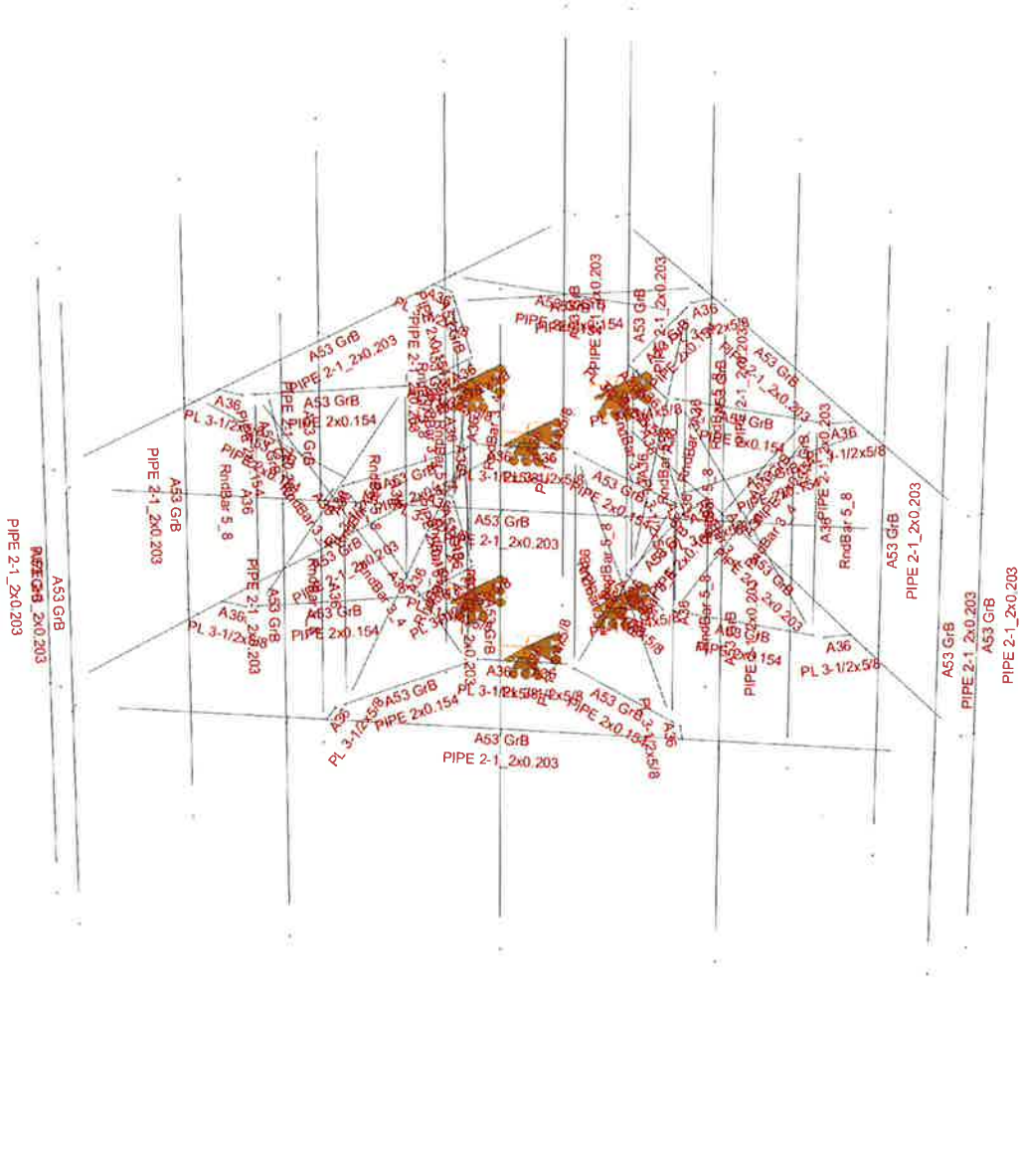
HUDSON
Design Group LLC

# Mount Calculations
# (Existing Conditions)

Bentley

**Current Date:** 12/10/2019 9:46 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev. 1\CT1003 (LTE

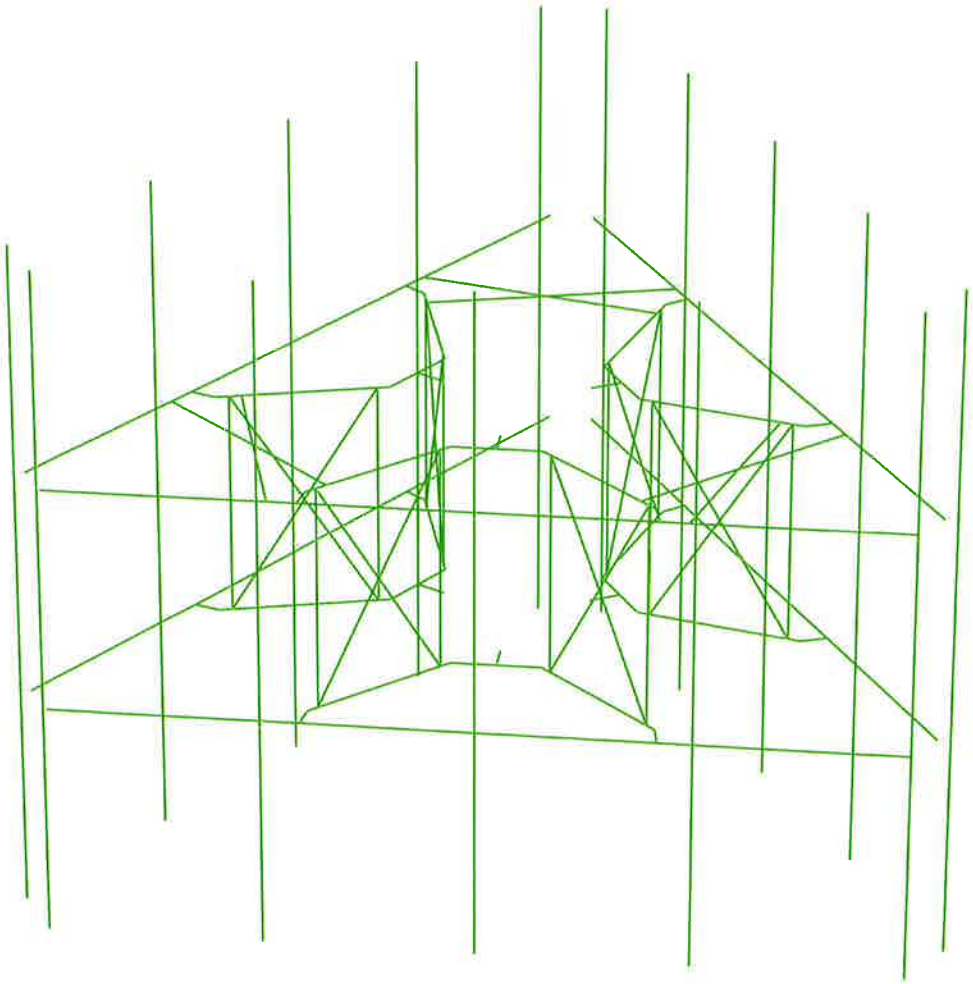


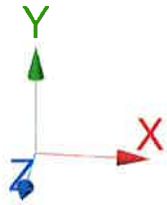

A53 GrB
PIPE 2-1_2x0.203
PIPE 2x0.154
A36
PL 3-1/2x5/8
RndBar 5_8
Y
X
Z

Bentley

**Current Date:** 12/10/2019 9:46 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev. 1\CT1003 (LTE

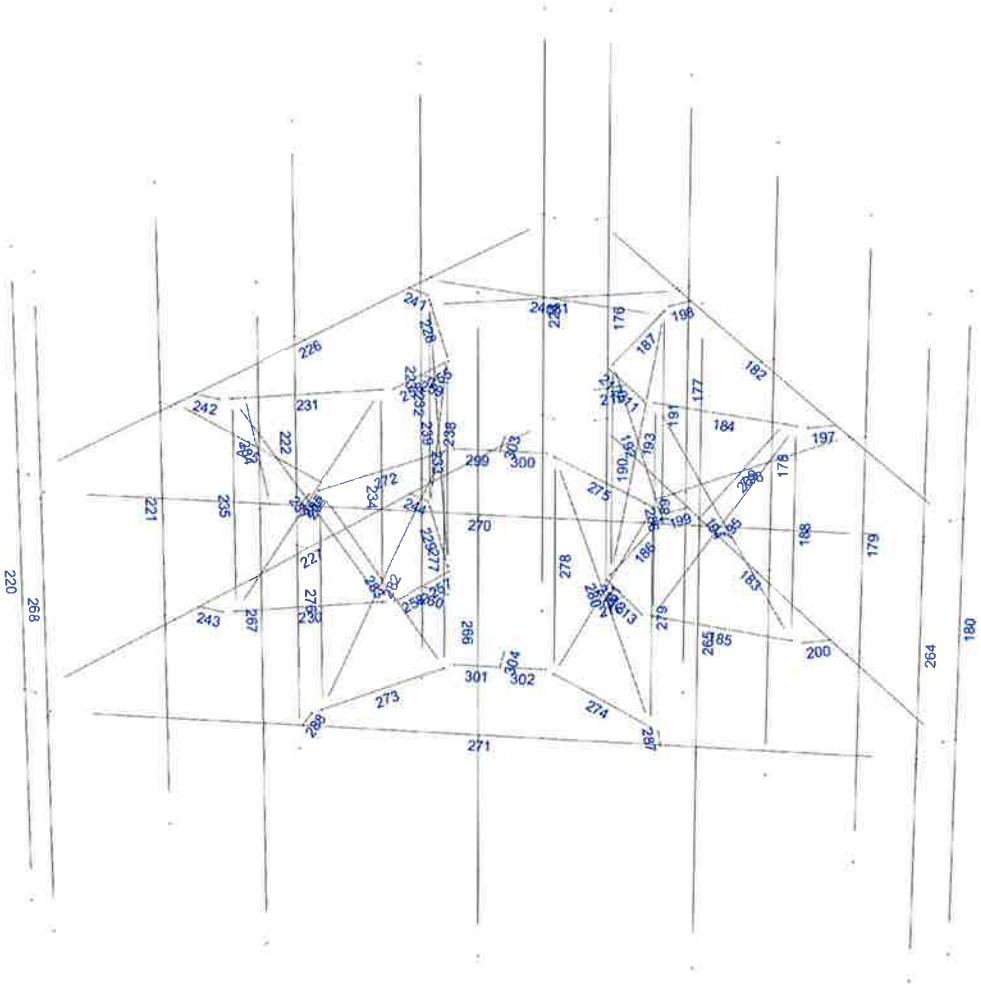
Not designed
Error on design
Design O.K.
With warnings





Bentley

**Current Date:** 12/10/2019 9:46 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev. 1\CT1003 (LTE



Bentley

**Current Date:** 1/14/2020 9:18 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev.2\CT1003 (LTE 3C 4C)(Rev. 2).retx

# Load data

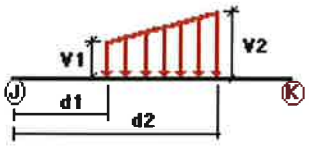
GLOSSARY

Comb : Indicates if load condition is a load combination

## Load Conditions

| Condition | Description | Comb. | Category |
|---|---|---|---|
| DL | Dead Load | No | DL |
| W0 | Wind Load 0/60/120 deg | No | WIND |
| W30 | Wind Load 30/90/150 deg | No | WIND |
| Di | Ice Load | No | LL |
| Wi0 | Ice Wind Load 0/60/120 deg | No | WIND |
| Wi30 | Ice Wind Load 30/90/150 deg | No | WIND |
| WL0 | WL 30 mph 0/60/120 deg | No | WIND |
| WL30 | WL 30 mph 30/90/150 deg | No | WIND |
| LL1 | 250 lb Live Load Center of Mount | No | LL |
| LL2 | 250 lb Live Load End of Mount | No | LL |
| LLa1 | 250 lb Live Load Antenna 1 | No | LL |
| LLa2 | 250 lb Live Load Antenna 2 | No | LL |
| LLa3 | 250 lb Live Load Antenna 3 | No | LL |

## Distributed force on members




| Condition | Member | Dir1 | Val1 [Kip/ft] | Val2 [Kip/ft] | Dist1 [ft] | % | Dist2 [ft] | % |
|---|---|---|---|---|---|---|---|---|
| W0 | 176 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 177 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 178 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 179 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 180 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 181 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 182 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 183 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 184 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 185 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 186 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 187 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 188 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 189 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 190 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 191 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 192 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 193 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 194 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 195 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 196 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 197 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 198 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 199 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 200 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 211 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 212 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 213 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 214 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 215 | z | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| 216 | z | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| 220 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 221 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 222 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 223 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 224 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 225 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 226 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 227 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 228 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 229 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 230 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 231 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 232 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 233 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 234 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 235 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 236 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 237 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 238 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 239 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 240 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 241 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 242 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 243 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 244 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 255 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 256 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 257 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 258 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| 259 | z | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| 260 | z | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| 265 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 267 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 269 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 270 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 271 | z | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| 272 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 273 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 274 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 275 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| 276 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 277 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 278 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| 279 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |

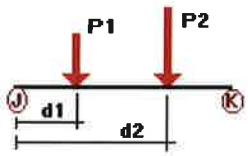
| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 280 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 281 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 282 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 283 | z | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 284 | z | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 285 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 286 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 287 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 288 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 299 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 300 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 301 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 302 | z | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| W30 | 177 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 179 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 181 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 182 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 183 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 184 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 185 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 186 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 187 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 188 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 189 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 190 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 191 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 192 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 193 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 194 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 195 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 196 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 197 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 198 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 199 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 200 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 211 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 212 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 213 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 214 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 215 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| | 216 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| | 220 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 221 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 222 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 223 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 224 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 225 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 226 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 227 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 228 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 229 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 230 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 231 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 232 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 233 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 234 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 235 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 236 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 237 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 238 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 239 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 240 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 241 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 242 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 243 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 244 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 255 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 256 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 257 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 258 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 259 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| | 260 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| | 264 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 265 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 266 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 267 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 268 | x | -0.013 | -0.013 | 0.00 | No | 100.00 | Yes |
| | 269 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 272 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 273 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 274 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 275 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 276 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 277 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 278 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 279 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 280 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 281 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 282 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 283 | x | -0.003 | -0.003 | 0.00 | No | 100.00 | Yes |
| | 284 | x | -0.011 | -0.011 | 0.00 | No | 100.00 | Yes |
| | 285 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 286 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 287 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 288 | x | -0.001 | -0.001 | 0.00 | No | 100.00 | Yes |
| | 303 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| | 304 | x | -0.002 | -0.002 | 0.00 | No | 100.00 | Yes |
| Di | 176 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 177 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 178 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 179 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 180 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 181 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 182 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 183 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| | 184 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 185 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 186 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 187 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 188 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| | 189 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| | 190 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| | 191 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| | 192 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| | 193 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| | 194 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| | 195 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| | 196 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| | 197 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| | 198 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 199 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 200 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 211 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 212 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 213 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 214 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 215 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |
| 216 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |
| 220 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 221 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 222 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 223 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 224 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 225 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 226 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 227 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 228 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 229 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 230 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 231 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 232 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 233 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 234 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 235 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 236 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 237 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 238 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 239 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 240 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 241 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 242 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 243 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 244 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 255 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 256 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 257 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 258 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 259 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |
| 260 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |
| 264 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 265 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 266 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 267 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 268 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 269 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 270 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 271 | y | -0.009 | -0.009 | 0.00 | No | 100.00 | Yes |
| 272 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 273 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 274 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 275 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |
| 276 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 277 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 278 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 279 | y | -0.004 | -0.004 | 0.00 | No | 100.00 | Yes |
| 280 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 281 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 282 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 283 | y | -0.005 | -0.005 | 0.00 | No | 100.00 | Yes |
| 284 | y | -0.008 | -0.008 | 0.00 | No | 100.00 | Yes |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 285 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 286 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 287 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 288 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 299 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 300 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 301 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 302 | y | -0.01 | -0.01 | 0.00 | No | 100.00 | Yes |
| 303 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |
| 304 | y | -0.026 | -0.026 | 0.00 | No | 100.00 | Yes |

## Concentrated forces on members




| Condition | Member | Dir1 | Value1 [Kip] | Dist1 [ft] | % |
|---|---|---|---|---|---|
| DL | 176 | y | -0.018 | 3.00 | No |
| | | y | -0.018 | 7.00 | No |
| | | y | -0.02 | 5.00 | No |
| | 178 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.072 | 3.00 | No |
| | 180 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.073 | 3.00 | No |
| | 220 | y | -0.018 | 3.00 | No |
| | | y | -0.018 | 7.00 | No |
| | | y | -0.02 | 5.00 | No |
| | 221 | y | -0.033 | 5.00 | No |
| | 222 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.072 | 3.00 | No |
| | 224 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.073 | 3.00 | No |
| | 264 | y | -0.018 | 3.00 | No |
| | | y | -0.018 | 7.00 | No |
| | | y | -0.02 | 5.00 | No |
| | 265 | y | -0.033 | 5.00 | No |
| | 266 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.072 | 3.00 | No |
| | 268 | y | -0.04 | 2.50 | No |
| | | y | -0.04 | 7.50 | No |
| | | y | -0.073 | 3.00 | No |
| W0 | 176 | z | -0.08 | 3.00 | No |
| | | z | -0.08 | 7.00 | No |
| | | z | -0.022 | 5.00 | No |
| | 178 | z | -0.164 | 2.50 | No |
| | | z | -0.164 | 7.50 | No |
| | | z | -0.059 | 3.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | 180 | z | -0.164 | 2.50 | No |
| | | z | -0.164 | 7.50 | No |
| | | z | -0.057 | 3.00 | No |
| | 220 | z | -0.08 | 3.00 | No |
| | | z | -0.08 | 7.00 | No |
| | | z | -0.022 | 5.00 | No |
| | 221 | z | -0.05 | 5.00 | No |
| | 222 | z | -0.164 | 2.50 | No |
| | | z | -0.164 | 7.50 | No |
| | | z | -0.059 | 3.00 | No |
| | 224 | z | -0.164 | 2.50 | No |
| | | z | -0.164 | 7.50 | No |
| | | z | -0.057 | 3.00 | No |
| | 264 | z | -0.123 | 3.00 | No |
| | | z | -0.123 | 7.00 | No |
| | 265 | z | -0.05 | 5.00 | No |
| | 266 | z | -0.282 | 2.50 | No |
| | | z | -0.282 | 7.50 | No |
| | 268 | z | -0.282 | 2.50 | No |
| | | z | -0.282 | 7.50 | No |
| W30 | 176 | x | -0.108 | 3.00 | No |
| | | x | -0.108 | 7.00 | No |
| | | x | -0.037 | 5.00 | No |
| | 178 | x | -0.243 | 2.50 | No |
| | | x | -0.243 | 7.50 | No |
| | | x | -0.042 | 3.00 | No |
| | 180 | x | -0.243 | 2.50 | No |
| | | x | -0.243 | 7.50 | No |
| | | x | -0.042 | 3.00 | No |
| | 220 | x | -0.108 | 3.00 | No |
| | | x | -0.108 | 7.00 | No |
| | | x | -0.037 | 5.00 | No |
| | 221 | x | -0.05 | 5.00 | No |
| | 222 | x | -0.243 | 2.50 | No |
| | | x | -0.243 | 7.50 | No |
| | | x | -0.042 | 3.00 | No |
| | 224 | x | -0.243 | 2.50 | No |
| | | x | -0.243 | 7.50 | No |
| | | x | -0.042 | 3.00 | No |
| | 264 | x | -0.065 | 3.00 | No |
| | | x | -0.065 | 7.00 | No |
| | | x | -0.015 | 5.00 | No |
| | 265 | x | -0.05 | 5.00 | No |
| | 266 | x | -0.125 | 2.50 | No |
| | | x | -0.125 | 7.50 | No |
| | | x | -0.06 | 3.00 | No |
| | 268 | x | -0.125 | 2.50 | No |
| | | x | -0.125 | 7.50 | No |
| | | x | -0.057 | 3.00 | No |
| Di | 176 | y | -0.062 | 3.00 | No |
| | | y | -0.062 | 7.00 | No |
| | | y | -0.024 | 5.00 | No |
| | 178 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.046 | 3.00 | No |
| | 180 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.045 | 3.00 | No |
| | 220 | y | -0.062 | 3.00 | No |
| | | y | -0.062 | 7.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | y | -0.024 | 5.00 | No |
| | 221 | y | -0.045 | 5.00 | No |
| | 222 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.046 | 3.00 | No |
| | 224 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.045 | 3.00 | No |
| | 264 | y | -0.062 | 3.00 | No |
| | | y | -0.062 | 7.00 | No |
| | | y | -0.024 | 5.00 | No |
| | 265 | y | -0.045 | 5.00 | No |
| | 266 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.046 | 3.00 | No |
| | 268 | y | -0.139 | 2.50 | No |
| | | y | -0.139 | 7.50 | No |
| | | y | -0.045 | 3.00 | No |
| Wi0 | 176 | z | -0.019 | 3.00 | No |
| | | z | -0.019 | 7.00 | No |
| | | z | -0.007 | 5.00 | No |
| | 178 | z | -0.035 | 2.50 | No |
| | | z | -0.035 | 7.50 | No |
| | | z | -0.015 | 3.00 | No |
| | 180 | z | -0.035 | 2.50 | No |
| | | z | -0.035 | 7.50 | No |
| | | z | -0.014 | 3.00 | No |
| | 220 | z | -0.019 | 3.00 | No |
| | | z | -0.019 | 7.00 | No |
| | | z | -0.007 | 5.00 | No |
| | 221 | z | -0.012 | 5.00 | No |
| | 222 | z | -0.035 | 2.50 | No |
| | | z | -0.035 | 7.50 | No |
| | | z | -0.015 | 3.00 | No |
| | 224 | z | -0.035 | 2.50 | No |
| | | z | -0.035 | 7.50 | No |
| | | z | -0.014 | 3.00 | No |
| | 264 | z | -0.027 | 3.00 | No |
| | | z | -0.027 | 7.00 | No |
| | 265 | z | -0.012 | 5.00 | No |
| | 266 | z | -0.055 | 2.50 | No |
| | | z | -0.055 | 7.50 | No |
| | 268 | z | -0.055 | 2.50 | No |
| | | z | -0.055 | 7.50 | No |
| Wi30 | 176 | x | -0.024 | 3.00 | No |
| | | x | -0.024 | 7.00 | No |
| | | x | -0.01 | 5.00 | No |
| | 178 | x | -0.048 | 2.50 | No |
| | | x | -0.048 | 7.50 | No |
| | | x | -0.01 | 3.00 | No |
| | 180 | x | -0.048 | 2.50 | No |
| | | x | -0.048 | 7.50 | No |
| | | x | -0.01 | 3.00 | No |
| | 220 | x | -0.024 | 3.00 | No |
| | | x | -0.024 | 7.00 | No |
| | | x | -0.01 | 5.00 | No |
| | 221 | x | -0.012 | 5.00 | No |
| | 222 | x | -0.048 | 2.50 | No |
| | | x | -0.048 | 7.50 | No |
| | | x | -0.01 | 3.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | 224 | x | -0.048 | 2.50 | No |
| | | x | -0.048 | 7.50 | No |
| | | x | -0.01 | 3.00 | No |
| | 264 | x | -0.017 | 3.00 | No |
| | | x | -0.017 | 7.00 | No |
| | | x | -0.006 | 5.00 | No |
| | 265 | x | -0.012 | 5.00 | No |
| | 266 | x | -0.028 | 2.50 | No |
| | | x | -0.028 | 7.50 | No |
| | | x | -0.015 | 3.00 | No |
| | 268 | x | -0.028 | 2.50 | No |
| | | x | -0.028 | 7.50 | No |
| | | x | -0.015 | 3.00 | No |
| WL0 | 176 | z | -0.005 | 3.00 | No |
| | | z | -0.005 | 7.00 | No |
| | | z | -0.001 | 5.00 | No |
| | 178 | z | -0.01 | 2.50 | No |
| | | z | -0.01 | 7.50 | No |
| | | z | -0.003 | 3.00 | No |
| | 180 | z | -0.01 | 2.50 | No |
| | | z | -0.01 | 7.50 | No |
| | | z | -0.003 | 3.00 | No |
| | 220 | z | -0.005 | 3.00 | No |
| | | z | -0.005 | 7.00 | No |
| | | z | -0.001 | 5.00 | No |
| | 221 | z | -0.003 | 5.00 | No |
| | 222 | z | -0.01 | 2.50 | No |
| | | z | -0.01 | 7.50 | No |
| | | z | -0.003 | 3.00 | No |
| | 224 | z | -0.01 | 2.50 | No |
| | | z | -0.01 | 7.50 | No |
| | | z | -0.003 | 3.00 | No |
| | 264 | z | -0.008 | 3.00 | No |
| | | z | -0.008 | 7.00 | No |
| | 265 | z | -0.003 | 5.00 | No |
| | 266 | z | -0.017 | 2.50 | No |
| | | z | -0.017 | 7.50 | No |
| | 268 | z | -0.017 | 2.50 | No |
| | | z | -0.017 | 7.50 | No |
| WL30 | 176 | x | -0.007 | 3.00 | No |
| | | x | -0.007 | 7.00 | No |
| | | x | -0.002 | 5.00 | No |
| | 178 | x | -0.014 | 2.50 | No |
| | | x | -0.014 | 7.50 | No |
| | | x | -0.002 | 3.00 | No |
| | 180 | x | -0.014 | 2.50 | No |
| | | x | -0.014 | 7.50 | No |
| | | x | -0.002 | 3.00 | No |
| | 220 | x | -0.007 | 3.00 | No |
| | | x | -0.007 | 7.00 | No |
| | | x | -0.002 | 5.00 | No |
| | 221 | x | -0.003 | 5.00 | No |
| | 222 | x | -0.014 | 2.50 | No |
| | | x | -0.014 | 7.50 | No |
| | | x | -0.002 | 3.00 | No |
| | 224 | x | -0.014 | 2.50 | No |
| | | x | -0.014 | 7.50 | No |
| | | x | -0.002 | 3.00 | No |
| | 264 | x | -0.004 | 3.00 | No |
| | | x | -0.004 | 7.00 | No |

| | | | | | |
|---|---|---|---|---|---|
| | | x | -0.001 | 5.00 | No |
| | 265 | x | -0.003 | 5.00 | No |
| | 266 | x | -0.008 | 2.50 | No |
| | | x | -0.008 | 7.50 | No |
| | | x | -0.003 | 3.00 | No |
| | 268 | x | -0.008 | 2.50 | No |
| | | x | -0.008 | 7.50 | No |
| | | x | -0.003 | 3.00 | No |
| LL1 | 270 | y | -0.25 | 50.00 | Yes |
| LL2 | 270 | y | -0.25 | 100.00 | Yes |
| LLa1 | 264 | y | -0.25 | 50.00 | Yes |
| LLa2 | 266 | y | -0.25 | 50.00 | Yes |
| LLa3 | 268 | y | -0.25 | 50.00 | Yes |

## Self weight multipliers for load conditions

| Condition | Description | Self weight multiplier | | | |
|---|---|---|---|---|---|
| | | Comb. | MultX | MultY | MultZ |
| DL | Dead Load | No | 0.00 | -1.00 | 0.00 |
| W0 | Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| W30 | Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| Di | Ice Load | No | 0.00 | 0.00 | 0.00 |
| Wi0 | Ice Wind Load 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| Wi30 | Ice Wind Load 30/90/150 deg | No | 0.00 | 0.00 | 0.00 |
| WL0 | WL 30 mph 0/60/120 deg | No | 0.00 | 0.00 | 0.00 |
| WL30 | WL 30 mph 30/90/150 deg | 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 End of Mount | No | 0.00 | 0.00 | 0.00 |
| LLa1 | 250 lb Live Load Antenna 1 | No | 0.00 | 0.00 | 0.00 |
| LLa2 | 250 lb Live Load Antenna 2 | No | 0.00 | 0.00 | 0.00 |
| LLa3 | 250 lb Live Load Antenna 3 | No | 0.00 | 0.00 | 0.00 |

## Earthquake (Dynamic analysis only)

| Condition | a/g | Ang. [Deg] | Damp. [%] |
|---|---|---|---|
| DL | 0.00 | 0.00 | 0.00 |
| W0 | 0.00 | 0.00 | 0.00 |
| W30 | 0.00 | 0.00 | 0.00 |
| Di | 0.00 | 0.00 | 0.00 |
| Wi0 | 0.00 | 0.00 | 0.00 |
| Wi30 | 0.00 | 0.00 | 0.00 |
| WL0 | 0.00 | 0.00 | 0.00 |
| WL30 | 0.00 | 0.00 | 0.00 |
| LL1 | 0.00 | 0.00 | 0.00 |
| LL2 | 0.00 | 0.00 | 0.00 |
| LLa1 | 0.00 | 0.00 | 0.00 |
| LLa2 | 0.00 | 0.00 | 0.00 |
| LLa3 | 0.00 | 0.00 | 0.00 |

Bentley

**Current Date:** 1/14/2020 9:19 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev.2\CT1003 (LTE 3C 4C)(Rev. 2).retx

# Steel Code Check

**Report: Summary - Group by member**

**Load conditions to be included in design :**

LC1=1.2DL+W0
LC2=1.2DL+W30
LC3=1.2DL-W0
LC4=1.2DL-W30
LC5=0.9DL+W0
LC6=0.9DL+W30
LC7=0.9DL-W0
LC8=0.9DL-W30
LC9=1.2DL+Di+Wi0
LC10=1.2DL+Di+Wi30
LC11=1.2DL+Di-Wi0
LC12=1.2DL+Di-Wi30
LC13=1.2DL
LC15=1.2DL+1.5LL1
LC16=1.2DL+1.5LL2
LC17=1.2DL+WL0+1.5LLa1
LC18=1.2DL+WL30+1.5LLa1
LC19=1.2DL-WL0+1.5LLa1
LC20=1.2DL-WL30+1.5LLa1
LC21=1.2DL+WL0+1.5LLa2
LC22=1.2DL+WL30+1.5LLa2
LC23=1.2DL-WL0+1.5LLa2
LC24=1.2DL-WL30+1.5LLa2
LC25=1.2DL+WL0+1.5LLa3
LC26=1.2DL+WL30+1.5LLa3
LC27=1.2DL-WL0+1.5LLa3
LC28=1.2DL-WL30+1.5LLa3

| Description | Section | Member | Ctrl Eq. | Ratio | Status | Reference |
|---|---|---|---|---|---|---|
| | ***PIPE 2-1_2x0.203*** | **176** | LC9 at 33.33% | 0.14 | OK | Eq. H1-1b |
| | | **177** | LC1 at 33.33% | 0.17 | OK | Eq. H1-1b |
| | | **178** | LC1 at 33.33% | 0.24 | OK | Eq. H1-1b |
| | | **179** | LC3 at 33.33% | 0.19 | OK | Eq. H1-1b |
| | | **180** | LC11 at 33.33% | 0.25 | OK | Eq. H1-1b |
| | | **182** | LC1 at 25.78% | 0.47 | OK | Eq. H1-1b |
| | | **183** | LC2 at 29.17% | 0.45 | OK | Eq. H1-1b |
| | | **220** | LC10 at 33.33% | 0.14 | OK | Eq. H1-1b |
| | | **221** | LC3 at 33.33% | 0.18 | OK | Eq. H1-1b |
| | | **222** | LC2 at 33.33% | 0.21 | OK | Eq. H1-1b |
| | | **223** | LC12 at 33.33% | 0.17 | OK | Eq. H1-1b |
| | | **224** | LC9 at 33.33% | 0.24 | OK | Eq. H1-1b |
| | | **226** | LC2 at 25.78% | **0.70** | **OK** | Eq. H1-1b |
| | | **227** | LC4 at 70.83% | 0.49 | OK | Eq. H1-1b |
| | | **264** | LC20 at 33.33% | 0.21 | OK | Eq. H1-1b |
| | | **265** | LC4 at 33.33% | 0.17 | OK | Eq. H1-1b |
| | | **266** | LC4 at 33.33% | 0.21 | OK | Eq. H1-1b |
| | | **267** | LC26 at 33.33% | 0.18 | OK | Eq. H1-1b |
| | | **268** | LC26 at 33.33% | 0.25 | OK | Eq. H1-1b |
| | | **270** | LC3 at 25.78% | 0.58 | OK | Eq. H1-1b |
| | | **271** | LC3 at 29.17% | 0.47 | OK | Eq. H1-1b |

| | | | | | |
|---|---|---|---|---|---|
| ***PIPE 2x0.154*** | **181** | LC2 at 100.00% | **0.43** | **OK** | Eq. H1-1b |
| | **184** | LC9 at 93.75% | 0.38 | OK | Eq. H1-1b |
| | **185** | LC10 at 93.75% | 0.24 | OK | Eq. H1-1b |
| | **186** | LC3 at 93.75% | 0.17 | OK | Eq. H1-1b |
| | **187** | LC2 at 14.06% | 0.33 | OK | Eq. H1-1b |
| | **196** | LC3 at 100.00% | 0.14 | OK | Eq. H1-1b |
| | **225** | LC3 at 100.00% | 0.37 | OK | Eq. H1-1b |
| | **228** | LC2 at 14.06% | 0.42 | OK | Eq. H1-1b |
| | **229** | LC11 at 93.75% | 0.24 | OK | Eq. H1-1b |
| | **230** | LC4 at 93.75% | 0.21 | OK | Eq. H1-1b |
| | **231** | LC12 at 93.75% | 0.25 | OK | Eq. H1-1b |
| | **240** | LC4 at 50.00% | 0.21 | OK | Eq. H1-1b |
| | **269** | LC4 at 100.00% | 0.23 | OK | Eq. H1-1b |
| | **272** | LC1 at 14.06% | 0.40 | OK | Eq. H1-1b |
| | **273** | LC9 at 93.75% | 0.24 | OK | Eq. H1-1b |
| | **274** | LC17 at 93.75% | 0.17 | OK | Eq. H1-1b |
| | **275** | LC12 at 93.75% | 0.25 | OK | Eq. H1-1b |
| | **284** | LC2 at 100.00% | 0.19 | OK | Eq. H1-1b |
| ***PL 11-1/4x5/8*** | **215** | LC12 at 100.00% | 0.33 | OK | Eq. H1-1b |
| | **216** | LC12 at 100.00% | 0.20 | OK | Eq. H1-1b |
| | **259** | LC9 at 100.00% | 0.34 | OK | Eq. H1-1b |
| | **260** | LC10 at 100.00% | 0.21 | OK | Eq. H1-1b |
| | **303** | LC11 at 100.00% | **0.34** | **OK** | Eq. H1-1b |
| | **304** | LC11 at 100.00% | 0.21 | OK | Eq. H1-1b |
| ***PL 3-1/2x5/8*** | **197** | LC10 at 100.00% | 0.38 | OK | Eq. H1-1b |
| | **198** | LC3 at 100.00% | 0.31 | OK | Eq. H1-1b |
| | **199** | LC11 at 100.00% | 0.31 | OK | Eq. H1-1b |
| | **200** | LC9 at 100.00% | 0.48 | OK | Eq. H1-1b |
| | **211** | LC12 at 100.00% | 0.62 | OK | Eq. H1-1b |
| | **212** | LC12 at 0.00% | 0.42 | OK | Eq. H1-1b |
| | **213** | LC9 at 100.00% | 0.60 | OK | Eq. H1-1b |
| | **214** | LC11 at 0.00% | 0.43 | OK | Eq. H1-1b |
| | **241** | LC2 at 100.00% | 0.40 | OK | Eq. H1-1b |
| | **242** | LC4 at 100.00% | 0.37 | OK | Eq. H1-1b |
| | **243** | LC12 at 100.00% | 0.35 | OK | Eq. H1-1b |
| | **244** | LC11 at 100.00% | 0.47 | OK | Eq. H1-1b |
| | **255** | LC10 at 100.00% | 0.61 | OK | Eq. H1-1b |
| | **256** | LC10 at 0.00% | 0.45 | OK | Eq. H1-1b |
| | **257** | LC11 at 100.00% | 0.60 | OK | Eq. H1-1b |
| | **258** | LC12 at 0.00% | 0.46 | OK | Eq. H1-1b |
| | **285** | LC12 at 100.00% | 0.38 | OK | Eq. H1-1b |
| | **286** | LC1 at 100.00% | 0.33 | OK | Eq. H1-1b |
| | **287** | LC18 at 100.00% | 0.35 | OK | Eq. H1-1b |
| | **288** | LC12 at 100.00% | 0.48 | OK | Eq. H1-1b |
| | **299** | LC11 at 100.00% | **0.62** | **OK** | Eq. H1-1b |
| | **300** | LC11 at 0.00% | 0.46 | OK | Eq. H1-1b |
| | **301** | LC12 at 100.00% | 0.60 | OK | Eq. H1-1b |
| | **302** | LC9 at 0.00% | 0.46 | OK | Eq. H1-1b |
| ***RndBar 3_4*** | **192** | LC9 at 100.00% | 0.17 | OK | Eq. H1-1b |
| | **193** | LC11 at 0.00% | 0.18 | OK | Eq. H1-1b |
| | **194** | LC10 at 100.00% | 0.26 | OK | Eq. H1-1b |
| | **195** | LC9 at 100.00% | **0.27** | **OK** | Eq. H1-1b |
| | **236** | LC11 at 100.00% | 0.19 | OK | Eq. H1-1b |
| | **237** | LC12 at 0.00% | 0.20 | OK | Eq. H1-1b |
| | **238** | LC10 at 100.00% | 0.26 | OK | Eq. H1-1b |
| | **239** | LC10 at 100.00% | 0.27 | OK | Eq. H1-1b |
| | **280** | LC17 at 0.00% | 0.19 | OK | Eq. H1-1b |
| | **281** | LC9 at 0.00% | 0.20 | OK | Eq. H1-1b |
| | **282** | LC11 at 100.00% | 0.26 | OK | Eq. H1-1b |
| | **283** | LC11 at 100.00% | 0.27 | OK | Eq. H1-1b |

| | | | | | |
|---|---|---|---|---|---|
| ***RndBar 5_8*** | **188** | LC9 at 87.50% | 0.59 | OK | Eq. H1-1a |
| | **189** | LC9 at 87.50% | 0.53 | OK | Eq. H1-1a |
| | **190** | LC11 at 87.50% | 0.37 | OK | Eq. H1-1a |
| | **191** | LC10 at 87.50% | 0.40 | OK | Eq. H1-1a |
| | **232** | LC11 at 87.50% | 0.59 | OK | Eq. H1-1a |
| | **233** | LC10 at 87.50% | 0.53 | OK | Eq. H1-1a |
| | **234** | LC12 at 87.50% | 0.40 | OK | Eq. H1-1a |
| | **235** | LC12 at 87.50% | 0.43 | OK | Eq. H1-1a |
| | **276** | LC12 at 87.50% | **0.60** | **OK** | Eq. H1-1a |
| | **277** | LC11 at 87.50% | 0.53 | OK | Eq. H1-1a |
| | **278** | LC9 at 87.50% | 0.40 | OK | Eq. H1-1a |
| | **279** | LC9 at 87.50% | 0.44 | OK | Eq. H1-1a |

Bentley

**Current Date:** 12/10/2019 9:48 AM
**Units system:** English
**File name:** W:\STRUCTURAL DEPARTMENT\ANALYSIS SOFTWARE\RAM Elements\RAM Projects\AT&T\CT\CT1003\LTE (2C 3C 4C)\Rev. 1\CT100
(LTE 3C 4C)(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 |
|---|---|---|---|---|
| 356 | -1.0392 | 0.00 | -0.60 | 0 |
| 358 | -1.0392 | -3.3333 | -0.60 | 0 |
| 290 | 1.0392 | 0.00 | -0.60 | 0 |
| 292 | 1.0392 | -3.3333 | -0.60 | 0 |
| 422 | 0.00 | 0.00 | 1.20 | 0 |
| 424 | 0.00 | -3.3333 | 1.20 | 0 |

## Restraints

| Node | TX | TY | TZ | RX | RY | RZ |
|---|---|---|---|---|---|---|
| 356 | 1 | 1 | 1 | 1 | 0 | 1 |
| 358 | 1 | 1 | 1 | 1 | 0 | 1 |
| 290 | 1 | 1 | 1 | 1 | 0 | 1 |
| 292 | 1 | 1 | 1 | 1 | 0 | 1 |
| 422 | 1 | 1 | 1 | 1 | 0 | 1 |
| 424 | 1 | 1 | 1 | 1 | 0 | 1 |

## Members

| Member | NJ | NK | Description | Section | Material | d0 [in] | dL [in] | lg factor |
|---|---|---|---|---|---|---|---|---|
| 176 | 297 | 296 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 177 | 323 | 322 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 178 | 329 | 328 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 179 | 321 | 320 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 180 | 299 | 298 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 188 | 310 | 311 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 191 | 316 | 317 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 192 | 314 | 317 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 193 | 315 | 316 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 194 | 311 | 312 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 195 | 310 | 313 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 220 | 363 | 362 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 221 | 389 | 388 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 222 | 395 | 394 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 223 | 387 | 386 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 224 | 365 | 364 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 232 | 376 | 377 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 235 | 382 | 383 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 236 | 380 | 383 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 237 | 381 | 382 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 238 | 377 | 378 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 239 | 376 | 379 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 264 | 429 | 428 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 265 | 455 | 454 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 266 | 461 | 460 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 267 | 453 | 452 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 268 | 431 | 430 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 276 | 442 | 443 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 279 | 448 | 449 | | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 280 | 446 | 449 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 281 | 447 | 448 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 282 | 443 | 444 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 283 | 442 | 445 | | RndBar 3_4 | A36 | 0.00 | 0.00 | 0.00 |
| 181 | 300 | 416 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 240 | 384 | 349 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 226 | 368 | 369 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 227 | 370 | 371 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 182 | 302 | 303 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 183 | 304 | 305 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 196 | 318 | 481 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 269 | 432 | 350 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 270 | 434 | 435 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 271 | 436 | 437 | | PIPE 2-1_2x0.203 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 225 | 366 | 482 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 284 | 450 | 415 | | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 255 | 357 | 412 | | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 256 | 412 | 361 | | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 257 | 359 | 413 | | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 258 | 413 | 360 | | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 259 | 412 | 356 | | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |
| 260 | 413 | 358 | | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 211 | 291 | 346 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 212 | 346 | 295 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 213 | 293 | 347 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 214 | 347 | 294 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 215 | 346 | 290 | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |
| 216 | 347 | 292 | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |
| 299 | 423 | 478 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 300 | 478 | 427 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 301 | 425 | 479 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 302 | 479 | 426 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 303 | 478 | 422 | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |
| 304 | 479 | 424 | PL 11-1/4x5/8 | A36 | 11.25 | 9.25 | 0.00 |
| 233 | 378 | 379 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 228 | 372 | 357 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 229 | 373 | 359 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 231 | 375 | 361 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 234 | 380 | 381 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 230 | 374 | 360 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 242 | 375 | 391 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 243 | 374 | 392 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 244 | 373 | 393 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 241 | 372 | 390 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 186 | 308 | 294 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 190 | 314 | 315 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 189 | 312 | 313 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 185 | 307 | 293 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 184 | 306 | 291 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 200 | 307 | 327 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 197 | 306 | 324 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 187 | 309 | 295 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 199 | 308 | 326 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 198 | 309 | 325 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 275 | 441 | 427 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 274 | 440 | 426 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 272 | 438 | 423 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 273 | 439 | 425 | PIPE 2x0.154 | A53 GrB | 0.00 | 0.00 | 0.00 |
| 278 | 446 | 447 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 277 | 444 | 445 | RndBar 5_8 | A36 | 0.00 | 0.00 | 0.00 |
| 286 | 441 | 457 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 287 | 440 | 458 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 288 | 439 | 459 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |
| 285 | 438 | 456 | PL 3-1/2x5/8 | A36 | 0.00 | 0.00 | 0.00 |

## Orientation of local axes

| Member | Rotation [Deg] | Axes23 | NX | NY | NZ |
|---|---|---|---|---|---|
| 176 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 177 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 178 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 179 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 180 | 0.00 | 2 | -0.9659 | 0.00 | -0.2588 |
| 188 | 0.00 | 2 | 0.866 | 0.00 | -0.50 |
| 191 | 0.00 | 2 | 0.866 | 0.00 | -0.50 |
| 220 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 221 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |

| | | | | | |
|---|---|---|---|---|---|
| 222 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 223 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 224 | 0.00 | 2 | 0.2588 | 0.00 | 0.9659 |
| 232 | 0.00 | 2 | -0.866 | 0.00 | -0.50 |
| 235 | 0.00 | 2 | -0.866 | 0.00 | -0.50 |
| 264 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 265 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 266 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 267 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 268 | 315.00 | 0 | 0.00 | 0.00 | 0.00 |
| 276 | 0.00 | 2 | 0.00 | 0.00 | 1.00 |
| 279 | 0.00 | 2 | 0.00 | 0.00 | 1.00 |
| 255 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 256 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 257 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 258 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 259 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 260 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 211 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 212 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 213 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 214 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 215 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 216 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 299 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 300 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 301 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 302 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 303 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 304 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 233 | 0.00 | 2 | -0.866 | 0.00 | -0.50 |
| 234 | 0.00 | 2 | -0.866 | 0.00 | -0.50 |
| 242 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 243 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 244 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 241 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 190 | 0.00 | 2 | 0.866 | 0.00 | -0.50 |
| 189 | 0.00 | 2 | 0.866 | 0.00 | -0.50 |
| 200 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 197 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 199 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 198 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 278 | 0.00 | 2 | 0.00 | 0.00 | 1.00 |
| 277 | 0.00 | 2 | 0.00 | 0.00 | 1.00 |
| 286 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 287 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 288 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |
| 285 | 90.00 | 0 | 0.00 | 0.00 | 0.00 |

## Rigid end offsets

| Member | DJX [in] | DJY [in] | DJZ [in] | DKX [in] | DKY [in] | DKZ [in] |
|---|---|---|---|---|---|---|
| 192 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 193 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 194 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 195 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 236 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 237 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 238 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 239 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 280 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 281 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 282 | 0.00 | 3.50 | 0.00 | 0.00 | -3.50 | 0.00 |
| 283 | 0.00 | -3.50 | 0.00 | 0.00 | 3.50 | 0.00 |
| 181 | 0.00 | -2.00 | 0.00 | 0.00 | -2.00 | 0.00 |
| 240 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 196 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 269 | 0.00 | -2.00 | 0.00 | 0.00 | -2.00 | 0.00 |
| 225 | 0.00 | -2.00 | 0.00 | 0.00 | -2.00 | 0.00 |
| 284 | 0.00 | 2.00 | 0.00 | 0.00 | 2.00 | 0.00 |
| 259 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |
| 260 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |
| 215 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |
| 216 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |
| 303 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |
| 304 | 0.00 | -0.625 | 0.00 | 0.00 | -0.625 | 0.00 |

## Hinges

| | Node-J | | | | Node-K | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Member | M33 | M22 | V3 | V2 | M33 | M22 | V3 | V2 | TOR | AXL | Axial rigidity |
| 193 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 195 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 237 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 239 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 281 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 283 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Tension only |
| 181 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 240 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 196 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 269 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 225 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 284 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 242 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 243 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 244 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 241 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 200 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 197 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 199 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 198 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 286 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 287 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 288 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |
| 285 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | Full |

EXHIBIT 3

DOCKET NO. 40

ORIGINAL

| | | |
|---|---|---|
| AN APPLICATION SUBMITTED BY THE SOUTHERN NEW ENGLAND TELEPHONE COMPANY FOR A CERTIFICATE OF ENVIRONMENTAL COMPATIBILITY AND PUBLIC NEED FOR THE CONSTRUCTION, MAINTENANCE, AND OPERATION OF FACILITIES TO PROVIDE CELLULAR SERVICE IN THE HARTFORD AND MIDDLESEX COUNTIES. | : | CONNECTICUT SITING COUNCIL |
| | : | May 15, 1984 |

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

Pursuant to the foregoing opinion, the Council hereby directs that a certificate of environmental compatibility and public need as required by section 16-50k of the General Statutes of Connecticut, revisions of 1958, revised to 1983, as amended, be issued to Southern New England Telephone for the construction, operation, and maintenance of a telecommunications tower and associated equipment to provide cellular service at each of the following sites:

Shuttle Meadow Road, Southington, Connecticut;
Mountain Street, Hartford, Connecticut;
Prestige Park Road, East Hartford, Connecticut;
Beckley Road, Berlin, Connecticut;
Slicer tract, Niederwerfer Road, South Windsor, Connecticut; and
Kikapoo Road, Middlefield, Connecticut.

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

1. The towers shall be no taller than necessary to provide the proposed service and in no event shall exceed

   a) 150 feet at the Southington site,
   b) 100 feet at the Hartford site,
   c) 150 feet at the East Hartford site,
   d) 150 feet at the Berlin site,
   e) 75 feet at the South Windsor site, and
   f) 75 feet at the Middlefield site.

2. A fence not lower than eight feet shall surround each tower and its associated equipment.

3. The applicant or its successor shall notify the Council if and when directional antennas or any other equipment is added to any of these facilities.
4. The applicant or its successor shall permit in accordance with representations made by it during the proceeding public or private entities to share space on the facilities, for due consideration received, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.
5. Unless necessary to comply with condition number seven, below, no lights shall be installed on any of these towers.
6. The facility construction shall be conducted in accordance with all applicable federal, state, and municipal laws and regulations.
7. The applicant shall submit a development and management plan (D&M) for the South Windsor, Southington, and Berlin sites pursuant to sections 16-50j-85 through 16-50j-87 of the regulations of state agencies, except that irrelevant items in section 16-50j-86 need only be identified as such. The D&M plans shall include appropriate evergreen screening of the sites. The applicant shall comply with the reporting requirements of section 16-50j-87 for all sites. The applicant shall consult with Mrs. Claire Aubin and the Town of South Windsor in the preparation of the South Windsor site D&M.
8. Construction activities shall take place during daylight working hours.
9. This decision and order shall be void and the towers and associated equipment approved herein shall be dismantled and removed,

or reapplication for any new use shall be made to the Connecticut Siting Council before any such new use is made, if the towers do not provide or permanently cease to provide cellular service following completion of construction.

10. This decision and order shall be void if all construction authorized is not completed within three years of the issuance of this decision.

Pursuant to section 16-50p(c) of the General Statutes, we hereby direct that a copy of the opinion and decision and order be served on each person listed below. A notice of the issuance shall be published in the Hartford Courant, Journal Inquirer, and the Middletown Press.

The parties to this proceeding are

| | |
|---|---|
| Southern New England Telephone Company<br>Room 314<br>227 Church Street<br>New Haven, Connecticut 06506 | (Applicant) |
| ATTN: Mr. Peter J. Tyrrell, Esquire | (its attorney) |
| Town of South Windsor<br>1540 Sullivan Avenue<br>South Windsor, Connecticut 06074 | represented by:<br>Mr. Richard M. Rittenband<br>Town Attorney<br>1734 Ellington Road<br>South Windsor, Connecticut 06074 |
| Frank Niederwerfer<br>260 Niederwerfer Road<br>South Windsor, Connecticut 06074 | (service waived) |
| Claire Aubin<br>407 Niederwerfer Road<br>South Windsor, Connecticut 06074 | (service waived) |

Betty S. Kleiner
Chairman
Hartford Audubon Society, Inc.
5 Flintlock Ridge
Simsbury, Connecticut 06070

(service waived)

Roger Thorpe
2916 Ellington Road
South Windsor, Connecticut 06074

Intervenors in this proceeding are

Dwight A. Johnson
Murtha, Cullina, Richter
and Pinney
101 Pearl Street
P.O. Box 3197
Hartford, Connecticut 06103-0197

representing:

Metromedia TeleCommunications
Nutmeg Telecommunications, Inc.
CSI of New Haven
CSI of Stamford
Cellular Communications, Inc.
LIN Cellular Corp.
Cellular Mobile Services
Maxcell TeleCommunications, Inc.
Mobile Cellular Telephone, Inc.
Cellular Dynamics
Connecticut Corridor Cellular
Chase/Post Cellular

# CERTIFICATION

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

Dated at New Britain, Connecticut, this 15th day of May, 1984.

| Council Members | Vote Cast |
|---|---|
| Gloria Dibble Pond<br>Chairperson | Yes |
| Commissioner John Downey<br>Designee: Commissioner Peter G. Boucher | Yes |
| Commissioner Stanley Pac<br>Designee: Christopher Cooper | Yes |
| Owen L. Clark | Yes |
| Fred J. Doocy | ~~Yes~~ Abstain |
| Mortimer A. Gelston | Yes |
| James G. Horsfall | Absent |
| Janet Sitty | Yes |
| Colin C. Tait | Absent |

STATE OF CONNECTICUT )
: ss. New Britain, May 15, 1984
COUNTY OF HARTFORD )

I hereby certify that the foregoing is a true and correct copy of the decision and order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

Christopher S. Wood, Executive Director
Connecticut Siting Council

# STATE OF CONNECTICUT

*CONNECTICUT SITING COUNCIL*

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

*Daniel F. Caruso*
*Chairman*


1018 - ELLINGTON
5307 - MANCHESTER
1003 - SO. WINDSOR
1005 > WATERBURY
1125 > WATERBURY

10

August 7, 2007

Steven L. Levine
Real Estate Consultant
New Cingular Wireless PCS, LLC
500 Enterprise Drive
Rocky Hill, CT 06067-3900

RE: **EM-CING-048-077-132-151-151-070717** – New Cingular Wireless PCS, LLC notice of intent to modify existing telecommunications facilities located at 101 Burbank Road, Ellington; 53 Slater Street, Manchester; 391 Niederwerfer Road, South Windsor; Farmdale Drive, Waterbury; and 229 Sheffield Street, Waterbury, Connecticut.

Dear Mr. Levine:

At a public meeting held on July 26, 2007, the Connecticut Siting Council (Council) acknowledged your notice to modify these existing telecommunications facilities, pursuant to Section 16-50j-73 of the Regulations of Connecticut State Agencies.

The proposed modifications are to be implemented as specified here and in your notice dated July 17, 2007, including the placement of all necessary equipment and shelters within the tower compounds. The modifications are in compliance with the exception criteria in Section 16-50j-72 (b) of the Regulations of Connecticut State Agencies as changes to existing facility sites that would not increase tower heights, extend the boundaries of the tower sites, increase noise levels at the tower site boundaries by six decibels, and increase the total radio frequencies electromagnetic radiation power densities measured at the tower site boundaries to or above the standard adopted by the State Department of Environmental Protection pursuant to General Statutes § 22a-162. These facilities have also been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequencies now used on these towers.

This decision is under the exclusive jurisdiction of the Council. Please be advised that the validity of this action shall expire one year from the date of this letter. Any additional change to any of these facilities will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

Thank you for your attention and cooperation.

Very truly yours,

Daniel F. Caruso
Chairman

DFC/MP/laf

c: The Honorable Michael P. Stupinski, First Selectman, Town of Ellington
Robert Pilips, Town Planner, Town of Ellington
The Honorable Josh M. Howroyd, Mayor, Town of Manchester
Steve Werbner, General Manager, Town of Manchester
Thomas R. O'Marra, Zoning Enforcement Officer, Town of Manchester
The Honorable Matthew Streeter, Mayor, Town of South Windsor
Matthew B. Galligan, Town Manager, Town of South Windsor
Marcia Banach, Director of Planning, Town of South Windsor
The Honorable Michael J. Jarjura, Mayor, City of Waterbury
Gil Grabeline, Zoning Enforcement Officer, City of Waterbury
Christopher B. Fisher, Esq., Cuddy & Feder LLP
Thomas J. Regan, Esq., Brown Rudnick Berlack Israels, LLP
Kenneth C. Baldwin, Esq., Robinson & Cole LLP
Christine Farrell, T-Mobile
Jeffrey W. Barbadora, Crown Atlantic Company LLC
American Tower Corporation
SBA Inc.

EXHIBIT 4

# Town of South Windsor, CT

## Property Listing Report

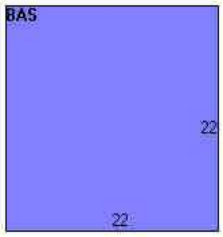
| Map Block Lot | 140-9-SPEC | Account | 63600391 |
|---|---|---|---|

## Property Information

| | |
|---|---|
| Property Location | 391 NIEDERWERFER ROAD |
| Owner | CAROLCLIFF HILL LLC |
| Co-Owner | |
| Mailing Address | 13 EILEEN DRIVE<br>EAST WINDSOR CT 06088 |
| Land Use | 201 Commercial |
| Land Class | C |
| Zoning Code | RR |
| Census Tract | 4871 |

| | |
|---|---|
| Neighborhood | C400 |
| Acreage | 0.23 |
| Utilities | |
| Lot Setting/Desc | |
| Water Information | WELL WATER |
| Trash Day | THURSDAY |

## Sketch




## Primary Construction Details

| | |
|---|---|
| Year Built | 1984 |
| Stories | 1.00 |
| Building Style | Multipurpose |
| Building Use | Comm/Ind |
| Building Condition | B- |
| Floors | Concrete |
| Total Rooms | 0 |

| | |
|---|---|
| Bedrooms | |
| Full Bathrooms | 0 |
| Half Bathrooms | |
| Bath Style | n/a |
| Kitchen Style | n/a |
| Roof Style | Flat |
| Roof Cover | Rolled |

| | |
|---|---|
| Exterior Walls | Stucco on Wood |
| Interior Walls | Minimum |
| Heating Type | Forced Hot Air |
| Heating Fuel | Heat Pump |
| AC Type | |
| Gross Bldg Area | 484 |
| Total Living Area | 484 |

Report Created On 1/24/2020

# Town of South Windsor, CT

**Property Listing Report** | Map Block Lot **140-9-SPEC** | Account **63600391**

## Valuation Summary

(Assessed value = 70% of Appraised Value)

| Item | Appraised | Assessed |
|---|---|---|
| Buildings | 41200 | 28800 |
| Extras | 0 | 0 |
| Improvements | 44000 | 30800 |
| Outbuildings | 2800 | 2000 |
| Land | 220700 | 154500 |
| Total | 264700 | 185300 |

## Outbuilding and Extra Items

| Type | Description |
|---|---|
| Paving | 1500.00 S.F. |
| Shed | 392.00 S.F. |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

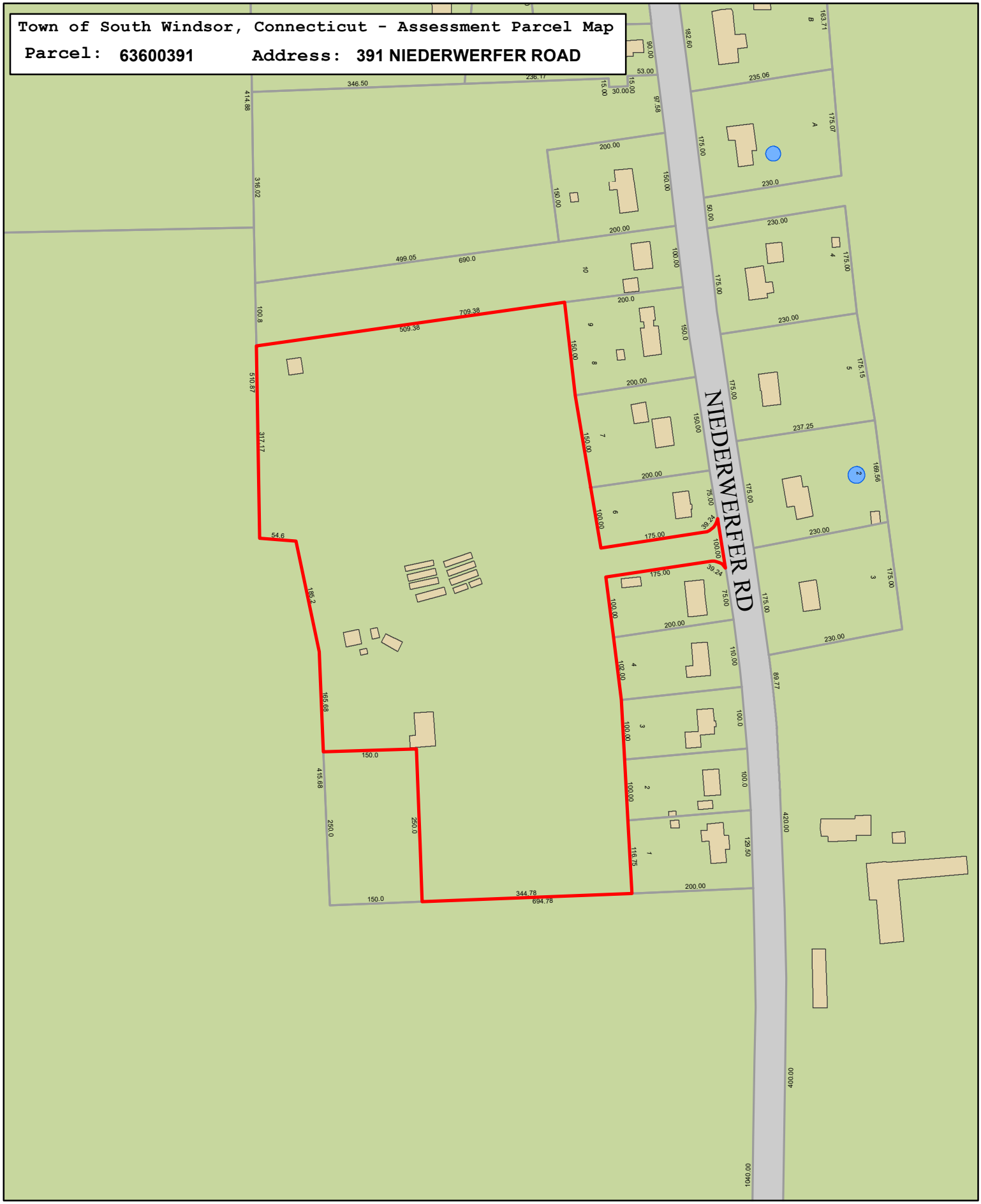
## Sub Areas

| Subarea Type | Gross Area (sq ft) | Living Area (sq ft) |
|---|---|---|
| First Floor | 484 | 484 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| Total Area | 484 | 484 |

## Sales History

| Owner of Record | Book/ Page | Sale Date | Sale Price |
|---|---|---|---|
| CAROLCLIFF HILL LLC | 2618/ 132 | 11/9/2017 | 0 |
| CURTISS DEBORAH L ETAL | 2533/ 295 | 7/7/2016 | 0 |
| SLICER CAROL B | 2399/ 221 | 4/1/2014 | 0 |
| SLICER CLIFFORD W & CAROL B | 102/ 82 | 6/9/1964 | 0 |

Report Created On **1/24/2020**




Disclaimer:
This map is for informational purposes only.
All information is subject to verification by any user.
The Town of South Windsor and its mapping contractors
assume no legal responsibility for the
information contained herein.

EXHIBIT 5

# Radio Frequency Emissions Analysis Report

AT&T

Site Name: **CT1003**

391 Niederwerfer Road
South Windsor, Connecticut 06074

**January 27, 2020**

**Centerline Communications Project Number: 950012-334**

| Site Compliance Summary | |
|---|---|
| Compliance Status: | **Compliant** |
| Site total MPE% of FCC general population allowable limit: | **36.71%** |

January 27, 2020

AT&T Mobility – New England
Attn: John Benedetto, RF Manager
550 Cochituate Road
Suite 550 – 13&14
Framingham, MA 01701

Emissions Analysis for Site: **CT1003**

Centerline Communications, LLC ("Centerline") was directed to analyze the proposed AT&T facility to be located on a **Monopole** near **391 Niederwerfer Road, South Windsor Connecticut 06074** for the purpose of determining whether the emissions from the proposed facility are within specified federal limits.

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

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

General population/uncontrolled exposure limits apply to situations in which the general population may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general population would always be considered under this category when exposure is not employment related, for example, in the case of a telecommunications tower that exposes persons in a nearby residential area.

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter (μW/cm$^2$). The general population exposure limits for the 1900 MHz (PCS) and 5 GHz (B46) bands is 1000 μW/cm$^2$.

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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were performed for the proposed facility using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing focused omnidirectional antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was focused at the base of the tower. This is a very conservative estimate since the gain reduction in actual applications is typically greater than 10 dB in the direction of ground immediately surrounding the facility. Real world emissions values from this facility are expected to be lower than values listed in this report at ground level. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

| Antenna # | Technology | Frequency Band | Channel Count | Transmit Power per Channel (W) |
|---|---|---|---|---|
| 1 | UMTS | 850 MHz | 1 | 40 |
| 2 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 2 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 3 | LTE | 700 MHz | 2 | 40 |
| 3 | LTE | 850 MHz | 1 | 40 |
| 3 | LTE | 2100 MHz (AWS Band) | 4 | 40 |
| 3 | LTE | 5G | 1 | 40 |
| 4 | UMTS | 850 MHz | 1 | 40 |
| 5 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 5 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 6 | LTE | 700 MHz | 2 | 40 |
| 6 | LTE | 850 MHz | 1 | 40 |
| 6 | LTE | 2100 MHz (AWS Band) | 4 | 40 |
| 6 | LTE | 5G | 1 | 40 |
| 7 | UMTS | 850 MHz | 1 | 40 |
| 8 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 8 | LTE | 1900 MHz (PCS Band) | 2 | 40 |
| 9 | LTE | 700 MHz | 2 | 40 |
| 9 | LTE | 850 MHz | 1 | 40 |
| 9 | LTE | 2100 MHz (AWS Band) | 4 | 40 |
| 9 | LTE | 5G | 1 | 40 |

*Table 1: Channel Data Table*

The following antennas listed in *Table 2* were used in the modeling for transmission in the 1900 MHz (PCS), 2100 MHz (AWS) and 5 GHz (Band 46) frequency bands. This is based on information from the carrier with regard to anticipated antenna selection. Maximum gain values for all antennas are listed in the AT&T Antenna Inventory & Power Levels table (Table 3) below in the Results section. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

| Sector | Antenna Number | Antenna Make / Model | Antenna Centerline (ft) |
|---|---|---|---|
| A | 1 | Powerwave 7770 | 73 |
| A | 2 | CCI DMP65R-BU6DA | 73 |
| A | 3 | CCI DMP65R-BU6DA | 73 |
| B | 4 | Powerwave 7770 | 73 |
| B | 5 | CCI DMP65R-BU6DA | 73 |
| B | 6 | CCI DMP65R-BU6DA | 73 |
| C | 7 | Powerwave 7770 | 73 |
| C | 8 | CCI DMP65R-BU6DA | 73 |
| C | 9 | CCI DMP65R-BU6DA | 73 |

*Table 2: Antenna Data*

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

## RESULTS

Per the calculations completed for the proposed AT&T configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

| Antenna ID | Antenna Make / Model | Frequency Bands | Antenna Gain (dBd) | Antenna Height (ft) | Channel Count | Total TX Power (W) | ERP (W) | MPE % |
|---|---|---|---|---|---|---|---|---|
| Antenna A1 | Powerwave 7770 | 850 MHz | 11.5 | 73 | 1 | 40 | 565.02 | 0.67% |
| Antenna A2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna A2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna A3 | CCI DMP65R-BU6DA | 700 MHz | 11.85 | 73 | 2 | 40 | 1224.87 | 1.77% |
| Antenna A3 | CCI DMP65R-BU6DA | 850 MHz | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| Antenna A3 | CCI DMP65R-BU6DA | 2100 MHz (AWS Band) | 15.95 | 73 | 4 | 40 | 6296.80 | 4.25% |
| Antenna A3 | CCI DMP65R-BU6DA | 5G | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| Antenna B1 | Powerwave 7770 | 850 MHz | 11.5 | 73 | 1 | 40 | 565.02 | 0.67% |
| Antenna B2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna B2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna B3 | CCI DMP65R-BU6DA | 700 MHz | 11.85 | 73 | 2 | 40 | 1224.87 | 1.77% |
| Antenna B3 | CCI DMP65R-BU6DA | 850 MHz | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| Antenna B3 | CCI DMP65R-BU6DA | 2100 MHz (AWS Band) | 15.95 | 73 | 4 | 40 | 6296.80 | 4.25% |
| Antenna B3 | CCI DMP65R-BU6DA | 5G | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| Antenna C1 | Powerwave 7770 | 850 MHz | 11.5 | 73 | 1 | 40 | 565.02 | 0.67% |
| Antenna C2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna C2 | CCI DMP65R-BU6DA | 1900 MHz (PCS Band) | 15.55 | 73 | 2 | 40 | 2871.38 | 1.94% |
| Antenna C3 | CCI DMP65R-BU6DA | 700 MHz | 11.85 | 73 | 2 | 40 | 1224.87 | 1.77% |
| Antenna C3 | CCI DMP65R-BU6DA | 850 MHz | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| Antenna C3 | CCI DMP65R-BU6DA | 2100 MHz (AWS Band) | 15.95 | 73 | 4 | 40 | 6296.80 | 4.25% |
| Antenna C3 | CCI DMP65R-BU6DA | 5G | 12.45 | 73 | 1 | 40 | 703.17 | 0.84% |
| | Sectors A, B & C Composite MPE% | | | | | | | **36.71 %** |

*Table 3: AT&T Antenna Inventory & Power Levels*

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated AT&T sector(s). Since this proposed facility is utilizing an omnidirectional antenna there is only one sector for this site (Sector A).

| AT&T _ Frequency Band / Technology Max Power Levels | # Channels | Watts ERP (Per Channel) | Height (feet) | Total Power Density (□W/cm²) | Frequency (MHz) | Allowable MPE (□W/cm²) | Calculated % MPE |
|---|---|---|---|---|---|---|---|
| AT&T 850 MHz | 1 | 565.02 | 73 | 3.8118 | 850 MHz | 1000 | 0.67% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 700 MHz | 2 | 1224.87 | 73 | 8.2634 | 700 MHz | 1000 | 1.77% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| AT&T 2100 MHz | 4 | 6296.80 | 73 | 42.4806 | 2100 MHz | 1000 | 4.25% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| AT&T 850 MHz | 1 | 565.02 | 73 | 3.8118 | 850 MHz | 1000 | 0.67% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 700 MHz | 2 | 1224.87 | 73 | 8.2634 | 700 MHz | 1000 | 1.77% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| AT&T 2100 MHz | 4 | 6296.80 | 73 | 42.4806 | 2100 MHz | 1000 | 4.25% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| AT&T 850 MHz | 1 | 565.02 | 73 | 3.8118 | 850 MHz | 1000 | 0.67% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 1900 MHz | 2 | 2871.38 | 73 | 19.3714 | 1900 MHz | 1000 | 1.94% |
| AT&T 700 MHz | 2 | 1224.87 | 73 | 8.2634 | 700 MHz | 1000 | 1.77% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| AT&T 2100 MHz | 4 | 6296.80 | 73 | 42.4806 | 2100 MHz | 1000 | 4.25% |
| AT&T 850 MHz | 1 | 703.17 | 73 | 4.7438 | 850 MHz | 1000 | 0.84% |
| | | | | | | **Sectors Total:** | **36.71%** |

*Table 6: AT&T Maximum Sector MPE Power Values*

## Summary

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

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

| AT&T Sector | Power Density Value (%) |
|---|---|
| Sector A: | 12.24% |
| Sector B: | 12.24% |
| Sector C: | 12.24% |
| AT&T Maximum Site Total: | 36.71% |
| | |
| Site Total: | **36.71%** |
| | |
| Site Compliance Status: | **Compliant** |

The anticipated composite MPE value for this site assuming all carriers present is **36.71%** of the allowable FCC established general population limit sampled at the ground level.

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

Michelle L. Stone
RF Compliance Consultant
**Centerline Communications, LLC**
750 West Center St. Suite 301
West Bridgewater, MA 02379

EXHIBIT 6

AMERICAN TOWER®
CORPORATION

# Structural Analysis Report

| | | |
|---|---|---|
| **Structure** | : | **75 ft Monopole** |
| **ATC Site Name** | : | **South Windsor, CT** |
| **ATC Asset Number** | : | **302474** |
| **Engineering Number** | : | **OAA755365_C3_01** |
| **Proposed Carrier** | : | **AT&T Mobility** |
| **Carrier Site Name** | : | **South Windsor** |
| **Carrier Site Number** | : | **CT1003** |
| **Site Location** | : | **391 Niederwerfer Rd**<br>**South Windsor, CT 06074-1724**<br>**41.863600, -72.523100** |
| **County** | : | **Hartford** |
| **Date** | : | **January 21, 2020** |
| **Max Usage** | : | **51%** |
| **Result** | : | **Pass** |


Prepared By:
Julio Benitez Santiago
Structural Engineer I

Reviewed By:

**COA: PEC.0001553**

AMERICAN TOWER®
CORPORATION

## Table of Contents

## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 75 ft monopole to reflect the change in loading by AT&T Mobility.

## Supporting Documents

| | |
|---|---|
| **Tower Drawings** | Spectra Site, CT-0010, dated May 20, 2002 |
| **Foundation Drawing** | Southern New England Telephone, Job No. 38903R, dated Feb 29, 1984, |
| **Geotechnical Report** | GEOS Project No. 21-07254, dated April 21, 2009 |

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

| | |
|---|---|
| **Basic Wind Speed:** | 97 mph (3-Second Gust, $V_{asd}$) / 125 mph (3-Second Gust, $V_{ult}$) |
| **Basic Wind Speed w/ Ice:** | 50 mph (3-Second Gust) w/ 1" radial ice concurrent |
| **Code:** | ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code |
| **Structure Class:** | II |
| **Exposure Category:** | B |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Spectral Response:** | Ss = 0.18, $S_1$ = 0.06 |
| **Site Class:** | D - Stiff Soil |

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at Engineering@americantower.com. Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

## Existing and Reserved Equipment

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 16.0 | 1 | Generic GPS | Flush | (1) 3/8" Coax | AT&T Mobility |

## Equipment to be Removed

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 78.0 | 3 | CCI DTMABP7819VG12A | Platform with Handrails | (2) 0.39" (10mm) Fiber Trunk<br>(4) 0.78" (19.7mm) 8 AWG 6<br>(1) 3" conduit<br>(12) 7/8" Coax | AT&T Mobility |
| | 3 | ADC DD800 | | | |
| | 1 | Raycap DC6-48-60-18-8F | | | |
| | 1 | Raycap DC6-48-60-18-8F (23.5" Height) | | | |
| | 3 | CCI DMP65R-BU8D | | | |
| | 3 | Ericsson RRUS 4449 B5, B12 | | | |
| | 3 | Powerwave Allgon 7770.00 | | | |
| | 3 | CCI DMP65R-BU6DA | | | |
| | 3 | Ericsson Radio 8843 - B2 + B66A | | | |

## Proposed Equipment

| Elev.[1] (ft) | Qty | Antenna | Mount Type | Lines | Carrier |
|---|---|---|---|---|---|
| 73.0 | 3 | CCI DTMABP7819VG12A | SitePro 1 VFA12-M3-WLL Sector Frames | (2) 0.39" (10mm) Fiber Trunk<br>(4) 0.78" (19.7mm) 8 AWG 6<br>(1) 3" conduit<br>(12) 7/8" Coax | AT&T Mobility |
| | 3 | ADC DD800 | | | |
| | 1 | Raycap DC6-48-60-18-8F (23.5" Height) | | | |
| | 1 | Raycap DC6-48-60-18-8F | | | |
| | 3 | Ericsson Radio 8843 - B2 + B66A | | | |
| | 3 | Ericsson RRUS 4449 B5, B12 | | | |
| | 3 | Powerwave Allgon 7770.00 | | | |
| | 6 | CCI DMP65R-BU6DA | | | |

[1] Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed lines inside the pole shaft.

## Structure Usages

| Structural Component | Controlling Usage | Pass/Fail |
|---|---|---|
| Anchor Bolts | 23% | Pass |
| Shaft | 51% | Pass |
| Base Plate | 49% | Pass |

## Foundations

| Reaction Component | Analysis Reactions | % of Usage |
|---|---|---|
| Moment (Kips-Ft) | 429.0 | 32% |
| Axial (Kips) | 9.3 | 19% |
| Shear (Kips) | 7.8 | 16% |

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.

## Deflection and Sway*

| Antenna Elevation (ft) | Antenna | Carrier | Deflection (ft) | Sway (Rotation) (°) |
|---|---|---|---|---|
| 73.0 | CCI DTMABP7819VG12A | AT&T Mobility | 0.526 | 0.741 |
| | ADC DD800 | | | |
| | Raycap DC6-48-60-18-8F (23.5" Height) | | | |
| | Raycap DC6-48-60-18-8F | | | |
| | Ericsson Radio 8843 - B2 + B66A | | | |
| | Ericsson RRUS 4449 B5, B12 | | | |
| | Powerwave Allgon 7770.00 | | | |
| | CCI DMP65R-BU6DA | | | |

***Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G**

AMERICAN TOWER®
CORPORATION

## Standard Conditions

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

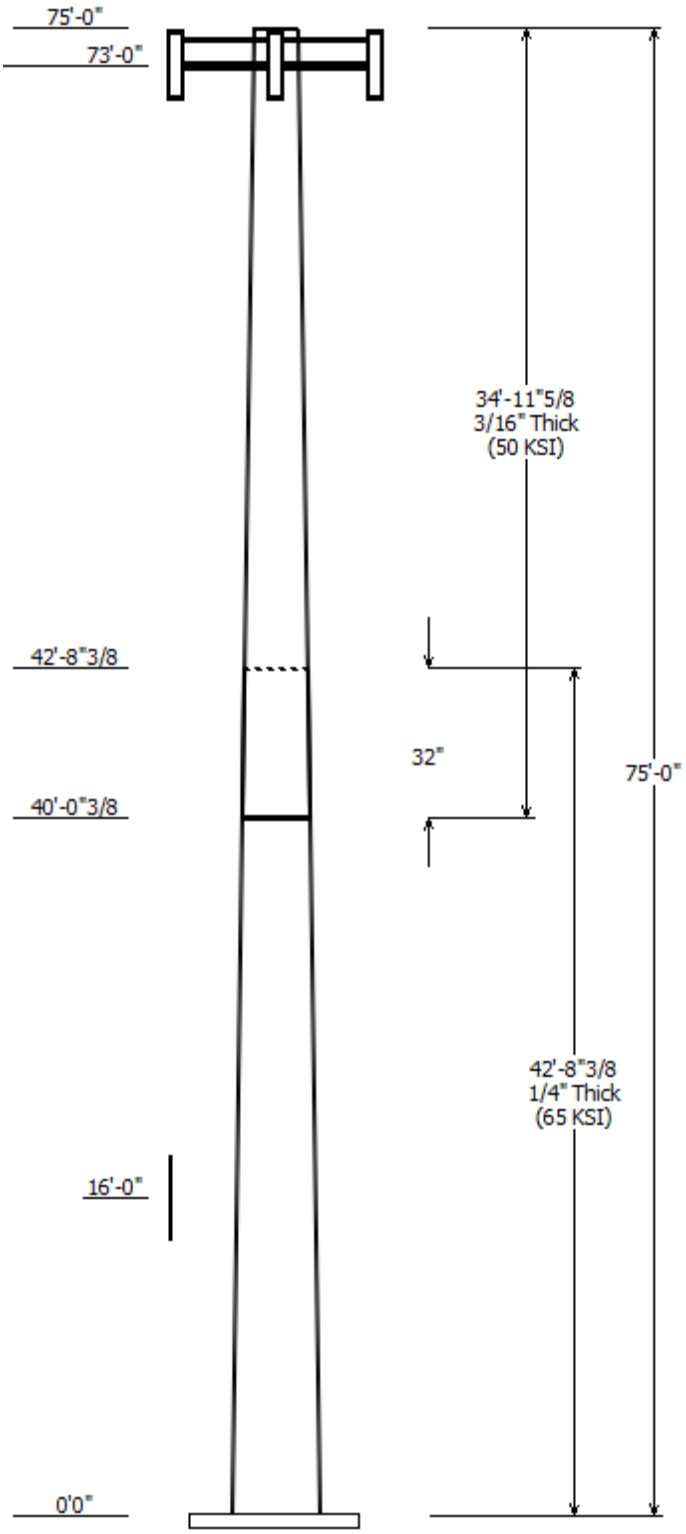
All assets of American Tower Corporation, its affiliates and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

## Job Information

Client : AT&T MOBILITY
Pole : 302474 Code: ANSI/TIA-222-G
Location : South Windsor, CT
Description : 75 ft ITT Meyer Type "L" Monopole Struct Class : II
Shape : 12 Sides Exposure : B
Height : 75.00 (ft) Topo : 1
Base Elev (ft): 0.00
Taper: 0.177945 (in/ft)




## Sections Properties

| Shaft Section | Length (ft) | Diameter (in) Accross Flats Top | Bottom | Thick (in) | Joint Type | Overlap Length (in) | Shape | Steel Grade (ksi) |
|---|---|---|---|---|---|---|---|---|
| 1 | 42.700 | 20.37 | 27.97 | 0.250 | | 0.000 | 12 Sides | 65 |
| 2 | 34.967 | 15.00 | 21.22 | 0.188 | Slip Joint | 32.000 | 12 Sides | 50 |

## Discrete Appurtenance

| Attach Elev (ft) | Force Elev (ft) | Qty | Description |
|---|---|---|---|
| 73.000 | 73.000 | 3 | SitePro 1 VFA12-M3-WLL |
| 73.000 | 73.000 | 6 | CCI DMP65R-BU6DA |
| 73.000 | 73.000 | 3 | Powerwave Allgon 7770.00 |
| 73.000 | 73.000 | 3 | Ericsson RRUS 4449 B5, B12 |
| 73.000 | 73.000 | 3 | Ericsson Radio 8843 - B2 + B66 |
| 73.000 | 73.000 | 1 | Raycap DC6-48-60-18-8F |
| 73.000 | 73.000 | 1 | Raycap DC6-48-60-18-8F (23.5" |
| 73.000 | 73.000 | 3 | ADC DD800 |
| 73.000 | 73.000 | 3 | CCI DTMABP7819VG12A |
| 16.000 | 16.000 | 1 | Generic GPS |

## Linear Appurtenance

| Elev (ft) From | To | Description | Exposed To Wind |
|---|---|---|---|
| 0.000 | 16.000 | 3/8" Coax | No |
| 0.000 | 73.000 | 0.39" (10mm) | No |
| 0.000 | 73.000 | 0.78" (19.7mm) 8 | No |
| 0.000 | 73.000 | 3" conduit | No |
| 0.000 | 73.000 | 7/8" Coax | No |

## Load Cases

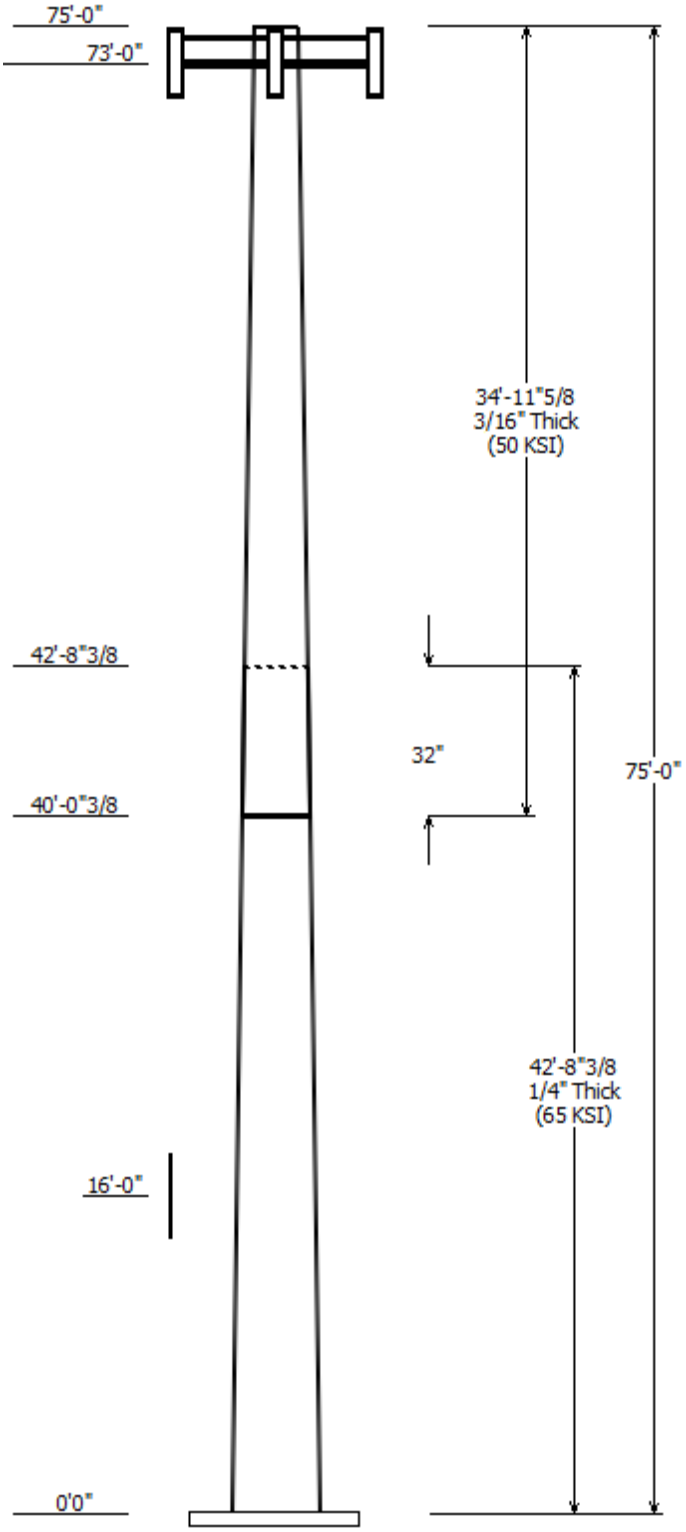
| | |
|---|---|
| 1.2D + 1.6W | 97 mph with No Ice |
| 0.9D + 1.6W | 97 mph with No Ice (Reduced DL) |
| 1.2D + 1.0Di + 1.0Wi | 50 mph with 1.00 in Radial Ice |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Lateral Forces Method |
| (1.2 + 0.2Sds) * DL + E | Seismic Equivalent Modal Analysis Method |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Lateral |
| (0.9 - 0.2Sds) * DL + E | Seismic (Reduced DL) Equivalent Modal |
| 1.0D + 1.0W | Serviceability 60 mph |

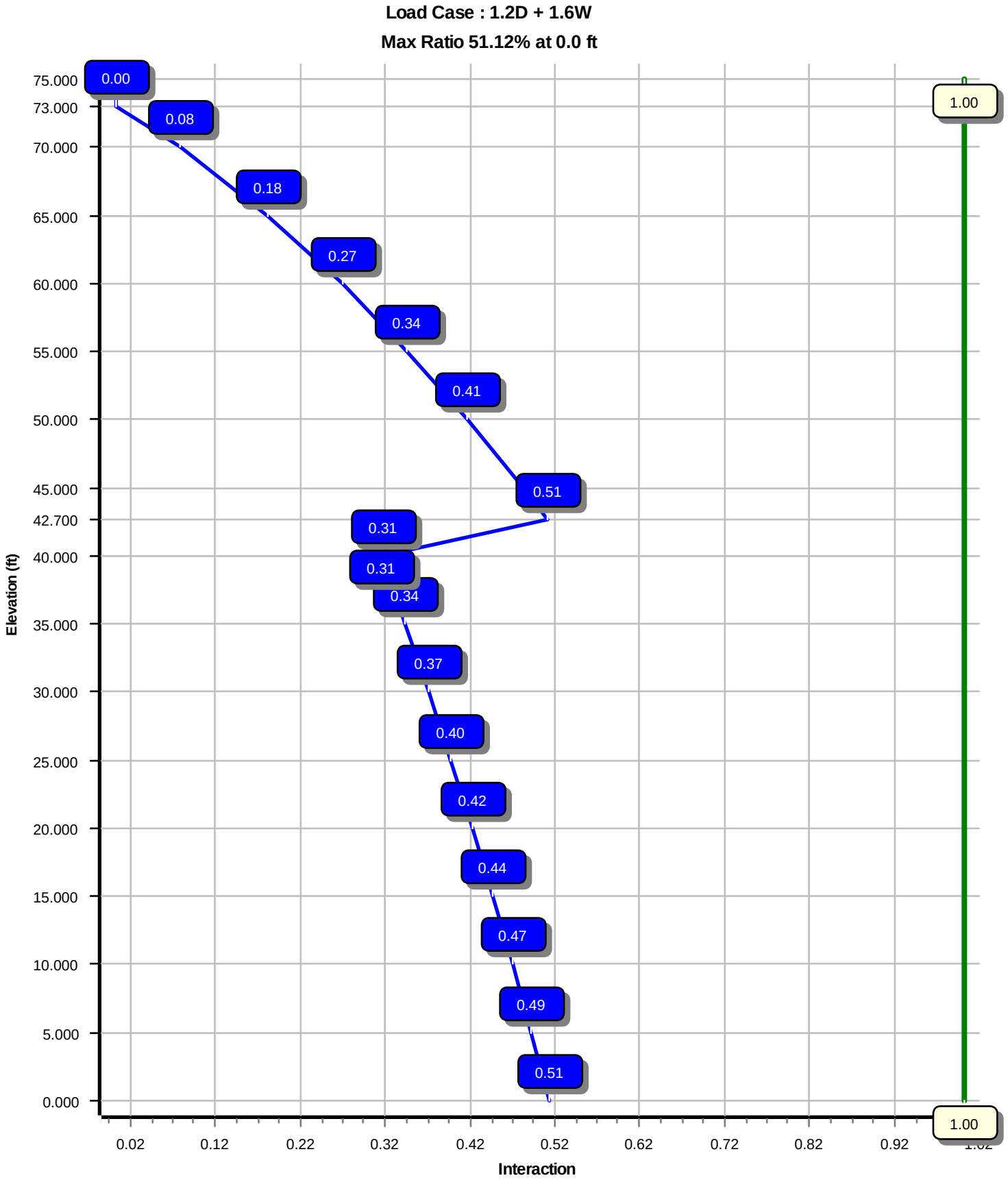
## Reactions

| Load Case | Moment (kip-ft) | Shear (kip) | Axial (kip) |
|---|---|---|---|
| 1.2D + 1.6W | 428.96 | 7.76 | 9.31 |
| 0.9D + 1.6W | 425.86 | 7.75 | 6.98 |
| 1.2D + 1.0Di + 1.0Wi | 110.93 | 1.89 | 19.55 |
| (1.2 + 0.2Sds) * DL + E ELFM | 24.22 | 0.38 | 9.07 |
| (1.2 + 0.2Sds) * DL + E EMAM | 49.58 | 0.72 | 9.07 |
| (0.9 - 0.2Sds) * DL + E ELFM | 23.98 | 0.38 | 6.32 |
| (0.9 - 0.2Sds) * DL + E EMAM | 49.13 | 0.72 | 6.32 |

| | | | |
|---|---|---|---|
| 1.0D + 1.0W | 91.38 | 1.66 | 7.77 |

| Dish Deflections | | | |
|---|---|---|---|
| Load Case | Attach Elev (ft) | Deflection (in) | Rotation (deg) |
| | 0.00 | 0.000 | 0.000 |




Load Case : 1.2D + 1.6W
Max Ratio 51.12% at 0.0 ft
Elevation (ft)
75.000
73.000
70.000
65.000
60.000
55.000
50.000
45.000
42.700
40.000
35.000
30.000
25.000
20.000
15.000
10.000
5.000
0.000
0.00
0.08
0.18
0.27
0.34
0.41
0.51
0.31
0.31
0.34
0.37
0.40
0.42
0.44
0.47
0.49
0.51
1.00
1.00
0.02
0.12
0.22
0.32
0.42
0.52
0.62
0.72
0.82
0.92
Interaction

**Site Number: 302474** **Code: ANSI/TIA-222-G** 

**Site Name: South Windsor, CT** **Engineering Number:OAA755365_C3_01** **1/22/2020 9:10:37 AM**

**Customer: AT&T MOBILITY**

## Analysis Parameters

| | | | |
|---|---|---|---|
| **Location :** | **Hartford County, CT** | **Height (ft) :** | **75** |
| **Code :** | **ANSI/TIA-222-G** | **Base Diameter (in) :** | **27.97** |
| **Shape :** | **12 Sides** | **Top Diameter (in) :** | **15.00** |
| **Pole Type :** | **Taper** | **Taper (in/ft) :** | **0.178** |
| **Pole Manfacturer :** | **ITT Meyer** | **Rotation (deg) :** | **0.00** |

## Ice & Wind Parameters

| | | | |
|---|---|---|---|
| **Structure Class:** | **II** | **Design Wind Speed Without Ice:** | **97 mph** |
| **Exposure Category:** | **B** | **Design Wind Speed With Ice:** | **50 mph** |
| **Topographic Category:** | **1** | **Operational Wind Speed:** | **60 mph** |
| **Crest Height:** | **0 ft** | **Design Ice Thickness:** | **1.00 in** |

## Seismic Parameters

**Analysis Method:** **Equivalent Modal Analysis & Equivalent Lateral Force Methods**

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

**Period Based on Rayleigh Method (sec):** **1.41**

| | | | | | |
|---|---|---|---|---|---|
| **$T_L$ (sec):** | **6** | **p:** | **1** | **$C_s$:** | **0.048** |
| **$S_s$:** | **0.177** | **$S_1$:** | **0.064** | **$C_s$ Max:** | **0.048** |
| **$F_a$:** | **1.600** | **$F_v$:** | **2.400** | **$C_s$ Min:** | **0.030** |
| **$S_{ds}$:** | **0.189** | **$S_{d1}$:** | **0.102** | | |

## Load Cases

| | |
|---|---|
| **1.2D + 1.6W** | **97 mph with No Ice** |
| **0.9D + 1.6W** | **97 mph with No Ice (Reduced DL)** |
| **1.2D + 1.0Di + 1.0Wi** | **50 mph with 1.00 in Radial Ice** |
| **(1.2 + 0.2Sds) * DL + E ELFM** | **Seismic Equivalent Lateral Forces Method** |
| **(1.2 + 0.2Sds) * DL + E EMAM** | **Seismic Equivalent Modal Analysis Method** |
| **(0.9 - 0.2Sds) * DL + E ELFM** | **Seismic (Reduced DL) Equivalent Lateral Forces Method** |
| **(0.9 - 0.2Sds) * DL + E EMAM** | **Seismic (Reduced DL) Equivalent Modal Analysis Method** |
| **1.0D + 1.0W** | **Serviceability 60 mph** |

## Shaft Section Properties

| Sect Info | Length (ft) | Thick (in) | Fy (ksi) | Joint Type | Slip Joint Len (in) | Weight (lb) | Bottom Dia (in) | Bottom Elev (ft) | Bottom Area (in²) | Bottom Ix (in⁴) | Bottom W/t Ratio | Bottom D/t Ratio | Top Dia (in) | Top Elev (ft) | Top Area (in²) | Top Ix (in⁴) | Top W/t Ratio | Top D/t Ratio | Taper (in/ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1-12 | 42.700 | 0.2500 | 65 | | 0.00 | 2,798 | 27.97 | 0.00 | 22.31 | 2188.6 | 27.30 | 111.88 | 20.37 | 42.70 | 16.20 | 837.1 | 19.15 | 81.49 | 0.177945 |
| 2-12 | 34.967 | 0.1880 | 50 | Slip | 32.00 | 1,291 | 21.22 | 40.03 | 12.73 | 719.1 | 27.57 | 112.88 | 15.00 | 75.00 | 8.97 | 251.1 | 18.70 | 79.79 | 0.177945 |
| | | | | Shaft Weight | | 4,089 | | | | | | | | | | | | | |

## Discrete Appurtenance Properties

| Attach Elev (ft) | Description | Qty | Ka | Vert Ecc (ft) | No Ice Weight (lb) | No Ice EPAa (sf) | No Ice Orientation Factor | Ice Weight (lb) | Ice EPAa (sf) | Ice Orientation Factor |
|---|---|---|---|---|---|---|---|---|---|---|
| 73.00 | CCI DTMABP7819VG12A | 3 | 0.80 | 0.000 | 19.20 | 0.972 | 0.50 | 50.80 | 1.784 | 0.50 |
| 73.00 | ADC DD800 | 3 | 0.80 | 0.000 | 13.90 | 1.062 | 0.50 | 46.35 | 1.916 | 0.50 |
| 73.00 | Raycap DC6-48-60-18-8F (23.5" | 1 | 0.80 | 0.000 | 20.00 | 1.260 | 1.00 | 85.32 | 2.077 | 1.00 |
| 73.00 | Raycap DC6-48-60-18-8F | 1 | 0.80 | 0.000 | 20.00 | 1.260 | 1.00 | 85.32 | 2.077 | 1.00 |
| 73.00 | Ericsson Radio 8843 - B2 + B66A | 3 | 0.80 | 0.000 | 71.90 | 1.650 | 0.50 | 148.34 | 2.701 | 0.50 |
| 73.00 | Ericsson RRUS 4449 B5, B12 | 3 | 0.80 | 0.000 | 71.00 | 1.969 | 0.50 | 150.96 | 3.126 | 0.50 |
| 73.00 | Powerwave Allgon 7770.00 | 3 | 0.80 | 0.000 | 35.00 | 5.508 | 0.65 | 211.53 | 6.839 | 0.65 |
| 73.00 | CCI DMP65R-BU6DA | 6 | 0.80 | 0.000 | 79.40 | 12.709 | 0.63 | 398.99 | 16.169 | 0.63 |
| 73.00 | SitePro 1 VFA12-M3-WLL Sector | 3 | 0.75 | 0.000 | 500.00 | 29.300 | 0.67 | 1,182.80 | 50.826 | 0.67 |
| 16.00 | Generic GPS | 1 | 1.00 | 0.000 | 10.00 | 0.900 | 1.00 | 41.15 | 1.581 | 1.00 |
| Totals | Num Loadings:10 | 27 | | | 2,659.40 | | | 7,978.10 | | |

## Linear Appurtenance Properties

Load Case Azimuth (deg) :

| Elev From (ft) | Elev To (ft) | Qty | Description | Coax Dia (in) | Coax Wt (lb/ft) | Flat | Max Coax / Row | Dist Between Rows (in) | Dist Between Cols (in) | Azimuth (deg) | Dist From Face (in) | Exposed To Wind | Carrier |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 73.00 | 2 | 0.39" (10mm) Fiber | 0.39 | 0.06 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 73.00 | 4 | 0.78" (19.7mm) 8 AWG | 0.78 | 0.59 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 73.00 | 1 | 3" conduit | 3.50 | 7.58 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 73.00 | 12 | 7/8" Coax | 1.09 | 0.33 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |
| 0.00 | 16.00 | 1 | 3/8" Coax | 0.44 | 0.08 | N | 0 | 0.00 | 0.00 | 0 | 0.00 | N | AT&T MOBILITY |

## Segment Properties (Max Len : 5. ft)

| Seg Top Elev (ft) | Description | Thick (in) | Flat Dia (in) | Area ($in^2$) | Ix ($in^4$) | W/t Ratio | D/t Ratio | F'y (ksi) | S ($in^3$) | Z ($in^3$) | Weight (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 0.2500 | 27.970 | 22.315 | 2,188.6 | 27.30 | 111.88 | 74.9 | 151.2 | 0.0 | 0.0 |
| 5.00 | | 0.2500 | 27.080 | 21.598 | 1,984.5 | 26.34 | 108.32 | 76.0 | 141.6 | 0.0 | 373.6 |
| 10.00 | | 0.2500 | 26.190 | 20.882 | 1,793.6 | 25.39 | 104.76 | 77.0 | 132.3 | 0.0 | 361.4 |
| 15.00 | | 0.2500 | 25.301 | 20.166 | 1,615.3 | 24.44 | 101.20 | 78.1 | 123.3 | 0.0 | 349.2 |
| 16.00 | | 0.2500 | 25.123 | 20.023 | 1,581.1 | 24.25 | 100.49 | 78.3 | 121.6 | 0.0 | 68.4 |
| 20.00 | | 0.2500 | 24.411 | 19.450 | 1,449.2 | 23.48 | 97.64 | 79.1 | 114.7 | 0.0 | 268.6 |
| 25.00 | | 0.2500 | 23.521 | 18.733 | 1,294.9 | 22.53 | 94.09 | 80.1 | 106.4 | 0.0 | 324.8 |
| 30.00 | | 0.2500 | 22.632 | 18.017 | 1,152.0 | 21.58 | 90.53 | 81.2 | 98.3 | 0.0 | 312.6 |
| 35.00 | | 0.2500 | 21.742 | 17.301 | 1,020.0 | 20.62 | 86.97 | 81.9 | 90.6 | 0.0 | 300.4 |
| 40.00 | | 0.2500 | 20.852 | 16.585 | 898.5 | 19.67 | 83.41 | 81.9 | 83.2 | 0.0 | 288.3 |
| 40.03 | Bot - Section 2 | 0.2500 | 20.846 | 16.580 | 897.7 | 19.66 | 83.38 | 81.9 | 83.2 | 0.0 | 1.9 |
| 42.70 | Top - Section 1 | 0.1880 | 20.748 | 12.446 | 671.5 | 26.89 | 110.36 | 60.8 | 62.5 | 0.0 | 263.0 |
| 45.00 | | 0.1880 | 20.338 | 12.198 | 632.2 | 26.31 | 108.18 | 61.2 | 60.0 | 0.0 | 96.4 |
| 50.00 | | 0.1880 | 19.449 | 11.660 | 552.1 | 25.04 | 103.45 | 62.1 | 54.8 | 0.0 | 203.0 |
| 55.00 | | 0.1880 | 18.559 | 11.121 | 479.1 | 23.77 | 98.72 | 63.0 | 49.9 | 0.0 | 193.8 |
| 60.00 | | 0.1880 | 17.669 | 10.582 | 412.8 | 22.50 | 93.99 | 63.0 | 45.1 | 0.0 | 184.6 |
| 65.00 | | 0.1880 | 16.779 | 10.044 | 352.9 | 21.24 | 89.25 | 63.0 | 40.6 | 0.0 | 175.5 |
| 70.00 | | 0.1880 | 15.890 | 9.505 | 299.1 | 19.97 | 84.52 | 63.0 | 36.4 | 0.0 | 166.3 |
| 73.00 | | 0.1880 | 15.356 | 9.182 | 269.6 | 19.21 | 81.68 | 63.0 | 33.9 | 0.0 | 95.4 |
| 75.00 | | 0.1880 | 15.000 | 8.967 | 251.1 | 18.70 | 79.79 | 63.0 | 32.3 | 0.0 | 61.8 |
| | | | | | | | | | | | 4,088.9 |

Site Number: 302474 Code: ANSI/TIA-222-G 

Site Name: South Windsor, CT Engineering Number:OAA755365_C3_01 1/22/2020 9:10:37 AM

Customer: AT&T MOBILITY

Load Case: 1.2D + 1.6W 97 mph with No Ice 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

## Applied Segment Forces Summary

| | | Shaft Forces | | Discrete Forces | | | | Linear Forces | | Sum of Forces | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg Elev (ft) | Description | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Torsion MY (lb-ft) | Moment MZ (lb-ft) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Torsion MY (lb-ft) | Moment MZ (lb) |
| 0.00 | | 167.4 | 0.0 | | | | | 0.0 | 0.0 | 167.4 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 329.3 | 448.3 | | | | | 0.0 | 84.6 | 329.3 | 532.9 | 0.0 | 0.0 |
| 10.00 | | 318.5 | 433.7 | | | | | 0.0 | 84.6 | 318.5 | 518.3 | 0.0 | 0.0 |
| 15.00 | | 187.2 | 419.0 | | | | | 0.0 | 84.6 | 187.2 | 503.6 | 0.0 | 0.0 |
| 16.00 | Appurtenance(s) | 151.1 | 82.1 | 25.4 | 0.0 | 0.0 | 12.0 | 0.0 | 16.9 | 176.5 | 111.0 | 0.0 | 0.0 |
| 20.00 | | 266.2 | 322.4 | | | | | 0.0 | 67.3 | 266.2 | 389.7 | 0.0 | 0.0 |
| 25.00 | | 286.0 | 389.8 | | | | | 0.0 | 84.1 | 286.0 | 473.9 | 0.0 | 0.0 |
| 30.00 | | 278.5 | 375.2 | | | | | 0.0 | 84.1 | 278.5 | 459.3 | 0.0 | 0.0 |
| 35.00 | | 276.3 | 360.5 | | | | | 0.0 | 84.1 | 276.3 | 444.7 | 0.0 | 0.0 |
| 40.00 | | 139.1 | 345.9 | | | | | 0.0 | 84.1 | 139.1 | 430.0 | 0.0 | 0.0 |
| 40.03 | Bot - Section 2 | 75.6 | 2.3 | | | | | 0.0 | 0.6 | 75.6 | 2.8 | 0.0 | 0.0 |
| 42.70 | Top - Section 1 | 138.8 | 315.5 | | | | | 0.0 | 44.9 | 138.8 | 360.4 | 0.0 | 0.0 |
| 45.00 | | 202.1 | 115.7 | | | | | 0.0 | 38.7 | 202.1 | 154.4 | 0.0 | 0.0 |
| 50.00 | | 273.7 | 243.5 | | | | | 0.0 | 84.1 | 273.7 | 327.7 | 0.0 | 0.0 |
| 55.00 | | 268.5 | 232.6 | | | | | 0.0 | 84.1 | 268.5 | 316.7 | 0.0 | 0.0 |
| 60.00 | | 262.0 | 221.6 | | | | | 0.0 | 84.1 | 262.0 | 305.7 | 0.0 | 0.0 |
| 65.00 | | 254.6 | 210.6 | | | | | 0.0 | 84.1 | 254.6 | 294.7 | 0.0 | 0.0 |
| 70.00 | | 198.4 | 199.6 | | | | | 0.0 | 84.1 | 198.4 | 283.7 | 0.0 | 0.0 |
| 73.00 | Appurtenance(s) | 120.9 | 114.5 | 3,637.5 | 0.0 | 0.0 | 3,179.3 | 0.0 | 50.5 | 3,758.4 | 3,344.2 | 0.0 | 0.0 |
| 75.00 | | 47.8 | 74.1 | | | | | 0.0 | 0.0 | 47.8 | 74.1 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 7,904.87 | 9,327.61 | 0.00 | 0.00 |

Site Number: 302474 Code: ANSI/TIA-222-G 

Site Name: South Windsor, CT Engineering Number:OAA755365_C3_01 1/22/2020 9:10:38 AM

Customer: AT&T MOBILITY

Load Case: 1.2D + 1.6W 97 mph with No Ice 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -9.31 | -7.76 | 0.00 | -428.96 | 0.00 | 428.96 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.511 |
| 5.00 | -8.74 | -7.47 | 0.00 | -390.16 | 0.00 | 390.16 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.14 | -0.27 | 0.490 |
| 10.00 | -8.19 | -7.19 | 0.00 | -352.81 | 0.00 | 352.81 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.56 | -0.53 | 0.467 |
| 15.00 | -7.67 | -7.01 | 0.00 | -316.89 | 0.00 | 316.89 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 1.27 | -0.80 | 0.444 |
| 16.00 | -7.55 | -6.85 | 0.00 | -309.87 | 0.00 | 309.87 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 1.44 | -0.85 | 0.440 |
| 20.00 | -7.14 | -6.61 | 0.00 | -282.46 | 0.00 | 282.46 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 2.25 | -1.07 | 0.420 |
| 25.00 | -6.64 | -6.34 | 0.00 | -249.41 | 0.00 | 249.41 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 3.50 | -1.33 | 0.395 |
| 30.00 | -6.16 | -6.08 | 0.00 | -217.68 | 0.00 | 217.68 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 5.03 | -1.58 | 0.368 |
| 35.00 | -5.70 | -5.82 | 0.00 | -187.27 | 0.00 | 187.27 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 6.83 | -1.83 | 0.341 |
| 40.00 | -5.26 | -5.67 | 0.00 | -158.19 | 0.00 | 158.19 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 8.88 | -2.07 | 0.314 |
| 40.03 | -5.26 | -5.60 | 0.00 | -158.00 | 0.00 | 158.00 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 8.89 | -2.08 | 0.314 |
| 42.70 | -4.89 | -5.46 | 0.00 | -143.05 | 0.00 | 143.05 | 680.63 | 340.31 | 576.96 | 284.94 | 10.09 | -2.20 | 0.509 |
| 45.00 | -4.73 | -5.27 | 0.00 | -130.49 | 0.00 | 130.49 | 671.79 | 335.89 | 558.03 | 275.59 | 11.18 | -2.31 | 0.481 |
| 50.00 | -4.39 | -5.00 | 0.00 | -104.14 | 0.00 | 104.14 | 651.92 | 325.96 | 517.39 | 255.52 | 13.74 | -2.57 | 0.415 |
| 55.00 | -4.07 | -4.73 | 0.00 | -79.13 | 0.00 | 79.13 | 630.56 | 315.28 | 477.10 | 235.62 | 16.57 | -2.81 | 0.343 |
| 60.00 | -3.76 | -4.47 | 0.00 | -55.46 | 0.00 | 55.46 | 600.02 | 300.01 | 431.78 | 213.24 | 19.62 | -3.01 | 0.267 |
| 65.00 | -3.47 | -4.21 | 0.00 | -33.12 | 0.00 | 33.12 | 569.48 | 284.74 | 388.73 | 191.98 | 22.86 | -3.16 | 0.179 |
| 70.00 | -3.20 | -3.99 | 0.00 | -12.09 | 0.00 | 12.09 | 538.94 | 269.47 | 347.93 | 171.83 | 26.23 | -3.25 | 0.076 |
| 73.00 | -0.07 | -0.05 | 0.00 | -0.10 | 0.00 | 0.10 | 520.62 | 260.31 | 324.54 | 160.28 | 28.28 | -3.27 | 0.001 |
| 75.00 | 0.00 | -0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 29.65 | -3.27 | 0.000 |

Site Number: 302474 Code: ANSI/TIA-222-G 

Site Name: South Windsor, CT Engineering Number:OAA755365_C3_01 1/22/2020 9:10:38 AM

Customer: AT&T MOBILITY

Load Case: 0.9D + 1.6W 97 mph with No Ice (Reduced DL) 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00

Dead Load Factor :0.90

Wind Load Factor :1.60

## Applied Segment Forces Summary

| | | Shaft Forces | | Discrete Forces | | | | Linear Forces | | Sum of Forces | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg Elev (ft) | Description | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Torsion MY (lb-ft) | Moment MZ (lb-ft) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Torsion MY (lb-ft) | Moment MZ (lb) |
| 0.00 | | 167.4 | 0.0 | | | | | 0.0 | 0.0 | 167.4 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 329.3 | 336.2 | | | | | 0.0 | 63.4 | 329.3 | 399.7 | 0.0 | 0.0 |
| 10.00 | | 318.5 | 325.2 | | | | | 0.0 | 63.4 | 318.5 | 388.7 | 0.0 | 0.0 |
| 15.00 | | 187.2 | 314.3 | | | | | 0.0 | 63.4 | 187.2 | 377.7 | 0.0 | 0.0 |
| 16.00 | Appurtenance(s) | 151.1 | 61.5 | 25.4 | 0.0 | 0.0 | 9.0 | 0.0 | 12.7 | 176.5 | 83.2 | 0.0 | 0.0 |
| 20.00 | | 266.2 | 241.8 | | | | | 0.0 | 50.5 | 266.2 | 292.2 | 0.0 | 0.0 |
| 25.00 | | 286.0 | 292.3 | | | | | 0.0 | 63.1 | 286.0 | 355.4 | 0.0 | 0.0 |
| 30.00 | | 278.5 | 281.4 | | | | | 0.0 | 63.1 | 278.5 | 344.5 | 0.0 | 0.0 |
| 35.00 | | 276.3 | 270.4 | | | | | 0.0 | 63.1 | 276.3 | 333.5 | 0.0 | 0.0 |
| 40.00 | | 139.1 | 259.4 | | | | | 0.0 | 63.1 | 139.1 | 322.5 | 0.0 | 0.0 |
| 40.03 | Bot - Section 2 | 75.6 | 1.7 | | | | | 0.0 | 0.4 | 75.6 | 2.1 | 0.0 | 0.0 |
| 42.70 | Top - Section 1 | 138.8 | 236.7 | | | | | 0.0 | 33.6 | 138.8 | 270.3 | 0.0 | 0.0 |
| 45.00 | | 202.1 | 86.8 | | | | | 0.0 | 29.0 | 202.1 | 115.8 | 0.0 | 0.0 |
| 50.00 | | 273.7 | 182.7 | | | | | 0.0 | 63.1 | 273.7 | 245.8 | 0.0 | 0.0 |
| 55.00 | | 268.5 | 174.4 | | | | | 0.0 | 63.1 | 268.5 | 237.5 | 0.0 | 0.0 |
| 60.00 | | 262.0 | 166.2 | | | | | 0.0 | 63.1 | 262.0 | 229.3 | 0.0 | 0.0 |
| 65.00 | | 254.6 | 157.9 | | | | | 0.0 | 63.1 | 254.6 | 221.0 | 0.0 | 0.0 |
| 70.00 | | 198.4 | 149.7 | | | | | 0.0 | 63.1 | 198.4 | 212.8 | 0.0 | 0.0 |
| 73.00 | Appurtenance(s) | 120.9 | 85.8 | 3,637.5 | 0.0 | 0.0 | 2,384.5 | 0.0 | 37.9 | 3,758.4 | 2,508.2 | 0.0 | 0.0 |
| 75.00 | | 47.8 | 55.6 | | | | | 0.0 | 0.0 | 47.8 | 55.6 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 7,904.87 | 6,995.70 | 0.00 | 0.00 |

Load Case: 0.9D + 1.6W 97 mph with No Ice (Reduced DL) 21 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :0.90
Wind Load Factor :1.60

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -6.98 | -7.75 | 0.00 | -425.86 | 0.00 | 425.86 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.506 |
| 5.00 | -6.54 | -7.45 | 0.00 | -387.09 | 0.00 | 387.09 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.14 | -0.26 | 0.484 |
| 10.00 | -6.12 | -7.16 | 0.00 | -349.82 | 0.00 | 349.82 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.56 | -0.53 | 0.462 |
| 15.00 | -5.73 | -6.99 | 0.00 | -314.02 | 0.00 | 314.02 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 1.26 | -0.79 | 0.439 |
| 16.00 | -5.63 | -6.82 | 0.00 | -307.03 | 0.00 | 307.03 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 1.43 | -0.85 | 0.434 |
| 20.00 | -5.32 | -6.57 | 0.00 | -279.75 | 0.00 | 279.75 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 2.23 | -1.06 | 0.415 |
| 25.00 | -4.94 | -6.30 | 0.00 | -246.89 | 0.00 | 246.89 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 3.47 | -1.32 | 0.390 |
| 30.00 | -4.58 | -6.03 | 0.00 | -215.39 | 0.00 | 215.39 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 4.99 | -1.57 | 0.363 |
| 35.00 | -4.23 | -5.77 | 0.00 | -185.23 | 0.00 | 185.23 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 6.77 | -1.82 | 0.336 |
| 40.00 | -3.90 | -5.62 | 0.00 | -156.40 | 0.00 | 156.40 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 8.80 | -2.06 | 0.309 |
| 40.03 | -3.89 | -5.55 | 0.00 | -156.21 | 0.00 | 156.21 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 8.81 | -2.06 | 0.309 |
| 42.70 | -3.62 | -5.41 | 0.00 | -141.41 | 0.00 | 141.41 | 680.63 | 340.31 | 576.96 | 284.94 | 10.00 | -2.18 | 0.502 |
| 45.00 | -3.49 | -5.22 | 0.00 | -128.96 | 0.00 | 128.96 | 671.79 | 335.89 | 558.03 | 275.59 | 11.08 | -2.29 | 0.473 |
| 50.00 | -3.24 | -4.95 | 0.00 | -102.88 | 0.00 | 102.88 | 651.92 | 325.96 | 517.39 | 255.52 | 13.62 | -2.55 | 0.408 |
| 55.00 | -2.99 | -4.68 | 0.00 | -78.15 | 0.00 | 78.15 | 630.56 | 315.28 | 477.10 | 235.62 | 16.41 | -2.78 | 0.337 |
| 60.00 | -2.77 | -4.41 | 0.00 | -54.76 | 0.00 | 54.76 | 600.02 | 300.01 | 431.78 | 213.24 | 19.44 | -2.98 | 0.262 |
| 65.00 | -2.55 | -4.15 | 0.00 | -32.70 | 0.00 | 32.70 | 569.48 | 284.74 | 388.73 | 191.98 | 22.64 | -3.13 | 0.175 |
| 70.00 | -2.34 | -3.94 | 0.00 | -11.94 | 0.00 | 11.94 | 538.94 | 269.47 | 347.93 | 171.83 | 25.98 | -3.22 | 0.074 |
| 73.00 | -0.05 | -0.05 | 0.00 | -0.10 | 0.00 | 0.10 | 520.62 | 260.31 | 324.54 | 160.28 | 28.01 | -3.24 | 0.001 |
| 75.00 | 0.00 | -0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 29.36 | -3.24 | 0.000 |

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 1.00 in Radial Ice 20 Iterations

Gust Response Factor :1.10 Ice Dead Load Factor :1.00 Wind Importance Factor :1.00
Dead Load Factor :1.20 Ice Importance Factor :1.00
Wind Load Factor :1.00

## Applied Segment Forces Summary

| | | Shaft Forces | | Discrete Forces | | | | Linear Forces | | Sum of Forces | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seg Elev (ft) | Description | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Torsion MY (lb-ft) | Moment MZ (lb-ft) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Wind FX (lb) | Dead Load (lb) | Torsion MY (lb-ft) | Moment MZ (lb) |
| 0.00 | | 37.0 | 0.0 | | | | | 0.0 | 0.0 | 37.0 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 73.3 | 734.5 | | | | | 0.0 | 84.6 | 73.3 | 819.1 | 0.0 | 0.0 |
| 10.00 | | 71.8 | 745.1 | | | | | 0.0 | 84.6 | 71.8 | 829.7 | 0.0 | 0.0 |
| 15.00 | | 42.4 | 737.3 | | | | | 0.0 | 84.6 | 42.4 | 821.9 | 0.0 | 0.0 |
| 16.00 | Appurtenance(s) | 34.5 | 146.8 | 7.4 | 0.0 | 0.0 | 53.2 | 0.0 | 16.9 | 41.9 | 216.8 | 0.0 | 0.0 |
| 20.00 | | 61.1 | 578.4 | | | | | 0.0 | 67.3 | 61.1 | 645.7 | 0.0 | 0.0 |
| 25.00 | | 66.1 | 706.5 | | | | | 0.0 | 84.1 | 66.1 | 790.6 | 0.0 | 0.0 |
| 30.00 | | 64.9 | 687.4 | | | | | 0.0 | 84.1 | 64.9 | 771.5 | 0.0 | 0.0 |
| 35.00 | | 64.9 | 666.9 | | | | | 0.0 | 84.1 | 64.9 | 751.1 | 0.0 | 0.0 |
| 40.00 | | 32.8 | 645.4 | | | | | 0.0 | 84.1 | 32.8 | 729.5 | 0.0 | 0.0 |
| 40.03 | Bot - Section 2 | 17.9 | 4.3 | | | | | 0.0 | 0.6 | 17.9 | 4.8 | 0.0 | 0.0 |
| 42.70 | Top - Section 1 | 32.9 | 476.2 | | | | | 0.0 | 44.9 | 32.9 | 521.1 | 0.0 | 0.0 |
| 45.00 | | 48.3 | 252.7 | | | | | 0.0 | 38.7 | 48.3 | 291.4 | 0.0 | 0.0 |
| 50.00 | | 65.9 | 532.0 | | | | | 0.0 | 84.1 | 65.9 | 616.1 | 0.0 | 0.0 |
| 55.00 | | 65.2 | 512.1 | | | | | 0.0 | 84.1 | 65.2 | 596.2 | 0.0 | 0.0 |
| 60.00 | | 64.3 | 491.7 | | | | | 0.0 | 84.1 | 64.3 | 575.8 | 0.0 | 0.0 |
| 65.00 | | 63.2 | 470.9 | | | | | 0.0 | 84.1 | 63.2 | 555.0 | 0.0 | 0.0 |
| 70.00 | | 49.8 | 449.7 | | | | | 0.0 | 84.1 | 49.8 | 533.9 | 0.0 | 0.0 |
| 73.00 | Appurtenance(s) | 30.6 | 261.0 | 911.8 | 0.0 | 0.0 | 9,001.2 | 0.0 | 50.5 | 942.4 | 9,312.7 | 0.0 | 0.0 |
| 75.00 | | 12.2 | 170.2 | | | | | 0.0 | 0.0 | 12.2 | 170.2 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 1,918.25 | 19,553.0 | 0.00 | 0.00 |

Site Number: 302474 Code: ANSI/TIA-222-G 

Site Name: South Windsor, CT Engineering Number:OAA755365_C3_01 1/22/2020 9:10:40 AM

Customer: AT&T MOBILITY

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph with 1.00 in Radial Ice 20 Iterations

Gust Response Factor :1.10 Ice Dead Load Factor :1.00 Wind Importance Factor :1.00

Dead Load Factor :1.20 Ice Importance Factor :1.00

Wind Load Factor :1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -19.55 | -1.89 | 0.00 | -110.93 | 0.00 | 110.93 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.144 |
| 5.00 | -18.73 | -1.84 | 0.00 | -101.47 | 0.00 | 101.47 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.04 | -0.07 | 0.138 |
| 10.00 | -17.90 | -1.79 | 0.00 | -92.26 | 0.00 | 92.26 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.15 | -0.14 | 0.133 |
| 15.00 | -17.08 | -1.76 | 0.00 | -83.31 | 0.00 | 83.31 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.33 | -0.21 | 0.127 |
| 16.00 | -16.86 | -1.73 | 0.00 | -81.55 | 0.00 | 81.55 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.37 | -0.22 | 0.126 |
| 20.00 | -16.21 | -1.68 | 0.00 | -74.65 | 0.00 | 74.65 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.58 | -0.28 | 0.121 |
| 25.00 | -15.42 | -1.63 | 0.00 | -66.25 | 0.00 | 66.25 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.91 | -0.35 | 0.115 |
| 30.00 | -14.65 | -1.57 | 0.00 | -58.11 | 0.00 | 58.11 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 1.32 | -0.42 | 0.108 |
| 35.00 | -13.89 | -1.52 | 0.00 | -50.24 | 0.00 | 50.24 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 1.79 | -0.48 | 0.101 |
| 40.00 | -13.16 | -1.49 | 0.00 | -42.64 | 0.00 | 42.64 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 2.33 | -0.55 | 0.094 |
| 40.03 | -13.16 | -1.47 | 0.00 | -42.59 | 0.00 | 42.59 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 2.33 | -0.55 | 0.094 |
| 42.70 | -12.64 | -1.44 | 0.00 | -38.66 | 0.00 | 38.66 | 680.63 | 340.31 | 576.96 | 284.94 | 2.65 | -0.58 | 0.154 |
| 45.00 | -12.34 | -1.40 | 0.00 | -35.34 | 0.00 | 35.34 | 671.79 | 335.89 | 558.03 | 275.59 | 2.94 | -0.61 | 0.147 |
| 50.00 | -11.73 | -1.34 | 0.00 | -28.33 | 0.00 | 28.33 | 651.92 | 325.96 | 517.39 | 255.52 | 3.62 | -0.68 | 0.129 |
| 55.00 | -11.13 | -1.28 | 0.00 | -21.61 | 0.00 | 21.61 | 630.56 | 315.28 | 477.10 | 235.62 | 4.37 | -0.75 | 0.109 |
| 60.00 | -10.56 | -1.22 | 0.00 | -15.19 | 0.00 | 15.19 | 600.02 | 300.01 | 431.78 | 213.24 | 5.18 | -0.80 | 0.089 |
| 65.00 | -10.00 | -1.15 | 0.00 | -9.10 | 0.00 | 9.10 | 569.48 | 284.74 | 388.73 | 191.98 | 6.05 | -0.84 | 0.065 |
| 70.00 | -9.47 | -1.10 | 0.00 | -3.33 | 0.00 | 3.33 | 538.94 | 269.47 | 347.93 | 171.83 | 6.95 | -0.87 | 0.037 |
| 73.00 | -0.17 | -0.01 | 0.00 | -0.03 | 0.00 | 0.03 | 520.62 | 260.31 | 324.54 | 160.28 | 7.49 | -0.87 | 0.001 |
| 75.00 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 7.86 | -0.87 | 0.000 |

Site Number: 302474 Code: ANSI/TIA-222-G 

Site Name: South Windsor, CT Engineering Number:OAA755365_C3_01 1/22/2020 9:10:40 AM

Customer: AT&T MOBILITY

Load Case: 1.0D + 1.0W Serviceability 60 mph 20 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00

Dead Load Factor :1.00

Wind Load Factor :1.00

## Applied Segment Forces Summary

| Seg Elev (ft) | Description | Shaft Forces Wind FX (lb) | Shaft Forces Dead Load (lb) | Discrete Forces Wind FX (lb) | Discrete Forces Torsion MY (lb-ft) | Discrete Forces Moment MZ (lb-ft) | Discrete Forces Dead Load (lb) | Linear Forces Wind FX (lb) | Linear Forces Dead Load (lb) | Sum of Forces Wind FX (lb) | Sum of Forces Dead Load (lb) | Sum of Forces Torsion MY (lb-ft) | Sum of Forces Moment MZ (lb) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | | 35.8 | 0.0 | | | | | 0.0 | 0.0 | 35.8 | 0.0 | 0.0 | 0.0 |
| 5.00 | | 70.5 | 373.6 | | | | | 0.0 | 70.5 | 70.5 | 444.1 | 0.0 | 0.0 |
| 10.00 | | 68.1 | 361.4 | | | | | 0.0 | 70.5 | 68.1 | 431.9 | 0.0 | 0.0 |
| 15.00 | | 40.1 | 349.2 | | | | | 0.0 | 70.5 | 40.1 | 419.7 | 0.0 | 0.0 |
| 16.00 | Appurtenance(s) | 32.3 | 68.4 | 5.4 | 0.0 | 0.0 | 10.0 | 0.0 | 14.1 | 37.8 | 92.5 | 0.0 | 0.0 |
| 20.00 | | 57.0 | 268.6 | | | | | 0.0 | 56.1 | 57.0 | 324.7 | 0.0 | 0.0 |
| 25.00 | | 61.2 | 324.8 | | | | | 0.0 | 70.1 | 61.2 | 394.9 | 0.0 | 0.0 |
| 30.00 | | 59.6 | 312.6 | | | | | 0.0 | 70.1 | 59.6 | 382.7 | 0.0 | 0.0 |
| 35.00 | | 59.1 | 300.4 | | | | | 0.0 | 70.1 | 59.1 | 370.5 | 0.0 | 0.0 |
| 40.00 | | 29.8 | 288.3 | | | | | 0.0 | 70.1 | 29.8 | 358.4 | 0.0 | 0.0 |
| 40.03 | Bot - Section 2 | 16.2 | 1.9 | | | | | 0.0 | 0.5 | 16.2 | 2.3 | 0.0 | 0.0 |
| 42.70 | Top - Section 1 | 29.7 | 263.0 | | | | | 0.0 | 37.4 | 29.7 | 300.3 | 0.0 | 0.0 |
| 45.00 | | 43.3 | 96.4 | | | | | 0.0 | 32.2 | 43.3 | 128.7 | 0.0 | 0.0 |
| 50.00 | | 58.6 | 203.0 | | | | | 0.0 | 70.1 | 58.6 | 273.1 | 0.0 | 0.0 |
| 55.00 | | 57.4 | 193.8 | | | | | 0.0 | 70.1 | 57.4 | 263.9 | 0.0 | 0.0 |
| 60.00 | | 56.1 | 184.6 | | | | | 0.0 | 70.1 | 56.1 | 254.7 | 0.0 | 0.0 |
| 65.00 | | 54.5 | 175.5 | | | | | 0.0 | 70.1 | 54.5 | 245.6 | 0.0 | 0.0 |
| 70.00 | | 42.5 | 166.3 | | | | | 0.0 | 70.1 | 42.5 | 236.4 | 0.0 | 0.0 |
| 73.00 | Appurtenance(s) | 25.9 | 95.4 | 778.3 | 0.0 | 0.0 | 2,649.4 | 0.0 | 42.1 | 804.2 | 2,786.8 | 0.0 | 0.0 |
| 75.00 | | 10.2 | 61.8 | | | | | 0.0 | 0.0 | 10.2 | 61.8 | 0.0 | 0.0 |
| | | | | | | | | Totals: | | 1,691.33 | 7,773.01 | 0.00 | 0.00 |

Load Case: 1.0D + 1.0W Serviceability 60 mph 20 Iterations

Gust Response Factor :1.10 Wind Importance Factor 1.00
Dead Load Factor :1.00
Wind Load Factor :1.00

## Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -7.77 | -1.66 | 0.00 | -91.38 | 0.00 | 91.38 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.113 |
| 5.00 | -7.33 | -1.60 | 0.00 | -83.08 | 0.00 | 83.08 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.03 | -0.06 | 0.108 |
| 10.00 | -6.89 | -1.53 | 0.00 | -75.10 | 0.00 | 75.10 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.12 | -0.11 | 0.103 |
| 15.00 | -6.47 | -1.50 | 0.00 | -67.43 | 0.00 | 67.43 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.27 | -0.17 | 0.098 |
| 16.00 | -6.38 | -1.46 | 0.00 | -65.94 | 0.00 | 65.94 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.31 | -0.18 | 0.097 |
| 20.00 | -6.05 | -1.41 | 0.00 | -60.09 | 0.00 | 60.09 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.48 | -0.23 | 0.093 |
| 25.00 | -5.66 | -1.35 | 0.00 | -53.04 | 0.00 | 53.04 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.75 | -0.28 | 0.087 |
| 30.00 | -5.27 | -1.29 | 0.00 | -46.29 | 0.00 | 46.29 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 1.07 | -0.34 | 0.081 |
| 35.00 | -4.90 | -1.24 | 0.00 | -39.81 | 0.00 | 39.81 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 1.45 | -0.39 | 0.075 |
| 40.00 | -4.54 | -1.21 | 0.00 | -33.62 | 0.00 | 33.62 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 1.89 | -0.44 | 0.069 |
| 40.03 | -4.54 | -1.19 | 0.00 | -33.58 | 0.00 | 33.58 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 1.89 | -0.44 | 0.069 |
| 42.70 | -4.24 | -1.16 | 0.00 | -30.40 | 0.00 | 30.40 | 680.63 | 340.31 | 576.96 | 284.94 | 2.15 | -0.47 | 0.113 |
| 45.00 | -4.11 | -1.12 | 0.00 | -27.73 | 0.00 | 27.73 | 671.79 | 335.89 | 558.03 | 275.59 | 2.38 | -0.49 | 0.107 |
| 50.00 | -3.84 | -1.06 | 0.00 | -22.13 | 0.00 | 22.13 | 651.92 | 325.96 | 517.39 | 255.52 | 2.92 | -0.55 | 0.093 |
| 55.00 | -3.57 | -1.01 | 0.00 | -16.81 | 0.00 | 16.81 | 630.56 | 315.28 | 477.10 | 235.62 | 3.53 | -0.60 | 0.077 |
| 60.00 | -3.32 | -0.95 | 0.00 | -11.78 | 0.00 | 11.78 | 600.02 | 300.01 | 431.78 | 213.24 | 4.18 | -0.64 | 0.061 |
| 65.00 | -3.07 | -0.89 | 0.00 | -7.04 | 0.00 | 7.04 | 569.48 | 284.74 | 388.73 | 191.98 | 4.86 | -0.67 | 0.042 |
| 70.00 | -2.84 | -0.85 | 0.00 | -2.57 | 0.00 | 2.57 | 538.94 | 269.47 | 347.93 | 171.83 | 5.58 | -0.69 | 0.020 |
| 73.00 | -0.06 | -0.01 | 0.00 | -0.02 | 0.00 | 0.02 | 520.62 | 260.31 | 324.54 | 160.28 | 6.02 | -0.70 | 0.000 |
| 75.00 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 6.31 | -0.70 | 0.000 |

## Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

| | | |
|---|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.18 | |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 | |
| Long-Period Transition Period ($T_L$): | 6 | |
| Importance Factor ($I_E$): | 1.00 | |
| Site Coefficient $F_a$: | 1.60 | |
| Site Coeffiecient $F_v$: | 2.40 | |
| Response Modification Coefficient (R): | 1.50 | |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.19 | |
| Design Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 | |
| Seismic Response Coefficient ($C_s$): | 0.05 | |
| Upper Limit $C_s$ | 0.05 | |
| Lower Limit $C_s$ | 0.03 | |
| Period based on Rayleigh Method (sec): | 1.41 | |
| Redundancy Factor (p): | 1.00 | |
| Seismic Force Distribution Exponent (k): | 1.45 | |
| Total Unfactored Dead Load: | 7.77 | k |
| Seismic Base Shear (E): | 0.38 | k |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 19 | 74.00 | 62 | 32 | 0.014 | 5 | 76 |
| 18 | 71.50 | 137 | 68 | 0.030 | 11 | 170 |
| 17 | 67.50 | 236 | 108 | 0.047 | 18 | 293 |
| 16 | 62.50 | 246 | 101 | 0.044 | 17 | 304 |
| 15 | 57.50 | 255 | 92 | 0.040 | 15 | 315 |
| 14 | 52.50 | 264 | 84 | 0.037 | 14 | 327 |
| 13 | 47.50 | 273 | 75 | 0.033 | 12 | 338 |
| 12 | 43.85 | 129 | 31 | 0.014 | 5 | 159 |
| 11 | 41.37 | 300 | 67 | 0.030 | 11 | 372 |
| 10 | 40.02 | 2 | 1 | 0.000 | 0 | 3 |
| 9 | 37.50 | 358 | 70 | 0.031 | 11 | 444 |
| 8 | 32.50 | 371 | 59 | 0.026 | 10 | 459 |
| 7 | 27.50 | 383 | 47 | 0.021 | 8 | 474 |
| 6 | 22.50 | 395 | 37 | 0.016 | 6 | 489 |
| 5 | 18.00 | 325 | 22 | 0.010 | 4 | 402 |
| 4 | 15.50 | 82 | 4 | 0.002 | 1 | 102 |
| 3 | 12.50 | 420 | 17 | 0.007 | 3 | 519 |
| 2 | 7.50 | 432 | 8 | 0.004 | 1 | 535 |
| 1 | 2.50 | 444 | 2 | 0.001 | 0 | 550 |
| CCI DTMABP7819VG12A | 73.00 | 58 | 30 | 0.013 | 5 | 71 |
| ADC DD800 | 73.00 | 42 | 21 | 0.009 | 4 | 52 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 10 | 0.004 | 2 | 25 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 10 | 0.004 | 2 | 25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Ericsson Radio 8843 | 73.00 | 216 | 111 | 0.048 | 18 | 267 |
| Ericsson RRUS 4449 B | 73.00 | 213 | 109 | 0.048 | 18 | 264 |
| Powerwave Allgon 777 | 73.00 | 105 | 54 | 0.024 | 9 | 130 |
| CCI DMP65R-BU6DA | 73.00 | 476 | 245 | 0.107 | 40 | 590 |
| SitePro 1 VFA12-M3-W | 73.00 | 1,500 | 770 | 0.337 | 127 | 1,857 |
| Generic GPS | 16.00 | 10 | 1 | 0.000 | 0 | 12 |
| | | 7,773 | 2,286 | 1.000 | 377 | 9,621 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

| Segment | Height Above Base (ft) | Weight (lb) | $W_z$ (lb-ft) | $C_{vx}$ | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|
| 19 | 74.00 | 62 | 32 | 0.014 | 5 | 53 |
| 18 | 71.50 | 137 | 68 | 0.030 | 11 | 119 |
| 17 | 67.50 | 236 | 108 | 0.047 | 18 | 204 |
| 16 | 62.50 | 246 | 101 | 0.044 | 17 | 212 |
| 15 | 57.50 | 255 | 92 | 0.040 | 15 | 220 |
| 14 | 52.50 | 264 | 84 | 0.037 | 14 | 228 |
| 13 | 47.50 | 273 | 75 | 0.033 | 12 | 235 |
| 12 | 43.85 | 129 | 31 | 0.014 | 5 | 111 |
| 11 | 41.37 | 300 | 67 | 0.030 | 11 | 259 |
| 10 | 40.02 | 2 | 1 | 0.000 | 0 | 2 |
| 9 | 37.50 | 358 | 70 | 0.031 | 11 | 309 |
| 8 | 32.50 | 371 | 59 | 0.026 | 10 | 320 |
| 7 | 27.50 | 383 | 47 | 0.021 | 8 | 330 |
| 6 | 22.50 | 395 | 37 | 0.016 | 6 | 341 |
| 5 | 18.00 | 325 | 22 | 0.010 | 4 | 280 |
| 4 | 15.50 | 82 | 4 | 0.002 | 1 | 71 |
| 3 | 12.50 | 420 | 17 | 0.007 | 3 | 362 |
| 2 | 7.50 | 432 | 8 | 0.004 | 1 | 372 |
| 1 | 2.50 | 444 | 2 | 0.001 | 0 | 383 |
| CCI DTMABP7819VG12A | 73.00 | 58 | 30 | 0.013 | 5 | 50 |
| ADC DD800 | 73.00 | 42 | 21 | 0.009 | 4 | 36 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 10 | 0.004 | 2 | 17 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 10 | 0.004 | 2 | 17 |
| Ericsson Radio 8843 | 73.00 | 216 | 111 | 0.048 | 18 | 186 |
| Ericsson RRUS 4449 B | 73.00 | 213 | 109 | 0.048 | 18 | 184 |
| Powerwave Allgon 777 | 73.00 | 105 | 54 | 0.024 | 9 | 91 |
| CCI DMP65R-BU6DA | 73.00 | 476 | 245 | 0.107 | 40 | 411 |
| SitePro 1 VFA12-M3-W | 73.00 | 1,500 | 770 | 0.337 | 127 | 1,293 |
| Generic GPS | 16.00 | 10 | 1 | 0.000 | 0 | 9 |
| | | 7,773 | 2,286 | 1.000 | 377 | 6,702 |

Load Case (1.2 + 0.2Sds) * DL + E ELFM Seismic Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -9.07 | -0.38 | 0.00 | -24.22 | 0.00 | 24.22 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.035 |
| 5.00 | -8.54 | -0.38 | 0.00 | -22.33 | 0.00 | 22.33 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.01 | -0.02 | 0.033 |
| 10.00 | -8.02 | -0.38 | 0.00 | -20.44 | 0.00 | 20.44 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.03 | -0.03 | 0.032 |
| 15.00 | -7.92 | -0.38 | 0.00 | -18.56 | 0.00 | 18.56 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.07 | -0.05 | 0.031 |
| 16.00 | -7.50 | -0.37 | 0.00 | -18.18 | 0.00 | 18.18 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.08 | -0.05 | 0.031 |
| 20.00 | -7.01 | -0.37 | 0.00 | -16.68 | 0.00 | 16.68 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.13 | -0.06 | 0.030 |
| 25.00 | -6.54 | -0.36 | 0.00 | -14.83 | 0.00 | 14.83 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.20 | -0.08 | 0.028 |
| 30.00 | -6.08 | -0.35 | 0.00 | -13.01 | 0.00 | 13.01 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 0.29 | -0.09 | 0.026 |
| 35.00 | -5.64 | -0.34 | 0.00 | -11.24 | 0.00 | 11.24 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 0.40 | -0.11 | 0.025 |
| 40.00 | -5.63 | -0.34 | 0.00 | -9.52 | 0.00 | 9.52 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 0.52 | -0.12 | 0.023 |
| 40.03 | -5.26 | -0.33 | 0.00 | -9.51 | 0.00 | 9.51 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 0.52 | -0.12 | 0.023 |
| 42.70 | -5.10 | -0.33 | 0.00 | -8.62 | 0.00 | 8.62 | 680.63 | 340.31 | 576.96 | 284.94 | 0.59 | -0.13 | 0.038 |
| 45.00 | -4.76 | -0.32 | 0.00 | -7.86 | 0.00 | 7.86 | 671.79 | 335.89 | 558.03 | 275.59 | 0.65 | -0.14 | 0.036 |
| 50.00 | -4.44 | -0.30 | 0.00 | -6.29 | 0.00 | 6.29 | 651.92 | 325.96 | 517.39 | 255.52 | 0.80 | -0.15 | 0.031 |
| 55.00 | -4.12 | -0.29 | 0.00 | -4.77 | 0.00 | 4.77 | 630.56 | 315.28 | 477.10 | 235.62 | 0.97 | -0.17 | 0.027 |
| 60.00 | -3.82 | -0.27 | 0.00 | -3.34 | 0.00 | 3.34 | 600.02 | 300.01 | 431.78 | 213.24 | 1.15 | -0.18 | 0.022 |
| 65.00 | -3.53 | -0.25 | 0.00 | -1.98 | 0.00 | 1.98 | 569.48 | 284.74 | 388.73 | 191.98 | 1.34 | -0.19 | 0.017 |
| 70.00 | -3.35 | -0.24 | 0.00 | -0.72 | 0.00 | 0.72 | 538.94 | 269.47 | 347.93 | 171.83 | 1.54 | -0.19 | 0.010 |
| 73.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 520.62 | 260.31 | 324.54 | 160.28 | 1.66 | -0.19 | 0.000 |
| 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 1.75 | -0.19 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E ELFM Seismic (Reduced DL) Equivalent Lateral Forces Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -6.32 | -0.38 | 0.00 | -23.98 | 0.00 | 23.98 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.032 |
| 5.00 | -5.95 | -0.38 | 0.00 | -22.10 | 0.00 | 22.10 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.01 | -0.01 | 0.031 |
| 10.00 | -5.58 | -0.38 | 0.00 | -20.21 | 0.00 | 20.21 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.03 | -0.03 | 0.030 |
| 15.00 | -5.51 | -0.38 | 0.00 | -18.34 | 0.00 | 18.34 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.07 | -0.05 | 0.029 |
| 16.00 | -5.22 | -0.37 | 0.00 | -17.96 | 0.00 | 17.96 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.08 | -0.05 | 0.029 |
| 20.00 | -4.88 | -0.37 | 0.00 | -16.47 | 0.00 | 16.47 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.13 | -0.06 | 0.028 |
| 25.00 | -4.55 | -0.36 | 0.00 | -14.64 | 0.00 | 14.64 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.20 | -0.08 | 0.026 |
| 30.00 | -4.23 | -0.35 | 0.00 | -12.84 | 0.00 | 12.84 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 0.29 | -0.09 | 0.025 |
| 35.00 | -3.93 | -0.34 | 0.00 | -11.08 | 0.00 | 11.08 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 0.39 | -0.11 | 0.023 |
| 40.00 | -3.92 | -0.34 | 0.00 | -9.39 | 0.00 | 9.39 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 0.51 | -0.12 | 0.022 |
| 40.03 | -3.66 | -0.33 | 0.00 | -9.37 | 0.00 | 9.37 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 0.51 | -0.12 | 0.021 |
| 42.70 | -3.55 | -0.32 | 0.00 | -8.50 | 0.00 | 8.50 | 680.63 | 340.31 | 576.96 | 284.94 | 0.58 | -0.13 | 0.035 |
| 45.00 | -3.32 | -0.31 | 0.00 | -7.75 | 0.00 | 7.75 | 671.79 | 335.89 | 558.03 | 275.59 | 0.64 | -0.13 | 0.033 |
| 50.00 | -3.09 | -0.30 | 0.00 | -6.19 | 0.00 | 6.19 | 651.92 | 325.96 | 517.39 | 255.52 | 0.79 | -0.15 | 0.029 |
| 55.00 | -2.87 | -0.28 | 0.00 | -4.70 | 0.00 | 4.70 | 630.56 | 315.28 | 477.10 | 235.62 | 0.96 | -0.16 | 0.025 |
| 60.00 | -2.66 | -0.27 | 0.00 | -3.29 | 0.00 | 3.29 | 600.02 | 300.01 | 431.78 | 213.24 | 1.14 | -0.18 | 0.020 |
| 65.00 | -2.46 | -0.25 | 0.00 | -1.95 | 0.00 | 1.95 | 569.48 | 284.74 | 388.73 | 191.98 | 1.33 | -0.19 | 0.014 |
| 70.00 | -2.34 | -0.24 | 0.00 | -0.71 | 0.00 | 0.71 | 538.94 | 269.47 | 347.93 | 171.83 | 1.52 | -0.19 | 0.008 |
| 73.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 520.62 | 260.31 | 324.54 | 160.28 | 1.64 | -0.19 | 0.000 |
| 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 1.72 | -0.19 | 0.000 |

## Equivalent Modal Analysis Method

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

| | |
|---|---|
| Spectral Response Acceleration for Short Period ($S_s$): | 0.18 |
| Spectral Response Acceleration at 1.0 Second Period ($S_1$): | 0.06 |
| Importance Factor ($I_E$): | 1.00 |
| Site Coefficient $F_a$: | 1.60 |
| Site Coefficient $F_v$ | 2.40 |
| Response Modification Coefficient (R): | 1.50 |
| Design Spectral Response Acceleration at Short Period ($S_{ds}$): | 0.19 |
| Desing Spectral Response Acceleration at 1.0 Second Period ($S_{d1}$): | 0.10 |
| Period Based on Rayleigh Method (sec): | 1.41 |
| Redundancy Factor (p): | 1.00 |

## Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|
| 19 | 74.00 | 62 | 1.840 | 1.726 | 1.048 | 0.345 | 14 | 76 |
| 18 | 71.50 | 137 | 1.718 | 1.191 | 0.842 | 0.274 | 25 | 170 |
| 17 | 67.50 | 236 | 1.531 | 0.580 | 0.580 | 0.178 | 28 | 293 |
| 16 | 62.50 | 246 | 1.312 | 0.138 | 0.347 | 0.089 | 15 | 304 |
| 15 | 57.50 | 255 | 1.111 | -0.064 | 0.194 | 0.033 | 6 | 315 |
| 14 | 52.50 | 264 | 0.926 | -0.121 | 0.098 | 0.006 | 1 | 327 |
| 13 | 47.50 | 273 | 0.758 | -0.103 | 0.043 | 0.004 | 1 | 338 |
| 12 | 43.85 | 129 | 0.646 | -0.069 | 0.021 | 0.012 | 1 | 159 |
| 11 | 41.37 | 300 | 0.575 | -0.044 | 0.012 | 0.020 | 4 | 372 |
| 10 | 40.02 | 2 | 0.538 | -0.030 | 0.009 | 0.024 | 0 | 3 |
| 9 | 37.50 | 358 | 0.472 | -0.006 | 0.006 | 0.031 | 7 | 444 |
| 8 | 32.50 | 371 | 0.355 | 0.031 | 0.008 | 0.040 | 10 | 459 |
| 7 | 27.50 | 383 | 0.254 | 0.055 | 0.017 | 0.043 | 11 | 474 |
| 6 | 22.50 | 395 | 0.170 | 0.066 | 0.027 | 0.041 | 11 | 489 |
| 5 | 18.00 | 325 | 0.109 | 0.071 | 0.036 | 0.038 | 8 | 402 |
| 4 | 15.50 | 82 | 0.081 | 0.072 | 0.040 | 0.036 | 2 | 102 |
| 3 | 12.50 | 420 | 0.053 | 0.071 | 0.042 | 0.034 | 10 | 519 |
| 2 | 7.50 | 432 | 0.019 | 0.063 | 0.037 | 0.029 | 8 | 535 |
| 1 | 2.50 | 444 | 0.002 | 0.033 | 0.018 | 0.015 | 5 | 550 |
| CCI DTMABP7819VG12A | 73.00 | 58 | 1.791 | 1.496 | 0.961 | 0.316 | 12 | 71 |
| ADC DD800 | 73.00 | 42 | 1.791 | 1.496 | 0.961 | 0.316 | 9 | 52 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 1.791 | 1.496 | 0.961 | 0.316 | 4 | 25 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 1.791 | 1.496 | 0.961 | 0.316 | 4 | 25 |
| Ericsson Radio 8843 | 73.00 | 216 | 1.791 | 1.496 | 0.961 | 0.316 | 45 | 267 |
| Ericsson RRUS 4449 B | 73.00 | 213 | 1.791 | 1.496 | 0.961 | 0.316 | 45 | 264 |
| Powerwave Allgon 777 | 73.00 | 105 | 1.791 | 1.496 | 0.961 | 0.316 | 22 | 130 |
| CCI DMP65R-BU6DA | 73.00 | 476 | 1.791 | 1.496 | 0.961 | 0.316 | 100 | 590 |
| SitePro 1 VFA12-M3-W | 73.00 | 1,500 | 1.791 | 1.496 | 0.961 | 0.316 | 316 | 1,857 |
| Generic GPS | 16.00 | 10 | 0.086 | 0.071 | 0.039 | 0.037 | 0 | 12 |
| | | 7,773 | 28.671 | 17.194 | 12.112 | 4.171 | 724 | 9,621 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

| Segment | Height Above Base (ft) | Weight (lb) | a | b | c | Saz | Horizontal Force (lb) | Vertical Force (lb) |
|---|---|---|---|---|---|---|---|---|
| 19 | 74.00 | 62 | 1.840 | 1.726 | 1.048 | 0.345 | 14 | 53 |
| 18 | 71.50 | 137 | 1.718 | 1.191 | 0.842 | 0.274 | 25 | 119 |
| 17 | 67.50 | 236 | 1.531 | 0.580 | 0.580 | 0.178 | 28 | 204 |
| 16 | 62.50 | 246 | 1.312 | 0.138 | 0.347 | 0.089 | 15 | 212 |
| 15 | 57.50 | 255 | 1.111 | -0.064 | 0.194 | 0.033 | 6 | 220 |
| 14 | 52.50 | 264 | 0.926 | -0.121 | 0.098 | 0.006 | 1 | 228 |
| 13 | 47.50 | 273 | 0.758 | -0.103 | 0.043 | 0.004 | 1 | 235 |
| 12 | 43.85 | 129 | 0.646 | -0.069 | 0.021 | 0.012 | 1 | 111 |
| 11 | 41.37 | 300 | 0.575 | -0.044 | 0.012 | 0.020 | 4 | 259 |
| 10 | 40.02 | 2 | 0.538 | -0.030 | 0.009 | 0.024 | 0 | 2 |
| 9 | 37.50 | 358 | 0.472 | -0.006 | 0.006 | 0.031 | 7 | 309 |
| 8 | 32.50 | 371 | 0.355 | 0.031 | 0.008 | 0.040 | 10 | 320 |
| 7 | 27.50 | 383 | 0.254 | 0.055 | 0.017 | 0.043 | 11 | 330 |
| 6 | 22.50 | 395 | 0.170 | 0.066 | 0.027 | 0.041 | 11 | 341 |
| 5 | 18.00 | 325 | 0.109 | 0.071 | 0.036 | 0.038 | 8 | 280 |
| 4 | 15.50 | 82 | 0.081 | 0.072 | 0.040 | 0.036 | 2 | 71 |
| 3 | 12.50 | 420 | 0.053 | 0.071 | 0.042 | 0.034 | 10 | 362 |
| 2 | 7.50 | 432 | 0.019 | 0.063 | 0.037 | 0.029 | 8 | 372 |
| 1 | 2.50 | 444 | 0.002 | 0.033 | 0.018 | 0.015 | 5 | 383 |
| CCI DTMABP7819VG12A | 73.00 | 58 | 1.791 | 1.496 | 0.961 | 0.316 | 12 | 50 |
| ADC DD800 | 73.00 | 42 | 1.791 | 1.496 | 0.961 | 0.316 | 9 | 36 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 1.791 | 1.496 | 0.961 | 0.316 | 4 | 17 |
| Raycap DC6-48-60-18- | 73.00 | 20 | 1.791 | 1.496 | 0.961 | 0.316 | 4 | 17 |
| Ericsson Radio 8843 | 73.00 | 216 | 1.791 | 1.496 | 0.961 | 0.316 | 45 | 186 |
| Ericsson RRUS 4449 B | 73.00 | 213 | 1.791 | 1.496 | 0.961 | 0.316 | 45 | 184 |
| Powerwave Allgon 777 | 73.00 | 105 | 1.791 | 1.496 | 0.961 | 0.316 | 22 | 91 |
| CCI DMP65R-BU6DA | 73.00 | 476 | 1.791 | 1.496 | 0.961 | 0.316 | 100 | 411 |
| SitePro 1 VFA12-M3-W | 73.00 | 1,500 | 1.791 | 1.496 | 0.961 | 0.316 | 316 | 1,293 |
| Generic GPS | 16.00 | 10 | 0.086 | 0.071 | 0.039 | 0.037 | 0 | 9 |
| | | 7,773 | 28.671 | 17.194 | 12.112 | 4.171 | 724 | 6,702 |

Load Case (1.2 + 0.2Sds) * DL + E EMAM Seismic Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -9.07 | -0.72 | 0.00 | -49.58 | 0.00 | 49.58 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.064 |
| 5.00 | -8.54 | -0.72 | 0.00 | -45.98 | 0.00 | 45.98 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.02 | -0.03 | 0.063 |
| 10.00 | -8.02 | -0.71 | 0.00 | -42.39 | 0.00 | 42.39 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.07 | -0.06 | 0.061 |
| 15.00 | -7.91 | -0.71 | 0.00 | -38.83 | 0.00 | 38.83 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.15 | -0.09 | 0.059 |
| 16.00 | -7.50 | -0.71 | 0.00 | -38.11 | 0.00 | 38.11 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.17 | -0.10 | 0.059 |
| 20.00 | -7.01 | -0.70 | 0.00 | -35.29 | 0.00 | 35.29 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.27 | -0.13 | 0.057 |
| 25.00 | -6.54 | -0.69 | 0.00 | -31.80 | 0.00 | 31.80 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.42 | -0.16 | 0.055 |
| 30.00 | -6.08 | -0.68 | 0.00 | -28.36 | 0.00 | 28.36 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 0.60 | -0.19 | 0.052 |
| 35.00 | -5.63 | -0.68 | 0.00 | -24.95 | 0.00 | 24.95 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 0.83 | -0.23 | 0.049 |
| 40.00 | -5.63 | -0.68 | 0.00 | -21.58 | 0.00 | 21.58 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 1.08 | -0.26 | 0.047 |
| 40.03 | -5.26 | -0.67 | 0.00 | -21.55 | 0.00 | 21.55 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 1.08 | -0.26 | 0.046 |
| 42.70 | -5.10 | -0.67 | 0.00 | -19.76 | 0.00 | 19.76 | 680.63 | 340.31 | 576.96 | 284.94 | 1.23 | -0.28 | 0.077 |
| 45.00 | -4.76 | -0.67 | 0.00 | -18.21 | 0.00 | 18.21 | 671.79 | 335.89 | 558.03 | 275.59 | 1.37 | -0.29 | 0.073 |
| 50.00 | -4.43 | -0.67 | 0.00 | -14.85 | 0.00 | 14.85 | 651.92 | 325.96 | 517.39 | 255.52 | 1.70 | -0.33 | 0.065 |
| 55.00 | -4.12 | -0.67 | 0.00 | -11.50 | 0.00 | 11.50 | 630.56 | 315.28 | 477.10 | 235.62 | 2.06 | -0.36 | 0.055 |
| 60.00 | -3.81 | -0.65 | 0.00 | -8.16 | 0.00 | 8.16 | 600.02 | 300.01 | 431.78 | 213.24 | 2.46 | -0.39 | 0.045 |
| 65.00 | -3.52 | -0.62 | 0.00 | -4.90 | 0.00 | 4.90 | 569.48 | 284.74 | 388.73 | 191.98 | 2.88 | -0.41 | 0.032 |
| 70.00 | -3.35 | -0.60 | 0.00 | -1.79 | 0.00 | 1.79 | 538.94 | 269.47 | 347.93 | 171.83 | 3.32 | -0.43 | 0.017 |
| 73.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 520.62 | 260.31 | 324.54 | 160.28 | 3.59 | -0.43 | 0.000 |
| 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 3.77 | -0.43 | 0.000 |

Load Case (0.9 - 0.2Sds) * DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Calculated Forces

| Seg Elev (ft) | Pu FY (-) (kips) | Vu FX (-) (kips) | Tu MY (ft-kips) | Mu MZ (ft-kips) | Mu MX (ft-kips) | Resultant Moment (ft-kips) | phi Pn (kips) | phi Vn (kips) | phi Tn (ft-kips) | phi Mn (ft-kips) | Total Deflect (in) | Rotation (deg) | Ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | -6.32 | -0.72 | 0.00 | -49.13 | 0.00 | 49.13 | 1,505.06 | 752.53 | 1,720.35 | 849.62 | 0.00 | 0.00 | 0.062 |
| 5.00 | -5.95 | -0.72 | 0.00 | -45.53 | 0.00 | 45.53 | 1,476.97 | 738.48 | 1,633.57 | 806.76 | 0.02 | -0.03 | 0.060 |
| 10.00 | -5.58 | -0.71 | 0.00 | -41.95 | 0.00 | 41.95 | 1,447.53 | 723.77 | 1,547.44 | 764.22 | 0.07 | -0.06 | 0.059 |
| 15.00 | -5.51 | -0.71 | 0.00 | -38.40 | 0.00 | 38.40 | 1,416.76 | 708.38 | 1,462.10 | 722.08 | 0.15 | -0.09 | 0.057 |
| 16.00 | -5.22 | -0.70 | 0.00 | -37.70 | 0.00 | 37.70 | 1,410.45 | 705.22 | 1,445.14 | 713.70 | 0.17 | -0.10 | 0.057 |
| 20.00 | -4.88 | -0.69 | 0.00 | -34.89 | 0.00 | 34.89 | 1,384.65 | 692.32 | 1,377.70 | 680.40 | 0.26 | -0.13 | 0.055 |
| 25.00 | -4.55 | -0.68 | 0.00 | -31.43 | 0.00 | 31.43 | 1,351.19 | 675.60 | 1,294.40 | 639.26 | 0.41 | -0.16 | 0.053 |
| 30.00 | -4.23 | -0.67 | 0.00 | -28.02 | 0.00 | 28.02 | 1,316.40 | 658.20 | 1,212.34 | 598.73 | 0.60 | -0.19 | 0.050 |
| 35.00 | -3.92 | -0.67 | 0.00 | -24.65 | 0.00 | 24.65 | 1,275.25 | 637.63 | 1,127.24 | 556.70 | 0.82 | -0.22 | 0.047 |
| 40.00 | -3.92 | -0.67 | 0.00 | -21.31 | 0.00 | 21.31 | 1,222.46 | 611.23 | 1,035.33 | 511.31 | 1.07 | -0.26 | 0.045 |
| 40.03 | -3.66 | -0.66 | 0.00 | -21.28 | 0.00 | 21.28 | 1,222.10 | 611.05 | 1,034.73 | 511.01 | 1.07 | -0.26 | 0.045 |
| 42.70 | -3.55 | -0.66 | 0.00 | -19.51 | 0.00 | 19.51 | 680.63 | 340.31 | 576.96 | 284.94 | 1.22 | -0.27 | 0.074 |
| 45.00 | -3.32 | -0.66 | 0.00 | -17.98 | 0.00 | 17.98 | 671.79 | 335.89 | 558.03 | 275.59 | 1.36 | -0.29 | 0.070 |
| 50.00 | -3.09 | -0.66 | 0.00 | -14.66 | 0.00 | 14.66 | 651.92 | 325.96 | 517.39 | 255.52 | 1.68 | -0.33 | 0.062 |
| 55.00 | -2.87 | -0.66 | 0.00 | -11.35 | 0.00 | 11.35 | 630.56 | 315.28 | 477.10 | 235.62 | 2.04 | -0.36 | 0.053 |
| 60.00 | -2.66 | -0.64 | 0.00 | -8.06 | 0.00 | 8.06 | 600.02 | 300.01 | 431.78 | 213.24 | 2.43 | -0.39 | 0.042 |
| 65.00 | -2.45 | -0.61 | 0.00 | -4.84 | 0.00 | 4.84 | 569.48 | 284.74 | 388.73 | 191.98 | 2.85 | -0.41 | 0.030 |
| 70.00 | -2.33 | -0.59 | 0.00 | -1.77 | 0.00 | 1.77 | 538.94 | 269.47 | 347.93 | 171.83 | 3.29 | -0.42 | 0.015 |
| 73.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 520.62 | 260.31 | 324.54 | 160.28 | 3.55 | -0.43 | 0.000 |
| 75.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 508.41 | 254.20 | 309.40 | 152.80 | 3.73 | -0.43 | 0.000 |

## Analysis Summary

| | Reactions | | | | | | Max Usage | |
|---|---|---|---|---|---|---|---|---|
| Load Case | Shear FX (kips) | Shear FZ (kips) | Axial FY (kips) | Moment MX (ft-kips) | Moment MY (ft-kips) | Moment MZ (ft-kips) | Elev (ft) | Interaction Ratio |
| 1.2D + 1.6W | 7.76 | 0.00 | 9.31 | 0.00 | 0.00 | 428.96 | 0.00 | 0.51 |
| 0.9D + 1.6W | 7.75 | 0.00 | 6.98 | 0.00 | 0.00 | 425.86 | 0.00 | 0.51 |
| 1.2D + 1.0Di + 1.0Wi | 1.89 | 0.00 | 19.55 | 0.00 | 0.00 | 110.93 | 42.70 | 0.15 |
| (1.2 + 0.2Sds) * DL + E ELFM | 0.38 | 0.00 | 9.07 | 0.00 | 0.00 | 24.22 | 42.70 | 0.04 |
| (1.2 + 0.2Sds) * DL + E EMAM | 0.72 | 0.00 | 9.07 | 0.00 | 0.00 | 49.58 | 42.70 | 0.08 |
| (0.9 - 0.2Sds) * DL + E ELFM | 0.38 | 0.00 | 6.32 | 0.00 | 0.00 | 23.98 | 42.70 | 0.04 |
| (0.9 - 0.2Sds) * DL + E EMAM | 0.72 | 0.00 | 6.32 | 0.00 | 0.00 | 49.13 | 42.70 | 0.07 |
| 1.0D + 1.0W | 1.66 | 0.00 | 7.77 | 0.00 | 0.00 | 91.38 | 42.70 | 0.11 |

**Site Name:** South Windsor,CT
**Site Number:** 302474
**Tower Type:** MP
**Design Loads (Factored) - Analysis per TIA-222-G Standards**

# Monolithic Mat & Pier Foundation Analysis

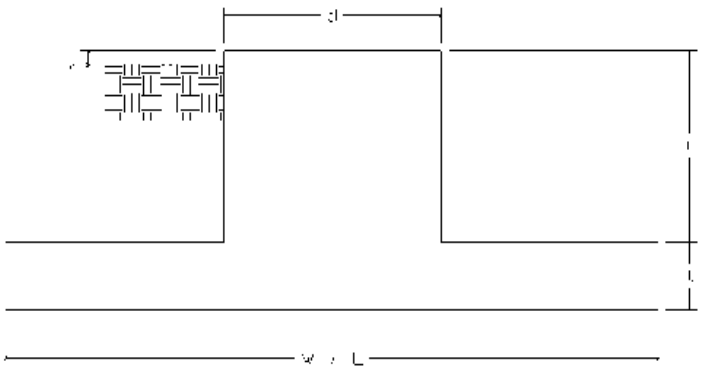
| Foundation Analysis Parameters | | |
|---|---|---|
| Design / Analysis / Mapping: | Analysis | - |
| Compression/Leg: | 9.3 | k |
| Uplift/Leg: | 0.0 | k |
| Total Shear: | 7.8 | k |
| Moment: | 429.0 | k-ft |
| Tower + Appurtenance Weight: | 9.3 | k |
| Depth to Base of Foundation (l + t - h): | 8 | ft |
| Diameter of Pier (d): | 4.89 | ft |
| Length of Pier (l): | 5.5 | ft |
| Height of Pier above Ground (h): | 0.5 | ft |
| Width of Pad (W): | 14 | ft |
| Length of Pad (L): | 14 | ft |
| Thickness of Pad (t): | 3 | ft |
| Tower Leg Center to Center: | 0 | ft |
| Number of Tower Legs: | 1 | - |
| Tower Center from Mat Center: | 0 | ft |
| Depth Below Ground Surface to Water Table: | 99 | ft |
| Unit Weight of Concrete: | 150 | pcf |
| Unit Weight of Soil Above Water Table: | 120 | pcf |
| Unit Weight of Water: | 62.4 | pcf |
| Unit Weight of Soil Below Water Table: | 57.6 | pcf |
| Friction Angle of Uplift: | 15 | ° |
| Coefficient of Shear Friction: | 0.3 | - |
| Ultimate Compressive Bearing Pressure: | 9,000 | psf |
| Ultimate Passive Pressure on Pad Face: | 0 | psf |
| $f_{Soil\ and\ Concrete\ Weight}$: | 0.9 | - |
| $f_{Soil}$: | 0.75 | - |

| Foundation Steel Parameters | | |
|---|---|---|
| Concrete Strength ($f'_c$): | 3,000 | psi |
| Pad Tension Steel Depth: | 32.0 | in |
| Dead Load Factor: | 0.9 | - |
| $f_{Shear}$: | 0.75 | - |
| $f_{Flexure\ /\ Tension}$: | 0.9 | - |
| $f_{Compression:}$ | 0.65 | - |
| b: | 0.85 | - |
| Bottom Pad Rebar Size #: | 9 | - |
| # of Bottom Pad Rebar: | 28 | - |
| Pad Bottom Steel Area: | 28.00 | $in^2$ |
| Pad Steel $F_y$: | 60,000 | psi |
| Top Pad Rebar Size #: | 5 | - |
| # of Top Pad Rebar: | 28 | - |
| Pad Top Steel Area: | 8.68 | $in^2$ |
| Pier Rebar Size #: | 10 | - |
| Pier Steel Area (Single Bar): | 1.27 | $in^2$ |
| # of Pier Rebar: | 36 | - |
| Pier Steel $F_y$: | 60,000 | psi |
| Pier Cage Diameter: | 50.7 | in |
| Rebar Strain Limit: | 0.008 | - |
| Steel Elastic Modulus: | 29,000 | ksi |
| Tie Rebar Size #: | 4 | - |
| Tie Steel Area (Single Bar): | 0.20 | $in^2$ |
| Tie Spacing: | 12 | in |
| Tie Steel $F_y$: | 60,000 | psi |

| Overturning Moment Usage | | |
|---|---|---|
| Design OTM: | 494.9 | k-ft |
| OTM Resistance: | 1562.8 | k-ft |
| Design OTM / OTM Resistance: | 32% | Pass |

| Soil Bearing Pressure Usage | | |
|---|---|---|
| Net Bearing Pressure: | 1309 | psf |
| Factored Nominal Bearing Pressure: | 6750 | psf |
| Factored Nominal (Net) Bearing Pressure: | 19% | Pass |
| Load Direction Controling Design Bearing Pressure: | *Diagonal to Pad Edge* | |

| Sliding Factor of Safety | | |
|---|---|---|
| Ultimate Friction Resistance: | 65.3 | k |
| Ultimate Passive Pressure Resistance: | 0.0 | k |
| Total Factored Sliding Resistance: | 49.0 | k |
| Sliding Design / Sliding Resistance: | 16% | Pass |



| Pad Strength Capacity | | | |
|---|---|---|---|
| Factored One Way Shear ($V_u$): | 30.8 | k | |
| One Way Shear Capacity ($fV_c$): | 441.7 | k | *ACI11.3.1.1* |
| $V_u$ / $fV_c$: | 7% | Pass | |
| Load Direction Controling Shear Capacity: | *Parallel to Pad Edge* | | |
| Lower Steel Pad Factored Moment ($M_u$): | 156.4 | k-ft | |
| Lower Steel Pad Moment Capacity ($fM_n$): | 3822.0 | k-ft | *ACI10.3* |
| $M_u$ / $fM_n$: | 4% | Pass | |
| Load Direction Controling Flexural Capacity: | *Parallel to Pad Edge* | | |
| Upper Steel Pad Factored Moment ($M_u$): | 107.1 | k-ft | |
| Upper Steel Pad Moment Capacity ($fM_n$): | 1229.7 | k-ft | |
| $M_u$ / $fM_n$: | 9% | Pass | |
| Lower Pad Flexural Reinforcement Ratio: | 0.0052 | | *OK - Minimum Reinforcement Ratio Met - ACI10.5.1* |
| Upper Pad Flexural Reinforcement Ratio: | 0.0016 | | *OK - Minimum Reinforcement Ratio Met - ACI10.5.1* |
| Pad Shrinkage Reinforcement Ratio: | 0.0068 | | *OK - Shrinkage Reinforcement Ratio Met - ACI7.12.2.1* |
| Lower Pad Reinforcement Spacing: | 6 | in | *Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4* |
| Upper Pad Reinforcement Spacing: | 6 | in | *Pad Reinforcing Spacing OK - ACI7.12.2.2 & 10.5.4* |
| Factored Punching Shear ($V_u$): | 0.0 | k | |
| Nominal Punching Shear Capacity ($f_cV_n$): | 1497.9 | k | *ACI11.12.2.1* |
| $V_u$ / $fV_c$: | 0% | Pass | |

| Pier Strength Capacity | | | |
|---|---|---|---|
| Factored Moment in Pier ($M_u$): | 471.6 | k-ft | |
| Pier Moment Capacity ($fM_n$): | 5099.0 | k-ft | |
| $M_u$ / $fM_n$: | 9% | Pass | |
| Factored Shear in Pier ($V_u$): | 7.8 | k | |
| Pier Shear Capacity ($fV_n$): | 293.0 | k | |
| $V_u$ / $fV_c$: | 3% | Pass | |
| Pier Shear Reinforcement Ratio: | 0.0007 | | *OK - No Ties Necessary for Shear - ACI11.5.6.1* |
| Factored Tension in Pier ($T_u$): | 0.0 | k | |
| Pier Tension Capacity ($fT_n$): | 2468.9 | k | |
| $T_u$ / $fT_n$: | 0% | Pass | |
| Factored Compression in Pier ($P_u$): | 9.3 | k | |
| Pier Compression Capacity ($fP_n$): | 3525.4 | k | *ACI10.3.6.2* |
| $P_u$ / $fP_n$: | 0% | Pass | |
| Pier Compression Reinforcement Ratio: | 0.017 | | *OK - Reinforcement Ratio Met - ACI10.9.1 & 10.8.4* |
| Minimum Depth to Develop Vertical Rebar: | 28 | in | *ACI12.2.3* |
| Minimum Hook Development Length: | 20 | in | *ACI12.5* |
| Minimum Mat Thickness / Edge Distance from Pier: | 23.0 | in | |
| Minimum Foundation Depth: | 4.52 | ft | |
| $M_u/f_BM_n + T_u/f_TT_n$: | 9% | Pass | |

# Base Plate & Anchor Rod Analysis

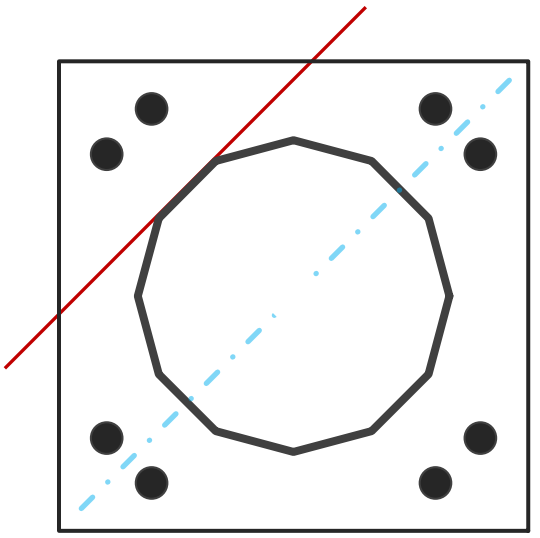
| Pole Dimensions | | |
|---|---|---|
| Number of Sides | 12 | - |
| Diameter | 27.97 | in |
| Thickness | 0.25 | in |
| Orientation Offset | 0 | ° |

| Base Reactions | | |
|---|---|---|
| Moment, Mu | 429.0 | k-ft |
| Axial, Pu | 9.3 | k |
| Shear, Vu | 7.8 | k |
| Neutral Axis | 45 | ° |

| Report Capacities | | |
|---|---|---|
| Component | Capacity | Result |
| Base Plate | 49% | Pass |
| Anchor Rods | 23% | Pass |
| Dwyidag | - | - |

| Base Plate | | |
|---|---|---|
| Shape | Square | - |
| Width | 44 | in |
| Thickness | 2 | in |
| Grade | A572-60 | |
| Yield Strength, Fy | 60 | ksi |
| Tensile Strength, Fu | 75 | ksi |
| Clip | 0 | in |
| Orientation Offset | 0 | ° |
| Anchor Rod Detail | c | η=0.55 |
| Clear Distance | N/A | in |
| Applied Moment, Mu | 907.7 | k |
| Bending Stress, ϕMn | 1836.3 | k |

| Original Anchor Rods | | |
|---|---|---|
| Arrangement | Cluster | - |
| Quantity | 8 | - |
| Diameter, ø | 2 1/4 | in |
| Bolt Circle | 44 | in |
| Grade | A615-75 | |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Spacing | 6.0 | in |
| Orientation Offset | 0 | ° |
| Applied Force, Pu | 59.1 | k |
| Anchor Rods, ϕPn | 259.8 | k |



# Calculations for Monopole Base Plate & Anchor Rod Analysis

**Reaction Distribution**

| Reaction | Shear Vu | Moment Mu | Factor |
|---|---|---|---|
| - | k | k-ft | - |
| Base Forces | 7.8 | 429.0 | 1.00 |
| Anchor Rod Forces | 7.8 | 429.0 | 1.00 |
| Additional Bolt (Grp1) Forces | 0.0 | 0.0 | 0.00 |
| Additional Bolt (Grp2) Forces | 0.0 | 0.0 | 0.00 |
| Dywidag Forces | 0.0 | 0.0 | 0.00 |
| Stiffener Forces | 0.0 | 0.0 | 0.00 |

**Geometric Properties**

| Section | Gross Area | Net Area | Individual Inertia | Threads per Inch | Moment of Inertia |
|---|---|---|---|---|---|
| - | $in^2$ | $in^2$ | $in^4$ | # | $in^4$ |
| Pole | 21.5234 | 1.7936 | 0.0375 | | 2067.77 |
| Bolt | 3.9761 | 3.2477 | 0.8393 | 4.5 | 6294.24 |
| Bolt1 | 0.0000 | 0.0000 | 0.0000 | 0 | 0.00 |
| Bolt2 | 0.0000 | 0.0000 | 0.0000 | 0 | 0.00 |
| Dywidag | 0.0000 | 0.0000 | 0.0000 | | 0.00 |
| Stiffener | 0.0000 | 0.0000 | 0.0000 | | 0.00 |

| Base Plate | | |
|---|---|---|
| Shape | Square | - |
| Width, W | 44 | in |
| Thickness, t | 2 | in |
| Yield Strength, Fy | 60 | ksi |
| Tensile Strength, Fu | 75 | ksi |
| Base Plate Chord | 33.966 | in |
| Detail Type | c | - |
| Detail Factor | 0.55 | - |
| Clear Distance | N/A | - |

| Anchor Rods | | |
|---|---|---|
| Anchor Rod Quantity, N | 8 | - |
| Rod Diameter, d | 2.25 | in |
| Bolt Circle, BC | 44 | in |
| Yield Strength, Fy | 75 | ksi |
| Tensile Strength, Fu | 100 | ksi |
| Applied Axial, Pu | 59.1 | k |
| Applied Shear, Vu | 0.2 | k |
| Compressive Capacity, ϕPn | 259.8 | k |
| Tensile Capacity, ϕRnt | 0.227 | OK |
| Interaction Capacity | 0.229 | OK |

| External Base Plate | | |
|---|---|---|
| Chord Length AA | 34.005 | in |
| Additional AA | 0.000 | in |
| Section Modulus, Z | 34.005 | $in^3$ |
| Applied Moment, Mu | 907.7 | k-ft |
| Bending Capacity, ϕMn | 1836.3 | k-ft |
| Capacity, Mu/ϕMn | 0.494 | OK |
| | | |
| Chord Length AB | 33.010 | in |
| Additional AB | 0.000 | in |
| Section Modulus, Z | 33.010 | $in^3$ |
| Applied Moment, Mu | 849.0 | k-ft |
| Bending Capacity, ϕMn | 1782.5 | k-ft |
| Capacity, Mu/ϕMn | 0.476 | OK |
| | | |
| Bend Line Length | 0.000 | in |
| Additional Bend Line | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

| Internal Base Plate | | |
|---|---|---|
| Arc Length | 0.000 | in |
| Section Modulus, Z | 0.000 | $in^3$ |
| Moment Arm | 0.000 | in |
| Applied Moment, Mu | 0.0 | k-ft |
| Bending Capacity, ϕMn | 0.0 | k-ft |
| Capacity, Mu/ϕMn | | |

**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

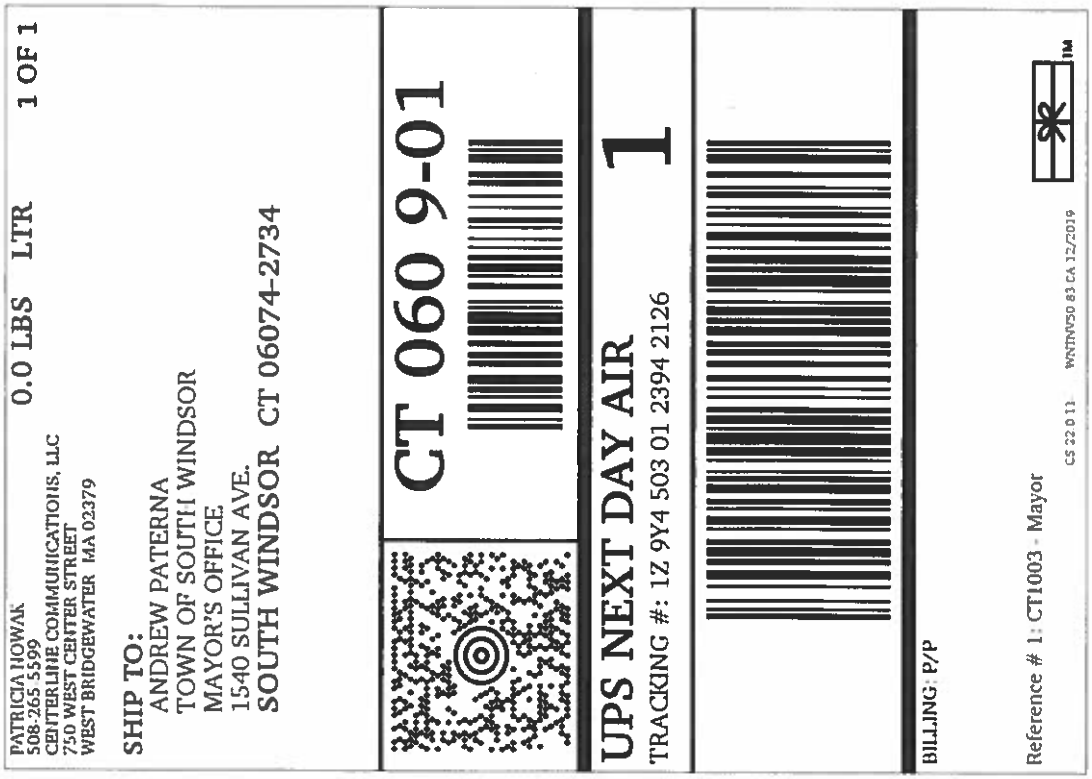
   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE



**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

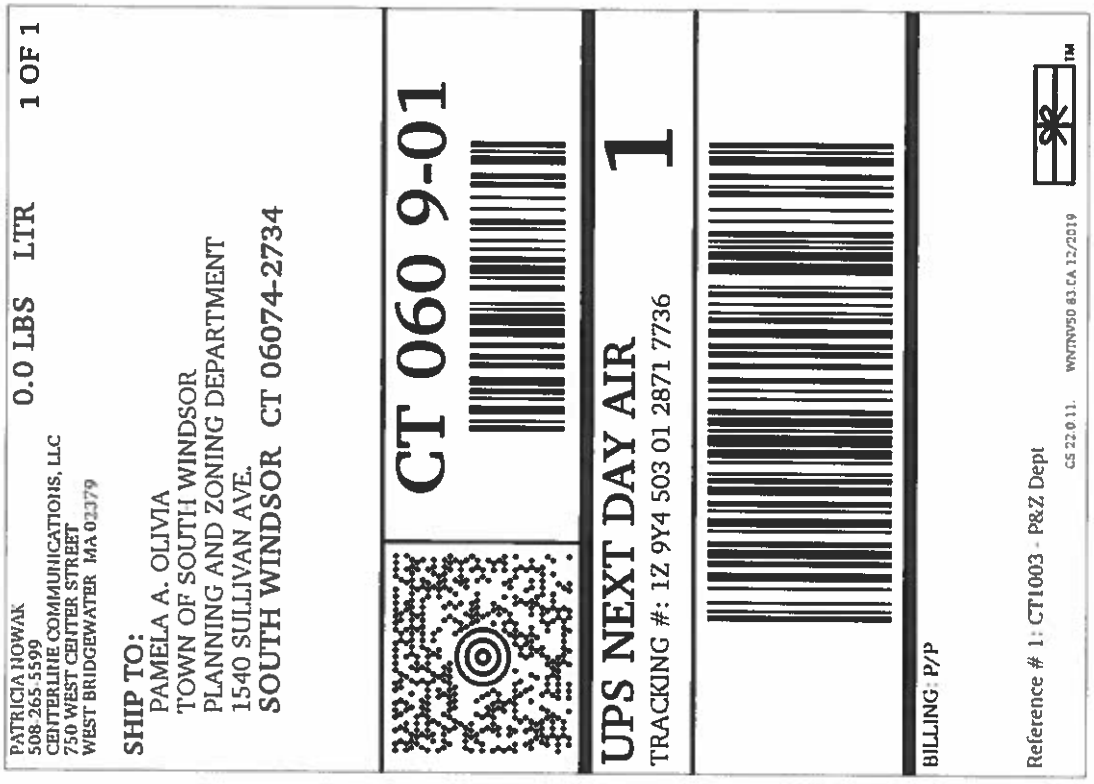
   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE



**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

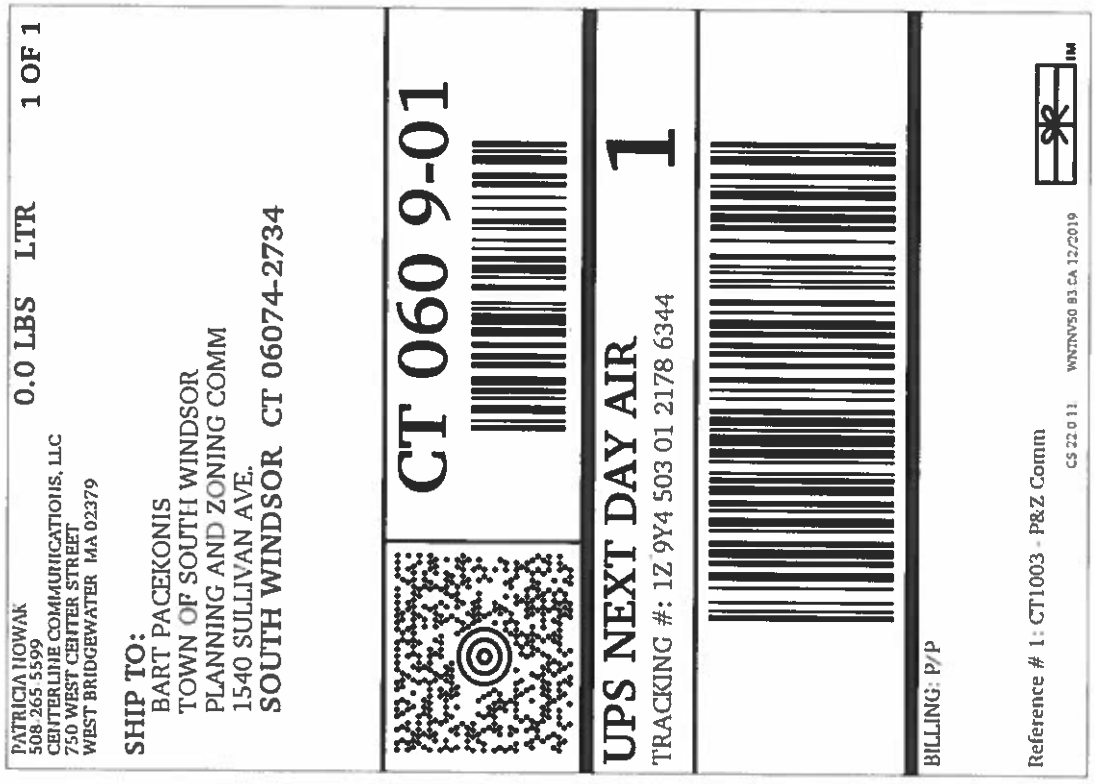
   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

**UPS Access Point™**
**CVS STORE # 972**
**555 WASHINGTON ST**
**SOUTH EASTON ,MA 02375**

**UPS Access Point™**
**CVS STORE # 7232**
**689 DEPOT ST**
**NORTH EASTON ,MA 02356**

**UPS Access Point™**
**TOWN LINE GENERAL STORE**
**450 E CENTER ST**
**WEST BRIDGEWATER ,MA 02379**

FOLD HERE



**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE

**UPS CampusShip: View/Print Label**

1. **Ensure there are no other shipping or tracking labels attached to your package.** Select the Print button on the print dialog box that appears. Note: If your browser does not support this function select Print from the File menu to print the label.

2. **Fold the printed label at the solid line below.** Place the label in a UPS Shipping Pouch. If you do not have a pouch, affix the folded label using clear plastic shipping tape over the entire label.

3. **GETTING YOUR SHIPMENT TO UPS**
   **Customers with a Daily Pickup**
   Your driver will pickup your shipment(s) as usual.

   **Customers without a Daily Pickup**
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To find the location nearest you, please visit the Resources area of CampusShip and select UPS Locations.
   Schedule a same day or future day Pickup to have a UPS driver pickup all your CampusShip packages.
   Hand the package to any UPS driver in your area.

UPS Access Point™
CVS STORE # 972
555 WASHINGTON ST
SOUTH EASTON ,MA 02375

UPS Access Point™
CVS STORE # 7232
689 DEPOT ST
NORTH EASTON ,MA 02356

UPS Access Point™
TOWN LINE GENERAL STORE
450 E CENTER ST
WEST BRIDGEWATER ,MA 02379

FOLD HERE