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
www.ct.gov/csc

VIA ELECTRONIC MAIL

January 22, 2020

Patricia Nowak
Site Acquisition Consultant
Centerline Communications
750 West Center Street, Suite 301
West Bridgewater, MA 02379

RE: **EM-CING-017-191216** – New Cingular Wireless PCS, LLC (AT&T) notice of intent to modify an existing telecommunications facility located at 383 Middle Street, Bristol, Connecticut.

Dear Ms. Nowak:

The Connecticut Siting Council (Council) is in receipt of your correspondence of January 21, 2020 submitted in response to the Council's December 24, 2019 notification of an incomplete request for exempt modification with regard to the above-referenced matter.

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

Thank you for your attention and cooperation.

Sincerely,

Melanie A. Bachman
Executive Director

MAB/IN/emr

Robidoux, Evan

From: Patricia Nowak <pnowak@clinellc.com>
Sent: Tuesday, January 21, 2020 4:47 PM
To: Mathews, Lisa A; CSC-DL Siting Council
Cc: David Ford
Subject: RE: Council Incomplete Letter for EM-CING-017-191216 (383 Middle Street, Bristol)- CT3461
Attachments: CT3461_EM-CING-017-191216_response.pdf

Good afternoon,

Attached please find a copy of the Cover Letter and Structural Analysis, that is in response to the Council's Letter dated December 24, 2019 regarding the above referenced exempt modification identification number. Hard copies of the documents will be delivered to the Council tomorrow via UPS overnight delivery. A copy of the UPS label is also attached for tracking purposes.

Please let us know if you need anything further to complete the review of the exempt modification request.

Thank you,
Trish

CENTERLINE COMMUNICATIONS

Patricia Nowak | Site Acquisition Consultant - NE
750 W Center St. Floor 3
West Bridgewater, MA 02379 | Phone: 508.265.5599
pnowak@clinellc.com | www.centerlinecommunications.com

From: David Ford <dford@clinellc.com>
Sent: Monday, January 20, 2020 1:52 PM
To: Lisa.A.Mathews@ct.gov
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>; Patricia Nowak <pnowak@clinellc.com>; David Ford <dford@clinellc.com>
Subject: RE: Council Incomplete Letter for EM-CING-017-191216 (383 Middle Street, Bristol)- CT3461

Lisa,

In response to the Siting Council's memo dated December 24, 2019, attached please find the revised SA.

We will submit a hard copy to your office, let us know if you need anything further to complete the review of the exempt modification request.

Thanks

David Ford
Centerline Communications
(508) 821-6509

From: Mathews, Lisa A <Lisa.A.Mathews@ct.gov>
Sent: Tuesday, December 24, 2019 12:24 PM
To: Patricia Nowak <pnowak@clinellc.com>
Cc: CSC-DL Siting Council <Siting.Council@ct.gov>
Subject: Council Incomplete Letter for EM-CING-017-191216 (383 Middle Street, Bristol)

Please see the attached correspondence.

Lisa A. Mathews
Office Assistant
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051
Lisa.A.Mathews@ct.gov
(860) 827-2957

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.

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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 21, 2020

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

Regarding: **EM-CING-017-191216 -Notice of Exempt Modification**
AT&T Site: **CT3461**
Address: **383 Middle Street, Bristol, CT 06010**

Dear Ms. Bachman:

In response to your letter dated December 24, 2019 regarding the Council's above referenced EM identification number, please find enclosed a Revised Structural Analysis Report dated January 20, 2020 that indicates a passing percentage stress capacity for the tower structure and the existing catwalk assembly. Please note that since the tower structure is a brick chimney, a separate mount analysis was not completed but that the above-mentioned Structural Analysis report shows that the catwalk assembly supporting AT&Ts antennas is sufficient.

Please let me know if the enclosed document is sufficient to complete the exempt modification request for the above referenced AT&T site.

Thank you for your time and consideration.

Sincerely,

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

Enclosures: Structural Analysis Report

CENTERLINE COMMUNICATIONS

750 West Center Street, Suite 301
West Bridgewater, MA 02379
781.713.4725

Revised Structural Analysis Report

Site Number: CT3461
Site Name: Bristol Middle Street (CT3461)
Address: 383 Middle Street
Bristol, CT 06010
Pace ID: BWE-MRCTB040756, 5G-MRCTB040824, 5C-MRCTB040465, 6C-MRCTBO40628, RETRO-MRCTB40798
Project: BWE Tower Top RRH add, 5G NR Upgrade, LTE 5C, 6C & RETRO
Scope: ST02

Analysis Condition	Stress Ratio	Overall Result
Brick Chimney	80.6%	PASS
Catwalk Assembly	85%	PASS

Client:

at&t Mobility Corp.
550 Cochituate Road
Framingham, MA 01701

at&t

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28551
LICENSED
PROFESSIONAL ENGINEER

Date: 1/20/2020 (Rev.2)
10/10/2019 (Rev.1)
10/4/2019

Scope of Work:

Centerline Communications was authorized by AT&T to perform a structural analysis of the existing brick chimney and the existing catwalk assembly supporting the AT&T antennas. This structural analysis is for the proposed and existing AT&T appurtenances listed below.

Proposed Appurtenances:

(6) DMP65R-BU8DA Antenna (96.0" H, 20.7" W, 7.7" D) (Weight= 95.7 lbs.)
(3) 4449 B5/B12 RRUS (14.96" H, 13.19" W, 10.43" D) (Weight= 73 lbs.)
(3) 8843 B2/B66A RRUS (14.9" H, 13.2" W, 10.9" D) (Weight= 72 lbs.)
(3) RRUS-E2 B29 (20.4" H, 18.5" W, 7.5" D) (Weight= 60 lbs.)
(1) DC6-48-60-18-8F Surge Arrestor (24.0" H, 9.7" ø) (Weight= 33.0 lbs.)

Existing Appurtenances:

(6) HPA-6R-BUU-H8 Antenna (92.4" H, 14.8" W, 7.4" D) (Weight= 68 lbs.)
(3) RRUS 32 B30 (26.7" H, 12.1" W, 6.7" D) (Weight= 60.0 lbs.)
(3) RRUS 12 B2 (20.4" H, 18.5" W, 7.5" D) (Weight= 50.0 lbs.)
(3) DC6-48-60-18-8F Surge Arrestor (24.0" H, 9.7" ø) (Weight= 33.0 lbs.)

Design Criteria:

Design Codes:

International Building Code 2015
Connecticut State Building Code 2018
ASCE 7-10

Design Loads:

Risk Category: II
Exposure Category: B (ASCE 7-10)
Ultimate Design Wind Speed (V_{ult}) = 121 mph (ASCE 7-10)
Ultimate Design Wind Speed (V_{ult}) = 120 mph (CSBC-Appendix N)

Design Codes:

TIA-222-H Structural Standard for Antenna Supporting Structures and Antennas

Design Loads:

Basic Wind Speed (V) = 120 mph (Annex B, Figure B-2)
Ice thickness= 1 in. (Annex B, Figure B-9)

****See calculations for additional design criteria.***

Conclusions:

- The results of the analysis concluded that the existing brick chimney is capable of supporting the existing and proposed AT&T appurtenance loads.

- The results of the analysis concluded that the existing catwalk assembly is capable of supporting the existing and proposed AT&T appurtenance loads with the following recommendations:

    - Install the proposed RRH's and surge arrestors below the existing catwalk assembly to minimize the loading on the catwalk.

    - Install the above mentioned equipment on new custom steel bands secured to the existing brick chimney. Reference the latest Centerline Communications construction drawings for the location of the existing and proposed AT&T appurtenances.

Reference Documents:

- Inspection Report by International Chimney Corporation dated December 10, 2019.

- Structural Design Calculations by Advanced Engineering Group dated July 18, 2017.

Assumptions and Exclusions:

- The existing catwalk assembly is assumed to have been correctly designed and installed.

- The calculations performed by Centerline Communications are limited to the structural members in these calculations only.

Site Photos:

Existing AT&T appurtenances

Existing AT&T appurtenances

Existing Catwalk Assembly Connections

Existing Catwalk Assembly Connections

Existing Catwalk Assembly Connections

Existing Catwalk Assembly Connections

Brick Chimney Calculations

Chimney Design Calculations by International Chimney Corporation
55 South Long Street, Williamsville, NY 14221

Customer: Centerline Communications

Project: CT-45617-C STRUCTURAL ANALYSIS

Site: 383 Middle Street | Bristol, CT 06010

Chimney Description: 127'-8" Radial Brick Chimney

Summary: The following is a structural analysis on a 127'-8" radial brick chimney. With the proposed AT&T cellular equipment modifications at the 120' elevation and a new RRUS array system at the 111' elevation, it was found that the chimney shell is not overstressed. This analysis assumes all antenna mounts have been designed by others.

Stress Capacity = 80.6% (PASS)

Submitted for approval

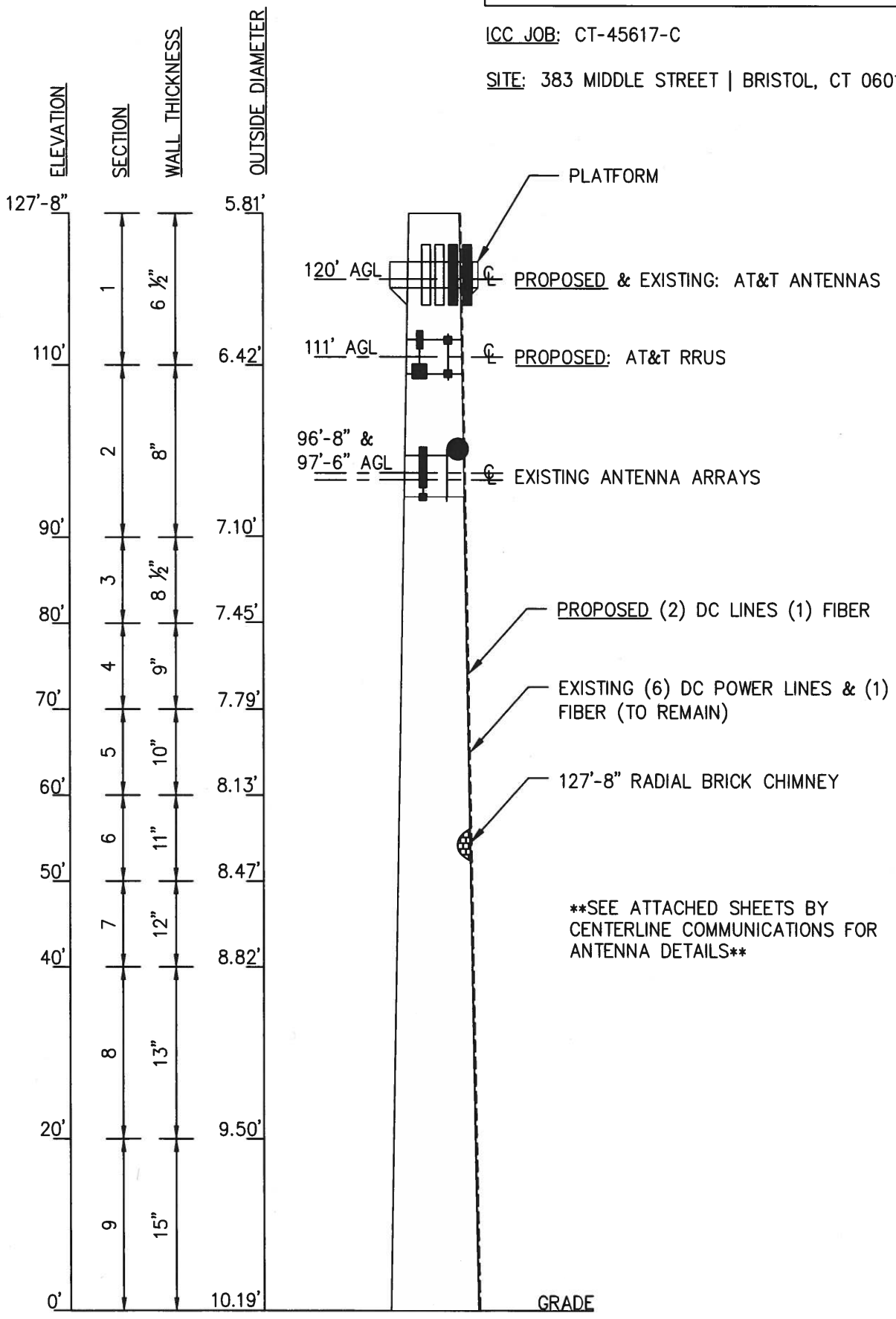
Finish cover page .....

By: JWL
Date: 1/13/2020

INTERNATIONAL CHIMNEY CORPORATION
Engineers Contractors
Buffalo, New York

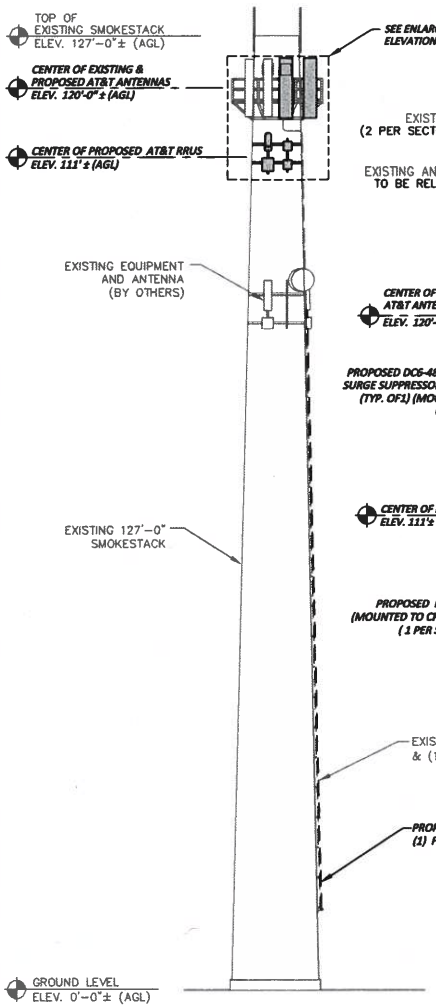
ICC JOB: CT-45617-C

SITE: 383 MIDDLE STREET | BRISTOL, CT 06010



NOTES:

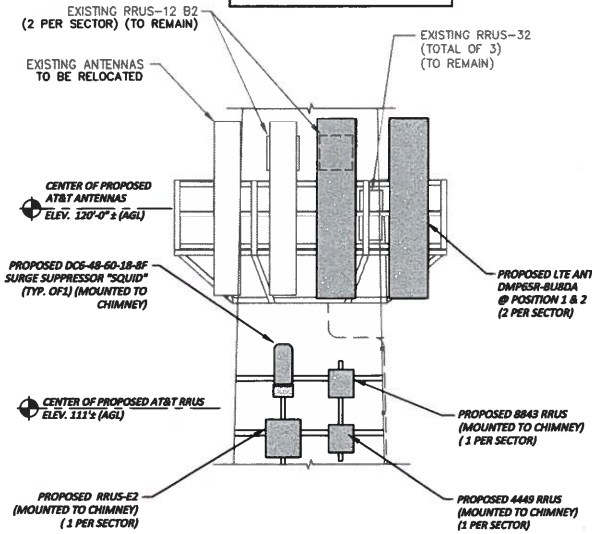
1. REFERENCE STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS DATED 10/10/19 FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.
2. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



TOWER ELEVATION

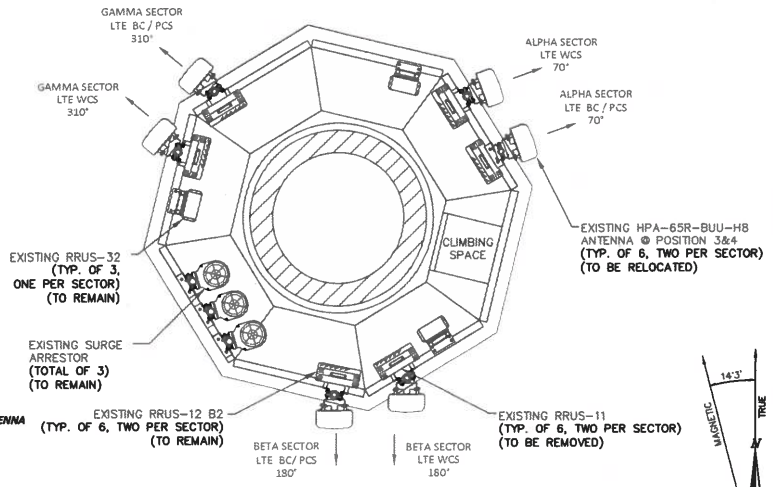
SCALE: 1/4"=1'-0" (22"X34")
1/8" = 1'-0" (11"X17")

GRAPHIC SCALE



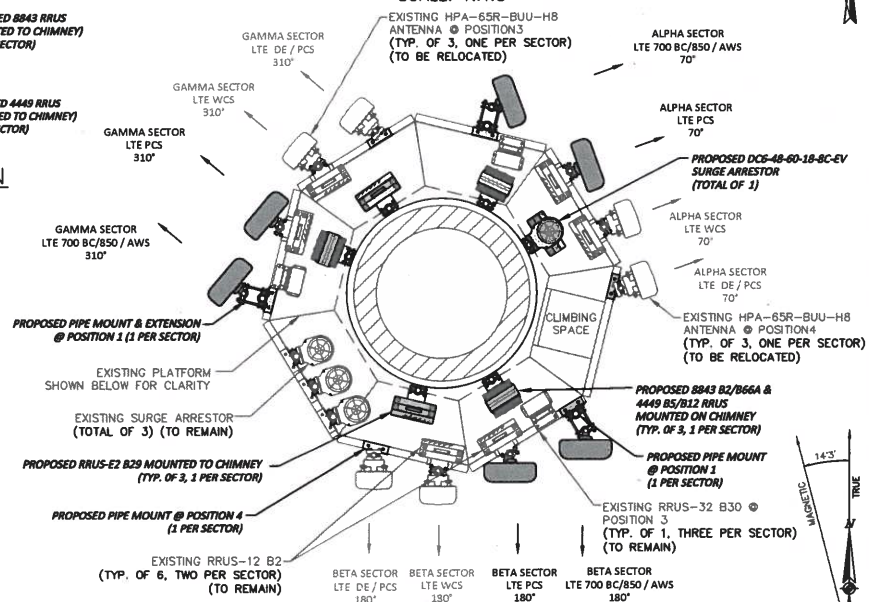
ENLARGED ANTENNA ELEVATION

SCALE: N.T.S



EXISTING ANTENNA CONFIGURATION

SCALE: N.T.S



PROPOSED ANTENNA CONFIGURATION

SCALE: N.T.S

at&t
at&t MOBILITY CORP.
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

CENTERLINE COMMUNICATIONS
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

REVISIONS		
2	10/24/19	CONSTRUCTION REVISED
1.	10/15/19	ISSUED FOR CONSTRUCTION
0.	10/15/19	ISSUED FOR REVIEW
NO.	DATE	DESCRIPTION

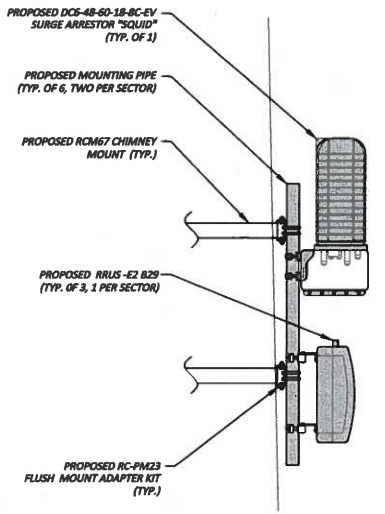
DESIGNED BY:	APPROVED BY:
AA	DC

STATE OF CONNECTICUT
DEREK J CREASER
No. 28551
LICENSED PROFESSIONAL ENGINEER

SITE NAME:	BRISTOL MIDDLE STREET (CT3461)
SITE NUMBER:	CT3461
SITE ADDRESS:	383 MIDDLE STREET BRISTOL, CT 06010
PROJECT TYPE:	LTE BWE, 5C, 5G, 6C & RETRO
SHEET TITLE:	ANTENNA LAYOUT & ELEVATIONS
DRAWING #:	A-2
REVISION:	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	PROPOSED	LTE 700 BC/840 /AWS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	70°	–	(P) (1) 4449 B5/B12 RRUS	15x13.2x10.4	(P) (2) DC POWER & (1) FIBER	(E) (1) RAYCAP DC6-48-60-18-8C-EV
A2	PROPOSED	LTE PCS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	70°	–	(P) (1) 8843 B2/B66A RRUS	14.9x13.2x10.9	(E) (2) DC POWER & (1) FIBER	(E) (1) RAYCAP DC6-48-60-18-8F
A3	EXISITNG	LTE WCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	70'	–	(E) (1) RRUS-32 B30	27.2x12.1x7.0	–	
A4	EXISITNG	LTE 700 DE / PCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	70'	–	(P) (1) RRUS-E2 B29 (E) (2) RRUS-12 B2	20.5x18.5x7.5 20.5x18.5x7.5	–	
B1	PROPOSED	LTE 700 BC/840 /AWS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	180°	–	(P) (1) 4449 B5/B12 RRUS	15x13.2x10.4	–	--
B2	PROPOSED	LTE PCS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	180°	–	(P) (1) 8843 B2/B66A RRUS	14.9x13.2x10.9	(E) (2) DC POWER & (1) FIBER	(E) (1) RAYCAP DC6-48-60-18-8F
B3	EXISITNG	LTE WCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	180'	–	(E) (1) RRUS-32 B30	27.2x12.1x7.0	–	
B4	EXISITNG	LTE 700 DE / PCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	180'	–	(P) (1) RRUS-E2 B29 (E) (2) RRUS-12 B2	20.5x18.5x7.5 20.5x18.5x7.5	–	
C1	PROPOSED	LTE 700 BC/840 /AWS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	310°	–	(P) (1) 4449 B5/B12 RRUS	15x13.2x10.4	–	--
C2	PROPOSED	LTE PCS	DMP65R-BU8DA	96.0X20.7X7.7	±120'	310°	–	(P) (1) 8843 B2/B66A RRUS	14.9x13.2x10.9	(E) (2) DC POWER	(E) (1) RAYCAP DC6-48-60-18-8F
C3	EXISITNG	LTE WCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	310'	–	(E) (1) RRUS-32 B30	27.2x12.1x7.0	–	
C4	EXISITNG	LTE 700 DE / PCS	HPA-65R-BUU-H8	92.4X14.8X7.4	±120'	310'	–	(P) (1) RRUS-E2 B29 (E) (2) RRUS-12 B2	20.5x18.5x7.5 20.5x18.5x7.5	–	



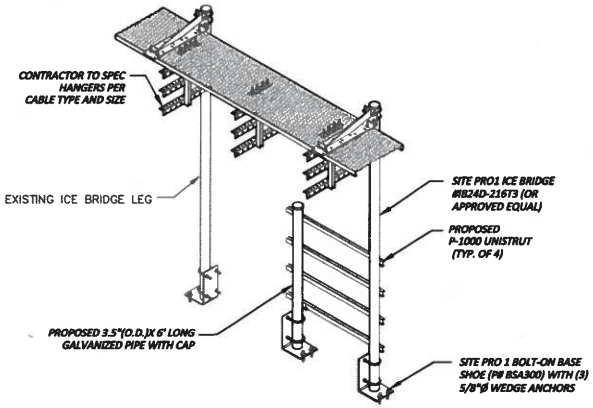
RRU MOUNTING DETAIL
N.T.S.

RRU CHART				
QUANTITY	MODEL	L	W	D
3(P)	4449 B5/B12	15.0"	13.2"	10.4"
3(P)	8843 B2/B66A	14.9"	13.2"	10.9"
3(P)	RRUS-E2 B29	20.4"	18.5"	7.5"
3(E)	RRUS-32 B30	27.2"	12.1"	7.0"
6(E)	RRUS-12 B2	20.4"	18.5"	7.5"

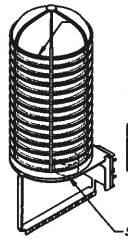
NOTE:
MOUNT PER MANUFACTURER'S SPECIFICATIONS.

REFER TO THE FINAL RFDS AND TABLE FOR THE PROPOSED RRUS MODEL, QUANTITY, AND DIMENSIONS

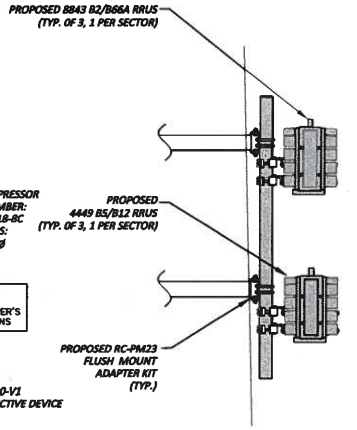
RRUS DETAIL
N.T.S.



ICE BRIDGE/H FRAME DETAIL
N.T.S.



DC SURGE SUPPRESSOR DETAIL
N.T.S.



RRU MOUNTING DETAIL
N.T.S.

at&t
at&t MOBILITY CORP.
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

CENTERLINE COMMUNICATIONS
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

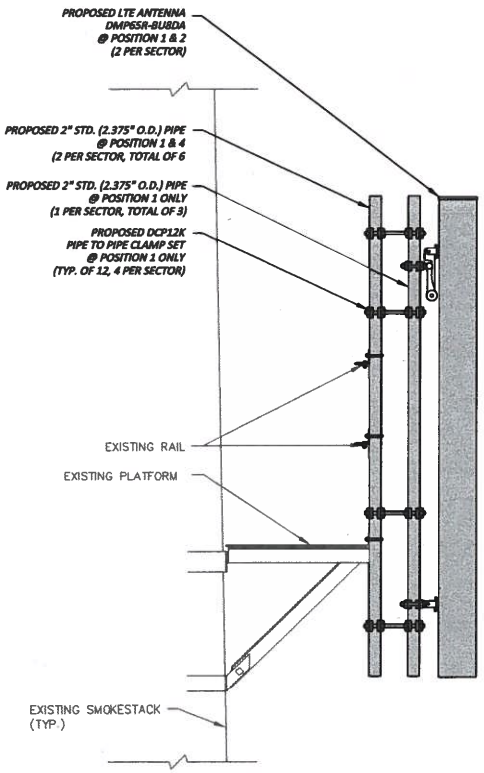
REVISIONS		
2	10/24/19	CONSTRUCTION REVISED
1.	10/15/19	ISSUED FOR CONSTRUCTION
0.	10/15/19	ISSUED FOR REVIEW
NO.	DATE	DESCRIPTION

DESIGNED BY:	APPROVED BY:
AA	DC

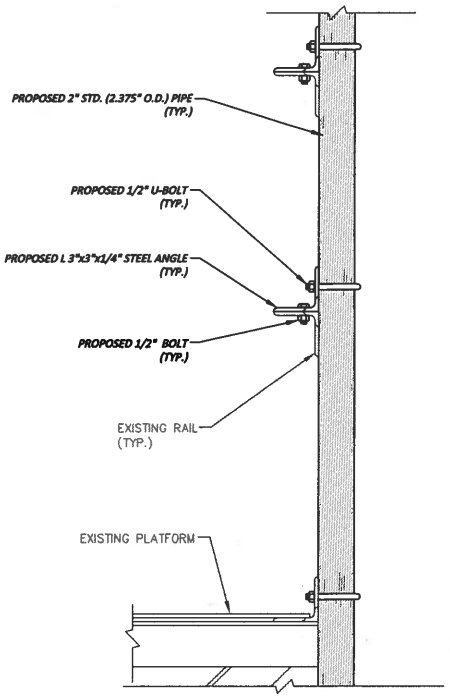
STATE OF CONNECTICUT
DEREK J. CREASER
No. 28351
LICENSED PROFESSIONAL ENGINEER

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER TO ALTER THIS DOCUMENT. UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ANY PERSON WHO ALTERS THIS DOCUMENT IS REQUIRED BY LAW TO AFFIX TO THE DOCUMENT THE SEAL OF THE ENGINEER AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

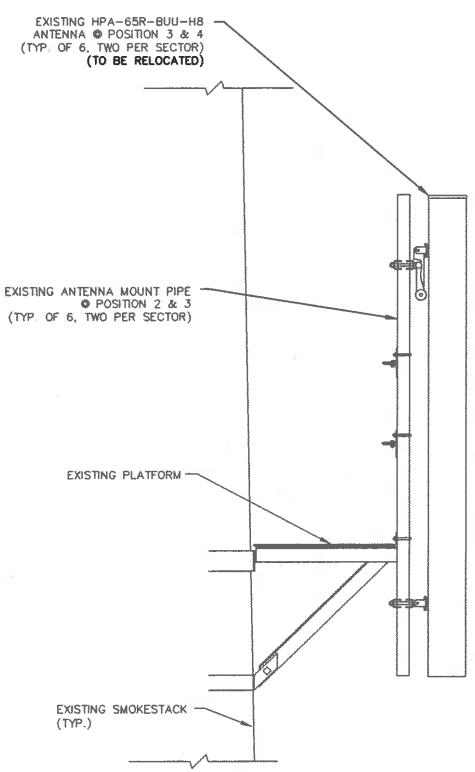
SITE NAME:	BRISTOL MIDDLE STREET (CT3461)
SITE NUMBER:	CT3461
SITE ADDRESS:	383 MIDDLE STREET BRISTOL, CT 06010
PROJECT TYPE:	LTE BWE, 5C, 5G, 6C & RETRO
SHEET TITLE:	DETAILS
DRAWING #: A-3	REVISION: 2



ANTENNA MOUNTING DETAIL
(POSITION 1)
N.T.S.



PIPE MOUNTING DETAIL
N.T.S.



ANTENNA MOUNTING DETAIL
(POSITION 4)
N.T.S.

at&t
at&t MOBILITY CORP.
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

CENTERLINE COMMUNICATIONS
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

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DESIGNED BY:	APPROVED BY:
AA	DC

STATE OF CONNECTICUT
DEREK J CREASER
No. 28551
LICENSED
PROFESSIONAL ENGINEER

SITE NAME:	BRISTOL MIDDLE STREET (CT3461)
SITE NUMBER:	CT3461
SITE ADDRESS:	383 MIDDLE STREET BRISTOL, CT 06010
PROJECT TYPE:	LTE BWE, 5C, 5G, 6C & RETRO
SHEET TITLE:	DETAILS
DRAWING #: A-4	REVISION: 2

STRUCTURAL NOTES:

1. DESIGN REQUIREMENTS ARE PER STATE BUILDING CODE AND APPLICABLE SUPPLEMENTS, INTERNATIONAL BUILDING CODE, EIA/TIA-222-G STRUCTURAL STANDARDS FOR STEEL ANTENNA, TOWERS AND ANTENNA SUPPORTING STRUCTURES.
2. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS IN THE FIELD PRIOR TO FABRICATION AND ERECTION OF ANY MATERIAL. ANY UNUSUAL CONDITIONS SHALL BE REPORTED TO THE ATTENTION OF THE CONSTRUCTION MANAGER AND ENGINEER OF RECORD.
3. DESIGN AND CONSTRUCTION OF STRUCTURAL STEEL SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS".
4. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992 (Fy=50 ksi), MISCELLANEOUS STEEL SHALL CONFORM TO ASTM A36 UNLESS OTHERWISE INDICATED.
5. STEEL PIPE SHALL CONFORM TO ASTM A500 "COLD-FORMED WELDED & SEAMLESS CARBON STEEL STRUCTURAL TUBING", GRADE B, OR ASTM A53 PIPE STEEL BLACK AND HOT-DIPPED ZINC-COATED WELDED AND SEAMLESS TYPE E OR S, GRADE B. PIPE SIZES INDICATED ARE NOMINAL. ACTUAL OUTSIDE DIAMETER IS LARGER.
6. STRUCTURAL CONNECTION BOLTS SHALL BE HIGH STRENGTH BOLTS (BEARING TYPE) AND CONFORM TO ASTM A325 TYPE-X "HIGH STRENGTH BOLTS FOR STRUCTURAL JOINTS, INCLUDING SUITABLE NUTS AND PLAIN HARDENED WASHERS". ALL BOLTS SHALL BE 3/4" DIA UON.
7. ALL STEEL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 "ZINC (HOT-DIP GALVANIZED) COATINGS ON IRON AND STEEL PRODUCTS", UNLESS OTHERWISE NOTED.
8. ALL BOLTS, ANCHORS AND MISCELLANEOUS HARDWARE SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153 "ZINC-COATING (HOT-DIP) ON IRON AND STEEL HARDWARE", UNLESS OTHERWISE NOTED.
9. FIELD WELDS, DRILL HOLES, SAW CUTS AND ALL DAMAGED GALVANIZED SURFACES SHALL BE REPAIRED WITH AN ORGANIC ZINC REPAIR PAINT COMPLYING WITH REQUIREMENTS OF ASTM A780. GALVANIZING REPAIR PAINT SHALL HAVE 65 PERCENT ZINC BY WEIGHT, ZIRP BY DUNCAN GALVANIZING, GALVA BRIGHT PREMIUM BY CROWN OR EQUAL. THICKNESS OF APPLIED GALVANIZING REPAIR PAINT SHALL BE NOT NOT LESS THAN 4 COATS (ALLOW TIME TO DRY BETWEEN COATS) WITH A RESULTING COATING THICKNESS REQUIRED BY ASTM A123 OR A153 AS APPLICABLE.
10. CONTRACTOR SHALL COMPLY WITH AWS CODE FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". ALL WELDING SHALL BE DONE USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND DI.I. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "STEEL CONSTRUCTION MANUAL". 14TH EDITION.
11. INCORRECTLY FABRICATED, DAMAGED OR OTHERWISE MISFITTING OR NON-CONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE CONSTRUCTION MANAGER PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH ACTION SHALL REQUIRE CONSTRUCTION MANAGER APPROVAL.
12. UNISTRUT SHALL BE FORMED STEEL CHANNEL STRUT FRAMING AS MANUFACTURED BY UNISTRUT CORP., WAYNE, MI OR EQUAL. STRUT MEMBERS SHALL BE 1 5/8"x1 5/8"x12GA, UNLESS OTHERWISE NOTED, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
13. EPOXY ANCHOR ASSEMBLY SHALL CONSIST OF STAINLESS STEEL ANCHOR ROD WITH NUTS & WASHERS. AN INTERNALLY THREADED INSERT, A SCREEN TUBE AND A EPOXY ADHESIVE. THE ANCHORING SYSTEM SHALL BE THE HILTI-HIT HY-270 AND OR HY-200 SYSTEMS (AS SPECIFIED IN DWG.) OR ENGINEERS APPROVED EQUAL.
14. EXPANSION BOLTS SHALL CONFORM TO FEDERAL SPECIFICATION FF-S-325, GROUP II, TYPE 4, CLASS I, HILTI KWIK BOLT III OR APPROVED EQUAL. INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
15. LUMBER SHALL COMPLY WITH THE REQUIREMENTS OF THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION AND THE NATIONAL FOREST PRODUCTS ASSOCIATION'S NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION. ALL LUMBER SHALL BE PRESSURE TREATED AND SHALL BE STRUCTURAL GRADE NO. 2 OR BETTER.
16. WHERE ROOF PENETRATIONS ARE REQUIRED, THE CONTRACTOR SHALL CONTACT AND COORDINATE RELATED WORK WITH THE BUILDING OWNER AND THE EXISTING ROOF INSTALLER. WORK SHALL BE PERFORMED IN SUCH A MANNER AS TO NOT VOID THE EXISTING ROOF WARRANTY. ROOF SHALL BE WATERTIGHT.
17. ALL FIBERGLASS MEMBERS USED ARE AS MANUFACTURED BY STRONGWELL COMPANY OF BRISTOL, VA 24203. ALL DESIGN CRITERIA FOR THESE MEMBERS IS BASED ON INFORMATION PROVIDED IN THE DESIGN MANUAL. ALL REQUIREMENTS PUBLISHED IN SAID MANUAL MUST BE STRICTLY ADHERED TO.
18. NO MATERIALS TO BE ORDERED AND NO WORK TO BE COMPLETED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED IN WRITING.
19. SUBCONTRACTOR SHALL FIREPROOF ALL STEEL TO PRE-EXISTING CONDITIONS.

SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

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

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

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

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

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

NOTES:

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

NOTES:

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

at&t MOBILITY CORP.
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

CENTERLINE COMMUNICATIONS
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

REVISIONS		
2	10/24/19	CONSTRUCTION REVISED
1.	10/15/19	ISSUED FOR CONSTRUCTION
0.	10/15/19	ISSUED FOR REVIEW
NO.	DATE	DESCRIPTION

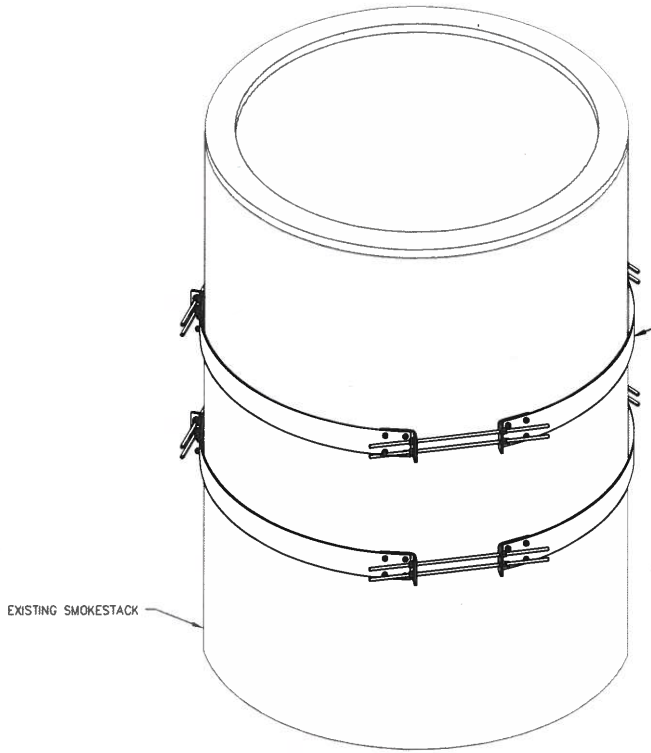
DESIGNED BY:	APPROVED BY:
KT	DC

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28551
LICENSED PROFESSIONAL ENGINEER

SITE NAME:	BRISTOL MIDDLE STREET (CT3461)
SITE NUMBER:	CT3461
SITE ADDRESS:	383 MIDDLE STREET BRISTOL, CT 06010
PROJECT TYPE:	LTE BWE, 5C, 5G, 6C & RETRO
SHEET TITLE:	STRUCTURAL NOTES
DRAWING #:	SN-1
REVISION:	2

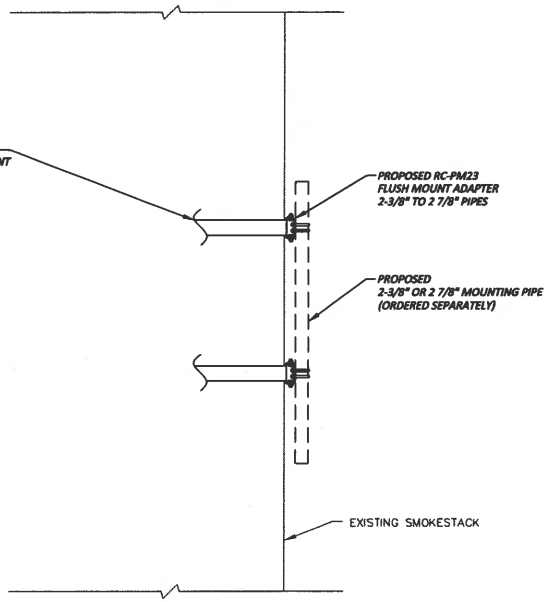
NOTES:

1. REFERENCE STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS DATED 10/10/19 FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.
2. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.



RCM67 ROUND CHIMNEY MOUNT DETAILS

N.T.S.



RC-PM23 FLUSH MOUNT ADAPTER DETAILS

N.T.S.

at&t MOBILITY CORP.
550 COCHITUATE ROAD
FRAMINGHAM, MA 01701

CENTERLINE COMMUNICATIONS
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

REVISIONS		
2	10/24/19	CONSTRUCTION REVISED
1.	10/15/19	ISSUED FOR CONSTRUCTION
0.	10/15/19	ISSUED FOR REVIEW
NO.	DATE	DESCRIPTION

DESIGNED BY:	APPROVED BY:
AA	DC

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28551
LICENSED PROFESSIONAL ENGINEER

SITE NAME:	BRISTOL MIDDLE STREET (CT3461)
SITE NUMBER:	CT3461
SITE ADDRESS:	383 MIDDLE STREET BRISTOL, CT 06010
PROJECT TYPE:	LTE BWE, 5C, 5G, 6C & RETRO
SHEET TITLE:	MOUNT DETAILS
DRAWING #:	S-1
REVISION:	2

THIS SPREADSHEET CALCULATES THE WIND PRESSURES ON VARIOUS SECTIONS OF THE CHIMNEY:

USING ASCE 7-10 WIND CRITERIA

INPUT =	

Height of Chimney (h in ft)	127.67	
Define Risk Category	II	(Table 1.5-1)
Define Exposure Factor	B	(Section 26.7.3)
Basic Wind Speed (in mph)	121	(See Attached Sheet)

G	0.85	(Section 26.9)
K_{zt}	1.0	(Section 26.8.2)
K_d	0.95	(Section 26.6)

$q_z = 0.00256K_zK_{zt}K_dV^2$ (Equation 29.3-1)

$p = q_zGC_f$ (Equation 29.4-1)

$q = 0.00256K_{zt}K_dGV^2 =$	30.27
Using Load Combination 2 from ASD, take 0.6q =	18.16

Calculate K_z using Table 29.3-1

Calculate C_f from Table 29.5-1

SECTION	ΔH (ft)	K_z	C_f	F_{des} (psf)
1	127.67-110	1.04	1.17	22.10
2	110-90	0.99	1.14	20.49
3	90-80	0.94	0.86	16.00
4	80-70	0.91	0.86	16.00
5	70-60	0.87	0.85	16.00
6	60-50	0.83	0.85	16.00
7	50-40	0.79	0.84	16.00
8	40-20	0.70	0.84	16.00
9	20-0	0.57	0.83	16.00

if F_{des} < 16 psf, then use
16 psf for minimum wind pressure

Input Stack Profile Data:

Starting from top of stack and working downward, enter data for each stack section to be analyzed:

TopOD :=		BtmOD :=		WallThk :=		SectHgt :=	
69.72	in	77.04	in	6.5	in	212	in
77.04		85.20		8		240	
85.20		89.40		8.5		120	
89.40		93.48		9		120	
93.48		97.56		10		120	
97.56		101.64		11		120	
101.64		105.84		12		120	
105.84		114		13		240	
114		122.28		15		240	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
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0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	
0		0		0		0	

Input Wind Load and Unit Weight Data:

Starting from top of stack and working downward, enter data for each stack section to be analyzed:

$$\text{DesignWindLoad} := \begin{pmatrix} 22.10 \\ 20.49 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{lb}{ft^2} \quad \text{WindCoefficient} := \begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \quad \text{UnitWeight} := \begin{pmatrix} 128 \\ 123 \\ 120 \\ 120 \\ 120 \\ 120 \\ 120 \\ 120 \\ 120 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{pmatrix} \frac{lb}{ft^3}$$

Calculate Total Number of Stack Sections:

NoSections = Total number of stack sections being analyzed

NoSections :=
Mp ← 0
for r ∈ 1..35
  Mp_r ← 1 if SectHgt_r > 0
  Mp_r ← 0 if SectHgt_r ≤ 0
Mp

$\sum NoSections = 9$

$N := \sum NoSections$

$N = 9$ (**N** is used in calculations below)

Calculate Dead Loads at Bottom of Each Stack Section:

DeadLoad = Total dead load at bottom of each *individual* stack section *all by itself*

DeadLoad :=
DL_1 ← SectWgt_1
for r ∈ 2..N
  Mp ← DL_{r−1} + SectWgt_r
  DL_r ← Mp
DL

$$DeadLoad = \begin{pmatrix} 21.447 \\ 52.841 \\ 70.376 \\ 89.801 \\ 112.19 \\ 137.705 \\ 166.526 \\ 232.497 \\ 313.503 \end{pmatrix} lb \cdot 1000$$

Calculate Total Bending Moments Due To Wind Load:

TotalSectionMoment = Sum of each row in "EachMoment" matrix. First row is total moment at bottom of stack Section No. 1 (top of stack). Second row is total moment at bottom of stack Section No. 2, and so on.

$$\text{TotalSectionMoment} := \left| \begin{array}{l} \text{for } r \in 1..N \\ \quad \left| \begin{array}{l} Mp \leftarrow \left(\text{EachMoment}^{T}\right)^{\langle r \rangle} \\ Tm_r \leftarrow \sum Mp \end{array} \right. \\ Tm \end{array} \right.$$

$$\text{TotalSectionMoment} = \begin{pmatrix} 21.09 \\ 96.542 \\ 153.94 \\ 223.253 \\ 305.03 \\ 399.816 \\ 508.157 \\ 767.984 \\ 1088.627 \end{pmatrix} \text{ft·lb·1000}$$

Calculate Cross Sectional Area:

Area = Cross sectional area at bottom of *each* stack section

$$\overrightarrow{Area := [(BtmOD - WallThk)\cdot\pi\cdot WallThk]}$$

Calculate Section Modulus:

SectionMod = Section modulus at bottom of each stack section

$Od := BtmOD$

$Id := BtmOD - 2\cdot WallThk$

$$S := \left| \begin{array}{l} \text{for } r \in 1..35 \\ \quad M_r \leftarrow \dfrac{\pi\cdot\left[(Od_r)^4 - (Id_r)^4\right]}{32\cdot Od_r} \\ M \end{array} \right.$$

$SectionMod := S$

Area =

	1
1	1440.452
2	1940.248
3	2160.316
4	2388.616
5	2750.779
6	3132.294
7	3537.685
8	4124.911
9	5055.451
10	0
11	0
12	0
13	0
14	0
15	0
16	...

$\cdot in^2$ SectionMod =

	1
1	23456.615
2	34295.015
3	39974.67
4	46108.041
5	54747.384
6	64228.425
7	74787.616
8	93805.545
9	121280.366
10	0
11	0
12	0
13	0
14	0
15	0
16	...

$\cdot i$

Calculate Stress:

Fa = Axial load at bottom of each stack section. This includes all dead load above the bottom of the stack section, including the stack section itself plus all other stack sections above it.

$$Fa := \left| \begin{array}{l} \text{for } r \in 1..N \\ \quad Fa_r \leftarrow \dfrac{DeadLoad_r}{Area_r} \\ Fa \end{array} \right.$$

Fb = Bending stress due to wind at bottom of each stack section. This includes all wind load on the stack section itself plus the wind load on all stack sections above it.

$$Fb := \left| \begin{array}{l} \text{for } r \in 1..N \\ \quad Fb_r \leftarrow \dfrac{TotalSectionMoment_r}{SectionMod_r} \\ Fb \end{array} \right.$$

$$Fa = \begin{pmatrix} 14.889 \\ 27.234 \\ 32.577 \\ 37.595 \\ 40.785 \\ 43.963 \\ 47.072 \\ 56.364 \\ 62.013 \end{pmatrix} \cdot \frac{lb}{in^2} \qquad Fb = \begin{pmatrix} 10.789 \\ 33.781 \\ 46.211 \\ 58.103 \\ 66.859 \\ 74.699 \\ 81.536 \\ 98.244 \\ 107.713 \end{pmatrix} \cdot \frac{lb}{in^2}$$

The weight of the antennas is negligible to the self weight of the chimney, therefore it is essentially no change to the seismic response of the structure due to this equipment.

The following is a spreadsheet that calculates the allowable stresses on the chimney using Code ACI 530-05/ASCE 5-05/TMS 402-05

Input =
Pass =
Fail =

Height of Chimney (h in feet)	127.67

f_m' (psi)	1500

Section	Wall Thk (in)	OD (ft)	ID (ft)	r (ft)	h/r	F_a (psi)	F_{bc} (psi)	f_a (psi)	f_{bc} (psi)	$(f_a/F_a)+(f_{bc}/F_{bc})$	f_{bt} (psi)	F_{bt} (psi)	f_{bt}/F_{bt}
1	6.5	6.42	5.34	2.09	61.17	303.41	499.5	14.889	10.789	0.0707	-4.100	30	-0.137
2	8	7.10	5.77	2.29	55.83	315.36	499.5	27.234	33.781	0.1540	6.547	30	0.218
3	8.5	7.45	6.03	2.40	53.27	320.71	499.5	32.577	46.211	0.1941	13.634	30	0.454
4	9	7.79	6.29	2.50	51.00	325.23	499.5	37.595	58.103	0.2319	20.508	30	0.684
5	10	8.13	6.46	2.60	49.17	328.74	499.5	40.785	66.859	0.2579	26.074	30	0.869
6	11	8.47	6.64	2.69	47.46	331.91	499.5	43.963	74.699	0.2820	30.736	30	1.025
7	12	8.82	6.82	2.79	45.80	334.86	499.5	47.072	81.536	0.3038	34.464	30	1.149
8	13	9.50	7.33	3.00	42.55	340.36	499.5	56.364	98.244	0.3623	41.880	30	1.396
9	15	10.19	7.69	3.19	40.00	344.38	499.5	62.013	107.713	0.3957	45.700	30	1.523

For $h/r < 99$: $F_a = (1/4)f_m'[1 - (h/140r)^2]$

For $h/r > 99$: $F_a = (1/4)f_m'(70r/h)^2]$

$F_{bc} = (1/3)f_m'$

No Tension Design - Cracked Section

Using "Structural Engineering Handbook" by Gaylord & Gaylord (1968)

Input =	

Area (in^2)	5055.451
Section Modulus (in^3)	121280.366
Weight (lb)	313503
Moment (ft-lb)	1088627

OD (ft)	10.19
Thickness (ft)	1.25

Mean Diameter (ft)	8.94
Mean Radius (ft)	4.47

F (psi) compression	169.726
F (psi) tension	-45.701

$F = (P/A) \pm (M/S)$

Eccentricity (ft)	3.4725
e/R	0.7768

$e = M/W$

From Fig. 7:

A	1.06
B	1.11

F_c (psi)	210.584
z (ft)	5.363

max. unit comp. stress

position of zero stress

F/F_c	0.806

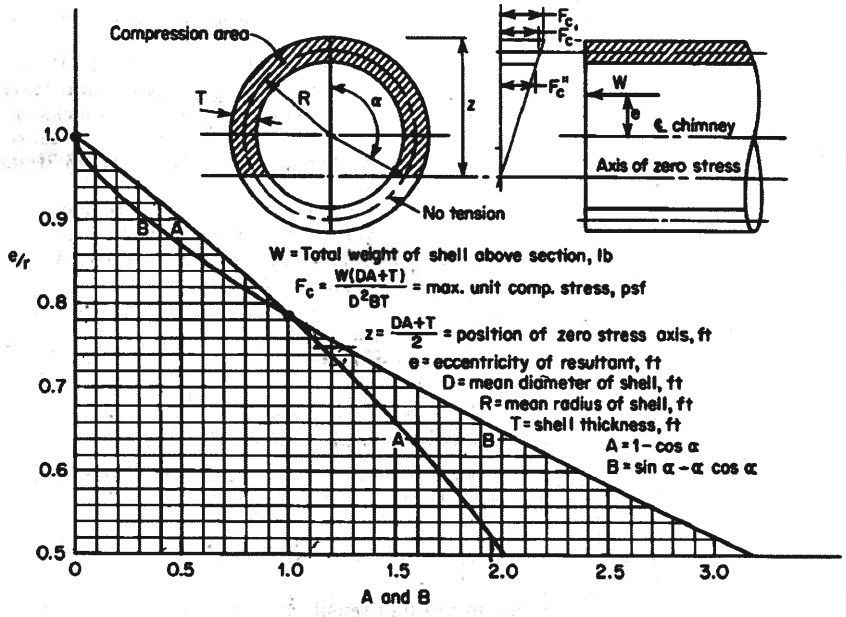


FIG. 7. Formulas for radial-brick chimneys.

Hazards by Location

Search Information

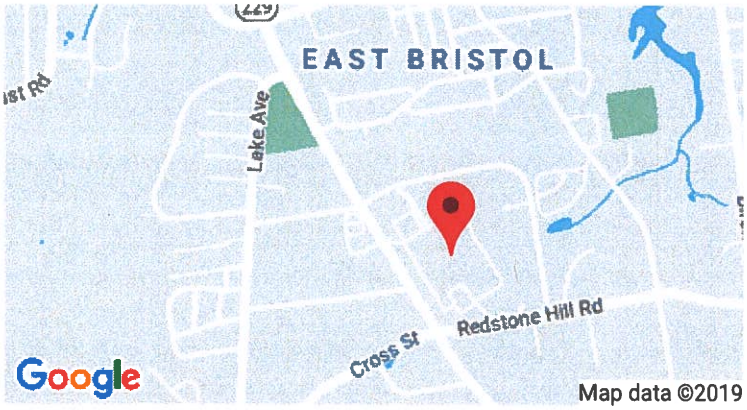
Address: 383 Middle St, Bristol, CT 06010, USA

Coordinates: 41.6589701, -72.9141472

Elevation: ft

Timestamp: 2019-12-09T20:59:55.480Z

Hazard Type: Wind



ASCE 7-16

MRI 10-Year	75 mph
MRI 25-Year	83 mph
MRI 50-Year	90 mph
MRI 100-Year	97 mph
Risk Category I	107 mph
Risk Category II	117 mph
Risk Category III	126 mph
Risk Category IV	⚠ 131 mph

You are in a wind-borne debris region if you are also within 1 mile of the coastal mean high water line.

ASCE 7-10

MRI 10-Year	76 mph
MRI 25-Year	86 mph
MRI 50-Year	92 mph
MRI 100-Year	99 mph
Risk Category I	111 mph
Risk Category II	121 mph
Risk Category III-IV	⚠ 130 mph

If the structure under consideration is a healthcare facility and you are also within 1 mile of the coastal mean high water line, you are in a wind-borne debris region. If other occupancy, use the Risk Category II basic wind speed contours to determine if you are in a wind-borne debris region.

ASCE 7-05

ASCE 7-05 Wind Speed	99 mph

The results indicated here DO NOT reflect any state or local amendments to the values or any delineation lines made during the building code adoption process. Users should confirm any output obtained from this tool with the local Authority Having Jurisdiction before proceeding with design.

Disclaimer

Hazard loads are interpolated from data provided in ASCE 7 and rounded up to the nearest whole integer. Per ASCE 7, islands and coastal areas outside the last contour should use the last wind speed contour of the coastal area – in some cases, this website will extrapolate past the last wind speed contour and therefore, provide a wind speed that is slightly higher. NOTE: For queries near wind-borne debris region boundaries, the resulting determination is sensitive to rounding which may affect whether or not it is considered to be within a wind-borne debris region.

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

Catwalk Assembly Calculations

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
DATE: 12/31/2019
BY: AA **CHECKED BY:** DC

ANSI/TIA-222-H WIND CALCULATIONS:

Design Criteria:

Height above ground level at the base of the structure, z=	120	ft	
Mean elevation of base of structure above sea level, z_s=	258	ft	
Height of structure, h=	127	ft	
Basic Wind Speed, V (mph) =	120		(CBSC-Appendix N)
30 mph Wind Speed, V_{30} (mph) =	30		(Section 16)
Basic Wind Speed with ice, V_i (mph) =	50		(Annex B, Figure B-9)
Max. Design Ice Thickness, t_i (in.)=	1		(Annex B, Figure B-9)
Exposure Category =	B		(2.6.5.1)
Topographic Category =	1		(2.6.6.2.1)
Risk Category	II		(Table 2-1)
Wind Direction Prob. Factor, K_d =	0.95		(Table 2-2)
Importance Factor, I =	1		(Table 2-3)
Velocity Pressure Coefficient, K_z =	1.04		(2.6.5.2)
Topographic Factor, K_{zt} =	1		(2.6.6.2.1)
Rooftop Wind Speed-Up Factor, K_s =	1		(2.6.7)
Ground Elevation Factor, K_e =	0.99		(2.6.8)
Gust Effect Factor G_h =	1		(2.6.9)
Factored thickness of radial glazed ice at z, tiz =	1.14	in	(2.6.10)

Calculate Velocity Pressure:

$q_z = 0.00256\, K_z\, K_{zt}\, K_s\, K_e\, K_d\, V^2$ (lb/ft^2) (2.6.11.6)

q_z= **36.12**

$q_{z(30)}$= **2.26**

Calculate Velocity Pressure with Ice:

$q_{zi} = 0.00256\, K_z\, K_{zt}\, K_s\, K_e\, K_d\, V^2$ (lb/ft^2) (2.6.11.6)

q_{zi}= **6.27**

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
DATE: 12/31/2019
BY: AA **CHECKED BY:** DC

ANSI/TIA-222-H WIND CALCULATIONS (Cont.):

Appurtenance/Equipment Properties:

Appurtenance/Equip.	Height (in)	Width (in)	Depth (in)	Normal Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	Side Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	EPA Normal Flat Area (ft^2)	EPA Side Flat Area (ft^2)
DMP65R-BU8DA Antenna	96.00	20.70	7.70	13.80	4.64	1.30	5.13	12.47	1.58	17.94	8.11
HPA-65R-BU-H8 Antenna	92.40	14.80	7.40	9.50	6.24	1.37	4.75	12.49	1.58	13.01	7.50
4449 B5/B12 RRU	14.96	13.19	10.43	1.37	1.13	1.20	1.08	1.43	1.20	1.64	1.30
8843 B2//B66A RRU	14.96	13.20	10.90	1.37	1.13	1.20	1.13	1.37	1.20	1.65	1.36
RRUS 32 B30	26.70	12.10	6.70	2.24	2.21	1.20	1.24	3.99	1.27	2.69	1.58
RRUS E2 B29	20.40	18.50	7.50	2.62	1.10	1.20	1.06	2.72	1.21	3.15	1.29
RRUS 12 B2	20.40	18.50	7.50	2.62	1.10	1.20	1.06	2.72	1.21	3.15	1.29
DC-48-60-18-8F Squid	24.00	9.70	9.70	1.62	2.47	0.70	1.62	2.47	0.70	1.13	1.13

Appurtenance/Equipment Properties with Ice:

t_{iz} (in) = **1.14**

Appurtenance/Equip.	Height w/ice (in)	Width w/ice (in)	Depth w/ice (in)	Normal Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	Side Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	EPA Normal Flat Area (ft^2)	EPA Side Flat Area (ft^2)
DMP65R-BU8DA Antenna	98.28	22.98	9.98	15.68	4.28	1.28	6.81	9.85	1.50	20.07	10.21
HPA-65R-BU-H8 Antenna	94.68	17.08	9.68	11.23	5.54	1.34	6.36	9.78	1.49	15.04	9.48
4449 B5/B12 RRU	17.24	15.47	12.71	1.85	1.11	1.20	1.52	1.36	1.20	2.22	1.82
8843 B2//B66A RRU	17.24	15.48	13.18	1.85	1.11	1.20	1.58	1.31	1.20	2.22	1.89
RRUS 32 B30	28.98	14.38	8.98	2.89	2.02	1.20	1.81	3.23	1.23	3.47	2.22
RRUS E2 B29	22.68	20.78	9.78	3.27	1.09	1.20	1.54	2.32	1.20	3.93	1.85
RRUS 12 B2	22.68	20.78	9.78	3.27	1.09	1.20	1.54	2.32	1.20	3.93	1.85
DC-48-60-18-8F Squid	26.28	11.98	11.98	2.19	2.19	0.70	2.19	2.19	0.70	1.53	1.53

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
DATE: 12/31/2019
BY: AA **CHECKED BY:** DC

ANSI/TIA-222-H WIND CALCULATIONS (Cont.):

Calculate Design Wind Force on Appurtenances: $(EPA)_A = k_a ((EPA)_N * \cos^2(\omega) + (EPA)T * \sin^2(\omega)$ (Section 2.6.11.2)

$k_a =$ 1

$F = q_z G_h (EPA)_A$ (2.6.9.2)

	Wind Direction								
	0° & 180°			30° & 210°			60° & 240°		
Appurtenance/Equip.	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**
DMP65R-BU8DA Antenna	648	126	40	559	110	35	382	79	24
HPA-65R-BU-H8 Antenna	470	94	29	420	86	26	321	68	20
4449 B5/B12 RRU	59	14	4	56	13	4	50	12	3
8843 B2//B66A RRU	59	14	4	57	13	4	52	12	3
RRUS 32 B30	97	22	6	87	20	5	67	16	4
RRUS E2 B29	114	25	7	97	21	6	63	15	4
RRUS 12 B2	114	25	7	97	21	6	63	15	4
DC-48-60-18-8F Squid	41	10	3	41	10	3	41	10	3

	Wind Direction								
	90° & 270°			120° & 300°			150° & 330°		
Appurtenance/Equip.	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**	**F (lbs.)**	**F_{ice} (lbs.)**	**F_{30} (lbs.)**
DMP65R-BU8DA Antenna	293	64	18	382	79	24	559	110	35
HPA-65R-BU-H8 Antenna	271	59	17	321	68	20	420	86	26
4449 B5/B12 RRU	47	11	3	50	12	3	56	13	4
8843 B2//B66A RRU	49	12	3	52	12	3	57	13	4
RRUS 32 B30	57	14	4	67	16	4	87	20	5
RRUS E2 B29	46	12	3	63	15	4	97	21	6
RRUS 12 B2	46	12	3	63	15	4	97	21	6
DC-48-60-18-8F Squid	41	10	3	41	10	3	41	10	3

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
DATE: 12/31/2019
BY: AA **CHECKED BY:** DC

ANSI/TIA-222-H WIND CALCULATIONS (Cont.):

Calculate Design Wind Force on Mounting Members:

Mount Member	Height (in)	Width (in)	Normal Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	EPA Normal Flat Area (ft^2)
2 STD Pipe	2.38	12.00	0.20	0.20	1.20	0.24
L3x3x1/4	3.00	12.00	0.25	0.25	2.00	0.50

Mount Member	Height w/ice (in)	Width (in)	Normal Flat Area (ft^2)	Aspect Ratio	Force Coef., C_a	EPA Normal Flat Area (ft^2)
2 STD Pipe	4.65	12.00	0.39	0.39	1.20	0.47
L3x3x1/4	5.28	12.00	0.44	0.44	2.00	0.88

Mount Member	F (lbs.)	F_{ice} (lbs.)	F_{30} (lbs.)
2 STD Pipe	9	3	1
L3x3x1/4	18	6	1

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
DATE: 12/31/2019
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ICE LOAD CALCULATIONS:

Unit Weight of Glaze Ice (lb/ft^3)= 56

Factored thickness of radial glazed ice at z, tiz (in) = 1.14

Appurtenances/Equip.	Height w/ice (in)	Width w/ice (in)	Depth w/ice (in)	Weight (lbs.)	Weight of Ice (lbs.)	Total Weight (lbs.)
DMP65R-BU8DA Antenna	98.28	22.98	9.98	95.70	234.08	329.78
HPA-65R-BU-H8 Antenna	94.68	17.08	9.68	68.00	178.97	246.97
4449 B5/B12 RRU	17.24	15.47	12.71	73.00	43.06	116.06
8843 B2//B66A RRU	17.24	15.48	13.18	72.00	44.14	116.14
RRUS 32 B30	28.98	14.38	8.98	60.00	51.01	111.01
RRUS E2 B29	22.68	20.78	9.78	60.00	57.52	117.52
RRUS 12 B2	22.68	20.78	9.78	50.00	57.52	107.52
DC-48-60-18-8F Squid	26.28	11.98	11.98	53.00	48.94	101.94

Member Properties for: L3x3x1/4

Leg Depth, d =	3.00	in.
Leg Width, b =	3.00	in.
Leg Thickness, t=	0.2500	in.

Design Parameters:

Ice Height Factor, k_{iz} =	1.14		$K_{iz} = (z/33)^{0.10}$
Design Ice Thickness, t_{iz} =	1.14	in.	$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$
Density of Ice, I_d =	56	pcf	I_d = (assumed = 56 pcf)
Weight of Ice (for t_{iz}) W_i =	5.31	psf	$W_i = (t_{iz}/12)\ I_d$

Ice Load on Circumscribing Diameter of Member per Code:

Circumscribing Dia., D_c =	4.24	in.	$Dc = SQRT\ (d^2+b^2)$
Area of Ice (for t_{iz}), A_i =	19.23	in^2	$A_i = \prod * t_{iz} * (D_c + t_{iz})$
Unif. Distributed Ice Load, w_i =	7.48	plf	$w_i = (A_i/144) * I_d$

SITE NUMBER: CT3461
SITE NAME: Bristol Middle Street (CT3461)
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ICE LOAD CALCULATIONS (Cont.):

Member Properties for: **Pipe 2 STD**

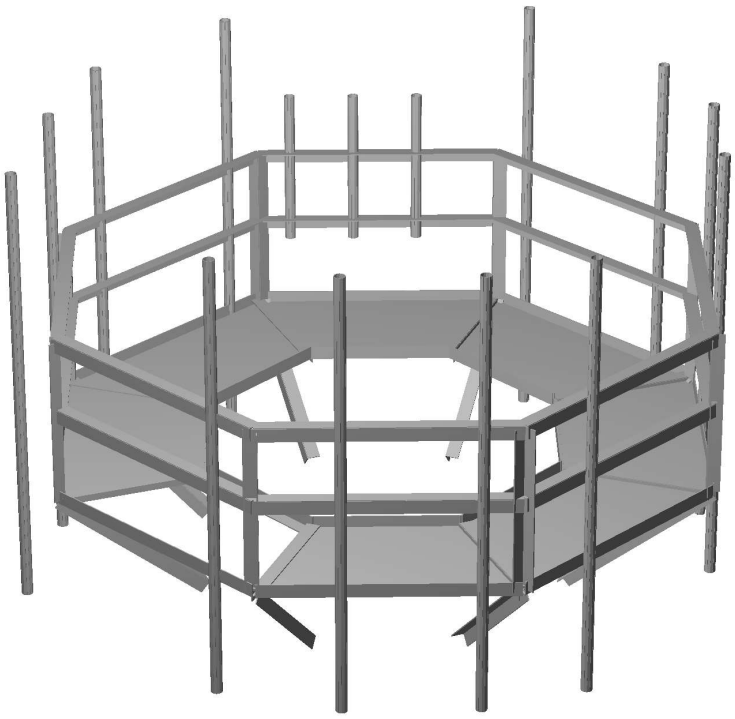
Outside Diameter, OD =	2.375	in.
Inside Diameter, ID =	2.067	in.
Nominal Wall Thickness, t =	0.154	in.

Design Parameters:

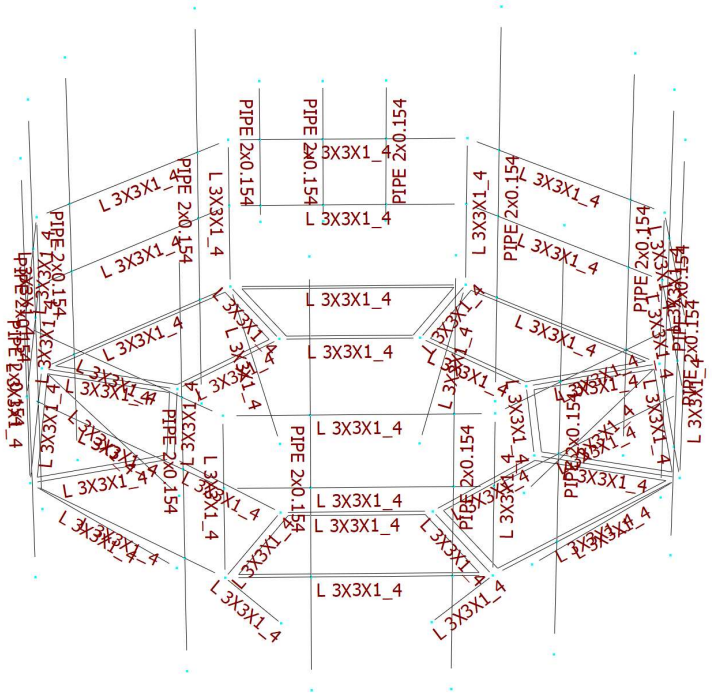
Ice Height Factor, k_{iz} =	1.14		$K_{iz} = (z/33)^{0.10}$
Design Ice Thickness, t_{iz} =	1.14	in.	$t_{iz} = t_i * I * K_{iz} * (K_{zt})^{0.35}$
Density of Ice, I_d =	56	pcf	I_d = (assumed = 56 pcf)
Weight of Ice (for t_{iz}) W_i =	5.31	psf	$W_i = (t_{iz}/12)\ I_d$

Ice Load on Circumscribing Diameter of Member per Code:

Circumscribing Dia., D_c =	2.38	in.	Dc = OD
Area of Ice (for t_{iz}), A_i =	12.56	in^2	$A_i = \prod * t_{iz} * (D_c + t_{iz})$
Unif. Distributed Ice Load, w_i =	4.88	plf	$w_i = (A_i/144) * I_d$




Y
X
Z


PIPE 2x0.154
L 3X3X1_4
Y
X
Z

Centerline Communications

Current Date: 12/31/2019 10:18 AM
Units system: English
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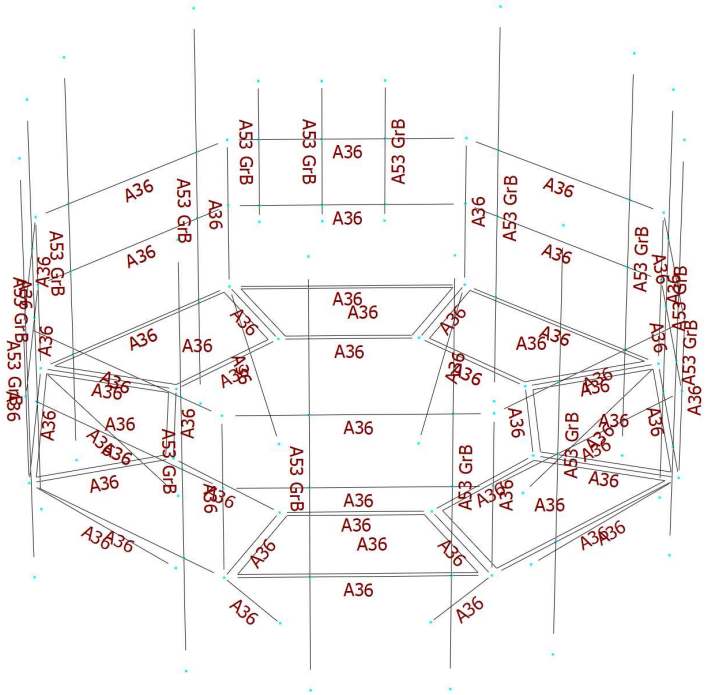

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Geometry data

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 [in]	Y [in]	Z [in]	Rigid Floor
1	0.00	0.00	0.00	0
2	-40.50	0.00	-40.50	0
3	53.00	0.00	0.00	0
4	93.50	0.00	-40.50	0
5	93.50	0.00	-93.50	0
6	-40.50	0.00	-93.50	0
7	0.00	0.00	-134.00	0
8	53.00	0.00	-134.00	0
9	-11.00	0.00	-51.00	0
10	64.00	0.00	-51.00	0
11	-11.00	0.00	-83.00	0
12	64.00	0.00	-83.00	0
13	11.00	0.00	-27.00	0
14	11.00	0.00	-107.00	0
15	42.00	0.00	-27.00	0
16	42.00	0.00	-107.00	0
17	-11.00	-26.00	-83.00	0
18	11.00	-26.00	-107.00	0
19	42.00	-26.00	-107.00	0
20	64.00	-26.00	-83.00	0
21	64.00	-26.00	-51.00	0
22	42.00	-26.00	-27.00	0
23	11.00	-26.00	-27.00	0
24	-11.00	-26.00	-51.00	0
25	0.00	20.00	-134.00	0
26	-40.50	20.00	-93.50	0
27	53.00	20.00	-134.00	0

28	93.50	20.00	-93.50	0
29	93.50	20.00	-40.50	0
30	53.00	20.00	0.00	0
31	0.00	20.00	0.00	0
32	-40.50	20.00	-40.50	0
33	0.00	36.00	-134.00	0
34	-40.50	36.00	-93.50	0
35	53.00	36.00	-134.00	0
36	93.50	36.00	-93.50	0
37	93.50	36.00	-40.50	0
38	53.00	36.00	0.00	0
39	0.00	36.00	0.00	0
40	-40.50	36.00	-40.50	0
41	17.00	36.00	0.00	0
42	17.00	20.00	0.00	0
43	17.00	0.00	0.00	0
44	17.00	70.00	0.00	0
45	17.00	-26.00	0.00	0
46	45.00	36.00	0.00	0
47	45.00	20.00	0.00	0
48	45.00	0.00	0.00	0
49	45.00	70.00	0.00	0
50	45.00	-26.00	0.00	0
51	66.50	36.00	-13.50	0
52	66.50	70.00	-13.50	0
53	66.50	20.00	-13.50	0
54	66.50	0.00	-13.50	0
55	66.50	-26.00	-13.50	0
56	93.50	36.00	-80.50	0
57	93.50	20.00	-80.50	0
58	93.50	0.00	-80.50	0
59	93.50	-26.00	-80.50	0
60	93.50	70.00	-80.50	0
61	59.75	36.00	-127.25	0
62	86.75	36.00	-100.25	0
63	86.75	20.00	-100.25	0
64	59.75	20.00	-127.25	0
65	86.75	0.00	-100.25	0
66	59.75	0.00	-127.25	0
67	59.75	-26.00	-127.25	0
68	86.75	-26.00	-100.25	0
69	86.75	70.00	-100.25	0
70	59.75	70.00	-127.25	0
71	-40.50	0.00	-77.50	0
72	-40.50	20.00	-77.50	0
73	-40.50	36.00	-77.50	0
74	-40.50	-26.00	-77.50	0
75	-40.50	70.00	-77.50	0
76	-40.50	70.00	-47.50	0
77	-40.50	-26.00	-47.50	0
78	-33.75	36.00	-100.25	0
79	-6.75	36.00	-127.25	0
80	-33.75	20.00	-100.25	0
81	-6.75	20.00	-127.25	0
82	-33.75	0.00	-100.25	0
83	-6.75	0.00	-127.25	0
84	-33.75	70.00	-100.25	0
85	-6.75	70.00	-127.25	0
86	-6.75	-26.00	-127.25	0
87	-33.75	-26.00	-100.25	0
88	-8.10	36.00	-8.10	0
89	-8.10	20.00	-8.10	0
90	-8.10	0.00	-8.10	0
91	-8.10	-26.00	-8.10	0
92	-8.10	70.00	-8.10	0
93	93.50	36.00	-54.50	0

94	93.50	20.00	-54.50	0
95	93.50	0.00	-54.50	0
96	93.50	-26.00	-54.50	0
97	93.50	70.00	-54.50	0
98	7.00	16.00	-134.00	0
99	7.00	50.00	-134.00	0
100	7.00	36.00	-134.00	0
101	7.00	20.00	-134.00	0
102	21.00	16.00	-134.00	0
103	21.00	50.00	-134.00	0
104	35.00	16.00	-134.00	0
105	35.00	50.00	-134.00	0
106	21.00	36.00	-134.00	0
107	35.00	36.00	-134.00	0
108	21.00	20.00	-134.00	0
109	35.00	20.00	-134.00	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
9	0	1	1	0	0	0
10	0	1	1	0	0	0
11	0	1	1	0	0	0
12	0	1	1	0	0	0
13	1	1	1	0	0	0
14	0	1	1	0	0	0
15	0	1	1	0	0	0
16	0	1	1	0	0	0
17	0	1	1	0	0	0
18	0	1	1	0	0	0
19	0	1	1	0	0	0
20	0	1	1	0	0	0
21	0	1	1	0	0	0
22	0	1	1	0	0	0
23	1	1	1	0	0	0
24	0	1	1	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
1	1	3	toe	L 3X3X1_4	A36	0.00	0.00	0.00
2	3	4	toe	L 3X3X1_4	A36	0.00	0.00	0.00
3	4	5	toe	L 3X3X1_4	A36	0.00	0.00	0.00
4	5	8	toe	L 3X3X1_4	A36	0.00	0.00	0.00
5	8	7	toe	L 3X3X1_4	A36	0.00	0.00	0.00
6	7	6	toe	L 3X3X1_4	A36	0.00	0.00	0.00
7	6	2	toe	L 3X3X1_4	A36	0.00	0.00	0.00
8	2	1	toe	L 3X3X1_4	A36	0.00	0.00	0.00
9	13	15	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
10	15	10	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
11	10	12	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
12	12	16	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
13	16	14	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
14	14	11	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
15	11	9	bot back	L 3X3X1_4	A36	0.00	0.00	0.00
16	9	13	bot back	L 3X3X1_4	A36	0.00	0.00	0.00

17	1	13	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
18	3	15	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
19	4	10	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
20	5	12	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
21	8	16	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
22	7	14	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
23	6	11	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
24	2	9	bot diagonal	L 3X3X1_4	A36	0.00	0.00	0.00
25	23	1	brace	L 3X3X1_4	A36	0.00	0.00	0.00
26	22	3	brace	L 3X3X1_4	A36	0.00	0.00	0.00
27	21	4	brace	L 3X3X1_4	A36	0.00	0.00	0.00
28	20	5	brace	L 3X3X1_4	A36	0.00	0.00	0.00
29	19	8	brace	L 3X3X1_4	A36	0.00	0.00	0.00
30	18	7	brace	L 3X3X1_4	A36	0.00	0.00	0.00
31	17	6	brace	L 3X3X1_4	A36	0.00	0.00	0.00
32	24	2	brace	L 3X3X1_4	A36	0.00	0.00	0.00
33	25	26	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
34	27	25	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
35	28	27	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
36	29	28	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
37	30	29	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
38	31	30	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
39	32	31	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
40	26	32	mid rail	L 3X3X1_4	A36	0.00	0.00	0.00
41	33	34	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
42	35	33	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
43	36	35	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
44	37	36	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
45	38	37	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
46	39	38	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
47	40	39	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
48	34	40	top rail	L 3X3X1_4	A36	0.00	0.00	0.00
49	1	39	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
50	3	38	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
51	4	37	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
52	5	36	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
53	8	35	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
54	7	33	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
55	6	34	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
56	2	40	vertical	L 3X3X1_4	A36	0.00	0.00	0.00
57	44	45	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
58	49	50	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
59	52	55	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
60	60	59	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
61	70	67	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
62	69	68	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
63	75	74	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
64	76	77	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
65	85	86	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
66	84	87	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
67	91	92	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
68	97	96	antenna pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
69	98	99	Squid pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
70	102	103	Squid pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
71	104	105	Squid pipe	PIPE 2x0.154	A53 GrB	0.00	0.00	0.00

Orientation of local axes

Member	Rotation [Deg]	Axes23	NX	NY	NZ
1	-90.00	0	0.00	0.00	0.00
2	-90.00	0	0.00	0.00	0.00
3	-90.00	0	0.00	0.00	0.00
4	-90.00	0	0.00	0.00	0.00
5	-90.00	0	0.00	0.00	0.00
6	-90.00	0	0.00	0.00	0.00
7	-90.00	0	0.00	0.00	0.00
8	-90.00	0	0.00	0.00	0.00
17	90.00	0	0.00	0.00	0.00
18	90.00	0	0.00	0.00	0.00
19	90.00	0	0.00	0.00	0.00
20	90.00	0	0.00	0.00	0.00
21	90.00	0	0.00	0.00	0.00
22	90.00	0	0.00	0.00	0.00
23	90.00	0	0.00	0.00	0.00
24	90.00	0	0.00	0.00	0.00
25	90.00	0	0.00	0.00	0.00
26	90.00	0	0.00	0.00	0.00
27	90.00	0	0.00	0.00	0.00
28	90.00	0	0.00	0.00	0.00
29	90.00	0	0.00	0.00	0.00
30	90.00	0	0.00	0.00	0.00
31	90.00	0	0.00	0.00	0.00
32	90.00	0	0.00	0.00	0.00
33	180.00	0	0.00	0.00	0.00
34	180.00	0	0.00	0.00	0.00
35	180.00	0	0.00	0.00	0.00
36	180.00	0	0.00	0.00	0.00
37	180.00	0	0.00	0.00	0.00
38	180.00	0	0.00	0.00	0.00
39	180.00	0	0.00	0.00	0.00
40	180.00	0	0.00	0.00	0.00
41	180.00	0	0.00	0.00	0.00
42	180.00	0	0.00	0.00	0.00
43	180.00	0	0.00	0.00	0.00
44	180.00	0	0.00	0.00	0.00
45	180.00	0	0.00	0.00	0.00
46	180.00	0	0.00	0.00	0.00
47	180.00	0	0.00	0.00	0.00
48	180.00	0	0.00	0.00	0.00
50	45.00	0	0.00	0.00	0.00
51	90.00	0	0.00	0.00	0.00
52	-225.00	0	0.00	0.00	0.00
53	180.00	0	0.00	0.00	0.00
54	225.00	0	0.00	0.00	0.00
55	-90.00	0	0.00	0.00	0.00
56	-45.00	0	0.00	0.00	0.00
69	225.00	0	0.00	0.00	0.00
70	225.00	0	0.00	0.00	0.00
71	225.00	0	0.00	0.00	0.00

Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
57	0.00	0.00	2.00	0.00	0.00	2.00
58	0.00	0.00	2.00	0.00	0.00	2.00
59	0.00	0.00	8.00	0.00	0.00	8.00
60	2.00	0.00	0.00	2.00	0.00	0.00
61	0.00	0.00	-8.00	0.00	0.00	-8.00
62	0.00	0.00	-2.00	0.00	0.00	-2.00
63	-2.00	0.00	0.00	-2.00	0.00	0.00

64	-8.00	0.00	0.00	-8.00	0.00	0.00
65	0.00	0.00	-2.00	0.00	0.00	-2.00
66	0.00	0.00	-2.00	0.00	0.00	-2.00
67	0.00	0.00	2.00	0.00	0.00	2.00
68	2.00	0.00	0.00	2.00	0.00	0.00

Shells

Shell	Description	Material	Thickness [in]	Center of gravity [in]	Area [in2]	N1, N2, ..., Nn
1	catwalk	A36	0.08	(26.50, 0.00, -121.68)	1134.00	7, 8, 16, 14
2	catwalk	A36	0.08	(64.22, 0.00, -105.06)	1239.00	16, 8, 5, 12
3	catwalk	A36	0.08	(79.96, 0.00, -67.00)	1253.75	12, 5, 4, 10
4	catwalk	A36	0.08	(64.22, 0.00, -28.94)	1239.00	10, 4, 3, 15
5	catwalk	A36	0.08	(26.50, 0.00, -12.32)	1134.00	15, 3, 1, 13
7	catwalk	A36	0.08	(-26.96, 0.00, -67.00)	1253.75	9, 2, 6, 11
8	catwalk	A36	0.08	(-11.22, 0.00, -105.06)	1239.00	11, 6, 7, 14

Current Date: 12/31/2019 2:55 PM
Units system: English
File name: C:\Users\Andres Agudelo\Centerline Communications\Derek Creaser - Centerline Engineering\Projects\AT&T\NEW ENGLAND\CT\CT3461 - Bristol Middle Street, 383 Middle St - SS\LTE 5C 6C BWE\Structural\Working Files\RAM\MSA\CT3461 - TIA-222-H.retx

Load data

GLOSSARY

Comb : Indicates if load condition is a load combination

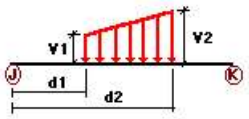
Load Conditions

Condition	Description	Comb.	Category
DL	Dead Load	No	DL
Di	Ice Load	No	LL
Wo	Wind Load (No Ice)	No	WIND
Wi	Wind Load (With Ice)	No	WIND
W30	Wind Load (30 mph)	No	WIND
SL1	Service Live Load at Position 1 (500 lb)	No	LL
SL2	Service Live Load at Position 2 (500 lb)	No	LL
SL3	Service Live Load at Position 3 (500 lb)	No	LL
SL4	Service Live Load at Position 4 (500 lb)	No	LL
SLC	Service Live Load at Center of Mount (250 lb)	No	LL
SLE1	Service Live Load at End of Mount (250 lb)	No	LL
SLE2	Service Live Load at End of Mount (250 lb)	No	LL
C1	1.2DL+Wo	Yes	
C2	0.9DL+Wo	Yes	
C3	1.2DL+Di+Wi	Yes	
C4	1.2DL	Yes	
C5	0.9DL	Yes	
C6	1.2DL+W30+1.5SL1	Yes	
C7	1.2DL+W30+1.5SL2	Yes	
C8	1.2DL+W30+1.5SL3	Yes	
C9	1.2DL+W30+1.5SL4	Yes	
C10	1.2DL+1.5SLC	Yes	
C11	1.2DL+1.5SLE1	Yes	
C12	1.2DL+1.5SLE2	Yes	

Load on nodes

Condition	Node	FX [Kip]	FY [Kip]	FZ [Kip]	MX [Kip*ft]	MY [Kip*ft]	MZ [Kip*ft]
SLC	5	0.00	-0.25	0.00	0.00	0.00	0.00
	6	0.00	-0.25	0.00	0.00	0.00	0.00
	43	0.00	-0.25	0.00	0.00	0.00	0.00
SLE1	2	0.00	-0.25	0.00	0.00	0.00	0.00
	8	0.00	-0.25	0.00	0.00	0.00	0.00
	54	0.00	-0.25	0.00	0.00	0.00	0.00
SLE2	4	0.00	-0.25	0.00	0.00	0.00	0.00
	7	0.00	-0.25	0.00	0.00	0.00	0.00
	90	0.00	-0.25	0.00	0.00	0.00	0.00

Distributed force on members



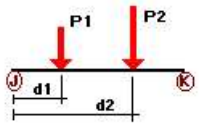
Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [in]	%	Dist2 [in]	%
Di	25	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	26	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	27	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	28	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	29	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	30	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	31	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	32	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	33	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	34	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	35	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	36	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	37	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	38	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	39	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	40	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	41	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	42	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	43	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	44	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	45	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	46	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	47	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	48	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	49	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	50	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	51	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	52	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	53	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	54	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	55	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	56	Y	-0.0075	-0.0075	0.00	Yes	100.00	Yes
	57	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	58	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	59	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	60	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	61	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	62	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	63	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	64	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	65	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	66	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	67	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	68	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	69	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	70	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
	71	Y	-0.0049	-0.0049	0.00	Yes	100.00	Yes
Wo	1	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	2	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	3	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	4	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	5	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	6	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	7	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	8	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	25	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	26	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	27	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	28	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	29	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	30	Z	-0.018	-0.018	0.00	Yes	100.00	Yes

	31	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	32	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	33	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	34	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	35	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	36	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	37	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	38	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	39	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	40	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	41	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	42	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	43	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	44	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	45	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	46	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	47	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	48	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	49	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	50	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	51	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	52	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	53	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	54	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	55	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	56	Z	-0.018	-0.018	0.00	Yes	100.00	Yes
	57	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	58	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	59	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	60	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	61	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	62	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	63	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	64	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	65	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	66	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	67	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	68	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	69	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	70	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
	71	Z	-0.009	-0.009	0.00	Yes	100.00	Yes
Wi	1	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	2	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	3	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	4	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	5	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	6	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	7	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	8	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	25	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	26	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	27	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	28	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	29	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	30	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	31	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	32	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	33	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	34	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	35	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	36	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	37	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	38	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	39	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	40	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	41	Z	-0.006	-0.006	0.00	Yes	100.00	Yes

	42	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	43	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	44	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	45	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	46	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	47	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	48	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	49	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	50	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	51	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	52	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	53	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	54	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	55	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	56	Z	-0.006	-0.006	0.00	Yes	100.00	Yes
	57	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	58	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	59	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	60	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	61	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	62	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	63	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	64	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	65	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	66	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	67	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	68	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	69	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	70	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
	71	Z	-0.003	-0.003	0.00	Yes	100.00	Yes
W30	1	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	2	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	3	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	4	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	5	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	6	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	7	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	8	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	25	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	26	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	27	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	28	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	29	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	30	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	31	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	32	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	33	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	34	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	35	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	36	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	37	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	38	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	39	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	40	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	41	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	42	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	43	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	44	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	45	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	46	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	47	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	48	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	49	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	50	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	51	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
	52	Z	-0.001	-0.001	0.00	Yes	100.00	Yes

53	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
54	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
55	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
56	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
57	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
58	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
59	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
60	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
61	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
62	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
63	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
64	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
65	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
66	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
67	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
68	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
69	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
70	Z	-0.001	-0.001	0.00	Yes	100.00	Yes
71	Z	-0.001	-0.001	0.00	Yes	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [in]	%
DL	57	Y	-0.068	48.00	No
		Y	-0.05	24.00	No
	58	Y	-0.068	48.00	No
		Y	-0.05	24.00	No
	59	Y	-0.0957	48.00	No
		Y	-0.06	24.00	No
	60	Y	-0.068	48.00	No
		Y	-0.05	24.00	No
	61	Y	-0.0957	48.00	No
		Y	-0.06	24.00	No
	62	Y	-0.0957	48.00	No
		Y	-0.05	24.00	No
	63	Y	-0.0957	48.00	No
		Y	-0.05	24.00	No
	64	Y	-0.0957	48.00	No
		Y	-0.06	24.00	No
	65	Y	-0.068	48.00	No
	66	Y	-0.068	48.00	No
		Y	-0.05	24.00	No
	67	Y	-0.068	48.00	No
	68	Y	-0.068	48.00	No
	69	Y	-0.033	22.00	No
	70	Y	-0.033	22.00	No
	71	Y	-0.033	22.00	No
Di	57	Y	-0.179	48.00	No
		Y	-0.058	24.00	No
	58	Y	-0.179	48.00	No
		Y	-0.058	24.00	No
	59	Y	-0.234	48.00	No
		Y	-0.051	24.00	No
	60	Y	-0.179	48.00	No
		Y	-0.058	24.00	No
	61	Y	-0.234	48.00	No

		Y	-0.051	24.00	No
	62	Y	-0.234	48.00	No
		Y	-0.058	24.00	No
	63	Y	-0.234	48.00	No
		Y	-0.058	24.00	No
	64	Y	-0.234	48.00	No
		Y	-0.051	24.00	No
	65	Y	-0.179	48.00	No
	66	Y	-0.179	48.00	No
		Y	-0.058	24.00	No
	67	Y	-0.179	48.00	No
	68	Y	-0.179	48.00	No
	69	Y	-0.049	22.00	No
	70	Y	-0.049	22.00	No
	71	Y	-0.049	22.00	No
Wo	57	Z	-0.47	48.00	No
		Z	-0.046	24.00	No
	58	Z	-0.648	48.00	No
		Z	-0.046	24.00	No
	59	Z	-0.648	48.00	No
		Z	-0.057	24.00	No
	60	Z	-0.164	48.00	No
		Z	-0.046	24.00	No
	61	Z	-0.293	48.00	No
		Z	-0.057	24.00	No
	62	Z	-0.293	48.00	No
		Z	-0.046	24.00	No
	63	Z	-0.293	48.00	No
		Z	-0.046	24.00	No
	64	Z	-0.293	48.00	No
		Z	-0.057	24.00	No
	65	Z	-0.164	48.00	No
	66	Z	-0.164	48.00	No
		Z	-0.046	24.00	No
	67	Z	-0.47	48.00	No
	68	Z	-0.164	48.00	No
	69	Z	-0.041	22.00	No
	70	Z	-0.041	22.00	No
	71	Z	-0.041	22.00	No
Wi	57	Z	-0.095	48.00	No
		Z	-0.012	24.00	No
	58	Z	-0.127	48.00	No
		Z	-0.012	24.00	No
	59	Z	-0.127	48.00	No
		Z	-0.014	24.00	No
	60	Z	-0.06	48.00	No
		Z	-0.012	24.00	No
	61	Z	-0.065	48.00	No
		Z	-0.014	24.00	No
	62	Z	-0.065	48.00	No
		Z	-0.012	24.00	No
	63	Z	-0.065	48.00	No
		Z	-0.012	24.00	No
	64	Z	-0.065	48.00	No
		Z	-0.014	24.00	No
	65	Z	-0.06	48.00	No
	66	Z	-0.06	48.00	No
		Z	-0.012	24.00	No
	67	Z	-0.095	48.00	No
	68	Z	-0.06	48.00	No
	69	Z	-0.01	22.00	No
	70	Z	-0.01	22.00	No
	71	Z	-0.01	22.00	No
W30	57	Z	-0.029	48.00	No
		Z	-0.007	24.00	No
	58	Z	-0.04	48.00	No

		Z	-0.007	24.00	No
	59	Z	-0.04	48.00	No
		Z	-0.007	24.00	No
	60	Z	-0.017	48.00	No
		Z	-0.003	24.00	No
	61	Z	-0.018	48.00	No
		Z	-0.004	24.00	No
	62	Z	-0.018	48.00	No
		Z	-0.003	24.00	No
	63	Z	-0.018	48.00	No
		Z	-0.004	24.00	No
	64	Z	-0.018	48.00	No
		Z	-0.004	24.00	No
	65	Z	-0.017	48.00	No
	66	Z	-0.017	48.00	No
		Z	-0.003	24.00	No
	67	Z	-0.029	48.00	No
	68	Z	-0.017	48.00	No
	69	Z	-0.003	22.00	No
	70	Z	-0.003	22.00	No
	71	Z	-0.003	22.00	No
SL1	59	Y	-0.50	48.00	No
	61	Y	-0.50	48.00	No
	64	Y	-0.50	48.00	No
SL2	58	Y	-0.50	48.00	No
	62	Y	-0.50	48.00	No
	63	Y	-0.50	48.00	No
SL3	57	Y	-0.50	48.00	No
	60	Y	-0.50	48.00	No
	66	Y	-0.50	48.00	No
SL4	65	Y	-0.50	48.00	No
	67	Y	-0.50	48.00	No
	68	Y	-0.50	48.00	No

Load on shells

Condition	Shell	Pressure [Kip/ft2]	Temp. [F]
Di	1	0.0053	0.00
	2	0.0053	0.00
	3	0.0053	0.00
	4	0.0053	0.00
	5	0.0053	0.00
	7	0.0053	0.00
	8	0.0053	0.00

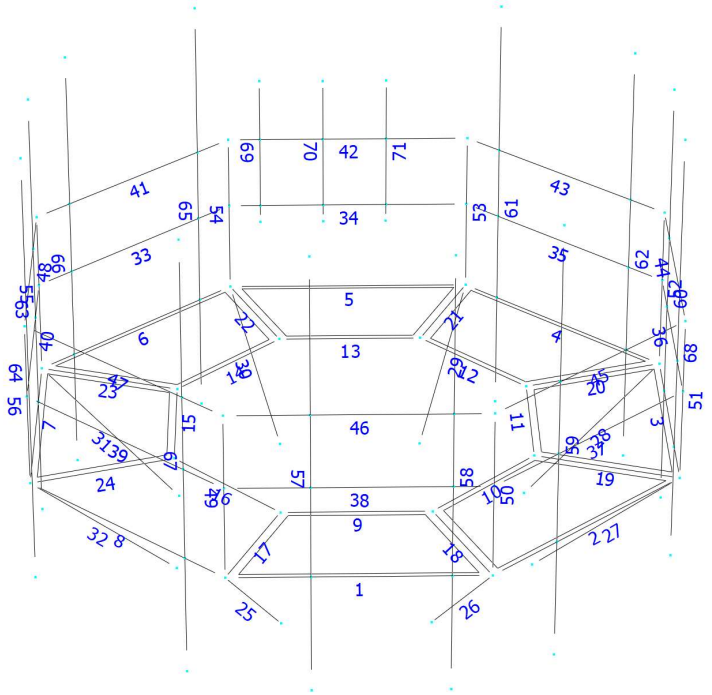
Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
DL	Dead Load	No	0.00	-1.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
Wo	Wind Load (No Ice)	No	0.00	0.00	0.00
Wi	Wind Load (With Ice)	No	0.00	0.00	0.00
W30	Wind Load (30 mph)	No	0.00	0.00	0.00
SL1	Service Live Load at Position 1 (500 lb)	No	0.00	0.00	0.00
SL2	Service Live Load at Position 2 (500 lb)	No	0.00	0.00	0.00

SL3	Service Live Load at Position 3 (500 lb)	No	0.00	0.00	0.00
SL4	Service Live Load at Position 4 (500 lb)	No	0.00	0.00	0.00
SLC	Service Live Load at Center of Mount (250 lb)	No	0.00	0.00	0.00
SLE1	Service Live Load at End of Mount (250 lb)	No	0.00	0.00	0.00
SLE2	Service Live Load at End of Mount (250 lb)	No	0.00	0.00	0.00
C1	1.2DL+Wo	Yes	0.00	0.00	0.00
C2	0.9DL+Wo	Yes	0.00	0.00	0.00
C3	1.2DL+Di+Wi	Yes	0.00	0.00	0.00
C4	1.2DL	Yes	0.00	0.00	0.00
C5	0.9DL	Yes	0.00	0.00	0.00
C6	1.2DL+W30+1.5SL1	Yes	0.00	0.00	0.00
C7	1.2DL+W30+1.5SL2	Yes	0.00	0.00	0.00
C8	1.2DL+W30+1.5SL3	Yes	0.00	0.00	0.00
C9	1.2DL+W30+1.5SL4	Yes	0.00	0.00	0.00
C10	1.2DL+1.5SLC	Yes	0.00	0.00	0.00
C11	1.2DL+1.5SLE1	Yes	0.00	0.00	0.00
C12	1.2DL+1.5SLE2	Yes	0.00	0.00	0.00

Earthquake (Dynamic analysis only)

Condition	a/g	Ang. [Deg]	Damp. [%]
DL	0.00	0.00	0.00
Di	0.00	0.00	0.00
Wo	0.00	0.00	0.00
Wi	0.00	0.00	0.00
W30	0.00	0.00	0.00
SL1	0.00	0.00	0.00
SL2	0.00	0.00	0.00
SL3	0.00	0.00	0.00
SL4	0.00	0.00	0.00
SLC	0.00	0.00	0.00
SLE1	0.00	0.00	0.00
SLE2	0.00	0.00	0.00
C1	0.00	0.00	0.00
C2	0.00	0.00	0.00
C3	0.00	0.00	0.00
C4	0.00	0.00	0.00
C5	0.00	0.00	0.00
C6	0.00	0.00	0.00
C7	0.00	0.00	0.00
C8	0.00	0.00	0.00
C9	0.00	0.00	0.00
C10	0.00	0.00	0.00
C11	0.00	0.00	0.00
C12	0.00	0.00	0.00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Centerline Communications

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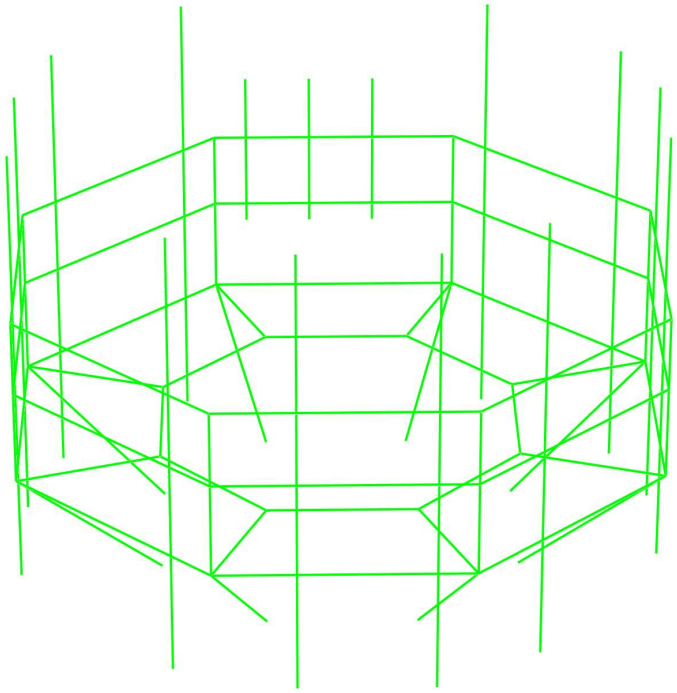
Design status
- Not designed
- Error on design
- Design O.K.
- With warnings



Centerline Communications

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Steel Code Check

Report: Summary - For all selected load conditions

Load conditions to be included in design :

C1=1.2DL+Wo
C2=0.9DL+Wo
C3=1.2DL+Di+Wi
C4=1.2DL
C5=0.9DL
C6=1.2DL+W30+1.5SL1
C7=1.2DL+W30+1.5SL2
C8=1.2DL+W30+1.5SL3
C9=1.2DL+W30+1.5SL4
C10=1.2DL+1.5SLC
C11=1.2DL+1.5SLE1
C12=1.2DL+1.5SLE2

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
antenna pipe	*PIPE 2x0.154*	57	C1 at 50.00%	0.08	OK	
			C10 at 71.88%	0.02	OK	
			C11 at 71.88%	0.04	OK	
			C12 at 71.88%	0.05	OK	
			C2 at 50.00%	**0.08**	**OK**	Eq. H1-1b
			C3 at 71.88%	0.08	OK	Eq. H1-1b
			C4 at 71.88%	0.03	OK	
			C5 at 71.88%	0.02	OK	
			C6 at 71.88%	0.07	OK	
			C7 at 71.88%	0.07	OK	
			C8 at 71.88%	0.07	OK	
			C9 at 71.88%	0.07	OK	
		58	C1 at 50.00%	0.09	OK	
			C10 at 71.88%	0.05	OK	
			C11 at 71.88%	0.06	OK	
			C12 at 71.88%	0.05	OK	
			C2 at 50.00%	0.09	OK	Eq. H1-1b
			C3 at 71.88%	**0.09**	**OK**	Eq. H1-1b
			C4 at 71.88%	0.03	OK	
			C5 at 71.88%	0.03	OK	
			C6 at 71.88%	0.08	OK	
			C7 at 71.88%	0.09	OK	
			C8 at 71.88%	0.08	OK	
			C9 at 71.88%	0.07	OK	
		59	C1 at 71.88%	**0.29**	**OK**	Eq. H1-1b
			C10 at 71.88%	0.09	OK	
			C11 at 71.88%	0.04	OK	
			C12 at 71.88%	0.09	OK	
			C2 at 71.88%	0.29	OK	
			C3 at 71.88%	0.20	OK	
			C4 at 71.88%	0.07	OK	
			C5 at 71.88%	0.06	OK	
			C6 at 71.88%	0.20	OK	
			C7 at 71.88%	0.12	OK	
			C8 at 71.88%	0.12	OK	
			C9 at 71.88%	0.11	OK	
		60	C1 at 71.88%	**0.17**	**OK**	Eq. H1-1b
			C10 at 51.56%	0.04	OK	
			C11 at 71.88%	0.04	OK	

	C12 at 71.88%	0.06	OK	
	C2 at 71.88%	0.16	OK	
	C3 at 71.88%	0.11	OK	
	C4 at 71.88%	0.03	OK	
	C5 at 71.88%	0.02	OK	
	C6 at 71.88%	0.06	OK	
	C7 at 51.56%	0.05	OK	
	C8 at 71.88%	0.08	OK	
	C9 at 71.88%	0.11	OK	
61	C1 at 71.88%	**0.31**	**OK**	Eq. H1-1b
	C10 at 53.13%	0.12	OK	
	C11 at 53.13%	0.07	OK	
	C12 at 53.13%	0.07	OK	
	C2 at 71.88%	0.29	OK	
	C3 at 71.88%	0.22	OK	
	C4 at 53.13%	0.07	OK	
	C5 at 53.13%	0.05	OK	
	C6 at 71.88%	0.14	OK	
	C7 at 71.88%	0.18	OK	
	C8 at 53.13%	0.16	OK	
	C9 at 53.13%	0.11	OK	
62	C1 at 71.88%	**0.24**	**OK**	Eq. H1-1b
	C10 at 53.13%	0.10	OK	
	C11 at 53.13%	0.04	OK	
	C12 at 53.13%	0.07	OK	
	C2 at 71.88%	0.23	OK	
	C3 at 53.13%	0.18	OK	
	C4 at 53.13%	0.05	OK	
	C5 at 53.13%	0.04	OK	
	C6 at 71.88%	0.05	OK	
	C7 at 53.13%	0.12	OK	
	C8 at 53.13%	0.14	OK	
	C9 at 53.13%	0.12	OK	
63	C1 at 71.88%	**0.21**	**OK**	Eq. H1-1b
	C10 at 71.88%	0.04	OK	
	C11 at 71.88%	0.06	OK	
	C12 at 71.88%	0.03	OK	
	C2 at 71.88%	0.21	OK	
	C3 at 71.88%	0.12	OK	
	C4 at 71.88%	0.03	OK	
	C5 at 71.88%	0.02	OK	
	C6 at 71.88%	0.11	OK	
	C7 at 71.88%	0.07	OK	
	C8 at 71.88%	0.05	OK	
	C9 at 71.88%	0.05	OK	
64	C1 at 71.88%	0.19	OK	
	C10 at 71.88%	0.10	OK	
	C11 at 71.88%	0.08	OK	
	C12 at 71.88%	0.08	OK	
	C2 at 71.88%	**0.19**	**OK**	Eq. H1-1b
	C3 at 71.88%	0.13	OK	
	C4 at 71.88%	0.07	OK	
	C5 at 71.88%	0.06	OK	
	C6 at 71.88%	0.16	OK	
	C7 at 71.88%	0.14	OK	
	C8 at 71.88%	0.11	OK	
	C9 at 71.88%	0.08	OK	
65	C1 at 71.88%	**0.18**	**OK**	Eq. H1-1b
	C10 at 53.13%	0.07	OK	
	C11 at 53.13%	0.07	OK	
	C12 at 53.13%	0.05	OK	
	C2 at 71.88%	0.17	OK	
	C3 at 53.13%	0.13	OK	
	C4 at 53.13%	0.05	OK	
	C5 at 53.13%	0.04	OK	
	C6 at 53.13%	0.09	OK	

			C7 at 53.13%	0.09	OK	
			C8 at 71.88%	0.12	OK	
			C9 at 71.88%	0.08	OK	
		66	C1 at 71.88%	**0.20**	**OK**	Eq. H1-1b
			C10 at 71.88%	0.07	OK	
			C11 at 35.94%	0.05	OK	
			C12 at 71.88%	0.03	OK	
			C2 at 71.88%	0.19	OK	
			C3 at 71.88%	0.12	OK	
			C4 at 35.94%	0.03	OK	
			C5 at 35.94%	0.02	OK	
			C6 at 35.94%	0.07	OK	
			C7 at 71.88%	0.10	OK	
			C8 at 71.88%	0.08	OK	
			C9 at 35.94%	0.03	OK	
		67	C1 at 28.13%	0.22	OK	
			C10 at 28.13%	0.09	OK	
			C11 at 28.13%	0.14	OK	
			C12 at 28.13%	0.10	OK	
			C2 at 28.13%	**0.24**	**OK**	Eq. H1-1b
			C3 at 46.88%	0.11	OK	
			C4 at 28.13%	0.08	OK	
			C5 at 28.13%	0.06	OK	
			C6 at 28.13%	0.17	OK	
			C7 at 28.13%	0.12	OK	
			C8 at 28.13%	0.08	OK	
			C9 at 28.13%	0.09	OK	
		68	C1 at 71.88%	**0.17**	**OK**	Eq. H1-1b
			C10 at 71.88%	0.05	OK	
			C11 at 71.88%	0.02	OK	
			C12 at 71.88%	0.04	OK	
			C2 at 71.88%	0.16	OK	
			C3 at 71.88%	0.07	OK	
			C4 at 71.88%	0.03	OK	
			C5 at 71.88%	0.02	OK	
			C6 at 71.88%	0.04	OK	
			C7 at 71.88%	0.05	OK	
			C8 at 71.88%	0.06	OK	
			C9 at 71.88%	0.07	OK	
bot back	***L 3X3X1_4***	**9**	C1 at 100.00%	0.05	OK	
			C10 at 100.00%	0.14	OK	
			C11 at 100.00%	0.16	OK	
			C12 at 100.00%	0.17	OK	
			C2 at 100.00%	0.08	OK	
			C3 at 100.00%	**0.23**	**OK**	Sec. F1
			C4 at 100.00%	0.12	OK	
			C5 at 100.00%	0.09	OK	
			C6 at 100.00%	0.19	OK	
			C7 at 100.00%	0.21	OK	
			C8 at 100.00%	0.18	OK	
			C9 at 100.00%	0.18	OK	
		10	C1 at 100.00%	0.26	OK	
			C10 at 100.00%	0.40	OK	
			C11 at 100.00%	0.37	OK	
			C12 at 100.00%	0.42	OK	
			C2 at 100.00%	0.18	OK	
			C3 at 100.00%	**0.69**	**OK**	Sec. F1
			C4 at 100.00%	0.30	OK	
			C5 at 100.00%	0.22	OK	
			C6 at 100.00%	0.45	OK	
			C7 at 100.00%	0.52	OK	
			C8 at 100.00%	0.53	OK	
			C9 at 100.00%	0.54	OK	
		11	C1 at 100.00%	0.54	OK	
			C10 at 100.00%	0.47	OK	

	C11 at 100.00%	0.42	OK	
	C12 at 0.00%	0.41	OK	
	C2 at 100.00%	0.46	OK	
	C3 at 100.00%	**0.83**	**OK**	Sec. F1
	C4 at 100.00%	0.33	OK	
	C5 at 100.00%	0.25	OK	
	C6 at 100.00%	0.53	OK	
	C7 at 100.00%	0.62	OK	
	C8 at 100.00%	0.61	OK	
	C9 at 100.00%	0.53	OK	
12	C1 at 0.00%	0.55	OK	
	C10 at 0.00%	0.49	OK	
	C11 at 0.00%	0.43	OK	
	C12 at 0.00%	0.42	OK	
	C2 at 0.00%	0.47	OK	
	C3 at 0.00%	**0.85**	**OK**	Sec. F1
	C4 at 0.00%	0.34	OK	
	C5 at 0.00%	0.25	OK	
	C6 at 0.00%	0.54	OK	
	C7 at 0.00%	0.63	OK	
	C8 at 0.00%	0.63	OK	
	C9 at 0.00%	0.55	OK	
13	C1 at 0.00%	0.40	OK	
	C10 at 0.00%	0.24	OK	
	C11 at 0.00%	0.28	OK	
	C12 at 0.00%	0.23	OK	
	C2 at 0.00%	0.35	OK	
	C3 at 0.00%	**0.51**	**OK**	Sec. F1
	C4 at 0.00%	0.19	OK	
	C5 at 0.00%	0.14	OK	
	C6 at 0.00%	0.38	OK	
	C7 at 0.00%	0.31	OK	
	C8 at 0.00%	0.30	OK	
	C9 at 0.00%	0.29	OK	
14	C1 at 100.00%	0.44	OK	
	C10 at 100.00%	0.40	OK	
	C11 at 100.00%	0.34	OK	
	C12 at 100.00%	0.32	OK	
	C2 at 100.00%	0.38	OK	
	C3 at 100.00%	**0.69**	**OK**	Sec. F1
	C4 at 100.00%	0.27	OK	
	C5 at 100.00%	0.20	OK	
	C6 at 100.00%	0.44	OK	
	C7 at 100.00%	0.50	OK	
	C8 at 100.00%	0.51	OK	
	C9 at 100.00%	0.41	OK	
15	C1 at 0.00%	0.43	OK	
	C10 at 0.00%	0.39	OK	
	C11 at 0.00%	0.33	OK	
	C12 at 0.00%	0.31	OK	
	C2 at 0.00%	0.37	OK	
	C3 at 0.00%	**0.67**	**OK**	Sec. F1
	C4 at 0.00%	0.26	OK	
	C5 at 0.00%	0.20	OK	
	C6 at 0.00%	0.43	OK	
	C7 at 0.00%	0.49	OK	
	C8 at 0.00%	0.50	OK	
	C9 at 0.00%	0.40	OK	
16	C1 at 0.00%	0.24	OK	
	C10 at 0.00%	0.24	OK	
	C11 at 0.00%	0.26	OK	
	C12 at 0.00%	0.19	OK	
	C2 at 0.00%	0.20	OK	
	C3 at 0.00%	**0.42**	**OK**	Sec. F1
	C4 at 0.00%	0.18	OK	
	C5 at 0.00%	0.13	OK	

		C6 at 0.00%	0.35	OK	
		C7 at 0.00%	0.31	OK	
		C8 at 0.00%	0.28	OK	
		C9 at 0.00%	0.23	OK	
bot diagonal	**17**	C1 at 0.00%	0.26	OK	
		C10 at 0.00%	0.20	OK	
		C11 at 0.00%	0.17	OK	
		C12 at 0.00%	0.19	OK	
		C2 at 0.00%	0.22	OK	
		C3 at 0.00%	**0.36**	**OK**	Sec. F1
		C4 at 0.00%	0.14	OK	
		C5 at 0.00%	0.10	OK	
		C6 at 0.00%	0.24	OK	
		C7 at 0.00%	0.25	OK	
		C8 at 0.00%	0.27	OK	
		C9 at 0.00%	0.24	OK	
	18	C1 at 0.00%	0.35	OK	
		C10 at 0.00%	0.22	OK	
		C11 at 0.00%	0.23	OK	
		C12 at 0.00%	0.20	OK	
		C2 at 0.00%	0.31	OK	
		C3 at 0.00%	**0.41**	**OK**	Sec. F1
		C4 at 0.00%	0.16	OK	
		C5 at 0.00%	0.12	OK	
		C6 at 0.00%	0.28	OK	
		C7 at 0.00%	0.29	OK	
		C8 at 0.00%	0.28	OK	
		C9 at 0.00%	0.27	OK	
	19	C1 at 100.00%	0.18	OK	
		C10 at 100.00%	0.29	OK	
		C11 at 100.00%	0.27	OK	
		C12 at 100.00%	0.30	OK	
		C2 at 100.00%	0.13	OK	
		C3 at 100.00%	**0.49**	**OK**	Sec. F1
		C4 at 100.00%	0.21	OK	
		C5 at 100.00%	0.16	OK	
		C6 at 100.00%	0.32	OK	
		C7 at 100.00%	0.37	OK	
		C8 at 100.00%	0.38	OK	
		C9 at 100.00%	0.38	OK	
	20	C1 at 100.00%	0.40	OK	
		C10 at 100.00%	0.35	OK	
		C11 at 100.00%	0.31	OK	
		C12 at 100.00%	0.30	OK	
		C2 at 100.00%	0.34	OK	
		C3 at 100.00%	**0.61**	**OK**	Sec. F1
		C4 at 100.00%	0.24	OK	
		C5 at 100.00%	0.18	OK	
		C6 at 100.00%	0.38	OK	
		C7 at 100.00%	0.45	OK	
		C8 at 100.00%	0.45	OK	
		C9 at 100.00%	0.39	OK	
	21	C1 at 0.00%	0.37	OK	
		C10 at 0.00%	0.31	OK	
		C11 at 0.00%	0.32	OK	
		C12 at 0.00%	0.30	OK	
		C2 at 0.00%	0.31	OK	
		C3 at 0.00%	**0.59**	**OK**	Sec. F1
		C4 at 0.00%	0.23	OK	
		C5 at 0.00%	0.18	OK	
		C6 at 0.00%	0.41	OK	
		C7 at 0.00%	0.39	OK	
		C8 at 0.00%	0.39	OK	
		C9 at 0.00%	0.38	OK	
	22	C1 at 0.00%	0.24	OK	

		C10 at 0.00%	0.24	OK	
		C11 at 0.00%	0.22	OK	
		C12 at 0.00%	0.20	OK	
		C2 at 0.00%	0.20	OK	
		C3 at 0.00%	**0.41**	**OK**	Sec. F1
		C4 at 0.00%	0.17	OK	
		C5 at 0.00%	0.13	OK	
		C6 at 0.00%	0.29	OK	
		C7 at 0.00%	0.30	OK	
		C8 at 0.00%	0.29	OK	
		C9 at 0.00%	0.26	OK	
	23	C1 at 100.00%	0.32	OK	
		C10 at 100.00%	0.29	OK	
		C11 at 100.00%	0.24	OK	
		C12 at 100.00%	0.23	OK	
		C2 at 100.00%	0.27	OK	
		C3 at 100.00%	**0.49**	**OK**	Sec. F1
		C4 at 100.00%	0.19	OK	
		C5 at 100.00%	0.14	OK	
		C6 at 100.00%	0.31	OK	
		C7 at 100.00%	0.36	OK	
		C8 at 100.00%	0.36	OK	
		C9 at 100.00%	0.29	OK	
	24	C1 at 100.00%	0.17	OK	
		C10 at 100.00%	0.18	OK	
		C11 at 100.00%	0.18	OK	
		C12 at 0.00%	0.14	OK	
		C2 at 100.00%	0.14	OK	
		C3 at 100.00%	**0.30**	**OK**	Sec. F1
		C4 at 100.00%	0.12	OK	
		C5 at 100.00%	0.09	OK	
		C6 at 100.00%	0.25	OK	
		C7 at 100.00%	0.22	OK	
		C8 at 100.00%	0.20	OK	
		C9 at 0.00%	0.17	OK	
brace	**25**	C1 at 100.00%	0.30	OK	Sec. F1
		C10 at 100.00%	0.17	OK	
		C11 at 100.00%	0.15	OK	
		C12 at 100.00%	0.15	OK	
		C2 at 100.00%	0.28	OK	
		C3 at 100.00%	**0.32**	**OK**	Sec. F1
		C4 at 100.00%	0.12	OK	
		C5 at 100.00%	0.09	OK	
		C6 at 100.00%	0.22	OK	
		C7 at 100.00%	0.22	OK	
		C8 at 100.00%	0.22	OK	
		C9 at 100.00%	0.20	OK	
	26	C1 at 100.00%	0.27	OK	
		C10 at 100.00%	0.18	OK	
		C11 at 100.00%	0.20	OK	
		C12 at 100.00%	0.22	OK	
		C2 at 100.00%	0.30	OK	Eq. H2-1
		C3 at 100.00%	**0.32**	**OK**	Sec. F1
		C4 at 100.00%	0.15	OK	
		C5 at 100.00%	0.11	OK	
		C6 at 100.00%	0.25	OK	
		C7 at 100.00%	0.29	OK	Sec. F1
		C8 at 100.00%	0.23	OK	
		C9 at 100.00%	0.22	OK	
	27	C1 at 100.00%	0.11	OK	
		C10 at 100.00%	0.09	OK	
		C11 at 100.00%	0.10	OK	
		C12 at 100.00%	0.11	OK	
		C2 at 100.00%	0.13	OK	Sec. F1
		C3 at 100.00%	**0.15**	**OK**	Sec. F1
		C4 at 100.00%	0.07	OK	

	C5 at 100.00%	0.05	OK	
	C6 at 100.00%	0.11	OK	
	C7 at 100.00%	0.12	OK	
	C8 at 100.00%	0.11	OK	
	C9 at 100.00%	0.12	OK	
28	C1 at 100.00%	**0.20**	**OK**	Sec. F1
	C10 at 100.00%	0.07	OK	
	C11 at 100.00%	0.07	OK	
	C12 at 100.00%	0.08	OK	
	C2 at 100.00%	0.20	OK	
	C3 at 100.00%	0.12	OK	
	C4 at 100.00%	0.05	OK	
	C5 at 100.00%	0.04	OK	
	C6 at 100.00%	0.08	OK	
	C7 at 100.00%	0.09	OK	
	C8 at 100.00%	0.09	OK	
	C9 at 100.00%	0.10	OK	
29	C1 at 100.00%	**0.45**	**OK**	Sec. F1
	C10 at 100.00%	0.16	OK	
	C11 at 100.00%	0.23	OK	
	C12 at 100.00%	0.15	OK	
	C2 at 100.00%	0.42	OK	
	C3 at 100.00%	0.42	OK	
	C4 at 100.00%	0.14	OK	
	C5 at 100.00%	0.11	OK	
	C6 at 100.00%	0.34	OK	
	C7 at 100.00%	0.20	OK	
	C8 at 100.00%	0.18	OK	
	C9 at 100.00%	0.20	OK	
30	C1 at 100.00%	0.41	OK	
	C10 at 100.00%	0.22	OK	
	C11 at 100.00%	0.22	OK	
	C12 at 100.00%	0.30	OK	
	C2 at 100.00%	0.37	OK	
	C3 at 100.00%	**0.51**	**OK**	Sec. F1
	C4 at 100.00%	0.19	OK	
	C5 at 100.00%	0.14	OK	
	C6 at 100.00%	0.26	OK	
	C7 at 100.00%	0.26	OK	
	C8 at 100.00%	0.29	OK	
	C9 at 100.00%	0.41	OK	
31	C1 at 100.00%	0.21	OK	
	C10 at 100.00%	0.13	OK	
	C11 at 100.00%	0.11	OK	
	C12 at 100.00%	0.12	OK	
	C2 at 100.00%	0.19	OK	
	C3 at 100.00%	**0.25**	**OK**	Sec. F1
	C4 at 100.00%	0.09	OK	
	C5 at 100.00%	0.07	OK	
	C6 at 100.00%	0.14	OK	
	C7 at 100.00%	0.16	OK	
	C8 at 100.00%	0.19	OK	
	C9 at 100.00%	0.16	OK	
32	C1 at 100.00%	0.10	OK	Sec. F1
	C10 at 100.00%	0.06	OK	
	C11 at 100.00%	0.05	OK	
	C12 at 100.00%	0.06	OK	
	C2 at 100.00%	0.09	OK	
	C3 at 100.00%	**0.12**	**OK**	Sec. F1
	C4 at 100.00%	0.05	OK	
	C5 at 100.00%	0.03	OK	
	C6 at 100.00%	0.06	OK	
	C7 at 100.00%	0.08	OK	
	C8 at 100.00%	0.09	OK	
	C9 at 100.00%	0.08	OK	

mid rail	**33**	C1 at 16.67%	**0.19**	**OK**	Sec. F1
		C10 at 100.00%	0.12	OK	
		C11 at 100.00%	0.08	OK	
		C12 at 100.00%	0.06	OK	
		C2 at 16.67%	0.18	OK	
		C3 at 100.00%	0.18	OK	
		C4 at 100.00%	0.06	OK	
		C5 at 100.00%	0.05	OK	
		C6 at 100.00%	0.11	OK	
		C7 at 100.00%	0.16	OK	
		C8 at 81.25%	0.15	OK	
		C9 at 100.00%	0.07	OK	
	34	C1 at 0.00%	0.13	OK	
		C10 at 60.94%	0.08	OK	
		C11 at 0.00%	0.09	OK	
		C12 at 0.00%	0.07	OK	
		C2 at 0.00%	0.12	OK	
		C3 at 0.00%	**0.14**	**OK**	Eq. H2-1
		C4 at 60.94%	0.05	OK	
		C5 at 60.94%	0.04	OK	
		C6 at 0.00%	0.12	OK	
		C7 at 60.94%	0.11	OK	
		C8 at 0.00%	0.11	OK	
		C9 at 0.00%	0.10	OK	
	35	C1 at 16.67%	**0.22**	**OK**	Sec. F1
		C10 at 0.00%	0.12	OK	
		C11 at 0.00%	0.07	OK	
		C12 at 0.00%	0.09	OK	
		C2 at 16.67%	0.21	OK	
		C3 at 0.00%	0.19	OK	Eq. H2-1
		C4 at 0.00%	0.06	OK	
		C5 at 0.00%	0.05	OK	
		C6 at 83.33%	0.16	OK	Sec. F1
		C7 at 16.67%	0.13	OK	
		C8 at 0.00%	0.17	OK	
		C9 at 0.00%	0.13	OK	
	36	C1 at 0.00%	**0.18**	**OK**	Sec. F1
		C10 at 100.00%	0.09	OK	
		C11 at 0.00%	0.06	OK	
		C12 at 0.00%	0.08	OK	
		C2 at 0.00%	0.17	OK	
		C3 at 77.08%	0.12	OK	Sec. F1
		C4 at 77.08%	0.05	OK	
		C5 at 77.08%	0.03	OK	
		C6 at 0.00%	0.08	OK	
		C7 at 100.00%	0.11	OK	Sec. F1
		C8 at 77.08%	0.11	OK	
		C9 at 27.08%	0.11	OK	
	37	C1 at 100.00%	0.27	OK	
		C10 at 0.00%	0.06	OK	
		C11 at 100.00%	0.04	OK	
		C12 at 0.00%	0.05	OK	
		C2 at 100.00%	**0.27**	**OK**	Eq. H2-1
		C3 at 0.00%	0.13	OK	
		C4 at 0.00%	0.04	OK	
		C5 at 0.00%	0.03	OK	
		C6 at 100.00%	0.10	OK	
		C7 at 0.00%	0.12	OK	
		C8 at 0.00%	0.09	OK	
		C9 at 0.00%	0.08	OK	
	38	C1 at 100.00%	0.20	OK	
		C10 at 10.42%	0.07	OK	
		C11 at 0.00%	0.10	OK	
		C12 at 0.00%	0.08	OK	
		C2 at 100.00%	**0.20**	**OK**	Eq. H3-8
		C3 at 0.00%	0.12	OK	

			C4 at 0.00%	0.07	OK	
			C5 at 0.00%	0.05	OK	
			C6 at 0.00%	0.14	OK	Eq. H2-1
			C7 at 0.00%	0.11	OK	
			C8 at 31.25%	0.08	OK	
			C9 at 0.00%	0.09	OK	
		39	C1 at 100.00%	0.26	OK	
			C10 at 0.00%	0.10	OK	
			C11 at 0.00%	0.16	OK	
			C12 at 0.00%	0.07	OK	
			C2 at 100.00%	**0.26**	**OK**	Sec. F1
			C3 at 100.00%	0.13	OK	
			C4 at 0.00%	0.08	OK	
			C5 at 0.00%	0.06	OK	
			C6 at 0.00%	0.20	OK	
			C7 at 0.00%	0.13	OK	
			C8 at 100.00%	0.09	OK	
			C9 at 100.00%	0.06	OK	
		40	C1 at 85.42%	**0.21**	**OK**	Eq. H2-1
			C10 at 0.00%	0.09	OK	
			C11 at 87.50%	0.12	OK	
			C12 at 87.50%	0.08	OK	
			C2 at 85.42%	0.20	OK	
			C3 at 87.50%	0.17	OK	
			C4 at 87.50%	0.07	OK	
			C5 at 87.50%	0.05	OK	
			C6 at 87.50%	0.18	OK	Sec. F1
			C7 at 87.50%	0.12	OK	
			C8 at 0.00%	0.12	OK	Sec. F1
			C9 at 87.50%	0.09	OK	
Squid pipe	***PIPE 2x0.154***	**69**	C1 at 12.50%	0.02	OK	
			C10 at 12.50%	0.04	OK	
			C11 at 12.50%	0.05	OK	
			C12 at 12.50%	0.03	OK	
			C2 at 12.50%	0.01	OK	
			C3 at 12.50%	**0.07**	**OK**	Eq. H1-1b
			C4 at 12.50%	0.03	OK	
			C5 at 12.50%	0.02	OK	
			C6 at 12.50%	0.05	OK	
			C7 at 12.50%	0.05	OK	
			C8 at 12.50%	0.04	OK	
			C9 at 12.50%	0.03	OK	Eq. H3-1
		70	C1 at 58.33%	0.02	OK	
			C10 at 58.33%	0.03	OK	
			C11 at 58.33%	0.05	OK	
			C12 at 12.50%	0.01	OK	
			C2 at 58.33%	0.02	OK	
			C3 at 58.33%	0.06	OK	
			C4 at 58.33%	0.03	OK	
			C5 at 58.33%	0.02	OK	
			C6 at 58.33%	**0.06**	**OK**	Eq. H1-1b
			C7 at 58.33%	0.04	OK	
			C8 at 58.33%	0.03	OK	
			C9 at 12.50%	0.02	OK	
		71	C1 at 12.50%	0.02	OK	
			C10 at 12.50%	0.01	OK	
			C11 at 12.50%	0.02	OK	
			C12 at 58.33%	0.02	OK	
			C2 at 12.50%	0.02	OK	
			C3 at 12.50%	0.03	OK	
			C4 at 12.50%	0.01	OK	
			C5 at 12.50%	0.01	OK	
			C6 at 12.50%	**0.04**	**OK**	Eq. H3-1
			C7 at 12.50%	0.02	OK	
			C8 at 58.33%	0.01	OK	
			C9 at 58.33%	0.03	OK	Eq. H1-1b

toe	***L 3X3X1_4***	**1**	C1 at 0.00%	0.26	OK	
			C10 at 100.00%	0.27	OK	
			C11 at 100.00%	0.28	OK	
			C12 at 100.00%	0.28	OK	
			C2 at 0.00%	0.23	OK	
			C3 at 100.00%	**0.50**	**OK**	Eq. H3-8
			C4 at 100.00%	0.21	OK	
			C5 at 100.00%	0.16	OK	
			C6 at 100.00%	0.32	OK	
			C7 at 100.00%	0.46	OK	
			C8 at 100.00%	0.35	OK	
			C9 at 100.00%	0.33	OK	
		2	C1 at 100.00%	0.26	OK	Sec. F1
			C10 at 0.00%	0.15	OK	
			C11 at 0.00%	0.22	OK	
			C12 at 0.00%	0.16	OK	
			C2 at 100.00%	0.24	OK	
			C3 at 0.00%	**0.28**	**OK**	Sec. F1
			C4 at 0.00%	0.12	OK	
			C5 at 0.00%	0.09	OK	
			C6 at 0.00%	0.24	OK	
			C7 at 0.00%	0.18	OK	
			C8 at 0.00%	0.19	OK	
			C9 at 0.00%	0.20	OK	
		3	C1 at 100.00%	0.19	OK	
			C10 at 0.00%	0.17	OK	
			C11 at 0.00%	0.15	OK	
			C12 at 100.00%	0.16	OK	
			C2 at 100.00%	0.16	OK	
			C3 at 100.00%	**0.28**	**OK**	Eq. H3-8
			C4 at 0.00%	0.12	OK	
			C5 at 0.00%	0.09	OK	
			C6 at 0.00%	0.17	OK	
			C7 at 0.00%	0.22	OK	
			C8 at 100.00%	0.26	OK	
			C9 at 0.00%	0.22	OK	
		4	C1 at 82.29%	0.19	OK	Sec. F1
			C10 at 0.00%	0.21	OK	
			C11 at 0.00%	0.22	OK	
			C12 at 0.00%	0.24	OK	
			C2 at 82.29%	0.18	OK	
			C3 at 0.00%	**0.41**	**OK**	Eq. H3-8
			C4 at 0.00%	0.18	OK	
			C5 at 0.00%	0.13	OK	
			C6 at 0.00%	0.27	OK	
			C7 at 0.00%	0.38	OK	
			C8 at 0.00%	0.27	OK	
			C9 at 0.00%	0.28	OK	
		5	C1 at 100.00%	0.16	OK	
			C10 at 100.00%	0.10	OK	
			C11 at 100.00%	0.11	OK	
			C12 at 0.00%	0.10	OK	
			C2 at 100.00%	0.14	OK	
			C3 at 100.00%	**0.19**	**OK**	Sec. F1
			C4 at 100.00%	0.08	OK	
			C5 at 100.00%	0.06	OK	
			C6 at 100.00%	0.15	OK	
			C7 at 100.00%	0.12	OK	
			C8 at 0.00%	0.12	OK	
			C9 at 0.00%	0.13	OK	
		6	C1 at 0.00%	0.34	OK	
			C10 at 0.00%	0.30	OK	
			C11 at 0.00%	0.27	OK	
			C12 at 0.00%	0.23	OK	
			C2 at 0.00%	0.29	OK	

		C3 at 0.00%	**0.53**	**OK**	Eq. H3-8
		C4 at 0.00%	0.21	OK	
		C5 at 0.00%	0.16	OK	
		C6 at 0.00%	0.36	OK	
		C7 at 0.00%	0.37	OK	
		C8 at 0.00%	0.36	OK	
		C9 at 0.00%	0.41	OK	
	7	C1 at 0.00%	0.29	OK	
		C10 at 0.00%	0.14	OK	
		C11 at 0.00%	0.17	OK	
		C12 at 0.00%	0.14	OK	
		C2 at 0.00%	0.26	OK	
		C3 at 0.00%	**0.33**	**OK**	Sec. F1
		C4 at 0.00%	0.12	OK	
		C5 at 0.00%	0.09	OK	
		C6 at 0.00%	0.25	OK	
		C7 at 0.00%	0.25	OK	
		C8 at 0.00%	0.17	OK	
		C9 at 0.00%	0.17	OK	
	8	C1 at 0.00%	0.28	OK	Sec. F1
		C10 at 100.00%	0.25	OK	
		C11 at 100.00%	0.25	OK	
		C12 at 100.00%	0.29	OK	
		C2 at 0.00%	0.28	OK	
		C3 at 100.00%	**0.45**	**OK**	Eq. H3-8
		C4 at 100.00%	0.19	OK	
		C5 at 100.00%	0.14	OK	
		C6 at 100.00%	0.33	OK	
		C7 at 100.00%	0.31	OK	
		C8 at 100.00%	0.30	OK	
		C9 at 100.00%	0.38	OK	
top rail	**41**	C1 at 0.00%	0.24	OK	
		C10 at 100.00%	0.14	OK	
		C11 at 0.00%	0.13	OK	
		C12 at 100.00%	0.08	OK	
		C2 at 0.00%	0.22	OK	
		C3 at 0.00%	**0.24**	**OK**	Sec. F1
		C4 at 0.00%	0.09	OK	
		C5 at 0.00%	0.07	OK	
		C6 at 0.00%	0.21	OK	
		C7 at 0.00%	0.20	OK	
		C8 at 100.00%	0.19	OK	Sec. F1
		C9 at 100.00%	0.10	OK	
	42	C1 at 100.00%	0.24	OK	
		C10 at 100.00%	0.14	OK	
		C11 at 100.00%	0.13	OK	
		C12 at 0.00%	0.10	OK	
		C2 at 100.00%	0.22	OK	
		C3 at 100.00%	**0.24**	**OK**	Sec. F1
		C4 at 100.00%	0.09	OK	
		C5 at 100.00%	0.06	OK	
		C6 at 100.00%	0.21	OK	
		C7 at 100.00%	0.19	OK	
		C8 at 100.00%	0.16	OK	
		C9 at 0.00%	0.16	OK	Sec. F1
	43	C1 at 16.67%	**0.19**	**OK**	Sec. F1
		C10 at 0.00%	0.13	OK	
		C11 at 0.00%	0.07	OK	
		C12 at 100.00%	0.10	OK	
		C2 at 16.67%	0.18	OK	
		C3 at 0.00%	0.18	OK	Sec. F1
		C4 at 0.00%	0.07	OK	
		C5 at 0.00%	0.05	OK	
		C6 at 16.67%	0.07	OK	
		C7 at 0.00%	0.18	OK	Eq. H2-1
		C8 at 0.00%	0.17	OK	

		C9 at 100.00%	0.16	OK	Sec. F1
	44	C1 at 27.08%	0.15	OK	Sec. F1
		C10 at 100.00%	0.13	OK	
		C11 at 100.00%	0.07	OK	
		C12 at 0.00%	0.10	OK	
		C2 at 27.08%	0.15	OK	
		C3 at 100.00%	**0.18**	**OK**	Sec. F1
		C4 at 100.00%	0.07	OK	
		C5 at 100.00%	0.05	OK	
		C6 at 100.00%	0.06	OK	
		C7 at 100.00%	0.17	OK	
		C8 at 100.00%	0.17	OK	
		C9 at 0.00%	0.16	OK	Eq. H2-1
	45	C1 at 100.00%	**0.21**	**OK**	Eq. H2-1
		C10 at 100.00%	0.06	OK	
		C11 at 100.00%	0.07	OK	
		C12 at 100.00%	0.11	OK	
		C2 at 100.00%	0.20	OK	
		C3 at 100.00%	0.15	OK	
		C4 at 100.00%	0.05	OK	
		C5 at 100.00%	0.04	OK	
		C6 at 31.25%	0.09	OK	
		C7 at 100.00%	0.06	OK	
		C8 at 100.00%	0.09	OK	
		C9 at 100.00%	0.15	OK	Sec. F1
	46	C1 at 83.33%	0.19	OK	Eq. H2-1
		C10 at 0.00%	0.12	OK	
		C11 at 0.00%	0.15	OK	
		C12 at 0.00%	0.11	OK	
		C2 at 83.33%	0.18	OK	
		C3 at 2.08%	0.18	OK	
		C4 at 0.00%	0.10	OK	
		C5 at 0.00%	0.07	OK	
		C6 at 0.00%	**0.23**	**OK**	Sec. F1
		C7 at 0.00%	0.17	OK	
		C8 at 0.00%	0.12	OK	
		C9 at 85.42%	0.12	OK	
	47	C1 at 0.00%	0.20	OK	Eq. H2-1
		C10 at 100.00%	0.12	OK	
		C11 at 100.00%	0.16	OK	
		C12 at 100.00%	0.11	OK	
		C2 at 78.13%	0.20	OK	Eq. H2-1
		C3 at 0.00%	0.21	OK	
		C4 at 100.00%	0.10	OK	
		C5 at 100.00%	0.08	OK	
		C6 at 0.00%	**0.24**	**OK**	Sec. F1
		C7 at 100.00%	0.17	OK	
		C8 at 100.00%	0.12	OK	
		C9 at 0.00%	0.11	OK	
	48	C1 at 85.42%	0.16	OK	Sec. F1
		C10 at 0.00%	0.14	OK	
		C11 at 100.00%	0.15	OK	
		C12 at 87.50%	0.10	OK	
		C2 at 85.42%	0.15	OK	
		C3 at 87.50%	0.23	OK	
		C4 at 87.50%	0.09	OK	
		C5 at 87.50%	0.07	OK	
		C6 at 87.50%	**0.25**	**OK**	Sec. F1
		C7 at 0.00%	0.19	OK	Eq. H2-1
		C8 at 0.00%	0.19	OK	Sec. F1
		C9 at 87.50%	0.11	OK	
vertical	**49**	C1 at 0.00%	**0.53**	**OK**	Sec. F1
		C10 at 0.00%	0.24	OK	
		C11 at 0.00%	0.19	OK	
		C12 at 0.00%	0.22	OK	

	C2 at 0.00%	0.49	OK	
	C3 at 0.00%	0.47	OK	
	C4 at 0.00%	0.16	OK	
	C5 at 0.00%	0.12	OK	
	C6 at 0.00%	0.28	OK	
	C7 at 0.00%	0.31	OK	
	C8 at 0.00%	0.33	OK	
	C9 at 0.00%	0.30	OK	
50	C1 at 0.00%	0.38	OK	
	C10 at 0.00%	0.30	OK	
	C11 at 0.00%	0.31	OK	
	C12 at 0.00%	0.28	OK	
	C2 at 0.00%	0.33	OK	
	C3 at 0.00%	**0.57**	**OK**	Eq. H2-1
	C4 at 0.00%	0.22	OK	
	C5 at 0.00%	0.17	OK	
	C6 at 0.00%	0.40	OK	
	C7 at 0.00%	0.44	OK	
	C8 at 0.00%	0.38	OK	
	C9 at 0.00%	0.36	OK	
51	C1 at 0.00%	0.28	OK	
	C10 at 0.00%	0.25	OK	
	C11 at 0.00%	0.22	OK	
	C12 at 0.00%	0.30	OK	
	C2 at 0.00%	0.28	OK	Sec. F1
	C3 at 0.00%	**0.42**	**OK**	Eq. H2-1
	C4 at 0.00%	0.19	OK	
	C5 at 0.00%	0.14	OK	
	C6 at 0.00%	0.27	OK	
	C7 at 0.00%	0.32	OK	
	C8 at 0.00%	0.33	OK	
	C9 at 0.00%	0.36	OK	
52	C1 at 0.00%	0.25	OK	
	C10 at 0.00%	0.28	OK	
	C11 at 0.00%	0.24	OK	
	C12 at 0.00%	0.26	OK	
	C2 at 0.00%	0.22	OK	
	C3 at 0.00%	**0.43**	**OK**	Eq. H2-1
	C4 at 0.00%	0.19	OK	
	C5 at 0.00%	0.14	OK	
	C6 at 0.00%	0.28	OK	
	C7 at 0.00%	0.35	OK	
	C8 at 0.00%	0.33	OK	
	C9 at 0.00%	0.31	OK	
53	C1 at 0.00%	0.38	OK	
	C10 at 0.00%	0.32	OK	
	C11 at 0.00%	0.30	OK	
	C12 at 0.00%	0.31	OK	
	C2 at 0.00%	0.33	OK	
	C3 at 0.00%	**0.53**	**OK**	Eq. H2-1
	C4 at 0.00%	0.23	OK	
	C5 at 0.00%	0.17	OK	
	C6 at 0.00%	0.38	OK	
	C7 at 0.00%	0.39	OK	
	C8 at 0.00%	0.42	OK	
	C9 at 0.00%	0.39	OK	
54	C1 at 0.00%	0.49	OK	
	C10 at 0.00%	0.40	OK	
	C11 at 0.00%	0.37	OK	
	C12 at 0.00%	0.41	OK	
	C2 at 0.00%	0.42	OK	
	C3 at 0.00%	**0.76**	**OK**	Sec. F1
	C4 at 0.00%	0.30	OK	
	C5 at 0.00%	0.22	OK	
	C6 at 0.00%	0.47	OK	
	C7 at 0.00%	0.49	OK	

	C8 at 0.00%	0.51	OK	
	C9 at 0.00%	0.55	OK	
55	C1 at 0.00%	0.35	OK	
	C10 at 0.00%	0.28	OK	
	C11 at 0.00%	0.24	OK	
	C12 at 0.00%	0.21	OK	
	C2 at 0.00%	0.31	OK	
	C3 at 0.00%	**0.48**	**OK**	Sec. F1
	C4 at 0.00%	0.18	OK	
	C5 at 0.00%	0.14	OK	
	C6 at 0.00%	0.31	OK	
	C7 at 0.00%	0.35	OK	
	C8 at 0.00%	0.34	OK	
	C9 at 0.00%	0.26	OK	
56	C1 at 0.00%	0.26	OK	
	C10 at 0.00%	0.22	OK	
	C11 at 0.00%	0.25	OK	
	C12 at 0.00%	0.20	OK	
	C2 at 0.00%	0.27	OK	Sec. F1
	C3 at 0.00%	**0.40**	**OK**	Eq. H2-1
	C4 at 0.00%	0.17	OK	
	C5 at 0.00%	0.12	OK	
	C6 at 0.00%	0.30	OK	
	C7 at 0.00%	0.28	OK	
	C8 at 0.00%	0.28	OK	
	C9 at 0.00%	0.24	OK	