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

May 2, 2021

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

RE: **Notice of Exempt Modification for T-Mobile:**
842858 - T-Mobile Site ID: CTHA518A
49 South Road, Bolton, CT 06043
Latitude: 41° 47′ 20.43″ / Longitude: -72° 25′ 44.91″

Dear Attorney Bachman:

T-Mobile currently maintains six (6) antennas at the 99-foot mount on the existing 120-foot Monopole Tower, located at 49 South Road, Bolton, CT. The tower is owned by Crown Castle and the property is owned by Leonard & Cheryl Giglio. T-Mobile now intends to replace three (3) existing antennas with three (3) new 1900/2100 MHz antennas and three (3) new 600/700 MHz antennas for a total antenna inventory of six (6) antennas. The new antennas will be capable of providing 5G service and will be installed at the 99-ft level of the tower. T-Mobile is also proposing a mount replacement pursuant to the Mount Replacement Analysis.

Planned Modifications:
Tower:

Remove:
(6) Diplexer

Remove and Replace:
(3) RFS-APXV18-206517S-C-A20 Antenna **(REMOVE)** - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz **(REPLACE)**

Install New:
(3) 1 5/8" Hybrid Fiber Line
(1) Platform mount and handrail kit
(3) Radio 4449 B71/B12
(3) TMA KRY 112 144/1
(3) AIR32_B66A_B2A Antenna 1900/2100 MHz

Existing to Remain:
(6) 1 5/8" Coax

Ground:
New RBS 6102 MU Cabinet.

The facility was approved by the Connecticut Siting Council via a Decision and Order in Docket Number 240 dated July 7, 2003. The approval was given with condition which this exempt modification complies with.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Sandra Pierog, First Selectwoman for the Town of Bolton, Jim Rupert, Zoning Enforcement Officer, Crown Castle as the tower owner, and Leonard & Cheryl Giglio, the property owners.

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

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

3. The proposed modification will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communication Commission safety standard.

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

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

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

Attachments
cc:
Sandra Pierog, First Selectwoman (*via email only to firstselectman@boltonct.org*)
Town of Bolton
Town Hall – Selectwoman's Office

222 Bolton Center Road
Bolton, CT 06043
860.649.8066

Jim Rupert, ZEO (*via email only to jrupert@boltonct.org*)
Town of Bolton
Town Hall – Land Use Department
222 Bolton Center Road
Bolton, CT 06043
860.649.8066

Leonard & Cheryl Giglio, Property Owner (*via email only to heathgreg92@gmail.com*)
49 South Road
Bolton, CT 06043
203.967.8367

Crown Castle, Tower Owner

From: Zsamba, Anne Marie
To: firstselectman@boltonct.org
Subject: Notice of Exempt Modification - 49 South Road, Bolton - 842858 - T-Mobile
Date: Sunday, May 2, 2021 3:29:00 PM
Attachments: EM-T-MOBILE-49 SOUTH RD BOLTON-CTHA518A-842858-NOTICE.pdf

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Dear First Selectwoman Pierog:

Attached please find T-Mobile's exempt modification application that is being sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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

Best,
Anne Marie Zsamba

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

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From:	Zsamba, Anne Marie
To:	"heathgreg92@gmail.com"
Subject:	Notice of Exempt Modification - 49 South Road, Bolton - 842858 - T-Mobile
Date:	Sunday, May 2, 2021 3:31:00 PM
Attachments:	EM-T-MOBILE-49 SOUTH RD BOLTON-CTHA518A-842858-NOTICE.pdf

Dear Mr. and Mrs. Giglio, as underlying property owners:

Attached please find T-Mobile's exempt modification application that is being sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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

Best,
Anne Marie Zsamba

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

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: Zsamba, Anne Marie
To: jrupert@boltonct.org
Subject: Notice of Exempt Modification - 49 South Road, Bolton - 842858 - T-Mobile
Date: Sunday, May 2, 2021 3:30:00 PM
Attachments: EM-T-MOBILE-49 SOUTH RD BOLTON-CTHA518A-842858-NOTICE.pdf

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Dear ZEO Rupert:

Attached please find T-Mobile's exempt modification application that is being sent to the Connecticut Siting Council today for submission on Sunday, May 2, 2021, for a filing date of Monday, May 3, 2021.

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

Best,
Anne Marie Zsamba

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

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

Exhibit A

Original Facility Approval

DOCKET NO. 240 – AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in Bolton, Connecticut.	}	Connecticut Siting Council

July 7, 2003

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need, as provided by General Statutes § 16-50k, be issued to AT&T Wireless PCS, LLC (AT&T) for the construction, maintenance and operation of a wireless telecommunications facility at proposed Candidate A site (Giglio property) located at 49 South Road, Bolton, Connecticut. We deny certification of the proposed Candidate B site located at 299 Hop River Road (Route 6), Bolton, Connecticut.

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

1. The tower shall be constructed as a monopole, no taller than necessary to provide the proposed telecommunications services, sufficient to accommodate the antennas of AT&T and other entities, both public and private, but such tower shall not exceed a height of 120 feet above ground level.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be submitted to and approved by the Council prior to the commencement of facility construction and shall include:

    a) a detailed site development plan that depicts the location of the access road, compound, tower, and utility line;
    b) specifications for the tower, tower foundation, antennas, equipment building, and security fence;
    c) construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

3. The Certificate Holder shall, prior to the commencement of operation, provide the Council worst-case modeling of electromagnetic radio frequency power densities of all proposed entities' antennas at the closest point of uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin No. 65, August 1997. The Certificate Holder shall provide a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels calculated and provided pursuant to this Decision and Order.

4. Upon the establishment of any new state or federal radio frequency standards applicable to frequencies of this facility, the facility granted herein shall be brought into compliance with such standards.

5. The Certificate Holder shall permit public or private entities to share space on the proposed tower for fair consideration, or shall provide any requesting entity with specific legal, technical, environmental, or economic reasons precluding such tower sharing.

6. If the facility does not initially provide wireless services within one year of completion of construction or ceases to provide wireless services for a period of one year, this Decision and Order shall be void, and the Certificate Holder shall dismantle the tower and remove all associated equipment or reapply for any continued or new use to the Council before any such use is made.

7. Any antenna that becomes obsolete and ceases to function shall be removed within 60 days after such antennas become obsolete and cease to function.

8. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved.

Pursuant to General Statutes § 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of issuance shall be published in The Hartford Courant.

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

The parties and intervenors to this proceeding are:

Applicant
AT&T Wireless PCS, LLC
d/b/a AT&T Wireless

Its Representative
Christopher B. Fisher, Esq.
Cuddy & Feder & Worby LLP
90 Maple Avenue
White Plains, NY 10601
(914) 761-1300
(914) 761-6405 - fax

CERTIFICATION

The undersigned members of the Connecticut Siting Council (Council) hereby certify that they have heard this case, or read the record thereof, in **DOCKET NO. 240** – AT&T Wireless PCS, LLC d/b/a AT&T Wireless application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a telecommunications facility in Bolton, Connecticut, and voted as follows to approve the proposed Candidate A site located at 49 South Road (Giglio property), Bolton, Connecticut, and deny certification of the proposed Candidate B site located at 299 Hop River Road (Route 6), Bolton, Connecticut:

Council Members	Vote Cast
Pamela B. Katz, P.E., Chairman	Yes
Commissioner Donald W. Downes Designee: Gerald J. Heffernan	Yes
Commissioner Arthur J. Rocque, Jr. Designee: Brian J. Emerick	Yes
Philip Ashton	Yes
Daniel P. Lynch, Jr.	No
James J. Murphy, Jr.	Abstain
Brian O'Neill	No
Colin C. Tait	No
Edward S. Wilensky	Abstain

Dated at New Britain, Connecticut July 8, 2003.

STATE OF CONNECTICUT)

ss. New Britain, Connecticut :

COUNTY OF HARTFORD)

I hereby certify that the foregoing is a true and correct copy of the Findings of Fact, Opinion, and Decision and Order issued by the Connecticut Siting Council, State of Connecticut.

ATTEST:

S. Derek Phelps
Executive Director
Connecticut Siting Council

I certify that a copy of the Findings of Fact, Opinion, and Decision and Order in Docket No. 240 has been forwarded by Certified First Class Return Receipt Requested mail on July 11, 2003, to all parties and intervenors of record as listed on the attached service list, dated January 21, 2003.

ATTEST:

Lisa Fontaine
Administrative Assistant
Connecticut Siting Council

Exhibit B

Property Card

49 SOUTH RD

Location	49 SOUTH RD	**Mblu**	05/ / 107/ /
Owner	GIGLIO LEONARD W &	**Assessment**	$394,650
Appraisal	$743,600	**PID**	1348
Building Count	1		

Current Value

Appraisal	
Valuation Year	**Total**
2018	$743,600

Assessment	
Valuation Year	**Total**
2018	$394,650

Owner of Record

Owner	GIGLIO LEONARD W &	**Sale Price**	$0
Co-Owner	GIGLIO CHERYL P	**Certificate**	SURV
Address	49 SOUTH RD	**Book & Page**	165/120
	BOLTON, CT 06043	**Sale Date**	04/15/2014
		Instrument	24

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
GIGLIO LEONARD W &	$0	SURV	165/120	24	04/15/2014
GIGLIO LEONARD W &	$0	salemaster	0087/0548		05/01/1996

Building Information

Building 1 : Section 1

Year Built: 1996
Living Area: 2,044
Building Percent Good: 89

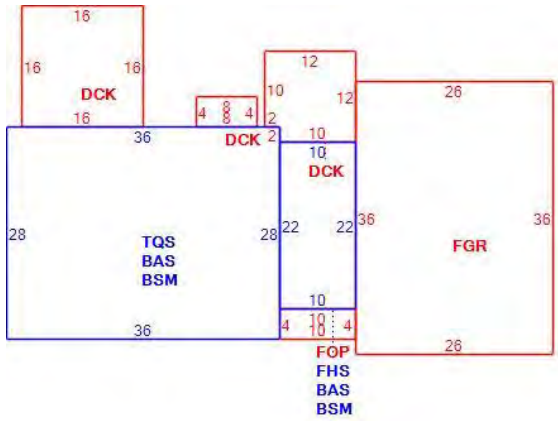
Building Attributes	
Field	**Description**

Style	Cape
Model	Residential
Grade:	B-
Stories	1.75
Occupancy	1
Exterior Wall 1	Vinyl Siding
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Arch Shingles
Interior Wall 1	Drywall
Interior Wall 2	
Interior Flr 1	Hardwood
Bath Floors	Ceramic Tile
Heat Fuel	Oil
Heat Type:	Hot Water
AC Percent	0
Total Bedrooms:	3 Bedrooms
Full Bthrms:	2
Half Baths:	0
Extra Fixtures	0
Total Rooms:	6
Num Kitchens	1
Fireplace(s)	1
Wood Stoves	
Foundation	Concrete
Bsmt Gar(s)	
SF Fin. Bsmt.	
Fin Bsmt Qual	
Usrfld 300	
Usrfld 301	

Building Photo

(http://images.vgsi.com/photos/BoltonCTPhotos//default.jpg)

Building Layout



(ParcelSketch.ashx?pid=1348&bid=1348)

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	1,228	1,228
TQS	Three Quarter Story	1,008	706
FHS	Finished Half Story	220	110
BSM	Basement	1,228	0
DCK	Deck	428	0
FGR	Garage	936	0
FOP	Open Porch	40	0
		5,088	2,044

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land

Land Use

Zone R-1

Land Line Valuation

Size (Acres)	29.00
Depth	
Assessed Value	$199,550
Appraised Value	$464,900

Outbuildings

Outbuildings					Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Bldg #**
FGR2	Garage W/ Loft	FR	Frame	1320.00 S.F.	1
FGR2	Garage W/ Loft	FR	Frame	2400.00 S.F.	1
FOP	Porch			960.00 S.F.	1
CELL	Cell Tower			120.00 FEET	1

Valuation History

Appraisal	
Valuation Year	**Total**
2019	$743,600
2018	$743,600

Assessment	
Valuation Year	**Total**
2019	$394,650
2018	$394,650


Stonehedge Ln
S Rd
49 S Rd, Bolton,
CT 06043
S Rd
Stony Rd
S Rd

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CTHA518A
T-MOBILE SITE NAME: AT&T BOLTON MONOPOLE
SITE TYPE: MONOPOLE
TOWER HEIGHT: 120'-0"

BUSINESS UNIT #: 842858
SITE ADDRESS: 49 SOUTH ROAD BOLTON, CT 06043
COUNTY: TOLLAND
JURISDICTION: TOWNSHIP OF BOLTON

T-MOBILE L600 SITE CONFIGURATION: 67D95FDB

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	BOLTON
SITE ADDRESS:	49 SOUTH ROAD BOLTON, CT 06043
COUNTY:	TOLLAND
MAP/PARCEL #:	----
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41° 47' 20.43"
LONGITUDE:	-72° 25' 44.9"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	----
CURRENT ZONING:	----
JURISDICTION:	TOWNSHIP OF BOLTON
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	---- ---- ----
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 35 GRIFFIN ROAD BLOOMFIELD, CT 06002
ELECTRIC PROVIDER:	---- ----
TELCO PROVIDER:	---- ----
JOB NO.:	2438.6790

PROJECT TEAM

A&E FIRM:	CROWN CASTLE USA INC. 2000 CORPORATE DRIVE CANONSBURG, PA 15317 CROWNAE.APPROVAL@CROWNCASTLE.COM
CROWN CASTLE USA INC. DISTRICT CONTACTS:	1200 MACARTHUR BLVD, SUITE 200 MAHWAH, NJ 07430
	JOSEPH CLARK - A&E SPECIALIST JOSEPH.CLARK@CROWNCASTLE.COM (704) 405-6579

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

DRAWING INDEX

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (6) DIPLEXER
- REMOVE FLESH MOUNT
- INSTALL PLATFORM MOUNT
- INSTALL (6) ANTENNAS
- INSTALL (3) RRUs
- INSTALL (3) TMAs
- INSTALL (3) 1-5/8" HYBRID CABLE

GROUND SCOPE OF WORK:
- UPGRADE BTS CABINET BREAKER
- REMOVE (1) RBS 6201 ODE CABINET
- INSTALL (1) RBS 6102 MU AC CABINET
- INSTALL (1) BB6630 IN (E) CABINET

NOTE:
THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T-MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.

LOCATION MAP

NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2018 CONNECTICUT STATE BUILDING CODE (2015 IBC)
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	MORRISON HERSHFIELD
DATED:	03/07/21
MOUNT ANALYSIS:	MASTEC NETWORK SOLUTIONS
DATED:	07/05/19
AC ELECTRICAL POWER DESIGN:	BY OTHERS
DATED:	
RFDS REVISION:	----
DATED:	04/29/19
ORDER ID:	482069
REVISION:	0

CALL CONNECTICUT ONE CALL (800) 922-4455 CBYD.COM CALL 2 WORKING DAYS BEFORE YOU DIG!

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

FPA FRENCH & PARRELLO ASSOCIATES
1600 Route 34, Suite 101 • Wall, New Jersey 07719
t: 732.312.9600 f: 732.312.9601

T-MOBILE SITE NUMBER:
CTHA518A

BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	04/01/21	C.J.R.	FINAL	J.B.

STATE OF CONNECTICUT * JOHN B. BOSCO * No. 25605 * LICENSED PROFESSIONAL ENGINEER *

JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
CARRIER: T–MOBILE
TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
#4 BARS AND SMALLER....................40 ksi
#5 BARS AND LARGER....................60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH....................3"
CONCRETE EXPOSED TO EARTH OR WEATHER:
#6 BARS AND LARGER....................2"
#5 BARS AND SMALLER....................1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
SLAB AND WALLS....................3/4"
BEAMS AND COLUMNS....................1–1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (–)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

FPA FRENCH & PARRELLO ASSOCIATES
1800 Route 34, Suite 101 • Wall, New Jersey 07719
o: 732.312.9800 f: 732.312.9801

T-MOBILE SITE NUMBER:
CTHA518A

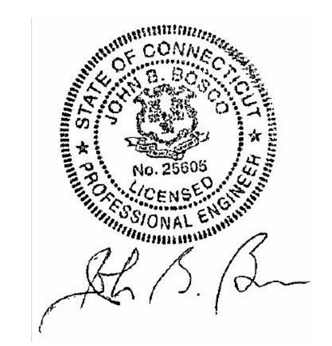
BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

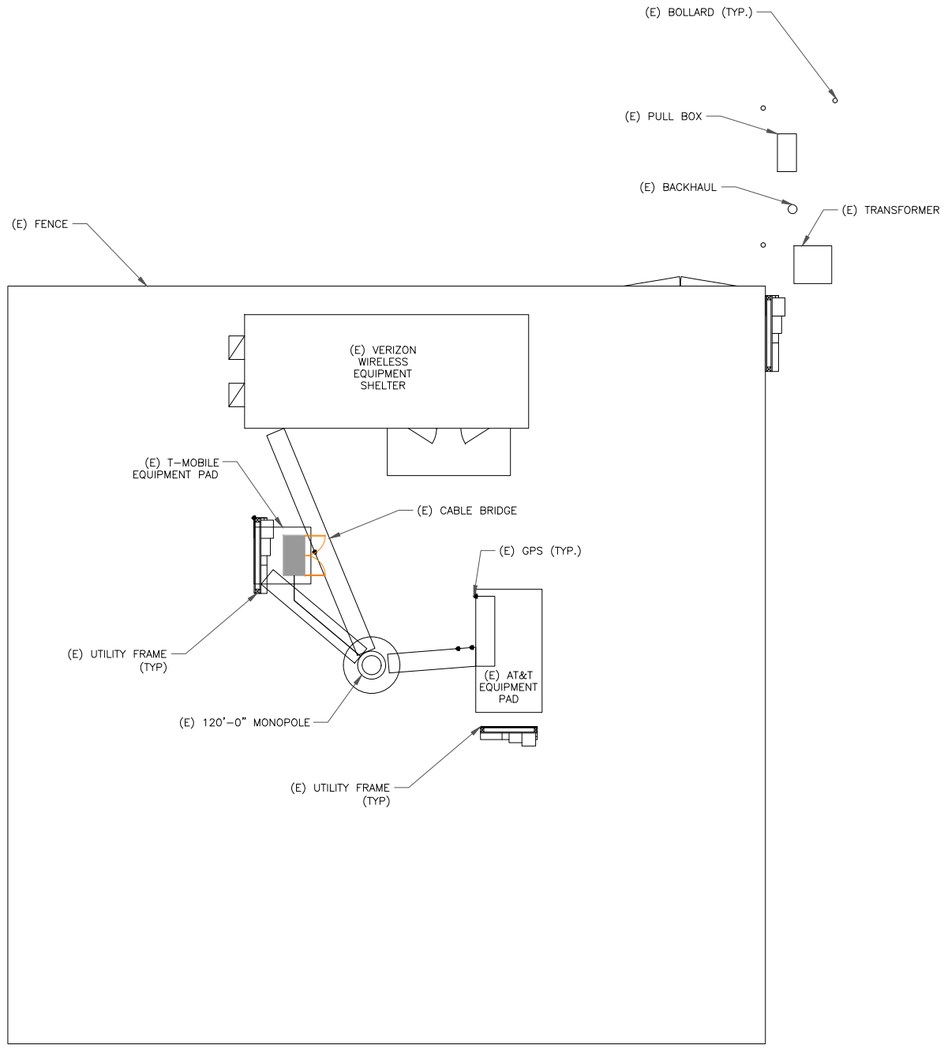
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	04/01/21	C.J.R.	FINAL	J.B.



JOHN BOSCO, PE LIC. NO. 25605

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

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



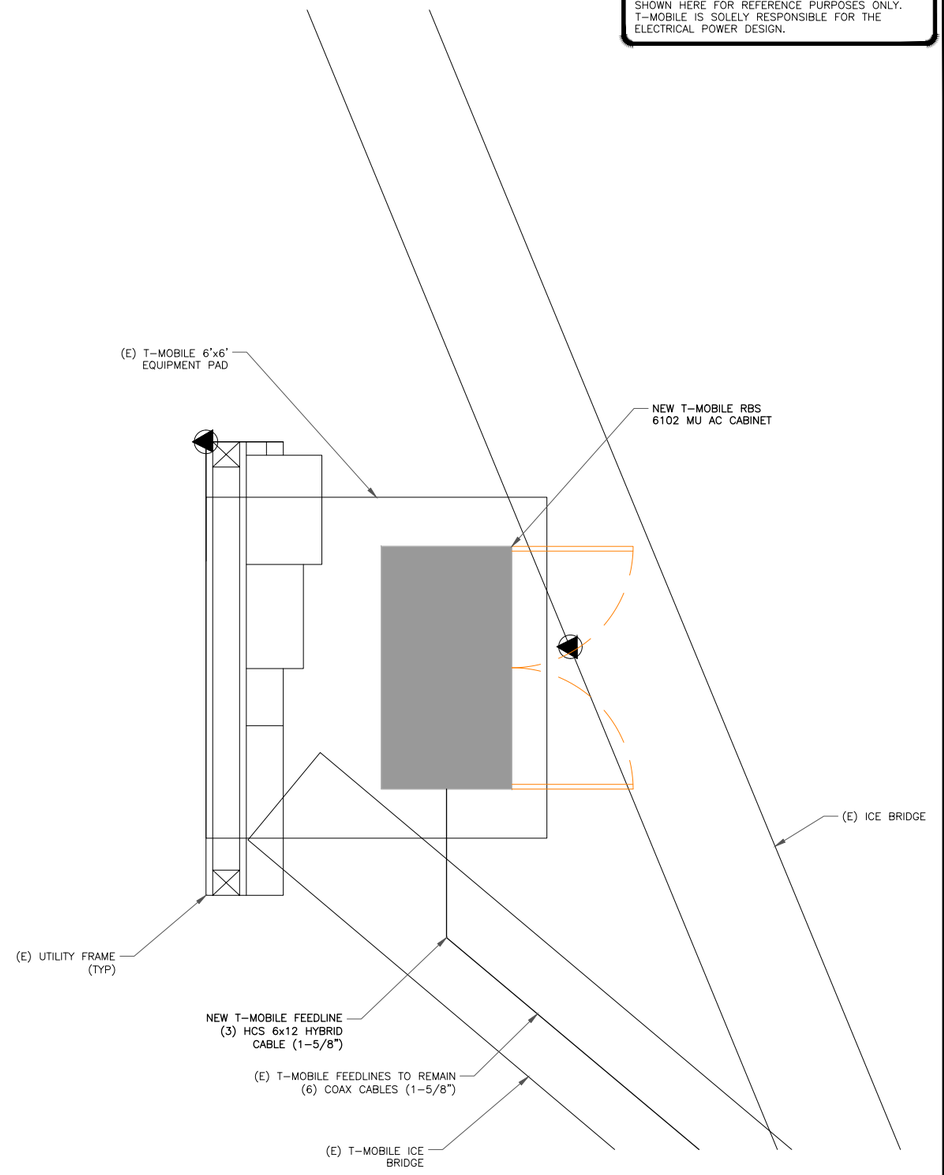
1 SITE PLAN

SCALE: 4' 3' 2' 1' 0 4' — 1/4"=1'–0" (FULL SIZE) 1/8"=1'–0" (11x17)

N

NOTES:

THE POWER DESIGN FOR ANY AC ELECTRICAL POWER CHANGES IS TO BE PERFORMED BY OTHERS AND IS SHOWN HERE FOR REFERENCE PURPOSES ONLY. T–MOBILE IS SOLELY RESPONSIBLE FOR THE ELECTRICAL POWER DESIGN.



2 ENLARGED SITE PLAN

SCALE: 1' 6" 0 1' — 1"=1'–0" (FULL SIZE) 1/2"=1'–0" (11x17)

N

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

FPA FRENCH & PARRELLO ASSOCIATES
1600 Route 34, Suite 101 • Wall, New Jersey 07719
t: 732.312.9600 f: 732.312.9601

T-MOBILE SITE NUMBER:
CTHA518A

BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

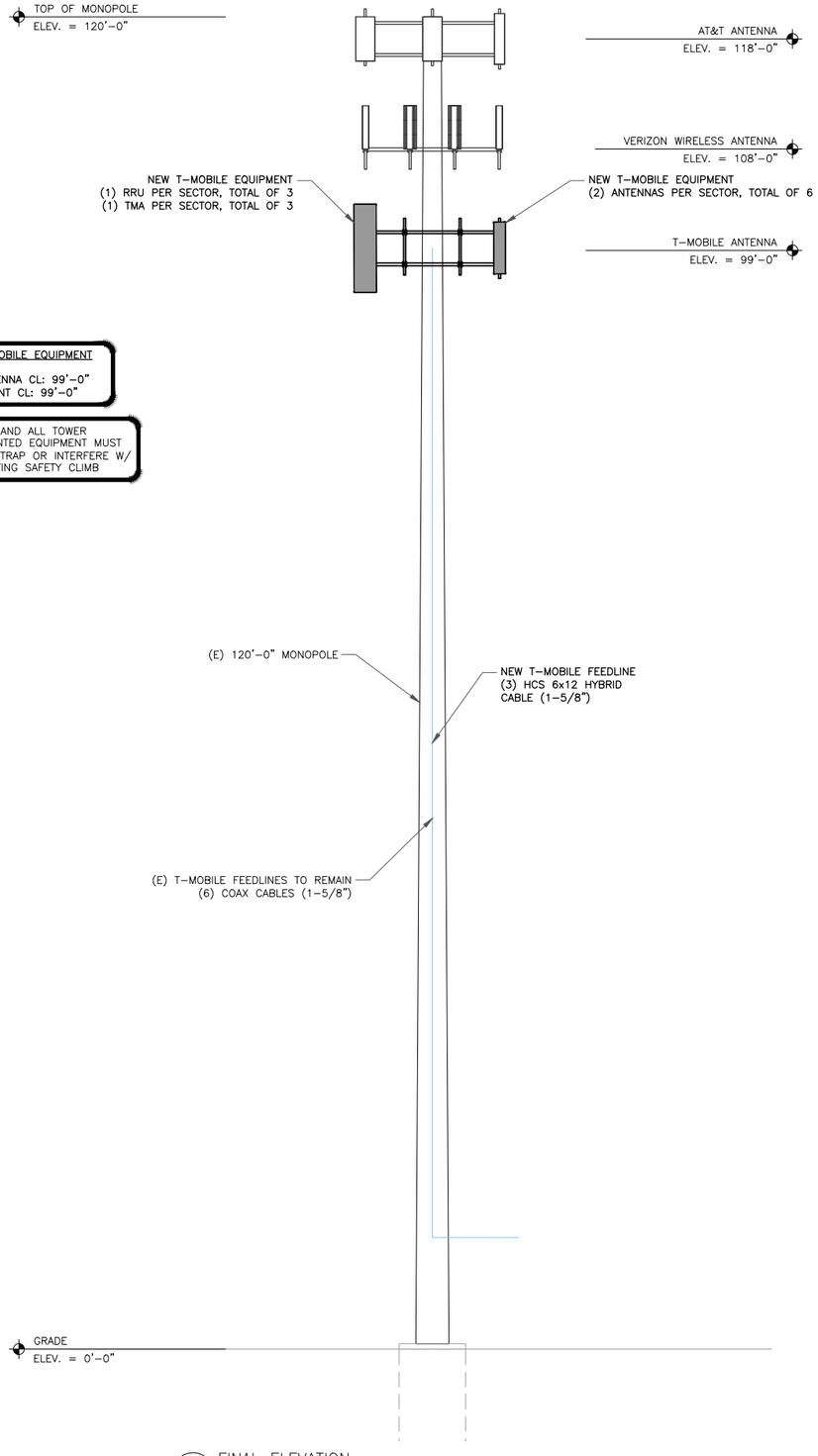
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	04/01/21	C.J.R.	FINAL	J.B.

STATE OF CONNECTICUT * JOHN B. BOSCO * No. 25605 * LICENSED PROFESSIONAL ENGINEER *

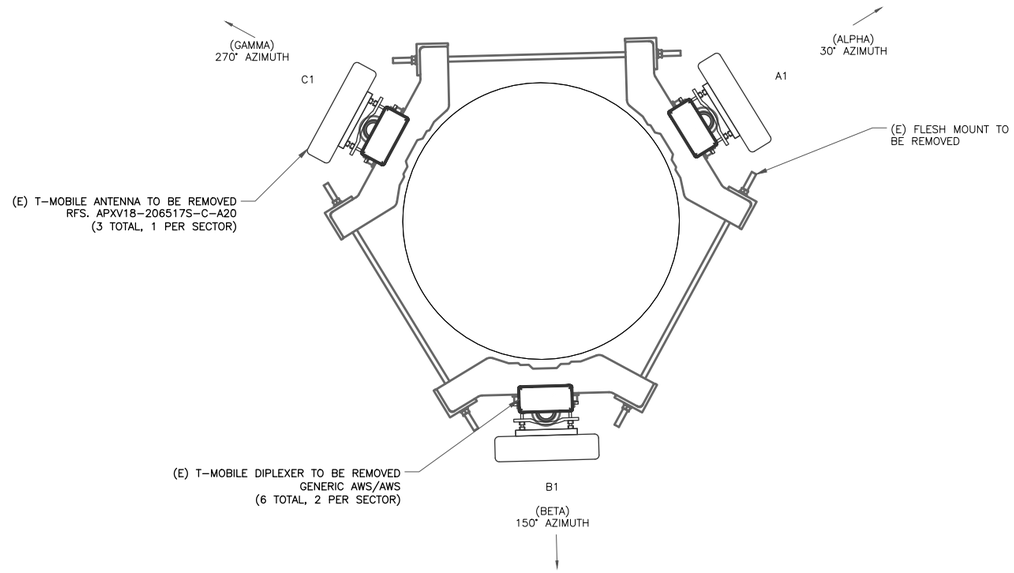
JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: C-1

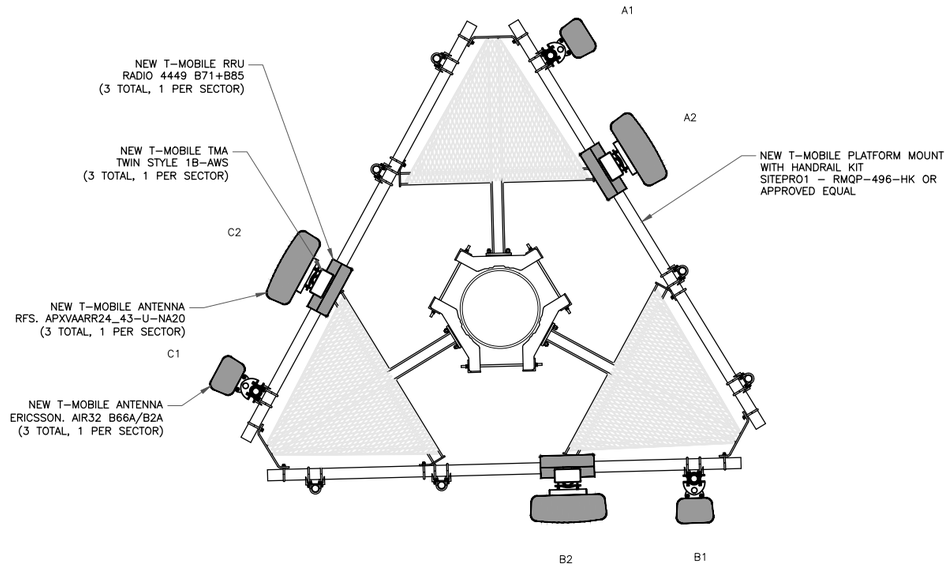
REVISION: 0



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA LAYOUT
SCALE: NOT TO SCALE



3 FINAL ANTENNA LAYOUT
SCALE: NOT TO SCALE

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EXISTING 120'-0" MONOPOLE

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STATE OF CONNECTICUT
JOHN B. BOSCO
No. 25605
LICENSED
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JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: C-2

REVISION: 0

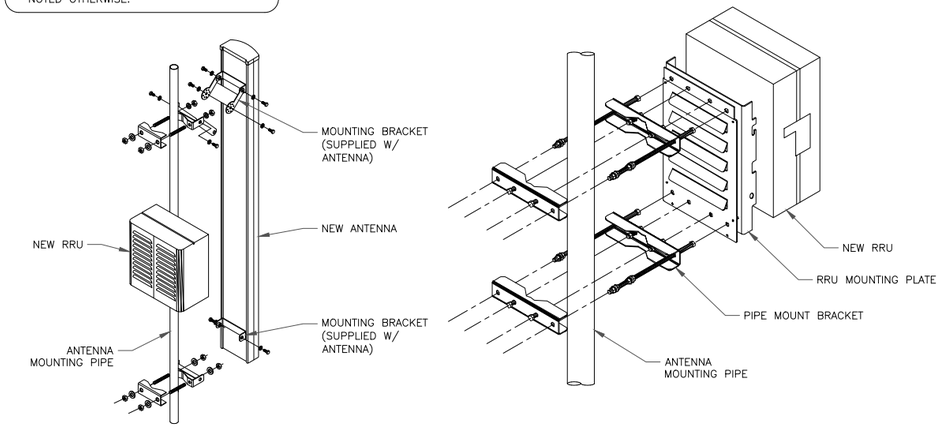
ANTENNA SCHEDULE

SECTOR	POS.	TECHNOLOGY	RAD CENTER	AZIMUTH	ANTENNA MANUFACTURER	ANTENNA MODEL	MECH. TILT	ELECT. TILT	TOWER MOUNTED EQUIPMENT	FEEDLINE TYPE
ALPHA	A1	LTE 2100/1900	99'-0"	30°	ERICSSON	AIR32 B66A/B2A	0°	2°/2°/2°/2°	–	(SHARED FIBER)
ALPHA	A2	LTE 600/700 UMTS 2100	99'-0"	30°	RFS	APXVAARR24_43-U-NA20	0°	2°/2°/0°/2°	(1) ERICSSON – RRUS 4449 B71+B85 (1) TWIN STYLE 1B-AWS TMA	(SHARED FIBER)
BETA	B1	LTE 2100/1900	99'-0"	150°	ERICSSON	AIR32 B66A/B2A	0°	2°/2°/2°/2°	–	(3) 1-5/8" HCS 6x12 HYBRID
BETA	B3	LTE 600/700 UMTS 2100	99'-0"	150°	RFS	APXVAARR24_43-U-NA20	0°	2°/2°/0°/2°	(1) ERICSSON – RRUS 4449 B71+B85 (1) TWIN STYLE 1B-AWS TMA	(6) 1-5/8" COAX
GAMMA	C1	LTE 2100/1900	99'-0"	270°	ERICSSON	AIR32 B66A/B2A	0°	2°/2°/2°/2°	–	(SHARED FIBER)
GAMMA	C2	LTE 600/700 UMTS 2100	99'-0"	270°	RFS	APXVAARR24_43-U-NA20	0°	2°/2°/0°/2°	(1) ERICSSON – RRUS 4449 B71+B85 (1) TWIN STYLE 1B-AWS TMA	(SHARED FIBER)

1 ANTENNA AND CABLE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRUs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRU PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



2 ANTENNA WITH RRU MOUNTING DETAIL
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

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1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

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T-MOBILE SITE NUMBER:
CTHA518A

BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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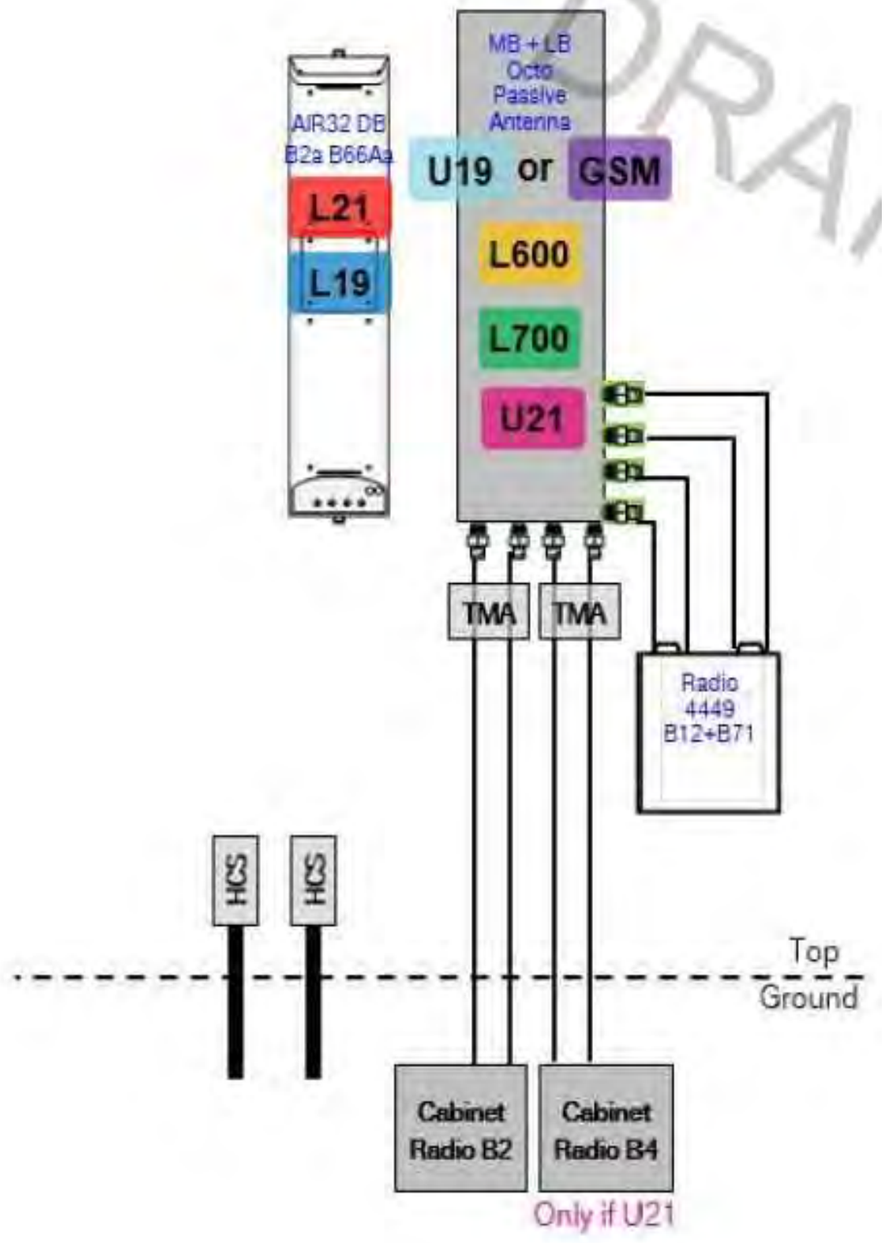
STATE OF CONNECTICUT ★ JOHN B. BOSCO ★ No. 25605 ★ LICENSED PROFESSIONAL ENGINEER

JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: C-3

REVISION: 0



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE
1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

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CTHA518A

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BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

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STATE OF CONNECTICUT
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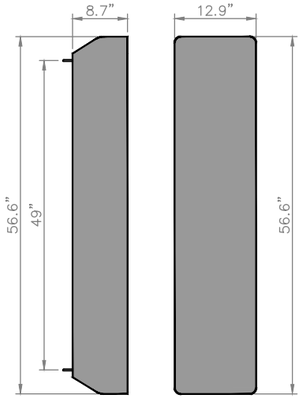
JOHN BOSCO, PE LIC. NO. 25605

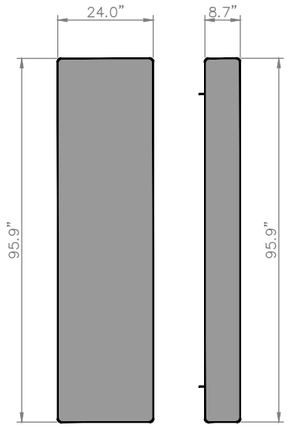
SHEET NUMBER: C-4

REVISION: 0



MECHANICAL
SPECIFICATIONS:
OVERALL
HEIGHT: 56.6 IN.
WIDTH: 12.9 IN.
DEPTH: 8.7 IN.
WEIGHT: 132.2 LBS.

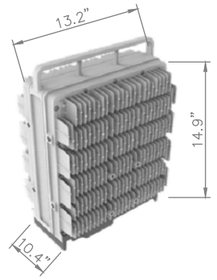
1 AIR32 B66A/B2A ANTENNA DIAGRAM
SCALE: NOT TO SCALE



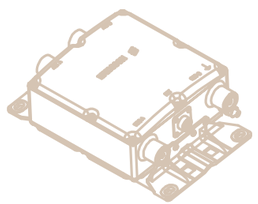
MECHANICAL
SPECIFICATIONS:
OVERALL
HEIGHT: 95.9 IN.
WIDTH: 24.0 IN.
DEPTH: 8.7 IN.
WEIGHT: 128 LBS.

2 APXVAARR24_43-U-NA20 ANTENNA DIAGRAM
SCALE: NOT TO SCALE

MECHANICAL
SPECIFICATIONS:
OVERALL
HEIGHT: 14.9 IN.
WIDTH: 13.2 IN.
DEPTH: 10.4 IN.
WEIGHT: 74 LBS.

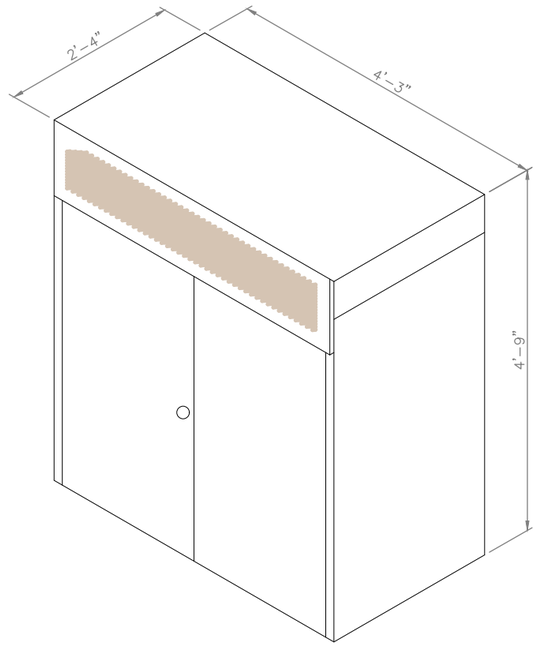


4 RADIO 4449 B71+B85 DIAGRAM
SCALE: NOT TO SCALE



MECHANICAL
SPECIFICATIONS:
HEIGHT: 8.6 IN.
WIDTH: 6.6 IN.
DEPTH: 3.1 IN.
WEIGHT: 9.7 LBS.

6 TWIN STYLE TB-AWS TMA DIAGRAM
SCALE: NOT TO SCALE



6 6102 MU AC CABINET DIAGRAM
SCALE: NOT TO SCALE

T-Mobile
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T-MOBILE SITE NUMBER:
CTHA518A

BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
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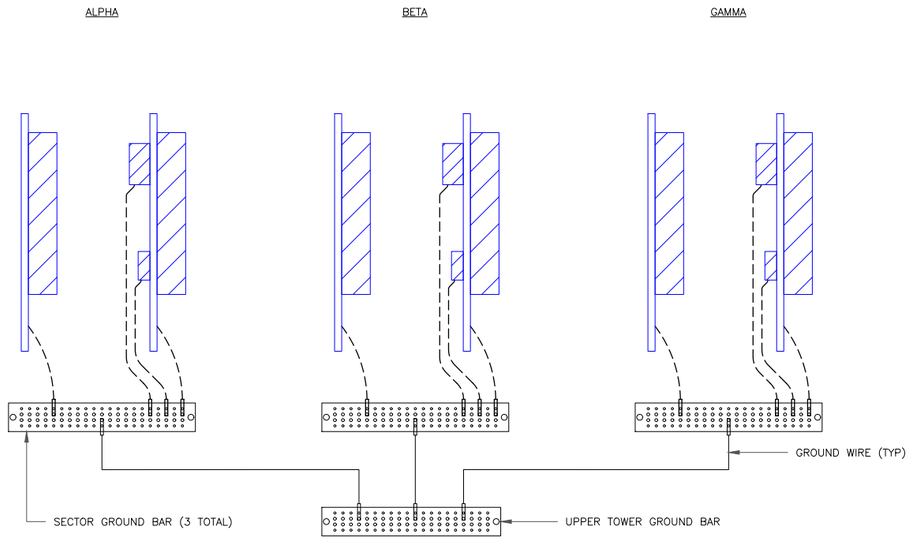
STATE OF CONNECTICUT
JOHN B. BOSCO
No. 25605
LICENSED
PROFESSIONAL ENGINEER

JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: C-5
REVISION: 0



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

T-Mobile

35 GRIFFIN ROAD
BLOOMFIELD, CT 06002

CROWN CASTLE

1200 MACARTHUR BLVD, SUITE 200
MAHWAH, NJ 07430

FPA
FRENCH & PARRELLO ASSOCIATES
1600 Route 34, Suite 101 • Wall, New Jersey 07719
t: 732.312.9600 f: 732.312.9601

T-MOBILE SITE NUMBER:
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BU #: **842858**
BOLTON

49 SOUTH ROAD
BOLTON, CT 06043

EXISTING 120'-0" MONOPOLE

ISSUED FOR:

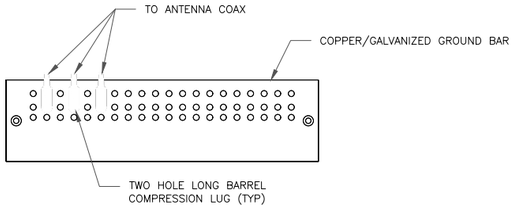
REV	DATE	DRWN	DESCRIPTION	DES./QA
A	04/01/21	C.J.R.	FINAL	J.B.

STATE OF CONNECTICUT
JOHN B. BOSCO
No. 25605
LICENSED PROFESSIONAL ENGINEER

JOHN BOSCO, PE LIC. NO. 25605

SHEET NUMBER: G-1

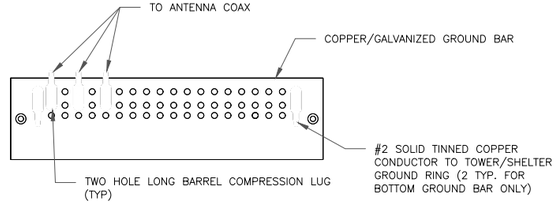
REVISION: 0



NOTES:

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

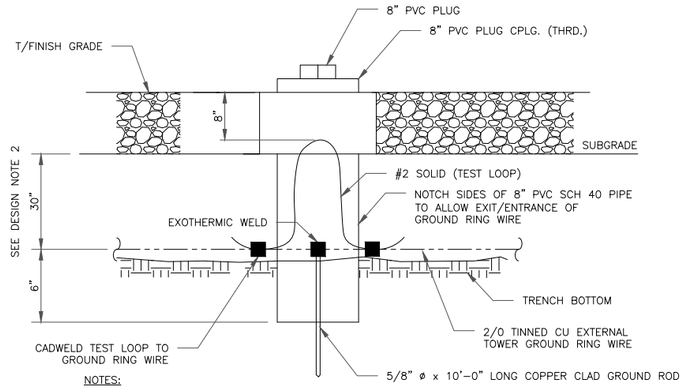
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

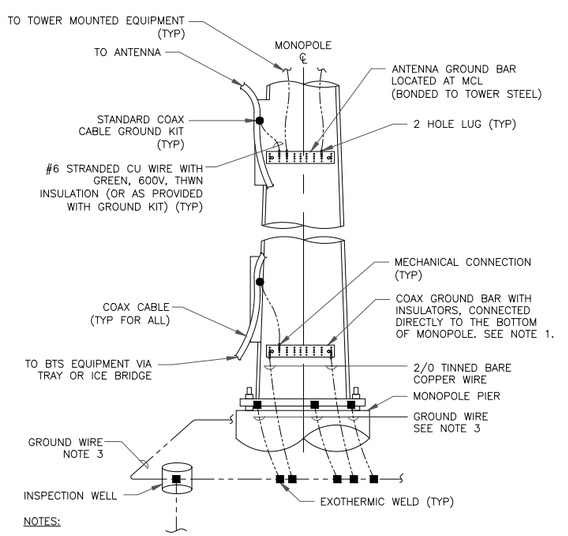
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

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

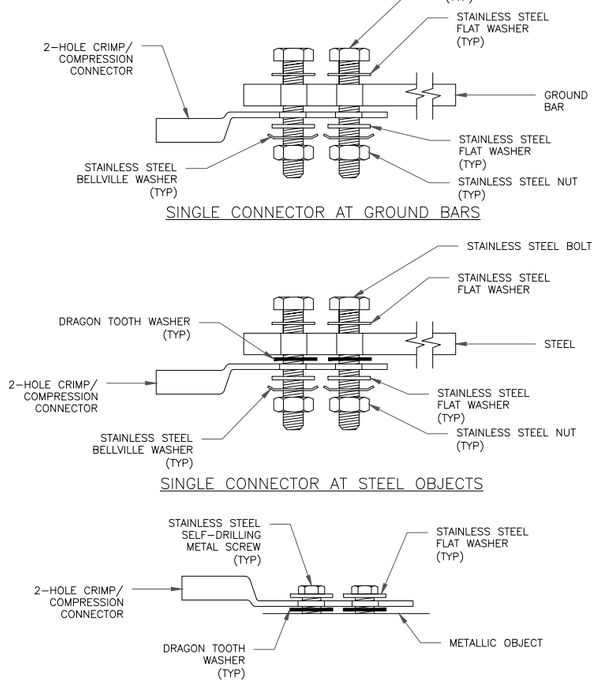
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



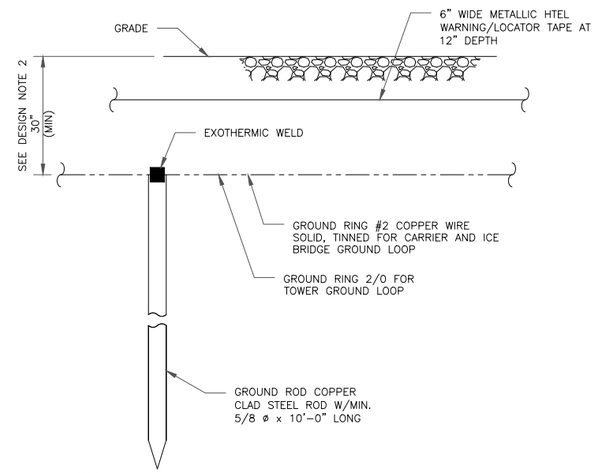
NOTES:

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

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

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

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

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BU #: **842858**
BOLTON

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EXISTING 120'-0" MONOPOLE

ISSUED FOR:

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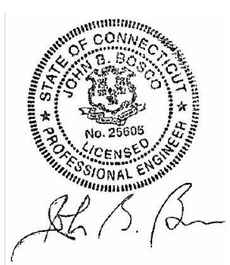
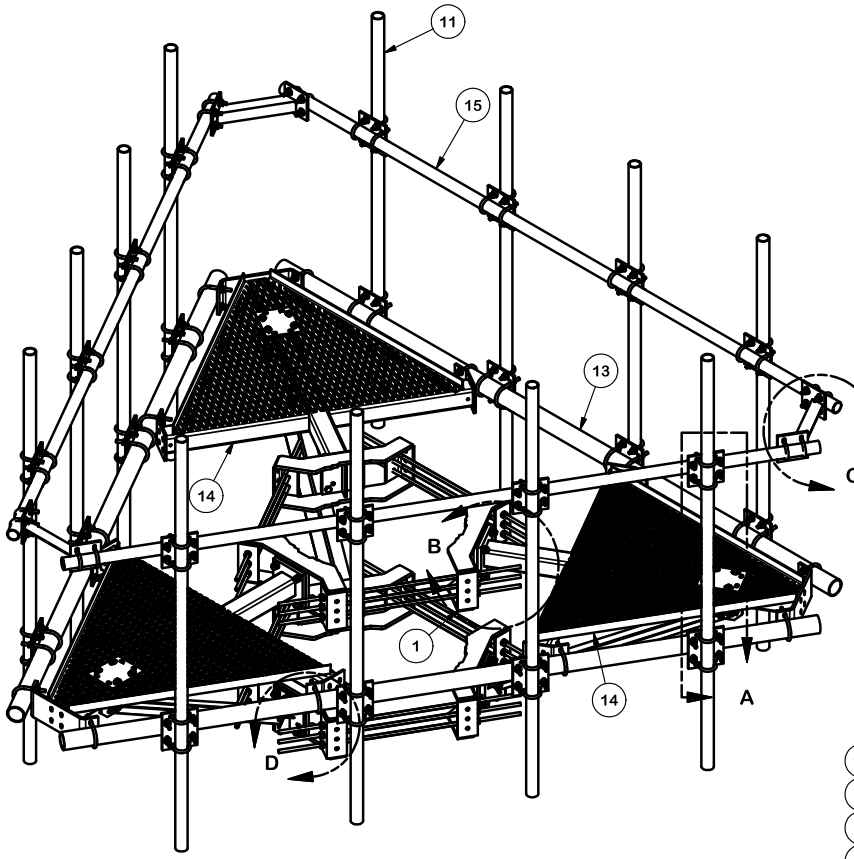
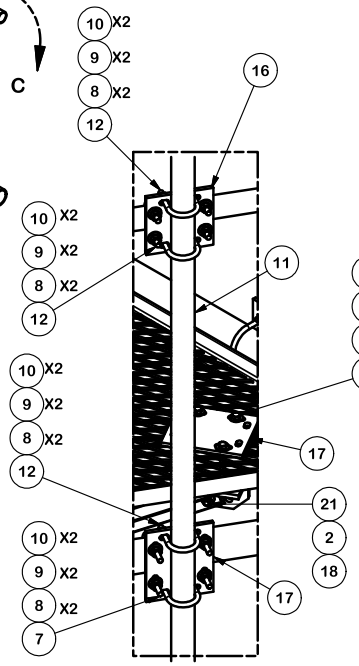


JOHN BOSCO, PE LIC. NO. 25605

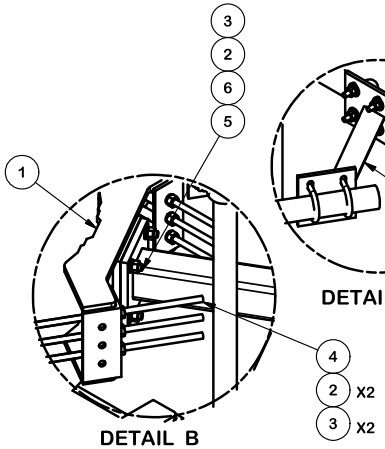
SHEET NUMBER: G-2

REVISION: 0

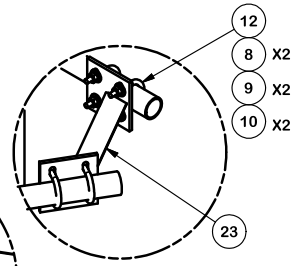




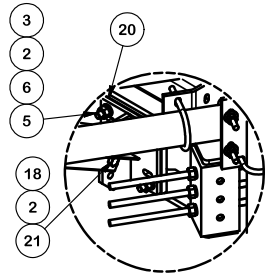
DETAIL A



DETAIL B



DETAIL C



DETAIL D

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	50.17
13	3	P3150	3-1/2" X 150" (3" SCH 40) GALVANIZED PIPE	150 in	94.80	284.40
14	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
15	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
16	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
20	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
					TOTAL WT. #	2445.81

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REVISION HISTORY				
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

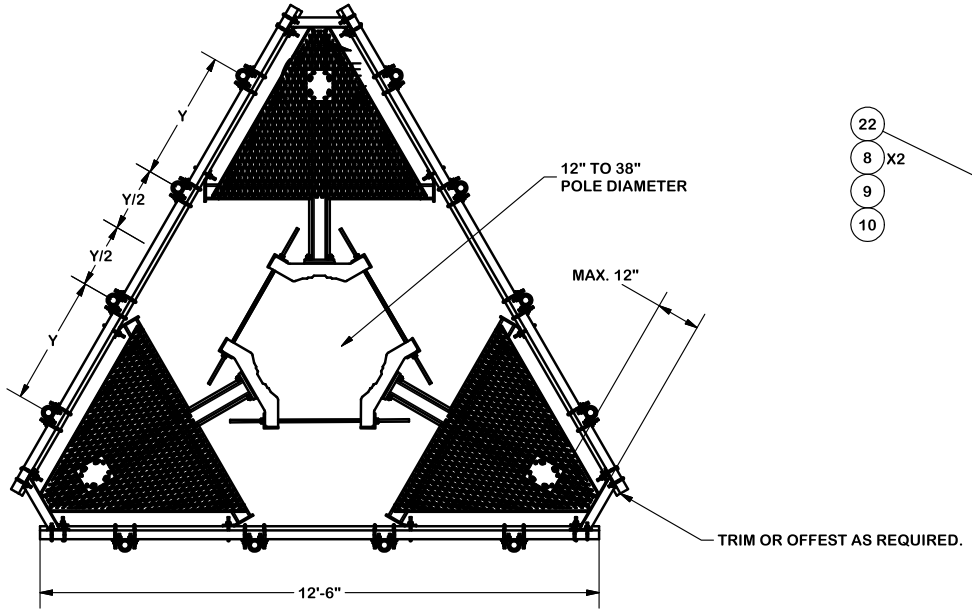
SITE PRO 1 — A valmont COMPANY

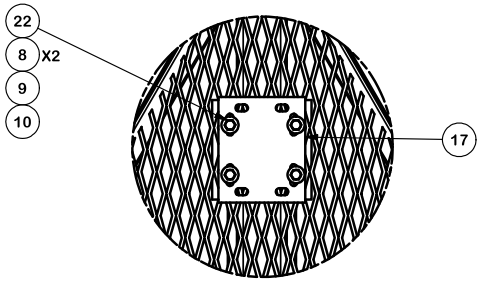
Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

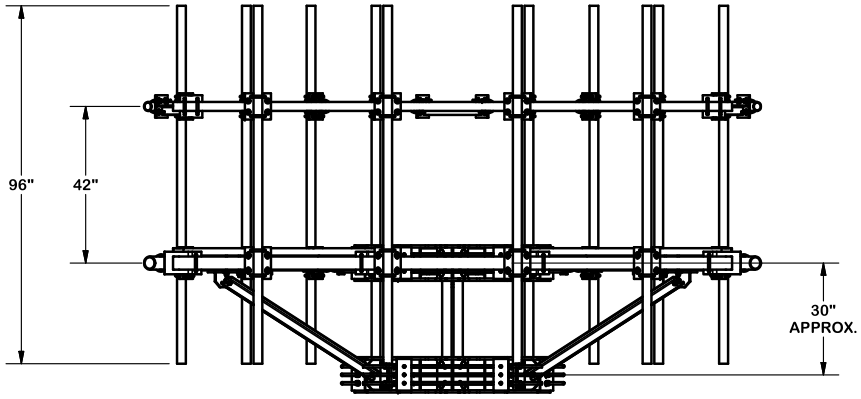
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4488	CEK 7/14/2014		RMQP-496-HK	1 OF 3

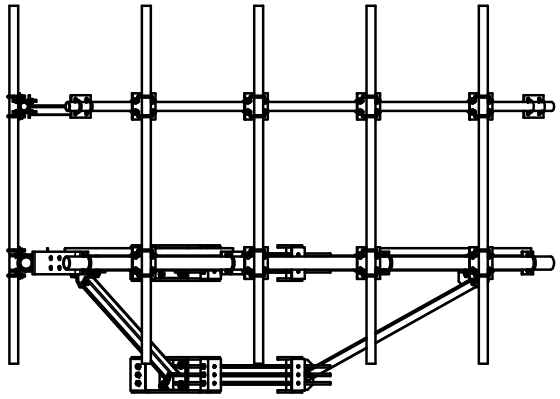
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK





DETAIL E





TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
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REVISION HISTORY

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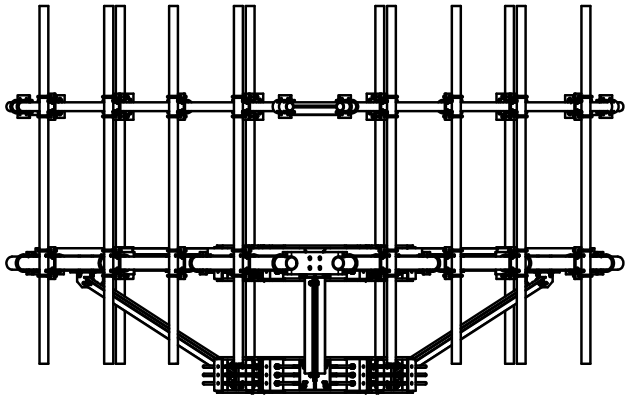
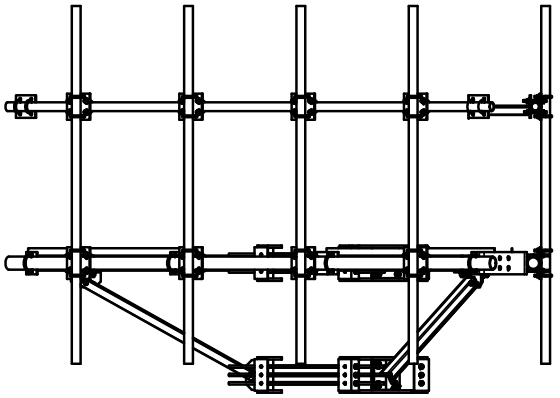
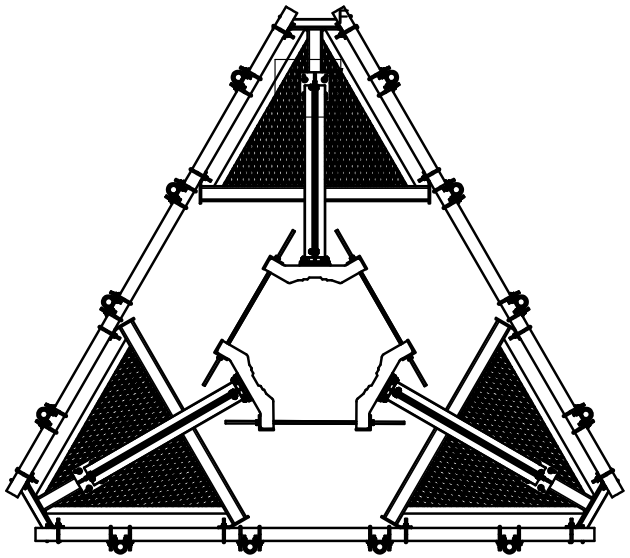
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

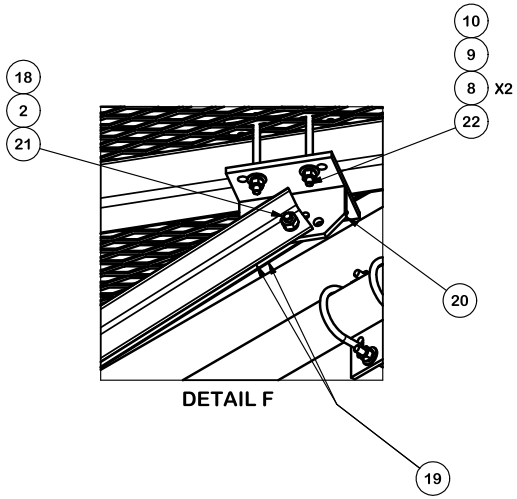
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK









DETAIL F

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
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CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK

Exhibit D

Structural Analysis Report

Date: **March 07, 2021**

MORRISON HERSHFIELD

Morrison Hershfield
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
(770) 379-8500

Subject:	**Structural Analysis Report**	
Carrier Designation:	***Metro PCS* Co-Locate**	
	Site Number:	CTHA518A
	Site Name:	AT&T Bolton Monopole
Crown Castle Designation:	**BU Number:**	842858
	Site Name:	Bolton
	JDE Job Number:	561000
	Work Order Number:	1916604
	Order Number:	482069 Rev. 0
Engineering Firm Designation:	**Morrison Hershfield Project Number:** CN7-522 / 2101398	
Site Data:	**49 South Road, Bolton, Tolland County, CT 06043**	
	Latitude *41° 47' 20.43"*, Longitude *-72° 25' 44.91"*	
	120 Foot – PennSummit Monopole Tower	

Morrison Hershfield is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

LC5: Proposed Equipment Configuration **Sufficient Capacity – 94.4%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2018 Connecticut State Building Code (2015 IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Respectfully submitted by:

G. Lance Cooke, P.E. (CT License No. PEN.0028133)
Senior Engineer

G. Lance Cooke
2021.03.07
11:09:13-08'00'

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by PennSummit Tubular, LLC/Paul J. Ford & Company.

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

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
99.0	99.0	3	ericsson	AIR 32 B2A/B66AA	9	1-5/8
		3	rfs celwave	APXVAARR24_43-U-NA20		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B12/B71		
		1	site pro 1	12.5' Platform Mount [#RMQP-496-HK]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	118.0	6	cci antennas	DMP65R-BU4D w/ Mount Pipe	12 4 2 2	1-1/4 1 3/8 2C
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	powerwave technologies	1001940		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8C		
		1	raycap	DC6-48-60-18-8F		
		1	-	Platform Mount [LP 303-1_HR-1]		
108.0	110.0	6	antel	LPA-185063/8CFX2 w/ Mount Pipe	18	1-5/8
		6	antel	LPD-6513 w/ Mount Pipe		
	108.0	1	-	Platform Mount [LP 303-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	5337356	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4291646	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4291644	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	4492167	CCISITES
4-POST-MODIFICATION INSPECTION	4497609	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	5096968	CCISITES
4-POST-MODIFICATION INSPECTION	5652677	CCISITES

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are presented in Appendix C.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L1	120 - 115	Pole	TP19.75x19x0.1875	Pole	4.7%	Pass
L2	115 - 110	Pole	TP20.501x19.75x0.1875	Pole	11.4%	Pass
L3	110 - 105	Pole	TP21.251x20.501x0.1875	Pole	21.5%	Pass
L4	105 - 100	Pole	TP22.001x21.251x0.1875	Pole	31.2%	Pass
L5	100 - 95	Pole	TP22.751x22.001x0.1875	Pole	44.1%	Pass
L6	95 - 90	Pole	TP23.502x22.751x0.1875	Pole	56.4%	Pass
L7	90 - 86.25	Pole	TP24.552x23.502x0.1875	Pole	65.0%	Pass
L8	86.25 - 81.25	Pole	TP24.44x23.689x0.25	Pole	53.9%	Pass
L9	81.25 - 76.25	Pole	TP25.19x24.44x0.25	Pole	60.8%	Pass
L10	76.25 - 71.25	Pole	TP25.94x25.19x0.25	Pole	67.2%	Pass
L11	71.25 - 66.25	Pole	TP26.69x25.94x0.25	Pole	73.0%	Pass
L12	66.25 - 61.25	Pole	TP27.44x26.69x0.25	Pole	78.5%	Pass
L13	61.25 - 61	Pole	TP27.478x27.44x0.25	Pole	78.8%	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
L14	61 - 60.75	Pole	TP27.515x27.478x0.25	Pole	79.0%	Pass
L15	60.75 - 59	Pole	TP27.778x27.515x0.25	Pole	80.8%	Pass
L16	59 - 58.75	Pole	TP27.815x27.778x0.25	Pole	81.1%	Pass
L17	58.75 - 53.75	Pole	TP28.566x27.815x0.25	Pole	86.0%	Pass
L18	53.75 - 48.75	Pole	TP29.316x28.566x0.25	Pole	90.6%	Pass
L19	48.75 - 45	Pole	TP30.441x29.316x0.25	Pole	93.9%	Pass
L20	45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 4 Tension Rupture	75.4%	Pass
L21	40.25 - 35.25	Pole + Reinf.	TP30.841x30.091x0.5375	Reinf. 4 Tension Rupture	78.6%	Pass
L22	35.25 - 33	Pole + Reinf.	TP31.179x30.841x0.5375	Reinf. 4 Tension Rupture	79.9%	Pass
L23	33 - 32.75	Pole	TP31.216x31.179x0.3125	Pole	80.3%	Pass
L24	32.75 - 27.75	Pole	TP31.966x31.216x0.3125	Pole	82.9%	Pass
L25	27.75 - 22.75	Pole	TP32.717x31.966x0.3125	Pole	85.3%	Pass
L26	22.75 - 18.5	Pole	TP33.354x32.717x0.3125	Pole	87.3%	Pass
L27	18.5 - 18.25	Pole	TP33.392x33.354x0.3125	Pole	87.4%	Pass
L28	18.25 - 13.25	Pole	TP34.142x33.392x0.3125	Pole	89.5%	Pass
L29	13.25 - 8.25	Pole	TP34.892x34.142x0.3125	Pole	91.4%	Pass
L30	8.25 - 3.25	Pole	TP35.642x34.892x0.3125	Pole	93.3%	Pass
L31	3.25 - 0	Pole	TP36.13x35.642x0.3125	Pole	94.4%	Pass
					Summary	
				Pole	94.4%	Pass
				Reinforcement	79.9%	Pass
				Overall	94.4%	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	71.2	Pass
1	Base Plate		60.8	Pass
1	Base Foundation	0	64.6	Pass
1	Base Foundation Soil Interaction		52.8	Pass

Structure Rating (max from all components) =	94.4%*

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) *Rating per TIA-222-H, Section 15.5.

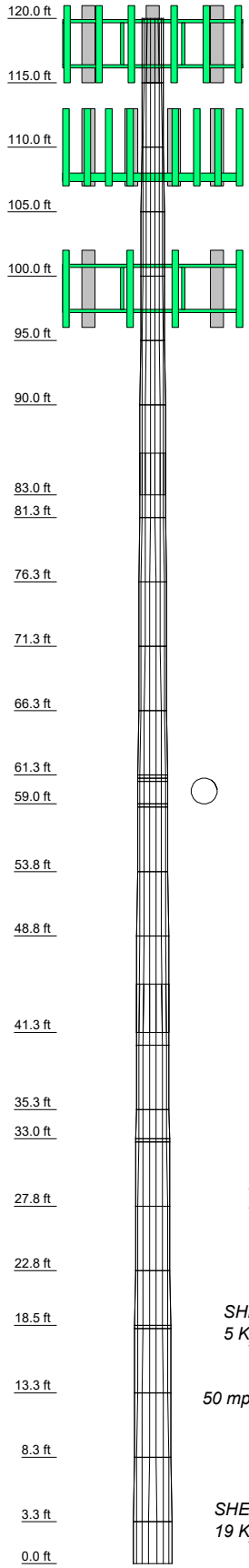
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Length (ft)	5.00	5.00	5.00	5.00	5.00	5.00	7.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	7.50	4.75	5.00	5.00	5.00	5.00	5.00	4.25	5.00	5.00	5.00	5.00	3.25
Number of Sides	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Thickness (in)	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.1875	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500	0.5500	0.5375	0.5375	0.3750	0.3126	0.3125	0.3125	0.3125	0.3126	0.3125	0.3125	0.3125
Socket Length (ft)																			3.75												
Top Dia (in)	19.0000	19.7503	20.5005	21.2508	22.0011	22.7514	23.5016	23.6893	24.4392	25.1897	25.9399	26.6901	27.4403	27.8154	28.1906	28.5657	28.9409	29.3157	29.3157	29.6910	30.0913	30.4664	30.8416	31.2168	31.9665	32.3417	32.7167	33.3918	34.1420	34.8922	35.6424
Bot Dia (in)	19.7503	20.5005	21.2508	22.0011	22.7514	23.5016	24.5520	24.4395	25.1897	25.9399	26.6901	27.4403	28.1906	28.5657	28.9409	29.3157	29.6910	30.0913	30.4410	30.4664	30.8416	31.2168	31.9665	32.3417	32.7167	33.3918	34.1420	34.8922	35.6424	36.1300	
Grade	A607-65																														
Weight (K)	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.8	0.8	0.4	0.4	0.5	0.5	0.5	0.0	0.6	0.6	0.6	0.4



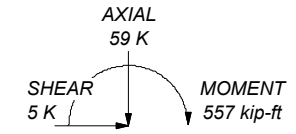
MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

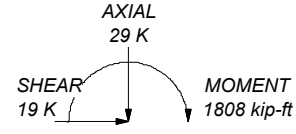
TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. CCIPOLE RATING: 94.4%

ALL REACTIONS ARE FACTORED



TORQUE 0 kip-ft
50 mph WIND - 2.0000 in ICE



TORQUE 0 kip-ft
REACTIONS - 125 mph WIND

Morrison Hershfield
Consulting Engineers
1455 Lincoln Parkway, Suite 500
Atlanta, GA 30346
Phone: (770) 379-8500
FAX: (770) 379-8501

Job: ***CN7-522 / 2101398***			
Project: ***842858 / Bolton***			
Client: Crown Castle USA	Drawn by: CKK	App'd:	
Code: TIA-222-H	Date: 03/07/21	Scale: NTS	
Path: C:\Users\CKatari\Desktop\CN7-522 - 842858 - BOLTON\CN7-522 SA\Analysis\CN7-522 BU_842858 WO_1916604 Reinforced Tower.eri		Dwg No. E-1	

Tower Input Data

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

Tower is located in Tolland County, Connecticut.
Tower base elevation above sea level: 621.50 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 2.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.00-115.00	5.00	0.00	18	19.0000	19.7503	0.1875	0.7500	A607-65 (65 ksi)
L2	115.00-110.00	5.00	0.00	18	19.7503	20.5005	0.1875	0.7500	A607-65 (65 ksi)
L3	110.00-105.00	5.00	0.00	18	20.5005	21.2508	0.1875	0.7500	A607-65 (65 ksi)
L4	105.00-100.00	5.00	0.00	18	21.2508	22.0011	0.1875	0.7500	A607-65 (65 ksi)
L5	100.00-95.00	5.00	0.00	18	22.0011	22.7514	0.1875	0.7500	A607-65 (65 ksi)
L6	95.00-90.00	5.00	0.00	18	22.7514	23.5016	0.1875	0.7500	A607-65 (65 ksi)
L7	90.00-83.00	7.00	3.25	18	23.5016	24.5520	0.1875	0.7500	A607-65 (65 ksi)
L8	83.00-81.25	5.00	0.00	18	23.6893	24.4395	0.2500	1.0000	A607-65 (65 ksi)
L9	81.25-76.25	5.00	0.00	18	24.4395	25.1897	0.2500	1.0000	A607-65 (65 ksi)
L10	76.25-71.25	5.00	0.00	18	25.1897	25.9399	0.2500	1.0000	A607-65 (65 ksi)
L11	71.25-66.25	5.00	0.00	18	25.9399	26.6901	0.2500	1.0000	A607-65 (65 ksi)
L12	66.25-61.25	5.00	0.00	18	26.6901	27.4403	0.2500	1.0000	A607-65 (65 ksi)
L13	61.25-61.00	0.25	0.00	18	27.4403	27.4778	0.2500	1.0000	A607-65 (65 ksi)
L14	61.00-60.75	0.25	0.00	18	27.4778	27.5153	0.2500	1.0000	A607-65 (65 ksi)
L15	60.75-59.00	1.75	0.00	18	27.5153	27.7778	0.2500	1.0000	A607-65 (65 ksi)
L16	59.00-58.75	0.25	0.00	18	27.7778	27.8153	0.2500	1.0000	A607-65 (65 ksi)
L17	58.75-53.75	5.00	0.00	18	27.8153	28.5655	0.2500	1.0000	A607-65 (65 ksi)
L18	53.75-48.75	5.00	0.00	18	28.5655	29.3157	0.2500	1.0000	A607-65 (65 ksi)
L19	48.75-41.25	7.50	3.75	18	29.3157	30.4410	0.2500	1.0000	A607-65 (65 ksi)
L20	41.25-40.25	4.75	0.00	18	29.3784	30.0910	0.5500	2.2000	A607-65 (65 ksi)
L21	40.25-35.25	5.00	0.00	18	30.0910	30.8412	0.5375	2.1500	A607-65 (65 ksi)
L22	35.25-33.00	2.25	0.00	18	30.8412	31.1788	0.5375	2.1500	A607-65 (65 ksi)
L23	33.00-32.75	0.25	0.00	18	31.1788	31.2163	0.3125	1.2500	A607-65 (65 ksi)
L24	32.75-27.75	5.00	0.00	18	31.2163	31.9665	0.3125	1.2500	A607-65 (65 ksi)
L25	27.75-22.75	5.00	0.00	18	31.9665	32.7167	0.3125	1.2500	A607-65 (65 ksi)
L26	22.75-18.50	4.25	0.00	18	32.7167	33.3543	0.3125	1.2500	A607-65 (65 ksi)
L27	18.50-18.25	0.25	0.00	18	33.3543	33.3918	0.3125	1.2500	A607-65 (65 ksi)
L28	18.25-13.25	5.00	0.00	18	33.3918	34.1420	0.3125	1.2500	A607-65 (65 ksi)
L29	13.25-8.25	5.00	0.00	18	34.1420	34.8922	0.3125	1.2500	A607-65 (65 ksi)
L30	8.25-3.25	5.00	0.00	18	34.8922	35.6424	0.3125	1.2500	A607-65 (65 ksi)
L31	3.25-0.00	3.25		18	35.6424	36.1300	0.3125	1.2500	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	19.2642	11.1958	500.5935	6.6784	9.6520	51.8642	1001.8456	5.5990	3.0140	16.075
	20.0260	11.6423	562.9071	6.9448	10.0331	56.1048	1126.5548	5.8223	3.1460	16.779
L2	20.0260	11.6423	562.9071	6.9448	10.0331	56.1048	1126.5548	5.8223	3.1460	16.779
	20.7879	12.0888	630.1885	7.2111	10.4143	60.5120	1261.2062	6.0455	3.2781	17.483
L3	20.7879	12.0888	630.1885	7.2111	10.4143	60.5120	1261.2062	6.0455	3.2781	17.483
	21.5497	12.5353	702.6282	7.4775	10.7954	65.0858	1406.1809	6.2688	3.4101	18.187
L4	21.5497	12.5353	702.6282	7.4775	10.7954	65.0858	1406.1809	6.2688	3.4101	18.187
	22.3116	12.9818	780.4167	7.7438	11.1765	69.8263	1561.8603	6.4921	3.5422	18.892
L5	22.3116	12.9818	780.4167	7.7438	11.1765	69.8263	1561.8603	6.4921	3.5422	18.892
	23.0734	13.4283	863.7445	8.0102	11.5577	74.7333	1728.6256	6.7154	3.6742	19.596
L6	23.0734	13.4283	863.7445	8.0102	11.5577	74.7333	1728.6256	6.7154	3.6742	19.596
	23.8352	13.8748	952.8024	8.2765	11.9388	79.8071	1906.8585	6.9387	3.8063	20.3
L7	23.8352	13.8748	952.8024	8.2765	11.9388	79.8071	1906.8585	6.9387	3.8063	20.3
	24.9018	14.4999	1087.4722	8.6494	12.4724	87.1902	2176.3753	7.2513	3.9912	21.286
L8	24.5113	18.5991	1290.9803	8.3210	12.0342	107.2762	2583.6594	9.3013	3.7293	14.917
	24.7780	19.1944	1418.9453	8.5873	12.4153	114.2903	2839.7576	9.5990	3.8614	15.445
L9	24.7780	19.1944	1418.9453	8.5873	12.4153	114.2903	2839.7576	9.5990	3.8614	15.445
	25.5397	19.7896	1555.0985	8.8536	12.7964	121.5266	3112.2432	9.8967	3.9934	15.974
L10	25.5397	19.7896	1555.0985	8.8536	12.7964	121.5266	3112.2432	9.8967	3.9934	15.974
	26.3015	20.3849	1699.6941	9.1199	13.1775	128.9849	3401.6247	10.1944	4.1254	16.502
L11	26.3015	20.3849	1699.6941	9.1199	13.1775	128.9849	3401.6247	10.1944	4.1254	16.502
	27.0632	20.9802	1852.9860	9.3862	13.5586	136.6654	3708.4102	10.4921	4.2575	17.03
L12	27.0632	20.9802	1852.9860	9.3862	13.5586	136.6654	3708.4102	10.4921	4.2575	17.03
	27.8250	21.5755	2015.2282	9.6525	13.9396	144.5681	4033.1080	10.7898	4.3895	17.558
L13	27.8250	21.5755	2015.2282	9.6525	13.9396	144.5681	4033.1080	10.7898	4.3895	17.558
	27.8631	21.6052	2023.5799	9.6659	13.9587	144.9690	4049.8225	10.8047	4.3961	17.584
L14	27.8631	21.6052	2023.5799	9.6659	13.9587	144.9690	4049.8225	10.8047	4.3961	17.584
	27.9012	21.6350	2031.9545	9.6792	13.9778	145.3705	4066.5827	10.8196	4.4027	17.611
L15	27.9012	21.6350	2031.9545	9.6792	13.9778	145.3705	4066.5827	10.8196	4.4027	17.611
	28.1678	21.8433	2091.2249	9.7724	14.1111	148.1967	4185.2015	10.9237	4.4489	17.796
L16	28.1678	21.8433	2091.2249	9.7724	14.1111	148.1967	4185.2015	10.9237	4.4489	17.796
	28.2059	21.8731	2099.7850	9.7857	14.1302	148.6027	4202.3329	10.9386	4.4555	17.822
L17	28.2059	21.8731	2099.7850	9.7857	14.1302	148.6027	4202.3329	10.9386	4.4555	17.822
	28.9676	22.4684	2275.9289	10.0520	14.5113	156.8385	4554.8526	11.2363	4.5875	18.35
L18	28.9676	22.4684	2275.9289	10.0520	14.5113	156.8385	4554.8526	11.2363	4.5875	18.35
	29.7294	23.0636	2461.6578	10.3183	14.8924	165.2964	4926.5547	11.5340	4.7196	18.878
L19	29.7294	23.0636	2461.6578	10.3183	14.8924	165.2964	4926.5547	11.5340	4.7196	18.878
	30.8720	23.9566	2758.7788	10.7178	15.4640	178.3998	5521.1876	11.9806	4.9176	19.67
L20	30.3180	50.3257	5284.0494	10.2341	14.9242	354.0590	10575.0518	25.1676	4.2026	7.641
	30.4704	51.5698	5685.7020	10.4871	15.2862	371.9489	11378.8854	25.7898	4.3280	7.869
L21	30.4723	50.4191	5563.5380	10.4915	15.2862	363.9571	11134.3967	25.2143	4.3500	8.093
	31.2341	51.6989	5998.0558	10.7578	15.6673	382.8382	12004.0040	25.8544	4.4821	8.339
L22	31.2341	51.6989	5998.0558	10.7578	15.6673	382.8382	12004.0040	25.8544	4.4821	8.339
	31.5769	52.2748	6200.7514	10.8777	15.8388	391.4905	12409.6618	26.1424	4.5415	8.449
L23	31.6116	30.6155	3685.0894	10.9575	15.8388	232.6617	7375.0277	15.3107	4.9375	15.8
	31.6497	30.6527	3698.5402	10.9709	15.8579	233.2304	7401.9470	15.3293	4.9441	15.821
L24	31.6497	30.6527	3698.5402	10.9709	15.8579	233.2304	7401.9470	15.3293	4.9441	15.821
	32.4114	31.3968	3974.4747	11.2372	16.2390	244.7491	7954.1791	15.7014	5.0761	16.244
L25	32.4114	31.3968	3974.4747	11.2372	16.2390	244.7491	7954.1791	15.7014	5.0761	16.244
	33.1732	32.1409	4263.8031	11.5035	16.6201	256.5455	8533.2166	16.0735	5.2081	16.666
L26	33.1732	32.1409	4263.8031	11.5035	16.6201	256.5455	8533.2166	16.0735	5.2081	16.666
	33.8207	32.7734	4520.5004	11.7298	16.9440	266.7907	9046.9490	16.3898	5.3204	17.025
L27	33.8207	32.7734	4520.5004	11.7298	16.9440	266.7907	9046.9490	16.3898	5.3204	17.025
	33.8587	32.8106	4535.9129	11.7432	16.9631	267.3996	9077.7942	16.4084	5.3270	17.046
L28	33.8587	32.8106	4535.9129	11.7432	16.9631	267.3996	9077.7942	16.4084	5.3270	17.046
	34.6205	33.5547	4851.5642	12.0095	17.3441	279.7235	9709.5123	16.7805	5.4590	17.469
L29	34.6205	33.5547	4851.5642	12.0095	17.3441	279.7235	9709.5123	16.7805	5.4590	17.469
	35.3823	34.2987	5181.5300	12.2758	17.7252	292.3250	10369.8781	17.1526	5.5910	17.891
L30	35.3823	34.2987	5181.5300	12.2758	17.7252	292.3250	10369.8781	17.1526	5.5910	17.891
	36.1440	35.0428	5526.1282	12.5421	18.1063	305.2042	11059.5278	17.5247	5.7231	18.314
L31	36.1440	35.0428	5526.1282	12.5421	18.1063	305.2042	11059.5278	17.5247	5.7231	18.314
	36.6392	35.5265	5758.1133	12.7152	18.3540	313.7246	11523.8032	17.7666	5.8089	18.588

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
L1 120.00-115.00				1	1	1			
L2 115.00-110.00				1	1	1			
L3 110.00-105.00				1	1	1			
L4 105.00-100.00				1	1	1			
L5 100.00-95.00				1	1	1			
L6 95.00-90.00				1	1	1			
L7 90.00-83.00				1	1	1			
L8 83.00-81.25				1	1	1			
L9 81.25-76.25				1	1	1			
L10 76.25-71.25				1	1	1			
L11 71.25-66.25				1	1	1			
L12 66.25-61.25				1	1	1			
L13 61.25-61.00				1	1	1			
L14 61.00-60.75				1	1	1			
L15 60.75-59.00				1	1	1			
L16 59.00-58.75				1	1	1			
L17 58.75-53.75				1	1	1			
L18 53.75-48.75				1	1	1			
L19 48.75-41.25				1	1	1			
L20 41.25-40.25				1	1	0.936348			
L21 40.25-35.25				1	1	0.948402			
L22 35.25-33.00				1	1	0.944359			
L23 33.00-32.75				1	1	1			
L24 32.75-27.75				1	1	1			
L25 27.75-22.75				1	1	1			
L26 22.75-18.50				1	1	1			
L27 18.50-18.25				1	1	1			
L28 18.25-13.25				1	1	1			
L29 13.25-8.25				1	1	1			
L30 8.25-3.25				1	1	1			
L31 3.25-0.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
Safety Line 3/8"	A	No	Surface Ar (CaAa)	120.00 - 11.00	1	1	0.450 0.450	0.3750		0.22
Step Pegs	A	No	Surface Ar (CaAa)	120.00 - 11.00	1	1	0.400 0.500	0.7050		1.80
HJ7-50A(1-5/8)	B	No	Surface Ar (CaAa)	108.00 - 8.00	6	6	-0.250 0.500	1.9800		1.04
******										
PL4x1.25 (MOD)	A	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
PL4x1.25 (MOD)	B	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
PL4x1.25 (MOD)	C	No	Surface Af (CaAa)	62.50 - 57.25	1	1	0.000 0.000	4.0000	10.5000	0.00
*										
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	43.75 - 38.75	1	1	-0.167 -0.167	5.0000	12.5000	21.27
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	43.75 - 38.75	1	1	0.330 0.330	5.0000	12.5000	21.27
*										
PL5x1.25 (MOD)	A	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
PL5x1.25 (MOD)	B	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
PL5x1.25 (MOD)	C	No	Surface Af (CaAa)	41.25 - 30.50	1	1	-0.500 -0.500	5.0000	12.5000	0.00
***										
PL4.5x1 (MOD)	A	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
PL4.5x1 (MOD)	B	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
PL4.5x1 (MOD)	C	No	Surface Af (CaAa)	59.00 - 41.33	1	1	-0.500 -0.500	4.5000	11.0000	0.00
*										
PL5x1 (MOD)	A	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	B	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	33.00 - 18.00	1	1	0.500 0.500	5.0000	12.0000	0.00
*										
PL5x1 (MOD)	A	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.167 -0.167	5.0000	12.0000	0.00
PL5x1 (MOD)	B	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.500 -0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	20.50 - 0.50	1	1	-0.500 -0.500	5.0000	12.0000	0.00
PL5x1 (MOD)	C	No	Surface Af (CaAa)	20.50 - 0.50	1	1	0.000 0.000	5.0000	12.0000	0.00
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
******									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	118.00 - 8.00	12	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
FB-L98B-034-XXX(3/8)	B	No	No	Inside Pole	118.00 - 8.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-CAT5E10P(1)	B	No	No	Inside Pole	118.00 - 8.00	4	No Ice	0.00	0.41
							1/2" Ice	0.00	0.41
							1" Ice	0.00	0.41
							2" Ice	0.00	0.41
CONDUIT(2)	B	No	No	Inside Pole	118.00 - 8.00	2	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
							2" Ice	0.00	2.80
******									
HJ7-50A(1-5/8)	A	No	No	Inside Pole	108.00 - 8.00	12	No Ice	0.00	1.04
							1/2" Ice	0.00	1.04
							1" Ice	0.00	1.04
							2" Ice	0.00	1.04
******									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	99.00 - 8.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
*									
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	99.00 - 8.00	3	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.00-115.00	A	0.000	0.000	0.540	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.00
L2	115.00-110.00	A	0.000	0.000	0.540	0.000	0.01
		B	0.000	0.000	0.000	0.000	0.07
		C	0.000	0.000	0.000	0.000	0.00
L3	110.00-105.00	A	0.000	0.000	0.540	0.000	0.05
		B	0.000	0.000	3.564	0.000	0.09
		C	0.000	0.000	0.000	0.000	0.00
L4	105.00-100.00	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.00
L5	100.00-95.00	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.05
L6	95.00-90.00	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.06
L7	90.00-83.00	A	0.000	0.000	0.756	0.000	0.10
		B	0.000	0.000	8.316	0.000	0.15

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	0.000	0.000	0.08
L8	83.00-81.25	A	0.000	0.000	0.189	0.000	0.03
		B	0.000	0.000	2.079	0.000	0.04
		C	0.000	0.000	0.000	0.000	0.02
L9	81.25-76.25	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.06
L10	76.25-71.25	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.06
L11	71.25-66.25	A	0.000	0.000	0.540	0.000	0.07
		B	0.000	0.000	5.940	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.06
L12	66.25-61.25	A	0.000	0.000	1.235	0.000	0.07
		B	0.000	0.000	6.635	0.000	0.10
		C	0.000	0.000	0.695	0.000	0.06
L13	61.25-61.00	A	0.000	0.000	0.166	0.000	0.00
		B	0.000	0.000	0.436	0.000	0.01
		C	0.000	0.000	0.139	0.000	0.00
L14	61.00-60.75	A	0.000	0.000	0.166	0.000	0.00
		B	0.000	0.000	0.436	0.000	0.01
		C	0.000	0.000	0.139	0.000	0.00
L15	60.75-59.00	A	0.000	0.000	1.162	0.000	0.03
		B	0.000	0.000	3.052	0.000	0.04
		C	0.000	0.000	0.973	0.000	0.02
L16	59.00-58.75	A	0.000	0.000	0.353	0.000	0.00
		B	0.000	0.000	0.623	0.000	0.01
		C	0.000	0.000	0.326	0.000	0.00
L17	58.75-53.75	A	0.000	0.000	5.124	0.000	0.07
		B	0.000	0.000	10.524	0.000	0.10
		C	0.000	0.000	4.584	0.000	0.06
L18	53.75-48.75	A	0.000	0.000	4.290	0.000	0.07
		B	0.000	0.000	9.690	0.000	0.10
		C	0.000	0.000	3.750	0.000	0.06
L19	48.75-41.25	A	0.000	0.000	9.614	0.000	0.22
		B	0.000	0.000	17.714	0.000	0.26
		C	0.000	0.000	8.804	0.000	0.20
L20	41.25-40.25	A	0.000	0.000	2.237	0.000	0.06
		B	0.000	0.000	3.317	0.000	0.06
		C	0.000	0.000	2.129	0.000	0.05
L21	40.25-35.25	A	0.000	0.000	6.650	0.000	0.14
		B	0.000	0.000	12.050	0.000	0.17
		C	0.000	0.000	6.110	0.000	0.12
L22	35.25-33.00	A	0.000	0.000	2.118	0.000	0.03
		B	0.000	0.000	4.548	0.000	0.05
		C	0.000	0.000	1.875	0.000	0.03
L23	33.00-32.75	A	0.000	0.000	0.444	0.000	0.00
		B	0.000	0.000	0.714	0.000	0.01
		C	0.000	0.000	0.417	0.000	0.00
L24	32.75-27.75	A	0.000	0.000	6.582	0.000	0.07
		B	0.000	0.000	11.982	0.000	0.10
		C	0.000	0.000	6.042	0.000	0.06
L25	27.75-22.75	A	0.000	0.000	4.707	0.000	0.07
		B	0.000	0.000	10.107	0.000	0.10
		C	0.000	0.000	4.167	0.000	0.06
L26	22.75-18.50	A	0.000	0.000	5.667	0.000	0.06
		B	0.000	0.000	10.257	0.000	0.09
		C	0.000	0.000	6.875	0.000	0.05
L27	18.50-18.25	A	0.000	0.000	0.444	0.000	0.00
		B	0.000	0.000	0.714	0.000	0.01
		C	0.000	0.000	0.625	0.000	0.00
L28	18.25-13.25	A	0.000	0.000	4.915	0.000	0.07
		B	0.000	0.000	10.315	0.000	0.10
		C	0.000	0.000	8.542	0.000	0.06
L29	13.25-8.25	A	0.000	0.000	4.410	0.000	0.07
		B	0.000	0.000	10.107	0.000	0.10
		C	0.000	0.000	8.333	0.000	0.06
L30	8.25-3.25	A	0.000	0.000	4.167	0.000	0.00
		B	0.000	0.000	4.464	0.000	0.01

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	8.333	0.000	0.00
L31	3.25-0.00	A	0.000	0.000	2.292	0.000	0.00
		B	0.000	0.000	2.292	0.000	0.00
		C	0.000	0.000	4.583	0.000	0.00

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.00-115.00	A	1.930	0.000	0.000	4.400	0.000	0.07
		B		0.000	0.000	0.000	0.000	0.04
		C		0.000	0.000	0.000	0.000	0.00
L2	115.00-110.00	A	1.922	0.000	0.000	4.384	0.000	0.07
		B		0.000	0.000	0.000	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.00
L3	110.00-105.00	A	1.913	0.000	0.000	4.366	0.000	0.10
		B		0.000	0.000	5.890	0.000	0.17
		C		0.000	0.000	0.000	0.000	0.00
L4	105.00-100.00	A	1.904	0.000	0.000	4.348	0.000	0.13
		B		0.000	0.000	9.805	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.00
L5	100.00-95.00	A	1.894	0.000	0.000	4.329	0.000	0.13
		B		0.000	0.000	9.793	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.05
L6	95.00-90.00	A	1.885	0.000	0.000	4.309	0.000	0.13
		B		0.000	0.000	9.781	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.06
L7	90.00-83.00	A	1.872	0.000	0.000	5.997	0.000	0.18
		B		0.000	0.000	13.671	0.000	0.32
		C		0.000	0.000	0.000	0.000	0.08
L8	83.00-81.25	A	1.862	0.000	0.000	1.499	0.000	0.04
		B		0.000	0.000	3.418	0.000	0.08
		C		0.000	0.000	0.000	0.000	0.02
L9	81.25-76.25	A	1.854	0.000	0.000	4.249	0.000	0.13
		B		0.000	0.000	9.743	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.06
L10	76.25-71.25	A	1.842	0.000	0.000	4.225	0.000	0.13
		B		0.000	0.000	9.728	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.06
L11	71.25-66.25	A	1.829	0.000	0.000	4.199	0.000	0.13
		B		0.000	0.000	9.712	0.000	0.23
		C		0.000	0.000	0.000	0.000	0.06
L12	66.25-61.25	A	1.816	0.000	0.000	5.110	0.000	0.14
		B		0.000	0.000	10.634	0.000	0.24
		C		0.000	0.000	0.939	0.000	0.08
L13	61.25-61.00	A	1.808	0.000	0.000	0.395	0.000	0.01
		B		0.000	0.000	0.672	0.000	0.01
		C		0.000	0.000	0.188	0.000	0.01
L14	61.00-60.75	A	1.807	0.000	0.000	0.395	0.000	0.01
		B		0.000	0.000	0.672	0.000	0.01
		C		0.000	0.000	0.188	0.000	0.01
L15	60.75-59.00	A	1.804	0.000	0.000	2.764	0.000	0.06
		B		0.000	0.000	4.701	0.000	0.10
		C		0.000	0.000	1.312	0.000	0.04
L16	59.00-58.75	A	1.801	0.000	0.000	0.672	0.000	0.01
		B		0.000	0.000	0.949	0.000	0.02
		C		0.000	0.000	0.465	0.000	0.01
L17	58.75-53.75	A	1.793	0.000	0.000	10.792	0.000	0.20
		B		0.000	0.000	16.333	0.000	0.30
		C		0.000	0.000	6.666	0.000	0.14
L18	53.75-48.75	A	1.776	0.000	0.000	9.619	0.000	0.18
		B		0.000	0.000	15.172	0.000	0.28
		C		0.000	0.000	5.526	0.000	0.12
L19	48.75-41.25	A	1.753	0.000	0.000	18.426	0.000	0.44
		B		0.000	0.000	26.781	0.000	0.59

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	12.355	0.000	0.35
L20	41.25-40.25	A	1.736	0.000	0.000	3.504	0.000	0.11
		B		0.000	0.000	4.618	0.000	0.13
		C		0.000	0.000	2.695	0.000	0.09
L21	40.25-35.25	A	1.723	0.000	0.000	11.560	0.000	0.29
		B		0.000	0.000	17.153	0.000	0.38
		C		0.000	0.000	7.574	0.000	0.23
L22	35.25-33.00	A	1.706	0.000	0.000	4.056	0.000	0.08
		B		0.000	0.000	6.579	0.000	0.13
		C		0.000	0.000	2.278	0.000	0.06
L23	33.00-32.75	A	1.699	0.000	0.000	0.737	0.000	0.01
		B		0.000	0.000	1.017	0.000	0.02
		C		0.000	0.000	0.540	0.000	0.01
L24	32.75-27.75	A	1.685	0.000	0.000	11.918	0.000	0.21
		B		0.000	0.000	17.539	0.000	0.30
		C		0.000	0.000	8.007	0.000	0.15
L25	27.75-22.75	A	1.655	0.000	0.000	9.570	0.000	0.18
		B		0.000	0.000	15.213	0.000	0.27
		C		0.000	0.000	5.719	0.000	0.12
L26	22.75-18.50	A	1.622	0.000	0.000	10.374	0.000	0.17
		B		0.000	0.000	15.193	0.000	0.25
		C		0.000	0.000	9.474	0.000	0.15
L27	18.50-18.25	A	1.603	0.000	0.000	0.760	0.000	0.01
		B		0.000	0.000	1.044	0.000	0.02
		C		0.000	0.000	0.861	0.000	0.01
L28	18.25-13.25	A	1.579	0.000	0.000	9.726	0.000	0.17
		B		0.000	0.000	15.427	0.000	0.27
		C		0.000	0.000	11.774	0.000	0.17
L29	13.25-8.25	A	1.520	0.000	0.000	7.297	0.000	0.14
		B		0.000	0.000	15.011	0.000	0.26
		C		0.000	0.000	11.372	0.000	0.17
L30	8.25-3.25	A	1.427	0.000	0.000	5.594	0.000	0.05
		B		0.000	0.000	6.054	0.000	0.06
		C		0.000	0.000	11.188	0.000	0.10
L31	3.25-0.00	A	1.258	0.000	0.000	2.983	0.000	0.02
		B		0.000	0.000	2.983	0.000	0.02
		C		0.000	0.000	5.967	0.000	0.05

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.00-115.00	-0.0865	-0.8228	-0.2836	-2.6986
L2	115.00-110.00	-0.0867	-0.8244	-0.2869	-2.7294
L3	110.00-105.00	3.6986	-1.5532	2.4288	-2.5689
L4	105.00-100.00	5.1020	-1.8335	3.4839	-2.5421
L5	100.00-95.00	5.1729	-1.8599	3.5524	-2.5901
L6	95.00-90.00	5.2414	-1.8854	3.6193	-2.6363
L7	90.00-83.00	5.3205	-1.9149	3.6976	-2.6895
L8	83.00-81.25	5.3458	-1.9242	3.7224	-2.7087
L9	81.25-76.25	5.3884	-1.9401	3.7663	-2.7318
L10	76.25-71.25	5.4498	-1.9630	3.8286	-2.7722
L11	71.25-66.25	5.5093	-1.9851	3.8896	-2.8107
L12	66.25-61.25	4.8807	-1.7592	3.6379	-2.6230
L13	61.25-61.00	3.5925	-1.2951	2.9695	-2.1383
L14	61.00-60.75	3.5953	-1.2962	2.9721	-2.1399
L15	60.75-59.00	3.6064	-1.3003	2.9825	-2.1462
L16	59.00-58.75	2.4427	-0.8808	2.1771	-1.5658
L17	58.75-53.75	2.9641	-1.0689	2.5237	-1.8124
L18	53.75-48.75	3.2964	-1.1891	2.7423	-1.9633
L19	48.75-41.25	2.7184	-0.9810	2.4108	-1.7183
L20	41.25-40.25	1.8731	-0.6760	1.9094	-1.3610
L21	40.25-35.25	2.6965	-0.9733	2.5277	-1.7894
L22	35.25-33.00	3.2857	-1.1862	2.9462	-2.0780
L23	33.00-32.75	2.2939	-0.8282	2.1940	-1.5453

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L24	32.75-27.75	2.7775	-1.0029	2.5291	-1.7759
L25	27.75-22.75	3.3685	-1.2166	2.9069	-2.0272
L26	22.75-18.50	2.0901	-1.1472	1.9479	-1.8306
L27	18.50-18.25	1.1573	-1.0931	1.1837	-1.6733
L28	18.25-13.25	1.5717	-1.4859	1.5237	-2.1415
L29	13.25-8.25	1.6525	-1.3940	1.6957	-1.6412
L30	8.25-3.25	-1.6046	-0.5807	-1.3920	-0.5201
L31	3.25-0.00	-1.7071	-0.5044	-1.4795	-0.4371

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8"	115.00 - 120.00	1.0000	1.0000
L1	3	Step Pegs	115.00 - 120.00	1.0000	1.0000
L2	2	Safety Line 3/8"	110.00 - 115.00	1.0000	1.0000
L2	3	Step Pegs	110.00 - 115.00	1.0000	1.0000
L3	2	Safety Line 3/8"	105.00 - 110.00	1.0000	1.0000
L3	3	Step Pegs	105.00 - 110.00	1.0000	1.0000
L3	11	HJ7-50A(1-5/8)	105.00 - 108.00	1.0000	1.0000
L4	2	Safety Line 3/8"	100.00 - 105.00	1.0000	1.0000
L4	3	Step Pegs	100.00 - 105.00	1.0000	1.0000
L4	11	HJ7-50A(1-5/8)	100.00 - 105.00	1.0000	1.0000
L5	2	Safety Line 3/8"	95.00 - 100.00	1.0000	1.0000
L5	3	Step Pegs	95.00 - 100.00	1.0000	1.0000
L5	11	HJ7-50A(1-5/8)	95.00 - 100.00	1.0000	1.0000
L6	2	Safety Line 3/8"	90.00 - 95.00	1.0000	1.0000
L6	3	Step Pegs	90.00 - 95.00	1.0000	1.0000
L6	11	HJ7-50A(1-5/8)	90.00 - 95.00	1.0000	1.0000
L7	2	Safety Line 3/8"	83.00 - 90.00	1.0000	1.0000
L7	3	Step Pegs	83.00 - 90.00	1.0000	1.0000
L7	11	HJ7-50A(1-5/8)	83.00 - 90.00	1.0000	1.0000
L8	2	Safety Line 3/8"	81.25 - 83.00	1.0000	1.0000
L8	3	Step Pegs	81.25 - 83.00	1.0000	1.0000
L8	11	HJ7-50A(1-5/8)	81.25 - 83.00	1.0000	1.0000
L9	2	Safety Line 3/8"	76.25 - 81.25	1.0000	1.0000
L9	3	Step Pegs	76.25 - 81.25	1.0000	1.0000
L9	11	HJ7-50A(1-5/8)	76.25 - 81.25	1.0000	1.0000
L10	2	Safety Line 3/8"	71.25 - 76.25	1.0000	1.0000
L10	3	Step Pegs	71.25 - 76.25	1.0000	1.0000
L10	11	HJ7-50A(1-5/8)	71.25 - 76.25	1.0000	1.0000
L11	2	Safety Line 3/8"	66.25 - 71.25	1.0000	1.0000
L11	3	Step Pegs	66.25 - 71.25	1.0000	1.0000
L11	11	HJ7-50A(1-5/8)	66.25 - 71.25	1.0000	1.0000
L12	2	Safety Line 3/8"	61.25 - 66.25	1.0000	1.0000
L12	3	Step Pegs	61.25 - 66.25	1.0000	1.0000
L12	11	HJ7-50A(1-5/8)	61.25 - 66.25	1.0000	1.0000
L12	17	PL4x1.25 (MOD)	61.25 - 62.50	1.0000	1.0000
L12	18	PL4x1.25 (MOD)	61.25 - 62.50	1.0000	1.0000
L12	19	PL4x1.25 (MOD)	61.25 - 62.50	1.0000	1.0000
L13	2	Safety Line 3/8"	61.00 - 61.25	1.0000	1.0000
L13	3	Step Pegs	61.00 - 61.25	1.0000	1.0000
L13	11	HJ7-50A(1-5/8)	61.00 - 61.25	1.0000	1.0000
L13	17	PL4x1.25 (MOD)	61.00 - 61.25	1.0000	1.0000
L13	18	PL4x1.25 (MOD)	61.00 - 61.25	1.0000	1.0000
L13	19	PL4x1.25 (MOD)	61.00 - 61.25	1.0000	1.0000
L14	2	Safety Line 3/8"	60.75 - 61.00	1.0000	1.0000
L14	3	Step Pegs	60.75 - 61.00	1.0000	1.0000
L14	11	HJ7-50A(1-5/8)	60.75 - 61.00	1.0000	1.0000
L14	17	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L14	18	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000
L14	19	PL4x1.25 (MOD)	60.75 - 61.00	1.0000	1.0000
L15	2	Safety Line 3/8"	59.00 - 60.75	1.0000	1.0000
L15	3	Step Pegs	59.00 - 60.75	1.0000	1.0000
L15	11	HJ7-50A(1-5/8)	59.00 - 60.75	1.0000	1.0000
L15	17	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L15	18	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L15	19	PL4x1.25 (MOD)	59.00 - 60.75	1.0000	1.0000
L16	2	Safety Line 3/8"	58.75 - 59.00	1.0000	1.0000
L16	3	Step Pegs	58.75 - 59.00	1.0000	1.0000
L16	11	HJ7-50A(1-5/8)	58.75 - 59.00	1.0000	1.0000
L16	17	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L16	18	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L16	19	PL4x1.25 (MOD)	58.75 - 59.00	1.0000	1.0000
L16	32	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L16	33	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L16	34	PL4.5x1 (MOD)	58.75 - 59.00	1.0000	1.0000
L17	2	Safety Line 3/8"	53.75 - 58.75	1.0000	1.0000
L17	3	Step Pegs	53.75 - 58.75	1.0000	1.0000
L17	11	HJ7-50A(1-5/8)	53.75 - 58.75	1.0000	1.0000
L17	17	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L17	18	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L17	19	PL4x1.25 (MOD)	57.25 - 58.75	1.0000	1.0000
L17	32	PL4.5x1 (MOD)	53.75 - 58.75	1.0000	1.0000
L17	33	PL4.5x1 (MOD)	53.75 - 58.75	1.0000	1.0000
L17	34	PL4.5x1 (MOD)	53.75 - 58.75	1.0000	1.0000
L18	2	Safety Line 3/8"	48.75 - 53.75	1.0000	1.0000
L18	3	Step Pegs	48.75 - 53.75	1.0000	1.0000
L18	11	HJ7-50A(1-5/8)	48.75 - 53.75	1.0000	1.0000
L18	32	PL4.5x1 (MOD)	48.75 - 53.75	1.0000	1.0000
L18	33	PL4.5x1 (MOD)	48.75 - 53.75	1.0000	1.0000
L18	34	PL4.5x1 (MOD)	48.75 - 53.75	1.0000	1.0000
L19	2	Safety Line 3/8"	41.25 - 48.75	1.0000	1.0000
L19	3	Step Pegs	41.25 - 48.75	1.0000	1.0000
L19	11	HJ7-50A(1-5/8)	41.25 - 48.75	1.0000	1.0000
L19	21	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	22	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	23	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	24	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	25	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	26	PL5x1.25 (MOD)	41.25 - 43.75	1.0000	1.0000
L19	32	PL4.5x1 (MOD)	41.33 - 48.75	1.0000	1.0000
L19	33	PL4.5x1 (MOD)	41.33 - 48.75	1.0000	1.0000
L19	34	PL4.5x1 (MOD)	41.33 - 48.75	1.0000	1.0000
L20	2	Safety Line 3/8"	40.25 - 41.25	1.0000	1.0000
L20	3	Step Pegs	40.25 - 41.25	1.0000	1.0000
L20	11	HJ7-50A(1-5/8)	40.25 - 41.25	1.0000	1.0000
L20	21	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	22	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	23	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	24	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	25	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	26	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	28	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	29	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L20	30	PL5x1.25 (MOD)	40.25 - 41.25	1.0000	1.0000
L21	2	Safety Line 3/8"	35.25 - 40.25	1.0000	1.0000
L21	3	Step Pegs	35.25 - 40.25	1.0000	1.0000
L21	11	HJ7-50A(1-5/8)	35.25 - 40.25	1.0000	1.0000
L21	21	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	22	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	23	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	24	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	25	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	26	PL5x1.25 (MOD)	38.75 - 40.25	1.0000	1.0000
L21	28	PL5x1.25 (MOD)	35.25 - 40.25	1.0000	1.0000
L21	29	PL5x1.25 (MOD)	35.25 - 40.25	1.0000	1.0000
L21	30	PL5x1.25 (MOD)	35.25 - 40.25	1.0000	1.0000
L22	2	Safety Line 3/8"	33.00 - 35.25	1.0000	1.0000
L22	3	Step Pegs	33.00 - 35.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	11	HJ7-50A(1-5/8)	33.00 - 35.25	1.0000	1.0000
L22	28	PL5x1.25 (MOD)	33.00 - 35.25	1.0000	1.0000
L22	29	PL5x1.25 (MOD)	33.00 - 35.25	1.0000	1.0000
L22	30	PL5x1.25 (MOD)	33.00 - 35.25	1.0000	1.0000
L23	2	Safety Line 3/8"	32.75 - 33.00	1.0000	1.0000
L23	3	Step Pegs	32.75 - 33.00	1.0000	1.0000
L23	11	HJ7-50A(1-5/8)	32.75 - 33.00	1.0000	1.0000
L23	28	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L23	29	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L23	30	PL5x1.25 (MOD)	32.75 - 33.00	1.0000	1.0000
L23	36	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L23	37	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L23	38	PL5x1 (MOD)	32.75 - 33.00	1.0000	1.0000
L24	2	Safety Line 3/8"	27.75 - 32.75	1.0000	1.0000
L24	3	Step Pegs	27.75 - 32.75	1.0000	1.0000
L24	11	HJ7-50A(1-5/8)	27.75 - 32.75	1.0000	1.0000
L24	28	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L24	29	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L24	30	PL5x1.25 (MOD)	30.50 - 32.75	1.0000	1.0000
L24	36	PL5x1 (MOD)	27.75 - 32.75	1.0000	1.0000
L24	37	PL5x1 (MOD)	27.75 - 32.75	1.0000	1.0000
L24	38	PL5x1 (MOD)	27.75 - 32.75	1.0000	1.0000
L25	2	Safety Line 3/8"	22.75 - 27.75	1.0000	1.0000
L25	3	Step Pegs	22.75 - 27.75	1.0000	1.0000
L25	11	HJ7-50A(1-5/8)	22.75 - 27.75	1.0000	1.0000
L25	36	PL5x1 (MOD)	22.75 - 27.75	1.0000	1.0000
L25	37	PL5x1 (MOD)	22.75 - 27.75	1.0000	1.0000
L25	38	PL5x1 (MOD)	22.75 - 27.75	1.0000	1.0000
L26	2	Safety Line 3/8"	18.50 - 22.75	1.0000	1.0000
L26	3	Step Pegs	18.50 - 22.75	1.0000	1.0000
L26	11	HJ7-50A(1-5/8)	18.50 - 22.75	1.0000	1.0000
L26	36	PL5x1 (MOD)	18.50 - 22.75	1.0000	1.0000
L26	37	PL5x1 (MOD)	18.50 - 22.75	1.0000	1.0000
L26	38	PL5x1 (MOD)	18.50 - 22.75	1.0000	1.0000
L26	40	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L26	41	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L26	42	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L26	43	PL5x1 (MOD)	18.50 - 20.50	1.0000	1.0000
L27	2	Safety Line 3/8"	18.25 - 18.50	1.0000	1.0000
L27	3	Step Pegs	18.25 - 18.50	1.0000	1.0000
L27	11	HJ7-50A(1-5/8)	18.25 - 18.50	1.0000	1.0000
L27	36	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	37	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	38	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	40	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	41	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	42	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L27	43	PL5x1 (MOD)	18.25 - 18.50	1.0000	1.0000
L28	2	Safety Line 3/8"	13.25 - 18.25	1.0000	1.0000
L28	3	Step Pegs	13.25 - 18.25	1.0000	1.0000
L28	11	HJ7-50A(1-5/8)	13.25 - 18.25	1.0000	1.0000
L28	36	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L28	37	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L28	38	PL5x1 (MOD)	18.00 - 18.25	1.0000	1.0000
L28	40	PL5x1 (MOD)	13.25 - 18.25	1.0000	1.0000
L28	41	PL5x1 (MOD)	13.25 - 18.25	1.0000	1.0000
L28	42	PL5x1 (MOD)	13.25 - 18.25	1.0000	1.0000
L28	43	PL5x1 (MOD)	13.25 - 18.25	1.0000	1.0000
L29	2	Safety Line 3/8"	11.00 - 13.25	1.0000	1.0000
L29	3	Step Pegs	11.00 - 13.25	1.0000	1.0000
L29	11	HJ7-50A(1-5/8)	8.25 - 13.25	1.0000	1.0000
L29	40	PL5x1 (MOD)	8.25 - 13.25	1.0000	1.0000
L29	41	PL5x1 (MOD)	8.25 - 13.25	1.0000	1.0000
L29	42	PL5x1 (MOD)	8.25 - 13.25	1.0000	1.0000
L29	43	PL5x1 (MOD)	8.25 - 13.25	1.0000	1.0000
L30	11	HJ7-50A(1-5/8)	8.00 - 8.25	1.0000	1.0000
L30	40	PL5x1 (MOD)	3.25 - 8.25	1.0000	1.0000
L30	41	PL5x1 (MOD)	3.25 - 8.25	1.0000	1.0000
L30	42	PL5x1 (MOD)	3.25 - 8.25	1.0000	1.0000
L30	43	PL5x1 (MOD)	3.25 - 8.25	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L31	40	PL5x1 (MOD)	0.50 - 3.25	1.0000	1.0000
L31	41	PL5x1 (MOD)	0.50 - 3.25	1.0000	1.0000
L31	42	PL5x1 (MOD)	0.50 - 3.25	1.0000	1.0000
L31	43	PL5x1 (MOD)	0.50 - 3.25	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L12	17	PL4x1.25 (MOD)	61.25 - 62.50	Auto	0.0000
L12	18	PL4x1.25 (MOD)	61.25 - 62.50	Auto	0.0000
L12	19	PL4x1.25 (MOD)	61.25 - 62.50	Auto	0.0000
L13	17	PL4x1.25 (MOD)	61.00 - 61.25	Auto	0.0000
L13	18	PL4x1.25 (MOD)	61.00 - 61.25	Auto	0.0000
L13	19	PL4x1.25 (MOD)	61.00 - 61.25	Auto	0.0000
L14	17	PL4x1.25 (MOD)	60.75 - 61.00	Auto	0.0000
L14	18	PL4x1.25 (MOD)	60.75 - 61.00	Auto	0.0000
L14	19	PL4x1.25 (MOD)	60.75 - 61.00	Auto	0.0000
L15	17	PL4x1.25 (MOD)	59.00 - 60.75	Auto	0.0000
L15	18	PL4x1.25 (MOD)	59.00 - 60.75	Auto	0.0000
L15	19	PL4x1.25 (MOD)	59.00 - 60.75	Auto	0.0000
L16	17	PL4x1.25 (MOD)	58.75 - 59.00	Auto	0.0000
L16	18	PL4x1.25 (MOD)	58.75 - 59.00	Auto	0.0000
L16	19	PL4x1.25 (MOD)	58.75 - 59.00	Auto	0.0000
L16	32	PL4.5x1 (MOD)	58.75 - 59.00	Auto	0.0106
L16	33	PL4.5x1 (MOD)	58.75 - 59.00	Auto	0.0106
L16	34	PL4.5x1 (MOD)	58.75 - 59.00	Auto	0.0106
L17	17	PL4x1.25 (MOD)	57.25 - 58.75	Auto	0.0000
L17	18	PL4x1.25 (MOD)	57.25 - 58.75	Auto	0.0000
L17	19	PL4x1.25 (MOD)	57.25 - 58.75	Auto	0.0000
L17	32	PL4.5x1 (MOD)	53.75 - 58.75	Auto	0.0017
L17	33	PL4.5x1 (MOD)	53.75 - 58.75	Auto	0.0017
L17	34	PL4.5x1 (MOD)	53.75 - 58.75	Auto	0.0017
L18	32	PL4.5x1 (MOD)	48.75 - 53.75	Auto	0.0000
L18	33	PL4.5x1 (MOD)	48.75 - 53.75	Auto	0.0000
L18	34	PL4.5x1 (MOD)	48.75 - 53.75	Auto	0.0000
L19	21	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	22	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	23	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	24	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	25	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	26	PL5x1.25 (MOD)	41.25 - 43.75	Auto	0.0231
L19	32	PL4.5x1 (MOD)	41.33 - 48.75	Auto	0.0000
L19	33	PL4.5x1 (MOD)	41.33 - 48.75	Auto	0.0000
L19	34	PL4.5x1 (MOD)	41.33 - 48.75	Auto	0.0000
L20	21	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	22	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	23	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	24	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	25	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	26	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	28	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	29	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L20	30	PL5x1.25 (MOD)	40.25 - 41.25	Auto	0.1370
L21	21	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	22	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	23	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	24	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	25	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	26	PL5x1.25 (MOD)	38.75 - 40.25	Auto	0.1260
L21	28	PL5x1.25 (MOD)	35.25 - 40.25	Auto	0.1168
L21	29	PL5x1.25 (MOD)	35.25 - 40.25	Auto	0.1168
L21	30	PL5x1.25 (MOD)	35.25 - 40.25	Auto	0.1168
L22	28	PL5x1.25 (MOD)	33.00 - 35.25	Auto	0.0976
L22	29	PL5x1.25 (MOD)	33.00 - 35.25	Auto	0.0976

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L22	30	PL5x1.25 (MOD)	33.00 - 35.25	Auto	0.0976
L23	28	PL5x1.25 (MOD)	32.75 - 33.00	Auto	0.0118
L23	29	PL5x1.25 (MOD)	32.75 - 33.00	Auto	0.0118
L23	30	PL5x1.25 (MOD)	32.75 - 33.00	Auto	0.0118
L23	36	PL5x1 (MOD)	32.75 - 33.00	Auto	0.0118
L23	37	PL5x1 (MOD)	32.75 - 33.00	Auto	0.0118
L23	38	PL5x1 (MOD)	32.75 - 33.00	Auto	0.0118
L24	28	PL5x1.25 (MOD)	30.50 - 32.75	Auto	0.0053
L24	29	PL5x1.25 (MOD)	30.50 - 32.75	Auto	0.0053
L24	30	PL5x1.25 (MOD)	30.50 - 32.75	Auto	0.0053
L24	36	PL5x1 (MOD)	27.75 - 32.75	Auto	0.0024
L24	37	PL5x1 (MOD)	27.75 - 32.75	Auto	0.0024
L24	38	PL5x1 (MOD)	27.75 - 32.75	Auto	0.0024
L25	36	PL5x1 (MOD)	22.75 - 27.75	Auto	0.0000
L25	37	PL5x1 (MOD)	22.75 - 27.75	Auto	0.0000
L25	38	PL5x1 (MOD)	22.75 - 27.75	Auto	0.0000
L26	36	PL5x1 (MOD)	18.50 - 22.75	Auto	0.0000
L26	37	PL5x1 (MOD)	18.50 - 22.75	Auto	0.0000
L26	38	PL5x1 (MOD)	18.50 - 22.75	Auto	0.0000
L26	40	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L26	41	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L26	42	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L26	43	PL5x1 (MOD)	18.50 - 20.50	Auto	0.0000
L27	36	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	37	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	38	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	40	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	41	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	42	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L27	43	PL5x1 (MOD)	18.25 - 18.50	Auto	0.0000
L28	36	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L28	37	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L28	38	PL5x1 (MOD)	18.00 - 18.25	Auto	0.0000
L28	40	PL5x1 (MOD)	13.25 - 18.25	Auto	0.0000
L28	41	PL5x1 (MOD)	13.25 - 18.25	Auto	0.0000
L28	42	PL5x1 (MOD)	13.25 - 18.25	Auto	0.0000
L28	43	PL5x1 (MOD)	13.25 - 18.25	Auto	0.0000
L29	40	PL5x1 (MOD)	8.25 - 13.25	Auto	0.0000
L29	41	PL5x1 (MOD)	8.25 - 13.25	Auto	0.0000
L29	42	PL5x1 (MOD)	8.25 - 13.25	Auto	0.0000
L29	43	PL5x1 (MOD)	8.25 - 13.25	Auto	0.0000
L30	40	PL5x1 (MOD)	3.25 - 8.25	Auto	0.0000
L30	41	PL5x1 (MOD)	3.25 - 8.25	Auto	0.0000
L30	42	PL5x1 (MOD)	3.25 - 8.25	Auto	0.0000
L30	43	PL5x1 (MOD)	3.25 - 8.25	Auto	0.0000
L31	40	PL5x1 (MOD)	0.50 - 3.25	Auto	0.0000
L31	41	PL5x1 (MOD)	0.50 - 3.25	Auto	0.0000
L31	42	PL5x1 (MOD)	0.50 - 3.25	Auto	0.0000
L31	43	PL5x1 (MOD)	0.50 - 3.25	Auto	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
(2) DMP65R-BU4D w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.53 8.04 8.57 9.68	3.79 4.23 4.68 5.63	0.09 0.16 0.22 0.39
(2) DMP65R-BU4D w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.53 8.04 8.57 9.68	3.79 4.23 4.68 5.63	0.09 0.16 0.22 0.39
(2) DMP65R-BU4D w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	7.53 8.04 8.57 9.68	3.79 4.23 4.68 5.63	0.09 0.16 0.22 0.39
7770.00 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
(3) RRUS 4449 B5/B12	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
(3) RRUS 4478 B14	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
(3) RRUS 8843 B2/B66A	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.32	1.35 1.50 1.65 1.99	0.07 0.09 0.11 0.16
(2) 1001940	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
1001940	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.18 0.23 0.30 0.44	0.08 0.13 0.18 0.30	0.00 0.00 0.01 0.01
(2) LGP21401	A	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	B	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
(2) LGP21401	C	From Leg	4.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.10 1.24 1.38 1.69	0.21 0.27 0.35 0.52	0.01 0.02 0.03 0.05
DC6-48-60-18-8C	A	From Leg	1.00 0.00 0.00	0.0000	118.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.74 2.96 3.20 3.68	2.74 2.96 3.20 3.68	0.03 0.05 0.08 0.15
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	118.00	No Ice	0.92	0.92	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Offsets: ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00					1/2" Ice	1.46	1.46	0.04
			0.00					1" Ice	1.64	1.64	0.06
								2" Ice	2.04	2.04	0.11
4' x 2" Pipe Mount	A	From Leg	1.00			0.0000	118.00	No Ice	0.79	0.79	0.03
			0.00					1/2" Ice	1.03	1.03	0.04
			0.00					1" Ice	1.28	1.28	0.04
								2" Ice	1.81	1.81	0.07
4' x 2" Pipe Mount	A	From Leg	4.00			0.0000	118.00	No Ice	0.79	0.79	0.03
			0.00					1/2" Ice	1.03	1.03	0.04
			0.00					1" Ice	1.28	1.28	0.04
								2" Ice	1.81	1.81	0.07
4' x 2" Pipe Mount	B	From Leg	4.00			0.0000	118.00	No Ice	0.79	0.79	0.03
			0.00					1/2" Ice	1.03	1.03	0.04
			0.00					1" Ice	1.28	1.28	0.04
								2" Ice	1.81	1.81	0.07
4' x 2" Pipe Mount	C	From Leg	4.00			0.0000	118.00	No Ice	0.79	0.79	0.03
			0.00					1/2" Ice	1.03	1.03	0.04
			0.00					1" Ice	1.28	1.28	0.04
								2" Ice	1.81	1.81	0.07
(2) 6' x 2" Mount Pipe	A	From Leg	4.00			0.0000	118.00	No Ice	1.43	1.43	0.02
			0.00					1/2" Ice	1.92	1.92	0.03
			0.00					1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
(2) 6' x 2" Mount Pipe	B	From Leg	4.00			0.0000	118.00	No Ice	1.43	1.43	0.02
			0.00					1/2" Ice	1.92	1.92	0.03
			0.00					1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
(2) 6' x 2" Mount Pipe	C	From Leg	4.00			0.0000	118.00	No Ice	1.43	1.43	0.02
			0.00					1/2" Ice	1.92	1.92	0.03
			0.00					1" Ice	2.29	2.29	0.05
								2" Ice	3.06	3.06	0.09
Platform Mount [LP 303-1_HR-1]	A	None				0.0000	118.00	No Ice	17.09	17.09	1.50
								1/2" Ice	21.47	21.47	1.88
								1" Ice	25.72	25.72	2.35
								2" Ice	33.96	33.96	3.52
******											
(2) LPA-185063/8CFX2 w/ Mount Pipe	A	From Leg	4.00			0.0000	108.00	No Ice	3.21	3.92	0.03
			0.00					1/2" Ice	3.57	4.52	0.06
			2.00					1" Ice	3.94	5.14	0.10
								2" Ice	4.69	6.40	0.20
(2) LPA-185063/8CFX2 w/ Mount Pipe	B	From Leg	4.00			0.0000	108.00	No Ice	3.21	3.92	0.03
			0.00					1/2" Ice	3.57	4.52	0.06
			2.00					1" Ice	3.94	5.14	0.10
								2" Ice	4.69	6.40	0.20
(2) LPA-185063/8CFX2 w/ Mount Pipe	C	From Leg	4.00			0.0000	108.00	No Ice	3.21	3.92	0.03
			0.00					1/2" Ice	3.57	4.52	0.06
			2.00					1" Ice	3.94	5.14	0.10
								2" Ice	4.69	6.40	0.20
(2) LPD-6513 w/ Mount Pipe	A	From Leg	4.00			0.0000	108.00	No Ice	5.91	5.86	0.05
			0.00					1/2" Ice	6.31	6.48	0.11
			2.00					1" Ice	6.71	7.11	0.17
								2" Ice	7.54	8.42	0.32
(2) LPD-6513 w/ Mount Pipe	B	From Leg	4.00			0.0000	108.00	No Ice	5.91	5.86	0.05
			0.00					1/2" Ice	6.31	6.48	0.11
			2.00					1" Ice	6.71	7.11	0.17
								2" Ice	7.54	8.42	0.32
(2) LPD-6513 w/ Mount Pipe	C	From Leg	4.00			0.0000	108.00	No Ice	5.91	5.86	0.05
			0.00					1/2" Ice	6.31	6.48	0.11
			2.00					1" Ice	6.71	7.11	0.17
								2" Ice	7.54	8.42	0.32
Platform Mount [LP 303-1]	A	None				0.0000	108.00	No Ice	14.69	14.69	1.25
								1/2" Ice	18.01	18.01	1.57
								1" Ice	21.34	21.34	1.94
								2" Ice	28.08	28.08	2.85
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Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
APXVAARR24_43-U-NA20	A	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	B	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
APXVAARR24_43-U-NA20	C	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	14.67 15.43 16.21 17.81	5.32 5.99 6.68 8.08	0.15 0.27 0.39 0.66
AIR 32 B2A/B66AA	A	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.86 4.23 4.61 5.41	2.51 2.86 3.22 3.97	0.17 0.22 0.27 0.40
AIR 32 B2A/B66AA	B	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.86 4.23 4.61 5.41	2.51 2.86 3.22 3.97	0.17 0.22 0.27 0.40
AIR 32 B2A/B66AA	C	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.86 4.23 4.61 5.41	2.51 2.86 3.22 3.97	0.17 0.22 0.27 0.40
RADIO 4449 B12/B71	A	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	B	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
RADIO 4449 B12/B71	C	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.65 1.81 1.98 2.34	1.16 1.30 1.45 1.76	0.07 0.09 0.11 0.16
KRY 112 144/1	A	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Leg	4.00 0.00 0.00	0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
12.5' Platform Mount [#RMQP-496-HK]	A	None		0.0000	99.00	No Ice 1/2" Ice 1" Ice 2" Ice	35.03 44.46 53.72 72.29	35.03 44.46 53.72 72.29	1.86 2.52 3.33 5.42
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Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 115	Pole	Max Tension	14	0.00	-0.00	0.00
			Max. Compression	26	-10.57	0.02	0.43
			Max. Mx	8	-3.41	-15.06	0.04
			Max. My	2	-3.40	-0.04	15.24
			Max. Vy	8	5.08	-15.06	0.04
			Max. Vx	2	-5.13	-0.04	15.24
			Max. Torque	20			-0.16
L2	115 - 110	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-11.23	0.06	0.48
			Max. Mx	20	-3.71	41.35	-0.10
			Max. My	2	-3.70	-0.10	41.79
			Max. Vy	8	5.44	-41.34	0.12
			Max. Vx	2	-5.49	-0.10	41.79
			Max. Torque	20			-0.16
L3	110 - 105	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-18.20	0.02	0.60
			Max. Mx	8	-5.70	-83.85	0.20
			Max. My	2	-5.68	-0.18	84.56
			Max. Vy	8	9.09	-83.85	0.20
			Max. Vx	2	-9.14	-0.18	84.56
			Max. Torque	20			-0.16
L4	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-19.14	-0.08	0.75
			Max. Mx	8	-6.15	-130.24	0.30
			Max. My	2	-6.13	-0.28	131.22
			Max. Vy	8	9.46	-130.24	0.30
			Max. Vx	2	-9.52	-0.28	131.22
			Max. Torque	20			-0.16
L5	100 - 95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-29.54	-0.20	0.92
			Max. Mx	8	-9.85	-194.32	0.40
			Max. My	2	-9.84	-0.37	195.58
			Max. Vy	8	13.79	-194.32	0.40
			Max. Vx	2	-13.85	-0.37	195.58
			Max. Torque	20			-0.16
L6	95 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-30.58	-0.32	1.10
			Max. Mx	8	-10.45	-264.16	0.51
			Max. My	2	-10.44	-0.47	265.70
			Max. Vy	8	14.15	-264.16	0.51
			Max. Vx	2	-14.20	-0.47	265.70
			Max. Torque	20			-0.16
L7	90 - 83	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-31.36	-0.41	1.23
			Max. Mx	8	-10.92	-317.68	0.59
			Max. My	2	-10.90	-0.55	319.43
			Max. Vy	8	14.41	-317.68	0.59
			Max. Vx	2	-14.46	-0.55	319.43
			Max. Torque	20			-0.16
L8	83 - 81.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-32.90	-0.53	1.41
			Max. Mx	8	-11.79	-390.76	0.69
			Max. My	2	-11.78	-0.65	392.78
			Max. Vy	8	14.82	-390.76	0.69
			Max. Vx	2	-14.87	-0.65	392.78
			Max. Torque	20			-0.16
L9	81.25 - 76.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.06	-0.65	1.59
			Max. Mx	8	-12.54	-465.68	0.79
			Max. My	2	-12.53	-0.75	467.99
			Max. Vy	8	15.16	-465.68	0.79
			Max. Vx	2	-15.22	-0.75	467.99
			Max. Torque	20			-0.16
L10	76.25 - 71.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.25	-0.78	1.77
			Max. Mx	8	-13.30	-542.32	0.90
			Max. My	2	-13.29	-0.85	544.91
			Max. Vy	8	15.50	-542.32	0.90
			Max. Vx	2	-15.56	-0.85	544.91
			Max. Torque	20			-0.16
L11	71.25 - 66.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.45	-0.90	1.95
			Max. Mx	8	-14.10	-620.64	1.00
			Max. My	2	-14.08	-0.95	623.50

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	15.83	-620.64	1.00
			Max. Vx	2	-15.89	-0.95	623.50
			Max. Torque	20			-0.16
L12	66.25 - 61.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.71	-1.03	2.13
			Max. Mx	8	-14.91	-700.56	1.11
			Max. My	2	-14.90	-1.05	703.71
			Max. Vy	8	16.15	-700.56	1.11
			Max. Vx	2	-16.21	-1.05	703.71
			Max. Torque	20			-0.16
L13	61.25 - 61	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.78	-1.04	2.14
			Max. Mx	8	-14.96	-704.60	1.12
			Max. My	2	-14.95	-1.05	707.76
			Max. Vy	20	-16.16	704.12	-0.50
			Max. Vx	2	-16.22	-1.05	707.76
			Max. Torque	20			-0.16
L14	61 - 60.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-37.85	-1.05	2.15
			Max. Mx	8	-15.00	-708.64	1.12
			Max. My	2	-14.99	-1.06	711.82
			Max. Vy	20	-16.18	708.16	-0.51
			Max. Vx	2	-16.24	-1.06	711.82
			Max. Torque	20			-0.16
L15	60.75 - 59	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.34	-1.09	2.21
			Max. Mx	8	-15.27	-737.05	1.16
			Max. My	2	-15.26	-1.09	740.31
			Max. Vy	8	16.30	-737.05	1.16
			Max. Vx	2	-16.36	-1.09	740.31
			Max. Torque	20			-0.16
L16	59 - 58.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-38.42	-1.10	2.22
			Max. Mx	8	-15.34	-741.12	1.16
			Max. My	2	-15.33	-1.10	744.40
			Max. Vy	20	-16.30	740.61	-0.52
			Max. Vx	2	-16.36	-1.10	744.40
			Max. Torque	20			-0.16
L17	58.75 - 53.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-39.90	-1.22	2.40
			Max. Mx	8	-16.17	-823.36	1.27
			Max. My	2	-16.17	-1.20	826.92
			Max. Vy	8	16.61	-823.36	1.27
			Max. Vx	2	-16.66	-1.20	826.92
			Max. Torque	20			-0.16
L18	53.75 - 48.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-41.34	-1.35	2.57
			Max. Mx	8	-17.04	-907.07	1.37
			Max. My	2	-17.04	-1.30	910.89
			Max. Vy	8	16.89	-907.07	1.37
			Max. Vx	2	-16.95	-1.30	910.89
			Max. Torque	20			-0.16
L19	48.75 - 41.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.71	-1.45	2.70
			Max. Mx	8	-17.90	-970.78	1.45
			Max. My	2	-17.89	-1.38	974.80
			Max. Vy	8	17.11	-970.78	1.45
			Max. Vx	2	-17.16	-1.38	974.80
			Max. Torque	20			-0.16
L20	41.25 - 40.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-45.70	-1.57	2.87
			Max. Mx	8	-19.84	-1052.99	1.55
			Max. My	2	-19.84	-1.48	1057.28
			Max. Vy	8	17.52	-1052.99	1.55

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-17.58	-1.48	1057.28
			Max. Torque	20			-0.16
L21	40.25 - 35.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.01	-1.70	3.04
			Max. Mx	8	-21.41	-1141.47	1.66
			Max. My	2	-21.40	-1.58	1146.06
			Max. Vy	8	17.88	-1141.47	1.66
			Max. Vx	2	-17.94	-1.58	1146.06
			Max. Torque	20			-0.16
L22	35.25 - 33	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.90	-1.76	3.12
			Max. Mx	8	-22.01	-1181.87	1.71
			Max. My	2	-22.01	-1.62	1186.60
			Max. Vy	8	18.04	-1181.87	1.71
			Max. Vx	2	-18.10	-1.62	1186.60
			Max. Torque	20			-0.16
L23	33 - 32.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-48.99	-1.77	3.13
			Max. Mx	8	-22.07	-1186.38	1.71
			Max. My	2	-22.06	-1.63	1191.12
			Max. Vy	20	-18.05	1185.54	-0.70
			Max. Vx	2	-18.11	-1.63	1191.12
			Max. Torque	20			-0.16
L24	32.75 - 27.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.68	-1.89	3.30
			Max. Mx	8	-23.10	-1277.19	1.82
			Max. My	2	-23.10	-1.73	1282.23
			Max. Vy	8	18.29	-1277.19	1.82
			Max. Vx	2	-18.35	-1.73	1282.23
			Max. Torque	20			-0.16
L25	27.75 - 22.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.29	-2.02	3.47
			Max. Mx	8	-24.17	-1369.12	1.92
			Max. My	2	-24.16	-1.83	1374.46
			Max. Vy	8	18.51	-1369.12	1.92
			Max. Vx	2	-18.57	-1.83	1374.46
			Max. Torque	20			-0.16
L26	22.75 - 18.5	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.75	-2.13	3.57
			Max. Mx	8	-25.09	-1448.07	2.01
			Max. My	2	-25.08	-1.92	1453.67
			Max. Vy	8	18.67	-1448.07	2.01
			Max. Vx	2	-18.73	-1.92	1453.67
			Max. Torque	20			-0.16
L27	18.5 - 18.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.84	-2.14	3.58
			Max. Mx	8	-25.15	-1452.74	2.02
			Max. My	2	-25.15	-1.93	1458.35
			Max. Vy	20	-18.67	1451.70	-0.80
			Max. Vx	2	-18.73	-1.93	1458.35
			Max. Torque	20			-0.16
L28	18.25 - 13.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-55.52	-2.28	3.69
			Max. Mx	8	-26.24	-1546.50	2.12
			Max. My	2	-26.24	-2.03	1552.40
			Max. Vy	8	18.85	-1546.50	2.12
			Max. Vx	2	-18.91	-2.03	1552.40
			Max. Torque	20			-0.16
L29	13.25 - 8.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-57.16	-2.46	3.77
			Max. Mx	8	-27.36	-1641.07	2.22
			Max. My	2	-27.36	-2.14	1647.25
			Max. Vy	8	19.01	-1641.07	2.22
			Max. Vx	2	-19.06	-2.14	1647.25
			Max. Torque	20			-0.16

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L30	8.25 - 3.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-58.40	-2.49	3.75
			Max. Mx	8	-28.23	-1736.37	2.29
			Max. My	2	-28.22	-2.21	1742.82
			Max. Vy	8	19.15	-1736.37	2.29
			Max. Vx	2	-19.21	-2.21	1742.82
			Max. Torque	20			-0.16
L31	3.25 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-59.14	-2.50	3.73
			Max. Mx	8	-28.79	-1798.70	2.33
			Max. My	2	-28.79	-2.25	1805.33
			Max. Vy	8	19.25	-1798.70	2.33
			Max. Vx	2	-19.31	-2.25	1805.33
			Max. Torque	20			-0.16

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	27	59.14	-0.00	5.30
	Max. H_x	20	28.80	19.23	-0.01
	Max. H_z	2	28.80	-0.01	19.28
	Max. M_x	2	1805.33	-0.01	19.28
	Max. M_z	8	1798.70	-19.23	0.01
	Max. Torsion	8	0.16	-19.23	0.01
	Min. Vert	7	21.60	-16.66	9.65
	Min. H_x	9	21.60	-19.23	0.01
	Min. H_z	14	28.80	0.01	-19.28
	Min. M_x	14	-1803.97	0.01	-19.28
	Min. M_z	20	-1797.51	19.23	-0.01
	Min. Torsion	20	-0.16	19.23	-0.01

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	24.00	0.00	0.00	-0.53	-0.46	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	28.80	0.01	-19.28	-1805.33	-2.25	-0.01
0.9 Dead+1.0 Wind 0 deg - No Ice	21.60	0.01	-19.28	-1769.23	-2.05	-0.01
1.2 Dead+1.0 Wind 30 deg - No Ice	28.80	9.66	-16.76	-1567.06	-902.70	-0.09
0.9 Dead+1.0 Wind 30 deg - No Ice	21.60	9.66	-16.76	-1535.71	-884.60	-0.09
1.2 Dead+1.0 Wind 60 deg - No Ice	28.80	16.66	-9.65	-904.30	-1558.53	-0.14
0.9 Dead+1.0 Wind 60 deg - No Ice	21.60	16.66	-9.65	-886.12	-1527.37	-0.14
1.2 Dead+1.0 Wind 90 deg - No Ice	28.80	19.23	-0.01	-2.33	-1798.70	-0.16
0.9 Dead+1.0 Wind 90 deg - No Ice	21.60	19.23	-0.01	-2.11	-1762.75	-0.16
1.2 Dead+1.0 Wind 120 deg - No Ice	28.80	16.65	9.63	900.24	-1557.17	-0.13
0.9 Dead+1.0 Wind 120 deg - No Ice	21.60	16.65	9.63	882.49	-1526.04	-0.13
1.2 Dead+1.0 Wind 150 deg - No Ice	28.80	9.64	16.75	1564.00	-899.83	-0.07
0.9 Dead+1.0 Wind 150 deg - No Ice	21.60	9.64	16.75	1533.06	-881.79	-0.07
1.2 Dead+1.0 Wind 180 deg - No Ice	28.80	-0.01	19.28	1803.97	1.05	0.01
0.9 Dead+1.0 Wind 180 deg - No Ice	21.60	-0.01	19.28	1768.23	1.17	0.01
1.2 Dead+1.0 Wind 210 deg - No Ice	28.80	-9.66	16.76	1565.69	901.51	0.09
0.9 Dead+1.0 Wind 210 deg - No Ice	21.60	-9.66	16.76	1534.71	883.73	0.09
1.2 Dead+1.0 Wind 240 deg - No Ice	28.80	-16.66	9.65	902.94	1557.34	0.15
0.9 Dead+1.0 Wind 240 deg - No Ice	21.60	-16.66	9.65	885.12	1526.49	0.14
1.2 Dead+1.0 Wind 270 deg - No Ice	28.80	-19.23	0.01	0.96	1797.51	0.16
0.9 Dead+1.0 Wind 270 deg - No Ice	21.60	-19.23	0.01	1.11	1761.88	0.16
1.2 Dead+1.0 Wind 300 deg - No Ice	28.80	-16.65	-9.63	-901.62	1555.98	0.13
0.9 Dead+1.0 Wind 300 deg - No Ice	21.60	-16.65	-9.63	-883.50	1525.16	0.13

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 330 deg - No Ice	28.80	-9.64	-16.75	-1565.37	898.63	0.07
0.9 Dead+1.0 Wind 330 deg - No Ice	21.60	-9.64	-16.75	-1534.06	880.91	0.07
1.2 Dead+1.0 Ice+1.0 Temp	59.14	0.00	-0.00	-3.73	-2.50	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	59.14	0.00	-5.30	-556.36	-2.86	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	59.14	2.65	-4.59	-482.49	-278.40	-0.04
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	59.14	4.58	-2.65	-280.35	-480.02	-0.07
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	59.14	5.29	-0.00	-4.11	-553.70	-0.08
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	59.14	4.58	2.65	272.23	-479.70	-0.07
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	59.14	2.64	4.59	474.60	-277.84	-0.04
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	59.14	-0.00	5.30	548.80	-2.21	-0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	59.14	-2.65	4.59	474.93	273.33	0.04
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	59.14	-4.58	2.65	272.79	474.95	0.07
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	59.14	-5.29	0.00	-3.46	548.63	0.08
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	59.14	-4.58	-2.65	-279.79	474.63	0.07
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	59.14	-2.64	-4.59	-482.17	272.77	0.04
Dead+Wind 0 deg - Service	24.00	0.00	-4.18	-388.37	-0.85	-0.00
Dead+Wind 30 deg - Service	24.00	2.10	-3.64	-337.17	-194.35	-0.02
Dead+Wind 60 deg - Service	24.00	3.61	-2.09	-194.74	-335.27	-0.03
Dead+Wind 90 deg - Service	24.00	4.17	-0.00	-0.92	-386.87	-0.04
Dead+Wind 120 deg - Service	24.00	3.61	2.09	193.03	-334.98	-0.03
Dead+Wind 150 deg - Service	24.00	2.09	3.63	335.66	-193.73	-0.02
Dead+Wind 180 deg - Service	24.00	-0.00	4.18	387.23	-0.14	0.00
Dead+Wind 210 deg - Service	24.00	-2.10	3.64	336.03	193.36	0.02
Dead+Wind 240 deg - Service	24.00	-3.61	2.09	193.61	334.29	0.03
Dead+Wind 270 deg - Service	24.00	-4.17	0.00	-0.21	385.89	0.04
Dead+Wind 300 deg - Service	24.00	-3.61	-2.09	-194.16	333.99	0.03
Dead+Wind 330 deg - Service	24.00	-2.09	-3.63	-336.80	192.74	0.02

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-24.00	0.00	0.00	24.00	0.00	0.000%
2	0.01	-28.80	-19.28	-0.01	28.80	19.28	0.000%
3	0.01	-21.60	-19.28	-0.01	21.60	19.28	0.000%
4	9.66	-28.80	-16.76	-9.66	28.80	16.76	0.000%
5	9.66	-21.60	-16.76	-9.66	21.60	16.76	0.000%
6	16.66	-28.80	-9.65	-16.66	28.80	9.65	0.000%
7	16.66	-21.60	-9.65	-16.66	21.60	9.65	0.000%
8	19.23	-28.80	-0.01	-19.23	28.80	0.01	0.000%
9	19.23	-21.60	-0.01	-19.23	21.60	0.01	0.000%
10	16.65	-28.80	9.63	-16.65	28.80	-9.63	0.000%
11	16.65	-21.60	9.63	-16.65	21.60	-9.63	0.000%
12	9.64	-28.80	16.75	-9.64	28.80	-16.75	0.000%
13	9.64	-21.60	16.75	-9.64	21.60	-16.75	0.000%
14	-0.01	-28.80	19.28	0.01	28.80	-19.28	0.000%
15	-0.01	-21.60	19.28	0.01	21.60	-19.28	0.000%
16	-9.66	-28.80	16.76	9.66	28.80	-16.76	0.000%
17	-9.66	-21.60	16.76	9.66	21.60	-16.76	0.000%
18	-16.66	-28.80	9.65	16.66	28.80	-9.65	0.000%
19	-16.66	-21.60	9.65	16.66	21.60	-9.65	0.000%
20	-19.23	-28.80	0.01	19.23	28.80	-0.01	0.000%
21	-19.23	-21.60	0.01	19.23	21.60	-0.01	0.000%
22	-16.65	-28.80	-9.63	16.65	28.80	9.63	0.000%
23	-16.65	-21.60	-9.63	16.65	21.60	9.63	0.000%
24	-9.64	-28.80	-16.75	9.64	28.80	16.75	0.000%
25	-9.64	-21.60	-16.75	9.64	21.60	16.75	0.000%
26	0.00	-59.14	0.00	-0.00	59.14	0.00	0.000%
27	0.00	-59.14	-5.30	-0.00	59.14	5.30	0.000%
28	2.65	-59.14	-4.59	-2.65	59.14	4.59	0.000%
29	4.58	-59.14	-2.65	-4.58	59.14	2.65	0.000%
30	5.29	-59.14	-0.00	-5.29	59.14	0.00	0.000%
31	4.58	-59.14	2.65	-4.58	59.14	-2.65	0.000%
32	2.64	-59.14	4.59	-2.64	59.14	-4.59	0.000%
33	-0.00	-59.14	5.30	0.00	59.14	-5.30	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
34	-2.65	-59.14	4.59	2.65	59.14	-4.59	0.000%
35	-4.58	-59.14	2.65	4.58	59.14	-2.65	0.000%
36	-5.29	-59.14	0.00	5.29	59.14	-0.00	0.000%
37	-4.58	-59.14	-2.65	4.58	59.14	2.65	0.000%
38	-2.64	-59.14	-4.59	2.64	59.14	4.59	0.000%
39	0.00	-24.00	-4.18	-0.00	24.00	4.18	0.000%
40	2.10	-24.00	-3.64	-2.10	24.00	3.64	0.000%
41	3.61	-24.00	-2.09	-3.61	24.00	2.09	0.000%
42	4.17	-24.00	-0.00	-4.17	24.00	0.00	0.000%
43	3.61	-24.00	2.09	-3.61	24.00	-2.09	0.000%
44	2.09	-24.00	3.63	-2.09	24.00	-3.63	0.000%
45	-0.00	-24.00	4.18	0.00	24.00	-4.18	0.000%
46	-2.10	-24.00	3.64	2.10	24.00	-3.64	0.000%
47	-3.61	-24.00	2.09	3.61	24.00	-2.09	0.000%
48	-4.17	-24.00	0.00	4.17	24.00	-0.00	0.000%
49	-3.61	-24.00	-2.09	3.61	24.00	2.09	0.000%
50	-2.09	-24.00	-3.63	2.09	24.00	3.63	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00085131
3	Yes	5	0.00000001	0.00029812
4	Yes	7	0.00000001	0.00062657
5	Yes	7	0.00000001	0.00013522
6	Yes	7	0.00000001	0.00062898
7	Yes	7	0.00000001	0.00013603
8	Yes	6	0.00000001	0.00009802
9	Yes	5	0.00000001	0.00045967
10	Yes	7	0.00000001	0.00062304
11	Yes	7	0.00000001	0.00013482
12	Yes	7	0.00000001	0.00062683
13	Yes	7	0.00000001	0.00013563
14	Yes	5	0.00000001	0.00082344
15	Yes	5	0.00000001	0.00029049
16	Yes	7	0.00000001	0.00062800
17	Yes	7	0.00000001	0.00013577
18	Yes	7	0.00000001	0.00062385
19	Yes	7	0.00000001	0.00013484
20	Yes	5	0.00000001	0.00088079
21	Yes	5	0.00000001	0.00031936
22	Yes	7	0.00000001	0.00062694
23	Yes	7	0.00000001	0.00013581
24	Yes	7	0.00000001	0.00062482
25	Yes	7	0.00000001	0.00013511
26	Yes	5	0.00000001	0.00027560
27	Yes	8	0.00000001	0.00038393
28	Yes	8	0.00000001	0.00065977
29	Yes	8	0.00000001	0.00066246
30	Yes	8	0.00000001	0.00038162
31	Yes	8	0.00000001	0.00064028
32	Yes	8	0.00000001	0.00064624
33	Yes	8	0.00000001	0.00037747
34	Yes	8	0.00000001	0.00063853
35	Yes	8	0.00000001	0.00063491
36	Yes	8	0.00000001	0.00037823
37	Yes	8	0.00000001	0.00065343
38	Yes	8	0.00000001	0.00064846
39	Yes	5	0.00000001	0.00017364
40	Yes	6	0.00000001	0.00010491
41	Yes	6	0.00000001	0.00010590
42	Yes	5	0.00000001	0.00017615
43	Yes	6	0.00000001	0.00010284

44	Yes	6	0.00000001	0.00010463
45	Yes	5	0.00000001	0.00017301
46	Yes	6	0.00000001	0.00010473
47	Yes	6	0.00000001	0.00010288
48	Yes	5	0.00000001	0.00017474
49	Yes	6	0.00000001	0.00010472
50	Yes	6	0.00000001	0.00010375

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 115	27.067	40	1.8721	0.0010
L2	115 - 110	25.107	40	1.8695	0.0009
L3	110 - 105	23.157	40	1.8551	0.0008
L4	105 - 100	21.228	40	1.8270	0.0007
L5	100 - 95	19.337	40	1.7827	0.0006
L6	95 - 90	17.501	40	1.7226	0.0005
L7	90 - 83	15.736	40	1.6451	0.0005
L8	86.25 - 81.25	14.471	40	1.5773	0.0004
L9	81.25 - 76.25	12.845	40	1.5196	0.0004
L10	76.25 - 71.25	11.299	40	1.4312	0.0003
L11	71.25 - 66.25	9.850	40	1.3362	0.0003
L12	66.25 - 61.25	8.503	40	1.2358	0.0002
L13	61.25 - 61	7.263	40	1.1310	0.0002
L14	61 - 60.75	7.204	40	1.1257	0.0002
L15	60.75 - 59	7.146	40	1.1203	0.0002
L16	59 - 58.75	6.742	40	1.0832	0.0002
L17	58.75 - 53.75	6.685	40	1.0778	0.0002
L18	53.75 - 48.75	5.614	40	0.9682	0.0002
L19	48.75 - 41.25	4.658	40	0.8561	0.0001
L20	45 - 40.25	4.020	40	0.7708	0.0001
L21	40.25 - 35.25	3.271	40	0.7311	0.0001
L22	35.25 - 33	2.536	40	0.6728	0.0001
L23	33 - 32.75	2.225	40	0.6465	0.0001
L24	32.75 - 27.75	2.191	40	0.6416	0.0001
L25	27.75 - 22.75	1.571	40	0.5430	0.0001
L26	22.75 - 18.5	1.054	40	0.4443	0.0001
L27	18.5 - 18.25	0.696	40	0.3606	0.0000
L28	18.25 - 13.25	0.677	40	0.3556	0.0000
L29	13.25 - 8.25	0.356	40	0.2574	0.0000
L30	8.25 - 3.25	0.138	40	0.1597	0.0000
L31	3.25 - 0	0.021	40	0.0627	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	(2) DMP65R-BU4D w/ Mount Pipe	40	26.282	1.8719	0.0009	34677
108.00	(2) LPA-185063/8CFX2 w/ Mount Pipe	40	22.382	1.8456	0.0007	10671
99.00	APXVAARR24_43-U-NA20	40	18.965	1.7718	0.0006	5227

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 115	125.603	2	8.7141	0.0046
L2	115 - 110	116.520	2	8.7022	0.0042
L3	110 - 105	107.477	2	8.6351	0.0037
L4	105 - 100	98.534	2	8.5044	0.0033
L5	100 - 95	89.767	2	8.2982	0.0028
L6	95 - 90	81.250	2	8.0191	0.0024
L7	90 - 83	73.065	2	7.6585	0.0021
L8	86.25 - 81.25	67.192	2	7.3428	0.0019
L9	81.25 - 76.25	59.652	4	7.0745	0.0017
L10	76.25 - 71.25	52.486	4	6.6629	0.0015
L11	71.25 - 66.25	45.763	4	6.2204	0.0013
L12	66.25 - 61.25	39.512	4	5.7526	0.0011
L13	61.25 - 61	33.757	4	5.2645	0.0010
L14	61 - 60.75	33.483	4	5.2397	0.0010
L15	60.75 - 59	33.210	4	5.2148	0.0010
L16	59 - 58.75	31.335	4	5.0420	0.0009
L17	58.75 - 53.75	31.072	4	5.0168	0.0009
L18	53.75 - 48.75	26.095	4	4.5059	0.0008
L19	48.75 - 41.25	21.656	4	3.9839	0.0006
L20	45 - 40.25	18.686	4	3.5869	0.0005
L21	40.25 - 35.25	15.206	4	3.4016	0.0005
L22	35.25 - 33	11.789	4	3.1303	0.0004
L23	33 - 32.75	10.344	4	3.0078	0.0004
L24	32.75 - 27.75	10.187	4	2.9849	0.0004
L25	27.75 - 22.75	7.304	4	2.5259	0.0003
L26	22.75 - 18.5	4.900	4	2.0666	0.0003
L27	18.5 - 18.25	3.235	4	1.6767	0.0002
L28	18.25 - 13.25	3.148	4	1.6539	0.0002
L29	13.25 - 8.25	1.655	4	1.1969	0.0001
L30	8.25 - 3.25	0.640	4	0.7425	0.0001
L31	3.25 - 0	0.099	4	0.2913	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.00	(2) DMP65R-BU4D w/ Mount Pipe	2	121.968	8.7132	0.0045	7800
108.00	(2) LPA-185063/8CFX2 w/ Mount Pipe	2	103.884	8.5910	0.0035	2393
99.00	APXVAARR24_43-U-NA20	2	88.041	8.2479	0.0028	1169

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	120 - 115 (1)	TP19.7503x19x0.1875	5.00	0.00	0.0	11.6423	-3.40	681.07	0.005
L2	115 - 110 (2)	TP20.5005x19.7503x0.1875	5.00	0.00	0.0	12.0888	-3.70	707.20	0.005
L3	110 - 105 (3)	TP21.2508x20.5005x0.1875	5.00	0.00	0.0	12.5353	-5.68	733.32	0.008
L4	105 - 100 (4)	TP22.0011x21.2508x0.18	5.00	0.00	0.0	12.981	-6.13	759.44	0.008

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L5	100 - 95 (5)	TP22.7514x22.0011x0.1875	5.00	0.00	0.0	13.4288	-9.84	785.56	0.013
L6	95 - 90 (6)	TP23.5016x22.7514x0.1875	5.00	0.00	0.0	13.8743	-10.44	811.68	0.013
L7	90 - 83 (7)	TP24.552x23.5016x0.1875	7.00	0.00	0.0	14.2097	-10.90	831.27	0.013
L8	83 - 81.25 (8)	TP24.4395x23.6893x0.25	5.00	0.00	0.0	19.1944	-11.77	1122.87	0.010
L9	81.25 - 76.25 (9)	TP25.1897x24.4395x0.25	5.00	0.00	0.0	19.7896	-12.52	1157.69	0.011
L10	76.25 - 71.25 (10)	TP25.9399x25.1897x0.25	5.00	0.00	0.0	20.3849	-13.29	1192.52	0.011
L11	71.25 - 66.25 (11)	TP26.6901x25.9399x0.25	5.00	0.00	0.0	20.9802	-14.08	1227.34	0.011
L12	66.25 - 61.25 (12)	TP27.4403x26.6901x0.25	5.00	0.00	0.0	21.5755	-14.90	1262.16	0.012
L13	61.25 - 61 (13)	TP27.4778x27.4403x0.25	0.25	0.00	0.0	21.6052	-14.95	1263.91	0.012
L14	61 - 60.75 (14)	TP27.5153x27.4778x0.25	0.25	0.00	0.0	21.6350	-14.99	1265.65	0.012
L15	60.75 - 59 (15)	TP27.7778x27.5153x0.25	1.75	0.00	0.0	21.8433	-15.26	1277.84	0.012
L16	59 - 58.75 (16)	TP27.8153x27.7778x0.25	0.25	0.00	0.0	21.8731	-15.32	1279.58	0.012
L17	58.75 - 53.75 (17)	TP28.5655x27.8153x0.25	5.00	0.00	0.0	22.4684	-16.16	1314.40	0.012
L18	53.75 - 48.75 (18)	TP29.3157x28.5655x0.25	5.00	0.00	0.0	23.0637	-17.03	1349.22	0.013
L19	48.75 - 41.25 (19)	TP30.441x29.3157x0.25	7.50	0.00	0.0	23.5101	-17.89	1375.34	0.013
L20	41.25 - 40.25 (20)	TP30.091x29.3784x0.55	4.75	0.00	0.0	51.5698	-19.83	3016.83	0.007
L21	40.25 - 35.25 (21)	TP30.8412x30.091x0.5375	5.00	0.00	0.0	51.6989	-21.40	3024.39	0.007
L22	35.25 - 33 (22)	TP31.1788x30.8412x0.5375	2.25	0.00	0.0	52.2748	-22.00	3058.08	0.007
L23	33 - 32.75 (23)	TP31.2163x31.1788x0.3125	0.25	0.00	0.0	30.6527	-22.06	1793.18	0.012
L24	32.75 - 27.75 (24)	TP31.9665x31.2163x0.3125	5.00	0.00	0.0	31.3968	-23.09	1836.71	0.013
L25	27.75 - 22.75 (25)	TP32.7167x31.9665x0.3125	5.00	0.00	0.0	32.1409	-24.16	1880.24	0.013
L26	22.75 - 18.5 (26)	TP33.3543x32.7167x0.3125	4.25	0.00	0.0	32.7734	-25.08	1917.24	0.013
L27	18.5 - 18.25 (27)	TP33.3918x33.3543x0.3125	0.25	0.00	0.0	32.8106	-25.15	1919.42	0.013
L28	18.25 - 13.25 (28)	TP34.142x33.3918x0.3125	5.00	0.00	0.0	33.5547	-26.24	1962.95	0.013
L29	13.25 - 8.25 (29)	TP34.8922x34.142x0.3125	5.00	0.00	0.0	34.2987	-27.35	2006.48	0.014
L30	8.25 - 3.25 (30)	TP35.6424x34.8922x0.3125	5.00	0.00	0.0	35.0428	-28.22	2050.01	0.014
L31	3.25 - 0 (31)	TP36.13x35.6424x0.3125	3.25	0.00	0.0	35.5265	-28.79	2078.30	0.014

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	120 - 115 (1)	TP19.7503x19x0.1875	15.24	339.28	0.045	0.00	339.28	0.000
L2	115 - 110 (2)	TP20.5005x19.7503x0.1875	41.79	362.17	0.115	0.00	362.17	0.000
L3	110 - 105 (3)	TP21.2508x20.5005x0.18	84.56	385.51	0.219	0.00	385.51	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L4	105 - 100 (4)	TP22.0011x21.2508x0.1875	131.22	409.25	0.321	0.00	409.25	0.000
L5	100 - 95 (5)	TP22.7514x22.0011x0.1875	195.58	433.36	0.451	0.00	433.36	0.000
L6	95 - 90 (6)	TP23.5016x22.7514x0.1875	265.70	457.83	0.580	0.00	457.83	0.000
L7	90 - 83 (7)	TP24.552x23.5016x0.1875	319.44	476.38	0.671	0.00	476.38	0.000
L8	83 - 81.25 (8)	TP24.4395x23.6893x0.25	392.80	704.59	0.557	0.00	704.59	0.000
L9	81.25 - 76.25 (9)	TP25.1897x24.4395x0.25	468.01	743.54	0.629	0.00	743.54	0.000
L10	76.25 - 71.25 (10)	TP25.9399x25.1897x0.25	544.94	783.16	0.696	0.00	783.16	0.000
L11	71.25 - 66.25 (11)	TP26.6901x25.9399x0.25	623.54	823.43	0.757	0.00	823.43	0.000
L12	66.25 - 61.25 (12)	TP27.4403x26.6901x0.25	703.75	864.31	0.814	0.00	864.31	0.000
L13	61.25 - 61 (13)	TP27.4778x27.4403x0.25	707.81	866.37	0.817	0.00	866.37	0.000
L14	61 - 60.75 (14)	TP27.5153x27.4778x0.25	711.86	868.43	0.820	0.00	868.43	0.000
L15	60.75 - 59 (15)	TP27.7778x27.5153x0.25	740.37	882.90	0.839	0.00	882.90	0.000
L16	59 - 58.75 (16)	TP27.8153x27.7778x0.25	744.46	884.97	0.841	0.00	884.97	0.000
L17	58.75 - 53.75 (17)	TP28.5655x27.8153x0.25	827.09	926.71	0.893	0.00	926.71	0.000
L18	53.75 - 48.75 (18)	TP29.3157x28.5655x0.25	911.23	968.98	0.940	0.00	968.98	0.000
L19	48.75 - 41.25 (19)	TP30.441x29.3157x0.25	975.27	1001.03	0.974	0.00	1001.03	0.000
L20	41.25 - 40.25 (20)	TP30.091x29.3784x0.55	1057.93	2302.82	0.459	0.00	2302.82	0.000
L21	40.25 - 35.25 (21)	TP30.8412x30.091x0.5375	1146.94	2370.25	0.484	0.00	2370.25	0.000
L22	35.25 - 33 (22)	TP31.1788x30.8412x0.5375	1187.59	2423.82	0.490	0.00	2423.82	0.000
L23	33 - 32.75 (23)	TP31.2163x31.1788x0.3125	1192.13	1430.12	0.834	0.00	1430.12	0.000
L24	32.75 - 27.75 (24)	TP31.9665x31.2163x0.3125	1283.53	1491.63	0.860	0.00	1491.63	0.000
L25	27.75 - 22.75 (25)	TP32.7167x31.9665x0.3125	1376.08	1553.96	0.886	0.00	1553.96	0.000
L26	22.75 - 18.5 (26)	TP33.3543x32.7167x0.3125	1455.57	1607.57	0.905	0.00	1607.57	0.000
L27	18.5 - 18.25 (27)	TP33.3918x33.3543x0.3125	1460.26	1610.73	0.907	0.00	1610.73	0.000
L28	18.25 - 13.25 (28)	TP34.142x33.3918x0.3125	1554.65	1674.55	0.928	0.00	1674.55	0.000
L29	13.25 - 8.25 (29)	TP34.8922x34.142x0.3125	1649.84	1739.09	0.949	0.00	1739.09	0.000
L30	8.25 - 3.25 (30)	TP35.6424x34.8922x0.3125	1745.74	1804.33	0.968	0.00	1804.33	0.000
L31	3.25 - 0 (31)	TP36.13x35.6424x0.3125	1808.47	1847.11	0.979	0.00	1847.11	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	120 - 115 (1)	TP19.7503x19x0.1875	5.13	204.32	0.025	0.01	350.05	0.000
L2	115 - 110 (2)	TP20.5005x19.7503x0.1875	5.49	212.16	0.026	0.01	377.41	0.000
L3	110 - 105 (3)	TP21.2508x20.5005x0.1875	9.14	220.00	0.042	0.01	405.81	0.000

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L4	105 - 100 (4)	TP22.0011x21.2508x0.1875	9.52	227.83	0.042	0.01	435.23	0.000
L5	100 - 95 (5)	TP22.7514x22.0011x0.1875	13.85	235.67	0.059	0.09	465.68	0.000
L6	95 - 90 (6)	TP23.5016x22.7514x0.1875	14.20	243.50	0.058	0.09	497.17	0.000
L7	90 - 83 (7)	TP24.552x23.5016x0.1875	14.46	249.38	0.058	0.09	521.46	0.000
L8	83 - 81.25 (8)	TP24.4395x23.6893x0.25	14.87	336.86	0.044	0.09	713.61	0.000
L9	81.25 - 76.25 (9)	TP25.1897x24.4395x0.25	15.22	347.31	0.044	0.09	758.55	0.000
L10	76.25 - 71.25 (10)	TP25.9399x25.1897x0.25	15.56	357.76	0.043	0.09	804.88	0.000
L11	71.25 - 66.25 (11)	TP26.6901x25.9399x0.25	15.89	368.20	0.043	0.09	852.57	0.000
L12	66.25 - 61.25 (12)	TP27.4403x26.6901x0.25	16.21	378.65	0.043	0.09	901.63	0.000
L13	61.25 - 61 (13)	TP27.4778x27.4403x0.25	16.22	379.17	0.043	0.09	904.13	0.000
L14	61 - 60.75 (14)	TP27.5153x27.4778x0.25	16.23	379.69	0.043	0.09	906.62	0.000
L15	60.75 - 59 (15)	TP27.7778x27.5153x0.25	16.36	383.35	0.043	0.09	924.16	0.000
L16	59 - 58.75 (16)	TP27.8153x27.7778x0.25	16.37	383.87	0.043	0.09	926.68	0.000
L17	58.75 - 53.75 (17)	TP28.5655x27.8153x0.25	16.69	394.32	0.042	0.09	977.81	0.000
L18	53.75 - 48.75 (18)	TP29.3157x28.5655x0.25	16.98	404.77	0.042	0.09	1030.31	0.000
L19	48.75 - 41.25 (19)	TP30.441x29.3157x0.25	17.20	412.60	0.042	0.09	1070.58	0.000
L20	41.25 - 40.25 (20)	TP30.091x29.3784x0.55	17.61	905.05	0.019	0.09	2341.42	0.000
L21	40.25 - 35.25 (21)	TP30.8412x30.091x0.5375	17.99	907.32	0.020	0.09	2407.88	0.000
L22	35.25 - 33 (22)	TP31.1788x30.8412x0.5375	18.15	917.42	0.020	0.09	2461.82	0.000
L23	33 - 32.75 (23)	TP31.2163x31.1788x0.3125	18.15	537.96	0.034	0.09	1455.93	0.000
L24	32.75 - 27.75 (24)	TP31.9665x31.2163x0.3125	18.41	551.01	0.033	0.09	1527.47	0.000
L25	27.75 - 22.75 (25)	TP32.7167x31.9665x0.3125	18.63	564.07	0.033	0.09	1600.72	0.000
L26	22.75 - 18.5 (26)	TP33.3543x32.7167x0.3125	18.80	575.17	0.033	0.09	1664.34	0.000
L27	18.5 - 18.25 (27)	TP33.3918x33.3543x0.3125	18.79	575.83	0.033	0.09	1668.13	0.000
L28	18.25 - 13.25 (28)	TP34.142x33.3918x0.3125	18.97	588.88	0.032	0.09	1744.64	0.000
L29	13.25 - 8.25 (29)	TP34.8922x34.142x0.3125	19.13	601.94	0.032	0.09	1822.88	0.000
L30	8.25 - 3.25 (30)	TP35.6424x34.8922x0.3125	19.27	615.00	0.031	0.09	1902.83	0.000
L31	3.25 - 0 (31)	TP36.13x35.6424x0.3125	19.37	623.49	0.031	0.09	1955.71	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 115 (1)	0.005	0.045	0.000	0.025	0.000	0.051	1.050	4.8.2
L2	115 - 110 (2)	0.005	0.115	0.000	0.026	0.000	0.121	1.050	4.8.2

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	110 - 105 (3)	0.008	0.219	0.000	0.042	0.000	0.229	1.050	4.8.2
L4	105 - 100 (4)	0.008	0.321	0.000	0.042	0.000	0.330	1.050	4.8.2
L5	100 - 95 (5)	0.013	0.451	0.000	0.059	0.000	0.467	1.050	4.8.2
L6	95 - 90 (6)	0.013	0.580	0.000	0.058	0.000	0.597	1.050	4.8.2
L7	90 - 83 (7)	0.013	0.671	0.000	0.058	0.000	0.687	1.050	4.8.2
L8	83 - 81.25 (8)	0.010	0.557	0.000	0.044	0.000	0.570	1.050	4.8.2
L9	81.25 - 76.25 (9)	0.011	0.629	0.000	0.044	0.000	0.642	1.050	4.8.2
L10	76.25 - 71.25 (10)	0.011	0.696	0.000	0.043	0.000	0.709	1.050	4.8.2
L11	71.25 - 66.25 (11)	0.011	0.757	0.000	0.043	0.000	0.771	1.050	4.8.2
L12	66.25 - 61.25 (12)	0.012	0.814	0.000	0.043	0.000	0.828	1.050	4.8.2
L13	61.25 - 61 (13)	0.012	0.817	0.000	0.043	0.000	0.831	1.050	4.8.2
L14	61 - 60.75 (14)	0.012	0.820	0.000	0.043	0.000	0.833	1.050	4.8.2
L15	60.75 - 59 (15)	0.012	0.839	0.000	0.043	0.000	0.852	1.050	4.8.2
L16	59 - 58.75 (16)	0.012	0.841	0.000	0.043	0.000	0.855	1.050	4.8.2
L17	58.75 - 53.75 (17)	0.012	0.893	0.000	0.042	0.000	0.907	1.050	4.8.2
L18	53.75 - 48.75 (18)	0.013	0.940	0.000	0.042	0.000	0.955	1.050	4.8.2
L19	48.75 - 41.25 (19)	0.013	0.974	0.000	0.042	0.000	0.989	1.050	4.8.2
L20	41.25 - 40.25 (20)	0.007	0.459	0.000	0.019	0.000	0.466	1.050	4.8.2
L21	40.25 - 35.25 (21)	0.007	0.484	0.000	0.020	0.000	0.491	1.050	4.8.2
L22	35.25 - 33 (22)	0.007	0.490	0.000	0.020	0.000	0.498	1.050	4.8.2
L23	33 - 32.75 (23)	0.012	0.834	0.000	0.034	0.000	0.847	1.050	4.8.2
L24	32.75 - 27.75 (24)	0.013	0.860	0.000	0.033	0.000	0.874	1.050	4.8.2
L25	27.75 - 22.75 (25)	0.013	0.886	0.000	0.033	0.000	0.899	1.050	4.8.2
L26	22.75 - 18.5 (26)	0.013	0.905	0.000	0.033	0.000	0.920	1.050	4.8.2
L27	18.5 - 18.25 (27)	0.013	0.907	0.000	0.033	0.000	0.921	1.050	4.8.2
L28	18.25 - 13.25 (28)	0.013	0.928	0.000	0.032	0.000	0.943	1.050	4.8.2
L29	13.25 - 8.25 (29)	0.014	0.949	0.000	0.032	0.000	0.963	1.050	4.8.2
L30	8.25 - 3.25 (30)	0.014	0.968	0.000	0.031	0.000	0.982	1.050	4.8.2
L31	3.25 - 0 (31)	0.014	0.979	0.000	0.031	0.000	0.994	1.050	4.8.2

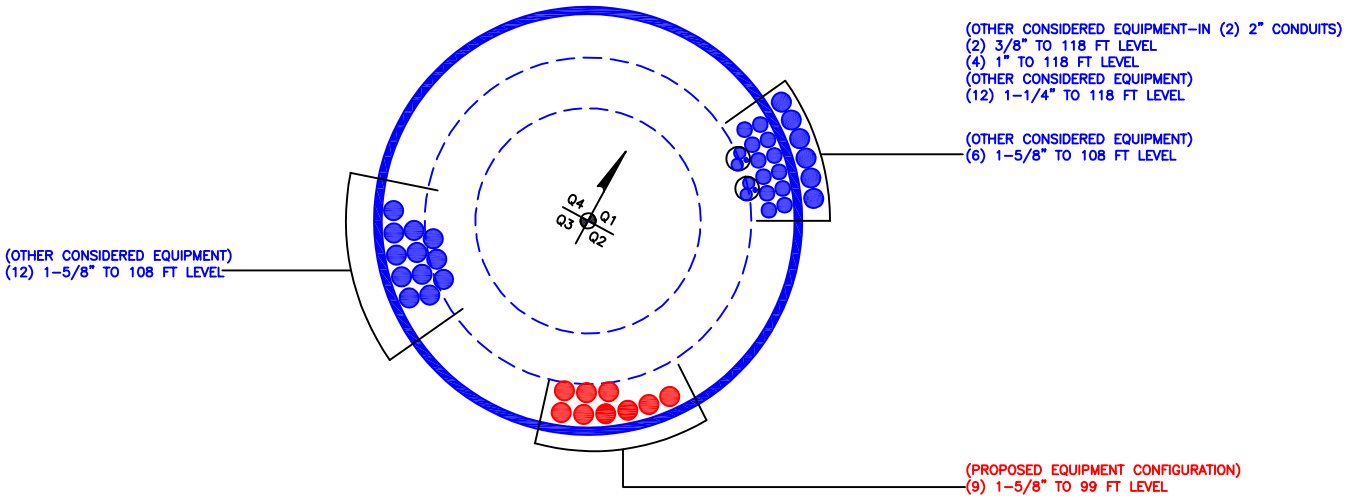
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 115	Pole	TP19.7503x19x0.1875	1	-3.40	715.13	4.8	Pass
L2	115 - 110	Pole	TP20.5005x19.7503x0.1875	2	-3.70	742.55	11.5	Pass
L3	110 - 105	Pole	TP21.2508x20.5005x0.1875	3	-5.68	769.98	21.8	Pass
L4	105 - 100	Pole	TP22.0011x21.2508x0.1875	4	-6.13	797.41	31.5	Pass
L5	100 - 95	Pole	TP22.7514x22.0011x0.1875	5	-9.84	824.83	44.5	Pass
L6	95 - 90	Pole	TP23.5016x22.7514x0.1875	6	-10.44	852.26	56.8	Pass
L7	90 - 83	Pole	TP24.552x23.5016x0.1875	7	-10.90	872.83	65.4	Pass
L8	83 - 81.25	Pole	TP24.4395x23.6893x0.25	8	-11.77	1179.01	54.3	Pass
L9	81.25 - 76.25	Pole	TP25.1897x24.4395x0.25	9	-12.52	1215.57	61.2	Pass
L10	76.25 - 71.25	Pole	TP25.9399x25.1897x0.25	10	-13.29	1252.15	67.5	Pass
L11	71.25 - 66.25	Pole	TP26.6901x25.9399x0.25	11	-14.08	1288.71	73.4	Pass
L12	66.25 - 61.25	Pole	TP27.4403x26.6901x0.25	12	-14.90	1325.27	78.8	Pass
L13	61.25 - 61	Pole	TP27.4778x27.4403x0.25	13	-14.95	1327.11	79.1	Pass
L14	61 - 60.75	Pole	TP27.5153x27.4778x0.25	14	-14.99	1328.93	79.4	Pass
L15	60.75 - 59	Pole	TP27.7778x27.5153x0.25	15	-15.26	1341.73	81.2	Pass
L16	59 - 58.75	Pole	TP27.8153x27.7778x0.25	16	-15.32	1343.56	81.4	Pass
L17	58.75 - 53.75	Pole	TP28.5655x27.8153x0.25	17	-16.16	1380.12	86.3	Pass
L18	53.75 - 48.75	Pole	TP29.3157x28.5655x0.25	18	-17.03	1416.68	90.9	Pass
L19	48.75 - 41.25	Pole	TP30.441x29.3157x0.25	19	-17.89	1444.11	94.2	Pass
L20	41.25 - 40.25	Pole	TP30.091x29.3784x0.55	20	-19.83	3167.67	44.4	Pass
L21	40.25 - 35.25	Pole	TP30.8412x30.091x0.5375	21	-21.40	3175.61	46.8	Pass
L22	35.25 - 33	Pole	TP31.1788x30.8412x0.5375	22	-22.00	3210.98	47.4	Pass
L23	33 - 32.75	Pole	TP31.2163x31.1788x0.3125	23	-22.06	1882.84	80.7	Pass
L24	32.75 - 27.75	Pole	TP31.9665x31.2163x0.3125	24	-23.09	1928.55	83.3	Pass
L25	27.75 - 22.75	Pole	TP32.7167x31.9665x0.3125	25	-24.16	1974.25	85.7	Pass
L26	22.75 - 18.5	Pole	TP33.3543x32.7167x0.3125	26	-25.08	2013.10	87.6	Pass
L27	18.5 - 18.25	Pole	TP33.3918x33.3543x0.3125	27	-25.15	2015.39	87.7	Pass
L28	18.25 - 13.25	Pole	TP34.142x33.3918x0.3125	28	-26.24	2061.10	89.8	Pass
L29	13.25 - 8.25	Pole	TP34.8922x34.142x0.3125	29	-27.35	2106.80	91.7	Pass
L30	8.25 - 3.25	Pole	TP35.6424x34.8922x0.3125	30	-28.22	2152.51	93.6	Pass
L31	3.25 - 0	Pole	TP36.13x35.6424x0.3125	31	-28.79	2182.21	94.7	Pass
							Summary	
						Pole (L31)	94.7	Pass
						RATING =	**94.7**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 842858 TOWER ID: C_BASELEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 842858

Work Order: 1916604

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	120	37	3.25	18	19	24.552	0.1875	Auto	A607-65
2	86.25	45	3.75	18	23.69	30.441	0.25	Auto	A607-65
3	45	45	0	18	29.38	36.13	0.3125	Auto	A607-65

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	18.5	plate	PL5x1 (Btm Welded)	4																		
2	18.5	33	plate	PL5x1	3																		
3	41.33	59	plate	PL4.5x1	3																		
4	33	41.33	plate	PL5x1.25	3																		
5	59	61	plate	PL4x1.25	3																		
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	5	1	5	0.5	Welded	n/a	PC 8.8 - M20 (120)	21.000	18.000	3.750	1.1875	A572-65
2	5	1	5	0.5	PC 8.8 - M20 (120)	21	PC 8.8 - M20 (120)	21.000	18.000	3.750	1.1875	A572-65
3	4.5	1	4.5	0.5	PC 8.8 - M20 (120)	18	PC 8.8 - M20 (120)	18.000	18.000	3.250	1.1875	A572-65
4	5	1.25	6.25	0.625	PC 8.8 - M20 (120)	27	PC 8.8 - M20 (120)	27.000	15.000	4.687	1.1876	A572-65
5	4	1.25	5	0.625	PC 8.8 - M20 (120)	18	PC 8.8 - M20 (120)	18.000	13.500	3.438	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
PL5x1 (Btm Welded)	Top	7	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	Fillet	5	-	-	0.3125	18	0.313	-
PL5x1	Top	7	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	7	N	3	3	-	-	-	-	-	-	-	-	-
PL4.5x1	Top	6	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	6	N	3	3	-	-	-	-	-	-	-	-	-
PL5x1.25	Top	9	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	9	N	3	3	-	-	-	-	-	-	-	-	-
PL4x1.25	Top	6	N	3	3	-	-	-	-	-	-	-	-	-
	Bottom	6	N	3	3	-	-	-	-	-	-	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	120 - 115	5		18	19.000	19.750	0.1875	A607-65	1.000
2	115 - 110	5		18	19.750	20.501	0.1875	A607-65	1.000
3	110 - 105	5		18	20.501	21.251	0.1875	A607-65	1.000
4	105 - 100	5		18	21.251	22.001	0.1875	A607-65	1.000
5	100 - 95	5		18	22.001	22.751	0.1875	A607-65	1.000
6	95 - 90	5		18	22.751	23.502	0.1875	A607-65	1.000
7	90 - 86.25	7	3.25	18	23.502	24.552	0.1875	A607-65	1.000
8	86.25 - 81.25	5		18	23.689	24.440	0.25	A607-65	1.000
9	81.25 - 76.25	5		18	24.440	25.190	0.25	A607-65	1.000
10	76.25 - 71.25	5		18	25.190	25.940	0.25	A607-65	1.000
11	71.25 - 66.25	5		18	25.940	26.690	0.25	A607-65	1.000
12	66.25 - 61.25	5		18	26.690	27.440	0.25	A607-65	1.000
13	61.25 - 61	0.25		18	27.440	27.478	0.25	A607-65	1.000
14	61 - 60.75	0.25		18	27.478	27.515	0.25	A607-65	1.000
15	60.75 - 59	1.75		18	27.515	27.778	0.25	A607-65	1.000
16	59 - 58.75	0.25		18	27.778	27.815	0.25	A607-65	1.000
17	58.75 - 53.75	5		18	27.815	28.566	0.25	A607-65	1.000
18	53.75 - 48.75	5		18	28.566	29.316	0.25	A607-65	1.000
19	48.75 - 45	7.5	3.75	18	29.316	30.441	0.25	A607-65	1.000
20	45 - 40.25	4.75		18	29.378	30.091	0.55	A607-65	0.936
21	40.25 - 35.25	5		18	30.091	30.841	0.5375	A607-65	0.948
22	35.25 - 33	2.25		18	30.841	31.179	0.5375	A607-65	0.944
23	33 - 32.75	0.25		18	31.179	31.216	0.3125	A607-65	1.000
24	32.75 - 27.75	5		18	31.216	31.966	0.3125	A607-65	1.000
25	27.75 - 22.75	5		18	31.966	32.717	0.3125	A607-65	1.000
26	22.75 - 18.5	4.25		18	32.717	33.354	0.3125	A607-65	1.000
27	18.5 - 18.25	0.25		18	33.354	33.392	0.3125	A607-65	1.000
28	18.25 - 13.25	5		18	33.392	34.142	0.3125	A607-65	1.000
29	13.25 - 8.25	5		18	34.142	34.892	0.3125	A607-65	1.000
30	8.25 - 3.25	5		18	34.892	35.642	0.3125	A607-65	1.000
31	3.25 - 0	3.25		18	35.642	36.130	0.3125	A607-65	1.000

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	120 - 115	3.40	15.24	5.13
2	115 - 110	3.70	41.79	5.49
3	110 - 105	5.68	84.56	9.14
4	105 - 100	6.13	131.23	9.52
5	100 - 95	9.84	195.58	13.85
6	95 - 90	10.44	265.70	14.20
7	90 - 86.25	10.90	319.44	14.46
8	86.25 - 81.25	11.77	392.80	14.87
9	81.25 - 76.25	12.52	468.01	15.22
10	76.25 - 71.25	13.29	544.94	15.56
11	71.25 - 66.25	14.08	623.54	15.89
12	66.25 - 61.25	14.90	703.75	16.21
13	61.25 - 61	14.95	707.81	16.22
14	61 - 60.75	14.99	711.86	16.24
15	60.75 - 59	15.26	740.37	16.36
16	59 - 58.75	15.32	744.46	16.37
17	58.75 - 53.75	16.16	827.09	16.69
18	53.75 - 48.75	17.03	911.23	16.98
19	48.75 - 45	17.89	975.28	17.20
20	45 - 40.25	19.83	1057.94	17.61
21	40.25 - 35.25	21.40	1146.94	17.99
22	35.25 - 33	22.00	1187.59	18.15
23	33 - 32.75	22.06	1192.13	18.15
24	32.75 - 27.75	23.09	1283.53	18.41
25	27.75 - 22.75	24.16	1376.08	18.63
26	22.75 - 18.5	25.08	1455.56	18.80
27	18.5 - 18.25	25.15	1460.26	18.79
28	18.25 - 13.25	26.24	1554.65	18.97
29	13.25 - 8.25	27.35	1649.84	19.13
30	8.25 - 3.25	28.22	1745.74	19.27
31	3.25 - 0	28.79	1808.46	19.37

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
120 - 115	Pole	TP19.75x19x0.1875	Pole	4.7%	Pass
115 - 110	Pole	TP20.501x19.75x0.1875	Pole	11.4%	Pass
110 - 105	Pole	TP21.251x20.501x0.1875	Pole	21.5%	Pass
105 - 100	Pole	TP22.001x21.251x0.1875	Pole	31.2%	Pass
100 - 95	Pole	TP22.751x22.001x0.1875	Pole	44.1%	Pass
95 - 90	Pole	TP23.502x22.751x0.1875	Pole	56.4%	Pass
90 - 86.25	Pole	TP24.552x23.502x0.1875	Pole	65.0%	Pass
86.25 - 81.25	Pole	TP24.44x23.689x0.25	Pole	53.9%	Pass
81.25 - 76.25	Pole	TP25.19x24.44x0.25	Pole	60.8%	Pass
76.25 - 71.25	Pole	TP25.94x25.19x0.25	Pole	67.2%	Pass
71.25 - 66.25	Pole	TP26.69x25.94x0.25	Pole	73.0%	Pass
66.25 - 61.25	Pole	TP27.44x26.69x0.25	Pole	78.5%	Pass
61.25 - 61	Pole	TP27.478x27.44x0.25	Pole	78.8%	Pass
61 - 60.75	Pole	TP27.515x27.478x0.25	Pole	79.0%	Pass
60.75 - 59	Pole	TP27.778x27.515x0.25	Pole	80.8%	Pass
59 - 58.75	Pole	TP27.815x27.778x0.25	Pole	81.1%	Pass
58.75 - 53.75	Pole	TP28.566x27.815x0.25	Pole	86.0%	Pass
53.75 - 48.75	Pole	TP29.316x28.566x0.25	Pole	90.6%	Pass
48.75 - 45	Pole	TP30.441x29.316x0.25	Pole	93.9%	Pass
45 - 40.25	Pole + Reinf.	TP30.091x29.378x0.55	Reinf. 4 Tension Rupture	75.4%	Pass
40.25 - 35.25	Pole + Reinf.	TP30.841x30.091x0.5375	Reinf. 4 Tension Rupture	78.6%	Pass
35.25 - 33	Pole + Reinf.	TP31.179x30.841x0.5375	Reinf. 4 Tension Rupture	79.9%	Pass
33 - 32.75	Pole	TP31.216x31.179x0.3125	Pole	80.3%	Pass
32.75 - 27.75	Pole	TP31.966x31.216x0.3125	Pole	82.9%	Pass
27.75 - 22.75	Pole	TP32.717x31.966x0.3125	Pole	85.3%	Pass
22.75 - 18.5	Pole	TP33.354x32.717x0.3125	Pole	87.3%	Pass
18.5 - 18.25	Pole	TP33.392x33.354x0.3125	Pole	87.4%	Pass
18.25 - 13.25	Pole	TP34.142x33.392x0.3125	Pole	89.5%	Pass
13.25 - 8.25	Pole	TP34.892x34.142x0.3125	Pole	91.4%	Pass
8.25 - 3.25	Pole	TP35.642x34.892x0.3125	Pole	93.3%	Pass
3.25 - 0	Pole	TP36.13x35.642x0.3125	Pole	94.4%	Pass
				Summary	
			Pole	94.4%	Pass
			Reinforcement	79.9%	Pass
			Overall	94.4%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
120 - 115	563	n/a	563	11.64	n/a	11.64	4.7%					
115 - 110	630	n/a	630	12.09	n/a	12.09	11.4%					
110 - 105	702	n/a	702	12.53	n/a	12.53	21.5%					
105 - 100	780	n/a	780	12.98	n/a	12.98	31.2%					
100 - 95	863	n/a	863	13.43	n/a	13.43	44.1%					
95 - 90	952	n/a	952	13.87	n/a	13.87	56.4%					
90 - 86.25	1023	n/a	1023	14.21	n/a	14.21	65.0%					
86.25 - 81.25	1418	n/a	1418	19.19	n/a	19.19	53.9%					
81.25 - 76.25	1555	n/a	1555	19.79	n/a	19.79	60.8%					
76.25 - 71.25	1699	n/a	1699	20.38	n/a	20.38	67.2%					
71.25 - 66.25	1852	n/a	1852	20.98	n/a	20.98	73.0%					
66.25 - 61.25	2015	n/a	2015	21.57	n/a	21.57	78.5%					
61.25 - 61	2023	n/a	2023	21.60	n/a	21.60	78.8%					
61 - 60.75	2031	n/a	2031	21.63	n/a	21.63	79.0%					
60.75 - 59	2090	n/a	2090	21.84	n/a	21.84	80.8%					
59 - 58.75	2099	n/a	2099	21.87	n/a	21.87	81.1%					
58.75 - 53.75	2275	n/a	2275	22.47	n/a	22.47	86.0%					
53.75 - 48.75	2461	n/a	2461	23.06	n/a	23.06	90.6%					
48.75 - 45	2606	n/a	2606	23.51	n/a	23.51	93.9%					
45 - 40.25	3308	2323	5631	29.54	18.75	48.29	44.1%				75.4%	
40.25 - 35.25	3564	2434	5999	30.28	18.75	49.03	46.3%				78.6%	
35.25 - 33	3684	2486	6169	30.61	18.75	49.36	47.3%				79.9%	
33 - 32.75	3697	n/a	3697	30.65	n/a	30.65	80.3%					
32.75 - 27.75	3973	n/a	3973	31.40	n/a	31.40	82.9%					
27.75 - 22.75	4262	n/a	4262	32.14	n/a	32.14	85.3%					
22.75 - 18.5	4519	n/a	4519	32.77	n/a	32.77	87.3%					
18.5 - 18.25	4534	n/a	4534	32.81	n/a	32.81	87.4%					
18.25 - 13.25	4850	n/a	4850	33.55	n/a	33.55	89.5%					
13.25 - 8.25	5180	n/a	5180	34.30	n/a	34.30	91.4%					
8.25 - 3.25	5524	n/a	5524	35.04	n/a	35.04	93.3%					
3.25 - 0	5756	n/a	5756	35.53	n/a	35.53	94.4%					

Note: Section capacity checked using 5 degree increments.
Rating per TIA-222-H Section 15.5.

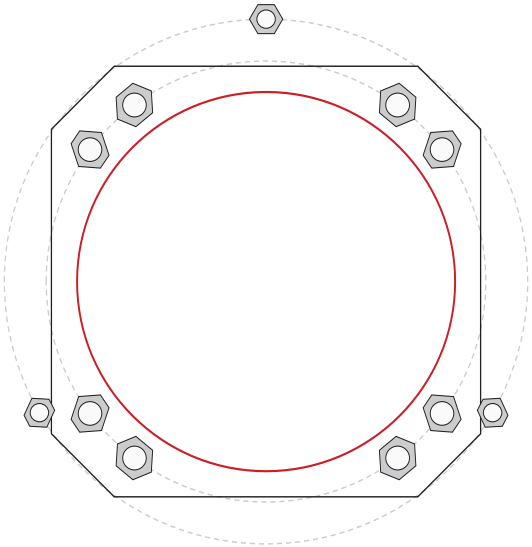
Monopole Base Plate Connection

Site Info	
BU #	842858
Site Name	Bolton
Order #	482069 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
l_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	1808.46
Axial Force (kips)	28.79
Shear Force (kips)	19.37

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (8) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 42" BC

Anchor Spacing: 6 in

GROUP 2: (3) 1-3/4" ø bolts (A193 Gr. B7 N; Fy=105 ksi, Fu=125 ksi) on 50" BC

Base Plate Data

41" W x 2.5" Plate (A572-55; Fy=55 ksi, Fu=70 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

36.13" x 0.3125" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

Anchor Rod Summary *(units of kips, kip-in)*

GROUP 1:		
Pu_c = 200.41	ϕPn_c = 268.39	**Stress Rating**
Vu = 2.42	ϕVn = 120.77	**71.2%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_c = 137.04	ϕPn_c = 227.3	**Stress Rating**
Vu = 0	ϕVn = 102.28	**57.4%**
Mu = 0	ϕMn = 84.41	**Pass**

Base Plate Summary

Max Stress (ksi):	31.62	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**60.8%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

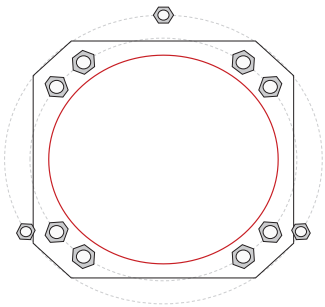
note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, n:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	36.786789	2.25	A615-75	42	0.5	1.125	N-Included		No
2	1	53.213211	2.25	A615-75	42	0.5	1.125	N-Included		No
3	1	126.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
4	1	143.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
5	1	216.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
6	1	233.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
7	1	306.78679	2.25	A615-75	42	0.5	1.125	N-Included		No
8	1	323.21321	2.25	A615-75	42	0.5	1.125	N-Included		No
9	2	90	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No
10	2	210	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No
11	2	330	1.75	A193 Gr. B7	50	0.5	3.375	N-Included		No

Plot Graphic



Drilled Pier Foundation

BU # :	842858
Site Name:	Bolton
Order Number:	482069 Rev. 0

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	1808.46	
Axial Force (kips)	28.8	
Shear Force (kips)	19.34	

Material Properties		
Concrete Strength, f'c:	3	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	40	ksi

Pier Design Data		
Depth	19.5	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 19.5' below grade		
Pier Diameter	6	ft
Rebar Quantity	16	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	5.22	-
Soil Safety Factor	2.40	-
Max Moment (kip-ft)	1936.99	-
Rating*	*52.8%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	98.82	-
End Bearing (kips)	1121.57	-
Weight of Concrete (kips)	72.15	-
Total Capacity (kips)	1220.40	-
Axial (kips)	100.95	-
Rating*	*7.9%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	4.97	-
Critical Moment (kip-ft)	1936.53	-
Critical Moment Capacity	3334.97	-
Rating*	*55.3%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	14.58	-
Critical Shear (kip)	292.00	-
Critical Shear Capacity	430.68	-
Rating*	*64.6%*	-

Soil Interaction Rating*	**52.8%**
Structural Foundation Rating*	**64.6%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

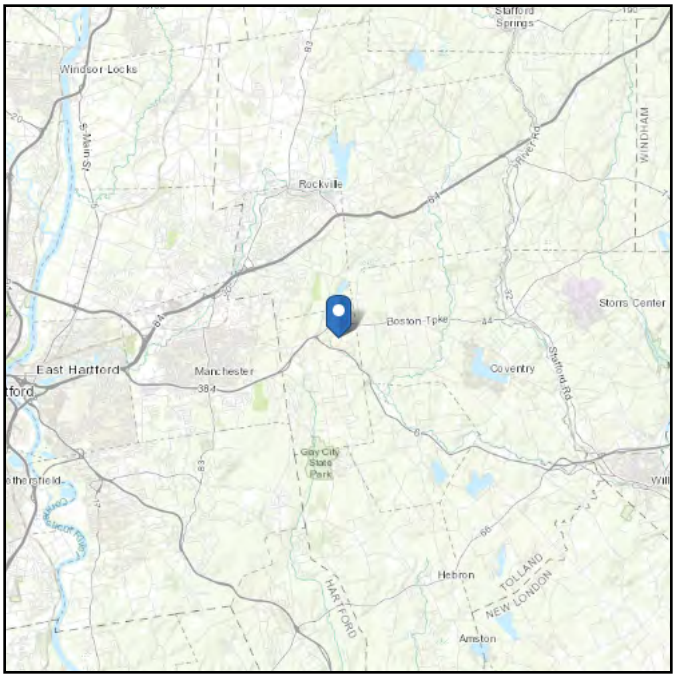
Groundwater Depth	5.5	# of Layers	12

Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	0.5	0.5	100	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	0.5	2	1.5	102	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	2	3	1	115	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
4	3	3.33	0.33	115	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
5	3.33	4	0.67	115	150	0	40	0.000	0.000	0.12	0.12			Cohesionless
6	4	5.5	1.5	115	150	0	37	0.000	0.000	0.20	0.20			Cohesionless
7	5.5	6	0.5	53	87.6	0	37	0.00	0.00	0.24	0.24			Cohesionless
8	6	8	2	53	87.6	0	37	0.00	0.00	0.26	0.26			Cohesionless
9	8	10	2	53	87.6	0	41	0.00	0.00	0.34	0.34			Cohesionless
10	10	12	2	55	87.6	0	45	0.00	0.00	0.44	0.44			Cohesionless
11	12	14	2	58	87.6	0	45	0.00	0.00	0.50	0.50			Cohesionless
12	14	19.5	5.5	58	87.6	0	45	0.00	0.00	0.62	0.62	52.89		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-10	**Elevation:**	621.52 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.789008
Soil Class:	D - Stiff Soil	**Longitude:**	-72.429142



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph

Data Source: ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

Date Accessed: Sun Mar 07 2021

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

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

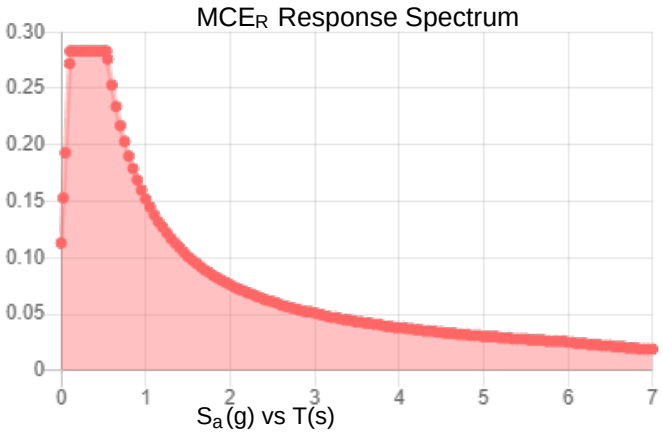
Seismic

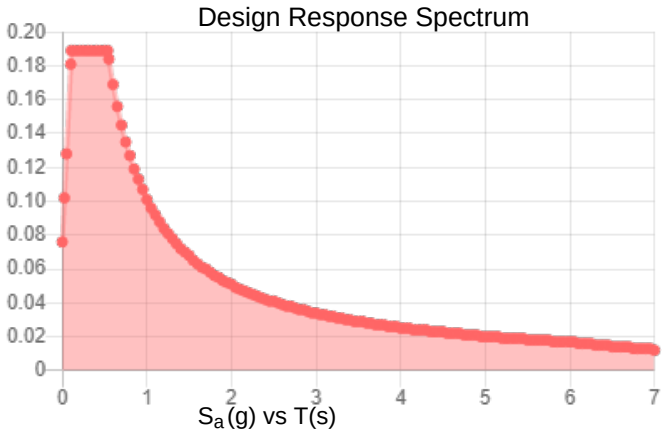
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.089
S_{MS} :	0.283	PGA_M :	0.142
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sun Mar 07 2021

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

Ice

Results:

Ice Thickness:	1.00 in.	Design Ice Thickness: 2*1.00 in. = 2.00 in.
Concurrent Temperature:	5 F	
Gust Speed:	50 mph	

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

Date Accessed: Sun Mar 07 2021

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

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

Exhibit E

Mount Analysis

Date: **January 8, 2021**

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277
(704) 405-6589

GPD Engineering and Architecture
Professional Corporation
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	***MetroPCS* Loading Modification**	
	Carrier Site Number:	CTHA518A
	Carrier Site Name:	AT&T Bolton Monopole
Crown Castle Designation:	**Crown Castle BU Number:**	842858
	Crown Castle Site Name:	BOLTON
	Crown Castle JDE Job Number:	561000
	Crown Castle Order Number:	482069 Rev. 0
Engineering Firm Designation:	**GPD Report Designation:**	2021777.842858.06
Site Data:	**49 South Road, Bolton, Tolland County, CT 06043** **Latitude 41° 47' 20.43" Longitude -72° 25' 44.91"**	
Structure Information:	**Tower Height & Type:**	**120.0 ft Monopole Tower**
	Mount Elevation:	**99.0 ft**
	Mount Type:	**12.5 ft Platform Mount**

Dear Darcy Tarr,

GPD is pleased to submit this **"Mount Replacement Analysis Report"** to determine the structural integrity of MetroPCS's antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

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

Platform Mount **Sufficient – 38.4%***

***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

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

Mount analysis prepared by: Brandon Brookbank

Respectfully Submitted by:

Christopher J. Scheks, P.E.
Connecticut #: 0030026

1/8/2021

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 12.5' Platform Mount designed by Site Pro 1 (Part #: RMQP-496-HK, dated 7/14/2014).

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 125 mph
Exposure Category: C
Topographic Factor at Base: 1
Topographic Factor at Mount: 1
Ice Thickness: 2 in
Wind Speed with Ice: 50 mph
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
99.0	99.0	3	Ericsson	AIR 32 B2A/B66AA	12.5 ft. Platform Mount
		3	RFS/Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	KRY 112 144/1	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 482069 Rev. 0	-	CCI
RF Data Sheet	RFDS #: CTHA518A, dated 4/29/2019	-	CCI
Mount Design	Site Pro 1 Part #: RMQP-496-HK, dated 7/14/2014	-	Site Pro 1

3.1) Analysis Method

RISA-3D Edition (Version 17.0.2), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by GPD, using Microsoft Excel, was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

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

3.2) Assumptions

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

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

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

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Standoff Arm	M91	99.0	14.9	Pass
	Cross Arm	M47		14.7	Pass
	Grating Angle	M49A		16.2	Pass
	Toe Rail	M16		10.7	Pass
	Connection Plate (End)	M52A		21.0	Pass
	Connection Plate (Mid)	M101		25.5	Pass
	Pipe Mount	A3		34.9	Pass
	Support Rail	M85		26.6	Pass
	Support Rail Corner	M84		38.4	Pass
	Platform Reinforcement Kicker	M92A		9.8	Pass
	Reinforcement Connection Plate	M93A		8.5	Pass
2,3	Mount to Tower Connection	-		15.0	Pass
	Reinforcement to Tower Connection			3.7	Pass

Structure Rating (max from all components) =	**38.4%[3]**

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
3) Ratings per TIA-222-H section 15.5.

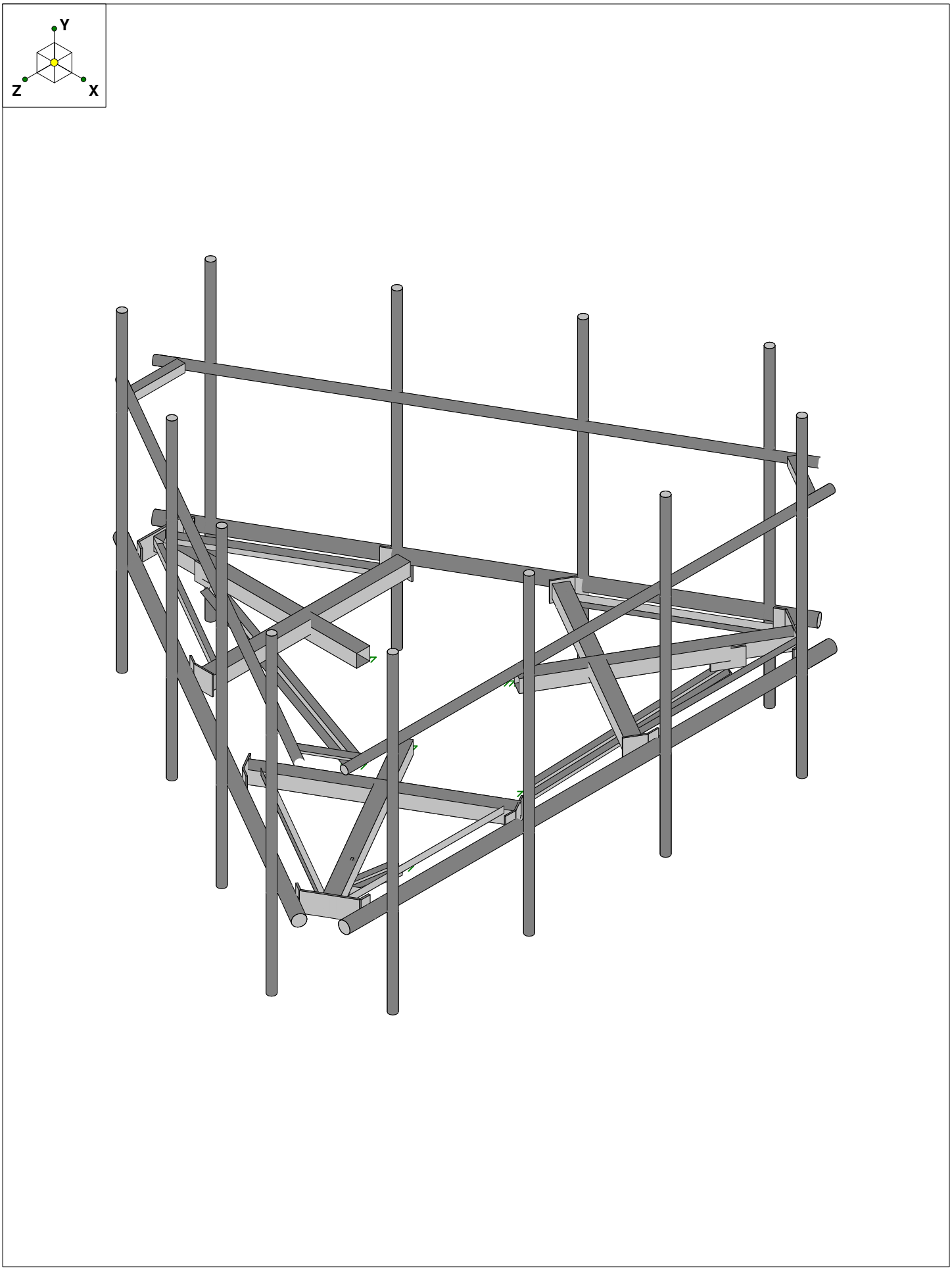
4.1) Recommendations

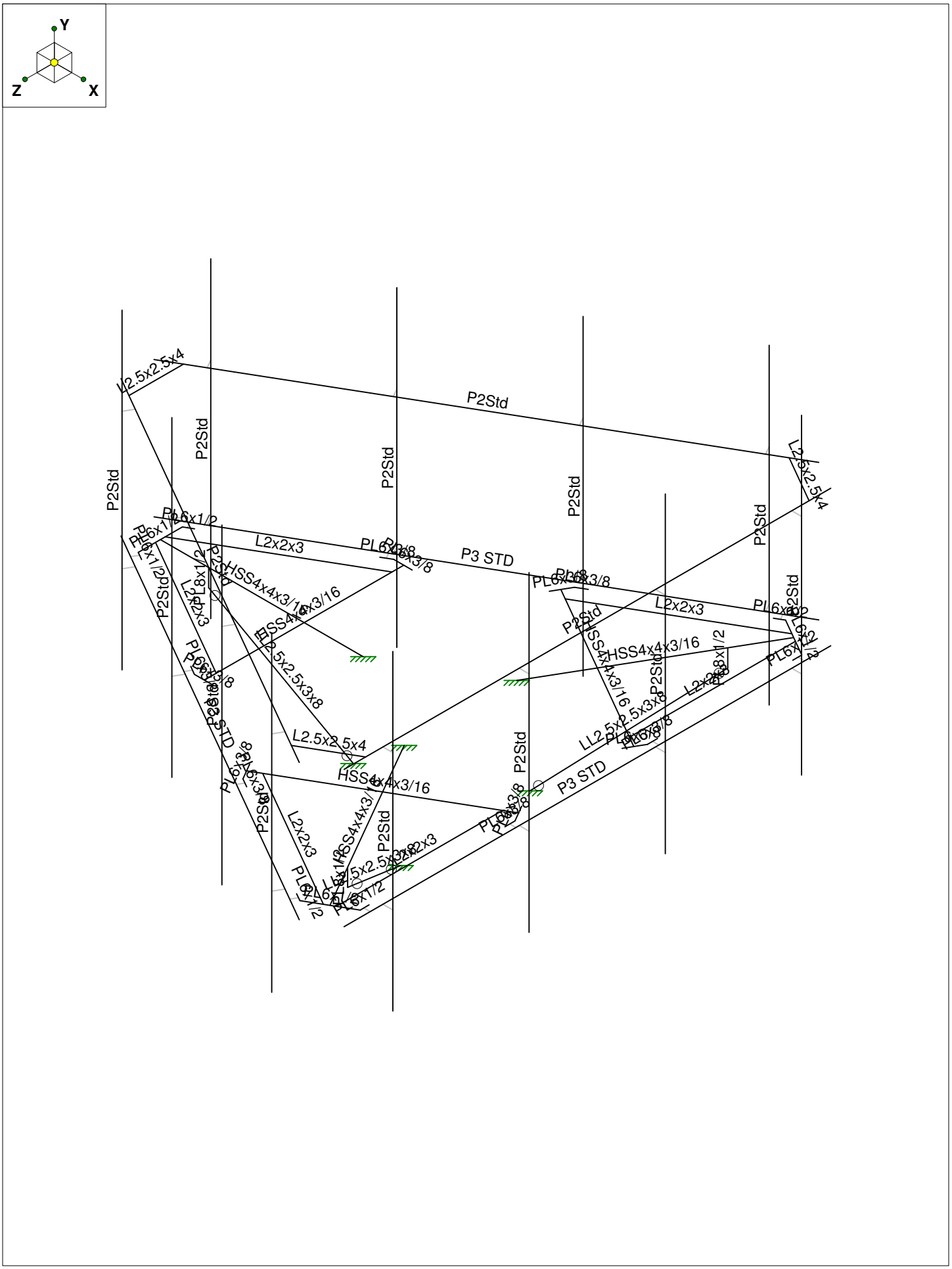
In order for the results of this analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

Site Pro 1 RMQP-496-HK

APPENDIX A

WIRE FRAME AND RENDERED MODELS


Y
Z
X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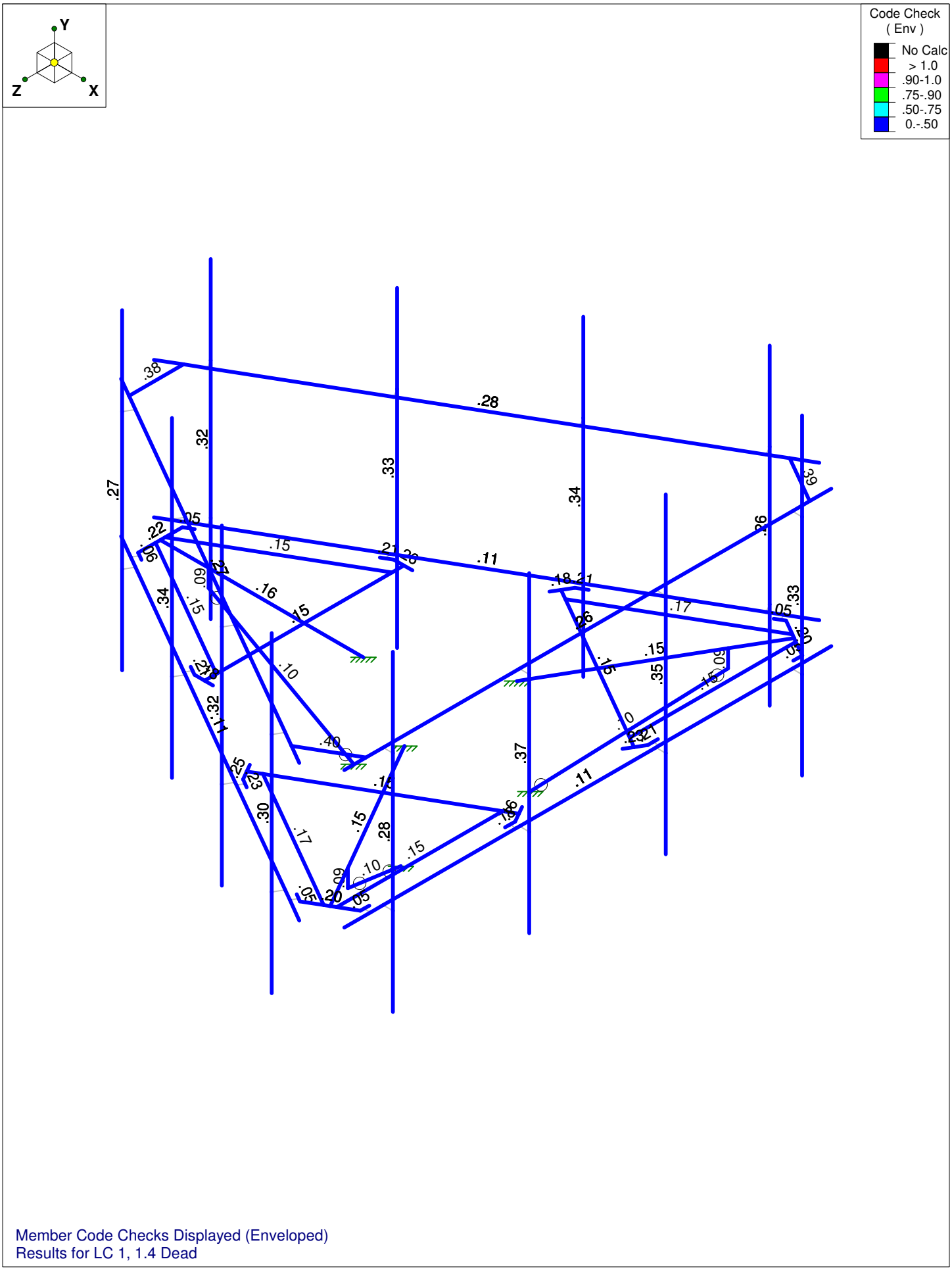
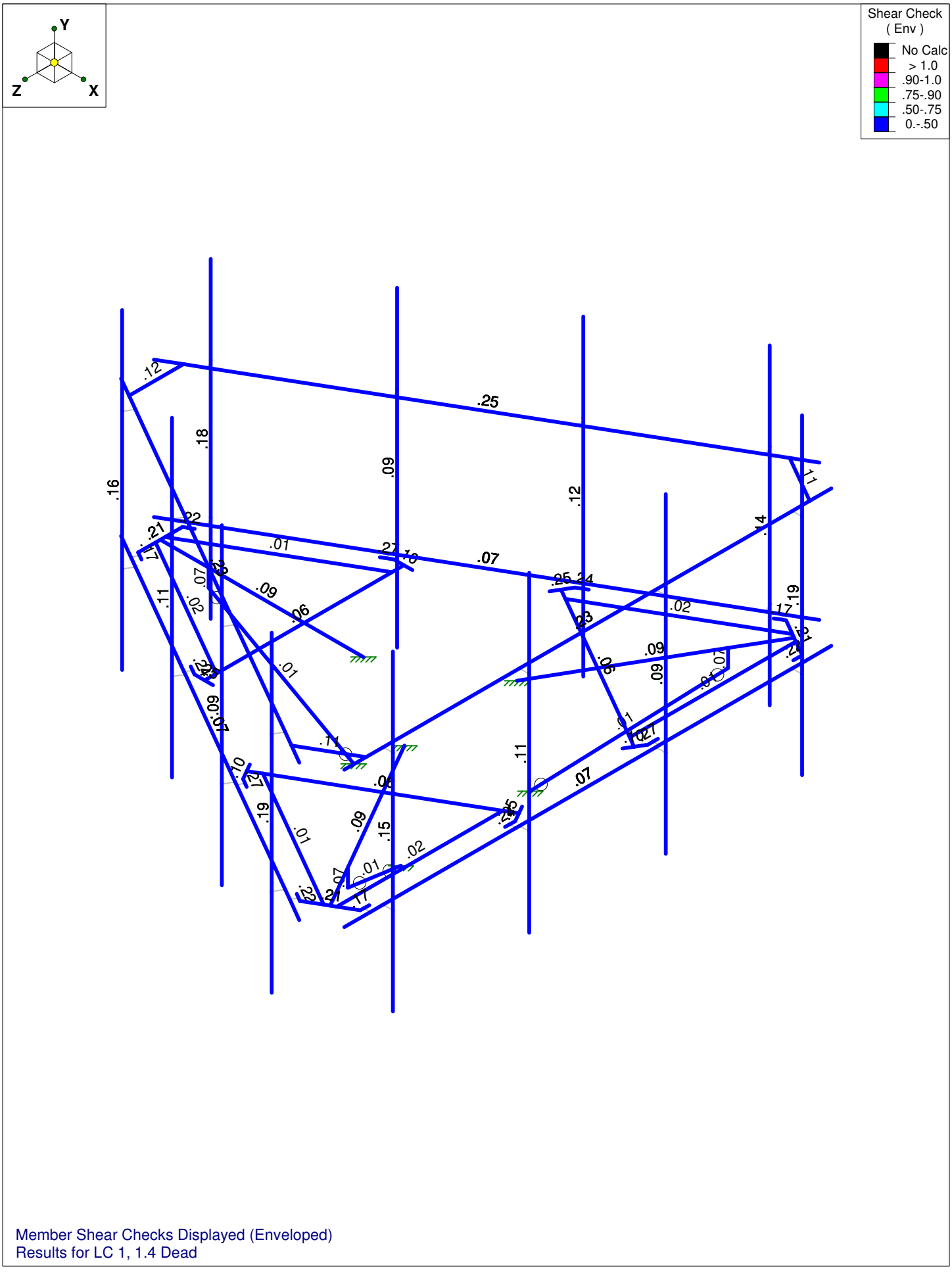
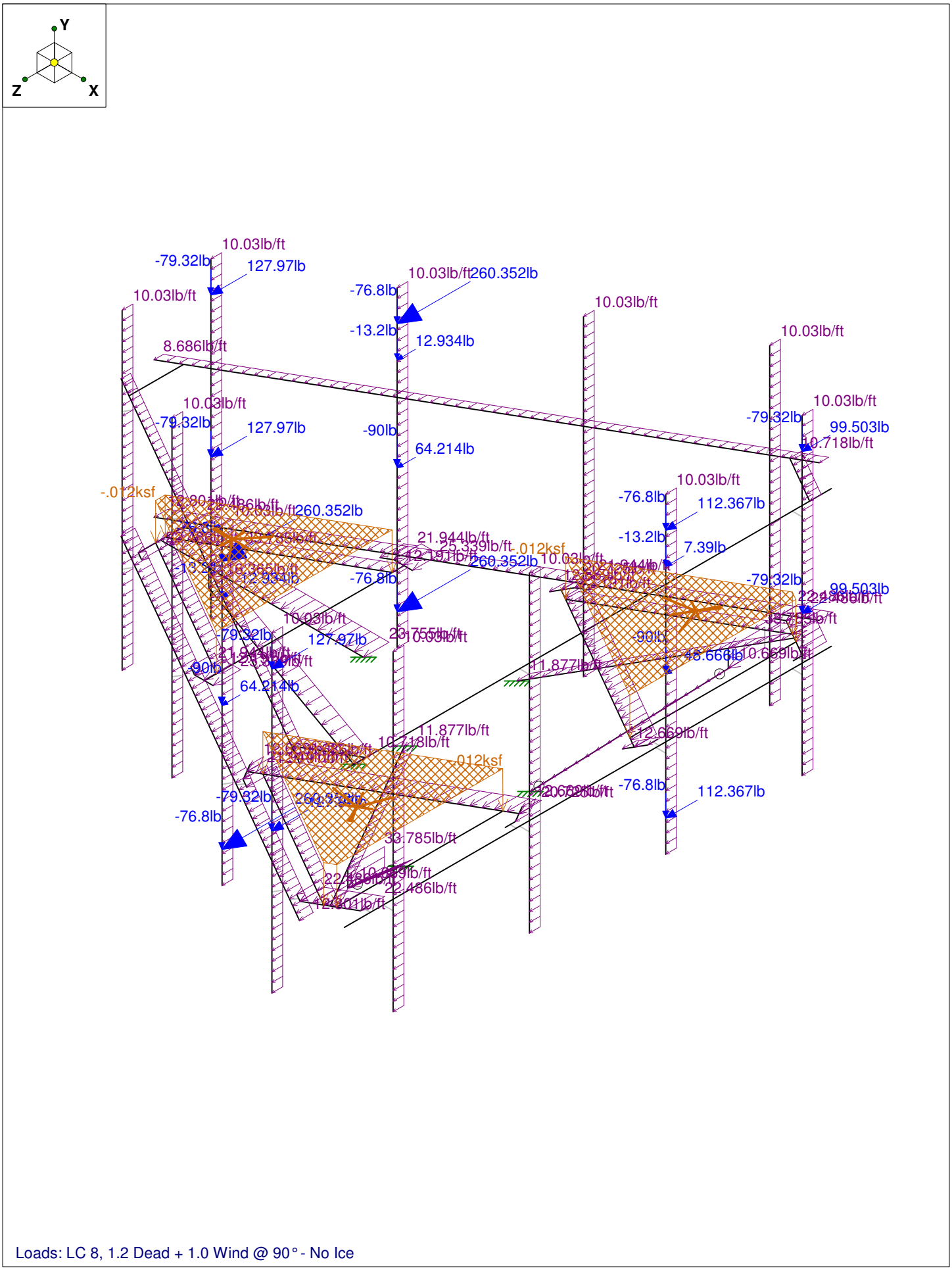
Z
X
P2Std
L2.5x2.5x4
P3 STD
L2x2x3
HSS4x4x3/16
L2.5x2.5x3x8
PL6x1/2
PL6x3/8
PL8x1/2



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.4 Dead



Loads: LC 8, 1.2 Dead + 1.0 Wind @ 90° - No Ice

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
842858 - BOLTON
2021777.842858.06

Structure Information		
Structure Type:	Monopole	
Structure Height:	120	ft
z (Mount Centerline) =	99	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	125	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	2	in
Exposure Category	C	
Tower Base Elevation (AMSL)	622	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Standoff Arm	Square/Rect.	62.500	4	4		5.66	Flat	0.90	1.00	26.39	5.79	21.52
Cross Arm	Square/Rect.	64.000	4	4		5.66	Flat	0.90	1.00	26.59	5.82	21.52
Grating Angle	Angle	54.000	2	2		2.83	Flat	0.90	1.00	15.64	4.13	13.80
Toe Rail	Pipe	150.000	3.5	3.5		3.50	Round	0.90	1.00	16.42	5.30	15.63
Connection Plate (End)	Square/Rect.	19.000	6	0.5		6.02	Flat	0.90	1.00	28.85	6.46	22.51
Connection Plate (Mid)	Square/Rect.	8.500	6	0.375		6.01	Flat	0.90	1.00	28.15	6.46	22.48
Pipe Mount	Pipe	96.000	2.375	2.375		2.38	Round	0.90	1.00	11.14	4.09	12.56
Support Rail	Pipe	150.000	2.375	2.375		2.38	Round	0.90	1.00	11.14	4.84	12.56
Support Rail Corner	Angle	18.000	2.5	2.5		3.54	Flat	0.90	1.00	13.75	3.84	15.73
Platform Reinforcement Kicker	Other	52.000	2.5	5.5	5.5	5.50	Flat	0.90	1.00	18.18	4.48	21.09
Reinforcement Connection Plate	Square/Rect.	5.375	8	0.5		8.02	Flat	0.90	1.00	37.54	7.96	27.95

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) AIR 32 B2A/B66AA	99	56.6	12.9	8.7	132.2	Flat	0%	0%	0.90	274.92	132.20	53.86	246.52
(3) APXVAARR24_43-U-NA20	99	95.9	24	8.7	128	CFD	0%	0%	0.90	619.36	128.00	123.00	577.52
(3) KRY 112 144/1	99	7	6	3	11	Flat	0%	0%	0.90	14.78	11.00	4.93	24.94
(3) RADIO 4449 B12/B71	99	14.95	13.19	9.25	75	Flat	0%	0%	0.90	69.40	75.00	15.88	93.23

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design ...	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoff Arm	HSS4x4x3/16	None	None	A500 Gr.B Rect	Typical	2.859	6.944	6.944	10.39
2	Cross Arm	HSS4x4x3/16	None	None	A500 Gr.B Rect	Typical	2.859	6.944	6.944	10.39
3	Grating Angle	L2x2x3	None	None	A36 Gr.36	Typical	.722	.271	.271	.009
4	Toe Rail	P3 STD	None	None	A53 Gr.B	Typical	2.228	3.017	3.017	6.034
5	Connection Plate (End)	PL6x1/2	None	None	A36 Gr.36	Typical	3	.063	9	.237
6	Connection Plate (Mid)	PL6x3/8	None	None	A36 Gr.36	Typical	2.25	.026	6.75	.101
7	Pipe Mount	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
8	Support Rail	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
9	Support Rail Corner	L2.5x2.5x4	None	None	A36 Gr.36	Typical	1.19	.692	.692	.026
10	Platform Reinforcement Kicker	LL2.5x2.5x3x8	None	None	A36 Gr.36	Typical	1.805	2.703	1.093	.02
11	Reinforcement Connection Pla...	PL8x1/2	None	None	A36 Gr.36	Typical	4	.083	21.333	.32

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface...
1	Dead	DL		-1			24		3	
2	No Ice Wind 0 deg	None					24	57		
3	No Ice Wind 30 deg	None					48	98		
4	No Ice Wind 60 deg	None					48	114		
5	No Ice Wind 90 deg	None					24	49		
6	No Ice Wind 120 deg	None					48	114		
7	No Ice Wind 150 deg	None					48	98		
8	No Ice Wind 180 deg	None					24	57		
9	No Ice Wind 210 deg	None					48	98		
10	No Ice Wind 240 deg	None					48	114		
11	No Ice Wind 270 deg	None					24	49		
12	No Ice Wind 300 deg	None					48	114		
13	No Ice Wind 330 deg	None					48	98		
14	Ice Weight	None					24	60		
15	Ice Wind 0 deg	None					24	57		
16	Ice Wind 30 deg	None					48	98		
17	Ice Wind 60 deg	None					48	114		
18	Ice Wind 90 deg	None					24	49		
19	Ice Wind 120 deg	None					48	114		
20	Ice Wind 150 deg	None					48	98		
21	Ice Wind 180 deg	None					24	57		
22	Ice Wind 210 deg	None					48	98		
23	Ice Wind 240 deg	None					48	114		
24	Ice Wind 270 deg	None					24	49		
25	Ice Wind 300 deg	None					48	114		
26	Ice Wind 330 deg	None					48	98		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface...
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M46 (Start)	None					1			
40	Live Load - M46 (Middle)	None					1			
41	Live Load - M46 (End)	None					1			
42	Live Load - M47 (Start)	None					1			
43	Live Load - M47 (Middle)	None					1			
44	Live Load - M47 (End)	None					1			
45	Live Load - M16 (Start)	None					1			
46	Live Load - M16 (Middle)	None					1			
47	Live Load - M16 (End)	None					1			
48	Live Load - M46A (Start)	None					1			
49	Live Load - M46A (Middle)	None					1			
50	Live Load - M46A (End)	None					1			
51	Live Load - M47A (Start)	None					1			
52	Live Load - M47A (Middle)	None					1			
53	Live Load - M47A (End)	None					1			
54	Live Load - M61 (Start)	None					1			
55	Live Load - M61 (Middle)	None					1			
56	Live Load - M61 (End)	None					1			
57	Live Load - M91 (Start)	None					1			
58	Live Load - M91 (Middle)	None					1			
59	Live Load - M91 (End)	None					1			
60	Live Load - M92 (Start)	None					1			
61	Live Load - M92 (Middle)	None					1			
62	Live Load - M92 (End)	None					1			
63	Live Load - M106 (Start)	None					1			
64	Live Load - M106 (Middle)	None					1			
65	Live Load - M106 (End)	None					1			
66	BLC 1 Transient Area Loads	None						51		

Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0		0					
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	1.2	2	1	0		0		0		0		0		0					
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	.9	2	1	0		0		0		0		0		0					
4	1.2 Dead + 1.0 Wind @ 30° - No Ice	Yes	Y		1	1.2	3	1	0		0		0		0		0		0					
5	0.9 Dead + 1.0 Wind @ 30° - No Ice	Yes	Y		1	.9	3	1	0		0		0		0		0		0					
6	1.2 Dead + 1.0 Wind @ 60° - No Ice	Yes	Y		1	1.2	4	1	0		0		0		0		0		0					
7	0.9 Dead + 1.0 Wind @ 60° - No Ice	Yes	Y		1	.9	4	1	0		0		0		0		0		0					
8	1.2 Dead + 1.0 Wind @ 90° - No Ice	Yes	Y		1	1.2	5	1	0		0		0		0		0		0					
9	0.9 Dead + 1.0 Wind @ 90° - No Ice	Yes	Y		1	.9	5	1	0		0		0		0		0		0					
10	1.2 Dead + 1.0 Wind @ 120° - No I...	Yes	Y		1	1.2	6	1	0		0		0		0		0		0					
11	0.9 Dead + 1.0 Wind @ 120° - No I...	Yes	Y		1	.9	6	1	0		0		0		0		0		0					
12	1.2 Dead + 1.0 Wind @ 150° - No I...	Yes	Y		1	1.2	7	1	0		0		0		0		0		0					
13	0.9 Dead + 1.0 Wind @ 150° - No I...	Yes	Y		1	.9	7	1	0		0		0		0		0		0					
14	1.2 Dead + 1.0 Wind @ 180° - No I...	Yes	Y		1	1.2	8	1	0		0		0		0		0		0					
15	0.9 Dead + 1.0 Wind @ 180° - No I...	Yes	Y		1	.9	8	1	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
16	1.2 Dead + 1.0 Wind @ 210° - No I..	Yes	Y		1	1.2	9	1	0		0		0		0		0		0					
17	0.9 Dead + 1.0 Wind @ 210° - No I..	Yes	Y		1	.9	9	1	0		0		0		0		0		0					
18	1.2 Dead + 1.0 Wind @ 240° - No I..	Yes	Y		1	1.2	10	1	0		0		0		0		0		0					
19	0.9 Dead + 1.0 Wind @ 240° - No I..	Yes	Y		1	.9	10	1	0		0		0		0		0		0					
20	1.2 Dead + 1.0 Wind @ 270° - No I..	Yes	Y		1	1.2	11	1	0		0		0		0		0		0					
21	0.9 Dead + 1.0 Wind @ 270° - No I..	Yes	Y		1	.9	11	1	0		0		0		0		0		0					
22	1.2 Dead + 1.0 Wind @ 300° - No I..	Yes	Y		1	1.2	12	1	0		0		0		0		0		0					
23	0.9 Dead + 1.0 Wind @ 300° - No I..	Yes	Y		1	.9	12	1	0		0		0		0		0		0					
24	1.2 Dead + 1.0 Wind @ 330° - No I..	Yes	Y		1	1.2	13	1	0		0		0		0		0		0					
25	0.9 Dead + 1.0 Wind @ 330° - No I..	Yes	Y		1	.9	13	1	0		0		0		0		0		0					
26	1.2 Dead + 1.0 Ice Wind @ 0°+ 1.0..	Yes	Y		1	1.2	15	1	14	1		1	0		0		0		0					
27	1.2 Dead + 1.0 Ice Wind @ 30°+ 1...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0		0					
28	1.2 Dead + 1.0 Ice Wind @ 60°+ 1...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0		0					
29	1.2 Dead + 1.0 Ice Wind @ 90°+ 1...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0		0					
30	1.2 Dead + 1.0 Ice Wind @ 120°+ ...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0		0					
31	1.2 Dead + 1.0 Ice Wind @ 150°+ ...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0		0					
32	1.2 Dead + 1.0 Ice Wind @ 180°+ ...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0		0					
33	1.2 Dead + 1.0 Ice Wind @ 210°+ ...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0		0					
34	1.2 Dead + 1.0 Ice Wind @ 240°+ ...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0		0					
35	1.2 Dead + 1.0 Ice Wind @ 270°+ ...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0		0					
36	1.2 Dead + 1.0 Ice Wind @ 300°+ ...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0		0					
37	1.2 Dead + 1.0 Ice Wind @ 330°+ ...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0		0					
38	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	2	.058	0		0		0		0		0					
39	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	3	.058	0		0		0		0		0					
40	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	4	.058	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	5	.058	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	6	.058	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	7	.058	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	8	.058	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	9	.058	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	10	.058	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	11	.058	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	12	.058	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1 + 1.0 ...	Yes	Y		1	1.2	27	1.5	13	.058	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	2	.058	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	3	.058	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	4	.058	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	5	.058	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	6	.058	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	7	.058	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	8	.058	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	9	.058	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	10	.058	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	11	.058	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	12	.058	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2 + 1.0 ...	Yes	Y		1	1.2	28	1.5	13	.058	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	2	.058	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	3	.058	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	4	.058	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	5	.058	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	6	.058	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	7	.058	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	8	.058	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	9	.058	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	10	.058	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	11	.058	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	12	.058	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
73	1.2 Dead + 1.5 Live_M - A3 + 1.0 ...	Yes	Y		1	1.2	29	1.5	13	.058	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	2	.058	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	3	.058	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	4	.058	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	5	.058	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	6	.058	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	7	.058	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	8	.058	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	9	.058	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	10	.058	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	11	.058	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	12	.058	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4 + 1.0 ...	Yes	Y		1	1.2	30	1.5	13	.058	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	2	.058	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	3	.058	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	4	.058	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	5	.058	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	6	.058	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	7	.058	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	8	.058	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	9	.058	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	10	.058	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	11	.058	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	12	.058	0		0		0		0		0					
97	1.2 Dead + 1.5 Live_M - B1 + 1.0 ...	Yes	Y		1	1.2	31	1.5	13	.058	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	2	.058	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	3	.058	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	4	.058	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	5	.058	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	6	.058	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	7	.058	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	8	.058	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	9	.058	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	10	.058	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	11	.058	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	12	.058	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_M - B2 + 1.0 ...	Yes	Y		1	1.2	32	1.5	13	.058	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	2	.058	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	3	.058	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	4	.058	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	5	.058	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	6	.058	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	7	.058	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	8	.058	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	9	.058	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	10	.058	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	11	.058	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	12	.058	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_M - B3 + 1.0 ...	Yes	Y		1	1.2	33	1.5	13	.058	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	2	.058	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	3	.058	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	4	.058	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	5	.058	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	6	.058	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	7	.058	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	8	.058	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	9	.058	0		0		0		0		0					

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
130	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	10	.058	0		0		0		0							
131	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	11	.058	0		0		0		0							
132	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	12	.058	0		0		0		0							
133	1.2 Dead + 1.5 Live_M - B4 + 1.0 ...	Yes	Y		1	1.2	34	1.5	13	.058	0		0		0		0							
134	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	2	.058	0		0		0		0							
135	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	3	.058	0		0		0		0							
136	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	4	.058	0		0		0		0							
137	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	5	.058	0		0		0		0							
138	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	6	.058	0		0		0		0							
139	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	7	.058	0		0		0		0							
140	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	8	.058	0		0		0		0							
141	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	9	.058	0		0		0		0							
142	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	10	.058	0		0		0		0							
143	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	11	.058	0		0		0		0							
144	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	12	.058	0		0		0		0							
145	1.2 Dead + 1.5 Live_M - C1 + 1.0 ...	Yes	Y		1	1.2	35	1.5	13	.058	0		0		0		0							
146	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	2	.058	0		0		0		0							
147	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	3	.058	0		0		0		0							
148	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	4	.058	0		0		0		0							
149	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	5	.058	0		0		0		0							
150	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	6	.058	0		0		0		0							
151	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	7	.058	0		0		0		0							
152	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	8	.058	0		0		0		0							
153	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	9	.058	0		0		0		0							
154	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	10	.058	0		0		0		0							
155	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	11	.058	0		0		0		0							
156	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	12	.058	0		0		0		0							
157	1.2 Dead + 1.5 Live_M - C2 + 1.0 ...	Yes	Y		1	1.2	36	1.5	13	.058	0		0		0		0							
158	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	2	.058	0		0		0		0							
159	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	3	.058	0		0		0		0							
160	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	4	.058	0		0		0		0							
161	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	5	.058	0		0		0		0							
162	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	6	.058	0		0		0		0							
163	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	7	.058	0		0		0		0							
164	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	8	.058	0		0		0		0							
165	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	9	.058	0		0		0		0							
166	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	10	.058	0		0		0		0							
167	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	11	.058	0		0		0		0							
168	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	12	.058	0		0		0		0							
169	1.2 Dead + 1.5 Live_M - C3 + 1.0 ...	Yes	Y		1	1.2	37	1.5	13	.058	0		0		0		0							
170	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	2	.058	0		0		0		0							
171	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	3	.058	0		0		0		0							
172	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	4	.058	0		0		0		0							
173	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	5	.058	0		0		0		0							
174	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	6	.058	0		0		0		0							
175	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	7	.058	0		0		0		0							
176	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	8	.058	0		0		0		0							
177	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	9	.058	0		0		0		0							
178	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	10	.058	0		0		0		0							
179	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	11	.058	0		0		0		0							
180	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	12	.058	0		0		0		0							
181	1.2 Dead + 1.5 Live_M - C4 + 1.0 ...	Yes	Y		1	1.2	38	1.5	13	.058	0		0		0		0							
182	1.2 Dead + 1.5 Live_V - M46 (Start)	Yes	Y		1	1.2	39	1.5	0		0		0		0		0							
183	1.2 Dead + 1.5 Live_V - M46 (Midd...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0							
184	1.2 Dead + 1.5 Live_V - M46 (End)	Yes	Y		1	1.2	41	1.5	0		0		0		0		0							
185	1.2 Dead + 1.5 Live_V - M47 (Start)	Yes	Y		1	1.2	42	1.5	0		0		0		0		0							
186	1.2 Dead + 1.5 Live_V - M47 (Midd...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0							

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
187	1.2 Dead + 1.5 Live_V - M47 (End)	Yes	Y		1	1.2	44	1.5	0		0		0		0		0							
188	1.2 Dead + 1.5 Live_V - M16 (Start)	Yes	Y		1	1.2	45	1.5	0		0		0		0		0							
189	1.2 Dead + 1.5 Live_V - M16 (Midd..	Yes	Y		1	1.2	46	1.5	0		0		0		0		0							
190	1.2 Dead + 1.5 Live_V - M16 (End)	Yes	Y		1	1.2	47	1.5	0		0		0		0		0							
191	1.2 Dead + 1.5 Live_V - M46A (Sta..	Yes	Y		1	1.2	48	1.5	0		0		0		0		0							
192	1.2 Dead + 1.5 Live_V - M46A (Mid..	Yes	Y		1	1.2	49	1.5	0		0		0		0		0							
193	1.2 Dead + 1.5 Live_V - M46A (End)	Yes	Y		1	1.2	50	1.5	0		0		0		0		0							
194	1.2 Dead + 1.5 Live_V - M47A (Sta..	Yes	Y		1	1.2	51	1.5	0		0		0		0		0							
195	1.2 Dead + 1.5 Live_V - M47A (Mid..	Yes	Y		1	1.2	52	1.5	0		0		0		0		0							
196	1.2 Dead + 1.5 Live_V - M47A (End)	Yes	Y		1	1.2	53	1.5	0		0		0		0		0							
197	1.2 Dead + 1.5 Live_V - M61 (Start)	Yes	Y		1	1.2	54	1.5	0		0		0		0		0							
198	1.2 Dead + 1.5 Live_V - M61 (Midd..	Yes	Y		1	1.2	55	1.5	0		0		0		0		0							
199	1.2 Dead + 1.5 Live_V - M61 (End)	Yes	Y		1	1.2	56	1.5	0		0		0		0		0							
200	1.2 Dead + 1.5 Live_V - M91 (Start)	Yes	Y		1	1.2	57	1.5	0		0		0		0		0							
201	1.2 Dead + 1.5 Live_V - M91 (Midd..	Yes	Y		1	1.2	58	1.5	0		0		0		0		0							
202	1.2 Dead + 1.5 Live_V - M91 (End)	Yes	Y		1	1.2	59	1.5	0		0		0		0		0							
203	1.2 Dead + 1.5 Live_V - M92 (Start)	Yes	Y		1	1.2	60	1.5	0		0		0		0		0							
204	1.2 Dead + 1.5 Live_V - M92 (Midd..	Yes	Y		1	1.2	61	1.5	0		0		0		0		0							
205	1.2 Dead + 1.5 Live_V - M92 (End)	Yes	Y		1	1.2	62	1.5	0		0		0		0		0							
206	1.2 Dead + 1.5 Live_V - M106 (Start)	Yes	Y		1	1.2	63	1.5	0		0		0		0		0							
207	1.2 Dead + 1.5 Live_V - M106 (Mid..	Yes	Y		1	1.2	64	1.5	0		0		0		0		0							
208	1.2 Dead + 1.5 Live_V - M106 (End)	Yes	Y		1	1.2	65	1.5	0		0		0		0		0							

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Cod...	Lo...	LC	She...	Loc[in]	...	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
1	M84	L2.5x2.5x4	.403	0	8	.109	0	y	24	36167...	38556	1.114	2.537	...	H2-1
2	M78	L2.5x2.5x4	.385	0	24	.109	0	y	16	36167...	38556	1.114	2.537	...	H2-1
3	M90	L2.5x2.5x4	.377	0	16	.117	0	y	8	36167...	38556	1.114	2.537	...	H2-1
4	A3	P2Std	.366	69	8	.112	69		4	15814...	33862...	1.998	1.998	...	H1-1b
5	A2	P2Std	.348	69	8	.087	27		12	15814...	33862...	1.998	1.998	...	H1-1b
6	C3	P2Std	.341	69	2	.120	69		20	15814...	33862...	1.998	1.998	...	H1-1b
7	B3	P2Std	.338	69	16	.114	69		12	15814...	33862...	1.998	1.998	...	H1-1b
8	C2	P2Std	.330	69	2	.085	27		4	15814...	33862...	1.998	1.998	...	H1-1b
9	A1	P2Std	.327	69	20	.193	27		2	15814...	33862...	1.998	1.998	...	H1-1b
10	C1	P2Std	.324	69	14	.185	27		18	15814...	33862...	1.998	1.998	...	H1-1b
11	B2	P2Std	.321	69	16	.092	27		20	15814...	33862...	1.998	1.998	...	H1-1b
12	B1	P2Std	.304	69	4	.190	27		8	15814...	33862...	1.998	1.998	...	H1-1b
13	M85	P2Std	.279	13...	15	.247	7.813		8	6687....	33862...	1.998	1.998	...	H1-1b
14	A4	P2Std	.278	69	8	.147	27		2	15814...	33862...	1.998	1.998	...	H1-1b
15	B4	P2Std	.274	69	14	.156	69		8	15814...	33862...	1.998	1.998	...	H1-1b
16	M79	P2Std	.269	13...	7	.232	7.813		24	6687....	33862...	1.998	1.998	...	H1-1b
17	M73	P2Std	.265	53....	2	.233	7.813		16	6687....	33862...	1.998	1.998	...	H1-1b
18	C4	P2Std	.256	69	24	.142	69		16	15814...	33862...	1.998	1.998	...	H1-1b
19	M100	PL6x3/8	.255	2.6...	20	.096	2.627	y	113	62895...	72900	.57	9.113	...	H1-1b
20	M55A	PL6x3/8	.255	2.6...	12	.096	2.627	y	73	62895...	72900	.57	9.113	...	H1-1b
21	M56A	PL6x3/8	.234	1.5...	20	.267	0	y	29	69770...	72900	.57	9.113	...	H1-1b
22	M55	PL6x3/8	.231	2.6...	4	.096	2.627	y	165	62895...	72900	.57	9.113	...	H1-1b
23	M96	PL6x1/2	.217	6.81	14	.210	6.81	y	33	60829...	97200	1.012	12.15	...	H1-1b
24	M101	PL6x3/8	.214	1.5...	4	.268	0	y	32	69770...	72900	.57	9.113	...	H1-1b
25	M54	PL6x3/8	.209	1.5...	8	.238	0	y	36	69770...	72900	.57	9.113	...	H1-1b
26	M56	PL6x3/8	.207	1.5...	12	.267	0	y	35	69770...	72900	.57	9.113	...	H1-1b
27	M99	PL6x3/8	.205	1.5...	2	.238	0	y	32	69770...	72900	.57	9.113	...	H1-1b
28	M51A	PL6x1/2	.204	6.81	8	.211	6.81	y	29	60829...	97200	1.012	12.15	...	H1-1b
29	M51	PL6x1/2	.202	6.81	20	.210	6.81	y	26	60829...	97200	1.012	12.15	...	H1-1b
30	M54A	PL6x3/8	.182	1.5...	16	.238	0	y	29	69770...	72900	.57	9.113	...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks (Continued)

	Member	Shape	Cod...	Lo...	LC	She...	Loc[in]	...	LC	phi*P...	phi*P...	phi*M...	phi*M.....		Eqn
31	M98	PL6x3/8	.177	2.6...	8	.249	2.627	y	35	62895...	.72900	.57	9.113	...	H1-1b
32	M53	PL6x3/8	.176	2.6...	16	.250	2.627	y	29	62895...	.72900	.57	9.113	...	H1-1b
33	M49A	L2x2x3	.170	0	8	.012	51.168	z	37	15920...	23392...	.558	1.213	...	H2-1
34	M48	L2x2x3	.166	0	20	.016	51.168	y	26	15920...	23392...	.558	1.212	...	H2-1
35	M53A	PL6x3/8	.163	2.6...	22	.250	2.627	y	32	62895...	.72900	.57	9.113	...	H1-1b
36	M91	HSS4x4x3/16	.156	0	35	.086	0	y	155	10623...	11837...	14.115	14.115	...	H1-1b
37	M47	HSS4x4x3/16	.154	30....	35	.058	30.687	y	27	10664...	11837...	14.115	14.115	...	H1-1b
38	M47A	HSS4x4x3/16	.153	30....	29	.058	30.688	y	31	10664...	11837...	14.115	14.115	...	H1-1b
39	M92	HSS4x4x3/16	.153	30....	31	.058	30.688	y	35	10664...	11837...	14.115	14.115	...	H1-1b
40	M46	HSS4x4x3/16	.153	0	27	.086	0	y	51	10623...	11837...	14.115	14.115	...	H1-1b
41	M46A	HSS4x4x3/16	.152	0	31	.086	0	y	103	10623...	11837...	14.115	14.115	...	H1-1b
42	M93	L2x2x3	.149	51....	32	.016	51.168	y	35	15920...	23392...	.558	1.238	...	H2-1
43	M49	L2x2x3	.148	0	24	.012	51.168	z	33	15920...	23392...	.558	1.219	...	H2-1
44	M94	L2x2x3	.148	0	16	.012	51.168	z	29	15920...	23392...	.558	1.224	...	H2-1
45	M48A	L2x2x3	.147	51....	29	.016	51.168	y	30	15920...	23392...	.558	1.238	...	H2-1
46	M16	P3 STD	.112	54....	29	.065	96.875		4	29986...	70196...	6.124	6.124	...	H1-1b
47	M106	P3 STD	.111	54....	26	.071	96.875		20	29986...	70196...	6.124	6.124	...	H1-1b
48	M61	P3 STD	.110	54....	33	.066	96.875		12	29986...	70196...	6.124	6.124	...	H1-1b
49	M92A	LL2.5x2.5x3x8	.103	50....	32	.006	0	y	33	42543...	58482	4.246	2.614	1	H1-...
50	M96A	LL2.5x2.5x3x8	.102	50....	28	.006	50.968	y	29	42543...	58482	4.246	2.614	...	H1-...
51	M94A	LL2.5x2.5x3x8	.102	50....	36	.006	50.968	y	37	42543...	58482	4.246	2.614	...	H1-...
52	M93A	PL8x1/2	.089	0	35	.073	0	y	36	12047...	129600	1.35	21.6	...	H1-1b
53	M91A	PL8x1/2	.089	0	32	.074	0	y	32	12047...	129600	1.35	21.6	...	H1-1b
54	M95A	PL8x1/2	.088	0	27	.073	0	y	29	12047...	129600	1.35	21.6	...	H1-1b
55	M95	PL6x1/2	.057	1.6...	14	.173	2.765	y	127	95340...	97200	1.012	12.15	...	H1-1b
56	M50	PL6x1/2	.054	1.6...	20	.173	2.765	y	179	95340...	97200	1.012	12.15	...	H1-1b
57	M50A	PL6x1/2	.052	1.6...	6	.173	2.765	y	74	95340...	97200	1.012	12.15	...	H1-1b
58	M97	PL6x1/2	.052	1.1...	14	.219	0	y	33	95340...	97200	1.012	12.15	...	H1-1b
59	M52	PL6x1/2	.047	1.1...	22	.218	0	y	37	95340...	97200	1.012	12.15	...	H1-1b
60	M52A	PL6x1/2	.047	1.1...	6	.221	0	y	29	95340...	97200	1.012	12.15	...	H1-1b

Envelope AISC 15th(360-16): LRFD Steel Code Checks

	Member	Shape	Code Check Actual	Code Check Allowable	Ratio (Act./Allow.)	Loc[in]	LC	Shear Check	Shear Check Allowable	Ratio (Act./Allow.)	Loc[in]	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M84	L2.5x2.5x4	0.403	1.05	0.384*	0	8	0.109	1.05	0.104*	0	36167.335	38556	1.114	2.537	1.905	H2-1
2	M78	L2.5x2.5x4	0.385	1.05	0.367*	0	24	0.109	1.05	0.104*	0	36167.335	38556	1.114	2.537	1.948	H2-1
3	M90	L2.5x2.5x4	0.377	1.05	0.359*	0	16	0.117	1.05	0.111*	0	36167.335	38556	1.114	2.537	1.86	H2-1
4	A3	P2Std	0.366	1.05	0.349*	69	8	0.112	1.05	0.107*	69	15814.703	33862.5	1.998	1.998	3.513	H1-1b
5	A2	P2Std	0.348	1.05	0.331*	69	8	0.087	1.05	0.083*	27	15814.703	33862.5	1.998	1.998	2.109	H1-1b
6	C3	P2Std	0.341	1.05	0.325*	69	2	0.12	1.05	0.114*	69	15814.703	33862.5	1.998	1.998	4.202	H1-1b
7	B3	P2Std	0.338	1.05	0.322*	69	16	0.114	1.05	0.109*	69	15814.703	33862.5	1.998	1.998	4.499	H1-1b
8	C2	P2Std	0.33	1.05	0.314*	69	2	0.085	1.05	0.081*	27	15814.703	33862.5	1.998	1.998	2.543	H1-1b
9	A1	P2Std	0.327	1.05	0.311*	69	20	0.193	1.05	0.184*	27	15814.703	33862.5	1.998	1.998	4.274	H1-1b
10	C1	P2Std	0.324	1.05	0.309*	69	14	0.185	1.05	0.176*	27	15814.703	33862.5	1.998	1.998	3.029	H1-1b
11	B2	P2Std	0.321	1.05	0.306*	69	16	0.092	1.05	0.088*	27	15814.703	33862.5	1.998	1.998	3.044	H1-1b
12	B1	P2Std	0.304	1.05	0.29*	69	4	0.19	1.05	0.181*	27	15814.703	33862.5	1.998	1.998	3.747	H1-1b
13	M85	P2Std	0.279	1.05	0.266*	139.1	15	0.247	1.05	0.235*	7.813	6687.004	33862.5	1.998	1.998	3.656	H1-1b
14	A4	P2Std	0.278	1.05	0.265*	69	8	0.147	1.05	0.14*	27	15814.703	33862.5	1.998	1.998	4.607	H1-1b
15	B4	P2Std	0.274	1.05	0.261*	69	14	0.156	1.05	0.149*	69	15814.703	33862.5	1.998	1.998	4.107	H1-1b
16	M79	P2Std	0.269	1.05	0.256*	139.1	7	0.232	1.05	0.221*	7.813	6687.004	33862.5	1.998	1.998	3.654	H1-1b
17	M73	P2Std	0.265	1.05	0.252*	53.13	2	0.233	1.05	0.222*	7.813	6687.004	33862.5	1.998	1.998	3.592	H1-1b
18	C4	P2Std	0.256	1.05	0.244*	69	24	0.142	1.05	0.135*	69	15814.703	33862.5	1.998	1.998	4.504	H1-1b
19	M100	PL6x3/8	0.255	1.05	0.243*	2.627	20	0.096	1.05	0.091*	2.627	62895.69	72900	0.57	9.113	1.417	H1-1b
20	M55A	PL6x3/8	0.255	1.05	0.243*	2.627	12	0.096	1.05	0.091*	2.627	62895.69	72900	0.57	9.113	1.419	H1-1b
21	M56A	PL6x3/8	0.234	1.05	0.223*	1.595	20	0.267	1.05	0.254*	0	69770.599	72900	0.57	9.113	1.86	H1-1b
22	M55	PL6x3/8	0.231	1.05	0.22*	2.627	4	0.096	1.05	0.091*	2.627	62895.69	72900	0.57	9.113	1.417	H1-1b
23	M96	PL6x1/2	0.217	1.05	0.207*	6.81	14	0.21	1.05	0.2*	6.81	60829.391	97200	1.012	12.15	1.328	H1-1b
24	M101	PL6x3/8	0.214	1.05	0.204*	1.595	4	0.268	1.05	0.255*	0	69770.599	72900	0.57	9.113	2.14	H1-1b
25	M54	PL6x3/8	0.209	1.05	0.199*	1.595	8	0.238	1.05	0.227*	0	69770.599	72900	0.57	9.113	1.376	H1-1b
26	M56	PL6x3/8	0.207	1.05	0.197*	1.595	12	0.267	1.05	0.254*	0	69770.599	72900	0.57	9.113	2.158	H1-1b
27	M99	PL6x3/8	0.205	1.05	0.195*	1.595	2	0.238	1.05	0.227*	0	69770.599	72900	0.57	9.113	1.384	H1-1b
28	M51A	PL6x1/2	0.204	1.05	0.194*	6.81	8	0.211	1.05	0.201*	6.81	60829.391	97200	1.012	12.15	1.392	H1-1b
29	M51	PL6x1/2	0.202	1.05	0.192*	6.81	20	0.21	1.05	0.2*	6.81	60829.391	97200	1.012	12.15	1.261	H1-1b
30	M54A	PL6x3/8	0.182	1.05	0.173*	1.595	16	0.238	1.05	0.227*	0	69770.599	72900	0.57	9.113	1.381	H1-1b
31	M98	PL6x3/8	0.177	1.05	0.169*	2.627	8	0.249	1.05	0.237*	2.627	62895.69	72900	0.57	9.113	1.512	H1-1b
32	M53	PL6x3/8	0.176	1.05	0.168*	2.627	16	0.25	1.05	0.238*	2.627	62895.69	72900	0.57	9.113	1.523	H1-1b
33	M49A	L2x2x3	0.17	1.05	0.162*	0	8	0.012	1.05	0.011*	51.17	15920.319	23392.8	0.558	1.213	2.198	H2-1
34	M48	L2x2x3	0.166	1.05	0.158*	0	20	0.016	1.05	0.015*	51.17	15920.319	23392.8	0.558	1.212	2.18	H2-1
35	M53A	PL6x3/8	0.163	1.05	0.155*	2.627	22	0.25	1.05	0.238*	2.627	62895.69	72900	0.57	9.113	1.588	H1-1b
36	M91	HSS4x4x3/16	0.156	1.05	0.149*	0	35	0.086	1.05	0.082*	0	106237.62	118378.13	14.115	14.115	3.097	H1-1b
37	M47	HSS4x4x3/16	0.154	1.05	0.147*	30.69	35	0.058	1.05	0.055*	30.69	106648.52	118378.13	14.115	14.115	1.333	H1-1b
38	M47A	HSS4x4x3/16	0.153	1.05	0.146*	30.69	29	0.058	1.05	0.055*	30.69	106648.52	118378.13	14.115	14.115	1.333	H1-1b
39	M92	HSS4x4x3/16	0.153	1.05	0.146*	30.69	31	0.058	1.05	0.055*	30.69	106648.52	118378.13	14.115	14.115	1.333	H1-1b
40	M46	HSS4x4x3/16	0.153	1.05	0.146*	0	27	0.086	1.05	0.082*	0	106237.62	118378.13	14.115	14.115	3.11	H1-1b
41	M46A	HSS4x4x3/16	0.152	1.05	0.145*	0	31	0.086	1.05	0.082*	0	106237.62	118378.13	14.115	14.115	3.085	H1-1b
42	M93	L2x2x3	0.149	1.05	0.142*	51.17	32	0.016	1.05	0.015*	51.17	15920.319	23392.8	0.558	1.238	2.518	H2-1
43	M49	L2x2x3	0.148	1.05	0.141*	0	24	0.012	1.05	0.011*	51.17	15920.319	23392.8	0.558	1.219	2.262	H2-1
44	M94	L2x2x3	0.148	1.05	0.141*	0	16	0.012	1.05	0.011*	51.17	15920.319	23392.8	0.558	1.224	2.334	H2-1
45	M48A	L2x2x3	0.147	1.05	0.14*	51.17	29	0.016	1.05	0.015*	51.17	15920.319	23392.8	0.558	1.238	2.525	H2-1
46	M16	P3 STD	0.112	1.05	0.107*	54.69	29	0.065	1.05	0.062*	96.88	29986.104	70196.805	6.124	6.124	2.472	H1-1b
47	M106	P3 STD	0.111	1.05	0.106*	54.69	26	0.071	1.05	0.068*	96.88	29986.104	70196.805	6.124	6.124	2.441	H1-1b
48	M61	P3 STD	0.11	1.05	0.105*	54.69	33	0.066	1.05	0.063*	96.88	29986.104	70196.805	6.124	6.124	2.455	H1-1b
49	M92A	LL2.5x2.5x3x8	0.103	1.05	0.098*	50.97	32	0.006	1.05	0.006*	0	42543.862	58482	4.246	2.614	1	H1-1b*
50	M96A	LL2.5x2.5x3x8	0.102	1.05	0.097*	50.97	28	0.006	1.05	0.006*	50.97	42543.862	58482	4.246	2.614	1.136	H1-1b*
51	M94A	LL2.5x2.5x3x8	0.102	1.05	0.097*	50.97	36	0.006	1.05	0.006*	50.97	42543.862	58482	4.246	2.614	1.136	H1-1b*
52	M93A	PL8x1/2	0.089	1.05	0.085*	0	35	0.073	1.05	0.07*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
53	M91A	PL8x1/2	0.089	1.05	0.085*	0	32	0.074	1.05	0.07*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
54	M95A	PL8x1/2	0.088	1.05	0.084*	0	27	0.073	1.05	0.07*	0	120475.67	129600	1.35	21.6	1.667	H1-1b
55	M95	PL6x1/2	0.057	1.05	0.054*	1.642	14	0.173	1.05	0.165*	2.765	95340.363	97200	1.012	12.15	2.961	H1-1b
56	M50	PL6x1/2	0.054	1.05	0.051*	1.642	20	0.173	1.05	0.165*	2.765	95340.363	97200	1.012	12.15	3.138	H1-1b
57	M50A	PL6x1/2	0.052	1.05	0.05*	1.642	6	0.173	1.05	0.165*	2.765	95340.363	97200	1.012	12.15	2.905	H1-1b
58	M97	PL6x1/2	0.052	1.05	0.05*	1.123	14	0.219	1.05	0.209*	0	95340.363	97200	1.012	12.15	4.128	H1-1b
59	M52	PL6x1/2	0.047	1.05	0.045*	1.123	22	0.218	1.05	0.208*	0	95340.363	97200	1.012	12.15	4.054	H1-1b
60	M52A	PL6x1/2	0.047	1.05	0.045*	1.123	6	0.221	1.05	0.21*	0	95340.363	97200	1.012	12.15	4.083	H1-1b

*Rating per TIA-222-H, Section 15.5

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
2021777.842858.06

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

Flange Information		
Height (h)	8	in
Width (w)	8	in
Thickness (t)	0.75	in
Steel Grade	A36	
Plate Yield Strength (Fy)	36	ksi
Support Arm Height	4	in
Support Arm Width	4	in

RISA 3D Reactions (Up-Down)		
Moment (M)	1.61	k-ft
Axial (T)	4.30	kips
Shear (V)	1.31	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	1.48	k-ft
Axial (T)	1.25	kips
Shear (V)	1.13	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	2.69	kips
Bolt Shear Force (V_{ub})	0.328	kips
$T_{ub}/\phi R_{nt}$	0.12590	
$V_{ub}/\phi R_{nv}$	0.02264	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01718	
Bolt Capacity =	12.6%	OK

*Rating per TIA-222-H, Section 15.5

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	1.80	kips
Bolt Shear Force (V_{ub})	0.282	kips
$T_{ub}/\phi R_{nt}$	0.08410	
$V_{ub}/\phi R_{nv}$	0.01944	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00782	
Bolt Capacity =	8.4%	OK

*Rating per TIA-222-H, Section 15.5

Plate Capacity (Up-Down)		
Bolt Circle (D_{BC})	8.485	in
Effective Width (B_{eff})	7.48	in
Flexural Moment (M_u)	5.38	k-in
Flexural Strength ($\emptyset M_n$)	34.10	k-in
Plate Capacity=	15.0%	OK

*Rating per TIA-222-H, Section 15.5

Plate Capacity (Left-Right)		
Bolt Circle (D_{BC})	8.485	in
Effective Width (B_{eff})	7.48	in
Flexural Moment (M_u)	3.59	k-in
Flexural Strength ($\emptyset M_n$)	34.10	k-in
Plate Capacity=	10.0%	OK

*Rating per TIA-222-H, Section 15.5

TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Typ. All Sectors
2021777.842858.06

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A325N	
Bolt Tensile Strength (F_{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-3.82	kips
Shear (V)	2.17	kips

Bolt Capacity		
Nominal Tensile Strength (R_{nt})	27.120	kips
Nominal Shear Strength (R_{nv})	18.41	kips
Bolt Tensile Force (T_{ub})	-0.96	kips
Bolt Shear Force (V_{ub})	0.542	kips
$T_{ub}/\phi R_{nt}$	-0.04473	
$V_{ub}/\phi R_{nv}$	0.03741	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.00357	
Bolt Capacity =	3.7%	OK

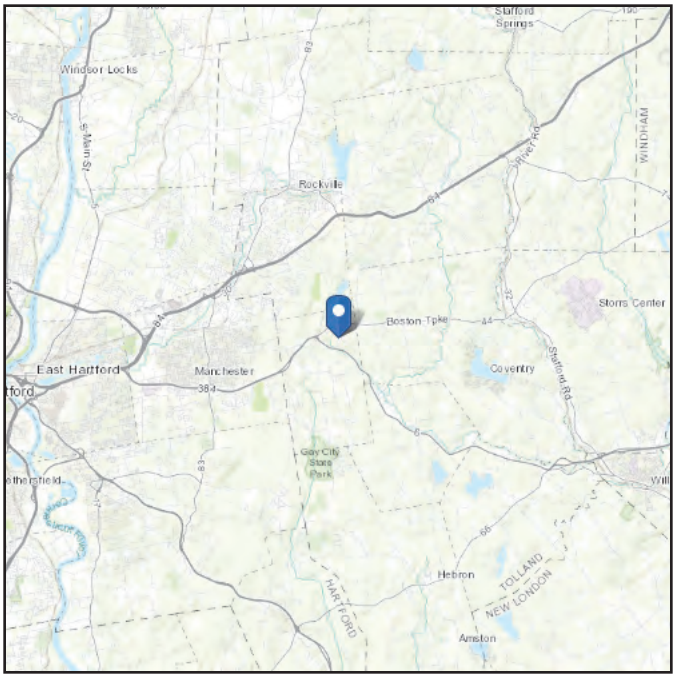
*Rating per TIA-222-H, Section 15.5

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 0 ft (NAVD 88)
Latitude: 41.789008
Longitude: -72.429142



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Fri Jan 08 2021

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

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

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

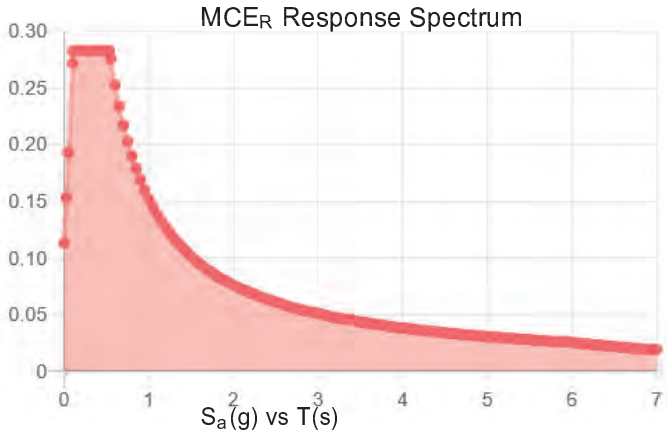
Seismic

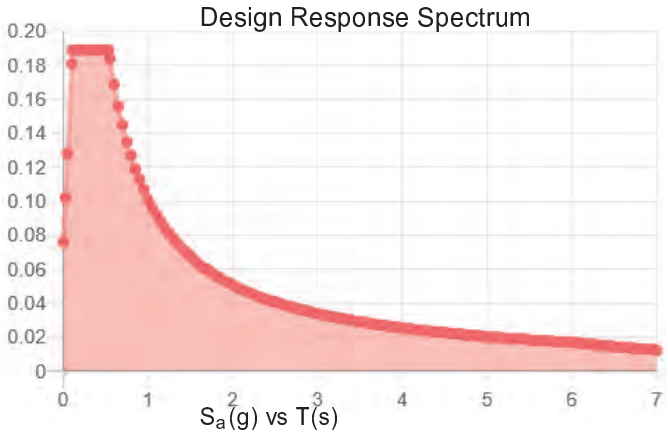
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.177	S_{DS} :	0.189
S_1 :	0.063	S_{D1} :	0.101
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.089
S_{MS} :	0.283	PGA_M :	0.142
S_{M1} :	0.152	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Fri Jan 08 2021

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

Ice

Results:

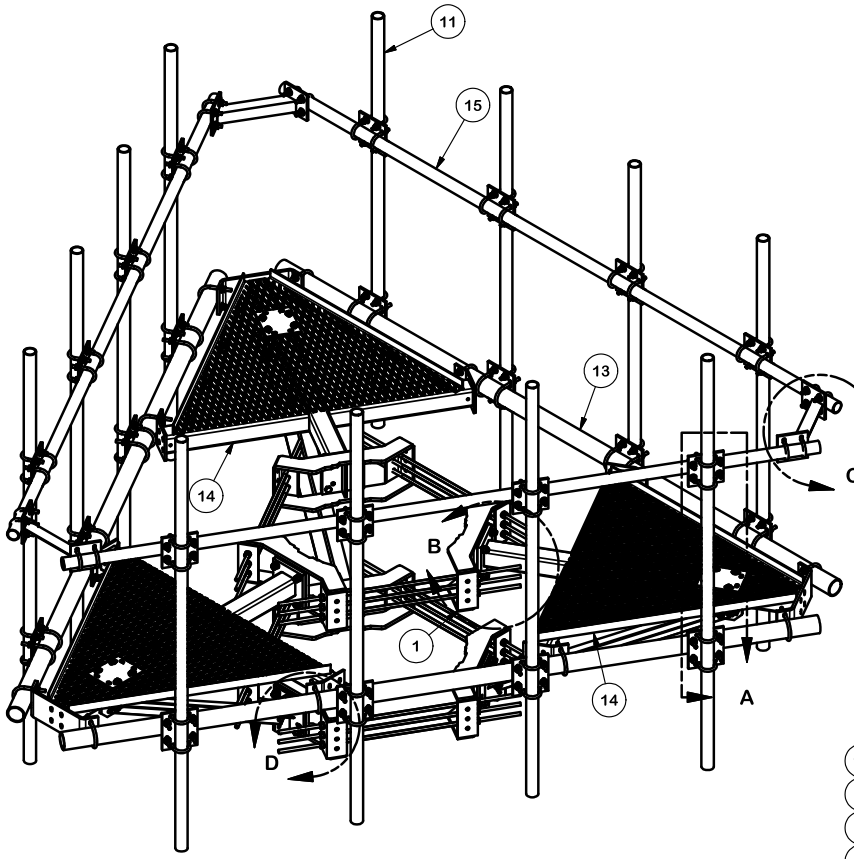
Ice Thickness:	1.00 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Fri Jan 08 2021

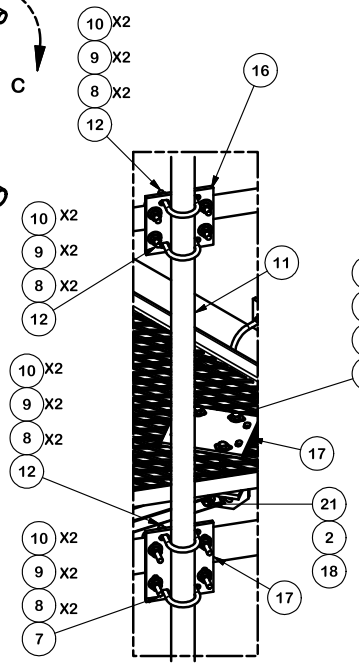
Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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

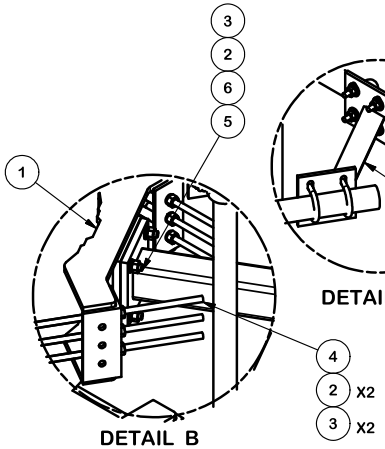
APPENDIX E

SUPPLEMENTAL DRAWINGS





DETAIL A



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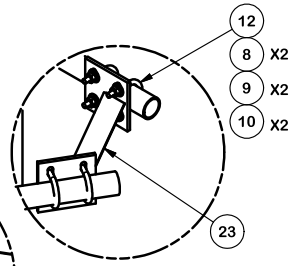

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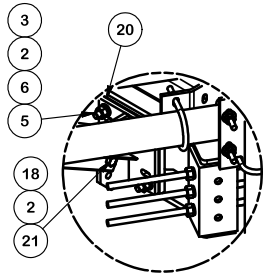


DETAIL D

PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	50.17
13	3	P3150	3-1/2" X 150" (3" SCH 40) GALVANIZED PIPE	150 in	94.80	284.40
14	3	X-SV196	LOW PROFILE PLATFORM CORNER		212.10	636.31
15	3	P2150	2-3/8" O.D. X 150" SCH 40 GALVANIZED PIPE	150 in	45.77	137.31
16	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-253993	PLATFORM REINFORCEMENT KIT ANGLE	52 25/32 in	14.33	85.99
20	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
					TOTAL WT. #	2445.81

TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES *(± 0.030")*
DRILLED AND GAS CUT HOLES *(± 0.030")* - NO CONING OF HOLES
LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
BENDS ARE ± 1/2 DEGREE
ALL OTHER MACHINING *(± 0.030")*
ALL OTHER ASSEMBLY *(± 0.060")*

REVISION HISTORY				
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

DESCRIPTION
12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

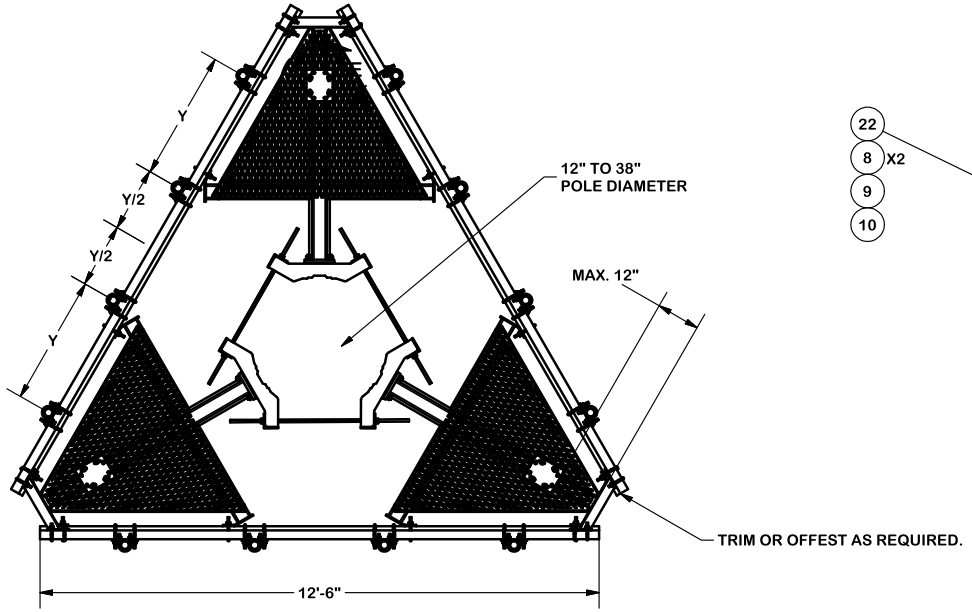
SITE PRO 1 — A valmont COMPANY

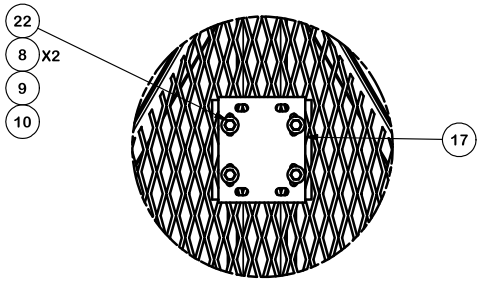
Engineering Support Team: 1-888-753-7446

Locations: New York, NY; Atlanta, GA; Los Angeles, CA; Plymouth, IN; Salem, OR; Dallas, TX

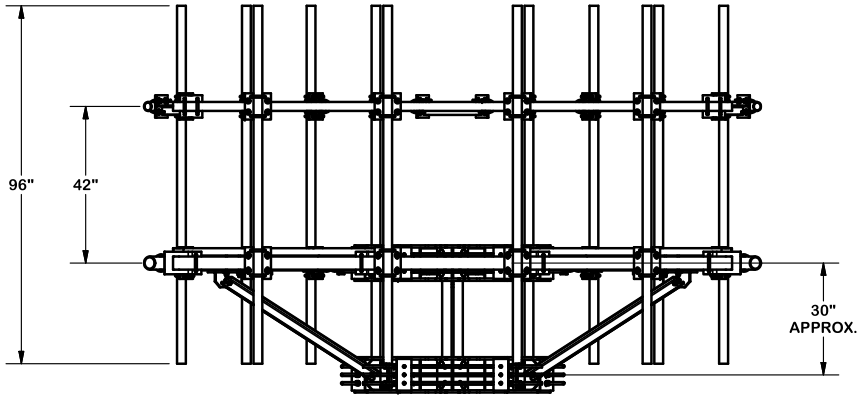
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
4488	CEK 7/14/2014		RMQP-496-HK	1 OF 3

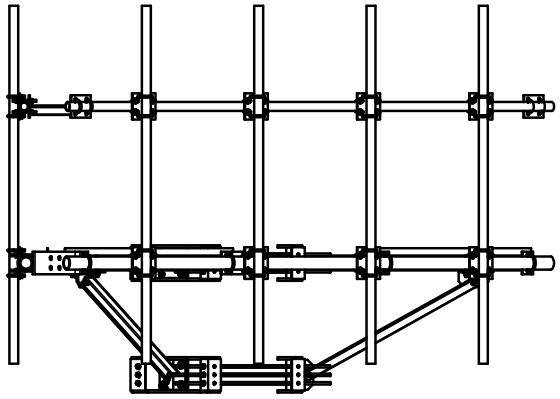
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK





DETAIL E





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LASER CUT EDGES AND HOLES *(± 0.010")* - NO CONING OF HOLES
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ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
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REVISION HISTORY

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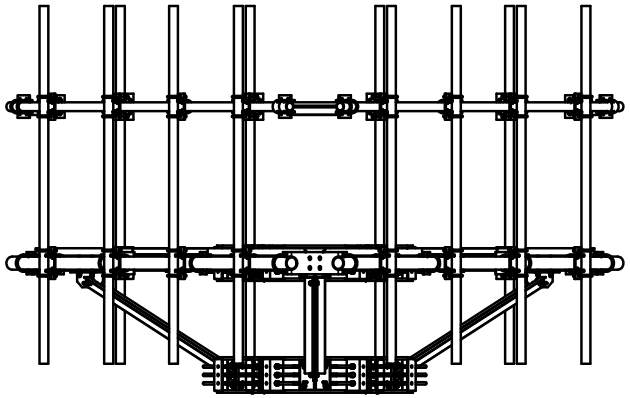
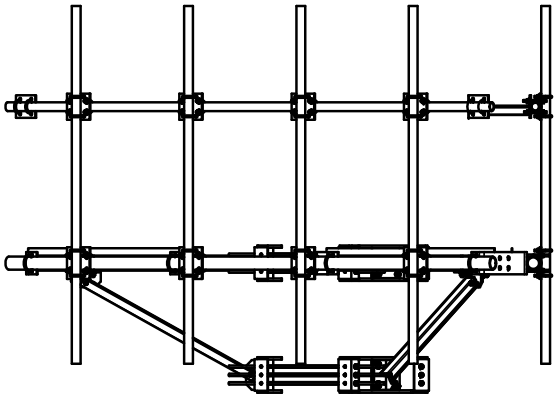
PIPES, AND HANDRAIL

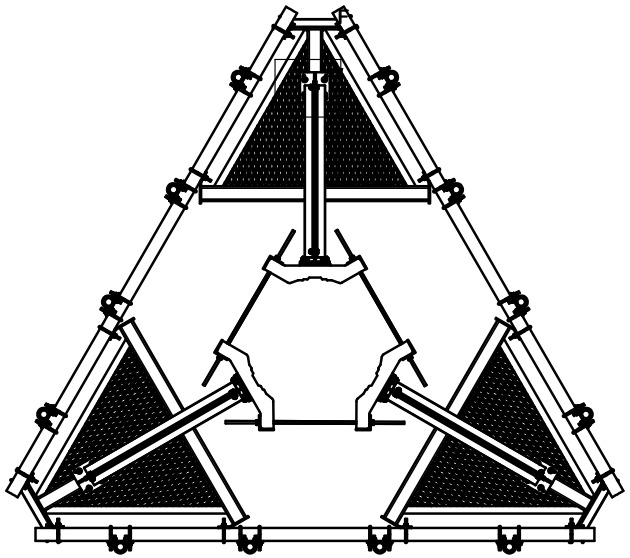
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX

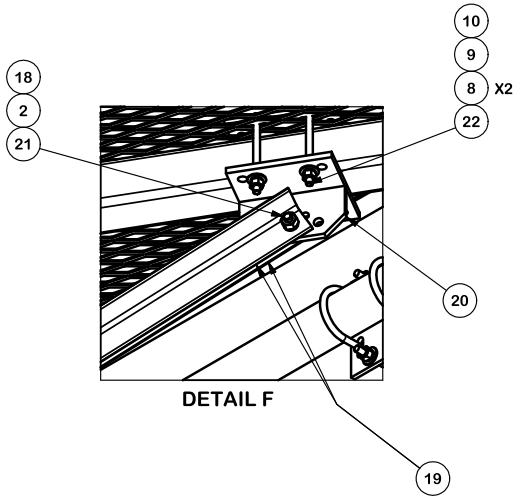
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK









DETAIL F

TOLERANCE NOTES

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ALL OTHER ASSEMBLY *(± 0.060")*

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

REVISION HISTORY

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12' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-3/8" ANTENNA MOUTING
PIPES, AND HANDRAIL

SITE PRO 1
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Engineering Support Team:
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Locations:
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Dallas, TX

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
4488	CEK 7/14/2014		RMQP-496-HK

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
81	02	CUSTOMER	BMC 7/14/2014	RMQP-496-HK

Exhibit F

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTHA518A

AT&T Bolton Monopole
49 South Road
Bolton, CT 06043

May 24, 2019

Transcom Engineering Project Number: 737001-0040

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**17.92 %**

May 24, 2019

T-MOBILE
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, CT 6009

Emissions Analysis for Site: **CTHA518A – AT&T Bolton Monopole**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **49 South Road, Bolton, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **49 South Road, Bolton, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20
UMTS	2100 MHz (AWS)	1	40

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600, 700 MHz, 1900 MHz (PCS) and 2100 MHz (AWS) frequency bands. This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR32 B66A / B2A	99
A	2	RFS APXVAARR24_43-U-NA20	99
B	1	Ericsson AIR32 B66A / B2A	99
B	2	RFS APXVAARR24_43-U-NA20	99
C	1	Ericsson AIR32 B66A / B2A	99
C	2	RFS APXVAARR24_43-U-NA20	99

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **2100 MHz (AWS) UMTS** radios are ground mounted the following cable loss values were used. For each ground mounted **2100 MHz (AWS) UMTS** radio there was **2.08 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **120 feet** of **7/8"** coax.

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	4.48
Antenna A2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.95 / 13.35 / 16.35	5	240	5,899.28	4.67
						Sector A Composite MPE%	**9.15**
Antenna B1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	4.48
Antenna B2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.95 / 13.35 / 16.35	5	240	5,899.28	4.67
						Sector B Composite MPE%	**9.15**
Antenna C1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85	6	280	10,768.57	4.48
Antenna C2	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz / 2100 MHz (AWS)	12.95 / 13.35 / 16.35	5	240	5,899.28	4.67
						Sector C Composite MPE%	**9.15**

Table 3: T-MOBILE Emissions Levels

The Following table (*table 4*) shows all additional carriers on site and their MPE% as recorded in the CSC active MPE database for this facility along with the newly calculated maximum T-MOBILE MPE contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results on all three sectors. *Table 5* below shows a summary for each T-MOBILE Sector as well as the composite MPE value for the site.

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**9.15 %**
AT&T	2.56 %
MetroPCS	0.79 %
Verizon Wireless	5.42 %
Site Total MPE %:	**17.92 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	9.15 %
T-MOBILE Sector B Total:	9.15 %
T-MOBILE Sector C Total:	9.15 %
Site Total:	17.92 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	1,538.37	99	25.58	1900 MHz (PCS)	1000	2.56%
T-Mobile 2100 MHz (AWS) LTE	2	2,307.55	99	19.18	2100 MHz (AWS)	1000	1.92%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	99	6.56	600 MHz	400	1.64%
T-Mobile 700 MHz LTE	2	1,297.63	99	10.79	700 MHz	467	2.31%
T-Mobile 2100 MHz (AWS) UMTS	1	1,726.08	99	7.17	2100 MHz (AWS)	1000	0.72%
						Total:	**9.15%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	9.15 %
Sector B:	9.15 %
Sector C:	9.15 %
T-MOBILE Maximum Total (per sector):	9.15 %
Site Total:	17.92 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **17.92 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
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Transcom Engineering, Inc
PO Box 1048
Sterling, MA 01564