Transcend Wireless

10 Industrial Ave,
Suite 3
Mahwah NJ 07430

Phone: 201.684.0055
Fax: 201.684.0066

July 21, 2020

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Notice of Exempt Modification
220 Evergreen Street, Bridgeport, CT 06606
Latitude: 41.19781100
Longitude: -73.19084500
T-Mobile Site#: CTFF335A – Anchor

Dear Ms. Bachman:

T-Mobile currently maintains twelve (12) antennas at the 110-foot level of the existing 135-foot monopole tower at 220 Evergreen Street, Bridgeport, CT. The 135-foot monopole is owned by Blue Sky Towers. The property is owned by Chapin & Bangs Company. T-Mobile now intends to replace four (4) existing antennas with four (4) new 600/700/1900/2100/2500 MHz antennas. The new antennas will be installed at the same 110-foot level of the tower.

Planned Modifications:
Tower:

Remove
N/A

Remove and Replace:
(4) DBXNH-6565B-A2M for (4) AIR 6449 B41 2500 MHz Antennas
(4) CBC6AE7LQ-DS-43 Diplexers for (4) SDX1926Q-43 Diplexers
(4) Ericsson RRUS11 for (4) Ericsson Radio 4449 RRUs
(4) Ericsson 4478 RRUs for (4) Ericsson 4415 RRUs

Install New:
(4) 1-5/8” Hybrid

Existing to Remain:
(4) APXVARR24_43-U-NA20 600/700/1900/2100 MHz Antennas
(4) AIR 32 1900/2100 MHz Antennas
(4) Ericsson RRUS11
(4) 1-5/8” Hybrid

Ground:
Install New: 6160 Cabinet and B160 Battery Cabinet

This tower was originally approved by the Connecticut Siting Council via Docket No. 464 on April 14, 2016. T-Mobile was approved for tower-sharing by the Connecticut Siting Council on February 15, 2018. The previous approvals did not come with conditions that would be violated by the proposed modification.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor -Joseph P. Ganim, Elected Official, and Thomas F. Gill, Director of Planning and Economic Development for the City of Bridgeport, as well as the property owner and tower owner.

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

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

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

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

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications 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 referenced telecommunications facility constitute an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Kyle Richers
Transcend Wireless
Cell: 908-447-4716
Email: krichers@transcendwireless.com

Attachments
cc: Joseph P. Ganim – Mayor of City of Bridgeport
Thomas F. Gill– Director of Planning & Economic Development for City of Bridgeport
Chapin & Bangs Company – Property Owner
Blue Sky Towers – Tower Owner

UPS Internet Shipping: View/Print Label

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

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

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

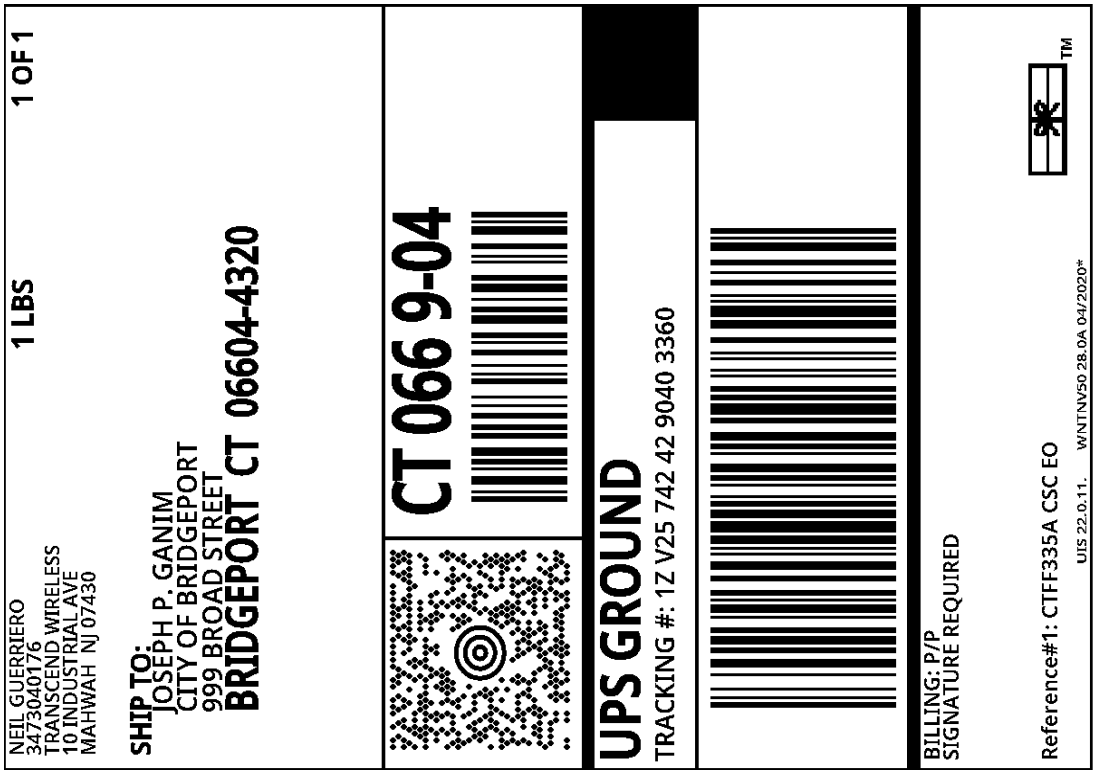
   Customers without a Daily Pickup
   Take your package to any location of The UPS Store®, UPS Access Point(TM) location, UPS Drop Box, UPS Customer Center, Staples® or Authorized Shipping Outlet near you. Items sent via UPS Return Services(SM) (including via Ground) are also accepted at Drop Boxes. To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

UPS Access Point™
MICHAELS STORE # 7773
75 INTERSTATE SHOP CTR
RAMSEY ,NJ 07446

UPS Access Point™
THE UPS STORE
115 FRANKLIN TPKE
MAHWAH ,NJ 07430

UPS Access Point™
THE UPS STORE
120 E MAIN ST
RAMSEY ,NJ 07446

FOLD HERE



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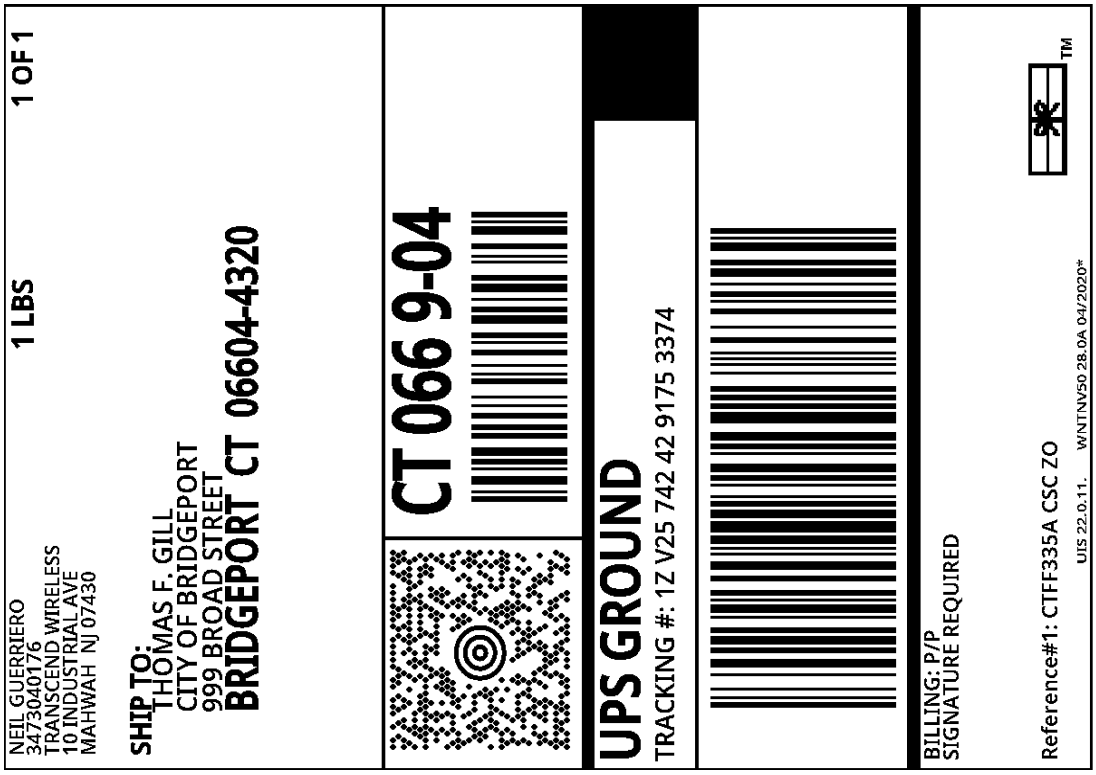

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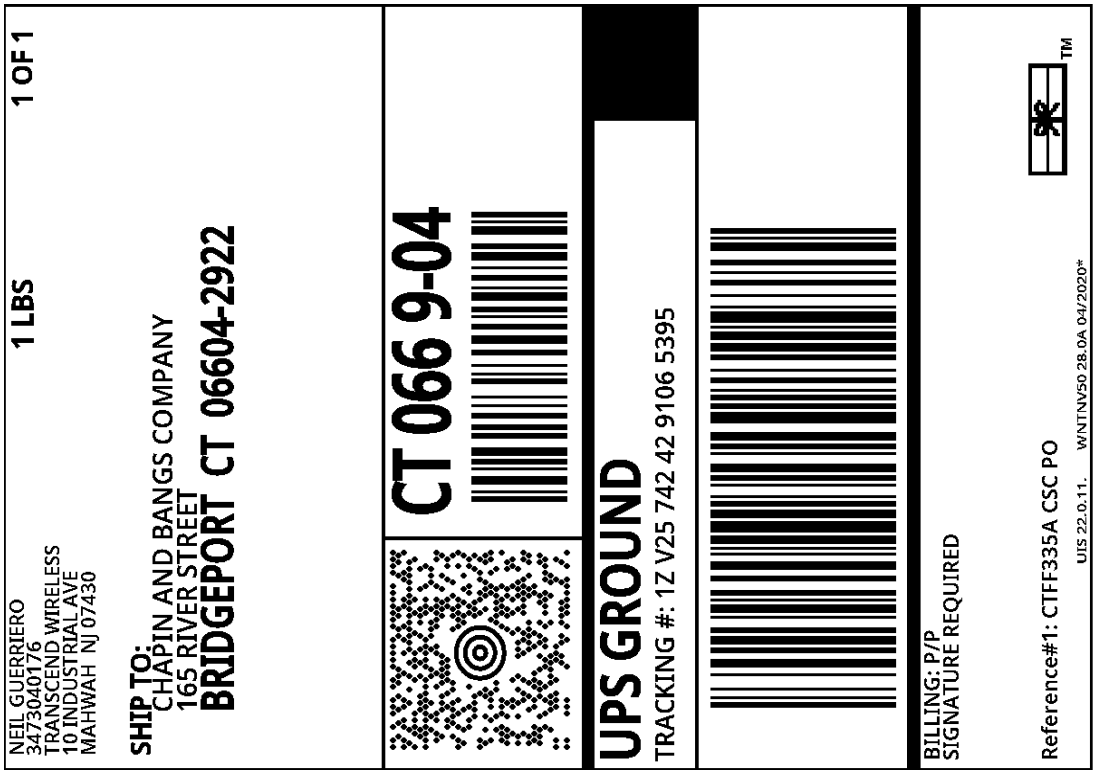


220 EVERGREEN ST

Location	220 EVERGREEN ST	**Mblu**	53/ 1527/ 2/ /
Acct#	R--0048990	**Owner**	CHAPIN & BANGS COMPANY
Assessment	$246,652	**Appraisal**	$352,360
PID	13578	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$2,250	$350,110	$352,360
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$1,580	$245,072	$246,652

Owner of Record

Owner	CHAPIN & BANGS COMPANY	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	PO BOX 1117 BRIDGEPORT, CT 06601	**Book & Page**	2291/0054
		Sale Date	05/12/1987
		Instrument	

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CHAPIN & BANGS COMPANY	$0		2291/0054		05/12/1987

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0
Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes

Field	Description
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy:	
Exterior Wall 1:	
Exterior Wall 2:	
Roof Structure:	
Roof Cover:	
Interior Wall 1:	
Interior Wall 2:	
Interior Flr 1:	
Interior Flr 2	
Heat Fuel:	
Heat Type:	
AC Type:	
Total Bedrooms	
Total Full Baths	
Total Half Baths	
Total Xtra Fixtrs:	
Total Rooms	
Bath Style:	
Kitchen Style:	
Num Kitchens	
Fireplaces	
Usrfld 103	
Usrfld 104	
Usrfld 105	
Fin Bsmt Area	
Fin Bsmt Quality	
Num Park	
Bsmt Garages	
Usrfld 108	
Usrfld 101	
Usrfld 102	
.	
Usrfld 300	
Usrfld 301	

Building Photo

(http://images.vgsi.com/photos2/BridgeportCTPhotos//\00\10\20\58.jpg)

Building Layout

(ParcelSketch.ashx?pid=13578&bid=13578)

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code	399
Description	Vac Ind Lnd
Zone	ILI
Neighborhood	IND
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.00
Frontage	0
Depth	0
Assessed Value	$245,072
Appraised Value	$350,110

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN2	Fence, WD	4	4 ft	150.00 LF	$2,250	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$2,250	$350,110	$352,360
2017	$2,250	$350,110	$352,360
2016	$29,050	$200,110	$229,160

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$1,580	$245,072	$246,652
2017	$1,580	$245,072	$246,652
2016	$1,580	$140,080	$141,660

City of Bridgeport

CTFF335A

Legend

- Parcels
- Streetname
- Roadways
  - Local
  - Collector
  - Minor Collector
  - Minor Arterial
  - Major Collector
  - PA Other
  - PA Other Expwy
  - PA Interstate

141.9 0 70.97 141.9 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Connecticut Metropolitan Council of Governments

METROCOG
Connecticut Metropolitan Council of Governments

DOCKET NO. 464 – Blue Sky Towers, LLC and New Cingular Wireless PCS, LLC application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of a telecommunications facility located at Bridgeport Tax Assessor Map 53, Block 1527, Lot 2, 220 Evergreen Street, Bridgeport, Connecticut.	}	Connecticut
	}	Siting
	}	Council
		April 14, 2016

Decision and Order

Pursuant to Connecticut General Statutes §16-50p and the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, maintenance, and operation 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 Blue Sky Towers, LLC, hereinafter referred to as the Certificate Holder, for a telecommunications facility at the proposed site located at 220 Evergreen Street, Bridgeport, Connecticut.

Unless otherwise approved by the Council, 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 at a height of 135 feet above ground level to provide the proposed wireless services, sufficient to accommodate the antennas of New Cingular Wireless PCS, LLC (AT&T) and other entities, both public and private. The height of the tower may be extended after the date of this Decision and Order pursuant to regulations of the Federal Communications Commission.

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 served on the City of Bridgeport (City) for comment, and all parties and intervenors as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
    a) final site plan(s) for development of the facility to include specifications for the tower, tower foundation, antennas, equipment compound including, but not limited to, fence with less than two inch mesh, radio equipment, access road, utility line, transformer, emergency backup generator, space for a future shared generator, flood elevation mitigation plan for equipment, and landscaping that employ the governing standard in the State of Connecticut for tower design in accordance with the currently adopted International Building Code and taking into account inundation risk;
    b) the tower designed with a yield point to ensure that the tower setback radius remains within the boundaries of the subject property;
    c) location of emergency generator and equipment shelter with air conditioning units and evidence of compliance with noise regulations;
    d) construction plans for site clearing, grading, landscaping, water drainage, and erosion and sedimentation controls consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended; and
    e) hours of construction.

3. Prior to the commencement of operation, the Certificate Holder shall provide the Council worst-case modeling of the electromagnetic radio frequency power density 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 ensure a recalculated report of the electromagnetic radio frequency power density be submitted to the Council 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 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. Unless otherwise approved by the Council, if the facility authorized herein is not fully constructed with at least one fully operational wireless telecommunications carrier providing wireless service within eighteen months from the date of the mailing of the Council's Findings of Fact, Opinion, and Decision and Order (collectively called "Final Decision"), 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. The time between the filing and resolution of any appeals of the Council's Final Decision shall not be counted in calculating this deadline. Authority to monitor and modify this schedule, as necessary, is delegated to the Executive Director. The Certificate Holder shall provide written notice to the Executive Director of any schedule changes as soon as is practicable.

7. Any request for extension of the time period referred to in Condition 6 shall be filed with the Council not later than 60 days prior to the expiration date of this Certificate and shall be served on all parties and intervenors, as listed in the service list, and the City of Bridgeport.

8. If the facility 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 within 90 days from the one year period of cessation of service. The Certificate Holder may submit a written request to the Council for an extension of the 90 day period not later than 60 days prior to the expiration of the 90 day period.

9. Any nonfunctioning antenna, and associated antenna mounting equipment, on this facility shall be removed within 60 days of the date the antenna ceased to function.

10. In accordance with Section 16-50j-77 of the Regulations of Connecticut State Agencies, the Certificate Holder shall provide the Council with written notice two weeks prior to the commencement of site construction activities. In addition, the Certificate Holder shall provide the Council with written notice of the completion of site construction, and the commencement of site operation.

11. The Certificate Holder shall remit timely payments associated with annual assessments and invoices submitted by the Council for expenses attributable to the facility under Conn. Gen. Stat. §16-50v.

12. This Certificate may be transferred in accordance with Conn. Gen. Stat. §16-50k(b), provided both the Certificate Holder/transferor and the transferee are current with payments to the Council for their respective annual assessments and invoices under Conn. Gen. Stat. §16-50v. In addition, both the Certificate Holder/transferor and the transferee shall provide the Council a written agreement as to the entity responsible for any quarterly assessment charges under Conn. Gen. Stat. §16-50v(b)(2) that may be associated with this facility.

13. The Certificate Holder shall maintain the facility and associated equipment, including but not limited to, the tower, tower foundation, antennas, equipment compound, radio equipment, access road, utility line and landscaping in a reasonable physical and operational condition that is consistent with this Decision and Order and a Development and Management Plan to be approved by the Council.

14. If the Certificate Holder is a wholly-owned subsidiary of a corporation or other entity and is sold/transferred to another corporation or other entity, the Council shall be notified of such sale and/or transfer and of any change in contact information for the individual or representative responsible for management and operations of the Certificate Holder within 30 days of the sale and/or transfer.

15. This Certificate may be surrendered by the Certificate Holder upon written notification and approval by the Council.

We hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed in the Service List, dated December 3, 2015, and notice of issuance published in the Connecticut Post.

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.

WIRELESS COMMUNICATIONS FACILITY

CTFF335A

SITE ID: CTFF335A

220 EVERGREEN STREET, BRIDGEPORT, CT 06606

T-MOBILE RF CONFIGURATION

67D5997DB_2xAIR+1OP

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTON, PLUMBING, ELECTRICAL, AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT, AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND ITS COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MANUFACTURER'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND 'MISSED' ITEMS ARE TO BE BROUGHT TO THE ATTENTION OF THE T–MOBILE CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUITS AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT 'CALL BEFORE YOU DIG' AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS AT 1–800–922–4455. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH THE OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.

SITE DIRECTIONS

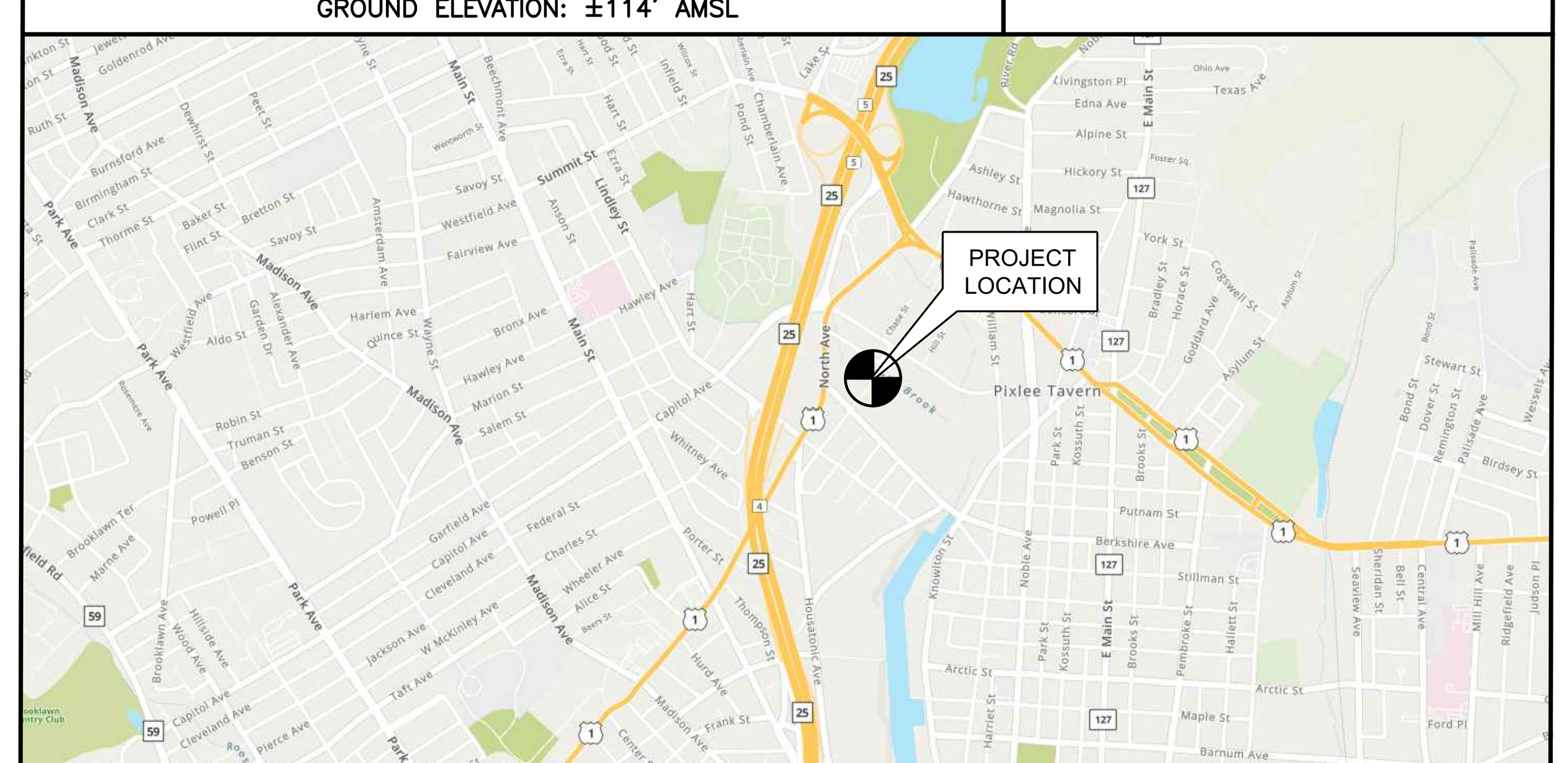
FROM: 35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002

TO: 220 EVERGREEN STREET,
BRIDGEPORT, CT 06606

1.	HEAD NORTH ON GRIFFIN ROAD S. TOWARD HARTMAN RD.	
2.	TAKE THE 2ND RIGHT ONTO DAY HILL RD.	0.30 MI.
3.	TAKE THE 1ST RIGHT ONTO BLUE HILLS AVENUE EXT/CT–187. CONTINUE TO FOLLOW CT–187.	0.14 MI.
4.	STAY STRAIGHT TO GO ONTO BLUE HILLS AVE/CT–187.	0.64 MI.
5.	TURN LEFT ONTO E WINTONBURY AVE/CT–178. CONTINUE TO FOLLOW CT–178.	2.72 MI.
6.	MERGE ONTO I–91 S TOWARD HARTFORD.	1.77 MI.
7.	MERGE ONTO CT–15 S VIA EXIT 17 TOWARD E MAIN ST.	23.74 MI.
8.	MERGE ONTO CT–8 S VIA EXIT 52 TOWARD BRIDGEPORT.	30.24 MI.
9.	TAKE EXIT 5 TOWARD NORTH AVE/BOSTON AVE/ MOTOR VEH DEPT/BEARDSLEY ZOOLOGICAL GARDENS	3.48 MI.
10.	MERGE ONTO CHOPSEY HILL RD.	0.34 MI.
11.	TURN RIGHT ONTO NORTH AVE/US–1 S.	0.29 MI.
12.	TURN LEFT ONTO RIVER ST.	0.40 MI.
13.	TAKE THE 1ST LEFT ONTO EVERGREEN ST.	0.08 MI.
14.	220 EVERGREEN ST, BRIDGEPORT, CT, IS ON THE RIGHT.	0.03 MI.

SITE COORDINATES: LATITUDE: 41° 11' 52.11" N
LONGITUDE: 73° 11' 27.04" W
GROUND ELEVATION: ±114' AMSL

COORDINATES AND GROUND ELEVATION ARE REFERENCED FROM GOOGLE EARTH



VICINITY MAP

NORTH

PROJECT SUMMARY

THE PROPOSED SCOPE OF WORK CONSISTS OF A MODIFICATION TO THE EXISTING UNMANNED TELECOMMUNICATIONS FACILITY INCLUDING THE FOLLOWING:

1. REPLACE BB5216 WITH (1) BB6630 FOR L2100, L1900 (BOTH CARRIERS), L700 AND L600 IN EXISTING CABINET.
2. REMOVE XMU FROM EXISTING CABINET.
3. INSTALL (1) ENCLOSURE 6160.
4. INSTALL (1) BATTERY CABINET B160.
5. INSTALL (1) iXRe ROUTER TO NEW ENCLOSRE 6160.
6. INSTALL (3) BB6630 FOR L2500, (1) BB6648 FOR N2500 TO NEW ENCLOSURE 6160.
7. INSTALL (4) 6X12 HCS. LENGTH OF NEW HCS WILL MATCH THAT OF EXISTING HCS.
8. REPLACE LOW–BAND QUAD WITH LOW–BAND/MID–BAND OCTO IN POSITION 2 PER EACH SECTOR.
9. REMOVE LOW–BAND DIPLEXER FROM POSITION 2 PER EACH SECTOR.
10. REPLACE RRUS11 B12 AND RADIO 4478 B71 WITH (1) RADIO 4449 B71+B85 AND CONNECT ITS PORTS TO THE LOW–BAND PORTS OF THE OCTO ANTENNA.
11. INSTALL (1) PCS/AWS 8:4 DIPLIXER TO POSITION 2 AT ANTENNA AND CONNECT ITS (4) OUTPUT PORTS TO THE MID–BAND PORTS OF THE OCTO ANTENNA.
12. INSTALL (1) RADIO 4415 B25 FOR L1900 2ND CARRIER TO POSITION 2 AT ANTENNA AND CONNECT ITS PORTS TO THE (4) PCS INPUT PORTS OF THE DIPLEXER.
13. MAKE SURE TO PLACE METAL CAPS ON THE UNUSED PORTS OF THE DIPLEXER.
14. REMOVE MID–BAND QUAD FROM POSITION 3 PER EACH SECTOR.
15. INSTALL (1) AIR6449 B41 FOR L2500 AND N2500 TO POSITION 3 PER EACH SECTOR.
16. INSTALL (1) DUAL SWIVEL MOUNT PER SECTOR, TOTAL OF (4).

PROJECT INFORMATION

SITE NAME:	CTFF335A
SITE ID:	CTFF335A
SITE ADDRESS:	220 EVERGREEN STREET, BRIDGEPORT, CT 06606
APPLICANT:	T–MOBILE NORTHEAST, LLC 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002
CONTACT PERSON:	DAN REID (PROJECT MANAGER) TRANSCEND WIRELESS, LLC (203) 592–8291
ENGINEER OF RECORD:	CENTEK ENGINEERING, INC. 63–2 NORTH BRANFORD RD. BRANFORD, CT 06405 CARLO F. CENTORE, PE (203) 488–0580 EXT. 122
PROJECT COORDINATES:	LATITUDE: 41° 11' 52.11" N LONGITUDE: 73° 11' 27.04" W GROUND ELEVATION: ±114' AMSL SITE COORDINATES AND GROUND ELEVATION REFERENCED FROM GOOGLE EARTH.

SHEET INDEX

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/13/20	KAWJR	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

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T–MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
CTFF335A
SITE ID: CTFF335A
220 EVERGREEN STREET,
BRIDGEPORT, CT 06606

DATE: 06/18/20
SCALE: AS NOTED
JOB NO. 20074.42

TITLE SHEET

T–1

NOTES AND SPECIFICATIONS

DESIGN BASIS:

GOVERNING CODE: 2015 INTERNATIONAL BUILDING (IBC) AS MODIFIED BY THE 2018 CONNECTICUT STATE BUILDING CODE.

1. DESIGN CRITERIA:

- WIND LOAD: PER TIA 222 G (ANTENNA MOUNTS): 90–110 MPH (3 SECOND GUST)
- RISK CATEGORY II (BASED ON IBC TABLE 1604.5)
- NOMIMAL DESIGN SPEED (OTHER STRUCTURE): 97 MPH (Vasd) (EXPOSURE C/ IMPORTANCE FACTOR 1.0 BASED ON ASCE 7–10).

SITE NOTES

1. THE CONTRACTOR SHALL CALL UTILITIES PRIOR TO THE START OF CONSTRUCTION.
2. ACTIVE EXISTING UTILITIES, WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY, PRIOR TO PROCEEDING, SHOULD ANY UNCOVERED EXISTING UTILITY PRECLUDE COMPLETION OF THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE AREAS OF THE COMPOUND DISTURBED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL CONDITION.
4. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
5. IF ANY FIELD CONDITIONS EXIST WHICH PRECLUDE COMPLIANCE WITH THE DRAWINGS, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER AND SHALL PROCEED WITH AFFECTED WORK AFTER CONFLICT IS SATISFACTORILY RESOLVED.

GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE AS MODIFIED BY THE 2018 CONNECTICUT SUPPLEMENT, INCLUDING THE TIA/EIA–222 REVISION "G" "STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND SUPPORTING STRUCTURES." 2017 CONNECTICUT FIRE SAFETY CODE, NATIONAL ELECTRICAL CODE AND LOCAL CODES.
2. CONTRACTOR SHALL REVIEW ALL DRAWINGS AND SPECIFICATIONS IN THE CONTRACT DOCUMENT SET. CONTRACTOR SHALL COORDINATE ALL WORK SHOWN IN THE SET OF DRAWINGS. THE CONTRACTOR SHALL PROVIDE A COMPLETE SET OF DRAWINGS TO ALL SUBCONTRACTORS AND ALL RELATED PARTIES. THE SUBCONTRACTORS SHALL EXAMINE ALL THE DRAWINGS AND SPECIFICATIONS FOR THE INFORMATION THAT AFFECTS THEIR WORK.
3. CONTRACTOR SHALL PROVIDE A COMPLETE BUILD–OUT WITH ALL FINISHES, STRUCTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS AND PROVIDE ALL ITEMS AS SHOWN OR INDICATED ON THE DRAWINGS OR IN THE WRITTEN SPECIFICATIONS.
4. CONTRACTOR SHALL FURNISH ALL MATERIAL, LABOR AND EQUIPMENT TO COMPLETE THE WORK AND FURNISH A COMPLETED JOB ALL IN ACCORDANCE WITH LOCAL AND STATE GOVERNING AUTHORITIES AND OTHER AUTHORITIES HAVING LAWFUL JURISDICTION OVER THE WORK.
5. CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND ALL INSPECTIONS REQUIRED AND SHALL ALSO PAY FEES REQUIRED FOR THE GENERAL CONSTRUCTION, PLUMBING, ELECTRICAL AND HVAC. PERMITS SHALL BE PAID FOR BY THE RESPECTIVE SUBCONTRACTORS.
6. CONTRACTOR SHALL MAINTAIN A CURRENT SET OF DRAWINGS AND SPECIFICATIONS ON SITE AT ALL TIMES AND INSURE DISTRIBUTION OF NEW DRAWINGS TO SUBCONTRACTORS AND OTHER RELEVANT PARTIES AS SOON AS THEY ARE MADE AVAILABLE. ALL OLD DRAWINGS SHALL BE MARKED VOID AND REMOVED FROM THE CONTRACT AREA. THE CONTRACTOR SHALL FURNISH AN 'AS–BUILT' SET OF DRAWINGS TO OWNER UPON COMPLETION OF PROJECT.
7. LOCATION OF EQUIPMENT AND WORK SUPPLIED BY OTHERS THAT IS DIAGRAMMATICALLY INDICATED ON THE DRAWINGS, SHALL BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL DETERMINE LOCATIONS AND DIMENSIONS SUBJECT TO STRUCTURAL CONDITIONS AND WORK OF THE SUBCONTRACTORS.
8. THE CONTRACTOR IS SOLELY RESPONSIBLE TO DETERMINE CONSTRUCTION PROCEDURE AND SEQUENCE, AND TO ENSURE THE SAFETY OF THE EXISTING STRUCTURES AND IT'S COMPONENT PARTS DURING CONSTRUCTION. THIS INCLUDES THE ADDITION OF WHATEVER SHORING, BRACING, UNDERPINNING, ETC. THAT MAY BE NECESSARY.
9. DRAWINGS INDICATE THE MINIMUM STANDARDS, BUT IF ANY WORK SHOULD BE INDICATED TO BE SUBSTANDARD TO ANY ORDINANCES, LAWS, CODES, RULES, OR REGULATIONS BEARING ON THE WORK, THE CONTRACTOR SHALL INCLUDE IN HIS WORK AND SHALL EXECUTE THE WORK CORRECTLY IN ACCORDANCE WITH SUCH ORDINANCES, LAWS, CODES, RULES OR REGULATIONS WITH NO INCREASE IN COSTS.
10. ALL UTILITY WORK SHALL BE IN ACCORDANCE WITH LOCAL UTILITY COMPANY REQUIREMENTS AND SPECIFICATIONS.
11. ALL EQUIPMENT AND PRODUCTS PURCHASED ARE TO BE REVIEWED BY CONTRACTOR AND ALL APPLICABLE SUBCONTRACTORS FOR ANY CONDITION PER MFR.'S RECOMMENDATIONS. CONTRACTOR TO SUPPLY THESE ITEMS AT NO COST TO OWNER OR CONSTRUCTION MANAGER.
12. ANY AND ALL ERRORS, DISCREPANCIES, AND "MISSED" ITEMS, ARE TO BE BROUGHT TO THE ATTENTION OF THE SITE OWNER'S CONSTRUCTION MANAGER DURING THE BIDDING PROCESS BY THE CONTRACTOR. ALL THESE ITEMS ARE TO BE INCLUDED IN THE BID. NO 'EXTRA' WILL BE ALLOWED FOR MISSED ITEMS.
13. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL ON–SITE SAFETY FROM THE TIME THE JOB IS AWARDED UNTIL ALL WORK IS COMPLETE AND ACCEPTED BY THE OWNER.
14. CONTRACTOR TO REVIEW ALL SHOP DRAWINGS AND SUBMIT COPY TO ENGINEER FOR APPROVAL. DRAWINGS MUST BEAR THE CHECKER'S INITIALS BEFORE SUBMITTING TO THE CONSTRUCTION MANAGER FOR REVIEW.
15. THE CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS, ELEVATIONS, ANGLES, AND EXISTING CONDITIONS AT THE SITE, PRIOR TO FABRICATION AND/OR INSTALLATION OF ANY WORK IN THE CONTRACT AREA.
16. COORDINATION, LAYOUT, FURNISHING AND INSTALLATION OF CONDUIT AND ALL APPURTENANCES REQUIRED FOR PROPER INSTALLATION OF ELECTRICAL AND TELECOMMUNICATION SERVICE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. ALL DAMAGE CAUSED TO ANY EXISTING STRUCTURE SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL BE HELD LIABLE FOR ALL REPAIRS REQUIRED FOR EXISTING STRUCTURES IF DAMAGED DURING CONSTRUCTION ACTIVITIES.
18. THE CONTRACTOR SHALL CONTACT "DIG SAFE" (DIAL 811) AT LEAST 48 HOURS PRIOR TO ANY EXCAVATIONS. ALL UTILITIES SHALL BE IDENTIFIED AND CLEARLY MARKED. CONTRACTOR SHALL MAINTAIN AND PROTECT MARKED UTILITIES THROUGHOUT PROJECT COMPLETION.
19. CONTRACTOR SHALL COMPLY WITH OWNER'S ENVIRONMENTAL ENGINEER ON ALL METHODS AND PROVISIONS FOR ALL EXCAVATION ACTIVITIES INCLUDING SOIL DISPOSAL. ALL BACKFILL MATERIALS TO BE PROVIDED BY THE CONTRACTOR.
20. THE COUNTY/CITY/TOWN WILL MAKE PERIODIC FIELD OBSERVATION AND INSPECTIONS TO MONITOR THE INSTALLATION, MATERIALS, WORKMANSHIP AND EQUIPMENT INCORPORATED INTO THE PROJECT TO ENSURE COMPLIANCE WITH THE DESIGN PLANS, SPECIFICATIONS, CONTRACT DOCUMENTS AND APPROVED SHOP DRAWINGS.
21. THE COUNTY/CITY/TOWN MUST BE NOTIFIED (2) WORKING DAYS PRIOR TO CONCEALMENT/BURIAL OF ANY SYSTEM OR MATERIAL THAT WILL PREVENT THE DIRECT INSPECTION OF MATERIALS, METHODS OR WORKMANSHIP. EXAMPLES OF THESE PROCESSES ARE BACKFILLING A GROUND RING OR TOWER FOUNDATION, POURING TOWER FOUNDATIONS, BURYING GROUND RODS, PLATES OR GRIDS, ETC. THE CONTRACTOR MAY PROCEED WITH THE SCHEDULED PROCESS (2) WORKING DAYS AFTER PROVIDING NOTICE UNLESS NOTIFIED OTHERWISE BY THE COUNTY/CITY/TOWN.

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

CTFF335A

SITE ID: CTFF335A

220 EVERGREEN STREET,
BRIDGEPORT, CT 06606

DATE: 06/18/20

SCALE: AS NOTED

JOB NO. 20074.42

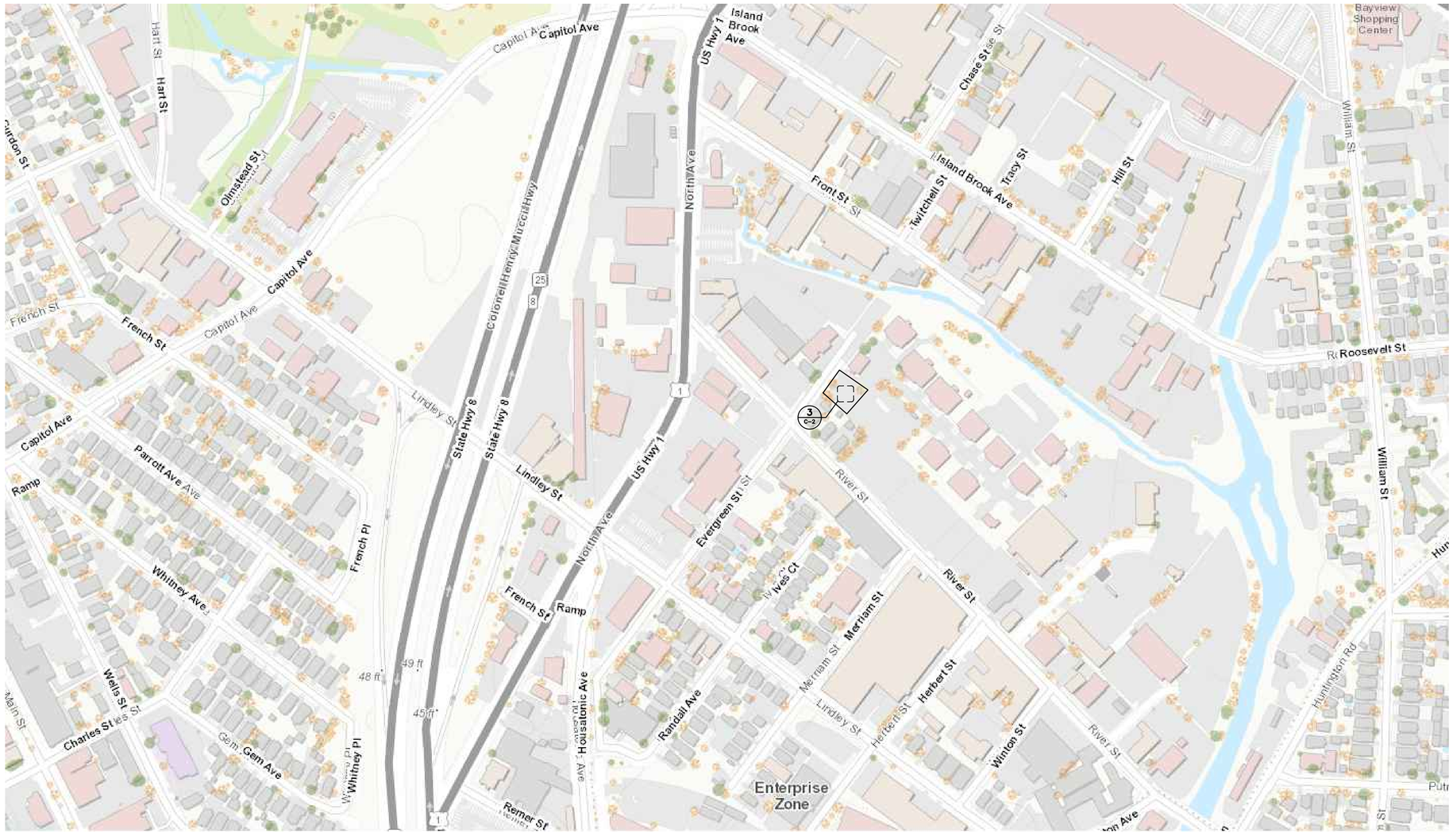
GENERAL NOTES AND SPECIFICATIONS

N-1

NOTE:
ALL COAX LENGTHS TO BE MEASURED
AND VERIFIED IN FIELD BEFORE ORDERING

ANTENNA SCHEDULE

SECTOR	EXISTING/PROPOSED	ANTENNA	SIZE (INCHES) (L x W x D)	ANTENNA ℄ HEIGHT	AZIMUTH	(E/P) RRU (QTY)	(E/P) DIPLEXER (QTY)	(QTY) PROPOSED COAX (LENGTH)
A1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	110'	60°			(1) 6x12 HYBRID CABLE (±180')
A2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	110'	60°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1), (E) RRUS11 B4 (1)	(P) COMMSCOPE - SDX1926Q-43 (E14F0 5P86) (1)	
A3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	110'	60°			
B1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	110'	150°			(1) 6x12 HYBRID CABLE (±180')
B2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	110'	150°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1), (E) RRUS11 B4 (1)	(P) COMMSCOPE - SDX1926Q-43 (E14F0 5P86) (1)	
B3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	110'	150°			
C1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	110'	240°			(1) 6x12 HYBRID CABLE (±180')
C2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	110'	240°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1), (E) RRUS11 B4 (1)	(P) COMMSCOPE - SDX1926Q-43 (E14F0 5P86) (1)	
C3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	110'	240°			
D1	EXISTING	ERICCSON (AIR32 KRD901146-1_B66A_B2A)	56.6 x 12.9 x 8.7	110'	330°			(1) 6x12 HYBRID CABLE (±180')
D2	EXISTING	RFS (APXVAARR24_43-U_NA20)	95.9 x 24 x 8.7	110'	330°	(P) RADIO 4449 B71+B85 (1), (P) RADIO 4415 B25 (1), (E) RRUS11 B4 (1)	(P) COMMSCOPE - SDX1926Q-43 (E14F0 5P86) (1)	
D3	PROPOSED	ERICSSON (AIR6449 B41)	33.1 x 20.6 x 8.6	110'	330°			



1 / C-1 SITE LOCATION PLAN
SCALE: NOT TO SCALE
TRUE NORTH

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
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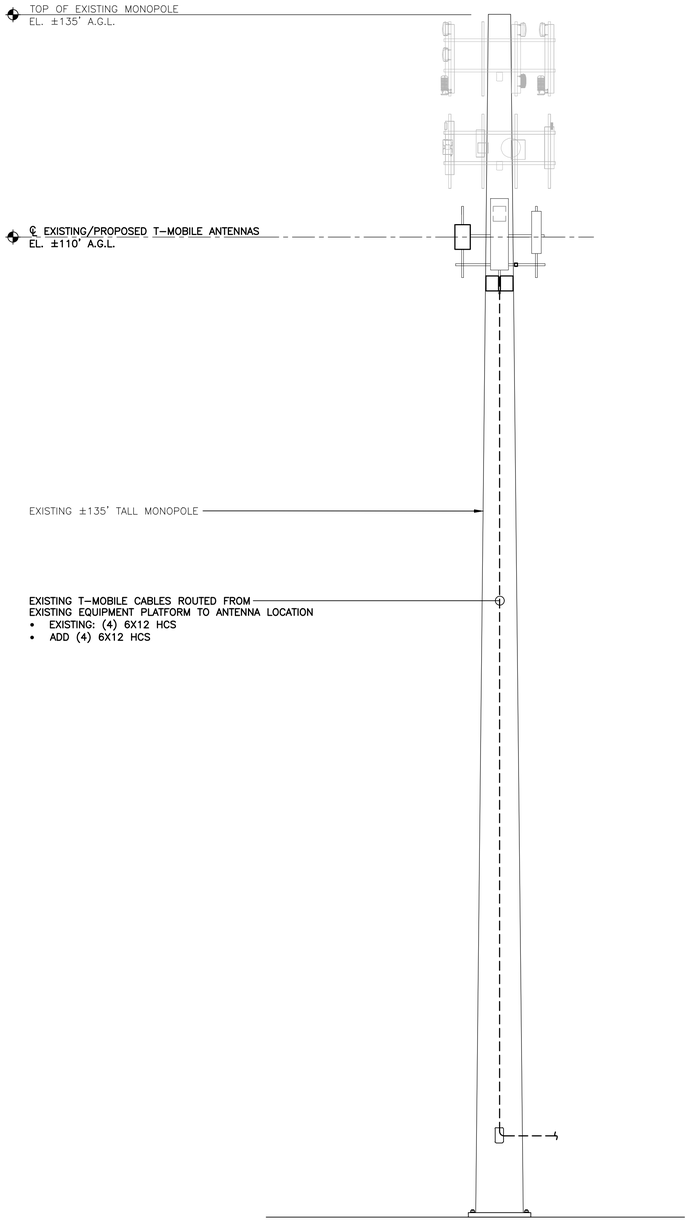
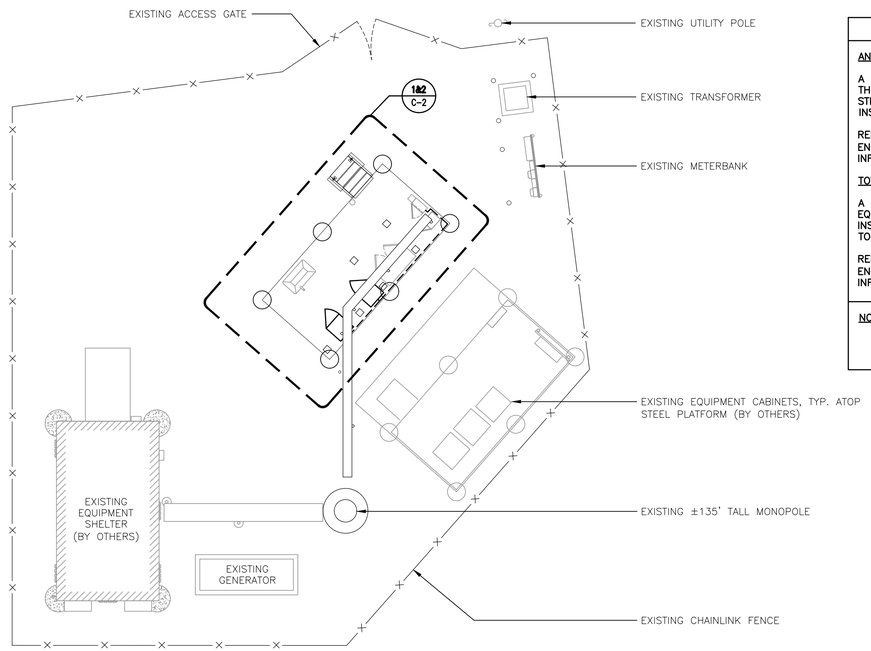
SITE LOCATION PLAN

C-1

Sheet No. 3 of 7



4 C-2 **TOWER ELEVATION - PROPOSED**
SCALE: 1/8" = 1'-0"



3 C-2 **COMPOUND PLAN - PROPOSED**
SCALE: 1" = 5'
APPROXIMATE NORTH

STRUCTURAL COMPLIANCE

ANTENNA MOUNTS

A STRUCTURAL ANALYSIS OF THE ANTENNA MOUNTS WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY DEFICIENT AND WARRANTING MODIFICATION PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.42) DATED 06/15/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

TOWER, TOWER FOUNDATION, AND EQUIPMENT PLATFORM

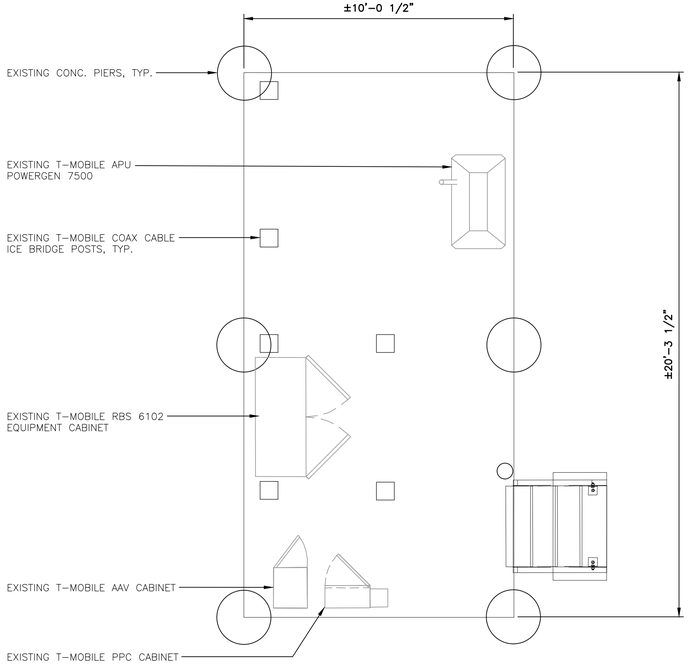
A STRUCTURAL ANALYSIS OF THE TOWER, TOWER FOUNDATION, AND EQUIPMENT PLATFORM WAS PERFORMED FOR THE PROPOSED EQUIPMENT INSTALLATION AND THEY WERE FOUND TO BE STRUCTURALLY SUFFICIENT TO ACCOMMODATE THE PROPOSED LOADING.

REFER TO THE STRUCTURAL ANALYSIS REPORT PREPARED BY CENTEK ENGINEERING (PROJECT # 20074.42) DATED 06/24/20 FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

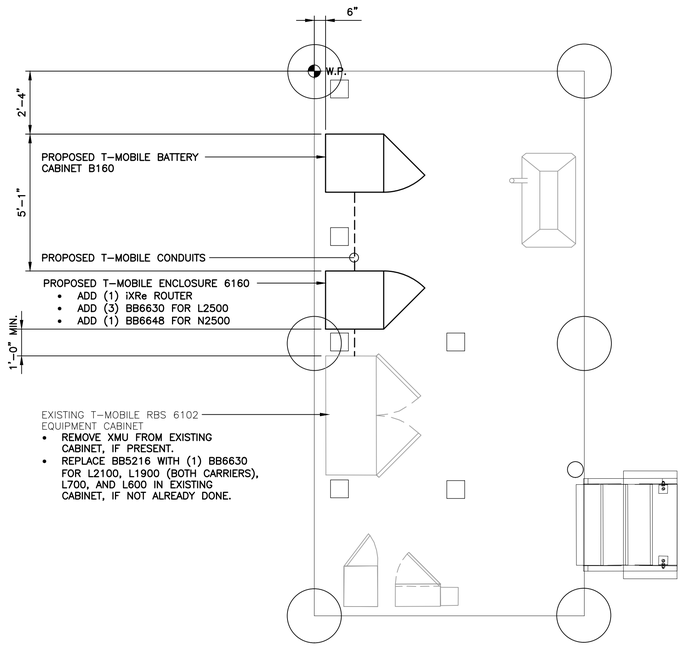
NOTE: NO EQUIPMENT SHALL BE INSTALLED ON THE HOSTING STRUCTURE WITHOUT A PASSING STRUCTURAL ANALYSIS REPORT AND CONTRACTOR PRIOR CONFIRMATION THAT ANY AND ALL REQUISITE MODIFICATIONS HAVE BEEN COMPLETED.

NOTE

EXISTING T-MOBILE COAX CABLE TRAY NOT SHOWN FOR CLARITY.



1 C-2 **EXISTING EQUIPMENT PLAN**
SCALE: 1/2" = 1'
APPROXIMATE NORTH



2 C-2 **PROPOSED EQUIPMENT PLAN**
SCALE: 1/2" = 1'
APPROXIMATE NORTH

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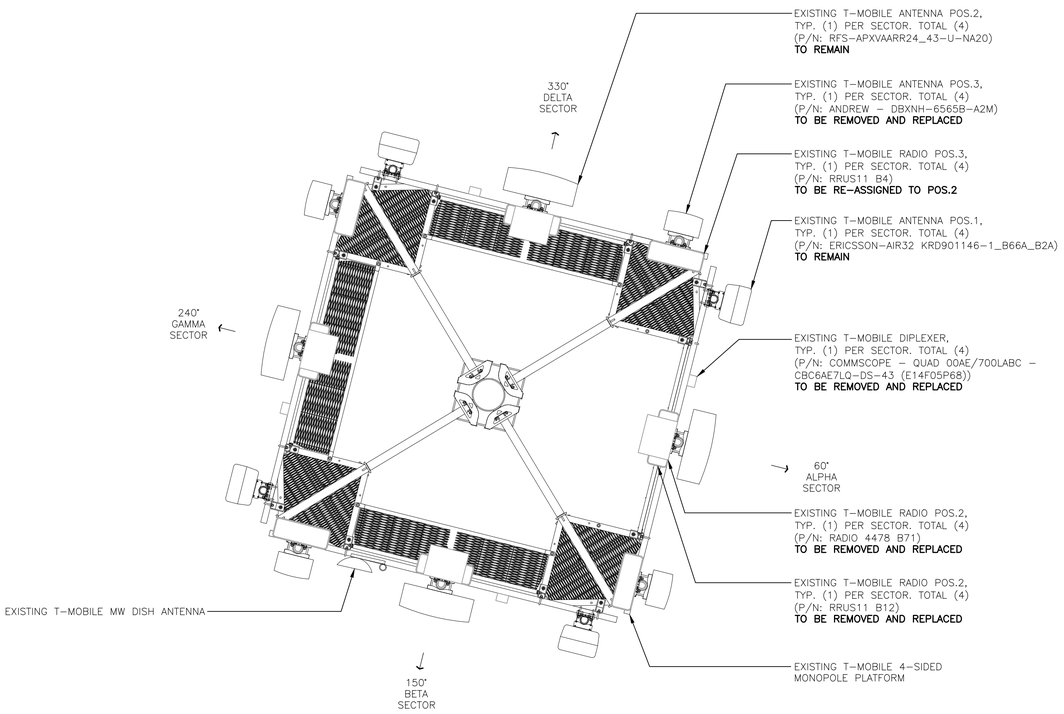
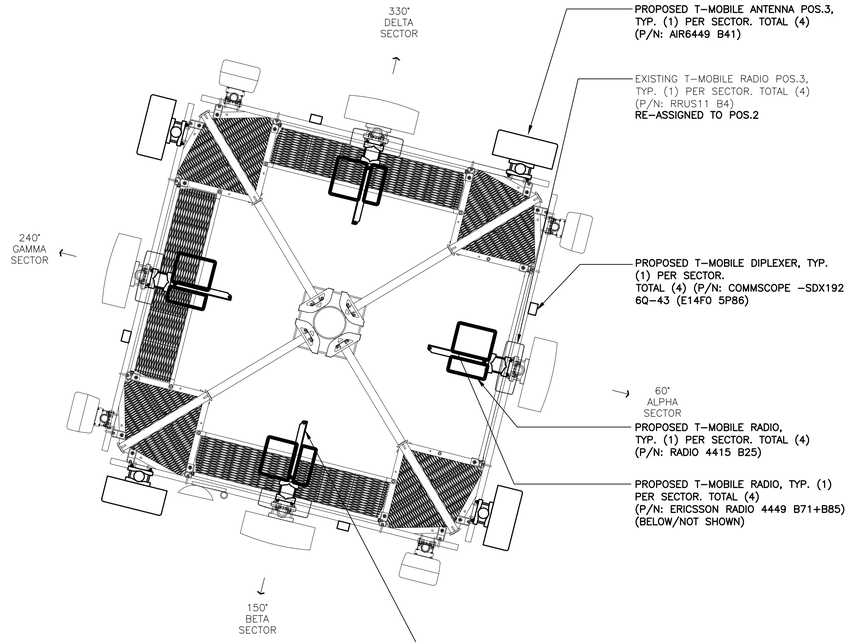
COMPOUND PLAN, EQUIPMENT PLAN, AND ELEVATION

C-2

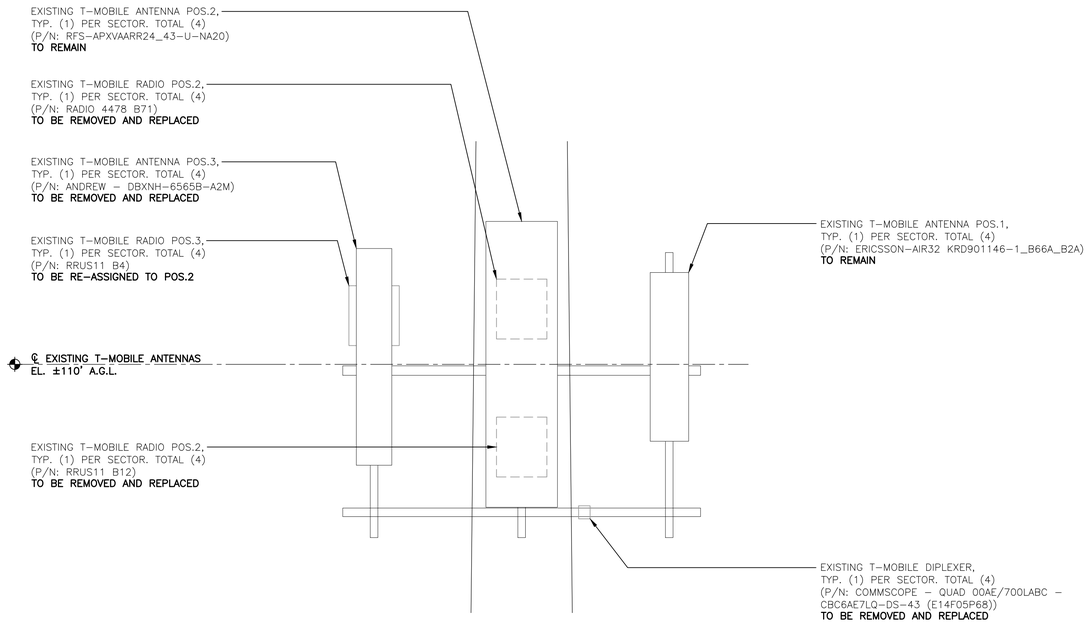
Sheet No. 4 of 7



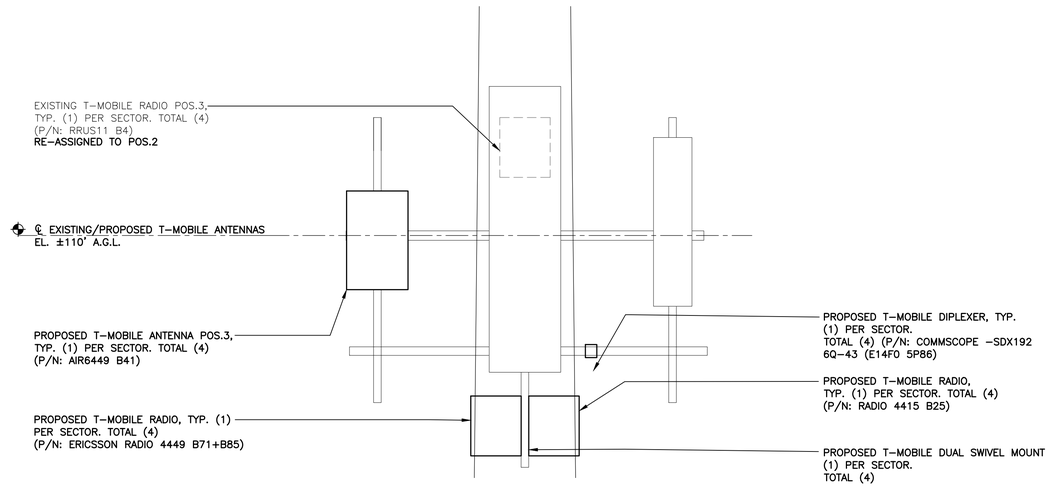
1 C-3 **ANTENNA PLAN - EXISTING**
SCALE: 1/2" = 1'
TRUE NORTH



2 C-3 **ANTENNA PLAN - PROPOSED**
SCALE: 1/2" = 1'
TRUE NORTH



1A C-3 **ANTENNA ELEVATION - EXISTING**
SCALE: 1/2" = 1'



2A C-3 **ANTENNA ELEVATION - PROPOSED**
SCALE: 1/2" = 1'

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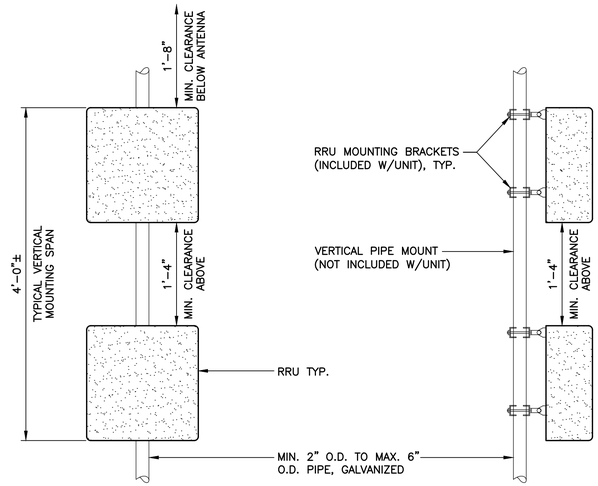
ANTENNA PLANS

C-3
Sheet No. 5 of 7

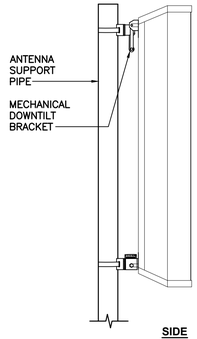


FRONT ELEVATION SIDE ELEVATION

NOTES:

1. T–MOBILE SHALL SUPPLY RRU, AND RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL SUPPLY POLE/PIPE AND INSTALL ALL MOUNTING HARDWARE INCLUDING ERICSSON RRU POLE–MOUNTING BRACKET. CONTRACTOR SHALL INSTALLS RRU AND MAKES CABLE TERMINATIONS.
2. NO PAINTING OF THE RRU OR SOLAR SHIELD IS ALLOWED.

1 / C–4 **TYPICAL RRUS MOUNTING DETAILS**
SCALE: NOT TO SCALE



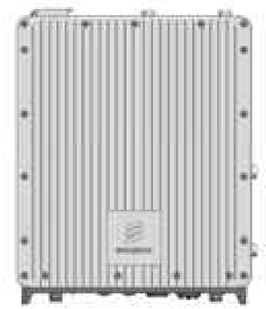
SIDE

FRONT

ALPHA/BETA/GAMMA ANTENNA		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: AIR6449 B41	33.1"L x 20.6"W x 8.6"D	±104 LBS.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

2 / C–4 **PROPOSED ANTENNA DETAIL**
SCALE: NOT TO SCALE

RADIO 4449 B71



RADIO 4415 B25

RRU (REMOTE RADIO UNIT)			
EQUIPMENT	DIMENSIONS	WEIGHT	CLEARANCES
MAKE: ERICSSON MODEL: RADIO 4449 B71	14.9"L x 13.18"W x 9.2"D	±74 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
MAKE: ERICSSON MODEL: RADIO 4415 B25	14.9"L x 13.2"W x 5.4"D	±46 LBS.	BEHIND ANT.: 8" MIN. BELOW ANT.: 20" MIN. BELOW RRU: 16" MIN.
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.			

3 / C–4 **PROPOSED RADIO DETAILS**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: ENCLOSURE 6160	62.0"H x 26.0"W x 26.0"D	±1200 LBS

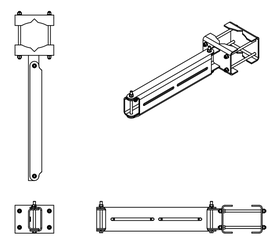
4 / C–4 **ENCLOSURE 6160 (OUTDOOR)**
SCALE: NOT TO SCALE

EQUIPMENT CABINET		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: ERICSSON MODEL: BATTERY CABINET B160	62.0"H x 26.0"W x 26.0"D	±1883 LBS

5 / C–4 **BATTERY CABINET DETAIL**
NOT TO SCALE

DIPLEXER		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: COMMSCOPE MODEL: SDZ1926Q–43(E14F05P86)	4.2"L x 7.0"W x 3.0"D	–
NOTES: 1. CONTRACTOR TO COORDINATE FINAL EQUIPMENT MODEL SELECTION WITH T–MOBILE CONSTRUCTION MANAGER PRIOR TO ORDERING.		

6 / C–4 **PROPOSED DIPLEXER DETAIL**
SCALE: NOT TO SCALE



RRU DUAL SWIVEL MOUNT		
EQUIPMENT	DIMENSIONS	WEIGHT
MAKE: SITE PRO 1 PART NO.: RRUDSM	27.75"L x 6.5"W x 4.7"D	39.4 LBS.

7 / C–4 **RRH DUAL SWIVEL MOUNT DETAIL**
SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/13/20	KAWJR	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

PROFESSIONAL ENGINEER SEAL

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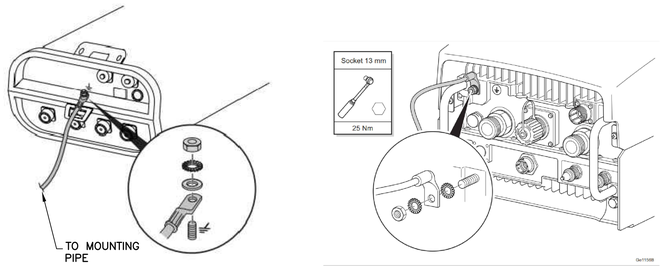
T-MOBILE NORTHEAST LLC
WIRELESS COMMUNICATIONS FACILITY
CTFF335A
SITE ID: CTFF335A
220 EVERGREEN STREET,
BRIDGEPORT, CT 06606

DATE: 06/18/20
SCALE: AS NOTED
JOB NO. 20074.42

TYPICAL EQUIPMENT DETAILS

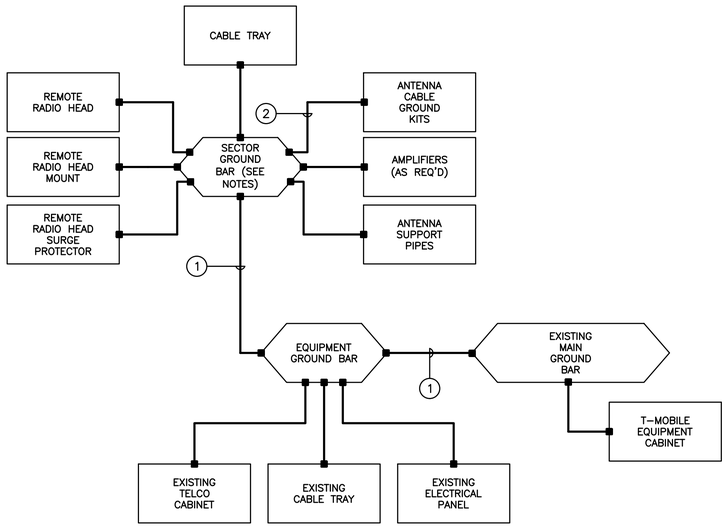
C-4

Sheet No. 6 of 7



1 E-1 TYPICAL ANTENNA/RRU GROUNDING DETAILS

SCALE: NOT TO SCALE



GROUNDING SCHEMATIC NOTES

(1) #2 AWG

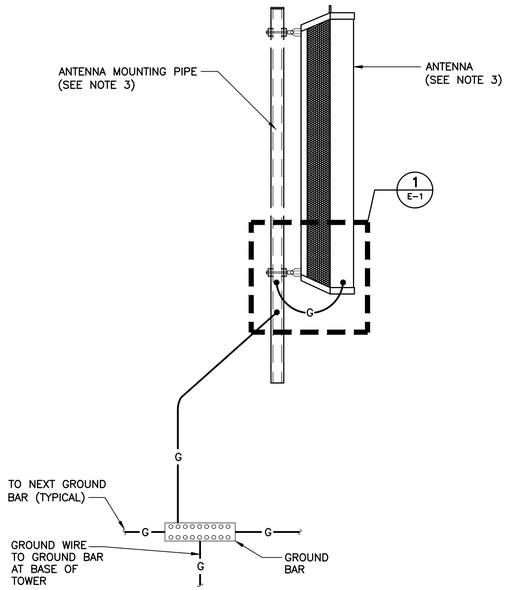
(2) #6 AWG

GENERAL NOTES:

1. ALL SURGE SUPPRESSION EQUIPMENT SHALL BE BONDED TO GROUND PER MANUFACTURER'S SPECIFICATIONS
2. UNLESS OTHERWISE NOTED OR REQUIRED BY CODE, GROUND CONDUCTORS SHOWN SHALL BE #2 AWG (SOLID TINNED BCW – EXTERIOR; STRANDED GREEN INSULATED – INTERIOR).
3. ALL SECTOR GROUND BARS SHALL BE BONDED TOGETHER WITH #2 AWG SOLID TINNED BCW.
4. BOND ALL EQUIPMENT CABINETS AND BATTERY CABINETS TO GROUND PER MANUFACTURER'S SPECIFICATIONS.
5. COORDINATE ALL ROOF MOUNTED EQUIPMENT WITH OWNER.
6. ALL ROOF MOUNTED AMPLIFIERS AND ASSOCIATED EQUIPMENT SHALL BE BONDED TO THE SECTOR GROUND BAR PER MANUFACTURER'S SPECIFICATIONS.
7. ALL GROUNDING SHALL BE IN ACCORDANCE WITH NEC AND OWNER'S REQUIREMENTS.

4 E-1 TYPICAL GROUNDING SCHEMATIC DETAIL

SCALE: NOT TO SCALE

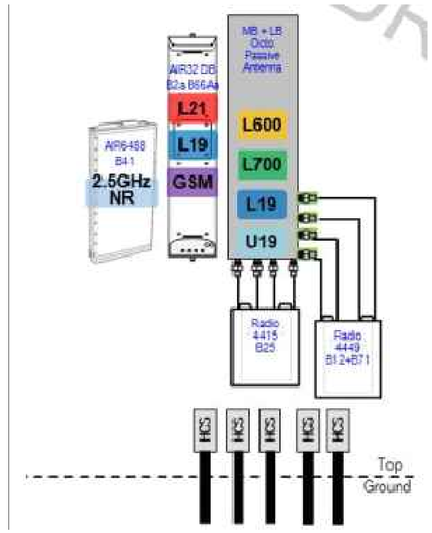


NOTES:

1. BOND COAXIAL CABLE GROUND KITS TO EACH OWNER'S GROUND BAR ALONG ENTIRE COAX RUN FROM ANTENNA TO SHELTER.
2. BOND ALL EQUIPMENT TO GROUND PER NEC AND MANUFACTURERS SPECIFICATIONS.
3. DETAIL IS TYPICAL FOR ALL ANTENNA SECTORS, INCLUDING GPS ANTENNA.

2 E-1 TYPICAL ANTENNA GROUNDING DETAIL

SCALE: NOT TO SCALE

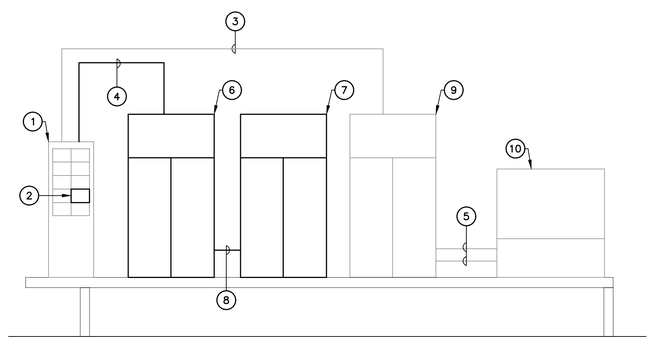


3 E-1 PROPOSED PLUMBING DIAGRAM

SCALE: NOT TO SCALE

RISER DIAGRAM NOTES

(1) EXISTING 200A, PPC CABINET TO REMAIN.
(2) NEW 100A/2P CIRCUIT BREAKER TO SERVE NEW EQUIPMENT CABINET.
(3) EXISTING CONDUITS AND CONDUCTORS TO REMAIN.
(4) (3) #1 AWG, (1) #8 AWG GROUND, 1–1/4" CONDUIT.
(5) EXISTING GENERATOR CONDUITS AND CONDUCTORS TO REMAIN.
(6) NEW T–MOBILE EQUIPMENT CABINET
(7) NEW T–MOBILE BATTERY CABINET
(8) DC CONDUIT AND CONDUCTORS FOR BATTERY CABINET CONNECTION PER MANUFACTURERS SPECIFICATIONS.
(9) EXISTING CABINET TO REMAIN.
(10) APU POWER GEN 7500 GENERATOR TO REMAIN.



5 E-1 ELECTRICAL POWER RISER DIAGRAM

SCALE: NOT TO SCALE

REV.	DATE	DRAWN BY	CHK'D BY	DESCRIPTION
0	07/13/20	KAWJR	TJR	CONSTRUCTION DRAWINGS – ISSUED FOR CONSTRUCTION

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T-MOBILE NORTHEAST LLC

WIRELESS COMMUNICATIONS FACILITY

CTFF335A

SITE ID: CTFF335A

220 EVERGREEN STREET,
BRIDGEPORT, CT 06606

DATE: 06/18/20
SCALE: AS NOTED
JOB NO. 20074.42

TYPICAL ELECTRICAL DETAILS

E-1

Sheet No. 7 of 7

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

135' Existing Monopole Tower and Equipment Platform

Proposed T-Mobile Antenna Upgrade

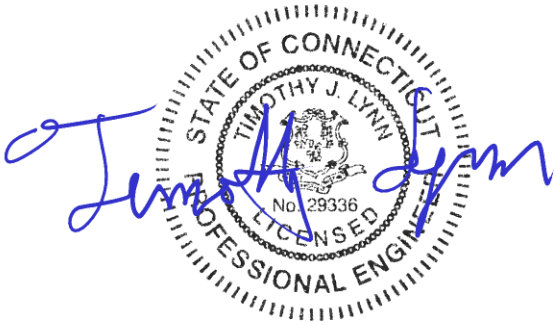
T-Mobile Site Ref: CTFF335A

220 Evergreen Street
Bridgeport, CT

Centek Project No. 20074.42

Revision 1: June 24, 2020

Max Stress Ratio = 51.7%



Prepared for:
T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna upgrade and equipment upgrade on existing platform proposed by T-Mobile on the existing monopole (tower) located in Bridgeport, Connecticut.

The host tower is a 135-ft tall, three-section, eighteen sided, tapered monopole, originally designed and manufactured by Rohn; file no. 217435 dated May 26, 2016. The tower geometry, structure member sizes and foundation system information were obtained from the original manufacturers design documents.

Antenna and appurtenance information were obtained from a previous structural analysis report prepared by Bennett & Pless job no. 19003.009 dated November 19, 2019 and a RF data sheet.

The tower is made up of three (3) tapered vertical sections consisting of A572-65 pole sections. The vertical tower sections are slip joint connected. The diameter of the pole (flat-flat) is 29.52-in at the top and 64.00-in at the base.

Antenna and Appurtenance Summary

The existing, proposed and future loads considered in this analysis consist of the following:

- AT&T (EXISTING TO REMAIN):
  Antennas: Six (6) CCI HPA-65R-BUU-H8 panel antennas, three (3) CCI OPA-65R-LCUU-H8 panel antennas, three (3) CCI DMP65R-BU8DA panel antennas, six (6) Ericsson RRUS-32 remote radio heads, three (3) Ericsson 4478 remote radio heads, three (3) Ericsson 4426 B66 remote radio heads, six (6) Ericsson RRUS-11, three (3) Ericsson RRUS-12, three (3) Ericsson E2 remote radio heads and six (6) Ericsson A2s and four (4) Raycap DC6-48-60-18-8F surge arrestors mounted on (1) platform w/ handrail with a RAD center elevation of 130-ft above grade level.
  Coax Cables: Four (4) 2" diameter conduits and three (3) ret cables running on the inside of the existing tower.
- SPRINT (EXISTING/RESERVED):
  Antennas: Three (3) RFS APXVSPP18-C panel antennas, three (3) Nokia AAHF panel antennas, six (6) ALU 1900 MHz RRHs, three (3) ALU 800 MHz RRHs, six (6) RFS combiners, three (3) DAP heads, four (4) ODUs and three (3) 2-ft microwave dishes mounted on (1) platform w/ handrail with a RAD center elevation of 120-ft above grade level.
  Coax Cables: Seven (7) fiber cables and eleven (11) ½" diameter cables running on the exterior of the existing tower.
- T-MOBILE (EXISTING TO REMAIN):
  Antennas: Four (4) Ericsson AIR32 panel antennas and four (4) Ericsson RRUS-11 remote radio units mounted on (1) platform w/ handrail with a RAD center elevation of 110-ft above grade level.
  Coax Cables: Four (4) 6x12 fiber cables running on the inside of the existing tower.

- **T-MOBILE (EXISTING TO REMOVE):**
  Antennas: Four (4) RFS APXVAA24_43 panel antennas, four (4) Andrew DBXNH-6565B panel antennas, four (4) Ericsson RRUS-11 remote radio units and four (4) Ericsson 4478 remote radio units and four (4) Commscope CBC6AE7LQ-DS-43 diplexers mounted on (1) platform w/ handrail with a RAD center elevation of 110-ft above grade level.
- **T-MOBILE (PROPOSED):**
  Antennas: Four (4) RFS APXVAARR24_43 panel antennas, four (4) Ericsson AIR6449 panel antennas, four (4) Ericsson 4449 remote radio units and four (4) Ericsson 4415 remote radio units and four (4) Commscope SDX1926Q-43 diplexers mounted on (1) platform w/ handrail with a RAD center elevation of 110-ft above grade level.
  Cables: Four (4) 6x12 fiber cables running on the inside of the existing tower.

The existing, proposed and future loads considered in this analysis for the equipment platforms consist of the following:

- T-MOBILE (EXISTING TO REMAIN – EQUIPMENT PLATFORM)
  Equipment: One (1) Ericsson RBS 6102 cabinet, one (1) APU generator and one (1) AAV Cabinet, the aforementioned equipment has been assumed to be at full capacity for the purpose of this analysis.
- **T-MOBILE (PROPOSED – EQUIPMENT PLATFORM):**
  Equipment: One (1) Ericsson 6160 cabinet and one (1) Ericsson B160 battery cabinet mounted to the T-Mobile equipment platform, the aforementioned equipment has been assumed to be at full capacity for the purpose of this analysis.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents or reinforcement drawings.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.

- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables to be installed as indicated in this report.

Analysis

The existing monopole was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 0.75" radial ice on the tower structure and its components.

Basic Wind Speed:	Fairfield County; v = 90-110 mph	*[Annex B of TIA-222-G-2005]*
	Bridgeport; v = 97 mph	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 97 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 50 mph wind speed w/ 0.75" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

- Calculated stresses were found to be within allowable limits. This tower was found to be at **39.4%** of its total capacity.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Pole Shaft (L2)	84.42'-109.08'	39.4%	**PASS**

Foundation and Anchors

The foundation consists of an 8.00-ft square x 3.75-ft long reinforced concrete pier on a 30.0-ft x 3.25-ft thick reinforce concrete pad. The sub-grade conditions used in the analysis of the foundation were obtained from the aforementioned original design documents. The base of the tower is connected to the foundation by means of (24) 2.25"∅, ASTM A615-75 anchor bolts embedded approximately 6-ft into the concrete foundation structure.

- The tower base reactions developed from the governing Load Case 1 were used in the verification of the foundation and its anchors:

Location	Vector	Proposed Reactions
Base	Shear	40 kips
	Compression	66 kips
	Moment	4028 kip-ft

- The foundation was found to be within allowable limits.

Foundation	Design Limit	TIA-222-G Section 9.4 FS[(1)]	Proposed Loading (FS)[(1)]	Result
Reinforced Concrete Pad and Pier	OTM[(2)]	1.0	2.65	**PASS**

Note 1: FS denotes Factor of Safety.
Note 2: OTM denotes Overturning Moment.

- The anchor bolts and base plate were found to be within allowable limits.

Tower Component	Design Limit	Stress Ratio (percentage of capacity)	Result
Anchor Bolts	Tension	36.9%	**PASS**
Base Plate	Bending	51.7%	**PASS**

Equipment Platform

Structure stresses were calculated utilizing the structural analysis software RISA 3D. The stresses were determined based on the AISC standard.

- Calculated stresses for the equipment platform were found to be within allowable limits.

Sector	Component	Capacity (%)	Result
Equipment Platform	W10X15 (Existing Platform Member)	57.2%	**PASS**
	L4X4 (Existing Platform Member)	87.0%	**PASS**

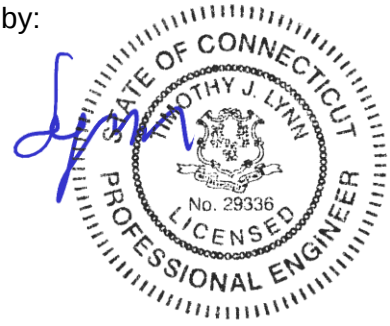
Conclusion

This analysis shows that the subject tower and equipment platform **are adequate** to support the proposed modified antenna configuration.

The analysis is based, in part, on the information provided to this office by T-Mobile. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the "as new" condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

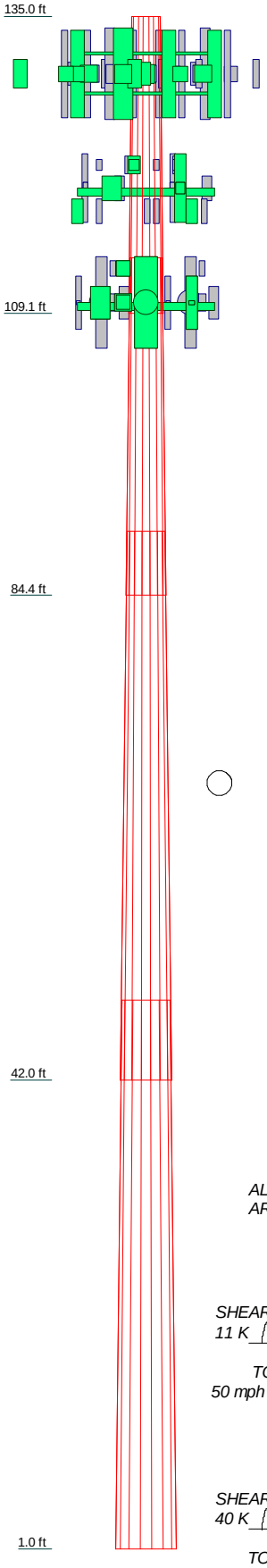
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

tnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, tnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

tnxTower Features:

- tnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- tnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	25.920	18	0.250	4.835	29.520	36.690		2.3
2	29.500	18	0.313	5.585	34.853	42.860		3.8
3	48.000	18	0.500	7.000	40.719	53.810	A572-65	12.1
4	48.000	18	0.625		50.901	64.000		18.4
								36.7



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HPA-65R-BUU-H8 (AT&T)	130	WiMAX DAP Head (Sprint)	120
OPA-65R-LCUU-H8 (AT&T)	130	WiMAX DAP Head (Sprint)	120
DMP65R-BU8DA (AT&T)	130	WiMAX DAP Head (Sprint)	120
HPA-65R-BUU-H8 (AT&T)	130	IBC1900-BB-1 (Sprint)	120
HPA-65R-BUU-H8 (AT&T)	130	IBC1900-BB-1 (Sprint)	120
OPA-65R-LCUU-H8 (AT&T)	130	IBC1900-BB-1 (Sprint)	120
DMP65R-BU8DA (AT&T)	130	IBC1900HG-2A (Sprint)	120
HPA-65R-BUU-H8 (AT&T)	130	IBC1900HG-2A (Sprint)	120
HPA-65R-BUU-H8 (AT&T)	130	IBC1900HG-2A (Sprint)	120
OPA-65R-LCUU-H8 (AT&T)	130	(2) ODU (Sprint)	120
DMP65R-BU8DA (AT&T)	130	ODU (Sprint)	120
HPA-65R-BUU-H8 (AT&T)	130	ODU (Sprint)	120
(2) RRUS-11 (AT&T)	130	GPS (Sprint)	120
(2) RRUS-11 (AT&T)	130	Valmont 13' Platform w/Rails (Sprint)	120
(2) RRUS-11 (AT&T)	130	AIR6449 (T-Mobile - Proposed)	110
RRUS-12 (AT&T)	130	AIR32 (T-Mobile)	110
RRUS-12 (AT&T)	130	APXVAARR24-43 (T-Mobile - Proposed)	110
RRUS-12 (AT&T)	130		
(2) RRUS-32 (AT&T)	130	AIR6449 (T-Mobile - Proposed)	110
(2) RRUS-32 (AT&T)	130	AIR32 (T-Mobile)	110
(2) RRUS-32 (AT&T)	130	APXVAARR24-43 (T-Mobile - Proposed)	110
4426 B66 (AT&T)	130	AIR6449 (T-Mobile - Proposed)	110
4426 B66 (AT&T)	130	RRUS-11 (T-Mobile)	110
4426 B66 (AT&T)	130	RRUS-11 (T-Mobile)	110
B14 4478 (AT&T)	130	RRUS-11 (T-Mobile)	110
B14 4478 (AT&T)	130	RRUS-11 (T-Mobile)	110
B14 4478 (AT&T)	130	4449 B12,B71 (T-Mobile - Proposed)	110
RRUS-E2 (AT&T)	130	4449 B12,B71 (T-Mobile - Proposed)	110
RRUS-E2 (AT&T)	130	4449 B12,B71 (T-Mobile - Proposed)	110
RRUS-E2 (AT&T)	130	4449 B12,B71 (T-Mobile - Proposed)	110
(2) A2 (AT&T)	130	4415 B25 (T-Mobile - Proposed)	110
(2) A2 (AT&T)	130	4415 B25 (T-Mobile - Proposed)	110
(2) A2 (AT&T)	130	4415 B25 (T-Mobile - Proposed)	110
(2) DC6-48-60-18-8F Surge Arrestor (AT&T)	130	4415 B25 (T-Mobile - Proposed)	110
DC6-48-60-18-8F Surge Arrestor (AT&T)	130	SDX1926Q-43 (T-Mobile - Proposed)	110
DC6-48-60-18-8F Surge Arrestor (AT&T)	130	SDX1926Q-43 (T-Mobile - Proposed)	110
Valmont 13' Platform w/Rails (AT&T)	130	SDX1926Q-43 (T-Mobile - Proposed)	110
APXVSPP18-C-A20 (Sprint)	120	SDX1926Q-43 (T-Mobile - Proposed)	110
APXVSPP18-C-A20 (Sprint)	120	F4P-10W w/ Handrail (T-Mobile)	110
APXVSPP18-C-A20 (Sprint)	120	AIR32 (T-Mobile)	110
AAHF (Sprint)	120	APXVAARR24-43 (T-Mobile - Proposed)	110
AAHF (Sprint)	120	AIR6449 (T-Mobile - Proposed)	110
AAHF (Sprint)	120	AIR32 (T-Mobile)	110
FD-RRH 2x50 800 (Sprint)	120	APXVAARR24-43 (T-Mobile - Proposed)	110
FD-RRH 2x50 800 (Sprint)	120	VHLP2-18 (Sprint)	110
FD-RRH 2x50 800 (Sprint)	120	VHLP2-18 (Sprint)	110
(2) FD-RRH 4x45 1900 (Sprint)	120	VHLP2-18 (Sprint)	110
(2) FD-RRH 4x45 1900 (Sprint)	120		
(2) FD-RRH 4x45 1900 (Sprint)	120		

MATERIAL STRENGTH

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

ALL REACTIONS ARE FACTORED

AXIAL 101 K

SHEAR 11 K

MOMENT 1141 kip-ft

TORQUE 4 kip-ft
50 mph WIND - 0.750 in ice

AXIAL 66 K

SHEAR 40 K

MOMENT 4028 kip-ft

TORQUE 15 kip-ft
REACTIONS - 97 mph WIND

TOWER DESIGN NOTES

1. Tower designed for Exposure C to the TIA-222-G Standard.
2. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 39.4%

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: **20074.42 - CTFF335A**		
Project: **135-ft Rohn Monopole - 220 Evergreen Street Bridgeport, CT**		
Client: T-Mobile	Drawn by: TJL	App'd:
Code: TIA-222-G	Date: 06/16/20	Scale: NTS
Path: J:\Jobs\20074\00.WI\42_CTFF335A\05_Structural\Tower Analysis\Backup Documentation\ER\135' Rohn Monopole _ Bridgeport CT.eri		Dwg No. E-1

Tower Input Data

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

Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.000 ft.
Nominal ice thickness of 0.750 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.
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-G Bracing Resist. Exemption
	Include Bolts In Member Capacity		Autocalc Torque Arm Areas		Use TIA-222-G 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	135.000-109.080	25.920	4.835	18	29.520	36.690	0.250	1.000	A572-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	109.080-84.415	29.500	5.585	18	34.853	42.860	0.313	1.250	A572-65 (65 ksi)
L3	84.415-42.000	48.000	7.000	18	40.719	53.810	0.500	2.000	A572-65 (65 ksi)
L4	42.000-1.000	48.000		18	50.901	64.000	0.625	2.500	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	29.937	23.226	2513.926	10.391	14.996	167.638	5031.161	11.615	4.756	19.022
	37.217	28.915	4850.868	12.936	18.639	260.260	9708.120	14.460	6.017	24.07
L2	36.675	34.259	5163.723	12.262	17.705	291.652	10334.241	17.133	5.584	17.869
	43.473	42.202	9651.983	15.104	21.773	443.303	19316.666	21.105	6.993	22.379
L3	42.817	63.828	13043.933	14.278	20.685	630.591	26105.030	31.920	6.287	12.573
	54.563	84.603	30376.688	18.925	27.335	1111.255	60793.347	42.310	8.591	17.181
L4	53.529	99.735	31849.592	17.848	25.858	1231.728	63741.093	49.877	7.859	12.574
	64.891	125.720	63793.776	22.498	32.512	1962.161	127671.493	62.872	10.164	16.262

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 135.000-109.080				1	1	1			
L2 109.080-84.415				1	1	1			
L3 84.415-42.000				1	1	1			
L4 42.000-1.000				1	1	1			

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 klf
2" Rigid Conduit (AT&T)	A	No	Yes	Inside Pole	131.000 - 5.000	4	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
0.3" dia RET (AT&T)	A	No	Yes	Inside Pole	131.000 - 5.000	3	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HYBRIFLEX 1-1/4" (Sprint)	A	No	Yes	Inside Pole	121.000 - 5.000	7	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
1/2	A	No	Yes	Inside Pole	121.000 - 5.000	11	No Ice	0.000	0.000

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
(Sprint)							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HYBRIFLEX 1-5/8" (T-Mobile)	C	No	Yes	Inside Pole	111.000 - 5.000	4	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
HYBRIFLEX 1-5/8" (T-Mobile - Proposed)	C	No	Yes	Inside Pole	111.000 - 5.000	4	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002

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	135.000-109.080	A	0.000	0.000	0.000	0.000	0.387
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.029
L2	109.080-84.415	A	0.000	0.000	0.000	0.000	0.569
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.375
L3	84.415-42.000	A	0.000	0.000	0.000	0.000	0.978
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.645
L4	42.000-1.000	A	0.000	0.000	0.000	0.000	0.853
		B	0.000	0.000	0.000	0.000	0.000
		C	0.000	0.000	0.000	0.000	0.562

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	135.000-109.080	A	1.709	0.000	0.000	0.000	0.000	0.387
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.029
L2	109.080-84.415	A	1.670	0.000	0.000	0.000	0.000	0.569
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.375
L3	84.415-42.000	A	1.600	0.000	0.000	0.000	0.000	0.978
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.645
L4	42.000-1.000	A	1.438	0.000	0.000	0.000	0.000	0.853
		B		0.000	0.000	0.000	0.000	0.000
		C		0.000	0.000	0.000	0.000	0.562

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

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
AIR32	A	From Face	3.000	0.000	110.000	No Ice	6.510	4.712	0.133
(T-Mobile)			-4.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAARR24-43	A	From Face	3.000	0.000	110.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	A	From Face	3.000	0.000	110.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			4.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
AIR32	B	From Face	3.000	0.000	110.000	No Ice	6.510	4.712	0.133
(T-Mobile)			-4.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAARR24-43	B	From Face	3.000	0.000	110.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	B	From Face	3.000	0.000	110.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			4.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
AIR32	C	From Face	3.000	0.000	110.000	No Ice	6.510	4.712	0.133
(T-Mobile)			-4.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAARR24-43	C	From Face	3.000	0.000	110.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	C	From Face	3.000	0.000	110.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			4.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
AIR32	C	From Face	3.000	0.000	110.000	No Ice	6.510	4.712	0.133
(T-Mobile)			-4.000			1/2" Ice	6.887	5.068	0.179
			0.000			1" Ice	7.271	5.431	0.230
APXVAARR24-43	C	From Face	3.000	0.000	110.000	No Ice	20.243	8.889	0.153
(T-Mobile - Proposed)			0.000			1/2" Ice	20.890	9.487	0.266
			0.000			1" Ice	21.544	10.092	0.387
AIR6449	C	From Face	3.000	0.000	110.000	No Ice	5.655	2.416	0.103
(T-Mobile - Proposed)			4.000			1/2" Ice	5.956	2.641	0.141
			0.000			1" Ice	6.265	2.874	0.184
RRUS-11	A	From Face	3.000	0.000	110.000	No Ice	2.566	1.068	0.050
(T-Mobile)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	B	From Face	3.000	0.000	110.000	No Ice	2.566	1.068	0.050
(T-Mobile)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	C	From Face	3.000	0.000	110.000	No Ice	2.566	1.068	0.050
(T-Mobile)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-11	C	From Face	3.000	0.000	110.000	No Ice	2.566	1.068	0.050
(T-Mobile)			2.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
4449 B12,B71	A	From Face	3.000	0.000	110.000	No Ice	1.650	1.156	0.080

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
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	A	From Face	3.000	0.000	110.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	B	From Face	3.000	0.000	110.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4449 B12,B71	C	From Face	3.000	0.000	110.000	No Ice	1.650	1.156	0.080
(T-Mobile - Proposed)			2.000			1/2" Ice	1.810	1.295	0.096
			0.000			1" Ice	1.978	1.441	0.115
4415 B25	A	From Face	3.000	0.000	110.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4415 B25	B	From Face	3.000	0.000	110.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4415 B25	C	From Face	3.000	0.000	110.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
4415 B25	C	From Face	3.000	0.000	110.000	No Ice	1.843	0.820	0.046
(T-Mobile - Proposed)			2.000			1/2" Ice	2.012	0.943	0.060
			3.000			1" Ice	2.190	1.075	0.077
SDX1926Q-43	A	From Face	3.000	0.000	110.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-4.000			1/2" Ice	0.306	0.144	0.032
			0.000			1" Ice	0.379	0.195	0.036
SDX1926Q-43	B	From Face	3.000	0.000	110.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-4.000			1/2" Ice	0.306	0.144	0.032
			0.000			1" Ice	0.379	0.195	0.036
SDX1926Q-43	C	From Face	3.000	0.000	110.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-4.000			1/2" Ice	0.306	0.144	0.032
			0.000			1" Ice	0.379	0.195	0.036
SDX1926Q-43	C	From Face	3.000	0.000	110.000	No Ice	0.241	0.101	0.030
(T-Mobile - Proposed)			-4.000			1/2" Ice	0.306	0.144	0.032
			0.000			1" Ice	0.379	0.195	0.036
F4P-10W w/ Handrail	A	None		0.000	110.000	No Ice	33.840	31.180	3.100
(T-Mobile)						1/2" Ice	41.720	39.160	3.500
						1" Ice	54.710	50.040	3.900
HPA-65R-BUU-H8	A	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			-6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
OPA-65R-LCUU-H8	A	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.088
(AT&T)			-2.000			1/2" Ice	13.558	8.087	0.162
			0.000			1" Ice	14.147	8.666	0.243
DMP65R-BU8DA	A	From Face	3.500	0.000	130.000	No Ice	17.871	8.122	0.120
(AT&T)			2.000			1/2" Ice	18.502	8.716	0.218
			0.000			1" Ice	19.141	9.317	0.323
HPA-65R-BUU-H8	A	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
HPA-65R-BUU-H8	B	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			-6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
OPA-65R-LCUU-H8	B	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.088
(AT&T)			-2.000			1/2" Ice	13.558	8.087	0.162
			0.000			1" Ice	14.147	8.666	0.243
DMP65R-BU8DA	B	From Face	3.500	0.000	130.000	No Ice	17.871	8.122	0.120

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
(AT&T)			2.000			1/2" Ice	18.502	8.716	0.218
			0.000			1" Ice	19.141	9.317	0.323
HPA-65R-BUU-H8	B	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
HPA-65R-BUU-H8	C	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			-6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
OPA-65R-LCUU-H8	C	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.088
(AT&T)			-2.000			1/2" Ice	13.558	8.087	0.162
			0.000			1" Ice	14.147	8.666	0.243
DMP65R-BU8DA	C	From Face	3.500	0.000	130.000	No Ice	17.871	8.122	0.120
(AT&T)			2.000			1/2" Ice	18.502	8.716	0.218
			0.000			1" Ice	19.141	9.317	0.323
HPA-65R-BUU-H8	C	From Face	3.500	0.000	130.000	No Ice	12.976	7.516	0.068
(AT&T)			6.000			1/2" Ice	13.558	8.087	0.142
			0.000			1" Ice	14.147	8.666	0.223
(2) RRUS-11	A	From Face	1.000	0.000	130.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
(2) RRUS-11	B	From Face	1.000	0.000	130.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
(2) RRUS-11	C	From Face	1.000	0.000	130.000	No Ice	2.566	1.068	0.050
(AT&T)			0.000			1/2" Ice	2.765	1.211	0.070
			0.000			1" Ice	2.971	1.361	0.092
RRUS-12	A	From Face	1.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	B	From Face	1.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-12	C	From Face	1.000	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			0.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) RRUS-32	A	From Face	3.500	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	B	From Face	3.500	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
(2) RRUS-32	C	From Face	3.500	0.000	130.000	No Ice	3.314	2.424	0.077
(AT&T)			6.000			1/2" Ice	3.558	2.638	0.105
			0.000			1" Ice	3.809	2.860	0.136
4426 B66	A	From Face	3.500	0.000	130.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	B	From Face	3.500	0.000	130.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
4426 B66	C	From Face	3.500	0.000	130.000	No Ice	1.650	0.727	0.049
(AT&T)			2.000			1/2" Ice	1.810	0.844	0.062
			0.000			1" Ice	1.978	0.971	0.077
B14 4478	A	From Face	3.500	0.000	130.000	No Ice	1.843	1.059	0.060
(AT&T)			6.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
B14 4478	B	From Face	3.500	0.000	130.000	No Ice	1.843	1.059	0.060

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
(AT&T)			6.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
B14 4478	C	From Face	3.500	0.000	130.000	No Ice	1.843	1.059	0.060
(AT&T)			6.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
RRUS-E2	A	From Face	3.500	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			2.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-E2	B	From Face	3.500	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			2.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
RRUS-E2	C	From Face	3.500	0.000	130.000	No Ice	3.145	1.285	0.058
(AT&T)			2.000			1/2" Ice	3.365	1.438	0.081
			0.000			1" Ice	3.592	1.600	0.108
(2) A2	A	From Face	3.500	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			2.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
(2) A2	B	From Face	3.500	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			2.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
(2) A2	C	From Face	3.500	0.000	130.000	No Ice	2.077	0.505	0.022
(AT&T)			2.000			1/2" Ice	2.257	0.615	0.035
			0.000			1" Ice	2.443	0.732	0.050
(2) DC6-48-60-18-8F Surge	A	From Face	3.500	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	B	From Face	3.500	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
DC6-48-60-18-8F Surge	C	From Face	3.500	0.000	130.000	No Ice	1.909	1.909	0.020
Arrestor			0.000			1/2" Ice	2.098	2.098	0.039
(AT&T)			0.000			1" Ice	2.294	2.294	0.062
Valmont 13' Platform w/Rails	C	From Face	3.000	0.000	130.000	No Ice	53.000	53.000	2.000
(AT&T)			0.000			1/2" Ice	68.000	68.000	3.000
			0.000			1" Ice	83.000	83.000	4.000
APXVSPP18-C-A20	A	From Face	3.000	0.000	120.000	No Ice	8.024	5.283	0.057
(Sprint)			-3.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	B	From Face	3.000	0.000	120.000	No Ice	8.024	5.283	0.057
(Sprint)			-3.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
APXVSPP18-C-A20	C	From Face	3.000	0.000	120.000	No Ice	8.024	5.283	0.057
(Sprint)			-3.000			1/2" Ice	8.480	5.736	0.107
			0.000			1" Ice	8.943	6.196	0.162
AAHF	A	From Face	3.000	0.000	120.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
AAHF	B	From Face	3.000	0.000	120.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
AAHF	C	From Face	3.000	0.000	120.000	No Ice	4.203	2.061	0.104
(Sprint)			3.000			1/2" Ice	4.458	2.252	0.136
			0.000			1" Ice	4.721	2.454	0.172
FD-RRH 2x50 800	A	From Face	1.000	0.000	120.000	No Ice	2.058	1.932	0.064
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
FD-RRH 2x50 800	B	From Face	1.000	0.000	120.000	No Ice	2.058	1.932	0.064

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
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
FD-RRH 2x50 800	C	From Face	1.000	0.000	120.000	No Ice	2.058	1.932	0.064
(Sprint)			1.000			1/2" Ice	2.240	2.109	0.086
			2.000			1" Ice	2.429	2.293	0.111
(2) FD-RRH 4x45 1900	A	From Face	1.000	0.000	120.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
(2) FD-RRH 4x45 1900	B	From Face	1.000	0.000	120.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
(2) FD-RRH 4x45 1900	C	From Face	1.000	0.000	120.000	No Ice	2.319	2.384	0.060
(Sprint)			1.000			1/2" Ice	2.524	2.590	0.084
			-2.000			1" Ice	2.736	2.804	0.111
WiMAX DAP Head	A	From Face	3.000	0.000	120.000	No Ice	1.804	0.778	0.033
(Sprint)			-3.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.172	1.058	0.057
WiMAX DAP Head	B	From Face	3.000	0.000	120.000	No Ice	1.804	0.778	0.033
(Sprint)			-3.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.172	1.058	0.057
WiMAX DAP Head	C	From Face	3.000	0.000	120.000	No Ice	1.804	0.778	0.033
(Sprint)			-3.000			1/2" Ice	1.988	0.918	0.045
			0.000			1" Ice	2.172	1.058	0.057
IBC1900-BB-1	A	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
IBC1900-BB-1	B	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
IBC1900-BB-1	C	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
IBC1900HG-2A	A	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
IBC1900HG-2A	B	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
IBC1900HG-2A	C	From Face	3.000	0.000	120.000	No Ice	0.966	0.459	0.022
(Sprint)			-3.000			1/2" Ice	1.091	0.553	0.030
			0.000			1" Ice	1.223	0.654	0.039
(2) ODU	A	From Face	1.000	0.000	120.000	No Ice	1.008	0.596	0.000
(Sprint)			1.000			1/2" Ice	1.134	0.697	0.010
			2.000			1" Ice	1.268	0.805	0.021
ODU	B	From Face	1.000	0.000	120.000	No Ice	1.008	0.596	0.000
(Sprint)			1.000			1/2" Ice	1.134	0.697	0.010
			2.000			1" Ice	1.268	0.805	0.021
ODU	C	From Face	1.000	0.000	120.000	No Ice	1.008	0.596	0.000
(Sprint)			1.000			1/2" Ice	1.134	0.697	0.010
			2.000			1" Ice	1.268	0.805	0.021
GPS	A	From Face	1.000	0.000	120.000	No Ice	1.000	1.000	0.010
(Sprint)			1.000			1/2" Ice	1.500	1.500	0.015
			2.000			1" Ice	2.000	2.000	0.020
Valmont 13' Platform w/Rails	A	None		0.000	120.000	No Ice	53.000	53.000	2.000
(Sprint)						1/2" Ice	68.000	68.000	3.000
						1" Ice	83.000	83.000	4.000

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral / Vert (ft)	Azimuth Adjustment (°)	3 dB Beam Width (°)	Elevation (ft)	Outside Diameter (ft)		Aperture Area (ft^2)	Weight (K)
VHLP2-18 (Sprint)	A	Paraboloid w/o Radome	From Face	3.000 0.000 0.000	Worst		110.000	2.175	No Ice 1/2" Ice 1" Ice	3.720 4.010 4.300	0.030 0.040 0.050
VHLP2-18 (Sprint)	B	Paraboloid w/o Radome	From Face	3.000 0.000 0.000	Worst		110.000	2.175	No Ice 1/2" Ice 1" Ice	3.720 4.010 4.300	0.030 0.040 0.050
VHLP2-18 (Sprint)	C	Paraboloid w/o Radome	From Face	3.000 0.000 0.000	Worst		110.000	2.175	No Ice 1/2" Ice 1" Ice	3.720 4.010 4.300	0.030 0.040 0.050

Tower Pressures - No Ice

G_H = 1.100

Section Elevation (ft)	z (ft)	K_Z	q_z (ksf)	A_G (ft^2)	Face	A_F (ft^2)	A_R (ft^2)	A_{leg} (ft^2)	Leg %	C_AA_A In Face (ft^2)	C_AA_A Out Face (ft^2)
L1 135.000-109.080	121.572	1.319	0.030	72.527	A B C	0.000 0.000 0.000	72.527 72.527 72.527	72.527	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000
L2 109.080-84.415	96.399	1.256	0.029	82.368	A B C	0.000 0.000 0.000	82.368 82.368 82.368	82.368	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000
L3 84.415-42.000	62.733	1.147	0.026	172.098	A B C	0.000 0.000 0.000	172.098 172.098 172.098	172.098	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000
L4 42.000-1.000	21.640	0.917	0.021	202.301	A B C	0.000 0.000 0.000	202.301 202.301 202.301	202.301	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000

Tower Pressure - With Ice

G_H = 1.100

Section Elevation (ft)	z (ft)	K_Z	q_z (ksf)	t_Z (in)	A_G (ft^2)	Face	A_F (ft^2)	A_R (ft^2)	A_{leg} (ft^2)	Leg %	C_AA_A In Face (ft^2)	C_AA_A Out Face (ft^2)
L1 135.000-109.080	121.572	1.319	0.008	1.709	79.909	A B C	0.000 0.000 0.000	79.909 79.909 79.909	79.909	100.00 100.00 100.00	0.000 0.000 0.000	0.000 0.000 0.000
L2	96.399	1.256	0.008	1.670	89.393	A	0.000	89.393	89.393	100.00	0.000	0.000

Section Elevation ft	z ft	K_Z	q_z ksf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
109.080-84.415						B	0.000	89.393		100.00	0.000	0.000
						C	0.000	89.393		100.00	0.000	0.000
L3	62.733	1.147	0.007	1.600	183.902	A	0.000	183.902	183.902	100.00	0.000	0.000
84.415-42.000						B	0.000	183.902		100.00	0.000	0.000
						C	0.000	183.902		100.00	0.000	0.000
L4 42.000-1.000	21.640	0.917	0.006	1.438	213.231	A	0.000	213.231	213.231	100.00	0.000	0.000
						B	0.000	213.231		100.00	0.000	0.000
						C	0.000	213.231		100.00	0.000	0.000

Tower Pressure - Service

G_H = 1.100

Section Elevation ft	z ft	K_Z	q_z ksf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
L1	121.572	1.319	0.010	72.527	A	0.000	72.527	72.527	100.00	0.000	0.000
135.000-109.0					B	0.000	72.527		100.00	0.000	0.000
80					C	0.000	72.527		100.00	0.000	0.000
L2	96.399	1.256	0.010	82.368	A	0.000	82.368	82.368	100.00	0.000	0.000
109.080-84.41					B	0.000	82.368		100.00	0.000	0.000
5					C	0.000	82.368		100.00	0.000	0.000
L3	62.733	1.147	0.009	172.098	A	0.000	172.098	172.098	100.00	0.000	0.000
84.415-42.000					B	0.000	172.098		100.00	0.000	0.000
					C	0.000	172.098		100.00	0.000	0.000
L4	21.640	0.917	0.007	202.301	A	0.000	202.301	202.301	100.00	0.000	0.000
42.000-1.000					B	0.000	202.301		100.00	0.000	0.000
					C	0.000	202.301		100.00	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft²	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.030	1	1	72.527	1.565	0.060	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.029	1	1	82.368	1.692	0.069	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.026	1	1	172.098	3.219	0.076	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.021	1	1	202.301	3.039	0.074	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	611.547 kip-ft	9.515		

Tower Forces - No Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.030	1	1	72.527	1.565	0.060	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.029	1	1	82.368	1.692	0.069	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.026	1	1	172.098	3.219	0.076	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.021	1	1	202.301	3.039	0.074	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	611.547 kip-ft	9.515		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.030	1	1	72.527	1.565	0.060	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.029	1	1	82.368	1.692	0.069	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.026	1	1	172.098	3.219	0.076	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.021	1	1	202.301	3.039	0.074	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	611.547 kip-ft	9.515		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.030	1	1	72.527	1.565	0.060	C

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.029	1	1	82.368	1.692	0.069	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.026	1	1	172.098	3.219	0.076	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.021	1	1	202.301	3.039	0.074	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	611.547 kip-ft	9.515		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	4.203	A	1	1.2	0.008	1	1	79.909	0.846	0.033	C
135.000-109.0			B	1	1.2		1	1	79.909			
80			C	1	1.2		1	1	79.909			
L2	0.944	5.931	A	1	1.2	0.008	1	1	89.393	0.901	0.037	C
109.080-84.41			B	1	1.2		1	1	89.393			
5			C	1	1.2		1	1	89.393			
L3	1.623	16.278	A	1	1.2	0.007	1	1	183.902	1.687	0.040	C
84.415-42.000			B	1	1.2		1	1	183.902			
			C	1	1.2		1	1	183.902			
L4	1.415	22.767	A	1	1.2	0.006	1	1	213.231	1.571	0.038	C
42.000-1.000			B	1	1.2		1	1	213.231			
			C	1	1.2		1	1	213.231			
Sum Weight:	4.398	49.179						OTM	324.504 kip-ft	5.005		

Tower Forces - With Ice - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	4.203	A	1	1.2	0.008	1	1	79.909	0.846	0.033	C
135.000-109.0			B	1	1.2		1	1	79.909			
80			C	1	1.2		1	1	79.909			
L2	0.944	5.931	A	1	1.2	0.008	1	1	89.393	0.901	0.037	C
109.080-84.41			B	1	1.2		1	1	89.393			
5			C	1	1.2		1	1	89.393			
L3	1.623	16.278	A	1	1.2	0.007	1	1	183.902	1.687	0.040	C
84.415-42.000			B	1	1.2		1	1	183.902			

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
			C	1	1.2		1	1	183.902			
L4	1.415	22.767	A	1	1.2	0.006	1	1	213.231	1.571	0.038	C
42.000-1.000			B	1	1.2		1	1	213.231			
			C	1	1.2		1	1	213.231			
Sum Weight:	4.398	49.179						OTM	324.504 kip-ft	5.005		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	4.203	A	1	1.2	0.008	1	1	79.909	0.846	0.033	C
135.000-109.0			B	1	1.2		1	1	79.909			
80			C	1	1.2		1	1	79.909			
L2	0.944	5.931	A	1	1.2	0.008	1	1	89.393	0.901	0.037	C
109.080-84.41			B	1	1.2		1	1	89.393			
5			C	1	1.2		1	1	89.393			
L3	1.623	16.278	A	1	1.2	0.007	1	1	183.902	1.687	0.040	C
84.415-42.000			B	1	1.2		1	1	183.902			
			C	1	1.2		1	1	183.902			
L4	1.415	22.767	A	1	1.2	0.006	1	1	213.231	1.571	0.038	C
42.000-1.000			B	1	1.2		1	1	213.231			
			C	1	1.2		1	1	213.231			
Sum Weight:	4.398	49.179						OTM	324.504 kip-ft	5.005		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	4.203	A	1	1.2	0.008	1	1	79.909	0.846	0.033	C
135.000-109.0			B	1	1.2		1	1	79.909			
80			C	1	1.2		1	1	79.909			
L2	0.944	5.931	A	1	1.2	0.008	1	1	89.393	0.901	0.037	C
109.080-84.41			B	1	1.2		1	1	89.393			
5			C	1	1.2		1	1	89.393			
L3	1.623	16.278	A	1	1.2	0.007	1	1	183.902	1.687	0.040	C
84.415-42.000			B	1	1.2		1	1	183.902			
			C	1	1.2		1	1	183.902			
L4	1.415	22.767	A	1	1.2	0.006	1	1	213.231	1.571	0.038	C
42.000-1.000			B	1	1.2		1	1	213.231			
			C	1	1.2		1	1	213.231			
Sum Weight:	4.398	49.179						OTM	324.504 kip-ft	5.005		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.010	1	1	72.527	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.010	1	1	82.368	0.579	0.023	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.009	1	1	172.098	1.102	0.026	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.007	1	1	202.301	1.040	0.025	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	209.355 kip-ft	3.257		

Tower Forces - Service - Wind 45 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.010	1	1	72.527	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.010	1	1	82.368	0.579	0.023	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.009	1	1	172.098	1.102	0.026	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.007	1	1	202.301	1.040	0.025	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	209.355 kip-ft	3.257		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.010	1	1	72.527	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.010	1	1	82.368	0.579	0.023	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.009	1	1	172.098	1.102	0.026	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.007	1	1	202.301	1.040	0.025	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	209.355 kip-ft	3.257		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight K	Self Weight K	Face	e	C_F	q_z ksf	D_F	D_R	A_E ft^2	F K	w klf	Ctrl. Face
L1	0.416	2.299	A	1	0.65	0.010	1	1	72.527	0.536	0.021	C
135.000-109.0			B	1	0.65		1	1	72.527			
80			C	1	0.65		1	1	72.527			
L2	0.944	3.838	A	1	0.65	0.010	1	1	82.368	0.579	0.023	C
109.080-84.41			B	1	0.65		1	1	82.368			
5			C	1	0.65		1	1	82.368			
L3	1.623	12.122	A	1	0.65	0.009	1	1	172.098	1.102	0.026	C
84.415-42.000			B	1	0.65		1	1	172.098			
			C	1	0.65		1	1	172.098			
L4	1.415	18.412	A	1	0.65	0.007	1	1	202.301	1.040	0.025	C
42.000-1.000			B	1	0.65		1	1	202.301			
			C	1	0.65		1	1	202.301			
Sum Weight:	4.398	36.671						OTM	209.355 kip-ft	3.257		

Force Totals

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Leg Weight	36.671					
Bracing Weight	0.000					
Total Member Self-Weight	36.671			10.514	0.284	
Total Weight	54.596			10.514	0.284	
Wind 0 deg - No Ice		-0.010	-24.922	-2455.751	1.464	-0.465
Wind 30 deg - No Ice		12.210	-21.578	-2124.744	-1205.463	4.299
Wind 45 deg - No Ice		17.273	-17.615	-1732.564	-1705.510	6.320

Load Case	Vertical Forces K	Sum of Forces X K	Sum of Forces Z K	Sum of Overturning Moments, M_x kip-ft	Sum of Overturning Moments, M_z kip-ft	Sum of Torques kip-ft
Wind 60 deg - No Ice		21.159	-12.452	-1221.596	-2089.311	7.911
Wind 90 deg - No Ice		24.438	0.010	11.695	-2413.254	9.404
Wind 120 deg - No Ice		21.169	12.470	1244.669	-2090.491	8.377
Wind 135 deg - No Ice		17.288	17.630	1755.262	-1707.180	6.978
Wind 150 deg - No Ice		12.228	21.588	2146.953	-1207.507	5.105
Wind 180 deg - No Ice		0.010	24.922	2476.780	-0.897	0.465
Wind 210 deg - No Ice		-12.210	21.578	2145.773	1206.030	-4.299
Wind 225 deg - No Ice		-17.273	17.615	1753.593	1706.078	-6.320
Wind 240 deg - No Ice		-21.159	12.452	1242.625	2089.878	-7.911
Wind 270 deg - No Ice		-24.438	-0.010	9.334	2413.821	-9.404
Wind 300 deg - No Ice		-21.169	-12.470	-1223.641	2091.059	-8.377
Wind 315 deg - No Ice		-17.288	-17.630	-1734.234	1707.747	-6.978
Wind 330 deg - No Ice		-12.228	-21.588	-2125.925	1208.075	-5.105
Member Ice	12.508					
Total Weight Ice	88.107			28.756	1.013	
Wind 0 deg - Ice		-0.003	-10.952	-1012.541	1.382	-0.181
Wind 30 deg - Ice		5.406	-9.483	-872.849	-511.999	2.136
Wind 45 deg - Ice		7.647	-7.742	-707.291	-724.687	3.114
Wind 60 deg - Ice		9.367	-5.473	-491.573	-887.919	3.880
Wind 90 deg - Ice		10.818	0.003	29.126	-1025.651	4.584
Wind 120 deg - Ice		9.370	5.479	549.725	-888.289	4.061
Wind 135 deg - Ice		7.652	7.747	765.326	-725.209	3.369
Wind 150 deg - Ice		5.412	9.487	930.731	-512.639	2.449
Wind 180 deg - Ice		0.003	10.952	1070.054	0.643	0.181
Wind 210 deg - Ice		-5.406	9.483	930.362	514.024	-2.136
Wind 225 deg - Ice		-7.647	7.742	764.804	726.712	-3.114
Wind 240 deg - Ice		-9.367	5.473	549.085	889.944	-3.880
Wind 270 deg - Ice		-10.818	-0.003	28.387	1027.676	-4.584
Wind 300 deg - Ice		-9.370	-5.479	-492.212	890.314	-4.061
Wind 315 deg - Ice		-7.652	-7.747	-707.814	727.234	-3.369
Wind 330 deg - Ice		-5.412	-9.487	-873.219	514.664	-2.449
Total Weight	54.596			10.514	0.284	
Wind 0 deg - Service		-0.004	-8.532	-833.781	0.688	-0.159
Wind 30 deg - Service		4.180	-7.387	-720.465	-412.488	1.472
Wind 45 deg - Service		5.913	-6.030	-586.207	-583.673	2.164
Wind 60 deg - Service		7.243	-4.263	-411.283	-715.063	2.708
Wind 90 deg - Service		8.366	0.004	10.918	-825.960	3.219
Wind 120 deg - Service		7.247	4.269	433.012	-715.467	2.868
Wind 135 deg - Service		5.918	6.035	607.807	-584.245	2.389
Wind 150 deg - Service		4.186	7.390	741.897	-413.188	1.748
Wind 180 deg - Service		0.004	8.532	854.809	-0.120	0.159
Wind 210 deg - Service		-4.180	7.387	741.493	413.056	-1.472
Wind 225 deg - Service		-5.913	6.030	607.235	584.241	-2.164
Wind 240 deg - Service		-7.243	4.263	432.312	715.630	-2.708
Wind 270 deg - Service		-8.366	-0.004	10.110	826.528	-3.219
Wind 300 deg - Service		-7.247	-4.269	-411.983	716.034	-2.868
Wind 315 deg - Service		-5.918	-6.035	-586.778	584.812	-2.389
Wind 330 deg - Service		-4.186	-7.390	-720.869	413.756	-1.748

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice

Comb. No.	Description
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 45 deg - No Ice
7	0.9 Dead+1.6 Wind 45 deg - No Ice
8	1.2 Dead+1.6 Wind 60 deg - No Ice
9	0.9 Dead+1.6 Wind 60 deg - No Ice
10	1.2 Dead+1.6 Wind 90 deg - No Ice
11	0.9 Dead+1.6 Wind 90 deg - No Ice
12	1.2 Dead+1.6 Wind 120 deg - No Ice
13	0.9 Dead+1.6 Wind 120 deg - No Ice
14	1.2 Dead+1.6 Wind 135 deg - No Ice
15	0.9 Dead+1.6 Wind 135 deg - No Ice
16	1.2 Dead+1.6 Wind 150 deg - No Ice
17	0.9 Dead+1.6 Wind 150 deg - No Ice
18	1.2 Dead+1.6 Wind 180 deg - No Ice
19	0.9 Dead+1.6 Wind 180 deg - No Ice
20	1.2 Dead+1.6 Wind 210 deg - No Ice
21	0.9 Dead+1.6 Wind 210 deg - No Ice
22	1.2 Dead+1.6 Wind 225 deg - No Ice
23	0.9 Dead+1.6 Wind 225 deg - No Ice
24	1.2 Dead+1.6 Wind 240 deg - No Ice
25	0.9 Dead+1.6 Wind 240 deg - No Ice
26	1.2 Dead+1.6 Wind 270 deg - No Ice
27	0.9 Dead+1.6 Wind 270 deg - No Ice
28	1.2 Dead+1.6 Wind 300 deg - No Ice
29	0.9 Dead+1.6 Wind 300 deg - No Ice
30	1.2 Dead+1.6 Wind 315 deg - No Ice
31	0.9 Dead+1.6 Wind 315 deg - No Ice
32	1.2 Dead+1.6 Wind 330 deg - No Ice
33	0.9 Dead+1.6 Wind 330 deg - No Ice
34	1.2 Dead+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
39	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
40	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
41	1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp
42	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
43	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
44	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
45	1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp
46	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
47	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
48	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
49	1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp
50	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
51	Dead+Wind 0 deg - Service
52	Dead+Wind 30 deg - Service
53	Dead+Wind 45 deg - Service
54	Dead+Wind 60 deg - Service
55	Dead+Wind 90 deg - Service
56	Dead+Wind 120 deg - Service
57	Dead+Wind 135 deg - Service
58	Dead+Wind 150 deg - Service
59	Dead+Wind 180 deg - Service
60	Dead+Wind 210 deg - Service
61	Dead+Wind 225 deg - Service
62	Dead+Wind 240 deg - Service
63	Dead+Wind 270 deg - Service
64	Dead+Wind 300 deg - Service
65	Dead+Wind 315 deg - Service

Comb. No.	Description
66	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	135 - 109.08	Pole	Max Tension	35	0.000	-0.000	-0.001
			Max. Compression	34	-29.399	0.561	-25.069
			Max. Mx	26	-11.433	240.313	-9.897
			Max. My	18	-11.412	0.046	-250.480
			Max. Vy	26	-19.171	240.313	-9.897
			Max. Vx	18	19.175	0.046	-250.480
			Max. Torque	11			-11.881
L2	109.08 - 84.415	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-48.964	1.109	-32.034
			Max. Mx	26	-23.176	878.267	-12.184
			Max. My	18	-23.128	-0.096	-906.638
			Max. Vy	26	-29.134	878.267	-12.184
			Max. Vx	18	29.926	-0.096	-906.638
			Max. Torque	27			14.884
L3	84.415 - 42	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-68.453	1.134	-32.771
			Max. Mx	26	-38.525	2171.017	-11.810
			Max. My	18	-38.500	-0.774	-2231.859
			Max. Vy	26	-33.919	2171.017	-11.810
			Max. Vx	18	34.708	-0.774	-2231.859
			Max. Torque	27			14.878
L4	42 - 1	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	34	-100.728	1.140	-32.929
			Max. Mx	26	-65.502	3929.353	-11.091
			Max. My	18	-65.502	-1.572	-4027.791
			Max. Vy	26	-39.123	3929.353	-11.091
			Max. Vx	18	39.897	-1.572	-4027.791
			Max. Torque	27			14.870

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	100.728	0.000	-0.000
	Max. H_x	27	49.136	39.101	0.016
	Max. H_z	2	65.515	0.016	39.875
	Max. M_x	2	4001.752	0.016	39.875
	Max. M_z	10	3928.650	-39.101	-0.016
	Max. Torsion	27	14.867	39.101	0.016
	Min. Vert	7	49.136	-27.637	28.184
	Min. H_x	10	65.515	-39.101	-0.016
	Min. H_z	18	65.515	-0.016	-39.875
	Min. M_x	18	-4027.791	-0.016	-39.875
	Min. M_z	26	-3929.353	39.101	0.016
	Min. Torsion	11	-14.867	-39.101	-0.016

Tower Mast Reaction Summary

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
Dead Only	54.596	0.000	0.000	10.722	0.289	0.000
1.2 Dead+1.6 Wind 0 deg - No Ice	65.515	-0.016	-39.875	-4001.752	2.273	-0.741
0.9 Dead+1.6 Wind 0 deg - No Ice	49.136	-0.016	-39.875	-3987.379	2.174	-0.741
1.2 Dead+1.6 Wind 30 deg - No Ice	65.515	19.536	-34.524	-3462.926	-1962.467	6.761
0.9 Dead+1.6 Wind 30 deg - No Ice	49.136	19.536	-34.524	-3450.929	-1953.896	6.786
1.2 Dead+1.6 Wind 45 deg - No Ice	65.515	27.637	-28.184	-2824.513	-2776.495	9.947
0.9 Dead+1.6 Wind 45 deg - No Ice	49.136	27.637	-28.184	-2815.332	-2764.332	9.982
1.2 Dead+1.6 Wind 60 deg - No Ice	65.515	33.854	-19.923	-1992.723	-3401.291	12.456
0.9 Dead+1.6 Wind 60 deg - No Ice	49.136	33.854	-19.923	-1987.211	-3386.370	12.499
1.2 Dead+1.6 Wind 90 deg - No Ice	65.515	39.101	0.016	14.934	-3928.650	14.816
0.9 Dead+1.6 Wind 90 deg - No Ice	49.136	39.101	0.016	11.590	-3911.401	14.867
1.2 Dead+1.6 Wind 120 deg - No Ice	65.515	33.871	19.952	2022.079	-3403.220	13.205
0.9 Dead+1.6 Wind 120 deg - No Ice	49.136	33.871	19.952	2009.880	-3388.288	13.250
1.2 Dead+1.6 Wind 135 deg - No Ice	65.515	27.660	28.207	2853.261	-2779.222	11.005
0.9 Dead+1.6 Wind 135 deg - No Ice	49.136	27.660	28.207	2837.395	-2767.044	11.042
1.2 Dead+1.6 Wind 150 deg - No Ice	65.515	19.565	34.541	3490.881	-1965.803	8.054
0.9 Dead+1.6 Wind 150 deg - No Ice	49.136	19.565	34.541	3472.202	-1957.215	8.080
1.2 Dead+1.6 Wind 180 deg - No Ice	65.515	0.016	39.875	4027.791	-1.572	0.741
0.9 Dead+1.6 Wind 180 deg - No Ice	49.136	0.016	39.875	4006.744	-1.653	0.742
1.2 Dead+1.6 Wind 210 deg - No Ice	65.515	-19.536	34.524	3488.961	1963.176	-6.770
0.9 Dead+1.6 Wind 210 deg - No Ice	49.136	-19.536	34.524	3470.291	1954.423	-6.795
1.2 Dead+1.6 Wind 225 deg - No Ice	65.515	-27.637	28.184	2850.544	2777.206	-9.957
0.9 Dead+1.6 Wind 225 deg - No Ice	49.136	-27.637	28.184	2834.691	2764.861	-9.993
1.2 Dead+1.6 Wind 240 deg - No Ice	65.515	-33.854	19.923	2018.751	3402.001	-12.465
0.9 Dead+1.6 Wind 240 deg - No Ice	49.136	-33.854	19.923	2006.567	3386.898	-12.509
1.2 Dead+1.6 Wind 270 deg - No Ice	65.515	-39.101	-0.016	11.089	3929.353	-14.816
0.9 Dead+1.6 Wind 270 deg - No Ice	49.136	-39.101	-0.016	7.763	3911.924	-14.867
1.2 Dead+1.6 Wind 300 deg - No Ice	65.515	-33.871	-19.952	-1996.053	3403.914	-13.197

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
0.9 Dead+1.6 Wind 300 deg - No Ice	49.136	-33.871	-19.952	-1990.526	3388.805	-13.241
1.2 Dead+1.6 Wind 315 deg - No Ice	65.515	-27.660	-28.207	-2827.231	2779.914	-10.995
0.9 Dead+1.6 Wind 315 deg - No Ice	49.136	-27.660	-28.207	-2818.037	2767.559	-11.031
1.2 Dead+1.6 Wind 330 deg - No Ice	65.515	-19.565	-34.541	-3464.847	1966.497	-8.045
0.9 Dead+1.6 Wind 330 deg - No Ice	49.136	-19.565	-34.541	-3452.842	1957.731	-8.071
1.2 Dead+1.0 Ice+1.0 Temp	100.728	-0.000	0.000	32.929	1.140	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	100.728	-0.003	-10.952	-1043.956	1.527	-0.178
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	100.728	5.406	-9.483	-899.474	-529.467	2.074
1.2 Dead+1.0 Wind 45 deg+1.0 Ice+1.0 Temp	100.728	7.647	-7.742	-728.237	-749.452	3.025
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	100.728	9.367	-5.473	-505.119	-918.285	3.770
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	100.728	10.818	0.003	33.442	-1060.743	4.456
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	100.728	9.370	5.479	571.901	-918.669	3.948
1.2 Dead+1.0 Wind 135 deg+1.0 Ice+1.0 Temp	100.728	7.652	7.747	794.898	-749.995	3.277
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	100.728	5.412	9.487	965.978	-530.131	2.382
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	100.728	0.003	10.952	1110.080	0.761	0.178
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	100.728	-5.406	9.483	965.595	531.757	-2.074
1.2 Dead+1.0 Wind 225 deg+1.0 Ice+1.0 Temp	100.728	-7.647	7.742	794.357	751.742	-3.025
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	100.728	-9.367	5.473	571.238	920.574	-3.770
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	100.728	-10.818	-0.003	32.677	1063.031	-4.456
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	100.728	-9.370	-5.479	-505.782	920.956	-3.948
1.2 Dead+1.0 Wind 315 deg+1.0 Ice+1.0 Temp	100.728	-7.652	-7.747	-728.778	752.281	-3.276
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	100.728	-5.412	-9.487	-899.857	532.418	-2.382
Dead+Wind 0 deg - Service	54.596	-0.004	-8.532	-845.859	0.702	-0.159
Dead+Wind 30 deg - Service	54.596	4.180	-7.387	-730.882	-418.533	1.454
Dead+Wind 45 deg - Service	54.596	5.913	-6.030	-594.656	-592.229	2.138
Dead+Wind 60 deg - Service	54.596	7.243	-4.263	-417.168	-725.545	2.677
Dead+Wind 90 deg - Service	54.596	8.366	0.004	11.222	-838.069	3.183
Dead+Wind 120 deg - Service	54.596	7.247	4.269	439.503	-725.955	2.837
Dead+Wind 135 deg - Service	54.596	5.918	6.035	616.861	-592.809	2.364
Dead+Wind 150 deg - Service	54.596	4.186	7.390	752.917	-419.244	1.730
Dead+Wind 180 deg - Service	54.596	0.004	8.532	867.484	-0.119	0.159
Dead+Wind 210 deg - Service	54.596	-4.180	7.387	752.506	419.117	-1.454
Dead+Wind 225 deg - Service	54.596	-5.913	6.030	616.281	592.812	-2.139
Dead+Wind 240 deg - Service	54.596	-7.243	4.263	438.793	726.128	-2.678
Dead+Wind 270 deg - Service	54.596	-8.366	-0.004	10.402	838.653	-3.183
Dead+Wind 300 deg - Service	54.596	-7.247	-4.269	-417.879	726.538	-2.836
Dead+Wind 315 deg - Service	54.596	-5.918	-6.035	-595.236	593.392	-2.363
Dead+Wind 330 deg - Service	54.596	-4.186	-7.390	-731.292	419.827	-1.729

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-54.596	0.000	0.000	54.596	0.000	0.000%
2	-0.016	-65.515	-39.875	0.016	65.515	39.875	0.000%
3	-0.016	-49.136	-39.875	0.016	49.136	39.875	0.000%
4	19.536	-65.515	-34.524	-19.536	65.515	34.524	0.000%
5	19.536	-49.136	-34.524	-19.536	49.136	34.524	0.000%
6	27.637	-65.515	-28.184	-27.637	65.515	28.184	0.000%
7	27.637	-49.136	-28.184	-27.637	49.136	28.184	0.000%
8	33.854	-65.515	-19.923	-33.854	65.515	19.923	0.000%
9	33.854	-49.136	-19.923	-33.854	49.136	19.923	0.000%
10	39.101	-65.515	0.016	-39.101	65.515	-0.016	0.000%
11	39.101	-49.136	0.016	-39.101	49.136	-0.016	0.000%
12	33.871	-65.515	19.952	-33.871	65.515	-19.952	0.000%
13	33.871	-49.136	19.952	-33.871	49.136	-19.952	0.000%
14	27.660	-65.515	28.207	-27.660	65.515	-28.207	0.000%
15	27.660	-49.136	28.207	-27.660	49.136	-28.207	0.000%
16	19.565	-65.515	34.541	-19.565	65.515	-34.541	0.000%
17	19.565	-49.136	34.541	-19.565	49.136	-34.541	0.000%
18	0.016	-65.515	39.875	-0.016	65.515	-39.875	0.000%
19	0.016	-49.136	39.875	-0.016	49.136	-39.875	0.000%
20	-19.536	-65.515	34.524	19.536	65.515	-34.524	0.000%
21	-19.536	-49.136	34.524	19.536	49.136	-34.524	0.000%
22	-27.637	-65.515	28.184	27.637	65.515	-28.184	0.000%
23	-27.637	-49.136	28.184	27.637	49.136	-28.184	0.000%
24	-33.854	-65.515	19.923	33.854	65.515	-19.923	0.000%
25	-33.854	-49.136	19.923	33.854	49.136	-19.923	0.000%
26	-39.101	-65.515	-0.016	39.101	65.515	0.016	0.000%
27	-39.101	-49.136	-0.016	39.101	49.136	0.016	0.000%
28	-33.871	-65.515	-19.952	33.871	65.515	19.952	0.000%
29	-33.871	-49.136	-19.952	33.871	49.136	19.952	0.000%
30	-27.660	-65.515	-28.207	27.660	65.515	28.207	0.000%
31	-27.660	-49.136	-28.207	27.660	49.136	28.207	0.000%
32	-19.565	-65.515	-34.541	19.565	65.515	34.541	0.000%
33	-19.565	-49.136	-34.541	19.565	49.136	34.541	0.000%
34	0.000	-100.728	0.000	0.000	100.728	-0.000	0.000%
35	-0.003	-100.728	-10.952	0.003	100.728	10.952	0.000%
36	5.406	-100.728	-9.483	-5.406	100.728	9.483	0.000%
37	7.647	-100.728	-7.742	-7.647	100.728	7.742	0.000%
38	9.367	-100.728	-5.473	-9.367	100.728	5.473	0.000%
39	10.818	-100.728	0.003	-10.818	100.728	-0.003	0.000%
40	9.370	-100.728	5.479	-9.370	100.728	-5.479	0.000%
41	7.652	-100.728	7.747	-7.652	100.728	-7.747	0.000%
42	5.412	-100.728	9.487	-5.412	100.728	-9.487	0.000%
43	0.003	-100.728	10.952	-0.003	100.728	-10.952	0.000%
44	-5.406	-100.728	9.483	5.406	100.728	-9.483	0.000%
45	-7.647	-100.728	7.742	7.647	100.728	-7.742	0.000%
46	-9.367	-100.728	5.473	9.367	100.728	-5.473	0.000%
47	-10.818	-100.728	-0.003	10.818	100.728	0.003	0.000%
48	-9.370	-100.728	-5.479	9.370	100.728	5.479	0.000%
49	-7.652	-100.728	-7.747	7.652	100.728	7.747	0.000%
50	-5.412	-100.728	-9.487	5.412	100.728	9.487	0.000%
51	-0.004	-54.596	-8.532	0.004	54.596	8.532	0.000%
52	4.180	-54.596	-7.387	-4.180	54.596	7.387	0.000%
53	5.913	-54.596	-6.030	-5.913	54.596	6.030	0.000%
54	7.243	-54.596	-4.263	-7.243	54.596	4.263	0.000%
55	8.366	-54.596	0.004	-8.366	54.596	-0.004	0.000%
56	7.247	-54.596	4.269	-7.247	54.596	-4.269	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
57	5.918	-54.596	6.035	-5.918	54.596	-6.035	0.000%
58	4.186	-54.596	7.390	-4.186	54.596	-7.390	0.000%
59	0.004	-54.596	8.532	-0.004	54.596	-8.532	0.000%
60	-4.180	-54.596	7.387	4.180	54.596	-7.387	0.000%
61	-5.913	-54.596	6.030	5.913	54.596	-6.030	0.000%
62	-7.243	-54.596	4.263	7.243	54.596	-4.263	0.000%
63	-8.366	-54.596	-0.004	8.366	54.596	0.004	0.000%
64	-7.247	-54.596	-4.269	7.247	54.596	4.269	0.000%
65	-5.918	-54.596	-6.035	5.918	54.596	6.035	0.000%
66	-4.186	-54.596	-7.390	4.186	54.596	7.390	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00009266
3	Yes	4	0.00000001	0.00005537
4	Yes	5	0.00000001	0.00004446
5	Yes	5	0.00000001	0.00002096
6	Yes	5	0.00000001	0.00004590
7	Yes	5	0.00000001	0.00002159
8	Yes	5	0.00000001	0.00003269
9	Yes	4	0.00000001	0.00098968
10	Yes	5	0.00000001	0.00003358
11	Yes	5	0.00000001	0.00001608
12	Yes	5	0.00000001	0.00005677
13	Yes	5	0.00000001	0.00002688
14	Yes	5	0.00000001	0.00004760
15	Yes	5	0.00000001	0.00002225
16	Yes	5	0.00000001	0.00003096
17	Yes	4	0.00000001	0.00092298
18	Yes	4	0.00000001	0.00009057
19	Yes	4	0.00000001	0.00005363
20	Yes	5	0.00000001	0.00003097
21	Yes	4	0.00000001	0.00092149
22	Yes	5	0.00000001	0.00004636
23	Yes	5	0.00000001	0.00002162
24	Yes	5	0.00000001	0.00005536
25	Yes	5	0.00000001	0.00002620
26	Yes	5	0.00000001	0.00003351
27	Yes	5	0.00000001	0.00001605
28	Yes	5	0.00000001	0.00003343
29	Yes	5	0.00000001	0.00001584
30	Yes	5	0.00000001	0.00004727
31	Yes	5	0.00000001	0.00002227
32	Yes	5	0.00000001	0.00004670
33	Yes	5	0.00000001	0.00002205
34	Yes	4	0.00000001	0.00007295
35	Yes	4	0.00000001	0.00093546
36	Yes	5	0.00000001	0.00004725
37	Yes	5	0.00000001	0.00004883
38	Yes	5	0.00000001	0.00004839
39	Yes	5	0.00000001	0.00004943
40	Yes	5	0.00000001	0.00005537
41	Yes	5	0.00000001	0.00005560

42	Yes	5	0.00000001	0.00005351
43	Yes	5	0.00000001	0.00004953
44	Yes	5	0.00000001	0.00005349
45	Yes	5	0.00000001	0.00005555
46	Yes	5	0.00000001	0.00005535
47	Yes	5	0.00000001	0.00004967
48	Yes	5	0.00000001	0.00004883
49	Yes	5	0.00000001	0.00004930
50	Yes	5	0.00000001	0.00004771
51	Yes	4	0.00000001	0.00001125
52	Yes	4	0.00000001	0.00005000
53	Yes	4	0.00000001	0.00005921
54	Yes	4	0.00000001	0.00006136
55	Yes	4	0.00000001	0.00008016
56	Yes	4	0.00000001	0.00008408
57	Yes	4	0.00000001	0.00006679
58	Yes	4	0.00000001	0.00004301
59	Yes	4	0.00000001	0.00001189
60	Yes	4	0.00000001	0.00003802
61	Yes	4	0.00000001	0.00006214
62	Yes	4	0.00000001	0.00008056
63	Yes	4	0.00000001	0.00008024
64	Yes	4	0.00000001	0.00006489
65	Yes	4	0.00000001	0.00006394
66	Yes	4	0.00000001	0.00005580

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	135 - 109.08	7.923	59	0.529	0.011
L2	113.915 - 84.415	5.638	59	0.490	0.007
L3	90 - 42	3.421	59	0.375	0.004
L4	49 - 1	0.967	59	0.184	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	HPA-65R-BUU-H8	59	7.368	0.523	0.010	65604
120.000	APXVSPP18-C-A20	59	6.277	0.507	0.008	21868
110.000	VHLP2-18	59	5.241	0.476	0.006	14761

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	135 - 109.08	36.290	18	2.378	0.053

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L2	113.915 - 84.415	25.965	18	2.235	0.033
L3	90 - 42	15.814	18	1.725	0.016
L4	49 - 1	4.481	18	0.853	0.005

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
130.000	HPA-65R-BUU-H8	18	33.790	2.361	0.048	16290
120.000	APXVSPP18-C-A20	18	28.863	2.303	0.039	5429
110.000	VHLP2-18	18	24.158	2.173	0.030	3573

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	135 - 109.08 (1)	TP36.69x29.52x0.25	25.920	0.000	0.0	27.854	-11.412	1860.030	0.006
L2	109.08 - 84.415 (2)	TP42.86x34.853x0.313	29.500	0.000	0.0	40.698	-23.128	2786.810	0.008
L3	84.415 - 42 (3)	TP53.81x40.719x0.5	48.000	0.000	0.0	81.573	-38.500	6018.840	0.006
L4	42 - 1 (4)	TP64x50.901x0.625	48.000	0.000	0.0	125.720	-65.502	9309.040	0.007

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	135 - 109.08 (1)	TP36.69x29.52x0.25	250.480	1343.592	0.186	0.000	1343.592	0.000
L2	109.08 - 84.415 (2)	TP42.86x34.853x0.313	906.642	2351.917	0.385	0.000	2351.917	0.000
L3	84.415 - 42 (3)	TP53.81x40.719x0.5	2231.858	6349.975	0.351	0.000	6349.975	0.000
L4	42 - 1 (4)	TP64x50.901x0.625	4027.792	12107.500	0.333	0.000	12107.500	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	135 - 109.08 (1)	TP36.69x29.52x0.25	19.175	925.039	0.021	0.437	2693.367	0.000
L2	109.08 - 84.415 (2)	TP42.86x34.853x0.313	29.926	1393.410	0.021	0.742	4715.008	0.000
L3	84.415 - 42 (3)	TP53.81x40.719x0.5	34.708	3009.420	0.012	0.741	12734.083	0.000
L4	42 - 1 (4)	TP64x50.901x0.625	39.897	4654.520	0.009	0.741	24280.584	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	135 - 109.08 (1)	0.006	0.186	0.000	0.021	0.000	0.193 ✔	1.000	4.8.2 ✔
L2	109.08 - 84.415 (2)	0.008	0.385	0.000	0.021	0.000	0.394 ✔	1.000	4.8.2 ✔
L3	84.415 - 42 (3)	0.006	0.351	0.000	0.012	0.000	0.358 ✔	1.000	4.8.2 ✔
L4	42 - 1 (4)	0.007	0.333	0.000	0.009	0.000	0.340 ✔	1.000	4.8.2 ✔

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	135 - 109.08	Pole	TP36.69x29.52x0.25	1	-11.412	1860.030	19.3	Pass
L2	109.08 - 84.415	Pole	TP42.86x34.853x0.313	2	-23.128	2786.810	39.4	Pass
L3	84.415 - 42	Pole	TP53.81x40.719x0.5	3	-38.500	6018.840	35.8	Pass
L4	42 - 1	Pole	TP64x50.901x0.625	4	-65.502	9309.040	34.0	Pass
							Summary	
						Pole (L2)	39.4	Pass
						RATING =	**39.4**	**Pass**

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Subject:	Anchor Bolt and Baseplate Analysis
Location:	135-FT ROHN Monopole Bridgeport, CT
Rev. 0: 6/16/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.42

Anchor Bolt and Base Plate Analysis:

Input Data:

Tower Reactions:

Overturning Moment =	$M_u := 4028 \cdot ft \cdot kips$	(Input From RisaTower)
Shear Force =	$Shear := 40 \cdot kips$	(Input From RisaTower)
Axial Force =	$R_u := 66 \cdot kips$	(Input From RisaTower)

Anchor Bolt Data:

ASTMA615 Grade 75

Number of Anchor Bolts =	$N := 24$	(User Input)
Diameter of Bolt Circle =	$D_{BC} := 70.5 \cdot in$	(User Input)
Bolt "Column" Distance =	$l := 3.0 \cdot in$	(User Input)
Bolt Ultimate Strength =	$F_u := 100 \cdot ksi$	(User Input)
Bolt Yield Strength =	$F_y := 75 \cdot ksi$	(User Input)
Bolt Modulus =	$E := 29000 \cdot ksi$	(User Input)
Diameter of Anchor Bolts =	$D := 2.25 \cdot in$	(User Input)
Threads per Inch =	$n := 4.5$	(User Input)
Top of Concrete to Bot Leveling Nut =	$l_{ar} := 2 \cdot in$	(User Input)
Anchor Rod Force Correction Factor =	$n_c = 1$	Table 2-1 Addendum 3

Base Plate Data:

Use AST MA572 Grade 50

Plate Yield Strength =	$F_{yf} := 50 \cdot ksi$	(User Input)
Base Plate Thickness =	$t_{TP} := 3 \cdot in$	(User Input)
Base Plate Diameter =	$D_{OD} := 75.5 \cdot in$	(User Input)
Outer Pole Diameter =	$D_T := 64.0 \cdot in$	(User Input)
Pole Wall Thickness =	$t_T := 0.625 \cdot in$	(User Input)
Pole Design Yield Strength =	$F_{yp} := 65 \cdot ksi$	(User Input)
	$\eta := 0.5$	For Ungrouted Base Plate per TIA-222-G Section 4.9.9

Anchor Bolt Analysis:

Gross Area of Bolt = $A_g := \frac{\pi}{4} \cdot D^2 = 3.976 \cdot in^2$

Net Area of Bolt = $A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743 \cdot in}{n} \right)^2 = 3.248 \cdot in^2$

Tensile Root Diameter = $d_{rt} := D - \frac{0.9743 \cdot in}{n} = 2.033 \cdot in$

Plastic Section Modulus = $Z := \frac{d_{rt}^3}{6} = 1.401 \cdot in^3$

Maximum Anchor Rod Force = $P_u := \frac{n_c \cdot \pi \cdot M_u}{N \cdot D_{BC}} + \frac{R_u}{N} = 92.5 \cdot kips$

Maximum Shear Force = $V_u := \frac{Shear}{N} = 1.7 \cdot kips$

Design Tensile Strength = $\Phi R_{nt} := 0.8 \cdot F_u \cdot A_n = 259.815 \cdot k$

Bolt % of Capacity = $\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \cdot 100 = 36.9$

Condition1 = $Condition1 := if\left[\frac{\left(P_u + \frac{V_u}{\eta} \right)}{\Phi R_{nt}} \le 1.00, "OK", "Overstressed" \right]$

Condition1 = "OK"

Design Shear Strength = $\Phi R_{nv} := 0.75 \cdot 0.45 \cdot F_u \cdot A_g = 134.193 \cdot k$

Design Flexural Strength = $\Phi R_{nm} := 0.9 \cdot F_y \cdot Z = 94.597 \cdot in \cdot k$

$$M_u := \begin{cases} 0 & \text{if } l_{ar} < D \\ 0.65 \cdot l_{ar} \cdot V_u & \text{otherwise} \end{cases} = 0 \cdot in \cdot k$$

Bolt % of Capacity = $\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \right] \cdot 100 = 12.7$

Condition2 = $Condition2 := if\left[\left(\frac{V_u}{\Phi R_{nv}} \right)^2 + \left(\frac{P_u}{\Phi R_{nt}} + \frac{M_u}{\Phi R_{nm}} \right)^2 \le 1.00, "OK", "Overstressed" \right]$

Condition2 = "OK"

Base Plate Analysis:

Strength Resistance Factor for Yielding due to Bending = $\phi_b := 0.9$

Strength Resistance Factor for Yielding due to Shear = $\phi_v := 1.0$

Outside Fillet Horizontal Leg Dimension = $w_1 := 0.25 \cdot in$

Effective Pole Outside Diameter = $D_e := D_T + w_1 = 64.25 \cdot in$

Effective Base Plate Outside Diameter = $D_{oe} := \begin{cases} D_{OD} & \text{if } D_{OD} \le \left(D_{BC} + 6 \cdot t_{TP}\right) \\ \left(D_{BC} + 6 \cdot t_{TP}\right) & \text{otherwise} \end{cases} = 75.5 \cdot in$

Half-Angle Between Radial Lines Extending from Pole Centerline Through Midpoints Between Adjacent Anchor Rods = $\theta_1 := \frac{\pi}{N} = 0.131$

Angle Defining Limiting Effective Base Plate Width Based on Plate Thickness = $\theta_2 := \operatorname{asin}\left(\frac{12 \cdot t_{TP}}{D_{BC}}\right) = 0.536$

Angle Defining Limiting Effective Base Plate Width Based on Distance Between Anchor Rod Bolt Circle and Effective Pole Outside Diameter = $\theta_3 := \operatorname{acos}\left(\frac{D_{BC} + D_e}{2 \cdot D_{BC}}\right) = 0.299$

Governing Angle Defining Effective Base Plate Width Resisting Bending = $\theta := \min\left(\theta_1, \theta_2, \theta_3\right) = 0.131$

Effective Moment Arm of Anchor Rod Force = $x := 0.5 \cdot \left(D_{BC} - D_e\right) = 3.125 \cdot in$

Effective Base Plate Width Resisting Bending from Transverse Bend Line = $B_{et} := D_{BC} \cdot \sin(\theta) = 9.202 \cdot in$

Effective Base Plate Width Resisting Bending from Radial Bend Lines = $B_{er} := \left(D_{oe} - D_e\right) \cdot \sin(\theta) = 1.468 \cdot in$

Total Effective Base Plate Width Resisting Bending = $B_{eff} := B_{et} + B_{er} = 10.671 \cdot in$

Required Base Plate Thickness = $t_{TP.Req} := \sqrt{\frac{4 \cdot P_u \cdot x}{\phi_b \cdot F_{yf} \cdot B_{eff}}} = 1.552 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 51.7 \cdot \%$

Condition2 = $Condition3 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition3 = "Ok"

Required Base Plate Thickness = $t_{TP.Req} := \frac{\phi_b \cdot t_T \cdot F_{yp}}{\phi_v \cdot 0.6 \cdot F_{yf}} = 1.219 \cdot in$

Plate Bending Stress % of Capacity = $\frac{t_{TP.Req}}{t_{TP}} = 40.6 \cdot \%$

Condition2 = $Condition4 := if\left(\frac{t_{TP.Req}}{t_{TP}} < 1.00, "Ok", "Overstressed"\right)$

Condition4 = "Ok"

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Subject:	FOUNDATION ANALYSIS
Location:	135-ft ROHN Monopole Bridgeport, CT
Rev. 0: 6/16/20	Prepared by: T.J.L Checked by: C.F.C. Job no. 20074.42

Standard Monopole Foundation:

Input Data:

Tower Data

Overturning Moment =	$OM := 4028 \cdot ft \cdot kips$	(User Input)	
Shear Force =	$Shear := 40 \cdot kip$	(User Input)	
Axial Force =	$Axial := 66 \cdot kip$	(User Input)	
Tower Height =	$H_t := 135 \cdot ft$	(User Input)	

Footing Data:

Overall Depth of Footing =	$D_f := 6.5 \cdot ft$	(User Input)	
Length of Pier =	$L_p := 3.75 \cdot ft$	(User Input)	
Extension of Pier Above Grade =	$L_{pag} := 0.5 \cdot ft$	(User Input)	
Diameter of Pier =	$d_p := 8.0 \cdot ft$	(User Input)	
Thickness of Footing =	$T_f := 3.25 \cdot ft$	(User Input)	
Width of Footing =	$W_f := 30 \cdot ft$	(User Input)	

Anchor Bolt Data:

Length of Anchor Bolts=	$L_{st} := 84 \cdot in$	(User Input)	
Projection of Anchor Bolts Above Pier =	$A_{BP} := 12.0 \cdot in$	(User Input)	
Anchor Bolt Diameter =	$d_{anchor} := 2.25 \cdot in$	(User Input)	
Base Plate Bolt Circle =	$MP := 70.5 \cdot in$	(User Input)	

Material Properties:

Concrete Compressive Strength =	$f_c := 4500 \cdot psi$	(User Input)	
Steel Reinforcment Yield Strength =	$f_y := 60000 \cdot psi$	(User Input)	
Anchor Bolt Yield Strength =	$f_{ya} := 75000 \cdot psi$	(User Input)	
Internal Friction Angle of Soil =	$\Phi_s := 30 \cdot deg$	(User Input)	
Ultimate Soil Bearing Capacity =	$q_u := 13700 \cdot psf$	(User Input)	
Allowable Soil Bearing Capacity =	$q_a := \frac{q_u}{2} = 6850 \cdot psf$	(User Input)	
Unit Weight of Soil =	$\gamma_{soil} := 100 \cdot pcf$	(User Input)	
Unit Weight of Concrete =	$\gamma_{conc} := 150 \cdot pcf$	(User Input)	
Foundation Bouyancy =	$Bouyancy := 0$	(User Input)	(Yes=1 / No=0)
Depth to Neglect =	$n := 0 \cdot ft$	(User Input)	
Cohesion of Clay Type Soil =	$c := 0 \cdot ksf$	(User Input)	(Use 0 for Sandy Soil)
Seismic Zone Factor =	$Z := 2$	(User Input)	(UBC-1997 Fig 23-2)
Coefficient of Friction Between Concrete =	$\mu := 0.45$	(User Input)	

Pier Reinforcement:

Bar Size =	$BS_{pier} := 10$	(User Input)	
Bar Diameter =	$d_{bpier} := 1.27 \cdot in$	(User Input)	
Number of Bars =	$NB_{pier} := 50$	(User Input)	
Clear Cover of Reinforcement =	$Cvr_{pier} := 3 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pier} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Diameter of Tie =	$d_{Tie} := 3 \cdot in$	(User Input)	

Pad Reinforcement:

Bar Size =	$BS_{top} := 9$	(User Input)	(Top of Pad)
Bar Diameter =	$d_{btop} := 1.128 \cdot in$	(User Input)	(Top of Pad)
Number of Bars =	$NB_{top} := 52$	(User Input)	(Top of Pad)
Bar Size =	$BS_{bot} := 9$	(User Input)	(Bottom of Pad)
Bar Diameter =	$d_{bbot} := 1.128 \cdot in$	(User Input)	(Bottom of Pad)
Number of Bars =	$NB_{bot} := 52$	(User Input)	(Bottom of Pad)
Clear Cover of Reinforcement =	$Cvr_{pad} := 3.0 \cdot in$	(User Input)	
Reinforcement Location Factor =	$\alpha_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Coating Factor =	$\beta_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Concrete Strength Factor =	$\lambda_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)
Reinforcement Size Factor =	$\gamma_{pad} := 1.0$	(User Input)	(ACI-2008 12.2.4)

Calculated Factors:

Pier Reinforcement Bar Area = $A_{bpier} := \frac{\pi \cdot d_{bpier}^2}{4} = 1.267 \cdot in^2$

Pad Top Reinforcement Bar Area = $A_{btop} := \frac{\pi \cdot d_{btop}^2}{4} = 0.999 \cdot in^2$

Pad Bottom Reinforcement Bar Area = $A_{bbot} := \frac{\pi \cdot d_{bbot}^2}{4} = 0.999 \cdot in^2$

Coefficient of Lateral Soil Pressure = $K_p := \frac{1 + \sin(\Phi_s)}{1 - \sin(\Phi_s)} = 3$

Stability of Footing:

Adjusted Concrete Unit Weight =

$$\gamma_c := \text{if}\left(\text{Bouyancy} = 1, \gamma_{conc} - 62.4pcf, \gamma_{conc}\right) = 150 \cdot pcf$$

Adjusted Soil Unit Weight =

$$\gamma_s := \text{if}\left(\text{Bouyancy} = 1, \gamma_{soil} - 62.4pcf, \gamma_{soil}\right) = 100 \cdot pcf$$

Passive Pressure =

$$P_{pn} := K_p \cdot \gamma_s \cdot n + c \cdot 2 \cdot \sqrt{K_p} = 0 \cdot ksf$$

$$P_{pt} := K_p \cdot \gamma_s \cdot \left(D_f - T_f\right) + c \cdot 2 \cdot \sqrt{K_p} = 0.975 \cdot ksf$$

$$P_{top} := \text{if}\left[n < \left(D_f - T_f\right), P_{pt}, P_{pn}\right] = 0.975 \cdot ksf$$

$$P_{bot} := K_p \cdot \gamma_s \cdot D_f + c \cdot 2 \cdot \sqrt{K_p} = 1.95 \cdot ksf$$

$$P_{ave} := \frac{P_{top} + P_{bot}}{2} = 1.463 \cdot ksf$$

$$T_p := \text{if}\left[n < \left(D_f - T_f\right), T_f, \left(D_f - n\right)\right] = 3.25$$

$$A_p := W_f \cdot T_p = 97.5$$

Ultimate Shear =

$$S_u := P_{ave} \cdot A_p = 142.594 \cdot kip$$

Weight of Concrete Pad =

$$WT_c := \left[\left(W_f^2 \cdot T_f\right) + d_p^2 L_p\right] \cdot \gamma_c = 474.75 \cdot kip$$

Weight of Soil Above Footing =

$$WT_{s1} := \left[\left(W_f^2 - d_p^2\right) \cdot \left(\left|L_p - L_{pag} - n\right|\right)\right] \cdot \gamma_s = 271.7 \cdot kip$$

Weight of Soil Wedge at Back Face =

$$WT_{s2} := \left(\frac{D_f^2 \cdot \tan\left(\Phi_s\right)}{2} \cdot W_f\right) \cdot \gamma_s = 36.59 \cdot kip$$

Weight of Soil Wedge at back face Corners =

$$WT_{s3} := 2 \cdot \left[\left(D_f\right)^3 \cdot \frac{\tan\left(\Phi_s\right)}{3}\right] \cdot \gamma_s = 10.57 \cdot kips$$

Total Weight =

$$WT_{tot} := WT_c + WT_{s1} + Axial = 812.45 \cdot kip$$

Resisting Weight =

$$WT_R := 0.9 \cdot WT_c + 0.75 \cdot WT_{s1} + 0.75 \cdot Axial = 680.55 \cdot kip$$

Resisting Moment =

$$M_r := \left(WT_R\right) \cdot \frac{W_f}{2} + 0.75 \cdot S_u \cdot \frac{T_f}{3} + 0.75 \cdot \left[\left(WT_{s2} + WT_{s3}\right) \cdot \left(W_f + \frac{D_f \cdot \tan\left(\Phi_s\right)}{3}\right)\right] = 11429 \cdot kip \cdot ft$$

Overturning Moment =

$$M_{ot} := OM + Shear \cdot \left(L_p + T_f\right) = 4308 \cdot kip \cdot ft$$

Factor of Safety Actual =

$$FS := \frac{M_r}{M_{ot}} = 2.65$$

Factor of Safety Required =

$$FS_{req} := 1$$

$$\text{OverTurning\_Moment\_Check} := \text{if}\left(FS \geq FS_{req}, \text{"Okay"}, \text{"No Good"}\right)$$

OverTurning_Moment_Check = "Okay"

Shear Capacity in Pier:

Shear Resistance of Pier = $S_p := \frac{P_{ave} \cdot A_p + \mu \cdot WT_{tot}}{FS_{req}} = 508.196 \cdot kips$

$Shear\_Check := if(S_p > Shear, "Okay", "No Good")$

Shear_Check = "Okay"

Bearing Pressure Caused by Footing:

Area of the Mat = $A_{mat} := W_f^2 = 900$

Section Modulus of Mat = $S := \frac{W_f^3}{6} = 4500 \cdot ft^3$

Maximum Pressure in Mat = $P_{max} := \frac{WT_{tot}}{A_{mat}} + \frac{M_{ot}}{S} = 1.86 \cdot ksf$

$Max\_Pressure\_Check := if(P_{max} < .75 \cdot q_u, "Okay", "No Good")$

Max_Pressure_Check = "Okay"

Minimum Pressure in Mat = $P_{min} := \frac{WT_{tot}}{A_{mat}} - \frac{M_{ot}}{S} = -0.055 \cdot ksf$

$Min\_Pressure\_Check := if[(P_{min} \geq 0) \cdot (P_{min} < .75 \cdot q_u), "Okay", "No Good"]$

Min_Pressure_Check = "No Good"

Distance to Resultant of Pressure Distribution = $X_p := \frac{P_{max}}{\frac{P_{max} - P_{min}}{W_f}} \cdot \frac{1}{3} = 9.715$

Distance to Kern = $X_k := \frac{W_f}{6} = 5$

Since Resultant Force is Not in Kern, Area to which Pressure is Applied Must be Reduced.

Eccentricity = $e := \frac{M_{ot}}{WT_{tot}} = 5.302$

Adjusted Soil Pressure = $P_a := \frac{2 \cdot WT_{tot}}{3 \cdot W_f \cdot \left(\frac{W_f}{2} - e\right)} = 1.862 \cdot ksf$

$q_{adj} := if(P_{min} < 0, P_a, P_{max}) = 1.862 \cdot ksf$

$Pressure\_Check := if(q_{adj} < .75 \cdot q_u, "Okay", "No Good")$

Pressure_Check = "Okay"

Concrete Bearing Capacity:

Strength Reduction Factor = $\Phi_c := 0.65$ (ACI-2008 9.3.2.2)

Bearing Strength Between Pier and Pad = $P_b := \Phi_c \cdot 0.85 \cdot f_c \cdot \frac{\pi \cdot d_p^2}{4} = 1.8 \times 10^4 \cdot kips$ (ACI-2008 10.14)

$Bearing\_Check := if\left(P_b > Axial, "Okay", "No Good"\right)$

Bearing_Check = "Okay"

Shear Strength of Concrete:

Beam Shear: (Critical section located at a distance d from the face of Pier) (ACI 11.3.1.1)

$\phi_c := 0.85$ (ACI 9.3.2.5)

$d := T_f - Cvr_{pad} - d_{bbot} = 2.906$

$d_1 := \frac{W_f}{2} - \frac{d_p}{2}$

$d_2 := d_1 - d$

$L := \left(\frac{W_f}{2} - e\right) \cdot 3$

$Slope := if\left(L > W_f, \frac{P_{max} - P_{min}}{W_f}, \frac{q_{adj}}{L}\right)$

$V_{req} := \left[\left(q_{adj} - Slope \cdot d_1\right) + \left(\frac{Slope \cdot d_1}{2}\right)\right] \cdot W_f \cdot d_1$

$V_{Avail} := \phi_c \cdot 2 \cdot \sqrt{f_c \cdot psi} \cdot W_f \cdot d$ (ACI-2008 11.2.1.1)

$Beam\_Shear\_Check := if\left(V_{req} < V_{Avail}, "Okay", "No Good"\right)$

Beam_Shear_Check = "Okay"

Punching Shear: (Critical Section Located at a distance of d/2 from the face of pier) (ACI 11.11.1.2)

Critical Perimeter of Punching Shear = $b_o := \left(d_p + d\right) \cdot \pi = 34.3$

Area Included Inside Perimeter = $A_{bo} := \frac{\pi \cdot \left(d_p + d\right)^2}{4} = 93.4$

Area Outside of Perimeter = $A_{out} := A_{mat} - A_{bo} = 806.6$

Guess Value = $v_u := 1ksf$ (From "Foundation Analysis and design", By Joseph Bowles, Eq. 8-9)

Given $d^2 + d_p \cdot d = \frac{WT_{tot}}{\pi \cdot v_u}$

$v_u := Find(v_u) = 8.2 \cdot ksf$

$V_u := v_u \cdot d \cdot W_f = 711.4 \cdot kips$

Required Shear Strength = $V_{req} := V_u = 711.4 \cdot kips$

Available Shear Strength = $V_{Avail} := \phi_c \cdot 4 \cdot \sqrt{f_c \cdot psi} \cdot b_o \cdot d = 3270.1 \cdot kip$ (ACI-2008 11.11.2.1)

$Punching\_Shear\_Check := if(V_{req} < V_{Avail}, "Okay", "No Good")$

Punching_Shear_Check = "Okay"

Steel Reinforcement in Pad:

Required Reinforcement for Bending:

Strength Reduction Factor = $\phi_m := .90$ (ACI-2008 9.3.2.1)

$q_b := q_{adj} - d_1 \cdot Slope = 1.158 \cdot ksf$

Maximum Bending at Face of Pier = $M_n := \frac{1}{\phi_m} \cdot \left[(q_{adj} - q_b) \cdot \frac{d_1^2}{3} + q_b \cdot \frac{d_1^2}{2} \right] \cdot W_f = 3281.3 \cdot kip \cdot ft$

$$\beta := \begin{cases} 0.85 & \text{if } 2500 \cdot psi \le f_c \le 4000 \cdot psi \\ 0.65 & \text{if } f_c > 8000 \cdot psi \\ \left[0.85 - \left[\frac{\left(\frac{f_c}{psi} - 4000 \right)}{1000} \right] \cdot 0.5 \right] & \text{otherwise} \end{cases} = 0.6$$ (ACI-200810.2.7.3)

$R_n := \frac{M_n}{W_f \cdot d^2} = 89.9 \cdot psi$

$\rho := \frac{0.85 \cdot f_c}{f_y} \left(1 - \sqrt{1 - \frac{2 \cdot R_n}{0.85 \cdot f_c}} \right) = 0.0015$

$\rho_{min} := \rho = 0.00152$

Required Reinforcement for Temperature and Shrinkage:

$$\rho_{sh} := \begin{cases} .0018 & \text{if } f_y \geq 60000 \cdot psi \\ .0020 & \text{otherwise} \end{cases}$$ (ACI-2008 7.12.2.1)

Check Bottom Bars:

$$As := \begin{cases} \rho_{min} \cdot W_f \cdot d & \text{if } \rho_{min} > \frac{\rho_{sh}}{2} \\ \rho_{sh} \cdot W_f \cdot \frac{d}{2} & \text{otherwise} \end{cases} = 19.046 \cdot in^2$$

$As_{prov} := A_{bbot} \cdot NB_{bot} = 52 \cdot in^2$

$Pad\_Reinforcement\_Bot := if(As_{prov} > As, "Okay", "No Good")$

$Pad\_Reinforcement\_Bot = "Okay"$

Check top Bars:

$As := \rho_{sh} \cdot \left(W_f \cdot \frac{d}{2}\right) = 11.3 \cdot in^2$

$As_{prov} := A_{btop} \cdot NB_{top} = 52 \cdot in^2$

$Pad\_Reinforcement\_Top := if(As_{prov} > As, "Okay", "No Good")$

$Pad\_Reinforcement\_Top = "Okay"$

Developement Length Pad Reinforcement:

Bar Spacing =

$$B_{sPad} := \frac{W_f - 2 \cdot Cvr_{pad} - NB_{bot} \cdot d_{bbot}}{NB_{bot} - 1} = 5.79 \cdot in$$

Spacing or Cover Dimension =

$$c := if\left(Cvr_{pad} < \frac{B_{sPad}}{2}, Cvr_{pad}, \frac{B_{sPad}}{2}\right) = 2.896 \cdot in$$

Transverse Reinforcement Index =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pad} \cdot \beta_{pad} \cdot \gamma_{pad} \cdot \lambda_{pad}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \frac{c + k_{tr}}{d_{bbot}}} \cdot d_{bbot} = 29.5 \cdot in$$

Minimum Development Length =

$L_{dbmin} := 12 \cdot in$ (ACI-2008 12.2.1)

$L_{dbtCheck} := if(L_{dbt} \geq L_{dbmin}, "Use L.dbt", "Use L.dbmin")$

Available Length in Pad =

$$L_{Pad} := \frac{W_f}{2} - \frac{d_p}{2} - Cvr_{pad} = 129 \cdot in$$

$Lpad\_Check := if(L_{Pad} > L_{dbt}, "Okay", "No Good")$

$Lpad\_Check = "Okay"$

Steel Reinforcement in Pier:

Area of Pier =

$A_p := d_p^2 = 9216 \cdot in^2$

$A_{smin} := 0.01 \cdot 0.5 \cdot A_p = 46.08 \cdot in^2$ (ACI-2008 10.8.4 & 10.9.1)

$A_{sprov} := NB_{pier} \cdot A_{bpier} = 63.34 \cdot in^2$

$Steel\_Area\_Check := if\left(A_{sprov} > A_{smin}, "Okay", "No Good"\right)$

Steel_Area_Check = "Okay"

NOTE: Anchor Bolts are not accounted for in reinforcement calculation and will provide additional reinforcement to satisfy minimum requirement of steel.

Bar Spacing In Pier =

$B_{sPier} := \frac{d_p \cdot \pi}{NB_{pier}} - d_{bpier} = 4.762 \cdot in$

Diameter of Reinforcement Cage =

$Diam_{cage} := d_p - 2 \cdot Cvr_{pier} = 90 \cdot in$

Maximum Moment in Pier =

$M_p := \left[OM + Shear \cdot \left(L_p + \frac{A_{BP}}{2}\right)\right] = 50376 \cdot in \cdot kips$

Pier Check evaluated from outside program and results are listed below;

$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) := \left(d_p \cdot 12 \;\; NB_{pier} \;\; BS_{pier} \;\; \frac{Axial \cdot 1.333}{kips} \;\; \frac{M_p}{in \cdot kips}\right)$

$\left(D \;\; N \;\; n \;\; P_u \;\; M_{xu}\right) = (96 \;\; 50 \;\; 10 \;\; 88 \;\; 50376)$

$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := (0 \;\; 0 \;\; 0 \;\; 0)$

$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) := \phi P'_n\left(D, N, n, P_u, M_{xu}\right)^T$

$\left(\phi P_n \;\; \phi M_{xn} \;\; f_{sp} \;\; \rho\right) = \left(241.2 \;\; 1.4 \times 10^5 \;\; -60 \;\; 0\right)$

$Axial\_Load\_Check := if\left(\phi P_n \geq P_u, "Okay", "No Good"\right)$

Axial_Load_Check = "Okay"

$Bending\_Check := if\left(\phi M_{xn} \geq M_{xu}, "Okay", "No Good"\right)$

Bending_Check = "Okay"

Development Length Pier Reinforcement:

Available Length in Foundation:

$L_{pier} := L_p - Cvr_{pier} = 42 \cdot in$

$L_{pad} := T_f - Cvr_{pad} = 36 \cdot in$

Tension: (ACI-2008 12.2.3)

Spacing or Cover Dimension =

$c := if\left(Cvr_{pier} < \frac{B_{sPier}}{2}, Cvr_{pier}, \frac{B_{sPier}}{2}\right) = 2.381 \cdot in$

Transverse Reinforcement =

$k_{tr} := 0$ (ACI-2008 12.2.3)

$L_{dbt} := \frac{3 \cdot f_y \cdot \alpha_{pier} \cdot \beta_{pier} \cdot \gamma_{pier} \cdot \lambda_{pier}}{40 \cdot \sqrt{f_c \cdot psi} \cdot \left(\frac{c + k_{tr}}{d_{bpier}}\right)} \cdot d_{bpier} = 45.44 \cdot in$

Minimum Development Length =

$L_{dh} := \frac{1200 \cdot d_{bpier}}{\sqrt{\frac{f_c}{psi}}} \cdot .7 = 15.903 \cdot in$ (ACI 12.2.1)

Pier reinforcement bars are standard 90 degree hooks and therefore developement in the pad is computed as follows:

$L_{db} := \max\left(L_{dbt}, L_{dbmin}\right)$

$L_{tension\_Check} := if\left(L_{pier} + L_{pad} > L_{dbt}, "Okay", "No Good"\right)$

$L_{tension\_Check} = "Okay"$

Compression: (ACI-2008 12.3.2)

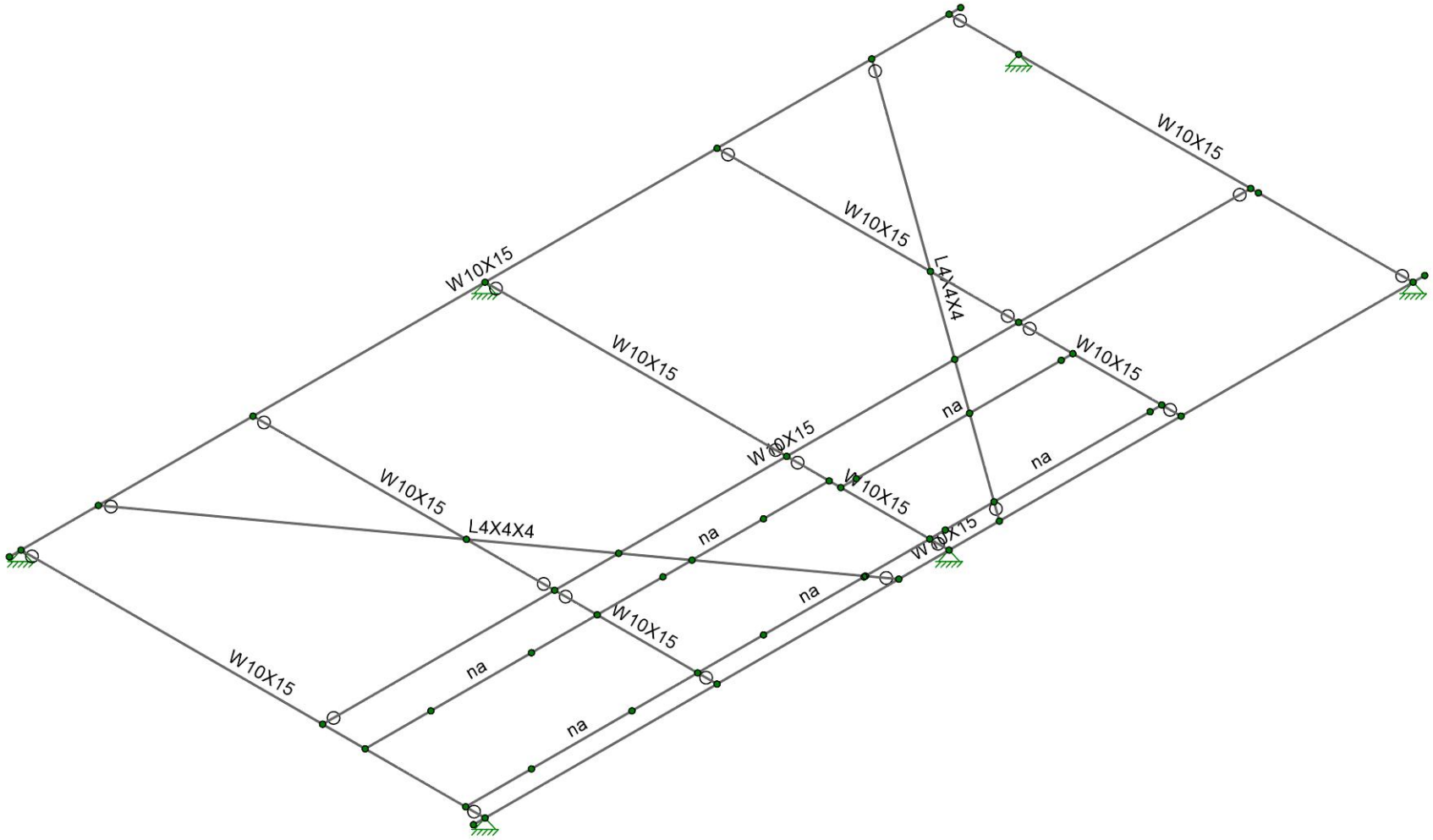
$L_{dbc1} := \frac{.02 \cdot d_{bpier} \cdot f_y}{\sqrt{f_c \cdot psi}} = 22.718 \cdot in$

$L_{dbmin} := 0.0003 \cdot \frac{in^2}{lb} \cdot \left(d_{bpier} \cdot f_y\right) = 22.86 \cdot in$

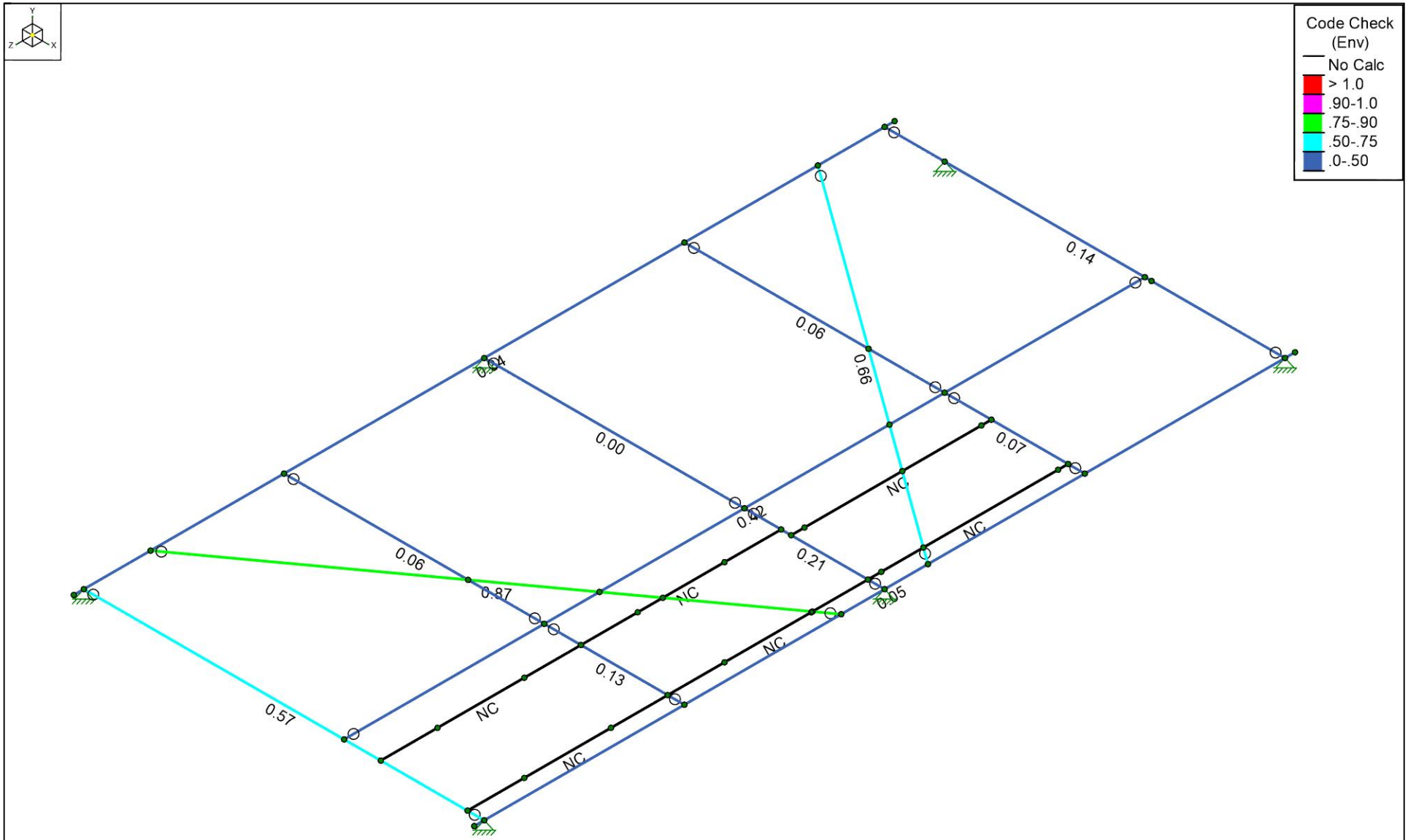
$L_{dbc} := if\left(L_{dbc1} \geq L_{dbmin}, L_{dbc1}, L_{dbmin}\right) = 22.86 \cdot in$

$L_{compression\_Check} := if\left(L_{pier} + L_{pad} > L_{dbc}, "Okay", "No Good"\right)$

$L_{compression\_Check} = "Okay"$



Centek Engineering	CTFF335A_Eq. Platform	SK-1
FJP		Jun 24, 2020 at 11:34 AM
20074.42	Member Framing	Platform_CTFF335A.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek Engineering	CTFF335A_Eq. Platform	SK-2
FJP		Jun 24, 2020 at 11:49 AM
20074.42	Member Unity Check	Platform_CTFF335A.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. C…	Density [k…	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.…	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.…	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	(E)W10X15	W10X15	Beam	Wide Flan…	A992	Typical	4.41	2.89	68.9	0.104
2	(E)L4X4	L4X4X4	Beam	Single Angle	A36 Gr.36	Typical	1.93	3	3	0.044

Hot Rolled Member Properties

	Label	Shape	Length [ft]	Lb y-y [ft]	Lb z-z [ft]	Lcomp t…	Lcomp…	L-Torqu…	K y-y	K z-z	Cb	Function
1	M1	(E)W10…	10			Lbyy						Lateral
2	M2	(E)W10…	6.5			Lbyy						Lateral
3	M3	(E)W10…	6.5			Lbyy						Lateral
4	M4	(E)W10…	6.5			Lbyy						Lateral
5	M5	(E)W10…	10			Lbyy						Lateral
6	M6	(E)W10…	20		Segment	Lbyy						Lateral
7	M7	(E)W10…	20.5		Segment	Lbyy						Lateral
8	M8	(E)W10…	20.5		Segment	Lbyy						Lateral
9	M9	(E)W10…	3.5			Lbyy						Lateral
10	M10	(E)W10…	3.5			Lbyy						Lateral
11	M11	(E)W10…	3.5			Lbyy						Lateral
12	M12	(E)L4X4	12.352		Segment	Lbyy						Lateral
13	M13	(E)L4X4	12.352		Segment	Lbyy						Lateral

Primary Member Properties

	Label	I Node	J Node	K Node	Rotate(deg)	Section/S…	Type	Design List	Material	Design Rule
1	M1	N3	N1			(E)W10X15	Beam	Wide Flan…	A992	Typical
2	M2	N5	N4			(E)W10X15	Beam	Wide Flan…	A992	Typical
3	M3	N8	N7			(E)W10X15	Beam	Wide Flan…	A992	Typical
4	M4	N11	N10			(E)W10X15	Beam	Wide Flan…	A992	Typical
5	M5	N15	N13			(E)W10X15	Beam	Wide Flan…	A992	Typical
6	M6	N2	N14			(E)W10X15	Beam	Wide Flan…	A992	Typical
7	M7	N17	N19			(E)W10X15	Beam	Wide Flan…	A992	Typical
8	M8	N16	N18			(E)W10X15	Beam	Wide Flan…	A992	Typical
9	M9	N6	N5			(E)W10X15	Beam	Wide Flan…	A992	Typical
10	M10	N9	N8			(E)W10X15	Beam	Wide Flan…	A992	Typical
11	M11	N12	N11			(E)W10X15	Beam	Wide Flan…	A992	Typical
12	M12	N20	N22		90	(E)L4X4	Beam	Single Angle	A36 Gr.36	Typical
13	M13	N21	N23		90	(E)L4X4	Beam	Single Angle	A36 Gr.36	Typical
14	M14	N28	N29			RIGID	None	None	RIGID	Typical
15	M15	N30	N31			RIGID	None	None	RIGID	Typical
16	M16	N31	N32			RIGID	None	None	RIGID	Typical
17	M17	N33	N34			RIGID	None	None	RIGID	Typical
18	M18	N34	N35			RIGID	None	None	RIGID	Typical
19	M19	N36	N33			RIGID	None	None	RIGID	Typical

Nodes

	Label	X [ft]	Y [ft]	Z [ft]	Temp [deg F]	Detach From Dia…
1	N1	0	0	5		
2	N2	6.5	0	5		
3	N3	10	0	5		

Nodes (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [deg F]	Detach From Dia…
4	N4	0	0	10		
5	N5	6.5	0	10		
6	N6	10	0	10		
7	N7	0	0	15		
8	N8	6.5	0	15		
9	N9	10	0	15		
10	N10	0	0	20		
11	N11	6.5	0	20		
12	N12	10	0	20		
13	N13	0	0	25		
14	N14	6.5	0	25		
15	N15	10	0	25		
16	N16	0	0	4.75		
17	N17	10	0	4.75		
18	N18	0	0	25.25		
19	N19	10	0	25.25		
20	N20	0	0	23.333333		
21	N21	0	0	6.666667		
22	N22	10	0	16.083333		
23	N23	10	0	13.916667		
24	N24	4.597701	0	10		
25	N25	4.597701	0	20		
26	N26	6.5	0	18.620833		
27	N27	6.5	0	11.379167		
28	N28	7.666667	0	10		
29	N29	7.666667	0	15		
30	N30	7.416667	0	15		
31	N31	7.416667	0	20		
32	N32	7.416667	0	25		
33	N33	9.583333	0	15		
34	N34	9.583333	0	20		
35	N35	9.583333	0	25		
36	N36	9.583333	0	10		
37	N37	7.666667	0	10.25		
38	N38	9.583333	0	10.25		
39	N39	7.666667	0	14.666667		
40	N40	9.583333	0	14.666667		
41	N41	1.5	0	5		
42	N42	6.666667	0	5		
43	N43	7.416667	0	16.416667		
44	N44	9.583333	0	16.416667		
45	N45	7.416667	0	18.583333		
46	N46	9.583333	0	18.583333		
47	N47	7.416667	0	21.416667		
48	N48	9.583333	0	21.416667		
49	N49	7.416667	0	23.583333		
50	N50	9.583333	0	23.583333		
51	N51	7.416667	0	17.95625		
52	N52	9.583333	0	16.385417		
53	N53	7.666667	0	12.225		
54	N54	9.583333	0	13.614583		

Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
1	N7	Reaction	Reaction	Reaction			
2	N9	Reaction	Reaction	Reaction			
3	N3	Reaction	Reaction	Reaction			
4	N15	Reaction	Reaction	Reaction			

Boundary Conditions (Continued)

	Node Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot [k-ft/rad]	Y Rot [k-ft/rad]	Z Rot [k-ft/rad]
5	N13	Reaction	Reaction	Reaction			
6	N41	Reaction	Reaction	Reaction			

Basic Load Cases

	BLC Desc…	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Me…	Surface(P…
1	Self Weight	DL		-1						
2	Grating &…	DL						4	2	
3	Live Load…	LL							12	
4	Snow Loa…	SL							2	
5	Weight of…	DL					14			
6	Wind X-Di…	WLX					26	2		
7	Wind Z-Di…	WLZ					26	2		
8	BLC 2 Tra…	None						80		
9	BLC 3 Tra…	None						90		
10	BLC 4 Tra…	None						80		

Weight of Equipment

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	Y	-0.1	1.75	Active
2	M1	Y	-0.215	3.833	Active
3	M19	Y	-0.215	0.25	Active
4	M19	Y	-0.215	4.667	Active
5	M14	Y	-0.215	0.25	Active
6	M14	Y	-0.215	4.667	Active
7	M17	Y	-0.3	1.417	Active
8	M15	Y	-0.3	1.417	Active
9	M17	Y	-0.3	3.583	Active
10	M15	Y	-0.3	3.583	Active
11	M18	Y	-0.471	1.417	Active
12	M16	Y	-0.471	1.417	Active
13	M16	Y	-0.471	3.583	Active
14	M18	Y	-0.471	3.583	Active

Wind X-Direction (58 psf)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	X	0.155	1.75	Active
2	M1	X	0.288	3.833	Active
3	M19	Y	-1.219	0.25	Active
4	M19	Y	-1.219	4.667	Active
5	M14	Y	1.219	0.25	Active
6	M14	Y	1.219	4.667	Active
7	M19	X	0.295	0.25	Active
8	M19	X	0.295	4.667	Active
9	M14	X	0.295	0.25	Active
10	M14	X	0.295	4.667	Active
11	M17	Y	-0.8	1.417	Active
12	M15	Y	0.8	1.417	Active
13	M17	Y	-0.8	3.583	Active
14	M15	Y	0.8	3.583	Active
15	M17	X	0.165	1.417	Active
16	M15	X	0.165	1.417	Active
17	M17	X	0.165	3.583	Active
18	M15	X	0.165	3.583	Active
19	M18	Y	-0.8	1.417	Active
20	M16	Y	0.8	1.417	Active
21	M16	Y	0.8	3.583	Active
22	M18	Y	-0.8	3.583	Active

Wind X-Direction (58 psf) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
23	M18	X	0.165	1.417	Active
24	M16	X	0.165	1.417	Active
25	M16	X	0.165	3.583	Active
26	M18	X	0.165	3.583	Active

Wind Z-Direction (58 psf)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in,…
1	M1	Z	0.232	1.75	Active
2	M1	Z	0.865	3.833	Active
3	M19	Y	0.354	0.25	Active
4	M19	Y	-0.354	4.667	Active
5	M14	Y	0.354	0.25	Active
6	M14	Y	-0.354	4.667	Active
7	M19	Z	0.159	0.25	Active
8	M19	Z	0.159	4.667	Active
9	M14	Z	0.159	0.25	Active
10	M14	Z	0.159	4.667	Active
11	M17	Y	0.8	1.417	Active
12	M15	Y	0.8	1.417	Active
13	M17	Y	-0.8	3.583	Active
14	M15	Y	-0.8	3.583	Active
15	M17	Z	0.165	1.417	Active
16	M15	Z	0.165	1.417	Active
17	M17	Z	0.165	3.583	Active
18	M15	Z	0.165	3.583	Active
19	M18	Y	0.8	1.417	Active
20	M16	Y	0.8	1.417	Active
21	M16	Y	-0.8	3.583	Active
22	M18	Y	-0.8	3.583	Active
23	M18	Z	0.165	1.417	Active
24	M16	Z	0.165	1.417	Active
25	M16	Z	0.165	3.583	Active
26	M18	Z	0.165	3.583	Active

Grating & Railing (10psf)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M1	Y	-0.01	-0.01	0	%100	Active
2	M5	Y	-0.01	-0.01	0	%100	Active
3	M7	Y	-0.01	-0.01	0.25	20.25	Active
4	M8	Y	-0.01	-0.01	0.25	20.25	Active

Wind X-Direction (58 psf)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M7	X	0.048	0.048	0	%100	Active
2	M8	X	0.048	0.048	0	%100	Active

Wind Z-Direction (58 psf)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M1	Z	0.048	0.048	0	%100	Active
2	M5	Z	0.048	0.048	0	%100	Active

BLC 2 Transient Area Loads

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M6	Y	-0.05	-0.044	0	2	Active
2	M6	Y	-0.044	-0.034	2	4	Active
3	M6	Y	-0.034	-0.027	4	6	Active

BLC 2 Transient Area Loads (Continued)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
4	M6	Y	-0.027	-0.033	6	8	Active
5	M6	Y	-0.033	-0.037	8	10	Active
6	M6	Y	-0.037	-0.033	10	12	Active
7	M6	Y	-0.033	-0.023	12	14	Active
8	M6	Y	-0.023	-0.02	14	16	Active
9	M6	Y	-0.02	-0.03	16	18	Active
10	M6	Y	-0.03	-0.043	18	20	Active
11	M8	Y	-0.028	-0.017	0	2.05	Active
12	M8	Y	-0.017	-0.017	2.05	4.1	Active
13	M8	Y	-0.017	-0.022	4.1	6.15	Active
14	M8	Y	-0.022	-0.032	6.15	8.2	Active
15	M8	Y	-0.032	-0.042	8.2	10.25	Active
16	M8	Y	-0.042	-0.032	10.25	12.3	Active
17	M8	Y	-0.032	-0.022	12.3	14.35	Active
18	M8	Y	-0.022	-0.017	14.35	16.4	Active
19	M8	Y	-0.017	-0.017	16.4	18.45	Active
20	M8	Y	-0.017	-0.028	18.45	20.5	Active
21	M12	Y	-0.033	-0.021	0	1.729	Active
22	M12	Y	-0.021	-0.018	1.729	3.458	Active
23	M12	Y	-0.018	-0.018	3.458	5.188	Active
24	M12	Y	-0.018	-0.013	5.188	6.917	Active
25	M12	Y	-0.013	-0.007	6.917	8.646	Active
26	M13	Y	-0.027	-0.019	0	1.729	Active
27	M13	Y	-0.019	-0.018	1.729	3.458	Active
28	M13	Y	-0.018	-0.018	3.458	5.188	Active
29	M13	Y	-0.018	-0.013	5.188	6.917	Active
30	M13	Y	-0.013	-0.007	6.917	8.646	Active
31	M7	Y	-0.013	-0.016	0	2.05	Active
32	M7	Y	-0.016	-0.014	2.05	4.1	Active
33	M7	Y	-0.014	-0.007	4.1	6.15	Active
34	M7	Y	-0.007	-0.002	6.15	8.2	Active
35	M7	Y	-0.002	-0.002	8.2	10.25	Active
36	M7	Y	-0.002	-0.002	10.25	12.3	Active
37	M7	Y	-0.002	-0.002	12.3	14.35	Active
38	M7	Y	-0.002	-0.002	14.35	16.4	Active
39	M7	Y	-0.002	-0.002	16.4	18.45	Active
40	M7	Y	-0.002	-0.002	18.45	20.5	Active
41	M12	Y	-0.000235	-0.002	7.411	8.399	Active
42	M12	Y	-0.002	-0.005	8.399	9.387	Active
43	M12	Y	-0.005	-0.007	9.387	10.375	Active
44	M12	Y	-0.007	-0.005	10.375	11.363	Active
45	M12	Y	-0.005	-0.000235	11.363	12.352	Active
46	M13	Y	-0.003	-0.003	7.411	8.399	Active
47	M13	Y	-0.003	-0.003	8.399	9.387	Active
48	M13	Y	-0.003	-0.006	9.387	10.375	Active
49	M13	Y	-0.006	-0.005	10.375	11.363	Active
50	M13	Y	-0.005	-0.0008437	11.363	12.352	Active
51	M14	Y	-0.016	-0.015	0	1	Active
52	M14	Y	-0.015	-0.011	1	2	Active
53	M14	Y	-0.011	-0.01	2	3	Active
54	M14	Y	-0.01	-0.014	3	4	Active
55	M14	Y	-0.014	-0.018	4	5	Active
56	M15	Y	-0.013	-0.013	0	1	Active
57	M15	Y	-0.013	-0.011	1	2	Active
58	M15	Y	-0.011	-0.012	2	3	Active
59	M15	Y	-0.012	-0.015	3	4	Active
60	M15	Y	-0.015	-0.014	4	5	Active
61	M16	Y	-0.013	-0.014	0	1	Active

BLC 2 Transient Area Loads (Continued)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
62	M16	Y	-0.014	-0.016	1	2	Active
63	M16	Y	-0.016	-0.016	2	3	Active
64	M16	Y	-0.016	-0.015	3	4	Active
65	M16	Y	-0.015	-0.015	4	5	Active
66	M17	Y	-0.018	-0.011	0	1	Active
67	M17	Y	-0.011	-0.008	1	2	Active
68	M17	Y	-0.008	-0.01	2	3	Active
69	M17	Y	-0.01	-0.012	3	4	Active
70	M17	Y	-0.012	-0.014	4	5	Active
71	M18	Y	-0.014	-0.015	0	1	Active
72	M18	Y	-0.015	-0.013	1	2	Active
73	M18	Y	-0.013	-0.012	2	3	Active
74	M18	Y	-0.012	-0.014	3	4	Active
75	M18	Y	-0.014	-0.014	4	5	Active
76	M19	Y	-0.014	-0.012	0	1	Active
77	M19	Y	-0.012	-0.01	1	2	Active
78	M19	Y	-0.01	-0.008	2	3	Active
79	M19	Y	-0.008	-0.008	3	4	Active
80	M19	Y	-0.008	-0.013	4	5	Active

BLC 3 Transient Area Loads

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M1	Y	-0.035	-0.085	3	4.4	Active
2	M1	Y	-0.085	-0.104	4.4	5.8	Active
3	M1	Y	-0.104	-0.094	5.8	7.2	Active
4	M1	Y	-0.094	-0.061	7.2	8.6	Active
5	M1	Y	-0.061	-0.005	8.6	10	Active
6	M2	Y	-0.121	-0.072	0	1.3	Active
7	M2	Y	-0.072	-0.035	1.3	2.6	Active
8	M2	Y	-0.035	-0.025	2.6	3.9	Active
9	M2	Y	-0.025	-0.045	3.9	5.2	Active
10	M2	Y	-0.045	-0.08	5.2	6.5	Active
11	M13	Y	-0.067	-0.073	0	1.235	Active
12	M13	Y	-0.073	-0.087	1.235	2.47	Active
13	M13	Y	-0.087	-0.092	2.47	3.705	Active
14	M13	Y	-0.092	-0.058	3.705	4.941	Active
15	M13	Y	-0.058	-0.008	4.941	6.176	Active
16	M6	Y	-0.015	-0.072	4	6	Active
17	M6	Y	-0.072	-0.133	6	8	Active
18	M6	Y	-0.133	-0.15	8	10	Active
19	M6	Y	-0.15	-0.131	10	12	Active
20	M6	Y	-0.131	-0.093	12	14	Active
21	M6	Y	-0.093	-0.082	14	16	Active
22	M6	Y	-0.082	-0.12	16	18	Active
23	M6	Y	-0.12	-0.172	18	20	Active
24	M8	Y	-0.042	-0.075	4.1	6.15	Active
25	M8	Y	-0.075	-0.13	6.15	8.2	Active
26	M8	Y	-0.13	-0.169	8.2	10.25	Active
27	M8	Y	-0.169	-0.13	10.25	12.3	Active
28	M8	Y	-0.13	-0.09	12.3	14.35	Active
29	M8	Y	-0.09	-0.069	14.35	16.4	Active
30	M8	Y	-0.069	-0.071	16.4	18.45	Active
31	M8	Y	-0.071	-0.115	18.45	20.5	Active
32	M12	Y	-0.132	-0.084	0	1.729	Active
33	M12	Y	-0.084	-0.071	1.729	3.458	Active
34	M12	Y	-0.071	-0.072	3.458	5.188	Active
35	M12	Y	-0.072	-0.051	5.188	6.917	Active
36	M12	Y	-0.051	-0.027	6.917	8.646	Active

BLC 3 Transient Area Loads (Continued)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
37	M13	Y	-7.49e-18	-0.047	4.941	5.682	Active
38	M13	Y	-0.047	-0.059	5.682	6.423	Active
39	M13	Y	-0.059	-0.057	6.423	7.164	Active
40	M13	Y	-0.057	-0.045	7.164	7.905	Active
41	M13	Y	-0.045	-7.49e-18	7.905	8.646	Active
42	M13	Y	-0.009	-0.009	7.629	9.903	Active
43	M14	Y	-0.023	-0.016	0	1.25	Active
44	M14	Y	-0.016	-0.019	1.25	2.5	Active
45	M14	Y	-0.019	-0.025	2.5	3.75	Active
46	M14	Y	-0.025	-0.024	3.75	5	Active
47	M6	Y	-0.07	-0.07	1.11e-16	5	Active
48	M7	Y	-0.07	-0.07	0.25	5.25	Active
49	M12	Y	-0.006	-0.006	8.534	9.534	Active
50	M15	Y	-0.018	-0.018	0	1	Active
51	M15	Y	-0.018	-0.018	1	2	Active
52	M15	Y	-0.018	-0.018	2	3	Active
53	M15	Y	-0.018	-0.017	3	4	Active
54	M15	Y	-0.017	-0.017	4	5	Active
55	M16	Y	-0.018	-0.018	2.415e-15	5	Active
56	M7	Y	-0.001	-0.006	4.1	6.15	Active
57	M7	Y	-0.006	-0.009	6.15	8.2	Active
58	M7	Y	-0.009	-0.009	8.2	10.25	Active
59	M7	Y	-0.009	-0.009	10.25	12.3	Active
60	M7	Y	-0.009	-0.009	12.3	14.35	Active
61	M7	Y	-0.009	-0.008	14.35	16.4	Active
62	M7	Y	-0.008	-0.008	16.4	18.45	Active
63	M7	Y	-0.008	-0.008	18.45	20.5	Active
64	M12	Y	-0.001	-0.001	11.388	12.352	Active
65	M13	Y	-0.001	-0.001	11.388	12.352	Active
66	M17	Y	-0.01	-0.008	0	1	Active
67	M17	Y	-0.008	-0.007	1	2	Active
68	M17	Y	-0.007	-0.008	2	3	Active
69	M17	Y	-0.008	-0.008	3	4	Active
70	M17	Y	-0.008	-0.008	4	5	Active
71	M18	Y	-0.008	-0.008	2.456e-15	5	Active
72	M19	Y	-0.008	-0.008	0	1	Active
73	M19	Y	-0.008	-0.007	1	2	Active
74	M19	Y	-0.007	-0.007	2	3	Active
75	M19	Y	-0.007	-0.008	3	4	Active
76	M19	Y	-0.008	-0.01	4	5	Active
77	M9	Y	-0.01	-0.01	0.417	2.333	Active
78	M10	Y	-0.013	-0.013	0.417	2.333	Active
79	M10	Y	-0.001	-0.024	0	0.63	Active
80	M10	Y	-0.024	-0.043	0.63	1.26	Active
81	M10	Y	-0.043	-0.053	1.26	1.89	Active
82	M10	Y	-0.053	-0.029	1.89	2.52	Active
83	M10	Y	-0.029	-0.001	2.52	3.15	Active
84	M12	Y	-0.0005426	-0.003	8.646	9.387	Active
85	M12	Y	-0.003	-0.007	9.387	10.128	Active
86	M12	Y	-0.007	-0.014	10.128	10.869	Active
87	M12	Y	-0.014	-0.013	10.869	11.611	Active
88	M12	Y	-0.013	-0.002	11.611	12.352	Active
89	M11	Y	-0.113	-0.113	0.417	2.583	Active
90	M5	Y	-0.057	-0.057	0.417	2.583	Active

BLC 4 Transient Area Loads

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
1	M6	Y	-0.149	-0.133	0	2	Active
2	M6	Y	-0.133	-0.102	2	4	Active
3	M6	Y	-0.102	-0.082	4	6	Active
4	M6	Y	-0.082	-0.1	6	8	Active
5	M6	Y	-0.1	-0.112	8	10	Active
6	M6	Y	-0.112	-0.098	10	12	Active
7	M6	Y	-0.098	-0.069	12	14	Active
8	M6	Y	-0.069	-0.061	14	16	Active
9	M6	Y	-0.061	-0.089	16	18	Active
10	M6	Y	-0.089	-0.128	18	20	Active
11	M8	Y	-0.084	-0.052	0	2.05	Active
12	M8	Y	-0.052	-0.05	2.05	4.1	Active
13	M8	Y	-0.05	-0.066	4.1	6.15	Active
14	M8	Y	-0.066	-0.096	6.15	8.2	Active
15	M8	Y	-0.096	-0.125	8.2	10.25	Active
16	M8	Y	-0.125	-0.096	10.25	12.3	Active
17	M8	Y	-0.096	-0.066	12.3	14.35	Active
18	M8	Y	-0.066	-0.05	14.35	16.4	Active
19	M8	Y	-0.05	-0.052	16.4	18.45	Active
20	M8	Y	-0.052	-0.085	18.45	20.5	Active
21	M12	Y	-0.099	-0.063	0	1.729	Active
22	M12	Y	-0.063	-0.053	1.729	3.458	Active
23	M12	Y	-0.053	-0.054	3.458	5.188	Active
24	M12	Y	-0.054	-0.039	5.188	6.917	Active
25	M12	Y	-0.039	-0.02	6.917	8.646	Active
26	M13	Y	-0.08	-0.058	0	1.729	Active
27	M13	Y	-0.058	-0.054	1.729	3.458	Active
28	M13	Y	-0.054	-0.055	3.458	5.188	Active
29	M13	Y	-0.055	-0.039	5.188	6.917	Active
30	M13	Y	-0.039	-0.021	6.917	8.646	Active
31	M7	Y	-0.039	-0.047	0	2.05	Active
32	M7	Y	-0.047	-0.043	2.05	4.1	Active
33	M7	Y	-0.043	-0.02	4.1	6.15	Active
34	M7	Y	-0.02	-0.007	6.15	8.2	Active
35	M7	Y	-0.007	-0.007	8.2	10.25	Active
36	M7	Y	-0.007	-0.007	10.25	12.3	Active
37	M7	Y	-0.007	-0.007	12.3	14.35	Active
38	M7	Y	-0.007	-0.006	14.35	16.4	Active
39	M7	Y	-0.006	-0.006	16.4	18.45	Active
40	M7	Y	-0.006	-0.006	18.45	20.5	Active
41	M12	Y	-0.0007051	-0.005	7.411	8.399	Active
42	M12	Y	-0.005	-0.014	8.399	9.387	Active
43	M12	Y	-0.014	-0.021	9.387	10.375	Active
44	M12	Y	-0.021	-0.016	10.375	11.363	Active
45	M12	Y	-0.016	-0.0007051	11.363	12.352	Active
46	M13	Y	-0.009	-0.008	7.411	8.399	Active
47	M13	Y	-0.008	-0.01	8.399	9.387	Active
48	M13	Y	-0.01	-0.017	9.387	10.375	Active
49	M13	Y	-0.017	-0.015	10.375	11.363	Active
50	M13	Y	-0.015	-0.003	11.363	12.352	Active
51	M14	Y	-0.048	-0.044	0	1	Active
52	M14	Y	-0.044	-0.032	1	2	Active
53	M14	Y	-0.032	-0.029	2	3	Active
54	M14	Y	-0.029	-0.043	3	4	Active
55	M14	Y	-0.043	-0.055	4	5	Active
56	M15	Y	-0.04	-0.04	0	1	Active
57	M15	Y	-0.04	-0.033	1	2	Active
58	M15	Y	-0.033	-0.036	2	3	Active

BLC 4 Transient Area Loads (Continued)

	Member Label	Direction	Start Magnitud…	End Magnitude…	Start Location […	End Location [(…	Inactive [(k, k-f…
59	M15	Y	-0.036	-0.044	3	4	Active
60	M15	Y	-0.044	-0.042	4	5	Active
61	M16	Y	-0.039	-0.042	0	1	Active
62	M16	Y	-0.042	-0.047	1	2	Active
63	M16	Y	-0.047	-0.048	2	3	Active
64	M16	Y	-0.048	-0.045	3	4	Active
65	M16	Y	-0.045	-0.044	4	5	Active
66	M17	Y	-0.054	-0.032	0	1	Active
67	M17	Y	-0.032	-0.024	1	2	Active
68	M17	Y	-0.024	-0.031	2	3	Active
69	M17	Y	-0.031	-0.037	3	4	Active
70	M17	Y	-0.037	-0.043	4	5	Active
71	M18	Y	-0.042	-0.046	0	1	Active
72	M18	Y	-0.046	-0.038	1	2	Active
73	M18	Y	-0.038	-0.035	2	3	Active
74	M18	Y	-0.035	-0.042	3	4	Active
75	M18	Y	-0.042	-0.041	4	5	Active
76	M19	Y	-0.042	-0.035	0	1	Active
77	M19	Y	-0.035	-0.029	1	2	Active
78	M19	Y	-0.029	-0.023	2	3	Active
79	M19	Y	-0.023	-0.025	3	4	Active
80	M19	Y	-0.025	-0.039	4	5	Active

Grating & Railing (10psf)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k,…
1	N2	N1	N13	N14	Y	A-B	-0.01	Active
2	N14	N15	N3	N2	Y	A-B	-0.01	Active

Live Load (40 psf)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k,…
1	N2	N5	N4	N1	Y	A-B	-0.04	Active
2	N5	N4	N13	N14	Y	A-B	-0.04	Active
3	N28	N5	N8	N29	Y	A-B	-0.04	Active
4	N3	N2	N5	N6	Y	A-B	-0.04	Active
5	N30	N8	N14	N32	Y	A-B	-0.04	Active
6	N6	N36	N35	N15	Y	A-B	-0.04	Active
7	N38	N36	N28	N37	Y	A-B	-0.04	Active
8	N40	N33	N29	N39	Y	A-B	-0.04	Active
9	N43	N30	N33	N44	Y	A-B	-0.04	Active
10	N45	N31	N34	N46	Y	A-B	-0.04	Active
11	N47	N31	N34	N48	Y	A-B	-0.04	Active
12	N50	N35	N32	N49	Y	A-B	-0.04	Active

Snow Load (30 psf)

	Node A	Node B	Node C	Node D	Direction	Load Direction	Magnitude [ksf]	Inactive [(k,…
1	N2	N1	N13	N14	Y	A-B	-0.03	Active
2	N14	N15	N3	N2	Y	A-B	-0.03	Active

Load Combinations

	De…	So…	PD…	SR…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…
1	IB…	Yes	Y		DL	1																		
2	IB…	Yes	Y		DL	1	LL	1	LLS	1														
3	IB…	Yes	Y		DL	1	SL	1	SLN	1														
4	IB…	Yes	Y		DL	1	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75										
5	IB…	Yes	Y		DL	1	WLX	0.6																
6	IB…	Yes	Y		DL	1	WLZ	0.6																

Load Combinations (Continued)

	De…	So…	PD…	SR…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…	BLC	Fa…
7	IB…	Yes	Y		DL	1	WLX	-0.6																
8	IB…	Yes	Y		DL	1	WLZ	-0.6																
9	IB…	Yes	Y		DL	1	WLX	0.45	LL	0.75	LLS	0.75												
10	IB…	Yes	Y		DL	1	WLZ	0.45	LL	0.75	LLS	0.75												
11	IB…	Yes	Y		DL	1	WLX	-0.45	LL	0.75	LLS	0.75												
12	IB…	Yes	Y		DL	1	WLZ	-0.45	LL	0.75	LLS	0.75												
13	IB…	Yes	Y		DL	1	WLX	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
14	IB…	Yes	Y		DL	1	WLZ	0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
15	IB…	Yes	Y		DL	1	WLX	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
16	IB…	Yes	Y		DL	1	WLZ	-0.45	LL	0.75	LLS	0.75	SL	0.75	SLN	0.75								
17	IB…	Yes	Y		DL	0.6	WLX	0.6																
18	IB…	Yes	Y		DL	0.6	WLZ	0.6																
19	IB…	Yes	Y		DL	0.6	WLX	-0.6																
20	IB…	Yes	Y		DL	0.6	WLZ	-0.6																

Asd360

	Member	Shape	Code…	Loc [ft]	LC	Shear…	Loc [ft]	Dir	LC	Pnc/o…	Pnt/o…	Mnyy/…	Mnzz/…	Cb	Eqn
1	M1	W10X…	0.139	3.438	16	0.030	8.438	y	15	30.166	132.036	5.739	31.692	1.67	H1-1b
2	M2	W10X…	0.063	1.964	15	0.022	0	y	15	66.971	132.036	5.739	39.92	1.593	H1-1b
3	M3	W10X…	0.004	3.25	7	0.001	6.5	y	7	66.971	132.036	5.739	33.962	1.136	H1-1b
4	M4	W10X…	0.064	1.896	15	0.157	0	y	15	66.971	132.036	5.739	39.92	2.062	H1-1b
5	M5	W10X…	0.568	2.604	15	0.062	10	y	15	30.166	132.036	5.739	35.344	1.862	H1-1b
6	M6	W10X…	0.416	5	15	0.040	0	y	15	7.541	132.036	5.739	15.368	2.098	H1-1b
7	M7	W10X…	0.052	11.318	8	0.007	10.25	y	13	7.178	132.036	5.739	10.878	1.531	H1-1b*
8	M8	W10X…	0.338	10.25	15	0.210	10.25	y	15	7.178	132.036	5.739	8.738	1.229	H1-1b
9	M9	W10X…	0.065	2.333	15	0.046	3.5	y	15	107.099	132.036	5.739	39.92	1.185	H1-1b
10	M10	W10X…	0.207	2.552	15	0.154	0	y	13	107.099	132.036	5.739	39.92	2.345	H1-1b
11	M11	W10X…	0.125	2.552	15	0.053	2.589	y	13	107.099	132.036	5.739	39.92	1.759	H1-1b
12	M12	L4X4X4	0.875	5.79	15	0.251	5.661	z	15	8.096	41.605	2.088	3.698	1.844	H2-1
13	M13	L4X4X4	0.664	8.106	15	0.099	9.392	z	15	8.096	41.605	2.088	4.114	2.819	H2-1

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 1 - Site Information

Site ID: CTFF335A
Status: Draft
Version: 2
Project Type: Anchor
Approved: Not Approved
Approved By: Not Approved
Last Modified: 5/29/2020 4:0:49 PM
Last Modified By: Dominic.Kallas2@T-Mobile.com

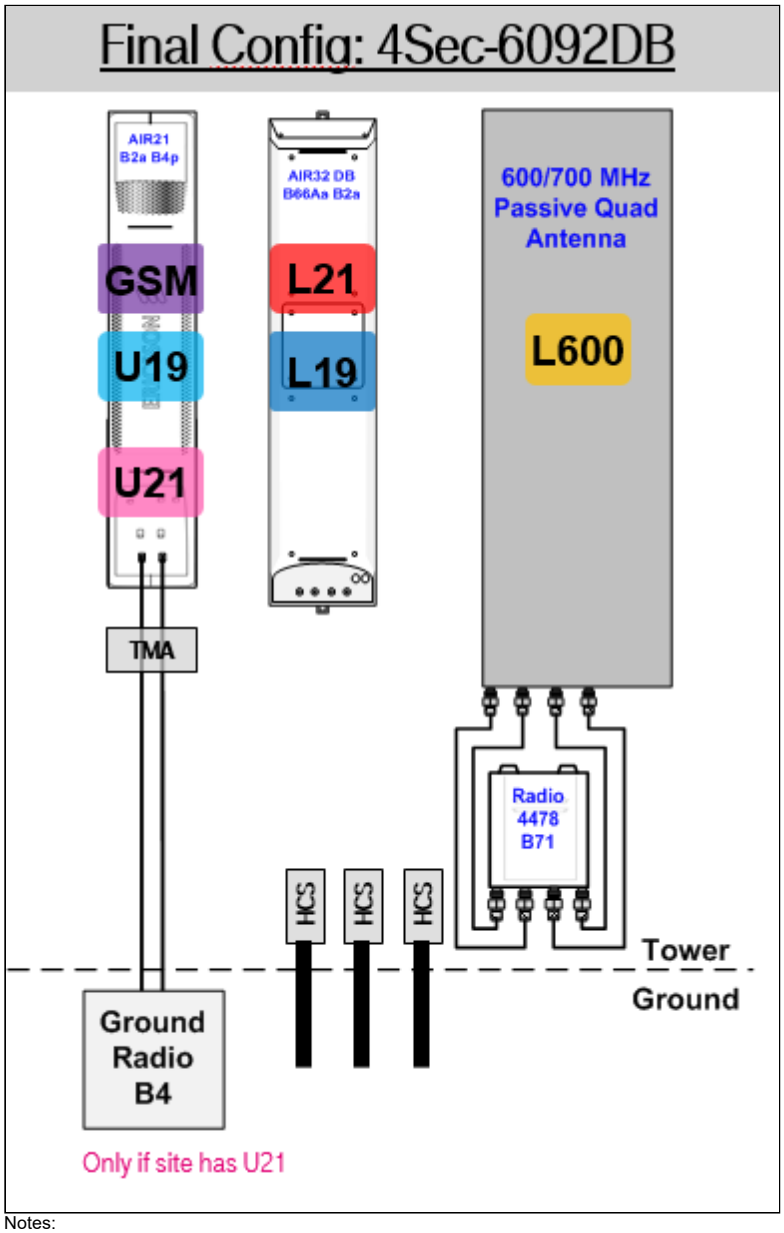
Site Name: CTFF335A
Site Class: Self Support Tower
Site Type: Structure Non Building
Plan Year: 2020
Market: CONNECTICUT CT
Vendor: Ericsson
Landlord: Blue Sky Towers

Latitude: 41.19781100
Longitude: -73.19084500
Address: 220 Evergreen St
City, State: Bridgeport, CT
Region: NORTHEAST

RAN Template: 4Sec-67D5A997DB MUAC			**AL Template:** 4Sec-67D5997DB_2xAIR+1OP (U21 Market)	
Sector Count: 4	**Antenna Count:** 12	**Coax Line Count:** 0	**TMA Count:** 0	**RRU Count:** 12

Section 2 - Existing Template Images

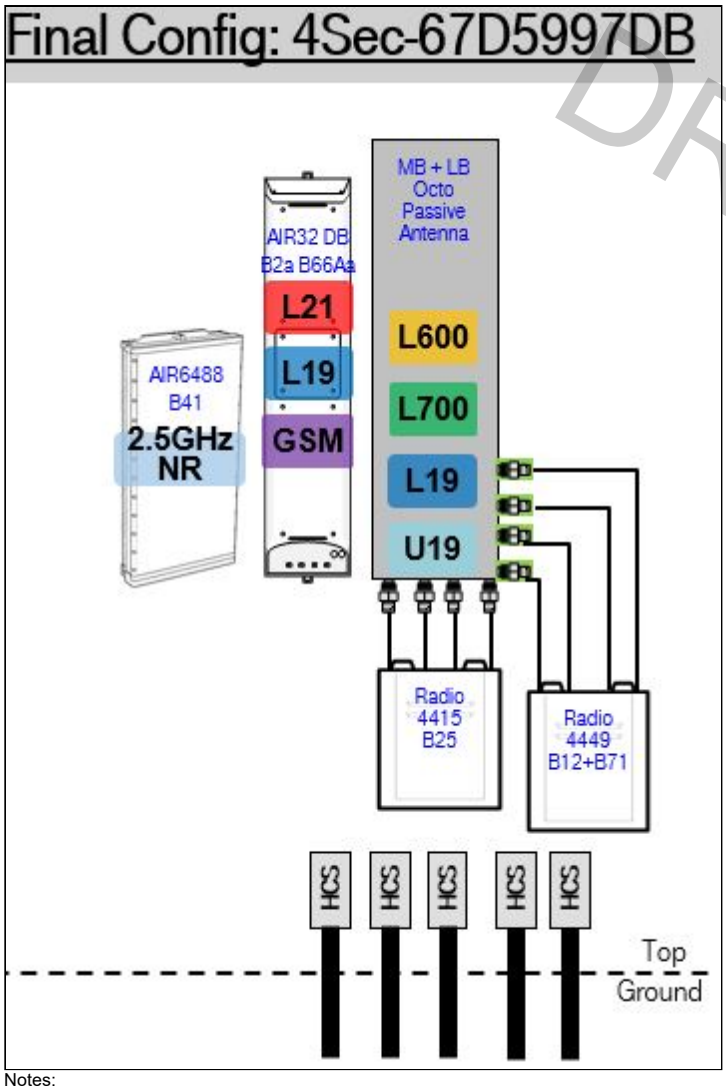
4Sec-6092DB_2AIR+1QP.PNG



Notes:

Section 3 - Proposed Template Images

4Sec-67D5997DB.jpg



Notes:

Section 4 - Siteplan Images

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RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 5 - RAN Equipment

Existing RAN Equipment

Template: 4Sec-6797DB3

Enclosure	1	2
Enclosure Type	RBS 6102 MU AC	Ancillary Equipment (Ericsson)
Baseband	DUW30 [U2100]; BB 5216 [L2100, L1900, L700, L600]; BB 6630 [N600]	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* **(x 2)**
Multiplexer	XMU [L2100, L1900, L700, L600]; XMU	

Proposed RAN Equipment

Template: 4Sec-67D5A997DB MUAC

Enclosure	1	2	3	4
Enclosure Type	RBS 6102 MU AC	Ancillary Equipment (Ericsson)	Enclosure 6160	B160
Baseband	DUW30 [U2100]; BB 6630 [L2100, L1900, L700, L600]; BB 6630 [N600]		BB 6630 **(x 3)** [L2500]; BB 6648 [N2500]	
Hybrid Cable System		Ericsson 6x12 HCS *Select Length & AWG* **(x 2)** Ericsson 6x12 HCS *Select AWG & Length* **(x 2)**	Ericsson 6x12 HCS *Select AWG & Length* **(x 4)**	

RAN Scope of Work:

Remove XMU from Existing Cabinet, if present.

Replace BB5216 with (1) BB6630 for L2100, L1900 (Both Carriers), L700, and L600 in Existing Cabinet, if not already done.

Add (1) Enclosure 6160.

Add (1) Battery Cabinet B160.

Add (1) iXRe Router to new Enclosure 6160.

Add (3) BB6630 for L2500 to new Enclosure 6160.

Add (1) BB6648 for N2500 to new Enclosure 6160.

Existing: (4) 6x12 HCS

Add (4) 6X12 HCS. Length of new HCS will match that of existing HCS.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 6 - A&L Equipment

Existing Template: 4Sec-6797DB2_1xAIR+1OP
Proposed Template: 4Sec-67D5997DB_2xAIR+1OP (U21 Market)

Sector 1 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAA24_43-U-A20 (Quad)		Andrew - DBXNH-6565B-A2M (Quad)	
Azimuth	60				60		60	
M. Tilt								
Height	110				110		110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900	L1900	L700	N600 L600	U2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables								
TMAs								
Diplexers / Combiners					Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)	SHARED Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)		
Radio					RRUS11 B12 (At Antenna)	Radio 4478 B71 (At Antenna)	RRUS11 B4 (At Antenna)	
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 1 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	60				60				60	
M. Tilt	0				0				0	
Height	110				110				110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600	L1900	U2100 L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables										
TMAs										
Diplexers / Combiners							Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)		
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna) RRUS11 B4 (At Antenna)		
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Replace Low-Band Quad with Low-Band/Mid-Band Octo in Position 2.

Remove Low-Band Diplexer from Position 2.

Replace RRUS11 B12 and Radio 4478 B71 with (1) Radio 4449 B71+B85, and connect its ports to the Low-Band Ports of the Octo Antenna.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Move RRUS11 B4 for U2100 to Position 2 at antenna, and connect its ports to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Remove Mid-Band Quad from Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to Position 3.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 2 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAA24_43-U-A20 (Quad)		Andrew - DBXNH-6565B-A2M (Quad)	
Azimuth	150				150		150	
M. Tilt								
Height	110				110		110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900	L1900	L700	N600 L600	U2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables								
TMAs								
Diplexers / Combiners					Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)	SHARED Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)		
Radio					RRUS11 B12 (At Antenna)	Radio 4478 B71 (At Antenna)	RRUS11 B4 (At Antenna)	
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 2 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	150				150				150	
M. Tilt	0				0				0	
Height	110				110				110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600	L1900	U2100 L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables										
TMAs										
Diplexers / Combiners							Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)		
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna) RRUS11 B4 (At Antenna)		
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Replace Low-Band Quad with Low-Band/Mid-Band Octo in Position 2.

Remove Low-Band Diplexer from Position 2.

Replace RRUS11 B12 and Radio 4478 B71 with (1) Radio 4449 B71+B85, and connect its ports to the Low-Band Ports of the Octo Antenna.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Move RRUS11 B4 for U2100 to Position 2 at antenna, and connect its ports to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Remove Mid-Band Quad from Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to Position 3.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 3 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAA24_43-U-A20 (Quad)		Andrew - DBXNH-6565B-A2M (Quad)	
Azimuth	240				240		240	
M. Tilt								
Height	110				110		110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900	L1900	L700	N600 L600	U2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables								
TMAs								
Diplexers / Combiners					Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)	SHARED Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)		
Radio					RRUS11 B12 (At Antenna)	Radio 4478 B71 (At Antenna)	RRUS11 B4 (At Antenna)	
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 3 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	240				240				240	
M. Tilt	0				0				0	
Height	110				110				110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600	L1900	U2100 L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables										
TMAs										
Diplexers / Combiners							Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)		
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna) RRUS11 B4 (At Antenna)		
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Replace Low-Band Quad with Low-Band/Mid-Band Octo in Position 2.

Remove Low-Band Diplexer from Position 2.

Replace RRUS11 B12 and Radio 4478 B71 with (1) Radio 4449 B71+B85, and connect its ports to the Low-Band Ports of the Octo Antenna.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Move RRUS11 B4 for U2100 to Position 2 at antenna, and connect its ports to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Remove Mid-Band Quad from Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to Position 3.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 4 (Existing) view from behind

Coverage Type	A - Outdoor Macro							
Antenna	1				2		3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAA24_43-U-A20 (Quad)		Andrew - DBXNH-6565B-A2M (Quad)	
Azimuth	330				330		330	
M. Tilt								
Height	110				110		110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8
Active Tech.	L2100	L2100	L1900	L1900	L700	N600 L600	U2100	
Dark Tech.								
Restricted Tech.								
Decomm. Tech.								
E. Tilt								
Cables								
TMAs								
Diplexers / Combiners					Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)	SHARED Commscope - Quad 600AE/700LABC - CBC6AE7LQ-DS-43 (E14F05P68) (AtAntenna)		
Radio					RRUS11 B12 (At Antenna)	Radio 4478 B71 (At Antenna)	RRUS11 B4 (At Antenna)	
Sector Equipment								

Unconnected Equipment:

Scope of Work:

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Sector 4 (Proposed) view from behind

Coverage Type	A - Outdoor Macro									
Antenna	1				2				3	
Antenna Model	Ericsson - AIR32 KRD901146-1_B66A_B2A (Octo)				RFS - APXVAARR24_43-U-NA20 (Octo)				Ericsson - AIR6449 B41 (Active Antenna - Massive MIMO)	
Azimuth	330				330				330	
M. Tilt	0				0				0	
Height	110				110				110	
Ports	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
Active Tech.	L2100	L2100	L1900	L1900	L700 L600 N600	L700 L600 N600	L1900	U2100 L1900	L2500 N2500	L2500 N2500
Dark Tech.										
Restricted Tech.										
Decomm. Tech.										
E. Tilt										
Cables										
TMAs										
Diplexers / Combiners							Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)	SHARED Commscope - SDX1926Q-43 (E14F05P86) (AtAntenna)		
Radio					Radio 4449 B71+B85 (At Antenna)	SHARED Radio 4449 B71+B85 (At Antenna)	Radio 4415 B25 (At Antenna)	SHARED Radio 4415 B25 (At Antenna) RRUS11 B4 (At Antenna)		
Sector Equipment										

Unconnected Equipment:

Scope of Work:

Replace Low-Band Quad with Low-Band/Mid-Band Octo in Position 2.

Remove Low-Band Diplexer from Position 2.

Replace RRUS11 B12 and Radio 4478 B71 with (1) Radio 4449 B71+B85, and connect its ports to the Low-Band Ports of the Octo Antenna.

Add (1) PCS/AWS 8:4 diplexer to Position 2 at antenna, and connect its four output ports to the Mid-Band Ports of the Octo antenna.

Add (1) Radio 4415 B25 for L1900 2nd Carrier to Position 2 at antenna, and connect its ports to the four PCS input ports of the diplexer.

Move RRUS11 B4 for U2100 to Position 2 at antenna, and connect its ports to two of the AWS input ports of the diplexer.

Make sure to place metal caps on the unused ports of the diplexer.

Remove Mid-Band Quad from Position 3.

Add (1) AIR6449 B41 for L2500 and N2500 to Position 3.

Ensure RET control is enabled for all technology layers according to the Design Documents.

*A dashed border indicates shared equipment. Any connected equipment is denoted with the SHARED keyword.

RAN Template:	A&L Template:
4Sec-67D5A997DB MUAC	4Sec-67D5997DB_2xAIR+1OP (U21 Market)

CTFF335A_Anchor_2_draft

Print Name: Standard
PORs: Anchor_Phase 3

Section 7 - Power Systems Equipment

Existing Power Systems Equipment

----- This section is intentionally blank. -----

Proposed Power Systems Equipment

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

Antenna Mount Analysis

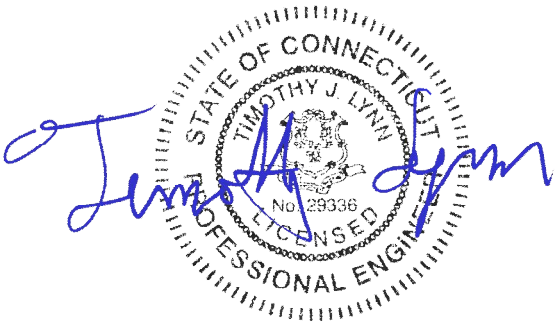
T-Mobile Site #: CTFF335A

220 Evergreen Street
Bridgeport, CT

Centek Project No. 20074.42

Date: June 15, 2020

Max Stress Ratio = 79.0%



Prepared for:

T-Mobile USA
35 Griffin Road
Bloomfield, CT 06002

Table of Contents

CENTEK engineering

Centered on Solutions℠

June 15, 2020

Mr. Dan Reid
Transcend Wireless
10 Industrial Ave
Mahwah, NJ 07430

Re: Structural Letter ~ Antenna Mount
T-Mobile – Site Ref: CTFF335A
220 Evergreen Street
Bridgeport, CT 06606

Centek Project No. 20074.42

Dear Mr. Reid,

Centek Engineering, Inc. has reviewed the T-Mobile antenna installation at the above referenced site. The purpose of the review is to determine the structural adequacy of the mount, consisting one (1) 10-ft square platform with handrails to support the proposed/existing equipment configuration. The review considered the effects of wind load, dead load and ice load in accordance with the 2015 International Building Code as modified by the 2018 Connecticut State Building Code (CTBC) including ASCE 7-10 and ANSI/TIA-222-G *Structural Standards for Steel Antenna Towers and Supporting Structures*.

The loads considered in this analysis consist of the following:

- T-Mobile:
  Platform w/ Handrail: Four (4) RFS APXVAARR24-43-NA20 panel antennas, four (4) RFS AIR32 panel antennas, four (4) Ericsson AIR6449 panel antennas, four (4) Ericsson RRUS-11 remote radio units, four (4) Ericsson 4449 remote radio units, four (4) Ericsson 4415 remote radio units and four (4) Commscope SDX1926Q-43 diplexers mounted on one (1) 10-ft square platform w/ rails with a RAD center elevation of 110-ft +/- AGL.

The antenna mount was analyzed per the requirements of the 2015 International Building Code as modified by the 2018 Connecticut State Building Code considering a nominal design wind speed of 97 mph for Bridgeport as required in Appendix N of the 2018 Connecticut State Building Code.

A structural analysis of tower and foundation needs to be completed prior to any work.

Based on our review of the installation, it is our opinion that the subject antenna mount has sufficient capacity to support the aforementioned antenna configuration. If there are any questions regarding this matter, please feel free to call.

Respectfully Submitted by:

Timothy J. Lynn, PE
Structural Engineer

STATE OF CONNECTICUT
TIMOTHY J. LYNN
No. 29336
LICENSED
PROFESSIONAL ENGINEER

Section 2 - Calculations

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject: TIA-222-G Loads

Location: Bridgeport, CT

Rev. 0: 6/15/20

Prepared by: T.J.L. Checked by: C.F.C.
Job No. 20074.42

Development of Design Heights, Exposure Coefficients, and Velocity Pressures Per TIA-222-G

Wind Speeds

Basic Wind Speed: $V := 97$ mph (User Input - 2018 CSBC Appendix N)

Basic Wind Speed with Ice: $V_i := 50$ mph (User Input per Annex B of TIA-222-G)

Input

Structure Type = $Structure\_Type := Pole$ (User Input)

Structure Category = $SC := II$ (User Input)

Exposure Category = $Exp := C$ (User Input)

Structure Height = $h := 135$ ft (User Input)

Height to Center of Antennas = $z_{Ant} := 110$ ft (User Input)

Radial Ice Thickness = $t_i := 0.75$ in (User Input per Annex B of TIA-222-G)

Radial Ice Density = $Id := 56.00$ pcf (User Input)

Topograpic Factor = $K_{zt} := 1.0$ (User Input)

$K_a := 1.0$ (User Input)

Gust Response Factor = $G_H = 1.1$ (User Input)

Output

Wind Direction Probability Factor = $K_d := \begin{cases} 0.95 & \text{if } Structure\_Type = Pole \\ 0.85 & \text{if } Structure\_Type = Lattice \end{cases} = 0.95$ (Per Table 2-2 of TIA-222-G)

Importance Factors = $I_{Wind} := \begin{cases} 0.87 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.15 & \text{if } SC = 3 \end{cases} = 1$ (Per Table 2-3 of TIA-222-G)

$I_{Wind\_w\_Ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.00 & \text{if } SC = 3 \end{cases} = 1$

$I_{ice} := \begin{cases} 0 & \text{if } SC = 1 \\ 1.00 & \text{if } SC = 2 \\ 1.25 & \text{if } SC = 3 \end{cases} = 1$

$K_{iz} := \left(\frac{z_{Ant}}{33}\right)^{0.1} = 1.128$

$t_{iz} := 2.0 \cdot t_i \cdot I_{ice} \cdot K_{iz} \cdot K_{zt}^{0.35} = 1.692$

Velocity Pressure Coefficient Antennas = $Kz_{Ant} := 2.01\left(\left(\frac{z_{Ant}}{zg}\right)\right)^{\frac{2}{\alpha}} = 1.291$

Velocity Pressure w/o Ice Antennas = $qz_{Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V^2 \cdot I_{Wind} = 29.548$

Velocity Pressure with Ice Antennas = $qz_{ice.Ant} := 0.00256 \cdot K_d \cdot Kz_{Ant} \cdot V_i^2 \cdot I_{Wind} = 7.851$

CENTEK engineering
Centered on Solutions℠ www.centekeng.com
63-2 North Branford Road P: (203) 488-0580
Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Bridgeport, CT
Rev. 0: 6/15/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.42

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	RFSAPXVAARR24-43		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 95.9$	in	(User Input)
Antenna Width =	$W_{ant} := 24$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 153$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.0$		
Antenna Force Coefficient =	$Ca_{ant} = 1.27$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 16$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 658$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 5.8$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 239$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 18.9$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 207$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 8.3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 91$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 153$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 2 \times 10^4$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 1 \times 10^4$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 416$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 416$	lbs

CENTEK engineering
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Branford, CT 06405 F: (203) 488-8587

Subject:	TIA-222-G Loads
Location:	Bridgeport, CT
Rev. 0: 6/15/20	Prepared by: T.J.L. Checked by: C.F.C. Job No. 20074.42

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR32		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 56.6$	in	(User Input)
Antenna Width =	$W_{ant} := 12.9$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.7$	in	(User Input)
Antenna Weight =	$WT_{ant} := 132$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 4.4$		
Antenna Force Coefficient =	$Ca_{ant} = 1.28$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 5.1$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 212$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 3.4$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 143$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.8$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 75$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 5$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 56$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 132$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 6352$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 5451$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 177$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 177$	lbs

Development of Wind & Ice Load on Antennas

Antenna Data:

Antenna Model =	Ericsson AIR6449		
Antenna Shape =	Flat		(User Input)
Antenna Height =	$L_{ant} := 33.1$	in	(User Input)
Antenna Width =	$W_{ant} := 20.5$	in	(User Input)
Antenna Thickness =	$T_{ant} := 8.3$	in	(User Input)
Antenna Weight =	$WT_{ant} := 103$	lbs	(User Input)
Number of Antennas =	$N_{ant} := 1$		(User Input)
Antenna Aspect Ratio =	$Ar_{ant} := \frac{L_{ant}}{W_{ant}} = 1.6$		
Antenna Force Coefficient =	$Ca_{ant} = 1.2$		

Wind Load (without ice)

Surface Area for One Antenna =	$SA_{antF} := \frac{L_{ant} \cdot W_{ant}}{144} = 4.7$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antF} = 184$	lbs
Surface Area for One Antenna =	$SA_{antS} := \frac{L_{ant} \cdot T_{ant}}{144} = 1.9$	sf
Total Antenna Wind Force =	$F_{ant} := qz_{Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{antS} = 74$	lbs

Wind Load (with ice)

Surface Area for One Antenna w/ Ice =	$SA_{ICEantF} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (W_{ant} + 2 \cdot t_{iz})}{144} = 6.1$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantF} = 63$	lbs
Surface Area for One Antenna w/ Ice =	$SA_{ICEantS} := \frac{(L_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz})}{144} = 3$	sf
Total Antenna Wind Force w/ Ice =	$Fi_{ant} := qz_{ice.Ant} \cdot G_H \cdot Ca_{ant} \cdot K_a \cdot SA_{ICEantS} = 31$	lbs

Gravity Load (without ice)

Weight of All Antennas =	$WT_{ant} \cdot N_{ant} = 103$	lbs

Gravity Loads (ice only)

Volume of Each Antenna =	$V_{ant} := L_{ant} \cdot W_{ant} \cdot T_{ant} = 5632$	cu in
Volume of Ice on Each Antenna =	$V_{ice} := (L_{ant} + 2 \cdot t_{iz})(W_{ant} + 2 \cdot t_{iz}) \cdot (T_{ant} + 2 \cdot t_{iz}) - V_{ant} = 4549$	cu in
Weight of Ice on Each Antenna =	$W_{ICEant} := \frac{V_{ice}}{1728} \cdot Id = 147$	lbs
Weight of Ice on All Antennas =	$W_{ICEant} \cdot N_{ant} = 147$	lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4449 B71B12

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 10.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 74$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 53$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 1.1$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 42$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 22$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.8$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 18$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 74$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2045$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2134$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 69$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 69$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model = Ericsson 4415 B25

RRUS Shape = Flat (User Input)

RRUS Height = $L_{RRUS} := 14.9$ in (User Input)

RRUS Width = $W_{RRUS} := 13.2$ in (User Input)

RRUS Thickness = $T_{RRUS} := 5.4$ in (User Input)

RRUS Weight = $WT_{RRUS} := 47$ lbs (User Input)

Number of RRUS's = $N_{RRUS} := 1$ (User Input)

RRUS Aspect Ratio = $Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1.1$

RRUS Force Coefficient = $Ca_{RRUS} = 1.2$

Wind Load (without ice)

Surface Area for One RRUS = $SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 1.4$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 53$ lbs

Surface Area for One RRUS = $SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.6$ sf

Total RRUS Wind Force = $F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 22$ lbs

Wind Load (with ice)

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 2.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 22$ lbs

Surface Area for One RRUS w/ Ice = $SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.1$ sf

Total RRUS Wind Force w/ Ice = $Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 12$ lbs

Gravity Load (without ice)

Weight of All RRUSs = $WT_{RRUS} \cdot N_{RRUS} = 47$ lbs

Gravity Loads (ice only)

Volume of Each RRUS = $V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 1062$ cu in

Volume of Ice on Each RRUS = $V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 1601$ cu in

Weight of Ice on Each RRUS = $W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 52$ lbs

Weight of Ice on All RRUSs = $W_{ICERRUS} \cdot N_{RRUS} = 52$ lbs

Development of Wind & Ice Load on RRUS

RRUS Data:

RRUS Model =	RRUS-11		
RRUS Shape =	Flat		(User Input)
RRUS Height =	$L_{RRUS} := 17.8$	in	(User Input)
RRUS Width =	$W_{RRUS} := 17.3$	in	(User Input)
RRUS Thickness =	$T_{RRUS} := 7.2$	in	(User Input)
RRUS Weight =	$WT_{RRUS} := 50$	lbs	(User Input)
Number of RRUS's =	$N_{RRUS} := 1$		(User Input)
RRUS Aspect Ratio =	$Ar_{RRUS} := \frac{L_{RRUS}}{W_{RRUS}} = 1$		
RRUS Force Coefficient =	$Ca_{RRUS} = 1.2$		

Wind Load (without ice)

Surface Area for One RRUS =	$SA_{RRUSF} := \frac{L_{RRUS} \cdot W_{RRUS}}{144} = 2.1$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSF} = 83$	lbs
Surface Area for One RRUS =	$SA_{RRUSS} := \frac{L_{RRUS} \cdot T_{RRUS}}{144} = 0.9$	sf
Total RRUS Wind Force =	$F_{RRUS} := qz_{Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{RRUSS} = 35$	lbs

Wind Load (with ice)

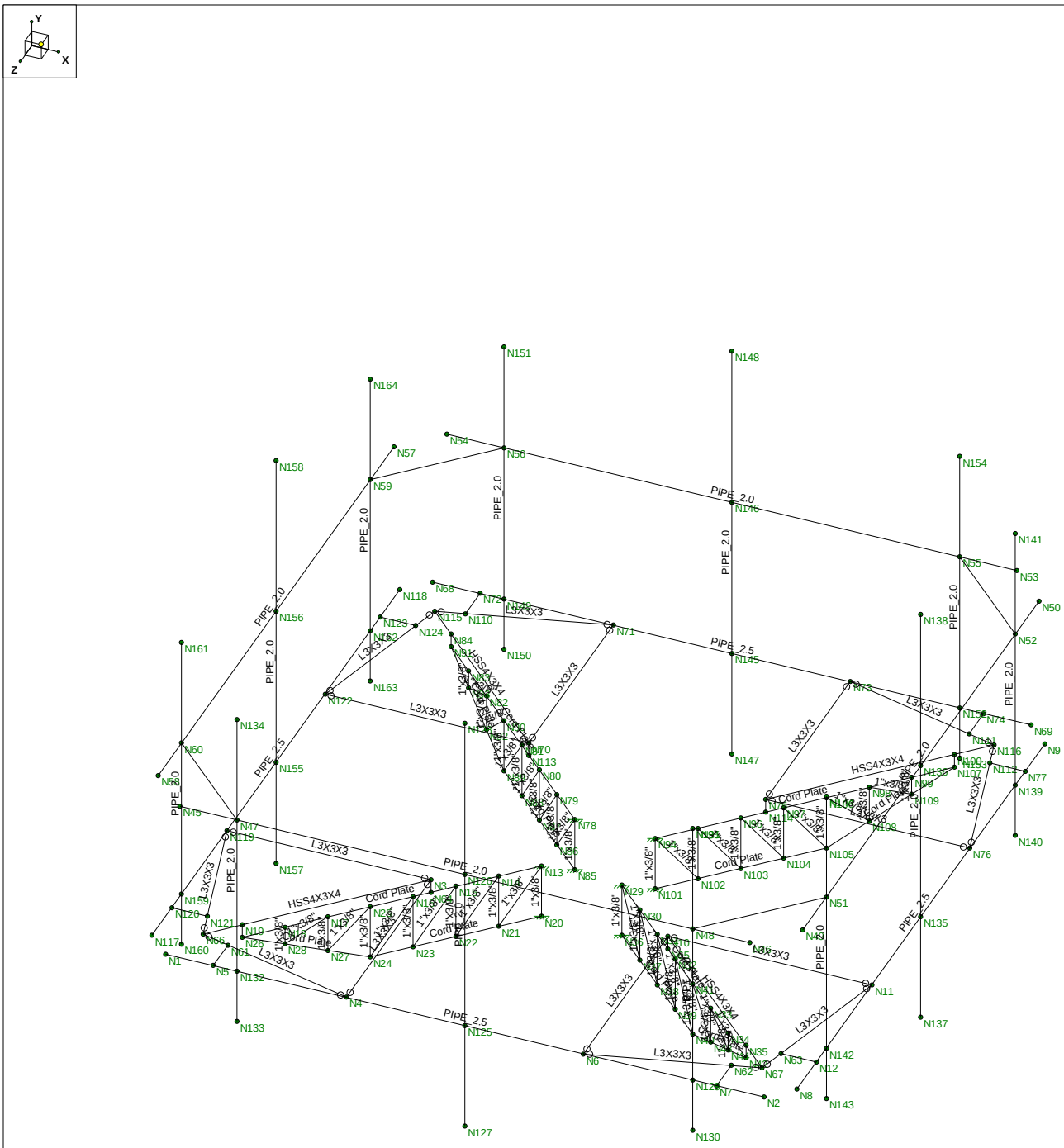
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSF} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (W_{RRUS} + 2 \cdot t_{iz})}{144} = 3$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSF} = 32$	lbs
Surface Area for One RRUS w/ Ice =	$SA_{ICERRUSS} := \frac{(L_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz})}{144} = 1.6$	sf
Total RRUS Wind Force w/ Ice =	$Fi_{RRUS} := qz_{ice.Ant} \cdot G_H \cdot Ca_{RRUS} \cdot K_a \cdot SA_{ICERRUSS} = 16$	lbs

Gravity Load (without ice)

Weight of All RRUSs =	$WT_{RRUS} \cdot N_{RRUS} = 50$	lbs

Gravity Loads (ice only)

Volume of Each RRUS =	$V_{RRUS} := L_{RRUS} \cdot W_{RRUS} \cdot T_{RRUS} = 2217$	cu in
Volume of Ice on Each RRUS =	$V_{ice} := (L_{RRUS} + 2 \cdot t_{iz})(W_{RRUS} + 2 \cdot t_{iz}) \cdot (T_{RRUS} + 2 \cdot t_{iz}) - V_{RRUS} = 2420$	cu in
Weight of Ice on Each RRUS =	$W_{ICERRUS} := \frac{V_{ice}}{1728} \cdot Id = 78$	lbs
Weight of Ice on All RRUSs =	$W_{ICERRUS} \cdot N_{RRUS} = 78$	lbs



Envelope Only Solution

Centek		
TJL	CTFF335A	June 15, 2020 at 5:01 PM
20074.42	Member Framing	CTHA524A_AMA.r3d

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (ft/sec^2)	32.2
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Y
Global Member Orientation Plane	XZ
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 14th(360-10): ASD
Cold Formed Steel Code	AISI S100-12: ASD
Wood Code	AWC NDS-15: ASD
Wood Temperature	< 100F
Concrete Code	ACI 318-14
Masonry Code	ACI 530-13: ASD
Aluminum Code	AA ADM1-15: ASD - Building
Stainless Steel Code	AISC 14th(360-10): ASD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	Yes
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (ft)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	4
Cd X	4
Rho Z	1
Rho X	1
Footing Overturning Safety Factor	1
Optimize for OTM/Sliding	No
Check Concrete Bearing	No
Footing Concrete Weight (k/ft^3)	.145
Footing Concrete f'c (ksi)	4
Footing Concrete Ec (ksi)	3644
Lambda	1
Footing Steel fy (ksi)	60
Minimum Steel	0.0018
Maximum Steel	0.0075
Footing Top Bar	#6
Footing Top Bar Cover (in)	1.5
Footing Bottom Bar	#6
Footing Bottom Bar Cover (in)	3
Pedestal Bar	#6
Pedestal Bar Cover (in)	1.5
Pedestal Ties	#4

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[k/ft^3]	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 List	Material	Design Rul...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	2.5" Std. Pipe	PIPE_2.5	Beam	None	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
2	2.0" Std. Pipe	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
3	HSS4x3	HSS4X3X4	Beam	None	A500 Gr.B ...	Typical	2.91	3.91	6.15	7.96
4	L3x3	L3X3X3	Beam	None	A36 Gr.36	Typical	1.09	.948	.948	.014
5	Cord Plate	Cord Plate	Beam	None	A36 Gr.36	Typical	2.25	2.668	.188	.158
6	Web Plate	1"x3/8"	Beam	None	A36 Gr.36	Typical	.375	.004	.031	.013
7	Handrail	PIPE_2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
1	M1	2.5" Std. Pipe	10.5			Lbyy						Lateral
2	M2	L3x3	3.578			Lbyy						Lateral
3	M3	L3x3	2.926			Lbyy						Lateral
4	M5	L3x3	3.578			Lbyy						Lateral
5	M6	L3x3	2.926			Lbyy						Lateral
6	M8	2.5" Std. Pipe	10.5			Lbyy						Lateral
7	M9	L3x3	3.578			Lbyy						Lateral
8	M10	L3x3	2.926			Lbyy						Lateral
9	M12	HSS4x3	4			Lbyy						Lateral
10	M13	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
11	M14	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
12	M15	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
13	M16	Web Plate	1			Lbyy						Lateral
14	M17	Web Plate	1			Lbyy						Lateral
15	M18	Web Plate	1			Lbyy						Lateral
16	M19	Web Plate	1			Lbyy						Lateral
17	M20	Web Plate	1			Lbyy						Lateral
18	M21	Web Plate	.667			Lbyy						Lateral
19	M22	Web Plate	.333			Lbyy						Lateral
20	M23	Web Plate	1.25			Lbyy						Lateral
21	M24	Web Plate	1.25			Lbyy						Lateral
22	M25	Web Plate	1.25			Lbyy						Lateral
23	M26	Web Plate	1.25			Lbyy						Lateral
24	M27	Web Plate	1.003			Lbyy						Lateral
25	M28	Web Plate	.821			Lbyy						Lateral
26	M30	HSS4x3	4			Lbyy						Lateral
27	M31	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
28	M32	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
29	M33	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
30	M34	Web Plate	1			Lbyy						Lateral
31	M35	Web Plate	1			Lbyy						Lateral
32	M36	Web Plate	1			Lbyy						Lateral
33	M37	Web Plate	1			Lbyy						Lateral
34	M38	Web Plate	1			Lbyy						Lateral
35	M39	Web Plate	.667			Lbyy						Lateral
36	M40	Web Plate	.333			Lbyy						Lateral
37	M41	Web Plate	1.25			Lbyy						Lateral
38	M42	Web Plate	1.25			Lbyy						Lateral
39	M43	Web Plate	1.25			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
40	M44	Web Plate	1.25			Lbyy						Lateral
41	M45	Web Plate	1.003			Lbyy						Lateral
42	M46	Web Plate	.821			Lbyy						Lateral
43	M48	Handrail	10			Lbyy						Lateral
44	M49	Handrail	10			Lbyy						Lateral
45	M50	Handrail	10			Lbyy						Lateral
46	M51	Handrail	10			Lbyy						Lateral
47	M58	2.5" Std. Pipe	10.5			Lbyy						Lateral
48	M59	L3x3	3.578			Lbyy						Lateral
49	M60	L3x3	2.926			Lbyy						Lateral
50	M62	L3x3	3.578			Lbyy						Lateral
51	M63	L3x3	2.926			Lbyy						Lateral
52	M65	L3x3	3.578			Lbyy						Lateral
53	M66	L3x3	2.926			Lbyy						Lateral
54	M68	HSS4x3	4			Lbyy						Lateral
55	M69	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
56	M70	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
57	M71	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
58	M72	Web Plate	1			Lbyy						Lateral
59	M73	Web Plate	1			Lbyy						Lateral
60	M74	Web Plate	1			Lbyy						Lateral
61	M75	Web Plate	1			Lbyy						Lateral
62	M76	Web Plate	1			Lbyy						Lateral
63	M77	Web Plate	.667			Lbyy						Lateral
64	M78	Web Plate	.333			Lbyy						Lateral
65	M79	Web Plate	1.25			Lbyy						Lateral
66	M80	Web Plate	1.25			Lbyy						Lateral
67	M81	Web Plate	1.25			Lbyy						Lateral
68	M82	Web Plate	1.25			Lbyy						Lateral
69	M83	Web Plate	1.003			Lbyy						Lateral
70	M84	Web Plate	.821			Lbyy						Lateral
71	M86	HSS4x3	4			Lbyy						Lateral
72	M87	Cord Plate	5.25	Segment	Segment	Segment	Segment	Segm...				Lateral
73	M88	Cord Plate	2.462	Segment	Segment	Segment	Segment	Segm...				Lateral
74	M89	Cord Plate	3	Segment	Segment	Segment	Segment	Segm...				Lateral
75	M90	Web Plate	1			Lbyy						Lateral
76	M91	Web Plate	1			Lbyy						Lateral
77	M92	Web Plate	1			Lbyy						Lateral
78	M93	Web Plate	1			Lbyy						Lateral
79	M94	Web Plate	1			Lbyy						Lateral
80	M95	Web Plate	.667			Lbyy						Lateral
81	M96	Web Plate	.333			Lbyy						Lateral
82	M97	Web Plate	1.25			Lbyy						Lateral
83	M98	Web Plate	1.25			Lbyy						Lateral
84	M99	Web Plate	1.25			Lbyy						Lateral
85	M100	Web Plate	1.25			Lbyy						Lateral
86	M101	Web Plate	1.003			Lbyy						Lateral
87	M102	Web Plate	.821			Lbyy						Lateral
88	M106	2.5" Std. Pipe	10.5			Lbyy						Lateral
89	M107	L3x3	3.578			Lbyy						Lateral
90	M108	L3x3	2.926			Lbyy						Lateral
91	M110	L3x3	3.578			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[...	Lcomp bot[...	L-torq...	Kyy	Kzz	Cb	Functi...
92	M111	L3x3	2.926			Lbyy						Lateral
93	M113	2.0" Std. Pipe	8			Lbyy						Lateral
94	M114	2.0" Std. Pipe	6			Lbyy						Lateral
95	M115	2.0" Std. Pipe	6			Lbyy						Lateral
96	M116	2.0" Std. Pipe	8			Lbyy						Lateral
97	M117	2.0" Std. Pipe	6			Lbyy						Lateral
98	M118	2.0" Std. Pipe	6			Lbyy						Lateral
99	M119	2.0" Std. Pipe	8			Lbyy						Lateral
100	M120	2.0" Std. Pipe	6			Lbyy						Lateral
101	M121	2.0" Std. Pipe	6			Lbyy						Lateral
102	M122	2.0" Std. Pipe	8			Lbyy						Lateral
103	M123	2.0" Std. Pipe	6			Lbyy						Lateral
104	M124	2.0" Std. Pipe	6			Lbyy						Lateral

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
1	M1	N1	N2			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
2	M2	N3	N4			L3x3	Beam	None	A36 Gr.36	Typical
3	M3	N66	N4			L3x3	Beam	None	A36 Gr.36	Typical
4	M4	N61	N5			RIGID	None	None	RIGID	Typical
5	M5	N10	N6			L3x3	Beam	None	A36 Gr.36	Typical
6	M6	N67	N6			L3x3	Beam	None	A36 Gr.36	Typical
7	M7	N62	N7			RIGID	None	None	RIGID	Typical
8	M8	N8	N9			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
9	M9	N10	N11			L3x3	Beam	None	A36 Gr.36	Typical
10	M10	N67	N11			L3x3	Beam	None	A36 Gr.36	Typical
11	M11	N63	N12			RIGID	None	None	RIGID	Typical
12	M12	N3	N66		90	HSS4x3	Beam	None	A500 Gr....	Typical
13	M13	N26	N13			Cord Plate	Beam	None	A36 Gr.36	Typical
14	M14	N26	N24			Cord Plate	Beam	None	A36 Gr.36	Typical
15	M15	N24	N20			Cord Plate	Beam	None	A36 Gr.36	Typical
16	M16	N13	N20			Web Plate	Beam	None	A36 Gr.36	Typical
17	M17	N14	N21			Web Plate	Beam	None	A36 Gr.36	Typical
18	M18	N15	N22			Web Plate	Beam	None	A36 Gr.36	Typical
19	M19	N16	N23			Web Plate	Beam	None	A36 Gr.36	Typical
20	M20	N25	N24			Web Plate	Beam	None	A36 Gr.36	Typical
21	M21	N17	N27			Web Plate	Beam	None	A36 Gr.36	Typical
22	M22	N18	N28			Web Plate	Beam	None	A36 Gr.36	Typical
23	M23	N13	N21			Web Plate	Beam	None	A36 Gr.36	Typical
24	M24	N14	N22			Web Plate	Beam	None	A36 Gr.36	Typical
25	M25	N15	N23			Web Plate	Beam	None	A36 Gr.36	Typical
26	M26	N16	N24			Web Plate	Beam	None	A36 Gr.36	Typical
27	M27	N25	N27			Web Plate	Beam	None	A36 Gr.36	Typical
28	M28	N17	N28			Web Plate	Beam	None	A36 Gr.36	Typical
29	M29	N19	N26			RIGID	None	None	RIGID	Typical
30	M30	N10	N67		90	HSS4x3	Beam	None	A500 Gr....	Typical
31	M31	N42	N29			Cord Plate	Beam	None	A36 Gr.36	Typical
32	M32	N42	N40			Cord Plate	Beam	None	A36 Gr.36	Typical
33	M33	N40	N36			Cord Plate	Beam	None	A36 Gr.36	Typical
34	M34	N29	N36			Web Plate	Beam	None	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
35	M35	N30	N37			Web Plate	Beam	None	A36 Gr.36	Typical
36	M36	N31	N38			Web Plate	Beam	None	A36 Gr.36	Typical
37	M37	N32	N39			Web Plate	Beam	None	A36 Gr.36	Typical
38	M38	N41	N40			Web Plate	Beam	None	A36 Gr.36	Typical
39	M39	N33	N43			Web Plate	Beam	None	A36 Gr.36	Typical
40	M40	N34	N44			Web Plate	Beam	None	A36 Gr.36	Typical
41	M41	N29	N37			Web Plate	Beam	None	A36 Gr.36	Typical
42	M42	N30	N38			Web Plate	Beam	None	A36 Gr.36	Typical
43	M43	N31	N39			Web Plate	Beam	None	A36 Gr.36	Typical
44	M44	N32	N40			Web Plate	Beam	None	A36 Gr.36	Typical
45	M45	N41	N43			Web Plate	Beam	None	A36 Gr.36	Typical
46	M46	N33	N44			Web Plate	Beam	None	A36 Gr.36	Typical
47	M47	N35	N42			RIGID	None	None	RIGID	Typical
48	M48	N45	N46			Handrail	Beam	None	A53 Gr.B	Typical
49	M49	N49	N50			Handrail	Beam	None	A53 Gr.B	Typical
50	M50	N53	N54			Handrail	Beam	None	A53 Gr.B	Typical
51	M51	N57	N58			Handrail	Beam	None	A53 Gr.B	Typical
52	M52	N60	N47			RIGID	None	None	RIGID	Typical
53	M53	N59	N56			RIGID	None	None	RIGID	Typical
54	M54	N55	N52			RIGID	None	None	RIGID	Typical
55	M55	N48	N51			RIGID	None	None	RIGID	Typical
56	M56	N3	N64			RIGID	None	None	RIGID	Typical
57	M57	N10	N65			RIGID	None	None	RIGID	Typical
58	M58	N68	N69			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
59	M59	N70	N71			L3x3	Beam	None	A36 Gr.36	Typical
60	M60	N115	N71			L3x3	Beam	None	A36 Gr.36	Typical
61	M61	N110	N72			RIGID	None	None	RIGID	Typical
62	M62	N75	N73			L3x3	Beam	None	A36 Gr.36	Typical
63	M63	N116	N73			L3x3	Beam	None	A36 Gr.36	Typical
64	M64	N111	N74			RIGID	None	None	RIGID	Typical
65	M65	N75	N76			L3x3	Beam	None	A36 Gr.36	Typical
66	M66	N116	N76			L3x3	Beam	None	A36 Gr.36	Typical
67	M67	N112	N77			RIGID	None	None	RIGID	Typical
68	M68	N70	N115		90	HSS4x3	Beam	None	A500 Gr....	Typical
69	M69	N91	N78			Cord Plate	Beam	None	A36 Gr.36	Typical
70	M70	N91	N89			Cord Plate	Beam	None	A36 Gr.36	Typical
71	M71	N89	N85			Cord Plate	Beam	None	A36 Gr.36	Typical
72	M72	N78	N85			Web Plate	Beam	None	A36 Gr.36	Typical
73	M73	N79	N86			Web Plate	Beam	None	A36 Gr.36	Typical
74	M74	N80	N87			Web Plate	Beam	None	A36 Gr.36	Typical
75	M75	N81	N88			Web Plate	Beam	None	A36 Gr.36	Typical
76	M76	N90	N89			Web Plate	Beam	None	A36 Gr.36	Typical
77	M77	N82	N92			Web Plate	Beam	None	A36 Gr.36	Typical
78	M78	N83	N93			Web Plate	Beam	None	A36 Gr.36	Typical
79	M79	N78	N86			Web Plate	Beam	None	A36 Gr.36	Typical
80	M80	N79	N87			Web Plate	Beam	None	A36 Gr.36	Typical
81	M81	N80	N88			Web Plate	Beam	None	A36 Gr.36	Typical
82	M82	N81	N89			Web Plate	Beam	None	A36 Gr.36	Typical
83	M83	N90	N92			Web Plate	Beam	None	A36 Gr.36	Typical
84	M84	N82	N93			Web Plate	Beam	None	A36 Gr.36	Typical
85	M85	N84	N91			RIGID	None	None	RIGID	Typical
86	M86	N75	N116		90	HSS4x3	Beam	None	A500 Gr....	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Rul...
87	M87	N107	N94			Cord Plate	Beam	None	A36 Gr.36	Typical
88	M88	N107	N105			Cord Plate	Beam	None	A36 Gr.36	Typical
89	M89	N105	N101			Cord Plate	Beam	None	A36 Gr.36	Typical
90	M90	N94	N101			Web Plate	Beam	None	A36 Gr.36	Typical
91	M91	N95	N102			Web Plate	Beam	None	A36 Gr.36	Typical
92	M92	N96	N103			Web Plate	Beam	None	A36 Gr.36	Typical
93	M93	N97	N104			Web Plate	Beam	None	A36 Gr.36	Typical
94	M94	N106	N105			Web Plate	Beam	None	A36 Gr.36	Typical
95	M95	N98	N108			Web Plate	Beam	None	A36 Gr.36	Typical
96	M96	N99	N109			Web Plate	Beam	None	A36 Gr.36	Typical
97	M97	N94	N102			Web Plate	Beam	None	A36 Gr.36	Typical
98	M98	N95	N103			Web Plate	Beam	None	A36 Gr.36	Typical
99	M99	N96	N104			Web Plate	Beam	None	A36 Gr.36	Typical
100	M100	N97	N105			Web Plate	Beam	None	A36 Gr.36	Typical
101	M101	N106	N108			Web Plate	Beam	None	A36 Gr.36	Typical
102	M102	N98	N109			Web Plate	Beam	None	A36 Gr.36	Typical
103	M103	N100	N107			RIGID	None	None	RIGID	Typical
104	M104	N70	N113			RIGID	None	None	RIGID	Typical
105	M105	N75	N114			RIGID	None	None	RIGID	Typical
106	M106	N117	N118			2.5" Std. Pipe	Beam	None	A53 Gr.B	Typical
107	M107	N3	N119			L3x3	Beam	None	A36 Gr.36	Typical
108	M108	N66	N119			L3x3	Beam	None	A36 Gr.36	Typical
109	M109	N121	N120			RIGID	None	None	RIGID	Typical
110	M110	N70	N122			L3x3	Beam	None	A36 Gr.36	Typical
111	M111	N115	N122			L3x3	Beam	None	A36 Gr.36	Typical
112	M112	N124	N123			RIGID	None	None	RIGID	Typical
113	M113	N127	N128			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
114	M114	N130	N131			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
115	M115	N133	N134			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
116	M116	N137	N138			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
117	M117	N140	N141			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
118	M118	N143	N144			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
119	M119	N147	N148			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
120	M120	N150	N151			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
121	M121	N153	N154			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
122	M122	N157	N158			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
123	M123	N160	N161			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical
124	M124	N163	N164			2.0" Std. Pipe	Beam	None	A53 Gr.B	Typical

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
1	N1	-5.25	0	5.656854	0	
2	N2	5.25	0	5.656854	0	
3	N3	-2.078427	0	2.078427	0	
4	N4	-2.078427	0	5.656854	0	
5	N5	-4.416667	0	5.656854	0	
6	N6	2.078427	0	5.656854	0	
7	N7	4.416667	0	5.656854	0	
8	N8	5.656854	0	5.25	0	
9	N9	5.656854	0	-5.25	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
10	N10	2.078427	0	2.078427	0	
11	N11	5.656854	0	2.078427	0	
12	N12	5.656854	0	4.416667	0	
13	N13	-0.707107	-.25	0.707107	0	
14	N14	-1.237437	-.25	1.237437	0	
15	N15	-1.767767	-.25	1.767767	0	
16	N16	-2.298097	-.25	2.298097	0	
17	N17	-3.358757	-.25	3.358757	0	
18	N18	-3.889087	-.25	3.889087	0	
19	N19	-4.419417	0	4.419417	0	
20	N20	-0.707107	-1.25	0.707107	0	
21	N21	-1.237437	-1.25	1.237437	0	
22	N22	-1.767767	-1.25	1.767767	0	
23	N23	-2.298097	-1.25	2.298097	0	
24	N24	-2.828427	-1.25	2.828427	0	
25	N25	-2.828427	-.25	2.828427	0	
26	N26	-4.419417	-.25	4.419417	0	
27	N27	-3.358757	-0.916667	3.358757	0	
28	N28	-3.889087	-0.583333	3.889087	0	
29	N29	0.707107	-.25	0.707107	0	
30	N30	1.237437	-.25	1.237437	0	
31	N31	1.767767	-.25	1.767767	0	
32	N32	2.298097	-.25	2.298097	0	
33	N33	3.358757	-.25	3.358757	0	
34	N34	3.889087	-.25	3.889087	0	
35	N35	4.419417	0	4.419417	0	
36	N36	0.707107	-1.25	0.707107	0	
37	N37	1.237437	-1.25	1.237437	0	
38	N38	1.767767	-1.25	1.767767	0	
39	N39	2.298097	-1.25	2.298097	0	
40	N40	2.828427	-1.25	2.828427	0	
41	N41	2.828427	-.25	2.828427	0	
42	N42	4.419417	-.25	4.419417	0	
43	N43	3.358757	-0.916667	3.358757	0	
44	N44	3.889087	-0.583333	3.889087	0	
45	N45	-5	3	5.656854	0	
46	N46	5	3	5.656854	0	
47	N47	-4	3	5.656854	0	
48	N48	4	3	5.656854	0	
49	N49	5.656854	3	5	0	
50	N50	5.656854	3	-5	0	
51	N51	5.656854	3	4	0	
52	N52	5.656854	3	-4	0	
53	N53	5	3	-5.656854	0	
54	N54	-5	3	-5.656854	0	
55	N55	4	3	-5.656854	0	
56	N56	-4	3	-5.656854	0	
57	N57	-5.656854	3	-5	0	
58	N58	-5.656854	3	5	0	
59	N59	-5.656854	3	-4	0	
60	N60	-5.656854	3	4	0	
61	N61	-4.416667	0	5.036835	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
62	N62	4.416667	0	5.036835	0	
63	N63	5.036835	0	4.416667	0	
64	N64	-2.078427	-.25	2.078427	0	
65	N65	2.078427	-.25	2.078427	0	
66	N66	-4.906854	0	4.906854	0	
67	N67	4.906854	0	4.906854	0	
68	N68	-5.25	0	-5.656854	0	
69	N69	5.25	0	-5.656854	0	
70	N70	-2.078427	0	-2.078427	0	
71	N71	-2.078427	0	-5.656854	0	
72	N72	-4.416667	0	-5.656854	0	
73	N73	2.078427	0	-5.656854	0	
74	N74	4.416667	0	-5.656854	0	
75	N75	2.078427	0	-2.078427	0	
76	N76	5.656854	0	-2.078427	0	
77	N77	5.656854	0	-4.416667	0	
78	N78	-0.707107	-.25	-0.707107	0	
79	N79	-1.237437	-.25	-1.237437	0	
80	N80	-1.767767	-.25	-1.767767	0	
81	N81	-2.298097	-.25	-2.298097	0	
82	N82	-3.358757	-.25	-3.358757	0	
83	N83	-3.889087	-.25	-3.889087	0	
84	N84	-4.419417	0	-4.419417	0	
85	N85	-0.707107	-1.25	-0.707107	0	
86	N86	-1.237437	-1.25	-1.237437	0	
87	N87	-1.767767	-1.25	-1.767767	0	
88	N88	-2.298097	-1.25	-2.298097	0	
89	N89	-2.828427	-1.25	-2.828427	0	
90	N90	-2.828427	-.25	-2.828427	0	
91	N91	-4.419417	-.25	-4.419417	0	
92	N92	-3.358757	-0.916667	-3.358757	0	
93	N93	-3.889087	-0.583333	-3.889087	0	
94	N94	0.707107	-.25	-0.707107	0	
95	N95	1.237437	-.25	-1.237437	0	
96	N96	1.767767	-.25	-1.767767	0	
97	N97	2.298097	-.25	-2.298097	0	
98	N98	3.358757	-.25	-3.358757	0	
99	N99	3.889087	-.25	-3.889087	0	
100	N100	4.419417	0	-4.419417	0	
101	N101	0.707107	-1.25	-0.707107	0	
102	N102	1.237437	-1.25	-1.237437	0	
103	N103	1.767767	-1.25	-1.767767	0	
104	N104	2.298097	-1.25	-2.298097	0	
105	N105	2.828427	-1.25	-2.828427	0	
106	N106	2.828427	-.25	-2.828427	0	
107	N107	4.419417	-.25	-4.419417	0	
108	N108	3.358757	-0.916667	-3.358757	0	
109	N109	3.889087	-0.583333	-3.889087	0	
110	N110	-4.416667	0	-5.036835	0	
111	N111	4.416667	0	-5.036835	0	
112	N112	5.036835	0	-4.416667	0	
113	N113	-2.078427	-.25	-2.078427	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Dia...
114	N114	2.078427	-.25	-2.078427	0	
115	N115	-4.906854	0	-4.906854	0	
116	N116	4.906854	0	-4.906854	0	
117	N117	-5.656854	0	5.25	0	
118	N118	-5.656854	0	-5.25	0	
119	N119	-5.656854	0	2.078427	0	
120	N120	-5.656854	0	4.416667	0	
121	N121	-5.036835	0	4.416667	0	
122	N122	-5.656854	0	-2.078427	0	
123	N123	-5.656854	0	-4.416667	0	
124	N124	-5.036835	0	-4.416667	0	
125	N125	0	0	5.656854	0	
126	N126	0	3	5.656854	0	
127	N127	0	-2	5.656854	0	
128	N128	0	6	5.656854	0	
129	N129	4	0	5.656854	0	
130	N130	4	-1	5.656854	0	
131	N131	4	5	5.656854	0	
132	N132	-4	0	5.656854	0	
133	N133	-4	-1	5.656854	0	
134	N134	-4	5	5.656854	0	
135	N135	5.656854	0	-0.	0	
136	N136	5.656854	3	-0.	0	
137	N137	5.656854	-2	-0.	0	
138	N138	5.656854	6	-0.	0	
139	N139	5.656854	0	-4.	0	
140	N140	5.656854	-1	-4.	0	
141	N141	5.656854	5	-4.	0	
142	N142	5.656854	0	4.	0	
143	N143	5.656854	-1	4.	0	
144	N144	5.656854	5	4.	0	
145	N145	-0.	0	-5.656854	0	
146	N146	-0.	3	-5.656854	0	
147	N147	-0.	-2	-5.656854	0	
148	N148	-0.	6	-5.656854	0	
149	N149	-4.	0	-5.656854	0	
150	N150	-4.	-1	-5.656854	0	
151	N151	-4.	5	-5.656854	0	
152	N152	4.	0	-5.656854	0	
153	N153	4.	-1	-5.656854	0	
154	N154	4.	5	-5.656854	0	
155	N155	-5.656854	0	0.	0	
156	N156	-5.656854	3	0.	0	
157	N157	-5.656854	-2	0.	0	
158	N158	-5.656854	6	0.	0	
159	N159	-5.656854	0	4.	0	
160	N160	-5.656854	-1	4.	0	
161	N161	-5.656854	5	4.	0	
162	N162	-5.656854	0	-4.	0	
163	N163	-5.656854	-1	-4.	0	
164	N164	-5.656854	5	-4.	0	

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N13	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N20	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N29	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N36	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N78	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N85	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N94	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
8	N101	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Member Point Loads (BLC 2 : Dead Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	Y	-.077	.5
2	M116	Y	-.077	.5
3	M119	Y	-.077	.5
4	M122	Y	-.077	.5
5	M113	Y	-.077	7.5
6	M116	Y	-.077	7.5
7	M119	Y	-.077	7.5
8	M122	Y	-.077	7.5
9	M114	Y	-.066	.5
10	M117	Y	-.066	.5
11	M120	Y	-.066	.5
12	M123	Y	-.066	.5
13	M114	Y	-.066	5.5
14	M117	Y	-.066	5.5
15	M120	Y	-.066	5.5
16	M123	Y	-.066	5.5
17	M115	Y	-.052	5.5
18	M118	Y	-.052	5.5
19	M121	Y	-.052	5.5
20	M124	Y	-.052	5.5
21	M115	Y	-.052	2.5
22	M118	Y	-.052	2.5
23	M121	Y	-.052	2.5
24	M124	Y	-.052	2.5
25	M113	Y	-.074	%50
26	M116	Y	-.074	%50
27	M119	Y	-.074	%50
28	M122	Y	-.074	%50
29	M113	Y	-.047	6.5
30	M116	Y	-.047	6.5
31	M119	Y	-.047	6.5
32	M122	Y	-.047	6.5
33	M115	Y	-.05	5
34	M118	Y	-.05	5
35	M121	Y	-.05	5
36	M124	Y	-.05	5

Member Point Loads (BLC 3 : Ice Load)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	Y	-.208	.5
2	M116	Y	-.208	.5
3	M119	Y	-.208	.5
4	M122	Y	-.208	.5
5	M113	Y	-.208	7.5
6	M116	Y	-.208	7.5
7	M119	Y	-.208	7.5
8	M122	Y	-.208	7.5
9	M114	Y	-.089	.5
10	M117	Y	-.089	.5
11	M120	Y	-.089	.5
12	M123	Y	-.089	.5
13	M114	Y	-.089	5.5
14	M117	Y	-.089	5.5
15	M120	Y	-.089	5.5
16	M123	Y	-.089	5.5
17	M115	Y	-.074	5.5
18	M118	Y	-.074	5.5
19	M121	Y	-.074	5.5
20	M124	Y	-.074	5.5
21	M115	Y	-.074	2.5
22	M118	Y	-.074	2.5
23	M121	Y	-.074	2.5
24	M124	Y	-.074	2.5
25	M113	Y	-.069	%50
26	M116	Y	-.069	%50
27	M119	Y	-.069	%50
28	M122	Y	-.069	%50
29	M113	Y	-.052	6.5
30	M116	Y	-.052	6.5
31	M119	Y	-.052	6.5
32	M122	Y	-.052	6.5
33	M115	Y	-.078	5
34	M118	Y	-.078	5
35	M121	Y	-.078	5
36	M124	Y	-.078	5

Member Point Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	X	.046	.5
2	M119	X	.046	.5
3	M113	X	.046	7.5
4	M119	X	.046	7.5
5	M116	X	.104	.5
6	M122	X	.104	.5
7	M116	X	.104	7.5
8	M122	X	.104	7.5
9	M114	X	.028	.5
10	M120	X	.028	.5
11	M114	X	.028	5.5
12	M120	X	.028	5.5

Member Point Loads (BLC 4 : Wind with Ice X) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
13	M117	X	.038	.5
14	M123	X	.038	.5
15	M117	X	.038	5.5
16	M123	X	.038	5.5
17	M115	X	.016	5.5
18	M121	X	.016	5.5
19	M115	X	.016	2.5
20	M121	X	.016	2.5
21	M118	X	.032	5.5
22	M124	X	.032	5.5
23	M118	X	.032	2.5
24	M124	X	.032	2.5
25	M113	X	.018	%50
26	M119	X	.018	%50
27	M113	X	.012	6.5
28	M119	X	.012	6.5
29	M115	X	.016	5
30	M121	X	.016	5

Member Point Loads (BLC 5 : Wind X)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	X	.12	.5
2	M119	X	.12	.5
3	M113	X	.12	7.5
4	M119	X	.12	7.5
5	M116	X	.329	.5
6	M122	X	.329	.5
7	M116	X	.329	7.5
8	M122	X	.329	7.5
9	M114	X	.072	.5
10	M120	X	.072	.5
11	M114	X	.072	5.5
12	M120	X	.072	5.5
13	M117	X	.106	.5
14	M123	X	.106	.5
15	M117	X	.106	5.5
16	M123	X	.106	5.5
17	M115	X	.037	5.5
18	M121	X	.037	5.5
19	M115	X	.037	2.5
20	M121	X	.037	2.5
21	M118	X	.092	5.5
22	M124	X	.092	5.5
23	M118	X	.092	2.5
24	M124	X	.092	2.5
25	M113	X	.042	%50
26	M119	X	.042	%50
27	M113	X	.022	6.5
28	M119	X	.022	6.5
29	M115	X	.035	5
30	M121	X	.035	5

Member Point Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	Z	.104	.5
2	M119	Z	.104	.5
3	M113	Z	.104	7.5
4	M119	Z	.104	7.5
5	M116	Z	.046	.5
6	M122	Z	.046	.5
7	M116	Z	.046	7.5
8	M122	Z	.046	7.5
9	M114	Z	.038	.5
10	M120	Z	.038	.5
11	M114	Z	.038	5.5
12	M120	Z	.038	5.5
13	M117	Z	.028	.5
14	M123	Z	.028	.5
15	M117	Z	.028	5.5
16	M123	Z	.028	5.5
17	M115	Z	.032	5.5
18	M121	Z	.032	5.5
19	M115	Z	.032	2.5
20	M121	Z	.032	2.5
21	M118	Z	.016	5.5
22	M124	Z	.016	5.5
23	M118	Z	.016	2.5
24	M124	Z	.016	2.5
25	M116	Z	.018	%50
26	M122	Z	.018	%50
27	M116	Z	.012	6.5
28	M122	Z	.012	6.5
29	M118	Z	.016	5
30	M124	Z	.016	5

Member Point Loads (BLC 7 : Wind Z)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
1	M113	Z	.329	.5
2	M119	Z	.329	.5
3	M113	Z	.329	7.5
4	M119	Z	.329	7.5
5	M116	Z	.12	.5
6	M122	Z	.12	.5
7	M116	Z	.12	7.5
8	M122	Z	.12	7.5
9	M114	Z	.106	.5
10	M120	Z	.106	.5
11	M114	Z	.106	5.5
12	M120	Z	.106	5.5
13	M117	Z	.072	.5
14	M123	Z	.072	.5
15	M117	Z	.072	5.5
16	M123	Z	.072	5.5
17	M115	Z	.092	5.5
18	M121	Z	.092	5.5

Member Point Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Magnitude[k,k-ft]	Location[ft,%]
19	M115	Z	.092	2.5
20	M121	Z	.092	2.5
21	M118	Z	.037	5.5
22	M124	Z	.037	5.5
23	M118	Z	.037	2.5
24	M124	Z	.037	2.5
25	M116	Z	.042	%50
26	M122	Z	.042	%50
27	M116	Z	.022	6.5
28	M122	Z	.022	6.5
29	M118	Z	.035	5
30	M124	Z	.035	5

Member Distributed Loads (BLC 4 : Wind with Ice X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M13	X	.003	.003	0	0
2	M14	X	.003	.003	0	0
3	M15	X	.003	.003	0	0
4	M16	X	.003	.003	0	0
5	M17	X	.003	.003	0	0
6	M18	X	.003	.003	0	0
7	M19	X	.003	.003	0	0
8	M20	X	.003	.003	0	0
9	M21	X	.003	.003	0	0
10	M22	X	.003	.003	0	0
11	M23	X	.003	.003	0	0
12	M24	X	.003	.003	0	0
13	M25	X	.003	.003	0	0
14	M26	X	.003	.003	0	0
15	M27	X	.003	.003	0	0
16	M28	X	.003	.003	0	0
17	M31	X	.003	.003	0	0
18	M32	X	.003	.003	0	0
19	M33	X	.003	.003	0	0
20	M34	X	.003	.003	0	0
21	M35	X	.003	.003	0	0
22	M36	X	.003	.003	0	0
23	M37	X	.003	.003	0	0
24	M38	X	.003	.003	0	0
25	M39	X	.003	.003	0	0
26	M40	X	.003	.003	0	0
27	M41	X	.003	.003	0	0
28	M42	X	.003	.003	0	0
29	M43	X	.003	.003	0	0
30	M44	X	.003	.003	0	0
31	M45	X	.003	.003	0	0
32	M46	X	.003	.003	0	0
33	M8	X	.003	.003	0	0
34	M51	X	.003	.003	0	0
35	M49	X	.003	.003	0	0

Member Distributed Loads (BLC 4 : Wind with Ice X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
36	M69	X	.003	.003	0	0
37	M70	X	.003	.003	0	0
38	M71	X	.003	.003	0	0
39	M72	X	.003	.003	0	0
40	M73	X	.003	.003	0	0
41	M74	X	.003	.003	0	0
42	M75	X	.003	.003	0	0
43	M76	X	.003	.003	0	0
44	M77	X	.003	.003	0	0
45	M78	X	.003	.003	0	0
46	M79	X	.003	.003	0	0
47	M80	X	.003	.003	0	0
48	M81	X	.003	.003	0	0
49	M82	X	.003	.003	0	0
50	M83	X	.003	.003	0	0
51	M84	X	.003	.003	0	0
52	M87	X	.003	.003	0	0
53	M88	X	.003	.003	0	0
54	M89	X	.003	.003	0	0
55	M90	X	.003	.003	0	0
56	M91	X	.003	.003	0	0
57	M92	X	.003	.003	0	0
58	M93	X	.003	.003	0	0
59	M94	X	.003	.003	0	0
60	M95	X	.003	.003	0	0
61	M96	X	.003	.003	0	0
62	M97	X	.003	.003	0	0
63	M98	X	.003	.003	0	0
64	M99	X	.003	.003	0	0
65	M100	X	.003	.003	0	0
66	M101	X	.003	.003	0	0
67	M102	X	.003	.003	0	0
68	M106	X	.003	.003	0	0
69	M115	X	.003	.003	0	0
70	M113	X	.003	.003	0	0
71	M114	X	.003	.003	0	0
72	M120	X	.003	.003	0	0
73	M119	X	.003	.003	0	0
74	M121	X	.003	.003	0	0

Member Distributed Loads (BLC 5 : Wind X)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M14	X	.008	.008	0	0
2	M15	X	.008	.008	0	0
3	M16	X	.008	.008	0	0
4	M17	X	.008	.008	0	0
5	M18	X	.008	.008	0	0
6	M19	X	.008	.008	0	0
7	M20	X	.008	.008	0	0
8	M21	X	.008	.008	0	0
9	M22	X	.008	.008	0	0

Member Distributed Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
10	M23	X	.008	.008	0	0
11	M24	X	.008	.008	0	0
12	M25	X	.008	.008	0	0
13	M26	X	.008	.008	0	0
14	M27	X	.008	.008	0	0
15	M28	X	.008	.008	0	0
16	M31	X	.008	.008	0	0
17	M32	X	.008	.008	0	0
18	M33	X	.008	.008	0	0
19	M34	X	.008	.008	0	0
20	M35	X	.008	.008	0	0
21	M36	X	.008	.008	0	0
22	M37	X	.008	.008	0	0
23	M38	X	.008	.008	0	0
24	M39	X	.008	.008	0	0
25	M40	X	.008	.008	0	0
26	M41	X	.008	.008	0	0
27	M42	X	.008	.008	0	0
28	M43	X	.008	.008	0	0
29	M44	X	.008	.008	0	0
30	M45	X	.008	.008	0	0
31	M46	X	.008	.008	0	0
32	M8	X	.008	.008	0	0
33	M51	X	.008	.008	0	0
34	M49	X	.008	.008	0	0
35	M70	X	.008	.008	0	0
36	M71	X	.008	.008	0	0
37	M72	X	.008	.008	0	0
38	M73	X	.008	.008	0	0
39	M74	X	.008	.008	0	0
40	M75	X	.008	.008	0	0
41	M76	X	.008	.008	0	0
42	M77	X	.008	.008	0	0
43	M78	X	.008	.008	0	0
44	M79	X	.008	.008	0	0
45	M80	X	.008	.008	0	0
46	M81	X	.008	.008	0	0
47	M82	X	.008	.008	0	0
48	M83	X	.008	.008	0	0
49	M84	X	.008	.008	0	0
50	M87	X	.008	.008	0	0
51	M88	X	.008	.008	0	0
52	M89	X	.008	.008	0	0
53	M90	X	.008	.008	0	0
54	M91	X	.008	.008	0	0
55	M92	X	.008	.008	0	0
56	M93	X	.008	.008	0	0
57	M94	X	.008	.008	0	0
58	M95	X	.008	.008	0	0
59	M96	X	.008	.008	0	0
60	M97	X	.008	.008	0	0
61	M98	X	.008	.008	0	0

Member Distributed Loads (BLC 5 : Wind X) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
62	M99	X	.008	.008	0	0
63	M100	X	.008	.008	0	0
64	M101	X	.008	.008	0	0
65	M102	X	.008	.008	0	0
66	M106	X	.008	.008	0	0
67	M115	X	.008	.008	0	0
68	M113	X	.008	.008	0	0
69	M114	X	.008	.008	0	0
70	M120	X	.008	.008	0	0
71	M119	X	.008	.008	0	0
72	M121	X	.008	.008	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	.003	.003	0	0
2	M14	Z	.003	.003	0	0
3	M15	Z	.003	.003	0	0
4	M16	Z	.003	.003	0	0
5	M17	Z	.003	.003	0	0
6	M18	Z	.003	.003	0	0
7	M19	Z	.003	.003	0	0
8	M20	Z	.003	.003	0	0
9	M21	Z	.003	.003	0	0
10	M22	Z	.003	.003	0	0
11	M23	Z	.003	.003	0	0
12	M24	Z	.003	.003	0	0
13	M25	Z	.003	.003	0	0
14	M26	Z	.003	.003	0	0
15	M27	Z	.003	.003	0	0
16	M28	Z	.003	.003	0	0
17	M31	Z	.003	.003	0	0
18	M32	Z	.003	.003	0	0
19	M33	Z	.003	.003	0	0
20	M34	Z	.003	.003	0	0
21	M35	Z	.003	.003	0	0
22	M36	Z	.003	.003	0	0
23	M37	Z	.003	.003	0	0
24	M38	Z	.003	.003	0	0
25	M39	Z	.003	.003	0	0
26	M40	Z	.003	.003	0	0
27	M41	Z	.003	.003	0	0
28	M42	Z	.003	.003	0	0
29	M43	Z	.003	.003	0	0
30	M44	Z	.003	.003	0	0
31	M45	Z	.003	.003	0	0
32	M46	Z	.003	.003	0	0
33	M1	Z	.003	.003	0	0
34	M48	Z	.003	.003	0	0
35	M50	Z	.003	.003	0	0
36	M58	Z	.003	.003	0	0
37	M69	Z	.003	.003	0	0

Member Distributed Loads (BLC 6 : Wind with Ice Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
38	M70	Z	.003	.003	0	0
39	M71	Z	.003	.003	0	0
40	M72	Z	.003	.003	0	0
41	M73	Z	.003	.003	0	0
42	M74	Z	.003	.003	0	0
43	M75	Z	.003	.003	0	0
44	M76	Z	.003	.003	0	0
45	M77	Z	.003	.003	0	0
46	M78	Z	.003	.003	0	0
47	M79	Z	.003	.003	0	0
48	M80	Z	.003	.003	0	0
49	M81	Z	.003	.003	0	0
50	M82	Z	.003	.003	0	0
51	M83	Z	.003	.003	0	0
52	M84	Z	.003	.003	0	0
53	M87	Z	.003	.003	0	0
54	M88	Z	.003	.003	0	0
55	M89	Z	.003	.003	0	0
56	M90	Z	.003	.003	0	0
57	M91	Z	.003	.003	0	0
58	M92	Z	.003	.003	0	0
59	M93	Z	.003	.003	0	0
60	M94	Z	.003	.003	0	0
61	M95	Z	.003	.003	0	0
62	M96	Z	.003	.003	0	0
63	M97	Z	.003	.003	0	0
64	M98	Z	.003	.003	0	0
65	M99	Z	.003	.003	0	0
66	M100	Z	.003	.003	0	0
67	M101	Z	.003	.003	0	0
68	M102	Z	.003	.003	0	0
69	M123	Z	.003	.003	0	0
70	M122	Z	.003	.003	0	0
71	M124	Z	.003	.003	0	0
72	M118	Z	.003	.003	0	0
73	M116	Z	.003	.003	0	0
74	M117	Z	.003	.003	0	0

Member Distributed Loads (BLC 7 : Wind Z)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
1	M13	Z	.008	.008	0	0
2	M14	Z	.008	.008	0	0
3	M15	Z	.008	.008	0	0
4	M16	Z	.008	.008	0	0
5	M17	Z	.008	.008	0	0
6	M18	Z	.008	.008	0	0
7	M19	Z	.008	.008	0	0
8	M20	Z	.008	.008	0	0
9	M21	Z	.008	.008	0	0
10	M22	Z	.008	.008	0	0
11	M23	Z	.008	.008	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
12	M24	Z	.008	.008	0	0
13	M25	Z	.008	.008	0	0
14	M26	Z	.008	.008	0	0
15	M27	Z	.008	.008	0	0
16	M28	Z	.008	.008	0	0
17	M31	Z	.008	.008	0	0
18	M32	Z	.008	.008	0	0
19	M33	Z	.008	.008	0	0
20	M34	Z	.008	.008	0	0
21	M35	Z	.008	.008	0	0
22	M36	Z	.008	.008	0	0
23	M37	Z	.008	.008	0	0
24	M38	Z	.008	.008	0	0
25	M39	Z	.008	.008	0	0
26	M40	Z	.008	.008	0	0
27	M41	Z	.008	.008	0	0
28	M42	Z	.008	.008	0	0
29	M43	Z	.008	.008	0	0
30	M44	Z	.008	.008	0	0
31	M45	Z	.008	.008	0	0
32	M46	Z	.008	.008	0	0
33	M1	Z	.008	.008	0	0
34	M48	Z	.008	.008	0	0
35	M50	Z	.008	.008	0	0
36	M58	Z	.008	.008	0	0
37	M69	Z	.008	.008	0	0
38	M70	Z	.008	.008	0	0
39	M71	Z	.008	.008	0	0
40	M72	Z	.008	.008	0	0
41	M73	Z	.008	.008	0	0
42	M74	Z	.008	.008	0	0
43	M75	Z	.008	.008	0	0
44	M76	Z	.008	.008	0	0
45	M77	Z	.008	.008	0	0
46	M78	Z	.008	.008	0	0
47	M79	Z	.008	.008	0	0
48	M80	Z	.008	.008	0	0
49	M81	Z	.008	.008	0	0
50	M82	Z	.008	.008	0	0
51	M83	Z	.008	.008	0	0
52	M84	Z	.008	.008	0	0
53	M87	Z	.008	.008	0	0
54	M88	Z	.008	.008	0	0
55	M89	Z	.008	.008	0	0
56	M90	Z	.008	.008	0	0
57	M91	Z	.008	.008	0	0
58	M92	Z	.008	.008	0	0
59	M93	Z	.008	.008	0	0
60	M94	Z	.008	.008	0	0
61	M95	Z	.008	.008	0	0
62	M96	Z	.008	.008	0	0
63	M97	Z	.008	.008	0	0

Member Distributed Loads (BLC 7 : Wind Z) (Continued)

	Member Label	Direction	Start Magnitude[k/ft,...	End Magnitude[k/ft,F...	Start Location[ft,%]	End Location[ft,%]
64	M98	Z	.008	.008	0	0
65	M99	Z	.008	.008	0	0
66	M100	Z	.008	.008	0	0
67	M101	Z	.008	.008	0	0
68	M102	Z	.008	.008	0	0
69	M123	Z	.008	.008	0	0
70	M122	Z	.008	.008	0	0
71	M124	Z	.008	.008	0	0
72	M118	Z	.008	.008	0	0
73	M116	Z	.008	.008	0	0
74	M117	Z	.008	.008	0	0

Basic Load Cases

	BLC Description	Category	X Gra...	Y Gra...	Z Gra...	Joint	Point	Distrib..	Area(...	Surfa...
1	Self Weight	None		-1						
2	Dead Load	None					36			
3	Ice Load	None					36			
4	Wind with Ice X	None					30	74		
5	Wind X	None					30	72		
6	Wind with Ice Z	None					30	74		
7	Wind Z	None					30	74		

Load Combinations

	Description	Solve	P...	S...	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	1.2D + 1.6W (X-direc...	Yes	Y		1	1.2	2	1.2	5	1.6																
2	0.9D + 1.6W (X-direc...	Yes	Y		1	.9	2	.9	5	1.6																
3	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	4	1														
4	1.2D + 1.6W (Z-direc...	Yes	Y		1	1.2	2	1.2	7	1.6																
5	0.9D + 1.6W (Z-direc...	Yes	Y		1	.9	2	.9	7	1.6																
6	1.2D + 1.0Di + 1.0Wi...	Yes	Y		1	1.2	2	1.2	3	1	6	1														

Envelope Joint Reactions

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N13	max	6.943	4	2.096	6	2.12	2	-.014	2	-.098	6	0	2
2		min	-2.818	2	.133	2	-7.616	4	-.1	6	-.533	2	-.09	6
3	N20	max	.186	2	.094	6	8.187	6	-.007	2	.03	1	.002	2
4		min	-8.216	6	.01	2	-.203	2	-.065	6	-.002	6	-.053	6
5	N29	max	-6.247	5	2.096	6	-6.222	2	-.06	2	.543	5	.092	3
6		min	-7.623	1	1.432	2	-7.665	4	-.101	6	-.532	1	.054	5
7	N36	max	8.215	6	.095	3	8.197	3	-.041	2	.011	2	.055	3
8		min	5.937	2	.063	5	5.933	5	-.065	6	-.035	4	.034	5
9	N78	max	4.362	6	1.797	3	4.354	3	.087	3	.5	2	-.001	2
10		min	-2.776	2	.131	5	-2.88	5	.002	5	-.561	4	-.08	6
11	N85	max	.207	5	.084	6	.201	2	.055	3	.022	5	.001	2
12		min	-6.815	3	.011	2	-6.799	6	0	5	-.027	1	-.047	6
13	N94	max	2.133	5	2.095	3	6.903	1	.098	3	.563	1	.093	3
14		min	-7.672	1	.131	5	-2.838	5	.002	5	.121	6	.014	5

Envelope Joint Reactions (Continued)

	Joint		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
15	N101	max	8.209	3	.095	3	.18	5	.063	3	-.003	6	.055	3
16		min	-.205	5	.013	5	-8.195	3	0	5	-.027	1	.006	5
17	Totals:	max	0	6	8.141	6	0	3						
18		min	-7.263	2	3.283	2	-7.397	4						

Envelope Joint Displacements

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
1	N1	max	.014	1	.008	2	.013	4	1.637e-02	4	2.404e-04	3	-3.65e-03	5
2		min	.001	6	-.227	4	.006	3	2.59e-03	2	-2.328e-04	5	-7.288e-03	3
3	N2	max	.016	1	-.098	2	.017	4	1.533e-02	4	2.317e-04	5	7.101e-03	6
4		min	.001	5	-.216	4	-.001	2	1.939e-03	2	-2.594e-04	3	1.069e-03	2
5	N3	max	.017	2	0	2	.02	4	3.18e-03	4	3.189e-04	4	5.838e-04	6
6		min	-.002	6	-.03	6	.007	3	1.295e-03	3	1.006e-04	6	-2.351e-03	2
7	N4	max	.014	1	-.124	2	.021	4	1.348e-02	4	6.835e-05	2	-1.79e-03	2
8		min	.001	6	-.404	6	.006	3	1.826e-03	2	-6.403e-04	4	-5.081e-03	6
9	N5	max	.014	1	-.034	2	.016	4	1.637e-02	4	2.404e-04	3	-3.652e-03	5
10		min	.001	6	-.271	4	.003	3	2.59e-03	2	-2.38e-04	5	-7.291e-03	3
11	N6	max	.016	1	-.145	2	.022	4	1.292e-02	4	5.386e-04	4	5.219e-03	6
12		min	0	5	-.401	6	-.008	2	9.711e-04	2	8.135e-05	3	1.833e-03	2
13	N7	max	.016	1	-.109	2	.019	4	1.533e-02	4	2.37e-04	5	7.104e-03	6
14		min	.001	5	-.263	4	-.003	2	1.939e-03	2	-2.594e-04	3	1.071e-03	2
15	N8	max	.013	1	-.102	5	.013	5	-6.845e-04	5	2.514e-04	6	-2.091e-03	5
16		min	-.005	5	-.226	1	-.002	1	-7.137e-03	3	-2.206e-04	2	-1.636e-02	1
17	N9	max	.017	1	.006	5	.012	5	7.102e-03	3	2.196e-04	2	-2.605e-03	5
18		min	.006	5	-.216	1	-.004	3	3.771e-03	5	-2.543e-04	6	-1.532e-02	1
19	N10	max	.02	1	-.021	2	.021	4	3.334e-03	4	3.265e-04	1	8.9e-04	5
20		min	-.009	5	-.03	6	-.008	2	-5.051e-04	2	-2.943e-04	5	-2.886e-03	1
21	N11	max	.021	1	-.137	5	.013	5	-1.667e-03	5	-1.224e-04	6	-1.174e-03	5
22		min	-.009	5	-.404	3	-.002	1	-5.081e-03	3	-6.312e-04	1	-1.347e-02	1
23	N12	max	.015	1	-.109	5	.013	5	-6.865e-04	5	2.514e-04	6	-2.091e-03	5
24		min	-.006	5	-.271	1	-.002	1	-7.14e-03	3	-2.259e-04	2	-1.636e-02	1
25	N13	max	0	6	0	6	0	6	0	6	0	6	0	6
26		min	0	1	0	1	0	1	0	1	0	1	0	1
27	N14	max	.003	2	0	2	.003	4	1.447e-03	4	6.113e-04	2	6.265e-04	6
28		min	0	6	-.009	6	.001	3	5.107e-04	2	1.207e-04	6	-4.842e-04	2
29	N15	max	.008	2	0	2	.009	4	2.087e-03	4	6.01e-04	1	4.906e-04	6
30		min	0	6	-.022	6	.002	3	1.313e-03	3	1.389e-04	6	-1.154e-03	2
31	N16	max	.011	2	.001	2	.012	4	2.807e-03	4	2.587e-04	4	5.97e-04	6
32		min	0	6	-.036	6	.003	3	1.401e-03	2	9.298e-05	6	-1.767e-03	2
33	N17	max	.012	2	.005	2	.013	4	2.05e-03	4	3.325e-05	6	2.408e-04	6
34		min	0	6	-.057	6	.004	3	8.996e-04	3	-1.027e-04	2	-1.519e-03	2
35	N18	max	.011	2	.007	2	.013	4	2.403e-03	4	-1.847e-06	6	4.17e-04	6
36		min	0	6	-.067	6	.005	3	1.097e-03	3	-2.531e-04	2	-1.702e-03	2
37	N19	max	.015	2	.01	2	.02	4	2.858e-03	4	-3.122e-05	6	6.814e-04	6
38		min	-.002	6	-.08	6	.008	3	1.305e-03	3	-3.721e-04	2	-2.006e-03	2
39	N20	max	0	6	0	6	0	6	0	6	0	6	0	6
40		min	0	1	0	1	0	1	0	1	0	1	0	1
41	N21	max	.001	6	0	2	0	2	1.143e-03	6	-9.241e-06	6	4.703e-04	6
42		min	0	2	-.007	6	-.001	6	2.515e-04	2	-5.604e-05	1	-2.041e-04	2
43	N22	max	.003	6	0	2	0	2	1.623e-03	4	-3.248e-05	3	5.124e-04	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
44		min	0	2	-.019	6	-.003	4	4.11e-04	2	-1.119e-04	1	-5.185e-04	2
45	N23	max	.003	6	.001	2	-.001	2	2.118e-03	4	-5.711e-05	3	6.744e-04	6
46		min	-.002	2	-.033	6	-.005	4	5.323e-04	2	-1.636e-04	4	-8.342e-04	2
47	N24	max	.004	6	.003	2	-.002	2	1.927e-03	4	-7.343e-05	3	4.94e-04	6
48		min	-.003	2	-.049	6	-.007	4	7.913e-04	2	-2.008e-04	4	-1.089e-03	2
49	N25	max	.012	2	.003	2	.013	4	2.21e-03	4	9.368e-05	4	3.079e-04	6
50		min	0	6	-.049	6	.004	3	1.084e-03	3	6.488e-05	3	-1.48e-03	2
51	N26	max	.009	2	.01	2	.011	4	2.858e-03	4	-3.122e-05	6	6.814e-04	6
52		min	0	6	-.08	6	.004	3	1.305e-03	3	-3.721e-04	2	-2.006e-03	2
53	N27	max	.003	6	.005	2	0	2	1.795e-03	4	-4.709e-05	6	2.092e-04	6
54		min	0	2	-.057	6	-.003	6	7.949e-04	3	-3.084e-04	2	-1.335e-03	2
55	N28	max	.004	1	.007	2	.004	5	2.295e-03	4	-5.731e-05	6	4.124e-04	6
56		min	.002	6	-.067	6	0	3	1.046e-03	3	-3.757e-04	2	-1.637e-03	2
57	N29	max	0	6	0	6	0	6	0	6	0	6	0	6
58		min	0	1	0	1	0	1	0	1	0	1	0	1
59	N30	max	.004	1	-.006	2	.004	4	1.49e-03	4	6.073e-04	1	-5.252e-05	5
60		min	-.001	5	-.009	6	-.001	2	4.095e-04	2	-6.177e-04	5	-1.045e-03	1
61	N31	max	.009	1	-.015	2	.009	4	2.187e-03	4	6.001e-04	1	7.262e-04	5
62		min	-.005	5	-.022	6	-.005	2	-3.291e-04	2	-5.948e-04	5	-1.678e-03	1
63	N32	max	.012	1	-.027	2	.012	4	2.937e-03	4	2.621e-04	1	8.164e-04	5
64		min	-.007	5	-.036	6	-.007	2	-3.417e-04	2	-2.257e-04	5	-2.335e-03	1
65	N33	max	.014	1	-.045	2	.013	4	2.157e-03	4	1.54e-04	4	9.078e-04	5
66		min	-.007	5	-.057	6	-.007	2	-6.112e-04	2	-8.719e-05	2	-1.809e-03	1
67	N34	max	.013	1	-.053	2	.012	4	2.516e-03	4	3.247e-04	4	8.427e-04	5
68		min	-.005	5	-.067	6	-.006	2	-5.092e-04	2	-2.338e-04	2	-2.129e-03	1
69	N35	max	.019	1	-.065	2	.018	4	2.985e-03	4	4.555e-04	4	7.35e-04	5
70		min	-.005	5	-.08	6	-.005	2	-4.14e-04	2	-3.398e-04	2	-2.615e-03	1
71	N36	max	0	6	0	6	0	6	0	6	0	6	0	6
72		min	0	1	0	1	0	1	0	1	0	1	0	1
73	N37	max	0	5	-.005	2	0	2	1.142e-03	6	7.13e-05	4	-1.643e-04	5
74		min	-.001	3	-.007	6	-.002	6	5.596e-04	2	-2.118e-05	2	-6.326e-04	1
75	N38	max	-.001	5	-.013	2	-.002	2	1.647e-03	4	1.505e-04	4	-5.166e-05	5
76		min	-.002	1	-.019	6	-.003	4	5.984e-04	2	-4.126e-05	2	-9.89e-04	1
77	N39	max	0	5	-.025	2	-.002	2	2.154e-03	4	2.198e-04	4	-2.192e-05	5
78		min	-.004	1	-.033	6	-.005	4	6.214e-04	2	-5.511e-05	2	-1.438e-03	1
79	N40	max	0	5	-.037	2	-.002	2	1.967e-03	4	2.634e-04	4	2.944e-04	5
80		min	-.005	1	-.049	6	-.008	4	6.233e-05	2	-6.091e-05	2	-1.559e-03	1
81	N41	max	.013	1	-.037	2	.013	4	2.32e-03	4	8.899e-05	1	8.788e-04	5
82		min	-.007	5	-.049	6	-.008	2	-4.617e-04	2	-4.197e-05	5	-1.83e-03	1
83	N42	max	.011	1	-.065	2	.009	4	2.985e-03	4	4.555e-04	4	7.35e-04	5
84		min	-.002	5	-.08	6	-.004	2	-4.14e-04	2	-3.398e-04	2	-2.615e-03	1
85	N43	max	0	2	-.045	2	-.002	5	1.868e-03	4	3.794e-04	4	7.485e-04	5
86		min	-.001	6	-.057	6	-.005	3	-5.09e-04	2	-2.447e-04	2	-1.596e-03	1
87	N44	max	.005	1	-.053	2	.003	5	2.397e-03	4	4.671e-04	4	7.835e-04	5
88		min	-.002	5	-.067	6	-.004	1	-4.86e-04	2	-3.183e-04	2	-2.061e-03	1
89	N45	max	.326	1	.05	2	.358	4	7.608e-03	5	-7.149e-04	3	-7.045e-05	5
90		min	-.001	5	-.29	4	.009	3	-1.676e-03	3	-3.994e-03	4	-8.994e-03	1
91	N46	max	.326	1	-.204	2	.352	4	7.555e-03	5	3.63e-03	4	1.351e-03	6
92		min	0	5	-.286	4	-.031	1	-1.607e-03	3	-4.007e-03	2	-7.608e-03	2
93	N47	max	.326	1	-.056	2	.406	4	7.608e-03	5	-7.149e-04	3	-7.56e-05	5
94		min	-.001	5	-.293	4	.018	3	-1.676e-03	3	-4.015e-03	4	-9.001e-03	1
95	N48	max	.326	1	-.113	2	.395	4	7.555e-03	5	3.651e-03	4	1.358e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
96		min	0	5	-.287	4	-.079	1	-1.607e-03	3	-4.007e-03	2	-7.603e-03	2
97	N49	max	.357	1	-.202	5	.323	5	7.56e-03	5	3.651e-03	4	1.358e-03	6
98		min	-.029	5	-.29	1	-.004	3	-1.6e-03	3	-3.986e-03	2	-7.603e-03	2
99	N50	max	.351	1	.053	5	.323	4	8.895e-03	4	4.105e-03	4	1.867e-03	6
100		min	.002	6	-.286	1	-.003	3	-1.19e-04	2	7.643e-04	3	-7.549e-03	2
101	N51	max	.405	1	-.111	5	.323	5	7.555e-03	5	3.651e-03	4	1.358e-03	6
102		min	-.073	5	-.293	1	-.004	3	-1.607e-03	3	-4.007e-03	2	-7.603e-03	2
103	N52	max	.395	1	-.051	5	.323	4	8.902e-03	4	4.105e-03	4	1.867e-03	6
104		min	.012	6	-.286	1	-.003	3	-1.139e-04	2	7.692e-04	3	-7.549e-03	2
105	N53	max	.322	2	.113	5	.356	4	8.902e-03	4	4.084e-03	4	1.86e-03	6
106		min	-.005	6	-.233	3	.003	3	-1.139e-04	2	7.692e-04	3	-7.554e-03	2
107	N54	max	.323	1	.11	5	.355	4	9.006e-03	4	4.104e-03	1	-1.176e-03	5
108		min	-.004	6	-.173	3	-.028	2	1.124e-03	2	-3.634e-03	5	-8.89e-03	1
109	N55	max	.322	2	.1	5	.405	4	8.902e-03	4	4.105e-03	4	1.867e-03	6
110		min	-.005	6	-.232	3	.012	3	-1.139e-04	2	7.692e-04	3	-7.549e-03	2
111	N56	max	.323	1	.096	5	.399	4	9.006e-03	4	4.104e-03	1	-1.182e-03	5
112		min	-.004	6	-.214	3	-.077	2	1.124e-03	2	-3.655e-03	5	-8.897e-03	1
113	N57	max	.355	1	.113	2	.326	4	8.999e-03	4	4.082e-03	1	-1.182e-03	5
114		min	-.032	4	-.176	6	.004	2	1.119e-03	2	-3.655e-03	5	-8.897e-03	1
115	N58	max	.355	1	.11	2	.326	4	7.614e-03	5	-7.099e-04	3	-7.56e-05	5
116		min	.01	6	-.232	6	.002	2	-1.669e-03	3	-4.015e-03	4	-9.001e-03	1
117	N59	max	.404	1	.099	2	.326	4	9.006e-03	4	4.104e-03	1	-1.182e-03	5
118		min	-.075	4	-.219	6	.004	2	1.124e-03	2	-3.655e-03	5	-8.897e-03	1
119	N60	max	.399	1	.096	2	.326	4	7.608e-03	5	-7.149e-04	3	-7.56e-05	5
120		min	.019	6	-.229	6	.002	2	-1.676e-03	3	-4.015e-03	4	-9.001e-03	1
121	N61	max	.013	2	-.014	2	.016	4	1.637e-02	4	2.404e-04	3	-3.652e-03	5
122		min	0	6	-.162	6	.003	3	2.59e-03	2	-2.38e-04	5	-7.291e-03	3
123	N62	max	.017	1	-.094	2	.019	4	1.533e-02	4	2.37e-04	5	7.104e-03	6
124		min	0	5	-.16	6	-.003	2	1.939e-03	2	-2.594e-04	3	1.071e-03	2
125	N63	max	.015	1	-.094	5	.014	4	-6.865e-04	5	2.514e-04	6	-2.091e-03	5
126		min	-.006	5	-.162	3	-.003	2	-7.14e-03	3	-2.259e-04	2	-1.636e-02	1
127	N64	max	.01	2	0	2	.011	4	3.18e-03	4	3.189e-04	4	5.838e-04	6
128		min	0	6	-.03	6	.003	3	1.295e-03	3	1.006e-04	6	-2.351e-03	2
129	N65	max	.011	1	-.021	2	.011	4	3.334e-03	4	3.265e-04	1	8.9e-04	5
130		min	-.006	5	-.03	6	-.006	2	-5.051e-04	2	-2.943e-04	5	-2.886e-03	1
131	N66	max	.013	2	.014	2	.017	4	3.307e-03	4	-3.806e-05	6	1.229e-03	6
132		min	-.002	6	-.099	6	.007	2	1.369e-03	2	-4.036e-04	2	-2.023e-03	2
133	N67	max	.017	1	-.081	2	.015	4	3.431e-03	4	4.924e-04	4	3.647e-04	5
134		min	-.002	5	-.099	6	-.003	2	-4.392e-05	2	-3.727e-04	2	-3.065e-03	1
135	N68	max	.012	2	.11	5	.012	5	1.013e-02	5	-1.985e-05	2	-9.34e-04	5
136		min	-.005	6	-.108	3	-.007	3	-6.108e-03	3	-4.541e-04	4	-7.084e-03	3
137	N69	max	.013	2	.118	5	.01	5	1.1e-02	5	4.467e-04	4	6.605e-03	6
138		min	0	6	-.136	3	-.003	3	-6.344e-03	3	1.065e-04	2	6.898e-04	2
139	N70	max	.016	2	0	5	.017	5	2.342e-03	5	3.333e-04	4	1.558e-03	4
140		min	-.013	4	-.025	3	-.012	1	-1.505e-03	1	-2.774e-04	2	-2.224e-03	2
141	N71	max	.012	2	.065	5	.019	5	9.62e-03	5	4.648e-05	3	-1.419e-03	5
142		min	-.004	6	-.353	3	-.011	1	-4.006e-03	3	-4.766e-04	5	-5.136e-03	3
143	N72	max	.012	2	.1	5	.016	5	1.013e-02	5	-1.985e-05	2	-9.361e-04	5
144		min	-.005	6	-.178	3	-.006	1	-6.108e-03	3	-4.594e-04	4	-7.087e-03	3
145	N73	max	.013	2	.066	5	.018	5	1.009e-02	5	5.356e-04	5	4.998e-03	3
146		min	0	6	-.361	3	-.002	3	-3.992e-03	3	-1.654e-04	1	1.465e-03	5
147	N74	max	.013	2	.105	5	.014	5	1.1e-02	5	4.52e-04	4	6.608e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
148		min	0	6	-.201	3	0	3	-6.344e-03	3	1.065e-04	2	6.918e-04	2
149	N75	max	.02	1	0	5	.016	5	2.215e-03	5	-3.379e-05	6	-9.762e-04	6
150		min	.006	6	-.03	3	-.003	3	-8.943e-04	3	-3.009e-04	2	-3.04e-03	1
151	N76	max	.021	1	-.115	5	.012	5	5.219e-03	3	5.295e-04	1	-1.963e-03	5
152		min	.005	6	-.401	3	-.004	3	1.707e-03	5	-6.918e-05	5	-1.292e-02	1
153	N77	max	.019	1	-.031	5	.012	5	7.105e-03	3	2.249e-04	2	-2.605e-03	5
154		min	.004	6	-.263	1	-.004	3	3.773e-03	5	-2.543e-04	6	-1.532e-02	1
155	N78	max	0	6	0	6	0	6	0	6	0	6	0	6
156		min	0	1	0	1	0	1	0	1	0	1	0	1
157	N79	max	.003	2	0	5	.003	5	4.535e-04	5	6.414e-04	4	6.768e-04	6
158		min	-.002	4	-.008	3	-.002	1	-1.122e-03	3	-5.717e-04	2	-4.51e-04	2
159	N80	max	.007	2	0	5	.008	5	1.116e-03	5	6.295e-04	4	1.331e-03	4
160		min	-.006	4	-.018	3	-.006	1	-1.402e-03	1	-5.534e-04	2	-1.075e-03	2
161	N81	max	.01	2	.002	5	.011	5	1.822e-03	5	2.647e-04	4	1.491e-03	4
162		min	-.009	4	-.029	3	-.008	1	-1.459e-03	1	-2.117e-04	2	-1.661e-03	2
163	N82	max	.011	2	.005	5	.012	5	1.523e-03	5	1.278e-04	1	1.287e-03	4
164		min	-.01	4	-.046	3	-.008	1	-1.239e-03	1	-1.103e-04	5	-1.422e-03	2
165	N83	max	.01	2	.007	5	.011	5	1.703e-03	5	2.74e-04	1	1.369e-03	4
166		min	-.008	4	-.053	3	-.006	1	-1.319e-03	1	-2.725e-04	5	-1.598e-03	2
167	N84	max	.013	2	.011	5	.015	5	1.996e-03	5	3.904e-04	1	1.461e-03	4
168		min	-.01	4	-.062	3	-.008	1	-1.406e-03	1	-3.918e-04	5	-1.894e-03	2
169	N85	max	0	6	0	6	0	6	0	6	0	6	0	6
170		min	0	1	0	1	0	1	0	1	0	1	0	1
171	N86	max	.001	6	0	5	.001	3	1.789e-04	5	5.397e-05	1	4.754e-04	6
172		min	0	2	-.006	3	0	5	-9.739e-04	3	-4.295e-05	5	-1.913e-04	2
173	N87	max	.002	6	0	5	.003	3	4.994e-04	5	1.112e-04	1	5.736e-04	6
174		min	0	2	-.016	3	0	5	-1.224e-03	3	-8.813e-05	5	-4.856e-04	2
175	N88	max	.002	6	.001	5	.004	3	8.672e-04	5	1.575e-04	1	7.811e-04	6
176		min	-.002	2	-.027	3	-.001	5	-1.402e-03	3	-1.265e-04	5	-7.749e-04	2
177	N89	max	.003	6	.003	5	.005	3	1.079e-03	5	1.831e-04	1	8.592e-04	4
178		min	-.003	2	-.039	3	-.002	5	-1.033e-03	3	-1.496e-04	5	-9.951e-04	2
179	N90	max	.011	2	.003	5	.012	5	1.5e-03	5	8.094e-05	4	1.317e-03	4
180		min	-.01	4	-.039	3	-.008	1	-1.276e-03	1	-4.3e-05	2	-1.385e-03	2
181	N91	max	.008	2	.011	5	.009	5	1.996e-03	5	3.904e-04	1	1.461e-03	4
182		min	-.006	4	-.062	3	-.004	1	-1.406e-03	1	-3.918e-04	5	-1.894e-03	2
183	N92	max	.001	3	.005	5	.004	6	1.323e-03	5	3.251e-04	1	1.1e-03	4
184		min	0	5	-.046	3	0	2	-1.05e-03	1	-2.994e-04	5	-1.24e-03	2
185	N93	max	.003	2	.007	5	.005	4	1.63e-03	5	3.956e-04	1	1.306e-03	4
186		min	-.003	4	-.053	3	-.002	2	-1.251e-03	1	-3.828e-04	5	-1.534e-03	2
187	N94	max	0	6	0	6	0	6	0	6	0	6	0	6
188		min	0	1	0	1	0	1	0	1	0	1	0	1
189	N95	max	.004	1	0	5	.003	5	4.196e-04	5	-1.307e-04	6	-4.234e-04	5
190		min	.001	6	-.009	3	0	3	-1.111e-03	3	-6.362e-04	1	-1.087e-03	1
191	N96	max	.009	1	0	5	.007	5	1.035e-03	5	-1.098e-04	6	-8.439e-04	6
192		min	.002	6	-.022	3	0	3	-9.685e-04	3	-6.09e-04	2	-1.777e-03	1
193	N97	max	.012	1	.002	5	.01	5	1.713e-03	5	-1.543e-05	6	-9.777e-04	6
194		min	.003	6	-.036	3	0	3	-1.074e-03	3	-2.286e-04	2	-2.463e-03	1
195	N98	max	.013	1	.005	5	.011	5	1.426e-03	5	1.541e-04	1	-6.193e-04	6
196		min	.003	6	-.057	3	0	3	-5.153e-04	3	7.108e-05	6	-1.915e-03	1
197	N99	max	.012	1	.007	5	.01	5	1.599e-03	5	3.134e-04	1	-7.871e-04	6
198		min	.002	6	-.067	3	-.002	3	-7.268e-04	3	1.023e-04	6	-2.243e-03	1
199	N100	max	.018	1	.01	5	.014	5	1.884e-03	5	4.293e-04	1	-1.029e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
200		min	.005	6	-.08	3	-.005	3	-9.471e-04	3	1.222e-04	6	-2.742e-03	1
201	N101	max	0	6	0	6	0	6	0	6	0	6	0	6
202		min	0	1	0	1	0	1	0	1	0	1	0	1
203	N102	max	0	5	0	5	.001	3	1.657e-04	5	4.389e-05	2	-1.986e-04	5
204		min	-.001	3	-.007	3	0	5	-1.054e-03	3	-7.775e-07	6	-6.424e-04	1
205	N103	max	0	5	0	5	.003	3	4.659e-04	5	8.221e-05	5	-3.433e-04	5
206		min	-.003	1	-.019	3	0	5	-1.296e-03	3	-1.026e-05	3	-1.013e-03	1
207	N104	max	-.001	5	.001	5	.004	3	8.068e-04	5	1.225e-04	5	-4.845e-04	5
208		min	-.004	1	-.033	3	-.001	5	-1.487e-03	3	-2.321e-05	3	-1.473e-03	1
209	N105	max	-.002	5	.003	5	.005	3	9.842e-04	5	1.493e-04	5	-6.58e-04	6
210		min	-.006	1	-.049	3	-.002	5	-9.912e-04	3	-3.179e-05	3	-1.6e-03	1
211	N106	max	.013	1	.003	5	.011	5	1.404e-03	5	3.379e-05	3	-6.85e-04	6
212		min	.003	6	-.049	3	0	3	-7.306e-04	3	-5.006e-05	5	-1.939e-03	1
213	N107	max	.01	1	.01	5	.008	5	1.884e-03	5	4.293e-04	1	-1.029e-03	6
214		min	.002	6	-.08	3	-.003	3	-9.471e-04	3	1.222e-04	6	-2.742e-03	1
215	N108	max	0	5	.005	5	.003	3	1.228e-03	5	3.176e-04	1	-5.242e-04	6
216		min	-.002	3	-.057	3	0	5	-4.755e-04	3	6.953e-05	6	-1.67e-03	1
217	N109	max	.003	2	.007	5	.004	4	1.526e-03	5	4.015e-04	1	-7.601e-04	6
218		min	0	6	-.067	3	0	3	-6.949e-04	3	9.573e-05	6	-2.163e-03	1
219	N110	max	.012	2	.025	5	.016	5	1.013e-02	5	-1.985e-05	2	-9.361e-04	5
220		min	-.007	6	-.133	3	-.006	1	-6.108e-03	3	-4.594e-04	4	-7.087e-03	3
221	N111	max	.014	1	.024	5	.014	5	1.1e-02	5	4.52e-04	4	6.608e-03	6
222		min	.002	6	-.154	3	0	3	-6.344e-03	3	1.065e-04	2	6.918e-04	2
223	N112	max	.019	1	-.012	5	.012	5	7.105e-03	3	2.249e-04	2	-2.605e-03	5
224		min	.004	6	-.16	3	-.006	3	3.773e-03	5	-2.543e-04	6	-1.532e-02	1
225	N113	max	.009	2	0	5	.01	5	2.342e-03	5	3.333e-04	4	1.558e-03	4
226		min	-.008	4	-.025	3	-.007	1	-1.505e-03	1	-2.774e-04	2	-2.224e-03	2
227	N114	max	.011	1	0	5	.01	5	2.215e-03	5	-3.379e-05	6	-9.762e-04	6
228		min	.003	6	-.03	3	0	3	-8.943e-04	3	-3.009e-04	2	-3.04e-03	1
229	N115	max	.011	2	.014	5	.013	5	2.013e-03	5	4.214e-04	1	1.522e-03	4
230		min	-.008	6	-.077	3	-.006	1	-1.754e-03	3	-4.271e-04	5	-1.913e-03	2
231	N116	max	.015	1	.014	5	.011	5	1.903e-03	5	4.652e-04	1	-1.246e-03	5
232		min	.004	6	-.099	3	-.006	3	-1.494e-03	3	1.302e-04	6	-3.189e-03	1
233	N117	max	.012	2	.109	2	.016	4	-9.343e-04	2	-1.851e-04	5	6.083e-03	6
234		min	-.005	6	-.133	6	.002	2	-6.451e-03	6	-4.478e-04	1	-1.013e-02	2
235	N118	max	.01	2	.118	2	.014	4	7.29e-03	6	4.404e-04	1	6.34e-03	6
236		min	-.008	4	-.11	6	0	2	1.263e-03	2	7.31e-05	5	-1.099e-02	2
237	N119	max	.019	2	.065	2	.016	4	-1.418e-03	2	1.185e-04	4	3.847e-03	6
238		min	0	6	-.361	6	.002	2	-5.149e-03	6	-4.721e-04	2	-9.618e-03	2
239	N120	max	.016	2	.1	2	.016	4	-9.363e-04	2	-1.851e-04	5	6.083e-03	6
240		min	-.002	6	-.197	6	.002	2	-6.454e-03	6	-4.531e-04	1	-1.013e-02	2
241	N121	max	.016	2	.025	2	.017	4	-9.363e-04	2	-1.851e-04	5	6.083e-03	6
242		min	-.002	6	-.152	6	.005	2	-6.454e-03	6	-4.531e-04	1	-1.013e-02	2
243	N122	max	.018	2	.066	2	.014	4	5.049e-03	6	5.311e-04	2	4.088e-03	6
244		min	-.012	4	-.358	6	0	2	1.465e-03	2	-7.587e-05	6	-1.009e-02	2
245	N123	max	.014	2	.105	2	.014	4	7.293e-03	6	4.457e-04	1	6.34e-03	6
246		min	-.007	4	-.183	6	0	2	1.265e-03	2	7.31e-05	5	-1.099e-02	2
247	N124	max	.014	2	.023	2	.013	5	7.293e-03	6	4.457e-04	1	6.34e-03	6
248		min	-.007	4	-.135	6	-.004	1	1.265e-03	2	7.31e-05	5	-1.099e-02	2
249	N125	max	.015	1	-.159	2	.04	4	1.144e-02	4	6.391e-04	1	3.918e-05	4
250		min	.001	5	-.474	6	.001	2	9.775e-04	2	5.862e-06	5	-1.673e-03	1
251	N126	max	.325	1	-.159	2	.684	4	2.482e-02	5	3.79e-03	1	1.194e-04	4

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
252		min	0	5	-.474	6	.003	2	-9.918e-04	3	1.064e-04	6	-4.54e-03	1
253	N127	max	.017	1	-.159	2	-.022	2	5.568e-03	4	6.391e-04	1	6.355e-04	2
254		min	.002	5	-.475	6	-.127	4	9.768e-04	2	5.862e-06	5	3.578e-05	6
255	N128	max	.673	1	-.159	2	2.004	4	4.121e-02	5	3.79e-03	1	1.198e-04	4
256		min	-.005	5	-.475	6	-.016	3	-1.001e-03	3	1.064e-04	6	-1.148e-02	1
257	N129	max	.016	1	-.112	2	.02	4	1.429e-02	4	1.813e-04	5	6.168e-03	6
258		min	.001	5	-.286	4	-.005	2	9.612e-04	2	-4.054e-04	1	1.306e-04	2
259	N130	max	.078	6	-.112	2	-.016	2	1.408e-02	4	1.813e-04	5	6.166e-03	6
260		min	.019	2	-.286	4	-.149	4	9.61e-04	2	-4.054e-04	1	2.942e-04	2
261	N131	max	.534	2	-.113	2	.611	5	9.449e-03	5	3.651e-03	4	1.36e-03	6
262		min	-.03	6	-.287	4	-.085	1	-1.61e-03	3	-4.007e-03	2	-9.06e-03	2
263	N132	max	.014	1	-.055	2	.016	4	1.535e-02	4	4.892e-05	3	-3.076e-03	5
264		min	.001	6	-.292	4	.003	3	2.61e-03	2	-2.248e-04	2	-6.487e-03	3
265	N133	max	-.035	5	-.055	2	-.024	2	1.535e-02	4	4.892e-05	3	-3.076e-03	5
266		min	-.074	3	-.292	4	-.168	4	2.61e-03	2	-2.248e-04	2	-6.482e-03	3
267	N134	max	.563	1	-.056	2	.618	5	9.256e-03	5	-7.149e-04	3	-7.568e-05	5
268		min	0	5	-.294	4	-.023	3	-1.681e-03	3	-4.015e-03	4	-1.012e-02	1
269	N135	max	.039	1	-.149	5	.013	5	1.7e-03	4	2.071e-05	3	-1.212e-03	5
270		min	0	5	-.474	3	-.003	3	3.594e-05	3	-6.426e-04	5	-1.143e-02	1
271	N136	max	.683	1	-.149	5	.322	4	4.589e-03	4	2.214e-04	1	9.252e-04	6
272		min	.014	5	-.474	3	-.003	3	7.11e-05	3	-3.752e-03	5	-2.482e-02	2
273	N137	max	-.028	5	-.149	5	.014	5	3.933e-05	1	2.071e-05	3	-1.211e-03	5
274		min	-.128	1	-.475	3	-.004	3	-6.148e-04	5	-6.426e-04	5	-5.564e-03	1
275	N138	max	2.004	1	-.15	5	.671	4	1.153e-02	4	2.214e-04	1	9.34e-04	6
276		min	-.012	6	-.475	3	0	3	7.177e-05	3	-3.752e-03	5	-4.12e-02	2
277	N139	max	.02	1	-.051	5	.012	5	6.361e-03	6	2.812e-04	5	-2.658e-03	5
278		min	.003	6	-.285	1	-.004	3	3.319e-03	2	-1.173e-04	3	-1.429e-02	1
279	N140	max	-.025	5	-.051	5	-.035	5	6.319e-03	6	2.812e-04	5	-2.657e-03	5
280		min	-.15	1	-.285	1	-.078	3	3.319e-03	2	-1.173e-04	3	-1.407e-02	1
281	N141	max	.61	2	-.051	5	.563	4	1.036e-02	4	4.105e-03	4	1.87e-03	6
282		min	-.033	6	-.286	1	-.002	2	-1.14e-04	2	7.692e-04	3	-9.444e-03	2
283	N142	max	.016	1	-.111	5	.013	5	2.611e-04	5	3.339e-04	4	-1.136e-03	5
284		min	-.007	5	-.292	1	-.002	1	-6.143e-03	3	-2.095e-04	2	-1.535e-02	1
285	N143	max	-.021	5	-.111	5	.073	3	2.399e-04	5	3.339e-04	4	-1.136e-03	5
286		min	-.168	1	-.292	1	.01	5	-6.143e-03	3	-2.095e-04	2	-1.535e-02	1
287	N144	max	.617	2	-.111	5	.525	5	8.668e-03	5	3.651e-03	4	1.362e-03	6
288		min	-.074	4	-.293	1	-.042	3	-1.611e-03	3	-4.007e-03	2	-9.25e-03	2
289	N145	max	.013	2	.043	5	.037	5	9.028e-03	5	2.246e-05	6	2.087e-05	5
290		min	-.003	6	-.428	3	-.003	3	-2.942e-03	3	-6.21e-04	2	-1.694e-03	1
291	N146	max	.322	1	.043	5	.67	5	2.577e-02	4	2.811e-05	6	7.988e-05	5
292		min	-.004	6	-.429	3	-.022	3	1.705e-04	2	-3.744e-03	2	-4.583e-03	1
293	N147	max	.015	2	.043	5	.067	3	3.163e-03	5	2.246e-05	6	6.204e-04	2
294		min	-.003	6	-.429	3	-.073	5	-2.933e-03	3	-6.21e-04	2	-2.461e-05	6
295	N148	max	.671	1	.043	5	2.026	4	4.219e-02	4	2.811e-05	6	8.01e-05	5
296		min	-.006	4	-.429	3	-.008	2	1.709e-04	2	-3.744e-03	2	-1.152e-02	1
297	N149	max	.012	2	.096	5	.018	5	1.017e-02	5	2.715e-04	2	-8.989e-04	5
298		min	-.005	6	-.213	3	-.007	1	-4.984e-03	3	-3.16e-04	4	-6.36e-03	3
299	N150	max	-.013	5	.096	5	.056	3	9.955e-03	5	2.715e-04	2	-8.987e-04	5
300		min	-.077	3	-.213	3	-.102	5	-4.982e-03	3	-3.16e-04	4	-6.317e-03	3
301	N151	max	.563	1	.096	5	.65	4	1.09e-02	4	4.104e-03	1	-1.182e-03	5
302		min	.026	5	-.214	3	-.05	2	1.125e-03	2	-3.655e-03	5	-1.036e-02	1
303	N152	max	.013	2	.099	5	.016	5	1.107e-02	5	3.186e-04	1	5.713e-03	6

Envelope Joint Displacements (Continued)

	Joint		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotatio...	LC	Z Rotatio...	LC
304		min	0	6	-.231	3	0	3	-4.957e-03	3	1.502e-04	3	-2.555e-04	2
305	N153	max	.068	6	.099	5	.06	3	1.107e-02	5	3.186e-04	1	5.713e-03	6
306		min	.01	2	-.231	3	-.117	5	-4.957e-03	3	1.502e-04	3	-2.344e-04	2
307	N154	max	.524	2	.1	5	.648	4	1.055e-02	4	4.105e-03	4	1.872e-03	6
308		min	-.05	6	-.232	3	.045	3	-1.14e-04	2	7.692e-04	3	-8.663e-03	2
309	N155	max	.036	2	.043	2	.015	4	1.679e-03	4	6.608e-04	4	2.898e-03	6
310		min	-.003	6	-.431	6	0	2	-2.466e-05	3	1.002e-05	2	-9.027e-03	2
311	N156	max	.67	2	.043	2	.326	4	4.546e-03	4	3.799e-03	4	-4.78e-04	5
312		min	-.019	6	-.431	6	.003	2	-2.877e-05	3	-1.764e-04	2	-2.577e-02	1
313	N157	max	.067	6	.043	2	.017	4	2.109e-05	2	6.608e-04	4	2.889e-03	6
314		min	-.073	2	-.431	6	0	2	-6.298e-04	5	1.002e-05	2	-3.161e-03	2
315	N158	max	2.025	1	.043	2	.673	4	1.148e-02	4	3.799e-03	4	-4.793e-04	5
316		min	.015	5	-.432	6	.003	3	-2.905e-05	3	-1.764e-04	2	-4.219e-02	1
317	N159	max	.018	2	.095	2	.016	4	-1.25e-04	5	-2.126e-04	3	4.717e-03	6
318		min	0	6	-.228	6	.002	2	-5.629e-03	3	-4.208e-04	4	-1.016e-02	2
319	N160	max	.056	6	.095	2	.073	6	-2.887e-04	5	-2.126e-04	3	4.715e-03	6
320		min	-.102	2	-.228	6	.013	2	-5.626e-03	3	-4.208e-04	4	-9.952e-03	2
321	N161	max	.649	1	.096	2	.534	5	9.066e-03	5	-7.149e-04	3	-7.565e-05	5
322		min	.058	6	-.229	6	-.037	3	-1.679e-03	3	-4.015e-03	4	-1.09e-02	1
323	N162	max	.015	2	.099	2	.014	4	6.488e-03	6	3.105e-04	1	5.183e-03	6
324		min	-.008	4	-.218	6	0	2	1.153e-03	2	-2.344e-04	5	-1.107e-02	2
325	N163	max	.06	6	.099	2	-.015	2	6.483e-03	6	3.105e-04	1	5.183e-03	6
326		min	-.117	2	-.218	6	-.074	6	1.153e-03	2	-2.344e-04	5	-1.107e-02	2
327	N164	max	.648	1	.099	2	.564	4	1.012e-02	4	4.104e-03	1	-1.183e-03	5
328		min	-.047	5	-.219	6	.031	2	1.125e-03	2	-3.655e-03	5	-1.055e-02	1

Envelope AISC 14th(360-10): LRFD Steel Code Checks

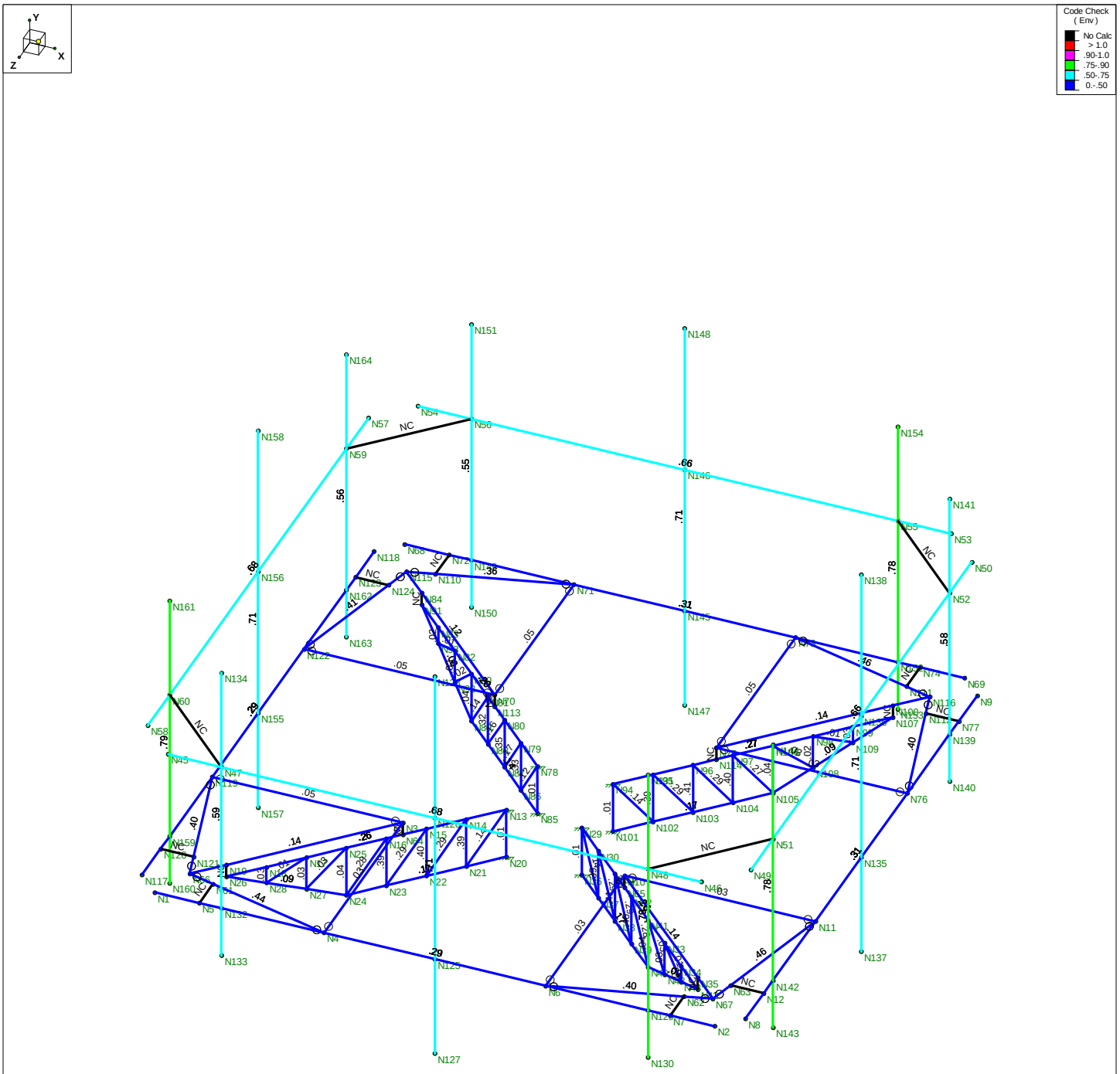
	Member	Shape	Code Check	Lo...	LC	She...	Lo...		...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
1	M123	PIPE_2.0	.790	1	4	.153	1		4	20.867	32.13	1.872	1.872	2.3...	H1-...
2	M114	PIPE_2.0	.790	1	1	.153	1		1	20.867	32.13	1.872	1.872	2.3...	H1-...
3	M118	PIPE_2.0	.776	1	4	.148	1		4	20.867	32.13	1.872	1.872	2.3...	H1-...
4	M121	PIPE_2.0	.776	1	1	.148	1		1	20.867	32.13	1.872	1.872	2.4...	H1-...
5	M119	PIPE_2.0	.713	5	4	.139	2		1	14.916	32.13	1.872	1.872	2.24	H1-...
6	M122	PIPE_2.0	.713	5	1	.140	2		4	14.916	32.13	1.872	1.872	1.6...	H1-...
7	M113	PIPE_2.0	.713	5	4	.140	2		1	14.916	32.13	1.872	1.872	2.1...	H1-...
8	M116	PIPE_2.0	.713	5	1	.139	2		4	14.916	32.13	1.872	1.872	1.6...	H1-...
9	M51	PIPE_2.0	.675	8....	4	.277	8....		2	9.837	32.13	1.872	1.872	1.6...	H1-...
10	M48	PIPE_2.0	.675	8....	1	.292	8....		4	9.837	32.13	1.872	1.872	1.6...	H1-...
11	M49	PIPE_2.0	.656	1....	4	.292	8....		1	9.837	32.13	1.872	1.872	1.6...	H1-...
12	M50	PIPE_2.0	.656	1....	1	.277	8....		5	9.837	32.13	1.872	1.872	1.6...	H1-...
13	M115	PIPE_2.0	.592	1	6	.106	2.5		4	20.867	32.13	1.872	1.872	2.45	H1-...
14	M117	PIPE_2.0	.582	1	3	.111	1		5	20.867	32.13	1.872	1.872	2.0...	H1-...
15	M124	PIPE_2.0	.557	1	3	.104	1		1	20.867	32.13	1.872	1.872	2.29	H1-...
16	M120	PIPE_2.0	.550	1	6	.111	1		2	20.867	32.13	1.872	1.872	2.4...	H1-...
17	M10	L3X3X3	.456	.488	6	.242	0	y	1	27.125	35.316	1.32	2.833	2.7...	H2-1
18	M63	L3X3X3	.456	.488	3	.149	0	y	4	27.125	35.316	1.32	2.833	2.7...	H2-1
19	M3	L3X3X3	.445	.488	6	.240	0	y	4	27.125	35.316	1.32	2.833	2.2...	H2-1
20	M92	1"x3/8"	.410	0	3	.018	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
21	M36	1"x3/8"	.409	0	3	.017	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
22	M111	L3X3X3	.408	.488	3	.148	0	y	1	27.125	35.316	1.32	2.833	2.6...	H2-1

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
23	M18	1"x3/8"	.404	0	6	.015	0	y	2	6.363	12.15	.095	.253	2.2...	H1-...
24	M108	L3X3X3	.402	.488	6	.134	0	z	2	27.125	35.316	1.32	2.833	2.4...	H2-1
25	M6	L3X3X3	.402	.488	3	.224	0	y	4	27.125	35.316	1.32	2.833	2.4...	H2-1
26	M66	L3X3X3	.402	.488	3	.226	0	y	1	27.125	35.316	1.32	2.833	2.0...	H2-1
27	M93	1"x3/8"	.398	0	3	.014	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
28	M37	1"x3/8"	.397	0	3	.014	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
29	M19	1"x3/8"	.391	0	6	.012	0	y	2	6.363	12.15	.095	.253	2.2...	H1-...
30	M91	1"x3/8"	.390	0	3	.019	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
31	M35	1"x3/8"	.389	0	3	.018	0	y	1	6.363	12.15	.095	.253	2.2...	H1-...
32	M17	1"x3/8"	.387	0	6	.014	0	y	2	6.363	12.15	.095	.253	2.2...	H1-...
33	M60	L3X3X3	.360	.488	6	.134	0	z	5	27.125	35.316	1.32	2.833	2.1...	H2-1
34	M74	1"x3/8"	.355	0	6	.016	0	y	4	6.363	12.15	.095	.253	2.2...	H1-...
35	M73	1"x3/8"	.330	0	6	.014	0	y	4	6.363	12.15	.095	.253	2.24	H1-...
36	M75	1"x3/8"	.316	1	6	.011	0	y	2	6.363	12.15	.095	.253	2.2...	H1-...
37	M8	PIPE_2.5	.310	1....	6	.305	.875		6	20.573	50.715	3.596	3.596	1.5...	H3-6
38	M58	PIPE_2.5	.310	9....	3	.305	9....		3	20.573	50.715	3.596	3.596	1.5...	H3-6
39	M99	1"x3/8"	.294	1.25	3	.021	0	y	1	4.412	12.15	.095	.253	2.2...	H1-...
40	M98	1"x3/8"	.294	1.25	3	.015	0	y	1	4.412	12.15	.095	.253	2.2...	H1-...
41	M42	1"x3/8"	.294	1.25	3	.014	0	y	1	4.412	12.15	.095	.253	2.2...	H1-...
42	M43	1"x3/8"	.294	1.25	3	.019	0	y	1	4.412	12.15	.095	.253	2.2...	H1-...
43	M24	1"x3/8"	.294	0	6	.012	0	y	4	4.412	12.15	.095	.253	2.2...	H1-...
44	M1	PIPE_2.5	.293	1....	6	.301	9....		3	20.573	50.715	3.596	3.596	1.5...	H3-6
45	M25	1"x3/8"	.291	1.25	6	.017	1.25	y	1	4.412	12.15	.095	.253	2.2...	H1-...
46	M106	PIPE_2.5	.288	1....	6	.301	.875		6	20.573	50.715	3.596	3.596	1.5...	H3-6
47	M44	1"x3/8"	.277	0	6	.018	0	y	4	4.412	12.15	.095	.253	2.2...	H1-...
48	M26	1"x3/8"	.277	0	6	.017	0	y	4	4.412	12.15	.095	.253	2.2...	H1-...
49	M87	Cord Plate	.267	5.25	1	.019	3....	y	4	69.264	72.9	5.442	1.08	1.4...	H1-...
50	M100	1"x3/8"	.267	0	3	.016	0	y	1	4.412	12.15	.095	.253	2.2...	H1-...
51	M31	Cord Plate	.262	5.25	4	.015	3....	z	5	69.264	72.9	5.442	1.08	1.3...	H1-...
52	M13	Cord Plate	.256	5.25	4	.018	3....	y	1	69.264	72.9	5.442	1.08	1.3...	H1-...
53	M69	Cord Plate	.199	3....	5	.019	3....	y	4	71.631	72.9	5.442	1.08	1.1...	H1-...
54	M33	Cord Plate	.168	2.25	6	.006	.75	y	1	69.264	72.9	5.442	1.08	1.0...	H1-...
55	M89	Cord Plate	.168	2.25	3	.006	.75	y	1	69.264	72.9	5.442	1.08	1.1...	H1-...
56	M15	Cord Plate	.168	2.25	6	.006	.75	y	4	69.264	72.9	5.442	1.08	1.0...	H1-...
57	M80	1"x3/8"	.167	1.25	6	.010	1.25	y	4	4.412	12.15	.095	.253	2.2...	H1-...
58	M81	1"x3/8"	.161	1.25	6	.017	1.25	y	1	4.412	12.15	.095	.253	2.3...	H1-...
59	M41	1"x3/8"	.143	1.25	3	.007	0	y	4	4.412	12.15	.095	.253	1.6...	H1-...
60	M97	1"x3/8"	.143	1.25	3	.005	0	y	3	4.412	12.15	.095	.253	1.6...	H1-...
61	M23	1"x3/8"	.139	1.25	6	.007	0	y	4	4.412	12.15	.095	.253	1.6...	H1-...
62	M71	Cord Plate	.139	3	3	.005	.75	y	6	69.264	72.9	5.442	1.08	1.2...	H1-...
63	M82	1"x3/8"	.138	0	3	.014	0	y	5	4.412	12.15	.095	.253	2.1...	H1-...
64	M30	HSS4X3X4	.137	3....	6	.076	3....	z	3	107....	120....	10.764	13.144	1.2...	H1-...
65	M86	HSS4X3X4	.137	3....	3	.076	3....	z	3	107....	120....	10.764	13.144	1.5...	H1-...
66	M12	HSS4X3X4	.137	3....	6	.076	3....	z	6	107....	120....	10.764	13.144	1.1...	H1-...
67	M79	1"x3/8"	.124	1.25	6	.005	1.25	y	3	4.412	12.15	.095	.253	1.7...	H1-...
68	M68	HSS4X3X4	.120	3....	3	.065	3....	z	6	107....	120....	10.764	13.144	1.2...	H1-...
69	M32	Cord Plate	.095	2....	6	.005	1....	y	1	68.567	72.9	5.442	1.08	2.1...	H1-...
70	M14	Cord Plate	.094	2....	6	.004	1....	y	4	68.567	72.9	5.442	1.08	2.2	H1-...
71	M88	Cord Plate	.093	2....	3	.005	1....	y	1	68.567	72.9	5.442	1.08	1.9...	H1-...
72	M70	Cord Plate	.077	2....	3	.003	1....	y	6	68.567	72.9	5.442	1.08	2.0...	H1-...
73	M59	L3X3X3	.053	1....	4	.013	0	y	6	24.903	35.316	1.32	2.632	1.1...	H2-1
74	M107	L3X3X3	.053	1....	1	.015	0	y	6	24.903	35.316	1.32	2.632	1.1...	H2-1

Envelope AISC 14th(360-10): LRFD Steel Code Checks (Continued)

	Member	Shape	Code Check	Lo...	LC	She...	Lo...	...	...	phi*P...	phi*P...	phi*...	phi*...	Cb	Eqn
75	M62	L3X3X3	.052	1....	4	.014	0	y	3	24.903	35.316	1.32	2.632	1.1...	H2-1
76	M110	L3X3X3	.052	1....	1	.014	0	y	3	24.903	35.316	1.32	2.632	1.1...	H2-1
77	M94	1"x3/8"	.045	0	1	.006	0	y	2	6.363	12.15	.095	.253	2.4...	H1-...
78	M38	1"x3/8"	.044	0	1	.006	0	y	1	6.363	12.15	.095	.253	2.4...	H1-...
79	M20	1"x3/8"	.040	0	4	.006	0	y	1	6.363	12.15	.095	.253	1.4...	H1-...
80	M76	1"x3/8"	.038	1	6	.006	0	y	2	6.363	12.15	.095	.253	2.2...	H1-...
81	M45	1"x3/8"	.034	0	4	.011	0	y	4	6.334	12.15	.095	.253	2.0...	H1-...
82	M27	1"x3/8"	.033	0	4	.010	0	y	4	6.334	12.15	.095	.253	2.0...	H1-...
83	M2	L3X3X3	.033	1....	3	.013	0	y	6	24.903	35.316	1.32	2.632	1.1...	H2-1
84	M39	1"x3/8"	.033	0	4	.008	0	y	4	9.114	12.15	.095	.253	2.1...	H1-...
85	M65	L3X3X3	.033	1....	6	.014	0	y	3	24.903	35.316	1.32	2.632	1.1...	H2-1
86	M21	1"x3/8"	.032	0	4	.008	0	y	4	9.114	12.15	.095	.253	2.1...	H1-...
87	M9	L3X3X3	.030	1....	6	.015	0	y	6	24.903	35.316	1.32	2.632	1.1...	H2-1
88	M96	1"x3/8"	.029	0	3	.008	0	y	1	11.307	12.15	.095	.253	2.23	H1-...
89	M5	L3X3X3	.029	1....	3	.014	0	y	3	24.903	35.316	1.32	2.632	1.1...	H2-1
90	M40	1"x3/8"	.029	0	3	.009	0	y	4	11.307	12.15	.095	.253	2.2...	H1-...
91	M22	1"x3/8"	.028	0	6	.009	0	y	4	11.307	12.15	.095	.253	2.2...	H1-...
92	M101	1"x3/8"	.025	0	1	.008	1....	y	5	6.334	12.15	.095	.253	2.0...	H1-...
93	M78	1"x3/8"	.024	0	6	.007	0	y	2	11.307	12.15	.095	.253	2.2...	H1-...
94	M83	1"x3/8"	.023	0	3	.009	1....	y	5	6.334	12.15	.095	.253	1.6...	H1-...
95	M95	1"x3/8"	.020	.667	1	.006	.667	y	1	9.114	12.15	.095	.253	1.9...	H1-...
96	M77	1"x3/8"	.020	0	5	.007	0	y	1	9.114	12.15	.095	.253	1.7...	H1-...
97	M46	1"x3/8"	.014	.487	4	.002	0	y	4	7.858	12.15	.095	.253	1.0...	H1-...
98	M28	1"x3/8"	.014	.487	4	.001	0	y	5	7.858	12.15	.095	.253	1.0...	H1-...
99	M102	1"x3/8"	.014	.419	1	.002	0	y	4	7.858	12.15	.095	.253	1.0...	H1-...
100	M16	1"x3/8"	.011	1	4	.001	0	y	2	6.363	12.15	.095	.252	1	H1-...
101	M34	1"x3/8"	.011	1	4	.001	1	y	2	6.363	12.15	.095	.252	1	H1-...
102	M72	1"x3/8"	.011	1	4	.001	0	y	2	6.363	12.15	.095	.252	1	H1-...
103	M90	1"x3/8"	.011	1	4	.001	1	y	2	6.363	12.15	.095	.252	1	H1-...
104	M84	1"x3/8"	.009	0	3	.002	0	y	5	7.858	12.15	.095	.253	1.2...	H1-...



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Centek		
TJL	CTFF335A	June 15, 2020 at 5:01 PM
20074.42	Unity Check	CTHA524A_AMA.r3d

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CTFF335A

220 Evergreen Street
Bridgeport, Connecticut 06606

July 16, 2020

EBI Project Number: 6220003153

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**27.10%**

July 16, 2020

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CTFF335A

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **220 Evergreen Street** in **Bridgeport, Connecticut** 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 ($\mu W/cm^2$). 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.

Public 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 MHz and 700 MHz frequency 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), 2100 MHz (AWS) and 11 GHz frequency 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 done for the proposed T-Mobile Wireless antenna facility located at 220 Evergreen Street in Bridgeport, Connecticut 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 manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

For all calculations, all equipment was calculated using the following assumptions:

1) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 1 NR channel (600 MHz Band) was considered for each sector of the proposed installation. This Channel has a transmit power of 80 Watts.

3) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

4) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

5) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

7) 2 LTE channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

8) 2 NR channels (BRS Band - 2500 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

9) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. 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. This is rarely the case, and if so, is never continuous.

10) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

11) The antennas used in this modeling are the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector A, the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector B, the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector C, the Ericsson AIR 32 for the 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24_43-U-NA20 for the 600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz channel(s), the Ericsson AIR 6449 for the 2500 MHz / 2500 MHz channel(s) in Sector D. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, 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.

12) The antenna mounting height centerline of the proposed antennas is 110 feet above ground level (AGL).

13) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C	Sector:	D
Antenna #:	1	Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32	Make / Model:	Ericsson AIR 32
Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd	Gain:	15.35 dBd / 15.85 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	8,728.31	ERP (W):	8,728.31	ERP (W):	8,728.31	ERP (W):	8,728.31
Antenna A1 MPE %:	**2.59%**	Antenna B1 MPE %:	**2.59%**	Antenna C1 MPE %:	**2.59%**	Antenna C1 MPE %:	**2.59%**
Antenna #:	2	Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20	Make / Model:	RFS APXVAARR24_43-U-NA20
Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	600 MHz / 600 MHz / 700 MHz / 1900 MHz / 2100 MHz
Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd	Gain:	12.95 dBd / 12.95 dBd / 13.35 dBd / 15.65 dBd / 16.35 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	9	Channel Count:	9	Channel Count:	9	Channel Count:	9
Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts	Total TX Power (W):	380 Watts
ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53	ERP (W):	11,055.53
Antenna A2 MPE %:	**4.96%**	Antenna B2 MPE %:	**4.96%**	Antenna C2 MPE %:	**4.96%**	Antenna C2 MPE %:	**4.96%**
Antenna #:	3	Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449	Make / Model:	Ericsson AIR 6449
Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz	Frequency Bands:	2500 MHz / 2500 MHz
Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd	Gain:	22.05 dBd / 22.05 dBd
Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet	Height (AGL):	110 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93	ERP (W):	25,651.93

Antenna A3 MPE %:	7.62%	Antenna B3 MPE %:	7.62%	Antenna C3 MPE %:	7.62%	Antenna A3 MPE %:	7.62%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	15.17%
Sprint	4.49%
AT&T	7.44%
Site Total MPE % :	27.10%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	15.17%
T-Mobile Sector B Total:	15.17%
T-Mobile Sector C Total:	15.17%
T-Mobile Sector D Total:	15.17%
Site Total MPE % :	27.10%

T-Mobile Maximum MPE Power Values (Sector A)

T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz LTE	2	2056.61	110.0	12.22	1900 MHz LTE	1000	1.22%
T-Mobile 2100 MHz LTE	2	2307.55	110.0	13.71	2100 MHz LTE	1000	1.37%
T-Mobile 600 MHz LTE	2	591.73	110.0	3.52	600 MHz LTE	400	0.88%
T-Mobile 600 MHz LTE	1	1577.94	110.0	4.69	600 MHz LTE	400	1.17%
T-Mobile 700 MHz NR	2	648.82	110.0	3.86	700 MHz NR	467	0.83%
T-Mobile 1900 MHz LTE	2	2203.69	110.0	13.10	1900 MHz LTE	1000	1.31%
T-Mobile 2100 MHz UMTS	2	1294.56	110.0	7.69	2100 MHz UMTS	1000	0.77%
T-Mobile 2500 MHz LTE	2	6412.98	110.0	38.11	2500 MHz LTE	1000	3.81%
T-Mobile 2500 MHz NR	2	6412.98	110.0	38.11	2500 MHz NR	1000	3.81%
						Total:	**15.17%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

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:	15.17%
Sector B:	15.17%
Sector C:	15.17%
Sector D:	15.17%
T-Mobile Maximum MPE % (Sector A):	15.17%
Site Total:	27.10%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **27.10%** 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.