Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
Jlanger@uks.com

July 7, 2022

***VIA EMAIL AND FEDERAL EXPRESS***

Connecticut Siting Council
Attn: Melanie Bachman, Executive Director
Ten Franklin Square
New Britain, CT 06051

**RE: Sub-Petition for An Approval of An Eligible Facilities Request for An Existing Telecommunications Facility at 170 Main Street, Ivoryton/Essex, Connecticut.**

Dear Attorney Bachman:

I write on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile has enclosed a sub-petition for an approval of an Eligible Facilities Request concerning an existing telecommunications facility at 170 Main Street, Ivoryton, Connecticut. T-Mobile has enclosed three (3) copies of this sub-petition.

If you have any questions or concerns regarding this matter, please contact me.

Very truly yours,

Jesse A. Langer

Enclosure

**STATE OF CONNECTICUT**
**CONNECTICUT SITING COUNCIL**

# SUB-PETITION FOR AN APPROVAL OF AN ELIGIBLE FACILITIES REQUEST FOR AN EXISTING TELECOMMUNICATIONS FACILITY AT 170 MAIN STREET IVORYTON/ESSEX CONNECTICUT

**JULY 7, 2022**

## TABLE OF CONTENTS


**I. AUTHORITY FOR REQUEST RELIEF……...1**

**II. CONTACT INFORMATION ….……1**

**III. BACKGROUND…….…….....2**

**A. The Existing Telecommunications Facility...…….....2**

**B. The Proposed Modification..……3**

**IV. COMPLIANCE WITH SECTION 6409……..….…….…….3**

**V. COMPLIANCE WITH FCC STANDARDS…….…….5**

**VI. NOTICE TO ABUTTERS AND MUNICIPALITY…..…….5**

**VII. CONCLUSION……..…...5**

## ATTACHMENTS

Attachment 1 – Verizon Approval

Attachment 2 – Detailed Plans

Attachment 3 – Structural Analysis Report

Attachment 4 – Radio Frequency Exposure Analysis Report

Attachment 5 – Service List of Abutters and Sample Letter to Abutters

Attachment 6 – Service List of Municipality and Municipal Officials, with Letter to Host Municipality

## I. INTRODUCTION AND AUTHORITY FOR REQUESTED RELIEF

In accordance with § 6409(a) of the Federal Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C § 1455(a), and commonly referenced as the Spectrum Act ("Section 6409"), T-Mobile Northeast, LLC ("T-Mobile") respectfully files this Sub-Petition for an Eligible Facilities Request ("EFR") to collocate its wireless equipment on an existing telecommunications facility located at 170 Main Street, Ivoryton, Connecticut.[1]

Section 6409 requires the State or local siting authority to engage in a streamlined approval process for the collocation, removal or replacement of "transmission equipment" that does not result in a "substantial change to the physical dimensions of [a] tower or base station." 47 U.S.C. § 1455(a)(1) and (2); 47 C.F.R. § 1.40001(b)(3). In Petition 1133, the Connecticut Siting Council ("Council") ruled that General Statutes § 16-50k does not apply to EFRs for existing telecommunications facilities and adopted a streamlined sub-petition process. *See* Petition 1133.

## II. CONTACT INFORMATION

T-Mobile is a personal wireless services provider licensed by the Federal Communications Commission ("FCC"). T-Mobile is a limited liability company organized under the laws of the State of Delaware, and is duly registered with the State of Connecticut. All correspondence or communications may be addressed to T-Mobile's legal counsel as follows:

Jesse A. Langer
Updike, Kelly & Spellacy, P.C.
One Century Tower
265 Church Street, 10th Floor
New Haven, CT 06510
(203) 786-8317
jlanger@uks.com

[1] Ivoryton is designated as a village located in the Town of Essex, Connecticut.

## III. BACKGROUND

### A. The Existing Telecommunications Facility

The existing telecommunications facility ("Facility") consists of a 124 foot water tank above grade level ("AGL"), with antennas installed on the sides of the tank and ground equipment contained in a 45 x 45 square foot fenced compound. The water tank no longer holds water. The Facility hosts wireless installations operated by the following: (1) Cellco Partnership *d.b.a.* Verizon Wireless ("Verizon") at approximately feet 119 AGL and (2) New Cingular Wireless PCS, LLC's ("AT&T") at approximately 106 feet AGL. The Facility is located on real property commonly known as 170 Main Street, Ivoryton, Connecticut ("Property"). The Property is an approximate 0.64 acre parcel with an existing bituminous access and is situated in a Limited Industrial District.

On or about June 23, 2017 the Town of Essex Zoning Commission ("Commission") approved Verizon's application for a special exception to "establish a wireless telecommunications" on the Property. The Commission did not condition the approval. The zoning approval for Verizon is appended hereto as Attachment 1.[2]

### B. The Proposed Modification

T-Mobile proposes the installation of six new panel antennas and six remote radio units ("RRUs") on a dome top antenna mount assembly. T-Mobile would also install three equipment cabinets and a forty-eight Kilowatt natural gas fueled generator on a 6 x 10'8" foot concrete pad. The ground equipment would be installed within the fenced compound and proximate to the existing ground equipment serving Verizon and AT&T. Detailed plans are appended hereto as Attachment 2.

[2] The Commission did not have a record of an approval for AT&T's installation.

## IV. COMPLIANCE WITH SECTION 6409

Section 6409 provides that "a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station." (Emphasis added.) 47 U.S.C. § 1455. An EFR may include "any request for modification of an existing wireless tower or base station that involves . . . collocation of new transmission equipment . . . . removal of transmission equipment . . . or . . . replacement of transmission equipment." § 1455(a)(2).

A "base station" includes structures such as buildings, which were not constructed for the sole or primary purpose of supporting wireless antennas and equipment. 47 C.F.R. § 1.6100(b)(1) and (9). The Facility, specifically the water tank, constitutes a "base station."

The FCC, charged with the implementation of Section 6409, has promulgated regulations and issued several orders in an effort to ensure that the spirit and letter of Section 6409 is fulfilled, specifically:

> to reduce regulatory barriers to wireless infrastructure deployment by further streamlining the state and local government review process for modifications to existing wireless infrastructure under section 6409(a) of the Spectrum Act of 2012. The development of wireless infrastructure is critical to the deployment of 5G and other advanced wireless networks, which will enable economic opportunities across the nation.

WT Docket No. 19-250, FCC Order 20-153, p. 1 ¶ 1 (F.C.C. Nov. 3, 2020). To promote this streamlined process, the FCC requires a State or local government to approve an EFR submission demonstrating compliance with required thresholds within sixty days of the filing of a complete application. 47 C.F.R. § 1.6100(a)(1).

The proposed collocation would not "substantially change" the physical dimensions of the water tank and, therefore, the proposal is compliant with Section 6409. The FCC has defined the thresholds for modifications that do not constitute a "substantial change." § 1.6100(b)(7). Each criterion enumerated in § 1.6100(b)(7) is addressed in turn.

### A. The Proposed Collocation Would Not Increase the Height of the Base Station by More than 10 Percent

The top of the water tank, excluding any proposed appurtenances, is 124 feet AGL. The uppermost height of T-Mobile's proposed installation is 135 feet AGL, totaling an increase of eleven feet. Ten percent of the height of the water tank is 12.4 feet. Accordingly, the increase in the height of the base station would be less than 10 percent. *See* Attachment 2.

### B. The Proposed Collocation Would Not Protrude from the Edge of the Structure by More than Six Feet

T-Mobile's proposed installation would be limited to the top of the water tank. Accordingly, the proposed collocation would not protrude from the edge of the base station more than six feet. *See* Attachment 2.

### C. The Proposed Collocation Would Not Involve the Installation of More Than the Standard Number of New Equipment Cabinets

T-Mobile's proposed installation would include three equipment cabinets and a back-up generator within the existing fenced compound and proximate to the existing ground equipment serving Verizon and AT&T. Accordingly, the proposed collocation would not involve more than the standard number of equipment cabinets. *See* Attachment 2.

### D. The Proposed Collocation Would Not Entail Excavation or Deployment Outside the Current Site

The proposed collocation would not entail any excavation or deployment outside the current site. *See* Attachment 2.

### E. The Proposed Collocation Would Not Defeat the Existing Concealment Elements of the Base Station

There are no concealment elements incorporated into the existing base station and the Commission did not attach any conditions concerning concealment measures to its approvals. *See* Attachment 1.

### F. The Proposed Collocation Would Comply with All Conditions Associated with Siting Approval Excluding any EFR Thresholds

T-Mobile's proposed collocation is consistent with the Commission's approval. The Commission did not condition its approval of the installations. *See* Attachment 1. As discussed above and herein, the proposed collocation would comply with the EFR thresholds required by the FCC. Moreover, T-Mobile confirmed that the existing Facility can support the additional loading associated with the proposed collocation. A copy of the structural analysis report is appended hereto as Attachment 3.

## V. COMPLIANCE WITH FCC RADIO FREQUENCY STANDARDS

T-Mobile's proposed collocation would comply with the FCC's standard for radio frequency emissions. A power density analysis reflects that T-Mobile's proposed installation, along with the existing antennas, would fall well within the standards set by the FCC. A copy of the radio frequency exposure analysis report is appended hereto as Attachment 4.

## VI. NOTICE TO ABUTTERS AND MUNICIPALITIES

In accordance with Petition 1133, T-Mobile sent a notice of its filing of this Sub-Petition, along with a copy of the Sub-Petition, via certified mail, return receipt requested, to each person appearing as a record owner of the host property, those appearing as a record owner of properties

which abut the Property[3] and the Town of Ivoryton/Essex ("Town"), including appropriate municipal officials. The service list of abutters and a sample letter to the abutters are appended hereto as Attachment 5 and the service list to the Town and appropriate municipal officials, as well as one of the letters sent to the Town, are appended hereto as Attachment 6.

## VII. CONCLUSION

This Sub-Petition and the appended attachments demonstrate that the proposed modification constitutes an EFR under Section 6409. T-Mobile, therefore, respectfully requests that the Council grant this Sub-Petition in accordance with Petition 1133.

Respectfully submitted by,

T-MOBILE NORTHEAST LLC

By: _____

Jesse A. Langer
UPDIKE, KELLY & SPELLACY, P.C.
One Century Tower
265 Church Street, 10th Floor
New Haven, CT 06510
(203) 786-8317
Email: jlanger@uks.com

[3] T-Mobile respectfully notes that the FCC has made it clear that State and local authorities may only require documentation reasonably related to determining compliance with Section 6409. 30 FCC Red. 31 (F.C.C. 2014), pp. 92, ¶ 214. Notice to abutters is not reasonably related to whether this request meets Section 6409.

# ATTACHMENT 1
# VERIZON APPROVAL

# Inlands Wetlands and Watercourses Commission

29 West Avenue, Essex, CT 06426 - 860-767-4340 x 115

January 10, 2016

Dean Gustafson
3 Saddlebrook Drive
Killingworth, CT 06419

Dear Mr. Gustafson,

Enclosed please find the Permit that was granted at the November 15, 2016 regularly scheduled meeting of the Essex Inland Wetlands and Watercourses Commission for the property at 170 Main Street, Ivoryton, CT and also known as Assessor's Map 58, Lot 31-1, to approve the upgrades to existing mechanical structures under the water tower.

Respectfully,

Joseph Budrow, WEO
Wetlands Enforcement Official
Town of Essex

CC Wetlands file

Attach: Wetlands Permit 16-15

# Inlands Wetlands and Watercourses Commission

29 West Avenue, Essex, CT 06426 - 860-767-4340 x 115
www.essexct.gov

## Wetland Permit No. 16-15

Property located at 170 Main Street, Ivoryton, CT

**Effective Date of Permit: December 15, 2016**

At the regularly scheduled meeting of the Essex Inland Wetlands and Watercourses Commission on November 15, 2016 a Permit was granted for **Application No. 16-15**, property at 170 Main Street, Ivoryton, CT, Assessor's Map 58, Lot 31-1 on behalf of Cellco Partnership d/b/a Verizon Wireless for Subcarrier Communications, Inc. This is an application to make improvements to the existing structures under the water tower. Based on the documents presented and on the testimony given at this meeting, the Commission finds that the proposed activity is a regulated activity not involving any significant or major effect upon the inland wetlands or watercourses which occur on or near the property as defined in Section 2.2 of the regulations and that no reasonable or prudent alternative exists to the proposed plans. The Commission members feel that the proposed activities are well suited to the area.

The Commission makes a Summary Ruling and grants a permit and permission for the applicant to proceed with proposed activity as stated on said application and as shown on plans accompanying the application, *subject to the following conditions:*

1. In accordance with the Commission's Regulations, the activity pursuant to said permit shall be initiated within 5 years of the date of publication and shall be completed within one year of the date of initiation and will occur between March 15th and October 15th of the year of initiation.

2. Should the applicant determine that the permitted activity will not be completed between March 14th and October 15th of the year of initiation, the applicant agrees to appear before the Commission and present a plan for the stabilization of the site during the non-permitted months.

3. The applicant agrees to follow the advice and direction of the Town of Essex Wetlands Enforcement Officer with regard to any field changes he deems necessary or may require for the protection of the inland wetlands and water course during the process.

4. The Commission, through its Enforcement Officer, shall be notified in writing upon the initiation of the authorized activity and again upon completion of these activities.

Essex IWWC Chairman
Daniel Lapman, Chairperson

DL/JMB

# MEMORANDUM OF DECISION
# APPLICATION FOR SPECIAL EXCEPTION NO. 16-15

This is to certify that at a meeting held on Monday, January 23, 2017, following a public hearing concluded on the same date, the Essex Zoning Commission voted to approve the following Application for Special Exception:

| | |
|---|---|
| OWNER: | Subcarrier Communications, Inc.<br>139 White Oak Lane<br>Old Bridge, NJ 08857 |
| APPLICANT: | Cellco Partnership d/b/a Verizon Wireless<br>c/o Kenneth C. Baldwin, Esquire<br>Robinson & Cole, LLP<br>280 Trumbull Street<br>Hartford, CT 06103 |
| SUBJECT PROPERTY: | All that certain piece or parcel of land, known as 170 Main Street, in the Village of Ivoryton, Town of Essex, County of Middlesex and State of Connecticut, and more particularly described in "Schedule A" attached hereto and made a part hereof. |
| TAX MAP NO.: 58 | |
| TAX LOT NOS.: 31-01 | |
| ZONE DISTRICT: | Design Municipal/Industrial District |
| USE AUTHORIZED: | Pursuant to Section 92A.2(D) of the Essex Zoning Regulations, a Special Exception is hereby granted to establish a wireless telecommunications facility on property located at 170 Main Street, in the Village of Ivoryton, in Essex, Connecticut. The cell site will consist of twelve (12) panel antennas (three (3) sectors of four (4) antennas each) pipe-mounted to the side of the existing water tank. The top of the antennas will not extend above the top of the water tank. Equipment associated with the antennas will be located on a steel platform installed beneath the water tank. A 15 k W propane-fueled back-up general may be installed on a concrete pad in the southwest corner of the fenced compound. A 500 gallon propane fuel tank may also be installed on the ground in the southeast corner of the fenced compound. (See Application for more details). |
| REASON FOR APPROVAL: | The Application complies with Sections 120G and 130A of the Essex Zoning Regulations. |
| VOTE: | In Favor - Mr. Wolfgram, Mr. Shipman, Mr. Hill, Ms. Uihlein and Ms. Forrest (alternate)<br><br>Opposed –None |

This Special Exception shall become effective upon the recording of this Memorandum of Decision on the Essex Land Records by the Applicant.

Essex Zoning Commission

BY: _____
Alvin G. Wolfgram, Its Chairman

# SCHEDULE A

That certain piece or parcel of land, with the buildings and improvements thereon, situated on the southerly side of Main Street in the Town of Essex, County of Middlesex and State of Connecticut, being shown and designated as "Water Tower Parcel" on a map entitled "Plan Prepared for Pratt-Read, Inc. Main Street Essex, CT Boundary Surveys Scale 1" = 50' Date 10-7-86 File No. 86119 Sheet 1 of 1 Meehan Associates Consulting Engineers Surveyors PC 387 North Main Street Manchester, CT 06040" which map is on file in the Town Clerk's Office in the said Town of Essex, reference to which is hereby made. Said parcel is more particularly bounded and described as follows:

Commencing at a point in the southerly line of Main Street, which point also marks the easterly line of Cheney Street; thence S 55° 24' 20" W along said Cheney Street a distance of 40.42 feet to a point; thence running S 03° 35' 40" E along Cheney Street a distance of 170.66 feet to a point at the centerline of a relocated channel and land of the Town of Essex; thence running N 52° 06' 55" W along the thread of said channel and land of the Town of Essex, a distance of 114.32 feet to a point; thence continuing N 65° 09' 00" W along the thread of said channel and land of Greider and Schwab, partly by each, a distance of 210.34 feet to a point in the southerly line of Main Street; thence running along a curve to the right having a delta angle of 18° 38' 40", a radius of 379.38 feet and a distance of 123.46 feet to a point; thence running N 87° 08' 50" E, a distance of 183.66 feet to the point and place of beginning, the last two courses being along the southerly line of Main Street.

# ATTACHMENT 2
# DETAILED PLANS

# PROJECT INFORMATION

| | |
|---|---|
| SITE NAME: | CTHA383A |
| SITE NUMBER: | CTHA383A |
| SITE ADDRESS: | 170 MAIN STREET<br>IVORYTON/ESSEX, CT 06442 |
| COUNTY | MIDDLETON |
| MUNICIPALITY: | TOWN OF ESSEX |
| ZONING: | RU (RURAL RESIDENTIAL DISTRICT) |
| LATITUDE: | N 41°20'42.3234" (41.34509000°) (NAD83) |
| LONGITUDE: | W 72°27'03.24" (-72.45090000°) (NAD83) |
| TYPE OF SITE: | WATER TANK |
| STRUCTURE HEIGHT: | 124'-0" AGL |
| ANTENNA CENTER: | 131'-0" AGL |
| GROUND ELEVATION: | 99'-0" (NAVD 88) |
| BUILDING OWNER NAME: | SUBCARRIER COMMUNICATIONS |
| BUILDING OWNER ADDRESS: | 139 WHITE OAK LANE<br>OLD BRIDGE, NJ 08857 |
| APPLICANT: | T-MOBILE NORTHEAST, LLC.<br>35 GRIFFIN RD S<br>BLOOMFIELD, CONNECTICUT 06002 |
| APPLICANT PHONE: | (860) 692-7100 |

# PROJECT DIRECTORY

ENGINEERING FIRM:
CENTERLINE ENGINEERING SERVICES, PA
750 WEST CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
DEREK CREASER (617) 306-3034

CARRIER:
T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 692-1700

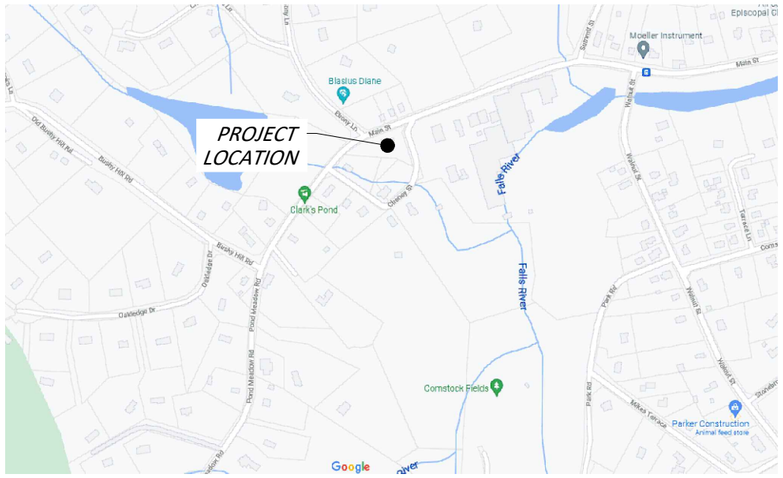
811 Know what's **below.** **Call** before you dig.

CENTERLINE ENGINEERING SERVICES, PA

T - Mobile NORTHEAST LLC

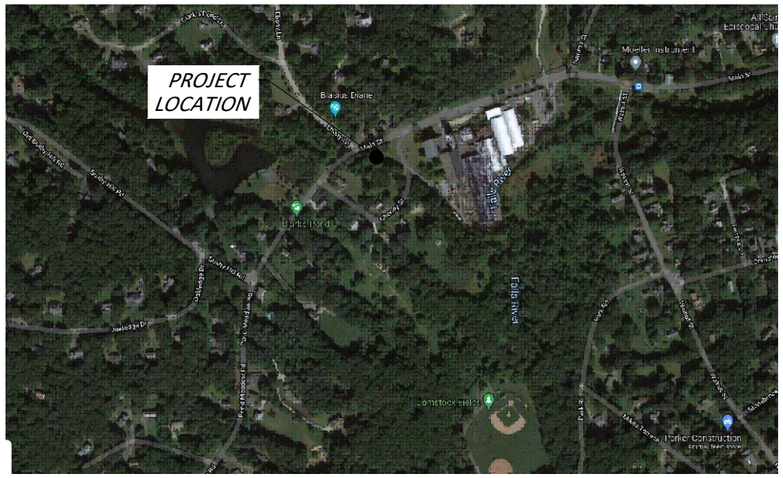
SITE NAME: CTHA383A
SITE ID: CTHA383A
ADDRESS: 170 MAIN STREET
IVORYTON/ESSEX, CT 06442

TECHNOLOGY: 67E5A998E 6160
MODIFICATION: NEW SITE BUILD




VICINITY MAP
NOT TO SCALE

N




LOCATION MAP
NOT TO SCALE

## GENERAL NOTES

1. THIS DOCUMENT IS THE CREATION, DESIGN, PROPERTY AND COPYRIGHTED WORK OF T-MOBILE. ANY DUPLICATION OR USE WITHOUT EXPRESS WRITTEN CONSENT IS STRICTLY PROHIBITED. DUPLICATION AND USE BY GOVERNMENT AGENCIES FOR THE PURPOSE OF CONDUCTING THEIR LAWFULLY AUTHORIZED REGULATORY AND ADMINISTRATIVE FUNCTIONS IS SPECIFICALLY ALLOWED.

2. THE FACILITY IS AN UNMANNED PRIVATE AND SECURED EQUIPMENT INSTALLATION. IT IS ONLY ACCESSED BY TRAINED TECHNICIANS FOR PERIODIC ROUTINE MAINTENANCE AND THEREFORE DOES NOT REQUIRE ANY WATER OR SANITARY SEWER SERVICE. THE FACILITY IS NOT GOVERNED BY REGULATIONS REQUIRING PUBLIC ACCESS PER ADA REQUIREMENTS.

3. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE T-MOBILE REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

## SCOPE OF WORK

1. INSTALL SIX NEW T-MOBILE ANTENNAS
2. INSTALL SIX NEW RRUs
3. INSTALL ONE NEW DOME TOP ANTENNA MOUNT ASSEMBLY
4. INSTALL ONE NEW H-FRAME
5. INSTALL ONE NEW PURCELL CABINET
6. INSTALL ONE NEW PPC CABINET
7. INSTALL ONE NEW ICE BRIDGE
8. INSTALL ONE NEW 6160 AC ENCLOSURE
9. INSTALL ONE NEW B160 BATTERY ENCLOSURE
10. INSTALL THREE NEW 6X24 HYBRID CABLES
11. INSTALL TWO SLABS
12. INSTALL TWO CANOPIES
13. INSTALL ONE GENERATOR
14. INSTALL ONE NEW CONC. EQUIPMENT SLAB ON GRADE

## DRAWING SCALE NOTES:

THESE DRAWINGS ARE FORMATTED TO BE FULL SIZE AT 22"x34". CONTRACTOR SHALL VERIFY ALL PLANS & EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

## DRAWING INDEX


| NO. | DESCRIPTION |
|---|---|
| T-1 | TITLE SHEET |
| GN-1 | GENERAL NOTES, RF NOTES, CABLING NOTES |
| C-1 | ABUTTERS MAP |
| A-1 | COMPOUND PLAN |
| A-2 | EQUIPMENT LAYOUT |
| A-3 | DETAILS |
| A-4 | SOUTHEAST ELEVATION |
| A-5 | ANTENNA LAYOUT |
| A-6 | DETAILS |
| A-7 | GENERATOR DETAIL |
| A-8 | ATS SPEC SHEET |
| SN-1 | STRUCTURAL NOTES & SPECIAL INSPECTIONS |
| S-1 | ANTENNA & RRU MOUNTING DETAILS |
| S-2 | STRUCTURAL DETAILS |
| S-3 | STRUCTURAL DETAILS |
| S-4 | STRUCTURAL DETAILS |
| S-5 | STRUCTURAL DETAILS |
| S-6 | STRUCTURAL DETAILS |
| S-7 | STRUCTURAL DETAILS |
| S-8 | STRUCTURAL DETAILS |
| E-1 | ELECTRICAL PLAN & DETAILS |
| G-1 | ONE-LINE DIAGRAM & GROUNDING DETAILS |
| G-2 | GROUNDING PLAN |


T - Mobile NORTHEAST LLC


T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700



CENTERLINE ENGINEERING SERVICES, PA
750 W CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



SITE NAME: CTHA383A
SITE ID: CTHA383A
SITE ADDRESS: 170 MAIN STREET IVORYTON/ESSEX, CT 06442 MIDDLETON COUNTY
SHEET TITLE: **TITLE SHEET**
DRAWING: **T-1**

# RF NOTES

1. ACTUAL LENGTHS SHALL BE DETERMINED PER SITE CONDITION BY SUBCONTRACTOR
2. THE DESIGN IS BASED ON RF DATA SHEETS, SIGNED AND APPROVED.
3. RADIO SIGNAL CABLE AND RACEWAY SHALL COMPLY WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC, NFPA 70), CHAPTER 8.
4. ALL SPECIFIED MATERIAL FOR EACH LOCATION (E.G. OUT DOORS-OCCUPIED, INDOORS-UNOCCUPIED, PLENUMS, RISER SHAFTS, ETC.) SHALL BE APPROVED, LISTED, OR LABELED AS REQUIRED BY THE NEC.
5. RADIO SIGNAL CABLE SHALL BE SUPPORTED AT MINIMUM OF EVERY THREE (3) FEET EXCEPT INSIDE MONOPOLES OR MONOPOLES WHERE CABLE AND CONNECTOR MANUFACTURERS SUPPORT RECOMMENDATIONS SHALL BE FOLLOWED. MANUFACTURER RECOMMENDATION CABLES SUPPORT ACCESSORIES SHALL BE USED.
6. THE OUTDOOR CABLE SUPPORT SYSTEM SHALL BE PROVIDED WITH AN ICE SHIELD TO SUPPORT AND PROTECT ANTENNA CABLE RUNS.
7. DRIP LOOPS SHALL BE REQUIRED ON ALL OUTSIDE CABLES. CABLES SHALL BE SLOPED AWAY FROM BUILDING OR OUTDOOR BTS CABINETS TO PREVENT WATER FROM ENTERING THROUGH THE COAXIAL CABLE PORT.
8. ALL FEEDER LINE AND JUMPER CONNECTORS SHALL BE 7/16 DIN CABLE CONNECTORS THAT MEET IP68 STANDARDS.
9. 7/16 DIN CONNECTORS REQUIRE NO ADDITIONAL WEATHER PROOFING IN INDOOR APPLICATIONS IF INSTALLED AND TORQUED PROPERLY. IN OUTDOOR APPLICATIONS WEATHER PROOFING IS REQUIRED AND THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED.
10. USING WEATHERPROOFING KIT APPROVED BY CABLE MANUFACTURER AND CONTRACTOR START TAPE APPROXIMATELY 5 INCHES FROM THE CONNECTOR, AND WRAP 2 INCHES TOWARD THE CONNECTOR, THEN REVERSE THE TAPE SO THAT THE STICKY SIDE IS UP. TAPE OVER THE CONNECTOR OR SURGE ARRESTOR UNTIL THREE (3) TO FOUR (4) INCHES BEYOND THE CONNECTOR AND REVERSE AGAIN WITH THE STICKY SIDE DOWN FOR ANOTHER INCH OR TWO. PASS THE BUTYL RUBBER AND FINISH WITH A FINAL LAYER OF TAPE.
11. ANTENNAS SHALL BE PAINTED,WHEN REQUIRED, BY THE LANDLORD OR AUTHORITY OF HAVING JURISDICTION IN ACCORDANCE WITH ANTENNA MANUFACTURERS' SURFACES PREPARATION AND PAINTING REQUIREMENTS.
12. CABLE SHIELDS AND TOWER CONDUITS SHALL BE GROUNDED AT THE TOP OF THE TOWER WITHIN 10 FEET OF THEIR CONNECTORS, AND AT THE BOTTOM OF THE TOWER ABOUT 6 INCHES BEFORE THEY TURN TOWARD THE FACILITY. THEY SHALL BE GROUNDED AT THE MIDPOINT OF THE TOWERS THAT ARE BETWEEN 60 FEET AND 200 FEET HIGH, AND AT INTERVALS OF 60 FEET OR LESS ON TOWERS THAT ARE HIGHER THAN 200 FEET.

# ANTENNA CABLE & SCHEDULING NOTES

1. SUBCONTRACTOR SHALL VERIFY THE ACTUAL LENGTH IN THE FIELD BEFORE INSTALLATION.
2. TAG AND COLOR CODE ALL MAIN CABLES AT LOCATIONS PER T-MOBILE ANTENNA CABLE MARKING STANDARD:
   - TOP OF TOWER END OF MAIN COAX
   - BOTTOM OF TOWER END OF MAIN COAX
   - DIRECTLY BEFORE AND AFTER RF EQUIPMENT
   - END OF JUMPERS AT BTS EQUIPMENT
3. ANTENNAS SHALL BE PROCURED AND INSTALLED WITH DOWN TILT MOUNTING BRACKETS SUPPLIED BY ANTENNA MANUFACTURER.
4. PRIOR APPROVAL IS REQUIRED BEFORE PERFORMING ANY WORK ON EXISTING CELL SITE EQUIPMENT.

# GENERAL NOTES

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR - CENTERLINE COMMUNICATIONS
   SUBCONTRACTOR - GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER - T-MOBILE MOBILITY
2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.
5. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
6. "KITTING LIST" SUPPLIED WITH THE BID PACKAGE IDENTIFIES ITEMS THAT WILL BE SUPPLIED BY CONTRACTOR. ITEMS NOT INCLUDED IN THE BILL OF MATERIALS AND KITTING LIST SHALL BE SUPPLIED BY THE SUBCONTRACTOR.
7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION SPACE FOR APPROVAL BY THE CONTRACTOR.
9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR.
10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
13. ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
14. ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL BE AIR-ENTRAINED AND SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS. ALL CONCRETE WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
15. ALL STRUCTURAL STEEL WORK SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS. ALL STRUCTURAL STEEL SHALL BE ASTM A36 (Fy = 36 ksi) UNLESS OTHERWISE NOTED. PIPES SHALL BE ASTM A53 TYPE E (Fy = 36 ksi). ALL STEEL EXPOSED TO WEATHER SHALL BE HOT DIPPED GALVANIZED. TOUCHUP ALL SCRATCHES AND OTHER MARKS IN THE FIELD AFTER STEEL IS ERECTED USING A COMPATIBLE ZINC RICH PAINT.
16. CONSTRUCTION SHALL COMPLY WITH SPECIFICATIONS AND "GENERAL CONSTRUCTION SERVICES FOR CONSTRUCTION OF T-MOBILE MOBILITY SITES."
17. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
18. THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
19. SINCE THE CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE ADVISED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.
20. APPLICABLE BUILDING CODES:
SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.

   BUILDING CODE: IBC 2015 & CONNECTICUT STATE BUILDING CODE 2018
   ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE
   LIGHTNING CODE: NFPA 70-2017

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

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

   AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

   MANUAL OF STEEL CONSTRUCTION, ASD, FOURTEENTH EDITION;

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

   ANTENNA TOWER AND ANTENNA SUPPORTING STRUCTURES; REFER TO ELECTRICAL DRAWINGS FOR SPECIFIC ELECTRICAL STANDARDS.

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

# ABBREVIATIONS

| | | | | | |
|---|---|---|---|---|---|
| AGL | ABOVE GRADE LEVEL | G.C. | GENERAL CONTRACTOR | RF | RADIO FREQUENCY |
| AWG | AMERICAN WIRE GAUGE | MGB | MASTER GROUND BUS | | |
| BCW | BARE COPPER WIRE | MIN | MINIMUM | TBD | TO BE DETERMINED |
| BTS | BASE TRANSCEIVER STATION | PROPOSED | NEW | TBR | TO BE REMOVED |
| EXISTING | EXISTING | N.T.S. | NOT TO SCALE | TBRR | TO BE REMOVED AND REPLACED |
| EG | EQUIPMENT GROUND | REF | REFERENCE | TYP | TYPICAL |
| EGR | EQUIPMENT GROUND RING | REQ | REQUIRED | | |


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

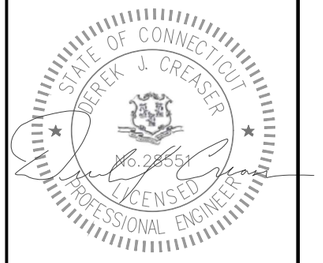
CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |




**DATE: 06/17/2022**



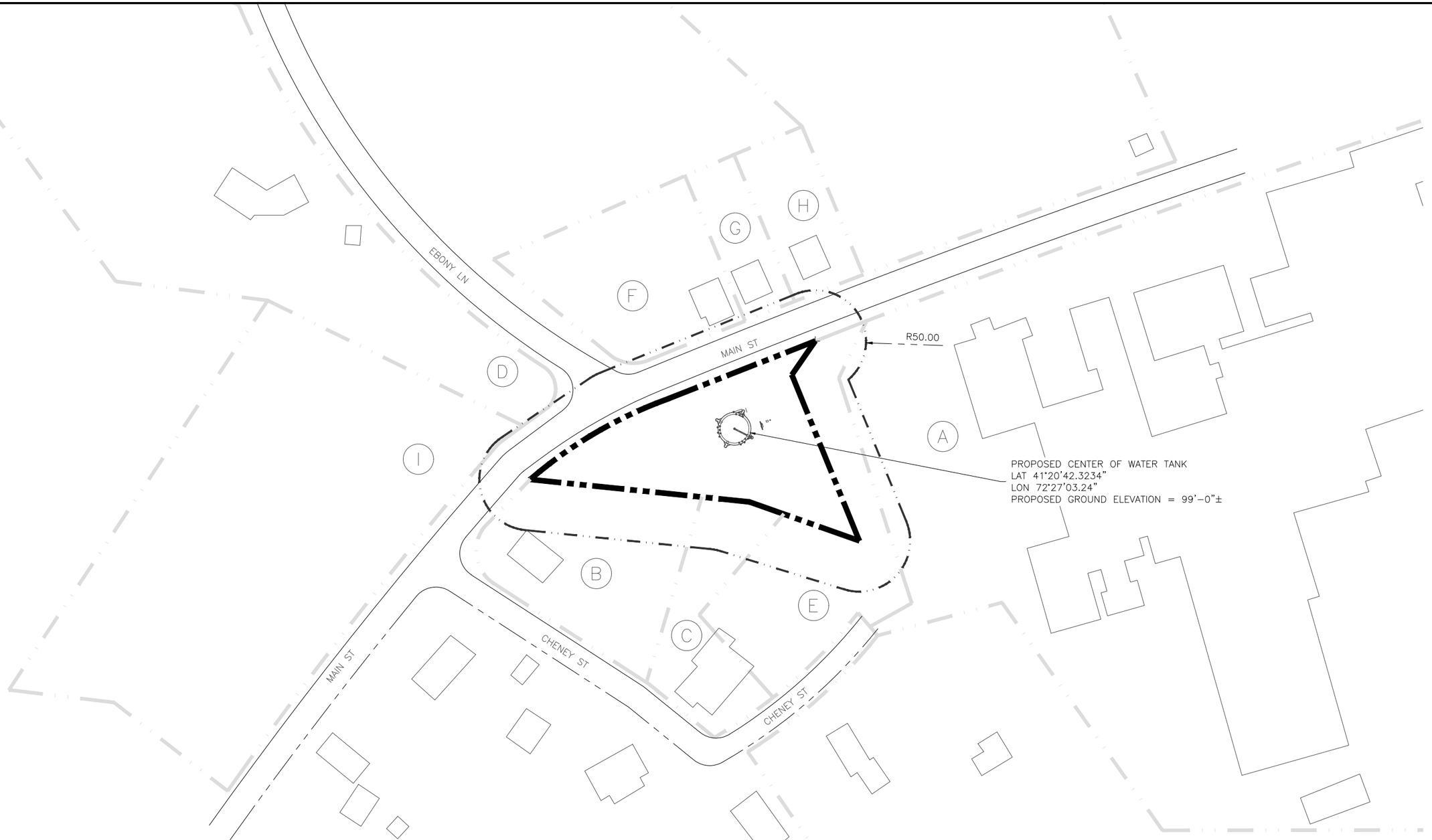
**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** GENERAL NOTES, RF NOTES, CABLING NOTES

**DRAWING:** GN-1




A. PARCEL ID: 31
58 MAIN ST
IVORY KEY

B. PARCEL ID:38
17 CHENEY
DOREEN SCHWAB

C. PARCEL ID:39
14 CHENEY
DARRELL DAMICO

D. PARCEL ID:39-1
8 EBONY LANE
EUGEAN HEINEY

E. PARCEL ID:40
40 CHENEY
TOWN OF ESSEX

F. PARCEL ID:42
175 MAIN ST
TODD & KELLY LAFAILLE

G. PARCEL ID:43
173 MAIN ST
MICHAEL BASSETT

H. PARCEL ID:44
171 MAIN ST
JONATHAN WARREN

I. PARCEL ID:46
180 MAIN ST
TOWN OF ESSEX

1 / C-1 ABUTTERS PLAN

GRAPHIC SCALE

50 0 25 50 100 200

1 INCH = 50 FEET (22X34)
1 INCH = 100 FEET (11X17)


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

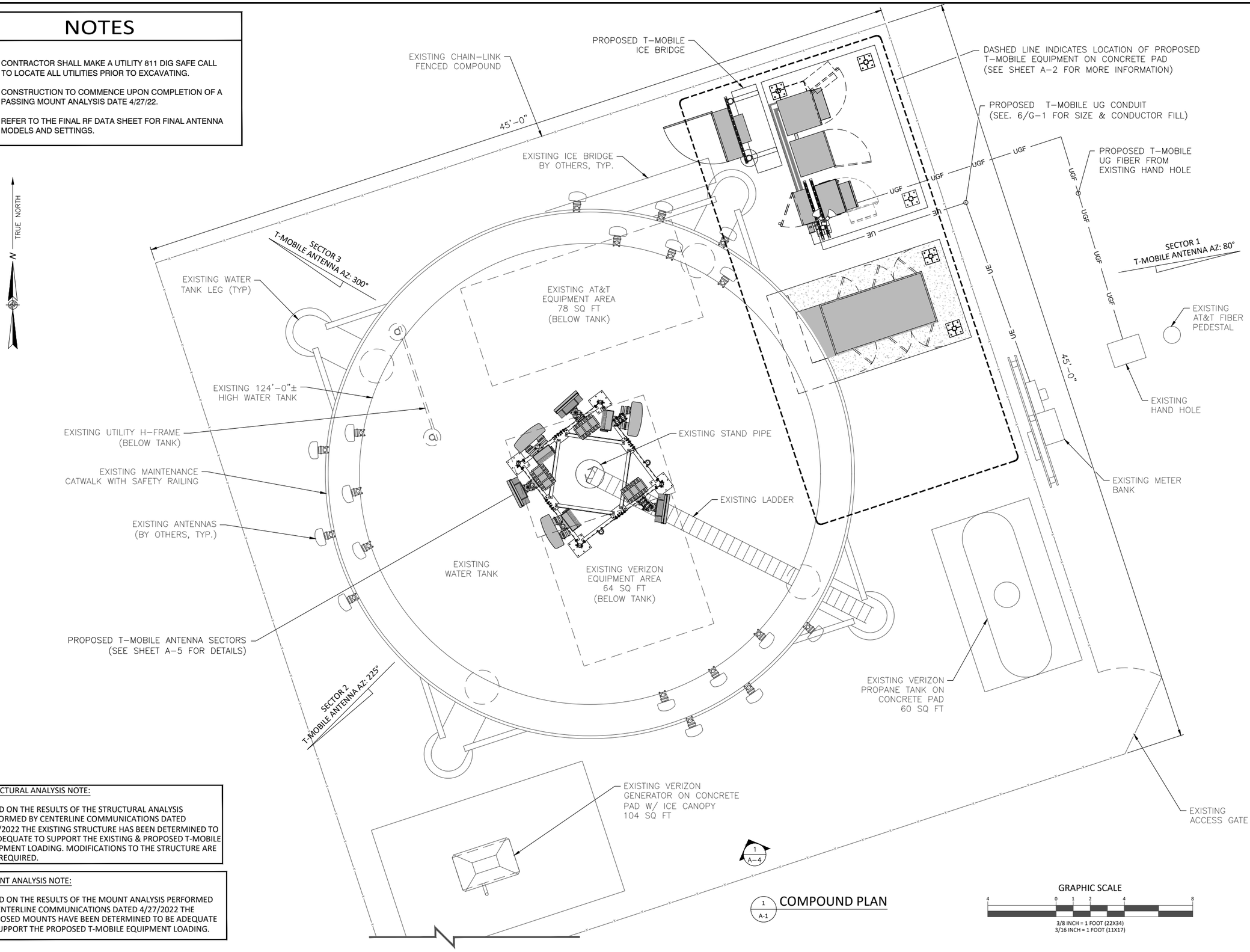
**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** ABUTTERS MAP

**DRAWING:** C-1

# NOTES

1. CONTRACTOR SHALL MAKE A UTILITY 811 DIG SAFE CALL TO LOCATE ALL UTILITIES PRIOR TO EXCAVATING.
2. CONSTRUCTION TO COMMENCE UPON COMPLETION OF A PASSING MOUNT ANALYSIS DATE 4/27/22.
3. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA MODELS AND SETTINGS.




STRUCTURAL ANALYSIS NOTE:

BASED ON THE RESULTS OF THE STRUCTURAL ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE EXISTING STRUCTURE HAS BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE EXISTING & PROPOSED T-MOBILE EQUIPMENT LOADING. MODIFICATIONS TO THE STRUCTURE ARE NOT REQUIRED.

MOUNT ANALYSIS NOTE:

BASED ON THE RESULTS OF THE MOUNT ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE PROPOSED MOUNTS HAVE BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE PROPOSED T-MOBILE EQUIPMENT LOADING.


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



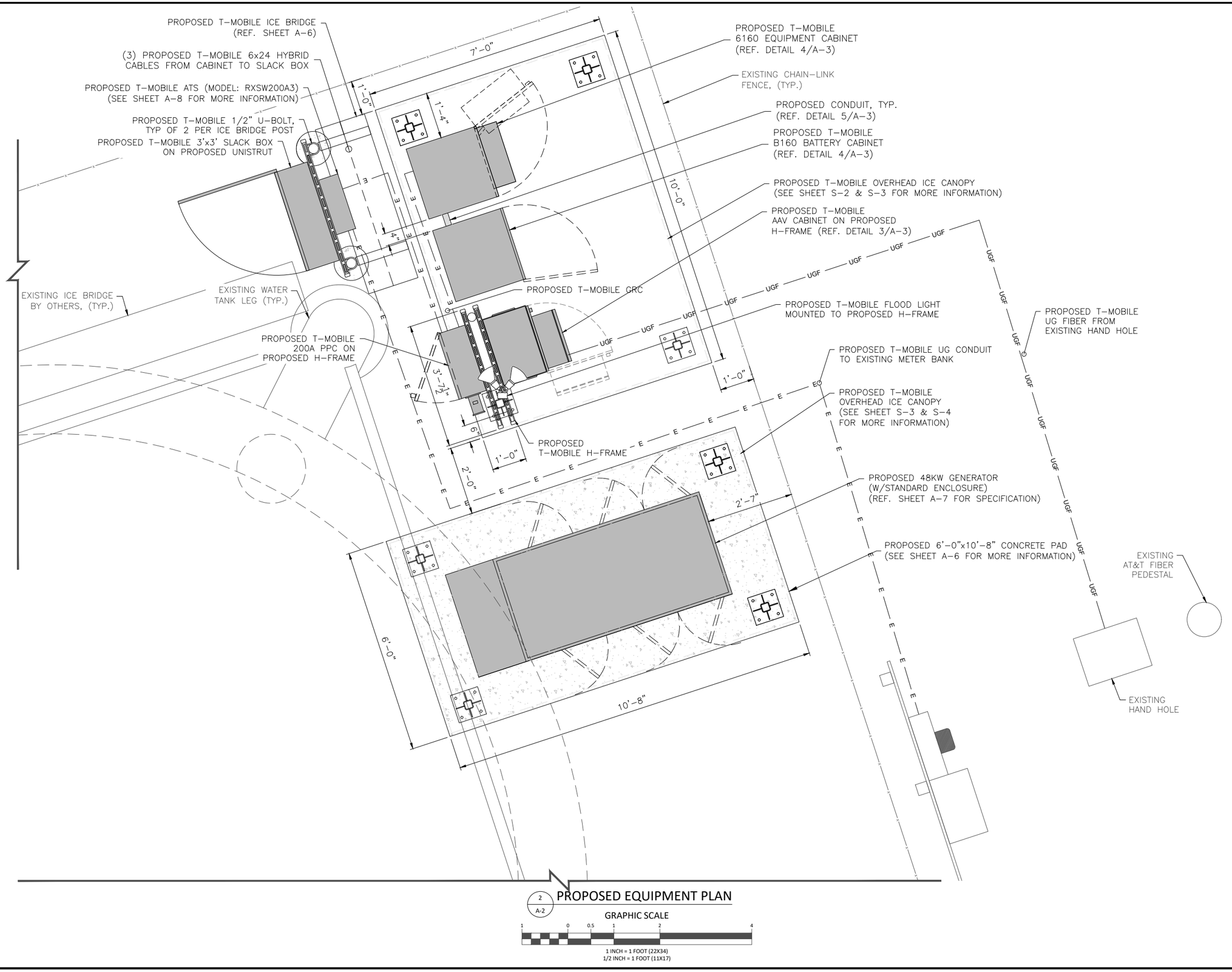
**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:** 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** COMPOUND PLAN

**DRAWING:** A-1




2 A-2 PROPOSED EQUIPMENT PLAN

GRAPHIC SCALE

1 0 0.5 1 2 4

1 INCH = 1 FOOT (22X34)
1/2 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

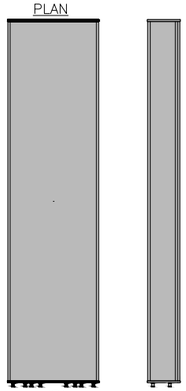
**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** EQUIPMENT LAYOUT

**DRAWING:** A-2

| RFS APXVAALL24_43-U-NA20 | |
|---|---|
| MODEL # | APXVAALL24_43-U-NA20 |
| MANUF. | RFS |
| HEIGHT | 95.9" |
| WIDTH | 24.0" |
| DEPTH | 8.5" |
| WEIGHT | 128 LBS W/O MTG HARDWARE<br>153.3LBS W/ MTG HARDWARE |
| FRONT EPA: | 15.98 $FT^2$ |
| SIDE EPA: | 5.66 $FT^2$ |

PLAN



FRONT



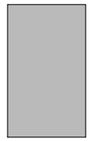
SIDE

1 A-3 ANTENNA DETAILS

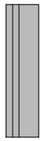
| ERICSSON AIR 6449 B41 | |
|---|---|
| MODEL # | AIR 6449 B41 |
| MANUF. | ERICSSON |
| HEIGHT | 33.1" |
| WIDTH | 20.6" |
| DEPTH | 8.6" |
| WEIGHT | 104.0 LBS |
| FRONT EPA: | 5.01 $FT^2$ |
| SIDE EPA: | 2.09 $FT^2$ |

PLAN

FRONT

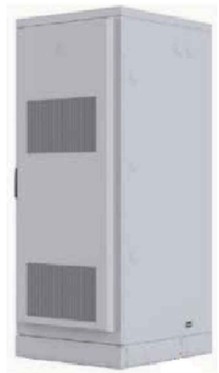


SIDE



6160 AC ENCLOSURE

| | |
|---|---|
| CAPACITY | |
| RACK SPACE USER EQUIP. | 19U(19" RACK) |
| HARDWARE CAPABILITIES | POWER AND CPRI SUPPORT FOR MULTI-STANDARD REMOTE RADIOS (RRU OR AIR)<br>ERS BASEBAND AND TRANSPORT UNITS<br>Li-ION BATTERIES<br>3PP EQUIPMENT<br>ADDITIONAL POWER FEED OPTIONS AVAILABLE |
| MECHANICAL SPECIFICATIONS | |
| WEIGHT | 320lbs (INCLUDING ACTIVE EQUIPMENT) |
| DIMENSIONS (HWD) | 63"x26"x26" (INCLUDING BASE FRAME) |
| BASE FRAME HEIGHT | 6" |
| MOUNTING POSITION | GROUND |
| ENCLOSURE MATERIAL | ALUMINUM |
| COLOR | POWDER PAINT NCS 2002-B |
| DOOR | FRONT ACCESS |
| RACK TYPE | 19" (IEC 60297-3-100) |
| LOCK TYPE | CYLINDER/PAD LOCK |
| POWER SYSTEM | |
| INPUT VOLTAGE | 3P+N+PE 346/200-415/240 VAC<br>2P+N+PE 208/120-220/127 VAC<br>1P+N+PE 200-250 VAC |



B160 BATTERY ENCLOSURE

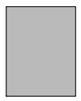
| | |
|---|---|
| CAPACITY | |
| VRLA12V: | 100Ah/150Ah/170Ah/190Ah/210Ah |
| Li-ION | 24U 19"/23" |
| SODIUM-NICKEL | 3xFIAMM |
| ELECTRICAL SPECIFICATIONS | |
| DC OUTPUT | -48VDC/200A |
| BATTERY BREAKERS | 2x125/2p |
| ALARMS | DOOR OPEN, CLIMATE FAILURE, MCB CONNECTION |
| MECHANICAL SPECIFICATIONS | |
| WEIGHT | 295 lbs (PLUS 3 STRINGS OF RECOMMENDED 190 aHR FOR ADDITIONAL 1588LBS) |
| DIMENSIONS (HWD) | 63"x26"x26" (INCLUDING BASE FRAME) |
| BASE FRAME HEIGHT | 6" |
| MATERIAL | GALVANIZED STEEL (180g/$m^2$) |
| COLOR | POWDER PAINT NCS 2002-B |
| LOCKING TYPE | CYLINDER/PAD LOCK |

4 A-3 PROPOSED EQUIPMENT CABINET SPECIFICATIONS

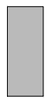
| RADIO DIMENSIONS | |
|---|---|
| MODEL # | RADIO 4480 B71+B85 |
| MANUF. | ERICSSON |
| HEIGHT | 19.5" |
| WIDTH | 15.1" |
| DEPTH | 7.8" |
| WEIGHT | 87 LBS |
| FRONT EPA: | |
| SIDE EPA: | |

PLAN

FRONT



SIDE



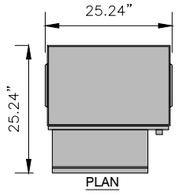
| RADIO DIMENSIONS | |
|---|---|
| MODEL # | RADIO 4460 B25_B66 |
| MANUF. | ERICSSON |
| HEIGHT | 15.1" |
| WIDTH | 17.0" |
| DEPTH | 11.9" |
| WEIGHT | 108 LBS |
| FRONT EPA: | |
| SIDE EPA: | |

PLAN

FRONT

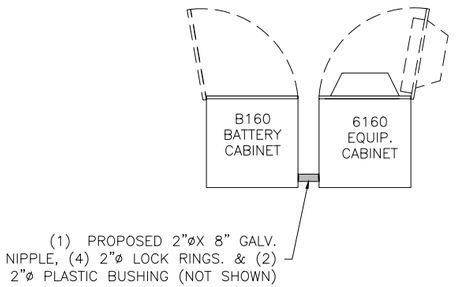
SIDE

2 A-3 RADIO DETAILS




| AAV CABINET | |
|---|---|
| MODEL # | NETXTEND 2416 |
| MANUF. | EMERSON |
| HEIGHT | 24.0" |
| WIDTH | 24.0" |
| DEPTH | 16.67" |
| WEIGHT | 64 LBS/100 LBS with (4) BATTERIES |

3 A-3 AAV CABINET DETAIL




5 A-3 PROPOSED EQUIPMENT CONDUIT DETAIL


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

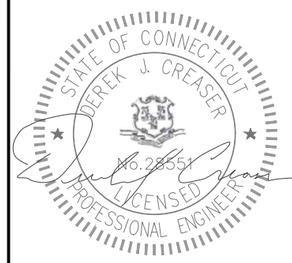
CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |




**DATE: 06/17/2022**



SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE: **EQUIPMENT DETAILS**

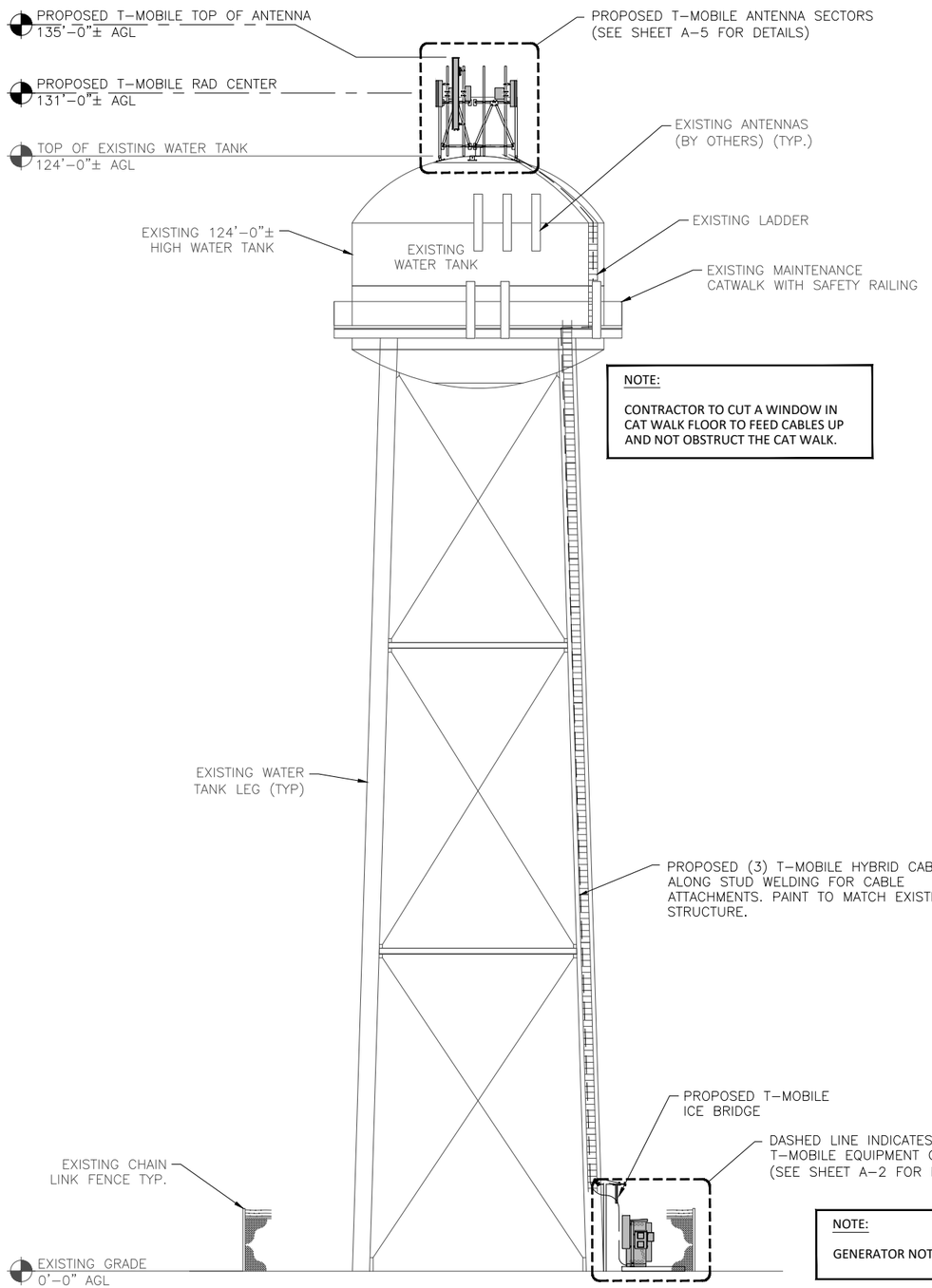
DRAWING: **A-3**

STRUCTURAL ANALYSIS NOTE:

BASED ON THE RESULTS OF THE STRUCTURAL ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE EXISTING STRUCTURE HAS BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE EXISTING & PROPOSED T-MOBILE EQUIPMENT LOADING. MODIFICATIONS TO THE STRUCTURE ARE NOT REQUIRED.

MOUNT ANALYSIS NOTE:

BASED ON THE RESULTS OF THE MOUNT ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE PROPOSED MOUNTS HAVE BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE PROPOSED T-MOBILE EQUIPMENT LOADING.




NOTE:

CONTRACTOR TO CUT A WINDOW IN CAT WALK FLOOR TO FEED CABLES UP AND NOT OBSTRUCT THE CAT WALK.

NOTE:

GENERATOR NOT SHOWN FOR CLARITY.

1 A-4 SOUTHWEST ELEVATION

GRAPHIC SCALE

16 8 0 1 2 4 8 16 24

1/16 INCH = 1 FOOT (22X34)
1/32 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:** 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** SOUTHEAST ELEVATION

**DRAWING:** A-4

ANTENNA & CABLE NOTES:

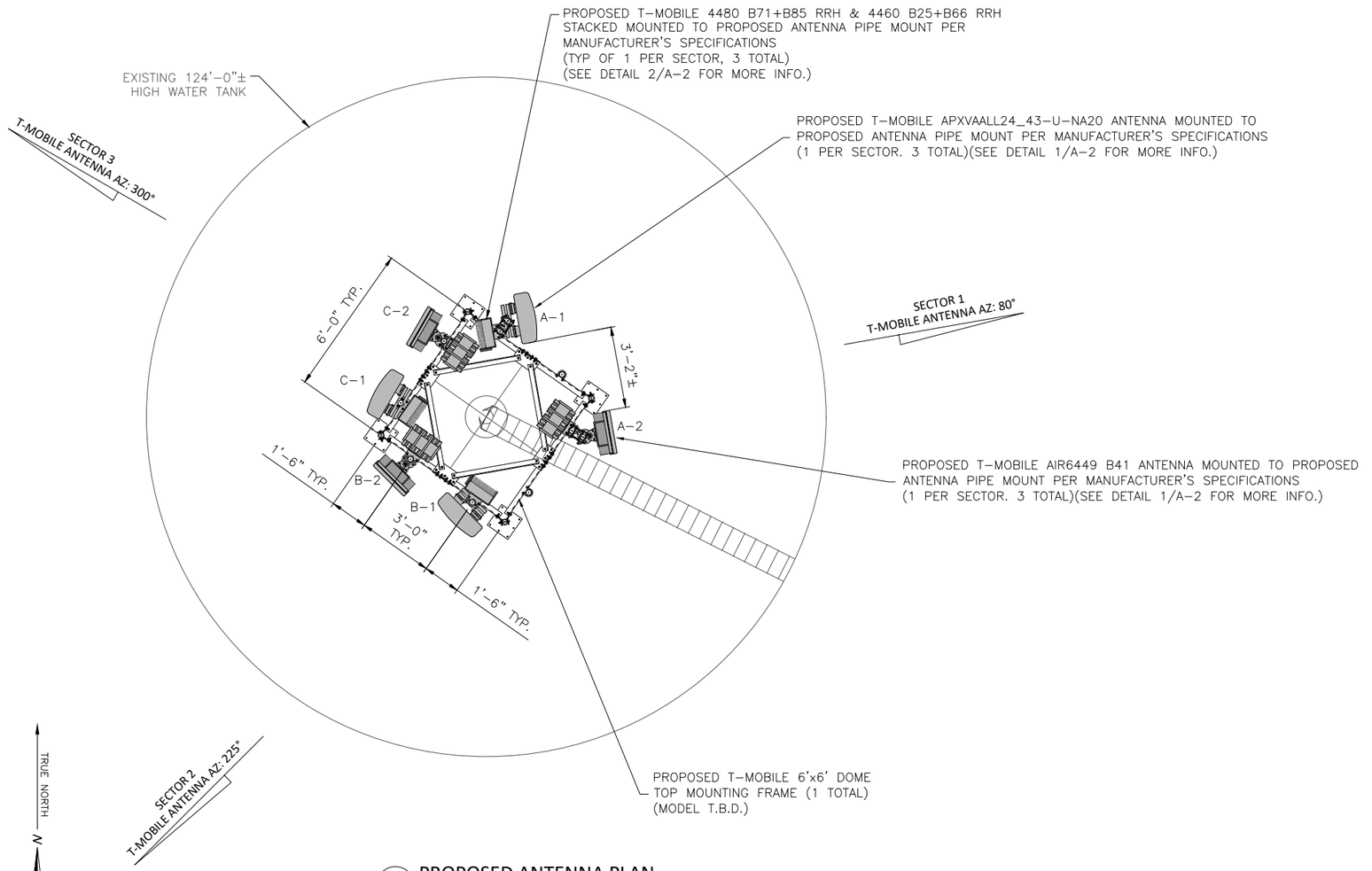
1. REFERENCE STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS DATED 4/27/22 FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.
2. REFER TO THE FINAL RF DATA SHEET FOR FINAL ANTENNA SETTINGS.
3. PAINT ANTENNAS AND EQUIP. TO MATCH EXISTING.

MOUNT ANALYSIS NOTE:

BASED ON THE RESULTS OF THE MOUNT ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE PROPOSED MOUNTS HAVE BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE PROPOSED T-MOBILE EQUIPMENT LOADING.

# ANTENNA & CABLE SCHEDULE:

| LOCATION | | AZIMUTH | RAD CENTER | STATUS | TECHNOLOGY | ANTENNA MODEL NO. | MECH DOWNTILT | ELEC DOWNTILT | CABLES | DIPLEXERS | TMA/RRU | CABLE SIZE | CABLE LENGTH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ALPHA | A-1 | 80° | 131'-0" | PROPOSED | L700, L600, N600 | APXVAALL24_43-U-NA20 | 0° | 5°/5°/2°/2° | (4)COAX JUMPER(X2) | N/A | RRUS 4480 B71+B85 RRUS 4460 B25 B66 | 6x24 HYBRID | 100' |
| | A-2 | 80° | 131'-0" | PROPOSED | L600, N600, L700, L1900, U2100 | AIR6449 B41 | 0° | 2°/2° | N/A | N/A | N/A | SHARED | N/A |
| BETA | B-1 | 225° | 131'-0" | PROPOSED | L700, L600, N600 | APXVAALL24_43-U-NA20 | 0° | 5°/5°/2°/2° | (4)COAX JUMPER(X2) | N/A | RRUS 4480 B71+B85 RRUS 4460 B25 B66 | 6x24 HYBRID | 100' |
| | B-2 | 225° | 131'-0" | PROPOSED | L600, N600, L700, L1900, U2100 | AIR6449 B41 | 0° | 2°/2° | N/A | N/A | N/A | SHARED | N/A |
| GAMMA | C-1 | 300° | 131'-0" | PROPOSED | L700, L600, N600 | APXVAALL24_43-U-NA20 | 0° | 5°/5°/2°/2° | (4)COAX JUMPER(X2) | N/A | RRUS 4480 B71+B85 RRUS 4460 B25 B66 | 6x24 HYBRID | 100' |
| | C-2 | 300° | 131'-0" | PROPOSED | L600, N600, L700, L1900, U2100 | AIR6449 B41 | 0° | 2°/2° | N/A | N/A | N/A | SHARED | N/A |
| NOTE: DARK TEXT IN TABLE ABOVE DENOTES PROPOSED EQUIPMENT | | | | | | | | | | | (3) TOTAL 6x24 HYBRID CABLES | | 300' |




2 / A-5 PROPOSED ANTENNA PLAN

GRAPHIC SCALE

4 0 1 2 4 8

3/8 INCH = 1 FOOT (22X34)
3/16 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



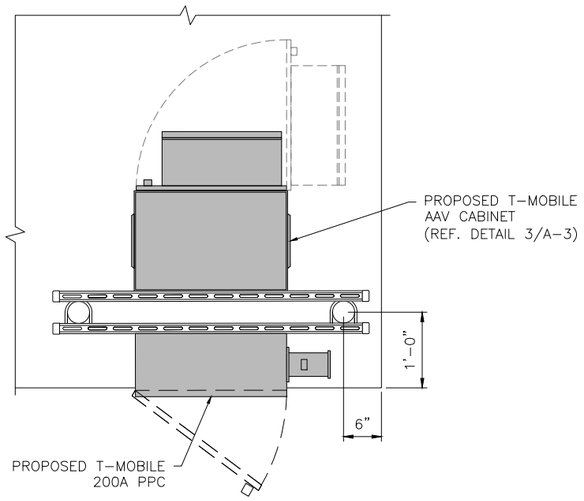
**SITE NAME:** CTHA383A

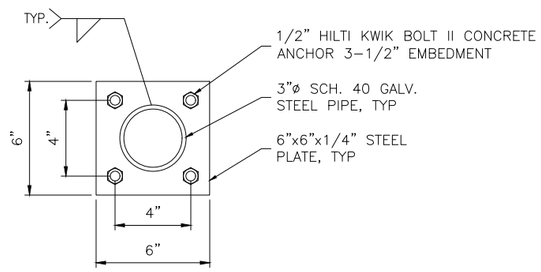
**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** PROPOSED ANTENNA PLAN & ELEVATION

**DRAWING:** A-5



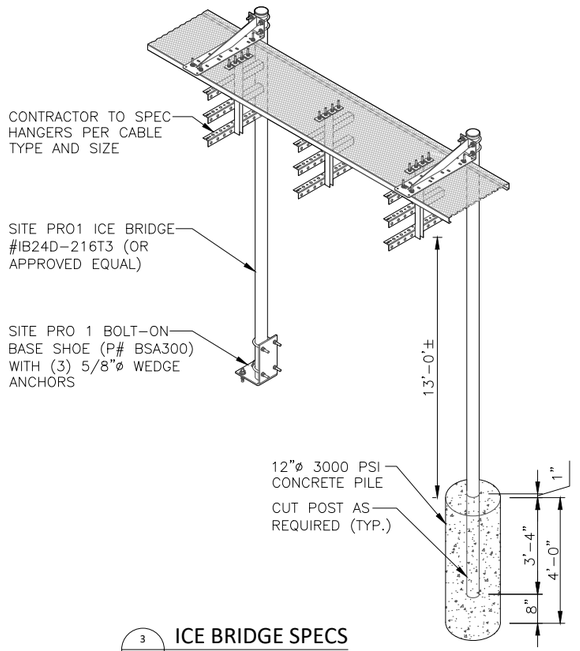




2 A-6 BASE PLATE DETAIL

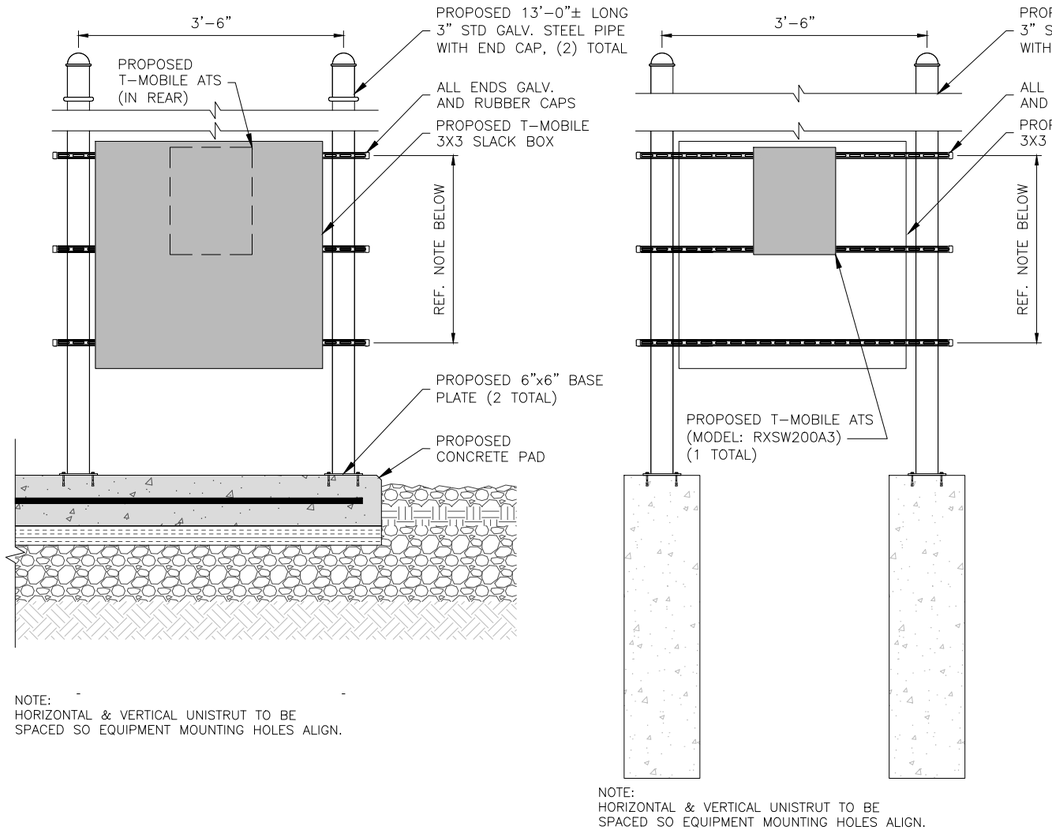
GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)




3 A-8 ICE BRIDGE SPECS







1 A-6 H-FRAME DETAILS

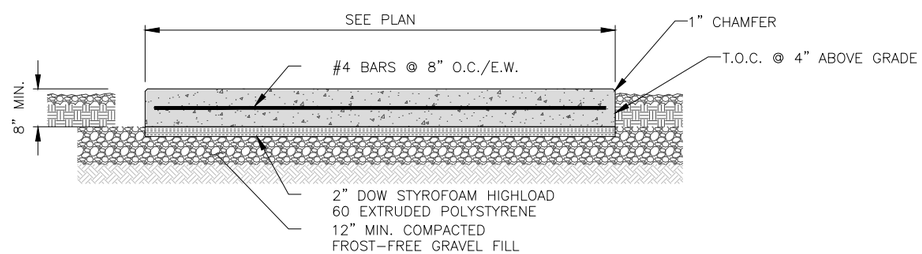
GRAPHIC SCALE

1 0 0.5 1 2 4

1 INCH = 1 FOOT (22X34)
1/2 INCH = 1 FOOT (11X17)

FOUNDATION NOTES & CONCRETE SPECIFICATIONS:

1. FOUNDATION AREA SHALL BE EXCAVATED TO THE DEPTH AND DIMENSIONS SHOWN ON THE PLANS. EXISTING LEDGE AND ALL OTHER EXISTING UNSUITABLE MATERIAL SHALL BE REMOVED AND LEGALLY DISPOSED OF OFF–SITE. THE SUBGRADE SHALL BE ROLLED WITH A 1–TON, VIBRATORY, WALK–BEHIND ROLLER AT A SPEED OF LESS THAN 2 FPS, 6 PASSES MINIMUM, TO PROVIDE UNYIELDING SURFACE.
2. UNDERCUT SOFT OR "WEAVING" AREAS A MINIMUM OF 12 INCHES DEEP. BACKFILL UNDERCUT AREA WITH FILL MEETING THE SPECIFICATIONS OF STRUCTURAL FILL.
3. CONCRETE TO HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c)=4000 psi. CONCRETE TO BE AIR ENTRAINED, DESIRED AIR CONTENT TO BE 6% (PLUS OR MINUS 2%)
4. REINFORCING BAR TO BE ASTM A615 GRADE 60.
5. WELDED WIRE FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A185. WIRES FOR FABRIC TO CONFORM TO THE REQUIREMENTS OF ASTM A82.
6. ALL REINFORCING TO HAVE MINIMUM CONCRETE COVER PER ACI SPECIFICATIONS.
7. ALL CONCRETE MATERIALS AND WORKMANSHIP SHALL CONFORM TO LATEST EDITION OF ACI 318 AND APPLICABLE STATE BUILDING CODE.
8. LEASE AREA IS ON A SLOPE. GRADE LEASE AREA AS REQUIRED TO FACILITATE INSTALLATION OF LEVEL CONCRETE SLAB.
9. SLOPE SLAB TO ALLOW FOR WATER DRAINAGE AWAY FROM SITE.




4 A-6 CONCRETE SLAB DETAIL

T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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

REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE: **ICE BRIDGE DETAILS**

DRAWING: **A-6**

[redacted]

# Protector® Series

[redacted]

INCLUDES:

- Two-Line LCD Multilingual Digital Evolution™ Controller (English/Spanish/French/Portuguese) With External Viewing Window for Easy Indication of Generator Status and Breaker Position
- Isochronous Electronic Governor
- Sound Attenuated Enclosure
- Closed Coolant Recovery System
- Smart Battery Charger
- UV/Ozone Resistant Hoses
- ±1% Voltage Regulation
- Field Convertible Fuel Type With No Mechanical Adjustment Required.
- 5 Year Limited Warranty
- UL 2200 Listed
- Listed and labeled by the Southwest Research Institute allowing installation as close as 18 in (457 mm) to a structure*

*Must be located away from doors, windows, and fresh air intakes and in accordance with local codes.
https://assets.swri.org/library/DirectoryOfListedProducts/ConstructionIndustry/973_DoC_204_13204-01-01_Rev9.pdf

GENERAC®

## PROTECTOR® SERIES

**Standby Generators**

**Liquid-Cooled Gaseous Engine**



Standby Power Rating
Model RG048 (Aluminum - Bisque) - 48 kW 60 Hz
Model RG060 (Aluminum - Bisque) - 60 kW 60 Hz
Model RG080 (Aluminum - Bisque) - 80 kW 60Hz

Meets EPA Emission Regulations
CA / MA Emission Compliant

## FEATURES

- **INNOVATIVE DESIGN & PROTOTYPE TESTING** are key components of GENERAC'S success in "IMPROVING POWER BY DESIGN." But it doesn't stop there. Total commitment to component testing, reliability testing, environmental testing, destruction and life testing, plus testing to applicable CSA, NEMA, EGSA, and other standards, allows you to choose GENERAC POWER SYSTEMS with the confidence that these systems will provide superior performance.
- **TEST CRITERIA:**
  - ✓ PROTOTYPE TESTED
  - ✓ NEMA MG1-22 EVALUATION
  - ✓ SYSTEM TORSIONAL TESTED
  - ✓ MOTOR STARTING ABILITY
- **MOBILE LINK® CONNECTIVITY:** Free with select Protector Series standby generator sets, Mobile Link Wi-Fi allows users to monitor the generator set status from anywhere in the world using a smartphone, tablet, or PC. Easily access information such as the current operating status and maintenance alerts. Users can connect an account to an authorized service dealer for fast, friendly, and proactive service. With Mobile Link, users are taken care of before the next power outage.
- **SOLID-STATE, FREQUENCY COMPENSATED VOLTAGE REGULATION.** This state-of-the-art power maximizing regulation system is standard on all Generac models. It provides optimized FAST RESPONSE to changing load conditions and MAXIMUM MOTOR STARTING CAPABILITY by electronically torque-matching the surge loads to the engine. Digital voltage regulation at ±1%.
- **SINGLE SOURCE SERVICE RESPONSE** from Generac's extensive dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component.
- **GENERAC TRANSFER SWITCHES.** Long life and reliability are synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is the GENERAC product line is offered with its own transfer systems and controls for total system compatibility.

GENERAC®

GENERAC®

## 48 / 60 / 80 kW

## application & engineering data

### GENERATOR SPECIFICATIONS

| | 48 kW | 60 / 80 kW |
|---|---|---|
| Type | Synchronous | Synchronous |
| Rotor Insulation Class | F | H |
| Stator Insulation Class | H | H |
| Telephone Interference Factor (TIF) | <50 | <50 |
| Alternator Output Leads 1-Phase | 4 wire | 4 wire |
| Alternator Output Leads 3-Phase | 6 wire | 6 wire |
| Bearings | Sealed Ball | Sealed Ball |
| Coupling | Flexible Disc | Flexible Disc |
| Excitation System | Direct | Brushless |

### VOLTAGE REGULATION

| | |
|---|---|
| Type | Electronic |
| Sensing | Single Phase |
| Regulation | ± 1% |

### GOVERNOR SPECIFICATIONS

| | |
|---|---|
| Type | Electronic |
| Frequency Regulation | Isochronous |
| Steady State Regulation | ± 0.25% |

### ELECTRICAL SYSTEM

| | |
|---|---|
| Battery Charge Alternator | 12 Volt 35 Amp |
| Static Battery Charger | 2.5 Amp |
| Recommended Battery (battery not included) | Group 27F (48kW), 725CCA |
| System Voltage | 12 Volts |

### GENERATOR FEATURES

Revolving field heavy duty generator
Directly connected to the engine
Operating temperature rise 120 °C above a 40 °C ambient
Class H insulation is NEMA rated
Class F insulation is NEMA rated
All models fully prototyped tested

### ENCLOSURE FEATURES

| | |
|---|---|
| Aluminum weather protective enclosure | Ensures protection against mother nature. Electrostatically applied textured epoxy paint for added durability. |
| Enclosed critical grade muffler | Quiet, critical grade muffler is mounted inside the unit to prevent injuries. |
| Small, compact, attractive | Makes for an easy, eye appealing installation. |
| SAE | Sound attenuated enclosure ensures quiet operation. |

(All ratings in accordance with BS5514, ISO3046, ISO8528, SAE J1349 and DIN6271)

### ENGINE SPECIFICATIONS

| | 48 kW | 60 / 80 kW |
|---|---|---|
| Make | Generac | Generac |
| Model | Inline 4 cylinder | Inline 4 cylinder |
| Cylinders | 4 | 4 |
| Displacement (Liters) | 4.5 | 4.5 |
| Bore (in/mm) | 4.5 / 114.3 | 4.5 / 114.3 |
| Stroke (in/mm) | 4.25 / 107.95 | 4.25 / 107.95 |
| Compression Ratio | 9.9:1 | 8.85:1 |
| Intake Air System | Naturally Aspirated | Turbocharged and aftercooled |
| Lifter Type | Hydraulic | Hydraulic |

### ENGINE LUBRICATION SYSTEM

| | |
|---|---|
| Oil Pump Type | Gear |
| Oil Filter Type | Full Flow Spin-On Cartridge |
| Crankcase Capacity (qt / l) | 12 / 11 |

### ENGINE COOLING SYSTEM

| | |
|---|---|
| Type | Ethylene Glycol 50 / 50 Mix |
| Water Pump | Belt-Driven |
| Fan Speed (rpm) | 2,100 |
| Fan Diameter 48 kW (in / cm) | 20 (50.8) |
| Fan Diameter 60 kW and 80 kW (in / cm) | 22 (55.9) |
| Fan Mode | Pusher |

### FUEL SYSTEM

| | |
|---|---|
| Fuel Type | Natural Gas, Propane Vapor |
| Fuel Shut Off Solenoid | Standard |
| LP Fuel Pressure | 7 - 14 in Water Column |
| NG Fuel Pressure | 3.5 - 14 in Water Column |

T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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

REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



SITE NAME:
CTHA383A

SITE ID:
CTHA383A

SITE ADDRESS:
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE:
**GENERATOR DETAIL**

DRAWING:
**A-7**

# Automatic Transfer Switches

GENERAC®

## Service and non-Service rated Automatic Smart Transfer Switches

Automatic Transfer Switches
Automatic Transfer Switches



## 100 - 400 Amps, Single Phase



c UL us LISTED

USA ENGINEERED & BUILT*

*Within the US & Italy domestic and foreign parts

*CUL only applies to non-service rated switches

## Description

Generac Automatic Transfer Switches are designed for use with single phase generators that utilize an Evolution™ or Nexus™ Controller. The 100, 200, and 400 amp open transition switches are available in single phase in both service equipment rated and non-service equipment rated configurations. The 150 and 300 amp open transition switches are only available in a service rated equipment configuration.

## Standard Features

Service rated (RXSW) Generac Automatic Transfer Switches are housed in an aluminum NEMA/UL Type 3R enclosure*, with electrostatically applied and baked powder paint. The Heavy Duty Generac Contactor is a UL recognized device, designed for years of service. The controller at the generator handles all the timing, sensing, exercising functions, and transfer commands. All switches are covered by a 5 year limited warranty.

* Non-service rated (RXSC) switches are housed in a steel enclosure.

## DPM Technology

Through the use of digital power technology (DPM), these switches have the capability to manage up to 4 individual HVAC (24 VAC controlled) loads with no additional hardware. When used in tandem with Smart Management Modules, up to 8 more loads can be managed as well, providing the most installation efficient power management options available.

GENERAC® ISO 9001:2008

GENERAC®

## 100-400 Amps, Single Phase — Automatic Smart Transfer Switches

## Functions

All timing and sensing functions originate in the generator controller

- Utility voltage drop-out ..... <65%
- Timer to generator start ..... 10 second factory set, adjustable between 2-1500 seconds by a qualified dealer*
- Engine warm up delay ..... 5 seconds
- Standby voltage sensor ..... 65% for 5 seconds
- Utility voltage pickup ..... >80%
- Re-transfer time delay ..... 15 seconds
- Engine cool-down timer ..... 60 seconds
- Exerciser ..... 5 or 12 minutes adjustable weekly/Bi-weekly/Monthly**

The transfer switch can be operated manually without power applied.

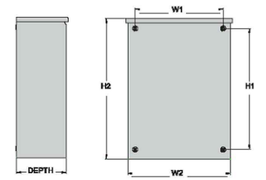
*When used in conjunction with units utilizing Evolution™ controls **Adjustable via the controller

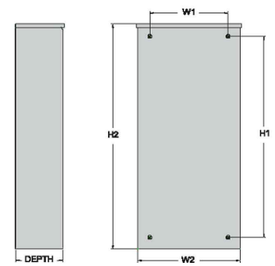
## Specifications

| Model | RXSC100A3 | | RXSC200A3 |
|---|---|---|---|
| Amps | 100 | | 200 |
| Voltage | 120/240, 1ø | | 120/240, 1ø |
| Load Transition Type (Automatic) | Open Transition | | Open Transition |
| Enclosure Type | NEMA/UL3R | | NEMA/UL3R |
| UL Rating | UL/CUL | | UL/CUL |
| Withstand Rating (Amps) | 10,000 | | 10,000 |
| Lug Range | 1/0 - #14 | | 250 MCM - #6 |

## Dimensions

| Model | | RXSC100A3 | RXSC200A3 |
|---|---|---|---|
| Height (in./mm) | H1 | 17.24/437.9 | 17.24/437.9 |
| | H2 | 20/508 | 20/508 |
| Width (in./mm) | W1 | 12.5/317.5 | 12.5/317.5 |
| | W2 | 14.6/370.8 | 14.6/370.8 |
| Depth (in./mm) | | 7.09/180.1 | 7.09/180.1 |
| Weight (lbs./kilos) | | 20/9.07 | 20/9.07 |




GENERAC®



T - Mobile NORTHEAST LLC
T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA
750 W CENTER ST, SUITE 301
WEST BRIDGEWATER, MA 02379
PHONE: 781.713.4725

REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

STATE OF CONNECTICUT
DEREK J. CREASER
No. 23551
LICENSED PROFESSIONAL ENGINEER

**DATE: 06/17/2022**



SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET IVORYTON/ESSEX, CT 06442 MIDDLETON COUNTY

SHEET TITLE: **ATS SPEC SHEET**

DRAWING: **A-8**

## STRUCTURAL NOTES:

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

## SPECIAL INSPECTIONS (REFERENCE IBC CHAPTER 17):

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

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

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

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

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

### NOTES:

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

### NOTES:

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


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |


**DATE: 06/17/2022**



SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE: **STRUCTURAL NOTES & SPECIAL INSPECTIONS**

DRAWING: **SN-1**

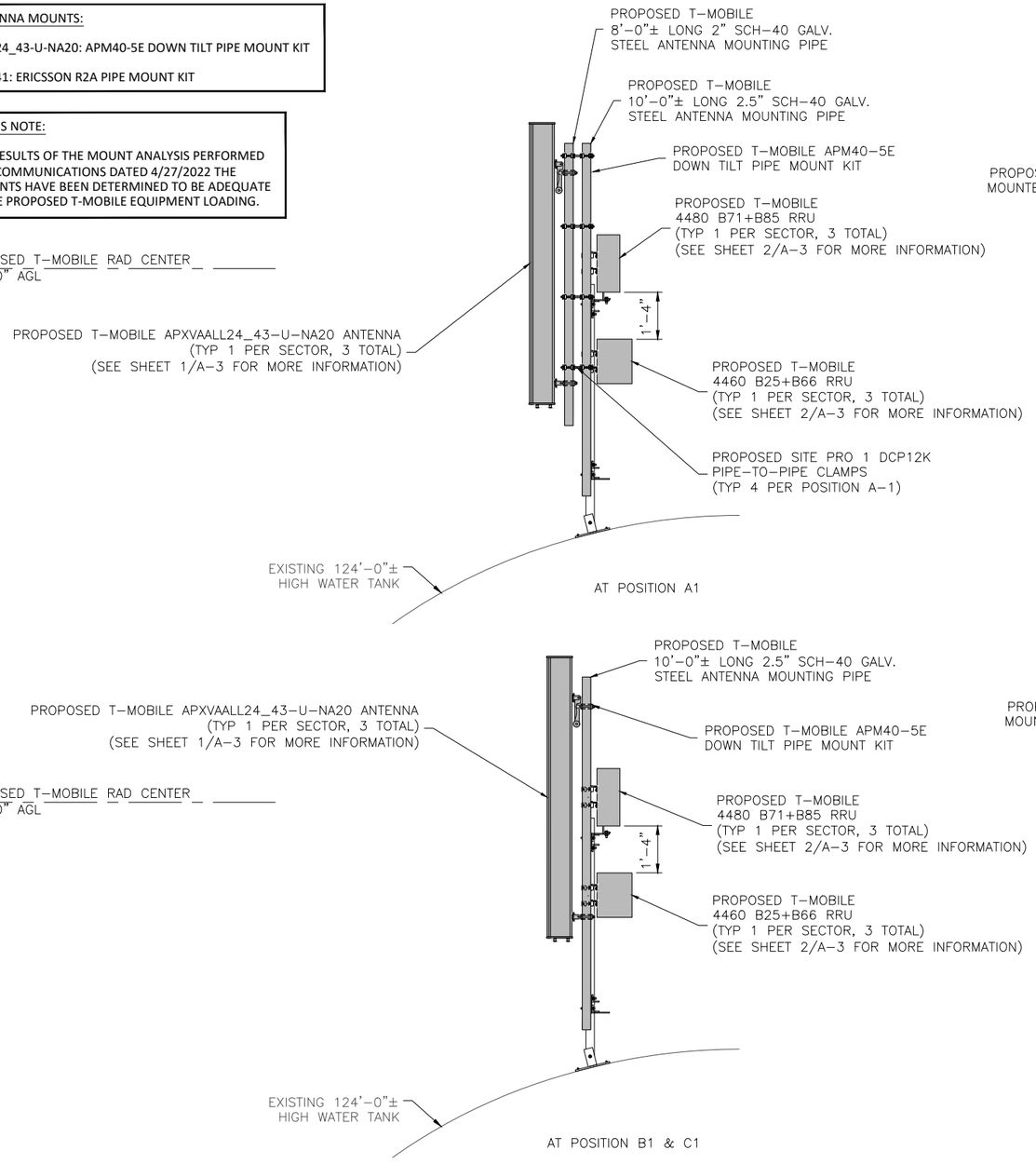
NOTES FOR ANTENNA MOUNTS:

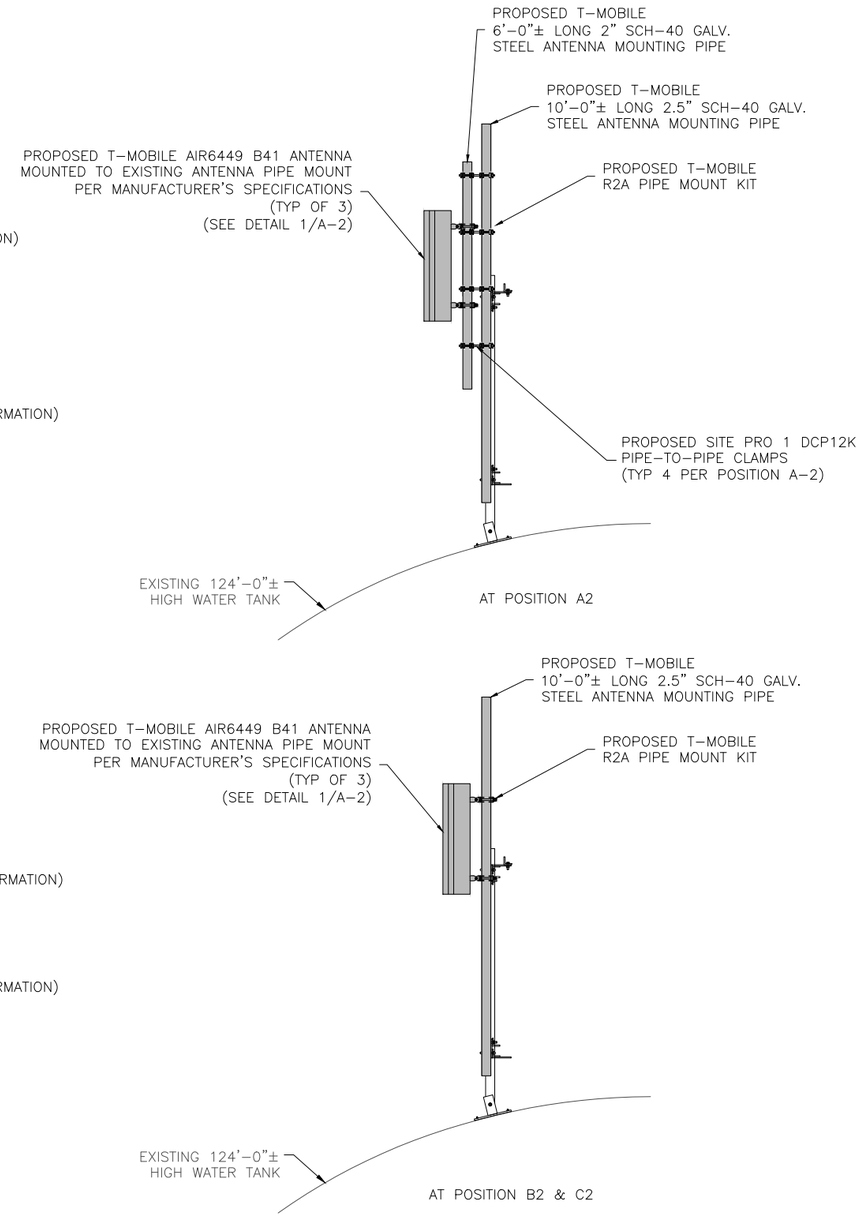
1. APXVAALL24_43-U-NA20: APM40-5E DOWN TILT PIPE MOUNT KIT
2. AIR6449 B41: ERICSSON R2A PIPE MOUNT KIT

MOUNT ANALYSIS NOTE:

BASED ON THE RESULTS OF THE MOUNT ANALYSIS PERFORMED BY CENTERLINE COMMUNICATIONS DATED 4/27/2022 THE PROPOSED MOUNTS HAVE BEEN DETERMINED TO BE ADEQUATE TO SUPPORT THE PROPOSED T-MOBILE EQUIPMENT LOADING.

PROPOSED T-MOBILE RAD CENTER
131'-0" AGL










1 / S-1 TYPICAL ANTENNA & RRU MOUNTING DETAILS

GRAPHIC SCALE

4 2 0 1 2 4

1/2 INCH = 1 FOOT (22X34)
1/4 INCH = 1 FOOT (11X17)


T-Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



SITE NAME: CTHA383A

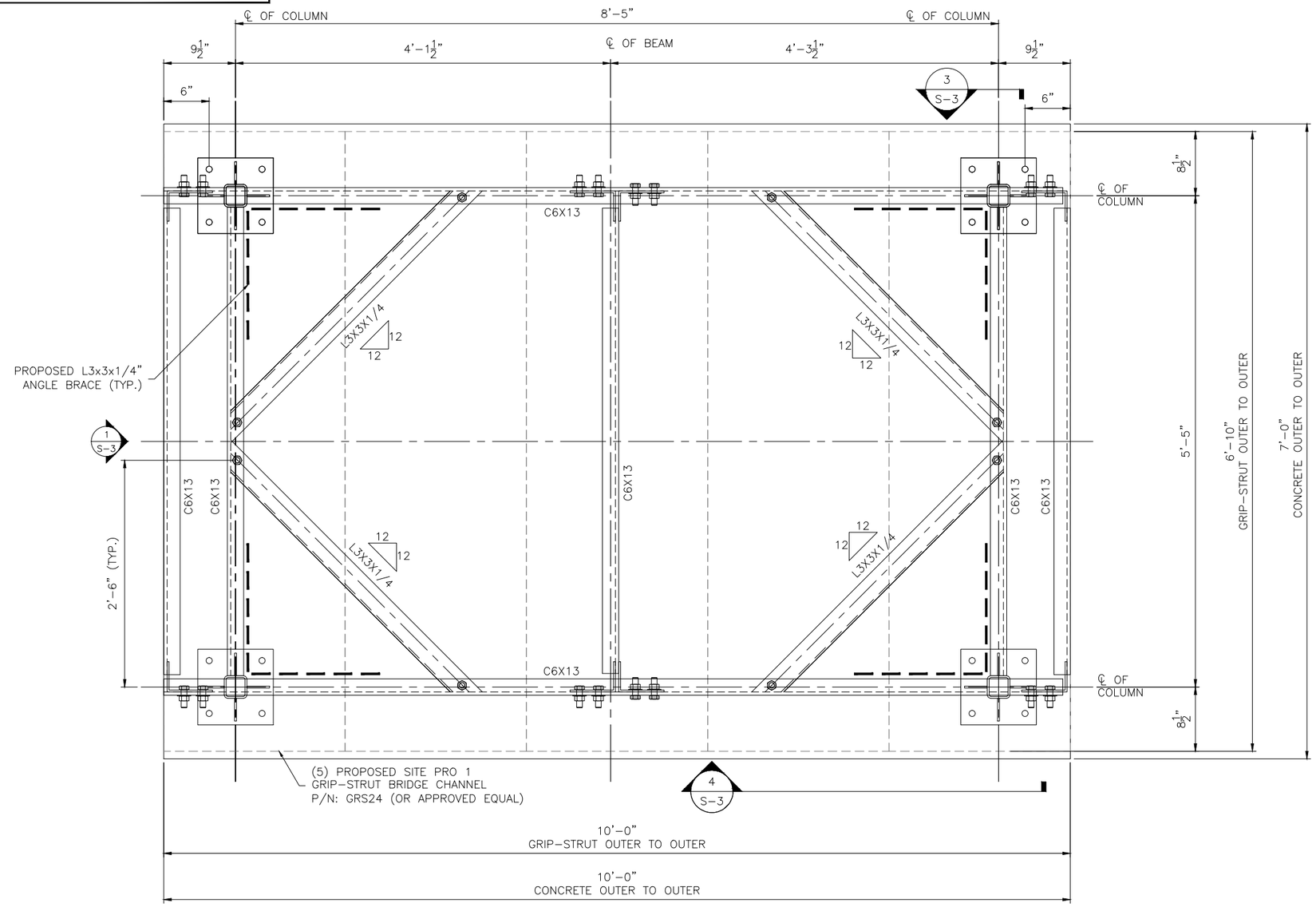
SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE: **ANTENNA & RRU MOUNTING DETAILS**

DRAWING: **S-1**

NOTES:
1. STRUCTURAL STEEL AND HARDWARE TO BE GALVANIZED.
2. GALVANIZED COATING REQUIRED AT ALL WELDS.
3. EQUIPMENT NOT SHOWN FOR CLARITY.
4. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO STEEL FABRICATION/ORDERING.
5. ENGINEERED/REVIEWED STEEL SHOP DRAWINGS REQUIRED PRIOR TO FABRICATION.
6. IF FIELD CONDITIONS DIFFER FROM WHAT IS SHOWN IN THESE DRAWINGS, CONTRACTOR TO CONTACT ENGINEER OF RECORD.
7. REFERENCE THE LATEST STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.




1 S-2 ICE CANOPY FRAMING PLAN

GRAPHIC SCALE

2 1 0 0.5 1 2

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)


T-Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



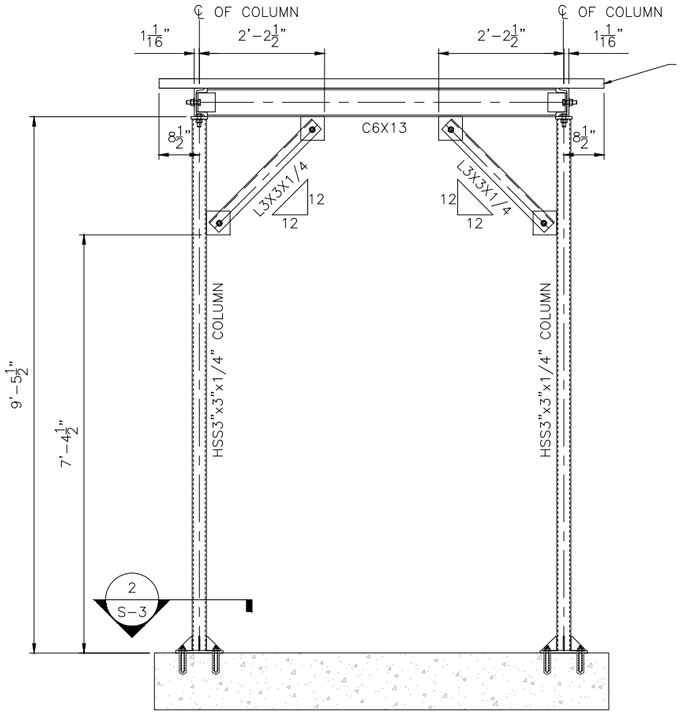
**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:** 170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** STRUCTURAL DETAILS

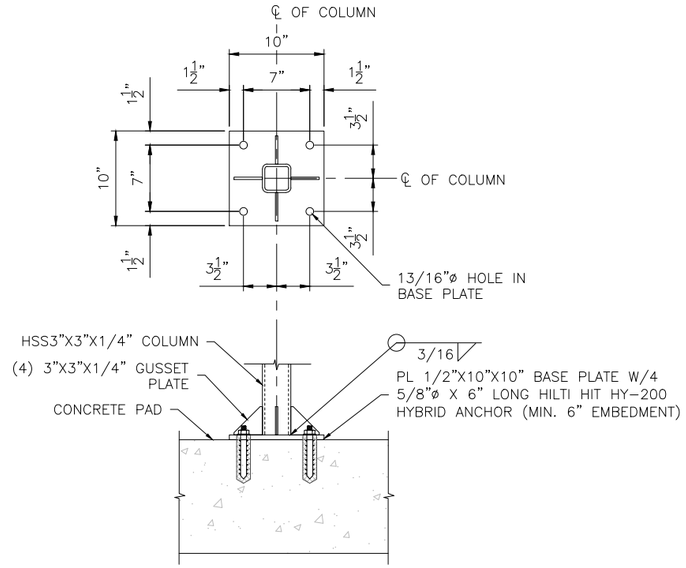
**DRAWING:** S-2




## 1 S-3 SECTION DETAIL

GRAPHIC SCALE

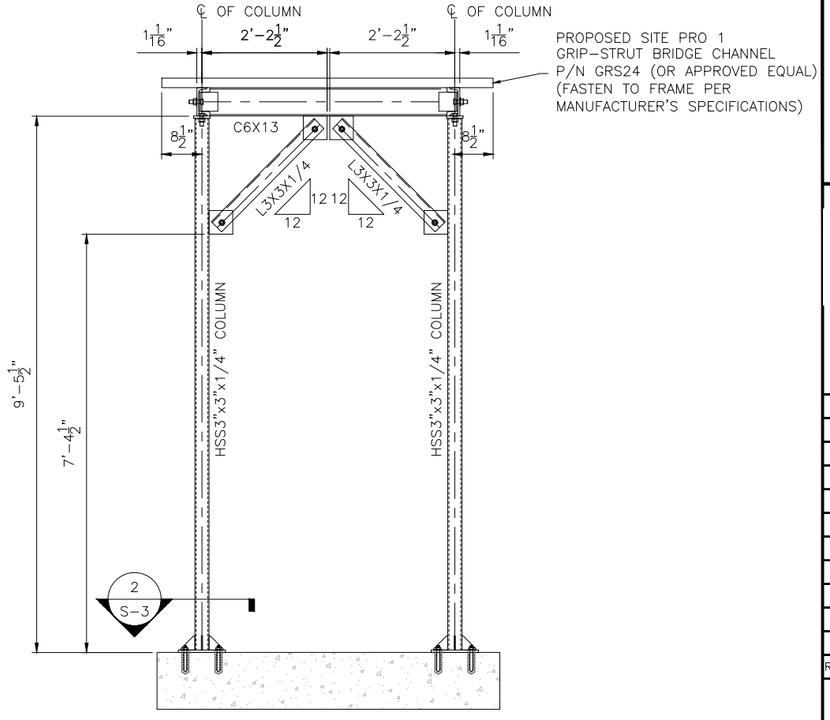
3/4 INCH = 1 FOOT (22X34)
3/8 INCH = 1 FOOT (11X17)




## 2 S-3 TYPICAL BASE PLATE DETAIL

GRAPHIC SCALE

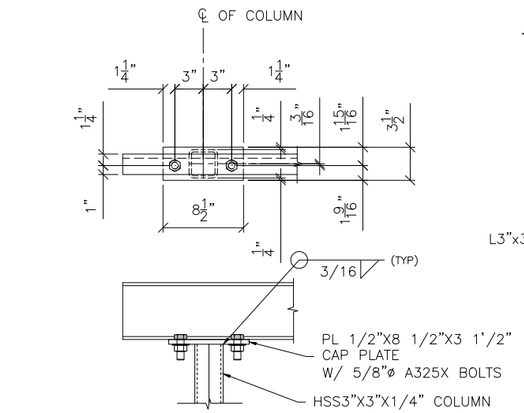
1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)




## 7 S-3 SECTION DETAIL

GRAPHIC SCALE

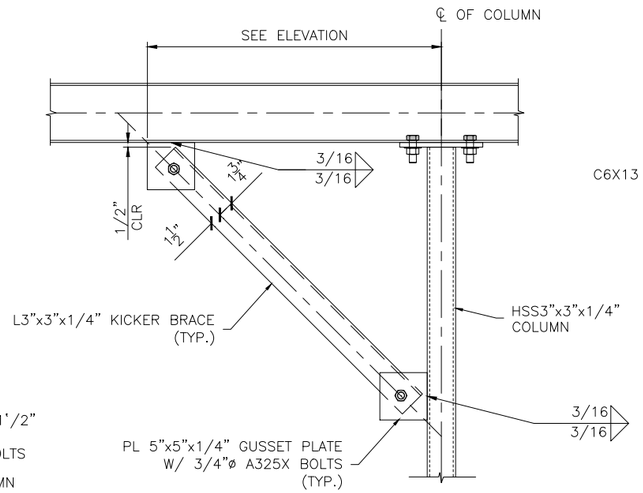
3/4 INCH = 1 FOOT (22X34)
3/8 INCH = 1 FOOT (11X17)




## 3 S-3 CONNECTION DETAIL

GRAPHIC SCALE

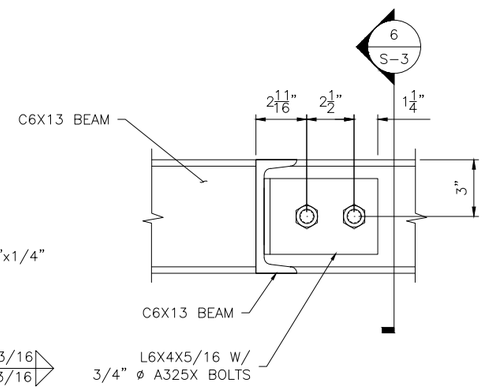
3/4 INCH = 1 FOOT (22X34)
3/8 INCH = 1 FOOT (11X17)




## 4 S-3 TYPICAL KICKER BRACE DETAIL

GRAPHIC SCALE

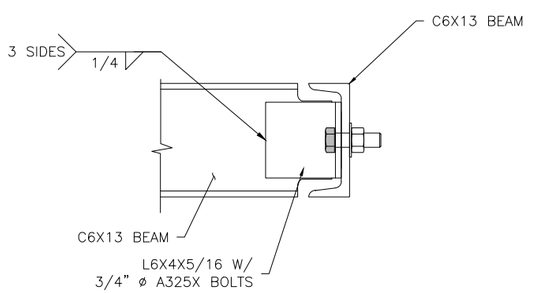
1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)




## 5 S-3 CONENCTION DETAIL

GRAPHIC SCALE

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)




## 6 S-3 SECTION DETAIL

GRAPHIC SCALE

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)


T-Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:**
CTHA383A

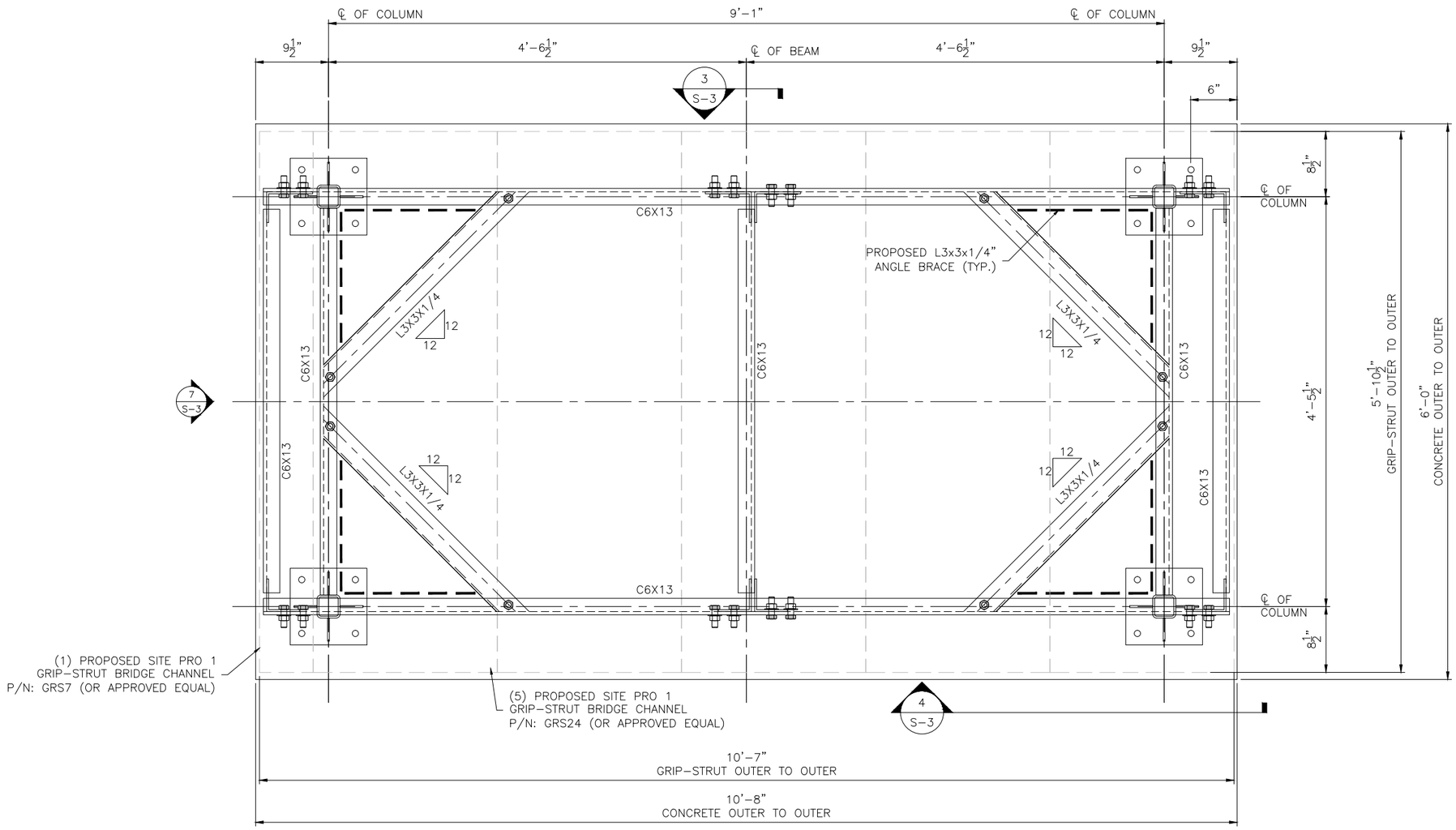
**SITE ID:**
CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:**
**STRUCTURAL DETAILS**

**DRAWING:**
**S-3**

NOTES:
1. STRUCTURAL STEEL AND HARDWARE TO BE GALVANIZED.
2. GALVANIZED COATING REQUIRED AT ALL WELDS.
3. EQUIPMENT NOT SHOWN FOR CLARITY.
4. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO STEEL FABRICATION/ORDERING.
5. ENGINEERED/REVIEWED STEEL SHOP DRAWINGS REQUIRED PRIOR TO FABRICATION.
6. IF FIELD CONDITIONS DIFFER FROM WHAT IS SHOWN IN THESE DRAWINGS, CONTRACTOR TO CONTACT ENGINEER OF RECORD.
7. REFERENCE THE LATEST STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.




1 S-4 ICE CANOPY FRAMING PLAN

GRAPHIC SCALE

2 1 0 0.5 1 2

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

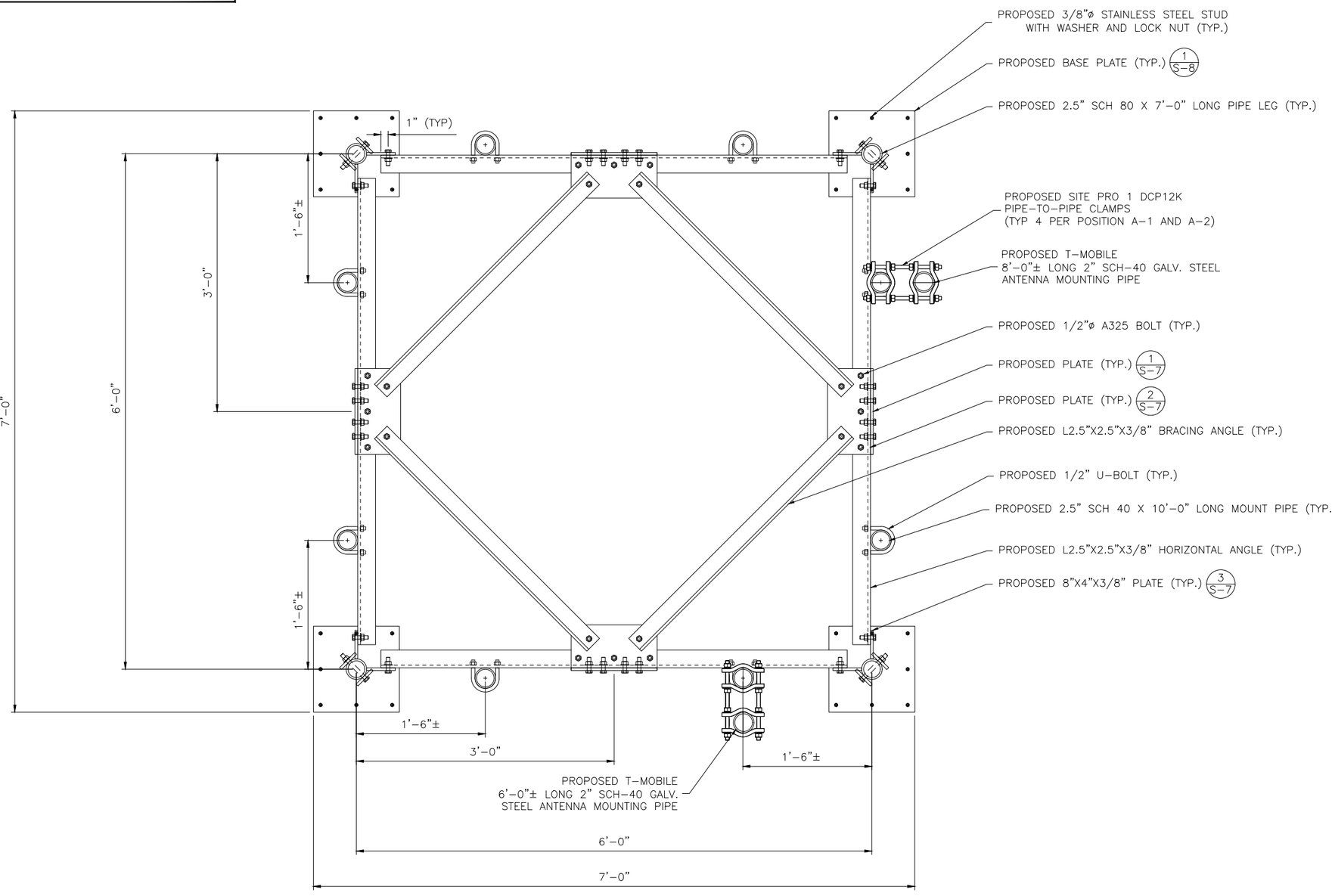
**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** STRUCTURAL DETAILS

**DRAWING:** S-4

NOTES:
1. STRUCTURAL STEEL AND HARDWARE TO BE GALVANIZED.
2. GALVANIZED COATING REQUIRED AT ALL WELDS.
3. EQUIPMENT NOT SHOWN FOR CLARITY.
4. CONTRACTOR TO VERIFY EXISTING CONDITIONS PRIOR TO STEEL FABRICATION/ORDERING.
5. ENGINEERED/REVIEWED STEEL SHOP DRAWINGS REQUIRED PRIOR TO FABRICATION.
6. IF FIELD CONDITIONS DIFFER FROM WHAT IS SHOWN IN THESE DRAWINGS, CONTRACTOR TO CONTACT ENGINEER OF RECORD.
7. REFERENCE THE LATEST STRUCTURAL ANALYSIS BY CENTERLINE COMMUNICATIONS FOR FURTHER INFORMATION REGARDING THE CAPACITY OF THE EXISTING STRUCTURE TO SUPPORT THIS EQUIPMENT UPGRADE.




1/S-5 ANTENNA MOUNT FRAMING PLAN

GRAPHIC SCALE

2 1 0 0.5 1 2

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



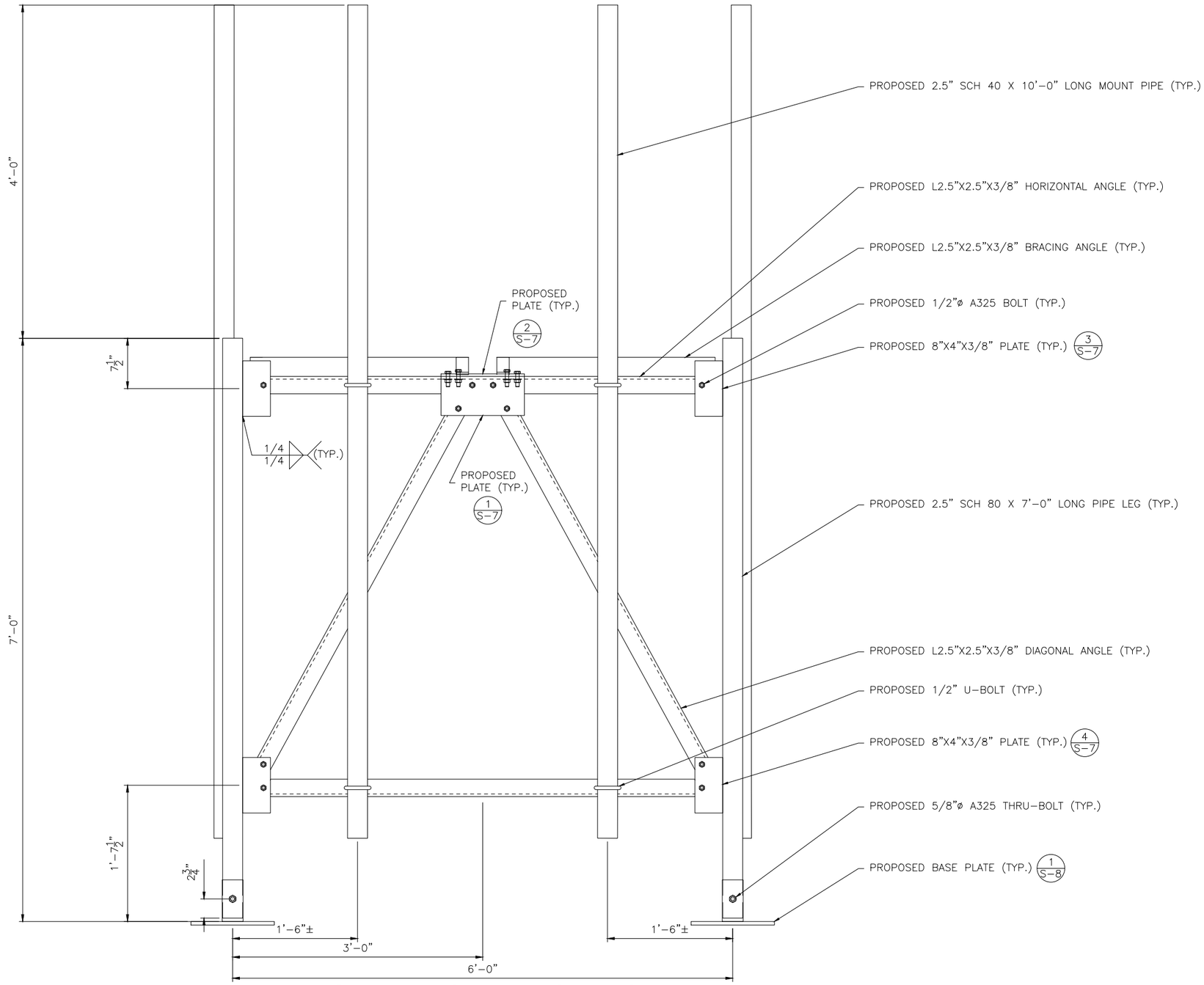
**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** STRUCTURAL DETAILS

**DRAWING:** S-5




1 S-6 ANTENNA MOUNT FRAMING ELEVATION

GRAPHIC SCALE

2 1 0 0.5 1 2

1-1/2 INCHES = 1 FOOT (22X34)
3/4 INCH = 1 FOOT (11X17)


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



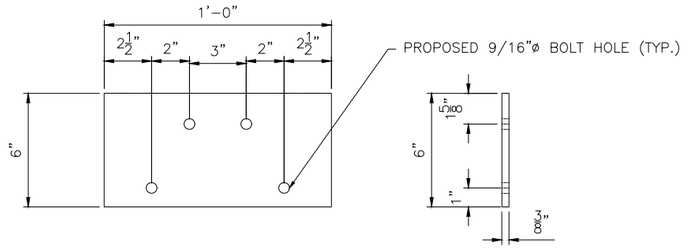
**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** STRUCTURAL DETAILS

**DRAWING:** S-6

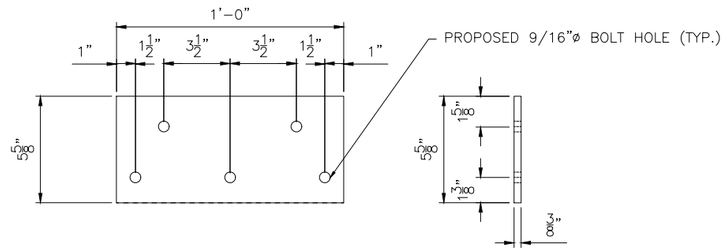



1 S-7 PLATE DETAIL 1

GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)

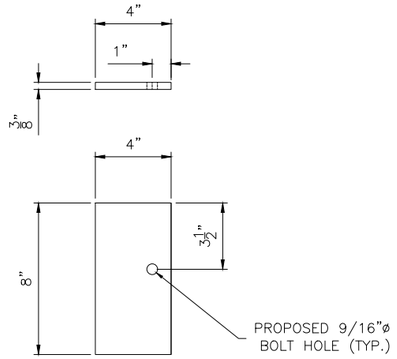



2 S-7 PLATE DETAIL 2

GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)

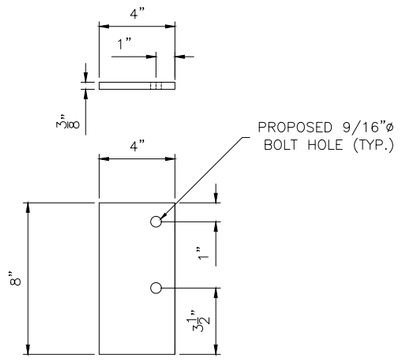



3 S-7 PLATE DETAIL 3

GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)




4 S-7 PLATE DETAIL 4

GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE
ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

STATE OF CONNECTICUT
DEREK J. CREASER
No. 28561
LICENSED PROFESSIONAL ENGINEER

**DATE: 06/17/2022**



**SITE NAME:**
CTHA383A

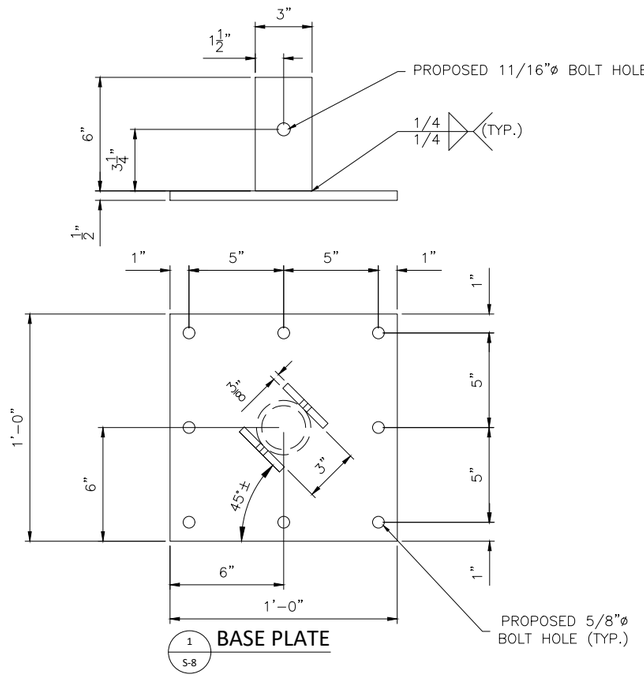
**SITE ID:**
CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:**
**STRUCTURAL DETAILS**

**DRAWING:**
**S-7**

NOTE:
ALL PROPOSED MOUNTING PLATE CONNECTIONS SHALL BE COMPLETELY BACK COATED WITH AN ELASTOMERIC SEALANT SUCH AS SIKAFLEX 15M OR EQUIVALENT. PERIMETER CAULKING OF THE PLATE IS NOT PERMITTED.




1 S-8 BASE PLATE

GRAPHIC SCALE

1 0 0.5 1

3 INCHES = 1 FOOT (22X34)
1-1/2 INCHES = 1 FOOT (11X17)

## STUD WELDING NOTES FOR EXISTING WATER TANK:

GENERAL:

1. WELDING STUDS SHALL BE FLANGED THREADED STAINLESS STEEL STUDS, GRADE 1010 THROUGH 1020, CONFORMING TO ASTM A-108 "STEEL" BARS, CARBON, COLD FINISHED, STANDARD QUALITY". ALL STUDS SHALL BE 3/8" DIAMETER BY 1-3/4" LONG, UNLESS OTHERWISE NOTED ON THE CONSTRUCTION DRAWINGS.
2. STUDS MUST BE WELDED BY THE CAPACITOR DISCHARGE METHOD, AS MANUFACTURED AND MARKETED BY COX INDUSTRIES, MACOMB, MICHIGAN (586) 738-0915, OR APPROVED EQUAL. FILLET WELDS ARE NOT ACCEPTABLE.
3. CONTRACTOR SHALL RECEIVE IN WRITING THE OWNERS REQUIREMENTS FOR TANK INSPECTIONS PRIOR TO COMMENCING WITH THE WORK ON THE TANK. UPON THE COMPLETION OF CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING A WRITTEN RELEASE FROM THE OWNER STATING THAT ALL WORK WAS PERFORMED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS AND THE OWNERS WRITTEN REQUIREMENTS AND RELEASES ALL LIABILITY TO THE CONTRACTOR, THE ENGINEER, THE APPLICANT, AND THE STUD MANUFACTURER.
4. CONTRACTOR SHALL COMPLY WITH AWS D1.1 AND AWS C5.4 FOR PROCEDURES, APPEARANCE AND QUALITY OF WELDS, AND FOR METHODS USED IN CORRECTING WELDING. ALL WELDERS AND WELDING PROCESSES SHALL BE QUALIFIED IN ACCORDANCE WITH AWS "STANDARD QUALIFICATION PROCEDURES". CONTRACTOR SHALL ADHERE TO AWS RECOMMENDED "SAFE PRACTICES FOR WELDING".
5. WELDING PARAMETERS, MACHINE POWER AND DWELL TIME SHALL BE QUALIFIED FOR THE WELDING POSITION, MATERIAL THICKNESS AND STUD SIZE TO BE USED. IF CHANCES IN THE SET-UP OCCUR AS DEFINED IN AWS D1.1, THE PROCEDURE MUST BE REQUALIFIED. CONTRACTOR SHALL SUBMIT CERTIFICATION OF WELDERS FOR STUD WELDING TO THE ENGINEER PRIOR TO COMMENCEMENT OF THE WORK.

SURFACE PREPARATION

1. CLEANING PROCEDURES "SHALL BE VERIFIED AS MEETING THE" MINIMUM REQUIREMENTS PER THE AWS WELDING HANDBOOK, VOLUME 2, "QUALITY CONTROL AND INSPECTION" FOR STUD WELDING, IF THE EXISTING COATING SYSTEM CONTAINS LEAD OR OTHER POTENTIALLY HAZARDOUS MATERIALS, SPECIAL PROCEDURES FOR REMOVAL AND DISPOSAL WILL BE REQUIRED.
2. PREPARE SURFACE TO BE WELDED BY SPOT REMOVING PAINT TO BARE METAL USING POWER BRUSHING IN ACCORDANCE WITH SSPC-SP11, (STEEL STRUCTURES PAINTING COUNCIL, SSPC-VIS 1-671). USE A 3M STRIP-N-CLEAN FLEXIBLE WHEEL OR APPROVED EQUAL. A WIRE WHEEL IS NOT ACCEPTABLE.
3. FOLLOW POWER TOOL CLEANING WITH A NON-FLAMMABLE SOLVENT CLEANING TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO STUD WELDING. (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL, SSPC-VIS 1-67T)

STUD QUALIFICATION TESTING AND SAMPLING

1. THE QUALIFICATION OF STUD APPLICATION AND PRE-PRODUCTION TESTING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 "STUD WELDING" OF AWS D1.1 INITIAL QUALIFICATION TESTING SHALL BE PERFORMED UNDER INSPECTION BY THE ENGINEER.
2. STUD APPLICATION SHALL BE QUALIFIED BY STUD WELDING TEN (10) SPECIMENS CONSECUTIVELY TO ASTM A-36 STEEL BASE MATERIALS USING RECOMMENDED PROCEDURES AND SETTINGS FOR EACH DIAMETER, POSITION, AND SURFACE GEOMETRY. THE TEN SPECIMENS SHALL BE TORQUE TESTED TO FAILURE. STUD APPLICATION SHALL BE CONSIDERED QUALIFICATION IF ALL TEST SPECIMENS ARE TORQUED TO DESTRUCTION WITHOUT FAILURE IN THE WELD. IN ADDITION, PRIOR TO PRODUCTION, CONTRACTOR SHALL PREPARE SIX (6) STUD WELDED SAMPLES USING A-36 STEEL PLATES AT THICKNESS EQUAL TO EACH OF THE PLATE THICKNESS OF THE WATER TANK TO BE WELDED TO. THE SIDE OPPOSITE THE STUD WELD SHALL HAVE A SIMILAR COATING (MINIMUM DFT-6MIL) TO THE EXISTING INTERIOR COATING OF THE WATER TANK. SAMPLES SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
3. BEFORE PRODUCTION, AT THE START OF EVERY SHIFT AND FOR EACH PARTICULAR SETUP, TESTING SHALL BE PERFORMED ON THE FIRST TWO STUDS THAT ARE WELDED. IN PLACE OF THE ACTUAL PRODUCTION STUD, TESTING MAY BE PERFORMED ON A MATERIAL SIMILAR TO THE PRODUCTION MEMBER IN THICKNESS AND PROPERTIES. TESTING SHALL INCLUDE A VISUAL EXAMINATION OF THE STUD WELD FOR A FULL 360 DEGREE FLASH. IN ADDITION, THE TEST SHALL INCLUDE TORQUE TESTING THE STUDS IN ACCORDANCE WITH THE FOLLOWING CRITERIA.

| STUD DIAMETER (IN.) | TESTING TORQUE (FT. LB) |
|---|---|
| 3/8 - 16 UNC | 16.9 |

4. IF FAILURE OCCURS, THE PROCEDURE SHALL BE CORRECTED AND TWO MORE STUDS SHALL BE WELDED AND TESTED.
5. PRIOR TO PRODUCTION, CONTRACTOR SHALL PERFORM THREE (3) TEST WELDS ON THE WATER TANK IN A LOCATION SPECIFIED BY THE TANK OWNER TO VERIFY THAT NO DAMAGE WILL OCCUR TO THE COATING SYSTEM ON THE INTERIOR OF THE TANK. ANY AND ALL DAMAGE TO THE INTERIOR COATING SHALL BE REPAIRED TO THE OWNER'S SATISFACTION. IF DAMAGE DOES OCCUR, THE PROCEDURE SHALL BE REEVALUATED BY THE ENGINEER, CONSTRUCTION AUTHORIZED REPRESENTATIVE, AND OWNER BEFORE COMMENCING WITH THE WORK.

REPAINTING

1. ALL PAINTING SURFACES AFFECTED BY WELDING OPERATIONS SHALL BE REPAINTED TO MATCH ADJACENT EXISTING SURFACES. PAINTING SHALL INCLUDE COATING OF THE STUDS.
2. PRIOR TO REPAINTING, SURFACES SHALL BE SOLVENT CLEANED TO REMOVE ANY OILS, CONTAMINANTS, RUST OR DIRT PRIOR TO REPAINTING (SSPC-SP1 BY STEEL STRUCTURES PAINTING COUNCIL, SSPC-VIS 1-67T)
3. PAINT USED TO REPAIR INTERIOR COATING SHALL MATCH THE EXISTING COATING SYSTEM OF THE TANK OR SHALL BE A SIMILAR SYSTEM COMPATIBLE WITH THE EXISTING SYSTEM AND ACCEPTABLE TO THE OWNER. VERIFY EXISTING COATING SYSTEM WITH THE TANK OWNER.
4. EXTERIOR STEEL SHALL BE PAINTED WITH 1 COAT EPOXY PRIMER (DFT-5-7 IL) AND 2 COATS POLYURETHANE FINISH (DFT-4-5 MIL) WITH COLOR TO MATCH EXISTING SURFACE. PAINT SHALL BE AS MANUFACTURED BY SHERWIN WILLIAMS, CLEVELAND, OHIO 1-800-321-8194 OR EQUAL COATING TO MATCH EXISTING. CONTRACTOR SHALL VERIFY OWNER'S PAINT REQUIREMENTS PRIOR TO COMMENCEMENT OF THE WORK.
5. CONTRACTOR TO VERIFY COATING SYSTEMS ARE COMPATIBLE WITH THE EXISTING SYSTEMS BY ADHESION TESTING PER ASTM D3359 "MEASURING ADHESION BY TAPE TEST".
6. CONTRACTOR TO VERIFY THAT CANS OF THE PRODUCT ARE NOT BEYOND MANUFACTURER RECOMMENDED SHELF LIFE. ASSURE THROUGH MIXING OF PREMEASURED TWO COMPONENT COATING SYSTEMS.
7. SURFACE CLEANING SHALL BE FOLLOWED WITH PRIMER COAT ON THE SAME DAY.
8. PAINT MUST BE APPLIED AT SURFACE AND AMBIENT TEMPERATURES BETWEEN 50 DEGREES TO 120 DEGREES FAHRENHEIT. NO PAINTING SHALL BE DONE ABOVE 80% RELATIVE HUMIDITY. THE AMBIENT TEMPERATURE BEFORE THE START OF COATING APPLICATION MUST AT BE LEAST 5 DEGREES FAHRENHEIT ABOVE THE DEW POINT AS DETERMINED BY CONVENTIONAL ACCEPTED STANDARDS.
9. PAINT SHALL BE APPLIED USING A NATURAL BRISTLE BRUSH FOR A SMOOTH BRUSH FINISH
10. PAINT SHALL BE FEATHERED OUT AT TIE-IN AREAS OF EXISTING COATING. PAINT SHALL BE WORKED IN AND AROUND IRREGULARITIES IN THE SURFACE


T-Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS:
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

SHEET TITLE: **STRUCTURAL DETAILS**

DRAWING: **S-8**

# ELECTRICAL NOTES

1. SUBMITTAL OF BID INDICATES THAT THE CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED UNDER THIS CONTRACT.

2. CONTRACTOR SHALL PERFORM ALL VERIFICATIONS, OBSERVATION TESTS, AND EXAMINATION WORK PRIOR TO ORDERING OF ANY EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE PROJECT MANAGER LISTING ALL MALFUNCTIONS, FAULTY EQUIPMENT AND DISCREPANCIES.

3. THESE PLANS ARE DIAGRAMMATIC ONLY, FOLLOW AS CLOSELY AS POSSIBLE.

4. CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES AND ALL OTHER SCHEDULING AND PROVISIONARY CIRCUMSTANCES SURROUNDING THE PROJECT.

5. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR COMPLETE AND FUNCTIONALLY OPERATING SYSTEMS ENERGIZED AND READY FOR USE THROUGHOUT AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE REQUIRED.

6. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. ELECTRICAL MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORIES AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH APPROVAL OF ALL GOVERNING BODIES HAVING JURISDICTION OVER THE CONSTRUCTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH ALL CURRENT APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA AND NBFU. ALL MATERIALS AND EQUIPMENT SHALL BE APPROVED FOR THEIR INTENDED USE AND LOCATION.

7. ALL WORK SHALL COMPLY WITH ALL APPLICABLE GOVERNING STATE, COUNTY AND CITY CODES AND OSHA, NFPA, NEC & ASHRAE REQUIREMENTS.

8. ENTIRE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE. ALL WORK, MATERIAL AND EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.

9. PROPERLY SEAL ALL PENETRATIONS. PROVIDE UL LISTED FIRE-STOPS WHERE PENETRATIONS ARE MADE THROUGH FIRE-RATED ASSEMBLIES. WATER-TIGHT USING SILICONE SEALANT.

10. DELIVER ALL BROCHURES, OPERATING MANUALS, CATALOGS AND SHOP DRAWINGS TO THE PROJECT MANAGER AT JOB COMPLETION. PROVIDE MAINTENANCE MANUALS FOR MECHANICAL EQUIPMENT. AFFIX MAINTENANCE LABELS TO MECHANICAL EQUIPMENT.

11. ALL CONDUCTORS SHALL BE COPPER. MINIMUM CONDUCTOR SIZE SHALL BE #12 AWG., UNLESS OTHERWISE NOTED. CONDUCTORS SHALL BE TYPE THHW, RATED IN ACCORDANCE WITH NEC 110-14(C).

12. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THE MAXIMUM INTERRUPTING CURRENT TO WHICH THEY MAY BE SUBJECTED.

13. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE; ARTICLES 250 & 810 AND THE UTILITY COMPANY STANDARDS.

14. CONDUIT:

A. RIGID CONDUIT SHALL BE U.L. LABEL GALVANIZED ZINC COATED WITH ZINC INTERIOR AND SHALL BE USED WHEN INSTALLED IN OR UNDER CONCRETE SLABS, IN CONTACT WITH THE EARTH, UNDER PUBLIC ROADWAYS, IN MASONRY WALLS OR EXPOSED ON BUILDING EXTERIOR. RIGID CONDUIT IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3.

B. ELECTRICAL METALLIC TUBING SHALL HAVE U.L. LABEL, FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.

C. LIQUID-TIGHT FLEXIBLE METAL CONDUIT SHALL BE U.L. LISTED AND SHALL BE USED AT FINAL CONNECTIONS TO MECHANICAL EQUIPMENT & RECTIFIERS AND WHERE PERMITTED BY CODE. ALL CONDUIT IN EXCESS OF SIX FEET IN LENGTH SHALL CONTAIN A FULL-SIZE GROUND CONDUCTOR.

D. CONDUIT RUNS SHALL BE SURFACE MOUNTED ON CEILINGS OR WALLS UNLESS NOTED OTHERWISE. ALL CONDUIT SHALL RUN PARALLEL OR PERPENDICULAR TO WALLS, FLOOR, CEILING, OR BEAMS. VERIFY EXACT ROUTING OF ALL EXPOSED CONDUIT WITH THE PROJECT MANAGER PRIOR TO INSTALLING.

E. PVC CONDUIT MAY BE PROVIDED ONLY WHERE SHOWN, OR IN UNDERGROUND INSTALLATIONS. PROVIDE UV-RESISTANT CONDUIT WHERE EXPOSED TO THE ATMOSPHERE. PROVIDE GROUND CONDUCTOR IN ALL PVC RUNS; EXCEPT WHERE PERMITTED BY CODE TO OMIT.

17. ALL ELECTRICAL EQUIPMENT SHALL BE LABELED WITH PERMANENT ENGRAVED PLASTIC LABELS. BACKGROUND SHALL BE BLACK WITH WHITE LETTERS; EXCEPT AS REQUIRED BY CODE TO FOLLOW A DIFFERENT SCHEME.

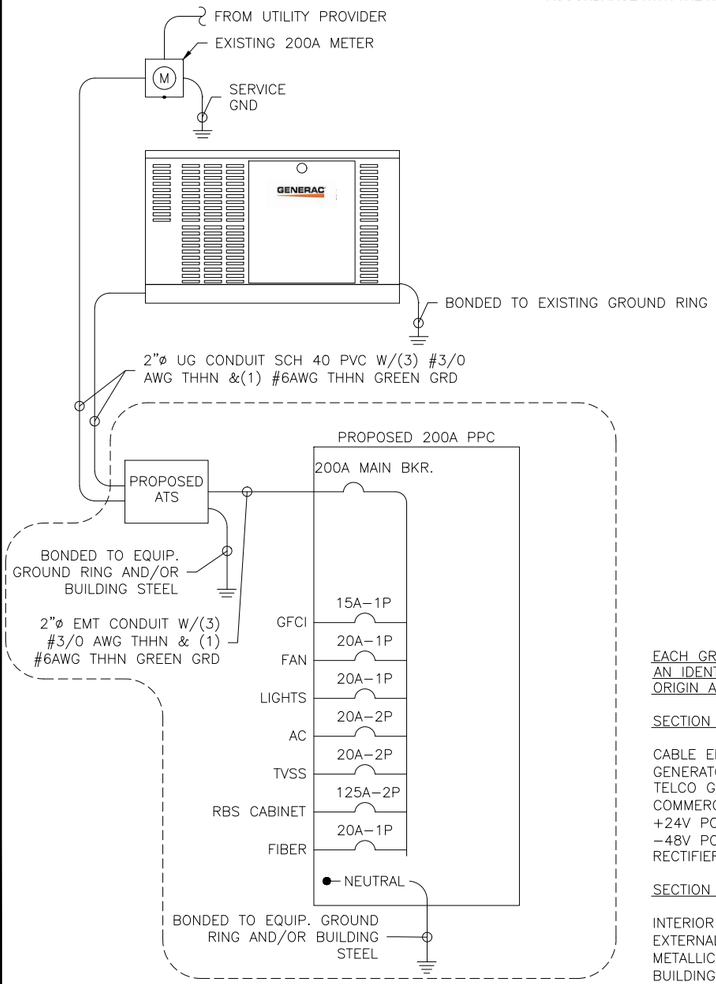
18. UPON COMPLETION OF WORK, CONDUCT CONTINUITY, SHORT CIRCUIT, AND FALL OF POTENTIAL GROUNDING TESTS FOR APPROVAL. SUBMIT TEST REPORTS TO PROJECT MANAGER. GROUNDING SYSTEM RESISTANCE SHALL NOT EXCEED 5 OHMS. IF THE RESISTANCE VALUE IS EXCEEDED, NOTIFY THE PROJECT MANAGER FOR FURTHER INSTRUCTION ON METHODS FOR REDUCING THE RESISTANCE VALUE.

19. CLEAN PREMISES OF ALL DEBRIS RESULTING FROM WORK AND LEAVE WORK IN A COMPLETE AND UNDAMAGED CONDITION. LEGALLY DISPOSE OF ALL REMOVED, UNUSED AND EXCESS MATERIAL GENERATED BY THE WORK OF THIS CONTRACT. DELIVER ITEMS INDICATED ON THE DRAWINGS TO THE OWNER IN GOOD CONDITION. OBTAIN SIGNED RECEIPT UPON DELIVERY.

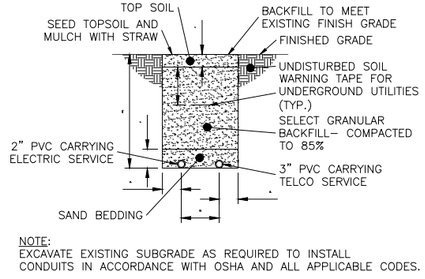
20. COORDINATE WITH UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOKUP COSTS SHALL BE PAID BY THE CONTRACTOR.

21. VERIFY ALL EXISTING CIRCUITRY PRIOR TO REMOVAL AND NEW WORK. MAINTAIN POWER TO ALL OTHER AREAS & CIRCUITS NOT SCHEDULED FOR REMOVAL.

22. RED LINED AS-BUILT PLANS SHALL BE PROVIDED TO THE CONSTRUCTION MANAGER.




1 E-1 ONE LINE DIAGRAM




NOTE:
EXCAVATE EXISTING SUBGRADE AS REQUIRED TO INSTALL CONDUITS IN ACCORDANCE WITH OSHA AND ALL APPLICABLE CODES.

3 E-1 TYPICAL TRENCH DETAIL

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

SECTION "P" – SURGE PRODUCERS

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

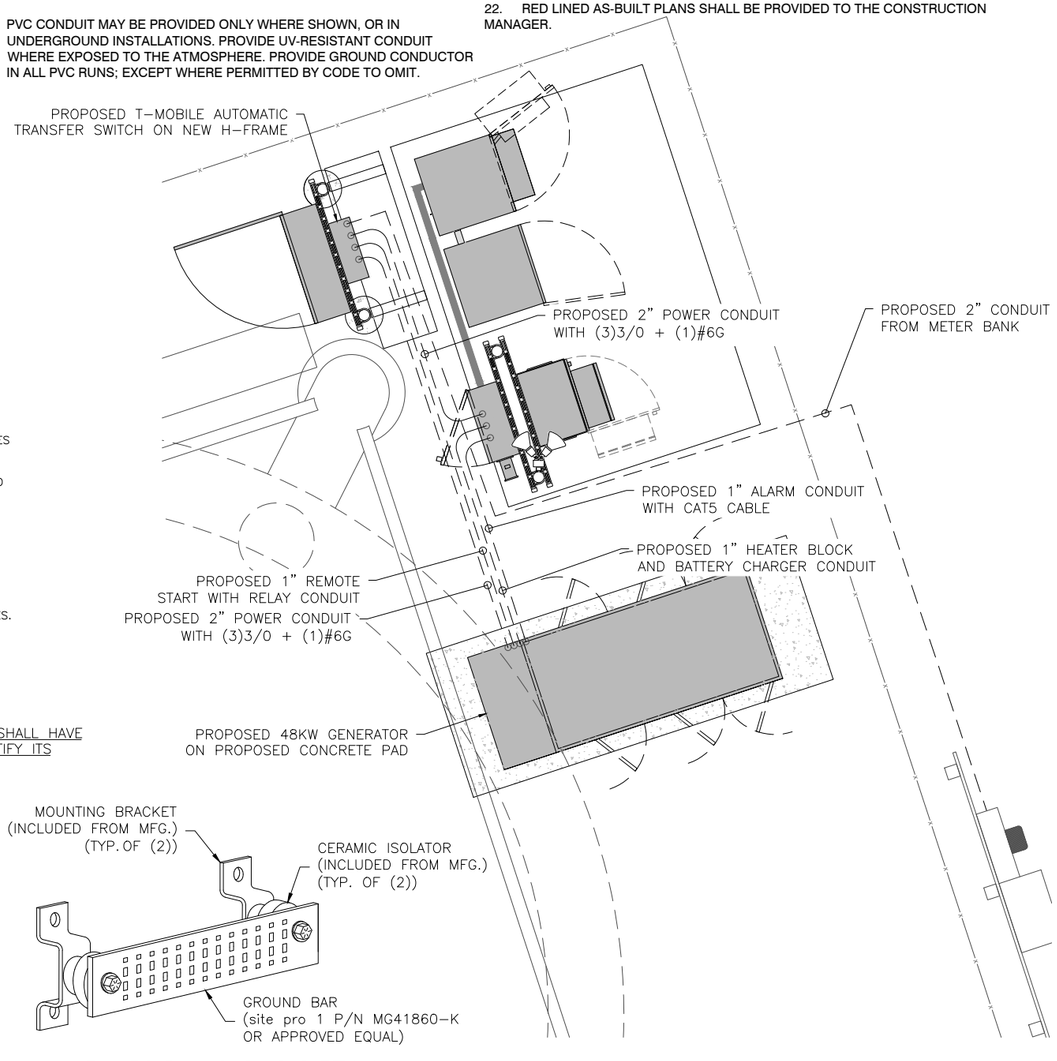
SECTION "A" – SURGE ABSORBERS

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

3 E-1 GROUND WIRE SCHEDULE




2 E-1 GROUND BAR DETAIL




5 E-1 ELECTRICAL PLAN

GRAPHIC SCALE
4 2 0 1 2 4
1/2 INCH = 1 FOOT (22X34)
1/4 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



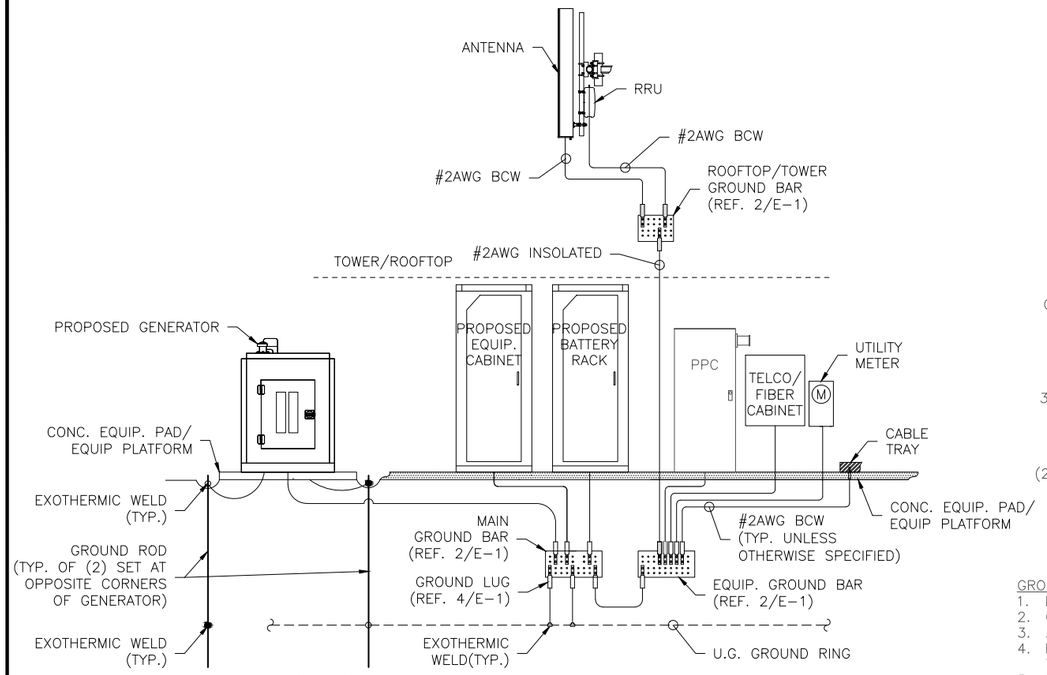
SITE NAME: CTHA383A

SITE ID: CTHA383A

SITE ADDRESS: 170 MAIN STREET IVORYTON/ESSEX, CT 06442 MIDDLETON COUNTY

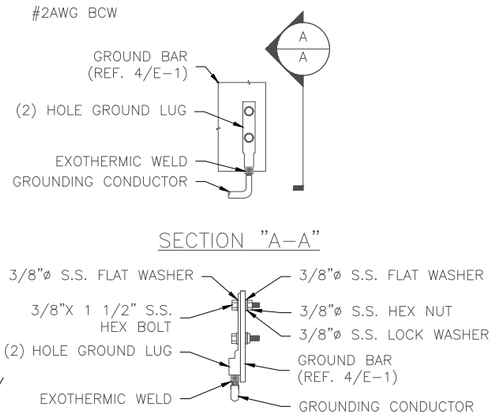
SHEET TITLE: **ELECTRICAL PLAN & DETAILS**

DRAWING: **E-1**



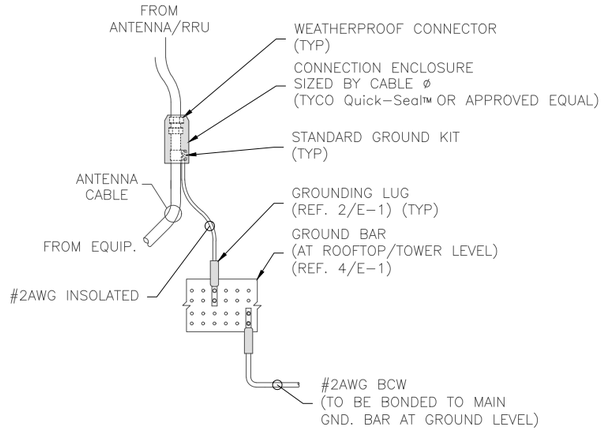

GROUNDING RISER NOTE:
UNLESS OTHERWISE SPECIFIED ALL GROUNDING CONDUCTORS ARE TO BE #2AWG BCW

## 1 G-1 GROUNDING RISER DIAGRAM



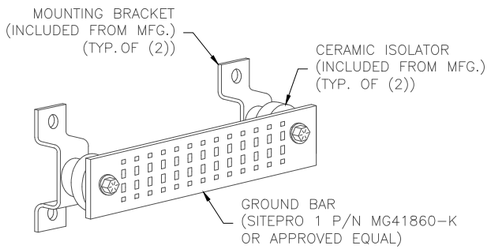

GROUNDING LUG NOTES:
1. DO NOT DOUBLE UP OR STACK LUGS.
2. OXIDE INHIBITING COMPOUND TO BE APPLIED TO ALL LUGS.
3. ALL LUGS ARE TO BE EXOTHERMIC WELDED TO GROUNDING CONDUCTORS.
4. FOR INSOLATED GROUNDING CONDUCTORS, EXPOSED BARE COPPER TO BE KEPT TO ABSOLUTE MINIMUM.
5. NO INSULATION IS ALLOWED WITHIN THE BARREL OF THE COMPRESSION TERMINAL.

## 2 E-1 GROUND LUG DETAIL




NOTES:
1. DO NOT INSTALL CABLE GROUND KIT AT BEND IN CABLE.
2. GROUND CABLES DIRECTLY TO CIGBE
3. JUMPER REQUIRED ONLY WHEN CABLE IS 1 1/4" OR LARGER

## 3 E-1 ANTENNA/RRU GROUNDING DETAIL




## 4 E-1 GROUND BAR DETAIL

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

SECTION "P" – SURGE PRODUCERS

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

SECTION "A" – SURGE ABSORBERS

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

## 5 E-1 GROUND WIRE SCHEDULE


T - Mobile
NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** ONE-LINE DIAGRAM & GROUNDING DETAILS

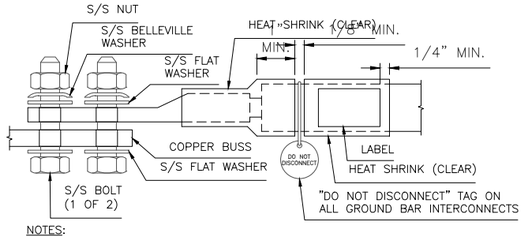
**DRAWING:** G-1

# GROUNDING NOTES:

1. GROUNDING SHALL COMPLY WITH ARTICLE 250 OF THE NATIONAL ELECTRICAL CODE.
2. ALL GROUNDING DEVICES SHALL BE U.L. APPROVED OR LISTED FOR THEIR INTENDED USE.
3. ALL WIRES SHALL BE AWG THHN/THWN COPPER UNLESS NOTED OTHERWISE.
4. GROUNDING CONNECTIONS TO GROUND RODS, GROUND RING WIRE, TOWER BASE AND FENCE POSTS SHALL BE EXOTHERMIC ("CADWELDS") UNLESS NOTED OTHERWISE. CLEAN SURFACES TO SHINY METAL. WHERE GROUND WIRES ARE CADWELDED TO GALVANIZED SURFACES, SPRAY CADWELD WITH GALVANIZING PAINT.
5. GROUNDING CONNECTIONS TO GROUND BARS ARE TO BE TWO-HOLE BRASS MECHANICAL CONNECTORS WITH STAINLESS STEEL HARDWARE (INCLUDING SCREW SET) CLEAN GROUND BAR TO SHINY METAL. AFTER MECHANICAL CONNECTION, TREAT WITH PROTECTIVE ANTIOXIDANT COATING.
6. GROUND COAXIAL CABLE SHIELDS AT BOTH ENDS WITH MANUFACTURER'S GROUNDING KITS.
7. ROUTE GROUNDING CONDUCTORS THE SHORTEST AND STRAIGHTEST PATH POSSIBLE. BEND GROUNDING LEADS WITH A MINIMUM 12" RADIUS.
8. INSTALL #2 AWG GREEN-INSULATED STRANDED WIRE FOR ABOVE GRADE GROUNDING AND #2 TINNED SOLID COPPER WIRE FOR BELOW GRADE GROUNDING UNLESS OTHERWISE NOTED.
9. REFER TO GROUNDING PLAN FOR GROUND BAR LOCATIONS. GROUNDING CONNECTIONS SHALL BE EXOTHERMIC TYPE ("CADWELDS") TO ANTENNA MOUNTS AND GROUND RING. REMAINING GROUNDING CONNECTIONS SHALL BE COMPRESSION FITTINGS. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO-HOLE LUGS.
10. THE GROUND ELECTRODE SYSTEM SHALL CONSIST OF DRIVEN GROUND RODS POSITION ACCORDING TO GROUNDING PLAN. THE GROUND RODS SHALL BE 5/8"X10'-0" COPPER CLAD STEEL INTERCONNECTED WITH #2 TINNED SOLID COPPER WIRE BURIED 36" BELOW GRADE. BURY GROUND RODS A MAXIMUM OF 15' APART, AND A MINIMUM OF 8' APART.
11. IF ROCK IS ENCOUNTERED GROUND RODS SHALL BE PLACED AT AN OBLIQUE ANGLE NOT TO EXCEED 45°.
12. EXOTHERMIC WELDS SHALL BE MADE IN ACCORDANCE WITH ERICO PRODUCTS BULLETIN A-AT.
13. CONSTRUCTION OF GROUND RING AND CONNECTIONS TO EXISTING GROUND RING SYSTEM SHALL BE DOCUMENTED WITH PHOTOGRAPHS PRIOR TO BACKFILLING SITE. PROVIDE PHOTOS TO THE CONSTRUCTION MANAGER.
14. ALL GROUND LEADS EXCEPT THOSE TO THE EQUIPMENT ARE TO BE #2 TINNED SOLID COPPER WIRE. ALL EXTERIOR GROUND BARS TINNED COPPER.
15. PRIOR TO INSTALLING LUGS ON GROUND WIRES, APPLY THOMAS & BETTS KOPR-SHIELD (TM OF JET LUBE INC.). PRIOR TO BOLTING GROUND WIRE LUGS TO GROUND BARS, APPLY KOPR-SHIELD OR EQUAL.
16. ENGAGE AN INDEPENDENT ELECTRICAL TESTING FIRM TO TEST AND VERIFY THAT IMPEDANCE DOES NOT EXCEED FIVE OHMS TO GROUND BY MEANS OF "FALL OF POTENTIAL TEST". TEST SHALL BE WITNESSED BY A T-MOBILE REPRESENTATIVE, AND RECORDED ON THE "GROUND RESISTANCE TEST" FORM.
17. WHERE BARE COPPER GROUND WIRES ARE ROUTED FROM ANY CONNECTION ABOVE GRADE TO GROUND RING, INSTALL WIRE IN 3/4" PVC SLEEVE, FROM 1' BELOW GRADE AND SEAL TOP WITH SILICONE MATERIAL.
18. PREPARE ALL BONDING SURFACES FOR GROUNDING CONNECTIONS BY REMOVING ALL PAINT AND CORROSION DOWN TO SHINY METAL. FOLLOWING CONNECTION, APPLY APPROPRIATE ANTI-OXIDIZATION PAINT.
19. ANY SITE WHERE THE EQUIPMENT (BTS, CABLE BRIDGE, PPC, GENERATOR, ETC.) IS LOCATED WITHIN 6 FEET OF METAL FENCING, THE GROUND RING SHALL BE BONDED TO THE NEAREST FENCE POST USING (3) RUNS OF #2 BARE TINNED COPPER WIRE.

## GROUNDING LEGEND

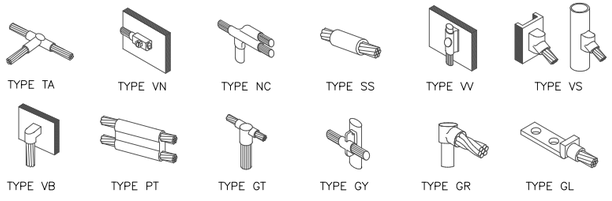
| | |
|---|---|
| ▩ | COAXIAL CABLE SHIELD GROUND KIT CONNECTION |
| ■ | COMPRESSION FITTING CONNECTION |
| ● | EXOTHERMIC WELD CONNECTION |
| ◉ | 5/8"X10' COPPER-CLAD STEEL GROUND ROD |
| ◉ | 5/8"X10' COPPER-CLAD STEEL GROUND ROD WITH INSPECTION WELL |
| ——— | EXISTING GROUND WIRING |
| - - - - - - | EXISTING GROUND WIRING |
| ▦ | TINNED COPPER GROUND BAR |
| CGB | COLLECTOR GROUND BAR |
| MGB | MAIN GROUND BAR |



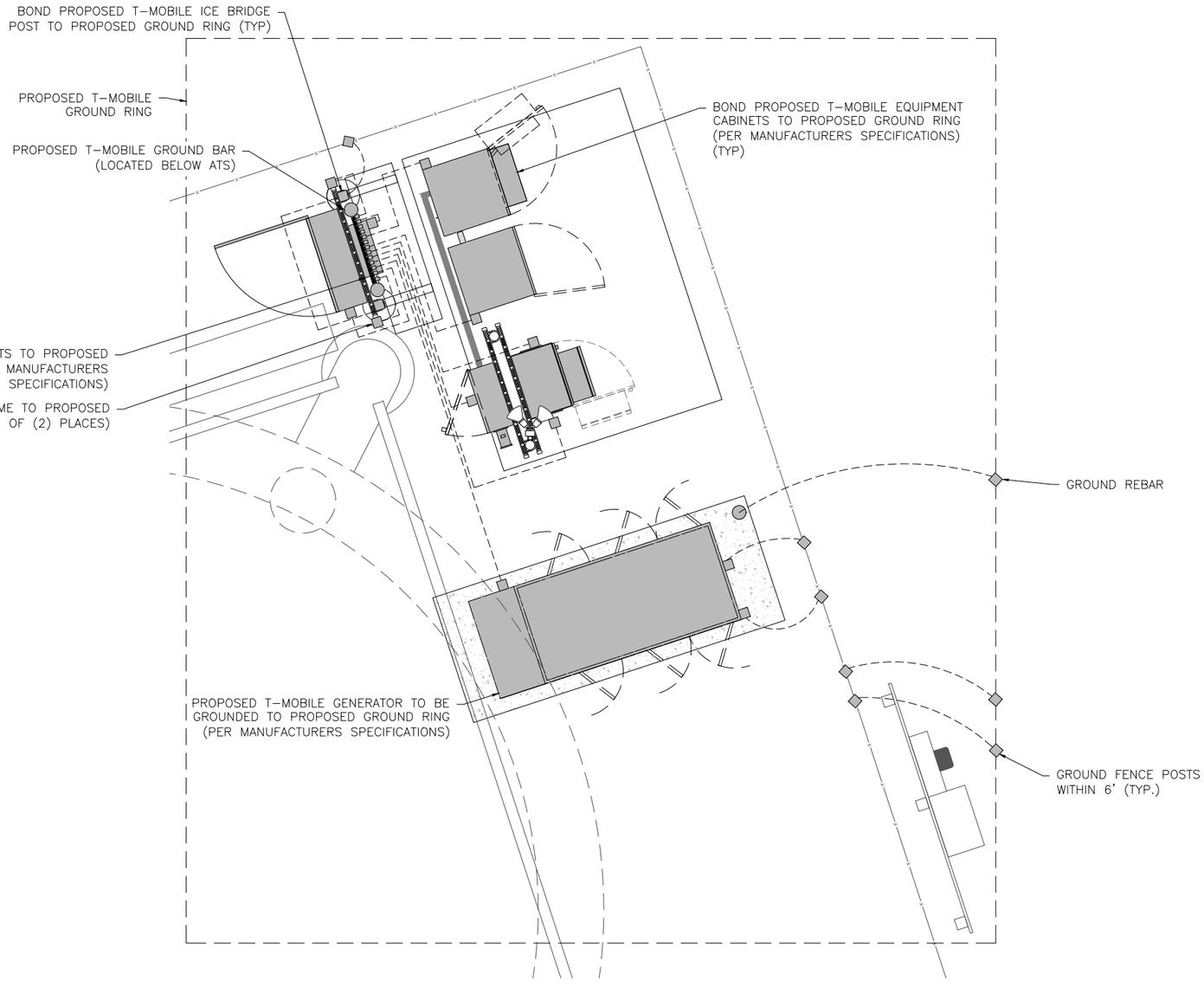

NOTES:

1. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING BELLEVILLES. COAT ALL SURFACES WITH ANTI-OXIDATION COMPOUND BEFORE MATING.
2. FOR GROUND BOND TO STEEL ONLY: INSERT A DRAGON TOOTH WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH ANTI-OXIDATION COMPOUND.
3. COAT ALL BARRELS WITH ANTI-OXIDATION COMPOUND BEFORE CRIMPING.

## 1 G-2 GENERAL LUG DETAIL




## 2 G-2 GROUNDING CONNECTION DETAILS




## 3 G-1 GROUNDING PLAN

GRAPHIC SCALE

4 2 0 1 2 4

1/2 INCH = 1 FOOT (22X34)
1/4 INCH = 1 FOOT (11X17)


T - Mobile NORTHEAST LLC

T-MOBILE NORTHEAST, LLC.
35 GRIFFIN RD S
BLOOMFIELD, CT 06002
PHONE: (860) 629-1700

CENTERLINE ENGINEERING SERVICES, PA

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


REVISIONS

| REV | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 1 | 06/17/22 | ABUTTERS PLAN | RL |
| 0 | 06/06/22 | ISSUED FOR CONSTRUCTION | MP |
| B | 02/24/22 | REVISED FOR REVIEW | AB |
| A | 01/19/22 | ISSUED FOR REVIEW | AB |

| DESIGNED BY: | APPROVED BY: |
|---|---|
| AB | WRD |

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

**DATE: 06/17/2022**



**SITE NAME:** CTHA383A

**SITE ID:** CTHA383A

**SITE ADDRESS:**
170 MAIN STREET
IVORYTON/ESSEX, CT 06442
MIDDLETON COUNTY

**SHEET TITLE:** GROUNDING PLAN

**DRAWING:** G-2

# ATTACHMENT 3
# STRUCTURAL ANALYSIS REPORT

CENTERLINE
ENGINEERING SERVICES, PA

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

# Revised Structural Analysis Report

**Site ID:** CTHA383A
**Site Name:** CTHA383_Underserved_Essex_WT
**Project Name:** NSB
**Address:** 170 Main Street
Essex, CT 06442

**Client:**

T - Mobile

**NORTHEAST, LLC**
**35 Griffin Rd S**
**Bloomfield, CT 06002**

**Date: 6/30/2022 (Rev. 3)**
6/28/2022 (Rev. 2)
4/27/2022 (Rev. 1)
2/3/2022 (Rev. 0)

***Scope of Work:***

Centerline Communications was authorized by T-Mobile Northeast LLC to perform an analysis of the existing structure to determine its capacity to support the proposed T-Mobile equipment listed in this report.

***Proposed Appurtenances:***

(3) APXVAALL24_43-U-NA20 Antennas
(3) AIR6449 B41 Antennas
(3) 4480 B71+B85 RRHs
(3) 4460 B25+B66 RRHs

***Design Criteria:***

**Design Codes:**

2015 International Building Code
ASCE 7-10
TIA-222-G Standards
2018 CT State Building Code

| | |
|---|---|
| Ultimate Wind Speed | 145 mph |
| Nominal Wind Speed | 112 mph |
| Wind Speed with Ice | 50 mph |
| Ice Thickness | 0.75 in. |
| Exposure Category | B |
| Topographic Category | 1 |
| Structure Class | III |
| Site Soil Class (Assumed) | D-Stiff Soil |
| Seismic Design Category | B |
| Spectral Response Acceleration Parameter at a Short Periods, $S_S$ | 0.168 g |
| Spectral Response Acceleration Parameter at a Period of 1 Second, $S_1$ | 0.059 g |
| Short Period Site Coefficient, $F_a$ | 1.6 |
| Long Period Site Coefficient, $F_v$ | 2.4 |
| Ground Snow Load, Pg | 30 psf |

***Refer to calculations for additional design criteria.**

***Conclusions:***

Based on the results of the analysis, we have determined that the existing structure is adequate to support the proposed T-Mobile equipment.

| | Stress Ratio | Overall Result |
|---|---|---|
| **Existing Structure** | **91%** | **PASS** |

***Antenna Support Recommendations:***

The new T-Mobile appurtenances are proposed to be mounted on a new custom steel frame welded to the water tank lid. Please refer to the latest drawings by Centerline Communications for more details.

***Additional Recommendations:***

- Centerline Communications recommends a full water tank condition assessment per the AWWA-D100 to confirm that any required tank maintenance is performed prior to the T-Mobile installation.

***Reference Documents:***

- T-Mobile RFDS CTHA383A_Coverage Strategy_1_draft, dated 10/27/2021
- Mapping Report by Structural Components, LLC., dated 12/10/2021

***Assumptions and Limitations:***

- The calculations performed by Centerline Communications are limited to the structural members in these calculations only.
- The calculation assumes all structural members to be in good condition i.e. no damage, rust, or other defects.
- The analysis is only for the T-Mobile equipment loading listed in the report.

***Photos:***

**Existing Structure**

# Design Results

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

| Site Details | |
|---|---|
| Site Name | CTHA383A |
| Carrier | T-Mobile |
| City, State | ESSEX, CT |
| Project | NSB |

| Mount Details | | |
|---|---|---|
| Mount Type | Sector Frame | |
| Mount Height, z | 62 | ft |
| Number of Sectors | 3 | |
| Structure Type | Water Tank | |
| Structure Height, h | 124 | ft |

| Topographic Factors | | |
|---|---|---|
| Topographic Category | 1 | |
| Feature | Flat | |
| Crest Height, H | N/A | ft |
| Distance from Crest, x | N/A | ft |
| Slope (H/L) | N/A | |
| Topographic Factor, $K_{zt}$ | 1.00 | |

| Seismic Factors | | |
|---|---|---|
| Importance Factor, $I_E$ | 1.5 | |
| Short Period Spectral Acceleration, $S_s$ | 0.168 | g |
| 1 Second Period Spectral Acceleration, $S_1$ | 0.059 | g |
| Long-Period Transition Period, $T_L$ | 6 | |
| Design Category | B | |
| Short Period Site Coefficient, $F_a$ | 1.60 | |
| Long-Period Site Coefficient, $F_v$ | 2.4 | |

| Site Parameters | | |
|---|---|---|
| Ultimate Wind Speed, $V_{ULT}$ | 145 | mph |
| Nominal Wind Speed, V | 112 | mph |
| Wind Speed with Ice, $V_i$ | 50 | mph |
| Design Ice Thickness, $t_i$ | 0.75 | in |
| Structural Class | III | |
| Exposure Category | B | |
| Site Soil Class | D-Stiff Soil (Assumed) | |

| Code | |
|---|---|
| Building Code | 2015 IBC |
| TIA Code | TIA-222-G |
| ASCE Code | 7-10 |

| Site Constants | | |
|---|---|---|
| Importance Factor, I (Wind no Ice) | 1.00 | |
| Importance Factor, I (Ice Thickness) | 1.25 | |
| Importance Factor, I (wind with Ice) | 1.00 | |
| Wind Direction Prob. Factor, $K_d$ | 0.95 | |
| Velocity Pressure Coefficient, $K_z$ | 0.86 | |
| Gust Effect Factor, $G_h$ | 1.00 | |
| Design Ice Thickness, $t_{iz}$ | 2.00 | in |
| Velocity Pressure, $q_z$ | 26.45 | psf |
| Velocity Pressure with Ice, $q_{zi}$ | 5.24 | psf |
| Shielding Factor, $K_a$ | 1.00 | |
| Flat Velocity Pressure (Ca =2.0) | 52.90 | psf |
| Round Velocity Pressure (Ca = 1.2) | 31.74 | psf |
| Round Velocity Pressure with Ice (Ca = 1.2) | 6.29 | psf |
| **Engineer Initials** | **AP** | |

CENTERLINE COMMUNICATIONS

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

| Sector 1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Wind Force | | | | Dimensions | Weights |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | H\W\D, in | Wt.\$Wt._{ice}$, lbs. |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 20.24 | 8.73 | 662.95 | 286.01 | 95.9\24\8.5 | 153.3\421.24 |
| Ericsson AIR6449 B41 Antenna | 131 | 5.68 | 2.49 | 186.09 | 81.57 | 33.1\20.6\8.6 | 104\152.89 |
| Ericsson 4460 B25+B66 RRH | 131 | 2.14 | 1.50 | 70.06 | 49.04 | 15.1\17\11.9 | 108\89.51 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.45 | 1.27 | 80.36 | 41.51 | 19.5\15.1\7.8 | 87\80.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 107.00 | 199.31 | 63\11\5 | 40\146.48 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 107.00 | 199.31 | 63\11\5 | 40\146.48 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 8.00 | 4.62 | 142.94 | 247.57 | 71\12\6 | 60\181.82 |
| Electrical - NEMA Box AT&T | 106 | 0.83 | 0.50 | 15.41 | 25.69 | 10\10\6 | 30\34.85 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.83 | 1.18 | 36.39 | 87.23 | 20\17\7 | 50.7\82.84 |
| Twin LGP21401 AT&T | 106 | 0.23 | 0.11 | 3.39 | 7.12 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 106 | 0.23 | 0.11 | 3.39 | 7.12 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 109.5 | 0.23 | 0.11 | 3.42 | 7.19 | 4.4\6.3\3 | 6\12.89 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 168.55 | 259.47 | 72\12\7 | 60\196.17 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 168.55 | 259.47 | 72\12\7 | 60\196.17 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 14.67 | 5.28 | 168.55 | 467.89 | 72\24\7 | 100\305.52 |
| B66A RRH 4x45 VZW | 113.5 | 1.85 | 1.25 | 39.19 | 58.16 | 14.9\14.9\10.04 | 97.5\73.48 |
| B13 RRH 4x30 VZW | 113.5 | 1.85 | 1.01 | 31.77 | 58.16 | 14.9\14.9\8.14 | 82\66.54 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.35 | 1.35 | 42.55 | 42.55 | 15.73\10.3\10.3 | 32\62.22 |
| | | | | | | | |
| | | | | | | | |

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

| Sector 1 Continue… | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Wind Force with Ice | | | | Wind Force V = 30 mph | | Seismic Force |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | 0° Force lbs. | 90° Force lbs. | Vs, lbs |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 13.72 | 6.83 | 220.46 | 101.03 | 47.30 | 20.41 | 27.47 |
| Ericsson AIR6449 B41 Antenna | 131 | 4.27 | 2.18 | 64.60 | 30.29 | 13.28 | 5.82 | 18.64 |
| Ericsson 4460 B25+B66 RRH | 131 | 1.84 | 1.38 | 25.84 | 18.70 | 5.00 | 3.50 | 19.35 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.07 | 1.25 | 29.35 | 16.37 | 5.73 | 2.96 | 15.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 40.55 | 69.73 | 7.63 | 14.22 | 7.17 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 40.55 | 69.73 | 7.63 | 14.22 | 7.17 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 5.97 | 3.97 | 52.71 | 85.69 | 10.20 | 17.66 | 10.75 |
| Electrical - NEMA Box AT&T | 106 | 0.87 | 0.61 | 6.78 | 10.40 | 1.10 | 1.83 | 5.38 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.31 | 1.18 | 14.40 | 31.40 | 2.60 | 6.22 | 9.09 |
| Twin LGP21401 AT&T | 106 | 0.37 | 0.24 | 2.14 | 3.64 | 0.24 | 0.51 | 1.08 |
| Twin LGP21901 AT&T | 106 | 0.37 | 0.24 | 2.14 | 3.64 | 0.24 | 0.51 | 1.08 |
| Twin LGP21901 AT&T | 109.5 | 0.37 | 0.24 | 2.17 | 3.68 | 0.24 | 0.51 | 1.08 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 61.17 | 89.85 | 12.02 | 18.51 | 10.75 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 61.17 | 89.85 | 12.02 | 18.51 | 10.75 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 10.13 | 4.39 | 61.17 | 156.76 | 12.02 | 33.38 | 17.92 |
| B66A RRH 4x45 VZW | 113.5 | 1.63 | 1.19 | 15.21 | 21.66 | 2.80 | 4.15 | 17.47 |
| B13 RRH 4x30 VZW | 113.5 | 1.63 | 1.03 | 12.69 | 21.66 | 2.27 | 4.15 | 14.69 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.27 | 1.27 | 16.39 | 16.39 | 3.04 | 3.04 | 5.73 |
| | | | | | | | | |
| | | | | | | | | |

CENTERLINE COMMUNICATIONS

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

| Sector 2 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Wind Force | | | | Dimensions | Weights |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | H\W\D, in | Wt.\$Wt._{ice}$, lbs. |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 20.24 | 8.73 | 538.94 | 410.02 | 95.9\24\8.5 | 153.3\421.24 |
| Ericsson AIR6449 B41 Antenna | 131 | 5.68 | 2.49 | 151.71 | 115.96 | 33.1\20.6\8.6 | 104\152.89 |
| Ericsson 4460 B25+B66 RRH | 131 | 2.14 | 1.50 | 63.14 | 55.96 | 15.1\17\11.9 | 108\89.51 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.45 | 1.27 | 67.58 | 54.29 | 19.5\15.1\7.8 | 87\80.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 196.53 | 109.78 | 63\11\5 | 40\146.48 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 196.53 | 109.78 | 63\11\5 | 40\146.48 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 8.00 | 4.62 | 244.41 | 146.10 | 71\12\6 | 60\181.82 |
| Electrical - NEMA Box AT&T | 106 | 0.83 | 0.50 | 25.38 | 15.72 | 10\10\6 | 30\34.85 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.83 | 1.18 | 85.69 | 37.92 | 20\17\7 | 50.7\82.84 |
| Twin LGP21401 AT&T | 106 | 0.23 | 0.11 | 7.01 | 3.50 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 106 | 0.23 | 0.11 | 7.01 | 3.50 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 109.5 | 0.23 | 0.11 | 7.07 | 3.54 | 4.4\6.3\3 | 6\12.89 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 256.73 | 171.29 | 72\12\7 | 60\196.17 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 256.73 | 171.29 | 72\12\7 | 60\196.17 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 14.67 | 5.28 | 458.87 | 177.57 | 72\24\7 | 100\305.52 |
| B66A RRH 4x45 VZW | 113.5 | 1.85 | 1.25 | 57.59 | 39.76 | 14.9\14.9\10.04 | 97.5\73.48 |
| B13 RRH 4x30 VZW | 113.5 | 1.85 | 1.01 | 57.36 | 32.57 | 14.9\14.9\8.14 | 82\66.54 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.35 | 1.35 | 42.55 | 42.55 | 15.73\10.3\10.3 | 32\62.22 |
| | | | | | | | |
| | | | | | | | |

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

| Sector 2 Continue… | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Wind Force with Ice | | | | Wind Force V = 30 mph | | Seismic Force |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | 0° Force lbs. | 90° Force lbs. | Vs, lbs |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 13.72 | 6.83 | 181.17 | 140.32 | 38.45 | 29.25 | 27.47 |
| Ericsson AIR6449 B41 Antenna | 131 | 4.27 | 2.18 | 53.31 | 41.58 | 10.82 | 8.27 | 18.64 |
| Ericsson 4460 B25+B66 RRH | 131 | 1.84 | 1.38 | 23.49 | 21.05 | 4.50 | 3.99 | 19.35 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.07 | 1.25 | 25.08 | 20.64 | 4.82 | 3.87 | 15.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 68.85 | 41.43 | 14.02 | 7.83 | 7.17 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 68.85 | 41.43 | 14.02 | 7.83 | 7.17 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 5.97 | 3.97 | 84.70 | 53.70 | 17.44 | 10.42 | 10.75 |
| Electrical - NEMA Box AT&T | 106 | 0.87 | 0.61 | 10.29 | 6.89 | 1.81 | 1.12 | 5.38 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.31 | 1.18 | 30.89 | 14.91 | 6.11 | 2.71 | 9.09 |
| Twin LGP21401 AT&T | 106 | 0.37 | 0.24 | 3.60 | 2.19 | 0.50 | 0.25 | 1.08 |
| Twin LGP21901 AT&T | 106 | 0.37 | 0.24 | 3.60 | 2.19 | 0.50 | 0.25 | 1.08 |
| Twin LGP21901 AT&T | 109.5 | 0.37 | 0.24 | 3.64 | 2.21 | 0.50 | 0.25 | 1.08 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 88.99 | 62.03 | 18.32 | 12.22 | 10.75 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 88.99 | 62.03 | 18.32 | 12.22 | 10.75 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 10.13 | 4.39 | 153.88 | 64.05 | 32.74 | 12.67 | 17.92 |
| B66A RRH 4x45 VZW | 113.5 | 1.63 | 1.19 | 21.47 | 15.40 | 4.11 | 2.84 | 17.47 |
| B13 RRH 4x30 VZW | 113.5 | 1.63 | 1.03 | 21.39 | 12.96 | 4.09 | 2.32 | 14.69 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.27 | 1.27 | 16.39 | 16.39 | 3.04 | 3.04 | 5.73 |
| | | | | | | | | |
| | | | | | | | | |

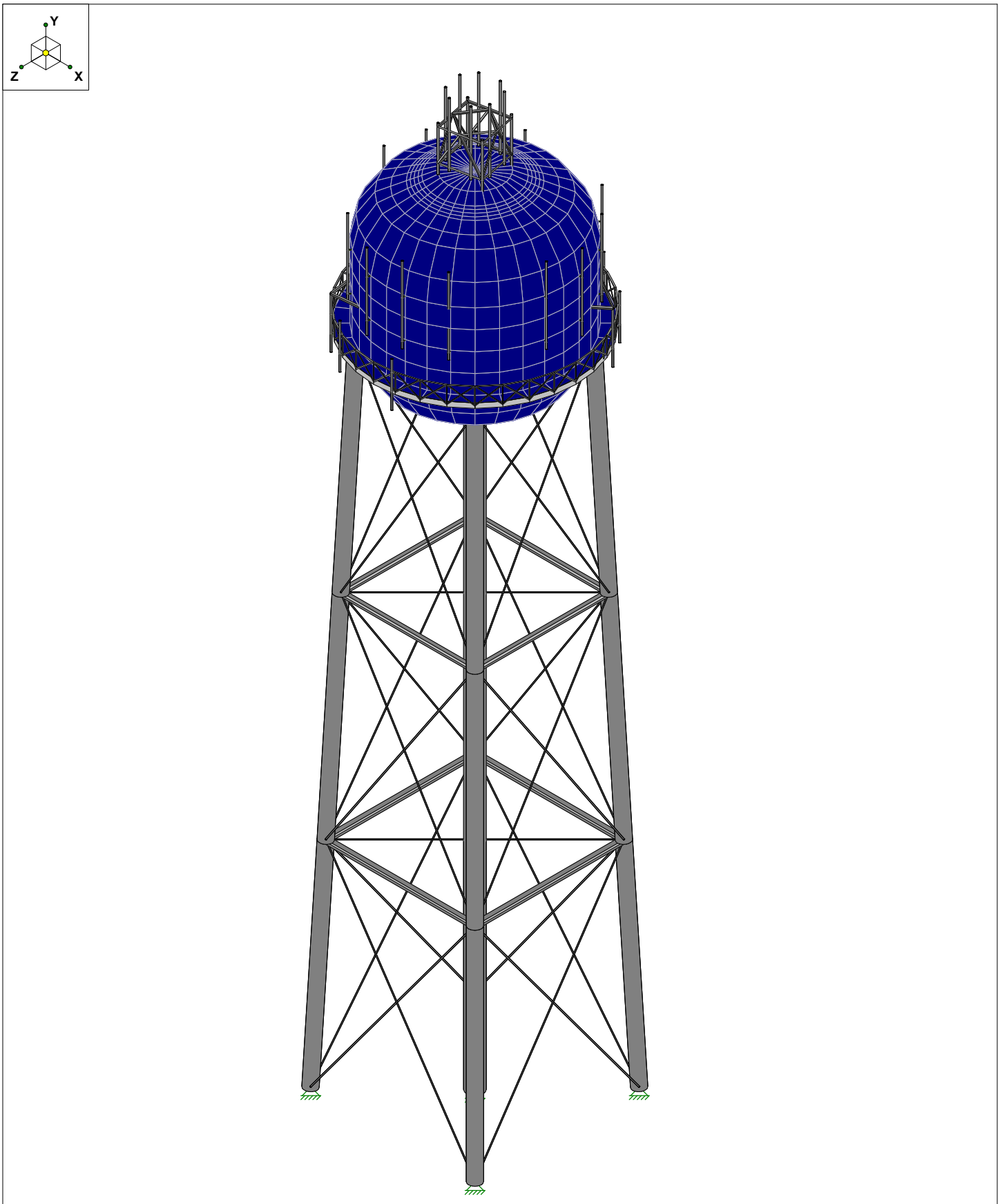
CENTERLINE COMMUNICATIONS

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

| Sector 3 | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Wind Force | | | | Dimensions | Weights |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | H\W\D, in | Wt.\$Wt._{ice}$, lbs. |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 20.24 | 8.73 | 507.21 | 441.75 | 95.9\24\8.5 | 153.3\421.24 |
| Ericsson AIR6449 B41 Antenna | 131 | 5.68 | 2.49 | 142.91 | 124.76 | 33.1\20.6\8.6 | 104\152.89 |
| Ericsson 4460 B25+B66 RRH | 131 | 2.14 | 1.50 | 61.37 | 57.72 | 15.1\17\11.9 | 108\89.51 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.45 | 1.27 | 64.31 | 57.56 | 19.5\15.1\7.8 | 87\80.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 145.14 | 161.17 | 63\11\5 | 40\146.48 |
| Kathrein RA21.7770.00 AT&T | 106 | 6.47 | 3.47 | 145.14 | 161.17 | 63\11\5 | 40\146.48 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 8.00 | 4.62 | 186.17 | 204.34 | 71\12\6 | 60\181.82 |
| Electrical - NEMA Box AT&T | 106 | 0.83 | 0.50 | 19.66 | 21.44 | 10\10\6 | 30\34.85 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.83 | 1.18 | 57.40 | 66.22 | 20\17\7 | 50.7\82.84 |
| Twin LGP21401 AT&T | 106 | 0.23 | 0.11 | 4.93 | 5.58 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 106 | 0.23 | 0.11 | 4.93 | 5.58 | 4.4\6.3\3 | 6\12.82 |
| Twin LGP21901 AT&T | 109.5 | 0.23 | 0.11 | 4.98 | 5.63 | 4.4\6.3\3 | 6\12.89 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 206.11 | 221.90 | 72\12\7 | 60\196.17 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 8.13 | 5.28 | 206.11 | 221.90 | 72\12\7 | 60\196.17 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 14.67 | 5.28 | 292.23 | 344.21 | 72\24\7 | 100\305.52 |
| B66A RRH 4x45 VZW | 113.5 | 1.85 | 1.25 | 47.03 | 50.32 | 14.9\14.9\10.04 | 97.5\73.48 |
| B13 RRH 4x30 VZW | 113.5 | 1.85 | 1.01 | 42.67 | 47.26 | 14.9\14.9\8.14 | 82\66.54 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.35 | 1.35 | 42.55 | 42.55 | 15.73\10.3\10.3 | 32\62.22 |
| | | | | | | | |
| | | | | | | | |

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

| Sector 3 Continue… | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Wind Force with Ice | | | | Wind Force V = 30 mph | | Seismic Force |
| Appurtenances | Rad. Ht., ft | Front EPA $ft^2$ | Side EPA $ft^2$ | 0° Force lbs. | 90° Force lbs. | 0° Force lbs. | 90° Force lbs. | Vs, lbs |
| RFS APXVAALL24_43-U-NA20 Antenna | 131 | 13.72 | 6.83 | 171.11 | 150.37 | 36.19 | 31.52 | 27.47 |
| Ericsson AIR6449 B41 Antenna | 131 | 4.27 | 2.18 | 50.42 | 44.46 | 10.20 | 8.90 | 18.64 |
| Ericsson 4460 B25+B66 RRH | 131 | 1.84 | 1.38 | 22.89 | 21.65 | 4.38 | 4.12 | 19.35 |
| Ericsson 4480 B71+B85 RRH | 131 | 2.07 | 1.25 | 23.98 | 21.73 | 4.59 | 4.11 | 15.59 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 52.61 | 57.67 | 10.35 | 11.50 | 7.17 |
| Kathrein RA21.7770.00 AT&T | 106 | 4.95 | 3.17 | 52.61 | 57.67 | 10.35 | 11.50 | 7.17 |
| KMW HB-X-AW-19-65 Panel AT&T | 107.5 | 5.97 | 3.97 | 66.34 | 72.06 | 13.28 | 14.58 | 10.75 |
| Electrical - NEMA Box AT&T | 106 | 0.87 | 0.61 | 8.27 | 8.90 | 1.40 | 1.53 | 5.38 |
| Ericsson RRU11 B12 AT&T | 105.5 | 2.31 | 1.18 | 21.43 | 24.38 | 4.09 | 4.72 | 9.09 |
| Twin LGP21401 AT&T | 106 | 0.37 | 0.24 | 2.76 | 3.02 | 0.35 | 0.40 | 1.08 |
| Twin LGP21901 AT&T | 106 | 0.37 | 0.24 | 2.76 | 3.02 | 0.35 | 0.40 | 1.08 |
| Twin LGP21901 AT&T | 109.5 | 0.37 | 0.24 | 2.79 | 3.06 | 0.36 | 0.40 | 1.08 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 73.02 | 78.00 | 14.70 | 15.83 | 10.75 |
| Amphenol Quad 856CW000 Panel VZW | 119.5 | 6.08 | 4.39 | 73.02 | 78.00 | 14.70 | 15.83 | 10.75 |
| Amphenol Quad 658C0000G Panel VZW | 119.5 | 10.13 | 4.39 | 100.66 | 117.26 | 20.85 | 24.56 | 17.92 |
| B66A RRH 4x45 VZW | 113.5 | 1.63 | 1.19 | 17.88 | 19.00 | 3.36 | 3.59 | 17.47 |
| B13 RRH 4x30 VZW | 113.5 | 1.63 | 1.03 | 16.39 | 17.95 | 3.04 | 3.37 | 14.69 |
| RRFDC-3315-PF-48 VZW | 114.5 | 1.27 | 1.27 | 16.39 | 16.39 | 3.04 | 3.04 | 5.73 |
| | | | | | | | | |
| | | | | | | | | |




Envelope Only Solution

| | | |
|---|---|---|
| Centerline Communcation... | CTHA383A_SA | RENDERED |
| AP | | Apr 27, 2022 at 12:47 PM |
| | | CTHA383A_SA.r3d |

## Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm (/1E5 F) | Density[lb/ft^3] | Yield[ksi] | Ry | Fu[ksi] | Rt |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | A992 | 29000 | 11154 | .3 | .65 | 490 | 50 | 1.1 | 65 | 1.1 |
| 2 | A36 Gr.36 | 29000 | 11154 | .3 | .65 | 490 | 36 | 1.5 | 58 | 1.2 |
| 3 | A572 Gr.50 | 29000 | 11154 | .3 | .65 | 490 | 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 | 490 | 35 | 1.6 | 60 | 1.2 |
| 7 | A1085 | 29000 | 11154 | .3 | .65 | 490 | 50 | 1.25 | 65 | 1.15 |
| 8 | A913 Gr.65 | 29000 | 11154 | .3 | .65 | 490 | 65 | 1.1 | 80 | 1.1 |

## Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design ... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Leg | 23" OD x 0.30" | Beam | Pipe | A53 Gr.B | Typical | 21.394 | 1378.2... | 1378.2... | 2756.5... |
| 2 | Top Diagonal | Sway Rods 1-1/8" OD | Beam | BAR | A36 Gr.36 | Typical | .994 | .079 | .079 | .157 |
| 3 | Mid Diagnoal | Sway Rods 1-3/8" OD | Beam | BAR | A36 Gr.36 | Typical | 1.485 | .175 | .175 | .351 |
| 4 | Bottom Diagonal | Sway Rods 1-1/2" OD | Beam | BAR | A36 Gr.36 | Typical | 1.767 | .249 | .249 | .497 |
| 5 | Lower Horizontal | W8X31 | Beam | BAR | A36 Gr.36 | Typical | 9.13 | 37.1 | 110 | .536 |
| 6 | Upper Horizontal | W8X24 | Beam | BAR | A36 Gr.36 | Typical | 7.08 | 18.3 | 82.7 | .346 |
| 7 | Riser | 30" OD x 0.30" | Beam | Pipe | A53 Gr.B | Typical | 27.992 | 3086.7... | 3086.7... | 6173.4... |
| 8 | Toe Plate | PL9x1/4 | Beam | RECT | A36 Gr.36 | Typical | 2.25 | .012 | 15.188 | .046 |
| 9 | Top Handrail | L2x1.5x4 | Beam | Single Angle | A36 Gr.36 | Typical | .813 | .151 | .316 | .015 |
| 10 | Vertical | L2x1.5x4 | Beam | Single Angle | A36 Gr.36 | Typical | .813 | .151 | .316 | .015 |
| 11 | Diagonal Brace | PL1.5x1/4 | Beam | RECT | A36 Gr.36 | Typical | .375 | .002 | .07 | .007 |
| 12 | Top Mount Vertical ... | PIPE_2.5X | Beam | Pipe | A53 Gr.B | Typical | 2.1 | 1.83 | 1.83 | 3.66 |
| 13 | Top Mount Horizon... | L2.5x2.5x6 | Beam | Single Angle | A53 Gr.B | Typical | 1.73 | .972 | .972 | .083 |
| 14 | Top Mount Pipe | PIPE_2.5 | Beam | Pipe | A53 Gr.B | Typical | 1.61 | 1.45 | 1.45 | 2.89 |
| 15 | Mount Pipe | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical | 1.02 | .627 | .627 | 1.25 |
| 16 | Kicker Angle | L3X3X3 | Beam | Single Angle | A36 Gr.36 | Typical | 1.09 | .948 | .948 | .014 |
| 17 | Top Mount Bracing | L2.5x2.5x6 | Beam | Single Angle | A53 Gr.B | Typical | 1.73 | .972 | .972 | .083 |

## Joint Coordinates and Temperatures

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 1 | N1 | -156 | 4.423817 | 155.937263 | 0 | |
| 2 | N2 | 156 | 4.423817 | 155.937263 | 0 | |
| 3 | N3 | 0 | 0 | 0 | 0 | |
| 4 | N19 | -118.818046 | 1260.412981 | 118.770262 | 0 | |
| 5 | N35 | 118.818046 | 1260.412981 | 118.770262 | 0 | |
| 6 | N38 | 155.937263 | 4.423817 | -156 | 0 | |
| 7 | N59 | 118.770262 | 1260.412981 | -118.818046 | 0 | |
| 8 | N63 | -156 | 4.423817 | -155.937263 | 0 | |
| 9 | N84 | -118.818046 | 1260.412981 | -118.770262 | 0 | |
| 10 | N200 | -93.380305 | 1260.412981 | 139.657516 | 0 | |
| 11 | N205A | -64.358248 | 1260.412981 | 155.184146 | 0 | |
| 12 | N210A | -32.865859 | 1260.412981 | 164.754176 | 0 | |
| 13 | N215A | -0.111945 | 1260.412981 | 168.00027 | 0 | |
| 14 | N241A | 32.775159 | 1260.41 | 164.771853 | 0 | |
| 15 | N242 | 64.290788 | 1260.41 | 155.211692 | 0 | |
| 16 | N243 | 93.335757 | 1260.41 | 139.686832 | 0 | |
| 17 | N245B | 139.686832 | 1260.41 | 93.335757 | 0 | |
| 18 | N246A | 155.211692 | 1260.41 | 64.290788 | 0 | |
| 19 | N247A | 164.771853 | 1260.41 | 32.775159 | 0 | |
| 20 | N248 | 167.999925 | 1260.41 | 0 | 0 | |
| 21 | N249 | 164.771853 | 1260.41 | -32.775159 | 0 | |
| 22 | N250A | 155.211692 | 1260.41 | -64.290788 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 23 | N251A | 139.686832 | 1260.41 | -93.335757 | 0 | |
| 24 | N253A | 93.335757 | 1260.41 | -139.686832 | 0 | |
| 25 | N254 | 64.290788 | 1260.41 | -155.211692 | 0 | |
| 26 | N255A | 32.775159 | 1260.41 | -164.771853 | 0 | |
| 27 | N256 | 0 | 1260.41 | -167.999925 | 0 | |
| 28 | N257A | -32.775159 | 1260.41 | -164.771853 | 0 | |
| 29 | N258A | -64.290788 | 1260.41 | -155.211692 | 0 | |
| 30 | N259A | -93.335757 | 1260.41 | -139.686832 | 0 | |
| 31 | N261 | -139.686832 | 1260.41 | -93.335757 | 0 | |
| 32 | N262 | -155.211692 | 1260.41 | -64.290788 | 0 | |
| 33 | N263A | -164.771853 | 1260.41 | -32.775159 | 0 | |
| 34 | N264A | -167.999925 | 1260.41 | 0 | 0 | |
| 35 | N265B | -164.771853 | 1260.41 | 32.775159 | 0 | |
| 36 | N266 | -155.211692 | 1260.41 | 64.290788 | 0 | |
| 37 | N267 | -139.686832 | 1260.41 | 93.335757 | 0 | |
| 38 | N257B | 0 | 1152.41 | 50.400274 | 0 | |
| 39 | N258B | 9.832606 | 1152.41 | 49.431846 | 0 | |
| 40 | N259B | 19.28735 | 1152.41 | 46.563781 | 0 | |
| 41 | N260A | 28.000892 | 1152.41 | 41.906296 | 0 | |
| 42 | N261A | 35.638375 | 1152.41 | 35.638375 | 0 | |
| 43 | N262A | 41.906296 | 1152.41 | 28.000892 | 0 | |
| 44 | N263B | 46.563781 | 1152.41 | 19.28735 | 0 | |
| 45 | N264B | 49.431846 | 1152.41 | 9.832606 | 0 | |
| 46 | N265C | 50.400274 | 1152.41 | 0 | 0 | |
| 47 | N266A | 49.431846 | 1152.41 | -9.832606 | 0 | |
| 48 | N267A | 46.563781 | 1152.41 | -19.28735 | 0 | |
| 49 | N268 | 41.906296 | 1152.41 | -28.000892 | 0 | |
| 50 | N269A | 35.638375 | 1152.41 | -35.638375 | 0 | |
| 51 | N270B | 28.000892 | 1152.41 | -41.906296 | 0 | |
| 52 | N271A | 19.28735 | 1152.41 | -46.563781 | 0 | |
| 53 | N272 | 9.832606 | 1152.41 | -49.431846 | 0 | |
| 54 | N273 | 0 | 1152.41 | -50.400274 | 0 | |
| 55 | N274 | -9.832606 | 1152.41 | -49.431846 | 0 | |
| 56 | N275B | -19.28735 | 1152.41 | -46.563781 | 0 | |
| 57 | N276A | -28.000892 | 1152.41 | -41.906296 | 0 | |
| 58 | N277A | -35.638375 | 1152.41 | -35.638375 | 0 | |
| 59 | N278 | -41.906296 | 1152.41 | -28.000892 | 0 | |
| 60 | N279 | -46.563781 | 1152.41 | -19.28735 | 0 | |
| 61 | N280A | -49.431846 | 1152.41 | -9.832606 | 0 | |
| 62 | N281A | -50.400274 | 1152.41 | 0 | 0 | |
| 63 | N282A | -49.431846 | 1152.41 | 9.832606 | 0 | |
| 64 | N283A | -46.563781 | 1152.41 | 19.28735 | 0 | |
| 65 | N284 | -41.906296 | 1152.41 | 28.000892 | 0 | |
| 66 | N285A | -35.638375 | 1152.41 | 35.638375 | 0 | |
| 67 | N286 | -28.000892 | 1152.41 | 41.906296 | 0 | |
| 68 | N287A | -19.28735 | 1152.41 | 46.563781 | 0 | |
| 69 | N288A | -9.832606 | 1152.41 | 49.431846 | 0 | |
| 70 | N290A | 0 | 1188.41 | 134.400729 | 0 | |
| 71 | N291 | 26.220282 | 1188.41 | 131.818257 | 0 | |
| 72 | N292 | 51.432932 | 1188.41 | 124.170083 | 0 | |
| 73 | N293A | 74.669045 | 1188.41 | 111.750122 | 0 | |
| 74 | N294 | 95.035667 | 1188.41 | 95.035667 | 0 | |
| 75 | N295A | 111.750122 | 1188.41 | 74.669045 | 0 | |
| 76 | N296 | 124.170083 | 1188.41 | 51.432932 | 0 | |
| 77 | N297 | 131.818257 | 1188.41 | 26.220282 | 0 | |
| 78 | N298 | 134.400729 | 1188.41 | 0 | 0 | |
| 79 | N299 | 131.818257 | 1188.41 | -26.220282 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 80 | N300A | 124.170083 | 1188.41 | -51.432932 | 0 | |
| 81 | N301 | 111.750122 | 1188.41 | -74.669045 | 0 | |
| 82 | N302 | 95.035667 | 1188.41 | -95.035667 | 0 | |
| 83 | N303 | 74.669045 | 1188.41 | -111.750122 | 0 | |
| 84 | N304 | 51.432932 | 1188.41 | -124.170083 | 0 | |
| 85 | N305A | 26.220282 | 1188.41 | -131.818257 | 0 | |
| 86 | N306 | 0 | 1188.41 | -134.400729 | 0 | |
| 87 | N307 | -26.220282 | 1188.41 | -131.818257 | 0 | |
| 88 | N308 | -51.432932 | 1188.41 | -124.170083 | 0 | |
| 89 | N309 | -74.669045 | 1188.41 | -111.750122 | 0 | |
| 90 | N310A | -95.035667 | 1188.41 | -95.035667 | 0 | |
| 91 | N311 | -111.750122 | 1188.41 | -74.669045 | 0 | |
| 92 | N312 | -124.170083 | 1188.41 | -51.432932 | 0 | |
| 93 | N313 | -131.818257 | 1188.41 | -26.220282 | 0 | |
| 94 | N314 | -134.400729 | 1188.41 | 0 | 0 | |
| 95 | N315A | -131.818257 | 1188.41 | 26.220282 | 0 | |
| 96 | N316 | -124.170083 | 1188.41 | 51.432932 | 0 | |
| 97 | N317 | -111.750122 | 1188.41 | 74.669045 | 0 | |
| 98 | N318 | -95.035667 | 1188.41 | 95.035667 | 0 | |
| 99 | N319 | -74.669045 | 1188.41 | 111.750122 | 0 | |
| 100 | N320A | -51.432932 | 1188.41 | 124.170083 | 0 | |
| 101 | N321 | -26.220282 | 1188.41 | 131.818257 | 0 | |
| 102 | N323 | 0 | 1224.41 | 159.600866 | 0 | |
| 103 | N324 | 31.136584 | 1224.41 | 156.53418 | 0 | |
| 104 | N325A | 61.076607 | 1224.41 | 147.451974 | 0 | |
| 105 | N326 | 88.66949 | 1224.41 | 132.70327 | 0 | |
| 106 | N327 | 112.854855 | 1224.41 | 112.854855 | 0 | |
| 107 | N328 | 132.70327 | 1224.41 | 88.66949 | 0 | |
| 108 | N329 | 147.451974 | 1224.41 | 61.076607 | 0 | |
| 109 | N330A | 156.53418 | 1224.41 | 31.136584 | 0 | |
| 110 | N331 | 159.600866 | 1224.41 | 0 | 0 | |
| 111 | N332 | 156.53418 | 1224.41 | -31.136584 | 0 | |
| 112 | N333 | 147.451974 | 1224.41 | -61.076607 | 0 | |
| 113 | N334 | 132.70327 | 1224.41 | -88.66949 | 0 | |
| 114 | N335A | 112.854855 | 1224.41 | -112.854855 | 0 | |
| 115 | N336 | 88.66949 | 1224.41 | -132.70327 | 0 | |
| 116 | N337 | 61.076607 | 1224.41 | -147.451974 | 0 | |
| 117 | N338 | 31.136584 | 1224.41 | -156.53418 | 0 | |
| 118 | N339 | 0 | 1224.41 | -159.600866 | 0 | |
| 119 | N340A | -31.136584 | 1224.41 | -156.53418 | 0 | |
| 120 | N341 | -61.076607 | 1224.41 | -147.451974 | 0 | |
| 121 | N342 | -88.66949 | 1224.41 | -132.70327 | 0 | |
| 122 | N343 | -112.854855 | 1224.41 | -112.854855 | 0 | |
| 123 | N344 | -132.70327 | 1224.41 | -88.66949 | 0 | |
| 124 | N345A | -147.451974 | 1224.41 | -61.076607 | 0 | |
| 125 | N346 | -156.53418 | 1224.41 | -31.136584 | 0 | |
| 126 | N347 | -159.600866 | 1224.41 | 0 | 0 | |
| 127 | N348 | -156.53418 | 1224.41 | 31.136584 | 0 | |
| 128 | N349 | -147.451974 | 1224.41 | 61.076607 | 0 | |
| 129 | N350A | -132.70327 | 1224.41 | 88.66949 | 0 | |
| 130 | N351 | -112.854855 | 1224.41 | 112.854855 | 0 | |
| 131 | N352 | -88.66949 | 1224.41 | 132.70327 | 0 | |
| 132 | N353 | -61.076607 | 1224.41 | 147.451974 | 0 | |
| 133 | N354 | -31.136584 | 1224.41 | 156.53418 | 0 | |
| 134 | N389 | 0 | 1296.41 | 168.000912 | 0 | |
| 135 | N390 | 32.775352 | 1296.41 | 164.772821 | 0 | |
| 136 | N391 | 64.291166 | 1296.41 | 155.212604 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 137 | N392 | 93.336306 | 1296.41 | 139.687653 | 0 | |
| 138 | N393 | 118.794584 | 1296.41 | 118.794584 | 0 | |
| 139 | N394 | 139.687653 | 1296.41 | 93.336306 | 0 | |
| 140 | N395 | 155.212604 | 1296.41 | 64.291166 | 0 | |
| 141 | N396 | 164.772821 | 1296.41 | 32.775352 | 0 | |
| 142 | N397 | 168.000912 | 1296.41 | 0 | 0 | |
| 143 | N398 | 164.772821 | 1296.41 | -32.775352 | 0 | |
| 144 | N399 | 155.212604 | 1296.41 | -64.291166 | 0 | |
| 145 | N400 | 139.687653 | 1296.41 | -93.336306 | 0 | |
| 146 | N401 | 118.794584 | 1296.41 | -118.794584 | 0 | |
| 147 | N402 | 93.336306 | 1296.41 | -139.687653 | 0 | |
| 148 | N403 | 64.291166 | 1296.41 | -155.212604 | 0 | |
| 149 | N404 | 32.775352 | 1296.41 | -164.772821 | 0 | |
| 150 | N405 | 0 | 1296.41 | -168.000912 | 0 | |
| 151 | N406 | -32.775352 | 1296.41 | -164.772821 | 0 | |
| 152 | N407 | -64.291166 | 1296.41 | -155.212604 | 0 | |
| 153 | N408 | -93.336306 | 1296.41 | -139.687653 | 0 | |
| 154 | N409 | -118.794584 | 1296.41 | -118.794584 | 0 | |
| 155 | N410 | -139.687653 | 1296.41 | -93.336306 | 0 | |
| 156 | N411 | -155.212604 | 1296.41 | -64.291166 | 0 | |
| 157 | N412 | -164.772821 | 1296.41 | -32.775352 | 0 | |
| 158 | N413 | -168.000912 | 1296.41 | 0 | 0 | |
| 159 | N414 | -164.772821 | 1296.41 | 32.775352 | 0 | |
| 160 | N415 | -155.212604 | 1296.41 | 64.291166 | 0 | |
| 161 | N416 | -139.687653 | 1296.41 | 93.336306 | 0 | |
| 162 | N417 | -118.794584 | 1296.41 | 118.794584 | 0 | |
| 163 | N418 | -93.336306 | 1296.41 | 139.687653 | 0 | |
| 164 | N419 | -64.291166 | 1296.41 | 155.212604 | 0 | |
| 165 | N420 | -32.775352 | 1296.41 | 164.772821 | 0 | |
| 166 | N422 | 0 | 1332.41 | 168.000912 | 0 | |
| 167 | N423 | 32.775352 | 1332.41 | 164.772821 | 0 | |
| 168 | N424 | 64.291166 | 1332.41 | 155.212604 | 0 | |
| 169 | N425 | 93.336306 | 1332.41 | 139.687653 | 0 | |
| 170 | N426 | 118.794584 | 1332.41 | 118.794584 | 0 | |
| 171 | N427 | 139.687653 | 1332.41 | 93.336306 | 0 | |
| 172 | N428 | 155.212604 | 1332.41 | 64.291166 | 0 | |
| 173 | N429 | 164.772821 | 1332.41 | 32.775352 | 0 | |
| 174 | N430 | 168.000912 | 1332.41 | 0 | 0 | |
| 175 | N431 | 164.772821 | 1332.41 | -32.775352 | 0 | |
| 176 | N432 | 155.212604 | 1332.41 | -64.291166 | 0 | |
| 177 | N433 | 139.687653 | 1332.41 | -93.336306 | 0 | |
| 178 | N434 | 118.794584 | 1332.41 | -118.794584 | 0 | |
| 179 | N435 | 93.336306 | 1332.41 | -139.687653 | 0 | |
| 180 | N436 | 64.291166 | 1332.41 | -155.212604 | 0 | |
| 181 | N437 | 32.775352 | 1332.41 | -164.772821 | 0 | |
| 182 | N438 | 0 | 1332.41 | -168.000912 | 0 | |
| 183 | N439 | -32.775352 | 1332.41 | -164.772821 | 0 | |
| 184 | N440 | -64.291166 | 1332.41 | -155.212604 | 0 | |
| 185 | N441 | -93.336306 | 1332.41 | -139.687653 | 0 | |
| 186 | N442 | -118.794584 | 1332.41 | -118.794584 | 0 | |
| 187 | N443 | -139.687653 | 1332.41 | -93.336306 | 0 | |
| 188 | N444 | -155.212604 | 1332.41 | -64.291166 | 0 | |
| 189 | N445 | -164.772821 | 1332.41 | -32.775352 | 0 | |
| 190 | N446 | -168.000912 | 1332.41 | 0 | 0 | |
| 191 | N447 | -164.772821 | 1332.41 | 32.775352 | 0 | |
| 192 | N448 | -155.212604 | 1332.41 | 64.291166 | 0 | |
| 193 | N449 | -139.687653 | 1332.41 | 93.336306 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 194 | N450 | -118.794584 | 1332.41 | 118.794584 | 0 | |
| 195 | N451 | -93.336306 | 1332.41 | 139.687653 | 0 | |
| 196 | N452 | -64.291166 | 1332.41 | 155.212604 | 0 | |
| 197 | N453 | -32.775352 | 1332.41 | 164.772821 | 0 | |
| 198 | N455 | 0 | 1368.41 | 168.000912 | 0 | |
| 199 | N456 | 32.775352 | 1368.41 | 164.772821 | 0 | |
| 200 | N457 | 64.291166 | 1368.41 | 155.212604 | 0 | |
| 201 | N458 | 93.336306 | 1368.41 | 139.687653 | 0 | |
| 202 | N459 | 118.794584 | 1368.41 | 118.794584 | 0 | |
| 203 | N460 | 139.687653 | 1368.41 | 93.336306 | 0 | |
| 204 | N461 | 155.212604 | 1368.41 | 64.291166 | 0 | |
| 205 | N462 | 164.772821 | 1368.41 | 32.775352 | 0 | |
| 206 | N463 | 168.000912 | 1368.41 | 0 | 0 | |
| 207 | N464 | 164.772821 | 1368.41 | -32.775352 | 0 | |
| 208 | N465 | 155.212604 | 1368.41 | -64.291166 | 0 | |
| 209 | N466 | 139.687653 | 1368.41 | -93.336306 | 0 | |
| 210 | N467 | 118.794584 | 1368.41 | -118.794584 | 0 | |
| 211 | N468 | 93.336306 | 1368.41 | -139.687653 | 0 | |
| 212 | N469 | 64.291166 | 1368.41 | -155.212604 | 0 | |
| 213 | N470 | 32.775352 | 1368.41 | -164.772821 | 0 | |
| 214 | N471 | 0 | 1368.41 | -168.000912 | 0 | |
| 215 | N472 | -32.775352 | 1368.41 | -164.772821 | 0 | |
| 216 | N473 | -64.291166 | 1368.41 | -155.212604 | 0 | |
| 217 | N474 | -93.336306 | 1368.41 | -139.687653 | 0 | |
| 218 | N475 | -118.794584 | 1368.41 | -118.794584 | 0 | |
| 219 | N476 | -139.687653 | 1368.41 | -93.336306 | 0 | |
| 220 | N477 | -155.212604 | 1368.41 | -64.291166 | 0 | |
| 221 | N478 | -164.772821 | 1368.41 | -32.775352 | 0 | |
| 222 | N479 | -168.000912 | 1368.41 | 0 | 0 | |
| 223 | N480 | -164.772821 | 1368.41 | 32.775352 | 0 | |
| 224 | N481 | -155.212604 | 1368.41 | 64.291166 | 0 | |
| 225 | N482 | -139.687653 | 1368.41 | 93.336306 | 0 | |
| 226 | N483 | -118.794584 | 1368.41 | 118.794584 | 0 | |
| 227 | N484 | -93.336306 | 1368.41 | 139.687653 | 0 | |
| 228 | N485 | -64.291166 | 1368.41 | 155.212604 | 0 | |
| 229 | N486 | -32.775352 | 1368.41 | 164.772821 | 0 | |
| 230 | N488 | 0 | 1404.41 | 168.000912 | 0 | |
| 231 | N489 | 32.775352 | 1404.41 | 164.772821 | 0 | |
| 232 | N490 | 64.291166 | 1404.41 | 155.212604 | 0 | |
| 233 | N491 | 93.336306 | 1404.41 | 139.687653 | 0 | |
| 234 | N492 | 118.794584 | 1404.41 | 118.794584 | 0 | |
| 235 | N493 | 139.687653 | 1404.41 | 93.336306 | 0 | |
| 236 | N494 | 155.212604 | 1404.41 | 64.291166 | 0 | |
| 237 | N495 | 164.772821 | 1404.41 | 32.775352 | 0 | |
| 238 | N496 | 168.000912 | 1404.41 | 0 | 0 | |
| 239 | N497 | 164.772821 | 1404.41 | -32.775352 | 0 | |
| 240 | N498 | 155.212604 | 1404.41 | -64.291166 | 0 | |
| 241 | N499 | 139.687653 | 1404.41 | -93.336306 | 0 | |
| 242 | N500 | 118.794584 | 1404.41 | -118.794584 | 0 | |
| 243 | N501 | 93.336306 | 1404.41 | -139.687653 | 0 | |
| 244 | N502 | 64.291166 | 1404.41 | -155.212604 | 0 | |
| 245 | N503 | 32.775352 | 1404.41 | -164.772821 | 0 | |
| 246 | N504 | 0 | 1404.41 | -168.000912 | 0 | |
| 247 | N505 | -32.775352 | 1404.41 | -164.772821 | 0 | |
| 248 | N506 | -64.291166 | 1404.41 | -155.212604 | 0 | |
| 249 | N507 | -93.336306 | 1404.41 | -139.687653 | 0 | |
| 250 | N508 | -118.794584 | 1404.41 | -118.794584 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 251 | N509 | -139.687653 | 1404.41 | -93.336306 | 0 | |
| 252 | N510 | -155.212604 | 1404.41 | -64.291166 | 0 | |
| 253 | N511 | -164.772821 | 1404.41 | -32.775352 | 0 | |
| 254 | N512 | -168.000912 | 1404.41 | 0 | 0 | |
| 255 | N513 | -164.772821 | 1404.41 | 32.775352 | 0 | |
| 256 | N514 | -155.212604 | 1404.41 | 64.291166 | 0 | |
| 257 | N515 | -139.687653 | 1404.41 | 93.336306 | 0 | |
| 258 | N516 | -118.794584 | 1404.41 | 118.794584 | 0 | |
| 259 | N517 | -93.336306 | 1404.41 | 139.687653 | 0 | |
| 260 | N518 | -64.291166 | 1404.41 | 155.212604 | 0 | |
| 261 | N519 | -32.775352 | 1404.41 | 164.772821 | 0 | |
| 262 | N521 | 0 | 1440.41 | 159.600866 | 0 | |
| 263 | N522 | 31.136584 | 1440.41 | 156.53418 | 0 | |
| 264 | N523 | 61.076607 | 1440.41 | 147.451974 | 0 | |
| 265 | N524 | 88.66949 | 1440.41 | 132.70327 | 0 | |
| 266 | N525 | 112.854855 | 1440.41 | 112.854855 | 0 | |
| 267 | N526 | 132.70327 | 1440.41 | 88.66949 | 0 | |
| 268 | N527 | 147.451974 | 1440.41 | 61.076607 | 0 | |
| 269 | N528 | 156.53418 | 1440.41 | 31.136584 | 0 | |
| 270 | N529 | 159.600866 | 1440.41 | 0 | 0 | |
| 271 | N530 | 156.53418 | 1440.41 | -31.136584 | 0 | |
| 272 | N531 | 147.451974 | 1440.41 | -61.076607 | 0 | |
| 273 | N532 | 132.70327 | 1440.41 | -88.66949 | 0 | |
| 274 | N533 | 112.854855 | 1440.41 | -112.854855 | 0 | |
| 275 | N534 | 88.66949 | 1440.41 | -132.70327 | 0 | |
| 276 | N535 | 61.076607 | 1440.41 | -147.451974 | 0 | |
| 277 | N536 | 31.136584 | 1440.41 | -156.53418 | 0 | |
| 278 | N537 | 0 | 1440.41 | -159.600866 | 0 | |
| 279 | N538 | -31.136584 | 1440.41 | -156.53418 | 0 | |
| 280 | N539 | -61.076607 | 1440.41 | -147.451974 | 0 | |
| 281 | N540 | -88.66949 | 1440.41 | -132.70327 | 0 | |
| 282 | N541 | -112.854855 | 1440.41 | -112.854855 | 0 | |
| 283 | N542 | -132.70327 | 1440.41 | -88.66949 | 0 | |
| 284 | N543 | -147.451974 | 1440.41 | -61.076607 | 0 | |
| 285 | N544 | -156.53418 | 1440.41 | -31.136584 | 0 | |
| 286 | N545 | -159.600866 | 1440.41 | 0 | 0 | |
| 287 | N546 | -156.53418 | 1440.41 | 31.136584 | 0 | |
| 288 | N547 | -147.451974 | 1440.41 | 61.076607 | 0 | |
| 289 | N548 | -132.70327 | 1440.41 | 88.66949 | 0 | |
| 290 | N549 | -112.854855 | 1440.41 | 112.854855 | 0 | |
| 291 | N550 | -88.66949 | 1440.41 | 132.70327 | 0 | |
| 292 | N551 | -61.076607 | 1440.41 | 147.451974 | 0 | |
| 293 | N552 | -31.136584 | 1440.41 | 156.53418 | 0 | |
| 294 | N554 | 0 | 1476.41 | 134.400729 | 0 | |
| 295 | N555 | 26.220282 | 1476.41 | 131.818257 | 0 | |
| 296 | N556 | 51.432932 | 1476.41 | 124.170083 | 0 | |
| 297 | N557 | 74.669045 | 1476.41 | 111.750122 | 0 | |
| 298 | N558 | 95.035667 | 1476.41 | 95.035667 | 0 | |
| 299 | N559 | 111.750122 | 1476.41 | 74.669045 | 0 | |
| 300 | N560 | 124.170083 | 1476.41 | 51.432932 | 0 | |
| 301 | N561 | 131.818257 | 1476.41 | 26.220282 | 0 | |
| 302 | N562 | 134.400729 | 1476.41 | 0 | 0 | |
| 303 | N563 | 131.818257 | 1476.41 | -26.220282 | 0 | |
| 304 | N564 | 124.170083 | 1476.41 | -51.432932 | 0 | |
| 305 | N565 | 111.750122 | 1476.41 | -74.669045 | 0 | |
| 306 | N566 | 95.035667 | 1476.41 | -95.035667 | 0 | |
| 307 | N567 | 74.669045 | 1476.41 | -111.750122 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 308 | N568 | 51.432932 | 1476.41 | -124.170083 | 0 | |
| 309 | N569 | 26.220282 | 1476.41 | -131.818257 | 0 | |
| 310 | N570 | 0 | 1476.41 | -134.400729 | 0 | |
| 311 | N571 | -26.220282 | 1476.41 | -131.818257 | 0 | |
| 312 | N572 | -51.432932 | 1476.41 | -124.170083 | 0 | |
| 313 | N573 | -74.669045 | 1476.41 | -111.750122 | 0 | |
| 314 | N574 | -95.035667 | 1476.41 | -95.035667 | 0 | |
| 315 | N575 | -111.750122 | 1476.41 | -74.669045 | 0 | |
| 316 | N576 | -124.170083 | 1476.41 | -51.432932 | 0 | |
| 317 | N577 | -131.818257 | 1476.41 | -26.220282 | 0 | |
| 318 | N578 | -134.400729 | 1476.41 | 0 | 0 | |
| 319 | N579 | -131.818257 | 1476.41 | 26.220282 | 0 | |
| 320 | N580 | -124.170083 | 1476.41 | 51.432932 | 0 | |
| 321 | N581 | -111.750122 | 1476.41 | 74.669045 | 0 | |
| 322 | N582 | -95.035667 | 1476.41 | 95.035667 | 0 | |
| 323 | N583 | -74.669045 | 1476.41 | 111.750122 | 0 | |
| 324 | N584 | -51.432932 | 1476.41 | 124.170083 | 0 | |
| 325 | N585 | -26.220282 | 1476.41 | 131.818257 | 0 | |
| 326 | N587 | 0 | 1512.41 | 50.400274 | 0 | |
| 327 | N588 | 9.832606 | 1512.41 | 49.431846 | 0 | |
| 328 | N589 | 19.28735 | 1512.41 | 46.563781 | 0 | |
| 329 | N590 | 28.000892 | 1512.41 | 41.906296 | 0 | |
| 330 | N591 | 35.638375 | 1512.41 | 35.638375 | 0 | |
| 331 | N592 | 41.906296 | 1512.41 | 28.000892 | 0 | |
| 332 | N593 | 46.563781 | 1512.41 | 19.28735 | 0 | |
| 333 | N594 | 49.431846 | 1512.41 | 9.832606 | 0 | |
| 334 | N595 | 50.400274 | 1512.41 | 0 | 0 | |
| 335 | N596 | 49.431846 | 1512.41 | -9.832606 | 0 | |
| 336 | N597 | 46.563781 | 1512.41 | -19.28735 | 0 | |
| 337 | N598 | 41.906296 | 1512.41 | -28.000892 | 0 | |
| 338 | N599 | 35.638375 | 1512.41 | -35.638375 | 0 | |
| 339 | N600 | 28.000892 | 1512.41 | -41.906296 | 0 | |
| 340 | N601 | 19.28735 | 1512.41 | -46.563781 | 0 | |
| 341 | N602 | 9.832606 | 1512.41 | -49.431846 | 0 | |
| 342 | N603 | 0 | 1512.41 | -50.400274 | 0 | |
| 343 | N604 | -9.832606 | 1512.41 | -49.431846 | 0 | |
| 344 | N605 | -19.28735 | 1512.41 | -46.563781 | 0 | |
| 345 | N606 | -28.000892 | 1512.41 | -41.906296 | 0 | |
| 346 | N607 | -35.638375 | 1512.41 | -35.638375 | 0 | |
| 347 | N608 | -41.906296 | 1512.41 | -28.000892 | 0 | |
| 348 | N609 | -46.563781 | 1512.41 | -19.28735 | 0 | |
| 349 | N610 | -49.431846 | 1512.41 | -9.832606 | 0 | |
| 350 | N611 | -50.400274 | 1512.41 | 0 | 0 | |
| 351 | N612 | -49.431846 | 1512.41 | 9.832606 | 0 | |
| 352 | N613 | -46.563781 | 1512.41 | 19.28735 | 0 | |
| 353 | N614 | -41.906296 | 1512.41 | 28.000892 | 0 | |
| 354 | N615 | -35.638375 | 1512.41 | 35.638375 | 0 | |
| 355 | N616 | -28.000892 | 1512.41 | 41.906296 | 0 | |
| 356 | N617 | -19.28735 | 1512.41 | 46.563781 | 0 | |
| 357 | N618 | -9.832606 | 1512.41 | 49.431846 | 0 | |
| 358 | N609A | 0 | 1512.41 | 0 | 0 | |
| 359 | N642 | 0 | 1152.41 | 0 | 0 | |
| 360 | N360 | 191.999925 | 1260.41 | 0 | 0 | |
| 361 | N361 | 188.3107 | 1260.41 | -37.457327 | 0 | |
| 362 | N362 | 191.999925 | 1292.41 | 0 | 0 | |
| 363 | N363 | 188.3107 | 1292.41 | -37.457327 | 0 | |
| 364 | N365 | 177.384801 | 1260.41 | -73.47519 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 365 | N367 | 177.384801 | 1292.41 | -73.47519 | 0 | |
| 366 | N369 | 159.642103 | 1260.41 | -106.669443 | 0 | |
| 367 | N371 | 159.642103 | 1292.41 | -106.669443 | 0 | |
| 368 | N373 | 135.764449 | 1260.41 | -135.764449 | 0 | |
| 369 | N375 | 135.764449 | 1292.41 | -135.764449 | 0 | |
| 370 | N377 | 106.669443 | 1260.41 | -159.642103 | 0 | |
| 371 | N379 | 106.669443 | 1292.41 | -159.642103 | 0 | |
| 372 | N381 | 73.47519 | 1260.41 | -177.384801 | 0 | |
| 373 | N383 | 73.47519 | 1292.41 | -177.384801 | 0 | |
| 374 | N385 | 37.457327 | 1260.41 | -188.3107 | 0 | |
| 375 | N387 | 37.457327 | 1292.41 | -188.3107 | 0 | |
| 376 | N389A | -0. | 1260.41 | -191.999925 | 0 | |
| 377 | N391A | -0. | 1292.41 | -191.999925 | 0 | |
| 378 | N393A | -37.457327 | 1260.41 | -188.3107 | 0 | |
| 379 | N395A | -37.457327 | 1292.41 | -188.3107 | 0 | |
| 380 | N397A | -73.47519 | 1260.41 | -177.384801 | 0 | |
| 381 | N399A | -73.47519 | 1292.41 | -177.384801 | 0 | |
| 382 | N401A | -106.669443 | 1260.41 | -159.642103 | 0 | |
| 383 | N403A | -106.669443 | 1292.41 | -159.642103 | 0 | |
| 384 | N405A | -135.764449 | 1260.41 | -135.764449 | 0 | |
| 385 | N407A | -135.764449 | 1292.41 | -135.764449 | 0 | |
| 386 | N409A | -159.642103 | 1260.41 | -106.669443 | 0 | |
| 387 | N411A | -159.642103 | 1292.41 | -106.669443 | 0 | |
| 388 | N413A | -177.384801 | 1260.41 | -73.47519 | 0 | |
| 389 | N415A | -177.384801 | 1292.41 | -73.47519 | 0 | |
| 390 | N417A | -188.3107 | 1260.41 | -37.457327 | 0 | |
| 391 | N419A | -188.3107 | 1292.41 | -37.457327 | 0 | |
| 392 | N421 | -191.999925 | 1260.41 | 0. | 0 | |
| 393 | N423A | -191.999925 | 1292.41 | 0. | 0 | |
| 394 | N425A | -188.3107 | 1260.41 | 37.457327 | 0 | |
| 395 | N427A | -188.3107 | 1292.41 | 37.457327 | 0 | |
| 396 | N429A | -177.384801 | 1260.41 | 73.47519 | 0 | |
| 397 | N431A | -177.384801 | 1292.41 | 73.47519 | 0 | |
| 398 | N433A | -159.642103 | 1260.41 | 106.669443 | 0 | |
| 399 | N435A | -159.642103 | 1292.41 | 106.669443 | 0 | |
| 400 | N437A | -135.764449 | 1260.41 | 135.764449 | 0 | |
| 401 | N439A | -135.764449 | 1292.41 | 135.764449 | 0 | |
| 402 | N441A | -106.669443 | 1260.41 | 159.642103 | 0 | |
| 403 | N443A | -106.669443 | 1292.41 | 159.642103 | 0 | |
| 404 | N445A | -73.47519 | 1260.41 | 177.384801 | 0 | |
| 405 | N447A | -73.47519 | 1292.41 | 177.384801 | 0 | |
| 406 | N449A | -37.457327 | 1260.41 | 188.3107 | 0 | |
| 407 | N451A | -37.457327 | 1292.41 | 188.3107 | 0 | |
| 408 | N453A | 0. | 1260.41 | 191.999925 | 0 | |
| 409 | N455A | 0. | 1292.41 | 191.999925 | 0 | |
| 410 | N457A | 37.457327 | 1260.41 | 188.3107 | 0 | |
| 411 | N459A | 37.457327 | 1292.41 | 188.3107 | 0 | |
| 412 | N461A | 73.47519 | 1260.41 | 177.384801 | 0 | |
| 413 | N463A | 73.47519 | 1292.41 | 177.384801 | 0 | |
| 414 | N465A | 106.669443 | 1260.41 | 159.642103 | 0 | |
| 415 | N467A | 106.669443 | 1292.41 | 159.642103 | 0 | |
| 416 | N469A | 135.764449 | 1260.41 | 135.764449 | 0 | |
| 417 | N471A | 135.764449 | 1292.41 | 135.764449 | 0 | |
| 418 | N473A | 159.642103 | 1260.41 | 106.669443 | 0 | |
| 419 | N475A | 159.642103 | 1292.41 | 106.669443 | 0 | |
| 420 | N477A | 177.384801 | 1260.41 | 73.47519 | 0 | |
| 421 | N479A | 177.384801 | 1292.41 | 73.47519 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 422 | N481A | 188.3107 | 1260.41 | 37.457327 | 0 | |
| 423 | N483A | 188.3107 | 1292.41 | 37.457327 | 0 | |
| 424 | N424A | 141.618285 | 411.085878 | 141.57646 | 0 | |
| 425 | N425B | 127.23657 | 817.747939 | 127.215657 | 0 | |
| 426 | N426A | 141.57646 | 411.085878 | -141.618285 | 0 | |
| 427 | N427B | 127.215657 | 817.747939 | -127.23657 | 0 | |
| 428 | N428A | -141.618285 | 411.085878 | -141.57646 | 0 | |
| 429 | N429B | -127.23657 | 817.747939 | -127.215657 | 0 | |
| 430 | N430A | -141.618285 | 411.085878 | 141.57646 | 0 | |
| 431 | N431B | -127.23657 | 817.747939 | 127.215657 | 0 | |
| 432 | N432A | 0 | 411.085878 | 0 | 0 | |
| 433 | N433B | 0 | 817.747939 | 0 | 0 | |
| 434 | N434A | 65.965357 | 1503.41 | 27.323745 | 0 | |
| 435 | N435B | 70.028449 | 1503.41 | 13.929525 | 0 | |
| 436 | N436A | 85.366932 | 1494.41 | 35.360141 | 0 | |
| 437 | N437B | 90.625052 | 1494.41 | 18.026444 | 0 | |
| 438 | N438A | 104.768508 | 1485.41 | 43.396537 | 0 | |
| 439 | N439B | 111.221654 | 1485.41 | 22.123363 | 0 | |
| 440 | N440A | -65.965357 | 1503.41 | 27.323745 | 0 | |
| 441 | N441B | -59.367253 | 1503.41 | 39.66793 | 0 | |
| 442 | N442A | -85.366932 | 1494.41 | 35.360141 | 0 | |
| 443 | N443B | -76.828209 | 1494.41 | 51.334968 | 0 | |
| 444 | N444A | -104.768508 | 1485.41 | 43.396537 | 0 | |
| 445 | N445B | -94.289166 | 1485.41 | 63.002006 | 0 | |
| 446 | N446A | 0 | 1503.41 | -71.400388 | 0 | |
| 447 | N447B | -13.929525 | 1503.41 | -70.028449 | 0 | |
| 448 | N448A | 0 | 1494.41 | -92.400502 | 0 | |
| 449 | N449B | -18.026444 | 1494.41 | -90.625052 | 0 | |
| 450 | N450A | 0 | 1485.41 | -113.400615 | 0 | |
| 451 | N451B | -22.123363 | 1485.41 | -111.221654 | 0 | |
| 452 | N474A | 73.306247 | 1494.41 | 56.249861 | 0 | |
| 453 | N476A | -80.021182 | 1494.41 | 46.200251 | 0 | |
| 454 | N456A | 70.815751 | 1501.16 | 29.332844 | 0 | |
| 455 | N457B | 75.1776 | 1501.16 | 14.953754 | 0 | |
| 456 | N458A | 75.666144 | 1498.91 | 31.341943 | 0 | |
| 457 | N459B | 80.32675 | 1498.91 | 15.977984 | 0 | |
| 458 | N460A | 80.516538 | 1496.66 | 33.351042 | 0 | |
| 459 | N461B | 85.475901 | 1496.66 | 17.002214 | 0 | |
| 460 | N524A | -50.487698 | 1503.41 | 50.487698 | 0 | |
| 461 | N525A | -65.337021 | 1494.41 | 65.337021 | 0 | |
| 462 | N526A | -80.186344 | 1485.41 | 80.186344 | 0 | |
| 463 | N527A | 32.775352 | 1332.41 | 170.772821 | 0 | |
| 464 | N528A | 32.775352 | 1404.41 | 170.772821 | 0 | |
| 465 | N529A | 32.775352 | 1320.41 | 170.772821 | 0 | |
| 466 | N530A | 32.775352 | 1464.41 | 170.772821 | 0 | |
| 467 | N534A | 95.540721 | 1332.41 | 145.291262 | 0 | |
| 468 | N535A | 95.540721 | 1404.41 | 145.291262 | 0 | |
| 469 | N536A | 95.540721 | 1320.41 | 145.291262 | 0 | |
| 470 | N537A | 95.540721 | 1464.41 | 145.291262 | 0 | |
| 471 | N538A | -34.964433 | 1332.41 | 170.338101 | 0 | |
| 472 | N539A | -34.964433 | 1404.41 | 170.338101 | 0 | |
| 473 | N540A | -34.964433 | 1308.41 | 170.338101 | 0 | |
| 474 | N541A | -34.964433 | 1452.41 | 170.338101 | 0 | |
| 475 | N542A | -97.398001 | 1332.41 | 144.052801 | 0 | |
| 476 | N543A | -97.398001 | 1404.41 | 144.052801 | 0 | |
| 477 | N544A | -97.398001 | 1320.41 | 144.052801 | 0 | |
| 478 | N545A | -97.398001 | 1464.41 | 144.052801 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 479 | N545B | -160.201422 | 1332.41 | -67.624587 | 0 | |
| 480 | N546A | -160.201422 | 1404.41 | -67.624587 | 0 | |
| 481 | N547A | -160.201422 | 1320.41 | -67.624587 | 0 | |
| 482 | N548A | -160.201422 | 1464.41 | -67.624587 | 0 | |
| 483 | N549A | -173.88485 | 1332.41 | -1.280294 | 0 | |
| 484 | N550A | -173.88485 | 1404.41 | -1.280294 | 0 | |
| 485 | N551A | -173.88485 | 1320.41 | -1.280294 | 0 | |
| 486 | N552A | -173.88485 | 1464.41 | -1.280294 | 0 | |
| 487 | N553 | -122.20611 | 1332.41 | -123.706293 | 0 | |
| 488 | N554A | -122.20611 | 1404.41 | -123.706293 | 0 | |
| 489 | N555A | -122.20611 | 1308.41 | -123.706293 | 0 | |
| 490 | N556A | -122.20611 | 1452.41 | -123.706293 | 0 | |
| 491 | N557A | -64.487048 | 1332.41 | -155.131322 | 0 | |
| 492 | N558A | -64.487048 | 1404.41 | -155.131322 | 0 | |
| 493 | N559A | -65.665017 | 1332.41 | -161.014551 | 0 | |
| 494 | N560A | -65.665017 | 1404.41 | -161.014551 | 0 | |
| 495 | N561A | -65.665017 | 1320.41 | -161.014551 | 0 | |
| 496 | N562A | -65.665017 | 1464.41 | -161.014551 | 0 | |
| 497 | N569A | 145.23093 | 1332.41 | -95.632406 | 0 | |
| 498 | N570A | 145.23093 | 1404.41 | -95.632406 | 0 | |
| 499 | N571A | 145.23093 | 1320.41 | -95.632406 | 0 | |
| 500 | N572A | 145.23093 | 1464.41 | -95.632406 | 0 | |
| 501 | N573A | 97.669773 | 1332.41 | -143.868675 | 0 | |
| 502 | N574A | 97.669773 | 1404.41 | -143.868675 | 0 | |
| 503 | N575A | 97.669773 | 1320.41 | -143.868675 | 0 | |
| 504 | N576A | 97.669773 | 1464.41 | -143.868675 | 0 | |
| 505 | N577A | 170.7521 | 1332.41 | -32.883133 | 0 | |
| 506 | N578A | 170.7521 | 1404.41 | -32.883133 | 0 | |
| 507 | N579A | 170.7521 | 1308.41 | -32.883133 | 0 | |
| 508 | N580A | 170.7521 | 1452.41 | -32.883133 | 0 | |
| 509 | N581A | 164.814064 | 1332.41 | 32.567324 | 0 | |
| 510 | N582A | 164.814064 | 1404.41 | 32.567324 | 0 | |
| 511 | N583A | 170.360236 | 1332.41 | 34.856425 | 0 | |
| 512 | N584A | 170.360236 | 1404.41 | 34.856425 | 0 | |
| 513 | N585A | 170.360236 | 1320.41 | 34.856425 | 0 | |
| 514 | N586 | 170.360236 | 1464.41 | 34.856425 | 0 | |
| 515 | N579B | 33.836281 | 1292.41 | 188.667342 | 0 | |
| 516 | N580B | 33.836281 | 1260.41 | 188.667342 | 0 | |
| 517 | N581B | 33.836281 | 1292.41 | 191.667342 | 0 | |
| 518 | N582B | 33.836281 | 1260.41 | 191.667342 | 0 | |
| 519 | N583B | 33.836281 | 1230.41 | 191.667342 | 0 | |
| 520 | N584B | 33.836281 | 1314.41 | 191.667342 | 0 | |
| 521 | N585B | -76.527084 | 1292.41 | 175.753529 | 0 | |
| 522 | N586A | -76.527084 | 1260.41 | 175.753529 | 0 | |
| 523 | N587A | -78.183456 | 1292.41 | 178.237513 | 0 | |
| 524 | N588A | -78.183456 | 1260.41 | 178.237513 | 0 | |
| 525 | N589A | -78.183456 | 1230.41 | 178.237513 | 0 | |
| 526 | N590A | -78.183456 | 1314.41 | 178.237513 | 0 | |
| 527 | N591A | -116.489047 | 1292.41 | 151.583362 | 0 | |
| 528 | N592A | -116.489047 | 1260.41 | 151.583362 | 0 | |
| 529 | N593A | -119.088349 | 1292.41 | 153.945539 | 0 | |
| 530 | N594A | -119.088349 | 1260.41 | 153.945539 | 0 | |
| 531 | N595A | -119.088349 | 1230.41 | 153.945539 | 0 | |
| 532 | N596A | -119.088349 | 1326.41 | 153.945539 | 0 | |
| 533 | N597A | -189.255445 | 1292.41 | 27.865172 | 0 | |
| 534 | N598A | -189.255445 | 1260.41 | 27.865172 | 0 | |
| 535 | N599A | -191.11777 | 1292.41 | 8.956663 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 536 | N600A | -191.11777 | 1260.41 | 8.956663 | 0 | |
| 537 | N605A | -193.304687 | 1292.41 | -22.683958 | 0 | |
| 538 | N606A | -193.304687 | 1260.41 | -22.683958 | 0 | |
| 539 | N607A | -193.304687 | 1230.41 | -22.683958 | 0 | |
| 540 | N608A | -193.304687 | 1314.41 | -22.683958 | 0 | |
| 541 | N607B | -189.878974 | 1292.41 | -21.534371 | 0 | |
| 542 | N608B | -189.878974 | 1260.41 | -21.534371 | 0 | |
| 543 | N609B | -148.242961 | 1292.41 | -126.11617 | 0 | |
| 544 | N610A | -148.242961 | 1260.41 | -126.11617 | 0 | |
| 545 | N611A | -148.242961 | 1230.41 | -126.11617 | 0 | |
| 546 | N612A | -148.242961 | 1314.41 | -126.11617 | 0 | |
| 547 | N613A | -146.028967 | 1292.41 | -123.257097 | 0 | |
| 548 | N614A | -146.028967 | 1260.41 | -123.257097 | 0 | |
| 549 | N615A | -120.838244 | 1292.41 | -152.575825 | 0 | |
| 550 | N616A | -120.838244 | 1260.41 | -152.575825 | 0 | |
| 551 | N617A | -120.838244 | 1230.41 | -152.575825 | 0 | |
| 552 | N618A | -120.838244 | 1326.41 | -152.575825 | 0 | |
| 553 | N619 | -119.223182 | 1292.41 | -149.339516 | 0 | |
| 554 | N620 | -119.223182 | 1260.41 | -149.339516 | 0 | |
| 555 | N621 | -90.072317 | 1292.41 | -168.513452 | 0 | |
| 556 | N622 | -90.072317 | 1260.41 | -168.513452 | 0 | |
| 557 | N623 | -98.37088 | 1292.41 | -164.077777 | 0 | |
| 558 | N624 | -98.37088 | 1260.41 | -164.077777 | 0 | |
| 559 | N625 | 59.437981 | 1292.41 | -185.333187 | 0 | |
| 560 | N626 | 59.437981 | 1260.41 | -185.333187 | 0 | |
| 561 | N627 | 59.437981 | 1230.41 | -185.333187 | 0 | |
| 562 | N628 | 59.437981 | 1314.41 | -185.333187 | 0 | |
| 563 | N629 | 57.647358 | 1292.41 | -182.186121 | 0 | |
| 564 | N630 | 57.647358 | 1260.41 | -182.186121 | 0 | |
| 565 | N631 | 46.461793 | 1284.41 | -185.579225 | 0 | |
| 566 | N632 | 46.461793 | 1268.41 | -185.579225 | 0 | |
| 567 | N633 | 94.399324 | 1292.41 | -170.20585 | 0 | |
| 568 | N634 | 94.399324 | 1260.41 | -170.20585 | 0 | |
| 569 | N636 | 94.399324 | 1314.41 | -170.20585 | 0 | |
| 570 | N637 | 92.02953 | 1292.41 | -167.467299 | 0 | |
| 571 | N639 | 121.216946 | 1292.41 | -147.703276 | 0 | |
| 572 | N640 | 121.216946 | 1260.41 | -147.703276 | 0 | |
| 573 | N641 | 113.943194 | 1292.41 | -153.672689 | 0 | |
| 574 | N642A | 113.943194 | 1260.41 | -153.672689 | 0 | |
| 575 | N643 | -141.733862 | 1284.41 | 128.490697 | 0 | |
| 576 | N644 | -141.733862 | 1268.41 | 128.490697 | 0 | |
| 577 | N645 | 139.679034 | 1292.41 | -135.539778 | 0 | |
| 578 | N646 | 139.679034 | 1260.41 | -135.539778 | 0 | |
| 579 | N647 | 139.679034 | 1230.41 | -135.539778 | 0 | |
| 580 | N648 | 139.679034 | 1314.41 | -135.539778 | 0 | |
| 581 | N649 | 137.22241 | 1292.41 | -133.987918 | 0 | |
| 582 | N650 | 137.22241 | 1260.41 | -133.987918 | 0 | |
| 583 | N651 | 172.967733 | 1292.41 | -89.238037 | 0 | |
| 584 | N652 | 172.967733 | 1260.41 | -89.238037 | 0 | |
| 585 | N653 | 172.967733 | 1230.41 | -89.238037 | 0 | |
| 586 | N654 | 172.967733 | 1326.41 | -89.238037 | 0 | |
| 587 | N655 | 169.474791 | 1292.41 | -88.273777 | 0 | |
| 588 | N656 | 169.474791 | 1260.41 | -88.273777 | 0 | |
| 589 | N657 | 180.116275 | 1292.41 | -64.470724 | 0 | |
| 590 | N658 | 181.026767 | 1260.41 | -61.469236 | 0 | |
| 591 | N659 | 180.116275 | 1260.41 | -64.470724 | 0 | |
| 592 | N660 | -300 | -139.576183 | 203.937263 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 593 | N661 | -300 | 1860.423817 | 203.937263 | 0 | |
| 594 | N662 | 300 | -139.576183 | 203.937263 | 0 | |
| 595 | N663 | 300 | 1860.423817 | 203.937263 | 0 | |
| 596 | N664 | 300 | -139.576183 | -226.062737 | 0 | |
| 597 | N665 | 300 | 1860.423817 | -226.062737 | 0 | |
| 598 | N674A | 0 | 1503.41 | 71.400388 | 0 | |
| 599 | N675A | 13.929525 | 1503.41 | 70.028449 | 0 | |
| 600 | N676 | 0 | 1494.41 | 92.400502 | 0 | |
| 601 | N677 | 18.026444 | 1494.41 | 90.625052 | 0 | |
| 602 | N678 | 0 | 1485.41 | 113.400615 | 0 | |
| 603 | N679 | 22.123363 | 1485.41 | 111.221654 | 0 | |
| 604 | N680 | 27.323745 | 1503.41 | 65.965357 | 0 | |
| 605 | N681 | 35.360141 | 1494.41 | 85.366932 | 0 | |
| 606 | N682 | 43.396537 | 1485.41 | 104.768508 | 0 | |
| 607 | N683 | 39.66793 | 1503.41 | 59.367253 | 0 | |
| 608 | N684 | 51.334968 | 1494.41 | 76.828209 | 0 | |
| 609 | N685 | 63.002006 | 1485.41 | 94.289166 | 0 | |
| 610 | N686 | 50.487698 | 1503.41 | 50.487698 | 0 | |
| 611 | N687 | 65.337021 | 1494.41 | 65.337021 | 0 | |
| 612 | N688 | 80.186344 | 1485.41 | 80.186344 | 0 | |
| 613 | N689 | 59.367253 | 1503.41 | 39.66793 | 0 | |
| 614 | N690 | 76.828209 | 1494.41 | 51.334968 | 0 | |
| 615 | N691 | 94.289166 | 1485.41 | 63.002006 | 0 | |
| 616 | N692 | 71.400388 | 1503.41 | 0 | 0 | |
| 617 | N693 | 92.400502 | 1494.41 | 0 | 0 | |
| 618 | N694 | 113.400615 | 1485.41 | 0 | 0 | |
| 619 | N695 | 70.028449 | 1503.41 | -13.929525 | 0 | |
| 620 | N696 | 90.625052 | 1494.41 | -18.026444 | 0 | |
| 621 | N697 | 111.221654 | 1485.41 | -22.123363 | 0 | |
| 622 | N698 | 65.965357 | 1503.41 | -27.323745 | 0 | |
| 623 | N699 | 85.366932 | 1494.41 | -35.360141 | 0 | |
| 624 | N700 | 104.768508 | 1485.41 | -43.396537 | 0 | |
| 625 | N701 | 59.367253 | 1503.41 | -39.66793 | 0 | |
| 626 | N702 | 76.828209 | 1494.41 | -51.334968 | 0 | |
| 627 | N703 | 94.289166 | 1485.41 | -63.002006 | 0 | |
| 628 | N704 | 50.487698 | 1503.41 | -50.487698 | 0 | |
| 629 | N705 | 65.337021 | 1494.41 | -65.337021 | 0 | |
| 630 | N706 | 80.186344 | 1485.41 | -80.186344 | 0 | |
| 631 | N707 | 39.66793 | 1503.41 | -59.367253 | 0 | |
| 632 | N708 | 51.334968 | 1494.41 | -76.828209 | 0 | |
| 633 | N709 | 63.002006 | 1485.41 | -94.289166 | 0 | |
| 634 | N710 | 27.323745 | 1503.41 | -65.965357 | 0 | |
| 635 | N711 | 35.360141 | 1494.41 | -85.366932 | 0 | |
| 636 | N712 | 43.396537 | 1485.41 | -104.768508 | 0 | |
| 637 | N713 | 13.929525 | 1503.41 | -70.028449 | 0 | |
| 638 | N714 | 18.026444 | 1494.41 | -90.625052 | 0 | |
| 639 | N715 | 22.123363 | 1485.41 | -111.221654 | 0 | |
| 640 | N716 | -27.323745 | 1503.41 | -65.965357 | 0 | |
| 641 | N717 | -35.360141 | 1494.41 | -85.366932 | 0 | |
| 642 | N718 | -43.396537 | 1485.41 | -104.768508 | 0 | |
| 643 | N719 | -39.66793 | 1503.41 | -59.367253 | 0 | |
| 644 | N720 | -51.334968 | 1494.41 | -76.828209 | 0 | |
| 645 | N721 | -63.002006 | 1485.41 | -94.289166 | 0 | |
| 646 | N722 | -50.487698 | 1503.41 | -50.487698 | 0 | |
| 647 | N723 | -65.337021 | 1494.41 | -65.337021 | 0 | |
| 648 | N724 | -80.186344 | 1485.41 | -80.186344 | 0 | |
| 649 | N725 | -59.367253 | 1503.41 | -39.66793 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 650 | N726 | -76.828209 | 1494.41 | -51.334968 | 0 | |
| 651 | N727 | -94.289166 | 1485.41 | -63.002006 | 0 | |
| 652 | N728 | -65.965357 | 1503.41 | -27.323745 | 0 | |
| 653 | N729 | -85.366932 | 1494.41 | -35.360141 | 0 | |
| 654 | N730 | -104.768508 | 1485.41 | -43.396537 | 0 | |
| 655 | N731 | -70.028449 | 1503.41 | -13.929525 | 0 | |
| 656 | N732 | -90.625052 | 1494.41 | -18.026444 | 0 | |
| 657 | N733 | -111.221654 | 1485.41 | -22.123363 | 0 | |
| 658 | N734 | -71.400388 | 1503.41 | 0 | 0 | |
| 659 | N735 | -92.400502 | 1494.41 | 0 | 0 | |
| 660 | N736 | -113.400615 | 1485.41 | 0 | 0 | |
| 661 | N737 | -70.028449 | 1503.41 | 13.929525 | 0 | |
| 662 | N738 | -90.625052 | 1494.41 | 18.026444 | 0 | |
| 663 | N739 | -111.221654 | 1485.41 | 22.123363 | 0 | |
| 664 | N740 | -39.66793 | 1503.41 | 59.367253 | 0 | |
| 665 | N741 | -51.334968 | 1494.41 | 76.828209 | 0 | |
| 666 | N742 | -63.002006 | 1485.41 | 94.289166 | 0 | |
| 667 | N743 | -27.323745 | 1503.41 | 65.965357 | 0 | |
| 668 | N744 | -35.360141 | 1494.41 | 85.366932 | 0 | |
| 669 | N745 | -43.396537 | 1485.41 | 104.768508 | 0 | |
| 670 | N746 | -13.929525 | 1503.41 | 70.028449 | 0 | |
| 671 | N747 | -18.026444 | 1494.41 | 90.625052 | 0 | |
| 672 | N748 | -22.123363 | 1485.41 | 111.221654 | 0 | |
| 673 | N749 | 0 | 1501.16 | 76.650416 | 0 | |
| 674 | N750 | 14.953754 | 1501.16 | 75.1776 | 0 | |
| 675 | N751 | 0 | 1498.91 | 81.900445 | 0 | |
| 676 | N752 | 15.977984 | 1498.91 | 80.32675 | 0 | |
| 677 | N753 | 0 | 1496.66 | 87.150473 | 0 | |
| 678 | N754 | 17.002214 | 1496.66 | 85.475901 | 0 | |
| 679 | N755 | 29.332844 | 1501.16 | 70.815751 | 0 | |
| 680 | N756 | 31.341943 | 1498.91 | 75.666144 | 0 | |
| 681 | N757 | 33.351042 | 1496.66 | 80.516538 | 0 | |
| 682 | N758 | 42.584689 | 1501.16 | 63.732492 | 0 | |
| 683 | N759 | 45.501449 | 1498.91 | 68.097731 | 0 | |
| 684 | N760 | 48.418209 | 1496.66 | 72.46297 | 0 | |
| 685 | N761 | 54.200029 | 1501.16 | 54.200029 | 0 | |
| 686 | N762 | 57.91236 | 1498.91 | 57.91236 | 0 | |
| 687 | N763 | 61.62469 | 1496.66 | 61.62469 | 0 | |
| 688 | N764 | 63.732492 | 1501.16 | 42.584689 | 0 | |
| 689 | N765 | 68.097731 | 1498.91 | 45.501449 | 0 | |
| 690 | N766 | 72.46297 | 1496.66 | 48.418209 | 0 | |
| 691 | N767 | 76.650416 | 1501.16 | 0 | 0 | |
| 692 | N768 | 81.900445 | 1498.91 | 0 | 0 | |
| 693 | N769 | 87.150473 | 1496.66 | 0 | 0 | |
| 694 | N770 | 75.1776 | 1501.16 | -14.953754 | 0 | |
| 695 | N771 | 80.32675 | 1498.91 | -15.977984 | 0 | |
| 696 | N772 | 85.475901 | 1496.66 | -17.002214 | 0 | |
| 697 | N773 | 70.815751 | 1501.16 | -29.332844 | 0 | |
| 698 | N774 | 75.666144 | 1498.91 | -31.341943 | 0 | |
| 699 | N775 | 80.516538 | 1496.66 | -33.351042 | 0 | |
| 700 | N776 | 63.732492 | 1501.16 | -42.584689 | 0 | |
| 701 | N777 | 68.097731 | 1498.91 | -45.501449 | 0 | |
| 702 | N778 | 72.46297 | 1496.66 | -48.418209 | 0 | |
| 703 | N779 | 54.200029 | 1501.16 | -54.200029 | 0 | |
| 704 | N780 | 57.91236 | 1498.91 | -57.91236 | 0 | |
| 705 | N781 | 61.62469 | 1496.66 | -61.62469 | 0 | |
| 706 | N782 | 42.584689 | 1501.16 | -63.732492 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 707 | N783 | 45.501449 | 1498.91 | -68.097731 | 0 | |
| 708 | N784 | 48.418209 | 1496.66 | -72.46297 | 0 | |
| 709 | N785 | 29.332844 | 1501.16 | -70.815751 | 0 | |
| 710 | N786 | 31.341943 | 1498.91 | -75.666144 | 0 | |
| 711 | N787 | 33.351042 | 1496.66 | -80.516538 | 0 | |
| 712 | N788 | 14.953754 | 1501.16 | -75.1776 | 0 | |
| 713 | N789 | 15.977984 | 1498.91 | -80.32675 | 0 | |
| 714 | N790 | 17.002214 | 1496.66 | -85.475901 | 0 | |
| 715 | N791 | 0 | 1501.16 | -76.650416 | 0 | |
| 716 | N792 | 0 | 1498.91 | -81.900445 | 0 | |
| 717 | N793 | 0 | 1496.66 | -87.150473 | 0 | |
| 718 | N794 | -14.953754 | 1501.16 | -75.1776 | 0 | |
| 719 | N795 | -29.332844 | 1501.16 | -70.815751 | 0 | |
| 720 | N796 | -15.977984 | 1498.91 | -80.32675 | 0 | |
| 721 | N797 | -31.341943 | 1498.91 | -75.666144 | 0 | |
| 722 | N798 | -17.002214 | 1496.66 | -85.475901 | 0 | |
| 723 | N799 | -33.351042 | 1496.66 | -80.516538 | 0 | |
| 724 | N800 | -42.584689 | 1501.16 | -63.732492 | 0 | |
| 725 | N801 | -45.501449 | 1498.91 | -68.097731 | 0 | |
| 726 | N802 | -48.418209 | 1496.66 | -72.46297 | 0 | |
| 727 | N803 | -54.200029 | 1501.16 | -54.200029 | 0 | |
| 728 | N804 | -57.91236 | 1498.91 | -57.91236 | 0 | |
| 729 | N805 | -61.62469 | 1496.66 | -61.62469 | 0 | |
| 730 | N806 | -63.732492 | 1501.16 | -42.584689 | 0 | |
| 731 | N807 | -68.097731 | 1498.91 | -45.501449 | 0 | |
| 732 | N808 | -72.46297 | 1496.66 | -48.418209 | 0 | |
| 733 | N809 | -70.815751 | 1501.16 | -29.332844 | 0 | |
| 734 | N810 | -75.666144 | 1498.91 | -31.341943 | 0 | |
| 735 | N811 | -80.516538 | 1496.66 | -33.351042 | 0 | |
| 736 | N812 | -75.1776 | 1501.16 | -14.953754 | 0 | |
| 737 | N813 | -80.32675 | 1498.91 | -15.977984 | 0 | |
| 738 | N814 | -85.475901 | 1496.66 | -17.002214 | 0 | |
| 739 | N815 | -76.650416 | 1501.16 | 0 | 0 | |
| 740 | N816 | -81.900445 | 1498.91 | 0 | 0 | |
| 741 | N817 | -87.150473 | 1496.66 | 0 | 0 | |
| 742 | N818 | -75.1776 | 1501.16 | 14.953754 | 0 | |
| 743 | N819 | -80.32675 | 1498.91 | 15.977984 | 0 | |
| 744 | N820 | -85.475901 | 1496.66 | 17.002214 | 0 | |
| 745 | N821 | -70.815751 | 1501.16 | 29.332844 | 0 | |
| 746 | N822 | -75.666144 | 1498.91 | 31.341943 | 0 | |
| 747 | N823 | -80.516538 | 1496.66 | 33.351042 | 0 | |
| 748 | N824 | -54.200029 | 1501.16 | 54.200029 | 0 | |
| 749 | N825 | -42.584689 | 1501.16 | 63.732492 | 0 | |
| 750 | N826 | -57.91236 | 1498.91 | 57.91236 | 0 | |
| 751 | N827 | -45.501449 | 1498.91 | 68.097731 | 0 | |
| 752 | N828 | -61.62469 | 1496.66 | 61.62469 | 0 | |
| 753 | N829 | -48.418209 | 1496.66 | 72.46297 | 0 | |
| 754 | N830 | -29.332844 | 1501.16 | 70.815751 | 0 | |
| 755 | N831 | -31.341943 | 1498.91 | 75.666144 | 0 | |
| 756 | N832 | -33.351042 | 1496.66 | 80.516538 | 0 | |
| 757 | N833 | -14.953754 | 1501.16 | 75.1776 | 0 | |
| 758 | N834 | -15.977984 | 1498.91 | 80.32675 | 0 | |
| 759 | N835 | -17.002214 | 1496.66 | 85.475901 | 0 | |
| 760 | N762A | 41.906296 | 1530.41 | 28.000892 | 0 | |
| 761 | N763A | 41.906296 | 1590.41 | 28.000892 | 0 | |
| 762 | N764A | 41.906296 | 1596.41 | 28.000892 | 0 | |
| 763 | N766A | 28.000892 | 1590.41 | -41.906296 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [in] | Y [in] | Z [in] | Temp [F] | Detach From Di... |
|---|---|---|---|---|---|---|
| 764 | N767A | 28.000892 | 1596.41 | -41.906296 | 0 | |
| 765 | N769A | -41.906296 | 1590.41 | -28.000892 | 0 | |
| 766 | N770A | -41.906296 | 1596.41 | -28.000892 | 0 | |
| 767 | N772A | -28.000892 | 1590.41 | 41.906296 | 0 | |
| 768 | N773A | -28.000892 | 1596.41 | 41.906296 | 0 | |
| 769 | N771A | 28.000892 | 1530.41 | -41.906296 | 0 | |
| 770 | N772B | -41.906296 | 1530.41 | -28.000892 | 0 | |
| 771 | N773B | -28.000892 | 1530.41 | 41.906296 | 0 | |
| 772 | N772C | -63.732492 | 1501.16 | 42.584689 | 0 | |
| 773 | N773C | -68.097731 | 1498.91 | 45.501449 | 0 | |
| 774 | N774A | -72.46297 | 1496.66 | 48.418209 | 0 | |
| 775 | N775A | 24.252161 | 1530.41 | 31.512518 | 0 | |
| 776 | N776A | 24.252161 | 1590.41 | 31.512518 | 0 | |
| 777 | N777A | -10.075324 | 1530.41 | 38.340679 | 0 | |
| 778 | N778A | -10.075324 | 1590.41 | 38.340679 | 0 | |
| 779 | N779A | 24.252161 | 1524.41 | 31.512518 | 0 | |
| 780 | N780A | -10.075324 | 1524.41 | 38.340679 | 0 | |
| 781 | N781A | 24.252161 | 1644.41 | 31.512518 | 0 | |
| 782 | N782A | -10.075324 | 1644.41 | 38.340679 | 0 | |
| 783 | N783A | 31.512518 | 1530.41 | -24.252161 | 0 | |
| 784 | N784A | 31.512518 | 1590.41 | -24.252161 | 0 | |
| 785 | N785A | 38.340679 | 1530.41 | 10.075324 | 0 | |
| 786 | N786A | 38.340679 | 1590.41 | 10.075324 | 0 | |
| 787 | N787A | 31.512518 | 1524.41 | -24.252161 | 0 | |
| 788 | N788A | 38.340679 | 1524.41 | 10.075324 | 0 | |
| 789 | N789A | 31.512518 | 1644.41 | -24.252161 | 0 | |
| 790 | N790A | 38.340679 | 1644.41 | 10.075324 | 0 | |
| 791 | N791A | -24.252161 | 1530.41 | -31.512518 | 0 | |
| 792 | N792A | -24.252161 | 1590.41 | -31.512518 | 0 | |
| 793 | N793A | 10.075324 | 1530.41 | -38.340679 | 0 | |
| 794 | N794A | 10.075324 | 1590.41 | -38.340679 | 0 | |
| 795 | N795A | -24.252161 | 1524.41 | -31.512518 | 0 | |
| 796 | N796A | 10.075324 | 1524.41 | -38.340679 | 0 | |
| 797 | N797A | -24.252161 | 1644.41 | -31.512518 | 0 | |
| 798 | N798A | 10.075324 | 1644.41 | -38.340679 | 0 | |
| 799 | N799A | -31.512518 | 1530.41 | 24.252161 | 0 | |
| 800 | N800A | -31.512518 | 1590.41 | 24.252161 | 0 | |
| 801 | N801A | -38.340679 | 1530.41 | -10.075324 | 0 | |
| 802 | N802A | -38.340679 | 1590.41 | -10.075324 | 0 | |
| 803 | N803A | -31.512518 | 1524.41 | 24.252161 | 0 | |
| 804 | N804A | -38.340679 | 1524.41 | -10.075324 | 0 | |
| 805 | N805A | -31.512518 | 1644.41 | 24.252161 | 0 | |
| 806 | N806A | -38.340679 | 1644.41 | -10.075324 | 0 | |
| 807 | N807A | 6.952702 | 1590.41 | 34.953594 | 0 | |
| 808 | N808A | -34.953594 | 1590.41 | 6.952702 | 0 | |
| 809 | N809A | -6.952702 | 1590.41 | -34.953594 | 0 | |
| 810 | N810A | 34.953594 | 1590.41 | -6.952702 | 0 | |
| 811 | N811A | -34.953594 | 1530.41 | 6.952702 | 0 | |
| 812 | N812A | 6.952702 | 1530.41 | 34.953594 | 0 | |
| 813 | N813A | 34.953594 | 1530.41 | -6.952702 | 0 | |
| 814 | N814A | -6.952702 | 1530.41 | -34.953594 | 0 | |

## Envelope Joint Reactions

| | Joint | | X [lb] | LC | Y [lb] | LC | Z [lb] | LC | MX [lb-ft] | LC | MY [lb-ft] | LC | MZ [lb-ft] | LC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | N1 | max | 14426.914 | 84 | 370370.299 | 85 | 33932.761 | 9 | 0 | 156 | 0 | 156 | 0 | 156 |
| 2 | | min | -4318.559 | 9 | -86193.695 | 9 | -14440.84 | 85 | 0 | 1 | 0 | 1 | 0 | 1 |
| 3 | N2 | max | 33203.946 | 12 | 340239.799 | 86 | 33061.093 | 9 | 0 | 156 | 0 | 156 | 0 | 156 |
| 4 | | min | -11948.924 | 86 | -126938.23 | 10 | -13588.233 | 86 | 0 | 1 | 0 | 1 | 0 | 1 |
| 5 | N3 | max | 2176.73 | 83 | 125916.711 | 79 | 2166.214 | 80 | 0 | 156 | 0 | 156 | 0 | 156 |
| 6 | | min | -9.98 | 136 | 13119.297 | 30 | -2165.218 | 86 | 0 | 1 | 0 | 1 | 0 | 1 |
| 7 | N38 | max | 32783.902 | 12 | 340100.234 | 80 | 13600.866 | 80 | 0 | 156 | 0 | 156 | 0 | 156 |
| 8 | | min | -11935.095 | 80 | -126857.081 | 14 | -33084.446 | 15 | 0 | 1 | 0 | 1 | 0 | 1 |
| 9 | N63 | max | 14431.862 | 82 | 370550.79 | 81 | 14447.458 | 81 | 0 | 156 | 0 | 156 | 0 | 156 |
| 10 | | min | -4309.44 | 15 | -86065.16 | 15 | -33924.021 | 15 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | Totals: | max | 79465.022 | 5 | 1.25164e+6 | 79 | 80666.379 | 2 | | | | | | |
| 12 | | min | -1.134 | 79 | 83097.889 | 9 | -80670.481 | 86 | | | | | | |

## 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 | N1 | Reaction | Reaction | Reaction | | | |
| 2 | N2 | Reaction | Reaction | Reaction | | | |
| 3 | N3 | Reaction | Reaction | Reaction | | | |
| 4 | N38 | Reaction | Reaction | Reaction | | | |
| 5 | N63 | Reaction | Reaction | Reaction | | | |
| 6 | N660 | | | | | | |
| 7 | N661 | | | | | | |
| 8 | N662 | | | | | | |
| 9 | N663 | | | | | | |
| 10 | N664 | | | | | | |
| 11 | N665 | | | | | | |

## Hot Rolled Steel Design Parameters

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 2 | M2 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 3 | M3 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 4 | M4 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 5 | M5 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 6 | M6 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 7 | M8 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 8 | M9 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 9 | M10 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 10 | M11 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 11 | M12 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 12 | M14 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 13 | M15 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 14 | M16 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 15 | M17 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 16 | M18 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 17 | M20 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 18 | M21 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 19 | M22 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 20 | M23 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 21 | M24 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 22 | M26 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 23 | M27 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 24 | M28 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 25 | M29 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | M30 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 27 | M32 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 28 | M33 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 29 | M34 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 30 | M35 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 31 | M36 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 32 | M38 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 33 | M39 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 34 | M40 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 35 | M41 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 36 | M42 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 37 | M44 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 38 | M45 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 39 | M46 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 40 | M47 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 41 | M48 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 42 | M50 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 43 | M51 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 44 | M52 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 45 | M53 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 46 | M54 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 47 | M56 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 48 | M57 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 49 | M58 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 50 | M59 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 51 | M60 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 52 | M62 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 53 | M63 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 54 | M64 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 55 | M65 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 56 | M66 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 57 | M68 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 58 | M69 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 59 | M70 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 60 | M71 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 61 | M72 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 62 | M74 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 63 | M75 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 64 | M76 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 65 | M77 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 66 | M78 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 67 | M80 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 68 | M81 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 69 | M82 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 70 | M83 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 71 | M84 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 72 | M86 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 73 | M87 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 74 | M88 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 75 | M89 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 76 | M90 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 77 | M92 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 78 | M93 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 79 | M94 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 80 | M95 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 81 | M96 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 82 | M98 | Vertical | 32 | | | Lbyy | | | | | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83 | M99 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 84 | M100 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 85 | M101 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 86 | M102 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 87 | M104 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 88 | M105 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 89 | M106 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 90 | M107 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 91 | M108 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 92 | M110 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 93 | M111 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 94 | M112 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 95 | M113 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 96 | M114 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 97 | M116 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 98 | M117 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 99 | M118 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 100 | M119 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 101 | M120 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 102 | M122 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 103 | M123 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 104 | M124 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 105 | M125 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 106 | M126 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 107 | M128 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 108 | M129 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 109 | M130 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 110 | M131 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 111 | M132 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 112 | M134 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 113 | M135 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 114 | M136 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 115 | M137 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 116 | M138 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 117 | M140 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 118 | M141 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 119 | M142 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 120 | M143 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 121 | M144 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 122 | M146 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 123 | M147 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 124 | M148 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 125 | M149 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 126 | M150 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 127 | M152 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 128 | M153 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 129 | M154 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 130 | M155 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 131 | M156 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 132 | M158 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 133 | M159 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 134 | M160 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 135 | M161 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 136 | M162 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 137 | M164 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 138 | M165 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 139 | M166 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | M167 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 141 | M168 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 142 | M170 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 143 | M171 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 144 | M172 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 145 | M173 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 146 | M174 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 147 | M176 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 148 | M177 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 149 | M178 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 150 | M179 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 151 | M180 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 152 | M182 | Vertical | 32 | | | Lbyy | | | | | | Lateral |
| 153 | M183 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 154 | M184 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 155 | M185 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 156 | M186 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 157 | M189 | Top Handrail | 37.639 | | | Lbyy | | | | | | Lateral |
| 158 | M190 | Toe Plate | 37.639 | | | Lbyy | | | | | | Lateral |
| 159 | M191 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 160 | M192 | Diagonal Brace | 49.403 | | | Lbyy | | | | | | Lateral |
| 161 | M193 | Riser | 1152.41 | | | Lbyy | | | | | | Lateral |
| 162 | M194 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 163 | M195 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 164 | M196 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 165 | M197 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 166 | M198 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 167 | M199 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 168 | M200 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 169 | M201 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 170 | M202 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 171 | M203 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 172 | M204 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 173 | M205 | Leg | 407.17 | | | Lbyy | | | | | | Lateral |
| 174 | M206 | Bottom Diagonal | 504.105 | | | Lbyy | | | | | | Lateral |
| 175 | M207 | Bottom Diagonal | 504.114 | | | Lbyy | | | | | | Lateral |
| 176 | M208 | Mid Diagnoal | 487.69 | | | Lbyy | | | | | | Lateral |
| 177 | M209 | Mid Diagnoal | 487.7 | | | Lbyy | | | | | | Lateral |
| 178 | M210 | Top Diagonal | 472.456 | | | Lbyy | | | | | | Lateral |
| 179 | M211 | Top Diagonal | 472.466 | | | Lbyy | | | | | | Lateral |
| 180 | M212 | Lower Horizontal | 283.195 | | | Lbyy | | | | | | Lateral |
| 181 | M213 | Upper Horizontal | 254.452 | | | Lbyy | | | | | | Lateral |
| 182 | M214 | Mid Diagnoal | 200.249 | | | Lbyy | | | | | | Lateral |
| 183 | M215 | Top Diagonal | 179.925 | | | Lbyy | | | | | | Lateral |
| 184 | M216 | Bottom Diagonal | 504.105 | | | Lbyy | | | | | | Lateral |
| 185 | M217 | Bottom Diagonal | 504.114 | | | Lbyy | | | | | | Lateral |
| 186 | M218 | Mid Diagnoal | 487.69 | | | Lbyy | | | | | | Lateral |
| 187 | M219 | Mid Diagnoal | 487.7 | | | Lbyy | | | | | | Lateral |
| 188 | M220 | Top Diagonal | 472.456 | | | Lbyy | | | | | | Lateral |
| 189 | M221 | Top Diagonal | 472.466 | | | Lbyy | | | | | | Lateral |
| 190 | M222 | Lower Horizontal | 283.195 | | | Lbyy | | | | | | Lateral |
| 191 | M223 | Upper Horizontal | 254.452 | | | Lbyy | | | | | | Lateral |
| 192 | M224 | Mid Diagnoal | 200.249 | | | Lbyy | | | | | | Lateral |
| 193 | M225 | Top Diagonal | 179.925 | | | Lbyy | | | | | | Lateral |
| 194 | M226 | Bottom Diagonal | 504.079 | | | Lbyy | | | | | | Lateral |
| 195 | M227 | Bottom Diagonal | 504.079 | | | Lbyy | | | | | | Lateral |
| 196 | M228 | Mid Diagnoal | 487.678 | | | Lbyy | | | | | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 197 | M229 | Mid Diagnoal | 487.678 | | | Lbyy | | | | | | Lateral |
| 198 | M230 | Top Diagonal | 472.456 | | | Lbyy | | | | | | Lateral |
| 199 | M231 | Top Diagonal | 472.456 | | | Lbyy | | | | | | Lateral |
| 200 | M232 | Lower Horizontal | 283.153 | | | Lbyy | | | | | | Lateral |
| 201 | M233 | Upper Horizontal | 254.431 | | | Lbyy | | | | | | Lateral |
| 202 | M234 | Mid Diagnoal | 200.249 | | | Lbyy | | | | | | Lateral |
| 203 | M235 | Top Diagonal | 179.925 | | | Lbyy | | | | | | Lateral |
| 204 | M236 | Bottom Diagonal | 504.14 | | | Lbyy | | | | | | Lateral |
| 205 | M237 | Bottom Diagonal | 504.14 | | | Lbyy | | | | | | Lateral |
| 206 | M238 | Mid Diagnoal | 487.712 | | | Lbyy | | | | | | Lateral |
| 207 | M239 | Mid Diagnoal | 487.712 | | | Lbyy | | | | | | Lateral |
| 208 | M240 | Top Diagonal | 472.466 | | | Lbyy | | | | | | Lateral |
| 209 | M241 | Top Diagonal | 472.466 | | | Lbyy | | | | | | Lateral |
| 210 | M242 | Lower Horizontal | 283.237 | | | Lbyy | | | | | | Lateral |
| 211 | M243 | Upper Horizontal | 254.473 | | | Lbyy | | | | | | Lateral |
| 212 | M244 | Mid Diagnoal | 200.249 | | | Lbyy | | | | | | Lateral |
| 213 | M245 | Top Diagonal | 179.925 | | | Lbyy | | | | | | Lateral |
| 214 | MP14 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 215 | MP13 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 216 | MP15 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 217 | MP16 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 218 | MP18 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 219 | MP17 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 220 | MP19 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 221 | MP20 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 222 | MP22 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 223 | MP21 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 224 | MP23 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 225 | MP24 | Mount Pipe | 144 | | | Lbyy | | | | | | Lateral |
| 226 | MP25 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 227 | MP26 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 228 | MP27 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 229 | MP28 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 230 | MP29 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 231 | MP30 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 232 | MP31 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 233 | MP32 | Mount Pipe | 84 | | | Lbyy | | | | | | Lateral |
| 234 | MP33 | Mount Pipe | 96 | | | Lbyy | | | | | | Lateral |
| 235 | M345 | Kicker Angle | 35.661 | | | Lbyy | | | | | | Lateral |
| 236 | M346 | Kicker Angle | 55.139 | | | Lbyy | | | | | | Lateral |
| 237 | M347 | Kicker Angle | 30.959 | | | Lbyy | | | | | | Lateral |
| 238 | M348 | Kicker Angle | 62.455 | | | Lbyy | | | | | | Lateral |
| 239 | M349 | Kicker Angle | 31.202 | | | Lbyy | | | | | | Lateral |
| 240 | M350 | Kicker Angle | 62.003 | | | Lbyy | | | | | | Lateral |
| 241 | M298 | Top Mount Verti... | 84 | | | Lbyy | | | | | | Lateral |
| 242 | M299A | Top Mount Verti... | 84 | | | Lbyy | | | | | | Lateral |
| 243 | M300A | Top Mount Verti... | 84 | | | Lbyy | | | | | | Lateral |
| 244 | M301 | Top Mount Verti... | 84 | | | Lbyy | | | | | | Lateral |
| 245 | M302A | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 246 | M303A | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 247 | M304 | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 248 | M305A | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 249 | M306A | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 250 | M307 | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 251 | M308 | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 252 | M309A | Top Mount Horiz... | 71.277 | | | Lbyy | | | | | | Lateral |
| 253 | MP2 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[... | Lbyy[in] | Lbzz[in] | Lcomp top[in] | Lcomp bot[in] | L-torq... | Kyy | Kzz | Cb | Funct... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 254 | MP1 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 255 | MP8 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 256 | MP7 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 257 | MP6 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 258 | MP5 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 259 | MP4 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 260 | MP3 | Top Mount Pipe | 120 | | | Lbyy | | | | | | Lateral |
| 261 | M310A | Top Mount Braci... | 50.4 | | | Lbyy | | | | | | Lateral |
| 262 | M311A | Top Mount Braci... | 50.4 | | | Lbyy | | | | | | Lateral |
| 263 | M312A | Top Mount Braci... | 50.4 | | | Lbyy | | | | | | Lateral |
| 264 | M313 | Top Mount Braci... | 50.4 | | | Lbyy | | | | | | Lateral |
| 265 | M314A | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 266 | M315A | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 267 | M316 | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 268 | M317A | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 269 | M318A | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 270 | M319 | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 271 | M320 | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |
| 272 | M321A | Top Mount Braci... | 69.786 | | | Lbyy | | | | | | Lateral |

## Member Primary Data

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | N360 | N362 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 2 | M2 | N361 | N363 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 3 | M3 | N362 | N363 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 4 | M4 | N360 | N361 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 5 | M5 | N363 | N360 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 6 | M6 | N361 | N362 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 7 | M8 | N365 | N367 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 8 | M9 | N363 | N367 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 9 | M10 | N361 | N365 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 10 | M11 | N367 | N361 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 11 | M12 | N365 | N363 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 12 | M14 | N369 | N371 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 13 | M15 | N367 | N371 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 14 | M16 | N365 | N369 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 15 | M17 | N371 | N365 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 16 | M18 | N369 | N367 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 17 | M20 | N373 | N375 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 18 | M21 | N371 | N375 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 19 | M22 | N369 | N373 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 20 | M23 | N375 | N369 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 21 | M24 | N373 | N371 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 22 | M26 | N377 | N379 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 23 | M27 | N375 | N379 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 24 | M28 | N373 | N377 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 25 | M29 | N379 | N373 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 26 | M30 | N377 | N375 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 27 | M32 | N381 | N383 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 28 | M33 | N379 | N383 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 29 | M34 | N377 | N381 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 30 | M35 | N383 | N377 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 31 | M36 | N381 | N379 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 32 | M38 | N385 | N387 | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 33 | M39 | N383 | N387 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 34 | M40 | N381 | N385 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 35 | M41 | N387 | N381 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 36 | M42 | N385 | N383 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 37 | M44 | N389A | N391A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 38 | M45 | N387 | N391A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 39 | M46 | N385 | N389A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 40 | M47 | N391A | N385 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 41 | M48 | N389A | N387 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 42 | M50 | N393A | N395A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 43 | M51 | N391A | N395A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 44 | M52 | N389A | N393A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 45 | M53 | N395A | N389A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 46 | M54 | N393A | N391A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 47 | M56 | N397A | N399A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 48 | M57 | N395A | N399A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 49 | M58 | N393A | N397A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 50 | M59 | N399A | N393A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 51 | M60 | N397A | N395A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 52 | M62 | N401A | N403A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 53 | M63 | N399A | N403A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 54 | M64 | N397A | N401A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 55 | M65 | N403A | N397A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 56 | M66 | N401A | N399A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 57 | M68 | N405A | N407A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 58 | M69 | N403A | N407A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 59 | M70 | N401A | N405A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 60 | M71 | N407A | N401A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 61 | M72 | N405A | N403A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 62 | M74 | N409A | N411A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 63 | M75 | N407A | N411A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 64 | M76 | N405A | N409A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 65 | M77 | N411A | N405A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 66 | M78 | N409A | N407A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 67 | M80 | N413A | N415A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 68 | M81 | N411A | N415A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 69 | M82 | N409A | N413A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 70 | M83 | N415A | N409A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 71 | M84 | N413A | N411A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 72 | M86 | N417A | N419A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 73 | M87 | N415A | N419A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 74 | M88 | N413A | N417A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 75 | M89 | N419A | N413A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 76 | M90 | N417A | N415A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 77 | M92 | N421 | N423A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 78 | M93 | N419A | N423A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 79 | M94 | N417A | N421 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 80 | M95 | N423A | N417A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 81 | M96 | N421 | N419A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 82 | M98 | N425A | N427A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 83 | M99 | N423A | N427A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 84 | M100 | N421 | N425A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 85 | M101 | N427A | N421 | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 86 | M102 | N425A | N423A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 87 | M104 | N429A | N431A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 88 | M105 | N427A | N431A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 89 | M106 | N425A | N429A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 90 | M107 | N431A | N425A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 91 | M108 | N429A | N427A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 92 | M110 | N433A | N435A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 93 | M111 | N431A | N435A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 94 | M112 | N429A | N433A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 95 | M113 | N435A | N429A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 96 | M114 | N433A | N431A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 97 | M116 | N437A | N439A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 98 | M117 | N435A | N439A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 99 | M118 | N433A | N437A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 100 | M119 | N439A | N433A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 101 | M120 | N437A | N435A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 102 | M122 | N441A | N443A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 103 | M123 | N439A | N443A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 104 | M124 | N437A | N441A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 105 | M125 | N443A | N437A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 106 | M126 | N441A | N439A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 107 | M128 | N445A | N447A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 108 | M129 | N443A | N447A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 109 | M130 | N441A | N445A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 110 | M131 | N447A | N441A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 111 | M132 | N445A | N443A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 112 | M134 | N449A | N451A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 113 | M135 | N447A | N451A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 114 | M136 | N445A | N449A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 115 | M137 | N451A | N445A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 116 | M138 | N449A | N447A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 117 | M140 | N453A | N455A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 118 | M141 | N451A | N455A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 119 | M142 | N449A | N453A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 120 | M143 | N455A | N449A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 121 | M144 | N453A | N451A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 122 | M146 | N457A | N459A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 123 | M147 | N455A | N459A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 124 | M148 | N453A | N457A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 125 | M149 | N459A | N453A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 126 | M150 | N457A | N455A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 127 | M152 | N461A | N463A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 128 | M153 | N459A | N463A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 129 | M154 | N457A | N461A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 130 | M155 | N463A | N457A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 131 | M156 | N461A | N459A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 132 | M158 | N465A | N467A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 133 | M159 | N463A | N467A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 134 | M160 | N461A | N465A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 135 | M161 | N467A | N461A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 136 | M162 | N465A | N463A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 137 | M164 | N469A | N471A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 138 | M165 | N467A | N471A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 139 | M166 | N465A | N469A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 140 | M167 | N471A | N465A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 141 | M168 | N469A | N467A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 142 | M170 | N473A | N475A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 143 | M171 | N471A | N475A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 144 | M172 | N469A | N473A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 145 | M173 | N475A | N469A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 146 | M174 | N473A | N471A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 147 | M176 | N477A | N479A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 148 | M177 | N475A | N479A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 149 | M178 | N473A | N477A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 150 | M179 | N479A | N473A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 151 | M180 | N477A | N475A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 152 | M182 | N481A | N483A | | | Vertical | Beam | Single Angle | A36 Gr.36 | Typical |
| 153 | M183 | N479A | N483A | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 154 | M184 | N477A | N481A | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 155 | M185 | N483A | N477A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 156 | M186 | N481A | N479A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 157 | M189 | N483A | N362 | | 90 | Top Handrail | Beam | Single Angle | A36 Gr.36 | Typical |
| 158 | M190 | N481A | N360 | | | Toe Plate | Beam | RECT | A36 Gr.36 | Typical |
| 159 | M191 | N362 | N481A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 160 | M192 | N360 | N483A | | | Diagonal Brace | Beam | RECT | A36 Gr.36 | Typical |
| 161 | M193 | N3 | N642 | | | Riser | Beam | Pipe | A53 Gr.B | Typical |
| 162 | M194 | N2 | N424A | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 163 | M195 | N38 | N426A | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 164 | M196 | N63 | N428A | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 165 | M197 | N1 | N430A | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 166 | M198 | N424A | N425B | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 167 | M199 | N425B | N327 | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 168 | M200 | N426A | N427B | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 169 | M201 | N427B | N335A | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 170 | M202 | N428A | N429B | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 171 | M203 | N429B | N343 | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 172 | M204 | N430A | N431B | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 173 | M205 | N431B | N351 | | | Leg | Beam | Pipe | A53 Gr.B | Typical |
| 174 | M206 | N2 | N426A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 175 | M207 | N38 | N424A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 176 | M208 | N424A | N427B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 177 | M209 | N426A | N425B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 178 | M210 | N425B | N335A | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 179 | M211 | N427B | N327 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 180 | M212 | N424A | N426A | | | Lower Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 181 | M213 | N425B | N427B | | | Upper Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 182 | M214 | N424A | N432A | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 183 | M215 | N425B | N433B | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 184 | M216 | N38 | N428A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 185 | M217 | N63 | N426A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 186 | M218 | N426A | N429B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 187 | M219 | N428A | N427B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 188 | M220 | N427B | N343 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 189 | M221 | N429B | N335A | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 190 | M222 | N426A | N428A | | | Lower Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 191 | M223 | N427B | N429B | | | Upper Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 192 | M224 | N426A | N432A | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 193 | M225 | N427B | N433B | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 194 | M226 | N63 | N430A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 195 | M227 | N1 | N428A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 196 | M228 | N428A | N431B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 197 | M229 | N430A | N429B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 198 | M230 | N429B | N351 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 199 | M231 | N431B | N343 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 200 | M232 | N428A | N430A | | | Lower Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 201 | M233 | N429B | N431B | | | Upper Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 202 | M234 | N428A | N432A | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 203 | M235 | N429B | N433B | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 204 | M236 | N1 | N424A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 205 | M237 | N2 | N430A | | | Bottom Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 206 | M238 | N430A | N425B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 207 | M239 | N424A | N431B | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 208 | M240 | N431B | N327 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 209 | M241 | N425B | N351 | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 210 | M242 | N430A | N424A | | | Lower Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 211 | M243 | N431B | N425B | | | Upper Horizontal | Beam | BAR | A36 Gr.36 | Typical |
| 212 | M244 | N430A | N432A | | | Mid Diagnoal | Beam | BAR | A36 Gr.36 | Typical |
| 213 | M245 | N431B | N433B | | | Top Diagonal | Beam | BAR | A36 Gr.36 | Typical |
| 214 | M275 | N489 | N528A | | | RIGID | None | None | RIGID | Typical |
| 215 | M276 | N423 | N527A | | | RIGID | None | None | RIGID | Typical |
| 216 | MP14 | N530A | N529A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 217 | M278 | N491 | N535A | | | RIGID | None | None | RIGID | Typical |
| 218 | M279 | N425 | N534A | | | RIGID | None | None | RIGID | Typical |
| 219 | MP13 | N537A | N536A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 220 | M281 | N519 | N539A | | | RIGID | None | None | RIGID | Typical |
| 221 | M282 | N453 | N538A | | | RIGID | None | None | RIGID | Typical |
| 222 | MP15 | N541A | N540A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 223 | M284 | N517 | N543A | | | RIGID | None | None | RIGID | Typical |
| 224 | M285 | N451 | N542A | | | RIGID | None | None | RIGID | Typical |
| 225 | MP16 | N545A | N544A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 226 | M287 | N510 | N546A | | | RIGID | None | None | RIGID | Typical |
| 227 | M288 | N444 | N545B | | | RIGID | None | None | RIGID | Typical |
| 228 | MP18 | N548A | N547A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 229 | M290 | N512 | N550A | | | RIGID | None | None | RIGID | Typical |
| 230 | M291 | N446 | N549A | | | RIGID | None | None | RIGID | Typical |
| 231 | MP17 | N552A | N551A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 232 | M293 | N508 | N554A | | | RIGID | None | None | RIGID | Typical |
| 233 | M294 | N442 | N553 | | | RIGID | None | None | RIGID | Typical |
| 234 | MP19 | N556A | N555A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 235 | MP20 | N562A | N561A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 236 | M297 | N560A | N506 | | | RIGID | None | None | RIGID | Typical |
| 237 | M298A | N559A | N440 | | | RIGID | None | None | RIGID | Typical |
| 238 | M299 | N499 | N570A | | | RIGID | None | None | RIGID | Typical |
| 239 | M300 | N433 | N569A | | | RIGID | None | None | RIGID | Typical |
| 240 | MP22 | N572A | N571A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 241 | M302 | N501 | N574A | | | RIGID | None | None | RIGID | Typical |
| 242 | M303 | N435 | N573A | | | RIGID | None | None | RIGID | Typical |
| 243 | MP21 | N576A | N575A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 244 | M305 | N497 | N578A | | | RIGID | None | None | RIGID | Typical |
| 245 | M306 | N431 | N577A | | | RIGID | None | None | RIGID | Typical |
| 246 | MP23 | N580A | N579A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 247 | MP24 | N586 | N585A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 248 | M309 | N584A | N495 | | | RIGID | None | None | RIGID | Typical |
| 249 | M310 | N583A | N429 | | | RIGID | None | None | RIGID | Typical |
| 250 | M311 | N579B | N581B | | | RIGID | None | None | RIGID | Typical |
| 251 | M312 | N580B | N582B | | | RIGID | None | None | RIGID | Typical |
| 252 | MP25 | N584B | N583B | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 253 | M314 | N585B | N587A | | | RIGID | None | None | RIGID | Typical |
| 254 | M315 | N586A | N588A | | | RIGID | None | None | RIGID | Typical |
| 255 | MP26 | N590A | N589A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 256 | M317 | N591A | N593A | | | RIGID | None | None | RIGID | Typical |
| 257 | M318 | N592A | N594A | | | RIGID | None | None | RIGID | Typical |
| 258 | MP27 | N596A | N595A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 259 | MP35 | N599A | N600A | | | RIGID | None | None | RIGID | Typical |
| 260 | M321 | N597A | N598A | | | RIGID | None | None | RIGID | Typical |
| 261 | MP28 | N608A | N607A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 262 | M324 | N605A | N607B | | | RIGID | None | None | RIGID | Typical |
| 263 | M325A | N606A | N608B | | | RIGID | None | None | RIGID | Typical |
| 264 | MP29 | N612A | N611A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 265 | M327 | N609B | N613A | | | RIGID | None | None | RIGID | Typical |
| 266 | M328 | N610A | N614A | | | RIGID | None | None | RIGID | Typical |
| 267 | MP30 | N618A | N617A | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 268 | M330 | N615A | N619 | | | RIGID | None | None | RIGID | Typical |
| 269 | M331 | N616A | N620 | | | RIGID | None | None | RIGID | Typical |
| 270 | MP36 | N621 | N622 | | | RIGID | None | None | RIGID | Typical |
| 271 | M333 | N623 | N624 | | | RIGID | None | None | RIGID | Typical |
| 272 | MP31 | N628 | N627 | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 273 | M335 | N625 | N629 | | | RIGID | None | None | RIGID | Typical |
| 274 | M336 | N626 | N630 | | | RIGID | None | None | RIGID | Typical |
| 275 | MP37 | N631 | N632 | | | RIGID | None | None | RIGID | Typical |
| 276 | MP34 | N643 | N644 | | | RIGID | None | None | RIGID | Typical |
| 277 | MP32 | N648 | N647 | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 278 | M339 | N645 | N649 | | | RIGID | None | None | RIGID | Typical |
| 279 | M340 | N646 | N650 | | | RIGID | None | None | RIGID | Typical |
| 280 | MP33 | N654 | N653 | | | Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 281 | M342 | N651 | N655 | | | RIGID | None | None | RIGID | Typical |
| 282 | M343 | N652 | N656 | | | RIGID | None | None | RIGID | Typical |
| 283 | MP38 | N657 | N659 | | | RIGID | None | None | RIGID | Typical |
| 284 | M345 | N596A | N450 | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 285 | M346 | N596A | N452 | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 286 | M347 | N441 | N618A | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 287 | M348 | N618A | N443 | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 288 | M349 | N432 | N654 | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 289 | M350 | N654 | N434 | | | Kicker Angle | Beam | Single Angle | A36 Gr.36 | Typical |
| 290 | M298 | N764A | N592 | | | Top Mount Vertical Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 291 | M299A | N767A | N600 | | | Top Mount Vertical Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 292 | M300A | N770A | N608 | | | Top Mount Vertical Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 293 | M301 | N773A | N616 | | | Top Mount Vertical Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 294 | M302A | N762A | N773B | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 295 | M303A | N773B | N772B | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 296 | M304 | N772B | N771A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 297 | M305A | N771A | N762A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 298 | M306A | N772A | N769A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 299 | M307 | N769A | N766A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 300 | M308 | N766A | N763A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 301 | M309A | N763A | N772A | | | Top Mount Horizontal | Beam | Single Angle | A53 Gr.B | Typical |
| 302 | MP2 | N782A | N780A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 303 | MP1 | N781A | N779A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 304 | MP8 | N790A | N788A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 305 | MP7 | N789A | N787A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 306 | MP6 | N798A | N796A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 307 | MP5 | N797A | N795A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 308 | MP4 | N806A | N804A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 309 | MP3 | N805A | N803A | | | Top Mount Pipe | Beam | Pipe | A53 Gr.B | Typical |
| 310 | M310A | N807A | N808A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 311 | M311A | N808A | N809A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 312 | M312A | N809A | N810A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 313 | M313 | N810A | N807A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 314 | M314A | N807A | N773B | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 315 | M315A | N807A | N762A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 316 | M316 | N810A | N762A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 317 | M317A | N810A | N771A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 318 | M318A | N809A | N771A | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotate(deg) | Section/Shape | Type | Design List | Material | Design R... |
|---|---|---|---|---|---|---|---|---|---|---|
| 319 | M319 | N809A | N772B | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 320 | M320 | N808A | N772B | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |
| 321 | M321A | N808A | N773B | | | Top Mount Bracing | Beam | Single Angle | A53 Gr.B | Typical |

## Member Advanced Data

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | | | | | | Yes | | | | None |
| 2 | M2 | | | | | | Yes | | | | None |
| 3 | M3 | | | | | | Yes | | | | None |
| 4 | M4 | | | | | Euler Buckling | Yes | | | | None |
| 5 | M5 | | | | | Euler Buckling | Yes | | | | None |
| 6 | M6 | | | | | Euler Buckling | Yes | | | | None |
| 7 | M8 | | | | | | Yes | | | | None |
| 8 | M9 | | | | | | Yes | | | | None |
| 9 | M10 | | | | | Euler Buckling | Yes | | | | None |
| 10 | M11 | | | | | Euler Buckling | Yes | | | | None |
| 11 | M12 | | | | | Euler Buckling | Yes | | | | None |
| 12 | M14 | | | | | | Yes | | | | None |
| 13 | M15 | | | | | | Yes | | | | None |
| 14 | M16 | | | | | Euler Buckling | Yes | | | | None |
| 15 | M17 | | | | | Euler Buckling | Yes | | | | None |
| 16 | M18 | | | | | Euler Buckling | Yes | | | | None |
| 17 | M20 | | | | | | Yes | | | | None |
| 18 | M21 | | | | | | Yes | | | | None |
| 19 | M22 | | | | | Euler Buckling | Yes | | | | None |
| 20 | M23 | | | | | Euler Buckling | Yes | | | | None |
| 21 | M24 | | | | | Euler Buckling | Yes | | | | None |
| 22 | M26 | | | | | | Yes | | | | None |
| 23 | M27 | | | | | | Yes | | | | None |
| 24 | M28 | | | | | Euler Buckling | Yes | | | | None |
| 25 | M29 | | | | | Euler Buckling | Yes | | | | None |
| 26 | M30 | | | | | Euler Buckling | Yes | | | | None |
| 27 | M32 | | | | | | Yes | | | | None |
| 28 | M33 | | | | | | Yes | | | | None |
| 29 | M34 | | | | | Euler Buckling | Yes | | | | None |
| 30 | M35 | | | | | Euler Buckling | Yes | | | | None |
| 31 | M36 | | | | | Euler Buckling | Yes | | | | None |
| 32 | M38 | | | | | | Yes | | | | None |
| 33 | M39 | | | | | | Yes | | | | None |
| 34 | M40 | | | | | Euler Buckling | Yes | | | | None |
| 35 | M41 | | | | | Euler Buckling | Yes | | | | None |
| 36 | M42 | | | | | Euler Buckling | Yes | | | | None |
| 37 | M44 | | | | | | Yes | | | | None |
| 38 | M45 | | | | | | Yes | | | | None |
| 39 | M46 | | | | | Euler Buckling | Yes | | | | None |
| 40 | M47 | | | | | Euler Buckling | Yes | | | | None |
| 41 | M48 | | | | | Euler Buckling | Yes | | | | None |
| 42 | M50 | | | | | | Yes | | | | None |
| 43 | M51 | | | | | | Yes | | | | None |
| 44 | M52 | | | | | Euler Buckling | Yes | | | | None |
| 45 | M53 | | | | | Euler Buckling | Yes | | | | None |
| 46 | M54 | | | | | Euler Buckling | Yes | | | | None |
| 47 | M56 | | | | | | Yes | | | | None |
| 48 | M57 | | | | | | Yes | | | | None |
| 49 | M58 | | | | | Euler Buckling | Yes | | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | M59 | | | | | Euler Buckling | Yes | | | | None |
| 51 | M60 | | | | | Euler Buckling | Yes | | | | None |
| 52 | M62 | | | | | | Yes | | | | None |
| 53 | M63 | | | | | | Yes | | | | None |
| 54 | M64 | | | | | Euler Buckling | Yes | | | | None |
| 55 | M65 | | | | | Euler Buckling | Yes | | | | None |
| 56 | M66 | | | | | Euler Buckling | Yes | | | | None |
| 57 | M68 | | | | | | Yes | | | | None |
| 58 | M69 | | | | | | Yes | | | | None |
| 59 | M70 | | | | | Euler Buckling | Yes | | | | None |
| 60 | M71 | | | | | Euler Buckling | Yes | | | | None |
| 61 | M72 | | | | | Euler Buckling | Yes | | | | None |
| 62 | M74 | | | | | | Yes | | | | None |
| 63 | M75 | | | | | | Yes | | | | None |
| 64 | M76 | | | | | Euler Buckling | Yes | | | | None |
| 65 | M77 | | | | | Euler Buckling | Yes | | | | None |
| 66 | M78 | | | | | Euler Buckling | Yes | | | | None |
| 67 | M80 | | | | | | Yes | | | | None |
| 68 | M81 | | | | | | Yes | | | | None |
| 69 | M82 | | | | | Euler Buckling | Yes | | | | None |
| 70 | M83 | | | | | Euler Buckling | Yes | | | | None |
| 71 | M84 | | | | | Euler Buckling | Yes | | | | None |
| 72 | M86 | | | | | | Yes | | | | None |
| 73 | M87 | | | | | | Yes | | | | None |
| 74 | M88 | | | | | Euler Buckling | Yes | | | | None |
| 75 | M89 | | | | | Euler Buckling | Yes | | | | None |
| 76 | M90 | | | | | Euler Buckling | Yes | | | | None |
| 77 | M92 | | | | | | Yes | | | | None |
| 78 | M93 | | | | | | Yes | | | | None |
| 79 | M94 | | | | | Euler Buckling | Yes | | | | None |
| 80 | M95 | | | | | Euler Buckling | Yes | | | | None |
| 81 | M96 | | | | | Euler Buckling | Yes | | | | None |
| 82 | M98 | | | | | | Yes | | | | None |
| 83 | M99 | | | | | | Yes | | | | None |
| 84 | M100 | | | | | Euler Buckling | Yes | | | | None |
| 85 | M101 | | | | | Euler Buckling | Yes | | | | None |
| 86 | M102 | | | | | Euler Buckling | Yes | | | | None |
| 87 | M104 | | | | | | Yes | | | | None |
| 88 | M105 | | | | | | Yes | | | | None |
| 89 | M106 | | | | | Euler Buckling | Yes | | | | None |
| 90 | M107 | | | | | Euler Buckling | Yes | | | | None |
| 91 | M108 | | | | | Euler Buckling | Yes | | | | None |
| 92 | M110 | | | | | | Yes | | | | None |
| 93 | M111 | | | | | | Yes | | | | None |
| 94 | M112 | | | | | Euler Buckling | Yes | | | | None |
| 95 | M113 | | | | | Euler Buckling | Yes | | | | None |
| 96 | M114 | | | | | Euler Buckling | Yes | | | | None |
| 97 | M116 | | | | | | Yes | | | | None |
| 98 | M117 | | | | | | Yes | | | | None |
| 99 | M118 | | | | | Euler Buckling | Yes | | | | None |
| 100 | M119 | | | | | Euler Buckling | Yes | | | | None |
| 101 | M120 | | | | | Euler Buckling | Yes | | | | None |
| 102 | M122 | | | | | | Yes | | | | None |
| 103 | M123 | | | | | | Yes | | | | None |
| 104 | M124 | | | | | Euler Buckling | Yes | | | | None |
| 105 | M125 | | | | | Euler Buckling | Yes | | | | None |
| 106 | M126 | | | | | Euler Buckling | Yes | | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 107 | M128 | | | | | | Yes | | | | None |
| 108 | M129 | | | | | | Yes | | | | None |
| 109 | M130 | | | | | Euler Buckling | Yes | | | | None |
| 110 | M131 | | | | | Euler Buckling | Yes | | | | None |
| 111 | M132 | | | | | Euler Buckling | Yes | | | | None |
| 112 | M134 | | | | | | Yes | | | | None |
| 113 | M135 | | | | | | Yes | | | | None |
| 114 | M136 | | | | | Euler Buckling | Yes | | | | None |
| 115 | M137 | | | | | Euler Buckling | Yes | | | | None |
| 116 | M138 | | | | | Euler Buckling | Yes | | | | None |
| 117 | M140 | | | | | | Yes | | | | None |
| 118 | M141 | | | | | | Yes | | | | None |
| 119 | M142 | | | | | Euler Buckling | Yes | | | | None |
| 120 | M143 | | | | | Euler Buckling | Yes | | | | None |
| 121 | M144 | | | | | Euler Buckling | Yes | | | | None |
| 122 | M146 | | | | | | Yes | | | | None |
| 123 | M147 | | | | | | Yes | | | | None |
| 124 | M148 | | | | | Euler Buckling | Yes | | | | None |
| 125 | M149 | | | | | Euler Buckling | Yes | | | | None |
| 126 | M150 | | | | | Euler Buckling | Yes | | | | None |
| 127 | M152 | | | | | | Yes | | | | None |
| 128 | M153 | | | | | | Yes | | | | None |
| 129 | M154 | | | | | Euler Buckling | Yes | | | | None |
| 130 | M155 | | | | | Euler Buckling | Yes | | | | None |
| 131 | M156 | | | | | Euler Buckling | Yes | | | | None |
| 132 | M158 | | | | | | Yes | | | | None |
| 133 | M159 | | | | | | Yes | | | | None |
| 134 | M160 | | | | | Euler Buckling | Yes | | | | None |
| 135 | M161 | | | | | Euler Buckling | Yes | | | | None |
| 136 | M162 | | | | | Euler Buckling | Yes | | | | None |
| 137 | M164 | | | | | | Yes | | | | None |
| 138 | M165 | | | | | | Yes | | | | None |
| 139 | M166 | | | | | Euler Buckling | Yes | | | | None |
| 140 | M167 | | | | | Euler Buckling | Yes | | | | None |
| 141 | M168 | | | | | Euler Buckling | Yes | | | | None |
| 142 | M170 | | | | | | Yes | | | | None |
| 143 | M171 | | | | | | Yes | | | | None |
| 144 | M172 | | | | | Euler Buckling | Yes | | | | None |
| 145 | M173 | | | | | Euler Buckling | Yes | | | | None |
| 146 | M174 | | | | | Euler Buckling | Yes | | | | None |
| 147 | M176 | | | | | | Yes | | | | None |
| 148 | M177 | | | | | | Yes | | | | None |
| 149 | M178 | | | | | Euler Buckling | Yes | | | | None |
| 150 | M179 | | | | | Euler Buckling | Yes | | | | None |
| 151 | M180 | | | | | Euler Buckling | Yes | | | | None |
| 152 | M182 | | | | | | Yes | | | | None |
| 153 | M183 | | | | | | Yes | | | | None |
| 154 | M184 | | | | | Euler Buckling | Yes | | | | None |
| 155 | M185 | | | | | Euler Buckling | Yes | | | | None |
| 156 | M186 | | | | | Euler Buckling | Yes | | | | None |
| 157 | M189 | | | | | | Yes | | | | None |
| 158 | M190 | | | | | Euler Buckling | Yes | | | | None |
| 159 | M191 | | | | | Euler Buckling | Yes | | | | None |
| 160 | M192 | | | | | Euler Buckling | Yes | | | | None |
| 161 | M193 | | | | | | Yes | | | | None |
| 162 | M194 | | | | | | Yes | | | | None |
| 163 | M195 | | | | | | Yes | | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 164 | M196 | | | | | | Yes | | | | None |
| 165 | M197 | | | | | | Yes | | | | None |
| 166 | M198 | | | | | | Yes | | | | None |
| 167 | M199 | | | | | | Yes | | | | None |
| 168 | M200 | | | | | | Yes | | | | None |
| 169 | M201 | | | | | | Yes | | | | None |
| 170 | M202 | | | | | | Yes | | | | None |
| 171 | M203 | | | | | | Yes | | | | None |
| 172 | M204 | | | | | | Yes | | | | None |
| 173 | M205 | | | | | | Yes | | | | None |
| 174 | M206 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 175 | M207 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 176 | M208 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 177 | M209 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 178 | M210 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 179 | M211 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 180 | M212 | | | | | | Yes | | | | None |
| 181 | M213 | | | | | | Yes | | | | None |
| 182 | M214 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 183 | M215 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 184 | M216 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 185 | M217 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 186 | M218 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 187 | M219 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 188 | M220 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 189 | M221 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 190 | M222 | | | | | | Yes | | | | None |
| 191 | M223 | | | | | | Yes | | | | None |
| 192 | M224 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 193 | M225 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 194 | M226 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 195 | M227 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 196 | M228 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 197 | M229 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 198 | M230 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 199 | M231 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 200 | M232 | | | | | | Yes | | | | None |
| 201 | M233 | | | | | | Yes | | | | None |
| 202 | M234 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 203 | M235 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 204 | M236 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 205 | M237 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 206 | M238 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 207 | M239 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 208 | M240 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 209 | M241 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 210 | M242 | | | | | | Yes | | | | None |
| 211 | M243 | | | | | | Yes | | | | None |
| 212 | M244 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 213 | M245 | BenPIN | BenPIN | | | Euler Buckling | Yes | | | | None |
| 214 | M275 | | | | | | Yes | ** NA ** | | | None |
| 215 | M276 | | | | | | Yes | ** NA ** | | | None |
| 216 | MP14 | | | | | | Yes | | | Exclude | None |
| 217 | M278 | | | | | | Yes | ** NA ** | | | None |
| 218 | M279 | | | | | | Yes | ** NA ** | | | None |
| 219 | MP13 | | | | | | Yes | | | Exclude | None |
| 220 | M281 | | | | | | Yes | ** NA ** | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | M282 | | | | | | Yes | ** NA ** | | | None |
| 222 | MP15 | | | | | | Yes | | | Exclude | None |
| 223 | M284 | | | | | | Yes | ** NA ** | | | None |
| 224 | M285 | | | | | | Yes | ** NA ** | | | None |
| 225 | MP16 | | | | | | Yes | | | Exclude | None |
| 226 | M287 | | | | | | Yes | ** NA ** | | | None |
| 227 | M288 | | | | | | Yes | ** NA ** | | | None |
| 228 | MP18 | | | | | | Yes | | | Exclude | None |
| 229 | M290 | | | | | | Yes | ** NA ** | | | None |
| 230 | M291 | | | | | | Yes | ** NA ** | | | None |
| 231 | MP17 | | | | | | Yes | | | Exclude | None |
| 232 | M293 | | | | | | Yes | ** NA ** | | | None |
| 233 | M294 | | | | | | Yes | ** NA ** | | | None |
| 234 | MP19 | | | | | | Yes | | | Exclude | None |
| 235 | MP20 | | | | | | Yes | | | Exclude | None |
| 236 | M297 | | | | | | Yes | ** NA ** | | | None |
| 237 | M298A | | | | | | Yes | ** NA ** | | | None |
| 238 | M299 | | | | | | Yes | ** NA ** | | | None |
| 239 | M300 | | | | | | Yes | ** NA ** | | | None |
| 240 | MP22 | | | | | | Yes | | | Exclude | None |
| 241 | M302 | | | | | | Yes | ** NA ** | | | None |
| 242 | M303 | | | | | | Yes | ** NA ** | | | None |
| 243 | MP21 | | | | | | Yes | | | Exclude | None |
| 244 | M305 | | | | | | Yes | ** NA ** | | | None |
| 245 | M306 | | | | | | Yes | ** NA ** | | | None |
| 246 | MP23 | | | | | | Yes | | | Exclude | None |
| 247 | MP24 | | | | | | Yes | | | Exclude | None |
| 248 | M309 | | | | | | Yes | ** NA ** | | | None |
| 249 | M310 | | | | | | Yes | ** NA ** | | | None |
| 250 | M311 | | | | | | Yes | ** NA ** | | | None |
| 251 | M312 | | | | | | Yes | ** NA ** | | | None |
| 252 | MP25 | | | | | | Yes | Default | | Exclude | None |
| 253 | M314 | | | | | | Yes | ** NA ** | | | None |
| 254 | M315 | | | | | | Yes | ** NA ** | | | None |
| 255 | MP26 | | | | | | Yes | | | Exclude | None |
| 256 | M317 | | | | | | Yes | ** NA ** | | | None |
| 257 | M318 | | | | | | Yes | ** NA ** | | | None |
| 258 | MP27 | | | | | | Yes | | | Exclude | None |
| 259 | MP35 | BenPIN | BenPIN | | | | Yes | ** NA ** | | | None |
| 260 | M321 | BenPIN | BenPIN | | | | Yes | ** NA ** | | | None |
| 261 | MP28 | | | | | | Yes | | | Exclude | None |
| 262 | M324 | | | | | | Yes | ** NA ** | | | None |
| 263 | M325A | | | | | | Yes | ** NA ** | | | None |
| 264 | MP29 | | | | | | Yes | | | Exclude | None |
| 265 | M327 | | | | | | Yes | ** NA ** | | | None |
| 266 | M328 | | | | | | Yes | ** NA ** | | | None |
| 267 | MP30 | | | | | | Yes | | | Exclude | None |
| 268 | M330 | | | | | | Yes | ** NA ** | | | None |
| 269 | M331 | | | | | | Yes | ** NA ** | | | None |
| 270 | MP36 | BenPIN | BenPIN | | | | Yes | ** NA ** | | | None |
| 271 | M333 | BenPIN | BenPIN | | | | Yes | ** NA ** | | | None |
| 272 | MP31 | | | | | | Yes | | | Exclude | None |
| 273 | M335 | | | | | | Yes | ** NA ** | | | None |
| 274 | M336 | | | | | | Yes | ** NA ** | | | None |
| 275 | MP37 | | | | | | Yes | ** NA ** | | | None |
| 276 | MP34 | | | | | | Yes | ** NA ** | | | None |
| 277 | MP32 | | | | | | Yes | | | Exclude | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Ra... | Analysis Offs... | Inactive | Seismi... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | M339 | | | | | | Yes | ** NA ** | | | None |
| 279 | M340 | | | | | | Yes | ** NA ** | | | None |
| 280 | MP33 | | | | | | Yes | | | Exclude | None |
| 281 | M342 | | | | | | Yes | ** NA ** | | | None |
| 282 | M343 | | | | | | Yes | ** NA ** | | | None |
| 283 | MP38 | BenPIN | BenPIN | | | | Yes | ** NA ** | | | None |
| 284 | M345 | BenPIN | BenPIN | | | | Yes | | | | None |
| 285 | M346 | BenPIN | BenPIN | | | | Yes | | | | None |
| 286 | M347 | BenPIN | BenPIN | | | | Yes | | | | None |
| 287 | M348 | BenPIN | BenPIN | | | | Yes | | | | None |
| 288 | M349 | BenPIN | BenPIN | | | | Yes | | | | None |
| 289 | M350 | BenPIN | BenPIN | | | | Yes | | | | None |
| 290 | M298 | | | | | | Yes | | | Exclude | None |
| 291 | M299A | | | | | | Yes | | | Exclude | None |
| 292 | M300A | | | | | | Yes | | | Exclude | None |
| 293 | M301 | | | | | | Yes | | | Exclude | None |
| 294 | M302A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 295 | M303A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 296 | M304 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 297 | M305A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 298 | M306A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 299 | M307 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 300 | M308 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 301 | M309A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 302 | MP2 | | | | | | Yes | | | Exclude | None |
| 303 | MP1 | | | | | | Yes | | | Exclude | None |
| 304 | MP8 | | | | | | Yes | | | Exclude | None |
| 305 | MP7 | | | | | | Yes | | | Exclude | None |
| 306 | MP6 | | | | | | Yes | | | Exclude | None |
| 307 | MP5 | | | | | | Yes | | | Exclude | None |
| 308 | MP4 | | | | | | Yes | | | Exclude | None |
| 309 | MP3 | | | | | | Yes | | | Exclude | None |
| 310 | M310A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 311 | M311A | BenPIN | BenPIN | | | | Yes | Default | | Exclude | None |
| 312 | M312A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 313 | M313 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 314 | M314A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 315 | M315A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 316 | M316 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 317 | M317A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 318 | M318A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 319 | M319 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 320 | M320 | BenPIN | BenPIN | | | | Yes | | | Exclude | None |
| 321 | M321A | BenPIN | BenPIN | | | | Yes | | | Exclude | None |

## Basic Load Cases

| | BLC Description | Category | X Grav... | Y Grav... | Z Grav... | Joint | Point | Distrib... | Area(M... | Surfac... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Dead Load | DL | | -1 | | | 78 | | | |
| 2 | Wind 0 | WLZ | | | | | 156 | | | |
| 3 | Wind 30 | None | | | | | 156 | | | |
| 4 | Wind 60 | None | | | | | 156 | | | |
| 5 | Wind 90 | WLX | | | | | 156 | | | |
| 6 | Wind 120 | None | | | | | 156 | | | |
| 7 | Wind 150 | None | | | | | 156 | | | |
| 8 | Wind 180 | WLZ | | | | | 156 | | | |

## Basic Load Cases (Continued)

| | BLC Description | Category | X Grav... | Y Grav... | Z Grav... | Joint | Point | Distrib... | Area(M... | Surfac... |
|---|---|---|---|---|---|---|---|---|---|---|
| 9 | Ice Weight | DL | | | | | 78 | | | |
| 10 | Ice + Wind 0 | WLZ | | | | | 156 | | | |
| 11 | Ice + Wind 30 | None | | | | | 156 | | | |
| 12 | Ice + Wind 60 | None | | | | | 156 | | | |
| 13 | Ice + Wind 90 | WLX | | | | | 156 | | | |
| 14 | Ice + Wind 120 | None | | | | | 156 | | | |
| 15 | Ice + Wind 150 | None | | | | | 156 | | | |
| 16 | Ice + Wind 180 | WLZ | | | | | 156 | | | |
| 17 | Distri. Wind Z | WLZ | | | | | | | 1 | |
| 18 | Distri. Wind X | WLX | | | | | | | 1 | |
| 19 | Distri. Ice + Win... | WLZ | | | | | | | 1 | |
| 20 | Distrr. Ice + Win... | WLX | | | | | | | 1 | |
| 21 | Seismic Load Z | ELZ | | | | | 78 | | | |
| 22 | Seismic Load X | ELX | | | | | 78 | | | |
| 23 | Live Load 1 | LL | | | | | | | | |
| 24 | Live Load 2 | LL | | | | | | | | |
| 25 | Live Load 3 | LL | | | | | | | | |
| 26 | Water Dead We... | None | | | | | | | | 288 |
| 27 | BLC 17 Transie... | None | | | | | | 187 | | |
| 28 | BLC 18 Transie... | None | | | | | | 191 | | |
| 29 | BLC 19 Transie... | None | | | | | | 187 | | |
| 30 | BLC 20 Transie... | None | | | | | | 191 | | |

## Load Combinations

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.4D | Yes | | | 1 | 1.4 | | | | | | | | | | | | | | | | | | |
| 2 | 1.2D + 1.6W 0° | Yes | | | 1 | 1.2 | 2 | 1.6 | 17 | 1.6 | 18 | | | | | | | | | | | | | |
| 3 | 1.2D + 1.6W 30° | Yes | | | 1 | 1.2 | 3 | 1.6 | 17 | 1.3... | 18 | .8 | | | | | | | | | | | | |
| 4 | 1.2D + 1.6W 60° | Yes | | | 1 | 1.2 | 4 | 1.6 | 17 | .8 | 18 | 1.3... | | | | | | | | | | | | |
| 5 | 1.2D + 1.6W 90° | Yes | | | 1 | 1.2 | 5 | 1.6 | 17 | | 18 | 1.6 | | | | | | | | | | | | |
| 6 | 1.2D + 1.6W 120° | Yes | | | 1 | 1.2 | 6 | 1.6 | 17 | -.8 | 18 | 1.3... | | | | | | | | | | | | |
| 7 | 1.2D + 1.6W 150° | Yes | | | 1 | 1.2 | 7 | 1.6 | 17 | -1.... | 18 | .8 | | | | | | | | | | | | |
| 8 | 1.2D + 1.6W 180° | Yes | | | 1 | 1.2 | 8 | 1.6 | 17 | -1.6 | 18 | | | | | | | | | | | | | |
| 9 | 0.9D + 1.6W 0° | Yes | | | 1 | .9 | 2 | 1.6 | 17 | 1.6 | 18 | | | | | | | | | | | | | |
| 10 | 0.9D + 1.6W 30° | Yes | | | 1 | .9 | 3 | 1.6 | 17 | 1.3... | 18 | .8 | | | | | | | | | | | | |
| 11 | 0.9D + 1.6W 60° | Yes | | | 1 | .9 | 4 | 1.6 | 17 | .8 | 18 | 1.3... | | | | | | | | | | | | |
| 12 | 0.9D + 1.6W 90° | Yes | | | 1 | .9 | 5 | 1.6 | 17 | | 18 | 1.6 | | | | | | | | | | | | |
| 13 | 0.9D + 1.6W 120° | Yes | | | 1 | .9 | 6 | 1.6 | 17 | -.8 | 18 | 1.3... | | | | | | | | | | | | |
| 14 | 0.9D + 1.6W 150° | Yes | | | 1 | .9 | 7 | 1.6 | 17 | -1.... | 18 | .8 | | | | | | | | | | | | |
| 15 | 0.9D + 1.6W 180° | Yes | | | 1 | .9 | 8 | 1.6 | 17 | -1.6 | 18 | | | | | | | | | | | | | |
| 16 | 1.2D + 1.0Di + 1.0Wi 0° | Yes | | | 1 | 1.2 | 9 | 1 | 10 | 1 | 19 | 1 | 20 | | | | | | | | | | | |
| 17 | 1.2D + 1.0Di + 1.0Wi 30° | Yes | | | 1 | 1.2 | 9 | 1 | 11 | 1 | 19 | .866 | 20 | .5 | | | | | | | | | | |
| 18 | 1.2D + 1.0Di + 1.0Wi 60° | Yes | | | 1 | 1.2 | 9 | 1 | 12 | 1 | 19 | .5 | 20 | .866 | | | | | | | | | | |
| 19 | 1.2D + 1.0Di + 1.0Wi 90° | Yes | | | 1 | 1.2 | 9 | 1 | 13 | 1 | 19 | | 20 | 1 | | | | | | | | | | |
| 20 | 1.2D + 1.0Di + 1.0Wi 120° | Yes | | | 1 | 1.2 | 9 | 1 | 14 | 1 | 19 | -.5 | 20 | .866 | | | | | | | | | | |
| 21 | 1.2D + 1.0Di + 1.0Wi 150° | Yes | | | 1 | 1.2 | 9 | 1 | 15 | 1 | 19 | -.866 | 20 | .5 | | | | | | | | | | |
| 22 | 1.2D + 1.0Di + 1.0Wi 180° | Yes | | | 1 | 1.2 | 9 | 1 | 16 | 1 | 19 | -1 | 20 | | | | | | | | | | | |
| 23 | 1.2D + 1.0Eh 0° | Yes | | | 1 | 1.2 | 21 | 1 | 22 | | | | | | | | | | | | | | | |
| 24 | 1.2D + 1.0Eh 30° | Yes | | | 1 | 1.2 | 21 | .866 | 22 | .5 | | | | | | | | | | | | | | |
| 25 | 1.2D + 1.0Eh 60° | Yes | | | 1 | 1.2 | 21 | .5 | 22 | .866 | | | | | | | | | | | | | | |
| 26 | 1.2D + 1.0Eh 90° | Yes | | | 1 | 1.2 | 21 | | 22 | 1 | | | | | | | | | | | | | | |
| 27 | 1.2D + 1.0Eh 120° | Yes | | | 1 | 1.2 | 21 | -.5 | 22 | .866 | | | | | | | | | | | | | | |
| 28 | 1.2D + 1.0Eh 150° | Yes | | | 1 | 1.2 | 21 | -.866 | 22 | .5 | | | | | | | | | | | | | | |
| 29 | 1.2D + 1.0Eh 180° | Yes | | | 1 | 1.2 | 21 | -1 | 22 | | | | | | | | | | | | | | | |
| 30 | 0.9D + 1.0Eh 0° | Yes | | | 1 | .9 | 21 | 1 | 22 | | | | | | | | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 31 | 0.9D + 1.0Eh 30° | Yes | | | 1 | .9 | 21 | .866 | 22 | .5 | | | | | | | | | | | | | | |
| 32 | 0.9D + 1.0Eh 60° | Yes | | | 1 | .9 | 21 | .5 | 22 | .866 | | | | | | | | | | | | | | |
| 33 | 0.9D + 1.0Eh 90° | Yes | | | 1 | .9 | 21 | | 22 | 1 | | | | | | | | | | | | | | |
| 34 | 0.9D + 1.0Eh 120° | Yes | | | 1 | .9 | 21 | -.5 | 22 | .866 | | | | | | | | | | | | | | |
| 35 | 0.9D + 1.0Eh 150° | Yes | | | 1 | .9 | 21 | -.866 | 22 | .5 | | | | | | | | | | | | | | |
| 36 | 0.9D + 1.0Eh 180° | Yes | | | 1 | .9 | 21 | -1 | 22 | | | | | | | | | | | | | | | |
| 37 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 2 | .222 | 17 | .222 | 18 | | | | | | | | | | | |
| 38 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | | | | | | | | | | |
| 39 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | | | | | | | | | | |
| 40 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 5 | .222 | 17 | | 18 | .222 | | | | | | | | | | |
| 41 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | | | | | | | | | | |
| 42 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | | | | | | | | | | |
| 43 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | | | | | | | | | | |
| 44 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 2 | .222 | 17 | .222 | 18 | | | | | | | | | | | |
| 45 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | | | | | | | | | | |
| 46 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | | | | | | | | | | |
| 47 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 5 | .222 | 17 | | 18 | .222 | | | | | | | | | | |
| 48 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | | | | | | | | | | |
| 49 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | | | | | | | | | | |
| 50 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | | | | | | | | | | |
| 51 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 2 | .222 | 17 | .222 | 18 | | | | | | | | | | | |
| 52 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | | | | | | | | | | |
| 53 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | | | | | | | | | | |
| 54 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 5 | .222 | 17 | | 18 | .222 | | | | | | | | | | |
| 55 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | | | | | | | | | | |
| 56 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | | | | | | | | | | |
| 57 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | | | | | | | | | | |
| 58 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 2 | .071 | 17 | .071 | 18 | | | | | | | | | | | |
| 59 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | | | | | | | | | | |
| 60 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | | | | | | | | | | |
| 61 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 5 | .071 | 17 | | 18 | .071 | | | | | | | | | | |
| 62 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | | | | | | | | | | |
| 63 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | | | | | | | | | | |
| 64 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 8 | .071 | 17 | -.071 | 18 | | | | | | | | | | | |
| 65 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 2 | .071 | 17 | .071 | 18 | | | | | | | | | | | |
| 66 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | | | | | | | | | | |
| 67 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | | | | | | | | | | |
| 68 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 5 | .071 | 17 | | 18 | .071 | | | | | | | | | | |
| 69 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | | | | | | | | | | |
| 70 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | | | | | | | | | | |
| 71 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 8 | .071 | 17 | -.071 | 18 | | | | | | | | | | | |
| 72 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 2 | .071 | 17 | .071 | 18 | | | | | | | | | | | |
| 73 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | | | | | | | | | | |
| 74 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | | | | | | | | | | |
| 75 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 5 | .071 | 17 | | 18 | .071 | | | | | | | | | | |
| 76 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | | | | | | | | | | |
| 77 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | | | | | | | | | | |
| 78 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 8 | .071 | 17 | -.071 | 18 | | | | | | | | | | | |
| 79 | 1.4D | Yes | | | 1 | 1.4 | | | | | | | | | 26 | 1.4 | | | | | | | | |
| 80 | 1.2D + 1.6W 0° | Yes | | | 1 | 1.2 | 2 | 1.6 | 17 | 1.6 | 18 | | | | 26 | 1.2 | | | | | | | | |
| 81 | 1.2D + 1.6W 30° | Yes | | | 1 | 1.2 | 3 | 1.6 | 17 | 1.3... | 18 | .8 | | | 26 | 1.2 | | | | | | | | |
| 82 | 1.2D + 1.6W 60° | Yes | | | 1 | 1.2 | 4 | 1.6 | 17 | .8 | 18 | 1.3... | | | 26 | 1.2 | | | | | | | | |
| 83 | 1.2D + 1.6W 90° | Yes | | | 1 | 1.2 | 5 | 1.6 | 17 | | 18 | 1.6 | | | 26 | 1.2 | | | | | | | | |
| 84 | 1.2D + 1.6W 120° | Yes | | | 1 | 1.2 | 6 | 1.6 | 17 | -.8 | 18 | 1.3... | | | 26 | 1.2 | | | | | | | | |
| 85 | 1.2D + 1.6W 150° | Yes | | | 1 | 1.2 | 7 | 1.6 | 17 | -1.... | 18 | .8 | | | 26 | 1.2 | | | | | | | | |
| 86 | 1.2D + 1.6W 180° | Yes | | | 1 | 1.2 | 8 | 1.6 | 17 | -1.6 | 18 | | | | 26 | 1.2 | | | | | | | | |
| 87 | 0.9D + 1.6W 0° | Yes | | | 1 | .9 | 2 | 1.6 | 17 | 1.6 | 18 | | | | 26 | .9 | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 88 | 0.9D + 1.6W 30° | Yes | | | 1 | .9 | 3 | 1.6 | 17 | 1.3... | 18 | .8 | | | 26 | .9 | | | | | | | | |
| 89 | 0.9D + 1.6W 60° | Yes | | | 1 | .9 | 4 | 1.6 | 17 | .8 | 18 | 1.3... | | | 26 | .9 | | | | | | | | |
| 90 | 0.9D + 1.6W 90° | Yes | | | 1 | .9 | 5 | 1.6 | 17 | | 18 | 1.6 | | | 26 | .9 | | | | | | | | |
| 91 | 0.9D + 1.6W 120° | Yes | | | 1 | .9 | 6 | 1.6 | 17 | -.8 | 18 | 1.3... | | | 26 | .9 | | | | | | | | |
| 92 | 0.9D + 1.6W 150° | Yes | | | 1 | .9 | 7 | 1.6 | 17 | -1.... | 18 | .8 | | | 26 | .9 | | | | | | | | |
| 93 | 0.9D + 1.6W 180° | Yes | | | 1 | .9 | 8 | 1.6 | 17 | -1.6 | 18 | | | | 26 | .9 | | | | | | | | |
| 94 | 1.2D + 1.0Di + 1.0Wi 0° | Yes | | | 1 | 1.2 | 9 | 1 | 10 | 1 | 19 | 1 | 20 | | 26 | 1.2 | | | | | | | | |
| 95 | 1.2D + 1.0Di + 1.0Wi 30° | Yes | | | 1 | 1.2 | 9 | 1 | 11 | 1 | 19 | .866 | 20 | .5 | 26 | 1.2 | | | | | | | | |
| 96 | 1.2D + 1.0Di + 1.0Wi 60° | Yes | | | 1 | 1.2 | 9 | 1 | 12 | 1 | 19 | .5 | 20 | .866 | 26 | 1.2 | | | | | | | | |
| 97 | 1.2D + 1.0Di + 1.0Wi 90° | Yes | | | 1 | 1.2 | 9 | 1 | 13 | 1 | 19 | | 20 | 1 | 26 | 1.2 | | | | | | | | |
| 98 | 1.2D + 1.0Di + 1.0Wi 120° | Yes | | | 1 | 1.2 | 9 | 1 | 14 | 1 | 19 | -.5 | 20 | .866 | 26 | 1.2 | | | | | | | | |
| 99 | 1.2D + 1.0Di + 1.0Wi 150° | Yes | | | 1 | 1.2 | 9 | 1 | 15 | 1 | 19 | -.866 | 20 | .5 | 26 | 1.2 | | | | | | | | |
| 100 | 1.2D + 1.0Di + 1.0Wi 180° | Yes | | | 1 | 1.2 | 9 | 1 | 16 | 1 | 19 | -1 | 20 | | 26 | 1.2 | | | | | | | | |
| 101 | 1.2D + 1.0Eh 0° | Yes | | | 1 | 1.2 | 21 | 1 | 22 | | | | | | 26 | 1.2 | | | | | | | | |
| 102 | 1.2D + 1.0Eh 30° | Yes | | | 1 | 1.2 | 21 | .866 | 22 | .5 | | | | | 26 | 1.2 | | | | | | | | |
| 103 | 1.2D + 1.0Eh 60° | Yes | | | 1 | 1.2 | 21 | .5 | 22 | .866 | | | | | 26 | 1.2 | | | | | | | | |
| 104 | 1.2D + 1.0Eh 90° | Yes | | | 1 | 1.2 | 21 | | 22 | 1 | | | | | 26 | 1.2 | | | | | | | | |
| 105 | 1.2D + 1.0Eh 120° | Yes | | | 1 | 1.2 | 21 | -.5 | 22 | .866 | | | | | 26 | 1.2 | | | | | | | | |
| 106 | 1.2D + 1.0Eh 150° | Yes | | | 1 | 1.2 | 21 | -.866 | 22 | .5 | | | | | 26 | 1.2 | | | | | | | | |
| 107 | 1.2D + 1.0Eh 180° | Yes | | | 1 | 1.2 | 21 | -1 | 22 | | | | | | 26 | 1.2 | | | | | | | | |
| 108 | 0.9D + 1.0Eh 0° | Yes | | | 1 | .9 | 21 | 1 | 22 | | | | | | 26 | .9 | | | | | | | | |
| 109 | 0.9D + 1.0Eh 30° | Yes | | | 1 | .9 | 21 | .866 | 22 | .5 | | | | | 26 | .9 | | | | | | | | |
| 110 | 0.9D + 1.0Eh 60° | Yes | | | 1 | .9 | 21 | .5 | 22 | .866 | | | | | 26 | .9 | | | | | | | | |
| 111 | 0.9D + 1.0Eh 90° | Yes | | | 1 | .9 | 21 | | 22 | 1 | | | | | 26 | .9 | | | | | | | | |
| 112 | 0.9D + 1.0Eh 120° | Yes | | | 1 | .9 | 21 | -.5 | 22 | .866 | | | | | 26 | .9 | | | | | | | | |
| 113 | 0.9D + 1.0Eh 150° | Yes | | | 1 | .9 | 21 | -.866 | 22 | .5 | | | | | 26 | .9 | | | | | | | | |
| 114 | 0.9D + 1.0Eh 180° | Yes | | | 1 | .9 | 21 | -1 | 22 | | | | | | 26 | .9 | | | | | | | | |
| 115 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 2 | .222 | 17 | .222 | 18 | | 26 | 1 | | | | | | | | |
| 116 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 117 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 118 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 5 | .222 | 17 | | 18 | .222 | 26 | 1 | | | | | | | | |
| 119 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 120 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 121 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 23 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | 26 | 1 | | | | | | | | |
| 122 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 2 | .222 | 17 | .222 | 18 | | 26 | 1 | | | | | | | | |
| 123 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 124 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 125 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 5 | .222 | 17 | | 18 | .222 | 26 | 1 | | | | | | | | |
| 126 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 127 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 128 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 24 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | 26 | 1 | | | | | | | | |
| 129 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 2 | .222 | 17 | .222 | 18 | | 26 | 1 | | | | | | | | |
| 130 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 3 | .222 | 17 | .192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 131 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 4 | .222 | 17 | .111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 132 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 5 | .222 | 17 | | 18 | .222 | 26 | 1 | | | | | | | | |
| 133 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 6 | .222 | 17 | -.111 | 18 | .192 | 26 | 1 | | | | | | | | |
| 134 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 7 | .222 | 17 | -.192 | 18 | .111 | 26 | 1 | | | | | | | | |
| 135 | 1.0D +1.5Lv + 1.0W (60 mp... | Yes | | | 1 | 1 | 25 | 1.5 | 8 | .222 | 17 | -.222 | 18 | | 26 | 1 | | | | | | | | |
| 136 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 2 | .071 | 17 | .071 | 18 | | 26 | 1.2 | | | | | | | | |
| 137 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | 26 | 1.2 | | | | | | | | |
| 138 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 139 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 5 | .071 | 17 | | 18 | .071 | 26 | 1.2 | | | | | | | | |
| 140 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 141 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | 26 | 1.2 | | | | | | | | |
| 142 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 23 | 1 | 8 | .071 | 17 | -.071 | 18 | | 26 | 1.2 | | | | | | | | |
| 143 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 2 | .071 | 17 | .071 | 18 | | 26 | 1.2 | | | | | | | | |
| 144 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | 26 | 1.2 | | | | | | | | |

## Load Combinations (Continued)

| | Description | S... | P... | S... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... | B... | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 145 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 146 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 5 | .071 | 17 | | 18 | .071 | 26 | 1.2 | | | | | | | | |
| 147 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 148 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | 26 | 1.2 | | | | | | | | |
| 149 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 24 | 1 | 8 | .071 | 17 | -.071 | 18 | | 26 | 1.2 | | | | | | | | |
| 150 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 2 | .071 | 17 | .071 | 18 | | 26 | 1.2 | | | | | | | | |
| 151 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 3 | .071 | 17 | .062 | 18 | .036 | 26 | 1.2 | | | | | | | | |
| 152 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 4 | .071 | 17 | .036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 153 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 5 | .071 | 17 | | 18 | .071 | 26 | 1.2 | | | | | | | | |
| 154 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 6 | .071 | 17 | -.036 | 18 | .062 | 26 | 1.2 | | | | | | | | |
| 155 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 7 | .071 | 17 | -.062 | 18 | .036 | 26 | 1.2 | | | | | | | | |
| 156 | 1.2D + 1.0Lv + 1.0W (30 mp... | Yes | | | 1 | 1.2 | 25 | 1 | 8 | .071 | 17 | -.071 | 18 | | 26 | 1.2 | | | | | | | | |

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

| | Member | Shape | Code Check | Loc[in] | LC | Shear Check | Loc[in] | ... | ... | phi*Pnc [lb] | phi*Pnt [lb] | ... | phi*... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M227 | Sway Rod... | .909 | 504.079 | 2 | .004 | 0 | | ... | 220.942 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 2 | M226 | Sway Rod... | .909 | 504.079 | 8 | .004 | 0 | | ... | 220.942 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 3 | M237 | Sway Rod... | .890 | 504.14 | 5 | .004 | 0 | | 2 | 220.888 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 4 | M207 | Sway Rod... | .885 | 504.114 | 8 | .004 | 504.114 | | 5 | 220.911 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 5 | M206 | Sway Rod... | .884 | 504.105 | 2 | .004 | 504.105 | | 5 | 220.919 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 6 | M216 | Sway Rod... | .879 | 504.105 | 5 | .004 | 504.105 | | 8 | 220.919 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 7 | M164 | L2x1.5x4 | .866 | 0 | 82 | .030 | 32 | y | ... | 15528.446 | 26325 | ... | 113... | 1.636 | H2-1 |
| 8 | M228 | Sway Rod... | .795 | 487.678 | 86 | .004 | 487.678 | | 6 | 166.669 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 9 | M229 | Sway Rod... | .794 | 487.678 | 80 | .004 | 487.678 | | 4 | 166.669 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 10 | M116 | L2x1.5x4 | .770 | 0 | 79 | .040 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.774 | H2-1 |
| 11 | M239 | Sway Rod... | .768 | 487.712 | 83 | .005 | 487.712 | | ... | 166.645 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 12 | M68 | L2x1.5x4 | .767 | 0 | 80 | .077 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.703 | H2-1 |
| 13 | M20 | L2x1.5x4 | .761 | 0 | 85 | .023 | 32 | y | ... | 15528.446 | 26325 | ... | 113... | 1.698 | H2-1 |
| 14 | M209 | Sway Rod... | .761 | 487.7 | 86 | .005 | 0 | | ... | 166.654 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 15 | M208 | Sway Rod... | .760 | 487.69 | 80 | .005 | 487.69 | | ... | 166.66 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 16 | M218 | Sway Rod... | .752 | 487.69 | 83 | .005 | 487.69 | | ... | 166.66 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 17 | M230 | Sway Rod... | .656 | 472.456 | 8 | .004 | 472.456 | | ... | 79.578 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 18 | M231 | Sway Rod... | .655 | 472.456 | 2 | .004 | 472.456 | | ... | 79.578 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 19 | M196 | 23" OD x ... | .652 | 169.654 | 81 | .011 | 407.17 | | 8 | 590751.697 | 673918.749 | ... | 386... | 1.213 | H1-1a |
| 20 | M197 | 23" OD x ... | .652 | 169.654 | 85 | .011 | 407.17 | | 2 | 590751.697 | 673918.749 | ... | 386... | 1.213 | H1-1a |
| 21 | M241 | Sway Rod... | .620 | 472.466 | 5 | .004 | 0 | | ... | 79.575 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 22 | M140 | L2x1.5x4 | .604 | 0 | 96 | .027 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.719 | H2-1 |
| 23 | M211 | Sway Rod... | .603 | 472.466 | 15 | .003 | 472.466 | | ... | 79.575 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 24 | M210 | Sway Rod... | .602 | 472.456 | 9 | .003 | 472.456 | | 4 | 79.578 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 25 | M194 | 23" OD x ... | .601 | 165.413 | 86 | .011 | 407.17 | | 2 | 590751.697 | 673918.749 | ... | 386... | 1.245 | H1-1a |
| 26 | M195 | 23" OD x ... | .600 | 165.413 | 80 | .011 | 407.17 | | 8 | 590751.697 | 673918.749 | ... | 386... | 1.239 | H1-1a |
| 27 | M220 | Sway Rod... | .590 | 472.456 | 12 | .004 | 472.456 | | ... | 79.578 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 28 | M202 | 23" OD x ... | .587 | 0 | 81 | .014 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.211 | H1-1a |
| 29 | M204 | 23" OD x ... | .587 | 0 | 85 | .014 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.215 | H1-1a |
| 30 | M69 | L2x1.5x4 | .558 | 37.639 | 86 | .123 | 37.639 | y | ... | 12683.052 | 26325 | ... | 109... | 1.268 | H2-1 |
| 31 | M203 | 23" OD x ... | .555 | 407.17 | 79 | .023 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.127 | H1-1a |
| 32 | M198 | 23" OD x ... | .551 | 0 | 86 | .014 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 1.957 | H1-1a |
| 33 | M200 | 23" OD x ... | .551 | 0 | 80 | .014 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 1.938 | H1-1a |
| 34 | M199 | 23" OD x ... | .551 | 407.17 | 79 | .024 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.128 | H1-1a |
| 35 | M201 | 23" OD x ... | .551 | 407.17 | 79 | .025 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.128 | H1-1a |
| 36 | M44 | L2x1.5x4 | .550 | 0 | 79 | .031 | 0 | z | ... | 15528.446 | 26325 | ... | 113... | 1.711 | H2-1 |
| 37 | M205 | 23" OD x ... | .550 | 407.17 | 79 | .022 | 0 | | ... | 590751.697 | 673918.749 | ... | 386... | 2.128 | H1-1a |
| 38 | M233 | W8X24 | .516 | 0 | 80 | .034 | 254.431 | y | ... | 63863.073 | 229392 | ... | 62370 | 2.18 | H1-1a |
| 39 | M8 | L2x1.5x4 | .505 | 0 | 99 | .087 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.569 | H2-1 |
| 40 | M75 | L2x1.5x4 | .496 | 0 | 86 | .054 | 37.639 | y | ... | 12683.052 | 26325 | ... | 112... | 1.539 | H2-1 |

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

| | Member | Shape | Code Check | Loc[in] | LC | Shear Check | Loc[in] | ... | ... | phi*Pnc [lb] | phi*Pnt [lb] | ... | phi*... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41 | M243 | W8X24 | .496 | 0 | 83 | .033 | 0 | y | ... | 63842.082 | 229392 | ... | 62370 | 2.176 | H1-1a |
| 42 | M1 | L2x1.5x4 | .495 | 0 | 79 | .023 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.692 | H2-1 |
| 43 | M92 | L2x1.5x4 | .492 | 0 | 79 | .037 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.725 | H2-1 |
| 44 | M123 | L2x1.5x4 | .489 | 25.092 | 80 | .118 | 25.092 | z | ... | 12683.052 | 26325 | ... | 111... | 1.423 | H2-1 |
| 45 | M223 | W8X24 | .484 | 254.452 | 83 | .032 | 254.452 | y | ... | 63852.576 | 229392 | ... | 62370 | 2.174 | H1-1a |
| 46 | M213 | W8X24 | .483 | 254.452 | 80 | .033 | 0 | y | ... | 63852.576 | 229392 | ... | 62370 | 2.176 | H1-1a |
| 47 | M232 | W8X31 | .451 | 0 | 80 | .031 | 283.153 | y | ... | 104537.393 | 295812 | ... | 82080 | 2.341 | H1-1a |
| 48 | M242 | W8X31 | .442 | 0 | 83 | .030 | 0 | y | ... | 104475.655 | 295812 | ... | 82080 | 2.341 | H1-1a |
| 49 | M212 | W8X31 | .440 | 283.195 | 80 | .030 | 0 | y | ... | 104506.515 | 295812 | ... | 82080 | 2.342 | H1-1a |
| 50 | M222 | W8X31 | .438 | 283.195 | 83 | .030 | 283.195 | y | ... | 104506.515 | 295812 | ... | 82080 | 2.343 | H1-1a |
| 51 | M21 | L2x1.5x4 | .432 | 37.639 | 84 | .347 | 37.639 | z | ... | 12683.052 | 26325 | ... | 113... | 2.216 | H2-1 |
| 52 | M146 | L2x1.5x4 | .422 | 0 | 80 | .017 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.747 | H2-1 |
| 53 | M27 | L2x1.5x4 | .421 | 37.639 | 84 | .026 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.3 | H2-1 |
| 54 | M33 | L2x1.5x4 | .420 | 0 | 84 | .028 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 1.287 | H2-1 |
| 55 | M171 | L2x1.5x4 | .394 | 0 | 79 | .021 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.188 | H2-1 |
| 56 | M165 | L2x1.5x4 | .394 | 37.639 | 82 | .026 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 2.178 | H2-1 |
| 57 | M50 | L2x1.5x4 | .393 | 0 | 82 | .026 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.695 | H2-1 |
| 58 | M15 | L2x1.5x4 | .388 | 16.467 | 84 | .095 | 0 | z | ... | 12683.052 | 26325 | ... | 113... | 1.837 | H2-1 |
| 59 | M134 | L2x1.5x4 | .379 | 0 | 100 | .034 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.662 | H2-1 |
| 60 | M152 | L2x1.5x4 | .378 | 0 | 80 | .040 | 0 | z | ... | 15528.446 | 26325 | ... | 113... | 1.685 | H2-1 |
| 61 | M38 | L2x1.5x4 | .369 | 0 | 86 | .062 | 0 | z | ... | 15528.446 | 26325 | ... | 113... | 1.754 | H2-1 |
| 62 | M111 | L2x1.5x4 | .368 | 37.639 | 80 | .024 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 1.274 | H2-1 |
| 63 | M117 | L2x1.5x4 | .364 | 0 | 80 | .031 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.182 | H2-1 |
| 64 | M80 | L2x1.5x4 | .351 | 0 | 81 | .044 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.643 | H2-1 |
| 65 | M86 | L2x1.5x4 | .347 | 0 | 80 | .050 | 32 | y | ... | 15528.446 | 26325 | ... | 113... | 1.725 | H2-1 |
| 66 | M129 | L2x1.5x4 | .346 | 34.502 | 83 | .154 | 34.502 | z | ... | 12683.052 | 26325 | ... | 113... | 1.943 | H2-1 |
| 67 | M2 | L2x1.5x4 | .346 | 0 | 100 | .044 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.722 | H2-1 |
| 68 | M56 | L2x1.5x4 | .319 | 0 | 83 | .074 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.621 | H2-1 |
| 69 | M177 | L2x1.5x4 | .319 | 0 | 81 | .019 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 1.216 | H2-1 |
| 70 | M98 | L2x1.5x4 | .316 | 0 | 79 | .034 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.706 | H2-1 |
| 71 | M159 | L2x1.5x4 | .311 | 37.639 | 81 | .024 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 1.251 | H2-1 |
| 72 | M176 | L2x1.5x4 | .299 | 0 | 83 | .032 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.672 | H2-1 |
| 73 | M104 | L2x1.5x4 | .299 | 0 | 85 | .032 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.673 | H2-1 |
| 74 | M32 | L2x1.5x4 | .291 | 0 | 86 | .060 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 2.102 | H2-1 |
| 75 | M39 | L2x1.5x4 | .289 | 16.467 | 81 | .064 | 37.639 | z | ... | 12683.052 | 26325 | ... | 113... | 1.682 | H2-1 |
| 76 | M63 | L2x1.5x4 | .284 | 28.229 | 86 | .035 | 0 | y | ... | 12683.052 | 26325 | ... | 111... | 1.135 | H2-1 |
| 77 | M128 | L2x1.5x4 | .284 | 0 | 94 | .017 | 0 | z | ... | 15528.446 | 26325 | ... | 112... | 1.287 | H2-1 |
| 78 | M81 | L2x1.5x4 | .283 | 27.445 | 86 | .039 | 37.639 | y | ... | 12683.052 | 26325 | ... | 110... | 1.017 | H2-1 |
| 79 | M193 | 30" OD x ... | .282 | 1152.41 | 81 | .017 | 828.295 | | ... | 472590.064 | 881735.117 | ... | 634... | 3.083 | H1-1a |
| 80 | M14 | L2x1.5x4 | .273 | 0 | 20 | .066 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.721 | H2-1 |
| 81 | M135 | L2x1.5x4 | .271 | 0 | 83 | .042 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.196 | H2-1 |
| 82 | M147 | L2x1.5x4 | .263 | 34.11 | 14 | .108 | 34.11 | z | ... | 12683.052 | 26325 | ... | 113... | 2.897 | H2-1 |
| 83 | M51 | L2x1.5x4 | .263 | 37.639 | 81 | .021 | 0 | y | ... | 12683.052 | 26325 | ... | 107... | 1.137 | H2-1 |
| 84 | M57 | L2x1.5x4 | .261 | 0 | 81 | .043 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 2.061 | H2-1 |
| 85 | M182 | L2x1.5x4 | .260 | 0 | 84 | .032 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.752 | H2-1 |
| 86 | M87 | L2x1.5x4 | .249 | 37.639 | 80 | .036 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 1.792 | H2-1 |
| 87 | M141 | L2x1.5x4 | .246 | 0 | 85 | .028 | 0 | z | ... | 12683.052 | 26325 | ... | 109... | 1.263 | H2-1 |
| 88 | M99 | L2x1.5x4 | .246 | 28.229 | 80 | .029 | 8.626 | z | ... | 12683.052 | 26325 | ... | 109... | 1.287 | H2-1 |
| 89 | M93 | L2x1.5x4 | .235 | 0 | 80 | .041 | 37.639 | z | ... | 12683.052 | 26325 | ... | 113... | 1.921 | H2-1 |
| 90 | M215 | Sway Rod... | .226 | 0 | 81 | .003 | 179.925 | | ... | 548.699 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 91 | M225 | Sway Rod... | .225 | 0 | 85 | .003 | 179.925 | | ... | 548.699 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 92 | M3 | L2x1.5x4 | .223 | 37.639 | 80 | .015 | 37.639 | y | ... | 12683.052 | 26325 | ... | 108... | 1.211 | H2-1 |
| 93 | M153 | L2x1.5x4 | .222 | 0 | 80 | .040 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.122 | H2-1 |
| 94 | M9 | L2x1.5x4 | .211 | 0 | 80 | .038 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 2.198 | H2-1 |
| 95 | M74 | L2x1.5x4 | .208 | 0 | 20 | .035 | 0 | z | ... | 15528.446 | 26325 | ... | 113... | 1.665 | H2-1 |
| 96 | M45 | L2x1.5x4 | .208 | 37.639 | 80 | .036 | 37.639 | y | ... | 12683.052 | 26325 | ... | 108... | 1.169 | H2-1 |
| 97 | M105 | L2x1.5x4 | .195 | 0 | 82 | .042 | 37.639 | y | ... | 12683.052 | 26325 | ... | 113... | 2.066 | H2-1 |

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

| | Member | Shape | Code Check | Loc[in] | LC | Shear Check | Loc[in] | ... | ... | phi*Pnc [lb] | phi*Pnt [lb] | ... | phi*... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 98 | M122 | L2x1.5x4 | .195 | 0 | 16 | .108 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 2.183 | H2-1 |
| 99 | M110 | L2x1.5x4 | .194 | 0 | 6 | .023 | 32 | y | 6 | 15528.446 | 26325 | ... | 113... | 1.673 | H2-1 |
| 100 | M62 | L2x1.5x4 | .190 | 0 | 100 | .085 | 0 | y | ... | 15528.446 | 26325 | ... | 113... | 1.65 | H2-1 |
| 101 | M189 | L2x1.5x4 | .174 | 0 | 79 | .023 | 37.639 | y | ... | 12683.052 | 26325 | ... | 110... | 1.298 | H2-1 |
| 102 | M26 | L2x1.5x4 | .168 | 0 | 16 | .018 | 0 | z | ... | 15528.446 | 26325 | ... | 113... | 1.684 | H2-1 |
| 103 | M183 | L2x1.5x4 | .165 | 37.639 | 79 | .039 | 0 | y | ... | 12683.052 | 26325 | ... | 113... | 2.217 | H2-1 |
| 104 | M245 | Sway Rod... | .159 | 0 | 80 | .003 | 179.925 | | ... | 548.699 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 105 | M235 | Sway Rod... | .157 | 0 | 86 | .003 | 179.925 | | ... | 548.699 | 32206.248 | ... | 603... | 1.136 | H1-... |
| 106 | M16 | PL9x1/4 | .156 | 0 | 79 | .119 | 0 | y | ... | 1868.806 | 72900 | ... | 309... | 1.203 | H1-... |
| 107 | M130 | PL9x1/4 | .153 | 34.502 | 79 | .206 | 37.639 | y | ... | 1868.806 | 72900 | ... | 289... | 1.126 | H1-... |
| 108 | M160 | PL9x1/4 | .153 | 0 | 79 | .022 | 37.639 | y | ... | 1868.806 | 72900 | ... | 280... | 1.088 | H1-... |
| 109 | M34 | PL9x1/4 | .150 | 0 | 79 | .013 | 0 | y | 2 | 1868.806 | 72900 | ... | 276... | 1.073 | H1-... |
| 110 | M178 | PL9x1/4 | .150 | 0 | 79 | .016 | 0 | y | ... | 1868.806 | 72900 | ... | 299... | 1.165 | H1-... |
| 111 | M82 | PL9x1/4 | .150 | 0 | 79 | .021 | 37.639 | y | 2 | 1868.806 | 72900 | ... | 293... | 1.139 | H1-... |
| 112 | M64 | PL9x1/4 | .148 | 0 | 79 | .025 | 37.639 | y | ... | 1868.806 | 72900 | ... | 309... | 1.201 | H1-... |
| 113 | M112 | PL9x1/4 | .148 | 0 | 79 | .013 | 37.639 | y | 4 | 1868.806 | 72900 | ... | 304... | 1.182 | H1-... |
| 114 | M22 | PL9x1/4 | .135 | 0 | 79 | .774 | 35.678 | y | ... | 1868.806 | 72900 | ... | 335... | 1.302 | H1-... |
| 115 | M28 | PL9x1/4 | .133 | 0 | 79 | .089 | 37.639 | y | ... | 1868.806 | 72900 | ... | 328... | 1.276 | H1-... |
| 116 | M166 | PL9x1/4 | .133 | 0 | 79 | .076 | 0 | y | ... | 1868.806 | 72900 | ... | 326... | 1.271 | H1-... |
| 117 | M124 | PL9x1/4 | .132 | 0 | 79 | .191 | 37.639 | y | ... | 1868.806 | 72900 | ... | 327... | 1.271 | H1-... |
| 118 | M76 | PL9x1/4 | .131 | 16.467 | 79 | .119 | 16.075 | y | ... | 1868.806 | 72900 | ... | 328... | 1.275 | H1-... |
| 119 | M172 | PL9x1/4 | .131 | 0 | 79 | .078 | 37.639 | y | ... | 1868.806 | 72900 | ... | 320... | 1.247 | H1-... |
| 120 | M70 | PL9x1/4 | .131 | 0 | 79 | .184 | 16.467 | y | ... | 1868.806 | 72900 | ... | 328... | 1.278 | H1-... |
| 121 | M118 | PL9x1/4 | .129 | 0 | 79 | .077 | 0 | y | ... | 1868.806 | 72900 | ... | 315... | 1.228 | H1-... |
| 122 | M126 | PL1.5x1/4 | .119 | 49.403 | 80 | .053 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.052 | H1-... |
| 123 | M83 | PL1.5x1/4 | .114 | 0 | 86 | .019 | 49.403 | y | 4 | 180.773 | 12150 | ... | 379... | 2.706 | H1-... |
| 124 | M12 | PL1.5x1/4 | .114 | 49.403 | 85 | .045 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.741 | H1-... |
| 125 | M23 | PL1.5x1/4 | .111 | 0 | 81 | .029 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.497 | H1-... |
| 126 | M88 | PL9x1/4 | .107 | 0 | 79 | .039 | 37.639 | y | ... | 1868.806 | 72900 | ... | 273... | 1.065 | H1-... |
| 127 | M10 | PL9x1/4 | .107 | 28.229 | 79 | .045 | 37.639 | y | ... | 1868.806 | 72900 | ... | 307... | 1.196 | H1-... |
| 128 | M154 | PL9x1/4 | .106 | 0 | 79 | .038 | 37.639 | y | ... | 1868.806 | 72900 | ... | 263... | 1.023 | H1-... |
| 129 | M136 | PL9x1/4 | .106 | 0 | 79 | .037 | 0 | y | ... | 1868.806 | 72900 | ... | 263... | 1.025 | H1-... |
| 130 | M224 | Sway Rod... | .105 | 0 | 13 | .003 | 0 | | ... | 988.508 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 131 | M214 | Sway Rod... | .105 | 0 | 11 | .003 | 0 | | ... | 988.508 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 132 | M184 | PL9x1/4 | .103 | 0 | 79 | .043 | 0 | y | ... | 1868.806 | 72900 | ... | 272... | 1.059 | H1-... |
| 133 | M106 | PL9x1/4 | .102 | 0 | 79 | .041 | 0 | y | ... | 1868.806 | 72900 | ... | 273... | 1.061 | H1-... |
| 134 | M58 | PL9x1/4 | .102 | 0 | 79 | .039 | 0 | y | ... | 1868.806 | 72900 | ... | 277... | 1.077 | H1-... |
| 135 | M18 | PL1.5x1/4 | .102 | 49.403 | 86 | .046 | 0 | y | 6 | 180.773 | 12150 | ... | 379... | 2.126 | H1-... |
| 136 | M40 | PL9x1/4 | .100 | 0 | 79 | .116 | 0 | y | ... | 1868.806 | 72900 | ... | 291... | 1.132 | H1-... |
| 137 | M179 | PL1.5x1/4 | .099 | 0 | 81 | .005 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.513 | H1-... |
| 138 | M66 | PL1.5x1/4 | .098 | 49.403 | 79 | .055 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.722 | H1-... |
| 139 | M119 | PL1.5x1/4 | .094 | 0 | 86 | .029 | 12.351 | y | 6 | 180.773 | 12150 | ... | 379... | 2.406 | H1-... |
| 140 | M158 | L2x1.5x4 | .092 | 0 | 79 | .018 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.548 | H2-1 |
| 141 | M108 | PL1.5x1/4 | .092 | 49.403 | 80 | .022 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.097 | H1-... |
| 142 | M162 | PL1.5x1/4 | .091 | 49.403 | 82 | .006 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.409 | H1-... |
| 143 | M170 | L2x1.5x4 | .091 | 0 | 82 | .015 | 32 | z | ... | 15528.446 | 26325 | ... | 113... | 1.633 | H2-1 |
| 144 | M156 | PL1.5x1/4 | .090 | 49.403 | 85 | .025 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.196 | H1-... |
| 145 | M114 | PL1.5x1/4 | .087 | 49.403 | 80 | .012 | 0 | y | 6 | 180.773 | 12150 | ... | 379... | 2.504 | H1-... |
| 146 | M71 | PL1.5x1/4 | .086 | 0 | 84 | .056 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.082 | H1-... |
| 147 | M30 | PL1.5x1/4 | .086 | 49.403 | 79 | .011 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.022 | H1-... |
| 148 | M137 | PL1.5x1/4 | .085 | 0 | 94 | .031 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.66 | H1-... |
| 149 | M41 | PL1.5x1/4 | .084 | 0 | 83 | .051 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.231 | H1-... |
| 150 | M131 | PL1.5x1/4 | .084 | 0 | 94 | .047 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.508 | H1-... |
| 151 | M35 | PL1.5x1/4 | .083 | 0 | 83 | .016 | 49.403 | y | 2 | 180.773 | 12150 | ... | 379... | 2.311 | H1-... |
| 152 | M174 | PL1.5x1/4 | .081 | 49.403 | 96 | .004 | 0 | y | 7 | 180.773 | 12150 | ... | 379... | 2.177 | H1-... |
| 153 | M148 | PL9x1/4 | .079 | 34.11 | 79 | .160 | 37.639 | y | ... | 1868.806 | 72900 | ... | 292... | 1.137 | H1-... |
| 154 | M89 | PL1.5x1/4 | .079 | 0 | 86 | .028 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.002 | H1-... |

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

| | Member | Shape | Code Check | Loc[in] | LC | Shear Check | Loc[in] | ... | ... | phi*Pnc [lb] | phi*Pnt [lb] | ... | phi*... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | M94 | PL9x1/4 | .079 | 16.075 | 79 | .082 | 0 | y | ... | 1868.806 | 72900 | ... | 301... | 1.171 | H1-... |
| 156 | M142 | PL9x1/4 | .079 | 0 | 79 | .015 | 37.639 | y | 4 | 1868.806 | 72900 | ... | 281... | 1.094 | H1-... |
| 157 | M4 | PL9x1/4 | .078 | 0 | 79 | .023 | 0 | y | ... | 1868.806 | 72900 | ... | 285... | 1.109 | H1-... |
| 158 | M190 | PL9x1/4 | .077 | 0 | 79 | .018 | 37.639 | y | ... | 1868.806 | 72900 | ... | 294... | 1.144 | H1-... |
| 159 | M185 | PL1.5x1/4 | .077 | 0 | 79 | .020 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.619 | H1-... |
| 160 | M234 | Sway Rod... | .077 | 0 | 8 | .003 | 0 | | ... | 988.508 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 161 | M244 | Sway Rod... | .077 | 0 | 2 | .003 | 0 | | ... | 988.508 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 162 | M100 | PL9x1/4 | .076 | 0 | 79 | .025 | 0 | y | ... | 1868.806 | 72900 | ... | 296... | 1.151 | H1-... |
| 163 | M167 | PL1.5x1/4 | .075 | 0 | 81 | .006 | 49.403 | y | 8 | 180.773 | 12150 | ... | 379... | 2.153 | H1-... |
| 164 | M52 | PL9x1/4 | .073 | 0 | 79 | .020 | 0 | y | ... | 1868.806 | 72900 | ... | 285... | 1.11 | H1-... |
| 165 | M46 | PL9x1/4 | .071 | 0 | 79 | .020 | 37.639 | y | ... | 1868.806 | 72900 | ... | 277... | 1.079 | H1-... |
| 166 | M60 | PL1.5x1/4 | .070 | 49.403 | 79 | .023 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.638 | H1-... |
| 167 | M78 | PL1.5x1/4 | .067 | 49.403 | 80 | .017 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 1.788 | H1-... |
| 168 | M96 | PL1.5x1/4 | .058 | 49.403 | 81 | .024 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.703 | H1-... |
| 169 | M53 | PL1.5x1/4 | .057 | 0 | 82 | .036 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.513 | H1-... |
| 170 | M149 | PL1.5x1/4 | .051 | 0 | 86 | .036 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.398 | H1-... |
| 171 | M144 | PL1.5x1/4 | .048 | 49.403 | 84 | .034 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.5 | H1-... |
| 172 | M192 | PL1.5x1/4 | .040 | 49.403 | 85 | .024 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.618 | H1-... |
| 173 | M236 | Sway Rod... | .040 | 504.14 | 9 | .004 | 0 | | 2 | 220.888 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 174 | M217 | Sway Rod... | .040 | 504.114 | 15 | .004 | 504.114 | | 8 | 220.911 | 57255.53 | ... | 143... | 1.136 | H1-... |
| 175 | M348 | L3X3X3 | .039 | 31.227 | 90 | .012 | 0 | z | 3 | 18675.418 | 35316 | ... | 240... | 1.136 | H2-1 |
| 176 | M101 | PL1.5x1/4 | .039 | 0 | 86 | .027 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.694 | H1-... |
| 177 | M48 | PL1.5x1/4 | .038 | 49.403 | 80 | .028 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.572 | H1-... |
| 178 | M350 | L3X3X3 | .038 | 31.001 | 8 | .025 | 0 | y | ... | 18823.12 | 35316 | ... | 241... | 1.136 | H2-1 |
| 179 | M346 | L3X3X3 | .037 | 27.57 | 80 | .020 | 0 | z | ... | 21064.329 | 35316 | ... | 248... | 1.136 | H2-1 |
| 180 | M5 | PL1.5x1/4 | .037 | 0 | 80 | .022 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.667 | H1-... |
| 181 | M102 | PL1.5x1/4 | .032 | 49.403 | 2 | .022 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.333 | H1-... |
| 182 | M47 | PL1.5x1/4 | .032 | 0 | 6 | .037 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.817 | H1-... |
| 183 | M77 | PL1.5x1/4 | .024 | 0 | 7 | .035 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.16 | H1-... |
| 184 | M120 | PL1.5x1/4 | .024 | 49.403 | 3 | .056 | 0 | y | 6 | 180.773 | 12150 | ... | 379... | 3.076 | H1-... |
| 185 | M150 | PL1.5x1/4 | .021 | 49.403 | 12 | .038 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.385 | H1-... |
| 186 | M6 | PL1.5x1/4 | .020 | 49.403 | 6 | .018 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.559 | H1-... |
| 187 | M95 | PL1.5x1/4 | .020 | 0 | 15 | .027 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 1.847 | H1-... |
| 188 | M17 | PL1.5x1/4 | .019 | 0 | 9 | .054 | 49.403 | y | 5 | 180.773 | 12150 | ... | 379... | 3.444 | H1-... |
| 189 | M155 | PL1.5x1/4 | .018 | 0 | 9 | .008 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.857 | H1-... |
| 190 | M138 | PL1.5x1/4 | .017 | 49.403 | 13 | .014 | 0 | y | 8 | 180.773 | 12150 | ... | 379... | 2.319 | H1-... |
| 191 | M345 | L3X3X3 | .017 | 17.83 | 83 | .033 | 35.661 | y | ... | 26978.929 | 35316 | ... | 272... | 1.136 | H2-1 |
| 192 | M84 | PL1.5x1/4 | .017 | 49.403 | 10 | .009 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.181 | H1-... |
| 193 | M65 | PL1.5x1/4 | .016 | 0 | 12 | .020 | 49.403 | y | 3 | 180.773 | 12150 | ... | 379... | 2.472 | H1-... |
| 194 | M132 | PL1.5x1/4 | .016 | 49.403 | 91 | .013 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 1.943 | H1-... |
| 195 | M125 | PL1.5x1/4 | .015 | 0 | 15 | .048 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.934 | H1-... |
| 196 | M90 | PL1.5x1/4 | .014 | 49.403 | 2 | .024 | 0 | y | 4 | 180.773 | 12150 | ... | 379... | 2.72 | H1-... |
| 197 | M11 | PL1.5x1/4 | .014 | 0 | 9 | .013 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.334 | H1-... |
| 198 | M29 | PL1.5x1/4 | .013 | 0 | 12 | .026 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.243 | H1-... |
| 199 | M238 | Sway Rod... | .012 | 487.712 | 9 | .005 | 487.712 | | 2 | 166.645 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 200 | M219 | Sway Rod... | .012 | 487.7 | 15 | .005 | 487.7 | | 8 | 166.654 | 48110.533 | ... | 110... | 1.136 | H1-... |
| 201 | M143 | PL1.5x1/4 | .012 | 0 | 94 | .032 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.448 | H1-... |
| 202 | M347 | L3X3X3 | .011 | 15.157 | 80 | .008 | 0 | z | ... | 28187.591 | 35316 | ... | 279... | 1.136 | H2-1 |
| 203 | M72 | PL1.5x1/4 | .011 | 49.403 | 9 | .047 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.159 | H1-... |
| 204 | M349 | L3X3X3 | .011 | 15.601 | 81 | .029 | 0 | z | ... | 28127.982 | 35316 | ... | 279... | 1.136 | H2-1 |
| 205 | M59 | PL1.5x1/4 | .010 | 0 | 5 | .010 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.504 | H1-... |
| 206 | M168 | PL1.5x1/4 | .010 | 49.403 | 8 | .028 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.318 | H1-... |
| 207 | M107 | PL1.5x1/4 | .009 | 0 | 15 | .011 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.533 | H1-... |
| 208 | M191 | PL1.5x1/4 | .009 | 0 | 2 | .021 | 49.403 | y | ... | 180.773 | 12150 | ... | 379... | 2.579 | H1-... |
| 209 | M24 | PL1.5x1/4 | .008 | 49.403 | 15 | .014 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 3.361 | H1-... |
| 210 | M113 | PL1.5x1/4 | .008 | 0 | 92 | .015 | 49.403 | y | 7 | 180.773 | 12150 | ... | 379... | 2.282 | H1-... |
| 211 | M36 | PL1.5x1/4 | .007 | 49.403 | 8 | .028 | 0 | y | 2 | 180.773 | 12150 | ... | 379... | 2.644 | H1-... |

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

| | Member | Shape | Code Check | Loc[in] | LC | Shear Check | Loc[in] | ... | ... | phi*Pnc [lb] | phi*Pnt [lb] | ... | phi*... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 212 | M42 | PL1.5x1/4 | .005 | 49.403 | 9 | .063 | 0 | y | 8 | 180.773 | 12150 | ... | 379... | 3.079 | H1-... |
| 213 | M180 | PL1.5x1/4 | .005 | 49.403 | 15 | .007 | 0 | y | 7 | 180.773 | 12150 | ... | 379... | 2.473 | H1-... |
| 214 | M173 | PL1.5x1/4 | .003 | 0 | 15 | .017 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.675 | H1-... |
| 215 | M186 | PL1.5x1/4 | .002 | 49.403 | 12 | .008 | 0 | y | 7 | 180.773 | 12150 | ... | 379... | 2.605 | H1-... |
| 216 | M54 | PL1.5x1/4 | .002 | 49.403 | 9 | .033 | 0 | y | ... | 180.773 | 12150 | ... | 379... | 2.889 | H1-... |
| 217 | M161 | PL1.5x1/4 | .000 | 0 | 156 | .007 | 49.403 | y | 8 | 180.773 | 12150 | ... | 379... | 2.419 | H1-1a |
| 218 | M221 | Sway Rod... | .000 | 0 | 156 | .000 | 0 | | ... | 79.575 | 32206.248 | ... | 603.... | 1 | H1-1a |
| 219 | M240 | Sway Rod... | .000 | 0 | 156 | .000 | 0 | | ... | 79.575 | 32206.248 | ... | 603.... | 1 | H1-1a |

# ATTACHMENT 4
# RADIO FREQUENCY EXPOSURE ANALYSIS REPORT

# Radio Frequency Exposure Analysis Report

**April 12, 2022**

**Centerline on behalf of T-Mobile**
**Centerline Communications Project Number: Internal**

**T-Mobile Site Name: CTHA383_Underserved_Essex_WT**
**Site Number: CTHA383A**

**Site Address: 170 Main Street, Essex, CT 06442**

## Site Compliance Summary

| | |
|---|---|
| **T-Mobile Compliance Status:** | Compliant |
| **Cumulative Calculated Power Density (Ground Level):** | 1.67916 µW/cm$^2$ |
| **Cumulative General Population % MPE (Ground Level):** | 0.18947% |

750 West Center Street | Suite 301 | West Bridgewater | MA | 02379

April 12, 2022

Centerline
Attn: Peter Fales, Senior Program Manager
750 W Center St, Suite 301
West Bridgewater, MA 02379

RF Exposure Analysis for Site: **CTHA383_Underserved_Essex_WT**

Centerline Communications, LLC ("Centerline") was contracted to analyze the proposed T-Mobile facility at **170 Main Street, Essex, CT 06442** for the purpose of determining whether the predictive exposure from the proposed facility is within specified federal limits.

All information used in this report was analyzed as a percentage of the Maximum Permissible Exposure (% MPE) limits as detailed in 47 CFR § 1.1310 as well as Federal Communications Commission (FCC) OET Bulletin 65 Edition 97-01. The FCC MPE limits are typically expressed in units of milliwatts per square centimeter ($mW/cm^2$) or microwatts per square centimeter ($\mu W/cm^2$). The exposure limits vary depending upon the frequencies being utilized. The General Population/Uncontrolled MPE limit (in $mW/cm^2$) for frequencies between 300 and 1500 is defined as frequency (in MHz) divided by 1500 ($f_{MHz}/1500$). Frequencies between 1500 and 100,000 MHz have a General Population/Uncontrolled MPE limit of 1 $mW/cm^2$ (1000 $\mu W/cm^2$). The calculated power density at each sample point divided by the limit at each calculated frequency provides a result in % MPE. Summing the calculated % MPE from all contributors provides a cumulative % MPE at a particular sample point. Wireless carriers use different frequency bands with varying MPE limits; therefore, it is useful to report results in terms of % MPE as opposed to power density.

All results were compared to the FCC radio frequency exposure rules as detailed in 47 CFR § 1.1307(b) to determine compliance with the 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.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/ controlled exposure limits also apply where exposure is of a transient nature as a result of incidental passage through a location where exposure levels may be above general population/uncontrolled limits, as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means. Additional details can be found in FCC OET 65.

## Calculation Methodology

Centerline Communications, LLC has performed theoretical modeling of the site using a software tool, RoofMaster®, which incorporates calculation methodologies detailed in FCC OET 65. RoofMaster® uses a cylindrical model for conservative power density predictions within the near field of the antenna where the antenna pattern has not truly formed yet. Within this area power density values tend to decrease based upon an inverse distance function. At the point where it is appropriate for modeling to change from near-field calculations to far-field calculations, the power decreases inversely with the square of the distance. The modeling is based on worst-case assumptions in terms of transmitter power and duty cycle. No losses were included in the power calculations unless they were specifically provided for the project.

In OET 65, a far field model is presented to calculate the spatial peak power density. The RoofMaster® implementation of this model incorporates antenna manufacturer's horizontal and vertical pattern data to determine the power density in all directions. This model yields the power density at a single point in space. In order to determine the spatial power density for comparison to the FCC limits, the average of several points calculated within the human profile (0-6') must be conducted. RoofMaster® calculates seven power density values between 0-6' above the specified study plane and performs a linear spatial average.

## Data & Results

The following table details the antennas and operating parameters for the T-Mobile antenna system as well as any other antenna systems at the site. This is based on antenna information provided by the client and data compiled from other sources where necessary. The data below was input into Roofmaster® to perform the theoretical exposure calculations at the ground.

The theoretical calculations performed in Roofmaster® determine the cumulative exposure at all sample points at ground level (0-6' spatial average). The results from highest cumulative sample point at ground level surrounding the site are displayed in the table below. The contribution from directional antennas to the maximum cumulative totals varies greatly depending on location; therefore, the contribution from one antenna sector at the highest calculated exposure point may be greater or less than other sectors since sectorized directional antennas are pointed in different directions and there is not much overlapping exposure.

The contribution to the cumulative power density and % MPE for each antenna/frequency band is listed in the table. The cumulative power density and cumulative % MPE are displayed at the bottom of the table.

## Maximum Calculated Cumulative Power Density (Location: approximately  of site)

| Antenna ID | Make / Model | Frequency Band (MHz) | Antenna Gain (dBd) | Antenna Centerline (ft) | Channel Count | TX Power/ Channel (watts) | ERP (watts) | Calculated Power Density (μW/cm²) | General Population MPE Limit (μW/cm²) | General Population % MPE |
|---|---|---|---|---|---|---|---|---|---|---|
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 700 | 13.65 | 131.00 | 2.00 | 40.00 | 1853.92 | 0.00006 | 466.67 | 0.00001 |
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 4.00 | 60.00 | 4844.08 | 0.00002 | 400.00 | 0.00000 |
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 2.00 | 40.00 | 1614.69 | 0.00001 | 400.00 | 0.00000 |
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 2100 | 16.45 | 131.00 | 2.00 | 140.00 | 12363.97 | 0.00009 | 1000.00 | 0.00001 |
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 2.00 | 140.00 | 9821.05 | 0.00001 | 1000.00 | 0.00000 |
| T-Mobile A 1 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 1.00 | 15.00 | 526.13 | 0.00000 | 1000.00 | 0.00000 |
| T-Mobile A 2 | ERICSSON AIR6449 LTE | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.00031 | 1000.00 | 0.00003 |
| T-Mobile A 2 | ERICSSON AIR6449 NR | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.00031 | 1000.00 | 0.00003 |
| T-Mobile A 2 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.00001 | 1000.00 | 0.00000 |
| T-Mobile A 2 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.00001 | 1000.00 | 0.00000 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 700 | 13.65 | 131.00 | 2.00 | 40.00 | 1853.92 | 0.03633 | 466.67 | 0.00778 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 4.00 | 60.00 | 4844.08 | 0.08444 | 400.00 | 0.02111 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 2.00 | 40.00 | 1614.69 | 0.02815 | 400.00 | 0.00704 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 2100 | 16.45 | 131.00 | 2.00 | 140.00 | 12363.97 | 0.12405 | 1000.00 | 0.01241 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 2.00 | 140.00 | 9821.05 | 0.13373 | 1000.00 | 0.01337 |
| T-Mobile B 3 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 1.00 | 15.00 | 526.13 | 0.00717 | 1000.00 | 0.00072 |
| T-Mobile B 4 | ERICSSON AIR6449 LTE | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.58901 | 1000.00 | 0.05890 |
| T-Mobile B 4 | ERICSSON AIR6449 NR | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.58901 | 1000.00 | 0.05890 |
| T-Mobile B 4 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.03154 | 1000.00 | 0.00315 |
| T-Mobile B 4 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.03154 | 1000.00 | 0.00315 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 700 | 13.65 | 131.00 | 2.00 | 40.00 | 1853.92 | 0.00006 | 466.67 | 0.00001 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 4.00 | 60.00 | 4844.08 | 0.00168 | 400.00 | 0.00042 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 600 | 13.05 | 131.00 | 2.00 | 40.00 | 1614.69 | 0.00056 | 400.00 | 0.00014 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 2100 | 16.45 | 131.00 | 2.00 | 140.00 | 12363.97 | 0.00075 | 1000.00 | 0.00008 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 2.00 | 140.00 | 9821.05 | 0.00068 | 1000.00 | 0.00007 |
| T-Mobile C 5 | RFS APXVAALL24 43-U-NA20 | 1900 | 15.45 | 131.00 | 1.00 | 15.00 | 526.13 | 0.00004 | 1000.00 | 0.00000 |
| T-Mobile C 6 | ERICSSON AIR6449 LTE | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.00868 | 1000.00 | 0.00087 |

| Antenna ID | Make / Model | Frequency Band (MHz) | Antenna Gain (dBd) | Antenna Centerline (ft) | Channel Count | TX Power/ Channel (watts) | ERP (watts) | Calculated Power Density (μW/cm²) | General Population MPE Limit (μW/cm²) | General Population % MPE |
|---|---|---|---|---|---|---|---|---|---|---|
| T-Mobile C 6 | ERICSSON AIR6449 NR | 2500 | 22.35 | 131.00 | 1.00 | 90.00 | 15461.18 | 0.00868 | 1000.00 | 0.00087 |
| T-Mobile C 6 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.00012 | 1000.00 | 0.00001 |
| T-Mobile C 6 | ERICSSON AIR6449 LTE 02DT | 2500 | 15.15 | 131.00 | 1.00 | 30.00 | 982.02 | 0.00012 | 1000.00 | 0.00001 |
| Unknown A 7 | GENERIC PANEL 6FT | 850 | 12.62 | 119.50 | 4.00 | 40.00 | 2924.96 | 0.00002 | 566.67 | 0.00000 |
| Unknown A 8 | GENERIC PANEL 6FT | 1900 | 15.84 | 119.50 | 4.00 | 40.00 | 6139.32 | 0.00007 | 1000.00 | 0.00001 |
| Unknown A 9 | GENERIC PANEL 6FT | 2100 | 16.39 | 119.50 | 4.00 | 40.00 | 6968.19 | 0.00001 | 1000.00 | 0.00000 |
| Unknown A 9 | GENERIC PANEL 6FT | 700 | 12.33 | 119.50 | 4.00 | 40.00 | 2736.02 | 0.00001 | 466.67 | 0.00000 |
| Unknown B 10 | GENERIC PANEL 6FT | 850 | 12.62 | 119.50 | 4.00 | 40.00 | 2924.96 | 0.00009 | 566.67 | 0.00002 |
| Unknown B 11 | GENERIC PANEL 6FT | 1900 | 15.84 | 119.50 | 4.00 | 40.00 | 6139.32 | 0.00007 | 1000.00 | 0.00001 |
| Unknown B 12 | GENERIC PANEL 6FT | 2100 | 16.39 | 119.50 | 4.00 | 40.00 | 6968.19 | 0.00002 | 1000.00 | 0.00000 |
| Unknown B 12 | GENERIC PANEL 6FT | 700 | 12.33 | 119.50 | 4.00 | 40.00 | 2736.02 | 0.00007 | 466.67 | 0.00002 |
| Unknown C 13 | GENERIC PANEL 6FT | 850 | 12.62 | 119.50 | 4.00 | 40.00 | 2924.96 | 0.00002 | 566.67 | 0.00000 |
| Unknown C 14 | GENERIC PANEL 6FT | 1900 | 15.84 | 119.50 | 4.00 | 40.00 | 6139.32 | 0.00003 | 1000.00 | 0.00000 |
| Unknown C 15 | GENERIC PANEL 6FT | 2100 | 16.39 | 119.50 | 4.00 | 40.00 | 6968.19 | 0.00005 | 1000.00 | 0.00000 |
| Unknown C 15 | GENERIC PANEL 6FT | 700 | 12.33 | 119.50 | 4.00 | 40.00 | 2736.02 | 0.00052 | 466.67 | 0.00011 |
| Unknown A 16 | GENERIC PANEL 6FT | 700 | 12.33 | 106.00 | 4.00 | 40.00 | 2736.02 | 0.00001 | 466.67 | 0.00000 |
| Unknown A 16 | GENERIC PANEL 6FT | 850 | 12.62 | 106.00 | 4.00 | 40.00 | 2924.96 | 0.00000 | 566.67 | 0.00000 |
| Unknown A 17 | GENERIC PANEL 6FT | 1900 | 15.84 | 106.00 | 4.00 | 30.00 | 4604.49 | 0.00001 | 1000.00 | 0.00000 |
| Unknown A 17 | GENERIC PANEL 6FT | 2100 | 16.39 | 106.00 | 4.00 | 40.00 | 6968.19 | 0.00000 | 1000.00 | 0.00000 |
| Unknown B 18 | GENERIC PANEL 6FT | 700 | 12.33 | 106.00 | 4.00 | 40.00 | 2736.02 | 0.00004 | 466.67 | 0.00001 |
| Unknown B 18 | GENERIC PANEL 6FT | 850 | 12.62 | 106.00 | 4.00 | 40.00 | 2924.96 | 0.00008 | 566.67 | 0.00001 |
| Unknown B 19 | GENERIC PANEL 6FT | 1900 | 15.84 | 106.00 | 4.00 | 30.00 | 4604.49 | 0.00004 | 1000.00 | 0.00000 |
| Unknown B 19 | GENERIC PANEL 6FT | 2100 | 16.39 | 106.00 | 4.00 | 40.00 | 6968.19 | 0.00002 | 1000.00 | 0.00000 |
| Unknown C 20 | GENERIC PANEL 6FT | 700 | 12.33 | 106.00 | 4.00 | 40.00 | 2736.02 | 0.00060 | 466.67 | 0.00013 |
| Unknown C 20 | GENERIC PANEL 6FT | 850 | 12.62 | 106.00 | 4.00 | 40.00 | 2924.96 | 0.00002 | 566.67 | 0.00000 |
| Unknown C 21 | GENERIC PANEL 6FT | 1900 | 15.84 | 106.00 | 4.00 | 30.00 | 4604.49 | 0.00005 | 1000.00 | 0.00001 |
| Unknown C 21 | GENERIC PANEL 6FT | 2100 | 16.39 | 106.00 | 4.00 | 40.00 | 6968.19 | 0.00019 | 1000.00 | 0.00002 |

| Antenna ID | Make / Model | Frequency Band (MHz) | Antenna Gain (dBd) | Antenna Centerline (ft) | Channel Count | TX Power/ Channel (watts) | ERP (watts) | Calculated Power Density ($\mu W/cm^2$) | General Population MPE Limit ($\mu W/cm^2$) | General Population % MPE |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Cumulative Power Density:** | **1.67916 $\mu W/cm^2$** | **Cumulative % MPE:** | **0.18947%** |

## Summary

The theoretical calculations performed for this analysis yielded cumulative power density totals in all areas at ground that are within the allowable federal limits for public exposure to RF energy. Therefore, the site is **Compliant** with FCC rules and regulations.

Michelle Stone
RF EME Technical Writer II
Centerline Communications, LLC

# ATTACHMENT 5
# SERVICE LIST OF ABUTTERS AND SAMPLE LETTER TO ABUTTERS

**CERTIFICATION OF SERVICE**

I hereby certify that on the 7th day of July, 2022, T-Mobile Northeast LLC ("T-Mobile") provided notice of its Sub-Petition for an approval of an Eligible Facilities Request concerning an existing telecommunications facility located at 170 Main Street in the Village of Ivoryton, Town of Essex, Connecticut, to the following:

**Abutters**

Ivory Key LLC
158 Main St. Ivtn.
Ivoryton, CT 06442

Michael Bassett
173 Main Street
Ivoryton, CT 06442

Jonathan Warner
171 Main Street
Ivoryton, CT 06442

Town of Essex
Re: 180 Main Street
29 West Avenue
Essex, CT 06426

Eugean Heiney
8 Ebony Lane
Ivoryton, CT 06442

Town of Essex
Re: Vacant land at 40 Cheney St.
29 West Avenue
Essex, CT 06426

Doreen Schwab
17 Cheney St.
PO BOX 582
Ivoryton, CT 06442

Darrell Damico
14 Cheney St.
Ivoryton, CT 06442

Todd and Kelly Lafaille
175 Main Street
Ivoryton, CT 06442

Geoffrey Matesky
58 Main Street
Ivoryton, CT 06442

**Owner**

Subcarrier Communications Inc.
139 White Oak Lane
Old Bridge, NJ 08857

Respectfully submitted by,

Jesse A. Langer

3641092

Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
Jlanger@uks.com

July 7, 2022

***VIA CERTIFIED MAIL***

Eugean Heiney
8 Ebony Lane
Ivoryton, CT 06442

**RE: Sub-Petition for An Approval of An Eligible Facilities Request for An Existing Telecommunications Facility at 170 Main Street, Ivoryton/Essex, Connecticut.**

To Whom It May Concern:

I write on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile is filing with the Connecticut Siting Council ("Council") a sub-petition for an approval of an Eligible Facilities Request ("EFR") concerning an existing telecommunications facility at 170 Main Street, Ivoryton, Connecticut ("Property").

The Sub-Petition relates to an existing 124 foot water tank ("Facility") located on the Property. T-Mobile seeks approval from the Council for the installation of six new panel antennas and six remote radio units on a dome top antenna mount assembly. T-Mobile would also install three equipment cabinets and a forty-eight Kilowatt natural gas fueled generator on a 6 x 10'8" foot concrete pad.

T-Mobile is filing this Sub-Petition under § 6409(a) of the Federal Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C § 1455(a), and commonly referenced as the Spectrum Act ("Section 6409"). T-Mobile's proposed collocation constitutes an EFR as defined by Section 6409 and the regulations promulgated by the Federal Communications Commission.

This letter serves as notice to you as an abutting property owner pursuant to Petition 1133 issued by the Council on March 6, 2015. A copy of the Sub-Petition is enclosed herein. Please submit any comments or concerns to the Council within thirty (30) days of this notice. If you have any questions or concerns regarding this matter, please contact the undersigned at (203) 786-8317, or the Council at (860) 827-2935.

Very truly yours,

Jesse A. Langer

Enclosure

# ATTACHMENT 6
# SERVICE LIST OF MUNICIPALITY AND MUNICIPAL OFFICIALS, WITH LETTER TO HOST MUNICIPALITY

## CERTIFICATION OF SERVICE

I hereby certify that on the 7th day of July, 2022, T-Mobile Northeast LLC ("T-Mobile") provided notice of its Sub-Petition for an approval of an Eligible Facilities Request concerning an existing telecommunications facility located at 170 Main Street in the Village of Ivoryton, Town of Essex, Connecticut, to the following:

### Town of Essex Municipal Officials

Norm Needleman
First Selectman
29 West Avenue
Essex, CT 06426

Joel Marzi
Town Clerk
29 West Avenue
Essex, CT 06426

Carey Duques
Zoning Board of Appeals, Land Use Official
29 West Avenue
Essex, CT 06426

Carey Duques
Zoning Board of Appeals, Land Use Official
29 West Avenue
Essex, CT 06426

Bob Doane
Inland Wetlands Commission, Wetlands
Enforcement Officer
29 West Avenue
Essex, CT 06426

Carey Duques
Conservation Commission, Land Use Official
29 West Avenue
Essex, CT 06426

Respectfully submitted by,

Jesse A. Langer

Jesse A. Langer
(t) 203.786.8317
(f) 203.772.2037
Jlanger@uks.com

July 7, 2022

***VIA CERTIFIED MAIL***

Norm Needleman
First Selectman
29 West Avenue
Essex, CT 06426

**RE: Sub-Petition for An Approval of An Eligible Facilities Request for An Existing Telecommunications Facility at 170 Main Street, Ivoryton/Essex, Connecticut.**

Dear Honorable Needleman:

I write on behalf of T-Mobile Northeast LLC ("T-Mobile"). T-Mobile is filing with the Connecticut Siting Council ("Council") a sub-petition for an approval of an Eligible Facilities Request ("EFR") concerning an existing telecommunications facility at 170 Main Street, Ivoryton, Connecticut ("Property").

The Sub-Petition relates to an existing 124 foot water tank ("Facility") located on the Property. T-Mobile seeks approval from the Council for the installation of six new panel antennas and six remote radio units on a dome top antenna mount assembly. T-Mobile would also install three equipment cabinets and a forty-eight Kilowatt natural gas fueled generator on a 6 x 10'8" foot concrete pad.

T-Mobile is filing this Sub-Petition under § 6409(a) of the Federal Middle Class Tax Relief and Job Creation Act of 2012, codified at 47 U.S.C § 1455(a), and commonly referenced as the Spectrum Act ("Section 6409"). T-Mobile's proposed collocation constitutes an EFR as defined by Section 6409 and the regulations promulgated by the Federal Communications Commission.

This letter serves as notice pursuant to Petition 1133 issued by the Council on March 6, 2015. A copy of the Sub-Petition is enclosed herein. Please submit any comments or concerns to the Council within thirty (30) days of this notice. If you have any questions or concerns regarding this matter, please contact the undersigned at (203) 786-8317, or the Council at (860) 827-2935.

Very truly yours,

Jesse A. Langer

Enclosure