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

February 23, 2021

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

RE: **Notice of Exempt Modification for AT&T:**
876325/517087 – AT&T Site ID: 10071071
92 Weston Street, Hartford, CT 06103
Latitude: 41° 47′ 12.30″ / Longitude: -72° 39′ 44.42″

Dear Ms. Bachman:

AT&T currently maintains nine (9) antennas at the 89-foot mount on the existing 110-foot Monopole Tower, located at 92 Weston Street, Hartford, CT. The tower is owned by Crown Castle and the property is owned by Freeport Realty V LLC. AT&T now intends to replace three (3) existing antennas with six (6) new antennas for a total antenna inventory of twelve (12) antennas. The new antennas will be installed at the 89-ft level of the tower. This modification includes B2, B5, and B12 hardware that is both 4G(LTE) and 5GNR capable through remote software configuration and either or both services may be turned on or off at various times. AT&T is also proposing a mount replacement as shown on the enclosed Mount Replacement Analysis, as well as, structural reinforcement to the facility.

The facility was approved by the City of Hartford on November 26, 1996. Communications Towers were a permitted use as of right in the underlying Industrial Zone and a Building Permit was issued, therefore there were no conditions that could feasibly be violated by this modification, including total facility height or mountain restrictions. This modification therefore complies with the approval.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Mr. Luke Bronin, Mayor for the City of Hartford, Aimee Chambers, Director of Planning, Crown Castle as the tower owner, and Freeport Realty V LLC, the property owner.

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

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

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

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

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

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

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

Sincerely,

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

Attachments

cc:

Luke Bronin, Mayor *(via email only to luke.bronin@hartford.gov)*
City of Hartford
550 Main Street, Room 200
Hartford, CT 06103

Aimee Chambers, Director of Planning *(via email only to aimee.chambers@hartford.gov)*
City of Hartford
250 Constitution Plaza, 4th Floor
Hartford, CT 06103

Freeport Realty V LLC, Property Owner
337 Freeport Street
Boston, MA 02122

Crown Castle, Tower Owner

After printing this label:
1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

From: Zsamba, Anne Marie
To: "aimee.chambers@hartford.gov"
Subject: Exempt Modification - AT&T - 92 Weston Street - 876325
Date: Tuesday, February 23, 2021 6:00:00 AM
Attachments: EM-AT&T-92 WESTON ST HARTFORD-876325-NOTICE.pdf

Dear Planning Director Chambers:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council today, February 23, 2021.

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

Best,
Anne Marie Zsamba

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

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

From: Zsamba, Anne Marie
To: "luke.bronin@hartford.gov"
Subject: Exempt Modification - AT&T - 92 Weston Street - 876325
Date: Tuesday, February 23, 2021 6:00:00 AM
Attachments: EM-AT&T-92 WESTON ST HARTFORD-876325-NOTICE.pdf

Dear Mayor Bronin:

Attached please find AT&T's exempt modification application that is being submitted to the Connecticut Siting Council today, February 23, 2021.

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

Best,
Anne Marie Zsamba

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

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

Exhibit A

Original Facility Approval

CT03XC064

BUILDING PERMIT

DEPARTMENT OF LICENSES & INSPECTIONS
CITY OF HARTFORD

Appl. Nbr.964013 Permit Nbr. 964785 E

THE APPLICANT NAMED BELOW IS HEREBY GRANTED PERMISSION TO PERFORM WORK AS DESCRIBED HEREIN AT:

0000 0092 WESTON ST

FLOOR: 0 0 0 CONDO:

IN ACCORDANCE WITH THE APPLICATION AND PLANS APPROVED BY THE DEPARTMENT OF LICENSES AND INSPECTIONS.

Joseph Hewes Date 11/26/96
Building Official

OWNER: WESTON SQUARE ASSOCIATES
ADDRESS: ONE HARTFORD SQUARE
NEW BRITAIN, CT 06051

APPLICANT: MIKE EVANCHICK
SPRINT SPECTRUM LP
9 BARNES INDUSTRIAL RD
WALLINGFORD, CT 06492

294-5600

ESTIMATED COST: $ 98000.

Application Date: 10/08/96 Fee: 1568.00

DESCRIPTION OF JOB:
INSTALLATION OF 110 FT MONOPOLE WITH 6 ANTENNAS AND ASSOCIATED INFRASTRUCTURE.

PARCEL ID.: NOT FOUND

Exhibit B

Property Card

Unofficial Property Record Card - Hartford, CT

General Property Data

Parcel ID	286-173-007	**Account Number**	
Prior Parcel ID			
Property Owner	FREEPORT REALTY V LLC	**Property Location**	92 WESTON ST
		Property Use	WAREHOUSE
Mailing Address	337 FREEPORT ST	**Most Recent Sale Date**	9/20/2019
		Legal Reference	07527-0278
City	BOSTON	**Grantor**	NEPREO INC
Mailing State	MA **Zip** 02122	**Sale Price**	0
ParcelZoning	ID-1	**Land Area**	187,335.000 acres

Current Property Assessment

Card 1 Value	Building Value 0	Xtra Features Value 0	Land Value 0	Total Value 0

Building Description

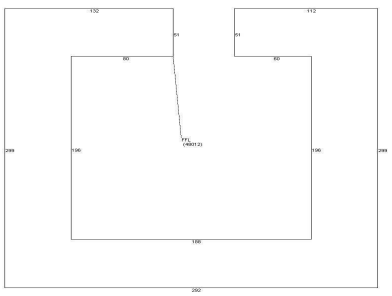
Building Style	OFFICE/WHS	**Foundation Type**	Concrete	**Flooring Type**	COMBINATION
# of Living Units	0	**Frame Type**	Steel	**Basement Floor**	N/A
Year Built	1978	**Roof Structure**	FLAT	**Heating Type**	Warm Air
Building Grade	Average	**Roof Cover**	Metal	**Heating Fuel**	Gas
Building Condition	N/A	**Siding**	Brick	**Air Conditioning**	30%
Finished Area (SF)	N/A	**Interior Walls**	DRYWALL	**# of Bsmt Garages**	0
Number Rooms	0	**# of Bedrooms**	0	**# of Full Baths**	0
# of 3/4 Baths	0	**# of 1/2 Baths**	0	**# of Other Fixtures**	0

Legal Description

Narrative Description of Property

This property contains 187,335.000 acres of land mainly classified as WAREHOUSE with a(n) OFFICE/WHS style building, built about 1978 , having Brick exterior and Metal roof cover, with 0 commercial unit(s) and 0 residential unit(s), 0 room(s), 0 bedroom(s), 0 bath(s), 0 half bath(s).

Property Images

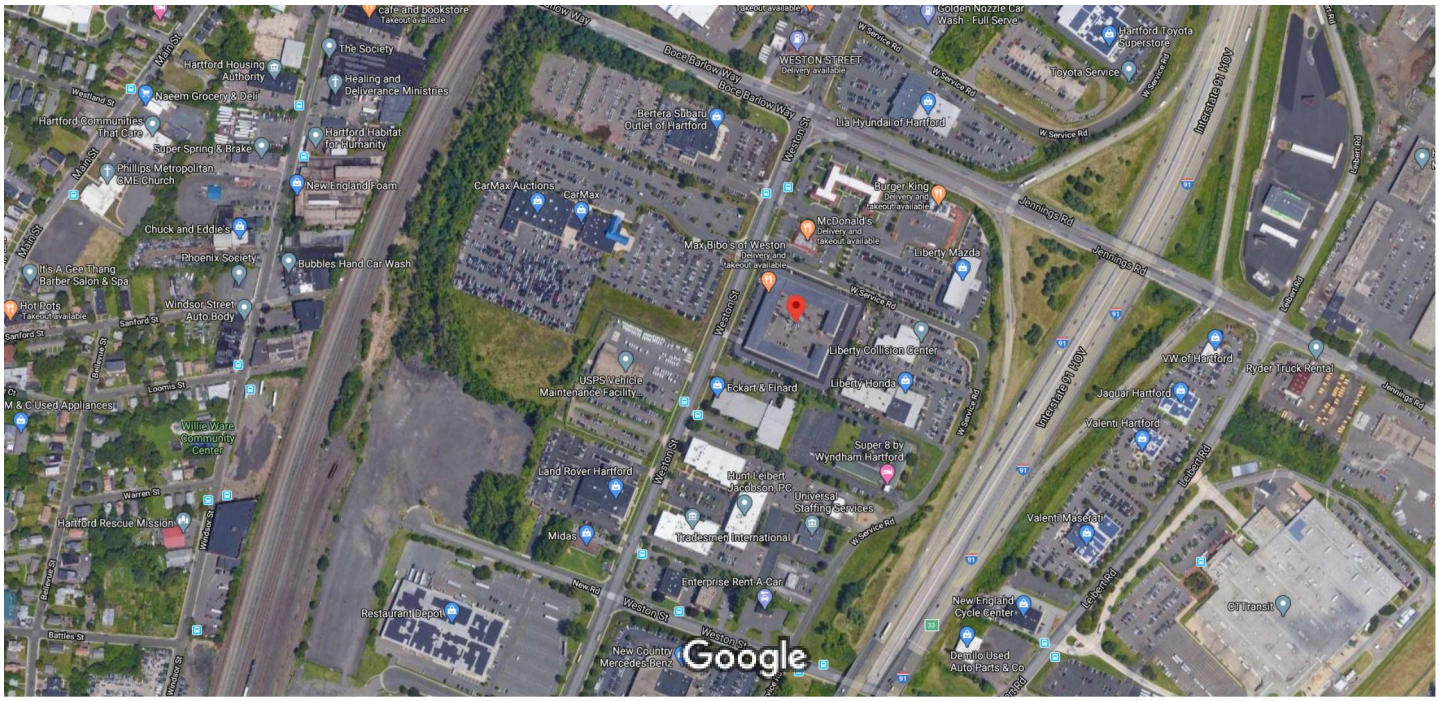


Disclaimer: This information is believed to be correct but is subject to change and is not warranteed.

Google Maps

41°47'12.3"N 72°39'44.4"W

Crown Castle - tower location



Imagery ©2020 Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2020 200 ft

41°47'12.3"N 72°39'44.4"W

41.786750, -72.662339

Directions Save Nearby Send to your phone Share

92 Weston St, Hartford, CT 06120

Q8PQ+M3 Hartford, Connecticut

Exhibit C

Construction Drawings

AT&T

AT&T SITE NUMBER: CTU5152
AT&T SITE NAME: HARTFORD NORTH
AT&T FA CODE: 10071071
AT&T PARENT PACE NUMBER: MRCTB047056
AT&T PROJECT: LTE 5C, 6C, 5GNR RADIO & MULTICARRIER

BUSINESS UNIT #: 876325
SITE ADDRESS: 92 WESTON STREET HARTFORD, CT 06103-1217
COUNTY: HARTFORD
SITE TYPE: MONOPOLE
TOWER HEIGHT: 110'-0"

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	WESTON SQUARE
SITE ADDRESS:	92 WESTON STREET HARTFORD, CT 06103-1217
COUNTY:	HARTFORD
MAP/PARCEL #:	HRFD-000286-000173-000007
AREA OF CONSTRUCTION:	EXISTING
LATTITUDE:	41° 47' 12.30"
LONGITUDE:	-72° 39' 44.42"
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	18 FT.
CURRENT ZONING:	NOT REQUIRED
JURISDICTION:	CITY OF HARTFORD
OCCUPANCY CLASSIFICATION:	U - UNMANNED
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	FREEPORT REALTY V LLC 20 WESTBOROUGH DRIVE C/O BOARDWALK REALTY ASSOCIATES LLC WEST HARTFORD, CT 06107
TOWER OWNER:	GLOBAL SIGNAL ACQUISITIONS II LLC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	NORTHEAST UTILITIES (800) 286-2000
TELCO PROVIDER:	AT&T (866) 620-6900

PROJECT TEAM

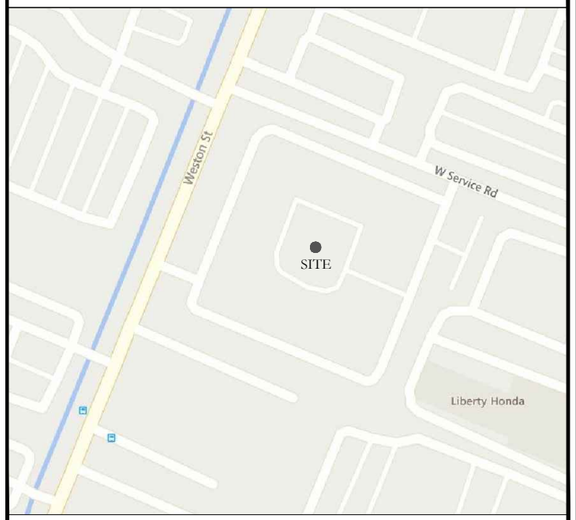
A&E FIRM:	POD 11490 BLUEGRASS PARKWAY LOUISVILLE, KY 40299 (502) 437-5252
CROWN CASTLE USA INC. DISTRICT CONTACTS:	10300 ORMSBY PARK PLACE, SUITE 501 LOUISVILLE, KY 40223 VERONICA DELIA - PROJECT MANAGER (610) 635-3222 JASON D'AMICO - CONSTRUCTION MANAGER (860) 209-0104 NICHOLAS ROMBACH- A&E SPECIALIST NICHOLAS.ROMBACH@CROWNCASTLE.COM

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1	SITE PLAN
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	FINAL EQUIPMENT SCHEDULE
C-4	MOUNTING ELEVATION & EQUIPMENT SPECS
C-5	FIBER COLOR CODE
C-6.1	COAX COLOR CODE - PART I
C-6.2	COAX COLOR CODE - PART II
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM (ATTACHED AT FINAL)
ATTACHED	MOUNT SPECIFICATIONS

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

LOCATION MAP



SITE PHOTO

PROJECT DESCRIPTION

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

TOWER SCOPE OF WORK:
- REMOVE (3) CCI ANTENNAS - HPA-65R-BUU-H6 ANTENNAS
- REMOVE (3) ERICSSON - RRUS-11 B12 RRHs
- REMOVE (3) RRUS-32 B2 RRHs
- INSTALL (3) CCI - DMP65R-BU6DA ANTENNAS
- INSTALL (3) CCI - OPA65R-BU6DA ANTENNAS
- INSTALL (3) ERICSSON - RRUS-E2 B29 RRHs
- INSTALL (3) ERICSSON - 4415 B25 RRHs
- INSTALL (3) ERICSSON - 4449 B5/B12 RRHs
- INSTALL (3) ERICSSON - 4478 B14 RRHs
- INSTALL (1) RAYCAP - DC6-48-60-0 SQUID
- INSTALL (2) ROSENBERGER LEONI - WR-VG86ST-BRD POWER CABLES
- INSTALL (6) B2B MOUNTS
- INSTALL MOUNT REPLACEMENT PER MOUNT ANALYSIS BY B+T GROUP DATED NOVEMBER 19, 2020

GROUND SCOPE OF WORK:
- INSTALL (1) 6630 + IDLe
- INSTALL (12) 512 UP CONVERTERS (NO "Y" CABLE TO EXISTING NETSURE 512 -48V OD CAB)

NOTE:
THE ELECTRICAL DESIGN FOR ADDITIONS AND/OR MODIFICATIONS TO THE EXISTING AC ELECTRICAL SYSTEM HAS BEEN PERFORMED BY SWARTLEY BROS. ENGINEERS, INC. THEY ARE SOLELY RESPONSIBLE FOR THE ELECTRICAL DESIGN. THEIR ELECTRICAL DESIGN, AS PROVIDED TO US, HAS BEEN ATTACHED TO THESE DRAWINGS.

APPLICABLE CODES/REFERENCE DOCUMENTS

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

CODE TYPE	CODE
BUILDING	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS
STRUCTURAL	2018 IBC & TIA-222-H

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	BLACK & VEATCH CORP
DATED:	AUGUST 11, 2020
MOUNT ANALYSIS:	B+T GROUP
DATED:	NOVEMBER 19, 2020
RFDS REVISION:	PRELIMINARY
DATED:	03/26/20
ORDER ID:	517087
REVISION:	1

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

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

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER
01/28/2021

SHEET NUMBER: T-1
REVISION: 3

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

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

GENERAL NOTES:

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

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

ELECTRICAL INSTALLATION NOTES:

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

CONDUCTOR COLOR CODE

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

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

APWA UNIFORM COLOR CODE:

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

ABBREVIATIONS:

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

GREENFIELD GROUNDING NOTES:

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

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

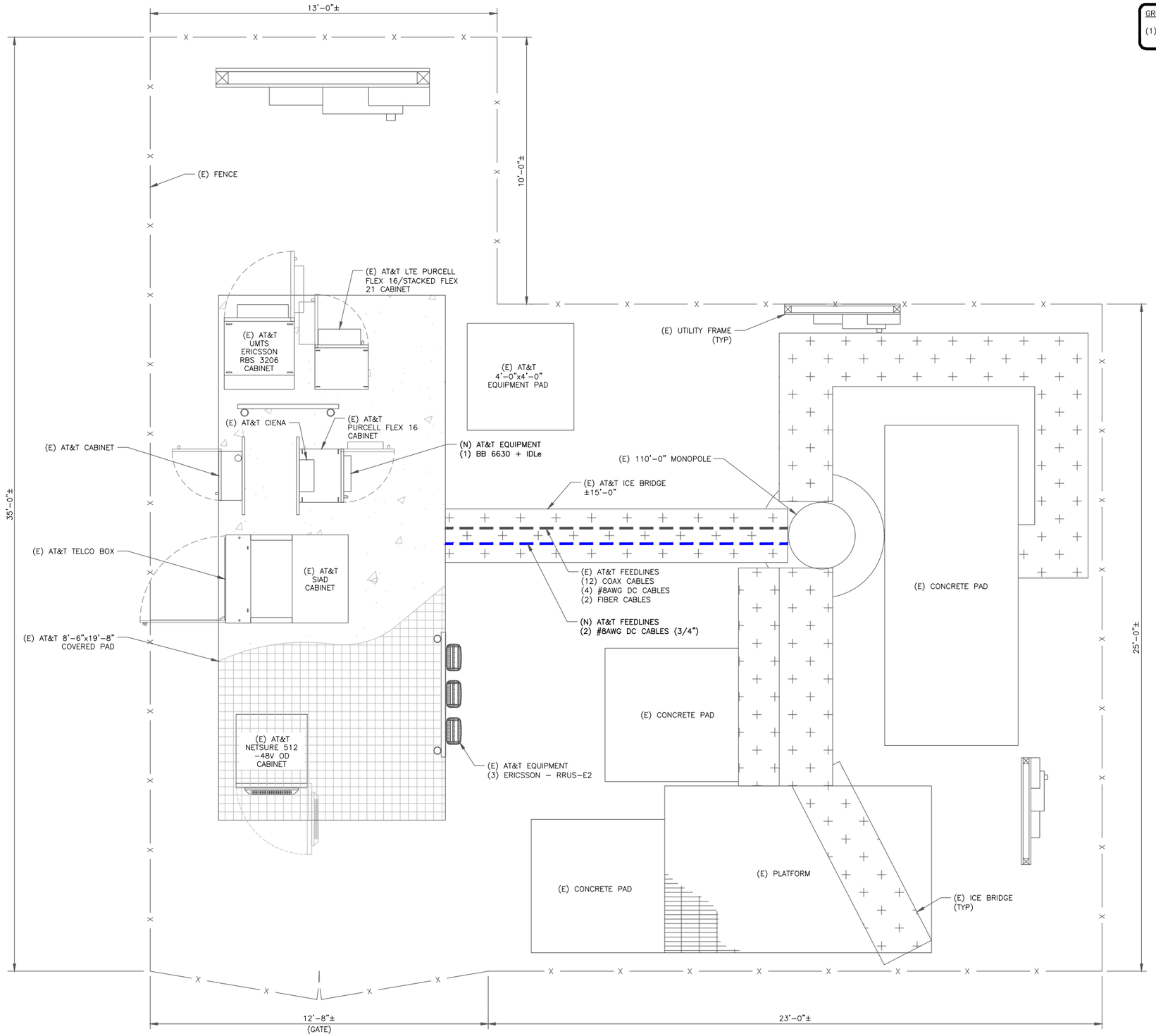
EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

01/28/2021

SHEET NUMBER: T-2
REVISION: 3



1 SITE PLAN
SCALE: 2' 1' 0 2' 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

N

GROUND SCOPE OF WORK:

(1) INSTALL BB 6630 + IDLE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

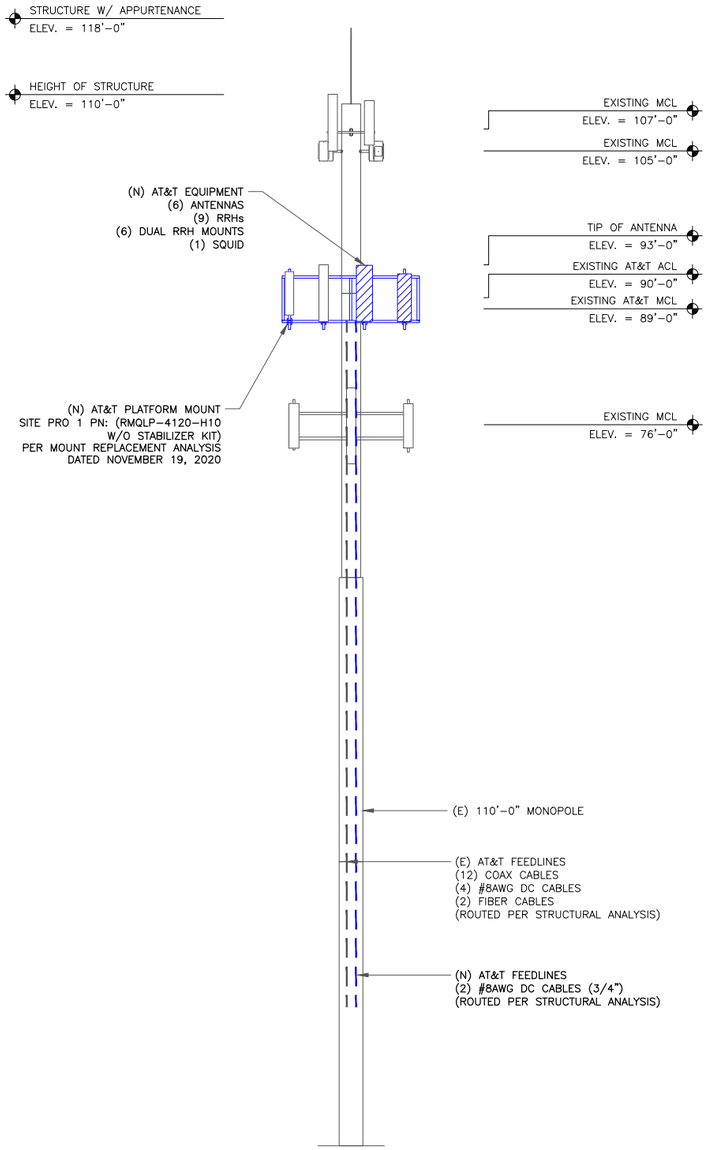
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

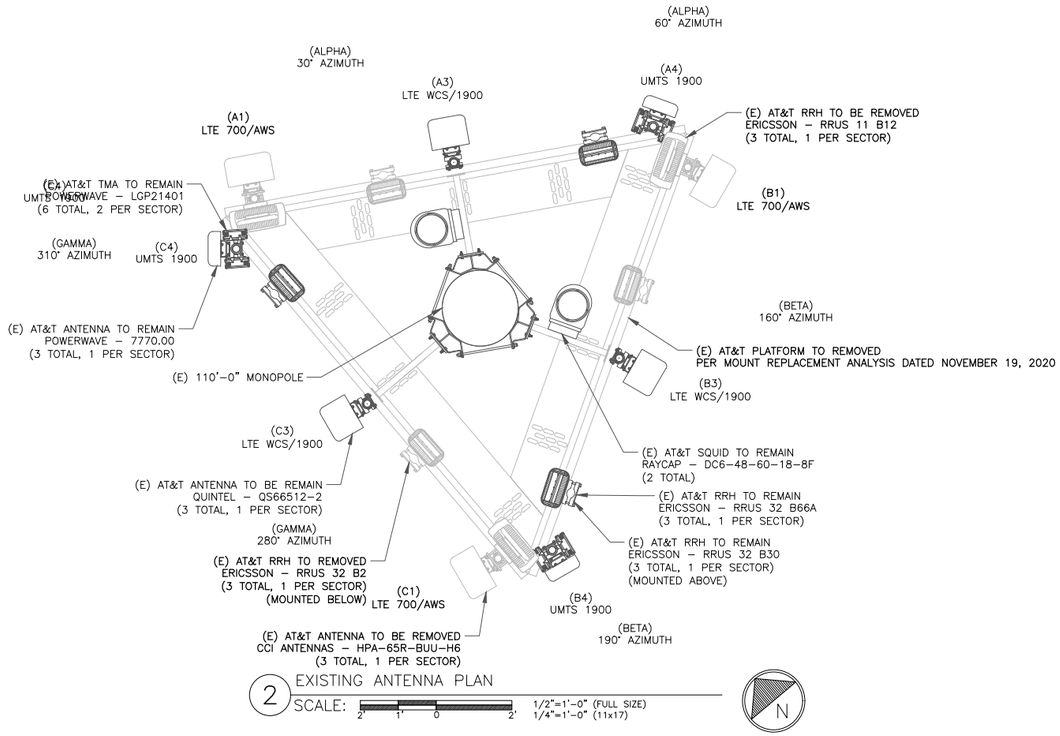
STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER
01/28/2021

SHEET NUMBER: C-1

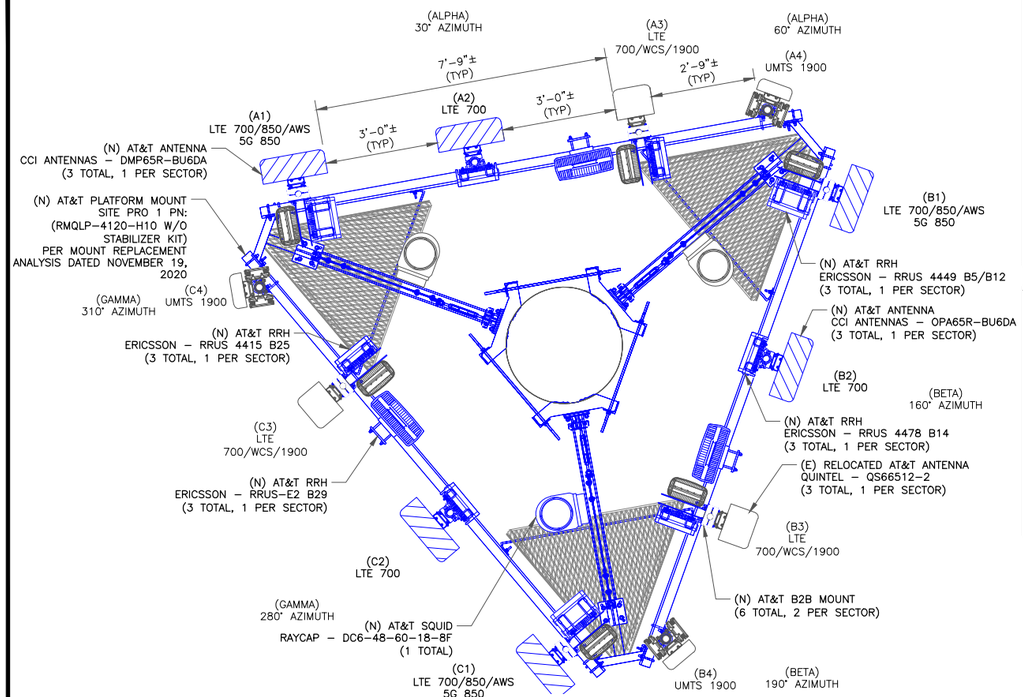
REVISION: 3



1 FINAL ELEVATION
SCALE: 8' 6' 4' 2' 0 8' — 1/8"=1'-0" (FULL SIZE) 1/16"=1'-0" (11x17)



2 EXISTING ANTENNA PLAN
SCALE: 2' 1' 0 2' — 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)



3 FINAL ANTENNA PLAN
SCALE: 2' 1' 0 2' — 1/2"=1'-0" (FULL SIZE) 1/4"=1'-0" (11x17)

"LOOK UP" - CROWN CASTLE USA INC.
SAFETY CLIMB REQUIREMENT:

THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.

INSTALLER NOTES:

1. REFERENCE C-3 FOR FINAL EQUIPMENT SCHEDULE.
2. REFERENCE C-4.1 FOR NEW EQUIPMENT SPECIFICATIONS.
3. CONTRACTOR TO VERIFY ALL ANTENNA TIP HEIGHTS DO NOT EXCEED BEACON BASE HEIGHT.
4. 3'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE ANTENNAS ON SAME SECTOR.
5. 6'-0" MINIMUM DISTANCE REQUIRED BETWEEN 700BC & 700DE ANTENNAS ON SAME SECTOR.
6. 4'-0" MINIMUM DISTANCE REQUIRED BETWEEN LTE 700 ANTENNAS ON OPPOSING SECTORS.
7. ALL ANTENNA MEASUREMENT DISTANCES MUST BE EDGE TO EDGE (RELOCATE ANTENNAS AS NEEDED).
8. 8" MINIMUM DISTANCE REQUIRED BETWEEN ANTENNA & RADIO. SEE GENERIC EXAMPLE DETAIL ON SHEET C-4.1.

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

01/28/2021

SHEET NUMBER: C-2

REVISION: 3

FINAL EQUIPMENT SCHEDULE
(VERIFY WITH CURRENT RFDS)

POSITION	ANTENNA				RADIO			DIPLEXER			TMA		SURGE PROTECTION		CABLES			
	TECH.	STATUS/MANUFACTURER MODEL	AZIMUTH	RAD CENTER	QTY.	STATUS/MODEL	LOCATION	QTY.	STATUS	LOCATION	QTY.	STATUS	QTY.	STATUS/MODEL	QTY.	STATUS/TYPE	SIZE	LENGTH
ALPHA																		
A1	LTE 5G	(N) CCI ANTENNAS DMP65R-BU6DA	30°	90'-0"	1	(N) RADIO 4449 B5/B12	TOWER	–	–	–	–	–	1	(E) DC6-48-60-18-8F	2	(E) DC	3/4"	140'-0"
					1	(E) RRUS-32 B66A	TOWER								1	(E) FIBER	3/8"	140'-0"
A2	LTE	(N) CCI ANTENNAS OPA65R-BU6DA	30°	90'-0"	1	(N) RADIO 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
A3	LTE	(E) QUINTEL QS66512-2	30°	90'-0"	1	(E) RRUS-32 B30	TOWER	–	–	–	–	–	–	–	2	(E) COAX	1-5/8"	140'-0"
					1	(N) 4415 B25	TOWER											
					1	(N) RRUS-E2 B29	GROUND											
A4	UMTS	(E) POWERWAVE TECH 7770.00	60°	90'-0"	–	–	–	2	(E)	GROUND	2	(E)	–	–	2	(E) COAX	1-5/8"	140'-0"
BETA																		
B1	LTE 5G	(N) CCI ANTENNAS DMP65R-BU6DA	160°	90'-0"	1	(N) RADIO 4449 B5/B12	TOWER	–	–	–	–	–	1	(E) DC6-48-60-18-8F	2	(E) DC	3/4"	140'-0"
					1	(E) RRUS-32 B66A	TOWER								1	(E) FIBER	3/8"	140'-0"
B2	LTE	(N) CCI ANTENNAS OPA65R-BU6DA	160°	90'-0"	1	(N) RADIO 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
B3	LTE	(E) QUINTEL QS66512-2	160°	90'-0"	1	(E) RRUS-32 B30	TOWER	–	–	–	–	–	–	–	2	(E) COAX	1-5/8"	140'-0"
					1	(N) 4415 B25	TOWER											
					1	(N) RRUS-E2 B29	GROUND											
B4	UMTS	(E) POWERWAVE TECH 7770.00	190°	90'-0"	–	–	–	2	(E)	GROUND	2	(E)	–	–	2	(E) COAX	1-5/8"	140'-0"
GAMMA																		
C1	LTE 5G	(N) CCI ANTENNAS DMP65R-BU6DA	280°	90'-0"	1	(N) RADIO 4449 B5/B12	TOWER	–	–	–	–	–	1	(N) DC6-48-60-18-8F	2	(N) DC	3/4"	140'-0"
					1	(E) RRUS-32 B66A	TOWER											
C2	LTE	(N) CCI ANTENNAS OPA65R-BU6DA	280°	90'-0"	1	(N) RADIO 4478 B14	TOWER	–	–	–	–	–	–	–	–	–	–	–
C3	LTE	(E) QUINTEL QS66512-2	280°	90'-0"	1	(E) RRUS-32 B30	TOWER	–	–	–	–	–	–	–	2	(E) COAX	1-5/8"	140'-0"
					1	(N) 4415 B25	TOWER											
					1	(N) RRUS-E2 B29	GROUND											
C4	UMTS	(E) POWERWAVE TECH 7770.00	310°	90'-0"	–	–	–	2	(E)	GROUND	2	(E)	–	–	2	(E) COAX	1-5/8"	140'-0"

1 FINAL EQUIPMENT SCHEDULE
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

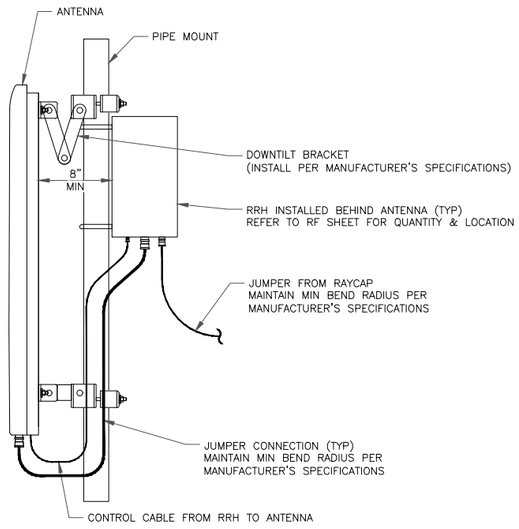
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

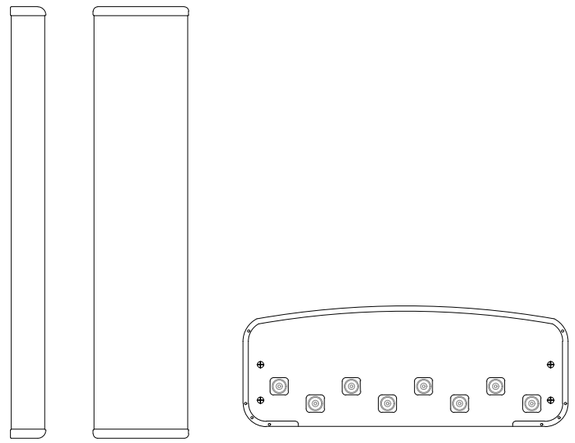
01/28/2021

SHEET NUMBER: C-3

REVISION: 3

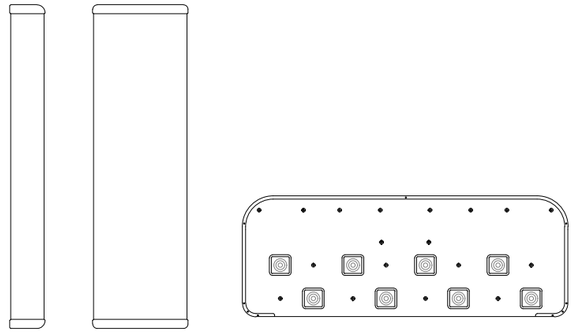


1 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE



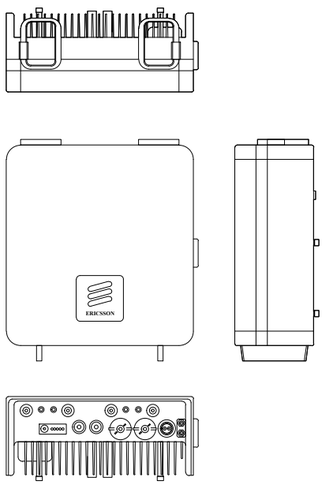
CCI ANTENNAS – DMP65R–BU8DA
WEIGHT (WITHOUT MOUNTING HARDWARE): 105.6 LBS
SIZE (HxWxD): 96.0x20.7x7.7 IN.
MOUNTING HARDWARE P/N: MBK–01
RATED WIND VELOCITY: 150.0 MPH

2 CCI ANTENNAS – DMP65R–BU8DA
SCALE: NOT TO SCALE



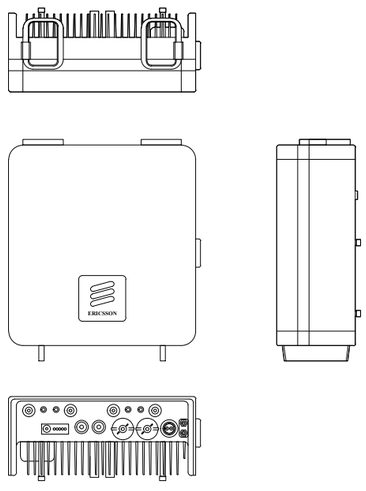
CCI ANTENNAS – OPA65R–BU6DA
WEIGHT (WITHOUT MOUNTING HARDWARE): 60.2 LBS
SIZE (HxWxD): 71.2x21.0x7.8 IN.
MOUNTING HARDWARE P/N: MBK–01
RATED WIND VELOCITY: 150.0 MPH

3 CCI ANTENNAS – OPA65R–BU6DA
SCALE: NOT TO SCALE



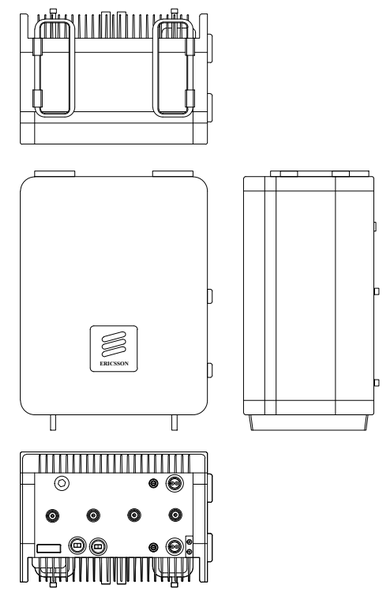
ERICSSON – RRUS 4415 B25
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

4 ERICSSON – RRUS 4415 B25
SCALE: NOT TO SCALE



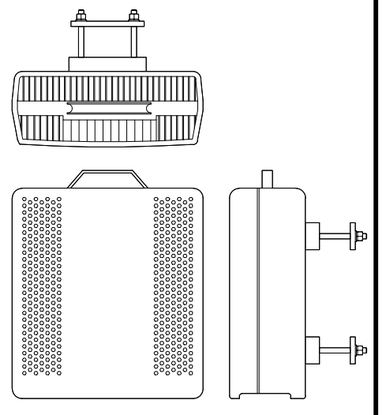
ERICSSON – RADIO 4478 B14
WEIGHT: 60.0 LBS
SIZE (HxWxD): 15.0x13.0x8.0 IN.

5 ERICSSON – RADIO 4478 B14
SCALE: NOT TO SCALE



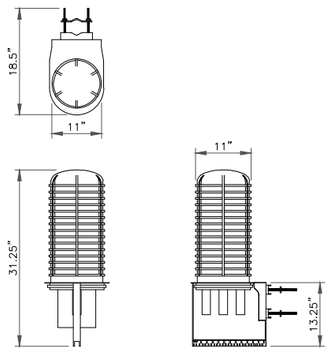
ERICSSON – RADIO 4449
WEIGHT: 70.0 LBS
SIZE (HxWxD): 18.0x13.2x9.4 IN.

6 ERICSSON – RADIO 4449
SCALE: NOT TO SCALE



ERICSSON – RRUS E2
WEIGHT (FULLY EQUIPPED): 52.9 LBS.
SIZE (HxWxD): 20.4x18.5x7.5 IN.

7 ERICSSON – RRUS E2
SCALE: NOT TO SCALE



RAYCAP – DC6–48–60–0–8C
SIZE: 11x31.25 IN.
WEIGHT: 32.8 LBS
NOMINAL OPERATING VOLTAGE: 48 VDC
VOLTAGE PROTECTION RATING: 400 V
WIND LOADING: 150 MPH SUSTAINED (105.7 LBS)
WIND LOADING: 195 MPH GUST (213.6 LBS)

CONTRACTOR TO USE "THREAD LUBRICANT" ON
MOUNTING BOLTS DURING INSTALLATION

8 RAYCAP – DC6–48–60–0–8C
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

01/28/2021

SHEET NUMBER: C-4

REVISION: 3

Table 1: E. PA / S.NJ / DE --- COAX Color Code Definition

Sector	Alpha			
	A - Split	GREEN	ORANGE	Blank
	Beta	Blue		
	B - Split	BLUE	BROWN	Blank
	Gamma	White		
	C - Split	WHITE	VIOLET	Blank
	D	ORANGE		
	E	BROWN		
	F	VIOLET		

DC Trunk / DC Jumper / First Fiber Jumper

Frequency Band				
	700 (B/C)	VIOLET		
	850	YELLOW		
	850 - 2nd Block	YELLOW	YELLOW	Blank
	1900 (PCS)	RED		
	1900 (PCS) - 2nd Block	RED	RED	Blank
	2100 (AWS)	ORANGE		
	2100 (AWS) - 2nd Block	ORANGE	ORANGE	Blank
	2300 (WCS)	BROWN		
	2300 (WCS) - 2nd Block	BROWN	BROWN	Blank
	2300 (WCS) - SXM Repeater	BROWN	BROWN	BROWN
	700 (D/E)	SLATE		
	700 First Net	VIOLET	BLUE	Blank
	700 (B/C) / 700 First Net (Dual RRH)	VIOLET	VIOLET	BLUE
	1900 (PCS) / 2100 (AWS) (Dual RRH)	RED	ORANGE	Blank

The left color codes are also true for DC Trunks at the raycap, interior and exterior hatch plate, transition up a structure, and before entering the surge protection on the tower. Power and fiber jumpers are to have one band of sector designation when exiting surge protection on the tower and at the RRH. Second Fiber Jumpers (Airscale RRH's ONLY) are to have two bands of sector designation when exiting surge protection on the tower and at the RRH.

1 FIBER COLOR CODE
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

SHEET NUMBER: C-5

REVISION: 3

Sector	Technology	Frequency Band	Color Code - Sector Designation for Sector Split	Color Code - Sector (Amount of Bands Based On Position)	Color Code - Frequency		45 + Coax	45 - Coax
A	LTE	700 B/C	Blank	GREEN	VIOLET	Blank	YELLOW	Blank
A	LTE	850	Blank	GREEN	YELLOW	Blank	YELLOW	Blank
A	LTE	850 - 2nd Block	Blank	GREEN	YELLOW / YELLOW	Blank	YELLOW	Blank
A	LTE	1900	Blank	GREEN	RED	Blank	YELLOW	Blank
A	LTE	1900 - 2nd Block	Blank	GREEN	RED / RED	Blank	YELLOW	Blank
A	LTE	2100	Blank	GREEN	ORANGE	Blank	YELLOW	Blank
A	LTE	2100 - 2nd Block	Blank	GREEN	ORANGE / ORANGE	Blank	YELLOW	Blank
A	LTE	700 D/E	Blank	GREEN	SLATE	Blank	YELLOW	Blank
A	LTE	2300	Blank	GREEN	BROWN	Blank	YELLOW	Blank
A	LTE	2300 - 2nd Block	Blank	GREEN	BROWN / BROWN	Blank	YELLOW	Blank
A	LTE	2300 - SXM Repeater	Blank	GREEN	BROWN / BROWN	BROWN	YELLOW	Blank
A	LTE	700 - FirstNet	Blank	GREEN	VIOLET / BLUE	Blank	YELLOW	Blank
A	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	GREEN	VIOLET / VIOLET	BLUE	YELLOW	Blank
A	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	GREEN	RED / ORANGE	Blank	YELLOW	Blank
A - Split	LTE	700 B/C	GREEN	ORANGE	VIOLET	Blank	YELLOW	Blank
A - Split	LTE	850	GREEN	ORANGE	YELLOW	Blank	YELLOW	Blank
A - Split	LTE	850 - 2nd Block	GREEN	ORANGE	YELLOW / YELLOW	Blank	YELLOW	Blank
A - Split	LTE	1900	GREEN	ORANGE	RED	Blank	YELLOW	Blank
A - Split	LTE	1900 - 2nd Block	GREEN	ORANGE	RED / RED	Blank	YELLOW	Blank
A - Split	LTE	2100	GREEN	ORANGE	ORANGE	Blank	YELLOW	Blank
A - Split	LTE	2100 - 2nd Block	GREEN	ORANGE	ORANGE / ORANGE	Blank	YELLOW	Blank
A - Split	LTE	700 D/E	GREEN	ORANGE	SLATE	Blank	YELLOW	Blank
A - Split	LTE	2300	GREEN	ORANGE	BROWN	Blank	YELLOW	Blank
A - Split	LTE	2300 - 2nd Block	GREEN	ORANGE	BROWN / BROWN	Blank	YELLOW	Blank
A - Split	LTE	2300 - SXM Repeater	GREEN	ORANGE	BROWN / BROWN	BROWN	YELLOW	Blank
A - Split	LTE	700 - FirstNet	GREEN	ORANGE	VIOLET / BLUE	Blank	YELLOW	Blank
A - Split	LTE	700 (B/C) / 700 First Net (Dual RRH)	GREEN	ORANGE	VIOLET / VIOLET	BLUE	YELLOW	Blank
A - Split	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	GREEN	ORANGE	RED / ORANGE	Blank	YELLOW	Blank
B	LTE	700 B/C	Blank	BLUE	VIOLET	Blank	YELLOW	Blank
B	LTE	850	Blank	BLUE	YELLOW	Blank	YELLOW	Blank
B	LTE	850 - 2nd Block	Blank	BLUE	YELLOW / YELLOW	Blank	YELLOW	Blank
B	LTE	1900	Blank	BLUE	RED	Blank	YELLOW	Blank
B	LTE	1900 - 2nd Block	Blank	BLUE	RED / RED	Blank	YELLOW	Blank
B	LTE	2100	Blank	BLUE	ORANGE	Blank	YELLOW	Blank
B	LTE	2100 - 2nd Block	Blank	BLUE	ORANGE / ORANGE	Blank	YELLOW	Blank
B	LTE	700 D/E	Blank	BLUE	SLATE	Blank	YELLOW	Blank
B	LTE	2300	Blank	BLUE	BROWN	Blank	YELLOW	Blank
B	LTE	2300 - 2nd Block	Blank	BLUE	BROWN / BROWN	Blank	YELLOW	Blank
B	LTE	2300 - SXM Repeater	Blank	BLUE	BROWN / BROWN	BROWN	YELLOW	Blank
B	LTE	700 - FirstNet	Blank	BLUE	VIOLET / BLUE	Blank	YELLOW	Blank
B	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	BLUE	VIOLET / VIOLET	BLUE	YELLOW	Blank
B	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	BLUE	RED / ORANGE	Blank	YELLOW	Blank
B - Split	LTE	700 B/C	BLUE	BROWN	VIOLET	Blank	YELLOW	Blank
B - Split	LTE	850	BLUE	BROWN	YELLOW	Blank	YELLOW	Blank
B - Split	LTE	850 - 2nd Block	BLUE	BROWN	YELLOW / YELLOW	Blank	YELLOW	Blank
B - Split	LTE	1900	BLUE	BROWN	RED	Blank	YELLOW	Blank
B - Split	LTE	1900 - 2nd Block	BLUE	BROWN	RED / RED	Blank	YELLOW	Blank
B - Split	LTE	2100	BLUE	BROWN	ORANGE	Blank	YELLOW	Blank
B - Split	LTE	2100 - 2nd Block	BLUE	BROWN	ORANGE / ORANGE	Blank	YELLOW	Blank
B - Split	LTE	700 D/E	BLUE	BROWN	SLATE	Blank	YELLOW	Blank
B - Split	LTE	2300	BLUE	BROWN	BROWN	Blank	YELLOW	Blank
B - Split	LTE	2300 - 2nd Block	BLUE	BROWN	BROWN / BROWN	Blank	YELLOW	Blank
B - Split	LTE	2300 - SXM Repeater	BLUE	BROWN	BROWN / BROWN	BROWN	YELLOW	Blank
B - Split	LTE	700 - FirstNet	BLUE	BROWN	VIOLET / BLUE	Blank	YELLOW	Blank
B - Split	LTE	700 (B/C) / 700 First Net (Dual RRH)	BLUE	BROWN	VIOLET / VIOLET	BLUE	YELLOW	Blank
B - Split	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	BLUE	BROWN	RED / ORANGE	Blank	YELLOW	Blank

1 COAX COLOR CODE – PART I
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

SHEET NUMBER: C-6.1

REVISION: 3

C	LTE	700 B/C	Blank	WHITE	VIOLET	Blank	YELLOW	Blank
C	LTE	850	Blank	WHITE	YELLOW	Blank	YELLOW	Blank
C	LTE	850 - 2nd Block	Blank	WHITE	YELLOW / YELLOW	Blank	YELLOW	Blank
C	LTE	1900	Blank	WHITE	RED	Blank	YELLOW	Blank
C	LTE	1900 - 2nd Block	Blank	WHITE	RED / RED	Blank	YELLOW	Blank
C	LTE	2100	Blank	WHITE	ORANGE	Blank	YELLOW	Blank
C	LTE	2100 - 2nd Block	Blank	WHITE	ORANGE / ORANGE	Blank	YELLOW	Blank
C	LTE	700 D/E	Blank	WHITE	SLATE	Blank	YELLOW	Blank
C	LTE	2300	Blank	WHITE	BROWN	Blank	YELLOW	Blank
C	LTE	2300 - 2nd Block	Blank	WHITE	BROWN / BROWN	Blank	YELLOW	Blank
C	LTE	2300 - SXM Repeater	Blank	WHITE	BROWN / BROWN	BROWN	YELLOW	Blank
C	LTE	700 - FirstNet	Blank	WHITE	VIOLET / BLUE	Blank	YELLOW	Blank
C	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	WHITE	VIOLET / VIOLET	BLUE	YELLOW	Blank
C	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	WHITE	RED / ORANGE	Blank	YELLOW	Blank
C - Split	LTE	700 B/C	WHITE	VIOLET	VIOLET	Blank	YELLOW	Blank
C - Split	LTE	850	WHITE	VIOLET	YELLOW	Blank	YELLOW	Blank
C - Split	LTE	850 - 2nd Block	WHITE	VIOLET	YELLOW / YELLOW	Blank	YELLOW	Blank
C - Split	LTE	1900	WHITE	VIOLET	RED	Blank	YELLOW	Blank
C - Split	LTE	1900 - 2nd Block	WHITE	VIOLET	RED / RED	Blank	YELLOW	Blank
C - Split	LTE	2100	WHITE	VIOLET	ORANGE	Blank	YELLOW	Blank
C - Split	LTE	2100 - 2nd Block	WHITE	VIOLET	ORANGE / ORANGE	Blank	YELLOW	Blank
C - Split	LTE	700 D/E	WHITE	VIOLET	SLATE	Blank	YELLOW	Blank
C - Split	LTE	2300	WHITE	VIOLET	BROWN	Blank	YELLOW	Blank
C - Split	LTE	2300 - 2nd Block	WHITE	VIOLET	BROWN / BROWN	Blank	YELLOW	Blank
C - Split	LTE	2300 - SXM Repeater	WHITE	VIOLET	BROWN / BROWN	BROWN	YELLOW	Blank
C - Split	LTE	700 - FirstNet	WHITE	VIOLET	VIOLET / BLUE	Blank	YELLOW	Blank
C - Split	LTE	700 (B/C) / 700 First Net (Dual RRH)	WHITE	VIOLET	VIOLET / VIOLET	BLUE	YELLOW	Blank
C - Split	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	WHITE	VIOLET	RED / ORANGE	Blank	YELLOW	Blank
D	LTE	700 B/C	Blank	ORANGE	VIOLET	Blank	YELLOW	Blank
D	LTE	850	Blank	ORANGE	YELLOW	Blank	YELLOW	Blank
D	LTE	850 - 2nd Block	Blank	ORANGE	YELLOW / YELLOW	Blank	YELLOW	Blank
D	LTE	1900	Blank	ORANGE	RED	Blank	YELLOW	Blank
D	LTE	1900 - 2nd Block	Blank	ORANGE	RED / RED	Blank	YELLOW	Blank
D	LTE	2100	Blank	ORANGE	ORANGE	Blank	YELLOW	Blank
D	LTE	2100 - 2nd Block	Blank	ORANGE	ORANGE / ORANGE	Blank	YELLOW	Blank
D	LTE	700 D/E	Blank	ORANGE	SLATE	Blank	YELLOW	Blank
D	LTE	2300	Blank	ORANGE	BROWN	Blank	YELLOW	Blank
D	LTE	2300 - 2nd Block	Blank	ORANGE	BROWN / BROWN	Blank	YELLOW	Blank
D	LTE	2300 - SXM Repeater	Blank	ORANGE	BROWN / BROWN	BROWN	YELLOW	Blank
D	LTE	700 - FirstNet	Blank	ORANGE	VIOLET / BLUE	Blank	YELLOW	Blank
D	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	ORANGE	VIOLET / VIOLET	BLUE	YELLOW	Blank
D	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	ORANGE	RED / ORANGE	Blank	YELLOW	Blank
E	LTE	700 B/C	Blank	BROWN	VIOLET	Blank	YELLOW	Blank
E	LTE	850	Blank	BROWN	YELLOW	Blank	YELLOW	Blank
E	LTE	850 - 2nd Block	Blank	BROWN	YELLOW / YELLOW	Blank	YELLOW	Blank
E	LTE	1900	Blank	BROWN	RED	Blank	YELLOW	Blank
E	LTE	1900 - 2nd Block	Blank	BROWN	RED / RED	Blank	YELLOW	Blank
E	LTE	2100	Blank	BROWN	ORANGE	Blank	YELLOW	Blank
E	LTE	2100 - 2nd Block	Blank	BROWN	ORANGE / ORANGE	Blank	YELLOW	Blank
E	LTE	700 D/E	Blank	BROWN	SLATE	Blank	YELLOW	Blank
E	LTE	2300	Blank	BROWN	BROWN	Blank	YELLOW	Blank
E	LTE	2300 - 2nd Block	Blank	BROWN	BROWN / BROWN	Blank	YELLOW	Blank
E	LTE	2300 - SXM Repeater	Blank	BROWN	BROWN / BROWN	BROWN	YELLOW	Blank
E	LTE	700 - FirstNet	Blank	BROWN	VIOLET / BLUE	Blank	YELLOW	Blank
E	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	BROWN	VIOLET / VIOLET	BLUE	YELLOW	Blank
E	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	BROWN	RED / ORANGE	Blank	YELLOW	Blank
F	LTE	700 B/C	Blank	VIOLET	VIOLET	Blank	YELLOW	Blank
F	LTE	850	Blank	VIOLET	YELLOW	Blank	YELLOW	Blank
F	LTE	850 - 2nd Block	Blank	VIOLET	YELLOW / YELLOW	Blank	YELLOW	Blank
F	LTE	1900	Blank	VIOLET	RED	Blank	YELLOW	Blank
F	LTE	1900 - 2nd Block	Blank	VIOLET	RED / RED	Blank	YELLOW	Blank
F	LTE	2100	Blank	VIOLET	ORANGE	Blank	YELLOW	Blank
F	LTE	2100 - 2nd Block	Blank	VIOLET	ORANGE / ORANGE	Blank	YELLOW	Blank
F	LTE	700 D/E	Blank	VIOLET	SLATE	Blank	YELLOW	Blank
F	LTE	2300	Blank	VIOLET	BROWN	Blank	YELLOW	Blank
F	LTE	2300 - 2nd Block	Blank	VIOLET	BROWN / BROWN	Blank	YELLOW	Blank
F	LTE	2300 - SXM Repeater	Blank	VIOLET	BROWN / BROWN	BROWN	YELLOW	Blank
F	LTE	700 - FirstNet	Blank	VIOLET	VIOLET / BLUE	Blank	YELLOW	Blank
F	LTE	700 (B/C) / 700 First Net (Dual RRH)	Blank	VIOLET	VIOLET / VIOLET	BLUE	YELLOW	Blank
F	LTE	1900 (PCS) / 2100 (AWS) (Dual RRH)	Blank	VIOLET	RED / ORANGE	Blank	YELLOW	Blank

1 COAX COLOR CODE – PART II
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

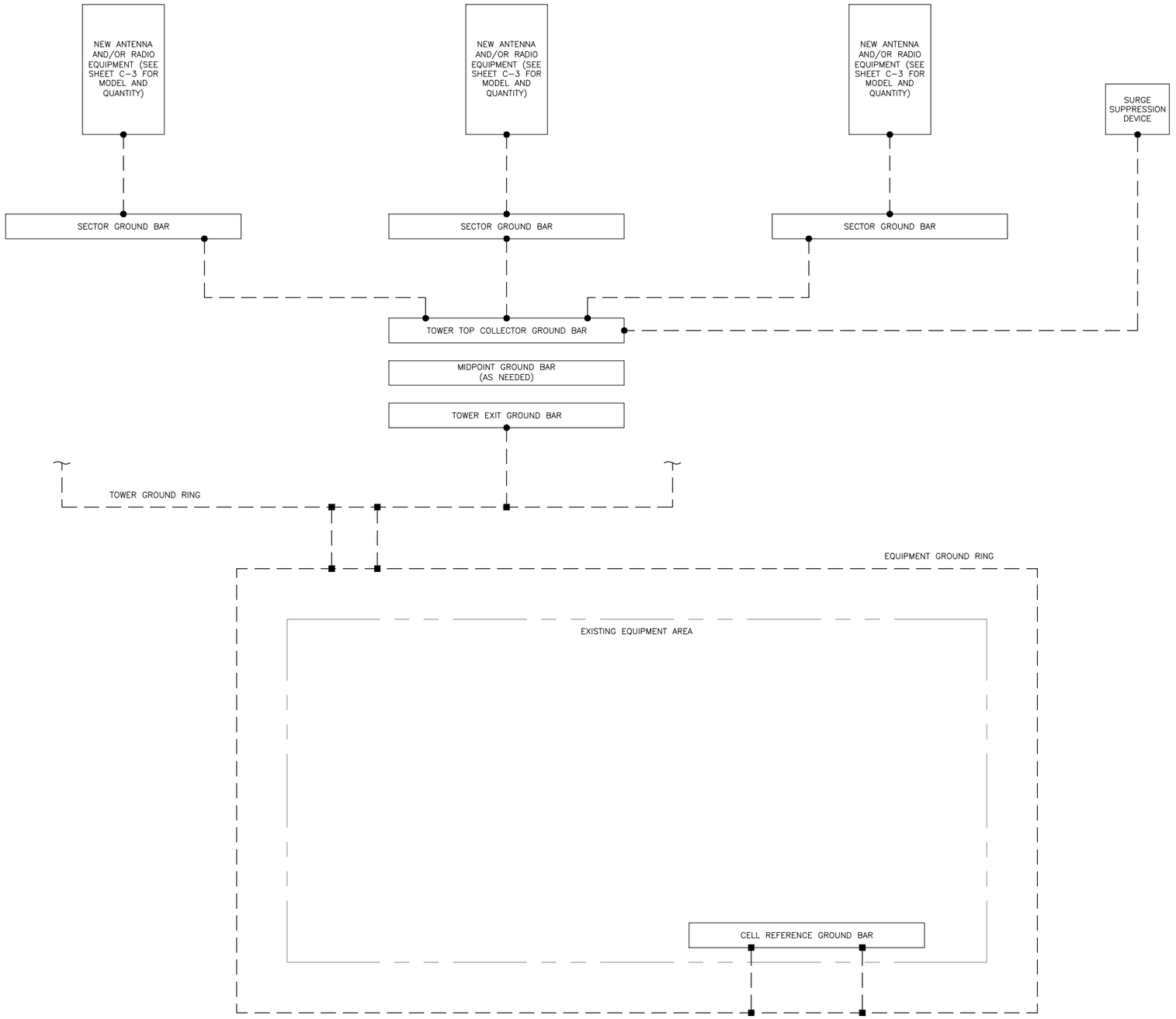
EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

SHEET NUMBER: C-6.2

REVISION: 3



1 GROUNDING SCHEMATIC
SCALE: NOT TO SCALE

GROUNDING PLAN LEGEND:

--- GROUND WIRE
■ EXOTHERMIC WELD
● MECHANICAL CONNECTION
COPPER GROUND ROD
GROUND ROD W/ TEST WELL

CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUITS (ATT-TP-76416 7.6.7).

HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CELL SITE REFERENCE GROUND BAR MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) #2 STRANDED GREEN INSULATED COPPER CONDUCTORS.

EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE (ATT-TP-76416 7.6.7.2).

DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICES CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR PER TP76300 SECTION H 6 AND TP76416 FIGURE 7-11 REQUIREMENTS.

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

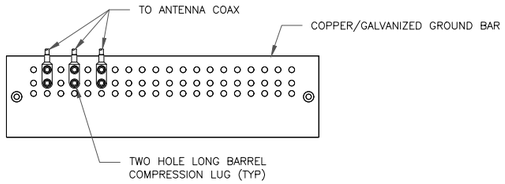
REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

01/28/2021

SHEET NUMBER: G-1

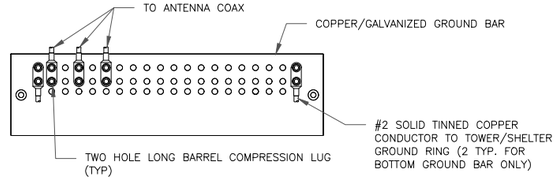
REVISION: 3



NOTES:

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

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

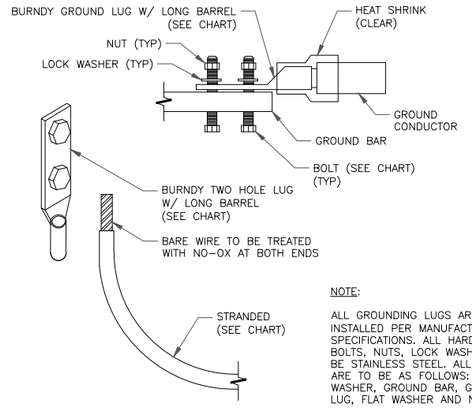


NOTES:

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

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

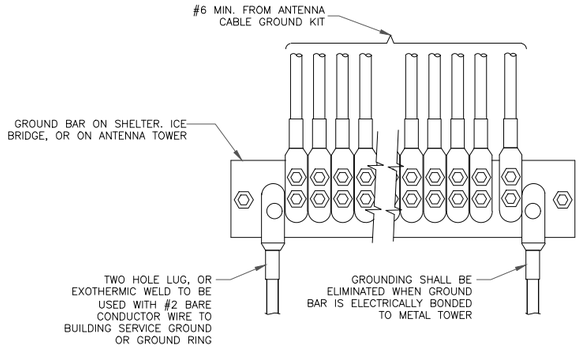
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" – 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" – 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" – 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" – 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" – 16 NC SS 2 BOLT



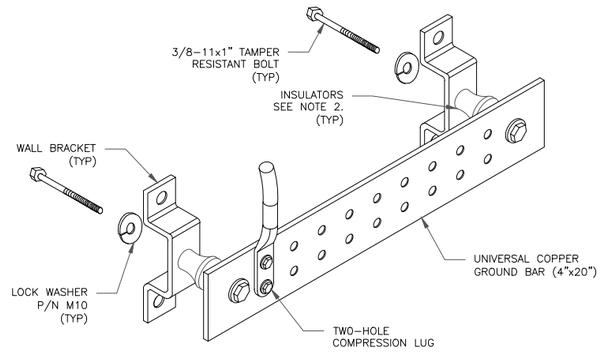
NOTE:

ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER, GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

3 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



4 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE

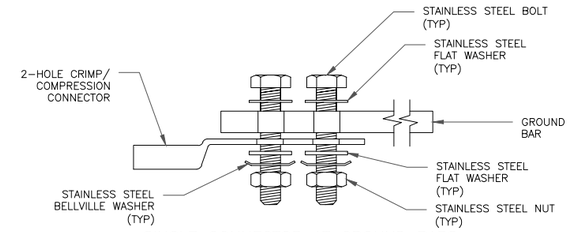


NOTES:

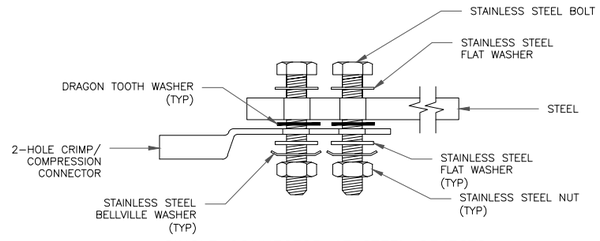
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

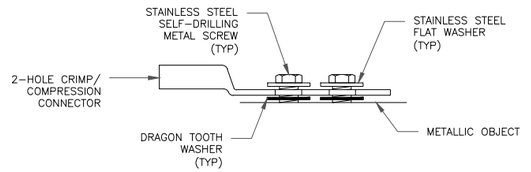
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

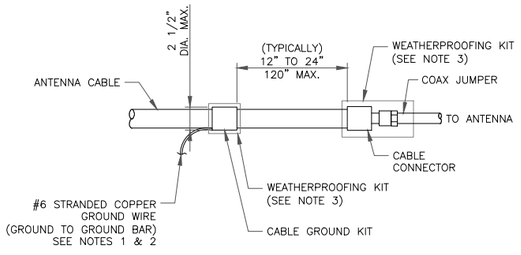


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

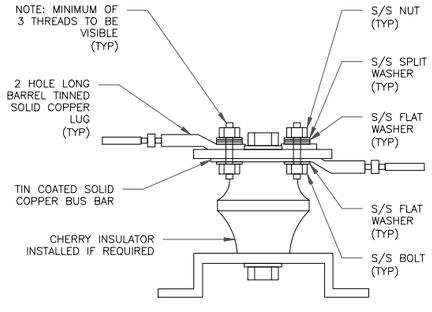
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT, COLD SHRINK SHALL NOT BE USED.

6 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE

AT&T
575 MOROSGO DRIVE
ATLANTA, GA 30324-3300

CROWN CASTLE
10300 ORMSBY PARK PLACE, SUITE 501
LOUISVILLE, KY 40223

POD
POWER OF DESIGN
11490 BLUEGRASS PKWY
LOUISVILLE, KY 40299
502-437-5252

AT&T SITE NUMBER: **CTU5152**

BU #: **876325**
WESTON SQUARE

92 WESTON STREET
HARTFORD, CT 06103-1217

EXISTING 110'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
0	10/16/2020	MLC	CONSTRUCTION	VRA
1	12/1/2020	EW	CONSTRUCTION	MEP
2	12/11/2020	EEW	CONSTRUCTION	MEP
3	01/28/2021	CPT	CONSTRUCTION	MEP

STATE OF CONNECTICUT
MARK E. PATTERSON
No. 31284
LICENSED PROFESSIONAL ENGINEER

01/28/2021

SHEET NUMBER: G-2

REVISION: 3

Diagram - Sector	A	Diagram File Name - CT5152_ABC_Multicarrier_1.vsd					
Atoll Site Name -	CTU5152	Location Name -	HARTFORD NORTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)"

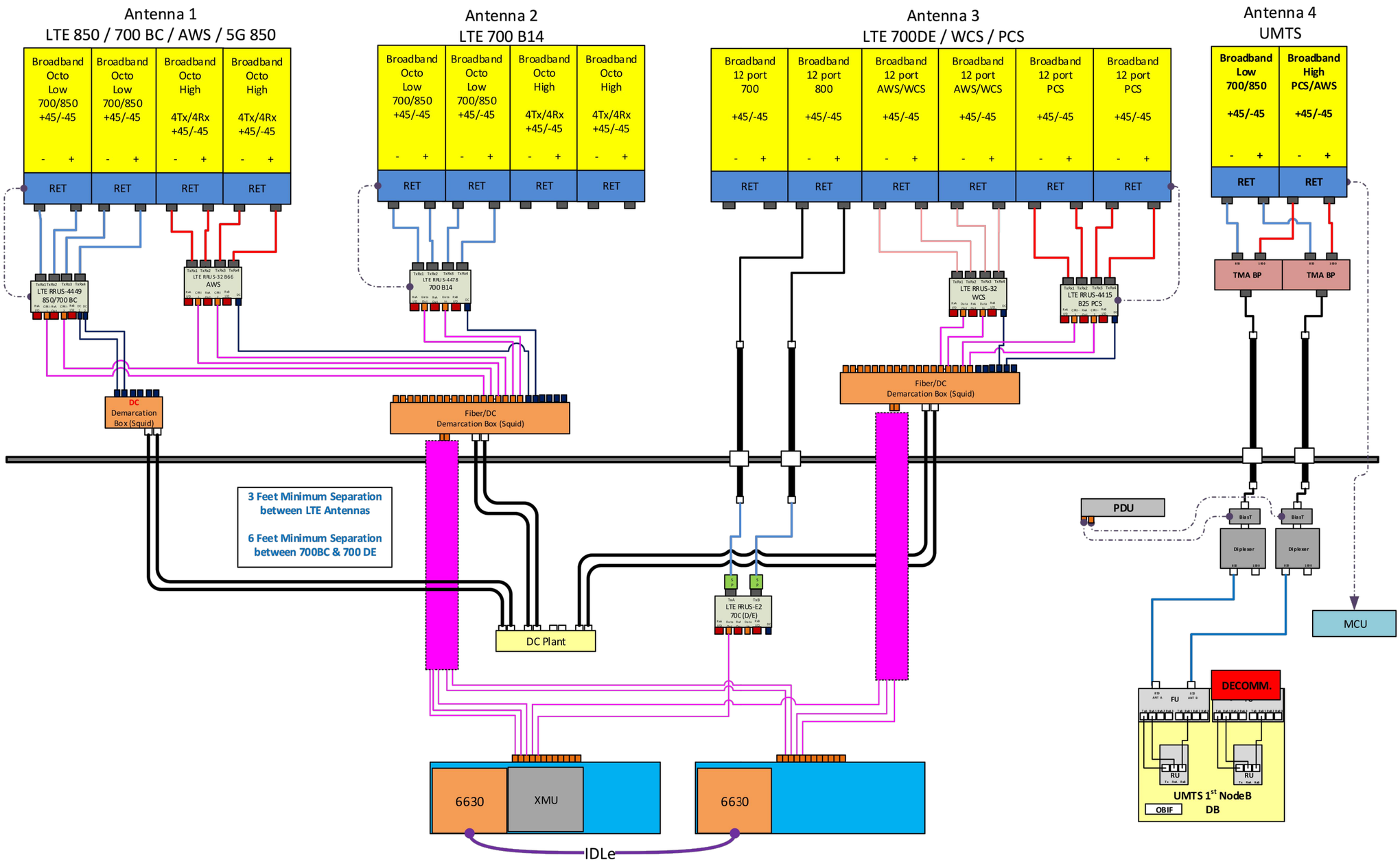


Diagram - Sector	B	Diagram File Name - CT5152_ABC_Multicarrier_1.vsd					
Atoll Site Name -	CTU5152	Location Name -	HARTFORD NORTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

Comments: "Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)"

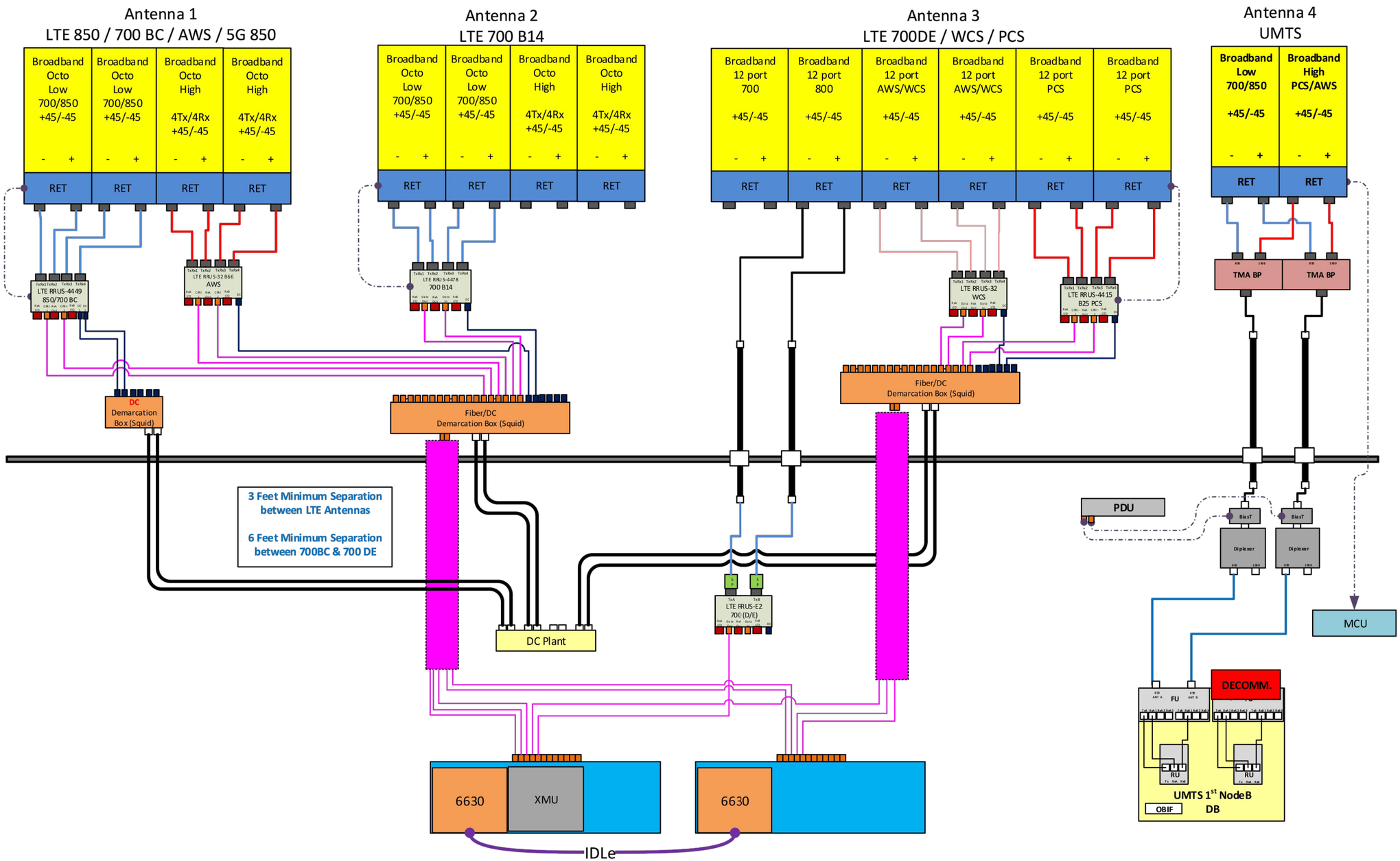
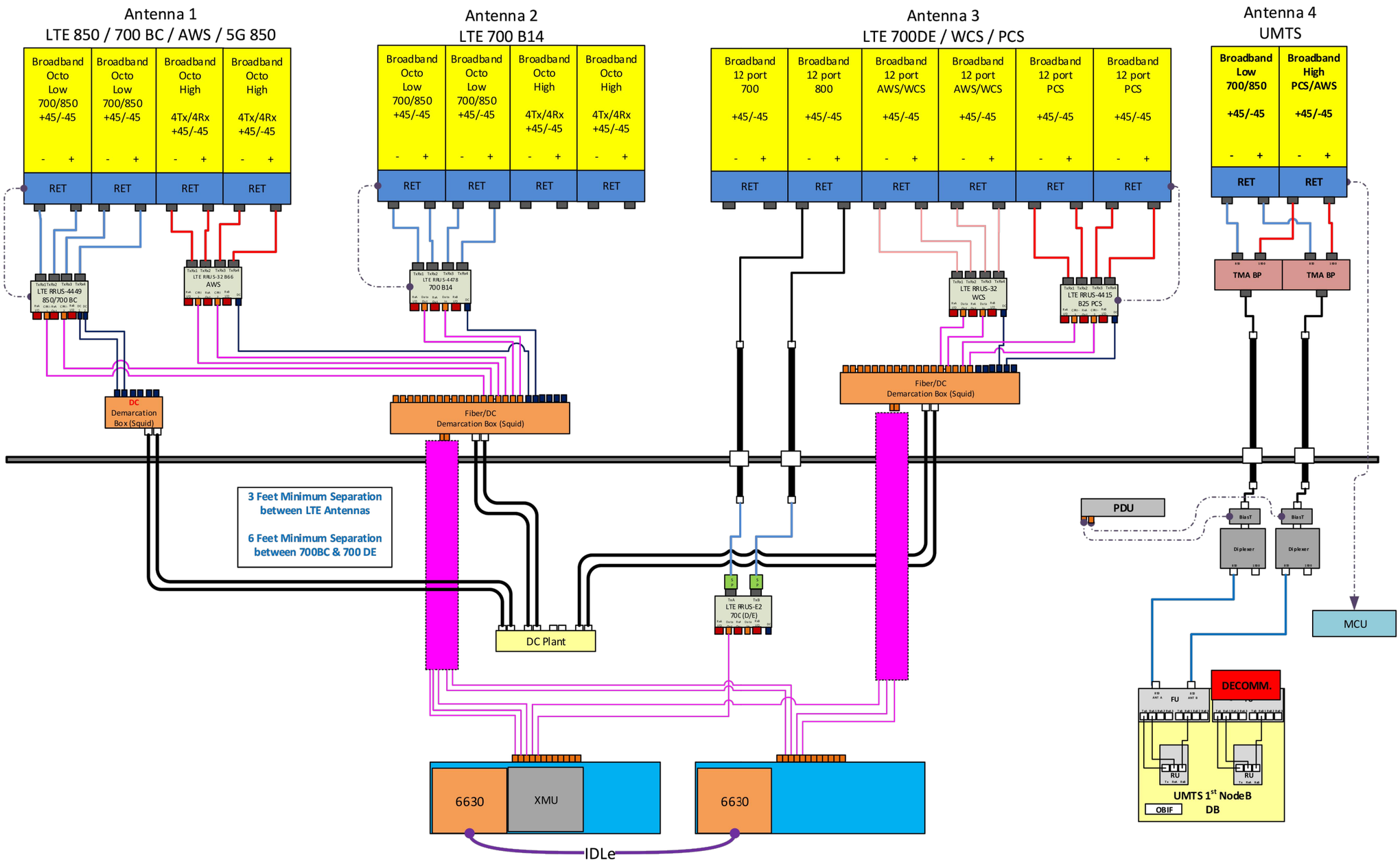
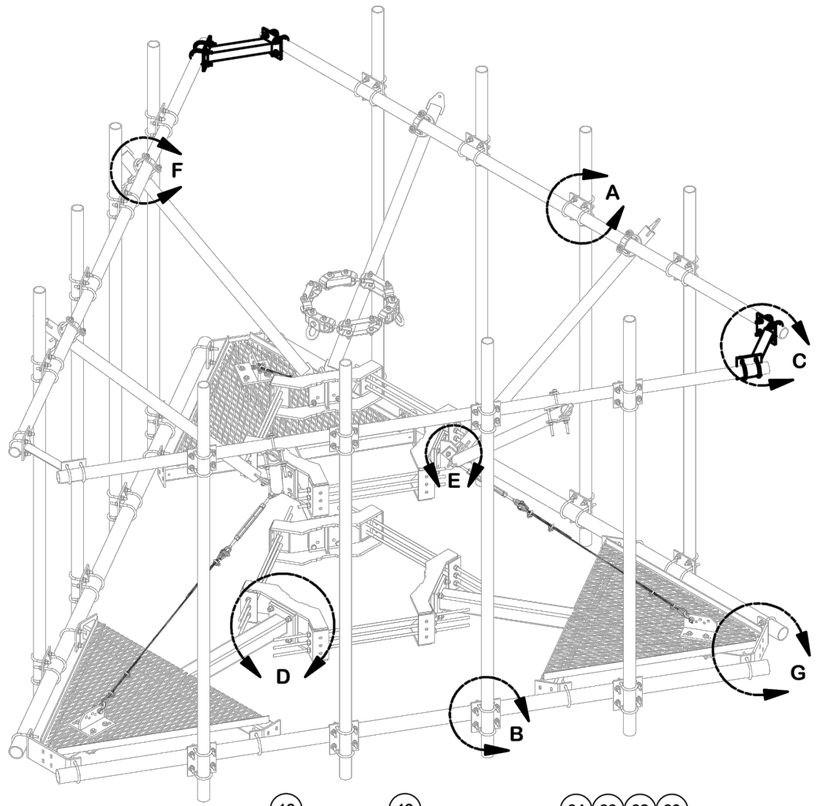


Diagram - Sector	C	Diagram File Name - CT5152_ABC_Multicarrier_1.vsd					
Atoll Site Name -	CTU5152	Location Name -	HARTFORD NORTH	Market -	CONNECTICUT	Market Cluster -	NEW ENGLAND

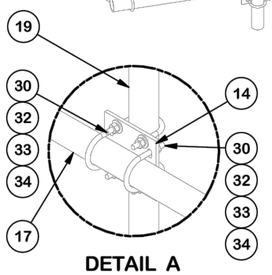
Comments: "Important Note: For detailed radio to antenna wiring refer to the latest 4T4R Antenna/ radio Port connections Field Notice (RF-HW-2016-265)"



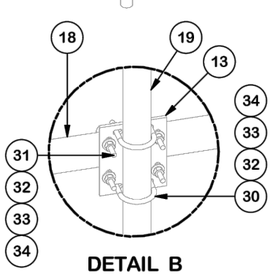


PARTS LIST

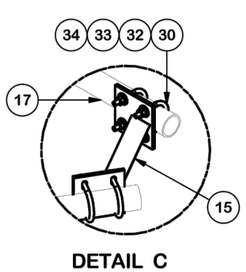
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
3	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
4	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
5	6	X-VSKL	LONG SUPPORT WELDMENT FOR VSK REINFORCEMENTS		37.05	222.33
6	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.51	15.04
7	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.92	11.06
8	3	320751-I	1/2" CHAIN SHACKLE		0.76	2.29
9	3	320601-I	5/8" TURNBUCKLE		2.63	7.89
10	6	320777-I	5/16" THIMBLE		0.06	0.36
11	12	320152-I	5/16" WIRE ROPE CLIP		1.32	15.78
12	3	AC516-10	5/16" AIRECRAFT CABLE		1.25	3.76
13	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
14	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
15	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
17	3	P30174	2-7/8" O.D. x 174" SCH. 40 PIPE	174 in	84.20	252.59
18	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
19	12	P30120	2-7/8" x 120" (2-1/2" SCH. 40) GALVANIZED PIPE	120 in	58.07	696.79
20	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
20	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
21	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
22	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
23	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
24	60	G58LW	5/8" HDG LOCKWASHER		0.03	1.57
25	60	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	7.79
26	6	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	0.89
27	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
28	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
29	24	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	9.83
30	84	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.67	56.19
31	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
32	288	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.82
33	285	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.96
34	285	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	20.41
35	1	HALO40	5,000 LB. MAINTENANCE TIE-OFF POINT		41.12	41.12
					TOTAL WT. #	3249.41



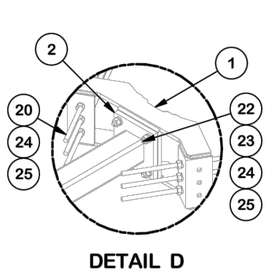
DETAIL A



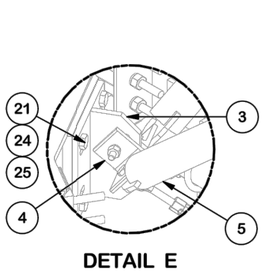
DETAIL B



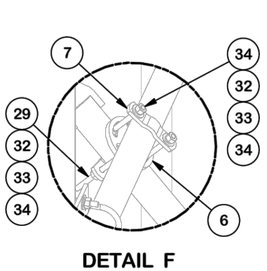
DETAIL C



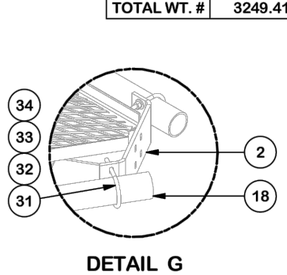
DETAIL D



DETAIL E



DETAIL F



DETAIL G

TOLERANCE NOTES

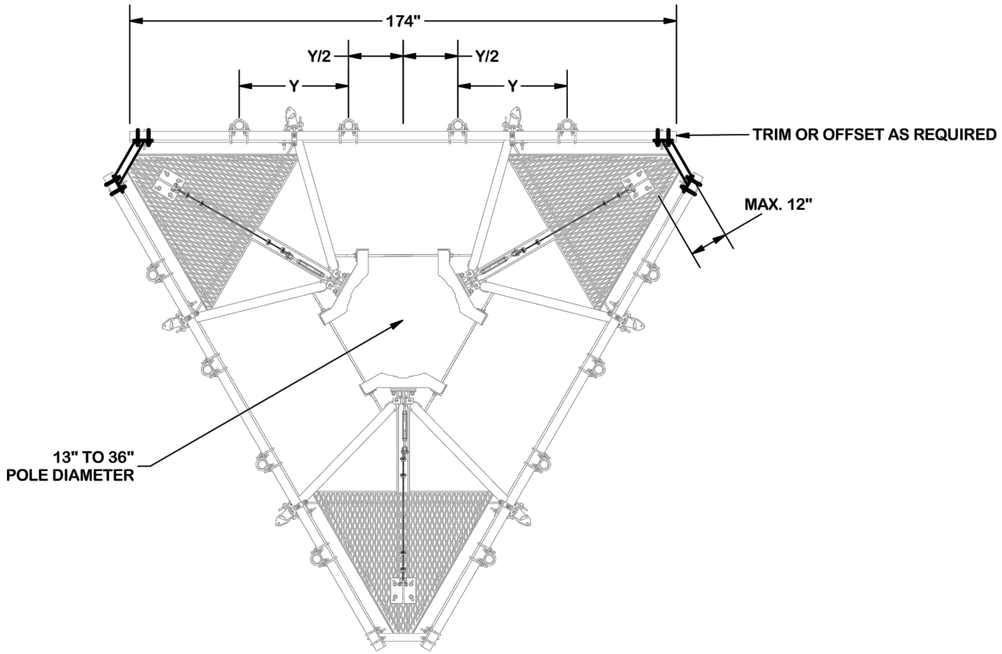
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (±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

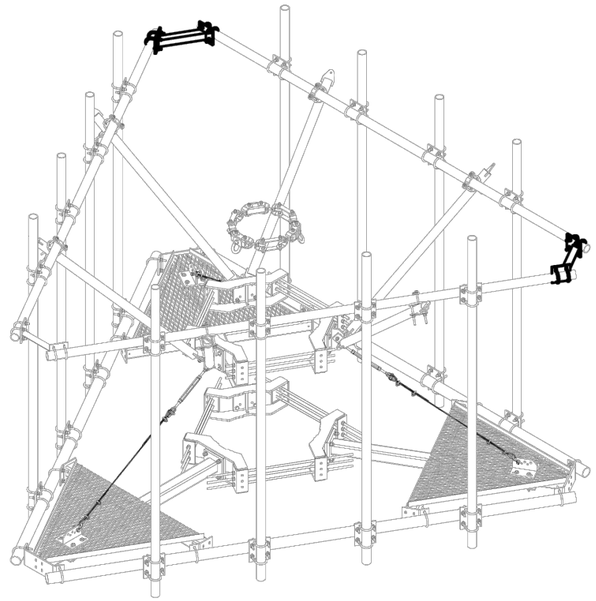
DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

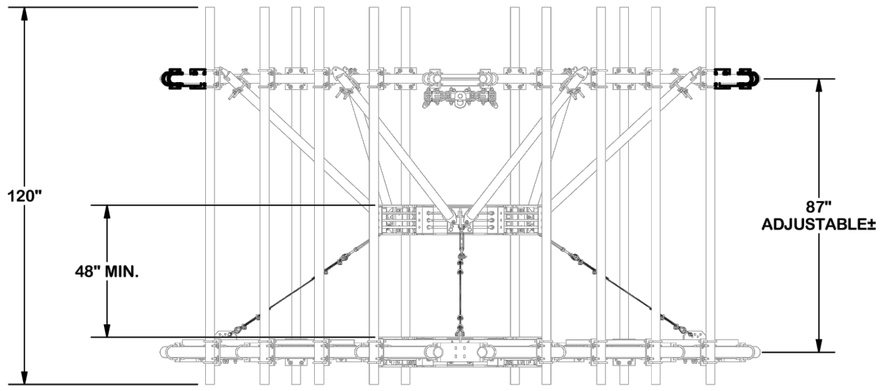
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

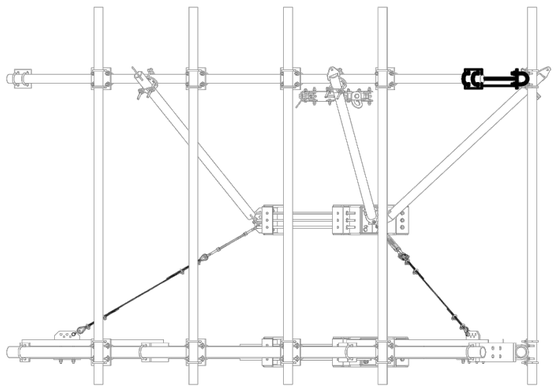
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CSL 10/17/2019	10/18/2019	RMQLP-4120-H10

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10









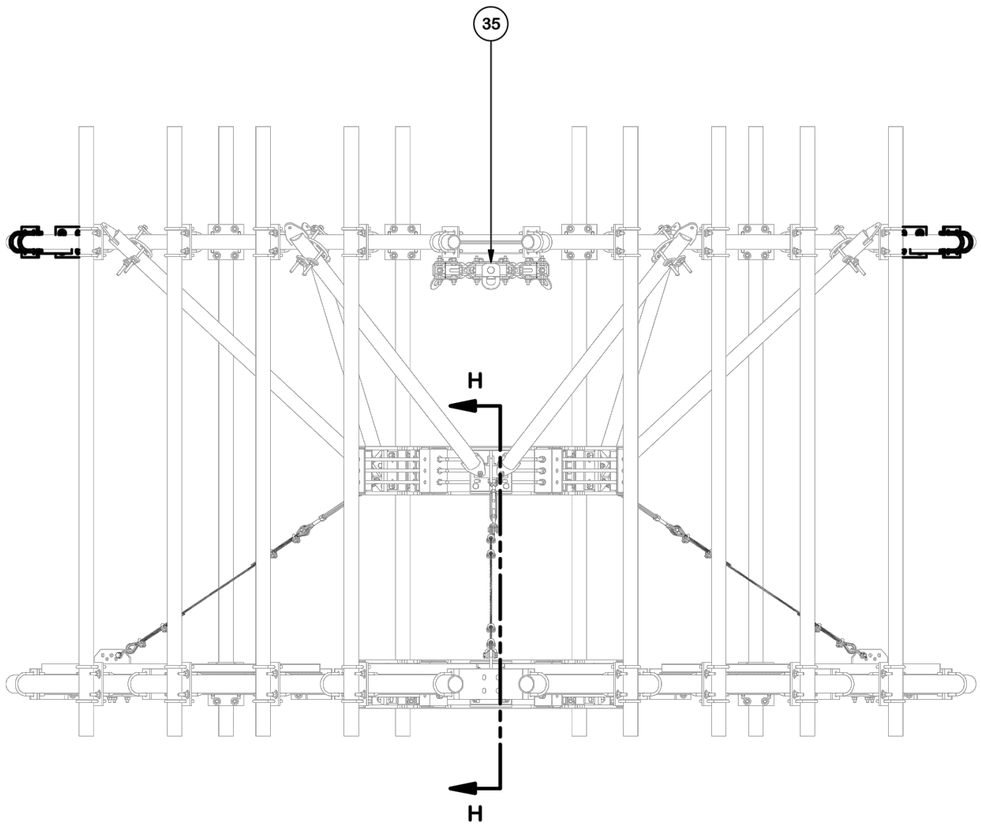
TOLERANCE NOTES

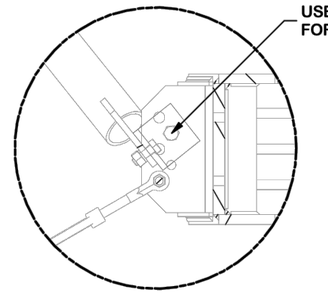
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (±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

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

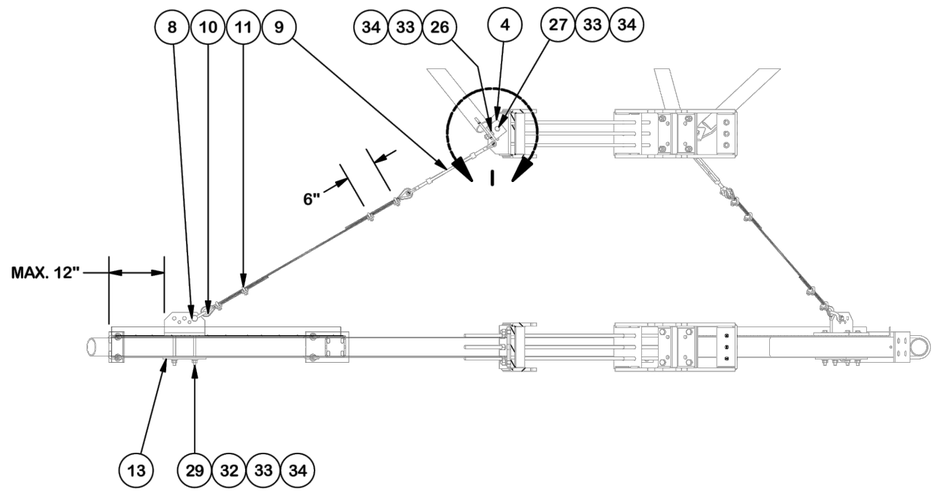
SITE PRO 1
A valmont COMPANY
Engineering Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

CPD NO.		DRAWN BY	ENG. APPROVAL	PART NO.	
		CSL 10/17/2019	10/18/2019	RMQLP-4120-H10	PAGE 2 OF 3
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10	





DETAIL I



SECTION H-H

NOTE:
SOME OBJECTS ARE TRANSPARENT FOR CLARITY

TOLERANCE NOTES

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

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

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

CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.	PAGE
	CSL 10/17/2019	10/18/2019	RMQLP-4120-H10	3 OF 3

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10

Exhibit D

Structural Analysis Report

Date: **January 12, 2021**

Steve Tuttle
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
(913) 458-6909

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CTU5152
	Carrier Site Name:	HARTFORD NORTH
Crown Castle Designation:	**Crown Castle BU Number:**	876325
	Crown Castle Site Name:	WESTON SQUARE
	Crown Castle JDE Job Number:	605411
	Crown Castle Work Order Number:	1912115
	Crown Castle Order Number:	517087 Rev. 1
Engineering Firm Designation:	**Black & Veatch Corp. Project Number:**	406642
Site Data:	**92 Weston Street, Hartford, Hartford County, CT**	
	Latitude *41° 47' 12.3"*, Longitude *-72° 39' 44.42"*	
	110 Foot - Monopole Tower	

Dear Steve Tuttle,

Black & Veatch Corp. is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above mentioned tower.

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

LC4.7: Proposed Equipment Configuration with Proposed Modifications **Sufficient Capacity – 90.8%**

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

Structural analysis prepared by: Phutthiphong Suwantha / Thunwa Chalermyan

Respectfully submitted by:

Joshua J. Riley, P.E.
Professional Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 110 ft Monopole tower designed by Rohn Industries, Inc.

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

The tower has been modified per reinforcement drawings prepared by B&T Engineering, Inc., in December of 2008. Reinforcement consists of addition of reinforcement plates from 0.5' – 10.5', additional anchor rods, and base plate stiffeners. Refer to Post Modification Inspection Report by B&T Engineering, Inc. in November of 2009. This modification has been considered effective in this analysis.

The tower was later modified per reinforcement drawings prepared by Paul J. Ford and Company, in May of 2012. Reinforcement consists of addition of reinforcement plates from 30.5' – 40.5', and bridge stiffeners at 30'. Refer to Modification Inspection Report by Tower Engineering Professionals, Inc. in October of 2012. This modification has been considered effective in this analysis.

The tower was later modified per reinforcement drawings prepared by Paul J. Ford and Company, in February of 2013. Reinforcement consists of addition of reinforcement plates from 6' – 21' and transition stiffeners. Refer to Modification Inspection Report by Tower Engineering Professionals, Inc. in August of 2013. This modification has been considered effective in this analysis.

The tower was later modified per reinforcement drawings prepared by Paul J. Ford and Company, in February of 2017. Reinforcement consists of addition of reinforcement plates from 4.5' – 26.5', jump plates at 30', and additional foundation reinforcement. Refer to Modification Inspection Report by Engineered Tower Solutions, PLLC. in August of 2017. This modification has been considered effective in this analysis.

The tower has been proposed to modify as per the Modification design by Black & Veatch Corp., in January of 2020. Reinforcement consists of removing existing base plate grout, addition of anchor rods with bracket at elevation 0', and removing existing anchor rods with bracket and installing new anchor rods with bracket at elevation 0'. All mentioned modifications are considered as effective and are considered in this analysis.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	2.000 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
89.0	90.0	3	cci antennas	DMP65R-BU6D w/ Mount Pipe	2 6 12 3	3/8 3/4 1-5/8 2"Conduit
		3	cci antennas	OPA65R-BU6D w/ Mount Pipe		
		3	ericsson	RRUS 32 B30		
		3	ericsson	RRUS 32 B66A		
		3	ericsson	RRUS 4415 B25		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	powerwave technologies	7770.00 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		3	quintel technology	QS66512-2 w/ Mount Pipe		
		3	raycap	DC6-48-60-18-8F		
	89.0	1	site pro 1	RMQLP-4120-H10		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
107.0	108.0	3	nokia	AAHF w/ Mount Pipe	3 1	1-1/4 1-1/2
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
	107.0	1	cci tower mounts (v2.1)	T-Arm Mount [TA 702-3]		
105.0	105.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		1	cci tower mounts (v2.1)	Side Arm Mount [SO 102-3]		
		3	rfs celwave	IBC1900BB-1		
		3	rfs celwave	IBC1900HG-2A		
76.0	76.0	1	cci tower mounts (v2.1)	Platform Mount [LP 303-1_HR-1]	6 3	7/8 1-5/8
		3	commscope	SDX1926Q-43		
		3	ericsson	AIR 32 B2a/B66Aa w/ Mount Pipe		
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	KRY 112 144/1		
		3	ericsson	RADIO 4449 B71 B85A_ T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
64.0	64.0	3	commscope	BSAMNT-SBS-1-2 Side By Side Bracket	2	1-7/8
		6	commscope	NHH-65B-R2B		
		1	perfect vision	PV-LPP12M-HR-B 12.5' Platform w/ Handrail		
		2	raycap	RVZDC-6627-PF-48		
		3	samsung telecommunications	20W CBRS		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		3	samsung telecommunications	RFV01U-D1A		
		3	samsung telecommunications	RFV01U-D2A		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	FDH Engineering, Inc.	2192540	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Rohn Industries, Inc.	1615433	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Rohn Industries, Inc.	1615400	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	B&T Engineering, Inc	2356066	CCISITES
4-POST-MODIFICATION INSPECTION	B&T Engineering, Inc	2561266	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	3187227	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals, Inc.	3355603	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	3667858	CCISITES
4-POST-MODIFICATION INSPECTION	Tower Engineering Professionals, Inc.	4075332	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Paul J. Ford and Company	6702634	CCISITES
4-POST-MODIFICATION INSPECTION	Engineered Tower Solutions, PLLC.	6996864	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	Black & Veatch Corp.	8892341	CCISITES

3.1) Analysis Method

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

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

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary) (Monopole Tower)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
110 - 105	Pole	TP24x24x0.25	Pole	1.3%	Pass
105 - 100	Pole	TP24x24x0.25	Pole	5.4%	Pass
100 - 95	Pole	TP24x24x0.25	Pole	9.7%	Pass
95 - 90	Pole	TP24x24x0.25	Pole	14.5%	Pass
90 - 85	Pole	TP24x24x0.375	Pole	17.2%	Pass
85 - 80	Pole	TP24x24x0.375	Pole	25.2%	Pass
80 - 75	Pole	TP24x24x0.375	Pole	34.5%	Pass
75 - 70	Pole	TP24x24x0.375	Pole	46.1%	Pass
70 - 65	Pole	TP24x24x0.375	Pole	57.9%	Pass
65 - 60	Pole	TP24x24x0.375	Pole	72.6%	Pass
60 - 55	Pole	TP30x30x0.375	Pole	58.1%	Pass
55 - 50	Pole	TP30x30x0.375	Pole	68.4%	Pass
50 - 45	Pole	TP30x30x0.375	Pole	78.8%	Pass
45 - 40	Pole	TP30x30x0.375	Pole	89.4%	Pass
40 - 39.33	Pole	TP30x30x0.375	Pole	90.8%	Pass
39.33 - 39.08	Pole + Reinf.	TP30x30x0.4875	Pole	71.3%	Pass
39.08 - 34.08	Pole + Reinf.	TP30x30x0.4875	Pole	79.7%	Pass
34.08 - 30	Pole + Reinf.	TP30x30x0.4875	Pole	86.7%	Pass
30 - 29.75	Pole	TP30x30x0.5	Pole	80.9%	Pass
29.75 - 25	Pole	TP30x30x0.5	Pole	88.6%	Pass
25 - 24.75	Pole + Reinf.	TP30x30x0.5563	Pole	80.1%	Pass
24.75 - 19.75	Pole + Reinf.	TP30x30x0.5563	Pole	87.4%	Pass
19.75 - 18.58	Pole + Reinf.	TP30x30x0.5563	Pole	89.2%	Pass
18.58 - 18.33	Pole + Reinf.	TP30x30x0.6875	Pole	77.5%	Pass
18.33 - 13.33	Pole + Reinf.	TP30x30x0.6875	Pole	84.1%	Pass
13.33 - 8.42	Pole + Reinf.	TP30x30x0.6875	Pole	90.6%	Pass
8.42 - 8.07	Pole + Reinf.	TP30x30x0.8625	Pole	69.8%	Pass
8.07 - 7.83	Pole + Reinf.	TP30x30x0.8625	Pole	70.1%	Pass
7.83 - 6	Pole + Reinf.	TP30x30x0.8625	Pole	72.0%	Pass

6 - 5.75	Pole + Reinf.	TP30x30x0.8	Pole	77.3%	Pass
5.75 - 2	Pole + Reinf.	TP30x30x0.8	Pole	81.6%	Pass
2 - 1.75	Pole + Reinf.	TP30x30x1.25	Reinf. 4 Weldment	79.3%	Pass
1.75 - 0	Pole + Reinf.	TP30x30x1.225	Reinf. 1 Weldment	79.4%	Pass
				Summary	
			Pole	90.8%	Pass
			Reinforcement	80.8%	Pass
			Overall	90.8%	Pass

Table 5 - Tower Component Stresses vs. Capacity (Monopole Tower) - LC4.7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1, 2	Flange Bolts	90	8.4	Pass
	Flange Plate		14.5	Pass
1, 2	Flange Bolts	60	44.1	Pass
	Flange Plate		72.6	Pass
1	Bridge Stiffeners	30	41.9	Pass
	Jump Plates		51.7	Pass
	Flange Bolts		25.2	Pass
	Flange Plate		20.2	Pass
1	Anchor Rods (Original)	0	55.6	Pass
	Anchor Rods (Existing Modification)		83.5	Pass
	Anchor Rods (Proposed Modification)		74.7	Pass
	Base Plate		61.0	Pass
1	Base Foundation	0	84.3	Pass
	Base Foundation Soil Interaction		25.5	Pass

Structure Rating (max from all components) =	**90.8%**

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed. Capacities per TIA-222-H Section 15.5.
2) Base/Flange plates are assumed to have the same capacity as their respective splice bolts or shaft.

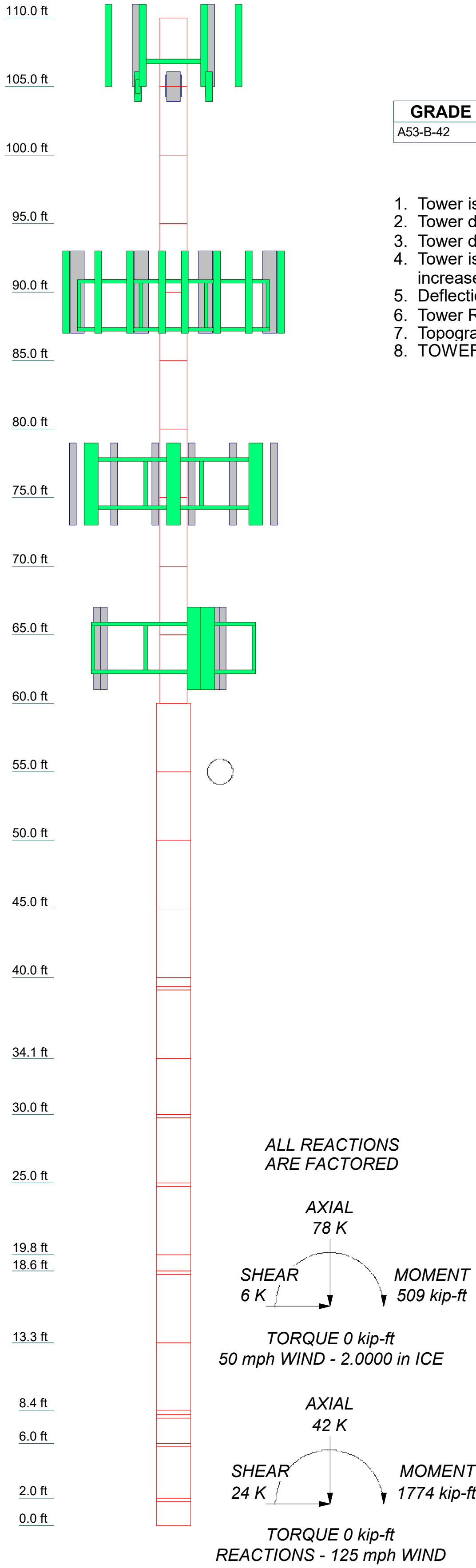
4.1) Recommendations

The tower and its foundation have sufficient capacity to carry the proposed load configuration once the proposed modifications are installed.

APPENDIX A

TNXTOWER OUTPUT

Section	Size	Length (ft)	Grade	Weight (K)
1	P24x0.25	5.00	A53-B-42	0.3
2	P24x0.25	5.00	A53-B-42	0.3
3	P24x0.25	5.00	A53-B-42	0.3
4	P24x0.25	5.00	A53-B-42	0.3
5	P24x0.375	5.00	A53-B-42	0.5
6	P24x0.375	5.00	A53-B-42	0.5
7	P24x0.375	5.00	A53-B-42	0.5
8	P24x0.375	5.00	A53-B-42	0.5
9	P24x0.375	5.00	A53-B-42	0.5
10	P24x0.375	5.00	A53-B-42	0.5
11	P30x0.375	5.00	A53-B-42	0.6
12	P30x0.375	5.00	A53-B-42	0.6
13	P30x0.375	5.00	A53-B-42	0.6
14	[illegible]x0.375	5.00	A53-B-42	0.6
15	[illegible]	[illegible]	A53-B-42	[illegible]
16	[illegible]	[illegible]	A53-B-42	[illegible]
17	P30x0[illegible]	5.00	A53-B-42	0.7
18	[illegible]0.4875	4.08	A53-B-42	0.6
19	[illegible]	0.25	A53-B-42	0.0
20	[illegible]	4.75	A53-B-42	0.7
21	[illegible]	0.25	A53-B-42	0.1
22	[illegible]	5.00	A53-B-42	1.1
23	[illegible]	[illegible]	A53-B-42	[illegible]
24	[illegible]	[illegible]	A53-B-42	[illegible]
25	P30x0[illegible]	5.00	A53-B-42	1.4
26	[illegible]0.6875	4.92	A53-B-42	1.4
27	[illegible]	[illegible]	A53-B-42	[illegible]
28	[illegible]	[illegible]	A53-B-42	[illegible]
29	[illegible]	[illegible]	A53-B-42	[illegible]
30	[illegible]	[illegible]	A53-B-42	[illegible]
31	[illegible]	3.75	A53-B-42	0.9
32	[illegible]	[illegible]	A53-B-42	[illegible]
33	[illegible]	[illegible]	A53-B-42	[illegible]
				15.3



MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 90.8%

BLACK & VEATCH
Building a world of difference.
Black & Veatch Corp.
6800 W. 115th St., Suite 2292
Overland Park, KS 66211
Phone: (913) 458-6909
FAX:

Job: **WESTON SQUARE (BU# 876325)**		
Project: **406642 (876325.1912115)**		
Client: Crown Castle	Drawn by: Thunwa Chalermyan	App'd:
Code: TIA-222-H	Date: 01/12/21	Scale: NTS
Path: C:\876325\876325.1912115 - TSA\Structural\876325.1912115 Structural Analysis - Modified.eri		Dwg No. E-1

Tower Input Data

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

1) Tower is located in Hartford County, Connecticut.
2) Tower base elevation above sea level: 10.00 ft.
3) Basic wind speed of 125 mph.
4) Risk Category II.
5) Exposure Category C.
6) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
7) Topographic Category: 1.
8) Crest Height: 0.00 ft.
9) Nominal ice thickness of 2.0000 in.
10) Ice thickness is considered to increase with height.
11) Ice density of 56 pcf.
12) A wind speed of 50 mph is used in combination with ice.
13) Temperature drop of 50 °F.
14) Deflections calculated using a wind speed of 60 mph.
15) A non-linear (P-delta) analysis was used.
16) Pressures are calculated at each section.
17) Stress ratio used in pole design is 1.05.
18) Tower analysis based on target reliabilities in accordance with Annex S.
19) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
20) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	*Elevation*	*Section Length*	*Pole Size*	*Pole Grade*	*Socket Length*
	ft	*ft*			*ft*
L1	110.00-105.00	5.00	P24x0.25	A53-B-42 (42 ksi)	

Section	*Elevation* ft	*Section Length* ft	*Pole Size*	*Pole Grade*	*Socket Length* ft
L2	105.00-100.00	5.00	P24x0.25	A53-B-42 (42 ksi)	
L3	100.00-95.00	5.00	P24x0.25	A53-B-42 (42 ksi)	
L4	95.00-90.00	5.00	P24x0.25	A53-B-42 (42 ksi)	
L5	90.00-85.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L6	85.00-80.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L7	80.00-75.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L8	75.00-70.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L9	70.00-65.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L10	65.00-60.00	5.00	P24x0.375	A53-B-42 (42 ksi)	
L11	60.00-55.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L12	55.00-50.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L13	50.00-45.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L14	45.00-40.00	5.00	P30x0.375	A53-B-42 (42 ksi)	
L15	40.00-39.33	0.67	P30x0.375	A53-B-42 (42 ksi)	
L16	39.33-39.08	0.25	P30x0.4875	A53-B-42 (42 ksi)	
L17	39.08-34.08	5.00	P30x0.4875	A53-B-42 (42 ksi)	
L18	34.08-30.00	4.08	P30x0.4875	A53-B-42 (42 ksi)	
L19	30.00-29.75	0.25	P30x0.5	A53-B-42 (42 ksi)	
L20	29.75-25.00	4.75	P30x0.5	A53-B-42 (42 ksi)	
L21	25.00-24.75	0.25	P30x0.55625	A53-B-42 (42 ksi)	
L22	24.75-19.75	5.00	P30x0.55625	A53-B-42 (42 ksi)	
L23	19.75-18.58	1.17	P30x0.55625	A53-B-42 (42 ksi)	
L24	18.58-18.33	0.25	P30x0.6875	A53-B-42 (42 ksi)	
L25	18.33-13.33	5.00	P30x0.6875	A53-B-42 (42 ksi)	
L26	13.33-8.42	4.92	P30x0.6875	A53-B-42 (42 ksi)	
L27	8.42-8.07	0.35	P30x0.8625	A53-B-42 (42 ksi)	
L28	8.07-7.83	0.23	P30x0.8625	A53-B-42 (42 ksi)	
L29	7.83-6.00	1.83	P30x0.8625	A53-B-42 (42 ksi)	
L30	6.00-5.75	0.25	P30x0.8	A53-B-42 (42 ksi)	
L31	5.75-2.00	3.75	P30x0.8	A53-B-42 (42 ksi)	
L32	2.00-1.75	0.25	P30x1.25	A53-B-42 (42 ksi)	
L33	1.75-0.00	1.75	P30x1.225	A53-B-42 (42 ksi)	

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft^2	in					in	in	in
L1 110.00-105.00				1	1	1			
L2 105.00-100.00				1	1	1			
L3 100.00-95.00				1	1	1			
L4 95.00-90.00				1	1	1			
L5 90.00-85.00				1	1	1			
L6 85.00-80.00				1	1	1			
L7 80.00-75.00				1	1	1			
L8 75.00-70.00				1	1	1			
L9 70.00-65.00				1	1	1			
L10 65.00-60.00				1	1	1			
L11 60.00-55.00				1	1	1			
L12 55.00-50.00				1	1	1			
L13 50.00-45.00				1	1	1			
L14 45.00-40.00				1	1	1			
L15 40.00-39.33				1	1	1			
L16 39.33-39.08				1	1	0.965972			
L17 39.08-34.08				1	1	0.965972			
L18 34.08-30.00				1	1	0.965972			
L19 30.00-29.75				1	1	1			
L20 29.75-25.00				1	1	1			
L21 25.00-24.75				1	1	1.25043			
L22 24.75-19.75				1	1	1.25043			
L23 19.75-18.58				1	1	1.25043			
L24 18.58-18.33				1	1	1.28397			
L25 18.33-13.33				1	1	1.28397			
L26 13.33-8.42				1	1	1.28397			
L27 8.42-8.07				1	1	1.10116			
L28 8.07-7.83				1	1	1.10116			
L29 7.83-6.00				1	1	1.10116			
L30 6.00-5.75				1	1	0.939375			
L31 5.75-2.00				1	1	0.939375			
L32 2.00-1.75				1	1	0.843115			
L33 1.75-0.00				1	1	0.859574			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight plf
***										
Safety Line 3/8	B	No	Surface Ar (CaAa)	110.00 - 3.00	1	1	0.037 0.050	0.3750		0.22
***										
(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	A	No	Surface Ar (CaAa)	89.00 - 0.00	5	5	0.000 0.346	2.0000		0.82
***										
(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	B	No	Surface Ar (CaAa)	76.00 - 0.00	8	8	-0.500 -0.046	1.6600		2.40
***										
HB158-U12S24-160-LI(1-7/8)	C	No	Surface Ar (CaAa)	64.00 - 0.00	2	2	-0.500 -0.366	1.9760		3.20
***										
*** Existing Modifications ***										
Aero Channel MP305	A	No	Surface Af (CaAa)	10.50 - 0.50	1	1	0.000 0.000	5.3125	14.8400	0.00
Aero Channel MP305	B	No	Surface Af (CaAa)	10.50 - 0.50	1	1	0.000 0.000	5.3125	14.8400	0.00
Aero Channel MP305	C	No	Surface Af (CaAa)	10.50 - 0.50	1	1	0.000 0.000	5.3125	14.8400	0.00
Aero Channel MP305	C	No	Surface Af (CaAa)	10.50 - 0.50	1	1	0.000 0.000	5.3125	14.8400	0.00
***										
Aero Channel MP303	A	No	Surface Af (CaAa)	40.50 - 30.50	1	1	0.000 0.000	4.0625	11.2600	0.00
Aero Channel MP303	B	No	Surface Af (CaAa)	40.50 - 30.50	1	1	0.000 0.000	4.0625	11.2600	0.00
Aero Channel MP303	C	No	Surface Af (CaAa)	40.50 - 30.50	1	1	0.000 0.000	4.0625	11.2600	0.00
***										
Aero Channel MP305	A	No	Surface Af (CaAa)	21.00 - 6.00	1	1	0.000 0.000	5.3125	14.8400	0.00
Aero Channel MP305	B	No	Surface Af (CaAa)	21.00 - 6.00	1	1	0.000 0.000	5.3125	14.8400	0.00
Aero Channel MP305	C	No	Surface Af (CaAa)	21.00 - 6.00	1	1	0.000 0.000	5.3125	14.8400	0.00
***										
CCI-SFP-045100	A	No	Surface Af (CaAa)	26.50 - 4.50	1	1	0.000 0.000	4.5000	11.0000	0.00
CCI-SFP-045100	B	No	Surface Af (CaAa)	26.50 - 4.50	1	1	0.000 0.000	4.5000	11.0000	0.00
CCI-SFP-045100	C	No	Surface Af (CaAa)	26.50 - 4.50	1	1	0.000 0.000	4.5000	11.0000	0.00
CCI-SFP-045100	C	No	Surface Af (CaAa)	26.50 - 4.50	1	1	0.000 0.000	4.5000	11.0000	0.00
***										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
***									
MLC6C-06C-008R-008R(1-1/2)	C	No	No	Inside Pole	107.00 - 0.00	1	No Ice	0.00	1.52
							1/2" Ice	0.00	1.52
							1" Ice	0.00	1.52
							2" Ice	0.00	1.52
HB114-1-08U4-M5J(1-1/4)	C	No	No	Inside Pole	107.00 - 0.00	3	No Ice	0.00	1.08
							1/2" Ice	0.00	1.08
							1" Ice	0.00	1.08
							2" Ice	0.00	1.08
LDF7-50A(1-5/8)	C	No	No	Inside Pole	89.00 - 0.00	9	No Ice	0.00	0.82

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
FB-L98B-034-XXX(3/8)	C	No	No	Inside Pole	89.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	89.00 - 0.00	6	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
2" innerduct conduit	C	No	No	Inside Pole	89.00 - 0.00	1	No Ice	0.00	0.20
							1/2" Ice	0.00	0.20
							1" Ice	0.00	0.20
							2" Ice	0.00	0.20
HCS 6X12 4AWG(1-5/8)	C	No	No	Inside Pole	76.00 - 0.00	1	No Ice	0.00	2.40
							1/2" Ice	0.00	2.40
							1" Ice	0.00	2.40
							2" Ice	0.00	2.40
***									
***									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	110.00-105.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.01
L2	105.00-100.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L3	100.00-95.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L4	95.00-90.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L5	90.00-85.00	A	0.000	0.000	4.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.07
L6	85.00-80.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	0.188	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.08
L7	80.00-75.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	1.516	0.000	0.02
		C	0.000	0.000	0.000	0.000	0.08
L8	75.00-70.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.09
L9	70.00-65.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10
		C	0.000	0.000	0.000	0.000	0.09
L10	65.00-60.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10
		C	0.000	0.000	1.581	0.000	0.12
L11	60.00-55.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10
		C	0.000	0.000	1.976	0.000	0.12
L12	55.00-50.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C	0.000	0.000	1.976	0.000	0.12
L13	50.00-45.00	A	0.000	0.000	5.000	0.000	0.02
		B	0.000	0.000	6.827	0.000	0.10
		C	0.000	0.000	1.976	0.000	0.12
L14	45.00-40.00	A	0.000	0.000	5.339	0.000	0.02
		B	0.000	0.000	7.166	0.000	0.10
		C	0.000	0.000	2.315	0.000	0.12
L15	40.00-39.33	A	0.000	0.000	1.119	0.000	0.00
		B	0.000	0.000	1.362	0.000	0.01
		C	0.000	0.000	0.715	0.000	0.02
L16	39.33-39.08	A	0.000	0.000	0.419	0.000	0.00
		B	0.000	0.000	0.511	0.000	0.00
		C	0.000	0.000	0.268	0.000	0.01
L17	39.08-34.08	A	0.000	0.000	8.385	0.000	0.02
		B	0.000	0.000	10.213	0.000	0.10
		C	0.000	0.000	5.361	0.000	0.12
L18	34.08-30.00	A	0.000	0.000	6.509	0.000	0.02
		B	0.000	0.000	8.001	0.000	0.08
		C	0.000	0.000	4.040	0.000	0.10
L19	30.00-29.75	A	0.000	0.000	0.250	0.000	0.00
		B	0.000	0.000	0.341	0.000	0.00
		C	0.000	0.000	0.099	0.000	0.01
L20	29.75-25.00	A	0.000	0.000	5.875	0.000	0.02
		B	0.000	0.000	7.611	0.000	0.09
		C	0.000	0.000	4.127	0.000	0.12
L21	25.00-24.75	A	0.000	0.000	0.438	0.000	0.00
		B	0.000	0.000	0.529	0.000	0.00
		C	0.000	0.000	0.474	0.000	0.01
L22	24.75-19.75	A	0.000	0.000	9.857	0.000	0.02
		B	0.000	0.000	11.684	0.000	0.10
		C	0.000	0.000	10.583	0.000	0.12
L23	19.75-18.58	A	0.000	0.000	3.076	0.000	0.00
		B	0.000	0.000	3.502	0.000	0.02
		C	0.000	0.000	3.245	0.000	0.03
L24	18.58-18.33	A	0.000	0.000	0.659	0.000	0.00
		B	0.000	0.000	0.750	0.000	0.00
		C	0.000	0.000	0.695	0.000	0.01
L25	18.33-13.33	A	0.000	0.000	13.177	0.000	0.02
		B	0.000	0.000	15.005	0.000	0.10
		C	0.000	0.000	13.903	0.000	0.12
L26	13.33-8.42	A	0.000	0.000	14.677	0.000	0.02
		B	0.000	0.000	16.474	0.000	0.10
		C	0.000	0.000	17.112	0.000	0.12
L27	8.42-8.07	A	0.000	0.000	1.212	0.000	0.00
		B	0.000	0.000	1.340	0.000	0.01
		C	0.000	0.000	1.552	0.000	0.01
L28	8.07-7.83	A	0.000	0.000	0.810	0.000	0.00
		B	0.000	0.000	0.896	0.000	0.00
		C	0.000	0.000	1.037	0.000	0.01
L29	7.83-6.00	A	0.000	0.000	6.345	0.000	0.01
		B	0.000	0.000	7.015	0.000	0.04
		C	0.000	0.000	8.126	0.000	0.05
L30	6.00-5.75	A	0.000	0.000	0.644	0.000	0.00
		B	0.000	0.000	0.735	0.000	0.00
		C	0.000	0.000	0.887	0.000	0.01
L31	5.75-2.00	A	0.000	0.000	7.786	0.000	0.02
		B	0.000	0.000	9.119	0.000	0.07
		C	0.000	0.000	9.555	0.000	0.09
L32	2.00-1.75	A	0.000	0.000	0.457	0.000	0.00
		B	0.000	0.000	0.539	0.000	0.00
		C	0.000	0.000	0.512	0.000	0.01
L33	1.75-0.00	A	0.000	0.000	2.783	0.000	0.01
		B	0.000	0.000	3.357	0.000	0.03
		C	0.000	0.000	2.757	0.000	0.04

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	110.00-105.00	A	1.913	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.101	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.01
L2	105.00-100.00	A	1.904	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.092	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.02
L3	100.00-95.00	A	1.895	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.082	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.02
L4	95.00-90.00	A	1.885	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.072	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.02
L5	90.00-85.00	A	1.874	0.000	0.000	6.874	0.000	0.10
		B		0.000	0.000	2.062	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.07
L6	85.00-80.00	A	1.863	0.000	0.000	8.579	0.000	0.13
		B		0.000	0.000	2.051	0.000	0.03
		C		0.000	0.000	0.000	0.000	0.08
L7	80.00-75.00	A	1.852	0.000	0.000	8.564	0.000	0.13
		B		0.000	0.000	4.162	0.000	0.07
		C		0.000	0.000	0.000	0.000	0.08
L8	75.00-70.00	A	1.839	0.000	0.000	8.549	0.000	0.13
		B		0.000	0.000	12.626	0.000	0.25
		C		0.000	0.000	0.000	0.000	0.09
L9	70.00-65.00	A	1.826	0.000	0.000	8.533	0.000	0.13
		B		0.000	0.000	12.596	0.000	0.25
		C		0.000	0.000	0.000	0.000	0.09
L10	65.00-60.00	A	1.812	0.000	0.000	8.515	0.000	0.13
		B		0.000	0.000	12.565	0.000	0.25
		C		0.000	0.000	3.788	0.000	0.16
L11	60.00-55.00	A	1.797	0.000	0.000	8.496	0.000	0.12
		B		0.000	0.000	12.531	0.000	0.25
		C		0.000	0.000	4.716	0.000	0.18
L12	55.00-50.00	A	1.781	0.000	0.000	8.476	0.000	0.12
		B		0.000	0.000	12.494	0.000	0.25
		C		0.000	0.000	4.696	0.000	0.18
L13	50.00-45.00	A	1.763	0.000	0.000	8.454	0.000	0.12
		B		0.000	0.000	12.454	0.000	0.24
		C		0.000	0.000	4.674	0.000	0.18
L14	45.00-40.00	A	1.744	0.000	0.000	8.875	0.000	0.13
		B		0.000	0.000	12.856	0.000	0.25
		C		0.000	0.000	5.095	0.000	0.18
L15	40.00-39.33	A	1.732	0.000	0.000	1.716	0.000	0.02
		B		0.000	0.000	2.245	0.000	0.04
		C		0.000	0.000	1.211	0.000	0.03
L16	39.33-39.08	A	1.730	0.000	0.000	0.643	0.000	0.01
		B		0.000	0.000	0.841	0.000	0.02
		C		0.000	0.000	0.454	0.000	0.01
L17	39.08-34.08	A	1.718	0.000	0.000	12.837	0.000	0.18
		B		0.000	0.000	16.792	0.000	0.30
		C		0.000	0.000	9.057	0.000	0.24
L18	34.08-30.00	A	1.695	0.000	0.000	10.007	0.000	0.14
		B		0.000	0.000	13.218	0.000	0.24
		C		0.000	0.000	6.920	0.000	0.19
L19	30.00-29.75	A	1.683	0.000	0.000	0.418	0.000	0.01
		B		0.000	0.000	0.614	0.000	0.01
		C		0.000	0.000	0.229	0.000	0.01
L20	29.75-25.00	A	1.669	0.000	0.000	9.544	0.000	0.13
		B		0.000	0.000	13.255	0.000	0.24
		C		0.000	0.000	7.579	0.000	0.20
L21	25.00-24.75	A	1.653	0.000	0.000	0.686	0.000	0.01
		B		0.000	0.000	0.880	0.000	0.01
		C		0.000	0.000	0.767	0.000	0.01
L22	24.75-19.75	A	1.634	0.000	0.000	15.122	0.000	0.19
		B		0.000	0.000	18.994	0.000	0.30
		C		0.000	0.000	16.727	0.000	0.30
L23	19.75-18.58	A	1.610	0.000	0.000	4.526	0.000	0.05
		B		0.000	0.000	5.424	0.000	0.08

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		C		0.000	0.000	4.895	0.000	0.08
L24	18.58-18.33	A	1.604	0.000	0.000	0.969	0.000	0.01
		B		0.000	0.000	1.161	0.000	0.02
		C		0.000	0.000	1.047	0.000	0.02
L25	18.33-13.33	A	1.580	0.000	0.000	19.307	0.000	0.23
		B		0.000	0.000	23.124	0.000	0.34
		C		0.000	0.000	20.856	0.000	0.34
L26	13.33-8.42	A	1.521	0.000	0.000	20.890	0.000	0.24
		B		0.000	0.000	24.585	0.000	0.35
		C		0.000	0.000	24.422	0.000	0.37
L27	8.42-8.07	A	1.480	0.000	0.000	1.678	0.000	0.02
		B		0.000	0.000	1.938	0.000	0.03
		C		0.000	0.000	2.125	0.000	0.03
L28	8.07-7.83	A	1.474	0.000	0.000	1.121	0.000	0.01
		B		0.000	0.000	1.295	0.000	0.02
		C		0.000	0.000	1.419	0.000	0.02
L29	7.83-6.00	A	1.454	0.000	0.000	8.755	0.000	0.10
		B		0.000	0.000	10.109	0.000	0.14
		C		0.000	0.000	11.082	0.000	0.16
L30	6.00-5.75	A	1.431	0.000	0.000	0.906	0.000	0.01
		B		0.000	0.000	1.090	0.000	0.02
		C		0.000	0.000	1.222	0.000	0.02
L31	5.75-2.00	A	1.372	0.000	0.000	10.914	0.000	0.12
		B		0.000	0.000	13.310	0.000	0.20
		C		0.000	0.000	13.019	0.000	0.22
L32	2.00-1.75	A	1.276	0.000	0.000	0.634	0.000	0.01
		B		0.000	0.000	0.736	0.000	0.01
		C		0.000	0.000	0.686	0.000	0.01
L33	1.75-0.00	A	1.182	0.000	0.000	3.900	0.000	0.04
		B		0.000	0.000	4.617	0.000	0.07
		C		0.000	0.000	3.772	0.000	0.08

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	110.00-105.00	0.3353	-0.1548	1.4515	-0.6701
L2	105.00-100.00	0.3353	-0.1548	1.4469	-0.6679
L3	100.00-95.00	0.3353	-0.1548	1.4420	-0.6657
L4	95.00-90.00	0.3353	-0.1548	1.4369	-0.6633
L5	90.00-85.00	-3.0252	-4.0473	-1.3127	-3.1048
L6	85.00-80.00	-3.4898	-4.5855	-1.7048	-3.4502
L7	80.00-75.00	-2.4964	-5.3093	-1.1489	-3.9225
L8	75.00-70.00	-0.0027	-7.1263	0.3429	-5.1870
L9	70.00-65.00	-0.0027	-7.1263	0.3411	-5.1884
L10	65.00-60.00	0.8306	-5.8940	1.0952	-3.8542
L11	60.00-55.00	1.1722	-6.4375	1.4616	-4.1644
L12	55.00-50.00	1.1722	-6.4375	1.4579	-4.1682
L13	50.00-45.00	1.1722	-6.4375	1.4538	-4.1724
L14	45.00-40.00	1.1189	-6.1445	1.4132	-4.0730
L15	40.00-39.33	0.7938	-4.3592	1.1520	-3.3289
L16	39.33-39.08	0.7938	-4.3592	1.1516	-3.3292
L17	39.08-34.08	0.7938	-4.3592	1.1491	-3.3309
L18	34.08-30.00	0.8265	-4.5387	1.1739	-3.4197
L19	30.00-29.75	1.1722	-6.4375	1.4351	-4.1917
L20	29.75-25.00	0.9590	-4.5616	1.2639	-3.2499
L21	25.00-24.75	0.5641	-1.7848	0.9982	-1.7975
L22	24.75-19.75	0.5224	-1.6530	0.9368	-1.6951
L23	19.75-18.58	0.4277	-1.3534	0.7930	-1.4443
L24	18.58-18.33	0.4277	-1.3534	0.7921	-1.4450
L25	18.33-13.33	0.4277	-1.3534	0.7883	-1.4477
L26	13.33-8.42	0.3779	-0.7703	0.7070	-0.9791
L27	8.42-8.07	0.3261	-0.1657	0.6222	-0.4600
L28	8.07-7.83	0.3261	-0.1657	0.6215	-0.4602

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L29	7.83-6.00	0.3261	-0.1657	0.6187	-0.4611
L30	6.00-5.75	0.3998	-0.2031	0.7354	-0.5523
L31	5.75-2.00	0.4718	-0.9931	0.7950	-1.3278
L32	2.00-1.75	0.4881	-1.5179	0.6540	-1.7885
L33	1.75-0.00	0.5505	-2.1778	0.7115	-2.3470

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	2	Safety Line 3/8	105.00 - 110.00	1.0000	1.0000
L2	2	Safety Line 3/8	100.00 - 105.00	1.0000	1.0000
L3	2	Safety Line 3/8	95.00 - 100.00	1.0000	1.0000
L4	2	Safety Line 3/8	90.00 - 95.00	1.0000	1.0000
L5	2	Safety Line 3/8	85.00 - 90.00	1.0000	1.0000
L5	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	85.00 - 89.00	1.0000	1.0000
L6	2	Safety Line 3/8	80.00 - 85.00	1.0000	1.0000
L6	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	80.00 - 85.00	1.0000	1.0000
L7	2	Safety Line 3/8	75.00 - 80.00	1.0000	1.0000
L7	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	75.00 - 80.00	1.0000	1.0000
L7	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	75.00 - 76.00	1.0000	1.0000
L8	2	Safety Line 3/8	70.00 - 75.00	1.0000	1.0000
L8	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	70.00 - 75.00	1.0000	1.0000
L8	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	70.00 - 75.00	1.0000	1.0000
L9	2	Safety Line 3/8	65.00 - 70.00	1.0000	1.0000
L9	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	65.00 - 70.00	1.0000	1.0000
L9	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	65.00 - 70.00	1.0000	1.0000
L10	2	Safety Line 3/8	60.00 - 65.00	1.0000	1.0000
L10	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	60.00 - 65.00	1.0000	1.0000
L10	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	60.00 - 65.00	1.0000	1.0000
L10	19	HB158-U12S24-160-LI(1-7/8)	60.00 - 64.00	1.0000	1.0000
L11	2	Safety Line 3/8	55.00 - 60.00	1.0000	1.0000
L11	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	55.00 - 60.00	1.0000	1.0000
L11	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	55.00 - 60.00	1.0000	1.0000
L11	19	HB158-U12S24-160-LI(1-	55.00 -	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
		7/8)	60.00		
L12	2	Safety Line 3/8	50.00 - 55.00	1.0000	1.0000
L12	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	50.00 - 55.00	1.0000	1.0000
L12	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	50.00 - 55.00	1.0000	1.0000
L12	19	HB158-U12S24-160-LI(1-7/8)	50.00 - 55.00	1.0000	1.0000
L13	2	Safety Line 3/8	45.00 - 50.00	1.0000	1.0000
L13	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	45.00 - 50.00	1.0000	1.0000
L13	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	45.00 - 50.00	1.0000	1.0000
L13	19	HB158-U12S24-160-LI(1-7/8)	45.00 - 50.00	1.0000	1.0000
L14	2	Safety Line 3/8	40.00 - 45.00	1.0000	1.0000
L14	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	40.00 - 45.00	1.0000	1.0000
L14	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	40.00 - 45.00	1.0000	1.0000
L14	19	HB158-U12S24-160-LI(1-7/8)	40.00 - 45.00	1.0000	1.0000
L14	27	Aero Channel MP303	40.00 - 40.50	1.0000	1.0000
L14	28	Aero Channel MP303	40.00 - 40.50	1.0000	1.0000
L14	29	Aero Channel MP303	40.00 - 40.50	1.0000	1.0000
L15	2	Safety Line 3/8	39.33 - 40.00	1.0000	1.0000
L15	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	39.33 - 40.00	1.0000	1.0000
L15	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	39.33 - 40.00	1.0000	1.0000
L15	19	HB158-U12S24-160-LI(1-7/8)	39.33 - 40.00	1.0000	1.0000
L15	27	Aero Channel MP303	39.33 - 40.00	1.0000	1.0000
L15	28	Aero Channel MP303	39.33 - 40.00	1.0000	1.0000
L15	29	Aero Channel MP303	39.33 - 40.00	1.0000	1.0000
L16	2	Safety Line 3/8	39.08 - 39.33	1.0000	1.0000
L16	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	39.08 - 39.33	1.0000	1.0000
L16	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	39.08 - 39.33	1.0000	1.0000
L16	19	HB158-U12S24-160-LI(1-7/8)	39.08 - 39.33	1.0000	1.0000
L16	27	Aero Channel MP303	39.08 - 39.33	1.0000	1.0000
L16	28	Aero Channel MP303	39.08 - 39.33	1.0000	1.0000
L16	29	Aero Channel MP303	39.08 - 39.33	1.0000	1.0000
L17	2	Safety Line 3/8	34.08 - 39.08	1.0000	1.0000
L17	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	34.08 - 39.08	1.0000	1.0000
L17	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	34.08 - 39.08	1.0000	1.0000
L17	19	HB158-U12S24-160-LI(1-7/8)	34.08 - 39.08	1.0000	1.0000
L17	27	Aero Channel MP303	34.08 - 39.08	1.0000	1.0000

Tower Section	*Feed Line Record No.*	*Description*	*Feed Line Segment Elev.*	*K_a No Ice*	*K_a Ice*
L17	28	Aero Channel MP303	34.08 - 39.08	1.0000	1.0000
L17	29	Aero Channel MP303	34.08 - 39.08	1.0000	1.0000
L18	2	Safety Line 3/8	30.00 - 34.08	1.0000	1.0000
L18	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	30.00 - 34.08	1.0000	1.0000
L18	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	30.00 - 34.08	1.0000	1.0000
L18	19	HB158-U12S24-160-LI(1-7/8)	30.00 - 34.08	1.0000	1.0000
L18	27	Aero Channel MP303	30.50 - 34.08	1.0000	1.0000
L18	28	Aero Channel MP303	30.50 - 34.08	1.0000	1.0000
L18	29	Aero Channel MP303	30.50 - 34.08	1.0000	1.0000
L19	2	Safety Line 3/8	29.75 - 30.00	1.0000	1.0000
L19	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	29.75 - 30.00	1.0000	1.0000
L19	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	29.75 - 30.00	1.0000	1.0000
L19	19	HB158-U12S24-160-LI(1-7/8)	29.75 - 30.00	1.0000	1.0000
L20	2	Safety Line 3/8	25.00 - 29.75	1.0000	1.0000
L20	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	25.00 - 29.75	1.0000	1.0000
L20	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	25.00 - 29.75	1.0000	1.0000
L20	19	HB158-U12S24-160-LI(1-7/8)	25.00 - 29.75	1.0000	1.0000
L20	35	CCI-SFP-045100	25.00 - 26.50	1.0000	1.0000
L20	36	CCI-SFP-045100	25.00 - 26.50	1.0000	1.0000
L20	37	CCI-SFP-045100	25.00 - 26.50	1.0000	1.0000
L20	38	CCI-SFP-045100	25.00 - 26.50	1.0000	1.0000
L21	2	Safety Line 3/8	24.75 - 25.00	1.0000	1.0000
L21	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	24.75 - 25.00	1.0000	1.0000
L21	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	24.75 - 25.00	1.0000	1.0000
L21	19	HB158-U12S24-160-LI(1-7/8)	24.75 - 25.00	1.0000	1.0000
L21	35	CCI-SFP-045100	24.75 - 25.00	1.0000	1.0000
L21	36	CCI-SFP-045100	24.75 - 25.00	1.0000	1.0000
L21	37	CCI-SFP-045100	24.75 - 25.00	1.0000	1.0000
L21	38	CCI-SFP-045100	24.75 - 25.00	1.0000	1.0000
L22	2	Safety Line 3/8	19.75 - 24.75	1.0000	1.0000
L22	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	19.75 - 24.75	1.0000	1.0000
L22	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	19.75 - 24.75	1.0000	1.0000
L22	19	HB158-U12S24-160-LI(1-7/8)	19.75 - 24.75	1.0000	1.0000
L22	31	Aero Channel MP305	19.75 - 21.00	1.0000	1.0000
L22	32	Aero Channel MP305	19.75 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L22	33	Aero Channel MP305	21.00 19.75 -	1.0000	1.0000
L22	35	CCI-SFP-045100	21.00 19.75 -	1.0000	1.0000
L22	36	CCI-SFP-045100	24.75 19.75 -	1.0000	1.0000
L22	37	CCI-SFP-045100	24.75 19.75 -	1.0000	1.0000
L22	38	CCI-SFP-045100	24.75 19.75 -	1.0000	1.0000
L23	2	Safety Line 3/8	24.75 18.58 -	1.0000	1.0000
L23	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	19.75 18.58 -	1.0000	1.0000
L23	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	19.75 18.58 -	1.0000	1.0000
L23	19	HB158-U12S24-160-LI(1-7/8)	19.75 18.58 -	1.0000	1.0000
L23	31	Aero Channel MP305	19.75 18.58 -	1.0000	1.0000
L23	32	Aero Channel MP305	19.75 18.58 -	1.0000	1.0000
L23	33	Aero Channel MP305	19.75 18.58 -	1.0000	1.0000
L23	35	CCI-SFP-045100	19.75 18.58 -	1.0000	1.0000
L23	36	CCI-SFP-045100	19.75 18.58 -	1.0000	1.0000
L23	37	CCI-SFP-045100	19.75 18.58 -	1.0000	1.0000
L23	38	CCI-SFP-045100	19.75 18.58 -	1.0000	1.0000
L24	2	Safety Line 3/8	19.75 18.33 -	1.0000	1.0000
L24	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	18.58 18.33 -	1.0000	1.0000
L24	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	18.58 18.33 -	1.0000	1.0000
L24	19	HB158-U12S24-160-LI(1-7/8)	18.58 18.33 -	1.0000	1.0000
L24	31	Aero Channel MP305	18.58 18.33 -	1.0000	1.0000
L24	32	Aero Channel MP305	18.58 18.33 -	1.0000	1.0000
L24	33	Aero Channel MP305	18.58 18.33 -	1.0000	1.0000
L24	35	CCI-SFP-045100	18.58 18.33 -	1.0000	1.0000
L24	36	CCI-SFP-045100	18.58 18.33 -	1.0000	1.0000
L24	37	CCI-SFP-045100	18.58 18.33 -	1.0000	1.0000
L24	38	CCI-SFP-045100	18.58 18.33 -	1.0000	1.0000
L25	2	Safety Line 3/8	18.58 13.33 -	1.0000	1.0000
L25	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	18.33 13.33 -	1.0000	1.0000
L25	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	18.33 13.33 -	1.0000	1.0000
L25	19	HB158-U12S24-160-LI(1-7/8)	18.33 13.33 -	1.0000	1.0000
L25	31	Aero Channel MP305	18.33 13.33 -	1.0000	1.0000
L25	32	Aero Channel MP305	18.33 13.33 -	1.0000	1.0000
L25	33	Aero Channel MP305	18.33 13.33 -	1.0000	1.0000
			18.33		

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L25	35	CCI-SFP-045100	13.33 - 18.33	1.0000	1.0000
L25	36	CCI-SFP-045100	13.33 - 18.33	1.0000	1.0000
L25	37	CCI-SFP-045100	13.33 - 18.33	1.0000	1.0000
L25	38	CCI-SFP-045100	13.33 - 18.33	1.0000	1.0000
L26	2	Safety Line 3/8	8.42 - 13.33	1.0000	1.0000
L26	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	8.42 - 13.33	1.0000	1.0000
L26	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	8.42 - 13.33	1.0000	1.0000
L26	19	HB158-U12S24-160-LI(1-7/8)	8.42 - 13.33	1.0000	1.0000
L26	22	Aero Channel MP305	8.42 - 10.50	1.0000	1.0000
L26	23	Aero Channel MP305	8.42 - 10.50	1.0000	1.0000
L26	24	Aero Channel MP305	8.42 - 10.50	1.0000	1.0000
L26	25	Aero Channel MP305	8.42 - 10.50	1.0000	1.0000
L26	31	Aero Channel MP305	8.42 - 13.33	1.0000	1.0000
L26	32	Aero Channel MP305	8.42 - 13.33	1.0000	1.0000
L26	33	Aero Channel MP305	8.42 - 13.33	1.0000	1.0000
L26	35	CCI-SFP-045100	8.42 - 13.33	1.0000	1.0000
L26	36	CCI-SFP-045100	8.42 - 13.33	1.0000	1.0000
L26	37	CCI-SFP-045100	8.42 - 13.33	1.0000	1.0000
L26	38	CCI-SFP-045100	8.42 - 13.33	1.0000	1.0000
L27	2	Safety Line 3/8	8.07 - 8.42	1.0000	1.0000
L27	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	8.07 - 8.42	1.0000	1.0000
L27	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	8.07 - 8.42	1.0000	1.0000
L27	19	HB158-U12S24-160-LI(1-7/8)	8.07 - 8.42	1.0000	1.0000
L27	22	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	23	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	24	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	25	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	31	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	32	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	33	Aero Channel MP305	8.07 - 8.42	1.0000	1.0000
L27	35	CCI-SFP-045100	8.07 - 8.42	1.0000	1.0000
L27	36	CCI-SFP-045100	8.07 - 8.42	1.0000	1.0000
L27	37	CCI-SFP-045100	8.07 - 8.42	1.0000	1.0000
L27	38	CCI-SFP-045100	8.07 - 8.42	1.0000	1.0000
L28	2	Safety Line 3/8	7.83 - 8.07	1.0000	1.0000
L28	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	7.83 - 8.07	1.0000	1.0000
L28	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	7.83 - 8.07	1.0000	1.0000
L28	19	HB158-U12S24-160-LI(1-7/8)	7.83 - 8.07	1.0000	1.0000
L28	22	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	23	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	24	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	25	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	31	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	32	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	33	Aero Channel MP305	7.83 - 8.07	1.0000	1.0000
L28	35	CCI-SFP-045100	7.83 - 8.07	1.0000	1.0000
L28	36	CCI-SFP-045100	7.83 - 8.07	1.0000	1.0000
L28	37	CCI-SFP-045100	7.83 - 8.07	1.0000	1.0000
L28	38	CCI-SFP-045100	7.83 - 8.07	1.0000	1.0000
L29	2	Safety Line 3/8	6.00 - 7.83	1.0000	1.0000
L29	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	6.00 - 7.83	1.0000	1.0000
L29	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	6.00 - 7.83	1.0000	1.0000
L29	19	HB158-U12S24-160-LI(1-7/8)	6.00 - 7.83	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L29	22	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	23	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	24	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	25	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	31	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	32	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	33	Aero Channel MP305	6.00 - 7.83	1.0000	1.0000
L29	35	CCI-SFP-045100	6.00 - 7.83	1.0000	1.0000
L29	36	CCI-SFP-045100	6.00 - 7.83	1.0000	1.0000
L29	37	CCI-SFP-045100	6.00 - 7.83	1.0000	1.0000
L29	38	CCI-SFP-045100	6.00 - 7.83	1.0000	1.0000
L30	2	Safety Line 3/8	5.75 - 6.00	1.0000	1.0000
L30	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	5.75 - 6.00	1.0000	1.0000
L30	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	5.75 - 6.00	1.0000	1.0000
L30	19	HB158-U12S24-160-LI(1-7/8)	5.75 - 6.00	1.0000	1.0000
L30	22	Aero Channel MP305	5.75 - 6.00	1.0000	1.0000
L30	23	Aero Channel MP305	5.75 - 6.00	1.0000	1.0000
L30	24	Aero Channel MP305	5.75 - 6.00	1.0000	1.0000
L30	25	Aero Channel MP305	5.75 - 6.00	1.0000	1.0000
L30	35	CCI-SFP-045100	5.75 - 6.00	1.0000	1.0000
L30	36	CCI-SFP-045100	5.75 - 6.00	1.0000	1.0000
L30	37	CCI-SFP-045100	5.75 - 6.00	1.0000	1.0000
L30	38	CCI-SFP-045100	5.75 - 6.00	1.0000	1.0000
L31	2	Safety Line 3/8	3.00 - 5.75	1.0000	1.0000
L31	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	2.00 - 5.75	1.0000	1.0000
L31	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	2.00 - 5.75	1.0000	1.0000
L31	19	HB158-U12S24-160-LI(1-7/8)	2.00 - 5.75	1.0000	1.0000
L31	22	Aero Channel MP305	2.00 - 5.75	1.0000	1.0000
L31	23	Aero Channel MP305	2.00 - 5.75	1.0000	1.0000
L31	24	Aero Channel MP305	2.00 - 5.75	1.0000	1.0000
L31	25	Aero Channel MP305	2.00 - 5.75	1.0000	1.0000
L31	35	CCI-SFP-045100	4.50 - 5.75	1.0000	1.0000
L31	36	CCI-SFP-045100	4.50 - 5.75	1.0000	1.0000
L31	37	CCI-SFP-045100	4.50 - 5.75	1.0000	1.0000
L31	38	CCI-SFP-045100	4.50 - 5.75	1.0000	1.0000
L32	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	1.75 - 2.00	1.0000	1.0000
L32	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	1.75 - 2.00	1.0000	1.0000
L32	19	HB158-U12S24-160-LI(1-7/8)	1.75 - 2.00	1.0000	1.0000
L32	22	Aero Channel MP305	1.75 - 2.00	1.0000	1.0000
L32	23	Aero Channel MP305	1.75 - 2.00	1.0000	1.0000
L32	24	Aero Channel MP305	1.75 - 2.00	1.0000	1.0000
L32	25	Aero Channel MP305	1.75 - 2.00	1.0000	1.0000
L33	8	(3) LDF7-50A(1-5/8) + (2) 2" innerduct conduit	0.00 - 1.75	1.0000	1.0000
L33	16	(2) HCS 6X12 4AWG(1-5/8) + (6) 810921-001(7/8)	0.00 - 1.75	1.0000	1.0000
L33	19	HB158-U12S24-160-LI(1-7/8)	0.00 - 1.75	1.0000	1.0000
L33	22	Aero Channel MP305	0.50 - 1.75	1.0000	1.0000
L33	23	Aero Channel MP305	0.50 - 1.75	1.0000	1.0000
L33	24	Aero Channel MP305	0.50 - 1.75	1.0000	1.0000
L33	25	Aero Channel MP305	0.50 - 1.75	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L14	27	Aero Channel MP303	40.00 - 40.50	Manual	1.0000
L14	28	Aero Channel MP303	40.00 - 40.50	Manual	1.0000
L14	29	Aero Channel MP303	40.00 - 40.50	Manual	1.0000
L15	27	Aero Channel MP303	39.33 - 40.00	Manual	1.0000
L15	28	Aero Channel MP303	39.33 - 40.00	Manual	1.0000
L15	29	Aero Channel MP303	39.33 - 40.00	Manual	1.0000
L16	27	Aero Channel MP303	39.08 - 39.33	Manual	1.0000
L16	28	Aero Channel MP303	39.08 - 39.33	Manual	1.0000
L16	29	Aero Channel MP303	39.08 - 39.33	Manual	1.0000
L17	27	Aero Channel MP303	34.08 - 39.08	Manual	1.0000
L17	28	Aero Channel MP303	34.08 - 39.08	Manual	1.0000
L17	29	Aero Channel MP303	34.08 - 39.08	Manual	1.0000
L18	27	Aero Channel MP303	30.50 - 34.08	Manual	1.0000
L18	28	Aero Channel MP303	30.50 - 34.08	Manual	1.0000
L18	29	Aero Channel MP303	30.50 - 34.08	Manual	1.0000
L20	35	CCI-SFP-045100	25.00 - 26.50	Auto	1.0000
L20	36	CCI-SFP-045100	25.00 - 26.50	Auto	1.0000
L20	37	CCI-SFP-045100	25.00 - 26.50	Auto	1.0000
L20	38	CCI-SFP-045100	25.00 - 26.50	Auto	1.0000
L21	35	CCI-SFP-045100	24.75 - 25.00	Auto	1.0000
L21	36	CCI-SFP-045100	24.75 - 25.00	Auto	1.0000
L21	37	CCI-SFP-045100	24.75 - 25.00	Auto	1.0000
L21	38	CCI-SFP-045100	24.75 - 25.00	Auto	1.0000
L22	31	Aero Channel MP305	19.75 - 21.00	Manual	1.0000
L22	32	Aero Channel MP305	19.75 - 21.00	Manual	1.0000
L22	33	Aero Channel MP305	19.75 - 21.00	Manual	1.0000
L22	35	CCI-SFP-045100	19.75 - 24.75	Auto	1.0000
L22	36	CCI-SFP-045100	19.75 - 24.75	Auto	1.0000
L22	37	CCI-SFP-045100	19.75 - 24.75	Auto	1.0000
L22	38	CCI-SFP-045100	19.75 - 24.75	Auto	1.0000
L23	31	Aero Channel MP305	18.58 - 19.75	Manual	1.0000
L23	32	Aero Channel MP305	18.58 - 19.75	Manual	1.0000
L23	33	Aero Channel MP305	18.58 -	Manual	1.0000

Tower Section	*Attachment Record No.*	*Description*	*Attachment Segment Elev.*	*Ratio Calculation Method*	*Effective Width Ratio*
L23	35	CCI-SFP-045100	18.58 - 19.75	Auto	1.0000
L23	36	CCI-SFP-045100	18.58 - 19.75	Auto	1.0000
L23	37	CCI-SFP-045100	18.58 - 19.75	Auto	1.0000
L23	38	CCI-SFP-045100	18.58 - 19.75	Auto	1.0000
L24	31	Aero Channel MP305	18.33 - 18.58	Manual	1.0000
L24	32	Aero Channel MP305	18.33 - 18.58	Manual	1.0000
L24	33	Aero Channel MP305	18.33 - 18.58	Manual	1.0000
L24	35	CCI-SFP-045100	18.33 - 18.58	Auto	1.0000
L24	36	CCI-SFP-045100	18.33 - 18.58	Auto	1.0000
L24	37	CCI-SFP-045100	18.33 - 18.58	Auto	1.0000
L24	38	CCI-SFP-045100	18.33 - 18.58	Auto	1.0000
L25	31	Aero Channel MP305	13.33 - 18.33	Manual	1.0000
L25	32	Aero Channel MP305	13.33 - 18.33	Manual	1.0000
L25	33	Aero Channel MP305	13.33 - 18.33	Manual	1.0000
L25	35	CCI-SFP-045100	13.33 - 18.33	Auto	1.0000
L25	36	CCI-SFP-045100	13.33 - 18.33	Auto	1.0000
L25	37	CCI-SFP-045100	13.33 - 18.33	Auto	1.0000
L25	38	CCI-SFP-045100	13.33 - 18.33	Auto	1.0000
L26	22	Aero Channel MP305	8.42 - 10.50	Manual	1.0000
L26	23	Aero Channel MP305	8.42 - 10.50	Manual	1.0000
L26	24	Aero Channel MP305	8.42 - 10.50	Manual	1.0000
L26	25	Aero Channel MP305	8.42 - 10.50	Manual	1.0000
L26	31	Aero Channel MP305	8.42 - 13.33	Manual	1.0000
L26	32	Aero Channel MP305	8.42 - 13.33	Manual	1.0000
L26	33	Aero Channel MP305	8.42 - 13.33	Manual	1.0000
L26	35	CCI-SFP-045100	8.42 - 13.33	Auto	1.0000
L26	36	CCI-SFP-045100	8.42 - 13.33	Auto	1.0000
L26	37	CCI-SFP-045100	8.42 - 13.33	Auto	1.0000
L26	38	CCI-SFP-045100	8.42 - 13.33	Auto	1.0000
L27	22	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	23	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	24	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	25	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	31	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	32	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	33	Aero Channel MP305	8.07 - 8.42	Manual	1.0000
L27	35	CCI-SFP-045100	8.07 - 8.42	Auto	1.0000
L27	36	CCI-SFP-045100	8.07 - 8.42	Auto	1.0000
L27	37	CCI-SFP-045100	8.07 - 8.42	Auto	1.0000
L27	38	CCI-SFP-045100	8.07 - 8.42	Auto	1.0000
L28	22	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	23	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	24	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	25	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	31	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	32	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	33	Aero Channel MP305	7.83 - 8.07	Manual	1.0000
L28	35	CCI-SFP-045100	7.83 - 8.07	Auto	1.0000
L28	36	CCI-SFP-045100	7.83 - 8.07	Auto	1.0000

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L28	37	CCI-SFP-045100	7.83 - 8.07	Auto	1.0000
L28	38	CCI-SFP-045100	7.83 - 8.07	Auto	1.0000
L29	22	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	23	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	24	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	25	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	31	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	32	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	33	Aero Channel MP305	6.00 - 7.83	Manual	1.0000
L29	35	CCI-SFP-045100	6.00 - 7.83	Auto	1.0000
L29	36	CCI-SFP-045100	6.00 - 7.83	Auto	1.0000
L29	37	CCI-SFP-045100	6.00 - 7.83	Auto	1.0000
L29	38	CCI-SFP-045100	6.00 - 7.83	Auto	1.0000
L30	22	Aero Channel MP305	5.75 - 6.00	Manual	1.0000
L30	23	Aero Channel MP305	5.75 - 6.00	Manual	1.0000
L30	24	Aero Channel MP305	5.75 - 6.00	Manual	1.0000
L30	25	Aero Channel MP305	5.75 - 6.00	Manual	1.0000
L30	35	CCI-SFP-045100	5.75 - 6.00	Auto	1.0000
L30	36	CCI-SFP-045100	5.75 - 6.00	Auto	1.0000
L30	37	CCI-SFP-045100	5.75 - 6.00	Auto	1.0000
L30	38	CCI-SFP-045100	5.75 - 6.00	Auto	1.0000
L31	22	Aero Channel MP305	2.00 - 5.75	Manual	1.0000
L31	23	Aero Channel MP305	2.00 - 5.75	Manual	1.0000
L31	24	Aero Channel MP305	2.00 - 5.75	Manual	1.0000
L31	25	Aero Channel MP305	2.00 - 5.75	Manual	1.0000
L31	35	CCI-SFP-045100	4.50 - 5.75	Auto	1.0000
L31	36	CCI-SFP-045100	4.50 - 5.75	Auto	1.0000
L31	37	CCI-SFP-045100	4.50 - 5.75	Auto	1.0000
L31	38	CCI-SFP-045100	4.50 - 5.75	Auto	1.0000
L32	22	Aero Channel MP305	1.75 - 2.00	Manual	1.0000
L32	23	Aero Channel MP305	1.75 - 2.00	Manual	1.0000
L32	24	Aero Channel MP305	1.75 - 2.00	Manual	1.0000
L32	25	Aero Channel MP305	1.75 - 2.00	Manual	1.0000
L33	22	Aero Channel MP305	0.50 - 1.75	Manual	1.0000
L33	23	Aero Channel MP305	0.50 - 1.75	Manual	1.0000
L33	24	Aero Channel MP305	0.50 - 1.75	Manual	1.0000
L33	25	Aero Channel MP305	0.50 - 1.75	Manual	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
T-Arm Mount [TA 702-3]	C	None		0.0000	107.00	No Ice	4.75	4.75	0.34
						1/2" Ice	5.82	5.82	0.43
						1" Ice	6.98	6.98	0.55
						2" Ice	9.72	9.72	0.87
AAHF w/ Mount Pipe	A	From Leg	3.00 -2.50 1.00	0.0000	107.00	No Ice	4.41	2.69	0.12
						1/2" Ice	4.73	3.08	0.16
						1" Ice	5.06	3.49	0.20
						2" Ice	5.74	4.36	0.31
AAHF w/ Mount Pipe	B	From Leg	3.00 -2.50 1.00	0.0000	107.00	No Ice	4.41	2.69	0.12
						1/2" Ice	4.73	3.08	0.16
							5.06	3.49	0.20

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						1" Ice	5.74	4.36	0.31
						2" Ice			
AAHF w/ Mount Pipe	C	From Leg	3.00 -2.50 1.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.41 4.73 5.06 5.74	2.69 3.08 3.49 4.36	0.12 0.16 0.20 0.31
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	3.00 2.50 1.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	3.00 2.50 1.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	3.00 2.50 1.00	0.0000	107.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.60 5.05 5.50 6.44	4.01 4.45 4.89 5.82	0.10 0.16 0.23 0.42
***									
Side Arm Mount [SO 102-3]	C	None		0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	3.60 4.18 4.75 5.90	3.60 4.18 4.75 5.90	0.07 0.11 0.14 0.20
(3) 5'x2" Mount Pipe	A	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
(3) 5'x2" Mount Pipe	B	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
(3) 5'x2" Mount Pipe	C	From Leg	1.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.19 1.50 1.81 2.46	1.19 1.50 1.81 2.46	0.02 0.03 0.04 0.08
800MHz 2X50W RRH W/FILTER	A	From Leg	2.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
800MHz 2X50W RRH W/FILTER	B	From Leg	2.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
800MHz 2X50W RRH W/FILTER	C	From Leg	2.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.06 2.24 2.43 2.83	1.93 2.11 2.29 2.68	0.06 0.09 0.11 0.17
PCS 1900MHz 4x45W-65MHz	A	From Leg	2.00 0.00 0.00	0.0000	105.00	No Ice 1/2" Ice 1" Ice 2" Ice	2.32 2.53 2.74 3.19	2.24 2.44 2.65 3.09	0.06 0.08 0.11 0.17
PCS 1900MHz 4x45W-65MHz	B	From Leg	2.00 0.00	0.0000	105.00	No Ice 1/2"	2.32 2.53	2.24 2.44	0.06 0.08

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
			0.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
PCS 1900MHz 4x45W-65MHz	C	From Leg	2.00	0.0000	105.00	No Ice	2.32	2.24	0.06
			0.00			1/2"	2.53	2.44	0.08
			0.00			Ice	2.74	2.65	0.11
						1" Ice	3.19	3.09	0.17
						2" Ice			
IBC1900BB-1	A	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
IBC1900BB-1	B	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
IBC1900BB-1	C	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
IBC1900HG-2A	A	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
IBC1900HG-2A	B	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
IBC1900HG-2A	C	From Leg	2.00	0.0000	105.00	No Ice	0.97	0.46	0.02
			0.00			1/2"	1.09	0.56	0.03
			0.00			Ice	1.22	0.66	0.04
						1" Ice	1.51	0.89	0.06
						2" Ice			
***									
SitePro1 RMQLP-4120-H10	C	None		0.0000	89.00	No Ice	21.41	21.41	1.60
						1/2"	26.62	26.62	2.06
						Ice	31.66	31.66	2.60
						1" Ice	41.38	41.38	3.96
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	89.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	B	From Leg	4.00	0.0000	89.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
DMP65R-BU6D w/ Mount Pipe	C	From Leg	4.00	0.0000	89.00	No Ice	11.96	5.97	0.11
			-7.00			1/2"	12.70	6.63	0.20
			1.00			Ice	13.46	7.30	0.30
						1" Ice	15.02	8.69	0.53
						2" Ice			
OPA65R-BU6D w/ Mount Pipe	A	From Leg	4.00	0.0000	89.00	No Ice	12.25	6.05	0.09
			-2.33			1/2"	13.00	6.71	0.18
			1.00			Ice	13.76	7.39	0.27
						1" Ice	15.34	8.79	0.51
						2" Ice			
OPA65R-BU6D w/ Mount	B	From Leg	4.00	0.0000	89.00	No Ice	12.25	6.05	0.09

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
Pipe			-2.33 1.00			1/2" Ice 1" Ice 2" Ice	13.00 13.76 15.34	6.71 7.39 8.79	0.18 0.27 0.51
OPA65R-BU6D w/ Mount Pipe	C	From Leg	4.00 -2.33 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	12.25 13.00 13.76 15.34	6.05 6.71 7.39 8.79	0.09 0.18 0.27 0.51
7770.00 w/ Mount Pipe	A	From Leg	4.00 7.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	B	From Leg	4.00 7.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
7770.00 w/ Mount Pipe	C	From Leg	4.00 7.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	5.75 6.18 6.61 7.49	4.25 5.01 5.71 7.16	0.06 0.10 0.16 0.29
QS66512-2 w/ Mount Pipe	A	From Leg	4.00 2.33 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.04 4.42 4.82 5.63	4.18 4.57 4.97 5.79	0.14 0.21 0.29 0.48
QS66512-2 w/ Mount Pipe	B	From Leg	4.00 2.33 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.04 4.42 4.82 5.63	4.18 4.57 4.97 5.79	0.14 0.21 0.29 0.48
QS66512-2 w/ Mount Pipe	C	From Leg	4.00 2.33 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.04 4.42 4.82 5.63	4.18 4.57 4.97 5.79	0.14 0.21 0.29 0.48
RRUS 4449 B5/B12	A	From Leg	4.00 0.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	B	From Leg	4.00 0.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4449 B5/B12	C	From Leg	4.00 0.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.14 2.33 2.72	1.41 1.56 1.73 2.07	0.07 0.09 0.11 0.16
RRUS 4478 B14	A	From Leg	4.00 0.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	B	From Leg	4.00 0.00 1.00	0.0000	89.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.84 2.01 2.19 2.57	1.06 1.20 1.34 1.66	0.06 0.08 0.09 0.14
RRUS 4478 B14	C	From Leg	4.00	0.0000	89.00	No Ice	1.84	1.06	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2"	2.01	1.20	0.08
			1.00			Ice	2.19	1.34	0.09
						1" Ice	2.57	1.66	0.14
						2" Ice			
DC6-48-60-18-8F	A	From Leg	1.00	0.0000	89.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
DC6-48-60-18-8F	B	From Leg	1.00	0.0000	89.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
DC6-48-60-18-8F	C	From Leg	1.00	0.0000	89.00	No Ice	0.92	0.92	0.02
			0.00			1/2"	1.46	1.46	0.04
			1.00			Ice	1.64	1.64	0.06
						1" Ice	2.04	2.04	0.11
						2" Ice			
RRUS 32 B30	A	From Leg	4.00	0.0000	89.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	B	From Leg	4.00	0.0000	89.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B30	C	From Leg	4.00	0.0000	89.00	No Ice	2.69	1.57	0.06
			0.00			1/2"	2.91	1.76	0.08
			1.00			Ice	3.14	1.95	0.10
						1" Ice	3.61	2.35	0.16
						2" Ice			
RRUS 32 B66A	A	From Leg	4.00	0.0000	89.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B66A	B	From Leg	4.00	0.0000	89.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 32 B66A	C	From Leg	4.00	0.0000	89.00	No Ice	2.86	1.78	0.06
			0.00			1/2"	3.09	1.97	0.08
			1.00			Ice	3.32	2.17	0.10
						1" Ice	3.81	2.59	0.16
						2" Ice			
RRUS 4415 B25	A	From Leg	4.00	0.0000	89.00	No Ice	1.64	0.68	0.04
			0.00			1/2"	1.80	0.79	0.06
			1.00			Ice	1.97	0.91	0.07
						1" Ice	2.33	1.18	0.11
						2" Ice			
RRUS 4415 B25	B	From Leg	4.00	0.0000	89.00	No Ice	1.64	0.68	0.04
			0.00			1/2"	1.80	0.79	0.06
			1.00			Ice	1.97	0.91	0.07
						1" Ice	2.33	1.18	0.11
						2" Ice			
RRUS 4415 B25	C	From Leg	4.00	0.0000	89.00	No Ice	1.64	0.68	0.04
			0.00			1/2"	1.80	0.79	0.06
			1.00			Ice	1.97	0.91	0.07
						1" Ice	2.33	1.18	0.11
						2" Ice			
(2) LGP21401	A	From Leg	4.00	0.0000	89.00	No Ice	1.10	0.35	0.01

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
(2) LGP21401	B	From Leg	4.00	0.0000	89.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
(2) LGP21401	C	From Leg	4.00	0.0000	89.00	No Ice	1.10	0.35	0.01
			0.00			1/2" Ice	1.24	0.44	0.02
			1.00			1" Ice	1.38	0.54	0.03
						2" Ice	1.69	0.77	0.05
***									
Platform Mount [LP 303-1_HR-1]	C	None		0.0000	76.00	No Ice	17.09	17.09	1.50
						1/2" Ice	21.47	21.47	1.88
						1" Ice	25.72	25.72	2.35
						2" Ice	33.96	33.96	3.52
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Face	4.00	0.0000	76.00	No Ice	14.69	6.87	0.19
			-6.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Face	4.00	0.0000	76.00	No Ice	14.69	6.87	0.19
			-6.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Face	4.00	0.0000	76.00	No Ice	14.69	6.87	0.19
			-6.00			1/2" Ice	15.46	7.55	0.31
			0.00			1" Ice	16.23	8.25	0.46
						2" Ice	17.82	9.67	0.79
AIR 32 B2a/B66Aa w/ Mount Pipe	A	From Face	4.00	0.0000	76.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR 32 B2a/B66Aa w/ Mount Pipe	B	From Face	4.00	0.0000	76.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR 32 B2a/B66Aa w/ Mount Pipe	C	From Face	4.00	0.0000	76.00	No Ice	6.75	6.07	0.15
			0.00			1/2" Ice	7.20	6.87	0.21
			0.00			1" Ice	7.65	7.58	0.28
						2" Ice	8.57	9.06	0.44
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Face	4.00	0.0000	76.00	No Ice	5.87	3.27	0.13
			6.00			1/2" Ice	6.23	3.73	0.18
			0.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Face	4.00	0.0000	76.00	No Ice	5.87	3.27	0.13
			6.00			1/2" Ice	6.23	3.73	0.18
			0.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Face	4.00	0.0000	76.00	No Ice	5.87	3.27	0.13
			6.00			1/2" Ice	6.23	3.73	0.18
			0.00			1" Ice	6.61	4.20	0.23
						2" Ice	7.38	5.20	0.36

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		C_AA_A *Front* ft^2	C_AA_A *Side* ft^2	*Weight* *K*
KRY 112 144/1	A	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	B	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
KRY 112 144/1	C	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.35 0.43 0.51 0.70	0.17 0.23 0.30 0.46	0.01 0.01 0.02 0.03
RADIO 4449 B71 B85A_T-MOBILE	A	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	B	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RADIO 4449 B71 B85A_T-MOBILE	C	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.97 2.15 2.33 2.72	1.59 1.75 1.92 2.28	0.07 0.09 0.12 0.17
RRUS 4415 B25	A	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
RRUS 4415 B25	B	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
RRUS 4415 B25	C	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.64 1.80 1.97 2.33	0.68 0.79 0.91 1.18	0.04 0.06 0.07 0.11
SDX1926Q-43	A	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	0.01 0.01 0.01 0.02
SDX1926Q-43	B	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	0.01 0.01 0.01 0.02
SDX1926Q-43	C	From Face	4.00 0.00 0.00	0.0000	76.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.24 0.31 0.38 0.55	0.10 0.14 0.19 0.32	0.01 0.01 0.01 0.02
***									
Perfect Vision PV-LPP12M-HR-B 12.5' Platform w/ Handrail	C	None		0.0000	64.00	No Ice 1/2" Ice 1" Ice	34.40 43.00 51.60 68.80	34.40 43.00 51.60 68.80	1.52 1.98 2.44 3.35

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice			
(4) 8'x2" Mount Pipe	A	From Face	4.00 0.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(4) 8'x2" Mount Pipe	B	From Face	4.00 0.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
(4) 8'x2" Mount Pipe	C	From Face	4.00 0.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	1.90 2.73 3.40 4.40	1.90 2.73 3.40 4.40	0.03 0.04 0.06 0.12
BSAMNT-SBS-1-2 Side By Side Bracket	A	From Face	4.00 -2.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.03 0.03 0.04 0.06
BSAMNT-SBS-1-2 Side By Side Bracket	B	From Face	4.00 -2.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.03 0.03 0.04 0.06
BSAMNT-SBS-1-2 Side By Side Bracket	C	From Face	4.00 -2.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.03 0.03 0.04 0.06
NHH-65B-R2B	A	From Face	4.00 -1.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
NHH-65B-R2B	B	From Face	4.00 -1.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
NHH-65B-R2B	C	From Face	4.00 -1.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
NHH-65B-R2B	A	From Face	4.00 -2.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
NHH-65B-R2B	B	From Face	4.00 -2.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
NHH-65B-R2B	C	From Face	4.00 -2.50 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice 2" Ice	4.16 4.56 4.98 5.84	2.49 2.88 3.27 4.08	0.04 0.09 0.15 0.28
RVZDC-6627-PF-48	B	From Face	4.00 0.00 0.00	0.0000	64.00	No Ice 1/2" Ice 1" Ice	3.79 4.04 4.30 4.84	2.51 2.73 2.95 3.42	0.03 0.06 0.10 0.18

Description	*Face or Leg*	*Offset Type*	*Offsets: Horz Lateral Vert* *ft* *ft* *ft*	*Azimuth Adjustment* *°*	*Placement* *ft*		*C_AA_A Front* *ft^2*	*C_AA_A Side* *ft^2*	*Weight* *K*
						2" Ice			
RVZDC-6627-PF-48	C	From Face	4.00	0.0000	64.00	No Ice	3.79	2.51	0.03
			0.00			1/2" Ice	4.04	2.73	0.06
			0.00			1" Ice	4.30	2.95	0.10
						2" Ice	4.84	3.42	0.18
20W CBRS	A	From Face	4.00	0.0000	64.00	No Ice	0.86	0.42	0.02
			0.00			1/2" Ice	0.98	0.51	0.03
			0.00			1" Ice	1.10	0.61	0.03
						2" Ice	1.37	0.83	0.06
20W CBRS	B	From Face	4.00	0.0000	64.00	No Ice	0.86	0.42	0.02
			0.00			1/2" Ice	0.98	0.51	0.03
			0.00			1" Ice	1.10	0.61	0.03
						2" Ice	1.37	0.83	0.06
20W CBRS	C	From Face	4.00	0.0000	64.00	No Ice	0.86	0.42	0.02
			0.00			1/2" Ice	0.98	0.51	0.03
			0.00			1" Ice	1.10	0.61	0.03
						2" Ice	1.37	0.83	0.06
RFV01U-D1A	A	From Face	4.00	0.0000	64.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			0.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D1A	B	From Face	4.00	0.0000	64.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			0.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D1A	C	From Face	4.00	0.0000	64.00	No Ice	1.88	1.25	0.08
			0.00			1/2" Ice	2.05	1.39	0.10
			0.00			1" Ice	2.22	1.54	0.12
						2" Ice	2.60	1.86	0.18
RFV01U-D2A	A	From Face	4.00	0.0000	64.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			0.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	B	From Face	4.00	0.0000	64.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			0.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
RFV01U-D2A	C	From Face	4.00	0.0000	64.00	No Ice	1.88	1.01	0.07
			0.00			1/2" Ice	2.05	1.14	0.09
			0.00			1" Ice	2.22	1.28	0.11
						2" Ice	2.60	1.59	0.15
*** Flange Modifications ***									
Bridge Stiffener 72" x 1.25" x 11"	A	From Face	0.00	0.0000	30.00	No Ice	1.13	8.99	0.28
			0.00			1/2" Ice	2.07	9.70	0.33
			0.00			1" Ice	3.02	10.41	0.37
						2" Ice	5.02	11.89	0.46
Bridge Stiffener 72" x 1.25" x 11"	B	From Face	0.00	0.0000	30.00	No Ice	1.13	8.99	0.28
			0.00			1/2" Ice	2.07	9.70	0.33
			0.00			1" Ice	3.02	10.41	0.37
						2" Ice	5.02	11.89	0.46
Bridge Stiffener 72" x 1.25" x 11"	C	From Face	0.00	0.0000	30.00	No Ice	1.13	8.99	0.28
			0.00			1/2" Ice	2.07	9.70	0.33
			0.00			Ice	3.02	10.41	0.37

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice	5.02	11.89	0.46
						2" Ice			
***									
Jump Plate 116" x 6.25" x 1"	A	From Face	0.00 0.00 0.00	0.0000	30.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.99 10.52 12.07 15.25	7.79 8.74 9.70 11.66	1.07 1.15 1.20 1.32
Jump Plate 116" x 6.25" x 1"	B	From Face	0.00 0.00 0.00	0.0000	30.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.99 10.52 12.07 15.25	7.79 8.74 9.70 11.66	1.07 1.15 1.20 1.32
Jump Plate 116" x 6.25" x 1"	C	From Face	0.00 0.00 0.00	0.0000	30.00	No Ice 1/2" Ice 1" Ice 2" Ice	8.99 10.52 12.07 15.25	7.79 8.74 9.70 11.66	1.07 1.15 1.20 1.32
***									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	110 - 105	Pole	Max Tension	42	0.00	0.00	0.00
			Max. Compression	26	-3.87	-0.03	0.02
			Max. Mx	8	-1.45	-4.59	0.00
			Max. My	2	-1.45	-0.00	4.59
			Max. Vy	8	1.70	-4.59	0.00
			Max. Vx	14	1.70	-0.00	-4.59
			Max. Torque	24			0.00
L2	105 - 100	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-6.97	-0.05	0.03
			Max. Mx	8	-2.61	-20.78	0.00
			Max. My	2	-2.61	-0.00	20.78
			Max. Vy	8	3.41	-20.78	0.00
			Max. Vx	14	3.41	-0.00	-20.78
			Max. Torque	24			0.00
L3	100 - 95	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-7.71	-0.08	0.05
			Max. Mx	8	-3.00	-38.63	0.00
			Max. My	2	-3.00	-0.01	38.63
			Max. Vy	8	3.73	-38.63	0.00
			Max. Vx	14	3.73	-0.01	-38.63
			Max. Torque	24			0.00
L4	95 - 90	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-8.45	-0.11	0.07
			Max. Mx	8	-3.39	-58.12	0.00
			Max. My	14	-3.39	-0.01	-58.11
			Max. Vy	8	4.06	-58.12	0.00
			Max. Vx	14	4.06	-0.01	-58.11
			Max. Torque	24			0.00
L5	90 - 85	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-21.94	-0.05	0.15
			Max. Mx	20	-8.16	107.39	0.01
			Max. My	2	-8.16	0.00	107.40
			Max. Vy	8	10.30	-107.38	0.02
			Max. Vx	14	10.30	0.01	-107.38
			Max. Torque	24			0.00
L6	85 - 80	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-23.06	0.04	0.25
			Max. Mx	20	-8.84	159.72	0.02
			Max. My	2	-8.84	0.02	159.71
			Max. Vy	8	10.63	-159.66	0.03
			Max. Vx	14	10.63	0.03	-159.67
			Max. Torque	24			0.00
L7	80 - 75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-33.65	0.08	0.37
			Max. Mx	20	-13.22	217.56	0.05
			Max. My	2	-13.21	0.01	217.59

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	14.88	-217.52	0.06
			Max. Vx	14	14.88	0.02	-217.50
			Max. Torque	24			0.00
L8	75 - 70	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-35.02	-0.07	0.60
			Max. Mx	8	-14.06	-292.78	0.14
			Max. My	2	-14.06	-0.08	292.80
			Max. Vy	8	15.19	-292.78	0.14
			Max. Vx	14	15.18	-0.07	-292.58
			Max. Torque	24			0.00
L9	70 - 65	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-36.39	-0.22	0.83
			Max. Mx	8	-14.92	-369.52	0.22
			Max. My	2	-14.92	-0.18	369.43
			Max. Vy	8	15.48	-369.52	0.22
			Max. Vx	14	15.45	-0.15	-369.06
			Max. Torque	2			0.00
L10	65 - 60	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-46.00	-1.12	0.55
			Max. Mx	8	-18.95	-463.58	0.27
			Max. My	2	-18.95	-0.49	463.12
			Max. Vy	8	19.68	-463.58	0.27
			Max. Vx	14	19.67	-0.29	-462.86
			Max. Torque	4			-0.47
L11	60 - 55	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-47.66	-1.30	0.70
			Max. Mx	8	-20.00	-562.87	0.42
			Max. My	2	-20.01	-0.70	562.26
			Max. Vy	8	20.01	-562.87	0.42
			Max. Vx	14	19.99	-0.30	-561.93
			Max. Torque	4			-0.47
L12	55 - 50	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-49.32	-1.48	0.85
			Max. Mx	8	-21.07	-663.74	0.57
			Max. My	2	-21.07	-0.92	662.97
			Max. Vy	8	20.31	-663.74	0.57
			Max. Vx	14	20.29	-0.31	-662.57
			Max. Torque	4			-0.47
L13	50 - 45	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.97	-1.66	1.00
			Max. Mx	8	-22.14	-766.03	0.72
			Max. My	2	-22.15	-1.14	765.11
			Max. Vy	8	20.58	-766.03	0.72
			Max. Vx	14	20.57	-0.31	-764.65
			Max. Torque	4			-0.47
L14	45 - 40	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.63	-1.82	1.13
			Max. Mx	8	-23.24	-869.60	0.87
			Max. My	2	-23.24	-1.35	868.53
			Max. Vy	8	20.82	-869.60	0.87
			Max. Vx	14	20.81	-0.32	-867.99
			Max. Torque	4			-0.47
L15	40 - 39.333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.87	-1.84	1.15
			Max. Mx	8	-23.39	-883.51	0.89
			Max. My	2	-23.39	-1.38	882.41
			Max. Vy	8	20.85	-883.51	0.89
			Max. Vx	14	20.88	-0.32	-881.88
			Max. Torque	4			-0.47
L16	39.333 - 39.083	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-52.97	-1.85	1.16
			Max. Mx	8	-23.46	-888.73	0.89
			Max. My	2	-23.46	-1.39	887.62
			Max. Vy	8	20.86	-888.73	0.89
			Max. Vx	14	20.90	-0.32	-887.10
			Max. Torque	4			-0.47
L17	39.083 - 34.083	Pole	Max Tension	1	0.00	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-54.96	-2.00	1.29
			Max. Mx	8	-24.72	-993.83	1.04
			Max. My	14	-24.70	-0.33	-992.91
			Max. Vy	8	21.15	-993.83	1.04
			Max. Vx	14	21.45	-0.33	-992.91
			Max. Torque	4			-0.47
L18	34.083 - 30	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.55	-2.13	1.39
			Max. Mx	8	-25.76	-1080.61	1.16
			Max. My	14	-25.75	-0.33	-1080.76
			Max. Vy	8	21.34	-1080.61	1.16
			Max. Vx	14	21.62	-0.33	-1080.76
			Max. Torque	4			-0.47
L19	30 - 29.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-62.60	-2.14	1.40
			Max. Mx	8	-30.70	-1085.99	1.17
			Max. My	14	-30.69	-0.33	-1086.20
			Max. Vy	8	21.50	-1085.99	1.17
			Max. Vx	14	21.77	-0.33	-1086.20
			Max. Torque	4			-0.47
L20	29.75 - 25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.42	-2.28	1.50
			Max. Mx	8	-31.97	-1188.54	1.31
			Max. My	14	-31.96	-0.34	-1189.90
			Max. Vy	8	21.66	-1188.54	1.31
			Max. Vx	14	21.93	-0.34	-1189.90
			Max. Torque	4			-0.47
L21	25 - 24.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-64.55	-2.29	1.50
			Max. Mx	8	-32.07	-1193.96	1.32
			Max. My	14	-32.06	-0.34	-1195.37
			Max. Vy	8	21.66	-1193.96	1.32
			Max. Vx	14	21.93	-0.34	-1195.37
			Max. Torque	4			-0.47
L22	24.75 - 19.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.01	-2.44	1.56
			Max. Mx	8	-33.77	-1302.82	1.47
			Max. My	14	-33.76	-0.34	-1306.03
			Max. Vy	8	21.86	-1302.82	1.47
			Max. Vx	14	22.37	-0.34	-1306.03
			Max. Torque	4			-0.47
L23	19.75 - 18.583	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.62	-2.47	1.57
			Max. Mx	8	-34.17	-1328.41	1.50
			Max. My	14	-34.16	-0.34	-1332.16
			Max. Vy	8	21.99	-1328.41	1.50
			Max. Vx	14	22.47	-0.34	-1332.16
			Max. Torque	4			-0.47
L24	18.583 - 18.333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-67.77	-2.48	1.57
			Max. Mx	8	-34.28	-1333.91	1.51
			Max. My	14	-34.27	-0.34	-1337.77
			Max. Vy	8	22.00	-1333.91	1.51
			Max. Vx	14	22.47	-0.34	-1337.77
			Max. Torque	4			-0.47
L25	18.333 - 13.333	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-70.69	-2.62	1.63
			Max. Mx	8	-36.33	-1445.35	1.65
			Max. My	14	-36.32	-0.35	-1451.10
			Max. Vy	8	22.55	-1445.35	1.65
			Max. Vx	14	22.90	-0.35	-1451.10
			Max. Torque	4			-0.47
L26	13.333 - 8.417	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.62	-2.77	1.65

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	8	-38.35	-1557.52	1.80
			Max. My	14	-38.35	-0.35	-1564.48
			Max. Vy	8	23.09	-1557.52	1.80
			Max. Vx	14	23.29	-0.35	-1564.48
			Max. Torque	4			-0.46
L27	8.417 - 8.067	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.85	-2.78	1.65
			Max. Mx	8	-38.52	-1565.61	1.81
			Max. My	14	-38.52	-0.35	-1572.62
			Max. Vy	8	23.11	-1565.61	1.81
			Max. Vx	14	23.30	-0.35	-1572.62
			Max. Torque	4			-0.46
L28	8.067 - 7.833	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-73.99	-2.78	1.65
			Max. Mx	8	-38.62	-1571.02	1.81
			Max. My	14	-38.62	-0.35	-1578.07
			Max. Vy	8	23.14	-1571.02	1.81
			Max. Vx	14	23.32	-0.35	-1578.07
			Max. Torque	4			-0.46
L29	7.833 - 6	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.16	-2.84	1.64
			Max. Mx	8	-39.40	-1613.67	1.87
			Max. My	14	-39.40	-0.35	-1620.93
			Max. Vy	8	23.40	-1613.67	1.87
			Max. Vx	14	23.50	-0.35	-1620.93
			Max. Torque	4			-0.46
L30	6 - 5.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-75.29	-2.84	1.64
			Max. Mx	8	-39.51	-1619.52	1.87
			Max. My	14	-39.50	-0.35	-1626.80
			Max. Vy	8	23.39	-1619.52	1.87
			Max. Vx	14	23.49	-0.35	-1626.80
			Max. Torque	4			-0.46
L31	5.75 - 2	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.13	-2.95	1.65
			Max. Mx	8	-40.86	-1707.97	1.98
			Max. My	14	-40.86	-0.35	-1715.31
			Max. Vy	8	23.77	-1707.97	1.98
			Max. Vx	14	23.76	-0.35	-1715.31
			Max. Torque	4			-0.46
L32	2 - 1.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.28	-2.95	1.66
			Max. Mx	8	-40.99	-1713.91	1.99
			Max. My	14	-40.99	-0.35	-1721.24
			Max. Vy	8	23.77	-1713.91	1.99
			Max. Vx	14	23.75	-0.35	-1721.24
			Max. Torque	4			-0.46
L33	1.75 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.24	-2.99	1.67
			Max. Mx	8	-41.79	-1755.58	2.04
			Max. My	14	-41.79	-0.35	-1762.90
			Max. Vy	8	23.85	-1755.58	2.04
			Max. Vx	14	23.90	-0.35	-1762.90
			Max. Torque	4			-0.46

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	30	78.24	-6.44	0.00
	Max. H_x	20	41.80	23.82	-0.02
	Max. H_z	2	41.80	-0.02	23.53

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
	Max. M_x	2	1750.57	-0.02	23.53
	Max. M_z	8	1755.58	-23.82	0.02
	Max. Torsion	16	0.46	12.02	-20.82
	Min. Vert	11	31.35	-19.88	-11.48
	Min. H_x	8	41.80	-23.82	0.02
	Min. H_z	14	41.80	0.02	-23.87
	Min. M_x	14	-1762.90	0.02	-23.87
	Min. M_z	20	-1752.19	23.82	-0.02
	Min. Torsion	4	-0.46	-12.24	21.20

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	34.83	0.00	0.00	-0.55	-1.36	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	41.80	0.02	-23.53	-1750.57	-3.04	0.40
0.9 Dead+1.0 Wind 0 deg - No Ice	31.35	0.02	-23.53	-1730.31	-2.59	0.40
1.2 Dead+1.0 Wind 30 deg - No Ice	41.80	12.24	-21.20	-1535.86	-888.03	0.46
0.9 Dead+1.0 Wind 30 deg - No Ice	31.35	12.24	-21.20	-1518.17	-877.48	0.46
1.2 Dead+1.0 Wind 60 deg - No Ice	41.80	20.86	-12.07	-887.14	-1534.38	0.41
0.9 Dead+1.0 Wind 60 deg - No Ice	31.35	20.86	-12.07	-876.84	-1516.44	0.40
1.2 Dead+1.0 Wind 90 deg - No Ice	41.80	23.82	-0.02	-2.04	-1755.58	0.17
0.9 Dead+1.0 Wind 90 deg - No Ice	31.35	23.82	-0.02	-1.85	-1735.04	0.17
1.2 Dead+1.0 Wind 120 deg - No Ice	41.80	19.88	11.48	868.87	-1507.82	0.00
0.9 Dead+1.0 Wind 120 deg - No Ice	31.35	19.88	11.48	859.03	-1490.03	0.00
1.2 Dead+1.0 Wind 150 deg - No Ice	41.80	11.52	20.00	1508.29	-871.36	-0.24
0.9 Dead+1.0 Wind 150 deg - No Ice	31.35	11.52	20.00	1491.10	-860.90	-0.24
1.2 Dead+1.0 Wind 180 deg - No Ice	41.80	-0.02	23.87	1762.90	-0.35	-0.41
0.9 Dead+1.0 Wind 180 deg - No Ice	31.35	-0.02	23.87	1742.92	0.07	-0.40
1.2 Dead+1.0 Wind 210 deg - No Ice	41.80	-12.02	20.82	1528.62	881.25	-0.46
0.9 Dead+1.0 Wind 210 deg - No Ice	31.35	-12.02	20.82	1511.31	871.59	-0.46
1.2 Dead+1.0 Wind 240 deg - No Ice	41.80	-20.03	11.59	874.53	1511.54	-0.41
0.9 Dead+1.0 Wind 240 deg - No Ice	31.35	-20.03	11.59	864.64	1494.57	-0.40
1.2 Dead+1.0 Wind 270 deg - No Ice	41.80	-23.82	0.02	0.65	1752.19	-0.17
0.9 Dead+1.0 Wind 270 deg - No Ice	31.35	-23.82	0.02	0.82	1732.52	-0.17
1.2 Dead+1.0 Wind 300 deg - No Ice	41.80	-20.74	-11.98	-881.97	1524.71	-0.00
0.9 Dead+1.0 Wind 300 deg - No Ice	31.35	-20.74	-11.98	-871.71	1507.70	-0.00
1.2 Dead+1.0 Wind 330 deg - No Ice	41.80	-11.79	-20.46	-1516.73	872.03	0.24
0.9 Dead+1.0 Wind 330 deg - No Ice	31.35	-11.79	-20.46	-1499.16	862.44	0.24
1.2 Dead+1.0 Ice+1.0 Temp	78.24	0.00	-0.00	-1.67	-2.99	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	78.24	0.00	-6.27	-506.01	-3.36	0.10
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	78.24	3.22	-5.58	-440.19	-256.25	0.11
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	78.24	5.44	-3.15	-254.21	-439.89	0.10
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	78.24	6.44	-0.00	-1.99	-508.93	0.03
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	78.24	5.40	3.12	250.01	-439.16	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	78.24	3.13	5.42	434.72	-254.81	-0.06
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	78.24	-0.00	6.27	502.52	-2.86	-0.10
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	78.24	-3.21	5.55	436.43	249.88	-0.11
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	78.24	-5.40	3.12	250.44	433.20	-0.10
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	78.24	-6.44	0.00	-1.49	502.71	-0.03
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	78.24	-5.44	-3.14	-253.77	433.42	-0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	78.24	-3.14	-5.45	-438.48	248.75	0.06
Dead+Wind 0 deg - Service	34.83	0.00	-5.11	-377.76	-1.70	0.09
Dead+Wind 30 deg - Service	34.83	2.66	-4.60	-331.50	-192.47	0.10
Dead+Wind 60 deg - Service	34.83	4.53	-2.62	-191.66	-331.79	0.09
Dead+Wind 90 deg - Service	34.83	5.17	-0.00	-0.86	-379.46	0.04
Dead+Wind 120 deg - Service	34.83	4.31	2.49	186.86	-326.05	0.00
Dead+Wind 150 deg - Service	34.83	2.50	4.34	324.68	-188.86	-0.05
Dead+Wind 180 deg - Service	34.83	-0.00	5.18	379.58	-1.12	-0.09
Dead+Wind 210 deg - Service	34.83	-2.61	4.52	329.08	188.92	-0.10
Dead+Wind 240 deg - Service	34.83	-4.35	2.51	188.08	324.77	-0.09
Dead+Wind 270 deg - Service	34.83	-5.17	0.00	-0.28	376.65	-0.04
Dead+Wind 300 deg - Service	34.83	-4.50	-2.60	-190.54	327.62	-0.00
Dead+Wind 330 deg - Service	34.83	-2.56	-4.44	-327.36	186.93	0.05

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-34.83	0.00	0.00	34.83	0.00	0.000%
2	0.02	-41.80	-23.53	-0.02	41.80	23.53	0.000%
3	0.02	-31.35	-23.53	-0.02	31.35	23.53	0.000%
4	12.24	-41.80	-21.20	-12.24	41.80	21.20	0.000%
5	12.24	-31.35	-21.20	-12.24	31.35	21.20	0.000%
6	20.86	-41.80	-12.07	-20.86	41.80	12.07	0.000%
7	20.86	-31.35	-12.07	-20.86	31.35	12.07	0.000%
8	23.82	-41.80	-0.02	-23.82	41.80	0.02	0.000%
9	23.82	-31.35	-0.02	-23.82	31.35	0.02	0.000%
10	19.88	-41.80	11.48	-19.88	41.80	-11.48	0.000%
11	19.88	-31.35	11.48	-19.88	31.35	-11.48	0.000%
12	11.52	-41.80	20.00	-11.52	41.80	-20.00	0.000%
13	11.52	-31.35	20.00	-11.52	31.35	-20.00	0.000%
14	-0.02	-41.80	23.87	0.02	41.80	-23.87	0.000%
15	-0.02	-31.35	23.87	0.02	31.35	-23.87	0.000%
16	-12.02	-41.80	20.82	12.02	41.80	-20.82	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
17	-12.02	-31.35	20.82	12.02	31.35	-20.82	0.000%
18	-20.03	-41.80	11.59	20.03	41.80	-11.59	0.000%
19	-20.03	-31.35	11.59	20.03	31.35	-11.59	0.000%
20	-23.82	-41.80	0.02	23.82	41.80	-0.02	0.000%
21	-23.82	-31.35	0.02	23.82	31.35	-0.02	0.000%
22	-20.74	-41.80	-11.98	20.74	41.80	11.98	0.000%
23	-20.74	-31.35	-11.98	20.74	31.35	11.98	0.000%
24	-11.79	-41.80	-20.46	11.79	41.80	20.46	0.000%
25	-11.79	-31.35	-20.46	11.79	31.35	20.46	0.000%
26	0.00	-78.24	0.00	-0.00	78.24	0.00	0.000%
27	0.00	-78.24	-6.27	-0.00	78.24	6.27	0.000%
28	3.22	-78.24	-5.58	-3.22	78.24	5.58	0.000%
29	5.44	-78.24	-3.15	-5.44	78.24	3.15	0.000%
30	6.44	-78.24	-0.00	-6.44	78.24	0.00	0.000%
31	5.40	-78.24	3.12	-5.40	78.24	-3.12	0.000%
32	3.13	-78.24	5.42	-3.13	78.24	-5.42	0.000%
33	-0.00	-78.24	6.27	0.00	78.24	-6.27	0.000%
34	-3.21	-78.24	5.55	3.21	78.24	-5.55	0.000%
35	-5.40	-78.24	3.12	5.40	78.24	-3.12	0.000%
36	-6.44	-78.24	0.00	6.44	78.24	-0.00	0.000%
37	-5.44	-78.24	-3.14	5.44	78.24	3.14	0.000%
38	-3.14	-78.24	-5.45	3.14	78.24	5.45	0.000%
39	0.00	-34.83	-5.11	-0.00	34.83	5.11	0.000%
40	2.66	-34.83	-4.60	-2.66	34.83	4.60	0.000%
41	4.53	-34.83	-2.62	-4.53	34.83	2.62	0.000%
42	5.17	-34.83	-0.00	-5.17	34.83	0.00	0.000%
43	4.31	-34.83	2.49	-4.31	34.83	-2.49	0.000%
44	2.50	-34.83	4.34	-2.50	34.83	-4.34	0.000%
45	-0.00	-34.83	5.18	0.00	34.83	-5.18	0.000%
46	-2.61	-34.83	4.52	2.61	34.83	-4.52	0.000%
47	-4.35	-34.83	2.51	4.35	34.83	-2.51	0.000%
48	-5.17	-34.83	0.00	5.17	34.83	-0.00	0.000%
49	-4.50	-34.83	-2.60	4.50	34.83	2.60	0.000%
50	-2.56	-34.83	-4.44	2.56	34.83	4.44	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	5	0.00000001	0.00014281
3	Yes	5	0.00000001	0.00005949
4	Yes	6	0.00000001	0.00019111
5	Yes	6	0.00000001	0.00006466
6	Yes	6	0.00000001	0.00018651
7	Yes	6	0.00000001	0.00006298
8	Yes	5	0.00000001	0.00011204
9	Yes	5	0.00000001	0.00004249
10	Yes	6	0.00000001	0.00018548
11	Yes	6	0.00000001	0.00006297
12	Yes	6	0.00000001	0.00018697
13	Yes	6	0.00000001	0.00006348
14	Yes	5	0.00000001	0.00013506
15	Yes	5	0.00000001	0.00005522
16	Yes	6	0.00000001	0.00018491
17	Yes	6	0.00000001	0.00006255
18	Yes	6	0.00000001	0.00018858
19	Yes	6	0.00000001	0.00006406
20	Yes	5	0.00000001	0.00011608
21	Yes	5	0.00000001	0.00004503
22	Yes	6	0.00000001	0.00018673
23	Yes	6	0.00000001	0.00006325
24	Yes	6	0.00000001	0.00018413
25	Yes	6	0.00000001	0.00006243
26	Yes	4	0.00000001	0.00020361

27	Yes	6	0.00000001	0.00050099
28	Yes	6	0.00000001	0.00056139
29	Yes	6	0.00000001	0.00056041
30	Yes	6	0.00000001	0.00050203
31	Yes	6	0.00000001	0.00055629
32	Yes	6	0.00000001	0.00055578
33	Yes	6	0.00000001	0.00049672
34	Yes	6	0.00000001	0.00055031
35	Yes	6	0.00000001	0.00055041
36	Yes	6	0.00000001	0.00049558
37	Yes	6	0.00000001	0.00055345
38	Yes	6	0.00000001	0.00055415
39	Yes	4	0.00000001	0.00041057
40	Yes	5	0.00000001	0.00005209
41	Yes	5	0.00000001	0.00004927
42	Yes	4	0.00000001	0.00040448
43	Yes	5	0.00000001	0.00004913
44	Yes	5	0.00000001	0.00005006
45	Yes	4	0.00000001	0.00041011
46	Yes	5	0.00000001	0.00004808
47	Yes	5	0.00000001	0.00005040
48	Yes	4	0.00000001	0.00040187
49	Yes	5	0.00000001	0.00004947
50	Yes	5	0.00000001	0.00004823

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 105	14.319	41	0.9717	0.0005
L2	105 - 100	13.301	41	0.9714	0.0005
L3	100 - 95	12.285	41	0.9685	0.0005
L4	95 - 90	11.275	41	0.9616	0.0005
L5	90 - 85	10.273	41	0.9504	0.0005
L6	85 - 80	9.284	41	0.9375	0.0005
L7	80 - 75	8.313	41	0.9165	0.0005
L8	75 - 70	7.368	41	0.8870	0.0005
L9	70 - 65	6.459	41	0.8468	0.0005
L10	65 - 60	5.599	41	0.7946	0.0005
L11	60 - 55	4.799	41	0.7291	0.0004
L12	55 - 50	4.057	41	0.6880	0.0004
L13	50 - 45	3.361	41	0.6388	0.0003
L14	45 - 40	2.722	41	0.5815	0.0003
L15	40 - 39.333	2.146	41	0.5160	0.0002
L16	39.333 - 39.083	2.075	41	0.5066	0.0002
L17	39.083 - 34.083	2.049	41	0.5038	0.0002
L18	34.083 - 30	1.551	41	0.4450	0.0002
L19	30 - 29.75	1.193	41	0.3920	0.0002
L20	29.75 - 25	1.173	41	0.3887	0.0002
L21	25 - 24.75	0.818	41	0.3227	0.0001
L22	24.75 - 19.75	0.801	41	0.3194	0.0001
L23	19.75 - 18.583	0.503	41	0.2502	0.0001
L24	18.583 - 18.333	0.443	41	0.2332	0.0001
L25	18.333 - 13.333	0.431	41	0.2302	0.0001
L26	13.333 - 8.417	0.223	41	0.1670	0.0001
L27	8.417 - 8.067	0.085	41	0.0997	0.0000
L28	8.067 - 7.833	0.078	41	0.0957	0.0000
L29	7.833 - 6	0.073	41	0.0930	0.0000
L30	6 - 5.75	0.042	41	0.0714	0.0000
L31	5.75 - 2	0.038	41	0.0682	0.0000
L32	2 - 1.75	0.004	40	0.0187	0.0000
L33	1.75 - 0	0.003	40	0.0164	0.0000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	T-Arm Mount [TA 702-3]	41	13.708	0.9717	0.0005	206821
105.00	Side Arm Mount [SO 102-3]	41	13.301	0.9714	0.0005	206821
89.00	SitePro1 RMQLP-4120-H10	41	10.074	0.9480	0.0005	22939
76.00	Platform Mount [LP 303-1_HR-1]	41	7.554	0.8937	0.0005	8782
64.00	Perfect Vision PV-LPP12M-HR-B 12.5' Platform w/ Handrail	41	5.434	0.7813	0.0005	4848
30.00	Bridge Stiffener 72" x 1.25" x 11"	41	1.193	0.3920	0.0002	4287

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	110 - 105	66.272	4	4.5049	0.0024
L2	105 - 100	61.563	4	4.5035	0.0024
L3	100 - 95	56.861	4	4.4900	0.0024
L4	95 - 90	52.183	6	4.4580	0.0024
L5	90 - 85	47.549	6	4.4058	0.0024
L6	85 - 80	42.971	6	4.3460	0.0024
L7	80 - 75	38.476	6	4.2483	0.0024
L8	75 - 70	34.102	6	4.1113	0.0024
L9	70 - 65	29.896	6	3.9245	0.0024
L10	65 - 60	25.914	6	3.6820	0.0024
L11	60 - 55	22.216	6	3.3781	0.0020
L12	55 - 50	18.779	6	3.1875	0.0018
L13	50 - 45	15.560	6	2.9595	0.0016
L14	45 - 40	12.599	6	2.6937	0.0014
L15	40 - 39.333	9.935	6	2.3896	0.0011
L16	39.333 - 39.083	9.605	6	2.3461	0.0011
L17	39.083 - 34.083	9.482	6	2.3333	0.0011
L18	34.083 - 30	7.180	6	2.0609	0.0009
L19	30 - 29.75	5.522	6	1.8154	0.0008
L20	29.75 - 25	5.427	6	1.8000	0.0008
L21	25 - 24.75	3.787	6	1.4939	0.0006
L22	24.75 - 19.75	3.709	6	1.4786	0.0006
L23	19.75 - 18.583	2.326	6	1.1584	0.0005
L24	18.583 - 18.333	2.052	6	1.0796	0.0004
L25	18.333 - 13.333	1.996	6	1.0656	0.0004
L26	13.333 - 8.417	1.032	4	0.7728	0.0003
L27	8.417 - 8.067	0.394	4	0.4615	0.0002
L28	8.067 - 7.833	0.361	4	0.4428	0.0002
L29	7.833 - 6	0.340	4	0.4302	0.0002
L30	6 - 5.75	0.194	4	0.3303	0.0001
L31	5.75 - 2	0.177	4	0.3155	0.0001
L32	2 - 1.75	0.018	4	0.0865	0.0000
L33	1.75 - 0	0.014	4	0.0760	0.0000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
107.00	T-Arm Mount [TA 702-3]	4	63.446	4.5050	0.0024	45079
105.00	Side Arm Mount [SO 102-3]	4	61.563	4.5035	0.0024	45079
89.00	SitePro1 RMQLP-4120-H10	6	46.628	4.3951	0.0024	4993
76.00	Platform Mount [LP 303-1_HR-1]	6	34.965	4.1426	0.0024	1909
64.00	Perfect Vision PV-LPP12M-HR-B 12.5' Platform w/ Handrail	6	25.151	3.6206	0.0024	1052

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
30.00	Bridge Stiffener 72" x 1.25" x 11"	6	5.522	1.8154	0.0008	927

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	110 - 105 (1)	P24x0.25	5.00	0.00	0.0	18.6532	-1.45	662.26	0.002
L2	105 - 100 (2)	P24x0.25	5.00	0.00	0.0	18.6532	-2.61	662.26	0.004
L3	100 - 95 (3)	P24x0.25	5.00	0.00	0.0	18.6532	-3.00	662.26	0.005
L4	95 - 90 (4)	P24x0.25	5.00	0.00	0.0	18.6532	-3.39	662.26	0.005
L5	90 - 85 (5)	P24x0.375	5.00	0.00	0.0	27.8325	-8.16	1052.07	0.008
L6	85 - 80 (6)	P24x0.375	5.00	0.00	0.0	27.8325	-8.84	1052.07	0.008
L7	80 - 75 (7)	P24x0.375	5.00	0.00	0.0	27.8325	-13.21	1052.07	0.013
L8	75 - 70 (8)	P24x0.375	5.00	0.00	0.0	27.8325	-14.05	1052.07	0.013
L9	70 - 65 (9)	P24x0.375	5.00	0.00	0.0	27.8325	-14.92	1052.07	0.014
L10	65 - 60 (10)	P24x0.375	5.00	0.00	0.0	27.8325	-18.94	1052.07	0.018
L11	60 - 55 (11)	P30x0.375	5.00	0.00	0.0	34.9011	-19.99	1311.06	0.015
L12	55 - 50 (12)	P30x0.375	5.00	0.00	0.0	34.9011	-21.05	1311.06	0.016
L13	50 - 45 (13)	P30x0.375	5.00	0.00	0.0	34.9011	-22.13	1311.06	0.017
L14	45 - 40 (14)	P30x0.375	5.00	0.00	0.0	34.9011	-23.23	1311.06	0.018
L15	40 - 39.333 (15)	P30x0.375	0.67	0.00	0.0	34.9011	-23.38	1311.06	0.018
L16	39.333 - 39.083 (16)	P30x0.4875	0.25	0.00	0.0	45.1992	-23.45	1708.53	0.014
L17	39.083 - 34.083 (17)	P30x0.4875	5.00	0.00	0.0	45.1992	-24.70	1708.53	0.014
L18	34.083 - 30 (18)	P30x0.4875	4.08	0.00	0.0	45.1992	-25.75	1708.53	0.015
L19	30 - 29.75 (19)	P30x0.5	0.25	0.00	0.0	46.3385	-30.69	1751.60	0.018
L20	29.75 - 25 (20)	P30x0.5	4.75	0.00	0.0	46.3385	-31.95	1751.60	0.018
L21	25 - 24.75 (21)	P30x0.55625	0.25	0.00	0.0	51.4533	-32.05	1944.93	0.016
L22	24.75 - 19.75 (22)	P30x0.55625	5.00	0.00	0.0	51.4533	-33.75	1944.93	0.017
L23	19.75 - 18.583 (23)	P30x0.55625	1.17	0.00	0.0	51.4533	-34.15	1944.93	0.018
L24	18.583 - 18.333 (24)	P30x0.6875	0.25	0.00	0.0	63.3105	-34.27	2393.14	0.014
L25	18.333 - 13.333 (25)	P30x0.6875	5.00	0.00	0.0	63.3105	-36.32	2393.14	0.015
L26	13.333 - 8.417 (26)	P30x0.6875	4.92	0.00	0.0	63.3105	-38.35	2393.14	0.016
L27	8.417 - 8.067	P30x0.8625	0.35	0.00	0.0	78.951	-38.51	2984.37	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L28	8.067 - 7.833 (28)	P30x0.8625	0.23	0.00	0.0	78.9517	-38.62	2984.37	0.013
L29	7.833 - 6 (29)	P30x0.8625	1.83	0.00	0.0	78.9517	-39.39	2984.37	0.013
L30	6 - 5.75 (30)	P30x0.8	0.25	0.00	0.0	73.3876	-39.50	2774.05	0.014
L31	5.75 - 2 (31)	P30x0.8	3.75	0.00	0.0	73.3876	-40.86	2774.05	0.015
L32	2 - 1.75 (32)	P30x1.25	0.25	0.00	0.0	112.9010	-40.99	4267.66	0.010
L33	1.75 - 0 (33)	P30x1.225	1.75	0.00	0.0	110.7390	-41.78	4185.94	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	110 - 105 (1)	P24x0.25	4.59	396.68	0.012	0.00	396.68	0.000
L2	105 - 100 (2)	P24x0.25	20.79	396.68	0.052	0.00	396.68	0.000
L3	100 - 95 (3)	P24x0.25	38.64	396.68	0.097	0.00	396.68	0.000
L4	95 - 90 (4)	P24x0.25	58.13	396.68	0.147	0.00	396.68	0.000
L5	90 - 85 (5)	P24x0.375	107.42	623.72	0.172	0.00	623.72	0.000
L6	85 - 80 (6)	P24x0.375	159.74	623.72	0.256	0.00	623.72	0.000
L7	80 - 75 (7)	P24x0.375	217.63	623.72	0.349	0.00	623.72	0.000
L8	75 - 70 (8)	P24x0.375	292.90	623.72	0.470	0.00	623.72	0.000
L9	70 - 65 (9)	P24x0.375	369.58	623.72	0.593	0.00	623.72	0.000
L10	65 - 60 (10)	P24x0.375	463.58	623.72	0.743	0.00	623.72	0.000
L11	60 - 55 (11)	P30x0.375	563.14	947.86	0.594	0.00	947.86	0.000
L12	55 - 50 (12)	P30x0.375	664.44	947.86	0.701	0.00	947.86	0.000
L13	50 - 45 (13)	P30x0.375	767.33	947.86	0.810	0.00	947.86	0.000
L14	45 - 40 (14)	P30x0.375	871.66	947.86	0.920	0.00	947.86	0.000
L15	40 - 39.333 (15)	P30x0.375	885.67	947.86	0.934	0.00	947.86	0.000
L16	39.333 - 39.083 (16)	P30x0.4875	890.94	1273.78	0.699	0.00	1273.78	0.000
L17	39.083 - 34.083 (17)	P30x0.4875	997.02	1273.78	0.783	0.00	1273.78	0.000
L18	34.083 - 30 (18)	P30x0.4875	1084.72	1273.78	0.852	0.00	1273.78	0.000
L19	30 - 29.75 (19)	P30x0.5	1090.17	1311.10	0.831	0.00	1311.10	0.000
L20	29.75 - 25 (20)	P30x0.5	1194.43	1311.10	0.911	0.00	1311.10	0.000
L21	25 - 24.75 (21)	P30x0.55625	1199.95	1481.77	0.810	0.00	1481.77	0.000
L22	24.75 - 19.75 (22)	P30x0.55625	1311.40	1481.77	0.885	0.00	1481.77	0.000
L23	19.75 - 18.583 (23)	P30x0.55625	1337.72	1481.77	0.903	0.00	1481.77	0.000
L24	18.583 - 18.333 (24)	P30x0.6875	1343.38	1861.09	0.722	0.00	1861.09	0.000
L25	18.333 - 13.333 (25)	P30x0.6875	1457.60	1861.09	0.783	0.00	1861.09	0.000
L26	13.333 - 8.417 (26)	P30x0.6875	1571.97	1861.09	0.845	0.00	1861.09	0.000
L27	8.417 - 8.067 (27)	P30x0.8625	1580.18	2307.28	0.685	0.00	2307.28	0.000
L28	8.067 - 7.833 (28)	P30x0.8625	1585.68	2307.28	0.687	0.00	2307.28	0.000
L29	7.833 - 6 (29)	P30x0.8625	1628.95	2307.28	0.706	0.00	2307.28	0.000
L30	6 - 5.75 (30)	P30x0.8	1634.88	2149.19	0.761	0.00	2149.19	0.000
L31	5.75 - 2 (31)	P30x0.8	1725.27	2149.19	0.803	0.00	2149.19	0.000
L32	2 - 1.75 (32)	P30x1.25	1731.35	3256.64	0.532	0.00	3256.64	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L33	1.75 - 0 (33)	P30x1.225	1774.10	3196.97	0.555	0.00	3196.97	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	110 - 105 (1)	P24x0.25	1.70	201.86	0.008	0.00	324.23	0.000
L2	105 - 100 (2)	P24x0.25	3.41	201.86	0.017	0.00	324.23	0.000
L3	100 - 95 (3)	P24x0.25	3.74	201.86	0.019	0.00	324.23	0.000
L4	95 - 90 (4)	P24x0.25	4.06	201.86	0.020	0.00	324.23	0.000
L5	90 - 85 (5)	P24x0.375	10.30	315.62	0.033	0.00	655.57	0.000
L6	85 - 80 (6)	P24x0.375	10.63	315.62	0.034	0.00	655.57	0.000
L7	80 - 75 (7)	P24x0.375	14.89	315.62	0.047	0.00	655.57	0.000
L8	75 - 70 (8)	P24x0.375	15.18	315.62	0.048	0.00	655.57	0.000
L9	70 - 65 (9)	P24x0.375	15.46	315.62	0.049	0.00	655.57	0.000
L10	65 - 60 (10)	P24x0.375	19.73	315.62	0.062	0.47	655.57	0.001
L11	60 - 55 (11)	P30x0.375	20.08	395.78	0.051	0.47	994.73	0.000
L12	55 - 50 (12)	P30x0.375	20.42	395.78	0.052	0.47	994.73	0.000
L13	50 - 45 (13)	P30x0.375	20.72	395.78	0.052	0.47	994.73	0.000
L14	45 - 40 (14)	P30x0.375	21.00	395.78	0.053	0.47	994.73	0.000
L15	40 - 39.333 (15)	P30x0.375	21.03	395.78	0.053	0.47	994.73	0.000
L16	39.333 - 39.083 (16)	P30x0.4875	21.04	512.56	0.041	0.47	1329.93	0.000
L17	39.083 - 34.083 (17)	P30x0.4875	21.36	512.56	0.042	0.47	1329.93	0.000
L18	34.083 - 30 (18)	P30x0.4875	21.59	512.56	0.042	0.47	1329.93	0.000
L19	30 - 29.75 (19)	P30x0.5	21.74	525.48	0.041	0.47	1362.88	0.000
L20	29.75 - 25 (20)	P30x0.5	22.05	525.48	0.042	0.41	1362.88	0.000
L21	25 - 24.75 (21)	P30x0.55625	22.05	583.48	0.038	0.41	1510.43	0.000
L22	24.75 - 19.75 (22)	P30x0.55625	22.50	583.48	0.039	0.41	1510.43	0.000
L23	19.75 - 18.583 (23)	P30x0.55625	22.61	583.48	0.039	0.41	1510.43	0.000
L24	18.583 - 18.333 (24)	P30x0.6875	22.61	717.94	0.031	0.41	1850.21	0.000
L25	18.333 - 13.333 (25)	P30x0.6875	23.05	717.94	0.032	0.41	1850.21	0.000
L26	13.333 - 8.417 (26)	P30x0.6875	23.47	717.94	0.033	0.41	1850.21	0.000
L27	8.417 - 8.067 (27)	P30x0.8625	23.48	895.31	0.026	0.41	2293.54	0.000
L28	8.067 - 7.833 (28)	P30x0.8625	23.50	895.31	0.026	0.41	2293.54	0.000
L29	7.833 - 6 (29)	P30x0.8625	23.70	895.31	0.026	0.41	2293.54	0.000
L30	6 - 5.75 (30)	P30x0.8	23.69	832.22	0.028	0.41	2136.47	0.000
L31	5.75 - 2 (31)	P30x0.8	24.35	832.22	0.029	0.46	2136.47	0.000
L32	2 - 1.75 (32)	P30x1.25	24.35	1280.30	0.019	0.46	3236.15	0.000
L33	1.75 - 0 (33)	P30x1.225	24.50	1255.78	0.020	0.46	3176.94	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	110 - 105 (1)	0.002	0.012	0.000	0.008	0.000	0.014	1.050	4.8.2
L2	105 - 100 (2)	0.004	0.052	0.000	0.017	0.000	0.057	1.050	4.8.2
L3	100 - 95 (3)	0.005	0.097	0.000	0.019	0.000	0.102	1.050	4.8.2
L4	95 - 90 (4)	0.005	0.147	0.000	0.020	0.000	0.152	1.050	4.8.2
L5	90 - 85 (5)	0.008	0.172	0.000	0.033	0.000	0.181	1.050	4.8.2
L6	85 - 80 (6)	0.008	0.256	0.000	0.034	0.000	0.266	1.050	4.8.2
L7	80 - 75 (7)	0.013	0.349	0.000	0.047	0.000	0.364	1.050	4.8.2
L8	75 - 70 (8)	0.013	0.470	0.000	0.048	0.000	0.485	1.050	4.8.2
L9	70 - 65 (9)	0.014	0.593	0.000	0.049	0.000	0.609	1.050	4.8.2
L10	65 - 60 (10)	0.018	0.743	0.000	0.062	0.001	0.765	1.050	4.8.2
L11	60 - 55 (11)	0.015	0.594	0.000	0.051	0.000	0.612	1.050	4.8.2
L12	55 - 50 (12)	0.016	0.701	0.000	0.052	0.000	0.720	1.050	4.8.2
L13	50 - 45 (13)	0.017	0.810	0.000	0.052	0.000	0.829	1.050	4.8.2
L14	45 - 40 (14)	0.018	0.920	0.000	0.053	0.000	0.940	1.050	4.8.2
L15	40 - 39.333 (15)	0.018	0.934	0.000	0.053	0.000	0.955	1.050	4.8.2
L16	39.333 - 39.083 (16)	0.014	0.699	0.000	0.041	0.000	0.715	1.050	4.8.2
L17	39.083 - 34.083 (17)	0.014	0.783	0.000	0.042	0.000	0.799	1.050	4.8.2
L18	34.083 - 30 (18)	0.015	0.852	0.000	0.042	0.000	0.868	1.050	4.8.2
L19	30 - 29.75 (19)	0.018	0.831	0.000	0.041	0.000	0.851	1.050	4.8.2
L20	29.75 - 25 (20)	0.018	0.911	0.000	0.042	0.000	0.931	1.050	4.8.2
L21	25 - 24.75 (21)	0.016	0.810	0.000	0.038	0.000	0.828	1.050	4.8.2
L22	24.75 - 19.75 (22)	0.017	0.885	0.000	0.039	0.000	0.904	1.050	4.8.2
L23	19.75 - 18.583 (23)	0.018	0.903	0.000	0.039	0.000	0.922	1.050	4.8.2
L24	18.583 - 18.333 (24)	0.014	0.722	0.000	0.031	0.000	0.737	1.050	4.8.2
L25	18.333 - 13.333 (25)	0.015	0.783	0.000	0.032	0.000	0.799	1.050	4.8.2
L26	13.333 - 8.417 (26)	0.016	0.845	0.000	0.033	0.000	0.862	1.050	4.8.2
L27	8.417 - 8.067 (27)	0.013	0.685	0.000	0.026	0.000	0.698	1.050	4.8.2
L28	8.067 - 7.833 (28)	0.013	0.687	0.000	0.026	0.000	0.701	1.050	4.8.2
L29	7.833 - 6 (29)	0.013	0.706	0.000	0.026	0.000	0.720	1.050	4.8.2
L30	6 - 5.75 (30)	0.014	0.761	0.000	0.028	0.000	0.776	1.050	4.8.2
L31	5.75 - 2 (31)	0.015	0.803	0.000	0.029	0.000	0.818	1.050	4.8.2
L32	2 - 1.75 (32)	0.010	0.532	0.000	0.019	0.000	0.542	1.050	4.8.2
L33	1.75 - 0 (33)	0.010	0.555	0.000	0.020	0.000	0.565	1.050	4.8.2

Section Capacity Table

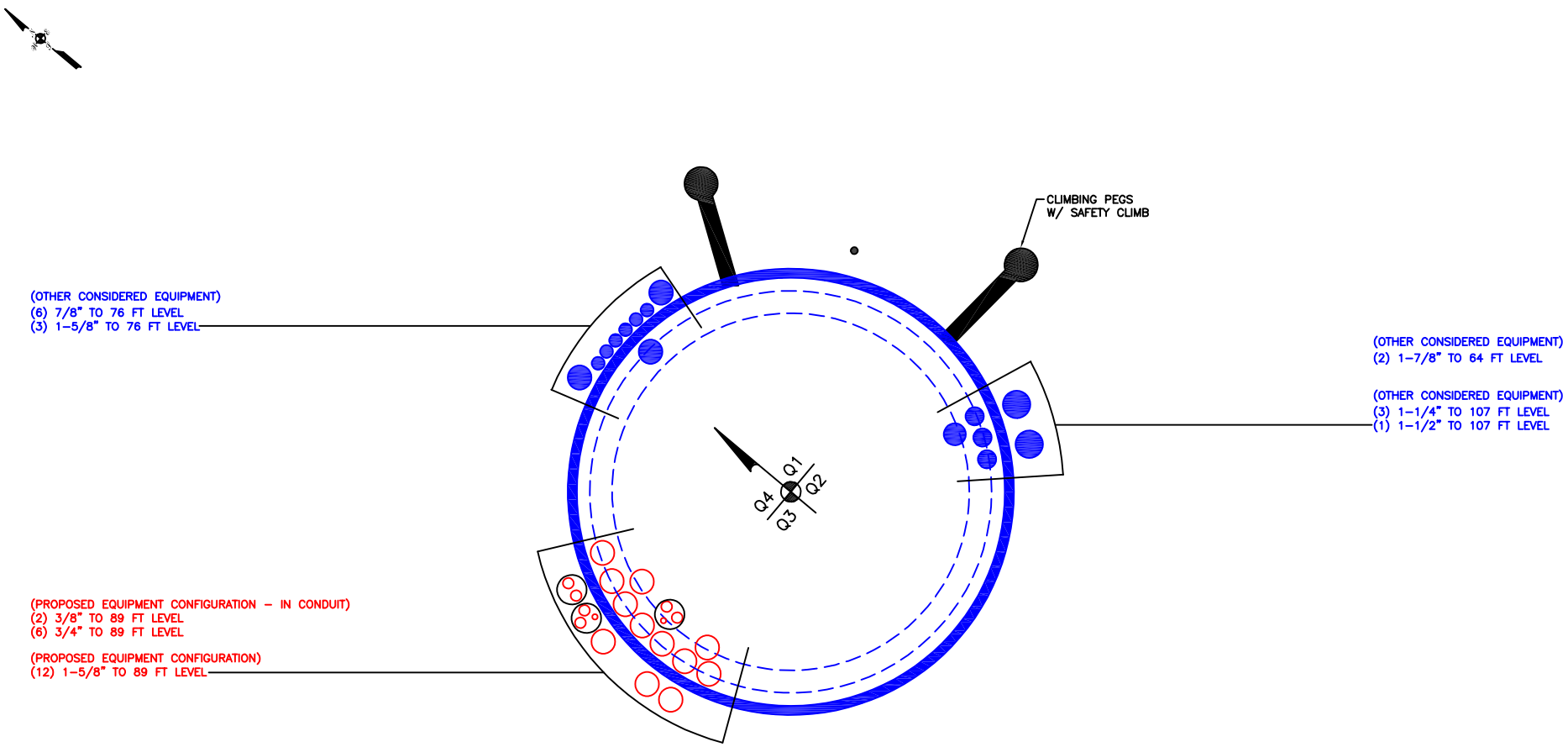
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	110 - 105	Pole	P24x0.25	1	-1.45	695.38	1.3	Pass
L2	105 - 100	Pole	P24x0.25	2	-2.61	695.38	5.4	Pass
L3	100 - 95	Pole	P24x0.25	3	-3.00	695.38	9.7	Pass
L4	95 - 90	Pole	P24x0.25	4	-3.39	695.38	14.5	Pass
L5	90 - 85	Pole	P24x0.375	5	-8.16	1104.67	17.2	Pass
L6	85 - 80	Pole	P24x0.375	6	-8.84	1104.67	25.3	Pass
L7	80 - 75	Pole	P24x0.375	7	-13.21	1104.67	34.6	Pass
L8	75 - 70	Pole	P24x0.375	8	-14.05	1104.67	46.2	Pass
L9	70 - 65	Pole	P24x0.375	9	-14.92	1104.67	58.0	Pass
L10	65 - 60	Pole	P24x0.375	10	-18.94	1104.67	72.9	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L11	60 - 55	Pole	P30x0.375	11	-19.99	1376.61	58.3	Pass
L12	55 - 50	Pole	P30x0.375	12	-21.05	1376.61	68.5	Pass
L13	50 - 45	Pole	P30x0.375	13	-22.13	1376.61	79.0	Pass
L14	45 - 40	Pole	P30x0.375	14	-23.23	1376.61	89.5	Pass
L15	40 - 39.333	Pole	P30x0.375	15	-23.38	1376.61	91.0	Pass
L16	39.333 - 39.083	Pole	P30x0.4875	16	-23.45	1793.96	68.1	Pass
L17	39.083 - 34.083	Pole	P30x0.4875	17	-24.70	1793.96	76.1	Pass
L18	34.083 - 30	Pole	P30x0.4875	18	-25.75	1793.96	82.7	Pass
L19	30 - 29.75	Pole	P30x0.5	19	-30.69	1839.18	81.0	Pass
L20	29.75 - 25	Pole	P30x0.5	20	-31.95	1839.18	88.7	Pass
L21	25 - 24.75	Pole	P30x0.55625	21	-32.05	2042.18	78.8	Pass
L22	24.75 - 19.75	Pole	P30x0.55625	22	-33.75	2042.18	86.1	Pass
L23	19.75 - 18.583	Pole	P30x0.55625	23	-34.15	2042.18	87.8	Pass
L24	18.583 - 18.333	Pole	P30x0.6875	24	-34.27	2512.80	70.2	Pass
L25	18.333 - 13.333	Pole	P30x0.6875	25	-36.32	2512.80	76.1	Pass
L26	13.333 - 8.417	Pole	P30x0.6875	26	-38.35	2512.80	82.1	Pass
L27	8.417 - 8.067	Pole	P30x0.8625	27	-38.51	3133.59	66.5	Pass
L28	8.067 - 7.833	Pole	P30x0.8625	28	-38.62	3133.59	66.8	Pass
L29	7.833 - 6	Pole	P30x0.8625	29	-39.39	3133.59	68.6	Pass
L30	6 - 5.75	Pole	P30x0.8	30	-39.50	2912.75	73.9	Pass
L31	5.75 - 2	Pole	P30x0.8	31	-40.86	2912.75	77.9	Pass
L32	2 - 1.75	Pole	P30x1.25	32	-40.99	4481.04	51.6	Pass
L33	1.75 - 0	Pole	P30x1.225	33	-41.78	4395.24	53.8	Pass
							Summary	
						Pole (L15)	91.0	Pass
						RATING =	**91.0**	**Pass**

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

APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(OTHER CONSIDERED EQUIPMENT)
(6) 7/8" TO 76 FT LEVEL
(3) 1-5/8" TO 76 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 1-7/8" TO 64 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(3) 1-1/4" TO 107 FT LEVEL
(1) 1-1/2" TO 107 FT LEVEL
Q1
Q2
Q3
Q4
(PROPOSED EQUIPMENT CONFIGURATION - IN CONDUIT)
(2) 3/8" TO 89 FT LEVEL
(6) 3/4" TO 89 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(12) 1-5/8" TO 89 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876325

Work Order: 1912115

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	110	20		0	24	24	0.25		A53-B-42
2	90	30		0	24.00	24	0.375		A53-B-42
3	60	30		0	30.00	30	0.375		A53-B-42
4	30	30		0	30.00	30	0.5		A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	8.083	channel	MP3-05 (Bottom Weld	4	45	135	225	315														
2	30	39.333	channel	MP3-03 (1.1875in)	3	105	225	345															
3	8.417	18.583	channel	MP3-05 (1.1875in)	3	0	90	270															
4	0	2	plate	TS 7"x1.25"	3	110	248	345															
5	6	25	plate	CCI-SFP-045100	4	70	110	250	290														
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	5.33	2.09	5.65	0.79	Welded	n/a	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
2	4.06	1.57	2.92	0.59	PC 8.8 - M20 (100)	14	PC 8.8 - M20 (100)	14.000	18.000	2.545	1.1875	A572-65
3	5.33	2.09	5.65	0.79	PC 8.8 - M20 (100)	29	PC 8.8 - M20 (100)	29.000	18.000	5.025	1.1875	A572-65
4	1.25	7	8.75	3.5	Welded	n/a	Welded	n/a	0.000	8.750	0.0000	A572-65
5	4.5	1	4.5	0.5	PC 8.8 - M20 (100)	18	PC 8.8 - M20 (100)	18.000	20.000	3.250	1.1875	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
MP3-05 (Bottom Weld)	Top	10	N	3	2	-	-	-	-	-	-	-	-	-
	Bottom	-	-	-	-	70	None	-	-	-	-	12	0.375	-
TS 7"x1.25"	Top	-	-	-	-	80	None	-	-	-	-	18	0.375	-
	Bottom	-	-	-	-	80	CJP Groove	6.25	1.25	45	0.625	-	-	-

TNX Geometry Input

Increment (ft): 5 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	110 - 105	5		0	24.000	24.000	0.25	A53-B-42	1.000
2	105 - 100	5		0	24.000	24.000	0.25	A53-B-42	1.000
3	100 - 95	5		0	24.000	24.000	0.25	A53-B-42	1.000
4	95 - 90	5	0	0	24.000	24.000	0.25	A53-B-42	1.000
5	90 - 85	5		0	24.000	24.000	0.375	A53-B-42	1.000
6	85 - 80	5		0	24.000	24.000	0.375	A53-B-42	1.000
7	80 - 75	5		0	24.000	24.000	0.375	A53-B-42	1.000
8	75 - 70	5		0	24.000	24.000	0.375	A53-B-42	1.000
9	70 - 65	5		0	24.000	24.000	0.375	A53-B-42	1.000
10	65 - 60	5	0	0	24.000	24.000	0.375	A53-B-42	1.000
11	60 - 55	5		0	30.000	30.000	0.375	A53-B-42	1.000
12	55 - 50	5		0	30.000	30.000	0.375	A53-B-42	1.000
13	50 - 45	5		0	30.000	30.000	0.375	A53-B-42	1.000
14	45 - 40	5		0	30.000	30.000	0.375	A53-B-42	1.000
15	40 - 39.333	0.667		0	30.000	30.000	0.375	A53-B-42	1.000
16	39.333 - 39.083	0.25		0	30.000	30.000	0.4875	A53-B-42	0.966
17	39.083 - 34.083	5		0	30.000	30.000	0.4875	A53-B-42	0.966
18	34.083 - 30	4.083	0	0	30.000	30.000	0.4875	A53-B-42	0.966
19	30 - 29.75	0.25		0	30.000	30.000	0.5	A53-B-42	1.000
20	29.75 - 25	4.75		0	30.000	30.000	0.5	A53-B-42	1.000
21	25 - 24.75	0.25		0	30.000	30.000	0.55625	A53-B-42	1.250
22	24.75 - 19.75	5		0	30.000	30.000	0.55625	A53-B-42	1.250
23	19.75 - 18.583	1.167		0	30.000	30.000	0.55625	A53-B-42	1.250
24	18.583 - 18.333	0.25		0	30.000	30.000	0.6875	A53-B-42	1.284
25	18.333 - 13.333	5		0	30.000	30.000	0.6875	A53-B-42	1.284
26	13.333 - 8.417	4.916		0	30.000	30.000	0.6875	A53-B-42	1.284
27	8.417 - 8.067	0.35		0	30.000	30.000	0.8625	A53-B-42	1.101
28	8.067 - 7.833	0.234		0	30.000	30.000	0.8625	A53-B-42	1.101
29	7.833 - 6	1.833		0	30.000	30.000	0.8625	A53-B-42	1.101
30	6 - 5.75	0.25		0	30.000	30.000	0.8	A53-B-42	0.939
31	5.75 - 2	3.75		0	30.000	30.000	0.8	A53-B-42	0.939
32	2 - 1.75	0.25		0	30.000	30.000	1.25	A53-B-42	0.843
33	1.75 - 0	1.75		0	30.000	30.000	1.225	A53-B-42	0.860

TNX Section Forces

Increment (ft):	5	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	110 - 105	1.45	4.59	1.70
2	105 - 100	2.61	20.79	3.41
3	100 - 95	3.00	38.64	3.74
4	95 - 90	3.39	58.13	4.06
5	90 - 85	8.16	107.42	10.30
6	85 - 80	8.84	159.74	10.63
7	80 - 75	13.21	217.63	14.89
8	75 - 70	14.05	292.90	15.18
9	70 - 65	14.92	369.58	15.46
10	65 - 60	18.95	463.58	19.68
11	60 - 55	19.99	563.14	20.08
12	55 - 50	21.05	664.44	20.42
13	50 - 45	22.13	767.33	20.72
14	45 - 40	23.23	871.66	21.00
15	40 - 39.333	23.38	885.68	21.03
16	39.333 - 39.083	23.45	890.94	21.04
17	39.083 - 34.083	24.70	997.01	21.36
18	34.083 - 30	25.75	1084.73	21.59
19	30 - 29.75	30.69	1090.17	21.74
20	29.75 - 25	31.95	1194.44	22.05
21	25 - 24.75	32.05	1199.95	22.05
22	24.75 - 19.75	33.75	1311.40	22.50
23	19.75 - 18.583	34.15	1337.72	22.61
24	18.583 - 18.333	34.27	1343.38	22.61
25	18.333 - 13.333	36.32	1457.60	23.05
26	13.333 - 8.417	38.35	1571.97	23.47
27	8.417 - 8.067	38.51	1580.18	23.48
28	8.067 - 7.833	38.62	1585.69	23.50
29	7.833 - 6	39.39	1628.95	23.70
30	6 - 5.75	39.50	1634.88	23.69
31	5.75 - 2	40.86	1725.26	24.35
32	2 - 1.75	40.99	1731.35	24.35
33	1.75 - 0	41.78	1774.10	24.50

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
110 - 105	Pole	TP24x24x0.25	Pole	1.3%	Pass
105 - 100	Pole	TP24x24x0.25	Pole	5.4%	Pass
100 - 95	Pole	TP24x24x0.25	Pole	9.7%	Pass
95 - 90	Pole	TP24x24x0.25	Pole	14.5%	Pass
90 - 85	Pole	TP24x24x0.375	Pole	17.2%	Pass
85 - 80	Pole	TP24x24x0.375	Pole	25.2%	Pass
80 - 75	Pole	TP24x24x0.375	Pole	34.5%	Pass
75 - 70	Pole	TP24x24x0.375	Pole	46.1%	Pass
70 - 65	Pole	TP24x24x0.375	Pole	57.9%	Pass
65 - 60	Pole	TP24x24x0.375	Pole	72.6%	Pass
60 - 55	Pole	TP30x30x0.375	Pole	58.1%	Pass
55 - 50	Pole	TP30x30x0.375	Pole	68.4%	Pass
50 - 45	Pole	TP30x30x0.375	Pole	78.8%	Pass
45 - 40	Pole	TP30x30x0.375	Pole	89.4%	Pass
40 - 39.33	Pole	TP30x30x0.375	Pole	90.8%	Pass
39.33 - 39.08	Pole + Reinf.	TP30x30x0.4875	Pole	71.3%	Pass
39.08 - 34.08	Pole + Reinf.	TP30x30x0.4875	Pole	79.7%	Pass
34.08 - 30	Pole + Reinf.	TP30x30x0.4875	Pole	86.7%	Pass
30 - 29.75	Pole	TP30x30x0.5	Pole	80.9%	Pass
29.75 - 25	Pole	TP30x30x0.5	Pole	88.6%	Pass
25 - 24.75	Pole + Reinf.	TP30x30x0.5563	Pole	80.1%	Pass
24.75 - 19.75	Pole + Reinf.	TP30x30x0.5563	Pole	87.4%	Pass
19.75 - 18.58	Pole + Reinf.	TP30x30x0.5563	Pole	89.2%	Pass
18.58 - 18.33	Pole + Reinf.	TP30x30x0.6875	Pole	77.5%	Pass
18.33 - 13.33	Pole + Reinf.	TP30x30x0.6875	Pole	84.1%	Pass
13.33 - 8.42	Pole + Reinf.	TP30x30x0.6875	Pole	90.6%	Pass
8.42 - 8.07	Pole + Reinf.	TP30x30x0.8625	Pole	69.8%	Pass
8.07 - 7.83	Pole + Reinf.	TP30x30x0.8625	Pole	70.1%	Pass
7.83 - 6	Pole + Reinf.	TP30x30x0.8625	Pole	72.0%	Pass
6 - 5.75	Pole + Reinf.	TP30x30x0.8	Pole	77.3%	Pass
5.75 - 2	Pole + Reinf.	TP30x30x0.8	Pole	81.6%	Pass
2 - 1.75	Pole + Reinf.	TP30x30x1.25	Reinf. 4 Weldment	79.3%	Pass
1.75 - 0	Pole + Reinf.	TP30x30x1.225	Reinf. 1 Weldment	79.4%	Pass
				Summary	
			Pole	90.8%	Pass
			Reinforcement	80.8%	Pass
			Overall	90.8%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*					
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2	R3	R4	R5
110 - 105	1315	n/a	1315	18.65	n/a	18.65	1.3%					
105 - 100	1315	n/a	1315	18.65	n/a	18.65	5.4%					
100 - 95	1315	n/a	1315	18.65	n/a	18.65	9.7%					
95 - 90	1315	n/a	1315	18.65	n/a	18.65	14.5%					
90 - 85	1942	n/a	1942	27.83	n/a	27.83	17.2%					
85 - 80	1942	n/a	1942	27.83	n/a	27.83	25.2%					
80 - 75	1942	n/a	1942	27.83	n/a	27.83	34.5%					
75 - 70	1942	n/a	1942	27.83	n/a	27.83	46.1%					
70 - 65	1942	n/a	1942	27.83	n/a	27.83	57.9%					
65 - 60	1942	n/a	1942	27.83	n/a	27.83	72.6%					
60 - 55	3829	n/a	3829	34.90	n/a	34.90	58.1%					
55 - 50	3829	n/a	3829	34.90	n/a	34.90	68.4%					
50 - 45	3829	n/a	3829	34.90	n/a	34.90	78.8%					
45 - 40	3829	n/a	3829	34.90	n/a	34.90	89.4%					
40 - 39.33	3829	n/a	3829	34.90	n/a	34.90	90.8%					
39.33 - 39.08	3829	1067	4897	34.90	8.76	43.66	71.3%		66.5%			
39.08 - 34.08	3829	1067	4897	34.90	8.76	43.66	79.7%		74.4%			
34.08 - 30	3829	1067	4897	34.90	8.76	43.66	86.7%		80.8%			
30 - 29.75	5042	n/a	5042	46.34	n/a	46.34	80.9%					
29.75 - 25	5042	n/a	5042	46.34	n/a	46.34	88.6%					
25 - 24.75	5042	533	5575	46.34	18.00	64.34	80.1%					62.8%
24.75 - 19.75	5042	533	5575	46.34	18.00	64.34	87.4%					68.6%
19.75 - 18.58	5042	533	5575	46.34	18.00	64.34	89.2%					69.9%
18.58 - 18.33	5098	1801	6899	46.34	34.95	81.29	77.5%			64.1%		57.9%
18.33 - 13.33	5098	1801	6899	46.34	34.95	81.29	84.1%			69.5%		62.8%
13.33 - 8.42	5098	1801	6899	46.34	34.95	81.29	90.6%			74.9%		67.7%
8.42 - 8.07	5042	3365	8407	46.34	40.60	86.94	69.8%	56.5%				59.8%
8.07 - 7.83	5042	3365	8407	46.34	40.60	86.94	70.1%	56.7%				60.0%
7.83 - 6	5042	3365	8407	46.34	40.60	86.94	72.0%	58.2%				61.6%
6 - 5.75	5042	2832	7874	46.34	22.60	68.94	77.3%	71.0%				
5.75 - 2	5042	2832	7874	46.34	22.60	68.94	81.6%	74.9%				
2 - 1.75	5052	6543	11595	46.34	48.85	95.19	57.7%	51.6%			79.3%	
1.75 - 0	5043	6419	11462	46.34	48.85	95.19	58.5%	79.4%			72.9%	

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

Monopole Flange Plate Connection

Elevation = 90 ft.

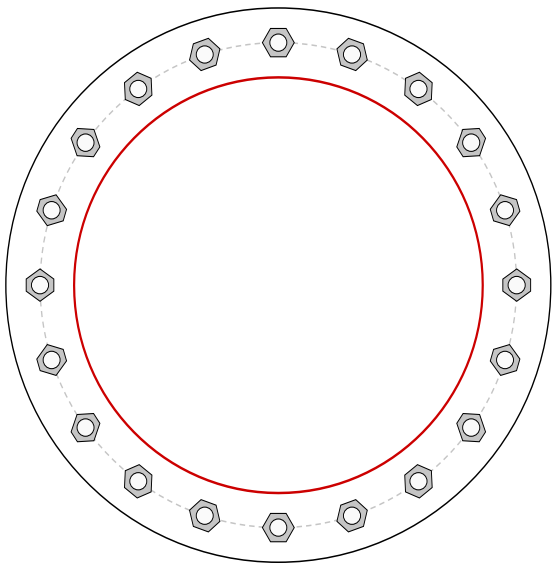
BU #	876325
Site Name	WESTON SQUARE
Order #	517087 Rev.1

TIA-222 Revision	H

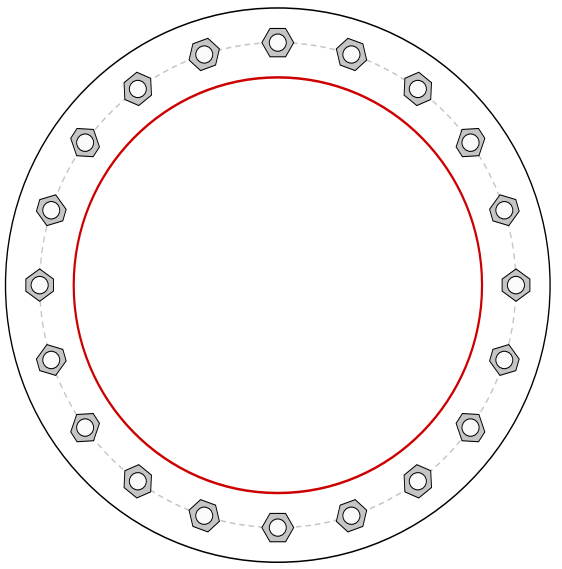
Applied Loads	
Moment (kip-ft)	58.13
Axial Force (kips)	3.39
Shear Force (kips)	4.06

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(20) 1" ø bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 28" BC

Top Plate Data

32" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

24" x 0.25" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

32" OD x 1.5" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	4.81	
Allowable (kips)	54.54	
Stress Rating:	**8.4%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Monopole Flange Plate Connection

Elevation = 60 ft.

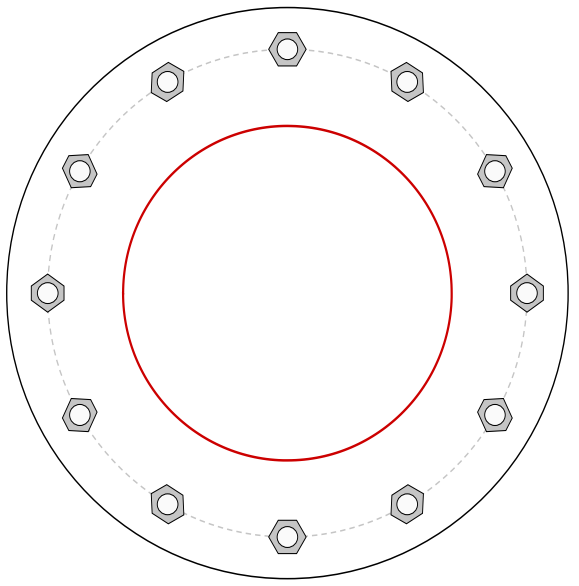
BU #	876325
Site Name	WESTON SQUARE
Order #	517087 Rev.1

TIA-222 Revision	H

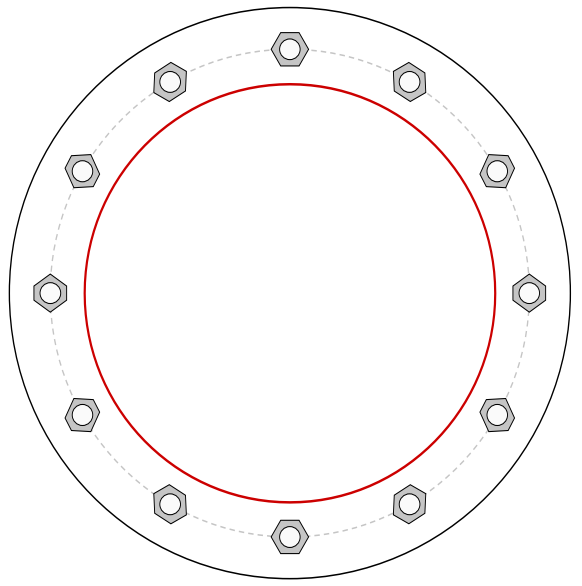
Applied Loads	
Moment (kip-ft)	463.58
Axial Force (kips)	18.95
Shear Force (kips)	19.68

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 35" BC

Top Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

24" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	51.36	
Allowable (kips)	111.01	
Stress Rating:	**44.1%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

BLACK & VEATCH Building a world of difference.	Client:	Crown Castle	Design:	PSA
6800 W 115th St. Suite 2292 Overland Park, KS 66211 Phone: (913) 458-8145	Project:	406642 ('876325.1912115)	Date:	1/12/2021
	Site:	WESTON SQUARE	Verify:	TCN
	Title:	Determination Reactions for Flange Connection	Date:	1/12/2021
			Code:	TIA-222-H

Reactions from TNX at **30** **ft**

Moment	1084.73	kip-ft
Axial	25.75	kips
Shear	21.59	kips

Flange Bolt Information:

N_{fb}	12	
Dia_{fb}	1.5	in
BC_{fb}	35	in
Ag_{fb}	1.7671	in^2
Group Area	21.21	in^2
Group Moment of Intertia	3247.13	in^4

Note: Flange bolts are assumed to take moment, full axial, and full shear.

Bridge Stiffener Information:

N_{bs}	3	
BC_{bs}	47	in
A_{bs}	6.25	in^2
Group Area	18.75	in^2
Group Moment of Intertia	5177.34	in^4

Note: Bridge stiffeners are assumed to take Moment only.

Jump Plate Information:

N_{jp}	3	
BC_{jp}	43	in
A_{jp}	6.25	in^2
Group Area	18.75	in^2
Group Moment of Intertia	4333.59	in^4

Note: Jump plates are assumed to take Moment only.

		Bolt	Bridge Stiffener	Jump Plate	Total	
Properties	Group Area, A	21.21	18.75	18.75	58.71	in^2
	Moment of Intertia, I	3247.13	5177.34	4333.59	12758.07	in^4
Reactions	Moment	276.08	440.19	368.46	1084.73	kip-ft
	Axial	25.75			25.75	kips
	Shear	21.59			21.59	kips

See attached additional calculations for capacities of connections

Welded-Plate Monopole Bridge Stiffeners
per TIA-222-H

CROWN CASTLE

Site Data

BU#: *876325*
Site Name: *WESTON SQUARE*
Order #: *517087 Rev.1*

Factored Loads at Splice Elevation		
Moment:	716.27	ft-kips
Axial:	25.75	kips
Shear:	21.59	kips

Elevation:	30	ft

Splice Bolt Data		
Quantity:	12	
Bolt Diameter:	1.5	in
Bolt Circle:	35	in

Pole Data		
Upper Diam:	30	in
Upper Thickness	0.375	in
Lower Diam:	30	in
Lower Thickness	0.5	in
Pipe Steel (Fy):	42	ksi

Bridge Stiffener Data		
Quantity:	3	
Total Length:	72.0	in
Plate Thickness:	1.250	in
Steel Grade (Fy):	65.0	ksi
Steel Ultimate (Fu):	80.0	ksi
Weld Type:	Fillet (both sides)	
Weld Size:	0.375	in
Weld Strength:	80	ksi
Upper Weld Length:	34	in
Upper Weld, C:	3.31	
Upper Plate Width:	11	in
Lower Weld Length:	32.375	in
Lower Weld, C:	3.25	
Lower Plate Width:	11	in
Gap PL Length:	5.6	in
Gap PL Width:	5	in

Stress Increase Factor		
ASIF:	1.000	

Stiffener Results	41.9%	
Maximum Compression:	149.9	kips
Allowable Compression:	357.3	kips
Compression Stress Ratio:	41.9%	
Maximum Tension:	149.9	kips
Allowable Tension:	365.6	kips
Tension Stress Ratio:	41.0%	
Maximum Flexure:	1273.7	in.kips
Allowable Flexure:	12774.2	in.kips
Bending&Shear Stress Ratio:	8.3%	

Weld Results	31.6%	
Upper Weld Eccentric Load:	149.85	kip
Allowable Weld Strength:	506.43	kip
Upper Weld Strength Ratio:	29.6%	
Upper Weld Eccentric Load:	149.85	kip
Allowable Weld Strength:	474.18	kip
Lower Weld Strength Ratio:	31.6%	

Pole Results	19.3%	
Punching Shear Stress:	7.29	kip/in
Allowable Punching Stress:	37.80	kip/in
Punching Shear Stress Ratio:	19.3%	

Loads to Use to Check Flange and Bolts w / CCIPlate		
Moment:	276	ft.kips
Axial:	25.8	kips
Shear:	21.6	kips

Bolted Bridge Stiffeners Reinforcement Check

TIA Rev. H

Description:

This sheet is for evaluation of the reinforcement of a flange connection using bolted bridge stiffeners.

Assumptions / Notes:

1. *For design purposes, it is assumed that the proposed bridge stiffeners are to take the full load.*
2. *The plastification of the pole is not considered.*
3. *All shear and axial loads are taken by the flange bolts.*

1. PARAMETERS

Analysis / Design

Flange Elevation: 30'- 0"

1.1 tnxTower Reactions

Apply TIA-222-H Section 15.5? No / Yes

Moment: $M := 644.54kip \cdot ft$

Axial Load: $P := 25.75kip$

Shear Load: $V := 21.59kip$

1.2 Shaft Properties at the Flange

Upper Shaft Diameter: $D_{shaft1} := 30in$

Upper Shaft Thickness: (inches) $t_1 := 0.375$

Lower Shaft Diameter: $D_{shaft2} := 30in$

Lower Shaft Thickness: (inches) $t_2 := 0.5$

Shaft Grade: $Fy_{shaft} := 42ksi$ $Fu_{shaft} := 60ksi$

1.3 Existing Bridge Stiffeners Properties

Number of Existing Bridge Stiffeners: $N_{new} := 3$

Thickness of Existing Bridge Stiffeners: $t_{new} := 1in$

Width of Existing Bridge Stiffeners: $w_{new} := 6.25in$

Diameter to the centroid of Existing Bridge Stiffeners: $BC_{new} := 43in$

Gross Area of One Exisnting Bridge Stiffener: $A_{g\_new} := w_{new} \cdot t_{new} = 6.25 \cdot in^2$

Radius of Gyration about x-axis: $r_x := \frac{t_{new}}{\sqrt{12}} = 0.289 \cdot in$

Moment of Inertia of Proposed Bridge Stiffeners: $I_{new} := \frac{N_{new} \cdot BC_{new}^2 \cdot A_{g\_new}}{8} = 4333.594 \cdot in^4$

1.5 Flange Bolt Properties

Number of Flange Bolts: $N_b := 12$

Diameter of Flange Bolts: 1-1/2"

Bolt Circle of Flange Bolts: $BC_{bolts} := 35in$

Gross Area of One Flange Bolt: $A_{g\_bolts} := \frac{\pi}{4} \cdot D_{bolts}^{2} = 1.767 \cdot in^2$

Moment of Inertia of Flange Bolts: $I_{bolts} := \frac{N_b \cdot BC_{bolts}^{2} \cdot A_{g\_bolts}}{8} = 3247.131 \cdot in^4$

1.6 Division of Forces

Total Gross Area: $A_{g\_total} := N_{new} \cdot A_{g\_new} + N_b \cdot A_{g\_bolts} = 39.956 \cdot in^2$

Total Moment of Inertia: $I_{total} := I_{new} + I_{bolts} = 7580.724 \cdot in^4$

1.8 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners: $M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}} \right) = 368.457 \cdot kip \cdot ft$

Axial Reaction to Proposed Bridge Stiffeners: $P_{new} := 0kip$

Shear Reaction to Proposed Bridge Stiffeners: $V_{new} := 0kip$

1.9 Reactions to Flange Bolts

(It is assumed that all shear and axial loads are taken by the flange bolts)

Moment Reaction to Flange Bolts: $M_{bolts} := M \cdot \left(\frac{I_{bolts}}{I_{total}} \right) = 276.083 \cdot kip \cdot ft$

Axial Reaction to Flange Bolts: $P_{bolts} := P = 25.75 \cdot kip$

Shear Reaction to Flange Bolts: $V_{bolts} := V = 21.59 \cdot kip$

Check Flange Connection in CCIplate with these Reactions

2. Determine Maximum Forces on Bridge Stiffener

2.1 Division of Forces For New Bridge Stiffener Design

Number of Flange Bolts:

$$N_{bolts} := \begin{cases} 0 & \text{if AorD = "Design"} \\ N_b & \text{if AorD = "Analysis"} \end{cases} = 12$$

Moment of Inertia of Flange Bolts:

$$I_{bolts} := \frac{N_{bolts} \cdot BC_{bolts}^{2} \cdot A_{g\_bolts}}{8} = 3247.1305 \cdot in^4$$

Total Gross Area:

$$A_{g\_total} := N_{new} \cdot A_{g\_new} + N_{bolts} \cdot A_{g\_bolts} = 39.956 \cdot in^2$$

Total Moment of Inertia:

$$I_{total} := I_{new} + I_{bolts} = 7580.724 \cdot in^4$$

2.2 Reactions to Proposed Bridge Stiffeners

Moment Reaction to Proposed Bridge Stiffeners:

$$M_{new} := M \cdot \left(\frac{I_{new}}{I_{total}} \right) = 368.457 \cdot kip \cdot ft$$

Axial Reaction to Proposed Bridge Stiffeners:

$$P_{new} := 0kip$$

Shear Reaction to Proposed Bridge Stiffeners:

$$V_{new} := 0kip$$

2.3 Maximum Axial Forces in Single Proposed Bridge Stiffener

Outer Radius of Bolt Circle:

$$C := \frac{BC_{new}}{2} = 21.5 \cdot in$$

Critical Compression Bending Stress:

$$P_{comp} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g\_new} + \frac{P_{new}}{N_{new}} = 137.1 \cdot kip$$

Critical Tension Bending Stress:

$$P_{tens} := \frac{M_{new} \cdot C}{I_{new}} \cdot A_{g\_new} - \frac{P_{new}}{N_{new}} = 137.1 \cdot kip$$

3. Bridge Stiffener Calculations

3.1 Available Compression Strength

[AISC 15th Edition E3-1]

Resistance Factor: $\phi_c := 0.9$

Unbraced Length: $L_u := 18in$

Effective Length Factor: $K := 1.0$

Strength of Bridge Stiffener: $F_y := 65ksi$ $F_u := 80ksi$

Effective Length of Member: $L_c := K \cdot L_u = 18 \cdot in$ [AISC 15th Edition E3-2]

Elastic Buckling Stress:
[AISC 15th Ed., Eq.E3-4]

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_x}\right)^2} = 73.616 \cdot ksi$$

Determination of Crticial Stress:
[AISC 15th Ed., Eqs. E3-2 and E3-3]

$$F_{cr} := \begin{cases} \left(0.658^{\frac{F_y}{F_e}} \cdot F_y\right) & \text{if } 4.71 \cdot \sqrt{\frac{E}{F_y}} \geq \frac{L_c}{r_x} \\ \left(0.877 \cdot F_e\right) & \text{otherwise} \end{cases}$$

$F_{cr} = 44.917 \cdot ksi$

Allowable Compressive Strength:
[AISC 15th Ed., Eqs. J4-6 and E3-1]

$$\phi P_n := \begin{cases} \left(\phi_c \cdot F_y \cdot A_{g\_new}\right) & \text{if } \frac{L_c}{r_x} \leq 25 \\ \left(\phi_c \cdot F_{cr} \cdot A_{g\_new}\right) & \text{otherwise} \end{cases}$$

$\phi P_n = 252.66 \cdot kip$

Check Compressive Strength:

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Capacity_{comp} \leq 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

$Capacity_{comp} = 51.679 \cdot \%$

3.2 Available Tension Strength

Gross Section Yield [AISC 15th Edition Ch. D2]

Available Tension Yield Strength: $\phi P_{ty} := 0.9 \cdot F_y \cdot A_{g\_new} = 365.625 \cdot kip$

Net Section Fracture

Bolt Hole Diameter: $BH := 1.1875in$

Thickness: $T := t_{new} = 1 \cdot in$

Net Area: $A_{net} := A_{g\_new} - \left(BH + \frac{1}{16} in \right) \cdot T = 5 \cdot in^2$

Net Area Limitation: $A_e := A_{net} = 5 \cdot in^2$

Available Fractile Strength: $\phi P_{tr} := 0.75 \cdot F_u \cdot A_e = 300 \cdot kip$

Tension Check

Controlling Mode of Failure:

$$Check_{mode} := \begin{cases} \text{"Fracture Controls"} & \text{if } \frac{P_{tens}}{\phi P_{tr}} > \frac{P_{tens}}{\phi P_{ty}} \\ \text{"Yield Controls"} & \text{otherwise} \end{cases}$$

$Check_{mode} = \text{"Fracture Controls"}$

$$\phi P_{nt} := \begin{cases} \phi P_{tr} & \text{if } Check_{mode} = \text{"Fracture Controls"} \\ \phi P_{ty} & \text{otherwise} \end{cases}$$

Controlling Tension Mode Check:

$$Check_{tension} := \begin{cases} \text{"OK"} & \text{if } Capacity_{tension} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{tension} = \text{"OK"}$

$Capacity_{tension} = 43.524 \cdot \%$

4. Bolt Checks

4.1 Evaluate Bolts for Controlling Capacity of the Plate or Controlling Axial Demand

Controlling Capacity Ratio:

$$Capacity_{max} := \begin{cases} \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) & \text{if S15Allowable = "No"} \\ \max\left(\frac{P_{comp}}{\phi P_n}, \frac{P_{tens}}{\phi P_{ty}}, \frac{P_{tens}}{\phi P_{tr}}\right) \cdot \left(\frac{1}{1.05}\right) & \text{if S15Allowable = "Yes"} \end{cases} = 51.679 \cdot \%$$

Controlling Capacity/Demand:

$$P_{max} = 137.1 \cdot kip$$

4.2 Blind Bolt Properties

[ENG-STD-10183]

Number of Bolts in the Eccentric Bolt Group:

$$N_{be} := 14$$

AJAX - Standard Sleeve
AJAX - Hi Shear Sleeve
NextGen2
FORGBolt
Design
Default

Intermediate Bolt Spacing:

$$L_b := 3in$$

Eccentricity:

$$ecc := \frac{BC_{new} - D_{shaft1}}{2} = 6.5 \cdot in$$

Bolt Diameter:

$$D_b := 20mm$$

Bolt Hole Diameter:

$$D_h := 1.1875in$$

Sleeve Diameter:

$$D_s := 1.14173in$$

Washer Diameter:

$$D_w := 42mm = 1.654 \cdot in$$

Ultimate Strength:

$$Fu_{bolt} := 120ksi$$

Gross Area:

$$A_{gb} := \frac{\pi}{4} \cdot D_b^{\,2} = 0.487 \cdot in^2$$

Allowable Shear:

$$\phi R_{nv} = 53.98 \cdot kip$$

4.4 Eccentric Connection

Bolt Shear Capacity:

$$\phi R_{nv1} := \begin{cases} \phi R_{nv} & \text{if } N_{be} \cdot L_b \le 38\text{in} \\ \left(\phi R_{nv} \cdot 0.833\right) & \text{if } N_{be} \cdot L_b > 38\text{in} \end{cases}$$

[AISC 15th Edition Table J3.2 Note (b)]

$$\phi R_{nv1} = 44.965 \cdot \text{kip}$$

Applied Bolt Shear:

$$V_{max} := \frac{P_{max}}{N_{be}} = 9.793 \cdot \text{kip}$$

$$Check_{ecc1} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shear.eccentric} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$$Check_{ecc1} = \text{"OK"}$$

5. Pole/ Shaft Checks

5.1 Shaft Bearing

[AISC 15th Ed., Eqs. J3-6a and J3-6c]

Minimum Thickness to Bear On:

$$t := \min(t_1, t_2) \cdot in = 0.375 \cdot in$$

Clear Distance from Edge of Hole to Edge of Adjacent Hole:

$$L_{ca} := L_b - D_h = 1.812 \cdot in$$

Bearing By Tear-out:

$$Rn_{shaft1} := 1.2 \cdot L_c \cdot t \cdot Fu_{shaft} = 48.937 \cdot kip$$

Bearing By Hole Deformation:

$$Rn_{shaft2} := 2.4 \cdot D_s \cdot t \cdot Fu_{shaft} = 61.653 \cdot kip$$

Bearing Capacity:

$$\phi Rn_{shaft} := 0.75 \cdot \min(Rn_{shaft1}, Rn_{shaft2}) = 36.703 \cdot kip$$

$$Check_{bearing} := \begin{cases} \text{"OK"} & \text{if } Capacity_{shaft.bearing} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bearing} = \text{"OK"}$

5.2 Pull-Out Check (through shaft wall)

AISC Design Guide 24 Ch. 3

Reduction Factor:

$$\phi := 0.67$$

Hollow Member Pull-Out Capacity:

$$\phi R_n := \phi \cdot (0.6 \cdot \pi \, D_w \cdot t) \cdot Fu_{shaft} = 46.987 \cdot kip$$

$$r_{ut} = 6.062 \cdot kip$$

$$Check_{pull} := \begin{cases} \text{"OK"} & \text{if } Capacity_{pullout} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{pull} = \text{"OK"}$

6. Weld Connection to Filler Plates

6.1 Weld Sizing

Thickness of Filler Plate: 6"

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Length of Filler Plate: $L_{be} := N_{be} \cdot L_b = 42 \cdot in$

Weld Material Grade: (•) E70XX ( ) E80XX

Electrode Strength Coefficient: $C_1 = 1$

Coefficient for Eccentrically Loaded Weld Groups: $C = 3.655$

Weld Reduction Factor: $\phi_w := 0.75$

Minimum Weld Size for Eccentrically Loaded Weld:

$$D_{min} := \frac{P_{max}}{\phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot \frac{kip}{in^2}} = 1.191 \cdot in$$ *(In sixteenths of an inch)*

$$D_{min1} := ceil\left(\frac{D_{min}}{in}\right) \cdot in = 2 \cdot in$$ *(In sixteenths of an inch)*

Minimum Fillet Size per Material Thickness (In sixteenths of an inch): $D_{min2} = 5 \cdot in$ [AISC 15th Edition Table J2.3]

Design Weld Size (In sixteenths of an inch): $D := \max(D_{min1}, D_{min2}) = 5 \cdot in$

6.2 Weld Capacity

Weld Capacity: $\phi R_{nw} := \phi_w \cdot C \cdot C_1 \cdot L_{be} \cdot D \cdot \frac{kip}{in^2} = 575.625 \cdot kip$

Check Weld Does Not Control:

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } Capacity_{weld} \le 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld} = \text{"OK"}$

Weld Size Used: $D = \frac{5}{16} \cdot in$

Monopole Flange Plate Connection

Elevation = 30 ft.

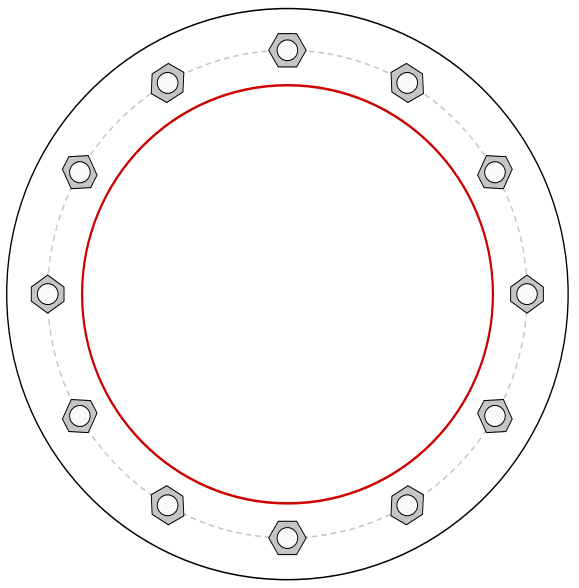
BU #	876325
Site Name	WESTON SQUARE
Order #	517087 Rev.1

TIA-222 Revision	H

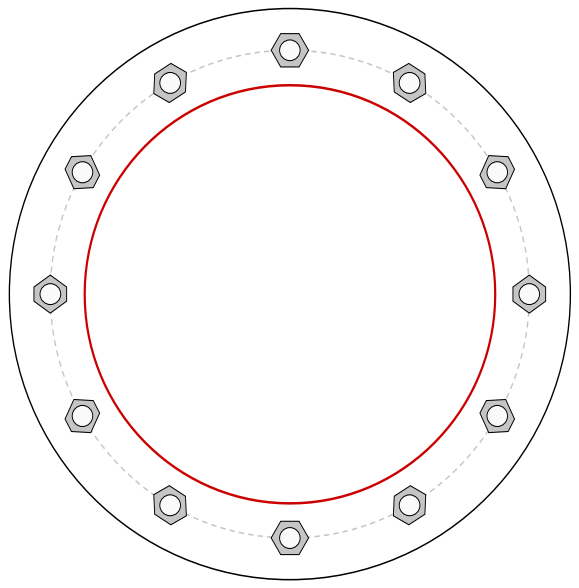
Applied Loads	
Moment (kip-ft)	276.08
Axial Force (kips)	25.75
Shear Force (kips)	21.59

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=105 ksi) on 35" BC

Top Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Stiffener Data

N/A

Bottom Pole Data

30" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	29.38	
Allowable (kips)	111.00	
Stress Rating:	**25.2%**	**Pass**

Top Plate Capacity

Max Stress (ksi):	6.89	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**20.2%**	**Pass**
Tension Side Stress Rating:	**6.6%**	**Pass**

Bottom Plate Capacity

Max Stress (ksi):	6.89	(Flexural)
Allowable Stress (ksi):	32.40	
Stress Rating:	**20.2%**	**Pass**
Tension Side Stress Rating:	**6.6%**	**Pass**

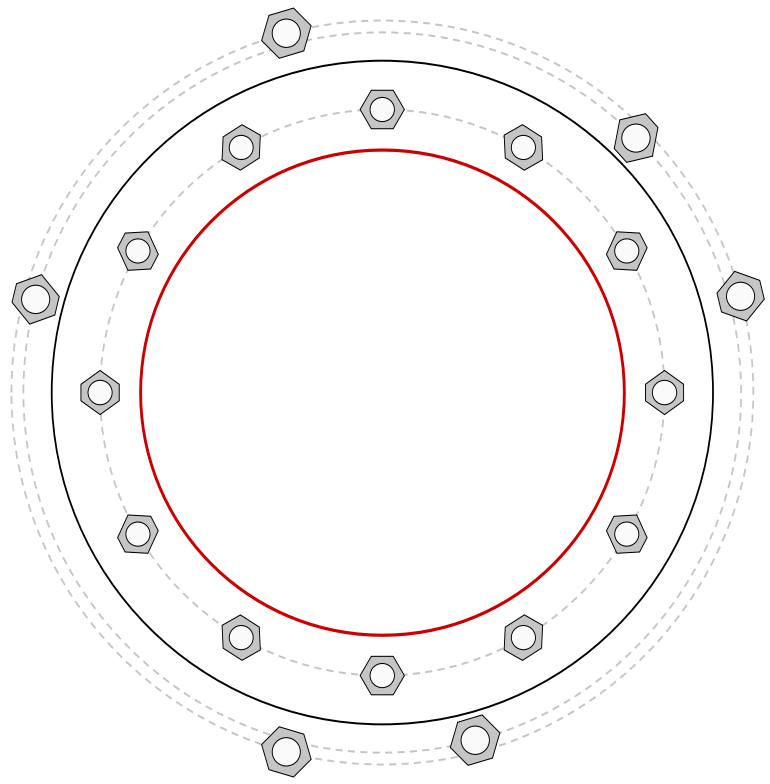
Monopole Base Plate Connection

Site Info	
BU #	876325
Site Name	WESTON SQUARE
Order #	517087 Rev.1

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

Applied Loads	
Moment (kip-ft)	1774.10
Axial Force (kips)	41.78
Shear Force (kips)	24.50

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

GROUP 1: (12) 1-1/2" ø bolts (A354-BC N; Fy=109 ksi, Fu=125 ksi) on 35" BC
GROUP 2: (3) 1-3/4" ø bolts (A722 N; Fy=120 ksi, Fu=125 ksi) on 44.5" BC
GROUP 3: (3) 1-3/4" ø bolts (A193 Gr. B7 N; Fy=105 ksi, Fu=125 ksi) on 46" BC
pos. (deg): 15, 105, 255

Base Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Stiffener Data

N/A

Pole Data

30" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

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

GROUP 1:		
Pu_c = 101.07	ϕPn_c = 173.36	**Stress Rating**
Vu = 2.04	ϕVn = 78.01	**55.6%**
Mu = n/a	ϕMn = n/a	**Pass**
GROUP 2:		
Pu_t = 228.27	ϕPn_t = 243.75	**Stress Rating**
Vu = 0	ϕVn = 121.88	**83.5%**
Mu = 0	ϕMn = 108.42	**Pass**
GROUP 3:		
Pu_t = 157.76	ϕPn_t = 178.13	**Stress Rating**
Vu = 0	ϕVn = 112.75	**74.7%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	20.74	(Flexural)
Allowable Stress (ksi):	32.4	
Stress Rating:	**61.0%**	**Pass**

CCIplate

Elevation (ft)	0	*(Base)*

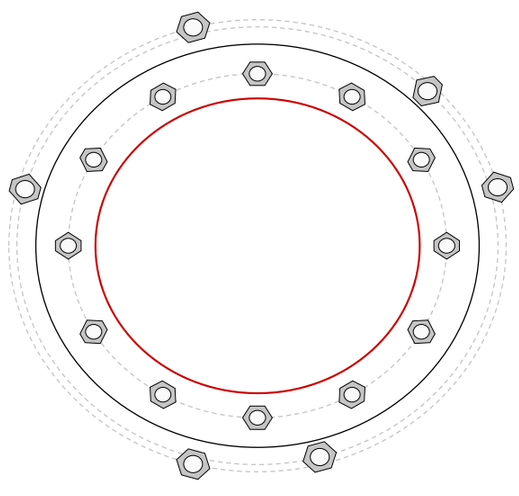
note: Bending interaction not considered when Grout Considered = "Yes"

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

Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η:	l_{ar} (in):	Thread Type	Area Override, in^2	Tension Only
1	1	0	1.5	A354-BC	35	0.5	0.75	N-Included		No
2	1	30	1.5	A354-BC	35	0.5	0.75	N-Included		No
3	1	60	1.5	A354-BC	35	0.5	0.75	N-Included		No
4	1	90	1.5	A354-BC	35	0.5	0.75	N-Included		No
5	1	120	1.5	A354-BC	35	0.5	0.75	N-Included		No
6	1	150	1.5	A354-BC	35	0.5	0.75	N-Included		No
7	1	180	1.5	A354-BC	35	0.5	0.75	N-Included		No
8	1	210	1.5	A354-BC	35	0.5	0.75	N-Included		No
9	1	240	1.5	A354-BC	35	0.5	0.75	N-Included		No
10	1	270	1.5	A354-BC	35	0.5	0.75	N-Included		No
11	1	300	1.5	A354-BC	35	0.5	0.75	N-Included		No
12	1	330	1.5	A354-BC	35	0.5	0.75	N-Included		No
13	2	45	1.75	A722	44.5	0.5	2	N-Included	2.6	No
14	2	165	1.75	A722	44.5	0.5	2	N-Included	2.6	No
15	2	285	1.75	A722	44.5	0.5	2	N-Included	2.6	No
16	3	15	1.75	A193 Gr. B7	46	0.5	1	N-Included		No
17	3	105	1.75	A193 Gr. B7	46	0.5	1	N-Included		No
18	3	255	1.75	A193 Gr. B7	46	0.5	1	N-Included		No

Plot Graphic



Anchor Rod Bracket Calculations:

Additional Anchor Rod Group:

$N_{new} := 3$ $D_{new} := 1.75 \cdot in$ $Fu_{rod} := 125 ksi$

$BC_{new} := 44.5 \cdot in$ $A_{net\_new} := 2.6 \cdot in^2$ $Fy_{rod} := 120 ksi$

$A_{n\_new} := N_{new} \cdot A_{net\_new} = 7.8 \cdot in^2$

Anchor Rod Bracket Calculations

Analysis
Design

Comment = "Analyze the anchor rod brackets to resist the controlling anchor rod demand force"

Anchor Rod Demand Force:

$P_{umax} := 228.27 kip$

Bracket Loading:

$$P_u := \begin{cases} \phi P_n & \text{if AorD = "Design"} \\ P_{umax} & \text{if AorD = "Analysis"} \end{cases} = 228.27 \cdot kip$$

Tube Design (HSS)

Member Size: HSS 4 1/2 x 4 1/2 x 1/2

Apply TIA-222-H Section 15.5? No / Yes

Member Properties (AISC 15th Ed., Table 1-12):

Outside Diameter: $OD_{HSS} := 4.5 \cdot in$

Area: $A_{HSS} := 6.95 \cdot in^2$ $A_{e\_HSS} := 0.75 \cdot A_{HSS} = 5.21 \cdot in^2$

Thickness: $t_{HSS} := 0.465 \cdot in$

Yield Strength: $F_{y\_HSS} := 50 \cdot ksi$ $F_{u\_HSS} := 62 \cdot ksi$

Length: $L_{HSS} := 16 \cdot in$

Moment of Inertia: $I_{HSS} := 18.1 \cdot in^4$

Radius of Gyration: $r_{HSS} := 1.61 \cdot in$

Inside Dimension: $ID_{HSS} := OD_{HSS} - 2 \cdot t_{HSS} = 3.57 \cdot in$

Bearing Check
(AISC 15th Ed., Equation J7-1):

$\phi_b := 0.75$

$Pu\_c = \phi_b \cdot R_n = \phi_b \cdot 1.8 \cdot F_{y\_HSS} \cdot A_{pb}$

$$A_{pb} := \frac{P_u}{\phi_b \cdot 1.8 \cdot F_{y\_HSS}} = 3.38 \cdot in^2$$

$$Check_{bear} := \begin{cases} \text{"OK"} & \text{if } A_{HSS} \geq A_{pb} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{bear} = \text{"OK"}$

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4):

$\phi_c := 0.9$

$K := 1$

$\phi P_{u\_comp} = \phi_c \cdot F_{cr} \cdot A_g$

$L_c := K \cdot L_{HSS} = 16 \cdot in$

$$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_{HSS}}\right)^2} = 2898.07 \cdot ksi$$

$$\frac{L_c}{r_{HSS}} = 9.94 \quad < \quad 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_{y\_HSS}}} = 113.43$$

$$\therefore \quad F_{cr} := 0.658^{\frac{F_{y\_HSS}}{F_e}} \cdot F_{y\_HSS} = 49.64 \cdot ksi$$

(AISC 15th Ed., Equation J4-6):

$$\phi P_{u\_comp} := \begin{cases} \phi_c \cdot F_{y\_HSS} \cdot A_{HSS} & \text{if } \frac{L_c}{r_{HSS}} \le 25 \\ \phi_c \cdot F_{cr} \cdot A_{HSS} & \text{otherwise} \end{cases}$$

$$\phi P_{u\_comp} = 312.75 \cdot kip$$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Rating_{comp} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

Gusset Plate Design

Gusset Plate width: $w_{plate} := 4 \cdot in$

Gusset Plate thickness: $t_{plate} := 1in$

$L_{plate1} := 36in$

$L_{plate2} := 16in$

Gusset Plate Strength: $Fy_{plate} := 65ksi$

$Fu_{plate} := 80ksi$

Pole thickness: $t_{pole} := 0.5in$

Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4):

$A_g := t_{plate} \cdot L_{plate2} = 16 \cdot in^2$

$A_{nv} := A_g = 16 \cdot in^2$

Shear Yielding

$\phi_v := 1$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_g \cdot Fy_{plate} = 624 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{sheary} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Shear Rupture

$\phi_w := 0.75$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_{nv} \cdot Fu_{plate} = 576 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{shearr} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Gusset Plate to Tower and Base Plate Weld Design (Horizontal and

Vertical Weld):
(AISC 15th Ed., Part 8)

Gusset plate thickness: $t_{plate} = 1 \cdot in$

Tower Grade: $Fy_{pole} := 42ksi$ $Fu_{pole} := 63ksi$

Base Plate Grade: $Fy_{base} := 36ksi$ $Fu_{base} := 58ksi$

Gussett Plate Grade: $Fy_{plate} = 65 \cdot ksi$ $Fu_{plate} = 80 \cdot ksi$

Height of vertical weld from base plate: $H := L_{plate1} = 36 \cdot in$

$Notch_{horiz} := 0.75 \cdot in$

$Notch_{vert} := 1 \cdot in$

Gap between Base Plate and HSS: $Gap := 0.5in$

Vertical fillet weld size to pole:
(in sixteenths of an inch) $D_{vpole} := 5$

$$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{5}{16}$$

Electrode Strength: 70ksi / 80ksi

$$Check := \begin{cases} \text{"OK"} & \text{if } Rating_{weld2} < 100\% \\ \text{"INSUFFICIENT"} & \text{otherwise} \end{cases}$$

Check = "OK"

Gusset Plate to HSS Weld Design
(AISC 15th Ed., Table 8-4)

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Electrode Strength: 70ksi / 80ksi

Fillet Weld Size (in sixteenths of an inch): D := 5

Groove Weld: None / 45 PJP / 60 PJP / CJP

Groove Depth (inches): GD := 0.5in

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.16 \cdot in$$

Load not in plane with weld group:

$k := 0$

$$a := \frac{ecc_2}{L_{plate2}} = 0.2$$

$C_1 = 1.03$

$Coeff_1 = 3.52$

$\phi_w := 0.75$

$$D_{min1} := ceil\left(\frac{P_u \cdot in}{\phi_w \cdot Coeff_1\, C_1 \cdot L_{plate2} \cdot kip}\right) = 6$$

$$minweldsize := \frac{D_{min1}}{16} = \frac{3}{8}$$

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } D_1 \geq D_{min1} \wedge D_1 \geq Min_{weldsize} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld} = \text{"OK"}$

$$\phi Rn_{weld1} := \phi_w \cdot Coeff_1\, ksi \cdot in \cdot C_1 \cdot D_1 \cdot L_{plate2} = 709.36 \cdot kip$$

$$Check_{weld1} := \begin{cases} \text{"OK"} & \text{if } Rating_{weld1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld1} = \text{"OK"}$

Gusset Plate to Pole Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

What is the bracket welded to? Tower Only / **Tower & Reinforcement** / Reinforcement Only

Reinforcement Thickness: $t_{ref} := 0.5in$

Reinforcement Grade: $F_{y\_ref} := 65ksi$

$F_{u\_ref} := 80ksi$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$\phi_{sy} := 1.0$

$\phi_{sr} := 0.75$

$$ecc_1 := w_{plate} + OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 7.16 \cdot in$$

$$M_1 := P_u \cdot ecc_1 = 1634.41 \cdot kip \cdot in$$

$$S_1 := \frac{t_{plate} \cdot L_{plate1}^2}{6} = 216 \cdot in^3$$

$$f_v := \frac{M_1}{S_1} \cdot t_{plate} \cdot 1in = 7.57 \cdot kip$$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot Fy_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$

$\phi F_{sy\_ref} := \phi_{sy} \cdot 0.6 \cdot F_{y\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot Fu_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$ $\phi F_{sr\_ref} := \phi_{sr} \cdot 0.6 \cdot F_{u\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

$\phi F_v = 25.2 \cdot kip$

$$Check_{PS1} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS1} = \text{"OK"}$

Gusset Plate to HSS Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.16 \cdot in$

$M_2 := P_u \cdot ecc_2 = 721.33 \cdot kip \cdot in$

$S_2 := \frac{t_{plate} \cdot L_{plate2}^2}{6} = 42.67 \cdot in^3$

$f_w := \frac{M_2}{S_2} \cdot t_{plate} \cdot 1in = 16.91 \cdot kip$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot F_{y\_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 27.9 \cdot kip$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot F_{u\_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 25.95 \cdot kip$

$\phi F_w := \min(\phi F_{sy}, \phi F_{sr}) = 25.95 \cdot kip$

$$Check_{PS2} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS2} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS2} = \text{"OK"}$

Embedment Depth Calculations

Projected Embedment Depth: $L_{em} := 8 \cdot ft$

Concrete Strength: $f'_c := 3000psi$

Are anchor rods installed in piers?: Yes / No

Yield Strength of Rebar: $f_y := 60ksi$

Transverse Reinforcement Index: $k_{tr} := 0$ Can be taken as 0 for design per ACI 318-14

Epoxy Factor: $\psi_e := 1$

Rebar Size Factor: $\psi_s := 1$

Casting Position Factor: $\psi_t := 1$

Concrete Weight Factor: $\lambda := 1 \cdot \sqrt{psi}$

Pier Diameter: $D_{pier} := 5ft$

Cover: $c_c := 3in$

Rebar Size: $d_s := 9$ $\quad d_b := \left|vlookup\left(d_s, d_{btable}, 2\right)\right| \cdot in = 1.13 \cdot in$

Tie Size: $Tie := 4$

Number of Vertical Rebar: $n := 16$

The embedment depth shall be analyzed based on the design tension capacity of the anchor rods.

Design Load:

$$\phi P_{nt} := 0.75 \cdot Fu_{rod} \cdot A_{net\_new} = 243.75 \cdot kip$$

Development Length (ACI 318-14 Chapter 25):

$$BC_{rebar} := D_{pier} - 2 \cdot c_c - \frac{Tie \cdot in}{4} - d_b = 51.87 \cdot in$$

$$S_{rebar} := \frac{\pi \cdot BC_{rebar}}{n} = 10.185 \cdot in$$

$$c_b := \min\left(c_c + \frac{Tie}{8}in + \frac{d_b}{2}, S_{rebar} \cdot 0.5\right) = 4.06 \cdot in$$

ACI 318-14, Equation 25.4.2.3a:

$$l_d := \left[\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s}{\min\left[\left(\frac{c_b + k_{tr}}{d_b}\right), 2.5\right]}\right] \cdot d_b = 37.07 \cdot in$$

Calculate Max Distance Between Rebar and New Anchor Rods:

$$A := \frac{1}{2} \cdot S_{rebar} = 5.093 \cdot in$$

$$B := \frac{BC_{rebar}}{2} - \frac{BC_{new}}{2} = 3.686 \cdot in$$

$$G := \sqrt{A^2 + B^2} = 6.287 \cdot in$$

$$l'_d := l_d + \frac{G}{1.5} + 3in = 3.69\,ft$$

Epoxy Development Length: Bond Strength:

Epoxy := Hilti Hit Re 500

$$S_b := \begin{cases} S_{bh} & \text{if Epoxy} = 0 \\ S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 4000\text{psi} \vee f'_c > 4000\cdot\text{psi}\right) \\ 0.94 S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 3000\text{psi} \vee f'_c < 3000\cdot\text{psi}\right) \\ E_{bond} & \text{if Epoxy} = 1 \wedge f'_c > 3000\text{psi} \wedge f'_c < 4000\text{psi} \end{cases} = 1130\,\text{psi}$$

$$\phi_{bond} := 0.65$$

$$L_{be} := \frac{\phi P_{nt}}{\pi \cdot D_{new} \cdot S_b \cdot \phi_{bond}} = 60.36\cdot\text{in}$$

Required Embedment Length:

Length of Breaker Tape: $L_{BT} := 0\cdot\text{in}$

$$L_{min} := \begin{cases} \max\left(L_{be} + L_{BT}, l'_d + 0.25\cdot L_{be}\right) & \text{if Piers} = \text{"Yes"} \\ \left(L_{be} + L_{BT}\right) & \text{if Piers} = \text{"No"} \end{cases} = 5.03\,\text{ft}$$

$$\text{Check} := \begin{cases} \text{"OK"} & \text{if } L_{min} \le L_{em} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

Check = "OK"

Anchor Rod Pullout Test:

$\phi_p := 0.75$

Is this a CA **DSA** site? ○ Yes ◉ No

$$\text{Pullout} := \begin{cases} \dfrac{\phi_p \cdot Fu_{rod} \cdot A_{net\_new}}{1.6} & \text{if CA} = 0 \\ \left(0.8 \cdot Fy_{rod} \cdot A_{net\_new}\right) & \text{otherwise} \end{cases} = 152\cdot\text{kip}$$

Anchor Rod Bracket Summary

Bracket HSS Compression:	$Rating_{comp} = 69.51 \cdot \%$
Bracket Plate Shear Yielding:	$Rating_{sheary} = 34.84 \cdot \%$
Bracket Plate Shear Rupture:	$Rating_{shearr} = 37.74 \cdot \%$
Bracket Plate to Pole Weld:	$Rating_{weld2} = 61.54 \cdot \%$
Bracket Plate to HSS Weld:	$Rating_{weld1} = 30.65 \cdot \%$
Bracket Plate to Pole Punching Shear:	$Rating_{PS1} = 28.6 \cdot \%$
Bracket Plate to HSS Punching Shear:	$Rating_{PS2} = 62.05 \cdot \%$

Anchor Rod Bracket Calculations:

Additional Anchor Rod Group:

$N_{new} := 3$ $D_{new} := 1.75 \cdot in$ $Fu_{rod} := 125 ksi$

$BC_{new} := 44.5 \cdot in$ $A_{net\_new} := 2.6 \cdot in^2$ $Fy_{rod} := 120 ksi$

$A_{n\_new} := N_{new} \cdot A_{net\_new} = 7.8 \cdot in^2$

Anchor Rod Bracket Calculations

Analysis
Design

Comment = "Analyze the anchor rod brackets to resist the controlling anchor rod demand force"

Anchor Rod Demand Force:

$P_{umax} := 228.27 kip$

Bracket Loading:

$$P_u := \begin{cases} \phi P_n & \text{if AorD = "Design"} \\ P_{umax} & \text{if AorD = "Analysis"} \end{cases} = 228.27 \cdot kip$$

Tube Design (HSS)

Member Size: HSS 4 1/2 x 4 1/2 x 1/2

Apply TIA-222-H Section 15.5? No / Yes

Member Properties (AISC 15th Ed., Table 1-12):

Outside Diameter: $OD_{HSS} := 4.5 \cdot in$

Area: $A_{HSS} := 6.95 \cdot in^2$ $A_{e\_HSS} := 0.75 \cdot A_{HSS} = 5.21 \cdot in^2$

Thickness: $t_{HSS} := 0.465 \cdot in$

Yield Strength: $F_{y\_HSS} := 50 \cdot ksi$ $F_{u\_HSS} := 62 \cdot ksi$

Length: $L_{HSS} := 13 \cdot in$

Moment of Inertia: $I_{HSS} := 18.1 \cdot in^4$

Radius of Gyration: $r_{HSS} := 1.61 \cdot in$

Inside Dimension: $ID_{HSS} := OD_{HSS} - 2 \cdot t_{HSS} = 3.57 \cdot in$

Bearing Check
(AISC 15th Ed., Equation J7-1):

$\phi_b := 0.75$

$Pu\_c = \phi_b \cdot R_n = \phi_b \cdot 1.8 \cdot F_{y\_HSS} \cdot A_{pb}$

$A_{pb} := \frac{P_u}{\phi_b \cdot 1.8 \cdot F_{y\_HSS}} = 3.38 \cdot in^2$

$Check_{bear} := \begin{cases} \text{"OK"} & \text{if } A_{HSS} \geq A_{pb} \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{bear} = \text{"OK"}$

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4):

$\phi_c := 0.9$

$K := 1$

$\phi P_{u\_comp} = \phi_c \cdot F_{cr} \cdot A_g$

$L_c := K \cdot L_{HSS} = 13 \cdot in$

$F_e := \frac{\pi^2 \cdot 29000ksi}{\left(\frac{L_c}{r_{HSS}}\right)^2} = 4389.98 \cdot ksi$

$\frac{L_c}{r_{HSS}} = 8.07 \quad < \quad 4.71 \cdot \sqrt{\frac{29000 \cdot ksi}{F_{y\_HSS}}} = 113.43$

$$\therefore \quad F_{cr} := 0.658^{\frac{F_{y\_HSS}}{F_e}} \cdot F_{y\_HSS} = 49.76 \cdot ksi$$

(AISC 15th Ed., Equation J4-6):

$$\phi P_{u\_comp} := \begin{cases} \phi_c \cdot F_{y\_HSS} \cdot A_{HSS} & \text{if } \frac{L_c}{r_{HSS}} \le 25 \\ \phi_c \cdot F_{cr} \cdot A_{HSS} & \text{otherwise} \end{cases}$$

$$\phi P_{u\_comp} = 312.75 \cdot kip$$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Rating_{comp} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

Gusset Plate Design

Gusset Plate width: $w_{plate} := 4.5 \cdot in$

Gusset Plate thickness: $t_{plate} := 1in$

$L_{plate1} := 26in$

$L_{plate2} := 13in$

Gusset Plate Strength: $Fy_{plate} := 65ksi$

$Fu_{plate} := 80ksi$

Pole thickness: $t_{pole} := 0.5in$

Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4):

$A_g := t_{plate} \cdot L_{plate2} = 13 \cdot in^2$

$A_{nv} := A_g = 13 \cdot in^2$

Shear Yielding

$\phi_v := 1$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_g \cdot Fy_{plate} = 507 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{sheary} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Shear Rupture

$\phi_v := 0.75$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_{nv} \cdot Fu_{plate} = 468 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{shearr} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Gusset Plate to Tower and Base Plate Weld Design (Horizontal and

Vertical Weld):
(AISC 15th Ed., Part 8)

Gusset plate thickness: $t_{plate} = 1 \cdot in$

Tower Grade: $Fy_{pole} := 42ksi$ $Fu_{pole} := 63ksi$

Base Plate Grade: $Fy_{base} := 36ksi$ $Fu_{base} := 58ksi$

Gussett Plate Grade: $Fy_{plate} = 65 \cdot ksi$ $Fu_{plate} = 80 \cdot ksi$

Height of vertical weld from base plate: $H := L_{plate1} = 26 \cdot in$

$Notch_{horiz} := 0.75 \cdot in$

$Notch_{vert} := 1 \cdot in$

Gap between Base Plate and HSS: $Gap := 0in$

Vertical fillet weld size to pole:
(in sixteenths of an inch) $D_{vpole} := 8$

$$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{1}{2}$$

Electrode Strength: 70ksi / 80ksi

$$Check := \begin{cases} \text{"OK"} & \text{if } Rating_{weld2} < 100\% \\ \text{"INSUFFICIENT"} & \text{otherwise} \end{cases}$$

Check = "OK"

Gusset Plate to HSS Weld Design
(AISC 15th Ed., Table 8-4)

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Electrode Strength: 70ksi / 80ksi

Fillet Weld Size (in sixteenths of an inch): D := 5

Groove Depth (inches): GD := 0.5in

Groove Weld: None / 45 PJP / 60 PJP / CJP

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.16 \cdot in$$

Load not in plane with weld group:

$k := 0$

$$a := \frac{ecc_2}{L_{plate2}} = 0.24$$

$C_1 = 1.03$

$Coeff_1 = 3.34$

$\phi_w := 0.75$

$$D_{min1} := ceil\left(\frac{P_u \cdot in}{\phi_w \cdot Coeff_1\, C_1 \cdot L_{plate2} \cdot kip}\right) = 7$$

$$minweldsize := \frac{D_{min1}}{16} = \frac{7}{16}$$

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } D_1 \geq D_{min1} \wedge D_1 \geq Min_{weldsize} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld} = \text{"OK"}$

$$\phi Rn_{weld1} := \phi_w \cdot Coeff_1\, ksi \cdot in \cdot C_1 \cdot D_1 \cdot L_{plate2} = 546.82 \cdot kip$$

$$Check_{weld1} := \begin{cases} \text{"OK"} & \text{if } Rating_{weld1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld1} = \text{"OK"}$

Gusset Plate to Pole Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

What is the bracket welded to? Tower Only / Tower & Reinforcement / Reinforcement Only

Reinforcement Thickness: $t_{ref} := 0in$

Reinforcement Grade: $F_{y\_ref} := 0ksi$

$F_{u\_ref} := 0ksi$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$\phi_{sy} := 1.0$

$\phi_{sr} := 0.75$

$$ecc_1 := w_{plate} + OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 7.66 \cdot in$$

$$M_1 := P_u \cdot ecc_1 = 1748.55 \cdot kip \cdot in$$

$$S_1 := \frac{t_{plate} \cdot L_{plate1}^2}{6} = 112.67 \cdot in^3$$

$$f_v := \frac{M_1}{S_1} \cdot t_{plate} \cdot 1in = 15.52 \cdot kip$$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot Fy_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$

$\phi F_{sy\_ref} := \phi_{sy} \cdot 0.6 \cdot F_{y\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot Fu_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$ $\phi F_{sr\_ref} := \phi_{sr} \cdot 0.6 \cdot F_{u\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

$\phi F_v = 25.2 \cdot kip$

$$Check_{PS1} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS1} = \text{"OK"}$

Gusset Plate to HSS Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 3.16 \cdot in$

$M_2 := P_u \cdot ecc_2 = 721.33 \cdot kip \cdot in$

$S_2 := \frac{t_{plate} \cdot L_{plate2}^2}{6} = 28.17 \cdot in^3$

$f_v := \frac{M_2}{S_2} \cdot t_{plate} \cdot 1in = 25.61 \cdot kip$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot F_{y\_HSS} \cdot 2 \cdot 2 \cdot t_{HSS} \cdot 1in = 55.8 \cdot kip$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot F_{u\_HSS} \cdot 2 \cdot 2 \cdot t_{HSS} \cdot 1in = 51.89 \cdot kip$

$\phi F_w := \min(\phi F_{sy}, \phi F_{sr}) = 51.89 \cdot kip$

$$Check_{PS2} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS2} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS2} = \text{"OK"}$

Embedment Depth Calculations

Projected Embedment Depth: $L_{em} := 8 \cdot ft$

Concrete Strength: $f'_c := 3000psi$

Are anchor rods installed in piers?: Yes / No

Yield Strength of Rebar: $f_y := 60ksi$

Transverse Reinforcement Index: $k_{tr} := 0$ Can be taken as 0 for design per ACI 318-14

Epoxy Factor: $\psi_e := 1$

Rebar Size Factor: $\psi_s := 1$

Casting Position Factor: $\psi_t := 1$

Concrete Weight Factor: $\lambda := 1 \cdot \sqrt{psi}$

Pier Diameter: $D_{pier} := 5ft$

Cover: $c_c := 3in$

Rebar Size: $d_s := 9$

$d_b := \left| vlookup\left(d_s, d_{btable}, 2\right) \right| \cdot in = 1.13 \cdot in$

Tie Size: $Tie := 4$

Number of Vertical Rebar: $n := 16$

The embedment depth shall be analyzed based on the design tension capacity of the anchor rods.

Design Load:

$$\phi P_{nt} := 0.75 \cdot Fu_{rod} \cdot A_{net\_new} = 243.75 \cdot kip$$

Development Length (ACI 318-14 Chapter 25):

$$BC_{rebar} := D_{pier} - 2 \cdot c_c - \frac{Tie \cdot in}{4} - d_b = 51.87 \cdot in$$

$$S_{rebar} := \frac{\pi \cdot BC_{rebar}}{n} = 10.185 \cdot in$$

$$c_b := \min\left(c_c + \frac{Tie}{8} in + \frac{d_b}{2}, S_{rebar} \cdot 0.5 \right) = 4.06 \cdot in$$

ACI 318-14, Equation 25.4.2.3a:

$$l_d := \left[\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s}{\min\left[\left(\frac{c_b + k_{tr}}{d_b} \right), 2.5 \right]} \right] \cdot d_b = 37.07 \cdot in$$

Calculate Max Distance Between Rebar and New Anchor Rods:

$$A := \frac{1}{2} \cdot S_{rebar} = 5.093 \cdot in$$

$$B := \frac{BC_{rebar}}{2} - \frac{BC_{new}}{2} = 3.686 \cdot in$$

$$G := \sqrt{A^2 + B^2} = 6.287 \cdot in$$

$$l'_d := l_d + \frac{G}{1.5} + 3in = 3.69\,ft$$

Epoxy Development Length: Bond Strength:

Epoxy := Hilti Hit Re 500

$$S_b := \begin{cases} S_{bh} & \text{if Epoxy} = 0 \\ S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 4000\text{psi} \vee f'_c > 4000\cdot\text{psi}\right) \\ 0.94 S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 3000\text{psi} \vee f'_c < 3000\cdot\text{psi}\right) \\ E_{bond} & \text{if Epoxy} = 1 \wedge f'_c > 3000\text{psi} \wedge f'_c < 4000\text{psi} \end{cases} = 1130\,\text{psi}$$

$$\phi_{bond} := 0.65$$

$$L_{be} := \frac{\phi P_{nt}}{\pi \cdot D_{new} \cdot S_b \cdot \phi_{bond}} = 60.36\cdot\text{in}$$

Required Embedment Length:

Length of Breaker Tape: $L_{BT} := 0\cdot\text{in}$

$$L_{min} := \begin{cases} \max\left(L_{be} + L_{BT}, l'_d + 0.25\cdot L_{be}\right) & \text{if Piers} = \text{"Yes"} \\ \left(L_{be} + L_{BT}\right) & \text{if Piers} = \text{"No"} \end{cases} = 5.03\,\text{ft}$$

$$\text{Check} := \begin{cases} \text{"OK"} & \text{if } L_{min} \le L_{em} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

Check = "OK"

Anchor Rod Pullout Test:

$\phi_p := 0.75$

Is this a CA **DSA** site? ○ Yes ◉ No

$$\text{Pullout} := \begin{cases} \dfrac{\phi_p \cdot Fu_{rod} \cdot A_{net\_new}}{1.6} & \text{if CA} = 0 \\ \left(0.8\cdot Fy_{rod} \cdot A_{net\_new}\right) & \text{otherwise} \end{cases} = 152\cdot\text{kip}$$

Anchor Rod Bracket Summary

Bracket HSS Compression:	$Rating_{comp} = 69.51 \cdot \%$
Bracket Plate Shear Yielding:	$Rating_{sheary} = 42.88 \cdot \%$
Bracket Plate Shear Rupture:	$Rating_{shearr} = 46.45 \cdot \%$
Bracket Plate to Pole Weld:	$Rating_{weld2} = 65.5 \cdot \%$
Bracket Plate to HSS Weld:	$Rating_{weld1} = 39.76 \cdot \%$
Bracket Plate to Pole Punching Shear:	$Rating_{PS1} = 58.65 \cdot \%$
Bracket Plate to HSS Punching Shear:	$Rating_{PS2} = 47 \cdot \%$

Anchor Rod Bracket Calculations:

Additional Anchor Rod Group:

$N_{new} := 3$ $D_{new} := 1.75 \cdot in$ $Fu_{rod} := 125 ksi$

$BC_{new} := 46 \cdot in$ $A_{net\_new} := 1.9 \cdot in^2$ $Fy_{rod} := 105 ksi$

$A_{n\_new} := N_{new} \cdot A_{net\_new} = 5.7 \cdot in^2$

Anchor Rod Bracket Calculations

Analysis
Design

Comment = "Analyze the anchor rod brackets to resist the controlling anchor rod demand force"

Anchor Rod Demand Force:

$P_{umax} := 157.76 kip$

Bracket Loading:

$$P_u := \begin{cases} \phi P_n & \text{if AorD = "Design"} \\ P_{umax} & \text{if AorD = "Analysis"} \end{cases} = 157.76 \cdot kip$$

Tube Design (Square HSS)

Member Size: HSS 4x4x1/2

Apply TIA-222-H Section 15.5? No / Yes

Member Properties (AISC 15th Ed., Table 1-12):

Outside Diameter: $OD_{HSS} := 4 \cdot in$

Area: $A_{HSS} := 6.02 \cdot in^2$ $A_{e\_HSS} := 0.75 \cdot A_{HSS} = 4.51 \cdot in^2$

Thickness: $t_{HSS} := 0.465 \cdot in$

Yield Strength: $F_{y\_HSS} := 50 \cdot ksi$ $F_{u\_HSS} := 62 \cdot ksi$

Length: $L_{HSS} := 20 \cdot in$

Moment of Inertia: $I_{HSS} := 11.9 \cdot in^4$

Radius of Gyration: $r_{HSS} := 1.41 \cdot in$

Inside Dimension: $ID_{HSS} := OD_{HSS} - 2 \cdot t_{HSS} = 3.07 \cdot in$

Bearing Check
(AISC 15th Ed., Equation J7-1):

$\phi_b := 0.75$

$Pu\_c = \phi_b \cdot R_n = \phi_b \cdot 1.8 \cdot F_{y\_HSS} \cdot A_{pb}$

$A_{pb} := \dfrac{P_u}{\phi_b \cdot 1.8 \cdot F_{y\_HSS}} = 2.34 \cdot in^2$

$Check_{bear} := \begin{cases} \text{"OK"} & \text{if } A_{HSS} \geq A_{pb} \\ \text{"N/G"} & \text{otherwise} \end{cases}$

$Check_{bear} = \text{"OK"}$

Compression Check
(AISC 15th Ed., Eqs. E3-1 to E3-4):

$\phi_c := 0.9$

$K := 1$

$\phi P_{u\_comp} = \phi_c \cdot F_{cr} \cdot A_g$

$L_c := K \cdot L_{HSS} = 20 \cdot in$

$F_e := \dfrac{\pi^2 \cdot 29000ksi}{\left(\dfrac{L_c}{r_{HSS}}\right)^2} = 1422.58 \cdot ksi$

$\dfrac{L_c}{r_{HSS}} = 14.18 \quad < \quad 4.71 \cdot \sqrt{\dfrac{29000 \cdot ksi}{F_{y\_HSS}}} = 113.43$

$$\therefore \quad F_{cr} := 0.658^{\frac{F_{y\_HSS}}{F_e}} \cdot F_{y\_HSS} = 49.27 \cdot ksi$$

(AISC 15th Ed., Equation J4-6):

$$\phi P_{u\_comp} := \begin{cases} \phi_c \cdot F_{y\_HSS} \cdot A_{HSS} & \text{if } \frac{L_c}{r_{HSS}} \le 25 \\ \phi_c \cdot F_{cr} \cdot A_{HSS} & \text{otherwise} \end{cases}$$

$$\phi P_{u\_comp} = 270.9 \cdot kip$$

$$Check_{comp} := \begin{cases} \text{"OK"} & \text{if } Rating_{comp} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{comp} = \text{"OK"}$

Gusset Plate Design

Gusset Plate width: $w_{plate} := 6 \cdot in$

Gusset Plate thickness: $t_{plate} := 1.25in$

$L_{plate1} := 23in$

$L_{plate2} := 17in$

Gusset Plate Strength: $Fy_{plate} := 65ksi$

$Fu_{plate} := 80ksi$

Pole thickness: $t_{pole} := 0.5in$

Shear Check
(AISC 15th Ed., Eqs. J4-3 and J4-4):

$A_g := t_{plate} \cdot L_{plate2} = 21.25 \cdot in^2$

$A_{nv} := A_g = 21.25 \cdot in^2$

Shear Yielding

$\phi_v := 1$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_g \cdot Fy_{plate} = 828.75 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{sheary} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Shear Rupture

$\phi_v := 0.75$

$\phi V_{plate} := \phi_v \cdot 0.6 \cdot A_{nv} \cdot Fu_{plate} = 765 \cdot kip$

$$Check_{shear} := \begin{cases} \text{"OK"} & \text{if } Rating_{shearr} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{shear} = \text{"OK"}$

Gusset Plate to Tower and Base Plate Weld Design (Horizontal and

Vertical Weld):
(AISC 15th Ed., Part 8)

Gusset plate thickness: $t_{plate} = 1.25 \cdot in$

Tower Grade: $Fy_{pole} := 42ksi$ $Fu_{pole} := 63ksi$

Base Plate Grade: $Fy_{base} := 36ksi$ $Fu_{base} := 58ksi$

Gussett Plate Grade: $Fy_{plate} = 65 \cdot ksi$ $Fu_{plate} = 80 \cdot ksi$

Height of vertical weld from base plate: $H := L_{plate1} = 23 \cdot in$

$Notch_{horiz} := 0.75 \cdot in$

$Notch_{vert} := 1.25 \cdot in$

Gap between Base Plate and HSS: $Gap := 0.5in$

Vertical fillet weld size to pole:
(in sixteenths of an inch) $D_{vpole} := 6$

$$weldsize_{pole} := \frac{D_{vpole}}{16} = \frac{3}{8}$$

Electrode Strength: 70ksi / 80ksi

$$Check := \begin{cases} \text{"OK"} & \text{if } Rating_{weld2} < 100\% \\ \text{"INSUFFICIENT"} & \text{otherwise} \end{cases}$$

Check = "OK"

Gusset Plate to HSS Weld Design
(AISC 15th Ed., Table 8-4)

Interpolation per AISC SCM Table 8-4:

13th Edition
14th Edition
15th Edition

Electrode Strength: 70ksi / 80ksi

Fillet Weld Size (in sixteenths of an inch): D := 6

Groove Depth (inches): GD := 0in

Groove Weld: None / 45 PJP / 60 PJP / CJP

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 2.66 \cdot in$$

Load not in plane with weld group:

$k := 0$

$$a := \frac{ecc_2}{L_{plate2}} = 0.16$$

$C_1 = 1.03$

$Coeff_1 = 3.65$

$\phi_w := 0.75$

$$D_{min1} := ceil\left(\frac{P_u \cdot in}{\phi_w \cdot Coeff_1\, C_1 \cdot L_{plate2} \cdot kip}\right) = 4$$

$$minweldsize := \frac{D_{min1}}{16} = \frac{1}{4}$$

$$Check_{weld} := \begin{cases} \text{"OK"} & \text{if } D_1 \geq D_{min1} \wedge D_1 \geq Min_{weldsize} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld} = \text{"OK"}$

$$\phi Rn_{weld1} := \phi_w \cdot Coeff_1\, ksi \cdot in \cdot C_1 \cdot D_1 \cdot L_{plate2} = 287.55 \cdot kip$$

$$Check_{weld1} := \begin{cases} \text{"OK"} & \text{if } Rating_{weld1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{weld1} = \text{"OK"}$

Gusset Plate to Pole Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

What is the bracket welded to? Tower Only / Tower & Reinforcement / Reinforcement Only

Reinforcement Thickness: $t_{ref} := 0in$

Reinforcement Grade: $F_{y\_ref} := 0ksi$

$F_{u\_ref} := 0ksi$

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$\phi_{sy} := 1.0$

$\phi_{sr} := 0.75$

$ecc_1 := w_{plate} + OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 8.66 \cdot in$

$M_1 := P_u \cdot ecc_1 = 1366.2 \cdot kip \cdot in$

$S_1 := \frac{t_{plate} \cdot L_{plate1}^2}{6} = 110.21 \cdot in^3$

$f_v := \frac{M_1}{S_1} \cdot t_{plate} \cdot 1in = 15.5 \cdot kip$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot Fy_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$

$\phi F_{sy\_ref} := \phi_{sy} \cdot 0.6 \cdot F_{y\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot Fu_{pole} \cdot 2 \cdot t_{pole} \cdot 1in$ $\phi F_{sr\_ref} := \phi_{sr} \cdot 0.6 \cdot F_{u\_ref} \cdot 2 \cdot t_{ref} \cdot 1in$

$\phi F_v = 25.2 \cdot kip$

$$Check_{PS1} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS1} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS1} = \text{"OK"}$

Gusset Plate to HSS Punching Shear Check (max per unit length): (AISC 15th Ed., Section J4.2)

Assume the worst-case installation scenario where the rod is positioned directly against the far side of the HSS.

$ecc_2 := OD_{HSS} - t_{HSS} - \frac{D_{new}}{2} = 2.66 \cdot in$

$M_2 := P_u \cdot ecc_2 = 419.64 \cdot kip \cdot in$

$S_2 := \frac{t_{plate} \cdot L_{plate2}^2}{6} = 60.21 \cdot in^3$

$f_v := \frac{M_2}{S_2} \cdot t_{plate} \cdot 1in = 8.71 \cdot kip$

AISC 15th Ed., Equation J4-3:

$\phi F_{sy} := \phi_{sy} \cdot 0.6 \cdot F_{y\_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 27.9 \cdot kip$

AISC 15th Ed., Equation J4-4:

$\phi F_{sr} := \phi_{sr} \cdot 0.6 \cdot F_{u\_HSS} \cdot 2 \cdot t_{HSS} \cdot 1in = 25.95 \cdot kip$

$\phi F_w := \min(\phi F_{sy}, \phi F_{sr}) = 25.95 \cdot kip$

$$Check_{PS2} := \begin{cases} \text{"OK"} & \text{if } Rating_{PS2} < 100\% \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

$Check_{PS2} = \text{"OK"}$

Embedment Depth Calculations

Projected Embedment Depth: $L_{em} := 5 \cdot ft$

Concrete Strength: $f'_c := 3000psi$

Are anchor rods installed in piers?: Yes / No

Yield Strength of Rebar: $f_y := 60ksi$

Transverse Reinforcement Index: $k_{tr} := 0$ Can be taken as 0 for design per ACI 318-14

Epoxy Factor: $\psi_e := 1$

Rebar Size Factor: $\psi_s := 1$

Casting Position Factor: $\psi_t := 1$

Concrete Weight Factor: $\lambda := 1 \cdot \sqrt{psi}$

Pier Diameter: $D_{pier} := 5ft$

Cover: $c_c := 3in$

Rebar Size: $d_s := 9$ $\quad d_b := \left|vlookup\left(d_s, d_{btable}, 2\right)\right| \cdot in = 1.13 \cdot in$

Tie Size: $Tie := 4$

Number of Vertical Rebar: $n := 16$

The embedment depth shall be analyzed based on the design tension capacity of the anchor rods.

Design Load:

$$\phi P_{nt} := 0.75 \cdot Fu_{rod} \cdot A_{net\_new} = 178.13 \cdot kip$$

Development Length (ACI 318-14 Chapter 25):

$$BC_{rebar} := D_{pier} - 2 \cdot c_c - \frac{Tie \cdot in}{4} - d_b = 51.87 \cdot in$$

$$S_{rebar} := \frac{\pi \cdot BC_{rebar}}{n} = 10.185 \cdot in$$

$$c_b := \min\left(c_c + \frac{Tie}{8}in + \frac{d_b}{2}, S_{rebar} \cdot 0.5\right) = 4.06 \cdot in$$

ACI 318-14, Equation 25.4.2.3a:

$$l_d := \left[\frac{3}{40} \cdot \frac{f_y}{\lambda \cdot \sqrt{f'_c}} \cdot \frac{\psi_t \cdot \psi_e \cdot \psi_s}{\min\left[\left(\frac{c_b + k_{tr}}{d_b}\right), 2.5\right]}\right] \cdot d_b = 37.07 \cdot in$$

Calculate Max Distance Between Rebar and New Anchor Rods:

$$A := \frac{1}{2} \cdot S_{rebar} = 5.093 \cdot in$$

$$B := \frac{BC_{rebar}}{2} - \frac{BC_{new}}{2} = 2.936 \cdot in$$

$$G := \sqrt{A^2 + B^2} = 5.878 \cdot in$$

$$l'_d := l_d + \frac{G}{1.5} + 3in = 3.67\,ft$$

Epoxy Development Length: Bond Strength:

Epoxy := AF35LVE

$$S_b := \begin{cases} S_{bh} & \text{if Epoxy} = 0 \\ S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 4000\text{psi} \vee f'_c > 4000\cdot\text{psi}\right) \\ 0.94 S_{bA} & \text{if Epoxy} = 1 \wedge \left(f'_c = 3000\text{psi} \vee f'_c < 3000\cdot\text{psi}\right) \\ E_{bond} & \text{if Epoxy} = 1 \wedge f'_c > 3000\text{psi} \wedge f'_c < 4000\text{psi} \end{cases} = 1613.98\ \text{psi}$$

$$\phi_{bond} := 0.65$$

$$L_{be} := \frac{\phi P_{nt}}{\pi \cdot D_{new} \cdot S_b \cdot \phi_{bond}} = 30.88\cdot\text{in}$$

Required Embedment Length:

Length of Breaker Tape: $L_{BT} := 12\cdot\text{in}$

$$L_{min} := \begin{cases} \max\left(L_{be} + L_{BT}, l'_d + 0.25\cdot L_{be}\right) & \text{if Piers} = \text{"Yes"} \\ \left(L_{be} + L_{BT}\right) & \text{if Piers} = \text{"No"} \end{cases} = 4.31\ \text{ft}$$

$$\text{Check} := \begin{cases} \text{"OK"} & \text{if } L_{min} \le L_{em} \\ \text{"N/G"} & \text{otherwise} \end{cases}$$

Check = "OK"

Anchor Rod Pullout Test:

$\phi_p := 0.75$

Is this a CA **DSA** site? ○ Yes ◉ No

$$\text{Pullout} := \begin{cases} \dfrac{\phi_p \cdot Fu_{rod} \cdot A_{net\_new}}{1.6} & \text{if CA} = 0 \\ \left(0.8\cdot Fy_{rod} \cdot A_{net\_new}\right) & \text{otherwise} \end{cases} = 111\cdot\text{kip}$$

Anchor Rod Bracket Summary

Bracket HSS Compression:	$Rating_{comp} = 55.46 \cdot \%$
Bracket Plate Shear Yielding:	$Rating_{sheary} = 18.13 \cdot \%$
Bracket Plate Shear Rupture:	$Rating_{shearr} = 19.64 \cdot \%$
Bracket Plate to Pole Weld:	$Rating_{weld2} = 57.54 \cdot \%$
Bracket Plate to HSS Weld:	$Rating_{weld1} = 52.25 \cdot \%$
Bracket Plate to Pole Punching Shear:	$Rating_{PS1} = 58.56 \cdot \%$
Bracket Plate to HSS Punching Shear:	$Rating_{PS2} = 31.98 \cdot \%$

Drilled Pier Foundation

BU # :	876325
Site Name:	WESTON SQUARE
Order Number:	517087 Rev.1

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	1774.1	
Axial Force (kips)	41.78	
Shear Force (kips)	24.5	

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

Pier Design Data		
Depth	37	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 23.59' below grade		
Pier Diameter	5	ft
Rebar Quantity	16	
Rebar Size	9	
Clear Cover to Ties	3	in
Tie Size	4	
Tie Spacing	12	in
Rebar Quantity	3	
Rebar Size	10	
Rebar Cage Diameter	44.5	in
Pier Section 2		
From 23.59' below grade to 37' below grade		
Pier Diameter	5	ft
Rebar Quantity	16	
Rebar Size	9	
Clear Cover to Ties	3	in
Tie Size	4	
Tie Spacing	12	in

Rebar & Pier Options
Embedded Pole Inputs
Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	9.06	-
Soil Safety Factor	5.71	-
Max Moment (kip-ft)	1938.28	-
Rating*	*22.2%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	395.02	-
End Bearing (kips)	135.00	-
Weight of Concrete (kips)	100.17	-
Total Capacity (kips)	530.01	-
Axial (kips)	141.95	-
Rating*	*25.5%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	8.76	-
Critical Moment (kip-ft)	1938.04	-
Critical Moment Capacity	2188.28	-
Rating*	*84.3%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	24.09	-
Critical Shear (kip)	151.03	-
Critical Shear Capacity	1008.00	-
Rating*	*14.3%*	-

Shear-Friciton Methodology is Applied

Soil Interaction Rating*	**25.5%**
Structural Foundation Rating*	**84.3%**

*Rating per TIA-222-H Section 15.5

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

Go to Soil Calculations

Soil Profile

Groundwater Depth	15	# of Layers	8

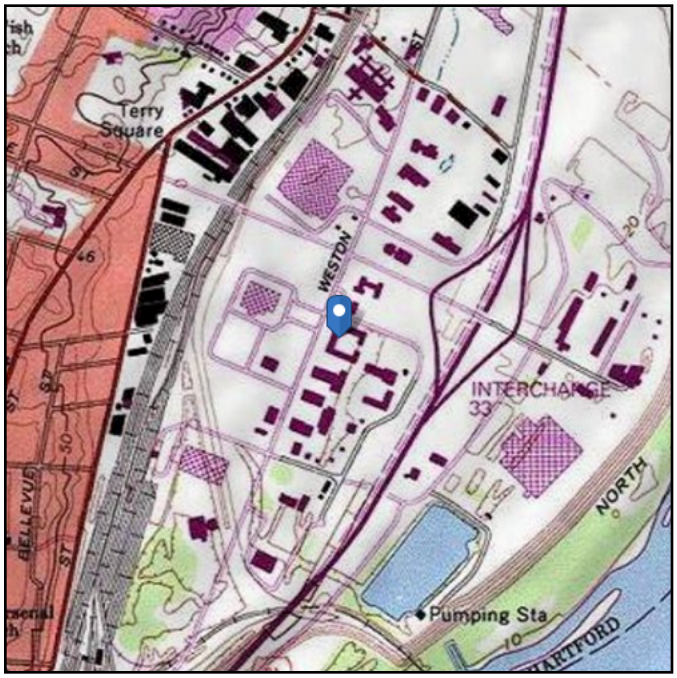
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	2	3.33	1.33	110	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	3.33	6	2.67	110	150	0	30	0.000	0.000	0.00	0.00			Cohesionless
4	6	13	7	110	150	0.75	0	0.413	0.413	0.40	0.40			Cohesive
5	13	15	2	105	150	0	30	0.000	0.000	1.70	1.70			Cohesionless
6	15	28	13	52.6	87.6	0	32	0.000	0.000	1.70	1.70			Cohesionless
7	28	33	5	37.6	87.6	0.75	0	0.41	0.41	0.39	0.39			Cohesive
8	33	37	4	57.6	87.6	1.5	0	0.83	0.83	0.79	0.79	9.167		Cohesive

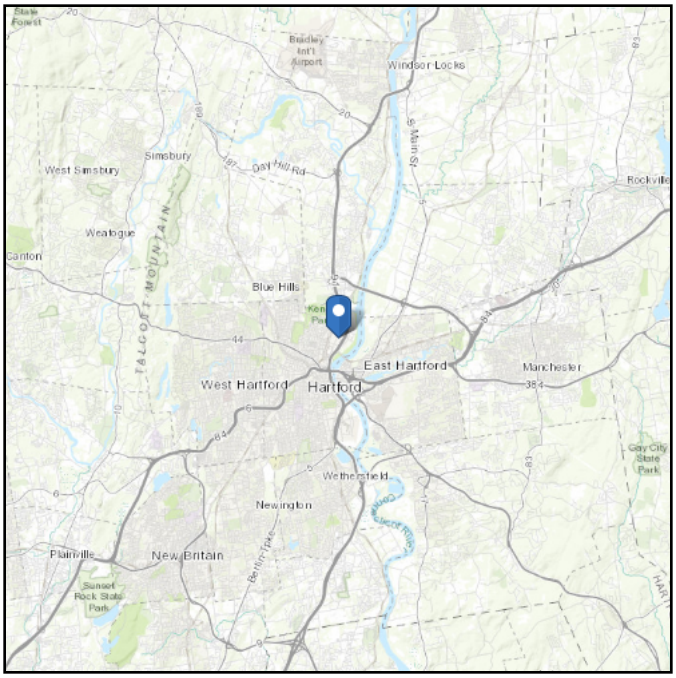
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 10.46 ft (NAVD 88)
Latitude: 41.78675
Longitude: -72.662339





Wind

Results:

Wind Speed:	122 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	92 Vmph
100-year MRI	100 Vmph

The state required wind speed 125 mph per Appendix N Municipality - Specific Structural Design Parameters

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

Date Accessed: Fri Jan 08 2021

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

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

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

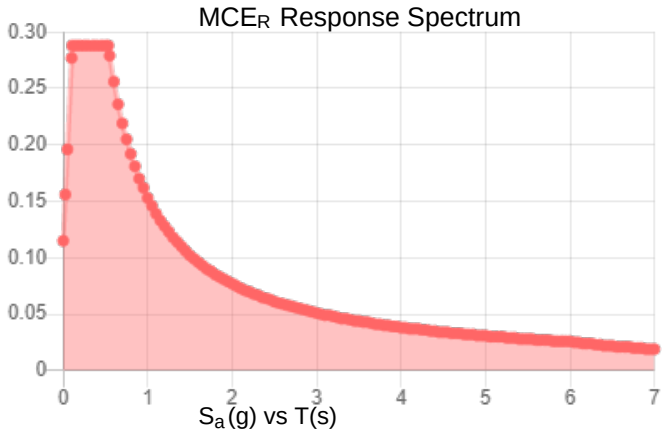
Seismic

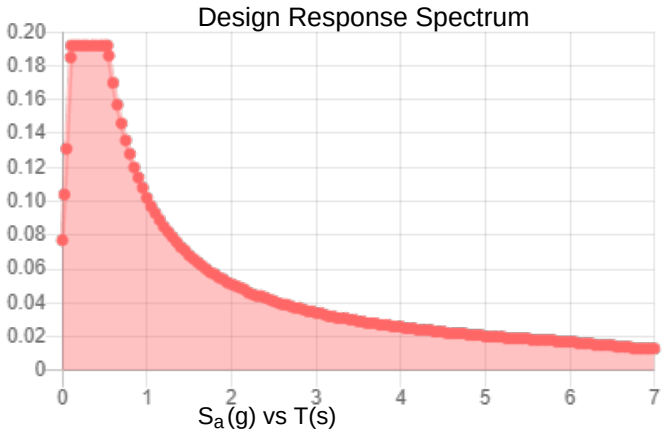
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.18	S_{DS} :	0.192
S_1 :	0.064	S_{D1} :	0.102
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.09
S_{MS} :	0.288	PGA_M :	0.145
S_{M1} :	0.153	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Fri Jan 08 2021

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

Ice

Results:

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

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

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

APPENDIX D

STRUCTURAL DESIGN DRAWING

MONOPOLE REINFORCEMENT DRAWINGS

SITE NAME: WESTON SQUARE
BU NUMBER: 876325

SITE ADDRESS:
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

HOT WORK INCLUDED	
N/A	BASE GRINDING ONLY
X	BASE WELDING (AND GRINDING)
N/A	AERIAL GRINDING ONLY
N/A	AERIAL WELDING (AND GRINDING)

SAFETY CLIMB: 'LOOK UP'
THE INTEGRITY OF THE WIRE ROPE SAFETY CLIMB SYSTEM SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER REINFORCEMENTS AND EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF ANY WIRE ROPE SAFETY CLIMB ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, OR IMPACT TO THE ANCHORAGE POINTS IN ANY WAY. ANY COMPROMISED SAFETY CLIMB MUST BE REPORTED TO YOUR CROWN POC FOR RESOLUTION, INCLUDING EXISTING CONDITIONS.

CODE COMPLIANCE

THIS REINFORCEMENT DESIGN IS BASED ON THE TIA-222-H STRUCTURAL STANDARD USING AN ULTIMATE 3-SECOND GUST WIND SPEED OF 125 MPH FROM THE 2018 CONNECTICUT BUILDING CODE, 50 MPH WITH 2.00 INCH ICE THICKNESS AND 60 MPH UNDER SERVICE LOADS, EXPOSURE CATEGORY C.

TOWER INFORMATION

TOWER MANUFACTURER / CCI DOC #:	ROHN / CCI DOC #2192540
TOWER HEIGHT / TYPE:	110 FT MONOPOLE TOWER
TOWER LOCATION: DATUM: NAD 1983	LATITUDE 41° 47' 12.3" LONGITUDE -72° 39' 44.42"
STRUCTURAL DESIGN DRAWING:	B&V / WO #1819530
STRUCTURAL ANALYSIS REPORT:	B&V / WO #1815154
ORDER ID:	508994 REV #0

PROJECT CONTACTS

CROWN PROJECT MANAGER
DAN VADNEY
(518) 373-3510
DAN.VADNEY@CROWNCASTLE.COM

BLACK & VEATCH CONTACTS
CROWNCASTLERFI@BV.COM
PATRICK DAVIS, P.E.
(913) 458-6984

LOCATION MAP

NO SCALE

DRIVING DIRECTIONS

FROM SPRINGFIELD, TAKE 91 SOUTH TO EXIT 33, BEAR RIGHT ON JENNINGS ROAD. TAKE LEFT ON WESTON STREET AND TOWER ON LEFT AFTER RED ROOF INN.

ATTENTION ALL CONTRACTORS

ANYTIME YOU ACCESS A CROWN SITE FOR ANY REASON YOU ARE TO CALL THE CROWN NOC UPON ARRIVAL AND DEPARTURE, DAILY AT 800-788-7011.

DRAWING INDEX

DO NOT SCALE DRAWINGS

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

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

SHEET TITLE
TITLE PAGE

SHEET NUMBER
TM-1

MI CHECKLIST

REQUIRED	REPORT ITEM	APPLICABLE CROWN DOC #	BRIEF DESCRIPTION
PRE–CONSTRUCTION			
X	MI CHECKLIST DRAWING	CED–SOW–10007	THIS CHECKLIST SERVES AS A GUIDELINE FOR THE REQUIRED CONSTRUCTION DOCUMENTS AND INSPECTIONS FOR THIS MODIFICATION.
X	EOR APPROVED SHOP DRAWINGS	CED–SOW–10007	ONCE THE PRE–MODIFICATION MAPPING IS COMPLETE AND PRIOR TO FABRICATION, THE CONTRACTOR SHALL PROVIDE DETAILED ASSEMBLY DRAWINGS AND/OR SHOP DRAWINGS. THESE ARE TO INCLUDE, BUT ARE NOT LIMITED TO, A VISUAL LAYOUT OF NEW REINFORCEMENT, EXISTING REINFORCEMENT CONFIGURATION, PORTHOLES, MOUNTS, STEP PEGS, SAFETY CLIMBS AND ANY OTHER MISCELLANEOUS ITEMS WHICH MAY AFFECT SUCCESSFUL INSTALLATION OF MODIFICATIONS ON THE TOWER. THESE DRAWINGS SHALL BE SUBMITTED TO THE EOR FOR APPROVAL. SHOP DRAWING SUBMISSION SHALL INCLUDE THE EOR RFI FORM DETAILING ANY CHANGES FROM ORIGINAL DESIGN.
X	FABRICATION INSPECTION	CED–SOW–10007	A LETTER FROM THE FABRICATOR, STATING THAT THE WORK WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THE CONTRACT DOCUMENTS, SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	FABRICATOR CERTIFIED WELD INSPECTION	CED–SOW–10007 CED–STD–10069	A CWI SHALL INSPECT ALL WELDING PERFORMED ON STRUCTURAL MEMBERS DURING FABRICATION. A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	MATERIAL TEST REPORTS (MTR)	CED–SOW–10007	MATERIAL TEST REPORTS SHALL BE PROVIDED FOR MATERIAL USED AS REQUIRED PER SECTION 9.2.5 OF CED–SOW–10007. MTRS SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	FABRICATOR NDE INSPECTION REPORT	CED–SOW–10066 CED–STD–10069	CRITICAL SHOP WELDS THAT REQUIRE TESTING ARE NOTED ON THESE CONTRACT DRAWINGS. A CERTIFIED NDT INSPECTOR SHALL PERFORM NON–DESTRUCTIVE EXAMINATION AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	NDE OF MONOPOLE BASE PLATE	ENG–SOW–10033	A NDE OF THE POLE TO BASE PLATE CONNECTION IS REQUIRED AND A WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	PACKING SLIPS	CED–SOW–10007	PACKING/SHIPPING LIST FOR ALL MATERIAL USED DURING CONSTRUCTION OF THE MODIFICATION.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
CONSTRUCTION			
N/A	FOUNDATION INSPECTIONS	CED–SOW–10144	A VISUAL OBSERVATION OF THE EXCAVATION AND REBAR SHALL BE PERFORMED BEFORE PLACING THE CONCRETE. A VISUAL OBSERVATION OF THE REBAR SHALL BE PERFORMED BEFORE PLACING THE EPOXY. A SEALED WRITTEN REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
N/A	CONCRETE COMP. STRENGTH AND SLUMP TEST	CED–SOW–10144	THE CONCRETE MIX DESIGN, SLUMP TEST, AND COMPRESSIVE STRENGTH TESTS SHALL BE PROVIDED AS PART OF THE FOUNDATION REPORT.
N/A	EARTHWORK	CED–SOW–10144	FOUNDATION SUB–GRADES SHALL BE INSPECTED AND APPROVED BY AN APPROVED FOUNDATION INSPECTOR AND RESULTS INCLUDED AS PART OF THE FOUNDATION REPORT.
N/A	MICROPILE/ROCK ANCHOR	CED–SOW–10144	MICROPILES/ROCK ANCHORS SHALL BE INSPECTED BY THE FOUNDATION INSPECTION VENDOR AND SHALL BE INCLUDED AS PART OF THE FOUNDATION INSPECTION REPORT, ADDITIONAL TESTING AND/OR INSPECTION REQUIREMENTS ARE NOTED IN THESE CONTRACT DOCUMENTS.
X	POST–INSTALLED ANCHOR ROD VERIFICATION	CED–SOW–10007 CED–FRM–10358	POST INSTALLED ANCHOR ROD VERIFICATION SHALL BE PERFORMED IN ACCORDANCE WITH CROWN REQUIREMENTS AND A REPORT SHALL BE PROVIDED TO THE MI INSPECTOR FOR INCLUSION IN THE MI REPORT.
X	BASE PLATE GROUT VERIFICATION	ENG–STD–10323	THE GENERAL CONTRACTOR SHALL PROVIDE DOCUMENTATION TO THE MI INSPECTOR THAT CERTIFIES THAT THE GROUT WAS REMOVED AND/OR INSTALLED IN ACCORDANCE WITH CROWN REQUIREMENTS FOR INCLUSION IN THE MI REPORT.
X	FIELD CERTIFIED WELD INSPECTION	CED–SOW–10066 CED–STD–10069	A CROWN APPROVED CERTIFIED WELD INSPECTOR SHALL INSPECT AND TEST FIELD WELDS, FOLLOWING ALL PROCEDURES SPECIFIED IN CROWN STANDARD DOCUMENTS APPLICABLE TO WELD INSPECTIONS. A REPORT SHALL BE PROVIDED. NDE OF FIELD WELDS SHALL BE PERFORMED AS REQUIRED BY CROWN STANDARDS AND CONTRACT DOCUMENTS. THE NDE REPORT SHALL BE INCLUDED IN THE CWI REPORT.
X	ON–SITE COLD GALVANIZING VERIFICATION	ENG–STD–10149 CED–FRM–10358	THE GENERAL CONTRACTOR SHALL PROVIDE WRITTEN AND PHOTOGRAPHIC DOCUMENTATION TO THE MI INSPECTOR VERIFYING THAT ANY ON–SITE COLD GALVANIZING WAS APPLIED PER MANUFACTURER SPECIFICATIONS AND APPLICABLE STANDARDS.
N/A	TENSION TWIST AND PLUMB	CED–PRC–10182 CED–STD–10261	THE GENERAL CONTRACTOR SHALL PROVIDE A REPORT IN ACCORDANCE WITH APPLICABLE STANDARDS DOCUMENTING TENSION TWIST AND PLUMB.
X	GC AS–BUILT DRAWINGS	CED–SOW–10007	THE GENERAL CONTRACTOR SHALL SUBMIT A LEGIBLE COPY OF THE ORIGINAL DESIGN DRAWINGS EITHER STATING "INSTALLED AS DESIGNED" OR NOTING ANY CHANGES THAT WERE REQUIRED AND APPROVED BY THE ENGINEER OF RECORD. EOR/RFI FORMS APPROVING ALL CHANGES SHALL BE SUBMITTED.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			
POST–CONSTRUCTION			
X	CONSTRUCTION COMPLIANCE LETTER	CED–SOW–10007 CED–FRM–10358	A LETTER FROM THE GENERAL CONTRACTOR STATING THAT THE WORKMANSHIP WAS PERFORMED IN ACCORDANCE WITH INDUSTRY STANDARDS AND THESE CONTRACT DRAWINGS, INCLUDING LISTING ADDITIONAL PARTIES TO THE MODIFICATION PROCESS.
X	POST–INSTALLED ANCHOR ROD PULL TESTS	CED–PRC–10119	POST–INSTALLED ANCHOR RODS SHALL BE TESTED BY A CROWN APPROVED PULL TEST INSPECTOR AND A REPORT SHALL BE PROVIDED INDICATING TESTING RESULTS.
X	PHOTOGRAPHS	CED–SOW–10007	PHOTOGRAPHS SHALL BE SUBMITTED TO THE MI. PHOTOS SHALL DOCUMENT ALL PHASES OF THE CONSTRUCTION. THE PHOTOS SHALL BE ORGANIZED IN A MANNER THAT EASILY IDENTIFIES THE EXACT LOCATION OF THE PHOTO.
N/A	BOLT HOLE INSTALLATION VERIFICATION REPORT	CED–SOW–10007	THE MI INSPECTOR SHALL VERIFY THE INSTALLATION AND TIGHTNESS 10% OF ALL NON PRE–TENSIONED BOLTS INSTALLED AS PART OF THE MODIFICATION. THE MI INSPECTOR SHALL LOOSEN THE NUT AND VERIFY THE BOLT HOLE SIZE AND CONDITION. THE MI REPORT SHALL CONTAIN THE COMPLETED BOLT INSTALLATION VERIFICATION REPORT, INCLUDING THE SUPPORTING PHOTOGRAPHS.
X	PUNCHLIST DEVELOPMENT AND CORRECTION DOCUMENTATION	CED–PRC–10283 CED–FRM–10285	FINAL PUNCHLIST INDICATING ALL NONCONFORMANCE(S) IDENTIFIED AND THE FINAL RESOLUTION AND APPROVAL.
X	MI INSPECTOR REDLINE OR RECORD DRAWING(S)	CED–SOW–10007	THE MI INSPECTOR SHALL OBSERVE AND REPORT ANY DISCREPANCIES BETWEEN THE CONTRACTOR'S REDLINE DRAWING AND THE ACTUAL COMPLETED INSTALLATION.
ADDITIONAL TESTING AND INSPECTIONS:			
N/A			

THE MI CHECKLIST SHALL BE REVIEWED PRIOR TO THE START OF CONSTRUCTION. ALL PARTIES TO THE MODIFICATION SHALL UNDERSTAND CROWN REQUIREMENTS AND INSPECTIONS/DOCUMENTATION THAT ARE APPLICABLE TO THE SOW THEY ARE PERFORMING. ERRORS ON THE CHECKLIST DO NOT ABSOLVE THE GC OR MI INSPECTOR FROM PERFORMING/COLLECTING DOCUMENTATION.

MODIFICATION INSPECTION NOTES

GENERAL

1. THE MI IS AN ON–SITE VISUAL AND HANDS–ON INSPECTION OF TOWER MODIFICATIONS INCLUDING A REVIEW OF CONSTRUCTION REPORTS AND ADDITIONAL PERTINENT DOCUMENTATION PROVIDED BY THE GENERAL CONTRACTOR (GC), AS WELL AS ANY INSPECTION DOCUMENTS PROVIDED BY 3RD PARTY INSPECTORS. THE MI IS TO ENSURE THE INSTALLATION WAS CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, NAMELY THE MODIFICATION DRAWINGS; IN ACCORDANCE WITH APPLICABLE CROWN STANDARDS; AND AS DESIGNED BY THE ENGINEER OF RECORD (EOR).
2. NO DOCUMENT, CODE OR POLICY CAN ANTICIPATE EVERY SITUATION THAT MAY ARISE. ACCORDINGLY, THIS CHECKLIST IS INTENDED TO SERVE AS A SOURCE OF GUIDING PRINCIPLES IN ESTABLISHING GUIDELINES FOR MODIFICATION INSPECTION.
3. THE MI IS TO CONFIRM INSTALLATION CONFIGURATION AND WORKMANSHIP ONLY AND IS NOT A REVIEW OF THE MODIFICATION DESIGN ITSELF, AND THE MI INSPECTOR DOES NOT TAKE OWNERSHIP OF THE MODIFICATION DESIGN. OWNERSHIP OF THE STRUCTURAL MODIFICATION DESIGN EFFECTIVENESS AND INTEGRITY RESIDES WITH THE EOR AT ALL TIMES. THE MI INSPECTOR SHALL INSPECT AND NOTE CONFORMANCE/NONCONFORMANCE AND PROVIDE TO THE CROWN POINT OF CONTACT (CROWN POC) FOR EVALUATION.
4. ALL MI'S SHALL BE CONDUCTED BY A CROWN APPROVED MI INSPECTOR, WORKING FOR A CROWN APPROVED MI VENDOR. SEE CROWN CED–LST–10173, "APPROVED MI VENDORS".
5. TO ENSURE THAT THE REQUIREMENTS OF THE MI ARE MET, IT IS VITAL THAT THE GENERAL CONTRACTOR (GC) AND THE MI INSPECTOR BEGIN COMMUNICATING AND COORDINATING AS SOON AS A PURCHASE ORDER (PO) IS RECEIVED. IT IS EXPECTED THAT EACH PARTY WILL BE PROACTIVE IN REACHING OUT TO THE OTHER PARTY. IF CONTACT INFORMATION IS NOT KNOWN THE GC AND/OR INSPECTOR SHALL CONTACT THE CROWN POINT OF CONTACT (CROWN POC).
6. REFER TO CROWN CED–SOW–10007, "MODIFICATION INSPECTION SOW", FOR FURTHER DETAILS AND REQUIREMENTS.

SERVICE LEVEL COMMITMENT

1. THE FOLLOWING RECOMMENDATIONS AND SUGGESTIONS ARE OFFERED TO ENHANCE THE EFFICIENCY AND EFFECTIVENESS OF DELIVERING AN MI REPORT:
   - THE GC SHALL PROVIDE A MINIMUM OF 5 BUSINESS DAYS NOTICE, PREFERABLY 10, TO THE MI INSPECTOR AS TO WHEN THE SITE WILL BE READY FOR THE MI TO BE CONDUCTED.
   - THE GC AND MI INSPECTOR COORDINATE CLOSELY THROUGHOUT THE ENTIRE PROJECT.
   - WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR ON–SITE SIMULTANEOUSLY FOR ANY GUY WIRE TENSIONING OR RE–TENSIONING OPERATIONS.
   - WHEN POSSIBLE, IT IS PREFERRED TO HAVE THE GC AND MI INSPECTOR DURING THE MI TO HAVE ANY MINOR DEFICIENCIES CORRECTED DURING THE INITIAL MI. THEREFORE, THE GC MAY CHOOSE TO COORDINATE THE MI CAREFULLY TO ENSURE ALL CONSTRUCTION FACILITIES ARE AT THEIR DISPOSAL WHEN THE MI INSPECTOR IS ON SITE.

REQUIRED PHOTOS

1. BETWEEN THE GC AND THE MI INSPECTOR THE FOLLOWING PHOTOGRAPHS, AT A MINIMUM, ARE TO BE TAKEN AND INCLUDED IN THE MI REPORT:
   - PRE–CONSTRUCTION GENERAL SITE CONDITION
   - PHOTOGRAPHS DURING THE REINFORCEMENT MODIFICATION CONSTRUCTION/ERECTION AND INSPECTION
     - RAW MATERIALS
     - PHOTOS OF ALL CRITICAL DETAILS
     - FOUNDATION MODIFICATIONS
     - WELD PREPARATION
     - BOLT INSTALLATION
     - FINAL INSTALLED CONDITION
     - SURFACE COATING REPAIR
   - POST CONSTRUCTION PHOTOGRAPHS
     - FINAL INFIELD CONDITION
2. PHOTOS OF ELEVATED MODIFICATIONS TAKEN ONLY FROM THE GROUND SHALL BE CONSIDERED INADEQUATE.
3. THIS IS NOT A COMPLETE LIST OF REQUIRED PHOTOS, FOR COMPLETE LIST OF PHOTO SEE DOCUMENT # CED–SOW–10007.

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103–1217
HARTFORD COUNTY, USA

SHEET TITLE

MODIFICATION INSPECTION CHECKLIST

SHEET NUMBER

TM-2

GENERAL NOTES

1. The General Contractor (GC) shall reference CED–STD–10159, "Tower Modification Construction Specifications", as a continuation of the following General Notes. The GC shall keep a copy of this document with the Structural Design Drawings (SDD) at all times, and shall ensure that all Contractor Personnel are aware of the information enclosed within the General Notes and CED–STD–10159.

2. The Contract Documents are the property of Crown Castle (Crown). They are provided to the GC and its Lower Tier Contractors and material suppliers for the limited purpose of use in completing the Work for this Site, and shall be kept in strict confidence and not disclosed to any third parties. The Contract Documents shall not be used for any other purpose whatsoever without the prior written consent of Crown.

3. Detail drawings, including notes and tables, shall govern over general notes and typical details. Contact the Crown Point of Contact (POC) and Engineer of Record (EOR) for clarification as needed.

4. Do not scale drawings.

5. Any Work performed without a prefabrication mapping is done at the risk of the GC and/or fabricator. All dimensions of existing structural elements are assumed based on the available documentation and are preliminary until field–verified by the GC, unless noted otherwise (UNO). Where discrepancies are found, GC shall contact the Crown POC and EOR through RFI.

6. For this analysis and modification, the tower has been assumed to be in good condition without any structural defects, UNO. If the GC discovers any indication of an existing structural defect, contact the Crown POC and EOR immediately.

7. All construction means and methods, including but not limited to erection plans, rigging plans, climbing plans, and rescue plans, shall be the responsibility of the GC responsible for the execution of the Work contained herein, and shall meet ANSI/ASSE A10.48 (latest edition); federal, state, and local regulations; and any applicable industry consensus standards related to the construction activities being performed. All rigging plans shall adhere to ANSI/ASSE A10.48 (latest edition) and Crown standard CED–STD–10253, "Rigging Program", including the required involvement of a qualified engineer for class IV construction to certify the supporting structure(s) in accordance with the ANSI/TIA–322 (latest edition).

8. The structural integrity of the modification design extends to the complete condition only. The GC must be cognizant that the removal of any structural component of an existing tower has the potential to cause the partial or complete collapse of the structure. All necessary precautions must be taken to ensure structural integrity, including, but not limited to, engineering assessment of construction stresses with installation maximum wind speed and/or temporary bracing and shoring.

9. Aerial and underground utilities and facilities may or may not be shown on the drawings. The GC shall take every precaution to preserve and protect these items, which may include aerial or underground power lines, telephone lines, water lines, sewer lines, cable television facilities, pipelines, structures and other public and private improvements within or adjacent to the Work area. The responsibility for determining the actual on–site location of these items shall rest exclusively with the GC.

10. All manufacturer's hardware assembly instructions shall be followed, UNO. Conflicting notes shall be brought to the attention of the EOR and the Crown POC.

11. The GC shall fabricate all required items per the materials specified below, UNO on the detail drawing sheets. If the GC finds for any component that the materials have not been clearly specified, the GC shall submit an RFI to the EOR to confirm the required material.

    All structural elements shall be new and shall conform to the following requirements, UNO:

    Monopoles:
    - Structural shapes and plates: ASTM A572 Grade 65 (Fy = 65 KSI)
    - Welding electrodes, SMAW: E80XX
    - Welding electrodes, FCAW: E8XT–XX
    - Welding electrodes, GMAW: ER80S–X

    Self–Support and Guyed Towers:
    - Structural shapes and plates: ASTM A572 Grade 50 (Fy = 50 KSI)
    - Welding electrodes, SMAW: E70XX
    - Welding electrodes, FCAW: E7XT–XX
    - Welding electrodes, GMAW: ER70S–X

    All tower types:
    - Steel angle: ASTM A572 Grade 50 (Fy = 50 KSI)
    - Solid rod: ASTM A36 (Fy = 36 KSI)
    - Pipe/tube (round): ASTM A500 Grade C (Fy = 46 KSI)
    - Pipe/tube (square): ASTM A500 Grade C (Fy = 50 KSI)
    - Bolts: ASTM F3125 Grade A325 Type 1
    - U–bolts: ASTM A307 Grade A, or SAE J429 Grade 2
    - Nuts: ASTM A563 Grade DH
    - Washers: ASTM F436 Type 1
    - Guy Wires: ASTM A475 Grade EHS
    - Bridge Strand: ASTM A586 Grade 1

12. After fabrication, hot–dip galvanize all steel items, UNO. Galvanize per ASTM A123, ASTM A153/A153M, or ASTM A653 G90, as applicable. ASTM A490 bolts shall not be hot–dip galvanized, but shall instead be coated with Magni 565 or EOR approved equivalent, per ASTM F2833.

13. Contractor Personnel shall not drill holes in any new or existing structural members, other than those drilled holes shown on structural drawings, without the approval of the EOR.

14. For a list of Crown–approved cold galvanizing compounds, refer to ENG–STD–10149, "Tower Protective Coatings Guidelines".

15. All exposed structural steel as the result of this scope of Work including welds (after final inspection of the weld by the CWI), field drilled holes, and shaft interiors (where accessible), shall be cleaned and two (2) coats cold galvanizing shall be applied by brush in accordance with ENG–STD–10149, "Tower Protective Coatings Guidelines". Photo documentation is required to be submitted to the MI Inspector.

16. If removal of existing modifications is required per the modification scope, the GC shall clean and cold galvanize any existing empty bolt holes, UNO. If additional unexpected, oversized, or slotted holes are found, the GC shall contact the EOR and Crown POC for guidance prior to proceeding with the modifications.

17. All Work involving base plate grout scope items or resulting in disturbance of base plate grout shall reference ENG–STD–10323, "Base Plate Grout", and shall follow any Base Plate Grout Removal Notes contained herein.

18. All tower grounding affected by the Work shall be repaired or replaced in accordance with OPS–STD–10090, "Tower Grounding", and OPS–BUL–10133, "Grounding Repair Recommendation".

19. If scope of modification requires removal or covering of tower ID tag, the tag must be replaced.

20. Any hardware removed from the existing tower shall be replaced with new hardware of equal size and quality, UNO. No existing fasteners shall be reused.

21. All joints using ASTM A325 or A490 bolts, U–bolts, V–bolts, and threaded rods shall be snug tightened, UNO.

22. A nut locking device shall be installed on all proposed and/or replaced snug tightened ASTM A325 or A490 bolts, U–bolts, V–bolts, and threaded rods.

23. All joints are bearing type connections UNO. If no bolt length is given in the Bill of Materials, the connection may include threads in the shear planes, and the GC is responsible for sizing the length of the bolt.

24. Blind bolts shall be installed per the installation specifications on the corresponding Approved Fastener sheets contained in CED–CAT–10300, "Monopole Standard Drawings and Approved Reinforcement Components".

25. If ASTM A325 or A490 bolts, and/or threaded rods are specified to be pre–tensioned, these shall be installed and tightened to the pretensioned condition according to the requirements of the RCSC Specification for Structural Joints Using ASTM High Strength Bolts.

26. All proposed and/or replaced bolts shall be of sufficient length such that the end of the bolt be at least flush with the face of the nut. It is not permitted for the bolt end to be below the face of the nut after tightening is completed.

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103–1217
HARTFORD COUNTY, USA

SHEET TITLE

NOTES

SHEET NUMBER

TM-3

CONCRETE NOTES

1. All concrete work shall be in accordance with ACI 301 specifications for structural concrete (latest edition). All concrete shall have a minimum 28 day compressive strength of 4500 PSI.
2. Prepare and submit batch tickets for each type and strength of concrete.
3. For field mixing, prepare and submit mix designs for pre–approval for each type and strength of concrete in accordance with ACI 211, "Proportioning Concrete Mixtures", and ACI 301, "Specifications for Structural Concrete".
4. All concrete shall be normal weight concrete.
5. Slump tests shall be made in accordance with ASTM C143. The allowable concrete slump shall be 4 inches (+/– 1") unless admixtures are used. Admixtures shall be in accordance with ASTM C494 standard types A, B, C, D, or E.
6. The engineer shall pre–approve superplasticizer use.
7. Cement shall conform to ASTM C150 Type II. Fine aggregate shall conform to ASTM C33. Coarse aggregate shall be gravel or crushed stone conforming to C33. Maximum aggregate size shall be 3/4".
8. Water shall be clean and free from oils, acids, alkalies, and organic materials. No additional water shall be added to the concrete at the job site.
9. Do not use chloride–containing admixtures.
10. Air entraining admixtures shall conform to ASTM C260.
11. Hot weather concrete placement shall comply with ACI 305R. Cold weather concrete placement shall comply with ACI 306.1.
12. Concrete shall be placed within 24 hours of excavation inspections. The contractor shall be responsible for protecting exposed excavations prior to concrete placement.
13. Place concrete by using a chute or hopper device such that concrete shall not free fall from a height greater than 5 feet. Deposit concrete within the center of the steel reinforcing cage to prevent segregation.
14. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 309R. Do not use vibrators to transport concrete.
15. Concrete shall be cured in accordance with ACI 301. When applicable, curing compounds shall be water clear, styrene acrylate type with a minimum solids content of 30%. Application shall be in conformance with manufacturer's instructions.
16. All concrete testing shall be in accordance with ACI 318. A minimum of two 6"x12" concrete cylinders per anchor block (Guyed towers only) and a minimum six 6"x12" concrete cylinders per batch are required.
17. A chamfer of 3/4" shall be provided at all exposed edges of concrete, unless noted otherwise, in accordance with ACI 301.

CONCRETE REINFORCING STEEL NOTES

1. All reinforcing steel shall be deformed billet steel conforming to ASTM A615, Grade 60 unless noted otherwise.
2. Reinforcing steel shall be detailed, fabricated, bent, and placed in accordance with the CRSI Manual of Standard Practice and ACI 315 (latest edition).
3. Welding of reinforcing and embedments is prohibited.
4. All reinforcing steel shall have a minimum three (3) inches concrete coverage unless noted otherwise.
5. Spacing devices shall be used as required to maintain the side and bottom clearance between the steel reinforcement and excavation.

BASE PLATE GROUT REMOVAL NOTES

1. When base plate grout removal is specified in the tower modification table, the contractor shall take the following steps:
   - A. The GC shall begin this procedure as early as possible during the modification process so that if issues arise, they can be resolved within the anticipated modification timeline.
   - B. If any deteriorated grout exists, begin at this location. Remove deteriorated grout and the grout around the nearest one or two anchor rods to fully expose the leveling nut. If the GC discovers that a half nut or jam nut was used as a leveling nut, or if no leveling nut is present, immediately contact CED and the Crown POC (typically the Mod PM) for a resolution. Do not remove any additional grout until directed to by Crown.
   - C. Otherwise, check the leveling nut for tightness in accordance with Section 7.2.3 of ENG–STD–10323 "Base Plate Grout". If severe corrosion / material loss is found or corrosion exists to the point where the leveling nut is unable to be tightened when obviously loose, immediately notify the Crown POC (typically the Mod PM). Reference ENG–BUL–10114 "Rust Classification" for examples of material loss. Do not remove any additional grout until directed to by Crown.
   - D. In the event that severe corrosion is not encountered, and being sure to check each anchor rod for corrosion per ENG–BUL–10114 "Rust Classification", remove all existing base plate grout while checking each leveling nut for tightness in accordance with Section 1.3.2.3 of ENG–STD–10323 "Base Plate Grout".
   - E. Consistent with Section 7.2.4 of ENG–STD–10323 "Base Plate Grout", hand tool clean to SSPC–SP2 and solvent clean to SSPC–SP1, all exposed structural steel elements, including anchor rods, leveling nuts, and underside of base plate to the greatest extent possible. Ensure that all existing grout is removed to allow cold galvanizing to adhere to the steel.
   - F. Apply by brush two coats of a Crown–approved cold–galvanizing compound to all exposed structural steel elements beneath the base plate, and allow curing in accordance with the manufacturer's recommendation. A list of Crown–approved direct application cold–galvanizing compounds can be found in ENG–STD–10149 "Tower Protective Coatings Guidelines" Section 2.1.1.
   - G. The GC shall provide photos of each anchor rod with leveling nut after cleaning but before cold–galvanization, and also again after cold–galvanization, for inclusion in the MI report.

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT · JOSHUA J. RILEY · 33208 · LICENSED PROFESSIONAL ENGINEER

01/21/2020

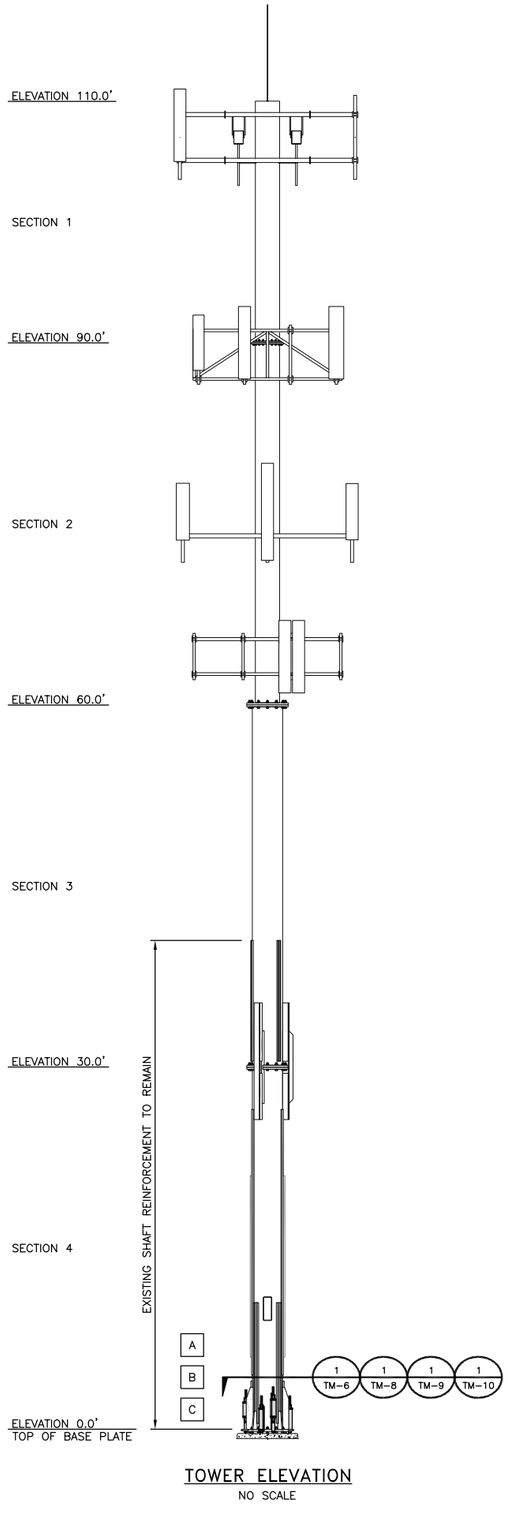
BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103–1217
HARTFORD COUNTY, USA

SHEET TITLE

NOTES

SHEET NUMBER

TM-4



TOWER ELEVATION
NO SCALE

POLE MODIFICATION SCHEDULE

CALLOUT	ELEVATION (FT)	MODIFICATION	REFERENCE SHEET
A	0.0	REMOVE EXISTING BASE PLATE GROUT SEE BASE PLATE GROUT REMOVAL NOTES	TM-4
B	0.0	INSTALL (3) NEW ANCHOR RODS WITH ANCHOR ROD BRACKETS	TM-6 & TM-7
C	0.0	REMOVE (3) EXISTING ANCHOR ROD BRACKETS AND INSTALL (3) NEW ANCHOR RODS WITH ANCHOR ROD BRACKETS	TM-8, TM-9, TM-10, TM-11, & TM-12

FOR PARTS NOT DETAILED WITHIN THE DRAWING AND STARTING WITH "CCI-", SEE THE FOLLOWING CATALOG FOR DETAILS: CED-CAT-10300, MONOPOLE STANDARD DRAWINGS AND APPROVED REINFORCEMENT COMPONENTS.

PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTH AND QUANTITIES GIVEN. LENGTHS AND QUANTITIES GIVEN ARE FOR QUOTING PURPOSES ONLY, AND SHALL NOT BE USED FOR FABRICATION.

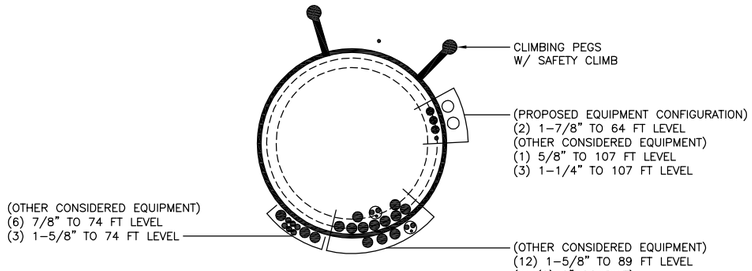
MANUFACTURER POLE SPECIFICATIONS

POLE SHAFT TYPE	ROUND
TAPER	0.00 IN/FT
BASE PLATE STEEL	ASTM A36 GRADE 36
ANCHOR RODS	1 1/2"ø A193 GRADE B7

MANUFACTURER SHAFT SECTION DATA

SHAFT SECTION	SHAFT LENGTH (FT)	THICKNESS (IN)	SECTION GRADE (KSI)	FLANGE PLATE GRADE (KSI)	LAP SPLICE (IN)	DIAMETER ACROSS FLAT (IN)	
						@ TOP	@ BOTTOM
1	20.00	0.2500	42	36	N/A	24.00	24.00
2	30.00	0.3750	42	36		24.00	24.00
3	30.00	0.3750	42	36		30.00	30.00
4	30.00	0.5000	42	36		30.00	30.00

NOTE: DIMENSIONS SHOWN DO NOT INCLUDE GALVANIZING TOLERANCES



COAX FEEDLINE PLAN
NO SCALE

PRIOR TO FABRICATION AND INSTALLATION, CONTRACTOR SHALL FIELD VERIFY ALL LENGTHS AND QUANTITIES GIVEN. LENGTH AND QUANTITIES PROVIDED ARE FOR QUOTING PURPOSES ONLY AND SHALL NOT BE USED FOR FABRICATION.

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH
6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

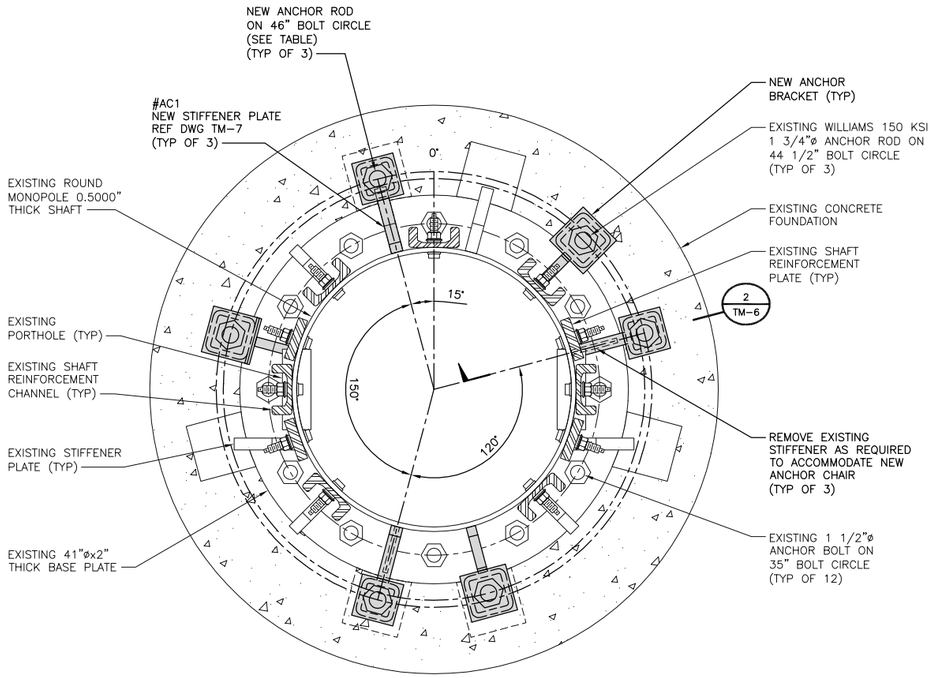
STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

SHEET TITLE
TOWER ELEVATION

SHEET NUMBER
TM-5

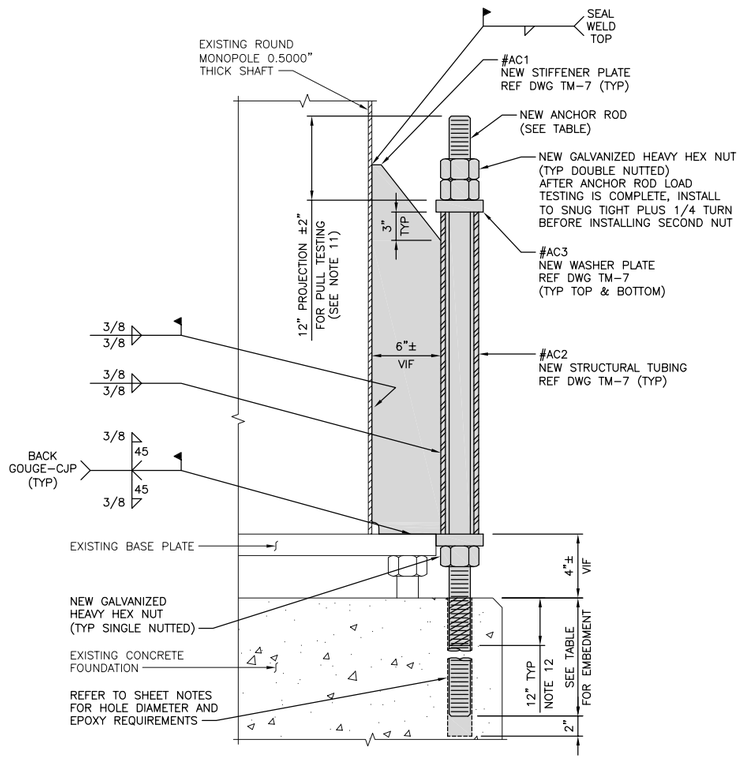
ANCHOR ROD SPECIFICATIONS								
CROWN PART #	ROD DIAMETER (IN)	INSTALLED LENGTH (IN)	MATERIAL	HOLE DIAMETER (IN)	EMBEDMENT DEPTH (IN) (+2",-0")	TARGET TENSION LOAD (KIPS)	EPOXY	CA-ONLY PROOF LOAD (KIPS)
CCI-AR-0175	1.75	96	A193 GR B7	2	60	111	AF35LVE	–



SECTION 1
ANCHOR ROD PLAN
NO SCALE

NOTES

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.
2. REFERENCE CC APPROVED COMPONENTS (CURRENT VERSION) FOR ANCHOR ROD DIMENSIONS.
3. RODS MUST BE GALVANIZED FROM THE TOP OF THE PROJECTION TO 15" BELOW THE SURFACE OF THE CONCRETE, AT A MINIMUM.
4. CORED HOLES MUST BE MECHANICALLY ROUGHENED USING A CARBIDE HOLE ROUGHENER OR EQUIVALENT. BRUSHING WITH A NYLON OR WIRE BRUSH SHALL BE USED IN THE PROCESS OF HOLE CLEANING, BUT DOES NOT SATISFY THE HOLE ROUGHENING REQUIREMENT.
5. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS FOR HOLE CLEANING.
6. ALL HOLES MUST BE DRY PRIOR TO PLACING EPOXY.
7. FOLLOW EPOXY MANUFACTURER'S RECOMMENDATIONS REGARDING HANDLING OF THREADED ROD AND EPOXY, AS WELL AS ALL INSTALLATION INSTRUCTIONS AND REQUIREMENTS.
8. TAKE ALL MEASUREMENTS NECESSARY TO AVOID DAMAGING EXISTING REINFORCEMENT BARS DURING CORING OPERATIONS, NOTIFY EOR IMMEDIATELY IF EXISTING REINFORCING BARS ARE ENCOUNTERED AND INTERFERE WITH PLACEMENT OF NEW ANCHORS. MINOR ADJUSTMENT TO PROPOSED LOCATIONS OF NEW ANCHORS MAY BE REQUIRED.
9. IF BASE PLATE GROUT REPAIR IS REQUIRED FOR ANCHOR ROD INSTALLATION, SEE ENG-PRC-10012: BASE PLATE GROUT REPAIR, FOR PROCEDURES AND RECOMMENDED MANUFACTURERS. CONTRACTOR TO DETERMINE THE QUANTITY REQUIRED.
10. ONCE ALL RESIN AND GROUT HAVE CURED, NEW ANCHOR ROD REINFORCING SHALL BE TARGET TENSIONED TO THE VALUE LISTED IN THE TABLE ON THIS SHEET. SEE CED-PRC-10119: PULL-OUT TESTING POST-INSTALLED ANCHOR RODS, FOR SPECIFICATIONS.
11. CONTRACTOR TO VERIFY THAT A PULL TEST IS ABLE TO BE PERFORMED USING THE ANCHOR ROD PROJECTIONS SHOWN.
12. ANCHOR ROD TO BE WRAPPED IN ELECTROTAPE 706B BOND BREAKER TAPE OR APPROVED EQUAL FOR 12" FROM TOP OF FOUNDATION. CONTRACTOR TO HAMMER DRILL HOLE WITH CARBIDE BIT (OR EQUIVALENT). FOR CORE DRILLING OPTION, CLEAN AND MECHANICALLY ROUGHEN HOLES PRIOR TO ANCHOR INSTALLATION. REFERENCE TABLE ON THIS SHEET FOR REQUIRED HOLE DIAMETER, EMBEDMENT DEPTH, AND ANCHOR ROD LENGTH.
13. WHEN COMPLETED WITH EPOXY INSTALLATION, THE TOP OF EPOXY SHALL BE EQUAL TO OR HIGHER THAN THE TOP OF FOUNDATION, SUCH THAT WATER IS NOT ABLE TO COLLECT IN ANNULAR AREA AROUND EXPOSED PORTION OF THE ANCHOR ROD.



SECTION 2
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

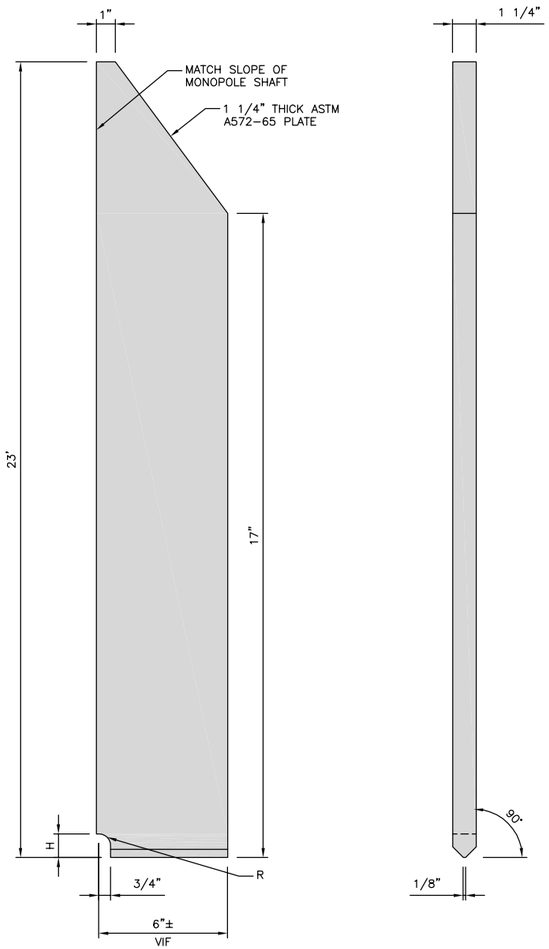
REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

SHEET TITLE
BASE PLATE ANCHOR ROD CHAIR DETAILS

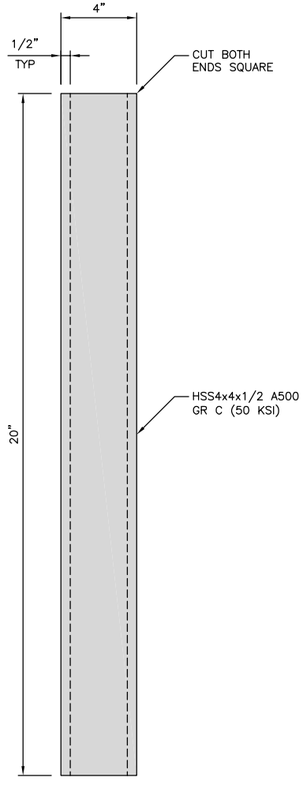
SHEET NUMBER
TM-6



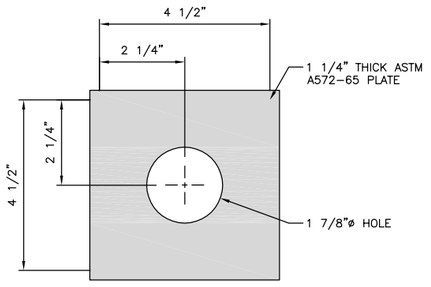
NOTE

R = STIFFENER THICKNESS/2
H = STIFFENER THICKNESS

#AC1
STIFFENER PLATE
NO SCALE



#AC2
STRUCTURAL TUBING
NO SCALE



#AC3
WASHER PLATE
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

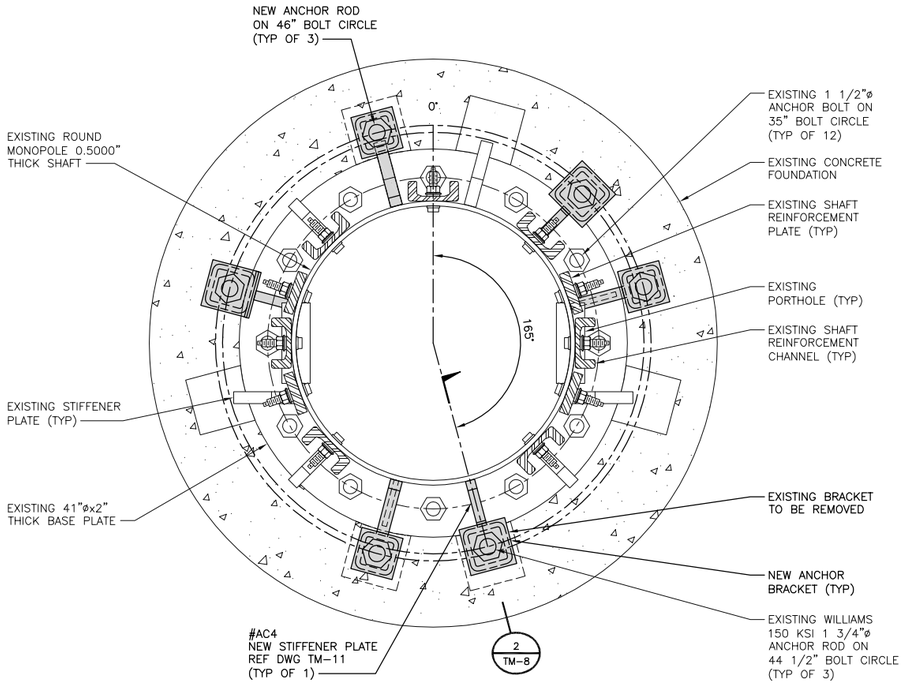
SHEET TITLE

BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

TM-7

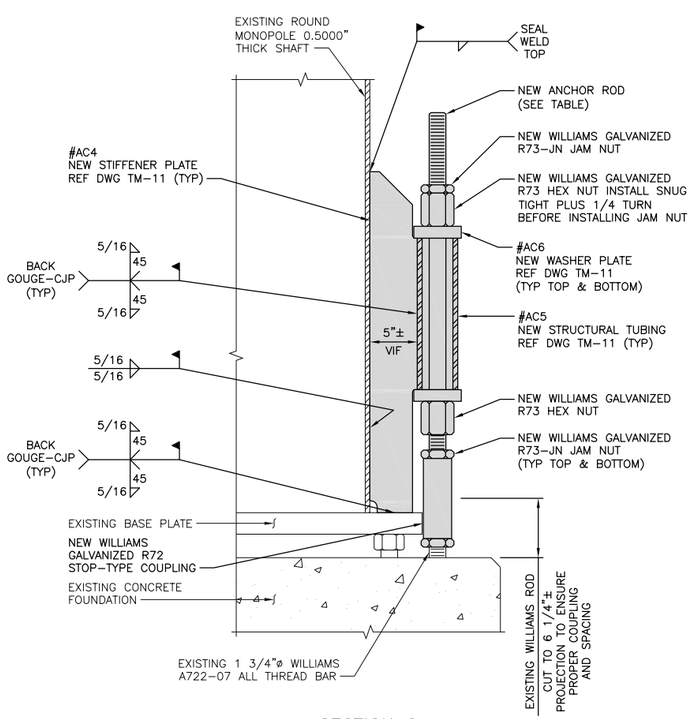
ANCHOR ROD SPECIFICATIONS			
PART #	ROD DIAMETER (IN)	INSTALLED LENGTH (IN)	MATERIAL
WILLIAMS 150 KSI ALL THREAD BARS	1.75	39	ASTM A722-07



SECTION 1
ANCHOR ROD PLAN
NO SCALE

NOTES

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.



SECTION 2
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

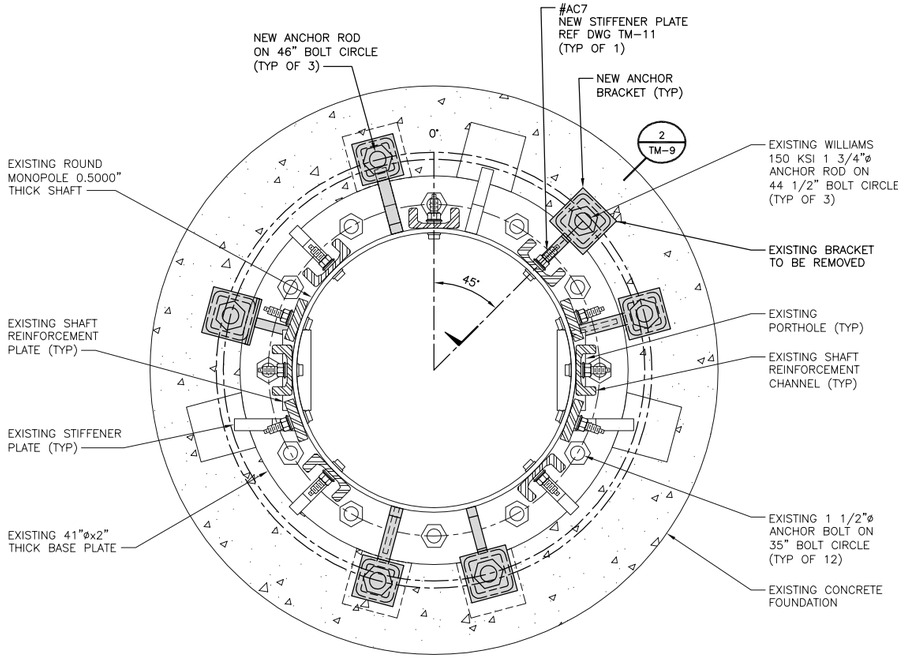
BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

SHEET TITLE

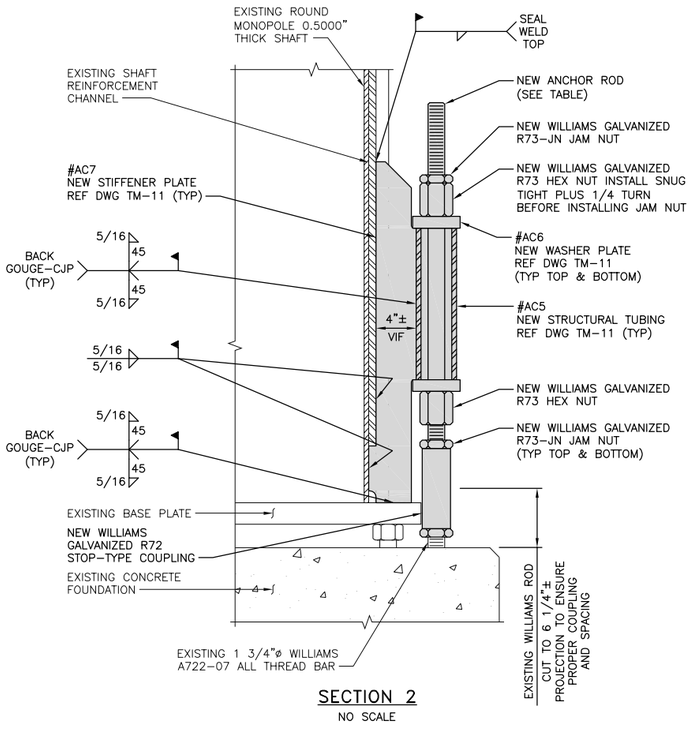
BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

TM-8



SECTION 1
ANCHOR ROD PLAN
NO SCALE

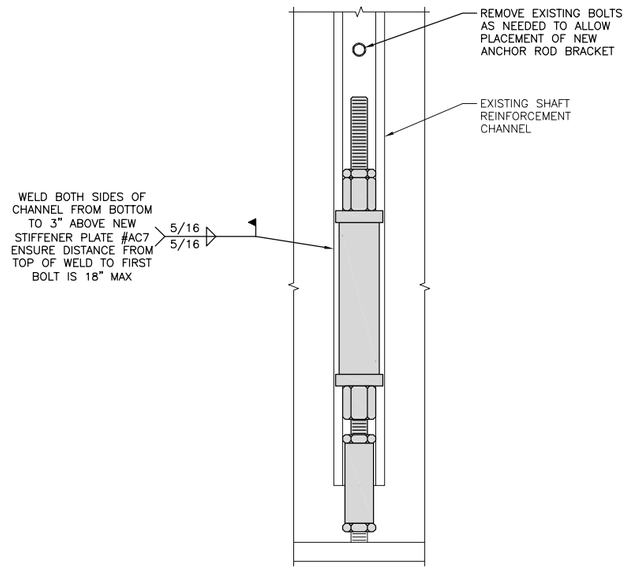


SECTION 2
NO SCALE

NOTES

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.

ANCHOR ROD SPECIFICATIONS			
PART #	ROD DIAMETER (IN)	INSTALLED LENGTH (IN)	MATERIAL
WILLIAMS 150 KSI ALL THREAD BARS	1.75	39	ASTM A722-07



ADDITIONAL WELDING
EXISTING REINFORCEMENT CHANNEL
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

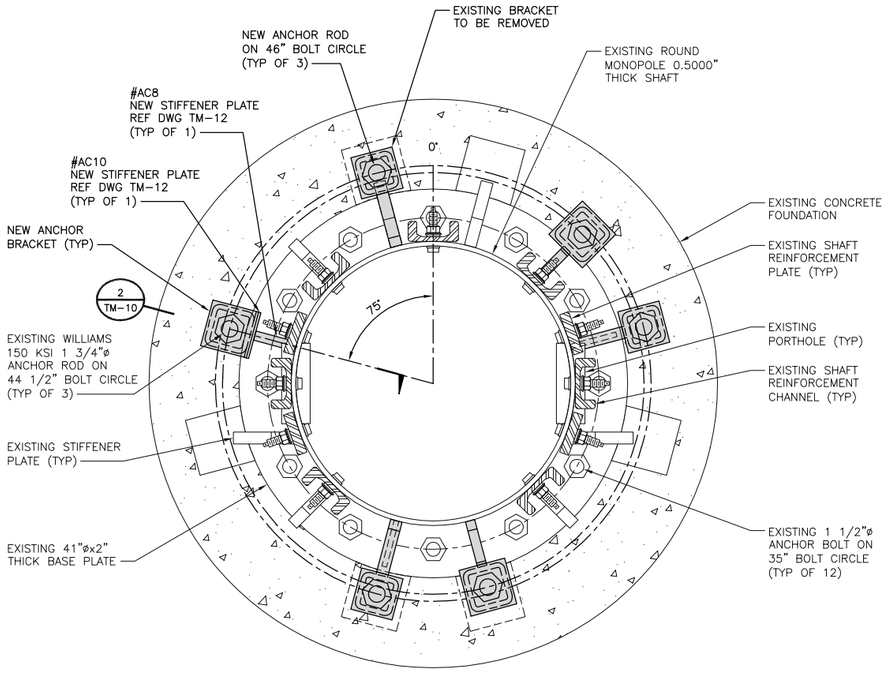
SHEET TITLE

BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

TM-9

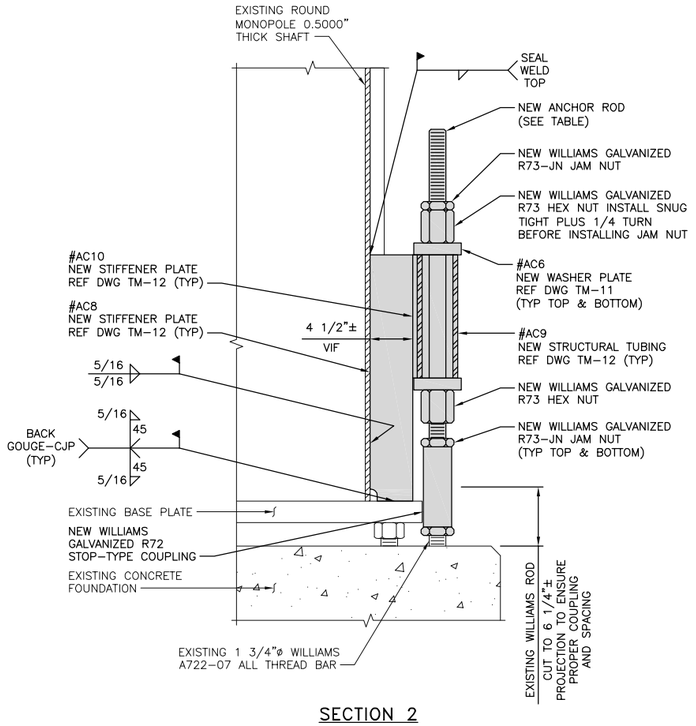
ANCHOR ROD SPECIFICATIONS			
PART #	ROD DIAMETER (IN)	INSTALLED LENGTH (IN)	MATERIAL
WILLIAMS 150 KSI ALL THREAD BARS	1.75	39	ASTM A722–07



SECTION 1
ANCHOR ROD PLAN
NO SCALE

NOTES

1. PLATE WASHER MUST FULLY BEAR ON THE TUBE.
2. CONTRACTOR TO ENSURE THAT THE FULL 26" GUSSET TO POLE SHAFT WELD IS ACHIEVED, IF THIS CANNOT BE ACCOMPLISHED CONTACT THE EOR IMMEDIATELY.



SECTION 2
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED PROFESSIONAL ENGINEER
01/21/2020

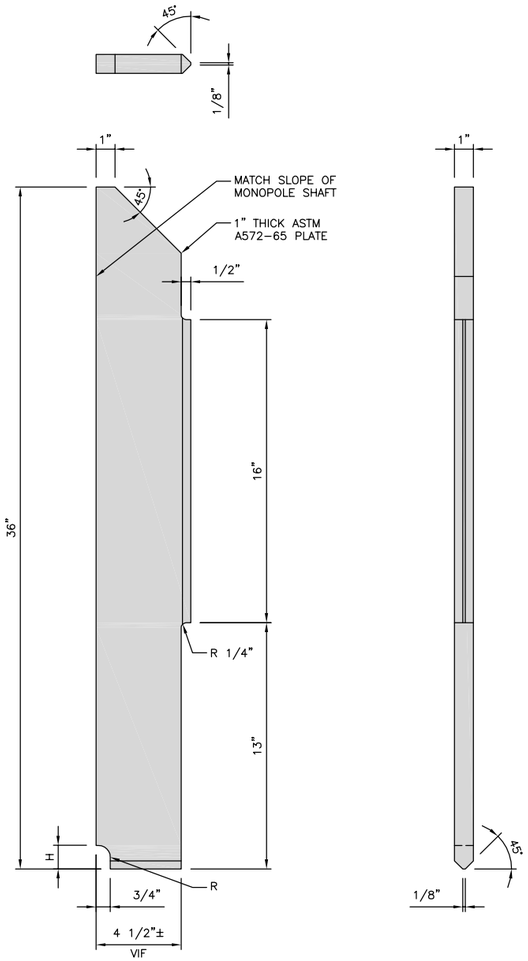
BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103–1217
HARTFORD COUNTY, USA

SHEET TITLE

BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

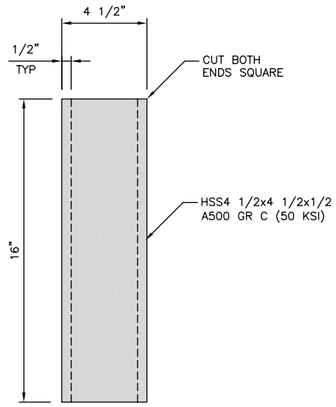
TM-10



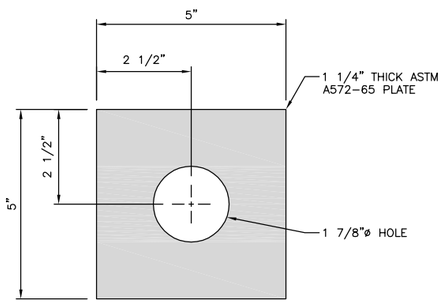
NOTE

R = STIFFENER THICKNESS/2
H = STIFFENER THICKNESS

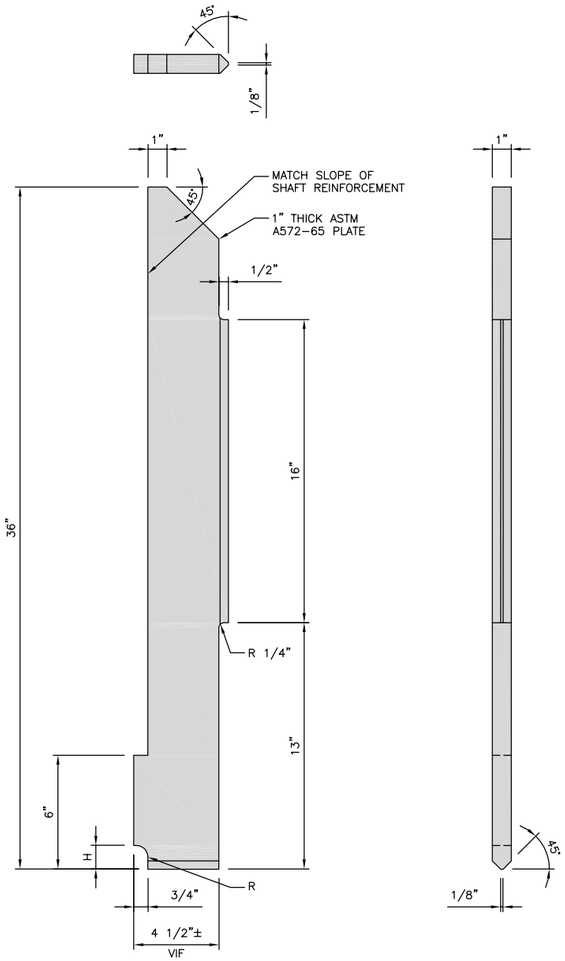
#AC4
STIFFENER PLATE
NO SCALE



#AC5
STRUCTURAL TUBING
NO SCALE



#AC6
WASHER PLATE
NO SCALE



NOTE

R = STIFFENER THICKNESS/2
H = STIFFENER THICKNESS

#AC7
STIFFENER PLATE
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
01/21/2020

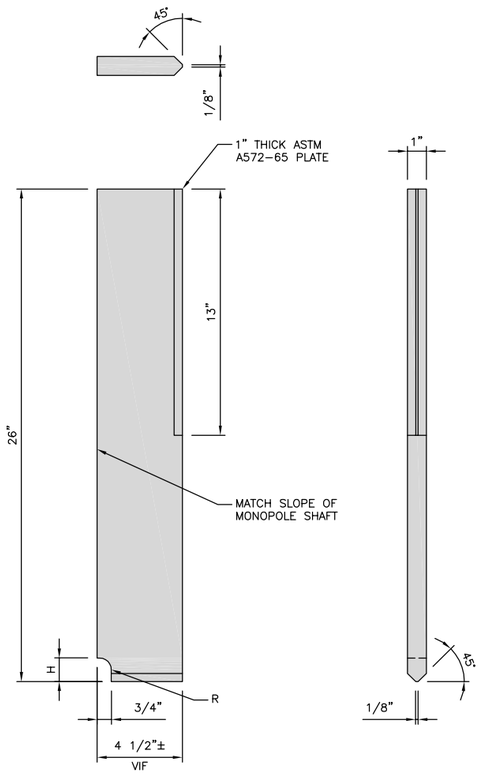
BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103-1217
HARTFORD COUNTY, USA

SHEET TITLE

BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

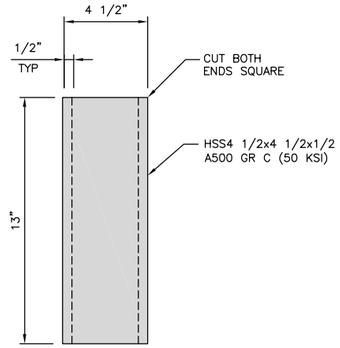
TM-11



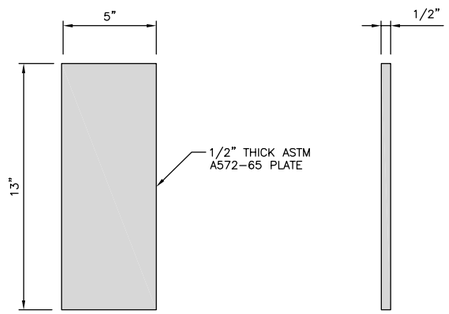
NOTE

R = STIFFENER THICKNESS/2
H = STIFFENER THICKNESS

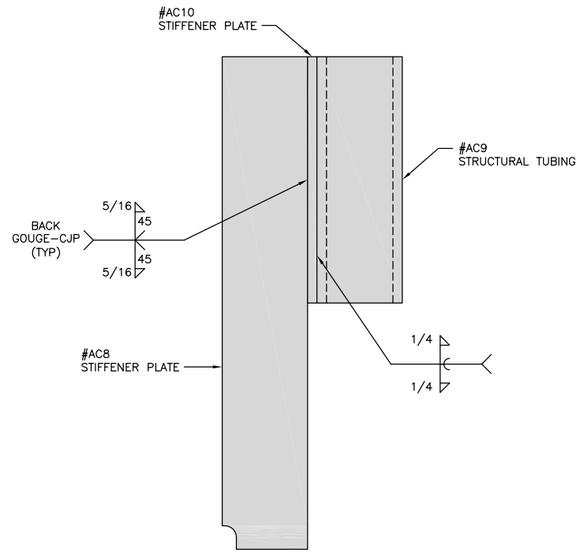
#AC8
STIFFENER PLATE
NO SCALE



#AC9
STRUCTURAL TUBING
NO SCALE



#AC10
STIFFENER PLATE
NO SCALE



ADDITIONAL
WELDING DETAIL
NO SCALE

PREPARED FOR:

CROWN CASTLE

BLACK & VEATCH

6800 W 115TH ST, SUITE 2292
OVERLAND PARK, KS 66211

PROJECT NO:	400087
DRAWN BY:	TYW
CHECKED BY:	PD

REV	DATE	DESCRIPTION
0	01/15/20	ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT
JOSHUA J. RILEY
33208
LICENSED
PROFESSIONAL ENGINEER
01/21/2020

BU #876325
WO #1819530
WESTON SQUARE
92 WESTON STREET
HARTFORD, CT 06103–1217
HARTFORD COUNTY, USA

SHEET TITLE

BASE PLATE ANCHOR ROD CHAIR DETAILS

SHEET NUMBER

TM-12

Exhibit E

Mount Analysis

Date: November 19, 2020

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	**AT&T Mobility Equipment Change-Out**	
	Carrier Site Number:	10071071
	Carrier Site Name:	Hartford North
Crown Castle Designation:	**Crown Castle BU Number:**	876325
	Crown Castle Site Name:	Weston Square
	Crown Castle JDE Job Number:	605411
	Crown Castle Order Number:	517087, Rev.1
Engineering Firm Designation:	**B+T Group Report Designation:**	136350.007.01
Site Data:	**92 Weston Street, Hartford, CT, Hartford, 06103-1217** **Latitude 41° 47' 12.30" Longitude -72° 39' 44.42"**	
Structure Information:	**Tower Height & Type:**	**110 ft. Monopole**
	Mount Elevation:	**89 ft.**
	Mount Type:	**14.5 ft. Platform Mount**

Dear Ms. Tarr,

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

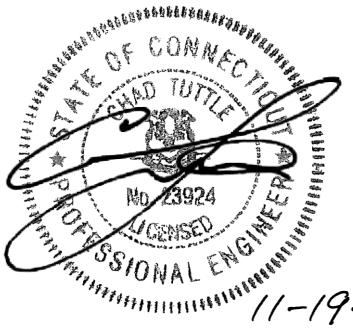
The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level to be:

Platform Mount **Sufficient**

This analysis has been performed in accordance with the 2018 International Building Code based upon an ultimate 3-second gust wind speed of 117 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount structural analysis prepared by: Leena Kantheti, E.I.T.

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2021



Chad E. Tuttle, P.E.

11-19-20

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 14.5' Platform Mount, designed by Sitepro1 (Part# RMQLP-4120-H10 w/o Stabilizer kit).

2) ANALYSIS CRITERIA

Building Code: 2018 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 117 mph
Exposure Category: C
Topographic Factor at Base: 1
Topographic Factor at Mount: 1
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Seismic S_s: 0.187
Seismic S_1: 0.055
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft.)	Antenna Centerline (ft.)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
89	90	3	CCI	DMP65R-BU6D	14.5 ft. Platform Mount
		3	CCI	OPA65R-BU6D	
		3	Powerwave	7770.00	
		3	Quintel	QS66512-2	
		3	Ericsson	RRUS 4415 B25	
		3	Ericsson	RRUS 32 B30	
		3	Ericsson	RRUS 32 B66A	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14	
		6	Powerwave	LGP21401	
		3	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Order	Existing Loading Proposed Loading	Date: 07/01/2020	Crown Castle
RFDS		Date: 11/18/2020	
Previous Mount Analysis	B+T Group	Date: 10/14/2020	On File

3.1) Analysis Method

RISA-3D (Version 18.0.5), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

A tool internally developed by B+T Group, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision C). In addition, this analysis is in accordance with AT&T's *Mount Technical Directive – R15.*

Manufacture drawing were used to create the model

3.2) Assumptions

1. The mount was properly fabricated and installed in accordance with its original design and manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas, mounts, and other appurtenances are as specified in Table-1.
4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.
6. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
9. The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
10. The following material grades were assumed (Unless Noted Otherwise):
    (a) Connection Bolts : ASTM A325
    (b) Steel Pipe : ASTM A53 (GR. 35)
    (c) HSS (Round) : ASTM 500 (GR. B-42)
    (d) HSS (Rectangular) : ASTM 500 (GR. B-46)
    (e) Channel : ASTM A36 (GR. 36)
    (f) Steel Solid Rod : ASTM A36 (GR. 36)
    (g) Steel Plate : ASTM A36 (GR. 36)
    (h) Steel Angle : ASTM A36 (GR. 36)
    (i) UNISTRUT : ASTM A570 (GR. 33)

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

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft.)	% Capacity	Pass / Fail
1	Main Horizontals	35	89	35.0	Pass
	Support Rails	M77	89	41.1	Pass
	Mount Pipes	62	89	57.0	Pass
	Support Tubes	28	89	36.7	Pass
	Support Angles	74	89	24.6	Pass
	Connection Plates	M93	89	28.3	Pass
	Kickers	27	89	84.7	Pass
	Tower Connection	--	89	55.0	Pass

Structure Rating (max from all components) =	84.7%

Notes:
1) See additional documentation in "Appendix B - Software Input Calculations and Analysis Output" for calculations supporting the % capacity consumed.

4.1) Recommendations

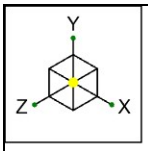
The proposed mount has sufficient capacity to support the proposed loading configuration. In order for the results of this analysis to be considered valid, the mount listed below shall be installed.

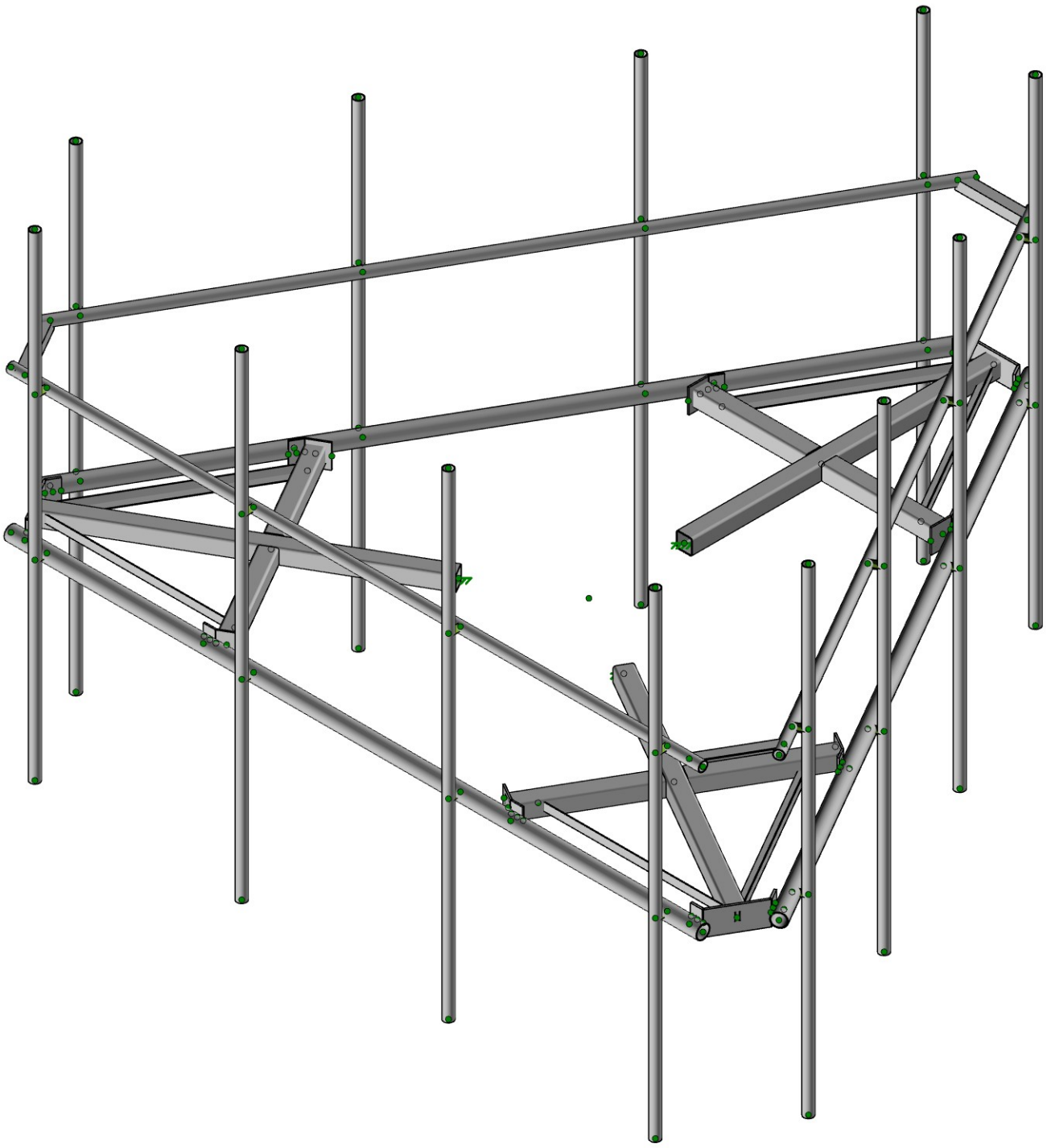
1. Mount replacement, Sitepro1 and Part# RMQLP-4120-H10 w/o stabilizer kit

Beyond the mount replacement, no structural modifications are required at this time, provided that the above listed changes are implemented.

APPENDIX A

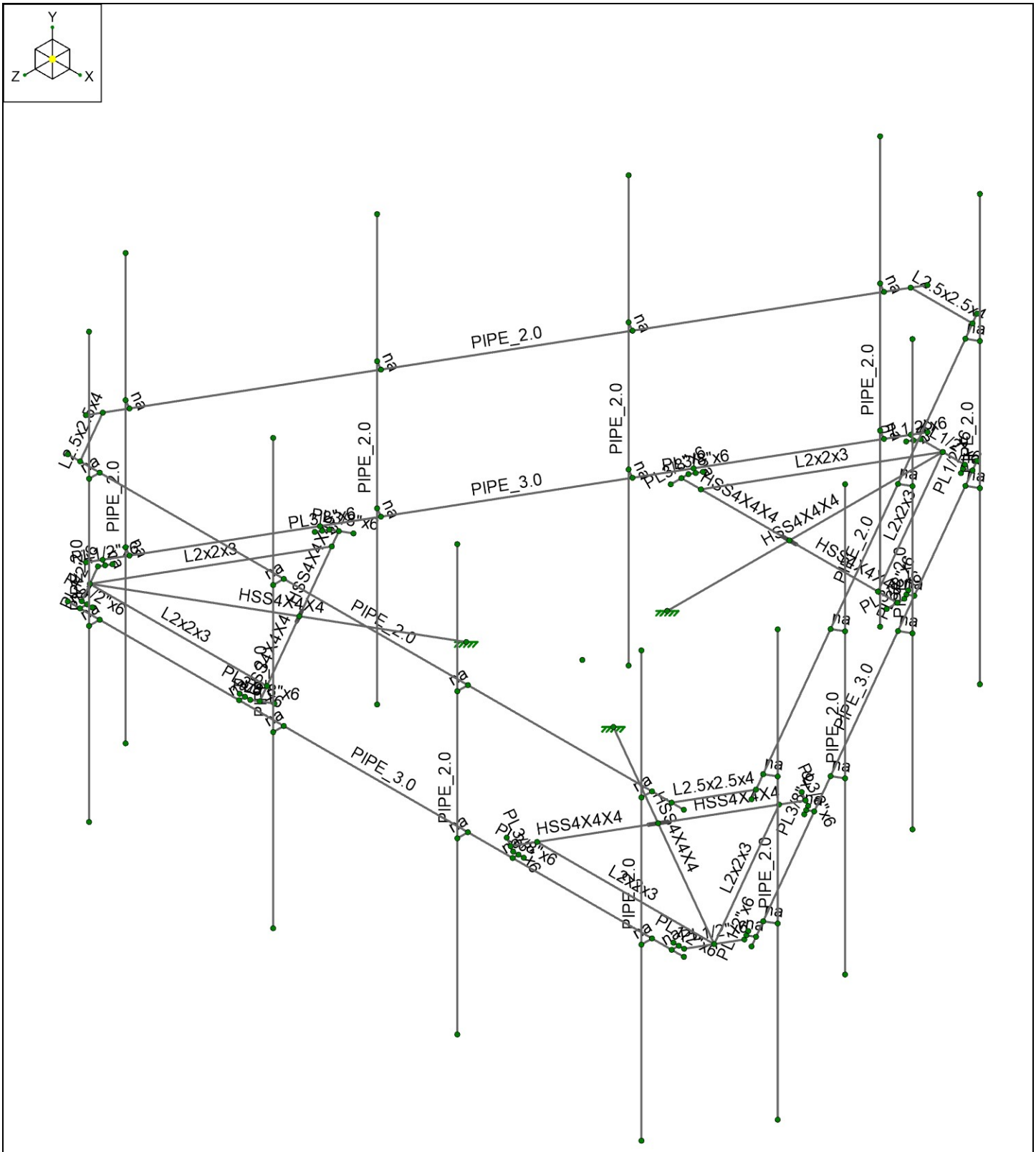
WIRE FRAME AND RENDERED MODELS





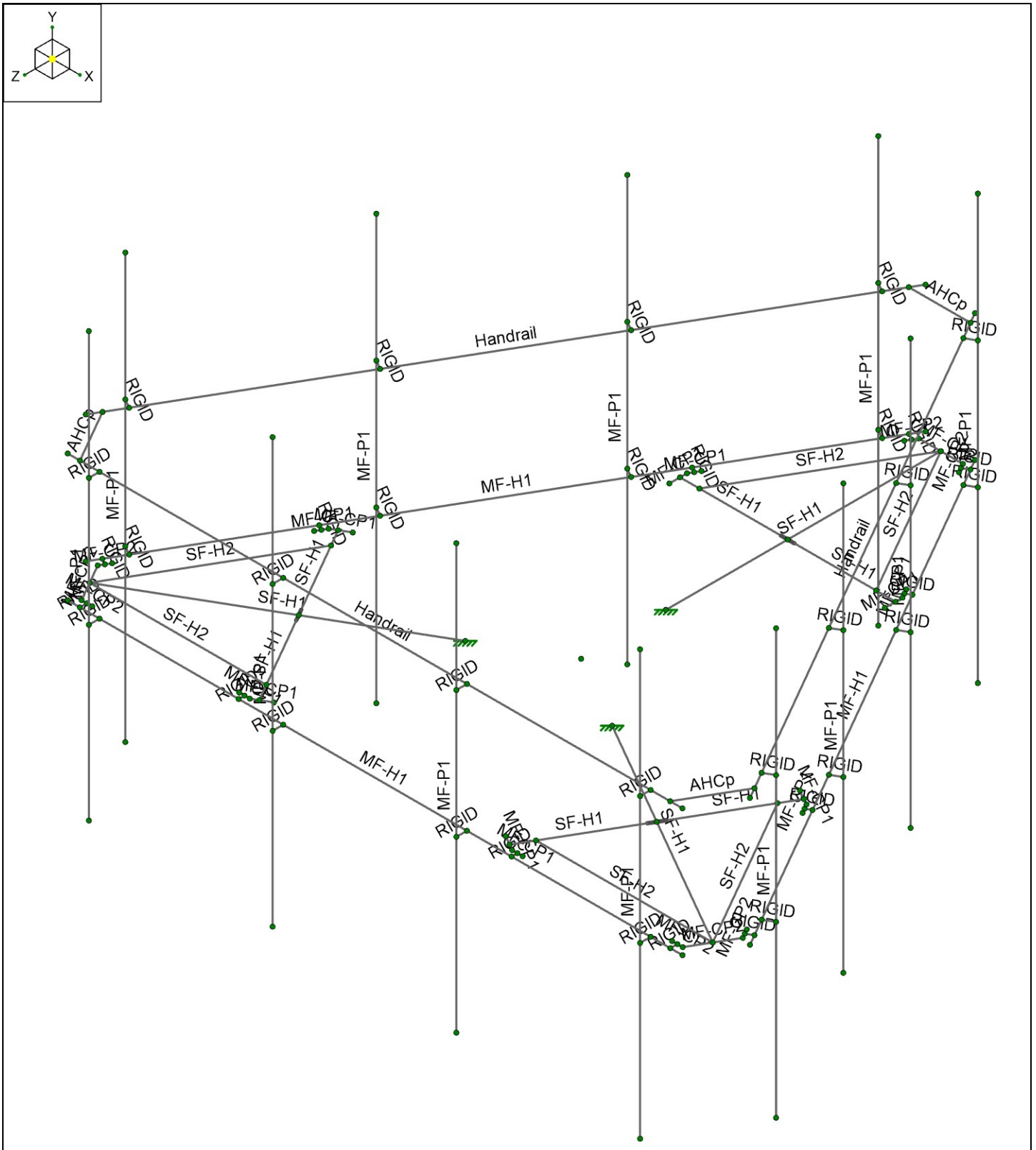
Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	876325_Weston Square	SK-1
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d



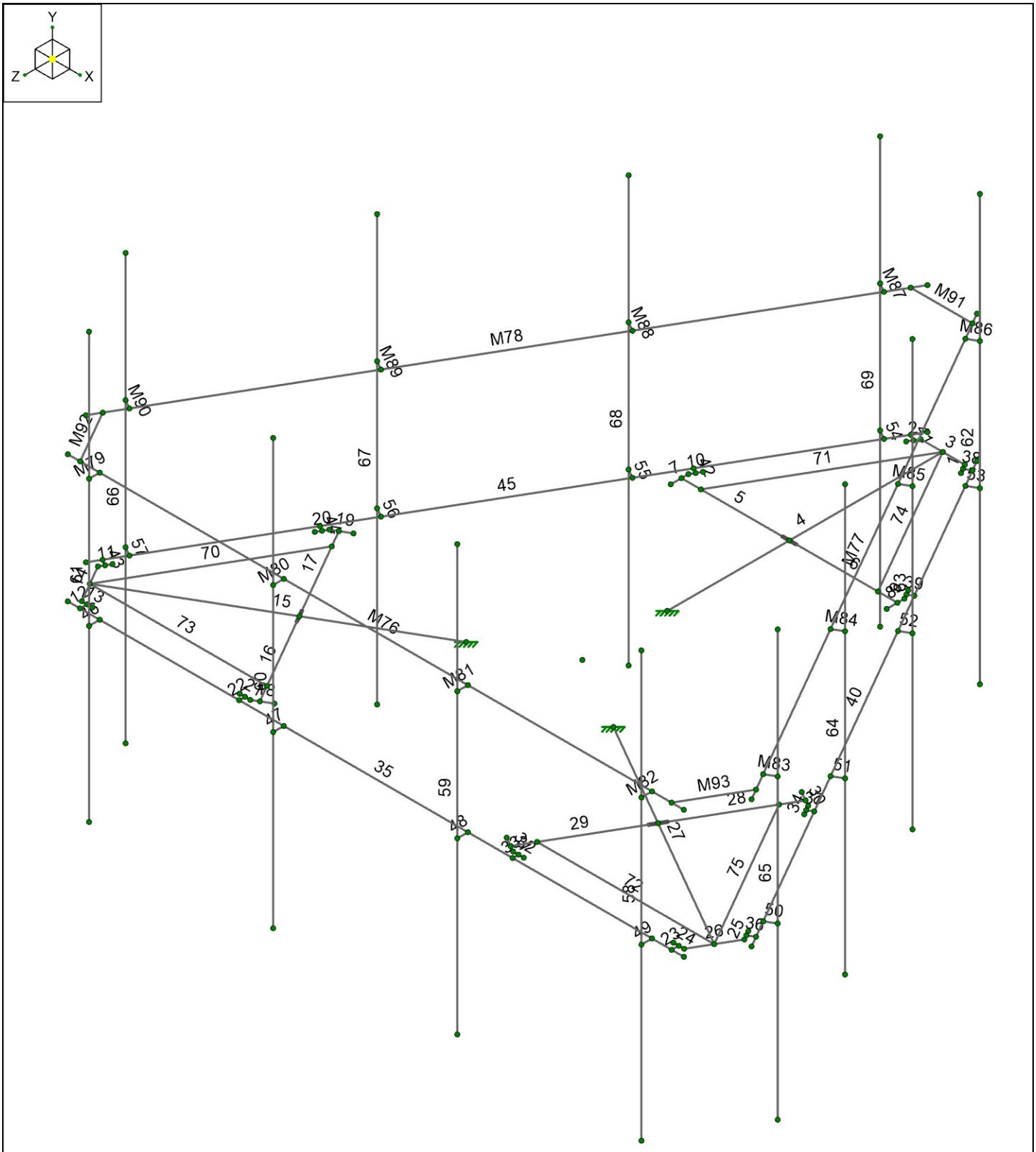
Envelope Only Solution

B+T Group	876325_Weston Square	SK-3
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d



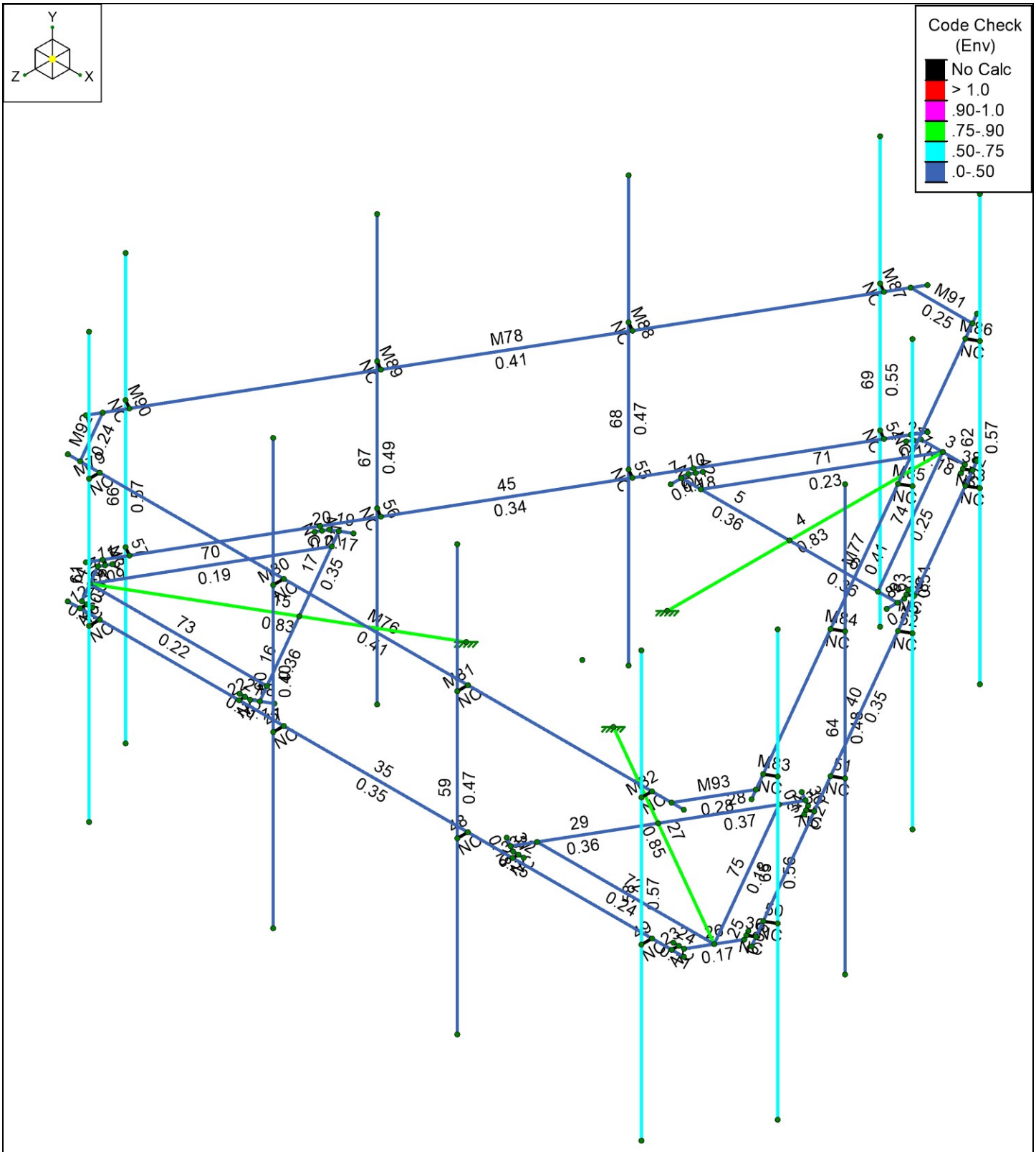
Envelope Only Solution

B+T Group	876325_Weston Square	SK-2
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d



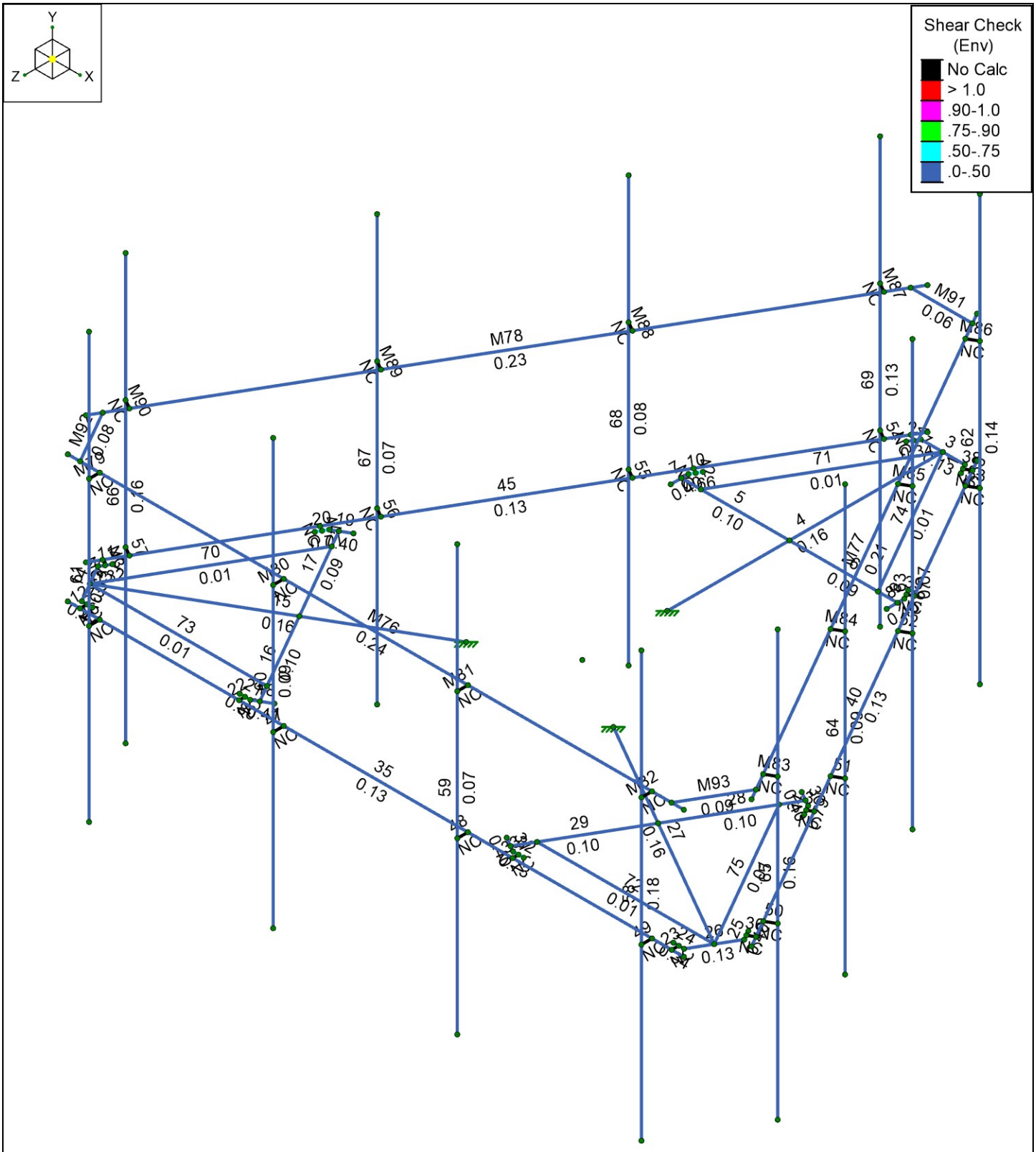
Envelope Only Solution

B+T Group	876325_Weston Square	SK-4
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	876325_Weston Square	SK-5
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	876325_Weston Square	SK-6
LHN		Nov 19, 2020
136350.007.01		136350_007_01_Risa.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

PROJECT	**136350.007.01 - Weston Squa**		**KSC**
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**11/19/20**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Tower Type		:	Monopole		
Ground Elevation	z_s	:	10	ft	[ASCE7 Hazard Tool]
Tower Height		:	110.00	ft	
Mount Elevation		:	89.00	ft	
Antenna Elevation		:	90.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	C		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	117	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.50	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.19		
	S_1	:	0.06		
	S_{DS}	:	0.20		
	S_{D1}	:	0.09		
Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.24		[Sec. 2.6.5.2]
Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	1.00		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.66	in	[Sec. 2.6.10]
Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.100		[Sec. 2.7.7.1]
Amplification	A_s	:	2.236364		[Sec. 16.7]
	q_z	:	41.10	psf	

PROJECT	**136350.007.01 - Weston Squa**		**KSC**
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**11/19/20**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.24	0.09	0.04	0.02
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.24	0.09	0.04	0.02
ERICSSON	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.88	2.43	0.05	0.07	0.01	0.01
ERICSSON	TME-RRUS 32 B66	1	3.89	1.26	1.32	2.29	2.19	3.27	0.06	0.11	0.01	0.02
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.24	0.09	0.04	0.02
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.24	0.09	0.04	0.02
ERICSSON	TME-RRUS 4478 B14	1	1.23	1.20	1.54	0.88	2.30	1.52	0.07	0.04	0.01	0.01
UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.08	0.07	0.02	0.02
UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.08	0.07	0.02	0.02
ERICSSON	TME-RRUS-32 B30	1	3.15	1.23	1.97	2.76	2.96	3.83	0.09	0.13	0.02	0.02
ERICSSON	RRUS 4415 B25	1	1.13	1.20	1.37	0.56	2.09	1.10	0.06	0.02	0.01	0.00
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.10	0.05	0.02	0.01
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.10	0.05	0.02	0.01
ERWAVE TECHNOLO	TME-LGP21401	2	1.57	1.20	1.84	0.52	3.08	1.45	0.08	0.02	0.01	0.00
RAYCAP	TME-DC6-48-60-18-8F	1	2.84	0.51	2.39	2.39	3.44	3.44	0.04	0.04	0.01	0.01
RAYCAP	TME-DC6-48-60-18-8F	1	2.84	0.51	2.39	2.39	3.44	3.44	0.04	0.04	0.01	0.01

PROJECT	**136350.007.01 - Weston Squa**		**LK**
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**11/19/20**	PAGE 3	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
RAYCAP	TME-DC6-48-60-18-8F	1	2.84	0.51	2.39	2.39	3.44	3.44	0.00	0.04	0.01	0.01
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.00	0.09	0.04	0.02
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.00	0.09	0.04	0.02
ERICSSON	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.88	2.43	0.00	0.07	0.01	0.01
ERICSSON	TME-RRUS 32 B66	1	3.89	1.26	1.32	2.29	2.19	3.27	0.00	0.11	0.01	0.02
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.00	0.09	0.04	0.02
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.00	0.09	0.04	0.02
ERICSSON	TME-RRUS 4478 B14	1	1.23	1.20	1.54	0.88	2.30	1.52	0.00	0.04	0.01	0.01
)UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.00	0.07	0.02	0.02
)UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.00	0.07	0.02	0.02
ERICSSON	TME-RRUS-32 B30	1	3.15	1.23	1.97	2.76	2.96	3.83	0.00	0.13	0.02	0.02
ERICSSON	RRUS 4415 B25	1	1.13	1.20	1.36	0.56	2.09	1.10	0.00	0.02	0.01	0.00
/ERWAVE TECHNOLO(	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.00	0.05	0.02	0.01
/ERWAVE TECHNOLO(	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.00	0.05	0.02	0.01
/ERWAVE TECHNOLO(	TME-LGP21401	2	1.57	1.20	1.84	0.52	3.08	1.45	0.00	0.02	0.01	0.00
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.00	0.09	0.04	0.02
CCI ANTENNAS	DMP65R-BU6DA	0.5	3.44	1.24	5.12	1.90	6.21	2.85	0.00	0.09	0.04	0.02
ERICSSON	RRUS 4449 B5/B12	1	1.90	1.20	1.17	1.64	1.88	2.43	0.00	0.07	0.01	0.01
ERICSSON	TME-RRUS 32 B66	1	3.89	1.26	1.32	2.29	2.19	3.27	0.00	0.11	0.01	0.02

PROJECT	**136350.007.01 - Weston Squa**		**LK**
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**11/19/20**	PAGE 4 OF	

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.24	0.09	0.04	0.02
CCI ANTENNAS	OPA65R-BU6DA	0.5	3.39	1.24	5.19	1.93	6.29	2.88	0.24	0.09	0.04	0.02
ERICSSON	TME-RRUS 4478 B14	1	1.23	1.20	1.54	0.88	2.30	1.52	0.07	0.04	0.01	0.01
UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.08	0.07	0.02	0.02
UINTEL TECHNOLOG	QS66512-2	0.5	6.00	1.36	3.00	2.40	4.00	3.38	0.08	0.07	0.02	0.02
ERICSSON	TME-RRUS-32 B30	1	3.15	1.23	1.97	2.76	2.96	3.83	0.09	0.13	0.02	0.02
ERICSSON	RRUS 4415 B25	1	1.13	1.20	1.37	0.56	2.09	1.10	0.06	0.02	0.01	0.00
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.10	0.05	0.02	0.01
ERWAVE TECHNOLO	7770.00	0.5	5.00	1.31	2.10	0.95	2.90	1.68	0.10	0.05	0.02	0.01
ERWAVE TECHNOLO	TME-LGP21401	2	1.57	1.20	1.84	0.52	3.08	1.45	0.08	0.02	0.01	0.00

PROJECT	**136350.007.01 - Weston Squa**		**LK**
SUBJECT	**Platform Mount Mount Analysis**		
DATE	**11/19/20**	PAGE 4	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	MF-H1	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
2	SF-H1	HSS4X4X4	Beam	Tube	A53 Gr.B	Typical	3.37	7.8	7.8	12.8
3	MF-P1	PIPE_2.0	Column	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
4	MF-CP1	PL3/8"x6	Beam	RECT	A36 Gr.36	Typical	2.25	0.026	6.75	0.101
5	MF-CP2	PL1/2"x6	Beam	RECT	A36 Gr.36	Typical	3	0.063	9	0.237
6	SF-H2	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical	0.722	0.271	0.271	0.009
7	Handrail	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	0.627	0.627	1.25
8	AHCp	L2.5x2.5x4	Beam	Single Angle	A36 Gr.36	Typical	1.19	0.692	0.692	0.026

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Y	-0.04	%25	Active
2	58	Y	-0.04	%75	Active
3	58	Y	-0.071	%50	Active
4	58	Y	-0.053	%50	Active
5	58	Y	0	0	Active
6	59	Y	-0.03	%25	Active
7	59	Y	-0.03	%75	Active
8	59	Y	-0.06	%50	Active
9	59	Y	0	0	Active
10	59	Y	0	0	Active
11	60	Y	-0.056	%25	Active
12	60	Y	-0.056	%75	Active
13	60	Y	-0.077	%50	Active
14	60	Y	-0.044	%50	Active
15	60	Y	0	0	Active
16	61	Y	-0.018	%30	Active
17	61	Y	-0.018	%70	Active
18	61	Y	-0.028	%50	Active
19	61	Y	0	0	Active
20	61	Y	0	0	Active
21	15	Y	-0.033	%60	Active
22	15	Y	0	0	Active
23	15	Y	0	0	Active
24	15	Y	0	0	Active
25	15	Y	0	0	Active
26	4	Y	-0.033	%60	Active
27	4	Y	0	0	Active
28	4	Y	0	0	Active
29	4	Y	0	0	Active
30	4	Y	0	0	Active
31	27	Y	-0.033	%90	Active
32	27	Y	0	0	Active
33	27	Y	0	0	Active
34	27	Y	0	0	Active
35	27	Y	0	0	Active
36	66	Y	-0.04	%25	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
37	66	Y	-0.04	%75	Active
38	66	Y	-0.071	%50	Active
39	66	Y	-0.053	%50	Active
40	66	Y	0	0	Active
41	67	Y	-0.03	%25	Active
42	67	Y	-0.03	%75	Active
43	67	Y	-0.06	%50	Active
44	67	Y	0	0	Active
45	67	Y	0	0	Active
46	68	Y	-0.056	%25	Active
47	68	Y	-0.056	%75	Active
48	68	Y	-0.077	%50	Active
49	68	Y	-0.044	%50	Active
50	68	Y	0	0	Active
51	69	Y	-0.018	%30	Active
52	69	Y	-0.018	%70	Active
53	69	Y	-0.028	%50	Active
54	69	Y	0	0	Active
55	69	Y	0	0	Active
56	62	Y	-0.04	%25	Active
57	62	Y	-0.04	%75	Active
58	62	Y	-0.071	%50	Active
59	62	Y	-0.053	%50	Active
60	62	Y	0	0	Active
61	63	Y	-0.03	%25	Active
62	63	Y	-0.03	%75	Active
63	63	Y	-0.06	%50	Active
64	63	Y	0	0	Active
65	63	Y	0	0	Active
66	64	Y	-0.056	%25	Active
67	64	Y	-0.056	%75	Active
68	64	Y	-0.077	%50	Active
69	64	Y	-0.044	%50	Active
70	64	Y	0	0	Active
71	65	Y	-0.018	%30	Active
72	65	Y	-0.018	%70	Active
73	65	Y	-0.028	%50	Active
74	65	Y	0	0	Active
75	65	Y	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Z	-0.236	%25	Active
2	58	Z	-0.236	%75	Active
3	58	Z	-0.052	%50	Active
4	58	Z	-0.062	%50	Active
5	58	Z	0	0	Active
6	59	Z	-0.239	%25	Active
7	59	Z	-0.239	%75	Active
8	59	Z	-0.068	%50	Active
9	59	Z	0	0	Active
10	59	Z	0	0	Active
11	60	Z	-0.083	%25	Active
12	60	Z	-0.083	%75	Active
13	60	Z	-0.09	%50	Active
14	60	Z	-0.061	%50	Active
15	60	Z	0	0	Active
16	61	Z	-0.102	%30	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
17	61	Z	-0.102	%70	Active
18	61	Z	-0.082	%50	Active
19	61	Z	0	0	Active
20	61	Z	0	0	Active
21	15	Z	-0.045	%60	Active
22	15	Z	0	0	Active
23	15	Z	0	0	Active
24	15	Z	0	0	Active
25	15	Z	0	0	Active
26	4	Z	-0.045	%60	Active
27	4	Z	0	0	Active
28	4	Z	0	0	Active
29	4	Z	0	0	Active
30	4	Z	0	0	Active
31	27	Z	-0.045	%90	Active
32	27	Z	0	0	Active
33	27	Z	0	0	Active
34	27	Z	0	0	Active
35	27	Z	0	0	Active
36	66	Z	-0.236	%25	Active
37	66	Z	-0.236	%75	Active
38	66	Z	-0.052	%50	Active
39	66	Z	-0.062	%50	Active
40	66	Z	0	0	Active
41	67	Z	-0.239	%25	Active
42	67	Z	-0.239	%75	Active
43	67	Z	-0.068	%50	Active
44	67	Z	0	0	Active
45	67	Z	0	0	Active
46	68	Z	-0.083	%25	Active
47	68	Z	-0.083	%75	Active
48	68	Z	-0.09	%50	Active
49	68	Z	-0.061	%50	Active
50	68	Z	0	0	Active
51	69	Z	-0.102	%30	Active
52	69	Z	-0.102	%70	Active
53	69	Z	-0.082	%50	Active
54	69	Z	0	0	Active
55	69	Z	0	0	Active
56	62	Z	-0.236	%25	Active
57	62	Z	-0.236	%75	Active
58	62	Z	-0.052	%50	Active
59	62	Z	-0.062	%50	Active
60	62	Z	0	0	Active
61	63	Z	-0.239	%25	Active
62	63	Z	-0.239	%75	Active
63	63	Z	-0.068	%50	Active
64	63	Z	0	0	Active
65	63	Z	0	0	Active
66	64	Z	-0.083	%25	Active
67	64	Z	-0.083	%75	Active
68	64	Z	-0.09	%50	Active
69	64	Z	-0.061	%50	Active
70	64	Z	0	0	Active
71	65	Z	-0.102	%30	Active
72	65	Z	-0.102	%70	Active
73	65	Z	-0.082	%50	Active
74	65	Z	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
75	65	Z	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	X	-0.088	%25	Active
2	58	X	-0.088	%75	Active
3	58	X	-0.073	%50	Active
4	58	X	-0.107	%50	Active
5	58	X	0	0	Active
6	59	X	-0.089	%25	Active
7	59	X	-0.089	%75	Active
8	59	X	-0.039	%50	Active
9	59	X	0	0	Active
10	59	X	0	0	Active
11	60	X	-0.069	%25	Active
12	60	X	-0.069	%75	Active
13	60	X	-0.126	%50	Active
14	60	X	-0.025	%50	Active
15	60	X	0	0	Active
16	61	X	-0.046	%30	Active
17	61	X	-0.046	%70	Active
18	61	X	-0.023	%50	Active
19	61	X	0	0	Active
20	61	X	0	0	Active
21	15	X	-0.045	%60	Active
22	15	X	0	0	Active
23	15	X	0	0	Active
24	15	X	0	0	Active
25	15	X	0	0	Active
26	4	X	-0.045	%60	Active
27	4	X	0	0	Active
28	4	X	0	0	Active
29	4	X	0	0	Active
30	4	X	0	0	Active
31	27	X	-0.045	%90	Active
32	27	X	0	0	Active
33	27	X	0	0	Active
34	27	X	0	0	Active
35	27	X	0	0	Active
36	66	X	-0.088	%25	Active
37	66	X	-0.088	%75	Active
38	66	X	-0.073	%50	Active
39	66	X	-0.107	%50	Active
40	66	X	0	0	Active
41	67	X	-0.089	%25	Active
42	67	X	-0.089	%75	Active
43	67	X	-0.039	%50	Active
44	67	X	0	0	Active
45	67	X	0	0	Active
46	68	X	-0.069	%25	Active
47	68	X	-0.069	%75	Active
48	68	X	-0.126	%50	Active
49	68	X	-0.025	%50	Active
50	68	X	0	0	Active
51	69	X	-0.046	%30	Active
52	69	X	-0.046	%70	Active
53	69	X	-0.023	%50	Active
54	69	X	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
55	69	X	0	0	Active
56	62	X	-0.088	%25	Active
57	62	X	-0.088	%75	Active
58	62	X	-0.073	%50	Active
59	62	X	-0.107	%50	Active
60	62	X	0	0	Active
61	63	X	-0.089	%25	Active
62	63	X	-0.089	%75	Active
63	63	X	-0.039	%50	Active
64	63	X	0	0	Active
65	63	X	0	0	Active
66	64	X	-0.069	%25	Active
67	64	X	-0.069	%75	Active
68	64	X	-0.126	%50	Active
69	64	X	-0.025	%50	Active
70	64	X	0	0	Active
71	65	X	-0.046	%30	Active
72	65	X	-0.046	%70	Active
73	65	X	-0.023	%50	Active
74	65	X	0	0	Active
75	65	X	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Z	-0.043	%25	Active
2	58	Z	-0.043	%75	Active
3	58	Z	-0.01	%50	Active
4	58	Z	-0.011	%50	Active
5	58	Z	0	0	Active
6	59	Z	-0.044	%25	Active
7	59	Z	-0.044	%75	Active
8	59	Z	-0.013	%50	Active
9	59	Z	0	0	Active
10	59	Z	0	0	Active
11	60	Z	-0.02	%25	Active
12	60	Z	-0.02	%75	Active
13	60	Z	-0.016	%50	Active
14	60	Z	-0.011	%50	Active
15	60	Z	0	0	Active
16	61	Z	-0.019	%30	Active
17	61	Z	-0.019	%70	Active
18	61	Z	-0.015	%50	Active
19	61	Z	0	0	Active
20	61	Z	0	0	Active
21	15	Z	-0.008	%60	Active
22	15	Z	0	0	Active
23	15	Z	0	0	Active
24	15	Z	0	0	Active
25	15	Z	0	0	Active
26	4	Z	-0.008	%60	Active
27	4	Z	0	0	Active
28	4	Z	0	0	Active
29	4	Z	0	0	Active
30	4	Z	0	0	Active
31	27	Z	-0.008	%90	Active
32	27	Z	0	0	Active
33	27	Z	0	0	Active
34	27	Z	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
35	27	Z	0	0	Active
36	66	Z	-0.043	%25	Active
37	66	Z	-0.043	%75	Active
38	66	Z	-0.01	%50	Active
39	66	Z	-0.011	%50	Active
40	66	Z	0	0	Active
41	67	Z	-0.044	%25	Active
42	67	Z	-0.044	%75	Active
43	67	Z	-0.013	%50	Active
44	67	Z	0	0	Active
45	67	Z	0	0	Active
46	68	Z	-0.02	%25	Active
47	68	Z	-0.02	%75	Active
48	68	Z	-0.016	%50	Active
49	68	Z	-0.011	%50	Active
50	68	Z	0	0	Active
51	69	Z	-0.019	%30	Active
52	69	Z	-0.019	%70	Active
53	69	Z	-0.015	%50	Active
54	69	Z	0	0	Active
55	69	Z	0	0	Active
56	62	Z	-0.043	%25	Active
57	62	Z	-0.043	%75	Active
58	62	Z	-0.01	%50	Active
59	62	Z	-0.011	%50	Active
60	62	Z	0	0	Active
61	63	Z	-0.044	%25	Active
62	63	Z	-0.044	%75	Active
63	63	Z	-0.013	%50	Active
64	63	Z	0	0	Active
65	63	Z	0	0	Active
66	64	Z	-0.02	%25	Active
67	64	Z	-0.02	%75	Active
68	64	Z	-0.016	%50	Active
69	64	Z	-0.011	%50	Active
70	64	Z	0	0	Active
71	65	Z	-0.019	%30	Active
72	65	Z	-0.019	%70	Active
73	65	Z	-0.015	%50	Active
74	65	Z	0	0	Active
75	65	Z	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	X	-0.016	%25	Active
2	58	X	-0.016	%75	Active
3	58	X	-0.013	%50	Active
4	58	X	-0.02	%50	Active
5	58	X	0	0	Active
6	59	X	-0.016	%25	Active
7	59	X	-0.016	%75	Active
8	59	X	-0.007	%50	Active
9	59	X	0	0	Active
10	59	X	0	0	Active
11	60	X	-0.017	%25	Active
12	60	X	-0.017	%75	Active
13	60	X	-0.023	%50	Active
14	60	X	-0.005	%50	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
15	60	X	0	0	Active
16	61	X	-0.009	%30	Active
17	61	X	-0.009	%70	Active
18	61	X	-0.004	%50	Active
19	61	X	0	0	Active
20	61	X	0	0	Active
21	15	X	-0.008	%60	Active
22	15	X	0	0	Active
23	15	X	0	0	Active
24	15	X	0	0	Active
25	15	X	0	0	Active
26	4	X	-0.008	%60	Active
27	4	X	0	0	Active
28	4	X	0	0	Active
29	4	X	0	0	Active
30	4	X	0	0	Active
31	27	X	-0.008	%90	Active
32	27	X	0	0	Active
33	27	X	0	0	Active
34	27	X	0	0	Active
35	27	X	0	0	Active
36	66	X	-0.016	%25	Active
37	66	X	-0.016	%75	Active
38	66	X	-0.013	%50	Active
39	66	X	-0.02	%50	Active
40	66	X	0	0	Active
41	67	X	-0.016	%25	Active
42	67	X	-0.016	%75	Active
43	67	X	-0.007	%50	Active
44	67	X	0	0	Active
45	67	X	0	0	Active
46	68	X	-0.017	%25	Active
47	68	X	-0.017	%75	Active
48	68	X	-0.023	%50	Active
49	68	X	-0.005	%50	Active
50	68	X	0	0	Active
51	69	X	-0.009	%30	Active
52	69	X	-0.009	%70	Active
53	69	X	-0.004	%50	Active
54	69	X	0	0	Active
55	69	X	0	0	Active
56	62	X	-0.016	%25	Active
57	62	X	-0.016	%75	Active
58	62	X	-0.013	%50	Active
59	62	X	-0.02	%50	Active
60	62	X	0	0	Active
61	63	X	-0.016	%25	Active
62	63	X	-0.016	%75	Active
63	63	X	-0.007	%50	Active
64	63	X	0	0	Active
65	63	X	0	0	Active
66	64	X	-0.017	%25	Active
67	64	X	-0.017	%75	Active
68	64	X	-0.023	%50	Active
69	64	X	-0.005	%50	Active
70	64	X	0	0	Active
71	65	X	-0.009	%30	Active
72	65	X	-0.009	%70	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
73	65	X	-0.004	%50	Active
74	65	X	0	0	Active
75	65	X	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Z	-0.016	%25	Active
2	58	Z	-0.016	%75	Active
3	58	Z	-0.003	%50	Active
4	58	Z	-0.004	%50	Active
5	58	Z	0	0	Active
6	59	Z	-0.016	%25	Active
7	59	Z	-0.016	%75	Active
8	59	Z	-0.005	%50	Active
9	59	Z	0	0	Active
10	59	Z	0	0	Active
11	60	Z	-0.005	%25	Active
12	60	Z	-0.005	%75	Active
13	60	Z	-0.006	%50	Active
14	60	Z	-0.004	%50	Active
15	60	Z	0	0	Active
16	61	Z	-0.007	%30	Active
17	61	Z	-0.007	%70	Active
18	61	Z	-0.005	%50	Active
19	61	Z	0	0	Active
20	61	Z	0	0	Active
21	15	Z	-0.003	%60	Active
22	15	Z	0	0	Active
23	15	Z	0	0	Active
24	15	Z	0	0	Active
25	15	Z	0	0	Active
26	4	Z	-0.003	%60	Active
27	4	Z	0	0	Active
28	4	Z	0	0	Active
29	4	Z	0	0	Active
30	4	Z	0	0	Active
31	27	Z	-0.003	%90	Active
32	27	Z	0	0	Active
33	27	Z	0	0	Active
34	27	Z	0	0	Active
35	27	Z	0	0	Active
36	66	Z	-0.016	%25	Active
37	66	Z	-0.016	%75	Active
38	66	Z	-0.003	%50	Active
39	66	Z	-0.004	%50	Active
40	66	Z	0	0	Active
41	67	Z	-0.016	%25	Active
42	67	Z	-0.016	%75	Active
43	67	Z	-0.005	%50	Active
44	67	Z	0	0	Active
45	67	Z	0	0	Active
46	68	Z	-0.005	%25	Active
47	68	Z	-0.005	%75	Active
48	68	Z	-0.006	%50	Active
49	68	Z	-0.004	%50	Active
50	68	Z	0	0	Active
51	69	Z	-0.007	%30	Active
52	69	Z	-0.007	%70	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
53	69	Z	-0.005	%50	Active
54	69	Z	0	0	Active
55	69	Z	0	0	Active
56	62	Z	-0.016	%25	Active
57	62	Z	-0.016	%75	Active
58	62	Z	-0.003	%50	Active
59	62	Z	-0.004	%50	Active
60	62	Z	0	0	Active
61	63	Z	-0.016	%25	Active
62	63	Z	-0.016	%75	Active
63	63	Z	-0.005	%50	Active
64	63	Z	0	0	Active
65	63	Z	0	0	Active
66	64	Z	-0.005	%25	Active
67	64	Z	-0.005	%75	Active
68	64	Z	-0.006	%50	Active
69	64	Z	-0.004	%50	Active
70	64	Z	0	0	Active
71	65	Z	-0.007	%30	Active
72	65	Z	-0.007	%70	Active
73	65	Z	-0.005	%50	Active
74	65	Z	0	0	Active
75	65	Z	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	X	-0.006	%25	Active
2	58	X	-0.006	%75	Active
3	58	X	-0.005	%50	Active
4	58	X	-0.007	%50	Active
5	58	X	0	0	Active
6	59	X	-0.006	%25	Active
7	59	X	-0.006	%75	Active
8	59	X	-0.003	%50	Active
9	59	X	0	0	Active
10	59	X	0	0	Active
11	60	X	-0.005	%25	Active
12	60	X	-0.005	%75	Active
13	60	X	-0.008	%50	Active
14	60	X	-0.002	%50	Active
15	60	X	0	0	Active
16	61	X	-0.003	%30	Active
17	61	X	-0.003	%70	Active
18	61	X	-0.002	%50	Active
19	61	X	0	0	Active
20	61	X	0	0	Active
21	15	X	-0.003	%60	Active
22	15	X	0	0	Active
23	15	X	0	0	Active
24	15	X	0	0	Active
25	15	X	0	0	Active
26	4	X	-0.003	%60	Active
27	4	X	0	0	Active
28	4	X	0	0	Active
29	4	X	0	0	Active
30	4	X	0	0	Active
31	27	X	-0.003	%90	Active
32	27	X	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
33	27	X	0	0	Active
34	27	X	0	0	Active
35	27	X	0	0	Active
36	66	X	-0.006	%25	Active
37	66	X	-0.006	%75	Active
38	66	X	-0.005	%50	Active
39	66	X	-0.007	%50	Active
40	66	X	0	0	Active
41	67	X	-0.006	%25	Active
42	67	X	-0.006	%75	Active
43	67	X	-0.003	%50	Active
44	67	X	0	0	Active
45	67	X	0	0	Active
46	68	X	-0.005	%25	Active
47	68	X	-0.005	%75	Active
48	68	X	-0.008	%50	Active
49	68	X	-0.002	%50	Active
50	68	X	0	0	Active
51	69	X	-0.003	%30	Active
52	69	X	-0.003	%70	Active
53	69	X	-0.002	%50	Active
54	69	X	0	0	Active
55	69	X	0	0	Active
56	62	X	-0.006	%25	Active
57	62	X	-0.006	%75	Active
58	62	X	-0.005	%50	Active
59	62	X	-0.007	%50	Active
60	62	X	0	0	Active
61	63	X	-0.006	%25	Active
62	63	X	-0.006	%75	Active
63	63	X	-0.003	%50	Active
64	63	X	0	0	Active
65	63	X	0	0	Active
66	64	X	-0.005	%25	Active
67	64	X	-0.005	%75	Active
68	64	X	-0.008	%50	Active
69	64	X	-0.002	%50	Active
70	64	X	0	0	Active
71	65	X	-0.003	%30	Active
72	65	X	-0.003	%70	Active
73	65	X	-0.002	%50	Active
74	65	X	0	0	Active
75	65	X	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Y	-0.143	%25	Active
2	58	Y	-0.143	%75	Active
3	58	Y	-0.054	%50	Active
4	58	Y	-0.072	%50	Active
5	58	Y	0	0	Active
6	59	Y	-0.145	%25	Active
7	59	Y	-0.145	%75	Active
8	59	Y	-0.048	%50	Active
9	59	Y	0	0	Active
10	59	Y	0	0	Active
11	60	Y	-0.153	%25	Active
12	60	Y	-0.153	%75	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
13	60	Y	-0.091	%50	Active
14	60	Y	-0.04	%50	Active
15	60	Y	0	0	Active
16	61	Y	-0.064	%30	Active
17	61	Y	-0.064	%70	Active
18	61	Y	-0.055	%50	Active
19	61	Y	0	0	Active
20	61	Y	0	0	Active
21	15	Y	-0.067	%60	Active
22	15	Y	0	0	Active
23	15	Y	0	0	Active
24	15	Y	0	0	Active
25	15	Y	0	0	Active
26	4	Y	-0.067	%60	Active
27	4	Y	0	0	Active
28	4	Y	0	0	Active
29	4	Y	0	0	Active
30	4	Y	0	0	Active
31	27	Y	-0.067	%90	Active
32	27	Y	0	0	Active
33	27	Y	0	0	Active
34	27	Y	0	0	Active
35	27	Y	0	0	Active
36	66	Y	-0.143	%25	Active
37	66	Y	-0.143	%75	Active
38	66	Y	-0.054	%50	Active
39	66	Y	-0.072	%50	Active
40	66	Y	0	0	Active
41	67	Y	-0.145	%25	Active
42	67	Y	-0.145	%75	Active
43	67	Y	-0.048	%50	Active
44	67	Y	0	0	Active
45	67	Y	0	0	Active
46	68	Y	-0.153	%25	Active
47	68	Y	-0.153	%75	Active
48	68	Y	-0.091	%50	Active
49	68	Y	-0.04	%50	Active
50	68	Y	0	0	Active
51	69	Y	-0.064	%30	Active
52	69	Y	-0.064	%70	Active
53	69	Y	-0.055	%50	Active
54	69	Y	0	0	Active
55	69	Y	0	0	Active
56	62	Y	-0.143	%25	Active
57	62	Y	-0.143	%75	Active
58	62	Y	-0.054	%50	Active
59	62	Y	-0.072	%50	Active
60	62	Y	0	0	Active
61	63	Y	-0.145	%25	Active
62	63	Y	-0.145	%75	Active
63	63	Y	-0.048	%50	Active
64	63	Y	0	0	Active
65	63	Y	0	0	Active
66	64	Y	-0.153	%25	Active
67	64	Y	-0.153	%75	Active
68	64	Y	-0.091	%50	Active
69	64	Y	-0.04	%50	Active
70	64	Y	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
71	65	Y	-0.064	%30	Active
72	65	Y	-0.064	%70	Active
73	65	Y	-0.055	%50	Active
74	65	Y	0	0	Active
75	65	Y	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	Z	-0.018	%25	Active
2	58	Z	-0.018	%75	Active
3	58	Z	-0.016	%50	Active
4	58	Z	-0.012	%50	Active
5	58	Z	0	0	Active
6	59	Z	-0.013	%25	Active
7	59	Z	-0.013	%75	Active
8	59	Z	-0.013	%50	Active
9	59	Z	0	0	Active
10	59	Z	0	0	Active
11	60	Z	-0.025	%25	Active
12	60	Z	-0.025	%75	Active
13	60	Z	-0.017	%50	Active
14	60	Z	-0.01	%50	Active
15	60	Z	0	0	Active
16	61	Z	-0.008	%30	Active
17	61	Z	-0.008	%70	Active
18	61	Z	-0.003	%50	Active
19	61	Z	0	0	Active
20	61	Z	0	0	Active
21	15	Z	-0.007	%60	Active
22	15	Z	0	0	Active
23	15	Z	0	0	Active
24	15	Z	0	0	Active
25	15	Z	0	0	Active
26	4	Z	-0.007	%60	Active
27	4	Z	0	0	Active
28	4	Z	0	0	Active
29	4	Z	0	0	Active
30	4	Z	0	0	Active
31	27	Z	-0.007	%90	Active
32	27	Z	0	0	Active
33	27	Z	0	0	Active
34	27	Z	0	0	Active
35	27	Z	0	0	Active
36	66	Z	-0.018	%25	Active
37	66	Z	-0.018	%75	Active
38	66	Z	-0.016	%50	Active
39	66	Z	-0.012	%50	Active
40	66	Z	0	0	Active
41	67	Z	-0.013	%25	Active
42	67	Z	-0.013	%75	Active
43	67	Z	-0.013	%50	Active
44	67	Z	0	0	Active
45	67	Z	0	0	Active
46	68	Z	-0.025	%25	Active
47	68	Z	-0.025	%75	Active
48	68	Z	-0.017	%50	Active
49	68	Z	-0.01	%50	Active
50	68	Z	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
51	69	Z	-0.008	%30	Active
52	69	Z	-0.008	%70	Active
53	69	Z	-0.003	%50	Active
54	69	Z	0	0	Active
55	69	Z	0	0	Active
56	62	Z	-0.018	%25	Active
57	62	Z	-0.018	%75	Active
58	62	Z	-0.016	%50	Active
59	62	Z	-0.012	%50	Active
60	62	Z	0	0	Active
61	63	Z	-0.013	%25	Active
62	63	Z	-0.013	%75	Active
63	63	Z	-0.013	%50	Active
64	63	Z	0	0	Active
65	63	Z	0	0	Active
66	64	Z	-0.025	%25	Active
67	64	Z	-0.025	%75	Active
68	64	Z	-0.017	%50	Active
69	64	Z	-0.01	%50	Active
70	64	Z	0	0	Active
71	65	Z	-0.008	%30	Active
72	65	Z	-0.008	%70	Active
73	65	Z	-0.003	%50	Active
74	65	Z	0	0	Active
75	65	Z	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	58	X	-0.018	%25	Active
2	58	X	-0.018	%75	Active
3	58	X	-0.016	%50	Active
4	58	X	-0.012	%50	Active
5	58	X	0	0	Active
6	59	X	-0.013	%25	Active
7	59	X	-0.013	%75	Active
8	59	X	-0.013	%50	Active
9	59	X	0	0	Active
10	59	X	0	0	Active
11	60	X	-0.025	%25	Active
12	60	X	-0.025	%75	Active
13	60	X	-0.017	%50	Active
14	60	X	-0.01	%50	Active
15	60	X	0	0	Active
16	61	X	-0.008	%30	Active
17	61	X	-0.008	%70	Active
18	61	X	-0.003	%50	Active
19	61	X	0	0	Active
20	61	X	0	0	Active
21	15	X	-0.007	%60	Active
22	15	X	0	0	Active
23	15	X	0	0	Active
24	15	X	0	0	Active
25	15	X	0	0	Active
26	4	X	-0.007	%60	Active
27	4	X	0	0	Active
28	4	X	0	0	Active
29	4	X	0	0	Active
30	4	X	0	0	Active

Member Point Loads (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
31	27	X	-0.007	%90	Active
32	27	X	0	0	Active
33	27	X	0	0	Active
34	27	X	0	0	Active
35	27	X	0	0	Active
36	66	X	-0.018	%25	Active
37	66	X	-0.018	%75	Active
38	66	X	-0.016	%50	Active
39	66	X	-0.012	%50	Active
40	66	X	0	0	Active
41	67	X	-0.013	%25	Active
42	67	X	-0.013	%75	Active
43	67	X	-0.013	%50	Active
44	67	X	0	0	Active
45	67	X	0	0	Active
46	68	X	-0.025	%25	Active
47	68	X	-0.025	%75	Active
48	68	X	-0.017	%50	Active
49	68	X	-0.01	%50	Active
50	68	X	0	0	Active
51	69	X	-0.008	%30	Active
52	69	X	-0.008	%70	Active
53	69	X	-0.003	%50	Active
54	69	X	0	0	Active
55	69	X	0	0	Active
56	62	X	-0.018	%25	Active
57	62	X	-0.018	%75	Active
58	62	X	-0.016	%50	Active
59	62	X	-0.012	%50	Active
60	62	X	0	0	Active
61	63	X	-0.013	%25	Active
62	63	X	-0.013	%75	Active
63	63	X	-0.013	%50	Active
64	63	X	0	0	Active
65	63	X	0	0	Active
66	64	X	-0.025	%25	Active
67	64	X	-0.025	%75	Active
68	64	X	-0.017	%50	Active
69	64	X	-0.01	%50	Active
70	64	X	0	0	Active
71	65	X	-0.008	%30	Active
72	65	X	-0.008	%70	Active
73	65	X	-0.003	%50	Active
74	65	X	0	0	Active
75	65	X	0	0	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	35	Y	-0.25	%5	Active
2	M76	Y	-0.25	%5	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	35	Y	-0.25	%95	Active
2	M76	Y	-0.25	%95	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	40	Y	-0.25	%5	Active
2	M77	Y	-0.25	%5	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	40	Y	-0.25	%95	Active
2	M77	Y	-0.25	%95	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	45	Y	-0.25	%5	Active
2	M78	Y	-0.25	%5	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	45	Y	-0.25	%95	Active
2	M78	Y	-0.25	%95	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	15	Y	-0.25	%95	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	4	Y	-0.25	%95	Active

Member Point Loads

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	27	Y	-0.25	%95	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	Z	-0.015	-0.015	0	%100	Active
2	2	Z	-0.015	-0.015	0	%100	Active
3	3	Z	-0.015	-0.015	0	%100	Active
4	4	Z	-0.022	-0.022	0	%100	Active
5	5	Z	-0.017	-0.017	0	%100	Active
6	6	Z	-0.017	-0.017	0	%100	Active
7	7	Z	-0.002	-0.002	0	%100	Active
8	8	Z	-0.002	-0.002	0	%100	Active
9	9	Z	-0.002	-0.002	0	%100	Active
10	10	Z	-0.002	-0.002	0	%100	Active
11	11	Z	-0.015	-0.015	0	%100	Active
12	13	Z	-0.015	-0.015	0	%100	Active
13	14	Z	-0.015	-0.015	0	%100	Active
14	15	Z	-0.022	-0.022	0	%100	Active
15	16	Z	-0.017	-0.017	0	%100	Active
16	17	Z	-0.017	-0.017	0	%100	Active
17	18	Z	-0.002	-0.002	0	%100	Active
18	19	Z	-0.002	-0.002	0	%100	Active
19	20	Z	-0.002	-0.002	0	%100	Active
20	21	Z	-0.002	-0.002	0	%100	Active
21	24	Z	-0.015	-0.015	0	%100	Active
22	25	Z	-0.015	-0.015	0	%100	Active
23	26	Z	-0.015	-0.015	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
24	27	Z	-0.022	-0.022	0	%100	Active
25	28	Z	-0.017	-0.017	0	%100	Active
26	29	Z	-0.017	-0.017	0	%100	Active
27	30	Z	-0.002	-0.002	0	%100	Active
28	31	Z	-0.002	-0.002	0	%100	Active
29	32	Z	-0.002	-0.002	0	%100	Active
30	34	Z	-0.002	-0.002	0	%100	Active
31	35	Z	-0.013	-0.013	0	%100	Active
32	40	Z	-0.013	-0.013	0	%100	Active
33	45	Z	-0.013	-0.013	0	%100	Active
34	58	Z	-0.009	-0.009	0	%100	Active
35	59	Z	-0.009	-0.009	0	%100	Active
36	60	Z	-0.009	-0.009	0	%100	Active
37	61	Z	-0.009	-0.009	0	%100	Active
38	62	Z	-0.009	-0.009	0	%100	Active
39	63	Z	-0.009	-0.009	0	%100	Active
40	64	Z	-0.009	-0.009	0	%100	Active
41	65	Z	-0.009	-0.009	0	%100	Active
42	66	Z	-0.009	-0.009	0	%100	Active
43	67	Z	-0.009	-0.009	0	%100	Active
44	68	Z	-0.009	-0.009	0	%100	Active
45	69	Z	-0.009	-0.009	0	%100	Active
46	70	Z	-0.009	-0.009	0	%100	Active
47	71	Z	-0.009	-0.009	0	%100	Active
48	72	Z	-0.009	-0.009	0	%100	Active
49	73	Z	-0.009	-0.009	0	%100	Active
50	74	Z	-0.009	-0.009	0	%100	Active
51	75	Z	-0.009	-0.009	0	%100	Active
52	M76	Z	-0.013	-0.013	0	%100	Active
53	M77	Z	-0.013	-0.013	0	%100	Active
54	M78	Z	-0.013	-0.013	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	X	-0.015	-0.015	0	%100	Active
2	2	X	-0.015	-0.015	0	%100	Active
3	3	X	-0.015	-0.015	0	%100	Active
4	4	X	-0.022	-0.022	0	%100	Active
5	5	X	-0.017	-0.017	0	%100	Active
6	6	X	-0.017	-0.017	0	%100	Active
7	7	X	-0.002	-0.002	0	%100	Active
8	8	X	-0.002	-0.002	0	%100	Active
9	9	X	-0.002	-0.002	0	%100	Active
10	10	X	-0.002	-0.002	0	%100	Active
11	11	X	-0.015	-0.015	0	%100	Active
12	13	X	-0.015	-0.015	0	%100	Active
13	14	X	-0.015	-0.015	0	%100	Active
14	15	X	-0.022	-0.022	0	%100	Active
15	16	X	-0.017	-0.017	0	%100	Active
16	17	X	-0.017	-0.017	0	%100	Active
17	18	X	-0.002	-0.002	0	%100	Active
18	19	X	-0.002	-0.002	0	%100	Active
19	20	X	-0.002	-0.002	0	%100	Active
20	21	X	-0.002	-0.002	0	%100	Active
21	24	X	-0.015	-0.015	0	%100	Active
22	25	X	-0.015	-0.015	0	%100	Active
23	26	X	-0.015	-0.015	0	%100	Active
24	27	X	-0.022	-0.022	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
25	28	X	-0.017	-0.017	0	%100	Active
26	29	X	-0.017	-0.017	0	%100	Active
27	30	X	-0.002	-0.002	0	%100	Active
28	31	X	-0.002	-0.002	0	%100	Active
29	32	X	-0.002	-0.002	0	%100	Active
30	34	X	-0.002	-0.002	0	%100	Active
31	35	X	-0.013	-0.013	0	%100	Active
32	40	X	-0.013	-0.013	0	%100	Active
33	45	X	-0.013	-0.013	0	%100	Active
34	58	X	-0.009	-0.009	0	%100	Active
35	59	X	-0.009	-0.009	0	%100	Active
36	60	X	-0.009	-0.009	0	%100	Active
37	61	X	-0.009	-0.009	0	%100	Active
38	62	X	-0.009	-0.009	0	%100	Active
39	63	X	-0.009	-0.009	0	%100	Active
40	64	X	-0.009	-0.009	0	%100	Active
41	65	X	-0.009	-0.009	0	%100	Active
42	66	X	-0.009	-0.009	0	%100	Active
43	67	X	-0.009	-0.009	0	%100	Active
44	68	X	-0.009	-0.009	0	%100	Active
45	69	X	-0.009	-0.009	0	%100	Active
46	70	X	-0.009	-0.009	0	%100	Active
47	71	X	-0.009	-0.009	0	%100	Active
48	72	X	-0.009	-0.009	0	%100	Active
49	73	X	-0.009	-0.009	0	%100	Active
50	74	X	-0.009	-0.009	0	%100	Active
51	75	X	-0.009	-0.009	0	%100	Active
52	M76	X	-0.013	-0.013	0	%100	Active
53	M77	X	-0.013	-0.013	0	%100	Active
54	M78	X	-0.013	-0.013	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	Z	-0.01	-0.01	0	%100	Active
2	2	Z	-0.01	-0.01	0	%100	Active
3	3	Z	-0.006	-0.006	0	%100	Active
4	4	Z	-0.008	-0.008	0	%100	Active
5	5	Z	-0.006	-0.006	0	%100	Active
6	6	Z	-0.006	-0.006	0	%100	Active
7	7	Z	-0.006	-0.006	0	%100	Active
8	8	Z	-0.006	-0.006	0	%100	Active
9	9	Z	-0.006	-0.006	0	%100	Active
10	10	Z	-0.006	-0.006	0	%100	Active
11	11	Z	-0.01	-0.01	0	%100	Active
12	13	Z	-0.01	-0.01	0	%100	Active
13	14	Z	-0.006	-0.006	0	%100	Active
14	15	Z	-0.008	-0.008	0	%100	Active
15	16	Z	-0.006	-0.006	0	%100	Active
16	17	Z	-0.006	-0.006	0	%100	Active
17	18	Z	-0.006	-0.006	0	%100	Active
18	19	Z	-0.006	-0.006	0	%100	Active
19	20	Z	-0.006	-0.006	0	%100	Active
20	21	Z	-0.006	-0.006	0	%100	Active
21	24	Z	-0.01	-0.01	0	%100	Active
22	25	Z	-0.01	-0.01	0	%100	Active
23	26	Z	-0.006	-0.006	0	%100	Active
24	27	Z	-0.008	-0.008	0	%100	Active
25	28	Z	-0.006	-0.006	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
26	29	Z	-0.006	-0.006	0	%100	Active
27	30	Z	-0.006	-0.006	0	%100	Active
28	31	Z	-0.006	-0.006	0	%100	Active
29	32	Z	-0.006	-0.006	0	%100	Active
30	34	Z	-0.006	-0.006	0	%100	Active
31	35	Z	-0.002	-0.002	0	%100	Active
32	40	Z	-0.002	-0.002	0	%100	Active
33	45	Z	-0.002	-0.002	0	%100	Active
34	58	Z	-0.002	-0.002	0	%100	Active
35	59	Z	-0.002	-0.002	0	%100	Active
36	60	Z	-0.002	-0.002	0	%100	Active
37	61	Z	-0.002	-0.002	0	%100	Active
38	62	Z	-0.002	-0.002	0	%100	Active
39	63	Z	-0.002	-0.002	0	%100	Active
40	64	Z	-0.002	-0.002	0	%100	Active
41	65	Z	-0.002	-0.002	0	%100	Active
42	66	Z	-0.002	-0.002	0	%100	Active
43	67	Z	-0.002	-0.002	0	%100	Active
44	68	Z	-0.002	-0.002	0	%100	Active
45	69	Z	-0.002	-0.002	0	%100	Active
46	70	Z	-0.006	-0.006	0	%100	Active
47	71	Z	-0.006	-0.006	0	%100	Active
48	72	Z	-0.006	-0.006	0	%100	Active
49	73	Z	-0.006	-0.006	0	%100	Active
50	74	Z	-0.006	-0.006	0	%100	Active
51	75	Z	-0.006	-0.006	0	%100	Active
52	M76	Z	-0.002	-0.002	0	%100	Active
53	M77	Z	-0.002	-0.002	0	%100	Active
54	M78	Z	-0.002	-0.002	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	X	-0.01	-0.01	0	%100	Active
2	2	X	-0.01	-0.01	0	%100	Active
3	3	X	-0.006	-0.006	0	%100	Active
4	4	X	-0.008	-0.008	0	%100	Active
5	5	X	-0.006	-0.006	0	%100	Active
6	6	X	-0.006	-0.006	0	%100	Active
7	7	X	-0.006	-0.006	0	%100	Active
8	8	X	-0.006	-0.006	0	%100	Active
9	9	X	-0.006	-0.006	0	%100	Active
10	10	X	-0.006	-0.006	0	%100	Active
11	11	X	-0.01	-0.01	0	%100	Active
12	13	X	-0.01	-0.01	0	%100	Active
13	14	X	-0.006	-0.006	0	%100	Active
14	15	X	-0.008	-0.008	0	%100	Active
15	16	X	-0.006	-0.006	0	%100	Active
16	17	X	-0.006	-0.006	0	%100	Active
17	18	X	-0.006	-0.006	0	%100	Active
18	19	X	-0.006	-0.006	0	%100	Active
19	20	X	-0.006	-0.006	0	%100	Active
20	21	X	-0.006	-0.006	0	%100	Active
21	24	X	-0.01	-0.01	0	%100	Active
22	25	X	-0.01	-0.01	0	%100	Active
23	26	X	-0.006	-0.006	0	%100	Active
24	27	X	-0.008	-0.008	0	%100	Active
25	28	X	-0.006	-0.006	0	%100	Active
26	29	X	-0.006	-0.006	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
27	30	X	-0.006	-0.006	0	%100	Active
28	31	X	-0.006	-0.006	0	%100	Active
29	32	X	-0.006	-0.006	0	%100	Active
30	34	X	-0.006	-0.006	0	%100	Active
31	35	X	-0.002	-0.002	0	%100	Active
32	40	X	-0.002	-0.002	0	%100	Active
33	45	X	-0.002	-0.002	0	%100	Active
34	58	X	-0.002	-0.002	0	%100	Active
35	59	X	-0.002	-0.002	0	%100	Active
36	60	X	-0.002	-0.002	0	%100	Active
37	61	X	-0.002	-0.002	0	%100	Active
38	62	X	-0.002	-0.002	0	%100	Active
39	63	X	-0.002	-0.002	0	%100	Active
40	64	X	-0.002	-0.002	0	%100	Active
41	65	X	-0.002	-0.002	0	%100	Active
42	66	X	-0.002	-0.002	0	%100	Active
43	67	X	-0.002	-0.002	0	%100	Active
44	68	X	-0.002	-0.002	0	%100	Active
45	69	X	-0.002	-0.002	0	%100	Active
46	70	X	-0.006	-0.006	0	%100	Active
47	71	X	-0.006	-0.006	0	%100	Active
48	72	X	-0.006	-0.006	0	%100	Active
49	73	X	-0.006	-0.006	0	%100	Active
50	74	X	-0.006	-0.006	0	%100	Active
51	75	X	-0.006	-0.006	0	%100	Active
52	M76	X	-0.002	-0.002	0	%100	Active
53	M77	X	-0.002	-0.002	0	%100	Active
54	M78	X	-0.002	-0.002	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	Z	-0.001	-0.001	0	%100	Active
2	2	Z	-0.001	-0.001	0	%100	Active
3	3	Z	-0.001	-0.001	0	%100	Active
4	4	Z	-0.002	-0.002	0	%100	Active
5	5	Z	-0.001	-0.001	0	%100	Active
6	6	Z	-0.001	-0.001	0	%100	Active
7	7	Z	-1e-04	-1e-04	0	%100	Active
8	8	Z	-1e-04	-1e-04	0	%100	Active
9	9	Z	-1e-04	-1e-04	0	%100	Active
10	10	Z	-1e-04	-1e-04	0	%100	Active
11	11	Z	-0.001	-0.001	0	%100	Active
12	13	Z	-0.001	-0.001	0	%100	Active
13	14	Z	-0.001	-0.001	0	%100	Active
14	15	Z	-0.002	-0.002	0	%100	Active
15	16	Z	-0.001	-0.001	0	%100	Active
16	17	Z	-0.001	-0.001	0	%100	Active
17	18	Z	-1e-04	-1e-04	0	%100	Active
18	19	Z	-1e-04	-1e-04	0	%100	Active
19	20	Z	-1e-04	-1e-04	0	%100	Active
20	21	Z	-1e-04	-1e-04	0	%100	Active
21	24	Z	-0.001	-0.001	0	%100	Active
22	25	Z	-0.001	-0.001	0	%100	Active
23	26	Z	-0.001	-0.001	0	%100	Active
24	27	Z	-0.002	-0.002	0	%100	Active
25	28	Z	-0.001	-0.001	0	%100	Active
26	29	Z	-0.001	-0.001	0	%100	Active
27	30	Z	-1e-04	-1e-04	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
28	31	Z	-1e-04	-1e-04	0	%100	Active
29	32	Z	-1e-04	-1e-04	0	%100	Active
30	34	Z	-1e-04	-1e-04	0	%100	Active
31	35	Z	-0.0004	-0.0004	0	%100	Active
32	40	Z	-0.0004	-0.0004	0	%100	Active
33	45	Z	-0.0004	-0.0004	0	%100	Active
34	58	Z	-0.0003	-0.0003	0	%100	Active
35	59	Z	-0.0003	-0.0003	0	%100	Active
36	60	Z	-0.0003	-0.0003	0	%100	Active
37	61	Z	-0.0003	-0.0003	0	%100	Active
38	62	Z	-0.0003	-0.0003	0	%100	Active
39	63	Z	-0.0003	-0.0003	0	%100	Active
40	64	Z	-0.0003	-0.0003	0	%100	Active
41	65	Z	-0.0003	-0.0003	0	%100	Active
42	66	Z	-0.0003	-0.0003	0	%100	Active
43	67	Z	-0.0003	-0.0003	0	%100	Active
44	68	Z	-0.0003	-0.0003	0	%100	Active
45	69	Z	-0.0003	-0.0003	0	%100	Active
46	70	Z	-0.0006	-0.0006	0	%100	Active
47	71	Z	-0.0006	-0.0006	0	%100	Active
48	72	Z	-0.0006	-0.0006	0	%100	Active
49	73	Z	-0.0006	-0.0006	0	%100	Active
50	74	Z	-0.0006	-0.0006	0	%100	Active
51	75	Z	-0.0006	-0.0006	0	%100	Active
52	M76	Z	-0.0004	-0.0004	0	%100	Active
53	M77	Z	-0.0004	-0.0004	0	%100	Active
54	M78	Z	-0.0004	-0.0004	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	X	-0.001	-0.001	0	%100	Active
2	2	X	-0.001	-0.001	0	%100	Active
3	3	X	-0.001	-0.001	0	%100	Active
4	4	X	-0.002	-0.002	0	%100	Active
5	5	X	-0.001	-0.001	0	%100	Active
6	6	X	-0.001	-0.001	0	%100	Active
7	7	X	-1e-04	-1e-04	0	%100	Active
8	8	X	-1e-04	-1e-04	0	%100	Active
9	9	X	-1e-04	-1e-04	0	%100	Active
10	10	X	-1e-04	-1e-04	0	%100	Active
11	11	X	-0.001	-0.001	0	%100	Active
12	13	X	-0.001	-0.001	0	%100	Active
13	14	X	-0.001	-0.001	0	%100	Active
14	15	X	-0.002	-0.002	0	%100	Active
15	16	X	-0.001	-0.001	0	%100	Active
16	17	X	-0.001	-0.001	0	%100	Active
17	18	X	-1e-04	-1e-04	0	%100	Active
18	19	X	-1e-04	-1e-04	0	%100	Active
19	20	X	-1e-04	-1e-04	0	%100	Active
20	21	X	-1e-04	-1e-04	0	%100	Active
21	24	X	-0.001	-0.001	0	%100	Active
22	25	X	-0.001	-0.001	0	%100	Active
23	26	X	-0.001	-0.001	0	%100	Active
24	27	X	-0.002	-0.002	0	%100	Active
25	28	X	-0.001	-0.001	0	%100	Active
26	29	X	-0.001	-0.001	0	%100	Active
27	30	X	-1e-04	-1e-04	0	%100	Active
28	31	X	-1e-04	-1e-04	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
29	32	X	-1e-04	-1e-04	0	%100	Active
30	34	X	-1e-04	-1e-04	0	%100	Active
31	35	X	-0.0004	-0.0004	0	%100	Active
32	40	X	-0.0004	-0.0004	0	%100	Active
33	45	X	-0.0004	-0.0004	0	%100	Active
34	58	X	-0.0003	-0.0003	0	%100	Active
35	59	X	-0.0003	-0.0003	0	%100	Active
36	60	X	-0.0003	-0.0003	0	%100	Active
37	61	X	-0.0003	-0.0003	0	%100	Active
38	62	X	-0.0003	-0.0003	0	%100	Active
39	63	X	-0.0003	-0.0003	0	%100	Active
40	64	X	-0.0003	-0.0003	0	%100	Active
41	65	X	-0.0003	-0.0003	0	%100	Active
42	66	X	-0.0003	-0.0003	0	%100	Active
43	67	X	-0.0003	-0.0003	0	%100	Active
44	68	X	-0.0003	-0.0003	0	%100	Active
45	69	X	-0.0003	-0.0003	0	%100	Active
46	70	X	-0.0006	-0.0006	0	%100	Active
47	71	X	-0.0006	-0.0006	0	%100	Active
48	72	X	-0.0006	-0.0006	0	%100	Active
49	73	X	-0.0006	-0.0006	0	%100	Active
50	74	X	-0.0006	-0.0006	0	%100	Active
51	75	X	-0.0006	-0.0006	0	%100	Active
52	M76	X	-0.0004	-0.0004	0	%100	Active
53	M77	X	-0.0004	-0.0004	0	%100	Active
54	M78	X	-0.0004	-0.0004	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	Y	-0.015	-0.015	0	%100	Active
2	2	Y	-0.015	-0.015	0	%100	Active
3	3	Y	-0.015	-0.015	0	%100	Active
4	4	Y	-0.015	-0.015	0	%100	Active
5	5	Y	-0.015	-0.015	0	%100	Active
6	6	Y	-0.015	-0.015	0	%100	Active
7	7	Y	-0.016	-0.016	0	%100	Active
8	8	Y	-0.016	-0.016	0	%100	Active
9	9	Y	-0.016	-0.016	0	%100	Active
10	10	Y	-0.016	-0.016	0	%100	Active
11	11	Y	-0.015	-0.015	0	%100	Active
12	13	Y	-0.015	-0.015	0	%100	Active
13	14	Y	-0.015	-0.015	0	%100	Active
14	15	Y	-0.015	-0.015	0	%100	Active
15	16	Y	-0.015	-0.015	0	%100	Active
16	17	Y	-0.015	-0.015	0	%100	Active
17	18	Y	-0.016	-0.016	0	%100	Active
18	19	Y	-0.016	-0.016	0	%100	Active
19	20	Y	-0.016	-0.016	0	%100	Active
20	21	Y	-0.016	-0.016	0	%100	Active
21	24	Y	-0.015	-0.015	0	%100	Active
22	25	Y	-0.015	-0.015	0	%100	Active
23	26	Y	-0.015	-0.015	0	%100	Active
24	27	Y	-0.015	-0.015	0	%100	Active
25	28	Y	-0.015	-0.015	0	%100	Active
26	29	Y	-0.015	-0.015	0	%100	Active
27	30	Y	-0.016	-0.016	0	%100	Active
28	31	Y	-0.016	-0.016	0	%100	Active
29	32	Y	-0.016	-0.016	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
30	34	Y	-0.016	-0.016	0	%100	Active
31	35	Y	-0.01	-0.01	0	%100	Active
32	40	Y	-0.01	-0.01	0	%100	Active
33	45	Y	-0.01	-0.01	0	%100	Active
34	58	Y	-0.008	-0.008	0	%100	Active
35	59	Y	-0.008	-0.008	0	%100	Active
36	60	Y	-0.008	-0.008	0	%100	Active
37	61	Y	-0.008	-0.008	0	%100	Active
38	62	Y	-0.008	-0.008	0	%100	Active
39	63	Y	-0.008	-0.008	0	%100	Active
40	64	Y	-0.008	-0.008	0	%100	Active
41	65	Y	-0.008	-0.008	0	%100	Active
42	66	Y	-0.008	-0.008	0	%100	Active
43	67	Y	-0.008	-0.008	0	%100	Active
44	68	Y	-0.008	-0.008	0	%100	Active
45	69	Y	-0.008	-0.008	0	%100	Active
46	70	Y	-0.008	-0.008	0	%100	Active
47	71	Y	-0.008	-0.008	0	%100	Active
48	72	Y	-0.008	-0.008	0	%100	Active
49	73	Y	-0.008	-0.008	0	%100	Active
50	74	Y	-0.008	-0.008	0	%100	Active
51	75	Y	-0.008	-0.008	0	%100	Active
52	M76	Y	-0.01	-0.01	0	%100	Active
53	M77	Y	-0.01	-0.01	0	%100	Active
54	M78	Y	-0.01	-0.01	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	Z	-0.003	-0.003	0	%100	Active
2	2	Z	-0.003	-0.003	0	%100	Active
3	3	Z	-0.003	-0.003	0	%100	Active
4	4	Z	-0.003	-0.003	0	%100	Active
5	5	Z	-0.003	-0.003	0	%100	Active
6	6	Z	-0.003	-0.003	0	%100	Active
7	7	Z	-0.002	-0.002	0	%100	Active
8	8	Z	-0.002	-0.002	0	%100	Active
9	9	Z	-0.002	-0.002	0	%100	Active
10	10	Z	-0.002	-0.002	0	%100	Active
11	11	Z	-0.003	-0.003	0	%100	Active
12	13	Z	-0.003	-0.003	0	%100	Active
13	14	Z	-0.003	-0.003	0	%100	Active
14	15	Z	-0.003	-0.003	0	%100	Active
15	16	Z	-0.003	-0.003	0	%100	Active
16	17	Z	-0.003	-0.003	0	%100	Active
17	18	Z	-0.002	-0.002	0	%100	Active
18	19	Z	-0.002	-0.002	0	%100	Active
19	20	Z	-0.002	-0.002	0	%100	Active
20	21	Z	-0.002	-0.002	0	%100	Active
21	24	Z	-0.003	-0.003	0	%100	Active
22	25	Z	-0.003	-0.003	0	%100	Active
23	26	Z	-0.003	-0.003	0	%100	Active
24	27	Z	-0.003	-0.003	0	%100	Active
25	28	Z	-0.003	-0.003	0	%100	Active
26	29	Z	-0.003	-0.003	0	%100	Active
27	30	Z	-0.002	-0.002	0	%100	Active
28	31	Z	-0.002	-0.002	0	%100	Active
29	32	Z	-0.002	-0.002	0	%100	Active
30	34	Z	-0.002	-0.002	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
31	35	Z	-0.002	-0.002	0	%100	Active
32	40	Z	-0.002	-0.002	0	%100	Active
33	45	Z	-0.002	-0.002	0	%100	Active
34	58	Z	-0.0008	-0.0008	0	%100	Active
35	59	Z	-0.0008	-0.0008	0	%100	Active
36	60	Z	-0.0008	-0.0008	0	%100	Active
37	61	Z	-0.0008	-0.0008	0	%100	Active
38	62	Z	-0.0008	-0.0008	0	%100	Active
39	63	Z	-0.0008	-0.0008	0	%100	Active
40	64	Z	-0.0008	-0.0008	0	%100	Active
41	65	Z	-0.0008	-0.0008	0	%100	Active
42	66	Z	-0.0008	-0.0008	0	%100	Active
43	67	Z	-0.0008	-0.0008	0	%100	Active
44	68	Z	-0.0008	-0.0008	0	%100	Active
45	69	Z	-0.0008	-0.0008	0	%100	Active
46	70	Z	-0.0004	-0.0004	0	%100	Active
47	71	Z	-0.0004	-0.0004	0	%100	Active
48	72	Z	-0.0004	-0.0004	0	%100	Active
49	73	Z	-0.0004	-0.0004	0	%100	Active
50	74	Z	-0.0004	-0.0004	0	%100	Active
51	75	Z	-0.0004	-0.0004	0	%100	Active
52	M76	Z	-0.002	-0.002	0	%100	Active
53	M77	Z	-0.002	-0.002	0	%100	Active
54	M78	Z	-0.002	-0.002	0	%100	Active

Member Distributed Loads

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	1	X	-0.003	-0.003	0	%100	Active
2	2	X	-0.003	-0.003	0	%100	Active
3	3	X	-0.003	-0.003	0	%100	Active
4	4	X	-0.003	-0.003	0	%100	Active
5	5	X	-0.003	-0.003	0	%100	Active
6	6	X	-0.003	-0.003	0	%100	Active
7	7	X	-0.002	-0.002	0	%100	Active
8	8	X	-0.002	-0.002	0	%100	Active
9	9	X	-0.002	-0.002	0	%100	Active
10	10	X	-0.002	-0.002	0	%100	Active
11	11	X	-0.003	-0.003	0	%100	Active
12	13	X	-0.003	-0.003	0	%100	Active
13	14	X	-0.003	-0.003	0	%100	Active
14	15	X	-0.003	-0.003	0	%100	Active
15	16	X	-0.003	-0.003	0	%100	Active
16	17	X	-0.003	-0.003	0	%100	Active
17	18	X	-0.002	-0.002	0	%100	Active
18	19	X	-0.002	-0.002	0	%100	Active
19	20	X	-0.002	-0.002	0	%100	Active
20	21	X	-0.002	-0.002	0	%100	Active
21	24	X	-0.003	-0.003	0	%100	Active
22	25	X	-0.003	-0.003	0	%100	Active
23	26	X	-0.003	-0.003	0	%100	Active
24	27	X	-0.003	-0.003	0	%100	Active
25	28	X	-0.003	-0.003	0	%100	Active
26	29	X	-0.003	-0.003	0	%100	Active
27	30	X	-0.002	-0.002	0	%100	Active
28	31	X	-0.002	-0.002	0	%100	Active
29	32	X	-0.002	-0.002	0	%100	Active
30	34	X	-0.002	-0.002	0	%100	Active
31	35	X	-0.002	-0.002	0	%100	Active

Member Distributed Loads (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf]	End Magnitude [k/ft, F, ksf]	Start Location [(ft, %)]	End Location [(ft, %)]	Inactive [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
32	40	X	-0.002	-0.002	0	%100	Active
33	45	X	-0.002	-0.002	0	%100	Active
34	58	X	-0.0008	-0.0008	0	%100	Active
35	59	X	-0.0008	-0.0008	0	%100	Active
36	60	X	-0.0008	-0.0008	0	%100	Active
37	61	X	-0.0008	-0.0008	0	%100	Active
38	62	X	-0.0008	-0.0008	0	%100	Active
39	63	X	-0.0008	-0.0008	0	%100	Active
40	64	X	-0.0008	-0.0008	0	%100	Active
41	65	X	-0.0008	-0.0008	0	%100	Active
42	66	X	-0.0008	-0.0008	0	%100	Active
43	67	X	-0.0008	-0.0008	0	%100	Active
44	68	X	-0.0008	-0.0008	0	%100	Active
45	69	X	-0.0008	-0.0008	0	%100	Active
46	70	X	-0.0004	-0.0004	0	%100	Active
47	71	X	-0.0004	-0.0004	0	%100	Active
48	72	X	-0.0004	-0.0004	0	%100	Active
49	73	X	-0.0004	-0.0004	0	%100	Active
50	74	X	-0.0004	-0.0004	0	%100	Active
51	75	X	-0.0004	-0.0004	0	%100	Active
52	M76	X	-0.002	-0.002	0	%100	Active
53	M77	X	-0.002	-0.002	0	%100	Active
54	M78	X	-0.002	-0.002	0	%100	Active

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	Dead	DL	-1		75	
2	0 Wind - No Ice	WLZ			75	54
3	90 Wind - No Ice	WLX			75	54
4	0 Wind - Ice	WLZ			75	54
5	90 Wind - Ice	WLX			75	54
6	0 Wind - Service	WLZ			75	54
7	90 Wind - Service	WLX			75	54
8	Ice	OL1			75	54
9	0 Seismic	ELZ			75	54
10	90 Seismic	ELX			75	54
11	Live Load a	LL		6		
12	Live Load b	LL		6		
13	Live Load c	LL		6		
14	Live Load d	LL		6		
15	Maint LL 1	LL			2	
16	Maint LL 2	LL			2	
17	Maint LL 3	LL			2	
18	Maint LL 4	LL			2	
19	Maint LL 5	LL			2	
20	Maint LL 6	LL			2	
21	Maint LL 7	LL			1	
22	Maint LL 8	LL			1	
23	Maint LL 9	LL			1	
24	Maint LL 10	LL				
25	Maint LL 11	LL				
26	Maint LL 12	LL				
27	Maint LL 13	LL				
28	Maint LL 14	LL				
29	Maint LL 15	LL				

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4 Dead	Yes	Y	1	1.4						
2	1.2 D + 1.0 - 0 W	Yes	Y	1	1.2	2	1				
3	1.2 D + 1.0 - 30 W	Yes	Y	1	1.2	2	0.866	3	0.5		
4	1.2 D + 1.0 - 60 W	Yes	Y	1	1.2	3	0.866	2	0.5		
5	1.2 D + 1.0 - 90 W	Yes	Y	1	1.2	3	1				
6	1.2 D + 1.0 - 120 W	Yes	Y	1	1.2	3	0.866	2	-0.5		
7	1.2 D + 1.0 - 150 W	Yes	Y	1	1.2	2	-0.866	3	0.5		
8	1.2 D + 1.0 - 180 W	Yes	Y	1	1.2	2	-1				
9	1.2 D + 1.0 - 210 W	Yes	Y	1	1.2	2	-0.866	3	-0.5		
10	1.2 D + 1.0 - 240 W	Yes	Y	1	1.2	3	-0.866	2	-0.5		
11	1.2 D + 1.0 - 270 W	Yes	Y	1	1.2	3	-1				
12	1.2 D + 1.0 - 300 W	Yes	Y	1	1.2	3	-0.866	2	0.5		
13	1.2 D + 1.0 - 330 W	Yes	Y	1	1.2	2	0.866	3	-0.5		
14	1.2 D + 1.0 - 0 W/Ice	Yes	Y	1	1.2	4	1			8	1
15	1.2 D + 1.0 - 30 W/Ice	Yes	Y	1	1.2	4	0.866	5	0.5	8	1
16	1.2 D + 1.0 - 60 W/Ice	Yes	Y	1	1.2	5	0.866	4	0.5	8	1
17	1.2 D + 1.0 - 90 W/Ice	Yes	Y	1	1.2	5	1			8	1
18	1.2 D + 1.0 - 120 W/Ice	Yes	Y	1	1.2	5	0.866	4	-0.5	8	1
19	1.2 D + 1.0 - 150 W/Ice	Yes	Y	1	1.2	4	-0.866	5	0.5	8	1
20	1.2 D + 1.0 - 180 W/Ice	Yes	Y	1	1.2	4	-1			8	1
21	1.2 D + 1.0 - 210 W/Ice	Yes	Y	1	1.2	4	-0.866	5	-0.5	8	1
22	1.2 D + 1.0 - 240 W/Ice	Yes	Y	1	1.2	5	-0.866	4	-0.5	8	1
23	1.2 D + 1.0 - 270 W/Ice	Yes	Y	1	1.2	5	-1			8	1
24	1.2 D + 1.0 - 300 W/Ice	Yes	Y	1	1.2	5	-0.866	4	0.5	8	1
25	1.2 D + 1.0 - 330 W/Ice	Yes	Y	1	1.2	4	0.866	5	-0.5	8	1
26	1.2 D + 1.0 E - 0	Yes	Y	1	1.2	9	1				
27	1.2 D + 1.0 E - 30	Yes	Y	1	1.2	9	0.866	10	0.5		
28	1.2 D + 1.0 E - 60	Yes	Y	1	1.2	10	0.866	9	0.5		
29	1.2 D + 1.0 E - 90	Yes	Y	1	1.2	10	1				
30	1.2 D + 1.0 E - 120	Yes	Y	1	1.2	10	0.866	9	-0.5		
31	1.2 D + 1.0 E - 150	Yes	Y	1	1.2	9	-0.866	10	0.5		
32	1.2 D + 1.0 E - 180	Yes	Y	1	1.2	9	-1				
33	1.2 D + 1.0 E - 210	Yes	Y	1	1.2	9	-0.866	10	-0.5		
34	1.2 D + 1.0 E - 240	Yes	Y	1	1.2	10	-0.866	9	-0.5		
35	1.2 D + 1.0 E - 270	Yes	Y	1	1.2	10	-1				
36	1.2 D + 1.0 E - 300	Yes	Y	1	1.2	10	-0.866	9	0.5		
37	1.2 D + 1.0 E - 330	Yes	Y	1	1.2	9	0.866	10	-0.5		
38	1.2 D + 1.5 LL a + Service - 0 W	Yes	Y	1	1.2	6	1			11	1.5
39	1.2 D + 1.5 LL a + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	11	1.5
40	1.2 D + 1.5 LL a + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	11	1.5
41	1.2 D + 1.5 LL a + Service - 90 W	Yes	Y	1	1.2	7	1			11	1.5
42	1.2 D + 1.5 LL a + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	11	1.5
43	1.2 D + 1.5 LL a + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	11	1.5
44	1.2 D + 1.5 LL a + Service - 180 W	Yes	Y	1	1.2	6	-1			11	1.5
45	1.2 D + 1.5 LL a + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	11	1.5
46	1.2 D + 1.5 LL a + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	11	1.5
47	1.2 D + 1.5 LL a + Service - 270 W	Yes	Y	1	1.2	7	-1			11	1.5
48	1.2 D + 1.5 LL a + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	11	1.5
49	1.2 D + 1.5 LL a + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	11	1.5
50	1.2 D + 1.5 LL b + Service - 0 W	Yes	Y	1	1.2	6	1			12	1.5
51	1.2 D + 1.5 LL b + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	12	1.5
52	1.2 D + 1.5 LL b + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	12	1.5
53	1.2 D + 1.5 LL b + Service - 90 W	Yes	Y	1	1.2	7	1			12	1.5
54	1.2 D + 1.5 LL b + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	12	1.5
55	1.2 D + 1.5 LL b + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	12	1.5
56	1.2 D + 1.5 LL b + Service - 180 W	Yes	Y	1	1.2	6	-1			12	1.5
57	1.2 D + 1.5 LL b + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	12	1.5
58	1.2 D + 1.5 LL b + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	12	1.5

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
59	1.2 D + 1.5 LL b + Service - 270 W	Yes	Y	1	1.2	7	-1			12	1.5
60	1.2 D + 1.5 LL b + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	12	1.5
61	1.2 D + 1.5 LL b + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	12	1.5
62	1.2 D + 1.5 LL c + Service - 0 W	Yes	Y	1	1.2	6	1			13	1.5
63	1.2 D + 1.5 LL c + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	13	1.5
64	1.2 D + 1.5 LL c + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	13	1.5
65	1.2 D + 1.5 LL c + Service - 90 W	Yes	Y	1	1.2	7	1			13	1.5
66	1.2 D + 1.5 LL c + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	13	1.5
67	1.2 D + 1.5 LL c + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	13	1.5
68	1.2 D + 1.5 LL c + Service - 180 W	Yes	Y	1	1.2	6	-1			13	1.5
69	1.2 D + 1.5 LL c + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	13	1.5
70	1.2 D + 1.5 LL c + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	13	1.5
71	1.2 D + 1.5 LL c + Service - 270 W	Yes	Y	1	1.2	7	-1			13	1.5
72	1.2 D + 1.5 LL c + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	13	1.5
73	1.2 D + 1.5 LL c + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	13	1.5
74	1.2 D + 1.5 LL d + Service - 0 W	Yes	Y	1	1.2	6	1			14	1.5
75	1.2 D + 1.5 LL d + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	14	1.5
76	1.2 D + 1.5 LL d + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	14	1.5
77	1.2 D + 1.5 LL d + Service - 90 W	Yes	Y	1	1.2	7	1			14	1.5
78	1.2 D + 1.5 LL d + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	14	1.5
79	1.2 D + 1.5 LL d + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	14	1.5
80	1.2 D + 1.5 LL d + Service - 180 W	Yes	Y	1	1.2	6	-1			14	1.5
81	1.2 D + 1.5 LL d + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	14	1.5
82	1.2 D + 1.5 LL d + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	14	1.5
83	1.2 D + 1.5 LL d + Service - 270 W	Yes	Y	1	1.2	7	-1			14	1.5
84	1.2 D + 1.5 LL d + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	14	1.5
85	1.2 D + 1.5 LL d + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	14	1.5
86	1.2 D + 1.5 LL Maint (1)	Yes	Y	1	1.2					15	1.5
87	1.2 D + 1.5 LL Maint (2)	Yes	Y	1	1.2					16	1.5
88	1.2 D + 1.5 LL Maint (3)	Yes	Y	1	1.2					17	1.5
89	1.2 D + 1.5 LL Maint (4)	Yes	Y	1	1.2					18	1.5
90	1.2 D + 1.5 LL Maint (5)	Yes	Y	1	1.2					19	1.5
91	1.2 D + 1.5 LL Maint (6)	Yes	Y	1	1.2					20	1.5
92	1.2 D + 1.5 LL Maint (7)	Yes	Y	1	1.2					21	1.5
93	1.2 D + 1.5 LL Maint (8)	Yes	Y	1	1.2					22	1.5
94	1.2 D + 1.5 LL Maint (9)	Yes	Y	1	1.2					23	1.5
95	1.2 D + 1.5 LL Maint (10)	Yes	Y	1	1.2					24	1.5
96	1.2 D + 1.5 LL Maint (11)	Yes	Y	1	1.2					25	1.5
97	1.2 D + 1.5 LL Maint (12)	Yes	Y	1	1.2					26	1.5
98	1.2 D + 1.5 LL Maint (13)	Yes	Y	1	1.2					27	1.5
99	1.2 D + 1.5 LL Maint (14)	Yes	Y	1	1.2					28	1.5
100	1.2 D + 1.5 LL Maint (15)	Yes	Y	1	1.2					29	1.5

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	1	2	3		MF-CP2	Beam	RECT	A36 Gr.36	Typical
2	2	5	6		MF-CP2	Beam	RECT	A36 Gr.36	Typical
3	3	6	3		MF-CP2	Beam	RECT	A36 Gr.36	Typical
4	4	8	7		SF-H1	Beam	Tube	A53 Gr.B	Typical
5	5	10	9		SF-H1	Beam	Tube	A53 Gr.B	Typical
6	6	9	11		SF-H1	Beam	Tube	A53 Gr.B	Typical
7	7	12	15		MF-CP1	Beam	RECT	A36 Gr.36	Typical
8	8	13	14		MF-CP1	Beam	RECT	A36 Gr.36	Typical
9	9	14	16		MF-CP1	Beam	RECT	A36 Gr.36	Typical
10	10	15	18		MF-CP1	Beam	RECT	A36 Gr.36	Typical
11	11	21	22		MF-CP2	Beam	RECT	A36 Gr.36	Typical
12	12	23	24		RIGID	None	None	RIGID	Typical
13	13	25	26		MF-CP2	Beam	RECT	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
14	14	26	22		MF-CP2	Beam	RECT	A36 Gr.36	Typical
15	15	28	27		SF-H1	Beam	Tube	A53 Gr.B	Typical
16	16	30	29		SF-H1	Beam	Tube	A53 Gr.B	Typical
17	17	29	31		SF-H1	Beam	Tube	A53 Gr.B	Typical
18	18	32	35		MF-CP1	Beam	RECT	A36 Gr.36	Typical
19	19	33	34		MF-CP1	Beam	RECT	A36 Gr.36	Typical
20	20	34	36		MF-CP1	Beam	RECT	A36 Gr.36	Typical
21	21	35	38		MF-CP1	Beam	RECT	A36 Gr.36	Typical
22	22	39	40		RIGID	None	None	RIGID	Typical
23	23	41	42		RIGID	None	None	RIGID	Typical
24	24	43	44		MF-CP2	Beam	RECT	A36 Gr.36	Typical
25	25	46	47		MF-CP2	Beam	RECT	A36 Gr.36	Typical
26	26	47	44		MF-CP2	Beam	RECT	A36 Gr.36	Typical
27	27	49	48		SF-H1	Beam	Tube	A53 Gr.B	Typical
28	28	51	50		SF-H1	Beam	Tube	A53 Gr.B	Typical
29	29	50	52		SF-H1	Beam	Tube	A53 Gr.B	Typical
30	30	53	56		MF-CP1	Beam	RECT	A36 Gr.36	Typical
31	31	54	55		MF-CP1	Beam	RECT	A36 Gr.36	Typical
32	32	55	57		MF-CP1	Beam	RECT	A36 Gr.36	Typical
33	33	58	59		RIGID	None	None	RIGID	Typical
34	34	56	60		MF-CP1	Beam	RECT	A36 Gr.36	Typical
35	35	63	62		MF-H1	Beam	Pipe	A53 Gr.B	Typical
36	36	64	45		RIGID	None	None	RIGID	Typical
37	37	61	65		RIGID	None	None	RIGID	Typical
38	38	66	1		RIGID	None	None	RIGID	Typical
39	39	17	67		RIGID	None	None	RIGID	Typical
40	40	69	68		MF-H1	Beam	Pipe	A53 Gr.B	Typical
41	41	70	4		RIGID	None	None	RIGID	Typical
42	42	19	71		RIGID	None	None	RIGID	Typical
43	43	72	20		RIGID	None	None	RIGID	Typical
44	44	37	73		RIGID	None	None	RIGID	Typical
45	45	75	74		MF-H1	Beam	Pipe	A53 Gr.B	Typical
46	46	80	76		RIGID	None	None	RIGID	Typical
47	47	82	78		RIGID	None	None	RIGID	Typical
48	48	83	79		RIGID	None	None	RIGID	Typical
49	49	81	77		RIGID	None	None	RIGID	Typical
50	50	88	84		RIGID	None	None	RIGID	Typical
51	51	90	86		RIGID	None	None	RIGID	Typical
52	52	91	87		RIGID	None	None	RIGID	Typical
53	53	89	85		RIGID	None	None	RIGID	Typical
54	54	96	92		RIGID	None	None	RIGID	Typical
55	55	98	94		RIGID	None	None	RIGID	Typical
56	56	99	95		RIGID	None	None	RIGID	Typical
57	57	97	93		RIGID	None	None	RIGID	Typical
58	58	105	101		MF-P1	Column	Pipe	A53 Gr.B	Typical
59	59	107	103		MF-P1	Column	Pipe	A53 Gr.B	Typical
60	60	106	102		MF-P1	Column	Pipe	A53 Gr.B	Typical
61	61	104	100		MF-P1	Column	Pipe	A53 Gr.B	Typical
62	62	113	109		MF-P1	Column	Pipe	A53 Gr.B	Typical
63	63	115	111		MF-P1	Column	Pipe	A53 Gr.B	Typical
64	64	114	110		MF-P1	Column	Pipe	A53 Gr.B	Typical
65	65	112	108		MF-P1	Column	Pipe	A53 Gr.B	Typical
66	66	121	117		MF-P1	Column	Pipe	A53 Gr.B	Typical
67	67	123	119		MF-P1	Column	Pipe	A53 Gr.B	Typical
68	68	122	118		MF-P1	Column	Pipe	A53 Gr.B	Typical
69	69	120	116		MF-P1	Column	Pipe	A53 Gr.B	Typical
70	70	27	125		SF-H2	Beam	Single Angle	A36 Gr.36	Typical
71	71	124	7		SF-H2	Beam	Single Angle	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
72	72	48	127		SF-H2	Beam	Single Angle	A36 Gr.36	Typical
73	73	126	27		SF-H2	Beam	Single Angle	A36 Gr.36	Typical
74	74	7	129		SF-H2	Beam	Single Angle	A36 Gr.36	Typical
75	75	128	48		SF-H2	Beam	Single Angle	A36 Gr.36	Typical
76	M76	N132	N131		Handrail	Beam	Pipe	A53 Gr.B	Typical
77	M77	N134	N133		Handrail	Beam	Pipe	A53 Gr.B	Typical
78	M78	N136	N135		Handrail	Beam	Pipe	A53 Gr.B	Typical
79	M79	N141	N137		RIGID	None	None	RIGID	Typical
80	M80	N143	N139		RIGID	None	None	RIGID	Typical
81	M81	N144	N140		RIGID	None	None	RIGID	Typical
82	M82	N142	N138		RIGID	None	None	RIGID	Typical
83	M83	N149	N145		RIGID	None	None	RIGID	Typical
84	M84	N151	N147		RIGID	None	None	RIGID	Typical
85	M85	N152	N148		RIGID	None	None	RIGID	Typical
86	M86	N150	N146		RIGID	None	None	RIGID	Typical
87	M87	N157	N153		RIGID	None	None	RIGID	Typical
88	M88	N159	N155		RIGID	None	None	RIGID	Typical
89	M89	N160	N156		RIGID	None	None	RIGID	Typical
90	M90	N158	N154		RIGID	None	None	RIGID	Typical
91	M91	N161	N162	180	AHCp	Beam	Single Angle	A36 Gr.36	Typical
92	M92	N163	N164	180	AHCp	Beam	Single Angle	A36 Gr.36	Typical
93	M93	N165	N166	180	AHCp	Beam	Single Angle	A36 Gr.36	Typical

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	8	max	1.154	5	3.82	14	4.075	2	10.065	14	1.705	11	0.571	71
2		min	-1.154	11	0.539	8	-4.192	8	0.607	8	-1.705	5	-0.6	53
3	28	max	2.705	6	3.787	18	2.229	13	-0.344	13	2.092	3	-1.097	12
4		min	-2.806	12	0.717	12	-2.17	7	-5.05	19	-2.091	9	-8.603	18
5	49	max	2.822	4	3.81	22	2.415	3	-0.233	3	2.227	7	8.747	22
6		min	-2.719	10	0.721	4	-2.356	9	-5.114	21	-2.227	13	1.164	4
7	Totals:	max	6.239	5	11.014	24	8.507	2						
8		min	-6.239	11	4.046	6	-8.507	8						

Frequencies and Participation

No Data to Print...

Warning Log

No Data to Print...

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	27	HSS4X4X4	0.847	0	20	0.157	0	y	61	92.852	106.155	12.311	12.311	3	H1-1b
2	4	HSS4X4X4	0.833	0	25	0.156	0	y	52	92.852	106.155	12.311	12.311	3	H1-1b
3	15	HSS4X4X4	0.831	0	20	0.158	0	y	56	92.852	106.155	12.311	12.311	3	H1-1b
4	62	PIPE_2.0	0.57	4.063	45	0.138	4.063		12	9.837	32.13	1.872	1.872	3	H1-1b
5	58	PIPE_2.0	0.568	4.063	41	0.177	4.063		7	9.837	32.13	1.872	1.872	2.878	H1-1b
6	66	PIPE_2.0	0.567	4.063	49	0.16	4.063		3	9.837	32.13	1.872	1.872	2.771	H1-1b
7	65	PIPE_2.0	0.556	4.063	74	0.16	4.063		13	9.837	32.13	1.872	1.872	2.757	H1-1b
8	69	PIPE_2.0	0.55	4.063	79	0.128	4.063		5	9.837	32.13	1.872	1.872	3	H1-1b
9	61	PIPE_2.0	0.55	4.063	82	0.152	4.063		9	9.837	32.13	1.872	1.872	2.866	H1-1b
10	63	PIPE_2.0	0.509	4.063	8	0.072	4.063		2	9.837	32.13	1.872	1.872	3	H1-1b
11	67	PIPE_2.0	0.49	4.063	2	0.073	4.063		2	9.837	32.13	1.872	1.872	3	H1-1b
12	64	PIPE_2.0	0.479	4.063	2	0.091	4.063		2	9.837	32.13	1.872	1.872	3	H1-1b
13	59	PIPE_2.0	0.472	4.063	2	0.069	4.063		78	9.837	32.13	1.872	1.872	3	H1-1b
14	68	PIPE_2.0	0.472	4.063	8	0.085	4.063		2	9.837	32.13	1.872	1.872	3	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
15	M77	PIPE_2.0	0.411	13.745	80	0.207	0.302		7	4.679	32.13	1.872	1.872	2.734	H1-1b
16	M78	PIPE_2.0	0.408	13.745	85	0.226	14.198		9	4.679	32.13	1.872	1.872	2.724	H1-1b
17	M76	PIPE_2.0	0.408	13.745	76	0.236	14.198		13	4.679	32.13	1.872	1.872	2.726	H1-1b
18	60	PIPE_2.0	0.402	4.063	2	0.089	4.063		9	9.837	32.13	1.872	1.872	3	H1-1b
19	28	HSS4X4X4	0.367	2.375	20	0.098	0.445	y	19	104.266	106.155	12.311	12.311	1.655	H1-1b
20	16	HSS4X4X4	0.365	2.375	19	0.097	0.445	y	15	104.266	106.155	12.311	12.311	1.647	H1-1b
21	5	HSS4X4X4	0.364	2.375	15	0.096	0.445	y	23	104.266	106.155	12.311	12.311	1.648	H1-1b
22	29	HSS4X4X4	0.362	0	21	0.1	1.929	z	2	104.266	106.155	12.311	12.311	1.651	H1-1b
23	6	HSS4X4X4	0.357	0	25	0.089	1.929	y	17	104.266	106.155	12.311	12.311	1.65	H1-1b
24	17	HSS4X4X4	0.352	0	20	0.091	1.929	y	21	104.266	106.155	12.311	12.311	1.655	H1-1b
25	35	PIPE_3.0	0.35	10.422	22	0.127	3.927		19	21.266	65.205	5.749	5.749	2.05	H1-1b
26	40	PIPE_3.0	0.348	10.422	14	0.126	3.927		23	21.266	65.205	5.749	5.749	2.042	H1-1b
27	45	PIPE_3.0	0.343	10.422	18	0.126	3.927		15	21.266	65.205	5.749	5.749	2.069	H1-1b
28	M93	L2.5x2.5x4	0.283	1.455	2	0.092	1.455	y	7	35.981	38.556	1.114	2.537	1.5	H2-1
29	32	PL3/8"x6	0.249	0.125	2	0.73	0	y	2	69.971	72.9	0.57	9.113	1.338	H1-1b
30	M91	L2.5x2.5x4	0.248	0	2	0.064	1.455	y	11	35.981	38.556	1.114	2.537	1.142	H2-1
31	74	L2x2x3	0.246	4.168	13	0.01	4.168	y	17	9.798	23.393	0.558	1.14	1.5	H2-1
32	M92	L2.5x2.5x4	0.245	1.455	9	0.084	0	y	9	35.981	38.556	1.114	2.537	1.5	H2-1
33	72	L2x2x3	0.242	4.168	9	0.01	4.168	y	25	9.798	23.393	0.558	1.14	1.5	H2-1
34	71	L2x2x3	0.229	0	3	0.011	4.168	y	24	9.798	23.393	0.558	1.14	1.5	H2-1
35	73	L2x2x3	0.221	0	7	0.011	4.168	y	15	9.798	23.393	0.558	1.14	1.5	H2-1
36	21	PL3/8"x6	0.215	0.125	2	0.802	0	y	3	69.971	72.9	0.57	9.113	1.338	H1-1b
37	34	PL3/8"x6	0.21	0.125	7	0.79	0	y	7	69.971	72.9	0.57	9.113	1.345	H1-1b
38	20	PL3/8"x6	0.207	0.125	9	0.71	0	y	9	69.971	72.9	0.57	9.113	1.345	H1-1b
39	70	L2x2x3	0.189	4.168	5	0.01	4.168	y	21	9.798	23.393	0.558	1.14	1.5	H2-1
40	10	PL3/8"x6	0.184	0.125	10	0.662	0	y	11	69.971	72.9	0.57	9.113	1.342	H1-1b
41	3	PL1/2"x6	0.184	0.519	2	0.13	0.519	y	83	65.639	97.2	1.012	12.15	1.109	H1-1b
42	9	PL3/8"x6	0.183	0.125	6	0.614	0	y	5	69.971	72.9	0.57	9.113	1.341	H1-1b
43	31	PL3/8"x6	0.177	0.256	13	0.401	0.256	y	56	65.053	72.9	0.57	9.113	2.403	H1-1b
44	75	L2x2x3	0.175	0	11	0.011	4.168	y	20	9.798	23.393	0.558	1.14	1.5	H2-1
45	14	PL1/2"x6	0.174	0.519	7	0.131	0.519	y	75	65.639	97.2	1.012	12.15	1.337	H1-1b
46	26	PL1/2"x6	0.174	0.519	9	0.131	0.519	y	79	65.639	97.2	1.012	12.15	1.226	H1-1b
47	30	PL3/8"x6	0.168	0.256	7	0.402	0.256	y	72	65.053	72.9	0.57	9.113	2.419	H1-1b
48	19	PL3/8"x6	0.165	0.256	9	0.4	0.256	y	53	65.053	72.9	0.57	9.113	2.425	H1-1b
49	18	PL3/8"x6	0.154	0.256	3	0.406	0.256	y	68	65.053	72.9	0.57	9.113	2.401	H1-1b
50	7	PL3/8"x6	0.139	0.256	11	0.403	0.256	y	63	65.053	72.9	0.57	9.113	2.433	H1-1b
51	8	PL3/8"x6	0.125	0.256	5	0.402	0.256	y	61	65.053	72.9	0.57	9.113	2.435	H1-1b
52	2	PL1/2"x6	0.12	0.25	2	0.341	0.25	y	4	95.014	97.2	1.012	12.15	1.328	H1-1b
53	1	PL1/2"x6	0.115	0.25	2	0.328	0.25	y	12	95.014	97.2	1.012	12.15	1.404	H1-1b
54	24	PL1/2"x6	0.109	0.125	3	0.339	0.25	y	8	95.014	97.2	1.012	12.15	1.928	H1-1b
55	13	PL1/2"x6	0.108	0.25	7	0.472	0.25	y	8	95.014	97.2	1.012	12.15	1.365	H1-1b
56	25	PL1/2"x6	0.091	0.25	10	0.401	0.25	y	13	95.014	97.2	1.012	12.15	1.351	H1-1b
57	11	PL1/2"x6	0.09	0.25	6	0.317	0.25	y	4	95.014	97.2	1.012	12.15	1.343	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

PROJECT	**136350.007.01 - Weston Sqaure**				**LK**
SUBJECT	**14.5 ft. Platform Mount Mount Analysis**				
DATE	**11/19/20**	PAGE	1	OF	1

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

[REF: AISC 360-05]

Reactions at Bolted Connection

Tension	:	2.229	k
Vertical Shear	:	3.787	k
Horizontal Shear	:	2.705	k
Torsion	:	-1.097	k.ft
Moment from Horizontal Forces	:	2.092	k.ft
Moment from Vertical Forces	:	-0.344	k.ft

Bolt Parameters

Bolt Grade	:	A307	
Bolt Diameter	:	0.625	in
Nominal Bolt Area	:	0.307	in^2
Bolt spacing, Horizontal	:	6	in
Bolt spacing, Vertical	:	6	in
Bolt edge distance, plate height	:	1.5	in
Bolt edge distance, plate width	:	1.5	in
Total Number of Bolts	:	4	bolts

Summary of Forces

Shear Resultant Force	:	4.65	k
Force from Horz. Moment	:	3.79	k
Force from Vert. Moment	:	-0.62	k
Shear Load / Bolt	:	1.16	k
Tension Load / Bolt	:	0.56	k
Resultant from Moments / Bolt	:	1.92	k

Bolt Checks

Nominal Tensile Stress, F_{nt}	:	45.00	ksi	[AISC Table J3.2]
Available Tensile Stress, ΦR_{nt}	:	10.36	k/bolt	[Eq. J3-1]
Unity Check, Bolt Tension	:	**23.91%**		**OKAY**
Nominal Shear Stress, F_{nv}	:	24.00	ksi	[AISC Table J3.2]
Available Shear Stress, ΦR_{nv}	:	5.53	k/bolt	[Eq. J3-1]
Unity Check, Bolt Shear	:	**31.14%**		**OKAY**
Unity Check, Combined	:	**55.05%**		**OKAY**
Available Bearing Strength, ΦR_n	:	34.66	k/bolt	
Unity Check, Bolt Bearing	:	**3.36%**		**OKAY**

PROJECT	**136350.007.01 - Weston Sqaure**				**LK**
SUBJECT	**14.5 ft. Platform Mount Mount Analysis**				
DATE	**11/19/20**	PAGE	1	OF	1

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

[REF: AISC 360-05]

Connecting Member Parameters

Plate Yield Strength, F_y	:	36.00	ksi	[AISC Table 2-5]
Plate Tensile Strength, F_u	:	58.00	ksi	[AISC Table 2-5]
Plate Height	:	9.00	in	
Plate Width	:	9.00	in	
Plate Thickness	:	0.50	in	
Edge Distance	:	1.06	in	
Gross Tension Area, A_{gt}	:	4.50	in^2	
Gross Shear Area, A_{gv}	:	0.75	in^2	
Net Area for tension, A_{nv}	:	4.16	in^2	
Net Area for shear, A_{nt}	:	3.00	in^2	

Plate Check

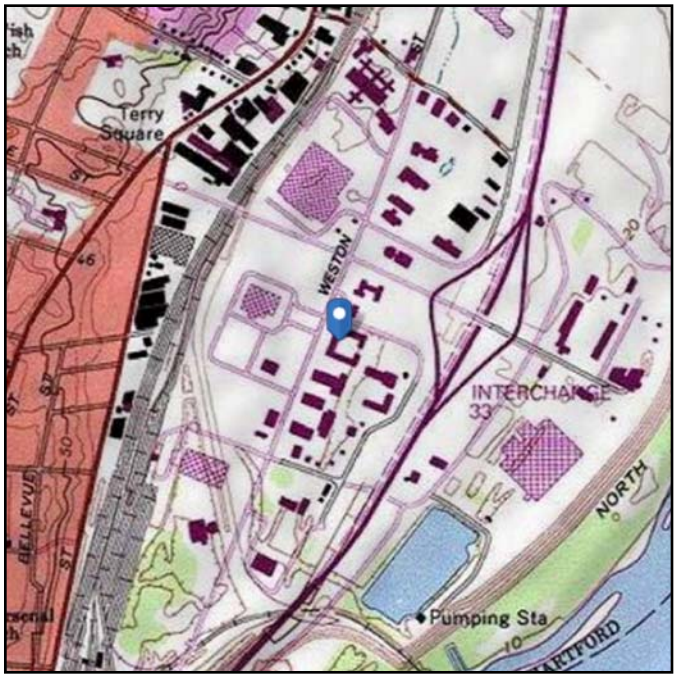
Available Tensile Yield	:	145.80	k	[Eq. J4-1]
Available Tensile Rupture	:	180.80	k	[Eq. J4-2]
Unity Check, Plate Tension	:	**1.70%**		**OKAY**
Available Shear Yield	:	16.20	k	[Eq. J4-3]
Available Shear Rupture	:	104.40	k	[Eq. J4-4]
Unity Check, Plate Shear	:	**28.73%**		**OKAY**
Available Block Shear, ΦRn	:	77.40	k	[Eq. J4-5]
Unity Check, Block Shear	:	**6.01%**		**OKAY**

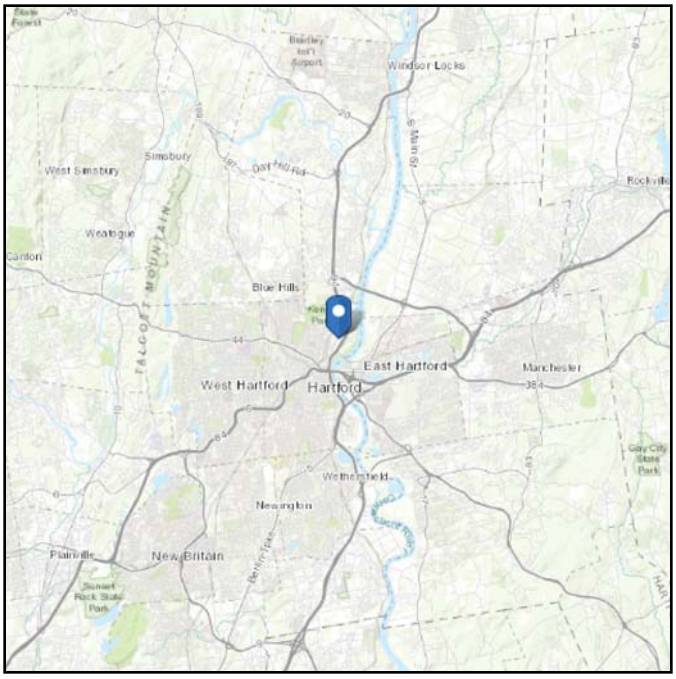
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 10.46 ft (NAVD 88)
Latitude: 41.78675
Longitude: -72.662339





Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	97 Vmph
Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4
Date Accessed:	Thu Oct 08 2020

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

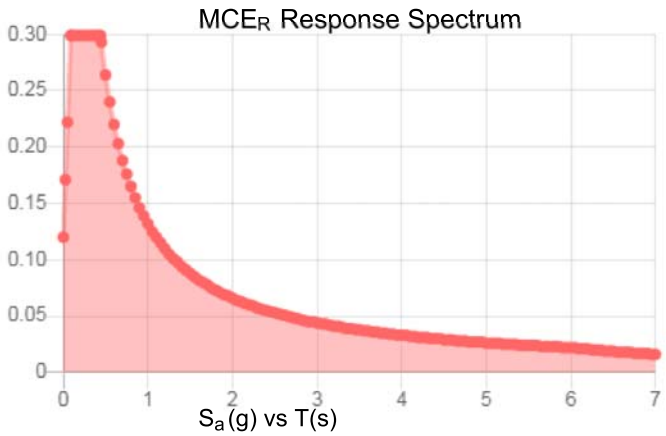
Seismic

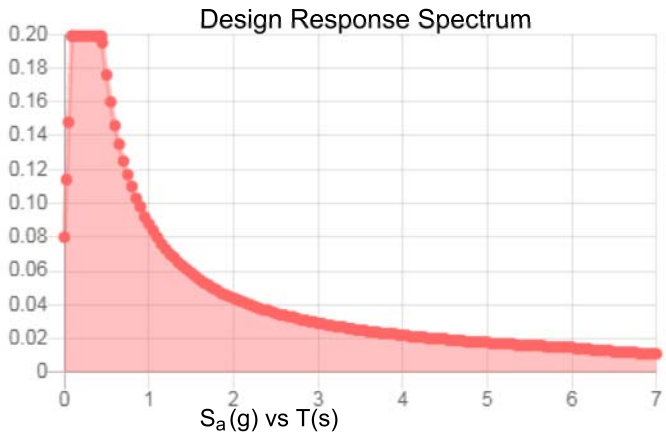
Site Soil Class: D - Default (see Section 11.4.3)

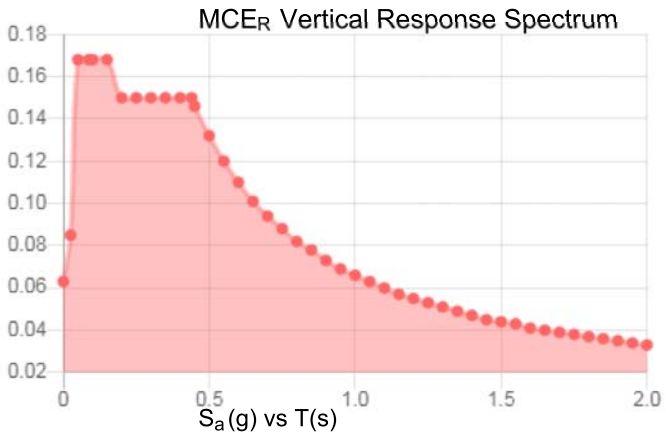
Results:

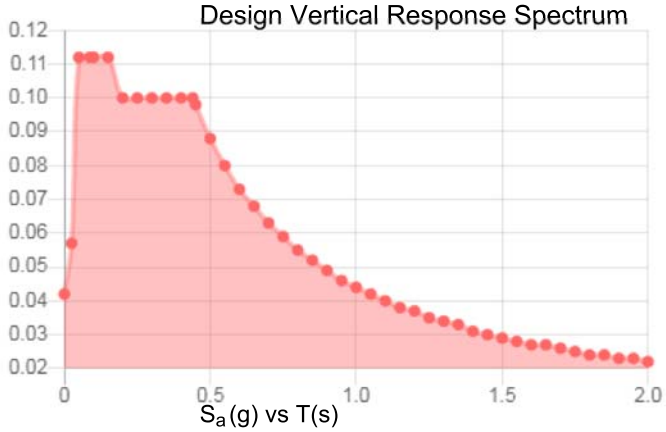
S_S :	0.187	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.1
F_v :	2.4	PGA_M :	0.161
S_{MS} :	0.299	F_{PGA} :	1.599
S_{M1} :	0.132	I_e :	1
S_{DS} :	0.199	C_v :	0.7

Seismic Design Category B









Data Accessed: Thu Oct 08 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

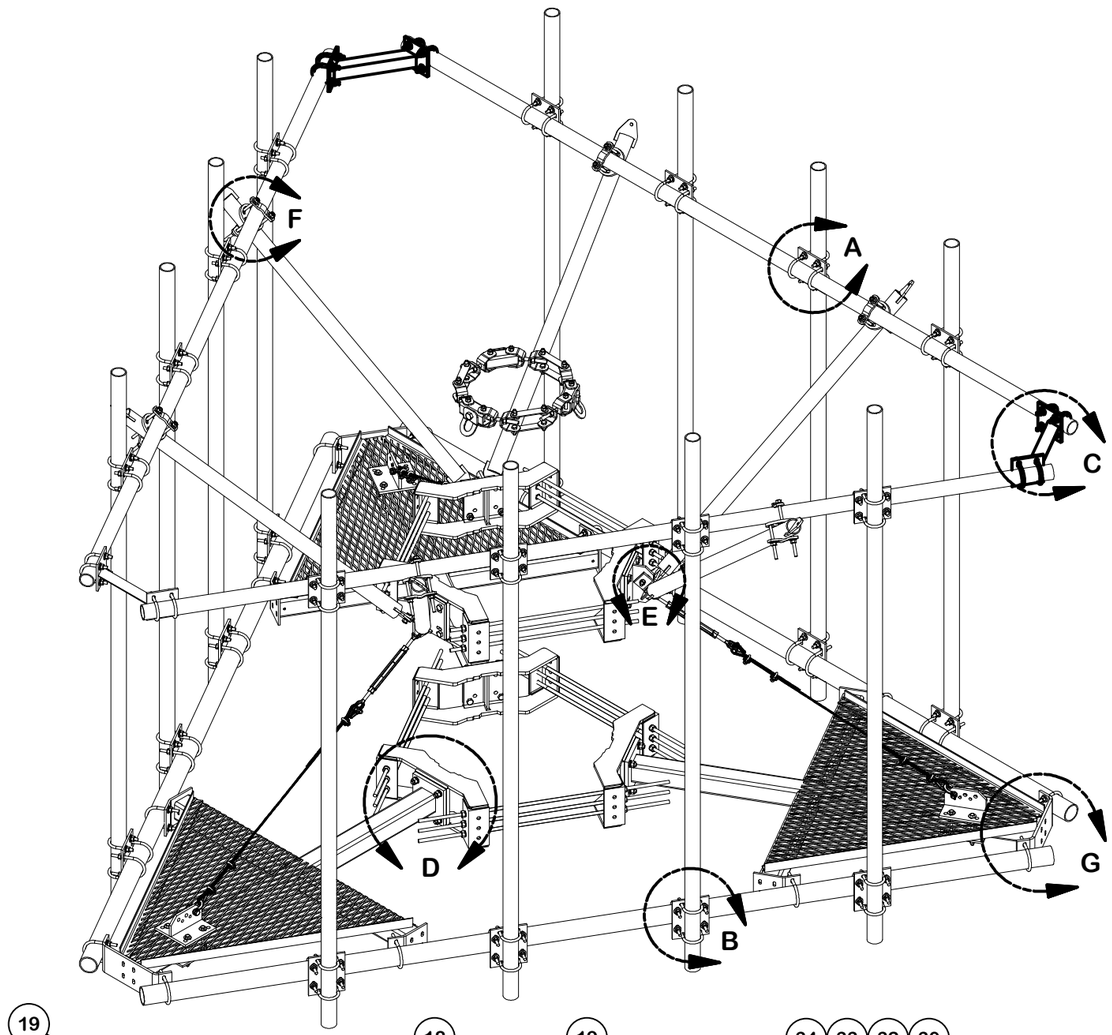
Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Thu Oct 08 2020

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

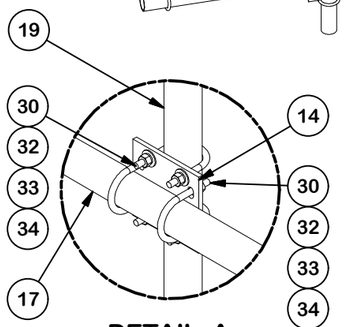
APPENDIX E

SUPPLEMENTAL DRAWINGS

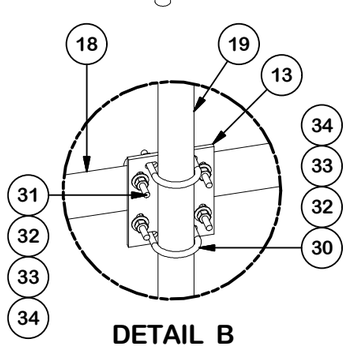


PARTS LIST

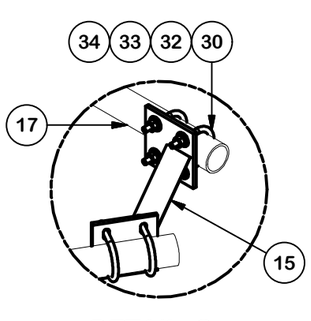
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
3	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
4	6	SHCM-T	CHAIN MOUNT TIGHTENER BRACKET	3 in	1.86	11.15
5	6	X-VSKL	LONG SUPPORT WELDMENT FOR VSK REINFORCEMENTS		37.05	222.33
6	6	X-127594	FLAT DISK CLAMP PLATE 4" CENTERS (GALV.)		2.51	15.04
7	12	X-100064	CLAMP (4" V-CLAMP) GALVANIZED		0.92	11.06
8	3	320751-I	1/2" CHAIN SHACKLE		0.76	2.29
9	3	320601-I	5/8" TURNBUCKLE		2.63	7.89
10	6	320777-I	5/16" THIMBLE		0.06	0.36
11	12	320152-I	5/16" WIRE ROPE CLIP		1.32	15.78
12	3	AC516-10	5/16" AIRECRAFT CABLE		1.25	3.76
13	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
14	12	SCX2	CROSSOVER PLATE	7 in	4.80	57.56
15	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
17	3	P30174	2-7/8" O.D. x 174" SCH. 40 PIPE	174 in	84.20	252.59
18	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
19	12	P30120	2-7/8" x 120" (2-1/2" SCH. 40) GALVANIZED PIPE	120 in	58.07	696.79
20	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
20	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
21	12	A582114	5/8" x 2-1/4" HDG A325 HEX BOLT	2 1/4 in	0.31	3.75
22	12	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	4.27
23	12	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.41
24	60	G58LW	5/8" HDG LOCKWASHER		0.03	1.57
25	60	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	7.79
26	6	G12112	1/2" x 1-1/2" HDG HEX BOLT GR5	1/2 in	0.15	0.89
27	3	G12212	1/2" x 2-1/2" HDG HEX BOLT GR5	2 1/2 in	0.20	0.61
28	12	G1204	1/2" x 4" HDG HEX BOLT GR5 FULL THREAD	4 in	0.27	3.24
29	24	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	9.83
30	84	X-UB1300	1/2" X 3" X 5" X 2" U-BOLT (HDG.)		0.67	56.19
31	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
32	288	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.82
33	285	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.96
34	285	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	20.41
35	1	HALO40	5,000 LB. MAINTENANCE TIE-OFF POINT		41.12	41.12
					TOTAL WT. #	3249.41



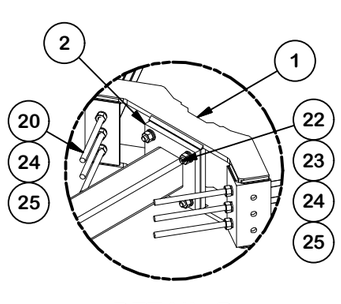
DETAIL A



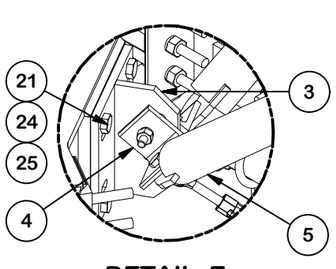
DETAIL B



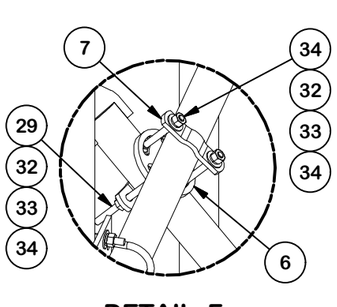
DETAIL C



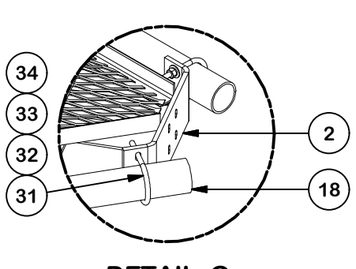
DETAIL D



DETAIL E



DETAIL F



DETAIL G

TOLERANCE NOTES

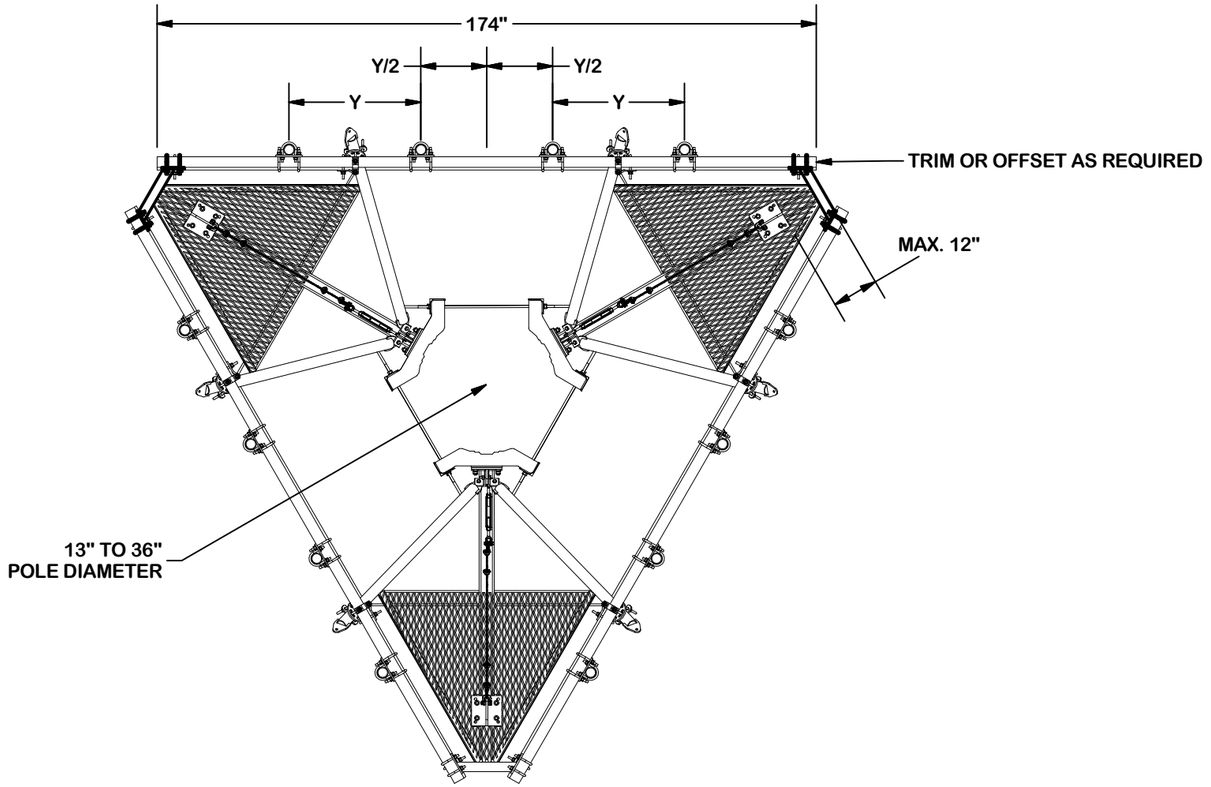
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (±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

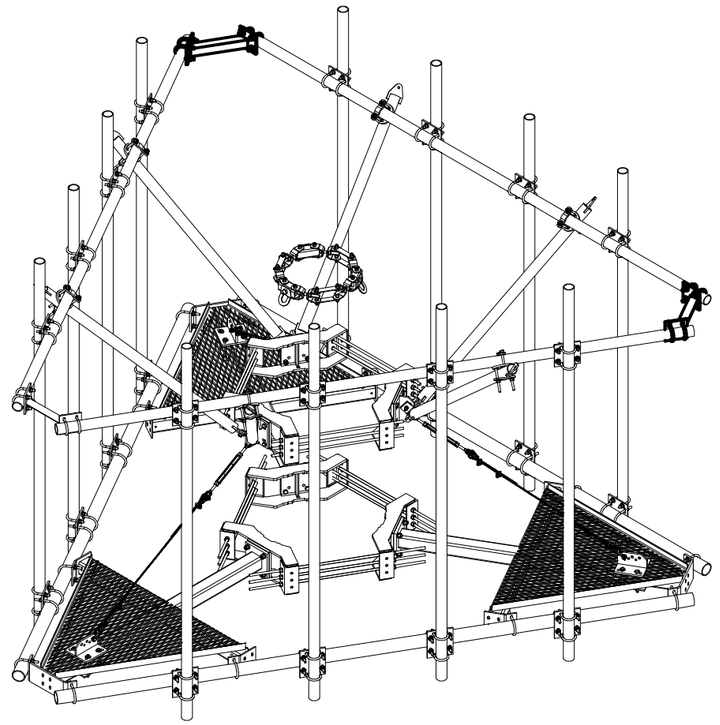
DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

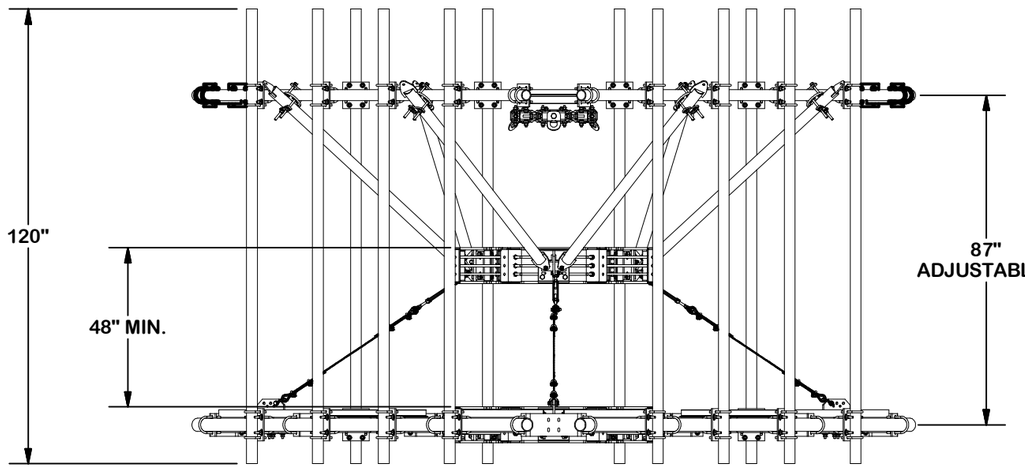
SITE PRO 1
A valmont COMPANY
Engineering Support Team: 1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

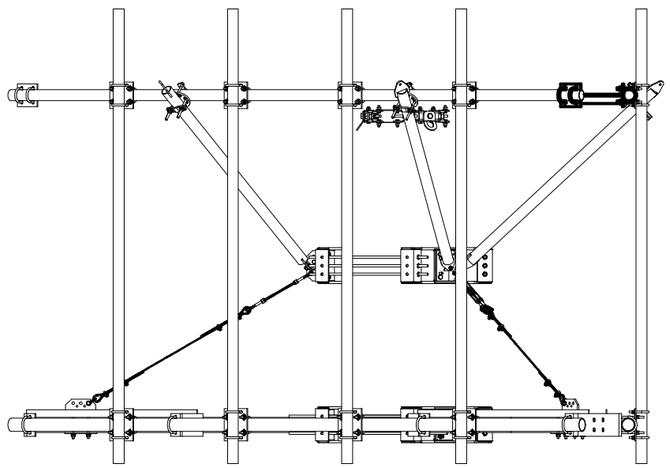
CPD NO.	DRAWN BY	ENG. APPROVAL	PART NO.
	CSL 10/17/2019	10/18/2019	RMQLP-4120-H10

CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10









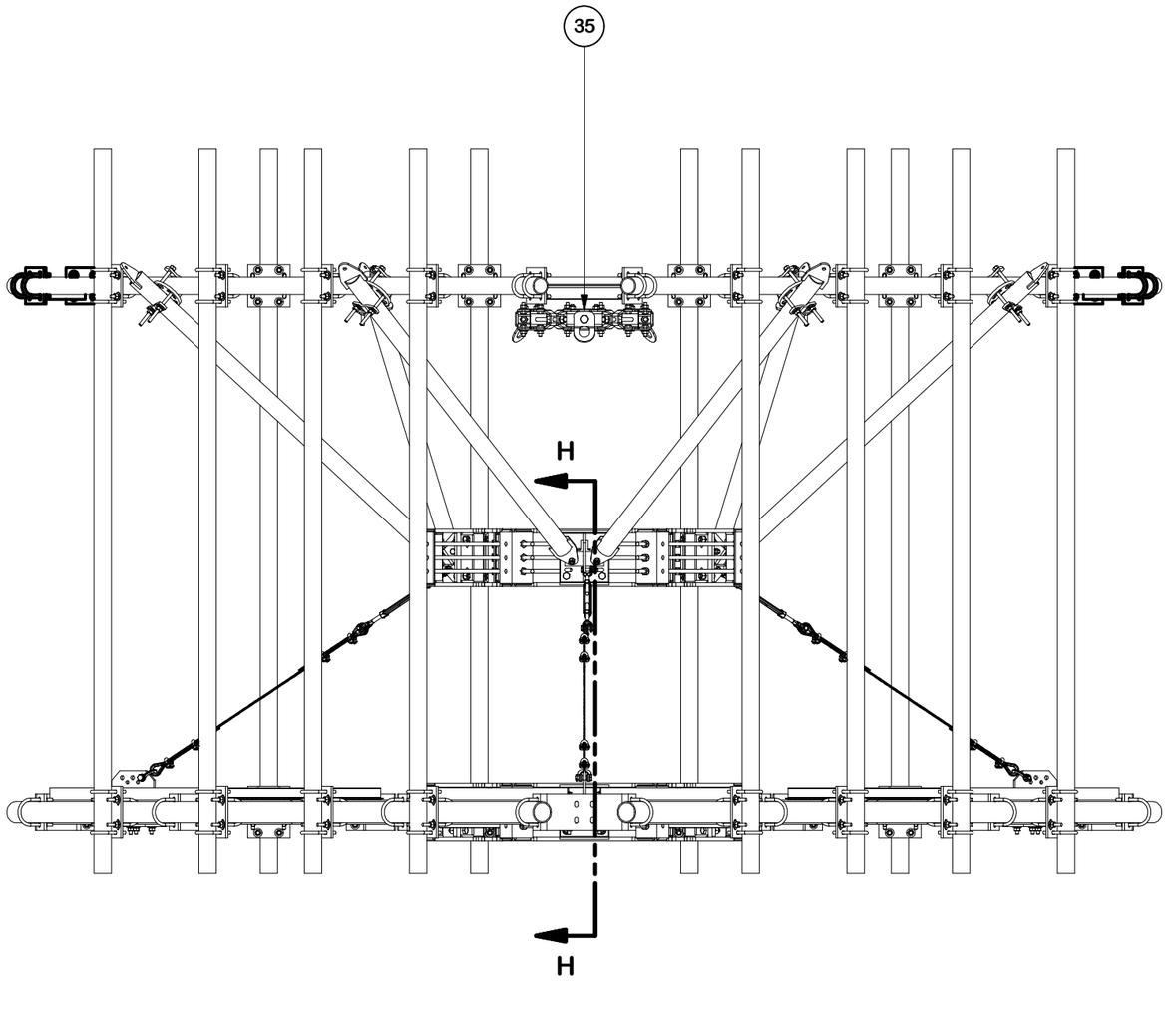
TOLERANCE NOTES

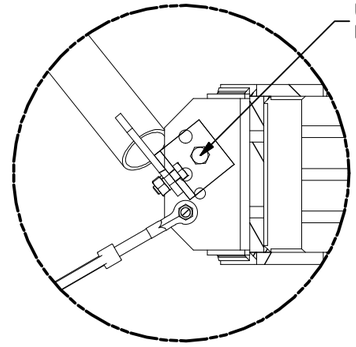
TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
SAWED, SHEARED AND GAS CUT EDGES (± 0.030")
DRILLED AND GAS CUT HOLES (± 0.030") - NO CONING OF HOLES
LASER CUT EDGES AND HOLES (± 0.010") - NO CONING OF HOLES
BENDS AND ANGLES ARE ± 1/2 DEGREE
ALL OTHER MACHINING (± 0.030")
ALL OTHER ASSEMBLY (±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

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

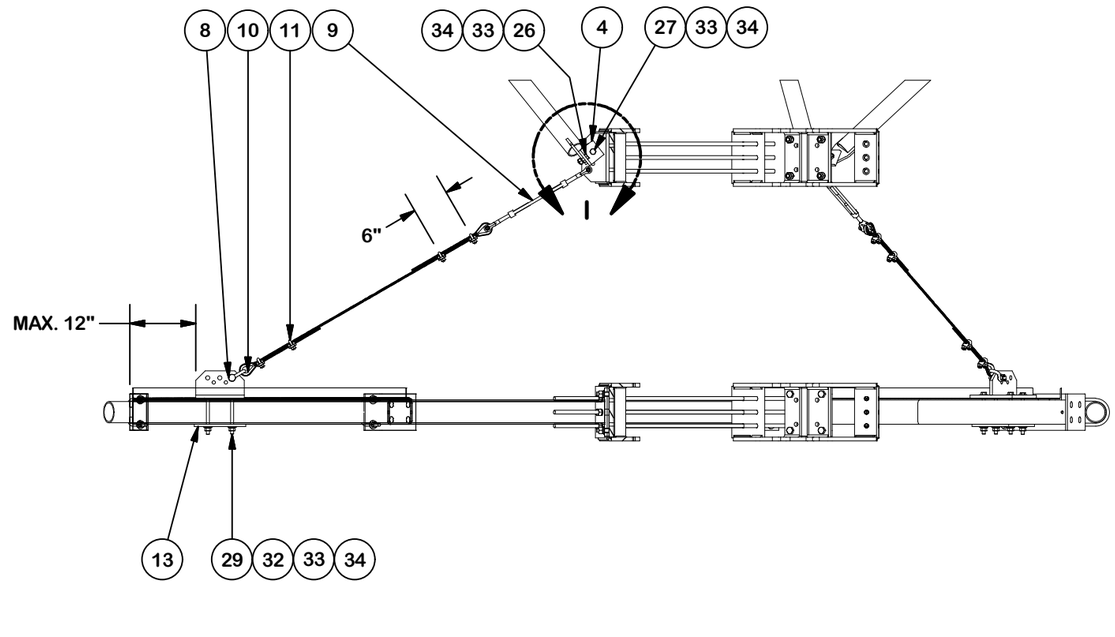
SITE PRO 1
A valmont COMPANY
Engineering
Support Team:
1-888-753-7446
Locations:
New York, NY
Atlanta, GA
Los Angeles, CA
Plymouth, IN
Salem, OR
Dallas, TX
Tampa, FL

CPD NO.		DRAWN BY	ENG. APPROVAL	PART NO.	
		CSL 10/17/2019	10/18/2019	RMQLP-4120-H10	
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10	





DETAIL I



SECTION H-H

NOTE:
SOME OBJECTS ARE TRANSPARENT FOR CLARITY

TOLERANCE NOTES

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

DESCRIPTION
14' 6" LOW PROFILE PLATFORM
WITH TWELVE 2-7/8" ANTENNA MOUTING
PIPES, REINFORCED HANDRAIL, AND CABLE

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

CPD NO.		DRAWN BY	ENG. APPROVAL	PART NO.	
		CSL 10/17/2019	10/18/2019	RMQLP-4120-H10	
CLASS	SUB	DRAWING USAGE	CHECKED BY	DWG. NO.	
87	02	CUSTOMER	BMC 10/18/2019	RMQLP-4120-H10	

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

AT&T Existing Facility

Site ID: 876325 / 10071071

CTU5152
92 Weston Street
Hartford, Connecticut 06103

February 19, 2021

EBI Project Number: 6221000595

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**60.89%**

February 19, 2021

Emissions Analysis for Site: 876325 / 10071071 - CTU5152

EBI Consulting was directed to analyze the proposed AT&T facility located at **92 Weston Street** in **Hartford, Connecticut** for the purpose of determining whether the emissions from the Proposed AT&T Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure. Occupational/controlled exposure limits also apply where exposure is of a transient nature as a result of

incidental passage through a location where exposure levels may be above general population/uncontrolled limits (see below), as long as the exposed person has been made fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed AT&T Wireless antenna facility located at 92 Weston Street in Hartford, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since AT&T is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 4 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

2) 4 LTE channels (700 MHz FN Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 2 LTE channels (700 MHz DE Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

4) 4 LTE channels (850 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

5) 2 UMTS channels (850 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

6) 4 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

7) 4 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

8) 4 LTE channels (WCS Band – 2300 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 25 Watts per Channel.

9) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

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

11) The antennas used in this modeling are the CCI DMP65R-BU6DA for the 700 MHz / 850 MHz / 2100 MHz channel(s), the CCI OPA65R-BU6DA for the 700 MHz channel(s), the Quintel QS66512-2 for the 700 MHz / 1900 MHz / 2300 MHz channel(s), the Powerwave 7770 for the 850 MHz channel(s) in Sector A, the CCI DMP65R-BU6DA for the 700 MHz / 850 MHz / 2100 MHz channel(s), the CCI OPA65R-BU6DA for the 700 MHz channel(s), the Quintel QS66512-2 for the 700 MHz / 1900 MHz / 2300 MHz channel(s), the Powerwave 7770 for the 850 MHz channel(s) in Sector B, the CCI DMP65R-BU6DA for the 700 MHz / 850 MHz / 2100 MHz channel(s), the CCI OPA65R-BU6DA for the 700 MHz channel(s), the Quintel QS66512-2 for the 700 MHz / 1900 MHz / 2300 MHz channel(s), the Powerwave 7770 for the 850 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

12) The antenna mounting height centerline of the proposed antennas is 90 feet above ground level (AGL).

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

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

AT&T Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	CCI DMP65R-BU6DA	Make / Model:	CCI DMP65R-BU6DA	Make / Model:	CCI DMP65R-BU6DA
Frequency Bands:	700 MHz / 850 MHz / 2100 MHz	Frequency Bands:	700 MHz / 850 MHz / 2100 MHz	Frequency Bands:	700 MHz / 850 MHz / 2100 MHz
Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd	Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd	Gain:	11.85 dBd / 12.45 dBd / 15.95 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts	Total TX Power (W):	480 Watts
ERP (W):	11,559.22	ERP (W):	11,559.22	ERP (W):	11,559.22
Antenna A1 MPE %:	**7.32%**	Antenna B1 MPE %:	**7.32%**	Antenna C1 MPE %:	**7.32%**
Antenna #:	2	Antenna #:	2	Antenna #:	2
Make / Model:	CCI OPA65R-BU6DA	Make / Model:	CCI OPA65R-BU6DA	Make / Model:	CCI OPA65R-BU6DA
Frequency Bands:	700 MHz	Frequency Bands:	700 MHz	Frequency Bands:	700 MHz
Gain:	12.15 dBd	Gain:	12.15 dBd	Gain:	12.15 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts	Total TX Power (W):	160 Watts
ERP (W):	2,624.94	ERP (W):	2,624.94	ERP (W):	2,624.94
Antenna A2 MPE %:	**2.49%**	Antenna B2 MPE %:	**2.49%**	Antenna C2 MPE %:	**2.49%**
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2	Make / Model:	Quintel QS66512-2
Frequency Bands:	700 MHz / 1900 MHz / 2300 MHz	Frequency Bands:	700 MHz / 1900 MHz / 2300 MHz	Frequency Bands:	700 MHz / 1900 MHz / 2300 MHz
Gain:	11.05 dBd / 13.85 dBd / 14.85 dBd	Gain:	11.05 dBd / 13.85 dBd / 14.85 dBd	Gain:	11.05 dBd / 13.85 dBd / 14.85 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 feet
Channel Count:	10	Channel Count:	10	Channel Count:	10
Total TX Power (W):	340 Watts	Total TX Power (W):	340 Watts	Total TX Power (W):	340 Watts
ERP (W):	7,956.30	ERP (W):	7,956.30	ERP (W):	7,956.30
Antenna A3 MPE %:	**4.05%**	Antenna B3 MPE %:	**4.05%**	Antenna C3 MPE %:	**4.05%**
Antenna #:	4	Antenna #:	4	Antenna #:	4
Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770	Make / Model:	Powerwave 7770
Frequency Bands:	850 MHz	Frequency Bands:	850 MHz	Frequency Bands:	850 MHz
Gain:	11.5 dBd	Gain:	11.5 dBd	Gain:	11.5 dBd
Height (AGL):	90 feet	Height (AGL):	90 feet	Height (AGL):	90 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	80 Watts	Total TX Power (W):	80 Watts	Total TX Power (W):	80 Watts
ERP (W):	1,130.03	ERP (W):	1,130.03	ERP (W):	1,130.03
Antenna A4 MPE %:	**0.88%**	Antenna B4 MPE %:	**0.88%**	Antenna C4 MPE %:	**0.88%**

Site Composite MPE %	
Carrier	**MPE %**
AT&T (Max at Sector A):	14.75%
Verizon	27.67%
T-Mobile	13.36%
Sprint	5.11%
Site Total MPE % :	60.89%

AT&T MPE % Per Sector	
AT&T Sector A Total:	14.75%
AT&T Sector B Total:	14.75%
AT&T Sector C Total:	14.75%
Site Total MPE % :	60.89%

AT&T Maximum MPE Power Values (Sector A)

AT&T Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
AT&T 700 MHz LTE	4	612.43	90.0	10.87	700 MHz LTE	467	2.33%
AT&T 850 MHz LTE/5G	4	703.17	90.0	12.48	850 MHz LTE/5G	567	2.20%
AT&T 2100 MHz LTE	4	1574.20	90.0	27.95	2100 MHz LTE	1000	2.79%
AT&T 700 MHz LTE FN	4	656.24	90.0	11.65	700 MHz LTE FN	467	2.49%
AT&T 700 MHz LTE	2	509.40	90.0	4.52	700 MHz LTE	467	0.97%
AT&T 1900 MHz LTE	4	970.64	90.0	17.23	1900 MHz LTE	1000	1.72%
AT&T 2300 MHz LTE	4	763.73	90.0	13.56	2300 MHz LTE	1000	1.36%
AT&T 850 MHz UMTS	2	565.02	90.0	5.02	850 MHz UMTS	567	0.88%
						Total:	**14.75%**

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

Summary

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

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

AT&T Sector	Power Density Value (%)
Sector A:	14.75%
Sector B:	14.75%
Sector C:	14.75%
AT&T Maximum MPE % (Sector A):	14.75%
Site Total:	60.89%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **60.89%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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