February 22, 2021

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

RE: **Notice of Exempt Modification for AT&T**
Crown Site ID# 803934; AT&T Site ID #CT5857
400 Main Street, Somers, CT 06071
Latitude: 41° 59' 1.48"/ Longitude: -72° 27' 56.87"

Dear Ms. Bachman:

AT&T currently maintains six (6) antennas at the 150-foot mount on the existing 187-foot Monopole Tower located at 400 Main Street in Somers. The property is owned by the Town of Somers and the Tower is owned by Crown Castle. AT&T now intends to remove three (3) antennas, relocate three (3) antennas, and add nine (9) new antennas and ancillary equipment. The new antennas will be installed at the 150-ft level of the tower. AT&T is also proposes tower mount modifications as shown on the enclosed Mount Analysis. This modification/proposal 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.

The facility was approved by the Town of Somers in 2001, however approval documents were not able to be located at the time of this application. Nonetheless, the Council has approved several exempt modifications for AT&T as well as other carriers since the tower came under the Siting Council's jurisdiction.

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 C.G. 'Bud' Knorr Jr., First Selectman for the Town of Somers, as well as Jennifer Roy, Zoning Enforcement Officer for the Town of Somers.

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).

Sincerely,

Richard Zajac
Site Acquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY
(585) 445-5896
Richard.zajac@crowncastle.com

cc:

C.G. 'Bud' Knorr, Jr., First Selectman *(via email to selectman@somersct.gov)*
Town of Somers
600 Main Street
Somers, CT 06071
860-763-8200

Ms. Jennifer Roy, Zoning Enforcement Officer *(via email to jroy@somersct.gov)*
Town of Somers
600 Main Street
Somers, CT 06071
860-763-8220

Zajac, Richard

From: Zajac, Richard
Sent: Monday, February 22, 2021 12:04 PM
To: selectman@somersct.gov
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 400 Main St.pdf

Good morning,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 400 Main Street in Somers.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Monday, February 22, 2021 12:10 PM
To: 'jroy@somersct.gov'
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 400 Main St.pdf

Good morning Ms. Roy,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 400 Main Street in Somers.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Exhibit A

Original Facility Approval

The Council's records indicated that the existing tower was originally approved by the Town of Somers in 2001. However, the approval documents were not able to be located at the time of this this application. Nonetheless, the Council has approved several exempt modifications for AT&T as well as other carriers since the tower came under the Siting Council's jurisdiction.

Exhibit B

Property Card

400 MAIN ST

Location	400 MAIN ST	**Mblu**	05/ 07/ / /
Acct#	00202300	**Owner**	SOMERS TOWN OF
Assessment	$2,655,300	**Appraisal**	$3,793,200
PID	2932	**Building Count**	1
Dev Lot		**Dev Map**	
Exempt Code	X		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,919,400	$873,800	$3,793,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2020	$2,043,600	$611,700	$2,655,300

Owner of Record

Owner	SOMERS TOWN OF	**Sale Price**	$240,000
Co-Owner	FIRE COMPLEX	**Certificate**	
Address	400 MAIN STREET SOMERS, CT 06071	**Book & Page**	0165/0819
		Sale Date	08/18/1995

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
SOMERS TOWN OF	$240,000		0165/0819	08/18/1995

Building Information

Building 1 : Section 1

Year Built:	2001
Living Area:	16,282
Replacement Cost:	$3,594,187

Building Percent Good: 77

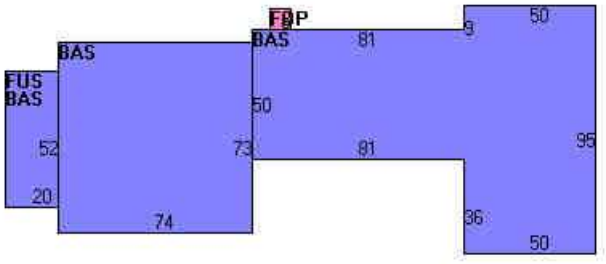
Replacement Cost Less Depreciation: $2,767,500

Building Attributes	
Field	**Description**
Style:	Fire Station
Model	Ind/Comm
Grade:	Good/Vg
Stories:	1.00
Occupancy:	1.00
Exterior Wall 1:	Brick Veneer
Exterior Wall 2:	Vinyl/Aluminum
Roof Struct:	Hip
Roof Cover:	Copper
Interior Wall 1:	Drywall
Interior Wall 2:	Minim/Masonry
Interior Floor 1:	Concr-Finished
Interior Floor 2:	Linoleum
Heating Fuel:	Oil
Heating Type:	Forced Air
AC Type:	None
Struct Class	Post Office
Bldg Use:	Fire Dept
Fin. Bsmt.	0
Ttl Bedrms:	
Ttl Baths:	
Ttl Half Baths:	
Ttl Xtra Fix:	
1st Floor Use:	
Heat/AC:	Heat/Ac Pkgs
Frame Type:	Wood Frame
Baths/Plumbing:	Average
Ceiling/Wall:	Sus-Ceil & Wl
Rooms/Prtns:	Average
Wall Height:	12.00
% Comn Wall:	

Building Photo

(http://images.vgsi.com/photos/SomersCTPhotos///0009/P1020043_9570...

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	15,242	15,242
FUS	Finished Upper Story	1,040	1,040
FOP	Open Porch	64	0
		16,346	16,282

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR1	Sprinklers-Wet	15242.00 SF	$31,700	1

A/C	Air Conditioning	8800.00 SF	$16,900	1

Land

Land Use

Use Code	928
Description	Fire Dept
Zone	A-1
Neighborhood	E
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	11.00
Frontage	
Depth	
Assessed Value	$611,700
Appraised Value	$873,800

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
PAV1	Paving Asph			32000.00 SF	$57,600	1
LT	Light	1	Single	13.00 UNITS	$21,800	1
TWR	Tower			190.00 LF	$0	1
CB1	PreCast Cell Shed	CB		120.00 SF	$18,000	1
FN4	Fence 8'			330.00 LF	$5,900	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$2,692,100	$592,500	$3,284,600
2016	$2,692,100	$592,500	$3,284,600
2014	$2,881,200	$505,000	$3,386,200

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$1,884,400	$414,800	$2,299,200
2016	$1,884,400	$414,800	$2,299,200
2014	$2,016,800	$353,500	$2,370,300

Google Maps 400 Main St

Imagery ©2021 MassGIS, Commonwealth of Massachusetts EOEA, Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data ©2021 100 ft

400 Main St

Somers, CT 06071
Building

Directions Save Nearby Send to your phone Share

Photos

Exhibit C

Construction Drawings

AT&T

AT&T SITE NUMBER: CT5857
AT&T SITE NAME: SOMERS CENTRAL
AT&T FA CODE: 10108715
AT&T PACE NUMBER: MRCTB049757 MRCTB048472 MRCTB048619 MRCTB048544 MRCTB048540
AT&T PROJECT: BWE/LTE 4C/LTE 5C/5G NR 1DR-1/4TX4RX

BUSINESS UNIT #: 803934
SITE ADDRESS: 400 MAIN STREET, SOMERS, CT 06071
COUNTY: TOLLAND
SITE TYPE: MONOPOLE
TOWER HEIGHT: 187'-0"

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	CT SOMERS FD CAC
SITE ADDRESS:	400 MAIN STREET SOMERS, CT 06071
COUNTY:	TOLLAND
MAP/PARCEL #:	2932
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.983744
LONGITUDE:	-72.465797
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	197'
CURRENT ZONING:	A-1
JURISDICTION:	TOWN OF SOMERS
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	TOWN OF SOMERS 400 MAIN STREET SOMERS, CT 06071
TOWER OWNER:	CROWN CASTLE USA INC 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	AT&T TOWER ASSET GROUP 575 MOROSGO DRIVE ATLANTA, GA 30324-3300
ELECTRIC PROVIDER:	N/A
TELCO PROVIDER:	N/A

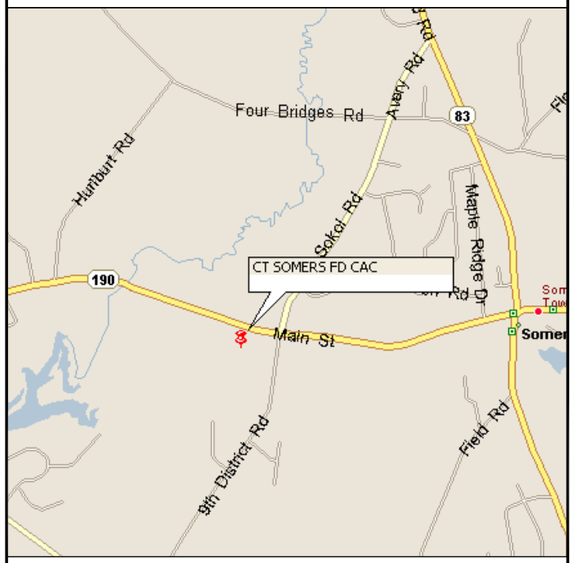
DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	SITE PLAN
C-1.2	EXISTING & FINAL EQUIPMENT PLANS
C-2	FINAL ELEVATION & ANTENNA PLANS
C-3	FINAL EQUIPMENT SCHEDULE
C-4	EQUIPMENT MOUNTING DETAILS
C-5	EQUIPMENT SPECS
E-1	POWER ANALYSIS
G-1	GROUNDING SCHEMATIC
G-2	GROUNDING DETAILS
ATTACHED	PLUMBING DIAGRAM
ATTACHED	MOUNT DETAIL

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR ----. 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.

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

LOCATION MAP



NO SCALE

SITE PHOTO

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S BOULDER AVE, SUITE 300 TULSA, OK 74119 JENNY PAUL jpaul@btgrp.com
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277 NICHOLAS ROMBACH NICHOLAS.ROMBACH@CROWNCASTLE.COM

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

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) POWERWAVE - P65-17-XLH-RR ANTENNAS
- REMOVE (3) ERICSSON - RRUS-11 B12 RRHs
- REMOVE (3) ERICSSON - RRUS-12 B2 RRHs
- INSTALL MOUNT MODIFICATIONS PER MOUNT ANALYSIS BY GPD GROUP DATED NOVEMBER 16, 2020
- INSTALL (3) CCI - HPA-65R-BU8AA ANTENNAS
- INSTALL (3) CCI - OPA65R-BU8DA ANTENNAS
- INSTALL (3) CCI - DMP65R-BU8DA ANTENNAS
- INSTALL (3) ERICSSON - RRUS 8843 B2/B66A RRUs
- INSTALL (3) ERICSSON - RRUS 4478 B14 RRUs
- INSTALL (3) ERICSSON - RRUS 4449 B5/B12 RRUs
- INSTALL (1) RAYCAP - DC6-48-60-18-8F SURGE SUPPRESSOR
- INSTALL (1) HYBRID CABLE (3/8")
- INSTALL (3) #6 AWG DC TRUNKS
- INSTALL (6) Y CABLES

GROUND SCOPE OF WORK:
- INSTALL (1) 6630 BBU
- INSTALL (1) XMU
- INSTALL (1) IDLe CABLE
- INSTALL (1) FLX-12 CABINET
- INSTALL (2) 19" DISTRIBUTION SHELVES
- INSTALL (15) VERTIV Up-CONVERTERS
- INSTALL (1) OUTDOOR DC12 RAYCAP
- INSTALL (6) JUMPER CABLES

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	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS:	CROWN CASTLE
DATED:	11/19/20
MOUNT ANALYSIS:	GPD GROUP
DATED:	11/16/20
RFDS REVISION:	2
DATED:	10/30/20
ORDER ID:	527505
REVISION:	4

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

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

400 MAIN STREET
SOMERS, CT 06071

EXISTING
187'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/11/20	BLB	PRELIMINARY REVIEW	GEH
B	12/22/20	JJD	PRELIMINARY REVIEW	MTJ
0	1/28/21	JJD	CONSTRUCTION	GEH

STATE OF CONNECTICUT
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/28/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-1
REVISION: 0

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

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

GENERAL NOTES:

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

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AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

400 MAIN STREET
SOMERS, CT 06071

EXISTING
187'-0" MONOPOLE

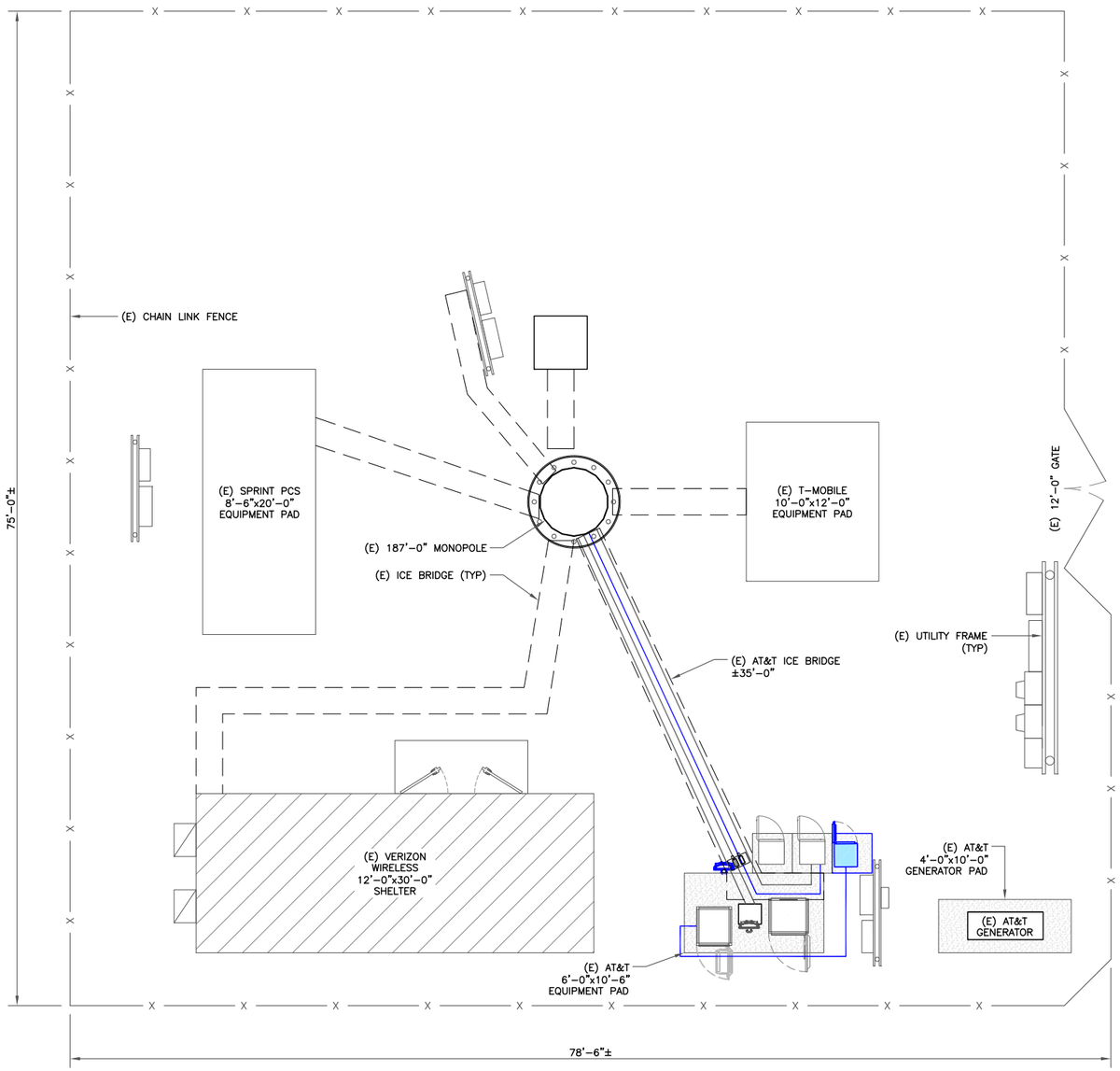
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/11/20	BLB	PRELIMINARY REVIEW	GEH
B	12/22/20	JJD	PRELIMINARY REVIEW	MTJ
0	1/28/21	JJD	CONSTRUCTION	GEH

1/28/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: T-2
REVISION: 0



1 SITE PLAN

SCALE: 4' 2' 0 4' 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N

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STATE OF CONNECTICUT
GARY E. HOLLENBECK
No. 23824
LICENSED
PROFESSIONAL ENGINEER

1/28/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-1.1

REVISION: 0

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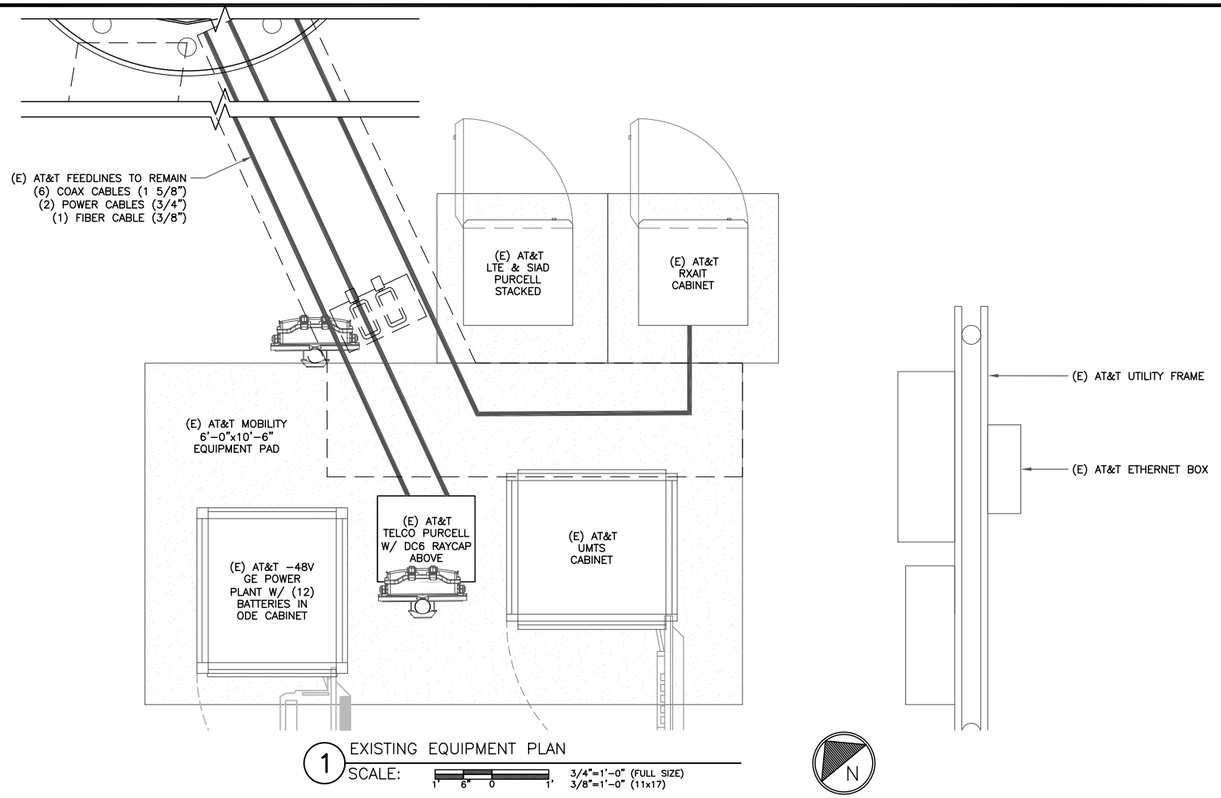
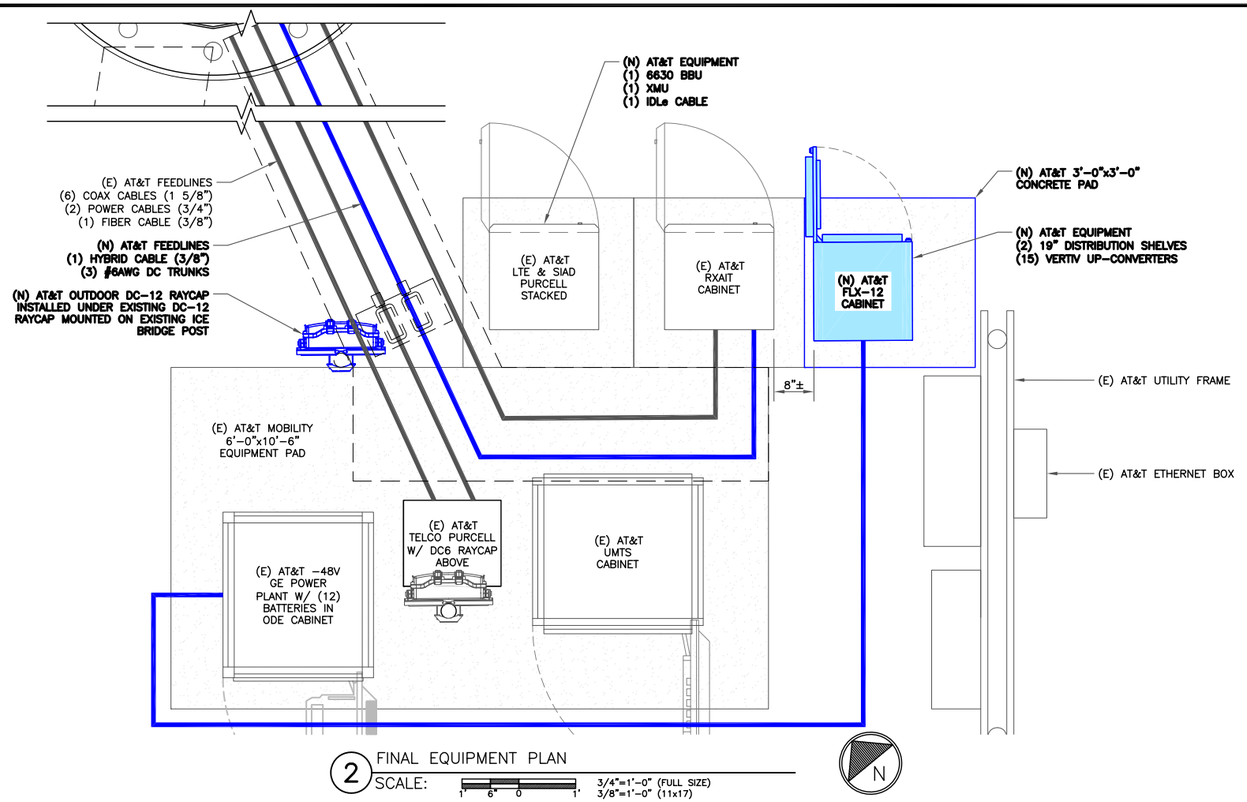


1 EXISTING EQUIPMENT PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)



2 FINAL EQUIPMENT PLAN
SCALE: 1' 6" 0 1' 3/4"=1'-0" (FULL SIZE) 3/8"=1'-0" (11x17)

GROUND SCOPE OF WORK:

- INSTALL (1) 6630 BBU
- INSTALL (1) XMU
- INSTALL (1) FLX-12 CABINET
- INSTALL (2) 19" DISTRIBUTION SHELVES
- INSTALL (18) VERTIV UP-CONVERTERS
- INSTALL (1) IDLe CABLE

NOTE:

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

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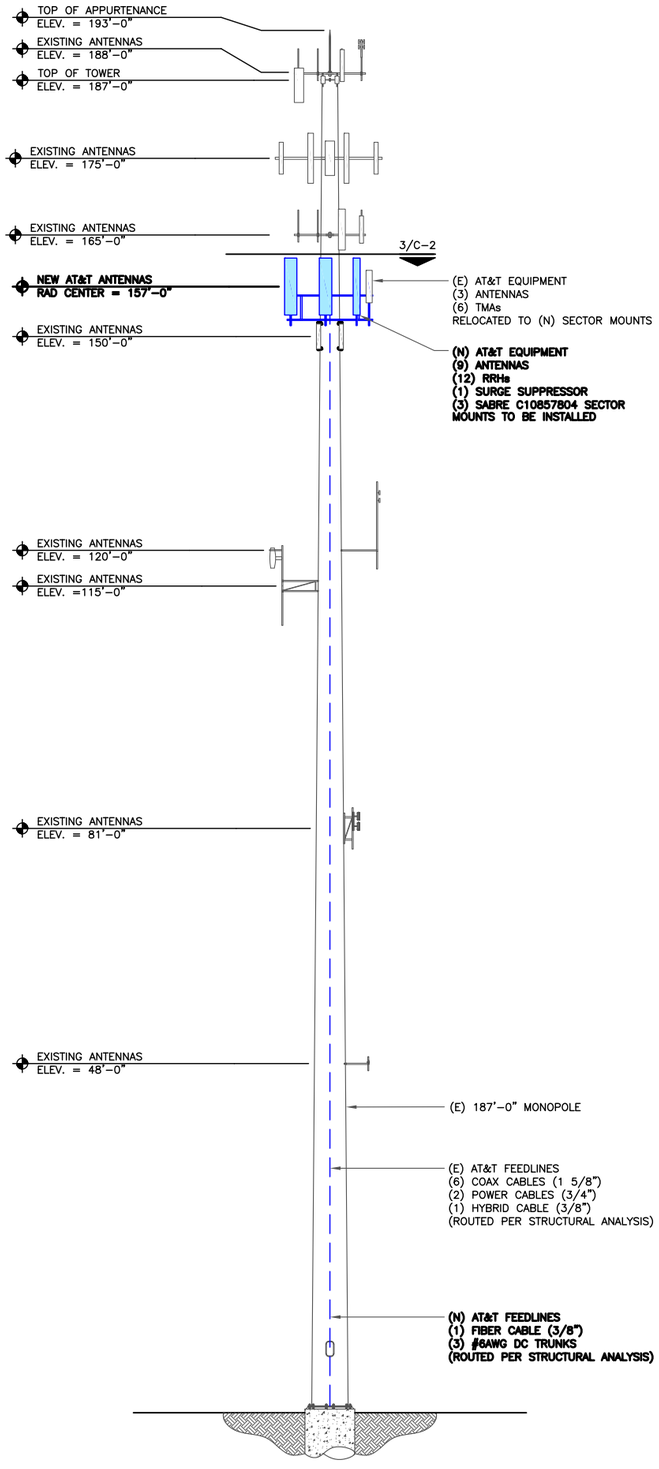
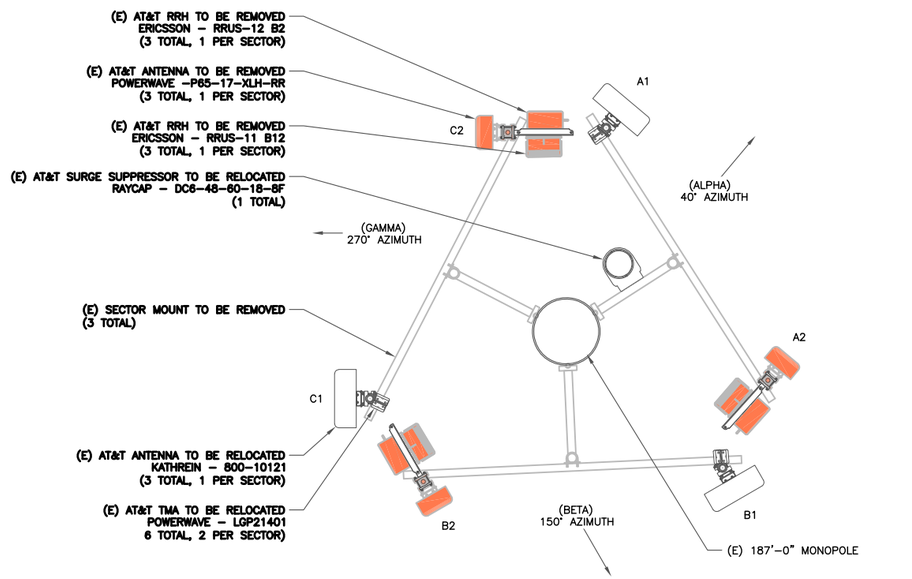
GARY E. HOLLOWAY CONNECTICUT No. 23924 LICENSED PROFESSIONAL ENGINEER
1/28/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-1.2
REVISION: 0

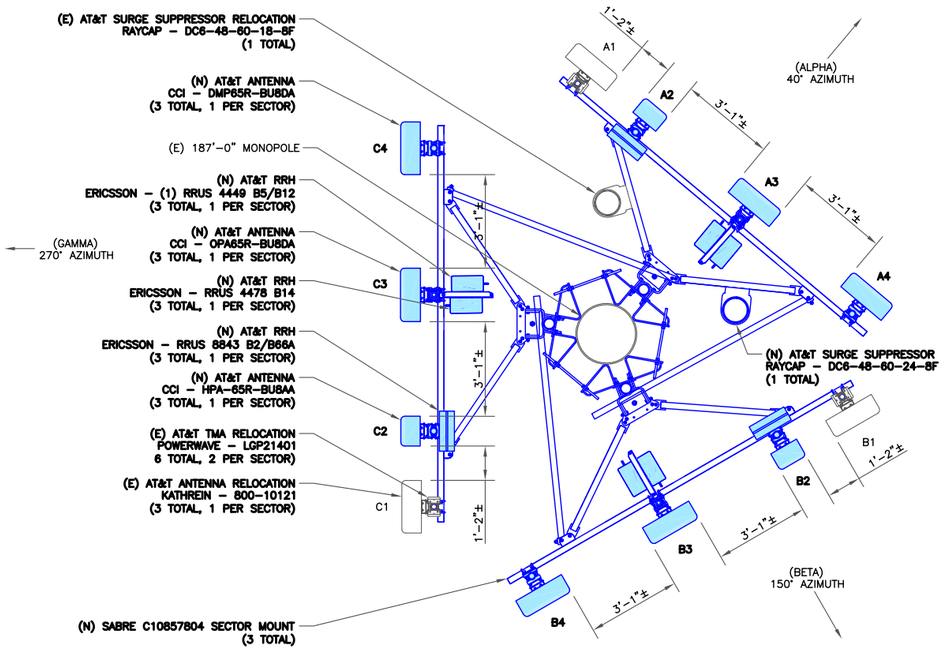


1 FINAL ELEVATION
SCALE: NOT TO SCALE



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

N



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

N

"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 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.

AT&T
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ATLANTA, GA 30324-3300

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www.btgrp.com

AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

400 MAIN STREET
SOMERS, CT 06071

EXISTING
187'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/11/20	BLB	PRELIMINARY REVIEW	GEH
B	12/22/20	JJD	PRELIMINARY REVIEW	MTJ
0	1/28/21	JJD	CONSTRUCTION	GEH

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-2

REVISION: 0

FINAL ANTENNA AND FEEDLINE SCHEDULE

POS.	TECH	STATUS	AZIMUTH	ANTENNA TYPE	ANTENNA RAD CENTER	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	MAIN COAX SIZE	MAIN COAX LENGTH	COAX QTY	TMA QTY AND MODEL	SURGE PROTECTION	DC/FIBER CABLES	RRHs QTY & MODEL ON TOWER	LOCATION	DIPLEXER ON TOWER	DIPLEXER ON GROUND	RET CABLE
ALPHA SECTOR																		
A1	UMTS 850	EXISTING	40°	KATHREIN 800–10121	157'–0"	0°	2°	1 5/8"	205'–0"	2	(2) LGP–21401	(1) DC6–48–60–18–8F **(1) DC6–48–60–18–8F** DC9–48–60–24–8F	(1) 3/8" HYBRID **(1) 3/8" HYBRID**	–	–	N	Y	Y
A2	**LTE 1900**	**NEW**	**40°**	**CCI HPA–65R–BU8AA**	**157'–0"**	**0°**	**1°/1°/1°**	–	–	–	–			**(1) RRUS 8843 B2/B66A**	**TOWER**	**N**	**N**	**Y**
A3	**LTE 700**	**NEW**	**40°**	**CCI OPA65R–BU8DA**	**157'–0"**	**0°**	**2°**	–	–	–	–			**(1) RRUS 4478 B14**	**TOWER**	**N**	**N**	**Y**
A4	**LTE 700/ LTE 850/ LTE AWS/ 5G 850**	**NEW**	**40°**	**CCI DMP65R–BU8DA**	**157'–0"**	**0°**	**3°/3°/1°/3°**	–	–	–	–			**(1) RRUS 4449 B5/B12**	**TOWER**	**N**	**N**	**Y**
BETA SECTOR																		
B1	UMTS 850	EXISTING	150°	KATHREIN 800–10121	157'–0"	0°	2°	1 5/8"	205'–0"	2	(2) LGP–21401	–	(2) 3/4" POWER **(2) #8AWG DC TRUNKS**	–	–	N	Y	Y
B2	**LTE 1900**	**NEW**	**150°**	**CCI HPA–65R–BU8AA**	**157'–0"**	**0°**	**1°/1°/1°**	–	–	–	–			**(1) RRUS 8843 B2/B66A**	**TOWER**	**N**	**N**	**Y**
B3	**LTE 700**	**NEW**	**150°**	**CCI OPA65R–BU8DA**	**157'–0"**	**0°**	**2°**	–	–	–	–			**(1) RRUS 4478 B14**	**TOWER**	**N**	**N**	**Y**
B4	**LTE 700/ LTE 850/ LTE AWS/ 5G 850**	**NEW**	**150°**	**CCI DMP65R–BU8DA**	**157'–0"**	**0°**	**3°/3°/1°/3°**	–	–	–	–			**(1) RRUS 4449 B5/B12**	**TOWER**	**N**	**N**	**Y**
GAMMA SECTOR																		
C1	UMTS 850	EXISTING	270°	KATHREIN 800–10121	157'–0"	0°	2°	1 5/8"	205'–0"	2	(2) LGP–21401	–	–	–	–	N	Y	Y
C2	**LTE 1900**	**NEW**	**270°**	**CCI HPA–65R–BU8AA**	**157'–0"**	**0°**	**1°/1°/1°**	–	–	–	–			**(1) RRUS 8843 B2/B66A**	**TOWER**	**N**	**N**	**Y**
C3	**LTE 700**	**NEW**	**270°**	**CCI OPA65R–BU8DA**	**157'–0"**	**0°**	**2°**	–	–	–	–			**(1) RRUS 4478 B14**	**TOWER**	**N**	**N**	**Y**
C4	**LTE 700/ LTE 850/ LTE AWS/ 5G 850**	**NEW**	**270°**	**CCI DMP65R–BU8DA**	**157'–0"**	**0°**	**3°/3°/1°/3°**	–	–	–	–			**(1) RRUS 4449 B5/B12**	**TOWER**	**N**	**N**	**Y**

NOTE: BOLD DENOTES NEW EQUIPMENT

1 FINAL ANTENNA AND FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

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AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

400 MAIN STREET
SOMERS, CT 06071

EXISTING
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ISSUED FOR:

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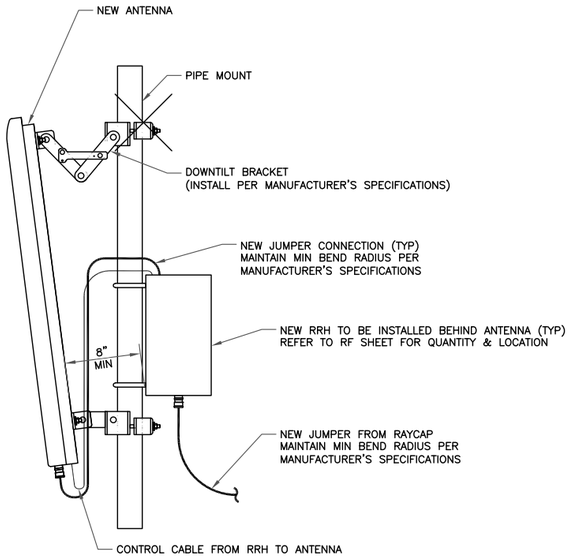
0	1/28/21	JJD	CONSTRUCTION	GEH

STATE OF CONNECTICUT
GREGORY E. HOYES
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/28/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-3

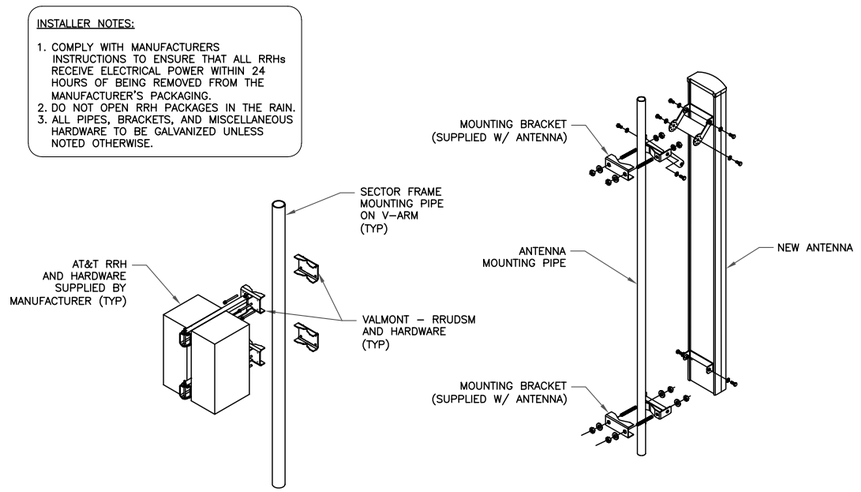
REVISION: 0



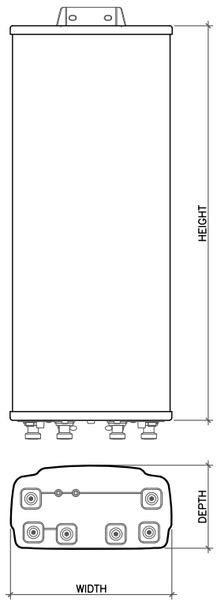
1 GENERIC ANTENNA MOUNTING ELEVATION
SCALE: NOT TO SCALE

INSTALLER NOTES:

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

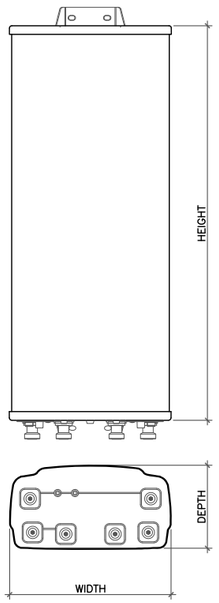


2 ANTENNA WITH RRHs MOUNTING DETAIL
SCALE: NOT TO SCALE



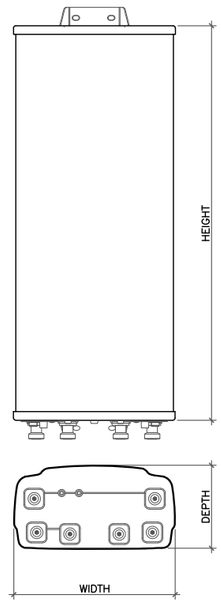
ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
DMP65R-BU8D	96"	20.7"	7.7"	105.6 lbs

3 ANTENNA DETAIL
SCALE: NOT TO SCALE



ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
HPA65R-BU8A	96"	11.7"	7.6"	54.0 lbs

4 ANTENNA DETAIL
SCALE: NOT TO SCALE



ANTENNA DIMENSIONS (INCHES)				
MODEL	HEIGHT	WIDTH	DEPTH	WEIGHT
OPA65R-BU8D	96"	21.0"	7.8"	76.5 lbs

5 ANTENNA DETAIL
SCALE: NOT TO SCALE

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AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

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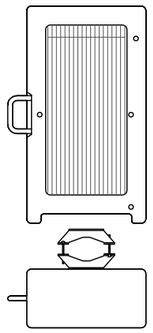
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

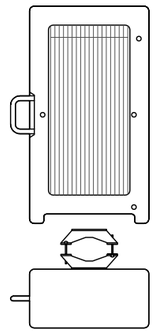
SHEET NUMBER: C-4

REVISION: 0



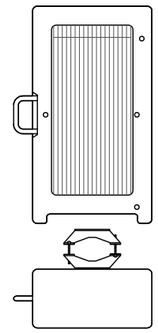
ERICSSON – RRUS 8843 B2/B66A
WEIGHT (FULLY EQUIPPED): 75.0 LBS
SIZE (HxWxD): 18.0x13.2x11.3 IN.
CONNECTOR TYPE: 4.3–10 FEMALE (4 TOTAL PORTS)

1 ERICSSON – RRUS 8843 B2/B66A
SCALE: NOT TO SCALE



ERICSSON – RRUS 4478 B14
WEIGHT (FULLY EQUIPPED): 59.4 LBS
SIZE (HxWxD): 18.1x13.4x8.3 IN.
CONNECTOR TYPE: 4.3–10 FEMALE (4 TOTAL PORTS)

2 ERICSSON – RRUS 4478 B14
SCALE: NOT TO SCALE



ERICSSON – RRUS 4449 B5/B12
WEIGHT (FULLY EQUIPPED): 71.0 LBS
SIZE (HxWxD): 17.9x13.2x9.4 IN.
CONNECTOR TYPE: 4.3–10 FEMALE (4 TOTAL PORTS)

3 ERICSSON – RRUS 4449 B5/B12
SCALE: NOT TO SCALE

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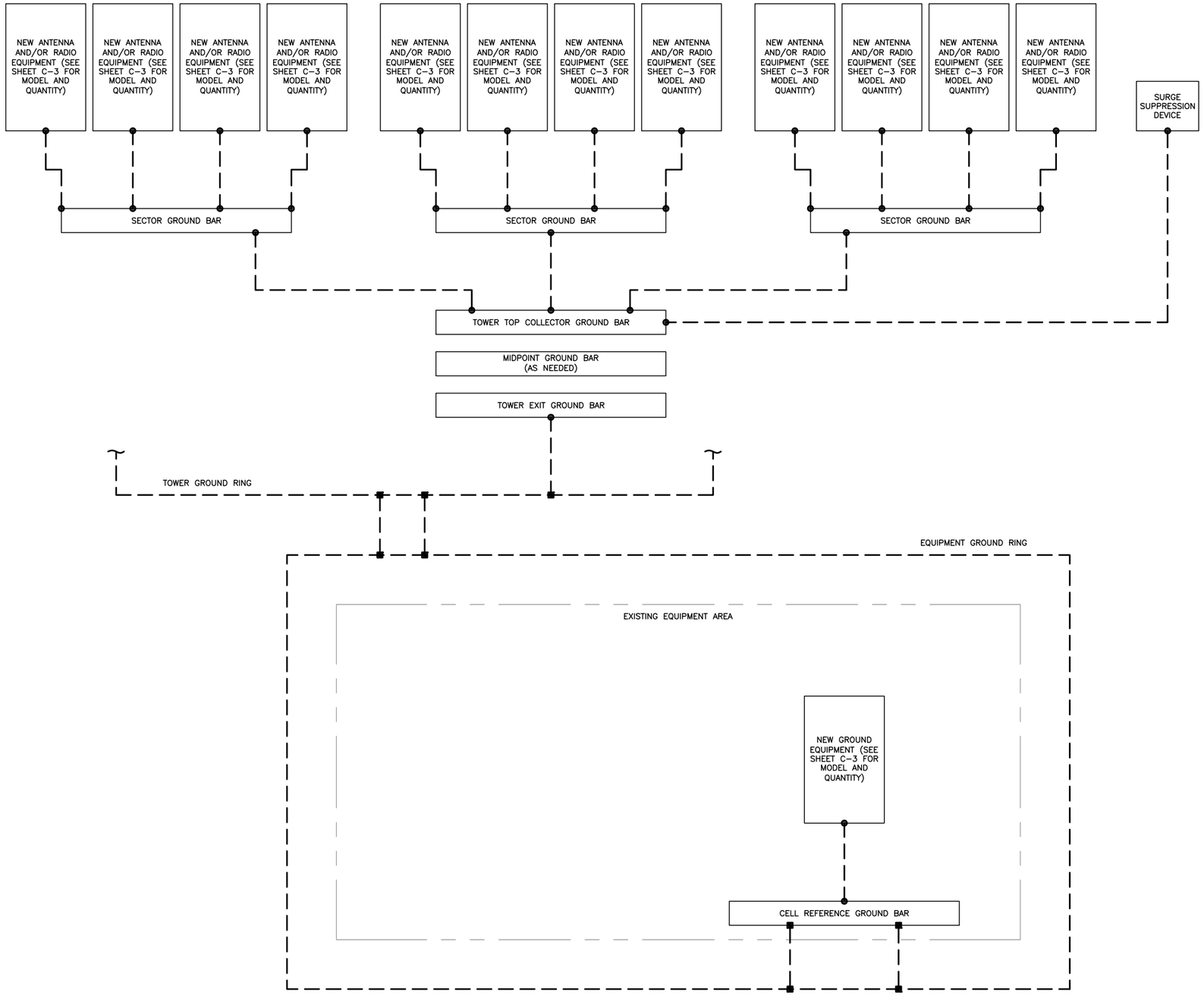
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: C-5

REVISION: 0



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.

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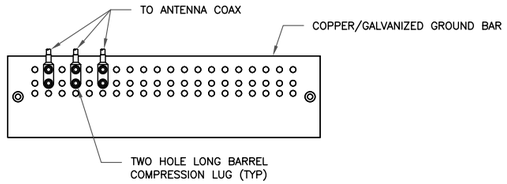
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-1

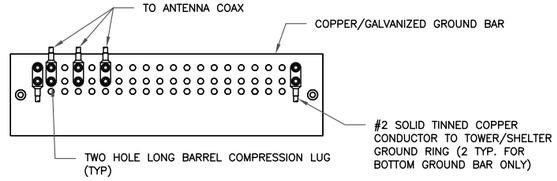
REVISION: 0



NOTES:

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

1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE

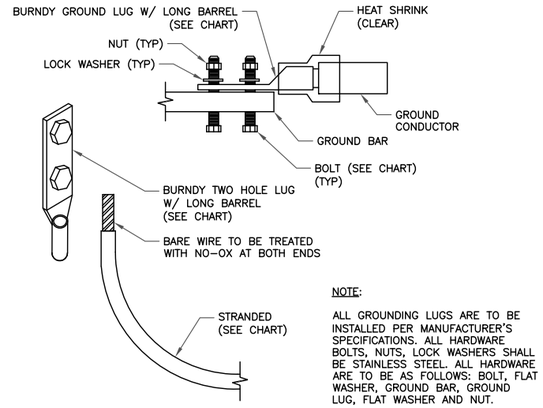


NOTES:

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

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

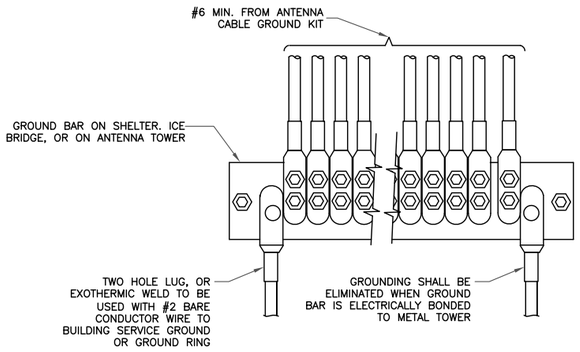
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 SOLID TINNED	YA3C-2TC38	3/8" - 16 NC SS 2 BOLT
#2 STRANDED	YA2C-2TC38	3/8" - 16 NC SS 2 BOLT
#2/0 STRANDED	YA26-2TC38	3/8" - 16 NC SS 2 BOLT
#4/0 STRANDED	YA28-2N	1/2" - 16 NC SS 2 BOLT



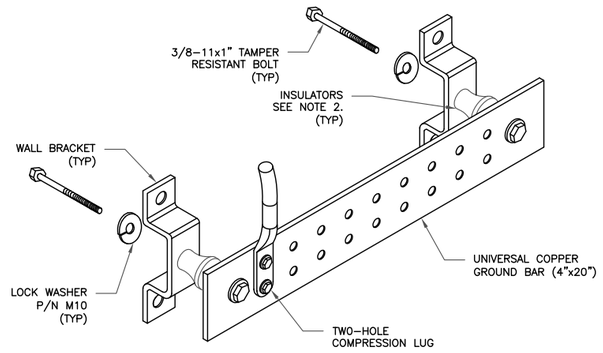
NOTE:

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

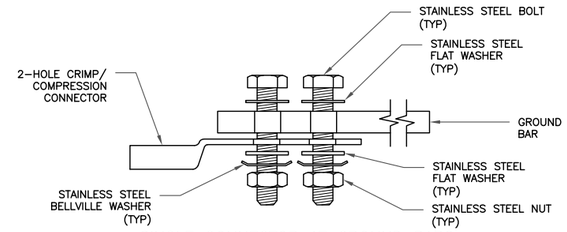


NOTES:

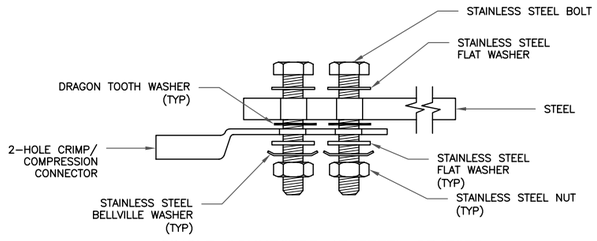
1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY QAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.

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

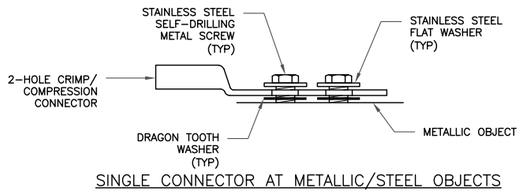
5 GROUND BAR DETAIL
SCALE: NOT TO SCALE



SINGLE CONNECTOR AT GROUND BARS

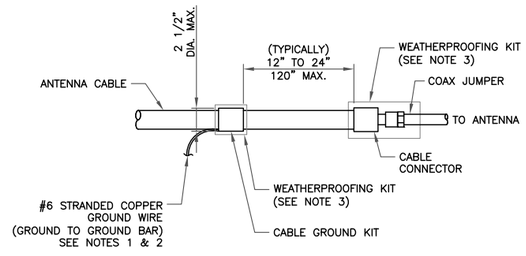


SINGLE CONNECTOR AT STEEL OBJECTS



SINGLE CONNECTOR AT METALLIC/STEEL OBJECTS

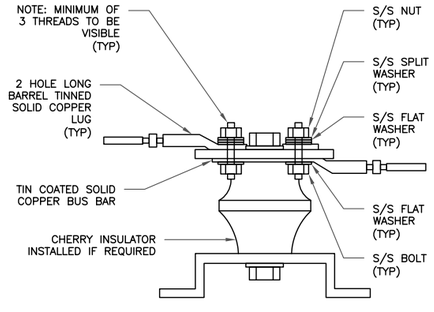
8 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



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
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

AT&T SITE NUMBER: **CT5857**

BU #: **803934**
CT SOMERS FD CAC

400 MAIN STREET
SOMERS, CT 06071

EXISTING
187'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	12/11/20	BLB	PRELIMINARY REVIEW	GEH
B	12/22/20	JJD	PRELIMINARY REVIEW	MTJ
0	1/28/21	JJD	CONSTRUCTION	GEH

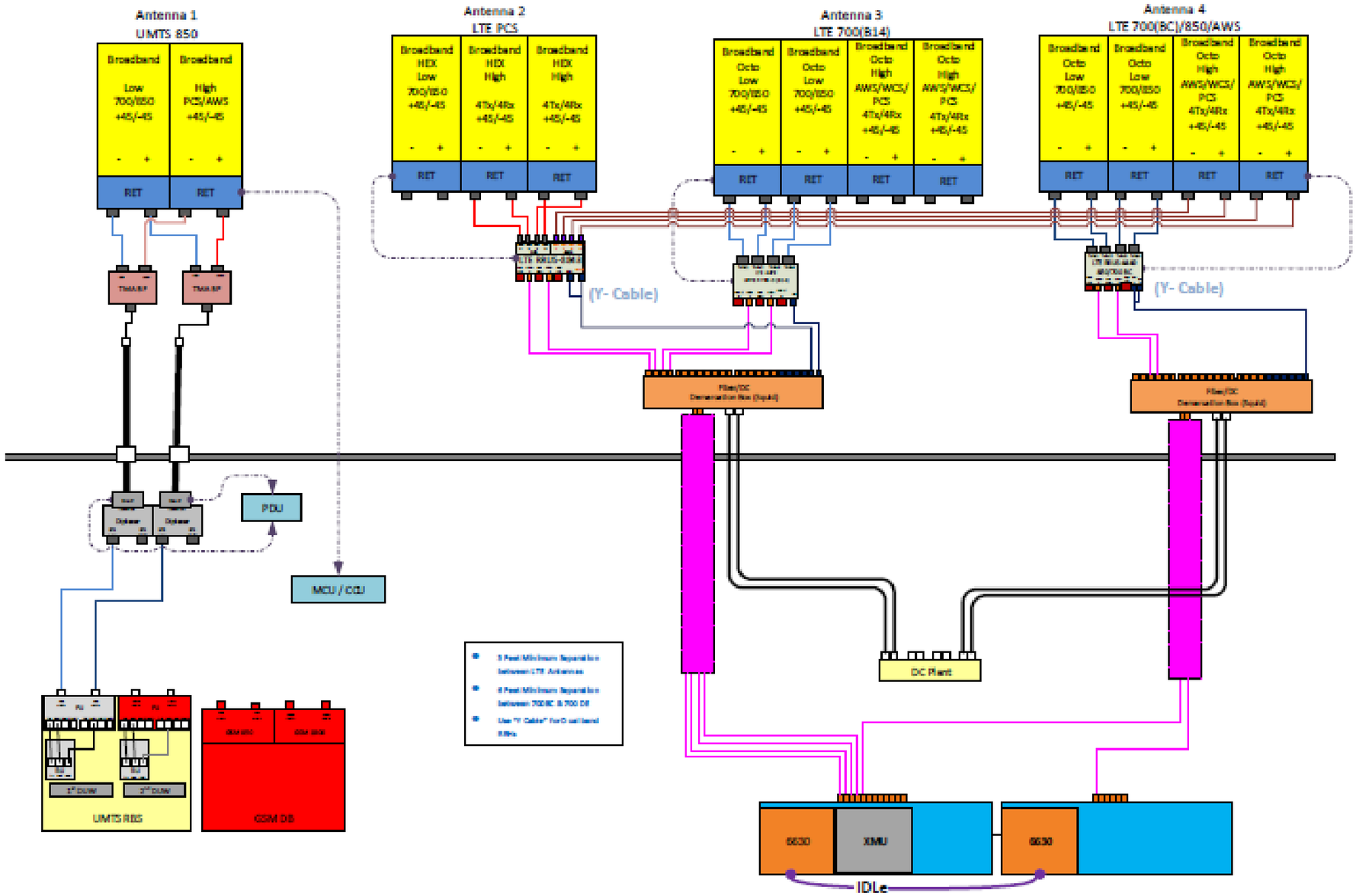
1/28/21

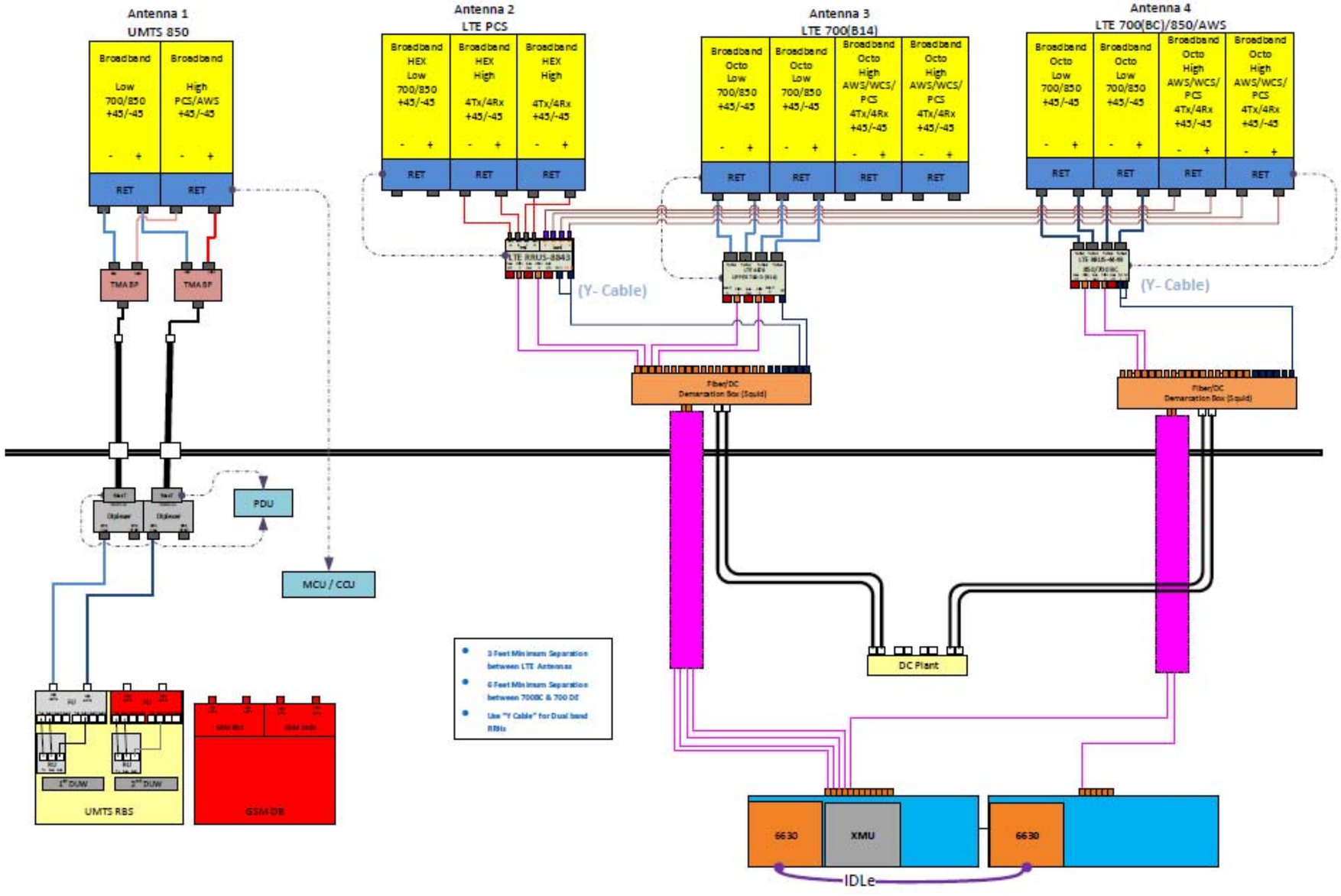
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/21

SHEET NUMBER: G-2

REVISION: 0

87311.005.01_CT SOMERS _ETA_AT&T_08.07.2020.dwg - Sheet:G-2 - User: ghayes - Jan 28, 2021 - 1:30pm


Antenna 1
UMTS 850
Broadband
Low
700/850
+45/-45
Broadband
High
PCS/AWS
+45/-45
RET
RET
Antenna 2
LTE PCS
Broadband
HDX
Low
700/850
+45/-45
Broadband
HDX
High
4Tx/4Rx
+45/-45
Broadband
HDX
High
4Tx/4Rx
+45/-45
RET
RET
RET
Antenna 3
LTE 700(B14)
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
RET
RET
RET
RET
Antenna 4
LTE 700(BC)/850/AWS
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
RET
RET
RET
RET
(Y- Cable)
(Y- Cable)
PDU
MCU / CCU
UMTS RBS
GSM DB
DC Plant
6630
XMU
6630
IDLe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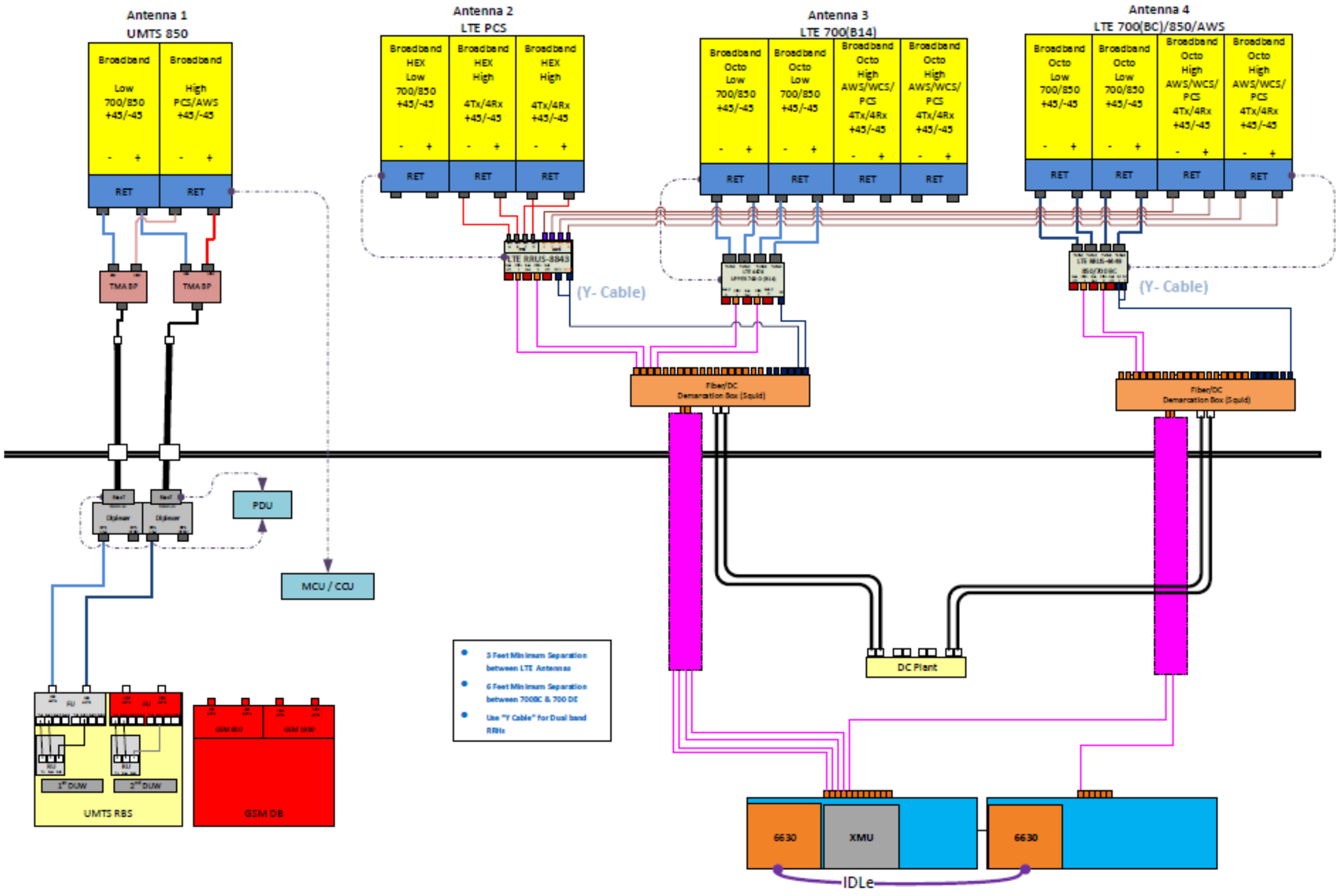
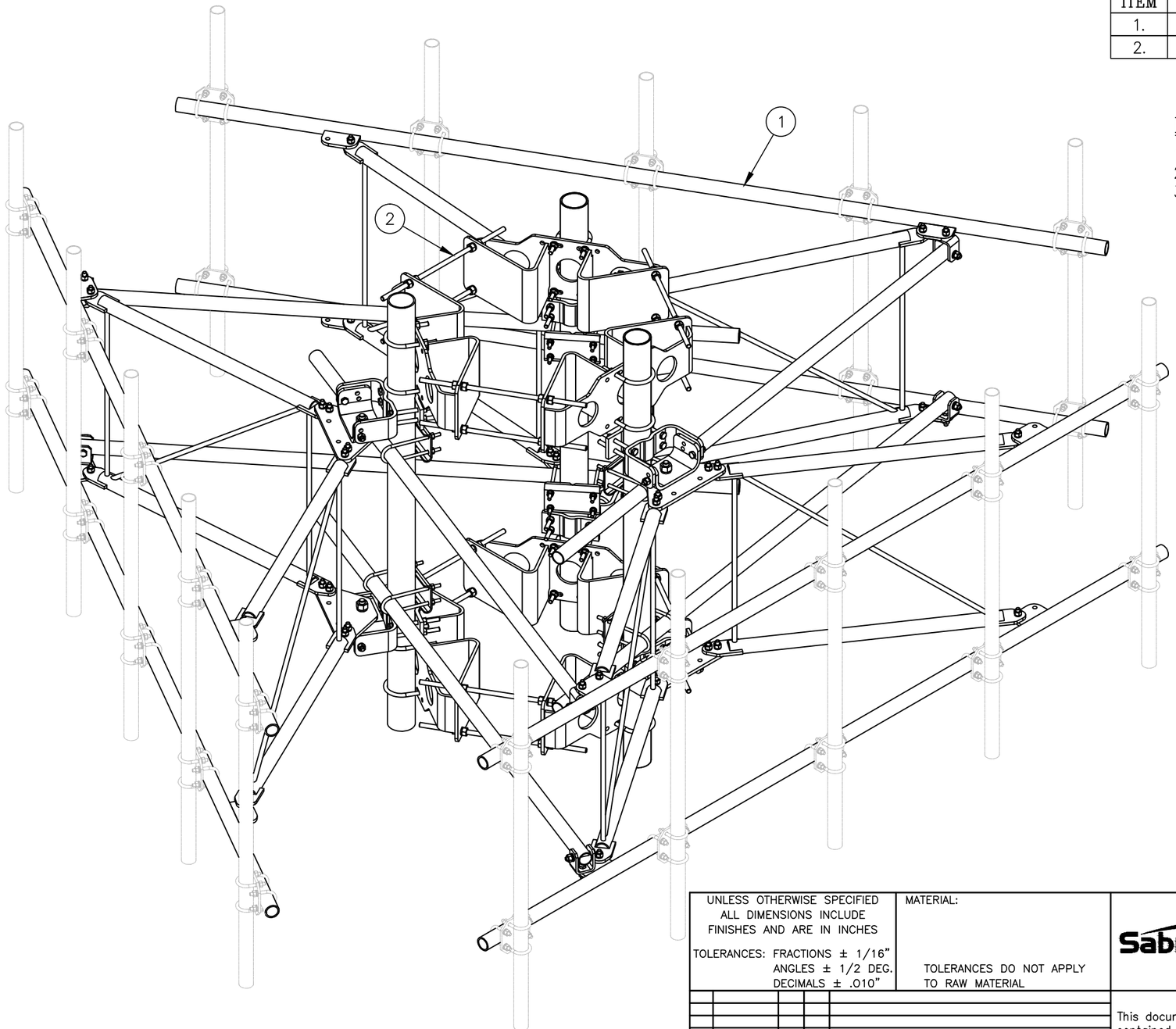
UMTS 850
Broadband
Low
700/850
+45/-45
Broadband
High
PCS/AWS
+45/-45
RET
TMA DP
Antenna 2
LTE PCS
Broadband
HEX
Low
700/850
+45/-45
Broadband
HEX
High
4Tx/4Rx
+45/-45
Antenna 3
LTE 700(B14)
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
Antenna 4
LTE 700(BC)/850/AWS
(Y- Cable)
Fiber/DC
Demarcation Box (Squid)
PDU
MCU / CCU
UMTS RBS
GSM BB
DC Plant
3 Feet Minimum Separation between LTE Antennas
6 Feet Minimum Separation between 700BC & 700 DE
Use "Y Cable" for Dual band RRHs
6630
XMU
IDLe


Antenna 1
UMTS 850
Broadband
Low
700/850
+45/-45
Broadband
High
PCS/AWS
+45/-45
RET
TMA BP
Antenna 2
LTE PCS
Broadband
HEX
Low
700/850
+45/-45
Broadband
HEX
High
4Tx/4Rx
+45/-45
Broadband
HEX
High
4Tx/4Rx
+45/-45
(Y- Cable)
Antenna 3
LTE 700(B14)
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
Antenna 4
LTE 700(BC)/850/AWS
Broadband
Octo
Low
700/850
+45/-45
Broadband
Octo
High
AWS/WCS/
PCS
4Tx/4Rx
+45/-45
(Y- Cable)
Fiber/DC
Demarcation Box (Squid)
PDU
MCU / CCU
DC Plant
3 Feet Minimum Separation between LTE Antennas
6 Feet Minimum Separation between 700BC & 700 DE
Use "Y Cable" for Dual band RRHs
1st DUW
2nd DUW
UMTS RBS
GSM DB
6630
XMU
6630
IDLe

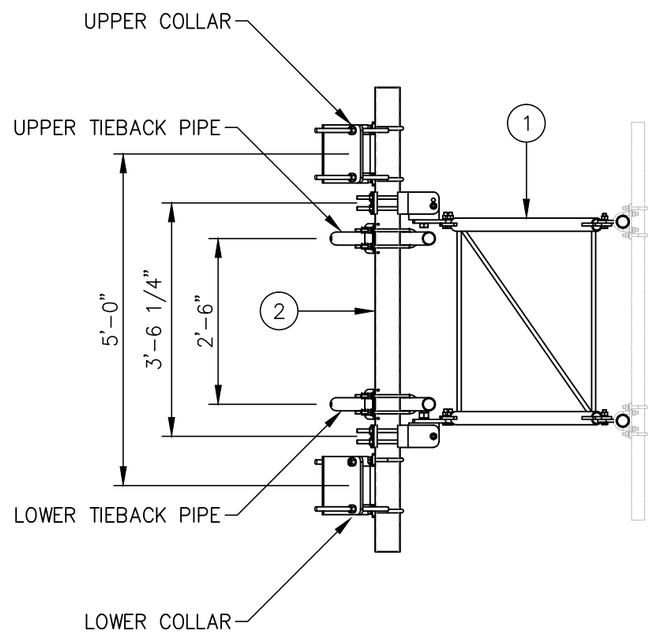
C10857804 12' EHD V-BOOM ASSEMBLIES W/TIEBACKS				
ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	3	C10857007C	12' EHD V-BOOM ASSEMBLY W/TIE BACKS	1533
2.	1	C10899055	4 1/2" O.D. MONOPOLE PIPE MOUNT ASSEMBLY	994
			TOTAL WEIGHT	2527



ISOMETRIC VIEW

NOTES:

1. MOUNTING PIPES & CROSSOVER PLATE KITS MUST BE PURCHASED SEPARATELY.
2. SEE DRAWING C10857007C FOR 12' V-BOOM ASSEMBLY.
3. SEE DRAWING C10899055 FOR 4 1/2" O.D. MONOPOLE PIPE MOUNT ASSEMBLY.



VIEW A-A
FROM PAGE 2

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"

MATERIAL:

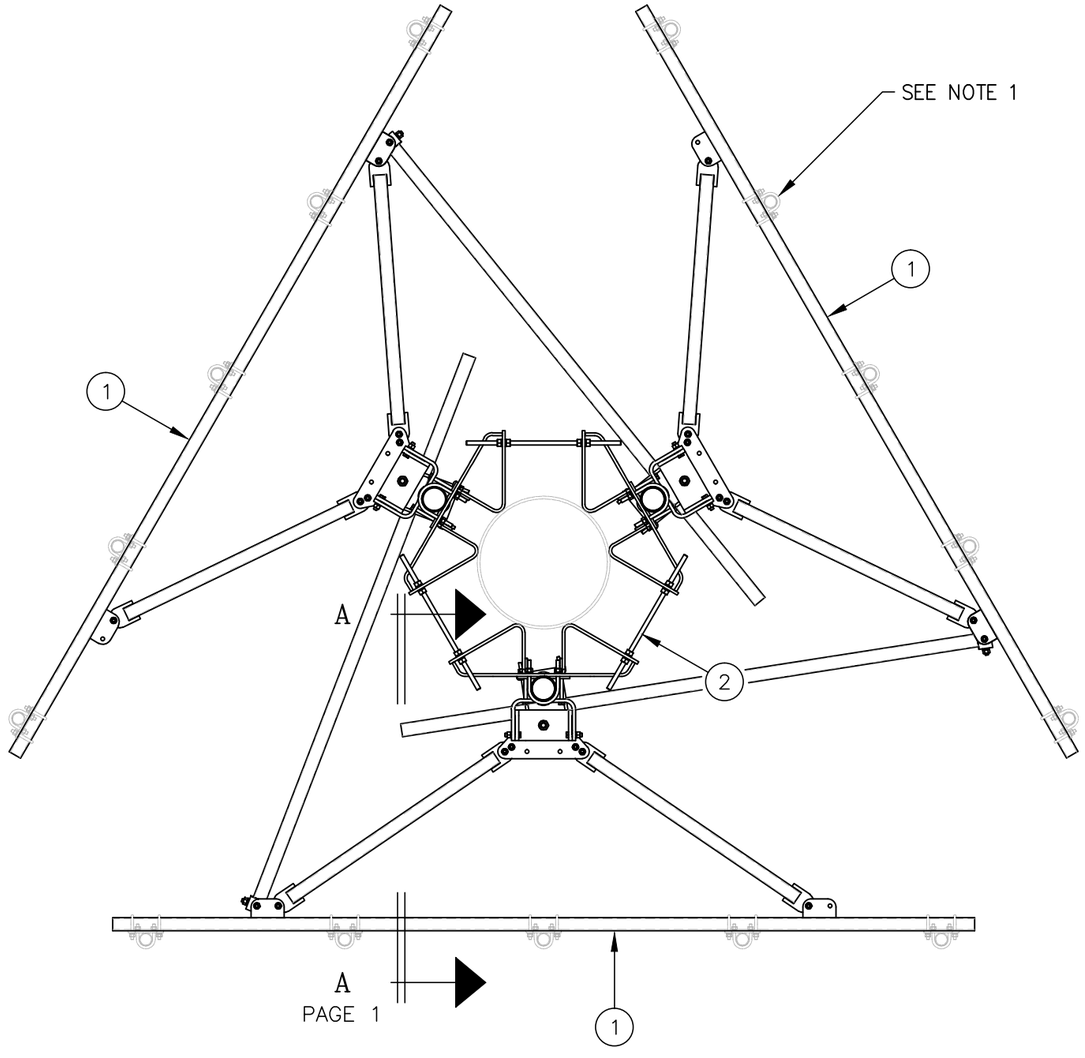
TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION

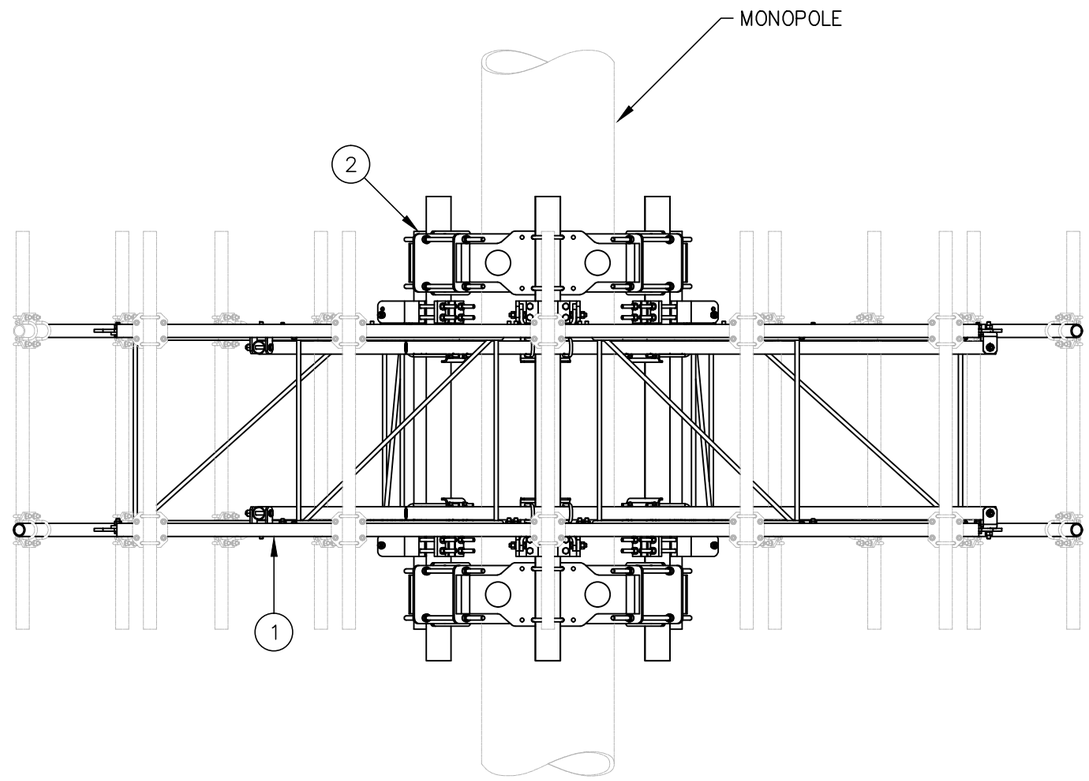
Sabre Industries™ Towers and Poles

12' EHD V-BOOM ASSEMBLIES W/TIEBACKS (3' STANDOFF) ON MONOPOLE PIPE MOUNT ASSEMBLY W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	9/24/18	B	C10857804	0
DRAWN BY	WRF			
CHECKED BY	WMN		SCALE None	PAGE 1 OF 2



PLAN VIEW



ELEVATION VIEW

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"	MATERIAL: TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION

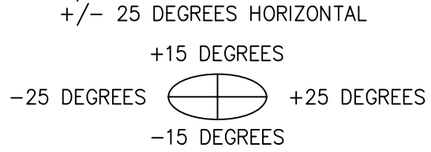
Sabre Industries™ Towers and Poles

12' EHD V-BOOM ASSEMBLIES W/TIEBACKS (3' STANDOFF) ON MONOPOLE PIPE MOUNT ASSEMBLY W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	09/24/18	B	C10857804	0
DRAWN BY	WRF			
CHECKED BY	WMN	SCALE None	PAGE 2 OF 2	

TIEBACK ANGLE RANGE DETAIL

+/− 15 DEGREES VERTICAL
+/− 25 DEGREES HORIZONTAL



ISOMETRIC VIEW

C10857007C 12' EHD V−BOOM ASSEMBLY W/TIEBACKS

ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	CW01222	WELDMENT, STANDOFF ARM	126
2.	2	CW01223	WELDMENT, FACE PIPE	147
3.	2	CS03109	PLATE, ROTATING	34
4.	1	CS03110	PLATE, PIVOTING (UPPER)	16
5.	1	CS03111	PLATE, LEG CLAMP (UPPER)	17
6.	1	CS03112	PLATE, PIVOTING (LOWER)	14
7.	1	CS03113	PLATE, LEG CLAMP (LOWER)	17
8.	2	CS03114	PLATE, LEG CLAMP (BACK)	14
9.	2	CS00098	PLATE, TIE BACK SWIVEL	5
10.	2	CS03285	PLATE, TIE BACK CLAMP	9
11.	2	CS03333	PIPE, TIE BACK	76
12.	2	C40026073	BOLT ASSEMBLY, 1 ø X 3 A325	4
13.	8	C40140004	BOLT ASSEMBLY, 5/8 ø X 8 A307	13
14.	2	C40026033	BOLT ASSEMBLY, 5/8 ø X 4 1/2 A325	2
15.	12	C40026025	BOLT ASSEMBLY, 5/8 ø X 2 1/2 A325	6
16.	6	C40026024	BOLT ASSEMBLY, 5/8 ø X 2 1/4 A325	3
17.	4	C40034183	U−BOLT ASSEMBLY, 1/2 ø X 2 9/16 C−C	6
18.	1	Z30992017	MOUNT CLASSIFICATION TAG C10857007C	1
19.	2	C40062103	STAINLESS STEEL SELF−LOCKING CABLE TIE	1
			TOTAL WEIGHT	511

PACKAGING NOTE

CK00386 INCLUDES ITEMS 1, 3, 4, 5, 6, 7, 12 & 15 (8 QTY)
CK00392 INCLUDES ITEMS 2, 8, 9, 10, 11, 13, 14, 15 (4 QTY), 16, 17, 18 & 19

INSTALLATION NOTES:

1. INSTALL MOUNT TO TOWER AS SHOWN, SO THAT WELDED STANDOFF DIAGONAL IS SLOPING DOWNWARD FROM TOWER END TO FACE PIPE END.
2. UPPER PIVOTING PLATE (ITEM 4) HAS THREE HOLES ON EACH SIDE AND UPPER LEG CLAMP PLATE (ITEM 5) HAS TWO HOLES ON EACH SIDE FOR TAPER ADJUSTMENT.
3. INSTALL PRODUCT EXACTLY AS SHOWN IN DRAWING, WITH ALL BOLTS FACING UPWARDS.

NOTES:

1. MOUNTING PIPES & CROSSOVER PLATE KITS MUST BE PURCHASED SEPARATELY.
2. QUANTITIES SHOWN IN LISTS OF MATERIAL ARE FOR ONE (1) V−BOOM ONLY.
3. THIS V−BOOM WILL MOUNT TO THE FOLLOWING:1 1/2"ø TO 5 9/16"ø ROUND LEG.
4. TIEBACKS MUST BE CONNECTED TO A RIGID MEMBER THAT PROVIDES ADEQUATE SUPPORT WITHIN THE LIMITS NOTED ABOVE IN THE TIEBACK ANGLE RANGE DETAIL UNLESS APPROVED BY THE ENGINEER OF RECORD.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES
TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"

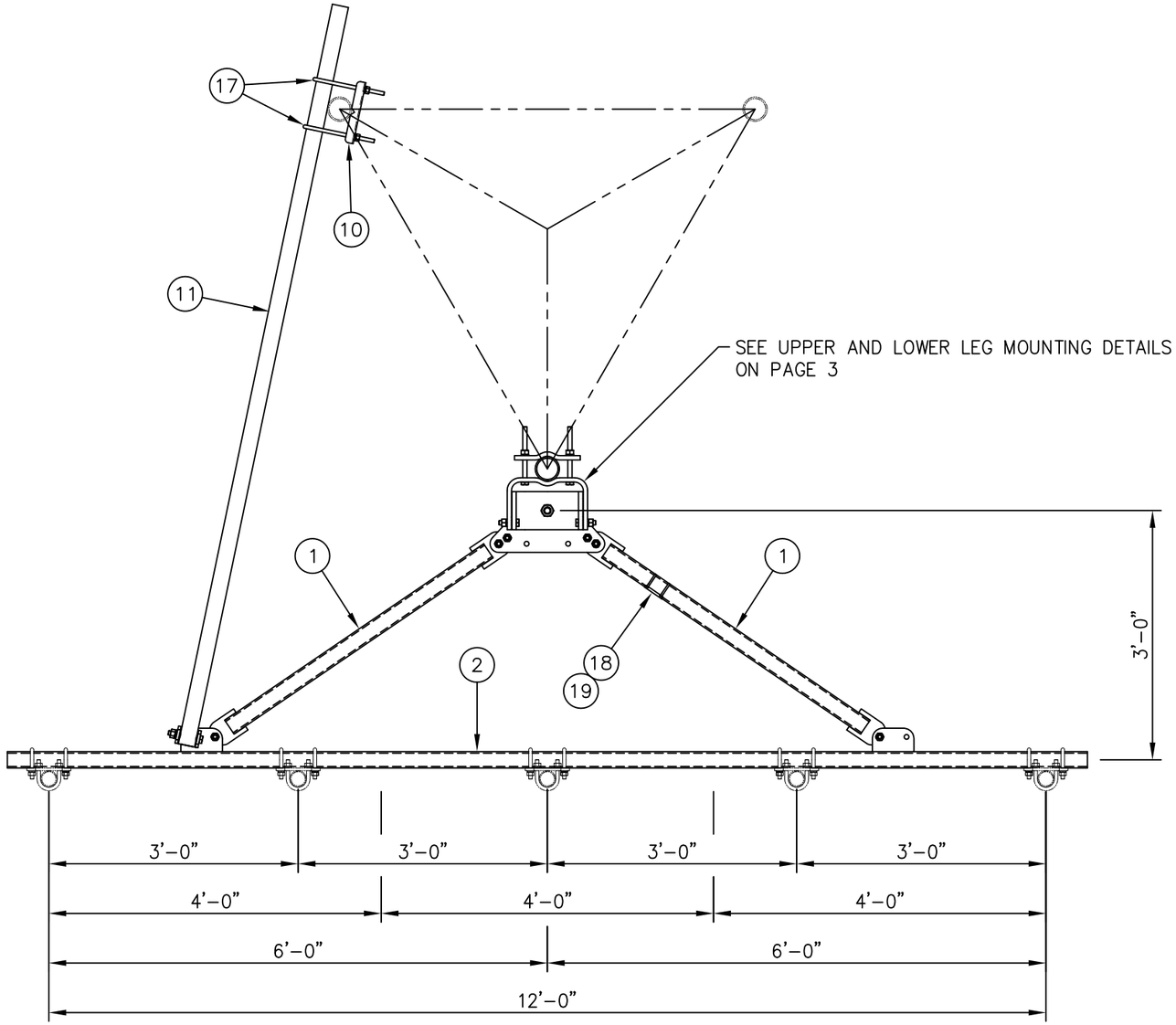
MATERIAL:
TOLERANCES DO NOT APPLY TO RAW MATERIAL

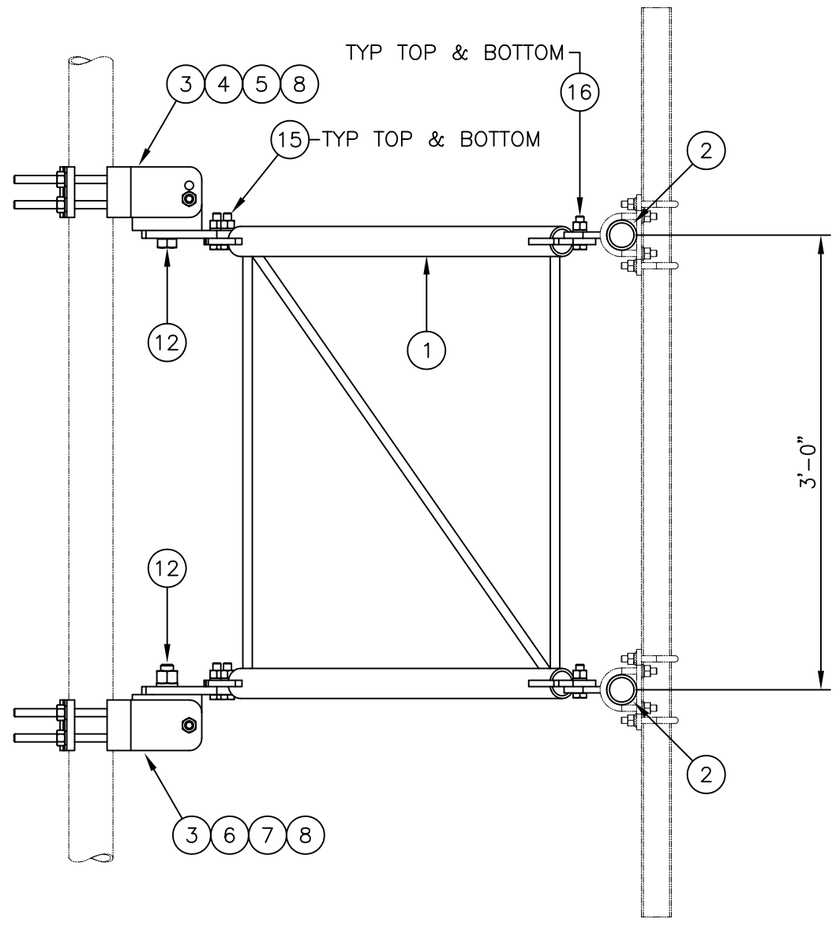
REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

Sabre Industries™ Towers and Poles

12' EHD V−BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	02/29/16	B	C10857007C	1
DRAWN BY	WRF			
CHECKED BY	KLE		SCALE None	PAGE 1 OF 3





SIDE VIEW

MOUNTING OPTIONS

SHOWING MOUNTING PIPE PLACEMENTS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE
FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY
TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

Sabre Industries™
Towers and Poles

12' EHD V-BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

DATE	02/29/16
DRAWN BY	WRF
CHECKED BY	KLE

SIZE	DRAWING NO.	REV
B	C10857007C	1

SCALE	PAGE
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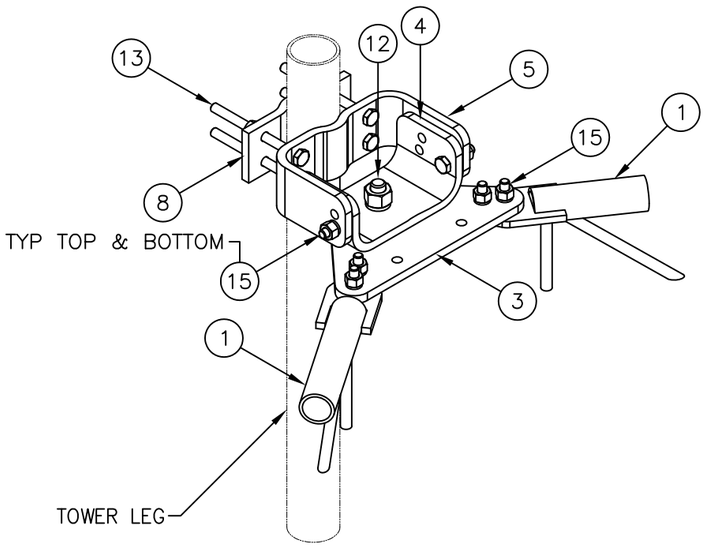
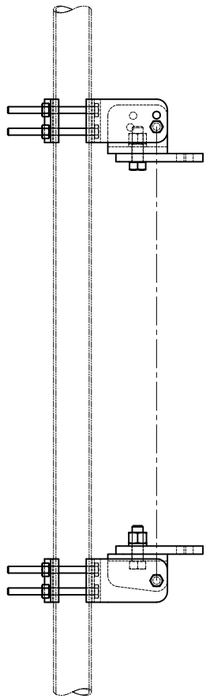
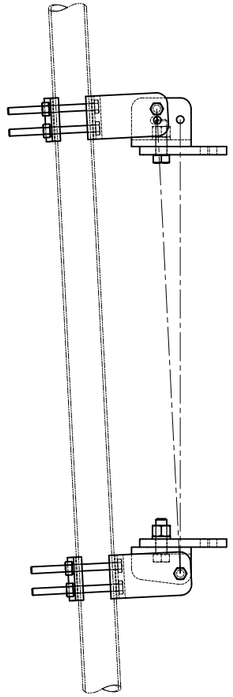


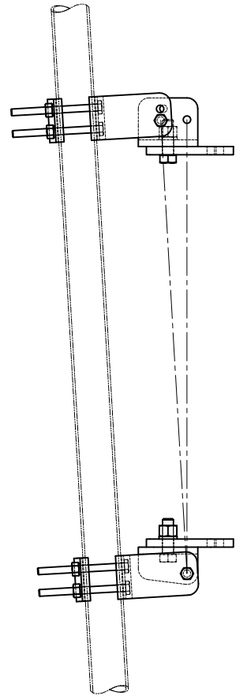
UPPER LEG MOUNTING DETAIL



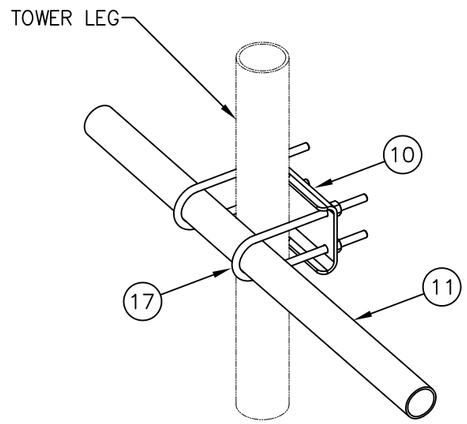
STRAIGHT
TOWER SECTION



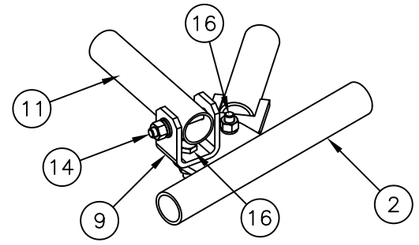
TAPERED
1'–9 IN 20' SLOPE



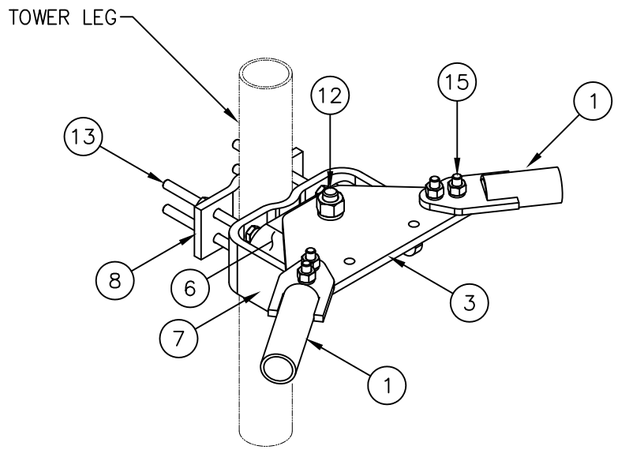
TAPERED
2' IN 20' SLOPE



TIE BACK DETAIL
AT TOWER LEG



TIE BACK DETAIL
AT ANTENNA MOUNTING FRAME



LOWER LEG MOUNTING DETAIL

-------PIVOTING OPTIONS-------

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE
FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY
TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

Sabre Industries™
Towers and Poles

12' EHD V-BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

DATE	02/29/16
DRAWN BY	WRF
CHECKED BY	KLE

SIZE	DRAWING NO.	REV
B	C10857007C	1

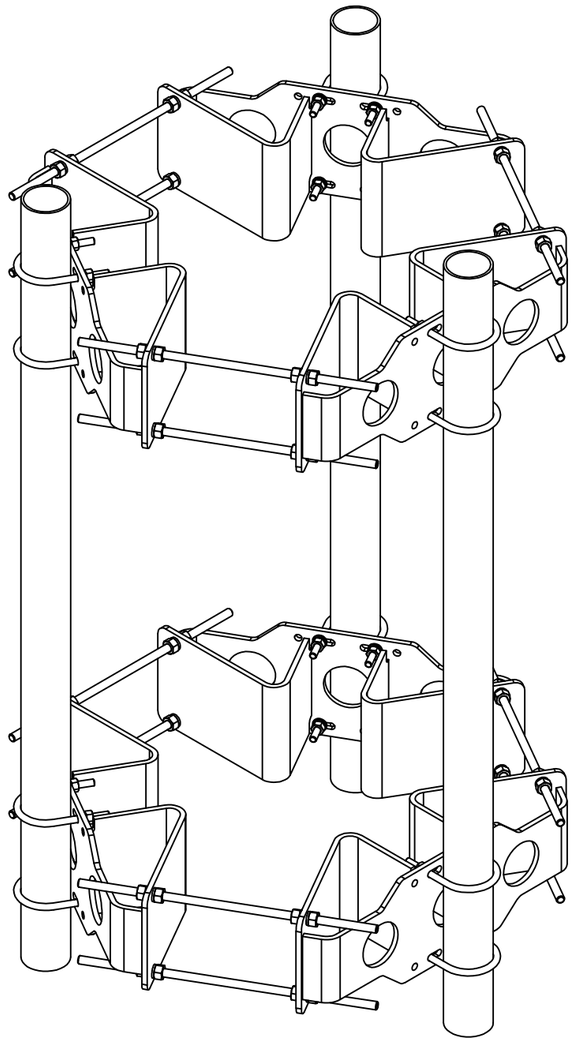
SCALE	PAGE
None	3 OF 3

NOTE:

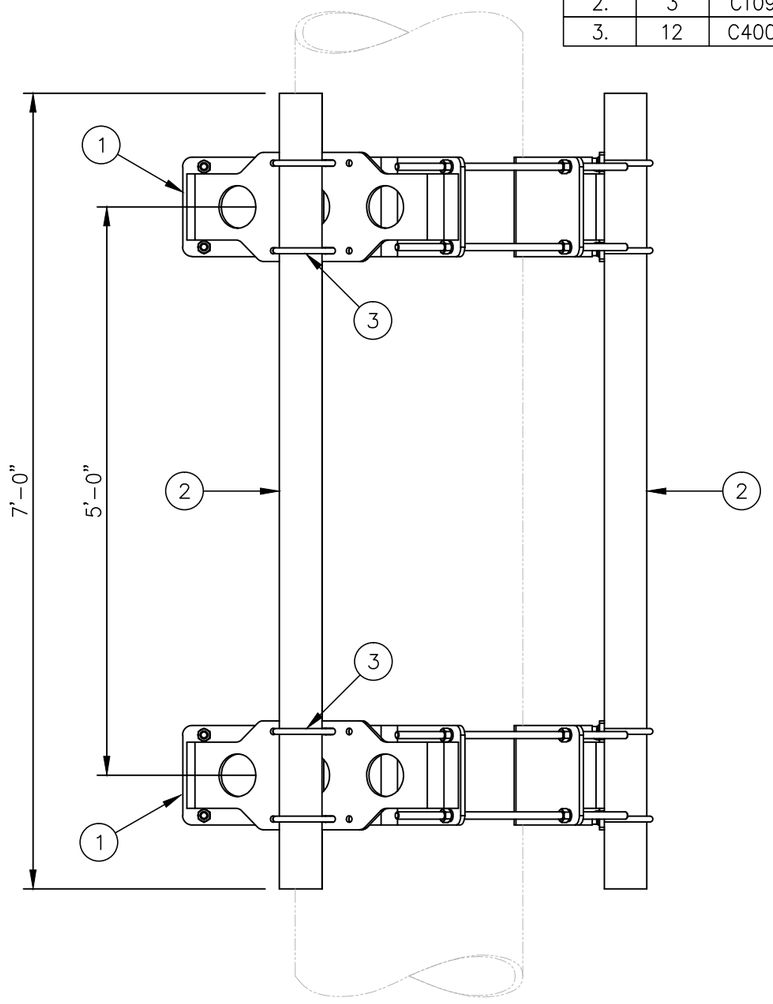
SEE DRAWING C10112378 FOR INSTALLATION OF TRI-COLLAR BRACKET ASSEMBLY

C10899055 4 1/2" O.D. PIPE MOUNT ASSEMBLY

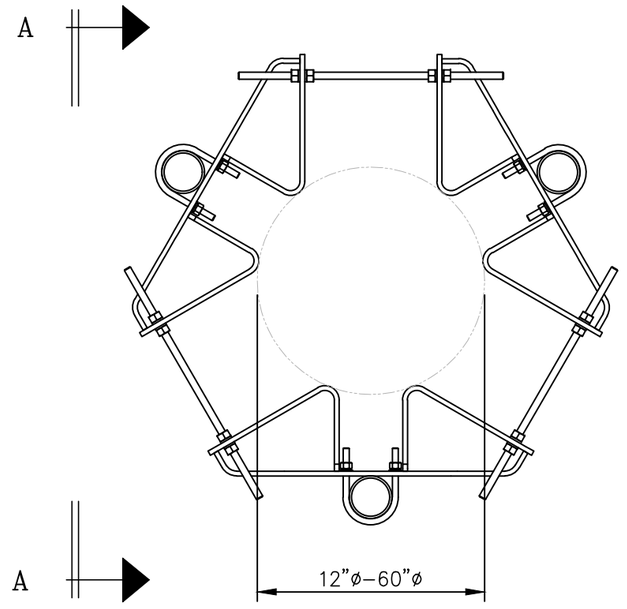
ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	C10112378	TRI-COLLAR BRACKET ASSEMBLY	732
2.	3	C10901407	PIPE, 4 1/2 O.D. X .237 X 7'-0	236
3.	12	C40034032	U-BOLT ASSEMBLY, 5/8 ø X 5 3/16 C-C	26
			TOTAL WEIGHT	994



ISOMETRIC VIEW



VIEW A-A



PLAN VIEW

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	02/03/17	WRF	KLE	COLLAR WAS C10112301

Sabre Industries™
Towers and Poles

4 1/2" O.D. PIPE MOUNT ASSEMBLY FOR MONOPOLES (FITS 12" TO 60" DIAMETER)

		SIZE	DRAWING NO.	REV
DATE	01/26/16	B	C10899055	1
DRAWN BY	WRF			
CHECKED BY	DLW	SCALE None	PAGE 1 OF 1	

Exhibit D

Structural Analysis Report

Date: **November 19, 2020**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***AT&T Mobility* Co-Locate**	
	Carrier Site Number:	CT5857
	Carrier Site Name:	SOMERS CENTRAL
	Carrier FA Number:	10108715
Crown Castle Designation:	**Crown Castle BU Number:**	803934
	Crown Castle Site Name:	CT SOMERS FD CAC
	Crown Castle JDE Job Number:	617827
	Crown Castle Work Order Number:	1893681
	Crown Castle Order Number:	527505 Rev. 4
Engineering Firm Designation:	**Crown Castle Project Number:**	1893681
Site Data:	**400 MAIN STREET, SOMERS, Tolland County, CT** **Latitude *41° 59' 1.48"*, Longitude *-72° 27' 56.87"*** **187 Foot - Monopole Tower**	

Dear Denice Nicholson,

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

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

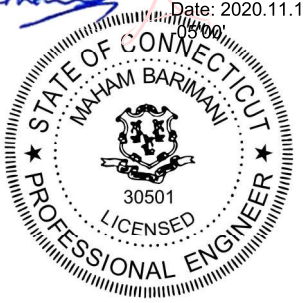
LC5: Proposed Equipment Configuration **Sufficient Capacity-73.3%**

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: Emma McCarty

Respectfully submitted by:

Digitally signed by Maham Barimani
Date: 2020.11.19 14:48:04 -05'00'



Maham Barimani, P.E.
Senior Project Engineer

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 187 ft Monopole tower designed by Summit Manufacturing, LLC..

2) ANALYSIS CRITERIA

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

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
157.0	157.0	3	cci antennas	DMP65R-BU8D w/ Mount Pipe	6 2 4 6	5/16 3/8 3/4 1-5/8
		3	cci antennas	HPA65R-BU8A w/ Mount Pipe		
		3	cci antennas	OPA65R-BU8D w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14_CCIV2		
		3	ericsson	RRUS 8843 B2/B66A_CCIV2		
		3	kathrein	800 10121 w/ Mount Pipe		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8F		
		1	Sabre	C10857804		

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)
188.0	193.0	1	andrew	DB404L-B	4 1	1-1/4 7/8
	190.0	3	alcatel lucent	TD-RRH8x20-25		
		2	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
	188.0	1	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 1201-1]		
	186.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe		
186.0	186.0	3	alcatel lucent	800MHz 2X50W RRH W/FILTER	-	-
		3	alcatel lucent	PCS 1900MHz 4x45W-65MHz		
		1	tower mounts	Side Arm Mount [SO 102-3]		
177.0	177.0	3	alcatel lucent	RRH2x40 700	-	-
		1	tower mounts	Side Arm Mount [SO 102-3]		
175.0	175.0	3	alcatel lucent	9442 RRH2X40-AWS	19	1-5/8
		3	andrew	LNX-6513DS-A1M w/ Mount Pipe		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		2	antel	LPA-80063/4CF w/ Mount Pipe		
		4	antel	LPA-80080-4CF-EDIN-0 w/ Mount Pipe		
		6	kathrein	742 213 w/ Mount Pipe		
		1	raycap	RRFDC-3315-PF-48		
		1	tower mounts	Platform Mount [LP 1201-1]		
165.0	165.0	3	commscope	ATBT-BOTTOM-24V	12	1-5/8
		3	commscope	LNX-6515DS-A1M w/ Mount Pipe		
		3	ems wireless	RR90-17-02DP w/ Mount Pipe		
		3	ericsson	KRY 112 71/1		
		1	tower mounts	Platform Mount [LP 1201-1]		
150.0	150.0	3	rfs celwave	APXV18-206517S-C	6	1-5/8
		1	tower mounts	Pipe Mount [PM 601-3]		
120.0	125.0	1	sinclair	SD212-SF2P2SNM	1	7/8
	120.0	1	tower mounts	Side Arm Mount [SO 702-1]		
115.0	122.0	1	sinclair	SD110-SFXPASNM	1	1/2
81.0	83.0	1	tower mounts	Side Arm Mount [SO 102-1]	1	7/8
	82.0	1	telewave	ANT450D3		
	81.0	1	tower mounts	Side Arm Mount [SO 310-1]		
	79.0	1	tower mounts	Side Arm Mount [SO 102-1]		
48.0	48.0	1	lucent	KS24019-L112A	1	1/2
		1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Clarence Welti Associates, Inc	1095648	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Summit Manufacturing, LLC / Paul J. Ford and Company	1058248	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Summit Manufacturing, LLC / Paul J. Ford and Company	419873	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.

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. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	187 - 136	Pole	TP36.201x26x0.25	1	-19.483	1708.402	53.1	Pass
L2	136 - 89.5	Pole	TP45.003x34.801x0.375	2	-31.775	3178.707	61.0	Pass
L3	89.5 - 44.25	Pole	TP53.304x43.103x0.438	3	-48.583	4394.155	66.2	Pass
L4	44.25 - 0	Pole	TP61.28x51.079x0.5	4	-73.424	5924.929	66.6	Pass
							Summary	
						Pole (L4)	66.6	Pass
						Rating =	66.6	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	60.0	Pass
1	Base Plate	0	45.0	Pass
1	Base Foundation (Structure)	0	73.3	Pass
1	Base Foundation (Soil Interaction)	0	54.8	Pass

Structure Rating (max from all components) =	73.3%

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

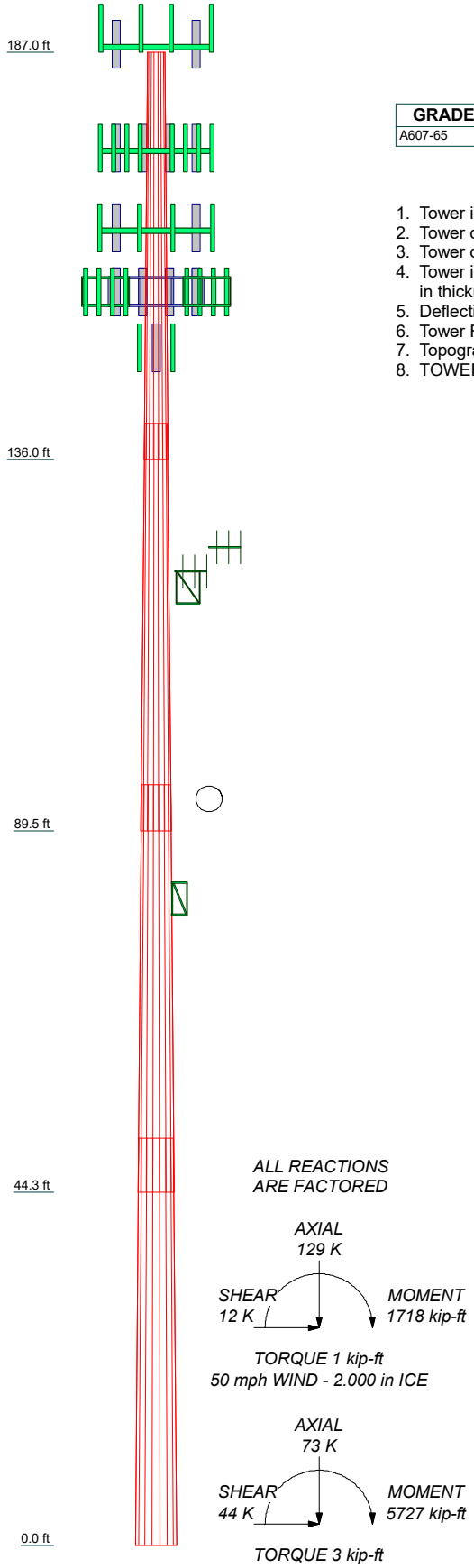
4.1) Recommendations

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

APPENDIX A

TNXTOWER OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	51.000	18	0.250	4.500	26.000	36.201	A607-65	4.2
2	51.000	18	0.375	5.750	34.801	45.003		8.2
3	51.000	18	0.438	6.750	43.103	53.304		11.5
4	51.000	18	0.500		51.079	61.280		15.3
								39.3



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 2.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 66.6%

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
Phone: (724) 416-2000
FAX:

Job: ***BU 803934***			
Project:			
Client: Crown Castle	Drawn by: emccarty		App'd:
Code: TIA-222-H	Date: 11/19/20		Scale: NTS
Path: C:\Users\emccarty\Desktop\WORK AREA\803934\WO 1893681 - SA\Prod\803934_RPA.er			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:

3) Tower is located in Tolland County, Connecticut.
4) Tower base elevation above sea level: 198.000 ft.
5) Basic wind speed of 125 mph.
6) Risk Category II.
7) Exposure Category C.
8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
9) Topographic Category: 1.
10) Crest Height: 0.000 ft.
11) Nominal ice thickness of 2.000 in.
12) Ice thickness is considered to increase with height.
13) Ice density of 56.000 pcf.
14) A wind speed of 50 mph is used in combination with ice.
15) Temperature drop of 50.000 °F.
16) Deflections calculated using a wind speed of 60 mph.
17) A non-linear (P-delta) analysis was used.
18) Pressures are calculated at each section.
19) Stress ratio used in pole design is 1.05.
20) Tower analysis based on target reliabilities in accordance with Annex S.
21) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
22) Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	187.000-136.000	51.000	4.500	18	26.000	36.201	0.250	1.000	A607-65 (65 ksi)

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L2	136.000-89.500	51.000	5.750	18	34.801	45.003	0.375	1.500	A607-65 (65 ksi)
L3	89.500-44.250	51.000	6.750	18	43.103	53.304	0.438	1.750	A607-65 (65 ksi)
L4	44.250-0.000	51.000		18	51.079	61.280	0.500	2.000	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	26.363	20.433	1711.654	9.141	13.208	129.592	3425.561	10.218	4.136	16.544
	36.721	28.527	4658.191	12.763	18.390	253.299	9322.512	14.266	5.931	23.726
L2	36.194	40.975	6135.246	12.221	17.679	347.039	12278.565	20.492	5.465	14.573
	45.639	53.118	13365.891	15.843	22.862	584.646	26749.369	26.564	7.261	19.361
L3	44.868	59.246	13625.290	15.146	21.896	622.267	27268.509	29.629	6.816	15.58
	54.059	73.412	25921.737	18.768	27.078	957.284	51877.583	36.713	8.612	19.683
L4	53.161	80.269	25943.041	17.955	25.948	999.807	51920.218	40.142	8.110	16.22
	62.148	96.458	45019.064	21.577	31.130	1446.152	90097.366	48.238	9.905	19.811

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 187.000-136.000				1	1	1			
L2 136.000-89.500				1	1	1			
L3 89.500-44.250				1	1	1			
L4 44.250-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
LDF7-50A(1-5/8) ***	C	No	Surface Ar (CaAa)	175.000 - 0.000	7	7	0.300 0.500	1.980		0.001
AVA5-50(7/8) ***	B	No	Surface Ar (CaAa)	81.000 - 8.000	1	1	-0.230 -0.220	1.102		0.000
LDF4-50A(1/2) ***	C	No	Surface Ar (CaAa)	48.000 - 8.000	1	1	0.240 0.250	0.630		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
***								

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
HB114-1-08U4-M5J(1-1/4)	A	No	No	Inside Pole	187.000 - 0.000	4	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
HCC 78-50J(7/8)	A	No	No	Inside Pole	187.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	175.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
***									
AVA7-50(1-5/8)	B	No	No	Inside Pole	165.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
***									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	157.000 - 0.000	6	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	157.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	157.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
860-10025(5/16)	C	No	No	Inside Pole	157.000 - 0.000	6	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	157.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	157.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
***									
HCS 6X12 4AWG(1-5/8)	B	No	No	Inside Pole	150.000 - 0.000	6	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
***									
HCC 78-50J(7/8)	A	No	No	Inside Pole	120.000 - 0.000	1	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
***									
HCC12-50J(1/2")	A	No	No	Inside Pole	115.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
***									

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	187.000-136.000	A	0.000	0.000	0.000	0.000	0.247
		B	0.000	0.000	0.000	0.000	0.445
		C	0.000	0.000	54.054	0.000	0.763
L2	136.000-89.500	A	0.000	0.000	0.000	0.000	0.248
		B	0.000	0.000	0.000	0.000	1.060
		C	0.000	0.000	64.449	0.000	1.067
L3	89.500-44.250	A	0.000	0.000	0.000	0.000	0.255
		B	0.000	0.000	4.050	0.000	1.043
		C	0.000	0.000	62.953	0.000	1.039
L4	44.250-0.000	A	0.000	0.000	0.000	0.000	0.249
		B	0.000	0.000	3.995	0.000	1.020
		C	0.000	0.000	63.614	0.000	1.021

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	187.000-136.000	A	1.991	0.000	0.000	0.000	0.000	0.247
		B		0.000	0.000	0.000	0.000	0.445
		C		0.000	0.000	86.981	0.000	1.933
L2	136.000-89.500	A	1.921	0.000	0.000	0.000	0.000	0.248
		B		0.000	0.000	0.000	0.000	1.060
		C		0.000	0.000	103.708	0.000	2.463
L3	89.500-44.250	A	1.824	0.000	0.000	0.000	0.000	0.255
		B		0.000	0.000	18.170	0.000	1.303
		C		0.000	0.000	101.806	0.000	2.368
L4	44.250-0.000	A	1.636	0.000	0.000	0.000	0.000	0.249
		B		0.000	0.000	17.216	0.000	1.256
		C		0.000	0.000	112.342	0.000	2.427

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	187.000-136.000	-4.532	4.081	-3.728	3.356
L2	136.000-89.500	-5.626	5.066	-4.708	4.239
L3	89.500-44.250	-5.562	4.845	-4.220	3.441
L4	44.250-0.000	-5.881	5.242	-4.799	4.361

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	6	LDF7-50A(1-5/8)	136.00 - 175.00	1.0000	1.0000
L2	6	LDF7-50A(1-5/8)	89.50 - 136.00	1.0000	1.0000
L3	6	LDF7-50A(1-5/8)	44.25 - 89.50	1.0000	1.0000
L3	23	AVA5-50(7/8)	44.25 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L3	25	LDF4-50A(1/2)	81.00 - 44.25 - 48.00	1.0000	1.0000
L4	6	LDF7-50A(1-5/8)	0.00 - 44.25	1.0000	1.0000
L4	23	AVA5-50(7/8)	8.00 - 44.25	1.0000	1.0000
L4	25	LDF4-50A(1/2)	8.00 - 44.25	1.0000	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
***									
DB404L-B	A	From Leg	2.000 0.000 5.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.140 2.052 2.964 4.788	1.140 2.052 2.964 4.788	0.014 0.018 0.022 0.031
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.095 0.160 0.235 0.419
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.095 0.160 0.235 0.419
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.600 5.050 5.500 6.440	4.010 4.450 4.890 5.820	0.095 0.160 0.235 0.419
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000 -2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.077 0.127 0.185 0.331
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000 -2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.077 0.127 0.185 0.331
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 -2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.090 4.480 4.880 5.710	2.860 3.230 3.610 4.400	0.077 0.127 0.185 0.331
TD-RRH8x20-25	A	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
TD-RRH8x20-25	B	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201

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
TD-RRH8x20-25	C	From Leg	4.000 0.000 2.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	4.045 4.298 4.557 5.098	1.535 1.714 1.901 2.295	0.070 0.097 0.128 0.201
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
(2) 6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
(2) 6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
(2) 6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
Platform Mount [LP 1201-1]	C	None		0.000	188.000	No Ice 1/2" Ice 1" Ice 2" Ice	18.380 22.110 25.870 33.470	18.380 22.110 25.870 33.470	2.100 2.652 3.263 4.662
186									
PCS 1900MHz 4x45W-65MHz	A	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
PCS 1900MHz 4x45W-65MHz	B	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
PCS 1900MHz 4x45W-65MHz	C	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.322 2.527 2.739 3.185	2.238 2.441 2.651 3.093	0.060 0.083 0.110 0.173
800MHz 2X50W RRH W/FILTER	A	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.058 2.240 2.429 2.829	1.932 2.109 2.293 2.684	0.064 0.086 0.111 0.172
800MHz 2X50W RRH W/FILTER	B	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice	2.058 2.240 2.429 2.829	1.932 2.109 2.293 2.684	0.064 0.086 0.111 0.172

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			
800MHz 2X50W RRH W/FILTER	C	From Leg	1.000 0.000 0.000	0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.058 2.240 2.429 2.829	1.932 2.109 2.293 2.684	0.064 0.086 0.111 0.172
Side Arm Mount [SO 102-3]	C	None		0.000	186.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
177									
RRH2x40 700	A	From Leg	1.000 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.962 2.137 2.318 2.704	1.034 1.168 1.311 1.617	0.050 0.067 0.086 0.134
RRH2x40 700	B	From Leg	1.000 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.962 2.137 2.318 2.704	1.034 1.168 1.311 1.617	0.050 0.067 0.086 0.134
RRH2x40 700	C	From Leg	1.000 0.000 0.000	0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.962 2.137 2.318 2.704	1.034 1.168 1.311 1.617	0.050 0.067 0.086 0.134
Side Arm Mount [SO 102-3]	C	None		0.000	177.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.180 4.750 5.900	3.600 4.180 4.750 5.900	0.075 0.105 0.135 0.195
175									
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.856 3.220 3.592 4.337	6.569 7.195 7.837 9.170	0.030 0.076 0.128 0.253
(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.856 3.220 3.592 4.337	6.569 7.195 7.837 9.170	0.030 0.076 0.128 0.253
(2) LPA-80063/4CF w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.385 6.784 7.192 8.035	6.603 7.232 7.876 9.214	0.038 0.104 0.176 0.344
LNX-6513DS-A1M w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.840 3.120 3.410 4.020	2.290 2.570 2.850 3.440	0.062 0.111 0.168 0.311
LNX-6513DS-A1M w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.840 3.120 3.410 4.020	2.290 2.570 2.850 3.440	0.062 0.111 0.168 0.311
LNX-6513DS-A1M w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	175.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.840 3.120 3.410 4.020	2.290 2.570 2.850 3.440	0.062 0.111 0.168 0.311
(2) 742 213 w/ Mount Pipe	A	From Leg	4.000 0.000	0.000	175.000	No Ice 1/2"	3.540 4.130	2.980 3.570	0.049 0.087

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Offsets: Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000				Ice	4.740	4.170	0.136
							1" Ice	6.010	5.420	0.267
							2" Ice			
(2) 742 213 w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	175.000	No Ice	3.540	2.980	0.049
			0.000				1/2"	4.130	3.570	0.087
			0.000				Ice	4.740	4.170	0.136
							1" Ice	6.010	5.420	0.267
							2" Ice			
(2) 742 213 w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	175.000	No Ice	3.540	2.980	0.049
			0.000				1/2"	4.130	3.570	0.087
			0.000				Ice	4.740	4.170	0.136
							1" Ice	6.010	5.420	0.267
							2" Ice			
RRFDC-3315-PF-48	A	From Leg	4.000	0.000	0.000	175.000	No Ice	3.364	2.192	0.032
			0.000				1/2"	3.597	2.395	0.061
			0.000				Ice	3.838	2.606	0.093
							1" Ice	4.343	3.049	0.168
							2" Ice			
9442 RRH2X40-AWS	A	From Leg	4.000	0.000	0.000	175.000	No Ice	2.155	1.420	0.044
			0.000				1/2"	2.353	1.590	0.061
			0.000				Ice	2.559	1.768	0.082
							1" Ice	2.992	2.143	0.132
							2" Ice			
9442 RRH2X40-AWS	B	From Leg	4.000	0.000	0.000	175.000	No Ice	2.155	1.420	0.044
			0.000				1/2"	2.353	1.590	0.061
			0.000				Ice	2.559	1.768	0.082
							1" Ice	2.992	2.143	0.132
							2" Ice			
9442 RRH2X40-AWS	C	From Leg	4.000	0.000	0.000	175.000	No Ice	2.155	1.420	0.044
			0.000				1/2"	2.353	1.590	0.061
			0.000				Ice	2.559	1.768	0.082
							1" Ice	2.992	2.143	0.132
							2" Ice			
Platform Mount [LP 1201-1]	C	None			0.000	175.000	No Ice	18.380	18.380	2.100
							1/2"	22.110	22.110	2.652
							Ice	25.870	25.870	3.263
							1" Ice	33.470	33.470	4.662
							2" Ice			
165										
RR90-17-02DP w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	165.000	No Ice	4.470	2.920	0.034
			0.000				1/2"	5.080	3.500	0.067
			0.000				Ice	5.700	4.100	0.108
							1" Ice	7.010	5.350	0.216
							2" Ice			
RR90-17-02DP w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	165.000	No Ice	4.470	2.920	0.034
			0.000				1/2"	5.080	3.500	0.067
			0.000				Ice	5.700	4.100	0.108
							1" Ice	7.010	5.350	0.216
							2" Ice			
RR90-17-02DP w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	165.000	No Ice	4.470	2.920	0.034
			0.000				1/2"	5.080	3.500	0.067
			0.000				Ice	5.700	4.100	0.108
							1" Ice	7.010	5.350	0.216
							2" Ice			
LNX-6515DS-A1M w/ Mount Pipe	A	From Leg	4.000	0.000	0.000	165.000	No Ice	5.310	4.270	0.083
			0.000				1/2"	5.800	4.750	0.165
			0.000				Ice	6.300	5.240	0.261
							1" Ice	7.330	6.240	0.495
							2" Ice			
LNX-6515DS-A1M w/ Mount Pipe	B	From Leg	4.000	0.000	0.000	165.000	No Ice	5.310	4.270	0.083
			0.000				1/2"	5.800	4.750	0.165
			0.000				Ice	6.300	5.240	0.261
							1" Ice	7.330	6.240	0.495
							2" Ice			
LNX-6515DS-A1M w/	C	From Leg	4.000	0.000	0.000	165.000	No Ice	5.310	4.270	0.083

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
Mount Pipe			0.000 0.000			1/2" Ice 1" Ice 2" Ice	5.800 6.300 7.330	4.750 5.240 6.240	0.165 0.261 0.495
KRY 112 71/1	A	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.583 0.688 0.799 1.045	0.398 0.488 0.586 0.805	0.013 0.018 0.025 0.044
KRY 112 71/1	B	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.583 0.688 0.799 1.045	0.398 0.488 0.586 0.805	0.013 0.018 0.025 0.044
KRY 112 71/1	C	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.583 0.688 0.799 1.045	0.398 0.488 0.586 0.805	0.013 0.018 0.025 0.044
ATBT-BOTTOM-24V	A	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.104 0.148 0.199 0.323	0.065 0.102 0.147 0.259	0.003 0.004 0.006 0.013
ATBT-BOTTOM-24V	B	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.104 0.148 0.199 0.323	0.065 0.102 0.147 0.259	0.003 0.004 0.006 0.013
ATBT-BOTTOM-24V	C	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.104 0.148 0.199 0.323	0.065 0.102 0.147 0.259	0.003 0.004 0.006 0.013
6' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
6' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.425 1.925 2.294 3.060	1.425 1.925 2.294 3.060	0.022 0.033 0.048 0.090
Platform Mount [LP 1201-1]	C	None		0.000	165.000	No Ice 1/2" Ice 1" Ice 2" Ice	18.380 22.110 25.870 33.470	18.380 22.110 25.870 33.470	2.100 2.652 3.263 4.662
157									
800 10121 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.000 4.420 5.290	2.950 3.340 3.740 4.590	0.072 0.115 0.166 0.297
800 10121 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.000 4.420 5.290	2.950 3.340 3.740 4.590	0.072 0.115 0.166 0.297

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
800 10121 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.600 4.000 4.420 5.290	2.950 3.340 3.740 4.590	0.072 0.115 0.166 0.297
(2) LGP21401	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
(2) LGP21401	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.104 1.239 1.381 1.688	0.207 0.274 0.348 0.521	0.014 0.021 0.030 0.055
HPA65R-BU8A w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.100 8.860 9.640 11.240	6.940 7.690 8.450 10.030	0.087 0.170 0.266 0.500
HPA65R-BU8A w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.100 8.860 9.640 11.240	6.940 7.690 8.450 10.030	0.087 0.170 0.266 0.500
HPA65R-BU8A w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	8.100 8.860 9.640 11.240	6.940 7.690 8.450 10.030	0.087 0.170 0.266 0.500
OPA65R-BU8D w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	17.460 18.460 19.480 21.580	8.580 9.490 10.420 12.330	0.109 0.224 0.353 0.656
OPA65R-BU8D w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	17.460 18.460 19.480 21.580	8.580 9.490 10.420 12.330	0.109 0.224 0.353 0.656
OPA65R-BU8D w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	17.460 18.460 19.480 21.580	8.580 9.490 10.420 12.330	0.109 0.224 0.353 0.656
DMP65R-BU8D w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679
DMP65R-BU8D w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679
DMP65R-BU8D w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	15.890 16.810 17.760 19.700	7.890 8.740 9.600 11.370	0.139 0.252 0.380 0.679

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
DC6-48-60-18-8F	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.212 1.892 2.105 2.570	1.212 1.892 2.105 2.570	0.020 0.042 0.067 0.126
RRUS 8843 B2/B66A_CCIV2	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 8843 B2/B66A_CCIV2	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 8843 B2/B66A_CCIV2	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.980 2.157 2.341 2.733	1.695 1.861 2.035 2.405	0.075 0.096 0.119 0.176
RRUS 4478 B14_CCIV2	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4478 B14_CCIV2	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.021 2.200 2.386 2.780	1.246 1.396 1.554 1.891	0.059 0.077 0.097 0.147
RRUS 4449 B5/B12	A	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
RRUS 4449 B5/B12	B	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
RRUS 4449 B5/B12	C	From Leg	4.000 0.000 0.000	0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.968 2.144 2.328 2.718	1.408 1.564 1.727 2.075	0.071 0.090 0.111 0.163
Sector Mount [SM 502-3]	C	None		0.000	157.000	No Ice 1/2" Ice 1" Ice 2" Ice	29.820 42.210 54.430 78.490	29.820 42.210 54.430 78.490	1.673 2.266 3.052 5.180
150									
APXV18-206517S-C	A	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.830 4.460 5.110 6.440	1.810 2.410 3.030 4.310	0.026 0.054 0.087 0.172
APXV18-206517S-C	B	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice	3.830 4.460 5.110 6.440	1.810 2.410 3.030 4.310	0.026 0.054 0.087 0.172

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			
APXV18-206517S-C	C	From Leg	1.000 0.000 0.000	0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.830 4.460 5.110 6.440	1.810 2.410 3.030 4.310	0.026 0.054 0.087 0.172
Pipe Mount [PM 601-3]	B	None		0.000	150.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.170 3.790 4.420 5.760	3.170 3.790 4.420 5.760	0.195 0.232 0.279 0.401
120									
SD212-SF2P2SNM	B	From Leg	6.000 0.000 5.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	2.160 3.960 5.760 9.360	2.160 3.960 5.760 9.360	0.021 0.050 0.079 0.137
Side Arm Mount [SO 702-1]	B	From Leg	3.000 0.000 0.000	0.000	120.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.620 0.740 0.890 1.250	1.490 2.070 2.540 3.550	0.027 0.042 0.063 0.122
115									
SD110-SFXPASNM	B	From Leg	1.000 0.000 7.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.333 7.917 9.501 12.669	6.333 7.917 9.501 12.669	0.025 0.069 0.112 0.199
16' x 2" Mount Pipe	B	From Leg	0.500 0.000 7.000	0.000	115.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.800 5.428 7.073 10.413	3.800 5.428 7.073 10.413	0.059 0.087 0.126 0.234
81									
ANT450D3	B	From Leg	3.000 0.000 1.000	0.000	81.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.431 2.185 2.939 4.446	1.431 2.185 2.939 4.446	0.088 0.100 0.112 0.136
Side Arm Mount [SO 310-1]	B	From Leg	1.500 0.000 0.000	0.000	81.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.670 2.430 3.210 4.840	3.950 5.690 7.620 12.320	0.055 0.087 0.130 0.249
Side Arm Mount [SO 102-1]	B	None		0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.740 1.980 2.460	1.500 1.740 1.980 2.460	0.025 0.035 0.045 0.065
Side Arm Mount [SO 102-1]	B	None		0.000	79.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.500 1.740 1.980 2.460	1.500 1.740 1.980 2.460	0.025 0.035 0.045 0.065
48									
KS24019-L112A	A	From Leg	3.000 0.000 0.000	0.000	48.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.100 0.180 0.260 0.420	0.100 0.180 0.260 0.420	0.005 0.006 0.008 0.011
Side Arm Mount [SO 701-1]	A	From Leg	1.500 0.000 0.000	0.000	48.000	No Ice 1/2" Ice 1" Ice 2" Ice	0.850 1.140 1.430 2.010	1.670 2.340 3.010 4.350	0.065 0.079 0.093 0.121

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
***								

Load Combinations

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	187 - 136	Pole	Max Tension	42	0.000	0.000	-0.000
			Max. Compression	26	-54.988	0.750	-1.060
			Max. Mx	20	-19.503	714.235	-5.198
			Max. My	14	-19.520	5.072	-710.336
			Max. Vy	8	25.953	-714.086	4.919
			Max. Vx	14	25.843	5.072	-710.336
			Max. Torque	8			0.991
L2	136 - 89.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-73.652	-1.765	-5.856
			Max. Mx	8	-31.790	-2038.167	11.338
			Max. My	14	-31.801	11.826	-2030.294
			Max. Vy	8	32.404	-2038.167	11.338
			Max. Vx	14	32.316	11.826	-2030.294
			Max. Torque	2			-2.168
L3	89.5 - 44.25	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-97.106	-3.701	-10.150
			Max. Mx	8	-48.594	-3608.418	19.111
			Max. My	14	-48.598	19.929	-3598.661
			Max. Vy	8	38.263	-3608.418	19.111
			Max. Vx	14	38.232	19.929	-3598.661
			Max. Torque	2			-3.040
L4	44.25 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-129.482	-4.289	-13.989
			Max. Mx	8	-73.424	-5703.641	29.166
			Max. My	14	-73.424	30.498	-5691.181
			Max. Vy	8	43.408	-5703.641	29.166
			Max. Vx	14	43.345	30.498	-5691.181
			Max. Torque	2			-3.032

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	34	129.482	6.101	-10.517
	Max. H_x	21	55.092	43.353	-0.203
	Max. H_z	2	73.456	-0.203	43.291
	Max. M_x	2	5686.229	-0.203	43.291
	Max. M_z	8	5703.641	-43.353	0.203
	Max. Torsion	14	3.028	0.203	-43.291
	Min. Vert	25	55.092	21.501	37.390
	Min. H_x	9	55.092	-43.353	0.203
	Min. H_z	15	55.092	0.203	-43.291
	Min. M_x	14	-5691.181	0.203	-43.291
	Min. M_z	20	-5701.287	43.353	-0.203
	Min. Torsion	2	-3.030	-0.203	43.291

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	61.213	0.000	0.000	1.962	-0.923	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	73.456	0.203	-43.291	-5686.229	-32.803	3.030
0.9 Dead+1.0 Wind 0 deg - No Ice	55.092	0.203	-43.291	-5608.298	-32.039	3.021
1.2 Dead+1.0 Wind 30 deg -	73.456	21.852	-37.592	-4939.815	-2879.779	2.876

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
No Ice						
0.9 Dead+1.0 Wind 30 deg - No Ice	55.092	21.852	-37.592	-4872.181	-2839.662	2.866
1.2 Dead+1.0 Wind 60 deg - No Ice	73.456	37.646	-21.821	-2869.211	-4955.403	1.949
0.9 Dead+1.0 Wind 60 deg - No Ice	55.092	37.646	-21.821	-2830.170	-4886.602	1.941
1.2 Dead+1.0 Wind 90 deg - No Ice	73.456	43.353	-0.203	-29.166	-5703.641	0.497
0.9 Dead+1.0 Wind 90 deg - No Ice	55.092	43.353	-0.203	-29.352	-5624.486	0.493
1.2 Dead+1.0 Wind 120 deg - No Ice	73.456	37.444	21.470	2819.465	-4923.935	-1.087
0.9 Dead+1.0 Wind 120 deg - No Ice	55.092	37.444	21.470	2779.923	-4855.586	-1.087
1.2 Dead+1.0 Wind 150 deg - No Ice	73.456	21.501	37.390	4913.310	-2825.061	-2.378
0.9 Dead+1.0 Wind 150 deg - No Ice	55.092	21.501	37.390	4844.834	-2785.739	-2.373
1.2 Dead+1.0 Wind 180 deg - No Ice	73.456	-0.203	43.291	5691.181	30.499	-3.028
0.9 Dead+1.0 Wind 180 deg - No Ice	55.092	-0.203	43.291	5611.938	30.339	-3.020
1.2 Dead+1.0 Wind 210 deg - No Ice	73.456	-21.852	37.592	4944.749	2877.455	-2.868
0.9 Dead+1.0 Wind 210 deg - No Ice	55.092	-21.852	37.592	4875.830	2837.948	-2.858
1.2 Dead+1.0 Wind 240 deg - No Ice	73.456	-37.646	21.821	2874.154	4953.054	-1.942
0.9 Dead+1.0 Wind 240 deg - No Ice	55.092	-37.646	21.821	2833.825	4884.870	-1.934
1.2 Dead+1.0 Wind 270 deg - No Ice	73.456	-43.353	0.203	34.135	5701.287	-0.498
0.9 Dead+1.0 Wind 270 deg - No Ice	55.092	-43.353	0.203	33.026	5622.750	-0.494
1.2 Dead+1.0 Wind 300 deg - No Ice	73.456	-37.444	-21.470	-2814.478	4921.602	1.079
0.9 Dead+1.0 Wind 300 deg - No Ice	55.092	-37.444	-21.470	-2776.236	4853.864	1.079
1.2 Dead+1.0 Wind 330 deg - No Ice	73.456	-21.501	-37.390	-4908.332	2822.752	2.371
0.9 Dead+1.0 Wind 330 deg - No Ice	55.092	-21.501	-37.390	-4841.153	2784.035	2.366
1.2 Dead+1.0 Ice+1.0 Temp	129.482	0.000	0.000	13.989	-4.289	-0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	129.482	0.054	-12.113	-1686.429	-12.100	1.440
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	129.482	6.101	-10.517	-1462.437	-861.737	1.436
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	129.482	10.513	-6.103	-842.755	-1481.647	1.046
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	129.482	12.108	-0.054	6.575	-1705.725	0.377
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	129.482	10.459	6.010	857.973	-1473.928	-0.394
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	129.482	6.007	10.463	1483.304	-848.365	-1.059
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	129.482	-0.054	12.113	1715.010	3.340	-1.440
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	129.482	-6.101	10.517	1491.011	852.969	-1.436
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	129.482	-10.513	6.103	871.333	1472.869	-1.046
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	129.482	-12.108	0.054	22.014	1696.946	-0.377
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	129.482	-10.459	-6.010	-829.377	1465.157	0.394
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	129.482	-6.007	-10.463	-1454.713	839.603	1.059
Dead+Wind 0 deg - Service	61.213	0.044	-9.394	-1223.032	-7.787	0.662

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 30 deg - Service	61.213	4.742	-8.157	-1062.307	-620.903	0.627
Dead+Wind 60 deg - Service	61.213	8.169	-4.735	-616.389	-1067.910	0.424
Dead+Wind 90 deg - Service	61.213	9.408	-0.044	-4.759	-1229.033	0.107
Dead+Wind 120 deg - Service	61.213	8.125	4.659	608.697	-1061.098	-0.238
Dead+Wind 150 deg - Service	61.213	4.666	8.113	1059.604	-609.103	-0.520
Dead+Wind 180 deg - Service	61.213	-0.044	9.394	1227.140	5.840	-0.662
Dead+Wind 210 deg - Service	61.213	-4.742	8.157	1066.415	618.956	-0.627
Dead+Wind 240 deg - Service	61.213	-8.169	4.735	620.497	1065.961	-0.424
Dead+Wind 270 deg - Service	61.213	-9.408	0.044	8.868	1227.084	-0.107
Dead+Wind 300 deg - Service	61.213	-8.125	-4.659	-604.588	1059.150	0.238
Dead+Wind 330 deg - Service	61.213	-4.666	-8.113	-1055.495	607.155	0.519

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	0.000	-61.213	0.000	0.000	61.213	0.000	0.000%
2	0.203	-73.456	-43.291	-0.203	73.456	43.291	0.000%
3	0.203	-55.092	-43.291	-0.203	55.092	43.291	0.000%
4	21.852	-73.456	-37.592	-21.852	73.456	37.592	0.000%
5	21.852	-55.092	-37.592	-21.852	55.092	37.592	0.000%
6	37.646	-73.456	-21.821	-37.646	73.456	21.821	0.000%
7	37.646	-55.092	-21.821	-37.646	55.092	21.821	0.000%
8	43.353	-73.456	-0.203	-43.353	73.456	0.203	0.000%
9	43.353	-55.092	-0.203	-43.353	55.092	0.203	0.000%
10	37.444	-73.456	21.470	-37.444	73.456	-21.470	0.000%
11	37.444	-55.092	21.470	-37.444	55.092	-21.470	0.000%
12	21.501	-73.456	37.390	-21.501	73.456	-37.390	0.000%
13	21.501	-55.092	37.390	-21.501	55.092	-37.390	0.000%
14	-0.203	-73.456	43.291	0.203	73.456	-43.291	0.000%
15	-0.203	-55.092	43.291	0.203	55.092	-43.291	0.000%
16	-21.852	-73.456	37.592	21.852	73.456	-37.592	0.000%
17	-21.852	-55.092	37.592	21.852	55.092	-37.592	0.000%
18	-37.646	-73.456	21.821	37.646	73.456	-21.821	0.000%
19	-37.646	-55.092	21.821	37.646	55.092	-21.821	0.000%
20	-43.353	-73.456	0.203	43.353	73.456	-0.203	0.000%
21	-43.353	-55.092	0.203	43.353	55.092	-0.203	0.000%
22	-37.444	-73.456	-21.470	37.444	73.456	21.470	0.000%
23	-37.444	-55.092	-21.470	37.444	55.092	21.470	0.000%
24	-21.501	-73.456	-37.390	21.501	73.456	37.390	0.000%
25	-21.501	-55.092	-37.390	21.501	55.092	37.390	0.000%
26	0.000	-129.482	0.000	-0.000	129.482	-0.000	0.000%
27	0.054	-129.482	-12.113	-0.054	129.482	12.113	0.000%
28	6.101	-129.482	-10.517	-6.101	129.482	10.517	0.000%
29	10.513	-129.482	-6.103	-10.513	129.482	6.103	0.000%
30	12.108	-129.482	-0.054	-12.108	129.482	0.054	0.000%
31	10.459	-129.482	6.010	-10.459	129.482	-6.010	0.000%
32	6.007	-129.482	10.463	-6.007	129.482	-10.463	0.000%
33	-0.054	-129.482	12.113	0.054	129.482	-12.113	0.000%
34	-6.101	-129.482	10.517	6.101	129.482	-10.517	0.000%
35	-10.513	-129.482	6.103	10.513	129.482	-6.103	0.000%
36	-12.108	-129.482	0.054	12.108	129.482	-0.054	0.000%
37	-10.459	-129.482	-6.010	10.459	129.482	6.010	0.000%
38	-6.007	-129.482	-10.463	6.007	129.482	10.463	0.000%
39	0.044	-61.213	-9.394	-0.044	61.213	9.394	0.000%
40	4.742	-61.213	-8.157	-4.742	61.213	8.157	0.000%
41	8.169	-61.213	-4.735	-8.169	61.213	4.735	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
42	9.408	-61.213	-0.044	-9.408	61.213	0.044	0.000%
43	8.125	-61.213	4.659	-8.125	61.213	-4.659	0.000%
44	4.666	-61.213	8.113	-4.666	61.213	-8.113	0.000%
45	-0.044	-61.213	9.394	0.044	61.213	-9.394	0.000%
46	-4.742	-61.213	8.157	4.742	61.213	-8.157	0.000%
47	-8.169	-61.213	4.735	8.169	61.213	-4.735	0.000%
48	-9.408	-61.213	0.044	9.408	61.213	-0.044	0.000%
49	-8.125	-61.213	-4.659	8.125	61.213	4.659	0.000%
50	-4.666	-61.213	-8.113	4.666	61.213	8.113	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	0.00013486
3	Yes	5	0.00000001	0.00006327
4	Yes	6	0.00000001	0.00017780
5	Yes	6	0.00000001	0.00005734
6	Yes	6	0.00000001	0.00017319
7	Yes	6	0.00000001	0.00005564
8	Yes	5	0.00000001	0.00004360
9	Yes	4	0.00000001	0.00052732
10	Yes	6	0.00000001	0.00016971
11	Yes	6	0.00000001	0.00005477
12	Yes	6	0.00000001	0.00017383
13	Yes	6	0.00000001	0.00005631
14	Yes	5	0.00000001	0.00006211
15	Yes	4	0.00000001	0.00070128
16	Yes	6	0.00000001	0.00017203
17	Yes	6	0.00000001	0.00005522
18	Yes	6	0.00000001	0.00017696
19	Yes	6	0.00000001	0.00005699
20	Yes	5	0.00000001	0.00005651
21	Yes	4	0.00000001	0.00062442
22	Yes	6	0.00000001	0.00017230
23	Yes	6	0.00000001	0.00005579
24	Yes	6	0.00000001	0.00016788
25	Yes	6	0.00000001	0.00005418
26	Yes	4	0.00000001	0.00005881
27	Yes	6	0.00000001	0.00019215
28	Yes	6	0.00000001	0.00028324
29	Yes	6	0.00000001	0.00027733
30	Yes	6	0.00000001	0.00019366
31	Yes	6	0.00000001	0.00028066
32	Yes	6	0.00000001	0.00028400
33	Yes	6	0.00000001	0.00019524
34	Yes	6	0.00000001	0.00028076
35	Yes	6	0.00000001	0.00028658
36	Yes	6	0.00000001	0.00019287
37	Yes	6	0.00000001	0.00027471
38	Yes	6	0.00000001	0.00027170
39	Yes	4	0.00000001	0.00011743
40	Yes	4	0.00000001	0.00059754
41	Yes	4	0.00000001	0.00054834
42	Yes	4	0.00000001	0.00008494
43	Yes	4	0.00000001	0.00053568
44	Yes	4	0.00000001	0.00057951
45	Yes	4	0.00000001	0.00010901
46	Yes	4	0.00000001	0.00054004
47	Yes	4	0.00000001	0.00058743
48	Yes	4	0.00000001	0.00008575
49	Yes	4	0.00000001	0.00055971
50	Yes	4	0.00000001	0.00051805

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	187 - 136	29.951	47	1.391	0.001
L2	140.5 - 89.5	17.083	47	1.172	0.001
L3	95.25 - 44.25	7.690	47	0.777	0.001
L4	51 - 0	2.179	47	0.390	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	DB404L-B	47	29.951	1.391	0.001	61374
186.000	PCS 1900MHz 4x45W-65MHz	47	29.660	1.387	0.001	61374
177.000	RRH2x40 700	47	27.049	1.354	0.001	30687
175.000	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	47	26.472	1.346	0.001	25572
165.000	RR90-17-02DP w/ Mount Pipe	47	23.622	1.305	0.001	13948
157.000	800 10121 w/ Mount Pipe	47	21.402	1.268	0.001	10228
150.000	APXV18-206517S-C	47	19.521	1.231	0.001	8293
120.000	SD212-SF2P2SNM	41	12.370	1.007	0.001	6648
115.000	SD110-SFXPASNM	41	11.336	0.962	0.001	6660
83.000	Side Arm Mount [SO 102-1]	47	5.783	0.664	0.001	6343
81.000	ANT450D3	47	5.498	0.646	0.001	6287
79.000	Side Arm Mount [SO 102-1]	47	5.221	0.628	0.001	6232
48.000	KS24019-L112A	47	1.950	0.366	0.000	5907

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	187 - 136	139.061	18	6.472	0.007
L2	140.5 - 89.5	79.362	18	5.453	0.005
L3	95.25 - 44.25	35.737	18	3.613	0.004
L4	51 - 0	10.125	18	1.815	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
188.000	DB404L-B	18	139.061	6.472	0.007	13526
186.000	PCS 1900MHz 4x45W-65MHz	18	137.712	6.456	0.007	13526
177.000	RRH2x40 700	18	125.601	6.301	0.006	6762
175.000	(2) LPA-80080-4CF-EDIN-0 w/ Mount Pipe	18	122.925	6.265	0.006	5634
165.000	RR90-17-02DP w/ Mount Pipe	18	109.704	6.075	0.006	3071
157.000	800 10121 w/ Mount Pipe	18	99.405	5.902	0.006	2250
150.000	APXV18-206517S-C	18	90.674	5.729	0.006	1822
120.000	SD212-SF2P2SNM	6	57.478	4.687	0.005	1450
115.000	SD110-SFXPASNM	6	52.674	4.476	0.005	1450

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
83.000	Side Arm Mount [SO 102-1]	18	26.874	3.090	0.003	1372
81.000	ANT450D3	18	25.550	3.006	0.003	1359
79.000	Side Arm Mount [SO 102-1]	18	24.261	2.923	0.003	1347
48.000	KS24019-L112A	18	9.061	1.702	0.001	1272

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	187 - 136 (1)	TP36.201x26x0.25	51.000	0.000	0.0	27.813	-19.483	1627.050	0.012
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	51.000	0.000	0.0	51.749	-31.775	3027.340	0.010
L3	89.5 - 44.25 (3)	TP53.304x43.103x0.438	51.000	0.000	0.0	71.537	-48.583	4184.910	0.012
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	51.000	0.000	0.0	96.458	-73.424	5642.790	0.013

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	187 - 136 (1)	TP36.201x26x0.25	717.619	1321.717	0.543	0.000	1321.717	0.000
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	2046.233	3254.917	0.629	0.000	3254.917	0.000
L3	89.5 - 44.25 (3)	TP53.304x43.103x0.438	3622.783	5306.567	0.683	0.000	5306.567	0.000
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	5726.558	8358.583	0.685	0.000	8358.583	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	187 - 136 (1)	TP36.201x26x0.25	26.052	488.116	0.053	0.870	1498.317	0.001
L2	136 - 89.5 (2)	TP45.003x34.801x0.375	32.526	908.202	0.036	1.316	3458.042	0.000
L3	89.5 - 44.25 (3)	TP53.304x43.103x0.438	38.438	1255.470	0.031	2.195	5664.117	0.000
L4	44.25 - 0 (4)	TP61.28x51.079x0.5	43.568	1692.840	0.026	1.942	9010.667	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	187 - 136 (1)	0.012	0.543	0.000	0.053	0.001	0.558	1.050	4.8.2
L2	136 - 89.5 (2)	0.010	0.629	0.000	0.036	0.000	0.640	1.050	4.8.2
L3	89.5 - 44.25	0.012	0.683	0.000	0.031	0.000	0.695	1.050	4.8.2

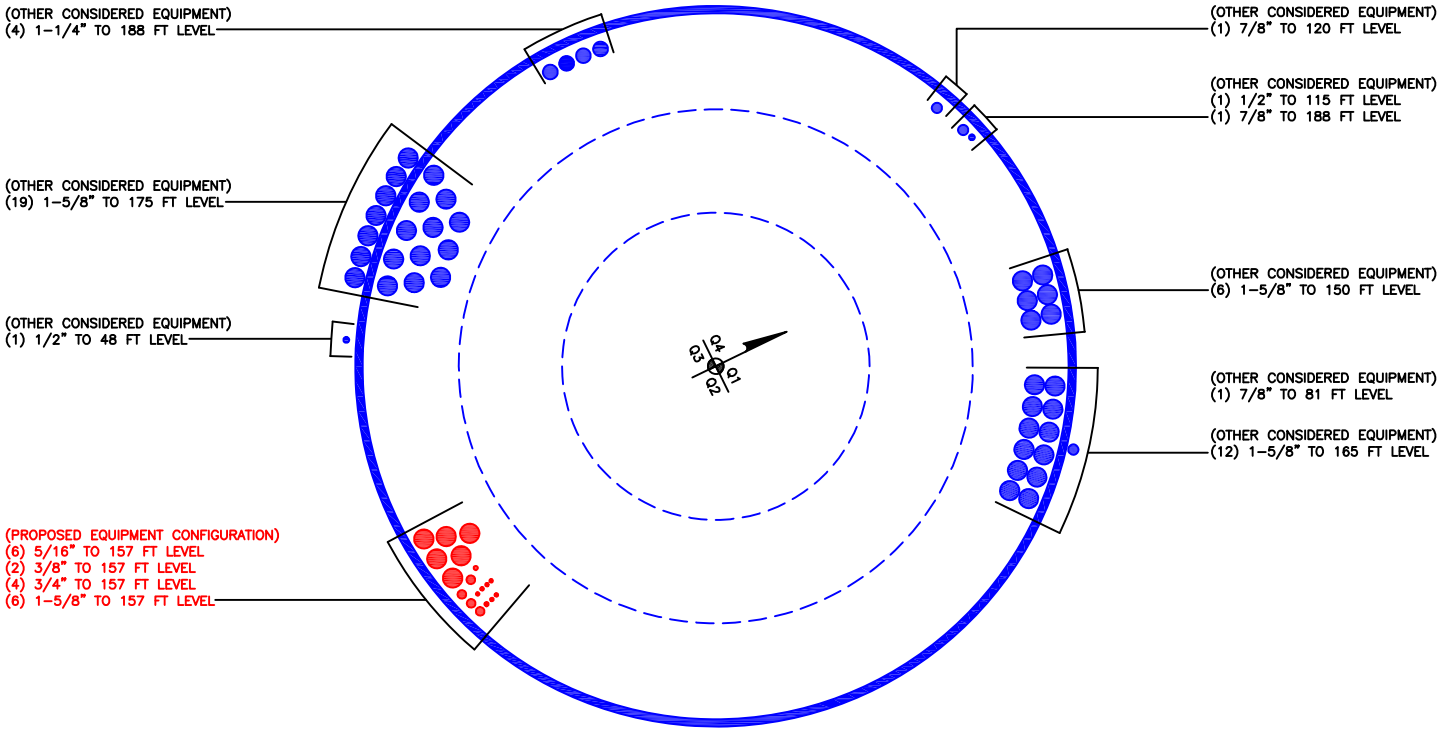
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L4	(3) 44.25 - 0 (4)	0.013	0.685	0.000	0.026	0.000	0.699	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	187 - 136	Pole	TP36.201x26x0.25	1	-19.483	1708.402	53.1	Pass
L2	136 - 89.5	Pole	TP45.003x34.801x0.375	2	-31.775	3178.707	61.0	Pass
L3	89.5 - 44.25	Pole	TP53.304x43.103x0.438	3	-48.583	4394.155	66.2	Pass
L4	44.25 - 0	Pole	TP61.28x51.079x0.5	4	-73.424	5924.929	66.6	Pass
							Summary	
						Pole (L4)	66.6	Pass
						RATING =	**66.6**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(4) 1-1/4" TO 188 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(19) 1-5/8" TO 175 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 48 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(6) 5/16" TO 157 FT LEVEL
(2) 3/8" TO 157 FT LEVEL
(4) 3/4" TO 157 FT LEVEL
(6) 1-5/8" TO 157 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 120 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 115 FT LEVEL
(1) 7/8" TO 188 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 150 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 81 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(12) 1-5/8" TO 165 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

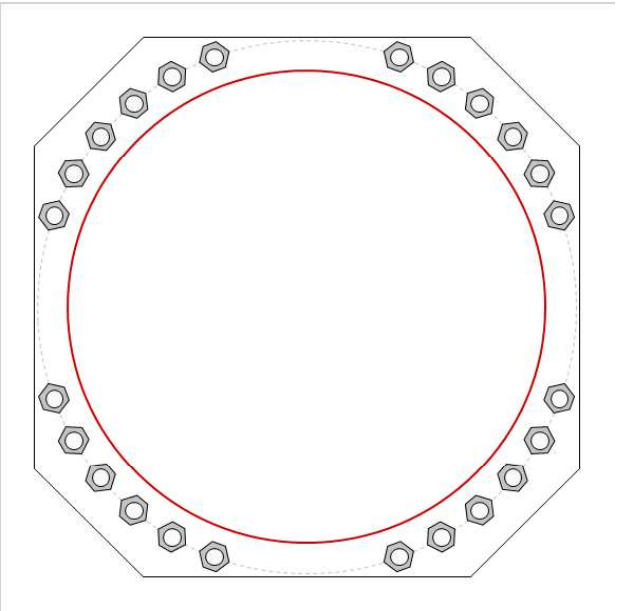
Monopole Base Plate Connection

Site Info	
BU #	803934
Site Name	CT SOMERS FD CAC
Order #	527505 Rev. 4

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	2

Applied Loads	
Moment (kip-ft)	5726.56
Axial Force (kips)	73.42
Shear Force (kips)	43.57

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(24) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 69" BC

Anchor Spacing: 6 in

Base Plate Data

70" W x 3.25" Plate (A572-55; Fy=55 ksi, Fu=70 ksi); Clip: 14 in

Stiffener Data

N/A

Pole Data

61.28" x 0.5" 18-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 168.97	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.82	ϕVn = 120.77	**60.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	23.41	(Flexural)
Allowable Stress (ksi):	49.5	
Stress Rating:	**45.0%**	**Pass**

Drilled Pier Foundation

BU # :	803934
Site Name:	CT SOMERS FD CAC
Order Number:	527505 Rev. 4

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	5726.56	
Axial Force (kips)	73.46	
Shear Force (kips)	43.51	

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

Pier Design Data		
Depth	29	ft
Ext. Above Grade	0.5	ft
Pier Section 1		
From 0.5' above grade to 29' below grade		
Pier Diameter	8	ft
Rebar Quantity	32	
Rebar Size	11	
Clear Cover to Ties	4	in
Tie Size	5	
Tie Spacing	18	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	6.58	-
Soil Safety Factor	2.31	-
Max Moment (kip-ft)	5970.30	-
Rating*	*54.8%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	282.74	-
End Bearing (kips)	904.78	-
Weight of Concrete (kips)	174.64	-
Total Capacity (kips)	1187.52	-
Axial (kips)	248.10	-
Rating*	*19.9%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	6.48	-
Critical Moment (kip-ft)	5970.16	-
Critical Moment Capacity	8998.89	-
Rating*	*63.2%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	20.84	-
Critical Shear (kip)	555.48	-
Critical Shear Capacity	721.56	-
Rating*	*73.3%*	-

Soil Interaction Rating*	**54.8%**
Structural Foundation Rating*	**73.3%**

*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	4.5	# of Layers	3

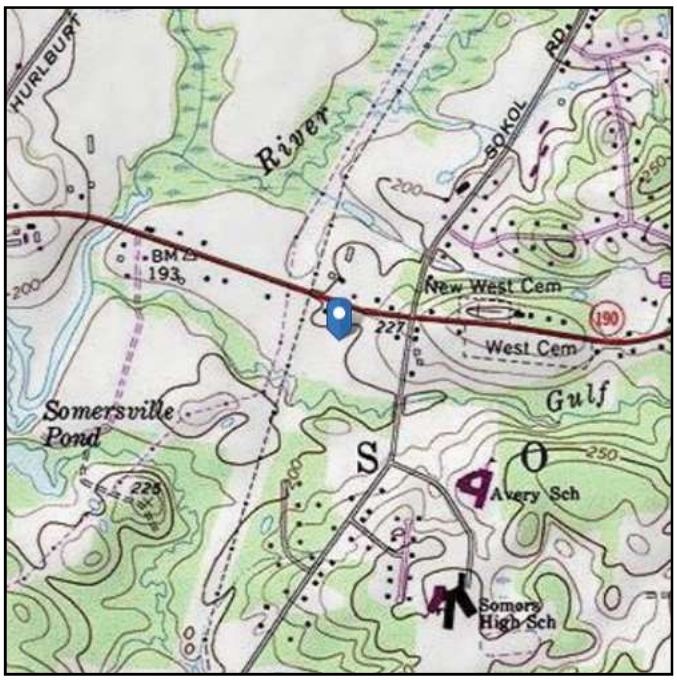
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	4	4	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	4	4.5	0.5	120	150	0	34	0.000	0.000	0.60	0.60			Cohesionless
3	4.5	29	24.5	60	87.6	0	34	0.000	0.000	0.60	0.60	24		Cohesionless

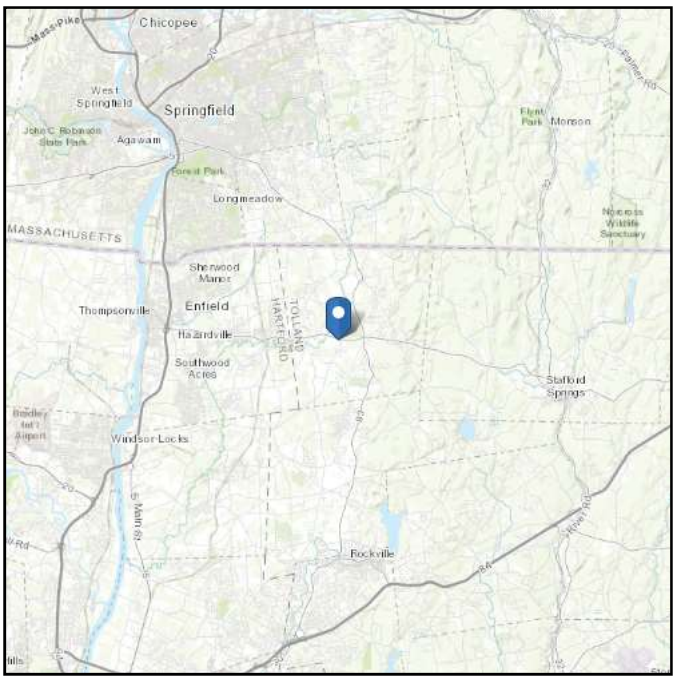
ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 197.69 ft (NAVD 88)
Latitude: 41.983744
Longitude: -72.465797





Wind

Results:

Wind Speed:	~~122 Vmph~~ 125mph per jurisdiction
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	93 Vmph
100-year MRI	100 Vmph

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

Date Accessed: Tue Nov 17 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 7-10 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.

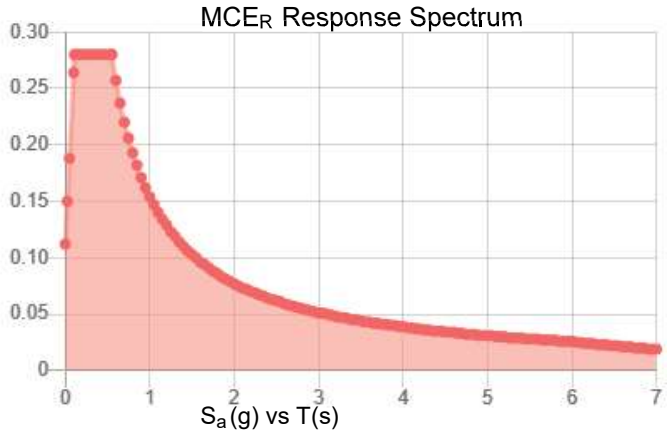
Seismic

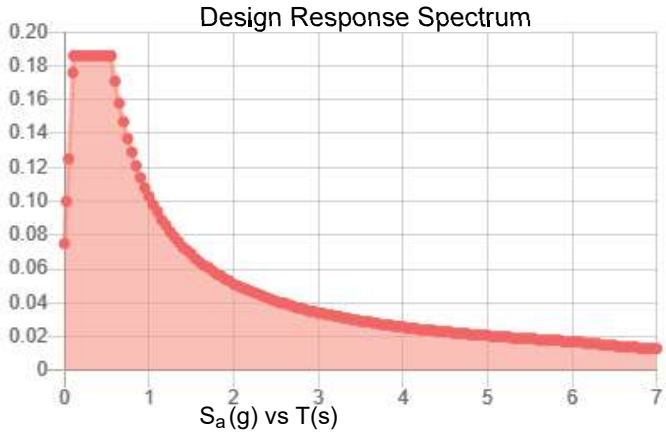
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.175	S_{DS} :	0.186
S_1 :	0.064	S_{D1} :	0.103
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.086
S_{MS} :	0.28	PGA_M :	0.137
S_{M1} :	0.154	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Tue Nov 17 2020

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:	Tue Nov 17 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 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

Date: **November 16, 2020**

GPD Engineering and Architecture
Professional Corporation
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Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

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

Subject:	**Mount Replacement Analysis Report**	
Carrier Designation:	***AT&T Mobility* Loading Modification**	
	Carrier Site Number:	CT5857
	Carrier Site Name:	SOMERS CENTRAL
	FA Number:	10108715
Crown Castle Designation:	**Crown Castle BU Number:**	803934
	Crown Castle Site Name:	CT SOMERS FD CAC
	Crown Castle JDE Job Number:	617827
	Crown Castle Order Number:	527505 Rev. 4
Engineering Firm Designation:	**GPD Report Designation:**	2020777.803934.02
Site Data:	**400 Main Street, Somers, Tolland County, CT 06071** **Latitude 41° 59' 1.48" Longitude -72° 27' 56.87"**	
Structure Information:	**Tower Height & Type:**	**190.0 ft Monopole Tower**
	Mount Elevation:	**157.0 ft**
	Mount Type:	**13.0 ft Sector Mount**

Dear Darcy Tarr,

GPD 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 stress level. Based on our analysis we have determined the mount stress level to be:

Sector Mount **Sufficient***

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

The analysis has been performed in accordance with the TIA-222-H Standard 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 analysis prepared by: Michael Hlava

Respectfully Submitted by:

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

11/16/2020

TABLE OF CONTENTS

1) INTRODUCTION

This is a proposed 13.0' Sector Mount designed by Sabre (Drawing # C10857804 Rev. 0, dated 9/24/2018).

2) ANALYSIS CRITERIA

TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 117 mph
Exposure Category: C
Ice Thickness: 1.5 in
Wind Speed with Ice: 50 mph
Live Loading Wind Speed: 30 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount Details
157.0	157.0	3	CCI Antennas	DMP65R-BU8D	(3) 13.0 ft. Sector Mounts
		3	CCI Antennas	HPA65R-BU8A	
		3	CCI Antennas	OPA65R-BU8D	
		3	Kathrein	800 10121	
		3	Ericsson	RRUS 4449 B5/B12	
		3	Ericsson	RRUS 4478 B14_CCIV2	
		3	Ericsson	RRUS 8843 B2/B66A_CCIV2	
		6	Powerwave Technologies	LGP21401	
		2	Raycap	DC6-48-60-18-8F	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 527505 Rev. 4	-	CCI
RF Data Sheet	RFDS Name: CT5857, dated 11/11/2020	-	CCI
Mount Design	Sabre Drawing # C10857804 Rev. 0, dated 9/24/2018		Sabre

3.1) Analysis Method

RISA-3D Edition (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

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

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

3.2) Assumptions

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

Solid Round, Plate	ASTM A572 (GR 50)
Pipe	ASTM A500 (GR C-50) & ASTM A53 (GR B-35)
Connection Bolts	ASTM A325 & ASTM A307

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

4) ANALYSIS RESULTS

Table 3(a) - Mount Component Stresses vs. Capacity (Alpha Sector Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M1	157.0	22.8	Pass
	V-Boom Horizontal	M9		26.2	Pass
	V-Boom Bracing	M19		17.6	Pass
	Stiff Arm	M31		5.5	Pass
	Mount Pipe	A3		36.7	Pass
	Tower Connection Pipe	M33		15.0	Pass
2	Mount to Tower Connection	-		19.1	Pass

Table 3(b) - Mount Component Stresses vs. Capacity (Beta Sector Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M44	157.0	24.4	Pass
	V-Boom Horizontal	M45		26.6	Pass
	V-Boom Bracing	M55		17.5	Pass
	Stiff Arm	M64		6.5	Pass
	Mount Pipe	B3		36.9	Pass
	Tower Connection Pipe	M59		15.3	Pass
2	Mount to Tower Connection	-		19.7	Pass

Table 3(c) - Mount Component Stresses vs. Capacity (Gamma Sector Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1	Face Horizontal	M76	157.0	25.7	Pass
	V-Boom Horizontal	M77		24.7	Pass
	V-Boom Bracing	M88		17.3	Pass
	Stiff Arm	M96		6.5	Pass
	Mount Pipe	C3		36.9	Pass
	Tower Connection Pipe	M91		16.2	Pass
2	Mount to Tower Connection	-		19.9	Pass

Structure Rating (max from all components) =	36.9%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

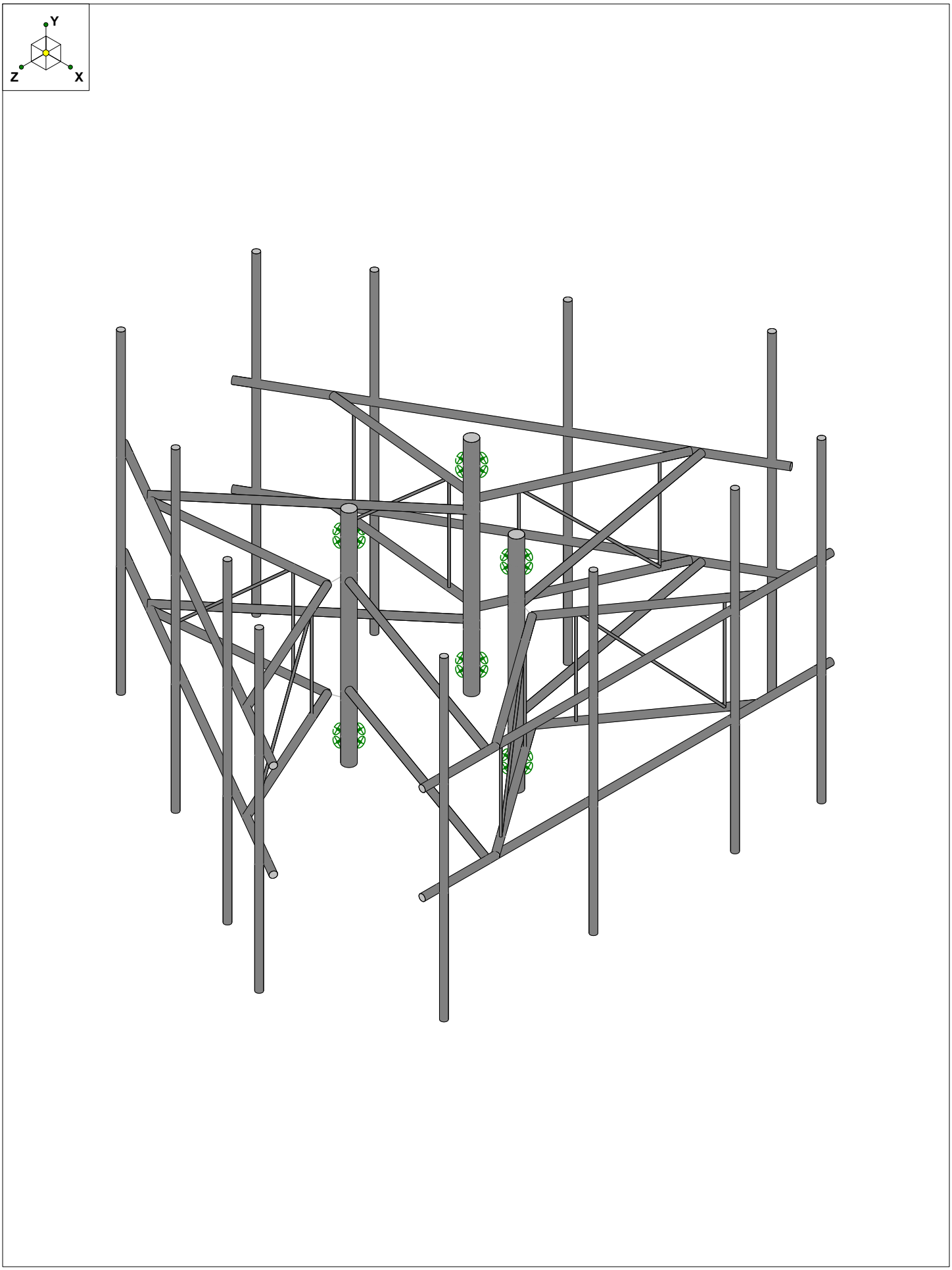
In order for the results of this analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

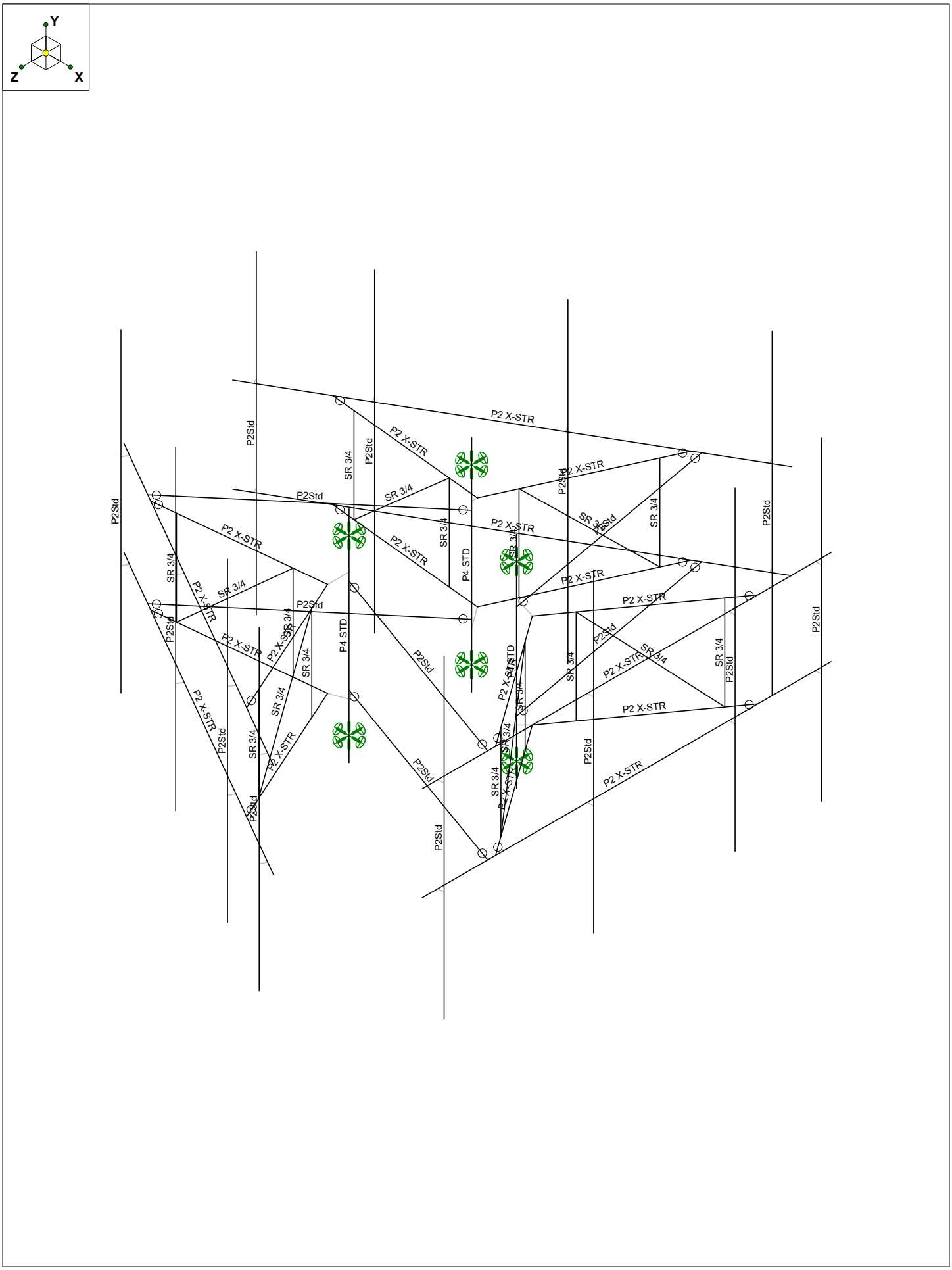
Sabre Drawing - C10857804

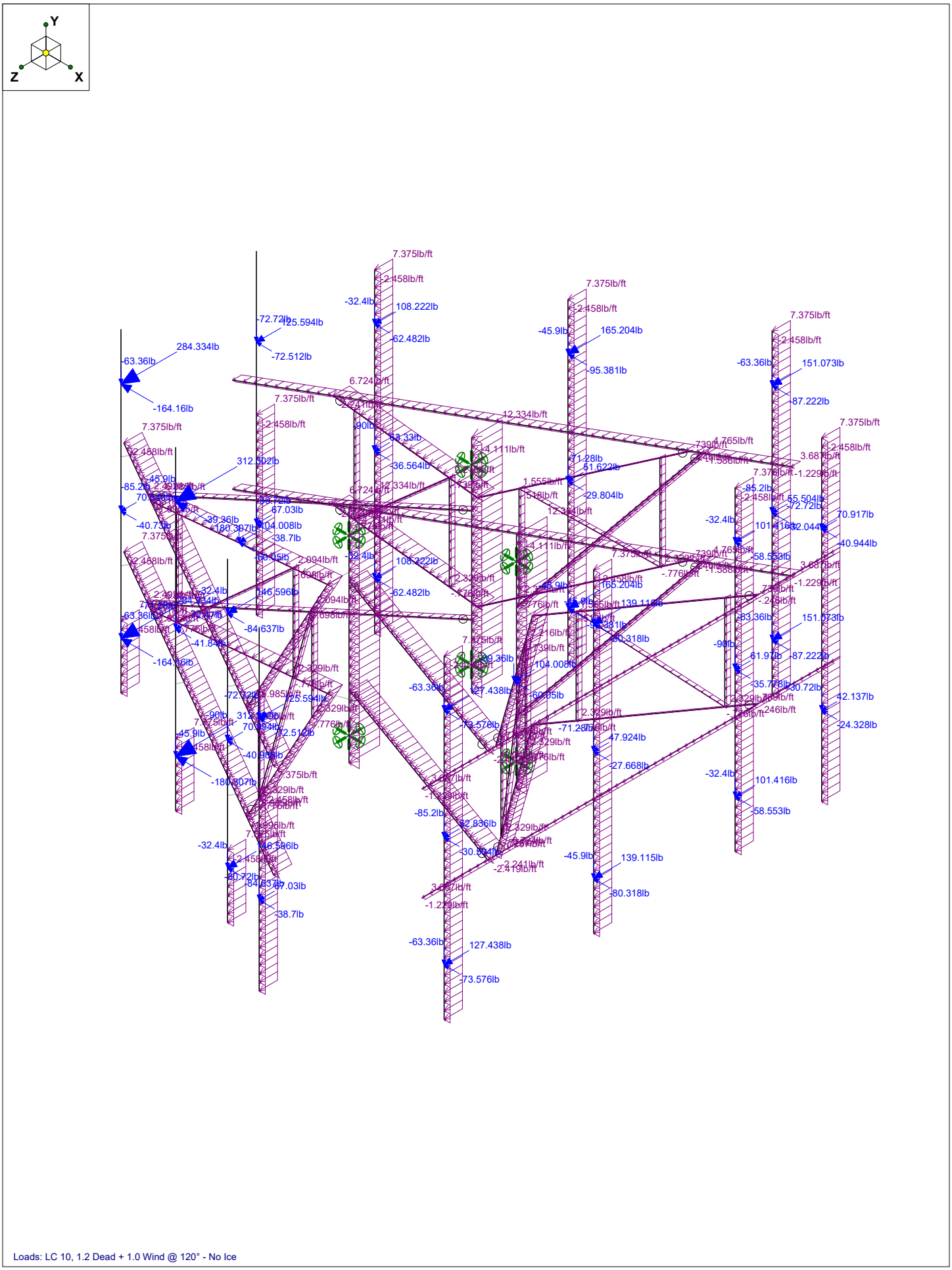
Engineering detail drawings have been provided in Appendix E – Supplemental Drawings.

APPENDIX A

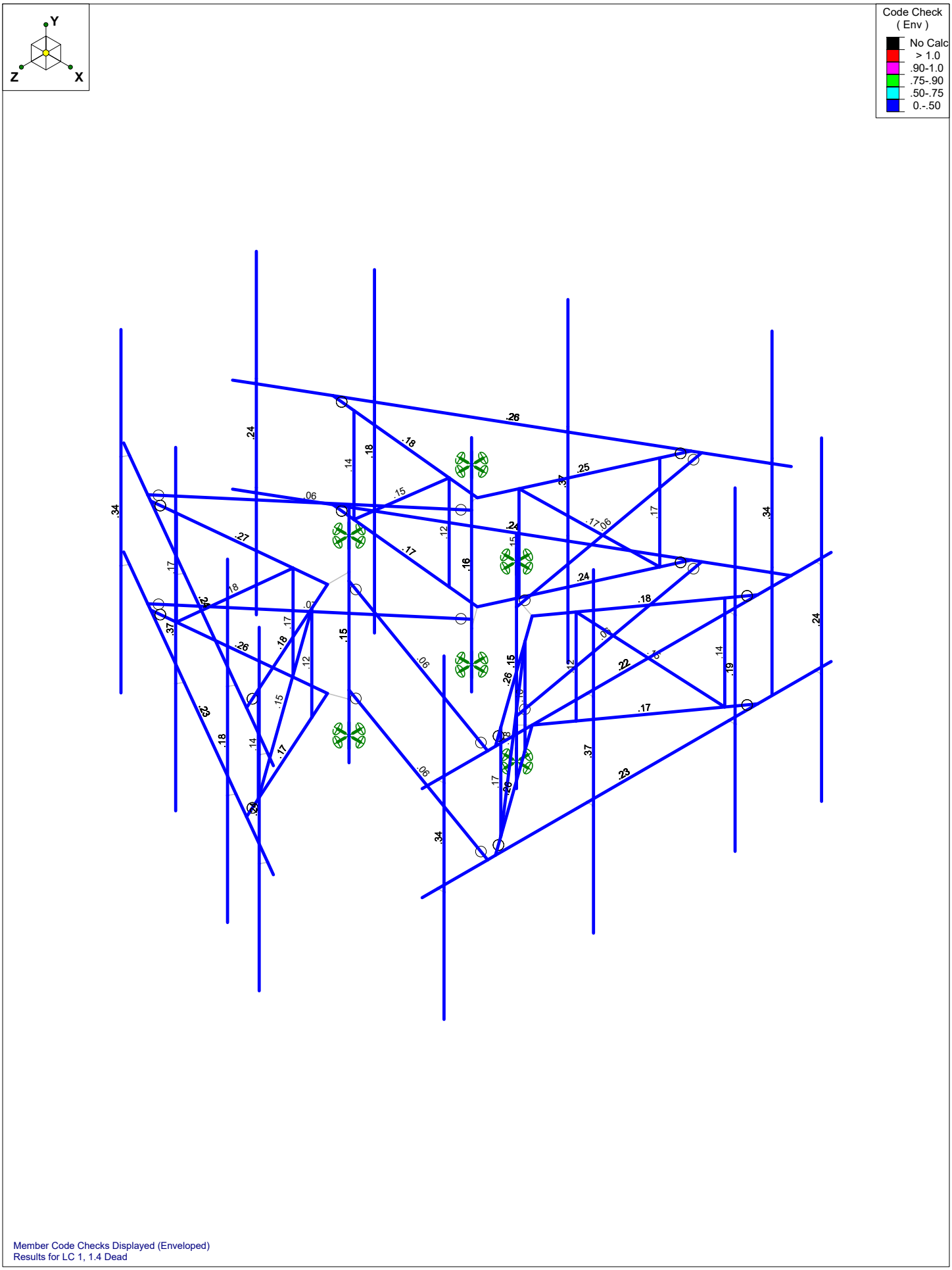
WIRE FRAME AND RENDERED MODELS


Y
Z
X

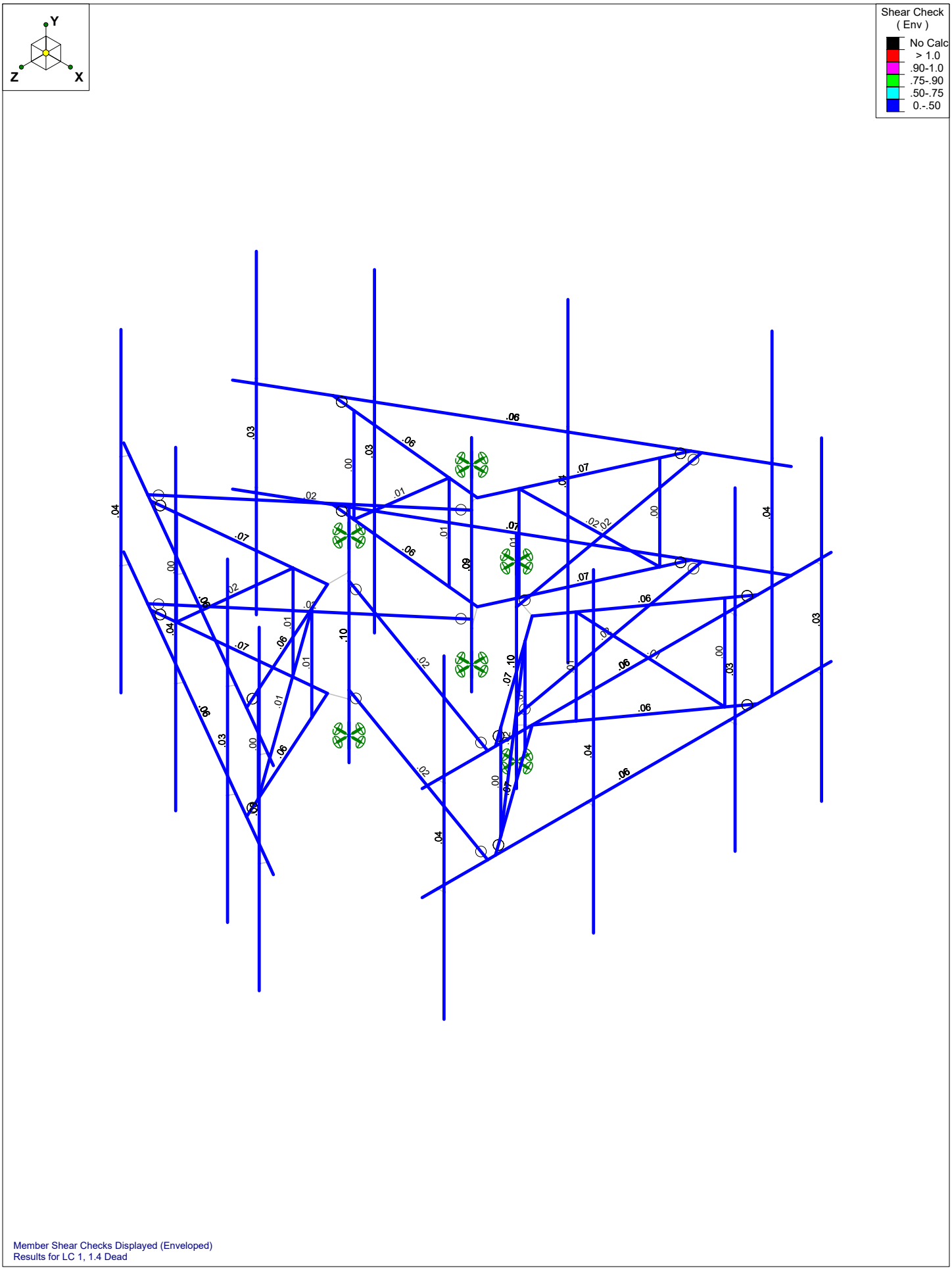

Y
Z
X
P2 X-STR
P2Std
SR 3/4
P4 STD



Loads: LC 10, 1.2 Dead + 1.0 Wind @ 120° - No Ice



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



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

APPENDIX B

SOFTWARE INPUT CALCULATIONS

TIA-222-H: Mount Analysis Wind Loading
803934 - CT SOMERS FD CAC
2020777.803934.02

Structure Information		
Structure Type:	Monopole	
Structure Height:	190	ft
z (Mount Centerline) =	157	ft
Gh (Mount Gust Effect Factor) =	1.00	
Risk Category:	II	

Code Specifications		
TIA/EIA Code:	H	
Ultimate Wind Speed (No Ice) =	117	mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50	mph (3-s gust)
Ice Thickness	1.5	in
Exposure Category	C	
Tower Base Elevation (AMSL)	197	ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice	Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K_a	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*
Face Horizontal	Pipe	156.000	2.375	2.375		2.38	Round	0.90	1.00	10.93	4.94	8.84
V-Boom Horizontal	Pipe	61.000	2.375	2.375		2.38	Round	0.90	1.00	10.93	3.60	8.84
V-Boom Bracing	Pipe	54.270	0.75	0.75		0.75	Round	0.90	1.00	3.45	2.76	5.36
Stiff Arm	Pipe	84.466	2.375	2.375		2.38	Round	0.90	1.00	10.93	3.97	8.84
Mount Pipe	Pipe	120.000	2.375	2.375		2.38	Round	0.90	1.00	10.93	4.52	8.84
Tower Connection Pipe	Pipe	84.000	4.5	4.5		4.50	Round	0.90	1.00	18.27	4.92	13.39

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K_a and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) DMP65R-BU8D	157	96	20.7	7.7	105.6	CFD	0%	0%	0.90	656.64	105.60	145.38	382.06
(3) HPA65R-BU8A	157	96	11.7	7.6	54	CFD	0%	0%	0.90	338.55	54.00	83.28	270.95
(3) OPA65R-BU8D	157	96	21	7.8	76.5	CFD	0%	0%	0.90	721.23	76.50	159.29	387.10
(3) 800 10121	157	54.5	10.3	5.9	51.2	CFD	0%	0%	0.90	154.80	51.20	40.35	139.62
(3) RRUS 4449 B5/B12	157	17.9	13.19	9.44	71	Flat	0%	0%	0.90	81.46	71.00	19.34	77.72
(3) RRUS 4478 B14_CCIV2	157	18.1	13.4	8.26	59.4	Flat	0%	0%	0.90	83.68	59.40	19.79	74.37
(3) RRUS 8843 B2/B66A_CCIV2	157	18	13.2	11.3	75	Flat	0%	0%	0.90	81.98	75.00	19.44	85.39
(6) LGP21401	157	14	7	2.7	17.5	Flat	0%	0%	0.90	33.81	17.50	9.33	28.42
(2) DC6-48-60-18-8F	157	31.25	11	11	32.8	Flat	0%	0%	0.90	120.10	32.80	27.56	114.49

*All forces are unfactored.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

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

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Face Horizontal	P2 X-STR	None	None	A572 Gr.50	Typical	1.477	.868	.868	1.736
2	V-Boom Horizontal	P2 X-STR	None	None	A572 Gr.50	Typical	1.477	.868	.868	1.736
3	V-Boom Bracing	SR 3/4	None	None	A572 Gr.50	Typical	.442	.016	.016	.031
4	Stiff Arm	P2Std	None	None	A572 Gr.50	Typical	1.075	.666	.666	1.331
5	Mount Pipe	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
6	Tower Connection Pipe	P4 STD	None	None	A572 Gr.50	Typical	3.174	7.233	7.233	14.465

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
1	A1	N50A	N54			Mount Pipe	None	None	A53 Gr.B	Typical
2	A2	N49A	N53			Mount Pipe	None	None	A53 Gr.B	Typical
3	A3	N48A	N52			Mount Pipe	None	None	A53 Gr.B	Typical
4	A4	N47A	N51			Mount Pipe	None	None	A53 Gr.B	Typical
5	M1	N1	N2			Face Horizontal	None	None	A572 Gr.50	Typical
6	M2	N3	N4			V-Boom Horizontal	None	None	A572 Gr.50	Typical
7	M3	N5	N4			V-Boom Horizontal	None	None	A572 Gr.50	Typical
8	M4	N10	N11			RIGID	None	None	RIGID	Typical
9	M5	N12	N13			RIGID	None	None	RIGID	Typical
10	M6	N14	N15			RIGID	None	None	RIGID	Typical
11	M7	N16	N17			RIGID	None	None	RIGID	Typical
12	M8	N18	N19			Face Horizontal	None	None	A572 Gr.50	Typical
13	M9	N20	N21			V-Boom Horizontal	None	None	A572 Gr.50	Typical
14	M10	N22	N21			V-Boom Horizontal	None	None	A572 Gr.50	Typical
15	M11	N27	N28			RIGID	None	None	RIGID	Typical
16	M12	N29	N30			RIGID	None	None	RIGID	Typical
17	M13	N31	N32			RIGID	None	None	RIGID	Typical
18	M14	N33	N34			RIGID	None	None	RIGID	Typical
19	AS	N8	N25			V-Boom Bracing	None	None	A572 Gr.50	Typical
20	M16	N25	N9			V-Boom Bracing	None	None	A572 Gr.50	Typical
21	M17	N9	N26			V-Boom Bracing	None	None	A572 Gr.50	Typical
22	M18	N7	N24			V-Boom Bracing	None	None	A572 Gr.50	Typical
23	M19	N24	N6			V-Boom Bracing	None	None	A572 Gr.50	Typical
24	M20	N6	N23			V-Boom Bracing	None	None	A572 Gr.50	Typical
25	M31A	N4	N58A			RIGID	None	None	RIGID	Typical
26	M32A	N21	N60			RIGID	None	None	RIGID	Typical
27	M33	N60A	N61			Tower Connection Pipe	None	None	A572 Gr.50	Typical
28	M31	N54A	N61A			Stiff Arm	None	None	A572 Gr.50	Typical
29	M32	N51B	N60B			Stiff Arm	None	None	A572 Gr.50	Typical
30	M37	N62A	N63			Face Horizontal	None	None	A572 Gr.50	Typical
31	M38	N64	N65			V-Boom Horizontal	None	None	A572 Gr.50	Typical
32	M39	N66	N65			V-Boom Horizontal	None	None	A572 Gr.50	Typical
33	M44	N79	N80			Face Horizontal	None	None	A572 Gr.50	Typical
34	M45	N81	N82			V-Boom Horizontal	None	None	A572 Gr.50	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
35	M46	N83	N82			V-Boom Horizontal	None	None	A572 Gr.50	Typical
36	M51	N69	N86			V-Boom Bracing	None	None	A572 Gr.50	Typical
37	M52	N86	N70			V-Boom Bracing	None	None	A572 Gr.50	Typical
38	M53	N70	N87			V-Boom Bracing	None	None	A572 Gr.50	Typical
39	M54	N68	N85			V-Boom Bracing	None	None	A572 Gr.50	Typical
40	M55	N85	N67			V-Boom Bracing	None	None	A572 Gr.50	Typical
41	M56	N67	N84			V-Boom Bracing	None	None	A572 Gr.50	Typical
42	M57	N65	N106			RIGID	None	None	RIGID	Typical
43	M58	N82	N107			RIGID	None	None	RIGID	Typical
44	M59	N109	N110			Tower Connection Pipe	None	None	A572 Gr.50	Typical
45	M63	N105	N122			Stiff Arm	None	None	A572 Gr.50	Typical
46	M64	N104	N121			Stiff Arm	None	None	A572 Gr.50	Typical
47	M69	N123	N124			Face Horizontal	None	None	A572 Gr.50	Typical
48	M70	N125	N126			V-Boom Horizontal	None	None	A572 Gr.50	Typical
49	M71	N127	N126			V-Boom Horizontal	None	None	A572 Gr.50	Typical
50	M76	N140	N141			Face Horizontal	None	None	A572 Gr.50	Typical
51	M77	N142	N143			V-Boom Horizontal	None	None	A572 Gr.50	Typical
52	M78	N144	N143			V-Boom Horizontal	None	None	A572 Gr.50	Typical
53	M83	N130	N147			V-Boom Bracing	None	None	A572 Gr.50	Typical
54	M84	N147	N131			V-Boom Bracing	None	None	A572 Gr.50	Typical
55	M85	N131	N148			V-Boom Bracing	None	None	A572 Gr.50	Typical
56	M86	N129	N146			V-Boom Bracing	None	None	A572 Gr.50	Typical
57	M87	N146	N128			V-Boom Bracing	None	None	A572 Gr.50	Typical
58	M88	N128	N145			V-Boom Bracing	None	None	A572 Gr.50	Typical
59	M89	N126	N167			RIGID	None	None	RIGID	Typical
60	M90	N143	N168			RIGID	None	None	RIGID	Typical
61	M91	N170	N171			Tower Connection Pipe	None	None	A572 Gr.50	Typical
62	M95	N166	N180			Stiff Arm	None	None	A572 Gr.50	Typical
63	M96	N165	N177			Stiff Arm	None	None	A572 Gr.50	Typical
64	B1	N147A	N151			Mount Pipe	None	None	A53 Gr.B	Typical
65	B2	N146A	N150			Mount Pipe	None	None	A53 Gr.B	Typical
66	B3	N145A	N149			Mount Pipe	None	None	A53 Gr.B	Typical
67	B4	N144A	N148A			Mount Pipe	None	None	A53 Gr.B	Typical
68	M77A	N128A	N129A			RIGID	None	None	RIGID	Typical
69	M78A	N130A	N131A			RIGID	None	None	RIGID	Typical
70	M79	N132	N133			RIGID	None	None	RIGID	Typical
71	M80	N134	N135			RIGID	None	None	RIGID	Typical
72	M81	N136	N137			RIGID	None	None	RIGID	Typical
73	M82	N138	N139			RIGID	None	None	RIGID	Typical
74	M83A	N140A	N141A			RIGID	None	None	RIGID	Typical
75	M84A	N142A	N143A			RIGID	None	None	RIGID	Typical
76	C1	N172A	N176A			Mount Pipe	None	None	A53 Gr.B	Typical
77	C2	N171A	N175A			Mount Pipe	None	None	A53 Gr.B	Typical
78	C3	N170A	N174			Mount Pipe	None	None	A53 Gr.B	Typical
79	C4	N169A	N173			Mount Pipe	None	None	A53 Gr.B	Typical
80	M89B	N153	N154			RIGID	None	None	RIGID	Typical
81	M90A	N155	N156			RIGID	None	None	RIGID	Typical
82	M91A	N157	N158			RIGID	None	None	RIGID	Typical
83	M92A	N159	N160			RIGID	None	None	RIGID	Typical
84	M93A	N161	N162			RIGID	None	None	RIGID	Typical
85	M94A	N163	N164			RIGID	None	None	RIGID	Typical
86	M95A	N165A	N166A			RIGID	None	None	RIGID	Typical
87	M96A	N167A	N168A			RIGID	None	None	RIGID	Typical

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N21						
2	N4						
3	N59	Reaction	Reaction	Reaction	Reaction		Reaction
4	N62	Reaction	Reaction	Reaction	Reaction		Reaction
5	N65						
6	N82						
7	N108	Reaction	Reaction	Reaction	Reaction		Reaction
8	N111	Reaction	Reaction	Reaction	Reaction		Reaction
9	N126						
10	N143						
11	N169	Reaction	Reaction	Reaction	Reaction		Reaction
12	N172	Reaction	Reaction	Reaction	Reaction		Reaction

Load Combinations

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0		0		0		0		0		0									
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	1.2	2	1	0		0		0		0		0									
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	.9	2	1	0		0		0		0		0									
4	1.2 Dead + 1.0 Wind @ 30° - No ...	Yes	Y		1	1.2	3	1	0		0		0		0		0									
5	0.9 Dead + 1.0 Wind @ 30° - No ...	Yes	Y		1	.9	3	1	0		0		0		0		0									
6	1.2 Dead + 1.0 Wind @ 60° - No ...	Yes	Y		1	1.2	4	1	0		0		0		0		0									
7	0.9 Dead + 1.0 Wind @ 60° - No ...	Yes	Y		1	.9	4	1	0		0		0		0		0									
8	1.2 Dead + 1.0 Wind @ 90° - No ...	Yes	Y		1	1.2	5	1	0		0		0		0		0									
9	0.9 Dead + 1.0 Wind @ 90° - No ...	Yes	Y		1	.9	5	1	0		0		0		0		0									
10	1.2 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	1.2	6	1	0		0		0		0		0									
11	0.9 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	.9	6	1	0		0		0		0		0									
12	1.2 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	1.2	7	1	0		0		0		0		0									
13	0.9 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	.9	7	1	0		0		0		0		0									
14	1.2 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	1.2	8	1	0		0		0		0		0									
15	0.9 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	.9	8	1	0		0		0		0		0									
16	1.2 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	1.2	9	1	0		0		0		0		0									
17	0.9 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	.9	9	1	0		0		0		0		0									
18	1.2 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	1.2	10	1	0		0		0		0		0									
19	0.9 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	.9	10	1	0		0		0		0		0									
20	1.2 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	1.2	11	1	0		0		0		0		0									
21	0.9 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	.9	11	1	0		0		0		0		0									
22	1.2 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	1.2	12	1	0		0		0		0		0									
23	0.9 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	.9	12	1	0		0		0		0		0									
24	1.2 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	1.2	13	1	0		0		0		0		0									
25	0.9 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	.9	13	1	0		0		0		0		0									
26	1.2 Dead + 1.0 Ice Wind @ 0°+ 1...	Yes	Y		1	1.2	15	1	14	1		1	0		0		0									
27	1.2 Dead + 1.0 Ice Wind @ 30°+ ...	Yes	Y		1	1.2	16	1	14	1		1	0		0		0									
28	1.2 Dead + 1.0 Ice Wind @ 60°+ ...	Yes	Y		1	1.2	17	1	14	1		1	0		0		0									
29	1.2 Dead + 1.0 Ice Wind @ 90°+ ...	Yes	Y		1	1.2	18	1	14	1		1	0		0		0									
30	1.2 Dead + 1.0 Ice Wind @ 120°...	Yes	Y		1	1.2	19	1	14	1		1	0		0		0									
31	1.2 Dead + 1.0 Ice Wind @ 150°...	Yes	Y		1	1.2	20	1	14	1		1	0		0		0									
32	1.2 Dead + 1.0 Ice Wind @ 180°...	Yes	Y		1	1.2	21	1	14	1		1	0		0		0									
33	1.2 Dead + 1.0 Ice Wind @ 210°...	Yes	Y		1	1.2	22	1	14	1		1	0		0		0									
34	1.2 Dead + 1.0 Ice Wind @ 240°...	Yes	Y		1	1.2	23	1	14	1		1	0		0		0									
35	1.2 Dead + 1.0 Ice Wind @ 270°...	Yes	Y		1	1.2	24	1	14	1		1	0		0		0									
36	1.2 Dead + 1.0 Ice Wind @ 300°...	Yes	Y		1	1.2	25	1	14	1		1	0		0		0									
37	1.2 Dead + 1.0 Ice Wind @ 330°...	Yes	Y		1	1.2	26	1	14	1		1	0		0		0									
38	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	2	.066	0		0		0		0									
39	1.2 Dead + 1.5 Live_M - A1 + 1.0...	Yes	Y		1	1.2	27	1.5	3	.066	0		0		0		0									

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
40	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	4	.066	0		0		0		0		0					
41	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	5	.066	0		0		0		0		0					
42	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	6	.066	0		0		0		0		0					
43	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	7	.066	0		0		0		0		0					
44	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	8	.066	0		0		0		0		0					
45	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	9	.066	0		0		0		0		0					
46	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	10	.066	0		0		0		0		0					
47	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	11	.066	0		0		0		0		0					
48	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	12	.066	0		0		0		0		0					
49	1.2 Dead + 1.5 Live_M - A1 + 1.0..	Yes	Y		1	1.2	27	1.5	13	.066	0		0		0		0		0					
50	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	2	.066	0		0		0		0		0					
51	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	3	.066	0		0		0		0		0					
52	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	4	.066	0		0		0		0		0					
53	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	5	.066	0		0		0		0		0					
54	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	6	.066	0		0		0		0		0					
55	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	7	.066	0		0		0		0		0					
56	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	8	.066	0		0		0		0		0					
57	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	9	.066	0		0		0		0		0					
58	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	10	.066	0		0		0		0		0					
59	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	11	.066	0		0		0		0		0					
60	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	12	.066	0		0		0		0		0					
61	1.2 Dead + 1.5 Live_M - A2 + 1.0..	Yes	Y		1	1.2	28	1.5	13	.066	0		0		0		0		0					
62	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	2	.066	0		0		0		0		0					
63	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	3	.066	0		0		0		0		0					
64	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	4	.066	0		0		0		0		0					
65	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	5	.066	0		0		0		0		0					
66	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	6	.066	0		0		0		0		0					
67	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	7	.066	0		0		0		0		0					
68	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	8	.066	0		0		0		0		0					
69	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	9	.066	0		0		0		0		0					
70	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	10	.066	0		0		0		0		0					
71	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	11	.066	0		0		0		0		0					
72	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	12	.066	0		0		0		0		0					
73	1.2 Dead + 1.5 Live_M - A3 + 1.0..	Yes	Y		1	1.2	29	1.5	13	.066	0		0		0		0		0					
74	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	2	.066	0		0		0		0		0					
75	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	3	.066	0		0		0		0		0					
76	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	4	.066	0		0		0		0		0					
77	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	5	.066	0		0		0		0		0					
78	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	6	.066	0		0		0		0		0					
79	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	7	.066	0		0		0		0		0					
80	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	8	.066	0		0		0		0		0					
81	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	9	.066	0		0		0		0		0					
82	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	10	.066	0		0		0		0		0					
83	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	11	.066	0		0		0		0		0					
84	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	12	.066	0		0		0		0		0					
85	1.2 Dead + 1.5 Live_M - A4 + 1.0..	Yes	Y		1	1.2	30	1.5	13	.066	0		0		0		0		0					
86	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	2	.066	0		0		0		0		0					
87	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	3	.066	0		0		0		0		0					
88	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	4	.066	0		0		0		0		0					
89	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	5	.066	0		0		0		0		0					
90	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	6	.066	0		0		0		0		0					
91	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	7	.066	0		0		0		0		0					
92	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	8	.066	0		0		0		0		0					
93	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	9	.066	0		0		0		0		0					
94	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	10	.066	0		0		0		0		0					
95	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	11	.066	0		0		0		0		0					
96	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	12	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
97	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y		1	1.2	31	1.5	13	.066	0		0		0		0		0					
98	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	2	.066	0		0		0		0		0					
99	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	3	.066	0		0		0		0		0					
100	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	4	.066	0		0		0		0		0					
101	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	5	.066	0		0		0		0		0					
102	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	6	.066	0		0		0		0		0					
103	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	7	.066	0		0		0		0		0					
104	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	8	.066	0		0		0		0		0					
105	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	9	.066	0		0		0		0		0					
106	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	10	.066	0		0		0		0		0					
107	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	11	.066	0		0		0		0		0					
108	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	12	.066	0		0		0		0		0					
109	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y		1	1.2	32	1.5	13	.066	0		0		0		0		0					
110	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	2	.066	0		0		0		0		0					
111	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	3	.066	0		0		0		0		0					
112	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	4	.066	0		0		0		0		0					
113	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	5	.066	0		0		0		0		0					
114	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	6	.066	0		0		0		0		0					
115	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	7	.066	0		0		0		0		0					
116	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	8	.066	0		0		0		0		0					
117	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	9	.066	0		0		0		0		0					
118	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	10	.066	0		0		0		0		0					
119	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	11	.066	0		0		0		0		0					
120	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	12	.066	0		0		0		0		0					
121	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y		1	1.2	33	1.5	13	.066	0		0		0		0		0					
122	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	2	.066	0		0		0		0		0					
123	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	3	.066	0		0		0		0		0					
124	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	4	.066	0		0		0		0		0					
125	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	5	.066	0		0		0		0		0					
126	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	6	.066	0		0		0		0		0					
127	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	7	.066	0		0		0		0		0					
128	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	8	.066	0		0		0		0		0					
129	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	9	.066	0		0		0		0		0					
130	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	10	.066	0		0		0		0		0					
131	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	11	.066	0		0		0		0		0					
132	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	12	.066	0		0		0		0		0					
133	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y		1	1.2	34	1.5	13	.066	0		0		0		0		0					
134	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	2	.066	0		0		0		0		0					
135	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	3	.066	0		0		0		0		0					
136	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	4	.066	0		0		0		0		0					
137	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	5	.066	0		0		0		0		0					
138	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	6	.066	0		0		0		0		0					
139	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	7	.066	0		0		0		0		0					
140	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	8	.066	0		0		0		0		0					
141	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	9	.066	0		0		0		0		0					
142	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	10	.066	0		0		0		0		0					
143	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	11	.066	0		0		0		0		0					
144	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	12	.066	0		0		0		0		0					
145	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y		1	1.2	35	1.5	13	.066	0		0		0		0		0					
146	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	2	.066	0		0		0		0		0					
147	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	3	.066	0		0		0		0		0					
148	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	4	.066	0		0		0		0		0					
149	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	5	.066	0		0		0		0		0					
150	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	6	.066	0		0		0		0		0					
151	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	7	.066	0		0		0		0		0					
152	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	8	.066	0		0		0		0		0					
153	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	9	.066	0		0		0		0		0					

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
154	1.2 Dead + 1.5 Live_M - C2 + 1.0...	Yes	Y		1	1.2	36	1.5	10	.066	0		0		0		0		0					
155	1.2 Dead + 1.5 Live_M - C2 + 1.0...	Yes	Y		1	1.2	36	1.5	11	.066	0		0		0		0		0					
156	1.2 Dead + 1.5 Live_M - C2 + 1.0...	Yes	Y		1	1.2	36	1.5	12	.066	0		0		0		0		0					
157	1.2 Dead + 1.5 Live_M - C2 + 1.0...	Yes	Y		1	1.2	36	1.5	13	.066	0		0		0		0		0					
158	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	2	.066	0		0		0		0		0					
159	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	3	.066	0		0		0		0		0					
160	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	4	.066	0		0		0		0		0					
161	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	5	.066	0		0		0		0		0					
162	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	6	.066	0		0		0		0		0					
163	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	7	.066	0		0		0		0		0					
164	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	8	.066	0		0		0		0		0					
165	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	9	.066	0		0		0		0		0					
166	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	10	.066	0		0		0		0		0					
167	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	11	.066	0		0		0		0		0					
168	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	12	.066	0		0		0		0		0					
169	1.2 Dead + 1.5 Live_M - C3 + 1.0...	Yes	Y		1	1.2	37	1.5	13	.066	0		0		0		0		0					
170	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	2	.066	0		0		0		0		0					
171	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	3	.066	0		0		0		0		0					
172	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	4	.066	0		0		0		0		0					
173	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	5	.066	0		0		0		0		0					
174	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	6	.066	0		0		0		0		0					
175	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	7	.066	0		0		0		0		0					
176	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	8	.066	0		0		0		0		0					
177	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	9	.066	0		0		0		0		0					
178	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	10	.066	0		0		0		0		0					
179	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	11	.066	0		0		0		0		0					
180	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	12	.066	0		0		0		0		0					
181	1.2 Dead + 1.5 Live_M - C4 + 1.0...	Yes	Y		1	1.2	38	1.5	13	.066	0		0		0		0		0					
182	1.2 Dead + 1.5 Live_V - M1 (Start)	Yes	Y		1	1.2	39	1.5	0		0		0		0		0		0					
183	1.2 Dead + 1.5 Live_V - M1 (Mid...	Yes	Y		1	1.2	40	1.5	0		0		0		0		0		0					
184	1.2 Dead + 1.5 Live_V - M1 (End)	Yes	Y		1	1.2	41	1.5	0		0		0		0		0		0					
185	1.2 Dead + 1.5 Live_V - M2 (Start)	Yes	Y		1	1.2	42	1.5	0		0		0		0		0		0					
186	1.2 Dead + 1.5 Live_V - M2 (Mid...	Yes	Y		1	1.2	43	1.5	0		0		0		0		0		0					
187	1.2 Dead + 1.5 Live_V - M2 (End)	Yes	Y		1	1.2	44	1.5	0		0		0		0		0		0					
188	1.2 Dead + 1.5 Live_V - M3 (Start)	Yes	Y		1	1.2	45	1.5	0		0		0		0		0		0					
189	1.2 Dead + 1.5 Live_V - M3 (Mid...	Yes	Y		1	1.2	46	1.5	0		0		0		0		0		0					
190	1.2 Dead + 1.5 Live_V - M3 (End)	Yes	Y		1	1.2	47	1.5	0		0		0		0		0		0					
191	1.2 Dead + 1.5 Live_V - M8 (Start)	Yes	Y		1	1.2	48	1.5	0		0		0		0		0		0					
192	1.2 Dead + 1.5 Live_V - M8 (Mid...	Yes	Y		1	1.2	49	1.5	0		0		0		0		0		0					
193	1.2 Dead + 1.5 Live_V - M8 (End)	Yes	Y		1	1.2	50	1.5	0		0		0		0		0		0					
194	1.2 Dead + 1.5 Live_V - M9 (Start)	Yes	Y		1	1.2	51	1.5	0		0		0		0		0		0					
195	1.2 Dead + 1.5 Live_V - M9 (Mid...	Yes	Y		1	1.2	52	1.5	0		0		0		0		0		0					
196	1.2 Dead + 1.5 Live_V - M9 (End)	Yes	Y		1	1.2	53	1.5	0		0		0		0		0		0					
197	1.2 Dead + 1.5 Live_V - M10 (Sta...	Yes	Y		1	1.2	54	1.5	0		0		0		0		0		0					
198	1.2 Dead + 1.5 Live_V - M10 (Mi...	Yes	Y		1	1.2	55	1.5	0		0		0		0		0		0					
199	1.2 Dead + 1.5 Live_V - M10 (End)	Yes	Y		1	1.2	56	1.5	0		0		0		0		0		0					
200	1.2 Dead + 1.5 Live_V - M37 (Sta...	Yes	Y		1	1.2	57	1.5	0		0		0		0		0		0					
201	1.2 Dead + 1.5 Live_V - M37 (Mi...	Yes	Y		1	1.2	58	1.5	0		0		0		0		0		0					
202	1.2 Dead + 1.5 Live_V - M37 (End)	Yes	Y		1	1.2	59	1.5	0		0		0		0		0		0					
203	1.2 Dead + 1.5 Live_V - M38 (Sta...	Yes	Y		1	1.2	60	1.5	0		0		0		0		0		0					
204	1.2 Dead + 1.5 Live_V - M38 (Mi...	Yes	Y		1	1.2	61	1.5	0		0		0		0		0		0					
205	1.2 Dead + 1.5 Live_V - M38 (End)	Yes	Y		1	1.2	62	1.5	0		0		0		0		0		0					
206	1.2 Dead + 1.5 Live_V - M39 (Sta...	Yes	Y		1	1.2	63	1.5	0		0		0		0		0		0					
207	1.2 Dead + 1.5 Live_V - M39 (Mi...	Yes	Y		1	1.2	64	1.5	0		0		0		0		0		0					
208	1.2 Dead + 1.5 Live_V - M39 (End)	Yes	Y		1	1.2	65	1.5	0		0		0		0		0		0					
209	1.2 Dead + 1.5 Live_V - M44 (Sta...	Yes	Y		1	1.2	66	1.5	0		0		0		0		0		0					
210	1.2 Dead + 1.5 Live_V - M44 (Mi...	Yes	Y		1	1.2	67	1.5	0		0		0		0		0		0					

Load Combinations (Continued)

	Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
211	1.2 Dead + 1.5 Live_V - M44 (End)	Yes	Y		1	1.2	68	1.5	0		0		0		0		0							
212	1.2 Dead + 1.5 Live_V - M45 (Sta...	Yes	Y		1	1.2	69	1.5	0		0		0		0		0							
213	1.2 Dead + 1.5 Live_V - M45 (Mi...	Yes	Y		1	1.2	70	1.5	0		0		0		0		0							
214	1.2 Dead + 1.5 Live_V - M45 (End)	Yes	Y		1	1.2	71	1.5	0		0		0		0		0							
215	1.2 Dead + 1.5 Live_V - M46 (Sta...	Yes	Y		1	1.2	72	1.5	0		0		0		0		0							
216	1.2 Dead + 1.5 Live_V - M46 (Mi...	Yes	Y		1	1.2	73	1.5	0		0		0		0		0							
217	1.2 Dead + 1.5 Live_V - M46 (End)	Yes	Y		1	1.2	74	1.5	0		0		0		0		0							
218	1.2 Dead + 1.5 Live_V - M69 (Sta...	Yes	Y		1	1.2	75	1.5	0		0		0		0		0							
219	1.2 Dead + 1.5 Live_V - M69 (Mi...	Yes	Y		1	1.2	76	1.5	0		0		0		0		0							
220	1.2 Dead + 1.5 Live_V - M69 (End)	Yes	Y		1	1.2	77	1.5	0		0		0		0		0							
221	1.2 Dead + 1.5 Live_V - M70 (Sta...	Yes	Y		1	1.2	78	1.5	0		0		0		0		0							
222	1.2 Dead + 1.5 Live_V - M70 (Mi...	Yes	Y		1	1.2	79	1.5	0		0		0		0		0							
223	1.2 Dead + 1.5 Live_V - M70 (End)	Yes	Y		1	1.2	80	1.5	0		0		0		0		0							
224	1.2 Dead + 1.5 Live_V - M71 (Sta...	Yes	Y		1	1.2	81	1.5	0		0		0		0		0							
225	1.2 Dead + 1.5 Live_V - M71 (Mi...	Yes	Y		1	1.2	82	1.5	0		0		0		0		0							
226	1.2 Dead + 1.5 Live_V - M71 (End)	Yes	Y		1	1.2	83	1.5	0		0		0		0		0							
227	1.2 Dead + 1.5 Live_V - M76 (Sta...	Yes	Y		1	1.2	84	1.5	0		0		0		0		0							
228	1.2 Dead + 1.5 Live_V - M76 (Mi...	Yes	Y		1	1.2	85	1.5	0		0		0		0		0							
229	1.2 Dead + 1.5 Live_V - M76 (End)	Yes	Y		1	1.2	86	1.5	0		0		0		0		0							
230	1.2 Dead + 1.5 Live_V - M77 (Sta...	Yes	Y		1	1.2	87	1.5	0		0		0		0		0							
231	1.2 Dead + 1.5 Live_V - M77 (Mi...	Yes	Y		1	1.2	88	1.5	0		0		0		0		0							
232	1.2 Dead + 1.5 Live_V - M77 (End)	Yes	Y		1	1.2	89	1.5	0		0		0		0		0							
233	1.2 Dead + 1.5 Live_V - M78 (Sta...	Yes	Y		1	1.2	90	1.5	0		0		0		0		0							
234	1.2 Dead + 1.5 Live_V - M78 (Mi...	Yes	Y		1	1.2	91	1.5	0		0		0		0		0							
235	1.2 Dead + 1.5 Live_V - M78 (End)	Yes	Y		1	1.2	92	1.5	0		0		0		0		0							

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1			52			
2	No Ice Wind 0 deg	None					52	57		
3	No Ice Wind 30 deg	None					104	110		
4	No Ice Wind 60 deg	None					104	114		
5	No Ice Wind 90 deg	None					52	55		
6	No Ice Wind 120 deg	None					104	114		
7	No Ice Wind 150 deg	None					104	110		
8	No Ice Wind 180 deg	None					52	57		
9	No Ice Wind 210 deg	None					104	110		
10	No Ice Wind 240 deg	None					104	114		
11	No Ice Wind 270 deg	None					52	55		
12	No Ice Wind 300 deg	None					104	114		
13	No Ice Wind 330 deg	None					104	110		
14	Ice Weight	None					52	57		
15	Ice Wind 0 deg	None					52	57		
16	Ice Wind 30 deg	None					104	110		
17	Ice Wind 60 deg	None					104	114		
18	Ice Wind 90 deg	None					52	55		
19	Ice Wind 120 deg	None					104	114		
20	Ice Wind 150 deg	None					104	110		
21	Ice Wind 180 deg	None					52	57		
22	Ice Wind 210 deg	None					104	110		
23	Ice Wind 240 deg	None					104	114		
24	Ice Wind 270 deg	None					52	55		
25	Ice Wind 300 deg	None					104	114		
26	Ice Wind 330 deg	None					104	110		
27	Live Load - A1	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Middle)	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M2 (Start)	None					1			
43	Live Load - M2 (Middle)	None					1			
44	Live Load - M2 (End)	None					1			
45	Live Load - M3 (Start)	None					1			
46	Live Load - M3 (Middle)	None					1			
47	Live Load - M3 (End)	None					1			
48	Live Load - M8 (Start)	None					1			
49	Live Load - M8 (Middle)	None					1			
50	Live Load - M8 (End)	None					1			
51	Live Load - M9 (Start)	None					1			
52	Live Load - M9 (Middle)	None					1			
53	Live Load - M9 (End)	None					1			
54	Live Load - M10 (Start)	None					1			
55	Live Load - M10 (Middle)	None					1			
56	Live Load - M10 (End)	None					1			
57	Live Load - M37 (Start)	None					1			
58	Live Load - M37 (Middle)	None					1			
59	Live Load - M37 (End)	None					1			
60	Live Load - M38 (Start)	None					1			
61	Live Load - M38 (Middle)	None					1			
62	Live Load - M38 (End)	None					1			
63	Live Load - M39 (Start)	None					1			
64	Live Load - M39 (Middle)	None					1			
65	Live Load - M39 (End)	None					1			
66	Live Load - M44 (Start)	None					1			
67	Live Load - M44 (Middle)	None					1			
68	Live Load - M44 (End)	None					1			
69	Live Load - M45 (Start)	None					1			
70	Live Load - M45 (Middle)	None					1			
71	Live Load - M45 (End)	None					1			
72	Live Load - M46 (Start)	None					1			
73	Live Load - M46 (Middle)	None					1			
74	Live Load - M46 (End)	None					1			
75	Live Load - M69 (Start)	None					1			
76	Live Load - M69 (Middle)	None					1			
77	Live Load - M69 (End)	None					1			
78	Live Load - M70 (Start)	None					1			
79	Live Load - M70 (Middle)	None					1			
80	Live Load - M70 (End)	None					1			
81	Live Load - M71 (Start)	None					1			
82	Live Load - M71 (Middle)	None					1			
83	Live Load - M71 (End)	None					1			
84	Live Load - M76 (Start)	None					1			

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
85	Live Load - M76 (Middle)	None					1			
86	Live Load - M76 (End)	None					1			
87	Live Load - M77 (Start)	None					1			
88	Live Load - M77 (Middle)	None					1			
89	Live Load - M77 (End)	None					1			
90	Live Load - M78 (Start)	None					1			
91	Live Load - M78 (Middle)	None					1			
92	Live Load - M78 (End)	None					1			

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N59	m...	1125.496	17	2128.951	27	1902.738	17	1.764	4	0	235	1.062	17
2		min	-3281.061	27	280.005	17	-2059.211	4	-1.684	17	0	1	-1.81	4
3	N62	m...	3299.278	33	2022.053	33	2036.998	16	1.75	16	0	235	1.004	5
4		min	-1091.305	5	252.347	5	-1880.936	5	-1.664	5	0	1	-1.857	33
5	N108	m...	3193.656	12	2136.708	31	143.229	25	1.218	31	0	235	2.476	12
6		min	-2279.951	25	266.551	25	-2454.264	31	-.177	25	0	1	-2.032	25
7	N111	m...	2102.602	13	2029.58	37	2423.422	37	1.291	37	0	235	2.375	24
8		min	-3017.93	24	239.073	13	-26.534	11	-.084	11	0	1	-1.891	13
9	N169	m...	1606.861	137	2088.806	35	3633.723	20	2.006	9	0	235	.996	8
10		min	-553.315	21	233.742	9	-2248.094	9	-2.679	20	0	1	-.687	21
11	N172	m...	571.358	9	1943.547	29	2104.016	21	1.874	21	0	235	1.033	20
12		min	-1608.251	143	198.712	21	-3495.567	8	-2.621	8	0	1	-.69	9
13	Totals:	m...	7624.348	15	11879.777	27	7927.066	21						
14		min	-7624.348	2	2944.352	17	-7927.067	8						

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y-...	phi*Mn ...	Cb	Eqn
1	A1	P2Std	.243	77.5	44	.031	77.5		43	10448.443	33862.5	1.998	1.998	4.0...	H1-1b
2	A2	P2Std	.187	78.75	2	.028	42.5		63	10448.443	33862.5	1.998	1.998	1.5...	H1-1b
3	A3	P2Std	.367	78.75	2	.037	78.75		3	10448.443	33862.5	1.998	1.998	1.5...	H1-1b
4	A4	P2Std	.337	78.75	2	.042	60		81	10448.443	33862.5	1.998	1.998	1.4...	H1-1b
5	M1	P2 X-STR	.228	29.25	4	.063	126.75		14	8056.956	66476.635	3.816	3.816	2.0...	H1-1b
6	M2	P2 X-STR	.255	61.612	34	.070	61.612		16	41447.891	66476.635	3.816	3.816	2.2...	H1-1b
7	M3	P2 X-STR	.167	61.612	31	.058	61.612		32	41447.891	66476.635	3.816	3.816	2.01	H1-1b
8	M8	P2 X-STR	.221	29.25	4	.065	27.625		18	8056.956	66476.635	3.816	3.816	3.0...	H1-1b
9	M9	P2 X-STR	.262	61.612	28	.069	61.612		4	41447.891	66476.635	3.816	3.816	2.6...	H1-1b
10	M10	P2 X-STR	.177	61.612	37	.061	61.612		26	41447.891	66476.635	3.816	3.816	2.1...	H1-1b
11	AS	SR 3/4	.116	0	35	.005	0		77	8255.694	19880.391	.249	.249	1	H1-1b*
12	M16	SR 3/4	.151	54.271	29	.009	54.271		18	3086.708	19880.391	.249	.249	2.8...	H1-1b
13	M17	SR 3/4	.136	0	32	.005	36		37	8255.694	19880.391	.249	.249	1	H1-1b
14	M18	SR 3/4	.164	0	33	.005	0		79	8255.694	19880.391	.249	.249	1	H1-1b*
15	M19	SR 3/4	.176	54.271	32	.016	54.271		12	3086.708	19880.391	.249	.249	2.8...	H1-1b
16	M20	SR 3/4	.172	0	32	.004	36		24	8255.694	19880.391	.249	.249	1	H1-1b
17	M33	P4 STD	.150	74.375	16	.095	63		33	113892.99	142832.18	16.168	16.168	2.5...	H1-1b
18	M31	P2Std	.055	0	11	.024	0		80	19534.596	48375	2.854	2.854	1.1...	H1-1b*
19	M32	P2Std	.055	0	10	.024	0		74	19534.596	48375	2.854	2.854	1.1...	H1-1b*
20	M37	P2 X-STR	.228	29.25	12	.063	126.75		22	8056.956	66476.635	3.816	3.816	2.0...	H1-1b
21	M38	P2 X-STR	.258	61.612	26	.067	61.612		24	41447.891	66476.635	3.816	3.816	2.3...	H1-1b
22	M39	P2 X-STR	.169	61.612	35	.058	61.612		36	41447.891	66476.635	3.816	3.816	2.0...	H1-1b
23	M44	P2 X-STR	.244	29.25	12	.063	27.625		2	8056.956	66476.635	3.816	3.816	2.9...	H1-1b
24	M45	P2 X-STR	.266	61.612	31	.070	61.612		31	41447.891	66476.635	3.816	3.816	2.6...	H1-1b
25	M46	P2 X-STR	.178	61.612	29	.062	61.612		31	41447.891	66476.635	3.816	3.816	2.1...	H1-1b
26	M51	SR 3/4	.116	0	27	.005	0		129	8255.694	19880.391	.249	.249	1	H1-1b*

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

	Member	Shape	Code C...	Loc[in]	LC	Shear ...	Loc[in]	Dir	LC	phi*Pnc [...	phi*Pnt [l...	phi*Mn y-...	phi*Mn ...	Cb	Eqn
27	M52	SR 3/4	.151	54.271	35	.009	54.271		2	3086.708	19880.391	.249	.249	2.8...	H1-1b
28	M53	SR 3/4	.138	0	35	.005	36		29	8255.694	19880.391	.249	.249	1	H1-1b
29	M54	SR 3/4	.165	0	37	.005	0		131	8255.694	19880.391	.249	.249	2.28	H1-1b*
30	M55	SR 3/4	.175	54.271	26	.019	54.271		20	3086.708	19880.391	.249	.249	2.8...	H1-1b
31	M56	SR 3/4	.172	0	26	.004	36		8	8255.694	19880.391	.249	.249	2.3...	H1-1b
32	M59	P4 STD	.153	9.625	12	.096	21		31	113892.99	142832.18	16.168	16.168	2.7...	H1-1b
33	M63	P2Std	.063	87.655	21	.024	0		132	19534.596	48375	2.854	2.854	1.1...	H1-1b*
34	M64	P2Std	.065	87.655	20	.024	0		126	19534.596	48375	2.854	2.854	1.1...	H1-1b*
35	M69	P2 X-STR	.241	29.25	20	.065	126.75		6	8056.956	66476.635	3.816	3.816	2.0...	H1-1b
36	M70	P2 X-STR	.238	61.612	29	.069	61.612		8	41447.891	66476.635	3.816	3.816	2.1...	H1-1b
37	M71	P2 X-STR	.168	61.612	27	.058	61.612		28	41447.891	66476.635	3.816	3.816	2.0...	H1-1b
38	M76	P2 X-STR	.257	29.25	20	.064	27.625		8	8056.956	66476.635	3.816	3.816	2.9...	H1-1b
39	M77	P2 X-STR	.247	61.612	35	.071	61.612		20	41447.891	66476.635	3.816	3.816	2.3...	H1-1b
40	M78	P2 X-STR	.175	61.612	33	.062	61.612		35	41447.891	66476.635	3.816	3.816	2.1...	H1-1b
41	M83	SR 3/4	.116	0	31	.005	0		179	8255.694	19880.391	.249	.249	2.4...	H1-1b*
42	M84	SR 3/4	.151	54.271	26	.010	54.271		8	3086.708	19880.391	.249	.249	2.8...	H1-1b
43	M85	SR 3/4	.138	0	26	.005	0		26	8255.694	19880.391	.249	.249	2.3...	H1-1b
44	M86	SR 3/4	.153	0	29	.005	36		179	8255.694	19880.391	.249	.249	1	H1-1b*
45	M87	SR 3/4	.172	54.271	29	.016	54.271		4	3086.708	19880.391	.249	.249	2.91	H1-1b
46	M88	SR 3/4	.173	0	29	.004	36		35	8255.694	19880.391	.249	.249	1	H1-1b
47	M91	P4 STD	.162	9.625	20	.094	21		35	113892.99	142832.18	16.168	16.168	2.6...	H1-1b
48	M95	P2Std	.061	87.655	5	.024	87.655		172	19534.596	48375	2.854	2.854	1.1...	H1-1b*
49	M96	P2Std	.065	87.655	4	.024	87.655		178	19534.596	48375	2.854	2.854	1.1...	H1-1b*
50	B1	P2Std	.243	77.5	96	.032	42.5		97	10448.443	33862.5	1.998	1.998	4.86	H1-1b
51	B2	P2Std	.183	78.75	10	.028	42.5		115	10448.443	33862.5	1.998	1.998	1.6...	H1-1b
52	B3	P2Std	.369	78.75	10	.037	78.75		11	10448.443	33862.5	1.998	1.998	1.47	H1-1b
53	B4	P2Std	.337	78.75	10	.042	60		132	10448.443	33862.5	1.998	1.998	1.5...	H1-1b
54	C1	P2Std	.243	77.5	136	.032	42.5		137	10448.443	33862.5	1.998	1.998	4.8...	H1-1b
55	C2	P2Std	.183	78.75	18	.028	42.5		167	10448.443	33862.5	1.998	1.998	1.6...	H1-1b
56	C3	P2Std	.369	78.75	18	.037	78.75		19	10448.443	33862.5	1.998	1.998	1.5...	H1-1b
57	C4	P2Std	.337	78.75	18	.041	60		172	10448.443	33862.5	1.998	1.998	1.5...	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Alpha Sector
2020777.803934.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	9.25	in
Bolt Distance Left-Right	5.1875	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	1.73	k-ft
Axial (T)	3.28	kips
Shear (V)	2.31	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	3.28	kips
Shear (V)	2.31	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	1.94	kips
Bolt Shear Force (V_{ub})	0.576	kips
$T_{ub}/\phi R_{nt}$	0.19119	
$V_{ub}/\phi R_{nv}$	0.08348	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04352	
Bolt Capacity =	19.1%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.82	kips
Bolt Shear Force (V_{ub})	0.576	kips
$T_{ub}/\phi R_{nt}$	0.08065	
$V_{ub}/\phi R_{nv}$	0.08348	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01347	
Bolt Capacity =	8.3%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Beta Sector
2020777.803934.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	9.25	in
Bolt Distance Left-Right	5.1875	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	1.79	k-ft
Axial (T)	3.36	kips
Shear (V)	2.32	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	3.36	kips
Shear (V)	2.32	kips

Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	2.00	kips
Bolt Shear Force (V_{ub})	0.581	kips
$T_{ub}/\phi R_{nt}$	0.19704	
$V_{ub}/\phi R_{nv}$	0.08416	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04591	
Bolt Capacity =	19.7%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.84	kips
Bolt Shear Force (V_{ub})	0.581	kips
$T_{ub}/\phi R_{nt}$	0.08263	
$V_{ub}/\phi R_{nv}$	0.08416	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01391	
Bolt Capacity =	8.4%	OK

TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Gamma Sector
2020777.803934.02

Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (An)	0.226	in^2
# of Bolts Total (n)	4	
Bolt Distance Up-Down	9.25	in
Bolt Distance Left-Right	5.1875	in
Bolt Grade	A307	
Bolt Tensile Strength (F_{ub})	60	ksi

RISA 3D Reactions (Up-Down)		
Moment (M)	2.00	k-ft
Axial (T)	2.92	kips
Shear (V)	2.40	kips

RISA 3D Reactions (Left -Right)		
Moment (M)	0.00	k-ft
Axial (T)	2.92	kips
Shear (V)	2.40	kips

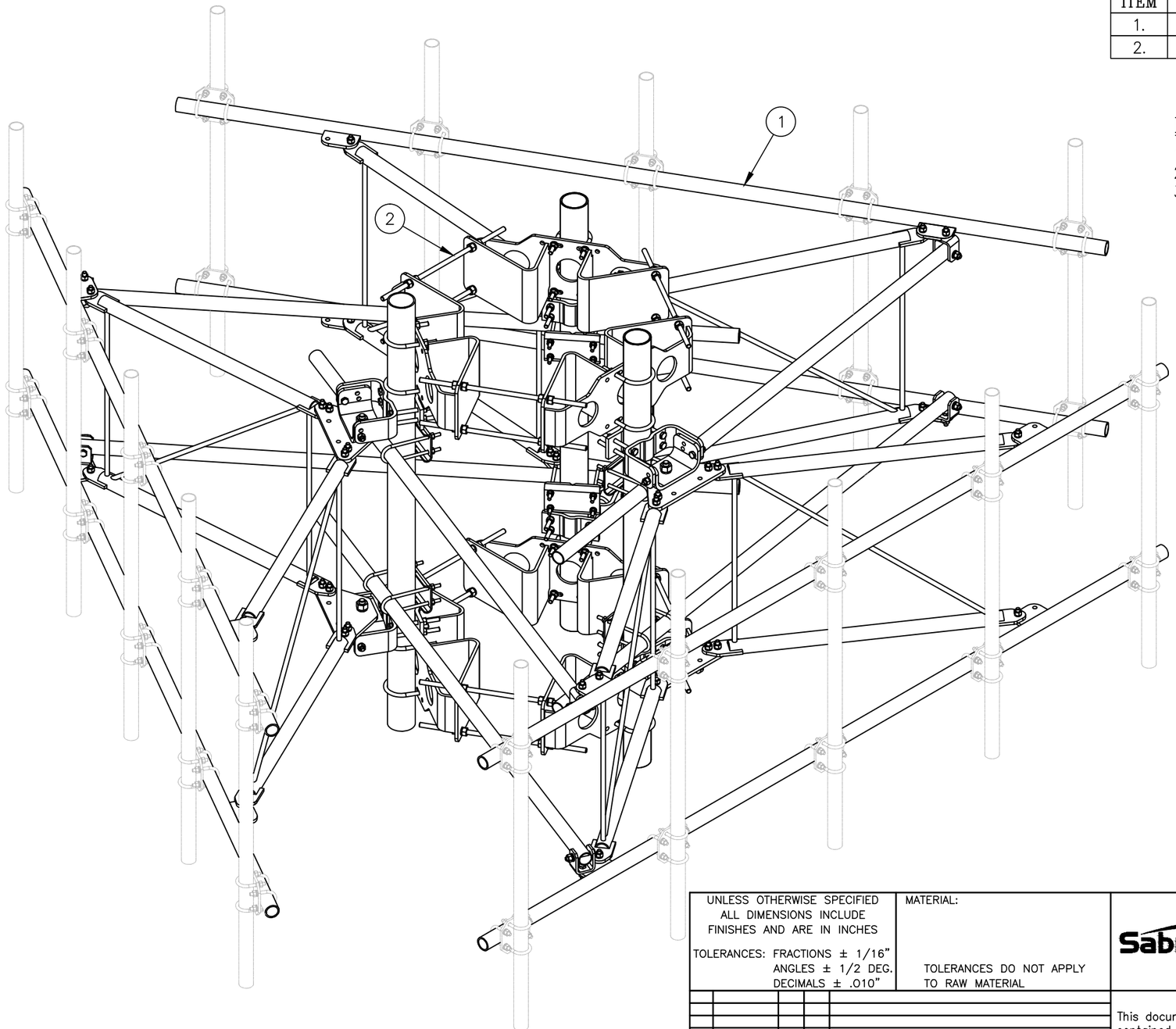
Bolt Capacity (Up-Down)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	2.03	kips
Bolt Shear Force (V_{ub})	0.600	kips
$T_{ub}/\phi R_{nt}$	0.19917	
$V_{ub}/\phi R_{nv}$	0.08699	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.04724	
Bolt Capacity =	19.9%	OK

Bolt Capacity (Left-Right)		
Nominal Tensile Strength (R_{nt})	13.560	kips
Nominal Shear Strength (R_{nv})	9.20	kips
Bolt Tensile Force (T_{ub})	0.73	kips
Bolt Shear Force (V_{ub})	0.600	kips
$T_{ub}/\phi R_{nt}$	0.07170	
$V_{ub}/\phi R_{nv}$	0.08699	
$(V_{ub}/\phi R_{nv})^2+(T_{ub}/\phi R_{nt})^2$	0.01271	
Bolt Capacity =	8.7%	OK

APPENDIX E

SUPPLEMENTAL DRAWINGS

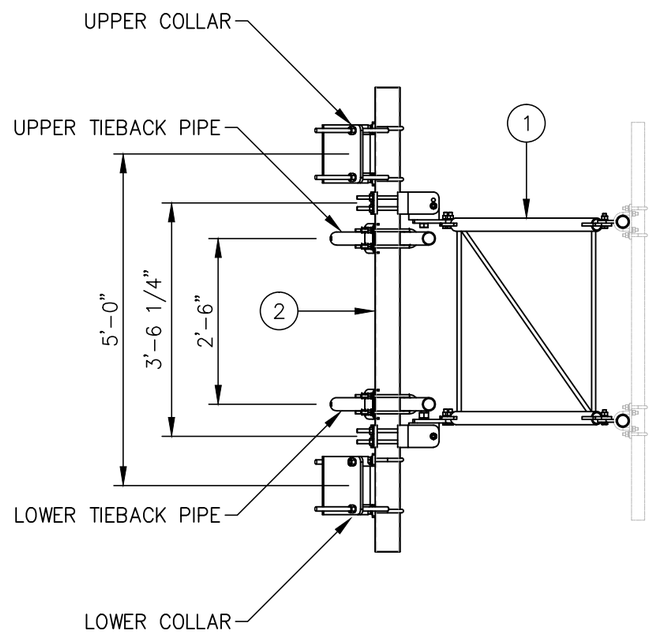
C10857804 12' EHD V-BOOM ASSEMBLIES W/TIEBACKS				
ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	3	C10857007C	12' EHD V-BOOM ASSEMBLY W/TIE BACKS	1533
2.	1	C10899055	4 1/2" O.D. MONOPOLE PIPE MOUNT ASSEMBLY	994
			TOTAL WEIGHT	2527



ISOMETRIC VIEW

NOTES:

1. MOUNTING PIPES & CROSSOVER PLATE KITS MUST BE PURCHASED SEPARATELY.
2. SEE DRAWING C10857007C FOR 12' V-BOOM ASSEMBLY.
3. SEE DRAWING C10899055 FOR 4 1/2" O.D. MONOPOLE PIPE MOUNT ASSEMBLY.



VIEW A-A
FROM PAGE 2

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"

MATERIAL:

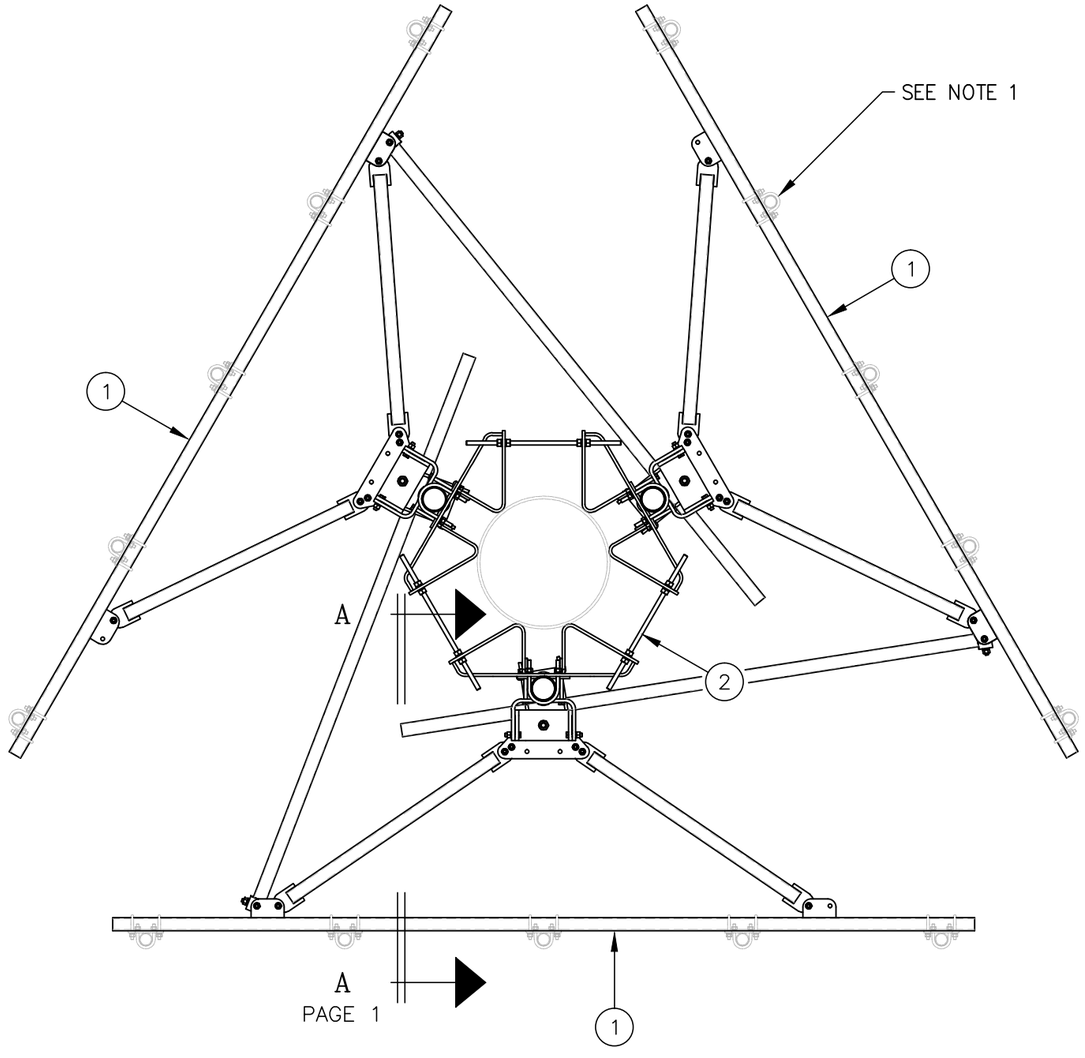
TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION

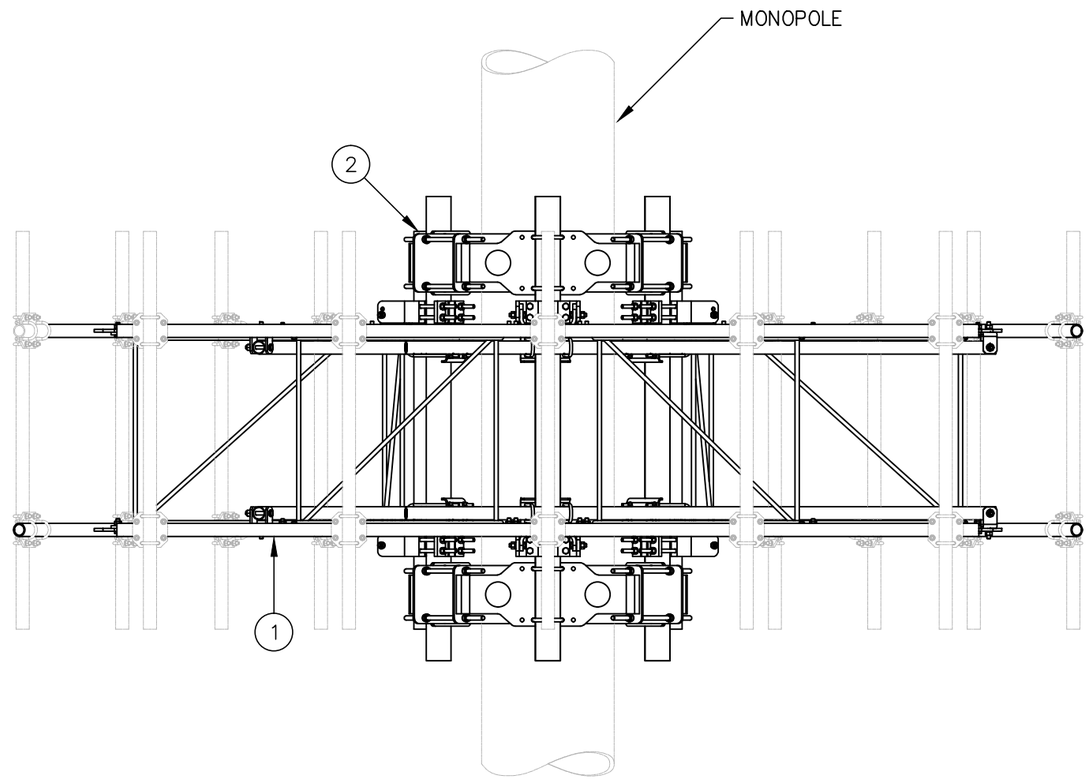
Sabre Industries™ Towers and Poles

12' EHD V-BOOM ASSEMBLIES W/TIEBACKS (3' STANDOFF) ON MONOPOLE PIPE MOUNT ASSEMBLY W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	9/24/18	B	C10857804	0
DRAWN BY	WRF			
CHECKED BY	WMN		SCALE None	PAGE 1 OF 2



PLAN VIEW



ELEVATION VIEW

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"	MATERIAL: TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION

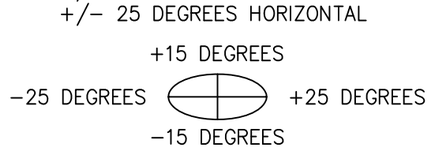
Sabre Industries™ Towers and Poles

12' EHD V-BOOM ASSEMBLIES W/TIEBACKS (3' STANDOFF) ON MONOPOLE PIPE MOUNT ASSEMBLY W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	09/24/18	B	C10857804	0
DRAWN BY	WRF			
CHECKED BY	WMN	SCALE None	PAGE 2 OF 2	

TIEBACK ANGLE RANGE DETAIL

+/− 15 DEGREES VERTICAL
+/− 25 DEGREES HORIZONTAL



ISOMETRIC VIEW

C10857007C 12' EHD V−BOOM ASSEMBLY W/TIEBACKS

ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	CW01222	WELDMENT, STANDOFF ARM	126
2.	2	CW01223	WELDMENT, FACE PIPE	147
3.	2	CS03109	PLATE, ROTATING	34
4.	1	CS03110	PLATE, PIVOTING (UPPER)	16
5.	1	CS03111	PLATE, LEG CLAMP (UPPER)	17
6.	1	CS03112	PLATE, PIVOTING (LOWER)	14
7.	1	CS03113	PLATE, LEG CLAMP (LOWER)	17
8.	2	CS03114	PLATE, LEG CLAMP (BACK)	14
9.	2	CS00098	PLATE, TIE BACK SWIVEL	5
10.	2	CS03285	PLATE, TIE BACK CLAMP	9
11.	2	CS03333	PIPE, TIE BACK	76
12.	2	C40026073	BOLT ASSEMBLY, 1 ø X 3 A325	4
13.	8	C40140004	BOLT ASSEMBLY, 5/8 ø X 8 A307	13
14.	2	C40026033	BOLT ASSEMBLY, 5/8 ø X 4 1/2 A325	2
15.	12	C40026025	BOLT ASSEMBLY, 5/8 ø X 2 1/2 A325	6
16.	6	C40026024	BOLT ASSEMBLY, 5/8 ø X 2 1/4 A325	3
17.	4	C40034183	U−BOLT ASSEMBLY, 1/2 ø X 2 9/16 C−C	6
18.	1	Z30992017	MOUNT CLASSIFICATION TAG C10857007C	1
19.	2	C40062103	STAINLESS STEEL SELF−LOCKING CABLE TIE	1
			TOTAL WEIGHT	511

PACKAGING NOTE

CK00386 INCLUDES ITEMS 1, 3, 4, 5, 6, 7, 12 & 15 (8 QTY)
CK00392 INCLUDES ITEMS 2, 8, 9, 10, 11, 13, 14, 15 (4 QTY), 16, 17, 18 & 19

INSTALLATION NOTES:

1. INSTALL MOUNT TO TOWER AS SHOWN, SO THAT WELDED STANDOFF DIAGONAL IS SLOPING DOWNWARD FROM TOWER END TO FACE PIPE END.
2. UPPER PIVOTING PLATE (ITEM 4) HAS THREE HOLES ON EACH SIDE AND UPPER LEG CLAMP PLATE (ITEM 5) HAS TWO HOLES ON EACH SIDE FOR TAPER ADJUSTMENT.
3. INSTALL PRODUCT EXACTLY AS SHOWN IN DRAWING, WITH ALL BOLTS FACING UPWARDS.

NOTES:

1. MOUNTING PIPES & CROSSOVER PLATE KITS MUST BE PURCHASED SEPARATELY.
2. QUANTITIES SHOWN IN LISTS OF MATERIAL ARE FOR ONE (1) V−BOOM ONLY.
3. THIS V−BOOM WILL MOUNT TO THE FOLLOWING:1 1/2"ø TO 5 9/16"ø ROUND LEG.
4. TIEBACKS MUST BE CONNECTED TO A RIGID MEMBER THAT PROVIDES ADEQUATE SUPPORT WITHIN THE LIMITS NOTED ABOVE IN THE TIEBACK ANGLE RANGE DETAIL UNLESS APPROVED BY THE ENGINEER OF RECORD.

UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES
TOLERANCES: FRACTIONS ± 1/16" ANGLES ± 1/2 DEG. DECIMALS ± .010"

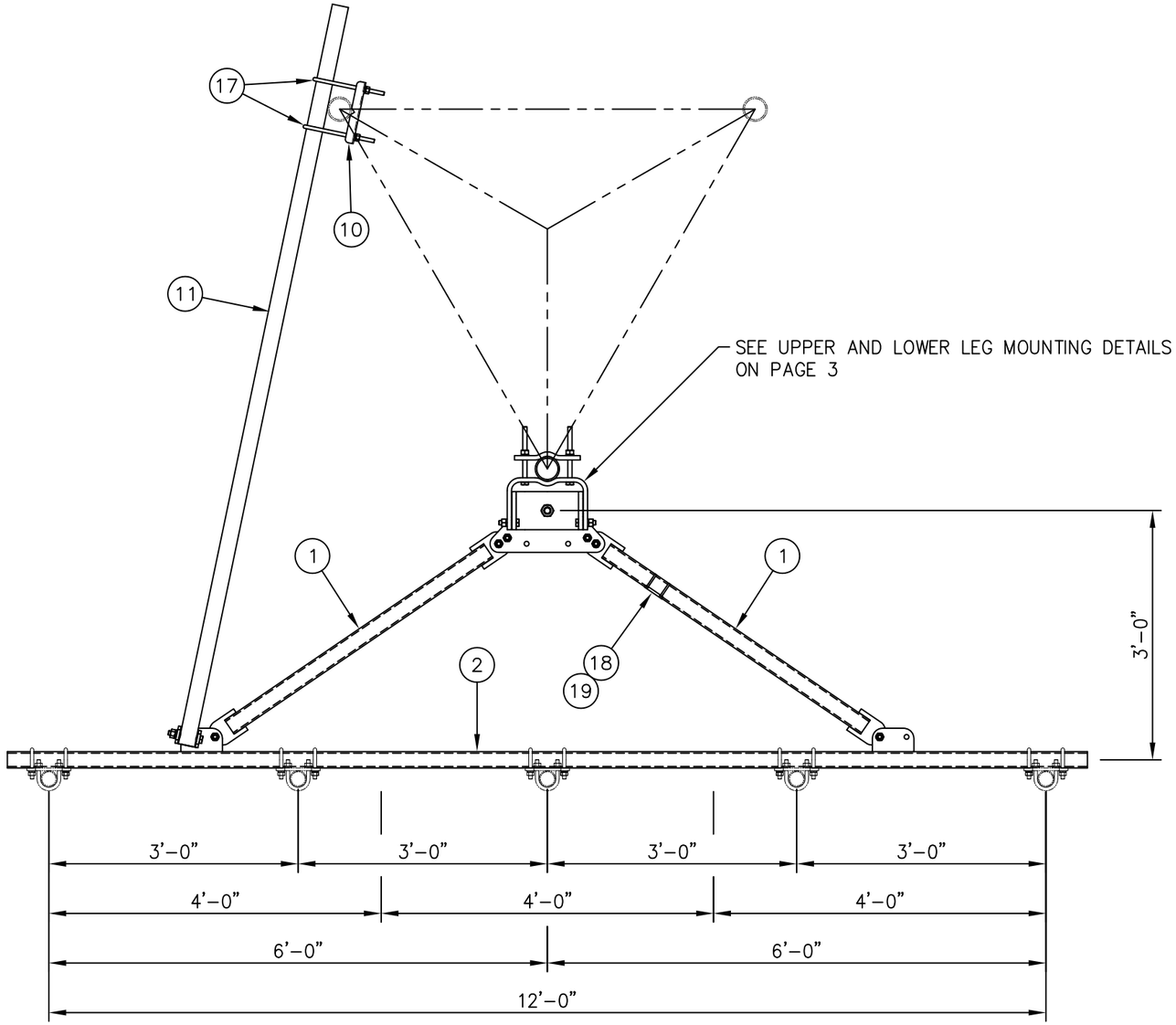
MATERIAL:
TOLERANCES DO NOT APPLY TO RAW MATERIAL

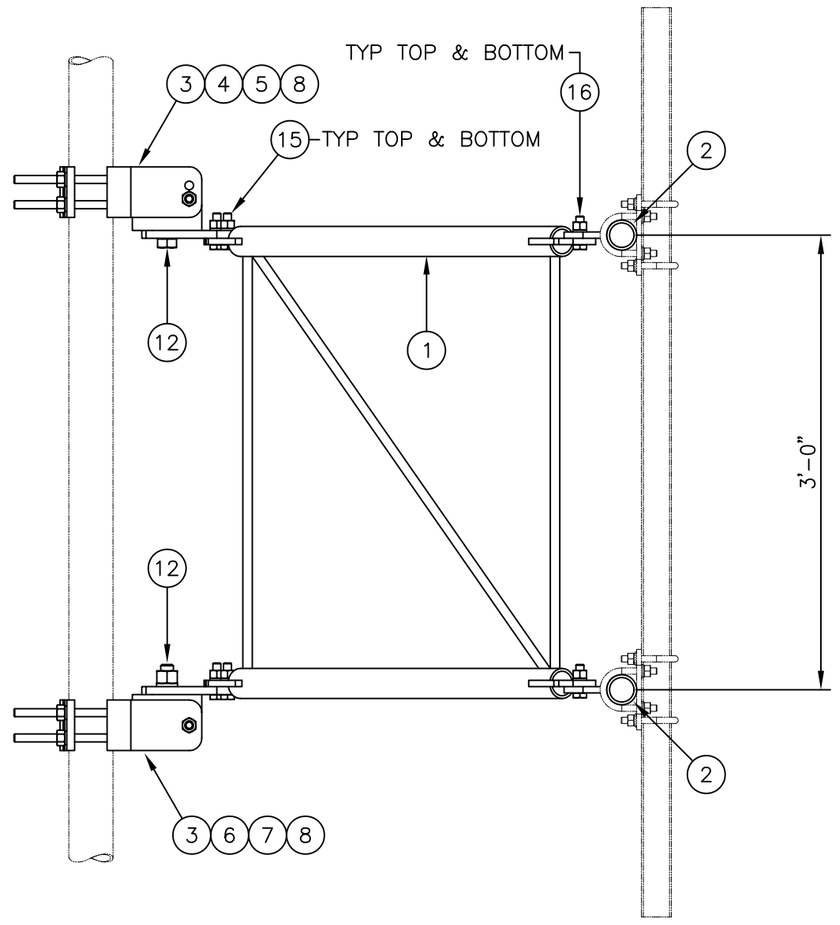
REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

Sabre Industries™ Towers and Poles

12' EHD V−BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

		SIZE	DRAWING NO.	REV
DATE	02/29/16	B	C10857007C	1
DRAWN BY	WRF			
CHECKED BY	KLE		SCALE None	PAGE 1 OF 3





SIDE VIEW

MOUNTING OPTIONS

SHOWING MOUNTING PIPE PLACEMENTS

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE
FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY
TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

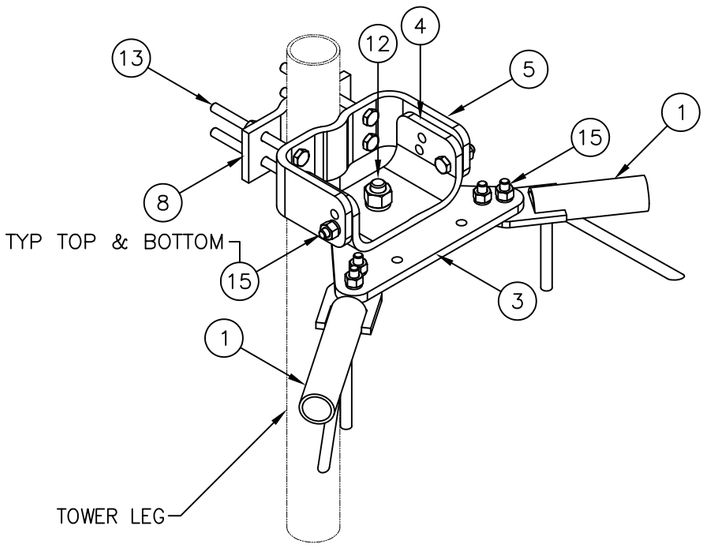
Sabre Industries™
Towers and Poles

12' EHD V-BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

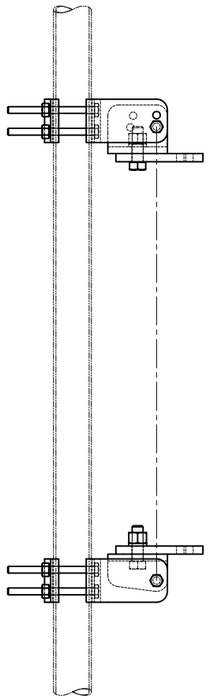
DATE	02/29/16
DRAWN BY	WRF
CHECKED BY	KLE

SIZE	DRAWING NO.	REV
B	C10857007C	1

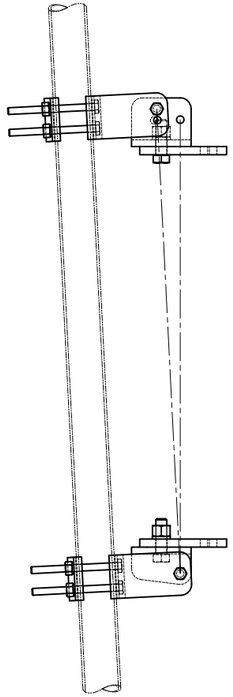
SCALE	PAGE
None	2 OF 3



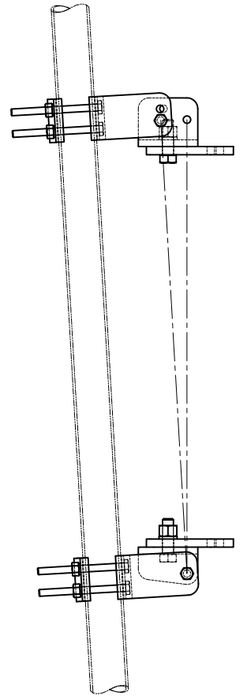
UPPER LEG MOUNTING DETAIL



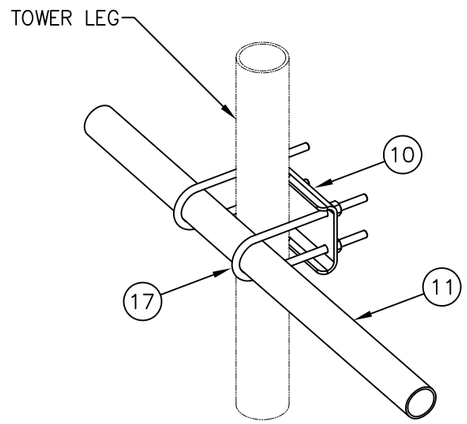
STRAIGHT
TOWER SECTION



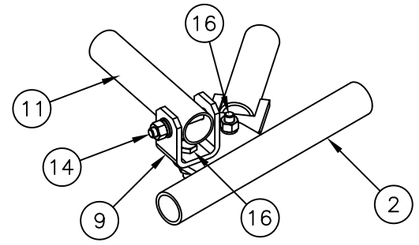
TAPERED
1'–9 IN 20' SLOPE



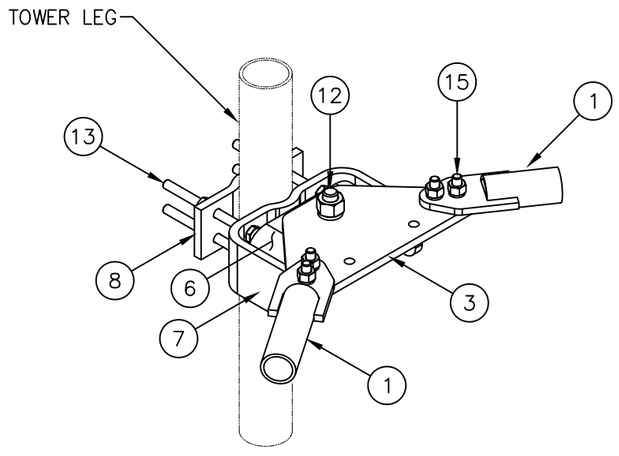
TAPERED
2' IN 20' SLOPE



TIE BACK DETAIL
AT TOWER LEG



TIE BACK DETAIL
AT ANTENNA MOUNTING FRAME



LOWER LEG MOUNTING DETAIL

-------PIVOTING OPTIONS-------

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE
FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY
TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	10/19/16	KLE	DEL	ADDED INSTALLATION NOTES

Sabre Industries™
Towers and Poles

12' EHD V-BOOM ASSEMBLY W/TIEBACKS (3' STANDOFF) W/NO ANTENNA MOUNTING PIPES

DATE	02/29/16
DRAWN BY	WRF
CHECKED BY	KLE

SIZE	DRAWING NO.	REV
B	C10857007C	1

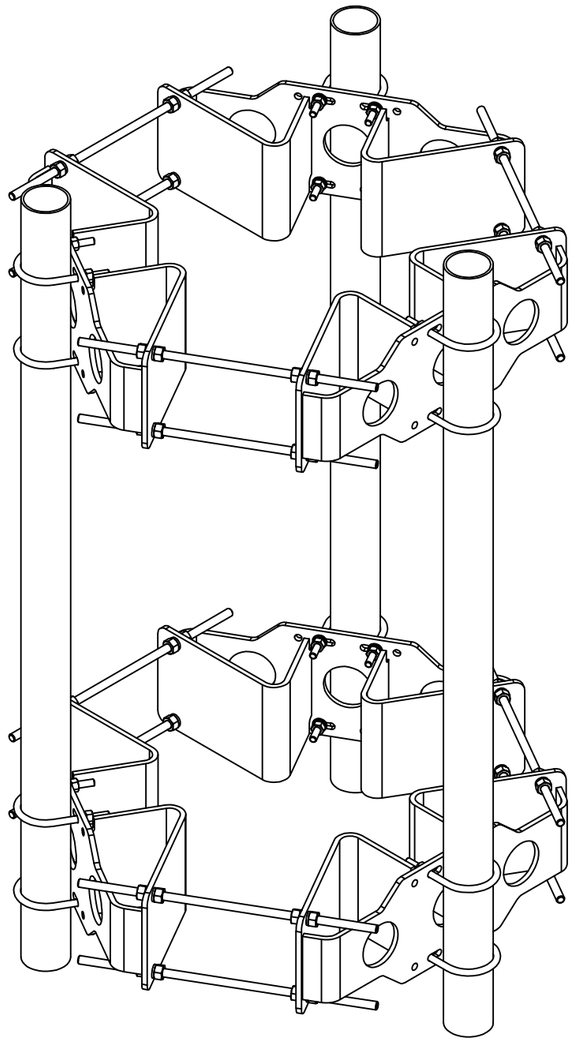
SCALE	PAGE
None	3 OF 3

NOTE:

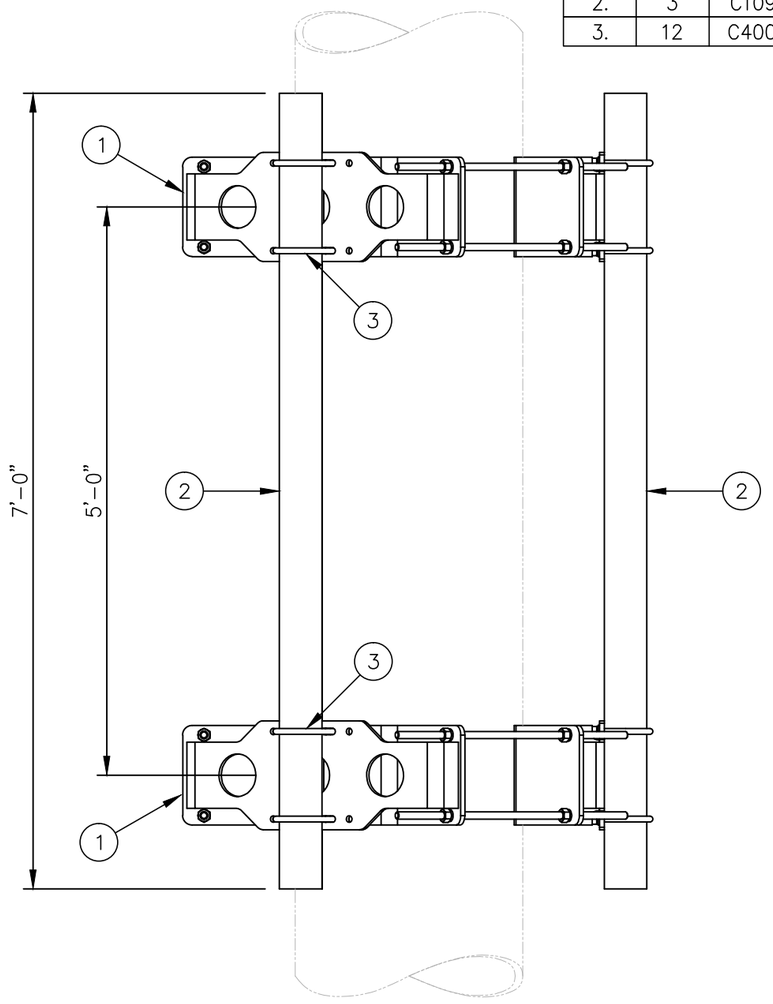
SEE DRAWING C10112378 FOR INSTALLATION OF TRI-COLLAR BRACKET ASSEMBLY

C10899055 4 1/2" O.D. PIPE MOUNT ASSEMBLY

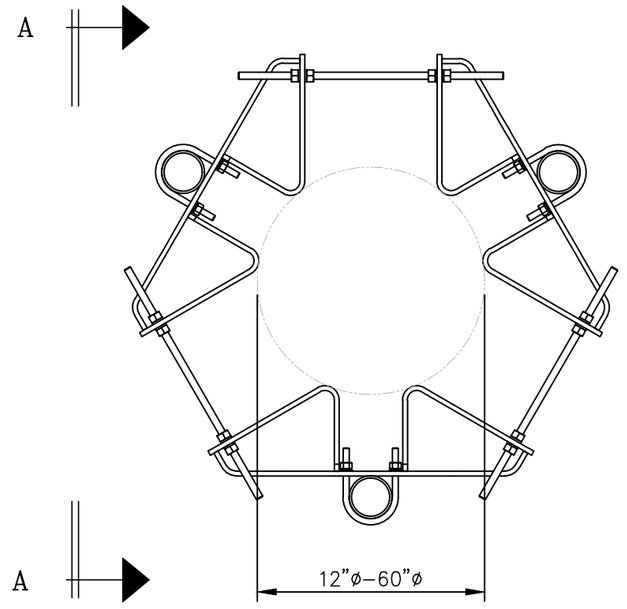
ITEM	QTY.	PART NO.	DESCRIPTION	WEIGHT
1.	2	C10112378	TRI-COLLAR BRACKET ASSEMBLY	732
2.	3	C10901407	PIPE, 4 1/2 O.D. X .237 X 7'-0	236
3.	12	C40034032	U-BOLT ASSEMBLY, 5/8 ø X 5 3/16 C-C	26
			TOTAL WEIGHT	994



ISOMETRIC VIEW



VIEW A-A



PLAN VIEW

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS INCLUDE FINISHES AND ARE IN INCHES

TOLERANCES: FRACTIONS ± 1/16"
ANGLES ± 1/2 DEG.
DECIMALS ± .010"

MATERIAL:

TOLERANCES DO NOT APPLY TO RAW MATERIAL

REV	DATE	DRW	CHK	DESCRIPTION
1	02/03/17	WRF	KLE	COLLAR WAS C10112301

Sabre Industries™
Towers and Poles

4 1/2" O.D. PIPE MOUNT ASSEMBLY FOR MONOPOLES (FITS 12" TO 60" DIAMETER)

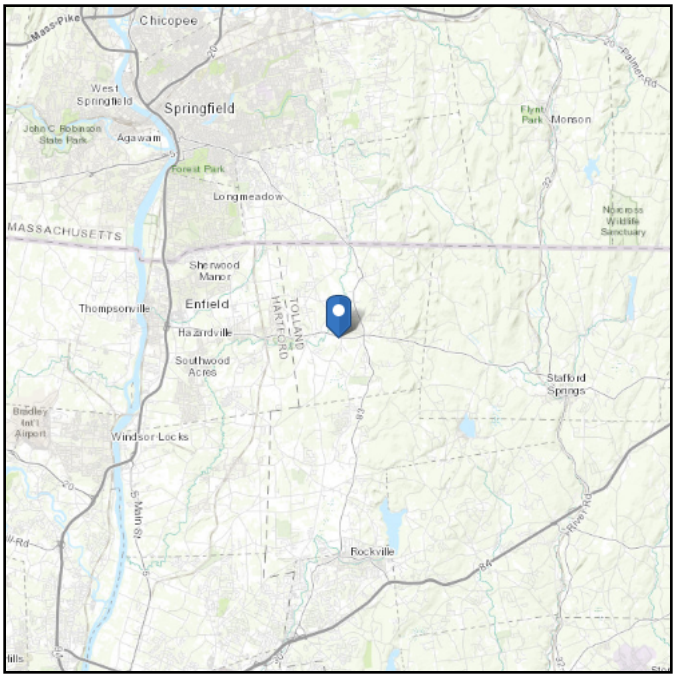
		SIZE	DRAWING NO.	REV
DATE	01/26/16	B	C10899055	1
DRAWN BY	WRF			
CHECKED BY	DLW	SCALE None	PAGE 1 OF 1	

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class:

Elevation: 197.69 ft (NAVD 88)
Latitude: 41.983744
Longitude: -72.465797



Wind

Results:

Wind Speed:	117 Vmph
10-year MRI	75 Vmph
25-year MRI	83 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:	Wed Oct 21 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.

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:	Wed Oct 21 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.

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: 803934

CT5857
400 Main Street
Somers, Connecticut 06071

December 9, 2020

EBI Project Number: 6220006189

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.33%**

December 9, 2020

Emissions Analysis for Site: 803934 - CT5857

EBI Consulting was directed to analyze the proposed AT&T facility located at **400 Main Street** in **Somers, 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 400 Main Street in Somers, 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 FN channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 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.

4) 4 LTE/5G 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) 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.

6) 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.

7) 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.

8) 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.

9) The antennas used in this modeling are the Kathrein 800-10121 for the 850 MHz channel(s), the CCI HPA-65R-BU8AA for the 1900 MHz channel(s), the CCI OPA65R-BU8DA for the 700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2100 MHz channel(s) in Sector A, the Kathrein 800-10121 for the 850 MHz channel(s), the CCI HPA-65R-BU8AA for the 1900 MHz channel(s), the CCI OPA65R-BU8DA for the 700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2100 MHz channel(s) in Sector B, the Kathrein 800-10121 for the 850 MHz channel(s), the CCI HPA-65R-BU8AA for the 1900 MHz channel(s), the CCI OPA65R-BU8DA for the 700 MHz channel(s), the CCI DMP65R-BU8DA for the 700 MHz / 850 MHz / 2100 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.

10) The antenna mounting height centerline of the proposed antennas is 157 feet above ground level (AGL).

11) 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.

12) 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:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121	Make / Model:	Kathrein 800-10121
Frequency Bands:	850 MHz	Frequency Bands:	850 MHz	Frequency Bands:	850 MHz
Gain:	11.25 dBd	Gain:	11.25 dBd	Gain:	11.25 dBd
Height (AGL):	157 feet	Height (AGL):	157 feet	Height (AGL):	157 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):	1,066.82	ERP (W):	1,066.82	ERP (W):	1,066.82
Antenna A1 MPE %:	**0.27%**	Antenna B1 MPE %:	**0.27%**	Antenna C1 MPE %:	**0.27%**
Antenna #:	**2**	Antenna #:	**2**	Antenna #:	**2**
Make / Model:	CCI HPA-65R-BU8AA	Make / Model:	CCI HPA-65R-BU8AA	Make / Model:	CCI HPA-65R-BU8AA
Frequency Bands:	1900 MHz	Frequency Bands:	1900 MHz	Frequency Bands:	1900 MHz
Gain:	16.8 dBd	Gain:	16.8 dBd	Gain:	16.8 dBd
Height (AGL):	157 feet	Height (AGL):	157 feet	Height (AGL):	157 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):	7,658.08	ERP (W):	7,658.08	ERP (W):	7,658.08
Antenna A2 MPE %:	**1.12%**	Antenna B2 MPE %:	**1.12%**	Antenna C2 MPE %:	**1.12%**
Antenna #:	**3**	Antenna #:	**3**	Antenna #:	**3**
Make / Model:	CCI OPA65R-BU8DA	Make / Model:	CCI OPA65R-BU8DA	Make / Model:	CCI OPA65R-BU8DA
Frequency Bands:	700 MHz	Frequency Bands:	700 MHz	Frequency Bands:	700 MHz
Gain:	13.55 dBd	Gain:	13.55 dBd	Gain:	13.55 dBd
Height (AGL):	157 feet	Height (AGL):	157 feet	Height (AGL):	157 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):	3,623.43	ERP (W):	3,623.43	ERP (W):	3,623.43
Antenna A3 MPE %:	**1.13%**	Antenna B3 MPE %:	**1.13%**	Antenna C3 MPE %:	**1.13%**
Antenna #:	**4**	Antenna #:	**4**	Antenna #:	**4**
Make / Model:	CCI DMP65R-BU8DA	Make / Model:	CCI DMP65R-BU8DA	Make / Model:	CCI DMP65R-BU8DA
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:	12.95 dBd / 13.85 dBd / 16.05 dBd	Gain:	12.95 dBd / 13.85 dBd / 16.05 dBd	Gain:	12.95 dBd / 13.85 dBd / 16.05 dBd
Height (AGL):	157 feet	Height (AGL):	157 feet	Height (AGL):	157 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):	13,481.93	ERP (W):	13,481.93	ERP (W):	13,481.93
Antenna A4 MPE %:	**2.92%**	Antenna B4 MPE %:	**2.92%**	Antenna C4 MPE %:	**2.92%**

Site Composite MPE %	
Carrier	**MPE %**
AT&T (Max at Sector A):	5.45%
Sprint	0.15%
Metro PCS	0.33%
Verizon	1.68%
T-Mobile	1.15%
Town	0.57%
Site Total MPE % :	9.33%

AT&T MPE % Per Sector	
AT&T Sector A Total:	5.45%
AT&T Sector B Total:	5.45%
AT&T Sector C Total:	5.45%
Site Total MPE % :	9.33%

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 850 MHz UMTS	2	533.41	157.0	1.56	850 MHz UMTS	567	0.27%
AT&T 1900 MHz LTE	4	1914.52	157.0	11.17	1900 MHz LTE	1000	1.12%
AT&T 700 MHz LTE FN	4	905.86	157.0	5.28	700 MHz LTE FN	467	1.13%
AT&T 700 MHz LTE	4	788.97	157.0	4.60	700 MHz LTE	467	0.99%
AT&T 850 MHz LTE/5G	4	970.64	157.0	5.66	850 MHz LTE/5G	567	1.00%
AT&T 2100 MHz LTE	4	1610.87	157.0	9.40	2100 MHz LTE	1000	0.94%
						Total:	**5.45%**

• 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:	5.45%
Sector B:	5.45%
Sector C:	5.45%
AT&T Maximum MPE % (Sector A):	5.45%
Site Total:	9.33%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.33%** 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.