Filed by:
G. Scott Shepherd, Sr. Property Specialist - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - GShepherd@sbasite.com

August 21, 2019

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

RE: Notice of Exempt Modification
26 Commerce Drive, North Branford, CT 06471
Latitude: 41.322138
Longitude: -72.773277
T-Mobile Site #: CT11390G_L600

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 154-foot level of the existing 155-foot Monopole Tower at 26 Commerce Drive, North Branford, CT. The 155-foot tower is owned by SBA Towers V, LLC. The property is owned by Artec Properties, LLC. T-Mobile now intends to install three (3) new 600/700 MHz antennas. The new antennas would be installed at the 154-foot level of the tower.

Planned Modifications:

TOWER

Remove:
- N/A

Remove and Replace:
- (3) 1-5/8" lines (Remove) - (3) 1-5/8" fiber (Replace)

Install New:
- (3) RFS APXVAARR24_43-U-NA20 600/700 MHz
- (3) Ericsson Radio 4449 B71+B12
- Modifications to T-Arms: (1)Support Rail Pipe Kit (MSHR35-2375); (1) V-Bracing Kit(MS-C1B-350P); (1) Collar Mount (MS-1436); (3) 2.0 X Pipe

Existing Equipment to Remain (including:
- (3) Ericsson - AIR 21 B2A/B4P – Panel 1900/2100 MHz
- (3) Ericsson - AIR 21 B4A B2P – Panel 2100 MHz
- (3) Ericsson - KRY 112 144/1 – TMA
- (3) T-Arms
- (9) 1-5/8" lines
- (1) 1-5/8" fiber

Entitlements:

- N/A

GROUND

Install New:

- Equipment inside (proposed) 6131 cabinet

This facility was approved Council on January 24, 2005 under Docket No. 295. Approval was given for a monopole no taller than 155-feet above ground level to provide telecommunications services to both public and private entities. A recalculated radio frequency report was to be provided when a change in operations caused a change in power density levels. Upon the establishment of any new State or federal radio frequency standards applicable to the facility, the facility was to be brought into compliance. The Certificate Holder was to permit public or private entities to share space on the tower for fair consideration, or to provide legal, technical, environmental, or economic reasons precluding such sharing. Reasonable space on the tower was to be provided for no compensation for any municipal antennas, provided they were compatible with the structural integrity of the tower. Any obsolete antennas were to be removed within 60 days. There were no further post construction stipulations set. Please see attached.

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 the Town of North Branford's Mayor, Michael J. Doody, and Zoning Enforcement Officer, Tom Hogarty, as well as to the property owner. (Separate notice is not being sent to tower owner, as it belongs to SBA.)

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. §16.50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.
2. The proposed modification will not require the extension of the site boundary.
3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.
4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.
5. The proposed modification will not cause a change or alteration in the physical or environmental characteristics of the site.
6. The existing structure and its foundation can support the proposed loading.

For the foregoing reasons, T-Mobile respectfully submits that the proposed modifications to the above-referenced telecommunication facility constitute an exempt modifications under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

J. Scott Shepherd

J. Scott Shepherd
Sr. Property Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581

508.251.0720 x3804 + T
508.366.2610 + F / 508.868.6000 + C
GShepherd@sbasite.com

Attachments

cc: Michael J. Doody, Mayor / with attachments
North Branford Town Hall, 909 Foxon Road, North Branford, CT 06471
Tom Hogarty, Zoning Enforcement Officer / with attachments
North Branford Town Hall, 909 Foxon Road, North Branford, CT 06471
Artec Properties LLC / with attachments
26 Commerce Drive, North Branford, CT 06471

Exhibit List

Exhibit 1	Check Copy	x
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	CSC 1/24/05
Exhibit 6	Construction Drawings	Chappell dated 7/17/19
Exhibit 7	Structural Analysis	TES dated 8/16/19
Exhibit 8	Post Mod Mount Analysis	TES 7/31/19
Exhibit 9	Mount Mod Drawings	TES dated 8/1/19
Exhibit 10	EME Report	Transcom 6/10/19

EXHIBIT 1

EXHIBIT 2

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

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.
Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com.FedEx will not be responsible for any claim in excess of $100 per package, whether the result of loss, damage, delay, non-delivery,misdelivery,or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim.Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental,consequential, or special is limited to the greater of $100 or the authorized declared value. Recovery cannot exceed actual documented loss.Maximum for items of extraordinary value is $1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our ServiceGuide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

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EXHIBIT 3

26 COMMERCE DR

Location	26 COMMERCE DR	**Mblu**	19/C 13-5/ / /
Acct#	000156	**Owner**	ARTEC PROPERTIES LLC
Assessment	$906,400	**Appraisal**	$1,294,800
PID	1373	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$787,700	$507,100	$1,294,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2015	$551,400	$355,000	$906,400

Owner of Record

Owner	ARTEC PROPERTIES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	26 COMMERCE DR NORTH BRANFORD, CT 06471-1250	**Book & Page**	472/1180
		Sale Date	12/30/2014

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
ARTEC PROPERTIES LLC	$0		472/1180	12/30/2014
ARTEC MACHINERY CORP	$0		140/ 074	06/17/1982

Building Information

Building 1 : Section 1

Year Built:	1984
Living Area:	27,700
Replacement Cost:	$1,576,753
Building Percent Good:	63
Replacement Cost Less Depreciation:	$993,400

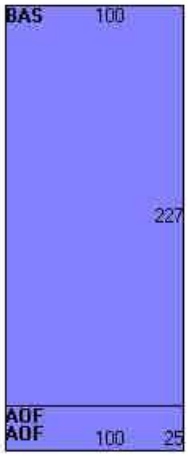
Building Attributes

Field	Description
STYLE	Pre-Eng Mfg
MODEL	Ind or Comm
Grade	Average
Stories:	1
Occupancy	5
Exterior Wall 1	Pre-finsh Metl
Exterior Wall 2	Brick Veneer
Roof Structure	Gable/Hip
Roof Cover	Metal/Tin
Interior Wall 1	Minim/Masonry
Interior Wall 2	Drywall/Sheet
Interior Floor 1	Concr-Finished
Interior Floor 2	Carpet
Heating Fuel	Gas
Heating Type	Forced Air-Duc
AC Type	None
Bldg Use	INDUSTRIAL MDL-96
Total Rooms	
Total Bedrms	00
Total Baths	0
1st Floor Use:	4000
Heat/AC	NONE
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	NONE
Rooms/Prtns	AVERAGE
Wall Height	16
% Comn Wall	0

Building Photo

(http://images.vgsi.com/photos/NorthBranfordCTPhotos//\00\00\

Building Layout



(http://images.vgsi.com/photos/NorthBranfordCTPhotos//Sketche

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	22,700	22,700
AOF	Office, (Average)	5,000	5,000
		27,700	27,700

Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
MEZ1	MEZZANINE-UNF	250 S.F.	$3,200	1
A/C	AIR CONDITION	2500 UNITS	$3,500	1
LFT2	LIFT-HEAVY	1 UNITS	$3,200	1
LDL1	LOAD LEVELERS	2 UNITS	$3,800	1

Land

Land Use

Use Code	4000
Description	INDUSTRIAL MDL-96
Zone	I2
Neighborhood	
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	2.02
Frontage	0
Depth	0
Assessed Value	$355,000
Appraised Value	$507,100

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
TW1	CELL TOWER			155 HEIGHT	$104,600	1
ELCB	ELECTRONIC COMM BLDG			360 S.F.	$60,800	1
ELCB	ELECTRONIC COMM BLDG			180 S.F.	$30,400	1
FN4	FENCE-8' CHAIN			192 L.F.	$3,400	1
	CONCRETE PAD			9	$0	1

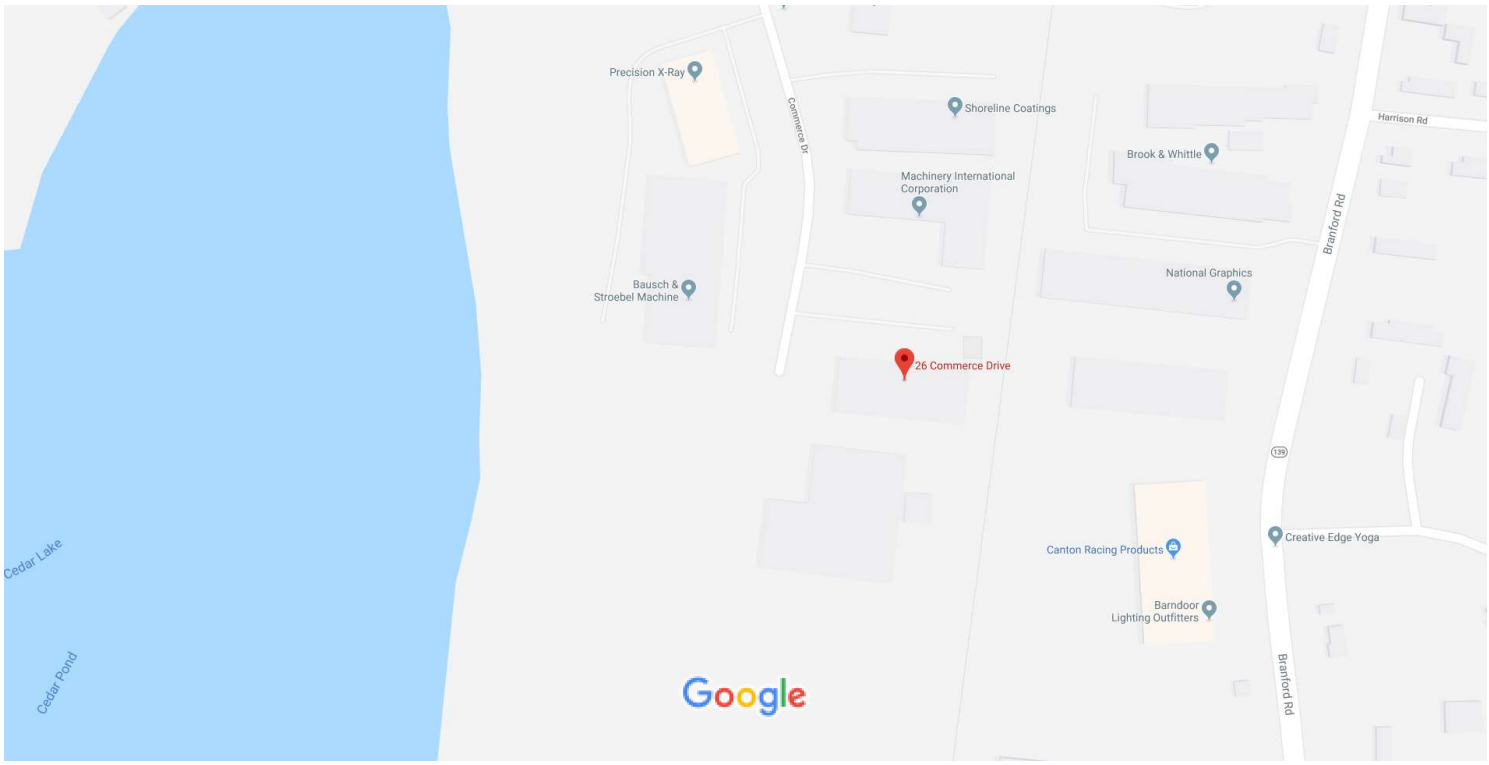
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$787,700	$507,100	$1,294,800
2016	$787,700	$507,100	$1,294,800
2015	$787,700	$507,100	$1,294,800

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$551,400	$355,000	$906,400
2016	$551,400	$355,000	$906,400
2015	$551,400	$355,000	$906,400

EXHIBIT 4

Google Maps 26 Commerce Dr



26 Commerce Dr

North Branford, CT 06471

Directions Save Nearby Send to your phone Share

At this location

Advantage Lawn Care LLC

Lawn care service · 26 Commerce Dr
Open until 5:00 PM

Artec Machine Systems

5.0 ★★★★★ (1)
Industrial equipment supplier · 26 Commerce Dr
Open until 4:30 PM

County Hill Landscaping Inc

Landscaper · 26 Commerce Dr

Financial & Benefits Concepts

Financial planner · 26 Commerce Dr # 2

Maco Machinery

Professional services · 26 Commerce Dr

Stephen W Whalen Law Offices

5.0 ★★★★★ (1)
Law firm · 26 Commerce Dr
Open until 5:30 PM

EXHIBIT 5

Connecticut Siting Council

Decisions

DOCKET NO. 295 – National Grid Communications, Inc. application for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance and operation of a wireless telecommunications facility in North Branford, Connecticut.	}	Connecticut
	}	Siting
	}	Council
		January 24, 2005

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a telecommunications facility including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Pubic Need, as provided by General Statutes § 16-50k, be issued to Tower Ventures II, LLC for the construction, maintenance and operation of a wireless telecommunications facility at 26 Commerce Drive, North Branford, Connecticut.

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

1. The tower shall be designed as a monopole and shall be constructed no taller than 155 feet above ground level to provide telecommunications services to both public and private entities.

2. The Certificate Holder shall prepare a Development and Management (D&M) Plan for this site in compliance with Sections 16-50j-75 through 16-50j-77 of the Regulations of Connecticut State Agencies. The D&M Plan shall be served on all parties and intervenors, as listed in the service list, and submitted to and approved by the Council prior to the commencement of facility construction and shall include:
   a. a final site plan(s) of site development to include specifications for the tower, tower foundation, T-bar mounted antennas, equipment building, access road, utility line, and landscaping; and
   b. construction plans for site clearing, water drainage, and erosion and sedimentation control consistent with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as amended.

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

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

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

6. The Certificate Holder shall provide reasonable space on the tower for no compensation for any municipal antennas, provided such antennas are compatible with the structural integrity of the tower.

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

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

9. Unless otherwise approved by the Council, this Decision and Order shall be void if the facility authorized herein is not operational within one year of the effective date of this Decision and Order or within one year after all appeals to this Decision and Order have been resolved. Any request for extensions of the period shall be filed with the Council not later than sixty days prior to expiration date of the Certificate and shall be served on all parties and intervenors, as listed in the service list. Any proposed modifications to this Decision and Order shall likewise be so served.

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

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

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

The parties and intervenors to this proceeding are:

Applicant	**Its Representative**
Tower Ventures II, LLC	Benjamin S. Proto, Jr., Esq. 2090 Cutspring Road Stratford, CT 06614 (203) 378-9595
Intervenor	
Southwestern Bell Mobile Systems, LLC d/b/a Cingular Wireless, LLC	Kenneth I. Spigle, Esq. Tower Ventures II, LLC 170 Westminster Street, Suite 701

	Providence, RI 02903 **Its Representative** Wendell G. Davis Blackwell, Davis & Spadacinni, LLC 158 East Center Street Manchester, CT 06040 (860) 432-0676 (860) 432-2926 fax

Content Last Modified on 10/3/2005 3:12:54 PM

EXHIBIT 6

CT390/TVI IND. PARK_FT

26 COMMERCE DRIVE
NORTH BRANFORD, CT 06471
NEW HAVEN COUNTY

SITE NO.: CT11390G

SITE TYPE: 155'± MONOPOLE

RF DESIGN GUIDELINE: 67D02C

APPROVALS

PROJECT MANAGER:	DATE:	ZONING/SITE ACQ.:	DATE:
CONSTRUCTION:	DATE:	OPERATIONS:	DATE:
RF ENGINEERING:	DATE:	TOWER OWNER:	DATE:

T-MOBILE TECHNICIAN SITE SAFETY NOTES

LOCATION	SPECIAL RESTRICTIONS
SECTOR A:	ACCESS BY CERTIFIED CLIMBER
SECTOR B:	ACCESS BY CERTIFIED CLIMBER
SECTOR C:	ACCESS BY CERTIFIED CLIMBER
SECTOR D:	ACCESS BY CERTIFIED CLIMBER
GPS/LMU:	UNRESTRICTED
RADIO CABINETS:	UNRESTRICTED
PPC DISCONNECT:	UNRESTRICTED
MAIN CIRCUIT D/C:	UNRESTRICTED
NIU/T DEMARC:	UNRESTRICTED
OTHER/SPECIAL:	NONE

SITE NOTES

1. THIS IS AN UNMANNED AND RESTRICTED ACCESS TELECOMMUNICATION FACILITY, AND IS NOT FOR HUMAN HABITATION. IT WILL BE USED FOR THE TRANSMISSION OF RADIO SIGNAL FOR THE PURPOSE OF PROVIDING PUBLIC CELLULAR SERVICE.
   - ADA COMPLIANCE NOT REQUIRED.
   - POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   - NO OUTDOOR STORAGE OR ANY SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACE THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. NEW CONSTRUCTION WILL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES.
   - BUILDING CODE: 2018 CONNECTICUT STATE BUILDING CODE
   - ELECTRICAL CODE: 2017 NATIONAL ELECTRICAL CODE
   - STRUCTURAL CODE: TIA/EIA-222-G STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.

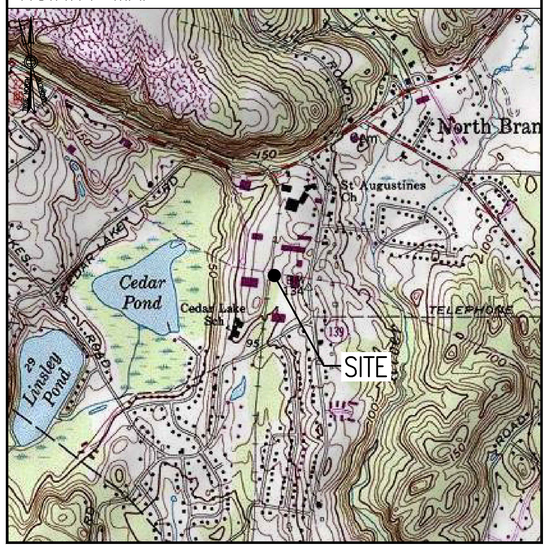
GENERAL NOTES

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAVE MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE OMNIPOINT REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWINGS/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDUMS OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NECESSARY CONSTRUCTION CONTROL SURVEYS, ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED TO CONSTRUCT ALL IMPROVEMENTS AS SHOWN HEREIN.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE WORK BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
12. THE CONTRACTOR SHALL MAKE NECESSARY PROMISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
13. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
14. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
15. THE CONTRACTOR SHALL NOTIFY THE PROJECT OWNER'S REPRESENTATIVE WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE LESSEE/LICENSEE REPRESENTATIVE.
16. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE JOB.
17. ALL UNDERGROUND UTILITY INFORMATION WAS DETERMINED FROM SURFACE INVESTIGATIONS AND EXISTING PLANS OF RECORD. THE CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES IN THE FIELD PRIOR TO ANY SITE WORK.

AT LEAST 72 HOURS PRIOR TO DIGGING, THE CONTRACTOR IS REQUIRED TO CALL DIG SAFE AT 811

VICINITY MAP

SCALE: 1" = 1000'-0"



DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE PROJECT OWNER'S REPRESENTATIVE IN WRITING OF DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

SHEET INDEX

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SPECIAL ZONING NOTE:
BASED ON INFORMATION PROVIDED BY T-MOBILE REGULATORY COMPLIANCE PROFESSIONALS AND LEGAL COUNSEL, THIS TELECOMMUNICATIONS EQUIPMENT DEPLOYMENT IS CONSIDERED AN ELIGIBLE FACILITY UNDER THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012, 47 USC 1455(A), SECTION 6409(A), AND IS SUBJECT TO AN ELIGIBLE FACILITY REQUEST, EXPEDITED REVIEW, AND LIMITED/PARTIAL ZONING PRE-EMPTION FOR LOCAL DISCRETIONARY PERMITS (VARIANCE, SPECIAL PERMIT, SITE PLAN REVIEW, OR ADMINISTRATIVE REVIEW).

PROJECT SUMMARY

SITE NUMBER:	CT11390G
SBA SITE NUMBER:	CT13610-A
SBA SITE NAME:	ARTEC
SITE ADDRESS:	26 COMMERCE DRIVE NORTH BRANFORD, CT 06471
PROPERTY OWNER:	ARTEC MACHINERY SYSTEMS 26 COMMERCE DRIVE NORTH BRANFORD, CT 06471
TOWER OWNER:	SBA TOWERS V, LLC 8501 CONGRESS AVENUE BOCA RATON, FL 33487 PHONE: 561-226-9523
COUNTY:	NEW HAVEN
ZONING DISTRICT:	I-2 (INDUSTRIAL ZONE)
STRUCTURE TYPE:	MONOPOLE
STRUCTURE HEIGHT:	155'±
APPLICANT:	T-MOBILE NORTHEAST LLC 15 COMMERCE WAY, SUITE B NORTON, MA 02766
SBA RSM:	STEPHEN ROTH PHONE: 860-539-4920 EMAIL: SRoth@sbasite.com
ARCHITECT:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
STRUCTURAL ENGINEER:	CHAPPELL ENGINEERING ASSOCIATES, LLC. 201 BOSTON POST ROAD WEST, SUITE 101 MARLBOROUGH, MA 01752
SITE CONTROL POINT:	LATITUDE: N.41.3221669° (41° 19' 19.70") LONGITUDE W.72.7732661° (72° 46' 23.80")

T-MOBILE NORTHEAST LLC
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STATE OF CONNECTICUT
CLEMENT J. SAMEK
No. 26876
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

REV.	DATE	DESCRIPTION	BY
1	07/17/19	ISSUED FOR CONSTRUCTION	CMC
0	06/21/19	ISSUED FOR REVIEW	MAM

SITE NUMBER:
CT11390G

SITE ADDRESS:
26 COMMERCE DRIVE
NORTH BRANFORD, CT 06471

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

1815.082

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWINGS, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR – T–MOBILE
   SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
   OWNER – T–MOBILE
   OEM – ORIGINAL EQUIPMENT MANUFACTURER

2. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.

3. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK.

4. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL, STATE AND FEDERAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

5. DRAWINGS PROVIDED HERE ARE NOT TO BE SCALED AND ARE INTENDED TO SHOW OUTLINE ONLY.

6. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

7. THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

8. IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR.

9. SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER, T1 CABLES AND GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR AND/OR LANDLORD PRIOR TO CONSTRUCTION.

10. THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER.

11. SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY.

12. SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION AND RETURN DISTURBED AREAS TO ORIGINAL CONDITIONS.

13. THE SUBCONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE SUBCONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.

14. SUBCONTRACTOR SHALL NOTIFY CHAPPELL ENGINEERING ASSOCIATES, LLC 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING TRENCHES, SEALING ROOF AND WALL PENETRATIONS AND POST DOWNS, FINISHING NEW WALLS OR FINAL ELECTRICAL CONNECTIONS FOR ENGINEERING REVIEW.

15. CONSTRUCTION SHALL COMPLY WITH ALL T–MOBILE STANDARDS AND SPECIFICATIONS.

16. SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.

17. THE EXISTING CELL SITES ARE IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK SHOULD BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.

18. IF THE EXISTING CELL SITE IS ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

SITE WORK GENERAL NOTES:

1. THE SUBCONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.

2. 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 ENGINEERS. EXTREME CAUTION SHOULD BE USED BY THE SUBCONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. SUBCONTRACTOR 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.

3. ALL SITE WORK SHALL BE AS INDICATED ON THE DRAWINGS AND PROJECT SPECIFICATIONS.

4. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

5. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE BTS EQUIPMENT AND TOWER AREAS.

6. 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.

7. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

8. 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 ENGINEERING, OWNER AND/OR LOCAL UTILITIES.

9. 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 IN THE PROJECT SPECIFICATIONS.

10. SUBCONTRACTOR 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.

11. THE SUBCONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE T–MOBILE SPECIFICATION FOR SITE SIGNAGE.

CONCRETE AND REINFORCING STEEL NOTES:

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. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS, UNLESS NOTED OTHERWISE. A HIGHER STRENGTH (4000PSI) MAY BE USED. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 381 CODE REQUIREMENTS

3. REINFORCING STEEL SHALL CONFORM TO ASTM A 615, GRADE 60, DEFORMED UNLESS NOTED OTHERWISE. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A 185 WELDED STEEL WIRE FABRIC UNLESS NOTED OTHERWISE. SPLICES SHALL BE CLASS "B" AND ALL HOOKS SHALL BE STANDARD, UNO.

4. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
   CONCRETE CAST AGAINST EARTH.....3 IN.
   CONCRETE EXPOSED TO EARTH OR WEATHER:
   #6 AND LARGER .....2 IN.
   #5 AND SMALLER & WWF .....1½ IN.
   CONCRETE NOT EXPOSED TO EARTH OR WEATHER
   OR NOT CAST AGAINST THE GROUND:
   SLAB AND WALL .....¾ IN.
   BEAMS AND COLUMNS .....1½ IN.

5. A CHAMFER ¾" SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNO, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

6. INSTALLATION OF CONCRETE EXPANSION/WEDGE ANCHORS SHALL BE PER MANUFACTURER'S WRITTEN RECOMMENDED PROCEDURE. THE ANCHOR BOLT, DOWEL OR ROD SHALL CONFORM TO THE MANUFACTURERS RECOMMENDATION FOR EMBEDMENT DEPTH OR AS SHOWN ON THE DRAWINGS. NO REBAR SHALL BE CUT WITHOUT PRIOR CONTRACTOR APPROVAL WHEN DRILLING HOLES IN CONCRETE. SPECIAL INSPECTIONS, REQUIRED BY GOVERNING CODES, SHALL BE PERFORMED IN ORDER TO MAINTAIN MANUFACTURER'S MAXIMUM ALLOWABLE LOADS. ALL EXPANSION/WEDGE ANCHORS SHALL BE STAINLESS STEEL OR HOT DIPPED GALVANIZED. EXPANSION BOLTS SHALL BE PROVIDED BY SIMPSON OR APPROVED EQUAL.

7. CONCRETE CYLINDER TIES ARE NOT REQUIRED FOR SLAB ON GRADE WHEN CONCRETE IS LESS THAN 50 CUBIC YARDS (IBC1905.6.2.3) IN THAT EVENT THE FOLLOWING RECORDS SHALL BE PROVIDED BY THE CONCRETE SUPPLIER;
   (A) RESULTS OF CONCRETE CYLINDER TEST PERFORMED AT THE SUPPLIERS PLANT.
   (B) CERTIFICATION OF MINIMUM COMPRESSIVE STRENGTH FOR THE CONCRETE GRADE SUPPLIED.
FOR GREATER THAN 50 CUBIC YARDS THE GC SHALL PERFORM THE CONCRETE CYLINDER TEST.

8. AS AN ALTERNATIVE TO ITEM 7. TEST CYLINDERS SHALL BE TAKEN INITIALLY AND THEREAFTER FOR EVERY 50 YARDS OF CONCRETE FROM EACH DIFFERENT BATCH PLANT.

9. EQUIPMENT SHALL NOT BE PLACED ON NEW PADS FOR SEVEN DAYS AFTER PAD IS POURED, UNLESS IT IS VERIFIED BY CYLINDER TESTS THAT COMPRESSIVE STRENGTH HAS BEEN ATTAINED.

STRUCTURAL STEEL NOTES:

1. ALL STEEL WORK SHALL BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE DRAWINGS AND T–MOBILE SPECIFICATIONS UNLESS OTHERWISE NOTED. STRUCTURAL STEEL SHALL BE ASTM–A–36 UNLESS OTHERWISE NOTED ON THE SITE SPECIFIC DRAWINGS. STEEL DESIGN, INSTALLATION AND BOLTING SHALL BE IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "MANUAL OF STEEL CONSTRUCTION".

2. ALL WELDING SHALL BE PERFORMED USING E70XX ELECTRODES AND WELDING SHALL CONFORM TO AISC AND AWS D1.1. WHERE FILLET WELD SIZES ARE NOT SHOWN, PROVIDE THE MINIMUM SIZE PER TABLE J2.4 IN THE AISC "MANUAL OF STEEL CONSTRUCTION", 9TH EDITION. PAINTED SURFACES SHALL BE TOUCHED UP.

3. BOLTED CONNECTIONS SHALL USE BEARING TYPE ASTM A325 BOLTS (¾"ø) AND SHALL HAVE MINIMUM OF TWO BOLTS UNLESS NOTED OTHERWISE. ALL BOLTS SHALL BE GALVANIZED OR STAINLESS STEEL.

4. NON–STRUCTURAL CONNECTIONS FOR STEEL GRATING MAY USE ⅝" DIA. ASTM A 307 BOLTS (GALV) UNLESS NOTED OTHERWISE.

5. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ENGINEER REVIEW & APPROVAL ON PROJECTS REQUIRING STRUCTURAL STEEL

6. ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.

SOIL COMPACTION NOTES FOR SLAB ON GRADE:

1. EXCAVATE AS REQUIRED TO REMOVE VEGETATION AND TOPSOIL TO EXPOSE NATURAL SUBGRADE AND PLACE CRUSHED STONE AS REQUIRED.

2. COMPACTION CERTIFICATION: AN INSPECTION AND WRITTEN CERTIFICATION BY A QUALIFIED GEOTECHNICAL TECHNICIAN OR ENGINEER IS ACCEPTABLE.

3. AS AN ALTERNATE TO INSPECTION AND WRITTEN CERTIFICATION, THE "UNDISTURBED SOIL" BASE SHALL BE COMPACTED WITH "COMPACTION EQUIPMENT", LISTED BELOW, TO AT LEAST 90% MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM D 1557 METHOD C.

4. COMPACTED SUBBASE SHALL BE UNIFORM AND LEVELED. PROVIDE 6" MINIMUM CRUSHED STONE OR GRAVEL COMPACTED IN 3" LIFTS ABOVE COMPACTED SOIL. GRAVEL SHALL BE NATURAL OR CRUSHED WITH 100% PASSING #1 SIEVE.

5. AS AN ALTERNATE TO ITEMS 2 AND 3, THE SUBGRADE SOILS WITH 5 PASSES OR A MEDIUM SIZED VIBRATORY PLATE COMPACTOR (SUCH AS BOMAG BPR 30/38) OR HAND–OPERATED SINGLE DRUM VIBRATORY ROLLER (SUCH AS BOMAG BW 55E). AND SOFT AREAS THAT ARE ENCOUNTERED SHOULD BE REMOVED AND REPLACED WITH A WELL–GRADED GRANULAR FILL AND COMPACTED AS STATED ABOVE.

COMPACTION EQUIPMENT:

1. HAND OPERATED DOUBLE DRUN, VIBRATORY ROLLER, VIBRATORY PLATE COMPACTOR OR JUMPING JACK COMPACTOR.

CONSTRUCTION NOTES:

1. FIELD VERIFICATION:
SUBCONTRACTOR SHALL FIELD VERIFY SCOPE OF WORK, T–MOBILE ANTENNA PLATFORM LOCATION AND UTILITY TRENCHWORK.

2. COORDINATION OF WORK:
SUBCONTRACTOR SHALL COORDINATE RF WORK AND PROCEDURES WITH CONTRACTOR.

3. CABLE LADDER RACK:
SUBCONTRACTOR SHALL FURNISH AND INSTALL CABLE LADDER RACK, CABLE TRAY AND/OR ICE BRIDGE, AND CONDUIT AS REQUIRED TO SUPPORT CABLES TO THE NEW BTS LOCATION.

ELECTRICAL INSTALLATION NOTES:

1. WIRING, RACEWAY, AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.

2. SUBCONTRACTOR SHALL MODIFY OR INSTALL CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLING TO THE NEW BTS EQUIPMENT. SUBCONTRACTOR SHALL SUBMIT MODIFICATIONS TO CONTRACTOR FOR APPROVAL.

3. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC AND TELCORDIA.

4. CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.

5. EACH END OF EVERY POWER, GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA, AND MATCH INSTALLATION REQUIREMENTS.

6. POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, ½ INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC AND OSHA.

7. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PANELBOARD AND CIRCUIT ID'S).

8. PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.

9. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.

10. POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

11. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (#6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.

12. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR #2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.

13. POWER AND CONTROL WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#34 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.

14. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY HARGER (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75'C (90'C IF AVAILABLE).

15. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

16. NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

17. ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

18. ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

19. GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.

20. RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.

21. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

22. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.

23. CABINETS, BOXES AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

24. CABINETS, BOXES AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.

25. WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

26. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.

27. 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 RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

28. NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

29. THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

30. THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

31. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE LOCAL CODES.

32. CONDUIT ROUTINGS ARE SCHEMATIC. SUBCONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED.

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APPROVED BY: JMT

SUBMITTALS

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1	07/17/19	ISSUED FOR CONSTRUCTION	CMC
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SITE NUMBER:
CT11390G

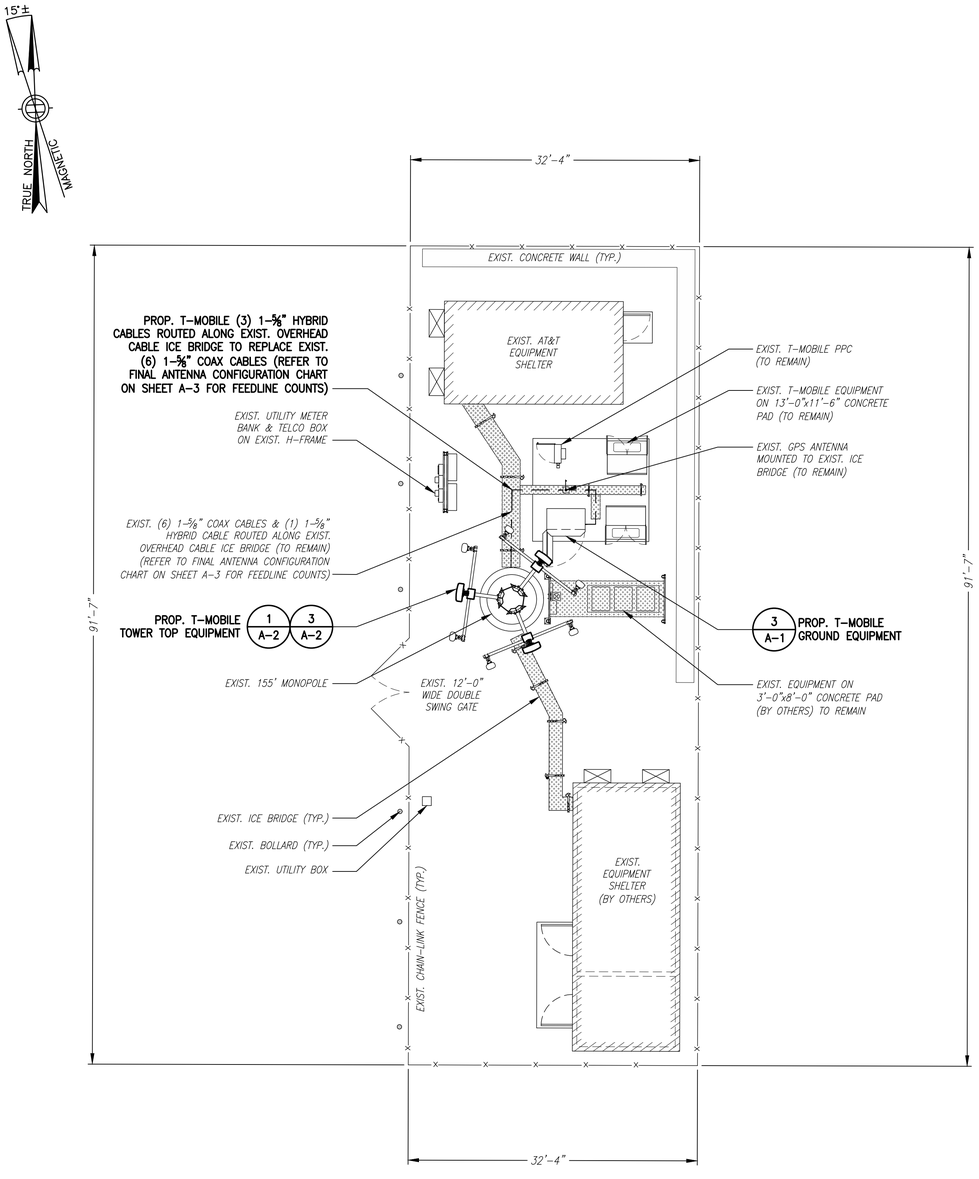
SITE ADDRESS:
26 COMMERCE DRIVE
NORTH BRANFORD, CT 06471

SHEET TITLE
GENERAL NOTES

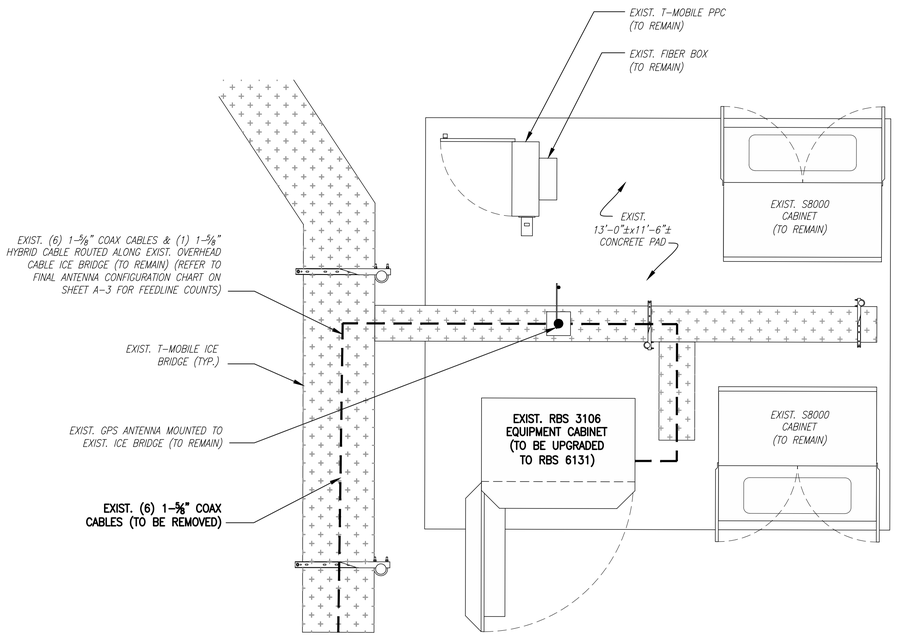
SHEET NUMBER
GN-1

1815.082

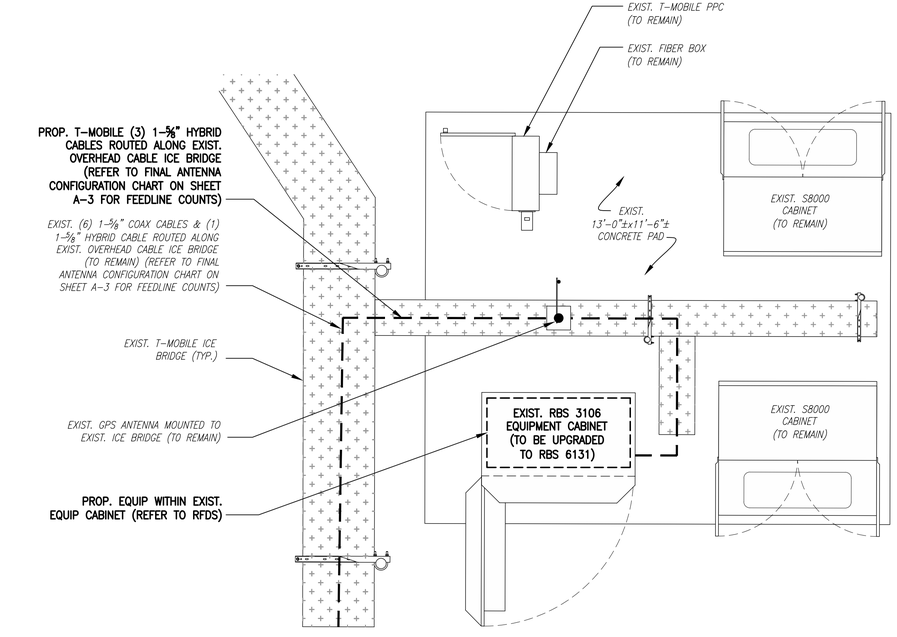
SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.



COMPOUND PLAN
1 A-1
SCALE: 1/8" = 1'-0"
0 4' 8' 16' 24'



EXISTING EQUIPMENT PLAN
2 A-1
SCALE: 1/2" = 1'-0"
0 2'-0" 4'-0" 6'-0"



PROPOSED EQUIPMENT PLAN
3 A-1
SCALE: 1/2" = 1'-0"
0 2'-0" 4'-0" 6'-0"

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CLEMENT J. SAMEK
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LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

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NORTH BRANFORD, CT 06471

SHEET TITLE
COMPOUND & EQUIPMENT PLAN

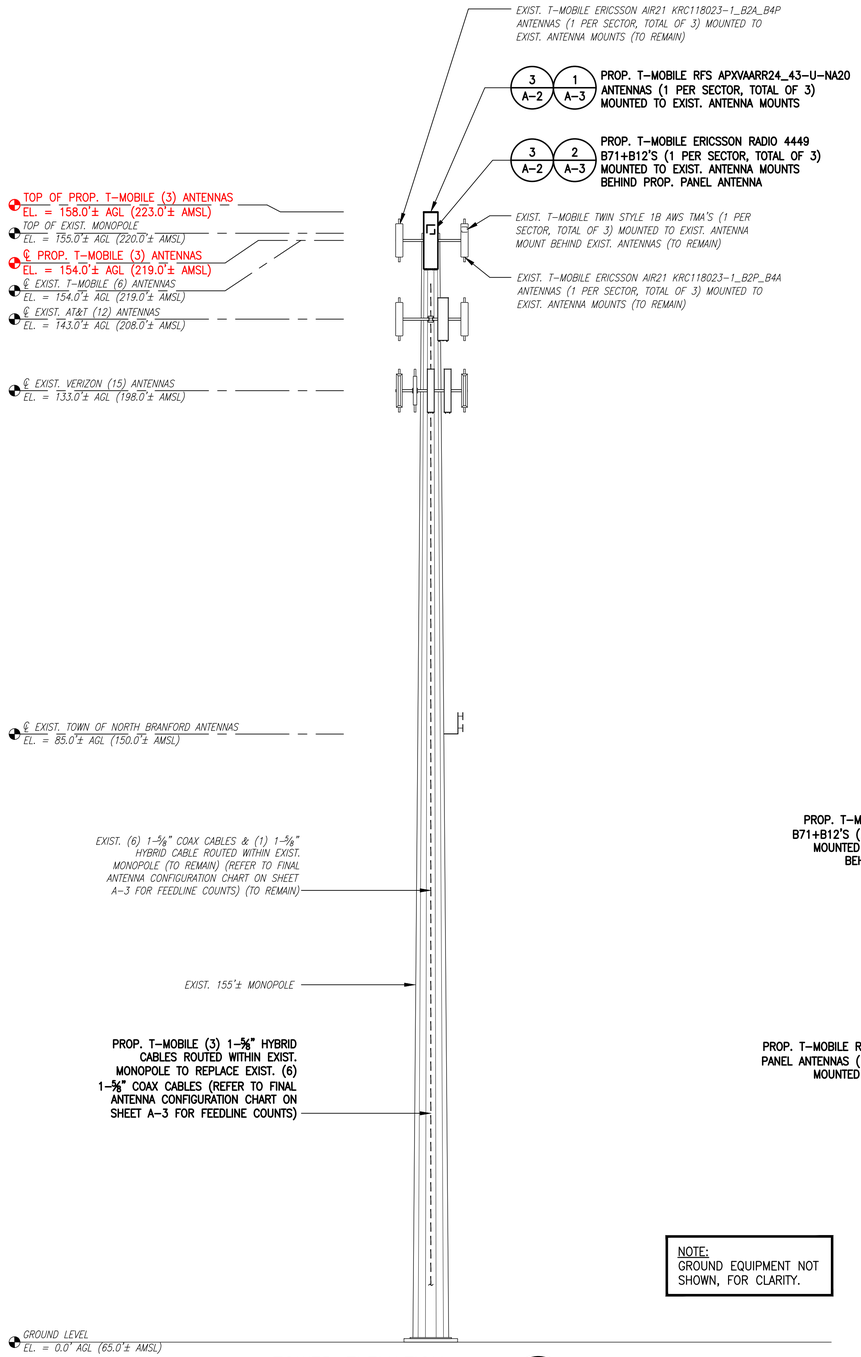
SHEET NUMBER
A-1

1815.082

SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY SPECIAL SHIELDING OF TOWER TOP EQUIPMENT AND FOR ANY SPECIAL FEEDLINE BUNDLING OR RELOCATION.

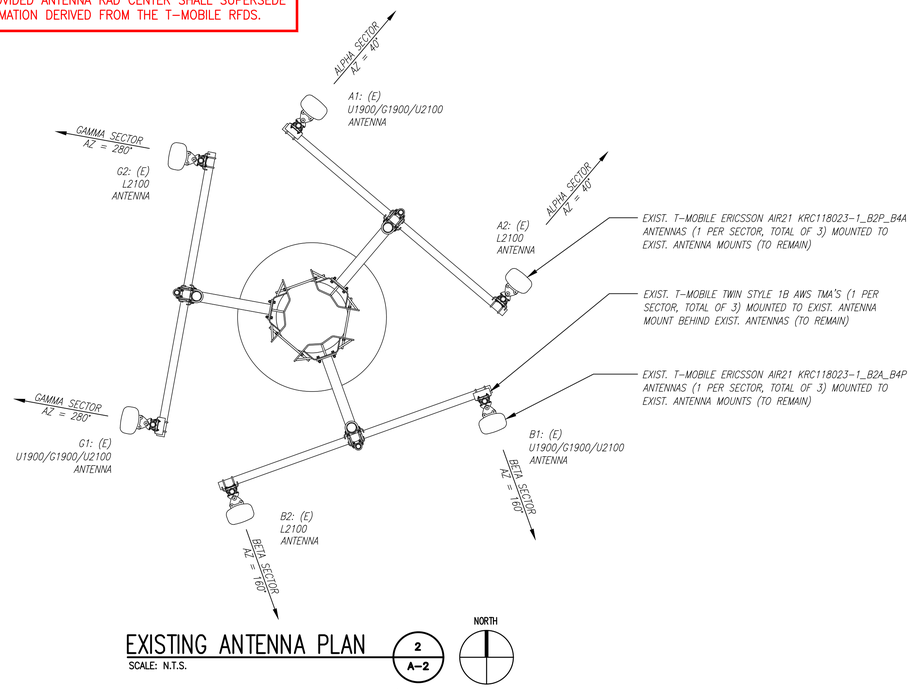
SPECIAL TOWER TOP EQUIPMENT INSTALLATION WORK NOTE (SAFETY-CLIMB ALIGNMENT REQUIREMENTS):
GENERAL CONTRACTOR SHALL ORIENT PROPOSED PLATFORM REINFORCEMENT KIT RING-MOUNTS SO THAT EXISTING SAFETY CLIMB CABLE IS NOT OBSTRUCTED/RE-ROUTED FROM VERTICAL ALIGNMENT AND IS NOT IN PHYSICAL CONTACT WITH EXISTING OR PROPOOSED RING-MOUNT HARDWARE. GENERAL CONTRACTOR SHALL INSTALL NEW OR ADDITIONAL SAFETY-CLIMB CABLE GUIDES IF ADDITIONAL CLEARANCE IS REQUIRED. ADDITIONAL CABLE GUIDES SHALL BE ATTACHED SECURELY TO THE POLE USING MECHANICAL FASTENERS OR FIELD WELDED BY A CERTIFIED WELDING TECHNICIAN.

RAD CENTER NOTE:
T-MOBILE RAD CENTER SHOWN IN RED TEXT BASED ON SBA-PROVIDED CO-LOCATION APPLICATION, EQUIPMENT DATABASE, AND STRUCTURAL ANALYSIS. THE SBA-PROVIDED ANTENNA RAD CENTER SHALL SUPERSEDE ANY CONFLICTING INFORMATION DERIVED FROM THE T-MOBILE RFDS.

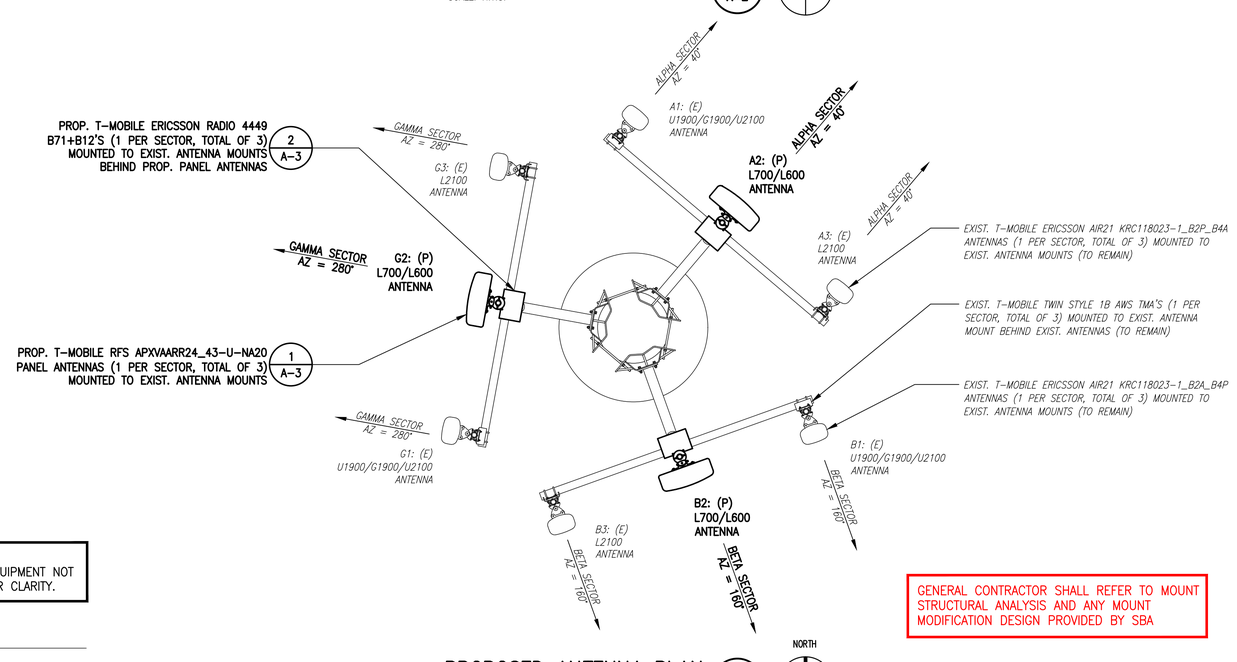


TOWER ELEVATION
SCALE: 1" = 20'
1 A-2
0 10' 20' 40' 60'

NOTE:
GROUND EQUIPMENT NOT SHOWN, FOR CLARITY.



EXISTING ANTENNA PLAN
SCALE: N.T.S.
2 A-2



PROPOSED ANTENNA PLAN
SCALE: N.T.S.
3 A-2

GENERAL CONTRACTOR SHALL REFER TO MOUNT STRUCTURAL ANALYSIS AND ANY MOUNT MODIFICATION DESIGN PROVIDED BY SBA

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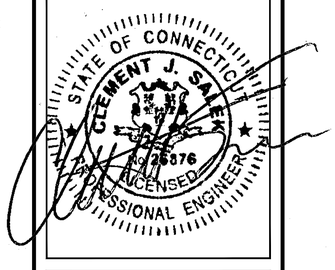

CHECKED BY: JMT

APPROVED BY: JMT

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NORTH BRANFORD, CT 06471

SHEET TITLE
TOWER ELEVATIONS & ANTENNA PLAN

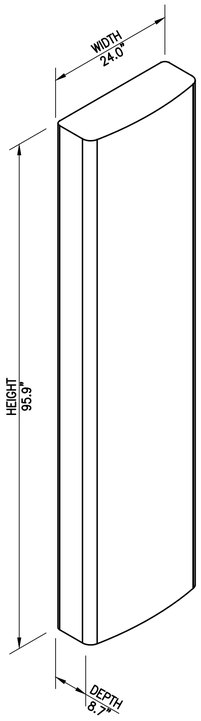
SHEET NUMBER
A-2

1815.082

FINAL ANTENNA CONFIGURATION

SECTOR	ANTENNA	RAD CENTER	AZIMUTH (TRUE NORTH)	MECHANICAL DOWNTILT	ELECTRICAL DOWNTILT	BAND	TMA/RADIOS	CABLES
ALPHA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*154'± AGL*	*40°*	*0°*	*0°*	*U1900/G1900*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1-5/8" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	**154'± AGL**	**40°**	**0°**	**0°**	**L600/L700**	**RADIO 4449 B71+B12**	**(1) 1-5/8" HCS CABLE**
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*154'± AGL*	*40°*	*0°*	*0°*	*L2100*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*
BETA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*154'± AGL*	*160°*	*0°*	*0°*	*U1900/G1900*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1-5/8" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	**154'± AGL**	**160°**	**0°**	**0°**	**L600/L700**	**RADIO 4449 B71+B12**	**(1) 1-5/8" HCS CABLE**
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*154'± AGL*	*160°*	*0°*	*0°*	*L2100*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*
GAMMA	*ERICSSON AIR21 KRC118023-1_B2A_B4P*	*154'± AGL*	*280°*	*0°*	*0°*	*U1900/G1900*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*
						U2100	*TWIN STYLE 1B AWS TMA*	*(2) 1-5/8" COAX CABLES*
	RFS APXVAARR24_43-U-NA20	**154'± AGL**	**280°**	**0°**	**0°**	**L600/L700**	**RADIO 4449 B71+B12**	**(1) 1-5/8" HCS CABLE**
	ERICSSON AIR21 KRC118023-1_B2P_B4A	*154'± AGL*	*280°*	*0°*	*0°*	*L2100*	*–*	*(1) 1-5/8" HYBRID CABLE (SHARED)*

NOTE: EXISTING (6) 1-5/8" COAX CABLES TO BE REMOVED.



RFS APXVAARR24_43-U-NA20 PANEL ANTENNA
DIMENSIONS: 95.9"H x 24.0"W x 8.7"D
WEIGHT: 128.0 LBS
1 PER SECTOR, TOTAL OF 3

ANTENNA DETAILS — 1 / A-3
SCALE: N.T.S.

ERICSSON RADIO 4449 B12+B71
DIMENSIONS: 14.9"H x 13.2"W x 9.3"D
WEIGHT: 74.0 LBS
1 PER SECTOR, TOTAL OF 3

RRU DETAIL — 2 / A-3
SCALE: N.T.S.

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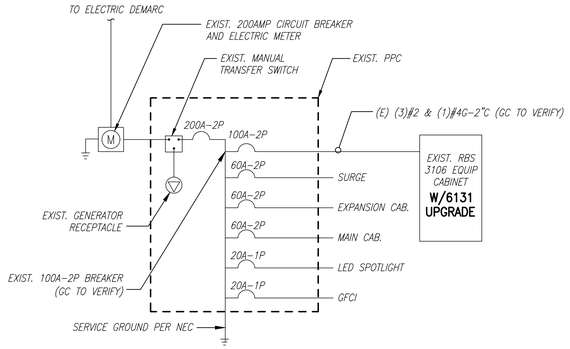
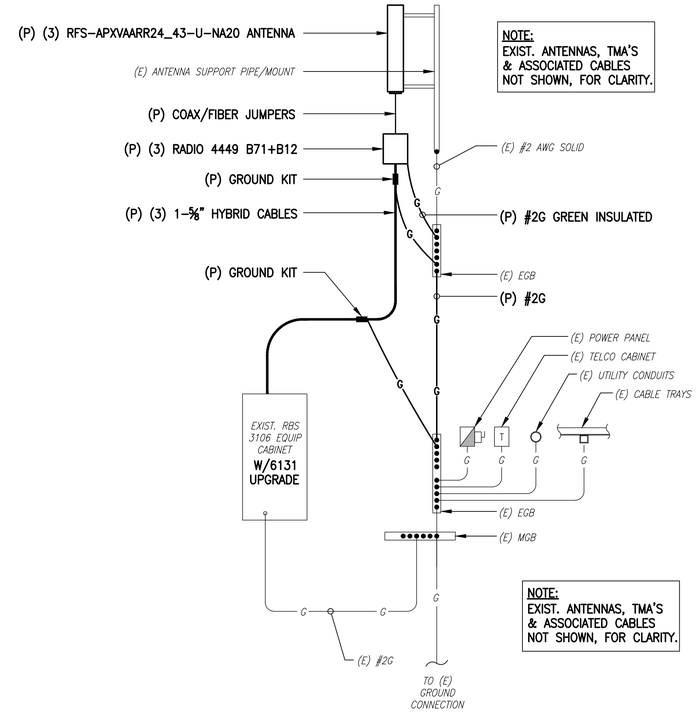
SHEET TITLE
SITE DETAILS

SHEET NUMBER
A-3

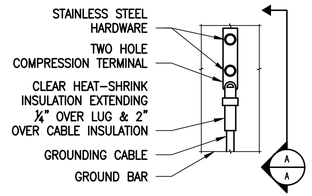
1815.082



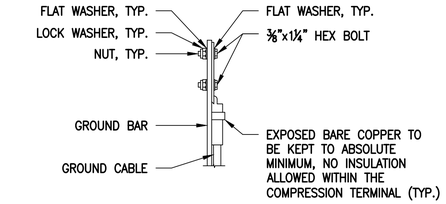
ONE LINE DIAGRAM (1 / E-1)
SCALE: NOT TO SCALE



GROUNDING RISER DIAGRAM (2 / E-1)
SCALE: NOT TO SCALE



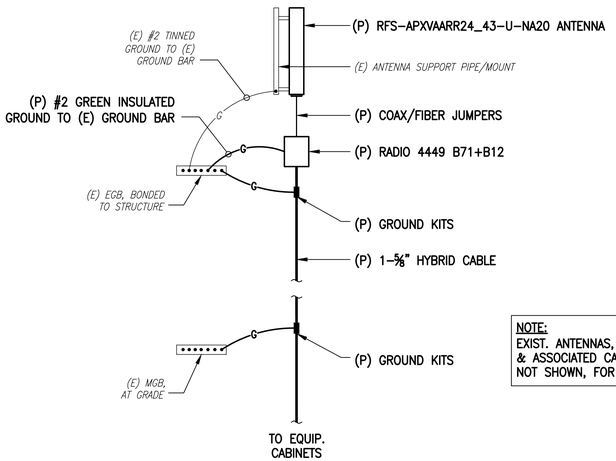
ELEVATION



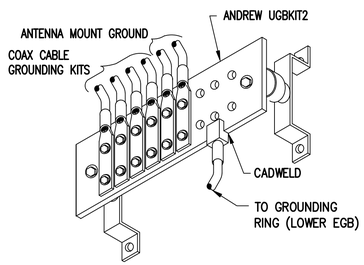
SECTION A-A

NOTES:
1. "DOUBLING UP" OR "STACKING" OF CONNECTION IS NOT PERMITTED.
2. OXIDE INHIBITING COMPOUND TO BE USED AT ALL LOCATIONS.
3. CADWELL DOWNLEADS FROM UPPER EGB, LOWER EGB AND MGB.

TYPICAL GROUND BAR CONNECTIONS DETAIL (3 / E-1)
SCALE: NOT TO SCALE



COAX CABLE CONNECTION AND GROUNDING DETAIL (4 / E-1)
SCALE: NOT TO SCALE



GROUND BAR (EGB) (5 / E-1)
SCALE: NOT TO SCALE

ELECTRICAL AND GROUNDING NOTES

1. ALL ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC) AS WELL AS APPLICABLE STATE AND LOCAL CODES.
2. ALL ELECTRICAL ITEMS SHALL BE U.L. APPROVED OR LISTED AND PROCURED PER SPECIFICATION REQUIREMENTS.
3. THE ELECTRICAL WORK INCLUDES ALL LABOR AND MATERIAL DESCRIBED BY DRAWINGS AND SPECIFICATION INCLUDING INCIDENTAL WORK TO PROVIDE COMPLETE OPERATING AND APPROVED ELECTRICAL SYSTEM.
4. GENERAL CONTRACTOR SHALL PAY FEES FOR PERMITS, AND IS RESPONSIBLE FOR OBTAINING SAID PERMITS AND COORDINATION OF INSPECTIONS.
5. ELECTRICAL AND TELCO WIRING OUTSIDE A BUILDING AND EXPOSED TO WEATHER SHALL BE IN WATER TIGHT GALVANIZED RIGID STEEL CONDUITS OR SCHEDULE 80 PVC (AS PERMITTED BY CODE) AND WHERE REQUIRED IN LIQUID TIGHT FLEXIBLE METAL OR NONMETALLIC CONDUITS.
6. BURIED CONDUIT SHALL BE SCHEDULE 40 PVC.
7. ELECTRICAL WIRING SHALL BE COPPER WITH TYPE XHHW, THWN, OR THININSULATION.
8. RUN ELECTRICAL CONDUIT OR CABLE BETWEEN ELECTRICAL UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE PPC AS INDICATED ON THIS DRAWING. PROVIDE FULL LENGTH PULL ROPE. COORDINATE INSTALLATION WITH UTILITY COMPANY.
9. RUN TELCO CONDUIT OR CABLE BETWEEN TELEPHONE UTILITY DEMARCATION POINT AND PROJECT OWNER CELL SITE TELCO CABINET AND BTS CABINET AS INDICATED ON THIS DRAWING PROVIDE FULL LENGTH PULL ROPE IN INSTALLED TELCO CONDUIT. PROVIDE GREENLEE CONDUIT MEASURING TAPE AT EACH END.
10. WHERE CONDUIT BETWEEN BTS AND PROJECT OWNER CELL SITE PPC AND BETWEEN BTS AND PROJECT OWNER CELL SITE TELCO SERVICE CABINET ARE UNDERGROUND USE PVC, SCHEDULE 40 CONDUIT. ABOVE THE GROUND PORTION OF THESE CONDUITS SHALL BE PVC CONDUIT.
11. ALL EQUIPMENT LOCATED OUTSIDE SHALL HAVE NEMA 3R ENCLOSURE.
12. PPC SUPPLIED BY PROJECT OWNER.
13. GROUNDING SHALL COMPLY WITH NEC ART. 250. ADDITIONALLY, GROUNDING, BONDING AND LIGHTNING PROTECTION SHALL BE DONE IN ACCORDANCE WITH "T-MOBILE BTS SITE GROUNDING STANDARDS".
14. GROUND COAXIAL CABLE SHIELDS MINIMUM AT BOTH ENDS USING MANUFACTURERS COAX CABLE GROUNDING KITS SUPPLIED BY PROJECT OWNER.
15. USE #6 COPPER STRANDED WIRE WITH GREEN COLOR INSULATION FOR ABOVE GRADE GROUNDING (UNLESS OTHERWISE SPECIFIED) AND #2 SOLID TINNED BARE COPPER WIRE FOR BELOW GRADE GROUNDING AS INDICATED ON THE DRAWING.
16. ALL GROUND CONNECTIONS TO BE BURNDY HYGROUND COMPRESSION TYPE CONNECTORS OR CADWELD EXOTHERMIC WELD. DO NOT ALLOW BARE COPPER WIRE TO BE IN CONTACT WITH GALVANIZED STEEL.
17. ROUTE GROUNDING CONDUCTORS ALONG THE SHORTEST AND STRAIGHTEST PATH POSSIBLE, EXCEPT AS OTHERWISE INDICATED. GROUNDING LEADS SHOULD NEVER BE BENT AT RIGHT ANGLE. ALWAYS MAKE AT LEAST 12" RADIUS BENDS. #6 WIRE CAN BE BENT AT 6" RADIUS WHEN NECESSARY. BOND ANY METAL OBJECTS WITHIN 6 FEET OF PROJECT OWNER EQUIPMENT OR CABINET TO MASTER GROUND BAR OR GROUNDING RING.
18. CONNECTIONS TO GROUND BARS SHALL BE MADE WITH TWO HOLE COMPRESSION TYPE COPPER LUGS. APPLY OXIDE INHIBITING COMPOUND TO ALL LOCATIONS.
19. APPLY OXIDE INHIBITING COMPOUND TO ALL COMPRESSION TYPE GROUND CONNECTIONS.
20. CONTRACTOR SHALL PROVIDE AND INSTALL OMNI DIRECTIONAL ELECTRONIC MARKER SYSTEM (EMS) BALLS OVER EACH GROUND ROD AND BONDING POINT BETWEEN EXIST. TOWER/ MONOPOLE GROUNDING RING AND EQUIPMENT GROUNDING RING.
21. CONTRACTOR SHALL TEST COMPLETED GROUND SYSTEM AND RECORD RESULTS FOR PROJECT CLOSE-OUT DOCUMENTATION. 5 OHMNS MINIMUM RESISTANCE REQUIRED.
22. CONTRACTOR SHALL CONDUCT ANTENNA, COAX, AND LNA RETURN-LOSS AND DISTANCE- TO-FAULT MEASUREMENTS (SWEEP TESTS) AND RECORD RESULTS FOR PROJECT CLOSE OUT.

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SHEET TITLE
ELECTRIC & GROUNDING DETAILS

SHEET NUMBER
E-1

1815.082

EXHIBIT 7

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 155 ft PennSummit Monopole
Customer Name: SBA Communications Corp
Customer Site Number: CT13610-A
Customer Site Name: ARTEC
Carrier Name: T-Mobile (App#: 117020, V1)
Carrier Site ID / Name: CT11390G / Artec
Site Location: 26 Commerce Drive
N. Branford, Connecticut
New Haven County
Latitude: 41.322138
Longitude: -72.773277

Analysis Result:

Max Structural Usage: 64.0% [Pass]
Max Foundation Usage: 33.0% [Pass]
Additional Usage Caused by Mount Modification: +5.0%

Report Prepared By : Dipika Dhungana

Introduction

The purpose of this report is to summarize the analysis results on the 155 ft PennSummit Monopole to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Paul J. Ford and Company, Job #29205-0112 Rev 1 dated March 3, 2005
Foundation Drawing	Paul J. Ford and Company, Job #29205-0112 dated May 31, 2005
Geotechnical Report	JGI Eastern, Inc., Project #05267G dated May 16, 2005
Modification Drawings	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-G**.** In accordance with this standard, the structure was analyzed using **TESPoles,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed Vult = 125.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed Vasd = 97.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft

This structural analysis is based upon the tower being classified as a Structure Class II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
-	154.0	3	Ericsson - AIR 21 B2A/B4P - Panel	(3) T-Arm	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
-		3	Ericsson - AIR 21 B4A B2P - Panel			
-		3	Ericsson - KRY 112 144/1 - TMA			
6	143.0	6	Powerwave 7770 - Panel	(3) T-Arm	(12) 1 5/8" (2) 1/2" DC power (1) 3/8" Fiber	AT&T
7		3	Cci HPA-65R-BUU-H6 – Panel			
8		6	Powerwave LGP21401 TMA			
9		6	Powerwave LGP13519 Diplexer			
10		6	Ericsson RRUS 11			
11		3	Ericsson RRUS 32 B2			
12		1	Raycap DC6-48-60-18-8F			
13	133.0	6	Andrew - SBNHH-1D65B - Panel	(3) T-Arm	(12) 1 5/8" (1) 1 5/8" Fiber	Verizon
14		6	Antel - LPA-80080-6CF - Panel			
15		3	Antel - BXA-171063-12CF - Panel			
16		3	Alcatel Lucent RRH2X60-700 – RRH			
17		3	Alcatel Lucent RRH2X60-AWS - RRH			
18		2	RFS Celwave DB-T1-6Z-8AB-0Z			
19	85.0	1	Andrew - DB408 - Whip	Pipe	(6) 7/8"	Town of North Branford
20		2	Sinclair - SD222 - Whip			
21		1	Radio Waves - SP4-4.7NS RD4 - Dish			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	154.0	3	Ericsson Air 21 B2A/B4P	(3) T-Arm with (1) MetroSite V-Bracing Kit: MS-C1B-350P (1) Metrosite End Connections (3) MetroSite Pipe: 238x204	(9) 1 5/8" (4) 1 5/8" Fiber	T-Mobile
2		3	Ericsson Air 21 B4A/B2P			
3		3	RFS APXVAARR24_43-U-NA20			
4		3	Ericsson KRY 112 144/1			
5		3	Ericsson Radio 4449 B71+B12			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

	Pole shafts	Anchor Bolts	Base Plate
Max. Usage:	**64.0%**	**42.0%**	**50.0%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Moment (Kip-Ft)	Shear (Kips)	Axial (Kips)
Analysis Reactions	3490.8	32.5	71.2

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 1.0412 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the ANSI/TIA/EIA 222-G Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the EIA/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Usage Diagram - Max Ratio 64.03% at 95.8ft

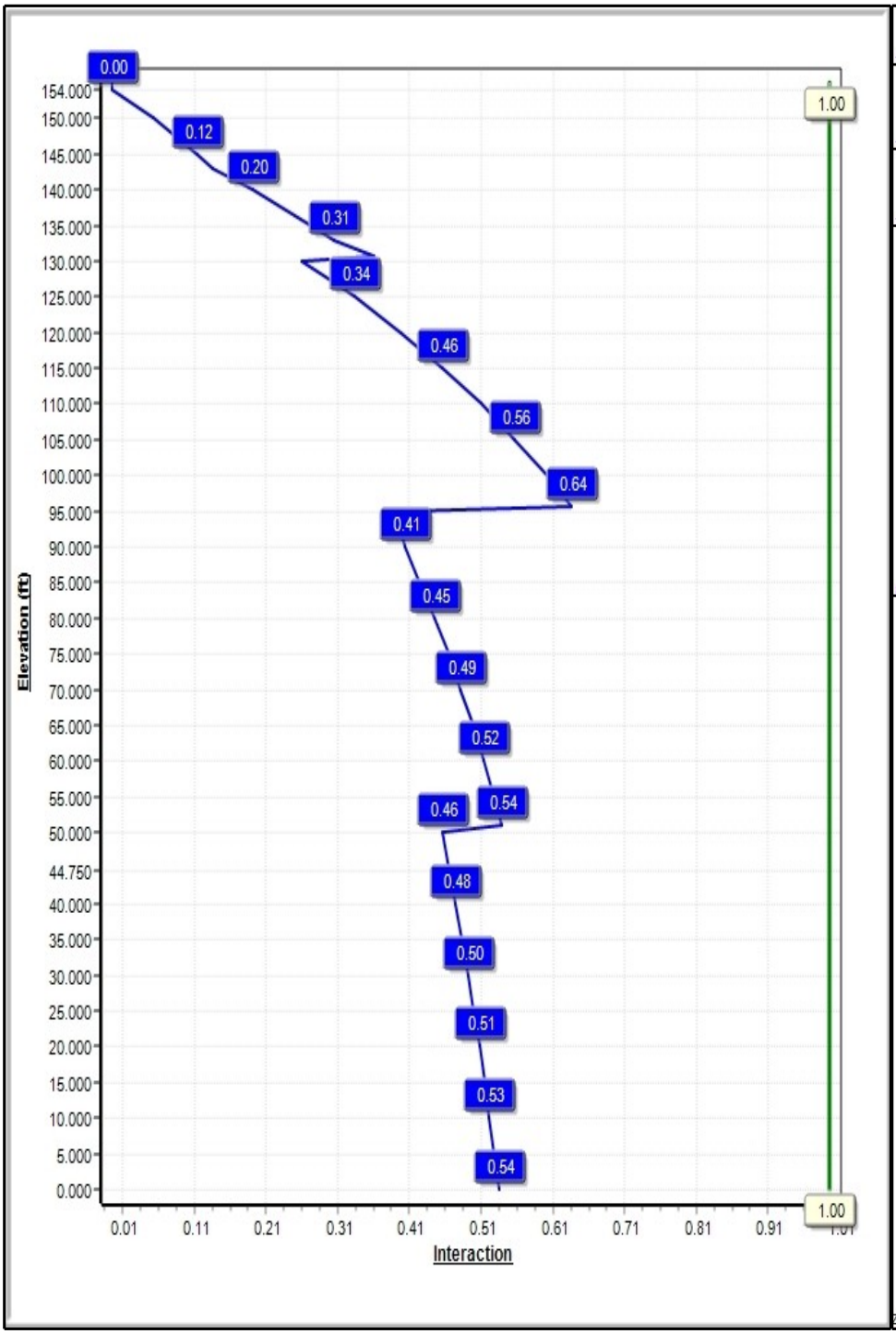
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC	**Exposure:**	C	
Height:	155.00 (ft)	**Gh:**	1.1	
Base Elev:	0.000 (ft)			Page: 1

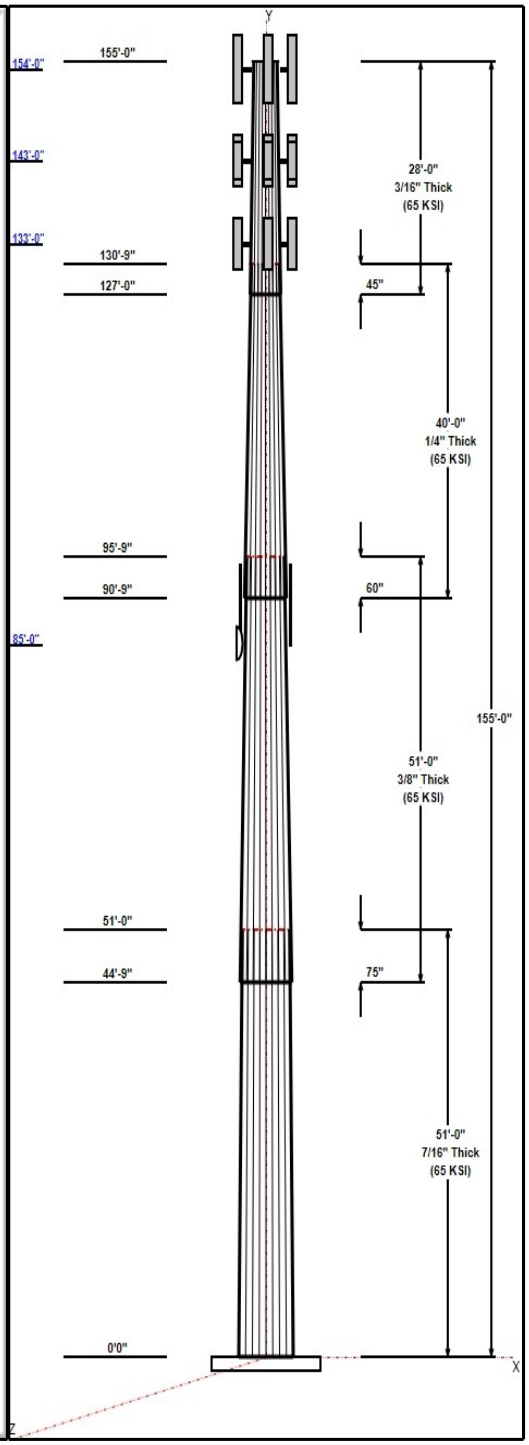
Tower Engineering Solutions

Dead Load Factor:	1.20
Wind Load Factor:	1.60

Load Case : 1.2D + 1.6W 97 mph Wind

Iterations: 23





Structure: CT13610-A-SBA

Type: Tapered
Site Name: ARTEC
Height: 155.00 (ft)
Base Elev: 0.00 (ft)

Base Shape: 18 Sided
Taper: 0.25803

6/28/2019

Tower Engineering Solutions

Shaft Properties

Seq	Length (ft)	Top (in)	Bottom (in)	Thick (in)	Joint Type	Taper	Grade (ksi)
1	51.00	47.71	60.87	0.438		0.25803	65
2	51.00	36.91	50.07	0.375	Slip	0.25803	65
3	40.00	28.38	38.70	0.250	Slip	0.25803	65
4	28.00	22.50	29.72	0.188	Slip	0.25803	65

Discrete Appurtenances

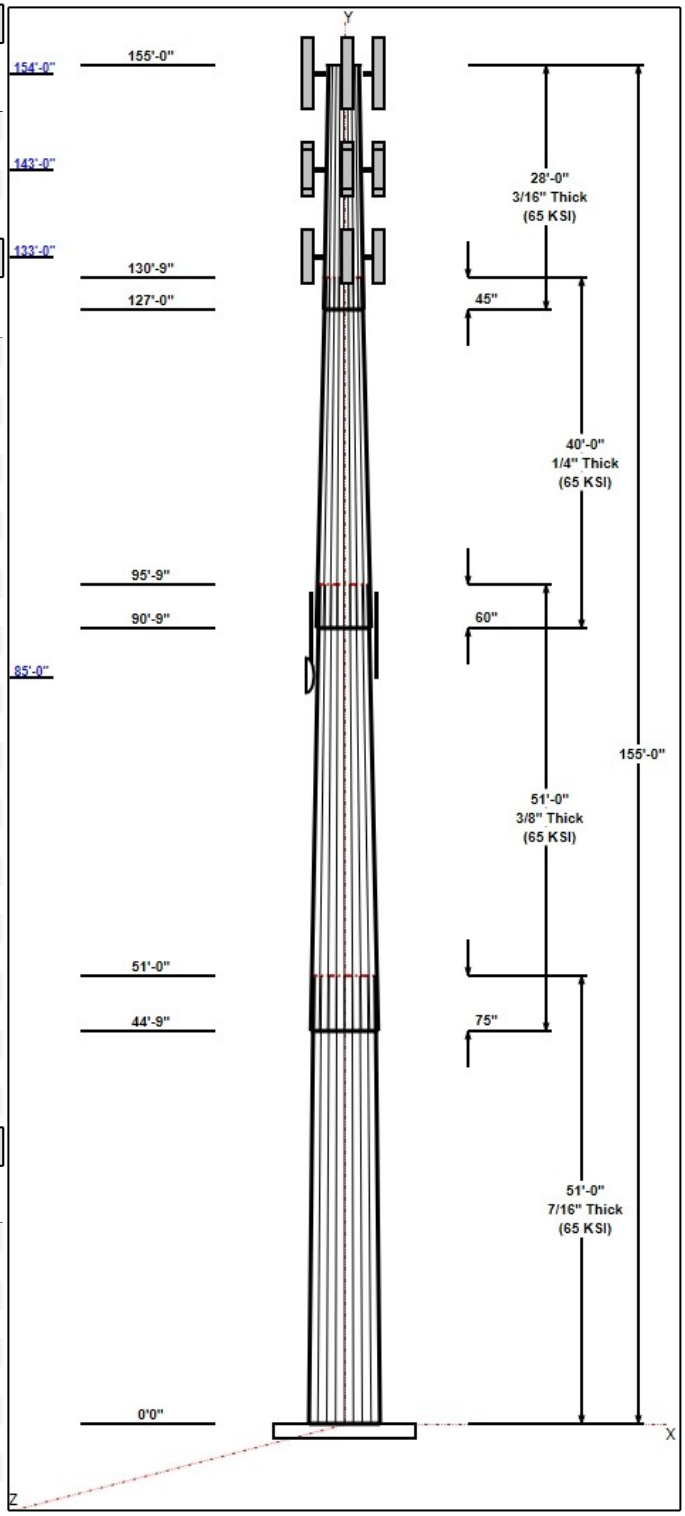
Attach Elev (ft)	Force Elev (ft)	Qty	Description	Carrier
154.00	154.00	3	AIR 21 B2A B4P	T-Mobile
154.00	154.00	3	AIR 21 B4A B2P	T-Mobile
154.00	154.00	3	KRY 112 144/1	T-Mobile
154.00	154.00	3	T-Arm	T-Mobile
154.00	154.00	3	APXVAARR24_43-U-NA20	T-Mobile
154.00	154.00	3	4449	T-Mobile
154.00	154.00	1	HRK12 (Handrail Kit)	T-Mobile
154.00	154.00	1	(3) HR w/ Double V-Brace	T-Mobile
143.00	143.00	3	T-Arm	AT&T
143.00	143.00	3	Cci HPA-65R-BUU-H6	AT&T
143.00	143.00	3	Ericsson RRUS 32 B2	AT&T
143.00	143.00	6	Ericsson RRUS 11	AT&T
143.00	143.00	1	Raycap DC6-48-60-18-8F	AT&T
143.00	143.00	6	Powerwave 7770	AT&T
143.00	143.00	6	Powerwave LGP21401	AT&T
143.00	143.00	6	Powerwave LGP13519	AT&T
133.00	133.00	3	BXA-171063-12CF	Verizon
133.00	133.00	3	RRH2X60-AWS	Verizon
133.00	133.00	3	RRH2X60-700	Verizon
133.00	133.00	2	DB-T1-6Z-8AB-0Z	Verizon
133.00	133.00	6	SBNHH-1D65B	Verizon
133.00	133.00	6	LPA-80080-6CF	Verizon
133.00	133.00	3	T-Arm	Verizon
85.00	85.00	2	Pipe Mount	Town of North Branford
85.00	85.00	1	SP4-4.7NS RD4	Town of North Branford
85.00	89.75	2	SD222	Town of North Branford
85.00	89.71	1	DB408	Town of North Branford

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Placement	Description	Carrier
0.00	154.00	Inside	1 5/8" Coax	T-Mobile
0.00	154.00	Inside	1 5/8" Fiber	T-Mobile
0.00	143.00	Inside	1 5/8" Coax	AT&T
0.00	143.00	Inside	1/2" DC power	AT&T
0.00	143.00	Inside	3" Innerduct	AT&T
0.00	143.00	Inside	3/8" Fiber	AT&T
0.00	133.00	Inside	1 5/8" Coax	Verizon
0.00	133.00	Inside	1 5/8" Fiber	Verizon
0.00	133.00	Outside	1 5/8" Fiber	Verizon
0.00	85.00	Inside	7/8" Coax	Town of North Branford

Anchor Bolts

Qty	Specifications	Grade (ksi)	Arrangement
24	2.25" 18J	75.0	Cluster



Base Plate

Thickness (in)	Specifications (in)	Grade (ksi)	Geometry
3.0000	70.0	50.0	Clipped

Reactions

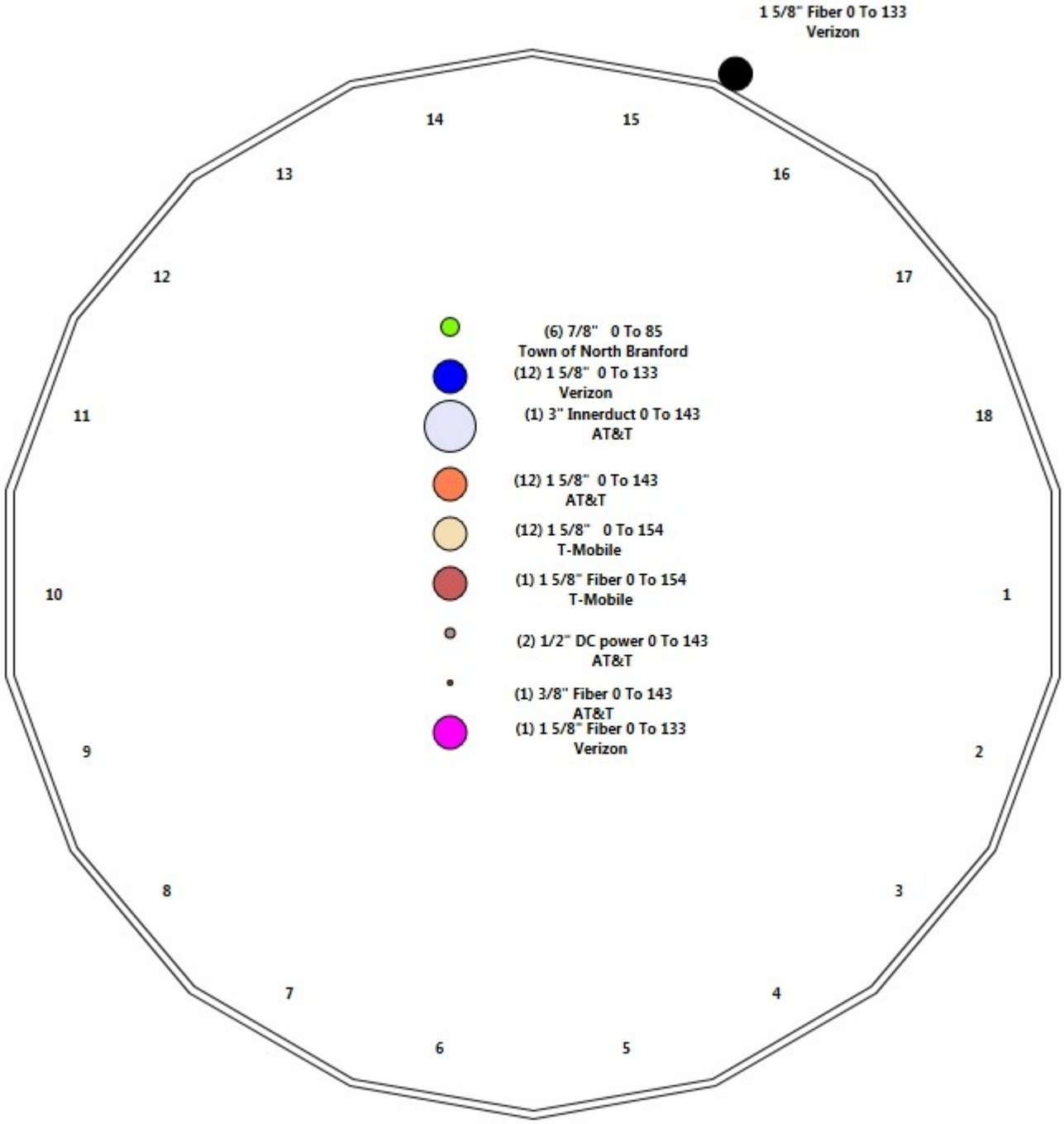
Load Case	Moment (FT-Kips)	Shear (Kips)	Axial (Kips)
1.2D + 1.6W 97 mph Wind	3695.5	33.8	49.2
0.9D + 1.6W 97 mph Wind	3667.5	33.8	36.9
1.2D + 1.0Di + 1.0Wi 50 mph Wind	1019.5	9.5	73.5
1.2D + 1.0E	312.8	2.6	49.3
0.9D + 1.0E	310.2	2.6	36.9
1.0D + 1.0W 60 mph Wind	879.9	8.1	41.0

Structure: CT13610-A-SBA - Coax Line Placement

Type: Monopole
Site Name: ARTEC
Height: 155.00 (ft)

6/28/2019

Tower Engineering Solutions



Shaft Properties

Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Sec. No.	Shape	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Overlap (in)	Weight (lb)
1	18	51.000	0.4375	65		0.00	12,977
2	18	51.000	0.3750	65	Slip	75.00	8,906
3	18	40.000	0.2500	65	Slip	60.00	3,596
4	18	28.000	0.1875	65	Slip	45.00	1,470
					Total Shaft Weight:		**26,949**

	Bottom						Top						
Sec. No.	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)	Area (sqin)	Ix (in^4)	W/t Ratio	D/t Ratio	Taper
1	60.87	0.00	83.92	38719.89	23.12	139.13	47.71	51.00	65.64	18533.5	17.82	109.0	0.258032
2	50.07	44.75	59.15	18458.39	22.13	133.53	36.91	95.75	43.49	7335.41	15.95	98.44	0.258032
3	38.70	90.75	30.51	5700.26	25.89	154.81	28.38	130.75	22.32	2232.03	18.61	113.5	0.258032
4	29.72	127.0	17.58	1937.59	26.54	158.53	22.50	155.00	13.28	835.20	19.75	120.0	0.258032

Load Summary

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 6	

Tower Engineering Solutions

Discrete Appurtenances

				No Ice			Ice				
No.	Elev (ft)	Description	Qty	Weight (lb)	CaAa (sf)	CaAa Factor	Weight (lb)	CaAa (sf)	CaAa Factor	Hor. Ecc. (ft)	Vert Ecc (ft)
1	154.00	AIR 21 B2A B4P	3	91.50	6.09	0.86	260.92	7.190	0.86	0.00	0.00
2	154.00	AIR 21 B4A B2P	3	90.40	6.09	0.86	259.82	7.190	0.86	0.00	0.00
3	154.00	KRY 112 144/1	3	11.00	0.41	0.67	21.81	0.886	0.70	0.00	0.00
4	154.00	T-Arm	3	400.00	10.00	0.67	679.97	18.749	0.67	0.00	0.00
5	154.00	APXVAARR24_43-U-NA20	3	128.00	20.24	0.70	547.17	22.145	0.70	0.00	0.00
6	154.00	4449	3	70.00	1.65	0.67	138.47	2.189	0.67	0.00	0.00
7	154.00	HRK12 (Handrail Kit)	1	261.72	6.75	1.00	573.13	13.364	1.00	0.00	0.00
8	154.00	(3) HR w/ Double V-Brace Kits	1	650.00	15.50	1.00	1468.91	31.773	1.00	0.00	0.00
9	143.00	T-Arm	3	400.00	10.00	0.67	677.90	18.684	0.67	0.00	0.00
10	143.00	Cci HPA-65R-BUU-H6	3	51.00	9.66	0.85	297.73	11.019	0.85	0.00	0.00
11	143.00	Ericsson RRUS 32 B2	3	77.00	1.65	0.67	125.18	2.227	0.67	0.00	0.00
12	143.00	Ericsson RRUS 11	6	50.70	2.52	0.71	139.37	3.168	0.71	0.00	0.00
13	143.00	Raycap DC6-48-60-18-8F	1	31.80	0.92	0.75	93.33	1.356	0.75	0.00	0.00
14	143.00	Powerwave 7770	6	35.00	5.50	0.73	169.38	6.560	0.73	0.00	0.00
15	143.00	Powerwave LGP21401 TMA	6	14.10	1.29	0.67	38.98	2.122	0.67	0.00	0.00
16	143.00	Powerwave LGP13519 Diplexer	6	5.30	0.34	0.67	14.75	0.792	0.67	0.00	0.00
17	133.00	BXA-171063-12CF	3	15.00	4.78	0.84	109.68	7.111	0.84	0.00	0.00
18	133.00	RRH2X60-AWS	3	60.00	3.50	0.76	146.25	4.280	0.76	0.00	0.00
19	133.00	RRH2X60-700	3	60.00	3.50	0.76	146.25	4.280	0.76	0.00	0.00
20	133.00	DB-T1-6Z-8AB-0Z	2	44.00	4.80	0.71	185.71	5.662	0.71	0.00	0.00
21	133.00	SBNHH-1D65B	6	40.00	8.16	0.83	240.24	9.443	0.83	0.00	0.00
22	133.00	LPA-80080-6CF	6	21.00	4.33	1.70	187.41	5.689	1.70	0.00	0.00
23	133.00	T-Arm	3	350.00	8.00	0.67	591.41	14.897	0.67	0.00	0.00
24	85.00	Pipe Mount	2	60.00	5.00	1.00	107.49	8.298	1.00	0.00	0.00
25	85.00	SP4-4.7NS RD4	1	60.00	23.14	1.00	282.63	26.192	1.00	0.00	0.00
26	85.00	SD222	2	17.00	5.30	1.00	151.21	13.043	1.00	0.00	4.75
27	85.00	DB408	1	17.00	2.90	1.00	134.44	11.633	1.00	0.00	4.71
		Totals:	**86**	**7,670.82**			**20,189.81**				

Linear Appurtenances

Bottom Elev. (ft)	Top Elev. (ft)	Description	Exposed Width	Exposed
0.00	154.00	(9) 1 5/8" Coax	0.00	Inside
0.00	154.00	(4) 1 5/8" Fiber	0.00	Inside
0.00	143.00	(12) 1 5/8" Coax	0.00	Inside
0.00	143.00	(2) 1/2" DC power	0.00	Inside
0.00	143.00	(1) 3" Innerduct	0.00	Inside
0.00	143.00	(1) 3/8" Fiber	0.00	Inside
0.00	133.00	(12) 1 5/8" Coax	0.00	Inside
0.00	133.00	(1) 1 5/8" Fiber	0.00	Inside
0.00	133.00	(1) 1 5/8" Fiber	2.00	Outside
0.00	85.00	(6) 7/8" Coax	0.00	Inside

Shaft Section Properties

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Increment Length: **5 (ft)**

Elev (ft)	Description	Thick (in)	Dia (in)	Area (in^2)	Ix (in^4)	W/t Ratio	D/t Ratio	Fpy (ksi)	S (in^3)	Weight (lb)
0.00		0.4375	60.870	83.915	38719.9	23.12	139.13	74.2	1252.	0.0
5.00		0.4375	59.580	82.124	36292.6	22.60	136.18	74.8	1199.	1412.5
10.00		0.4375	58.290	80.332	33968.9	22.08	133.23	75.4	1147.	1382.0
15.00		0.4375	57.000	78.541	31746.6	21.56	130.28	76.0	1097.	1351.5
20.00		0.4375	55.709	76.749	29623.4	21.04	127.34	76.7	1047.	1321.0
25.00		0.4375	54.419	74.958	27597.0	20.52	124.39	77.3	998.8	1290.6
30.00		0.4375	53.129	73.166	25665.2	20.00	121.44	77.9	951.5	1260.1
35.00		0.4375	51.839	71.375	23825.7	19.48	118.49	78.5	905.3	1229.6
40.00		0.4375	50.549	69.583	22076.3	18.96	115.54	79.1	860.2	1199.1
44.75	Bot - Section 2	0.4375	49.323	67.881	20495.8	18.47	112.74	79.7	818.5	1110.9
45.00		0.4375	49.259	67.792	20414.7	18.44	112.59	79.7	816.3	108.0
50.00		0.4375	47.968	66.000	18838.7	17.92	109.64	80.3	773.5	2130.2
51.00	Top - Section 1	0.3750	48.460	57.232	16719.1	21.38	129.23	0.0	0.0	419.2
55.00		0.3750	47.428	56.003	15665.5	20.89	126.48	76.8	650.6	770.6
60.00		0.3750	46.138	54.468	14411.9	20.28	123.03	77.5	615.2	939.8
65.00		0.3750	44.848	52.932	13227.0	19.68	119.59	78.3	580.9	913.6
70.00		0.3750	43.558	51.396	12108.9	19.07	116.15	79.0	547.5	887.5
75.00		0.3750	42.268	49.861	11055.7	18.46	112.71	79.7	515.2	861.4
80.00		0.3750	40.977	48.325	10065.4	17.86	109.27	80.4	483.8	835.3
85.00		0.3750	39.687	46.790	9136.1	17.25	105.83	81.1	453.4	809.1
90.00		0.3750	38.397	45.254	8265.8	16.64	102.39	81.8	424.0	783.0
90.75	Bot - Section 3	0.3750	38.204	45.024	8140.2	16.55	101.88	81.9	419.7	115.2
95.00		0.3750	37.107	43.719	7452.6	16.04	98.95	82.5	395.6	1076.7
95.75	Top - Section 2	0.2500	37.413	29.488	5145.5	24.98	149.65	0.0	0.0	186.7
100.00		0.2500	36.317	28.618	4703.3	24.20	145.27	72.9	255.1	420.2
105.00		0.2500	35.027	27.594	4216.4	23.29	140.11	74.0	237.1	478.2
110.00		0.2500	33.736	26.571	3764.4	22.38	134.95	75.1	219.8	460.8
115.00		0.2500	32.446	25.547	3345.8	21.47	129.79	76.1	203.1	443.4
120.00		0.2500	31.156	24.523	2959.5	20.56	124.62	77.2	187.1	425.9
125.00		0.2500	29.866	23.499	2604.1	19.65	119.46	78.3	171.7	408.5
127.00	Bot - Section 4	0.2500	29.350	23.090	2470.4	19.29	117.40	78.7	165.8	158.5
130.00		0.2500	28.576	22.476	2278.4	18.74	114.30	79.4	157.0	409.7
130.75	Top - Section 3	0.1875	28.757	17.002	1753.3	25.63	153.37	0.0	0.0	100.7
133.00		0.1875	28.177	16.656	1648.6	25.09	150.28	71.9	115.2	128.8
135.00		0.1875	27.661	16.349	1559.1	24.60	147.52	72.5	111.0	112.3
140.00		0.1875	26.370	15.582	1349.6	23.39	140.64	73.9	100.8	271.6
143.00		0.1875	25.596	15.121	1233.4	22.66	136.51	74.7	94.9	156.7
145.00		0.1875	25.080	14.814	1159.8	22.18	133.76	75.3	91.1	101.9
150.00		0.1875	23.790	14.046	988.6	20.96	126.88	76.7	81.8	245.5
154.00		0.1875	22.758	13.432	864.5	19.99	121.38	77.9	74.8	187.0
155.00		0.1875	22.500	13.278	835.2	19.75	120.00	78.2	73.1	45.4
										26948.9

Wind Loading - Shaft

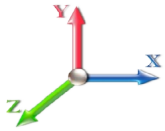
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	460.63	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	450.87	0.650	0.000	5.00	25.481	16.56	567.0	0.0	1695.0
10.00		1.00	0.85	19.450	21.40	441.10	0.650	0.000	5.00	24.935	16.21	554.8	0.0	1658.4
15.00		1.00	0.85	19.450	21.40	431.34	0.650	0.000	5.00	24.389	15.85	542.7	0.0	1621.8
20.00		1.00	0.90	20.638	22.70	434.25	0.650	0.000	5.00	23.843	15.50	562.9	0.0	1585.2
25.00		1.00	0.95	21.630	23.79	434.28	0.650	0.000	5.00	23.297	15.14	576.5	0.0	1548.7
30.00		1.00	0.98	22.477	24.72	432.20	0.650	0.000	5.00	22.752	14.79	585.0	0.0	1512.1
35.00		1.00	1.01	23.218	25.54	428.60	0.650	0.000	5.00	22.206	14.43	589.8	0.0	1475.5
40.00		1.00	1.04	23.880	26.27	423.85	0.650	0.000	5.00	21.660	14.08	591.7	0.0	1438.9
44.75	Bot - Section 2	1.00	1.07	24.451	26.90	418.49	0.650	0.000	4.75	20.071	13.05	561.4	0.0	1333.1
45.00		1.00	1.07	24.479	26.93	418.18	0.650	0.000	0.25	1.059	0.69	29.6	0.0	129.6
50.00		1.00	1.09	25.029	27.53	411.77	0.650	0.000	5.00	20.885	13.58	598.0	0.0	2556.2
51.00	Top - Section 1	1.00	1.10	25.133	27.65	410.41	0.650	0.000	1.00	4.112	2.67	118.2	0.0	503.1
55.00		1.00	1.12	25.536	28.09	411.24	0.650	0.000	4.00	16.228	10.55	474.1	0.0	924.7
60.00		1.00	1.14	26.008	28.61	403.74	0.650	0.000	5.00	19.794	12.87	588.9	0.0	1127.7
65.00		1.00	1.16	26.450	29.09	395.77	0.650	0.000	5.00	19.248	12.51	582.4	0.0	1096.4
70.00		1.00	1.17	26.866	29.55	387.39	0.650	0.000	5.00	18.702	12.16	574.8	0.0	1065.0
75.00		1.00	1.19	27.259	29.98	378.66	0.650	0.000	5.00	18.156	11.80	566.2	0.0	1033.7
80.00		1.00	1.21	27.632	30.39	369.60	0.650	0.000	5.00	17.610	11.45	556.7	0.0	1002.3
85.00	Appurtenance(s)	1.00	1.22	27.987	30.79	360.26	0.650	0.000	5.00	17.064	11.09	546.3	0.0	971.0
90.00		1.00	1.24	28.325	31.16	350.65	0.650	0.000	5.00	16.519	10.74	535.3	0.0	939.6
90.75	Bot - Section 3	1.00	1.24	28.375	31.21	349.19	0.650	0.000	0.75	2.431	1.58	78.9	0.0	138.2
95.00		1.00	1.25	28.650	31.51	340.80	0.650	0.000	4.25	13.722	8.92	449.7	0.0	1292.0
95.75	Top - Section 2	1.00	1.25	28.697	31.57	339.30	0.650	0.000	0.75	2.381	1.55	78.2	0.0	224.1
100.00		1.00	1.27	28.961	31.86	335.35	0.650	0.000	4.25	13.258	8.62	439.2	0.0	504.2
105.00		1.00	1.28	29.260	32.19	325.10	0.650	0.000	5.00	15.092	9.81	505.2	0.0	573.8
110.00		1.00	1.29	29.548	32.50	314.66	0.650	0.000	5.00	14.547	9.46	491.7	0.0	552.9
115.00		1.00	1.30	29.826	32.81	304.05	0.650	0.000	5.00	14.001	9.10	477.7	0.0	532.0
120.00		1.00	1.32	30.094	33.10	293.27	0.650	0.000	5.00	13.455	8.75	463.2	0.0	511.1
125.00		1.00	1.33	30.354	33.39	282.34	0.650	0.000	5.00	12.909	8.39	448.3	0.0	490.2
127.00	Bot - Section 4	1.00	1.33	30.455	33.50	277.92	0.650	0.000	2.00	5.011	3.26	174.6	0.0	190.2
130.00		1.00	1.34	30.605	33.67	271.26	0.650	0.000	3.00	7.448	4.84	260.8	0.0	491.6
130.75	Top - Section 3	1.00	1.34	30.642	33.71	269.58	0.650	0.000	0.75	1.831	1.19	64.2	0.0	120.8
133.00	Appurtenance(s)	1.00	1.34	30.753	33.83	268.11	0.650	0.000	2.25	5.420	3.52	190.7	0.0	154.6
135.00		1.00	1.35	30.850	33.93	263.62	0.650	0.000	2.00	4.725	3.07	166.8	0.0	134.8
140.00		1.00	1.36	31.087	34.20	252.28	0.650	0.000	5.00	11.430	7.43	406.5	0.0	326.0
143.00	Appurtenance(s)	1.00	1.36	31.226	34.35	245.43	0.650	0.000	3.00	6.596	4.29	235.6	0.0	188.1
145.00		1.00	1.37	31.317	34.45	240.83	0.650	0.000	2.00	4.288	2.79	153.6	0.0	122.2
150.00		1.00	1.38	31.541	34.70	229.26	0.650	0.000	5.00	10.338	6.72	373.0	0.0	294.6
154.00	Appurtenance(s)	1.00	1.39	31.717	34.89	219.92	0.650	0.000	4.00	7.878	5.12	285.8	0.0	224.4
155.00		1.00	1.39	31.760	34.94	217.57	0.650	0.000	1.00	1.915	1.24	69.6	0.0	54.5
								Totals:	**155.00**			**16,115.7**		**32,338.6**

Discrete Appurtenance Forces

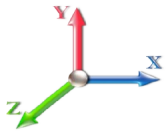
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	154.00	T-Arm	3	31.717	34.888	0.50	0.75	15.08	1440.00	0.000	0.000	841.51	0.00	0.00
2	154.00	AIR 21 B2A B4P	3	31.717	34.888	0.69	0.80	12.57	329.40	0.000	0.000	701.66	0.00	0.00
3	154.00	AIR 21 B4A B2P	3	31.717	34.888	0.69	0.80	12.57	325.44	0.000	0.000	701.66	0.00	0.00
4	154.00	KRY 112 144/1	3	31.717	34.888	0.54	0.80	0.66	39.60	0.000	0.000	36.80	0.00	0.00
5	154.00	(3) HR w/ Double V-Brace	1	31.717	34.888	1.00	1.00	15.50	780.00	0.000	0.000	865.23	0.00	0.00
6	154.00	APXVAARR24_43-U-NA2	3	31.717	34.888	0.56	0.80	34.00	460.80	0.000	0.000	1898.11	0.00	0.00
7	154.00	4449	3	31.717	34.888	0.54	0.80	2.65	252.00	0.000	0.000	148.11	0.00	0.00
8	154.00	HRK12 (Handrail Kit)	1	31.717	34.888	1.00	1.00	6.75	314.06	0.000	0.000	376.79	0.00	0.00
9	143.00	Powerwave LGP13519	6	31.226	34.348	0.54	0.80	1.09	38.16	0.000	0.000	60.09	0.00	0.00
10	143.00	Powerwave LGP21401	6	31.226	34.348	0.54	0.80	4.15	101.52	0.000	0.000	228.00	0.00	0.00
11	143.00	Powerwave 7770	6	31.226	34.348	0.58	0.80	19.27	252.00	0.000	0.000	1059.14	0.00	0.00
12	143.00	Raycap DC6-48-60-18-8F	1	31.226	34.348	0.60	0.80	0.55	38.16	0.000	0.000	30.34	0.00	0.00
13	143.00	Ericsson RRUS 11	6	31.226	34.348	0.57	0.80	8.59	365.04	0.000	0.000	471.98	0.00	0.00
14	143.00	Ericsson RRUS 32 B2	3	31.226	34.348	0.54	0.80	2.65	277.20	0.000	0.000	145.81	0.00	0.00
15	143.00	T-Arm	3	31.226	34.348	0.50	0.75	15.08	1440.00	0.000	0.000	828.48	0.00	0.00
16	143.00	Cci HPA-65R-BUU-H6	3	31.226	34.348	0.68	0.80	19.71	183.60	0.000	0.000	1083.01	0.00	0.00
17	133.00	DB-T1-6Z-8AB-0Z	2	30.753	33.828	0.57	0.80	5.45	105.60	0.000	0.000	295.13	0.00	0.00
18	133.00	BXA-171063-12CF	3	30.753	33.828	0.67	0.80	9.64	54.00	0.000	0.000	521.57	0.00	0.00
19	133.00	RRH2X60-AWS	3	30.753	33.828	0.61	0.80	6.38	216.00	0.000	0.000	345.53	0.00	0.00
20	133.00	RRH2X60-700	3	30.753	33.828	0.61	0.80	6.38	216.00	0.000	0.000	345.53	0.00	0.00
21	133.00	SBNHH-1D65B	6	30.753	33.828	0.66	0.80	32.51	288.00	0.000	0.000	1759.57	0.00	0.00
22	133.00	LPA-80080-6CF	6	30.753	33.828	1.36	0.80	35.33	151.20	0.000	0.000	1912.38	0.00	0.00
23	133.00	T-Arm	3	30.753	33.828	0.50	0.75	12.06	1260.00	0.000	0.000	652.75	0.00	0.00
24	85.00	DB408	1	28.306	31.137	1.00	1.00	2.90	20.40	0.000	4.708	144.47	0.00	680.23
25	85.00	SD222	2	28.309	31.140	1.00	1.00	10.60	40.80	0.000	4.750	528.13	0.00	2508.62
26	85.00	SP4-4.7NS RD4	1	27.987	30.785	1.00	1.00	23.14	72.00	0.000	0.000	1139.80	0.00	0.00
27	85.00	Pipe Mount	2	27.987	30.785	1.00	1.00	10.00	144.00	0.000	0.000	492.56	0.00	0.00
							Totals:		**9,204.98**			**17,614.15**		

Total Applied Force Summary

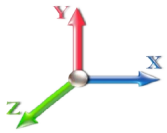
Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 10

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		566.98	1972.18	0.00	0.00
10.00		554.83	1935.60	0.00	0.00
15.00		542.69	1899.03	0.00	0.00
20.00		562.92	1862.45	0.00	0.00
25.00		576.49	1825.87	0.00	0.00
30.00		585.01	1789.30	0.00	0.00
35.00		589.81	1752.72	0.00	0.00
40.00		591.72	1716.14	0.00	0.00
44.75		561.43	1596.46	0.00	0.00
45.00		29.65	143.45	0.00	0.00
50.00		598.00	2833.41	0.00	0.00
51.00		118.22	558.53	0.00	0.00
55.00		474.07	1146.51	0.00	0.00
60.00		588.92	1404.92	0.00	0.00
65.00		582.41	1373.57	0.00	0.00
70.00		574.79	1342.22	0.00	0.00
75.00		566.18	1310.87	0.00	0.00
80.00		556.67	1279.52	0.00	0.00
85.00	(6) attachments	2851.31	1525.37	0.00	3188.85
90.00		535.27	1198.09	0.00	0.00
90.75		78.90	177.01	0.00	0.00
95.00		449.74	1511.69	0.00	0.00
95.75		78.15	262.85	0.00	0.00
100.00		439.25	723.90	0.00	0.00
105.00		505.19	832.31	0.00	0.00
110.00		491.71	811.41	0.00	0.00
115.00		477.71	790.51	0.00	0.00
120.00		463.22	769.61	0.00	0.00
125.00		448.26	748.71	0.00	0.00
127.00		174.58	293.63	0.00	0.00
130.00		260.76	646.68	0.00	0.00
130.75		64.19	159.61	0.00	0.00
133.00	(26) attachments	6023.15	2561.73	0.00	0.00
135.00		166.75	202.93	0.00	0.00
140.00		406.49	496.36	0.00	0.00
143.00	(34) attachments	4142.47	2985.97	0.00	0.00
145.00		153.63	155.26	0.00	0.00
150.00		373.05	377.17	0.00	0.00
154.00	(20) attachments	5855.70	4231.75	0.00	0.00
155.00		69.57	54.53	0.00	0.00
	Totals:	**33,729.86**	**49,259.87**	**0.00**	**3,188.85**

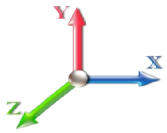
Linear Appurtenance Segment Forces (Factored)

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 11	

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 23

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	19.450	0.00	6.60
10.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	19.450	0.00	6.60
15.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.034	0.000	19.450	0.00	6.60
20.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.035	0.000	20.638	0.00	6.60
25.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.036	0.000	21.630	0.00	6.60
30.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.037	0.000	22.477	0.00	6.60
35.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	23.218	0.00	6.60
40.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	23.880	0.00	6.60
44.75	1 5/8" Fiber	Yes	4.75	0.000	2.00	0.79	0.00	0.039	0.000	24.451	0.00	6.27
45.00	1 5/8" Fiber	Yes	0.25	0.000	2.00	0.04	0.00	0.040	0.000	24.479	0.00	0.33
50.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.041	0.000	25.029	0.00	6.60
51.00	1 5/8" Fiber	Yes	1.00	0.000	2.00	0.17	0.00	0.041	0.000	25.133	0.00	1.32
55.00	1 5/8" Fiber	Yes	4.00	0.000	2.00	0.67	0.00	0.041	0.000	25.536	0.00	5.28
60.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.042	0.000	26.008	0.00	6.60
65.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.043	0.000	26.450	0.00	6.60
70.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.045	0.000	26.866	0.00	6.60
75.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.046	0.000	27.259	0.00	6.60
80.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.047	0.000	27.632	0.00	6.60
85.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.049	0.000	27.987	0.00	6.60
90.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.050	0.000	28.325	0.00	6.60
90.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.051	0.000	28.375	0.00	0.99
95.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.052	0.000	28.650	0.00	5.61
95.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.053	0.000	28.697	0.00	0.99
100.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.053	0.000	28.961	0.00	5.61
105.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.055	0.000	29.260	0.00	6.60
110.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.057	0.000	29.548	0.00	6.60
115.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.060	0.000	29.826	0.00	6.60
120.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.062	0.000	30.094	0.00	6.60
125.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.065	0.000	30.354	0.00	6.60
127.00	1 5/8" Fiber	Yes	2.00	0.000	2.00	0.33	0.00	0.067	0.000	30.455	0.00	2.64
130.00	1 5/8" Fiber	Yes	3.00	0.000	2.00	0.50	0.00	0.068	0.000	30.605	0.00	3.96
130.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.069	0.000	30.642	0.00	0.99
133.00	1 5/8" Fiber	Yes	2.25	0.000	2.00	0.38	0.00	0.069	0.000	30.753	0.00	2.97
									Totals:		**0.0**	**175.6**

Calculated Forces

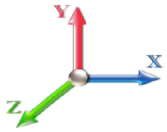
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 97 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.60



Iterations 23

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-49.22	-33.79	0.00	-3695.4	0.00	3695.48	5604.23	2802.12	13924.9	6972.80	0.00	0.000	0.000	0.539
5.00	-47.17	-33.33	0.00	-3526.5	0.00	3526.55	5529.79	2764.90	13444.5	6732.24	0.07	-0.133	0.000	0.533
10.00	-45.16	-32.87	0.00	-3359.9	0.00	3359.90	5453.38	2726.69	12967.3	6493.32	0.28	-0.268	0.000	0.526
15.00	-43.18	-32.43	0.00	-3195.5	0.00	3195.53	5374.99	2687.50	12493.8	6256.19	0.64	-0.405	0.000	0.519
20.00	-41.25	-31.95	0.00	-3033.4	0.00	3033.41	5294.63	2647.32	12024.1	6021.01	1.14	-0.544	0.000	0.512
25.00	-39.35	-31.45	0.00	-2873.6	0.00	2873.67	5212.30	2606.15	11558.7	5787.94	1.78	-0.686	0.000	0.504
30.00	-37.49	-30.94	0.00	-2716.4	0.00	2716.42	5128.00	2564.00	11097.7	5557.14	2.58	-0.830	0.000	0.496
35.00	-35.67	-30.41	0.00	-2561.7	0.00	2561.74	5041.73	2520.86	10641.7	5328.76	3.53	-0.977	0.000	0.488
40.00	-33.89	-29.87	0.00	-2409.6	0.00	2409.69	4953.48	2476.74	10190.8	5102.98	4.63	-1.125	0.000	0.479
44.75	-32.27	-29.32	0.00	-2267.7	0.00	2267.79	4867.82	2433.91	9767.51	4891.01	5.82	-1.268	0.000	0.470
45.00	-32.08	-29.33	0.00	-2260.4	0.00	2260.46	4863.26	2431.63	9745.37	4879.93	5.89	-1.276	0.000	0.470
50.00	-29.22	-28.72	0.00	-2113.7	0.00	2113.79	4771.07	2385.54	9305.74	4659.79	7.31	-1.428	0.000	0.460
51.00	-28.62	-28.62	0.00	-2085.0	0.00	2085.07	3927.98	1963.99	7761.51	3886.53	7.61	-1.460	0.000	0.544
55.00	-27.42	-28.19	0.00	-1970.5	0.00	1970.58	3872.44	1936.22	7486.25	3748.69	8.89	-1.585	0.000	0.533
60.00	-25.95	-27.64	0.00	-1829.6	0.00	1829.63	3801.23	1900.62	7145.52	3578.07	10.64	-1.757	0.000	0.518
65.00	-24.51	-27.09	0.00	-1691.4	0.00	1691.44	3728.06	1864.03	6808.79	3409.45	12.58	-1.931	0.000	0.503
70.00	-23.11	-26.54	0.00	-1556.0	0.00	1556.00	3652.91	1826.46	6476.38	3243.00	14.69	-2.106	0.000	0.486
75.00	-21.74	-25.99	0.00	-1423.3	0.00	1423.32	3575.79	1787.90	6148.62	3078.88	16.99	-2.281	0.000	0.469
80.00	-20.41	-25.44	0.00	-1293.3	0.00	1293.39	3496.70	1748.35	5825.81	2917.23	19.48	-2.455	0.000	0.449
85.00	-18.94	-22.58	0.00	-1163.0	0.00	1163.00	3415.64	1707.82	5508.27	2758.23	22.14	-2.629	0.000	0.427
90.00	-17.73	-22.02	0.00	-1050.1	0.00	1050.10	3332.60	1666.30	5196.32	2602.02	24.99	-2.801	0.000	0.409
90.75	-17.53	-21.96	0.00	-1033.5	0.00	1033.59	3319.98	1659.99	5150.02	2578.84	25.43	-2.828	0.000	0.406
95.00	-16.01	-21.46	0.00	-940.26	0.00	940.26	3247.59	1623.80	4890.27	2448.77	28.01	-2.975	0.000	0.389
95.75	-15.72	-21.39	0.00	-924.17	0.00	924.17	1911.44	955.72	2922.15	1463.25	28.48	-3.002	0.000	0.640
100.00	-14.95	-20.96	0.00	-833.26	0.00	833.26	1878.47	939.23	2786.43	1395.29	31.22	-3.147	0.000	0.606
105.00	-14.06	-20.47	0.00	-728.45	0.00	728.45	1837.85	918.92	2627.99	1315.95	34.64	-3.383	0.000	0.562
110.00	-13.20	-19.98	0.00	-626.11	0.00	626.11	1795.26	897.63	2471.18	1237.43	38.31	-3.611	0.000	0.514
115.00	-12.37	-19.50	0.00	-526.22	0.00	526.22	1750.70	875.35	2316.31	1159.88	42.21	-3.829	0.000	0.461
120.00	-11.57	-19.02	0.00	-428.73	0.00	428.73	1704.17	852.08	2163.70	1083.46	46.33	-4.032	0.000	0.403
125.00	-10.82	-18.54	0.00	-333.63	0.00	333.63	1655.66	827.83	2013.66	1008.33	50.65	-4.215	0.000	0.338
127.00	-10.51	-18.36	0.00	-296.54	0.00	296.54	1635.71	817.85	1954.43	978.67	52.43	-4.284	0.000	0.310
130.00	-9.87	-18.06	0.00	-241.45	0.00	241.45	1605.19	802.59	1866.51	934.64	55.15	-4.377	0.000	0.265
130.75	-9.70	-17.99	0.00	-227.91	0.00	227.91	1090.28	545.14	1281.57	641.74	55.84	-4.399	0.000	0.365
133.00	-7.60	-11.80	0.00	-187.42	0.00	187.42	1077.75	538.87	1240.93	621.39	57.93	-4.458	0.000	0.309
135.00	-7.39	-11.63	0.00	-163.82	0.00	163.82	1066.28	533.14	1204.93	603.36	59.81	-4.519	0.000	0.279
140.00	-6.92	-11.20	0.00	-105.68	0.00	105.68	1036.22	518.11	1115.60	558.63	64.60	-4.642	0.000	0.196
143.00	-4.27	-6.83	0.00	-72.09	0.00	72.09	1017.23	508.62	1062.55	532.07	67.54	-4.698	0.000	0.140
145.00	-4.12	-6.66	0.00	-58.44	0.00	58.44	1004.18	502.09	1027.46	514.49	69.51	-4.728	0.000	0.118
150.00	-3.78	-6.26	0.00	-25.12	0.00	25.12	970.18	485.09	940.83	471.12	74.49	-4.780	0.000	0.057
154.00	-0.05	-0.07	0.00	-0.07	0.00	0.07	941.55	470.78	872.83	437.06	78.50	-4.794	0.000	0.000
155.00	0.00	-0.07	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	79.50	-4.794	0.000	0.000

Wind Loading - Shaft

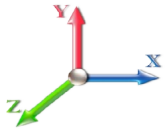
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 23

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	19.450	21.40	460.63	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	19.450	21.40	450.87	0.650	0.000	5.00	25.481	16.56	567.0	0.0	1271.2
10.00		1.00	0.85	19.450	21.40	441.10	0.650	0.000	5.00	24.935	16.21	554.8	0.0	1243.8
15.00		1.00	0.85	19.450	21.40	431.34	0.650	0.000	5.00	24.389	15.85	542.7	0.0	1216.4
20.00		1.00	0.90	20.638	22.70	434.25	0.650	0.000	5.00	23.843	15.50	562.9	0.0	1188.9
25.00		1.00	0.95	21.630	23.79	434.28	0.650	0.000	5.00	23.297	15.14	576.5	0.0	1161.5
30.00		1.00	0.98	22.477	24.72	432.20	0.650	0.000	5.00	22.752	14.79	585.0	0.0	1134.1
35.00		1.00	1.01	23.218	25.54	428.60	0.650	0.000	5.00	22.206	14.43	589.8	0.0	1106.6
40.00		1.00	1.04	23.880	26.27	423.85	0.650	0.000	5.00	21.660	14.08	591.7	0.0	1079.2
44.75	Bot - Section 2	1.00	1.07	24.451	26.90	418.49	0.650	0.000	4.75	20.071	13.05	561.4	0.0	999.8
45.00		1.00	1.07	24.479	26.93	418.18	0.650	0.000	0.25	1.059	0.69	29.6	0.0	97.2
50.00		1.00	1.09	25.029	27.53	411.77	0.650	0.000	5.00	20.885	13.58	598.0	0.0	1917.2
51.00	Top - Section 1	1.00	1.10	25.133	27.65	410.41	0.650	0.000	1.00	4.112	2.67	118.2	0.0	377.3
55.00		1.00	1.12	25.536	28.09	411.24	0.650	0.000	4.00	16.228	10.55	474.1	0.0	693.6
60.00		1.00	1.14	26.008	28.61	403.74	0.650	0.000	5.00	19.794	12.87	588.9	0.0	845.8
65.00		1.00	1.16	26.450	29.09	395.77	0.650	0.000	5.00	19.248	12.51	582.4	0.0	822.3
70.00		1.00	1.17	26.866	29.55	387.39	0.650	0.000	5.00	18.702	12.16	574.8	0.0	798.8
75.00		1.00	1.19	27.259	29.98	378.66	0.650	0.000	5.00	18.156	11.80	566.2	0.0	775.3
80.00		1.00	1.21	27.632	30.39	369.60	0.650	0.000	5.00	17.610	11.45	556.7	0.0	751.7
85.00	Appurtenance(s)	1.00	1.22	27.987	30.79	360.26	0.650	0.000	5.00	17.064	11.09	546.3	0.0	728.2
90.00		1.00	1.24	28.325	31.16	350.65	0.650	0.000	5.00	16.519	10.74	535.3	0.0	704.7
90.75	Bot - Section 3	1.00	1.24	28.375	31.21	349.19	0.650	0.000	0.75	2.431	1.58	78.9	0.0	103.7
95.00		1.00	1.25	28.650	31.51	340.80	0.650	0.000	4.25	13.722	8.92	449.7	0.0	969.0
95.75	Top - Section 2	1.00	1.25	28.697	31.57	339.30	0.650	0.000	0.75	2.381	1.55	78.2	0.0	168.1
100.00		1.00	1.27	28.961	31.86	335.35	0.650	0.000	4.25	13.258	8.62	439.2	0.0	378.1
105.00		1.00	1.28	29.260	32.19	325.10	0.650	0.000	5.00	15.092	9.81	505.2	0.0	430.4
110.00		1.00	1.29	29.548	32.50	314.66	0.650	0.000	5.00	14.547	9.46	491.7	0.0	414.7
115.00		1.00	1.30	29.826	32.81	304.05	0.650	0.000	5.00	14.001	9.10	477.7	0.0	399.0
120.00		1.00	1.32	30.094	33.10	293.27	0.650	0.000	5.00	13.455	8.75	463.2	0.0	383.3
125.00		1.00	1.33	30.354	33.39	282.34	0.650	0.000	5.00	12.909	8.39	448.3	0.0	367.7
127.00	Bot - Section 4	1.00	1.33	30.455	33.50	277.92	0.650	0.000	2.00	5.011	3.26	174.6	0.0	142.7
130.00		1.00	1.34	30.605	33.67	271.26	0.650	0.000	3.00	7.448	4.84	260.8	0.0	368.7
130.75	Top - Section 3	1.00	1.34	30.642	33.71	269.58	0.650	0.000	0.75	1.831	1.19	64.2	0.0	90.6
133.00	Appurtenance(s)	1.00	1.34	30.753	33.83	268.11	0.650	0.000	2.25	5.420	3.52	190.7	0.0	116.0
135.00		1.00	1.35	30.850	33.93	263.62	0.650	0.000	2.00	4.725	3.07	166.8	0.0	101.1
140.00		1.00	1.36	31.087	34.20	252.28	0.650	0.000	5.00	11.430	7.43	406.5	0.0	244.5
143.00	Appurtenance(s)	1.00	1.36	31.226	34.35	245.43	0.650	0.000	3.00	6.596	4.29	235.6	0.0	141.0
145.00		1.00	1.37	31.317	34.45	240.83	0.650	0.000	2.00	4.288	2.79	153.6	0.0	91.7
150.00		1.00	1.38	31.541	34.70	229.26	0.650	0.000	5.00	10.338	6.72	373.0	0.0	221.0
154.00	Appurtenance(s)	1.00	1.39	31.717	34.89	219.92	0.650	0.000	4.00	7.878	5.12	285.8	0.0	168.3
155.00		1.00	1.39	31.760	34.94	217.57	0.650	0.000	1.00	1.915	1.24	69.6	0.0	40.9
								Totals:	**155.00**			**16,115.7**		**24,254.0**

Discrete Appurtenance Forces

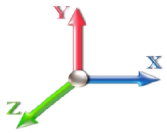
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 23

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	154.00	T-Arm	3	31.717	34.888	0.50	0.75	15.08	1080.00	0.000	0.000	841.51	0.00	0.00
2	154.00	AIR 21 B2A B4P	3	31.717	34.888	0.69	0.80	12.57	247.05	0.000	0.000	701.66	0.00	0.00
3	154.00	AIR 21 B4A B2P	3	31.717	34.888	0.69	0.80	12.57	244.08	0.000	0.000	701.66	0.00	0.00
4	154.00	KRY 112 144/1	3	31.717	34.888	0.54	0.80	0.66	29.70	0.000	0.000	36.80	0.00	0.00
5	154.00	(3) HR w/ Double V-Brace	1	31.717	34.888	1.00	1.00	15.50	585.00	0.000	0.000	865.23	0.00	0.00
6	154.00	APXVAARR24_43-U-NA2	3	31.717	34.888	0.56	0.80	34.00	345.60	0.000	0.000	1898.11	0.00	0.00
7	154.00	4449	3	31.717	34.888	0.54	0.80	2.65	189.00	0.000	0.000	148.11	0.00	0.00
8	154.00	HRK12 (Handrail Kit)	1	31.717	34.888	1.00	1.00	6.75	235.55	0.000	0.000	376.79	0.00	0.00
9	143.00	Powerwave LGP13519	6	31.226	34.348	0.54	0.80	1.09	28.62	0.000	0.000	60.09	0.00	0.00
10	143.00	Powerwave LGP21401	6	31.226	34.348	0.54	0.80	4.15	76.14	0.000	0.000	228.00	0.00	0.00
11	143.00	Powerwave 7770	6	31.226	34.348	0.58	0.80	19.27	189.00	0.000	0.000	1059.14	0.00	0.00
12	143.00	Raycap DC6-48-60-18-8F	1	31.226	34.348	0.60	0.80	0.55	28.62	0.000	0.000	30.34	0.00	0.00
13	143.00	Ericsson RRUS 11	6	31.226	34.348	0.57	0.80	8.59	273.78	0.000	0.000	471.98	0.00	0.00
14	143.00	Ericsson RRUS 32 B2	3	31.226	34.348	0.54	0.80	2.65	207.90	0.000	0.000	145.81	0.00	0.00
15	143.00	T-Arm	3	31.226	34.348	0.50	0.75	15.08	1080.00	0.000	0.000	828.48	0.00	0.00
16	143.00	Cci HPA-65R-BUU-H6	3	31.226	34.348	0.68	0.80	19.71	137.70	0.000	0.000	1083.01	0.00	0.00
17	133.00	DB-T1-6Z-8AB-0Z	2	30.753	33.828	0.57	0.80	5.45	79.20	0.000	0.000	295.13	0.00	0.00
18	133.00	BXA-171063-12CF	3	30.753	33.828	0.67	0.80	9.64	40.50	0.000	0.000	521.57	0.00	0.00
19	133.00	RRH2X60-AWS	3	30.753	33.828	0.61	0.80	6.38	162.00	0.000	0.000	345.53	0.00	0.00
20	133.00	RRH2X60-700	3	30.753	33.828	0.61	0.80	6.38	162.00	0.000	0.000	345.53	0.00	0.00
21	133.00	SBNHH-1D65B	6	30.753	33.828	0.66	0.80	32.51	216.00	0.000	0.000	1759.57	0.00	0.00
22	133.00	LPA-80080-6CF	6	30.753	33.828	1.36	0.80	35.33	113.40	0.000	0.000	1912.38	0.00	0.00
23	133.00	T-Arm	3	30.753	33.828	0.50	0.75	12.06	945.00	0.000	0.000	652.75	0.00	0.00
24	85.00	DB408	1	28.306	31.137	1.00	1.00	2.90	15.30	0.000	4.708	144.47	0.00	680.23
25	85.00	SD222	2	28.309	31.140	1.00	1.00	10.60	30.60	0.000	4.750	528.13	0.00	2508.62
26	85.00	SP4-4.7NS RD4	1	27.987	30.785	1.00	1.00	23.14	54.00	0.000	0.000	1139.80	0.00	0.00
27	85.00	Pipe Mount	2	27.987	30.785	1.00	1.00	10.00	108.00	0.000	0.000	492.56	0.00	0.00
							Totals:		**6,903.74**			**17,614.15**		

Total Applied Force Summary

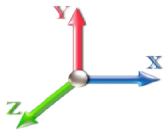
Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 15

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 23

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		566.98	1479.13	0.00	0.00
10.00		554.83	1451.70	0.00	0.00
15.00		542.69	1424.27	0.00	0.00
20.00		562.92	1396.84	0.00	0.00
25.00		576.49	1369.40	0.00	0.00
30.00		585.01	1341.97	0.00	0.00
35.00		589.81	1314.54	0.00	0.00
40.00		591.72	1287.11	0.00	0.00
44.75		561.43	1197.34	0.00	0.00
45.00		29.65	107.59	0.00	0.00
50.00		598.00	2125.06	0.00	0.00
51.00		118.22	418.90	0.00	0.00
55.00		474.07	859.88	0.00	0.00
60.00		588.92	1053.69	0.00	0.00
65.00		582.41	1030.18	0.00	0.00
70.00		574.79	1006.66	0.00	0.00
75.00		566.18	983.15	0.00	0.00
80.00		556.67	959.64	0.00	0.00
85.00	(6) attachments	2851.31	1144.02	0.00	3188.85
90.00		535.27	898.57	0.00	0.00
90.75		78.90	132.76	0.00	0.00
95.00		449.74	1133.77	0.00	0.00
95.75		78.15	197.14	0.00	0.00
100.00		439.25	542.92	0.00	0.00
105.00		505.19	624.23	0.00	0.00
110.00		491.71	608.56	0.00	0.00
115.00		477.71	592.88	0.00	0.00
120.00		463.22	577.21	0.00	0.00
125.00		448.26	561.53	0.00	0.00
127.00		174.58	220.22	0.00	0.00
130.00		260.76	485.01	0.00	0.00
130.75		64.19	119.71	0.00	0.00
133.00	(26) attachments	6023.15	1921.30	0.00	0.00
135.00		166.75	152.20	0.00	0.00
140.00		406.49	372.27	0.00	0.00
143.00	(34) attachments	4142.47	2239.48	0.00	0.00
145.00		153.63	116.44	0.00	0.00
150.00		373.05	282.88	0.00	0.00
154.00	(20) attachments	5855.70	3173.82	0.00	0.00
155.00		69.57	40.90	0.00	0.00
	Totals:	**33,729.86**	**36,944.90**	**0.00**	**3,188.85**

Linear Appurtenance Segment Forces (Factored)

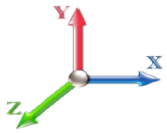
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 16	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 23

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	19.450	0.00	4.95
10.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	19.450	0.00	4.95
15.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.034	0.000	19.450	0.00	4.95
20.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.035	0.000	20.638	0.00	4.95
25.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.036	0.000	21.630	0.00	4.95
30.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.037	0.000	22.477	0.00	4.95
35.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	23.218	0.00	4.95
40.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	23.880	0.00	4.95
44.75	1 5/8" Fiber	Yes	4.75	0.000	2.00	0.79	0.00	0.039	0.000	24.451	0.00	4.70
45.00	1 5/8" Fiber	Yes	0.25	0.000	2.00	0.04	0.00	0.040	0.000	24.479	0.00	0.25
50.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.041	0.000	25.029	0.00	4.95
51.00	1 5/8" Fiber	Yes	1.00	0.000	2.00	0.17	0.00	0.041	0.000	25.133	0.00	0.99
55.00	1 5/8" Fiber	Yes	4.00	0.000	2.00	0.67	0.00	0.041	0.000	25.536	0.00	3.96
60.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.042	0.000	26.008	0.00	4.95
65.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.043	0.000	26.450	0.00	4.95
70.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.045	0.000	26.866	0.00	4.95
75.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.046	0.000	27.259	0.00	4.95
80.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.047	0.000	27.632	0.00	4.95
85.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.049	0.000	27.987	0.00	4.95
90.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.050	0.000	28.325	0.00	4.95
90.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.051	0.000	28.375	0.00	0.74
95.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.052	0.000	28.650	0.00	4.21
95.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.053	0.000	28.697	0.00	0.74
100.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.053	0.000	28.961	0.00	4.21
105.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.055	0.000	29.260	0.00	4.95
110.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.057	0.000	29.548	0.00	4.95
115.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.060	0.000	29.826	0.00	4.95
120.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.062	0.000	30.094	0.00	4.95
125.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.065	0.000	30.354	0.00	4.95
127.00	1 5/8" Fiber	Yes	2.00	0.000	2.00	0.33	0.00	0.067	0.000	30.455	0.00	1.98
130.00	1 5/8" Fiber	Yes	3.00	0.000	2.00	0.50	0.00	0.068	0.000	30.605	0.00	2.97
130.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.069	0.000	30.642	0.00	0.74
133.00	1 5/8" Fiber	Yes	2.25	0.000	2.00	0.38	0.00	0.069	0.000	30.753	0.00	2.23
									Totals:		**0.0**	**131.7**

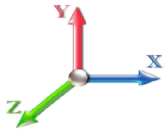
Calculated Forces

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 17	

Load Case: 0.9D + 1.6W 97 mph Wind

Dead Load Factor 0.90

Wind Load Factor 1.60



Iterations 23

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-36.90	-33.77	0.00	-3667.5	0.00	3667.51	5604.23	2802.12	13924.9	6972.80	0.00	0.000	0.000	0.533
5.00	-35.35	-33.29	0.00	-3498.6	0.00	3498.64	5529.79	2764.90	13444.5	6732.24	0.07	-0.132	0.000	0.526
10.00	-33.82	-32.81	0.00	-3332.2	0.00	3332.22	5453.38	2726.69	12967.3	6493.32	0.28	-0.266	0.000	0.520
15.00	-32.32	-32.33	0.00	-3168.1	0.00	3168.19	5374.99	2687.50	12493.8	6256.19	0.63	-0.402	0.000	0.513
20.00	-30.85	-31.83	0.00	-3006.5	0.00	3006.53	5294.63	2647.32	12024.1	6021.01	1.13	-0.540	0.000	0.505
25.00	-29.41	-31.32	0.00	-2847.3	0.00	2847.36	5212.30	2606.15	11558.7	5787.94	1.77	-0.681	0.000	0.498
30.00	-28.00	-30.78	0.00	-2690.7	0.00	2690.79	5128.00	2564.00	11097.7	5557.14	2.56	-0.823	0.000	0.490
35.00	-26.62	-30.24	0.00	-2536.8	0.00	2536.87	5041.73	2520.86	10641.7	5328.76	3.50	-0.968	0.000	0.481
40.00	-25.27	-29.69	0.00	-2385.6	0.00	2385.67	4953.48	2476.74	10190.8	5102.98	4.59	-1.115	0.000	0.473
44.75	-24.05	-29.13	0.00	-2244.6	0.00	2244.65	4867.82	2433.91	9767.51	4891.01	5.78	-1.257	0.000	0.464
45.00	-23.90	-29.14	0.00	-2237.3	0.00	2237.37	4863.26	2431.63	9745.37	4879.93	5.84	-1.265	0.000	0.464
50.00	-21.74	-28.52	0.00	-2091.6	0.00	2091.69	4771.07	2385.54	9305.74	4659.79	7.25	-1.415	0.000	0.454
51.00	-21.29	-28.42	0.00	-2063.1	0.00	2063.17	3927.98	1963.99	7761.51	3886.53	7.55	-1.447	0.000	0.536
55.00	-20.37	-27.98	0.00	-1949.4	0.00	1949.48	3872.44	1936.22	7486.25	3748.69	8.81	-1.570	0.000	0.526
60.00	-19.25	-27.42	0.00	-1809.5	0.00	1809.59	3801.23	1900.62	7145.52	3578.07	10.55	-1.741	0.000	0.511
65.00	-18.16	-26.86	0.00	-1672.5	0.00	1672.51	3728.06	1864.03	6808.79	3409.45	12.46	-1.912	0.000	0.496
70.00	-17.09	-26.30	0.00	-1538.2	0.00	1538.22	3652.91	1826.46	6476.38	3243.00	14.56	-2.085	0.000	0.479
75.00	-16.06	-25.74	0.00	-1406.7	0.00	1406.73	3575.79	1787.90	6148.62	3078.88	16.84	-2.258	0.000	0.462
80.00	-15.04	-25.19	0.00	-1278.0	0.00	1278.01	3496.70	1748.35	5825.81	2917.23	19.30	-2.431	0.000	0.443
85.00	-13.96	-22.34	0.00	-1148.8	0.00	1148.85	3415.64	1707.82	5508.27	2758.23	21.93	-2.603	0.000	0.421
90.00	-13.05	-21.78	0.00	-1037.1	0.00	1037.16	3332.60	1666.30	5196.32	2602.02	24.75	-2.773	0.000	0.403
90.75	-12.89	-21.72	0.00	-1020.8	0.00	1020.83	3319.98	1659.99	5150.02	2578.84	25.19	-2.799	0.000	0.400
95.00	-11.75	-21.23	0.00	-928.53	0.00	928.53	3247.59	1623.80	4890.27	2448.77	27.75	-2.944	0.000	0.383
95.75	-11.52	-21.16	0.00	-912.61	0.00	912.61	1911.44	955.72	2922.15	1463.25	28.21	-2.970	0.000	0.630
100.00	-10.94	-20.73	0.00	-822.69	0.00	822.69	1878.47	939.23	2786.43	1395.29	30.92	-3.113	0.000	0.596
105.00	-10.26	-20.23	0.00	-719.06	0.00	719.06	1837.85	918.92	2627.99	1315.95	34.31	-3.347	0.000	0.552
110.00	-9.61	-19.74	0.00	-617.92	0.00	617.92	1795.26	897.63	2471.18	1237.43	37.93	-3.572	0.000	0.505
115.00	-8.98	-19.26	0.00	-519.24	0.00	519.24	1750.70	875.35	2316.31	1159.88	41.79	-3.787	0.000	0.453
120.00	-8.37	-18.78	0.00	-422.96	0.00	422.96	1704.17	852.08	2163.70	1083.46	45.86	-3.987	0.000	0.396
125.00	-7.80	-18.31	0.00	-329.05	0.00	329.05	1655.66	827.83	2013.66	1008.33	50.14	-4.168	0.000	0.332
127.00	-7.57	-18.13	0.00	-292.43	0.00	292.43	1635.71	817.85	1954.43	978.67	51.90	-4.236	0.000	0.304
130.00	-7.09	-17.84	0.00	-238.04	0.00	238.04	1605.19	802.59	1866.51	934.64	54.59	-4.328	0.000	0.260
130.75	-6.96	-17.77	0.00	-224.65	0.00	224.65	1090.28	545.14	1281.57	641.74	55.27	-4.349	0.000	0.358
133.00	-5.49	-11.63	0.00	-184.66	0.00	184.66	1077.75	538.87	1240.93	621.39	57.33	-4.408	0.000	0.303
135.00	-5.34	-11.46	0.00	-161.41	0.00	161.41	1066.28	533.14	1204.93	603.36	59.19	-4.468	0.000	0.273
140.00	-4.98	-11.03	0.00	-104.11	0.00	104.11	1036.22	518.11	1115.60	558.63	63.94	-4.589	0.000	0.192
143.00	-3.08	-6.72	0.00	-71.02	0.00	71.02	1017.23	508.62	1062.55	532.07	66.84	-4.644	0.000	0.137
145.00	-2.97	-6.56	0.00	-57.57	0.00	57.57	1004.18	502.09	1027.46	514.49	68.79	-4.674	0.000	0.115
150.00	-2.71	-6.17	0.00	-24.75	0.00	24.75	970.18	485.09	940.83	471.12	73.71	-4.724	0.000	0.056
154.00	-0.04	-0.07	0.00	-0.07	0.00	0.07	941.55	470.78	872.83	437.06	77.67	-4.739	0.000	0.000
155.00	0.00	-0.07	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	78.66	-4.739	0.000	0.000

Wind Loading - Shaft

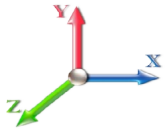
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 18	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	5.168	5.68	0.00	1.200	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	5.168	5.68	0.00	1.200	1.242	5.00	26.516	31.82	180.9	473.3	2168.2
10.00		1.00	0.85	5.168	5.68	0.00	1.200	1.331	5.00	26.044	31.25	177.7	497.2	2155.6
15.00		1.00	0.85	5.168	5.68	0.00	1.200	1.386	5.00	25.544	30.65	174.3	507.0	2128.9
20.00		1.00	0.90	5.483	6.03	0.00	1.200	1.427	5.00	25.032	30.04	181.2	510.7	2095.9
25.00		1.00	0.95	5.747	6.32	0.00	1.200	1.459	5.00	24.513	29.42	186.0	510.7	2059.3
30.00		1.00	0.98	5.972	6.57	0.00	1.200	1.486	5.00	23.990	28.79	189.1	508.3	2020.4
35.00		1.00	1.01	6.169	6.79	0.00	1.200	1.509	5.00	23.463	28.16	191.1	504.2	1979.7
40.00		1.00	1.04	6.345	6.98	0.00	1.200	1.529	5.00	22.934	27.52	192.1	498.8	1937.8
44.75	Bot - Section 2	1.00	1.07	6.497	7.15	0.00	1.200	1.546	4.75	21.295	25.55	182.6	468.1	1801.2
45.00		1.00	1.07	6.504	7.15	0.00	1.200	1.547	0.25	1.123	1.35	9.6	25.0	154.6
50.00		1.00	1.09	6.650	7.32	0.00	1.200	1.564	5.00	22.188	26.63	194.8	492.5	3048.7
51.00	Top - Section 1	1.00	1.10	6.678	7.35	0.00	1.200	1.567	1.00	4.373	5.25	38.5	98.2	601.3
55.00		1.00	1.12	6.785	7.46	0.00	1.200	1.579	4.00	17.280	20.74	154.8	387.7	1312.4
60.00		1.00	1.14	6.910	7.60	0.00	1.200	1.592	5.00	21.121	25.34	192.7	476.1	1603.8
65.00		1.00	1.16	7.028	7.73	0.00	1.200	1.605	5.00	20.586	24.70	191.0	467.0	1563.4
70.00		1.00	1.17	7.138	7.85	0.00	1.200	1.617	5.00	20.050	24.06	188.9	457.6	1522.6
75.00		1.00	1.19	7.243	7.97	0.00	1.200	1.628	5.00	19.513	23.42	186.6	447.7	1481.3
80.00		1.00	1.21	7.342	8.08	0.00	1.200	1.639	5.00	18.976	22.77	183.9	437.4	1439.7
85.00	Appurtenance(s)	1.00	1.22	7.436	8.18	0.00	1.200	1.649	5.00	18.438	22.13	181.0	426.9	1397.8
90.00		1.00	1.24	7.526	8.28	0.00	1.200	1.658	5.00	17.900	21.48	177.8	416.0	1355.6
90.75	Bot - Section 3	1.00	1.24	7.539	8.29	0.00	1.200	1.660	0.75	2.638	3.17	26.3	62.2	200.4
95.00		1.00	1.25	7.612	8.37	0.00	1.200	1.667	4.25	14.903	17.88	149.7	348.6	1640.6
95.75	Top - Section 2	1.00	1.25	7.625	8.39	0.00	1.200	1.669	0.75	2.589	3.11	26.1	61.3	285.3
100.00		1.00	1.27	7.695	8.46	0.00	1.200	1.676	4.25	14.445	17.33	146.7	338.9	843.1
105.00		1.00	1.28	7.774	8.55	0.00	1.200	1.684	5.00	16.496	19.80	169.3	387.2	961.0
110.00		1.00	1.29	7.851	8.64	0.00	1.200	1.692	5.00	15.957	19.15	165.4	375.4	928.3
115.00		1.00	1.30	7.925	8.72	0.00	1.200	1.699	5.00	15.417	18.50	161.3	363.4	895.4
120.00		1.00	1.32	7.996	8.80	0.00	1.200	1.707	5.00	14.877	17.85	157.0	351.2	862.3
125.00		1.00	1.33	8.065	8.87	0.00	1.200	1.714	5.00	14.337	17.20	152.6	338.9	829.1
127.00	Bot - Section 4	1.00	1.33	8.092	8.90	0.00	1.200	1.716	2.00	5.583	6.70	59.6	133.5	323.8
130.00		1.00	1.34	8.132	8.95	0.00	1.200	1.720	3.00	8.308	9.97	89.2	198.2	689.8
130.75	Top - Section 3	1.00	1.34	8.142	8.96	0.00	1.200	1.721	0.75	2.046	2.46	22.0	49.3	170.1
133.00	Appurtenance(s)	1.00	1.34	8.171	8.99	0.00	1.200	1.724	2.25	6.067	7.28	65.4	145.3	299.9
135.00		1.00	1.35	8.197	9.02	0.00	1.200	1.727	2.00	5.301	6.36	57.4	127.1	261.9
140.00		1.00	1.36	8.260	9.09	0.00	1.200	1.733	5.00	12.874	15.45	140.4	305.0	630.9
143.00	Appurtenance(s)	1.00	1.36	8.297	9.13	0.00	1.200	1.737	3.00	7.465	8.96	81.7	178.3	366.4
145.00		1.00	1.37	8.321	9.15	0.00	1.200	1.739	2.00	4.868	5.84	53.5	116.8	239.0
150.00		1.00	1.38	8.381	9.22	0.00	1.200	1.745	5.00	11.793	14.15	130.5	279.0	573.6
154.00	Appurtenance(s)	1.00	1.39	8.427	9.27	0.00	1.200	1.750	4.00	9.044	10.85	100.6	214.8	439.2
155.00		1.00	1.39	8.439	9.28	0.00	1.200	1.751	1.00	2.207	2.65	24.6	53.2	107.7
								Totals:	**155.00**			**5,333.6**		**45,376.1**

Discrete Appurtenance Forces

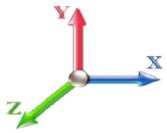
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 19	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	154.00	T-Arm	3	8.427	9.270	0.50	0.75	28.26	2039.91	0.000	0.000	262.01	0.00	0.00
2	154.00	AIR 21 B2A B4P	3	8.427	9.270	0.69	0.80	14.84	837.66	0.000	0.000	137.57	0.00	0.00
3	154.00	AIR 21 B4A B2P	3	8.427	9.270	0.69	0.80	14.84	833.70	0.000	0.000	137.57	0.00	0.00
4	154.00	KRY 112 144/1	3	8.427	9.270	0.56	0.80	1.49	62.73	0.000	0.000	13.80	0.00	0.00
5	154.00	(3) HR w/ Double V-Brace	1	8.427	9.270	1.00	1.00	31.77	1448.91	0.000	0.000	294.54	0.00	0.00
6	154.00	APXVAARR24_43-U-NA2	3	8.427	9.270	0.56	0.80	37.20	1718.32	0.000	0.000	344.88	0.00	0.00
7	154.00	4449	3	8.427	9.270	0.54	0.80	3.52	457.42	0.000	0.000	32.63	0.00	0.00
8	154.00	HRK12 (Handrail Kit)	1	8.427	9.270	1.00	1.00	13.36	887.20	0.000	0.000	123.89	0.00	0.00
9	143.00	Powerwave LGP13519	6	8.297	9.126	0.54	0.80	2.55	78.67	0.000	0.000	23.24	0.00	0.00
10	143.00	Powerwave LGP21401	6	8.297	9.126	0.54	0.80	6.82	208.21	0.000	0.000	62.27	0.00	0.00
11	143.00	Powerwave 7770	6	8.297	9.126	0.58	0.80	22.99	1058.30	0.000	0.000	209.77	0.00	0.00
12	143.00	Raycap DC6-48-60-18-8F	1	8.297	9.126	0.60	0.80	0.81	81.99	0.000	0.000	7.42	0.00	0.00
13	143.00	Ericsson RRUS 11	6	8.297	9.126	0.57	0.80	10.80	897.08	0.000	0.000	98.53	0.00	0.00
14	143.00	Ericsson RRUS 32 B2	3	8.297	9.126	0.54	0.80	3.58	421.75	0.000	0.000	32.68	0.00	0.00
15	143.00	T-Arm	3	8.297	9.126	0.50	0.75	28.17	2033.71	0.000	0.000	257.06	0.00	0.00
16	143.00	Cci HPA-65R-BUU-H6	3	8.297	9.126	0.68	0.80	22.48	923.79	0.000	0.000	205.16	0.00	0.00
17	133.00	DB-T1-6Z-8AB-0Z	2	8.171	8.988	0.57	0.80	6.43	389.01	0.000	0.000	57.82	0.00	0.00
18	133.00	BXA-171063-12CF	3	8.171	8.988	0.67	0.80	14.34	255.53	0.000	0.000	128.85	0.00	0.00
19	133.00	RRH2X60-AWS	3	8.171	8.988	0.61	0.80	7.81	429.44	0.000	0.000	70.16	0.00	0.00
20	133.00	RRH2X60-700	3	8.171	8.988	0.61	0.80	7.81	429.44	0.000	0.000	70.16	0.00	0.00
21	133.00	SBNHH-1D65B	6	8.171	8.988	0.66	0.80	37.62	1489.47	0.000	0.000	338.16	0.00	0.00
22	133.00	LPA-80080-6CF	6	8.171	8.988	1.36	0.80	46.42	859.88	0.000	0.000	417.24	0.00	0.00
23	133.00	T-Arm	3	8.171	8.988	0.50	0.75	22.46	1774.23	0.000	0.000	201.86	0.00	0.00
24	85.00	DB408	1	7.521	8.273	1.00	1.00	11.63	111.54	0.000	4.708	96.24	0.00	453.15
25	85.00	SD222	2	7.522	8.274	1.00	1.00	26.09	227.82	0.000	4.750	215.83	0.00	1025.18
26	85.00	SP4-4.7NS RD4	1	7.436	8.180	1.00	1.00	26.19	227.13	0.000	0.000	214.25	0.00	0.00
27	85.00	Pipe Mount	2	7.436	8.180	1.00	1.00	16.60	-541.03	0.000	0.000	135.75	0.00	0.00
							Totals:		**19,641.80**			**4,189.37**		

Total Applied Force Summary

Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 20

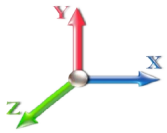
Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Iterations 22

Dead Load Factor 1.20

Wind Load Factor 1.00



Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		180.88	2466.19	0.00	0.00
10.00		177.67	2455.64	0.00	0.00
15.00		174.26	2430.25	0.00	0.00
20.00		181.19	2398.30	0.00	0.00
25.00		185.96	2362.56	0.00	0.00
30.00		189.11	2324.30	0.00	0.00
35.00		191.06	2284.24	0.00	0.00
40.00		192.08	2242.81	0.00	0.00
44.75		182.62	2091.44	0.00	0.00
45.00		9.64	169.85	0.00	0.00
50.00		194.77	3354.65	0.00	0.00
51.00		38.54	662.49	0.00	0.00
55.00		154.77	1557.50	0.00	0.00
60.00		192.66	1910.53	0.00	0.00
65.00		190.97	1870.50	0.00	0.00
70.00		188.92	1830.00	0.00	0.00
75.00		186.55	1789.07	0.00	0.00
80.00		183.90	1747.77	0.00	0.00
85.00	(6) attachments	843.05	1731.59	0.00	1478.33
90.00		177.83	1645.45	0.00	0.00
90.75		26.25	243.87	0.00	0.00
95.00		149.75	1887.14	0.00	0.00
95.75		26.06	328.86	0.00	0.00
100.00		146.72	1089.90	0.00	0.00
105.00		169.28	1251.56	0.00	0.00
110.00		165.36	1219.09	0.00	0.00
115.00		161.27	1186.41	0.00	0.00
120.00		157.03	1153.55	0.00	0.00
125.00		152.63	1120.50	0.00	0.00
127.00		59.63	440.39	0.00	0.00
130.00		89.18	864.80	0.00	0.00
130.75		21.99	213.86	0.00	0.00
133.00	(26) attachments	1349.69	6058.15	0.00	0.00
135.00		57.35	330.03	0.00	0.00
140.00		140.37	801.32	0.00	0.00
143.00	(34) attachments	977.90	6172.13	0.00	0.00
145.00		53.47	272.07	0.00	0.00
150.00		130.46	656.15	0.00	0.00
154.00	(20) attachments	1447.51	8791.05	0.00	0.00
155.00		24.58	107.69	0.00	0.00
	Totals:	**9,522.93**	**73,513.69**	**0.00**	**1,478.33**

Linear Appurtenance Segment Forces (Factored)

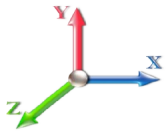
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 21	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	1.87	0.00	0.033	0.000	5.168	0.00	27.35
10.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	1.94	0.00	0.033	0.000	5.168	0.00	29.45
15.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	1.99	0.00	0.034	0.000	5.168	0.00	30.79
20.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.02	0.00	0.035	0.000	5.483	0.00	31.80
25.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.05	0.00	0.036	0.000	5.747	0.00	32.62
30.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.07	0.00	0.037	0.000	5.972	0.00	33.31
35.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.09	0.00	0.038	0.000	6.169	0.00	33.91
40.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.11	0.00	0.038	0.000	6.345	0.00	34.45
44.75	1 5/8" Fiber	Yes	4.75	0.000	2.00	2.02	0.00	0.039	0.000	6.497	0.00	33.16
45.00	1 5/8" Fiber	Yes	0.25	0.000	2.00	0.11	0.00	0.040	0.000	6.504	0.00	1.75
50.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.14	0.00	0.041	0.000	6.650	0.00	35.37
51.00	1 5/8" Fiber	Yes	1.00	0.000	2.00	0.43	0.00	0.041	0.000	6.678	0.00	7.09
55.00	1 5/8" Fiber	Yes	4.00	0.000	2.00	1.72	0.00	0.041	0.000	6.785	0.00	28.62
60.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.16	0.00	0.042	0.000	6.910	0.00	36.14
65.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.17	0.00	0.043	0.000	7.028	0.00	36.49
70.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.18	0.00	0.045	0.000	7.138	0.00	36.82
75.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.19	0.00	0.046	0.000	7.243	0.00	37.13
80.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.20	0.00	0.047	0.000	7.342	0.00	37.42
85.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.21	0.00	0.049	0.000	7.436	0.00	37.70
90.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.22	0.00	0.050	0.000	7.526	0.00	37.97
90.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.33	0.00	0.051	0.000	7.539	0.00	5.70
95.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	1.89	0.00	0.052	0.000	7.612	0.00	32.49
95.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.33	0.00	0.053	0.000	7.625	0.00	5.74
100.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	1.90	0.00	0.053	0.000	7.695	0.00	32.69
105.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.24	0.00	0.055	0.000	7.774	0.00	38.69
110.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.24	0.00	0.057	0.000	7.851	0.00	38.92
115.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.25	0.00	0.060	0.000	7.925	0.00	39.13
120.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.26	0.00	0.062	0.000	7.996	0.00	39.34
125.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	2.26	0.00	0.065	0.000	8.065	0.00	39.54
127.00	1 5/8" Fiber	Yes	2.00	0.000	2.00	0.91	0.00	0.067	0.000	8.092	0.00	15.85
130.00	1 5/8" Fiber	Yes	3.00	0.000	2.00	1.36	0.00	0.068	0.000	8.132	0.00	23.84
130.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.34	0.00	0.069	0.000	8.142	0.00	5.96
133.00	1 5/8" Fiber	Yes	2.25	0.000	2.00	1.02	0.00	0.069	0.000	8.171	0.00	17.93
									Totals:		**0.0**	**955.1**

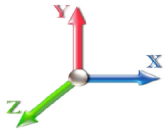
Calculated Forces

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 22	

Load Case: 1.2D + 1.0Di + 1.0Wi 50 mph Wind

Dead Load Factor 1.20

Wind Load Factor 1.00



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-73.51	-9.55	0.00	-1019.5	0.00	1019.51	5604.23	2802.12	13924.9	6972.80	0.00	0.000	0.000	0.159
5.00	-71.04	-9.41	0.00	-971.78	0.00	971.78	5529.79	2764.90	13444.5	6732.24	0.02	-0.037	0.000	0.157
10.00	-68.58	-9.28	0.00	-924.73	0.00	924.73	5453.38	2726.69	12967.3	6493.32	0.08	-0.074	0.000	0.155
15.00	-66.14	-9.14	0.00	-878.36	0.00	878.36	5374.99	2687.50	12493.8	6256.19	0.18	-0.112	0.000	0.153
20.00	-63.74	-9.00	0.00	-832.65	0.00	832.65	5294.63	2647.32	12024.1	6021.01	0.31	-0.150	0.000	0.150
25.00	-61.37	-8.85	0.00	-787.67	0.00	787.67	5212.30	2606.15	11558.7	5787.94	0.49	-0.189	0.000	0.148
30.00	-59.04	-8.69	0.00	-743.44	0.00	743.44	5128.00	2564.00	11097.7	5557.14	0.71	-0.228	0.000	0.145
35.00	-56.75	-8.53	0.00	-699.99	0.00	699.99	5041.73	2520.86	10641.7	5328.76	0.97	-0.268	0.000	0.143
40.00	-54.50	-8.36	0.00	-657.35	0.00	657.35	4953.48	2476.74	10190.8	5102.98	1.27	-0.309	0.000	0.140
44.75	-52.41	-8.19	0.00	-617.63	0.00	617.63	4867.82	2433.91	9767.51	4891.01	1.60	-0.348	0.000	0.137
45.00	-52.24	-8.20	0.00	-615.58	0.00	615.58	4863.26	2431.63	9745.37	4879.93	1.62	-0.350	0.000	0.137
50.00	-48.88	-8.00	0.00	-574.60	0.00	574.60	4771.07	2385.54	9305.74	4659.79	2.01	-0.391	0.000	0.134
51.00	-48.21	-7.98	0.00	-566.60	0.00	566.60	3927.98	1963.99	7761.51	3886.53	2.09	-0.400	0.000	0.158
55.00	-46.65	-7.84	0.00	-534.70	0.00	534.70	3872.44	1936.22	7486.25	3748.69	2.44	-0.434	0.000	0.155
60.00	-44.74	-7.67	0.00	-495.49	0.00	495.49	3801.23	1900.62	7145.52	3578.07	2.92	-0.481	0.000	0.150
65.00	-42.86	-7.50	0.00	-457.13	0.00	457.13	3728.06	1864.03	6808.79	3409.45	3.45	-0.528	0.000	0.146
70.00	-41.03	-7.33	0.00	-419.63	0.00	419.63	3652.91	1826.46	6476.38	3243.00	4.03	-0.575	0.000	0.141
75.00	-39.24	-7.15	0.00	-383.00	0.00	383.00	3575.79	1787.90	6148.62	3078.88	4.65	-0.622	0.000	0.135
80.00	-37.48	-6.98	0.00	-347.24	0.00	347.24	3496.70	1748.35	5825.81	2917.23	5.33	-0.669	0.000	0.130
85.00	-35.76	-6.15	0.00	-310.86	0.00	310.86	3415.64	1707.82	5508.27	2758.23	6.06	-0.715	0.000	0.123
90.00	-34.11	-5.96	0.00	-280.13	0.00	280.13	3332.60	1666.30	5196.32	2602.02	6.83	-0.761	0.000	0.118
90.75	-33.87	-5.95	0.00	-275.66	0.00	275.66	3319.98	1659.99	5150.02	2578.84	6.95	-0.769	0.000	0.117
95.00	-31.98	-5.78	0.00	-250.39	0.00	250.39	3247.59	1623.80	4890.27	2448.77	7.65	-0.808	0.000	0.112
95.75	-31.65	-5.77	0.00	-246.05	0.00	246.05	1911.44	955.72	2922.15	1463.25	7.78	-0.815	0.000	0.185
100.00	-30.56	-5.63	0.00	-221.55	0.00	221.55	1878.47	939.23	2786.43	1395.29	8.52	-0.853	0.000	0.175
105.00	-29.30	-5.47	0.00	-193.40	0.00	193.40	1837.85	918.92	2627.99	1315.95	9.45	-0.916	0.000	0.163
110.00	-28.08	-5.32	0.00	-166.03	0.00	166.03	1795.26	897.63	2471.18	1237.43	10.45	-0.977	0.000	0.150
115.00	-26.89	-5.16	0.00	-139.45	0.00	139.45	1750.70	875.35	2316.31	1159.88	11.50	-1.034	0.000	0.136
120.00	-25.74	-5.01	0.00	-113.64	0.00	113.64	1704.17	852.08	2163.70	1083.46	12.61	-1.088	0.000	0.120
125.00	-24.62	-4.85	0.00	-88.62	0.00	88.62	1655.66	827.83	2013.66	1008.33	13.78	-1.137	0.000	0.103
127.00	-24.17	-4.79	0.00	-78.92	0.00	78.92	1635.71	817.85	1954.43	978.67	14.26	-1.155	0.000	0.095
130.00	-23.31	-4.69	0.00	-64.57	0.00	64.57	1605.19	802.59	1866.51	934.64	14.99	-1.180	0.000	0.084
130.75	-23.10	-4.66	0.00	-61.05	0.00	61.05	1090.28	545.14	1281.57	641.74	15.18	-1.186	0.000	0.116
133.00	-17.07	-3.19	0.00	-50.56	0.00	50.56	1077.75	538.87	1240.93	621.39	15.74	-1.202	0.000	0.097
135.00	-16.74	-3.14	0.00	-44.18	0.00	44.18	1066.28	533.14	1204.93	603.36	16.25	-1.218	0.000	0.089
140.00	-15.94	-2.98	0.00	-28.50	0.00	28.50	1036.22	518.11	1115.60	558.63	17.55	-1.251	0.000	0.066
143.00	-9.79	-1.87	0.00	-19.54	0.00	19.54	1017.23	508.62	1062.55	532.07	18.34	-1.267	0.000	0.046
145.00	-9.52	-1.82	0.00	-15.79	0.00	15.79	1004.18	502.09	1027.46	514.49	18.87	-1.275	0.000	0.040
150.00	-8.86	-1.67	0.00	-6.72	0.00	6.72	970.18	485.09	940.83	471.12	20.21	-1.288	0.000	0.023
154.00	-0.11	-0.03	0.00	-0.03	0.00	0.03	941.55	470.78	872.83	437.06	21.29	-1.292	0.000	0.000
155.00	0.00	-0.02	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	21.57	-1.292	0.000	0.000

Seismic Segment Forces (Factored)

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 23	

Tower Engineering Solutions

Load Case:	1.2D + 1.0E					**Iterations**	21
Gust Response Factor	1.10			**Sds**	0.26	**Ss**	0.32
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11	**S1**	0.10
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.43	**SA**	0.05	**Seismic Importance Factor**	1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1412.4	0.00	0.03	0.02	32.92	
10.00		1382.0	0.01	0.05	0.03	47.31	
15.00		1351.5	0.02	0.06	0.04	53.76	
20.00		1321.0	0.03	0.07	0.04	56.40	
25.00		1290.5	0.05	0.07	0.04	57.28	
30.00		1260.0	0.07	0.07	0.04	57.46	
35.00		1229.6	0.10	0.07	0.04	57.42	
40.00		1199.1	0.13	0.07	0.03	57.28	
44.75	Bot - Section 2	1110.9	0.16	0.07	0.03	53.99	
45.00		107.99	0.16	0.07	0.03	5.25	
50.00		2130.1	0.20	0.06	0.02	104.16	
51.00	Top - Section 1	419.24	0.20	0.06	0.02	20.47	
55.00		770.62	0.24	0.06	0.02	36.97	
60.00		939.77	0.28	0.05	0.01	42.35	
65.00		913.64	0.33	0.04	0.01	35.91	
70.00		887.52	0.39	0.02	0.01	26.60	
75.00		861.39	0.44	0.00	0.01	14.55	
80.00		835.26	0.50	-0.02	0.01	0.76	
85.00	Appurtenance(s)	1040.1	0.57	-0.04	0.01	-16.53	
90.00		783.01	0.64	-0.07	0.02	-24.14	
90.75	Bot - Section 3	115.20	0.65	-0.07	0.02	-3.77	
95.00		1076.6	0.71	-0.09	0.03	-44.72	
95.75	Top - Section 2	186.73	0.72	-0.09	0.03	-7.97	
100.00		420.16	0.79	-0.11	0.05	-19.55	
105.00		478.19	0.87	-0.12	0.08	-21.62	
110.00		460.78	0.95	-0.12	0.11	-17.25	
115.00		443.36	1.04	-0.10	0.15	-10.31	
120.00		425.94	1.13	-0.05	0.21	-1.16	
125.00		408.53	1.23	0.03	0.28	9.86	
127.00	Bot - Section 4	158.53	1.27	0.08	0.31	5.81	
130.00		409.66	1.33	0.16	0.36	23.49	
130.75	Top - Section 3	100.70	1.34	0.19	0.38	6.33	
133.00	Appurtenance(s)	2037.8	1.39	0.27	0.42	163.73	
135.00		112.31	1.43	0.35	0.47	10.89	
140.00		271.63	1.54	0.61	0.59	38.89	
143.00	Appurtenance(s)	2403.1	1.61	0.81	0.68	418.38	
145.00		101.86	1.65	0.96	0.75	19.97	
150.00		245.51	1.77	1.41	0.93	62.79	
154.00	Appurtenance(s)	3471.4	1.87	1.85	1.09	1071.09	
155.00		45.44	1.89	1.98	1.14	14.65	
	Totals:	**34,619.7**				**2,439.7**	**Total Wind:** **33,729.9**

Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 24	

Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Iterations 21

Gust Response Factor	1.10			**Sds**	0.26			**Ss**	0.32
Dead Load Factor	1.20	**Seismic Load Factor**	1.00	**Sd1**	0.11			**S1**	0.10
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.43	**SA**	0.05	**Seismic Importance Factor**			1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-49.26	-2.61	0.00	-312.82	0.00	312.82	5604.23	2802.12	13924.9	6972.80		0.00	0.00	0.054
5.00	-47.29	-2.59	0.00	-299.77	0.00	299.77	5529.79	2764.90	13444.5	6732.24		0.01	-0.01	0.053
10.00	-45.35	-2.55	0.00	-286.83	0.00	286.83	5453.38	2726.69	12967.3	6493.32		0.02	-0.02	0.052
15.00	-43.45	-2.50	0.00	-274.09	0.00	274.09	5374.99	2687.50	12493.8	6256.19		0.05	-0.03	0.052
20.00	-41.59	-2.45	0.00	-261.58	0.00	261.58	5294.63	2647.32	12024.1	6021.01		0.10	-0.05	0.051
25.00	-39.76	-2.40	0.00	-249.31	0.00	249.31	5212.30	2606.15	11558.7	5787.94		0.15	-0.06	0.051
30.00	-37.97	-2.35	0.00	-237.29	0.00	237.29	5128.00	2564.00	11097.7	5557.14		0.22	-0.07	0.050
35.00	-36.22	-2.30	0.00	-225.53	0.00	225.53	5041.73	2520.86	10641.7	5328.76		0.30	-0.08	0.050
40.00	-34.50	-2.25	0.00	-214.02	0.00	214.02	4953.48	2476.74	10190.8	5102.98		0.40	-0.10	0.049
44.75	-32.91	-2.20	0.00	-203.34	0.00	203.34	4867.82	2433.91	9767.51	4891.01		0.50	-0.11	0.048
45.00	-32.76	-2.19	0.00	-202.79	0.00	202.79	4863.26	2431.63	9745.37	4879.93		0.51	-0.11	0.048
50.00	-29.93	-2.09	0.00	-191.82	0.00	191.82	4771.07	2385.54	9305.74	4659.79		0.63	-0.12	0.047
51.00	-29.37	-2.07	0.00	-189.74	0.00	189.74	3927.98	1963.99	7761.51	3886.53		0.66	-0.13	0.056
55.00	-28.22	-2.04	0.00	-181.45	0.00	181.45	3872.44	1936.22	7486.25	3748.69		0.77	-0.14	0.056
60.00	-26.82	-2.00	0.00	-171.27	0.00	171.27	3801.23	1900.62	7145.52	3578.07		0.92	-0.15	0.055
65.00	-25.44	-1.97	0.00	-161.27	0.00	161.27	3728.06	1864.03	6808.79	3409.45		1.09	-0.17	0.054
70.00	-24.10	-1.94	0.00	-151.44	0.00	151.44	3652.91	1826.46	6476.38	3243.00		1.28	-0.19	0.053
75.00	-22.79	-1.93	0.00	-141.72	0.00	141.72	3575.79	1787.90	6148.62	3078.88		1.49	-0.21	0.052
80.00	-21.51	-1.93	0.00	-132.06	0.00	132.06	3496.70	1748.35	5825.81	2917.23		1.71	-0.22	0.051
85.00	-19.98	-1.93	0.00	-122.40	0.00	122.40	3415.64	1707.82	5508.27	2758.23		1.95	-0.24	0.050
90.00	-18.79	-1.93	0.00	-112.74	0.00	112.74	3332.60	1666.30	5196.32	2602.02		2.22	-0.26	0.049
90.75	-18.61	-1.93	0.00	-111.29	0.00	111.29	3319.98	1659.99	5150.02	2578.84		2.26	-0.26	0.049
95.00	-17.10	-1.93	0.00	-103.08	0.00	103.08	3247.59	1623.80	4890.27	2448.77		2.50	-0.28	0.047
95.75	-16.83	-1.93	0.00	-101.63	0.00	101.63	1911.44	955.72	2922.15	1463.25		2.54	-0.28	0.078
100.00	-16.11	-1.93	0.00	-93.43	0.00	93.43	1878.47	939.23	2786.43	1395.29		2.80	-0.30	0.076
105.00	-15.27	-1.94	0.00	-83.77	0.00	83.77	1837.85	918.92	2627.99	1315.95		3.12	-0.32	0.072
110.00	-14.46	-1.94	0.00	-74.09	0.00	74.09	1795.26	897.63	2471.18	1237.43		3.48	-0.35	0.068
115.00	-13.67	-1.94	0.00	-64.40	0.00	64.40	1750.70	875.35	2316.31	1159.88		3.86	-0.38	0.063
120.00	-12.90	-1.94	0.00	-54.71	0.00	54.71	1704.17	852.08	2163.70	1083.46		4.27	-0.40	0.058
125.00	-12.15	-1.93	0.00	-45.02	0.00	45.02	1655.66	827.83	2013.66	1008.33		4.70	-0.43	0.052
127.00	-11.86	-1.92	0.00	-41.16	0.00	41.16	1635.71	817.85	1954.43	978.67		4.88	-0.44	0.049
130.00	-11.21	-1.89	0.00	-35.40	0.00	35.40	1605.19	802.59	1866.51	934.64		5.16	-0.45	0.045
130.75	-11.05	-1.89	0.00	-33.98	0.00	33.98	1090.28	545.14	1281.57	641.74		5.23	-0.45	0.063
133.00	-8.49	-1.71	0.00	-29.73	0.00	29.73	1077.75	538.87	1240.93	621.39		5.45	-0.46	0.056
135.00	-8.29	-1.70	0.00	-26.32	0.00	26.32	1066.28	533.14	1204.93	603.36		5.64	-0.47	0.051
140.00	-7.79	-1.65	0.00	-17.85	0.00	17.85	1036.22	518.11	1115.60	558.63		6.15	-0.49	0.039
143.00	-4.81	-1.21	0.00	-12.88	0.00	12.88	1017.23	508.62	1062.55	532.07		6.46	-0.50	0.029
145.00	-4.65	-1.19	0.00	-10.46	0.00	10.46	1004.18	502.09	1027.46	514.49		6.67	-0.51	0.025
150.00	-4.28	-1.12	0.00	-4.51	0.00	4.51	970.18	485.09	940.83	471.12		7.20	-0.51	0.014
154.00	-0.05	-0.02	0.00	-0.02	0.00	0.02	941.55	470.78	872.83	437.06		7.64	-0.52	0.000
155.00	0.00	-0.01	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65		7.75	-0.52	0.000

Seismic Segment Forces (Factored)

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 25	

Tower Engineering Solutions

Load Case:	0.9D + 1.0E							**Iterations**	21
Gust Response Factor	1.10				**Sds**	0.26		**Ss**	0.32
Dead Load Factor	0.90	**Seismic Load Factor**	1.00		**Sd1**	0.11		**S1**	0.10
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.43		**SA**	0.05	**Seismic Importance Factor**		1.00

Top Elev (ft)	Description	Wz (lb)	a	b	c	Lateral Fs (lb)	R: 1.50
0.00		0.00	0.00	0.00	0.00	0.00	
5.00		1412.4	0.00	0.03	0.02	32.92	
10.00		1382.0	0.01	0.05	0.03	47.31	
15.00		1351.5	0.02	0.06	0.04	53.76	
20.00		1321.0	0.03	0.07	0.04	56.40	
25.00		1290.5	0.05	0.07	0.04	57.28	
30.00		1260.0	0.07	0.07	0.04	57.46	
35.00		1229.6	0.10	0.07	0.04	57.42	
40.00		1199.1	0.13	0.07	0.03	57.28	
44.75	Bot - Section 2	1110.9	0.16	0.07	0.03	53.99	
45.00		107.99	0.16	0.07	0.03	5.25	
50.00		2130.1	0.20	0.06	0.02	104.16	
51.00	Top - Section 1	419.24	0.20	0.06	0.02	20.47	
55.00		770.62	0.24	0.06	0.02	36.97	
60.00		939.77	0.28	0.05	0.01	42.35	
65.00		913.64	0.33	0.04	0.01	35.91	
70.00		887.52	0.39	0.02	0.01	26.60	
75.00		861.39	0.44	0.00	0.01	14.55	
80.00		835.26	0.50	-0.02	0.01	0.76	
85.00	Appurtenance(s)	1040.1	0.57	-0.04	0.01	-16.53	
90.00		783.01	0.64	-0.07	0.02	-24.14	
90.75	Bot - Section 3	115.20	0.65	-0.07	0.02	-3.77	
95.00		1076.6	0.71	-0.09	0.03	-44.72	
95.75	Top - Section 2	186.73	0.72	-0.09	0.03	-7.97	
100.00		420.16	0.79	-0.11	0.05	-19.55	
105.00		478.19	0.87	-0.12	0.08	-21.62	
110.00		460.78	0.95	-0.12	0.11	-17.25	
115.00		443.36	1.04	-0.10	0.15	-10.31	
120.00		425.94	1.13	-0.05	0.21	-1.16	
125.00		408.53	1.23	0.03	0.28	9.86	
127.00	Bot - Section 4	158.53	1.27	0.08	0.31	5.81	
130.00		409.66	1.33	0.16	0.36	23.49	
130.75	Top - Section 3	100.70	1.34	0.19	0.38	6.33	
133.00	Appurtenance(s)	2037.8	1.39	0.27	0.42	163.73	
135.00		112.31	1.43	0.35	0.47	10.89	
140.00		271.63	1.54	0.61	0.59	38.89	
143.00	Appurtenance(s)	2403.1	1.61	0.81	0.68	418.38	
145.00		101.86	1.65	0.96	0.75	19.97	
150.00		245.51	1.77	1.41	0.93	62.79	
154.00	Appurtenance(s)	3471.4	1.87	1.85	1.09	1071.09	
155.00		45.44	1.89	1.98	1.14	14.65	
	Totals:	**34,619.7**				**2,439.7**	**Total Wind:** **33,729.9**

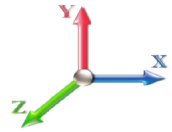
Seismic Base Shear is Less Than 50% of Wind Force - An Analysis is NOT Required

Calculated Forces

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 26	

Tower Engineering Solutions

Load Case: 0.9D + 1.0E



Gust Response Factor	1.10			**Sds**	0.26			**Iterations**	21
Dead Load Factor	0.90	**Seismic Load Factor**	1.00	**Sd1**	0.11			**Ss**	0.32
Wind Load Factor	0.00	**Structure Frequency (f1)**	0.43	**SA**	0.05			**S1**	0.10
								Seismic Importance Factor	1.00

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-36.94	-2.61	0.00	-310.20	0.00	310.20	5604.23	2802.12	13924.9	6972.80		0.00	0.00	0.051
5.00	-35.46	-2.58	0.00	-297.16	0.00	297.16	5529.79	2764.90	13444.5	6732.24		0.01	-0.01	0.051
10.00	-34.01	-2.54	0.00	-284.24	0.00	284.24	5453.38	2726.69	12967.3	6493.32		0.02	-0.02	0.050
15.00	-32.59	-2.49	0.00	-271.53	0.00	271.53	5374.99	2687.50	12493.8	6256.19		0.05	-0.03	0.049
20.00	-31.19	-2.44	0.00	-259.05	0.00	259.05	5294.63	2647.32	12024.1	6021.01		0.10	-0.05	0.049
25.00	-29.82	-2.39	0.00	-246.83	0.00	246.83	5212.30	2606.15	11558.7	5787.94		0.15	-0.06	0.048
30.00	-28.48	-2.34	0.00	-234.87	0.00	234.87	5128.00	2564.00	11097.7	5557.14		0.22	-0.07	0.048
35.00	-27.16	-2.29	0.00	-223.18	0.00	223.18	5041.73	2520.86	10641.7	5328.76		0.30	-0.08	0.047
40.00	-25.88	-2.23	0.00	-211.75	0.00	211.75	4953.48	2476.74	10190.8	5102.98		0.39	-0.10	0.047
44.75	-24.68	-2.18	0.00	-201.14	0.00	201.14	4867.82	2433.91	9767.51	4891.01		0.50	-0.11	0.046
45.00	-24.57	-2.18	0.00	-200.60	0.00	200.60	4863.26	2431.63	9745.37	4879.93		0.50	-0.11	0.046
50.00	-22.45	-2.07	0.00	-189.71	0.00	189.71	4771.07	2385.54	9305.74	4659.79		0.62	-0.12	0.045
51.00	-22.03	-2.05	0.00	-187.64	0.00	187.64	3927.98	1963.99	7761.51	3886.53		0.65	-0.13	0.054
55.00	-21.17	-2.02	0.00	-179.43	0.00	179.43	3872.44	1936.22	7486.25	3748.69		0.76	-0.14	0.053
60.00	-20.11	-1.98	0.00	-169.34	0.00	169.34	3801.23	1900.62	7145.52	3578.07		0.91	-0.15	0.053
65.00	-19.08	-1.95	0.00	-159.44	0.00	159.44	3728.06	1864.03	6808.79	3409.45		1.08	-0.17	0.052
70.00	-18.07	-1.92	0.00	-149.71	0.00	149.71	3652.91	1826.46	6476.38	3243.00		1.27	-0.19	0.051
75.00	-17.09	-1.91	0.00	-140.10	0.00	140.10	3575.79	1787.90	6148.62	3078.88		1.47	-0.20	0.050
80.00	-16.13	-1.91	0.00	-130.55	0.00	130.55	3496.70	1748.35	5825.81	2917.23		1.69	-0.22	0.049
85.00	-14.99	-1.91	0.00	-121.00	0.00	121.00	3415.64	1707.82	5508.27	2758.23		1.93	-0.24	0.048
90.00	-14.09	-1.91	0.00	-111.45	0.00	111.45	3332.60	1666.30	5196.32	2602.02		2.19	-0.26	0.047
90.75	-13.95	-1.91	0.00	-110.02	0.00	110.02	3319.98	1659.99	5150.02	2578.84		2.23	-0.26	0.047
95.00	-12.82	-1.91	0.00	-101.90	0.00	101.90	3247.59	1623.80	4890.27	2448.77		2.47	-0.27	0.046
95.75	-12.62	-1.91	0.00	-100.47	0.00	100.47	1911.44	955.72	2922.15	1463.25		2.52	-0.28	0.075
100.00	-12.08	-1.91	0.00	-92.36	0.00	92.36	1878.47	939.23	2786.43	1395.29		2.77	-0.29	0.073
105.00	-11.45	-1.91	0.00	-82.81	0.00	82.81	1837.85	918.92	2627.99	1315.95		3.09	-0.32	0.069
110.00	-10.84	-1.91	0.00	-73.25	0.00	73.25	1795.26	897.63	2471.18	1237.43		3.44	-0.35	0.065
115.00	-10.25	-1.91	0.00	-63.68	0.00	63.68	1750.70	875.35	2316.31	1159.88		3.82	-0.37	0.061
120.00	-9.67	-1.91	0.00	-54.11	0.00	54.11	1704.17	852.08	2163.70	1083.46		4.22	-0.40	0.056
125.00	-9.11	-1.90	0.00	-44.54	0.00	44.54	1655.66	827.83	2013.66	1008.33		4.65	-0.42	0.050
127.00	-8.89	-1.90	0.00	-40.73	0.00	40.73	1635.71	817.85	1954.43	978.67		4.83	-0.43	0.047
130.00	-8.40	-1.87	0.00	-35.04	0.00	35.04	1605.19	802.59	1866.51	934.64		5.11	-0.44	0.043
130.75	-8.28	-1.87	0.00	-33.64	0.00	33.64	1090.28	545.14	1281.57	641.74		5.18	-0.45	0.060
133.00	-6.36	-1.69	0.00	-29.44	0.00	29.44	1077.75	538.87	1240.93	621.39		5.39	-0.46	0.053
135.00	-6.21	-1.68	0.00	-26.06	0.00	26.06	1066.28	533.14	1204.93	603.36		5.58	-0.47	0.049
140.00	-5.84	-1.64	0.00	-17.68	0.00	17.68	1036.22	518.11	1115.60	558.63		6.08	-0.49	0.037
143.00	-3.60	-1.20	0.00	-12.77	0.00	12.77	1017.23	508.62	1062.55	532.07		6.39	-0.50	0.028
145.00	-3.49	-1.18	0.00	-10.37	0.00	10.37	1004.18	502.09	1027.46	514.49		6.60	-0.50	0.024
150.00	-3.20	-1.11	0.00	-4.47	0.00	4.47	970.18	485.09	940.83	471.12		7.13	-0.51	0.013
154.00	-0.04	-0.01	0.00	-0.01	0.00	0.01	941.55	470.78	872.83	437.06		7.56	-0.51	0.000
155.00	0.00	-0.01	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65		7.66	-0.51	0.000

Wind Loading - Shaft

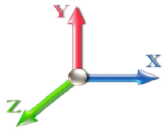
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 27	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 22

Elev (ft)	Description	Kzt	Kz	qz (psf)	qzGh (psf)	C (mph-ft)	Cf	Ice Thick (in)	Tributary (ft)	Aa (sf)	CfAa (sf)	Wind Force X (lb)	Dead Load Ice (lb)	Tot Dead Load (lb)
0.00		1.00	0.85	7.442	8.19	284.93	0.650	0.000	0.00	0.000	0.00	0.0	0.0	0.0
5.00		1.00	0.85	7.442	8.19	278.89	0.650	0.000	5.00	25.481	16.56	135.6	0.0	1412.5
10.00		1.00	0.85	7.442	8.19	272.85	0.650	0.000	5.00	24.935	16.21	132.7	0.0	1382.0
15.00		1.00	0.85	7.442	8.19	266.81	0.650	0.000	5.00	24.389	15.85	129.8	0.0	1351.5
20.00		1.00	0.90	7.896	8.69	268.61	0.650	0.000	5.00	23.843	15.50	134.6	0.0	1321.0
25.00		1.00	0.95	8.276	9.10	268.63	0.650	0.000	5.00	23.297	15.14	137.9	0.0	1290.6
30.00		1.00	0.98	8.600	9.46	267.34	0.650	0.000	5.00	22.752	14.79	139.9	0.0	1260.1
35.00		1.00	1.01	8.883	9.77	265.11	0.650	0.000	5.00	22.206	14.43	141.0	0.0	1229.6
40.00		1.00	1.04	9.137	10.05	262.18	0.650	0.000	5.00	21.660	14.08	141.5	0.0	1199.1
44.75	Bot - Section 2	1.00	1.07	9.355	10.29	258.86	0.650	0.000	4.75	20.071	13.05	134.3	0.0	1110.9
45.00		1.00	1.07	9.366	10.30	258.67	0.650	0.000	0.25	1.059	0.69	7.1	0.0	108.0
50.00		1.00	1.09	9.576	10.53	254.71	0.650	0.000	5.00	20.885	13.58	143.0	0.0	2130.2
51.00	Top - Section 1	1.00	1.10	9.616	10.58	253.86	0.650	0.000	1.00	4.112	2.67	28.3	0.0	419.2
55.00		1.00	1.12	9.770	10.75	254.38	0.650	0.000	4.00	16.228	10.55	113.4	0.0	770.6
60.00		1.00	1.14	9.951	10.95	249.73	0.650	0.000	5.00	19.794	12.87	140.8	0.0	939.8
65.00		1.00	1.16	10.120	11.13	244.80	0.650	0.000	5.00	19.248	12.51	139.3	0.0	913.6
70.00		1.00	1.17	10.279	11.31	239.62	0.650	0.000	5.00	18.702	12.16	137.5	0.0	887.5
75.00		1.00	1.19	10.430	11.47	234.22	0.650	0.000	5.00	18.156	11.80	135.4	0.0	861.4
80.00		1.00	1.21	10.572	11.63	228.62	0.650	0.000	5.00	17.610	11.45	133.1	0.0	835.3
85.00	Appurtenance(s)	1.00	1.22	10.708	11.78	222.84	0.650	0.000	5.00	17.064	11.09	130.6	0.0	809.1
90.00		1.00	1.24	10.838	11.92	216.90	0.650	0.000	5.00	16.519	10.74	128.0	0.0	783.0
90.75	Bot - Section 3	1.00	1.24	10.857	11.94	215.99	0.650	0.000	0.75	2.431	1.58	18.9	0.0	115.2
95.00		1.00	1.25	10.962	12.06	210.80	0.650	0.000	4.25	13.722	8.92	107.5	0.0	1076.7
95.75	Top - Section 2	1.00	1.25	10.980	12.08	209.88	0.650	0.000	0.75	2.381	1.55	18.7	0.0	186.7
100.00		1.00	1.27	11.081	12.19	207.43	0.650	0.000	4.25	13.258	8.62	105.0	0.0	420.2
105.00		1.00	1.28	11.195	12.31	201.09	0.650	0.000	5.00	15.092	9.81	120.8	0.0	478.2
110.00		1.00	1.29	11.305	12.44	194.64	0.650	0.000	5.00	14.547	9.46	117.6	0.0	460.8
115.00		1.00	1.30	11.412	12.55	188.07	0.650	0.000	5.00	14.001	9.10	114.2	0.0	443.4
120.00		1.00	1.32	11.514	12.67	181.40	0.650	0.000	5.00	13.455	8.75	110.8	0.0	425.9
125.00		1.00	1.33	11.614	12.78	174.64	0.650	0.000	5.00	12.909	8.39	107.2	0.0	408.5
127.00	Bot - Section 4	1.00	1.33	11.653	12.82	171.91	0.650	0.000	2.00	5.011	3.26	41.7	0.0	158.5
130.00		1.00	1.34	11.710	12.88	167.79	0.650	0.000	3.00	7.448	4.84	62.4	0.0	409.7
130.75	Top - Section 3	1.00	1.34	11.724	12.90	166.75	0.650	0.000	0.75	1.831	1.19	15.4	0.0	100.7
133.00	Appurtenance(s)	1.00	1.34	11.766	12.94	165.84	0.650	0.000	2.25	5.420	3.52	45.6	0.0	128.8
135.00		1.00	1.35	11.803	12.98	163.06	0.650	0.000	2.00	4.725	3.07	39.9	0.0	112.3
140.00		1.00	1.36	11.894	13.08	156.05	0.650	0.000	5.00	11.430	7.43	97.2	0.0	271.6
143.00	Appurtenance(s)	1.00	1.36	11.947	13.14	151.81	0.650	0.000	3.00	6.596	4.29	56.3	0.0	156.7
145.00		1.00	1.37	11.982	13.18	148.97	0.650	0.000	2.00	4.288	2.79	36.7	0.0	101.9
150.00		1.00	1.38	12.068	13.27	141.81	0.650	0.000	5.00	10.338	6.72	89.2	0.0	245.5
154.00	Appurtenance(s)	1.00	1.39	12.135	13.35	136.03	0.650	0.000	4.00	7.878	5.12	68.4	0.0	187.0
155.00		1.00	1.39	12.152	13.37	134.58	0.650	0.000	1.00	1.915	1.24	16.6	0.0	45.4
								Totals:	**155.00**			**3,853.8**		**26,948.9**

Discrete Appurtenance Forces

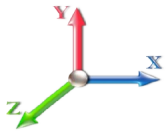
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 28	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 22

No.	Elev (ft)	Description	Qty	qz (psf)	qzGh (psf)	Orient Factor x Ka	Ka	Total CaAa (sf)	Dead Load (lb)	Horiz Ecc (ft)	Vert Ecc (ft)	Wind FX (lb)	Mom Y (lb-ft)	Mom Z (lb-ft)
1	154.00	T-Arm	3	12.135	13.349	0.50	0.75	15.08	1200.00	0.000	0.000	201.23	0.00	0.00
2	154.00	AIR 21 B2A B4P	3	12.135	13.349	0.69	0.80	12.57	274.50	0.000	0.000	167.79	0.00	0.00
3	154.00	AIR 21 B4A B2P	3	12.135	13.349	0.69	0.80	12.57	271.20	0.000	0.000	167.79	0.00	0.00
4	154.00	KRY 112 144/1	3	12.135	13.349	0.54	0.80	0.66	33.00	0.000	0.000	8.80	0.00	0.00
5	154.00	(3) HR w/ Double V-Brace	1	12.135	13.349	1.00	1.00	15.50	650.00	0.000	0.000	206.91	0.00	0.00
6	154.00	APXVAARR24_43-U-NA2	3	12.135	13.349	0.56	0.80	34.00	384.00	0.000	0.000	453.90	0.00	0.00
7	154.00	4449	3	12.135	13.349	0.54	0.80	2.65	210.00	0.000	0.000	35.42	0.00	0.00
8	154.00	HRK12 (Handrail Kit)	1	12.135	13.349	1.00	1.00	6.75	261.72	0.000	0.000	90.10	0.00	0.00
9	143.00	Powerwave LGP13519	6	11.947	13.142	0.54	0.80	1.09	31.80	0.000	0.000	14.37	0.00	0.00
10	143.00	Powerwave LGP21401	6	11.947	13.142	0.54	0.80	4.15	84.60	0.000	0.000	54.52	0.00	0.00
11	143.00	Powerwave 7770	6	11.947	13.142	0.58	0.80	19.27	210.00	0.000	0.000	253.27	0.00	0.00
12	143.00	Raycap DC6-48-60-18-8F	1	11.947	13.142	0.60	0.80	0.55	31.80	0.000	0.000	7.25	0.00	0.00
13	143.00	Ericsson RRUS 11	6	11.947	13.142	0.57	0.80	8.59	304.20	0.000	0.000	112.87	0.00	0.00
14	143.00	Ericsson RRUS 32 B2	3	11.947	13.142	0.54	0.80	2.65	231.00	0.000	0.000	34.87	0.00	0.00
15	143.00	T-Arm	3	11.947	13.142	0.50	0.75	15.08	1200.00	0.000	0.000	198.12	0.00	0.00
16	143.00	Cci HPA-65R-BUU-H6	3	11.947	13.142	0.68	0.80	19.71	153.00	0.000	0.000	258.98	0.00	0.00
17	133.00	DB-T1-6Z-8AB-0Z	2	11.766	12.943	0.57	0.80	5.45	88.00	0.000	0.000	70.58	0.00	0.00
18	133.00	BXA-171063-12CF	3	11.766	12.943	0.67	0.80	9.64	45.00	0.000	0.000	124.73	0.00	0.00
19	133.00	RRH2X60-AWS	3	11.766	12.943	0.61	0.80	6.38	180.00	0.000	0.000	82.63	0.00	0.00
20	133.00	RRH2X60-700	3	11.766	12.943	0.61	0.80	6.38	180.00	0.000	0.000	82.63	0.00	0.00
21	133.00	SBNHH-1D65B	6	11.766	12.943	0.66	0.80	32.51	240.00	0.000	0.000	420.77	0.00	0.00
22	133.00	LPA-80080-6CF	6	11.766	12.943	1.36	0.80	35.33	126.00	0.000	0.000	457.31	0.00	0.00
23	133.00	T-Arm	3	11.766	12.943	0.50	0.75	12.06	1050.00	0.000	0.000	156.09	0.00	0.00
24	85.00	DB408	1	10.830	11.913	1.00	1.00	2.90	17.00	0.000	4.708	34.55	0.00	162.67
25	85.00	SD222	2	10.831	11.914	1.00	1.00	10.60	34.00	0.000	4.750	126.29	0.00	599.89
26	85.00	SP4-4.7NS RD4	1	10.708	11.779	1.00	1.00	23.14	60.00	0.000	0.000	272.56	0.00	0.00
27	85.00	Pipe Mount	2	10.708	11.779	1.00	1.00	10.00	120.00	0.000	0.000	117.79	0.00	0.00
							Totals:		**7,670.82**			**4,212.12**		

Total Applied Force Summary

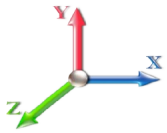
Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 29

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 22

Elev (ft)	Description	Lateral FX (-) (lb)	Axial FY (-) (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)
0.00		0.00	0.00	0.00	0.00
5.00		135.58	1643.48	0.00	0.00
10.00		132.68	1613.00	0.00	0.00
15.00		129.77	1582.52	0.00	0.00
20.00		134.61	1552.04	0.00	0.00
25.00		137.86	1521.56	0.00	0.00
30.00		139.90	1491.08	0.00	0.00
35.00		141.04	1460.60	0.00	0.00
40.00		141.50	1430.12	0.00	0.00
44.75		134.26	1330.38	0.00	0.00
45.00		7.09	119.54	0.00	0.00
50.00		143.00	2361.18	0.00	0.00
51.00		28.27	465.44	0.00	0.00
55.00		113.36	955.42	0.00	0.00
60.00		140.83	1170.77	0.00	0.00
65.00		139.27	1144.64	0.00	0.00
70.00		137.45	1118.52	0.00	0.00
75.00		135.39	1092.39	0.00	0.00
80.00		133.12	1066.26	0.00	0.00
85.00	(6) attachments	681.84	1271.14	0.00	762.56
90.00		128.00	998.41	0.00	0.00
90.75		18.87	147.51	0.00	0.00
95.00		107.55	1259.74	0.00	0.00
95.75		18.69	219.04	0.00	0.00
100.00		105.04	603.25	0.00	0.00
105.00		120.81	693.59	0.00	0.00
110.00		117.58	676.18	0.00	0.00
115.00		114.24	658.76	0.00	0.00
120.00		110.77	641.34	0.00	0.00
125.00		107.19	623.93	0.00	0.00
127.00		41.75	244.69	0.00	0.00
130.00		62.36	538.90	0.00	0.00
130.75		15.35	133.01	0.00	0.00
133.00	(26) attachments	1440.33	2134.78	0.00	0.00
135.00		39.88	169.11	0.00	0.00
140.00		97.21	413.63	0.00	0.00
143.00	(34) attachments	990.60	2488.31	0.00	0.00
145.00		36.74	129.38	0.00	0.00
150.00		89.21	314.31	0.00	0.00
154.00	(20) attachments	1400.29	3526.46	0.00	0.00
155.00		16.64	45.44	0.00	0.00
	Totals:	**8,065.91**	**41,049.89**	**0.00**	**762.56**

Linear Appurtenance Segment Forces (Factored)

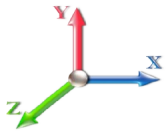
Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 30	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 22

Top Elev (ft)	Description	Wind Exposed	Length (ft)	Ca	Exposed Width (in)	Area (sqft)	CaAa (sqft)	Ra	Cf Adjust Factor	qz (psf)	F X (lb)	Dead Load (lb)
5.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	7.442	0.00	5.50
10.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.033	0.000	7.442	0.00	5.50
15.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.034	0.000	7.442	0.00	5.50
20.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.035	0.000	7.896	0.00	5.50
25.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.036	0.000	8.276	0.00	5.50
30.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.037	0.000	8.600	0.00	5.50
35.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	8.883	0.00	5.50
40.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.038	0.000	9.137	0.00	5.50
44.75	1 5/8" Fiber	Yes	4.75	0.000	2.00	0.79	0.00	0.039	0.000	9.355	0.00	5.23
45.00	1 5/8" Fiber	Yes	0.25	0.000	2.00	0.04	0.00	0.040	0.000	9.366	0.00	0.28
50.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.041	0.000	9.576	0.00	5.50
51.00	1 5/8" Fiber	Yes	1.00	0.000	2.00	0.17	0.00	0.041	0.000	9.616	0.00	1.10
55.00	1 5/8" Fiber	Yes	4.00	0.000	2.00	0.67	0.00	0.041	0.000	9.770	0.00	4.40
60.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.042	0.000	9.951	0.00	5.50
65.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.043	0.000	10.120	0.00	5.50
70.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.045	0.000	10.279	0.00	5.50
75.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.046	0.000	10.430	0.00	5.50
80.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.047	0.000	10.572	0.00	5.50
85.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.049	0.000	10.708	0.00	5.50
90.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.050	0.000	10.838	0.00	5.50
90.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.051	0.000	10.857	0.00	0.83
95.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.052	0.000	10.962	0.00	4.68
95.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.053	0.000	10.980	0.00	0.83
100.00	1 5/8" Fiber	Yes	4.25	0.000	2.00	0.71	0.00	0.053	0.000	11.081	0.00	4.68
105.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.055	0.000	11.195	0.00	5.50
110.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.057	0.000	11.305	0.00	5.50
115.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.060	0.000	11.412	0.00	5.50
120.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.062	0.000	11.514	0.00	5.50
125.00	1 5/8" Fiber	Yes	5.00	0.000	2.00	0.83	0.00	0.065	0.000	11.614	0.00	5.50
127.00	1 5/8" Fiber	Yes	2.00	0.000	2.00	0.33	0.00	0.067	0.000	11.653	0.00	2.20
130.00	1 5/8" Fiber	Yes	3.00	0.000	2.00	0.50	0.00	0.068	0.000	11.710	0.00	3.30
130.75	1 5/8" Fiber	Yes	0.75	0.000	2.00	0.13	0.00	0.069	0.000	11.724	0.00	0.83
133.00	1 5/8" Fiber	Yes	2.25	0.000	2.00	0.38	0.00	0.069	0.000	11.766	0.00	2.48
									Totals:		**0.0**	**146.3**

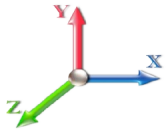
Calculated Forces

Structure:	CT13610-A-SBA	**Code:**	EIA/TIA-222-G	6/28/2019	
Site Name:	ARTEC	**Exposure:**	C		
Height:	155.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	C - Very Dense Soil		
Gh:	1.1 **Topography:** 1	**Struct Class:**	II	Page: 31	

Load Case: 1.0D + 1.0W 60 mph Wind

Dead Load Factor 1.00

Wind Load Factor 1.00



Iterations 22

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation Sway (deg)	Rotation Twist (deg)	Stress Ratio
0.00	-41.05	-8.08	0.00	-879.92	0.00	879.92	5604.23	2802.12	13924.9	6972.80	0.00	0.000	0.000	0.134
5.00	-39.40	-7.96	0.00	-839.53	0.00	839.53	5529.79	2764.90	13444.5	6732.24	0.02	-0.032	0.000	0.132
10.00	-37.78	-7.85	0.00	-799.72	0.00	799.72	5453.38	2726.69	12967.3	6493.32	0.07	-0.064	0.000	0.130
15.00	-36.20	-7.74	0.00	-760.47	0.00	760.47	5374.99	2687.50	12493.8	6256.19	0.15	-0.096	0.000	0.128
20.00	-34.64	-7.62	0.00	-721.77	0.00	721.77	5294.63	2647.32	12024.1	6021.01	0.27	-0.130	0.000	0.126
25.00	-33.11	-7.50	0.00	-683.67	0.00	683.67	5212.30	2606.15	11558.7	5787.94	0.42	-0.163	0.000	0.124
30.00	-31.62	-7.37	0.00	-646.17	0.00	646.17	5128.00	2564.00	11097.7	5557.14	0.61	-0.198	0.000	0.122
35.00	-30.15	-7.25	0.00	-609.30	0.00	609.30	5041.73	2520.86	10641.7	5328.76	0.84	-0.232	0.000	0.120
40.00	-28.72	-7.12	0.00	-573.07	0.00	573.07	4953.48	2476.74	10190.8	5102.98	1.10	-0.268	0.000	0.118
44.75	-27.39	-6.98	0.00	-539.27	0.00	539.27	4867.82	2433.91	9767.51	4891.01	1.39	-0.302	0.000	0.116
45.00	-27.27	-6.98	0.00	-537.53	0.00	537.53	4863.26	2431.63	9745.37	4879.93	1.40	-0.304	0.000	0.116
50.00	-24.90	-6.84	0.00	-502.60	0.00	502.60	4771.07	2385.54	9305.74	4659.79	1.74	-0.340	0.000	0.113
51.00	-24.44	-6.81	0.00	-495.77	0.00	495.77	3927.98	1963.99	7761.51	3886.53	1.81	-0.347	0.000	0.134
55.00	-23.48	-6.71	0.00	-468.51	0.00	468.51	3872.44	1936.22	7486.25	3748.69	2.12	-0.377	0.000	0.131
60.00	-22.30	-6.58	0.00	-434.96	0.00	434.96	3801.23	1900.62	7145.52	3578.07	2.53	-0.418	0.000	0.127
65.00	-21.15	-6.44	0.00	-402.08	0.00	402.08	3728.06	1864.03	6808.79	3409.45	2.99	-0.459	0.000	0.124
70.00	-20.03	-6.31	0.00	-369.86	0.00	369.86	3652.91	1826.46	6476.38	3243.00	3.50	-0.501	0.000	0.120
75.00	-18.94	-6.18	0.00	-338.30	0.00	338.30	3575.79	1787.90	6148.62	3078.88	4.04	-0.542	0.000	0.115
80.00	-17.87	-6.05	0.00	-307.40	0.00	307.40	3496.70	1748.35	5825.81	2917.23	4.63	-0.584	0.000	0.110
85.00	-16.60	-5.37	0.00	-276.39	0.00	276.39	3415.64	1707.82	5508.27	2758.23	5.27	-0.625	0.000	0.105
90.00	-15.60	-5.23	0.00	-249.56	0.00	249.56	3332.60	1666.30	5196.32	2602.02	5.95	-0.666	0.000	0.101
90.75	-15.45	-5.22	0.00	-245.63	0.00	245.63	3319.98	1659.99	5150.02	2578.84	6.05	-0.673	0.000	0.100
95.00	-14.19	-5.10	0.00	-223.45	0.00	223.45	3247.59	1623.80	4890.27	2448.77	6.67	-0.707	0.000	0.096
95.75	-13.97	-5.08	0.00	-219.63	0.00	219.63	1911.44	955.72	2922.15	1463.25	6.78	-0.714	0.000	0.157
100.00	-13.37	-4.98	0.00	-198.02	0.00	198.02	1878.47	939.23	2786.43	1395.29	7.43	-0.748	0.000	0.149
105.00	-12.67	-4.86	0.00	-173.11	0.00	173.11	1837.85	918.92	2627.99	1315.95	8.24	-0.804	0.000	0.138
110.00	-11.99	-4.75	0.00	-148.79	0.00	148.79	1795.26	897.63	2471.18	1237.43	9.11	-0.859	0.000	0.127
115.00	-11.33	-4.63	0.00	-125.05	0.00	125.05	1750.70	875.35	2316.31	1159.88	10.04	-0.910	0.000	0.114
120.00	-10.69	-4.52	0.00	-101.88	0.00	101.88	1704.17	852.08	2163.70	1083.46	11.02	-0.959	0.000	0.100
125.00	-10.06	-4.41	0.00	-79.27	0.00	79.27	1655.66	827.83	2013.66	1008.33	12.05	-1.002	0.000	0.085
127.00	-9.82	-4.37	0.00	-70.46	0.00	70.46	1635.71	817.85	1954.43	978.67	12.47	-1.019	0.000	0.078
130.00	-9.28	-4.30	0.00	-57.36	0.00	57.36	1605.19	802.59	1866.51	934.64	13.12	-1.041	0.000	0.067
130.75	-9.14	-4.28	0.00	-54.14	0.00	54.14	1090.28	545.14	1281.57	641.74	13.29	-1.046	0.000	0.093
133.00	-7.04	-2.80	0.00	-44.51	0.00	44.51	1077.75	538.87	1240.93	621.39	13.78	-1.060	0.000	0.078
135.00	-6.87	-2.76	0.00	-38.91	0.00	38.91	1066.28	533.14	1204.93	603.36	14.23	-1.074	0.000	0.071
140.00	-6.45	-2.66	0.00	-25.10	0.00	25.10	1036.22	518.11	1115.60	558.63	15.37	-1.104	0.000	0.051
143.00	-3.98	-1.62	0.00	-17.12	0.00	17.12	1017.23	508.62	1062.55	532.07	16.07	-1.117	0.000	0.036
145.00	-3.86	-1.58	0.00	-13.88	0.00	13.88	1004.18	502.09	1027.46	514.49	16.54	-1.124	0.000	0.031
150.00	-3.54	-1.49	0.00	-5.97	0.00	5.97	970.18	485.09	940.83	471.12	17.72	-1.136	0.000	0.016
154.00	-0.05	-0.02	0.00	-0.02	0.00	0.02	941.55	470.78	872.83	437.06	18.68	-1.140	0.000	0.000
155.00	0.00	-0.02	0.00	0.00	0.00	0.00	934.20	467.10	856.03	428.65	18.92	-1.140	0.000	0.000

Final Analysis Summary

Structure:	CT13610-A-SBA		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 32

Tower Engineering Solutions

Reactions

Load Case	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)
1.2D + 1.6W 97 mph Wind	33.8	0.00	49.22	0.00	0.00	3695.48
0.9D + 1.6W 97 mph Wind	33.8	0.00	36.90	0.00	0.00	3667.51
1.2D + 1.0Di + 1.0Wi 50 mph Wind	9.5	0.00	73.51	0.00	0.00	1019.51
1.2D + 1.0E	2.6	0.00	49.26	0.00	0.00	312.82
0.9D + 1.0E	2.6	0.00	36.94	0.00	0.00	310.20
1.0D + 1.0W 60 mph Wind	8.1	0.00	41.05	0.00	0.00	879.92

Max Stresses

Load Case	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (-) (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Elev (ft)	Stress Ratio
1.2D + 1.6W 97 mph Wind	-15.72	-21.39	0.00	-924.17	0.00	-924.17	1911.44	955.72	2922.15	1463.25	95.75	0.640
0.9D + 1.6W 97 mph Wind	-11.52	-21.16	0.00	-912.61	0.00	-912.61	1911.44	955.72	2922.15	1463.25	95.75	0.630
1.2D + 1.0Di + 1.0Wi 50 mph Wind	-31.65	-5.77	0.00	-246.05	0.00	-246.05	1911.44	955.72	2922.15	1463.25	95.75	0.185
1.2D + 1.0E	-16.83	-1.93	0.00	-101.63	0.00	-101.63	1911.44	955.72	2922.15	1463.25	95.75	0.078
0.9D + 1.0E	-12.62	-1.91	0.00	-100.47	0.00	-100.47	1911.44	955.72	2922.15	1463.25	95.75	0.075
1.0D + 1.0W 60 mph Wind	-13.97	-5.08	0.00	-219.63	0.00	-219.63	1911.44	955.72	2922.15	1463.25	95.75	0.157

Base Plate Summary

Structure:	CT13610-A-SB		**Code:**	EIA/TIA-222-G	6/28/2019
Site Name:	ARTEC		**Exposure:**	C	
Height:	155.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	C - Very Dense Soil	
Gh:	1.1	**Topography:** 1	**Struct Class:**	II	Page: 33

Tower Engineering Solutions

Reactions

Original Design

Moment (kip-ft):	5060.00
Axial (kip):	30.00
Shear (kip):	45.00

Analysis

Moment (kip-ft):	3695.48
Axial (kip):	73.51
Shear (kip):	33.79
Moment Design %:	73.03

Base Plate

Yield (ksi):	50.00
Width (in):	70.00
Style:	Clipped
Polygon Sides:	0.00
Clip Length (in):	15.00
Effective Len (in):	7.89
Moment (kip-in):	398.40
Allow Stress (ksi):	67.50
Applied Stress (ksi):	0.00
Stress Ratio:	0.50

Anchor Bolts

Bolt Circle:	68.00
Number Bolts:	24.00
Bolt Type:	2.25" 18J
Bolt Diameter (in):	2.25
Yield (ksi):	75.00
Ultimate (ksi):	100.00
Arrangement:	Clustered
Cluster Dist (in):	6.00
Start Angle (deg):	45.00

Compression

Force (kip):	111.75
Allowable (kip):	260.00
Ratio:	0.44

Tension

Force (kip):	105.63
Allowable (kip):	260.00
Ratio:	0.42

Monopole Mat Foundation Design

				Date
				6/28/2019
	Customer Name:	T-Mobile	**EIA/TIA Standard:**	EIA-222-G
	Site Name:		**Structure Height (Ft.):**	155
	Site Number:	CT13610-A-SBA	**Engineer Name:**	J. Chen
	Engr. Number:	78520	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Monopole

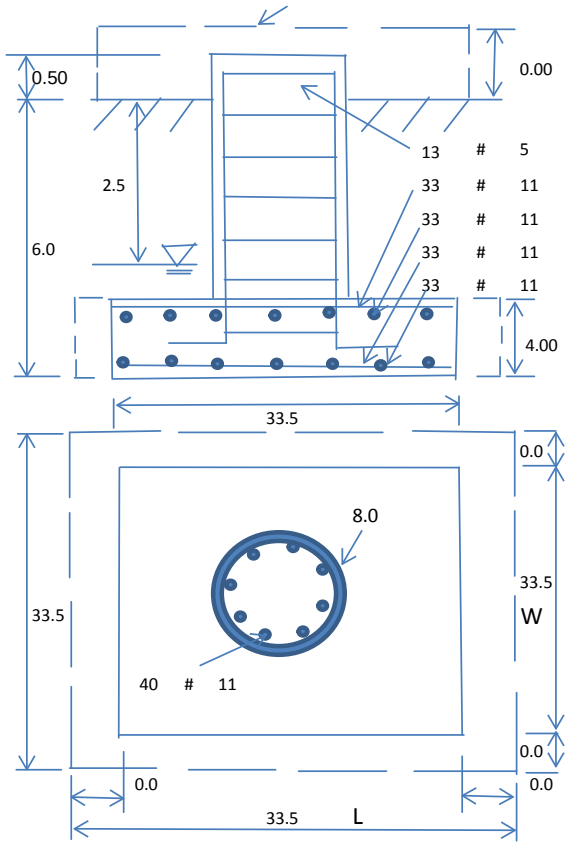
Analysis or Design? Analysis

Base Reactions (Factored):

Axial Load (Kips):	73.5	Shear Force (Kips):	33.8
Uplift Force (Kips):	0.0	Moment (Kips-ft):	3695.5
Allowable overstress %:	5.0%		

Foundation Geometries:

		Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	8.0	Depth of Base BG (ft.):	6.0
Pier Height A. G. (ft.):	0.50	Thickness of Pad (ft):	4.00
Length of Pad (ft.):	33.5	Width of Pad (ft.):	33.5
Final Length of pad (ft)	33.5	Final width of pad (ft):	33.5



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	40	
Vertical Rebar Size #:	11	Tie / Stirrup Size #:	5	
Qty. of Vertical Rebars:	40	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	33	Qty. of Rebar in Pad (W):	33	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	33	Qty. of Rebar in Pad (W):	33	
Apply 1.35 factor for e/w Per G:	1.35			

Soil Design Parameters:

Soil Unit Weight (pcf):	115.0	Soil Buoyant Weight:	52.6	Pcf		
Water Table B.G.S. (ft):	2.5	Unit Weight of Water:	62.4	pcf	Angle from Top of Pad:	30
Ultimate Bearing Pressure (psf):	16000	Ultimate Skin Friction:	0	Psf	Angle from Bottm of Pad:	25
Consider Friction for O.T.M. (Y/N):	No	Consider Friction for bearing (Y/N):	Yes		Angle from Bottm of Pad:	25
Consider soil hor. resist. for OTM.:	Yes	Reduction factor on the maximum soil bearing pressure:			1.00	

Foundation Analysis and Design: Uplift Strength Reduction Factor: 0.75 — Compression Strength Reduction Factor: 0.75

Total Dry Soil Volume (cu. Ft.):	2143.97	Total Dry Soil Weight (Kips):	246.56
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	246.56	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	686.79	Total Dry Concrete Weight (Kips):	103.02
Total Buoyant Concrete Volume (cu. Ft.):	3927.88	Total Buoyant Concrete Weight (Kips):	344.08
Total Effective Concrete Weight (Kips):	447.10	Total Vertical Load on Base (Kips):	767.16

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	1219	<	Allowable Factored Soil Bearing (psf):	12000	0.10	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	11688.0	>	Design Factored Momont (kips-ft):	3722	0.32	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	3.14	OK!				

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90		Strength reduction factor (Shear):	0.75		
Strength reduction factor (Axial compresion):	0.65		Wind Load Factor on Concrete Design:	1.00		
					Load/ Capacity Ratio	
(1) Concrete Pier:						
Vertical Steel Rebar Area (sq. in./each):	1.56		Tie / Stirrup Area (sq. in./each):	0.31		
Calculated Moment Capacity (Mn,Kips-Ft):	11470.4	>	Design Factored Moment (Mu, Kips-F	3780.0	0.33	OK!
Calculated Shear Capacity (Kips):	912.1	>	Design Factored Shear (Kips):	33.8	0.04	OK!
Calculated Tension Capacity (Tn, Kips):	3369.6	>	Design Factored Tension (Tu Kips):	0.0	0.00	OK!
Calculated Compression Capacity (Pn, Kips):	9515.1	>	Design Factored Axial Load (Pu Kips):	73.5	0.01	OK!
Moment & Axial Strength Combination:	0.33	OK!	Check Tie Spacing (Design/Required):		0.5	OK!
Pier Reinforcement Ratio:	0.009		Reinforcement Ratio is satisfied per ACI			
(2).Concrete Pad:						
One-Way Design Shear Capacity (L-Direction, Kips):	1463.5	>	One-Way Factored Shear (L-D. Kips):	226.5	0.15	OK!
One-Way Design Shear Capacity (W-Direction, Kips):	1463.5	>	One-Way Factored Shear (W-D., Kips)	226.5	0.15	OK!
One-Way Design Shear Capacity (Corner-Corner. Kips):	1397.6	>	One-Way Factored Shear (C-C, Kips):	211.0	0.15	OK!
Lower Steel Pad Reinforcement Ratio (L-Direct.):	0.0029	OK!	Lower Steel Pad Reinf. Ratio (W-Direc	0.0029		
Lower Steel Pad Moment Capacity (L-Direction. Kips-ft):	9916.4	>	Moment at Bottom (L-Dir. K-Ft):	1784.3	0.18	OK!
Lower Steel Pad Moment Capacity (W-Direction. Kips-ft):	9916.4	>	Moment at Bottom (W-Dir. K-Ft):	1784.3	0.18	OK!
Lower Steel Pad Moment Capacity (Corner-Corner,K-ft):	13923.7	>	Moment at Bottom (C-C Dir. K-Ft):	2523.4	0.18	OK!
Upper Steel Pad Reinforcement Ratio (L-Direct.):	0.0029	OK!	Upper Steel Reinf. Ratio (W-Dir.):	0.0029		
Upper Steel Pad Moment Capacity (L-Direc. Kips-ft):	9916.4	>	Moment at the top (L-Dir K-Ft):	509.0	0.05	OK!
Upper Steel Pad Moment Capacity (W-Direc. Kips-ft):	9916.4	>	Moment at the top (W-Dir K-Ft):	509.0	0.05	OK!
Upper Steel Pad Moment Capacity (Corner-Corner. K-ft):	13923.7	>	Moment at the top (C-C Dir. K-Ft):	475.5	0.03	OK!
(3).Check Punching Shear Capacity due to Moment in the Pier:						
Moment transferred by punching shear:	1478.2	k-ft.	Max. factored shear stress v_{u_CD}:		1.2	Psi
Max. factored shear stress v_{u_AB}:	6.9	Psi	Factored shear Strength ϕv_n:		164.3	Psi
Max. factored shear stress v_u:	6.9	Psi	Check Usage of Punching Shear Capacity:		0.04	OK!

EXHIBIT 8

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Post-Mod Antenna Mount Analysis Report

Existing 155-Ft Monopole Tower
Customer Name: SBA Communications Corp
Customer Site Number: CT13610-A
Customer Site Name: ARTEC
Carrier Name: T-Mobile (App#: 117020, V1)
Carrier Site ID / Name: CT11390G / Artec
Site Location: 26 Commerce Drive
N. Branford, Connecticut
New Haven County
Latitude: 41.322138
Longitude: -72.773277

Analysis Result:

Max Structural Usage: 83.6% [Pass]

Report Prepared By: Cameron Pescatello

7/31/19

Introduction

The purpose of this report is to summarize the analysis results on the (3) T-Arm at 154.00' elevation including the proposed modifications to support the proposed antenna configuration. Any existing modification listed under Sources of Information was assumed completed and was included in this analysis.

The proposed modification by **TES** listed under Sources of Information was considered completed and was included in this analysis.

Sources of Information

Mount Drawings	Mount mapping provided by Full Metal Tower Services, dated 04/26/2019
Antenna Loading	SBA, Application #: 117020, v1, dated 06/21/2019
Existing Modification	N/A
Proposed Modification	TES Project No. 81048

Analysis Criteria

Basic Wind Speed Used in the Analysis: V_{ULT} = 125 mph (3-Sec. Gust) / Equivalent to
V_{ASD} = 97 mph (3-Sec. Gust)
Basic Wind Speed with Ice: 50 mph (3-Sec. Gust) with 0.75" radial ice concurrent
Operational Wind Speed: 60 mph +0" Radial ice
Standard/Codes: ANSI/TIA/EIA 222-G/ 2015 IBC / 2018 CSBC
Exposure Category: C
Structure Class: II
Topographic Category: 1
Crest Height (Ft): 0

The site is a Risk Category II structure per IBC Table 1604.5. This site does not support emergency communication equipment for first responders such as fire departments, police, hospitals, ambulance services or any of the facilities listed for Risk Categories III and IV. The scope of work detailed in this structural analysis does not include items that are a part of emergency service as the 911 or essential facility service of an emergency response system.

Mount Information

(3) T-Arm at 154.00' elevation

Proposed Modifications

(1) MetroSite V-Bracing Kit: MS-C1B-350P
(1) Metrosite End Connections
(3) MetroSite Pipe: 238x204

Final Antenna Configuration

3	Ericsson Air 21 B2A/B4P
3	Ericsson Air 21 B4A/B2P
3	RFS APXVAARR24_43-U-NA20
3	Ericsson KRY 112 144/1
3	Ericsson 4449 B71+B12

Any proposed antennas not currently installed should be mounted such that the centers of the antennas do not exceed 0.5 ft vertically from the center of the T-Arm.

Analysis Results

Our calculations have determined that under design wind load the existing mounts will be structurally adequate to support the proposed antenna configuration after the proposed modification is successfully completed. The maximum structural usage is 83.6%, which occurs in the mount pipe. The proposed equipment must be installed as stipulated in the Final Antenna Configuration section of this report. The analysis results are void if the proposed equipment is not installed in accordance with this report.

Attachments

1. Mount Photos Before Modification
2. Antenna Placement Diagram
3. Mount Mapping Information
4. Analysis Calculations

Standard Conditions

1. The loading configuration as analyzed in this report is as provided from the customer. Any deviation from this design shall be communicated to TES to verify deviation will not adversely impact the analysis.

2. The analysis is based on the presumption that the antenna mount members and components along with any existing reinforcement items have been correctly and properly designed, manufactured, installed and maintained.

3. All the existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion. The mount analysis is not a condition assessment of the mount.

4. The mount analysis was performed in accordance with the loading provided, and if applicable the modification required to support the additional loading.

5. If the mount is modified, installation must adhere to the configuration communicated in the modification drawings.

6. The modification drawings are not intended to convey means or methods. These are the responsibility of the installing contractor.

7. Rigging plan review is available if the contractor requires for a construction class IV or other if required. Review fee would apply.

8. The mount modification package was created based upon information provided for the mount loading. The underlying tower is assumed to provide support and sufficient rigidity to support the mount loads as a tower analysis was not part of the mount analysis.

9. TES is not responsible for modifications to climbing facilities unless communicated to TES in writing.


04 . 2


04 26 2019 09 34

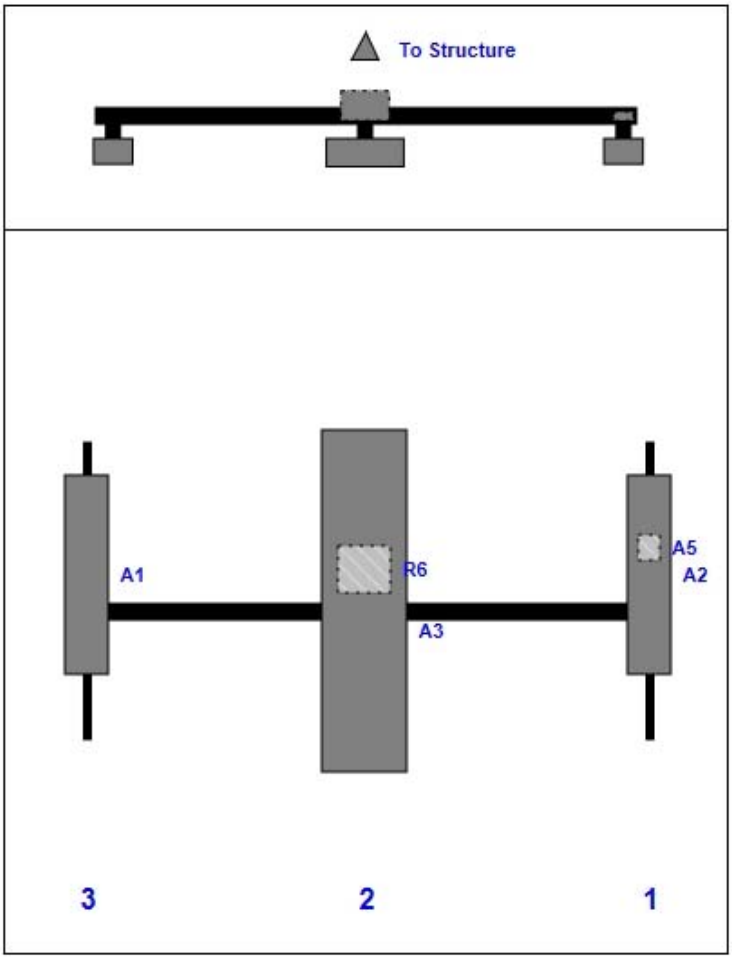
Structure: CT13610-A-SBA - ARTEC

Sector: A
Structure Type: Monopole
Mount Elev: 154.00

7/30/2019

TES Tower Engineering Solutions

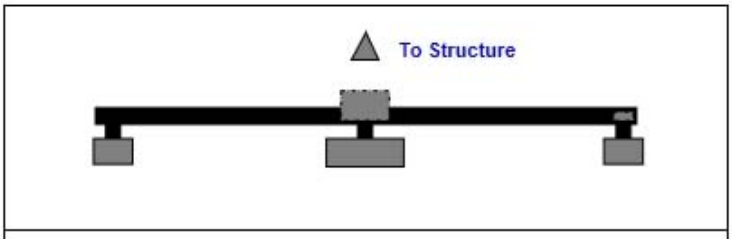
Plan View



Front View
Looking Toward Structure

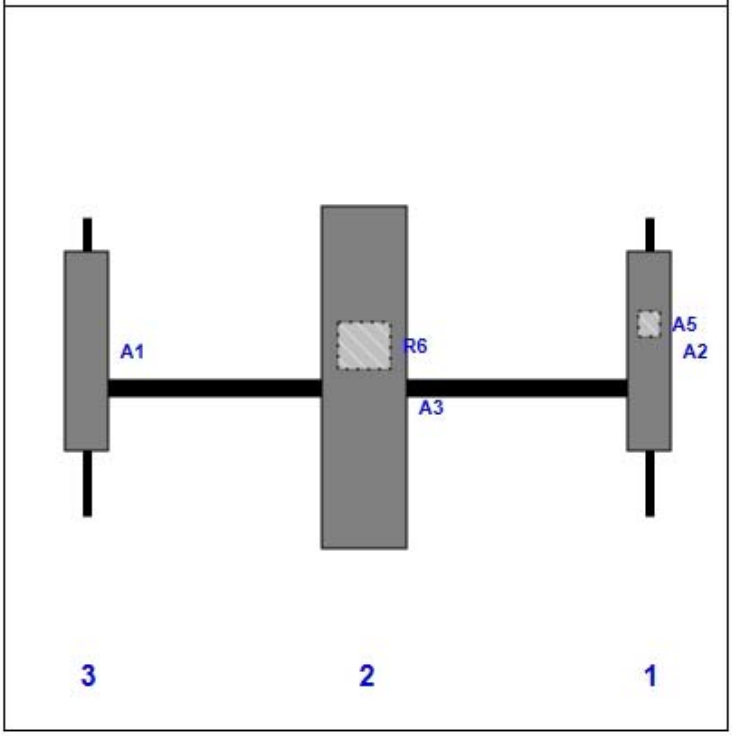
Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A2	Air 21 B4A/B2P	56.00	12.10	164.00	1	a	Front	37.50	0.00
A5	KRY 112 144/1	6.90	6.10	164.00	1	b	Behind	30.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	84.00	2	a	Front	45.00	0.00
R6	4449 B71+B12	13.10	14.90	84.00	2	a	Behind	36.00	0.00
A1	Air 21 B2A/B4P	56.00	12.10	6.00	3	a	Front	37.50	0.00

Plan View



Front View

Looking Toward Structure



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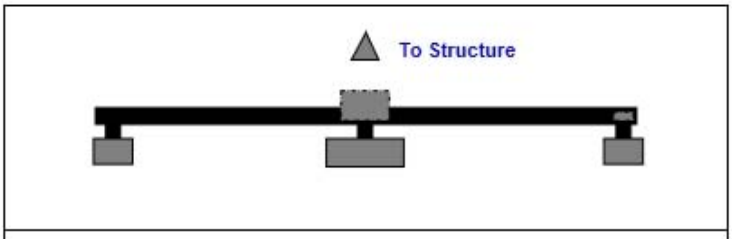
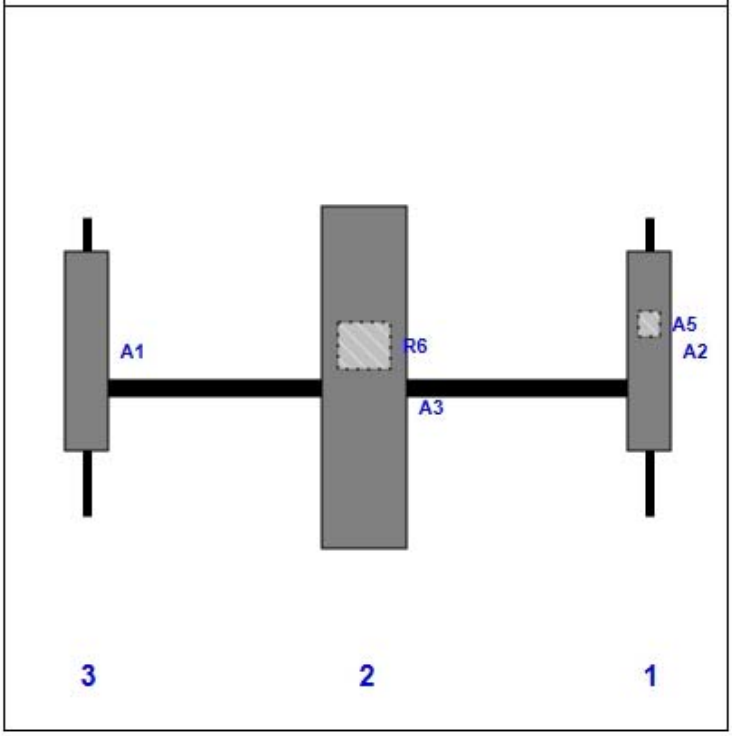
A1	Air 21 B2A/B4P	56.00	12.10	6.00	3	a	Front	37.50	0.00

Plan View



Front View

Looking Toward Structure



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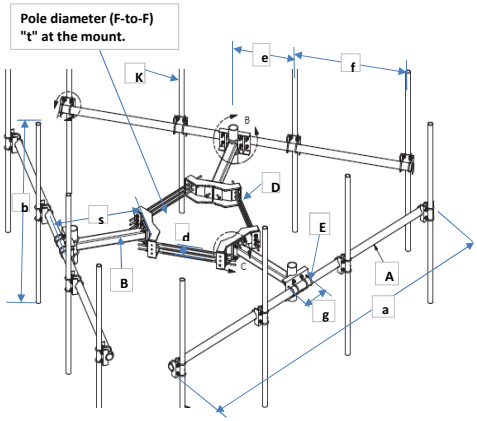
A1	Air 21 B2A/B4P	56.00	12.10	6.00	3	a	Front	37.50	0.00

Antenna Mount Type "MT-Z" Mapping Form (PATENT PENDING)

FCC # Not Posted

Tower Owner:	SBA Communications	**Mapping Date:**	4/26/19
Site Name:	ARTEC	**Structure Type:**	Monopole
Site Number or ID:	CT13610-A-SBA	**Structure Height (Ft.):**	157
Mapping Contractor:	Full Metal Tower Services	**Mount Height (Ft.):**	153.7



Geometries (Unit: inches)

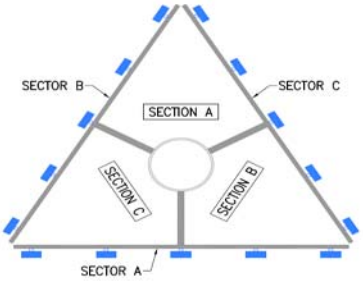
a	168	**e**		**j**		**o**		**s**	48
b	84	**f**		**k**		**p**		**t**	23
c		**g**	7	**m**		**q**		**u ***	48
d	6	**h**		**n**		**r**		**v ***	84

Members/Bolts (Unit: inches) — *** - See Ant. Layout for "u", "v" and member "K" (pipe)**

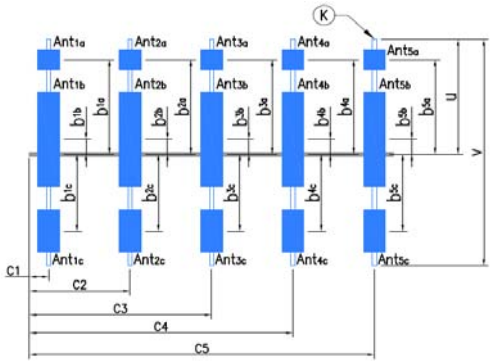
Items	Member	Lx (O.D.)	Ly (I.D.)	T	Items	Member	Lx (O.D.)	Ly (I.D.)	T
A	Tubing 4x4x1/4	4	4	0.25	**F**				
B	Tubing 4x4x1/4	4	4	0.25	**G**				
C					**H**				
D	3/4" Bolt	12			**J**				
E	1/2" Bolt	U-Bolt			**K* (pipe)**	2.375 OD x 0.154 Pipe	2.375	2.067	0.154

Distance from top of main platform member to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.)	N/A
Distance from top of main platform member to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.)	9'

Please enter the infomation below if members can't be found from the drop down lists



Climbing ladder is Located at Section C, at 310° Degree Azimuth



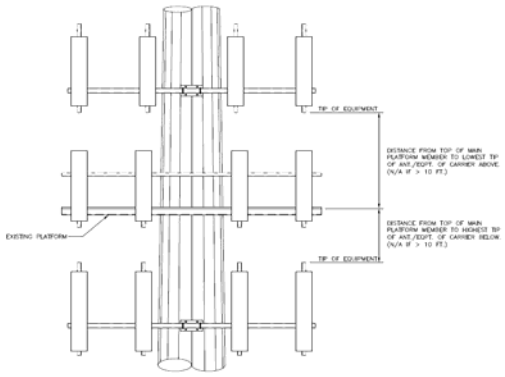
Antenna Layout

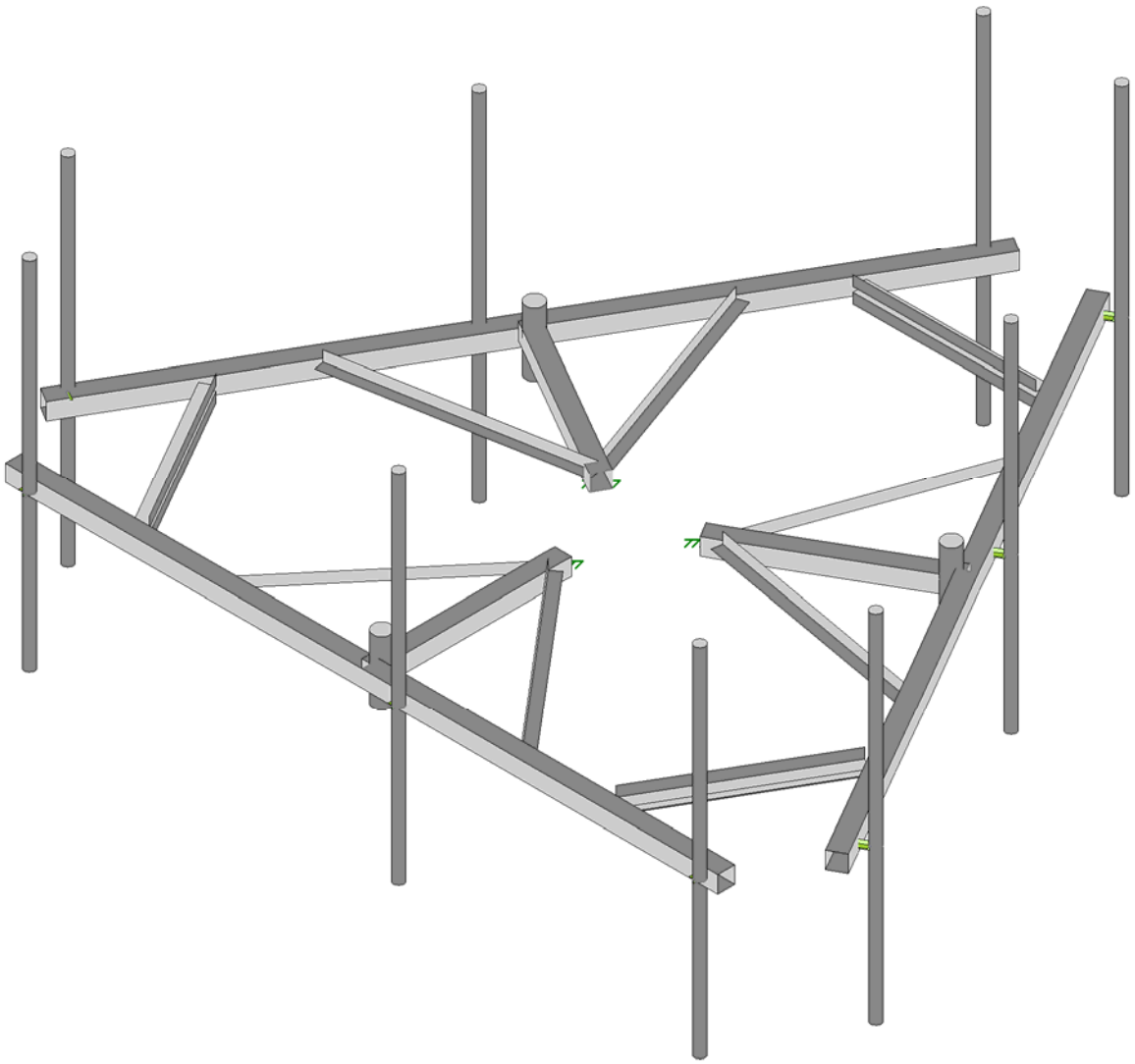
Ants. Items	Enter antenna model. If not labled, enter "Unknown". If no antenna at specified location, enter "N/A". If antennas and the locations are the same on all three sectors, only enter one sector.	Mounting Locations (Unit: inches)							Photos of antennas
	Antenna Models if Known	Width (in.)	Depth (in.)	Height (in.)	Coax Size and Qty	Vertical Distances"b_{1a}, b_{2a}, b_{3a}, b_{1b}...." (In.)	Horiz. offset (Use "-" if Ant. is inside)	Horiz. offset "C_1, C_2, C_3, C_4, C_5" (in.)	Photo Numbers
Sector A									
Ant_{1a}								164	
Ant_{1b}	Antenna A	13	9	57	1/2" (2)	6	8		
Ant_{1c}	TMA A	6	3	8	1/2" (2)	10			
Ant_{2a}								6	
Ant_{2b}	Antenna B	12	8	56	1/2" (1)	5	7		
Ant_{2c}									
Ant_{3a}									
Ant_{3b}									
Ant_{3c}									
Ant_{4a}									
Ant_{4b}									
Ant_{4c}									
Ant_{5a}									
Ant_{5b}									
Ant_{5c}									
Are Ant same as sector A?	Yes	**Antennas on Sector B are the same as Sector A**							

Azimuth (Degree) of Each Sector and Climbing Information

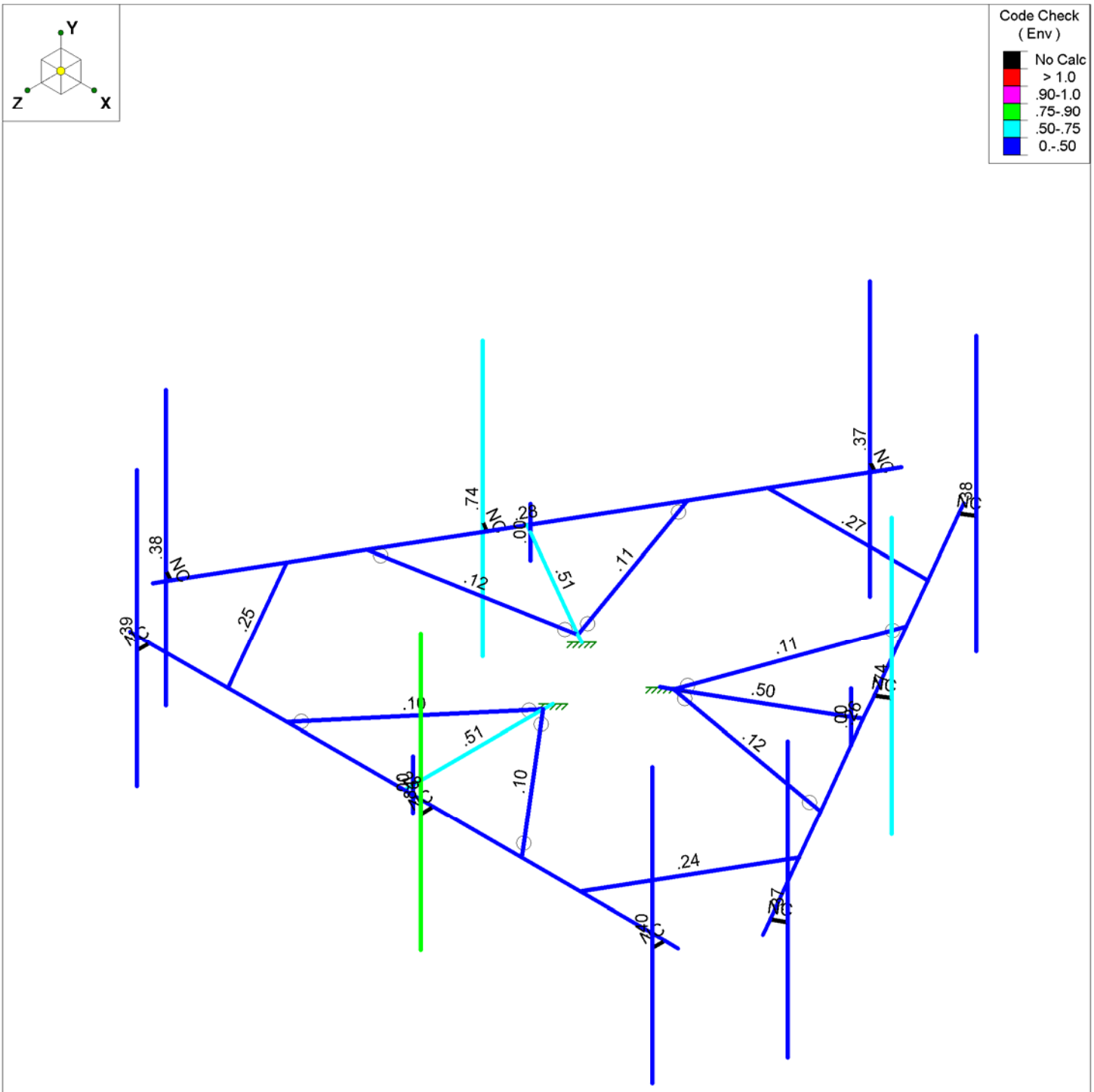
Sector A:	340°	Deg	
Sector B:	90°	Deg	
Sector C:	200°	Deg	
Climbing	310°	Deg	Located at Section C
Climbing Facility	Corrosion Type:		No corrosion observed
	Access:		Climbing path was unobstructed.
	Condition:		N/A

Are Ant same as sector A/B?	Same As A	**Antennas on Sector C are the same as Sector A**



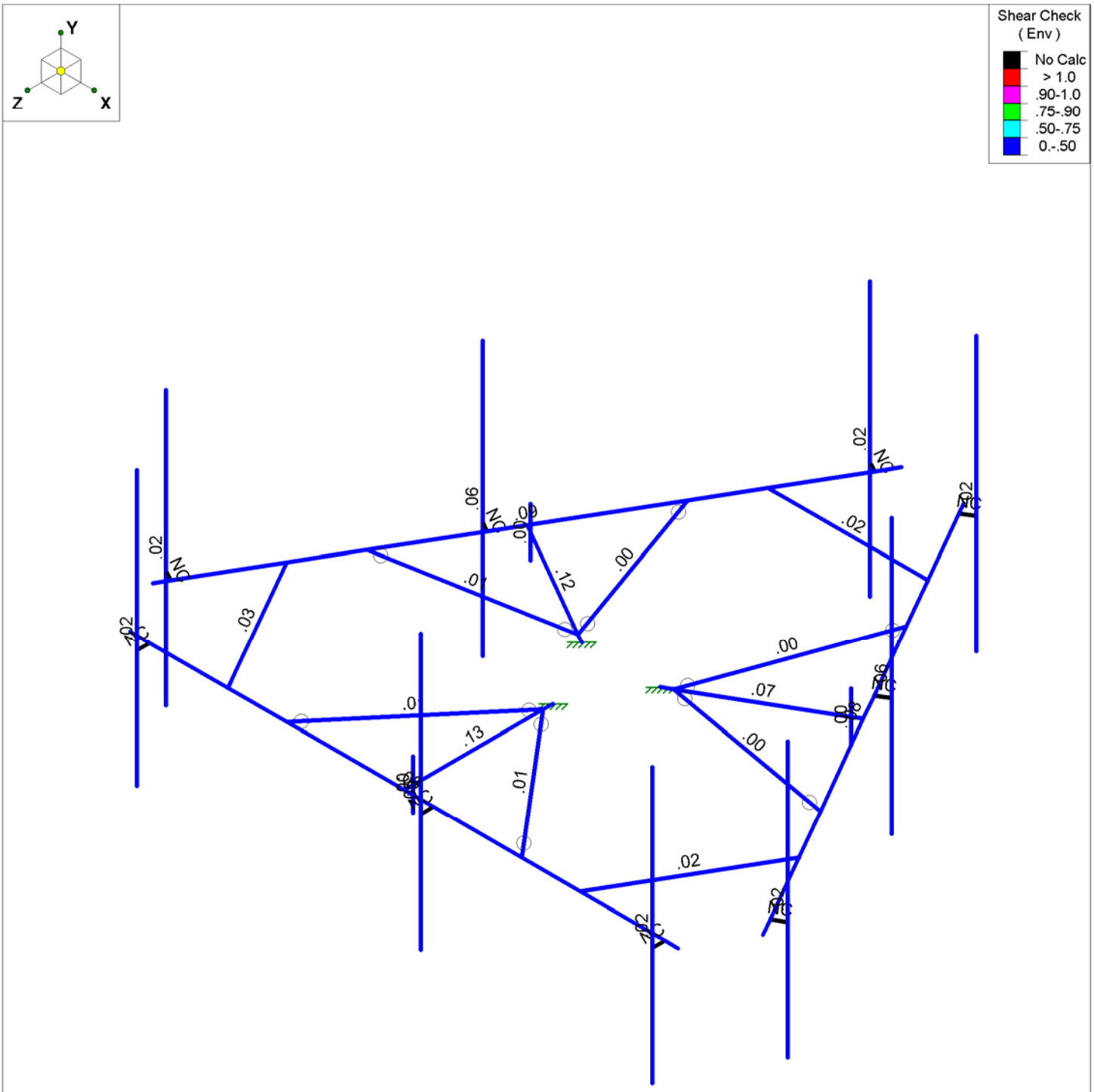


Tower Engineering Solutio...	CT13610-A-SBA_MT_LO_Loads Only_G	SK - 1
		July 31, 2019 at 9:37 AM
TES Project No. 81048		CT13610-A-SBA_81048_G_RISA_L...



Member Code Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.6W (Front)

Tower Engineering Solutio...	CT13610-A-SBA_MT_LO_Loads Only_G	SK - 2
		July 31, 2019 at 9:37 AM
TES Project No. 81048		CT13610-A-SBA_81048_G_RISA_L...



Member Shear Checks Displayed (Enveloped)
Results for LC 1, 1.2D+1.6W (Front)

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		July 31, 2019 at 9:38 AM
TES Project No. 81048		CT13610-A-SBA_81048_G_RISA_L...

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Antenna D	None					24			
2	Antenna Di	None					24			
3	Antenna W Front	None					24			
4	Antenna Wi Front	None					24			
5	Antenna W Side	None					24			
6	Antenna Wi Side	None					24			
7	Service Lm1	None					1			
8	Service Lm2	None					1			
9	Structure D	None		-1						
10	Structure Di	None						19		
11	Structure W Front	None						19		
12	Structure Wi Front	None						19		
13	Structure W Side	None						19		
14	Structure Wi Side	None						19		

Load Combinations

	Description	So...	P...	S...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...	BLC	Fac...
1	1.2D+1.6W (Front)	Yes	Y		1	1.2	9	1.2	3	1.6	11	1.6												
2	1.2D+1.6W (Back)	Yes	Y		1	1.2	9	1.2	3	-1.6	11	-1.6												
3	1.2D+1.6W (Left)	Yes	Y		1	1.2	9	1.2	5	1.6	13	1.6												
4	1.2D+1.6W (Right)	Yes	Y		1	1.2	9	1.2	5	-1.6	13	-1.6												
5	1.2D+1.0Di+1.0Wi (...	Yes	Y		1	1.2	9	1.2	2	1	10	1	4	1	12	1								
6	1.2D+1.0Di+1.0Wi (...	Yes	Y		1	1.2	9	1.2	2	1	10	1	4	-1	12	-1								
7	1.2D+1.0Di+1.0Wi (...	Yes	Y		1	1.2	9	1.2	2	1	10	1	6	1	14	1								
8	1.2D+1.0Di+1.0Wi (...	Yes	Y		1	1.2	9	1.2	2	1	10	1	6	-1	14	-1								
9	1.2D+1.5L1+.16W (...	Yes	Y		1	1.2	9	1.2	7	1.5	3	.16	11	.16										
10	1.2D+1.5L2+.16W (...	Yes	Y		1	1.2	9	1.2	8	1.5	3	.16	11	.16										
11	1.4D	Yes	Y		1	1.4	9	1.4																

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0.	0	.2	0	
2	N2	0.	0	4	0	
3	N3	-7	0	4	0	
4	N4	7	0	4	0	
5	NP1	6.666667	4	4.328125	0	
6	NP2	6.666667	-3	4.328125	0	
7	NP3	.75	4	4.328125	0	
8	NP4	.75	-3	4.328125	0	
9	NP5	-6.5	4	4.328125	0	
10	NP6	-6.5	-3	4.328125	0	
11	N11	6.666667	0	4.328125	0	
12	N12	-6.5	0	4.328125	0	
13	N13	0.	.625	3.770833	0	
14	N14	0.	-.625	3.770833	0	
15	N15	.75	0	4.328125	0	
16	N16	6.666667	0	4	0	
17	N17	-6.5	0	4	0	
18	N27	-3	0	4	0	
19	N28	3	0	4	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
20	CENTER	0	0	-0.9583	0	
21	N23	4.294014	0	-3.43745	0	
22	N24	7.794014	0	2.624728	0	
23	N25	0.794014	0	-9.499628	0	
24	N26	1.244845	4	-9.375015	0	
25	N27A	1.244845	-3	-9.375015	0	
26	N28A	4.203178	4	-4.251032	0	
27	N29	4.203178	-3	-4.251032	0	
28	N30	7.828178	4	2.027653	0	
29	N31	7.828178	-3	2.027653	0	
30	N32	1.244845	0	-9.375015	0	
31	N33	7.828178	0	2.027653	0	
32	N34	4.09555	.625	-3.322867	0	
33	N35	4.09555	-.625	-3.322867	0	
34	N37	0.96068	0	-9.210953	0	
35	N38	7.544014	0	2.191715	0	
36	N44	-4.294014	0	-3.43745	0	
37	N45	-0.794014	0	-9.499628	0	
38	N46	-7.794014	0	2.624728	0	
39	N47	-7.911512	4	2.17199	0	
40	N48	-7.911512	-3	2.17199	0	
41	N49	-4.953178	4	-2.951993	0	
42	N50	-4.953178	-3	-2.951993	0	
43	N51	-1.328178	4	-9.230678	0	
44	N52	-1.328178	-3	-9.230678	0	
45	N53	-7.911512	0	2.17199	0	
46	N54	-1.328178	0	-9.230678	0	
47	N55	-4.09555	.625	-3.322867	0	
48	N56	-4.09555	-.625	-3.322867	0	
49	N58	-7.627347	0	2.336053	0	
50	N59	-1.044014	0	-9.066615	0	
51	N67	0.	0	3.770833	0	
52	N66A	4.09555	0	-3.322867	0	
53	N67A	-4.09555	0	-3.322867	0	
54	N72A	-4.5	0	4	0	
55	N79	-6.544014	0	0.459664	0	
56	N68	0.	0	.45	0	
57	N72B	6.544014	0	0.459664	0	
58	N73	4.5	0	4	0	
59	N75A	-2.044014	0	-7.334564	0	
60	N76B	2.044014	0	-7.334564	0	
61	N65	1.003117	0	-1.53745	0	
62	N67B	5.794014	0	-0.839374	0	
63	N68A	2.794014	0	-6.035526	0	
64	N70	1.219624	0	-1.66245	0	
65	N71	-1.003117	0	-1.53745	0	
66	N73A	-2.794014	0	-6.035526	0	
67	N74	-5.794014	0	-0.839374	0	
68	N76	-1.219624	0	-1.66245	0	
69	N71A	.75	0	4	0	
70	N72	-4.669014	0	-2.787931	0	
71	N73B	-4.953178	0	-2.951993	0	
72	N73C	3.919014	0	-4.086969	0	
73	N74A	4.203178	0	-4.251032	0	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	xxxxx	HSS16x0.438	Beam	None	A572 Gr.50	Typical	19.9	606	606	1210

Cold Formed Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	CF	4CU5.25X03...	Beam	CU	A570 Gr.33	Typical	4.854	13.238	12.817	.228

Aluminum Section Sets

	Label	Shape	Type	Design List	Material	Design Rules	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	AL1A	AACS14X1...	Beam	AA Channel	3003-H14	Typical	11.8	44.7	401	1.19

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E...	Density[k/ft...	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

Cold Formed Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E5 F)	Density[k/ft^3]	Yield[ksi]	Fu[ksi]
1	A570 Gr.33	29500	11346	.3	.65	.49	33	52
2	A607 C1 Gr.55	29500	11346	.3	.65	.49	55	70

Aluminum Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (...	Density[...	Table B.4	kt	Ftu[ksi]	Fty[ksi]	Fcy[ksi]	Fsu[ksi]	Ct
1	3003-H14	10100	3787.5	.33	1.3	.173	Table B....	1	19	16	13	12	141
2	6061-T6	10100	3787.5	.33	1.3	.173	Table B....	1	38	35	35	24	141
3	6063-T5	10100	3787.5	.33	1.3	.173	Table B....	1	22	16	16	13	141
4	6063-T6	10100	3787.5	.33	1.3	.173	Table B....	1	30	25	25	19	141
5	5052-H34	10200	3787.5	.33	1.3	.173	Table B....	1	34	26	24	20	141
6	6061-T6 W	10100	3787.5	.33	1.3	.173	Table B....	1	24	15	15	15	141

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N4			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
2	M2	N1	N2			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
3	MP1A	NP1	NP2			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
4	MP2A	NP3	NP4			PIPE_2.0X	Beam	Pipe	A53 Gr.B	DR1
5	MP3A	NP5	NP6			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
6	M6	N14	N13			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
7	M7	N17	N12			RIGID	Beam	None	RIGID	DR1
8	M8	N71A	N15			RIGID	Beam	None	RIGID	DR1
9	M9	N16	N11			RIGID	Beam	None	RIGID	DR1
10	M13	N24	N25			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
11	MP1C	N26	N27A			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
12	MP2C	N28A	N29			PIPE_2.0X	Beam	Pipe	A53 Gr.B	DR1
13	MP3C	N30	N31			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
14	M18	N35	N34			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
15	M19	N38	N33			RIGID	Beam	None	RIGID	DR1
16	M21	N37	N32			RIGID	Beam	None	RIGID	DR1
17	M25	N45	N46			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
18	MP1B	N47	N48			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
19	MP2B	N49	N50			PIPE_2.0X	Beam	Pipe	A53 Gr.B	DR1
20	MP3B	N51	N52			PIPE_2.0	Beam	Pipe	A53 Gr.B	DR1
21	M30	N56	N55			PIPE_3.5	Beam	Pipe	A53 Gr.B	Typical
22	M31	N59	N54			RIGID	Beam	None	RIGID	DR1
23	M33	N58	N53			RIGID	Beam	None	RIGID	DR1
24	M35	N72A	N79		90	LL3x3x4x0	Beam	Double Angle (...	A36 Gr.36	Typical
25	M29	N72B	N73		90	LL3x3x4x0	Beam	Double Angle (...	A36 Gr.36	Typical
26	M30A	N75A	N76B		90	LL3x3x4x0	Beam	Double Angle (...	A36 Gr.36	Typical
27	M31A	N28	N68			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
28	M32A	N68	N27			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
29	M31B	N65	N23			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
30	M32B	N68A	N70			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
31	M33A	N70	N67B			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
32	M34	N71	N44			HSS4x4x4	Beam	None	A500 Gr.B...	DR1
33	M35A	N74	N76			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
34	M36	N76	N73A			L2.5x2.5x4	VBrace	Single Angle	A36 Gr.36	Typical
35	M37	N72	N73B			RIGID	Beam	None	RIGID	DR1
36	M37A	N73C	N74A			RIGID	Beam	None	RIGID	DR1

Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
1	M1						Yes			None
2	M2						Yes			None
3	MP1A						Yes	-z		None
4	MP2A						Yes	-z		None
5	MP3A						Yes	-z		None
6	M6						Yes			None
7	M7						Yes			None
8	M8						Yes			None
9	M9						Yes			None
10	M13						Yes			None
11	MP1C						Yes	-z		None
12	MP2C						Yes	-z		None
13	MP3C						Yes	-z		None
14	M18						Yes			None
15	M19						Yes			None
16	M21						Yes			None
17	M25						Yes			None
18	MP1B						Yes	-z		None
19	MP2B						Yes	-z		None
20	MP3B						Yes	-z		None
21	M30						Yes			None
22	M31						Yes			None
23	M33						Yes			None
24	M35			3	3		Yes			None
25	M29			3	3		Yes			None
26	M30A			3	3		Yes			None
27	M31A	BenPIN	BenPIN				Yes			None

Member Advanced Data (Continued)

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Analysis ...	Inactive	Seismic Design ...
28	M32A	BenPIN	BenPIN				Yes			None
29	M31B						Yes			None
30	M32B	BenPIN	BenPIN				Yes			None
31	M33A	BenPIN	BenPIN				Yes			None
32	M34						Yes			None
33	M35A	BenPIN	BenPIN				Yes			None
34	M36	BenPIN	BenPIN				Yes			None
35	M37						Yes			None
36	M37A						Yes			None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	HSS4x4x4	14			Lbyy						Gravity
2	M2	HSS4x4x4	3.8			Lbyy						Gravity
3	MP1A	PIPE_2.0	7			Lbyy						Gravity
4	MP2A	PIPE_2.0X	7			Lbyy						Lateral
5	MP3A	PIPE_2.0	7			Lbyy						Gravity
6	M6	PIPE_3.5	1.25			Lbyy						Lateral
7	M13	HSS4x4x4	14			Lbyy						Gravity
8	MP1C	PIPE_2.0	7			Lbyy						Lateral
9	MP2C	PIPE_2.0X	7			Lbyy						Lateral
10	MP3C	PIPE_2.0	7			Lbyy						Lateral
11	M18	PIPE_3.5	1.25			Lbyy						Lateral
12	M25	HSS4x4x4	14			Lbyy						Gravity
13	MP1B	PIPE_2.0	7			Lbyy						Lateral
14	MP2B	PIPE_2.0X	7			Lbyy						Lateral
15	MP3B	PIPE_2.0	7			Lbyy						Lateral
16	M30	PIPE_3.5	1.25			Lbyy						Lateral
17	M35	LL3x3x4x0	4.088			Lbyy						Lateral
18	M29	LL3x3x4x0	4.088			Lbyy						Lateral
19	M30A	LL3x3x4x0	4.088			Lbyy						Lateral
20	M31A	L2.5x2.5x4	4.648									Lateral
21	M32A	L2.5x2.5x4	4.648									Lateral
22	M31B	HSS4x4x4	3.8			Lbyy						Gravity
23	M32B	L2.5x2.5x4	4.648									Lateral
24	M33A	L2.5x2.5x4	4.648									Lateral
25	M34	HSS4x4x4	3.8			Lbyy						Gravity
26	M35A	L2.5x2.5x4	4.648									Lateral
27	M36	L2.5x2.5x4	4.648									Lateral

Cold Formed Steel Design Parameters

Label	Shape	Lengt...	Lbyy[ft]	Lbzz[ft]	Lcomp t...	Lcomp ...	L-torque...	Kyy	Kzz	Cm-...	Cm-...	Cb	R	a[ft]	y sw..	z sw...
No Data to Print ...																

Aluminum Design Parameters

Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
No Data to Print ...											

Joint Loads and Enforced Displacements

Joint Label	L,D,M	Direction	Magnitude[(lb,k-ft), (in,rad), (lb*s^2...
No Data to Print ...			

Member Point Loads (BLC 1 : Antenna D)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	Y	-45.75	.25
2	MP3A	Y	-45.75	6
3	MP3B	Y	-45.75	.25
4	MP3B	Y	-45.75	6
5	MP3C	Y	-45.75	.25
6	MP3C	Y	-45.75	6
7	MP1A	Y	-45.2	.25
8	MP1A	Y	-45.2	6
9	MP1B	Y	-45.2	.25
10	MP1B	Y	-45.2	6
11	MP1C	Y	-45.2	.25
12	MP1C	Y	-45.2	6
13	MP2A	Y	-64	.5
14	MP2A	Y	-64	7
15	MP2B	Y	-64	.5
16	MP2B	Y	-64	7
17	MP2C	Y	-64	.5
18	MP2C	Y	-64	7
19	MP1A	Y	-11	2.5
20	MP1B	Y	-11	2.5
21	MP1C	Y	-11	2.5
22	MP2A	Y	-74	3
23	MP2B	Y	-74	3
24	MP2C	Y	-74	3

Member Point Loads (BLC 2 : Antenna Di)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	Y	-84.709	.25
2	MP3A	Y	-84.709	6
3	MP3B	Y	-84.709	.25
4	MP3B	Y	-84.709	6
5	MP3C	Y	-84.709	.25
6	MP3C	Y	-84.709	6
7	MP1A	Y	-84.709	.25
8	MP1A	Y	-84.709	6
9	MP1B	Y	-84.709	.25
10	MP1B	Y	-84.709	6
11	MP1C	Y	-84.709	.25
12	MP1C	Y	-84.709	6
13	MP2A	Y	-215.885	.5
14	MP2A	Y	-215.885	7
15	MP2B	Y	-215.885	.5
16	MP2B	Y	-215.885	7
17	MP2C	Y	-215.885	.5
18	MP2C	Y	-215.885	7
19	MP1A	Y	-16.375	2.5
20	MP1B	Y	-16.375	2.5
21	MP1C	Y	-16.375	2.5
22	MP2A	Y	-67.507	3
23	MP2B	Y	-67.507	3

Member Point Loads (BLC 2 : Antenna Di) (Continued)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
24	MP2C	Y	-67.507	3

Member Point Loads (BLC 3 : Antenna W Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	Z	-106.235	.25
2	MP3A	Z	-106.235	6
3	MP3B	Z	-82.95	.25
4	MP3B	Z	-82.95	6
5	MP3C	Z	-82.95	.25
6	MP3C	Z	-82.95	6
7	MP1A	Z	-106.235	.25
8	MP1A	Z	-106.235	6
9	MP1B	Z	-82.95	.25
10	MP1B	Z	-82.95	6
11	MP1C	Z	-82.95	.25
12	MP1C	Z	-82.95	6
13	MP2A	Z	-353.07	.5
14	MP2A	Z	-353.07	7
15	MP2B	Z	-204.557	.5
16	MP2B	Z	-204.557	7
17	MP2C	Z	-204.557	.5
18	MP2C	Z	-204.557	7
19	MP1A	Z	-7.152	2.5
20	MP1B	Z	-3.823	2.5
21	MP1C	Z	-3.823	2.5
22	MP2A	Z	-34.365	3
23	MP2B	Z	-21.731	3
24	MP2C	Z	-21.731	3

Member Point Loads (BLC 4 : Antenna Wi Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	Z	-33.327	.25
2	MP3A	Z	-33.327	6
3	MP3B	Z	-26.768	.25
4	MP3B	Z	-26.768	6
5	MP3C	Z	-26.768	.25
6	MP3C	Z	-26.768	6
7	MP1A	Z	-33.327	.25
8	MP1A	Z	-33.327	6
9	MP1B	Z	-26.768	.25
10	MP1B	Z	-26.768	6
11	MP1C	Z	-26.768	.25
12	MP1C	Z	-26.768	6
13	MP2A	Z	-102.643	.5
14	MP2A	Z	-102.643	7
15	MP2B	Z	-62.168	.5
16	MP2B	Z	-62.168	7
17	MP2C	Z	-62.168	.5
18	MP2C	Z	-62.168	7
19	MP1A	Z	-2.927	2.5
20	MP1B	Z	-2.046	2.5
21	MP1C	Z	-2.046	2.5
22	MP2A	Z	-10.023	3
23	MP2B	Z	-7.523	3
24	MP2C	Z	-7.523	3

Member Point Loads (BLC 5 : Antenna W Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	X	75.188	.25
2	MP3A	X	75.188	6
3	MP3B	X	98.473	.25
4	MP3B	X	98.473	6
5	MP3C	X	98.473	.25
6	MP3C	X	98.473	6
7	MP1A	X	75.188	.25
8	MP1A	X	75.188	6
9	MP1B	X	98.473	.25
10	MP1B	X	98.473	6
11	MP1C	X	98.473	.25
12	MP1C	X	98.473	6
13	MP2A	X	155.053	.5
14	MP2A	X	155.053	7
15	MP2B	X	303.566	.5
16	MP2B	X	303.566	7
17	MP2C	X	303.566	.5
18	MP2C	X	303.566	7
19	MP1A	X	5.428	2.5
20	MP1B	X	12.085	2.5
21	MP1C	X	12.085	2.5
22	MP2A	X	35.04	3
23	MP2B	X	60.307	3
24	MP2C	X	60.307	3

Member Point Loads (BLC 6 : Antenna Wi Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP3A	X	24.582	.25
2	MP3A	X	24.582	6
3	MP3B	X	31.141	.25
4	MP3B	X	31.141	6
5	MP3C	X	31.141	.25
6	MP3C	X	31.141	6
7	MP1A	X	24.582	.25
8	MP1A	X	24.582	6
9	MP1B	X	31.141	.25
10	MP1B	X	31.141	6
11	MP1C	X	31.141	.25
12	MP1C	X	31.141	6
13	MP2A	X	48.676	.5
14	MP2A	X	48.676	7
15	MP2B	X	89.151	.5
16	MP2B	X	89.151	7
17	MP2C	X	89.151	.5
18	MP2C	X	89.151	7
19	MP1A	X	3.505	2.5
20	MP1B	X	5.266	2.5
21	MP1C	X	5.266	2.5
22	MP2A	X	13.379	3
23	MP2B	X	18.379	3
24	MP2C	X	18.379	3

Member Point Loads (BLC 7 : Service Lm1)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	M1	Y	-500	0

Member Point Loads (BLC 8 : Service Lm2)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	M1	Y	-500	%50

Member Distributed Loads (BLC 10 : Structure Di)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	Y	-15.651	-15.651	0	%100
2	M2	Y	-15.651	-15.651	0	%100
3	MP1A	Y	-8.818	-8.818	0	%100
4	MP2A	Y	-8.818	-8.818	0	%100
5	MP3A	Y	-8.818	-8.818	0	%100
6	M6	Y	-12.292	-12.292	0	%100
7	M13	Y	-15.651	-15.651	0	%100
8	MP1C	Y	-8.818	-8.818	0	%100
9	MP2C	Y	-8.818	-8.818	0	%100
10	MP3C	Y	-8.818	-8.818	0	%100
11	M18	Y	-12.292	-12.292	0	%100
12	M25	Y	-15.651	-15.651	0	%100
13	MP1B	Y	-8.818	-8.818	0	%100
14	MP2B	Y	-8.818	-8.818	0	%100
15	MP3B	Y	-8.818	-8.818	0	%100
16	M30	Y	-12.292	-12.292	0	%100
17	M35	Y	-17.012	-17.012	0	%100
18	M31B	Y	-15.651	-15.651	0	%100
19	M34	Y	-15.651	-15.651	0	%100

Member Distributed Loads (BLC 11 : Structure W Front)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-23.259	-23.259	0	%100
2	M2	PZ	-23.259	-23.259	0	%100
3	MP1A	PZ	-8.286	-8.286	0	%100
4	MP2A	PZ	-8.286	-8.286	0	%100
5	MP3A	PZ	-8.286	-8.286	0	%100
6	M6	PZ	-13.955	-13.955	0	%100
7	M13	PZ	-23.259	-23.259	0	%100
8	MP1C	PZ	-8.286	-8.286	0	%100
9	MP2C	PZ	-8.286	-8.286	0	%100
10	MP3C	PZ	-8.286	-8.286	0	%100
11	M18	PZ	-13.955	-13.955	0	%100
12	M25	PZ	-23.259	-23.259	0	%100
13	MP1B	PZ	-8.286	-8.286	0	%100
14	MP2B	PZ	-8.286	-8.286	0	%100
15	MP3B	PZ	-8.286	-8.286	0	%100
16	M30	PZ	-13.955	-13.955	0	%100
17	M35	PZ	-17.444	-17.444	0	%100
18	M31B	PZ	-23.259	-23.259	0	%100
19	M34	PZ	-23.259	-23.259	0	%100

Member Distributed Loads (BLC 12 : Structure Wi Front)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PZ	-9.424	-9.424	0	%100
2	M2	PZ	-9.424	-9.424	0	%100
3	MP1A	PZ	-5.446	-5.446	0	%100
4	MP2A	PZ	-5.446	-5.446	0	%100
5	MP3A	PZ	-5.446	-5.446	0	%100
6	M6	PZ	-6.952	-6.952	0	%100

Member Distributed Loads (BLC 12 : Structure Wi Front) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
7	M13	PZ	-9.424	-9.424	0	%100
8	MP1C	PZ	-5.446	-5.446	0	%100
9	MP2C	PZ	-5.446	-5.446	0	%100
10	MP3C	PZ	-5.446	-5.446	0	%100
11	M18	PZ	-6.952	-6.952	0	%100
12	M25	PZ	-9.424	-9.424	0	%100
13	MP1B	PZ	-5.446	-5.446	0	%100
14	MP2B	PZ	-5.446	-5.446	0	%100
15	MP3B	PZ	-5.446	-5.446	0	%100
16	M30	PZ	-6.952	-6.952	0	%100
17	M35	PZ	-7.879	-7.879	0	%100
18	M31B	PZ	-9.424	-9.424	0	%100
19	M34	PZ	-9.424	-9.424	0	%100

Member Distributed Loads (BLC 13 : Structure W Side)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	23.259	23.259	0	%100
2	M2	PX	23.259	23.259	0	%100
3	MP1A	PX	8.286	8.286	0	%100
4	MP2A	PX	8.286	8.286	0	%100
5	MP3A	PX	8.286	8.286	0	%100
6	M6	PX	13.955	13.955	0	%100
7	M13	PX	23.259	23.259	0	%100
8	MP1C	PX	8.286	8.286	0	%100
9	MP2C	PX	8.286	8.286	0	%100
10	MP3C	PX	8.286	8.286	0	%100
11	M18	PX	13.955	13.955	0	%100
12	M25	PX	23.259	23.259	0	%100
13	MP1B	PX	8.286	8.286	0	%100
14	MP2B	PX	8.286	8.286	0	%100
15	MP3B	PX	8.286	8.286	0	%100
16	M30	PX	13.955	13.955	0	%100
17	M35	PX	17.444	17.444	0	%100
18	M31B	PX	23.259	23.259	0	%100
19	M34	PX	23.259	23.259	0	%100

Member Distributed Loads (BLC 14 : Structure Wi Side)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
1	M1	PX	9.424	9.424	0	%100
2	M2	PX	9.424	9.424	0	%100
3	MP1A	PX	5.446	5.446	0	%100
4	MP2A	PX	5.446	5.446	0	%100
5	MP3A	PX	5.446	5.446	0	%100
6	M6	PX	6.952	6.952	0	%100
7	M13	PX	9.424	9.424	0	%100
8	MP1C	PX	5.446	5.446	0	%100
9	MP2C	PX	5.446	5.446	0	%100
10	MP3C	PX	5.446	5.446	0	%100
11	M18	PX	6.952	6.952	0	%100
12	M25	PX	9.424	9.424	0	%100
13	MP1B	PX	5.446	5.446	0	%100
14	MP2B	PX	5.446	5.446	0	%100
15	MP3B	PX	5.446	5.446	0	%100
16	M30	PX	6.952	6.952	0	%100
17	M35	PX	7.879	7.879	0	%100
18	M31B	PX	9.424	9.424	0	%100

Member Distributed Loads (BLC 14 : Structure Wi Side) (Continued)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magnitude[lb/ft,...	Start Location[ft,%]	End Location[ft,%]
19	M34	PX	9.424	9.424	0	%100

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[ksf]
No Data to Print ...						

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	CENTER						
3	N68						
4	N65	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N70						
6	N71	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
7	N76						

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	N1	max	1216.388	4	2386.829	6	2822.545	1	-1.811	1	.251	3	.325	3
2		min	-1216.244	3	747.389	1	-2822.704	2	-8.204	6	-.251	4	-1.291	9
3	N65	max	2637.135	4	2276.208	7	1945.441	1	3.903	5	1.54	3	6.648	7
4		min	-2638.066	3	536.819	9	-1945.154	2	1.029	9	-1.541	4	1.524	4
5	N71	max	2814.448	4	2336.398	8	1816.831	1	3.741	5	1.639	3	-1.554	3
6		min	-2813.66	3	751.992	3	-1816.96	2	.964	2	-1.637	4	-6.976	8
7	Totals:	max	6667.97	4	6869.215	6	6584.818	1						
8		min	-6667.97	3	2807.309	1	-6584.818	2						

Envelope Member Section Forces

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
1	M1	1	max	0	1	0	1	0	1	0	1	0	1	0	1
2			min	0	1	-750	9	0	1	0	1	0	1	0	1
3		2	max	443.367	2	-140.548	1	711.695	2	.862	9	.858	2	2.263	9
4			min	-443.393	1	-636.678	6	-710.683	1	-.631	5	-.858	1	.49	1
5		3	max	1473.73	2	1464.073	6	685.903	1	.863	9	.252	4	4.426	6
6			min	-1473.329	1	453.354	1	-685.745	2	-.63	5	-.252	3	1.15	1
7		4	max	357.855	2	505.953	6	618.45	4	.857	9	.816	2	1.809	6
8			min	-357.819	1	105.283	1	-617.39	3	.056	2	-.816	1	.44	1
9		5	max	0	1	0	1	0	1	0	1	0	1	0	1
10			min	0	1	0	1	0	1	0	1	0	1	0	1
11	M2	1	max	2822.545	1	2386.337	6	1216.239	3	.325	3	.251	3	8.204	6
12			min	-2822.704	2	747.9	1	-1216.392	4	-1.291	9	-.251	4	1.811	1
13		2	max	336.842	1	2329.204	6	222.059	4	.324	3	.408	3	5.971	6
14			min	-335.484	2	715.898	1	-222.214	3	-1.289	9	-.408	4	1.121	1
15		3	max	336.842	1	2300.276	6	257.412	4	.324	3	.18	3	3.772	6
16			min	-335.484	2	701.838	1	-257.567	3	-1.289	9	-.18	4	.447	1
17		4	max	336.842	1	2271.348	6	292.766	4	.324	3	.148	2	1.6	6
18			min	-335.484	2	687.778	1	-292.921	3	-1.289	9	-.148	1	-.213	1
19		5	max	308.931	1	2214.289	6	356.03	4	.324	3	.383	4	.31	2
20			min	-307.573	2	660.926	1	-356.185	3	-1.289	9	-.383	3	-.857	1
21	MP1A	1	max	0	1	.179	4	.35	1	0	7	0	1	0	1
22			min	0	1	-1.074	7	-1.108	6	0	4	0	1	0	1

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
23		2	max	161.67	6	143.68	4	193.527	1	0	7	.276	1	.202	3
24			min	61.529	1	-143.955	3	-193.775	2	0	4	-.276	2	-.201	4
25		3	max	213.965	6	175.565	4	228.171	1	0	7	.646	1	.482	3
26			min	82.017	1	-175.84	3	-228.419	2	0	4	-.647	2	-.481	4
27		4	max	-61.528	2	143.614	3	193.319	2	0	9	.148	1	.111	3
28			min	-161.669	5	-143.396	4	-193.123	1	0	6	-.148	2	-.11	4
29		5	max	0	6	.724	6	.692	6	0	9	0	6	0	3
30			min	0	9	.021	9	.054	1	0	6	0	9	0	4
31	MP2A	1	max	0	1	.891	4	1.772	1	0	7	0	1	0	1
32			min	0	1	-1.085	7	-3.31	6	0	4	0	1	0	1
33		2	max	318.121	7	272.177	4	589.886	1	0	7	.73	1	.332	3
34			min	86.804	2	-272.345	3	-590.522	2	0	4	-.731	2	-.332	4
35		3	max	499.863	7	351.441	4	668.071	1	0	7	1.81	1	.857	3
36			min	185.608	2	-351.609	3	-668.706	2	0	4	-1.812	2	-.857	4
37		4	max	-86.804	1	270.957	3	587.5	2	.025	4	.999	1	.454	3
38			min	-318.122	6	-270.806	4	-586.942	1	-.025	3	-1.015	2	-.454	4
39		5	max	-76.8	1	247.756	3	564.299	2	.025	4	-.008	1	0	3
40			min	-292.686	6	-247.605	4	-563.741	1	-.025	3	-.029	6	0	4
41	MP3A	1	max	0	1	.941	8	.3	1	0	3	0	1	0	1
42			min	0	1	-.152	3	-.829	6	0	8	0	1	0	1
43		2	max	162.33	7	143.875	4	193.477	1	0	3	.276	1	.201	3
44			min	62.189	10	-143.653	3	-193.651	2	0	8	-.276	2	-.201	4
45		3	max	185.05	7	167.076	4	216.678	1	0	3	.635	1	.473	3
46			min	69.477	10	-166.853	3	-216.852	2	0	8	-.635	2	-.473	4
47		4	max	-62.187	9	143.397	3	193.291	2	0	6	.148	1	.11	3
48			min	-162.329	5	-143.606	4	-193.127	1	0	1	-.148	2	-.111	4
49		5	max	.001	9	-.07	1	.573	6	0	6	0	9	0	3
50			min	0	1	-.74	6	.05	1	0	1	0	1	0	4
51	M6	1	max	0	1	.015	9	.065	6	0	1	0	1	0	1
52			min	0	1	-.004	3	.004	1	0	1	0	1	0	1
53		2	max	-3.19	2	6.98	4	6.996	2	0	1	.001	2	.001	3
54			min	-7.031	6	-6.981	3	-6.974	1	0	1	-.001	1	-.001	4
55		3	max	-6.38	2	13.959	3	13.951	1	0	1	.004	2	.004	3
56			min	-14.063	6	-13.958	4	-13.973	2	0	1	-.004	1	-.004	4
57		4	max	7.031	6	6.981	3	6.974	1	0	1	.001	2	.001	3
58			min	3.19	2	-6.98	4	-6.996	2	0	1	-.001	1	-.001	4
59		5	max	0	1	.004	3	-.004	1	0	1	0	1	0	1
60			min	0	1	-.015	9	-.065	6	0	1	0	1	0	1
61	M7	1	max	432.755	1	370.678	5	333.404	3	.258	3	.142	4	.404	2
62			min	-432.755	2	136.429	2	-333.404	4	-.258	4	-.142	3	-.286	1
63		2	max	432.755	1	370.678	5	333.404	3	.258	3	.115	4	.393	2
64			min	-432.755	2	136.429	2	-333.404	4	-.258	4	-.115	3	-.297	1
65		3	max	432.755	1	370.678	5	333.404	3	.258	3	.088	4	.382	2
66			min	-432.755	2	136.429	2	-333.404	4	-.258	4	-.088	3	-.309	1
67		4	max	432.755	1	370.678	5	333.404	3	.258	3	.06	4	.37	2
68			min	-432.755	2	136.429	2	-333.404	4	-.258	4	-.06	3	-.32	1
69		5	max	432.755	1	370.678	5	333.404	3	.258	3	.033	4	.359	2
70			min	-432.755	2	136.429	2	-333.404	4	-.258	4	-.033	3	-.331	1
71	M8	1	max	1277.612	1	845.459	5	645.036	3	.232	3	.251	4	.506	2
72			min	-1277.612	2	274.738	2	-645.036	4	-.232	4	-.251	3	-.281	1
73		2	max	1277.612	1	845.459	5	645.036	3	.232	3	.198	4	.483	2
74			min	-1277.612	2	274.738	2	-645.036	4	-.232	4	-.198	3	-.304	1
75		3	max	1277.612	1	845.459	5	645.036	3	.232	3	.145	4	.461	2
76			min	-1277.612	2	274.738	2	-645.036	4	-.232	4	-.145	3	-.328	1
77		4	max	1277.612	1	845.459	5	645.036	3	.232	3	.092	4	.438	2
78			min	-1277.612	2	274.738	2	-645.036	4	-.232	4	-.092	3	-.351	1
79		5	max	1277.612	1	845.459	5	645.036	3	.232	3	.039	4	.416	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
80			min	-1277.612	2	274.738	2	-645.036	4	-.232	4	-.039	3	-.374	1
81	M9	1	max	444.199	1	399.076	5	342.088	3	.271	3	.146	4	.426	2
82			min	-444.199	2	147.849	2	-342.088	4	-.271	4	-.146	3	-.298	1
83		2	max	444.199	1	399.076	5	342.088	3	.271	3	.118	4	.414	2
84			min	-444.199	2	147.849	2	-342.088	4	-.271	4	-.118	3	-.311	1
85		3	max	444.199	1	399.076	5	342.088	3	.271	3	.09	4	.402	2
86			min	-444.199	2	147.849	2	-342.088	4	-.271	4	-.09	3	-.323	1
87		4	max	444.199	1	399.076	5	342.088	3	.271	3	.062	4	.39	2
88			min	-444.199	2	147.849	2	-342.088	4	-.271	4	-.062	3	-.335	1
89		5	max	444.199	1	399.076	5	342.088	3	.271	3	.034	4	.378	2
90			min	-444.199	2	147.849	2	-342.088	4	-.271	4	-.034	3	-.348	1
91	M13	1	max	0	1	.02	3	.002	1	0	1	0	1	0	1
92			min	0	1	-.008	1	-.006	4	0	1	0	1	0	1
93		2	max	570.802	1	-22.294	9	933.583	3	-.149	3	1.156	3	1.885	7
94			min	-570.617	2	-564.955	5	-933.623	4	-.635	8	-1.158	4	.4	4
95		3	max	1745.204	3	1436.35	7	642.916	4	.465	4	.109	2	4.115	5
96			min	-1743.214	4	359.583	9	-643.958	3	-.634	8	-.109	1	.77	9
97		4	max	582.519	3	476.877	7	888.752	2	.387	6	.931	1	1.703	5
98			min	-582.207	4	14.388	9	-888.9	1	-.074	9	-.933	2	.373	2
99		5	max	0	1	.008	3	.004	2	0	1	0	1	0	1
100			min	0	1	-.014	1	-.005	3	0	1	0	1	0	1
101	MP1C	1	max	0	1	.457	4	1.357	5	0	7	0	1	0	1
102			min	0	1	-.526	7	-.262	2	0	4	0	1	0	1
103		2	max	161.67	6	181.215	4	156.52	1	0	7	.22	1	.258	3
104			min	61.529	9	-181.28	3	-156.182	2	0	4	-.22	2	-.257	4
105		3	max	213.965	6	223.752	4	185.838	1	0	7	.521	1	.614	3
106			min	82.017	9	-223.817	3	-185.5	2	0	4	-.52	2	-.614	4
107		4	max	-61.528	1	180.781	3	155.794	2	0	2	.12	1	.139	3
108			min	-161.668	6	-180.73	4	-156.061	1	0	5	-.12	2	-.138	4
109		5	max	.002	5	.198	5	-.086	4	0	2	0	1	0	4
110			min	0	2	.012	2	-.904	7	0	5	0	5	0	3
111	MP2C	1	max	0	1	1.595	4	2.152	5	0	7	0	1	0	1
112			min	0	1	-2.479	7	-1.031	2	0	4	0	1	0	1
113		2	max	318.121	5	510.501	4	351.954	1	0	7	.432	1	.631	3
114			min	86.804	10	-510.944	3	-351.523	2	0	4	-.431	2	-.63	4
115		3	max	499.863	5	630.194	4	409.925	1	0	7	1.086	1	1.594	3
116			min	185.608	10	-630.636	3	-409.493	2	0	4	-1.084	2	-1.592	4
117		4	max	-86.804	4	508.327	3	349.764	2	.048	4	.585	1	.869	3
118			min	-318.122	7	-507.928	4	-350.167	1	-.048	3	-.599	2	-.869	4
119		5	max	-76.8	4	485.127	3	326.563	2	.048	4	-.008	4	0	4
120			min	-292.686	7	-484.728	4	-326.966	1	-.048	3	-.029	7	0	3
121	MP3C	1	max	0	1	.311	4	.272	1	0	7	0	1	0	1
122			min	0	1	-1.079	7	-.572	6	0	4	0	1	0	1
123		2	max	162.33	8	181.069	4	156.192	1	0	7	.22	1	.258	3
124			min	62.189	2	-181.317	3	-156.306	2	0	4	-.22	2	-.257	4
125		3	max	185.05	8	204.27	4	179.393	1	0	7	.513	1	.595	3
126			min	69.477	2	-204.518	3	-179.507	2	0	4	-.514	2	-.594	4
127		4	max	-62.188	3	180.896	3	155.948	2	0	9	.12	1	.139	3
128			min	-162.328	8	-180.663	4	-155.841	1	0	5	-.12	2	-.138	4
129		5	max	.002	7	.772	5	.359	5	0	9	0	1	0	4
130			min	0	4	.066	9	.017	9	0	5	0	7	0	3
131	M18	1	max	0	1	-.003	4	-.002	2	0	1	0	1	0	1
132			min	0	1	-.051	7	-.032	5	0	1	0	1	0	1
133		2	max	-3.19	3	6.975	4	6.976	2	0	1	.001	2	.001	3
134			min	-7.031	5	-6.993	3	-6.987	1	0	1	-.001	1	-.001	4
135		3	max	-6.38	3	13.97	3	13.965	1	0	1	.004	2	.004	3
136			min	-14.063	5	-13.953	4	-13.954	2	0	1	-.004	1	-.004	4

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
137		4	max	7.031	5	6.993	3	6.987	1	0	1	.001	2	.001	3
138			min	3.19	3	-6.975	4	-6.976	2	0	1	-.001	1	-.001	4
139		5	max	0	1	.051	7	.032	5	0	1	0	1	0	1
140			min	0	1	.003	4	.002	2	0	1	0	1	0	1
141	M19	1	max	353.268	4	370.512	8	310.149	1	.23	1	.102	2	.319	3
142			min	-353.267	3	137.124	3	-310.344	2	-.255	2	-.102	1	-.242	4
143		2	max	353.268	4	370.512	8	310.149	1	.23	1	.076	2	.307	3
144			min	-353.267	3	137.124	3	-310.344	2	-.255	2	-.076	1	-.253	4
145		3	max	353.268	4	370.512	8	310.149	1	.23	1	.051	2	.296	3
146			min	-353.267	3	137.124	3	-310.344	2	-.255	2	-.051	1	-.264	4
147		4	max	353.268	4	370.512	8	310.149	1	.23	1	.025	2	.285	3
148			min	-353.267	3	137.124	3	-310.344	2	-.255	2	-.025	1	-.276	4
149		5	max	353.268	4	370.512	8	310.149	1	.23	1	.04	4	.274	3
150			min	-353.267	3	137.124	3	-310.344	2	-.255	2	-.04	3	-.287	4
151	M21	1	max	370.015	4	398.904	8	315.794	1	.238	1	.103	2	.347	3
152			min	-370.014	3	148.674	3	-315.296	2	-.263	2	-.104	1	-.264	4
153		2	max	370.015	4	398.904	8	315.794	1	.238	1	.078	2	.335	3
154			min	-370.014	3	148.674	3	-315.296	2	-.263	2	-.078	1	-.276	4
155		3	max	370.015	4	398.904	8	315.794	1	.238	1	.052	2	.323	3
156			min	-370.014	3	148.674	3	-315.296	2	-.263	2	-.052	1	-.288	4
157		4	max	370.015	4	398.904	8	315.794	1	.238	1	.026	2	.311	3
158			min	-370.014	3	148.674	3	-315.296	2	-.263	2	-.026	1	-.301	4
159		5	max	370.015	4	398.904	8	315.794	1	.238	1	.042	4	.299	3
160			min	-370.014	3	148.674	3	-315.296	2	-.263	2	-.042	3	-.313	4
161	M25	1	max	0	1	.02	1	.008	4	0	1	0	1	0	1
162			min	0	1	-.011	4	-.006	2	0	1	0	1	0	1
163		2	max	681.621	4	-105.322	3	885.194	1	-.171	4	.89	1	1.878	5
164			min	-681.076	3	-607.567	8	-885.083	2	-.676	7	-.892	2	.408	2
165		3	max	1259.648	4	1457.776	5	363.11	2	.517	3	.257	3	4.43	8
166			min	-1257.27	3	435.147	2	-364.106	1	-.676	7	-.257	4	1.114	3
167		4	max	508.641	1	620.817	9	854.711	3	.5	9	1.194	4	1.799	8
168			min	-508.694	2	90.117	2	-854.394	4	.04	4	-1.196	3	.346	3
169		5	max	0	1	.006	5	.004	3	0	1	0	1	0	1
170			min	0	1	-.014	4	0	1	0	1	0	1	0	1
171	MP1B	1	max	0	1	1.469	8	.329	1	0	3	0	1	0	1
172			min	0	1	-.373	3	-.668	6	0	8	0	1	0	1
173		2	max	161.67	7	181.466	4	156.249	1	0	3	.22	1	.257	3
174			min	61.529	2	-181.131	3	-156.375	2	0	8	-.22	2	-.258	4
175		3	max	213.965	7	224.003	4	185.567	1	0	3	.52	1	.614	3
176			min	82.017	2	-223.668	3	-185.693	2	0	8	-.52	2	-.615	4
177		4	max	-61.527	9	180.663	3	155.946	2	0	8	.12	1	.138	3
178			min	-161.668	7	-180.928	4	-155.847	1	0	3	-.12	2	-.139	4
179		5	max	.002	9	-.095	3	.359	5	0	8	0	1	0	4
180			min	0	3	-.941	8	.026	2	0	3	0	9	0	3
181	MP2B	1	max	0	1	3.136	8	1.297	1	0	3	0	1	0	1
182			min	0	1	-1.543	3	-1.149	2	0	8	0	1	0	1
183		2	max	318.121	5	511.057	4	351.789	1	0	3	.432	1	.63	3
184			min	86.804	4	-510.449	3	-351.641	2	0	8	-.431	2	-.631	4
185		3	max	499.863	5	630.75	4	409.759	1	0	3	1.085	1	1.592	3
186			min	185.608	4	-630.141	3	-409.612	2	0	8	-1.084	2	-1.594	4
187		4	max	-86.804	3	507.881	3	349.87	2	.048	4	.585	1	.868	3
188			min	-318.122	8	-508.429	4	-350.018	1	-.048	3	-.6	2	-.869	4
189		5	max	-76.8	3	484.681	3	326.67	2	.048	4	-.008	3	0	4
190			min	-292.686	8	-485.228	4	-326.817	1	-.048	3	-.029	8	0	3
191	MP3B	1	max	0	1	.417	4	1.07	5	0	3	0	1	0	1
192			min	0	1	-.386	3	-.226	2	0	4	0	1	0	1
193		2	max	162.33	8	181.175	4	156.407	1	0	3	.22	1	.257	3

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
194			min	62.189	4	-181.144	3	-156.146	2	0	4	-.22	2	-.257	4
195		3	max	185.05	8	204.376	4	179.608	1	0	3	.514	1	.595	3
196			min	69.478	4	-204.344	3	-179.347	2	0	4	-.513	2	-.595	4
197		4	max	-62.188	1	180.733	3	155.798	2	0	7	.12	1	.138	3
198			min	-162.328	6	-180.762	4	-156.043	1	0	4	-.12	2	-.138	4
199		5	max	.001	5	-.004	4	-.047	9	0	7	0	1	0	4
200			min	0	2	-.114	7	-.813	8	0	4	0	5	0	3
201	M30	1	max	0	1	.056	8	.003	9	0	1	0	1	0	1
202			min	0	1	.003	3	-.026	5	0	1	0	1	0	1
203		2	max	-3.19	4	6.993	4	6.977	2	0	1	.001	2	.001	3
204			min	-7.031	5	-6.975	3	-6.986	1	0	1	-.001	1	-.001	4
205		3	max	-6.38	4	13.952	3	13.964	1	0	1	.004	2	.004	3
206			min	-14.063	5	-13.971	4	-13.955	2	0	1	-.004	1	-.004	4
207		4	max	7.031	5	6.975	3	6.986	1	0	1	.001	2	.001	3
208			min	3.19	4	-6.993	4	-6.977	2	0	1	-.001	1	-.001	4
209		5	max	0	1	-.003	3	.026	5	0	1	0	1	0	1
210			min	0	1	-.056	8	-.003	9	0	1	0	1	0	1
211	M31	1	max	353.262	3	370.514	7	310	2	.254	2	.102	1	.319	4
212			min	-353.272	4	137.136	4	-310.492	1	-.231	1	-.102	2	-.242	3
213		2	max	353.262	3	370.514	7	310	2	.254	2	.076	1	.307	4
214			min	-353.272	4	137.136	4	-310.492	1	-.231	1	-.076	2	-.253	3
215		3	max	353.262	3	370.514	7	310	2	.254	2	.051	1	.296	4
216			min	-353.272	4	137.136	4	-310.492	1	-.231	1	-.051	2	-.264	3
217		4	max	353.262	3	370.514	7	310	2	.254	2	.025	1	.285	4
218			min	-353.272	4	137.136	4	-310.492	1	-.231	1	-.025	2	-.276	3
219		5	max	353.262	3	370.514	7	310	2	.254	2	.04	4	.274	4
220			min	-353.272	4	137.136	4	-310.492	1	-.231	1	-.04	3	-.287	3
221	M33	1	max	370.014	3	398.912	7	315.606	2	.264	2	.104	1	.347	4
222			min	-370.013	4	148.548	4	-315.483	1	-.237	1	-.104	2	-.264	3
223		2	max	370.014	3	398.912	7	315.606	2	.264	2	.078	1	.335	4
224			min	-370.013	4	148.548	4	-315.483	1	-.237	1	-.078	2	-.276	3
225		3	max	370.014	3	398.912	7	315.606	2	.264	2	.052	1	.323	4
226			min	-370.013	4	148.548	4	-315.483	1	-.237	1	-.052	2	-.288	3
227		4	max	370.014	3	398.912	7	315.606	2	.264	2	.026	1	.311	4
228			min	-370.013	4	148.548	4	-315.483	1	-.237	1	-.026	2	-.301	3
229		5	max	370.014	3	398.912	7	315.606	2	.264	2	.042	4	.299	4
230			min	-370.013	4	148.548	4	-315.483	1	-.237	1	-.042	3	-.313	3
231	M35	1	max	466.649	4	309.837	1	375.392	9	.003	1	.909	6	.739	1
232			min	-467.307	3	-309.938	2	-159.22	6	-.01	9	-.878	9	-.739	2
233		2	max	477.49	4	316.096	1	385.94	9	.003	1	.777	6	.458	1
234			min	-478.148	3	-316.197	2	-141.918	2	-.01	9	-.537	9	-.458	2
235		3	max	488.331	4	322.355	1	396.489	9	.003	1	.682	8	.248	3
236			min	-488.989	3	-322.456	2	-131.369	2	-.01	9	-.186	9	-.248	4
237		4	max	499.172	4	328.614	1	407.038	9	.003	1	.629	8	.372	3
238			min	-499.83	3	-328.715	2	-120.82	2	-.01	9	.066	3	-.372	4
239		5	max	510.013	4	334.873	1	417.587	9	.003	1	.599	8	.48	3
240			min	-510.671	3	-334.974	2	-110.272	2	-.01	9	.009	3	-.479	4
241	M29	1	max	635.129	3	324.379	2	168.514	9	.004	2	.86	7	.496	4
242			min	-635.699	4	-324.448	1	-139.132	1	-.003	1	.111	4	-.496	3
243		2	max	635.129	3	324.379	2	179.063	9	.004	2	.795	7	.375	4
244			min	-635.699	4	-324.448	1	-128.583	1	-.003	1	.129	4	-.375	3
245		3	max	635.129	3	324.379	2	189.612	9	.004	2	.739	6	.254	4
246			min	-635.699	4	-324.448	1	-118.034	1	-.003	1	.151	1	-.253	3
247		4	max	635.129	3	324.379	2	200.16	9	.004	2	.786	9	.417	1
248			min	-635.699	4	-324.448	1	-107.486	1	-.003	1	.05	1	-.417	2
249		5	max	635.129	3	324.379	2	210.709	9	.004	2	.97	9	.708	1
250			min	-635.699	4	-324.448	1	-96.937	1	-.003	1	-.042	1	-.708	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
251	M30A	1	max	778.048	1	423.356	3	84.053	3	.004	3	.902	8	.78	3
252			min	-777.957	2	-423.416	4	-230.499	9	-.003	4	.107	3	-.781	4
253		2	max	778.048	1	423.356	3	94.602	3	.004	3	.794	5	.4	3
254			min	-777.957	2	-423.416	4	-219.95	9	-.003	4	.18	2	-.401	4
255		3	max	778.048	1	423.356	3	105.151	3	.004	3	.718	5	.274	2
256			min	-777.957	2	-423.416	4	-209.402	9	-.003	4	.156	2	-.273	1
257		4	max	778.048	1	423.356	3	115.7	3	.004	3	.661	7	.359	4
258			min	-777.957	2	-423.416	4	-198.853	9	-.003	4	.092	4	-.359	3
259		5	max	778.048	1	423.356	3	126.249	3	.004	3	.63	7	.738	4
260			min	-777.957	2	-423.416	4	-188.304	9	-.003	4	-.031	4	-.739	3
261	M31A	1	max	1658.861	1	13.174	11	0	4	0	1	0	1	0	1
262			min	-1659.968	2	11.292	4	0	2	-.001	9	0	1	0	1
263		2	max	1658.861	1	6.587	11	0	4	0	1	.008	11	-.007	4
264			min	-1659.968	2	5.646	4	0	2	-.001	9	.007	2	-.008	11
265		3	max	1658.861	1	0	1	0	1	0	1	.011	11	-.009	4
266			min	-1659.968	2	0	1	0	1	-.001	9	.009	2	-.011	11
267		4	max	1658.861	1	-5.646	6	0	4	0	1	.008	11	-.007	4
268			min	-1659.968	2	-6.587	11	0	2	-.001	9	.007	2	-.008	11
269		5	max	1658.861	1	-11.292	6	0	4	0	1	0	1	0	1
270			min	-1659.968	2	-13.174	11	0	2	-.001	9	0	1	0	1
271	M32A	1	max	1595.731	1	13.174	11	0	4	0	10	0	1	0	1
272			min	-1596.256	2	11.292	9	0	3	-.001	9	0	1	0	1
273		2	max	1595.731	1	6.587	11	0	4	0	10	.008	11	-.007	4
274			min	-1596.256	2	5.646	9	0	3	-.001	9	.007	3	-.008	11
275		3	max	1595.731	1	0	1	0	1	0	10	.011	11	-.009	4
276			min	-1596.256	2	0	1	0	1	-.001	9	.009	3	-.011	11
277		4	max	1595.731	1	-5.646	1	0	4	0	10	.008	11	-.007	4
278			min	-1596.256	2	-6.587	11	0	3	-.001	9	.007	3	-.008	11
279		5	max	1595.731	1	-11.292	1	0	4	0	10	0	1	0	1
280			min	-1596.256	2	-13.174	11	0	3	-.001	9	0	1	0	1
281	M31B	1	max	2381.234	4	2275.813	7	1474.499	1	.259	1	1.54	3	7.702	7
282			min	-2381.758	3	536.796	9	-1474.69	2	-.209	2	-1.541	4	1.856	9
283		2	max	237.635	4	2219.887	7	392.717	4	.259	1	.976	3	5.572	7
284			min	-236.863	3	499.851	9	-392.437	3	-.209	2	-.976	4	1.174	4
285		3	max	222.326	4	2190.959	7	383.878	4	.259	1	.607	3	3.477	7
286			min	-221.554	3	485.791	9	-383.598	3	-.209	2	-.607	4	.502	4
287		4	max	207.018	4	2162.031	7	375.04	4	.259	1	.247	3	1.41	7
288			min	-206.245	3	471.731	9	-374.76	3	-.209	2	-.247	4	-.157	4
289		5	max	167.538	4	2105.06	7	352.257	4	.259	1	.102	4	.172	3
290			min	-166.766	3	444.922	9	-351.955	3	-.209	2	-.102	3	-.843	8
291	M32B	1	max	1862.034	2	13.174	11	0	3	0	4	0	1	0	1
292			min	-1861.999	1	11.292	8	0	4	0	3	0	1	0	1
293		2	max	1862.034	2	6.587	11	0	3	0	4	.008	11	-.007	3
294			min	-1861.999	1	5.646	8	0	4	0	3	.007	4	-.008	11
295		3	max	1862.034	2	0	1	0	1	0	4	.011	11	-.009	3
296			min	-1861.999	1	0	1	0	1	0	3	.009	4	-.011	11
297		4	max	1862.034	2	-5.646	3	0	3	0	4	.008	11	-.007	3
298			min	-1861.999	1	-6.587	11	0	4	0	3	.007	4	-.008	11
299		5	max	1862.034	2	-11.292	3	0	3	0	4	0	1	0	1
300			min	-1861.999	1	-13.174	11	0	4	0	3	0	1	0	1
301	M33A	1	max	1974.409	4	13.174	11	0	3	0	1	0	1	0	1
302			min	-1973.187	3	11.292	7	0	1	0	2	0	1	0	1
303		2	max	1974.409	4	6.587	11	0	3	0	1	.008	11	-.007	6
304			min	-1973.187	3	5.646	7	0	1	0	2	.007	1	-.008	11
305		3	max	1974.409	4	0	1	0	1	0	1	.011	11	-.009	6
306			min	-1973.187	3	0	1	0	1	0	2	.009	1	-.011	11
307		4	max	1974.409	4	-5.646	4	0	3	0	1	.008	11	-.007	6

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
308			min	-1973.187	3	-6.587	11	0	1	0	2	.007	1	-.008	11
309		5	max	1974.409	4	-11.292	4	0	3	0	1	0	1	0	1
310			min	-1973.187	3	-13.174	11	0	1	0	2	0	1	0	1
311	M34	1	max	2473.764	3	2335.978	8	1406.39	2	1.048	9	1.639	3	7.905	8
312			min	-2474.02	4	752.448	3	-1405.945	1	-.181	1	-1.637	4	1.851	3
313		2	max	237.011	3	2279.553	8	497.583	4	1.046	9	.952	3	5.72	8
314			min	-235.461	4	719.537	3	-497.919	3	-.18	1	-.951	4	1.157	3
315		3	max	221.703	3	2250.625	8	488.745	4	1.046	9	.483	3	3.568	8
316			min	-220.153	4	705.477	3	-489.081	3	-.18	1	-.483	4	.48	3
317		4	max	206.394	3	2221.697	8	479.906	4	1.046	9	.167	1	1.443	8
318			min	-204.844	4	691.417	3	-480.242	3	-.18	1	-.167	2	-.183	3
319		5	max	166.914	3	2164.73	8	457.136	4	1.046	9	.426	4	.212	4
320			min	-165.364	4	664.538	3	-457.426	3	-.18	1	-.426	3	-1.073	9
321	M35A	1	max	2103.159	3	13.174	11	0	3	.002	9	0	1	0	1
322			min	-2102.601	4	11.292	3	0	8	0	1	0	1	0	1
323		2	max	2103.159	3	6.587	11	0	3	.002	9	.008	11	-.007	3
324			min	-2102.601	4	5.646	3	0	8	0	1	.007	1	-.008	11
325		3	max	2103.159	3	0	1	0	1	.002	9	.011	11	-.009	3
326			min	-2102.601	4	0	1	0	1	0	1	.009	1	-.011	11
327		4	max	2103.159	3	-5.646	8	0	3	.002	9	.008	11	-.007	3
328			min	-2102.601	4	-6.587	11	0	8	0	1	.007	1	-.008	11
329		5	max	2103.159	3	-11.292	8	0	3	.002	9	0	1	0	1
330			min	-2102.601	4	-13.174	11	0	8	0	1	0	1	0	1
331	M36	1	max	1795.085	2	13.174	11	0	3	0	4	0	1	0	1
332			min	-1794.567	1	11.292	4	0	4	0	3	0	1	0	1
333		2	max	1795.085	2	6.587	11	0	3	0	4	.008	11	-.007	3
334			min	-1794.567	1	5.646	4	0	4	0	3	.007	4	-.008	11
335		3	max	1795.085	2	0	1	0	1	0	4	.011	11	-.009	3
336			min	-1794.567	1	0	1	0	1	0	3	.009	4	-.011	11
337		4	max	1795.085	2	-5.646	7	0	3	0	4	.008	11	-.007	3
338			min	-1794.567	1	-6.587	11	0	4	0	3	.007	4	-.008	11
339		5	max	1795.085	2	-11.292	7	0	3	0	4	0	1	0	1
340			min	-1794.567	1	-13.174	11	0	4	0	3	0	1	0	1
341	M37	1	max	1005.202	3	844.975	7	677.585	2	.235	2	.222	1	.423	4
342			min	-1005.202	4	276.836	4	-677.149	1	-.2	1	-.222	2	-.259	3
343		2	max	1005.202	3	844.975	7	677.585	2	.235	2	.167	1	.401	4
344			min	-1005.202	4	276.836	4	-677.149	1	-.2	1	-.167	2	-.283	3
345		3	max	1005.202	3	844.975	7	677.585	2	.235	2	.111	1	.378	4
346			min	-1005.202	4	276.836	4	-677.149	1	-.2	1	-.111	2	-.306	3
347		4	max	1005.202	3	844.975	7	677.585	2	.235	2	.056	1	.355	4
348			min	-1005.202	4	276.836	4	-677.149	1	-.2	1	-.056	2	-.329	3
349		5	max	1005.202	3	844.975	7	677.585	2	.235	2	.067	4	.333	4
350			min	-1005.202	4	276.836	4	-677.149	1	-.2	1	-.067	3	-.352	3
351	M37A	1	max	1005.202	4	844.932	8	677.135	1	.2	1	.222	2	.423	3
352			min	-1005.2	3	276.943	3	-677.599	2	-.235	2	-.222	1	-.259	4
353		2	max	1005.202	4	844.932	8	677.135	1	.2	1	.167	2	.401	3
354			min	-1005.2	3	276.943	3	-677.599	2	-.235	2	-.167	1	-.283	4
355		3	max	1005.202	4	844.932	8	677.135	1	.2	1	.111	2	.378	3
356			min	-1005.2	3	276.943	3	-677.599	2	-.235	2	-.111	1	-.306	4
357		4	max	1005.202	4	844.932	8	677.135	1	.2	1	.056	2	.355	3
358			min	-1005.2	3	276.943	3	-677.599	2	-.235	2	-.056	1	-.329	4
359		5	max	1005.202	4	844.932	8	677.135	1	.2	1	.067	4	.333	3
360			min	-1005.2	3	276.943	3	-677.599	2	-.235	2	-.067	3	-.352	4

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

	Member	Shape	Code Check	Loc[ft]	LC	Shea...	Loc[ft]	Dir	LC	phi*Pn...	phi*Pnt...	phi*Mn...	phi*Mn...	Cb	Eqn
1	MP2A	PIPE_2.0X	.836	3.938	2	.051	3.938		2	23929....	44100	2.531	2.531	1.455	H1-1b
2	MP2B	PIPE_2.0X	.743	3.938	4	.062	4.01		4	23929....	44100	2.531	2.531	1.504	H1-1b
3	MP2C	PIPE_2.0X	.743	3.938	3	.061	4.01		3	23929....	44100	2.531	2.531	1.504	H1-1b
4	M34	HSS4x4x4	.511	0	8	.117	0	y	9	13133...	139518	16.181	16.181	1.78	H1-1b
5	M2	HSS4x4x4	.510	0	6	.133	0	y	9	13133...	139518	16.181	16.181	1.759	H1-1b
6	M31B	HSS4x4x4	.497	0	7	.069	0	y	5	13133...	139518	16.181	16.181	1.779	H1-1b
7	MP1A	PIPE_2.0	.402	3.938	2	.024	3.938		2	17855....	32130	1.872	1.872	1.48	H1-1b
8	MP3A	PIPE_2.0	.393	3.938	2	.023	3.938		2	17855....	32130	1.872	1.872	1.446	H1-1b
9	MP1B	PIPE_2.0	.384	3.938	4	.024	3.938		4	17855....	32130	1.872	1.872	1.643	H1-1b
10	MP1C	PIPE_2.0	.384	3.938	3	.024	3.938		3	17855....	32130	1.872	1.872	1.643	H1-1b
11	MP3C	PIPE_2.0	.369	3.938	3	.022	3.938		3	17855....	32130	1.872	1.872	1.623	H1-1b
12	MP3B	PIPE_2.0	.368	3.938	4	.022	3.938		4	17855....	32130	1.872	1.872	1.623	H1-1b
13	M25	HSS4x4x4	.280	7	8	.087	7	y	7	61430....	139518	16.181	16.181	1.396	H1-1b
14	M1	HSS4x4x4	.278	7	6	.083	7	y	5	61430....	139518	16.181	16.181	1.383	H1-1b
15	M30A	LL3x3x4x0	.271	0	3	.023	0	y	3	79637....	93312	6.48	3.069	1.511	H1-1b
16	M13	HSS4x4x4	.257	7	5	.083	7	y	6	61430....	139518	16.181	16.181	1.382	H1-1b
17	M35	LL3x3x4x0	.254	0	1	.035	3.588	z	9	79637....	93312	6.48	3.069	1.54	H1-1b
18	M29	LL3x3x4x0	.238	3.588	1	.019	0	y	2	79637....	93312	6.48	3.069	1.914	H1-1b
19	M35A	L2.5x2.5x4	.123	2.324	3	.012	0	y	9	19052....	38556	1.114	2.336	1.136	H2-1
20	M33A	L2.5x2.5x4	.116	2.324	4	.004	4.648	y	2	19052....	38556	1.114	2.336	1.136	H2-1
21	M32B	L2.5x2.5x4	.110	2.324	2	.004	4.648	y	4	19052....	38556	1.114	2.336	1.136	H2-1
22	M36	L2.5x2.5x4	.107	2.324	2	.004	0	y	3	19052....	38556	1.114	2.336	1.136	H2-1
23	M31A	L2.5x2.5x4	.099	2.324	1	.006	0	y	9	19052....	38556	1.114	2.336	1.136	H2-1
24	M32A	L2.5x2.5x4	.096	2.324	1	.008	4.648	y	9	19052....	38556	1.114	2.336	1.136	H2-1
25	M6	PIPE_3.5	.001	.625	2	.001	.625		2	78250	78750	7.954	7.954	1	H1-1b
26	M30	PIPE_3.5	.001	.625	4	.001	.625		4	78250	78750	7.954	7.954	1.562	H1-1b
27	M18	PIPE_3.5	.001	.625	3	.001	.625		3	78250	78750	7.954	7.954	1.562	H1-1b

Envelope AISI S100-10: LRFD Cold Formed Steel Code Checks

Member	Shape	Code Check	Loc[ft]	LC	Shear...	Loc[ft]	Dir	LC	phi*Pn[l...	phi*Tn[l...	phi*Mn...	phi*Mn...	Cb	Cmyy	Cmzz	Eqn
No Data to Print ...																

Envelope AA ADM1-10: ASD - Building Aluminum Code Checks

Member	Shape	Code C...	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	Pnc/O...	Pnt/Om...	Mny/O...	Mnz/O...	Vny/O...	Vnz/O...	Cb	Eqn
No Data to Print ...																

EXHIBIT 9

MODIFICATION AND DESIGN DRAWINGS FOR EXISTING ANTENNA MOUNTS EXISTING MONOPOLE TOWER

PROPOSED CARRIER: T-MOBILE

TOWER OWNER: SBA / TOWER OWNER SITE #: CT13610-A

CARRIER SITE #/NAME: CT11390G / ARTEC

COORDINATES (LATITUDE: 41.322138°, LONGITUDE: -72.773277°)

PLEASE NOTE THIS SET OF DRAWINGS ARE FOR INSTALLATION AND ASSEMBLY ONLY. FABRICATION DETAIL DRAWINGS ARE NOT PROVIDED AND MUST BE COMPLETED BY THE STEEL FABRICATOR SELECTED. TES CAN PROVIDE THE FABRICATION DETAIL DRAWINGS FOR AN ADDITIONAL FEE.

SHEET	SHEET TITLE	REV
T-1	TITLE SHEET	0
BOM	BILL OF MATERIALS	0
GN-1	GENERAL NOTES	0
A-1	ANTENNA MOUNT MODIFICATION DETAILS	0
A-2	ANTENNA MOUNT PHOTOS	0
D-1	STANDARD DETAILS	0
D-2	STANDARD DETAILS	0

NOTE:

1. THE MODIFICATION DRAWINGS ARE BASED ON THE TES PROJECT NO. 78335, DATED 06/19/2019.

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PH: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO: 81048

CUSTOMER SITE NO: CT13610-A-SBA

CUSTOMER SITE NAME: ARTEC

26 COMMERCE DRIVE
N. BRANFORD, CT 06471

Exp.01/31/2020

STATE OF CONNECTICUT
MUSTAPHA ASSI
No. 23865
LICENSED PROFESSIONAL ENGINEER

08/01/2019

DRAWN BY: SP | CHECKED BY: CP/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: T-1 | REV #: 0

BILL OF MATERIALS

QUANTITY COUNTED	QUANTITY PROVIDED	PART NUMBER	DESCRIPTIONS	SHEET LIST	PIECE WEIGHT (LBS)	WEIGHT (LB)	NOTES
			MATERIAL & HARDWARE				
			FOLLOWING ITEMS ARE "CUSTOM" PARTS				
3	3	PX2375-7	2" PX (2.375" O.D. X 0.218" THICKNESS) X 7'-0" A53 GR-B 35KSI	A-1	35.90	107.7	GALVANIZED
6	6	L252525-8	L 2 1/2" X 2 1/2" X 1/4" X 8'-0" A36	D-1	33.50	201.0	GALVANIZED (FINAL CUT LENGTH TO BE DETERMINED IN FIELD)
6	6	L3325-8	L 3" X 3" X 1/4" X 8'-0" A36	D-1	40.10	240.6	GALVANIZED (FINAL CUT LENGTH TO BE DETERMINED IN FIELD)
3	3	PL400-2375	PL 3/8" X 7 1/8" X 11" A36	D-1	8.50	25.5	GALVANIZED
6	6	PL6S-375	PL 3/8" X 4 3/4" X 7 1/4" A36	D-1	3.70	22.2	GALVANIZED
6	6	BRKW-6S	WELDMENT BRACKET	D-1	7.50	45.0	GALVANIZED
72	76	--	THREADED ROD 5/8" X 10" A36 W/ (2) HHN & LKW EA	D-1	0.00	0.0	(2) HHN & LKW-EA GALVANIZED
15	16	--	BOLT 5/8" X 2 1/4" A325	D-1	0.00	0.0	(1) HHN & LKW-EA GALVANIZED
6	7	MS02-625-250-400	RU-BOLT 5/8" X 2 1/2" I.W. X 4" I.L. A36 (OR EQUIV.)	D-1	1.17	8.6	(2) HHN & LKW-EA GALVANIZED
3	3	PL-22	P 2" X 2 X 1/2" A36 SHIM	D-1	1.24	3.7	GALVANIZED
12	12	BRKW-4S	WELDMENT BRACKET	D-1	5.90	70.8	GALVANIZED
3	3	PL375-450	PL 3/8" X 7 1/8" X 7 1/2"A36	D-1	5.80	17.4	GALVANIZED
12	13	--	BOLT 5/8" X 2" A325	D-1	0.00	0.0	(1) HHN & LKW-EA GALVANIZED
6	6	PL-1	PL 3/8" X 4 3/4" X 7 1/2" A36	D-1	3.84	23.0	GALVANIZED
			ALL METROSITE PARTS ARE AVAILABLE FROM METROSITE, LLC.				
			180 IND PARK BLVD COMMERCE, GA 30529				
			OFFICE: (706) 335-7045				
			FAX: (706) 335-7056				
			NOTE: ALL MATERIALS, WHICH WEREN'T LISTED IN THIS SHEET, ARE ASSUMED TO BE PROVIDED BY THE CONTRACTOR.				
				TOTAL WEIGHT (LBS) =		**765.6**	

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PH: (972) 483-0607

SBA
5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
81048

CUSTOMER SITE NO:
CT13610-A-SBA
CUSTOMER SITE NAME:
ARTEC
26 COMMERCE DRIVE
N. BRANFORD, CT 06471

DRAWN BY: SP | CHECKED BY: CP/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:
BILL OF MATERIALS

SHEET NUMBER: BOM
REV #: 0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE ANSI/TIA-222-G, ANSI/ASSP A10.48, AND ANY OTHER GOVERNING BUILDING CODES AND OSHA SAFETY REGULATIONS.
2. ALL WORK INDICATED ON THE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TELECOMMUNICATIONS TOWER, POLE AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF ALL MISCELLANEOUS PARTS (SUCH AS SHIMS), TEMPORARY SUPPORTS, AND GUYINGS, ETC., PER ANSI/ASSP A10.48, TO COMPLETE THE ASSEMBLY AS SHOWN IN THE DRAWINGS.
4. CONTRACTOR SHALL PROCEED WITH THE INSTALLATION WORK CAREFULLY SO THE WORK WILL NOT DAMAGE ANY EXISTING CABLE, EQUIPMENT OR THE STRUCTURE.
5. THE USE OF GAS TORCH OR WELDER, ARE NOT ALLOWED ON ANY TOWER STRUCTURE WITHOUT THE CONSENT OF THE TOWER OWNER.
6. GENERALLY THE CONTRACTOR IS RESPONSIBLE TO CONDUCT AN ONSITE VISIT SURVEY OF THE JOB SITE AFTER AWARD, AND REPORT ANY ISSUES WITH THE SITE TO **TES** BEFORE PROCEEDING CONSTRUCTION.
7. IT IS THE RESPONSIBILITY OF THE GC TO VERIFY THAT THERE IS NO INTERFERENCES (WITH SAFETY CLIMB BRACKETS, TRANSMISSION LINES, ETC.) PRIOR TO MOBILIZATION AND INSTALLATION OF THESE MODIFICATIONS.
8. PLEASE NOTIFY TES IMMEDIATELY IF ANY INSTALLATION ISSUES OCCUR RELATED TO THIS DRAWING @ 972-483-0607 OR EMAIL-TESCONSTRUCTION@TESTOWER.US

FABRICATION

1. ALL STEEL SHALL MEET OR EXCEED THE MINIMUM STRENGTH AS SPECIFIED IN THE DRAWINGS. IF YIELD STRENGTH WAS NOT NOTED IN THE DRAWINGS, CONTRACTORS SHALL CONTACT TES FOR DIRECTION.
2. ALL FIELD CUT EDGES SHALL BE GROUND SMOOTH. ALL FIELD CUT AND DRILLED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

WELDING

1. ALL WELDING SHALL BE PERFORMED BY AWS CERTIFIED WELDERS AND IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNO. (E70XX UNLESS NOTED OTHERWISE).
2. PRIOR TO FIELD WELDING GALVANIZED MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING APPROX. 0.5" BEYOND THE PROPOSED FIELD WELD SURFACES.
3. ALL WELDS SHALL BE INSPECTED VISUALLY. A MINIMUM OF 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. 100% OF WELDS SHALL BE INSPECTED IF DEFECTS ARE FOUND.
4. WELD INSPECTIONS SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
5. AFTER INSPECTION, ALL FIELD WELDED SURFACES SHALL BE REPAIRED WITH A MINIMUM OF TWO COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.

BOLTED ASSEMBLIES AND TIGHTENING OF CONNECTIONS

1. ALL HIGH STRENGTH BOLTS SHALL CONFORM TO THE PROVISIONS OF THE SPECIFICATIONS FOR STRUCTURAL JOINTS USING A325 OR A490 BOLTS AS APPROVED BY THE RCSC.
2. FLANGE BOLTS SHALL BE TIGHTENED BY THE AISC "TURN-OF-THE-NUT" METHOD. THE FOLLOWING TABLE SHOULD BE USED FOR THE "TURN-OF-THE-NUT" TIGHTENING.
3. SPLICE BOLTS AND ALL OTHER BOLTS IN BEARING TYPE CONNECTIONS SHALL BE TIGHTENED TO A SNUG-TIGHT CONDITION.
4. THE SNUG-TIGHT CONDITION IS DEFINED AS THE TIGHTNESS ATTAINED BY EITHER A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER WITH AN ORDINARY SPUD WRENCH TO BRING THE CONNECTED PLIES INTO FIRM CONTACT.
5. HB HOLLO-BOLT SHALL BE INSTALLED PER ICC ESR-3330 INSTRUCTIONS.

VERIFICATION AND INSPECTION

1. IF APPLICABLE, VERIFICATION INSPECTION TO BE PERFORMED SHALL BE IN ACCORDANCE TO IBC-2015 SECTION 1705 FOR STEEL CONSTRUCTION AND TABLE 1705.3 FOR CONCRETE CONSTRUCTION.

TABLE 8.2 NUT ROTATION FROM SNUG-TIGHT CONDITION FOR TURN-OF-NUT PRETENSIONING [a,b]

BOLT LENGTH [c]	DISPOSITION OF OUTER FACE OF BOLTED PARTS		
	BOTH FACES NORMAL TO BOLT AXIS	ONE FACE NORMAL TO BOLT AXIS, OTHER SLOPED NOT MORE THAN 1:20 [d]	BOTH FACES SLOPED NOT MORE THAN 1:20 FROM NORMAL TO BOLT AXIS [d]
NOT MORE THAN $4d_b$	1/3 TURN	1/2 TURN	2/3 TURN
MORE THAN $4d_b$ BUT NOT MORE THAN $8d_b$	1/2 TURN	2/3 TURN	5/6 TURN
MORE THAN $8d_b$ BUT NOT MORE THAN $12d_b$	2/3 TURN	5/6 TURN	1 TURN

[a] NUT ROTATION IS RELATIVE TO BOLT REGARDLESS OF THE ELEMENT (NUT OR BOLT) BEING TURNED. FOR REQUIRED NUT ROTATIONS OF 1/2 TURN AND LESS, THE TOLERANCE IS PLUS OR MINUS 30 DEGREES; FOR REQUIRED NUT ROTATIONS OF 2/3 TURN AND MORE, THE TOLERANCE IS PLUS OR MINUS 45 DEGREES.

[b] APPLICABLE ONLY TO JOINTS IN WHICH ALL MATERIAL WITHIN THE GRIP IS STEEL.

[c] WHEN THE BOLT LENGTH EXCEEDS $12d_b$, THE REQUIRED NUT ROTATION SHALL BE DETERMINED BY ACTUAL TESTING IN A SUITABLE TENSION CALIBRATOR THAT SIMULATES THE CONDITIONS OF SOLIDLY FITTING STEEL.

[d] BEVELED WASHER NOT USED.

SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS, JUNE 30, 2004 RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS

INSTALLATION TORQUE REQUIRED FOR HOLLO BOLTS AND AJAX BOLTS:

1. HB12 HOLLO BOLT: 59 FT-LBS
2. HB16 HOLLO BOLT: 140 FT-LBS
3. HB20 HOLLO BOLT: 221 FT-LBS
4. M20 AJAX BOLT: 280 FT-LBS.

FIELD HOT WORK PLAN NOTES:

FOLLOWING GUIDELINES SHALL BE COMPLIED WITH:

1. CONTRACTOR'S RESPONSIBILITY TO COMPLETE A HOT WORK PLAN IF AWARDED PER CUSTOMER SPECIFICATIONS GUIDELINES FOR WELDING, CUTTING & SPARK PRODUCING WORK.
2. HAVE A FIRE PLAN APPROVED BY THE CUSTOMER AND THEIR SAFETY MANAGEMENT DEPT.
3. CONTRACTOR MUST OBTAIN THE CONTACT INFO OF THE LOCAL FIRE DEPARTMENT AND THE 911 ADDRESS OF THE TOWER SITE BEFORE CONSTRUCTION.
4. CONTRACTOR SHALL MAKE SURE THAT CELL PHONE COVERAGE IS AVAILABLE IN THE TOWER SITE. IF CELL COVERAGE IS NOT AVAILABLE, AN IMMEDIATE AVAILABLE MEANS OF DIRECT COMMUNICATION WITH THE FIRE DEPARTMENT SHALL BE DETERMINED PRIOR TO CONSTRUCTION START.
5. ALL CONSTRUCTION SHALL BE PERFORMED UNDER WIND SPEED LESS THAN 10 MPH ON THE GROUND LEVEL. IF WIND SPEED INCREASE, CONTRACTOR MUST DETERMINE IF CONSTRUCTION SHALL BE DISCONTINUED.
6. FIRE SUPPRESSION EQUIPMENT MUST BE MADE AVAILABLE ON SITE AND READY TO USE.
7. CONTRACTOR SHALL ASSIGN A FIRE WATCHER TO PERFORM FIRE-FIGHTING DUTIES.
8. ALL WELDERS SHALL BE AWS OR STATE CERTIFIED. THEY MUST ALSO BE EXPERIENCED IN WELDING ON GALVANIZED MATERIALS.
9. IF IT IS POSSIBLE, ALL EXISTING COAX NEAR WELDING AREA SHALL BE TEMPORARILY MOVED AWAY FROM THE WELDING AREA BEFORE WELDING THE PLATES.
10. PLEASE REPORT ANY FIELD ISSUE TO TES @ 972-483-0607.

TES
Tower Engineering Solutions
1320 GREENWAY DRIVE, SUITE 600
IRVING, TX 75038
PH: (972) 483-0607

SBA

5900 BROKEN SOUND PARKWAY, NW
BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
81048

CUSTOMER SITE NO:
CT13610-A-SBA
CUSTOMER SITE NAME:
ARTEC
26 COMMERCE DRIVE
N. BRANFORD, CT 06471

DRAWN BY: SP | CHECKED BY: CP/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:
GENERAL NOTES

SHEET NUMBER: GN-1
REV #: 0

SCOPE OF WORK

1. INSTALL NEW 2" EXTRA STRONG ANTENNA MOUNT PIPE (7'-0" LONG). (1) PER SECTOR AS SHOWN
2. INSTALL NEW DOUBLE ANGLE END CONNECTION AS SHOWN. SEE SHEET D-1 FOR DETAILS.
3. INSTALL NEW V-BRACING. (1) PER SECTOR. SEE SHEET D-1 FOR DETAILS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP, REMOVAL AND DISPOSAL OF EXCESS MATERIALS USED AND REMOVED FROM THE STRUCTURE AT THE COMPLETION OF THE PROJECT.

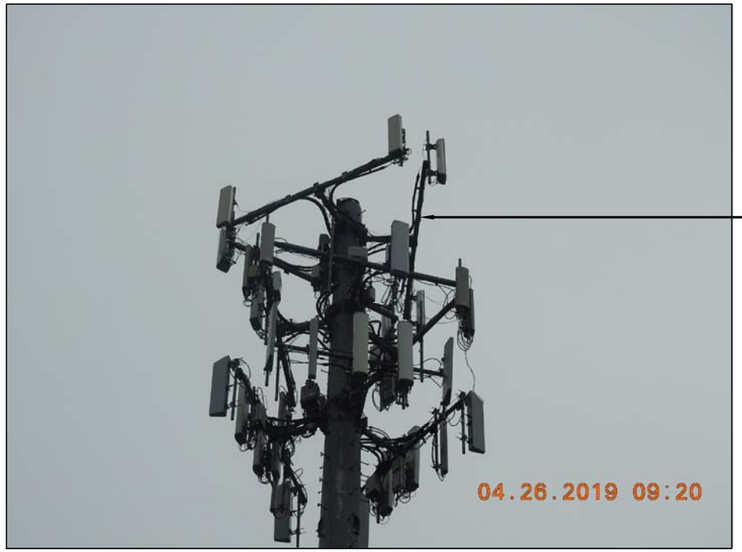
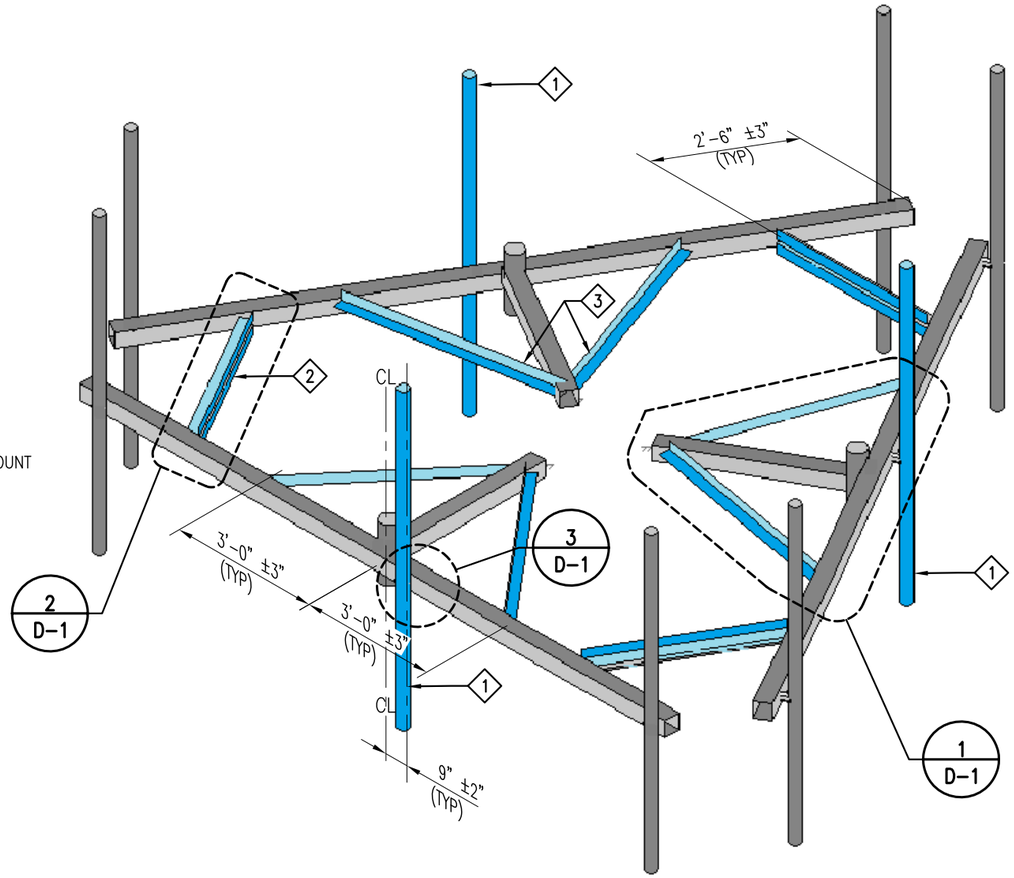


PHOTO 1



ISOMETRIC VIEW
EXISTING ANTENNA MOUNT @ 154' ELEV.

GC NOTE:
1. **IT IS THE RESPONSIBILITY OF THE GC TO VERIFY THAT THERE IS NO INTERFERENCES WITH (PORT HOLES, SAFETY CLIMB BRACKETS, TRANSMISSION LINES, ETC.) PRIOR TO MOBILIZATION AND INSTALLATION OF THESE MODIFICATIONS.**
2. **PLEASE NOTIFY TES IMMEDIATELY IF ANY INSTALLATION ISSUES OCCUR RELATED TO THIS DRAWING @ 972-483-0607 OR EMAIL-TESCONSTRUCTION@TESTOWER.US**

NOTES:
1. TEMPORARILY RELOCATE ANY EXISTING COAX ATTACHED TO THE LEGS AND/OR ANY OTHER MEMBERS WHERE OBSTRUCTION WITH THE PROPOSED MODIFICATION MAY OCCUR.
2. WHEN FIELD CUTTING AND DRILLING ANGLES, USE SAME GAGE LINES AND EDGE DISTANCES AS INDICATED ON SHOP CUT AND DRILLED ENDS.
3. APPLY (2) COATS OF ZINC RICH GALVANIZING COMPOUND AS PER THE MANUFACTURER'S SPECIFICATIONS TO ALL FIELD CUT AND DRILLED AREAS.
4. **MEMBERS IN BLUE COLOR ARE NEW REINFORCEMENTS.**

ITEM NO.	QTY.	PART NO.	DESCRIPTIONS
1	3	PX2375-7	2" PX (2.375" O.D. X 0.218" THICKNESS) X 7'-0" A53 GR-B

TES
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BOCA RATON, FL 33487
(800)-487-SITE

TES JOB NO:
81048

CUSTOMER SITE NO:
CT13610-A-SBA
CUSTOMER SITE NAME:
ARTEC
26 COMMERCE DRIVE
N. BRANFORD, CT 06471

DRAWN BY: SP | CHECKED BY: CP/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:
ANTENNA MOUNT MODIFICATION DETAILS

SHEET NUMBER: A-1
REV #: 0

PHOTO 1

PHOTO 2

COAX HANGERS MAY NEED TO BE RELOCATED TO ACCOMMODATE INSTALLATION OF MOUNT MODIFICATION

PHOTO 3

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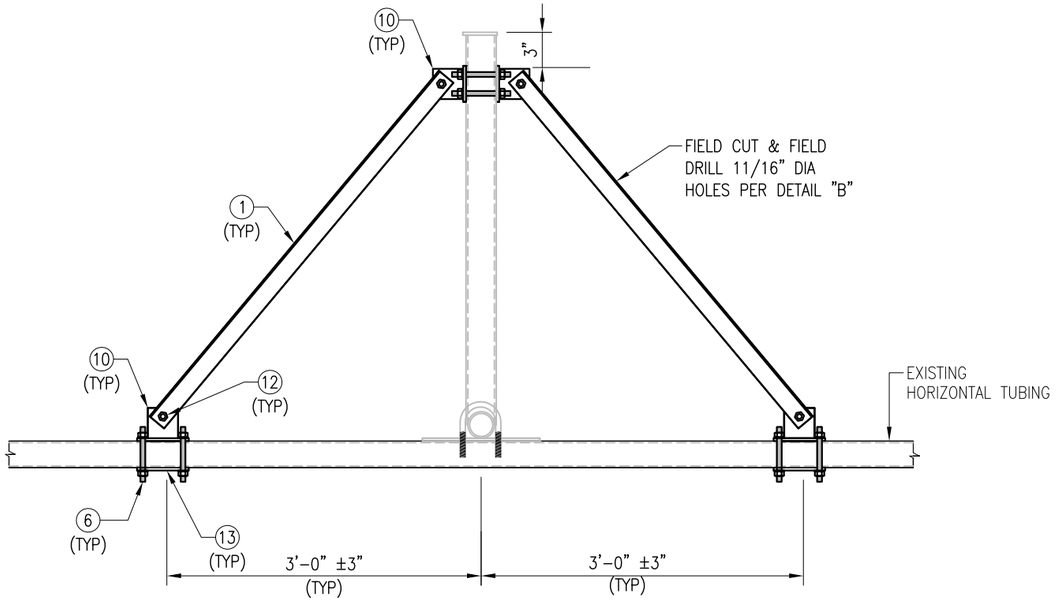
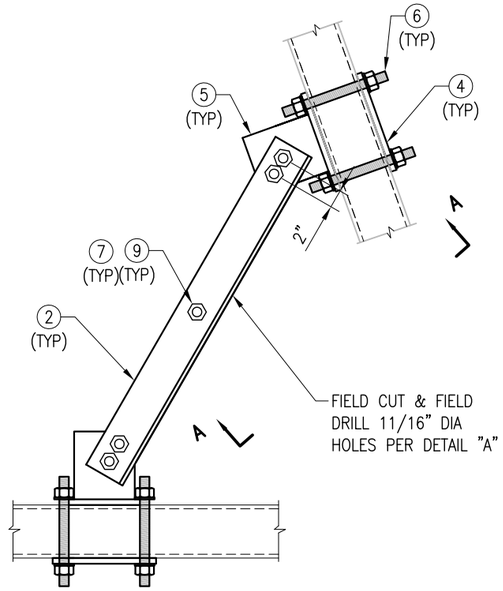
REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:
ANTENNA MOUNT PHOTOS

SHEET NUMBER: A-2
REV #: 0



1 / D-1 DETAIL



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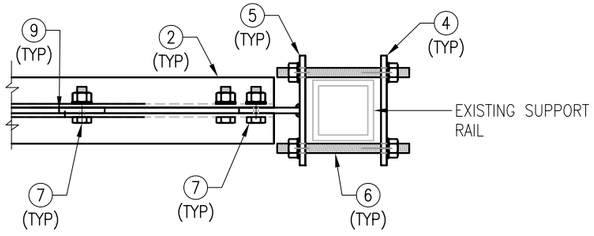
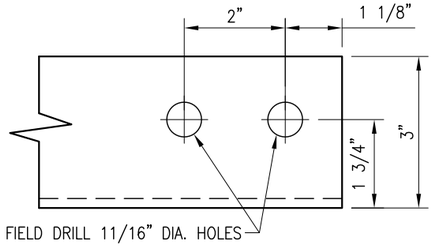


SECTION "A-A"



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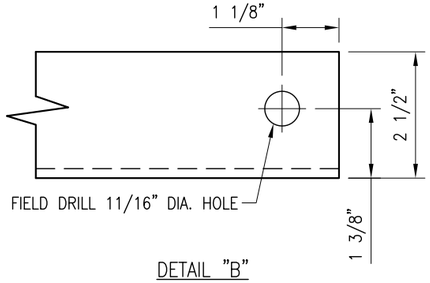

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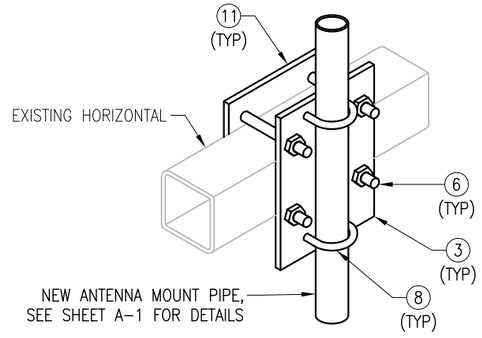

3 / D-1 DETAIL

ITEM NO.	QTY.	PART NO.	DESCRIPTIONS
1	6	L252525-8	L 2 1/2" X 2 1/2" X 1/4" X 8'-0" A36
2	6	L3325-8	L 3" X 3" X 1/4" X 8'-0" A36
3	3	PL400-2375	PL 3/8" X 7 1/8" X 11" A36
4	6	PL6S-375	PL 3/8" X 4 3/4" X 7 1/4" A36
5	6	BRKW-6S	WELDMENT BRACKET
6	72	--	THREADED ROD 5/8" X 10" A36 W/ (2) HHN & LKW EA
7	15	--	BOLT 5/8" X 2 1/4" A325
8	6	MS02-625-250-400	RU-BOLT 5/8" X 2 1/2" I.W. X 4" I.L. A36 (OR EQUIV.)
9	3	PL-22	P 2" X 2 X 1/2" A36 SHIM
10	12	BRKW-4S	WELDMENT BRACKET
11	3	PL375-450	PL 3/8" X 7 1/8" X 7 1/2"A36
12	12	--	BOLT 5/8" X 2" A325
13	6	PL-1	PL 3/8" X 4 3/4" X 7 1/2" A36

NOTES:
1. HOT-DIPPED GALVANIZED PER ASTM A123.
2. ALL HOLES ARE 11/16" DIA. U.N.O

TES
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(800)-487-SITE

TES JOB NO: 81048

CUSTOMER SITE NO: CT13610-A-SBA

CUSTOMER SITE NAME: ARTEC

26 COMMERCE DRIVE
N. BRANFORD, CT 06471

DRAWN BY: SP | CHECKED BY: CP/HMA

REV.	DESCRIPTION	BY	DATE
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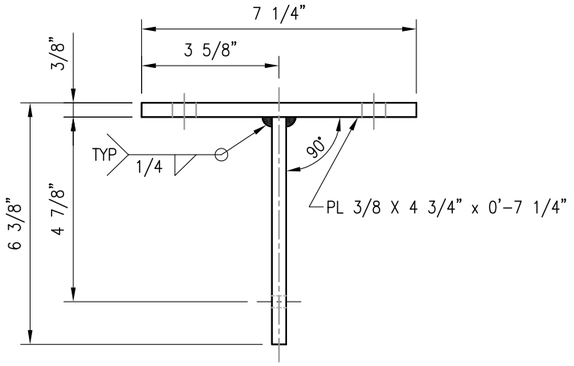
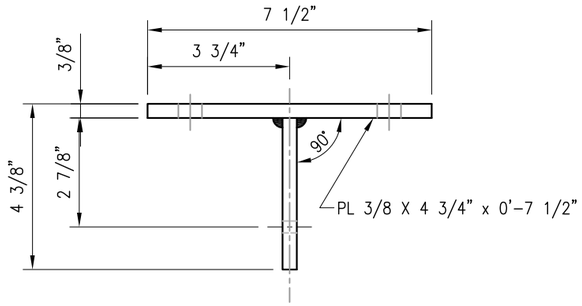
SHEET TITLE: STANDARD DETAILS

SHEET NUMBER: D-1

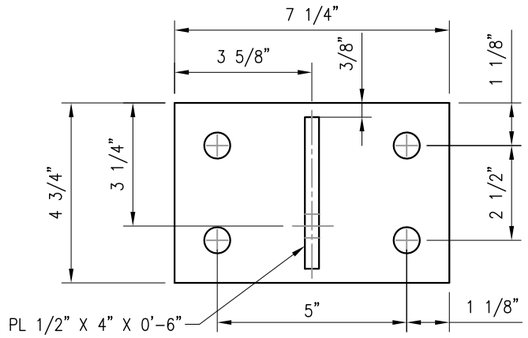
REV #: 0



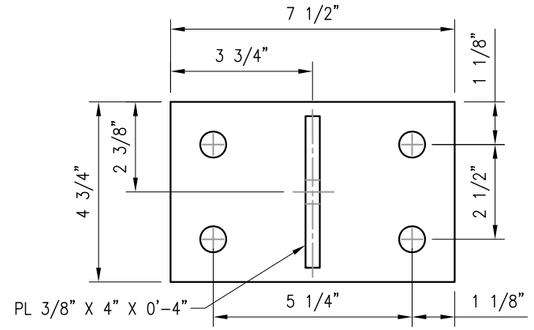
TOP VIEW
BRKW-6S WELDMENT



TOP VIEW
BRKW-4S WELDMENT



FRONT VIEW
BRKW-6S WELDMENT



FRONT VIEW
BRKW-4S WELDMENT

NOTES:
1. HOT-DIPPED GALVANIZED PER ASTM A123.
2. ALL HOLES ARE 11/16" DIA. U.N.O

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TES JOB NO:
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N. BRANFORD, CT 06471

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REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	SP	08/01/19

SHEET TITLE:
STANDARD DETAILS

SHEET NUMBER: D-2
REV #: 0

EXHIBIT 10

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11390G

CT390/TVI Ind. Park_FT
26 Commerce Dr
North Branford, CT 06471

June 10, 2019

Transcom Engineering Project Number: 737001-0083

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.54 %**

June 10, 2019

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

Emissions Analysis for Site: **CT11390G – CT390/TVI Ind. Park_FT**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **26 Commerce Dr, North Branford, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **26 Commerce Dr, North Branford, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

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

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

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

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
GSM	1900 MHz (PCS)	1	15
UMTS	1900 MHz (PCS)	1	40
UMTS	2100 MHz (AWS)	1	40
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

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

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR21 B2A/B4P	160
A	2	Ericsson AIR21 B4A/B2P	160
A	3	RFS APXVAARR24_43-U-NA20	160
B	1	Ericsson AIR21 B2A/B4P	160
B	2	Ericsson AIR21 B4A/B2P	160
B	3	RFS APXVAARR24_43-U-NA20	160
C	1	Ericsson AIR21 B2A/B4P	160
C	2	Ericsson AIR21 B4A/B2P	160
C	3	RFS APXVAARR24_43-U-NA20	160

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **2100 MHz (AWS) UMTS** radios are ground mounted the following cable loss values were used. For each ground mounted **2100 MHz (AWS) UMTS** radio there was **1.91 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **180 feet** of **1-5/8"** coax.

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS	15.9 / 15.9	3	95	3,142.19	0.48
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.71
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.88
						Sector A Composite MPE%	**2.07**
Antenna B1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS	15.9 / 15.9	3	95	3,142.19	0.48
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.71
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.88
						Sector B Composite MPE%	**2.07**
Antenna C1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS	15.9 / 15.9	3	95	3,142.19	0.48
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.71
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	0.88
						Sector C Composite MPE%	**2.07**

Table 3: T-MOBILE Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**2.07 %**
AT&T	2.27 %
Verizon Wireless	5.20 %
Site Total MPE %:	**9.54 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	2.07 %
T-MOBILE Sector B Total:	2.07 %
T-MOBILE Sector C Total:	2.07 %
Site Total:	9.54 %

Table 5: Site MPE Summary

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

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) GSM	1	583.57	160	0.88	1900 MHz (PCS)	1000	0.09%
T-Mobile 1900 MHz (PCS) UMTS	1	1,556.18	160	2.36	1900 MHz (PCS)	1000	0.24%
T-Mobile 2100 MHz (AWS) UMTS	1	1,002.44	160	1.52	2100 MHz (AWS)	1000	0.15%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	160	7.08	2100 MHz (AWS)	1000	0.71%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	160	2.39	600 MHz	400	0.60%
T-Mobile 700 MHz LTE	2	432.54	160	1.31	700 MHz	467	0.28%
						Total:	**2.07%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	2.07 %
Sector B:	2.07 %
Sector C:	2.07 %
T-MOBILE Maximum Total (per sector):	2.07 %
Site Total:	9.54 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **9.54 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

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