*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 20, 2019

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

**RE: Notice of Exempt Modification**
**60 Adams Street, Manchester, CT 06042**
**41.7940481 N**
**-72.55536 W**
**T-Mobile #: CTHA039A_L600**

Dear Ms. Bachman:

T-Mobile currently maintains six (6) antennas at the 135-foot level of the existing 141-foot Monopole Tower at 60 Adams St, Manchester, CT. The 141-foot tower is owned by SBA Towers VIII, LLC. The property is owned by Pom-Pom Gali. T-Mobile now intends to remove (3) L700/L600 antennas and install three (3) new L700/L600MHz antennas. The new antennas would be installed at the 135-foot level of the tower.

Planned Modifications:

TOWER

Remove:

- N/A

Remove and Replace:

- 15" X 14" X 7.5" – RRU (Remove) – (3) Ericsson Radio 4449 B71+B12 RRUs (Replace)
- (3) Commscope F-65C-R2 – 600/700 MHz antenna (Remove) – RFS APXVAARR24_43-U-NA20 600/700 MHZ antenna (Replace)
- (3) Ericsson S11B12 – RRU (Remove) – Ericsson RRUS11 B4 (Replace)

Install New:

- (1) 1-1/4" HCS Fiber

Existing Equipment to Remain:

- (3) Ericsson Air 32 KRD901146- 1_B66A_B2A – Panel
- (3) RFS APXVAARR24_43-U-NA20 - Panel
- (3) RFS APX16DWV-16DWVS-E-A20 – Panel
- (3) Ericsson RRUS11 B4 RRUs
- (3) Ericsson RRUS 32 B66A RRUs
- (2) 1-5/8" Fiber

Entitlements:

- (1) 1-5/8" HCS Fiber

GROUND

Install New:

- Equipment inside existing 6102 cabinet

This facility was approved on December 17, 1998 by the Council in Case #TS-BAMSCLP-077-981208 and the Town of Manchester on April 19, 1999 with Zoning Permit 99-1764. Approval was given for a 140' replacement monopole tower with two modular buildings. Fencing surrounding the base of the tower was to consist of black vinyl chainlink. 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 Manchester's General Manager, Scott Shanley, and Zoning Enforcement Officer, James Davis, 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,

G. Scott Shepherd

G. 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: Scott Shanley, General Manager / with attachments
*The Town of Manchester, 41 Center Street, Manchester, CT 06040*
James Davis, Zoning Enforcement Officer / with attachments
*The Town of Manchester, 41 Center Street, Manchester, CT 06040*
Pom-Pom Gali, LLC / with attachments
*79 Boston Post Road,* Willimantic CT 06226 *(SBA overnight address on file)*
*PO Box 133 Willimantic, CT 06226 (Town address on file)*

Exhibit List

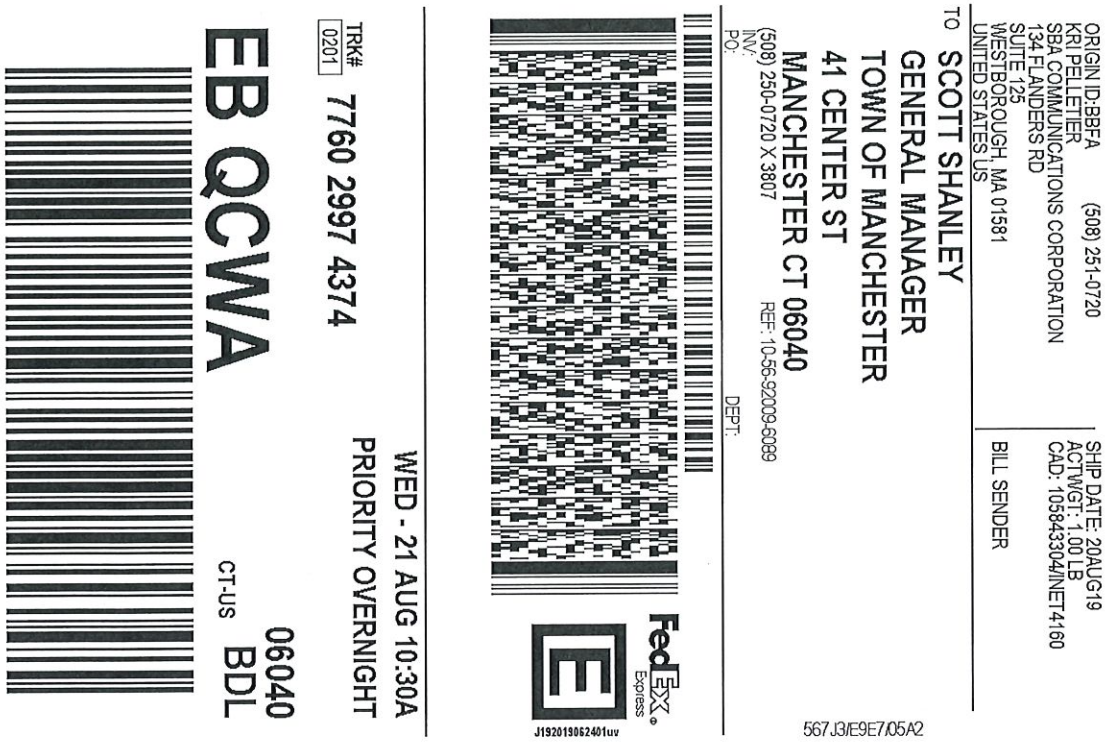
| | | |
|---|---|---|
| Exhibit 1 | Check Copy | x |
| Exhibit 2 | Notification Receipts | x |
| Exhibit 3 | Property Card | x |
| Exhibit 4 | Property Map | x |
| Exhibit 5 | Original Zoning Approval | x |
| Exhibit 6 | Construction Drawings | Chappell 8/18/19 |
| Exhibit 7 | Structural Analysis | TESS 7/9/19 |
| Exhibit 8 | Mount Analysis | TESS 8/19/19 |
| Exhibit 9 | EME Report | Transcom dated 6/13/19 |
| | | |
| | | |

# 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

# 60 ADAMS STREET

| | | | |
|---|---|---|---|
| **Location** | 60 ADAMS STREET | **Mblu** | 28/ 20/ 60/ / |
| **Acct#** | 002000060 | **Owner** | POM-POM GALI LLC |
| **Assessment** | $1,144,100 | **Appraisal** | $1,634,300 |
| **PID** | 26 | **Building Count** | 3 |
| **DISTRICT** | E | **CONCRETE** | |

## Current Value

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2016 | $520,100 | $1,114,200 | $1,634,300 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2016 | $364,200 | $779,900 | $1,144,100 |

## Owner of Record

**Owner** POM-POM GALI LLC
**Address** PO BOX 133
WILLIMANTIC, CT 06226

**Sale Price** $1,551,222
**Certificate** C
**Book & Page** 3204/ 184
**Sale Date** 12/23/2005
**Instrument** 36

## Ownership History

| Ownership History | | | | | |
|---|---|---|---|---|---|
| **Owner** | **Sale Price** | **Certificate** | **Book & Page** | **Instrument** | **Sale Date** |
| POM-POM GALI LLC | $1,551,222 | C | 3204/ 184 | 36 | 12/23/2005 |
| THORNTON WILLIAM B EST | $0 | | 3130/ 054 | 35 | 08/25/2005 |
| THORNTON WILLIAM B | $0 | | 492/ 089 | | |

## Building Information

### Building 1 : Section 1

**Year Built:** 1965
**Living Area:** 1,863
**Replacement Cost:** $223,203

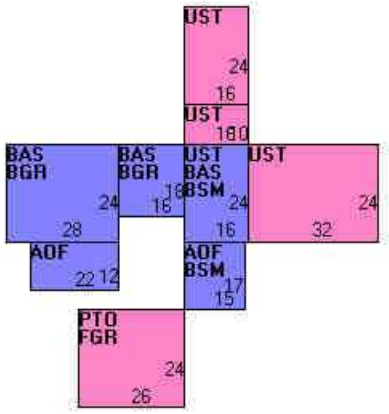
**Replacement Cost Less Depreciation:** $84,800

| Building Attributes | |
|---|---|
| **Field** | **Description** |
| STYLE | Light Indust |
| MODEL | Ind/Comm |
| Grade | Average |
| Stories: | 1 |
| Occupancy | 1 |
| Exterior Wall 1 | Pre-finsh Metl |
| Exterior Wall 2 | Concr/Cinder |
| Roof Structure | Flat |
| Roof Cover | Tar + Gravel |
| Interior Wall 1 | Minim/Masonry |
| Interior Wall 2 | Drywall/Sheetr |
| Interior Floor 1 | Concr-Finished |
| Interior Floor 2 | |
| Heating Fuel | Electric |
| Heating Type | Electr Basebrd |
| AC Type | None |
| Bldg Use | Industrial 96 |
| Total Rooms | |
| Total Bedrms | 00 |
| Total Baths | 0 |
| 1st Floor Use: | 300 |
| Heat/AC | None |
| Frame Type | Masonry |
| Baths/Plumbing | Average |
| Ceiling/Wall | Ceiling & Wall |
| Rooms/Prtns | Average |
| Wall Height | 9 |
| % Comn Wall | 0 |

### Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\02\6

### Building Layout




(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

| Building Sub-Areas (sq ft) | | | Legend |
|---|---|---|---|
| **Code** | **Description** | **Gross Area** | **Living Area** |
| BAS | First Floor | 1,344 | 1,344 |
| AOF | Office, (Average) | 519 | 519 |
| BGR | Basement Garage | 960 | 0 |
| BSM | Basement | 639 | 0 |
| FGR | Garage | 624 | 0 |
| PTO | Patio | 624 | 0 |
| UST | Utility, Storage, Unfinished | 1,696 | 0 |
| | | 6,406 | 1,863 |

## Building 2 : Section 1

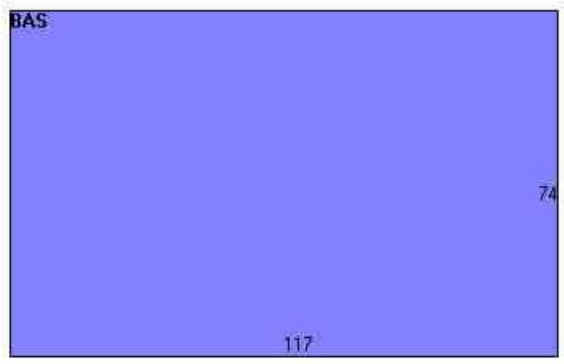
**Year Built:** 1965
**Living Area:** 8,658
**Replacement Cost:** $367,995
**Replacement Cost Less Depreciation:** $139,800

| Building Attributes : Bldg 2 of 3 | |
|---|---|
| **Field** | **Description** |
| STYLE | Service Shop |
| MODEL | Serv Station |
| Grade | Minimum |
| Stories: | 1 |
| Occupancy | 1 |
| Exterior Wall 1 | Concr/Cinder |
| Exterior Wall 2 | |
| Roof Structure | Flat |
| Roof Cover | Metal/Tin |
| Interior Wall 1 | Minim/Masonry |
| Interior Wall 2 | |
| Interior Floor 1 | Concr-Finished |
| Interior Floor 2 | |
| Heating Fuel | Oil |
| Heating Type | Forced Air-Duc |
| AC Type | None |
| Bldg Use | Industrial 96 |
| Total Rooms | |
| Total Bedrms | 00 |
| Total Baths | 0 |
| 1st Floor Use: | 300 |
| Heat/AC | None |
| Frame Type | Masonry |
| Baths/Plumbing | Average |
| Ceiling/Wall | Ceiling & Wall |
| Rooms/Prtns | Average |
| Wall Height | 18 |
| % Comn Wall | 0 |

### Building Photo

(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\02\6

### Building Layout




(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

| Building Sub-Areas (sq ft) | | | Legend |
|---|---|---|---|
| **Code** | **Description** | **Gross Area** | **Living Area** |
| BAS | First Floor | 8,658 | 8,658 |
| | | 8,658 | 8,658 |

## Building 3 : Section 1

**Year Built:** 1965
**Living Area:** 6,398
**Replacement Cost:** $454,584
**Replacement Cost Less Depreciation:** $172,700

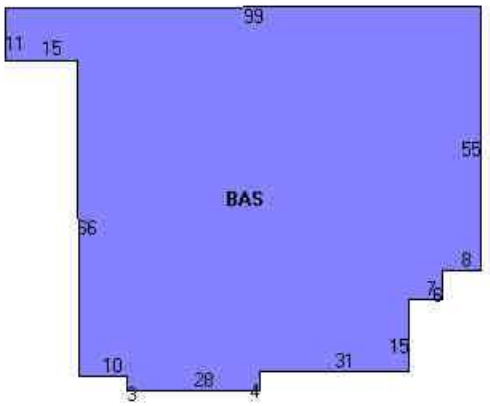
| Building Attributes : Bldg 3 of 3 | |
|---|---|
| **Field** | **Description** |
| STYLE | Office Bldg |
| MODEL | Comm/Ind |
| Grade | Below Average |

| | |
|---|---|
| Stories: | 1 |
| Occupancy | 1 |
| Exterior Wall 1 | Concr/Cinder |
| Exterior Wall 2 | |
| Roof Structure | Flat |
| Roof Cover | Metal/Tin |
| Interior Wall 1 | Drywall/Sheetr |
| Interior Wall 2 | |
| Interior Floor 1 | Tile/Vinyl Cmp |
| Interior Floor 2 | Carpet |
| Heating Fuel | Electric |
| Heating Type | Electr Basebrd |
| AC Type | Central |
| Bldg Use | Industrial 94 |
| Total Rooms | |
| Total Bedrms | 00 |
| Total Baths | 0 |
| 1st Floor Use: | 300C |
| Heat/AC | Heat AC Split |
| Frame Type | Masonry |
| Baths/Plumbing | Average |
| Ceiling/Wall | Susp Ceil & Wl |
| Rooms/Prtns | Average |
| Wall Height | 10 |
| % Comn Wall | 0 |

### Building Photo


(http://images.vgsi.com/photos2/ManchesterCTPhotos//\00\02\6

### Building Layout




(http://images.vgsi.com/photos2/ManchesterCTPhotos//Sketches

| Building Sub-Areas (sq ft) | | | Legend |
|---|---|---|---|
| **Code** | **Description** | **Gross Area** | **Living Area** |
| BAS | First Floor | 6,398 | 6,398 |
| | | 6,398 | 6,398 |

### Extra Features

| Extra Features | Legend |
|---|---|
| No Data for Extra Features | |

### Land

#### Land Use

| | |
|---|---|
| **Use Code** | 300 |
| **Description** | Industrial 96 |
| **Zone** | IND |

#### Land Line Valuation

| | |
|---|---|
| **Size (Acres)** | 26.45 |
| **Frontage** | 0 |
| **Depth** | 0 |

| | | | |
|---|---|---|---|
| **Neighborhood** | 4000 | **Assessed Value** | $779,900 |
| **Alt Land Appr** | No | **Appraised Value** | $1,114,200 |
| **Category** | | | |

## Outbuildings

| Outbuildings | | | | | | Legend |
|---|---|---|---|---|---|---|
| **Code** | **Description** | **Sub Code** | **Sub Description** | **Size** | **Value** | **Bldg #** |
| FGR1 | Garage Average | | | 1440 S.F. | $13,000 | 2 |
| PAV2 | Paving Concrete | | | 40000 S.F. | $54,000 | 1 |
| PAV2 | Paving Concrete | | | 11498 S.F. | $25,900 | 3 |
| SHD1 | Shed | | | 1680 S.F. | $15,100 | 1 |
| PAV1 | Paving Asphalt | | | 8000 S.F. | $10,000 | 3 |
| TNK5 | Tank Elevated | | | 240 GALS | $400 | 1 |
| FN4 | Fence 8' Chain | | | 290 L.F. | $4,400 | 1 |

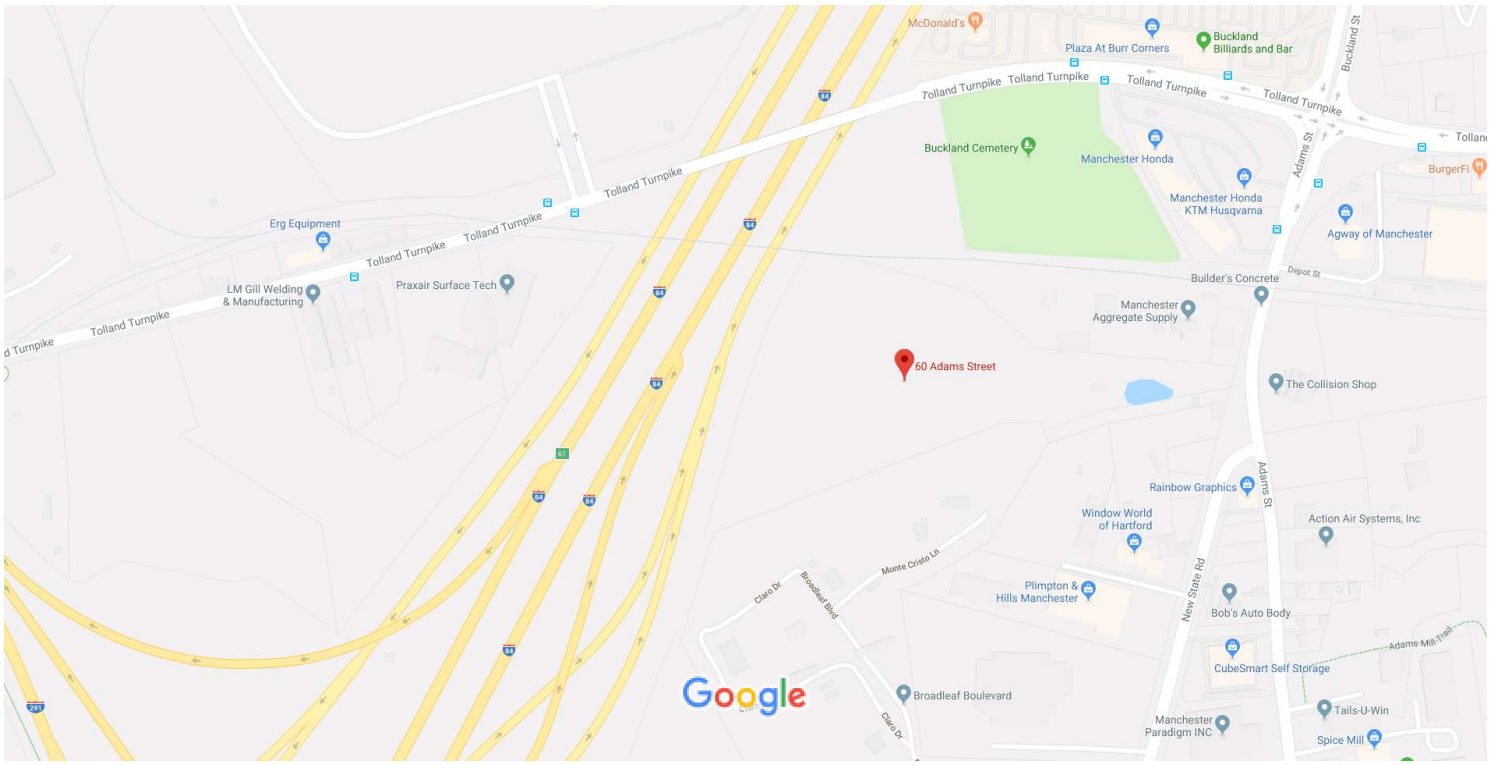
## Valuation History

| Appraisal | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2015 | $440,800 | $1,114,200 | $1,555,000 |
| 2010 | $527,000 | $1,156,400 | $1,683,400 |
| 2005 | $458,400 | $795,200 | $1,253,600 |

| Assessment | | | |
|---|---|---|---|
| **Valuation Year** | **Improvements** | **Land** | **Total** |
| 2015 | $308,600 | $779,900 | $1,088,500 |
| 2010 | $369,000 | $809,400 | $1,178,400 |
| 2005 | $320,900 | $556,600 | $877,500 |

# EXHIBIT 4

Google Maps 60 Adams St




Map data ©2019 200 ft

# 60 Adams St

Manchester, CT 06040

Directions Save Nearby Send to your phone Share

QCVV+95 Manchester, CT

## At this location

### 1-800 Dump Runs
3.0 ★★★☆☆ (1)
Garbage dump service · 60 Adams St

### A Aiudi & Sons LLC
Concrete contractor · 60 Adams St

### Builder's Concrete Inc
3.7 ★★★½☆ (3)
Ready mix concrete supplier · 60 Adams St

### Manchester Aggregate Supply
4.3 ★★★★½ (3)
Aggregate supplier · 60 Adams St

# EXHIBIT 5

# STATE OF CONNECTICUT

*CONNECTICUT SITING COUNCIL*

Ten Franklin Square
New Britain, Connecticut 06051
Phone: (860) 827-2935
Fax: (860) 827-2950

December 22, 1998

Jennifer Young Gaudet
Manager-Regulatory
Bell Atlantic Mobile
20 Alexander Drive
Wallingford, CT 06492

RE: TS-BAM/SCLP-077-981208 - Cellco Partnership d/b/a Bell Atlantic Mobile and Springwich Cellular Limited Partnership request for an order to approve tower sharing on a telecommunications tower to be replaced at 60 Adams Street, Manchester, Connecticut.

Dear Ms. Gaudet:

At a public meeting held on December 17, 1998, the Connecticut Siting Council (Council) ruled that the shared use of this replacement tower site is technically, legally, environmentally, and economically feasible and meets public safety concerns, and therefore, in compliance with General Statutes § 16-50aa, the Council has ordered the shared use of this facility to avoid the unnecessary proliferation of tower structures. The proposed shared use is to be implemented as specified in your letter dated December 8, 1998, with the condition that fencing surrounding the base of the tower will consist of black vinyl chainlink fencing as requested by the Town of Manchester.

This facility has been carefully modeled to ensure that radio frequency emissions are conservatively below State and federal standards applicable to the frequency now used on this tower. Any additional change to this facility will require explicit notice to this agency pursuant to Regulations of Connecticut State Agencies Section 16-50j-73. Such notice shall include all relevant information regarding the proposed change with cumulative worst-case modeling of radio frequency exposure at the closest point uncontrolled access to the tower base, consistent with Federal Communications Commission, Office of Engineering and Technology, Bulletin 65. Any deviation from this format may result in the Council implementing enforcement proceedings pursuant to General Statutes § 16-50u including, without limitation, imposition of expenses resulting from such failure and of civil penalties in an amount not less than one thousand dollars per day for each day of construction or operation in material violation.

This decision applies only to this request for tower sharing and is not applicable to any other request or construction. Please notify the Council when all work is complete.

Very truly yours,

Mortimer A. Gelston
Chairman

MAG/RKE/jlh

c: Honorable Stephen T. Cassano, Mayor, Town of Manchester
Peter Van wilgen, Springwich
Mark Pellegrini, Director of Planning & Economic Development, Town of Manchester

I:\siting\em\bam\manchest\dc121798.doc

99-1764

# TOWN OF MANCHESTER ZONING PERMIT

41 Center Street — **Please Print or Type** — Telephone: 647-3052

**TO: ZONING ENFORCEMENT OFFICER**

Certification of Zoning Approval is hereby requested for:

application of a Building Permit — Other:

Decision is based on the following information:

1.) Location: (street and no. or lot no.) 60 ADAMS ST

2.) Owner's Name: BELL ATLANTIC MOBILE

3.) Builder: BELL ATLANTIC MOBILE

Address: 20 ALEXANDER DR WALLINGFOR CT 06492

4.) Check Type of Construction: /__/ New Building /__/ Addition /__/ Alteration /__/ Repair /__/ Miscellaneous

5.) Job Description* CONSTRUCT A 140-0 MONOPOLE TOWER WITH TWO MODULAR BUILDINGS

(*Plot Plan required for all additions to buildings and accessory structures).

6.) Other Buildings Not Shown:

7.) Merestones or Stakes Indicating Lot Boundaries? ON PLANS

8.) Distance from Street Line: 500 T

9.) Distance from Side Line: Left 100 + Right 100 +

10.) Distance from Building to Rear Lot Line: 100 +

11.) Proposed Use: CELLULAR COMMUNICATION FACILITY
(For example: manufacturing, office, storage, dwelling, school, bath, garage)

12.) /__/ Sewer /__/ Septic /__/ Water /__/ Well

**THIS PERMIT SHALL NOT BE EFFECTIVE FOR 24 HOURS AFTER APPROVAL**

I hereby certify that the above statements are true to the best of my knowledge and belief.

4-19-99 (Date) — Mark D. Gaughan (Signature) — 203-494-0023 (Telephone)

---

**FOR OFFICE USE ONLY**

This is to certify that the above-stated information is a permitted and lawful use as controlled by the Zoning Regulations of the Town of Manchester, Connecticut, upon authorized signature of the Zoning Enforcement Officer.

Zoning Permit Issued: 4/ 29 /99 — Conditions:

Zone: IND — Approved By: Thomas A. O'Leary, Zoning Enforcement Officer

**ADDITIONAL APPROVAL FOR BUSINESS AND INDUSTRIAL USE**

| Date | Engineering | Date | Police | Date | Fire |
|---|---|---|---|---|---|
| / | | / | | | |

Comments: approved by zoning council

Additional Permits May Be Required From: ____ Dept(s).

for ____

# EXHIBIT 6

# CTHA039A

60 ADAMS STREET
MANCHESTER, CT 06040
HARTFORD COUNTY

# SITE NO.: CTHA039A

SITE TYPE: 141'± MONOPOLE

RF DESIGN GUIDELINE: 67D97DB2

## 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.

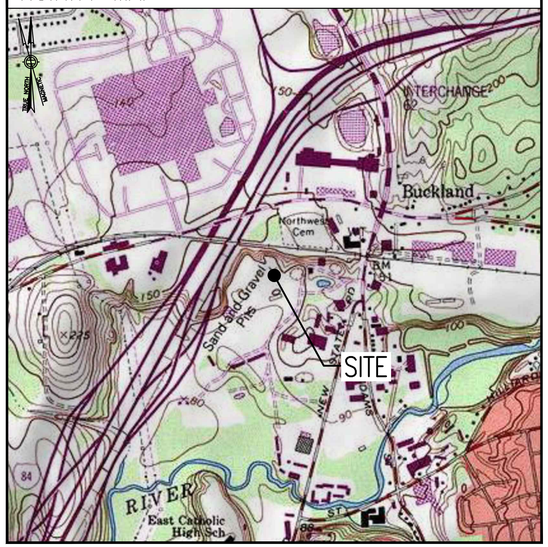
## GENERAL NOTES

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 PROVISIONS 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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| GN-1 | GENERAL NOTES | 2 |
| A-1 | COMPOUND & EQUIPMENT PLAN | 2 |
| A-2 | TOWER ELEVATIONS & ANTENNA PLAN | 2 |
| A-3 | SITE DETAILS | 2 |
| E-1 | ELECTRIC & GROUNDING DETAILS | 2 |

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: | CTHA039A |
| SBA SITE NUMBER: | CT16504-A |
| SBA SITE NAME: | MANCHESTER 12, CT |
| SITE ADDRESS: | 60 ADAMS STREET<br>MANCHESTER, CT 06040 |
| PROPERTY OWNER: | POM-POM GALI LLC<br>PO BOX 133<br>WILLIMANTIC, CT 06226 |
| TOWER OWNER: | SBA TOWERS VIII, LLC<br>8501 CONGRESS AVENUE<br>BOCA RATON, FL 33487<br>PHONE: 561-226-9523 |
| COUNTY: | HARTFORD |
| ZONING DISTRICT: | INDUSTRIAL 96 |
| STRUCTURE TYPE: | MONOPOLE |
| STRUCTURE HEIGHT: | 141'± |
| APPLICANT: | T-MOBILE NORTHEAST LLC<br>15 COMMERCE WAY, SUITE B<br>NORTON, MA 02766 |
| SBA RSM: | STEPHEN ROTH<br>PHONE: 860-539-4920<br>EMAIL: SRoth@sbasite.com |
| ARCHITECT: | CHAPPELL ENGINEERING ASSOCIATES, LLC.<br>201 BOSTON POST ROAD WEST, SUITE 101<br>MARLBOROUGH, MA 01752 |
| STRUCTURAL ENGINEER: | CHAPPELL ENGINEERING ASSOCIATES, LLC.<br>201 BOSTON POST ROAD WEST, SUITE 101<br>MARLBOROUGH, MA 01752 |
| SITE CONTROL POINT: | LATITUDE: 41.794050° N41°47'38.58"<br>LONGITUDE: -72.555999° W72°33'21.60" |


T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
(508) 286-2700

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
(508) 251-0720

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil· Structural ·Land Surveying
R.K. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MARLBOROUGH, MA 01752
(508) 481-7400
www.chappellengineering.com


STATE OF CONNECTICUT
CLEMENT J. SAMEK
No. 26876
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

### SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| 2 | 08/18/19 | REVISED CONSTRUCTION | JRV |
| 1 | 08/08/19 | ISSUED FOR CONSTRUCTION | CMC |
| 0 | 06/13/19 | ISSUED FOR REVIEW | JRV |

SITE NUMBER:
CTHA039A

SITE ADDRESS:
60 ADAMS STREET
MANCHESTER, CT 06040

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

1815.103

## 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 (⅞"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.


T-MOBILE
NORTHEAST LLC

15 COMMERCE WAY, SUITE B
NORTON, MA 02766
(508) 286–2700

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
(508) 251–0720

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil ·Structural ·Land Surveying

R.K. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MARLBOROUGH, MA 01752
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www.chappellengineering.com


STATE OF CONNECTICUT
CLEMENT J. GAUTHIER
No. 26876
LICENSED
PROFESSIONAL ENGINEER

CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

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| 2 | 08/18/19 | REVISED CONSTRUCTION | JRV |
| 1 | 08/08/19 | ISSUED FOR CONSTRUCTION | CMC |
| 0 | 06/13/19 | ISSUED FOR REVIEW | JRV |

SITE NUMBER:
CTHA039A

SITE ADDRESS:
60 ADAMS STREET
MANCHESTER, CT 06040

SHEET TITLE
GENERAL NOTES

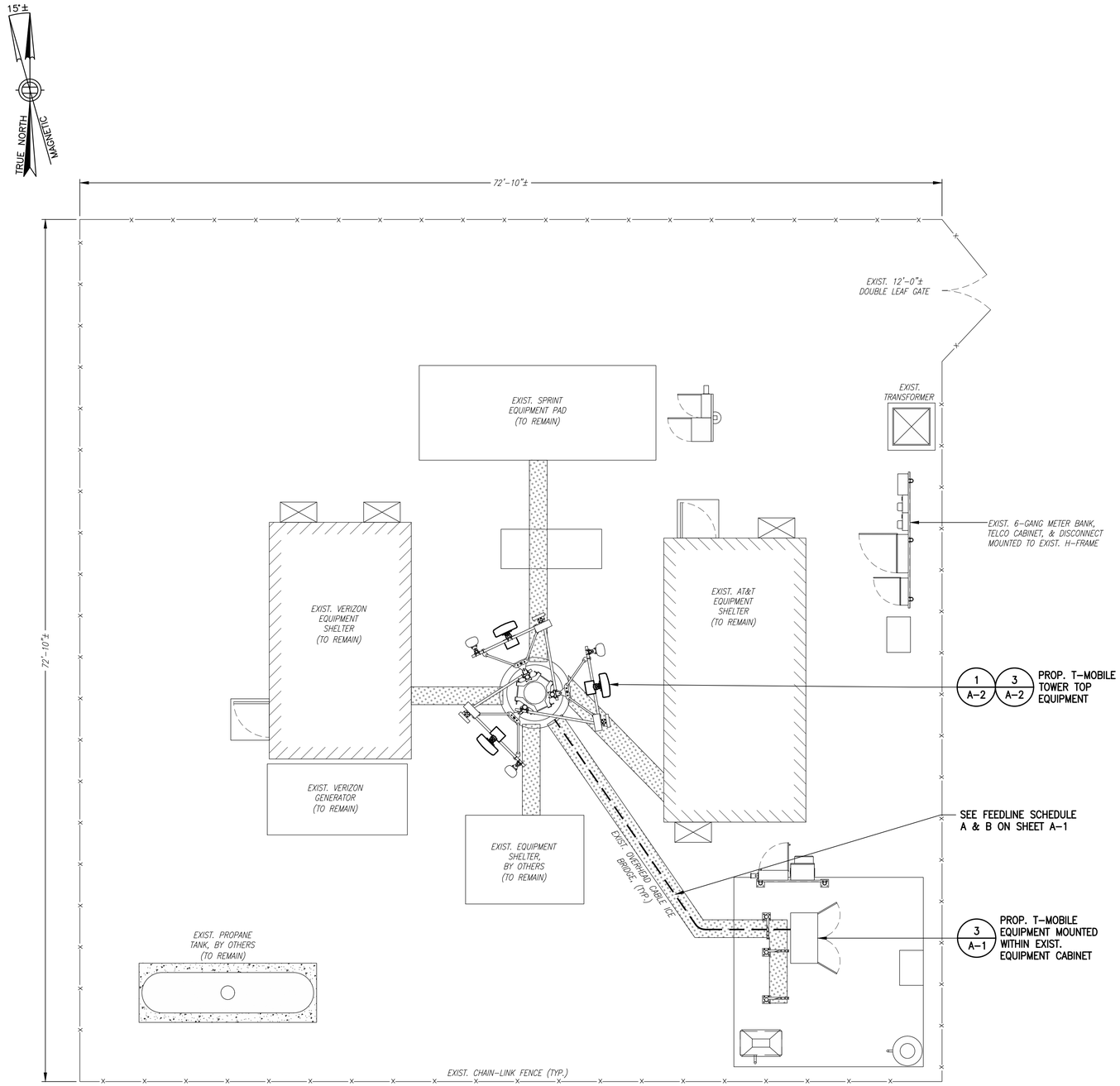
SHEET NUMBER
GN-1

1815.103

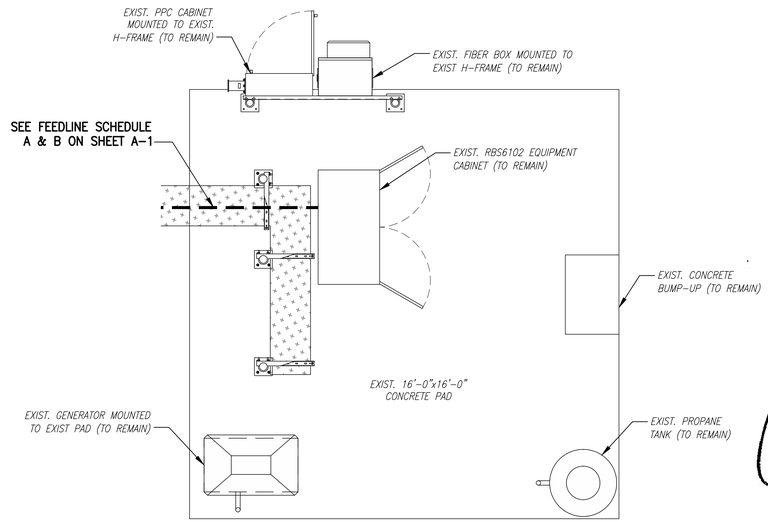
SPECIAL PRE-CONSTRUCTION WORK NOTE (SBA-PROVIDED TOWER STRUCTURAL ANALYSIS SPECIAL EQUIPMENT INSTALLATION REQUIREMENTS):
GENERAL CONTRACTOR SHALL FURNISH AND INSTALL ALL SPECIAL OR SUPPLEMENTAL ADDITIONAL TOWER-MOUNTED EQUIPMENT PER RECOMMENDATIONS FROM SBA-PROVIDED TOWER STRUCTURAL ANALYSIS FOR ANY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

| FEEDLINE SCHEDULE | FEEDLINES | LOCATION |
|---|---|---|
| A | *EXISTING TO REMAIN:* *(2) 1-5/8" REMAIN* | ROUTED PER TOWER STRUCTURAL ANALYSIS |
| B | **PROPOSED:** **(1) 1-¼" PROPOSED** | |

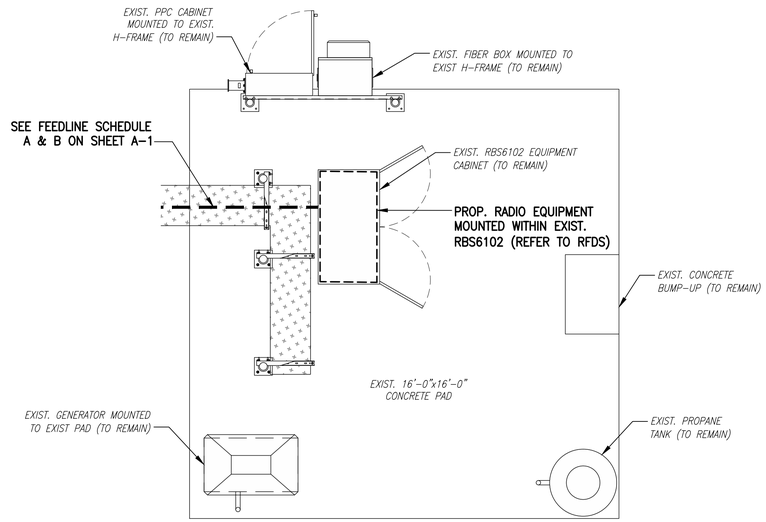
**NOTE:**
**EXISTING T-MOBILE EQUIPMENT FEEDLINE INVENTORY BASED ON OBSERVED FIELD CONDITIONS. RFDS AND FEEDLINE LEASING ENTITLEMENTS MAY DIFFER.**




## COMPOUND PLAN
SCALE: 1" = 5'-0" (1 A-1)
0 5'-0" 10'-0 15'-0"




## EXISTING EQUIPMENT PLAN
SCALE: 3/8" = 1'-0" (2 A-1)
0 2'-8" 5'-4" 8'-0"




## PROPOSED EQUIPMENT PLAN
SCALE: 3/8" = 1'-0" (3 A-1)
0 2'-8" 5'-4" 8'-0"


T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
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134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
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(508) 481-7400
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60 ADAMS STREET
MANCHESTER, CT 06040

SHEET TITLE
COMPOUND & EQUIPMENT PLAN

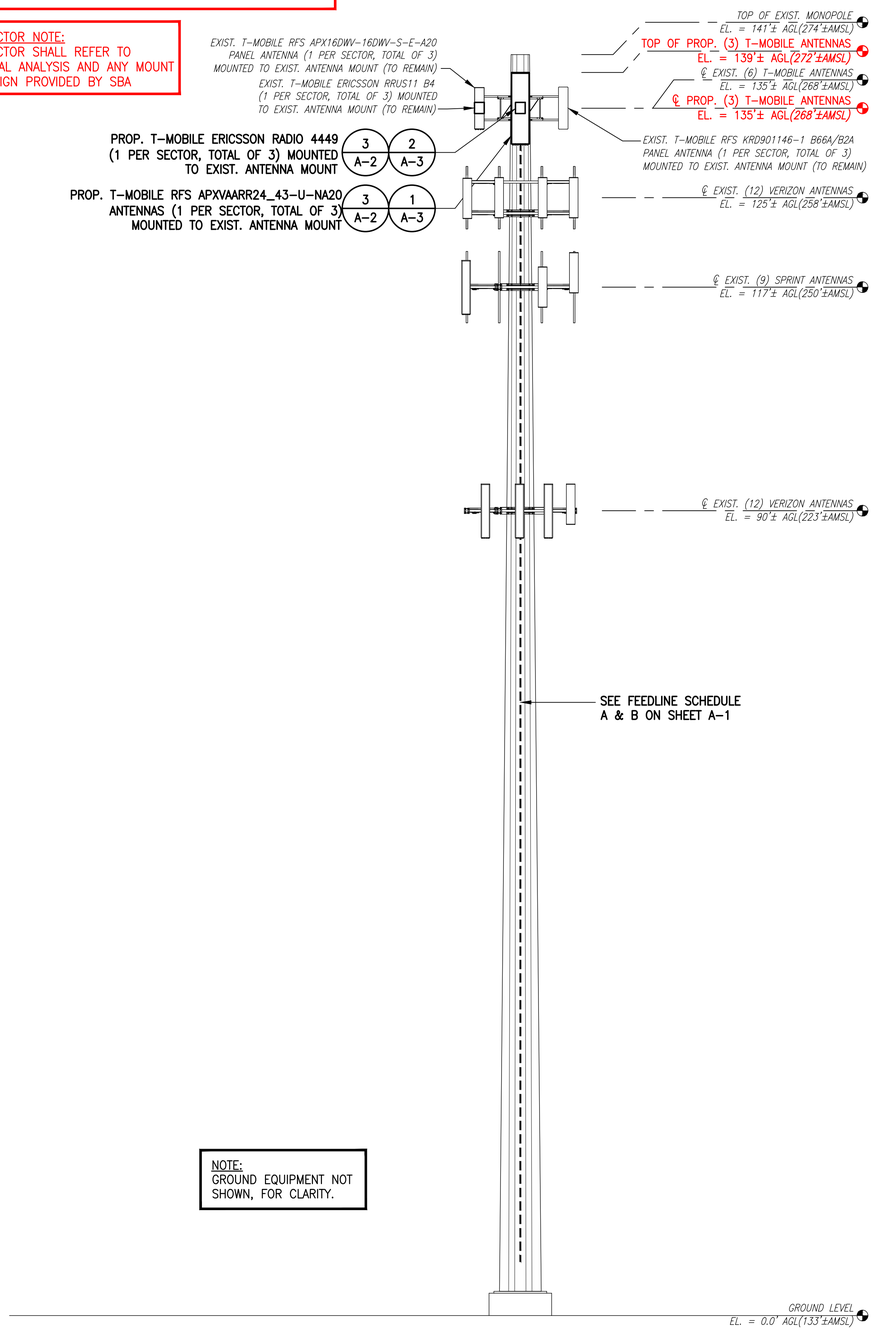
SHEET NUMBER
A-1

1815.103

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.

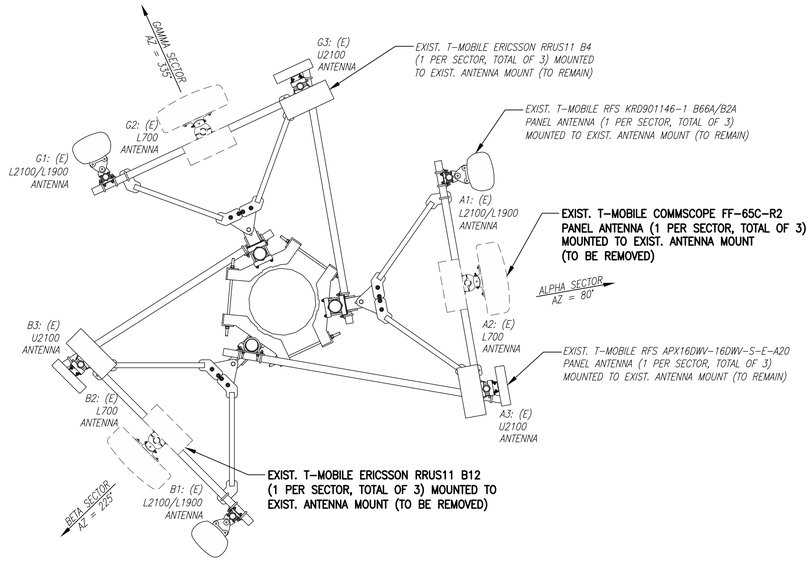
RAD CENTER NOTE:
T-MOBILE RAD CENTER SHOWN IN RED TEXT BASED ON SBA-PROVIDED CO-LOCATION APPLICATION, EQUIPMENT DATABASE, AND STRUCTURAL ANALYSIS. THE SBA-PROVIDED ANTENNA RAD CENTER SHALL SUPERSEDE ANY CONFLICTING INFORMATION DERIVED FROM THE T-MOBILE RFDS.

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

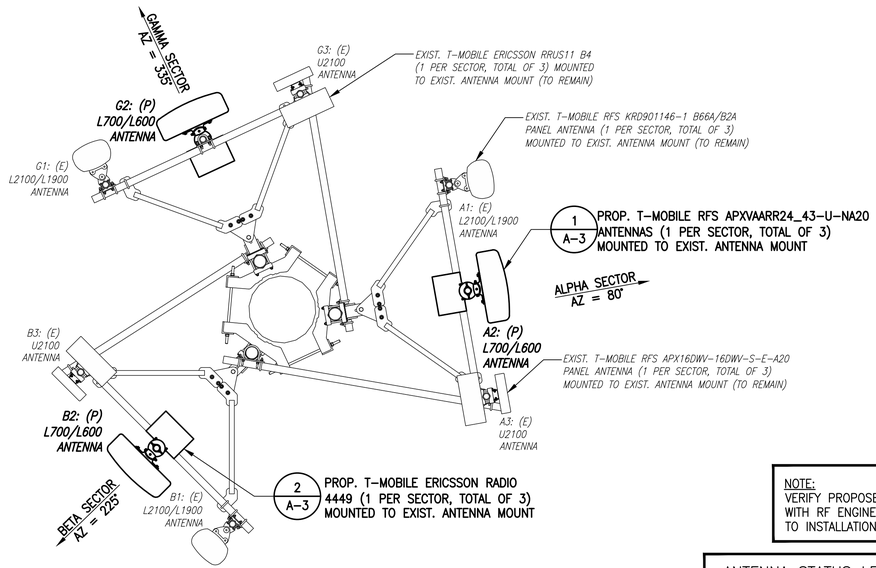



TOWER ELEVATION
SCALE: 1" = 8'
1 A-2
0 4' 8' 16' 24'

NOTE:
GROUND EQUIPMENT NOT SHOWN, FOR CLARITY.




EXISTING ANTENNA PLAN
SCALE: 1/2" = 1'-0"
2 A-2
NORTH




PROPOSED ANTENNA PLAN
SCALE: 1/2" = 1'-0"
3 A-2
NORTH

NOTE:
VERIFY PROPOSED AZIMUTHS WITH RF ENGINEER PRIOR TO INSTALLATION.

ANTENNA STATUS LEGEND:

EMPTY - EMPTY PIPE

(E) - EXISTING
(P) - INSTALL
(F) - FUTURE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NORTON, MA 02766
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WESTBOROUGH, MA 01581
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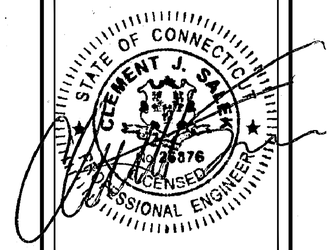


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60 ADAMS STREET
MANCHESTER, CT 06040

SHEET TITLE
TOWER ELEVATIONS & ANTENNA PLAN

SHEET NUMBER
A-2

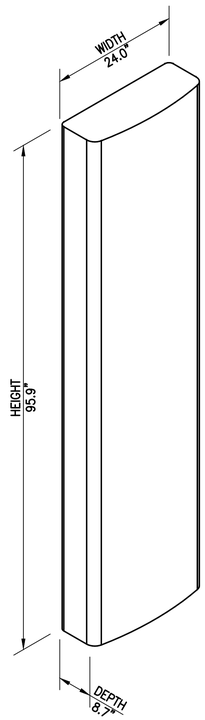
1815.103

## FINAL ANTENNA CONFIGURATION

| SECTOR | ANTENNA | RAD CENTER | AZIMUTH (TRUE NORTH) | MECHANICAL DOWNTILT | ELECTRICAL DOWNTILT | BAND | RADIOS/TMAS | CABLES |
|---|---|---|---|---|---|---|---|---|
| ALPHA | *ERICSSON AIR32 KRD901146-1 B66A/B2A* | *135'± AGL* | *80°* | *0°* | *4°* | *L1900/L1900* | – | (2) 1-5/8" REMAIN<br><br>(1) 1-¼" PROPOSED |
| | **RFS APXVAARR24_43-U-NA20** | **135'± AGL** | **80°** | **0°** | **4°** | **L600/L700** | **RADIO 4449 B71+B12** | |
| | *RFS APX16DWV-16DWV-S-E-A20* | *135'± AGL* | *80°* | *0°* | *4°* | *U2100* | *RRUS11 B4* | |
| BETA | *ERICSSON AIR32 KRD901146-1 B66A/B2A* | *135'± AGL* | *225°* | *0°* | *4°* | *L1900/L1900* | – | |
| | **RFS APXVAARR24_43-U-NA20** | **135'± AGL** | **225°** | **0°** | **4°** | **L600/L700** | **RADIO 4449 B71+B12** | |
| | *RFS APX16DWV-16DWV-S-E-A20* | *135'± AGL* | *225°* | *0°* | *4°* | *U2100* | *RRUS11 B4* | |
| GAMMA | *ERICSSON AIR32 KRD901146-1 B66A/B2A* | *135'± AGL* | *335°* | *0°* | *4°* | *L1900/L1900* | – | |
| | **RFS APXVAARR24_43-U-NA20** | **135'± AGL** | **335°** | **0°** | **4°** | **L600/L700** | **RADIO 4449 B71+B12** | |
| | *RFS APX16DWV-16DWV-S-E-A20* | *135'± AGL* | *335°* | *0°* | *4°* | *U2100* | *RRUS11 B4* | |

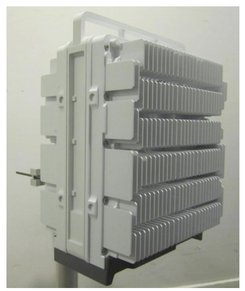
CABLE NOTE: SEE FEEDLINE SCHEDULE A&B ON SHEET A-1

NOTE: RFDS REV1.1 – 05/14/19




RFS APXVAARR24_43-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

RRUS DETAILS (2 / A-3)
SCALE: N.T.S.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NORTON, MA 02766
(508) 286-2700

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WESTBOROUGH, MA 01581
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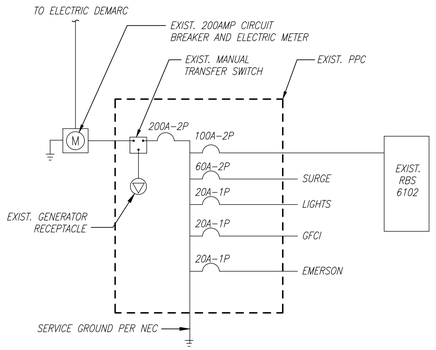
MANCHESTER, CT 06040

SHEET TITLE
SITE DETAILS

SHEET NUMBER
A-3

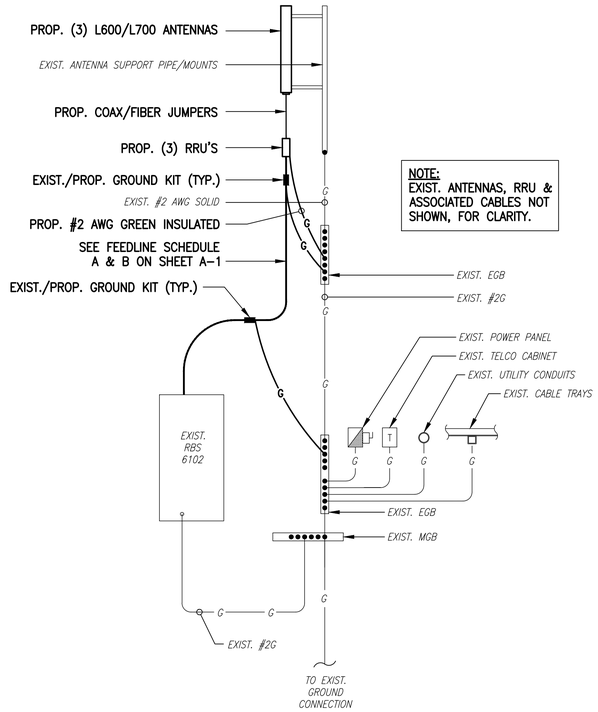
1815.103




## ONE LINE DIAGRAM

SCALE: NOT TO SCALE

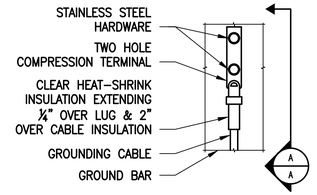
1 / E-1



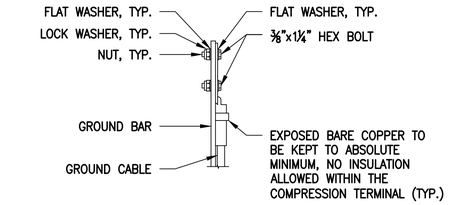

## GROUNDING RISER DIAGRAM

SCALE: NOT TO SCALE

2 / E-1




**ELEVATION**



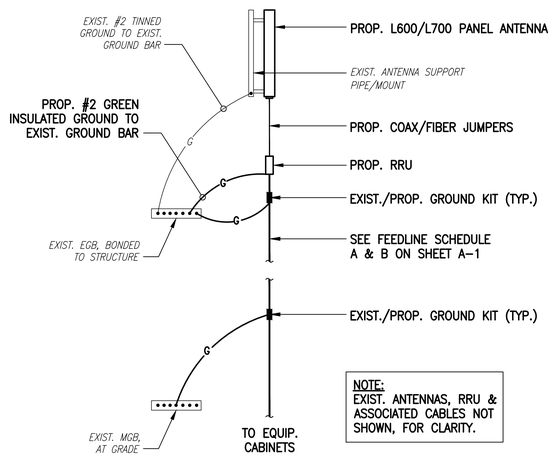

**SECTION A-A**

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

SCALE: NOT TO SCALE

3 / E-1

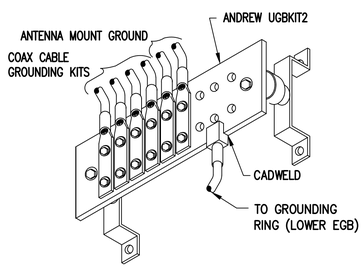



L600/L700

## COAX CABLE CONNECTION AND GROUNDING DETAIL

SCALE: NOT TO SCALE

4 / E-1




## GROUND BAR (EGB)

SCALE: NOT TO SCALE

5 / E-1

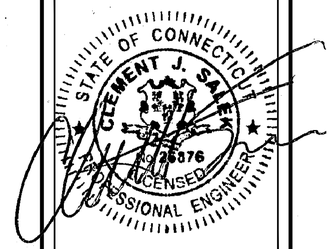
## ELECTRICAL AND GROUNDING NOTES

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.


T-MOBILE NORTHEAST LLC
15 COMMERCE WAY, SUITE B
NORTON, MA 02766
(508) 286-2700

SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
(508) 251-0720

CHAPPELL ENGINEERING ASSOCIATES, LLC
Civil ·Structural ·Land Surveying
R.K. EXECUTIVE CENTRE
201 BOSTON POST ROAD WEST, SUITE 101
MARLBOROUGH, MA 01752
(508) 481-7400
www.chappellengineering.com


CHECKED BY: JMT

APPROVED BY: JMT

SUBMITTALS

| REV. | DATE | DESCRIPTION | BY |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| 2 | 08/18/19 | REVISED CONSTRUCTION | JRV |
| 1 | 08/08/19 | ISSUED FOR CONSTRUCTION | CMC |
| 0 | 06/13/19 | ISSUED FOR REVIEW | JRV |

SITE NUMBER:
CTHA039A

SITE ADDRESS:
60 ADAMS STREET
MANCHESTER, CT 06040

SHEET TITLE
ELECTRIC & GROUNDING DETAILS

SHEET NUMBER
E-1

1815.103

# 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 141 ft EEI Monopole**

**Customer Name: SBA Communications Corp**

**Customer Site Number: CT16504-A**

**Customer Site Name: Manchester 12, CT**

**Carrier Name: T-Mobile (App#: 117033, V2)**

**Carrier Site ID / Name: CTHA039A / Manchester**

**Site Location: 60 Adams Street**

**Manchester, Connecticut**

**Hartford County**

**Latitude: 41.794100**

**Longitude: -72.555300**


**Analysis Result:**

**Max Structural Usage: 92.4% [Pass]**

**Max Foundation Usage: 88.0% [Pass]**

**Additional Usage Caused by New Mount/Mount Modification : N/A**

**Report Prepared By : Linfeng Chen**

## Introduction

The purpose of this report is to summarize the analysis results on the 141 ft EEI 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** | FDH, Mapping Report #15BRLA1500, dated June 15, 2015 |
| **Foundation Drawing** | FDH, Mapping Report # 15BRLC1500, dated June 16, 2015 |
| **Geotechnical Report** | FDH, Project # 15BRNG1600, dated June 17, 2015 |
| **Modification Drawings** | TES, Job # 36710, dated December 14, 2017 |

## Analysis Criteria

The comprehensive analysis was performed in accordance with the requirements and stipulations of the ANSI/TIA/EIA 222-H**.** 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:** | 118.0 mph (3-Sec. Gust) (Ultimate wind speed) |
| **Wind Speed with Ice:** | 50 mph (3-Sec. Gust) with 1”1/2 radial ice concurrent |
| **Service Load Wind Speed:** | 60 mph + 0” Radial ice |
| **Standard/Codes:** | ANSI/TIA/EIA 222-H / 2015 IBC / 2018 Connecticut State Building Code |
| **Exposure Category:** | C |
| **Risk Category:** | II |
| **Topographic Category:** | 1 |
| **Crest Height:** | 0 ft |
| **Seismic Parameters:** | $S_S$ = 0.188, $S_1$ = 0.055 |

This structural analysis is based upon the tower being classified as a Risk Category 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 |
|---|---|---|---|---|---|---|
| - | 135.0 | 3 | Ericsson AIR32 KRD901146-1_B66A_B2A - Panel | (3) Sector Frame (MCG23HDX-10M-9-96) | (2) 1 1/4" Fiber (2) 1 5/8" | T-Mobile |
| - | | 3 | Commscope F-65C-R2 - Panel | | | |
| - | | 3 | RFS APX16DWV-16DWVS-E-A20 - Panel | | | |
| - | | 3 | Ericsson S11B12 - RRU | | | |
| - | | 3 | Ericsson RRUS 32 B66A - RRU | | | |
| - | | 3 | 15" X 14" X 7.5" - RRU | | | |
| 7 | 125.0 | 3 | Quintel QS66512-2 - Panel | Platform w/ Hand Rails | (12) 1 1/4" (4) 0.625" DC (2) 0.40" Fiber (2) 2" Conduit | AT&T |
| 8 | | 3 | Kathrein 800-10121 - Panel | | | |
| 9 | | 3 | CCI OPA-65R-LCUU-H6 - Panel | | | |
| 10 | | 3 | CCI HPA-65R-BUU-H6 - Panel | | | |
| 11 | | 6 | CCI DTMABP7819VG12A | | | |
| 12 | | 6 | Kathrein 782 10250 | | | |
| 13 | | 6 | Ericsson RRUS-32 | | | |
| 14 | | 3 | Ericsson RRUS-11 | | | |
| 15 | | 3 | Ericsson B14 4478 | | | |
| 16 | | 3 | Ericsson RRUS 32 B66 | | | |
| 17 | | 6 | Kaelus DBC0061F1V51-2 | | | |
| 18 | | 3 | Raycap DC6-48-60-18-8F | | | |
| 19 | 118.5 | 1 | Andrew VHLP1-23-DW1 - Dish | Low Profile Platform* | (3) 1-1/4" (2) 2 1/8" F.C. (1) 3/4" Fiber (2) 5/8" | Sprint-Clearwire |
| 20 | | 1 | Andrew VHLP2-23-DW1 - Dish | | | |
| 21 | 117.0 | 3 | RFS APXVTM14 - Panel | | | |
| 22 | | 3 | RFS APXVSPP18 - Panel | | | |
| 23 | | 3 | Alcatel Lucent RRH8x20-25-FEU | | | |
| 24 | | 3 | Alcatel Lucent RRH1900-4X45 | | | |
| 25 | 114.5 | 3 | Argus LLPX310R-V1 - Panel | | | |
| 26 | 114.0 | 1 | 20" x 18" x 9" Junction Box | | | |
| 27 | 113.0 | 3 | Samsung SPI-22132825WB | | | |
| 28 | 112.5 | 3 | Alcatel Lucent RRH2X50-800 | | | |
| 29 | 90.0 | 3 | Swedcom SLCP 2x6014 - Panel | Platform w/ Hand Rails | (12) 1 5/8" (2) 1 5/8" Fiber | Verizon |
| 30 | | 6 | Commscope SBNHH-1D65B - Panel | | | |
| 31 | | 3 | Antel BXA-70063-6CF-EDIN-x - Panel | | | |
| 32 | | 3 | Alcatel Lucent RRH2X60-AWS | | | |
| 33 | | 3 | Alcatel Lucent RRH2X60-700 | | | |
| 34 | | 3 | Alcatel Lucent RRH2X60-PCS | | | |
| 35 | | 1 | RFS DB-T1-6Z-8AB-0Z | | | |

*Mount is at 114'.

## 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 | 135.0 | 3 | Ericsson Air 32 KRD901146-1_B66A_B2A - Panel | (3) Sector Frame* | (2) 1 1/4" Fiber<br>(2) 1 5/8" Fiber | T-Mobile |
| 2 | | 3 | RFS APXVAARR24_43-U-NA20 - Panel | | | |
| 3 | | 3 | RFS APX16DWV-16DWVS-E-A20 - Panel | | | |
| 4 | | 3 | Ericsson RRUS11 B4 RRUs | | | |
| 5 | | 3 | Ericsson RRUS 32 B66A RRUs | | | |
| 6 | | 3 | Ericsson Radio 4449 B71+B12 RRUs | | | |

*According to Mapping and Mount Analysis.

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: | **92.4%** | **81.4%** | **62.0%** |
| Pass/Fail | **Pass** | **Pass** | **Pass** |

## Foundations

| | Moment (Kip-Ft) | Shear (Kips) | Axial (Kips) |
|---|---|---|---|
| Analysis Reactions | 3377.9 | 32.2 | 41.3 |

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.

## Service Load Condition (Rigidity):

The maximum twist and sway of the microwave dishes under the operational wind speed as specified in the Analysis Criteria are listed in the table below:

| Elevation (ft) | Antenna / Dish | Carrier | Twist (deg) | Sway (deg) |
|---|---|---|---|---|
| 118.5 | Andrew VHLP1-23-DW1 - Dish | Sprint-Clearwire | 0.000 | 1.825 |
| | Andrew VHLP2-23-DW1 - Dish | Sprint-Clearwire | 0.000 | 1.825 |

It is recommended that the carriers review the twist and sway values of the microwave dishes.

## 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-H 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 ANSI/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 92.43% at 70.0ft

| | | | | |
|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | **Gh:** | 1.1 | |
| **Base Elev:** | 0.000 (ft) | | | Page: 1 |

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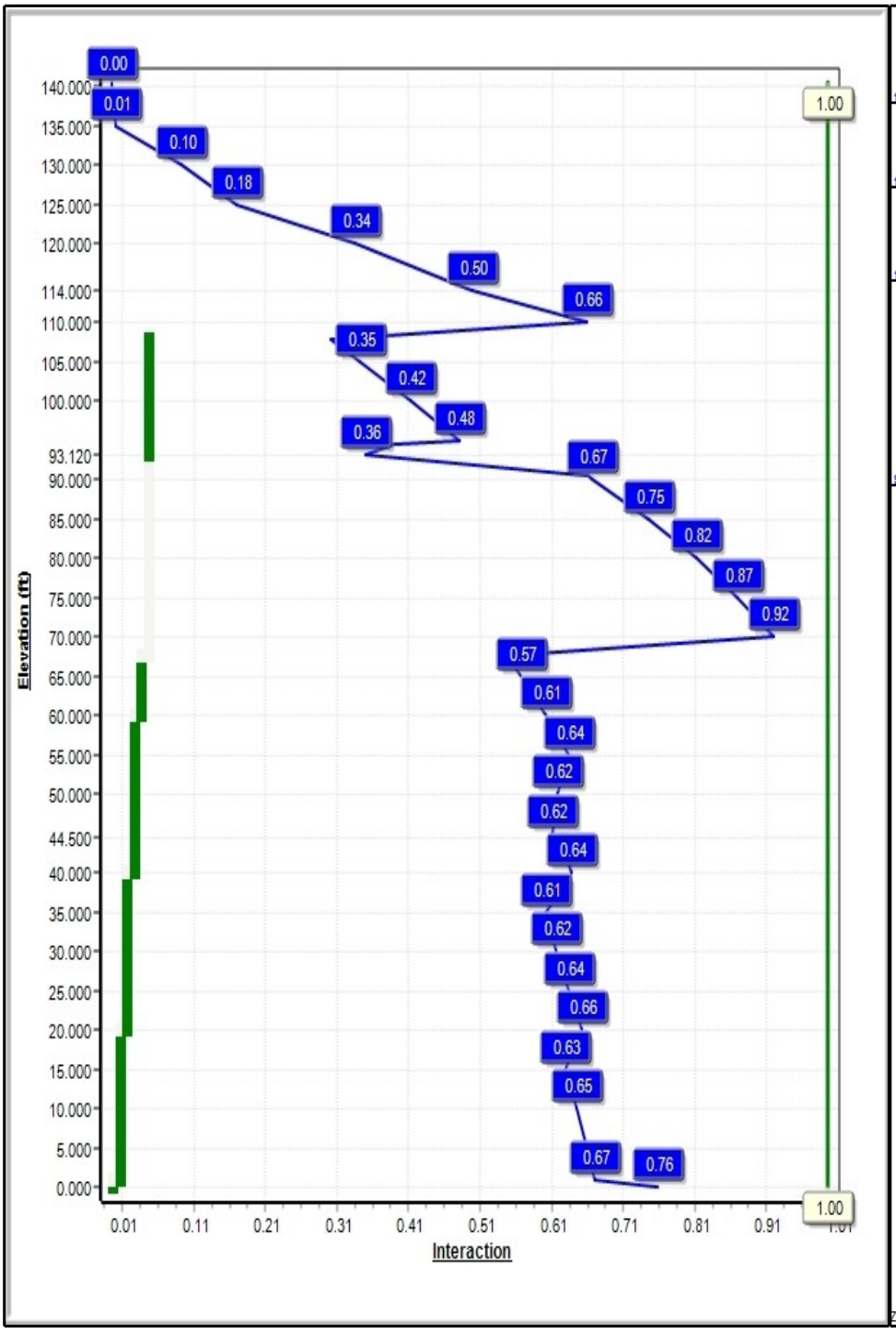
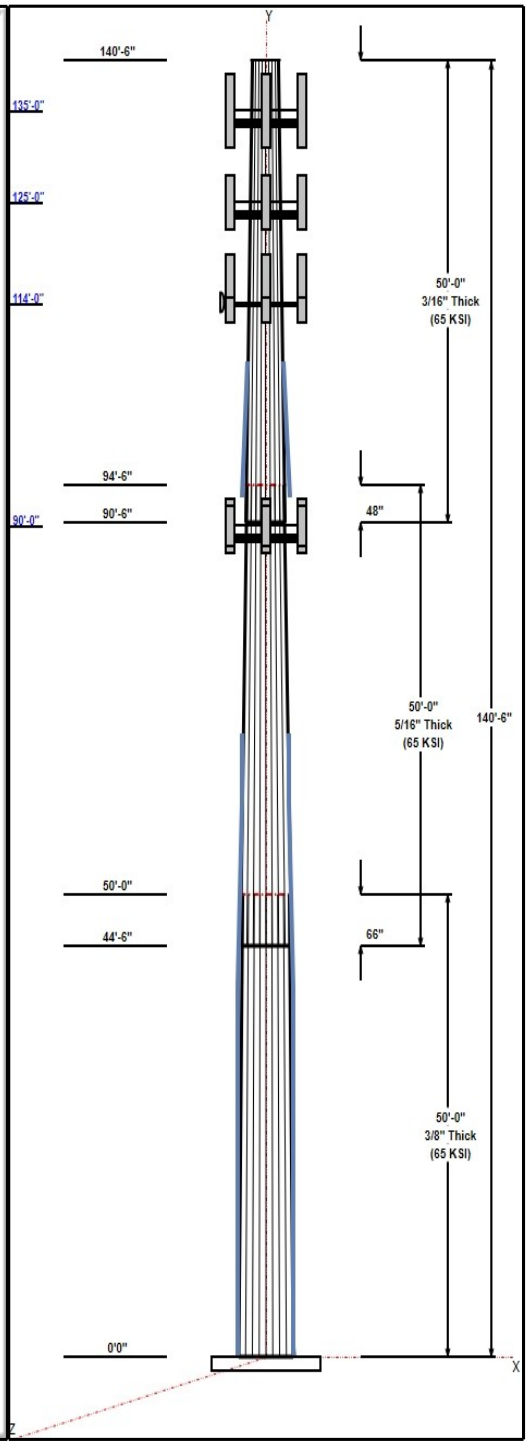
| | |
|---|---|
| Dead Load Factor: | 1.20 |
| Wind Load Factor: | 1.00 |

**Load Case : 1.2D + 1.0W 118 mph Wind**

**Iterations:** 25





# Structure: CT16504-A-SBA

**Type:** Tapered
**Site Name:** Manchester 12, CT
**Height:** 140.50 (ft)
**Base Elev:** 0.00 (ft)

**Base Shape:** 18 Sided
**Taper:** 0.18206

7/9/2019



Tower Engineering Solutions

## Shaft Properties

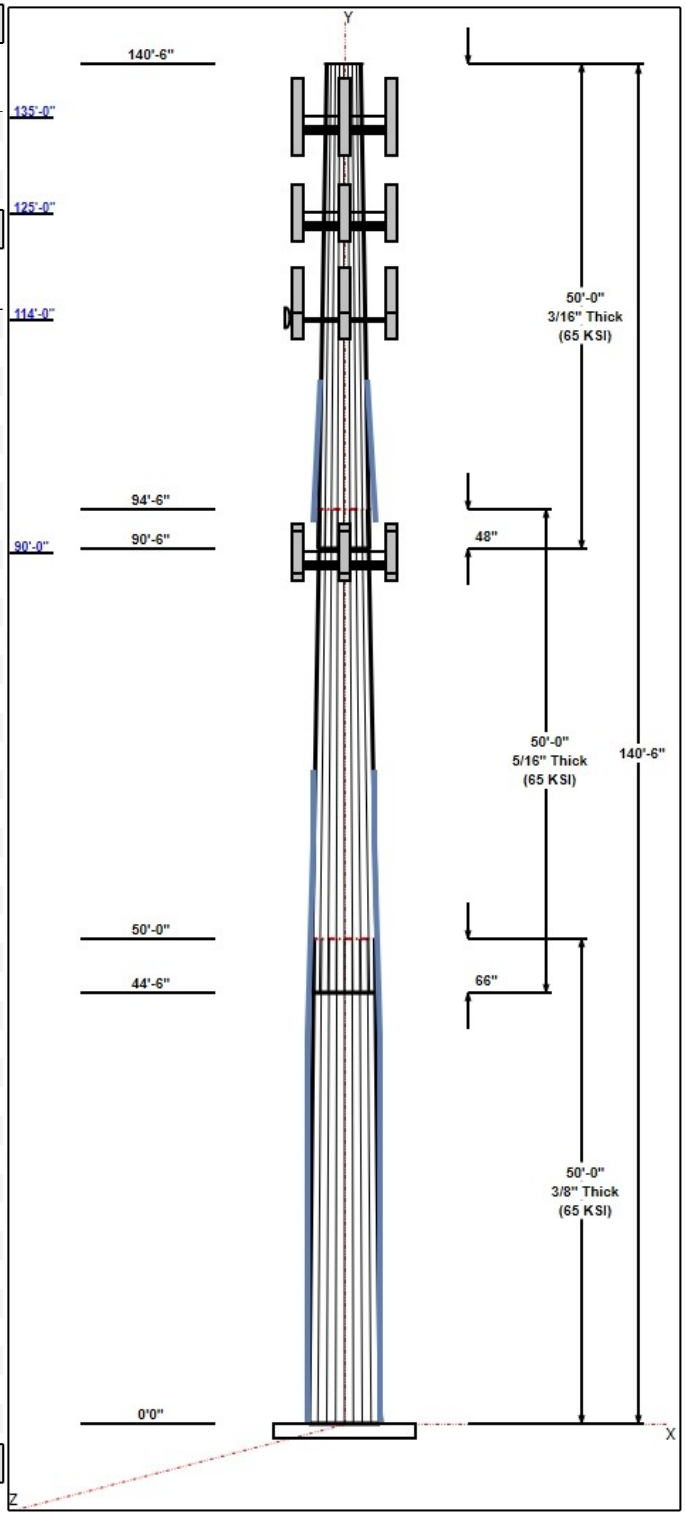
| Seq | Length (ft) | Top (in) | Bottom (in) | Thick (in) | Joint Type | Taper | Grade (ksi) |
|---|---|---|---|---|---|---|---|
| 1 | 50.00 | 33.44 | 42.54 | 0.375 | | 0.18206 | 65 |
| 2 | 50.00 | 25.96 | 35.06 | 0.313 | Slip | 0.18206 | 65 |
| 3 | 50.00 | 17.96 | 27.06 | 0.188 | Slip | 0.18206 | 65 |

## Discrete Appurtenances

| Attach Elev (ft) | Force Elev (ft) | Qty | Description | Carrier |
|---|---|---|---|---|
| 135.00 | 135.00 | 3 | Ericsson Air 32 | T-Mobile |
| 135.00 | 135.00 | 3 | RFS | T-Mobile |
| 135.00 | 135.00 | 3 | RFS | T-Mobile |
| 135.00 | 135.00 | 3 | Ericsson RRUS11 B4 | T-Mobile |
| 135.00 | 135.00 | 3 | Sector Frame | T-Mobile |
| 135.00 | 135.00 | 3 | Ericsson RRUS 32 B66A | T-Mobile |
| 135.00 | 135.00 | 3 | Ericsson Radio 4449 | T-Mobile |
| 125.00 | 125.00 | 1 | Platform w/ Hand Rails | AT&T |
| 125.00 | 125.00 | 3 | QS66512-2 | AT&T |
| 125.00 | 125.00 | 3 | CCI OPA-65R-LCUU-H6 | AT&T |
| 125.00 | 125.00 | 6 | Kathrein 782 10250 | AT&T |
| 125.00 | 125.00 | 3 | B14 4478 | AT&T |
| 125.00 | 125.00 | 3 | RRUS 32 B66 | AT&T |
| 125.00 | 125.00 | 6 | DBC0061F1V51-2 | AT&T |
| 125.00 | 125.00 | 3 | Raycap DC6-48-60-18-8F | AT&T |
| 125.00 | 125.00 | 6 | CCI DTMABP7819VG12A | AT&T |
| 125.00 | 125.00 | 3 | Ericsson RRUS-11 | AT&T |
| 125.00 | 125.00 | 6 | Ericsson RRUS-32 | AT&T |
| 125.00 | 125.00 | 3 | Kathrein 800-10121 | AT&T |
| 125.00 | 125.00 | 3 | HPA-65R-BUU-H6 | AT&T |
| 114.00 | 118.50 | 1 | Andrew VHLP1-23-DW1 | Sprint-Clearwire |
| 114.00 | 118.50 | 1 | Andrew VHLP2-23-DW1 | Sprint-Clearwire |
| 114.00 | 114.50 | 3 | Argus LLPX310R-V1 | Sprint-Clearwire |
| 114.00 | 113.00 | 3 | Samsung | Sprint-Clearwire |
| 114.00 | 114.00 | 1 | 20" x 18" x 9" Junction Box | Sprint-Clearwire |
| 114.00 | 117.00 | 3 | RFS APXVTM14 | Sprint-Clearwire |
| 114.00 | 115.00 | 3 | RFS APXVSPP18 | Sprint-Clearwire |
| 114.00 | 117.00 | 3 | Alcatel Lucent | Sprint-Clearwire |
| 114.00 | 112.50 | 3 | Alcatel Lucent | Sprint-Clearwire |
| 114.00 | 117.00 | 3 | Alcatel Lucent | Sprint-Clearwire |
| 114.00 | 114.00 | 1 | Low Profile Platform | Sprint-Clearwire |
| 90.00 | 90.00 | 3 | Swedcom SLCP 2x6014 | Verizon |
| 90.00 | 90.00 | 6 | Commscope | Verizon |
| 90.00 | 90.00 | 3 | Antel | Verizon |
| 90.00 | 90.00 | 3 | Alcatel Lucent | Verizon |
| 90.00 | 90.00 | 3 | Alcatel Lucent | Verizon |
| 90.00 | 90.00 | 3 | Alcatel Lucent | Verizon |
| 90.00 | 90.00 | 1 | RFS DB-T1-6Z-8AB-0Z | Verizon |
| 90.00 | 90.00 | 1 | Platform w/ Hand Rails | Verizon |

## Linear Appurtenances

| Elev From (ft) | Elev To (ft) | Placement | Description | Carrier |
|---|---|---|---|---|
| 0.00 | 135.00 | Outside | 1 1/4" Fiber | T-Mobile |
| 0.00 | 135.00 | Outside | 1 5/8" Fiber | T-Mobile |
| 0.00 | 125.00 | Inside | 0.40" Fiber | AT&T |
| 0.00 | 125.00 | Inside | 0.625" DC | AT&T |



| | | | | |
|---|---|---|---|---|
| 0.00 | 125.00 | Inside | 1 1/4" Coax | AT&T |
| 0.00 | 125.00 | Inside | 2" Conduit | AT&T |
| 0.00 | 114.00 | Inside | 1-1/4" | Sprint-Clearwire |
| 0.00 | 114.00 | Inside | 2 1/8" F.C. | Sprint-Clearwire |
| 0.00 | 114.00 | Inside | 3/4" | Sprint-Clearwire |
| 0.00 | 114.00 | Inside | 5/8" | Sprint-Clearwire |
| 90.50 | 110.50 | Outside | 1" Reinforcing plate | |
| 90.50 | 110.50 | Outside | 1" Reinforcing plate | |
| 0.00 | 90.00 | Inside | 1 5/8" Coax | Verizon |
| 0.00 | 90.00 | Inside | 1 5/8" Fiber | Verizon |
| 40.00 | 70.00 | Outside | 1" Reinforcing plate | |
| 40.00 | 70.00 | Outside | 1" Reinforcing plate | |
| 0.00 | 40.00 | Outside | 1.25" Reinforcing plate | |
| 0.00 | 40.00 | Outside | 1.25" Reinforcing plate | |

## Anchor Bolts

| Qty | Specifications | Grade (ksi) | Arrangement |
|---|---|---|---|
| 12 | 2.25" 18J | 75.0 | Radial |

## Base Plate

| Thickness (in) | Specifications (in) | Grade (ksi) | Geometry |
|---|---|---|---|
| 1.7500 | 57.0 | 60.0 | Round |

## Reactions

| Load Case | Moment (FT-Kips) | Shear (Kips) | Axial (Kips) |
|---|---|---|---|
| 1.2D + 1.0W 118 mph Wind | 3377.9 | 32.2 | 41.3 |
| 0.9D + 1.0W 118 mph Wind | 3330.3 | 32.2 | 30.9 |
| 1.2D + 1.0Di + 1.0Wi 50 mph Wind | 936.6 | 8.7 | 72.8 |
| 1.2D + 1.0Ev + 1.0Eh | 282.5 | 2.7 | 41.3 |
| 0.9D + 1.0Ev + 1.0Eh | 278.1 | 2.7 | 31.0 |
| 1.0D + 1.0W 60 mph Wind | 867.0 | 8.3 | 34.4 |

# Structure: CT16504-A-SBA - Coax Line Placement

**Type:** Monopole
**Site Name:** Manchester 12, CT
**Height:** 140.50 (ft)

7/9/2019



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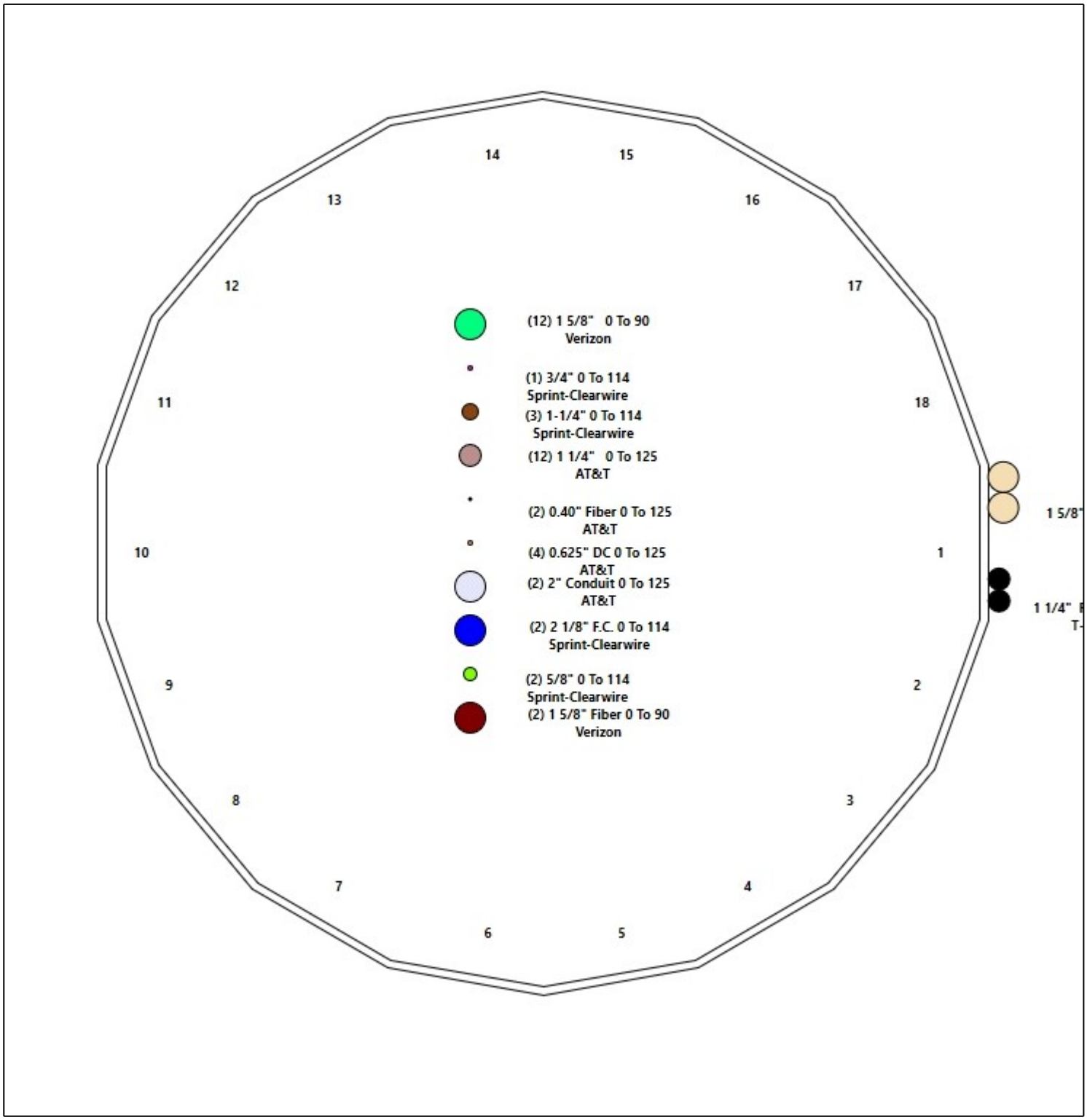

# Shaft Properties

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | | **Crest Height:** | 0.00 | |
| **Base Elev:** | 0.000 (ft) | | **Site Class:** | D - Stiff Soil | |
| **Gh:** | 1.1 | **Topography:** 1 | **Struct Class:** | II | Page: 5 |

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| Sec. No. | Shape | Length (ft) | Thick (in) | Fy (ksi) | Joint Type | Overlap (in) | Weight (lb) |
|---|---|---|---|---|---|---|---|
| 1 | 18 | 50.000 | 0.3750 | 65 | | 0.00 | 7,617 |
| 2 | 18 | 50.000 | 0.3125 | 65 | Slip | 66.00 | 5,096 |
| 3 | 18 | 50.000 | 0.1875 | 65 | Slip | 48.00 | 2,260 |
| | | | | | **Total Shaft Weight:** | | **14,973** |

| | 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 | 42.54 | 0.00 | 50.19 | 11272.80 | 18.59 | 113.44 | 33.44 | 50.00 | 39.35 | 5434.44 | 14.31 | 89.16 | 0.182064 |
| 2 | 35.06 | 44.50 | 34.47 | 5258.76 | 18.37 | 112.20 | 25.96 | 94.50 | 25.44 | 2114.11 | 13.24 | 83.07 | 0.182064 |
| 3 | 27.06 | 90.50 | 15.99 | 1459.57 | 24.04 | 144.34 | 17.96 | 140.50 | 10.58 | 422.08 | 15.48 | 95.79 | 0.182064 |

## Additional Steel

| | | | | | | | Intermediate Connectors | | Termination Connectors | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elev From (ft) | Elev To (ft) | Qty | Description | Fy (ksi) | Fu (ksi) | Offset (in) | Description | Spacing (in) | Description | Spacing (in) | Lower Qty | Upper Qty |
| 0.00 | 1.00 | 4 | SOL 2 1/4" William R71 | 105 | 125 | 4.75 | 5/8" Hollo Bolt | 18.00 | 5/8" Hollo Bolt | 3.00 | | |
| 1.00 | 20.00 | 4 | LNP LP7X125-B-20A | 65 | 80 | 0.00 | 5/8" Hollo Bolt | 24.00 | 5/8" Hollo Bolt | 3.00 | | |
| 20.00 | 40.00 | 4 | LNP LP6X125-G-20AB | 65 | 80 | 0.00 | 5/8" Hollo Bolt | 24.00 | 5/8" Hollo Bolt | 3.00 | | |
| 40.00 | 60.00 | 4 | LNP LP6X100-G-20BC | 65 | 80 | 0.00 | 5/8" Hollo Bolt | 24.00 | 5/8" Hollo Bolt | 3.00 | | |
| 60.00 | 67.50 | 4 | LNP LP6X100-G-10CT | 65 | 80 | 0.00 | 5/8" Hollo Bolt | 24.00 | 5/8" Hollo Bolt | 3.00 | | |
| 93.12 | 107.8 | 3 | LNP LP6X100-G-20TT | 65 | 80 | 0.00 | 5/8" Hollo Bolt | 24.00 | 5/8" Hollo Bolt | 3.00 | 8 | 8 |

# Load Summary

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 6 | |

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## 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 | 135.00 | Ericsson Air 32 | 3 | 132.20 | 6.51 | 0.87 | 314.29 | 7.677 | 0.87 | 0.00 | 0.00 |
| 2 | 135.00 | RFS APXVAARR24_43-U-NA20 | 3 | 128.00 | 20.24 | 0.70 | 541.00 | 22.119 | 0.70 | 0.00 | 0.00 |
| 3 | 135.00 | RFS APX16DWV-16DWVS-E-A20 | 3 | 40.70 | 6.46 | 0.62 | 175.93 | 7.562 | 0.62 | 0.00 | 0.00 |
| 4 | 135.00 | Ericsson RRUS11 B4 RRUs | 3 | 51.00 | 2.83 | 0.67 | 122.52 | 3.534 | 0.67 | 0.00 | 0.00 |
| 5 | 135.00 | Sector Frame | 3 | 817.00 | 15.00 | 0.75 | 1449.08 | 22.460 | 0.75 | 0.00 | 0.00 |
| 6 | 135.00 | Ericsson RRUS 32 B66A RRUs | 3 | 53.00 | 2.74 | 0.67 | 139.86 | 3.461 | 0.67 | 0.00 | 0.00 |
| 7 | 135.00 | Ericsson Radio 4449 B71+B12 RRUs | 3 | 70.00 | 1.65 | 0.67 | 137.35 | 2.182 | 0.67 | 0.00 | 0.00 |
| 8 | 125.00 | Platform w/ Hand Rails | 1 | 2000.00 | 40.00 | 1.00 | 4056.42 | 60.564 | 1.00 | 0.00 | 0.00 |
| 9 | 125.00 | QS66512-2 | 3 | 111.00 | 8.13 | 0.92 | 333.47 | 9.404 | 0.92 | 0.00 | 0.00 |
| 10 | 125.00 | CCI OPA-65R-LCUU-H6 | 3 | 73.00 | 9.66 | 0.79 | 299.87 | 11.000 | 0.79 | 0.00 | 0.00 |
| 11 | 125.00 | Kathrein 782 10250 | 6 | 6.40 | 0.52 | 0.67 | 18.96 | 1.079 | 0.67 | 0.00 | 0.00 |
| 12 | 125.00 | B14 4478 | 3 | 59.40 | 1.65 | 0.67 | 119.08 | 2.177 | 0.67 | 0.00 | 0.00 |
| 13 | 125.00 | RRUS 32 B66 | 3 | 53.00 | 2.74 | 0.67 | 139.04 | 3.454 | 0.67 | 0.00 | 0.00 |
| 14 | 125.00 | DBC0061F1V51-2 | 6 | 25.40 | 0.43 | 0.67 | 39.68 | 0.710 | 0.67 | 0.00 | 0.00 |
| 15 | 125.00 | Raycap DC6-48-60-18-8F | 3 | 32.80 | 1.47 | 0.67 | 93.51 | 2.157 | 0.67 | 0.00 | 0.00 |
| 16 | 125.00 | CCI DTMABP7819VG12A | 6 | 19.00 | 1.14 | 0.67 | 43.80 | 1.896 | 0.67 | 0.00 | 0.00 |
| 17 | 125.00 | Ericsson RRUS-11 | 3 | 54.00 | 2.52 | 0.67 | 141.23 | 3.159 | 0.67 | 0.00 | 0.00 |
| 18 | 125.00 | Ericsson RRUS-32 | 6 | 77.00 | 2.52 | 0.67 | 190.98 | 4.250 | 0.67 | 0.00 | 0.00 |
| 19 | 125.00 | Kathrein 800-10121 | 3 | 44.10 | 5.15 | 0.79 | 177.13 | 6.175 | 0.79 | 0.00 | 0.00 |
| 20 | 125.00 | HPA-65R-BUU-H6 | 3 | 51.00 | 9.66 | 0.85 | 293.90 | 11.000 | 0.85 | 0.00 | 0.00 |
| 21 | 114.00 | Andrew VHLP1-23-DW1 | 1 | 14.00 | 1.61 | 1.00 | 48.45 | 2.348 | 1.00 | 0.00 | 4.50 |
| 22 | 114.00 | Andrew VHLP2-23-DW1 | 1 | 31.00 | 4.69 | 1.00 | 126.21 | 5.932 | 1.00 | 0.00 | 4.50 |
| 23 | 114.00 | Argus LLPX310R-V1 | 3 | 50.70 | 4.31 | 0.69 | 156.26 | 5.244 | 0.69 | 0.00 | 0.50 |
| 24 | 114.00 | Samsung SPI-22132825WB | 3 | 33.10 | 1.82 | 0.76 | 75.84 | 2.769 | 0.76 | 0.00 | -1.00 |
| 25 | 114.00 | 20" x 18" x 9" Junction Box | 1 | 20.00 | 3.15 | 1.00 | 114.45 | 4.372 | 1.00 | 0.00 | 0.00 |
| 26 | 114.00 | RFS APXVTM14 | 3 | 116.70 | 6.34 | 0.79 | 271.92 | 7.421 | 0.79 | 0.00 | 3.00 |
| 27 | 114.00 | RFS APXVSPP18 | 3 | 125.30 | 8.02 | 0.83 | 318.56 | 9.277 | 0.83 | 0.00 | 1.00 |
| 28 | 114.00 | Alcatel Lucent RRH8x20-25-FEU | 3 | 70.00 | 4.05 | 0.69 | 176.87 | 4.840 | 0.69 | 0.00 | 3.00 |
| 29 | 114.00 | Alcatel Lucent RRH2X50-800 | 3 | 64.00 | 2.40 | 0.97 | 139.11 | 3.489 | 0.97 | 0.00 | -1.50 |
| 30 | 114.00 | Alcatel Lucent RRH1900-4X45 | 3 | 60.00 | 2.71 | 0.98 | 138.57 | 3.939 | 0.98 | 0.00 | 3.00 |
| 31 | 114.00 | Low Profile Platform | 1 | 1800.00 | 25.00 | 1.00 | 3328.17 | 45.376 | 1.00 | 0.00 | 0.00 |
| 32 | 90.00 | Swedcom SLCP 2x6014 | 3 | 45.60 | 6.49 | 0.89 | 233.55 | 7.516 | 0.89 | 0.00 | 0.00 |
| 33 | 90.00 | Commscope SBNHH-1D65B | 6 | 76.40 | 8.08 | 0.83 | 265.70 | 9.275 | 0.83 | 0.00 | 0.00 |
| 34 | 90.00 | Antel BXA-70063-6CF-EDIN-x | 3 | 42.60 | 7.57 | 0.73 | 206.35 | 8.763 | 0.73 | 0.00 | 0.00 |
| 35 | 90.00 | Alcatel Lucent RRH2X60-AWS | 3 | 90.00 | 3.50 | 0.76 | 214.41 | 4.250 | 0.76 | 0.00 | 0.00 |
| 36 | 90.00 | Alcatel Lucent RRH2X60-700 | 3 | 90.00 | 3.50 | 0.76 | 214.41 | 4.250 | 0.76 | 0.00 | 0.00 |
| 37 | 90.00 | Alcatel Lucent RRH2X60-PCS | 3 | 55.00 | 1.51 | 0.90 | 134.38 | 2.802 | 0.90 | 0.00 | 0.00 |
| 38 | 90.00 | RFS DB-T1-6Z-8AB-0Z | 1 | 44.00 | 4.80 | 1.00 | 179.36 | 5.627 | 1.00 | 0.00 | 0.00 |
| 39 | 90.00 | Platform w/ Hand Rails | 1 | 2200.00 | 42.00 | 1.00 | 4388.96 | 62.895 | 1.00 | 0.00 | 0.00 |
| | | **Totals:** | **118** | **15,173.80** | | | **35,869.11** | | | | |

## Linear Appurtenances

| Bottom Elev. (ft) | Top Elev. (ft) | Description | Exposed Width | Exposed |
|---|---|---|---|---|
| 0.00 | 135.00 | (2) 1 1/4" Fiber | 0.00 | Outside |
| 0.00 | 135.00 | (2) 1 5/8" Fiber | 1.98 | Outside |

## Discrete Appurtenances

| No. | Elev (ft) | Description | Qty | No Ice Weight (lb) | No Ice CaAa (sf) | No Ice CaAa Factor | Ice Weight (lb) | Ice CaAa (sf) | Ice CaAa Factor | Hor. Ecc. (ft) | Vert Ecc (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 125.00 | (2) 0.40" Fiber | | | 0.00 | Inside | | | | | |
| 0.00 | 125.00 | (4) 0.625" DC | | | 0.00 | Inside | | | | | |
| 0.00 | 125.00 | (12) 1 1/4" Coax | | | 0.00 | Inside | | | | | |
| 0.00 | 125.00 | (2) 2" Conduit | | | 0.00 | Inside | | | | | |
| 0.00 | 114.00 | (3) 1-1/4" | | | 0.00 | Inside | | | | | |
| 0.00 | 114.00 | (2) 2 1/8" F.C. | | | 0.00 | Inside | | | | | |
| 0.00 | 114.00 | (1) 3/4" | | | 0.00 | Inside | | | | | |
| 0.00 | 114.00 | (2) 5/8" | | | 0.00 | Inside | | | | | |
| 90.50 | 110.50 | (1) 1" Reinforcing plate | | | 1.00 | Outside | | | | | |
| 90.50 | 110.50 | (2) 1" Reinforcing plate | | | 1.00 | Outside | | | | | |
| 0.00 | 90.00 | (12) 1 5/8" Coax | | | 0.00 | Inside | | | | | |
| 0.00 | 90.00 | (2) 1 5/8" Fiber | | | 0.00 | Inside | | | | | |
| 40.00 | 70.00 | (2) 1" Reinforcing plate | | | 1.00 | Outside | | | | | |
| 40.00 | 70.00 | (2) 1" Reinforcing plate | | | 1.00 | Outside | | | | | |
| 0.00 | 40.00 | (2) 1.25" Reinforcing plate | | | 1.25 | Outside | | | | | |
| 0.00 | 40.00 | (2) 1.25" Reinforcing plate | | | 1.25 | Outside | | | | | |

# Shaft Section Properties

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 8 | |

Tower Engineering Solutions

**Increment Length:** **5 (ft)**

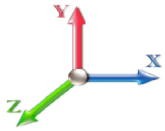
| | | | | | | | | | | | Additional Reinforcing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elev (ft) | Description | Thick (in) | Flat Dia (in) | Area (in^2) | Ix (in^4) | W/t Ratio | D/t Ratio | Fy (ksi) | Fb (ksi) | Weight (lb) | Area (in^2) | Ixp (in^4) | Iyp (in^4) | Weight (lb) |
| 0.00 | RB1 | 0.3750 | 42.540 | 50.185 | 11272.8 | 18.59 | 113.44 | 65 | 80 | 0.0 | 16.32 | 7061.8 | 4973.6 | |
| 1.00 | RT1 RB2 | 0.3750 | 42.358 | 49.968 | 11127.4 | 18.51 | 112.95 | 65 | 80 | 170.4 | 35.00 | 9835.2 | 6951.8 | 119.1 |
| 5.00 | | 0.3750 | 41.630 | 49.102 | 10558.3 | 18.16 | 111.01 | 65 | 80 | 674.2 | 35.00 | 9511.8 | 6724.0 | 476.4 |
| 10.00 | | 0.3750 | 40.719 | 48.018 | 9874.7 | 17.74 | 108.58 | 65 | 81 | 826.2 | 35.00 | 9115.2 | 6444.8 | 595.5 |
| 15.00 | | 0.3750 | 39.809 | 46.935 | 9221.2 | 17.31 | 106.16 | 65 | 81 | 807.8 | 35.00 | 8727.1 | 6171.5 | 595.5 |
| 20.00 | RT2 RB3 | 0.3750 | 38.899 | 45.851 | 8597.3 | 16.88 | 103.73 | 65 | 82 | 789.3 | 30.00 | 7139.4 | 5043.9 | 510.4 |
| 25.00 | | 0.3750 | 37.988 | 44.768 | 8002.1 | 16.45 | 101.30 | 65 | 82 | 770.9 | 30.00 | 6821.4 | 4819.9 | 510.4 |
| 30.00 | | 0.3750 | 37.078 | 43.684 | 7435.0 | 16.02 | 98.87 | 65 | 83 | 752.5 | 30.00 | 6510.6 | 4601.1 | 510.4 |
| 35.00 | | 0.3750 | 36.168 | 42.601 | 6895.4 | 15.60 | 96.45 | 65 | 83 | 734.0 | 30.00 | 6207.1 | 4387.4 | 510.4 |
| 40.00 | RT3 RB4 | 0.3750 | 35.257 | 41.517 | 6382.6 | 15.17 | 94.02 | 65 | 83 | 715.6 | 24.00 | 4664.1 | 3297.5 | 408.3 |
| 44.50 | Bot - Section 2 | 0.3750 | 34.438 | 40.542 | 5943.3 | 14.78 | 91.84 | 65 | 83 | 628.3 | 24.00 | 4457.3 | 3151.9 | 367.5 |
| 45.00 | | 0.3750 | 34.347 | 40.434 | 5895.8 | 14.74 | 91.59 | 65 | 83 | 127.5 | 24.00 | 4591.6 | 3246.4 | 40.8 |
| 50.00 | Top - Section 1 | 0.3125 | 34.062 | 33.474 | 4817.1 | 17.81 | 109.00 | 65 | 80 | 1255.9 | 24.00 | 4363.9 | 3086.1 | 408.3 |
| 55.00 | | 0.3125 | 33.151 | 32.571 | 4437.8 | 17.29 | 106.08 | 65 | 81 | 561.8 | 24.00 | 4142.0 | 2929.9 | 408.3 |
| 60.00 | RT4 RB5 | 0.3125 | 32.241 | 31.668 | 4078.8 | 16.78 | 103.17 | 65 | 82 | 546.5 | 24.00 | 3926.0 | 2777.8 | 408.3 |
| 65.00 | | 0.3125 | 31.331 | 30.765 | 3739.8 | 16.27 | 100.26 | 65 | 82 | 531.1 | 24.00 | 3715.9 | 2629.8 | 408.3 |
| 67.50 | RT5 | 0.3125 | 30.876 | 30.314 | 3577.6 | 16.01 | 98.80 | 65 | 83 | 259.8 | 24.00 | 3613.0 | 2557.4 | 204.2 |
| 70.00 | | 0.3125 | 30.421 | 29.862 | 3420.1 | 15.75 | 97.35 | 65 | 83 | 256.0 | | | | |
| 75.00 | | 0.3125 | 29.510 | 28.959 | 3119.2 | 15.24 | 94.43 | 65 | 83 | 500.4 | | | | |
| 80.00 | | 0.3125 | 28.600 | 28.057 | 2836.4 | 14.73 | 91.52 | 65 | 83 | 485.0 | | | | |
| 85.00 | | 0.3125 | 27.690 | 27.154 | 2571.3 | 14.21 | 88.61 | 65 | 83 | 469.7 | | | | |
| 90.00 | | 0.3125 | 26.779 | 26.251 | 2323.2 | 13.70 | 85.69 | 65 | 83 | 454.3 | | | | |
| 90.50 | Bot - Section 3 | 0.3125 | 26.688 | 26.160 | 2299.4 | 13.65 | 85.40 | 65 | 83 | 44.6 | | | | |
| 93.12 | RB6 | 0.3125 | 26.211 | 25.687 | 2176.8 | 13.38 | 83.88 | 65 | 83 | 372.4 | 18.00 | 1740.0 | 1740.0 | 160.5 |
| 94.50 | Top - Section 2 | 0.1875 | 26.335 | 15.560 | 1344.1 | 23.36 | 140.45 | 65 | 74 | 193.5 | 18.00 | 1708.9 | 1708.9 | 84.5 |
| 95.00 | | 0.1875 | 26.244 | 15.506 | 1330.1 | 23.27 | 139.97 | 65 | 74 | 26.4 | 18.00 | 1697.8 | 1697.8 | 30.6 |
| 100.00 | | 0.1875 | 25.334 | 14.965 | 1195.5 | 22.41 | 135.11 | 65 | 75 | 259.2 | 18.00 | 1588.0 | 1588.0 | 306.2 |
| 105.00 | | 0.1875 | 24.423 | 14.423 | 1070.3 | 21.56 | 130.26 | 65 | 76 | 250.0 | 18.00 | 1482.0 | 1482.0 | 306.2 |
| 107.87 | RT6 | 0.1875 | 23.901 | 14.112 | 1002.6 | 21.07 | 127.47 | 65 | 77 | 139.3 | 18.00 | 1422.9 | 1422.9 | 175.8 |
| 110.00 | | 0.1875 | 23.513 | 13.881 | 954.2 | 20.70 | 125.40 | 65 | 77 | 101.4 | | | | |
| 114.00 | | 0.1875 | 22.785 | 13.448 | 867.6 | 20.02 | 121.52 | 65 | 78 | 186.0 | | | | |
| 115.00 | | 0.1875 | 22.603 | 13.339 | 846.8 | 19.85 | 120.55 | 65 | 78 | 45.6 | | | | |
| 120.00 | | 0.1875 | 21.692 | 12.798 | 747.7 | 18.99 | 115.69 | 65 | 79 | 222.3 | | | | |
| 125.00 | | 0.1875 | 20.782 | 12.256 | 656.7 | 18.13 | 110.84 | 65 | 80 | 213.1 | | | | |
| 130.00 | | 0.1875 | 19.872 | 11.714 | 573.5 | 17.28 | 105.98 | 65 | 81 | 203.9 | | | | |
| 135.00 | | 0.1875 | 18.961 | 11.172 | 497.5 | 16.42 | 101.13 | 65 | 82 | 194.7 | | | | |
| 140.00 | | 0.1875 | 18.051 | 10.631 | 428.6 | 15.56 | 96.27 | 65 | 83 | 185.5 | | | | |
| 140.50 | | 0.1875 | 17.960 | 10.576 | 422.1 | 15.48 | 95.79 | 65 | 83 | 18.0 | | | | |
| | | | | | | | | | **Total Weight** | **14973.2** | | | | **7546.2** |

# Wind Loading - Shaft

**Structure:** CT16504-A-SBA | **Code:** EIA/TIA-222-H | 7/9/2019
**Site Name:** Manchester 12, CT | **Exposure:** C
**Height:** 140.50 (ft) | **Crest Height:** 0.00
**Base Elev:** 0.000 (ft) | **Site Class:** D - Stiff Soil
**Gh:** 1.1 | **Topography:** 1 | **Struct Class:** II | Page: 9

IES Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind
**Dead Load Factor** 1.20
**Wind Load Factor** 1.00




**Iterations** 25

| 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 | RB1 | 1.00 | 0.85 | 28.680 | 31.55 | 390.90 | 0.730 | 0.000 | 0.00 | 0.000 | 0.00 | 0.0 | 0.0 | 0.0 |
| 1.00 | RT1 RB2 | 1.00 | 0.85 | 28.680 | 31.55 | 389.23 | 0.739 * | 0.000 | 1.00 | 3.592 | 2.65 | 83.7 | 0.0 | 204.5 |
| 5.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 382.54 | 0.741 * | 0.000 | 4.00 | 14.214 | 10.53 | 332.3 | 0.0 | 809.1 |
| 10.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 374.17 | 0.746 * | 0.000 | 5.00 | 17.421 | 12.99 | 409.8 | 0.0 | 991.4 |
| 15.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 365.81 | 0.751 * | 0.000 | 5.00 | 17.036 | 12.79 | 403.6 | 0.0 | 969.3 |
| 20.00 | RT2 RB3 | 1.00 | 0.90 | 30.430 | 33.47 | 368.19 | 0.757 * | 0.000 | 5.00 | 16.650 | 12.60 | 421.6 | 0.0 | 947.2 |
| 25.00 | | 1.00 | 0.95 | 31.894 | 35.08 | 368.12 | 0.762 * | 0.000 | 5.00 | 16.265 | 12.40 | 435.0 | 0.0 | 925.1 |
| 30.00 | | 1.00 | 0.98 | 33.142 | 36.46 | 366.26 | 0.768 * | 0.000 | 5.00 | 15.880 | 12.20 | 444.9 | 0.0 | 902.9 |
| 35.00 | | 1.00 | 1.01 | 34.235 | 37.66 | 363.12 | 0.775 * | 0.000 | 5.00 | 15.495 | 12.01 | 452.1 | 0.0 | 880.8 |
| 40.00 | RT3 RB4 | 1.00 | 1.04 | 35.211 | 38.73 | 358.99 | 0.782 * | 0.000 | 5.00 | 15.110 | 11.81 | 457.4 | 0.0 | 858.7 |
| 44.50 | Bot - Section 2 | 1.00 | 1.07 | 36.011 | 39.61 | 354.60 | 0.757 * | 0.000 | 4.50 | 13.270 | 10.05 | 398.1 | 0.0 | 753.9 |
| 45.00 | | 1.00 | 1.07 | 36.095 | 39.70 | 354.08 | 0.761 * | 0.000 | 0.50 | 1.482 | 1.13 | 44.7 | 0.0 | 152.9 |
| 50.00 | Top - Section 1 | 1.00 | 1.09 | 36.905 | 40.60 | 348.54 | 0.764 * | 0.000 | 5.00 | 14.604 | 11.16 | 453.1 | 0.0 | 1507.1 |
| 55.00 | | 1.00 | 1.12 | 37.653 | 41.42 | 349.05 | 0.766 * | 0.000 | 5.00 | 14.219 | 10.90 | 451.4 | 0.0 | 674.2 |
| 60.00 | RT4 RB5 | 1.00 | 1.14 | 38.349 | 42.18 | 342.59 | 0.774 * | 0.000 | 5.00 | 13.834 | 10.70 | 451.4 | 0.0 | 655.8 |
| 65.00 | | 1.00 | 1.16 | 39.001 | 42.90 | 335.73 | 0.781 * | 0.000 | 5.00 | 13.448 | 10.50 | 450.6 | 0.0 | 637.3 |
| 67.50 | RT5 | 1.00 | 1.17 | 39.312 | 43.24 | 332.17 | 0.787 * | 0.000 | 2.50 | 6.580 | 5.18 | 223.9 | 0.0 | 311.8 |
| 70.00 | | 1.00 | 1.17 | 39.614 | 43.58 | 328.53 | 0.791 * | 0.000 | 2.50 | 6.484 | 5.13 | 223.5 | 0.0 | 307.1 |
| 75.00 | | 1.00 | 1.19 | 40.194 | 44.21 | 321.02 | 0.730 | 0.000 | 5.00 | 12.678 | 9.26 | 409.2 | 0.0 | 600.5 |
| 80.00 | | 1.00 | 1.21 | 40.743 | 44.82 | 313.24 | 0.730 | 0.000 | 5.00 | 12.293 | 8.97 | 402.2 | 0.0 | 582.0 |
| 85.00 | | 1.00 | 1.22 | 41.267 | 45.39 | 305.21 | 0.730 | 0.000 | 5.00 | 11.908 | 8.69 | 394.6 | 0.0 | 563.6 |
| 90.00 | Appurtenance(s) | 1.00 | 1.24 | 41.766 | 45.94 | 296.96 | 0.730 | 0.000 | 5.00 | 11.523 | 8.41 | 386.5 | 0.0 | 545.2 |
| 90.50 | Bot - Section 3 | 1.00 | 1.24 | 41.815 | 46.00 | 296.12 | 0.730 | 0.000 | 0.50 | 1.131 | 0.83 | 38.0 | 0.0 | 53.5 |
| 93.12 | RB6 | 1.00 | 1.25 | 42.067 | 46.27 | 291.70 | 0.836 * | 0.000 | 2.62 | 5.947 | 4.97 | 229.9 | 0.0 | 446.9 |
| 94.50 | Top - Section 2 | 1.00 | 1.25 | 42.198 | 46.42 | 289.36 | 0.840 * | 0.000 | 1.38 | 3.090 | 2.60 | 120.5 | 0.0 | 232.2 |
| 95.00 | | 1.00 | 1.25 | 42.244 | 46.47 | 292.68 | 0.838 * | 0.000 | 0.50 | 1.112 | 0.93 | 43.3 | 0.0 | 31.7 |
| 100.00 | | 1.00 | 1.27 | 42.703 | 46.97 | 284.06 | 0.844 * | 0.000 | 5.00 | 10.911 | 9.21 | 432.5 | 0.0 | 311.1 |
| 105.00 | | 1.00 | 1.28 | 43.144 | 47.46 | 275.26 | 0.856 * | 0.000 | 5.00 | 10.526 | 9.01 | 427.6 | 0.0 | 300.0 |
| 107.87 | RT6 | 1.00 | 1.29 | 43.390 | 47.73 | 270.14 | 0.866 * | 0.000 | 2.87 | 5.868 | 5.08 | 242.6 | 0.0 | 167.2 |
| 110.00 | | 1.00 | 1.29 | 43.569 | 47.93 | 266.31 | 0.873 * | 0.000 | 2.13 | 4.273 | 3.73 | 178.8 | 0.0 | 121.7 |
| 114.00 | Appurtenance(s) | 1.00 | 1.30 | 43.898 | 48.29 | 259.03 | 0.730 | 0.000 | 4.00 | 7.835 | 5.72 | 276.2 | 0.0 | 223.2 |
| 115.00 | | 1.00 | 1.30 | 43.978 | 48.38 | 257.20 | 0.730 | 0.000 | 1.00 | 1.920 | 1.40 | 67.8 | 0.0 | 54.7 |
| 120.00 | | 1.00 | 1.32 | 44.374 | 48.81 | 247.95 | 0.730 | 0.000 | 5.00 | 9.370 | 6.84 | 333.9 | 0.0 | 266.8 |
| 125.00 | Appurtenance(s) | 1.00 | 1.33 | 44.757 | 49.23 | 238.56 | 0.730 | 0.000 | 5.00 | 8.985 | 6.56 | 322.9 | 0.0 | 255.8 |
| 130.00 | | 1.00 | 1.34 | 45.128 | 49.64 | 229.06 | 0.730 | 0.000 | 5.00 | 8.600 | 6.28 | 311.7 | 0.0 | 244.7 |
| 135.00 | Appurtenance(s) | 1.00 | 1.35 | 45.488 | 50.04 | 219.43 | 0.731 * | 0.000 | 5.00 | 8.215 | 6.00 | 300.5 | 0.0 | 233.6 |
| 140.00 | | 1.00 | 1.36 | 45.838 | 50.42 | 209.70 | 0.730 | 0.000 | 5.00 | 7.830 | 5.72 | 288.2 | 0.0 | 222.6 |
| 140.50 | | 1.00 | 1.36 | 45.872 | 50.46 | 208.72 | 0.730 | 0.000 | 0.50 | 0.762 | 0.56 | 28.1 | 0.0 | 21.6 |
| | | | | | | | | **Totals:** | **140.50** | | | **11,372.0** | | **17,967.8** |

* Cf Adjusted by Linear Load Ra Effect

# Discrete Appurtenance Forces

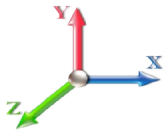
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 10 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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 | 135.00 | Ericsson RRUS 32 B66A | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 4.41 | 190.80 | 0.000 | 0.000 | 220.46 | 0.00 | 0.00 |
| 2 | 135.00 | Sector Frame | 3 | 45.488 | 50.037 | 0.56 | 0.75 | 25.31 | 2941.20 | 0.000 | 0.000 | 1266.56 | 0.00 | 0.00 |
| 3 | 135.00 | Ericsson RRUS11 B4 | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 4.55 | 183.60 | 0.000 | 0.000 | 227.70 | 0.00 | 0.00 |
| 4 | 135.00 | RFS | 3 | 45.488 | 50.037 | 0.50 | 0.80 | 9.61 | 146.52 | 0.000 | 0.000 | 480.98 | 0.00 | 0.00 |
| 5 | 135.00 | RFS | 3 | 45.488 | 50.037 | 0.56 | 0.80 | 34.00 | 460.80 | 0.000 | 0.000 | 1701.42 | 0.00 | 0.00 |
| 6 | 135.00 | Ericsson Air 32 | 3 | 45.488 | 50.037 | 0.70 | 0.80 | 13.59 | 475.92 | 0.000 | 0.000 | 680.15 | 0.00 | 0.00 |
| 7 | 135.00 | Ericsson Radio 4449 | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 2.65 | 252.00 | 0.000 | 0.000 | 132.76 | 0.00 | 0.00 |
| 8 | 125.00 | Kathrein 782 10250 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 1.57 | 46.08 | 0.000 | 0.000 | 77.19 | 0.00 | 0.00 |
| 9 | 125.00 | RRUS 32 B66 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 4.13 | 190.80 | 0.000 | 0.000 | 203.36 | 0.00 | 0.00 |
| 10 | 125.00 | B14 4478 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 2.49 | 213.84 | 0.000 | 0.000 | 122.46 | 0.00 | 0.00 |
| 11 | 125.00 | DBC0061F1V51-2 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 1.30 | 182.88 | 0.000 | 0.000 | 63.83 | 0.00 | 0.00 |
| 12 | 125.00 | CCI OPA-65R-LCUU-H6 | 3 | 44.757 | 49.233 | 0.59 | 0.75 | 17.17 | 262.80 | 0.000 | 0.000 | 845.36 | 0.00 | 0.00 |
| 13 | 125.00 | QS66512-2 | 3 | 44.757 | 49.233 | 0.69 | 0.75 | 16.83 | 399.60 | 0.000 | 0.000 | 828.54 | 0.00 | 0.00 |
| 14 | 125.00 | Ericsson RRUS-32 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 7.60 | 554.40 | 0.000 | 0.000 | 374.06 | 0.00 | 0.00 |
| 15 | 125.00 | Raycap DC6-48-60-18-8F | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 2.22 | 118.08 | 0.000 | 0.000 | 109.10 | 0.00 | 0.00 |
| 16 | 125.00 | CCI DTMABP7819VG12A | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 3.44 | 136.80 | 0.000 | 0.000 | 169.22 | 0.00 | 0.00 |
| 17 | 125.00 | Ericsson RRUS-11 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 3.80 | 194.40 | 0.000 | 0.000 | 187.03 | 0.00 | 0.00 |
| 18 | 125.00 | Kathrein 800-10121 | 3 | 44.757 | 49.233 | 0.59 | 0.75 | 9.15 | 158.76 | 0.000 | 0.000 | 450.68 | 0.00 | 0.00 |
| 19 | 125.00 | HPA-65R-BUU-H6 | 3 | 44.757 | 49.233 | 0.64 | 0.75 | 18.47 | 183.60 | 0.000 | 0.000 | 909.56 | 0.00 | 0.00 |
| 20 | 125.00 | Platform w/ Hand Rails | 1 | 44.757 | 49.233 | 1.00 | 1.00 | 40.00 | 2400.00 | 0.000 | 0.000 | 1969.31 | 0.00 | 0.00 |
| 21 | 114.00 | 20" x 18" x 9" Junction Box | 1 | 43.898 | 48.287 | 1.00 | 1.00 | 3.15 | 24.00 | 0.000 | 0.000 | 152.10 | 0.00 | 0.00 |
| 22 | 114.00 | Andrew VHLP1-23-DW1 | 1 | 44.257 | 48.682 | 1.00 | 1.00 | 1.61 | 16.80 | 0.000 | 4.500 | 78.38 | 0.00 | 352.70 |
| 23 | 114.00 | Andrew VHLP2-23-DW1 | 1 | 44.257 | 48.682 | 1.00 | 1.00 | 4.69 | 37.20 | 0.000 | 4.500 | 228.32 | 0.00 | 1027.44 |
| 24 | 114.00 | Argus LLPX310R-V1 | 3 | 43.938 | 48.332 | 0.55 | 0.80 | 7.14 | 182.52 | 0.000 | 0.500 | 344.96 | 0.00 | 172.48 |
| 25 | 114.00 | Samsung | 3 | 43.816 | 48.198 | 0.61 | 0.80 | 3.32 | 119.16 | 0.000 | -1.000 | 160.00 | 0.00 | -160.00 |
| 26 | 114.00 | Low Profile Platform | 1 | 43.898 | 48.287 | 1.00 | 1.00 | 25.00 | 2160.00 | 0.000 | 0.000 | 1207.18 | 0.00 | 0.00 |
| 27 | 114.00 | RFS APXVSPP18 | 3 | 43.978 | 48.376 | 0.66 | 0.80 | 15.98 | 451.08 | 0.000 | 1.000 | 772.85 | 0.00 | 772.85 |
| 28 | 114.00 | Alcatel Lucent | 3 | 44.138 | 48.552 | 0.55 | 0.80 | 6.71 | 252.00 | 0.000 | 3.000 | 325.63 | 0.00 | 976.89 |
| 29 | 114.00 | Alcatel Lucent | 3 | 43.775 | 48.153 | 0.78 | 0.80 | 5.59 | 230.40 | 0.000 | -1.500 | 269.04 | 0.00 | -403.56 |
| 30 | 114.00 | Alcatel Lucent | 3 | 44.138 | 48.552 | 0.78 | 0.80 | 6.37 | 216.00 | 0.000 | 3.000 | 309.47 | 0.00 | 928.40 |
| 31 | 114.00 | RFS APXVTM14 | 3 | 44.138 | 48.552 | 0.63 | 0.80 | 12.02 | 420.12 | 0.000 | 3.000 | 583.63 | 0.00 | 1750.88 |
| 32 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.57 | 0.75 | 5.99 | 324.00 | 0.000 | 0.000 | 274.97 | 0.00 | 0.00 |
| 33 | 90.00 | Swedcom SLCP 2x6014 | 3 | 41.766 | 45.943 | 0.67 | 0.75 | 13.00 | 164.16 | 0.000 | 0.000 | 597.09 | 0.00 | 0.00 |
| 34 | 90.00 | Commscope | 6 | 41.766 | 45.943 | 0.62 | 0.75 | 30.18 | 550.08 | 0.000 | 0.000 | 1386.50 | 0.00 | 0.00 |
| 35 | 90.00 | Antel | 3 | 41.766 | 45.943 | 0.55 | 0.75 | 12.43 | 153.36 | 0.000 | 0.000 | 571.24 | 0.00 | 0.00 |
| 36 | 90.00 | RFS DB-T1-6Z-8AB-0Z | 1 | 41.766 | 45.943 | 1.00 | 1.00 | 4.80 | 52.80 | 0.000 | 0.000 | 220.53 | 0.00 | 0.00 |
| 37 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.57 | 0.75 | 5.99 | 324.00 | 0.000 | 0.000 | 274.97 | 0.00 | 0.00 |
| 38 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.68 | 0.75 | 3.06 | 198.00 | 0.000 | 0.000 | 140.48 | 0.00 | 0.00 |
| 39 | 90.00 | Platform w/ Hand Rails | 1 | 41.766 | 45.943 | 1.00 | 1.00 | 42.00 | 2640.00 | 0.000 | 0.000 | 1929.61 | 0.00 | 0.00 |
| | | | | | | | **Totals:** | | **18,208.56** | | | **20,846.68** | | |

# Total Applied Force Summary

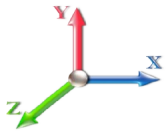
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | | **Crest Height:** | 0.00 | |
| **Base Elev:** | 0.000 (ft) | | **Site Class:** | D - Stiff Soil | |
| **Gh:** | 1.1 | **Topography:** 1 | **Struct Class:** | II | Page: 11 |

TES Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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 |
| 1.00 | | 83.70 | 250.63 | 0.00 | 0.00 |
| 5.00 | | 332.31 | 993.69 | 0.00 | 0.00 |
| 10.00 | | 409.80 | 1222.20 | 0.00 | 0.00 |
| 15.00 | | 403.60 | 1200.08 | 0.00 | 0.00 |
| 20.00 | | 421.64 | 1177.96 | 0.00 | 0.00 |
| 25.00 | | 435.02 | 1155.84 | 0.00 | 0.00 |
| 30.00 | | 444.87 | 1133.72 | 0.00 | 0.00 |
| 35.00 | | 452.13 | 1111.60 | 0.00 | 0.00 |
| 40.00 | | 457.40 | 1089.48 | 0.00 | 0.00 |
| 44.50 | | 398.07 | 961.62 | 0.00 | 0.00 |
| 45.00 | | 44.74 | 176.02 | 0.00 | 0.00 |
| 50.00 | | 453.10 | 1737.88 | 0.00 | 0.00 |
| 55.00 | | 451.36 | 904.98 | 0.00 | 0.00 |
| 60.00 | | 451.40 | 886.55 | 0.00 | 0.00 |
| 65.00 | | 450.63 | 868.11 | 0.00 | 0.00 |
| 67.50 | | 223.92 | 427.14 | 0.00 | 0.00 |
| 70.00 | | 223.50 | 422.53 | 0.00 | 0.00 |
| 75.00 | | 409.19 | 831.24 | 0.00 | 0.00 |
| 80.00 | | 402.19 | 812.81 | 0.00 | 0.00 |
| 85.00 | | 394.59 | 794.38 | 0.00 | 0.00 |
| 90.00 | (23) attachments | 5781.84 | 5182.34 | 0.00 | 0.00 |
| 90.50 | | 37.98 | 67.77 | 0.00 | 0.00 |
| 93.12 | | 229.93 | 521.70 | 0.00 | 0.00 |
| 94.50 | | 120.49 | 271.53 | 0.00 | 0.00 |
| 95.00 | | 43.29 | 45.98 | 0.00 | 0.00 |
| 100.00 | | 432.50 | 453.75 | 0.00 | 0.00 |
| 105.00 | | 427.62 | 442.69 | 0.00 | 0.00 |
| 107.87 | | 242.61 | 249.11 | 0.00 | 0.00 |
| 110.00 | | 178.79 | 182.52 | 0.00 | 0.00 |
| 114.00 | (25) attachments | 4707.75 | 4446.62 | 0.00 | 5418.08 |
| 115.00 | | 67.82 | 74.20 | 0.00 | 0.00 |
| 120.00 | | 333.89 | 364.37 | 0.00 | 0.00 |
| 125.00 | (49) attachments | 6632.64 | 5395.35 | 0.00 | 0.00 |
| 130.00 | | 311.65 | 265.09 | 0.00 | 0.00 |
| 135.00 | (21) attachments | 5010.48 | 4904.87 | 0.00 | 0.00 |
| 140.00 | | 288.20 | 222.57 | 0.00 | 0.00 |
| 140.50 | | 28.06 | 21.65 | 0.00 | 0.00 |
| | **Totals:** | **32,218.70** | **41,270.60** | **0.00** | **5,418.08** |

# Linear Appurtenance Segment Forces (Factored)

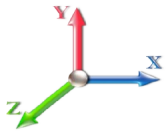
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 12 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 1.58 |
| 1.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 2.50 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 0.00 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 0.00 |
| 5.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 6.34 |
| 5.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 9.98 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 0.00 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 0.00 |
| 10.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 7.92 |
| 10.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 12.48 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 0.00 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 0.00 |
| 15.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 7.92 |
| 15.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 12.48 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 0.00 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 0.00 |
| 20.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 7.92 |
| 20.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 12.48 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 0.00 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 0.00 |
| 25.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 7.92 |
| 25.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 12.48 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 0.00 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 0.00 |
| 30.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 7.92 |
| 30.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 12.48 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 0.00 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 0.00 |
| 35.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 7.92 |
| 35.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 12.48 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 0.00 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 0.00 |
| 40.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 7.92 |
| 40.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 12.48 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 0.00 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 0.00 |
| 44.50 | 1 1/4" Fiber | Yes | 4.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 7.13 |
| 44.50 | 1 5/8" Fiber | Yes | 4.50 | 0.000 | 1.98 | 0.74 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 11.23 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 0.00 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 0.00 |
| 45.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.79 |
| 45.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 1.25 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.00 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.00 |
| 50.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 7.92 |
| 50.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 12.48 |
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

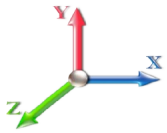
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 13 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 0.00 |
| 55.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 7.92 |
| 55.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 12.48 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 0.00 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 0.00 |
| 60.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 7.92 |
| 60.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 12.48 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 0.00 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 0.00 |
| 65.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 7.92 |
| 65.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 12.48 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 0.00 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 0.00 |
| 67.50 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 3.96 |
| 67.50 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 6.24 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 0.00 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 0.00 |
| 70.00 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 3.96 |
| 70.00 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 6.24 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 0.00 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 0.00 |
| 75.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.065 | 0.000 | 40.194 | 0.00 | 7.92 |
| 75.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.065 | 0.000 | 40.194 | 0.00 | 12.48 |
| 80.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.067 | 0.000 | 40.743 | 0.00 | 7.92 |
| 80.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.067 | 0.000 | 40.743 | 0.00 | 12.48 |
| 85.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.069 | 0.000 | 41.267 | 0.00 | 7.92 |
| 85.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.069 | 0.000 | 41.267 | 0.00 | 12.48 |
| 90.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.072 | 0.000 | 41.766 | 0.00 | 7.92 |
| 90.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.072 | 0.000 | 41.766 | 0.00 | 12.48 |
| 90.50 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.073 | 0.000 | 41.815 | 0.00 | 0.79 |
| 90.50 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.073 | 0.000 | 41.815 | 0.00 | 1.25 |
| 93.12 | 1 1/4" Fiber | Yes | 2.62 | 0.000 | 0.00 | 0.00 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 4.15 |
| 93.12 | 1 5/8" Fiber | Yes | 2.62 | 0.000 | 1.98 | 0.43 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 6.54 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 0.00 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 0.00 |
| 94.50 | 1 1/4" Fiber | Yes | 1.38 | 0.000 | 0.00 | 0.00 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 2.19 |
| 94.50 | 1 5/8" Fiber | Yes | 1.38 | 0.000 | 1.98 | 0.23 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 3.44 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 0.00 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 0.00 |
| 95.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.79 |
| 95.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 1.25 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.00 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.00 |
| 100.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 7.92 |
| 100.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 12.48 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 0.00 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

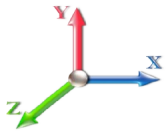
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 14 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 7.92 |
| 105.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 12.48 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 0.00 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 0.00 |
| 107.87 | 1 1/4" Fiber | Yes | 2.87 | 0.000 | 0.00 | 0.00 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 4.55 |
| 107.87 | 1 5/8" Fiber | Yes | 2.87 | 0.000 | 1.98 | 0.47 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 7.16 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 0.00 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 0.00 |
| 110.00 | 1 1/4" Fiber | Yes | 2.13 | 0.000 | 0.00 | 0.00 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 3.37 |
| 110.00 | 1 5/8" Fiber | Yes | 2.13 | 0.000 | 1.98 | 0.35 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 5.32 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 0.00 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 0.00 |
| 114.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 6.34 |
| 114.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 9.98 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 0.00 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 0.00 |
| 115.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.086 | 0.000 | 43.978 | 0.00 | 1.58 |
| 115.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.086 | 0.000 | 43.978 | 0.00 | 2.50 |
| 120.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.088 | 0.000 | 44.374 | 0.00 | 7.92 |
| 120.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.088 | 0.000 | 44.374 | 0.00 | 12.48 |
| 125.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.092 | 0.000 | 44.757 | 0.00 | 7.92 |
| 125.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.092 | 0.000 | 44.757 | 0.00 | 12.48 |
| 130.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.096 | 0.000 | 45.128 | 0.00 | 7.92 |
| 130.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.096 | 0.000 | 45.128 | 0.00 | 12.48 |
| 135.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.100 | 1.001 | 45.488 | 0.00 | 7.92 |
| 135.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.100 | 1.001 | 45.488 | 0.00 | 12.48 |
| | | | | | | | | | | **Totals:** | **0.0** | **550.8** |

# Calculated Forces

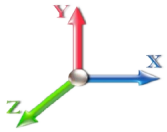
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 15 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0W 118 mph Wind

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 25

| 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 | -41.25 | -32.24 | 0.00 | -3377.9 | 0.00 | 3377.94 | 3592.24 | 880.75 | 3081.19 | 3113.33 | 0.00 | 0.000 | 0.000 | 0.763 |
| 1.00 | -40.93 | -32.25 | 0.00 | -3345.7 | 0.00 | 3345.70 | 3581.26 | 876.95 | 3054.64 | 3090.29 | 0.01 | -0.059 | 0.000 | 0.674 |
| 5.00 | -39.80 | -32.08 | 0.00 | -3216.6 | 0.00 | 3216.69 | 3536.93 | 861.73 | 2949.58 | 2998.63 | 0.14 | -0.265 | 0.000 | 0.663 |
| 10.00 | -38.44 | -31.83 | 0.00 | -3056.3 | 0.00 | 3056.30 | 3480.64 | 842.72 | 2820.85 | 2885.21 | 0.56 | -0.524 | 0.000 | 0.649 |
| 15.00 | -37.10 | -31.59 | 0.00 | -2897.1 | 0.00 | 2897.13 | 3423.37 | 823.70 | 2694.99 | 2773.12 | 1.25 | -0.783 | 0.000 | 0.634 |
| 20.00 | -35.79 | -31.31 | 0.00 | -2739.2 | 0.00 | 2739.20 | 3365.12 | 804.69 | 2572.00 | 2662.41 | 2.21 | -1.043 | 0.000 | 0.656 |
| 25.00 | -34.49 | -31.02 | 0.00 | -2582.6 | 0.00 | 2582.64 | 3305.89 | 785.67 | 2451.88 | 2553.15 | 3.45 | -1.321 | 0.000 | 0.639 |
| 30.00 | -33.22 | -30.71 | 0.00 | -2427.5 | 0.00 | 2427.52 | 3245.52 | 766.66 | 2334.64 | 2445.26 | 4.98 | -1.599 | 0.000 | 0.621 |
| 35.00 | -31.97 | -30.38 | 0.00 | -2273.9 | 0.00 | 2273.97 | 3165.03 | 747.64 | 2220.26 | 2324.87 | 6.80 | -1.877 | 0.000 | 0.605 |
| 40.00 | -30.76 | -30.03 | 0.00 | -2122.0 | 0.00 | 2122.07 | 3084.53 | 728.63 | 2108.76 | 2207.52 | 8.92 | -2.154 | 0.000 | 0.642 |
| 44.50 | -29.74 | -29.67 | 0.00 | -1986.9 | 0.00 | 1986.93 | 3012.08 | 711.52 | 2010.87 | 2104.51 | 11.08 | -2.426 | 0.000 | 0.625 |
| 45.00 | -29.48 | -29.71 | 0.00 | -1972.0 | 0.00 | 1972.09 | 3004.03 | 709.61 | 2000.14 | 2093.21 | 11.33 | -2.457 | 0.000 | 0.615 |
| 50.00 | -27.61 | -29.32 | 0.00 | -1823.5 | 0.00 | 1823.56 | 2423.81 | 587.47 | 1644.99 | 1680.79 | 14.06 | -2.752 | 0.000 | 0.622 |
| 55.00 | -26.58 | -28.96 | 0.00 | -1676.9 | 0.00 | 1676.97 | 2376.14 | 571.62 | 1557.44 | 1602.88 | 17.10 | -3.044 | 0.000 | 0.639 |
| 60.00 | -25.57 | -28.60 | 0.00 | -1532.1 | 0.00 | 1532.17 | 2327.49 | 555.78 | 1472.29 | 1526.13 | 20.45 | -3.354 | 0.000 | 0.606 |
| 65.00 | -24.62 | -28.19 | 0.00 | -1389.1 | 0.00 | 1389.19 | 2277.86 | 539.93 | 1389.54 | 1450.59 | 24.12 | -3.657 | 0.000 | 0.571 |
| 67.50 | -24.13 | -28.00 | 0.00 | -1318.7 | 0.00 | 1318.71 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 26.08 | -3.808 | 0.000 | 0.553 |
| 67.50 | -24.13 | -28.00 | 0.00 | -1318.7 | 0.00 | 1318.71 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 26.08 | -3.808 | 0.000 | 0.553 |
| 70.00 | -23.57 | -27.89 | 0.00 | -1248.7 | 0.00 | 1248.70 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 28.11 | -3.957 | 0.000 | 0.924 |
| 75.00 | -22.54 | -27.61 | 0.00 | -1109.2 | 0.00 | 1109.27 | 2151.54 | 508.24 | 1231.20 | 1288.93 | 32.52 | -4.447 | 0.000 | 0.874 |
| 80.00 | -21.54 | -27.32 | 0.00 | -971.23 | 0.00 | 971.23 | 2084.46 | 492.39 | 1155.63 | 1209.39 | 37.43 | -4.922 | 0.000 | 0.816 |
| 85.00 | -20.58 | -27.01 | 0.00 | -834.65 | 0.00 | 834.65 | 2017.38 | 476.55 | 1082.45 | 1132.40 | 42.82 | -5.375 | 0.000 | 0.750 |
| 90.00 | -15.90 | -20.81 | 0.00 | -699.60 | 0.00 | 699.60 | 1950.30 | 460.70 | 1011.66 | 1057.93 | 48.67 | -5.799 | 0.000 | 0.671 |
| 90.50 | -15.79 | -20.81 | 0.00 | -689.19 | 0.00 | 689.19 | 1943.59 | 459.12 | 1004.71 | 1050.62 | 49.28 | -5.841 | 0.000 | 0.666 |
| 93.12 | -15.25 | -20.56 | 0.00 | -634.68 | 0.00 | 634.68 | 1908.44 | 450.81 | 968.70 | 1012.75 | 52.54 | -6.056 | 0.000 | 0.355 |
| 94.50 | -14.97 | -20.42 | 0.00 | -606.31 | 0.00 | 606.31 | 1035.36 | 273.09 | 592.44 | 557.40 | 54.30 | -6.118 | 0.000 | 0.393 |
| 95.00 | -14.88 | -20.41 | 0.00 | -596.10 | 0.00 | 596.10 | 1033.16 | 272.13 | 588.32 | 554.27 | 54.94 | -6.141 | 0.000 | 0.485 |
| 100.00 | -14.39 | -19.99 | 0.00 | -494.05 | 0.00 | 494.05 | 1010.63 | 262.63 | 547.93 | 523.10 | 61.50 | -6.397 | 0.000 | 0.418 |
| 105.00 | -13.94 | -19.56 | 0.00 | -394.09 | 0.00 | 394.09 | 987.11 | 253.12 | 508.98 | 492.30 | 68.31 | -6.624 | 0.000 | 0.348 |
| 107.87 | -13.69 | -19.31 | 0.00 | -337.96 | 0.00 | 337.96 | 973.17 | 247.66 | 487.27 | 474.80 | 72.32 | -6.741 | 0.000 | 0.306 |
| 107.87 | -13.69 | -19.31 | 0.00 | -337.96 | 0.00 | 337.96 | 973.17 | 247.66 | 487.27 | 474.80 | 72.32 | -6.741 | 0.000 | 0.306 |
| 110.00 | -13.46 | -19.16 | 0.00 | -296.83 | 0.00 | 296.83 | 962.61 | 243.61 | 471.46 | 461.91 | 75.33 | -6.820 | 0.000 | 0.663 |
| 114.00 | -9.58 | -13.98 | 0.00 | -214.77 | 0.00 | 214.77 | 942.31 | 236.01 | 442.48 | 437.94 | 81.17 | -7.128 | 0.000 | 0.504 |
| 115.00 | -9.47 | -13.93 | 0.00 | -200.80 | 0.00 | 200.80 | 937.13 | 234.11 | 435.38 | 431.99 | 82.67 | -7.196 | 0.000 | 0.478 |
| 120.00 | -9.10 | -13.59 | 0.00 | -131.14 | 0.00 | 131.14 | 910.67 | 224.60 | 400.73 | 402.61 | 90.35 | -7.475 | 0.000 | 0.339 |
| 125.00 | -4.61 | -6.31 | 0.00 | -63.20 | 0.00 | 63.20 | 883.23 | 215.09 | 367.52 | 373.80 | 98.26 | -7.660 | 0.000 | 0.175 |
| 130.00 | -4.38 | -5.98 | 0.00 | -31.62 | 0.00 | 31.62 | 854.80 | 205.58 | 335.75 | 345.64 | 106.32 | -7.763 | 0.000 | 0.097 |
| 135.00 | -0.20 | -0.35 | 0.00 | -1.75 | 0.00 | 1.75 | 825.39 | 196.08 | 305.42 | 318.16 | 114.46 | -7.804 | 0.000 | 0.006 |
| 140.00 | -0.02 | -0.03 | 0.00 | -0.02 | 0.00 | 0.02 | 789.80 | 186.57 | 276.52 | 289.54 | 122.61 | -7.807 | 0.000 | 0.000 |
| 140.50 | 0.00 | -0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | 123.42 | -7.807 | 0.000 | 0.000 |

# Wind Loading - Shaft

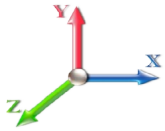
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 16 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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 | RB1 | 1.00 | 0.85 | 28.680 | 31.55 | 390.90 | 0.730 | 0.000 | 0.00 | 0.000 | 0.00 | 0.0 | 0.0 | 0.0 |
| 1.00 | RT1 RB2 | 1.00 | 0.85 | 28.680 | 31.55 | 389.23 | 0.739 * | 0.000 | 1.00 | 3.592 | 2.65 | 83.7 | 0.0 | 153.4 |
| 5.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 382.54 | 0.741 * | 0.000 | 4.00 | 14.214 | 10.53 | 332.3 | 0.0 | 606.8 |
| 10.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 374.17 | 0.746 * | 0.000 | 5.00 | 17.421 | 12.99 | 409.8 | 0.0 | 743.6 |
| 15.00 | | 1.00 | 0.85 | 28.680 | 31.55 | 365.81 | 0.751 * | 0.000 | 5.00 | 17.036 | 12.79 | 403.6 | 0.0 | 727.0 |
| 20.00 | RT2 RB3 | 1.00 | 0.90 | 30.430 | 33.47 | 368.19 | 0.757 * | 0.000 | 5.00 | 16.650 | 12.60 | 421.6 | 0.0 | 710.4 |
| 25.00 | | 1.00 | 0.95 | 31.894 | 35.08 | 368.12 | 0.762 * | 0.000 | 5.00 | 16.265 | 12.40 | 435.0 | 0.0 | 693.8 |
| 30.00 | | 1.00 | 0.98 | 33.142 | 36.46 | 366.26 | 0.768 * | 0.000 | 5.00 | 15.880 | 12.20 | 444.9 | 0.0 | 677.2 |
| 35.00 | | 1.00 | 1.01 | 34.235 | 37.66 | 363.12 | 0.775 * | 0.000 | 5.00 | 15.495 | 12.01 | 452.1 | 0.0 | 660.6 |
| 40.00 | RT3 RB4 | 1.00 | 1.04 | 35.211 | 38.73 | 358.99 | 0.782 * | 0.000 | 5.00 | 15.110 | 11.81 | 457.4 | 0.0 | 644.0 |
| 44.50 | Bot - Section 2 | 1.00 | 1.07 | 36.011 | 39.61 | 354.60 | 0.757 * | 0.000 | 4.50 | 13.270 | 10.05 | 398.1 | 0.0 | 565.4 |
| 45.00 | | 1.00 | 1.07 | 36.095 | 39.70 | 354.08 | 0.761 * | 0.000 | 0.50 | 1.482 | 1.13 | 44.7 | 0.0 | 114.7 |
| 50.00 | Top - Section 1 | 1.00 | 1.09 | 36.905 | 40.60 | 348.54 | 0.764 * | 0.000 | 5.00 | 14.604 | 11.16 | 453.1 | 0.0 | 1130.3 |
| 55.00 | | 1.00 | 1.12 | 37.653 | 41.42 | 349.05 | 0.766 * | 0.000 | 5.00 | 14.219 | 10.90 | 451.4 | 0.0 | 505.7 |
| 60.00 | RT4 RB5 | 1.00 | 1.14 | 38.349 | 42.18 | 342.59 | 0.774 * | 0.000 | 5.00 | 13.834 | 10.70 | 451.4 | 0.0 | 491.8 |
| 65.00 | | 1.00 | 1.16 | 39.001 | 42.90 | 335.73 | 0.781 * | 0.000 | 5.00 | 13.448 | 10.50 | 450.6 | 0.0 | 478.0 |
| 67.50 | RT5 | 1.00 | 1.17 | 39.312 | 43.24 | 332.17 | 0.787 * | 0.000 | 2.50 | 6.580 | 5.18 | 223.9 | 0.0 | 233.8 |
| 70.00 | | 1.00 | 1.17 | 39.614 | 43.58 | 328.53 | 0.791 * | 0.000 | 2.50 | 6.484 | 5.13 | 223.5 | 0.0 | 230.4 |
| 75.00 | | 1.00 | 1.19 | 40.194 | 44.21 | 321.02 | 0.730 | 0.000 | 5.00 | 12.678 | 9.26 | 409.2 | 0.0 | 450.4 |
| 80.00 | | 1.00 | 1.21 | 40.743 | 44.82 | 313.24 | 0.730 | 0.000 | 5.00 | 12.293 | 8.97 | 402.2 | 0.0 | 436.5 |
| 85.00 | | 1.00 | 1.22 | 41.267 | 45.39 | 305.21 | 0.730 | 0.000 | 5.00 | 11.908 | 8.69 | 394.6 | 0.0 | 422.7 |
| 90.00 | Appurtenance(s) | 1.00 | 1.24 | 41.766 | 45.94 | 296.96 | 0.730 | 0.000 | 5.00 | 11.523 | 8.41 | 386.5 | 0.0 | 408.9 |
| 90.50 | Bot - Section 3 | 1.00 | 1.24 | 41.815 | 46.00 | 296.12 | 0.730 | 0.000 | 0.50 | 1.131 | 0.83 | 38.0 | 0.0 | 40.1 |
| 93.12 | RB6 | 1.00 | 1.25 | 42.067 | 46.27 | 291.70 | 0.836 * | 0.000 | 2.62 | 5.947 | 4.97 | 229.9 | 0.0 | 335.2 |
| 94.50 | Top - Section 2 | 1.00 | 1.25 | 42.198 | 46.42 | 289.36 | 0.840 * | 0.000 | 1.38 | 3.090 | 2.60 | 120.5 | 0.0 | 174.1 |
| 95.00 | | 1.00 | 1.25 | 42.244 | 46.47 | 292.68 | 0.838 * | 0.000 | 0.50 | 1.112 | 0.93 | 43.3 | 0.0 | 23.8 |
| 100.00 | | 1.00 | 1.27 | 42.703 | 46.97 | 284.06 | 0.844 * | 0.000 | 5.00 | 10.911 | 9.21 | 432.5 | 0.0 | 233.3 |
| 105.00 | | 1.00 | 1.28 | 43.144 | 47.46 | 275.26 | 0.856 * | 0.000 | 5.00 | 10.526 | 9.01 | 427.6 | 0.0 | 225.0 |
| 107.87 | RT6 | 1.00 | 1.29 | 43.390 | 47.73 | 270.14 | 0.866 * | 0.000 | 2.87 | 5.868 | 5.08 | 242.6 | 0.0 | 125.4 |
| 110.00 | | 1.00 | 1.29 | 43.569 | 47.93 | 266.31 | 0.873 * | 0.000 | 2.13 | 4.273 | 3.73 | 178.8 | 0.0 | 91.3 |
| 114.00 | Appurtenance(s) | 1.00 | 1.30 | 43.898 | 48.29 | 259.03 | 0.730 | 0.000 | 4.00 | 7.835 | 5.72 | 276.2 | 0.0 | 167.4 |
| 115.00 | | 1.00 | 1.30 | 43.978 | 48.38 | 257.20 | 0.730 | 0.000 | 1.00 | 1.920 | 1.40 | 67.8 | 0.0 | 41.0 |
| 120.00 | | 1.00 | 1.32 | 44.374 | 48.81 | 247.95 | 0.730 | 0.000 | 5.00 | 9.370 | 6.84 | 333.9 | 0.0 | 200.1 |
| 125.00 | Appurtenance(s) | 1.00 | 1.33 | 44.757 | 49.23 | 238.56 | 0.730 | 0.000 | 5.00 | 8.985 | 6.56 | 322.9 | 0.0 | 191.8 |
| 130.00 | | 1.00 | 1.34 | 45.128 | 49.64 | 229.06 | 0.730 | 0.000 | 5.00 | 8.600 | 6.28 | 311.7 | 0.0 | 183.5 |
| 135.00 | Appurtenance(s) | 1.00 | 1.35 | 45.488 | 50.04 | 219.43 | 0.731 * | 0.000 | 5.00 | 8.215 | 6.00 | 300.5 | 0.0 | 175.2 |
| 140.00 | | 1.00 | 1.36 | 45.838 | 50.42 | 209.70 | 0.730 | 0.000 | 5.00 | 7.830 | 5.72 | 288.2 | 0.0 | 166.9 |
| 140.50 | | 1.00 | 1.36 | 45.872 | 50.46 | 208.72 | 0.730 | 0.000 | 0.50 | 0.762 | 0.56 | 28.1 | 0.0 | 16.2 |
| | | | | | | | | **Totals:** | **140.50** | | | **11,372.0** | | **13,475.8** |

* Cf Adjusted by Linear Load Ra Effect

# Discrete Appurtenance Forces

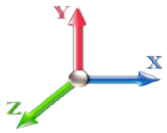
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 17 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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 | 135.00 | Ericsson RRUS 32 B66A | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 4.41 | 143.10 | 0.000 | 0.000 | 220.46 | 0.00 | 0.00 |
| 2 | 135.00 | Sector Frame | 3 | 45.488 | 50.037 | 0.56 | 0.75 | 25.31 | 2205.90 | 0.000 | 0.000 | 1266.56 | 0.00 | 0.00 |
| 3 | 135.00 | Ericsson RRUS11 B4 | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 4.55 | 137.70 | 0.000 | 0.000 | 227.70 | 0.00 | 0.00 |
| 4 | 135.00 | RFS | 3 | 45.488 | 50.037 | 0.50 | 0.80 | 9.61 | 109.89 | 0.000 | 0.000 | 480.98 | 0.00 | 0.00 |
| 5 | 135.00 | RFS | 3 | 45.488 | 50.037 | 0.56 | 0.80 | 34.00 | 345.60 | 0.000 | 0.000 | 1701.42 | 0.00 | 0.00 |
| 6 | 135.00 | Ericsson Air 32 | 3 | 45.488 | 50.037 | 0.70 | 0.80 | 13.59 | 356.94 | 0.000 | 0.000 | 680.15 | 0.00 | 0.00 |
| 7 | 135.00 | Ericsson Radio 4449 | 3 | 45.488 | 50.037 | 0.54 | 0.80 | 2.65 | 189.00 | 0.000 | 0.000 | 132.76 | 0.00 | 0.00 |
| 8 | 125.00 | Kathrein 782 10250 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 1.57 | 34.56 | 0.000 | 0.000 | 77.19 | 0.00 | 0.00 |
| 9 | 125.00 | RRUS 32 B66 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 4.13 | 143.10 | 0.000 | 0.000 | 203.36 | 0.00 | 0.00 |
| 10 | 125.00 | B14 4478 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 2.49 | 160.38 | 0.000 | 0.000 | 122.46 | 0.00 | 0.00 |
| 11 | 125.00 | DBC0061F1V51-2 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 1.30 | 137.16 | 0.000 | 0.000 | 63.83 | 0.00 | 0.00 |
| 12 | 125.00 | CCI OPA-65R-LCUU-H6 | 3 | 44.757 | 49.233 | 0.59 | 0.75 | 17.17 | 197.10 | 0.000 | 0.000 | 845.36 | 0.00 | 0.00 |
| 13 | 125.00 | QS66512-2 | 3 | 44.757 | 49.233 | 0.69 | 0.75 | 16.83 | 299.70 | 0.000 | 0.000 | 828.54 | 0.00 | 0.00 |
| 14 | 125.00 | Ericsson RRUS-32 | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 7.60 | 415.80 | 0.000 | 0.000 | 374.06 | 0.00 | 0.00 |
| 15 | 125.00 | Raycap DC6-48-60-18-8F | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 2.22 | 88.56 | 0.000 | 0.000 | 109.10 | 0.00 | 0.00 |
| 16 | 125.00 | CCI DTMABP7819VG12A | 6 | 44.757 | 49.233 | 0.50 | 0.75 | 3.44 | 102.60 | 0.000 | 0.000 | 169.22 | 0.00 | 0.00 |
| 17 | 125.00 | Ericsson RRUS-11 | 3 | 44.757 | 49.233 | 0.50 | 0.75 | 3.80 | 145.80 | 0.000 | 0.000 | 187.03 | 0.00 | 0.00 |
| 18 | 125.00 | Kathrein 800-10121 | 3 | 44.757 | 49.233 | 0.59 | 0.75 | 9.15 | 119.07 | 0.000 | 0.000 | 450.68 | 0.00 | 0.00 |
| 19 | 125.00 | HPA-65R-BUU-H6 | 3 | 44.757 | 49.233 | 0.64 | 0.75 | 18.47 | 137.70 | 0.000 | 0.000 | 909.56 | 0.00 | 0.00 |
| 20 | 125.00 | Platform w/ Hand Rails | 1 | 44.757 | 49.233 | 1.00 | 1.00 | 40.00 | 1800.00 | 0.000 | 0.000 | 1969.31 | 0.00 | 0.00 |
| 21 | 114.00 | 20" x 18" x 9" Junction Box | 1 | 43.898 | 48.287 | 1.00 | 1.00 | 3.15 | 18.00 | 0.000 | 0.000 | 152.10 | 0.00 | 0.00 |
| 22 | 114.00 | Andrew VHLP1-23-DW1 | 1 | 44.257 | 48.682 | 1.00 | 1.00 | 1.61 | 12.60 | 0.000 | 4.500 | 78.38 | 0.00 | 352.70 |
| 23 | 114.00 | Andrew VHLP2-23-DW1 | 1 | 44.257 | 48.682 | 1.00 | 1.00 | 4.69 | 27.90 | 0.000 | 4.500 | 228.32 | 0.00 | 1027.44 |
| 24 | 114.00 | Argus LLPX310R-V1 | 3 | 43.938 | 48.332 | 0.55 | 0.80 | 7.14 | 136.89 | 0.000 | 0.500 | 344.96 | 0.00 | 172.48 |
| 25 | 114.00 | Samsung | 3 | 43.816 | 48.198 | 0.61 | 0.80 | 3.32 | 89.37 | 0.000 | -1.000 | 160.00 | 0.00 | -160.00 |
| 26 | 114.00 | Low Profile Platform | 1 | 43.898 | 48.287 | 1.00 | 1.00 | 25.00 | 1620.00 | 0.000 | 0.000 | 1207.18 | 0.00 | 0.00 |
| 27 | 114.00 | RFS APXVSPP18 | 3 | 43.978 | 48.376 | 0.66 | 0.80 | 15.98 | 338.31 | 0.000 | 1.000 | 772.85 | 0.00 | 772.85 |
| 28 | 114.00 | Alcatel Lucent | 3 | 44.138 | 48.552 | 0.55 | 0.80 | 6.71 | 189.00 | 0.000 | 3.000 | 325.63 | 0.00 | 976.89 |
| 29 | 114.00 | Alcatel Lucent | 3 | 43.775 | 48.153 | 0.78 | 0.80 | 5.59 | 172.80 | 0.000 | -1.500 | 269.04 | 0.00 | -403.56 |
| 30 | 114.00 | Alcatel Lucent | 3 | 44.138 | 48.552 | 0.78 | 0.80 | 6.37 | 162.00 | 0.000 | 3.000 | 309.47 | 0.00 | 928.40 |
| 31 | 114.00 | RFS APXVTM14 | 3 | 44.138 | 48.552 | 0.63 | 0.80 | 12.02 | 315.09 | 0.000 | 3.000 | 583.63 | 0.00 | 1750.88 |
| 32 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.57 | 0.75 | 5.99 | 243.00 | 0.000 | 0.000 | 274.97 | 0.00 | 0.00 |
| 33 | 90.00 | Swedcom SLCP 2x6014 | 3 | 41.766 | 45.943 | 0.67 | 0.75 | 13.00 | 123.12 | 0.000 | 0.000 | 597.09 | 0.00 | 0.00 |
| 34 | 90.00 | Commscope | 6 | 41.766 | 45.943 | 0.62 | 0.75 | 30.18 | 412.56 | 0.000 | 0.000 | 1386.50 | 0.00 | 0.00 |
| 35 | 90.00 | Antel | 3 | 41.766 | 45.943 | 0.55 | 0.75 | 12.43 | 115.02 | 0.000 | 0.000 | 571.24 | 0.00 | 0.00 |
| 36 | 90.00 | RFS DB-T1-6Z-8AB-0Z | 1 | 41.766 | 45.943 | 1.00 | 1.00 | 4.80 | 39.60 | 0.000 | 0.000 | 220.53 | 0.00 | 0.00 |
| 37 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.57 | 0.75 | 5.99 | 243.00 | 0.000 | 0.000 | 274.97 | 0.00 | 0.00 |
| 38 | 90.00 | Alcatel Lucent | 3 | 41.766 | 45.943 | 0.68 | 0.75 | 3.06 | 148.50 | 0.000 | 0.000 | 140.48 | 0.00 | 0.00 |
| 39 | 90.00 | Platform w/ Hand Rails | 1 | 41.766 | 45.943 | 1.00 | 1.00 | 42.00 | 1980.00 | 0.000 | 0.000 | 1929.61 | 0.00 | 0.00 |
| | | | | | | | **Totals:** | | **13,656.42** | | | **20,846.68** | | |

# Total Applied Force Summary

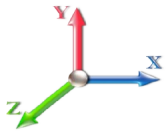
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | | **Crest Height:** | 0.00 | |
| **Base Elev:** | 0.000 (ft) | | **Site Class:** | D - Stiff Soil | |
| **Gh:** | 1.1 | **Topography:** 1 | **Struct Class:** | II | Page: 18 |

TES Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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 |
| 1.00 | | 83.70 | 187.98 | 0.00 | 0.00 |
| 5.00 | | 332.31 | 745.27 | 0.00 | 0.00 |
| 10.00 | | 409.80 | 916.65 | 0.00 | 0.00 |
| 15.00 | | 403.60 | 900.06 | 0.00 | 0.00 |
| 20.00 | | 421.64 | 883.47 | 0.00 | 0.00 |
| 25.00 | | 435.02 | 866.88 | 0.00 | 0.00 |
| 30.00 | | 444.87 | 850.29 | 0.00 | 0.00 |
| 35.00 | | 452.13 | 833.70 | 0.00 | 0.00 |
| 40.00 | | 457.40 | 817.11 | 0.00 | 0.00 |
| 44.50 | | 398.07 | 721.21 | 0.00 | 0.00 |
| 45.00 | | 44.74 | 132.01 | 0.00 | 0.00 |
| 50.00 | | 453.10 | 1303.41 | 0.00 | 0.00 |
| 55.00 | | 451.36 | 678.73 | 0.00 | 0.00 |
| 60.00 | | 451.40 | 664.91 | 0.00 | 0.00 |
| 65.00 | | 450.63 | 651.08 | 0.00 | 0.00 |
| 67.50 | | 223.92 | 320.36 | 0.00 | 0.00 |
| 70.00 | | 223.50 | 316.90 | 0.00 | 0.00 |
| 75.00 | | 409.19 | 623.43 | 0.00 | 0.00 |
| 80.00 | | 402.19 | 609.61 | 0.00 | 0.00 |
| 85.00 | | 394.59 | 595.78 | 0.00 | 0.00 |
| 90.00 | (23) attachments | 5781.84 | 3886.76 | 0.00 | 0.00 |
| 90.50 | | 37.98 | 50.83 | 0.00 | 0.00 |
| 93.12 | | 229.93 | 391.28 | 0.00 | 0.00 |
| 94.50 | | 120.49 | 203.65 | 0.00 | 0.00 |
| 95.00 | | 43.29 | 34.49 | 0.00 | 0.00 |
| 100.00 | | 432.50 | 340.31 | 0.00 | 0.00 |
| 105.00 | | 427.62 | 332.02 | 0.00 | 0.00 |
| 107.87 | | 242.61 | 186.83 | 0.00 | 0.00 |
| 110.00 | | 178.79 | 136.89 | 0.00 | 0.00 |
| 114.00 | (25) attachments | 4707.75 | 3334.96 | 0.00 | 5418.08 |
| 115.00 | | 67.82 | 55.65 | 0.00 | 0.00 |
| 120.00 | | 333.89 | 273.28 | 0.00 | 0.00 |
| 125.00 | (49) attachments | 6632.64 | 4046.52 | 0.00 | 0.00 |
| 130.00 | | 311.65 | 198.82 | 0.00 | 0.00 |
| 135.00 | (21) attachments | 5010.48 | 3678.65 | 0.00 | 0.00 |
| 140.00 | | 288.20 | 166.93 | 0.00 | 0.00 |
| 140.50 | | 28.06 | 16.24 | 0.00 | 0.00 |
| | **Totals:** | **32,218.70** | **30,952.95** | **0.00** | **5,418.08** |

# Linear Appurtenance Segment Forces (Factored)

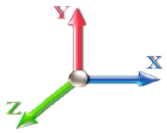
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 19 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 1.19 |
| 1.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 1.87 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 0.00 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 28.680 | 0.00 | 0.00 |
| 5.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 4.75 |
| 5.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 7.49 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 0.00 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 28.680 | 0.00 | 0.00 |
| 10.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 5.94 |
| 10.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 9.36 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 0.00 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 28.680 | 0.00 | 0.00 |
| 15.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 5.94 |
| 15.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 9.36 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 0.00 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 28.680 | 0.00 | 0.00 |
| 20.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 5.94 |
| 20.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 9.36 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 0.00 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 30.430 | 0.00 | 0.00 |
| 25.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 5.94 |
| 25.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 9.36 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 0.00 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 31.894 | 0.00 | 0.00 |
| 30.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 5.94 |
| 30.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 9.36 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 0.00 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 33.142 | 0.00 | 0.00 |
| 35.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 5.94 |
| 35.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 9.36 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 0.00 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 34.235 | 0.00 | 0.00 |
| 40.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 5.94 |
| 40.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 9.36 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 0.00 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 35.211 | 0.00 | 0.00 |
| 44.50 | 1 1/4" Fiber | Yes | 4.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 5.35 |
| 44.50 | 1 5/8" Fiber | Yes | 4.50 | 0.000 | 1.98 | 0.74 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 8.42 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 0.00 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 36.011 | 0.00 | 0.00 |
| 45.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.59 |
| 45.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.94 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.00 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 36.095 | 0.00 | 0.00 |
| 50.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 5.94 |
| 50.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 9.36 |
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

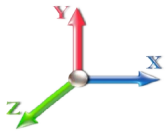
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 20 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 36.905 | 0.00 | 0.00 |
| 55.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 5.94 |
| 55.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 9.36 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 0.00 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 37.653 | 0.00 | 0.00 |
| 60.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 5.94 |
| 60.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 9.36 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 0.00 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 38.349 | 0.00 | 0.00 |
| 65.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 5.94 |
| 65.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 9.36 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 0.00 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 39.001 | 0.00 | 0.00 |
| 67.50 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 2.97 |
| 67.50 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 4.68 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 0.00 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 39.312 | 0.00 | 0.00 |
| 70.00 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 2.97 |
| 70.00 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 4.68 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 0.00 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 39.614 | 0.00 | 0.00 |
| 75.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.065 | 0.000 | 40.194 | 0.00 | 5.94 |
| 75.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.065 | 0.000 | 40.194 | 0.00 | 9.36 |
| 80.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.067 | 0.000 | 40.743 | 0.00 | 5.94 |
| 80.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.067 | 0.000 | 40.743 | 0.00 | 9.36 |
| 85.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.069 | 0.000 | 41.267 | 0.00 | 5.94 |
| 85.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.069 | 0.000 | 41.267 | 0.00 | 9.36 |
| 90.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.072 | 0.000 | 41.766 | 0.00 | 5.94 |
| 90.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.072 | 0.000 | 41.766 | 0.00 | 9.36 |
| 90.50 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.073 | 0.000 | 41.815 | 0.00 | 0.59 |
| 90.50 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.073 | 0.000 | 41.815 | 0.00 | 0.94 |
| 93.12 | 1 1/4" Fiber | Yes | 2.62 | 0.000 | 0.00 | 0.00 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 3.11 |
| 93.12 | 1 5/8" Fiber | Yes | 2.62 | 0.000 | 1.98 | 0.43 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 4.90 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 0.00 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 42.067 | 0.00 | 0.00 |
| 94.50 | 1 1/4" Fiber | Yes | 1.38 | 0.000 | 0.00 | 0.00 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 1.64 |
| 94.50 | 1 5/8" Fiber | Yes | 1.38 | 0.000 | 1.98 | 0.23 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 2.58 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 0.00 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 42.198 | 0.00 | 0.00 |
| 95.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.59 |
| 95.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.94 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.00 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 42.244 | 0.00 | 0.00 |
| 100.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 5.94 |
| 100.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 9.36 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 0.00 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 42.703 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

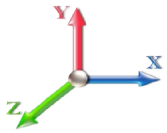
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 21 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 5.94 |
| 105.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 9.36 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 0.00 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 43.144 | 0.00 | 0.00 |
| 107.87 | 1 1/4" Fiber | Yes | 2.87 | 0.000 | 0.00 | 0.00 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 3.41 |
| 107.87 | 1 5/8" Fiber | Yes | 2.87 | 0.000 | 1.98 | 0.47 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 5.37 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 0.00 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 43.390 | 0.00 | 0.00 |
| 110.00 | 1 1/4" Fiber | Yes | 2.13 | 0.000 | 0.00 | 0.00 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 2.53 |
| 110.00 | 1 5/8" Fiber | Yes | 2.13 | 0.000 | 1.98 | 0.35 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 3.99 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 0.00 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 43.569 | 0.00 | 0.00 |
| 114.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 4.75 |
| 114.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 7.49 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 0.00 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 43.898 | 0.00 | 0.00 |
| 115.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.086 | 0.000 | 43.978 | 0.00 | 1.19 |
| 115.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.086 | 0.000 | 43.978 | 0.00 | 1.87 |
| 120.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.088 | 0.000 | 44.374 | 0.00 | 5.94 |
| 120.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.088 | 0.000 | 44.374 | 0.00 | 9.36 |
| 125.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.092 | 0.000 | 44.757 | 0.00 | 5.94 |
| 125.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.092 | 0.000 | 44.757 | 0.00 | 9.36 |
| 130.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.096 | 0.000 | 45.128 | 0.00 | 5.94 |
| 130.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.096 | 0.000 | 45.128 | 0.00 | 9.36 |
| 135.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.100 | 1.001 | 45.488 | 0.00 | 5.94 |
| 135.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.100 | 1.001 | 45.488 | 0.00 | 9.36 |
| | | | | | | | | | | **Totals:** | **0.0** | **413.1** |

# Calculated Forces

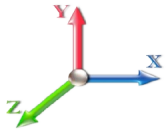
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 22 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0W 118 mph Wind

**Dead Load Factor** 0.90

**Wind Load Factor** 1.00




**Iterations** 25

| 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 | -30.94 | -32.24 | 0.00 | -3330.2 | 0.00 | 3330.29 | 3592.24 | 880.75 | 3081.19 | 3113.33 | 0.00 | 0.000 | 0.000 | 0.750 |
| 1.00 | -30.67 | -32.22 | 0.00 | -3298.0 | 0.00 | 3298.06 | 3581.26 | 876.95 | 3054.64 | 3090.29 | 0.01 | -0.058 | 0.000 | 0.663 |
| 5.00 | -29.80 | -32.01 | 0.00 | -3169.1 | 0.00 | 3169.17 | 3536.93 | 861.73 | 2949.58 | 2998.63 | 0.14 | -0.262 | 0.000 | 0.652 |
| 10.00 | -28.75 | -31.72 | 0.00 | -3009.1 | 0.00 | 3009.14 | 3480.64 | 842.72 | 2820.85 | 2885.21 | 0.55 | -0.516 | 0.000 | 0.637 |
| 15.00 | -27.71 | -31.43 | 0.00 | -2850.5 | 0.00 | 2850.55 | 3423.37 | 823.70 | 2694.99 | 2773.12 | 1.23 | -0.771 | 0.000 | 0.622 |
| 20.00 | -26.69 | -31.12 | 0.00 | -2693.4 | 0.00 | 2693.40 | 3365.12 | 804.69 | 2572.00 | 2662.41 | 2.17 | -1.027 | 0.000 | 0.644 |
| 25.00 | -25.69 | -30.79 | 0.00 | -2537.8 | 0.00 | 2537.82 | 3305.89 | 785.67 | 2451.88 | 2553.15 | 3.39 | -1.300 | 0.000 | 0.627 |
| 30.00 | -24.70 | -30.44 | 0.00 | -2383.8 | 0.00 | 2383.89 | 3245.52 | 766.66 | 2334.64 | 2445.26 | 4.90 | -1.573 | 0.000 | 0.608 |
| 35.00 | -23.74 | -30.08 | 0.00 | -2231.6 | 0.00 | 2231.69 | 3165.03 | 747.64 | 2220.26 | 2324.87 | 6.70 | -1.846 | 0.000 | 0.593 |
| 40.00 | -22.80 | -29.70 | 0.00 | -2081.3 | 0.00 | 2081.31 | 3084.53 | 728.63 | 2108.76 | 2207.52 | 8.77 | -2.118 | 0.000 | 0.628 |
| 44.50 | -22.02 | -29.33 | 0.00 | -1947.6 | 0.00 | 1947.68 | 3012.08 | 711.52 | 2010.87 | 2104.51 | 10.90 | -2.384 | 0.000 | 0.611 |
| 45.00 | -21.81 | -29.34 | 0.00 | -1933.0 | 0.00 | 1933.01 | 3004.03 | 709.61 | 2000.14 | 2093.21 | 11.15 | -2.415 | 0.000 | 0.602 |
| 50.00 | -20.38 | -28.93 | 0.00 | -1786.3 | 0.00 | 1786.32 | 2423.81 | 587.47 | 1644.99 | 1680.79 | 13.83 | -2.704 | 0.000 | 0.608 |
| 55.00 | -19.58 | -28.55 | 0.00 | -1641.6 | 0.00 | 1641.66 | 2376.14 | 571.62 | 1557.44 | 1602.88 | 16.82 | -2.990 | 0.000 | 0.624 |
| 60.00 | -18.79 | -28.16 | 0.00 | -1498.9 | 0.00 | 1498.92 | 2327.49 | 555.78 | 1472.29 | 1526.13 | 20.11 | -3.293 | 0.000 | 0.591 |
| 65.00 | -18.06 | -27.74 | 0.00 | -1358.1 | 0.00 | 1358.12 | 2277.86 | 539.93 | 1389.54 | 1450.59 | 23.72 | -3.590 | 0.000 | 0.557 |
| 67.50 | -17.69 | -27.54 | 0.00 | -1288.7 | 0.00 | 1288.77 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 25.63 | -3.737 | 0.000 | 0.539 |
| 67.50 | -17.69 | -27.54 | 0.00 | -1288.7 | 0.00 | 1288.77 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 25.63 | -3.737 | 0.000 | 0.539 |
| 70.00 | -17.23 | -27.39 | 0.00 | -1219.9 | 0.00 | 1219.92 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 27.63 | -3.883 | 0.000 | 0.900 |
| 75.00 | -16.42 | -27.08 | 0.00 | -1082.9 | 0.00 | 1082.95 | 2151.54 | 508.24 | 1231.20 | 1288.93 | 31.95 | -4.362 | 0.000 | 0.851 |
| 80.00 | -15.63 | -26.75 | 0.00 | -947.57 | 0.00 | 947.57 | 2084.46 | 492.39 | 1155.63 | 1209.39 | 36.76 | -4.825 | 0.000 | 0.794 |
| 85.00 | -14.88 | -26.42 | 0.00 | -813.82 | 0.00 | 813.82 | 2017.38 | 476.55 | 1082.45 | 1132.40 | 42.05 | -5.266 | 0.000 | 0.729 |
| 90.00 | -11.48 | -20.34 | 0.00 | -681.73 | 0.00 | 681.73 | 1950.30 | 460.70 | 1011.66 | 1057.93 | 47.78 | -5.680 | 0.000 | 0.652 |
| 90.50 | -11.39 | -20.32 | 0.00 | -671.56 | 0.00 | 671.56 | 1943.59 | 459.12 | 1004.71 | 1050.62 | 48.38 | -5.722 | 0.000 | 0.647 |
| 93.12 | -10.98 | -20.07 | 0.00 | -618.33 | 0.00 | 618.33 | 1908.44 | 450.81 | 968.70 | 1012.75 | 51.57 | -5.931 | 0.000 | 0.345 |
| 94.50 | -10.77 | -19.94 | 0.00 | -590.63 | 0.00 | 590.63 | 1035.36 | 273.09 | 592.44 | 557.40 | 53.30 | -5.991 | 0.000 | 0.382 |
| 95.00 | -10.70 | -19.92 | 0.00 | -580.66 | 0.00 | 580.66 | 1033.16 | 272.13 | 588.32 | 554.27 | 53.92 | -6.013 | 0.000 | 0.470 |
| 100.00 | -10.32 | -19.50 | 0.00 | -481.05 | 0.00 | 481.05 | 1010.63 | 262.63 | 547.93 | 523.10 | 60.34 | -6.262 | 0.000 | 0.405 |
| 105.00 | -9.99 | -19.06 | 0.00 | -383.57 | 0.00 | 383.57 | 987.11 | 253.12 | 508.98 | 492.30 | 67.01 | -6.483 | 0.000 | 0.337 |
| 107.87 | -9.80 | -18.82 | 0.00 | -328.86 | 0.00 | 328.86 | 973.17 | 247.66 | 487.27 | 474.80 | 70.94 | -6.597 | 0.000 | 0.296 |
| 107.87 | -9.80 | -18.82 | 0.00 | -328.86 | 0.00 | 328.86 | 973.17 | 247.66 | 487.27 | 474.80 | 70.94 | -6.597 | 0.000 | 0.296 |
| 110.00 | -9.62 | -18.66 | 0.00 | -288.77 | 0.00 | 288.77 | 962.61 | 243.61 | 471.46 | 461.91 | 73.89 | -6.675 | 0.000 | 0.641 |
| 114.00 | -6.83 | -13.61 | 0.00 | -208.73 | 0.00 | 208.73 | 942.31 | 236.01 | 442.48 | 437.94 | 79.61 | -6.974 | 0.000 | 0.487 |
| 115.00 | -6.74 | -13.55 | 0.00 | -195.12 | 0.00 | 195.12 | 937.13 | 234.11 | 435.38 | 431.99 | 81.07 | -7.041 | 0.000 | 0.462 |
| 120.00 | -6.46 | -13.21 | 0.00 | -127.35 | 0.00 | 127.35 | 910.67 | 224.60 | 400.73 | 402.61 | 88.58 | -7.311 | 0.000 | 0.327 |
| 125.00 | -3.28 | -6.12 | 0.00 | -61.28 | 0.00 | 61.28 | 883.23 | 215.09 | 367.52 | 373.80 | 96.32 | -7.491 | 0.000 | 0.168 |
| 130.00 | -3.12 | -5.79 | 0.00 | -30.66 | 0.00 | 30.66 | 854.80 | 205.58 | 335.75 | 345.64 | 104.20 | -7.590 | 0.000 | 0.093 |
| 135.00 | -0.14 | -0.34 | 0.00 | -1.70 | 0.00 | 1.70 | 825.39 | 196.08 | 305.42 | 318.16 | 112.16 | -7.631 | 0.000 | 0.006 |
| 140.00 | -0.01 | -0.03 | 0.00 | -0.01 | 0.00 | 0.01 | 789.80 | 186.57 | 276.52 | 289.54 | 120.13 | -7.633 | 0.000 | 0.000 |
| 140.50 | 0.00 | -0.03 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | 120.93 | -7.633 | 0.000 | 0.000 |

# Wind Loading - Shaft

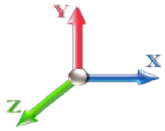
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 23 | |

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** 24

| 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 | RB1 | 1.00 | 0.85 | 5.149 | 5.66 | 0.00 | 1.200 | 0.000 | 0.00 | 0.000 | 0.00 | 0.0 | 0.0 | 0.0 |
| 1.00 | RT1 RB2 | 1.00 | 0.85 | 5.149 | 5.66 | 0.00 | 1.214 * | 1.057 | 1.00 | 3.768 | 4.58 | 25.9 | 57.5 | 262.0 |
| 5.00 | | 1.00 | 0.85 | 5.149 | 5.66 | 0.00 | 1.218 * | 1.242 | 4.00 | 15.042 | 18.32 | 103.8 | 266.8 | 1075.9 |
| 10.00 | | 1.00 | 0.85 | 5.149 | 5.66 | 0.00 | 1.226 * | 1.331 | 5.00 | 18.530 | 22.71 | 128.7 | 350.6 | 1342.1 |
| 15.00 | | 1.00 | 0.85 | 5.149 | 5.66 | 0.00 | 1.234 * | 1.386 | 5.00 | 18.191 | 22.46 | 127.2 | 357.7 | 1327.0 |
| 20.00 | RT2 RB3 | 1.00 | 0.90 | 5.464 | 6.01 | 0.00 | 1.244 * | 1.427 | 5.00 | 17.839 | 22.18 | 133.3 | 360.3 | 1307.5 |
| 25.00 | | 1.00 | 0.95 | 5.726 | 6.30 | 0.00 | 1.253 * | 1.459 | 5.00 | 17.481 | 21.91 | 138.0 | 360.4 | 1285.5 |
| 30.00 | | 1.00 | 0.98 | 5.951 | 6.55 | 0.00 | 1.263 * | 1.486 | 5.00 | 17.118 | 21.62 | 141.5 | 358.9 | 1261.8 |
| 35.00 | | 1.00 | 1.01 | 6.147 | 6.76 | 0.00 | 1.274 * | 1.509 | 5.00 | 16.752 | 21.34 | 144.3 | 356.0 | 1236.9 |
| 40.00 | RT3 RB4 | 1.00 | 1.04 | 6.322 | 6.95 | 0.00 | 1.285 * | 1.529 | 5.00 | 16.384 | 21.05 | 146.4 | 352.3 | 1211.0 |
| 44.50 | Bot - Section 2 | 1.00 | 1.07 | 6.466 | 7.11 | 0.00 | 1.245 * | 1.546 | 4.50 | 14.429 | 17.96 | 127.8 | 313.5 | 1067.4 |
| 45.00 | | 1.00 | 1.07 | 6.481 | 7.13 | 0.00 | 1.250 * | 1.547 | 0.50 | 1.611 | 2.01 | 14.4 | 35.4 | 188.3 |
| 50.00 | Top - Section 1 | 1.00 | 1.09 | 6.626 | 7.29 | 0.00 | 1.256 * | 1.564 | 5.00 | 15.907 | 19.98 | 145.7 | 348.9 | 1856.0 |
| 55.00 | | 1.00 | 1.12 | 6.760 | 7.44 | 0.00 | 1.260 * | 1.579 | 5.00 | 15.534 | 19.57 | 145.5 | 343.3 | 1017.5 |
| 60.00 | RT4 RB5 | 1.00 | 1.14 | 6.885 | 7.57 | 0.00 | 1.272 * | 1.592 | 5.00 | 15.161 | 19.28 | 146.0 | 337.4 | 993.2 |
| 65.00 | | 1.00 | 1.16 | 7.002 | 7.70 | 0.00 | 1.284 * | 1.605 | 5.00 | 14.786 | 18.98 | 146.2 | 331.1 | 968.4 |
| 67.50 | RT5 | 1.00 | 1.17 | 7.058 | 7.76 | 0.00 | 1.294 * | 1.611 | 2.50 | 7.251 | 9.38 | 72.8 | 163.9 | 475.6 |
| 70.00 | | 1.00 | 1.17 | 7.113 | 7.82 | 0.00 | 1.300 * | 1.617 | 2.50 | 7.157 | 9.31 | 72.8 | 162.2 | 469.4 |
| 75.00 | | 1.00 | 1.19 | 7.217 | 7.94 | 0.00 | 1.200 | 1.628 | 5.00 | 14.035 | 16.84 | 133.7 | 317.5 | 918.0 |
| 80.00 | | 1.00 | 1.21 | 7.315 | 8.05 | 0.00 | 1.200 | 1.639 | 5.00 | 13.659 | 16.39 | 131.9 | 310.3 | 892.3 |
| 85.00 | | 1.00 | 1.22 | 7.409 | 8.15 | 0.00 | 1.200 | 1.649 | 5.00 | 13.282 | 15.94 | 129.9 | 302.9 | 866.5 |
| 90.00 | Appurtenance(s) | 1.00 | 1.24 | 7.499 | 8.25 | 0.00 | 1.200 | 1.658 | 5.00 | 12.905 | 15.49 | 127.7 | 295.3 | 840.4 |
| 90.50 | Bot - Section 3 | 1.00 | 1.24 | 7.508 | 8.26 | 0.00 | 1.200 | 1.659 | 0.50 | 1.269 | 1.52 | 12.6 | 29.4 | 83.0 |
| 93.12 | RB6 | 1.00 | 1.25 | 7.553 | 8.31 | 0.00 | 1.373 * | 1.664 | 2.62 | 6.674 | 9.17 | 76.2 | 154.2 | 601.2 |
| 94.50 | Top - Section 2 | 1.00 | 1.25 | 7.576 | 8.33 | 0.00 | 1.381 * | 1.666 | 1.38 | 3.473 | 4.80 | 40.0 | 80.6 | 312.8 |
| 95.00 | | 1.00 | 1.25 | 7.585 | 8.34 | 0.00 | 1.377 * | 1.667 | 0.50 | 1.251 | 1.72 | 14.4 | 29.1 | 60.9 |
| 100.00 | | 1.00 | 1.27 | 7.667 | 8.43 | 0.00 | 1.387 * | 1.676 | 5.00 | 12.308 | 17.07 | 144.0 | 283.4 | 594.4 |
| 105.00 | | 1.00 | 1.28 | 7.746 | 8.52 | 0.00 | 1.407 * | 1.684 | 5.00 | 11.929 | 16.79 | 143.0 | 275.3 | 575.2 |
| 107.87 | RT6 | 1.00 | 1.29 | 7.790 | 8.57 | 0.00 | 1.424 * | 1.689 | 2.87 | 6.676 | 9.51 | 81.5 | 155.3 | 322.5 |
| 110.00 | | 1.00 | 1.29 | 7.823 | 8.60 | 0.00 | 1.435 * | 1.692 | 2.13 | 4.874 | 6.99 | 60.2 | 113.7 | 235.5 |
| 114.00 | Appurtenance(s) | 1.00 | 1.30 | 7.882 | 8.67 | 0.00 | 1.200 | 1.698 | 4.00 | 8.967 | 10.76 | 93.3 | 208.2 | 431.4 |
| 115.00 | | 1.00 | 1.30 | 7.896 | 8.69 | 0.00 | 1.200 | 1.699 | 1.00 | 2.204 | 2.64 | 23.0 | 51.7 | 106.4 |
| 120.00 | | 1.00 | 1.32 | 7.967 | 8.76 | 0.00 | 1.200 | 1.707 | 5.00 | 10.793 | 12.95 | 113.5 | 250.0 | 516.8 |
| 125.00 | Appurtenance(s) | 1.00 | 1.33 | 8.036 | 8.84 | 0.00 | 1.200 | 1.714 | 5.00 | 10.413 | 12.50 | 110.5 | 241.3 | 497.1 |
| 130.00 | | 1.00 | 1.34 | 8.103 | 8.91 | 0.00 | 1.200 | 1.720 | 5.00 | 10.034 | 12.04 | 107.3 | 232.5 | 477.2 |
| 135.00 | Appurtenance(s) | 1.00 | 1.35 | 8.167 | 8.98 | 0.00 | 1.202 * | 1.727 | 5.00 | 9.654 | 11.60 | 104.2 | 223.6 | 457.2 |
| 140.00 | | 1.00 | 1.36 | 8.230 | 9.05 | 0.00 | 1.200 | 1.733 | 5.00 | 9.274 | 11.13 | 100.8 | 214.6 | 437.2 |
| 140.50 | | 1.00 | 1.36 | 8.236 | 9.06 | 0.00 | 1.200 | 1.734 | 0.50 | 0.906 | 1.09 | 9.9 | 21.4 | 43.0 |
| | | | | | | | | **Totals:** | **140.50** | | | **3,717.6** | | **26,614.3** |

* Cf Adjusted by Linear Load Ra Effect

# Discrete Appurtenance Forces

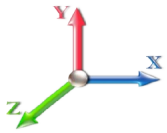
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 24 | |

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** 24

| 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 | 135.00 | Ericsson RRUS 32 B66A | 3 | 8.167 | 8.984 | 0.54 | 0.80 | 5.56 | 451.39 | 0.000 | 0.000 | 49.99 | 0.00 | 0.00 |
| 2 | 135.00 | Sector Frame | 3 | 8.167 | 8.984 | 0.56 | 0.75 | 37.90 | 5638.45 | 0.000 | 0.000 | 340.51 | 0.00 | 0.00 |
| 3 | 135.00 | Ericsson RRUS11 B4 | 3 | 8.167 | 8.984 | 0.54 | 0.80 | 5.68 | 350.15 | 0.000 | 0.000 | 51.05 | 0.00 | 0.00 |
| 4 | 135.00 | RFS | 3 | 8.167 | 8.984 | 0.50 | 0.80 | 11.25 | 552.20 | 0.000 | 0.000 | 101.09 | 0.00 | 0.00 |
| 5 | 135.00 | RFS | 3 | 8.167 | 8.984 | 0.56 | 0.80 | 37.16 | 1699.80 | 0.000 | 0.000 | 333.85 | 0.00 | 0.00 |
| 6 | 135.00 | Ericsson Air 32 | 3 | 8.167 | 8.984 | 0.70 | 0.80 | 16.03 | 1022.20 | 0.000 | 0.000 | 144.02 | 0.00 | 0.00 |
| 7 | 135.00 | Ericsson Radio 4449 | 3 | 8.167 | 8.984 | 0.54 | 0.80 | 3.51 | 454.05 | 0.000 | 0.000 | 31.51 | 0.00 | 0.00 |
| 8 | 125.00 | Kathrein 782 10250 | 6 | 8.036 | 8.840 | 0.50 | 0.75 | 3.25 | 99.81 | 0.000 | 0.000 | 28.75 | 0.00 | 0.00 |
| 9 | 125.00 | RRUS 32 B66 | 3 | 8.036 | 8.840 | 0.50 | 0.75 | 5.21 | 448.93 | 0.000 | 0.000 | 46.03 | 0.00 | 0.00 |
| 10 | 125.00 | B14 4478 | 3 | 8.036 | 8.840 | 0.50 | 0.75 | 3.28 | 392.87 | 0.000 | 0.000 | 29.01 | 0.00 | 0.00 |
| 11 | 125.00 | DBC0061F1V51-2 | 6 | 8.036 | 8.840 | 0.50 | 0.75 | 2.14 | 247.54 | 0.000 | 0.000 | 18.92 | 0.00 | 0.00 |
| 12 | 125.00 | CCI OPA-65R-LCUU-H6 | 3 | 8.036 | 8.840 | 0.59 | 0.75 | 19.55 | 943.40 | 0.000 | 0.000 | 172.84 | 0.00 | 0.00 |
| 13 | 125.00 | QS66512-2 | 3 | 8.036 | 8.840 | 0.69 | 0.75 | 19.47 | 1067.02 | 0.000 | 0.000 | 172.08 | 0.00 | 0.00 |
| 14 | 125.00 | Ericsson RRUS-32 | 6 | 8.036 | 8.840 | 0.50 | 0.75 | 12.81 | 1238.25 | 0.000 | 0.000 | 113.27 | 0.00 | 0.00 |
| 15 | 125.00 | Raycap DC6-48-60-18-8F | 3 | 8.036 | 8.840 | 0.50 | 0.75 | 3.25 | 247.10 | 0.000 | 0.000 | 28.75 | 0.00 | 0.00 |
| 16 | 125.00 | CCI DTMABP7819VG12A | 6 | 8.036 | 8.840 | 0.50 | 0.75 | 5.72 | 252.29 | 0.000 | 0.000 | 50.52 | 0.00 | 0.00 |
| 17 | 125.00 | Ericsson RRUS-11 | 3 | 8.036 | 8.840 | 0.50 | 0.75 | 4.76 | 456.08 | 0.000 | 0.000 | 42.09 | 0.00 | 0.00 |
| 18 | 125.00 | Kathrein 800-10121 | 3 | 8.036 | 8.840 | 0.59 | 0.75 | 10.98 | 557.86 | 0.000 | 0.000 | 97.02 | 0.00 | 0.00 |
| 19 | 125.00 | HPA-65R-BUU-H6 | 3 | 8.036 | 8.840 | 0.64 | 0.75 | 21.04 | 912.31 | 0.000 | 0.000 | 185.97 | 0.00 | 0.00 |
| 20 | 125.00 | Platform w/ Hand Rails | 1 | 8.036 | 8.840 | 1.00 | 1.00 | 60.56 | 3856.42 | 0.000 | 0.000 | 535.36 | 0.00 | 0.00 |
| 21 | 114.00 | 20" x 18" x 9" Junction Box | 1 | 7.882 | 8.670 | 1.00 | 1.00 | 4.37 | 100.45 | 0.000 | 0.000 | 37.90 | 0.00 | 0.00 |
| 22 | 114.00 | Andrew VHLP1-23-DW1 | 1 | 7.946 | 8.741 | 1.00 | 1.00 | 2.35 | 41.15 | 0.000 | 4.500 | 20.52 | 0.00 | 92.36 |
| 23 | 114.00 | Andrew VHLP2-23-DW1 | 1 | 7.946 | 8.741 | 1.00 | 1.00 | 5.93 | 104.41 | 0.000 | 4.500 | 51.85 | 0.00 | 233.34 |
| 24 | 114.00 | Argus LLPX310R-V1 | 3 | 7.889 | 8.678 | 0.55 | 0.80 | 8.68 | 499.21 | 0.000 | 0.500 | 75.36 | 0.00 | 37.68 |
| 25 | 114.00 | Samsung | 3 | 7.867 | 8.654 | 0.61 | 0.80 | 5.05 | 209.87 | 0.000 | -1.000 | 43.71 | 0.00 | -43.71 |
| 26 | 114.00 | Low Profile Platform | 1 | 7.882 | 8.670 | 1.00 | 1.00 | 45.38 | 3288.17 | 0.000 | 0.000 | 393.40 | 0.00 | 0.00 |
| 27 | 114.00 | RFS APXVSPP18 | 3 | 7.896 | 8.686 | 0.66 | 0.80 | 18.48 | 1030.87 | 0.000 | 1.000 | 160.52 | 0.00 | 160.52 |
| 28 | 114.00 | Alcatel Lucent | 3 | 7.925 | 8.717 | 0.55 | 0.80 | 8.01 | 572.60 | 0.000 | 3.000 | 69.86 | 0.00 | 209.59 |
| 29 | 114.00 | Alcatel Lucent | 3 | 7.860 | 8.646 | 0.78 | 0.80 | 8.12 | 389.44 | 0.000 | -1.500 | 70.22 | 0.00 | -105.33 |
| 30 | 114.00 | Alcatel Lucent | 3 | 7.925 | 8.717 | 0.78 | 0.80 | 9.27 | 382.41 | 0.000 | 3.000 | 80.77 | 0.00 | 242.32 |
| 31 | 114.00 | RFS APXVTM14 | 3 | 7.925 | 8.717 | 0.63 | 0.80 | 14.07 | 885.77 | 0.000 | 3.000 | 122.66 | 0.00 | 367.98 |
| 32 | 90.00 | Alcatel Lucent | 3 | 7.499 | 8.249 | 0.57 | 0.75 | 7.27 | 605.44 | 0.000 | 0.000 | 59.95 | 0.00 | 0.00 |
| 33 | 90.00 | Swedcom SLCP 2x6014 | 3 | 7.499 | 8.249 | 0.67 | 0.75 | 15.05 | 728.02 | 0.000 | 0.000 | 124.16 | 0.00 | 0.00 |
| 34 | 90.00 | Commscope | 6 | 7.499 | 8.249 | 0.62 | 0.75 | 34.64 | 1685.86 | 0.000 | 0.000 | 285.75 | 0.00 | 0.00 |
| 35 | 90.00 | Antel | 3 | 7.499 | 8.249 | 0.55 | 0.75 | 14.39 | 644.61 | 0.000 | 0.000 | 118.73 | 0.00 | 0.00 |
| 36 | 90.00 | RFS DB-T1-6Z-8AB-0Z | 1 | 7.499 | 8.249 | 1.00 | 1.00 | 5.63 | 188.16 | 0.000 | 0.000 | 46.42 | 0.00 | 0.00 |
| 37 | 90.00 | Alcatel Lucent | 3 | 7.499 | 8.249 | 0.57 | 0.75 | 7.27 | 605.44 | 0.000 | 0.000 | 59.95 | 0.00 | 0.00 |
| 38 | 90.00 | Alcatel Lucent | 3 | 7.499 | 8.249 | 0.68 | 0.75 | 5.67 | 436.14 | 0.000 | 0.000 | 46.80 | 0.00 | 0.00 |
| 39 | 90.00 | Platform w/ Hand Rails | 1 | 7.499 | 8.249 | 1.00 | 1.00 | 62.89 | 4628.96 | 0.000 | 0.000 | 518.81 | 0.00 | 0.00 |
| | | | | | | | **Totals:** | | **37,915.07** | | | **4,959.96** | | |

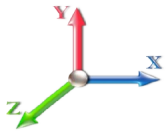
# Total Applied Force Summary

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | | **Crest Height:** | 0.00 | |
| **Base Elev:** | 0.000 (ft) | | **Site Class:** | D - Stiff Soil | |
| **Gh:** | 1.1 | **Topography:** 1 | **Struct Class:** | II | Page: 25 |

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

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 24

| 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 |
| 1.00 | | 25.92 | 325.11 | 0.00 | 0.00 |
| 5.00 | | 103.79 | 1343.59 | 0.00 | 0.00 |
| 10.00 | | 128.65 | 1686.44 | 0.00 | 0.00 |
| 15.00 | | 127.20 | 1677.63 | 0.00 | 0.00 |
| 20.00 | | 133.33 | 1662.85 | 0.00 | 0.00 |
| 25.00 | | 137.99 | 1644.61 | 0.00 | 0.00 |
| 30.00 | | 141.54 | 1624.08 | 0.00 | 0.00 |
| 35.00 | | 144.27 | 1601.91 | 0.00 | 0.00 |
| 40.00 | | 146.38 | 1578.50 | 0.00 | 0.00 |
| 44.50 | | 127.75 | 1393.68 | 0.00 | 0.00 |
| 45.00 | | 14.35 | 224.60 | 0.00 | 0.00 |
| 50.00 | | 145.66 | 2220.67 | 0.00 | 0.00 |
| 55.00 | | 145.54 | 1384.05 | 0.00 | 0.00 |
| 60.00 | | 146.01 | 1361.33 | 0.00 | 0.00 |
| 65.00 | | 146.23 | 1338.13 | 0.00 | 0.00 |
| 67.50 | | 72.83 | 660.88 | 0.00 | 0.00 |
| 70.00 | | 72.82 | 654.95 | 0.00 | 0.00 |
| 75.00 | | 133.70 | 1231.12 | 0.00 | 0.00 |
| 80.00 | | 131.89 | 1206.20 | 0.00 | 0.00 |
| 85.00 | | 129.90 | 1181.03 | 0.00 | 0.00 |
| 90.00 | (23) attachments | 1388.30 | 10678.24 | 0.00 | 0.00 |
| 90.50 | | 12.58 | 105.67 | 0.00 | 0.00 |
| 93.12 | | 76.15 | 751.82 | 0.00 | 0.00 |
| 94.50 | | 39.97 | 392.23 | 0.00 | 0.00 |
| 95.00 | | 14.37 | 89.64 | 0.00 | 0.00 |
| 100.00 | | 143.99 | 883.45 | 0.00 | 0.00 |
| 105.00 | | 143.04 | 865.27 | 0.00 | 0.00 |
| 107.87 | | 81.46 | 489.27 | 0.00 | 0.00 |
| 110.00 | | 60.19 | 359.43 | 0.00 | 0.00 |
| 114.00 | (25) attachments | 1220.07 | 8125.75 | 0.00 | 1194.73 |
| 115.00 | | 22.97 | 143.35 | 0.00 | 0.00 |
| 120.00 | | 113.50 | 702.08 | 0.00 | 0.00 |
| 125.00 | (49) attachments | 1631.07 | 11402.70 | 0.00 | 0.00 |
| 130.00 | | 107.32 | 586.27 | 0.00 | 0.00 |
| 135.00 | (21) attachments | 1156.23 | 10735.00 | 0.00 | 0.00 |
| 140.00 | | 100.75 | 437.17 | 0.00 | 0.00 |
| 140.50 | | 9.85 | 43.02 | 0.00 | 0.00 |
| | **Totals:** | **8,677.57** | **72,791.70** | **0.00** | **1,194.73** |

# Linear Appurtenance Segment Forces (Factored)

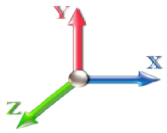
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 26 | |

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** 24

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.104 | 1.012 | 5.149 | 0.00 | 5.90 |
| 1.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.34 | 0.00 | 0.104 | 1.012 | 5.149 | 0.00 | 7.77 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.28 | 0.00 | 0.104 | 1.012 | 5.149 | 0.00 | 3.68 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.28 | 0.00 | 0.104 | 1.012 | 5.149 | 0.00 | 3.68 |
| 5.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.105 | 1.015 | 5.149 | 0.00 | 27.46 |
| 5.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 1.49 | 0.00 | 0.105 | 1.015 | 5.149 | 0.00 | 35.44 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 1.24 | 0.00 | 0.105 | 1.015 | 5.149 | 0.00 | 18.24 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 1.24 | 0.00 | 0.105 | 1.015 | 5.149 | 0.00 | 18.24 |
| 10.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.107 | 1.021 | 5.149 | 0.00 | 36.80 |
| 10.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 1.93 | 0.00 | 0.107 | 1.021 | 5.149 | 0.00 | 47.08 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.63 | 0.00 | 0.107 | 1.021 | 5.149 | 0.00 | 25.07 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.63 | 0.00 | 0.107 | 1.021 | 5.149 | 0.00 | 25.07 |
| 15.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.110 | 1.029 | 5.149 | 0.00 | 38.38 |
| 15.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 1.98 | 0.00 | 0.110 | 1.029 | 5.149 | 0.00 | 48.84 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.68 | 0.00 | 0.110 | 1.029 | 5.149 | 0.00 | 26.52 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.68 | 0.00 | 0.110 | 1.029 | 5.149 | 0.00 | 26.52 |
| 20.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.036 | 5.464 | 0.00 | 39.56 |
| 20.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.01 | 0.00 | 0.112 | 1.036 | 5.464 | 0.00 | 50.16 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.71 | 0.00 | 0.112 | 1.036 | 5.464 | 0.00 | 27.61 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.71 | 0.00 | 0.112 | 1.036 | 5.464 | 0.00 | 27.61 |
| 25.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.115 | 1.044 | 5.726 | 0.00 | 40.52 |
| 25.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.04 | 0.00 | 0.115 | 1.044 | 5.726 | 0.00 | 51.22 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.74 | 0.00 | 0.115 | 1.044 | 5.726 | 0.00 | 28.49 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.74 | 0.00 | 0.115 | 1.044 | 5.726 | 0.00 | 28.49 |
| 30.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.118 | 1.053 | 5.951 | 0.00 | 41.32 |
| 30.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.06 | 0.00 | 0.118 | 1.053 | 5.951 | 0.00 | 52.12 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.76 | 0.00 | 0.118 | 1.053 | 5.951 | 0.00 | 29.23 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.76 | 0.00 | 0.118 | 1.053 | 5.951 | 0.00 | 29.23 |
| 35.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.061 | 6.147 | 0.00 | 42.02 |
| 35.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.08 | 0.00 | 0.120 | 1.061 | 6.147 | 0.00 | 52.90 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.78 | 0.00 | 0.120 | 1.061 | 6.147 | 0.00 | 29.88 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.78 | 0.00 | 0.120 | 1.061 | 6.147 | 0.00 | 29.88 |
| 40.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.124 | 1.071 | 6.322 | 0.00 | 42.64 |
| 40.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.10 | 0.00 | 0.124 | 1.071 | 6.322 | 0.00 | 53.58 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.80 | 0.00 | 0.124 | 1.071 | 6.322 | 0.00 | 30.45 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 1.80 | 0.00 | 0.124 | 1.071 | 6.322 | 0.00 | 30.45 |
| 44.50 | 1 1/4" Fiber | Yes | 4.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.037 | 6.466 | 0.00 | 38.83 |
| 44.50 | 1 5/8" Fiber | Yes | 4.50 | 0.000 | 1.98 | 1.90 | 0.00 | 0.112 | 1.037 | 6.466 | 0.00 | 48.73 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 1.53 | 0.00 | 0.112 | 1.037 | 6.466 | 0.00 | 24.70 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 1.53 | 0.00 | 0.112 | 1.037 | 6.466 | 0.00 | 24.70 |
| 45.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.114 | 1.042 | 6.481 | 0.00 | 4.32 |
| 45.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.21 | 0.00 | 0.114 | 1.042 | 6.481 | 0.00 | 5.42 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.17 | 0.00 | 0.114 | 1.042 | 6.481 | 0.00 | 2.75 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.17 | 0.00 | 0.114 | 1.042 | 6.481 | 0.00 | 2.75 |
| 50.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.116 | 1.047 | 6.626 | 0.00 | 43.71 |
| 50.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.13 | 0.00 | 0.116 | 1.047 | 6.626 | 0.00 | 54.77 |
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.72 | 0.00 | 0.116 | 1.047 | 6.626 | 0.00 | 27.93 |

# Linear Appurtenance Segment Forces (Factored)

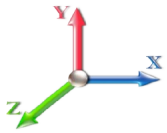
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 27 | |

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** 24

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.72 | 0.00 | 0.116 | 1.047 | 6.626 | 0.00 | 27.93 |
| 55.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.117 | 1.050 | 6.760 | 0.00 | 44.18 |
| 55.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.14 | 0.00 | 0.117 | 1.050 | 6.760 | 0.00 | 55.29 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.73 | 0.00 | 0.117 | 1.050 | 6.760 | 0.00 | 28.34 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.73 | 0.00 | 0.117 | 1.050 | 6.760 | 0.00 | 28.34 |
| 60.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.060 | 6.885 | 0.00 | 44.61 |
| 60.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.15 | 0.00 | 0.120 | 1.060 | 6.885 | 0.00 | 55.77 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.74 | 0.00 | 0.120 | 1.060 | 6.885 | 0.00 | 28.71 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.74 | 0.00 | 0.120 | 1.060 | 6.885 | 0.00 | 28.71 |
| 65.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.123 | 1.070 | 7.002 | 0.00 | 45.02 |
| 65.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.16 | 0.00 | 0.123 | 1.070 | 7.002 | 0.00 | 56.21 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.75 | 0.00 | 0.123 | 1.070 | 7.002 | 0.00 | 29.06 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.75 | 0.00 | 0.123 | 1.070 | 7.002 | 0.00 | 29.06 |
| 67.50 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.126 | 1.078 | 7.058 | 0.00 | 22.60 |
| 67.50 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 1.08 | 0.00 | 0.126 | 1.078 | 7.058 | 0.00 | 28.21 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.88 | 0.00 | 0.126 | 1.078 | 7.058 | 0.00 | 14.61 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.88 | 0.00 | 0.126 | 1.078 | 7.058 | 0.00 | 14.61 |
| 70.00 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.128 | 1.084 | 7.113 | 0.00 | 22.70 |
| 70.00 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 1.09 | 0.00 | 0.128 | 1.084 | 7.113 | 0.00 | 28.32 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.88 | 0.00 | 0.128 | 1.084 | 7.113 | 0.00 | 14.69 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.88 | 0.00 | 0.128 | 1.084 | 7.113 | 0.00 | 14.69 |
| 75.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.065 | 0.000 | 7.217 | 0.00 | 45.75 |
| 75.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.18 | 0.00 | 0.065 | 0.000 | 7.217 | 0.00 | 57.03 |
| 80.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.067 | 0.000 | 7.315 | 0.00 | 46.09 |
| 80.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.19 | 0.00 | 0.067 | 0.000 | 7.315 | 0.00 | 57.40 |
| 85.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.069 | 0.000 | 7.409 | 0.00 | 46.41 |
| 85.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.20 | 0.00 | 0.069 | 0.000 | 7.409 | 0.00 | 57.75 |
| 90.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.072 | 0.000 | 7.499 | 0.00 | 46.72 |
| 90.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.21 | 0.00 | 0.072 | 0.000 | 7.499 | 0.00 | 58.09 |
| 90.50 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.073 | 0.000 | 7.508 | 0.00 | 4.67 |
| 90.50 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.22 | 0.00 | 0.073 | 0.000 | 7.508 | 0.00 | 5.81 |
| 93.12 | 1 1/4" Fiber | Yes | 2.62 | 0.000 | 0.00 | 0.00 | 0.00 | 0.148 | 1.145 | 7.553 | 0.00 | 24.57 |
| 93.12 | 1 5/8" Fiber | Yes | 2.62 | 0.000 | 1.98 | 1.16 | 0.00 | 0.148 | 1.145 | 7.553 | 0.00 | 30.54 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.94 | 0.00 | 0.148 | 1.145 | 7.553 | 0.00 | 13.44 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.94 | 0.00 | 0.148 | 1.145 | 7.553 | 0.00 | 18.02 |
| 94.50 | 1 1/4" Fiber | Yes | 1.38 | 0.000 | 0.00 | 0.00 | 0.00 | 0.150 | 1.151 | 7.576 | 0.00 | 12.97 |
| 94.50 | 1 5/8" Fiber | Yes | 1.38 | 0.000 | 1.98 | 0.61 | 0.00 | 0.150 | 1.151 | 7.576 | 0.00 | 16.11 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.50 | 0.00 | 0.150 | 1.151 | 7.576 | 0.00 | 7.10 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.50 | 0.00 | 0.150 | 1.151 | 7.576 | 0.00 | 9.51 |
| 95.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.149 | 1.147 | 7.585 | 0.00 | 4.70 |
| 95.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.22 | 0.00 | 0.149 | 1.147 | 7.585 | 0.00 | 5.84 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.18 | 0.00 | 0.149 | 1.147 | 7.585 | 0.00 | 2.57 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.18 | 0.00 | 0.149 | 1.147 | 7.585 | 0.00 | 3.45 |
| 100.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.152 | 1.156 | 7.667 | 0.00 | 47.28 |
| 100.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.22 | 0.00 | 0.152 | 1.156 | 7.667 | 0.00 | 58.72 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.81 | 0.00 | 0.152 | 1.156 | 7.667 | 0.00 | 25.95 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.81 | 0.00 | 0.152 | 1.156 | 7.667 | 0.00 | 34.75 |

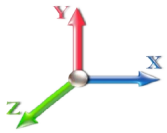
# Linear Appurtenance Segment Forces (Factored)

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 28 | |

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

**Dead Load Factor** 1.20

**Wind Load Factor** 1.00




**Iterations** 24

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.158 | 1.173 | 7.746 | 0.00 | 47.55 |
| 105.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.23 | 0.00 | 0.158 | 1.173 | 7.746 | 0.00 | 59.01 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.82 | 0.00 | 0.158 | 1.173 | 7.746 | 0.00 | 26.16 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 1.82 | 0.00 | 0.158 | 1.173 | 7.746 | 0.00 | 35.00 |
| 107.87 | 1 1/4" Fiber | Yes | 2.87 | 0.000 | 0.00 | 0.00 | 0.00 | 0.162 | 1.187 | 7.790 | 0.00 | 27.38 |
| 107.87 | 1 5/8" Fiber | Yes | 2.87 | 0.000 | 1.98 | 1.28 | 0.00 | 0.162 | 1.187 | 7.790 | 0.00 | 33.97 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 1.05 | 0.00 | 0.162 | 1.187 | 7.790 | 0.00 | 15.08 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 1.05 | 0.00 | 0.162 | 1.187 | 7.790 | 0.00 | 20.17 |
| 110.00 | 1 1/4" Fiber | Yes | 2.13 | 0.000 | 0.00 | 0.00 | 0.00 | 0.165 | 1.196 | 7.823 | 0.00 | 20.37 |
| 110.00 | 1 5/8" Fiber | Yes | 2.13 | 0.000 | 1.98 | 0.95 | 0.00 | 0.165 | 1.196 | 7.823 | 0.00 | 25.26 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.78 | 0.00 | 0.165 | 1.196 | 7.823 | 0.00 | 11.23 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.78 | 0.00 | 0.165 | 1.196 | 7.823 | 0.00 | 15.01 |
| 114.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.095 | 0.000 | 7.882 | 0.00 | 38.41 |
| 114.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 1.79 | 0.00 | 0.095 | 0.000 | 7.882 | 0.00 | 47.61 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.18 | 0.00 | 0.095 | 0.000 | 7.882 | 0.00 | 2.65 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.18 | 0.00 | 0.095 | 0.000 | 7.882 | 0.00 | 3.54 |
| 115.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.086 | 0.000 | 7.896 | 0.00 | 9.61 |
| 115.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.45 | 0.00 | 0.086 | 0.000 | 7.896 | 0.00 | 11.91 |
| 120.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.088 | 0.000 | 7.967 | 0.00 | 48.29 |
| 120.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.25 | 0.00 | 0.088 | 0.000 | 7.967 | 0.00 | 59.83 |
| 125.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.092 | 0.000 | 8.036 | 0.00 | 48.52 |
| 125.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.25 | 0.00 | 0.092 | 0.000 | 8.036 | 0.00 | 60.08 |
| 130.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.096 | 0.000 | 8.103 | 0.00 | 48.75 |
| 130.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.26 | 0.00 | 0.096 | 0.000 | 8.103 | 0.00 | 60.33 |
| 135.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.100 | 1.001 | 8.167 | 0.00 | 48.96 |
| 135.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 2.26 | 0.00 | 0.100 | 1.001 | 8.167 | 0.00 | 60.56 |
| | | | | | | | | | | **Totals:** | **0.0** | **3,718.9** |

# Calculated Forces

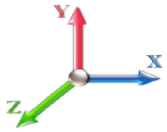
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 29 | |

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** 24

| 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 | -72.79 | -8.69 | 0.00 | -936.55 | 0.00 | 936.55 | 3592.24 | 880.75 | 3081.19 | 3113.33 | 0.00 | 0.000 | 0.000 | 0.224 |
| 1.00 | -72.46 | -8.71 | 0.00 | -927.87 | 0.00 | 927.87 | 3581.26 | 876.95 | 3054.64 | 3090.29 | 0.00 | -0.016 | 0.000 | 0.197 |
| 5.00 | -71.11 | -8.68 | 0.00 | -893.03 | 0.00 | 893.03 | 3536.93 | 861.73 | 2949.58 | 2998.63 | 0.04 | -0.074 | 0.000 | 0.194 |
| 10.00 | -69.41 | -8.64 | 0.00 | -849.61 | 0.00 | 849.61 | 3480.64 | 842.72 | 2820.85 | 2885.21 | 0.16 | -0.145 | 0.000 | 0.190 |
| 15.00 | -67.72 | -8.59 | 0.00 | -806.42 | 0.00 | 806.42 | 3423.37 | 823.70 | 2694.99 | 2773.12 | 0.35 | -0.218 | 0.000 | 0.186 |
| 20.00 | -66.05 | -8.54 | 0.00 | -763.46 | 0.00 | 763.46 | 3365.12 | 804.69 | 2572.00 | 2662.41 | 0.61 | -0.290 | 0.000 | 0.193 |
| 25.00 | -64.39 | -8.48 | 0.00 | -720.77 | 0.00 | 720.77 | 3305.89 | 785.67 | 2451.88 | 2553.15 | 0.96 | -0.367 | 0.000 | 0.188 |
| 30.00 | -62.76 | -8.41 | 0.00 | -678.38 | 0.00 | 678.38 | 3245.52 | 766.66 | 2334.64 | 2445.26 | 1.38 | -0.445 | 0.000 | 0.183 |
| 35.00 | -61.15 | -8.33 | 0.00 | -636.33 | 0.00 | 636.33 | 3165.03 | 747.64 | 2220.26 | 2324.87 | 1.89 | -0.523 | 0.000 | 0.179 |
| 40.00 | -59.56 | -8.25 | 0.00 | -594.66 | 0.00 | 594.66 | 3084.53 | 728.63 | 2108.76 | 2207.52 | 2.48 | -0.600 | 0.000 | 0.190 |
| 44.50 | -58.16 | -8.15 | 0.00 | -557.52 | 0.00 | 557.52 | 3012.08 | 711.52 | 2010.87 | 2104.51 | 3.08 | -0.677 | 0.000 | 0.185 |
| 45.00 | -57.93 | -8.18 | 0.00 | -553.45 | 0.00 | 553.45 | 3004.03 | 709.61 | 2000.14 | 2093.21 | 3.15 | -0.685 | 0.000 | 0.183 |
| 50.00 | -55.70 | -8.09 | 0.00 | -512.54 | 0.00 | 512.54 | 2423.81 | 587.47 | 1644.99 | 1680.79 | 3.92 | -0.768 | 0.000 | 0.185 |
| 55.00 | -54.31 | -8.00 | 0.00 | -472.10 | 0.00 | 472.10 | 2376.14 | 571.62 | 1557.44 | 1602.88 | 4.77 | -0.850 | 0.000 | 0.191 |
| 60.00 | -52.93 | -7.92 | 0.00 | -432.08 | 0.00 | 432.08 | 2327.49 | 555.78 | 1472.29 | 1526.13 | 5.70 | -0.938 | 0.000 | 0.182 |
| 65.00 | -51.59 | -7.80 | 0.00 | -392.49 | 0.00 | 392.49 | 2277.86 | 539.93 | 1389.54 | 1450.59 | 6.73 | -1.023 | 0.000 | 0.172 |
| 67.50 | -50.93 | -7.76 | 0.00 | -372.98 | 0.00 | 372.98 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 7.28 | -1.066 | 0.000 | 0.167 |
| 67.50 | -50.93 | -7.76 | 0.00 | -372.98 | 0.00 | 372.98 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 7.28 | -1.066 | 0.000 | 0.167 |
| 70.00 | -50.26 | -7.75 | 0.00 | -353.59 | 0.00 | 353.59 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 7.85 | -1.108 | 0.000 | 0.281 |
| 75.00 | -49.01 | -7.71 | 0.00 | -314.83 | 0.00 | 314.83 | 2151.54 | 508.24 | 1231.20 | 1288.93 | 9.08 | -1.247 | 0.000 | 0.267 |
| 80.00 | -47.79 | -7.66 | 0.00 | -276.27 | 0.00 | 276.27 | 2084.46 | 492.39 | 1155.63 | 1209.39 | 10.46 | -1.382 | 0.000 | 0.252 |
| 85.00 | -46.60 | -7.60 | 0.00 | -237.96 | 0.00 | 237.96 | 2017.38 | 476.55 | 1082.45 | 1132.40 | 11.98 | -1.511 | 0.000 | 0.233 |
| 90.00 | -35.96 | -5.96 | 0.00 | -199.94 | 0.00 | 199.94 | 1950.30 | 460.70 | 1011.66 | 1057.93 | 13.63 | -1.632 | 0.000 | 0.208 |
| 90.50 | -35.85 | -5.97 | 0.00 | -196.96 | 0.00 | 196.96 | 1943.59 | 459.12 | 1004.71 | 1050.62 | 13.80 | -1.644 | 0.000 | 0.206 |
| 93.12 | -35.09 | -5.90 | 0.00 | -181.32 | 0.00 | 181.32 | 1908.44 | 450.81 | 968.70 | 1012.75 | 14.72 | -1.705 | 0.000 | 0.110 |
| 94.50 | -34.70 | -5.85 | 0.00 | -173.18 | 0.00 | 173.18 | 1035.36 | 273.09 | 592.44 | 557.40 | 15.21 | -1.723 | 0.000 | 0.122 |
| 95.00 | -34.61 | -5.86 | 0.00 | -170.25 | 0.00 | 170.25 | 1033.16 | 272.13 | 588.32 | 554.27 | 15.39 | -1.730 | 0.000 | 0.151 |
| 100.00 | -33.72 | -5.73 | 0.00 | -140.95 | 0.00 | 140.95 | 1010.63 | 262.63 | 547.93 | 523.10 | 17.25 | -1.803 | 0.000 | 0.131 |
| 105.00 | -32.86 | -5.59 | 0.00 | -112.30 | 0.00 | 112.30 | 987.11 | 253.12 | 508.98 | 492.30 | 19.17 | -1.867 | 0.000 | 0.111 |
| 107.87 | -32.37 | -5.51 | 0.00 | -96.27 | 0.00 | 96.27 | 973.17 | 247.66 | 487.27 | 474.80 | 20.30 | -1.901 | 0.000 | 0.099 |
| 107.87 | -32.37 | -5.51 | 0.00 | -96.27 | 0.00 | 96.27 | 973.17 | 247.66 | 487.27 | 474.80 | 20.30 | -1.901 | 0.000 | 0.099 |
| 110.00 | -32.01 | -5.47 | 0.00 | -84.54 | 0.00 | 84.54 | 962.61 | 243.61 | 471.46 | 461.91 | 21.15 | -1.923 | 0.000 | 0.217 |
| 114.00 | -23.92 | -3.99 | 0.00 | -61.49 | 0.00 | 61.49 | 942.31 | 236.01 | 442.48 | 437.94 | 22.81 | -2.011 | 0.000 | 0.166 |
| 115.00 | -23.78 | -3.98 | 0.00 | -57.50 | 0.00 | 57.50 | 937.13 | 234.11 | 435.38 | 431.99 | 23.23 | -2.031 | 0.000 | 0.159 |
| 120.00 | -23.08 | -3.87 | 0.00 | -37.59 | 0.00 | 37.59 | 910.67 | 224.60 | 400.73 | 402.61 | 25.40 | -2.110 | 0.000 | 0.119 |
| 125.00 | -11.74 | -1.82 | 0.00 | -18.24 | 0.00 | 18.24 | 883.23 | 215.09 | 367.52 | 373.80 | 27.64 | -2.164 | 0.000 | 0.062 |
| 130.00 | -11.16 | -1.70 | 0.00 | -9.13 | 0.00 | 9.13 | 854.80 | 205.58 | 335.75 | 345.64 | 29.93 | -2.193 | 0.000 | 0.040 |
| 135.00 | -0.48 | -0.13 | 0.00 | -0.65 | 0.00 | 0.65 | 825.39 | 196.08 | 305.42 | 318.16 | 32.23 | -2.205 | 0.000 | 0.003 |
| 140.00 | -0.04 | -0.01 | 0.00 | -0.01 | 0.00 | 0.01 | 789.80 | 186.57 | 276.52 | 289.54 | 34.54 | -2.206 | 0.000 | 0.000 |
| 140.50 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | 34.77 | -2.206 | 0.000 | 0.000 |

# Seismic Segment Forces (Factored)

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 30 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0Ev + 1.0Eh

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Gust Response Factor** | 1.10 | | | **Sds** | 0.20 | **Iterations** | 23 |
| **Dead Load Factor** | 1.20 | **Seismic Load Factor** | 1.00 | **Sd1** | 0.09 | **Ss** | 0.19 |
| **Wind Load Factor** | 0.00 | **Structure Frequency (f1)** | 0.25 | **SA** | 0.02 | **S1** | 0.06 |
| | | | | | | **Seismic Importance Factor** | 1.00 |

| Top Elev (ft) | Description | Wz (lb) | a | b | c | Lateral Fs (lb) | R: 1.50 |
|---|---|---|---|---|---|---|---|
| 0.00 | RB1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1.00 | RT1 RB2 | 170.40 | 0.00 | 0.01 | 0.00 | 8.29 | |
| 5.00 | | 674.23 | 0.00 | 0.03 | 0.02 | 44.46 | |
| 10.00 | | 826.19 | 0.01 | 0.05 | 0.03 | 61.81 | |
| 15.00 | | 807.76 | 0.02 | 0.06 | 0.04 | 63.58 | |
| 20.00 | RT2 RB3 | 789.32 | 0.04 | 0.07 | 0.04 | 63.61 | |
| 25.00 | | 770.89 | 0.06 | 0.07 | 0.04 | 63.04 | |
| 30.00 | | 752.46 | 0.09 | 0.07 | 0.04 | 62.35 | |
| 35.00 | | 734.02 | 0.12 | 0.07 | 0.03 | 61.74 | |
| 40.00 | RT3 RB4 | 715.59 | 0.15 | 0.07 | 0.03 | 61.10 | |
| 44.50 | Bot - Section 2 | 628.27 | 0.19 | 0.06 | 0.02 | 54.16 | |
| 45.00 | | 127.45 | 0.19 | 0.06 | 0.02 | 10.99 | |
| 50.00 | Top - Section 1 | 1255.9 | 0.24 | 0.06 | 0.02 | 107.84 | |
| 55.00 | | 561.84 | 0.29 | 0.05 | 0.01 | 46.55 | |
| 60.00 | RT4 RB5 | 546.48 | 0.34 | 0.03 | 0.01 | 41.13 | |
| 65.00 | | 531.12 | 0.40 | 0.02 | 0.01 | 32.52 | |
| 67.50 | RT5 | 259.80 | 0.44 | 0.01 | 0.01 | 13.42 | |
| 70.00 | | 255.96 | 0.47 | -0.01 | 0.01 | 10.47 | |
| 75.00 | | 500.39 | 0.54 | -0.03 | 0.01 | 9.33 | |
| 80.00 | | 485.03 | 0.61 | -0.06 | 0.02 | 0.30 | |
| 85.00 | | 469.67 | 0.69 | -0.08 | 0.03 | -4.70 | |
| 90.00 | Appurtenance(s) | 4126.3 | 0.78 | -0.11 | 0.05 | -54.27 | |
| 90.50 | Bot - Section 3 | 44.59 | 0.78 | -0.11 | 0.05 | -0.58 | |
| 93.12 | RB6 | 372.44 | 0.83 | -0.12 | 0.06 | -4.36 | |
| 94.50 | Top - Section 2 | 193.46 | 0.86 | -0.12 | 0.07 | -1.99 | |
| 95.00 | | 26.43 | 0.86 | -0.12 | 0.07 | -0.26 | |
| 100.00 | | 259.21 | 0.96 | -0.12 | 0.11 | -0.05 | |
| 105.00 | | 250.00 | 1.06 | -0.09 | 0.16 | 3.73 | |
| 107.87 | RT6 | 139.33 | 1.11 | -0.06 | 0.20 | 3.64 | |
| 110.00 | | 101.45 | 1.16 | -0.03 | 0.23 | 3.61 | |
| 114.00 | Appurtenance(s) | 3610.3 | 1.24 | 0.05 | 0.29 | 202.89 | |
| 115.00 | | 45.58 | 1.27 | 0.08 | 0.31 | 2.82 | |
| 120.00 | | 222.35 | 1.38 | 0.24 | 0.41 | 20.90 | |
| 125.00 | Appurtenance(s) | 4414.8 | 1.50 | 0.49 | 0.54 | 582.73 | |
| 130.00 | | 203.91 | 1.62 | 0.84 | 0.69 | 35.91 | |
| 135.00 | Appurtenance(s) | 4070.3 | 1.74 | 1.30 | 0.89 | 922.30 | |
| 140.00 | | 185.48 | 1.88 | 1.91 | 1.11 | 52.59 | |
| 140.50 | | 18.04 | 1.89 | 1.98 | 1.14 | 5.22 | |
| | **Totals:** | **30,147.0** | | | | **2,586.9** | **Total Wind:** **32,218.7** |

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

# Calculated Forces

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 31 | |

Tower Engineering Solutions

**Load Case:** 1.2D + 1.0Ev + 1.0Eh

**Iterations** 23

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Gust Response Factor** | 1.10 | | | **Sds** | 0.20 | | | **Ss** | 0.19 |
| **Dead Load Factor** | 1.20 | **Seismic Load Factor** | 1.00 | **Sd1** | 0.09 | | | **S1** | 0.06 |
| **Wind Load Factor** | 0.00 | **Structure Frequency (f1)** | 0.25 | **SA** | 0.02 | | | **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 | -41.27 | -2.65 | 0.00 | -282.51 | 0.00 | 282.51 | 3592.24 | 880.75 | 3081.19 | 3113.33 | | 0.00 | 0.00 | 0.072 |
| 1.00 | -41.02 | -2.65 | 0.00 | -279.86 | 0.00 | 279.86 | 3581.26 | 876.95 | 3054.64 | 3090.29 | | 0.00 | 0.00 | 0.062 |
| 5.00 | -40.02 | -2.62 | 0.00 | -269.24 | 0.00 | 269.24 | 3536.93 | 861.73 | 2949.58 | 2998.63 | | 0.01 | -0.02 | 0.061 |
| 10.00 | -38.80 | -2.58 | 0.00 | -256.13 | 0.00 | 256.13 | 3480.64 | 842.72 | 2820.85 | 2885.21 | | 0.05 | -0.04 | 0.060 |
| 15.00 | -37.60 | -2.52 | 0.00 | -243.25 | 0.00 | 243.25 | 3423.37 | 823.70 | 2694.99 | 2773.12 | | 0.10 | -0.07 | 0.059 |
| 20.00 | -36.42 | -2.47 | 0.00 | -230.63 | 0.00 | 230.63 | 3365.12 | 804.69 | 2572.00 | 2662.41 | | 0.18 | -0.09 | 0.061 |
| 25.00 | -35.27 | -2.42 | 0.00 | -218.26 | 0.00 | 218.26 | 3305.89 | 785.67 | 2451.88 | 2553.15 | | 0.29 | -0.11 | 0.060 |
| 30.00 | -34.13 | -2.37 | 0.00 | -206.14 | 0.00 | 206.14 | 3245.52 | 766.66 | 2334.64 | 2445.26 | | 0.42 | -0.13 | 0.058 |
| 35.00 | -33.02 | -2.32 | 0.00 | -194.28 | 0.00 | 194.28 | 3165.03 | 747.64 | 2220.26 | 2324.87 | | 0.57 | -0.16 | 0.057 |
| 40.00 | -31.93 | -2.27 | 0.00 | -182.67 | 0.00 | 182.67 | 3084.53 | 728.63 | 2108.76 | 2207.52 | | 0.75 | -0.18 | 0.061 |
| 44.50 | -30.97 | -2.22 | 0.00 | -172.45 | 0.00 | 172.45 | 3012.08 | 711.52 | 2010.87 | 2104.51 | | 0.93 | -0.21 | 0.060 |
| 45.00 | -30.79 | -2.22 | 0.00 | -171.34 | 0.00 | 171.34 | 3004.03 | 709.61 | 2000.14 | 2093.21 | | 0.95 | -0.21 | 0.059 |
| 50.00 | -29.05 | -2.11 | 0.00 | -160.26 | 0.00 | 160.26 | 2423.81 | 587.47 | 1644.99 | 1680.79 | | 1.19 | -0.23 | 0.060 |
| 55.00 | -28.15 | -2.08 | 0.00 | -149.68 | 0.00 | 149.68 | 2376.14 | 571.62 | 1557.44 | 1602.88 | | 1.44 | -0.26 | 0.063 |
| 60.00 | -27.26 | -2.05 | 0.00 | -139.29 | 0.00 | 139.29 | 2327.49 | 555.78 | 1472.29 | 1526.13 | | 1.73 | -0.29 | 0.061 |
| 65.00 | -26.39 | -2.02 | 0.00 | -129.07 | 0.00 | 129.07 | 2277.86 | 539.93 | 1389.54 | 1450.59 | | 2.05 | -0.32 | 0.059 |
| 67.50 | -25.96 | -2.01 | 0.00 | -124.02 | 0.00 | 124.02 | 2252.16 | 532.01 | 1349.06 | 1412.97 | | 2.22 | -0.33 | 0.058 |
| 67.50 | -25.96 | -2.01 | 0.00 | -124.02 | 0.00 | 124.02 | 2252.16 | 532.01 | 1349.06 | 1412.97 | | 2.22 | -0.33 | 0.058 |
| 70.00 | -25.54 | -2.01 | 0.00 | -119.00 | 0.00 | 119.00 | 2218.62 | 524.08 | 1309.17 | 1370.99 | | 2.39 | -0.34 | 0.098 |
| 75.00 | -24.71 | -2.02 | 0.00 | -108.95 | 0.00 | 108.95 | 2151.54 | 508.24 | 1231.20 | 1288.93 | | 2.78 | -0.39 | 0.096 |
| 80.00 | -23.89 | -2.03 | 0.00 | -98.87 | 0.00 | 98.87 | 2084.46 | 492.39 | 1155.63 | 1209.39 | | 3.21 | -0.44 | 0.093 |
| 85.00 | -23.09 | -2.04 | 0.00 | -88.73 | 0.00 | 88.73 | 2017.38 | 476.55 | 1082.45 | 1132.40 | | 3.70 | -0.49 | 0.090 |
| 90.00 | -17.91 | -2.00 | 0.00 | -78.52 | 0.00 | 78.52 | 1950.30 | 460.70 | 1011.66 | 1057.93 | | 4.23 | -0.53 | 0.083 |
| 90.50 | -17.84 | -2.01 | 0.00 | -77.52 | 0.00 | 77.52 | 1943.59 | 459.12 | 1004.71 | 1050.62 | | 4.29 | -0.54 | 0.083 |
| 93.12 | -17.32 | -2.01 | 0.00 | -72.26 | 0.00 | 72.26 | 1908.44 | 450.81 | 968.70 | 1012.75 | | 4.59 | -0.56 | 0.045 |
| 94.50 | -17.05 | -2.01 | 0.00 | -69.49 | 0.00 | 69.49 | 1035.36 | 273.09 | 592.44 | 557.40 | | 4.75 | -0.57 | 0.050 |
| 95.00 | -17.00 | -2.01 | 0.00 | -68.49 | 0.00 | 68.49 | 1033.16 | 272.13 | 588.32 | 554.27 | | 4.81 | -0.57 | 0.062 |
| 100.00 | -16.55 | -2.01 | 0.00 | -58.44 | 0.00 | 58.44 | 1010.63 | 262.63 | 547.93 | 523.10 | | 5.42 | -0.60 | 0.055 |
| 105.00 | -16.11 | -2.01 | 0.00 | -48.37 | 0.00 | 48.37 | 987.11 | 253.12 | 508.98 | 492.30 | | 6.07 | -0.63 | 0.049 |
| 107.87 | -15.86 | -2.01 | 0.00 | -42.60 | 0.00 | 42.60 | 973.17 | 247.66 | 487.27 | 474.80 | | 6.45 | -0.64 | 0.044 |
| 107.87 | -15.86 | -2.01 | 0.00 | -42.60 | 0.00 | 42.60 | 973.17 | 247.66 | 487.27 | 474.80 | | 6.45 | -0.64 | 0.044 |
| 110.00 | -15.67 | -2.01 | 0.00 | -38.32 | 0.00 | 38.32 | 962.61 | 243.61 | 471.46 | 461.91 | | 6.74 | -0.65 | 0.099 |
| 114.00 | -11.23 | -1.76 | 0.00 | -30.29 | 0.00 | 30.29 | 942.31 | 236.01 | 442.48 | 437.94 | | 7.30 | -0.69 | 0.081 |
| 115.00 | -11.15 | -1.76 | 0.00 | -28.53 | 0.00 | 28.53 | 937.13 | 234.11 | 435.38 | 431.99 | | 7.45 | -0.70 | 0.078 |
| 120.00 | -10.79 | -1.74 | 0.00 | -19.72 | 0.00 | 19.72 | 910.67 | 224.60 | 400.73 | 402.61 | | 8.21 | -0.74 | 0.061 |
| 125.00 | -5.40 | -1.09 | 0.00 | -11.01 | 0.00 | 11.01 | 883.23 | 215.09 | 367.52 | 373.80 | | 9.00 | -0.77 | 0.036 |
| 130.00 | -5.13 | -1.05 | 0.00 | -5.57 | 0.00 | 5.57 | 854.80 | 205.58 | 335.75 | 345.64 | | 9.82 | -0.79 | 0.022 |
| 135.00 | -0.24 | -0.06 | 0.00 | -0.31 | 0.00 | 0.31 | 825.39 | 196.08 | 305.42 | 318.16 | | 10.66 | -0.80 | 0.001 |
| 140.00 | -0.02 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 789.80 | 186.57 | 276.52 | 289.54 | | 11.49 | -0.80 | 0.000 |
| 140.50 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | | 11.58 | -0.80 | 0.000 |

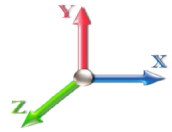
# Seismic Segment Forces (Factored)

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 32 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0Ev + 1.0Eh

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Gust Response Factor** | 1.10 | | | **Sds** | 0.20 | **Iterations** | 22 |
| **Dead Load Factor** | 0.90 | **Seismic Load Factor** | 1.00 | **Sd1** | 0.09 | **Ss** | 0.19 |
| **Wind Load Factor** | 0.00 | **Structure Frequency (f1)** | 0.25 | **SA** | 0.02 | **S1** | 0.06 |
| | | | | | | **Seismic Importance Factor** | 1.00 |




| Top Elev (ft) | Description | Wz (lb) | a | b | c | Lateral Fs (lb) | R: 1.50 |
|---|---|---|---|---|---|---|---|
| 0.00 | RB1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 1.00 | RT1 RB2 | 170.40 | 0.00 | 0.01 | 0.00 | 8.29 | |
| 5.00 | | 674.23 | 0.00 | 0.03 | 0.02 | 44.46 | |
| 10.00 | | 826.19 | 0.01 | 0.05 | 0.03 | 61.81 | |
| 15.00 | | 807.76 | 0.02 | 0.06 | 0.04 | 63.58 | |
| 20.00 | RT2 RB3 | 789.32 | 0.04 | 0.07 | 0.04 | 63.61 | |
| 25.00 | | 770.89 | 0.06 | 0.07 | 0.04 | 63.04 | |
| 30.00 | | 752.46 | 0.09 | 0.07 | 0.04 | 62.35 | |
| 35.00 | | 734.02 | 0.12 | 0.07 | 0.03 | 61.74 | |
| 40.00 | RT3 RB4 | 715.59 | 0.15 | 0.07 | 0.03 | 61.10 | |
| 44.50 | Bot - Section 2 | 628.27 | 0.19 | 0.06 | 0.02 | 54.16 | |
| 45.00 | | 127.45 | 0.19 | 0.06 | 0.02 | 10.99 | |
| 50.00 | Top - Section 1 | 1255.9 | 0.24 | 0.06 | 0.02 | 107.84 | |
| 55.00 | | 561.84 | 0.29 | 0.05 | 0.01 | 46.55 | |
| 60.00 | RT4 RB5 | 546.48 | 0.34 | 0.03 | 0.01 | 41.13 | |
| 65.00 | | 531.12 | 0.40 | 0.02 | 0.01 | 32.52 | |
| 67.50 | RT5 | 259.80 | 0.44 | 0.01 | 0.01 | 13.42 | |
| 70.00 | | 255.96 | 0.47 | -0.01 | 0.01 | 10.47 | |
| 75.00 | | 500.39 | 0.54 | -0.03 | 0.01 | 9.33 | |
| 80.00 | | 485.03 | 0.61 | -0.06 | 0.02 | 0.30 | |
| 85.00 | | 469.67 | 0.69 | -0.08 | 0.03 | -4.70 | |
| 90.00 | Appurtenance(s) | 4126.3 | 0.78 | -0.11 | 0.05 | -54.27 | |
| 90.50 | Bot - Section 3 | 44.59 | 0.78 | -0.11 | 0.05 | -0.58 | |
| 93.12 | RB6 | 372.44 | 0.83 | -0.12 | 0.06 | -4.36 | |
| 94.50 | Top - Section 2 | 193.46 | 0.86 | -0.12 | 0.07 | -1.99 | |
| 95.00 | | 26.43 | 0.86 | -0.12 | 0.07 | -0.26 | |
| 100.00 | | 259.21 | 0.96 | -0.12 | 0.11 | -0.05 | |
| 105.00 | | 250.00 | 1.06 | -0.09 | 0.16 | 3.73 | |
| 107.87 | RT6 | 139.33 | 1.11 | -0.06 | 0.20 | 3.64 | |
| 110.00 | | 101.45 | 1.16 | -0.03 | 0.23 | 3.61 | |
| 114.00 | Appurtenance(s) | 3610.3 | 1.24 | 0.05 | 0.29 | 202.89 | |
| 115.00 | | 45.58 | 1.27 | 0.08 | 0.31 | 2.82 | |
| 120.00 | | 222.35 | 1.38 | 0.24 | 0.41 | 20.90 | |
| 125.00 | Appurtenance(s) | 4414.8 | 1.50 | 0.49 | 0.54 | 582.73 | |
| 130.00 | | 203.91 | 1.62 | 0.84 | 0.69 | 35.91 | |
| 135.00 | Appurtenance(s) | 4070.3 | 1.74 | 1.30 | 0.89 | 922.30 | |
| 140.00 | | 185.48 | 1.88 | 1.91 | 1.11 | 52.59 | |
| 140.50 | | 18.04 | 1.89 | 1.98 | 1.14 | 5.22 | |
| | **Totals:** | **30,147.0** | | | | **2,586.9** | **Total Wind:** **32,218.7** |

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

# Calculated Forces

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 33 | |

Tower Engineering Solutions

**Load Case:** 0.9D + 1.0Ev + 1.0Eh

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Gust Response Factor** | 1.10 | | | **Sds** | 0.20 | | | **Iterations** | 22 |
| **Dead Load Factor** | 0.90 | **Seismic Load Factor** | 1.00 | **Sd1** | 0.09 | | | **Ss** | 0.19 |
| **Wind Load Factor** | 0.00 | **Structure Frequency (f1)** | 0.25 | **SA** | 0.02 | | | **S1** | 0.06 |
| | | | | | | | | **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 | -30.95 | -2.65 | 0.00 | -278.08 | 0.00 | 278.08 | 3592.24 | 880.75 | 3081.19 | 3113.33 | | 0.00 | 0.00 | 0.068 |
| 1.00 | -30.76 | -2.65 | 0.00 | -275.43 | 0.00 | 275.43 | 3581.26 | 876.95 | 3054.64 | 3090.29 | | 0.00 | 0.00 | 0.060 |
| 5.00 | -30.02 | -2.62 | 0.00 | -264.83 | 0.00 | 264.83 | 3536.93 | 861.73 | 2949.58 | 2998.63 | | 0.01 | -0.02 | 0.059 |
| 10.00 | -29.10 | -2.56 | 0.00 | -251.75 | 0.00 | 251.75 | 3480.64 | 842.72 | 2820.85 | 2885.21 | | 0.05 | -0.04 | 0.058 |
| 15.00 | -28.20 | -2.51 | 0.00 | -238.92 | 0.00 | 238.92 | 3423.37 | 823.70 | 2694.99 | 2773.12 | | 0.10 | -0.06 | 0.056 |
| 20.00 | -27.32 | -2.46 | 0.00 | -226.37 | 0.00 | 226.37 | 3365.12 | 804.69 | 2572.00 | 2662.41 | | 0.18 | -0.09 | 0.059 |
| 25.00 | -26.45 | -2.40 | 0.00 | -214.09 | 0.00 | 214.09 | 3305.89 | 785.67 | 2451.88 | 2553.15 | | 0.28 | -0.11 | 0.057 |
| 30.00 | -25.60 | -2.35 | 0.00 | -202.07 | 0.00 | 202.07 | 3245.52 | 766.66 | 2334.64 | 2445.26 | | 0.41 | -0.13 | 0.056 |
| 35.00 | -24.76 | -2.30 | 0.00 | -190.33 | 0.00 | 190.33 | 3165.03 | 747.64 | 2220.26 | 2324.87 | | 0.56 | -0.16 | 0.055 |
| 40.00 | -23.94 | -2.24 | 0.00 | -178.85 | 0.00 | 178.85 | 3084.53 | 728.63 | 2108.76 | 2207.52 | | 0.74 | -0.18 | 0.058 |
| 44.50 | -23.22 | -2.19 | 0.00 | -168.77 | 0.00 | 168.77 | 3012.08 | 711.52 | 2010.87 | 2104.51 | | 0.92 | -0.20 | 0.057 |
| 45.00 | -23.09 | -2.18 | 0.00 | -167.67 | 0.00 | 167.67 | 3004.03 | 709.61 | 2000.14 | 2093.21 | | 0.94 | -0.20 | 0.056 |
| 50.00 | -21.79 | -2.08 | 0.00 | -156.75 | 0.00 | 156.75 | 2423.81 | 587.47 | 1644.99 | 1680.79 | | 1.16 | -0.23 | 0.057 |
| 55.00 | -21.11 | -2.04 | 0.00 | -146.34 | 0.00 | 146.34 | 2376.14 | 571.62 | 1557.44 | 1602.88 | | 1.42 | -0.25 | 0.060 |
| 60.00 | -20.44 | -2.01 | 0.00 | -136.14 | 0.00 | 136.14 | 2327.49 | 555.78 | 1472.29 | 1526.13 | | 1.70 | -0.28 | 0.058 |
| 65.00 | -19.79 | -1.98 | 0.00 | -126.10 | 0.00 | 126.10 | 2277.86 | 539.93 | 1389.54 | 1450.59 | | 2.01 | -0.31 | 0.056 |
| 67.50 | -19.47 | -1.97 | 0.00 | -121.16 | 0.00 | 121.16 | 2252.16 | 532.01 | 1349.06 | 1412.97 | | 2.17 | -0.32 | 0.055 |
| 67.50 | -19.47 | -1.97 | 0.00 | -121.16 | 0.00 | 121.16 | 2252.16 | 532.01 | 1349.06 | 1412.97 | | 2.17 | -0.32 | 0.055 |
| 70.00 | -19.15 | -1.97 | 0.00 | -116.24 | 0.00 | 116.24 | 2218.62 | 524.08 | 1309.17 | 1370.99 | | 2.35 | -0.34 | 0.093 |
| 75.00 | -18.53 | -1.97 | 0.00 | -106.41 | 0.00 | 106.41 | 2151.54 | 508.24 | 1231.20 | 1288.93 | | 2.72 | -0.38 | 0.091 |
| 80.00 | -17.91 | -1.98 | 0.00 | -96.58 | 0.00 | 96.58 | 2084.46 | 492.39 | 1155.63 | 1209.39 | | 3.15 | -0.43 | 0.088 |
| 85.00 | -17.32 | -1.99 | 0.00 | -86.69 | 0.00 | 86.69 | 2017.38 | 476.55 | 1082.45 | 1132.40 | | 3.62 | -0.48 | 0.085 |
| 90.00 | -13.43 | -1.96 | 0.00 | -76.76 | 0.00 | 76.76 | 1950.30 | 460.70 | 1011.66 | 1057.93 | | 4.15 | -0.52 | 0.079 |
| 90.50 | -13.38 | -1.96 | 0.00 | -75.78 | 0.00 | 75.78 | 1943.59 | 459.12 | 1004.71 | 1050.62 | | 4.20 | -0.53 | 0.079 |
| 93.12 | -12.99 | -1.96 | 0.00 | -70.65 | 0.00 | 70.65 | 1908.44 | 450.81 | 968.70 | 1012.75 | | 4.50 | -0.55 | 0.043 |
| 94.50 | -12.78 | -1.96 | 0.00 | -67.94 | 0.00 | 67.94 | 1035.36 | 273.09 | 592.44 | 557.40 | | 4.66 | -0.56 | 0.047 |
| 95.00 | -12.75 | -1.96 | 0.00 | -66.96 | 0.00 | 66.96 | 1033.16 | 272.13 | 588.32 | 554.27 | | 4.71 | -0.56 | 0.059 |
| 100.00 | -12.41 | -1.97 | 0.00 | -57.14 | 0.00 | 57.14 | 1010.63 | 262.63 | 547.93 | 523.10 | | 5.32 | -0.59 | 0.053 |
| 105.00 | -12.07 | -1.96 | 0.00 | -47.32 | 0.00 | 47.32 | 987.11 | 253.12 | 508.98 | 492.30 | | 5.95 | -0.61 | 0.046 |
| 107.87 | -11.89 | -1.96 | 0.00 | -41.68 | 0.00 | 41.68 | 973.17 | 247.66 | 487.27 | 474.80 | | 6.32 | -0.63 | 0.042 |
| 107.87 | -11.89 | -1.96 | 0.00 | -41.68 | 0.00 | 41.68 | 973.17 | 247.66 | 487.27 | 474.80 | | 6.32 | -0.63 | 0.042 |
| 110.00 | -11.75 | -1.96 | 0.00 | -37.51 | 0.00 | 37.51 | 962.61 | 243.61 | 471.46 | 461.91 | | 6.60 | -0.64 | 0.093 |
| 114.00 | -8.42 | -1.72 | 0.00 | -29.67 | 0.00 | 29.67 | 942.31 | 236.01 | 442.48 | 437.94 | | 7.15 | -0.68 | 0.077 |
| 115.00 | -8.36 | -1.72 | 0.00 | -27.94 | 0.00 | 27.94 | 937.13 | 234.11 | 435.38 | 431.99 | | 7.30 | -0.69 | 0.074 |
| 120.00 | -8.09 | -1.70 | 0.00 | -19.33 | 0.00 | 19.33 | 910.67 | 224.60 | 400.73 | 402.61 | | 8.04 | -0.73 | 0.057 |
| 125.00 | -4.05 | -1.07 | 0.00 | -10.81 | 0.00 | 10.81 | 883.23 | 215.09 | 367.52 | 373.80 | | 8.82 | -0.76 | 0.034 |
| 130.00 | -3.85 | -1.03 | 0.00 | -5.46 | 0.00 | 5.46 | 854.80 | 205.58 | 335.75 | 345.64 | | 9.62 | -0.77 | 0.020 |
| 135.00 | -0.18 | -0.06 | 0.00 | -0.30 | 0.00 | 0.30 | 825.39 | 196.08 | 305.42 | 318.16 | | 10.44 | -0.78 | 0.001 |
| 140.00 | -0.02 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 789.80 | 186.57 | 276.52 | 289.54 | | 11.26 | -0.78 | 0.000 |
| 140.50 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | | 11.34 | -0.78 | 0.000 |

# Wind Loading - Shaft

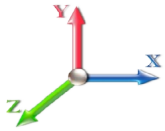
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 34 | |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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 | RB1 | 1.00 | 0.85 | 7.415 | 8.16 | 198.77 | 0.730 | 0.000 | 0.00 | 0.000 | 0.00 | 0.0 | 0.0 | 0.0 |
| 1.00 | RT1 RB2 | 1.00 | 0.85 | 7.415 | 8.16 | 197.91 | 0.739 * | 0.000 | 1.00 | 3.592 | 2.65 | 21.6 | 0.0 | 170.4 |
| 5.00 | | 1.00 | 0.85 | 7.415 | 8.16 | 194.51 | 0.741 * | 0.000 | 4.00 | 14.214 | 10.53 | 85.9 | 0.0 | 674.2 |
| 10.00 | | 1.00 | 0.85 | 7.415 | 8.16 | 190.26 | 0.746 * | 0.000 | 5.00 | 17.421 | 12.99 | 106.0 | 0.0 | 826.2 |
| 15.00 | | 1.00 | 0.85 | 7.415 | 8.16 | 186.00 | 0.751 * | 0.000 | 5.00 | 17.036 | 12.79 | 104.3 | 0.0 | 807.8 |
| 20.00 | RT2 RB3 | 1.00 | 0.90 | 7.868 | 8.65 | 187.22 | 0.757 * | 0.000 | 5.00 | 16.650 | 12.60 | 109.0 | 0.0 | 789.3 |
| 25.00 | | 1.00 | 0.95 | 8.246 | 9.07 | 187.18 | 0.762 * | 0.000 | 5.00 | 16.265 | 12.40 | 112.5 | 0.0 | 770.9 |
| 30.00 | | 1.00 | 0.98 | 8.569 | 9.43 | 186.24 | 0.768 * | 0.000 | 5.00 | 15.880 | 12.20 | 115.0 | 0.0 | 752.5 |
| 35.00 | | 1.00 | 1.01 | 8.851 | 9.74 | 184.63 | 0.775 * | 0.000 | 5.00 | 15.495 | 12.01 | 116.9 | 0.0 | 734.0 |
| 40.00 | RT3 RB4 | 1.00 | 1.04 | 9.104 | 10.01 | 182.54 | 0.782 * | 0.000 | 5.00 | 15.110 | 11.81 | 118.3 | 0.0 | 715.6 |
| 44.50 | Bot - Section 2 | 1.00 | 1.07 | 9.310 | 10.24 | 180.31 | 0.757 * | 0.000 | 4.50 | 13.270 | 10.05 | 102.9 | 0.0 | 628.3 |
| 45.00 | | 1.00 | 1.07 | 9.332 | 10.27 | 180.04 | 0.761 * | 0.000 | 0.50 | 1.482 | 1.13 | 11.6 | 0.0 | 127.5 |
| 50.00 | Top - Section 1 | 1.00 | 1.09 | 9.542 | 10.50 | 177.22 | 0.764 * | 0.000 | 5.00 | 14.604 | 11.16 | 117.1 | 0.0 | 1255.9 |
| 55.00 | | 1.00 | 1.12 | 9.735 | 10.71 | 177.48 | 0.766 * | 0.000 | 5.00 | 14.219 | 10.90 | 116.7 | 0.0 | 561.8 |
| 60.00 | RT4 RB5 | 1.00 | 1.14 | 9.915 | 10.91 | 174.20 | 0.774 * | 0.000 | 5.00 | 13.834 | 10.70 | 116.7 | 0.0 | 546.5 |
| 65.00 | | 1.00 | 1.16 | 10.084 | 11.09 | 170.71 | 0.781 * | 0.000 | 5.00 | 13.448 | 10.50 | 116.5 | 0.0 | 531.1 |
| 67.50 | RT5 | 1.00 | 1.17 | 10.164 | 11.18 | 168.90 | 0.787 * | 0.000 | 2.50 | 6.580 | 5.18 | 57.9 | 0.0 | 259.8 |
| 70.00 | | 1.00 | 1.17 | 10.242 | 11.27 | 167.05 | 0.791 * | 0.000 | 2.50 | 6.484 | 5.13 | 57.8 | 0.0 | 256.0 |
| 75.00 | | 1.00 | 1.19 | 10.392 | 11.43 | 163.23 | 0.730 | 0.000 | 5.00 | 12.678 | 9.26 | 105.8 | 0.0 | 500.4 |
| 80.00 | | 1.00 | 1.21 | 10.534 | 11.59 | 159.28 | 0.730 | 0.000 | 5.00 | 12.293 | 8.97 | 104.0 | 0.0 | 485.0 |
| 85.00 | | 1.00 | 1.22 | 10.669 | 11.74 | 155.19 | 0.730 | 0.000 | 5.00 | 11.908 | 8.69 | 102.0 | 0.0 | 469.7 |
| 90.00 | Appurtenance(s) | 1.00 | 1.24 | 10.799 | 11.88 | 151.00 | 0.730 | 0.000 | 5.00 | 11.523 | 8.41 | 99.9 | 0.0 | 454.3 |
| 90.50 | Bot - Section 3 | 1.00 | 1.24 | 10.811 | 11.89 | 150.57 | 0.730 | 0.000 | 0.50 | 1.131 | 0.83 | 9.8 | 0.0 | 44.6 |
| 93.12 | RB6 | 1.00 | 1.25 | 10.876 | 11.96 | 148.32 | 0.836 * | 0.000 | 2.62 | 5.947 | 4.97 | 59.4 | 0.0 | 372.4 |
| 94.50 | Top - Section 2 | 1.00 | 1.25 | 10.910 | 12.00 | 147.13 | 0.840 * | 0.000 | 1.38 | 3.090 | 2.60 | 31.2 | 0.0 | 193.5 |
| 95.00 | | 1.00 | 1.25 | 10.922 | 12.01 | 148.82 | 0.838 * | 0.000 | 0.50 | 1.112 | 0.93 | 11.2 | 0.0 | 26.4 |
| 100.00 | | 1.00 | 1.27 | 11.041 | 12.14 | 144.44 | 0.844 * | 0.000 | 5.00 | 10.911 | 9.21 | 111.8 | 0.0 | 259.2 |
| 105.00 | | 1.00 | 1.28 | 11.155 | 12.27 | 139.96 | 0.856 * | 0.000 | 5.00 | 10.526 | 9.01 | 110.6 | 0.0 | 250.0 |
| 107.87 | RT6 | 1.00 | 1.29 | 11.218 | 12.34 | 137.36 | 0.866 * | 0.000 | 2.87 | 5.868 | 5.08 | 62.7 | 0.0 | 139.3 |
| 110.00 | | 1.00 | 1.29 | 11.265 | 12.39 | 135.41 | 0.873 * | 0.000 | 2.13 | 4.273 | 3.73 | 46.2 | 0.0 | 101.4 |
| 114.00 | Appurtenance(s) | 1.00 | 1.30 | 11.350 | 12.48 | 131.71 | 0.730 | 0.000 | 4.00 | 7.835 | 5.72 | 71.4 | 0.0 | 186.0 |
| 115.00 | | 1.00 | 1.30 | 11.370 | 12.51 | 130.78 | 0.730 | 0.000 | 1.00 | 1.920 | 1.40 | 17.5 | 0.0 | 45.6 |
| 120.00 | | 1.00 | 1.32 | 11.473 | 12.62 | 126.07 | 0.730 | 0.000 | 5.00 | 9.370 | 6.84 | 86.3 | 0.0 | 222.3 |
| 125.00 | Appurtenance(s) | 1.00 | 1.33 | 11.572 | 12.73 | 121.30 | 0.730 | 0.000 | 5.00 | 8.985 | 6.56 | 83.5 | 0.0 | 213.1 |
| 130.00 | | 1.00 | 1.34 | 11.668 | 12.83 | 116.47 | 0.730 | 0.000 | 5.00 | 8.600 | 6.28 | 80.6 | 0.0 | 203.9 |
| 135.00 | Appurtenance(s) | 1.00 | 1.35 | 11.761 | 12.94 | 111.58 | 0.731 * | 0.000 | 5.00 | 8.215 | 6.00 | 77.7 | 0.0 | 194.7 |
| 140.00 | | 1.00 | 1.36 | 11.851 | 13.04 | 106.63 | 0.730 | 0.000 | 5.00 | 7.830 | 5.72 | 74.5 | 0.0 | 185.5 |
| 140.50 | | 1.00 | 1.36 | 11.860 | 13.05 | 106.13 | 0.730 | 0.000 | 0.50 | 0.762 | 0.56 | 7.3 | 0.0 | 18.0 |
| | | | | | | | | **Totals:** | **140.50** | | | **2,940.2** | | **14,973.2** |

* Cf Adjusted by Linear Load Ra Effect

# Discrete Appurtenance Forces

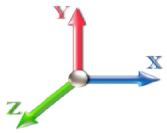
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 35 | |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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 | 135.00 | Ericsson RRUS 32 B66A | 3 | 11.761 | 12.937 | 0.54 | 0.80 | 4.41 | 159.00 | 0.000 | 0.000 | 57.00 | 0.00 | 0.00 |
| 2 | 135.00 | Sector Frame | 3 | 11.761 | 12.937 | 0.56 | 0.75 | 25.31 | 2451.00 | 0.000 | 0.000 | 327.46 | 0.00 | 0.00 |
| 3 | 135.00 | Ericsson RRUS11 B4 | 3 | 11.761 | 12.937 | 0.54 | 0.80 | 4.55 | 153.00 | 0.000 | 0.000 | 58.87 | 0.00 | 0.00 |
| 4 | 135.00 | RFS | 3 | 11.761 | 12.937 | 0.50 | 0.80 | 9.61 | 122.10 | 0.000 | 0.000 | 124.36 | 0.00 | 0.00 |
| 5 | 135.00 | RFS | 3 | 11.761 | 12.937 | 0.56 | 0.80 | 34.00 | 384.00 | 0.000 | 0.000 | 439.90 | 0.00 | 0.00 |
| 6 | 135.00 | Ericsson Air 32 | 3 | 11.761 | 12.937 | 0.70 | 0.80 | 13.59 | 396.60 | 0.000 | 0.000 | 175.85 | 0.00 | 0.00 |
| 7 | 135.00 | Ericsson Radio 4449 | 3 | 11.761 | 12.937 | 0.54 | 0.80 | 2.65 | 210.00 | 0.000 | 0.000 | 34.32 | 0.00 | 0.00 |
| 8 | 125.00 | Kathrein 782 10250 | 6 | 11.572 | 12.729 | 0.50 | 0.75 | 1.57 | 38.40 | 0.000 | 0.000 | 19.96 | 0.00 | 0.00 |
| 9 | 125.00 | RRUS 32 B66 | 3 | 11.572 | 12.729 | 0.50 | 0.75 | 4.13 | 159.00 | 0.000 | 0.000 | 52.58 | 0.00 | 0.00 |
| 10 | 125.00 | B14 4478 | 3 | 11.572 | 12.729 | 0.50 | 0.75 | 2.49 | 178.20 | 0.000 | 0.000 | 31.66 | 0.00 | 0.00 |
| 11 | 125.00 | DBC0061F1V51-2 | 6 | 11.572 | 12.729 | 0.50 | 0.75 | 1.30 | 152.40 | 0.000 | 0.000 | 16.50 | 0.00 | 0.00 |
| 12 | 125.00 | CCI OPA-65R-LCUU-H6 | 3 | 11.572 | 12.729 | 0.59 | 0.75 | 17.17 | 219.00 | 0.000 | 0.000 | 218.56 | 0.00 | 0.00 |
| 13 | 125.00 | QS66512-2 | 3 | 11.572 | 12.729 | 0.69 | 0.75 | 16.83 | 333.00 | 0.000 | 0.000 | 214.22 | 0.00 | 0.00 |
| 14 | 125.00 | Ericsson RRUS-32 | 6 | 11.572 | 12.729 | 0.50 | 0.75 | 7.60 | 462.00 | 0.000 | 0.000 | 96.71 | 0.00 | 0.00 |
| 15 | 125.00 | Raycap DC6-48-60-18-8F | 3 | 11.572 | 12.729 | 0.50 | 0.75 | 2.22 | 98.40 | 0.000 | 0.000 | 28.21 | 0.00 | 0.00 |
| 16 | 125.00 | CCI DTMABP7819VG12A | 6 | 11.572 | 12.729 | 0.50 | 0.75 | 3.44 | 114.00 | 0.000 | 0.000 | 43.75 | 0.00 | 0.00 |
| 17 | 125.00 | Ericsson RRUS-11 | 3 | 11.572 | 12.729 | 0.50 | 0.75 | 3.80 | 162.00 | 0.000 | 0.000 | 48.36 | 0.00 | 0.00 |
| 18 | 125.00 | Kathrein 800-10121 | 3 | 11.572 | 12.729 | 0.59 | 0.75 | 9.15 | 132.30 | 0.000 | 0.000 | 116.52 | 0.00 | 0.00 |
| 19 | 125.00 | HPA-65R-BUU-H6 | 3 | 11.572 | 12.729 | 0.64 | 0.75 | 18.47 | 153.00 | 0.000 | 0.000 | 235.16 | 0.00 | 0.00 |
| 20 | 125.00 | Platform w/ Hand Rails | 1 | 11.572 | 12.729 | 1.00 | 1.00 | 40.00 | 2000.00 | 0.000 | 0.000 | 509.16 | 0.00 | 0.00 |
| 21 | 114.00 | 20" x 18" x 9" Junction Box | 1 | 11.350 | 12.484 | 1.00 | 1.00 | 3.15 | 20.00 | 0.000 | 0.000 | 39.33 | 0.00 | 0.00 |
| 22 | 114.00 | Andrew VHLP1-23-DW1 | 1 | 11.442 | 12.587 | 1.00 | 1.00 | 1.61 | 14.00 | 0.000 | 4.500 | 20.26 | 0.00 | 91.19 |
| 23 | 114.00 | Andrew VHLP2-23-DW1 | 1 | 11.442 | 12.587 | 1.00 | 1.00 | 4.69 | 31.00 | 0.000 | 4.500 | 59.03 | 0.00 | 265.64 |
| 24 | 114.00 | Argus LLPX310R-V1 | 3 | 11.360 | 12.496 | 0.55 | 0.80 | 7.14 | 152.10 | 0.000 | 0.500 | 89.19 | 0.00 | 44.59 |
| 25 | 114.00 | Samsung | 3 | 11.329 | 12.461 | 0.61 | 0.80 | 3.32 | 99.30 | 0.000 | -1.000 | 41.37 | 0.00 | -41.37 |
| 26 | 114.00 | Low Profile Platform | 1 | 11.350 | 12.484 | 1.00 | 1.00 | 25.00 | 1800.00 | 0.000 | 0.000 | 312.11 | 0.00 | 0.00 |
| 27 | 114.00 | RFS APXVSPP18 | 3 | 11.370 | 12.507 | 0.66 | 0.80 | 15.98 | 375.90 | 0.000 | 1.000 | 199.82 | 0.00 | 199.82 |
| 28 | 114.00 | Alcatel Lucent | 3 | 11.412 | 12.553 | 0.55 | 0.80 | 6.71 | 210.00 | 0.000 | 3.000 | 84.19 | 0.00 | 252.57 |
| 29 | 114.00 | Alcatel Lucent | 3 | 11.318 | 12.450 | 0.78 | 0.80 | 5.59 | 192.00 | 0.000 | -1.500 | 69.56 | 0.00 | -104.34 |
| 30 | 114.00 | Alcatel Lucent | 3 | 11.412 | 12.553 | 0.78 | 0.80 | 6.37 | 180.00 | 0.000 | 3.000 | 80.01 | 0.00 | 240.03 |
| 31 | 114.00 | RFS APXVTM14 | 3 | 11.412 | 12.553 | 0.63 | 0.80 | 12.02 | 350.10 | 0.000 | 3.000 | 150.89 | 0.00 | 452.68 |
| 32 | 90.00 | Alcatel Lucent | 3 | 10.799 | 11.878 | 0.57 | 0.75 | 5.99 | 270.00 | 0.000 | 0.000 | 71.09 | 0.00 | 0.00 |
| 33 | 90.00 | Swedcom SLCP 2x6014 | 3 | 10.799 | 11.878 | 0.67 | 0.75 | 13.00 | 136.80 | 0.000 | 0.000 | 154.37 | 0.00 | 0.00 |
| 34 | 90.00 | Commscope | 6 | 10.799 | 11.878 | 0.62 | 0.75 | 30.18 | 458.40 | 0.000 | 0.000 | 358.48 | 0.00 | 0.00 |
| 35 | 90.00 | Antel | 3 | 10.799 | 11.878 | 0.55 | 0.75 | 12.43 | 127.80 | 0.000 | 0.000 | 147.69 | 0.00 | 0.00 |
| 36 | 90.00 | RFS DB-T1-6Z-8AB-0Z | 1 | 10.799 | 11.878 | 1.00 | 1.00 | 4.80 | 44.00 | 0.000 | 0.000 | 57.02 | 0.00 | 0.00 |
| 37 | 90.00 | Alcatel Lucent | 3 | 10.799 | 11.878 | 0.57 | 0.75 | 5.99 | 270.00 | 0.000 | 0.000 | 71.09 | 0.00 | 0.00 |
| 38 | 90.00 | Alcatel Lucent | 3 | 10.799 | 11.878 | 0.68 | 0.75 | 3.06 | 165.00 | 0.000 | 0.000 | 36.32 | 0.00 | 0.00 |
| 39 | 90.00 | Platform w/ Hand Rails | 1 | 10.799 | 11.878 | 1.00 | 1.00 | 42.00 | 2200.00 | 0.000 | 0.000 | 498.89 | 0.00 | 0.00 |
| | | | | | | | **Totals:** | | **15,173.80** | | | **5,389.83** | | |

# Total Applied Force Summary

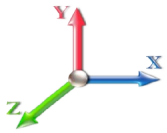
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | | **Code:** | EIA/TIA-222-H | 7/9/2019 |
| **Site Name:** | Manchester 12, CT | | **Exposure:** | C | |
| **Height:** | 140.50 (ft) | | **Crest Height:** | 0.00 | |
| **Base Elev:** | 0.000 (ft) | | **Site Class:** | D - Stiff Soil | |
| **Gh:** | 1.1 | **Topography:** 1 | **Struct Class:** | II | Page: 36 |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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 |
| 1.00 | | 21.64 | 208.86 | 0.00 | 0.00 |
| 5.00 | | 85.92 | 828.07 | 0.00 | 0.00 |
| 10.00 | | 105.95 | 1018.50 | 0.00 | 0.00 |
| 15.00 | | 104.35 | 1000.07 | 0.00 | 0.00 |
| 20.00 | | 109.01 | 981.63 | 0.00 | 0.00 |
| 25.00 | | 112.47 | 963.20 | 0.00 | 0.00 |
| 30.00 | | 115.02 | 944.77 | 0.00 | 0.00 |
| 35.00 | | 116.90 | 926.33 | 0.00 | 0.00 |
| 40.00 | | 118.26 | 907.90 | 0.00 | 0.00 |
| 44.50 | | 102.92 | 801.35 | 0.00 | 0.00 |
| 45.00 | | 11.57 | 146.68 | 0.00 | 0.00 |
| 50.00 | | 117.15 | 1448.23 | 0.00 | 0.00 |
| 55.00 | | 116.70 | 754.15 | 0.00 | 0.00 |
| 60.00 | | 116.71 | 738.79 | 0.00 | 0.00 |
| 65.00 | | 116.51 | 723.43 | 0.00 | 0.00 |
| 67.50 | | 57.89 | 355.95 | 0.00 | 0.00 |
| 70.00 | | 57.78 | 352.11 | 0.00 | 0.00 |
| 75.00 | | 105.80 | 692.70 | 0.00 | 0.00 |
| 80.00 | | 103.98 | 677.34 | 0.00 | 0.00 |
| 85.00 | | 102.02 | 661.98 | 0.00 | 0.00 |
| 90.00 | (23) attachments | 1494.87 | 4318.62 | 0.00 | 0.00 |
| 90.50 | | 9.82 | 56.48 | 0.00 | 0.00 |
| 93.12 | | 59.45 | 434.75 | 0.00 | 0.00 |
| 94.50 | | 31.15 | 226.28 | 0.00 | 0.00 |
| 95.00 | | 11.19 | 38.32 | 0.00 | 0.00 |
| 100.00 | | 111.82 | 378.12 | 0.00 | 0.00 |
| 105.00 | | 110.56 | 368.91 | 0.00 | 0.00 |
| 107.87 | | 62.73 | 207.59 | 0.00 | 0.00 |
| 110.00 | | 46.23 | 152.10 | 0.00 | 0.00 |
| 114.00 | (25) attachments | 1217.17 | 3705.52 | 0.00 | 1400.83 |
| 115.00 | | 17.53 | 61.84 | 0.00 | 0.00 |
| 120.00 | | 86.33 | 303.65 | 0.00 | 0.00 |
| 125.00 | (49) attachments | 1714.85 | 4496.13 | 0.00 | 0.00 |
| 130.00 | | 80.58 | 220.91 | 0.00 | 0.00 |
| 135.00 | (21) attachments | 1295.44 | 4087.39 | 0.00 | 0.00 |
| 140.00 | | 74.51 | 185.48 | 0.00 | 0.00 |
| 140.50 | | 7.26 | 18.04 | 0.00 | 0.00 |
| | **Totals:** | **8,330.03** | **34,392.16** | **0.00** | **1,400.83** |

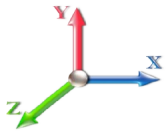
# Linear Appurtenance Segment Forces (Factored)

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 37 | |

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.104 | 1.012 | 7.415 | 0.00 | 1.32 |
| 1.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.104 | 1.012 | 7.415 | 0.00 | 2.08 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 7.415 | 0.00 | 0.00 |
| 1.00 | 1.25" Reinforcing | Yes | 1.00 | 0.000 | 1.25 | 0.10 | 0.00 | 0.104 | 1.012 | 7.415 | 0.00 | 0.00 |
| 5.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.105 | 1.015 | 7.415 | 0.00 | 5.28 |
| 5.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.105 | 1.015 | 7.415 | 0.00 | 8.32 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 7.415 | 0.00 | 0.00 |
| 5.00 | 1.25" Reinforcing | Yes | 4.00 | 0.000 | 1.25 | 0.42 | 0.00 | 0.105 | 1.015 | 7.415 | 0.00 | 0.00 |
| 10.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.107 | 1.021 | 7.415 | 0.00 | 6.60 |
| 10.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.107 | 1.021 | 7.415 | 0.00 | 10.40 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 7.415 | 0.00 | 0.00 |
| 10.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.107 | 1.021 | 7.415 | 0.00 | 0.00 |
| 15.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.110 | 1.029 | 7.415 | 0.00 | 6.60 |
| 15.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.110 | 1.029 | 7.415 | 0.00 | 10.40 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 7.415 | 0.00 | 0.00 |
| 15.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.110 | 1.029 | 7.415 | 0.00 | 0.00 |
| 20.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.036 | 7.868 | 0.00 | 6.60 |
| 20.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.112 | 1.036 | 7.868 | 0.00 | 10.40 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 7.868 | 0.00 | 0.00 |
| 20.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.112 | 1.036 | 7.868 | 0.00 | 0.00 |
| 25.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.115 | 1.044 | 8.246 | 0.00 | 6.60 |
| 25.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.115 | 1.044 | 8.246 | 0.00 | 10.40 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 8.246 | 0.00 | 0.00 |
| 25.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.115 | 1.044 | 8.246 | 0.00 | 0.00 |
| 30.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.118 | 1.053 | 8.569 | 0.00 | 6.60 |
| 30.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.118 | 1.053 | 8.569 | 0.00 | 10.40 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 8.569 | 0.00 | 0.00 |
| 30.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.118 | 1.053 | 8.569 | 0.00 | 0.00 |
| 35.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.061 | 8.851 | 0.00 | 6.60 |
| 35.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.061 | 8.851 | 0.00 | 10.40 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 8.851 | 0.00 | 0.00 |
| 35.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.120 | 1.061 | 8.851 | 0.00 | 0.00 |
| 40.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.124 | 1.071 | 9.104 | 0.00 | 6.60 |
| 40.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.124 | 1.071 | 9.104 | 0.00 | 10.40 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 9.104 | 0.00 | 0.00 |
| 40.00 | 1.25" Reinforcing | Yes | 5.00 | 0.000 | 1.25 | 0.52 | 0.00 | 0.124 | 1.071 | 9.104 | 0.00 | 0.00 |
| 44.50 | 1 1/4" Fiber | Yes | 4.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.112 | 1.037 | 9.310 | 0.00 | 5.94 |
| 44.50 | 1 5/8" Fiber | Yes | 4.50 | 0.000 | 1.98 | 0.74 | 0.00 | 0.112 | 1.037 | 9.310 | 0.00 | 9.36 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 9.310 | 0.00 | 0.00 |
| 44.50 | 1" Reinforcing plate | Yes | 4.50 | 0.000 | 1.00 | 0.38 | 0.00 | 0.112 | 1.037 | 9.310 | 0.00 | 0.00 |
| 45.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.114 | 1.042 | 9.332 | 0.00 | 0.66 |
| 45.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.114 | 1.042 | 9.332 | 0.00 | 1.04 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 9.332 | 0.00 | 0.00 |
| 45.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.114 | 1.042 | 9.332 | 0.00 | 0.00 |
| 50.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.116 | 1.047 | 9.542 | 0.00 | 6.60 |
| 50.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.116 | 1.047 | 9.542 | 0.00 | 10.40 |
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 9.542 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

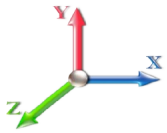
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 38 | |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.116 | 1.047 | 9.542 | 0.00 | 0.00 |
| 55.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.117 | 1.050 | 9.735 | 0.00 | 6.60 |
| 55.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.117 | 1.050 | 9.735 | 0.00 | 10.40 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 9.735 | 0.00 | 0.00 |
| 55.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.117 | 1.050 | 9.735 | 0.00 | 0.00 |
| 60.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.120 | 1.060 | 9.915 | 0.00 | 6.60 |
| 60.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.120 | 1.060 | 9.915 | 0.00 | 10.40 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 9.915 | 0.00 | 0.00 |
| 60.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.120 | 1.060 | 9.915 | 0.00 | 0.00 |
| 65.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.123 | 1.070 | 10.084 | 0.00 | 6.60 |
| 65.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.123 | 1.070 | 10.084 | 0.00 | 10.40 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 10.084 | 0.00 | 0.00 |
| 65.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.123 | 1.070 | 10.084 | 0.00 | 0.00 |
| 67.50 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.126 | 1.078 | 10.164 | 0.00 | 3.30 |
| 67.50 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.126 | 1.078 | 10.164 | 0.00 | 5.20 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 10.164 | 0.00 | 0.00 |
| 67.50 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.126 | 1.078 | 10.164 | 0.00 | 0.00 |
| 70.00 | 1 1/4" Fiber | Yes | 2.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.128 | 1.084 | 10.242 | 0.00 | 3.30 |
| 70.00 | 1 5/8" Fiber | Yes | 2.50 | 0.000 | 1.98 | 0.41 | 0.00 | 0.128 | 1.084 | 10.242 | 0.00 | 5.20 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 10.242 | 0.00 | 0.00 |
| 70.00 | 1" Reinforcing plate | Yes | 2.50 | 0.000 | 1.00 | 0.21 | 0.00 | 0.128 | 1.084 | 10.242 | 0.00 | 0.00 |
| 75.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.065 | 0.000 | 10.392 | 0.00 | 6.60 |
| 75.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.065 | 0.000 | 10.392 | 0.00 | 10.40 |
| 80.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.067 | 0.000 | 10.534 | 0.00 | 6.60 |
| 80.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.067 | 0.000 | 10.534 | 0.00 | 10.40 |
| 85.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.069 | 0.000 | 10.669 | 0.00 | 6.60 |
| 85.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.069 | 0.000 | 10.669 | 0.00 | 10.40 |
| 90.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.072 | 0.000 | 10.799 | 0.00 | 6.60 |
| 90.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.072 | 0.000 | 10.799 | 0.00 | 10.40 |
| 90.50 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.073 | 0.000 | 10.811 | 0.00 | 0.66 |
| 90.50 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.073 | 0.000 | 10.811 | 0.00 | 1.04 |
| 93.12 | 1 1/4" Fiber | Yes | 2.62 | 0.000 | 0.00 | 0.00 | 0.00 | 0.148 | 1.145 | 10.876 | 0.00 | 3.46 |
| 93.12 | 1 5/8" Fiber | Yes | 2.62 | 0.000 | 1.98 | 0.43 | 0.00 | 0.148 | 1.145 | 10.876 | 0.00 | 5.45 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 10.876 | 0.00 | 0.00 |
| 93.12 | 1" Reinforcing plate | Yes | 2.62 | 0.000 | 1.00 | 0.22 | 0.00 | 0.148 | 1.145 | 10.876 | 0.00 | 0.00 |
| 94.50 | 1 1/4" Fiber | Yes | 1.38 | 0.000 | 0.00 | 0.00 | 0.00 | 0.150 | 1.151 | 10.910 | 0.00 | 1.82 |
| 94.50 | 1 5/8" Fiber | Yes | 1.38 | 0.000 | 1.98 | 0.23 | 0.00 | 0.150 | 1.151 | 10.910 | 0.00 | 2.87 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 10.910 | 0.00 | 0.00 |
| 94.50 | 1" Reinforcing plate | Yes | 1.38 | 0.000 | 1.00 | 0.11 | 0.00 | 0.150 | 1.151 | 10.910 | 0.00 | 0.00 |
| 95.00 | 1 1/4" Fiber | Yes | 0.50 | 0.000 | 0.00 | 0.00 | 0.00 | 0.149 | 1.147 | 10.922 | 0.00 | 0.66 |
| 95.00 | 1 5/8" Fiber | Yes | 0.50 | 0.000 | 1.98 | 0.08 | 0.00 | 0.149 | 1.147 | 10.922 | 0.00 | 1.04 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 10.922 | 0.00 | 0.00 |
| 95.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.149 | 1.147 | 10.922 | 0.00 | 0.00 |
| 100.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.152 | 1.156 | 11.041 | 0.00 | 6.60 |
| 100.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.152 | 1.156 | 11.041 | 0.00 | 10.40 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 11.041 | 0.00 | 0.00 |
| 100.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.152 | 1.156 | 11.041 | 0.00 | 0.00 |

# Linear Appurtenance Segment Forces (Factored)

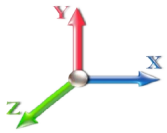
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 39 | |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.158 | 1.173 | 11.155 | 0.00 | 6.60 |
| 105.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.158 | 1.173 | 11.155 | 0.00 | 10.40 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 11.155 | 0.00 | 0.00 |
| 105.00 | 1" Reinforcing plate | Yes | 5.00 | 0.000 | 1.00 | 0.42 | 0.00 | 0.158 | 1.173 | 11.155 | 0.00 | 0.00 |
| 107.87 | 1 1/4" Fiber | Yes | 2.87 | 0.000 | 0.00 | 0.00 | 0.00 | 0.162 | 1.187 | 11.218 | 0.00 | 3.79 |
| 107.87 | 1 5/8" Fiber | Yes | 2.87 | 0.000 | 1.98 | 0.47 | 0.00 | 0.162 | 1.187 | 11.218 | 0.00 | 5.97 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 11.218 | 0.00 | 0.00 |
| 107.87 | 1" Reinforcing plate | Yes | 2.87 | 0.000 | 1.00 | 0.24 | 0.00 | 0.162 | 1.187 | 11.218 | 0.00 | 0.00 |
| 110.00 | 1 1/4" Fiber | Yes | 2.13 | 0.000 | 0.00 | 0.00 | 0.00 | 0.165 | 1.196 | 11.265 | 0.00 | 2.81 |
| 110.00 | 1 5/8" Fiber | Yes | 2.13 | 0.000 | 1.98 | 0.35 | 0.00 | 0.165 | 1.196 | 11.265 | 0.00 | 4.43 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 11.265 | 0.00 | 0.00 |
| 110.00 | 1" Reinforcing plate | Yes | 2.13 | 0.000 | 1.00 | 0.18 | 0.00 | 0.165 | 1.196 | 11.265 | 0.00 | 0.00 |
| 114.00 | 1 1/4" Fiber | Yes | 4.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.095 | 0.000 | 11.350 | 0.00 | 5.28 |
| 114.00 | 1 5/8" Fiber | Yes | 4.00 | 0.000 | 1.98 | 0.66 | 0.00 | 0.095 | 0.000 | 11.350 | 0.00 | 8.32 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 11.350 | 0.00 | 0.00 |
| 114.00 | 1" Reinforcing plate | Yes | 0.50 | 0.000 | 1.00 | 0.04 | 0.00 | 0.095 | 0.000 | 11.350 | 0.00 | 0.00 |
| 115.00 | 1 1/4" Fiber | Yes | 1.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.086 | 0.000 | 11.370 | 0.00 | 1.32 |
| 115.00 | 1 5/8" Fiber | Yes | 1.00 | 0.000 | 1.98 | 0.17 | 0.00 | 0.086 | 0.000 | 11.370 | 0.00 | 2.08 |
| 120.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.088 | 0.000 | 11.473 | 0.00 | 6.60 |
| 120.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.088 | 0.000 | 11.473 | 0.00 | 10.40 |
| 125.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.092 | 0.000 | 11.572 | 0.00 | 6.60 |
| 125.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.092 | 0.000 | 11.572 | 0.00 | 10.40 |
| 130.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.096 | 0.000 | 11.668 | 0.00 | 6.60 |
| 130.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.096 | 0.000 | 11.668 | 0.00 | 10.40 |
| 135.00 | 1 1/4" Fiber | Yes | 5.00 | 0.000 | 0.00 | 0.00 | 0.00 | 0.100 | 1.001 | 11.761 | 0.00 | 6.60 |
| 135.00 | 1 5/8" Fiber | Yes | 5.00 | 0.000 | 1.98 | 0.82 | 0.00 | 0.100 | 1.001 | 11.761 | 0.00 | 10.40 |
| | | | | | | | | | | **Totals:** | **0.0** | **459.0** |

# Calculated Forces

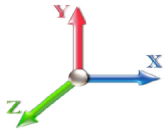
| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 40 | |

Tower Engineering Solutions

**Load Case:** 1.0D + 1.0W 60 mph Wind

**Dead Load Factor** 1.00

**Wind Load Factor** 1.00




**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 | -34.39 | -8.33 | 0.00 | -867.00 | 0.00 | 867.00 | 3592.24 | 880.75 | 3081.19 | 3113.33 | 0.00 | 0.000 | 0.000 | 0.201 |
| 1.00 | -34.18 | -8.33 | 0.00 | -858.67 | 0.00 | 858.67 | 3581.26 | 876.95 | 3054.64 | 3090.29 | 0.00 | -0.015 | 0.000 | 0.177 |
| 5.00 | -33.34 | -8.28 | 0.00 | -825.34 | 0.00 | 825.34 | 3536.93 | 861.73 | 2949.58 | 2998.63 | 0.04 | -0.068 | 0.000 | 0.174 |
| 10.00 | -32.31 | -8.21 | 0.00 | -783.94 | 0.00 | 783.94 | 3480.64 | 842.72 | 2820.85 | 2885.21 | 0.14 | -0.134 | 0.000 | 0.170 |
| 15.00 | -31.30 | -8.14 | 0.00 | -742.88 | 0.00 | 742.88 | 3423.37 | 823.70 | 2694.99 | 2773.12 | 0.32 | -0.201 | 0.000 | 0.166 |
| 20.00 | -30.31 | -8.06 | 0.00 | -702.19 | 0.00 | 702.19 | 3365.12 | 804.69 | 2572.00 | 2662.41 | 0.57 | -0.268 | 0.000 | 0.172 |
| 25.00 | -29.34 | -7.98 | 0.00 | -661.87 | 0.00 | 661.87 | 3305.89 | 785.67 | 2451.88 | 2553.15 | 0.88 | -0.339 | 0.000 | 0.167 |
| 30.00 | -28.39 | -7.90 | 0.00 | -621.96 | 0.00 | 621.96 | 3245.52 | 766.66 | 2334.64 | 2445.26 | 1.28 | -0.410 | 0.000 | 0.162 |
| 35.00 | -27.45 | -7.81 | 0.00 | -582.49 | 0.00 | 582.49 | 3165.03 | 747.64 | 2220.26 | 2324.87 | 1.74 | -0.481 | 0.000 | 0.158 |
| 40.00 | -26.54 | -7.71 | 0.00 | -543.46 | 0.00 | 543.46 | 3084.53 | 728.63 | 2108.76 | 2207.52 | 2.29 | -0.552 | 0.000 | 0.168 |
| 44.50 | -25.73 | -7.62 | 0.00 | -508.75 | 0.00 | 508.75 | 3012.08 | 711.52 | 2010.87 | 2104.51 | 2.84 | -0.622 | 0.000 | 0.163 |
| 45.00 | -25.58 | -7.62 | 0.00 | -504.94 | 0.00 | 504.94 | 3004.03 | 709.61 | 2000.14 | 2093.21 | 2.91 | -0.630 | 0.000 | 0.161 |
| 50.00 | -24.12 | -7.52 | 0.00 | -466.82 | 0.00 | 466.82 | 2423.81 | 587.47 | 1644.99 | 1680.79 | 3.61 | -0.705 | 0.000 | 0.162 |
| 55.00 | -23.36 | -7.43 | 0.00 | -429.22 | 0.00 | 429.22 | 2376.14 | 571.62 | 1557.44 | 1602.88 | 4.38 | -0.780 | 0.000 | 0.167 |
| 60.00 | -22.61 | -7.33 | 0.00 | -392.09 | 0.00 | 392.09 | 2327.49 | 555.78 | 1472.29 | 1526.13 | 5.24 | -0.859 | 0.000 | 0.159 |
| 65.00 | -21.88 | -7.22 | 0.00 | -355.44 | 0.00 | 355.44 | 2277.86 | 539.93 | 1389.54 | 1450.59 | 6.19 | -0.937 | 0.000 | 0.149 |
| 67.50 | -21.52 | -7.18 | 0.00 | -337.38 | 0.00 | 337.38 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 6.69 | -0.976 | 0.000 | 0.145 |
| 67.50 | -21.52 | -7.18 | 0.00 | -337.38 | 0.00 | 337.38 | 2252.16 | 532.01 | 1349.06 | 1412.97 | 6.69 | -0.976 | 0.000 | 0.145 |
| 70.00 | -21.16 | -7.14 | 0.00 | -319.44 | 0.00 | 319.44 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 7.21 | -1.014 | 0.000 | 0.243 |
| 75.00 | -20.46 | -7.07 | 0.00 | -283.73 | 0.00 | 283.73 | 2151.54 | 508.24 | 1231.20 | 1288.93 | 8.34 | -1.139 | 0.000 | 0.230 |
| 80.00 | -19.77 | -6.99 | 0.00 | -248.39 | 0.00 | 248.39 | 2084.46 | 492.39 | 1155.63 | 1209.39 | 9.60 | -1.260 | 0.000 | 0.215 |
| 85.00 | -19.09 | -6.91 | 0.00 | -213.45 | 0.00 | 213.45 | 2017.38 | 476.55 | 1082.45 | 1132.40 | 10.98 | -1.376 | 0.000 | 0.198 |
| 90.00 | -14.81 | -5.32 | 0.00 | -178.90 | 0.00 | 178.90 | 1950.30 | 460.70 | 1011.66 | 1057.93 | 12.48 | -1.485 | 0.000 | 0.177 |
| 90.50 | -14.75 | -5.32 | 0.00 | -176.23 | 0.00 | 176.23 | 1943.59 | 459.12 | 1004.71 | 1050.62 | 12.64 | -1.496 | 0.000 | 0.175 |
| 93.12 | -14.31 | -5.26 | 0.00 | -162.30 | 0.00 | 162.30 | 1908.44 | 450.81 | 968.70 | 1012.75 | 13.47 | -1.550 | 0.000 | 0.094 |
| 94.50 | -14.09 | -5.22 | 0.00 | -155.04 | 0.00 | 155.04 | 1035.36 | 273.09 | 592.44 | 557.40 | 13.92 | -1.566 | 0.000 | 0.103 |
| 95.00 | -14.04 | -5.22 | 0.00 | -152.43 | 0.00 | 152.43 | 1033.16 | 272.13 | 588.32 | 554.27 | 14.09 | -1.572 | 0.000 | 0.127 |
| 100.00 | -13.66 | -5.11 | 0.00 | -126.33 | 0.00 | 126.33 | 1010.63 | 262.63 | 547.93 | 523.10 | 15.77 | -1.638 | 0.000 | 0.110 |
| 105.00 | -13.30 | -5.00 | 0.00 | -100.77 | 0.00 | 100.77 | 987.11 | 253.12 | 508.98 | 492.30 | 17.52 | -1.696 | 0.000 | 0.092 |
| 107.87 | -13.09 | -4.94 | 0.00 | -86.41 | 0.00 | 86.41 | 973.17 | 247.66 | 487.27 | 474.80 | 18.54 | -1.726 | 0.000 | 0.082 |
| 107.87 | -13.09 | -4.94 | 0.00 | -86.41 | 0.00 | 86.41 | 973.17 | 247.66 | 487.27 | 474.80 | 18.54 | -1.726 | 0.000 | 0.082 |
| 110.00 | -12.93 | -4.90 | 0.00 | -75.89 | 0.00 | 75.89 | 962.61 | 243.61 | 471.46 | 461.91 | 19.32 | -1.746 | 0.000 | 0.178 |
| 114.00 | -9.26 | -3.57 | 0.00 | -54.90 | 0.00 | 54.90 | 942.31 | 236.01 | 442.48 | 437.94 | 20.82 | -1.825 | 0.000 | 0.135 |
| 115.00 | -9.20 | -3.56 | 0.00 | -51.32 | 0.00 | 51.32 | 937.13 | 234.11 | 435.38 | 431.99 | 21.20 | -1.842 | 0.000 | 0.129 |
| 120.00 | -8.90 | -3.48 | 0.00 | -33.51 | 0.00 | 33.51 | 910.67 | 224.60 | 400.73 | 402.61 | 23.17 | -1.913 | 0.000 | 0.093 |
| 125.00 | -4.46 | -1.61 | 0.00 | -16.13 | 0.00 | 16.13 | 883.23 | 215.09 | 367.52 | 373.80 | 25.20 | -1.961 | 0.000 | 0.048 |
| 130.00 | -4.24 | -1.53 | 0.00 | -8.07 | 0.00 | 8.07 | 854.80 | 205.58 | 335.75 | 345.64 | 27.27 | -1.987 | 0.000 | 0.028 |
| 135.00 | -0.20 | -0.09 | 0.00 | -0.45 | 0.00 | 0.45 | 825.39 | 196.08 | 305.42 | 318.16 | 29.36 | -1.997 | 0.000 | 0.002 |
| 140.00 | -0.02 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 789.80 | 186.57 | 276.52 | 289.54 | 31.45 | -1.998 | 0.000 | 0.000 |
| 140.50 | 0.00 | -0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 785.78 | 185.62 | 273.70 | 286.58 | 31.66 | -1.998 | 0.000 | 0.000 |

# Final Analysis Summary

| | | | | | |
|---|---|---|---|---|---|
| **Structure:** | CT16504-A-SBA | **Code:** | EIA/TIA-222-H | 7/9/2019 | |
| **Site Name:** | Manchester 12, CT | **Exposure:** | C | | |
| **Height:** | 140.50 (ft) | **Crest Height:** | 0.00 | | |
| **Base Elev:** | 0.000 (ft) | **Site Class:** | D - Stiff Soil | | |
| **Gh:** | 1.1 **Topography:** 1 | **Struct Class:** | II | Page: 41 | |

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 + 1.0W 118 mph Wind | 32.2 | 0.00 | 41.25 | 0.00 | 0.00 | 3377.94 |
| 0.9D + 1.0W 118 mph Wind | 32.2 | 0.00 | 30.94 | 0.00 | 0.00 | 3330.29 |
| 1.2D + 1.0Di + 1.0Wi 50 mph Wind | 8.7 | 0.00 | 72.79 | 0.00 | 0.00 | 936.55 |
| 1.2D + 1.0Ev + 1.0Eh | 2.7 | 0.00 | 41.27 | 0.00 | 0.00 | 282.51 |
| 0.9D + 1.0Ev + 1.0Eh | 2.7 | 0.00 | 30.95 | 0.00 | 0.00 | 278.08 |
| 1.0D + 1.0W 60 mph Wind | 8.3 | 0.00 | 34.39 | 0.00 | 0.00 | 867.00 |

## 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 + 1.0W 118 mph Wind | -23.57 | -27.89 | 0.00 | -1248.7 | 0.00 | -1248.7 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 70.00 | 0.924 |
| 0.9D + 1.0W 118 mph Wind | -17.23 | -27.39 | 0.00 | -1219.9 | 0.00 | -1219.9 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 70.00 | 0.900 |
| 1.2D + 1.0Di + 1.0Wi 50 mph Wind | -50.26 | -7.75 | 0.00 | -353.59 | 0.00 | -353.59 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 70.00 | 0.281 |
| 1.2D + 1.0Ev + 1.0Eh | -15.67 | -2.01 | 0.00 | -38.32 | 0.00 | -38.32 | 962.61 | 243.61 | 471.46 | 461.91 | 110.00 | 0.099 |
| 0.9D + 1.0Ev + 1.0Eh | -11.75 | -1.96 | 0.00 | -37.51 | 0.00 | -37.51 | 962.61 | 243.61 | 471.46 | 461.91 | 110.00 | 0.093 |
| 1.0D + 1.0W 60 mph Wind | -21.16 | -7.14 | 0.00 | -319.44 | 0.00 | -319.44 | 2218.62 | 524.08 | 1309.17 | 1370.99 | 70.00 | 0.243 |

## Additional Steel Summary

| | | | Intermediate Connectors | | | Lower Termination | | | | Upper Termination | | | | Max Member | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Elev From (ft) | Elev To (ft) | Member | VQ/I (lb/in) | Vu (kips) | phi Vn (kips) | MQ/I (kips) | phi Vn (kips) | Num Reqd | Num Actual | MQ/I (kips) | phi Vn (kips) | Num Reqd | Num Actual | Pu (kips) | phi Pn (kips) | phi Tn (kips) | Ratio |
| 0.0 | 1.0 | (4) SOL-2 1/4" William R71 | -313.8 | -5.65 | 25.3 | 258.3 | 25.3 | 11 | 0 | 390.6 | 25.3 | | | 258.32 | 370.7 | 385.56 | 0.697 |
| 1.0 | 20.0 | (4) LNP-LP7X125-B-20A | -348.3 | -8.36 | 25.3 | 390.6 | 25.3 | | | 365.7 | 25.3 | | | 390.63 | 460.8 | 440.63 | 0.887 |
| 20.0 | 40.0 | (4) LNP-LP6X125-G-20AB | -358.2 | -8.60 | 25.3 | 335.4 | 25.3 | | | 303.7 | 25.3 | | | 335.36 | 395.0 | 365.63 | 0.917 |
| 40.0 | 60.0 | (4) LNP-LP6X100-G-20BC | -382.2 | -9.17 | 25.3 | 266.0 | 25.3 | | | 245.7 | 25.3 | | | 266.01 | 297.8 | 292.50 | 0.909 |
| 60.0 | 67.5 | (4) LNP-LP6X100-G-10CT | -400.3 | -9.61 | 25.3 | 245.7 | 25.3 | | | 226.2 | 25.3 | 9 | 0 | 245.71 | 297.8 | 292.50 | 0.840 |
| 93.1 | 107.9 | (3) LNP-LP6X100-G-20TT | 594.8 | 14.27 | 25.3 | 160.9 | 25.3 | 7 | 8 | 124.9 | 25.3 | 5 | 8 | 193.09 | 297.8 | 292.50 | 0.660 |

# Pier Foundation Design For Monopole

| | | | |
|---|---|---|---|
| | | | Date: 7/9/2019 |
| **Customer Name:** | **T-Mobile** | **EIA/TIA Standard:** | EIA-222-H |
| **Site Name:** | | **Structure Height (Ft.):** | 140.5 |
| **Site Number:** | CT16504-A-SBA | **Engineer Name:** | H. You |
| **Engr. Number:** | 78008 | **Engineer Login ID:** | |

**Foundation Info Obtained from:** Drawings/Calculations

**Structure Type:** Monopole

**Analysis or Design?** Analysis

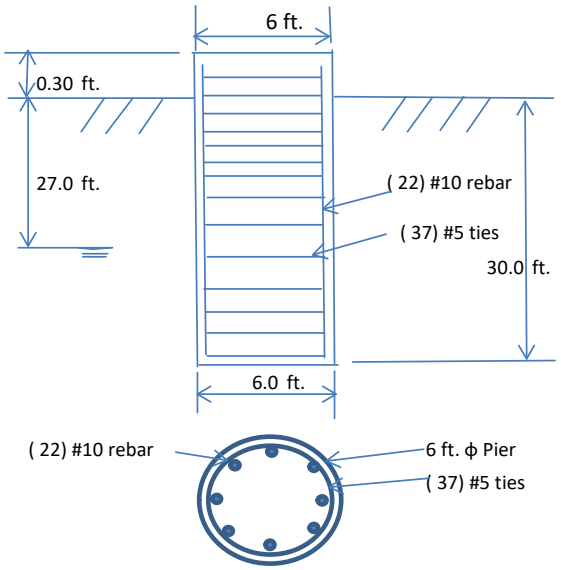
Acceptable overstress ( 5.0%

**Base Reactions (Factored):**

| | | | |
|---|---|---|---|
| Axial Load (Kips): | 41.3 | Shear Force (Kips): | 32.2 |
| Uplift Force (Kips): | 0.0 | Moment (Kips-ft): | 3377.9 |

**Foundation Geometries:**

| | | | | |
|---|---|---|---|---|
| Diameter of Pier (ft.): | 6.0 | Depth of Base B. G. S. : | 30.0 | ft. |
| Pier Height A. G. (ft.): | 0.30 | | | |




**Monopole Pier Foundation**

**Material Properties and Reabr Info:**

| | | | | |
|---|---|---|---|---|
| Concrete Strength (psi): | 3000 | Steel Elastic Modulus: | 29000 | ksi |
| Vertical bar yield (ksi) | 60 | Tie steel yield strength: | 40 | ksi |
| Vertical Rebar Size #: | 10 | Tie / Stirrup Size #: | 5 | |
| Qty. of Vertical Rebars: | 22 | Tie Spacing: | 12.0 | in. |
| Concrete Cover (in.): | 4 | Concrete unit weight: | 150.0 | pcf |

**Soil Design Parameters:**

| | | | | |
|---|---|---|---|---|
| Water Table B.G.S. (ft): | 27.0 | Unit weight of water: | 62.4 | psf |
| Ratio of Uplift/Axial Skin Friction: | 1.0 | Pullout failure Angle: | 30 | (°) |

Skin Frictions are to be obtained from: Calculations

Please Enter Ultimate End Bearing Pressure (psf): 11600

Kc = 1.15 For Sand

Kc = 1.0 Silt/Clay

Kt = 0.7 For Sand and Silt

Kt = 0.85 For Clay

Friction δ Between Pier & Soil = 0.95

| Depth of Layers (ft) Top | Depth of Layers (ft) Bottom | $\gamma_{soil}$ (pcf) | ϕ (°) | Cohesion (psf) | | | Soil Types | Ultimate Uplift Skin Friction (psf) | Ultimate Axial Skin Friction (psf) | Kc | Kt | α |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | 1.0 | 100 | 0 | 0 | | 0 | Sand | | | 1.15 | 0.70 | |
| 1.0 | 5.0 | 135 | 40 | 0 | | 0 | Sand | 175.0 | 287.5 | 1.15 | 0.70 | |
| 5.0 | 7.0 | 120 | 33 | 0 | | 0 | Sand | 187.6 | 308.3 | 1.15 | 0.70 | |
| 7.0 | 10.0 | 130 | 38 | 0 | | 0 | Sand | 324.1 | 532.5 | 1.15 | 0.70 | |
| 10.0 | 15.0 | 128 | 37 | 0 | | 0 | Sand | 470.7 | 773.3 | 1.15 | 0.70 | |
| 15.0 | 30.0 | 132 | 39 | 0 | | 11600 | Sand | 988.8 | 1624.5 | 1.15 | 0.70 | |
| 30.0 | 35.0 | 127 | 36 | 0 | | 11600 | Sand | 982.1 | 1613.4 | 1.15 | 0.70 | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

**Foundation Analysis and Design:**

| | | | | |
|---|---|---|---|---|
| Uplift Strength Reduction Factor: | 0.75 | Soil Bearing Strength Reduction Factor: | 0.75 | |
| Total Dry Soil Volume from Conical Failure (cu. Ft.): | 14255 | Dry Soil Weight from Conical Failure: | 1845 | Kips |
| Total Buoyant Soil Volume from Conical Failure (cu. Ft.): | 58 | Buoyant Soil Weight from Conical Failure (Ki | 5 | Kips |
| Total Dry Concrete Volume (cu. Ft.): | 772 | Total Dry Concrete Weight: | 115.8 | Kips |
| Total Buoyant Concrete Volume (cu. Ft.): | 84.8 | Total Buoyant Concrete Weight: | 7.43 | Kips |
| Total Effective Concrete Weight (Kips): | 123.2 | Total Effective Soil Weight: | 1849.7 | Kips |
| Total Effective Vertical Load on Base (Kips): | 58.4 | | | |

**Check Soil Capacities:**

| | | | | | Usage | |
|---|---|---|---|---|---|---|
| Allowable Foundation Overturning Resistance (kips-ft.): | 16167.5 | > | Design Factored Momont (kips-ft): | 4046 | 0.25 | OK! |
| Factor of Safety of Passive Soil Resistance against Moment: | 4.00 | 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 |

Reinforcing Concrete Pier:

| | | | | | Usage | |
|---|---|---|---|---|---|---|
| Vertical Steel Rebar Area (sq. in./each): | 1.27 | | Tie / Stirrup Area (sq. in./each): | 0.31 | | |
| Calculated Moment Capacity (Mn,Kips-Ft): | 3931.4 | > | Design Factored Moment (Mu, K-Ft): | 3467.8 | 0.88 | OK! |
| Calculated Shear Capacity (Kips): | 707.8 | > | Design Factored Shear (Kips): | 290.4 | 0.41 | OK! |
| Calculated Tension Capacity (Tn, Kips): | 1508.8 | > | Design Factored Tension (Tu Kips): | 0.0 | 0.00 | OK! |
| Calculated Compression Capacity (Pn, Kips): | 5362 | > | Design Factored Axial Load (Pu Kips): | 41.3 | 0.01 | OK! |
| Moment & Axial Strength Combination: | 0.88 | OK! | Max. Allowable Tie/Stirrup Spacing: | 12.00 | in. | |
| Pier Reinforcement Ratio: | 0.007 | Reinforcement Ratio is satisfied per ACI | | | | |

# EXHIBIT 8

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

# Antenna Mount Analysis Report

**Existing 141-Ft Monopole Tower**
**Customer Name: SBA Communications Corp**
**Customer Site Number: CT16504-A-SBA**
**Customer Site Name: Manchester 12, CT**
**Carrier Name: T-Mobile (App#: 117033, V2)**
**Carrier Site ID / Name: CTHA039A / Manchester**
**Site Location: 60 Adams Street**
**Manchester, Connecticut**
**Hartford County**
**Latitude: 41.794100**
**Longitude: -72.555300**


**Analysis Result:**

**Max Structural Usage: 55% [Pass]**

**Report Prepared By: Khaibar Noorzad**

## Introduction

The purpose of this report is to summarize the analysis results on the (3) Sector Frames at 135.00' elevation to support the proposed antenna configuration. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

## Sources of Information

| | |
|---|---|
| Mount Drawings | Mapping by Full Metal Tower Services; Dated 04/28/2019 |
| Antenna Loading | Provided by SBA; Application #: 117033, v2 |
| Modification Drawings | N/A |

## Analysis Criteria

Wind Speed Used in the Analysis: 118 mph (3-Sec. Gust) (Ultimate Wind Speed)
Wind Speed with Ice: 50 mph (3-Sec. Gust) with 1.5" radial ice concurrent
Service Load Wind Speed: 60 mph +0" Radial ice
Standard/Codes: ANSI/TIA 222-H/ 2015 IBC / 2018 CSBC
Exposure Category: C
Risk Category: II
Topographic Category: 1
Crest Height (Ft): 0
Ground Elevation Factor: 1

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) Sector Frames at 135.00' elevation

## Final Antenna Configuration

3 Ericsson Air 32 KRD901146-1_B66A_B2A
3 RFS APX16DWV-16DWVS-E-A20
3 RFS APXVAARR24_43-U-NA20
3 Ericsson RRUS11 B4
3 Ericsson RRUS 32 B66A
3 Ericsson Radio 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 Sector Frames.

In addition to the proposed equipment loading, a 500 lb serviceability load was also considered in this analysis in accordance with TIA requirements.

## Analysis Results

Our calculations have determined that under design wind load the existing mounts will be structurally adequate to support the proposed antenna configuration. The maximum structural usage is 55%, which occurs in the standoff arm connections. 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
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.


04.28.2019 10:54


04.28.2019 10:34

# Structure: CT16504-A-SBA - Manchester 12, CT

**Sector:** A

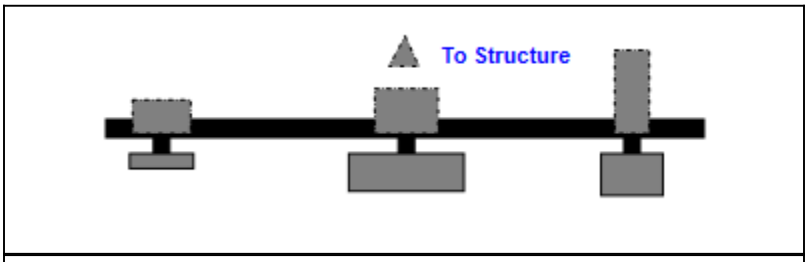
**Structure Type:** Monopole

**Mount Elev:** 135.00

8/19/2019

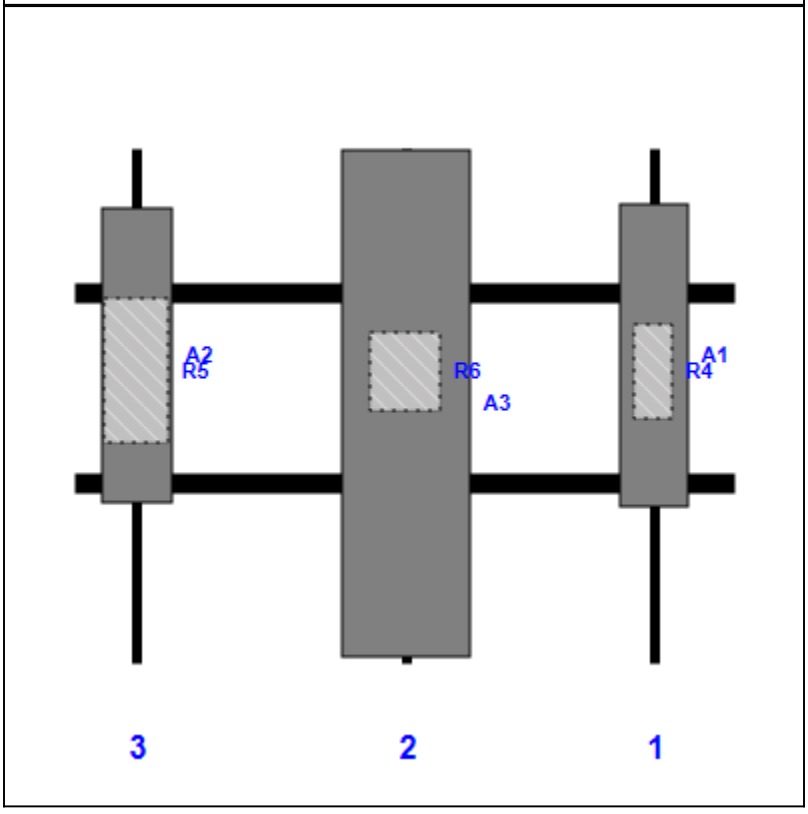


## Plan View



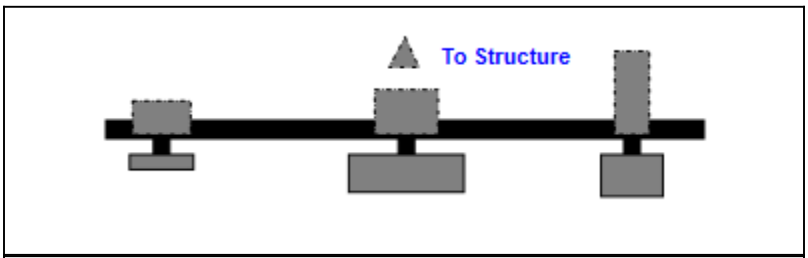

## Front View

**Looking Toward Structure**



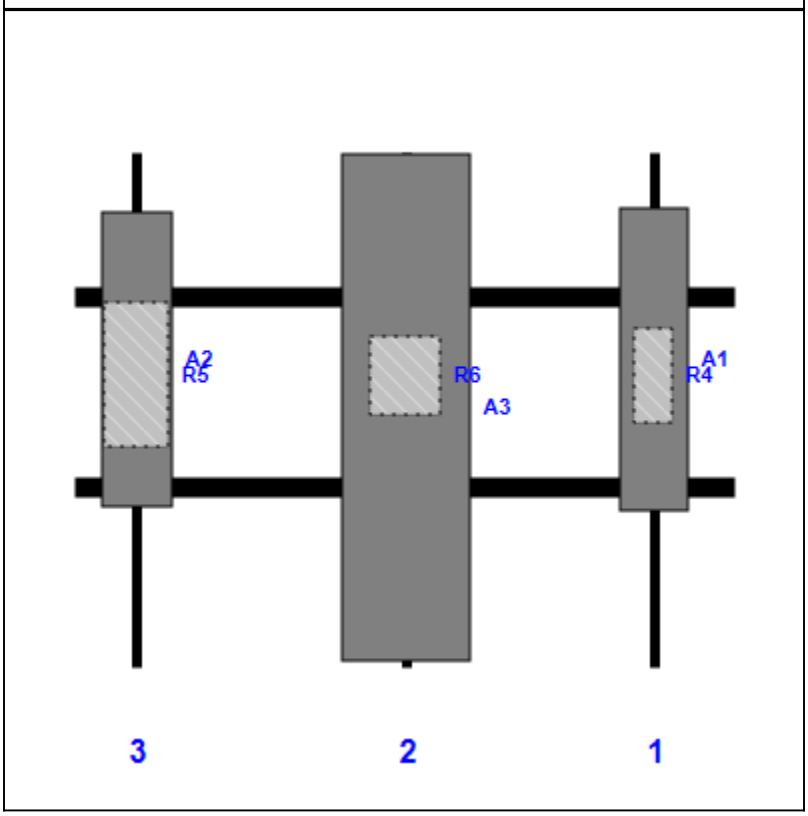

| Ref # | Model | Height (in) | Width (in) | H Dist From Left | Pipe # | Pipe Pos V | Antenna Pos | Center Ant From Top | Antenna H Offset |
|---|---|---|---|---|---|---|---|---|---|
| A1 | Air 32 | 57.00 | 12.90 | 110.00 | 1 | a | Front | 39.00 | 0.00 |
| R4 | RRUS11 B4 | 17.80 | 7.20 | 110.00 | 1 | a | Behind | 42.00 | 0.00 |
| A3 | APXVAARR24_43-U-NA20 | 95.90 | 24.00 | 63.00 | 2 | a | Front | 48.00 | 0.00 |
| R6 | Radio 4449 B71+B12 | 15.00 | 13.20 | 63.00 | 2 | a | Behind | 42.00 | 0.00 |
| A2 | APX16DWV-16DWVS-E-A20 | 55.90 | 13.30 | 12.00 | 3 | a | Front | 39.00 | 0.00 |
| R5 | RRUS 32 B66A | 27.20 | 12.10 | 12.00 | 3 | a | Behind | 42.00 | 0.00 |

## Plan View



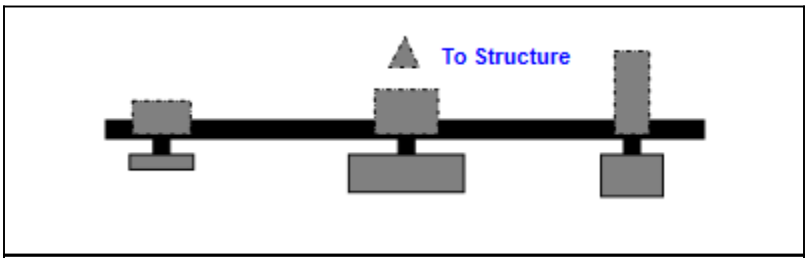

## Front View

**Looking Toward Structure**



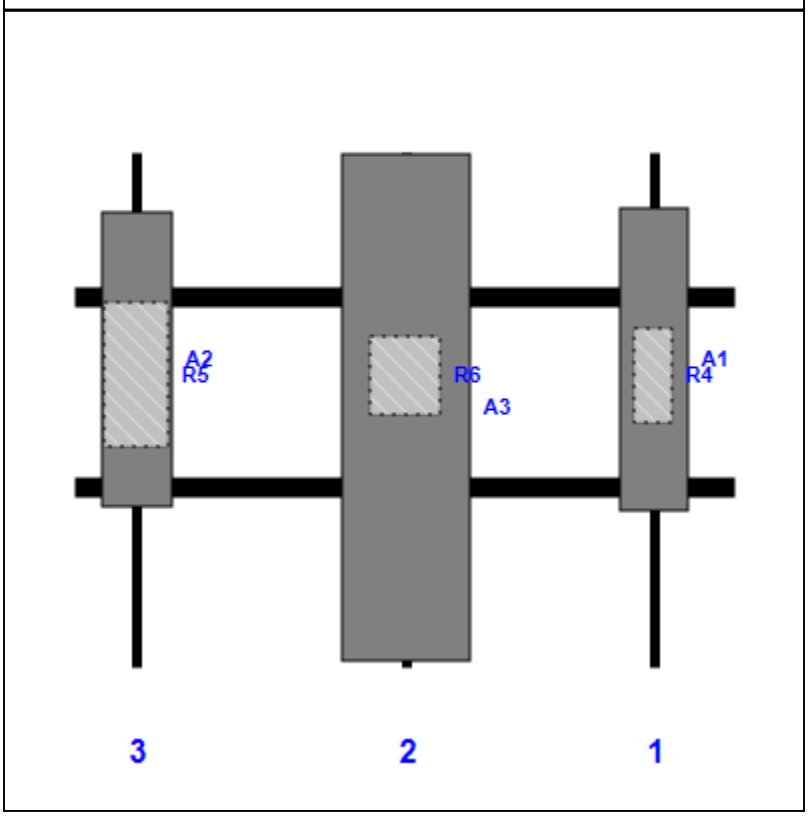

| Ref # | Model | Height (in) | Width (in) | H Dist From Left | Pipe # | Pipe Pos V | Antenna Pos | Center Ant From Top | Antenna H Offset |
|---|---|---|---|---|---|---|---|---|---|
| A1 | Air 32 | 57.00 | 12.90 | 110.00 | 1 | a | Front | 39.00 | 0.00 |
| R4 | RRUS11 B4 | 17.80 | 7.20 | 110.00 | 1 | a | Behind | 42.00 | 0.00 |
| A3 | APXVAARR24_43-U-NA20 | 95.90 | 24.00 | 63.00 | 2 | a | Front | 48.00 | 0.00 |
| R6 | Radio 4449 B71+B12 | 15.00 | 13.20 | 63.00 | 2 | a | Behind | 42.00 | 0.00 |
| A2 | APX16DWV-16DWVS-E-A20 | 55.90 | 13.30 | 12.00 | 3 | a | Front | 39.00 | 0.00 |
| R5 | RRUS 32 B66A | 27.20 | 12.10 | 12.00 | 3 | a | Behind | 42.00 | 0.00 |

### Plan View




### Front View

**Looking Toward Structure**



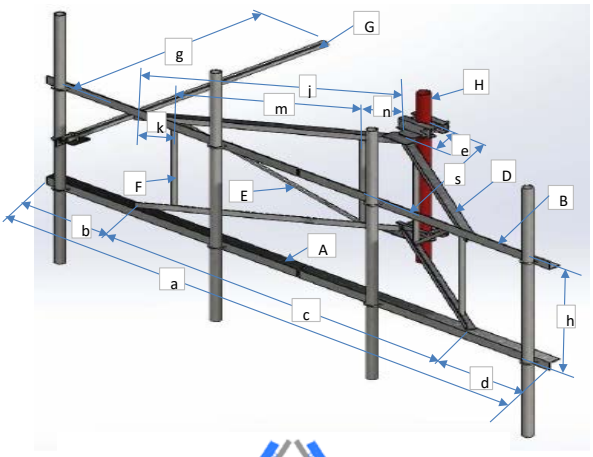

| Ref # | Model | Height (in) | Width (in) | H Dist From Left | Pipe # | Pipe Pos V | Antenna Pos | Center Ant From Top | Antenna H Offset |
|---|---|---|---|---|---|---|---|---|---|
| A1 | Air 32 | 57.00 | 12.90 | 110.00 | 1 | a | Front | 39.00 | 0.00 |
| R4 | RRUS11 B4 | 17.80 | 7.20 | 110.00 | 1 | a | Behind | 42.00 | 0.00 |
| A3 | APXVAARR24_43-U-NA20 | 95.90 | 24.00 | 63.00 | 2 | a | Front | 48.00 | 0.00 |
| R6 | Radio 4449 B71+B12 | 15.00 | 13.20 | 63.00 | 2 | a | Behind | 42.00 | 0.00 |
| A2 | APX16DWV-16DWVS-E-A20 | 55.90 | 13.30 | 12.00 | 3 | a | Front | 39.00 | 0.00 |
| R5 | RRUS 32 B66A | 27.20 | 12.10 | 12.00 | 3 | a | Behind | 42.00 | 0.00 |

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

FCC # Not Posted

| | | | |
|---|---|---|---|
| **Tower Owner:** | SBA Communications | **Mapping Date:** | 4/28/19 |
| **Site Name:** | Manchester 12, CT | **Structure Type:** | Other |
| **Site Number or ID:** | CT16504-A-SBA | **Structure Height (Ft.):** | 144 |
| **Mapping Contractor:** | Full Metal Tower Services | **Mount Height (Ft.):** | 137.4 |






| Geometries (Unit: inches) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **a** | 125 | **e** | 10 | **j** | 50 | **o** | | **s** | 45 |
| **b** | 26 | **f** | | **k** | 6 | **p** | | **t** | 18 |
| **c** | 74 | **g** | 92 | **m** | 36 | **q** | | **u *** | 63 |
| **d** | 25 | **h** | 36 | **n** | 8 | **r** | | **v *** | 97 |

| Members (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** | 2.875 OD x 0.203 Pipe | 2.875 | 2.469 | 0.203 | **F** | 2.375 OD x 0.154 Pipe | 2.375 | 2.067 | 0.154 |
| **B** | 2.875 OD x 0.203 Pipe | 2.875 | 2.469 | 0.203 | **G** | 2.375 OD x 0.154 Pipe | 2.375 | 2.067 | 0.154 |
| **C** | | | | | **H** | 4.5 OD x 0.237 Pipe | 4.5 | 4.026 | 0.237 |
| **D** | 2.875 OD x 0.203 Pipe | 2.875 | 2.469 | 0.203 | **J** | | | | |
| **E** | 0.75" Solid Rod | 0.75 | 0.75 | N/A | **K (pipe)*** | 2.875 OD x 0.203 Pipe | 2.875 | 2.469 | 0.203 |

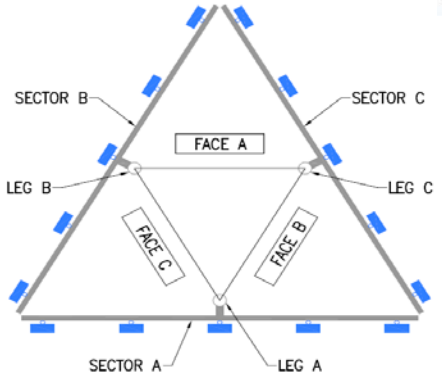
| | |
|---|---|
| Distance from top of bottom support rail to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.) | N/A |
| Distance from top of bottom support rail to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.) | 2.5' |

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

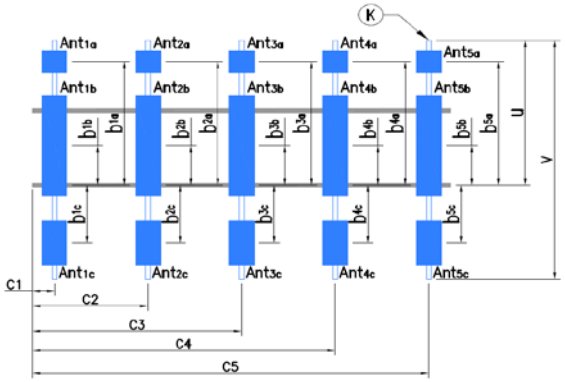
Collar All-Thread is 3/4"x18"

Structure is a MONOPOLE

| | | | |
|---|---|---|---|
| Tower Face Width at the mount (ft.): | N/A | Tower Leg Size at the mount (in.): | N/A |




**Climbing facility is Ouside Face C, at 335° Degree Azimuth**

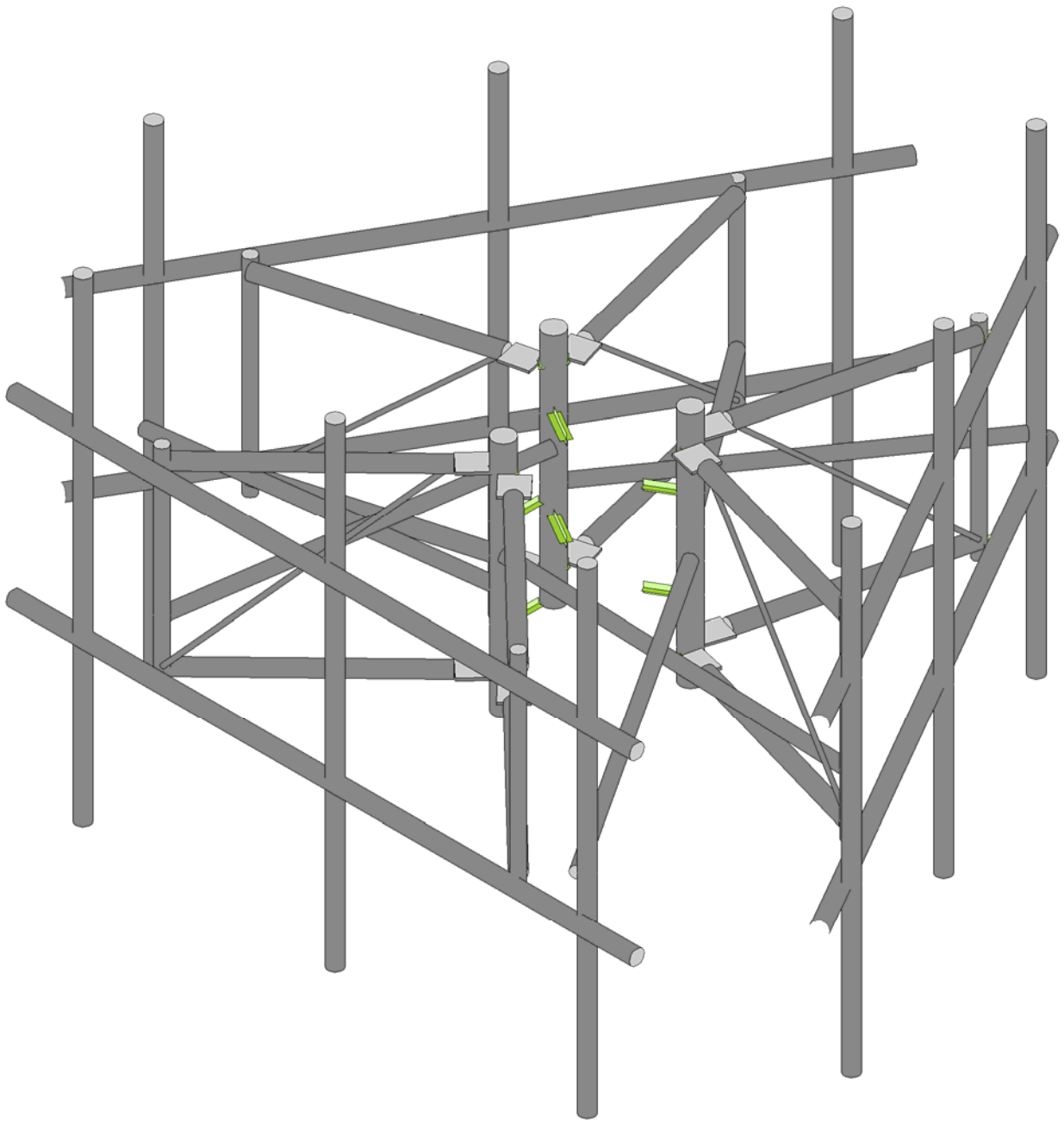



**Antenna Layout**

| 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** | | | | | | | | | |
| $Ant_{1a}$ | | | | | | | | 110 | |
| $Ant_{1b}$ | Antenna A | 13 | 9 | 56 | 1/2" (2) | +20" | 8 | 12 | |
| $Ant_{1c}$ | | | | | | | | | |
| $Ant_{2a}$ | | | | | | | | 63 | |
| $Ant_{2b}$ | Antenna B | 24 | 9 | 96 | 1/2" (2) | +18" | 8 | 63 | |
| $Ant_{2c}$ | RRH A | 17 | 7 | 20 | 1/2" (2) | +25" | | 63 | |
| $Ant_{3a}$ | | | | | | | | 12 | |
| $Ant_{3b}$ | Antenna C | 13 | 3.5 | 56 | 1/2" (2) | +19" | 6.5 | 116 | |
| $Ant_{3c}$ | RRH A | 17 | 7 | 20 | 1/2" (2) | +24" | | 116 | |
| $Ant_{4a}$ | | | | | | | | | |
| $Ant_{4b}$ | | | | | | | | | |
| $Ant_{4c}$ | | | | | | | | | |
| $Ant_{5a}$ | | | | | | | | | |
| $Ant_{5b}$ | | | | | | | | | |
| $Ant_{5c}$ | | | | | | | | | |
| Are Ant same as sector A? | Yes | **Antennas on Sector B are the same as Sector A** | | | | | | | |

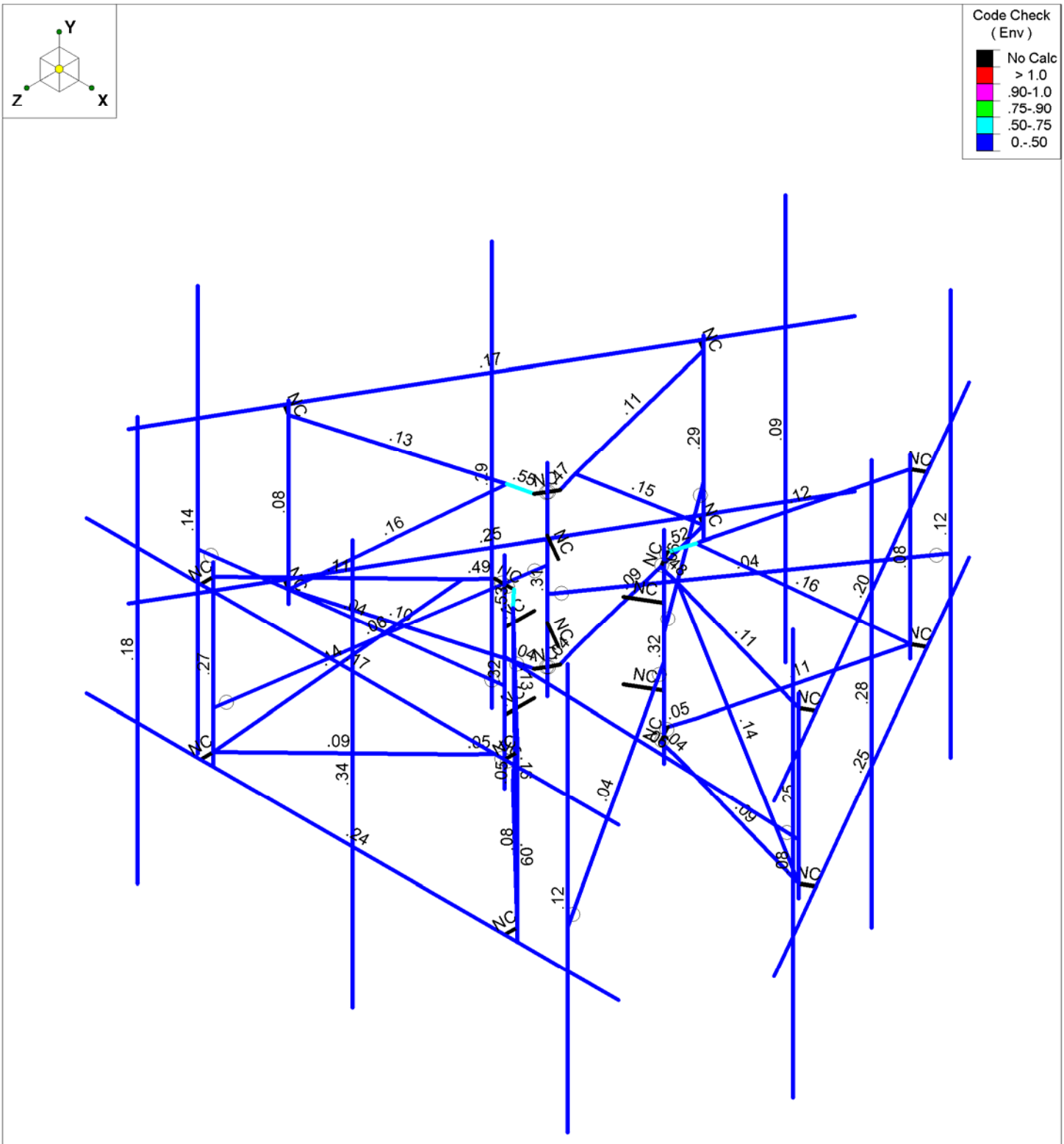
**Azimuth (Degree) of Each Sector and Climbing Information**

| | | | |
|---|---|---|---|
| Sector A: | 350° | Deg | |
| Sector B: | 90° | Deg | |
| Sector C: | 225° | Deg | |
| Climbing | 335° | Deg | Ouside Face C |
| Climbing Facility | Corrosion Type: | | No corrosion observed |
| | Access: | | Climbing path was unobstructed. |
| | Condition: | | N/A |



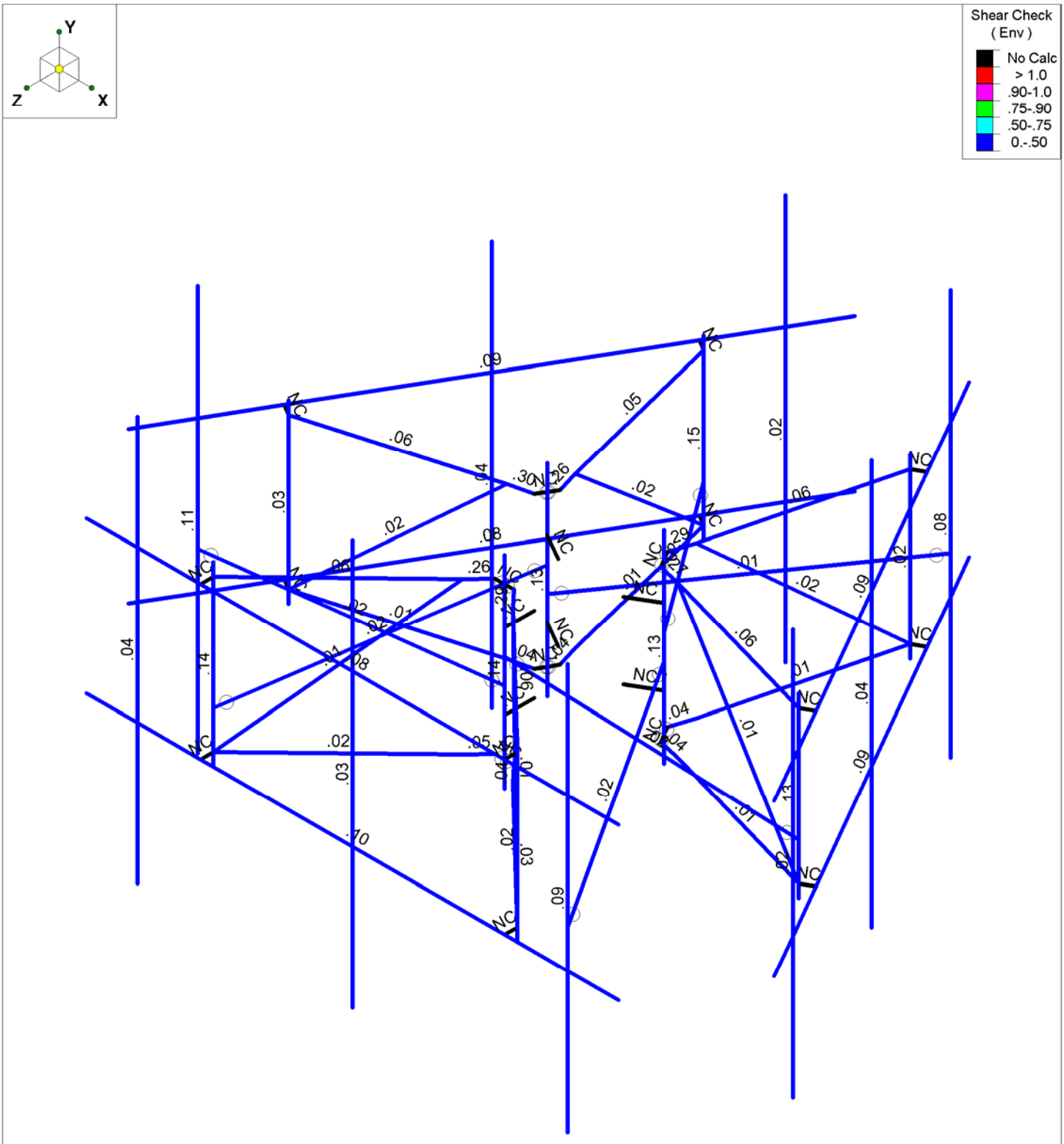

Loads: BLC 31,

| | | |
|---|---|---|
| Tower Engineering Solutio... | CT16504-A-SBA_MT_LO_Loads Only_H | SK - 1 |
| | | Aug 19, 2019 at 4:05 PM |
| TES Project No. 84081 | | CT16504-A-SBA_84081_H_RISA_L... |




Member Code Checks Displayed (Enveloped)
Loads: BLC 31,
Results for LC 1, 1.2D+1.0W (Front)

| | | |
|---|---|---|
| Tower Engineering Solutio... | CT16504-A-SBA_MT_LO_Loads Only_H | SK - 2 |
| | | Aug 19, 2019 at 4:07 PM |
| TES Project No. 84081 | | CT16504-A-SBA_84081_H_RISA_L... |




Member Shear Checks Displayed (Enveloped)
Loads: BLC 31,
Results for LC 1, 1.2D+1.0W (Front)

| | | |
|---|---|---|
| Tower Engineering Solutio... | CT16504-A-SBA_MT_LO_Loads Only_H | SK - 3 |
| | | Aug 19, 2019 at 4:08 PM |
| TES Project No. 84081 | | CT16504-A-SBA_84081_H_RISA_L... |

## Basic Load Cases

| | BLC Description | Category | X Gravity | Y Gravity | Z Gravity | Joint | Point | Distributed | Area(Memb... | Surface(... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Antenna D | None | | | | | 27 | | | |
| 2 | Antenna Di | None | | | | | 27 | | | |
| 3 | Antenna W Front | None | | | | | 27 | | | |
| 4 | Antenna Wi Front | None | | | | | 27 | | | |
| 5 | Antenna W Side | None | | | | | 27 | | | |
| 6 | Antenna Wi Side | None | | | | | 27 | | | |
| 7 | Service Lm1 | None | | | | | 1 | | | |
| 8 | Service Lm2 | None | | | | | 1 | | | |
| 9 | Structure D | None | | -1 | | | | | | |
| 10 | Structure Di | None | | | | | | 60 | | |
| 11 | Structure W Front | None | | | | | | 60 | | |
| 12 | Structure Wi Front | None | | | | | | 60 | | |
| 13 | Structure W Side | None | | | | | | 60 | | |
| 14 | Structure Wi Side | None | | | | | | 60 | | |
| 15 | Antenna Wm Front | None | | | | | 27 | | | |
| 16 | Antenna Wm Side | None | | | | | 27 | | | |
| 17 | Structure Wm Front | None | | | | | | 60 | | |
| 18 | Structure Wm Side | None | | | | | | 60 | | |
| 19 | Service Lv1 | None | | | | | 1 | | | |
| 20 | Service Lv2 | None | | | | | 1 | | | |

## Load Combinations

| | Description | So.. | P... | S... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... | BLC | Fa... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.2D+1.0W (Front) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 3 | 1 | 11 | 1 | | | | | | | | | | | | |
| 2 | 1.2D+1.0W (Back) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 3 | -1 | 11 | -1 | | | | | | | | | | | | |
| 3 | 1.2D+1.0W (Left) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 5 | 1 | 13 | 1 | | | | | | | | | | | | |
| 4 | 1.2D+1.0W (Right) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 5 | -1 | 13 | -1 | | | | | | | | | | | | |
| 5 | 1.2D+1.0Di+1.0Wi (Front) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 2 | 1 | 10 | 1 | 4 | 1 | 12 | 1 | | | | | | | | |
| 6 | 1.2D+1.0Di+1.0Wi (Back) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 2 | 1 | 10 | 1 | 4 | -1 | 12 | -1 | | | | | | | | |
| 7 | 1.2D+1.0Di+1.0Wi (Left) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 2 | 1 | 10 | 1 | 6 | 1 | 14 | 1 | | | | | | | | |
| 8 | 1.2D+1.0Di+1.0Wi (Right) | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 2 | 1 | 10 | 1 | 6 | -1 | 14 | -1 | | | | | | | | |
| 9 | 1.2D+1.5Lm1+1.0Wm (M... | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 7 | 1.5 | 15 | 1 | 17 | 1 | | | | | | | | | | |
| 10 | 1.2D+1.5LmL2+1.0Wm (... | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 8 | 1.5 | 15 | 1 | 17 | 1 | | | | | | | | | | |
| 11 | 1.2D+1.5Lv1 (Maintenan... | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 19 | 1.5 | | | | | | | | | | | | | | |
| 12 | 1.2D+1.5Lv2 (Maintenan... | Yes | Y | | 1 | 1.2 | 9 | 1.2 | 20 | 1.5 | | | | | | | | | | | | | | |
| 13 | 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 Diaphragm |
|---|---|---|---|---|---|---|
| 1 | N1 | 0 | 3 | 1.333333 | 0 | |
| 2 | N2 | 0 | 0 | 1.333333 | 0 | |
| 3 | N3 | -5.25 | 3 | 4.333331 | 0 | |
| 4 | N4 | -5.25 | 0 | 4.333331 | 0 | |
| 5 | N5 | 5.25 | 3 | 4.333331 | 0 | |
| 6 | N6 | 5.25 | 0 | 4.333331 | 0 | |
| 7 | N7 | -0.186384 | 3 | 1.333333 | 0 | |
| 8 | N8 | -0.186384 | 0 | 1.333333 | 0 | |
| 9 | N9 | 0.186384 | 3 | 1.333333 | 0 | |
| 10 | N10 | 0.186384 | 0 | 1.333333 | 0 | |
| 11 | N11 | -4.25 | 5.25 | 4.333331 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diaphragm |
|---|---|---|---|---|---|---|
| 12 | N12 | -4.25 | -2.75 | 4.333331 | 0 | |
| 13 | N13 | 0 | 5.25 | 4.333331 | 0 | |
| 14 | N14 | 0 | -2.75 | 4.333331 | 0 | |
| 15 | N15 | 4.25 | 5.25 | 4.333331 | 0 | |
| 16 | N16 | 4.25 | -2.75 | 4.333331 | 0 | |
| 17 | N17 | -4.25 | 3 | 4.333331 | 0 | |
| 18 | N18 | 0 | 3 | 4.333331 | 0 | |
| 19 | N19 | 4.25 | 3 | 4.333331 | 0 | |
| 20 | N20 | -4.25 | 0 | 4.333331 | 0 | |
| 21 | N21 | 0 | 0 | 4.333331 | 0 | |
| 22 | N22 | 4.25 | 0 | 4.333331 | 0 | |
| 23 | N23 | 0 | 3.5 | 1.333333 | 0 | |
| 24 | N24 | 0 | -.5 | 1.333333 | 0 | |
| 25 | N25 | 0 | 2.25 | .75 | 0 | |
| 26 | N26 | 0 | 2.25 | 1.333333 | 0 | |
| 27 | N27 | 0 | .75 | .75 | 0 | |
| 28 | N28 | 0 | .75 | 1.333333 | 0 | |
| 29 | N29 | 3 | 3 | 4.333331 | 0 | |
| 30 | N30 | -3 | 3 | 4.333331 | 0 | |
| 31 | N31 | 3 | 0 | 4.333331 | 0 | |
| 32 | N32 | -3 | 0 | 4.333331 | 0 | |
| 33 | N33 | 3 | 3 | 4.083331 | 0 | |
| 34 | N34 | -3 | 3 | 4.083331 | 0 | |
| 35 | N35 | 3 | 0 | 4.083331 | 0 | |
| 36 | N36 | -3 | 0 | 4.083331 | 0 | |
| 37 | N37 | -3 | 3.25 | 4.083331 | 0 | |
| 38 | N38 | -3 | -.25 | 4.083331 | 0 | |
| 39 | N39 | -0.494223 | 3 | 1.661564 | 0 | |
| 40 | N40 | -0.494223 | 0 | 1.661564 | 0 | |
| 41 | N41 | 3 | 3.25 | 4.083331 | 0 | |
| 42 | N42 | 3 | -.25 | 4.083331 | 0 | |
| 43 | N43 | 0.494223 | 3 | 1.661564 | 0 | |
| 44 | N44 | 0.494223 | 0 | 1.661564 | 0 | |
| 45 | N45 | 4.25 | .75 | 4.333331 | 0 | |
| 46 | N46 | -3 | .75 | 4.083331 | 0 | |
| 47 | N47 | 1.154701 | 3 | -0.666667 | 0 | |
| 48 | N48 | 1.154701 | 0 | -0.666667 | 0 | |
| 49 | N49 | 6.377774 | 3 | 2.379968 | 0 | |
| 50 | N50 | 6.377774 | 0 | 2.379968 | 0 | |
| 51 | N51 | 1.127774 | 3 | -6.713299 | 0 | |
| 52 | N52 | 1.127774 | 0 | -6.713299 | 0 | |
| 53 | N53 | 1.247893 | 3 | -0.505253 | 0 | |
| 54 | N54 | 1.247893 | 0 | -0.505253 | 0 | |
| 55 | N55 | 1.061509 | 3 | -0.82808 | 0 | |
| 56 | N56 | 1.061509 | 0 | -0.82808 | 0 | |
| 57 | N57 | 5.877775 | 5.25 | 1.513942 | 0 | |
| 58 | N58 | 5.877774 | -2.75 | 1.513943 | 0 | |
| 59 | N59 | 3.752774 | 5.25 | -2.166665 | 0 | |
| 60 | N60 | 3.752774 | -2.75 | -2.166665 | 0 | |
| 61 | N61 | 1.627774 | 5.25 | -5.847273 | 0 | |
| 62 | N62 | 1.627774 | -2.75 | -5.847273 | 0 | |
| 63 | N63 | 5.877774 | 3 | 1.513943 | 0 | |
| 64 | N64 | 3.752774 | 3 | -2.166665 | 0 | |
| 65 | N65 | 1.627774 | 3 | -5.847273 | 0 | |
| 66 | N66 | 5.877774 | 0 | 1.513943 | 0 | |
| 67 | N67 | 3.752774 | 0 | -2.166665 | 0 | |
| 68 | N68 | 1.627774 | 0 | -5.847273 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diaphragm |
|---|---|---|---|---|---|---|
| 69 | N69 | 1.154701 | 3.5 | -0.666667 | 0 | |
| 70 | N70 | 1.154701 | -.5 | -0.666667 | 0 | |
| 71 | N71 | 0.649519 | 2.25 | -.375 | 0 | |
| 72 | N72 | 1.154701 | 2.25 | -0.666667 | 0 | |
| 73 | N73 | 0.649519 | .75 | -.375 | 0 | |
| 74 | N74 | 1.154701 | .75 | -0.666667 | 0 | |
| 75 | N75 | 2.252774 | 3 | -4.764742 | 0 | |
| 76 | N76 | 5.252774 | 3 | 0.431411 | 0 | |
| 77 | N77 | 2.252774 | 0 | -4.764742 | 0 | |
| 78 | N78 | 5.252774 | 0 | 0.431411 | 0 | |
| 79 | N79 | 2.036268 | 3 | -4.639742 | 0 | |
| 80 | N80 | 5.036268 | 3 | 0.556411 | 0 | |
| 81 | N81 | 2.036268 | 0 | -4.639742 | 0 | |
| 82 | N82 | 5.036268 | 0 | 0.556411 | 0 | |
| 83 | N83 | 5.036268 | 3.25 | 0.556411 | 0 | |
| 84 | N84 | 5.036268 | -.25 | 0.556411 | 0 | |
| 85 | N85 | 1.686068 | 3 | -0.402773 | 0 | |
| 86 | N86 | 1.686068 | 0 | -0.402773 | 0 | |
| 87 | N87 | 2.036268 | 3.25 | -4.639742 | 0 | |
| 88 | N88 | 2.036268 | -.25 | -4.639742 | 0 | |
| 89 | N89 | 1.191845 | 3 | -1.258792 | 0 | |
| 90 | N90 | 1.191845 | 0 | -1.258792 | 0 | |
| 91 | N91 | 1.627774 | .75 | -5.847273 | 0 | |
| 92 | N92 | 5.036268 | .75 | 0.556411 | 0 | |
| 93 | N93 | -1.154701 | 3 | -0.666667 | 0 | |
| 94 | N94 | -1.154701 | 0 | -0.666667 | 0 | |
| 95 | N95 | -1.127774 | 3 | -6.713299 | 0 | |
| 96 | N96 | -1.127774 | 0 | -6.713299 | 0 | |
| 97 | N97 | -6.377774 | 3 | 2.379968 | 0 | |
| 98 | N98 | -6.377774 | 0 | 2.379968 | 0 | |
| 99 | N99 | -1.061509 | 3 | -0.82808 | 0 | |
| 100 | N100 | -1.061509 | 0 | -0.82808 | 0 | |
| 101 | N101 | -1.247893 | 3 | -0.505253 | 0 | |
| 102 | N102 | -1.247893 | 0 | -0.505253 | 0 | |
| 103 | N103 | -1.627775 | 5.25 | -5.847273 | 0 | |
| 104 | N104 | -1.627774 | -2.75 | -5.847273 | 0 | |
| 105 | N105 | -3.752774 | 5.25 | -2.166665 | 0 | |
| 106 | N106 | -3.752774 | -2.75 | -2.166665 | 0 | |
| 107 | N107 | -5.877774 | 5.25 | 1.513943 | 0 | |
| 108 | N108 | -5.877774 | -2.75 | 1.513943 | 0 | |
| 109 | N109 | -1.627774 | 3 | -5.847273 | 0 | |
| 110 | N110 | -3.752774 | 3 | -2.166665 | 0 | |
| 111 | N111 | -5.877774 | 3 | 1.513943 | 0 | |
| 112 | N112 | -1.627774 | 0 | -5.847273 | 0 | |
| 113 | N113 | -3.752774 | 0 | -2.166665 | 0 | |
| 114 | N114 | -5.877774 | 0 | 1.513943 | 0 | |
| 115 | N115 | -1.154701 | 3.5 | -0.666667 | 0 | |
| 116 | N116 | -1.154701 | -.5 | -0.666667 | 0 | |
| 117 | N117 | -0.649519 | 2.25 | -.375 | 0 | |
| 118 | N118 | -1.154701 | 2.25 | -0.666667 | 0 | |
| 119 | N119 | -0.649519 | .75 | -.375 | 0 | |
| 120 | N120 | -1.154701 | .75 | -0.666667 | 0 | |
| 121 | N121 | -5.252774 | 3 | 0.431411 | 0 | |
| 122 | N122 | -2.252774 | 3 | -4.764742 | 0 | |
| 123 | N123 | -5.252774 | 0 | 0.431411 | 0 | |
| 124 | N124 | -2.252774 | 0 | -4.764742 | 0 | |
| 125 | N125 | -5.036268 | 3 | 0.556411 | 0 | |

## Joint Coordinates and Temperatures (Continued)

| | Label | X [ft] | Y [ft] | Z [ft] | Temp [F] | Detach From Diaphragm |
|---|---|---|---|---|---|---|
| 126 | N126 | -2.036268 | 3 | -4.639742 | 0 | |
| 127 | N127 | -5.036268 | 0 | 0.556411 | 0 | |
| 128 | N128 | -2.036268 | 0 | -4.639742 | 0 | |
| 129 | N129 | -2.036268 | 3.25 | -4.639742 | 0 | |
| 130 | N130 | -2.036268 | -.25 | -4.639742 | 0 | |
| 131 | N131 | -1.191845 | 3 | -1.258792 | 0 | |
| 132 | N132 | -1.191845 | 0 | -1.258792 | 0 | |
| 133 | N133 | -5.036268 | 3.25 | 0.556411 | 0 | |
| 134 | N134 | -5.036268 | -.25 | 0.556411 | 0 | |
| 135 | N135 | -1.686068 | 3 | -0.402773 | 0 | |
| 136 | N136 | -1.686068 | 0 | -0.402773 | 0 | |
| 137 | N137 | -5.877774 | .75 | 1.513943 | 0 | |
| 138 | N138 | -2.036268 | .75 | -4.639742 | 0 | |
| 139 | N139 | 0 | 1.25 | 1.333333 | 0 | |
| 140 | N140 | 0 | 1.75 | 1.333333 | 0 | |
| 141 | N141 | 1.154701 | 1.25 | -0.666667 | 0 | |
| 142 | N142 | 1.154701 | 1.75 | -0.666667 | 0 | |
| 143 | N143 | -1.154701 | 1.25 | -0.666667 | 0 | |
| 144 | N144 | -1.154701 | 1.75 | -0.666667 | 0 | |

## Hot Rolled Steel Section Sets

| | Label | Shape | Type | Design List | Material | Design ... | 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 R... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | CF | 4CU5.25X0375 | Beam | CU | A570 Gr.33 | Typical | 4.854 | 13.238 | 12.817 | .228 |

## Aluminum Section Sets

| | Label | Shape | Type | Design List | Material | Design R... | A [in2] | Iyy [in4] | Izz [in4] | J [in4] |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AL1A | AACS14... | Beam | AA Channel | 3003-H14 | Typical | 11.8 | 44.7 | 401 | 1.19 |

## Hot Rolled Steel Properties

| | Label | E [ksi] | G [ksi] | Nu | Therm (/1... | Density[k/... | 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 | Rotat... | Section/Shape | Type | Design List | Material | Design ... |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | N3 | N5 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 2 | M2 | N4 | N6 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 3 | M3 | N7 | N39 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 4 | M4 | N8 | N40 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 5 | M5 | N39 | N36 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 6 | MP3A | N11 | N12 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 7 | MP2A | N13 | N14 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 8 | MP1A | N15 | N16 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 9 | M9 | N23 | N24 | | | PIPE_3.5 | Beam | Pipe | A53 Gr.B | Typical |
| 10 | M10 | N25 | N26 | | | RIGID | Beam | None | RIGID | DR1 |
| 11 | M11 | N27 | N28 | | | RIGID | Beam | None | RIGID | DR1 |
| 12 | M12 | N9 | N7 | | | RIGID | Beam | None | RIGID | DR1 |
| 13 | M13 | N10 | N8 | | | RIGID | Beam | None | RIGID | DR1 |
| 14 | M14 | N34 | N30 | | | RIGID | Beam | None | RIGID | DR1 |
| 15 | M15 | N36 | N32 | | | RIGID | Beam | None | RIGID | DR1 |
| 16 | M16 | N33 | N29 | | | RIGID | Beam | None | RIGID | DR1 |
| 17 | M17 | N35 | N31 | | | RIGID | Beam | None | RIGID | DR1 |
| 18 | M18 | N37 | N38 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 19 | M19 | N40 | N36 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 20 | M20 | N39 | N34 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 21 | M21 | N43 | N35 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 22 | M22 | N41 | N42 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 23 | M23 | N44 | N35 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 24 | M24 | N43 | N33 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 25 | M25 | N9 | N43 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 26 | M26 | N10 | N44 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 27 | M27 | N49 | N51 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 28 | M28 | N50 | N52 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 29 | M29 | N53 | N85 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 30 | M30 | N54 | N86 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 31 | M31 | N85 | N82 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 32 | MP3C | N57 | N58 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 33 | MP2C | N59 | N60 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 34 | MP1C | N61 | N62 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 35 | M35 | N69 | N70 | | | PIPE_3.5 | Beam | Pipe | A53 Gr.B | Typical |
| 36 | M36 | N71 | N72 | | | RIGID | Beam | None | RIGID | DR1 |
| 37 | M37 | N73 | N74 | | | RIGID | Beam | None | RIGID | DR1 |
| 38 | M38 | N55 | N53 | | | RIGID | Beam | None | RIGID | DR1 |
| 39 | M39 | N56 | N54 | | | RIGID | Beam | None | RIGID | DR1 |
| 40 | M40 | N80 | N76 | | | RIGID | Beam | None | RIGID | DR1 |
| 41 | M41 | N82 | N78 | | | RIGID | Beam | None | RIGID | DR1 |
| 42 | M42 | N79 | N75 | | | RIGID | Beam | None | RIGID | DR1 |
| 43 | M43 | N81 | N77 | | | RIGID | Beam | None | RIGID | DR1 |
| 44 | M44 | N83 | N84 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 45 | M45 | N86 | N82 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |

## Member Primary Data (Continued)

| | Label | I Joint | J Joint | K Joint | Rotat... | Section/Shape | Type | Design List | Material | Design ... |
|---|---|---|---|---|---|---|---|---|---|---|
| 46 | M46 | N85 | N80 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 47 | M47 | N89 | N81 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 48 | M48 | N87 | N88 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 49 | M49 | N90 | N81 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 50 | M50 | N89 | N79 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 51 | M51 | N55 | N89 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 52 | M52 | N56 | N90 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 53 | M53 | N95 | N97 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 54 | M54 | N96 | N98 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 55 | M55 | N99 | N131 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 56 | M56 | N100 | N132 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 57 | M57 | N131 | N128 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 58 | MP3B | N103 | N104 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 59 | MP2B | N105 | N106 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 60 | MP1B | N107 | N108 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 61 | M61 | N115 | N116 | | | PIPE_3.5 | Beam | Pipe | A53 Gr.B | Typical |
| 62 | M62 | N117 | N118 | | | RIGID | Beam | None | RIGID | DR1 |
| 63 | M63 | N119 | N120 | | | RIGID | Beam | None | RIGID | DR1 |
| 64 | M64 | N101 | N99 | | | RIGID | Beam | None | RIGID | DR1 |
| 65 | M65 | N102 | N100 | | | RIGID | Beam | None | RIGID | DR1 |
| 66 | M66 | N126 | N122 | | | RIGID | Beam | None | RIGID | DR1 |
| 67 | M67 | N128 | N124 | | | RIGID | Beam | None | RIGID | DR1 |
| 68 | M68 | N125 | N121 | | | RIGID | Beam | None | RIGID | DR1 |
| 69 | M69 | N127 | N123 | | | RIGID | Beam | None | RIGID | DR1 |
| 70 | M70 | N129 | N130 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 71 | M71 | N132 | N128 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 72 | M72 | N131 | N126 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 73 | M73 | N135 | N127 | | | SR_0.75 | Beam | BAR | A36 Gr.36 | DR1 |
| 74 | M74 | N133 | N134 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 75 | M75 | N136 | N127 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 76 | M76 | N135 | N125 | | | PIPE_2.5 | Beam | Pipe | A53 Gr.B | DR1 |
| 77 | M77 | N101 | N135 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 78 | M78 | N102 | N136 | | 90 | PL1/2x5 | Beam | RECT | A36 Gr.36 | Typical |
| 79 | M79 | N46 | N144 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 80 | M80 | N45 | N141 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 81 | M81 | N92 | N140 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 82 | M82 | N91 | N143 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 83 | M83 | N138 | N142 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |
| 84 | M84 | N137 | N139 | | | PIPE_2.0 | Beam | Pipe | A53 Gr.B | Typical |

## Member Advanced Data

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Rat... | Analysis ... | Inactive | Seismic... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | | | | | | Yes | | | | None |
| 2 | M2 | | | | | | Yes | | | | None |
| 3 | M3 | | | | | | Yes | | | | None |
| 4 | M4 | | | | | | Yes | | | | None |
| 5 | M5 | | | | | | Yes | | | | None |
| 6 | MP3A | | | | | | Yes | | -z | | None |
| 7 | MP2A | | | | | | Yes | | -z | | None |
| 8 | MP1A | | | | | | Yes | | -z | | None |
| 9 | M9 | | | | | | Yes | | | | None |
| 10 | M10 | | | | | | Yes | | | | None |
| 11 | M11 | | | | | | Yes | | | | None |
| 12 | M12 | BenPIN | BenPIN | | | | Yes | | | | None |
| 13 | M13 | BenPIN | BenPIN | | | | Yes | | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Rat... | Analysis ... | Inactive | Seismic... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 14 | M14 | | | | | | Yes | | | | None |
| 15 | M15 | | | | | | Yes | | | | None |
| 16 | M16 | | | | | | Yes | | | | None |
| 17 | M17 | | | | | | Yes | | | | None |
| 18 | M18 | | | | | | Yes | | | | None |
| 19 | M19 | | | | | | Yes | | | | None |
| 20 | M20 | | | | | | Yes | | | | None |
| 21 | M21 | | | | | | Yes | | | | None |
| 22 | M22 | | | | | | Yes | | | | None |
| 23 | M23 | | | | | | Yes | | | | None |
| 24 | M24 | | | | | | Yes | | | | None |
| 25 | M25 | | | | | | Yes | | | | None |
| 26 | M26 | | | | | | Yes | | | | None |
| 27 | M27 | | | | | | Yes | | | | None |
| 28 | M28 | | | | | | Yes | | | | None |
| 29 | M29 | | | | | | Yes | | | | None |
| 30 | M30 | | | | | | Yes | | | | None |
| 31 | M31 | | | | | | Yes | | | | None |
| 32 | MP3C | | | | | | Yes | | -z | | None |
| 33 | MP2C | | | | | | Yes | | -z | | None |
| 34 | MP1C | | | | | | Yes | | -z | | None |
| 35 | M35 | | | | | | Yes | | | | None |
| 36 | M36 | | | | | | Yes | | | | None |
| 37 | M37 | | | | | | Yes | | | | None |
| 38 | M38 | BenPIN | BenPIN | | | | Yes | | | | None |
| 39 | M39 | BenPIN | BenPIN | | | | Yes | | | | None |
| 40 | M40 | | | | | | Yes | | | | None |
| 41 | M41 | | | | | | Yes | | | | None |
| 42 | M42 | | | | | | Yes | | | | None |
| 43 | M43 | | | | | | Yes | | | | None |
| 44 | M44 | | | | | | Yes | | | | None |
| 45 | M45 | | | | | | Yes | | | | None |
| 46 | M46 | | | | | | Yes | | | | None |
| 47 | M47 | | | | | | Yes | | | | None |
| 48 | M48 | | | | | | Yes | | | | None |
| 49 | M49 | | | | | | Yes | | | | None |
| 50 | M50 | | | | | | Yes | | | | None |
| 51 | M51 | | | | | | Yes | | | | None |
| 52 | M52 | | | | | | Yes | | | | None |
| 53 | M53 | | | | | | Yes | | | | None |
| 54 | M54 | | | | | | Yes | | | | None |
| 55 | M55 | | | | | | Yes | | | | None |
| 56 | M56 | | | | | | Yes | | | | None |
| 57 | M57 | | | | | | Yes | | | | None |
| 58 | MP3B | | | | | | Yes | | -z | | None |
| 59 | MP2B | | | | | | Yes | | -z | | None |
| 60 | MP1B | | | | | | Yes | | -z | | None |
| 61 | M61 | | | | | | Yes | | | | None |
| 62 | M62 | | | | | | Yes | | | | None |
| 63 | M63 | | | | | | Yes | | | | None |
| 64 | M64 | BenPIN | BenPIN | | | | Yes | | | | None |
| 65 | M65 | BenPIN | BenPIN | | | | Yes | | | | None |
| 66 | M66 | | | | | | Yes | | | | None |
| 67 | M67 | | | | | | Yes | | | | None |
| 68 | M68 | | | | | | Yes | | | | None |
| 69 | M69 | | | | | | Yes | | | | None |
| 70 | M70 | | | | | | Yes | | | | None |

## Member Advanced Data (Continued)

| | Label | I Release | J Release | I Offset[in] | J Offset[in] | T/C Only | Physical | Defl Rat... | Analysis ... | Inactive | Seismic... |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 71 | M71 | | | | | | Yes | | | | None |
| 72 | M72 | | | | | | Yes | | | | None |
| 73 | M73 | | | | | | Yes | | | | None |
| 74 | M74 | | | | | | Yes | | | | None |
| 75 | M75 | | | | | | Yes | | | | None |
| 76 | M76 | | | | | | Yes | | | | None |
| 77 | M77 | | | | | | Yes | | | | None |
| 78 | M78 | | | | | | Yes | | | | None |
| 79 | M79 | BenPIN | BenPIN | | | | Yes | | | | None |
| 80 | M80 | BenPIN | BenPIN | | | | Yes | | | | None |
| 81 | M81 | BenPIN | BenPIN | | | | Yes | | | | None |
| 82 | M82 | BenPIN | BenPIN | | | | Yes | | | | None |
| 83 | M83 | BenPIN | BenPIN | | | | Yes | | | | None |
| 84 | M84 | BenPIN | BenPIN | | | | Yes | | | | None |

## Hot Rolled Steel Design Parameters

| | Label | Shape | Length[ft] | Lbyy[ft] | Lbzz[ft] | Lcomp top[... | Lcomp bot[... | L-torqu... | Kyy | Kzz | Cb | Functi... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M1 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 2 | M2 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 3 | M3 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 4 | M4 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 5 | M5 | SR_0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 6 | MP3A | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 7 | MP2A | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 8 | MP1A | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 9 | M9 | PIPE_3.5 | 4 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 10 | M18 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 11 | M19 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 12 | M20 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 13 | M21 | SR_0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 14 | M22 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 15 | M23 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 16 | M24 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 17 | M25 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 18 | M26 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 19 | M27 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 20 | M28 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 21 | M29 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 22 | M30 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 23 | M31 | SR_0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 24 | MP3C | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 25 | MP2C | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 26 | MP1C | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 27 | M35 | PIPE_3.5 | 4 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 28 | M44 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 29 | M45 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 30 | M46 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 31 | M47 | SR_0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 32 | M48 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 33 | M49 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 34 | M50 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 35 | M51 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 36 | M52 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 37 | M53 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 38 | M54 | PIPE_2.5 | 10.5 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |

## Hot Rolled Steel Design Parameters (Continued)

| | Label | Shape | Length[ft] | Lbyy[ft] | Lbzz[ft] | Lcomp top[.. | Lcomp bot[.. | L-torqu... | Kyy | Kzz | Cb | Functi... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 39 | M55 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 40 | M56 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 41 | M57 | SR 0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 42 | MP3B | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 43 | MP2B | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 44 | MP1B | PIPE_2.5 | 8 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 45 | M61 | PIPE_3.5 | 4 | | | Lbyy | | | 2.1 | 2.1 | | Lateral |
| 46 | M70 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 47 | M71 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 48 | M72 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 49 | M73 | SR 0.75 | 4.598 | | | Lbyy | | | .65 | .65 | | Lateral |
| 50 | M74 | PIPE_2.0 | 3.5 | | | Lbyy | | | | | | Lateral |
| 51 | M75 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 52 | M76 | PIPE_2.5 | 3.485 | | | Lbyy | | | .8 | .8 | | Lateral |
| 53 | M77 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 54 | M78 | PL1/2x5 | .45 | | | Lbyy | | | .8 | .8 | | Lateral |
| 55 | M79 | PIPE_2.0 | 5.193 | | | Lbyy | | | | | | Lateral |
| 56 | M80 | PIPE_2.0 | 5.902 | | | Lbyy | | | | | | Lateral |
| 57 | M81 | PIPE_2.0 | 5.193 | | | Lbyy | | | | | | Lateral |
| 58 | M82 | PIPE_2.0 | 5.902 | | | Lbyy | | | | | | Lateral |
| 59 | M83 | PIPE_2.0 | 5.193 | | | Lbyy | | | | | | Lateral |
| 60 | M84 | PIPE_2.0 | 5.902 | | | Lbyy | | | | | | Lateral |

## Cold Formed Steel Design Parameters

| Label | Shape | Len... | Lbyy[ft] | Lbzz[ft] | Lcomp.. | Lcomp.. | L-torq... | Kyy | Kzz | Cm... | Cm... | Cb | R | a[ft] | y s... | z s... |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 | MP1A | Y | -66.1 | 1 |
| 2 | MP1A | Y | -66.1 | 5.5 |
| 3 | MP1B | Y | -66.1 | 1 |
| 4 | MP1B | Y | -66.1 | 5.5 |
| 5 | MP1C | Y | -66.1 | 1 |
| 6 | MP1C | Y | -66.1 | 5.5 |
| 7 | MP3A | Y | -20.35 | 1 |
| 8 | MP3A | Y | -20.35 | 5.5 |
| 9 | MP3B | Y | -20.35 | 1 |
| 10 | MP3B | Y | -20.35 | 5.5 |
| 11 | MP3C | Y | -20.35 | 1 |
| 12 | MP3C | Y | -20.35 | 5.5 |
| 13 | MP2A | Y | -64 | 0 |
| 14 | MP2A | Y | -64 | 8 |

## Member Point Loads (BLC 1 : Antenna D) (Continued)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 15 | MP2B | Y | -64 | 0 |
| 16 | MP2B | Y | -64 | 8 |
| 17 | MP2C | Y | -64 | 0 |
| 18 | MP2C | Y | -64 | 8 |
| 19 | MP1A | Y | -44 | 3.5 |
| 20 | MP1B | Y | -44 | 3.5 |
| 21 | MP1C | Y | -44 | 3.5 |
| 22 | MP3A | Y | -53 | 3.5 |
| 23 | MP3B | Y | -53 | 3.5 |
| 24 | MP3C | Y | -53 | 3.5 |
| 25 | MP2A | Y | -70 | 3.5 |
| 26 | MP2B | Y | -70 | 3.5 |
| 27 | MP2C | Y | -70 | 3.5 |

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

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | Y | -91.046 | 1 |
| 2 | MP1A | Y | -91.046 | 5.5 |
| 3 | MP1B | Y | -91.046 | 1 |
| 4 | MP1B | Y | -91.046 | 5.5 |
| 5 | MP1C | Y | -91.046 | 1 |
| 6 | MP1C | Y | -91.046 | 5.5 |
| 7 | MP3A | Y | -68.257 | 1 |
| 8 | MP3A | Y | -68.257 | 5.5 |
| 9 | MP3B | Y | -68.257 | 1 |
| 10 | MP3B | Y | -68.257 | 5.5 |
| 11 | MP3C | Y | -68.257 | 1 |
| 12 | MP3C | Y | -68.257 | 5.5 |
| 13 | MP2A | Y | -206.5 | 0 |
| 14 | MP2A | Y | -206.5 | 8 |
| 15 | MP2B | Y | -206.5 | 0 |
| 16 | MP2B | Y | -206.5 | 8 |
| 17 | MP2C | Y | -206.5 | 0 |
| 18 | MP2C | Y | -206.5 | 8 |
| 19 | MP1A | Y | -80.443 | 3.5 |
| 20 | MP1B | Y | -80.443 | 3.5 |
| 21 | MP1C | Y | -80.443 | 3.5 |
| 22 | MP3A | Y | -86.865 | 3.5 |
| 23 | MP3B | Y | -86.865 | 3.5 |
| 24 | MP3C | Y | -86.865 | 3.5 |
| 25 | MP2A | Y | -67.349 | 3.5 |
| 26 | MP2B | Y | -67.349 | 3.5 |
| 27 | MP2C | Y | -67.349 | 3.5 |

## Member Point Loads (BLC 3 : Antenna W Front)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | Z | -133.258 | 1 |
| 2 | MP1A | Z | -133.258 | 5.5 |
| 3 | MP1B | Z | -106.278 | 1 |
| 4 | MP1B | Z | -106.278 | 5.5 |
| 5 | MP1C | Z | -106.278 | 1 |
| 6 | MP1C | Z | -106.278 | 5.5 |
| 7 | MP3A | Z | -135.305 | 1 |
| 8 | MP3A | Z | -135.305 | 5.5 |
| 9 | MP3B | Z | -66.485 | 1 |
| 10 | MP3B | Z | -66.485 | 5.5 |

## Member Point Loads (BLC 3 : Antenna W Front) (Continued)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 11 | MP3C | Z | -66.485 | 1 |
| 12 | MP3C | Z | -66.485 | 5.5 |
| 13 | MP2A | Z | -414.306 | 0 |
| 14 | MP2A | Z | -414.306 | 8 |
| 15 | MP2B | Z | -229.3 | 0 |
| 16 | MP2B | Z | -229.3 | 8 |
| 17 | MP2C | Z | -229.3 | 0 |
| 18 | MP2C | Z | -229.3 | 8 |
| 19 | MP1A | Z | -78.911 | 3.5 |
| 20 | MP1B | Z | -78.822 | 3.5 |
| 21 | MP1C | Z | -78.822 | 3.5 |
| 22 | MP3A | Z | -84.13 | 3.5 |
| 23 | MP3B | Z | -59.446 | 3.5 |
| 24 | MP3C | Z | -59.446 | 3.5 |
| 25 | MP2A | Z | -50.662 | 3.5 |
| 26 | MP2B | Z | -39.436 | 3.5 |
| 27 | MP2C | Z | -39.436 | 3.5 |

## Member Point Loads (BLC 4 : Antenna Wi Front)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | Z | -28.216 | 1 |
| 2 | MP1A | Z | -28.216 | 5.5 |
| 3 | MP1B | Z | -22.941 | 1 |
| 4 | MP1B | Z | -22.941 | 5.5 |
| 5 | MP1C | Z | -22.941 | 1 |
| 6 | MP1C | Z | -22.941 | 5.5 |
| 7 | MP3A | Z | -28.281 | 1 |
| 8 | MP3A | Z | -28.281 | 5.5 |
| 9 | MP3B | Z | -15.434 | 1 |
| 10 | MP3B | Z | -15.434 | 5.5 |
| 11 | MP3C | Z | -15.434 | 1 |
| 12 | MP3C | Z | -15.434 | 5.5 |
| 13 | MP2A | Z | -81.295 | 0 |
| 14 | MP2A | Z | -81.295 | 8 |
| 15 | MP2B | Z | -47.198 | 0 |
| 16 | MP2B | Z | -47.198 | 8 |
| 17 | MP2C | Z | -47.198 | 0 |
| 18 | MP2C | Z | -47.198 | 8 |
| 19 | MP1A | Z | -8.521 | 3.5 |
| 20 | MP1B | Z | -15.417 | 3.5 |
| 21 | MP1C | Z | -15.417 | 3.5 |
| 22 | MP3A | Z | -19.077 | 3.5 |
| 23 | MP3B | Z | -14.084 | 3.5 |
| 24 | MP3C | Z | -14.084 | 3.5 |
| 25 | MP2A | Z | -12.026 | 3.5 |
| 26 | MP2B | Z | -9.74 | 3.5 |
| 27 | MP2C | Z | -9.74 | 3.5 |

## Member Point Loads (BLC 5 : Antenna W Side)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | X | 97.285 | 1 |
| 2 | MP1A | X | 97.285 | 5.5 |
| 3 | MP1B | X | 124.264 | 1 |
| 4 | MP1B | X | 124.264 | 5.5 |
| 5 | MP1C | X | 124.264 | 1 |
| 6 | MP1C | X | 124.264 | 5.5 |

## Member Point Loads (BLC 5 : Antenna W Side) (Continued)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 7 | MP3A | X | 43.545 | 1 |
| 8 | MP3A | X | 43.545 | 5.5 |
| 9 | MP3B | X | 112.365 | 1 |
| 10 | MP3B | X | 112.365 | 5.5 |
| 11 | MP3C | X | 112.365 | 1 |
| 12 | MP3C | X | 112.365 | 5.5 |
| 13 | MP2A | X | 167.631 | 0 |
| 14 | MP2A | X | 167.631 | 8 |
| 15 | MP2B | X | 352.638 | 0 |
| 16 | MP2B | X | 352.638 | 8 |
| 17 | MP2C | X | 352.638 | 0 |
| 18 | MP2C | X | 352.638 | 8 |
| 19 | MP1A | X | 105.057 | 3.5 |
| 20 | MP1B | X | 105.175 | 3.5 |
| 21 | MP1C | X | 105.175 | 3.5 |
| 22 | MP3A | X | 68.291 | 3.5 |
| 23 | MP3B | X | 101.203 | 3.5 |
| 24 | MP3C | X | 101.203 | 3.5 |
| 25 | MP2A | X | 47.592 | 3.5 |
| 26 | MP2B | X | 62.56 | 3.5 |
| 27 | MP2C | X | 62.56 | 3.5 |

## Member Point Loads (BLC 6 : Antenna Wi Side)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | X | 21.182 | 1 |
| 2 | MP1A | X | 21.182 | 5.5 |
| 3 | MP1B | X | 26.458 | 1 |
| 4 | MP1B | X | 26.458 | 5.5 |
| 5 | MP1C | X | 26.458 | 1 |
| 6 | MP1C | X | 26.458 | 5.5 |
| 7 | MP3A | X | 11.151 | 1 |
| 8 | MP3A | X | 11.151 | 5.5 |
| 9 | MP3B | X | 23.999 | 1 |
| 10 | MP3B | X | 23.999 | 5.5 |
| 11 | MP3C | X | 23.999 | 1 |
| 12 | MP3C | X | 23.999 | 5.5 |
| 13 | MP2A | X | 35.832 | 0 |
| 14 | MP2A | X | 35.832 | 8 |
| 15 | MP2B | X | 69.929 | 0 |
| 16 | MP2B | X | 69.929 | 8 |
| 17 | MP2C | X | 69.929 | 0 |
| 18 | MP2C | X | 69.929 | 8 |
| 19 | MP1A | X | 23.621 | 3.5 |
| 20 | MP1B | X | 14.427 | 3.5 |
| 21 | MP1C | X | 14.427 | 3.5 |
| 22 | MP3A | X | 16.56 | 3.5 |
| 23 | MP3B | X | 23.217 | 3.5 |
| 24 | MP3C | X | 23.217 | 3.5 |
| 25 | MP2A | X | 11.97 | 3.5 |
| 26 | MP2B | X | 15.019 | 3.5 |
| 27 | MP2C | X | 15.019 | 3.5 |

## Member Point Loads (BLC 7 : Service Lm1)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M2 | Y | -500 | 0 |

## Member Point Loads (BLC 8 : Service Lm2)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M2 | Y | -500 | %50 |

## Member Point Loads (BLC 15 : Antenna Wm Front)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | Z | -8.613 | 1 |
| 2 | MP1A | Z | -8.613 | 5.5 |
| 3 | MP1B | Z | -6.869 | 1 |
| 4 | MP1B | Z | -6.869 | 5.5 |
| 5 | MP1C | Z | -6.869 | 1 |
| 6 | MP1C | Z | -6.869 | 5.5 |
| 7 | MP3A | Z | -8.746 | 1 |
| 8 | MP3A | Z | -8.746 | 5.5 |
| 9 | MP3B | Z | -4.297 | 1 |
| 10 | MP3B | Z | -4.297 | 5.5 |
| 11 | MP3C | Z | -4.297 | 1 |
| 12 | MP3C | Z | -4.297 | 5.5 |
| 13 | MP2A | Z | -26.779 | 0 |
| 14 | MP2A | Z | -26.779 | 8 |
| 15 | MP2B | Z | -14.821 | 0 |
| 16 | MP2B | Z | -14.821 | 8 |
| 17 | MP2C | Z | -14.821 | 0 |
| 18 | MP2C | Z | -14.821 | 8 |
| 19 | MP1A | Z | -5.101 | 3.5 |
| 20 | MP1B | Z | -5.095 | 3.5 |
| 21 | MP1C | Z | -5.095 | 3.5 |
| 22 | MP3A | Z | -5.438 | 3.5 |
| 23 | MP3B | Z | -3.842 | 3.5 |
| 24 | MP3C | Z | -3.842 | 3.5 |
| 25 | MP2A | Z | -3.275 | 3.5 |
| 26 | MP2B | Z | -2.549 | 3.5 |
| 27 | MP2C | Z | -2.549 | 3.5 |

## Member Point Loads (BLC 16 : Antenna Wm Side)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | MP1A | X | 6.288 | 1 |
| 2 | MP1A | X | 6.288 | 5.5 |
| 3 | MP1B | X | 8.032 | 1 |
| 4 | MP1B | X | 8.032 | 5.5 |
| 5 | MP1C | X | 8.032 | 1 |
| 6 | MP1C | X | 8.032 | 5.5 |
| 7 | MP3A | X | 2.815 | 1 |
| 8 | MP3A | X | 2.815 | 5.5 |
| 9 | MP3B | X | 7.263 | 1 |
| 10 | MP3B | X | 7.263 | 5.5 |
| 11 | MP3C | X | 7.263 | 1 |
| 12 | MP3C | X | 7.263 | 5.5 |
| 13 | MP2A | X | 10.835 | 0 |
| 14 | MP2A | X | 10.835 | 8 |
| 15 | MP2B | X | 22.793 | 0 |
| 16 | MP2B | X | 22.793 | 8 |
| 17 | MP2C | X | 22.793 | 0 |
| 18 | MP2C | X | 22.793 | 8 |
| 19 | MP1A | X | 6.791 | 3.5 |
| 20 | MP1B | X | 6.798 | 3.5 |
| 21 | MP1C | X | 6.798 | 3.5 |
| 22 | MP3A | X | 4.414 | 3.5 |

## Member Point Loads (BLC 16 : Antenna Wm Side) (Continued)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 23 | MP3B | X | 6.541 | 3.5 |
| 24 | MP3C | X | 6.541 | 3.5 |
| 25 | MP2A | X | 3.076 | 3.5 |
| 26 | MP2B | X | 4.044 | 3.5 |
| 27 | MP2C | X | 4.044 | 3.5 |

## Member Point Loads (BLC 19 : Service Lv1)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M19 | Y | -250 | %50 |

## Member Point Loads (BLC 20 : Service Lv2)

| | Member Label | Direction | Magnitude[lb,k-ft] | Location[ft,%] |
|---|---|---|---|---|
| 1 | M23 | Y | -250 | %95 |

## 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 | -9.709 | -9.709 | 0 | %100 |
| 2 | M2 | Y | -9.709 | -9.709 | 0 | %100 |
| 3 | M3 | Y | -14.245 | -14.245 | 0 | %100 |
| 4 | M4 | Y | -14.245 | -14.245 | 0 | %100 |
| 5 | M5 | Y | -5.226 | -5.226 | 0 | %100 |
| 6 | MP3A | Y | -9.709 | -9.709 | 0 | %100 |
| 7 | MP2A | Y | -9.709 | -9.709 | 0 | %100 |
| 8 | MP1A | Y | -9.709 | -9.709 | 0 | %100 |
| 9 | M9 | Y | -12.083 | -12.083 | 0 | %100 |
| 10 | M18 | Y | -8.654 | -8.654 | 0 | %100 |
| 11 | M19 | Y | -9.709 | -9.709 | 0 | %100 |
| 12 | M20 | Y | -9.709 | -9.709 | 0 | %100 |
| 13 | M21 | Y | -5.226 | -5.226 | 0 | %100 |
| 14 | M22 | Y | -8.654 | -8.654 | 0 | %100 |
| 15 | M23 | Y | -9.709 | -9.709 | 0 | %100 |
| 16 | M24 | Y | -9.709 | -9.709 | 0 | %100 |
| 17 | M25 | Y | -14.245 | -14.245 | 0 | %100 |
| 18 | M26 | Y | -14.245 | -14.245 | 0 | %100 |
| 19 | M27 | Y | -9.709 | -9.709 | 0 | %100 |
| 20 | M28 | Y | -9.709 | -9.709 | 0 | %100 |
| 21 | M29 | Y | -14.245 | -14.245 | 0 | %100 |
| 22 | M30 | Y | -14.245 | -14.245 | 0 | %100 |
| 23 | M31 | Y | -5.226 | -5.226 | 0 | %100 |
| 24 | MP3C | Y | -9.709 | -9.709 | 0 | %100 |
| 25 | MP2C | Y | -9.709 | -9.709 | 0 | %100 |
| 26 | MP1C | Y | -9.709 | -9.709 | 0 | %100 |
| 27 | M35 | Y | -12.083 | -12.083 | 0 | %100 |
| 28 | M44 | Y | -8.654 | -8.654 | 0 | %100 |
| 29 | M45 | Y | -9.709 | -9.709 | 0 | %100 |
| 30 | M46 | Y | -9.709 | -9.709 | 0 | %100 |
| 31 | M47 | Y | -5.226 | -5.226 | 0 | %100 |
| 32 | M48 | Y | -8.654 | -8.654 | 0 | %100 |
| 33 | M49 | Y | -9.709 | -9.709 | 0 | %100 |
| 34 | M50 | Y | -9.709 | -9.709 | 0 | %100 |
| 35 | M51 | Y | -14.245 | -14.245 | 0 | %100 |
| 36 | M52 | Y | -14.245 | -14.245 | 0 | %100 |
| 37 | M53 | Y | -9.709 | -9.709 | 0 | %100 |
| 38 | M54 | Y | -9.709 | -9.709 | 0 | %100 |

## Member Distributed Loads (BLC 10 : Structure Di) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 39 | M55 | Y | -14.245 | -14.245 | 0 | %100 |
| 40 | M56 | Y | -14.245 | -14.245 | 0 | %100 |
| 41 | M57 | Y | -5.226 | -5.226 | 0 | %100 |
| 42 | MP3B | Y | -9.709 | -9.709 | 0 | %100 |
| 43 | MP2B | Y | -9.709 | -9.709 | 0 | %100 |
| 44 | MP1B | Y | -9.709 | -9.709 | 0 | %100 |
| 45 | M61 | Y | -12.083 | -12.083 | 0 | %100 |
| 46 | M70 | Y | -8.654 | -8.654 | 0 | %100 |
| 47 | M71 | Y | -9.709 | -9.709 | 0 | %100 |
| 48 | M72 | Y | -9.709 | -9.709 | 0 | %100 |
| 49 | M73 | Y | -5.226 | -5.226 | 0 | %100 |
| 50 | M74 | Y | -8.654 | -8.654 | 0 | %100 |
| 51 | M75 | Y | -9.709 | -9.709 | 0 | %100 |
| 52 | M76 | Y | -9.709 | -9.709 | 0 | %100 |
| 53 | M77 | Y | -14.245 | -14.245 | 0 | %100 |
| 54 | M78 | Y | -14.245 | -14.245 | 0 | %100 |
| 55 | M79 | Y | -8.654 | -8.654 | 0 | %100 |
| 56 | M80 | Y | -8.654 | -8.654 | 0 | %100 |
| 57 | M81 | Y | -8.654 | -8.654 | 0 | %100 |
| 58 | M82 | Y | -8.654 | -8.654 | 0 | %100 |
| 59 | M83 | Y | -8.654 | -8.654 | 0 | %100 |
| 60 | M84 | Y | -8.654 | -8.654 | 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 | -11.77 | -11.77 | 0 | %100 |
| 2 | M2 | PZ | -11.77 | -11.77 | 0 | %100 |
| 3 | M3 | PZ | -20.47 | -20.47 | 0 | %100 |
| 4 | M4 | PZ | -20.47 | -20.47 | 0 | %100 |
| 5 | M5 | PZ | -3.07 | -3.07 | 0 | %100 |
| 6 | MP3A | PZ | -11.77 | -11.77 | 0 | %100 |
| 7 | MP2A | PZ | -11.77 | -11.77 | 0 | %100 |
| 8 | MP1A | PZ | -11.77 | -11.77 | 0 | %100 |
| 9 | M9 | PZ | -11.271 | -11.271 | 0 | %100 |
| 10 | M18 | PZ | -8.406 | -8.406 | 0 | %100 |
| 11 | M19 | PZ | -9.491 | -9.491 | 0 | %100 |
| 12 | M20 | PZ | -9.491 | -9.491 | 0 | %100 |
| 13 | M21 | PZ | -3.07 | -3.07 | 0 | %100 |
| 14 | M22 | PZ | -8.406 | -8.406 | 0 | %100 |
| 15 | M23 | PZ | -9.491 | -9.491 | 0 | %100 |
| 16 | M24 | PZ | -9.491 | -9.491 | 0 | %100 |
| 17 | M25 | PZ | -20.47 | -20.47 | 0 | %100 |
| 18 | M26 | PZ | -20.47 | -20.47 | 0 | %100 |
| 19 | M27 | PZ | -11.77 | -11.77 | 0 | %100 |
| 20 | M28 | PZ | -11.77 | -11.77 | 0 | %100 |
| 21 | M29 | PZ | -20.47 | -20.47 | 0 | %100 |
| 22 | M30 | PZ | -20.47 | -20.47 | 0 | %100 |
| 23 | M31 | PZ | -3.07 | -3.07 | 0 | %100 |
| 24 | MP3C | PZ | -11.77 | -11.77 | 0 | %100 |
| 25 | MP2C | PZ | -11.77 | -11.77 | 0 | %100 |
| 26 | MP1C | PZ | -11.77 | -11.77 | 0 | %100 |
| 27 | M35 | PZ | -11.271 | -11.271 | 0 | %100 |
| 28 | M44 | PZ | -8.406 | -8.406 | 0 | %100 |
| 29 | M45 | PZ | -9.491 | -9.491 | 0 | %100 |
| 30 | M46 | PZ | -9.491 | -9.491 | 0 | %100 |
| 31 | M47 | PZ | -3.07 | -3.07 | 0 | %100 |

## Member Distributed Loads (BLC 11 : Structure W Front) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 32 | M48 | PZ | -8.406 | -8.406 | 0 | %100 |
| 33 | M49 | PZ | -9.491 | -9.491 | 0 | %100 |
| 34 | M50 | PZ | -9.491 | -9.491 | 0 | %100 |
| 35 | M51 | PZ | -20.47 | -20.47 | 0 | %100 |
| 36 | M52 | PZ | -20.47 | -20.47 | 0 | %100 |
| 37 | M53 | PZ | -11.77 | -11.77 | 0 | %100 |
| 38 | M54 | PZ | -11.77 | -11.77 | 0 | %100 |
| 39 | M55 | PZ | -20.47 | -20.47 | 0 | %100 |
| 40 | M56 | PZ | -20.47 | -20.47 | 0 | %100 |
| 41 | M57 | PZ | -3.07 | -3.07 | 0 | %100 |
| 42 | MP3B | PZ | -11.77 | -11.77 | 0 | %100 |
| 43 | MP2B | PZ | -11.77 | -11.77 | 0 | %100 |
| 44 | MP1B | PZ | -11.77 | -11.77 | 0 | %100 |
| 45 | M61 | PZ | -11.271 | -11.271 | 0 | %100 |
| 46 | M70 | PZ | -8.406 | -8.406 | 0 | %100 |
| 47 | M71 | PZ | -9.491 | -9.491 | 0 | %100 |
| 48 | M72 | PZ | -9.491 | -9.491 | 0 | %100 |
| 49 | M73 | PZ | -3.07 | -3.07 | 0 | %100 |
| 50 | M74 | PZ | -8.406 | -8.406 | 0 | %100 |
| 51 | M75 | PZ | -9.491 | -9.491 | 0 | %100 |
| 52 | M76 | PZ | -9.491 | -9.491 | 0 | %100 |
| 53 | M77 | PZ | -20.47 | -20.47 | 0 | %100 |
| 54 | M78 | PZ | -20.47 | -20.47 | 0 | %100 |
| 55 | M79 | PZ | -9.723 | -9.723 | 0 | %100 |
| 56 | M80 | PZ | -9.723 | -9.723 | 0 | %100 |
| 57 | M81 | PZ | -9.723 | -9.723 | 0 | %100 |
| 58 | M82 | PZ | -9.723 | -9.723 | 0 | %100 |
| 59 | M83 | PZ | -9.723 | -9.723 | 0 | %100 |
| 60 | M84 | PZ | -9.723 | -9.723 | 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 | -4.652 | -4.652 | 0 | %100 |
| 2 | M2 | PZ | -4.652 | -4.652 | 0 | %100 |
| 3 | M3 | PZ | -6.214 | -6.214 | 0 | %100 |
| 4 | M4 | PZ | -6.214 | -6.214 | 0 | %100 |
| 5 | M5 | PZ | -3.09 | -3.09 | 0 | %100 |
| 6 | MP3A | PZ | -4.652 | -4.652 | 0 | %100 |
| 7 | MP2A | PZ | -4.652 | -4.652 | 0 | %100 |
| 8 | MP1A | PZ | -4.652 | -4.652 | 0 | %100 |
| 9 | M9 | PZ | -4.16 | -4.16 | 0 | %100 |
| 10 | M18 | PZ | -3.704 | -3.704 | 0 | %100 |
| 11 | M19 | PZ | -3.751 | -3.751 | 0 | %100 |
| 12 | M20 | PZ | -3.751 | -3.751 | 0 | %100 |
| 13 | M21 | PZ | -3.09 | -3.09 | 0 | %100 |
| 14 | M22 | PZ | -3.704 | -3.704 | 0 | %100 |
| 15 | M23 | PZ | -3.751 | -3.751 | 0 | %100 |
| 16 | M24 | PZ | -3.751 | -3.751 | 0 | %100 |
| 17 | M25 | PZ | -6.214 | -6.214 | 0 | %100 |
| 18 | M26 | PZ | -6.214 | -6.214 | 0 | %100 |
| 19 | M27 | PZ | -4.652 | -4.652 | 0 | %100 |
| 20 | M28 | PZ | -4.652 | -4.652 | 0 | %100 |
| 21 | M29 | PZ | -6.214 | -6.214 | 0 | %100 |
| 22 | M30 | PZ | -6.214 | -6.214 | 0 | %100 |
| 23 | M31 | PZ | -3.09 | -3.09 | 0 | %100 |
| 24 | MP3C | PZ | -4.652 | -4.652 | 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,%] |
|---|---|---|---|---|---|---|
| 25 | MP2C | PZ | -4.652 | -4.652 | 0 | %100 |
| 26 | MP1C | PZ | -4.652 | -4.652 | 0 | %100 |
| 27 | M35 | PZ | -4.16 | -4.16 | 0 | %100 |
| 28 | M44 | PZ | -3.704 | -3.704 | 0 | %100 |
| 29 | M45 | PZ | -3.751 | -3.751 | 0 | %100 |
| 30 | M46 | PZ | -3.751 | -3.751 | 0 | %100 |
| 31 | M47 | PZ | -3.09 | -3.09 | 0 | %100 |
| 32 | M48 | PZ | -3.704 | -3.704 | 0 | %100 |
| 33 | M49 | PZ | -3.751 | -3.751 | 0 | %100 |
| 34 | M50 | PZ | -3.751 | -3.751 | 0 | %100 |
| 35 | M51 | PZ | -6.214 | -6.214 | 0 | %100 |
| 36 | M52 | PZ | -6.214 | -6.214 | 0 | %100 |
| 37 | M53 | PZ | -4.652 | -4.652 | 0 | %100 |
| 38 | M54 | PZ | -4.652 | -4.652 | 0 | %100 |
| 39 | M55 | PZ | -6.214 | -6.214 | 0 | %100 |
| 40 | M56 | PZ | -6.214 | -6.214 | 0 | %100 |
| 41 | M57 | PZ | -3.09 | -3.09 | 0 | %100 |
| 42 | MP3B | PZ | -4.652 | -4.652 | 0 | %100 |
| 43 | MP2B | PZ | -4.652 | -4.652 | 0 | %100 |
| 44 | MP1B | PZ | -4.652 | -4.652 | 0 | %100 |
| 45 | M61 | PZ | -4.16 | -4.16 | 0 | %100 |
| 46 | M70 | PZ | -3.704 | -3.704 | 0 | %100 |
| 47 | M71 | PZ | -3.751 | -3.751 | 0 | %100 |
| 48 | M72 | PZ | -3.751 | -3.751 | 0 | %100 |
| 49 | M73 | PZ | -3.09 | -3.09 | 0 | %100 |
| 50 | M74 | PZ | -3.704 | -3.704 | 0 | %100 |
| 51 | M75 | PZ | -3.751 | -3.751 | 0 | %100 |
| 52 | M76 | PZ | -3.751 | -3.751 | 0 | %100 |
| 53 | M77 | PZ | -6.214 | -6.214 | 0 | %100 |
| 54 | M78 | PZ | -6.214 | -6.214 | 0 | %100 |
| 55 | M79 | PZ | -4.284 | -4.284 | 0 | %100 |
| 56 | M80 | PZ | -4.284 | -4.284 | 0 | %100 |
| 57 | M81 | PZ | -4.284 | -4.284 | 0 | %100 |
| 58 | M82 | PZ | -4.284 | -4.284 | 0 | %100 |
| 59 | M83 | PZ | -4.284 | -4.284 | 0 | %100 |
| 60 | M84 | PZ | -4.284 | -4.284 | 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 | 11.77 | 11.77 | 0 | %100 |
| 2 | M2 | PX | 11.77 | 11.77 | 0 | %100 |
| 3 | M3 | PX | 20.47 | 20.47 | 0 | %100 |
| 4 | M4 | PX | 20.47 | 20.47 | 0 | %100 |
| 5 | M5 | PX | 3.07 | 3.07 | 0 | %100 |
| 6 | MP3A | PX | 11.77 | 11.77 | 0 | %100 |
| 7 | MP2A | PX | 11.77 | 11.77 | 0 | %100 |
| 8 | MP1A | PX | 11.77 | 11.77 | 0 | %100 |
| 9 | M9 | PX | 11.271 | 11.271 | 0 | %100 |
| 10 | M18 | PX | 8.406 | 8.406 | 0 | %100 |
| 11 | M19 | PX | 9.491 | 9.491 | 0 | %100 |
| 12 | M20 | PX | 9.491 | 9.491 | 0 | %100 |
| 13 | M21 | PX | 3.07 | 3.07 | 0 | %100 |
| 14 | M22 | PX | 8.406 | 8.406 | 0 | %100 |
| 15 | M23 | PX | 9.491 | 9.491 | 0 | %100 |
| 16 | M24 | PX | 9.491 | 9.491 | 0 | %100 |
| 17 | M25 | PX | 20.47 | 20.47 | 0 | %100 |

## Member Distributed Loads (BLC 13 : Structure W Side) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 18 | M26 | PX | 20.47 | 20.47 | 0 | %100 |
| 19 | M27 | PX | 11.77 | 11.77 | 0 | %100 |
| 20 | M28 | PX | 11.77 | 11.77 | 0 | %100 |
| 21 | M29 | PX | 20.47 | 20.47 | 0 | %100 |
| 22 | M30 | PX | 20.47 | 20.47 | 0 | %100 |
| 23 | M31 | PX | 3.07 | 3.07 | 0 | %100 |
| 24 | MP3C | PX | 11.77 | 11.77 | 0 | %100 |
| 25 | MP2C | PX | 11.77 | 11.77 | 0 | %100 |
| 26 | MP1C | PX | 11.77 | 11.77 | 0 | %100 |
| 27 | M35 | PX | 11.271 | 11.271 | 0 | %100 |
| 28 | M44 | PX | 8.406 | 8.406 | 0 | %100 |
| 29 | M45 | PX | 9.491 | 9.491 | 0 | %100 |
| 30 | M46 | PX | 9.491 | 9.491 | 0 | %100 |
| 31 | M47 | PX | 3.07 | 3.07 | 0 | %100 |
| 32 | M48 | PX | 8.406 | 8.406 | 0 | %100 |
| 33 | M49 | PX | 9.491 | 9.491 | 0 | %100 |
| 34 | M50 | PX | 9.491 | 9.491 | 0 | %100 |
| 35 | M51 | PX | 20.47 | 20.47 | 0 | %100 |
| 36 | M52 | PX | 20.47 | 20.47 | 0 | %100 |
| 37 | M53 | PX | 11.77 | 11.77 | 0 | %100 |
| 38 | M54 | PX | 11.77 | 11.77 | 0 | %100 |
| 39 | M55 | PX | 20.47 | 20.47 | 0 | %100 |
| 40 | M56 | PX | 20.47 | 20.47 | 0 | %100 |
| 41 | M57 | PX | 3.07 | 3.07 | 0 | %100 |
| 42 | MP3B | PX | 11.77 | 11.77 | 0 | %100 |
| 43 | MP2B | PX | 11.77 | 11.77 | 0 | %100 |
| 44 | MP1B | PX | 11.77 | 11.77 | 0 | %100 |
| 45 | M61 | PX | 11.271 | 11.271 | 0 | %100 |
| 46 | M70 | PX | 8.406 | 8.406 | 0 | %100 |
| 47 | M71 | PX | 9.491 | 9.491 | 0 | %100 |
| 48 | M72 | PX | 9.491 | 9.491 | 0 | %100 |
| 49 | M73 | PX | 3.07 | 3.07 | 0 | %100 |
| 50 | M74 | PX | 8.406 | 8.406 | 0 | %100 |
| 51 | M75 | PX | 9.491 | 9.491 | 0 | %100 |
| 52 | M76 | PX | 9.491 | 9.491 | 0 | %100 |
| 53 | M77 | PX | 20.47 | 20.47 | 0 | %100 |
| 54 | M78 | PX | 20.47 | 20.47 | 0 | %100 |
| 55 | M79 | PX | 9.723 | 9.723 | 0 | %100 |
| 56 | M80 | PX | 9.723 | 9.723 | 0 | %100 |
| 57 | M81 | PX | 9.723 | 9.723 | 0 | %100 |
| 58 | M82 | PX | 9.723 | 9.723 | 0 | %100 |
| 59 | M83 | PX | 9.723 | 9.723 | 0 | %100 |
| 60 | M84 | PX | 9.723 | 9.723 | 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 | 4.652 | 4.652 | 0 | %100 |
| 2 | M2 | PX | 4.652 | 4.652 | 0 | %100 |
| 3 | M3 | PX | 6.214 | 6.214 | 0 | %100 |
| 4 | M4 | PX | 6.214 | 6.214 | 0 | %100 |
| 5 | M5 | PX | 3.09 | 3.09 | 0 | %100 |
| 6 | MP3A | PX | 4.652 | 4.652 | 0 | %100 |
| 7 | MP2A | PX | 4.652 | 4.652 | 0 | %100 |
| 8 | MP1A | PX | 4.652 | 4.652 | 0 | %100 |
| 9 | M9 | PX | 4.16 | 4.16 | 0 | %100 |
| 10 | M18 | PX | 3.704 | 3.704 | 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,%] |
|---|---|---|---|---|---|---|
| 11 | M19 | PX | 3.751 | 3.751 | 0 | %100 |
| 12 | M20 | PX | 3.751 | 3.751 | 0 | %100 |
| 13 | M21 | PX | 3.09 | 3.09 | 0 | %100 |
| 14 | M22 | PX | 3.704 | 3.704 | 0 | %100 |
| 15 | M23 | PX | 3.751 | 3.751 | 0 | %100 |
| 16 | M24 | PX | 3.751 | 3.751 | 0 | %100 |
| 17 | M25 | PX | 6.214 | 6.214 | 0 | %100 |
| 18 | M26 | PX | 6.214 | 6.214 | 0 | %100 |
| 19 | M27 | PX | 4.652 | 4.652 | 0 | %100 |
| 20 | M28 | PX | 4.652 | 4.652 | 0 | %100 |
| 21 | M29 | PX | 6.214 | 6.214 | 0 | %100 |
| 22 | M30 | PX | 6.214 | 6.214 | 0 | %100 |
| 23 | M31 | PX | 3.09 | 3.09 | 0 | %100 |
| 24 | MP3C | PX | 4.652 | 4.652 | 0 | %100 |
| 25 | MP2C | PX | 4.652 | 4.652 | 0 | %100 |
| 26 | MP1C | PX | 4.652 | 4.652 | 0 | %100 |
| 27 | M35 | PX | 4.16 | 4.16 | 0 | %100 |
| 28 | M44 | PX | 3.704 | 3.704 | 0 | %100 |
| 29 | M45 | PX | 3.751 | 3.751 | 0 | %100 |
| 30 | M46 | PX | 3.751 | 3.751 | 0 | %100 |
| 31 | M47 | PX | 3.09 | 3.09 | 0 | %100 |
| 32 | M48 | PX | 3.704 | 3.704 | 0 | %100 |
| 33 | M49 | PX | 3.751 | 3.751 | 0 | %100 |
| 34 | M50 | PX | 3.751 | 3.751 | 0 | %100 |
| 35 | M51 | PX | 6.214 | 6.214 | 0 | %100 |
| 36 | M52 | PX | 6.214 | 6.214 | 0 | %100 |
| 37 | M53 | PX | 4.652 | 4.652 | 0 | %100 |
| 38 | M54 | PX | 4.652 | 4.652 | 0 | %100 |
| 39 | M55 | PX | 6.214 | 6.214 | 0 | %100 |
| 40 | M56 | PX | 6.214 | 6.214 | 0 | %100 |
| 41 | M57 | PX | 3.09 | 3.09 | 0 | %100 |
| 42 | MP3B | PX | 4.652 | 4.652 | 0 | %100 |
| 43 | MP2B | PX | 4.652 | 4.652 | 0 | %100 |
| 44 | MP1B | PX | 4.652 | 4.652 | 0 | %100 |
| 45 | M61 | PX | 4.16 | 4.16 | 0 | %100 |
| 46 | M70 | PX | 3.704 | 3.704 | 0 | %100 |
| 47 | M71 | PX | 3.751 | 3.751 | 0 | %100 |
| 48 | M72 | PX | 3.751 | 3.751 | 0 | %100 |
| 49 | M73 | PX | 3.09 | 3.09 | 0 | %100 |
| 50 | M74 | PX | 3.704 | 3.704 | 0 | %100 |
| 51 | M75 | PX | 3.751 | 3.751 | 0 | %100 |
| 52 | M76 | PX | 3.751 | 3.751 | 0 | %100 |
| 53 | M77 | PX | 6.214 | 6.214 | 0 | %100 |
| 54 | M78 | PX | 6.214 | 6.214 | 0 | %100 |
| 55 | M79 | PX | 4.284 | 4.284 | 0 | %100 |
| 56 | M80 | PX | 4.284 | 4.284 | 0 | %100 |
| 57 | M81 | PX | 4.284 | 4.284 | 0 | %100 |
| 58 | M82 | PX | 4.284 | 4.284 | 0 | %100 |
| 59 | M83 | PX | 4.284 | 4.284 | 0 | %100 |
| 60 | M84 | PX | 4.284 | 4.284 | 0 | %100 |

## Member Distributed Loads (BLC 17 : Structure Wm Front)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | PZ | -.761 | -.761 | 0 | %100 |
| 2 | M2 | PZ | -.761 | -.761 | 0 | %100 |
| 3 | M3 | PZ | -1.323 | -1.323 | 0 | %100 |

## Member Distributed Loads (BLC 17 : Structure Wm Front) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 4 | M4 | PZ | -1.323 | -1.323 | 0 | %100 |
| 5 | M5 | PZ | -.198 | -.198 | 0 | %100 |
| 6 | MP3A | PZ | -.761 | -.761 | 0 | %100 |
| 7 | MP2A | PZ | -.761 | -.761 | 0 | %100 |
| 8 | MP1A | PZ | -.761 | -.761 | 0 | %100 |
| 9 | M9 | PZ | -.729 | -.729 | 0 | %100 |
| 10 | M18 | PZ | -.543 | -.543 | 0 | %100 |
| 11 | M19 | PZ | -.613 | -.613 | 0 | %100 |
| 12 | M20 | PZ | -.613 | -.613 | 0 | %100 |
| 13 | M21 | PZ | -.198 | -.198 | 0 | %100 |
| 14 | M22 | PZ | -.543 | -.543 | 0 | %100 |
| 15 | M23 | PZ | -.613 | -.613 | 0 | %100 |
| 16 | M24 | PZ | -.613 | -.613 | 0 | %100 |
| 17 | M25 | PZ | -1.323 | -1.323 | 0 | %100 |
| 18 | M26 | PZ | -1.323 | -1.323 | 0 | %100 |
| 19 | M27 | PZ | -.761 | -.761 | 0 | %100 |
| 20 | M28 | PZ | -.761 | -.761 | 0 | %100 |
| 21 | M29 | PZ | -1.323 | -1.323 | 0 | %100 |
| 22 | M30 | PZ | -1.323 | -1.323 | 0 | %100 |
| 23 | M31 | PZ | -.198 | -.198 | 0 | %100 |
| 24 | MP3C | PZ | -.761 | -.761 | 0 | %100 |
| 25 | MP2C | PZ | -.761 | -.761 | 0 | %100 |
| 26 | MP1C | PZ | -.761 | -.761 | 0 | %100 |
| 27 | M35 | PZ | -.729 | -.729 | 0 | %100 |
| 28 | M44 | PZ | -.543 | -.543 | 0 | %100 |
| 29 | M45 | PZ | -.613 | -.613 | 0 | %100 |
| 30 | M46 | PZ | -.613 | -.613 | 0 | %100 |
| 31 | M47 | PZ | -.198 | -.198 | 0 | %100 |
| 32 | M48 | PZ | -.543 | -.543 | 0 | %100 |
| 33 | M49 | PZ | -.613 | -.613 | 0 | %100 |
| 34 | M50 | PZ | -.613 | -.613 | 0 | %100 |
| 35 | M51 | PZ | -1.323 | -1.323 | 0 | %100 |
| 36 | M52 | PZ | -1.323 | -1.323 | 0 | %100 |
| 37 | M53 | PZ | -.761 | -.761 | 0 | %100 |
| 38 | M54 | PZ | -.761 | -.761 | 0 | %100 |
| 39 | M55 | PZ | -1.323 | -1.323 | 0 | %100 |
| 40 | M56 | PZ | -1.323 | -1.323 | 0 | %100 |
| 41 | M57 | PZ | -.198 | -.198 | 0 | %100 |
| 42 | MP3B | PZ | -.761 | -.761 | 0 | %100 |
| 43 | MP2B | PZ | -.761 | -.761 | 0 | %100 |
| 44 | MP1B | PZ | -.761 | -.761 | 0 | %100 |
| 45 | M61 | PZ | -.729 | -.729 | 0 | %100 |
| 46 | M70 | PZ | -.543 | -.543 | 0 | %100 |
| 47 | M71 | PZ | -.613 | -.613 | 0 | %100 |
| 48 | M72 | PZ | -.613 | -.613 | 0 | %100 |
| 49 | M73 | PZ | -.198 | -.198 | 0 | %100 |
| 50 | M74 | PZ | -.543 | -.543 | 0 | %100 |
| 51 | M75 | PZ | -.613 | -.613 | 0 | %100 |
| 52 | M76 | PZ | -.613 | -.613 | 0 | %100 |
| 53 | M77 | PZ | -1.323 | -1.323 | 0 | %100 |
| 54 | M78 | PZ | -1.323 | -1.323 | 0 | %100 |
| 55 | M79 | PZ | -.628 | -.628 | 0 | %100 |
| 56 | M80 | PZ | -.628 | -.628 | 0 | %100 |
| 57 | M81 | PZ | -.628 | -.628 | 0 | %100 |
| 58 | M82 | PZ | -.628 | -.628 | 0 | %100 |
| 59 | M83 | PZ | -.628 | -.628 | 0 | %100 |
| 60 | M84 | PZ | -.628 | -.628 | 0 | %100 |

## Member Distributed Loads (BLC 18 : Structure Wm Side)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 1 | M1 | PX | .761 | .761 | 0 | %100 |
| 2 | M2 | PX | .761 | .761 | 0 | %100 |
| 3 | M3 | PX | 1.323 | 1.323 | 0 | %100 |
| 4 | M4 | PX | 1.323 | 1.323 | 0 | %100 |
| 5 | M5 | PX | .198 | .198 | 0 | %100 |
| 6 | MP3A | PX | .761 | .761 | 0 | %100 |
| 7 | MP2A | PX | .761 | .761 | 0 | %100 |
| 8 | MP1A | PX | .761 | .761 | 0 | %100 |
| 9 | M9 | PX | .729 | .729 | 0 | %100 |
| 10 | M18 | PX | .543 | .543 | 0 | %100 |
| 11 | M19 | PX | .613 | .613 | 0 | %100 |
| 12 | M20 | PX | .613 | .613 | 0 | %100 |
| 13 | M21 | PX | .198 | .198 | 0 | %100 |
| 14 | M22 | PX | .543 | .543 | 0 | %100 |
| 15 | M23 | PX | .613 | .613 | 0 | %100 |
| 16 | M24 | PX | .613 | .613 | 0 | %100 |
| 17 | M25 | PX | 1.323 | 1.323 | 0 | %100 |
| 18 | M26 | PX | 1.323 | 1.323 | 0 | %100 |
| 19 | M27 | PX | .761 | .761 | 0 | %100 |
| 20 | M28 | PX | .761 | .761 | 0 | %100 |
| 21 | M29 | PX | 1.323 | 1.323 | 0 | %100 |
| 22 | M30 | PX | 1.323 | 1.323 | 0 | %100 |
| 23 | M31 | PX | .198 | .198 | 0 | %100 |
| 24 | MP3C | PX | .761 | .761 | 0 | %100 |
| 25 | MP2C | PX | .761 | .761 | 0 | %100 |
| 26 | MP1C | PX | .761 | .761 | 0 | %100 |
| 27 | M35 | PX | .729 | .729 | 0 | %100 |
| 28 | M44 | PX | .543 | .543 | 0 | %100 |
| 29 | M45 | PX | .613 | .613 | 0 | %100 |
| 30 | M46 | PX | .613 | .613 | 0 | %100 |
| 31 | M47 | PX | .198 | .198 | 0 | %100 |
| 32 | M48 | PX | .543 | .543 | 0 | %100 |
| 33 | M49 | PX | .613 | .613 | 0 | %100 |
| 34 | M50 | PX | .613 | .613 | 0 | %100 |
| 35 | M51 | PX | 1.323 | 1.323 | 0 | %100 |
| 36 | M52 | PX | 1.323 | 1.323 | 0 | %100 |
| 37 | M53 | PX | .761 | .761 | 0 | %100 |
| 38 | M54 | PX | .761 | .761 | 0 | %100 |
| 39 | M55 | PX | 1.323 | 1.323 | 0 | %100 |
| 40 | M56 | PX | 1.323 | 1.323 | 0 | %100 |
| 41 | M57 | PX | .198 | .198 | 0 | %100 |
| 42 | MP3B | PX | .761 | .761 | 0 | %100 |
| 43 | MP2B | PX | .761 | .761 | 0 | %100 |
| 44 | MP1B | PX | .761 | .761 | 0 | %100 |
| 45 | M61 | PX | .729 | .729 | 0 | %100 |
| 46 | M70 | PX | .543 | .543 | 0 | %100 |
| 47 | M71 | PX | .613 | .613 | 0 | %100 |
| 48 | M72 | PX | .613 | .613 | 0 | %100 |
| 49 | M73 | PX | .198 | .198 | 0 | %100 |
| 50 | M74 | PX | .543 | .543 | 0 | %100 |
| 51 | M75 | PX | .613 | .613 | 0 | %100 |
| 52 | M76 | PX | .613 | .613 | 0 | %100 |
| 53 | M77 | PX | 1.323 | 1.323 | 0 | %100 |
| 54 | M78 | PX | 1.323 | 1.323 | 0 | %100 |
| 55 | M79 | PX | .628 | .628 | 0 | %100 |
| 56 | M80 | PX | .628 | .628 | 0 | %100 |
| 57 | M81 | PX | .628 | .628 | 0 | %100 |

## Member Distributed Loads (BLC 18 : Structure Wm Side) (Continued)

| | Member Label | Direction | Start Magnitude[lb/ft,... | End Magnitude[lb/ft,... | Start Location[ft,%] | End Location[ft,%] |
|---|---|---|---|---|---|---|
| 58 | M82 | PX | .628 | .628 | 0 | %100 |
| 59 | M83 | PX | .628 | .628 | 0 | %100 |
| 60 | M84 | PX | .628 | .628 | 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 | N25 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 2 | N27 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 3 | N71 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 4 | N73 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 5 | N117 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |
| 6 | N119 | Reaction | Reaction | Reaction | Reaction | Reaction | Reaction |

## 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 | N25 | max | 972.227 | 9 | 2757.324 | 8 | 566.169 | 1 | -.74 | 1 | .377 | 9 | 1.508 | 3 |
| 2 | | min | -951.269 | 1 | 629.676 | 3 | -2595.84 | 6 | -3.89 | 6 | -.531 | 1 | -1.265 | 4 |
| 3 | N27 | max | 542.825 | 4 | 296.892 | 5 | 3082.079 | 5 | .032 | 2 | .26 | 1 | 1.198 | 4 |
| 4 | | min | -989.119 | 9 | 2.381 | 2 | -172.64 | 2 | -2.518 | 5 | -.384 | 9 | -.98 | 3 |
| 5 | N71 | max | 1387.708 | 4 | 2782.02 | 6 | 1499.898 | 8 | 2.225 | 5 | .679 | 3 | 3.379 | 7 |
| 6 | | min | -2588.39 | 3 | 538.528 | 1 | -138.166 | 3 | -.273 | 2 | -.83 | 4 | .008 | 4 |
| 7 | N73 | max | 2495.31 | 8 | 301.113 | 8 | 32.507 | 1 | 1.47 | 6 | .294 | 2 | 2.152 | 8 |
| 8 | | min | -535.4 | 3 | -4.342 | 3 | -1788.514 | 6 | -.417 | 1 | -.139 | 1 | -.456 | 3 |
| 9 | N117 | max | 2259.604 | 8 | 2777.791 | 7 | 1579.674 | 1 | 2.02 | 5 | .346 | 1 | -.591 | 3 |
| 10 | | min | -72.372 | 3 | 563.647 | 4 | -1162.815 | 2 | -.851 | 2 | -.538 | 2 | -3.447 | 8 |
| 11 | N119 | max | 140.813 | 4 | 290.181 | 7 | 535.627 | 1 | 1.463 | 2 | .509 | 3 | .001 | 4 |
| 12 | | min | -2793.254 | 7 | 30.758 | 4 | -1211.276 | 6 | -.858 | 1 | -.318 | 4 | -2.219 | 7 |
| 13 | Totals: | max | 5922.142 | 4 | 8751.845 | 8 | 5811.73 | 1 | | | | | | |
| 14 | | min | -5922.141 | 3 | 3300.38 | 3 | -5811.732 | 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 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 |
| 2 | | | min | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 3 | | 2 | max | 518.442 | 2 | 285.201 | 8 | 248.998 | 1 | .193 | 1 | .23 | 2 | .282 | 8 |
| 4 | | | min | -550.766 | 1 | -67.032 | 3 | -262.93 | 2 | -.182 | 2 | -.215 | 1 | -.065 | 3 |
| 5 | | 3 | max | 518.442 | 2 | 242.457 | 8 | 233.397 | 2 | .201 | 2 | .398 | 1 | -.009 | 2 |
| 6 | | | min | -555.904 | 1 | -269.035 | 10 | -217.517 | 1 | -.083 | 4 | -.429 | 2 | -.455 | 10 |
| 7 | | 4 | max | 510.423 | 2 | 33.907 | 4 | 264.293 | 2 | .201 | 2 | .224 | 2 | .306 | 7 |
| 8 | | | min | -555.904 | 1 | -297.622 | 7 | -248.413 | 1 | -.177 | 1 | -.222 | 1 | -.021 | 4 |
| 9 | | 5 | max | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 |
| 10 | | | min | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 11 | M2 | 1 | max | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 |
| 12 | | | min | 0 | 1 | -750 | 9 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 13 | | 2 | max | 463.324 | 2 | 268.437 | 10 | 290.199 | 1 | .249 | 2 | .251 | 2 | .264 | 6 |
| 14 | | | min | -543.681 | 1 | -3.267 | 1 | -294.715 | 2 | -.235 | 1 | -.242 | 1 | -.025 | 1 |
| 15 | | 3 | max | 471.343 | 2 | 153.242 | 2 | 35.986 | 9 | .249 | 2 | .487 | 1 | .007 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | | | min | -543.681 | 1 | -262.098 | 10 | -275.834 | 1 | -.076 | 9 | -.482 | 2 | -.443 | 10 |
| 17 | | 4 | max | 471.343 | 2 | -5.642 | 1 | 277.626 | 2 | .235 | 1 | .215 | 2 | .297 | 6 |
| 18 | | | min | -538.544 | 1 | -280.977 | 6 | -306.731 | 1 | -.247 | 2 | -.278 | 1 | -.008 | 1 |
| 19 | | 5 | max | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 | 0 | 13 |
| 20 | | | min | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 |
| 21 | M3 | 1 | max | 545.225 | 3 | 27.447 | 3 | 9.408 | 3 | .165 | 8 | .176 | 8 | 0 | 13 |
| 22 | | | min | -1749.426 | 8 | -78.669 | 9 | -1263.264 | 9 | .011 | 3 | .011 | 3 | 0 | 1 |
| 23 | | 2 | max | 544.076 | 3 | 26.222 | 3 | 10.556 | 3 | .165 | 8 | .036 | 5 | .009 | 9 |
| 24 | | | min | -1749.078 | 8 | -78.6 | 9 | -1262.116 | 9 | .011 | 3 | .009 | 2 | -.003 | 3 |
| 25 | | 3 | max | 542.927 | 3 | 24.997 | 3 | 11.705 | 3 | .165 | 8 | .014 | 3 | .018 | 9 |
| 26 | | | min | -1748.729 | 8 | -78.53 | 9 | -1260.968 | 9 | .011 | 3 | -.121 | 9 | -.006 | 3 |
| 27 | | 4 | max | 541.778 | 3 | 23.772 | 3 | 12.853 | 3 | .165 | 8 | .015 | 3 | .027 | 9 |
| 28 | | | min | -1748.38 | 8 | -78.46 | 9 | -1259.819 | 9 | .011 | 3 | -.263 | 9 | -.009 | 3 |
| 29 | | 5 | max | 540.629 | 3 | 22.546 | 3 | 14.002 | 3 | .165 | 8 | .017 | 3 | .035 | 9 |
| 30 | | | min | -1748.031 | 8 | -78.391 | 9 | -1258.671 | 9 | .011 | 3 | -.405 | 9 | -.011 | 3 |
| 31 | M4 | 1 | max | 2158.115 | 9 | 91.385 | 9 | -.399 | 4 | .03 | 11 | .032 | 11 | 0 | 13 |
| 32 | | | min | -247.766 | 4 | .034 | 1 | -159.572 | 11 | 0 | 9 | 0 | 9 | 0 | 1 |
| 33 | | 2 | max | 2158.041 | 9 | 91.455 | 9 | .749 | 4 | .03 | 11 | .018 | 8 | 0 | 1 |
| 34 | | | min | -246.617 | 4 | 1.112 | 1 | -158.423 | 11 | 0 | 9 | -.004 | 9 | -.01 | 9 |
| 35 | | 3 | max | 2157.967 | 9 | 91.524 | 9 | 1.898 | 4 | .03 | 11 | .01 | 4 | 0 | 1 |
| 36 | | | min | -245.468 | 4 | 2.19 | 1 | -157.275 | 11 | 0 | 9 | -.009 | 9 | -.021 | 9 |
| 37 | | 4 | max | 2157.892 | 9 | 91.594 | 9 | 3.046 | 4 | .03 | 11 | .01 | 4 | 0 | 1 |
| 38 | | | min | -244.319 | 4 | 3.267 | 1 | -156.126 | 11 | 0 | 9 | -.021 | 11 | -.031 | 9 |
| 39 | | 5 | max | 2157.818 | 9 | 91.664 | 9 | 4.195 | 4 | .03 | 11 | .011 | 4 | 0 | 1 |
| 40 | | | min | -243.17 | 4 | 4.345 | 1 | -154.978 | 11 | 0 | 9 | -.039 | 11 | -.041 | 9 |
| 41 | M5 | 1 | max | 7.722 | 3 | 14.142 | 7 | 4.445 | 2 | .001 | 1 | .006 | 5 | .008 | 7 |
| 42 | | | min | -2209.145 | 9 | -1.59 | 4 | -4.991 | 5 | 0 | 2 | -.003 | 2 | -.004 | 4 |
| 43 | | 2 | max | 7.463 | 3 | 6.619 | 7 | 2.287 | 2 | .001 | 1 | .002 | 9 | 0 | 3 |
| 44 | | | min | -2207.894 | 9 | -1.774 | 4 | -2.82 | 5 | 0 | 2 | 0 | 3 | -.004 | 5 |
| 45 | | 3 | max | 7.203 | 3 | 1.019 | 3 | .13 | 2 | .001 | 1 | .003 | 6 | 0 | 4 |
| 46 | | | min | -2206.642 | 9 | -1.958 | 4 | -1.552 | 9 | 0 | 2 | -.001 | 1 | -.007 | 7 |
| 47 | | 4 | max | 6.944 | 3 | -.052 | 2 | 1.926 | 4 | .001 | 1 | 0 | 2 | .002 | 4 |
| 48 | | | min | -2205.391 | 9 | -8.979 | 5 | -2.702 | 6 | 0 | 2 | -.002 | 9 | -.002 | 3 |
| 49 | | 5 | max | 6.685 | 3 | -.264 | 2 | 3.983 | 4 | .001 | 1 | .004 | 4 | .014 | 5 |
| 50 | | | min | -2204.139 | 9 | -16.474 | 5 | -4.873 | 6 | 0 | 2 | -.004 | 3 | 0 | 2 |
| 51 | MP3A | 1 | max | 0 | 9 | .037 | 9 | .02 | 1 | 0 | 3 | 0 | 9 | 0 | 13 |
| 52 | | | min | 0 | 1 | -.029 | 3 | -.074 | 7 | 0 | 9 | 0 | 1 | 0 | 1 |
| 53 | | 2 | max | 125.244 | 8 | 67.112 | 4 | 158.865 | 1 | 0 | 3 | .159 | 1 | .067 | 3 |
| 54 | | | min | 37.568 | 3 | -67.114 | 3 | -158.878 | 2 | 0 | 9 | -.159 | 2 | -.067 | 4 |
| 55 | | 3 | max | 186.129 | 3 | 22.261 | 10 | 57.4 | 4 | .038 | 9 | .11 | 4 | .18 | 9 |
| 56 | | | min | -613.404 | 9 | -356.354 | 9 | -43.517 | 3 | -.02 | 2 | -.095 | 3 | -.038 | 4 |
| 57 | | 4 | max | -13.148 | 9 | 23.549 | 3 | 23.533 | 2 | 0 | 9 | .023 | 1 | .024 | 3 |
| 58 | | | min | -32.567 | 7 | -23.546 | 4 | -23.515 | 1 | 0 | 3 | -.024 | 2 | -.024 | 4 |
| 59 | | 5 | max | 0 | 13 | .009 | 3 | .082 | 5 | 0 | 9 | 0 | 13 | 0 | 13 |
| 60 | | | min | 0 | 1 | -.064 | 9 | -.018 | 9 | 0 | 3 | 0 | 1 | 0 | 1 |
| 61 | MP2A | 1 | max | 283.3 | 7 | 167.815 | 4 | 414.838 | 1 | 0 | 7 | 0 | 1 | 0 | 13 |
| 62 | | | min | 76.8 | 10 | -167.836 | 3 | -414.877 | 2 | 0 | 4 | 0 | 2 | 0 | 1 |
| 63 | | 2 | max | 315.867 | 7 | 191.356 | 4 | 438.378 | 1 | 0 | 7 | .853 | 1 | .359 | 3 |
| 64 | | | min | 89.948 | 10 | -191.376 | 3 | -438.417 | 2 | 0 | 4 | -.853 | 2 | -.359 | 4 |
| 65 | | 3 | max | 215.34 | 2 | 128.344 | 4 | 75.304 | 1 | .056 | 9 | .604 | 1 | .098 | 3 |
| 66 | | | min | -339.242 | 10 | -141.299 | 3 | -47.854 | 2 | -.055 | 3 | -.578 | 2 | -.095 | 4 |
| 67 | | 4 | max | -89.948 | 2 | 191.013 | 3 | 437.119 | 2 | 0 | 3 | .851 | 1 | .358 | 3 |
| 68 | | | min | -315.867 | 5 | -190.991 | 4 | -437.058 | 1 | 0 | 8 | -.851 | 2 | -.358 | 4 |
| 69 | | 5 | max | -76.8 | 2 | 167.473 | 3 | 413.579 | 2 | 0 | 3 | 0 | 1 | 0 | 13 |
| 70 | | | min | -283.3 | 5 | -167.451 | 4 | -413.518 | 1 | 0 | 8 | 0 | 2 | 0 | 1 |
| 71 | MP1A | 1 | max | 0 | 9 | .051 | 4 | .07 | 3 | 0 | 7 | 0 | 13 | 0 | 13 |
| 72 | | | min | 0 | 7 | -.102 | 7 | -.106 | 8 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 73 | | 2 | max | 202.933 | 8 | 120.876 | 4 | 156.853 | 1 | 0 | 7 | .157 | 1 | .121 | 3 |
| 74 | | | min | 92.468 | 12 | -120.906 | 3 | -156.868 | 2 | 0 | 4 | -.157 | 2 | -.121 | 4 |
| 75 | | 3 | max | 175.403 | 4 | 105.396 | 3 | 223.668 | 3 | .11 | 4 | .231 | 3 | .093 | 4 |
| 76 | | | min | -139.366 | 3 | -39.708 | 4 | -228.418 | 4 | -.091 | 3 | -.239 | 4 | -.086 | 3 |
| 77 | | 4 | max | -13.148 | 3 | 23.594 | 3 | 23.513 | 2 | 0 | 9 | .023 | 1 | .024 | 3 |
| 78 | | | min | -32.567 | 5 | -23.572 | 4 | -23.492 | 1 | 0 | 7 | -.023 | 2 | -.024 | 4 |
| 79 | | 5 | max | 0 | 13 | .065 | 7 | .093 | 5 | 0 | 9 | 0 | 13 | 0 | 13 |
| 80 | | | min | 0 | 1 | -.052 | 9 | -.027 | 2 | 0 | 7 | 0 | 1 | 0 | 1 |
| 81 | M9 | 1 | max | 0 | 13 | .002 | 9 | 0 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 82 | | | min | 0 | 1 | -.002 | 3 | -.008 | 6 | 0 | 1 | 0 | 1 | 0 | 1 |
| 83 | | 2 | max | 2619.369 | 8 | 1140.831 | 4 | 335.881 | 1 | .241 | 3 | -.03 | 1 | .85 | 3 |
| 84 | | | min | 725.349 | 3 | -1427.507 | 3 | -2563.849 | 6 | -.19 | 9 | -1.758 | 6 | -.706 | 9 |
| 85 | | 3 | max | 96.996 | 4 | 596.467 | 2 | 42.043 | 4 | .002 | 2 | .021 | 2 | .144 | 3 |
| 86 | | | min | -89.094 | 3 | -705.22 | 1 | -33.304 | 3 | -.002 | 1 | -.021 | 1 | -.147 | 4 |
| 87 | | 4 | max | -18.658 | 1 | 1047.129 | 9 | 127.436 | 2 | .211 | 4 | 1.593 | 5 | .527 | 9 |
| 88 | | | min | -197.278 | 11 | -1245.406 | 4 | -3058.008 | 5 | -.193 | 9 | -.031 | 2 | -.628 | 4 |
| 89 | | 5 | max | 0 | 13 | .001 | 8 | .007 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |
| 90 | | | min | 0 | 1 | -.001 | 9 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 91 | M10 | 1 | max | 566.169 | 1 | 2757.324 | 8 | 951.269 | 1 | 1.508 | 3 | .377 | 9 | 3.89 | 6 |
| 92 | | | min | -2595.84 | 6 | 629.676 | 3 | -972.227 | 9 | -1.265 | 4 | -.531 | 1 | .74 | 1 |
| 93 | | 2 | max | 566.169 | 1 | 2757.324 | 8 | 951.269 | 1 | 1.508 | 3 | .275 | 2 | 3.514 | 6 |
| 94 | | | min | -2595.84 | 6 | 629.676 | 3 | -972.227 | 9 | -1.265 | 4 | -.392 | 1 | .555 | 1 |
| 95 | | 3 | max | 566.169 | 1 | 2757.324 | 8 | 951.269 | 1 | 1.508 | 3 | .193 | 2 | 3.139 | 6 |
| 96 | | | min | -2595.84 | 6 | 629.676 | 3 | -972.227 | 9 | -1.265 | 4 | -.254 | 1 | .371 | 1 |
| 97 | | 4 | max | 566.169 | 1 | 2757.324 | 8 | 951.269 | 1 | 1.508 | 3 | .171 | 3 | 2.764 | 6 |
| 98 | | | min | -2595.84 | 6 | 629.676 | 3 | -972.227 | 9 | -1.265 | 4 | -.176 | 4 | .187 | 1 |
| 99 | | 5 | max | 566.169 | 1 | 2757.324 | 8 | 951.269 | 1 | 1.508 | 3 | .245 | 3 | 2.389 | 6 |
| 100 | | | min | -2595.84 | 6 | 629.676 | 3 | -972.227 | 9 | -1.265 | 4 | -.192 | 4 | .003 | 1 |
| 101 | M11 | 1 | max | 3082.079 | 5 | 296.892 | 5 | 989.119 | 9 | 1.198 | 4 | .26 | 1 | 2.518 | 5 |
| 102 | | | min | -172.64 | 2 | 2.381 | 2 | -542.825 | 4 | -.98 | 3 | -.384 | 9 | -.032 | 2 |
| 103 | | 2 | max | 3082.079 | 5 | 296.892 | 5 | 989.119 | 9 | 1.198 | 4 | .188 | 1 | 2.474 | 5 |
| 104 | | | min | -172.64 | 2 | 2.381 | 2 | -542.825 | 4 | -.98 | 3 | -.24 | 9 | -.033 | 2 |
| 105 | | 3 | max | 3082.079 | 5 | 296.892 | 5 | 989.119 | 9 | 1.198 | 4 | .117 | 1 | 2.431 | 5 |
| 106 | | | min | -172.64 | 2 | 2.381 | 2 | -542.825 | 4 | -.98 | 3 | -.096 | 9 | -.033 | 2 |
| 107 | | 4 | max | 3082.079 | 5 | 296.892 | 5 | 989.119 | 9 | 1.198 | 4 | .138 | 3 | 2.388 | 5 |
| 108 | | | min | -172.64 | 2 | 2.381 | 2 | -542.825 | 4 | -.98 | 3 | -.135 | 4 | -.033 | 2 |
| 109 | | 5 | max | 3082.079 | 5 | 296.892 | 5 | 989.119 | 9 | 1.198 | 4 | .193 | 9 | 2.344 | 5 |
| 110 | | | min | -172.64 | 2 | 2.381 | 2 | -542.825 | 4 | -.98 | 3 | -.214 | 4 | -.034 | 2 |
| 111 | M12 | 1 | max | 30.025 | 1 | -362.832 | 4 | 91.339 | 1 | -.077 | 4 | 0 | 13 | 0 | 13 |
| 112 | | | min | -1400.44 | 7 | -1425.051 | 7 | -1394.948 | 6 | -.266 | 7 | 0 | 1 | 0 | 1 |
| 113 | | 2 | max | 30.025 | 1 | -362.832 | 4 | 91.339 | 1 | -.077 | 4 | .009 | 1 | .133 | 7 |
| 114 | | | min | -1400.44 | 7 | -1425.051 | 7 | -1394.948 | 6 | -.266 | 7 | -.13 | 6 | .034 | 4 |
| 115 | | 3 | max | 171.639 | 1 | 1276.476 | 9 | 1225.866 | 8 | .223 | 9 | .043 | 1 | .266 | 7 |
| 116 | | | min | -1400.44 | 7 | -1425.051 | 7 | -1394.948 | 6 | -.266 | 7 | -.26 | 6 | .097 | 2 |
| 117 | | 4 | max | 392.071 | 3 | 1276.476 | 9 | 1225.866 | 8 | .241 | 8 | .035 | 3 | .119 | 9 |
| 118 | | | min | -1250.222 | 8 | -9.436 | 3 | -379.885 | 3 | .016 | 3 | -.114 | 8 | 0 | 3 |
| 119 | | 5 | max | 392.071 | 3 | 1276.476 | 9 | 1225.866 | 8 | .241 | 8 | 0 | 11 | 0 | 13 |
| 120 | | | min | -1250.222 | 8 | -9.436 | 3 | -379.885 | 3 | .016 | 3 | 0 | 6 | 0 | 4 |
| 121 | M13 | 1 | max | 1677.794 | 8 | -3.08 | 1 | 1636.703 | 5 | -.001 | 3 | 0 | 13 | 0 | 13 |
| 122 | | | min | 102.825 | 2 | -76.386 | 6 | 12.938 | 2 | -.035 | 8 | 0 | 1 | 0 | 1 |
| 123 | | 2 | max | 1677.794 | 8 | -3.08 | 1 | 1636.703 | 5 | -.001 | 3 | .153 | 5 | .007 | 6 |
| 124 | | | min | 102.825 | 2 | -76.386 | 6 | 12.938 | 2 | -.035 | 8 | .001 | 2 | 0 | 1 |
| 125 | | 3 | max | 1677.794 | 8 | 157.628 | 11 | 1636.703 | 5 | .044 | 11 | .305 | 5 | .029 | 11 |
| 126 | | | min | 102.825 | 2 | -76.386 | 6 | -1511.873 | 9 | -.022 | 4 | -.024 | 2 | .001 | 1 |
| 127 | | 4 | max | 1543.06 | 9 | 157.628 | 11 | 187.728 | 4 | .044 | 11 | .141 | 9 | .015 | 11 |
| 128 | | | min | -161.983 | 4 | .64 | 4 | -1511.873 | 9 | 0 | 9 | -.017 | 4 | 0 | 4 |
| 129 | | 5 | max | 1543.06 | 9 | 157.628 | 11 | 187.728 | 4 | .044 | 11 | 0 | 9 | 0 | 13 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 130 | | | min | -161.983 | 4 | .64 | 4 | -1511.873 | 9 | 0 | 9 | 0 | 3 | 0 | 1 |
| 131 | M14 | 1 | max | 522.237 | 1 | 915.437 | 9 | 527.227 | 1 | .19 | 10 | .139 | 2 | .254 | 9 |
| 132 | | | min | -548.808 | 2 | -121.326 | 3 | -542.606 | 2 | -.163 | 9 | -.119 | 1 | -.151 | 3 |
| 133 | | 2 | max | 522.237 | 1 | 915.437 | 9 | 527.227 | 1 | .19 | 10 | .105 | 2 | .216 | 4 |
| 134 | | | min | -548.808 | 2 | -121.326 | 3 | -542.606 | 2 | -.163 | 9 | -.086 | 1 | -.144 | 3 |
| 135 | | 3 | max | 522.237 | 1 | 915.437 | 9 | 527.227 | 1 | .19 | 10 | .071 | 2 | .189 | 2 |
| 136 | | | min | -548.808 | 2 | -121.326 | 3 | -542.606 | 2 | -.163 | 9 | -.053 | 1 | -.14 | 1 |
| 137 | | 4 | max | 522.237 | 1 | 915.437 | 9 | 527.227 | 1 | .19 | 10 | .037 | 2 | .188 | 2 |
| 138 | | | min | -548.808 | 2 | -121.326 | 3 | -542.606 | 2 | -.163 | 9 | -.02 | 1 | -.164 | 1 |
| 139 | | 5 | max | 522.237 | 1 | 915.437 | 9 | 527.227 | 1 | .19 | 10 | .024 | 5 | .188 | 2 |
| 140 | | | min | -548.808 | 2 | -121.326 | 3 | -542.606 | 2 | -.163 | 9 | -.004 | 10 | -.187 | 1 |
| 141 | M15 | 1 | max | 528.913 | 1 | 557.01 | 7 | 567.962 | 1 | .211 | 10 | .177 | 2 | .32 | 3 |
| 142 | | | min | -518.185 | 2 | -30.26 | 4 | -438.212 | 2 | -.119 | 3 | -.196 | 1 | -.26 | 4 |
| 143 | | 2 | max | 528.913 | 1 | 557.01 | 7 | 567.962 | 1 | .211 | 10 | .15 | 2 | .296 | 3 |
| 144 | | | min | -518.185 | 2 | -30.26 | 4 | -438.212 | 2 | -.119 | 3 | -.16 | 1 | -.258 | 4 |
| 145 | | 3 | max | 528.913 | 1 | 557.01 | 7 | 567.962 | 1 | .211 | 10 | .123 | 2 | .272 | 3 |
| 146 | | | min | -518.185 | 2 | -30.26 | 4 | -438.212 | 2 | -.119 | 3 | -.125 | 1 | -.256 | 4 |
| 147 | | 4 | max | 528.913 | 1 | 557.01 | 7 | 567.962 | 1 | .211 | 10 | .095 | 2 | .248 | 3 |
| 148 | | | min | -518.185 | 2 | -30.26 | 4 | -438.212 | 2 | -.119 | 3 | -.089 | 1 | -.254 | 4 |
| 149 | | 5 | max | 528.913 | 1 | 557.01 | 7 | 567.962 | 1 | .211 | 10 | .068 | 2 | .224 | 3 |
| 150 | | | min | -518.185 | 2 | -30.26 | 4 | -438.212 | 2 | -.119 | 3 | -.054 | 1 | -.252 | 4 |
| 151 | M16 | 1 | max | 529.173 | 1 | 706.953 | 7 | 540.351 | 2 | .056 | 2 | .133 | 3 | .257 | 6 |
| 152 | | | min | -539.205 | 2 | -33.407 | 4 | -521.418 | 1 | -.173 | 10 | -.178 | 4 | -.049 | 1 |
| 153 | | 2 | max | 529.173 | 1 | 706.953 | 7 | 540.351 | 2 | .056 | 2 | .154 | 3 | .229 | 2 |
| 154 | | | min | -539.205 | 2 | -33.407 | 4 | -521.418 | 1 | -.173 | 10 | -.196 | 4 | -.076 | 1 |
| 155 | | 3 | max | 529.173 | 1 | 706.953 | 7 | 540.351 | 2 | .056 | 2 | .174 | 3 | .224 | 2 |
| 156 | | | min | -539.205 | 2 | -33.407 | 4 | -521.418 | 1 | -.173 | 10 | -.215 | 4 | -.103 | 1 |
| 157 | | 4 | max | 529.173 | 1 | 706.953 | 7 | 540.351 | 2 | .056 | 2 | .194 | 3 | .22 | 2 |
| 158 | | | min | -539.205 | 2 | -33.407 | 4 | -521.418 | 1 | -.173 | 10 | -.234 | 4 | -.13 | 1 |
| 159 | | 5 | max | 529.173 | 1 | 706.953 | 7 | 540.351 | 2 | .056 | 2 | .214 | 3 | .215 | 2 |
| 160 | | | min | -539.205 | 2 | -33.407 | 4 | -521.418 | 1 | -.173 | 10 | -.252 | 4 | -.158 | 1 |
| 161 | M17 | 1 | max | 624.21 | 4 | 642.114 | 6 | 463.683 | 3 | .041 | 9 | .254 | 3 | .151 | 1 |
| 162 | | | min | -436.31 | 3 | 58.96 | 1 | -691.713 | 4 | -.215 | 10 | -.293 | 4 | -.12 | 2 |
| 163 | | 2 | max | 624.21 | 4 | 642.114 | 6 | 463.683 | 3 | .041 | 9 | .283 | 3 | .147 | 1 |
| 164 | | | min | -436.31 | 3 | 58.96 | 1 | -691.713 | 4 | -.215 | 10 | -.336 | 4 | -.146 | 2 |
| 165 | | 3 | max | 624.21 | 4 | 642.114 | 6 | 463.683 | 3 | .041 | 9 | .312 | 3 | .143 | 1 |
| 166 | | | min | -436.31 | 3 | 58.96 | 1 | -691.713 | 4 | -.215 | 10 | -.38 | 4 | -.172 | 2 |
| 167 | | 4 | max | 624.21 | 4 | 642.114 | 6 | 463.683 | 3 | .041 | 9 | .341 | 3 | .14 | 1 |
| 168 | | | min | -436.31 | 3 | 58.96 | 1 | -691.713 | 4 | -.215 | 10 | -.423 | 4 | -.199 | 2 |
| 169 | | 5 | max | 624.21 | 4 | 642.114 | 6 | 463.683 | 3 | .041 | 9 | .37 | 3 | .136 | 1 |
| 170 | | | min | -436.31 | 3 | 58.96 | 1 | -691.713 | 4 | -.215 | 10 | -.466 | 4 | -.225 | 2 |
| 171 | M18 | 1 | max | 0 | 13 | 0 | 9 | 0 | 4 | 0 | 13 | 0 | 13 | 0 | 13 |
| 172 | | | min | 0 | 1 | -.001 | 7 | -.002 | 7 | 0 | 1 | 0 | 1 | 0 | 1 |
| 173 | | 2 | max | 1113.244 | 9 | 88.591 | 3 | 276.827 | 4 | .025 | 9 | .065 | 1 | .07 | 10 |
| 174 | | | min | -80.935 | 3 | -64.379 | 4 | -294.208 | 3 | -.016 | 3 | -.059 | 2 | -.059 | 9 |
| 175 | | 3 | max | 1116.888 | 9 | 84.653 | 10 | 276.827 | 4 | .025 | 9 | .202 | 4 | .05 | 4 |
| 176 | | | min | -77.291 | 3 | -57.024 | 4 | -294.208 | 3 | -.016 | 3 | -.212 | 3 | -.054 | 3 |
| 177 | | 4 | max | 1075.536 | 9 | 456.423 | 4 | 1141.492 | 3 | .02 | 9 | .283 | 4 | .058 | 9 |
| 178 | | | min | -365.074 | 3 | -505.367 | 3 | -961.012 | 4 | -.01 | 3 | -.28 | 3 | -.075 | 10 |
| 179 | | 5 | max | 0 | 13 | .001 | 7 | .002 | 8 | 0 | 13 | 0 | 13 | 0 | 13 |
| 180 | | | min | 0 | 1 | 0 | 9 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 181 | M19 | 1 | max | 2159.721 | 9 | 153.584 | 11 | 50.892 | 2 | .028 | 11 | .041 | 9 | .01 | 4 |
| 182 | | | min | -242.131 | 4 | -4.286 | 4 | -63.398 | 1 | 0 | 9 | 0 | 1 | -.04 | 11 |
| 183 | | 2 | max | 2159.454 | 9 | 147.856 | 11 | 46.617 | 2 | .028 | 11 | .064 | 2 | .017 | 4 |
| 184 | | | min | -237.999 | 4 | -10.013 | 4 | -59.122 | 1 | 0 | 9 | -.052 | 1 | -.171 | 11 |
| 185 | | 3 | max | 2159.187 | 9 | 50.203 | 7 | 42.342 | 2 | .028 | 11 | .102 | 2 | .028 | 4 |
| 186 | | | min | -233.867 | 4 | -232.871 | 11 | -54.847 | 1 | 0 | 9 | -.102 | 1 | -.298 | 11 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 187 | | 4 | max | 2158.92 | 9 | 37.729 | 3 | 39.487 | 4 | .028 | 11 | .137 | 2 | .044 | 4 |
| 188 | | | min | -229.735 | 4 | -238.599 | 11 | -52.096 | 3 | 0 | 9 | -.148 | 1 | -.164 | 7 |
| 189 | | 5 | max | 2158.653 | 9 | 32.002 | 3 | 43.48 | 4 | .028 | 11 | .169 | 2 | .118 | 11 |
| 190 | | | min | -225.603 | 4 | -244.326 | 11 | -56.089 | 3 | 0 | 9 | -.19 | 1 | -.19 | 7 |
| 191 | M20 | 1 | max | 779.399 | 1 | -5.658 | 1 | 51.287 | 2 | .141 | 8 | .013 | 3 | .01 | 3 |
| 192 | | | min | -778.999 | 2 | -171.306 | 9 | -38.942 | 1 | .014 | 3 | -.038 | 9 | -.41 | 9 |
| 193 | | 2 | max | 775.267 | 1 | -11.386 | 1 | 47.011 | 2 | .141 | 8 | .042 | 2 | .024 | 3 |
| 194 | | | min | -774.867 | 2 | -177.034 | 9 | -34.667 | 1 | .014 | 3 | -.049 | 1 | -.3 | 8 |
| 195 | | 3 | max | 771.135 | 1 | -17.113 | 1 | 42.736 | 2 | .141 | 8 | .081 | 2 | .044 | 3 |
| 196 | | | min | -770.735 | 2 | -182.761 | 9 | -30.392 | 1 | .014 | 3 | -.078 | 1 | -.189 | 8 |
| 197 | | 4 | max | 767.003 | 1 | -22.84 | 1 | 38.461 | 2 | .141 | 8 | .117 | 2 | .069 | 2 |
| 198 | | | min | -766.603 | 2 | -188.489 | 9 | -26.116 | 1 | .014 | 3 | -.102 | 1 | -.098 | 4 |
| 199 | | 5 | max | 762.871 | 1 | -28.568 | 1 | 35.788 | 4 | .141 | 8 | .148 | 2 | .227 | 9 |
| 200 | | | min | -762.47 | 2 | -194.216 | 9 | -23.871 | 3 | .014 | 3 | -.123 | 1 | -.075 | 1 |
| 201 | M21 | 1 | max | -596.381 | 4 | 13.329 | 8 | 5.199 | 3 | 0 | 4 | .003 | 2 | .006 | 8 |
| 202 | | | min | -2357.29 | 7 | -.729 | 3 | -4.575 | 4 | -.002 | 3 | -.006 | 5 | -.003 | 3 |
| 203 | | 2 | max | -596.64 | 4 | 5.807 | 8 | 3.142 | 3 | 0 | 4 | 0 | 3 | 0 | 2 |
| 204 | | | min | -2350.394 | 7 | -.913 | 3 | -2.518 | 4 | -.002 | 3 | -.002 | 8 | -.005 | 5 |
| 205 | | 3 | max | -596.899 | 4 | -.111 | 2 | 1.086 | 3 | 0 | 4 | .002 | 3 | 0 | 3 |
| 206 | | | min | -2343.498 | 7 | -1.943 | 5 | -.461 | 4 | -.002 | 3 | -.003 | 8 | -.007 | 8 |
| 207 | | 4 | max | -597.158 | 4 | -.323 | 2 | 2.792 | 6 | 0 | 4 | .002 | 3 | 0 | 1 |
| 208 | | | min | -2336.602 | 7 | -9.437 | 5 | -1.519 | 1 | -.002 | 3 | -.002 | 4 | 0 | 8 |
| 209 | | 5 | max | -597.418 | 4 | -.535 | 2 | 4.963 | 6 | 0 | 4 | .004 | 6 | .015 | 5 |
| 210 | | | min | -2329.706 | 7 | -16.932 | 5 | -3.676 | 1 | -.002 | 3 | -.003 | 5 | 0 | 2 |
| 211 | M22 | 1 | max | 0 | 13 | 0 | 9 | 0 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 212 | | | min | 0 | 1 | 0 | 7 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | 1 |
| 213 | | 2 | max | 905.38 | 7 | 35.852 | 9 | 50.782 | 7 | .034 | 4 | .059 | 1 | .03 | 9 |
| 214 | | | min | 28.087 | 4 | -69.814 | 10 | -8.642 | 9 | -.035 | 3 | -.066 | 2 | -.062 | 10 |
| 215 | | 3 | max | 916.597 | 7 | 35.852 | 9 | 50.782 | 7 | .034 | 4 | .072 | 1 | .008 | 1 |
| 216 | | | min | 31.731 | 4 | -69.814 | 10 | -8.166 | 9 | -.035 | 3 | -.047 | 2 | -.01 | 2 |
| 217 | | 4 | max | 927.814 | 7 | 35.852 | 9 | 50.782 | 7 | .034 | 4 | .091 | 1 | .06 | 10 |
| 218 | | | min | 35.376 | 4 | -69.814 | 10 | -7.691 | 9 | -.035 | 3 | -.035 | 2 | -.033 | 9 |
| 219 | | 5 | max | 0 | 13 | 0 | 7 | .002 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |
| 220 | | | min | 0 | 1 | 0 | 9 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 221 | M23 | 1 | max | 2337.343 | 5 | 68.596 | 6 | 63.663 | 3 | 0 | 3 | .024 | 3 | .004 | 1 |
| 222 | | | min | 87.306 | 2 | -.319 | 1 | -64.519 | 4 | -.024 | 8 | -.062 | 4 | -.012 | 2 |
| 223 | | 2 | max | 2335.71 | 5 | 54.41 | 6 | 59.669 | 3 | 0 | 3 | .078 | 3 | .007 | 1 |
| 224 | | | min | 91.438 | 2 | -6.047 | 1 | -60.525 | 4 | -.024 | 8 | -.117 | 4 | -.064 | 6 |
| 225 | | 3 | max | 2334.076 | 5 | 40.224 | 6 | 55.676 | 3 | 0 | 3 | .128 | 3 | .015 | 1 |
| 226 | | | min | 95.57 | 2 | -11.774 | 1 | -56.532 | 4 | -.024 | 8 | -.168 | 4 | -.105 | 6 |
| 227 | | 4 | max | 2332.443 | 5 | 32.797 | 10 | 51.682 | 3 | 0 | 3 | .175 | 3 | .027 | 1 |
| 228 | | | min | 99.702 | 2 | -17.502 | 1 | -52.539 | 4 | -.024 | 8 | -.215 | 4 | -.134 | 6 |
| 229 | | 5 | max | 2330.81 | 5 | 27.069 | 10 | 47.689 | 3 | 0 | 3 | .218 | 3 | .045 | 1 |
| 230 | | | min | 103.834 | 2 | -357.795 | 12 | -48.545 | 4 | -.024 | 8 | -.259 | 4 | -.151 | 6 |
| 231 | M24 | 1 | max | 753.55 | 1 | -22.892 | 1 | 40.772 | 3 | -.048 | 9 | .054 | 3 | -.112 | 9 |
| 232 | | | min | -799.721 | 2 | -132.189 | 6 | -59.946 | 4 | -.155 | 7 | -.03 | 4 | -.447 | 7 |
| 233 | | 2 | max | 749.418 | 1 | -28.62 | 1 | 36.778 | 3 | -.048 | 9 | .088 | 3 | -.079 | 4 |
| 234 | | | min | -795.589 | 2 | -146.375 | 6 | -55.953 | 4 | -.155 | 7 | -.081 | 4 | -.327 | 7 |
| 235 | | 3 | max | 745.286 | 1 | -34.347 | 1 | 32.785 | 3 | -.048 | 9 | .118 | 3 | -.014 | 2 |
| 236 | | | min | -791.457 | 2 | -160.561 | 6 | -51.959 | 4 | -.155 | 7 | -.128 | 4 | -.199 | 5 |
| 237 | | 4 | max | 741.154 | 1 | -40.075 | 1 | 28.791 | 3 | -.048 | 9 | .145 | 3 | .068 | 2 |
| 238 | | | min | -787.325 | 2 | -174.747 | 6 | -47.966 | 4 | -.155 | 7 | -.172 | 4 | -.096 | 1 |
| 239 | | 5 | max | 737.022 | 1 | -45.802 | 1 | 24.798 | 3 | -.048 | 9 | .168 | 3 | .156 | 2 |
| 240 | | | min | -783.193 | 2 | -188.934 | 6 | -43.972 | 4 | -.155 | 7 | -.212 | 4 | -.059 | 1 |
| 241 | M25 | 1 | max | 87.163 | 1 | 116.05 | 3 | -362.739 | 4 | -.053 | 4 | .194 | 7 | 0 | 13 |
| 242 | | | min | -1963.212 | 6 | -66.688 | 4 | -1407.837 | 7 | -.182 | 7 | .056 | 4 | 0 | 1 |
| 243 | | 2 | max | 86.014 | 1 | 114.824 | 3 | -361.591 | 4 | -.053 | 4 | .038 | 5 | .007 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 244 | | | min | -1962.863 | 6 | -65.463 | 4 | -1405.086 | 7 | -.182 | 7 | .011 | 2 | -.013 | 3 |
| 245 | | 3 | max | 84.865 | 1 | 113.599 | 3 | -360.442 | 4 | -.053 | 4 | -.025 | 9 | .015 | 4 |
| 246 | | | min | -1962.514 | 6 | -64.238 | 4 | -1402.335 | 7 | -.182 | 7 | -.122 | 7 | -.026 | 3 |
| 247 | | 4 | max | 83.716 | 1 | 112.374 | 3 | -359.294 | 4 | -.053 | 4 | -.066 | 4 | .022 | 4 |
| 248 | | | min | -1962.165 | 6 | -63.013 | 4 | -1399.584 | 7 | -.182 | 7 | -.28 | 7 | -.039 | 3 |
| 249 | | 5 | max | 82.567 | 1 | 111.149 | 3 | -358.145 | 4 | -.053 | 4 | -.106 | 4 | .029 | 4 |
| 250 | | | min | -1961.816 | 6 | -61.788 | 4 | -1396.833 | 7 | -.182 | 7 | -.437 | 7 | -.051 | 3 |
| 251 | M26 | 1 | max | 2336.63 | 5 | 55.816 | 3 | -4.028 | 1 | 0 | 3 | .025 | 8 | 0 | 13 |
| 252 | | | min | 79.776 | 2 | -140.544 | 4 | -80.597 | 6 | -.024 | 8 | 0 | 3 | 0 | 1 |
| 253 | | 2 | max | 2336.281 | 5 | 54.591 | 3 | -2.88 | 1 | 0 | 3 | .017 | 8 | .016 | 4 |
| 254 | | | min | 80.925 | 2 | -139.318 | 4 | -77.846 | 6 | -.024 | 8 | -.002 | 3 | -.006 | 3 |
| 255 | | 3 | max | 2335.932 | 5 | 53.366 | 3 | -1.731 | 1 | 0 | 3 | .009 | 4 | .031 | 4 |
| 256 | | | min | 82.074 | 2 | -138.093 | 4 | -75.095 | 6 | -.024 | 8 | -.005 | 3 | -.012 | 3 |
| 257 | | 4 | max | 2335.584 | 5 | 52.141 | 3 | -.583 | 1 | 0 | 3 | .006 | 4 | .047 | 4 |
| 258 | | | min | 83.223 | 2 | -136.868 | 4 | -72.344 | 6 | -.024 | 8 | -.008 | 3 | -.018 | 3 |
| 259 | | 5 | max | 2335.235 | 5 | 50.916 | 3 | .566 | 1 | 0 | 3 | .004 | 1 | .062 | 4 |
| 260 | | | min | 84.372 | 2 | -135.643 | 4 | -69.593 | 6 | -.024 | 8 | -.011 | 2 | -.024 | 3 |
| 261 | M27 | 1 | max | 0 | 13 | .003 | 1 | .006 | 2 | 0 | 13 | 0 | 13 | 0 | 13 |
| 262 | | | min | 0 | 1 | 0 | 9 | 0 | 9 | 0 | 1 | 0 | 1 | 0 | 1 |
| 263 | | 2 | max | 512.551 | 3 | 294.111 | 6 | 247.752 | 4 | .222 | 4 | .219 | 3 | .288 | 6 |
| 264 | | | min | -579.525 | 4 | -71.259 | 1 | -251.805 | 3 | -.203 | 3 | -.214 | 4 | -.061 | 1 |
| 265 | | 3 | max | 499.172 | 3 | 251.367 | 6 | 96.891 | 1 | .222 | 4 | .406 | 4 | -.122 | 12 |
| 266 | | | min | -566.146 | 4 | -241.852 | 8 | -228.633 | 3 | -.203 | 3 | -.411 | 3 | -.428 | 6 |
| 267 | | 4 | max | 354.237 | 3 | 55.79 | 3 | 165.092 | 3 | .143 | 1 | .175 | 1 | .296 | 8 |
| 268 | | | min | -437.139 | 4 | -284.596 | 8 | -161.795 | 4 | -.13 | 2 | -.186 | 2 | -.044 | 3 |
| 269 | | 5 | max | 0 | 13 | 0 | 7 | 0 | 2 | 0 | 13 | 0 | 13 | 0 | 13 |
| 270 | | | min | 0 | 1 | -.003 | 1 | 0 | 4 | 0 | 1 | 0 | 1 | 0 | 1 |
| 271 | M28 | 1 | max | 0 | 13 | .002 | 4 | .006 | 2 | 0 | 13 | 0 | 13 | 0 | 13 |
| 272 | | | min | 0 | 1 | 0 | 9 | 0 | 9 | 0 | 1 | 0 | 1 | 0 | 1 |
| 273 | | 2 | max | 674.375 | 3 | 268.929 | 5 | 223.207 | 4 | .234 | 3 | .169 | 3 | .27 | 7 |
| 274 | | | min | -717.838 | 4 | 27.009 | 2 | -238.142 | 3 | -.211 | 4 | -.151 | 4 | .031 | 4 |
| 275 | | 3 | max | 660.996 | 3 | 226.185 | 5 | 200.034 | 4 | .234 | 3 | .405 | 4 | -.122 | 11 |
| 276 | | | min | -704.46 | 4 | -221.101 | 7 | -214.969 | 3 | -.211 | 4 | -.426 | 3 | -.399 | 5 |
| 277 | | 4 | max | 348.177 | 3 | -27.461 | 4 | 187.321 | 3 | .184 | 4 | .179 | 1 | .279 | 5 |
| 278 | | | min | -375.712 | 4 | -263.845 | 7 | -203.269 | 4 | -.206 | 3 | -.231 | 2 | .058 | 2 |
| 279 | | 5 | max | 0 | 13 | 0 | 7 | .003 | 2 | 0 | 13 | 0 | 13 | 0 | 13 |
| 280 | | | min | 0 | 1 | -.003 | 1 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | 1 |
| 281 | M29 | 1 | max | 993.029 | 4 | 38.774 | 1 | 6.136 | 1 | .168 | 6 | .179 | 6 | 0 | 13 |
| 282 | | | min | -1964.613 | 3 | -77.33 | 6 | -1282.522 | 6 | .01 | 1 | .011 | 1 | 0 | 1 |
| 283 | | 2 | max | 992.518 | 4 | 36.591 | 1 | 7.284 | 1 | .168 | 6 | .035 | 8 | .009 | 6 |
| 284 | | | min | -1964.103 | 3 | -76.667 | 6 | -1279.771 | 6 | .01 | 1 | .01 | 3 | -.004 | 1 |
| 285 | | 3 | max | 992.007 | 4 | 34.407 | 1 | 8.433 | 1 | .168 | 6 | .012 | 1 | .017 | 6 |
| 286 | | | min | -1963.592 | 3 | -76.004 | 6 | -1277.02 | 6 | .01 | 1 | -.109 | 6 | -.008 | 1 |
| 287 | | 4 | max | 991.497 | 4 | 32.224 | 1 | 9.581 | 1 | .168 | 6 | .013 | 1 | .026 | 6 |
| 288 | | | min | -1963.081 | 3 | -75.341 | 6 | -1274.269 | 6 | .01 | 1 | -.252 | 6 | -.012 | 1 |
| 289 | | 5 | max | 990.986 | 4 | 30.041 | 1 | 10.73 | 1 | .168 | 6 | .014 | 1 | .034 | 6 |
| 290 | | | min | -1962.571 | 3 | -74.678 | 6 | -1271.518 | 6 | .01 | 1 | -.396 | 6 | -.015 | 1 |
| 291 | M30 | 1 | max | 2128.73 | 8 | 81.356 | 5 | 11.14 | 2 | .024 | 7 | .026 | 7 | 0 | 13 |
| 292 | | | min | -698.9 | 3 | -2.153 | 2 | -96.039 | 5 | .007 | 4 | .008 | 4 | 0 | 1 |
| 293 | | 2 | max | 2128.575 | 8 | 80.693 | 5 | 12.288 | 2 | .024 | 7 | .017 | 7 | 0 | 2 |
| 294 | | | min | -698.389 | 3 | .03 | 2 | -93.288 | 5 | .007 | 4 | .002 | 1 | -.009 | 5 |
| 295 | | 3 | max | 2128.42 | 8 | 80.03 | 5 | 13.436 | 2 | .024 | 7 | .011 | 2 | 0 | 2 |
| 296 | | | min | -697.878 | 3 | 2.214 | 2 | -90.537 | 5 | .007 | 4 | -.006 | 1 | -.018 | 5 |
| 297 | | 4 | max | 2128.265 | 8 | 79.367 | 5 | 14.585 | 2 | .024 | 7 | .012 | 2 | 0 | 2 |
| 298 | | | min | -697.368 | 3 | 4.397 | 2 | -87.786 | 5 | .007 | 4 | -.014 | 1 | -.027 | 5 |
| 299 | | 5 | max | 2128.11 | 8 | 78.704 | 5 | 15.733 | 2 | .024 | 7 | .014 | 2 | 0 | 2 |
| 300 | | | min | -696.857 | 3 | 6.58 | 2 | -85.035 | 5 | .007 | 4 | -.021 | 1 | -.036 | 5 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | M31 | 1 | max | -20.097 | 1 | 14.164 | 8 | 6.442 | 1 | .002 | 2 | .008 | 6 | .008 | 8 |
| 302 | | | min | -2113.994 | 6 | -1.135 | 3 | -7.284 | 6 | 0 | 1 | -.005 | 1 | -.004 | 2 |
| 303 | | 2 | max | -19.463 | 1 | 6.513 | 8 | 3.123 | 1 | .002 | 2 | .002 | 5 | 0 | 1 |
| 304 | | | min | -2107.996 | 6 | -1.302 | 2 | -3.944 | 6 | 0 | 1 | 0 | 4 | -.004 | 6 |
| 305 | | 3 | max | -18.83 | 1 | 1.295 | 1 | .066 | 3 | .002 | 2 | .003 | 5 | 0 | 3 |
| 306 | | | min | -2101.998 | 6 | -2.254 | 2 | -.694 | 8 | 0 | 1 | -.002 | 2 | -.007 | 8 |
| 307 | | 4 | max | -18.196 | 1 | -.898 | 1 | 3.085 | 2 | .002 | 2 | .001 | 3 | .002 | 2 |
| 308 | | | min | -2096 | 6 | -8.789 | 8 | -3.995 | 5 | 0 | 1 | 0 | 4 | -.003 | 1 |
| 309 | | 5 | max | -17.563 | 1 | -1.359 | 3 | 6.403 | 2 | .002 | 2 | .006 | 2 | .013 | 8 |
| 310 | | | min | -2090.003 | 6 | -16.441 | 8 | -7.334 | 5 | 0 | 1 | -.006 | 5 | 0 | 1 |
| 311 | MP3C | 1 | max | 0 | 6 | .012 | 2 | .051 | 5 | 0 | 5 | 0 | 8 | 0 | 13 |
| 312 | | | min | 0 | 1 | -.051 | 5 | -.039 | 2 | 0 | 2 | 0 | 1 | 0 | 1 |
| 313 | | 2 | max | 125.244 | 6 | 135.91 | 4 | 90.07 | 1 | 0 | 5 | .09 | 1 | .136 | 3 |
| 314 | | | min | 37.568 | 1 | -135.919 | 3 | -90.064 | 2 | 0 | 2 | -.09 | 2 | -.136 | 4 |
| 315 | | 3 | max | 139.418 | 1 | 53.763 | 2 | 76.885 | 5 | .01 | 4 | .113 | 1 | .1 | 1 |
| 316 | | | min | -82.928 | 2 | -28.337 | 1 | -21.908 | 2 | -.018 | 3 | -.108 | 2 | -.118 | 2 |
| 317 | | 4 | max | -13.148 | 2 | 23.539 | 3 | 23.54 | 2 | 0 | 1 | .024 | 1 | .024 | 3 |
| 318 | | | min | -32.567 | 5 | -23.527 | 4 | -23.549 | 1 | 0 | 6 | -.024 | 2 | -.024 | 4 |
| 319 | | 5 | max | 0 | 13 | .062 | 6 | .012 | 3 | 0 | 1 | 0 | 13 | 0 | 13 |
| 320 | | | min | 0 | 1 | -.003 | 1 | -.036 | 8 | 0 | 6 | 0 | 1 | 0 | 1 |
| 321 | MP2C | 1 | max | 283.3 | 5 | 353.069 | 4 | 229.597 | 1 | 0 | 3 | 0 | 1 | 0 | 13 |
| 322 | | | min | 76.8 | 2 | -353.08 | 3 | -229.573 | 2 | 0 | 4 | 0 | 2 | 0 | 1 |
| 323 | | 2 | max | 315.867 | 5 | 376.609 | 4 | 253.137 | 1 | 0 | 3 | .483 | 1 | .73 | 3 |
| 324 | | | min | 89.948 | 2 | -376.62 | 3 | -253.113 | 2 | 0 | 4 | -.483 | 2 | -.73 | 4 |
| 325 | | 3 | max | 84.803 | 3 | 88.737 | 4 | 135.149 | 1 | .044 | 2 | .209 | 1 | .398 | 3 |
| 326 | | | min | -.179 | 4 | -76.713 | 3 | -124.64 | 2 | -.057 | 1 | -.217 | 2 | -.418 | 4 |
| 327 | | 4 | max | -89.948 | 2 | 375.619 | 3 | 252.521 | 2 | 0 | 3 | .482 | 1 | .728 | 3 |
| 328 | | | min | -315.867 | 5 | -375.589 | 4 | -252.557 | 1 | 0 | 4 | -.482 | 2 | -.728 | 4 |
| 329 | | 5 | max | -76.8 | 2 | 352.079 | 3 | 228.981 | 2 | 0 | 3 | 0 | 1 | 0 | 13 |
| 330 | | | min | -283.3 | 5 | -352.049 | 4 | -229.017 | 1 | 0 | 4 | 0 | 2 | 0 | 1 |
| 331 | MP1C | 1 | max | 0 | 3 | .127 | 4 | .081 | 5 | 0 | 3 | 0 | 13 | 0 | 13 |
| 332 | | | min | 0 | 5 | -.123 | 3 | -.008 | 2 | 0 | 4 | 0 | 1 | 0 | 1 |
| 333 | | 2 | max | 202.933 | 6 | 147.932 | 4 | 129.854 | 1 | 0 | 3 | .13 | 1 | .148 | 3 |
| 334 | | | min | 92.468 | 4 | -147.928 | 3 | -129.826 | 2 | 0 | 4 | -.13 | 2 | -.148 | 4 |
| 335 | | 3 | max | 155.388 | 3 | 107.689 | 4 | 155.411 | 2 | .099 | 3 | .197 | 3 | .203 | 3 |
| 336 | | | min | -118.935 | 4 | -162.889 | 2 | -184.888 | 1 | -.079 | 4 | -.183 | 4 | -.197 | 4 |
| 337 | | 4 | max | -13.148 | 4 | 23.54 | 3 | 23.554 | 2 | 0 | 1 | .024 | 1 | .024 | 3 |
| 338 | | | min | -32.567 | 7 | -23.535 | 4 | -23.579 | 1 | 0 | 6 | -.024 | 2 | -.024 | 4 |
| 339 | | 5 | max | 0 | 13 | .064 | 6 | .029 | 3 | 0 | 1 | 0 | 13 | 0 | 13 |
| 340 | | | min | 0 | 1 | -.042 | 1 | -.081 | 8 | 0 | 6 | 0 | 1 | 0 | 1 |
| 341 | M35 | 1 | max | 0 | 13 | 0 | 4 | .005 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |
| 342 | | | min | 0 | 1 | -.007 | 7 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 343 | | 2 | max | 2621.925 | 6 | 925.69 | 4 | 1652.182 | 1 | .235 | 1 | 1.06 | 5 | 1.509 | 7 |
| 344 | | | min | 702.566 | 1 | -2200.247 | 3 | -639.301 | 2 | -.19 | 2 | -.282 | 2 | -.379 | 4 |
| 345 | | 3 | max | 104.156 | 2 | 325.752 | 4 | 500.858 | 4 | .001 | 1 | .101 | 1 | .072 | 2 |
| 346 | | | min | -97.085 | 1 | -267.602 | 3 | -408.512 | 3 | -.002 | 2 | -.104 | 2 | -.071 | 1 |
| 347 | | 4 | max | -23.817 | 2 | 646.039 | 3 | 1775.526 | 6 | .205 | 2 | .187 | 1 | .292 | 3 |
| 348 | | | min | -187.622 | 5 | -2583.534 | 8 | -376.713 | 1 | -.161 | 1 | -.923 | 6 | -1.347 | 8 |
| 349 | | 5 | max | 0 | 13 | .006 | 8 | 0 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 350 | | | min | 0 | 1 | 0 | 3 | -.004 | 6 | 0 | 1 | 0 | 1 | 0 | 1 |
| 351 | M36 | 1 | max | 591.143 | 4 | 2782.02 | 6 | 1751.526 | 4 | 1.482 | 1 | .679 | 3 | 3.864 | 7 |
| 352 | | | min | -2474.432 | 7 | 538.528 | 1 | -1413.851 | 3 | -1.279 | 2 | -.83 | 4 | .489 | 4 |
| 353 | | 2 | max | 591.143 | 4 | 2782.02 | 6 | 1751.526 | 4 | 1.482 | 1 | .473 | 3 | 3.479 | 7 |
| 354 | | | min | -2474.432 | 7 | 538.528 | 1 | -1413.851 | 3 | -1.279 | 2 | -.575 | 4 | .341 | 4 |
| 355 | | 3 | max | 591.143 | 4 | 2782.02 | 6 | 1751.526 | 4 | 1.482 | 1 | .266 | 3 | 3.094 | 7 |
| 356 | | | min | -2474.432 | 7 | 538.528 | 1 | -1413.851 | 3 | -1.279 | 2 | -.319 | 4 | .194 | 4 |
| 357 | | 4 | max | 591.143 | 4 | 2782.02 | 6 | 1751.526 | 4 | 1.482 | 1 | .184 | 1 | 2.71 | 7 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 358 | | | min | -2474.432 | 7 | 538.528 | 1 | -1413.851 | 3 | -1.279 | 2 | -.19 | 2 | .046 | 4 |
| 359 | | 5 | max | 591.143 | 4 | 2782.02 | 6 | 1751.526 | 4 | 1.482 | 1 | .238 | 1 | 2.325 | 7 |
| 360 | | | min | -2474.432 | 7 | 538.528 | 1 | -1413.851 | 3 | -1.279 | 2 | -.195 | 2 | -.102 | 4 |
| 361 | M37 | 1 | max | 2968.098 | 8 | 301.113 | 8 | 516.676 | 1 | 1.09 | 2 | .294 | 2 | 2.444 | 8 |
| 362 | | | min | -209.655 | 3 | -4.342 | 3 | -860.617 | 2 | -.906 | 1 | -.139 | 1 | -.073 | 3 |
| 363 | | 2 | max | 2968.098 | 8 | 301.113 | 8 | 516.676 | 1 | 1.09 | 2 | .169 | 2 | 2.401 | 8 |
| 364 | | | min | -209.655 | 3 | -4.342 | 3 | -860.617 | 2 | -.906 | 1 | -.063 | 1 | -.073 | 3 |
| 365 | | 3 | max | 2968.098 | 8 | 301.113 | 8 | 516.676 | 1 | 1.09 | 2 | .065 | 6 | 2.357 | 8 |
| 366 | | | min | -209.655 | 3 | -4.342 | 3 | -860.617 | 2 | -.906 | 1 | .012 | 1 | -.072 | 3 |
| 367 | | 4 | max | 2968.098 | 8 | 301.113 | 8 | 516.676 | 1 | 1.09 | 2 | .087 | 1 | 2.313 | 8 |
| 368 | | | min | -209.655 | 3 | -4.342 | 3 | -860.617 | 2 | -.906 | 1 | -.082 | 2 | -.071 | 3 |
| 369 | | 5 | max | 2968.098 | 8 | 301.113 | 8 | 516.676 | 1 | 1.09 | 2 | .163 | 1 | 2.269 | 8 |
| 370 | | | min | -209.655 | 3 | -4.342 | 3 | -860.617 | 2 | -.906 | 1 | -.208 | 2 | -.071 | 3 |
| 371 | M38 | 1 | max | 216.077 | 2 | -370.474 | 3 | 144.633 | 2 | -.074 | 3 | 0 | 13 | 0 | 13 |
| 372 | | | min | -1354.959 | 5 | -1396.635 | 5 | -1323.871 | 5 | -.263 | 8 | 0 | 1 | 0 | 1 |
| 373 | | 2 | max | 216.077 | 2 | -370.474 | 3 | 144.633 | 2 | -.074 | 3 | .013 | 2 | .13 | 5 |
| 374 | | | min | -1354.959 | 5 | -1396.635 | 5 | -1323.871 | 5 | -.263 | 8 | -.123 | 5 | .035 | 3 |
| 375 | | 3 | max | 684.465 | 4 | 1295.985 | 6 | 1398.494 | 3 | .145 | 2 | .134 | 4 | .26 | 5 |
| 376 | | | min | -1380.517 | 3 | -1396.635 | 5 | -1323.871 | 5 | -.263 | 8 | -.261 | 3 | .1 | 12 |
| 377 | | 4 | max | 684.465 | 4 | 1295.985 | 6 | 1398.494 | 3 | .245 | 6 | .067 | 4 | .121 | 6 |
| 378 | | | min | -1380.517 | 3 | -6.144 | 1 | -719.63 | 4 | .015 | 1 | -.13 | 3 | 0 | 1 |
| 379 | | 5 | max | 684.465 | 4 | 1295.985 | 6 | 1398.494 | 3 | .245 | 6 | 0 | 5 | 0 | 13 |
| 380 | | | min | -1380.517 | 3 | -6.144 | 1 | -719.63 | 4 | .015 | 1 | 0 | 2 | 0 | 2 |
| 381 | M39 | 1 | max | 1633.653 | 6 | -5.365 | 4 | 1557.533 | 6 | 0 | 4 | 0 | 13 | 0 | 13 |
| 382 | | | min | -45.187 | 1 | -78.132 | 7 | 16.509 | 1 | -.036 | 7 | 0 | 1 | 0 | 1 |
| 383 | | 2 | max | 1633.653 | 6 | -5.365 | 4 | 1557.533 | 6 | 0 | 4 | .145 | 6 | .007 | 7 |
| 384 | | | min | -45.187 | 1 | -78.132 | 7 | 16.509 | 1 | -.036 | 7 | .002 | 1 | 0 | 4 |
| 385 | | 3 | max | 1633.653 | 6 | 92.072 | 5 | 1557.533 | 6 | .035 | 5 | .29 | 6 | .017 | 5 |
| 386 | | | min | 524.746 | 3 | -78.132 | 7 | -1503.066 | 8 | -.036 | 7 | -.099 | 3 | .005 | 2 |
| 387 | | 4 | max | 1509.172 | 8 | 92.072 | 5 | 530.044 | 3 | .035 | 7 | .14 | 8 | .009 | 5 |
| 388 | | | min | -456.413 | 3 | -11.125 | 2 | -1503.066 | 8 | .011 | 4 | -.049 | 3 | -.001 | 2 |
| 389 | | 5 | max | 1509.172 | 8 | 92.072 | 5 | 530.044 | 3 | .035 | 7 | 0 | 6 | 0 | 13 |
| 390 | | | min | -456.413 | 3 | -11.125 | 2 | -1503.066 | 8 | .011 | 4 | 0 | 3 | 0 | 1 |
| 391 | M40 | 1 | max | 515.021 | 4 | 609.478 | 6 | 678.168 | 4 | .098 | 6 | .143 | 3 | .312 | 3 |
| 392 | | | min | -512.593 | 3 | -79.243 | 1 | -664.601 | 3 | -.016 | 1 | -.132 | 4 | -.228 | 4 |
| 393 | | 2 | max | 515.021 | 4 | 609.478 | 6 | 678.168 | 4 | .098 | 6 | .102 | 3 | .289 | 3 |
| 394 | | | min | -512.593 | 3 | -79.243 | 1 | -664.601 | 3 | -.016 | 1 | -.089 | 4 | -.228 | 4 |
| 395 | | 3 | max | 515.021 | 4 | 609.478 | 6 | 678.168 | 4 | .098 | 6 | .06 | 3 | .265 | 3 |
| 396 | | | min | -512.593 | 3 | -79.243 | 1 | -664.601 | 3 | -.016 | 1 | -.047 | 4 | -.228 | 4 |
| 397 | | 4 | max | 515.021 | 4 | 609.478 | 6 | 678.168 | 4 | .098 | 6 | .022 | 6 | .242 | 3 |
| 398 | | | min | -512.593 | 3 | -79.243 | 1 | -664.601 | 3 | -.016 | 1 | -.004 | 4 | -.229 | 4 |
| 399 | | 5 | max | 515.021 | 4 | 609.478 | 6 | 678.168 | 4 | .098 | 6 | .038 | 4 | .218 | 3 |
| 400 | | | min | -512.593 | 3 | -79.243 | 1 | -664.601 | 3 | -.016 | 1 | -.023 | 3 | -.229 | 4 |
| 401 | M41 | 1 | max | 369.481 | 4 | 566.391 | 5 | 858.128 | 4 | .191 | 3 | .235 | 3 | .363 | 4 |
| 402 | | | min | -384.125 | 3 | 12.421 | 2 | -756.806 | 3 | -.113 | 4 | -.246 | 4 | -.31 | 3 |
| 403 | | 2 | max | 369.481 | 4 | 566.391 | 5 | 858.128 | 4 | .191 | 3 | .188 | 3 | .345 | 4 |
| 404 | | | min | -384.125 | 3 | 12.421 | 2 | -756.806 | 3 | -.113 | 4 | -.192 | 4 | -.316 | 3 |
| 405 | | 3 | max | 369.481 | 4 | 566.391 | 5 | 858.128 | 4 | .191 | 3 | .141 | 3 | .327 | 4 |
| 406 | | | min | -384.125 | 3 | 12.421 | 2 | -756.806 | 3 | -.113 | 4 | -.139 | 4 | -.321 | 3 |
| 407 | | 4 | max | 369.481 | 4 | 566.391 | 5 | 858.128 | 4 | .191 | 3 | .093 | 3 | .309 | 4 |
| 408 | | | min | -384.125 | 3 | 12.421 | 2 | -756.806 | 3 | -.113 | 4 | -.085 | 4 | -.326 | 3 |
| 409 | | 5 | max | 369.481 | 4 | 566.391 | 5 | 858.128 | 4 | .191 | 3 | .046 | 3 | .291 | 4 |
| 410 | | | min | -384.125 | 3 | 12.421 | 2 | -756.806 | 3 | -.113 | 4 | -.031 | 4 | -.331 | 3 |
| 411 | M42 | 1 | max | 445.542 | 2 | 682.172 | 8 | 500.505 | 1 | .073 | 3 | .196 | 4 | .226 | 7 |
| 412 | | | min | -413.548 | 1 | -36.008 | 3 | -529.318 | 2 | -.09 | 4 | -.233 | 3 | -.028 | 4 |
| 413 | | 2 | max | 445.542 | 2 | 682.172 | 8 | 500.505 | 1 | .073 | 3 | .184 | 4 | .195 | 3 |
| 414 | | | min | -413.548 | 1 | -36.008 | 3 | -529.318 | 2 | -.09 | 4 | -.223 | 3 | -.061 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 415 | | 3 | max | 445.542 | 2 | 682.172 | 8 | 500.505 | 1 | .073 | 3 | .174 | 1 | .197 | 3 |
| 416 | | | min | -413.548 | 1 | -36.008 | 3 | -529.318 | 2 | -.09 | 4 | -.215 | 2 | -.095 | 4 |
| 417 | | 4 | max | 445.542 | 2 | 682.172 | 8 | 500.505 | 1 | .073 | 3 | .205 | 1 | .199 | 3 |
| 418 | | | min | -413.548 | 1 | -36.008 | 3 | -529.318 | 2 | -.09 | 4 | -.248 | 2 | -.128 | 4 |
| 419 | | 5 | max | 445.542 | 2 | 682.172 | 8 | 500.505 | 1 | .073 | 3 | .236 | 1 | .202 | 3 |
| 420 | | | min | -413.548 | 1 | -36.008 | 3 | -529.318 | 2 | -.09 | 4 | -.281 | 2 | -.162 | 4 |
| 421 | M43 | 1 | max | 759.534 | 2 | 621.962 | 7 | 646.661 | 1 | .01 | 4 | .324 | 4 | .151 | 4 |
| 422 | | | min | -610.197 | 1 | 95.031 | 4 | -826.409 | 2 | -.131 | 7 | -.371 | 3 | -.136 | 3 |
| 423 | | 2 | max | 759.534 | 2 | 621.962 | 7 | 646.661 | 1 | .01 | 4 | .321 | 4 | .145 | 4 |
| 424 | | | min | -610.197 | 1 | 95.031 | 4 | -826.409 | 2 | -.131 | 7 | -.379 | 3 | -.16 | 3 |
| 425 | | 3 | max | 759.534 | 2 | 621.962 | 7 | 646.661 | 1 | .01 | 4 | .318 | 4 | .139 | 4 |
| 426 | | | min | -610.197 | 1 | 95.031 | 4 | -826.409 | 2 | -.131 | 7 | -.387 | 3 | -.183 | 3 |
| 427 | | 4 | max | 759.534 | 2 | 621.962 | 7 | 646.661 | 1 | .01 | 4 | .318 | 1 | .133 | 4 |
| 428 | | | min | -610.197 | 1 | 95.031 | 4 | -826.409 | 2 | -.131 | 7 | -.4 | 2 | -.207 | 3 |
| 429 | | 5 | max | 759.534 | 2 | 621.962 | 7 | 646.661 | 1 | .01 | 4 | .359 | 1 | .128 | 4 |
| 430 | | | min | -610.197 | 1 | 95.031 | 4 | -826.409 | 2 | -.131 | 7 | -.451 | 2 | -.231 | 3 |
| 431 | M44 | 1 | max | 0 | 13 | 0 | 2 | .002 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |
| 432 | | | min | 0 | 1 | -.001 | 5 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 433 | | 2 | max | 779.458 | 6 | 264.32 | 2 | 69.158 | 4 | .011 | 2 | .053 | 3 | .061 | 3 |
| 434 | | | min | -24.565 | 1 | -295.249 | 1 | -79.343 | 3 | -.017 | 1 | -.044 | 4 | -.079 | 4 |
| 435 | | 3 | max | 790.675 | 6 | 264.32 | 2 | 73.721 | 1 | .011 | 2 | .069 | 1 | .228 | 1 |
| 436 | | | min | -20.92 | 1 | -295.249 | 1 | -84.421 | 2 | -.017 | 1 | -.069 | 2 | -.219 | 2 |
| 437 | | 4 | max | 860.596 | 6 | 1218.97 | 1 | 83.342 | 2 | .008 | 2 | .086 | 1 | .301 | 1 |
| 438 | | | min | -307.294 | 1 | -1042.45 | 2 | -129.541 | 1 | -.012 | 1 | -.106 | 2 | -.29 | 2 |
| 439 | | 5 | max | 0 | 13 | .002 | 6 | 0 | 3 | 0 | 13 | 0 | 13 | 0 | 13 |
| 440 | | | min | 0 | 1 | 0 | 1 | -.002 | 8 | 0 | 1 | 0 | 1 | 0 | 1 |
| 441 | M45 | 1 | max | 2129.114 | 8 | 83.454 | 5 | 64.367 | 3 | .024 | 7 | .036 | 5 | .014 | 2 |
| 442 | | | min | -694.581 | 3 | -15.736 | 2 | -74.964 | 4 | .007 | 4 | 0 | 2 | -.022 | 1 |
| 443 | | 2 | max | 2128.25 | 8 | 69.267 | 5 | 63.741 | 3 | .024 | 7 | .069 | 3 | .03 | 2 |
| 444 | | | min | -692.393 | 3 | -21.463 | 2 | -74.337 | 4 | .007 | 4 | -.057 | 4 | -.083 | 5 |
| 445 | | 3 | max | 2127.385 | 8 | 56.135 | 1 | 63.114 | 3 | .024 | 7 | .125 | 3 | .051 | 2 |
| 446 | | | min | -690.205 | 3 | -27.19 | 2 | -73.711 | 4 | .007 | 4 | -.121 | 4 | -.137 | 5 |
| 447 | | 4 | max | 2126.52 | 8 | 50.408 | 1 | 62.488 | 3 | .024 | 7 | .179 | 3 | .077 | 2 |
| 448 | | | min | -688.017 | 3 | -32.918 | 2 | -73.084 | 4 | .007 | 4 | -.185 | 4 | -.179 | 5 |
| 449 | | 5 | max | 2125.655 | 8 | 44.68 | 1 | 61.861 | 3 | .024 | 7 | .233 | 3 | .108 | 2 |
| 450 | | | min | -685.829 | 3 | -38.645 | 2 | -72.458 | 4 | .007 | 4 | -.248 | 4 | -.217 | 1 |
| 451 | M46 | 1 | max | 1080.49 | 4 | 2.847 | 4 | 47.636 | 3 | .142 | 6 | .019 | 1 | .008 | 1 |
| 452 | | | min | -1036.6 | 3 | -107.542 | 7 | -37.33 | 4 | .015 | 1 | -.039 | 6 | -.406 | 6 |
| 453 | | 2 | max | 1078.302 | 4 | -2.88 | 4 | 47.01 | 3 | .142 | 6 | .023 | 1 | .035 | 1 |
| 454 | | | min | -1034.412 | 3 | -121.728 | 7 | -36.703 | 4 | .015 | 1 | -.032 | 2 | -.311 | 6 |
| 455 | | 3 | max | 1076.114 | 4 | -8.608 | 4 | 46.383 | 3 | .142 | 6 | .061 | 3 | .067 | 1 |
| 456 | | | min | -1032.224 | 3 | -135.915 | 7 | -36.077 | 4 | .015 | 1 | -.061 | 4 | -.204 | 6 |
| 457 | | 4 | max | 1073.926 | 4 | -14.335 | 4 | 45.757 | 3 | .142 | 6 | .101 | 3 | .104 | 1 |
| 458 | | | min | -1030.036 | 3 | -150.101 | 7 | -35.45 | 4 | .015 | 1 | -.092 | 4 | -.139 | 2 |
| 459 | | 5 | max | 1071.738 | 4 | -20.063 | 4 | 45.13 | 3 | .142 | 6 | .141 | 3 | .146 | 1 |
| 460 | | | min | -1027.848 | 3 | -164.287 | 7 | -34.824 | 4 | .015 | 1 | -.123 | 4 | -.086 | 2 |
| 461 | M47 | 1 | max | -601.425 | 2 | 13.601 | 6 | 7.883 | 4 | .001 | 3 | .005 | 3 | .007 | 6 |
| 462 | | | min | -2307.501 | 5 | -.805 | 1 | -7.248 | 3 | -.002 | 4 | -.008 | 8 | -.003 | 1 |
| 463 | | 2 | max | -601.83 | 2 | 5.952 | 6 | 4.517 | 4 | .001 | 3 | 0 | 4 | 0 | 3 |
| 464 | | | min | -2300.458 | 5 | -.863 | 1 | -3.882 | 3 | -.002 | 4 | -.003 | 7 | -.005 | 8 |
| 465 | | 3 | max | -602.236 | 2 | .133 | 3 | 1.15 | 4 | .001 | 3 | .003 | 4 | 0 | 1 |
| 466 | | | min | -2293.415 | 5 | -1.961 | 8 | -.516 | 3 | -.002 | 4 | -.004 | 7 | -.007 | 6 |
| 467 | | 4 | max | -602.641 | 2 | -.891 | 3 | 3.879 | 7 | .001 | 3 | .002 | 4 | .001 | 4 |
| 468 | | | min | -2286.372 | 5 | -9.347 | 6 | -2.521 | 8 | -.002 | 4 | -.003 | 3 | 0 | 3 |
| 469 | | 5 | max | -603.047 | 2 | -1.037 | 1 | 7.266 | 7 | .001 | 3 | .005 | 7 | .015 | 6 |
| 470 | | | min | -2279.328 | 5 | -16.996 | 6 | -5.909 | 8 | -.002 | 4 | -.004 | 8 | 0 | 3 |
| 471 | M48 | 1 | max | 0 | 13 | 0 | 4 | 0 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 472 | | | min | 0 | 1 | 0 | 7 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 473 | | 2 | max | 875.951 | 5 | 41.835 | 5 | -1.223 | 2 | .034 | 3 | .027 | 3 | .044 | 3 |
| 474 | | | min | 49.264 | 2 | -7.37 | 2 | -13.986 | 1 | -.032 | 4 | -.027 | 4 | -.045 | 4 |
| 475 | | 3 | max | 887.168 | 5 | 41.835 | 5 | -5.971 | 3 | .034 | 3 | .021 | 3 | .044 | 3 |
| 476 | | | min | 52.909 | 2 | -7.37 | 2 | -9.14 | 4 | -.032 | 4 | -.035 | 4 | -.065 | 4 |
| 477 | | 4 | max | 898.385 | 5 | 43.381 | 8 | .725 | 1 | .034 | 3 | .016 | 3 | .051 | 3 |
| 478 | | | min | 56.553 | 2 | -11.321 | 3 | -15.934 | 2 | -.032 | 4 | -.043 | 4 | -.092 | 4 |
| 479 | | 5 | max | 0 | 13 | .002 | 6 | 0 | 3 | 0 | 13 | 0 | 13 | 0 | 13 |
| 480 | | | min | 0 | 1 | 0 | 1 | -.001 | 8 | 0 | 1 | 0 | 1 | 0 | 1 |
| 481 | M49 | 1 | max | 2256.212 | 6 | 70.11 | 7 | 92.735 | 4 | 0 | 4 | .023 | 4 | .005 | 2 |
| 482 | | | min | -18.436 | 1 | 1.85 | 4 | -95.579 | 3 | -.024 | 7 | -.059 | 3 | -.013 | 1 |
| 483 | | 2 | max | 2255.443 | 6 | 55.924 | 7 | 84.951 | 4 | 0 | 4 | .1 | 4 | -.002 | 4 |
| 484 | | | min | -16.492 | 1 | -3.878 | 4 | -87.795 | 3 | -.024 | 7 | -.139 | 3 | -.064 | 7 |
| 485 | | 3 | max | 2254.675 | 6 | 41.737 | 7 | 77.168 | 4 | 0 | 4 | .171 | 4 | .004 | 4 |
| 486 | | | min | -14.548 | 1 | -9.605 | 4 | -80.012 | 3 | -.024 | 7 | -.212 | 3 | -.107 | 7 |
| 487 | | 4 | max | 2253.907 | 6 | 29.299 | 3 | 69.385 | 4 | 0 | 4 | .235 | 4 | .015 | 4 |
| 488 | | | min | -12.604 | 1 | -15.333 | 4 | -72.229 | 3 | -.024 | 7 | -.278 | 3 | -.137 | 7 |
| 489 | | 5 | max | 2253.138 | 6 | 23.572 | 3 | 61.601 | 4 | 0 | 4 | .292 | 4 | .031 | 4 |
| 490 | | | min | -10.661 | 1 | -21.06 | 4 | -64.445 | 3 | -.024 | 7 | -.338 | 3 | -.155 | 7 |
| 491 | M50 | 1 | max | 705.27 | 2 | -28.862 | 2 | 66.46 | 4 | -.048 | 2 | .051 | 4 | -.115 | 3 |
| 492 | | | min | -683.711 | 1 | -126.367 | 5 | -84.055 | 3 | -.154 | 5 | -.028 | 3 | -.439 | 8 |
| 493 | | 2 | max | 703.326 | 2 | -34.589 | 2 | 58.677 | 4 | -.048 | 2 | .106 | 4 | -.057 | 3 |
| 494 | | | min | -681.767 | 1 | -140.553 | 5 | -76.272 | 3 | -.154 | 5 | -.098 | 3 | -.329 | 8 |
| 495 | | 3 | max | 701.382 | 2 | -40.316 | 2 | 50.893 | 4 | -.048 | 2 | .153 | 4 | .005 | 3 |
| 496 | | | min | -679.823 | 1 | -154.739 | 5 | -68.489 | 3 | -.154 | 5 | -.161 | 3 | -.206 | 8 |
| 497 | | 4 | max | 699.438 | 2 | -46.044 | 2 | 43.11 | 4 | -.048 | 2 | .194 | 4 | .073 | 3 |
| 498 | | | min | -677.879 | 1 | -168.926 | 5 | -60.705 | 3 | -.154 | 5 | -.217 | 3 | -.105 | 4 |
| 499 | | 5 | max | 697.494 | 2 | -51.771 | 2 | 35.327 | 4 | -.048 | 2 | .228 | 4 | .145 | 3 |
| 500 | | | min | -675.935 | 1 | -183.112 | 5 | -52.922 | 3 | -.154 | 5 | -.267 | 3 | -.056 | 4 |
| 501 | M51 | 1 | max | 253.279 | 2 | 108.399 | 4 | -368.626 | 3 | -.05 | 3 | .192 | 8 | 0 | 13 |
| 502 | | | min | -1892.639 | 5 | -60.491 | 3 | -1380.227 | 5 | -.18 | 8 | .054 | 3 | 0 | 1 |
| 503 | | 2 | max | 252.64 | 2 | 106.289 | 4 | -367.478 | 3 | -.05 | 3 | .037 | 8 | .007 | 3 |
| 504 | | | min | -1892.446 | 5 | -59.266 | 2 | -1377.476 | 5 | -.18 | 8 | .012 | 1 | -.012 | 4 |
| 505 | | 3 | max | 252.002 | 2 | 105.349 | 1 | -366.329 | 3 | -.05 | 3 | -.027 | 2 | .013 | 2 |
| 506 | | | min | -1892.252 | 5 | -59.072 | 2 | -1374.725 | 5 | -.18 | 8 | -.12 | 5 | -.024 | 4 |
| 507 | | 4 | max | 251.363 | 2 | 105.155 | 1 | -365.181 | 3 | -.05 | 3 | -.069 | 2 | .02 | 2 |
| 508 | | | min | -1892.058 | 5 | -58.879 | 2 | -1371.974 | 5 | -.18 | 8 | -.274 | 5 | -.036 | 1 |
| 509 | | 5 | max | 250.725 | 2 | 104.962 | 1 | -364.032 | 3 | -.05 | 3 | -.11 | 2 | .027 | 2 |
| 510 | | | min | -1891.864 | 5 | -58.686 | 2 | -1369.223 | 5 | -.18 | 8 | -.428 | 5 | -.047 | 1 |
| 511 | M52 | 1 | max | 2253.519 | 6 | 54.911 | 4 | -6.501 | 4 | 0 | 4 | .026 | 7 | 0 | 13 |
| 512 | | | min | -18.876 | 1 | -135.668 | 3 | -82.08 | 7 | -.025 | 7 | 0 | 4 | 0 | 5 |
| 513 | | 2 | max | 2253.325 | 6 | 52.801 | 4 | -5.352 | 4 | 0 | 4 | .017 | 6 | .015 | 3 |
| 514 | | | min | -18.238 | 1 | -133.559 | 3 | -79.329 | 7 | -.025 | 7 | -.003 | 1 | -.006 | 4 |
| 515 | | 3 | max | 2253.132 | 6 | 50.691 | 4 | -4.204 | 4 | 0 | 4 | .011 | 2 | .03 | 3 |
| 516 | | | min | -17.599 | 1 | -131.449 | 3 | -76.578 | 7 | -.025 | 7 | -.007 | 1 | -.012 | 4 |
| 517 | | 4 | max | 2252.938 | 6 | 48.582 | 4 | -3.055 | 4 | 0 | 4 | .008 | 2 | .045 | 3 |
| 518 | | | min | -16.961 | 1 | -129.339 | 3 | -73.827 | 7 | -.025 | 7 | -.01 | 1 | -.017 | 4 |
| 519 | | 5 | max | 2252.744 | 6 | 46.472 | 4 | -1.907 | 4 | 0 | 4 | .006 | 2 | .059 | 3 |
| 520 | | | min | -16.322 | 1 | -129.058 | 6 | -71.076 | 7 | -.025 | 7 | -.013 | 1 | -.023 | 4 |
| 521 | M53 | 1 | max | 0 | 13 | .003 | 2 | .007 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 522 | | | min | 0 | 1 | 0 | 9 | 0 | 11 | 0 | 1 | 0 | 1 | 0 | 1 |
| 523 | | 2 | max | 298.479 | 1 | 269.604 | 5 | 145.346 | 3 | .168 | 2 | .131 | 4 | .265 | 7 |
| 524 | | | min | -369.406 | 2 | -85.23 | 2 | -146.529 | 4 | -.141 | 1 | -.129 | 3 | -.082 | 4 |
| 525 | | 3 | max | 429.425 | 4 | 226.86 | 5 | 211.566 | 4 | .212 | 4 | .295 | 3 | -.125 | 9 |
| 526 | | | min | -517.512 | 3 | -269.615 | 6 | -119.203 | 1 | -.192 | 3 | -.317 | 4 | -.442 | 6 |
| 527 | | 4 | max | 442.803 | 4 | 50.27 | 1 | 234.739 | 4 | .212 | 4 | .269 | 4 | .322 | 6 |
| 528 | | | min | -530.89 | 3 | -312.359 | 6 | -228.664 | 3 | -.192 | 3 | -.275 | 3 | -.033 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 529 | | 5 | max | 0 | 13 | 0 | 7 | 0 | 3 | 0 | 13 | 0 | 13 | 0 | 13 |
| 530 | | | min | 0 | 1 | -.004 | 2 | -.001 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 531 | M54 | 1 | max | 0 | 13 | .002 | 2 | .007 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 532 | | | min | 0 | 1 | 0 | 7 | 0 | 11 | 0 | 1 | 0 | 1 | 0 | 1 |
| 533 | | 2 | max | 530.777 | 1 | 247.75 | 8 | 203.089 | 3 | .155 | 4 | .223 | 4 | .242 | 5 |
| 534 | | | min | -564.672 | 2 | -3.17 | 3 | -219.387 | 4 | -.125 | 3 | -.203 | 3 | .043 | 3 |
| 535 | | 3 | max | 517.398 | 1 | 144.162 | 4 | 64.798 | 2 | .154 | 3 | .33 | 3 | -.133 | 11 |
| 536 | | | min | -551.294 | 2 | -241.015 | 5 | -237.331 | 3 | -.171 | 4 | -.332 | 4 | -.405 | 5 |
| 537 | | 4 | max | 454.875 | 4 | -63.473 | 2 | 240.011 | 4 | .154 | 3 | .268 | 4 | .309 | 8 |
| 538 | | | min | -473.682 | 3 | -283.759 | 5 | -260.503 | 3 | -.171 | 4 | -.323 | 3 | .046 | 3 |
| 539 | | 5 | max | 0 | 13 | 0 | 7 | .003 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 540 | | | min | 0 | 1 | -.004 | 2 | 0 | 8 | 0 | 1 | 0 | 1 | 0 | 1 |
| 541 | M55 | 1 | max | 911.265 | 2 | 33.497 | 4 | 48.33 | 2 | .162 | 5 | .172 | 5 | 0 | 13 |
| 542 | | | min | -1825.151 | 1 | -70.456 | 7 | -1235.208 | 5 | .008 | 2 | .008 | 2 | 0 | 1 |
| 543 | | 2 | max | 910.626 | 2 | 31.387 | 4 | 49.479 | 2 | .162 | 5 | .035 | 7 | .008 | 7 |
| 544 | | | min | -1824.512 | 1 | -69.816 | 7 | -1232.457 | 5 | .008 | 2 | .011 | 4 | -.004 | 4 |
| 545 | | 3 | max | 909.988 | 2 | 29.278 | 4 | 50.627 | 2 | .162 | 5 | .019 | 2 | .016 | 7 |
| 546 | | | min | -1823.874 | 1 | -69.175 | 7 | -1229.706 | 5 | .008 | 2 | -.105 | 5 | -.007 | 4 |
| 547 | | 4 | max | 909.349 | 2 | 27.168 | 4 | 51.776 | 2 | .162 | 5 | .025 | 2 | .023 | 7 |
| 548 | | | min | -1823.235 | 1 | -68.535 | 7 | -1226.955 | 5 | .008 | 2 | -.243 | 5 | -.01 | 4 |
| 549 | | 5 | max | 908.711 | 2 | 25.058 | 4 | 52.924 | 2 | .162 | 5 | .031 | 2 | .031 | 7 |
| 550 | | | min | -1822.597 | 1 | -67.895 | 7 | -1224.204 | 5 | .008 | 2 | -.381 | 5 | -.013 | 4 |
| 551 | M56 | 1 | max | 2029.191 | 6 | 77.007 | 8 | 14.254 | 3 | .025 | 8 | .026 | 8 | 0 | 13 |
| 552 | | | min | -604.193 | 1 | -9.441 | 3 | -93.374 | 8 | .007 | 3 | .007 | 3 | 0 | 1 |
| 553 | | 2 | max | 2028.997 | 6 | 76.367 | 8 | 15.402 | 3 | .025 | 8 | .018 | 5 | 0 | 3 |
| 554 | | | min | -603.554 | 1 | -7.332 | 3 | -90.623 | 8 | .007 | 3 | .002 | 2 | -.009 | 8 |
| 555 | | 3 | max | 2028.803 | 6 | 75.726 | 8 | 16.551 | 3 | .025 | 8 | .011 | 3 | .002 | 3 |
| 556 | | | min | -602.916 | 1 | -5.222 | 3 | -87.872 | 8 | .007 | 3 | -.005 | 4 | -.017 | 8 |
| 557 | | 4 | max | 2028.609 | 6 | 75.086 | 8 | 17.699 | 3 | .025 | 8 | .013 | 3 | .002 | 3 |
| 558 | | | min | -602.277 | 1 | -3.112 | 3 | -85.121 | 8 | .007 | 3 | -.013 | 4 | -.026 | 8 |
| 559 | | 5 | max | 2028.416 | 6 | 74.445 | 8 | 18.848 | 3 | .025 | 8 | .015 | 3 | .002 | 3 |
| 560 | | | min | -601.639 | 1 | -1.003 | 3 | -82.369 | 8 | .007 | 3 | -.021 | 4 | -.034 | 8 |
| 561 | M57 | 1 | max | 82.173 | 2 | 14.423 | 6 | 6.724 | 4 | .002 | 3 | .008 | 7 | .009 | 6 |
| 562 | | | min | -2042.611 | 5 | -1.816 | 1 | -7.372 | 7 | -.001 | 4 | -.005 | 4 | -.005 | 1 |
| 563 | | 2 | max | 81.768 | 2 | 6.774 | 6 | 3.358 | 4 | .002 | 3 | .002 | 8 | 0 | 4 |
| 564 | | | min | -2035.568 | 5 | -1.874 | 1 | -3.984 | 7 | -.001 | 4 | 0 | 2 | -.004 | 7 |
| 565 | | 3 | max | 81.363 | 2 | 1.232 | 4 | -.009 | 4 | .002 | 3 | .003 | 8 | 0 | 1 |
| 566 | | | min | -2028.524 | 5 | -2.154 | 3 | -.629 | 6 | -.001 | 4 | -.002 | 3 | -.007 | 6 |
| 567 | | 4 | max | 80.957 | 2 | .208 | 4 | 2.979 | 3 | .002 | 3 | 0 | 1 | .002 | 1 |
| 568 | | | min | -2021.481 | 5 | -8.524 | 6 | -3.953 | 8 | -.001 | 4 | 0 | 2 | -.002 | 2 |
| 569 | | 5 | max | 80.552 | 2 | -.816 | 4 | 6.345 | 3 | .002 | 3 | .005 | 3 | .013 | 7 |
| 570 | | | min | -2014.438 | 5 | -16.173 | 6 | -7.341 | 8 | -.001 | 4 | -.006 | 8 | -.002 | 4 |
| 571 | MP3B | 1 | max | 0 | 5 | .088 | 8 | .028 | 5 | 0 | 3 | 0 | 8 | 0 | 13 |
| 572 | | | min | 0 | 2 | -.041 | 3 | -.013 | 2 | 0 | 8 | 0 | 2 | 0 | 1 |
| 573 | | 2 | max | 125.244 | 5 | 135.959 | 4 | 90.041 | 1 | 0 | 3 | .09 | 1 | .136 | 3 |
| 574 | | | min | 37.568 | 2 | -135.946 | 3 | -90.038 | 2 | 0 | 8 | -.09 | 2 | -.136 | 4 |
| 575 | | 3 | max | 183.14 | 2 | 76.935 | 4 | .789 | 4 | .008 | 3 | .039 | 4 | .167 | 3 |
| 576 | | | min | -127.497 | 1 | -48.934 | 3 | -50.661 | 7 | -.019 | 4 | -.053 | 3 | -.163 | 4 |
| 577 | | 4 | max | -13.148 | 1 | 23.522 | 3 | 23.544 | 2 | 0 | 6 | .024 | 1 | .024 | 3 |
| 578 | | | min | -32.567 | 6 | -23.54 | 4 | -23.548 | 1 | 0 | 1 | -.024 | 2 | -.024 | 4 |
| 579 | | 5 | max | 0 | 13 | .003 | 1 | .009 | 4 | 0 | 6 | 0 | 13 | 0 | 13 |
| 580 | | | min | 0 | 1 | -.074 | 6 | -.034 | 7 | 0 | 1 | 0 | 1 | 0 | 1 |
| 581 | MP2B | 1 | max | 283.3 | 8 | 353.123 | 4 | 229.555 | 1 | 0 | 3 | 0 | 1 | 0 | 13 |
| 582 | | | min | 76.8 | 3 | -353.092 | 3 | -229.569 | 2 | 0 | 8 | 0 | 2 | 0 | 1 |
| 583 | | 2 | max | 315.867 | 8 | 376.663 | 4 | 253.095 | 1 | 0 | 3 | .483 | 1 | .73 | 3 |
| 584 | | | min | 89.948 | 3 | -376.632 | 3 | -253.109 | 2 | 0 | 8 | -.483 | 2 | -.73 | 4 |
| 585 | | 3 | max | 115.766 | 4 | 111.672 | 4 | 109.314 | 1 | .047 | 1 | .159 | 1 | .479 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 586 | | | min | -30.753 | 3 | -108.865 | 3 | -126.392 | 2 | -.069 | 2 | -.172 | 2 | -.461 | 4 |
| 587 | | 4 | max | -89.948 | 2 | 375.551 | 3 | 252.567 | 2 | 0 | 7 | .482 | 1 | .728 | 3 |
| 588 | | | min | -315.867 | 5 | -375.603 | 4 | -252.563 | 1 | 0 | 4 | -.482 | 2 | -.728 | 4 |
| 589 | | 5 | max | -76.8 | 2 | 352.011 | 3 | 229.027 | 2 | 0 | 7 | 0 | 1 | 0 | 13 |
| 590 | | | min | -283.3 | 5 | -352.063 | 4 | -229.023 | 1 | 0 | 4 | 0 | 2 | 0 | 1 |
| 591 | MP1B | 1 | max | 0 | 1 | .108 | 5 | .1 | 1 | 0 | 2 | 0 | 13 | 0 | 13 |
| 592 | | | min | 0 | 6 | -.057 | 2 | -.13 | 2 | 0 | 5 | 0 | 1 | 0 | 1 |
| 593 | | 2 | max | 202.932 | 5 | 147.83 | 4 | 129.919 | 1 | 0 | 2 | .13 | 1 | .148 | 3 |
| 594 | | | min | 92.468 | 2 | -147.807 | 3 | -129.949 | 2 | 0 | 5 | -.13 | 2 | -.148 | 4 |
| 595 | | 3 | max | 153.84 | 1 | 262.024 | 1 | 94.046 | 5 | .071 | 1 | .074 | 1 | .306 | 2 |
| 596 | | | min | -112.418 | 2 | -276.227 | 2 | -1.185 | 2 | -.061 | 2 | -.072 | 2 | -.316 | 1 |
| 597 | | 4 | max | -13.148 | 3 | 23.51 | 3 | 23.591 | 2 | 0 | 6 | .024 | 1 | .023 | 3 |
| 598 | | | min | -32.567 | 8 | -23.535 | 4 | -23.57 | 1 | 0 | 1 | -.024 | 2 | -.024 | 4 |
| 599 | | 5 | max | 0 | 13 | .014 | 1 | .065 | 4 | 0 | 6 | 0 | 13 | 0 | 13 |
| 600 | | | min | 0 | 1 | -.088 | 6 | -.045 | 3 | 0 | 1 | 0 | 1 | 0 | 1 |
| 601 | M61 | 1 | max | 0 | 13 | .007 | 8 | .004 | 5 | 0 | 13 | 0 | 13 | 0 | 13 |
| 602 | | | min | 0 | 1 | 0 | 3 | -.001 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 603 | | 2 | max | 2615.67 | 5 | 2290.367 | 8 | 1792.446 | 1 | .256 | 2 | 1.083 | 1 | -.009 | 3 |
| 604 | | | min | 723.98 | 2 | -311.969 | 3 | -1273.655 | 2 | -.193 | 1 | -.695 | 2 | -1.588 | 8 |
| 605 | | 3 | max | 77.951 | 3 | 281.692 | 3 | 474.45 | 4 | .002 | 4 | .061 | 3 | .04 | 1 |
| 606 | | | min | -70.483 | 4 | -231.884 | 4 | -572.643 | 3 | -.002 | 3 | -.059 | 4 | -.039 | 2 |
| 607 | | 4 | max | -6.742 | 3 | 2706.523 | 7 | 1675.567 | 2 | .224 | 1 | .485 | 1 | 1.412 | 7 |
| 608 | | | min | -189.167 | 8 | -53.562 | 4 | -996.924 | 1 | -.164 | 2 | -.849 | 2 | -.012 | 4 |
| 609 | | 5 | max | 0 | 13 | 0 | 4 | 0 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 610 | | | min | 0 | 1 | -.006 | 7 | -.003 | 6 | 0 | 1 | 0 | 1 | 0 | 1 |
| 611 | M62 | 1 | max | 110.654 | 3 | 2777.791 | 7 | 1361.832 | 2 | 1.362 | 2 | .346 | 1 | 3.846 | 5 |
| 612 | | | min | -2348.485 | 8 | 563.647 | 4 | -927.467 | 1 | -1.074 | 1 | -.538 | 2 | .658 | 2 |
| 613 | | 2 | max | 110.654 | 3 | 2777.791 | 7 | 1361.832 | 2 | 1.362 | 2 | .211 | 1 | 3.451 | 5 |
| 614 | | | min | -2348.485 | 8 | 563.647 | 4 | -927.467 | 1 | -1.074 | 1 | -.339 | 2 | .543 | 2 |
| 615 | | 3 | max | 110.654 | 3 | 2777.791 | 7 | 1361.832 | 2 | 1.362 | 2 | .084 | 4 | 3.056 | 5 |
| 616 | | | min | -2348.485 | 8 | 563.647 | 4 | -927.467 | 1 | -1.074 | 1 | -.151 | 3 | .429 | 2 |
| 617 | | 4 | max | 110.654 | 3 | 2777.791 | 7 | 1361.832 | 2 | 1.362 | 2 | .14 | 4 | 2.661 | 5 |
| 618 | | | min | -2348.485 | 8 | 563.647 | 4 | -927.467 | 1 | -1.074 | 1 | -.144 | 3 | .314 | 2 |
| 619 | | 5 | max | 110.654 | 3 | 2777.791 | 7 | 1361.832 | 2 | 1.362 | 2 | .256 | 2 | 2.266 | 5 |
| 620 | | | min | -2348.485 | 8 | 563.647 | 4 | -927.467 | 1 | -1.074 | 1 | -.195 | 1 | .199 | 2 |
| 621 | M63 | 1 | max | 2834.606 | 6 | 290.181 | 7 | 731.815 | 4 | 1.151 | 1 | .509 | 3 | 2.354 | 6 |
| 622 | | | min | 259.916 | 4 | 30.758 | 4 | -1165.324 | 3 | -.9 | 2 | -.318 | 4 | .278 | 1 |
| 623 | | 2 | max | 2834.606 | 6 | 290.181 | 7 | 731.815 | 4 | 1.151 | 1 | .339 | 3 | 2.312 | 6 |
| 624 | | | min | 259.916 | 4 | 30.758 | 4 | -1165.324 | 3 | -.9 | 2 | -.212 | 4 | .272 | 1 |
| 625 | | 3 | max | 2834.606 | 6 | 290.181 | 7 | 731.815 | 4 | 1.151 | 1 | .169 | 3 | 2.27 | 6 |
| 626 | | | min | 259.916 | 4 | 30.758 | 4 | -1165.324 | 3 | -.9 | 2 | -.105 | 4 | .266 | 1 |
| 627 | | 4 | max | 2834.606 | 6 | 290.181 | 7 | 731.815 | 4 | 1.151 | 1 | .113 | 2 | 2.228 | 6 |
| 628 | | | min | 259.916 | 4 | 30.758 | 4 | -1165.324 | 3 | -.9 | 2 | -.11 | 1 | .26 | 1 |
| 629 | | 5 | max | 2834.606 | 6 | 290.181 | 7 | 731.815 | 4 | 1.151 | 1 | .165 | 2 | 2.186 | 6 |
| 630 | | | min | 259.916 | 4 | 30.758 | 4 | -1165.324 | 3 | -.9 | 2 | -.226 | 1 | .254 | 1 |
| 631 | M64 | 1 | max | 325.423 | 3 | -347.711 | 1 | 297.164 | 3 | -.073 | 1 | 0 | 13 | 0 | 13 |
| 632 | | | min | -1440.58 | 8 | -1457.3 | 6 | -1420.507 | 8 | -.272 | 6 | 0 | 1 | 0 | 1 |
| 633 | | 2 | max | 325.423 | 3 | -347.711 | 1 | 297.164 | 3 | -.073 | 1 | .028 | 3 | .136 | 6 |
| 634 | | | min | -1440.58 | 8 | -1457.3 | 6 | -1420.507 | 8 | -.272 | 6 | -.132 | 8 | .032 | 1 |
| 635 | | 3 | max | -468.104 | 9 | 837.263 | 1 | 1290.019 | 1 | .142 | 1 | -.078 | 3 | .272 | 6 |
| 636 | | | min | -1440.58 | 8 | -1457.3 | 6 | -1420.507 | 8 | -.272 | 6 | -.265 | 8 | .101 | 9 |
| 637 | | 4 | max | 637.222 | 2 | 1248.743 | 5 | 1290.019 | 1 | .236 | 5 | .061 | 2 | .116 | 5 |
| 638 | | | min | -1292.256 | 1 | -48.149 | 2 | -651.874 | 2 | .011 | 2 | -.12 | 1 | -.004 | 2 |
| 639 | | 5 | max | 637.222 | 2 | 1248.743 | 5 | 1290.019 | 1 | .236 | 5 | 0 | 8 | 0 | 13 |
| 640 | | | min | -1292.256 | 1 | -48.149 | 2 | -651.874 | 2 | .011 | 2 | 0 | 4 | 0 | 7 |
| 641 | M65 | 1 | max | 1710.232 | 7 | -11.517 | 3 | 1646.891 | 7 | .003 | 2 | 0 | 13 | 0 | 13 |
| 642 | | | min | -139.497 | 4 | -76.87 | 8 | -130.56 | 4 | -.035 | 5 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 643 | | 2 | max | 1710.232 | 7 | -11.517 | 3 | 1646.891 | 7 | .003 | 2 | .153 | 7 | .007 | 8 |
| 644 | | | min | -139.497 | 4 | -76.87 | 8 | -130.56 | 4 | -.035 | 5 | -.012 | 4 | .001 | 3 |
| 645 | | 3 | max | 1710.232 | 7 | 86.737 | 6 | 1646.891 | 7 | .036 | 8 | .307 | 7 | .017 | 8 |
| 646 | | | min | 497.296 | 4 | -76.87 | 8 | -1432.67 | 6 | -.025 | 1 | .084 | 4 | -.003 | 3 |
| 647 | | 4 | max | 1438.716 | 6 | 90.008 | 8 | 454.428 | 1 | .036 | 8 | .134 | 6 | .008 | 8 |
| 648 | | | min | -398.58 | 1 | -14.595 | 3 | -1432.67 | 6 | .01 | 3 | -.042 | 1 | -.001 | 3 |
| 649 | | 5 | max | 1438.716 | 6 | 90.008 | 8 | 454.428 | 1 | .036 | 8 | 0 | 13 | 0 | 13 |
| 650 | | | min | -398.58 | 1 | -14.595 | 3 | -1432.67 | 6 | .01 | 3 | 0 | 8 | 0 | 1 |
| 651 | M66 | 1 | max | 333.871 | 3 | 597.047 | 5 | 488.771 | 2 | .09 | 7 | .109 | 1 | .291 | 1 |
| 652 | | | min | -328.885 | 4 | -136.051 | 2 | -459.722 | 1 | -.042 | 4 | -.098 | 2 | -.214 | 2 |
| 653 | | 2 | max | 333.871 | 3 | 597.047 | 5 | 488.771 | 2 | .09 | 7 | .08 | 1 | .259 | 1 |
| 654 | | | min | -328.885 | 4 | -136.051 | 2 | -459.722 | 1 | -.042 | 4 | -.068 | 2 | -.205 | 2 |
| 655 | | 3 | max | 333.871 | 3 | 597.047 | 5 | 488.771 | 2 | .09 | 7 | .052 | 1 | .228 | 1 |
| 656 | | | min | -328.885 | 4 | -136.051 | 2 | -459.722 | 1 | -.042 | 4 | -.037 | 2 | -.197 | 2 |
| 657 | | 4 | max | 333.871 | 3 | 597.047 | 5 | 488.771 | 2 | .09 | 7 | .023 | 1 | .197 | 1 |
| 658 | | | min | -328.885 | 4 | -136.051 | 2 | -459.722 | 1 | -.042 | 4 | -.007 | 2 | -.188 | 2 |
| 659 | | 5 | max | 333.871 | 3 | 597.047 | 5 | 488.771 | 2 | .09 | 7 | .027 | 7 | .166 | 1 |
| 660 | | | min | -328.885 | 4 | -136.051 | 2 | -459.722 | 1 | -.042 | 4 | -.006 | 1 | -.18 | 2 |
| 661 | M67 | 1 | max | 424.201 | 3 | 548.363 | 8 | 721.284 | 2 | .205 | 1 | .19 | 1 | .371 | 2 |
| 662 | | | min | -447.555 | 4 | -42.428 | 3 | -643.375 | 1 | -.135 | 2 | -.2 | 2 | -.324 | 1 |
| 663 | | 2 | max | 424.201 | 3 | 548.363 | 8 | 721.284 | 2 | .205 | 1 | .15 | 1 | .348 | 2 |
| 664 | | | min | -447.555 | 4 | -42.428 | 3 | -643.375 | 1 | -.135 | 2 | -.155 | 2 | -.322 | 1 |
| 665 | | 3 | max | 424.201 | 3 | 548.363 | 8 | 721.284 | 2 | .205 | 1 | .11 | 1 | .324 | 2 |
| 666 | | | min | -447.555 | 4 | -42.428 | 3 | -643.375 | 1 | -.135 | 2 | -.11 | 2 | -.32 | 1 |
| 667 | | 4 | max | 424.201 | 3 | 548.363 | 8 | 721.284 | 2 | .205 | 1 | .07 | 1 | .3 | 2 |
| 668 | | | min | -447.555 | 4 | -42.428 | 3 | -643.375 | 1 | -.135 | 2 | -.065 | 2 | -.318 | 1 |
| 669 | | 5 | max | 424.201 | 3 | 548.363 | 8 | 721.284 | 2 | .205 | 1 | .036 | 4 | .276 | 2 |
| 670 | | | min | -447.555 | 4 | -42.428 | 3 | -643.375 | 1 | -.135 | 2 | -.026 | 3 | -.316 | 1 |
| 671 | M68 | 1 | max | 643.184 | 3 | 707.506 | 6 | 685.182 | 4 | .046 | 1 | .182 | 2 | .237 | 8 |
| 672 | | | min | -617.93 | 4 | -28.398 | 1 | -699.643 | 3 | -.076 | 6 | -.218 | 1 | -.04 | 3 |
| 673 | | 2 | max | 643.184 | 3 | 707.506 | 6 | 685.182 | 4 | .046 | 1 | .19 | 2 | .195 | 8 |
| 674 | | | min | -617.93 | 4 | -28.398 | 1 | -699.643 | 3 | -.076 | 6 | -.227 | 1 | -.046 | 3 |
| 675 | | 3 | max | 643.184 | 3 | 707.506 | 6 | 685.182 | 4 | .046 | 1 | .199 | 2 | .159 | 4 |
| 676 | | | min | -617.93 | 4 | -28.398 | 1 | -699.643 | 3 | -.076 | 6 | -.236 | 1 | -.051 | 3 |
| 677 | | 4 | max | 643.184 | 3 | 707.506 | 6 | 685.182 | 4 | .046 | 1 | .207 | 2 | .144 | 1 |
| 678 | | | min | -617.93 | 4 | -28.398 | 1 | -699.643 | 3 | -.076 | 6 | -.245 | 1 | -.068 | 2 |
| 679 | | 5 | max | 643.184 | 3 | 707.506 | 6 | 685.182 | 4 | .046 | 1 | .216 | 2 | .145 | 1 |
| 680 | | | min | -617.93 | 4 | -28.398 | 1 | -699.643 | 3 | -.076 | 6 | -.255 | 1 | -.102 | 2 |
| 681 | M69 | 1 | max | 882.385 | 3 | 644.901 | 5 | 732.809 | 4 | .015 | 3 | .314 | 2 | .102 | 3 |
| 682 | | | min | -726.661 | 4 | 159.978 | 2 | -927.862 | 3 | -.143 | 8 | -.36 | 1 | -.081 | 4 |
| 683 | | 2 | max | 882.385 | 3 | 644.901 | 5 | 732.809 | 4 | .015 | 3 | .335 | 2 | .086 | 2 |
| 684 | | | min | -726.661 | 4 | 159.978 | 2 | -927.862 | 3 | -.143 | 8 | -.392 | 1 | -.097 | 1 |
| 685 | | 3 | max | 882.385 | 3 | 644.901 | 5 | 732.809 | 4 | .015 | 3 | .356 | 2 | .076 | 2 |
| 686 | | | min | -726.661 | 4 | 159.978 | 2 | -927.862 | 3 | -.143 | 8 | -.425 | 1 | -.118 | 1 |
| 687 | | 4 | max | 882.385 | 3 | 644.901 | 5 | 732.809 | 4 | .015 | 3 | .377 | 2 | .066 | 2 |
| 688 | | | min | -726.661 | 4 | 159.978 | 2 | -927.862 | 3 | -.143 | 8 | -.458 | 1 | -.14 | 1 |
| 689 | | 5 | max | 882.385 | 3 | 644.901 | 5 | 732.809 | 4 | .015 | 3 | .398 | 2 | .056 | 2 |
| 690 | | | min | -726.661 | 4 | 159.978 | 2 | -927.862 | 3 | -.143 | 8 | -.49 | 1 | -.166 | 5 |
| 691 | M70 | 1 | max | 0 | 13 | .002 | 8 | 0 | 4 | 0 | 13 | 0 | 13 | 0 | 13 |
| 692 | | | min | 0 | 1 | 0 | 3 | 0 | 7 | 0 | 1 | 0 | 1 | 0 | 1 |
| 693 | | 2 | max | 766.442 | 5 | 239.431 | 2 | 236.453 | 2 | .01 | 3 | .027 | 1 | .056 | 2 |
| 694 | | | min | -105.835 | 2 | -226.166 | 1 | -207.288 | 1 | -.02 | 4 | -.044 | 2 | -.051 | 1 |
| 695 | | 3 | max | 777.659 | 5 | 239.431 | 2 | 229.098 | 2 | .01 | 3 | .159 | 2 | .161 | 3 |
| 696 | | | min | -102.19 | 2 | -226.166 | 1 | -199.933 | 1 | -.02 | 4 | -.152 | 1 | -.167 | 4 |
| 697 | | 4 | max | 886.384 | 1 | 670.388 | 1 | 943.026 | 1 | .009 | 3 | .216 | 2 | .217 | 3 |
| 698 | | | min | -410.384 | 2 | -791.676 | 2 | -1074.605 | 2 | -.016 | 4 | -.196 | 1 | -.209 | 4 |
| 699 | | 5 | max | 0 | 13 | 0 | 4 | 0 | 4 | 0 | 13 | 0 | 13 | 0 | 13 |

## 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 700 | | | min | 0 | 1 | -.002 | 7 | 0 | 5 | 0 | 1 | 0 | 1 | 0 | 1 |
| 701 | M71 | 1 | max | 2029.363 | 6 | 81.13 | 8 | 51.561 | 1 | .024 | 5 | .034 | 8 | .015 | 3 |
| 702 | | | min | -599.884 | 1 | -18.555 | 3 | -62.338 | 2 | .007 | 2 | -.002 | 3 | -.021 | 4 |
| 703 | | 2 | max | 2028.594 | 6 | 66.944 | 8 | 52.047 | 1 | .024 | 5 | .055 | 1 | .033 | 3 |
| 704 | | | min | -597.941 | 1 | -24.283 | 3 | -62.823 | 2 | .007 | 2 | -.044 | 2 | -.079 | 4 |
| 705 | | 3 | max | 2027.826 | 6 | 57.895 | 4 | 52.532 | 1 | .024 | 5 | .1 | 1 | .057 | 3 |
| 706 | | | min | -595.997 | 1 | -30.01 | 3 | -63.309 | 2 | .007 | 2 | -.099 | 2 | -.132 | 4 |
| 707 | | 4 | max | 2027.058 | 6 | 52.168 | 4 | 53.018 | 1 | .024 | 5 | .146 | 1 | .086 | 3 |
| 708 | | | min | -594.053 | 1 | -35.738 | 3 | -63.794 | 2 | .007 | 2 | -.154 | 2 | -.18 | 4 |
| 709 | | 5 | max | 2026.289 | 6 | 46.44 | 4 | 53.503 | 1 | .024 | 5 | .193 | 1 | .119 | 3 |
| 710 | | | min | -592.109 | 1 | -41.465 | 3 | -64.28 | 2 | .007 | 2 | -.21 | 2 | -.223 | 4 |
| 711 | M72 | 1 | max | 841.541 | 2 | -4.038 | 2 | 35.425 | 1 | .14 | 5 | .016 | 4 | .024 | 2 |
| 712 | | | min | -784.106 | 1 | -101.54 | 5 | -24.969 | 2 | .01 | 2 | -.036 | 7 | -.39 | 5 |
| 713 | | 2 | max | 839.597 | 2 | -9.766 | 2 | 35.911 | 1 | .14 | 5 | .041 | 4 | .03 | 2 |
| 714 | | | min | -782.162 | 1 | -115.726 | 5 | -25.455 | 2 | .01 | 2 | -.048 | 3 | -.296 | 5 |
| 715 | | 3 | max | 837.654 | 2 | -15.493 | 2 | 36.396 | 1 | .14 | 5 | .059 | 4 | .07 | 4 |
| 716 | | | min | -780.218 | 1 | -129.912 | 5 | -25.94 | 2 | .01 | 2 | -.057 | 3 | -.194 | 7 |
| 717 | | 4 | max | 835.71 | 2 | -21.221 | 2 | 36.882 | 1 | .14 | 5 | .07 | 4 | .119 | 4 |
| 718 | | | min | -778.274 | 1 | -144.098 | 5 | -26.426 | 2 | .01 | 2 | -.058 | 3 | -.152 | 3 |
| 719 | | 5 | max | 833.766 | 2 | -26.948 | 2 | 37.367 | 1 | .14 | 5 | .101 | 1 | .173 | 4 |
| 720 | | | min | -776.33 | 1 | -158.284 | 5 | -26.911 | 2 | .01 | 2 | -.081 | 2 | -.115 | 3 |
| 721 | M73 | 1 | max | -595.452 | 1 | 13.425 | 7 | 7.89 | 2 | .001 | 1 | .005 | 1 | .006 | 7 |
| 722 | | | min | -2400.656 | 6 | -.42 | 4 | -7.212 | 1 | -.002 | 2 | -.008 | 6 | -.002 | 2 |
| 723 | | 2 | max | -594.818 | 1 | 5.774 | 7 | 4.571 | 2 | .001 | 1 | 0 | 2 | 0 | 1 |
| 724 | | | min | -2394.658 | 6 | -.48 | 2 | -3.893 | 1 | -.002 | 2 | -.003 | 5 | -.005 | 7 |
| 725 | | 3 | max | -594.185 | 1 | -.063 | 1 | 1.253 | 2 | .001 | 1 | .003 | 2 | 0 | 4 |
| 726 | | | min | -2388.661 | 6 | -2.019 | 6 | -.574 | 1 | -.002 | 2 | -.004 | 1 | -.007 | 7 |
| 727 | | 4 | max | -593.551 | 1 | -.588 | 4 | 3.847 | 5 | .001 | 1 | .003 | 2 | 0 | 2 |
| 728 | | | min | -2382.663 | 6 | -9.529 | 7 | -2.375 | 6 | -.002 | 2 | -.003 | 1 | 0 | 1 |
| 729 | | 5 | max | -592.918 | 1 | -.644 | 4 | 7.187 | 5 | .001 | 1 | .005 | 5 | .015 | 7 |
| 730 | | | min | -2376.665 | 6 | -17.18 | 7 | -5.715 | 6 | -.002 | 2 | -.004 | 6 | 0 | 4 |
| 731 | M74 | 1 | max | 0 | 13 | 0 | 5 | 0 | 1 | 0 | 13 | 0 | 13 | 0 | 13 |
| 732 | | | min | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 1 | 0 | 1 |
| 733 | | 2 | max | 903.061 | 6 | -2.001 | 3 | 5.619 | 3 | .038 | 1 | .049 | 4 | .036 | 3 |
| 734 | | | min | 46.856 | 1 | -31.178 | 8 | -38.618 | 8 | -.04 | 2 | -.045 | 3 | -.036 | 4 |
| 735 | | 3 | max | 914.278 | 6 | -5.005 | 1 | 6.041 | 1 | .038 | 1 | .029 | 4 | .046 | 2 |
| 736 | | | min | 50.501 | 1 | -29.052 | 6 | -38.618 | 8 | -.04 | 2 | -.041 | 3 | -.023 | 1 |
| 737 | | 4 | max | 925.495 | 6 | -5.005 | 1 | 13.396 | 1 | .038 | 1 | .019 | 1 | .065 | 2 |
| 738 | | | min | 54.145 | 1 | -29.052 | 6 | -41.705 | 6 | -.04 | 2 | -.052 | 6 | -.019 | 1 |
| 739 | | 5 | max | 0 | 13 | 0 | 4 | 0 | 4 | 0 | 13 | 0 | 13 | 0 | 13 |
| 740 | | | min | 0 | 1 | -.002 | 7 | 0 | 7 | 0 | 1 | 0 | 1 | 0 | 1 |
| 741 | M75 | 1 | max | 2373.536 | 7 | 69.093 | 8 | 85.345 | 2 | .002 | 2 | .03 | 2 | .008 | 3 |
| 742 | | | min | -189.034 | 4 | 7.543 | 3 | -88.192 | 1 | -.024 | 5 | -.068 | 1 | -.017 | 4 |
| 743 | | 2 | max | 2372.671 | 7 | 54.907 | 8 | 77.702 | 2 | .002 | 2 | .101 | 2 | .004 | 3 |
| 744 | | | min | -186.846 | 4 | 1.816 | 3 | -80.55 | 1 | -.024 | 5 | -.142 | 1 | -.067 | 8 |
| 745 | | 3 | max | 2371.807 | 7 | 40.721 | 8 | 70.06 | 2 | .002 | 2 | .165 | 2 | .005 | 3 |
| 746 | | | min | -184.658 | 4 | -3.912 | 3 | -72.907 | 1 | -.024 | 5 | -.208 | 1 | -.109 | 8 |
| 747 | | 4 | max | 2370.942 | 7 | 26.535 | 8 | 62.417 | 2 | .002 | 2 | .223 | 2 | .011 | 3 |
| 748 | | | min | -182.47 | 4 | -9.639 | 3 | -65.265 | 1 | -.024 | 5 | -.269 | 1 | -.138 | 8 |
| 749 | | 5 | max | 2370.077 | 7 | 18.273 | 4 | 54.775 | 2 | .002 | 2 | .274 | 2 | .022 | 3 |
| 750 | | | min | -180.282 | 4 | -15.366 | 3 | -57.623 | 1 | -.024 | 5 | -.322 | 1 | -.155 | 8 |
| 751 | M76 | 1 | max | 961.739 | 3 | -18.884 | 3 | 61.403 | 2 | -.049 | 1 | .061 | 2 | -.107 | 1 |
| 752 | | | min | -956.222 | 4 | -133.52 | 8 | -78.209 | 1 | -.158 | 8 | -.037 | 1 | -.459 | 6 |
| 753 | | 2 | max | 959.551 | 3 | -24.612 | 3 | 53.76 | 2 | -.049 | 1 | .111 | 2 | -.062 | 1 |
| 754 | | | min | -954.034 | 4 | -147.706 | 8 | -70.566 | 1 | -.158 | 8 | -.102 | 1 | -.342 | 6 |
| 755 | | 3 | max | 957.363 | 3 | -30.339 | 3 | 46.118 | 2 | -.049 | 1 | .155 | 2 | -.012 | 1 |
| 756 | | | min | -951.846 | 4 | -161.892 | 8 | -62.924 | 1 | -.158 | 8 | -.16 | 1 | -.212 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 757 | | 4 | max | 955.174 | 3 | -36.067 | 3 | 38.476 | 2 | -.049 | 1 | .192 | 2 | .043 | 1 |
| 758 | | | min | -949.658 | 4 | -176.078 | 8 | -55.282 | 1 | -.158 | 8 | -.211 | 1 | -.078 | 2 |
| 759 | | 5 | max | 952.986 | 3 | -41.794 | 3 | 30.833 | 2 | -.049 | 1 | .222 | 2 | .122 | 4 |
| 760 | | | min | -947.47 | 4 | -190.264 | 8 | -47.639 | 1 | -.158 | 8 | -.256 | 1 | -.033 | 3 |
| 761 | M77 | 1 | max | 439.334 | 3 | 130.57 | 2 | -347.083 | 1 | -.05 | 1 | .198 | 6 | 0 | 13 |
| 762 | | | min | -2021.71 | 8 | -79.959 | 1 | -1440.578 | 6 | -.186 | 6 | .053 | 1 | 0 | 1 |
| 763 | | 2 | max | 438.824 | 3 | 128.386 | 2 | -345.934 | 1 | -.05 | 1 | .037 | 7 | .009 | 1 |
| 764 | | | min | -2021.555 | 8 | -77.775 | 1 | -1437.827 | 6 | -.186 | 6 | .011 | 4 | -.015 | 2 |
| 765 | | 3 | max | 438.313 | 3 | 126.203 | 2 | -344.786 | 1 | -.05 | 1 | -.025 | 1 | .017 | 1 |
| 766 | | | min | -2021.4 | 8 | -75.592 | 1 | -1435.076 | 6 | -.186 | 6 | -.125 | 6 | -.029 | 2 |
| 767 | | 4 | max | 437.802 | 3 | 124.019 | 2 | -343.637 | 1 | -.05 | 1 | -.064 | 1 | .026 | 1 |
| 768 | | | min | -2021.245 | 8 | -73.409 | 1 | -1432.325 | 6 | -.186 | 6 | -.287 | 6 | -.043 | 2 |
| 769 | | 5 | max | 437.292 | 3 | 121.836 | 2 | -342.489 | 1 | -.05 | 1 | -.102 | 1 | .034 | 1 |
| 770 | | | min | -2021.09 | 8 | -71.225 | 1 | -1429.574 | 6 | -.186 | 6 | -.448 | 6 | -.057 | 2 |
| 771 | M78 | 1 | max | 2371.07 | 7 | 70.753 | 2 | -11.678 | 3 | .002 | 2 | .026 | 5 | 0 | 13 |
| 772 | | | min | -190.671 | 4 | -155.57 | 1 | -81.188 | 8 | -.024 | 5 | -.002 | 2 | 0 | 1 |
| 773 | | 2 | max | 2370.915 | 7 | 68.569 | 2 | -10.53 | 3 | .002 | 2 | .017 | 5 | .017 | 1 |
| 774 | | | min | -190.16 | 4 | -153.387 | 1 | -78.437 | 8 | -.024 | 5 | -.004 | 2 | -.008 | 2 |
| 775 | | 3 | max | 2370.76 | 7 | 66.386 | 2 | -9.381 | 3 | .002 | 2 | .011 | 3 | .035 | 1 |
| 776 | | | min | -189.649 | 4 | -151.203 | 1 | -75.686 | 8 | -.024 | 5 | -.007 | 4 | -.015 | 2 |
| 777 | | 4 | max | 2370.605 | 7 | 64.203 | 2 | -8.233 | 3 | .002 | 2 | .01 | 3 | .051 | 1 |
| 778 | | | min | -189.139 | 4 | -149.02 | 1 | -72.935 | 8 | -.024 | 5 | -.012 | 4 | -.023 | 2 |
| 779 | | 5 | max | 2370.45 | 7 | 62.019 | 2 | -7.084 | 3 | .002 | 2 | .009 | 3 | .068 | 1 |
| 780 | | | min | -188.628 | 4 | -146.836 | 1 | -70.184 | 8 | -.024 | 5 | -.017 | 4 | -.03 | 2 |
| 781 | M79 | 1 | max | 1362.141 | 4 | 33.47 | 5 | 21.997 | 4 | .028 | 3 | 0 | 13 | 0 | 13 |
| 782 | | | min | -1575.872 | 3 | 8.781 | 2 | -21.997 | 3 | -.023 | 9 | 0 | 1 | 0 | 1 |
| 783 | | 2 | max | 1356.907 | 4 | 16.735 | 5 | 10.998 | 4 | .028 | 3 | .021 | 4 | -.009 | 2 |
| 784 | | | min | -1572.721 | 3 | 4.39 | 2 | -10.998 | 3 | -.023 | 9 | -.021 | 3 | -.033 | 5 |
| 785 | | 3 | max | 1351.673 | 4 | 0 | 13 | 0 | 13 | .028 | 3 | .029 | 4 | -.011 | 2 |
| 786 | | | min | -1569.569 | 3 | 0 | 1 | 0 | 1 | -.023 | 9 | -.029 | 3 | -.043 | 5 |
| 787 | | 4 | max | 1346.439 | 4 | -4.39 | 2 | 10.998 | 3 | .028 | 3 | .021 | 4 | -.009 | 2 |
| 788 | | | min | -1566.418 | 3 | -16.735 | 5 | -10.998 | 4 | -.023 | 9 | -.021 | 3 | -.033 | 5 |
| 789 | | 5 | max | 1341.205 | 4 | -8.781 | 2 | 21.997 | 3 | .028 | 3 | 0 | 13 | 0 | 13 |
| 790 | | | min | -1563.266 | 3 | -33.47 | 5 | -21.997 | 4 | -.023 | 9 | 0 | 1 | 0 | 1 |
| 791 | M80 | 1 | max | 801.705 | 3 | 38.176 | 5 | 20.771 | 4 | .021 | 3 | 0 | 13 | 0 | 13 |
| 792 | | | min | -989.418 | 4 | 11.148 | 2 | -20.771 | 3 | -.03 | 9 | 0 | 1 | 0 | 1 |
| 793 | | 2 | max | 794.778 | 3 | 19.088 | 5 | 10.385 | 4 | .021 | 3 | .023 | 4 | -.012 | 2 |
| 794 | | | min | -983.532 | 4 | 5.574 | 2 | -10.385 | 3 | -.03 | 9 | -.023 | 3 | -.042 | 5 |
| 795 | | 3 | max | 787.852 | 3 | 0 | 13 | 0 | 13 | .021 | 3 | .031 | 4 | -.016 | 2 |
| 796 | | | min | -977.647 | 4 | 0 | 1 | 0 | 1 | -.03 | 9 | -.031 | 3 | -.056 | 5 |
| 797 | | 4 | max | 780.925 | 3 | -5.574 | 2 | 10.385 | 3 | .021 | 3 | .023 | 4 | -.012 | 2 |
| 798 | | | min | -971.761 | 4 | -19.088 | 5 | -10.385 | 4 | -.03 | 9 | -.023 | 3 | -.042 | 5 |
| 799 | | 5 | max | 773.998 | 3 | -11.148 | 2 | 20.771 | 3 | .021 | 3 | 0 | 13 | 0 | 13 |
| 800 | | | min | -965.876 | 4 | -38.176 | 5 | -20.771 | 4 | -.03 | 9 | 0 | 1 | 0 | 1 |
| 801 | M81 | 1 | max | 1343.297 | 2 | 33.179 | 8 | 24.67 | 2 | .029 | 4 | 0 | 13 | 0 | 13 |
| 802 | | | min | -1556.476 | 1 | 9.44 | 3 | -24.67 | 1 | -.023 | 3 | 0 | 1 | 0 | 1 |
| 803 | | 2 | max | 1344.123 | 2 | 16.59 | 8 | 12.335 | 2 | .029 | 4 | .024 | 2 | -.009 | 3 |
| 804 | | | min | -1559.385 | 1 | 4.72 | 3 | -12.335 | 1 | -.023 | 3 | -.024 | 1 | -.032 | 8 |
| 805 | | 3 | max | 1344.949 | 2 | 0 | 13 | 0 | 13 | .029 | 4 | .032 | 2 | -.012 | 3 |
| 806 | | | min | -1562.293 | 1 | 0 | 1 | 0 | 1 | -.023 | 3 | -.032 | 1 | -.043 | 8 |
| 807 | | 4 | max | 1345.775 | 2 | -4.72 | 3 | 12.335 | 1 | .029 | 4 | .024 | 2 | -.009 | 3 |
| 808 | | | min | -1565.202 | 1 | -16.59 | 8 | -12.335 | 2 | -.023 | 3 | -.024 | 1 | -.032 | 8 |
| 809 | | 5 | max | 1346.601 | 2 | -9.44 | 3 | 24.67 | 1 | .029 | 4 | 0 | 13 | 0 | 13 |
| 810 | | | min | -1568.11 | 1 | -33.179 | 8 | -24.67 | 2 | -.023 | 3 | 0 | 1 | 0 | 1 |
| 811 | M82 | 1 | max | 730.01 | 1 | 38.145 | 6 | 22.291 | 3 | .02 | 1 | 0 | 13 | 0 | 13 |
| 812 | | | min | -920.773 | 2 | 11.22 | 1 | -22.291 | 4 | -.02 | 2 | 0 | 1 | 0 | 1 |
| 813 | | 2 | max | 723.457 | 1 | 19.072 | 6 | 11.146 | 3 | .02 | 1 | .025 | 3 | -.012 | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 814 | | | min | -915.262 | 2 | 5.61 | 1 | -11.146 | 4 | -.02 | 2 | -.025 | 4 | -.042 | 6 |
| 815 | | 3 | max | 716.904 | 1 | 0 | 13 | 0 | 13 | .02 | 1 | .033 | 3 | -.017 | 1 |
| 816 | | | min | -909.75 | 2 | 0 | 1 | 0 | 1 | -.02 | 2 | -.033 | 4 | -.056 | 6 |
| 817 | | 4 | max | 710.352 | 1 | -5.61 | 1 | 11.146 | 4 | .02 | 1 | .025 | 3 | -.012 | 1 |
| 818 | | | min | -904.238 | 2 | -19.072 | 6 | -11.146 | 3 | -.02 | 2 | -.025 | 4 | -.042 | 6 |
| 819 | | 5 | max | 703.799 | 1 | -11.22 | 1 | 22.291 | 4 | .02 | 1 | 0 | 13 | 0 | 13 |
| 820 | | | min | -898.727 | 2 | -38.145 | 6 | -22.291 | 3 | -.02 | 2 | 0 | 1 | 0 | 1 |
| 821 | M83 | 1 | max | 1473.751 | 1 | 33.738 | 6 | 15.529 | 3 | .034 | 2 | 0 | 13 | 0 | 13 |
| 822 | | | min | -1686.255 | 2 | 8.171 | 1 | -15.529 | 4 | -.024 | 1 | 0 | 1 | 0 | 1 |
| 823 | | 2 | max | 1466.49 | 1 | 16.869 | 6 | 7.765 | 3 | .034 | 2 | .015 | 3 | -.008 | 1 |
| 824 | | | min | -1681.077 | 2 | 4.086 | 1 | -7.765 | 4 | -.024 | 1 | -.015 | 4 | -.033 | 6 |
| 825 | | 3 | max | 1459.23 | 1 | 0 | 13 | 0 | 13 | .034 | 2 | .02 | 3 | -.011 | 1 |
| 826 | | | min | -1675.899 | 2 | 0 | 1 | 0 | 1 | -.024 | 1 | -.02 | 4 | -.044 | 6 |
| 827 | | 4 | max | 1451.97 | 1 | -4.086 | 1 | 7.765 | 4 | .034 | 2 | .015 | 3 | -.008 | 1 |
| 828 | | | min | -1670.722 | 2 | -16.869 | 6 | -7.765 | 3 | -.024 | 1 | -.015 | 4 | -.033 | 6 |
| 829 | | 5 | max | 1444.71 | 1 | -8.171 | 1 | 15.529 | 4 | .034 | 2 | 0 | 13 | 0 | 13 |
| 830 | | | min | -1665.544 | 2 | -33.738 | 6 | -15.529 | 3 | -.024 | 1 | 0 | 1 | 0 | 1 |
| 831 | M84 | 1 | max | 864.326 | 2 | 37.789 | 7 | 28.665 | 1 | .023 | 2 | 0 | 13 | 0 | 13 |
| 832 | | | min | -1046.236 | 1 | 12.027 | 4 | -28.665 | 2 | -.019 | 1 | 0 | 1 | 0 | 1 |
| 833 | | 2 | max | 863.367 | 2 | 18.894 | 7 | 14.332 | 1 | .023 | 2 | .032 | 1 | -.013 | 4 |
| 834 | | | min | -1046.317 | 1 | 6.014 | 4 | -14.332 | 2 | -.019 | 1 | -.032 | 2 | -.042 | 7 |
| 835 | | 3 | max | 862.407 | 2 | 0 | 13 | 0 | 13 | .023 | 2 | .042 | 1 | -.018 | 4 |
| 836 | | | min | -1046.399 | 1 | 0 | 1 | 0 | 1 | -.019 | 1 | -.042 | 2 | -.056 | 7 |
| 837 | | 4 | max | 861.448 | 2 | -6.014 | 4 | 14.332 | 2 | .023 | 2 | .032 | 1 | -.013 | 4 |
| 838 | | | min | -1046.481 | 1 | -18.894 | 7 | -14.332 | 1 | -.019 | 1 | -.032 | 2 | -.042 | 7 |
| 839 | | 5 | max | 860.488 | 2 | -12.027 | 4 | 28.665 | 2 | .023 | 2 | 0 | 13 | 0 | 13 |
| 840 | | | min | -1046.563 | 1 | -37.789 | 7 | -28.665 | 1 | -.019 | 1 | 0 | 1 | 0 | 1 |

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

| | Member | Shape | Code Ch... | Loc[ft] | LC | Shear Ch... | Loc[ft] | Dir | LC | phi*Pnc ... | phi*Pnt ... | phi*Mn y-y [... | phi*Mn z-z ... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M77 | PL1/2x5 | .547 | .45 | 6 | .297 | 0 | y | 6 | 77268.8... | 81000 | .844 | 8.438 | 1.66 | H1-1b |
| 2 | M25 | PL1/2x5 | .534 | .45 | 7 | .291 | 0 | y | 7 | 77268.8... | 81000 | .844 | 8.438 | 1.663 | H1-1b |
| 3 | M51 | PL1/2x5 | .524 | .45 | 5 | .287 | 0 | y | 8 | 77268.8... | 81000 | .844 | 8.438 | 1.666 | H1-1b |
| 4 | M3 | PL1/2x5 | .494 | .45 | 9 | .263 | 0 | y | 8 | 77268.8... | 81000 | .844 | 8.438 | 1.666 | H1-1b |
| 5 | M29 | PL1/2x5 | .483 | .45 | 6 | .268 | 0 | y | 6 | 77268.8... | 81000 | .844 | 8.438 | 1.658 | H1-1b |
| 6 | M55 | PL1/2x5 | .465 | .45 | 5 | .258 | 0 | y | 5 | 77268.8... | 81000 | .844 | 8.438 | 1.666 | H1-1b |
| 7 | MP2A | PIPE_2.5 | .343 | 5.25 | 2 | .032 | 5.25 | | 2 | 8059.847 | 50715 | 3.596 | 3.596 | 4.142 | H1-1b |
| 8 | M9 | PIPE_3.5 | .324 | 1.25 | 6 | .136 | 2.75 | | 5 | 59065.3... | 78750 | 7.954 | 7.954 | 1.887 | H1-1b |
| 9 | M35 | PIPE_3.5 | .315 | 1.25 | 7 | .127 | 2.75 | | 6 | 59065.3... | 78750 | 7.954 | 7.954 | 2.043 | H1-1b |
| 10 | M61 | PIPE_3.5 | .306 | 1.25 | 5 | .134 | 2.75 | | 7 | 59065.3... | 78750 | 7.954 | 7.954 | 1.856 | H1-1b |
| 11 | M70 | PIPE_2.0 | .291 | 3.245 | 2 | .146 | 3.245 | | 2 | 27741.09 | 32130 | 1.872 | 1.872 | 1.842 | H1-1b |
| 12 | MP2B | PIPE_2.5 | .290 | 5.25 | 4 | .042 | 5.25 | | 4 | 8059.847 | 50715 | 3.596 | 3.596 | 1.447 | H1-1b |
| 13 | MP2C | PIPE_2.5 | .283 | 5.25 | 3 | .041 | 5.25 | | 4 | 8059.847 | 50715 | 3.596 | 3.596 | 1.49 | H1-1b |
| 14 | M18 | PIPE_2.0 | .268 | 3.245 | 3 | .136 | 3.245 | | 3 | 27741.09 | 32130 | 1.872 | 1.872 | 2.72 | H1-1b |
| 15 | M28 | PIPE_2.5 | .254 | 8.312 | 2 | .090 | 2.297 | | 3 | 4678.732 | 50715 | 3.596 | 3.596 | 1.494 | H1-1b |
| 16 | M44 | PIPE_2.0 | .248 | 3.245 | 1 | .135 | 2.516 | | 1 | 27741.09 | 32130 | 1.872 | 1.872 | 1.867 | H1-1b |
| 17 | M54 | PIPE_2.5 | .246 | 8.312 | 3 | .082 | 8.312 | | 3 | 4678.732 | 50715 | 3.596 | 3.596 | 1.618 | H1-1b |
| 18 | M2 | PIPE_2.5 | .235 | 8.313 | 4 | .101 | 2.297 | | 2 | 4678.732 | 50715 | 3.596 | 3.596 | 1.423 | H1-1b |
| 19 | M27 | PIPE_2.5 | .199 | 5.25 | 3 | .087 | 5.25 | | 4 | 4678.732 | 50715 | 3.596 | 3.596 | 1.486 | H1-1b |
| 20 | MP3A | PIPE_2.5 | .180 | 5.25 | 9 | .036 | 5.25 | | 9 | 8059.847 | 50715 | 3.596 | 3.596 | 3.425 | H1-1b |
| 21 | M53 | PIPE_2.5 | .175 | 8.312 | 3 | .087 | 8.203 | | 4 | 4678.732 | 50715 | 3.596 | 3.596 | 1.403 | H1-1b |
| 22 | M1 | PIPE_2.5 | .175 | 5.25 | 2 | .081 | 2.297 | | 1 | 4678.732 | 50715 | 3.596 | 3.596 | 2.388 | H1-1b |
| 23 | M21 | SR_0.75 | .161 | 4.598 | 5 | .013 | 0 | | 3 | 2809.869 | 14320.8 | .184 | .184 | 2.329 | H1-1b |
| 24 | M73 | SR_0.75 | .159 | 4.598 | 7 | .017 | 0 | | 2 | 2809.869 | 14320.8 | .184 | .184 | 2.302 | H1-1b |
| 25 | M47 | SR_0.75 | .156 | 4.598 | 8 | .018 | 0 | | 4 | 2809.869 | 14320.8 | .184 | .184 | 2.314 | H1-1b |

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

| | Member | Shape | Code Ch... | Loc[ft] | LC | Shear Ch.. | Loc[ft] | Dir | LC | phi*Pnc .. | phi*Pnt .. | phi*Mn y-y [... | phi*Mn z-z ... | Cb | Eqn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | M57 | SR_0.75 | .145 | 4.598 | 7 | .015 | 4.598 | | 3 | 2809.869 | 14320.8 | .184 | .184 | 2.305 | H1-1b |
| 27 | M5 | SR_0.75 | .142 | 4.598 | 5 | .012 | 4.598 | | 1 | 2809.869 | 14320.8 | .184 | .184 | 2.246 | H1-1b |
| 28 | M31 | SR_0.75 | .141 | 4.598 | 6 | .013 | 4.598 | | 2 | 2809.869 | 14320.8 | .184 | .184 | 2.302 | H1-1b |
| 29 | MP1B | PIPE_2.5 | .138 | 4.5 | 1 | .114 | 5.25 | | 1 | 8059.847 | 50715 | 3.596 | 3.596 | 2.346 | H1-1b |
| 30 | M76 | PIPE_2.5 | .129 | 0 | 6 | .062 | 3.485 | | 8 | 47589.8... | 50715 | 3.596 | 3.596 | 1.777 | H1-1b |
| 31 | M24 | PIPE_2.5 | .127 | 0 | 7 | .061 | 3.485 | | 7 | 47589.8... | 50715 | 3.596 | 3.596 | 1.846 | H1-1b |
| 32 | M50 | PIPE_2.5 | .124 | 0 | 8 | .061 | 3.485 | | 5 | 47589.8... | 50715 | 3.596 | 3.596 | 1.759 | H1-1b |
| 33 | MP1C | PIPE_2.5 | .119 | 4.5 | 3 | .078 | 4.5 | | 2 | 8059.847 | 50715 | 3.596 | 3.596 | 1.749 | H1-1b |
| 34 | MP1A | PIPE_2.5 | .116 | 4.5 | 4 | .086 | 4.5 | | 4 | 8059.847 | 50715 | 3.596 | 3.596 | 2.195 | H1-1b |
| 35 | M20 | PIPE_2.5 | .115 | 0 | 9 | .055 | 3.485 | | 8 | 47589.8... | 50715 | 3.596 | 3.596 | 2.148 | H1-1b |
| 36 | M46 | PIPE_2.5 | .114 | 0 | 6 | .056 | 3.485 | | 6 | 47589.8... | 50715 | 3.596 | 3.596 | 1.683 | H1-1b |
| 37 | M72 | PIPE_2.5 | .111 | 0 | 5 | .055 | 3.485 | | 5 | 47589.8... | 50715 | 3.596 | 3.596 | 1.726 | H1-1b |
| 38 | M49 | PIPE_2.5 | .107 | 3.485 | 3 | .013 | 0 | | 7 | 47589.8... | 50715 | 3.596 | 3.596 | 1.493 | H1-1b |
| 39 | M75 | PIPE_2.5 | .105 | 3.485 | 1 | .012 | 0 | | 5 | 47589.8... | 50715 | 3.596 | 3.596 | 1.472 | H1-1b |
| 40 | M45 | PIPE_2.5 | .094 | 3.485 | 4 | .013 | 0 | | 5 | 47589.8... | 50715 | 3.596 | 3.596 | 1.39 | H1-1b |
| 41 | M19 | PIPE_2.5 | .092 | 1.742 | 11 | .025 | 3.485 | | 11 | 47589.8... | 50715 | 3.596 | 3.596 | 1.365 | H1-1b |
| 42 | M71 | PIPE_2.5 | .092 | 3.485 | 2 | .013 | 0 | | 8 | 47589.8... | 50715 | 3.596 | 3.596 | 1.46 | H1-1b |
| 43 | M23 | PIPE_2.5 | .088 | 3.485 | 4 | .027 | 3.485 | | 12 | 47589.8... | 50715 | 3.596 | 3.596 | 1.371 | H1-1b |
| 44 | MP3B | PIPE_2.5 | .086 | 5.25 | 4 | .016 | 5.25 | | 4 | 8059.847 | 50715 | 3.596 | 3.596 | 1.862 | H1-1b |
| 45 | M22 | PIPE_2.0 | .083 | 3.245 | 10 | .025 | 3.245 | | 3 | 27741.09 | 32130 | 1.872 | 1.872 | 2.078 | H1-1b |
| 46 | MP3C | PIPE_2.5 | .079 | 5.25 | 1 | .015 | 5.25 | | 3 | 8059.847 | 50715 | 3.596 | 3.596 | 2.291 | H1-1b |
| 47 | M48 | PIPE_2.0 | .078 | 3.245 | 4 | .024 | 3.245 | | 4 | 27741.09 | 32130 | 1.872 | 1.872 | 1.501 | H1-1b |
| 48 | M74 | PIPE_2.0 | .077 | 3.245 | 6 | .028 | 3.245 | | 2 | 27741.09 | 32130 | 1.872 | 1.872 | 1.757 | H1-1b |
| 49 | M83 | PIPE_2.0 | .063 | 0 | 1 | .022 | 5.193 | | 2 | 23253.44 | 32130 | 1.872 | 1.872 | 1.136 | H1-1... |
| 50 | M79 | PIPE_2.0 | .059 | 0 | 4 | .019 | 5.193 | | 3 | 23253.44 | 32130 | 1.872 | 1.872 | 1.136 | H1-1... |
| 51 | M81 | PIPE_2.0 | .058 | 5.193 | 2 | .019 | 5.193 | | 4 | 23253.44 | 32130 | 1.872 | 1.872 | 1.136 | H1-1... |
| 52 | M4 | PL1/2x5 | .053 | .45 | 11 | .049 | 0 | y | 11 | 77268.8... | 81000 | .844 | 8.438 | 1.667 | H1-1b |
| 53 | M52 | PL1/2x5 | .045 | 0 | 6 | .043 | 0 | y | 7 | 77268.8... | 81000 | .844 | 8.438 | 1.666 | H1-1b |
| 54 | M26 | PL1/2x5 | .045 | 0 | 8 | .042 | 0 | y | 8 | 77268.8... | 81000 | .844 | 8.438 | 1.664 | H1-1b |
| 55 | M84 | PIPE_2.0 | .045 | 2.951 | 2 | .017 | 5.902 | | 2 | 21161.3... | 32130 | 1.872 | 1.872 | 1.136 | H1-1b |
| 56 | M78 | PL1/2x5 | .045 | 0 | 5 | .042 | 0 | y | 5 | 77268.8... | 81000 | .844 | 8.438 | 1.662 | H1-1b |
| 57 | M56 | PL1/2x5 | .043 | 0 | 6 | .041 | 0 | y | 8 | 77268.8... | 81000 | .844 | 8.438 | 1.666 | H1-1b |
| 58 | M30 | PL1/2x5 | .043 | 0 | 5 | .040 | 0 | y | 7 | 77268.8... | 81000 | .844 | 8.438 | 1.659 | H1-1b |
| 59 | M80 | PIPE_2.0 | .039 | 2.951 | 8 | .020 | 0 | | 9 | 21161.3... | 32130 | 1.872 | 1.872 | 1.136 | H1-1b |
| 60 | M82 | PIPE_2.0 | .038 | 2.951 | 6 | .013 | 5.902 | | 2 | 21161.3... | 32130 | 1.872 | 1.872 | 1.136 | H1-1b |

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

| Member | Shape | Code Check | Loc[ft] | LC | Shear C... | Loc[ft] | Dir | LC | phi*Pn... | phi*Tn... | 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

Transcom Engineering, Inc.
Wireless Network Design and Deployment

# Radio Frequency Emissions Analysis Report

**T-MOBILE** Existing Facility

## Site ID: CTHA039A

SBA Manchester_Adams St
60 Adams St
Manchester, CT 06040

**June 13, 2019**

**Transcom Engineering Project Number: 737001-0101**

| Site Compliance Summary | |
|---|---|
| Compliance Status: | **COMPLIANT** |
| Site total MPE% of FCC general population allowable limit: | **22.71 %** |

June 13, 2019

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

Emissions Analysis for Site: **CTHA039A – SBA Manchester_Adams St**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **60 Adams St, Manchester, 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 **60 Adams St, Manchester, 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) |
|---|---|---|---|
| LTE | 1900 MHz (PCS) | 4 | 40 |
| LTE | 2100 MHz (AWS) | 2 | 60 |
| UMTS | 2100 MHz (AWS) | 1 | 40 |
| 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 AIR32 B66A / B2A | 135 |
| A | 2 | RFS APX16DWV-16DWV-S-E-ACU | 135 |
| A | 3 | RFS APXVAARR24_43-U-NA20 | 135 |
| B | 1 | Ericsson AIR32 B66A / B2A | 135 |
| B | 2 | RFS APX16DWV-16DWV-S-E-ACU | 135 |
| B | 3 | RFS APXVAARR24_43-U-NA20 | 135 |
| C | 1 | Ericsson AIR32 B66A / B2A | 135 |
| C | 2 | RFS APX16DWV-16DWV-S-E-ACU | 135 |
| C | 3 | RFS APXVAARR24_43-U-NA20 | 135 |

*Table 2: Antenna Data*

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

## 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 AIR32 B66A / B2A | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.85 / 15.85 | 6 | 360 | 13,845.30 | 2.99 |
| Antenna A2 | RFS APX16DWV-16DWV-S-E-ACU | 2100 MHz (AWS) | 15.9 | 1 | 30 | 1,167.14 | 0.25 |
| Antenna A3 | RFS APXVAARR24_43-U-NA20 | 600 MHz / 700 MHz | 12.95 / 13.35 | 4 | 180 | 3,778.72 | 1.84 |
| | | | | | | Sector A Composite MPE% | **5.08** |
| Antenna B1 | Ericsson AIR32 B66A / B2A | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.85 / 15.85 | 6 | 360 | 13,845.30 | 2.99 |
| Antenna B2 | RFS APX16DWV-16DWV-S-E-ACU | 2100 MHz (AWS) | 15.9 | 1 | 30 | 1,167.14 | 0.25 |
| Antenna B3 | RFS APXVAARR24_43-U-NA20 | 600 MHz / 700 MHz | 12.95 / 13.35 | 4 | 180 | 3,778.72 | 1.84 |
| | | | | | | Sector B Composite MPE% | **5.08** |
| Antenna C1 | Ericsson AIR32 B66A / B2A | 1900 MHz (PCS) / 2100 MHz (AWS) | 15.85 / 15.85 | 6 | 360 | 13,845.30 | 2.99 |
| Antenna C2 | RFS APX16DWV-16DWV-S-E-ACU | 2100 MHz (AWS) | 15.9 | 1 | 30 | 1,167.14 | 0.25 |
| Antenna C3 | RFS APXVAARR24_43-U-NA20 | 600 MHz / 700 MHz | 12.95 / 13.35 | 4 | 180 | 3,778.72 | 1.84 |
| | | | | | | Sector C Composite MPE% | **5.08** |

*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 | **5.08 %** |
| AT&T | 6.44 % |
| Nextel | 0.65 % |
| PageNet | 0.40 % |
| Verizon Wireless | 9.91 % |
| Clearwire | 0.16 % |
| Sprint | 0.07 % |
| **Site Total MPE %:** | **22.71 %** |

*Table 4: All Carrier MPE Contributions*

| | |
|---|---|
| T-MOBILE Sector A Total: | 5.08 % |
| T-MOBILE Sector B Total: | 5.08 % |
| T-MOBILE Sector C Total: | 5.08 % |
| | |
| Site Total: | 22.71 % |

*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) LTE | 4 | 2,307.55 | 135 | 19.94 | 1900 MHz (PCS) | 1000 | 1.99% |
| T-Mobile 2100 MHz (AWS) LTE | 2 | 2,307.55 | 135 | 9.97 | 2100 MHz (AWS) | 1000 | 1.00% |
| T-Mobile 2100 MHz (AWS) UMTS | 1 | 1,167.14 | 135 | 2.52 | 2100 MHz (AWS) | 1000 | 0.25% |
| T-Mobile 600 MHz LTE / 5G NR | 2 | 591.73 | 135 | 2.56 | 600 MHz | 400 | 0.64% |
| T-Mobile 700 MHz LTE | 2 | 1,297.63 | 135 | 5.61 | 700 MHz | 467 | 1.20% |
| | | | | | | **Total:** | **5.08%** |

*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: | 5.08 % |
| Sector B: | 5.08 % |
| Sector C: | 5.08 % |
| T-MOBILE Maximum Total (per sector): | 5.08 % |
| | |
| Site Total: | 22.71 % |
| | |
| Site Compliance Status: | **COMPLIANT** |

The anticipated composite MPE value for this site assuming all carriers present is **22.71 %** 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