Filed by:
G. Scott Shepherd, Site Development Specialist II - SBA Communications
134 Flanders Rd., Suite 125, Westborough, MA 01581
508.251.0720 x 3807 - gshepherd@sbasite.com

May 20, 2020

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

RE: Notice of Exempt Modification
35 South Bartlett Road, Quaker Hill, CT 06375
Latitude: 41.417778
Longitude: 72.105833
T-Mobile Site #: CTNL021D_L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 150-foot level of the existing 180-foot Self-Supporting Tower at 35 South Bartlett Rd., Quaker, CT. The 180-foot tower is owned by SBA Towers II LLC. The property is owned by the Town of Waterford. T-Mobile now intends to install three (3) new 600/1900/2100MHZ antennas). The new antennas would be installed at the 150-foot level of the tower.

Please note: Per the Connecticut Siting Council Website: CSC COVID 19 Guidelines.
In order to prevent the spread of Coronavirus and protect the health and safety of our members and staff, as of March 18, 2020, the Connecticut Siting Council shall convert to full remote operations until March 30, 2020. Please be advised that during this time period, all hard copy filing requirements will be waived in lieu of an electronic filing. Please also be advised that the March 26, 2020 regular meeting shall be held via teleconference. The Council's website is not equipped with an on-line filing fee receipt service. Therefore, filing fees and/or direct cost charges associated with matters received electronically during the above-mentioned time period will be directly invoiced at a later date.

Planned Modifications:

TOWER

Remove:
- (3) 1-5/8" Coax

Remove and Replace:
- (3) LNX-6515DS antenna – (Remove) – (3) RFS APXVAARR24_43-U-NA20 – (Replace)
- (3) Ericsson RRUS 11 B12 RRU – (Remove) – (3) Ericsson Radio 4449 B71+B12 RRU – Replace)

Install New:

- (3) 1-5/8" Fiber
- (3) V-brace Kit (Metro Site MS-C1B-2875P)

Existing Equipment to Remain:

- (9) 1-5/8" Coax
- (1) 1-5/8" Fiber
- (3) Air 21 B2A/B4P Panel
- (3) Air B4A/B2P Panel
- (3) KRY 112 144/1 TMA
- (3) T-Frames

GROUND

Install New:

- Equipment inside existing 6131 cabinet

This facility was approved by the Town of Waterford's Planning and Zoning Commission on August 14, 2006. Special Permit PZ-2006-024 approved the installation of a 180' communications tower. No post construction stipulations were 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 Waterford's First Selectman, Daniel M. Steward, and Zoning Official, Josh Lecar. (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
Site Development Specialist II
SBA COMMUNICATIONS CORPORATION
134 Flanders Rd., Suite 125
Westborough, MA 01581

508.251.0720 x3807 + T
508.366.2610 + F
508.868.6000 + C
gshepherd@sbasite.com

Attachments
cc: Daniel M. Steward, First Selectman / with attachments
Town of Waterford, 15 Rope Ferry Road, Waterford, CT 06385
Josh Lecar, Zoning Official / with attachments
Town of Waterford, 15 Rope Ferry Road, Waterford, CT 06385

EXHIBIT LIST

Exhibit 1	Check Copy	
Exhibit 2	Notification Receipts	
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	Town of Waterford P&Z 8/14/06
Exhibit 6	Construction Drawings	Chappell Engineering 9/17/19
Exhibit 7	Modification Drawings	TES 8/5/19
Exhibit 8	Structural Analysis	TES 8/5/19
Exhibit 9	Post-Mod Mount Analysis	TES 8/5/19
Exhibit 10	EME Report	Transcom Engineering 5/22/19

EXHIBIT 1

Normally, Exhibit would contain a copy of the check for the filing fee.

EXHIBIT 2

Normally, Exhibit 2 would contain the FedEx labels of the recipients of the enclosed filing.

EXHIBIT 3

35 SOUTH BARTLETT ROAD

Location	35 SOUTH BARTLETT ROAD	**Mblu**	11/ / 4866/ /
Acct#	00443701	**Owner**	WATERFORD TOWN OF
Assessment	$643,430	**Appraisal**	$919,180
PID	4866	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$697,500	$221,680	$919,180
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$488,250	$155,180	$643,430

Parcel Addreses

Additional Addresses		
Address	**City, State Zip**	**Type**
35 SOUTH BARTLETT ROAD		Primary

Owner of Record

Owner	WATERFORD TOWN OF	**Sale Price**	$53,000
Co-Owner		**Certificate**	
		Book & Page	777/ 90
		Sale Date	04/22/2005
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
WATERFORD TOWN OF	$53,000		777/ 90	00	04/22/2005
MASHANTUCKET PEQUOT TRIBE THE	$0		743/ 219	00	12/07/2004

Building Information

Building 1 : Section 1

Building Photo

Year Built: 1950
Living Area: 0
Replacement Cost: $0
Building Percent Good: 62

Building Attributes	
Field	**Description**
STYLE	Commercial
MODEL	Comm/Ind
Grade	Below Ave
Stories:	.00
Occupancy	1
Exterior Wall 1	Average
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asphalt
Interior Wall 1	Typical
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	None
Heating Type	None
% Central Air	0
Foundation	N/A
Bldg Use	Exempt Comm
Total Rooms	0
Total Bedrms	0
Total Fixtures	0
% Wet Sprinkler	
% Dry Sprinkler	
1st Floor Use	
Heat/AC	Typical
Frame Type	NONE
Baths/Plumbing	NONE
% Finished	0
Class	
Wall Height	23

Building Photo

(http://images.vgsi.com/photos/WaterfordCTPhotos//default.jpg)

Building Layout

Building Layout
(http://images.vgsi.com/photos/WaterfordCTPhotos//Sketches/48

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend

No Data for Extra Features

Land

Land Use

Use Code	920
Description	Exempt Comm
Zone	IP-1
Neighborhood	IND1
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	1.7
Frontage	0
Depth	0
Assessed Value	$155,180
Appraised Value	$221,680

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
LSUM	Lump Sum			775000 UNITS	$697,500	1

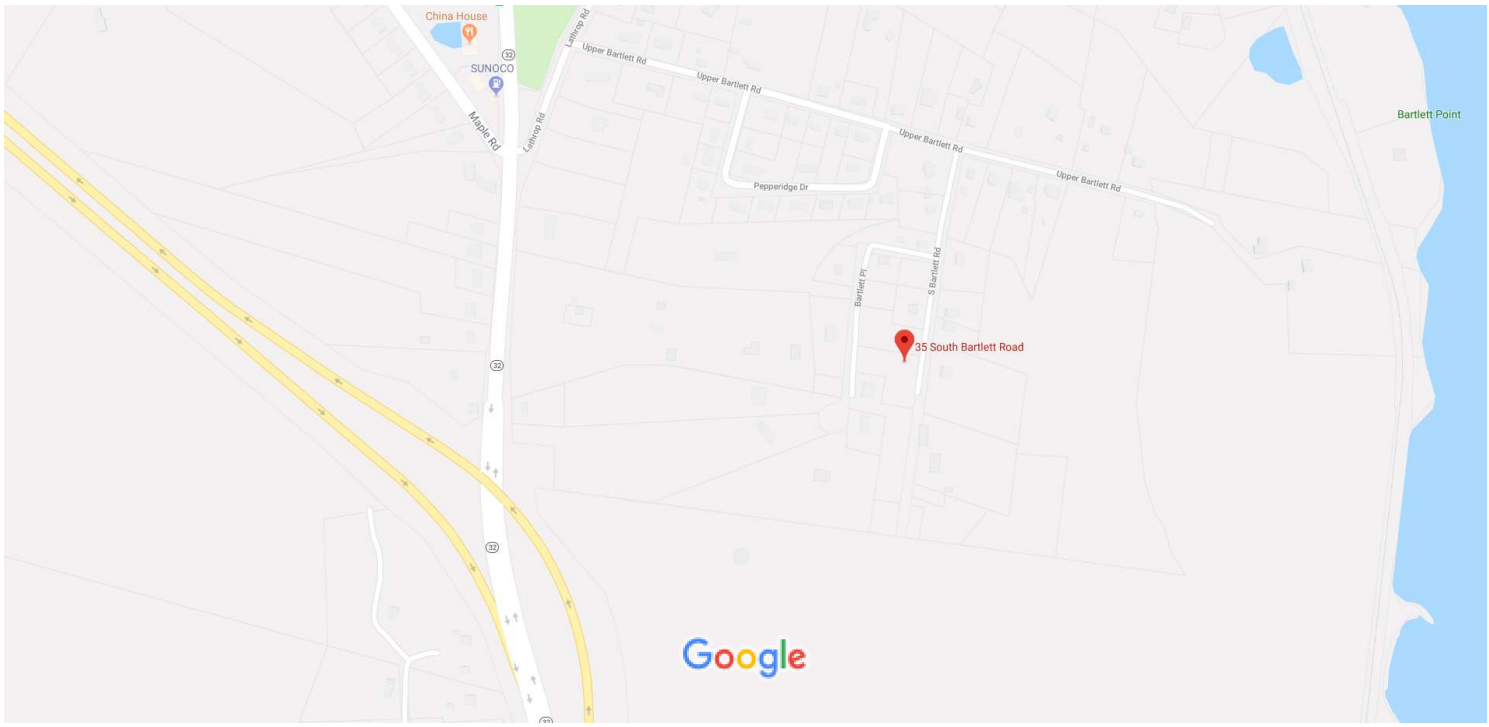
Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$697,500	$166,260	$863,760
2013	$697,500	$166,260	$863,760
2010	$0	$0	$988,386

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2016	$488,250	$116,380	$604,630
2013	$488,250	$116,380	$604,630
2010	$0	$0	$691,870

EXHIBIT 4

Google Maps 35 S Bartlett Rd



Map data ©2019 Google 200 ft

35 S Bartlett Rd

Quaker Hill, CT 06375

Directions Save Nearby Send to your phone Share

EXHIBIT 5

VOL 899 PAGE 309

FIFTEEN ROPE FERRY ROAD

WATERFORD, CT 06385-2886

TOWN OF WATERFORD
PLANNING & ZONING COMMISSION

NOTICE OF GRANT OF A SPECIAL PERMIT

This is to certify that on August 14, 2006, the Waterford Planning & Zoning Commission granted Special Permit #PZ2006-024.

Owner of Record: Town of Waterford

Address: 35 South Bartlett Road

Description of Premises:

As recorded in Volumes 777, Page 090 of the Waterford Land Records

Nature of Special Permit: Special Permit and site plan approval granted for installation of a communications tower.

Applicable Zoning Regulations: Sections 13.2.1 , 19, 22 and 23.

Permit findings, stipulations and conditions are filed in the office of the Town Clerk as stated in the minutes of the Planning & Zoning Commission meeting of August 14, 2006.

PLANNING & ZONING COMMISSION

By: Dawn Choisy
Dawn Choisy
Recording Secretary
Planning & Zoning Commission

This notice is to be recorded on the land records of the Town of Waterford, indexed in the Grantor's Index under the name of the record owner.

ATTEST: TOWN CLERK

RECEIVED FOR RECORD
WATERFORD, CT
06 SEP 13 AM 11:07

There being no further comments or questions, the public hearing was closed at 7:34.

#PZ2006-024 – Request of the Town of Waterford, Director of Emergency Management, applicant; Town of Waterford, owner, for special permit and site plan approval to locate a communications tower at 35 South Bartlett Road, IP-1 zone, in accordance with Sections 13.2.1, 19, 22 and 23 of the Zoning Regulations and as shown on plans entitled "Preliminary Antenna Site Plan Prepared for Town of Waterford Emergency Communications Committee, Waterford, Connecticut" dated June 15, 2006, with modifications requested from sections 13.4.2 and 13.4.3 of the Zoning Regulations.

Chairman Maguire opened the public hearing and read the exhibits into the record:

EXHIBIT A -	Application and support materials.
EXHIBIT B -	Notice of Public Hearing advertised in the Day newspaper on July 31, 2006 and August 7, 2006.
EXHIBIT C -	Notification letter to applicant, along with certificates of mailing.
EXHIBIT D -	Staff and agency condensed comment sheet.
EXHIBIT E -	Plans titled "Preliminary Antenna Site Plan, Prepared for Town of Waterford Emergency Communications Committee, Waterford, Connecticut, dated June 15, 2006.

Murray Pendleton, Director of Emergency Management, and Thomas Dembeck presented this application to the Commission.

Chief Pendleton stated that this proposal involves erecting a 180-foot communications tower on the site of the newly constructed water tank, which is property owned by the Town. The goal is that the system provide first responders have 95% portable radio coverage. He stated that replacing the current radio system and antennas is very important.

Chairman Maguire asked if this proposal needed to go through the siting council. T. Wagner stated that the application is being processed as a municipal tower, and may need to be reviewed by the siting council. Any future co-location by cell phone carriers will usually require approval from the siting council.

Chief Pendleton stated that they want to complete the project in the most economical way possible, and that would involve co-locating of venders on the tower.

T. Wagner stated that two sites were originally identified as possible sites for the tower, and asked why the site at the water tank was preferred. T. Dembeck showed maps of coverage from both the proposed water tank site and the site at the Sportsman's Club, the other proposed location. These were entered into the record as Exhibits G and H.

Chief Pendleton stated that there is a tremendous financial responsibility and involvement in the licensing process that exists right now. This antenna will help to enable all emergency

personnel in town to communicate with each other. Mr. Dembeck explained how the new communications system will work. A flyer showing the tower design was entered into the record as Exhibit F.

J. Auwood stated concerns with the effect on the neighboring properties, noting that the antenna is quite a bit higher than the water tank. T. Dembeck stated that J. Bartelli of the Utility Commission has been in contact with the neighbors who voiced concerns during the public hearing held for the water tank. The proposed tower will be at the back side of the tank, and won't be lit. An 11' x 14' modular concrete building will be constructed to support the radio equipment.

M. Pendelton stated that when the water tank was constructed, the idea was to have the communication tower attached to it, and special brackets were attached to the tank for that purpose. The study that was done showed that an antenna on the water tank would not work.

T. Wagner stated that this public hearing is being held because this proposal is a vast deviation from what was approved for the construction of the water tank.

T. Ward also stated concerns regarding the neighbors. Chief Pendelton stated that this particular antenna was not planned at the time of the approval of the water tank.

Chairman Maguire asked if there was anyone present who wished to speak regarding this application.

Wayne Wainwright of Great Neck Road asked if any of the other towers around would be sufficient for this use. He stated that it seems more like a cell phone tower. He also requested the town consider placing their system on his tower in Montville

M. Wujtewicz stated that the neighbors were sent notices regarding the public hearing, and had opportunity to review the file.

There being no further comments or questions, the public hearing was closed at 7:56.

ITEM #6 APPLICATION REVIEWS
#PZ2006-008 – Request of New London Country Club, owner; and applicant; Gerwick-Mereen, LLC, agent; for a 2-lot resubdivision for property located at 28 Lamphere Road, OS zone, as shown on plans entitled "Jordan View Resubdivision" dated December 5, 2006 with revisions to July 10, 2006, sheets 1 through 4. A coastal site plan review is required in accordance with the Coastal Management Act.

It was the consensus of the Commission to have draft prepare a decision for review at the next meeting.

#PZ2006-013 - Request of Waterford & Miner, LLC, owner and applicant; Glenn M. Gordon, Esq., agent, to change the zone for property located at 22 Miner Lane from C-G (General Commercial) to C-MF (Commercial Multi-Family).

The Commission will review the material submitted during the public hearing and will discuss this application at the next meeting.

#PZ2006-016 – Request of the Town of Waterford Board of Education, applicant; Town of Waterford, owner; Jacunski Humes Architects, LLC, agent for site plan approval to build a new elementary school at 116 Old Norwich Road, VR-10 zone, in accordance with Sections 6a and 22 of the Zoning Regulations and as shown on plans entitled "Planning and Zoning Commission Submittal, Quaker Hill Elementary School" dated 6/26/06.

The Commission reviewed the draft approval prepared by Staff at the direction of the Commission, outlining the stipulations and conditions of approval.

M. Wujtewicz stated that the approval of this application includes an extension of the public water line pursuant to CGS 8-24.

MOTION: Motion made by T. Ward, seconded by H. Daniels, to approve Application #PZ2006-016 with the stipulations and conditions stated in Attachment A.

VOTE: 5-0

#PZ2006-023– Request of Crystal Mall, agent and applicant; Simon Property Group, owner, for site plan approval to locate an auto show at 850 Hartford Turnpike on August 20, 2006, in accordance with Section 3.19 of the Zoning Regulations.

Holly Carpenter of the Crystal Mall and Brian Rheaume of WWRX/WBMW were present to discuss this application with the Commission.

Mr. Rheaume stated that the proposed is the third annual car show held at the Mall, sponsored by Cohanzie Fire Department. Concerns regarding traffic control have been addressed.

T. Wagner stated that he had met with the Mall manager regarding outstanding issues with the stormwater system, and modifications that the Mall hopes to make.

Ms. Carpenter stated that in addition to two police officers at the site, the Mall is providing two uniformed security officers for the event.

MOTION: Motion made by T. Ward, seconded by D. Offen, to approve Application #PZ2006-023.

VOTE: 5-0

#PZ2006-024 – Request of the Town of Waterford, Director of Emergency Management, applicant; Town of Waterford, owner, for special permit and site plan approval to locate a communications tower at 35 South Bartlett Road, IP-1 zone, in accordance with Sections

13.2.1, 19, 22 and 23 of the Zoning Regulations and as shown on plans entitled "Preliminary Antenna Site Plan Prepared for Town of Waterford Emergency Communications Committee, Waterford, Connecticut" dated June 15, 2006, with modifications requested from sections 13.4.2 and 13.4.3 of the Zoning Regulations.

MOTION: Motion made by J. Anwood, seconded by H. Daniels, to approve Application #PZ2006-024.

VOTE: 5-0

ITEM #7 ADMINISTRATIVE REVIEW

Thames Landing – Request for Building and Foundation Permits.

Richard Schneck, representing Thames Landing, addressed the Commission. Mr. Schneck stated that a consolidated site plan and a construction schedule had been submitted to Staff.

E. Maguire stated that the Commission is looking to see that some of the public improvements are completed. Mr. Schneck stated that they are moving forward on the fishing pier, tennis courts and swimming pool. Proposals have been received for the pedestrian bridge. There have been delays in some of the construction.

R. Schneck stated that they want to be able to apply for building and foundation permits. The original agreement was that 70 units be completed and the public recreation area be completed concurrently. They hope to have the public recreation area done by December or January, however it will be quite a while before 70 units are completed.

T. Wagner noted that the construction sequence submitted shows that foundation excavation to occur on October 19 for buildings 7 through 12. Mr. Schneck stated that the schedule shows the worst case scenario, and they would like to have it done sooner.

T. Wagner stated that permits have been issued based on two phases. Phase one being everything on the south side, as defined by the drainage basin and conservation easement. There is one building that is part of phase one that has yet to be started. Staff would like to see more progress completed on the public improvements. He suggested that progress on the pool and the tennis court be presented to the Commission at their next meeting.

Mr. Schneck stated that the developer is looking to refinance the project, and the bank wants the developer to have permits in place prior to re-financing.

Chairman Maguire stated that the Commission can give Staff the authority to determine if progress is being made on the public improvements. T. Wagner stated that Staff will provide to the bank verification that the project is still valid.

The Commission stated that the amenities that were supposed to be part of the development should be in place for the current owners of the units. Mr. Schneck stated that the tennis court and swimming pool have been scheduled.

M. Wujtewicz stated that the swimming pool and tennis courts are not part of the public improvements, they are for the use of the condominium owners. The beach, shoreline, etc.,

RICHARD BLUMENTHAL
ATTORNEY GENERAL

55 Elm Street
P.O. Box 120
Hartford, CT 06141-0120

Office of The Attorney General
State of Connecticut

September 5, 2007

Daniel F. Caruso, Chairman
State of Connecticut Siting Council
Ten Franklin Square
New Britain, Connecticut 06051

Dear Chairman Caruso:

Your agency has asked for an opinion on whether the Connecticut Siting Council ("Council") has jurisdiction over the siting of municipal towers pursuant to Conn. Gen. Stat. § 16-50i (a)(6). By the term "municipal tower", the Council means a tower used, at least in part, for wireless telephone (commonly called "cell phone") service when that tower is owned by a municipality on municipal property. Specifically, the Council seeks an opinion as to whether the Council has jurisdiction over proposed towers that are to be owned by a municipality, built on municipal property, and will have one or more antennas to provide commercial cell phone service. According to the information you have provided, for many years the Council has interpreted its statutory authority to prohibit jurisdiction over such municipal towers. For the reasons stated below, I conclude that the Council should seek legislative clarification on this issue.[1]

The Public Utility Environmental Standards Act ("PUESA"), codified at Conn. Gen. Stat. § § 16-50g, *et seq.*, grants exclusive jurisdiction over the siting of certain facilities to the Council. Such facilities are defined in Conn. Gen. Stat. § 16-50i (a). Conn. Gen. Stat. § 16-50i (a)(6) defines the term "facility" to include "such telecommunications towers, including associated telecommunications equipment, owned or operated by the state, a public service company or a certified telecommunications provider or used in a cellular system, as defined in the Code of Federal regulations Title 47, Part 22, as amended, which

[1] It should be noted that this opinion request does not include towers built by a municipality for municipal communications that have sufficient space for cell phone antennas, but are initially built without such antennas. You have informed this office that the Council maintains that it has no jurisdiction over such towers. For example, if a municipality wishes to build a tower for police and fire department communications on town land and there is no cell antenna on the tower, the Council continues to hold that it has no jurisdiction over the siting and building of such a tower, even if such a tower could, at a later date, accommodate a cell antenna.

may have a substantial adverse environmental effect, as said council shall, by regulation, prescribe." The Council's relevant regulations include Reg. Conn. State Agencies § 16-50j-2a (g), which states, in part, that "facility" includes "telecommunications towers owned or operated by the state, a public service company as defined in section 16-1 of the General Statutes, or used for public cellular radio communications service as defined in section 16-50i of the General Statutes, which may have a substantial adverse environmental effect."

In recent years, the courts have interpreted Conn. Gen. Stat. § 16-50i (a)(6). In *Sprint Spectrum L.P v. Connecticut Siting Council*, 274 F.3d 674 (2d Cir. 2001), the United States Court of Appeals for the Second Circuit held that the Council's jurisdiction covered both cellular systems regulated by 47 C.F.R. Part 22 and Personal Communications Services (PCS) regulated by 47 C.F.R. Part 24. In *Town of Westport v. Connecticut Siting Council*, 47 Conn. Supp. 382, 797 A.2d 6555 (2001), *affirmed*, 260 Conn. 266, 796 A.2d 510 (2002), it was held that the Council had exclusive jurisdiction over mixed use towers (towers used in part, but not exclusively, for cellular service). Neither case concerned municipal ownership of towers.

Conn. Gen. Stat. § 1-2z states: "The meaning of a statute shall, in the first instance, be ascertained from the text of the statute itself and its relationship to other statutes. If, after examining such text and considering such relationship, the meaning of such text is plain and unambiguous and does not yield absurd or unworkable results, extratextual evidence of the meaning of the statute shall not be considered." The literal text of Conn. Gen. Stat. § 16-50i (a)(6) gives the Council jurisdiction over all "telecommunications towers. . . used in a cellular system" and does not exempt municipal towers from the Council's jurisdiction. Without a specific exemption for municipalities in the statute, a municipal tower "used in a cellular system. . . which may have a substantial adverse environmental effect" appears to fall within the Council's regulatory authority. Conn. Gen. Stat. § 16-50i(a)(6).

However, while a reasonable interpretation of Conn. Gen. Stat. § 16-50i(a)(6) places municipals towers within the Council's jurisdiction, other factors make the Council's jurisdiction less clear. First, although the text of the statute does not specifically exempt municipal towers, neither does the statute include municipal towers within the Council's jurisdiction. Conn. Gen. Stat. § 16-50i(a)(6) specifically gives the Council jurisdiction over towers "owned or operated by the state," but does not give the Council similar specific authority over towers owned by municipalities. Had the legislature intended to give the Council jurisdiction over all facilities owned by governmental entities "that were

used for public cellular radio communications services," the legislature may not have specifically included state owned facilities within the Council's jurisdiction. The legislature's failure to include towers owned or operated by municipalities within its definition of regulated facilities, while including those owned or operated by the state, may be construed as a legislative decision not to give the Council jurisdiction over municipal towers. *See Gay & Lesbian Law Students Ass'n v. Board of Trustees*, 236 Conn. 453, 476 (1996) (citing rule of statutory construction, expressio unius est exclusio alterius, or "the expression of one thing is the exclusion of another"); *Hyatt v. Burlington Coat Factory*, 263 Conn. 279, 295 (2003).

Second, Conn. Gen. Stat. § 16-50*l* (e) requires prior consultation with the chief elected official of a municipality by an applicant before filing an application with the Council, and permits the municipality to conduct public hearings. If the legislature had intended that municipal towers fall within the Council's jurisdiction, the process set forth in Section 16-50*l* (e) would require the town to consult with itself prior to filing an application with the council: "[w]e presume that the legislature intends sensible results from the statutes it enacts . . . Therefore, we read each statute in a manner that will not thwart its intended purpose or lead to absurd results." *Collins v. Colonial Penn. Ins. Co.*, 257 Conn. 718, 728-29 (2001) (citations omitted; internal quotation marks omitted.) Finally, the Council itself has never interpreted this statute to give it jurisdiction over municipal towers and continues to recognize that it has no jurisdiction over towers constructed by a town on town property that do not contain cell phone antennas, even if the town installs such antennas after the tower is constructed. Courts accord "considerable deference to the construction given a statute by the administrative agency charged with its enforcement, particularly when the agency has consistently followed its construction over a long period of time." *Sutton v. Lopes*, 201Conn. 115, 120 (1986).

The legislative history does not clarify whether municipal towers are facilities under Conn. Gen. Stat. § 16-50i (a)(6) as it contains no reference to municipal towers. As the Superior Court in *Town of Westport v. Connecticut Siting Council, supra*, noted:

> Public Acts 1984, No. 84-249 added subsection 6 to the definitions of § 16-50i(a). The act as initially passed in the Senate gave the council exclusive jurisdiction to regulate telecommunications towers used for public cellular radio communication services. 27 S.Proc., Pt. 3, 1984 Sess., p. 842,

> remarks of Senator John B. Larson. In the House proceedings, Representative David Lavine first generally pointed out that the purpose of the legislation was to end ad hoc town-by-town regulation in favor of regulation by the council. He also introduced an amendment that changed the Senate language to the current 'used in a cellular system' terminology with a reference to the federal definition of a cellular system. 27 H.R.Proc., Pt. 9, 1984 Sess., pp. 3206-11, especially pp. 3209-10. The Senate later joined in the bill as amended in the House. Public Act 84-249 as enacted thus contains broader language than as initially proposed.

Town of Westport v. Connecticut Siting Council, supra, 47 Conn. Supp. at 398-399.[2]

While the legislative history supports granting the Council exclusive jurisdiction over the siting of cellular towers, in contrast to town-by-town regulation, it does not clarify the Council's jurisdiction over towers owned by municipalities themselves. Both the language of Conn. Gen. Stat. § 16-50i (a)(6), and its legislative history are ambiguous as to the Council's jurisdiction over municipal towers and legislative clarification of this matter is, therefore, appropriate.

Please advise me if any further clarification is required.

Very truly yours,

RICHARD BLUMENTHAL
ATTORNEY GENERAL

[2] Note that the Connecticut Supreme Court essentially adopted the Superior Court's decision. *Town of Westport v. Connecticut Siting Council*, 260 Conn. 266, 796 A.2d 510 (2002).

EXHIBIT 6

EXHIBIT 7

MODIFICATION AND DESIGN
DRAWINGS FOR EXISTING ANTENNA MOUNTS
EXISTING SELF SUPPORTING TOWER

PROPOSED CARRIER: T-MOBILE

TOWER OWNER: SBA / TOWER OWNER SITE #: CT09680-S

CARRIER SITE #/NAME: CTNL021D / ROGERS HILL

COORDINATES (LATITUDE: 41.417652°, LONGITUDE: -72.106728°)

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

SHEET	SHEET TITLE	REV
T-1	TITLE SHEET	0
BOM	BILL OF METERIALS	0
GN-1	GENERAL NOTES	0
A-1	ANTENNA MOUNT MODIFICATION DETAILS	0
A-2	ANTENNA MOUNT PHOTOS	0
D-1	STANDARD DETAILS	0
MS-C1B-2875P	METROSITE V BRACING KIT	

NOTE:

1. THE MODIFICATION DRAWINGS ARE BASED ON THE **TES** PROJECT NO. 77884, DATED 06/19/19.

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

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

TES JOB NO:
82883

CUSTOMER SITE NO:
CT09680-S-SBA

CUSTOMER SITE NAME:
ROGERS HILL

35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

STATE OF CONNECTICUT
JAIME RIVERA
No. 17534
LICENSED
PROFESSIONAL ENGINEER
8/5/19

DRAWN BY: RK | CHECKED BY: SD/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: T-1

REV #: 0

BILL OF MATERIALS

QUANTITY COUNTED	QUANTITY PROVIDED	PART NUMBER	DESCRIPTIONS	SHEET LIST	PIECE WEIGHT (LBS)	WEIGHT (LB)	NOTES
			MATERIAL & HARDWARE				
2	2	MS-C1B-2875P	METROSITE V BRACING KIT	A-1, MS-C1B-2875P	328.0	656.0	Galvanized
			FOLLOWING ITEMS ARE "CUSTOM" PARTS				
			ALL METROSITE PARTS ARE AVAILABLE FROM METROSITE, LLC. **180 IND PARK BLVD COMMERCE, GA 30529** **OFFICE: (706) 335-7045** **FAX: (706) 335-7056**				
			NOTE: ALL MATERIALS, WHICH WEREN'T LISTED IN THIS SHEET, ARE ASSUMED TO BE PROVIDED BY THE CONTRACTOR.				
				TOTAL WEIGHT (LBS) =		**656.0**	

TES

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

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

TES JOB NO:
82883

CUSTOMER SITE NO:
CT09680-S-SBA
CUSTOMER SITE NAME:
ROGERS HILL
35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

DRAWN BY: RK | CHECKED BY: SD/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

SHEET TITLE:
BILL OF MATERIALS

SHEET NUMBER: BOM
REV #: 0

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH THE ANSI/TIA-222-G, ANSI/ASSP A10.48, 2018 CONNECTICUT STATE BUILDING CODE AND ANY OTHER GOVERNING BUILDING CODES AND OSHA SAFETY REGULATIONS.
2. ALL WORK INDICATED ON THE DRAWINGS SHALL BE PERFORMED BY QUALIFIED CONTRACTORS EXPERIENCED IN TELECOMMUNICATIONS TOWER, POLE AND FOUNDATION CONSTRUCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND FABRICATION OF ALL MISCELLANEOUS PARTS (SUCH AS SHIMS), TEMPORARY SUPPORTS, AND GUYINGS, ETC., PER ANSI/ASSP A10.48, TO COMPLETE THE ASSEMBLY AS SHOWN IN THE DRAWINGS.
4. CONTRACTOR SHALL PROCEED WITH THE INSTALLATION WORK CAREFULLY SO THE WORK WILL NOT DAMAGE ANY EXISTING CABLE, EQUIPMENT OR THE STRUCTURE.
5. THE USE OF GAS TORCH OR WELDER, ARE NOT ALLOWED ON ANY TOWER STRUCTURE WITHOUT THE CONSENT OF THE TOWER OWNER.
6. GENERALLY THE CONTRACTOR IS RESPONSIBLE TO CONDUCT AN ONSITE VISIT SURVEY OF THE JOB SITE AFTER AWARD, AND REPORT ANY ISSUES WITH THE SITE TO **TES** BEFORE PROCEEDING CONSTRUCTION.
7. IT IS THE RESPONSIBILITY OF THE GC TO VERIFY THAT THERE IS NO INTERFERENCES (WITH SAFETY CLIMB BRACKETS, TRANSMISSION LINES, ETC.) PRIOR TO MOBILIZATION AND INSTALLATION OF THESE MODIFICATIONS.
8. PLEASE NOTIFY TES IMMEDIATELY IF ANY INSTALLATION ISSUES OCCUR RELATED TO THIS DRAWING @ 972-483-0607 OR EMAIL-TESCONSTRUCTION@TESTOWER.US

FABRICATION

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

WELDING

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

BOLTED ASSEMBLIES AND TIGHTENING OF CONNECTIONS

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

VERIFICATION AND INSPECTION

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

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

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

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

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

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

[d] BEVELED WASHER NOT USED.

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

INSTALLATION TORQUE REQUIRED FOR HOLLO BOLTS AND AJAX BOLTS:

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

FIELD HOT WORK PLAN NOTES:

FOLLOWING GUIDELINES SHALL BE COMPLIED WITH:

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

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

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

TES JOB NO:
82883

CUSTOMER SITE NO:
CT09680-S-SBA
CUSTOMER SITE NAME:
ROGERS HILL
35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

DRAWN BY: RK | CHECKED BY: SD/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

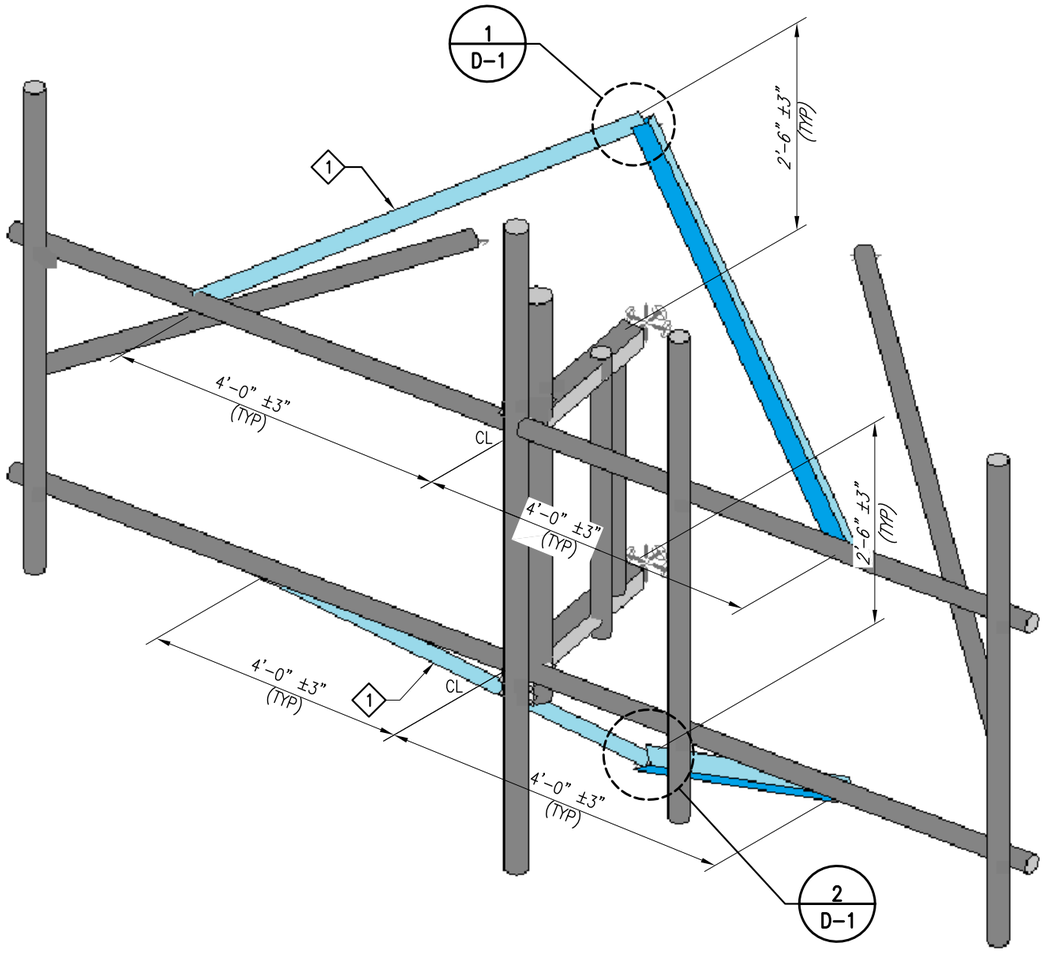
SHEET TITLE:
GENERAL NOTES

SHEET NUMBER: GN-1
REV #: 0

SCOPE OF WORK

1. INSTALL NEW V-BRACING KITS ON THE TOP AND BOTTOM HORIZONTALS, SEE SHEETS MS-C1B-2875P & D-1 FOR DETAILS.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEAN-UP, REMOVAL AND DISPOSAL OF EXCESS MATERIALS USED AND REMOVED FROM THE STRUCTURE AT THE COMPLETION OF THE PROJECT.

PHOTO 1



ISOMETRIC VIEW
EXISTING ANTENNA MOUNT @ 150' ELEV.
(MODIFICATION IS TYPICAL FOR ALL (3) SECTORS)

GC NOTE:

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

NOTES:

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

ITEM NO.	QTY.	PART NO.	DESCRIPTIONS
1	2	MS-C1B-2875P	METROSITE V BRACING KIT

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

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

TES JOB NO:
82883

CUSTOMER SITE NO:
CT09680-S-SBA
CUSTOMER SITE NAME:
ROGERS HILL
35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

DRAWN BY: RK | CHECKED BY: SD/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

SHEET TITLE:
ANTENNA MOUNT MODIFICATION DETAILS

SHEET NUMBER: A-1
REV #: 0

PHOTO 1

PHOTO 2

PHOTO 3

PHOTO 4

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

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

TES JOB NO:
82883

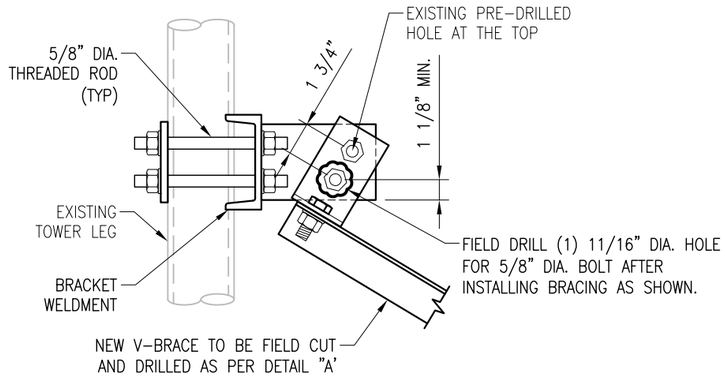
CUSTOMER SITE NO:
CT09680-S-SBA
CUSTOMER SITE NAME:
ROGERS HILL
35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

DRAWN BY: RK | CHECKED BY: SD/HMA

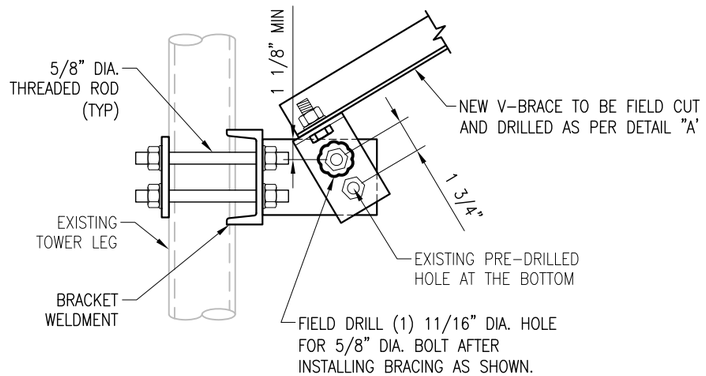
REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

SHEET TITLE:
ANTENNA MOUNT PHOTOS

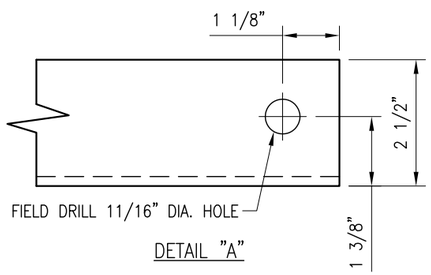
SHEET NUMBER: A-2
REV #: 0



1 / D-1 DETAIL



2 / D-1 DETAIL



DETAIL "A"

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

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

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

TES JOB NO:
82883

CUSTOMER SITE NO:
CT09680-S-SBA
CUSTOMER SITE NAME:
ROGERS HILL
35 SOUTH BARTLETT ROAD
QUAKER HILL, CT 06375

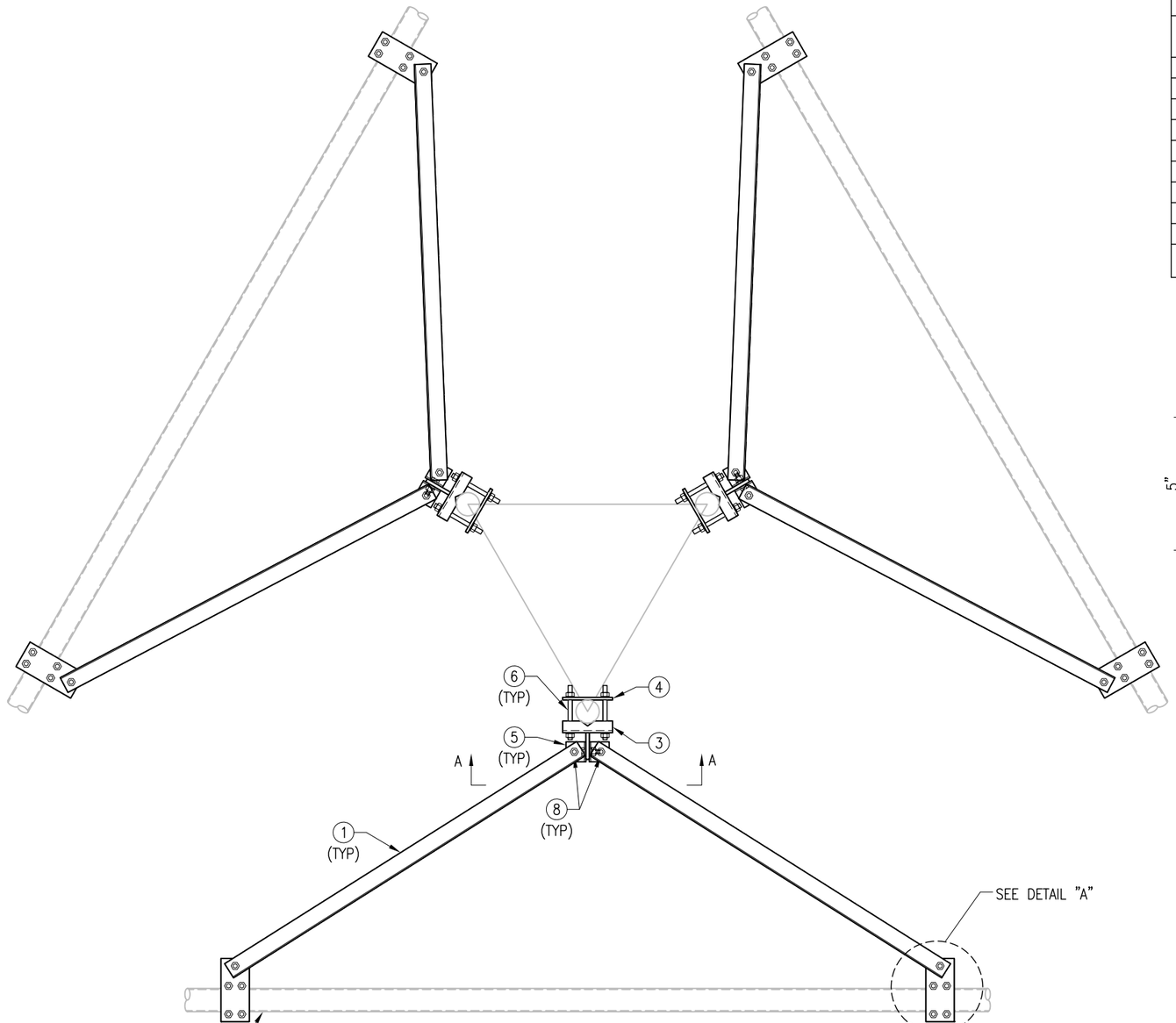
DRAWN BY: RK | CHECKED BY: SD/HMA

REV.	DESCRIPTION	BY	DATE
0	FIRST ISSUE	RK	08/05/19

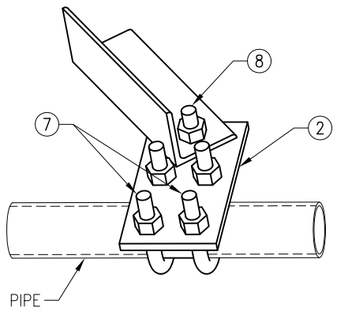
SHEET TITLE:
STANDARD DETAILS

SHEET NUMBER: D-1
REV #: 0

THE FOLLOWING DRAWINGS ARE INCLUDED FOR REFERENCE ONLY
PLEASE REFER TO THE INSTALLATION DRAWINGS FOR ACTUAL INSTALLATION DETAILS

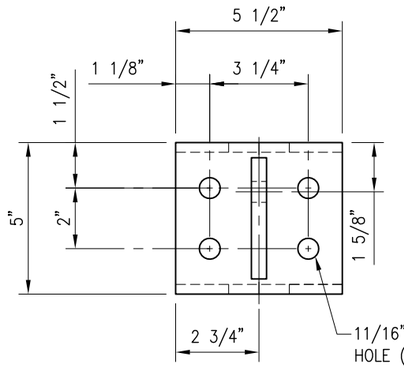


PLAN VIEW

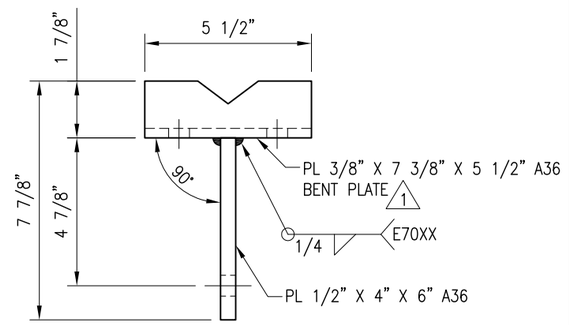


DETAIL "A"

MS-C1B-2875P						
ITEM NO.	QTY.	PART NO.	DESCRIPTION	GRADE	SHEET #	WT
1	6	VB-25-10	L 2 1/2" X 2 1/2" X 1/4" X 10'-0"	A36	BK-1	258
2	6	PL375-4259	PL 3/8" X 4 1/4" X 9"	A36	BK-2	25.8
3	3	C1BW-150-250	BRACKET WELDMENT	A36	C1BW-150-250	24.0
4	3	PL5-42550	PL 1/2" X 4 1/4" X 5 1/2"	A572-50	BK-2	10.5
5	6	AL-533	L 5" X 3" X 1/4" X 3"	A36	BK-1	10.2
6	12	---	THREADED ROD 5/8" X 10" W/ (2) HHN & LKW EA.	A36	--	--
7	12	MS02-625-300-500	RU-BOLT 5/8" X 3" I.W. X 5" I.L. A36 (OR EQUIV.)	---	RBC-1	--
8	12	---	BOLT 5/8" X 1 3/4" A325 W/ HHN & LKW EA.	---	--	--
9	6	---	BOLT 5/8" X 2 1/4" A325 W/ HHN & LKW EA.	---	---	--
					GALVANIZED WT	329

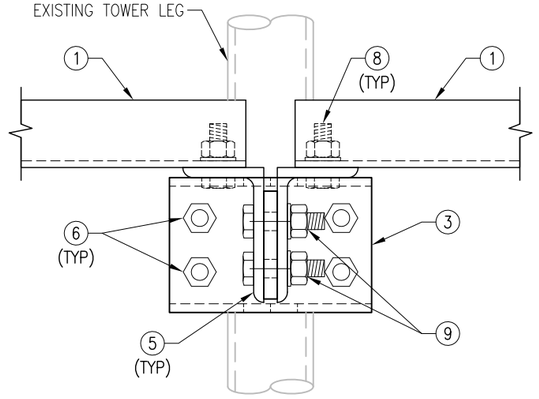


FRONT VIEW



TOP VIEW

C1BW-150-250 WELDMENT



SECTION "A-A"

NOTE:
1) FITS 1 1/2" DIA. TO 2 1/2" DIA. LEG.
2) THREADED ROD MAY BE CUT TO LENGTH AS REQUIRED.
3) FITS 1 1/2" TO 2 7/8" O.D HORIZONTAL PIPE.

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES AND INCLUDE FINISH

STANDARD SHEET TOLERANCES

DECIMALS	ANGLES
.X ± 0.1	± 1°
.XX ± 0.02	FRACTIONS
.XXX ± 0.005	± 1/32

APPROVAL / SIGNATURES		DATE
DRAWN BY	XXX	05/12/17
REVIEWED	XXX	-
APPROVED	XXX	-

METROSITE FABRICATORS LLC
180 INDUSTRIAL PARK BLVD.
COMMERCE GA 30529

TITLE

MS-C1B-2875P
V-BRACING KIT

SIZE	DWG NO	REV
B	MS-C1B-2875P	1

SCALE -

SHEET 1 OF 1

EXHIBIT 8

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

Structural Analysis Report

Existing 180 ft. World Tower Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT09680-S

Customer Site Name: Rogers Hill

Carrier Name: T-Mobile (App#: 116819, V1)

Carrier Site ID / Name: CTNL021D / Rogers Hill

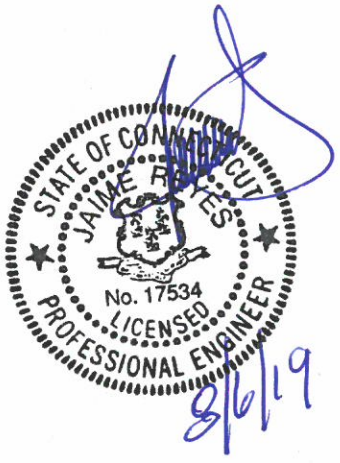
Site Location: 35 South Bartlett Road

Quaker Hill, Connecticut

New London County

Latitude: 41.417652

Longitude: -72.106728



Analysis Result:

Max Structural Usage: 90.9% [Pass]

Max Foundation Usage: 69% [Pass]

Additional Usage Caused by Mount Modification: +0.8%

Report Prepared By : Stacey Hesselbein

Introduction

The purpose of this report is to summarize the analysis results on the 180 ft. World Tower Self Supporting Tower 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	World Tower, Drawing # Q071062 Dated 12/05/2007
Foundation Drawing	World Tower, Drawing @ Q071062F Dated 01/08/2008
Geotechnical Report	Clarence Welti Associates, Inc., Site Name: Rogers Hill Dated 12/17/2007
Modification Drawings	N/A

Analysis Criteria

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

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 135 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 105.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 3/4" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	ANSI/TIA/EIA 222-G / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft.
Seismic Parameters:	S_S = 0.161, S_1 = 0.058

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

Existing Antennas, Mounts and Transmission Lines

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

Items	Elevation (ft.)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
1	187.6	2	Sinclair SC488-HF2LNF Omni	(3) Standoffs	(3) 1 5/8"	Town of Waterford
2	185.0	1	9" x 13.25" x 21.25" TMA			
3	182.5	1	Telewave ANT150F2 Panel			
-	150.0	3	Ericsson Air 21 B2A/B4P Panel	(3) T-Frames	(12) 1 5/8" (1) 1 5/8" Fiber	T-Mobile
-		3	Ericsson Air B4A/B2P Panel			
-		3	Commscope LNX-6515DS - Panel			
-		3	Ericsson KRY 112 144/1 TMA			
-		3	Ericsson RRUS 11 B12 RRU			
9	120.0	12	Commscope SBNHH-1D65B Panel	(3) Sector Frames (Commscope SF-QV12-B)	(9) 1 5/8" (3) 1 5/8" Fiber	Verizon
10		3	Alcatel Lucent RRH 2x60 AWS RRH			
11		3	Alcatel Lucent RRH2X60-1900 RRH			
12		3	Alcatel Lucent RRH2x60-700 RRH			
13		3	RFS DB-T1-6Z-8AB-0Z DC Surge			

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
4	150.0	3	Ericsson Air 21 B2A/B4P Panel	(3) T-Frames w/ V-brace Kit (Metro Site MS-C1B-2875P)	(9) 1 5/8" (4) 1 5/8" Fiber	T-Mobile
5		3	Ericsson Air 21 B4A/B2P Panel			
6		3	RFS APXVAARR24_43-U-NA20 Panel			
7		3	Ericsson KRY 112 144/1TMA			
8		3	Ericsson Radio 4449 B71+B12 RRU			

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:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	**77.8%**	**90.9%**	**26.0%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Original Design Reactions	386.0	333.0	43.0
Analysis Reactions	351.7	315.3	26.6
Factored Reactions*	521.1	449.6	58.1
% of Design Reactions	67.5%	70.1%	45.9%

* Per section 15.5.1 of the TIA-222-G standard, factored reactions were obtained by multiplying a 1.35 factor to the original design reactions.

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

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by ANSI/TIA/EIA 222-G for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.2180 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

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

Standard Conditions

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

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

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

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

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

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

Structure: CT09680-S-SBA

Site Name:	Rogers Hill			**Code:**	EIA/TIA-222-G	8/6/2019
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	105.00	
Height:	180.00 (ft)	**Base Width:**	14.50	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	4.00	**Operational WS:**	60.00	Page: 1

Tower Engineering Solutions

Section Properties

Sect	Leg Members	Diagonal Members	Horizontal Members
1	SOL 4" SOLID	SAE 3X3X0.25	
2	SOL 4" SOLID	SAE 3X3X0.1875	
3	SOL 3 3/4" SOLID	SAE 3X3X0.1875	
4	SOL 3 1/2" SOLID	SAE 3X3X0.1875	
5	SOL 3 1/2" SOLID	SAE 2X2X0.25	
6	SOL 3" SOLID	SAE 2X2X0.25	
7	SOL 2 3/4" SOLID	SAE 2X2X0.1875	SAE 2x2x0.125
8	SOL 2" SOLID	SOL 1 1/4" SOLID	SOL 1" SOLID
9	SOL 1 1/2" SOLID	SOL 1" SOLID	SOL 1" SOLID

Discrete Appurtenances

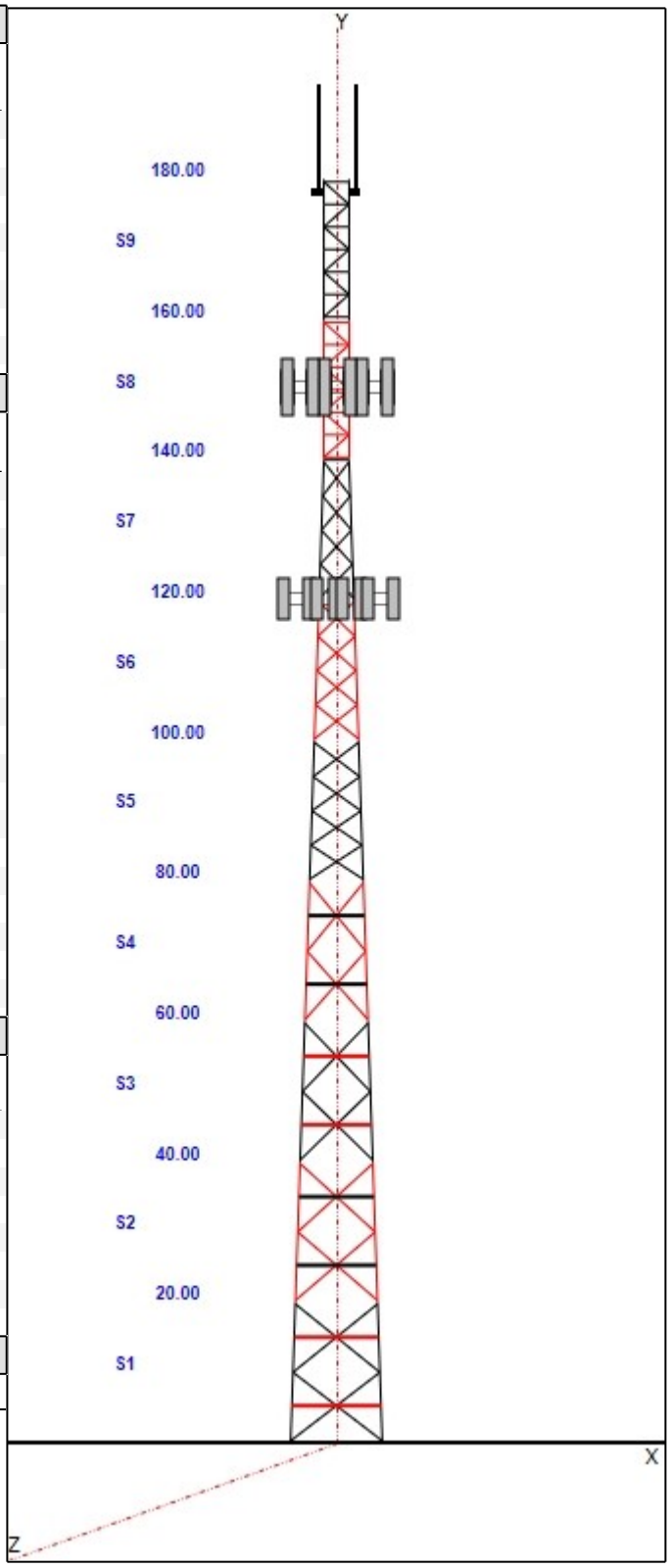
Attach Elev (ft)	Force Elev (ft)	Qty	Description
180.00	180.00	1	6' Lightning rod
180.00	180.00	1	Beacon
178.00	185.63	2	SC488-HF2LNF
178.00	182.50	1	ANT150F2
178.00	185.00	1	9" x 13.25" x 21.25"
178.00	178.00	3	4 ft Sidearm
150.00	150.00	3	T-Frames
150.00	150.00	2	MS-C1B-2875P
150.00	150.00	3	Air 21 B2A/B4P
150.00	150.00	3	Air 21 B4A/B2P
150.00	150.00	3	APXVAARR24_43-U-NA20
150.00	150.00	3	KRY 112 144/1
150.00	150.00	3	Radio 4449 B71+B12
120.00	120.00	1	(3) SF-QV12-B
120.00	120.00	12	SBNHH-1D65B
120.00	120.00	3	RRH 2x60W-1900 MHz
120.00	120.00	3	DB-T1-6Z-8AB-0Z
120.00	120.00	3	RRH2x60-700
120.00	120.00	3	RRH2X60-AWS

Linear Appurtenances

Elev From (ft)	Elev To (ft)	Qty	Description
0.00	180.00	3	1 5/8" Coax
0.00	180.00	1	Climbing Ladder
0.00	180.00	1	W/G Ladder
0.00	150.00	9	1 5/8" Coax
0.00	150.00	4	1 5/8" Fiber
0.00	120.00	9	1 5/8" Coax
0.00	120.00	3	1 5/8" Fiber
0.00	120.00	1	W/G Ladder

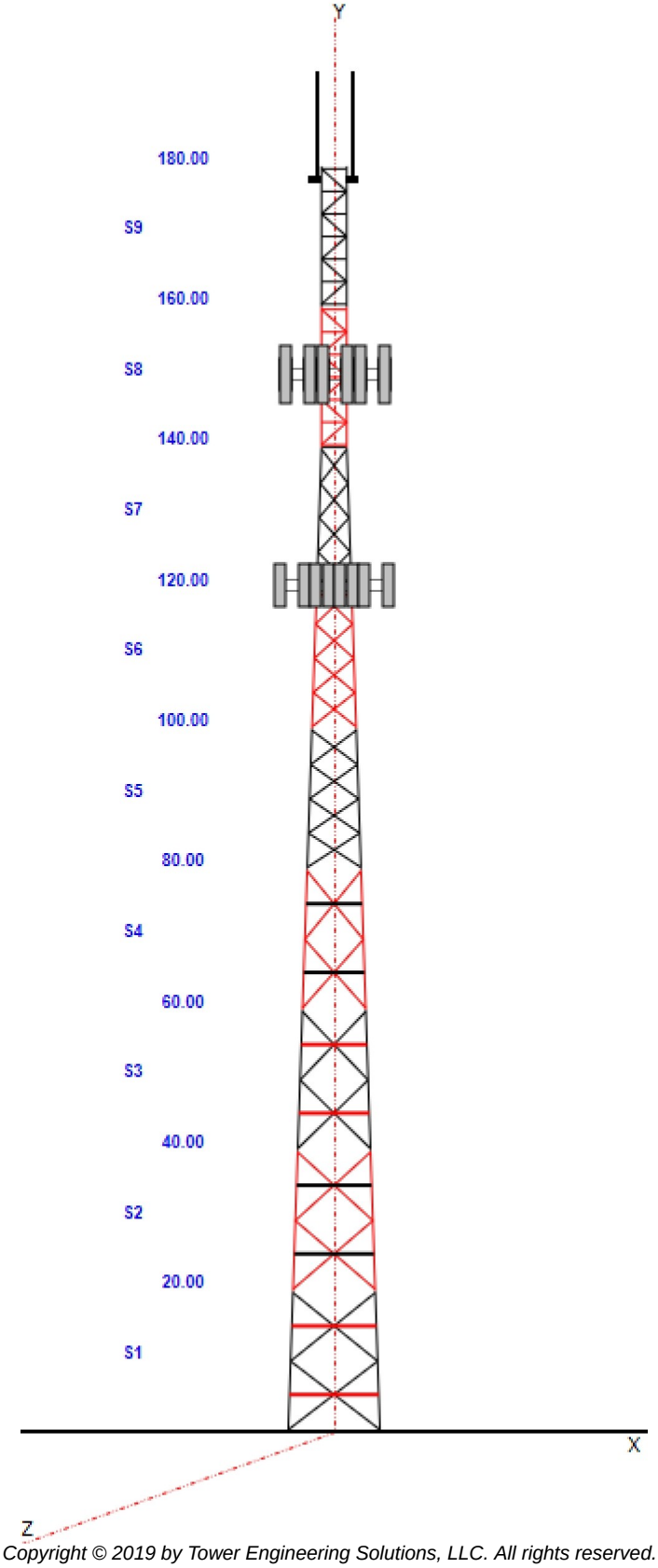
Base Reactions

Leg			Overturning	
Max Uplift:	-315.32 (kips		Moment:	4241.62 (ft-kips)
Max Down:	351.70 (kips		Total Down:	41.76 (kips)
Max Shear:	26.61 (kips		Total Shear:	45.41 (kips)



Structure: CT09680-S-SBA

Site Name:	Rogers Hill			**Code:**	EIA/TIA-222-G	8/6/2019
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	105.00	
Height:	180.00 (ft)	**Base Width:**	14.50	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	4.00	**Operational WS:**	60.00	Page: 2

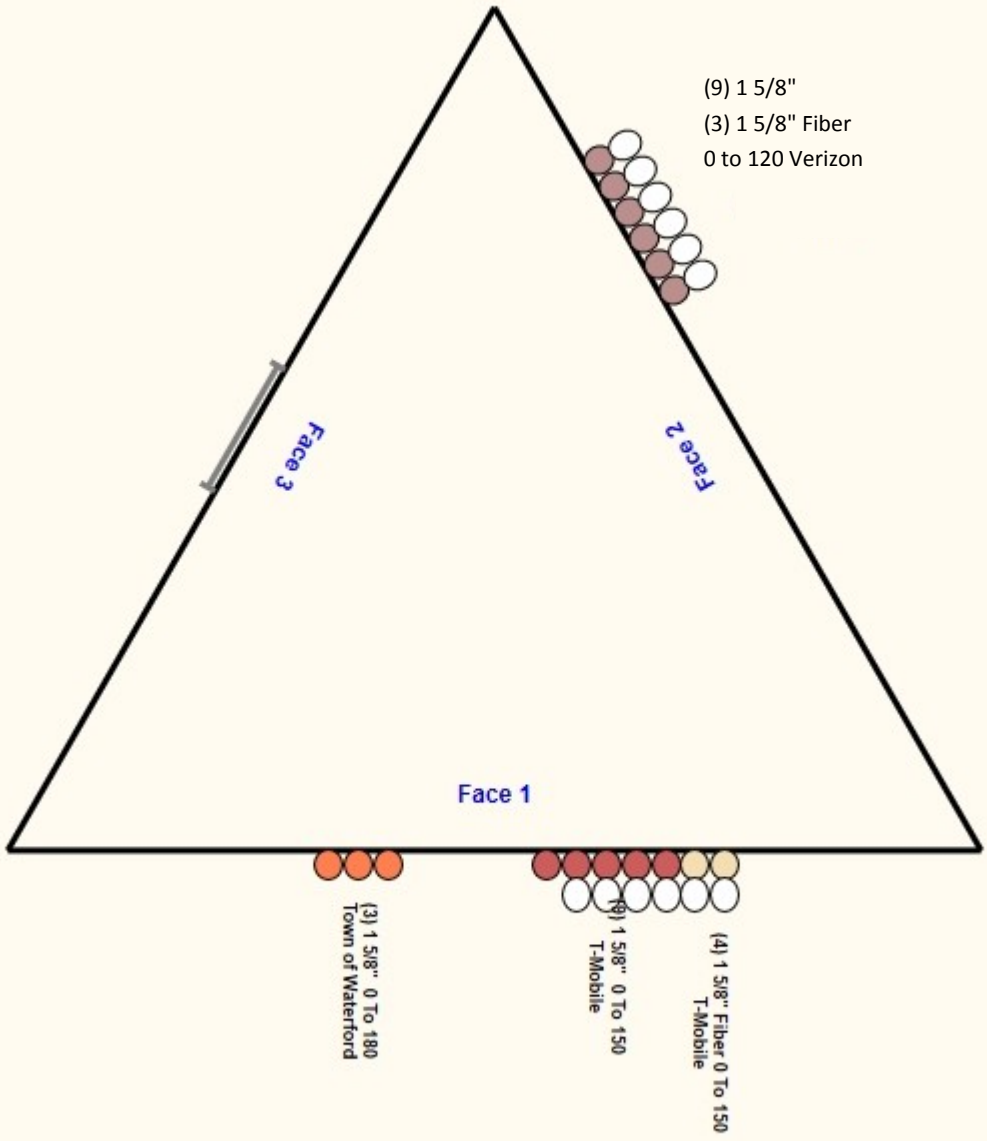


Structure: CT09680-S-SBA - Coax Line Placement

Type: Self Support
Site Name: Rogers Hill
Height: 180.00 (ft)

8/6/2019

Tower Engineering Solutions



Loading Summary

Structure:	CT09680-S-SBA		**Code:**	EIA/TIA-222-G	8/6/2019
Site Name:	Rogers Hill		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	0.85	**Topography:** 1	**Struct Class:**	II	Page: 4

Tower Engineering Solutions

Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	Ice Weight (lb)	Ice CaAa (sf)	Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
180.00	6' Lightning rod	1	6.50	0.380	43.26	1.481	72.000	0.600	0.600	1.00	1.00	0.000
180.00	Beacon	1	36.00	2.720	170.87	3.681	28.000	17.500	17.500	1.00	1.00	0.000
178.00	SC488-HF2LNF	2	31.00	4.420	144.31	9.922	l83.000	2.900	2.900	1.00	1.00	7.625
178.00	ANT150F2	1	13.00	1.230	46.49	2.303	60.000	2.500	2.500	1.00	1.00	4.500
178.00	9” x 13.25” x 21.25”	1	25.00	1.560	82.26	2.255	21.200	9.000	13.200	1.00	1.00	7.000
178.00	4 ft Sidearm	3	53.32	3.500	161.76	11.594	0.000	0.000	0.000	0.75	0.75	0.000
150.00	T-Frames	3	500.00	15.000	1023.56	34.546	0.000	0.000	0.000	0.75	0.75	0.000
150.00	MS-C1B-2875P	2	329.00	10.000	788.34	20.471	0.000	0.000	0.000	0.75	1.00	0.000
150.00	Air 21 B2A/B4P	3	91.50	6.090	260.39	7.187	56.000	12.100	7.900	0.80	0.86	0.000
150.00	Air 21 B4A/B2P	3	90.40	6.090	259.29	7.187	56.000	12.100	7.900	0.80	0.86	0.000
150.00	APXVAARR24_43-U-NA20	3	128.00	20.240	545.93	22.140	95.900	24.000	7.800	0.80	0.70	0.000
150.00	KRY 112 144/1	3	11.00	0.410	21.78	0.885	6.900	6.100	2.700	0.80	0.75	0.000
150.00	Radio 4449 B71+B12	3	70.00	1.650	138.25	2.188	15.000	13.200	9.300	0.80	0.67	0.000
120.00	(3) SF-QV12-B	1	1611.0	52.780	3791.54	106.36	0.000	0.000	0.000	0.75	1.00	0.000
120.00	SBNHH-1D65B	12	40.60	8.080	234.91	9.330	72.000	11.900	7.100	0.80	0.83	0.000
120.00	RRH 2x60W-1900 MHz	3	19.50	1.510	77.04	2.042	20.100	9.000	7.200	0.80	0.67	0.000
120.00	DB-T1-6Z-8AB-0Z	3	18.90	4.800	157.48	5.645	24.000	24.000	10.000	0.80	0.71	0.000
120.00	RRH2x60-700	3	48.00	1.730	97.47	2.259	18.500	11.200	8.900	0.80	0.67	0.000
120.00	RRH2X60-AWS	3	55.00	3.500	132.57	4.265	37.000	11.000	6.000	0.80	0.67	0.000
	Totals:	**54**	**6,155.56**		**17,445.15**						**Number of Appurtenances :**	**19**

Loading Summary

Structure:	CT09680-S-SBA		**Code:**	EIA/TIA-222-G	8/6/2019
Site Name:	Rogers Hill		**Exposure:**	C	
Height:	180.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	0.85	**Topography:** 1	**Struct Class:**	II	Page: 5

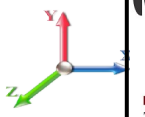
Tower Engineering Solutions

Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	180.00	1 5/8" Coax	3	1.98	1.04	100.00	1	Individual NR		N	1.00	1.00	
0.00	180.00	Climbing Ladder	1	1.50	6.90	100.00	3	Individual NR		N	1.00	1.00	
0.00	180.00	W/G Ladder	1	1.50	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	150.00	1 5/8" Coax	9	1.98	1.04	50.00	1	Block		N	0.50	1.00	
0.00	150.00	1 5/8" Fiber	4	2.00	1.10	50.00	1	Block		N	0.50	1.00	
0.00	120.00	1 5/8" Coax	9	1.98	1.04	50.00	2	Block		N	0.50	0.63	
0.00	120.00	1 5/8" Fiber	3	2.00	1.10	50.00	2	Block		N	0.50	0.67	
0.00	120.00	W/G Ladder	1	1.50	6.00	100.00	2	Individual NR		N	1.00	1.00	

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 6	



Tower Engineering Solutions

Load Case: 1.2D + 1.6W Normal Wind — 1.2D + 1.6W 105 mph Wind at Normal To Face

Wind Load Factor: 1.60
Dead Load Factor: 1.20
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	1.00	1.00	0.00	29.78	72.07	0.00	5,737.4	0.0	2362.35	1811.74	4,174.08
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	1.00	1.00	0.00	27.81	72.07	0.00	5,351.3	0.0	2522.45	2093.63	4,616.07
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	1.00	1.00	0.00	24.73	72.07	0.00	4,835.0	0.0	2488.85	2331.33	4,820.18
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	1.00	1.00	0.00	22.79	72.07	0.00	4,350.0	0.0	2431.51	2502.46	4,933.98
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	1.00	1.00	0.00	18.33	72.07	0.00	4,363.5	0.0	2062.62	2638.43	4,701.05
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	1.00	1.00	0.00	15.93	72.07	0.00	3,624.4	0.0	1845.67	2752.28	4,597.95
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	1.00	1.00	0.00	14.66	42.23	0.00	2,673.8	0.0	1689.58	1646.38	3,335.96
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	1.00	1.00	0.00	6.92	28.57	0.00	2,051.2	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	1.00	1.00	0.00	5.59	14.90	0.00	1,382.9	0.0	746.68	606.17	1,352.85
														34,369.7	**0.0**			**34,545.03**

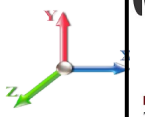
Load Case: 1.2D + 1.6W 60° Wind — 1.2D + 1.6W 105 mph Wind at 60° From Face

Wind Load Factor: 1.60
Dead Load Factor: 1.20
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	0.80	1.00	0.00	25.33	72.07	0.00	5,737.4	0.0	2009.34	1811.74	3,821.08
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	0.80	1.00	0.00	23.72	72.07	0.00	5,351.3	0.0	2151.87	2093.63	4,245.50
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	0.80	1.00	0.00	21.17	72.07	0.00	4,835.0	0.0	2130.89	2331.33	4,462.23
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	0.80	1.00	0.00	19.54	72.07	0.00	4,350.0	0.0	2085.16	2502.46	4,587.62
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	0.80	1.00	0.00	15.97	72.07	0.00	4,363.5	0.0	1796.57	2638.43	4,435.00
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	0.80	1.00	0.00	13.88	72.07	0.00	3,624.4	0.0	1608.32	2752.28	4,360.61
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	0.80	1.00	0.00	12.78	42.23	0.00	2,673.8	0.0	1472.70	1646.38	3,119.09
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	0.80	1.00	0.00	6.92	28.57	0.00	2,051.2	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	0.80	1.00	0.00	5.59	14.90	0.00	1,382.9	0.0	746.68	606.17	1,352.85
														34,369.7	**0.0**			**32,396.88**

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 7	



Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90° Wind — 1.2D + 1.6W 105 mph Wind at 90° From Face

Wind Load Factor: 1.60
Dead Load Factor: 1.20
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	0.85	1.00	0.00	26.44	72.07	0.00	5,737.4	0.0	2097.60	1811.74	3,909.33
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	0.85	1.00	0.00	24.74	72.07	0.00	5,351.3	0.0	2244.51	2093.63	4,338.14
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	0.85	1.00	0.00	22.06	72.07	0.00	4,835.0	0.0	2220.38	2331.33	4,551.71
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	0.85	1.00	0.00	20.35	72.07	0.00	4,350.0	0.0	2171.75	2502.46	4,674.21
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	0.85	1.00	0.00	16.56	72.07	0.00	4,363.5	0.0	1863.08	2638.43	4,501.51
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	0.85	1.00	0.00	14.39	72.07	0.00	3,624.4	0.0	1667.66	2752.28	4,419.94
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	0.85	1.00	0.00	13.25	42.23	0.00	2,673.8	0.0	1526.92	1646.38	3,173.31
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	0.85	1.00	0.00	6.92	28.57	0.00	2,051.2	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	0.85	1.00	0.00	5.59	14.90	0.00	1,382.9	0.0	746.68	606.17	1,352.85
														34,369.7	**0.0**			**32,933.92**

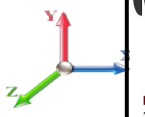
Load Case: 0.9D + 1.6W Normal Wind — 0.9D + 1.6W 105 mph Wind at Normal To Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	1.00	1.00	0.00	29.78	72.07	0.00	4,303.1	0.0	2362.35	1811.74	4,174.08
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	1.00	1.00	0.00	27.81	72.07	0.00	4,013.5	0.0	2522.45	2093.63	4,616.07
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	1.00	1.00	0.00	24.73	72.07	0.00	3,626.3	0.0	2488.85	2331.33	4,820.18
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	1.00	1.00	0.00	22.79	72.07	0.00	3,262.5	0.0	2431.51	2502.46	4,933.98
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	1.00	1.00	0.00	18.33	72.07	0.00	3,272.6	0.0	2062.62	2638.43	4,701.05
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	1.00	1.00	0.00	15.93	72.07	0.00	2,718.3	0.0	1845.67	2752.28	4,597.95
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	1.00	1.00	0.00	14.66	42.23	0.00	2,005.4	0.0	1689.58	1646.38	3,335.96
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	1.00	1.00	0.00	6.92	28.57	0.00	1,538.4	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	1.00	1.00	0.00	5.59	14.90	0.00	1,037.2	0.0	746.68	606.17	1,352.85
														25,777.3	**0.0**			**34,545.03**

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 8	



Tower Engineering Solutions

Load Case: 0.9D + 1.6W 60° Wind — 0.9D + 1.6W 105 mph Wind at 60° From Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	0.80	1.00	0.00	25.33	72.07	0.00	4,303.1	0.0	2009.34	1811.74	3,821.08
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	0.80	1.00	0.00	23.72	72.07	0.00	4,013.5	0.0	2151.87	2093.63	4,245.50
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	0.80	1.00	0.00	21.17	72.07	0.00	3,626.3	0.0	2130.89	2331.33	4,462.23
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	0.80	1.00	0.00	19.54	72.07	0.00	3,262.5	0.0	2085.16	2502.46	4,587.62
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	0.80	1.00	0.00	15.97	72.07	0.00	3,272.6	0.0	1796.57	2638.43	4,435.00
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	0.80	1.00	0.00	13.88	72.07	0.00	2,718.3	0.0	1608.32	2752.28	4,360.61
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	0.80	1.00	0.00	12.78	42.23	0.00	2,005.4	0.0	1472.70	1646.38	3,119.09
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	0.80	1.00	0.00	6.92	28.57	0.00	1,538.4	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	0.80	1.00	0.00	5.59	14.90	0.00	1,037.2	0.0	746.68	606.17	1,352.85
														25,777.3	**0.0**			**32,396.88**

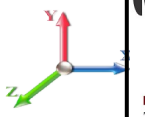
Load Case: 0.9D + 1.6W 90° Wind — 0.9D + 1.6W 105 mph Wind at 90° From Face

Wind Load Factor: 1.60
Dead Load Factor: 0.90
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	20.39	22.250	13.35	0.00	0.13	2.86	0.85	1.00	0.00	26.44	72.07	0.00	4,303.1	0.0	2097.60	1811.74	3,909.33
2	30.0	23.56	20.426	13.35	0.00	0.13	2.83	0.85	1.00	0.00	24.74	72.07	0.00	4,013.5	0.0	2244.51	2093.63	4,338.14
3	50.0	26.24	17.783	12.51	0.00	0.14	2.82	0.85	1.00	0.00	22.06	72.07	0.00	3,626.3	0.0	2220.38	2331.33	4,551.71
4	70.0	28.17	16.231	11.68	0.00	0.15	2.79	0.85	1.00	0.00	20.35	72.07	0.00	3,262.5	0.0	2171.75	2502.46	4,674.21
5	90.0	29.70	11.823	11.68	0.00	0.15	2.79	0.85	1.00	0.00	16.56	72.07	0.00	3,272.6	0.0	1863.08	2638.43	4,501.51
6	110.0	30.98	10.241	10.01	0.00	0.16	2.75	0.85	1.00	0.00	14.39	72.07	0.00	2,718.3	0.0	1667.66	2752.28	4,419.94
7	130.0	32.09	9.408	9.18	0.00	0.19	2.64	0.85	1.00	0.00	13.25	42.23	0.00	2,005.4	0.0	1526.92	1646.38	3,173.31
8	150.0	33.07	0.000	12.00	0.00	0.14	2.79	0.85	1.00	0.00	6.92	28.57	0.00	1,538.4	0.0	869.34	1143.57	2,012.91
9	170.0	33.95	0.000	9.76	0.00	0.12	2.89	0.85	1.00	0.00	5.59	14.90	0.00	1,037.2	0.0	746.68	606.17	1,352.85
														25,777.3	**0.0**			**32,933.92**

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 9	



TES Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	22.250	37.19	23.84	0.21	2.57	1.00	1.00	1.33	43.67	103.13	13.31	10,013.	4276.5	441.14	395.35	836.49
2	30.0	5.34	20.426	38.77	25.43	0.23	2.50	1.00	1.00	1.49	42.93	106.73	14.86	10,065.	4714.0	486.86	475.82	962.69
3	50.0	5.95	17.783	38.08	25.57	0.25	2.45	1.00	1.00	1.56	40.03	108.55	15.64	9,559.0	4724.0	495.50	539.63	1,035.13
4	70.0	6.39	16.231	36.96	25.28	0.27	2.38	1.00	1.00	1.62	38.06	109.80	16.17	9,065.7	4715.7	490.83	584.08	1,074.92
5	90.0	6.73	11.823	42.99	31.32	0.33	2.22	1.00	1.00	1.66	37.99	110.76	16.58	8,841.2	4477.7	482.86	612.41	1,095.27
6	110.0	7.02	10.241	39.19	29.18	0.36	2.14	1.00	1.00	1.69	34.60	111.54	16.92	7,939.9	4315.5	441.86	638.13	1,080.00
7	130.0	7.28	9.408	37.43	28.26	0.44	1.98	1.00	1.00	1.72	33.99	65.17	17.20	6,112.2	3438.4	416.69	424.68	841.37
8	150.0	7.50	0.000	40.73	28.73	0.46	1.96	1.00	1.00	1.75	27.12	46.02	17.45	4,768.4	2717.1	339.27	329.96	669.23
9	170.0	7.70	0.000	38.85	29.09	0.44	1.99	1.00	1.00	1.77	25.51	26.68	17.67	3,627.0	2244.1	332.33	244.44	576.77
														69,992.8	**35623.1**			**8,171.86**

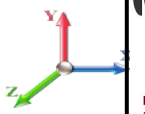
Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	22.250	37.19	23.84	0.21	2.57	0.80	1.00	1.33	39.22	103.13	13.31	10,013.	4276.5	396.19	395.35	791.54
2	30.0	5.34	20.426	38.77	25.43	0.23	2.50	0.80	1.00	1.49	38.85	106.73	14.86	10,065.	4714.0	440.54	475.82	916.36
3	50.0	5.95	17.783	38.08	25.57	0.25	2.45	0.80	1.00	1.56	36.47	108.55	15.64	9,559.0	4724.0	451.47	539.63	991.10
4	70.0	6.39	16.231	36.96	25.28	0.27	2.38	0.80	1.00	1.62	34.81	109.80	16.17	9,065.7	4715.7	448.97	584.08	1,033.05
5	90.0	6.73	11.823	42.99	31.32	0.33	2.22	0.80	1.00	1.66	35.63	110.76	16.58	8,841.2	4477.7	452.81	612.41	1,065.22
6	110.0	7.02	10.241	39.19	29.18	0.36	2.14	0.80	1.00	1.69	32.55	111.54	16.92	7,939.9	4315.5	415.71	638.13	1,053.84
7	130.0	7.28	9.408	37.43	28.26	0.44	1.98	0.80	1.00	1.72	32.11	65.17	17.20	6,112.2	3438.4	393.63	424.68	818.30
8	150.0	7.50	0.000	40.73	28.73	0.46	1.96	0.80	1.00	1.75	27.12	46.02	17.45	4,768.4	2717.1	339.27	329.96	669.23
9	170.0	7.70	0.000	38.85	29.09	0.44	1.99	0.80	1.00	1.77	25.51	26.68	17.67	3,627.0	2244.1	332.33	244.44	576.77
														69,992.8	**35623.1**			**7,915.40**

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 10	



TES Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	4.62	22.250	37.19	23.84	0.21	2.57	0.85	1.00	1.33	40.33	103.13	13.31	10,013.	4276.5	407.42	395.35	802.78
2	30.0	5.34	20.426	38.77	25.43	0.23	2.50	0.85	1.00	1.49	39.87	106.73	14.86	10,065.	4714.0	452.12	475.82	927.94
3	50.0	5.95	17.783	38.08	25.57	0.25	2.45	0.85	1.00	1.56	37.36	108.55	15.64	9,559.0	4724.0	462.48	539.63	1,002.11
4	70.0	6.39	16.231	36.96	25.28	0.27	2.38	0.85	1.00	1.62	35.62	109.80	16.17	9,065.7	4715.7	459.43	584.08	1,043.52
5	90.0	6.73	11.823	42.99	31.32	0.33	2.22	0.85	1.00	1.66	36.22	110.76	16.58	8,841.2	4477.7	460.32	612.41	1,072.73
6	110.0	7.02	10.241	39.19	29.18	0.36	2.14	0.85	1.00	1.69	33.07	111.54	16.92	7,939.9	4315.5	422.25	638.13	1,060.38
7	130.0	7.28	9.408	37.43	28.26	0.44	1.98	0.85	1.00	1.72	32.58	65.17	17.20	6,112.2	3438.4	399.39	424.68	824.07
8	150.0	7.50	0.000	40.73	28.73	0.46	1.96	0.85	1.00	1.75	27.12	46.02	17.45	4,768.4	2717.1	339.27	329.96	669.23
9	170.0	7.70	0.000	38.85	29.09	0.44	1.99	0.85	1.00	1.77	25.51	26.68	17.67	3,627.0	2244.1	332.33	244.44	576.77
														69,992.8	**35623.1**			**7,979.52**

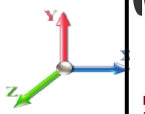
Load Case: 1.0D + 1.0W Normal Wind — 1.0D + 1.0W 60 mph Wind at Normal To Face

Wind Load Factor: 1.00
Dead Load Factor: 1.00
Ice Dead Load Factor: 0.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	22.250	13.35	0.00	0.13	2.86	1.00	1.00	0.00	29.80	72.07	0.00	4,781.2	0.0	482.40	369.74	852.14
2	30.0	7.69	20.426	13.35	0.00	0.13	2.83	1.00	1.00	0.00	27.98	72.07	0.00	4,459.4	0.0	518.01	427.27	945.28
3	50.0	8.57	17.783	12.51	0.00	0.14	2.82	1.00	1.00	0.00	24.87	72.07	0.00	4,029.2	0.0	510.80	475.78	986.58
4	70.0	9.20	16.231	11.68	0.00	0.15	2.79	1.00	1.00	0.00	22.85	72.07	0.00	3,625.0	0.0	497.64	510.71	1,008.35
5	90.0	9.70	11.823	11.68	0.00	0.15	2.79	1.00	1.00	0.00	18.45	72.07	0.00	3,636.3	0.0	423.56	538.46	962.01
6	110.0	10.12	10.241	10.01	0.00	0.16	2.75	1.00	1.00	0.00	15.93	72.07	0.00	3,020.4	0.0	376.67	561.69	938.36
7	130.0	10.48	9.408	9.18	0.00	0.19	2.64	1.00	1.00	0.00	14.66	42.23	0.00	2,228.2	0.0	344.81	336.00	680.81
8	150.0	10.80	0.000	12.00	0.00	0.14	2.79	1.00	1.00	0.00	6.92	28.57	0.00	1,709.4	0.0	177.42	233.38	410.80
9	170.0	11.09	0.000	9.76	0.00	0.12	2.89	1.00	1.00	0.00	5.59	14.90	0.00	1,152.4	0.0	152.38	123.71	276.09
														28,641.4	**0.0**			**7,060.41**

Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 11	



TES Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60° Wind — 1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	22.250	13.35	0.00	0.13	2.86	0.80	1.00	0.00	25.35	72.07	0.00	4,781.2	0.0	410.36	369.74	780.10
2	30.0	7.69	20.426	13.35	0.00	0.13	2.83	0.80	1.00	0.00	23.90	72.07	0.00	4,459.4	0.0	442.38	427.27	869.65
3	50.0	8.57	17.783	12.51	0.00	0.14	2.82	0.80	1.00	0.00	21.31	72.07	0.00	4,029.2	0.0	437.74	475.78	913.53
4	70.0	9.20	16.231	11.68	0.00	0.15	2.79	0.80	1.00	0.00	19.61	72.07	0.00	3,625.0	0.0	426.96	510.71	937.66
5	90.0	9.70	11.823	11.68	0.00	0.15	2.79	0.80	1.00	0.00	16.08	72.07	0.00	3,636.3	0.0	369.26	538.46	907.71
6	110.0	10.12	10.241	10.01	0.00	0.16	2.75	0.80	1.00	0.00	13.88	72.07	0.00	3,020.4	0.0	328.23	561.69	889.92
7	130.0	10.48	9.408	9.18	0.00	0.19	2.64	0.80	1.00	0.00	12.78	42.23	0.00	2,228.2	0.0	300.55	336.00	636.55
8	150.0	10.80	0.000	12.00	0.00	0.14	2.79	0.80	1.00	0.00	6.92	28.57	0.00	1,709.4	0.0	177.42	233.38	410.80
9	170.0	11.09	0.000	9.76	0.00	0.12	2.89	0.80	1.00	0.00	5.59	14.90	0.00	1,152.4	0.0	152.38	123.71	276.09
														28,641.4	**0.0**			**6,622.01**

Load Case: 1.0D + 1.0W 90° Wind — 1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

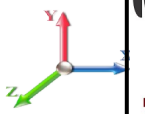
Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	10.0	6.66	22.250	13.35	0.00	0.13	2.86	0.85	1.00	0.00	26.46	72.07	0.00	4,781.2	0.0	428.37	369.74	798.11
2	30.0	7.69	20.426	13.35	0.00	0.13	2.83	0.85	1.00	0.00	24.92	72.07	0.00	4,459.4	0.0	461.29	427.27	888.56
3	50.0	8.57	17.783	12.51	0.00	0.14	2.82	0.85	1.00	0.00	22.20	72.07	0.00	4,029.2	0.0	456.01	475.78	931.79
4	70.0	9.20	16.231	11.68	0.00	0.15	2.79	0.85	1.00	0.00	20.42	72.07	0.00	3,625.0	0.0	444.63	510.71	955.33
5	90.0	9.70	11.823	11.68	0.00	0.15	2.79	0.85	1.00	0.00	16.67	72.07	0.00	3,636.3	0.0	382.83	538.46	921.29
6	110.0	10.12	10.241	10.01	0.00	0.16	2.75	0.85	1.00	0.00	14.39	72.07	0.00	3,020.4	0.0	340.34	561.69	902.03
7	130.0	10.48	9.408	9.18	0.00	0.19	2.64	0.85	1.00	0.00	13.25	42.23	0.00	2,228.2	0.0	311.62	336.00	647.61
8	150.0	10.80	0.000	12.00	0.00	0.14	2.79	0.85	1.00	0.00	6.92	28.57	0.00	1,709.4	0.0	177.42	233.38	410.80
9	170.0	11.09	0.000	9.76	0.00	0.12	2.89	0.85	1.00	0.00	5.59	14.90	0.00	1,152.4	0.0	152.38	123.71	276.09
														28,641.4	**0.0**			**6,731.61**

Force/Stress Compression Summary

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 12	



TES Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	SOL - 4" SOLID	-342.20	1.2D + 1.6W Normal Wind	9.76	50	50	50	58.55	50.00	440.08	77.8	Member X
2	40	SOL - 4" SOLID	-302.21	1.2D + 1.6W Normal Wind	9.76	50	50	50	58.55	50.00	440.08	68.7	Member X
3	60	SOL - 3 3/4" SOLID	-259.72	1.2D + 1.6W Normal Wind	9.76	50	50	50	62.46	50.00	373.68	69.5	Member X
4	80	SOL - 3 1/2" S0LID	-215.91	1.2D + 1.6W Normal Wind	9.76	50	50	50	66.92	50.00	312.05	69.2	Member X
5	100	SOL - 3 1/2" S0LID	-176.10	1.2D + 1.6W Normal Wind	4.88	100	100	100	66.92	50.00	312.05	56.4	Member X
6	120	SOL - 3" SOLID	-128.64	1.2D + 1.6W Normal Wind	4.88	100	100	100	78.07	50.00	203.71	63.1	Member X
7	140	SOL - 2 3/4" SOLID	-77.59	1.2D + 1.6W Normal Wind	4.88	100	100	100	85.17	50.00	157.26	49.3	Member X
8	160	SOL - 2" SOLID	-41.71	1.2D + 1.6W Normal Wind	3.21	100	100	100	77.00	50.00	91.64	45.5	Member X
9	180	SOL - 1 1/2" SOLID	-9.68	1.2D + 1.6W Normal Wind	3.21	100	100	100	102.67	50.00	36.79	26.3	Member X

HORIZONTAL MEMBERS

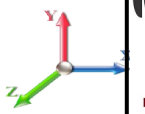
Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20										0.00	0	0				
2	40										0.00	0	0				
3	60										0.00	0	0				
4	80										0.00	0	0				
5	100										0.00	0	0				
6	120										0.00	0	0				
7	140	SAE - 2x2x0.125	-1.29	1.2D + 1.6W 60° Wind	4.00	100	100	100	120.60	36.00	7.23	1	1	12.43	6.53	20	Bolt Bear
8	160	SOL - 1" SOLID	-2.56	1.2D + 1.6W 60° Wind	4.00	100	100	100	134.40	36.00	9.82	0	0			26	Member X
9	180	SOL - 1" SOLID	-0.80	1.2D + 1.6W 60° Wind	4.00	100	100	100	134.40	36.00	9.82	0	0			8	Member X

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	20	SAE - 3X3X0.25	-8.93	0.9D + 1.6W 90° Wind	17.16	49	49	49	170.41	36.00	11.20	1	1	17.89	14.3	80	Member Z
2	40	SAE - 3X3X0.1875	-9.04	1.2D + 1.6W 90° Wind	15.95	49	49	49	157.32	36.00	9.95	1	1	17.89	10.7	91	Member Z
3	60	SAE - 3X3X0.1875	-9.13	1.2D + 1.6W 90° Wind	14.25	49	49	49	140.55	36.00	12.47	1	1	17.89	10.7	85	Bolt Bear
4	80	SAE - 3X3X0.1875	-8.86	1.2D + 1.6W 90° Wind	13.19	49	49	49	130.15	36.00	14.48	1	1	17.89	10.7	82	Bolt Bear
5	100	SAE - 2X2X0.25	-6.29	1.2D + 1.6W 90° Wind	9.63	49	49	49	144.74	36.00	10.14	1	1	12.43	13.0	62	Member Z
6	120	SAE - 2X2X0.25	-6.34	1.2D + 1.6W 90° Wind	7.50	49	49	49	114.62	36.00	15.25	1	1	12.43	13.0	51	Bolt Shear
7	140	SAE - 2X2X0.1875	-4.14	1.2D + 1.6W 90° Wind	6.44	49	49	49	102.04	36.00	13.30	1	1	12.43	9.79	42	Bolt Bear
8	160	SOL - 1 1/4" SOLID	-7.22	1.2D + 1.6W 90° Wind	5.13	100	100	100	137.83	36.00	14.59	0	0			49	Member X
9	180	SOL - 1" SOLID	-1.77	1.2D + 1.6W Normal Wind	5.13	100	100	100	172.29	36.00	5.98	0	0			30	Member X

Force/Stress Tension Summary

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 13	



Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	20	SOL - 4" SOLID	316.37	0.9D + 1.6W 60° Wind	50	565.47	55.9	Member
2	40	SOL - 4" SOLID	282.14	0.9D + 1.6W 60° Wind	50	565.47	49.9	Member
3	60	SOL - 3 3/4" SOLID	245.09	0.9D + 1.6W 60° Wind	50	497.03	49.3	Member
4	80	SOL - 3 1/2" S0LID	206.35	0.9D + 1.6W 60° Wind	50	432.95	47.7	Member
5	100	SOL - 3 1/2" S0LID	165.82	0.9D + 1.6W 60° Wind	50	432.95	38.3	Member
6	120	SOL - 3" SOLID	122.28	0.9D + 1.6W 60° Wind	50	318.11	38.4	Member
7	140	SOL - 2 3/4" SOLID	74.24	0.9D + 1.6W 60° Wind	50	267.28	27.8	Member
8	160	SOL - 2" SOLID	39.89	0.9D + 1.6W 60° Wind	50	141.37	28.2	Member
9	180	SOL - 1 1/2" SOLID	8.11	0.9D + 1.6W 60° Wind	50	79.52	10.2	Member

HORIZONTAL MEMBERS

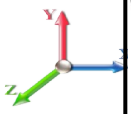
Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	-			36	0.00	0	0					
2	40	-			36	0.00	0	0					
3	60	-			36	0.00	0	0					
4	80	-			36	0.00	0	0					
5	100	-			36	0.00	0	0					
6	120	-			36	0.00	0	0					
7	140	SAE - 2x2x0.125	1.30	0.9D + 1.6W 90° Wind	36	12.60	1	1	12.43	6.53	5.68	22.9	Blck Shear
8	160	SOL - 1" SOLID	2.67	1.2D + 1.6W Normal Wi	36	25.45	0	0				10.5	Member
9	180	SOL - 1" SOLID	0.84	1.2D + 1.6W Normal Wi	36	25.45	0	0				3.3	Member

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	20	SAE - 3X3X0.25	9.16	0.9D + 1.6W 90° Wind	36	39.84	1	1	17.89	14.35	13.90	65.9	Blck Shear
2	40	SAE - 3X3X0.1875	8.97	0.9D + 1.6W 90° Wind	36	30.21	1	1	17.89	10.77	10.42	86.1	Blck Shear
3	60	SAE - 3X3X0.1875	8.59	0.9D + 1.6W 90° Wind	36	30.21	1	1	17.89	10.77	10.42	82.4	Blck Shear
4	80	SAE - 3X3X0.1875	8.20	1.2D + 1.6W 90° Wind	36	30.21	1	1	17.89	10.77	10.42	78.7	Blck Shear
5	100	SAE - 2X2X0.25	6.43	1.2D + 1.6W 90° Wind	36	24.55	1	1	12.43	13.05	9.99	64.3	Blck Shear
6	120	SAE - 2X2X0.25	6.18	1.2D + 1.6W 90° Wind	36	24.55	1	1	12.43	13.05	9.99	61.8	Blck Shear
7	140	SAE - 2X2X0.1875	3.98	1.2D + 1.6W 90° Wind	36	18.58	1	1	12.43	9.79	7.50	53.1	Blck Shear
8	160	SOL - 1 1/4" SOLID	8.10	1.2D + 1.6W 90° Wind	36	39.76	0	0				20.4	Member
9	180	SOL - 1" SOLID	2.03	1.2D + 1.6W 90° Wind	36	25.45	0	0				8.0	Member

Seismic Section Forces

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 14	



Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Dead Load Factor	1.20	**Sds**	0.171	**Ss**	0.1610	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.092	**S1**	0.0580	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.102	**R**	3.0000	**Vs**	1.4308	**f1**	1.1071

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	10.00	4781.1	0.01	0.05	0.03	21.62
2	30.00	4459.4	0.05	0.07	0.04	36.39
3	50.00	4029.1	0.15	0.07	0.03	44.58
4	70.00	3625.0	0.29	0.05	0.01	51.33
5	90.00	3636.2	0.47	-0.01	0.01	56.21
6	110.00	5542.7	0.71	-0.09	0.03	83.48
7	130.00	2228.2	0.99	-0.11	0.12	44.04
8	150.00	5040.0	1.31	0.14	0.35	208.99
9	170.00	1454.8	1.69	1.07	0.79	129.92

Load Case: 0.9D + 1.0E

Dead Load Factor	0.90	**Sds**	0.171	**Ss**	0.1610	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.092	**S1**	0.0580	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.102	**R**	3.0000	**Vs**	1.4308	**f1**	1.1071

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	10.00	4781.1	0.01	0.05	0.03	21.62
2	30.00	4459.4	0.05	0.07	0.04	36.39
3	50.00	4029.1	0.15	0.07	0.03	44.58
4	70.00	3625.0	0.29	0.05	0.01	51.33
5	90.00	3636.2	0.47	-0.01	0.01	56.21
6	110.00	5542.7	0.71	-0.09	0.03	83.48
7	130.00	2228.2	0.99	-0.11	0.12	44.04
8	150.00	5040.0	1.31	0.14	0.35	208.99
9	170.00	1454.8	1.69	1.07	0.79	129.92

Support Forces Summary

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 15	

Tower Engineering Solutions

Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	0.00	351.70	-26.61	
	1a	9.39	-154.97	-9.40	
	1b	-9.39	-154.97	-9.40	
1.2D + 1.6W 60° Wind	1	-3.48	177.28	-12.71	
	1a	-12.74	176.80	3.34	
	1b	-21.25	-312.32	-12.26	
1.2D + 1.6W 90° Wind	1	-3.94	13.93	-0.16	
	1a	-20.33	298.70	9.31	
	1b	-19.53	-270.87	-9.15	
0.9D + 1.6W Normal Wind	1	0.00	347.72	-26.47	
	1a	9.51	-158.20	-9.47	
	1b	-9.51	-158.20	-9.47	
0.9D + 1.6W 60° Wind	1	-3.48	173.56	-12.57	
	1a	-12.62	173.08	3.28	
	1b	-21.38	-315.32	-12.34	
0.9D + 1.6W 90° Wind	1	-3.94	10.45	-0.02	
	1a	-20.21	294.80	9.25	
	1b	-19.66	-273.93	-9.23	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	113.27	-6.84	
	1a	1.78	-13.19	-1.88	
	1b	-1.78	-13.19	-1.88	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-0.73	70.48	-3.66	
	1a	-3.53	70.33	1.20	
	1b	-4.71	-53.92	-2.72	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-0.84	28.96	-0.62	
	1a	-5.34	100.98	2.59	
	1b	-4.24	-43.05	-1.97	
1.2D + 1.0E	1	0.00	20.05	0.28	
	1a	0.74	10.85	-0.46	
	1b	-0.74	10.85	-0.46	
0.9D + 1.0E	1	0.00	16.57	0.43	
	1a	0.87	7.38	-0.53	
	1b	-0.87	7.38	-0.53	
1.0D + 1.0W Normal Wind	1	0.00	80.52	-5.82	
	1a	1.56	-22.86	-1.73	
	1b	-1.56	-22.86	-1.73	
1.0D + 1.0W 60° Wind	1	-0.68	44.93	-3.02	
	1a	-2.95	44.83	0.92	
	1b	-4.02	-54.96	-2.32	
1.0D + 1.0W 90° Wind	1	-0.80	11.60	-0.46	
	1a	-4.49	69.70	2.12	
	1b	-3.67	-46.51	-1.66	

Max Reactions

Leg			Overturning		
Max Uplift:	-315.32	(kips)	Moment:	4241.62	(ft-kips)
Max Down:	351.70	(kips)	Total Down:	41.76	(kips)
Max Shear:	26.61	(kips)	Total Shear:	45.41	(kips)

Analysis Summary

Structure:	CT09680-S-SBA	**Code:**	EIA/TIA-222-G	8/6/2019	
Site Name:	Rogers Hill	**Exposure:**	C		
Height:	180.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 17	

Tower Engineering Solutions

Max Reactions

Leg			Overturning		
Max Uplift:	-315.32	(kips)	Moment:	4241.62	(ft-kips)
Max Down:	351.70	(kips)	Total Down:	41.76	(kips)
Max Shear:	26.61	(kips)	Total Shear:	45.41	(kips)

Anchor Bolts

Bolt Size (in.):	1.25	Number Bolts:	6
Yield Strength (Ksi):	109.00	Tensile Strength (Ksi):	125.00
Detail Type:	C		

Interaction Ratio: 0.63

Max Usages

Max Leg: 77.8% (1.2D + 1.6W Normal Wind - Sect 1)
Max Diag: 90.9% (1.2D + 1.6W 90° Wind - Sect 2)
Max Horiz: 26.0% (1.2D + 1.6W 60° Wind - Sect 8)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0E - Normal To Face	120.00	0.0187	-0.0012	0.0220
	150.00	0.0311	-0.0015	0.0283
	176.42	0.0451	-0.0002	0.0306
	180.00	0.0470	-0.0002	0.0334
0.9D + 1.6W 105 mph Wind at 60° From Face	120.00	0.8587	0.1841	0.9621
	150.00	1.3440	0.3759	1.0225
	176.42	1.8353	0.9848	0.9959
	180.00	1.9042	1.0030	1.3488
0.9D + 1.6W 105 mph Wind at 90° From Face	120.00	0.8634	0.0668	0.9544
	150.00	1.3492	0.1056	1.0199
	176.42	1.8387	0.1051	0.3124
	180.00	1.9082	0.1051	1.4918
0.9D + 1.6W 105 mph Wind at Normal To Face	120.00	0.8828	-0.0693	0.9925
	150.00	1.3798	-0.1076	1.0483
	176.42	1.8875	-0.1058	1.8657
	180.00	1.9557	-0.1057	0.8045
1.0D + 1.0W 60 mph Wind at 60° From Face	120.00	0.1754	0.0161	0.1979
	150.00	0.2745	0.0281	0.2095
	176.42	0.3748	0.0500	0.1968
	180.00	0.3889	0.0505	0.2755
1.0D + 1.0W 60 mph Wind at 90° From Face	120.00	0.1764	-0.0107	0.1949
	150.00	0.2757	0.0162	0.2088
	176.42	0.3757	0.0126	0.0641
	180.00	0.3899	0.0123	0.3050

1.0D + 1.0W 60 mph Wind at Normal To Face	120.00	0.1804	-0.0130	0.2014
	150.00	0.2821	-0.0196	0.2150
	176.42	0.3859	-0.0160	0.3813
	180.00	0.3999	-0.0158	0.1649
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	120.00	0.2257	0.0275	0.2620
	150.00	0.3605	0.0498	0.2931
	176.42	0.5030	0.1009	0.2831
	180.00	0.5231	0.1023	0.3985
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	120.00	0.2260	-0.0191	0.2575
	150.00	0.3609	-0.0276	0.2910
	176.42	0.5026	-0.0257	0.0838
	180.00	0.5228	-0.0256	0.4410
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	120.00	0.2287	-0.0237	0.2616
	150.00	0.3659	-0.0353	0.2982
	176.42	0.5121	-0.0334	0.5478
	180.00	0.5318	-0.0333	0.2326
1.2D + 1.0E - Normal To Face	120.00	0.0187	-0.0014	0.0219
	150.00	0.0312	-0.0017	0.0284
	176.42	0.0452	-0.0002	0.0308
	180.00	0.0471	-0.0002	0.0336
1.2D + 1.6W 105 mph Wind at 60° From Face	120.00	0.8604	0.1843	0.9648
	150.00	1.3470	0.3765	1.0255
	176.42	1.8397	0.9871	0.9981
	180.00	1.9088	1.0053	1.3518
1.2D + 1.6W 105 mph Wind at 90° From Face	120.00	0.8651	0.0668	0.9567
	150.00	1.3523	0.1056	1.0229
	176.42	1.8431	0.1050	0.3154
	180.00	1.9128	0.1050	1.4949
1.2D + 1.6W 105 mph Wind at Normal To Face	120.00	0.8846	-0.0701	0.9949
	150.00	1.3830	-0.1086	1.0514
	176.42	1.8921	-0.1068	1.8686
	180.00	1.9605	-0.1067	0.8078

Last revised on March 27, 2019

Mat Foundation Design for Self Supporting Tower

			Date: 7/9/2019
Customer Name:	**SBA Communications Corp**	**EIA/TIA Standard:**	EIA-222-G
Site Name:	Rogers Hill	**Structure Height (Ft.):**	180
Site Nmber:	CT09680-S-SBA	**Engineer Name:**	S. Hesselbein
Engr. Number:	77945	**Engineer Login ID:**	

Foundation Info Obtained from: Drawings/Calculations

Analysis or Design? Analysis

Number of Tower Legs: 3 Legs

Base Reactions (Factored):

(1). Individual Leg:

Axial Load (Kips):	351.7	Uplift Force (Kips):	315.3
Shear Force (Kips):	26.6		

(2). Tower Base:

Total Vertical Load (Kips):	41.8	Total Shear Force (Kips):	45.4
Moment (Kips-ft):	4241.6		

Foundation Geometries:

Leg distance (Center-to-Center ft.):		14.5	Mods required -Yes/No ?:	No	
Diameter of Pier (ft.):	Round	3.0	Pier Height A. G. (ft.):	1.00	
Tower center to mat center (ft):		0.00	Depth of Base BG (ft.):	4.5	
Length of Pad (ft.):		28	Width of Pad (ft.):	28	
Thickness of Pad (ft):		2.50			

Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield (ksi):	60	
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	4	
Qty. of Vertical Rebars:	12	Tie Spacing (in):	6.0	
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	9	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf

Rebar at the bottom of the concrete pad:

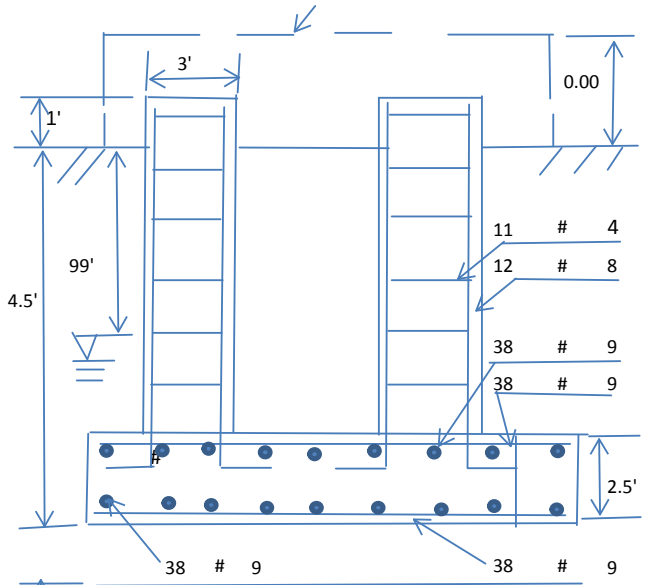
Qty. of Rebar in Pad (L):	38	Qty. of Rebar in Pad (W):	38

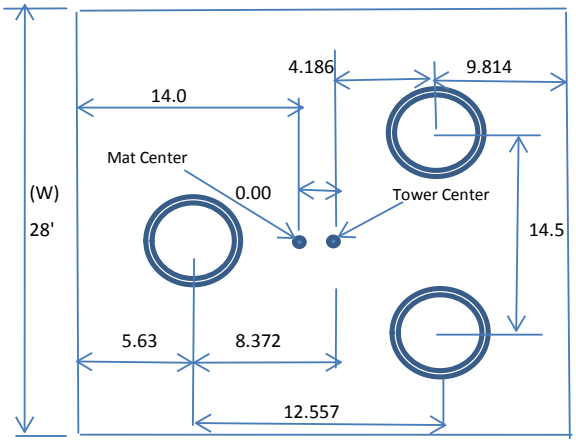
Rebar at the top of the concrete pad:

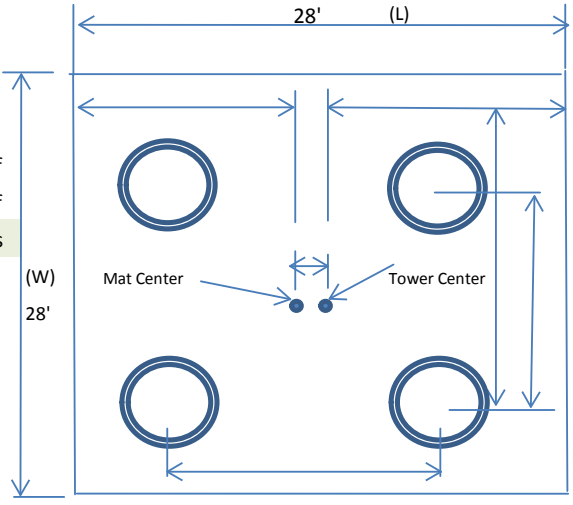
Qty. of Rebar in Pad (L):	38	Qty. of Rebar in Pad (W):	38

Soil Design Parameters:

Soil Unit Weight (pcf):	110.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	12000	Consider ties in concrete shear strength:	Yes	







Allowable overstress %: 5.00% **TES Engr. Number:** 77945 Page 2/2 Date: 7/9/2019

Apply 1.35 for e/w per G/H: 1.35

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

Total Dry Soil Volume (cu. Ft.):	1525.59	Total Dry Soil Weight (Kips):	167.81
Total Buoyant Soil Volume (cu. Ft.):	0.00	Total Buoyant Soil Weight (Kips):	0.00
Total Effective Soil Weight (Kips):	167.81	Weight from the Concrete Block at Top (K):	0.00
Total Dry Concrete Volume (cu. Ft.):	2023.62	Total Dry Concrete Weight (Kips):	303.54
Total Buoyant Concrete Volume (cu. Ft.):	0.00	Total Buoyant Concrete Weight (Kips):	0.00
Total Effective Concrete Weight (Kips):	303.54	Total Vertical Load on Base (Kips):	513.11

Check Soil Capacities:

					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2297.02	<	Allowable Factored Soil Bearing (psf):	9000	0.26	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	6523.7	>	Design Factored Momont (kips-ft):	4469	0.69	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.46	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			
(1) Concrete Pier:					Load/ Capacity Ratio	
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.20		
Calculated Moment Capacity (Mn,Kips-Ft):	263.8	>	Design Factored Moment (Mu, Kips-Ft)	79.8	0.30	OK!
Calculated Shear Capacity (Kips):	117.9	>	Design Factored Shear (Kips):	26.6	0.23	OK!
Calculated Tension Capacity (Tn, Kips):	511.9	>	Design Factored Tension (Tu Kips):	315.3	0.62	OK!
Calculated Compression Capacity (Pn, Kips):	1782.8	>	Design Factored Axial Load (Pu Kips):	351.7	0.20	OK!
Moment & Tension Strength Combination:	0.30	OK!	Check Tie Spacing (Design/Req'd):	0.5		OK!
Pier Reinforcement Ratio:	0.009	Reinforcement Ratio is satisfied per ACI				
(2).Concrete Pad:						
One-Way Design Shear Capacity (L or W Direction, Kips):	842.7	>	One-Way Factored Shear (L/W-Dir Kips	267.3	0.32	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	715.7	>	One-Way Factored Shear (Dia. Dir, Kips	172.3	0.24	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct.):	0.0043		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0039		
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	4350.2	>	Moment at Bottom (L-Direct. K-Ft):	1649.3	0.38	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	4130.4	>	Moment at Bottom (Dia. Dir. K-Ft):	1461.1	0.35	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0043		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0039		
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	4350.2	>	Moment at the top (L-Dir Kips-Ft):	739.8	0.17	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	4130.4	>	Moment at the top (Dia. Dir., K-Ft):	467.6	0.11	OK!
Punching Failure Capacity (Kips):	983.9	>	Punch. Failure Factored Shear (K):	351.7	0.36	OK!

EXHIBIT 9

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

Post-Mod Antenna Mount Analysis Report

Existing 180 ft. World Tower Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT09680-S-SBA

Customer Site Name: Rogers Hill

Carrier Name: T-Mobile (App#: 116819, V#1)

Carrier Site ID / Name: CTNL021D / Rogers Hill

Site Location: 35 South Bartlett Road

Quaker Hill, Connecticut

New London County

Latitude: 41.417652

Longitude: -72.106728

8/5/19

Analysis Result:

Max Structural Usage: 70.6% [Pass]

Report Prepared By: Saroj Dangol

Introduction

The purpose of this report is to summarize the analysis results on the (3) T-Frame at 150.00' elevation including the proposed modifications to support the proposed antenna configuration. Any existing modification listed under Sources of Information was assumed completed and was included in this analysis.

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

Sources of Information

Mount Drawings	Mount mapping by Full Metal Services dated 04/30/2019
Antenna Loading	SBA Application #: 116819, v1 dated 06/02/2019
Existing Modification	N/A
Proposed Modification	TES Project No. 82883

Analysis Criteria

Basic Wind Speed Used in the Analysis: V_{ULT} = 135 mph (3-Sec. Gust) / Equivalent to
V_{ASD} = 105 mph (3-Sec. Gust)
Basic Wind Speed with Ice: 50 mph (3-Sec. Gust) with 0.75" radial ice concurrent
Operational Wind Speed: 60 mph +0" Radial ice
Standard/Codes: ANSI/TIA/EIA 222-G / IBC 2015 / 2018 Connecticut State Building Code
Exposure Category: C
Structure Class: II
Topographic Category: 1
Crest Height (Ft): 0

The site is a Risk Category II structure per table 1604.5 of the 2015 IBC. This site does not support emergency communication equipment for first responders such as fire departments, police, hospitals, ambulance services or any of the facilities listed for Risk Categories III and IV. The scope of work detailed in this structural analysis does not include items that are a part of emergency service as the 911 or essential facility service of an emergency response system.

Mount Information

(3) T-Frame at 150.00' elevation at azimuths 70/190/320

Proposed Modifications

(1) METROSITE V BRACING KIT: MS-C1B-2875P

Final Antenna Configuration

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

*** Equipment to be flush mounted directly to the standoff and aren't shown in the placement diagram.**

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

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 after the proposed modification is successfully completed. The maximum structural usage is 70.6%, which occurs in the all thread connection. The proposed equipment must be installed as stipulated in the Final Antenna Configuration section of this report. The analysis results are void if the proposed equipment is not installed in accordance with this report.

Attachments

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

Standard Conditions

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

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

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

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

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

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

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

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

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


04.30.2019 13:28

Structure: CT09680-S-SBA - Rogers Hill

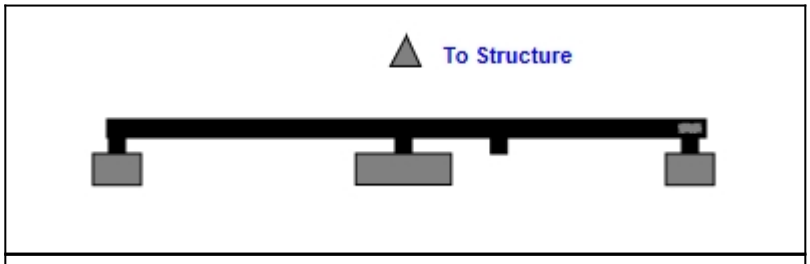
Sector: A

Structure Type: Self Support

Mount Elev: 150.00

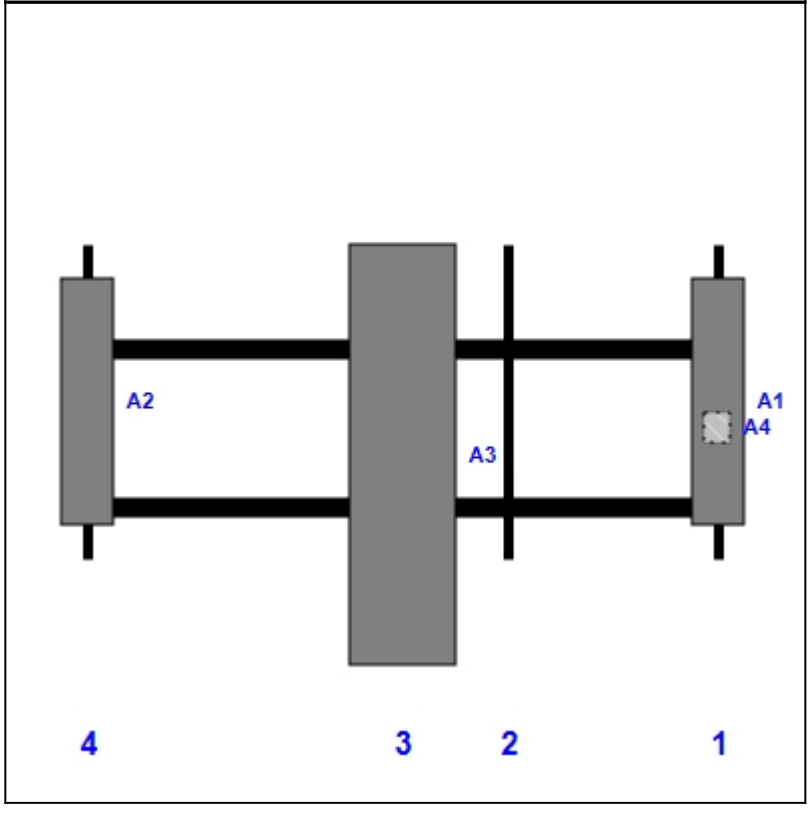
8/5/2019

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 21 B2A/B4P	56.00	12.10	147.00	1	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	147.00	1	a	Behind	42.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	75.00	3	a	Front	48.00	0.00
A2	Air 21 B4A/B2P	56.00	12.10	3.00	4	a	Front	36.00	0.00

Structure: CT09680-S-SBA - Rogers Hill

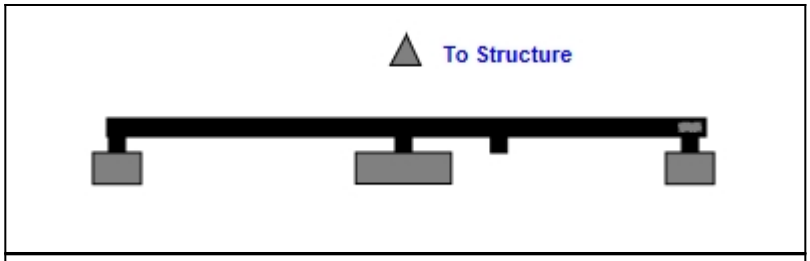
Sector: B

Structure Type: Self Support

Mount Elev: 150.00

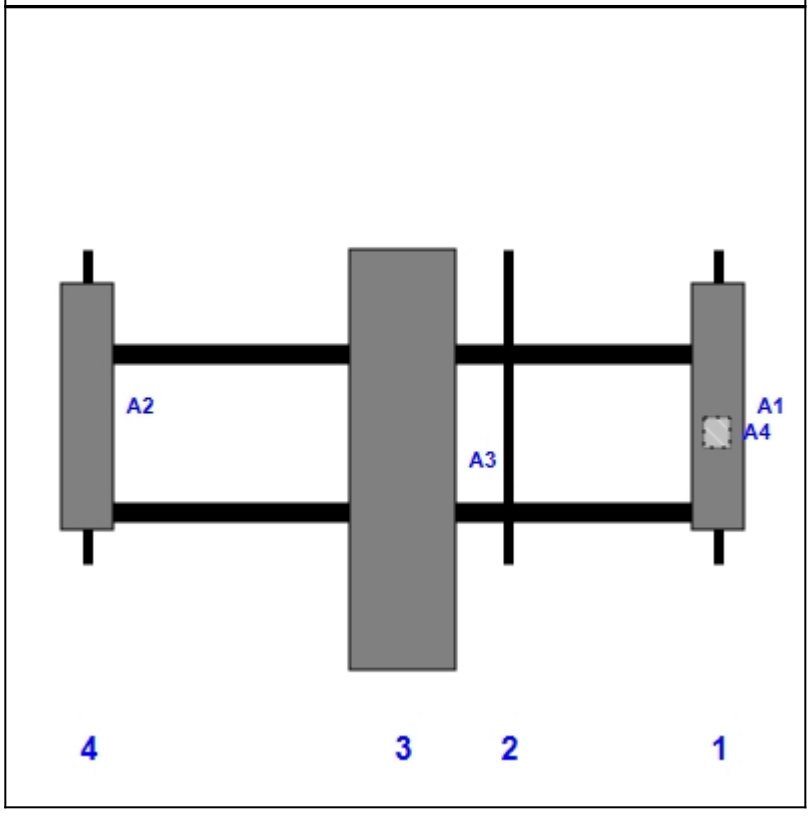
8/5/2019

Plan View



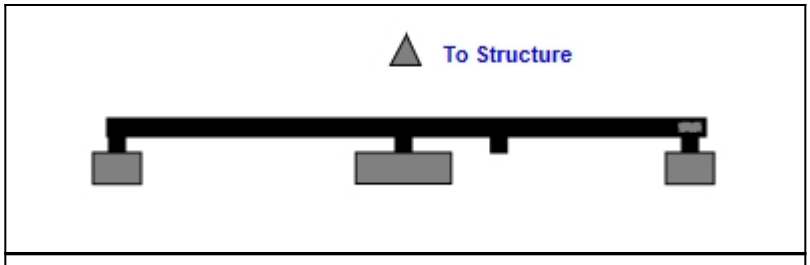
Front View

Looking Toward Structure



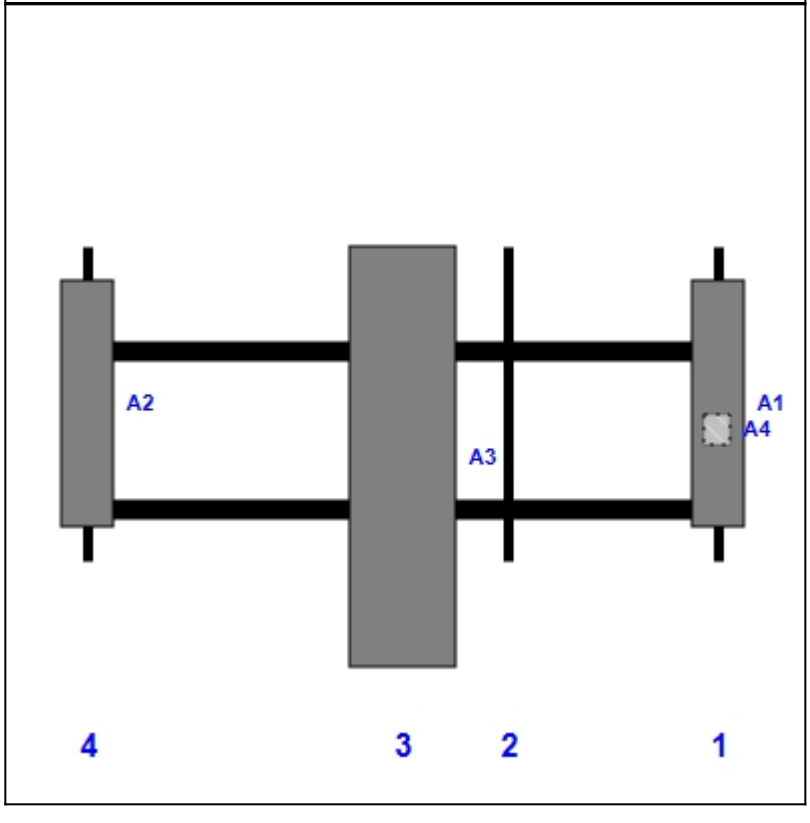
Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A1	Air 21 B2A/B4P	56.00	12.10	147.00	1	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	147.00	1	a	Behind	42.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	75.00	3	a	Front	48.00	0.00
A2	Air 21 B4A/B2P	56.00	12.10	3.00	4	a	Front	36.00	0.00

Plan View



Front View

Looking Toward Structure

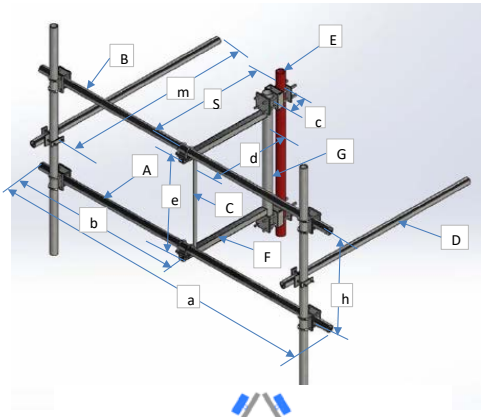


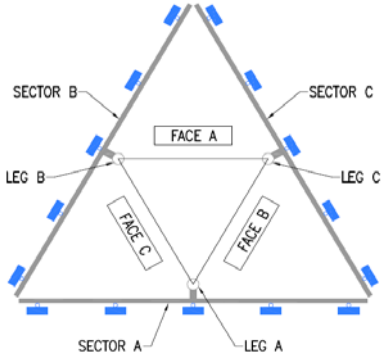
Ref #	Model	Height (in)	Width (in)	H Dist From Left	Pipe #	Pipe Pos V	Antenna Pos	Center Ant From Top	Antenna H Offset
A1	Air 21 B2A/B4P	56.00	12.10	147.00	1	a	Front	36.00	0.00
A4	KRY 112 144/1	6.90	6.10	147.00	1	a	Behind	42.00	0.00
A3	APXVAARR24_43-U-NA20	95.90	24.00	75.00	3	a	Front	48.00	0.00
A2	Air 21 B4A/B2P	56.00	12.10	3.00	4	a	Front	36.00	0.00

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

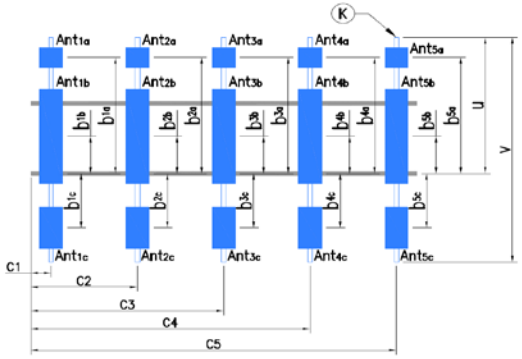
FCC # 1262077

Tower Owner:	SBA Communications	**Mapping Date:**	4/30/19
Site Name:	Rogers Hill	**Structure Type:**	3-Sided S.S. Tower
Site Number or ID:	CT09680-S-SBA	**Structure Height (Ft.):**	180
Mapping Contractor:	Full Metal Tower Services	**Mount Height (Ft.):**	150.2





Climbing facility is On Leg A, at 60° Degree Azimuth



Antenna Layout

Geometries (Unit: inches)									
a	151	**e**	37	**j**	N/A	**o**	N/A	**s**	28
b	74	**f**	N/A	**k**	N/A	**p**	N/A	**t**	N/A
c	7	**g**	N/A	**m**	134	**q**	N/A	**u ***	59
d	21	**h**	37	**n**	N/A	**r**	N/A	**v ***	72

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	2.375 OD x 0.154 Pipe	2.375	2.067	0.154	**F**	Tubing 3x3x1/4	3	3	0.25
B	2.375 OD x 0.154 Pipe	2.375	2.067	0.154	**G**	2.375 OD x 0.154 Pipe	2.375	2.067	0.154
C	2.375 OD x 0.154 Pipe	2.375	2.067	0.154	**H**				
D	2.375 OD x 0.154 Pipe	2.375	2.067	0.154	**J**				
E	2" SR	2	0	2	**K (pipe)***	2.375 OD x 0.154 Pipe	2.375	2.067	0.154

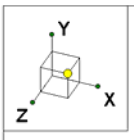
Distance from top of bottom support rail to lowest tip of ant./eqpt. of Carrier above. (N/A if > 10 ft.)	N/A
Distance from top of bottom support rail to highest tip of ant./eqpt. of Carrier below. (N/A if > 10 ft.)	N/A
Please enter the infomation below if members can't be found from the drop down lists	
(3) RRHs (17"x7"x20") mounted to Member C.	

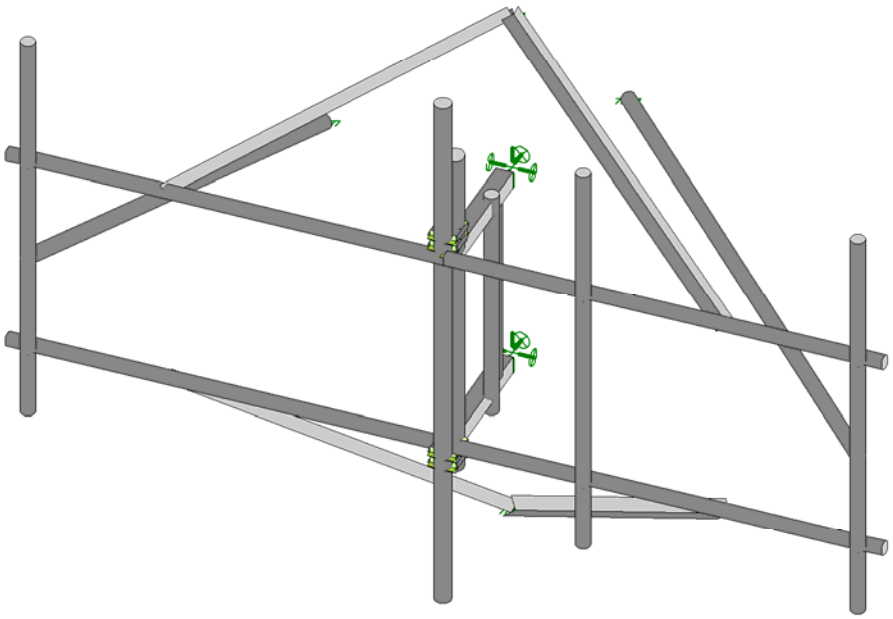
Tower Face Width at the mount (ft.):	4'	Tower Leg Size at the mount (in.):	2.0" Solid Rod

	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
Ants. Items	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}									
Ant_{1b}	Antenna A	12	8	56	1/2" (2)	+24"	7	3	
Ant_{1c}	TMA A	6	3	8	1/2" (2)	+23"	N/A	3	
Ant_{2a}									
Ant_{2b}	Empty Mast	N/A	N/A	N/A	N/A	N/A	N/A	51	
Ant_{2c}									
Ant_{3a}									
Ant_{3b}	Antenna B	12	7.5	96.5	1/2" (2)	+26"	7	74	
Ant_{3c}									
Ant_{4a}									
Ant_{4b}	Antenna C	13	9	56	1/2" (1)	+24"	8	148	
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**						

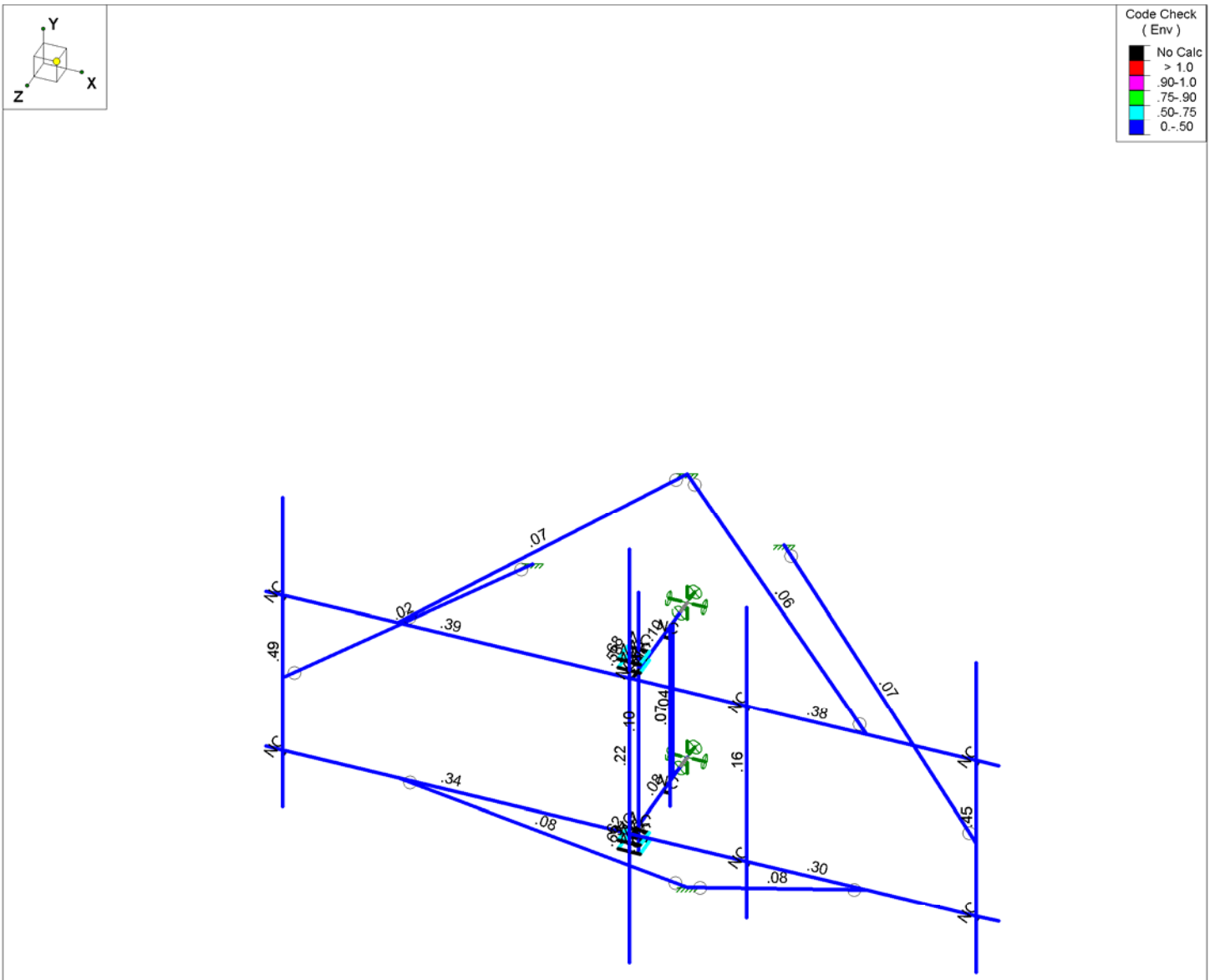
Azimuth (Degree) of Each Sector and Climbing Information

Sector A:	70°	Deg	
Sector B:	190°	Deg	
Sector C:	320°	Deg	
Climbing	60°	Deg	On Leg A
Climbing Facility	Corrosion Type:		Severe corrosion observed
	Access:		Climbing path was unobstructed.
	Condition:		N/A

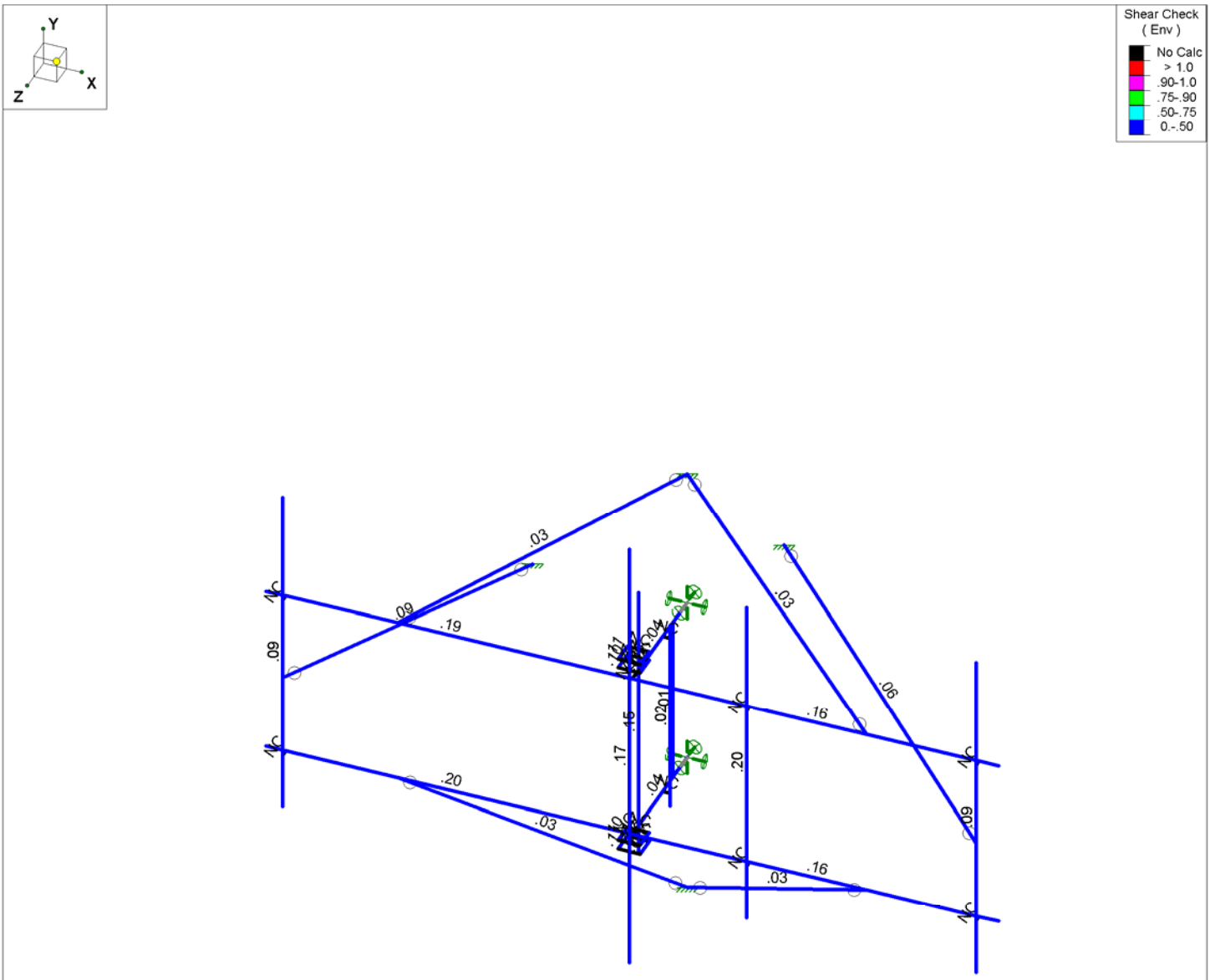




Tower Engineering Solutio...	CT09680-S-SBA_MT_LOT_Loads Only_Sector A_G	SK - 1
SAROJ DANGOL		Aug 5, 2019 at 1:26 PM
TES Project No. 82883		CT09680-S-SBA_82883_G_RISA_L...



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



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

Tower Engineering Solutio...	CT09680-S-SBA_MT_LOT_Loads Only_Sector A_G	SK - 3
SAROJ DANGOL		Aug 5, 2019 at 1:27 PM
TES Project No. 82883		CT09680-S-SBA_82883_G_RISA_L...

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(P...
1	Antenna D	None					8			
2	Antenna Di	None					8			
3	Antenna W Front	None					8			
4	Antenna Wi Front	None					8			
5	Antenna W Side	None					8			
6	Antenna Wi Side	None					8			
7	Service Lm1	None					1			
8	Service Lm2	None					1			
9	Structure D	None		-1						
10	Structure Di	None						27		
11	Structure W Front	None						27		
12	Structure Wi Front	None						27		
13	Structure W Side	None						27		
14	Structure Wi Side	None						27		

Load Combinations

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

Joint Coordinates and Temperatures

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
1	N1	0	0	2.25	0	
2	N2	0	3	2.25	0	
3	N3	-6.25	0	2.25	0	
4	N4	-6.25	3	2.25	0	
5	N7	6.25	0	2.25	0	
6	N8	6.25	3	2.25	0	
7	N7A	0	0	2	0	
8	N8A	0	3	2	0	
9	N9	0	4.5	2	0	
10	N10	0	-.5	2	0	
11	N13	0	0	0	0	
12	N14	0	3	0	0	
13	N15	5.91667	0	2.25	0	
14	N16	5.91667	3	2.25	0	
15	N21A	-5.91667	0	2.25	0	
16	N22A	-5.91667	3	2.25	0	
17	N23	5.91667	5	2.375	0	
18	N24	-5.91667	5	2.375	0	
19	N25	5.91667	-1	2.375	0	

Joint Coordinates and Temperatures (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Temp [F]	Detach From Diap...
20	N26	-5.91667	-1	2.375	0	
21	N27	0	5.5833	2.375	0	
22	N28	2	5	2.375	0	
23	N29	0	-2.4167	2.375	0	
24	N30	2	-1	2.375	0	
25	N33	-3.464	1.5	-2	0	
26	N31	2	0	2.25	0	
27	N32A	2	3	2.25	0	
28	N33A	5.91667	0	2.375	0	
29	N34	5.91667	3	2.375	0	
30	N37	-5.91667	0	2.375	0	
31	N38	-5.91667	3	2.375	0	
32	N39	2	0	2.375	0	
33	N40	2	3	2.375	0	
34	N39A	0	3	0.58333	0	
35	N40A	0	0	0.58333	0	
36	N41	0	3	1	0	
37	N42	0	0	1	0	
38	N43	.125	3	1	0	
39	N44	.125	0	1	0	
40	N43A	.125	3.25	1	0	
41	N44A	.125	-.25	1	0	
42	N45	0	3.25	2	0	
43	N46	0	3.25	2.375	0	
44	N47	0	3.4166	2	0	
45	N48	0	3.4166	2.375	0	
46	N49	0.1875	3.25	2	0	
47	N50	0.1875	3.25	2.375	0	
48	N51	0.1875	3.4166	2	0	
49	N52	0.1875	3.4166	2.375	0	
50	N57	-0.1875	3.25	2	0	
51	N58	-0.1875	3.25	2.375	0	
52	N59	-0.1875	3.4166	2	0	
53	N60	-0.1875	3.4166	2.375	0	
54	N57A	0	-.25	2	0	
55	N58A	0	-.25	2.375	0	
56	N59A	0	-0.0834	2	0	
57	N60A	0	-0.0834	2.375	0	
58	N61	0.1875	-.25	2	0	
59	N62	0.1875	-.25	2.375	0	
60	N63	0.1875	-0.0834	2	0	
61	N64	0.1875	-0.0834	2.375	0	
62	N65	-0.1875	-.25	2	0	
63	N66	-0.1875	-.25	2.375	0	
64	N67	-0.1875	-0.0834	2	0	
65	N68	-0.1875	-0.0834	2.375	0	
66	N67A	-5.91667	1.5	2.375	0	
67	N67B	0	1.5	-4	0	
68	N68A	5.91667	1.5	2.375	0	
69	N69	-4	3	2.25	0	
70	N70	4	3	2.25	0	
71	N71	0	5.5	0	0	
72	N72	-4	0	2.25	0	
73	N73	4	0	2.25	0	
74	N74	0	-2.5	0	0	

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	MP1	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
2	MP2	PIPE_2.5	Beam	Pipe	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
3	Front face	HSS2.375X0.1...	Beam	HSS Pipe	A500 Gr.B RND	Typical	.823	.527	.527	1.05
4	Standoff	HSS3X3X3	Beam	SquareTube	A500 Gr.B Rect	Typical	1.89	2.46	2.46	4.03
5	SA V	PIPE_3.0	Beam	Pipe	A53 Gr.B	Typical	2.07	2.85	2.85	5.69
6	Stabilizer	PIPE_2.0	Beam	Pipe	A53 Gr.B	Typical	1.02	.627	.627	1.25
7	All Thread	0.5_All_Thread	Beam	BAR	A36 Gr.36	Typical	.142	.002	.002	.003
8	V Brace	L2.5x2.5x4	Beam	Single Angle	A36 Gr.36	Typical	1.19	.692	.692	.026

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1E...	Density[k/ft...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
2	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
3	A992	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

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
1	M1	N3	N1			Front face	Beam	HSS Pipe	A500 Gr.B RND	Typical
2	M2	N1	N7			Front face	Beam	HSS Pipe	A500 Gr.B RND	Typical
3	M3	N4	N2			Front face	Beam	HSS Pipe	A500 Gr.B RND	Typical
4	M4	N2	N8			Front face	Beam	HSS Pipe	A500 Gr.B RND	Typical
5	M5	N9	N10			SA V	Beam	Pipe	A53 Gr.B	Typical
6	M6	N14	N8A			Standoff	Beam	SquareTube	A500 Gr.B Rect	Typical
7	M7	N13	N7A			Standoff	Beam	SquareTube	A500 Gr.B Rect	Typical
8	M8	N8A	N2			RIGID	None	None	RIGID	Typical
9	M9	N7A	N1			RIGID	None	None	RIGID	Typical
10	MP4A	N24	N26			MP1	Beam	Pipe	A53 Gr.B	Typical
11	MP1A	N23	N25			MP1	Beam	Pipe	A53 Gr.B	Typical
12	MP3A	N27	N29			MP2	Beam	Pipe	A53 Gr.B	Typical
13	MP2A	N28	N30			MP1	Beam	Pipe	A53 Gr.B	Typical
14	M14	N67A	N33			Stabilizer	Beam	Pipe	A53 Gr.B	Typical
15	M15	N22A	N38			RIGID	None	None	RIGID	Typical
16	M16	N21A	N37			RIGID	None	None	RIGID	Typical
17	M19	N32A	N40			RIGID	None	None	RIGID	Typical
18	M20	N31	N39			RIGID	None	None	RIGID	Typical
19	M21	N16	N34			RIGID	None	None	RIGID	Typical
20	M22	N15	N33A			RIGID	None	None	RIGID	Typical
21	M23	N39A	N40A			MP1	Beam	Pipe	A53 Gr.B	Typical
22	M24	N41	N43			RIGID	None	None	RIGID	Typical
23	M25	N42	N44			RIGID	None	None	RIGID	Typical
24	MP5A	N43A	N44A			MP1	Beam	Pipe	A53 Gr.B	Typical
25	M27	N59	N51			RIGID	None	None	RIGID	Typical
26	M28	N60	N52			RIGID	None	None	RIGID	Typical
27	M29	N58	N50			RIGID	None	None	RIGID	Typical
28	M30	N57	N49			RIGID	None	None	RIGID	Typical
29	M31	N59	N60			All Thread	Beam	BAR	A36 Gr.36	Typical
30	M32	N51	N52			All Thread	Beam	BAR	A36 Gr.36	Typical
31	M33	N57	N58			All Thread	Beam	BAR	A36 Gr.36	Typical
32	M34	N49	N50			All Thread	Beam	BAR	A36 Gr.36	Typical

Member Primary Data (Continued)

	Label	I Joint	J Joint	K Joint	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rules
33	M35	N67	N63			RIGID	None	None	RIGID	Typical
34	M36	N68	N64			RIGID	None	None	RIGID	Typical
35	M37	N66	N62			RIGID	None	None	RIGID	Typical
36	M38	N65	N61			RIGID	None	None	RIGID	Typical
37	M39	N67	N68			All Thread	Beam	BAR	A36 Gr.36	Typical
38	M40	N63	N64			All Thread	Beam	BAR	A36 Gr.36	Typical
39	M41	N65	N66			All Thread	Beam	BAR	A36 Gr.36	Typical
40	M42	N61	N62			All Thread	Beam	BAR	A36 Gr.36	Typical
41	M41A	N68A	N67B			Stabilizer	Beam	Pipe	A53 Gr.B	Typical
42	M42A	N71	N69			V Brace	Beam	Single Angle	A36 Gr.36	Typical
43	M43	N71	N70			V Brace	Beam	Single Angle	A36 Gr.36	Typical
44	M44	N74	N72			V Brace	Beam	Single Angle	A36 Gr.36	Typical
45	M45	N74	N73			V Brace	Beam	Single Angle	A36 Gr.36	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	M6			3			Yes				None
7	M7			3			Yes				None
8	M8						Yes	** NA **			None
9	M9						Yes	** NA **			None
10	MP4A						Yes				None
11	MP1A						Yes				None
12	MP3A						Yes				None
13	MP2A						Yes				None
14	M14	BenPIN	BenPIN				Yes				None
15	M15						Yes	** NA **			None
16	M16						Yes	** NA **			None
17	M19						Yes	** NA **			None
18	M20						Yes	** NA **			None
19	M21						Yes	** NA **			None
20	M22						Yes	** NA **			None
21	M23						Yes				None
22	M24						Yes	** NA **			None
23	M25						Yes	** NA **			None
24	MP5A						Yes				None
25	M27						Yes	** NA **			None
26	M28						Yes	** NA **			None
27	M29						Yes	** NA **			None
28	M30						Yes	** NA **			None
29	M31						Yes				None
30	M32						Yes				None
31	M33						Yes				None
32	M34						Yes				None
33	M35						Yes	** NA **			None
34	M36						Yes	** NA **			None
35	M37						Yes	** NA **			None
36	M38						Yes	** NA **			None
37	M39						Yes				None
38	M40						Yes				None
39	M41						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...
40	M42						Yes				None
41	M41A	BenPIN	BenPIN				Yes				None
42	M42A	BenPIN	BenPIN				Yes				None
43	M43	BenPIN	BenPIN				Yes				None
44	M44	BenPIN	BenPIN				Yes				None
45	M45	BenPIN	BenPIN				Yes				None

Hot Rolled Steel Design Parameters

	Label	Shape	Length[ft]	Lbyy[ft]	Lbzz[ft]	Lcomp top[ft]	Lcomp bot[ft]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Front face	6.25			Lbyy						Lateral
2	M2	Front face	6.25			Lbyy						Lateral
3	M3	Front face	6.25			Lbyy						Lateral
4	M4	Front face	6.25			Lbyy						Lateral
5	M5	SA V	5			Lbyy						Lateral
6	M6	Standoff	2			Lbyy						Lateral
7	M7	Standoff	2			Lbyy						Lateral
8	MP4A	MP1	6			Lbyy						Lateral
9	MP1A	MP1	6			Lbyy						Lateral
10	MP3A	MP2	8			Lbyy						Lateral
11	MP2A	MP1	6			Lbyy						Lateral
12	M14	Stabilizer	5.016			Lbyy						Lateral
13	M23	MP1	3			Lbyy						Lateral
14	MP5A	MP1	3.5			Lbyy						Lateral
15	M31	All Thread	.375			Lbyy			.65	.65		Lateral
16	M32	All Thread	.375			Lbyy			.65	.65		Lateral
17	M33	All Thread	.375			Lbyy			.65	.65		Lateral
18	M34	All Thread	.375			Lbyy			.65	.65		Lateral
19	M39	All Thread	.375			Lbyy			.65	.65		Lateral
20	M40	All Thread	.375			Lbyy			.65	.65		Lateral
21	M41	All Thread	.375			Lbyy			.65	.65		Lateral
22	M42	All Thread	.375			Lbyy			.65	.65		Lateral
23	M41A	Stabilizer	8.698			Lbyy						Lateral
24	M42A	V Brace	5.226			Lbyy						Lateral
25	M43	V Brace	5.226			Lbyy						Lateral
26	M44	V Brace	5.226			Lbyy						Lateral
27	M45	V Brace	5.226			Lbyy						Lateral

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	-45.75	1
2	MP1A	Y	-45.75	5
3	MP4A	Y	-45.2	1
4	MP4A	Y	-45.2	5
5	MP3A	Y	-64	.5
6	MP3A	Y	-64	7.5
7	MP1A	Y	-11	3.5
8	MP5A	Y	-70	1.5

Member Point Loads (BLC 2 : Antenna Di)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Y	-84.444	1
2	MP1A	Y	-84.444	5
3	MP4A	Y	-84.444	1
4	MP4A	Y	-84.444	5
5	MP3A	Y	-208.966	.5
6	MP3A	Y	-208.966	7.5
7	MP1A	Y	-16.308	3.5
8	MP5A	Y	-68.247	1.5

Member Point Loads (BLC 3 : Antenna W Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Z	-85.589	1
2	MP1A	Z	-85.589	5
3	MP4A	Z	-85.589	1
4	MP4A	Z	-85.589	5
5	MP3A	Z	-284.454	.5
6	MP3A	Z	-284.454	7.5
7	MP1A	Z	-11.524	3.5
8	MP5A	Z	-46.378	1.5

Member Point Loads (BLC 4 : Antenna Wi Front)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	Z	-22.905	1
2	MP1A	Z	-22.905	5
3	MP4A	Z	-22.905	1
4	MP4A	Z	-22.905	5
5	MP3A	Z	-70.557	.5
6	MP3A	Z	-70.557	7.5
7	MP1A	Z	-4.019	3.5
8	MP5A	Z	-13.944	1.5

Member Point Loads (BLC 5 : Antenna W Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	60.576	1
2	MP1A	X	60.576	5
3	MP4A	X	60.576	1
4	MP4A	X	60.576	5
5	MP3A	X	115.092	.5
6	MP3A	X	115.092	7.5
7	MP1A	X	4.373	3.5
8	MP5A	X	32.676	1.5

Member Point Loads (BLC 6 : Antenna Wi Side)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	MP1A	X	16.893	1
2	MP1A	X	16.893	5
3	MP4A	X	16.893	1
4	MP4A	X	16.893	5
5	MP3A	X	31.127	.5
6	MP3A	X	31.127	7.5
7	MP1A	X	2.405	3.5
8	MP5A	X	10.415	1.5

Member Point Loads (BLC 7 : Service Lm1)

Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]

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

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

Member Point Loads (BLC 8 : Service Lm2)

	Member Label	Direction	Magnitude[lb,k-ft]	Location[ft,%]
1	M2	Y	-500	%100

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	-8.785	-8.785	0	%100
2	M2	Y	-8.785	-8.785	0	%100
3	M3	Y	-8.785	-8.785	0	%100
4	M4	Y	-8.785	-8.785	0	%100
5	M5	Y	-11.184	-11.184	0	%100
6	M6	Y	-12.882	-12.882	0	%100
7	M7	Y	-12.882	-12.882	0	%100
8	MP4A	Y	-8.785	-8.785	0	%100
9	MP1A	Y	-8.785	-8.785	0	%100
10	MP3A	Y	-9.851	-9.851	0	%100
11	MP2A	Y	-8.785	-8.785	0	%100
12	M14	Y	-8.785	-8.785	0	%100
13	M23	Y	-8.785	-8.785	0	%100
14	MP5A	Y	-8.785	-8.785	0	%100
15	M31	Y	-4.787	-4.787	0	%100
16	M32	Y	-4.787	-4.787	0	%100
17	M33	Y	-4.787	-4.787	0	%100
18	M34	Y	-4.787	-4.787	0	%100
19	M39	Y	-4.787	-4.787	0	%100
20	M40	Y	-4.787	-4.787	0	%100
21	M41	Y	-4.787	-4.787	0	%100
22	M42	Y	-4.787	-4.787	0	%100
23	M41A	Y	-8.785	-8.785	0	%100
24	M42A	Y	-9.156	-9.156	0	%100
25	M43	Y	-9.156	-9.156	0	%100
26	M44	Y	-9.156	-9.156	0	%100
27	M45	Y	-9.156	-9.156	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	-6.676	-6.676	0	%100
2	M2	PZ	-6.676	-6.676	0	%100
3	M3	PZ	-6.676	-6.676	0	%100
4	M4	PZ	-6.676	-6.676	0	%100
5	M5	PZ	-9.838	-9.838	0	%100
6	M6	PZ	-14.054	-14.054	0	%100
7	M7	PZ	-14.054	-14.054	0	%100
8	MP4A	PZ	-6.676	-6.676	0	%100
9	MP1A	PZ	-6.676	-6.676	0	%100
10	MP3A	PZ	-8.081	-8.081	0	%100
11	MP2A	PZ	-6.676	-6.676	0	%100
12	M14	PZ	-6.676	-6.676	0	%100
13	M23	PZ	-6.676	-6.676	0	%100
14	MP5A	PZ	-6.676	-6.676	0	%100
15	M31	PZ	-1.405	-1.405	0	%100
16	M32	PZ	-1.405	-1.405	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,%]
17	M33	PZ	-1.405	-1.405	0	%100
18	M34	PZ	-1.405	-1.405	0	%100
19	M39	PZ	-1.405	-1.405	0	%100
20	M40	PZ	-1.405	-1.405	0	%100
21	M41	PZ	-1.405	-1.405	0	%100
22	M42	PZ	-1.405	-1.405	0	%100
23	M41A	PZ	-6.676	-6.676	0	%100
24	M42A	PZ	-11.712	-11.712	0	%100
25	M43	PZ	-11.712	-11.712	0	%100
26	M44	PZ	-11.712	-11.712	0	%100
27	M45	PZ	-11.712	-11.712	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	-3.738	-3.738	0	%100
2	M2	PZ	-3.738	-3.738	0	%100
3	M3	PZ	-3.738	-3.738	0	%100
4	M4	PZ	-3.738	-3.738	0	%100
5	M5	PZ	-4.455	-4.455	0	%100
6	M6	PZ	-5.412	-5.412	0	%100
7	M7	PZ	-5.412	-5.412	0	%100
8	MP4A	PZ	-3.738	-3.738	0	%100
9	MP1A	PZ	-3.738	-3.738	0	%100
10	MP3A	PZ	-4.057	-4.057	0	%100
11	MP2A	PZ	-3.738	-3.738	0	%100
12	M14	PZ	-3.738	-3.738	0	%100
13	M23	PZ	-3.738	-3.738	0	%100
14	MP5A	PZ	-3.738	-3.738	0	%100
15	M31	PZ	-2.543	-2.543	0	%100
16	M32	PZ	-2.543	-2.543	0	%100
17	M33	PZ	-2.543	-2.543	0	%100
18	M34	PZ	-2.543	-2.543	0	%100
19	M39	PZ	-2.543	-2.543	0	%100
20	M40	PZ	-2.543	-2.543	0	%100
21	M41	PZ	-2.543	-2.543	0	%100
22	M42	PZ	-2.543	-2.543	0	%100
23	M41A	PZ	-3.738	-3.738	0	%100
24	M42A	PZ	-4.88	-4.88	0	%100
25	M43	PZ	-4.88	-4.88	0	%100
26	M44	PZ	-4.88	-4.88	0	%100
27	M45	PZ	-4.88	-4.88	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	6.676	6.676	0	%100
2	M2	PX	6.676	6.676	0	%100
3	M3	PX	6.676	6.676	0	%100
4	M4	PX	6.676	6.676	0	%100
5	M5	PX	9.838	9.838	0	%100
6	M6	PX	14.054	14.054	0	%100
7	M7	PX	14.054	14.054	0	%100
8	MP4A	PX	6.676	6.676	0	%100
9	MP1A	PX	6.676	6.676	0	%100
10	MP3A	PX	8.081	8.081	0	%100
11	MP2A	PX	6.676	6.676	0	%100
12	M14	PX	6.676	6.676	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,%]
13	M23	PX	6.676	6.676	0	%100
14	MP5A	PX	6.676	6.676	0	%100
15	M31	PX	1.405	1.405	0	%100
16	M32	PX	1.405	1.405	0	%100
17	M33	PX	1.405	1.405	0	%100
18	M34	PX	1.405	1.405	0	%100
19	M39	PX	1.405	1.405	0	%100
20	M40	PX	1.405	1.405	0	%100
21	M41	PX	1.405	1.405	0	%100
22	M42	PX	1.405	1.405	0	%100
23	M41A	PX	6.676	6.676	0	%100
24	M42A	PX	11.712	11.712	0	%100
25	M43	PX	11.712	11.712	0	%100
26	M44	PX	11.712	11.712	0	%100
27	M45	PX	11.712	11.712	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	3.738	3.738	0	%100
2	M2	PX	3.738	3.738	0	%100
3	M3	PX	3.738	3.738	0	%100
4	M4	PX	3.738	3.738	0	%100
5	M5	PX	4.455	4.455	0	%100
6	M6	PX	5.412	5.412	0	%100
7	M7	PX	5.412	5.412	0	%100
8	MP4A	PX	3.738	3.738	0	%100
9	MP1A	PX	3.738	3.738	0	%100
10	MP3A	PX	4.057	4.057	0	%100
11	MP2A	PX	3.738	3.738	0	%100
12	M14	PX	3.738	3.738	0	%100
13	M23	PX	3.738	3.738	0	%100
14	MP5A	PX	3.738	3.738	0	%100
15	M31	PX	2.543	2.543	0	%100
16	M32	PX	2.543	2.543	0	%100
17	M33	PX	2.543	2.543	0	%100
18	M34	PX	2.543	2.543	0	%100
19	M39	PX	2.543	2.543	0	%100
20	M40	PX	2.543	2.543	0	%100
21	M41	PX	2.543	2.543	0	%100
22	M42	PX	2.543	2.543	0	%100
23	M41A	PX	3.738	3.738	0	%100
24	M42A	PX	4.88	4.88	0	%100
25	M43	PX	4.88	4.88	0	%100
26	M44	PX	4.88	4.88	0	%100
27	M45	PX	4.88	4.88	0	%100

Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
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	N14	Reaction	Reaction	Reaction	Reaction		Reaction
2	N13	Reaction	Reaction	Reaction	Reaction		Reaction
3	N33	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
4	N67B	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
5	N71	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
6	N74	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	N14	max	31.978	10	708.339	7	775.495	1	-.166	2	0	11	.075	10
2		min	-105.274	9	231.573	1	-782.681	2	-.704	5	0	1	-.023	1
3	N13	max	102.182	9	724.662	5	613.987	1	-.212	3	0	11	.087	10
4		min	-40.055	4	146.487	2	-606.069	2	-.695	8	0	1	-.049	2
5	N33	max	192.635	3	32.86	7	390.954	4	.069	9	0	11	-.001	2
6		min	-196.908	4	9.792	1	-387.228	3	0	2	0	1	-.124	9
7	N67B	max	444.638	1	56.587	6	510.035	1	.067	10	0	11	.073	10
8		min	-443.461	2	17.525	1	-510.052	2	.001	2	0	1	.001	2
9	N71	max	1179.63	4	671.777	6	105.508	1	.005	9	.002	9	.002	10
10		min	-1212.685	3	6.308	1	-557.26	6	0	2	-.002	10	-.002	9
11	N74	max	1143.73	4	648.317	5	545.284	5	.005	9	.002	10	.002	10
12		min	-1110.564	3	89.315	2	-30.572	2	.001	2	-.002	9	-.002	9
13	Totals:	max	1711.457	4	2726.966	6	2704.421	1						
14		min	-1711.458	3	945.807	1	-2704.447	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	11	0	11	0	11	0	11	0	11	0	11
2			min	0	1	-750	9	0	1	0	1	0	1	0	1
3		2	max	488.09	9	144.618	4	152.416	4	-.027	4	.163	4	.052	3
4			min	-143.825	4	-438.916	9	-229.172	3	-.245	9	-.249	3	-.111	4
5		3	max	199.699	4	96.977	3	217.52	9	-.026	4	.218	4	.209	9
6			min	-335.796	3	-106.964	4	-56.963	4	-.24	9	-.281	3	-.118	4
7		4	max	199.699	4	91.33	3	215.851	9	-.026	4	.177	9	.212	9
8			min	-335.796	3	-112.611	4	-56.963	4	-.24	9	-.055	3	.024	3
9		5	max	199.699	4	85.682	3	214.182	9	-.026	4	.513	9	.234	4
10			min	-335.796	3	-118.258	4	-56.963	4	-.24	9	.04	4	-.114	3
11	M2	1	max	169.349	2	121.782	4	59.429	3	.195	10	.404	10	.151	8
12			min	-254.828	1	-63.627	3	-232.453	10	.026	9	-.02	3	-.029	3
13		2	max	169.349	2	116.135	4	59.429	3	.195	10	.073	3	.075	3
14			min	-254.828	1	-69.275	3	-234.122	10	.026	9	-.049	4	-.067	4
15		3	max	154.672	2	165.028	3	52.993	3	.185	10	.23	3	.277	10
16			min	-323.836	1	-152.833	4	-247.281	10	.009	3	-.262	4	-.002	3
17		4	max	460.868	10	436.059	10	235.275	4	.189	10	.164	3	.045	4
18			min	-230.412	3	-96.247	3	-163.964	3	.01	3	-.245	4	-.079	3
19		5	max	0	11	750	10	0	11	0	11	0	11	0	11
20			min	0	1	0	1	0	1	0	1	0	1	0	1
21	M3	1	max	0	11	0	11	0	11	0	11	0	11	0	11
22			min	0	1	0	1	0	1	0	1	0	1	0	1
23		2	max	206.945	3	142.433	3	236.754	4	.027	2	.252	4	.08	4
24			min	-509.507	9	-466.902	9	-159.932	3	-.234	9	-.168	3	-.173	9
25		3	max	412.58	2	111.937	4	61.24	3	.026	2	.286	4	.186	4
26			min	-270.335	1	-120.85	3	-224.843	9	-.23	9	-.224	3	-.132	3
27		4	max	412.58	2	106.29	4	61.24	3	.026	2	.055	4	.221	9
28			min	-270.335	1	-126.498	3	-226.512	9	-.23	9	-.195	9	.006	2

Envelope Member Section Forces (Continued)

	Member	Sec		Axial[lb]	LC	y Shear[lb]	LC	z Shear[lb]	LC	Torque[k-...	LC	y-y Mome...	LC	z-z Mom...	LC
29		5	max	412.58	2	100.642	4	61.24	3	.026	2	-.029	2	.279	9
30			min	-270.335	1	-132.145	3	-228.181	9	-.23	9	-.55	9	-.146	4
31	M4	1	max	390.551	2	106.057	7	250.964	10	.191	10	.036	4	.145	5
32			min	-303.202	1	-35.52	4	-70.944	4	.008	2	-.436	10	-.014	2
33		2	max	390.551	2	88.689	3	249.295	10	.191	10	.051	3	.065	10
34			min	-303.202	1	-41.168	4	-70.944	4	.008	2	-.075	4	-.055	3
35		3	max	405.229	2	191.385	4	254.911	10	.172	10	.264	3	.274	10
36			min	-234.195	1	-181.738	3	-67.562	4	-.05	2	-.235	4	-.004	4
37		4	max	293.388	4	491.436	10	174.537	4	.176	10	.252	3	.073	3
38			min	-508.794	10	-93.784	4	-243.907	3	-.05	2	-.174	4	-.114	10
39		5	max	0	11	0	11	0	11	0	11	0	11	0	11
40			min	0	1	0	1	0	1	0	1	0	1	0	1
41	M5	1	max	0	11	0	9	.004	1	0	11	0	11	0	11
42			min	0	1	-.002	10	-.005	6	0	1	0	1	0	1
43		2	max	406.365	5	259.207	4	2853.186	1	.081	4	.463	1	.062	3
44			min	-29.9	2	-258.875	3	-2807.83	2	-.074	3	-.475	2	-.062	4
45		3	max	242.884	3	4.554	2	172.966	6	.103	9	.123	1	.056	2
46			min	-241.94	4	-97.139	9	-29.458	9	-.152	10	-.171	2	-.069	1
47		4	max	253.45	3	14.374	4	167.397	6	.103	9	.149	1	.06	9
48			min	-231.374	4	-97.139	9	-27.49	9	-.152	10	-.078	2	-.031	1
49		5	max	0	11	0	5	0	5	0	11	0	11	0	11
50			min	0	1	0	2	0	2	0	1	0	1	0	1
51	M6	1	max	775.495	1	708.33	7	105.438	9	.075	10	.026	9	.528	5
52			min	-782.681	2	231.622	1	-31.897	10	-.023	1	-.008	10	.104	2
53		2	max	775.651	1	696.572	5	113.719	9	.071	10	.065	9	.286	5
54			min	-754.159	2	141.977	2	-29.692	10	-.031	1	-.039	10	.03	2
55		3	max	737.356	1	656.645	1	128.041	9	.07	10	.112	9	.116	6
56			min	-668.522	2	-302.841	2	-85.012	3	-.049	9	-.075	10	-.031	1
57		4	max	737.356	1	653.014	1	128.041	9	.07	10	.168	9	.221	2
58			min	-668.522	2	-306.473	2	-94.85	3	-.049	9	-.093	3	-.318	1
59		5	max	737.356	1	649.382	1	134.871	4	.07	10	.224	9	.356	2
60			min	-668.522	2	-310.104	2	-104.687	3	-.049	9	-.136	3	-.603	1
61	M7	1	max	613.987	1	724.69	5	40.066	4	.087	10	.01	4	.518	8
62			min	-606.069	2	146.457	2	-102.211	9	-.049	2	-.026	9	.149	1
63		2	max	581.788	1	685.64	8	67.445	4	.084	10	.033	10	.283	6
64			min	-602.548	2	190.63	3	-110.522	9	-.053	2	-.063	9	.044	1
65		3	max	508.494	1	632.299	6	117.779	4	.075	10	.066	10	.113	5
66			min	-576.596	2	-216.087	1	-147.638	3	-.035	9	-.107	9	-.009	2
67		4	max	508.494	1	623.032	6	127.617	4	.075	10	.117	4	.161	1
68			min	-576.596	2	-219.718	1	-157.476	3	-.035	9	-.162	9	-.259	2
69		5	max	508.494	1	613.765	6	137.455	4	.075	10	.175	4	.258	1
70			min	-576.596	2	-223.349	1	-167.314	3	-.035	9	-.217	9	-.508	2
71	M8	1	max	300.558	5	226.732	3	418.693	4	.148	4	.368	9	.006	2
72			min	-15.994	2	-136.055	4	-362.166	3	-.209	9	-.314	10	-.237	9
73		2	max	300.558	5	226.732	3	418.693	4	.148	4	.382	9	.009	2
74			min	-15.994	2	-136.055	4	-362.166	3	-.209	9	-.314	10	-.242	9
75		3	max	300.558	5	226.732	3	418.693	4	.148	4	.396	9	.012	2
76			min	-15.994	2	-136.055	4	-362.166	3	-.209	9	-.315	10	-.248	9
77		4	max	300.558	5	226.732	3	418.693	4	.148	4	.41	9	.015	2
78			min	-15.994	2	-136.055	4	-362.166	3	-.209	9	-.316	10	-.253	9
79		5	max	300.558	5	226.732	3	418.693	4	.148	4	.424	9	.019	2
80			min	-15.994	2	-136.055	4	-362.166	3	-.209	9	-.316	10	-.258	9
81	M9	1	max	-53.419	1	239.671	4	410.799	4	.085	3	.296	10	-.002	4
82			min	-286.413	6	-149.428	3	-466.992	3	-.167	9	-.36	9	-.255	9
83		2	max	-53.419	1	239.671	4	410.799	4	.085	3	.296	10	-.017	4
84			min	-286.413	6	-149.428	3	-466.992	3	-.167	9	-.374	9	-.258	9
85		3	max	-53.419	1	239.671	4	410.799	4	.085	3	.296	10	-.031	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
86			min	-286.413	6	-149.428	3	-466.992	3	-.167	9	-.388	9	-.261	9
87		4	max	-53.419	1	239.671	4	410.799	4	.085	3	.296	10	-.046	4
88			min	-286.413	6	-149.428	3	-466.992	3	-.167	9	-.402	9	-.264	9
89		5	max	-53.419	1	239.671	4	410.799	4	.085	3	.296	10	-.056	2
90			min	-286.413	6	-149.428	3	-466.992	3	-.167	9	-.416	9	-.266	9
91	MP4A	1	max	0	11	.183	8	.8	5	0	11	0	11	0	11
92			min	0	1	-.075	3	-.099	2	0	1	0	1	0	1
93		2	max	158.109	8	113.053	4	153.252	1	0	11	.081	1	.061	3
94			min	60.487	1	-113.018	3	-153.063	2	0	1	-.081	2	-.061	4
95		3	max	214.541	3	77.764	3	236.883	4	.048	9	.203	1	.074	3
96			min	-398.82	9	-509.324	9	-158.693	3	-.037	2	-.23	2	-.235	9
97		4	max	230.692	3	31.029	4	229.08	3	.048	9	.138	1	.631	9
98			min	-381.807	9	-488.349	9	-153.512	4	-.037	2	-.073	2	-.057	4
99		5	max	0	11	.002	4	-.004	4	0	11	0	11	0	11
100			min	0	1	-.013	7	-.057	7	0	1	0	1	0	1
101	MP1A	1	max	0	11	.027	4	.711	5	0	11	0	11	0	11
102			min	0	1	-.189	7	-.11	2	0	1	0	1	0	1
103		2	max	158.769	8	112.97	4	153.24	1	0	11	.081	1	.061	3
104			min	61.147	1	-113.016	3	-153.074	2	0	1	-.081	2	-.061	4
105		3	max	166.88	4	508.83	10	244.088	3	.03	2	.244	1	.207	10
106			min	-422.612	10	-164.428	4	-173.435	4	-.054	10	-.266	2	-.085	1
107		4	max	204.104	4	461.314	10	258.056	2	.03	2	.139	1	-.013	3
108			min	-384.81	10	-140.322	1	-187.665	1	-.054	10	-.082	2	-.581	10
109		5	max	0	11	.015	5	-.003	3	0	11	0	11	0	11
110			min	0	1	-.002	2	-.049	8	0	1	0	1	0	1
111	MP3A	1	max	0	11	.157	4	.227	1	0	11	0	11	0	11
112			min	0	1	-.164	3	-.234	2	0	1	0	1	0	1
113		2	max	318.617	8	210.164	4	481.213	1	0	11	.709	1	.302	3
114			min	89.948	1	-210.17	3	-481.219	2	0	1	-.709	2	-.302	4
115		3	max	144.432	2	.013	2	49.066	6	.041	9	.336	1	.306	3
116			min	-143.841	1	-.842	10	4.138	9	-.06	10	-.337	2	-.305	4
117		4	max	-89.948	10	209.864	3	480.766	2	0	11	.708	1	.302	3
118			min	-318.617	5	-209.858	4	-480.76	1	0	1	-.708	2	-.302	4
119		5	max	0	11	.149	4	.226	1	0	11	0	11	0	11
120			min	0	1	-.142	3	-.219	2	0	1	0	1	0	1
121	MP2A	1	max	0	11	.001	2	.037	5	0	11	0	11	0	11
122			min	0	1	-.019	5	-.002	2	0	1	0	1	0	1
123		2	max	19.425	8	16.018	4	16.031	1	0	11	.012	1	.012	3
124			min	6.248	1	-16.022	3	-16.024	2	0	1	-.012	2	-.012	4
125		3	max	250.858	4	192.101	10	27.107	2	-.032	2	.049	1	.105	10
126			min	-252.239	3	14.679	2	-17.259	1	-.305	10	-.054	2	-.027	3
127		4	max	257.105	4	192.101	10	14.815	7	-.032	2	.035	1	-.016	4
128			min	-245.991	3	14.679	2	-3.507	9	-.305	10	-.025	2	-.183	10
129		5	max	0	11	.009	7	-.001	9	0	11	0	11	0	11
130			min	0	1	0	4	-.017	7	0	1	0	1	0	1
131	M14	1	max	460.162	4	32.476	8	20.381	4	-.001	2	0	11	0	11
132			min	-454.822	3	10.445	1	-20.381	3	-.142	9	0	1	0	1
133		2	max	454.449	4	16.238	8	10.19	4	-.001	2	.019	4	-.01	10
134			min	-449.11	3	5.222	1	-10.19	3	-.142	9	-.019	3	-.031	5
135		3	max	448.736	4	0	11	0	11	-.001	2	.026	4	-.013	10
136			min	-443.397	3	0	1	0	1	-.142	9	-.026	3	-.041	5
137		4	max	443.023	4	-5.222	10	10.19	3	-.001	2	.019	4	-.01	10
138			min	-437.684	3	-16.238	5	-10.19	4	-.142	9	-.019	3	-.031	5
139		5	max	437.31	4	-10.445	10	20.381	3	-.001	2	0	11	0	11
140			min	-431.971	3	-32.476	5	-20.381	4	-.142	9	0	1	0	1
141	M15	1	max	159.084	3	468.783	9	206.179	3	.744	9	.039	4	.027	2
142			min	-237.976	4	-148.007	3	-509.354	9	-.039	3	-.029	3	-.234	9

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
143		2	max	159.084	3	468.783	9	206.179	3	.744	9	.035	2	.022	2
144			min	-237.976	4	-148.007	3	-509.354	9	-.039	3	-.031	1	-.249	9
145		3	max	159.084	3	468.783	9	206.179	3	.744	9	.036	2	.017	2
146			min	-237.976	4	-148.007	3	-509.354	9	-.039	3	-.036	1	-.264	9
147		4	max	159.084	3	468.783	9	206.179	3	.744	9	.037	2	.012	2
148			min	-237.976	4	-148.007	3	-509.354	9	-.039	3	-.041	1	-.278	9
149		5	max	159.084	3	468.783	9	206.179	3	.744	9	.037	2	.008	2
150			min	-237.976	4	-148.007	3	-509.354	9	-.039	3	-.048	9	-.293	9
151	M16	1	max	228.149	3	290.221	3	488.222	9	.876	9	.047	1	-.027	4
152			min	-153.002	4	-324.646	9	-144.569	4	-.069	4	-.056	2	-.245	9
153		2	max	228.149	3	290.221	3	488.222	9	.876	9	.047	1	-.022	4
154			min	-153.002	4	-324.646	9	-144.569	4	-.069	4	-.051	2	-.235	9
155		3	max	228.149	3	290.221	3	488.222	9	.876	9	.047	1	-.018	4
156			min	-153.002	4	-324.646	9	-144.569	4	-.069	4	-.047	2	-.224	9
157		4	max	228.149	3	290.221	3	488.222	9	.876	9	.047	1	-.013	4
158			min	-153.002	4	-324.646	9	-144.569	4	-.069	4	-.042	2	-.214	9
159		5	max	228.149	3	290.221	3	488.222	9	.876	9	.048	9	-.008	4
160			min	-153.002	4	-324.646	9	-144.569	4	-.069	4	-.037	2	-.204	9
161	M19	1	max	49.37	1	264.74	3	192.106	10	.008	3	.281	10	.046	1
162			min	-59.174	2	-238.359	4	14.744	2	-.297	10	.031	2	-.057	2
163		2	max	49.37	1	264.74	3	192.106	10	.008	3	.287	10	.047	1
164			min	-59.174	2	-238.359	4	14.744	2	-.297	10	.031	2	-.059	2
165		3	max	49.37	1	264.74	3	192.106	10	.008	3	.293	10	.048	1
166			min	-59.174	2	-238.359	4	14.744	2	-.297	10	.032	2	-.061	2
167		4	max	49.37	1	264.74	3	192.106	10	.008	3	.299	10	.049	1
168			min	-59.174	2	-238.359	4	14.744	2	-.297	10	.032	2	-.063	2
169		5	max	49.37	1	264.74	3	192.106	10	.008	3	.305	10	.05	1
170			min	-59.174	2	-238.359	4	14.744	2	-.297	10	.032	2	-.065	2
171	M20	1	max	20.149	5	263.35	4	-2.77	3	-.045	4	-.031	2	.026	4
172			min	-4.917	2	-239.751	3	-192.193	10	-.279	10	-.281	10	-.037	3
173		2	max	20.149	5	263.35	4	-2.77	3	-.045	4	-.031	2	.017	4
174			min	-4.917	2	-239.751	3	-192.193	10	-.279	10	-.287	10	-.03	3
175		3	max	20.149	5	263.35	4	-2.77	3	-.045	4	-.032	2	.013	2
176			min	-4.917	2	-239.751	3	-192.193	10	-.279	10	-.293	10	-.027	1
177		4	max	20.149	5	263.35	4	-2.77	3	-.045	4	-.032	2	.015	2
178			min	-4.917	2	-239.751	3	-192.193	10	-.279	10	-.299	10	-.029	1
179		5	max	20.149	5	263.35	4	-2.77	3	-.045	4	-.032	2	.016	2
180			min	-4.917	2	-239.751	3	-192.193	10	-.279	10	-.305	10	-.031	1
181	M21	1	max	173.645	4	492.043	10	508.661	10	.012	4	.04	4	.05	2
182			min	-244.98	3	-99.615	4	-292.725	4	-.716	10	-.048	3	-.176	10
183		2	max	173.645	4	492.043	10	508.661	10	.012	4	.031	4	.048	2
184			min	-244.98	3	-99.615	4	-292.725	4	-.716	10	-.033	3	-.191	10
185		3	max	173.645	4	492.043	10	508.661	10	.012	4	.023	1	.046	2
186			min	-244.98	3	-99.615	4	-292.725	4	-.716	10	-.021	2	-.207	10
187		4	max	173.645	4	492.043	10	508.661	10	.012	4	.038	10	.044	2
188			min	-244.98	3	-99.615	4	-292.725	4	-.716	10	-.025	2	-.222	10
189		5	max	173.645	4	492.043	10	508.661	10	.012	4	.054	10	.042	2
190			min	-244.98	3	-99.615	4	-292.725	4	-.716	10	-.03	2	-.238	10
191	M22	1	max	234.283	4	264.388	4	231.042	3	.042	3	.067	2	-.01	3
192			min	-164.673	3	-325.64	10	-460.986	10	-.812	10	-.06	1	-.189	10
193		2	max	234.283	4	264.388	4	231.042	3	.042	3	.058	2	-.007	3
194			min	-164.673	3	-325.64	10	-460.986	10	-.812	10	-.056	1	-.178	10
195		3	max	234.283	4	264.388	4	231.042	3	.042	3	.049	2	-.003	3
196			min	-164.673	3	-325.64	10	-460.986	10	-.812	10	-.051	1	-.168	10
197		4	max	234.283	4	264.388	4	231.042	3	.042	3	.039	2	0	3
198			min	-164.673	3	-325.64	10	-460.986	10	-.812	10	-.047	1	-.158	10
199		5	max	234.283	4	264.388	4	231.042	3	.042	3	.03	2	.003	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
200			min	-164.673	3	-325.64	10	-460.986	10	-.812	10	-.054	10	-.148	10
201	M23	1	max	94.817	1	12.1	3	49.216	6	.004	4	-.019	1	.004	2
202			min	-105.233	2	-14.574	4	.156	1	-.018	10	-.068	6	-.013	9
203		2	max	97.94	1	4.089	3	46.412	6	.004	4	-.005	2	.004	4
204			min	-102.11	2	-8.298	9	8.167	1	-.018	10	-.034	5	-.007	9
205		3	max	101.064	1	1.447	4	44.408	5	.004	4	.007	2	.006	4
206			min	-98.986	2	-8.298	9	12.5	2	-.018	10	-.007	1	-.006	3
207		4	max	104.188	1	9.458	4	47.212	5	.004	4	.034	6	.006	9
208			min	-95.862	2	-11.933	3	4.489	2	-.018	10	.008	1	-.002	1
209		5	max	107.312	1	17.469	4	50.016	5	.004	4	.069	5	.012	9
210			min	-92.738	2	-19.944	3	-3.521	2	-.018	10	.014	2	-.008	4
211	M24	1	max	49.301	4	441.094	2	38.299	1	.118	6	.023	10	.045	2
212			min	-47.043	3	-337.417	1	-88.699	6	.007	1	0	4	-.029	1
213		2	max	49.301	4	441.094	2	38.299	1	.118	6	.022	10	.031	2
214			min	-47.043	3	-337.417	1	-88.699	6	.007	1	-.001	4	-.018	1
215		3	max	49.301	4	441.094	2	38.299	1	.118	6	.022	10	.025	9
216			min	-47.043	3	-337.417	1	-88.699	6	.007	1	-.002	4	-.01	3
217		4	max	49.301	4	441.094	2	38.299	1	.118	6	.021	10	.024	9
218			min	-47.043	3	-337.417	1	-88.699	6	.007	1	-.003	4	-.015	3
219		5	max	49.301	4	441.094	2	38.299	1	.118	6	.02	10	.023	9
220			min	-47.043	3	-337.417	1	-88.699	6	.007	1	-.004	4	-.019	3
221	M25	1	max	40.382	4	435.994	1	86.574	5	.118	5	.004	2	.051	1
222			min	-42.633	3	-342.517	2	-25.953	2	.007	2	-.024	10	-.035	2
223		2	max	40.382	4	435.994	1	86.574	5	.118	5	.003	2	.037	1
224			min	-42.633	3	-342.517	2	-25.953	2	.007	2	-.023	10	-.025	2
225		3	max	40.382	4	435.994	1	86.574	5	.118	5	.002	4	.025	9
226			min	-42.633	3	-342.517	2	-25.953	2	.007	2	-.022	10	-.014	2
227		4	max	40.382	4	435.994	1	86.574	5	.118	5	.003	4	.024	3
228			min	-42.633	3	-342.517	2	-25.953	2	.007	2	-.021	10	-.018	4
229		5	max	40.382	4	435.994	1	86.574	5	.118	5	.004	4	.026	3
230			min	-42.633	3	-342.517	2	-25.953	2	.007	2	-.02	10	-.022	4
231	MP5A	1	max	0	11	0	1	0	2	0	11	0	11	0	11
232			min	0	1	0	6	0	5	0	1	0	1	0	1
233		2	max	341.062	1	37.712	3	85.426	6	.004	4	-.015	2	.009	2
234			min	-437.45	2	-39.945	4	-28.945	1	-.02	10	-.066	5	-.014	9
235		3	max	428.706	1	21.682	4	80.033	5	.004	4	.029	2	.022	4
236			min	-349.806	2	-23.915	3	-7.26	2	-.02	10	-.029	1	-.022	3
237		4	max	432.35	1	31.028	4	83.304	5	.004	4	.065	5	.011	9
238			min	-346.161	2	-33.261	3	-16.606	2	-.02	10	.017	9	-.006	1
239		5	max	0	11	0	5	0	6	0	11	0	11	0	11
240			min	0	1	0	2	0	1	0	1	0	1	0	1
241	M27	1	max	71.533	3	9.298	2	1396.772	2	.017	8	.013	3	.002	4
242			min	-70.892	4	-93.702	8	-1425.177	1	0	2	-.013	4	-.002	3
243		2	max	71.533	3	9.298	2	1396.772	2	.017	8	.131	2	.009	8
244			min	-70.892	4	-93.702	8	-1425.177	1	0	2	-.133	1	-.002	3
245		3	max	71.579	4	94.64	7	1396.772	2	.017	8	.262	2	.018	7
246			min	-14.997	7	-93.702	8	-1425.177	1	-.018	5	-.267	1	-.003	2
247		4	max	71.579	4	95.789	5	1408.201	1	.001	2	.131	2	.009	7
248			min	-70.938	3	-12.933	2	-1391.402	2	-.018	5	-.132	1	-.002	4
249		5	max	71.579	4	95.789	5	1408.201	1	.001	2	.013	4	.002	3
250			min	-70.938	3	-12.933	2	-1391.402	2	-.018	5	-.013	3	-.002	4
251	M28	1	max	70.053	4	91.683	8	1425.177	1	.018	5	.013	3	.002	3
252			min	-70.694	3	-9.515	2	-1396.772	2	-.004	2	-.013	4	-.002	4
253		2	max	70.053	4	91.683	8	1425.177	1	.018	5	.134	1	.002	3
254			min	-70.694	3	-9.515	2	-1396.772	2	-.004	2	-.131	2	-.009	8
255		3	max	2.174	2	91.683	8	1425.177	1	.017	8	.267	1	.003	2
256			min	-70.74	4	-92.619	7	-1396.772	2	-.018	5	-.262	2	-.018	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
257		4	max	70.099	3	13.151	2	1391.402	2	.004	2	.132	1	.002	4
258			min	-70.74	4	-93.776	5	-1408.201	1	-.018	5	-.13	2	-.009	7
259		5	max	70.099	3	13.151	2	1391.402	2	.004	2	.013	4	.002	4
260			min	-70.74	4	-93.776	5	-1408.201	1	-.018	5	-.013	3	-.002	3
261	M29	1	max	47.256	4	93.037	5	1124.191	2	.018	5	.009	3	.002	3
262			min	-47.836	3	-7.698	2	-1149.527	1	-.002	2	-.009	4	-.002	4
263		2	max	47.256	4	93.037	5	1124.191	2	.018	5	.106	2	.002	3
264			min	-47.836	3	-7.698	2	-1149.527	1	-.002	2	-.108	1	-.009	8
265		3	max	9.487	7	81.616	6	1181.87	1	.017	8	.213	2	.002	2
266			min	-48.096	4	-95.596	5	-1134.532	2	-.018	5	-.221	1	-.018	5
267		4	max	47.18	3	10.971	2	1181.87	1	.003	2	.106	2	.001	4
268			min	-48.096	4	-95.596	5	-1134.532	2	-.018	5	-.111	1	-.009	7
269		5	max	47.18	3	10.971	2	1181.87	1	.003	2	.009	4	.002	4
270			min	-48.096	4	-95.596	5	-1134.532	2	-.018	5	-.009	3	-.002	3
271	M30	1	max	48.683	3	7.481	2	1149.527	1	.017	8	.009	3	.002	4
272			min	-48.103	4	-95.05	5	-1124.191	2	0	3	-.009	4	-.002	3
273		2	max	48.683	3	7.481	2	1149.527	1	.017	8	.108	1	.009	8
274			min	-48.103	4	-95.05	5	-1124.191	2	0	3	-.105	2	-.002	3
275		3	max	48.935	4	97.609	5	1134.532	2	.017	8	.222	1	.018	5
276			min	-10.439	7	-83.627	6	-1181.87	1	-.018	5	-.213	2	-.002	2
277		4	max	48.935	4	97.609	5	1134.532	2	0	2	.111	1	.009	7
278			min	-48.019	3	-10.754	2	-1181.87	1	-.018	5	-.107	2	-.001	4
279		5	max	48.935	4	97.609	5	1134.532	2	0	2	.009	4	.002	3
280			min	-48.019	3	-10.754	2	-1181.87	1	-.018	5	-.009	3	-.002	4
281	M31	1	max	1425.177	1	94.547	5	71.405	3	.002	3	.013	4	.017	8
282			min	-1396.769	2	-11.335	2	-71.264	4	-.002	4	-.013	3	0	2
283		2	max	1425.177	1	94.044	5	71.195	3	.002	3	.007	4	.009	8
284			min	-1396.769	2	-11.389	2	-71.053	4	-.002	4	-.007	3	0	3
285		3	max	1425.177	1	93.541	5	70.984	3	.002	3	0	10	.001	2
286			min	-1396.769	2	-11.444	2	-70.842	4	-.002	4	0	9	-.001	1
287		4	max	1425.177	1	93.038	5	70.773	3	.002	3	.007	3	.002	2
288			min	-1396.769	2	-11.498	2	-70.631	4	-.002	4	-.007	4	-.009	5
289		5	max	1425.177	1	92.535	5	70.562	3	.002	3	.013	3	.004	2
290			min	-1396.769	2	-11.552	2	-70.421	4	-.002	4	-.013	4	-.018	5
291	M32	1	max	1408.201	1	96.91	5	71.405	3	.002	3	.013	4	.018	5
292			min	-1391.4	2	-14.743	2	-71.264	4	-.002	4	-.013	3	-.001	2
293		2	max	1408.201	1	96.407	5	71.195	3	.002	3	.007	4	.009	7
294			min	-1391.4	2	-14.798	2	-71.053	4	-.002	4	-.007	3	0	4
295		3	max	1408.201	1	95.904	5	70.984	3	.002	3	0	10	.001	2
296			min	-1391.4	2	-14.852	2	-70.842	4	-.002	4	0	9	-.001	1
297		4	max	1408.201	1	95.4	5	70.773	3	.002	3	.007	3	.003	2
298			min	-1391.4	2	-14.906	2	-70.631	4	-.002	4	-.007	4	-.009	5
299		5	max	1408.201	1	94.897	5	70.562	3	.002	3	.013	3	.004	2
300			min	-1391.4	2	-14.961	2	-70.421	4	-.002	4	-.013	4	-.018	5
301	M33	1	max	1124.189	2	94.081	5	48.158	3	.002	3	.009	4	.017	8
302			min	-1149.526	1	-5.842	2	-48.448	4	-.002	4	-.009	3	0	3
303		2	max	1124.189	2	93.578	5	47.947	3	.002	3	.005	4	.009	8
304			min	-1149.526	1	-5.896	2	-48.237	4	-.002	4	-.004	3	0	3
305		3	max	1124.189	2	93.075	5	47.736	3	.002	3	0	10	.001	2
306			min	-1149.526	1	-5.951	2	-48.026	4	-.002	4	0	9	-.001	1
307		4	max	1124.189	2	92.572	5	47.526	3	.002	3	.004	3	.002	2
308			min	-1149.526	1	-6.005	2	-47.815	4	-.002	4	-.004	4	-.009	5
309		5	max	1124.189	2	92.069	5	47.315	3	.002	3	.009	3	.002	2
310			min	-1149.526	1	-6.059	2	-47.605	4	-.002	4	-.009	4	-.018	5
311	M34	1	max	1134.53	2	96.458	5	48.158	3	.002	3	.009	4	.018	5
312			min	-1181.869	1	-9.28	2	-48.448	4	-.002	4	-.009	3	0	2
313		2	max	1134.53	2	95.955	5	47.947	3	.002	3	.005	4	.009	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
314			min	-1181.869	1	-9.334	2	-48.237	4	-.002	4	-.004	3	0	4
315		3	max	1134.53	2	95.452	5	47.736	3	.002	3	0	10	.001	2
316			min	-1181.869	1	-9.388	2	-48.026	4	-.002	4	0	9	-.001	1
317		4	max	1134.53	2	94.948	5	47.526	3	.002	3	.004	3	.002	2
318			min	-1181.869	1	-9.443	2	-47.815	4	-.002	4	-.004	4	-.009	5
319		5	max	1134.53	2	94.445	5	47.315	3	.002	3	.009	3	.003	2
320			min	-1181.869	1	-9.497	2	-47.605	4	-.002	4	-.009	4	-.018	5
321	M35	1	max	49.324	3	4.387	1	1241.913	1	.018	7	.009	3	.001	3
322			min	-47.447	4	-94.226	7	-1262.603	2	0	4	-.009	4	-.002	4
323		2	max	49.324	3	4.387	1	1241.913	1	.018	7	.116	1	.009	7
324			min	-47.447	4	-94.226	7	-1262.603	2	0	4	-.118	2	-.002	4
325		3	max	49.324	3	95.503	6	1241.913	1	.018	7	.233	1	.018	8
326			min	-.673	6	-85.427	5	-1262.603	2	-.018	6	-.237	2	-.001	1
327		4	max	48.683	4	95.503	6	1253.442	2	0	1	.113	1	.009	8
328			min	-47.92	3	-7.023	1	-1208.967	1	-.018	6	-.118	2	-.001	3
329		5	max	48.683	4	95.503	6	1253.442	2	0	1	.009	4	.002	4
330			min	-47.92	3	-7.023	1	-1208.967	1	-.018	6	-.009	3	-.001	3
331	M36	1	max	46.608	4	92.218	7	1262.603	2	.018	6	.009	3	.002	4
332			min	-48.492	3	-4.604	1	-1241.913	1	-.002	1	-.009	4	-.001	3
333		2	max	46.608	4	92.218	7	1262.603	2	.018	6	.119	2	.002	4
334			min	-48.492	3	-4.604	1	-1241.913	1	-.002	1	-.116	1	-.009	7
335		3	max	.672	6	83.414	5	1262.603	2	.017	7	.237	2	.001	1
336			min	-48.492	3	-93.489	6	-1241.913	1	-.018	6	-.233	1	-.018	8
337		4	max	47.089	3	7.24	1	1208.967	1	.003	1	.117	2	.001	3
338			min	-47.852	4	-93.489	6	-1253.442	2	-.018	6	-.113	1	-.009	8
339		5	max	47.089	3	7.24	1	1208.967	1	.003	1	.009	4	.001	3
340			min	-47.852	4	-93.489	6	-1253.442	2	-.018	6	-.009	3	-.002	4
341	M37	1	max	70.107	4	94.175	6	1472.349	1	.018	6	.013	3	.002	4
342			min	-70.686	3	-13.299	1	-1497.605	2	-.004	1	-.013	4	-.002	3
343		2	max	70.107	4	94.175	6	1472.349	1	.018	6	.138	1	.002	4
344			min	-70.686	3	-13.299	1	-1497.605	2	-.004	1	-.141	2	-.009	7
345		3	max	.463	6	94.175	6	1502.679	2	.017	7	.279	1	.003	1
346			min	-71.045	4	-93.46	8	-1490.239	1	-.018	6	-.282	2	-.018	6
347		4	max	69.649	3	15.601	1	1502.679	2	.004	1	.14	1	.002	3
348			min	-71.045	4	-96.282	6	-1490.239	1	-.018	6	-.141	2	-.009	8
349		5	max	69.649	3	15.601	1	1502.679	2	.004	1	.013	4	.002	3
350			min	-71.045	4	-96.282	6	-1490.239	1	-.018	6	-.013	3	-.002	4
351	M38	1	max	71.533	3	13.081	1	1497.605	2	.018	7	.013	3	.002	3
352			min	-70.93	4	-96.188	6	-1472.349	1	0	1	-.013	4	-.002	4
353		2	max	71.533	3	13.081	1	1497.605	2	.018	7	.14	2	.009	7
354			min	-70.93	4	-96.188	6	-1472.349	1	0	1	-.138	1	-.002	4
355		3	max	71.869	4	95.467	8	1490.239	1	.018	7	.282	2	.018	6
356			min	-.462	6	-96.188	6	-1502.679	2	-.018	6	-.28	1	-.003	1
357		4	max	71.869	4	98.294	6	1490.239	1	.001	1	.141	2	.009	8
358			min	-70.496	3	-15.384	1	-1502.679	2	-.018	6	-.14	1	-.002	3
359		5	max	71.869	4	98.294	6	1490.239	1	.001	1	.013	4	.002	4
360			min	-70.496	3	-15.384	1	-1502.679	2	-.018	6	-.013	3	-.002	3
361	M39	1	max	1262.6	2	94.529	6	48.628	3	.002	4	.009	4	.018	7
362			min	-1241.912	1	-5.903	1	-48.3	4	-.001	3	-.009	3	0	4
363		2	max	1262.6	2	94.026	6	48.417	3	.002	4	.005	4	.009	7
364			min	-1241.912	1	-5.957	1	-48.089	4	-.001	3	-.005	3	0	4
365		3	max	1262.6	2	93.523	6	48.206	3	.002	4	0	9	.001	1
366			min	-1241.912	1	-6.011	1	-47.878	4	-.001	3	0	10	-.001	2
367		4	max	1262.6	2	93.02	6	47.995	3	.002	4	.004	3	.002	1
368			min	-1241.912	1	-6.066	1	-47.667	4	-.001	3	-.004	4	-.009	6
369		5	max	1262.6	2	92.517	6	47.785	3	.002	4	.009	3	.002	1
370			min	-1241.912	1	-6.12	1	-47.457	4	-.001	3	-.009	4	-.018	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
371	M40	1	max	1253.44	2	96.685	6	48.628	3	.002	4	.009	4	.018	6
372			min	-1208.966	1	-8.362	1	-48.3	4	-.001	3	-.009	3	0	1
373		2	max	1253.44	2	96.182	6	48.417	3	.002	4	.005	4	.009	8
374			min	-1208.966	1	-8.416	1	-48.089	4	-.001	3	-.005	3	0	3
375		3	max	1253.44	2	95.679	6	48.206	3	.002	4	0	9	.001	1
376			min	-1208.966	1	-8.47	1	-47.878	4	-.001	3	0	10	-.001	2
377		4	max	1253.44	2	95.176	6	47.995	3	.002	4	.004	3	.002	1
378			min	-1208.966	1	-8.525	1	-47.667	4	-.001	3	-.004	4	-.009	6
379		5	max	1253.44	2	94.673	6	47.785	3	.002	4	.009	3	.003	1
380			min	-1208.966	1	-8.579	1	-47.457	4	-.001	3	-.009	4	-.018	6
381	M41	1	max	1472.348	1	94.976	6	71.067	3	.002	4	.013	4	.018	7
382			min	-1497.603	2	-11.283	1	-71.196	4	-.002	3	-.013	3	0	1
383		2	max	1472.348	1	94.473	6	70.856	3	.002	4	.007	4	.009	7
384			min	-1497.603	2	-11.337	1	-70.985	4	-.002	3	-.007	3	0	4
385		3	max	1472.348	1	93.97	6	70.646	3	.002	4	0	9	.001	1
386			min	-1497.603	2	-11.391	1	-70.774	4	-.002	3	0	10	-.002	2
387		4	max	1472.348	1	93.467	6	70.435	3	.002	4	.007	3	.003	1
388			min	-1497.603	2	-11.446	1	-70.563	4	-.002	3	-.007	4	-.009	6
389		5	max	1472.348	1	92.964	6	70.224	3	.002	4	.013	3	.004	1
390			min	-1497.603	2	-11.5	1	-70.352	4	-.002	3	-.013	4	-.018	6
391	M42	1	max	1490.238	1	97.117	6	71.067	3	.002	4	.013	4	.018	6
392			min	-1502.677	2	-13.731	1	-71.196	4	-.002	3	-.013	3	-.001	1
393		2	max	1490.238	1	96.614	6	70.856	3	.002	4	.007	4	.009	8
394			min	-1502.677	2	-13.786	1	-70.985	4	-.002	3	-.007	3	0	3
395		3	max	1490.238	1	96.11	6	70.646	3	.002	4	0	9	.001	1
396			min	-1502.677	2	-13.84	1	-70.774	4	-.002	3	0	10	-.002	2
397		4	max	1490.238	1	95.607	6	70.435	3	.002	4	.007	3	.003	1
398			min	-1502.677	2	-13.894	1	-70.563	4	-.002	3	-.007	4	-.009	6
399		5	max	1490.238	1	95.104	6	70.224	3	.002	4	.013	3	.004	1
400			min	-1502.677	2	-13.949	1	-70.352	4	-.002	3	-.013	4	-.018	6
401	M41A	1	max	629.989	1	56.317	8	24.954	4	.099	10	0	11	0	11
402			min	-629.201	2	18.113	1	-24.954	3	.002	2	0	1	0	1
403		2	max	641.569	1	28.158	8	12.477	4	.099	10	.041	4	-.03	10
404			min	-640.781	2	9.056	1	-12.477	3	.002	2	-.041	3	-.092	5
405		3	max	653.149	1	0	11	0	11	.099	10	.054	4	-.039	10
406			min	-652.361	2	0	1	0	1	.002	2	-.054	3	-.122	5
407		4	max	664.729	1	-9.056	10	12.477	3	.099	10	.041	4	-.03	10
408			min	-663.942	2	-28.158	5	-12.477	4	.002	2	-.041	3	-.092	5
409		5	max	676.31	1	-18.113	10	24.954	3	.099	10	0	11	0	11
410			min	-675.522	2	-56.317	5	-24.954	4	.002	2	0	1	0	1
411	M42A	1	max	528.375	3	35.582	7	38.519	2	0	2	0	11	0	11
412			min	-960.461	9	-1.988	4	-38.519	1	-.006	9	0	1	0	1
413		2	max	519.353	3	17.791	7	19.26	2	0	2	.028	3	.026	2
414			min	-958.375	9	-.994	4	-19.26	1	-.006	9	-.012	4	-.042	1
415		3	max	510.33	3	0	11	0	11	0	2	.037	3	.035	2
416			min	-956.29	9	0	1	0	1	-.006	9	-.016	4	-.055	1
417		4	max	501.307	3	.994	4	19.26	1	0	2	.028	3	.026	2
418			min	-954.204	9	-17.791	7	-19.26	2	-.006	9	-.012	4	-.042	1
419		5	max	492.284	3	1.988	4	38.519	1	0	2	0	11	0	11
420			min	-952.119	9	-35.582	7	-38.519	2	-.006	9	0	1	0	1
421	M43	1	max	575.248	4	35.582	8	38.519	1	.005	10	0	11	0	11
422			min	-1020.587	3	-1.988	3	-38.519	2	0	2	0	1	0	1
423		2	max	566.225	4	17.791	8	19.26	1	.005	10	.042	1	.012	3
424			min	-1005.491	3	-.994	3	-19.26	2	0	2	-.026	2	-.028	4
425		3	max	557.203	4	0	11	0	11	.005	10	.055	1	.016	3
426			min	-990.394	3	0	1	0	1	0	2	-.035	2	-.037	4
427		4	max	548.18	4	.994	3	19.26	2	.005	10	.042	1	.012	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
428			min	-975.297	3	-17.791	8	-19.26	1	0	2	-.026	2	-.028	4
429		5	max	539.157	4	1.988	3	38.519	2	.005	10	0	11	0	11
430			min	-960.2	3	-35.582	8	-38.519	1	0	2	0	1	0	1
431	M44	1	max	962.023	9	35.582	8	38.519	2	0	2	0	11	0	11
432			min	-506.714	4	-1.988	3	-38.519	1	-.006	9	0	1	0	1
433		2	max	958.035	9	17.791	8	19.26	2	0	2	.042	2	.012	3
434			min	-497.691	4	-.994	3	-19.26	1	-.006	9	-.026	1	-.028	4
435		3	max	954.047	9	0	11	0	11	0	2	.055	2	.016	3
436			min	-488.668	4	0	1	0	1	-.006	9	-.035	1	-.037	4
437		4	max	950.058	9	.994	3	19.26	1	0	2	.042	2	.012	3
438			min	-479.646	4	-17.791	8	-19.26	2	-.006	9	-.026	1	-.028	4
439		5	max	946.07	9	1.988	3	38.519	1	0	2	0	11	0	11
440			min	-470.623	4	-35.582	8	-38.519	2	-.006	9	0	1	0	1
441	M45	1	max	954.674	4	35.582	7	38.519	1	.005	10	0	11	0	11
442			min	-526.092	3	-1.988	4	-38.519	2	0	9	0	1	0	1
443		2	max	939.577	4	17.791	7	19.26	1	.005	10	.028	3	.026	1
444			min	-517.07	3	-.994	4	-19.26	2	0	9	-.012	4	-.042	2
445		3	max	924.481	4	0	11	0	11	.005	10	.037	3	.035	1
446			min	-508.047	3	0	1	0	1	0	9	-.016	4	-.055	2
447		4	max	919.69	10	.994	4	19.26	2	.005	10	.028	3	.026	1
448			min	-499.024	3	-17.791	7	-19.26	1	0	9	-.012	4	-.042	2
449		5	max	915.701	10	1.988	4	38.519	2	.005	10	0	11	0	11
450			min	-490.001	3	-35.582	7	-38.519	1	0	9	0	1	0	1

Envelope AISC 13th(360-05): LRFD Steel Code Checks

	Member	Shape	Code Check	Loc[ft]	LC	Shear ...	Loc[ft]	Dir	LC	phi*Pnc...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M42	0.5_All_Thr...	.706	.375	2	.111	0		4	4416.533	4596.361	.033	.033	2...	H1-1a
2	M32	0.5_All_Thr...	.701	.375	1	.112	0		3	4416.533	4596.361	.033	.033	2...	H1-1a
3	M41	0.5_All_Thr...	.688	.375	2	.110	0		3	4416.533	4596.361	.033	.033	2...	H1-1a
4	M31	0.5_All_Thr...	.681	.375	1	.111	0		4	4416.533	4596.361	.033	.033	2...	H1-1a
5	M40	0.5_All_Thr...	.631	.375	2	.096	0		4	4416.533	4596.361	.033	.033	2...	H1-1a
6	M39	0.5_All_Thr...	.616	.375	2	.095	0		3	4416.533	4596.361	.033	.033	2...	H1-1a
7	M34	0.5_All_Thr...	.606	.375	1	.097	0		3	4416.533	4596.361	.033	.033	2...	H1-1a
8	M33	0.5_All_Thr...	.575	.375	1	.096	0		4	4416.533	4596.361	.033	.033	2...	H1-1a
9	MP4A	PIPE_2.0	.486	5	9	.086	3.5		9	20866.7...	32130	1.872	1.872	2...	H1-1b
10	MP1A	PIPE_2.0	.447	5	10	.088	3.5		10	20866.7...	32130	1.872	1.872	2...	H1-1b
11	M3	HSS2.375...	.393	.391	9	.193	2.214		9	18137.5...	31109.4	1.865	1.865	2...	H1-1b
12	M4	HSS2.375...	.377	5.859	10	.160	4.036		10	18137.5...	31109.4	1.865	1.865	2...	H1-1b
13	M1	HSS2.375...	.335	.391	9	.197	2.214		9	18137.5...	31109.4	1.865	1.865	2...	H1-1b
14	M2	HSS2.375...	.301	5.859	10	.161	4.036		10	18137.5...	31109.4	1.865	1.865	2...	H1-1b
15	MP3A	PIPE_2.5	.221	2.167	2	.166	5.667		2	30038.4...	50715	3.596	3.596	1...	H1-1b
16	MP2A	PIPE_2.0	.160	2	10	.203	5		10	20866.7...	32130	1.872	1.872	2...	H1-1b
17	M5	PIPE_3.0	.103	1.458	2	.154	4.583		2	57037.4...	65205	5.749	5.749	1...	H1-1b
18	M6	HSS3X3X3	.095	1.75	1	.041	0	y	6	76482.8...	78246	6.796	6.796	2...	H1-1b
19	M7	HSS3X3X3	.083	1.75	2	.043	0	y	5	76482.8...	78246	6.796	6.796	2...	H1-1b
20	M45	L2.5x2.5x4	.082	2.559	8	.025	5.226	y	10	15814.0...	38556	1.114	2.281	1...	H2-1
21	M44	L2.5x2.5x4	.081	2.559	7	.030	0	y	9	15814.0...	38556	1.114	2.281	1...	H2-1
22	M41A	PIPE_2.0	.072	4.349	5	.061	0		10	12971.9...	32130	1.872	1.872	1...	H1-1b
23	M42A	L2.5x2.5x4	.069	2.559	3	.030	5.226	y	9	15814.0...	38556	1.114	2.281	1...	H2-1
24	MP5A	PIPE_2.0	.066	3.245	5	.015	3.245		10	27741.09	32130	1.872	1.872	2...	H1-1b
25	M43	L2.5x2.5x4	.062	2.613	5	.025	0	y	10	15814.0...	38556	1.114	2.281	1...	H2-1
26	M23	PIPE_2.0	.038	3	5	.012	3		10	28843.4...	32130	1.872	1.872	2...	H1-1b
27	M14	PIPE_2.0	.025	2.508	4	.086	0		9	23763.9...	32130	1.872	1.872	1...	H1-1b

EXHIBIT 10

Transcom Engineering, Inc.
Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CTNL021D

NL021/SBAWaterfordFT
35 South Bartlett Rd
Waterford, CT 06375

May 22, 2019

Transcom Engineering Project Number: 737001-0059

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**5.45 %**

May 22, 2019

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

Emissions Analysis for Site: **CTNL021D – NL021/SBAWaterfordFT**

Transcom Engineering, Inc ("Transcom") was directed to analyze the proposed upgrades to the T-MOBILE facility located at **35 South Bartlett Rd, Waterford, 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 & 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 **35 South Bartlett Rd, Waterford, 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)
UMTS	1900 MHz (PCS)	1	40
GSM	1900 MHz (PCS)	1	15
LTE	2100 MHz (AWS)	2	60
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

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

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR21 B2A/B4P	150
A	2	Ericsson AIR21 B4A/B2P	150
A	3	RFS APXVAARR24_43-U-NA20	150
B	1	Ericsson AIR21 B2A/B4P	150
B	2	Ericsson AIR21 B4A/B2P	150
B	3	RFS APXVAARR24_43-U-NA20	150
C	1	Ericsson AIR21 B2A/B4P	150
C	2	Ericsson AIR21 B4A/B2P	150
C	3	RFS APXVAARR24_43-U-NA20	150

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 AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.37
Antenna A2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.81
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.00
						Sector A Composite MPE%	**2.18**
Antenna B1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.37
Antenna B2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.81
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.00
						Sector B Composite MPE%	**2.18**
Antenna C1	Ericsson AIR21 B2A/B4P	1900 MHz (PCS)	15.9	2	55	2,139.75	0.37
Antenna C2	Ericsson AIR21 B4A/B2P	2100 MHz (AWS)	15.9	2	120	4,668.54	0.81
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.00
						Sector C Composite MPE%	**2.18**

Table 3: T-MOBILE Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
T-MOBILE – Max Per Sector Value	**2.18 %**
Verizon Wireless	3.09 %
MetroPCS	0.18 %
Site Total MPE %:	**5.45 %**

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	2.18 %
T-MOBILE Sector B Total:	2.18 %
T-MOBILE Sector C Total:	2.18 %
Site Total:	5.45 %

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) UMTS	1	1,556.18	150	2.70	1900 MHz (PCS)	1000	0.27%
T-Mobile 1900 MHz (PCS) GSM	1	583.57	150	1.01	1900 MHz (PCS)	1000	0.10%
T-Mobile 2100 MHz (AWS) LTE	2	2,334.27	150	8.09	2100 MHz (AWS)	1000	0.81%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	150	2.74	600 MHz	400	0.68%
T-Mobile 700 MHz LTE	2	432.54	150	1.50	700 MHz	467	0.32%
						Total:	**2.18%**

Table 6: T-MOBILE Maximum Sector MPE Power Values

Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	2.18 %
Sector B:	2.18 %
Sector C:	2.18 %
T-MOBILE Maximum Total (per sector):	2.18 %
Site Total:	5.45 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.45 %** 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