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# brownrudnick

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September 25, 2023

## VIA OVERNIGHT MAIL

Town of Wareham  
Zoning Board of Appeals  
Memorial Town Hall  
54 Marion Road  
Wareham, MA 02571

**Re:** Application for a Special Permit as an Eligible Facilities Request for a Modification of an Existing Wireless Communications Services Facility for the Colocation of Transmission Equipment (the "Application")

**Applicant:** New Cingular Wireless PCS, LLC d/b/a AT&T ("AT&T" or "Applicant")

**Site:** 25 Brown Street, Wareham, MA (Assessor's Map 56, Lot 1000A) (the "Site")

**Owner:** ITW Realty Trust,  
Michael J. Umano, Trustee  
40 Lone Street  
Marshfield MA 02050

**Facility:** Install six (6) panel antennas (two (2) antennas per sector) on a proposed ten (10) foot extension to the existing 150' lattice tower (the "Tower") at the Site as well as associated antenna equipment including remote radio heads, surge arrestors, coax cables, cable trays, global positioning system antennas and conduits for new network service with associated electronic equipment inside a walk-in cabinet on a concrete pad, and a diesel emergency generator (all of the foregoing collectively hereinafter referred to as the "Facility").

**Relief Requested:** Approval of a Special Permit as an Eligible Facilities Request pursuant to Section 6409(a) of the Middle Class Tax Relief and Job Creation Act of 2012 (the "Spectrum Act"), and/or a Wireless Telecommunications Facility Special Permit pursuant to: Article 3, Section 321 and Article 5, Section 540; of the Zoning Bylaw of the Town of Wareham (hereinafter the "Bylaw"), Massachusetts General Laws chapter 40A, and the Telecommunications Act of 1996 (the "TCA") for the modification of the Existing Wireless Communication Facility, and such other relief as deemed necessary, all rights reserved.



Dear Honorable Members of the Zoning Board of Appeals:

On behalf of AT&T, we are pleased to submit this memorandum to the Town of Wareham Zoning Board of Appeals (the "Board") in support of the Application for the modification of the Existing Wireless Tower at the Site, all in accordance with the Spectrum Act, the TCA and the Bylaw. As will be demonstrated in this memorandum and at the public hearing(s) before the Board, the modification to the Existing Wireless Tower qualifies as an Eligible Facilities Request that does not substantially change the physical dimensions of the Tower and also complies with the Bylaw to the extent possible. The following provides background information regarding the Facility and addresses each applicable section of the Bylaw. Capitalized terms not defined herein shall have the same meanings provided in the Spectrum Act and the associated Regulations, as defined below.

## **BACKGROUND**

AT&T proposes to install six (6) panel antennas (two (2) panel antennas per sector) on a proposed 10 foot extension to the existing 150' Tower as well as install associated antenna related equipment including remote radio heads, surge arrestors, coax cables, cable trays, global positioning system antennas and conduits for new network service with associated electronic equipment inside a concrete walk-in cabinet, and a diesel emergency generator. The antennas will be attached at the 159' above ground level ("AGL") height of the extended tower and extend to a top height of 163'. The Facility is shown in detail on the plans (the "Plans") attached hereto and submitted with this Application, and the entire Facility is located within the existing fenced compound.

We note that the Tower has been previously approved by the Board for use as a wireless telecommunications facility pursuant to Board of Appeals decision dated November 3, 2015 (see attached). We also note that the federal Spectrum Act preempts conflicting provisions of the Bylaw as discussed below. However, while not waiving any rights, AT&T has submitted materials in the spirit of cooperation with the Board to also evidence compliance with the Bylaw to the extent possible.

AT&T leases a portion of the Site from the tower owner, ITW Realty Trust a/k/a Industrial Communications. AT&T operates a nationwide wireless communications system that offers enhanced features such as caller ID, voice mail, e-mail, superior call clarity and high-speed data services. AT&T is in the process of building out a national network as required and authorized by license issued by the Federal Communications Commission (the "FCC"). The Facility aids in reaching AT&T's goal to provide reliable and cutting-edge wireless communication services in and around the Town of Wareham and to all of Massachusetts. AT&T strives to be a good neighbor to the communities where it has wireless communications facilities.

The modification to the Existing Tower will not be a threat to public health, safety and welfare. In fact, AT&T submits that the Facility will aid in public safety by providing additional FCC-licensed wireless communication services to the residents, businesses, commuters, and emergency personnel utilizing wireless communications in the immediate vicinity and along the



nearby roads. These services further the public interest of health and safety as they will provide wireless 911 services to the community and communication services for the public during power outages. According to published reports, 240 million 911-calls, or nearly 80% of all calls received by the 911 centers nationwide, are made annually from mobile devices in the United States. Today, wireless infrastructure is required to assist with public safety needs.

The proposed modification to the Existing Tower, and the collocation of the Facility will not generate any unreasonable noise, odor, fumes, glare, smoke, or dust or require additional lighting or signage. No significant increase in traffic or hindrance to pedestrian movements will result from the Facility. This Site is an unmanned facility and will have minimal negative effect on the adjoining lots in this area. The Facility will not be dangerous to the public health or safety as it is designed to comply with all applicable codes and regulations and will comply with all applicable requirements of the Massachusetts building code. As provided in the report submitted with the Application, the Facility will comply with the FCC guidelines relating to emissions. In fact, the emission at ground level will amount to a fraction of the FCC maximum. Further, the Facility will help to improve wireless communication coverage to residents, commercial establishments and travelers throughout the area. This facility does not require police or fire protection because the installation has its own monitoring equipment that can detect malfunction and/or tampering.

### **THE SPECTRUM ACT**

We are submitting this analysis in support of AT&T's Eligible Facilities Request to collocate Transmission Equipment at the Site. As you now, Section 6409(a) of the Spectrum Act mandates that state and local governments "may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station." Under Section 6409(a)(2)(A)-(C), an Eligible Facilities Request is any request to modify a Tower or Base Station that involves "collocation of new Transmission Equipment". In the applicable Regulations promulgated by the FCC (defined below), "Transmission Equipment" is defined as equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply. The term includes equipment associated with wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

The FCC adopted a Report and Order, In re: Acceleration of Broadband Deployment by Improving Wireless Facilities Siting Policies, FCC Docket No. 13 238, Report and Order No. 14-153 (October 17, 2014) Final Rule codified at 47 CFR §1.6100 (the "Regulations") interpreting and implementing the provisions of the Spectrum Act. We have attached a copy of the Regulations for the Board's convenience. The Regulations determined that any modification to a Tower that meets the following six criteria does not substantially change the physical dimensions of the existing Tower and, therefore, is an Eligible Facilities Request which must be granted. We provide our analysis below in bold to demonstrate that the modification is NOT a substantial change to the Tower:



Substantial change. A modification substantially changes the physical dimensions of an eligible support structure if it meets any of the following criteria:

- (i) For towers other than towers in the public rights-of-way, the modification increases the height of the structure by more than 10% or more than twenty feet, whichever is greater;

**AT&T's proposed modification will increase the height of the Tower by only ten (10) feet (with the antennas extending an additional 3 feet) thereby complying with this provision.**

- (ii) For towers other than towers in the public right-of-way, the modification involves adding an appurtenance to the body of the structure that would protrude from the edge of the structure by more than twenty feet;

**AT&T's modification to the existing Tower will not protrude more than seven feet (7') from the edge of the Tower, thereby complying with this provision.**

- (iii) For any eligible support structure, it involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets;

**AT&T proposes to collocate one (1) equipment cabinet within the existing fenced compound area, thereby complying with this provision.**

- (iv) It entails any excavation or deployment outside the current site;

**AT&T does not propose any excavation or deployment outside the current Site in accordance with this provision. The proposed Transmission Equipment will be collocated within the existing fenced compound.**

- (v) It would defeat the concealment elements of the eligible support structure; or

**AT&T's proposal will not defeat and is consistent with the existing concealment elements in accordance with this provision. The Modification will be installed in a manner similar to the Transmission Equipment currently located at the Site.**

- (vi) It does not comply with conditions associated with the siting approval of the construction or modification of the eligible support structure or base station equipment, provided however that this limitation does not apply to any modification that is non-compliant only in a manner that would not exceed the thresholds identified in §1.40001(b)(7)(i) through (iv).



**AT&T's modification complies with the conditions of the siting approval of the existing wireless facility.**

As evidenced on the Plans, AT&T's modification to the Tower contained in this Eligible Facilities Request fully conforms to the Regulations and Section 6409(a) of the Spectrum Act. We are confident that you will agree that AT&T's proposed modification does not substantially change the physical dimensions of the Tower at the Site as enumerated in the Regulations and therefore qualifies as an Eligible Facilities Request and we therefore respectfully request the Board's determination that the modification does not substantially change the physical dimensions of the Tower. AT&T is committed to working cooperatively with the Town of Wareham, and all jurisdictions around the country, to secure expeditious approval of requests to modify existing personal wireless service facilities.

**COMPLIANCE WITH THE WAREHAM ZONING BY-LAW**

**ARTICLE 5, SECTION 540-- WIRELESS COMMUNICATIONS FACILITIES**

**541 PURPOSE**

**It is the purpose of this Section to minimize the adverse impacts of communication structures, towers, and facilities by establishing requirements, guidelines, standards for review, and procedures to permit their installation in the Town of Wareham.**

Consistent with the intent and purpose of the Bylaw, the proposed Facility will be collocated on an existing Tower so that constructing a new large antenna structure will not be necessary and thus the visual impact of the Facility is mitigated and the aesthetic qualities of the Town of Wareham are preserved. The Facility will not be contrary to the public interest and welfare. The Facility will benefit those living and working in, and traveling through the area by providing enhanced wireless telecommunication services. In fact, AT&T submits that the proposed Facility will aid in public safety by providing and improving wireless communications services to the residents, businesses, commuters, and emergency personnel utilizing wireless communications in the immediate vicinity and along the nearby roads. The Facility will not generate any objectionable noise, odor, fumes, glare, smoke, or dust or require additional lighting or signage. The Facility will have no negative impact on property values in the area. No significant increase in traffic or hindrance to pedestrian movements will result from the Facility. On average, only one or two round trip visits per month are required to service and maintain the Facility. The Facility is unmanned and will have no negative effect on the adjoining lots. This Facility does not require police or fire protection because the installation has its own monitoring equipment that can detect malfunction and/or tampering.

**542 APPLICABILITY**



**542.1 No wireless communications facility or structure shall be erected or installed except in compliance with the provisions of this Section.**

AT&T submits this Application in compliance with the terms of this provision of the Bylaw.

**542.2 Any proposed extension in the height or construction of a new or replacement facility, or additional appurtenances, shall be subject to a new application.**

AT&T acknowledges the terms of this provision of the Bylaw.

**543 GENERAL REQUIREMENTS**

**543.1 Only freestanding structures are allowed. Structures requiring guy wires for support are prohibited.**

AT&T's Facility will be located upon an existing structure and will not require any guy wires.

**543.2 All towers shall be set back a distance at least equal to the height of the tower from all property lines. Antennas or structures to be used exclusively by a federally licensed amateur radio operator may be closer than the above-described 300 feet, but must be located so as to minimize harm to any nearby structures.**

AT&T's proposed 10' extension to the tower and additional 3' of antenna height above said extension, are exempt from this setback requirement pursuant to the Spectrum Act.

**543.3 Abandoned structures shall be removed within one (1) year of cessation or use. The applicant shall post a performance bond of an amount, which the Board of Appeals deems to be sufficient for removal of the structure. If not removed within one year, the Town shall have the right to remove the structure at the owner's expense.**

AT&T will comply with the terms of this provision of the Bylaw and will work with the Board to establish a mutually acceptable amount.

**543.4 Applicant for a tower shall post an insurance certificate naming the Town as additional insured -minimum of \$1,000,000 - for general liability insurance for any lawsuit either for damage, interference, or health-related claims. Proof shall be furnished to the Town Clerk, including a stipulation claims. Proof shall be furnished to the Town Clerk, including a stipulation that if the policy is canceled due to nonpayment, the Town will be notified. Any cancellation shall constitute a violation of the Special Permit.**

If the Board renders a favorable decision, AT&T will comply with the terms of this provision of the Bylaw.



## **544 DESIGN GUIDELINES**

### **544.1 Towers and attached accessory antennas shall not exceed one hundred ninety (190) feet in height as measured from ground level at the base of the pole.**

AT&T's proposed 10' tower extension and antennas which will extend 3' above said extension will have a top height of 163' and are thus will be well below the 190' height limit.

### **544.2 The height of a satellite dish located on a building or in the yards of residential structures shall not exceed the tree line on the lot. Satellite dishes located on non-residential buildings shall not exceed ten (10) feet in height above the highest point of the structure.**

AT&T's Facility does not entail the installation of a satellite dish.

### **544.3 All wireless communication facilities shall be sited to limit visibility from abutting properties. Tower facilities may not be placed in open areas, but shall be surrounded by a mature stand of trees.**

AT&T's proposed Facility will be attached to an existing Tower which obviates the need for the construction of a new antenna structure, which therefore results in a minimal visual impact on the surrounding area.

### **544.4 Towers and satellite dishes shall be painted or otherwise colored so they will blend in with the landscape or structure on which they are located. A different color scheme shall be used to blend the structure with the background below and above the tree or building line.**

AT&T's proposed tower extension and antennas will generally match the color of the existing Tower and antennas and thus blend in for a minimal visual impact.

### **544.5 Towers and antennas shall be designed and constructed to withstand a category 5 hurricane.**

AT&T's Facility will be designed and constructed in accordance with all applicable building codes and structural standards.

### **544.6 An applicant proposing a wireless communication facility in a residential zoning district shall prove to the satisfaction of the Board that the visual, economic, and aesthetic impacts of the facility on residential abutters will be minimal; and shall also prove that the proposed location is required due to technical, topographic or the unique circumstances.**

AT&T's proposed Facility will blend with the existing tower and compound and thus the adverse impacts upon residential abutters will be minimized. The aesthetic qualities of



the Town of Wareham are thereby preserved. The Facility will not be contrary to the public interest and welfare. The Facility will benefit those living and working in, and traveling through the area by providing enhanced wireless telecommunication services. In fact, AT&T submits that the proposed Facility will aid in public safety by providing and improving wireless communications services to the residents, businesses, commuters, and emergency personnel utilizing wireless communications in the immediate vicinity and along the nearby roads. The Facility will not generate any objectionable noise, odor, fumes, glare, smoke, or dust or require additional lighting or signage. The Facility will have no negative impact on property values in the area. No significant increase in traffic or hindrance to pedestrian movements will result from the Facility. On average, only one or two round trip visits per month are required to service and maintain the Facility. The Facility is unmanned and will have no negative effect on the adjoining lots. This Facility does not require police or fire protection because the installation has its own monitoring equipment that can detect malfunction and/or tampering. The Facility is required to provide necessary coverage to fill a significant gap in AT&T's wireless communications services network. The Site is the least obtrusive means available by which AT&T may provide the necessary coverage to fill the significant gap in its network.

**544.7 Lighting of communication facilities and other appurtenances shall be limited to that which is required by Federal Law.**

There will be no additional exterior lighting added to the Site as a result of AT&T's Facility.

**545 APPLICATION REQUIREMENTS**

**In addition to materials required by the Board of Appeals for a Special Permit application, the applicant for a communication facility shall provide.**

**545.1 A statement of need for the proposed facility with as much specific information is required to demonstrate the need, including a description of the proposed system and how the proposed facility would eliminate or alleviate an existing deficiency or limitation.**

AT&T's engineers have determined that there is a need for coverage in this area of Wareham.

**545.2 A color photograph or rendition of the proposed tower with its antenna and/or panels. A rendition shall also be prepared showing a view of the tower, antenna, or AT&T from the nearest street.**

Please see the plans included with AT&T's application.

**545.3 The following information prepared by one or more professional engineers;**





- a) **A description of the tower and the technical, economic, and other reasons for the proposed location, height, and design;**
- b) **Confirmation that the tower complies with Federal and State standards;**
- c) **A description of the capacity of the tower including the number and type of panels, antenna, and/or transmitter receivers that it can accommodate and the basis for these calculations.**

Per the Spectrum Act, AT&T's Facility will comply with all applicable building and life and safety rules and regulations and AT&T will comply with all building permit application requirements and submissions.

#### **546 SPECIAL PERMIT REVIEW**

- 546.1 Applications shall be approved or approved with conditions, if the petitioner can fulfill the requirements of these regulations to the satisfaction of the Board.**

AT&T respectfully asserts that it has provided materials of sufficient detail for the Board to make an informed decision. AT&T will cooperate with the Board and will comply with all reasonable requests for additional information.

- 546.2 Applications shall be denied if the petitioner cannot fulfill the requirements for these regulations to the satisfaction of the Board.**

AT&T acknowledges the terms of this provision of the Bylaw.

- 546.3 When considering an application for a communication facility, the Board shall place great emphasis on the proximity of the facility to residential dwellings and its impact on these residences, new facilities shall only be considered after a finding that existing (or previously approved) facilities cannot accommodate the proposed use(s).**

Please refer to the RF Emissions Study submitted herewith which demonstrates that the Facility will comply with all applicable FCC RF emissions regulations. AT&T's Facility will blend with the existing Tower and fenced equipment compound. The Facility will not produce odor, smoke, glare, waste, unreasonable noise or significant amounts of traffic. AT&T's Facility will not adversely impact neighboring properties and will provide a benefit to the residents, businesses and travelers within the Town of Wareham in the form of improved wireless communications services infrastructure.

- 546.4 When considering an application for an antenna or dish to be placed on a structure, the Board shall consider the visual impact of the unit from the abutting neighborhoods and streets, and highways.**

AT&T's Facility will blend with the existing Tower and equipment compound.



## THE TELECOMMUNICATIONS ACT OF 1996

The Federal TCA provides that: no laws or actions by any local government or planning or zoning board may prohibit, or have the effect of prohibiting, the placement, construction, or modification of communications towers, antennas, or other wireless facilities in any particular geographic area, see 47 U.S.C. §332(c)(7)(B)(i); local government or planning or zoning boards may not unreasonably discriminate among providers of functionally equivalent services, see 47 U.S.C. §332(c)(7)(B)(i); health concerns may not be considered so long as the emissions comply with the applicable standards of the FCC, see 47 U.S.C. §332(c)(7)(B)(iv); and, decisions must be rendered within a reasonable period of time, see 47 U.S.C. §332(c)(7)(B)(ii) and the FCC's Regulations, commonly referred to as the "Shot Clock". The "Shot Clock" in this instance is ninety (90) days from the date of application. Pursuant to the Spectrum Act, the proposed modifications must be approved if they do not substantially change the physical dimension of the Tower as defined in the Regulations.

## CONCLUSION

As evidenced by the materials submitted with the Application and as will be further demonstrated by AT&T through evidence submitted to the Board at the public hearing(s) in connection herewith, in light of the Spectrum Act and the TCA, the proposed modification satisfies the intent and objectives of the Bylaw. The Facility will be collocated on an Existing Tower and within the existing fenced compound area and will not have any adverse effect on property values in the area. The Facility will not be dangerous to the public health or safety as it is designed to comply with all applicable codes and regulations and will comply with all applicable requirements of the Massachusetts building code. As provided in the report submitted with the Application, the Facility will comply with the FCC guidelines relating to emissions. The Facility will not cause any nuisance such as unreasonable noise, vibration, smoke, odor or dust. Further, the Facility will help to improve communication coverage to residents, commercial establishments and travelers throughout the area.

AT&T respectfully requests that the Board grant all necessary relief to install, operate and maintain the Facility. Accordingly, a denial of the Application would violate the Spectrum Act and materially inhibit AT&T from providing adequate service to the Town of Wareham.

Sincerely,

Brown Rudnick LLP

  
Michael R. Dolan, Esq. (SMA)



## ATTACHMENTS

1. Special Permit Application Form
2. Letter of Authorization
3. Emissions Report Demonstrating Compliance
4. Plans
5. FCC Regulations
6. Building Commissioner Denial Letter
7. Original Approval for Tower
8. Structural Report

TOWN OF WAREHAM ABUTTERS

MAP 56 LOT 1000/A  
OWNER ITW REALTY TRUST, MICHAEL J UMANO

MAP & LOT	OWNERS	STREET ADDRESS	TOWN & STATE	ZIP CODE
48-0-1045	RIPLEY'S MANUFACTURED HOME, % SWIFT'S BEACH MANUFACTURED HOME	COMMUNITY INC, PO BOX 54	SALEM, NH	3079
48-0-1047	ROGERS FANNIE W ET ALS, C/O DANIEL MCASSEY	12 SWIFTS BEACH RD,	WAREHAM, MA	2571
48-0-1048	GAUDETTE BRIAN, BELROSE EMILY	12 SWIFTS BCH RD,	WAREHAM, MA	2571
48-0-1049	THOMAS RONALD E,	14 SWIFTS BEACH RD,	WAREHAM, MA	2571
56-0-1000-A	UMANO MICHAEL J TRUSTEE, ITW REALTY TRUST	40 LONE ST,	MARSHFIELD, MA	2050
56-0-1001-A	SWEBCO LLC,	20 NORTH PARK AVE,	PLYMOUTH, MA	2360
56-0-1001-B	HICKIE WILLIAM, HICKIE SAMANTHA	23 SWIFTS BEACH RD,	WAREHAM, MA	2571
56-0-1001.C1	STENSON THOMAS, STENSON EILEEN	11 BROWN ST,	WAREHAM, MA	2571
56-0-1001.C2	WANDRIE KATIE-ANNE,	13 BROWN ST,	WAREHAM, MA	2571
56-0-1010	246 MARION ROAD LLC,	7 FIELDSTONE LN,	MARION, MA	2738
56-0-1012	TATRO TANYA M, PIRES DEREK J JR	22 BROWN ST,	WAREHAM, MA	2571
56-0-1013	OLIVEIRA BARBARA, C/O HABITAT FOR HUMANITY	PO BOX 1584,	MATTAPOISETT, MA	2739
56-0-1022	FRANKLIN HARRY,	18 BROWN ST,	WAREHAM, MA	2571
56-0-1023	PATRAS NORMAN J, BRITO-PATRAS PAULA	3 OLD BEAVERDAM RD,	WAREHAM, MA	2571
56-0-1025/1A	SCHOBEL SUSAN M,	5A ROCK MARSH RD,	WAREHAM, MA	2571
56-0-1025/1B	LAVOIE ANDREW TRUSTEE, ANDREW CHARLES LAVOIE LIVING TR	52 GILBERT ST	RIDGEFIELD, T	6877
56-0-1025/7A	ELENIFFSKY CARA M,	2A ROCK MARSH RD,	WAREHAM, MA	2571
56-0-1025/7B	NEWCOMB JOHN D, GULNICK VICKI L	28 ROCK MARSH RD,	WAREHAM, MA	2571
59-0-1002	CANNATA EDWARD N III, CANNATA KAREN J	247 MARION RD,	WAREHAM, MA	2571
59-0-1003	CNS HOME SOLUTIONS LLC,	128 UNION ST SUITE LLS	NEW BEDFORD, MA	2740
59-0-1004	MARSHALKA DAVID,	29 BROWN ST,	WAREHAM, MA	2571
59-0-1005	BISCEGLIA PAUL M & PAUL M JR, BISCEGLIA KEITH TRUSTEES	106 GUNNING PT RD,	PLYMOUTH, MA	2360
59-0-1006	BTF LLC	410 GREAT RD STE 6-2-2-G	LITTLETON, MA	1460
59-0-1008	FELDMAN GREGORY S, WORTHINGTON BARBARA	2729 CRANBERRY HWY,	WAREHAM, MA	2571
59-0-1018	WHEATON TAYLOR, HOWELL-SHERYL K	33 BROWN ST,	WAREHAM, MA	2571
59-0-1024	TAVARES ARTHUR,	64 CREST RD,	MUNSON, MA	1057
59-0-5	CRISPIN MICHAEL,	251 MARION RD,	WAREHAM, MA	2571
59-0-7	KIRKLAND MITCHELL V III, KIRKLAND ELEANOR M TRUSTEES	541 MAIN ST,	WAREHAM, MA	2571
56-0-1000-B	FAMILY PANTRY, THE - DAMIEN'S PLACE CORP 3065 CRAN HWY #B820	PO BOX 730	E WAREHAM, MA	2538

CERTIFIED ABUTTERS AS THEY APPEAR ON  
OUR TAX ROLLS AS OF 9/13/2023

*Gy Renee Atkins*

ASSESSORS OFFICE

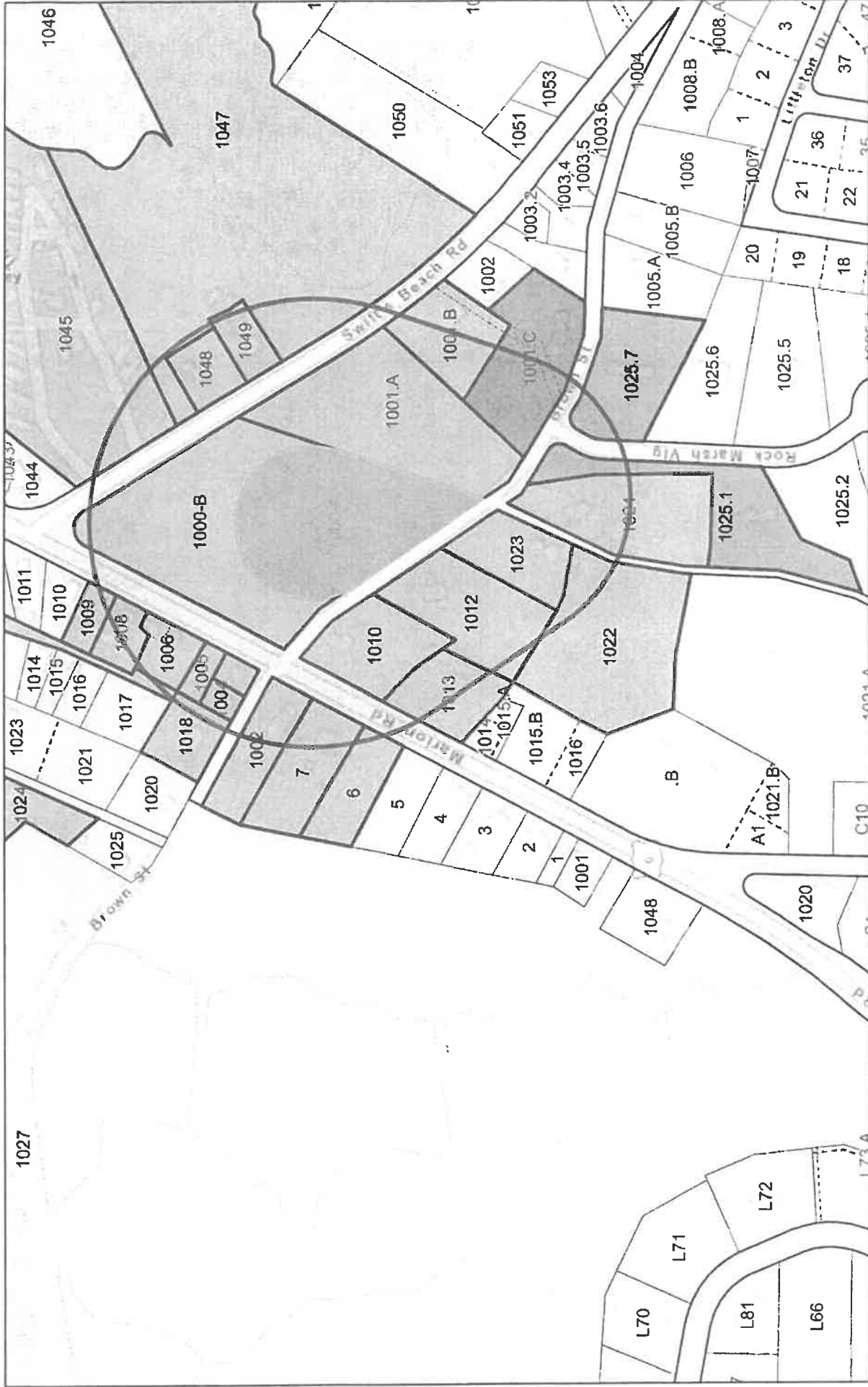
REQUESTED BY

MICHAEL DOLAN

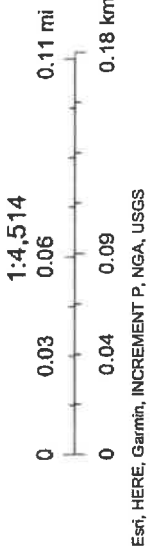
401.261-5128

MDOLAN@BROWNRUDNICK.COM

# ArcGIS Web Map



9/13/2023, 11:47:53 AM



- Parcels with CAMA Data
- Parcel Lines
- Common Line
- Private Road
- Property Line
- Public Road
- Right of Way
- MiscPolys
- Private Road ROW
- Utility
- Wetland
- Miscellaneous Lines

[Home](#) » [Departments](#) » [Assessing Department](#) » [Abutter Request Form - Online](#) » [Webform results](#)

# Submission #206

[View](#)[Delete](#)

Welcome to the website. For Help Documentation & Videos, please visit our [Municipal User Center](#) or, for schools, visit our [Schools User Center](#). **It is recommended you write down the following credentials to login to the User Center - Username: "CivicOpen" and Password: "ClientUser10!"**

[Previous submission](#)[Next submission](#)[Print](#) [Resend e-mails](#)

## Submission information

Form: [Abutter Request Form - Online](#)  
Submitted by Anonymous (not verified)  
September 13, 2023 - 9:24am  
24.253.190.105

## Contact Information

Michael Dolan

### Phone Number:

4012615128

### Email Address:

mdolan@brownrudnick.com

### Date of Request:

September 13, 2023

### Owners Name:

ITW Realty Trust, Michael J. Umano, Trustee

### Property Location:

25 Brown Street

### Map/Lot

56/1000A

### Distance Required

300'

### Which Board are you appearing before?

Zoning Board of Appeals

[Previous submission](#)[Next submission](#)





This form was received on the date stamped here:

TOWN OF WAREHAM

ZONING BOARD OF APPEALS APPLICATION FOR A:

- VARIANCE
- SPECIAL PERMIT
- SITE PLAN REVIEW
- APPEAL

Certain uses are allowed in zoning districts only by means of a Variance and/or Special Permit from the Zoning Board of Appeals. Those uses are indicated in the Wareham Zoning By-Laws. Permits may be issued only after a public hearing. To apply for a public hearing for a Permit from the Zoning Board of Appeals, please do the following:

- Complete this form.
- Read information packets. (Directions attached)
- Submit application form and packet of information to Town Clerk for signature.
- Submit application form to Town Collector for signature.
- Submit completed form, packets, and appropriate fees\*\* to the Planning and Community Development Office.

\*\* See Directions for fees, or ask at the Planning and Community Development Office.

I hereby apply for a [check applicable]: \_\_\_\_\_ Variance XX Special Permit \_\_\_\_\_ Site Plan \_\_\_\_\_ Appeal for a use at the following place:

STREET & NUMBER: 25 Brown Street MAP: 56 LOT: 1000A

ZONING DISTRICT: MR30

USE REQUESTED: Wireless Communications Facility

OWNER OF LAND & BUILDING: ITW Realty Trust, Michael J. Umamo, Trustee

ADDRESS OF OWNER: 40 Lone Street, Mansfield MA 02050

PERSON(S) WHO WILL UTILIZE PERMIT: New Cingular Wireless PCS, LLC d/b/a AT&T

ADDRESS: c/o Michael Dolan, Esq., Brown Rudnick LLP, One Financial Center, Boston, MA 02111

DATE: September 13, 2023 SIGNATURE: Michael Dolan, as agent for New Cingular Wireless PCS LLC

Town Clerk: \_\_\_\_\_ Date: \_\_\_\_\_

Tax Collector: Danielle Cambora Date: 10-30-23

Planning/Zoning Dept.: Sonia Raposo Date: 10/30/23

Application fee paid: 750.00 Check #: 1061 Receipt: \_\_\_\_\_

Advertising fee paid: 150.00 Check #: 1062 Receipt: \_\_\_\_\_

Abutters fee paid: 276.30 Check #: 1063 Receipt: \_\_\_\_\_

WAREHAM TOWN CLERK  
2023 OCT 30 PM 6:15



**SHEET NOT TO BE POSTED**  
**FOR OFFICE USE ONLY**

**TOWN OF WAREHAM**

**APPLICANT/CONTRACTOR/REPRESENTATIVE INFORMATION SHEET**

Check Applicable: \_\_\_\_\_ Variance    XX Special Permit    \_\_\_\_\_ Site Plan    \_\_\_\_\_ Appeal

Date stamped in: \_\_\_\_\_ Date decision is due \_\_\_\_\_

Applicant's Name: New Cingular Wireless PCS, LLC d/b/a AT&T

Applicant's Address: c/o Michael Dolan, Esq., Brown Rudnick LLP, One Financial Center,  
Boston, MA 02111

Telephone Number: 6178568200

Cell Phone Number: 4012615128

Email Address: mdolan@brownrudnick.com

Address of Property/Project: 25 Brown Street

Landowner's Name: JTW Realty Trust, Michael J. Umamo, Trustee

Owner's Address: 40 Lone Street, Mansfield MA 02050

Telephone Number: (781) 319-1100

Contact Person: Tom Lennon Telephone Number: (781) 319-1100

Map 56 Lot 1000A Zone MR 30

Date Approved \_\_\_\_\_ Date Denied \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_





Industrial Communications & Electronics, Inc.  
Industrial Tower and Wireless, LLC  
Industrial Communications, LLC

40 Lone Street  
Marshfield, Massachusetts 02050  
781-319-1111 • Fax 781-837-4000

**LETTER OF AUTHORIZATION**

This letter of Authorization dated this 13<sup>th</sup> day of September 2023 provides written authorization for AT&T Wireless (Licensee) its attorney, agents or representatives to apply for any necessary zoning petitions, permits or any other approvals, including but not limited to the filing of a building permit application on behalf of Industrial Communications LLC/Industrial Tower and Wireless, LLC (after required zoning approval if required has been completed) which are necessary for Licensee's installation of its communication equipment on Licensor's tower at 25 Brown St, Wareham, MA.

Industrial Tower and Wireless, LLC

BY

  
Thomas Lennon  
Vice President





C Squared Systems, LLC  
65 Dartmouth Drive  
Auburn, NH 03032  
(603) 644-2800  
[support@csquaredsystems.com](mailto:support@csquaredsystems.com)

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## Calculated Radio Frequency Emissions Report



MA1883  
25 Brown Street, Wareham, MA

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September 5, 2023

## Table of Contents

1. Introduction .....	2
2. FCC Guidelines for Evaluating RF Radiation Exposure Limits.....	2
3. RF Exposure Prediction Methods.....	3
4. Antenna Inventory .....	4
5. Calculation Results .....	5
6. Conclusion .....	7
7. Statement of Certification.....	7
Attachment A: References .....	8
Attachment B: FCC Limits for Maximum Permissible Exposure (MPE) .....	9
Attachment C: AT&T Mobility Antenna Model Data Sheets and Electrical Patterns .....	11

## List of Figures

Figure 1: Graph of General Population % MPE vs. Distance.....	5
Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE).....	10

## List of Tables

Table 1: Proposed Antenna Inventory .....	4
Table 2: Maximum Percent of General Population Exposure Values .....	6
Table 3: FCC Limits for Maximum Permissible Exposure .....	9

## 1. Introduction

The purpose of this report is to investigate compliance with applicable FCC regulations for the proposed installation of AT&T antenna arrays to be mounted at 159' AGL on an existing self-support tower located at 25 Brown Street in Wareham, MA. The coordinates of the tower are 41° 45' 11.7" N, 70° 43' 57" W.

AT&T is proposing the following:

- 1) Install six (6) multi-band antennas (two (2) per sector) to support its commercial LTE network and the FirstNet National Public Safety Broadband Network ("NPSBN").

This report considers the planned antenna configuration for AT&T<sup>1</sup> and the existing<sup>2</sup> antennas for DISH, T-Mobile, and Verizon to derive the resulting % MPE of its proposed installation.

## 2. FCC Guidelines for Evaluating RF Radiation Exposure Limits

In 1985, the FCC established rules to regulate radio frequency (RF) exposure from FCC licensed antenna facilities. In 1996, the FCC updated these rules, which were further amended in August 1997 by OET Bulletin 65 Edition 97-01. These new rules include Maximum Permissible Exposure (MPE) limits for transmitters operating between 300 kHz and 100 GHz. The FCC MPE limits are based upon those recommended by the National Council on Radiation Protection and Measurements (NCRP), developed by the Institute of Electrical and Electronics Engineers, Inc., (IEEE) and adopted by the American National Standards Institute (ANSI).

The FCC general population/uncontrolled limits set the maximum exposure to which most people may be subjected. General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

Public exposure to radio frequencies is regulated and enforced in units of milliwatts per square centimeter ( $\text{mW}/\text{cm}^2$ ). The general population exposure limits for the various frequency ranges are defined in the attached "FCC Limits for Maximum Permissible Exposure (MPE)" in Attachment C of this report.

Higher exposure limits are permitted under the occupational/controlled exposure category, but only for persons who are exposed as a consequence of their employment and who have been made fully aware of the potential for exposure, and they must be able to exercise control over their exposure. General population/uncontrolled limits are five times more stringent than the levels that are acceptable for occupational, or radio frequency trained individuals. Attachment C contains excerpts from OET Bulletin 65 and defines the Maximum Exposure Limit.

Finally, it should be noted that the MPE limits adopted by the FCC for both general population/uncontrolled exposure and for occupational/controlled exposure incorporate a substantial margin of safety and have been established to be well below levels generally accepted as having the potential to cause adverse health effects.

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<sup>1</sup> As referenced to AT&T's Radio Frequency Design Sheet, dated 07/06/2023.

<sup>2</sup> As referenced to Tower Engineering Professionals Structural Analysis Report, dated 03/24/2023

### 3. RF Exposure Prediction Methods

The emission field calculation results displayed in the following figures were generated using the following formula as outlined in FCC bulletin OET 65:

$$\text{Power Density} = \left( \frac{GRF \times 1.64 \times ERP}{4\pi \times R^2} \right) \times \text{Off Beam Loss}$$

Where:

EIRP = Effective Isotropic Radiated Power

R = Radial Distance =  $\sqrt{(H^2 + V^2)}$

H = Horizontal Distance from antenna in meters

V = Vertical Distance from radiation center of antenna in meters

Off Beam Loss is determined by the selected antenna patterns

GRF = Ground Reflection Factor of 2.0

These calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings, etc.) that would normally attenuate the signal are not taken into account. The calculations assume even terrain in the area of study and do not take into account actual terrain elevations which could attenuate the signal. As a result, the predicted signal levels reported below are much higher than the actual signal levels will be from the final installations.



#### 4. Antenna Inventory

Table I below outlines AT&T's proposed antenna configuration for the site. The associated data sheets and antenna patterns for these specific antenna models are included in Attachments C.

Operator	Sector / Call Sign	TX Freq (MHz)	Power at Antenna (Watts)	Ant Gain (dBi)	Power EIRP (Watts)	Antenna Model	Beam Width	Mech. Tilt	Length (ft)	Antenna Centerline Height (ft)
AT&T	Alpha / 60°	763	160	15.6	5809	TPA65R-BU8D	73	0	8.0	159
		1900	160	18.1	10330		66			
		2100	240	18.3	16226		66			
		739	160	15.1	5177	DMP65R-BU8D	75			
		850	160	16.0	6370		64			
		2300	100	18.1	6457		54			
	Beta / 150°	763	160	15.6	5809	TPA65R-BU8D	73	0	8.0	159
		1900	160	18.1	10330		66			
		2100	240	18.3	16226		66			
		739	160	15.1	5177	DMP65R-BU8D	75			
		850	160	16.0	6370		64			
		2300	100	18.1	6457		54			
	Gamma / 270°	763	160	15.6	5809	TPA65R-BU8D	73	0	8.0	159
		1900	160	18.1	10330		66			
		2100	240	18.3	16226		66			
		739	160	15.1	5177	DMP65R-BU8D	75			
		850	160	16.0	6370		64			
		2300	100	18.1	6457		54			

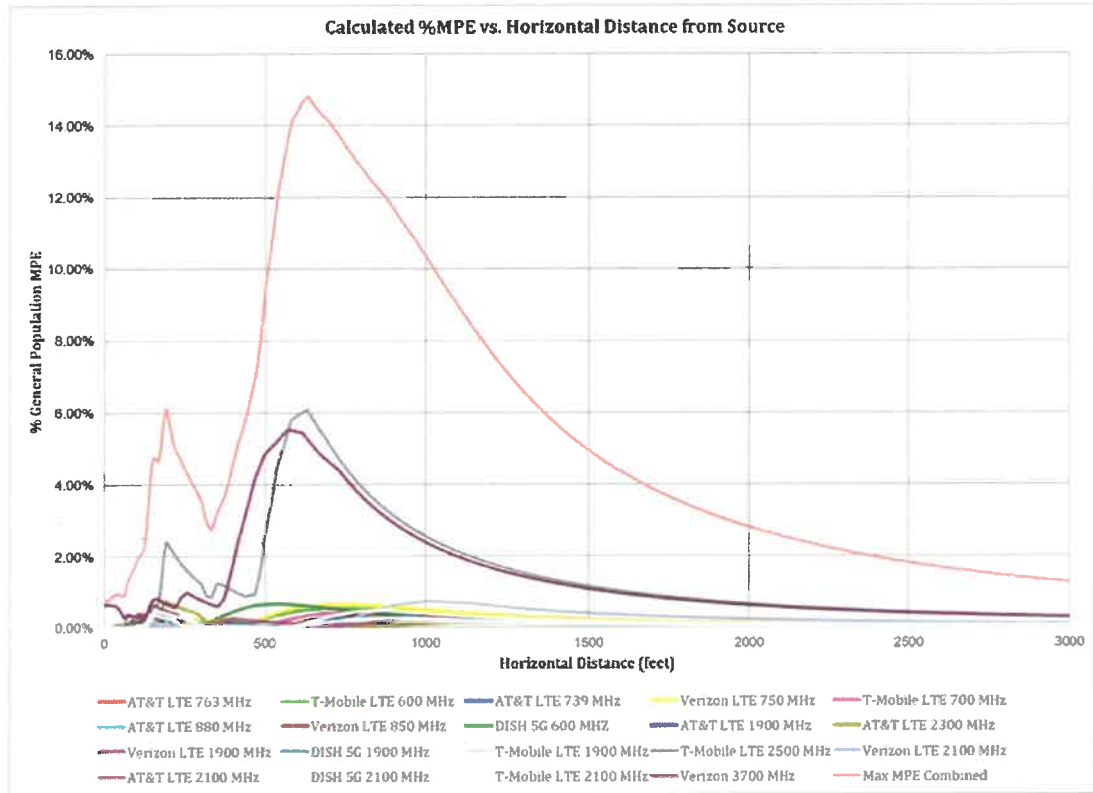
Table 1: Proposed Antenna Inventory<sup>3 4</sup>

<sup>3</sup> Antenna heights are in reference to the Tylon TSF. Construction Drawings, dated 06/19/2023.

<sup>4</sup> Transmit power assumes 0 dB of cable loss.

## 5. Calculation Results

The calculated power density results are shown in Figure 1 below. For completeness, the calculations for this analysis range from 0 feet horizontal distance (directly below the antennas) to a value of 3,000 feet horizontal distance from the site. In addition to the other worst-case scenario considerations that were previously mentioned, the power density calculations to each horizontal distance point away from the antennas was completed using a local maximum off beam antenna gain (within  $\pm 5$  degrees of the true mathematical angle) to incorporate a realistic worst-case scenario.



**Figure 1: Graph of General Population % MPE vs. Distance**

The highest percent of MPE (14.82% of the General Population limit) is calculated to occur at a horizontal distance of 630 feet from antennas. Please note that the percent of MPE calculations close to the site take into account off beam loss, which is determined from the vertical pattern of the antennas used. Therefore, RF power density levels may increase as the distance from the site increases. At distances of approximately 1500 feet and beyond, one would now be in the main beam of the antenna pattern and off beam loss is no longer considered. Beyond this point, RF levels become calculated solely on distance from the site and the percent of MPE decreases significantly as distance from the site increases.

Table 2 below lists percent of MPE values as well as the associated parameters that were included in the calculations. The highest percent of MPE value was calculated to occur at a horizontal distance of 630 feet from the site (reference Figure 1).

As stated in Section 3, all calculations assume that the antennas are operating at 100 percent capacity, that all antenna channels are transmitting simultaneously, and that the radio transmitters are operating at full power. Obstructions (trees, buildings etc.) that would normally attenuate the signal are not taken into account. In addition, a six-foot height offset was considered in this analysis to account for average human height. As a result, the predicted signal levels are significantly higher than the actual signal levels will be from the final configuration. The results presented in Figure 1 and Table 2 assume level ground elevation from the base of the tower out to the horizontal distances calculated.

Carrier	Number of Transmitters	Power out of Base Station Per Transmitter (Watts)	Antenna Height (Feet)	Distance to the Base of Antennas (Feet)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	% MPE
AT&T LTE 1900 MHz	1	160.0	159.0	630	0.000747	1.000	0.07%
AT&T LTE 2100 MHz	1	240.0	159.0	630	0.001121	1.000	0.11%
AT&T LTE 2300 MHz	1	100.0	159.0	630	0.000960	1.000	0.10%
AT&T LTE 739 MHz	1	160.0	159.0	630	0.000718	0.493	0.15%
AT&T LTE 763 MHz	1	160.0	159.0	630	0.000902	0.509	0.18%
AT&T LTE 880 MHz	1	160.0	159.0	630	0.000502	0.587	0.09%
DISH 5G 1900 MHz	1	160.0	129.0	630	0.001425	1.000	0.14%
DISH 5G 2100 MHz	1	160.0	129.0	630	0.001256	1.000	0.13%
DISH 5G 600 MHz	1	246.0	129.0	630	0.003459	0.567	0.61%
T-Mobile LTE 1900 MHz	1	120.0	140.0	630	0.000755	1.000	0.08%
T-Mobile LTE 2100 MHz	1	120.0	140.0	630	0.000694	1.000	0.07%
T-Mobile LTE 2500 MHz	1	240.0	140.0	630	0.060874	1.000	6.09%
T-Mobile LTE 600 MHz	1	160.0	140.0	630	0.001982	0.400	0.50%
T-Mobile LTE 700 MHz	1	160.0	140.0	630	0.001529	0.467	0.33%
Verizon 3700 MHz	1	200.0	148.0	630	0.052675	1.000	5.27%
Verizon LTE 1900 MHz	1	160.0	148.0	630	0.000477	1.000	0.05%
Verizon LTE 2100 MHz	1	240.0	148.0	630	0.001038	1.000	0.10%
Verizon LTE 750 MHz	1	160.0	148.0	630	0.002990	0.500	0.60%
Verizon LTE 850 MHz	1	160.0	148.0	630	0.001025	0.567	0.18%
<b>Total</b>							<b>14.82%</b>

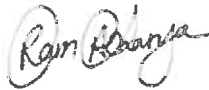
**Table 2: Maximum Percent of General Population Exposure Values**

## 6. Conclusion

The above analysis verifies that RF exposure levels from the site with AT&T's proposed antenna configuration will be well below the maximum permissible levels as outlined by the FCC in the OET Bulletin 65 Ed. 97-01. Using the conservative calculation methods and parameters detailed above, the maximum cumulative percent of MPE in consideration of all transmitters is calculated to be **14.82% of the FCC limit (General Population/Uncontrolled)**. This maximum cumulative percent of MPE value is calculated to occur 630 feet away from the site.

## 7. Statement of Certification

I certify to the best of my knowledge that the statements in this report are true and accurate. The calculations follow guidelines set forth in ANSI/IEEE Std. C95.3, ANSI/IEEE Std. C95.1 and FCC OET Bulletin 65 Edition 97-01.



Report Prepared By:

\_\_\_\_\_  
Ram Acharya  
RF Engineer I  
C Squared Systems, LLC

September 5, 2023

Date



Reviewed/Approved By:

\_\_\_\_\_  
Martin J. Lavin  
Senior RF Engineer  
C Squared Systems, LLC

September 5, 2023

Date

## **Attachment A: References**

OET Bulletin 65 - Edition 97-01 - August 1997 Federal Communications Commission Office of Engineering & Technology

IEEE C95.1-2005, IEEE Standard Safety Levels With Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz IEEE-SA Standards Board

IEEE C95.3-2002 (R2008), IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields, 100 kHz-300 GHz IEEE-SA Standards Board

**Attachment B: FCC Limits for Maximum Permissible Exposure (MPE)**

**(A) Limits for Occupational/Controlled Exposure<sup>5</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f <sup>2</sup> )*	6
30-300	61.4	0.163	1.0	6
300-1500	-	-	f/300	6
1500-100,000	-	-	5	6

**(B) Limits for General Population/Uncontrolled Exposure<sup>6</sup>**

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (E) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f <sup>2</sup> )*	30
30-300	27.5	0.073	0.2	30
300-1500	-	-	f/1500	30
1500-100,000	-	-	1.0	30

f = frequency in MHz \* Plane-wave equivalent power density

**Table 3: FCC Limits for Maximum Permissible Exposure**

<sup>5</sup> Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

<sup>6</sup> General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

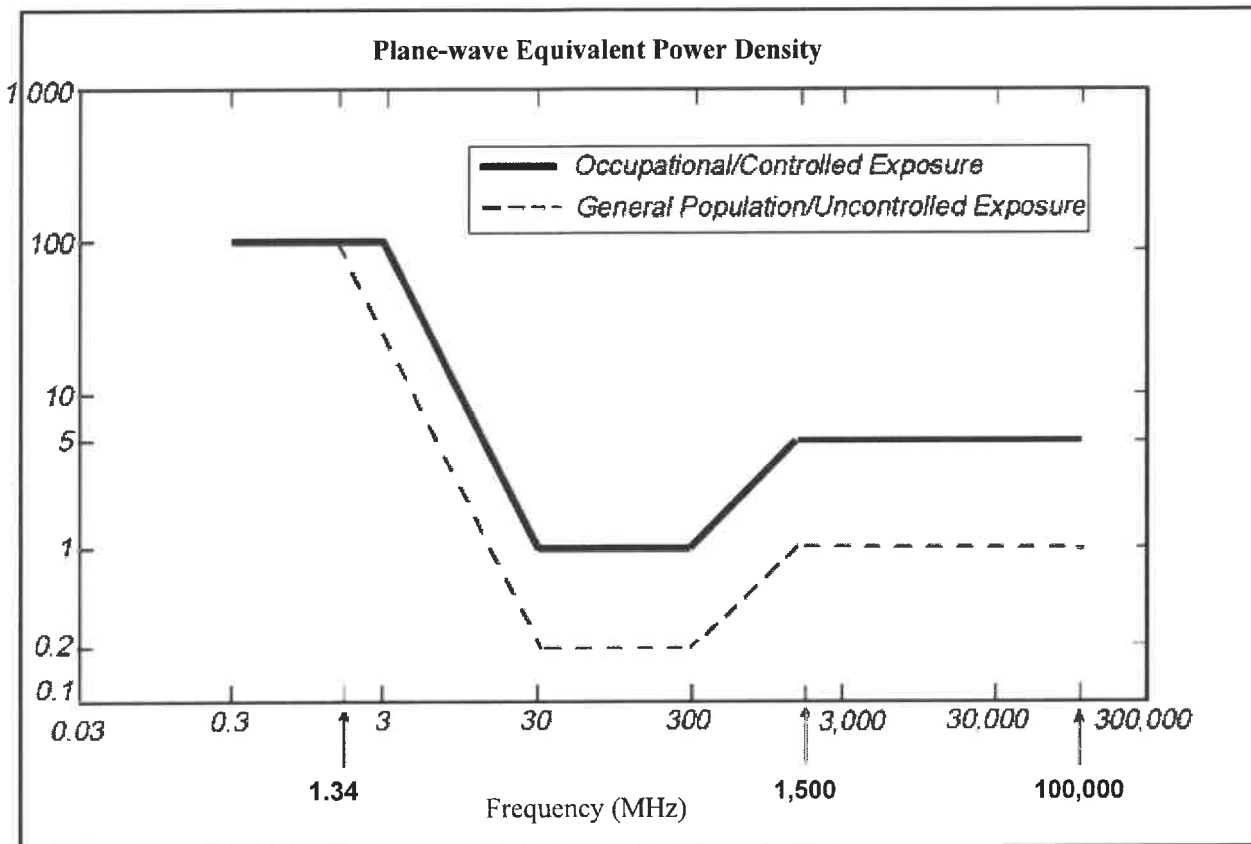
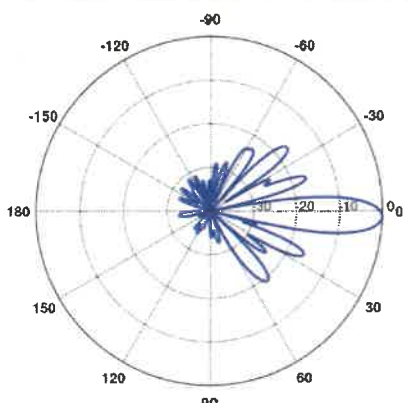
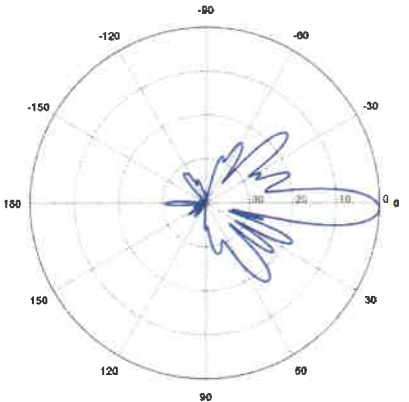
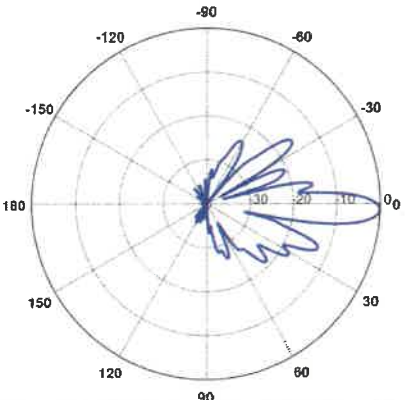
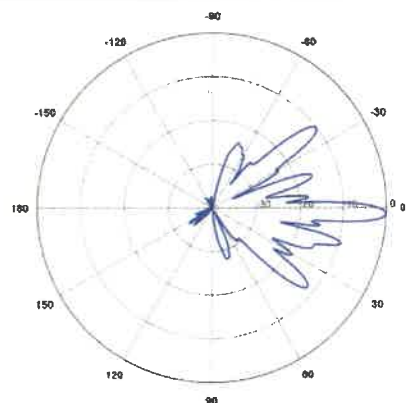
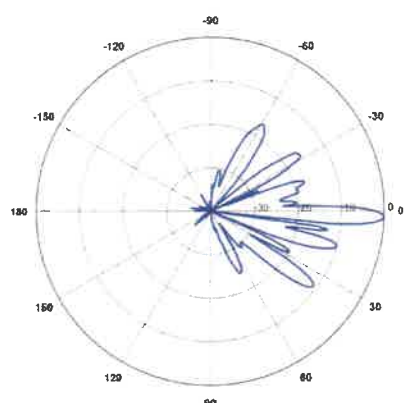
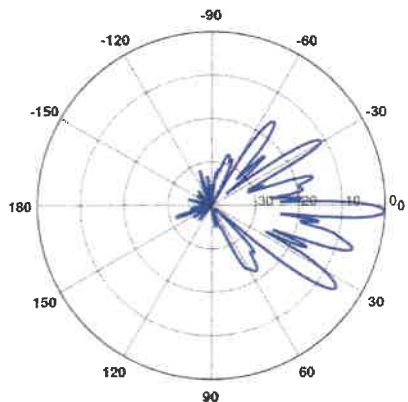


Figure 2: Graph of FCC Limits for Maximum Permissible Exposure (MPE)

**Attachment C: AT&T Mobility Antenna Model Data Sheets and Electrical Patterns**

<p><b>739 MHz</b></p> <p>Manufacturer: CCI            Model #: DMP65R-BU8D            Frequency Band: 698-798 MHz            Gain: 15.1 dBi            Vertical Beamwidth: 9.5°            Horizontal Beamwidth: 75°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96" x 20.7" x 7.7"</p>	
<p><b>763 MHz</b></p> <p>Manufacturer: CCI            Model #: TPA65R-BU8D            Frequency Band: 698-806 MHz            Gain: 15.6 dBi            Vertical Beamwidth: 9.5°            Horizontal Beamwidth: 73°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96.0" x 21.0" x 7.8"</p>	
<p><b>885 MHz</b></p> <p>Manufacturer: CCI            Model #: DMP65R-BU8D            Frequency Band: 824-896 MHz            Gain: 16.0 dBi            Vertical Beamwidth: 8.0°            Horizontal Beamwidth: 64°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96" x 20.7" x 7.7"</p>	



<p><b>1900 MHz</b></p> <p>Manufacturer: CCI            Model #: TPA65R-BU8D            Frequency Band: 1850-1990 MHz            Gain: 18.1 dBi            Vertical Beamwidth: 5.1°            Horizontal Beamwidth: 66°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96.0" x 21.0" x 7.8"</p>	
<p><b>2100 MHz</b></p> <p>Manufacturer: CCI            Model #: TPA65R-BU8D            Frequency Band: 1920-2180 MHz            Gain: 18.3 dBi            Vertical Beamwidth: 4.8°            Horizontal Beamwidth: 66°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96.0" x 21.0" x 7.8"</p>	
<p><b>2300 MHz</b></p> <p>Manufacturer: CCI            Model #: DMP65R-BU8D            Frequency Band: 2300-2400 MHz            Gain: 18.1 dBi            Vertical Beamwidth: 4.1°            Horizontal Beamwidth: 54°            Polarization: Dual Linear 45°            Dimensions (L x W x D): 96" x 20.7" x 7.7"</p>	





**Subpart U—State and Local Government Regulation of the Placement, Construction, and  
Modification of Personal Wireless Service Facilities**

**Contents**

**§1.6001 Purpose.**

**§1.6002 Definitions.**

**§1.6003 Reasonable periods of time to act on siting applications.**

**§1.6100 Wireless Facility Modifications.**

Source: 83 FR 51884, Oct. 15, 2018, unless otherwise noted.

**§1.6001 Purpose.**

This subpart implements 47 U.S.C. 332(c)(7) and 1455.

**§1.6002 Definitions.**

Terms not specifically defined in this section or elsewhere in this subpart have the meanings defined in this part and the Communications Act of 1934, 47 U.S.C. 151 et seq. Terms used in this subpart have the following meanings:

(a) *Action* or *to act* on a siting application means a siting authority's grant of a siting application or issuance of a written decision denying a siting application.

(b) *Antenna*, consistent with §1.1320(d), means an apparatus designed for the purpose of emitting radiofrequency (RF) radiation, to be operated or operating from a fixed location pursuant to Commission authorization, for the provision of personal wireless service and any commingled information services. For purposes of this definition, the term antenna does not include an unintentional radiator, mobile station, or device authorized under part 15 of this chapter.

(c) *Antenna equipment*, consistent with §1.1320(d), means equipment, switches, wiring, cabling, power sources, shelters or cabinets associated with an antenna, located at the same fixed location as the antenna, and, when collocated on a structure, is mounted or installed at the same time as such antenna.

(d) *Antenna facility* means an antenna and associated antenna equipment.

(e) *Applicant* means a person or entity that submits a siting application and the agents, employees, and contractors of such person or entity.

(f) *Authorization* means any approval that a siting authority must issue under applicable law prior to the deployment of personal wireless service facilities, including, but not limited to, zoning approval and building permit.

(g) *Collocation*, consistent with §1.1320(d) and the Nationwide Programmatic Agreement (NPA) for the Collocation of Wireless Antennas, appendix B of this part, section I.B, means—

- (1) Mounting or installing an antenna facility on a pre-existing structure; and/or
- (2) Modifying a structure for the purpose of mounting or installing an antenna facility on that structure.
- (3) The definition of “collocation” in §1.6100(b)(2) applies to the term as used in that section.

(h) *Deployment* means placement, construction, or modification of a personal wireless service facility.

(i) *Facility or personal wireless service facility* means an antenna facility or a structure that is used for the provision of personal wireless service, whether such service is provided on a stand-alone basis or commingled with other wireless communications services.

(j) *Siting application or application* means a written submission to a siting authority requesting authorization for the deployment of a personal wireless service facility at a specified location.

(k) *Siting authority* means a State government, local government, or instrumentality of a State government or local government, including any official or organizational unit thereof, whose authorization is necessary prior to the deployment of personal wireless service facilities.

(l) *Small wireless facilities*, consistent with §1.1312(e)(2), are facilities that meet each of the following conditions:

- (1) The facilities—
  - (i) Are mounted on structures 50 feet or less in height including their antennas as defined in §1.1320(d); or
  - (ii) Are mounted on structures no more than 10 percent taller than other adjacent structures; or
  - (iii) Do not extend existing structures on which they are located to a height of more than 50 feet or by more than 10 percent, whichever is greater;

(2) Each antenna associated with the deployment, excluding associated antenna equipment (as defined in the definition of “antenna” in §1.1320(d)), is no more than three cubic feet in volume;

(3) All other wireless equipment associated with the structure, including the wireless equipment associated with the antenna and any pre-existing associated equipment on the structure, is no more than 28 cubic feet in volume;

(4) The facilities do not require antenna structure registration under part 17 of this chapter;

(5) The facilities are not located on Tribal lands, as defined under 36 CFR 800.16(x); and

(6) The facilities do not result in human exposure to radiofrequency radiation in excess of the applicable safety standards specified in §1.1307(b).

(m) Structure means a pole, tower, base station, or other building, whether or not it has an existing antenna facility, that is used or to be used for the provision of personal wireless service (whether on its own or comingled with other types of services).

#### **§1.6003 Reasonable periods of time to act on siting applications.**

(a) *Timely action required.* A siting authority that fails to act on a siting application on or before the shot clock date for the application, as defined in paragraph (e) of this section, is presumed not to have acted within a reasonable period of time.

(b) *Shot clock period.* The shot clock period for a siting application is the sum of—

(1) The number of days of the presumptively reasonable period of time for the pertinent type of application, pursuant to paragraph (c) of this section; plus

(2) The number of days of the tolling period, if any, pursuant to paragraph (d) of this section.

(c) *Presumptively reasonable periods of time—*

(1) *Review periods for individual applications.* The following are the presumptively reasonable periods of time for action on applications seeking authorization for deployments in the categories set forth in paragraphs (c)(1)(i) through (iv) of this section:

(i) Review of an application to collocate a Small Wireless Facility using an existing structure: 60 days.

(ii) Review of an application to collocate a facility other than a Small Wireless Facility using an existing structure: 90 days.

(iii) Review of an application to deploy a Small Wireless Facility using a new structure: 90 days.

(iv) Review of an application to deploy a facility other than a Small Wireless Facility using a new structure: 150 days.

(2) *Batching.*

(i) If a single application seeks authorization for multiple deployments, all of which fall within a category set forth in either paragraph (c)(1)(i) or (iii) of this section, then the presumptively reasonable period of time for the application as a whole is equal to that for a single deployment within that category.

(ii) If a single application seeks authorization for multiple deployments, the components of which are a mix of deployments that fall within paragraph (c)(1)(i) of this section and deployments that fall within paragraph (c)(1)(iii) of this section, then the presumptively reasonable period of time for the application as a whole is 90 days.

(iii) Siting authorities may not refuse to accept applications under paragraphs (c)(2)(i) and (ii) of this section.

(d) *Tolling period.* Unless a written agreement between the applicant and the siting authority provides otherwise, the tolling period for an application (if any) is as set forth in paragraphs (d)(1) through (3) of this section.

(1) For an initial application to deploy Small Wireless Facilities, if the siting authority notifies the applicant on or before the 10th day after submission that the application is materially incomplete, and clearly and specifically identifies the missing documents or information and the specific rule or regulation creating the obligation to submit such documents or information, the shot clock date calculation shall restart at zero on the date on which the applicant submits all the documents and information identified by the siting authority to render the application complete.

(2) For all other initial applications, the tolling period shall be the number of days from—

(i) The day after the date when the siting authority notifies the applicant in writing that the application is materially incomplete and clearly and specifically identifies the missing documents or information that the applicant must submit to render the application complete and the specific rule or regulation creating this obligation; until

(ii) The date when the applicant submits all the documents and information identified by the siting authority to render the application complete;

(iii) But only if the notice pursuant to paragraph (d)(2)(i) of this section is effectuated on or before the 30th day after the date when the application was submitted; or

(3) For resubmitted applications following a notice of deficiency, the tolling period shall be the number of days from—

(i) The day after the date when the siting authority notifies the applicant in writing that the applicant's supplemental submission was not sufficient to render the application complete and clearly and specifically identifies the missing documents or information that need to be submitted based on the siting authority's original request under paragraph (d)(1) or (2) of this section; until

(ii) The date when the applicant submits all the documents and information identified by the siting authority to render the application complete;

(iii) But only if the notice pursuant to paragraph (d)(3)(i) of this section is effectuated on or before the 10th day after the date when the applicant makes a supplemental submission in response to the siting authority's request under paragraph (d)(1) or (2) of this section.

(e) *Shot clock date.* The shot clock date for a siting application is determined by counting forward, beginning on the day after the date when the application was submitted, by the number of calendar days of the shot clock period identified pursuant to paragraph (b) of this section and including any pre-application period asserted by the siting authority; provided, that if the date calculated in this manner is a “holiday” as defined in §1.4(e)(1) or a legal holiday within the relevant State or local jurisdiction, the shot clock date is the next business day after such date. The term “business day” means any day as defined in §1.4(e)(2) and any day that is not a legal holiday as defined by the State or local jurisdiction.

#### **§1.6100 Wireless Facility Modifications.**

(a) [Reserved]

(b) *Definitions.* Terms used in this section have the following meanings.

(1) *Base station.* A structure or equipment at a fixed location that enables Commission-licensed or authorized wireless communications between user equipment and a communications network. The term does not encompass a tower as defined in this subpart or any equipment associated with a tower.



(i) The term includes, but is not limited to, equipment associated with wireless communications services such as private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

(ii) The term includes, but is not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, regular and backup power supplies, and comparable equipment, regardless of technological configuration (including Distributed Antenna Systems and small-cell networks).

(iii) The term includes any structure other than a tower that, at the time the relevant application is filed with the State or local government under this section, supports or houses equipment described in paragraphs (b)(1)(i) through (ii) of this section that has been reviewed and approved under the applicable zoning or siting process, or under another State or local regulatory review process, even if the structure was not built for the sole or primary purpose of providing such support.

(iv) The term does not include any structure that, at the time the relevant application is filed with the State or local government under this section, does not support or house equipment described in paragraphs (b)(1)(i)-(ii) of this section.

(2) *Collocation.* The mounting or installation of transmission equipment on an eligible support structure for the purpose of transmitting and/or receiving radio frequency signals for communications purposes.

(3) *Eligible facilities request.* Any request for modification of an existing tower or base station that does not substantially change the physical dimensions of such tower or base station, involving:

(i) Collocation of new transmission equipment;

(ii) Removal of transmission equipment; or

(iii) Replacement of transmission equipment.

(4) *Eligible support structure.* Any tower or base station as defined in this section, provided that it is existing at the time the relevant application is filed with the State or local government under this section.

(5) *Existing.* A constructed tower or base station is existing for purposes of this section if it has been reviewed and approved under the applicable zoning or siting process, or under another State or local regulatory review process, provided that a tower that has not been reviewed and approved because it was not in a zoned area when it was built, but was lawfully constructed, is existing for purposes of this definition.

(6) *Site*. For towers other than towers in the public rights-of-way, the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site, and, for other eligible support structures, further restricted to that area in proximity to the structure and to other transmission equipment already deployed on the ground. The current boundaries of a site are the boundaries that existed as of the date that the original support structure or a modification to that structure was last reviewed and approved by a State or local government, if the approval of the modification occurred prior to the Spectrum Act or otherwise outside of the section 6409(a) process.

(7) *Substantial change*. A modification substantially changes the physical dimensions of an eligible support structure if it meets any of the following criteria:

(i) For towers other than towers in the public rights-of-way, it increases the height of the tower by more than 10% or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater; for other eligible support structures, it increases the height of the structure by more than 10% or more than ten feet, whichever is greater;

(A) Changes in height should be measured from the original support structure in cases where deployments are or will be separated horizontally, such as on buildings' rooftops; in other circumstances, changes in height should be measured from the dimensions of the tower or base station, inclusive of originally approved appurtenances and any modifications that were approved prior to the passage of the Spectrum Act.

(ii) For towers other than towers in the public rights-of-way, it involves adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater; for other eligible support structures, it involves adding an appurtenance to the body of the structure that would protrude from the edge of the structure by more than six feet;

(iii) For any eligible support structure, it involves installation of more than the standard number of new equipment cabinets for the technology involved, but not to exceed four cabinets; or, for towers in the public rights-of-way and base stations, it involves installation of any new equipment cabinets on the ground if there are no pre-existing ground cabinets associated with the structure, or else involves installation of ground cabinets that are more than 10% larger in height or overall volume than any other ground cabinets associated with the structure;

(iv) It entails any excavation or deployment outside of the current site, except that, for towers other than towers in the public rights-of-way, it entails any excavation or deployment of transmission equipment outside of the current site by more than 30 feet in any direction. The site

boundary from which the 30 feet is measured excludes any access or utility easements currently related to the site;

(v) It would defeat the concealment elements of the eligible support structure; or

(vi) It does not comply with conditions associated with the siting approval of the construction or modification of the eligible support structure or base station equipment, provided however that this limitation does not apply to any modification that is non-compliant only in a manner that would not exceed the thresholds identified in §1.40001(b)(7)(i) through (iv).

(8) *Transmission equipment.* Equipment that facilitates transmission for any Commission-licensed or authorized wireless communication service, including, but not limited to, radio transceivers, antennas, coaxial or fiber-optic cable, and regular and backup power supply. The term includes equipment associated with wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul.

(9) *Tower.* Any structure built for the sole or primary purpose of supporting any Commission-licensed or authorized antennas and their associated facilities, including structures that are constructed for wireless communications services including, but not limited to, private, broadcast, and public safety services, as well as unlicensed wireless services and fixed wireless services such as microwave backhaul, and the associated site.

(c) *Review of applications.* A State or local government may not deny and shall approve any eligible facilities request for modification of an eligible support structure that does not substantially change the physical dimensions of such structure.

(1) *Documentation requirement for review.* When an applicant asserts in writing that a request for modification is covered by this section, a State or local government may require the applicant to provide documentation or information only to the extent reasonably related to determining whether the request meets the requirements of this section. A State or local government may not require an applicant to submit any other documentation, including but not limited to documentation intended to illustrate the need for such wireless facilities or to justify the business decision to modify such wireless facilities.

(2) *Timeframe for review.* Within 60 days of the date on which an applicant submits a request seeking approval under this section, the State or local government shall approve the application unless it determines that the application is not covered by this section.

(3) *Tolling of the timeframe for review.* The 60-day period begins to run when the application is filed, and may be tolled only by mutual agreement or in cases where the reviewing

State or local government determines that the application is incomplete. The timeframe for review is not tolled by a moratorium on the review of applications.

(i) To toll the timeframe for incompleteness, the reviewing State or local government must provide written notice to the applicant within 30 days of receipt of the application, clearly and specifically delineating all missing documents or information. Such delineated information is limited to documents or information meeting the standard under paragraph (c)(1) of this section.

(ii) The timeframe for review begins running again when the applicant makes a supplemental submission in response to the State or local government's notice of incompleteness.

(iii) Following a supplemental submission, the State or local government will have 10 days to notify the applicant that the supplemental submission did not provide the information identified in the original notice delineating missing information. The timeframe is tolled in the case of second or subsequent notices pursuant to the procedures identified in this paragraph (c)(3). Second or subsequent notices of incompleteness may not specify missing documents or information that were not delineated in the original notice of incompleteness.

(4) *Failure to act.* In the event the reviewing State or local government fails to approve or deny a request seeking approval under this section within the timeframe for review (accounting for any tolling), the request shall be deemed granted. The deemed grant does not become effective until the applicant notifies the applicable reviewing authority in writing after the review period has expired (accounting for any tolling) that the application has been deemed granted.

(5) *Remedies.* Applicants and reviewing authorities may bring claims related to Section 6409(a) to any court of competent jurisdiction.

[80 FR 1269, Jan. 8, 2015. Redesignated and amended at 83 FR 51886, Oct. 15, 2018; 85 FR 78018, Dec. 3, 2020]



# PUBLIC NOTICE

Federal Communications Commission  
445 12<sup>th</sup> St., S.W.  
Washington, D.C. 20554

News Media Information 202 / 418-0500  
Internet: <http://www.fcc.gov>  
TTY: 1-888-835-5322

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## WIRELESS TELECOMMUNICATIONS BUREAU OFFERS GUIDANCE ON INTERPRETATION OF SECTION 6409(a) OF THE MIDDLE CLASS TAX RELIEF AND JOB CREATION ACT OF 2012

DA 12-2047  
January 25, 2013

On February 22, 2012, the Middle Class Tax Relief and Job Creation Act of 2012 (Tax Act)<sup>1</sup> became law. Section 6409(a) of the Tax Act provides that a state or local government “may not deny, and shall approve” any request for collocation, removal, or replacement of transmission equipment on an existing wireless tower or base station, provided this action does not substantially change the physical dimensions of the tower or base station.<sup>2</sup> The full text of Section 6409(a) is reproduced in the Appendix to this Public Notice.

To date, the Commission has not received any formal petition to interpret or apply the provisions of Section 6409(a). We also are unaware of any judicial precedent interpreting or applying its terms. The Wireless Telecommunications Bureau has, however, received informal inquiries from service providers, facilities owners, and state and local governments seeking guidance as to how Section 6409(a) should be applied. In order to assist interested parties, this Public Notice summarizes the Bureau’s understanding of Section 6409(a) in response to several of the most frequently asked questions.<sup>3</sup>

### What does it mean to “substantially change the physical dimensions” of a tower or base station?

Section 6409(a) does not define what constitutes a “substantial[] change” in the dimensions of a tower or base station. In a similar context, under the *Nationwide Collocation Agreement* with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, the Commission has applied a four-prong test to determine whether a collocation will effect a “substantial increase in the size of [a] tower.”<sup>4</sup> A proposed collocation that does not involve a substantial increase in

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<sup>1</sup> Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. 112-96, H.R. 3630, 126 Stat. 156 (enacted Feb. 22, 2012) (Tax Act).

<sup>2</sup> *Id.*, § 6409(a).

<sup>3</sup> Although we offer this interpretive guidance to assist parties in understanding their obligations under Section 6409(a), *see, e.g., Truckers United for Safety v. Federal Highway Administration*, 139 F.3d 934 (D.C.Cir. 1998), the Commission remains free to exercise its discretion to interpret Section 6409(a) either by exercising its rulemaking authority or through adjudication. With two exceptions not relevant here, the Tax Act expressly grants the Commission authority to “implement and enforce” this and other provisions of Title VI of that Act “as if this title is a part of the Communications Act of 1934 (47 U.S.C. 151 et seq.)” Tax Act § 6003.

<sup>4</sup> 47 C.F.R. Part 1, App. B, *Nationwide Programmatic Agreement for the Collocation of Wireless Antennas*, § I.C (*Nationwide Collocation Agreement*).

size is ordinarily excluded from the Commission's required historic preservation review under Section 106 of the National Historic Preservation Act (NHPA).<sup>5</sup> The Commission later adopted the same definition in the *2009 Declaratory Ruling* to determine whether an application will be treated as a collocation when applying Section 332(c)(7) of the Communications Act of 1934.<sup>6</sup> The Commission has also applied a similar definition to determine whether a modification of an existing registered tower requires public notice for purposes of environmental review.<sup>7</sup>

Under Section I.C of the *Nationwide Collocation Agreement*, a "substantial increase in the size of the tower" occurs if:

- 1) [t]he mounting of the proposed antenna on the tower would increase the existing height of the tower by more than 10%, or by the height of one additional antenna array with separation from the nearest existing antenna not to exceed twenty feet, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to avoid interference with existing antennas; or
- 2) [t]he mounting of the proposed antenna would involve the installation of more than the standard number of new equipment cabinets for the technology involved, not to exceed four, or more than one new equipment shelter; or
- 3) [t]he mounting of the proposed antenna would involve adding an appurtenance to the body of the tower that would protrude from the edge of the tower more than twenty feet, or more than the width of the tower structure at the level of the appurtenance, whichever is greater, except that the mounting of the proposed antenna may exceed the size limits set forth in this paragraph if necessary to shelter the antenna from inclement weather or to connect the antenna to the tower via cable; or
- 4) [t]he mounting of the proposed antenna would involve excavation outside the current tower site, defined as the current boundaries of the leased or owned property surrounding the tower and any access or utility easements currently related to the site.

Although Congress did not adopt the Commission's terminology of "substantial increase in size" in Section 6409(a), we believe that the policy reasons for excluding from Section 6409(a) collocations that substantially change the physical dimensions of a structure are closely analogous to those that animated the Commission in the *Nationwide Collocation Agreement* and subsequent proceedings. In light of the Commission's prior findings, the Bureau believes it is appropriate to look to the existing definition of "substantial increase in size" to determine whether the collocation, removal, or replacement of equipment

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<sup>5</sup> See 16 U.S.C. § 470f, *see also* 47 C.F.R. § 1.1307(a)(4) (requiring applicants to determine whether proposed facilities may affect properties that are listed, or are eligible for listing, in the National Register of Historic Places).

<sup>6</sup> See Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review and to Preempt Under Section 253 State and Local Ordinances that Classify All Wireless Siting Proposals as Requiring a Variance, WT Docket No. 08-165, *Declaratory Ruling*, 24 FCC Rcd. 13994, 14012, para. 46 & n.146 (2009) (*2009 Declaratory Ruling*), *recon. denied*, 25 FCC Rcd. 11157 (2010), *pet. for review denied sub nom. City of Arlington, Texas v. FCC*, 668 F.3d 229 (5<sup>th</sup> Cir.), *cert. granted*, 113 S.Ct. 524 (2012); 47 U.S.C. § 332(c)(7).

<sup>7</sup> See 47 C.F.R. § 17.4(c)(1)(B); National Environmental Policy Act Compliance for Proposed Tower Registrations, WT Docket No. 08-61, *Order on Remand*, 26 FCC Rcd. 16700, 16720-21, para. 53 (2011).

on a wireless tower or base station substantially changes the physical dimensions of the underlying structure within the meaning of Section 6409(a).

**What is a “wireless tower or base station”?**

A “tower” is defined in the *Nationwide Collocation Agreement* as “any structure built for the sole or primary purpose of supporting FCC-licensed antennas and their associated facilities.”<sup>8</sup> The Commission has described a “base station” as consisting of “radio transceivers, antennas, coaxial cable, a regular and backup power supply, and other associated electronics.”<sup>9</sup> Section 6409(a) applies to the collocation, removal, or replacement of equipment on a wireless tower or base station. In this context, we believe it is reasonable to interpret a “base station” to include a structure that currently supports or houses an antenna, transceiver, or other associated equipment that constitutes part of a base station.<sup>10</sup> Moreover, given the absence of any limiting statutory language, we believe a “base station” encompasses such equipment in any technological configuration, including distributed antenna systems and small cells.

Section 6409(a) by its terms applies to any “wireless” tower or base station. By contrast, the scope of Section 332(c)(7) extends only to facilities used for “personal wireless services” as defined in that section.<sup>11</sup> Given Congress’s decision not to use the pre-existing definition from another statutory provision relating to wireless siting, we believe the scope of a “wireless” tower or base station under Section 6409(a) is not intended to be limited to facilities that support “personal wireless services” under Section 332(c)(7).

**May a state or local government require an application for an action covered under Section 6409(a)?**

Section 6409(a) states that a state or local government “may not deny, and shall approve, any eligible facilities request....” It does not say that a state or local government may not require an application to be filed. The provision that a state or local government must approve and may not deny a request to take a covered action, in the Bureau’s view, implies that the relevant government entity may require the filing of an application for administrative approval.

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<sup>8</sup> See *Nationwide Collocation Agreement*, § I.B.

<sup>9</sup> See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, WT Docket No. 10-133, *Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, Fifteenth Report*, 26 FCC Rcd. 9664, 9481, para. 308 (2011).

<sup>10</sup> See also 47 C.F.R. Part 1, App. C, *Nationwide Programmatic Agreement Regarding the Section 106 National Historic Preservation Act Review Process*, § II.A.14 (defining “tower” to include “the on-site fencing, equipment, switches, wiring, cabling, power sources, shelters, or cabinets associated with that Tower but not installed as part of an Antenna as defined herein”).

<sup>11</sup> 47 U.S.C. § 332(c)(7)(A). “Personal wireless services” is in turn defined to mean “commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services.” *Id.* § 332(c)(7)(C)(1).

**Is there a time limit within which an application must be approved?**

Section 6409(a) does not specify any period of time for approving an application. However, the statute clearly contemplates an administrative process that invariably ends in approval of a covered application. We believe the time period for processing these applications should be commensurate with the nature of the review.

In the *2009 Declaratory Ruling*, the Commission found that 90 days is a presumptively reasonable period of time to process collocation applications.<sup>12</sup> In light of the requirement of Section 6409(a) that the reviewing authority “may not deny, and shall approve” a covered request, we believe that 90 days should be the maximum presumptively reasonable period of time for reviewing such applications, whether for “personal wireless services” or other wireless facilities.

Wireless Telecommunications Bureau contact: Maria Kirby at (202) 418-1476 or by email: [Maria.Kirby@fcc.gov](mailto:Maria.Kirby@fcc.gov).

-FCC-

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<sup>12</sup> See *2009 Declaratory Ruling*, 24 FCC Rcd. at 14012-13, paras. 46-47.



## APPENDIX

### SEC. 6409. WIRELESS FACILITIES DEPLOYMENT.

#### (a) FACILITY MODIFICATIONS.

(1) **IN GENERAL.** Notwithstanding section 704 of the Telecommunications Act of 1996 (Public Law 104–104) or any other provision of law, a State or local government may not deny, and shall approve, any eligible facilities request for a modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station.

(2) **ELIGIBLE FACILITIES REQUEST.** For purposes of this subsection, the term “eligible facilities request” means any request for modification of an existing wireless tower or base station that involves —

- (A) collocation of new transmission equipment;
- (B) removal of transmission equipment; or
- (C) replacement of transmission equipment.

(3) **APPLICABILITY OF ENVIRONMENTAL LAWS.** Nothing in paragraph (1) shall be construed to relieve the Commission from the requirements of the National Historic Preservation Act or the National Environmental Policy Act of 1969.





# TOWN of WAREHAM

*Massachusetts*

## BUILDING DEPARTMENT

Paul Turner  
Director of Inspectional Services

---

June 21, 2023

Mr. David Walsh  
85 Rangeway Road  
Building 3-Suite 102  
Billerica, Massachusetts 01862

**RE: 25 Brown Street / Map 56, Lot 1000 A**

Mr. Walsh,

I have reviewed your Building Permit application B-23-335, submitted June 5, 2023 with a description of work stating "Extent existing 150' communications tower by 10' to a new structure height of 160' (overall height with antennas will be 163'). On extension install (6) panel antenna's, (12) radios and 1 new cable demarcation unit. On grade with the existing fenced compound an 8'x8' walk in equipment shelter on a concrete pad and a 20KW diesel backup generator for emergency power." located at 25 Brown Street, Wareham, Massachusetts. At this time I must deny your request.

Your application is being denied under the following section of the Wareham Zoning By-Laws:

**Article 5 Supplemental Regulations;**

**540 Wireless Communications Facilities, 542.2**

Any proposed extension in the height or construction of a new or replacement facility, or additional appurtenances, shall be subject to a new application.

**543 General Requirements, 543.2**

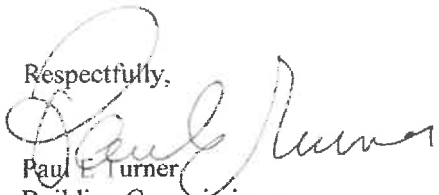
All towers shall be set back a distance at least equal to the height of the tower from all property lines.

The proposed extension to the tower's height increases its fall zone resulting in an encroachment to all of its abutter's. To the north, map 56, lot 1000B, to the east, map 56, lot 1001A and to the southwest, the public way know as Brown Street.

Therefore, a **Special Permit** must be secured from the Zoning Board of Appeals in order to proceed with your application.

The subject dwelling is located in **M-R30** zoning district.

Respectfully,



Paul E. Turner  
Building Commissioner  
Zoning Enforcement Officer

**It is the owners' responsibility to check with other departments to ensure full compliance.**

**In accordance with the provisions of MGL chapter 40A §§ 15, you may apply to the Zoning Board of Appeals for the above noted relief within thirty (30) days of receipt of this letter.**



THE COMMONWEALTH OF MASSACHUSETTS

Wareham

City or Town of Wareham

BOARD OF APPEALS

Petition No.: 20-15

Book: Page:

Date: November 3, 2015

Certificate of Granting of ~~Variance~~ Special Permit  
(General Laws Chapter 40A, Section 11)

The Board of Appeals of the City or Town of Wareham hereby certifies that a ~~Variance~~ Special Permit has been granted:

To: Industrial Tower & Wireless, LLC

Address:  
40 Lone Street

City or Town:  
Marshfield, MA 02050

Affecting the rights of the owner with respect to land or buildings at Assessors Map 56 -

Lot 1000A - Brown Street (formally a part of 242 Marion Road,  
Wareham, MA 02571

The Board of Appeals certifies that the decision attached hereto is a true and correct copy of its decision to grant a special permit - variance and that copies of said decision, and of all plans referred to in the decision, have been filed with the ZBA, Conservation Commission, and the Town Clerk.

The Board of Appeals also calls to the attention of the owner or applicant that General Laws, Chapter 40A, Section 11 provides that no special permit, or any extension, modification or renewal thereof, shall take effect until a copy of the decision bearing the certification of the Town Clerk that twenty days have elapsed after the decision has been filed in the office of the Town Clerk and no appeal has been filed or that, if such appeal has been filed, that it has been dismissed or denied, is recorded in the Registry of Deeds for the county and district in which the land is located and indexed in the grantor index under the name of the owner of record or is recorded and noted on the owner's certificate of title. The owner or applicant shall pay the fee for such recording or registering. A copy of the registered decision shall be returned to the Board of Appeals as proof of filing.

Any person aggrieved by this decision may appeal to the Superior Court of Land Court as in Section 17 of Chapter 40A, M.G.L. by filing a NOTICE OF ACTION AND COMPLAINT within twenty (20) days of the date of filing of this decision.

  
Chairman

Clerk







March 24, 2023

Tom Lennon  
Industrial Communications  
40 Lone Street  
Marshfield, MA 02050  
(781) 319-1012



Tower Engineering Professionals  
326 Tryon Road  
Raleigh, NC 27603  
(919) 661-6351  
[Structures@tepgroup.net](mailto:Structures@tepgroup.net)

**Subject: Structural Analysis Report**

**Carrier Designation:** **AT&T Mobility Reconfiguration**  
**Carrier Site Number:** MA1883S  
**Carrier Site Name:** Wareham  
**FA Location Code:** 15283436

**Client Designation:** **Site Number:** N/A  
**Site Name:** Wareham, MA

**Engineering Firm Designation:** **TEP Project Number:** 75332.828773

**Site Data:** **25 Brown Street, Wareham, Plymouth County, MA 02571**  
**Latitude 41° 45' 11.70", Longitude -70° 43' 57.00"**  
**160± Foot - Self-Support Tower**

Dear Tom Lennon,

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

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

LC2: Existing + Proposed + Reserved Loading with Proposed Modifications  
Note: See Table 1 for the existing, proposed, and reserved loading

**Sufficient Capacity**

Structure Capacity	Foundation Capacity
75.8%	55.9%

The analysis has been performed in accordance with the ANSI/TIA-222-G-2-2009 Structural Standard for Antenna Supporting Structures and Antennas – Addendum 2 and the Massachusetts State Building Code, 9<sup>th</sup> Edition.

All modifications and equipment proposed in this report shall be installed in accordance with the appurtenances listed in Table 1 and the attached drawings for the determined available structural capacity to be effective.

We at *Tower Engineering Professionals* appreciate the opportunity of providing our continuing professional services to you and *Industrial Communications*. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Peter J. Laird / AEW

Respectfully submitted by:

Ronald E. Glover, P.E., S.E.



03/24/2023

## TABLE OF CONTENTS

### 1) INTRODUCTION

### 2) ANALYSIS CRITERIA

Table 1 - Existing, Proposed, and Reserved Antenna and Cable Information

### 3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

### 4) ANALYSIS RESULTS

Table 3 - Section Capacity (Summary)

Table 4 - Tower Component Stresses vs. Capacity

Table 5 - Dish Twist/Sway Results for 60 mph Service Wind Speed

4.1) Recommendations

### 5) APPENDIX A

tnxTower Output

### 6) APPENDIX B

Additional Calculations

## 1) INTRODUCTION

The tower is a 150± Foot Self-Support Tower designed by Valmont in December of 2015. A proposed 10-ft tower extension has been considered in this analysis, increasing the overall height of the tower to 160-ft. The tower was originally designed for a 3-second gust wind speed of 157 mph with no ice, 40 mph with 1.25 inch radial ice thickness and 60 mph under service loads using Structure Class III, Exposure Category C, and Topographic Category 1 per ANSI/TIA-222-G. All information provided to TEP was assumed to be accurate and complete.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	ANSI/TIA-222-G-2-2009
<b>Type of Analysis:</b>	Rigorous
<b>Risk Category:</b>	III
<b>Wind Speed:</b>	149 mph (Ultimate)
<b>Exposure Category:</b>	C
<b>Topographic Category:</b>	1 (Kzt = 1.0)
<b>Ice Thickness:</b>	0.75 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Seismic Design Category:</b>	C
<b>Seismic Ss:</b>	0.173
<b>Seismic S1:</b>	0.059
<b>Service Wind Speed:</b>	60 mph

Table 1 - Existing, Proposed, and Reserved Antenna and Cable Information

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
<b>Proposed</b>	<b>159.0</b>	<b>159.0</b>	<b>3</b>	<b>CCI TPA65R-BU8DA-K</b>	<b>(3) Site Pro 1 VFA12-WLL- 30120</b>	<b>3 1</b>	<b>DC Fiber</b>	<b>AB Face</b>	<b>AT&amp;T</b>
			<b>3</b>	<b>CCI DMP65R-BU8DA-K</b>					
			<b>3</b>	<b>Ericsson 4478 B14</b>					
			<b>3</b>	<b>Ericsson 4449 B5-B12</b>					
			<b>3</b>	<b>Ericsson 8843 B2/B66A</b>					
			<b>1</b>	<b>Raycap DC9-48-60-24-8C-EV</b>					
<b>Reserved</b>	<b>159.0</b>	<b>159.0</b>	<b>3</b>	<b>Ericsson 4415 B30</b>					
<b>Existing</b>	<b>148.0</b>	<b>148.0</b>	<b>3</b>	<b>NL Sub6 Antenna</b>	<b>(3) Sector Mounts</b>	<b>3</b>	<b>6x12 Hybrid</b>	<b>CA Face</b>	<b>Verizon</b>
			<b>3</b>	<b>Samsung B2/B66a RRH BR049</b>					
			<b>3</b>	<b>Samsung B5/B13 RRH BR04C</b>					
			<b>3</b>	<b>VZS01</b>					
			<b>4</b>	<b>Commscope SBNHH-1D45B</b>					
			<b>2</b>	<b>Commscope SBNHH-1D85C</b>					
			<b>2</b>	<b>Raycap DB-B1-6C-12AB-0Z</b>					

**Table 1 - Existing, Proposed, and Reserved Antenna and Cable Information - Continued**

Existing/ Proposed/ Reserved	Mount Level (ft)	Ant CL (ft)	Qty	Antenna Model	Mount Type	Qty Coax	Coax Size	Coax Location	Owner/ Tenant
Existing	140.0	140.0	3	Ericsson AIR32 KRD901146-1 B66A B2A	(3) Sector Mounts	4	6x12 Hybrid	BC Face	T-Mobile
			3	Ericsson AIR6449 B41					
			3	RFS APXVAARR24 43-U-NA20					
			3	Ericsson Radio 4449 B71+B85					
			3	Ericsson RRUS11 B4					
			3	Ericsson RRUS 4415 B25					
			3	Microdata MI-54131 Diplexer					
Existing	129.0	129.0	6	JMA MX08FRO665-21	(3) Commscope MTC3975083	2	Hybrid	AB Face	Dish
			6	Fujitsu TA8025-B605					
			6	Fujitsu TA8025-B604					
			2	Raycap RDIDC-9181-PF-48					

### 3) ANALYSIS PROCEDURE

**Table 2 - Documents Provided**

Document	Remarks	Source
Tower and Foundation Design	Valmont, dated December 4, 2015 Dwg. No. 260865T	Industrial Comm.
Geotechnical Report	R.W. Gillespie & Associates, Inc., dated August 25, 2015 Project No. 0379-113	Industrial Comm.
Structural Modification Analysis	Tower Engineering Professionals, dated April 7, 2022 TEP Project No. 75332.680284	TEP
Engineering Letter	Tower Engineering Professionals, Inc., dated December 15, 2022 TEP Project No. 75332.797322	TEP
Construction Drawings	Trylon, dated February 27, 2023	Industrial Comm.
Mount Analysis	Trylon, dated March 15, 2023 Project No. 203685	Industrial Comm.
Correspondence	Correspondence in reference to the existing, proposed, and reserved loading.	Industrial Comm.

#### 3.1) Analysis Method

tnxTower (version 8.1.1.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

### 3.2) Analysis Assumptions

- 1) The tower and foundation were built and maintained in accordance with the manufacturer's specification.
- 2) Unless specified by the client or tower mapping, the location of the existing and proposed coax is assumed by TEP and listed in Table 1.
- 3) All tower components are in sufficient condition to carry their full design capacity.
- 4) Serviceability with respect to antenna twist, tilt, roll, or lateral translation, is not checked and is left to the carrier or tower owner to ensure conformance.
- 5) All antenna mounts and mounting hardware are structurally sufficient to carry the full design capacity requirements of appurtenance wind area and weight as provided by the original manufacturer specifications. It is the carrier's responsibility to ensure compliance to the structural limitations of the existing and/or proposed antenna mounts. TEP did not perform a site visit to verify the size, condition or capacity of the antenna mounts and did not analyze antennas supporting mounts as part of this structural analysis report.

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

### 4) ANALYSIS RESULTS

**Table 3 - Section Capacity (Summary)**

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	øP <sub>allow</sub> (K)	% Capacity	Pass / Fail
T1	160 - 150	Leg	Valmont 196994 - 10-ft Section	3	-7483.23	145979.00	59.2	Pass
T2	150 - 140	Leg	Valmont 196994 (10-ft   58ksi)	15	-25889.00	165942.00	43.9	Pass
T3	140 - 120	Leg	Valmont 194434	27	-87373.60	166292.00	52.5	Pass
T4	120 - 100	Leg	Valmont 194651	42	-151074.00	248431.00	60.8	Pass
T5	100 - 80	Leg	Valmont 195213	57	-209721.00	347961.00	60.3	Pass
T6	80 - 60	Leg	Valmont 195637	72	-246093.00	401936.00	61.2	Pass
T7	60 - 40	Leg	Valmont 195960	81	-300300.00	508981.00	59.0	Pass
T8	40 - 20	Leg	Valmont 195962	90	-349937.00	628758.00	55.7	Pass
T9	20 - 0	Leg	Valmont 195964	99	-393691.00	628758.00	62.6	Pass
T1	160 - 150	Diagonal	L2 1/2x2 1/2x3/16	12	-5247.08	12259.40	42.8 45.4 (b)	Pass
T2	150 - 140	Diagonal	L2 1/2x2 1/2x3/16	23	-8299.81	10949.10	75.8	Pass
T3	140 - 120	Diagonal	L3x3x5/16	33	-13018.60	23616.10	55.1 65.7 (b)	Pass
T4	120 - 100	Diagonal	L3 1/2x3 1/2x5/16	48	-12308.40	30260.70	40.7 48.4 (b)	Pass
T5	100 - 80	Diagonal	L3 1/2x3 1/2x5/16	61	-12035.00	24882.90	48.4	Pass
T6	80 - 60	Diagonal	2L3 1/2x3 1/2x1/4x1/2	75	-18997.30	41714.90	45.5 60.4 (b)	Pass
T7	60 - 40	Diagonal	2L3 1/2x3 1/2x1/4x1/2	84	-17791.90	37782.20	47.1 58.2 (b)	Pass
T8	40 - 20	Diagonal	2L3 1/2x3 1/2x1/4x1/2	93	-16611.40	34156.40	48.6 57.7 (b)	Pass
T9	20 - 0	Diagonal	2L3 1/2x3 1/2x1/4x1/2	102	-19746.80	30862.80	64.0	Pass
T1	160 - 150	Top Girt	L3x3x3/16	5	-1065.80	19238.00	5.5 7.5 (b)	Pass
T2	150 - 140	Top Girt	L3x3x3/16	18	-460.43	17167.80	2.7 4.4 (b)	Pass

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	$\phi P_{allow}$ (K)	% Capacity	Pass / Fail
							Summary	
							Leg (T9)	62.6 Pass
							Diagonal (T2)	75.8 Pass
							Top Girt (T1)	7.5 Pass
							Bolt Checks	74.9 Pass
							<b>RATING =</b>	<b>75.8 Pass</b>

**Table 4 - Tower Component Stresses vs. Capacity**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	-	44.0	Pass
1	Base Foundation Structural	-	48.3	Pass
1	Base Foundation Soil Interaction	-	55.9	Pass

<b>Structure Rating (max from all components) =</b>	<b>75.8%</b>
-----------------------------------------------------	--------------

Notes:

- 1) See additional documentation in "Appendix B - Additional Calculations" for calculations supporting the % capacity listed.

**Table 5 - Dish Twist/Sway Results for 60 mph Service Wind Speed**

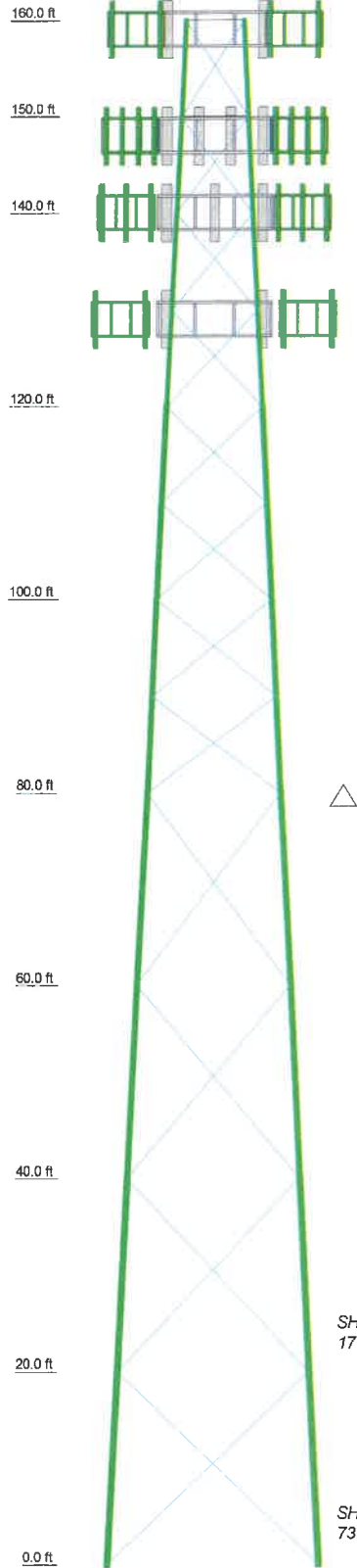
Elevation (ft)	Dish Model	Beam Deflection		
		Deflection (in)	Tilt (deg)	Twist (deg)
-	-	-	-	-

**4.1) Recommendations**

- 1) If the load differs from that described in Table 1 of this report or the provisions of this analysis are found to be invalid, another structural analysis should be performed.
- 2) The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

**APPENDIX A**  
**TNX TOWER OUTPUT**

Section	19	16	17	18	15	14	13	12	T1
Legs	Valmont 195954	Valmont 195962	Valmont 195960	Valmont 195637	Valmont 195213	Valmont 194651	Valmont 194434	B	A
Leg Grade				A572-58				L2 1/2x2 1/2x3/16	A572-50
Diagonals		2L3 1/2x3 1/2x1/4x1/2			L3 1/2x3 1/2x5/16				
Diagonal Grade				A36					
Top Girts				N.A.					
Face Width (ft)	20	18	16	14	12	10	8	7	6
# Panels @ (ft)		4 @ 20				8 @ 10			
Weight (lb)	58102	5779	50148	40913	35841	30913	26860	6849	9721



**SYMBOL LIST**

MARK	SIZE	MARK	SIZE
A	Valmont 196994 - 10-ft Section	B	Valmont 196994 (10-ft   58ksi)

**MATERIAL STRENGTH**

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A572-58	58 ksi	75 ksi
A36	36 ksi	58 ksi			

**TOWER DESIGN NOTES**

1. Tower is located in Plymouth County, Massachusetts.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 149 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 0.75 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category III and IV.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 75.8%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:

DOWN: 418501 lb  
SHEAR: 46480 lb


UPLIFT: -368376 lb  
SHEAR: 41739 lb



TORQUE 15081 lb-ft  
50 mph WIND - 0.750 in ICE



TORQUE 49137 lb-ft  
REACTIONS - 149 mph WIND

 Tower Engineering Professionals, Inc.	<b>Tower Engineering Professionals, Inc.</b>		Job: <b>Wareham, MA</b>
	326 Tryon Road		Project: <b>TEP No. 75332.828773</b>
	Raleigh, NC 27603		Client: Industrial Communications
	Phone: (919) 661-6351		Drawn by: Peter Laird
	FAX: (919) 661-6350		Date: 03/24/23
			App'd: _____
			Scale: NTS
			Dwg No. E-1



<b>inxTower</b>	Wareham, MA	Page 1 of 22
<b>Tower Engineering Professionals, Inc.</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Project TEP No. 75332.828773	Date 14:42:30 03/24/23
Client Industrial Communications	Designed by Peter Laird	

### Tower Input Data

The main tower is a 3x free standing tower with an overall height of 160.00 ft. above the ground line. The base of the tower is set at an elevation of 0.00 ft above the ground line. The face width of the tower is 6.00 ft at the top and 22.00 ft at the base. This tower is designed using the TIA-222-G standard. The following design criteria apply:

Tower is located in Plymouth County, Massachusetts.

ASCE 7-10 Wind Data is used.

Basic wind speed of 149 mph

Risk Category III and IV.

Exposure Category C.

Topographic Category I.

Crest Height 0.00 ft.

Nominal ice thickness of 0.750 in.

Ice thickness is considered to increase with height.

Ice density of 56 pcf.

A wind speed of 50 mph is used in combination with ice.

Temperature drop of 50 °p.

Deflections calculated using a wind speed of 60 mph.

Pressures are calculated at each section.

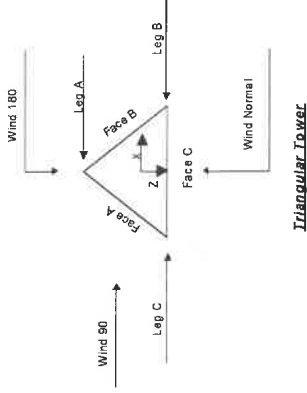
Stress ratio used in tower member design is 1.

Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

### Options

- Consider Moments - Legs
- Consider Moments - Diagonals
- Use Moment Magnification
- Use Code Stress Ratios
- Use Code Safety Factors - Guys
- Escalate Ice
- Always Use Max K<sub>r</sub>
- Use Special Wind Profile
- Include Bolts in Member Capacity
- Leg Bolts Are At Top Of Section
- Secondary Horizontal Braces Leg
- SR Members Have Cut Ends
- SR Members Are Concave
- Distribute Leg Loads As Uniform
- Assume Legs Pinned
- Assume Rigid Joints
- Use Clear Spans For Wind Area
- Return Guy's To Initial Tension
- Bypass Mast Stability Checks
- Use Azimuth Dash Coefficients
- Project Wind Area of Appurt.
- Allocate Torque Arm Areas
- Add IRC 6D-BW Combination
- Short Capacity Reports By Component
- Triangulate Diagonal Inner Bracing
- Pinned In The Joints (A/C Under
- Ignore K<sub>r</sub>/r For 60 Deg. Angle Legs
- Use ASCE 10 X-Brace Ly Rules
- Calculate Redundant Bracing Forces
- Ignore Redundant Members in FEA
- SR Leg Bolts Resist Compression
- All Leg Panels Have Same Allowable
- Offset Gut At Foundation
- Consider Feed Line Torque
- Include Angle Block Shear Check
- Use TIA-222-G Bracing Resist. Exemption
- Use TIA-222-G Tension Splice Exemption
- Poles
- Include Shear-torsion Interaction
- Always Use Sub-Critical Flow
- Use Appurtenance Sockets
- Pole With Shear-Ly Not Appurtenances
- Outside and Inside Corner Radii Are Known

<b>inxTower</b>	Wareham, MA	Page 2 of 22
<b>Tower Engineering Professionals, Inc.</b> 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350	Project TEP No. 75332.828773	Date 14:42:30 03/24/23
Client Industrial Communications	Designed by Peter Laird	



Triangular Tower

### Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	160.00-150.00			6.00	1	10.00
T2	150.00-140.00			7.00	1	10.00
T3	140.00-120.00			8.00	1	20.00
T4	120.00-100.00			10.00	1	20.00
T5	100.00-80.00			12.00	1	20.00
T6	80.00-60.00			14.00	1	20.00
T7	60.00-40.00			16.00	1	20.00
T8	40.00-20.00			18.00	1	20.00
T9	20.00-0.00			20.00	1	20.00

### Tower Section Geometry (cont'd)

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	U-Brace K-Factor	Har. Horizontals	Har. Top Gut Offset	Bottom Gut Offset
	ft	ft				in	in
T1	160.00-150.00	10.00		No	No	0.000	0.000
T2	150.00-140.00	10.00	X Brace	No	No	0.000	0.000
T3	140.00-120.00	10.00	X Brace	No	No	0.000	0.000
T4	120.00-100.00	10.00	X Brace	No	No	0.000	0.000
T5	100.00-80.00	10.00	X Brace	No	No	0.000	0.000
T6	80.00-60.00	20.00	X Brace	No	No	0.000	0.000



<b>tnxTower</b>		Wareham, MA		Page	5 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project TEP No. 75332.828773		Date	14:42:30 03/24/23
Client Industrial Communications		Designed by Peter Laird			

Tower Elevation ft	Leg Connection Type	Leg Panels	X Brace Diagonals	Z Brace Diagonals	X Brace Diagonals	Z Brace Diagonals
T1	Flange	1	0.5	0.7	0.5	0.85
T2	Flange	1	0.5	0.7	0.5	0.85
T3	Flange	1	0.5	0.7	0.5	0.85
T4	Flange	1	0.5	0.7	0.5	0.85
T5	Flange	1	0.5	0.7	0.5	0.85
T6	Flange	1	0.5	0.7	0.5	0.85
T7	Flange	1	0.5	0.7	0.5	0.85
T8	Flange	1	0.5	0.7	0.5	0.85
T9	Flange	1	0.5	0.7	0.5	0.85

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Diagonal		Top Chord		Bottom Chord		Mid Chord		Long Horizontal		Short Horizontal	
		Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct
T1	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T2	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T3	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T4	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T5	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T6	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T7	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T8	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T9	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000

<b>tnxTower</b>		Wareham, MA		Page	6 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project TEP No. 75332.828773		Date	14:42:30 03/24/23
Client Industrial Communications		Designed by Peter Laird			

Tower Elevation ft	Leg Connection Type	Redundant Horizontal		Redundant Diagonal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
		Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct
T4	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T5	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T6	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T7	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T8	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75
T9	Flange	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75

**Tower Section Geometry (cont'd)**

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Chord		Bottom Chord		Mid Chord		Long Horizontal		Short Horizontal	
		Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct	Net Width in	U/Deduct
T1	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T2	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T3	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T4	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T5	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T6	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T7	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T8	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000
T9	Flange	1.000	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000	0.75	0.000

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Clearance	Shield	Flange	Radius	Conductor	Placement	Face	Offset	Clearance	Per Spacing	Clearance	Perimeter	Weight
12" Waveguide	B	No	No	A1(CaAa)	129.00 - 0.000	0	0	1	1	0.300	4.800		7.66
06" Shielded Soley Line 3/8" ****	A	No	No	A1(CaAa)	160.00 - 0.000	0.5	1	1	1	0.375	0.375		0.22
Real 1.1 3/4" x	A	No	No	A1(CaAa)	130.00 - 0.000	0	2	2	2	38.000	1.750		1.06



<b>inxTower</b>		Job	Wareham, MA	Page	9 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

<b>inxTower</b>		Job	Wareham, MA	Page	10 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

### Feed Line Center of Pressure

Section	Height	C <sub>Px</sub>	C <sub>Py</sub>	C <sub>Pz</sub>	C <sub>Px</sub>	C <sub>Py</sub>	C <sub>Pz</sub>
T1	160.00-150.00	1.653	-5.376	4.631	0.6000	0.6000	0.6000
T2	150.00-140.00	0.717	-7.763	0.961	0.6000	0.6000	0.6000
T3	140.00-130.00	1.942	-8.529	2.107	0.6000	0.6000	0.6000
T4	130.00-120.00	3.334	-9.815	3.695	0.6000	0.6000	0.6000
T5	100.00-80.00	3.668	-10.893	4.272	0.6000	0.6000	0.6000
T6	80.00-60.00	4.411	-13.035	5.010	0.6000	0.6000	0.6000
T7	60.00-40.00	4.777	-14.157	5.483	0.6000	0.6000	0.6000
T8	40.00-20.00	5.110	-15.182	5.914	0.6000	0.6000	0.6000
T9	20.00-0.00	5.105	-15.274	5.834	0.6000	0.6000	0.6000

### Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T1	4	Safety Line 3/8"	150.00 - 160.00	0.6000	0.6000
T1	10	Rail 1.1 3/4 x 3/4 x 1/8"	150.00 - 160.00	0.6000	0.6000
T1	11	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	160.00 - 180.00	0.6000	0.6000
T1	19	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	180.00 - 200.00	0.6000	0.6000
T1	20	3/8" Fiber Cable	159.00 - 160.00	0.6000	0.6000
T2	4	Safety Line 3/8"	150.00 - 160.00	0.6000	0.6000
T2	6	Rail 1.1 3/4 x 3/4 x 1/8"	150.00 - 160.00	0.6000	0.6000
T2	7	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	160.00 - 180.00	0.6000	0.6000
T2	8	Rail 1.1 3/4 x 3/4 x 1/8"	180.00 - 190.00	0.6000	0.6000
T2	9	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	190.00 - 200.00	0.6000	0.6000
T2	10	Rail 1.1 3/4 x 3/4 x 1/8"	200.00 - 210.00	0.6000	0.6000
T2	11	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	210.00 - 220.00	0.6000	0.6000
T2	13	IICS 6X12 6AWG(1-3/8)	140.00 - 160.00	0.6000	0.6000
T2	19	5/8" DC	140.00 - 160.00	0.6000	0.6000
T2	20	3/8" Fiber Cable	140.00 - 160.00	0.6000	0.6000
T3	3	12" Waveguide 0% Shielded	120.00 - 130.00	0.6000	0.6000
T3	4	Safety Line 3/8"	120.00 - 130.00	0.6000	0.6000
T3	6	Rail 1.1 3/4 x 3/4 x 1/8"	120.00 - 130.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K <sub>a</sub> No Ice	K <sub>a</sub> Ice
T3	7	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	140.00 - 150.00	0.6000	0.6000
T3	8	Rail 1.1 3/4 x 3/4 x 1/8"	150.00 - 160.00	0.6000	0.6000
T3	9	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	160.00 - 170.00	0.6000	0.6000
T3	10	Rail 1.1 3/4 x 3/4 x 1/8"	170.00 - 180.00	0.6000	0.6000
T3	11	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	180.00 - 190.00	0.6000	0.6000
T3	13	IICS 6X12 6AWG(1-3/8)	140.00 - 160.00	0.6000	0.6000
T3	15	IICS 6X12 4AWG(1-5/8")	120.00 - 130.00	0.6000	0.6000
T3	17	1 5/8" Hybrid Cable	120.00 - 130.00	0.6000	0.6000
T3	19	5/8" DC	120.00 - 130.00	0.6000	0.6000
T3	20	3/8" Fiber Cable	120.00 - 130.00	0.6000	0.6000
T4	3	12" Waveguide 0% Shielded	100.00 - 110.00	0.6000	0.6000
T4	4	Safety Line 3/8"	100.00 - 110.00	0.6000	0.6000
T4	6	Rail 1.1 3/4 x 3/4 x 1/8"	100.00 - 110.00	0.6000	0.6000
T4	7	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	110.00 - 120.00	0.6000	0.6000
T4	8	Rail 1.1 3/4 x 3/4 x 1/8"	120.00 - 130.00	0.6000	0.6000
T4	9	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	130.00 - 140.00	0.6000	0.6000
T4	10	Rail 1.1 3/4 x 3/4 x 1/8"	140.00 - 150.00	0.6000	0.6000
T4	11	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	150.00 - 160.00	0.6000	0.6000
T4	13	IICS 6X12 6AWG(1-3/8)	100.00 - 120.00	0.6000	0.6000
T4	15	IICS 6X12 4AWG(1-5/8")	120.00 - 130.00	0.6000	0.6000
T4	17	1 5/8" Hybrid Cable	120.00 - 130.00	0.6000	0.6000
T4	19	5/8" DC	120.00 - 130.00	0.6000	0.6000
T4	20	3/8" Fiber Cable	120.00 - 130.00	0.6000	0.6000
T5	3	12" Waveguide 0% Shielded	80.00 - 90.00	0.6000	0.6000
T5	4	Safety Line 3/8"	80.00 - 90.00	0.6000	0.6000
T5	6	Rail 1.1 3/4 x 3/4 x 1/8"	80.00 - 90.00	0.6000	0.6000
T5	7	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	90.00 - 100.00	0.6000	0.6000
T5	8	Rail 1.1 3/4 x 3/4 x 1/8"	100.00 - 110.00	0.6000	0.6000
T5	9	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	110.00 - 120.00	0.6000	0.6000
T5	10	Rail 1.1 3/4 x 3/4 x 1/8"	120.00 - 130.00	0.6000	0.6000
T5	11	Rung C 1.3/4x13/6x1/8 (3/8 25" Wide, 40" Step)	130.00 - 140.00	0.6000	0.6000
T5	13	IICS 6X12 6AWG(1-3/8)	80.00 - 100.00	0.6000	0.6000
T5	15	IICS 6X12 4AWG(1-5/8")	100.00 - 110.00	0.6000	0.6000
T5	17	1 5/8" Hybrid Cable	100.00 - 110.00	0.6000	0.6000
T5	19	5/8" DC	100.00 - 110.00	0.6000	0.6000
T5	20	3/8" Fiber Cable	100.00 - 110.00	0.6000	0.6000





<b>mxTower</b>		Wareham, MA		Page 15 of 22	
Tower Engineering Professionals, Inc. 326 From Road Wareham, MA 02703 Phone: (919) 601-6531 FAX: (919) 601-6530		Project TEP No. 75332.828773		Date 14:42:30 03/24/23	
Client Industrial Communications		Designed by Peter Laird			

Description	Face or Leg	Offset Type	Offset Horiz	Offset Vert	Amuth Adjustment	Placement	C-1, Front	C-1, Side	Weight
			ft	ft	ft		ft	ft	lb
RRUS 1114	C	From Leg	0.00	0.00	-20.000	140.00	3.00	1.34	71.57
							3.21	1.50	95.48
							No Ice		50.70
							12" Ice		71.57
RAD10 4449 B71/B85A	A	From Leg	0.00	0.00	-10.000	140.00	3.21	1.50	95.48
							1.86	1.31	63.90
							12" Ice		92.22
RAD10 4449 B71/B85A	B	From Leg	0.00	0.00	10.000	140.00	1.97	1.61	113.19
							1.64	1.31	74.95
							12" Ice		92.22
RAD10 4449 B71/B85A	C	From Leg	0.00	0.00	-20.000	140.00	1.97	1.61	112.19
							1.80	1.46	92.22
							12" Ice		112.19
RRUS 4415 B25	A	From Leg	0.00	0.00	-10.000	140.00	1.64	0.68	44.00
							1.80	0.79	56.43
							12" Ice		64.00
RRUS 4415 B25	B	From Leg	0.00	0.00	10.000	140.00	1.64	0.68	44.00
							1.80	0.79	56.43
							12" Ice		64.00
RRUS 4415 B25	C	From Leg	0.00	0.00	-20.000	140.00	1.64	0.68	44.00
							1.80	0.79	56.43
							12" Ice		64.00
MI-54131	A	From Leg	0.00	0.00	-10.000	140.00	0.29	0.11	7.39
							0.36	0.15	10.27
							12" Ice		14.35
MI-54131	B	From Leg	0.00	0.00	10.000	140.00	0.29	0.11	7.39
							0.36	0.15	10.27
							12" Ice		14.35
MI-54131	C	From Leg	0.00	0.00	-20.000	140.00	0.29	0.11	7.39
							0.36	0.15	10.27
							12" Ice		14.35
Shower Mount (SM S02-3)	C	None	0.00	0.00	0.000	140.00	29.82	29.82	1673.30
							42.21	42.21	2266.26
							54.43	54.43	3051.51
***									
(2) MX08FR0665-21 w/ Mount Pipe	A	From Leg	4.00	0.00	0.000	129.00	12.71	7.43	90.05
							13.13	8.72	102.15
							13.89	9.62	113.19
(2) MX08FR0665-21 w/ Mount Pipe	B	From Leg	4.00	0.00	0.000	129.00	12.71	7.43	90.05
							13.13	8.72	102.15
							13.89	9.62	113.19
(2) MX08FR0665-21 w/ Mount Pipe	C	From Leg	4.00	0.00	0.000	129.00	12.71	7.43	90.05
							13.13	8.72	102.15
							13.89	9.62	113.19
(2) TA08025-3605	A	From Leg	0.00	0.00	0.000	129.00	1.96	1.13	75.00
							2.14	1.27	92.97
							2.32	1.41	117.72
(2) TA08025-3605	B	From Leg	0.00	0.00	0.000	129.00	1.96	1.13	75.00
							2.14	1.27	92.97
							2.32	1.41	117.72
(2) TA08025-3605	C	From Leg	0.00	0.00	0.000	129.00	1.96	1.13	75.00
							2.14	1.27	92.97
							2.32	1.41	117.72
(2) TA08025-3604	A	From Leg	0.00	0.00	0.000	129.00	1.96	0.98	63.90
							2.14	1.11	80.65
							2.32	1.25	100.10

<b>mxTower</b>		Wareham, MA		Page 16 of 22	
Tower Engineering Professionals, Inc. 326 From Road Wareham, MA 02703 Phone: (919) 601-6531 FAX: (919) 601-6530		Project TEP No. 75332.828773		Date 14:42:30 03/24/23	
Client Industrial Communications		Designed by Peter Laird			

Description	Face or Leg	Offset Type	Offset Horiz	Offset Vert	Amuth Adjustment	Placement	C-1, Front	C-1, Side	Weight
			ft	ft	ft		ft	ft	lb
(2) TA08025-3604	B	From Leg	4.00	0.00	0.000	129.00	1.96	0.98	63.90
							2.14	1.11	80.65
							2.32	1.25	100.10
(2) TA08025-3604	C	From Leg	4.00	0.00	0.000	129.00	1.96	0.98	63.90
							2.14	1.11	80.65
							2.32	1.25	100.10
RDDTC-9181-PP-48	A	From Leg	0.00	0.00	0.000	129.00	2.19	1.31	218.55
							2.37	1.46	239.53
							2.57	1.66	259.97
RDDTC-9181-PP-48	B	From Leg	0.00	0.00	0.000	129.00	2.19	1.31	218.55
							2.37	1.46	239.53
							2.57	1.66	259.97
Commscope MTC3975083 (3)	C	None	0.00	0.00	0.000	129.00	23.85	23.85	1260.00
							34.12	34.12	1803.00
							44.39	44.39	2346.00
***									
****									

### Truss-Leg Properties

Section Designation	Area	Self Weight	Ice Weight	Equip. Diameter	Equip. Diameter	Leg Area
	in <sup>2</sup>	lb	lb	in	in	in <sup>2</sup>
Valmont 1909994 - 10-ft Section	870.289	3052.793	446.74	923.30	6.044	21.200
Valmont 1909994 - 10-ft Section	870.289	3047.397	446.74	912.68	6.044	21.164
Valmont 1909994 - 10-ft Section	1799.706	6090.786	455.13	1939.50	6.228	21.148
Valmont 1909994 - 10-ft Section	1911.952	6179.652	455.13	2072.95	6.228	21.148
Valmont 1909994 - 10-ft Section	2034.959	6270.779	455.13	2216.90	6.228	21.148
Valmont 1909994 - 10-ft Section	2178.712	6375.615	455.13	2371.35	6.228	21.148
Valmont 1909994 - 10-ft Section	2314.648	6494.264	455.13	2537.30	6.228	21.148
Valmont 1909994 - 10-ft Section	2454.943	6626.717	455.13	2714.75	6.228	21.148
Valmont 1909994 - 10-ft Section	2654.943	6883.160	455.13	2903.70	6.228	21.148
Valmont 1909994 - 10-ft Section	2854.943	7153.593	455.13	3104.15	6.228	21.148

### Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 dir - No Ice
3	0.9 Dead+1.6 Wind 0 dir - No Ice
4	1.2 Dead+1.0 Wind 30 dir - No Ice
5	0.9 Dead+1.0 Wind 30 dir - No Ice
6	1.2 Dead+1.0 Wind 60 dir - No Ice
7	0.9 Dead+1.0 Wind 60 dir - No Ice
8	1.2 Dead+1.0 Wind 90 dir - No Ice



<b>mxTower</b>		Job	Wareham, MA	Page	17 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6231 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

<b>mxTower</b>		Job	Wareham, MA	Page	18 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6231 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

Description

Comb. No.	Description	Elevation ft.	Horz. Deflection in.	Max. Load C/comb.	Tilt	Twist
9	1.9 Dead+1.0 Wind 90 deg. - No Ice					
10	1.2 Dead+1.0 Wind 120 deg. - No Ice					
11	0.9 Dead+1.0 Wind 150 deg. - No Ice					
12	1.3 Dead+1.0 Wind 180 deg. - No Ice					
13	0.9 Dead+1.0 Wind 150 deg. - No Ice					
14	1.2 Dead+1.0 Wind 120 deg. - No Ice					
15	0.9 Dead+1.0 Wind 90 deg. - No Ice					
16	1.2 Dead+1.0 Wind 60 deg. - No Ice					
17	0.9 Dead+1.0 Wind 30 deg. - No Ice					
18	1.2 Dead+1.0 Wind 0 deg. - No Ice					
19	0.9 Dead+1.0 Wind 30 deg. - No Ice					
20	1.2 Dead+1.0 Wind 60 deg. - No Ice					
21	0.9 Dead+1.0 Wind 90 deg. - No Ice					
22	1.2 Dead+1.0 Wind 120 deg. - No Ice					
23	0.9 Dead+1.0 Wind 150 deg. - No Ice					
24	1.2 Dead+1.0 Wind 180 deg. - No Ice					
25	0.9 Dead+1.0 Wind 150 deg. - No Ice					
26	1.2 Dead+1.0 Wind 120 deg. - No Ice					
27	0.9 Dead+1.0 Wind 90 deg. - No Ice					
28	1.2 Dead+1.0 Wind 60 deg. - No Ice					
29	0.9 Dead+1.0 Wind 30 deg. - No Ice					
30	1.2 Dead+1.0 Wind 0 deg. - No Ice					
31	0.9 Dead+1.0 Wind 30 deg. - No Ice					
32	1.2 Dead+1.0 Wind 60 deg. - No Ice					
33	0.9 Dead+1.0 Wind 90 deg. - No Ice					
34	1.2 Dead+1.0 Wind 120 deg. - No Ice					
35	0.9 Dead+1.0 Wind 150 deg. - No Ice					
36	1.2 Dead+1.0 Wind 180 deg. - No Ice					
37	0.9 Dead+1.0 Wind 150 deg. - No Ice					
38	1.2 Dead+1.0 Wind 120 deg. - No Ice					
39	0.9 Dead+1.0 Wind 90 deg. - No Ice					
40	1.2 Dead+1.0 Wind 60 deg. - No Ice					
41	0.9 Dead+1.0 Wind 30 deg. - No Ice					
42	1.2 Dead+1.0 Wind 0 deg. - No Ice					
43	0.9 Dead+1.0 Wind 30 deg. - No Ice					
44	1.2 Dead+1.0 Wind 60 deg. - No Ice					
45	0.9 Dead+1.0 Wind 90 deg. - No Ice					
46	1.2 Dead+1.0 Wind 120 deg. - No Ice					
47	0.9 Dead+1.0 Wind 150 deg. - No Ice					
48	1.2 Dead+1.0 Wind 180 deg. - No Ice					
49	0.9 Dead+1.0 Wind 150 deg. - No Ice					
50	1.2 Dead+1.0 Wind 120 deg. - No Ice					

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft.	Horz. Deflection in.	Max. Load C/comb.	Tilt	Twist
T1	160 - 150	2.210	39	0.131	0.014
12	150 - 140	2.029	39	0.130	0.013
13	140 - 120	1.948	39	0.116	0.011
14	120 - 100	1.839	39	0.105	0.009
15	100 - 80	0.830	39	0.082	0.007
16	80 - 60	0.513	39	0.060	0.005
17	60 - 40	0.266	39	0.034	0.002
18	40 - 20	0.134	39	0.026	0.002
19	20 - 0	0.034	39	0.013	0.001

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft.	Appurtenance	Max. Load C/comb.	Deflection in.	Tilt	Twist	Radius of Curvature
150.00	(1) A658-30 RD w/ Mount Pipe	39	2.262	0.131	0.014	405635
148.00	(2) SRNTH11-D458 w/ Mount Pipe	39	1.973	0.130	0.013	Inf
140.00	AIR32 KRDP90114e-1 1866a w/ Mount Pipe	39	1.748	0.126	0.011	69154
129.00	(2) MX08FR0665-21 w/ Mount Pipe	39	1.457	0.116	0.010	52983

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft.	Horz. Deflection in.	Max. Load C/comb.	Tilt	Twist
T1	160 - 150	14.084	2	0.797	0.085
12	150 - 140	12.378	2	0.792	0.080
13	140 - 120	10.668	2	0.769	0.070
14	120 - 100	2.857	2	0.642	0.055
15	100 - 80	3.169	2	0.467	0.033
16	80 - 60	1.736	2	0.326	0.023
17	60 - 40	0.823	2	0.160	0.014
18	40 - 20	0.207	2	0.080	0.007
19	20 - 0				

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft.	Appurtenance	Max. Load C/comb.	Deflection in.	Tilt	Twist	Radius of Curvature
150.00	(1) A658-30 RD w/ Mount Pipe	2	13.914	0.797	0.084	63751
148.00	(2) SRNTH11-D458 w/ Mount Pipe	2	12.034	0.789	0.078	306051
140.00	AIR32 KRDP90114e-1 1866a w/ Mount Pipe	2	10.688	0.769	0.070	11399
129.00	(2) MX08FR0665-21 w/ Mount Pipe	2	8.854	0.708	0.061	8571

### Bolt Design Data

Section No.	Elevation ft.	Component Type	Bolt Grade	Bolt Size	Number Of Bolts	Allowable Load per Bolt lb.	Ratio Allowable	Criteria
T1	160	Leg	A325N	1/2"	6	101073	53013.40	0.019
		Diagonal	A325X	1/2"	1	484218	10662.90	0.454
								Bolt Tension Member/Bolt Shear

<b>inxTower</b>		Wareham, MA		Page 19 of 22	
Tower Engineering Professionals, Inc. 336 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6331 Fax: (919) 661-6330		Project TEP No. 75332.828773		Date 14:42:30 03/24/23	
Client Industrial Communications		Designed by Peter Laird			

Section No.	Elevation	Component Type	Initial Grade	Ball Size	Number Of Balls	Maximum Load per Ball	Allowable Load	Ratio	Criteria
		Top Girt	A325X	1.000	1	1183.33	15766.50	0.075	Member Block
T2	150	Leg	A325N	1.000	6	3517.65	53014.40	0.066	Ball Tension
		Diagonal	A325X	1.000	1	7985.65	10662.90	0.749	Member Block
									Shear
		Top Girt	A325N	1.000	1	692.86	15766.50	0.044	Member Block
									Shear
T3	140	Leg	A325N	1.000	6	2312.69	53014.40	0.232	Ball Tension
		Diagonal	A325X	1.000	1	12788.90	15970.70	0.657	Member Block
									Shear
T4	120	Leg	A325N	1.000	6	22107.30	53014.40	0.417	Ball Tension
		Diagonal	A325X	1.000	1	12720.30	26367.60	0.484	Member Block
									Shear
T5	100	Leg	A325N	1.250	6	31029.30	82835.00	0.375	Ball Tension
		Diagonal	A325X	1.000	1	12557.80	26367.60	0.478	Member Block
									Shear
T6	80	Leg	A325N	1.000	12	18251.40	53014.40	0.344	Ball Tension
		Diagonal	A325X	0.875	1	17865.30	29580.00	0.604	Gusset Bearing
									Ball Tension
T7	60	Leg	A325N	1.000	12	22228.10	53014.40	0.419	Ball Tension
		Diagonal	A325X	0.875	1	17225.30	29580.00	0.582	Gusset Bearing
									Ball Tension
T8	40	Leg	A325N	1.250	12	25808.50	82835.00	0.312	Ball Tension
		Diagonal	A325X	0.875	1	17069.70	29580.00	0.577	Gusset Bearing
									Gusset Bearing
T9	20	Leg	A325X	0.875	1	18406.30	29580.00	0.622	Gusset Bearing

### Compression Checks

### Leg Design Data (Compression)

Section No.	Elevation	Size	L	L <sub>e</sub>	K/Lr	A	P <sub>n</sub>	φ <sub>c</sub> P <sub>n</sub>	Ratio
T1	160-150	Valmont 195964	10.02	10.02	41.6	3.682	-2744.08	145939.00	0.053
		Section			K=1.00				
T2	150-140	Valmont 196094	10.02	10.02	41.6	3.682	-26550.10	165942.00	0.160
		88x84			K=1.00				
T3	140-120	Valmont 194434	20.03	10.02	41.3	3.682	-87373.60	166292.00	0.525
		Valmont 194651	20.03	10.02	35.7	5.301	-151074.00	248431.00	0.608
T4	130-100	Valmont 195213	20.03	10.02	30.6	7.216	-209721.00	347961.00	0.603
		Valmont 195687	20.03	10.02	48.8	9.425	-246093.00	401936.00	0.612
T5	100-80	Valmont 195960	20.03	20.03	48.8	11.928	-503300.00	508981.00	0.590
		Valmont 195962	20.03	20.03	48.8	14.726	-349937.00	628738.00	0.557
T6	80-60	Valmont 195964	20.03	20.03	48.7	14.726	-339031.00	628738.00	0.626
		Valmont 195966	20.03	20.03	48.7	14.726	-339031.00	628738.00	0.626
									K=1.00

<b>inxTower</b>		Wareham, MA		Page 20 of 22	
Tower Engineering Professionals, Inc. 336 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6331 Fax: (919) 661-6330		Project TEP No. 75332.828773		Date 14:42:30 03/24/23	
Client Industrial Communications		Designed by Peter Laird			

1 P<sub>n</sub> / φ<sub>c</sub>P<sub>n</sub> controls

### Truss-Leg Diagonal Data

Section No.	Elevation	Dugumet Size	L <sub>e</sub>	K/Lr	φ <sub>c</sub> P <sub>n</sub>	A	P <sub>n</sub>	Ratio
T1	160-150	0.5	1.41	94.5	165670.00	0.196	2765.45	4074.98
								0.932
T2	150-140	0.5	1.41	94.5	192177.00	0.196	2054.38	4074.98
								0.439
T3	140-120	0.5	1.42	95.2	276735.00	0.196	475.97	475.97
								0.114
T4	120-100	0.5	1.40	94.4	376667.00	0.196	741.82	4667.46
								0.161
T5	100-80	0.5	1.39	92.4	491073.00	0.196	789.16	4671.02
								0.169
T6	80-60	0.5	1.38	92.4	622654.00	0.196	1070.29	4709.25
								0.227
T7	60-40	0.5	1.36	91.6	768708.00	0.196	1229.39	4746.81
								0.259
T8	40-20	0.5	1.36	91.6	768708.00	0.196	1132.65	4746.81
								0.239
T9	20-0	0.5	1.36	91.6	768708.00	0.196	1132.65	4746.81
								0.239

### Diagonal Design Data (Compression)

Section No.	Elevation	Size	L	L <sub>e</sub>	K/Lr	A	P <sub>n</sub>	Ratio
T1	160-150	1.2 1/2x3 1/2x3/16	11.53	5.30	128.5	0.902	-5247.08	12259.40
					K=1.00			0.428
T2	150-140	1.2 1/2x3 1/2x3/16	12.50	5.63	156.0	0.902	-8239.81	10949.10
					K=1.00			0.758
T3	140-120	1.3x3x5/16	13.80	6.33	130.2	1.780	-13018.60	23616.10
					K=1.00			0.551
T4	120-100	1.3 1/2x3 1/2x3/16	15.24	7.08	124.1	2.100	-12308.40	30560.70
					K=1.00			0.407
T5	100-80	1.3 1/2x3 1/2x3/16	16.80	7.88	138.1	2.100	-12035.00	24882.90
					K=1.00			0.484
T6	80-60	21.3 1/2x3 1/2x1/8x1/2	25.01	12.30	135.2	3.375	-18997.30	41714.90
					K=1.00			0.455
T7	60-40	21.3 1/2x3 1/2x1/8x1/2	26.26	12.92	142.1	3.375	-17791.90	37382.20
					K=1.00			0.471
T8	40-20	21.3 1/2x3 1/2x1/8x1/2	27.59	13.59	149.4	3.375	-16611.40	34156.40
					K=1.00			0.486
T9	20-0	21.3 1/2x3 1/2x1/8x1/2	29.01	14.29	157.6	3.375	-19746.80	30862.80
					K=1.00			0.640

1 P<sub>n</sub> / φ<sub>c</sub>P<sub>n</sub> controls

### Top Girt Design Data (Compression)

Section No.	Elevation	Size	L	L <sub>e</sub>	K/Lr	A	P <sub>n</sub>	Ratio
T1	160-150	1.3x3x3/16	6.00	4.58	106.1	1.090	-1065.80	19338.00
					K=1.15			0.055
T2	150-140	1.3x3x3/16	7.00	5.58	116.2	1.090	-460.43	17167.80
					K=1.03			0.057

<b>inxTower</b>		Job	Wareham, MA	Page	21 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

1  $P_u$  /  $\phi_t$  controls

### Tension Checks

### Leg Design Data (Tension)

Section No.	Elevation	Size	$L_e$	$t_e$	$K_{tr}$	$A$	$m^2$	$P_u$	$\phi_t P_u$	Ratio
	$\beta$		$\beta$	$\beta$				$lb$	$lb$	$\frac{P_u}{\phi_t P_u}$
T1	160 - 150	Valmont 196994 - 10x4	10.02	10.02	41.6	3.682	21105.90	192177.00	165570.00	0.037
T2	150 - 140	Section 58831								
T3	140 - 120	Valmont 194454	20.03	10.02	41.3	3.682	78395.60	192177.00	0.394	
T4	120 - 100	Valmont 194625	20.03	10.02	35.7	3.901	132515.00	275667.00	0.491	
T5	100 - 80	Valmont 195203	20.03	10.02	30.6	7.216	186176.00	376667.00	0.491	
T6	80 - 60	Valmont 195637	20.03	20.03	48.8	9.425	219317.00	491673.00	0.445	
T7	60 - 40	Valmont 195962	20.03	20.03	48.8	11.928	266738.00	622654.00	0.428	
T8	40 - 20	Valmont 195962	20.03	20.03	48.7	14.726	309702.00	768708.00	0.403	
T9	20 - 0	Valmont 195964	20.03	20.03	48.7	14.726	347282.00	768708.00	0.452	

1  $P_u$  /  $\phi_t$  controls

### Truss-Leg Diagonal Data

Section No.	Elevation	Diagonal Size	$L_e$	$K_{tr}$	$\phi_t P_u$	$t_e$	$P_u$	Stress Ratio
	$\beta$		$\beta$	$\beta$	$lb$	$lb$	$\frac{P_u}{\phi_t P_u}$	
T1	160 - 150	0.5	1.41	94.5	155670.00	0.196	2763.45	4674.98
T2	150 - 140	0.5	1.40	94.5	192177.00	0.196	2421.49	4712.08
T3	140 - 120	0.5	1.42	95.3	276735.00	0.196	475.71	4568.17
T4	120 - 100	0.5	1.40	94.4	376667.00	0.196	741.87	4697.46
T5	100 - 80	0.5	1.39	93.2	491973.00	0.196	789.16	4671.02
T6	80 - 60	0.5	1.38	92.1	622654.00	0.196	1070.29	4709.25
T7	60 - 40	0.5	1.36	91.6	768708.00	0.196	1229.39	4746.81
T8	40 - 20	0.5	1.36	91.6	768708.00	0.196	1132.65	4746.81
T9	20 - 0	0.5						0.239

### Diagonal Design Data (Tension)

Section No.	Elevation	Size	$L_e$	$t_e$	$K_{tr}$	$A$	$P_u$	$\phi_t P_u$	Ratio
	$\beta$		$\beta$	$\beta$		$lb$	$lb$	$\frac{P_u}{\phi_t P_u}$	
T1	160 - 150	1.2 1/2x3 1/2x3/16	11.93	5.30	84.9	0.519	4842.18	22557.10	0.215
T2	150 - 140	1.2 1/2x3 1/2x3/16	12.50	5.63	90.0	0.519	7989.65	22557.10	0.354
T3	140 - 120	1.3 3/8x3/16	13.80	6.33	85.4	1.071	12788.90	46602.80	0.274
T4	120 - 100	1.3 1/2x3 1/2x3/16	14.50	6.73	77.0	1.311	12720.30	57042.80	0.223
T5	100 - 80	1.3 1/2x3 1/2x3/16	16.80	7.88	89.9	1.311	12557.80	57042.80	0.220
T6	80 - 60	21.3 1/2x3 1/2x1/8x1/2	25.01	12.70	137.5	2.156	17855.30	93796.90	0.190
T7	60 - 40	21.3 1/2x3 1/2x1/8x1/2	26.26	13.92	144.3	2.156	17225.30	93796.90	0.184
T8	40 - 20	21.3 1/2x3 1/2x1/8x1/2	27.59	15.59	151.7	2.156	17069.70	93796.90	0.182
T9	20 - 0	21.3 1/2x3 1/2x1/8x1/2	29.01	14.29	159.5	2.156	18406.30	93796.90	0.196

<b>inxTower</b>		Job	Wareham, MA	Page	22 of 22
Tower Engineering Professionals, Inc. 326 Tryon Road Raleigh, NC 27603 Phone: (919) 661-6351 FAX: (919) 661-6350		Project	TEP No. 75332.828773	Date	14:42:30 03/24/23
		Client	Industrial Communications	Designed by	Peter Laird

1  $P_u$  /  $\phi_t$  controls

### Top Girt Design Data (Tension)

Section No.	Elevation	Size	$L_e$	$t_e$	$K_{tr}$	$A$	$m^2$	$P_u$	$\phi_t P_u$	Ratio
	$\beta$		$\beta$	$\beta$		$lb$	$lb$	$lb$	$lb$	$\frac{P_u}{\phi_t P_u}$
T1	160 - 150	1.3 3/8x3/16	6.00	4.58	63.9	0.659	1183.23	28679.40	0.024	
T2	150 - 140	1.3 3/8x3/16	7.00	5.58	76.7	0.659	692.86	28679.40	0.024	

1  $P_u$  /  $\phi_t$  controls

### Section Capacity Table

Section	Elevation	Component	Type	Size	Critical Element	$P$	$\phi_t P_u$	$\phi_t P_u$	Capacity	Ratio
	$\beta$					$lb$	$lb$	$lb$	$lb$	$\frac{P}{\phi_t P_u}$
T1	160 - 150	Leg	Leg	Valmont 196994 - 10x4 Section	3	-7493.23	145970.00	512	512	Pass
T2	150 - 140	Leg	Leg	Valmont 196994 - 10x4 (58x3)	15	-25889.10	165942.00	52.5	52.5	Pass
T3	140 - 120	Leg	Leg	Valmont 194454	27	-87373.60	166242.00	60.8	60.8	Pass
T4	120 - 100	Leg	Leg	Valmont 194625	42	-151074.00	249841.00	60.3	60.3	Pass
T5	100 - 80	Leg	Leg	Valmont 195213	57	-219721.00	347961.00	61.2	61.2	Pass
T6	80 - 60	Leg	Leg	Valmont 195637	72	-246093.00	411936.00	59.0	59.0	Pass
T7	60 - 40	Leg	Leg	Valmont 195962	81	-316310.00	508981.00	55.7	55.7	Pass
T8	40 - 20	Leg	Leg	Valmont 195962	90	-319937.00	628758.00	62.6	62.6	Pass
T9	20 - 0	Diagonal	Diagonal	1.2 1/2x3 1/2x3/16	12	-5247.08	12259.40	42.8	42.8	Pass
T12	150 - 140	Diagonal	Diagonal	1.2 1/2x3 1/2x3/16	23	-8599.81	10949.10	75.8	75.8	Pass
T13	140 - 120	Diagonal	Diagonal	1.3 3/8x3/16	33	-13018.60	23616.10	65.7	65.7	Pass
T14	120 - 100	Diagonal	Diagonal	1.3 1/2x3 1/2x3/16	48	-12308.40	30260.70	48.1	48.1	Pass
T15	100 - 80	Diagonal	Diagonal	1.3 1/2x3 1/2x3/16	61	-12035.00	24882.90	48.1	48.1	Pass
T16	80 - 60	Diagonal	Diagonal	21.3 1/2x3 1/2x1/8x1/2	75	-18997.30	41714.90	45.5	45.5	Pass
T17	60 - 40	Diagonal	Diagonal	21.3 1/2x3 1/2x1/8x1/2	84	-17791.90	37982.20	47.1	47.1	Pass
T18	40 - 20	Diagonal	Diagonal	21.3 1/2x3 1/2x1/8x1/2	93	-16611.40	34156.40	48.6	48.6	Pass
T19	20 - 0	Diagonal	Diagonal	21.3 1/2x3 1/2x1/8x1/2	102	-19746.80	30862.80	64.0	64.0	Pass
T1	160 - 150	Top Girt	Top Girt	1.3 3/8x3/16	5	-1063.80	19238.00	5.5	5.5	Pass
T2	150 - 140	Top Girt	Top Girt	1.3 3/8x3/16	18	-460.43	17167.80	2.7	2.7	Pass

Summary

Leg (19)	Pass
Diagonal	75.8
Top Girt	7.5
Bolt Checks	74.9
<b>RATING =</b>	<b>75.8</b>

**APPENDIX B**  
**ADDITIONAL CALCULATIONS**

## Self Support Anchor Rod Capacity

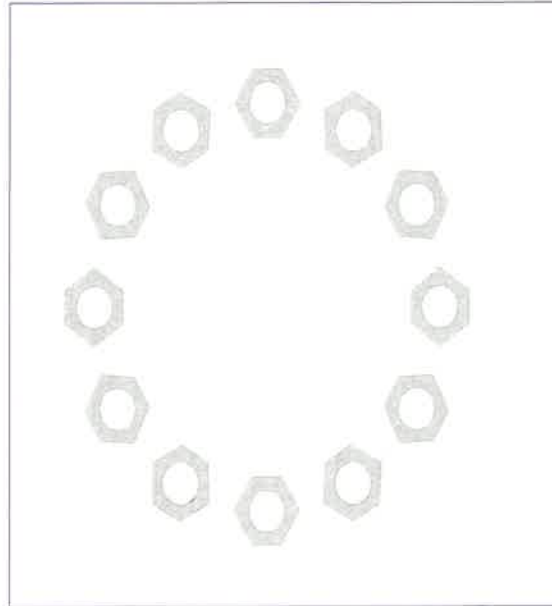
Site Info	
Site #	N/A
Site Name	Wareham, MA
TEP #	75332.828773

Analysis Considerations	
TIA-222 Revision	G
Grout Considered:	No
$l_{ar}$ (in)	1.25
Eta Factor, $\eta$	0.5

Applied Loads		
	Comp.	Uplift
Axial Force (kips)	418.50	368.38
Shear Force (kips)	46.48	41.74

Considered Eccentricity	
Leg Mod Eccentricity (in)	0.000
Anchor Rod N.A Shift (in)	0.000
Total Eccentricity (in)	0.000

\*Anchor Rod Eccentricity Applied



Connection Properties	Analysis Results
-----------------------	------------------

Anchor Rod Data
(12) 1-1/4" $\phi$ bolts (F1554-105 N; $F_y=105$ ksi, $F_u=125$ ksi)
$l_{ar}$ (in): 1.25

Anchor Rod Summary		(units of kips, kip-in)
$P_u_c = 34.88$	$\phi P_n_t = 96.9$	<b>Stress Rating</b>
$V_u = 3.87$	$\phi V_n = n/a$	<b>44.0%</b>
$M_u = n/a$	$\phi M_n = n/a$	<b>Pass</b>

# SST Unit Base Foundation

Site #: N/A  
 Site Name: Wareham  
 TEP Number: 75332.828773

TIA-222 Revision: G

Top & Bot. Pad Rein. Different?:	<input type="checkbox"/>
Tower Centroid Offset?:	<input checked="" type="checkbox"/>
Block Foundation?:	<input type="checkbox"/>
Rectangular Pad?:	<input type="checkbox"/>

Superstructure Analysis Reactions		
Global Moment, <b>M</b> :	7584.637	ft-kips
Global Axial, <b>P</b> :	61.233	kips
Global Shear, <b>V</b> :	73.83	kips
Leg Compression, <b>P<sub>comp</sub></b> :	418.501	kips
Leg Comp. Shear, <b>V<sub>u,comp</sub></b> :	46.48	kips
Leg Uplift, <b>P<sub>uplift</sub></b> :	368.376	kips
Leg Uplift. Shear, <b>V<sub>u,uplift</sub></b> :	41.739	kips
Tower Height, <b>H</b> :	160	ft
Base Face Width, <b>BW</b> :	22	ft
BP Dist. Above Fdn, <b>bp<sub>dist</sub></b> :	3	in

Foundation Analysis Checks				
	Capacity	Demand	Rating	Check
<i>Lateral (Sliding) (kips)</i>	189.72	73.83	38.9%	Pass
<i>Bearing Pressure (ksf)</i>	3.00	0.99	33.0%	Pass
<i>Overtuning (kip*ft)</i>	14922.44	8344.76	55.9%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	2753.59	220.78	8.0%	Pass
<i>Pier Flexure (Tension) (kip*ft)</i>	1480.93	198.26	13.4%	Pass
<i>Pier Compression (kip)</i>	15912.00	434.73	2.7%	Pass
<i>Pad Flexure (kip*ft)</i>	5681.85	1236.38	21.8%	Pass
<i>Pad Shear - 1-way (kips)</i>	798.31	212.13	26.6%	Pass
<i>Pad Shear - Comp 2-way (ksi)</i>	0.190	0.092	48.3%	Pass

Pier Properties		
Pier Shape:	Square	
Pier Diameter, <b>dpier</b> :	5.00	ft
Ext. Above Grade, <b>E</b> :	0.50	ft
Pier Rebar Size, <b>Sc</b> :	8	
Pier Rebar Quantity, <b>mc</b> :	24	
Pier Tie/Spiral Size, <b>St</b> :	5	
Pier Tie/Spiral Quantity, <b>mt</b> :	10	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, <b>cc<sub>pier</sub></b> :	3	in

Structural Rating:	48.3%
Soil Rating:	55.9%

Pad Properties		
Depth, <b>D</b> :	6.00	ft
Pad Width, <b>W<sub>1</sub></b> :	43.00	ft
Pad Thickness, <b>T</b> :	1.75	ft
Pad Rebar Size (Bottom dir. 2), <b>Sp<sub>2</sub></b> :	9	
Pad Rebar Quantity (Bottom dir. 2), <b>mp<sub>2</sub></b> :	85	
Pad Clear Cover, <b>cc<sub>pad</sub></b> :	3	in

Material Properties		
Rebar Grade, <b>Fy</b> :	60	ksi
Concrete Compressive Strength, <b>F'c</b> :	4	ksi
Dry Concrete Density, <b>δc</b> :	150	pcf

Soil Properties		
Total Soil Unit Weight, <b>γ</b> :	100	pcf
Ultimate Gross Bearing, <b>Qult</b> :	4,000	ksf
Cohesion, <b>Cu</b> :		ksf
Friction Angle, <b>φ</b> :	30	degrees
SPT Blow Count, <b>N<sub>blows</sub></b> :	8	
Base Friction, <b>μ</b> :	0.25	
Neglected Depth, <b>N</b> :	4.0	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, <b>gw</b> :	1.5	ft

<-- Toggle between Gross and Net