NORTHEAST
SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
420 Main Street, Sturbridge MA 01566
860-209-4690
denise@northeastsitesolutions.com

July 12, 2019

Members of the Siting Council
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Exempt Modification Application
37 Bacon Road, Enfield CT 06082
Latitude: 41.997659
Longitude: -72.552918
T-Mobile Site#: CT11533B-MWAAV

Dear Ms. Bachman:

T-Mobile is requesting to file an exempt modification for an existing 180-foot monopole located at 37 Bacon Road, Enfield CT 06082. T-Mobile currently has approval for three (3) antennas at the 160-foot level of the existing 180-foot tower. The property is owned by Shaker Pines Fire District #5 and the tower is owned by SAI Group. T-Mobile now intends to install one (1) IBR1300 Dish. The new dish would be installed at the 160-foot and level of the tower.

Planned Modifications:

Remove:
NONE

Remove and Replace:
NONE

Install New:
(1)IBR1300 Dish
(1)Fiber line
(2)CAT6 Cables

Existing to Remain:
(6) 1-5/8" Coax
(6) TMA
(3) RR90 Antenna – 1900 MHz

This facility was approved by the CT Siting Council Docket No.139 on September 18, 1991. Please see attached.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies§ 16- SOj-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.SA. § 16-SOj-73, a copy of this letter is being sent to Mayor Mike Ludwick, Elected Official and Raquel Ocasio, Assistant Town Planner for the Town of Enfield, as well as the property owner and the tower owner.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S;A. § 16-50j-72(b)(2).

1. The proposed modifications will not result in an increase in the height of the existing structure.

2. The proposed modifications will not require the extension of the site boundary.

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed state and local criteria.

4. The operation of the replacement antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard.

5. The proposed modifications will not cause a change or alteration in the physical or environmental characteristics of the site.

6. The existing structure and its foundation can support the proposed loading.

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

Sincerely,

Denise Sabo

Mobile: 860-209-4690
Fax: 413-521-0558
Office: 420 Main Street, Sturbridge, MA 01566
Email: denise@northeastsitesolutions.com

Attachments
Copy to:

Mayor Mike Ludwick
Enfield Town Hall
820 Enfield Street
Enfield CT 06082

Enfield Town Hall
820 Enfield Street
Enfield CT 06082
Attn: Planning Dept.
Raquel Ocasio – Assistant Town Planner

Shaker Pines Fire District #5
37 Bacon Rd
Enfield CT 06082

SAI Group
12 Industrial Way
Salem, NH 03079
Attn: Renee Martinson

Exhibit A

DOCKET NO. 139 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of Enfield, East Hartford, and Wethersfield, Connecticut. : Connecticut : Siting : Council

September 18, 1991

Decision and Order

Pursuant to the foregoing Findings of Fact and Opinion, the Connecticut Siting Council (Council) finds that the effects associated with the construction, operation, and maintenance of a cellular telecommunications towers and equipment buildings at the proposed Enfield, Connecticut, alternate site and the proposed East Hartford, Connecticut, prime site including effects on the natural environment; ecological integrity and balance; public health and safety; scenic, historic, and recreational values; forests and parks; air and water purity; and fish and wildlife are not disproportionate either alone or cumulatively with other effects when compared to need, are not in conflict with the policies of the State concerning such effects, and are not sufficient reason to deny the application and therefore directs that a Certificate of Environmental Compatibility and Public Need as provided by section 16-50k of the Connecticut General Statutes (CGS), be issued to Metro Mobile CTS of Hartford, Inc., for the construction, operation, and maintenance of a cellular telecommunications tower, associated equipment, and building at the proposed alternate site in Enfield, Connecticut, and the proposed prime site in East Hartford, Connecticut.

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

1. The self-supporting monopole towers shall be no taller than necessary to provide the proposed communication service and in no event shall the towers exceed a total height of 163 feet above ground level (AGL) at the proposed Enfield alternate site and 123 feet AGL at the proposed East Hartford prime site, with antennas and appurtenances.

2. The Certificate holder shall prepare a Development and Management (D&M) Plan, for approval by the Council, for these sites in compliance with sections 16-50j-75 through 16-50j-77 of the Regulations of State Agencies. This D&M plan

shall include detailed plans of the towers, tower foundations, soil boring reports, equipment buildings, access roads, security fences, landscaping plans, detailed erosion and sedimentation control plans, and a final schedule. In addition, the D&M plan shall include for Council consideration, detailed plans and itemized costs for the placement of service utilities underground in order to further mitigate the visual effect of the facilities.

3. The Certificate holder shall comply with any existing and future radio frequency (RF) standards promulgated by State or federal regulatory agencies. Upon the establishment of any new governmental RF standards, the facilities granted herein shall be brought into compliance with such standards.

4. The Certificate holder shall provide the Council with a recalculated report of electromagnetic radio frequency power density if and when circumstances in operation cause a change in power density above the levels originally calculated and provided in the application.

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

6. If the facility does not initially provide or permanently ceases to provide cellular service following completion of construction, this Decision and Order shall be void, and the tower and all associated equipment shall be dismantled and removed or reapplication for any new use shall be made to the Council as soon as practicable before any such new use is made.

7. Unless otherwise approved by the Council, this Decision and Order shall be void if all construction authorized herein is not completed within three years of the effective date of this Decision and Order or within three years after all appeals to this Decision and Order have been resolved.

Pursuant to CGS section 16-50p, we hereby direct that a copy of the Findings of Fact, Opinion, and Decision and Order be served on each person listed below, and notice of this issuance shall be published in the Hartford Courant and the Journal Inquirer.

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

The parties to this proceeding are:

PARTIES	ITS REPRESENTATIVE
Metro Mobile CTS of Hartford, Inc. 20 Alexander Drive P.O. Box 5029 Wallingford, CT 06492 Attn: Gary Schulman	Robinson and Cole One Commercial Plaza Hartford, CT 06103-3597 Attn: Earl Phillips, Jr. (203) 275-8200
The Town of East Hartford	G. Barry Goodberg Assistant Corporation Counsel Town of East Hartford 740 Main Street East Hartford, CT 06108 (203) 289-2781
The Town of Enfield	Christopher W. Bromson Enfield Town Attorney 47 No. Main Street Enfield, CT 06082 (203) 745-0371 Ext. 290

SMH:bw

5534E

CERTIFICATION

The undersigned members of the Connecticut Siting Council hereby certify that they have heard this case in DOCKET NO. 139 - An application of Metro Mobile CTS of Hartford, Inc., for a Certificate of Environmental Compatibility and Public Need for the construction, maintenance, and operation of cellular facilities in the Towns of Enfield, East Hartford, and Wethersfield, Connecticut, or read the record thereof, and that we voted as follows:

Dated at New Britain, Connecticut the 18th day of September, 1991.

Council Members	Vote Cast
Mortimer A. Gelston Chairman	YES
Commissioner Clifton A. Leonhardt Designee: Commissioner Richard G. Patterson	ABSTAIN
Commissioner Timothy R.E. Keeney Designee: Brian Emerick	ABSENT
Harry E. Covey	NO
Daniel P. Lynch, Jr.	NO
Gloria Dibble Pond	YES
Paulann H. Sheets	YES
William H. Smith	YES
Colin C. Tait	YES

Exhibit B

37 BACON RD

Location	37 BACON RD	**Mblu**	094/ / 0062/ /
Acct#	052900010040E	**Owner**	SHAKER PINES FIRE DISTRICT #5
Assessment	$957,470	**Appraisal**	$1,367,790
PID	30306	**Building Count**	1
Fire District	5		

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$1,236,370	$131,420	$1,367,790

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2017	$865,470	$92,000	$957,470

Owner of Record

Owner	SHAKER PINES FIRE DISTRICT #5	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	37 BACON RD ENFIELD, CT 06082	**Book & Page**	617/ 455
		Sale Date	10/01/2015
		Instrument	15

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
SHAKER PINES FIRE DISTRICT #5	$0		617/ 455	15	10/01/2015

Building Information

Building 1 : Section 1

Year Built:	2001
Living Area:	10,620
Replacement Cost:	$1,486,946
Building Percent Good:	81

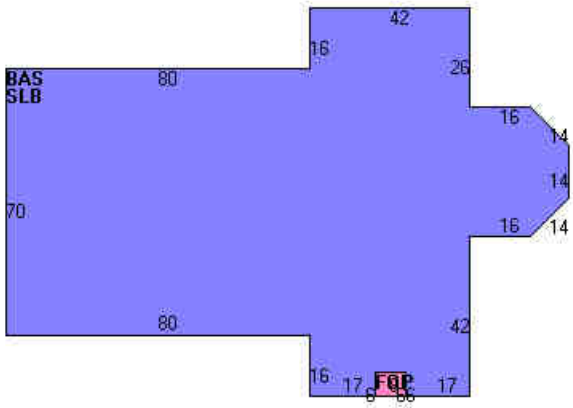
Replacement Cost Less Depreciation: $1,204,430

Building Attributes	
Field	**Description**
STYLE	Fire Station
MODEL	Comm/Ind
Grade	Average +10
Stories:	1
Occupancy	1
Exterior Wall 1	Brick
Exterior Wall 2	
Roof Structure	Gable
Roof Cover	Asph/F Gls/Cmp
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Vinyl/Asphalt
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	Partial
Bldg Use	Exempt Comm
Total Rooms	
Total Bedrms	
Total Baths	
Total H Bths	
Extra Fixtures	
1st Floor Use:	
Heat/AC	None
Frame Type	Masonry
Baths/Plumbing	Average
Ceiling/Wall	Sus Ceil Wall
Rooms/Prtns	Average
Wall Height	18
% Comn Wall	

Building Photo

(http://images.vgsi.com/photos2/EnfieldCTPhotos//\00\03\40/95

Building Layout



(http://images.vgsi.com/photos2/EnfieldCTPhotos//Sketches/303

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	10,620	10,620
FOP	Open Porch	48	0
SLB	Slab	10,620	0
		21,288	10,620

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
SPR1	SPRINKLERS-WET	10620 SF	$8,600	1

Land

Land Use

Use Code	925
Description	Exempt Comm
Zone	I1
Neighborhood	C500
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	6.5
Frontage	
Depth	
Assessed Value	$92,000
Appraised Value	$131,420

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FGR1	Garage	FR	Frame	400 S.F.	$5,000	1
PAV1	Paving	AS	Asphalt	3420 S.F.	$3,680	1
SHD1	Shed	MS	Masonry	360 S.F.	$2,930	1
SHD1	Shed	MS	Masonry	348 S.F.	$2,840	1
FN2	FENCE-6' CHAIN			280 L.F.	$2,380	1
SHD1	Shed	FR	Frame	288 S.F.	$1,760	1
FOP	Porch			792 S.F.	$4,750	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$1,236,370	$131,420	$1,367,790
2017	$1,236,370	$131,420	$1,367,790
2016	$1,236,370	$131,420	$1,367,790

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$865,470	$92,000	$957,470
2017	$865,470	$92,000	$957,470
2016	$865,470	$92,000	$957,470

Exhibit C

ANTENNA UPGRADES BY

T-Mobile

T-MOBILE NORTHEAST LLC

PROJECT: MWAAV

SITE NUMBER: CT11533B

SITE NAME: SHAKER PINES FIRE DEPARTMENT

SITE ADDRESS: 37 BACON ROAD
ENFIELD, CT 06082

PROJECT NOTES:

1. THIS IS AN UNMANNED TELECOMMUNICATION FACILITY AND NOT FOR HUMAN HABITATION:
   HANDICAPPED ACCESS IS NOT REQUIRED.
   POTABLE WATER OR SANITARY SERVICE IS NOT REQUIRED.
   NO OUTDOOR STORAGE OR ANY
   SOLID WASTE RECEPTACLES REQUIRED.
2. CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ARCHITECT/ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK. FAILURE TO NOTIFY THE ARCHITECT/ENGINEER PLACES THE RESPONSIBILITY ON THE CONTRACTOR TO CORRECT THE DISCREPANCIES AT THE CONTRACTOR'S EXPENSE.
3. DEVELOPMENT AND USE OF THE SITE WILL CONFORM TO ALL APPLICABLE CODES, ORDINANCES AND SPECIFICATIONS.

STRUCTURAL NOTES:

PRIOR TO INSTALLATION OF THE PROPOSED EQUIPMENT CONTRACTOR SHOULD REVIEW THE STRUCTURAL EVALUATION REPORT AND MOUNT EVALUATION REPORT BOTH PREPARED BY DESTEK ENGINEERING, LLC. DATED JUNE 24, 2019 AND ADHERE TO THE REPORT FULLY AND ALL THE RECOMMENDATIONS THEREIN, INCLUDING BUT NOT LIMITED TO ANTENNA PLACEMENT, COAX ROUTING, STRUCTURAL IMPROVEMENTS, ETC.

APPLICABLE STATE ADOPTED CODES:

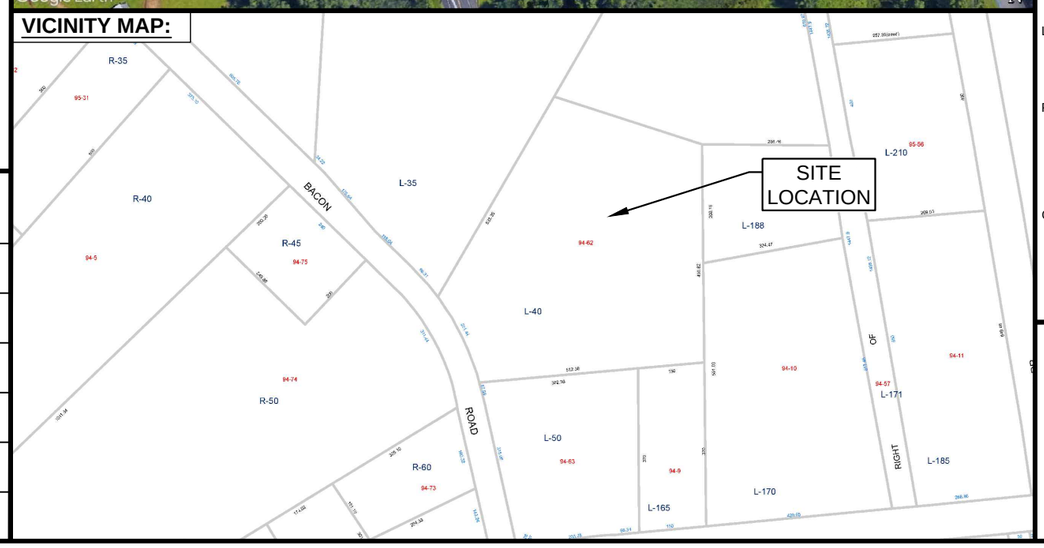
LATEST EDITION OF:
CONNECTICUT STATE BUILDING CODE (CSBC).
ANSI/TIA-222-G STRUCTURAL STANDARD FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.
NATIONAL ELECTRICAL CODE (NEC) FOR POWER AND GROUNDING REQUIREMENTS.
OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA).
NFPA - NATIONAL FIRE PROTECTION ASSOCIATION.

APPROVALS:

FSA CM	DATE
RF ENGINEER	DATE
FOPS	DATE
T-MOBILE ENGINEERING AND DEVELOPMENT	DATE
	DATE
	DATE

SITE IMAGE:

VICINITY MAP:



PROJECT SCOPE:

THE PROJECT SCOPE CONSISTS OF THE FOLLOWING:

ADDITION OF A BACKHAUL RADIO, (1) FIBER AND (2) CAT6 CABLES TO EXISTING TOWER.

PROJECT INFORMATION:

ADDRESS:	37 BACON ROAD ENFIELD, CT 06082
PARCEL ID:	094// 0062//
STRUCTURE TYPE:	MONOPOLE TOWER
COORDINATES:	42°00'57.43" N 72°31'43.49"W

PROJECT TEAM:

APPLICANT:	T-MOBILE NORTHEAST, LLC. 35 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002 860-692-7100
LANDLORD:	SHAKER PINES FIRE DISTRICT 25 NASHUA ROAD, SUITE C1 LONDONDERRY, NH 03053
PROJECT MANAGER:	NORTHEAST SITE SOLUTIONS 420 MAIN STREET, BLDG 4 STURBRIDGE, MA 01566 SHELDON FREINCLE SHELDON@NORTHEASTSITESOLUTIONS.COM 201-776-8521
CONSULTANTS:	FORESITE LLC 462 WALNUT ST NEWTON, MA 02460 SAEED MOSSAVAT SMOSSAVAT@FORESITELLC.COM 617-212-3123

SHEET INDEX:

T-1:	TITLE SHEET
A-1:	PLANS AND ELEVATIONS
A-2:	DETAILS

APPLICANT:

T-Mobile

T-MOBILE NORTHEAST LLC

35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

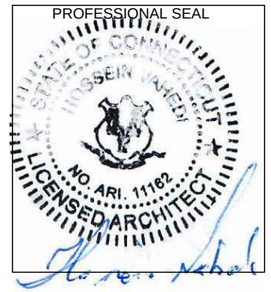
PROJECT MANAGER

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:

FORESITE LLC
Innovative design solutions
Foresitellc.com
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	06/24/19
0	FINAL ISSUED	07/11/19

SITE NUMBER: CT11533B
SITE NAME: SHAKER PINES FIRE DEPARTMENT
SITE ADDRESS: 37 BACON ROAD
ENFIELD, CT 06082

SHEET TITLE:

T-1: TITLE SHEET

GENERAL NOTES:

1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES.

2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.

3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CLIENT'S REPRESENTATIVE OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK.

5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONSTRUCTION DOCUMENTS.

6. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S / VENDOR'S SPECIFICATIONS UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.

7. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS DURING CONSTRUCTION.

8. THE CONTRACTOR SHALL COMPLY WITH ALL PERTINENT SECTIONS OF THE BASIC STATE BUILDING CODE, LATEST EDITION, AND ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJEC

9. THE CONTRACTOR SHALL NOTIFY THE CLIENT'S REPRESENTATIVE IN WRITING WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL CONFLICT IS RESOLVED BY THE CLIENT'S REPRESENTATIVE.

10. THE WORK SHALL CONFORM TO THE CODES AND STANDARDS OF THE FOLLOWING AGENCIES AS FURTHER CITED HEREIN:

A. ASTM: AMERICAN SOCIETY FOR TESTING AND MATERIALS, AS PUBLISHED IN "COMPILATION OF ASTM STANDARDS BUILDING CODES" OR LATEST EDITION.

B. AWS: AMERICAN WELDING SOCIETY INC. AS PUBLISHED IN "STANDARD D1.1–08, STRUCTURAL WELDING CODE" OR LATEST EDITION.

C. AISC: AMERICAN INSTITUTE FOR STEEL CONSTRUCTION AS PUBLISHED IN "CODE FOR STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES"; "SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (LATEST EDITION).

11. BOLTING:

A. BOLTS SHALL BE CONFORMING TO ASTM A325 HIGH STRENGTH, HOT DIP GALVANIZED WITH ASTM A153 HEAVY HEX TYPE NUTS.

B. BOLTS SHALL BE 3/4"ø MINIMUM (UNLESS OTHERWISE NOTED)

C. ALL CONNECTIONS SHALL BE 2 BOLTS MINIMUM.

12. FABRICATION:

A. FABRICATION OF STEEL SHALL CONFORM TO THE AISC AND AWS STANDARDS AND CODES (LATEST EDITION).

B. ALL STRUCTURAL STEEL SHALL BE HOT–DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123 (LATEST EDITION), UNLESS OTHERWISE NOTED.

13. ERECTION OF STEEL:

A. PROVIDE ALL ERECTION EQUIPMENT, BRACING, PLANKING, FIELD BOLTS, NUTS, WASHERS, DRIFT PINS, AND SIMILAR MATERIALS WHICH DO NOT FORM A PART OF THE COMPLETED CONSTRUCTION BUT ARE NECESSARY FOR ITS PROPER ERECTION.

B. ERECT AND ANCHOR ALL STRUCTURAL STEEL IN ACCORDANCE WITH AISC REFERENCE STANDARDS. ALL WORK SHALL BE ACCURATELY SET TO ESTABLISHED LINES AND ELEVATIONS AND RIGIDLY FASTENED IN PLACE WITH SUITABLE ATTACHMENTS TO THE CONSTRUCTION OF THE BUILDING.

C. TEMPORARY BRACING, GUYING AND SUPPORT SHALL BE PROVIDED TO KEEP THE STRUCTURE SAFE AND ALIGNED AT ALL TIMES DURING CONSTRUCTION, AND TO PREVENT DANGER TO PERSONS AND PROPERTY. CHECK ALL TEMPORARY LOADS AND STAY WITHIN SAFE CAPACITY OF ALL BUILDING COMPONENTS.

14. ANTENNA INSTALLATION:

A. INSTALL ANTENNAS AS INDICATED ON DRAWINGS AND CLIENT'S REPRESENTATIVE SPECIFICATIONS.

B. INSTALL GALVANIZED STEEL ANTENNA MOUNTS AS INDICATED ON DRAWINGS.

C. INSTALL COAXIAL / FIBER CABLES AND TERMINATIONS BETWEEN ANTENNAS AND EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. WEATHERPROOF ALL CONNECTORS BETWEEN THE ANTENNA AND EQUIPMENT PER MANUFACTURER'S REQUIREMENTS.

15. ANTENNA AND COAXIAL / FIBER CABLE GROUNDING:

A. ALL EXTERIOR #6 GREEN GROUND WIRE "DAISY CHAIN" CONNECTIONS ARE TO BE WEATHER SEALED WITH ANDREWS CONNECTOR/SPLICE WEATHERPROOFING KIT TYPE #221213 OR EQUAL.

B. ALL COAXIAL / FIBER CABLE GROUNDING KITS ARE TO BE INSTALLED ON STRAIGHT RUNS OF COAXIAL / FIBER CABLE (NOT WITHIN BENDS).

16. RELATED WORK, FURNISH THE FOLLOWING WORK AS SPECIFIED UNDER CONSTRUCTION DOCUMENTS, BUT COORDINATE WITH OTHER TRADES PRIOR TO BID:

A. FLASHING OF OPENING INTO OUTSIDE WALLS

B. SEALING AND CAULKING ALL OPENINGS

C. PAINTING

D. CUTTING AND PATCHING

17. REQUIREMENTS OF REGULATORY AGENCIES:

A. FURNISH U.L. LISTED EQUIPMENT WHERE SUCH LABEL IS AVAILABLE. INSTALL IN CONFORMANCE WITH U.L. STANDARDS WHERE APPLICABLE.

B. INSTALL ANTENNA, ANTENNA CABLES, GROUNDING SYSTEM IN ACCORDANCE WITH DRAWINGS AND SPECIFICATION IN EFFECT AT PROJECT LOCATION AND RECOMMENDATIONS OF STATE AND LOCAL BUILDING CODES, AND SPECIAL CODES HAVING JURISDICTION OVER SPECIFIC PORTIONS OF WORK. THIS WORK INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

C. TIA–EIA – 222 (LATEST EDITION). STRUCTURAL STANDARDS FOR STEEL ANTENNA TOWERS AND ANTENNA SUPPORTING STRUCTURES.

D. FAA – FEDERAL AVIATION ADMINISTRATION ADVISORY CIRCULAR AC 70/7460–IH, OBSTRUCTION MARKING AND LIGHTING.

E. FCC – FEDERAL COMMUNICATIONS COMMISSION RULES AND REGULATIONS FORM 715, OBSTRUCTION MARKING AND LIGHTING SPECIFICATION FOR ANTENNA STRUCTURES AND FORM 715A, HIGH INTENSITY OBSTRUCTION LIGHTING SPECIFICATIONS FOR ANTENNA STRUCTURES.

F. AISC – AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 BOLTS (LATEST EDITION).

G. NEC – NATIONAL ELECTRICAL CODE – ON TOWER LIGHTING KITS.

H. UL – UNDERWRITER'S LABORATORIES APPROVED ELECTRICAL PRODUCTS.

I. IN ALL CASES, PART 77 OF THE FAA RULES AND PARTS 17 AND 22 OF THE FCC RULES ARE APPLICABLE AND IN THE EVENT OF CONFLICT, SUPERSEDE ANY OTHER STANDARDS OR SPECIFICATIONS.

J. 2009 LIFE SAFETY CODE NFPA – 101.

APPLICANT:
T-Mobile
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
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203-275-6669

CONSULTANT:
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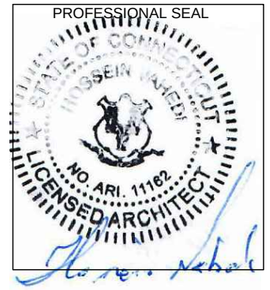
Innovative design solutions
Foresitellc.com
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

PROFESSIONAL SEAL



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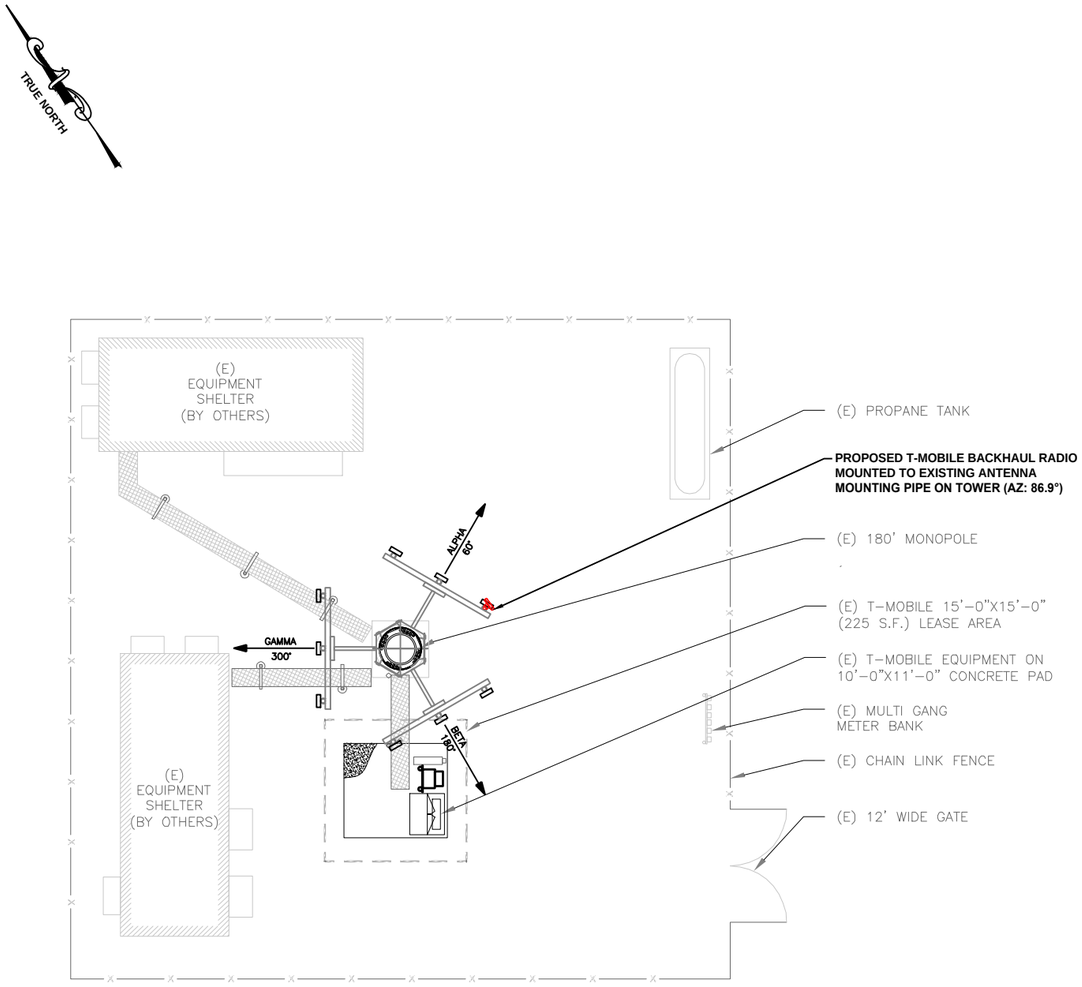
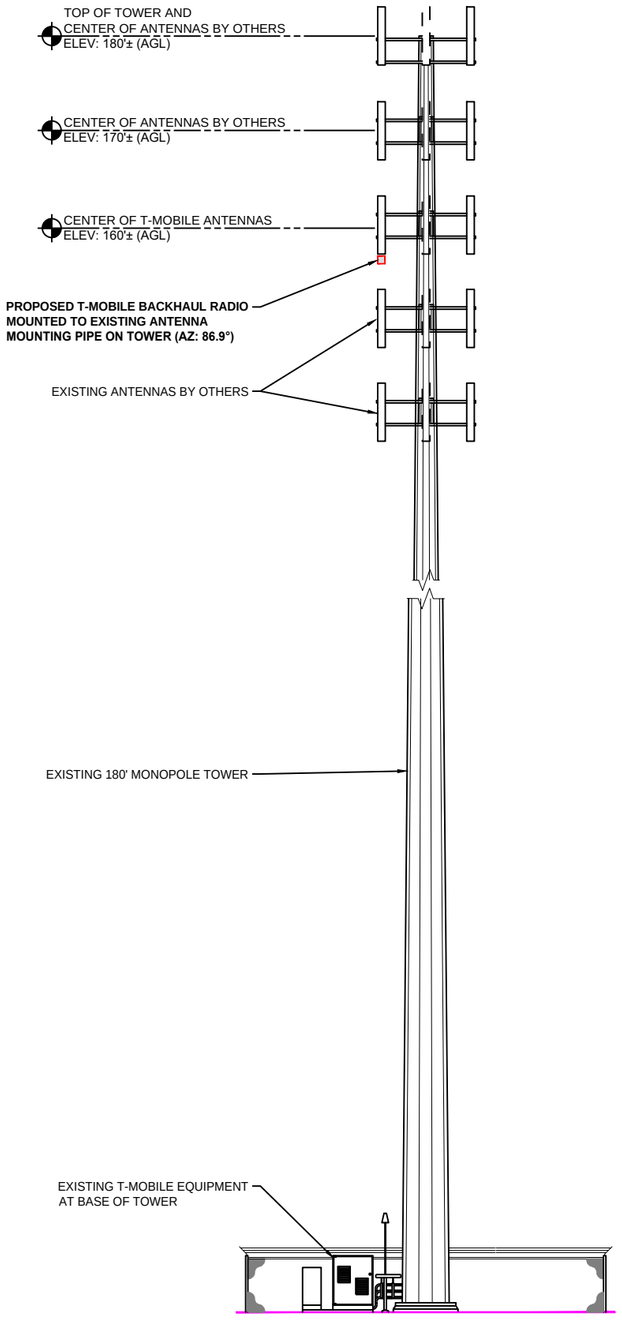
SHEET TITLE:
N-1: NOTES AND DISCLAIMERS



SITE PLAN
SCALE: 1/16" = 1'-0" 1/A-1



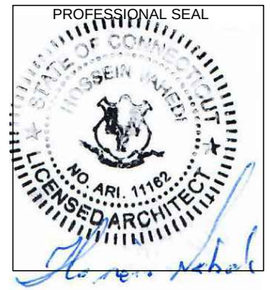
ELEVATION
SCALE: 1/16" = 1'-0" 1/A-1

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development
420 MAIN STREET, BLDG 4
STURBRIDGE, MA 01566
203-275-6669

CONSULTANT:
FORESITE LLC
Innovative design solutions
Foresitellc.com
462 WALNUT STREET
NEWTON, MA 02460
617-212-3123

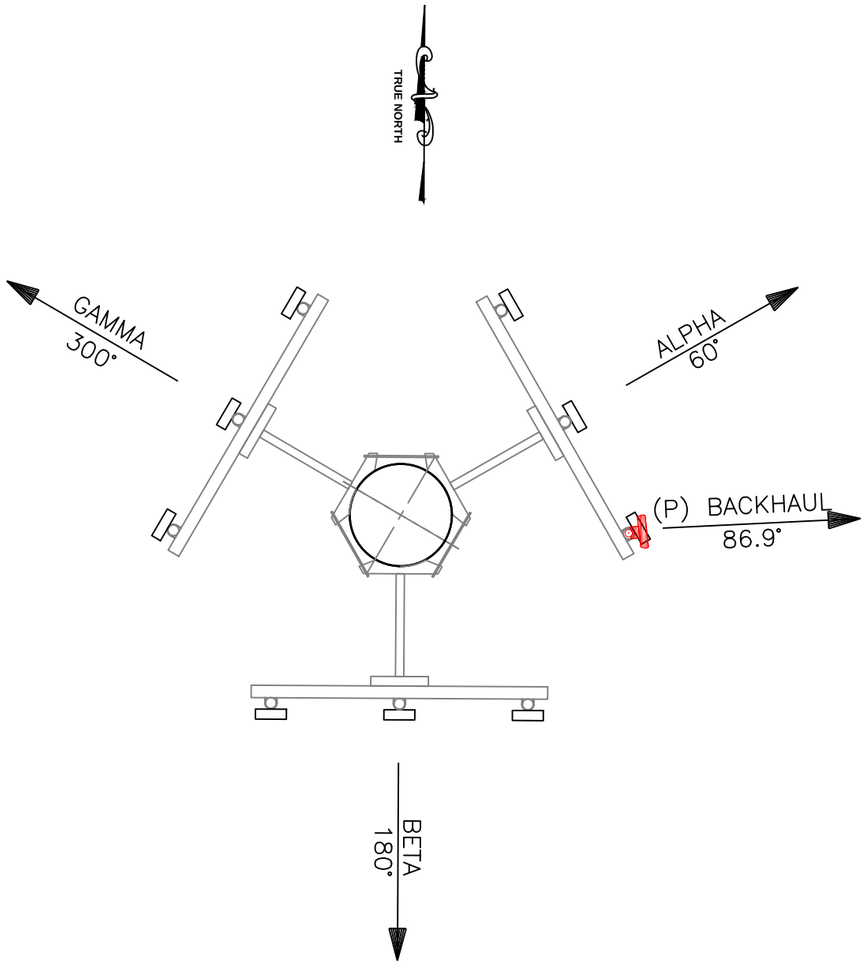
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	06/24/19
0	FINAL ISSUED	07/11/19

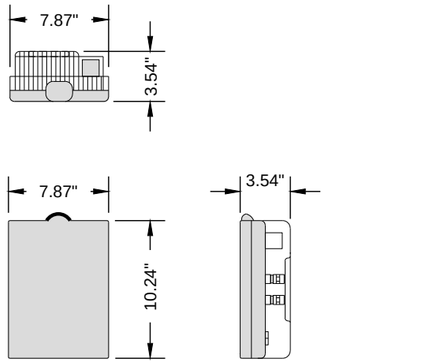
SITE NUMBER: CT11533B
SITE NAME: SHAKER PINES FIRE DEPARTMENT
SITE ADDRESS: 37 BACON ROAD
ENFIELD, CT 06082

SHEET TITLE:
A-1: PLANS AND ELEVATIONS



ANTENNA PLAN
N.T.S.

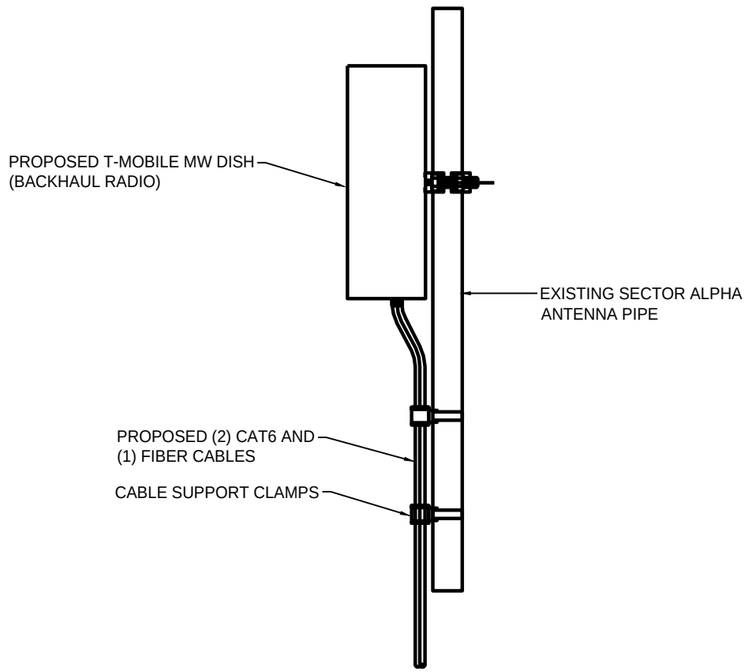
1
A-2



MANUFACTURER: FASTBACK
MODEL: IBR 1300
FOOTPRINT: 10.24"HX7.87"WX3.54"D
WEIGHT: 8.82 LBS

BACKHAUL RADIO SPECS
N.T.S.

2
A-2



BACKHAUL RADIO MOUNTING DETAIL
N.T.S.

2
A-2

APPLICANT:
T-MOBILE NORTHEAST LLC
35 GRIFFIN ROAD SOUTH
BLOOMFIELD, CT 06002
860-692-7100

PROJECT MANAGER
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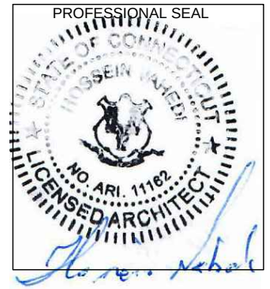
PROFESSIONAL SEAL



REV	DESCRIPTION	DATE
A	PRELIMINARY	06/24/19
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SITE NUMBER: CT11533B
SITE NAME: SHAKER PINES FIRE DEPARTMENT
SITE ADDRESS: 37 BACON ROAD
ENFIELD, CT 06082

SHEET TITLE:
A-2: DETAILS

Exhibit D

STRUCTURAL ANALYSIS REPORT
MONOPOLE

Prepared For:

T-Mobile Northeast, LLC
35 Griffin Road South
Bloomfield, CT 06002

Structure Rating:	
Monopole:	**88.0% (Pass)**
Base Plate:	**53.0% (Pass)**
Anchor bolts:	**69.4% (Pass)**
Foundation:	**82.0% (Pass)**

Sincerely,
Destek Engineering, LLC
Firm License No: PEC0001429

06-24-2019

STATE OF CONNECTICUT
AHMET COLAKOGLU
PEN. 27057
LICENSED
PROFESSIONAL ENGINEER

Ahmet Colakoglu, PE
Connecticut Professional Engineer
License No: 27057

Site ID: CT11533B
Site Name: Shaker Pines Fire Department
37 Bacon Road
Enfield, CT 06082

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

CONTENTS

1.0 - SUBJECT AND REFERENCES

1.1 - STRUCTURE

2.0 - EXISTING AND PROPOSED APPURTENANCES

3.0 - CODES AND LOADING

4.0 - STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

5.0 - ANALYSIS AND ASSUMPTIONS

6.0 - RESULTS AND CONCLUSION

APPENDICES

A - SOFTWARE OUTPUT

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

1.0 SUBJECT AND REFERENCES

The purpose of this analysis is to evaluate the structural capacity of the 180ft tall monopole located at 37 Bacon Road, Enfield, CT 06082 for the additions and alterations proposed by T-Mobile.

The structural analysis is based on the following documentation provided to Destek Engineering, LLC (Destek):

- Scope description email by Foresite, dated 06/05/2019.
- Structural Analysis Report prepared by Centek Engineering, dated 10/05/2016.
- Construction Drawings prepared by Atlantis Group, dated 08/04/2014.
- Photographs provided by Foresite, LLC, dated 03/24/2019.

1.1 STRUCTURE

The structure is a 180 ft. tall, 18-sided monopole, which is attached to the foundation with a base plate and anchor bolts. It is formed by the following sections:

Section Length (ft)	Lap Splice (ft)	Shaft Thickness (in)	Top Diameter (in)	Bottom Diameter (in)	Yield Strength (ksi)
31	2.75	0.1875	14.4	21.38	65
24.5	0	0.25	20.38	25.91	65
29	4	0.3	25.91	32.44	65
53.5	5.5	0.34	30.94	43.1	65
33.25	0	0.34	41.17	48.95	65
20	0	0.35	48.95	53.23	65

2.0 EXISTING AND PROPOSED APPURTENANCES

Existing Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax*	Mounts
160	(3) Andrew RR90-17-02DPL2 (6) 10’’x8’’x3’’-TMAs	(6) 1-5/8"	(3) T-Arm with work platform support

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Proposed and Final Configuration of T-Mobile Appurtenances:

Rad Center (ft.)	Antennas & Equipment	Coax*	Mounts
160	(3) Andrew RR90-17-02DPL2 (6) 10''x8''x3''-TMAs (1) Radio IBR 1300	(6) 1-5/8" (2) Cat6 (1) Fiber cable	(3) T-Arm with work platform support

***Feedlines inside monopole**

Appurtenances by Others:

Rad Center (ft.)	Antennas & Equipment	Coax*	Mounts
177	(1) 10'x1'' Omni (1) 1'x1' Panel	(2) 1/2'' (2) 1-1/4''	(2) Dual Mount Standoffs
168	(2) KMW AM-X-CD-16-65-00T-RET (2) Andrew SBNH-1D6565C (2) powerwave P65-17-XLH-RR (3) kathrein 80010121 (6) Ericsson RRUS11 (6) kathrein 86010025 (6) powerwave LGP21401 (12) powerwave LGP21901 (3) cci antennas DTMABP7819VG12A	(12) 1-5/8'' (1) #8 AWG Copper Wire (1) RG6-Fiber	(3) T-Arm Mounts
150	(6) Antel LPA-80080/4CF (6) Andrew SBNHH-1D65B (3) amphenol BXA-70063-6CF (3) alcatel lucent B13 RRH 4x30 (3) alcatel lucent B25 RRH 4x30 (3) RRH4x45/2x90-AWS (2) rfs celwave DB-T1-6Z-8AB-0Z	(14) 1-5/8''	(1) Existing Platform Mount

***Feedlines inside monopole**

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3.0 CODES AND LOADING

This analysis has been performed in accordance with the 2018 Connecticut Building Code (2015 IBC) based upon an ultimate 3-second gust wind speed of 125 mph (Risk Category II) converted to a nominal 3-second gust wind speed of 97 mph per section 1609.3.1 as required for use in the TIA-222-G Standard per Exception #5 of Section 1609.1.1. The following loading criteria were used in the analysis for Hartford County, CT:

- Basic wind speed of 97 mph without ice (V)
- Basic wind speed of 50 mph concurrent with the design ice thickness of 1 ” (Vi and ti)
- Exposure Category C, Topographic Category 1

The following load combinations were used with wind blowing at 0°, 30°, 60°, and 90°, measured from a line normal to the face of the tower:

- $1.2\ D + 1.6\ W_0$
- $0.9\ D + 1.6\ W_0$
- $1.2\ D + 1.0\ D_i + 1.0\ W_i + 1.0\ T_i$

D: Dead load of structures and appurtenances
D_i: Weight of ice due to factored ice thickness (based upon t_i)
T_i: Load effects due to temperature
W_0: Wind load without ice (based upon V)
W_i: Wind load with ice (based upon V_i)

4.0 STANDARD CONDITIONS FOR ENGINEERING SERVICES ON EXISTING STRUCTURES

The analysis is based on the information provided to Destek and is assumed to be current and correct. Unless otherwise noted, the structure and the foundation system are assumed to be in good condition, free of defects and can achieve theoretical strength.

It is assumed that the structure has been maintained and shall be maintained during its service. The superstructure and the foundation system are assumed to be designed with proper engineering practice and fabricated, constructed and erected in accordance with the design documents. Destek will accept no liability which may arise due to any existing deficiency in design, material, fabrication, erection, construction, etc. or lack of maintenance.

The analysis does not include a qualification of the mounts attached on the structure or their connections. The analysis is performed to verify the capacity of the main structural members, which is the current practice in the tower industry.

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The analysis results presented in this report are only applicable for the previously mentioned existing and proposed additions and alterations. Any deviation of the proposed equipment and placement, etc., will require Destek to generate an additional structural analysis.

5.0 ANALYSIS AND ASSUMPTIONS

The tower was analyzed by utilizing tnxTower, a non-linear, three-dimensional, finite element-analysis software package, a product of Tower Numerics, Inc. Software output for this analysis is provided in Appendix A of this report.

6.0 RESULTS AND CONCLUSION

Based on a structural analysis per *ANSI/TIA-222-G*, the existing monopole has **adequate** structural capacity for the proposed changes by T-Mobile. For the code specified load combinations and as a maximum, the monopole shaft from 21 ft. to 48.75 ft. is stressed to **88.0%** of its structural capacity. The base plate and anchor bolts are stressed to **53.0%** and **69.4%** of their structural capacities, respectively.

The existing tower foundation has **adequate** capacity for the proposed loading by T-Mobile. For the code specified load combinations and as a maximum, the tower foundation is stressed to **82.0%** of its structural capacity.

Therefore, the proposed alterations and additions by T-Mobile **can** be implemented as intended with the conditions outlined in this report.

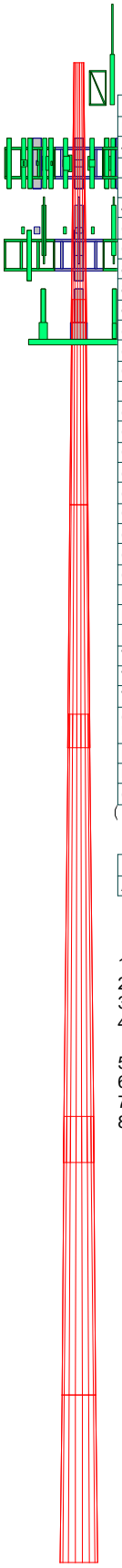
Should you have any questions about this report or require any additional information, please contact Ahmet Colakoglu at (770) 693-0835 or acolakoglu@destekengineering.com

DESTEK ENGINEERING, LLC
1281 Kennestone Circle, Ste 100, Marietta, GA 30066-Tel: (770) 693-0835

APPENDIX A
SOFTWARE OUTPUT

Section	Length (ft)	Number of Sides	Thickness (in)	Socket Length (ft)	Top Dia (in)	Bot Dia (in)	Grade	Weight (K)
1	31.00	18	0.1875	2.75	14.4000	21.3800		1.1
2	24.50	18	0.2500		20.3858	25.9100		1.5
3	29.00	18	0.3000	4.00	25.9100	32.4400		2.7
4	53.50	18	0.3400	5.50	30.9393	43.1000	A572-65	7.2
5	33.25	18	0.3400		41.1698	48.9500		5.5
6	20.00	18	0.3500		48.9500	53.2300		3.8
								21.8

180.0 ft
149.0 ft
127.3 ft
98.3 ft
48.8 ft
21.0 ft
1.0 ft



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
HP2-4.7	178	(2) 10"x8"x3"-TMA	157
4ft Dual Mount Standoff	177	(2) 10"x8"x3"-TMA	157
10'x1" Dia Omni	177	IBR 1300 Series	157
1'x1' Panel	177	(2) 8'-P2x0.203	157
4ft Dual Mount Standoff	177	(2) 8'-P2x0.203	157
(2) SBNH-1D6565C w/ Mount Pipe	168	(2) 8'-P2x0.203	157
(2) P65-17-XLH-RR w/ Mount Pipe	168	12ft T-Arm w/ Work Support Platform	157
800 10121 w/ Mount Pipe	168	12ft T-Arm w/ Work Support Platform	157
800 10121 w/ Mount Pipe	168	12ft T-Arm w/ Work Support Platform	157
800 10121 w/ Mount Pipe	168	RR90-17-02DPL2 w/ Mount Pipe	157
(2) RRUS 11	168	(2) LPA-80080/4CF w/ Mount Pipe	147
(2) RRUS 11	168	(2) LPA-80080/4CF w/ Mount Pipe	147
(2) RRUS 11	168	(2) SBNHH-1D65B w/ Mount Pipe	147
DC6-48-60-18-8F	168	(2) SBNHH-1D65B w/ Mount Pipe	147
(2) 860 10025	168	(2) SBNHH-1D65B w/ Mount Pipe	147
(2) 860 10025	168	BXA-70063-6CF-EDIN-X w/ Mount Pipe	147
(2) 860 10025	168	BXA-70063-6CF-EDIN-X w/ Mount Pipe	147
(2) LGP21401	168	BXA-70063-6CF-EDIN-X w/ Mount Pipe	147
(2) LGP21401	168	B13 RRH 4X30	147
(2) LGP21401	168	B13 RRH 4X30	147
(4) LGP21901	168	B13 RRH 4X30	147
(4) LGP21901	168	RRH4x45/2x90-AWS	147
(4) LGP21901	168	RRH4x45/2x90-AWS	147
DTMABP7819VG12A	168	RRH4x45/2x90-AWS	147
DTMABP7819VG12A	168	B25 RRH4X30	147
DTMABP7819VG12A	168	B25 RRH4X30	147
Valmont T-Arm	168	B25 RRH4X30	147
Valmont T-Arm	168	DB-T1-6Z-8AB-0Z	147
Valmont T-Arm	168	DB-T1-6Z-8AB-0Z	147
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	168	Andrew 12'-6" Low Profile Platform	147
RR90-17-02DPL2 w/ Mount Pipe	157	(2) LPA-80080/4CF w/ Mount Pipe	147
RR90-17-02DPL2 w/ Mount Pipe	157		
(2) 10"x8"x3"-TMA	157		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-G Standard.
3. Tower designed for a 97 mph basic wind in accordance with the TIA-222-G Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Structure Class II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 88%

ALL REACTIONS ARE FACTORED

AXIAL 77 K

SHEAR 10 K *MOMENT 1372 kip-ft*

TORQUE 1 kip-ft
50 mph WIND - 1.0000 in ICE

AXIAL 41 K

SHEAR 29 K *MOMENT 3594 kip-ft*

TORQUE 5 kip-ft
REACTIONS - 97 mph WIND

Destek Engineering, LLC
1281 Kennestone Circle, Ste 100
Marietta, GA
Phone: (770) 693-0835
FAX:

Job: 1975085			
Project: CT11533B			
Client: Foresite LLC	Drawn by: Ahmet Colakoglu		App'd:
Code: TIA-222-G	Date: 06/21/19		Scale: NTS
Path: S:\Projects\2019\75 - Foresite LLC\085 - CT11533B\TNX\CT11533B.eri			Dwg No. E-1

Tower Input Data

The tower is a monopole.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

Tower is located in Hartford County, Connecticut.
Basic wind speed of 97 mph.
Structure Class II.
Exposure Category C.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 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 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Tapered Pole Section Geometry

Section	*Elevation* *ft*	*Section Length* *ft*	*Splice Length* *ft*	*Number of Sides*	*Top Diameter* *in*	*Bottom Diameter* *in*	*Wall Thickness* *in*	*Bend Radius* *in*	*Pole Grade*
L1	180.00-149.00	31.00	2.75	18	14.4000	21.3800	0.1875	0.7500	A572-65 (65 ksi)
L2	149.00-127.25	24.50	0.00	18	20.3858	25.9100	0.2500	1.0000	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	127.25-98.25	29.00	4.00	18	25.9100	32.4400	0.3000	1.2000	(65 ksi) A572-65
L4	98.25-48.75	53.50	5.50	18	30.9393	43.1000	0.3400	1.3600	(65 ksi) A572-65
L5	48.75-21.00	33.25	0.00	18	41.1698	48.9500	0.3400	1.3600	(65 ksi) A572-65
L6	21.00-1.00	20.00		18	48.9500	53.2300	0.3500	1.4000	(65 ksi) A572-65

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	14.5932	8.4582	215.8525	5.0454	7.3152	29.5074	431.9890	4.2299	2.2044	11.757
	21.6809	12.6122	715.6361	7.5233	10.8610	65.8902	1432.2138	6.3073	3.4329	18.309
L2	21.2914	15.9778	818.4486	7.1482	10.3560	79.0314	1637.9742	7.9904	3.1479	12.592
	26.2711	20.3612	1693.7696	9.1093	13.1623	128.6836	3389.7679	10.1825	4.1202	16.481
L3	26.2634	24.3858	2020.6652	9.0915	13.1623	153.5194	4043.9892	12.1952	4.0322	13.441
	32.8942	30.6037	3993.9557	11.4097	16.4795	242.3587	7993.1668	15.3048	5.1814	17.271
L4	32.2874	33.0216	3906.2334	10.8628	15.7172	248.5329	7817.6067	16.5139	4.8469	14.256
	43.7124	46.1449	10659.4888	15.1798	21.8948	486.8502	21333.0037	23.0768	6.9872	20.551
L5	43.0593	44.0619	9280.1756	14.4946	20.9143	443.7244	18572.5624	22.0351	6.6475	19.551
	49.6527	52.4580	15660.3027	17.2566	24.8666	629.7726	31341.2117	26.2340	8.0168	23.579
L6	49.6511	53.9897	16110.9528	17.2530	24.8666	647.8953	32243.1048	27.0000	7.9992	22.855
	53.9972	58.7444	20753.2805	18.7724	27.0408	767.4791	41533.8687	29.3778	8.7525	25.007

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 180.00-149.00				1	1	1			
L2 149.00-127.25				1	1	1			
L3 127.25-98.25				1	1	1			
L4 98.25-48.75				1	1	1			
L5 48.75-21.00				1	1	1			
L6 21.00-1.00				1	1	1			

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
LDF6-50A(1-1/4)	C	No	No	Inside Pole	180.00 - 1.00	2	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
LDF4-50A(1/2)	C	No	No	Inside Pole	180.00 - 1.00	2	No Ice	0.00	0.15

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
							1/2" Ice	0.00	0.15
							1" Ice	0.00	0.15
**********									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	171.00 - 1.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
#8 AWG Copper Wire	C	No	No	Inside Pole	171.00 - 1.00	2	No Ice	0.00	0.05
							1/2" Ice	0.00	0.05
							1" Ice	0.00	0.05
RG6-Fiber	C	No	No	Inside Pole	171.00 - 1.00	1	No Ice	0.00	1.00
							1/2" Ice	0.00	1.00
							1" Ice	0.00	1.00
**********									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	161.00 - 1.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
CAT6(1/4)	C	No	No	Inside Pole	161.00 - 1.00	2	No Ice	0.00	0.05
							1/2" Ice	0.00	0.05
							1" Ice	0.00	0.05
Fiber cable	C	No	No	Inside Pole	161.00 - 1.00	1	No Ice	0.00	0.05
							1/2" Ice	0.00	0.05
							1" Ice	0.00	0.05
**********									
LDF7-50A(1-5/8)	C	No	No	Inside Pole	151.00 - 1.00	12	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
Hybriflex 1-5/8"	C	No	No	Inside Pole	151.00 - 1.00	1	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90
Hybriflex 1-5/8"	C	No	No	Inside Pole	151.00 - 1.00	1	No Ice	0.00	1.90
							1/2" Ice	0.00	1.90
							1" Ice	0.00	1.90

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.00-149.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.38
L2	149.00-127.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.68
L3	127.25-98.25	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.90
L4	98.25-48.75	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	1.54
L5	48.75-21.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.86
L6	21.00-1.00	A	0.000	0.000	0.000	0.000	0.00

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.62

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	180.00-149.00	A	2.347	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.38
L2	149.00-127.25	A	2.307	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.68
L3	127.25-98.25	A	2.260	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.90
L4	98.25-48.75	A	2.164	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	1.54
L5	48.75-21.00	A	2.009	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.86
L6	21.00-1.00	A	1.790	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.62

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	180.00-149.00	0.0000	0.0000	0.0000	0.0000
L2	149.00-127.25	0.0000	0.0000	0.0000	0.0000
L3	127.25-98.25	0.0000	0.0000	0.0000	0.0000
L4	98.25-48.75	0.0000	0.0000	0.0000	0.0000
L5	48.75-21.00	0.0000	0.0000	0.0000	0.0000
L6	21.00-1.00	0.0000	0.0000	0.0000	0.0000

Note: For pole sections, center of pressure calculations do not consider feed line shielding.

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
***									
4ft Dual Mount Standoff	A	From Leg	2.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	5.20 6.30 7.40	5.20 6.30 7.40	0.05 0.06 0.07
4ft Dual Mount Standoff	B	From Leg	2.00 0.00 0.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	5.20 6.30 7.40	5.20 6.30 7.40	0.05 0.06 0.07
10'x1" DIa Omni	B	From Leg	4.00 0.00 5.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	1.00 2.02 3.04	1.00 2.02 3.04	0.03 0.04 0.05
1'x1' Panel	B	From Leg	4.00 0.00 1.00	0.0000	177.00	No Ice 1/2" Ice 1" Ice	1.20 1.34 1.48	0.32 0.40 0.48	0.02 0.03 0.04
*** ***									
168ft AT&T									
(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	4.63 5.06 5.51	3.27 3.69 4.12	0.07 0.13 0.20
(2) SBNH-1D6565C w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	5.56 6.07 6.59	4.47 4.97 5.47	0.08 0.17 0.26
(2) P65-17-XLH-RR w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	11.70 12.42 13.15	8.94 10.45 11.99	0.09 0.18 0.27
800 10121 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.42	2.95 3.34 3.74	0.07 0.11 0.17
800 10121 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.42	2.95 3.34 3.74	0.07 0.11 0.17
800 10121 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	3.60 4.00 4.42	2.95 3.34 3.74	0.07 0.11 0.17
(2) RRUS 11	A	From Leg	0.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
(2) RRUS 11	B	From Leg	0.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
(2) RRUS 11	C	From Leg	0.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	2.78 2.99 3.21	1.19 1.33 1.49	0.05 0.07 0.10
DC6-48-60-18-8F	C	From Leg	0.50 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.79 1.27 1.45	0.79 1.27 1.45	0.02 0.03 0.05
(2) 860 10025	A	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.14 0.19 0.25	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	B	From Leg	4.00 0.00 0.00	0.0000	168.00	No Ice 1/2" Ice 1" Ice	0.14 0.19 0.25	0.12 0.17 0.23	0.00 0.00 0.01
(2) 860 10025	C	From Leg	4.00 0.00	0.0000	168.00	No Ice 1/2" Ice	0.14 0.19	0.12 0.17	0.00 0.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	0.25	0.23	0.01
(2) LGP21401	A	From Leg	4.00	0.0000	168.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
(2) LGP21401	B	From Leg	4.00	0.0000	168.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
(2) LGP21401	C	From Leg	4.00	0.0000	168.00	No Ice	1.10	0.21	0.01
			0.00			1/2" Ice	1.24	0.27	0.02
			0.00			1" Ice	1.38	0.35	0.03
(4) LGP21901	A	From Leg	4.00	0.0000	168.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(4) LGP21901	B	From Leg	4.00	0.0000	168.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
(4) LGP21901	C	From Leg	4.00	0.0000	168.00	No Ice	0.23	0.16	0.01
			0.00			1/2" Ice	0.29	0.21	0.01
			0.00			1" Ice	0.36	0.28	0.01
DTMABP7819VG12A	A	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	B	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
DTMABP7819VG12A	C	From Leg	4.00	0.0000	168.00	No Ice	0.98	0.34	0.02
			0.00			1/2" Ice	1.10	0.42	0.03
			0.00			1" Ice	1.23	0.51	0.04
Valmont T-Arm	A	From Leg	4.00	0.0000	168.00	No Ice	10.54	10.54	0.34
			0.00			1/2" Ice	14.45	14.45	0.41
			0.00			1" Ice	18.36	18.36	0.48
Valmont T-Arm	B	From Leg	4.00	0.0000	168.00	No Ice	10.54	10.54	0.34
			0.00			1/2" Ice	14.45	14.45	0.41
			0.00			1" Ice	18.36	18.36	0.48
Valmont T-Arm	C	From Leg	4.00	0.0000	168.00	No Ice	10.54	10.54	0.34
			0.00			1/2" Ice	14.45	14.45	0.41
			0.00			1" Ice	18.36	18.36	0.48
***									
***									
160ft T-Mobile									
RR90-17-02DPL2 w/ Mount Pipe	A	From Leg	4.00	0.0000	157.00	No Ice	4.59	3.34	0.03
			0.00			1/2" Ice	5.02	4.11	0.07
			3.00			1" Ice	5.44	4.81	0.12
RR90-17-02DPL2 w/ Mount Pipe	B	From Leg	4.00	0.0000	157.00	No Ice	4.59	3.34	0.03
			0.00			1/2" Ice	5.02	4.11	0.07
			3.00			1" Ice	5.44	4.81	0.12
RR90-17-02DPL2 w/ Mount Pipe	C	From Leg	4.00	0.0000	157.00	No Ice	4.59	3.34	0.03
			0.00			1/2" Ice	5.02	4.11	0.07
			3.00			1" Ice	5.44	4.81	0.12
(2) 10"x8"x3"-TMA	A	From Leg	4.00	0.0000	157.00	No Ice	0.67	0.26	0.05
			0.00			1/2" Ice	0.77	0.33	0.06
			3.00			1" Ice	0.88	0.41	0.06
(2) 10"x8"x3"-TMA	B	From Leg	4.00	0.0000	157.00	No Ice	0.67	0.26	0.05
			0.00			1/2" Ice	0.77	0.33	0.06
			3.00			1" Ice	0.88	0.41	0.06
(2) 10"x8"x3"-TMA	C	From Leg	4.00	0.0000	157.00	No Ice	0.67	0.26	0.05
			0.00			1/2" Ice	0.77	0.33	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.00			1" Ice	0.88	0.41	0.06
IBR 1300 Series	A	From Leg	4.00	0.0000	157.00	No Ice	0.67	0.23	0.01
			0.00			1/2" Ice	0.78	0.30	0.01
			3.00			1" Ice	0.89	0.37	0.02
(2) 8'-P2x0.203	A	From Leg	4.00	0.0000	157.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			3.00			1" Ice	3.40	3.40	0.06
(2) 8'-P2x0.203	B	From Leg	4.00	0.0000	157.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			3.00			1" Ice	3.40	3.40	0.06
(2) 8'-P2x0.203	C	From Leg	4.00	0.0000	157.00	No Ice	1.90	1.90	0.03
			0.00			1/2" Ice	2.73	2.73	0.04
			3.00			1" Ice	3.40	3.40	0.06
12ft T-Arm w/ Work Support Platform	A	From Leg	4.00	0.0000	157.00	No Ice	14.20	14.20	0.49
			0.00			1/2" Ice	19.70	19.70	0.57
			0.00			1" Ice	25.20	25.20	0.66
12ft T-Arm w/ Work Support Platform	B	From Leg	4.00	0.0000	157.00	No Ice	14.20	14.20	0.49
			0.00			1/2" Ice	19.70	19.70	0.57
			0.00			1" Ice	25.20	25.20	0.66
12ft T-Arm w/ Work Support Platform	C	From Leg	4.00	0.0000	157.00	No Ice	14.20	14.20	0.49
			0.00			1/2" Ice	19.70	19.70	0.57
			0.00			1" Ice	25.20	25.20	0.66
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***									
150ft Verizon									
(2) LPA-80080/4CF w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	2.86	6.57	0.03
			0.00			1/2" Ice	3.22	7.19	0.08
			3.00			1" Ice	3.59	7.84	0.13
(2) LPA-80080/4CF w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	2.86	6.57	0.03
			0.00			1/2" Ice	3.22	7.19	0.08
			3.00			1" Ice	3.59	7.84	0.13
(2) LPA-80080/4CF w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	2.86	6.57	0.03
			0.00			1/2" Ice	3.22	7.19	0.08
			3.00			1" Ice	3.59	7.84	0.13
(2) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2" Ice	4.49	3.68	0.13
			3.00			1" Ice	4.89	4.07	0.20
(2) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2" Ice	4.49	3.68	0.13
			3.00			1" Ice	4.89	4.07	0.20
(2) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	4.09	3.30	0.07
			0.00			1/2" Ice	4.49	3.68	0.13
			3.00			1" Ice	4.89	4.07	0.20
BXA-70063-6CF-EDIN-X w/ Mount Pipe	A	From Leg	4.00	0.0000	147.00	No Ice	7.81	5.80	0.04
			0.00			1/2" Ice	8.36	6.95	0.10
			3.00			1" Ice	8.87	7.82	0.17
BXA-70063-6CF-EDIN-X w/ Mount Pipe	B	From Leg	4.00	0.0000	147.00	No Ice	7.81	5.80	0.04
			0.00			1/2" Ice	8.36	6.95	0.10
			3.00			1" Ice	8.87	7.82	0.17
BXA-70063-6CF-EDIN-X w/ Mount Pipe	C	From Leg	4.00	0.0000	147.00	No Ice	7.81	5.80	0.04
			0.00			1/2" Ice	8.36	6.95	0.10
			3.00			1" Ice	8.87	7.82	0.17
B13 RRH 4X30	A	From Leg	4.00	0.0000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07
			1.00			1" Ice	2.43	1.64	0.09
B13 RRH 4X30	B	From Leg	4.00	0.0000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.00			1" Ice	2.43	1.64	0.09
B13 RRH 4X30	C	From Leg	4.00	0.0000	147.00	No Ice	2.06	1.32	0.06
			0.00			1/2" Ice	2.24	1.48	0.07
			1.00			1" Ice	2.43	1.64	0.09
RRH4x45/2x90-AWS	A	From Leg	4.00	0.0000	147.00	No Ice	2.58	1.69	0.08
			0.00			1/2" Ice	2.79	1.87	0.10
			1.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	B	From Leg	4.00	0.0000	147.00	No Ice	2.58	1.69	0.08
			0.00			1/2" Ice	2.79	1.87	0.10
			1.00			1" Ice	3.01	2.06	0.12
RRH4x45/2x90-AWS	C	From Leg	4.00	0.0000	147.00	No Ice	2.58	1.69	0.08
			0.00			1/2" Ice	2.79	1.87	0.10
			1.00			1" Ice	3.01	2.06	0.12
B25 RRH4X30	A	From Leg	4.00	0.0000	147.00	No Ice	2.20	1.74	0.06
			0.00			1/2" Ice	2.39	1.92	0.08
			1.00			1" Ice	2.59	2.11	0.10
B25 RRH4X30	B	From Leg	4.00	0.0000	147.00	No Ice	2.20	1.74	0.06
			0.00			1/2" Ice	2.39	1.92	0.08
			1.00			1" Ice	2.59	2.11	0.10
B25 RRH4X30	C	From Leg	4.00	0.0000	147.00	No Ice	2.20	1.74	0.06
			0.00			1/2" Ice	2.39	1.92	0.08
			1.00			1" Ice	2.59	2.11	0.10
DB-T1-6Z-8AB-0Z	A	From Leg	4.00	0.0000	147.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			1.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z	C	From Leg	4.00	0.0000	147.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			1.00			1" Ice	5.35	2.39	0.12
Andrew 12'-6" Low Profile Platform	C	None		0.0000	147.00	No Ice	14.45	14.45	1.30
						1/2" Ice	19.00	19.00	1.69
						1" Ice	23.55	23.55	2.08

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft^2	Weight K
HP2-4.7	A	Paraboloid w/Shroud (HP)	From Face	40.00	0.0000		178.00	2.00	No Ice	3.14	0.03
				0.00					1/2" Ice	3.41	0.04
				0.00					1" Ice	3.68	0.06

Load Combinations

Comb. No.	Description
1	Dead Only

Comb. No.	Description
2	1.2 Dead+1.6 Wind 0 deg - No Ice
3	0.9 Dead+1.6 Wind 0 deg - No Ice
4	1.2 Dead+1.6 Wind 30 deg - No Ice
5	0.9 Dead+1.6 Wind 30 deg - No Ice
6	1.2 Dead+1.6 Wind 60 deg - No Ice
7	0.9 Dead+1.6 Wind 60 deg - No Ice
8	1.2 Dead+1.6 Wind 90 deg - No Ice
9	0.9 Dead+1.6 Wind 90 deg - No Ice
10	1.2 Dead+1.6 Wind 120 deg - No Ice
11	0.9 Dead+1.6 Wind 120 deg - No Ice
12	1.2 Dead+1.6 Wind 150 deg - No Ice
13	0.9 Dead+1.6 Wind 150 deg - No Ice
14	1.2 Dead+1.6 Wind 180 deg - No Ice
15	0.9 Dead+1.6 Wind 180 deg - No Ice
16	1.2 Dead+1.6 Wind 210 deg - No Ice
17	0.9 Dead+1.6 Wind 210 deg - No Ice
18	1.2 Dead+1.6 Wind 240 deg - No Ice
19	0.9 Dead+1.6 Wind 240 deg - No Ice
20	1.2 Dead+1.6 Wind 270 deg - No Ice
21	0.9 Dead+1.6 Wind 270 deg - No Ice
22	1.2 Dead+1.6 Wind 300 deg - No Ice
23	0.9 Dead+1.6 Wind 300 deg - No Ice
24	1.2 Dead+1.6 Wind 330 deg - No Ice
25	0.9 Dead+1.6 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	180 - 149	Pole	Max Tension	48	0.00	-0.00	-0.00
			Max. Compression	26	-18.44	3.84	1.13
			Max. Mx	20	-5.10	152.36	1.61
			Max. My	2	-5.12	1.84	149.73

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	8	11.27	-151.65	-0.91
			Max. Vx	14	11.14	-2.05	-148.90
			Max. Torque	17			-4.48
L2	149 - 127.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-34.84	5.55	1.98
			Max. Mx	8	-10.46	-568.40	-0.37
			Max. My	2	-10.48	1.82	564.63
			Max. Vy	8	18.58	-568.40	-0.37
			Max. Vx	14	18.51	-2.40	-563.80
			Max. Torque	17			-4.85
L3	127.25 - 98.25	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-40.73	5.98	2.14
			Max. Mx	8	-14.58	-1057.93	0.30
			Max. My	2	-14.60	1.32	1052.16
			Max. Vy	8	20.64	-1057.93	0.30
			Max. Vx	14	20.57	-2.80	-1051.58
			Max. Torque	17			-4.82
L4	98.25 - 48.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-56.08	6.47	2.31
			Max. Mx	8	-25.37	-2151.64	1.57
			Max. My	2	-25.38	0.18	2142.06
			Max. Vy	8	24.91	-2151.64	1.57
			Max. Vx	14	24.84	-3.64	-2141.96
			Max. Torque	17			-4.79
L5	48.75 - 21	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-69.41	6.53	2.33
			Max. Mx	8	-34.92	-3026.87	2.44
			Max. My	14	-34.92	-4.24	-3014.96
			Max. Vy	8	27.66	-3026.87	2.44
			Max. Vx	14	27.60	-4.24	-3014.96
			Max. Torque	17			-4.75
L6	21 - 1	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-77.10	6.53	2.33
			Max. Mx	8	-40.76	-3592.51	2.94
			Max. My	14	-40.76	-4.60	-3579.32
			Max. Vy	8	28.95	-3592.51	2.94
			Max. Vx	14	28.88	-4.60	-3579.32
			Max. Torque	17			-4.74

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	36	77.10	9.80	0.02
	Max. H_x	20	40.78	28.88	-0.04
	Max. H_z	3	30.58	-0.03	28.86
	Max. M_x	2	3578.87	-0.03	28.86
	Max. M_z	8	3592.51	-28.93	0.03
	Max. Torsion	5	4.74	-14.48	25.03
	Min. Vert	19	30.58	25.07	-14.45
	Min. H_x	8	40.78	-28.93	0.03
	Min. H_z	15	30.58	-0.02	-28.87
	Min. M_x	14	-3579.32	-0.02	-28.87
	Min. M_z	20	-3586.59	28.88	-0.04
	Min. Torsion	17	-4.74	14.52	-25.01

Tower Mast Reaction Summary

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead Only	33.98	-0.00	-0.00	-0.60	1.03	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice	40.78	0.03	-28.86	-3578.87	-1.22	-4.02
0.9 Dead+1.6 Wind 0 deg - No Ice	30.58	0.03	-28.86	-3520.06	-1.53	-4.07
1.2 Dead+1.6 Wind 30 deg - No Ice	40.78	14.48	-25.03	-3106.00	-1797.12	-4.68
0.9 Dead+1.6 Wind 30 deg - No Ice	30.58	14.48	-25.03	-3054.95	-1767.97	-4.74
1.2 Dead+1.6 Wind 60 deg - No Ice	40.78	25.10	-14.42	-1785.63	-3118.86	-2.11
0.9 Dead+1.6 Wind 60 deg - No Ice	30.58	25.10	-14.42	-1756.25	-3068.02	-2.15
1.2 Dead+1.6 Wind 90 deg - No Ice	40.78	28.93	-0.03	-2.94	-3592.51	-0.58
0.9 Dead+1.6 Wind 90 deg - No Ice	30.58	28.93	-0.03	-2.73	-3533.93	-0.60
1.2 Dead+1.6 Wind 120 deg - No Ice	40.78	25.02	14.39	1783.41	-3105.98	1.36
0.9 Dead+1.6 Wind 120 deg - No Ice	30.58	25.02	14.39	1754.39	-3055.37	1.36
1.2 Dead+1.6 Wind 150 deg - No Ice	40.78	14.44	24.97	3095.85	-1793.86	2.93
0.9 Dead+1.6 Wind 150 deg - No Ice	30.58	14.44	24.97	3045.33	-1764.72	2.95
1.2 Dead+1.6 Wind 180 deg - No Ice	40.78	0.02	28.87	3579.32	-4.61	3.48
0.9 Dead+1.6 Wind 180 deg - No Ice	30.58	0.02	28.87	3520.87	-4.78	3.52
1.2 Dead+1.6 Wind 210 deg - No Ice	40.78	-14.52	25.01	3100.88	1805.99	4.69
0.9 Dead+1.6 Wind 210 deg - No Ice	30.58	-14.52	25.01	3050.28	1776.06	4.74
1.2 Dead+1.6 Wind 240 deg - No Ice	40.78	-25.07	14.45	1790.38	3115.60	2.67
0.9 Dead+1.6 Wind 240 deg - No Ice	30.58	-25.07	14.45	1761.26	3064.19	2.71
1.2 Dead+1.6 Wind 270 deg - No Ice	40.78	-28.88	0.04	4.08	3586.59	0.21
0.9 Dead+1.6 Wind 270 deg - No Ice	30.58	-28.88	0.04	4.23	3527.47	0.24
1.2 Dead+1.6 Wind 300 deg - No Ice	40.78	-24.98	-14.37	-1780.77	3101.24	-1.36
0.9 Dead+1.6 Wind 300 deg - No Ice	30.58	-24.98	-14.37	-1751.41	3050.08	-1.37
1.2 Dead+1.6 Wind 330 deg - No Ice	40.78	-14.41	-24.94	-3091.36	1789.78	-2.57
0.9 Dead+1.6 Wind 330 deg - No Ice	30.58	-14.41	-24.94	-3040.54	1760.10	-2.60
1.2 Dead+1.0 Ice+1.0 Temp	77.10	-0.00	-0.00	-2.33	6.53	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	77.10	-0.02	-9.82	-1367.50	11.32	-0.72
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	77.10	4.89	-8.50	-1183.75	-671.36	-0.79
1.2 Dead+1.0 Wind 60 deg+1.0	77.10	8.49	-4.88	-679.25	-1174.48	-0.16

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Ice+1.0 Temp 1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	77.10	9.81	0.02	2.37	-1357.85	0.12
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	77.10	8.50	4.92	683.53	-1176.34	0.42
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	77.10	4.92	8.51	1181.99	-679.73	0.62
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	77.10	0.03	9.82	1363.30	-0.26	0.59
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	77.10	-4.89	8.49	1178.01	686.37	0.78
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	77.10	-8.49	4.89	676.15	1186.20	0.29
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	77.10	-9.80	-0.02	-6.42	1368.80	-0.21
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	77.10	-8.49	-4.92	-687.13	1187.61	-0.43
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	77.10	-4.91	-8.50	-1185.08	691.22	-0.53
Dead+Wind 0 deg - Service	33.98	0.01	-6.17	-760.91	0.58	-0.90
Dead+Wind 30 deg - Service	33.98	3.10	-5.36	-660.46	-381.02	-1.05
Dead+Wind 60 deg - Service	33.98	5.37	-3.09	-379.91	-661.90	-0.48
Dead+Wind 90 deg - Service	33.98	6.19	-0.01	-1.10	-762.55	-0.13
Dead+Wind 120 deg - Service	33.98	5.35	3.08	378.48	-659.15	0.30
Dead+Wind 150 deg - Service	33.98	3.09	5.34	657.35	-380.33	0.66
Dead+Wind 180 deg - Service	33.98	0.00	6.18	760.06	-0.14	0.78
Dead+Wind 210 deg - Service	33.98	-3.11	5.35	658.41	384.58	1.05
Dead+Wind 240 deg - Service	33.98	-5.36	3.09	379.95	662.85	0.60
Dead+Wind 270 deg - Service	33.98	-6.18	0.01	0.40	762.91	0.05
Dead+Wind 300 deg - Service	33.98	-5.35	-3.07	-378.84	659.77	-0.30
Dead+Wind 330 deg - Service	33.98	-3.08	-5.34	-657.31	381.11	-0.58

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0.00	-33.98	0.00	0.00	33.98	0.00	0.000%
2	0.03	-40.78	-28.86	-0.03	40.78	28.86	0.000%
3	0.03	-30.58	-28.86	-0.03	30.58	28.86	0.000%
4	14.48	-40.78	-25.03	-14.48	40.78	25.03	0.000%
5	14.48	-30.58	-25.03	-14.48	30.58	25.03	0.000%
6	25.10	-40.78	-14.42	-25.10	40.78	14.42	0.000%
7	25.10	-30.58	-14.42	-25.10	30.58	14.42	0.000%
8	28.93	-40.78	-0.03	-28.93	40.78	0.03	0.000%
9	28.93	-30.58	-0.03	-28.93	30.58	0.03	0.000%
10	25.02	-40.78	14.39	-25.02	40.78	-14.39	0.000%
11	25.02	-30.58	14.39	-25.02	30.58	-14.39	0.000%
12	14.44	-40.78	24.97	-14.44	40.78	-24.97	0.000%
13	14.44	-30.58	24.97	-14.44	30.58	-24.97	0.000%
14	0.02	-40.78	28.87	-0.02	40.78	-28.87	0.000%
15	0.02	-30.58	28.87	-0.02	30.58	-28.87	0.000%
16	-14.52	-40.78	25.01	14.52	40.78	-25.01	0.000%
17	-14.52	-30.58	25.01	14.52	30.58	-25.01	0.000%
18	-25.07	-40.78	14.45	25.07	40.78	-14.45	0.000%
19	-25.07	-30.58	14.45	25.07	30.58	-14.45	0.000%
20	-28.88	-40.78	0.04	28.88	40.78	-0.04	0.000%
21	-28.88	-30.58	0.04	28.88	30.58	-0.04	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
22	-24.98	-40.78	-14.37	24.98	40.78	14.37	0.000%
23	-24.98	-30.58	-14.37	24.98	30.58	14.37	0.000%
24	-14.41	-40.78	-24.94	14.41	40.78	24.94	0.000%
25	-14.41	-30.58	-24.94	14.41	30.58	24.94	0.000%
26	0.00	-77.10	0.00	0.00	77.10	0.00	0.000%
27	-0.02	-77.10	-9.82	0.02	77.10	9.82	0.000%
28	4.89	-77.10	-8.50	-4.89	77.10	8.50	0.000%
29	8.49	-77.10	-4.88	-8.49	77.10	4.88	0.000%
30	9.81	-77.10	0.02	-9.81	77.10	-0.02	0.000%
31	8.50	-77.10	4.92	-8.50	77.10	-4.92	0.000%
32	4.92	-77.10	8.51	-4.92	77.10	-8.51	0.000%
33	0.03	-77.10	9.82	-0.03	77.10	-9.82	0.000%
34	-4.89	-77.10	8.49	4.89	77.10	-8.49	0.000%
35	-8.49	-77.10	4.89	8.49	77.10	-4.89	0.000%
36	-9.80	-77.10	-0.02	9.80	77.10	0.02	0.000%
37	-8.49	-77.10	-4.92	8.49	77.10	4.92	0.000%
38	-4.91	-77.10	-8.50	4.91	77.10	8.50	0.000%
39	0.01	-33.98	-6.17	-0.01	33.98	6.17	0.000%
40	3.10	-33.98	-5.36	-3.10	33.98	5.36	0.000%
41	5.37	-33.98	-3.09	-5.37	33.98	3.09	0.000%
42	6.19	-33.98	-0.01	-6.19	33.98	0.01	0.000%
43	5.35	-33.98	3.08	-5.35	33.98	-3.08	0.000%
44	3.09	-33.98	5.34	-3.09	33.98	-5.34	0.000%
45	0.00	-33.98	6.18	-0.00	33.98	-6.18	0.000%
46	-3.11	-33.98	5.35	3.11	33.98	-5.35	0.000%
47	-5.36	-33.98	3.09	5.36	33.98	-3.09	0.000%
48	-6.18	-33.98	0.01	6.18	33.98	-0.01	0.000%
49	-5.35	-33.98	-3.07	5.35	33.98	3.07	0.000%
50	-3.08	-33.98	-5.34	3.08	33.98	5.34	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000546
2	Yes	6	0.00000001	0.00011355
3	Yes	5	0.00000001	0.00070466
4	Yes	7	0.00000001	0.00007861
5	Yes	6	0.00000001	0.00031675
6	Yes	7	0.00000001	0.00008876
7	Yes	6	0.00000001	0.00036361
8	Yes	5	0.00000001	0.00027646
9	Yes	5	0.00000001	0.00011867
10	Yes	7	0.00000001	0.00008738
11	Yes	6	0.00000001	0.00035709
12	Yes	7	0.00000001	0.00008085
13	Yes	6	0.00000001	0.00032710
14	Yes	6	0.00000001	0.00009044
15	Yes	5	0.00000001	0.00056390
16	Yes	7	0.00000001	0.00009264
17	Yes	6	0.00000001	0.00038140
18	Yes	7	0.00000001	0.00008132
19	Yes	6	0.00000001	0.00032921
20	Yes	5	0.00000001	0.00008096
21	Yes	5	0.00000001	0.00003212
22	Yes	7	0.00000001	0.00008283

23	Yes	6	0.00000001	0.00033693
24	Yes	7	0.00000001	0.00008880
25	Yes	6	0.00000001	0.00036434
26	Yes	4	0.00000001	0.00033297
27	Yes	7	0.00000001	0.00030103
28	Yes	8	0.00000001	0.00022563
29	Yes	8	0.00000001	0.00023354
30	Yes	7	0.00000001	0.00028270
31	Yes	8	0.00000001	0.00023720
32	Yes	8	0.00000001	0.00022928
33	Yes	7	0.00000001	0.00029018
34	Yes	8	0.00000001	0.00024588
35	Yes	8	0.00000001	0.00023537
36	Yes	7	0.00000001	0.00028756
37	Yes	8	0.00000001	0.00024173
38	Yes	8	0.00000001	0.00025026
39	Yes	5	0.00000001	0.00010787
40	Yes	5	0.00000001	0.00028327
41	Yes	5	0.00000001	0.00035222
42	Yes	4	0.00000001	0.00038859
43	Yes	5	0.00000001	0.00033565
44	Yes	5	0.00000001	0.00028872
45	Yes	5	0.00000001	0.00009218
46	Yes	5	0.00000001	0.00039767
47	Yes	5	0.00000001	0.00029572
48	Yes	4	0.00000001	0.00031980
49	Yes	5	0.00000001	0.00030664
50	Yes	5	0.00000001	0.00035902

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 149	44.131	48	2.2927	0.0364
L2	151.75 - 127.25	30.859	47	2.1294	0.0150
L3	127.25 - 98.25	20.835	47	1.7291	0.0077
L4	102.25 - 48.75	12.930	47	1.2898	0.0042
L5	54.25 - 21	3.386	47	0.6050	0.0014
L6	21 - 1	0.451	47	0.2182	0.0004

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	HP2-4.7	48	43.167	2.2869	0.0348	27079
177.00	4ft Dual Mount Standoff	48	42.685	2.2839	0.0339	27079
168.00	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	48	38.371	2.2518	0.0262	11282
157.00	RR90-17-02DPL2 w/ Mount Pipe	47	33.232	2.1822	0.0181	5885
147.00	(2) LPA-80080/4CF w/ Mount Pipe	47	28.768	2.0681	0.0129	4239

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	180 - 149	206.565	8	10.6902	0.1670
L2	151.75 - 127.25	144.785	8	9.9884	0.0677
L3	127.25 - 98.25	97.882	8	8.1297	0.0348
L4	102.25 - 48.75	60.792	8	6.0697	0.0190
L5	54.25 - 21	15.930	6	2.8480	0.0062
L6	21 - 1	2.121	6	1.0268	0.0019

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
178.00	HP2-4.7	8	202.088	10.6675	0.1605	6422
177.00	4ft Dual Mount Standoff	8	199.851	10.6559	0.1564	6422
168.00	(2) AM-X-CD-16-65-00T-RET w/ Mount Pipe	8	179.814	10.5250	0.1207	2673
157.00	RR90-17-02DPL2 w/ Mount Pipe	8	155.866	10.2247	0.0830	1390
147.00	(2) LPA-80080/4CF w/ Mount Pipe	8	135.017	9.7082	0.0587	983

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	180 - 149 (1)	TP21.38x14.4x0.1875	31.00	0.00	0.0	12.2437	-5.10	887.61	0.006
L2	149 - 127.25 (2)	TP25.91x20.3858x0.25	24.50	0.00	0.0	20.3612	-10.46	1502.96	0.007
L3	127.25 - 98.25 (3)	TP32.44x25.91x0.3	29.00	0.00	0.0	29.7461	-14.58	2187.43	0.007
L4	98.25 - 48.75 (4)	TP43.1x30.9393x0.34	53.50	0.00	0.0	44.7958	-25.37	3144.28	0.008
L5	48.75 - 21 (5)	TP48.95x41.1698x0.34	33.25	0.00	0.0	52.4580	-34.92	3478.02	0.010
L6	21 - 1 (6)	TP53.23x48.95x0.35	20.00	0.00	0.0	58.7444	-40.76	3806.00	0.011

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	180 - 149 (1)	TP21.38x14.4x0.1875	152.36	375.04	0.406	0.00	375.04	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L2	149 - 127.25 (2)	TP25.91x20.3858x0.25	568.40	791.56	0.718	0.00	791.56	0.000
L3	127.25 - 98.25 (3)	TP32.44x25.91x0.3	1057.98	1402.74	0.754	0.00	1402.74	0.000
L4	98.25 - 48.75 (4)	TP43.1x30.9393x0.34	2152.08	2683.01	0.802	0.00	2683.01	0.000
L5	48.75 - 21 (5)	TP48.95x41.1698x0.34	3027.83	3479.55	0.870	0.00	3479.55	0.000
L6	21 - 1 (6)	TP53.23x48.95x0.35	3593.84	4143.69	0.867	0.00	4143.69	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	180 - 149 (1)	TP21.38x14.4x0.1875	11.23	443.80	0.025	0.01	752.03	0.000
L2	149 - 127.25 (2)	TP25.91x20.3858x0.25	18.58	751.48	0.025	0.59	1587.38	0.000
L3	127.25 - 98.25 (3)	TP32.44x25.91x0.3	20.64	1093.72	0.019	2.70	2812.98	0.001
L4	98.25 - 48.75 (4)	TP43.1x30.9393x0.34	24.92	1572.14	0.016	2.67	5379.23	0.000
L5	48.75 - 21 (5)	TP48.95x41.1698x0.34	27.68	1739.01	0.016	2.11	6974.97	0.000
L6	21 - 1 (6)	TP53.23x48.95x0.35	28.97	1903.00	0.015	2.11	8305.82	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	180 - 149 (1)	0.006	0.406	0.000	0.025	0.000	0.413	1.000	4.8.2
L2	149 - 127.25 (2)	0.007	0.718	0.000	0.025	0.000	0.726	1.000	4.8.2
L3	127.25 - 98.25 (3)	0.007	0.754	0.000	0.019	0.001	0.761	1.000	4.8.2
L4	98.25 - 48.75 (4)	0.008	0.802	0.000	0.016	0.000	0.810	1.000	4.8.2
L5	48.75 - 21 (5)	0.010	0.870	0.000	0.016	0.000	0.880	1.000	4.8.2
L6	21 - 1 (6)	0.011	0.867	0.000	0.015	0.000	0.878	1.000	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	180 - 149	Pole	TP21.38x14.4x0.1875	1	-5.10	887.61	41.3	Pass

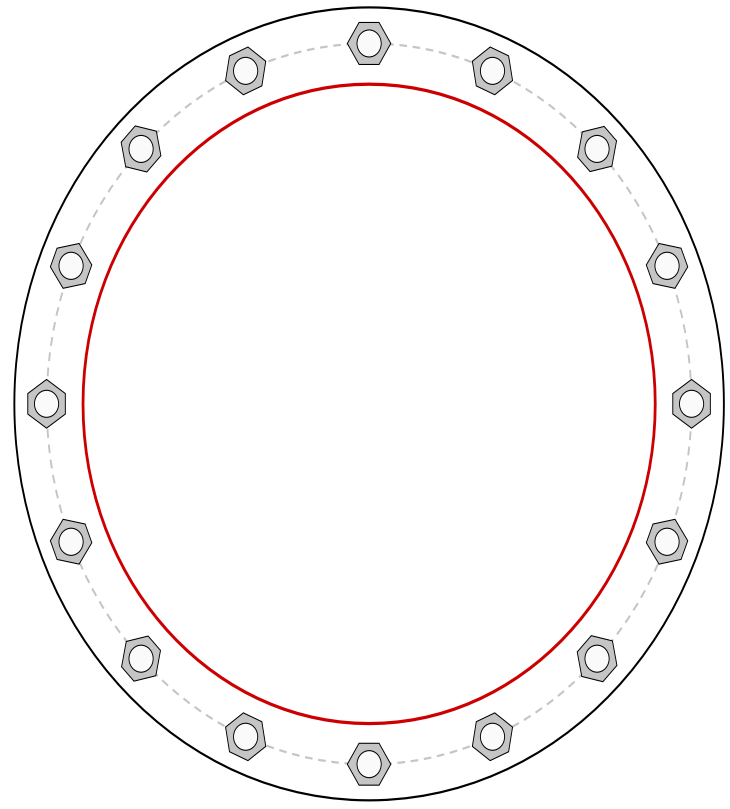
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L2	149 - 127.25	Pole	TP25.91x20.3858x0.25	2	-10.46	1502.96	72.6	Pass
L3	127.25 - 98.25	Pole	TP32.44x25.91x0.3	3	-14.58	2187.43	76.1	Pass
L4	98.25 - 48.75	Pole	TP43.1x30.9393x0.34	4	-25.37	3144.28	81.0	Pass
L5	48.75 - 21	Pole	TP48.95x41.1698x0.34	5	-34.92	3478.02	88.0	Pass
L6	21 - 1	Pole	TP53.23x48.95x0.35	6	-40.76	3806.00	87.8	Pass
							Summary	
						Pole (L5)	88.0	Pass
						RATING =	**88.0**	**Pass**

Monopole Base Plate Connection

Site Info	
BU #	
Site Name	CT11533B
Order #	

Analysis Considerations	
TIA-222 Revision	G
Grout Considered:	Yes
l_{ar} (in)	1
Eta Factor, η	0.55

Applied Loads	
Moment (kip-ft)	3593.85
Axial Force (kips)	40.76
Shear Force (kips)	28.97



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 60" BC

Base Plate Data

66" OD x 2.25" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

53.23" x 0.35" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_t = 177.04	ϕPn_t = 260	**Stress Rating**
Vu = 1.81	ϕVn = n/a	**69.4%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	28.64	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**53.0%**	**Pass**

Analysis Date: 6/21/2019

Pier and Pad Foundation

Site #:	CT11533B

TIA-222 Revision:	G
Tower Type:	Monopole

Top & Bot. Pad Rein. Different?:	☐
Block Foundation?:	☐

Superstructure Analysis Reactions

Compression, P_{comp}:	41	kips
Base Shear, Vu_comp:	29	kips
Moment, M_u:	3594	ft-kips
Tower Height, **H**:	179	ft
BP Dist. Above Fdn, bp_{dist}:	3	in

Foundation Analysis Checks

	Capacity	Demand	Rating	Check
Lateral (Sliding) (kips)	222.15	29.00	**13.1%**	**Pass**
Bearing Pressure (ksf)	5.06	3.15	**62.2%**	**Pass**
*Overturning (kip*ft)*	4623.07	3789.75	**82.0%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	4715.54	3724.50	**79.0%**	**Pass**
Pier Compression (kip)	31187.52	80.69	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	2379.25	1792.11	**75.3%**	**Pass**
Pad Shear - 1-way (kips)	510.58	305.89	**59.9%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.190	0.000	**0.0%**	**Pass**

Pier Properties

Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	8	
Pier Rebar Quantity, **mc**:	36	
Pier Tie/Spiral Size, **St**:	3	
Pier Tie/Spiral Quantity, **mt**:	4	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Soil Rating:	**82.0%**
Structural Rating:	**79.0%**

Pad Properties

Depth, **D**:	6	ft
Pad Width, **W**:	23	ft
Pad Thickness, **T**:	2	ft
Pad Rebar Size (Bottom), **Sp**:	8	
Pad Rebar Quantity (Bottom), **mp**:	36	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties

Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	4	ksi
Dry Concrete Density, δc:	150	pcf

Soil Properties

Total Soil Unit Weight, γ:	125	pcf
Ultimate Net Bearing, Qnet:	6.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:		
Base Friction, μ:	0.45	
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

<--Toggle between Gross and Net

Exhibit E

EBI Consulting

environmental | engineering | due diligence

RADIO FREQUENCY EMISSIONS ANALYSIS REPORT
EVALUATION OF HUMAN EXPOSURE POTENTIAL TO NON-IONIZING EMISSIONS

T-Mobile Existing Facility

Site ID: CT11533B

CT533/SAI - Enfield
37 Bacon Road
Enfield, Connecticut 06082

July 3, 2019

EBI Project Number: 6219002949

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**5.27%**

July 3, 2019

T-Mobile
Attn: Jason Overbey, RF Manager
35 Griffin Road South
Bloomfield, Connecticut 06002

Emissions Analysis for Site: CT11533B - CT533/SAI - Enfield

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **37 Bacon Road** in **Enfield, Connecticut** for the purpose of determining whether the emissions from the Proposed T-Mobile Antenna Installation located on this property are within specified federal limits.

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

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

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

Public exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$, respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed T-Mobile Wireless antenna facility located at 37 Bacon Road in Enfield, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-Mobile is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

For all calculations, all equipment was calculated using the following assumptions:

1) 4 GSM channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 2 LTE channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.

3) 1 microwave backhaul channel (5 GHz) was considered for the proposed facility. This channel has a transmit power of 1.585 Watts.

4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.

5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antennas used in this modeling are the EMS RR90-17-XXDP for the 1900 MHz / 1900 MHz channel(s) in Sector A, the EMS RR90-17-XXDP for the 1900 MHz / 1900 MHz channel(s) in Sector B, the EMS RR90-17-XXDP for the 1900 MHz / 1900 MHz channel(s) in Sector C. Modeling also included calculations for the proposed 5 GHz microwave backhaul antenna. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 10 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is 160 feet above ground level (AGL).

8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.

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

T-Mobile Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	EMS RR90-17-XXDP	Make / Model:	EMS RR90-17-XXDP	Make / Model:	EMS RR90-17-XXDP
Frequency Bands:	1900 MHz / 1900 MHz	Frequency Bands:	1900 MHz / 1900 MHz	Frequency Bands:	1900 MHz / 1900 MHz
Gain:	14.4 dBd / 14.4 dBd	Gain:	14.4 dBd / 14.4 dBd	Gain:	14.4 dBd / 14.4 dBd
Height (AGL):	160 feet	Height (AGL):	160 feet	Height (AGL):	160 feet
Channel Count:	6	Channel Count:	6	Channel Count:	6
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	6,610.15	ERP (W):	6,610.15	ERP (W):	6,610.15
Antenna A1 MPE %:	**0.93%**	Antenna B1 MPE %:	**0.93%**	Antenna C1 MPE %:	**0.93%**

Microwave Backhaul Data									
Sector	Antenna Make	Antenna Model	Frequency (MHz)	Transmitter Power (W)	Channel Count	Antenna Centerline (feet) AGL	Gain (dBd)	Total ERP (W)	MPE %
A	Fastback	IBR1300	5000	1.585	1	160	10.0	15.85	0.00%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	0.93%
Omnipoint	0.24%
Town	0.23%
AT&T	1.67%
Verizon	2.2%
Site Total MPE % :	5.27%

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	0.93%
T-Mobile Sector B Total:	0.93%
T-Mobile Sector C Total:	0.93%
Site Total MPE % :	5.27%

T-Mobile Maximum MPE Power Values (Sector A)							
T-Mobile Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
T-Mobile 1900 MHz GSM	4	826.27	160.0	4.64	1900 MHz GSM	1000	0.46%
T-Mobile 1900 MHz LTE	2	1652.54	160.0	4.64	1900 MHz LTE	1000	0.46%
T-Mobile 5 GHz Microwave	1	15.85	160.0	0.02	5 GHz	1000	0.00%
						Total:	**0.93%**

• NOTE: Totals may vary by approximately 0.01% due to summation of remainders in calculations.

Summary

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

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

T-Mobile Sector	Power Density Value (%)
Sector A:	0.93%
Sector B:	0.93%
Sector C:	0.93%
T-Mobile Maximum MPE % (Sector A):	0.93%
Site Total:	5.27%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **5.27%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit F

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Ref#: 533MWAAV

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Carrier -- Leave if No Response

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ENFIELD CT 06082-2964

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Trans. #:	468099092
Print Date:	07/12/2019
Ship Date:	07/12/2019
Expected Delivery Date:	07/15/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

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NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: MIKE LUDWICK
TOWN OF ENFIELD-MAYOR
820 ENFIELD ST
ENFIELD CT 06082-2964

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420 MAIN ST STE 2
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Expected Delivery Date: 07/15/19
Ref#: 533MWAAV

0006

Carrier -- Leave if No Response

C003

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TOWN OF ENFIELD-PLANNING DEPT.
820 ENFIELD ST
ENFIELD CT 06082-2964

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0057 3781 13

Trans. #:	468099092
Print Date:	07/12/2019
Ship Date:	07/12/2019
Expected Delivery Date:	07/15/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: DEBORAH CHASE Ref#: 533MWAAV
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: RAQUEL OCASIO
TOWN OF ENFIELD-PLANNING DEPT.
820 ENFIELD ST
ENFIELD CT 06082-2964

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PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 07/15/19
Ref#: 533MWAAV

0006

Carrier -- Leave if No Response

R010

SHIP TO: CHIEF CHARLES MASCATA
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1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0057 3781 37

Trans. #:	468099092
Print Date:	07/12/2019
Ship Date:	07/12/2019
Expected Delivery Date:	07/15/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

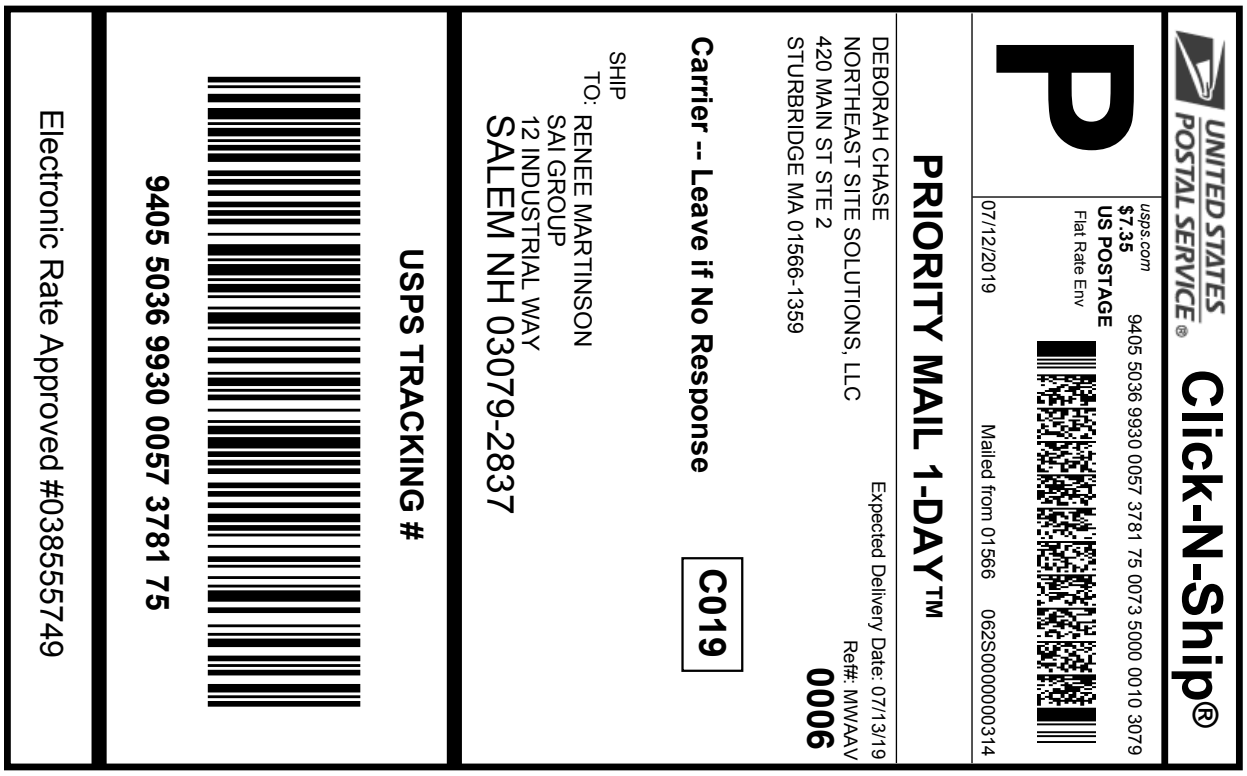
From: DEBORAH CHASE Ref#: 533MWAAV
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: CHIEF CHARLES MASCATA
SHAKER PINES FIRE DISTRICT #5-
37 BACON RD
ENFIELD CT 06082-2379

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com



Cut on dotted line.

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0057 3781 75

Trans. #:	468099092
Print Date:	07/12/2019
Ship Date:	07/12/2019
Expected Delivery Date:	07/13/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: DEBORAH CHASE Ref#: MWAAV
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: RENEE MARTINSON
SAI GROUP
12 INDUSTRIAL WAY
SALEM NH 03079-2837

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

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UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0057 3781 82 0073 5000 0010 6082

usps.com
$7.35
US POSTAGE
Flat Rate Env

07/12/2019 Mailed from 01566 062S0000000314

P

PRIORITY MAIL 2-DAY™

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

Expected Delivery Date: 07/15/19
Ref#: 533MWAAV

0006

Carrier -- Leave if No Response

C003

SHIP TO: CHRISTOPHER W BROMSOM
TOWN OF ENFIELD- TOWN PLANNER
820 ENFIELD ST
ENFIELD CT 06082-2964

USPS TRACKING #

9405 5036 9930 0057 3781 82

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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Click-N-Ship® Label Record

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9405 5036 9930 0057 3781 82

Trans. #:	468099092
Print Date:	07/12/2019
Ship Date:	07/12/2019
Expected Delivery Date:	07/15/2019

Priority Mail® Postage:	**$7.35**
Total	**$7.35**

From: DEBORAH CHASE Ref#: 533MWAAV
NORTHEAST SITE SOLUTIONS, LLC
420 MAIN ST STE 2
STURBRIDGE MA 01566-1359

To: CHRISTOPHER W BROMSOM
TOWN OF ENFIELD- TOWN PLANNER
820 ENFIELD ST
ENFIELD CT 06082-2964

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