



10 INDUSTRIAL AVENUE,  
SUITE 3  
MAHWAH, NJ 07430  
  
PHONE: 201.684.0055  
FAX: 201.684.0066

June 28, 2019

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

**Notice of Exempt Modification:**

125 Washington Ave, North Haven, CT  
Latitude: 41.3978472222222  
Longitude: -72.8566916666667  
T-Mobile Site#: CTNH735A / L600

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 109-foot level of the existing 120-foot monopole tower at 125 Washington Ave, in North Haven, CT. The 120-foot monopole tower is owned by American Tower and the underlying property is owned by Candid Associates LLC. T-Mobile now intends to replace three (3) of its existing antennas with three (3) new 600/700 MHz antennas. The new antennas would be installed at the 109-foot level of the tower and the platform mount is being replaced by a sector frame mount.

**Planned Modifications:**

**Remove:**

**Coax:**

(3) 1-5/8" coax cables

**Remove and Replace:**

(3) Andrew LNX-6515DS-VTM (REMOVE) - (3) RFS APXVAARR24 - 600 MHz / 700 MHz antenna (REPLACE)  
(3) Ericsson RRUS-11 (REMOVE) - (3) Ericsson 4449 B71 B12 RRH's (REPLACE)

**Install New:**

**Cables:**

(3) 1 5/8" (1.63"- 41.3mm) Fiber  
Sector Frame (Perfect Vision PV-MPM-SFA10- 12-278X96) w/Work Platform

**Existing to Remain:**

**Antennas:**

(3) Ericsson AIR 21, 1.3M, B2A B4P (RELOCATE)  
(3) Ericsson AIR 21, 1.3M, B4A B2P (RELOCATE)  
(3) TMAs Ericsson KRY 112 489/2

**Coax Cables:**

(9) 1-5/8" coax cables

(1) 1-1/4" fiber

This facility was approved by the Town of North Haven on August 12, 1998, with no record of conditions that would restrict exempt modifications. Therefore, this modification complies with the aforementioned approval. A copy of the approval is 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.S.A. § 16-SOj-73, a copy of this letter is being sent to Michael J. Freda, First Selectman and Alan Fredricksen, Land Use Administrator

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,

*Elizabeth Jamieson*

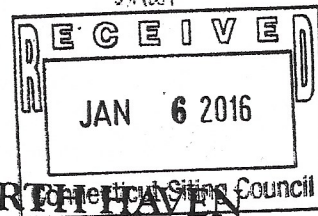
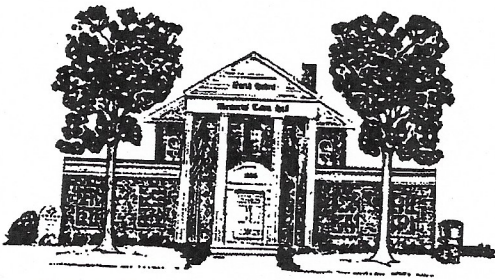
Elizabeth Jamieson  
Transcend Wireless  
10 Industrial Ave., Suite 3  
Mahwah, New Jersey 07430  
860-605-7808  
EJamieson@TranscendWireless.com

cc:

Michael J. Freda, First Selectman  
Alan Fredricksen, Land Use Administrator  
American Tower, Tower Owner  
Candid Associates LLC, property owner

# Exhibit A

## **Original Facility Approval**



CT-5040  
ZA

# TOWN OF NORTH HAVEN

MEMORIAL TOWN HALL / 18 CHURCH STREET  
NORTH HAVEN, CONNECTICUT 06473



REPLY TO:

PLANNING & ZONING COMMISSION

Tel. (203) 239-5321  
Fax (203) 234-2130

August 12, 1998

RECEIVED AND FILED  
TOWN CLERKS OFFICE  
NORTH HAVEN, CONN.

AUG 17 1998 e 4:55 PM

*Elnor C. Redden*

TOWN CLERK

Mr. Vincent A. Longobardi  
110 Washington Avenue  
North Haven, CT 06473

Re: #P98-46 Special Permit application of Vincent A. Longobardi, relative to 125T Washington Avenue (Rear), Ferro Lane. Plan Entitled: Proposed Monopole Tower With Service Building, North Haven, Connecticut, Prepared By Vincent C. Amore, Registered Architect, Dated June 10, 1996, Revised June 30, 1998. Scale 1" = 30'.  
IL-20/IL-30 Zoning Districts.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, August 3, 1998, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit three (3) revised plans which include:
  - a.) The title block must reference the nature of the application, i.e., "#P98-46, Special Permit, Section 3.3 - Required Lot Frontage".
  - b.) Address/include all conditions of the related site plan approval #P98-47.

In accordance with the Connecticut State Statutes, Section 8-3d, the special permit is not effective until a certified copy of the Commission's decision has been recorded on the Land Records, at the owner's expense. Accordingly, you must record this certified decision letter at the Town Clerk's Office, 18 Church Street, North Haven, CT. Immediately after filing with the Town Clerk, please submit a copy of the decision letter, stamped as recorded, to the Land Use Office, for our permanent record.



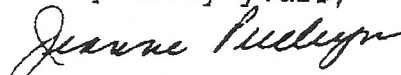
#P98-46  
Page 2

Please note that one (1) set of revised drawings should be submitted for review after all outstanding issues (conditions of approval as set forth above), are adequately addressed. If there are any questions relative to the conditions of approval, please call the Town prior to submitting the revised plans. This will avoid costly and time consuming revisions and reviews, therefore expediting the process for you as the applicant.

This approval is subject to compliance with any and all Zoning Regulations of the Town of North Haven.

You may not proceed with this approval until you have received a signed plan from the Land Use Office.

Very truly yours,



Jeanne Pulleyn, Secretary  
Planning & Zoning Commission

JP/ts  
cc: First Selectman  
Engineering Dept.  
Building Dept.  
CERTIFIED MAIL R/R

BUILDING PERMIT

NO 06792

USE PENCIL OR BALLPOINT PEN. PRESS HARD TO GO THROUGH THE 3 COPIES.

The undersigned hereby applies for permission to construct the same to be in all respects in accordance with the laws and Building Regulations of the State of Connecticut, and the Town of North Haven, and as set forth in the accompanying drawings and specification in so far as the same shall be found not to conflict with the aforesaid State and Town Laws and Building Regulations.

Date Sept. 8, 1998

Location 125 Washington Ave Zone 11-30 11-80

Interior Lot X Corner Lot Lot Area Frontage 35

Front yard set back 7.5 Right side yard Left side yard Rear

Dimensions of main building Front Side

Dimensions of attached garage Detached Basement

Materials of Footing Concrete Width 24 Depth 6 Ft. below grade 5

Type of building: Single fam. - Office Factory - Gas Station - Com. Garage

Const. Type: Frame - Brick - Conc. Block - Veneer - Steel as per plan

Exterior: Clpd. - Wd. Shingle - Brick Com. - Alum. Siding Mono Pole + Tower Foundation only

Roofing material: Asph. Sh. - Wood Shingle - Built up - Comp.

Roof Type Hip - Gambrel - Flat - Shed - Roof pitch

Floor Const: Wood Joist - Concrete - Steel / Flooring: Hardwood - Carpet

Floor Joist: 1st floor span Size / 2nd floor span Size

Ceiling Joist span Size Roof rafter span Size Girder

Plate Studs Column Size Post Sill

Fireplaces Flue Size Damper Size Chimneys Flue Size

Cellar: Full - part - none - Floor: Concrete - Dirt

Interior: Plas. - Gyp. Bd. - Wood - Ins. Bd. - Lay out - Cond.

No. Bedrooms Bath rooms Toilet rooms Total rooms

Total sq. ft. of building Est. Cost \$ 99,000 Fee \$ 594.00

Attic Insulation size Side wall Insulation size

Applicant's Name (Please Print) Vincent J. Longobardi

Address 110 Washington Ave North Haven, Ct. 06473

Phone (203) 227-5991

Owner's Name (Please Print) Anne

Address

Phone

Building Official John D. White

The owner of this building or the authorized agent agree to conform to all applicable laws of this jurisdiction.

Signature of owner Vincent J. Longobardi Authorized agent

Made oath that the statements herein are true and correct and in the event that the final cost shall exceed that stated herein a further fee based on the revised estimate will be paid.

on this 8 day of September 1998

Notary Public GLORIA GIANO

NOTARY PUBLIC MY COMMISSION EXPIRES JUNE 30, 2003

My Commission Expires March 31, 19

# Exhibit B

## Property card

# 125 WASHINGTON AVE

**Location** 125 WASHINGTON AVE

**Mblu** 073/ / 011/ /

**Acct#** 200200

**Owner** CANDID ASSOCIATES LLC

**Assessment** \$144,830

**Appraisal** \$206,900

**PID** 8727

**Building Count** 1

## Current Value

Appraisal			
Valuation Year	Improvements	Land	Total
2014	\$80,800	\$126,100	\$206,900

Assessment			
Valuation Year	Improvements	Land	Total
2014	\$56,560	\$88,270	\$144,830

## Owner of Record

**Owner** CANDID ASSOCIATES LLC  
**Co-Owner**  
**Address** 110 WASHINGTON AVE  
NORTH HAVEN, CT 06473

**Sale Price** \$0  
**Certificate** 1  
**Book & Page** 528/ 443  
**Sale Date** 09/15/1998

## Ownership History

Ownership History				
Owner	Sale Price	Certificate	Book & Page	Sale Date
CANDID ASSOCIATES LLC	\$0	1	528/ 443	09/15/1998
LONGOBARDI VINCENT	\$0	3	361/ 982	12/16/1986
LONGOBARDI VINCENT	\$0	4	299/ 167	02/01/1978

## Building Information

### Building 1 : Section 1

**Year Built:** 1950  
**Living Area:** 4,320  
**Replacement Cost:** \$152,453  
**Building Percent** 53  
**Good:**  
**Replacement Cost**  
**Less Depreciation:** \$80,800

**Building Attributes**

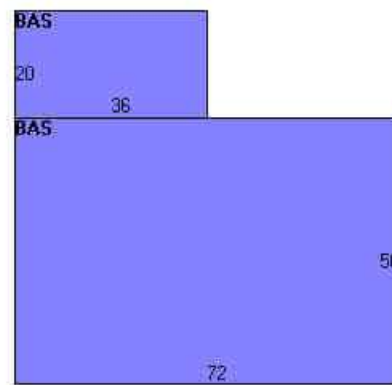
Field	Description
STYLE	Warehouse
MODEL	Ind/Comm
Grade	C
Stories:	1
Occupancy	1
Exterior Wall 1	Concr/Cinder
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	T&G/Rubber
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	None
Heating Type	None
AC Type	None
Bldg Use	IND WHSES M96
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	CEIL & WALLS
Rooms/Prtns	AVERAGE
Wall Height	14
% Comn Wall	

## Building Photo



(<http://images.vgsi.com/photos/NorthHavenCTPhotos//\00\01\98>)

## Building Layout



Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	First Floor	4,320	4,320
		4,320	4,320

## Extra Features

Extra Features				Legend
Code	Description	Size	Value	Bldg #
OVHD	OVER HEADDOOR	448 S.F.	\$0	1
OVHD	OVER HEADDOOR	120 S.F.	\$0	1

## Land

### Land Use

Use Code 4010

### Land Line Valuation

Size (Acres) 3.15

**Description** IND WHSES M96  
**Zone** IL80  
**Neighborhood** 301  
**Alt Land Appr Category** No

**Frontage**  
**Depth**  
**Assessed Value** \$88,270  
**Appraised Value** \$126,100

**Outbuildings**

<b>Outbuildings</b>	<b><u>Legend</u></b>
No Data for Outbuildings	

**Valuation History**

<b>Appraisal</b>			
<b>Valuation Year</b>	<b>Improvements</b>	<b>Land</b>	<b>Total</b>
2013	\$107,700	\$126,100	\$233,800
2008	\$61,800	\$201,100	\$262,900
2007		\$70,770	\$114,030

<b>Assessment</b>			
<b>Valuation Year</b>	<b>Improvements</b>	<b>Land</b>	<b>Total</b>
2013	\$75,390	\$88,270	\$163,660
2008	\$43,260	\$140,770	\$184,030
2007		\$70,770	\$114,030



# 125 Washington Ave



**MAP FOR REFERENCE ONLY  
NOT A LEGAL DOCUMENT**

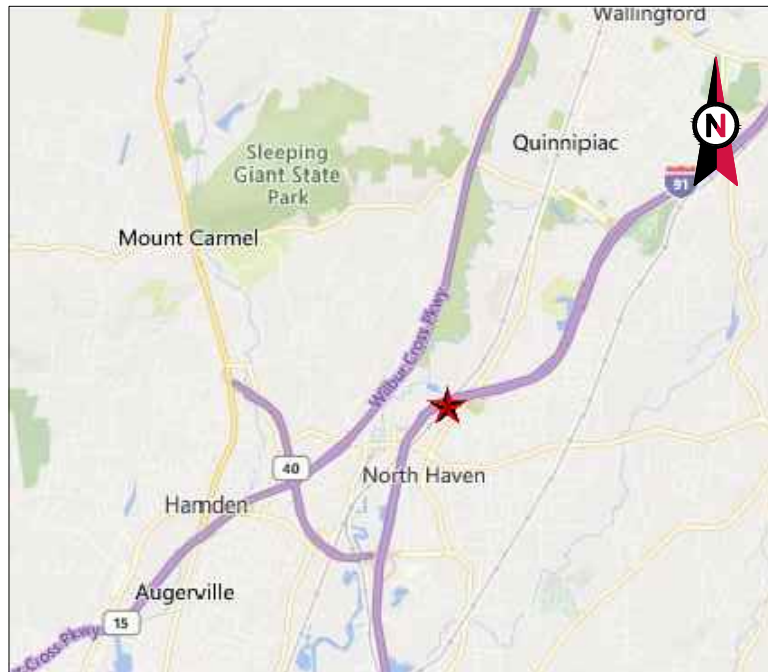
Town of North Haven, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 07/01/2018  
Data updated 11/18/2018



# Exhibit C

## **Construction Drawings**



VICINITY MAP



**AMERICAN TOWER®**

ATC SITE NAME: NORTHHAVEN I  
 ATC SITE NUMBER: 370629  
 T-MOBILE SITE ID: CTNH735A  
 SITE ADDRESS: 125 WASHINGTON AVE  
 NORTH HAVEN, CT 06473



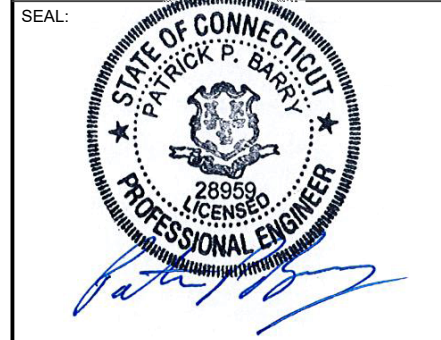
LOCATION MAP

**AMERICAN TOWER®**  
**A.T. ENGINEERING SERVICE, PLLC**  
 3500 REGENCY PARKWAY  
 SUITE 100  
 CARY, NC 27518  
 PHONE: (919) 468-0112  
 COA: PEC.0001553

THESE DRAWINGS AND/OR THE ACCOMPANYING SPECIFICATION AS INSTRUMENTS OR SERVICE ARE THE EXCLUSIVE PROPERTY OF AMERICAN TOWER. THEIR USE AND PUBLICATION SHALL BE RESTRICTED TO THE ORIGINAL SITE FOR WHICH THEY ARE PREPARED. ANY USE OR DISCLOSURE OTHER THAN THAT WHICH RELATES TO AMERICAN TOWER OR THE SPECIFIED CARRIER IS STRICTLY PROHIBITED. TITLE TO THESE DOCUMENTS SHALL REMAIN THE PROPERTY OF AMERICAN TOWER WHETHER OR NOT THE PROJECT IS EXECUTED. NEITHER THE ARCHITECT NOR THE ENGINEER WILL BE PROVIDING ON-SITE CONSTRUCTION REVIEW OF THIS PROJECT. CONTRACTOR(S) MUST VERIFY ALL DIMENSIONS AND ADVISE AMERICAN TOWER OF ANY DISCREPANCIES. ANY PRIOR ISSUANCE OF THIS DRAWING IS SUPERSEDED BY THE LATEST VERSION ON FILE WITH AMERICAN TOWER.

REV.	DESCRIPTION	BY	DATE
0	FOR CONSTRUCTION	CA	05/29/19

ATC SITE NUMBER:  
**370629**  
 ATC SITE NAME:  
**NORTHHAVEN I**  
 SITE ADDRESS:  
 125 WASHINGTON AVE  
 NORTH HAVEN, CT 06473



Authorized by "EOR"  
 May 31 2019 11:06 AM

**T-MOBILE L600 ANTENNA AMENDMENT  
 67D02C CONFIGURATION**

COMPLIANCE CODE	PROJECT SUMMARY	PROJECT DESCRIPTION	SHEET INDEX				
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNMENT AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.  1. INTERNATIONAL BUILDING CODE (IBC) 2. NATIONAL ELECTRIC CODE (NEC) 3. LOCAL BUILDING CODE 4. CITY/COUNTY ORDINANCES	<u>SITE ADDRESS:</u> 125 WASHINGTON AVE NORTH HAVEN, CT 06473 COUNTY: NEW HAVEN  <u>1A CERTIFICATE SUMMARY:</u> LATITUDE: 41° 23' 52.21" N LONGITUDE: 72° 51' 24.05" W GROUND ELEVATION: 34.6' AMSL TOWER HEIGHT: 121.6' AGL HIGHEST APPURTENANCE: 126' AGL	THE PROPOSED PROJECT INCLUDES MODIFYING GROUND BASED AND TOWER MOUNTED EQUIPMENT AS INDICATED PER BELOW:  REMOVE (3) PANELS, (3) RRU, (3) 1-5/8" COAX CABLES, (1) PLATFORM MOUNT AND (3) SECTOR FRAMES  INSTALL (3) NEW PANELS, (3) 1-5/8" HYBRID CABLE AND (3) RRU  EXISTING (6) PANELS, (3) TTAs, (1) 1-1/4" HYBRID CABLE AND (9) 1-5/8" COAX CABLES TO REMAIN	SHEET NO:	DESCRIPTION:	REV:	DATE:	BY:
	<u>PROJECT TEAM</u> <u>TOWER OWNER:</u> AMERICAN TOWER 10 PRESIDENTIAL WAY WOBURN, MA 01801  <u>ENGINEER:</u> ATC TOWER SERVICES, LLC 3500 REGENCY PKWY STE 100 CARY, NC 27518  <u>PROPERTY OWNER:</u> CANDID ASSOCIATES LLC 110 Washington Ave 4th FL North Haven, CT 06473	<u>PROJECT NOTES</u> 1. THE FACILITY IS UNMANNED. 2. A TECHNICIAN WILL VISIT THE SITE APPROXIMATELY ONCE A MONTH FOR ROUTINE INSPECTION AND MAINTENANCE. 3. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT LAND DISTURBANCE OR EFFECT OF STORM WATER DRAINAGE. 4. NO SANITARY SEWER, POTABLE WATER OR TRASH DISPOSAL IS REQUIRED. 5. HANDICAP ACCESS IS NOT REQUIRED.	G-001 TITLE SHEET G-002 GENERAL NOTES C-101 DETAILED SITE PLAN & TOWER ELEVATION C-501 ANTENNA INFORMATION & SCHEDULE E-501 GROUNDING DETAILS R-601 SUPPLEMENTAL R-602 SUPPLEMENTAL R-603 SUPPLEMENTAL				
<u>UTILITY COMPANIES</u>  POWER COMPANY: UNITED ILLUMINATED PHONE: (877) 251-9959  TELEPHONE COMPANY: FRONTIER COMMUNICATIONS PHONE: (800) 376-6843	<u>PROJECT TEAM</u> <u>TOWER OWNER:</u> AMERICAN TOWER 10 PRESIDENTIAL WAY WOBURN, MA 01801  <u>ENGINEER:</u> ATC TOWER SERVICES, LLC 3500 REGENCY PKWY STE 100 CARY, NC 27518  <u>PROPERTY OWNER:</u> CANDID ASSOCIATES LLC 110 Washington Ave 4th FL North Haven, CT 06473	<u>PROJECT LOCATION DIRECTIONS</u>  FROM DOWNTOWN NEW HAVEN CT START OUT GOING NORTHEAST ON CHURCH ST TOWARD WALL ST. TURN LEFT ONTO GROVE ST. TAKE THE 2ND LEFT ONTO COLLEGE ST. TURN SLIGHT RIGHT ONTO CONGRESS AVE. TURN LEFT ONTO CEDAR ST. TAKE THE 1ST LEFT ONTO WASHINGTON AVE. 127 WASHINGTON AVE, NEW HAVEN, CT 06519-1616, 127 WASHINGTON AVE IS ON THE LEFT.					



DRAWN BY:	CA
APPROVED BY:	PPB
DATE DRAWN:	05/29/19
ATC JOB NO:	12951836

**TITLE SHEET**  
 SHEET NUMBER: **G-001**  
 REVISION: **0**

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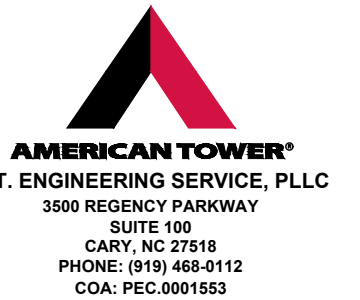
**GENERAL CONSTRUCTION NOTES:**

1. ALL WORK SHALL CONFORM TO ALL CURRENT APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING ANSI/EIA/TIA-222, AND COMPLY WITH ATC MASTER SPECIFICATIONS.
2. CONTRACTOR SHALL CONTACT LOCAL 811 FOR IDENTIFICATION OF UNDERGROUND UTILITIES PRIOR TO START OF CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIRED INSPECTIONS.
4. ALL DIMENSIONS TO, OF, AND ON EXISTING BUILDINGS, DRAINAGE STRUCTURES, AND SITE IMPROVEMENTS SHALL BE VERIFIED IN FIELD BY CONTRACTOR WITH ALL DISCREPANCIES REPORTED TO THE ENGINEER.
5. DO NOT CHANGE SIZE OR SPACING OF STRUCTURAL ELEMENTS.
6. DETAILS SHOWN ARE TYPICAL; SIMILAR DETAILS APPLY TO SIMILAR CONDITIONS UNLESS OTHERWISE NOTED.
7. THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY WHICH SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
8. CONTRACTOR SHALL BRACE STRUCTURES UNTIL ALL STRUCTURAL ELEMENTS NEEDED FOR STABILITY ARE INSTALLED. THESE ELEMENTS ARE AS FOLLOWS: LATERAL BRACING, ANCHOR BOLTS, ETC.
9. CONTRACTOR SHALL DETERMINE EXACT LOCATION OF EXISTING UTILITIES, GROUNDS DRAINS, DRAIN PIPES, VENTS, ETC. BEFORE COMMENCING WORK.
10. INCORRECTLY FABRICATED, DAMAGED, OR OTHERWISE MISFITTING OR NONCONFORMING MATERIALS OR CONDITIONS SHALL BE REPORTED TO THE T-MOBILE WIRELESS REP PRIOR TO REMEDIAL OR CORRECTIVE ACTION. ANY SUCH REMEDIAL ACTION SHALL REQUIRE WRITTEN APPROVAL BY THE T-MOBILE WIRELESS REP PRIOR TO PROCEEDING.
11. EACH CONTRACTOR SHALL COOPERATE WITH THE T-MOBILE WIRELESS REP, AND COORDINATE HIS WORK WITH THE WORK OF OTHERS.
12. CONTRACTOR SHALL REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION OF THIS PROJECT TO MATCH EXISTING PRE-CONSTRUCTION CONDITIONS TO THE SATISFACTION OF THE T-MOBILE WIRELESS CONSTRUCTION MANAGER.
13. ALL CABLE/CONDUIT ENTRY/EXIT PORTS SHALL BE WEATHERPROOFED DURING INSTALLATION USING A SILICONE SEALANT.
14. WHERE EXISTING CONDITIONS DO NOT MATCH THOSE SHOWN IN THIS PLAN SET, CONTRACTOR SHALL NOTIFY THE T-MOBILE WIRELESS REP IMMEDIATELY.
15. CONTRACTOR SHALL ENSURE ALL SUBCONTRACTORS ARE PROVIDED WITH A COMPLETE AND CURRENT SET OF DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
16. CONTRACTOR SHALL REMOVE ALL RUBBISH AND DEBRIS FROM THE SITE AT THE END OF EACH DAY.
17. CONTRACTOR SHALL COORDINATE WORK SCHEDULE WITH LANDLORD AND TAKE PRECAUTIONS TO MINIMIZE IMPACT AND DISRUPTION OF OTHER OCCUPANTS OF THE FACILITY.
18. CONTRACTOR SHALL FURNISH T-MOBILE WIRELESS WITH A PDF MARKED UP AS-BUILT SET OF DRAWINGS UPON COMPLETION OF WORK.
19. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE WIRELESS REP TO DETERMINE WHAT, IF ANY, ITEMS WILL BE PROVIDED. ALL ITEMS NOT PROVIDED SHALL BE PROVIDED AND INSTALLED BY THE CONTRACTOR. CONTRACTOR WILL INSTALL ALL ITEMS PROVIDED.
20. PRIOR TO SUBMISSION OF BID, CONTRACTOR SHALL COORDINATE WITH T-MOBILE WIRELESS REP TO DETERMINE IF ANY PERMITS WILL BE OBTAINED BY CONTRACTOR. ALL REQUIRED PERMITS NOT OBTAINED BY T-MOBILE WIRELESS MUST BE OBTAINED, AND PAID FOR, BY THE CONTRACTOR.
21. CONTRACTOR SHALL INSTALL ALL SITE SIGNAGE IN ACCORDANCE WITH T-MOBILE WIRELESS SPECIFICATIONS AND REQUIREMENTS.
22. CONTRACTOR SHALL SUBMIT ALL SHOP DRAWINGS TO T-MOBILE WIRELESS FOR REVIEW AND APPROVAL PRIOR TO FABRICATION.
23. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S SPECIFICATIONS AND LOCATED ACCORDING TO T-MOBILE WIRELESS SPECIFICATIONS, AND AS SHOWN IN THESE PLANS.
24. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
25. CONTRACTOR SHALL NOTIFY T-MOBILE WIRELESS REP A MINIMUM OF 48 HOURS IN ADVANCE OF POURING CONCRETE OR BACKFILLING ANY UNDERGROUND UTILITIES, FOUNDATIONS OR SEALING ANY WALL, FLOOR OR ROOF PENETRATIONS FOR ENGINEERING REVIEW AND APPROVAL.
26. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SAFETY INCLUDING COMPLIANCE WITH ALL APPLICABLE OSHA STANDARDS AND RECOMMENDATIONS AND SHALL PROVIDE ALL NECESSARY SAFETY DEVICES INCLUDING PPE AND PPM AND CONSTRUCTION DEVICES SUCH AS WELDING AND FIRE PREVENTION, TEMPORARY SHORING, SCAFFOLDING, TRENCH BOXES/SLOPING, BARRIERS, ETC.

27. THE CONTRACTOR SHALL PROTECT AT HIS OWN EXPENSE, ALL EXISTING FACILITIES AND SUCH OF HIS NEW WORK LIABLE TO INJURY DURING THE CONSTRUCTION PERIOD. ANY DAMAGE CAUSED BY NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, OR BY THE ELEMENTS DUE TO NEGLIGENCE ON THE PART OF THIS CONTRACTOR OR HIS REPRESENTATIVES, EITHER TO THE EXISTING WORK, OR TO HIS WORK OR THE WORK OF ANY OTHER CONTRACTOR, SHALL BE REPAIRED AT HIS EXPENSE TO THE OWNER'S SATISFACTION.
28. ALL WORK SHALL BE INSTALLED IN A FIRST CLASS, NEAT AND WORKMANLIKE MANNER BY MECHANICS SKILLED IN THE TRADE INVOLVED. THE QUALITY OF WORKMANSHIP SHALL BE SUBJECT TO THE APPROVAL OF THE T-MOBILE WIRELESS REP. ANY WORK FOUND BY THE T-MOBILE WIRELESS REP TO BE OF INFERIOR QUALITY AND/OR WORKMANSHIP SHALL BE REPLACED AND/OR REWORKED AT CONTRACTOR EXPENSE UNTIL APPROVAL IS OBTAINED.
29. IN ORDER TO ESTABLISH STANDARDS OF QUALITY AND PERFORMANCE, ALL TYPES OF MATERIALS LISTED HEREINAFTER BY MANUFACTURER'S NAMES AND/OR MANUFACTURER'S CATALOG NUMBER SHALL BE PROVIDED BY THESE MANUFACTURERS AS SPECIFIED.

**STRUCTURAL STEEL NOTES:**

1. STRUCTURAL STEEL SHALL CONFORM TO THE LATEST EDITION OF THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS."
2. STRUCTURAL STEEL ROLLED SHAPES, PLATES AND BARS SHALL CONFORM TO THE FOLLOWING ASTM DESIGNATIONS:
  - A. ASTM A-572, GRADE 50 - ALL W SHAPES, UNLESS NOTED OR A992 OTHERWISE
  - B. ASTM A-36 - ALL OTHER ROLLED SHAPES, PLATES AND BARS UNLESS NOTED OTHERWISE.
  - C. ASTM A-500, GRADE B - HSS SECTION (SQUARE, RECTANGULAR, AND ROUND)
  - D. ASTM A-325, TYPE SC OR N - ALL BOLTS FOR CONNECTING STRUCTURAL MEMBERS
  - E. ASTM F-1554 07 - ALL ANCHOR BOLTS, UNLESS NOTED OTHERWISE
3. ALL EXPOSED STRUCTURAL STEEL MEMBERS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION PER ASTM A123. EXPOSED STEEL HARDWARE AND ANCHOR BOLTS SHALL BE GALVANIZED PER ASTM A153 OR B695.
4. ALL FIELD CUT SURFACES, FIELD DRILLED HOLES AND GROUND SURFACES WHERE EXISTING PAINT OR GALVANIZATION REMOVAL WAS REQUIRED SHALL BE REPAIRED WITH (2) BRUSHED COATS OF ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURER'S RECOMMENDATIONS.
5. DO NOT DRILL HOLES THROUGH STRUCTURAL STEEL MEMBERS EXCEPT AS SHOWN AND DETAILED ON STRUCTURAL DRAWINGS.
6. CONNECTIONS:
  - A. ALL WELDING TO BE PERFORMED BY AWS CERTIFIED WELDERS AND CONDUCTED IN ACCORDANCE WITH THE LATEST EDITION OF THE AWS WELDING CODE D1.1.
  - B. ALL WELDS SHALL BE INSPECTED VISUALLY. 25% OF WELDS SHALL BE INSPECTED WITH DYE PENETRANT OR MAGNETIC PARTICLE TO MEET THE ACCEPTANCE CRITERIA OF AWS D1.1. REPAIR ALL WELDS AS NECESSARY.
  - C. INSPECTION SHALL BE PERFORMED BY AN AWS CERTIFIED WELD INSPECTOR.
  - D. IT IS THE CONTRACTORS RESPONSIBILITY TO PROVIDE BURNING/WELDING PERMITS AS REQUIRED BY LOCAL GOVERNING AUTHORITY AND IF REQUIRED SHALL HAVE FIRE DEPARTMENT DETAIL FOR ANY WELDING ACTIVITY.
  - E. ALL ELECTRODES TO BE LOW HYDROGEN, MATCHING FILLER METAL, PER AWS D1.1, UNLESS NOTED OTHERWISE.
  - F. MINIMUM WELD SIZE TO BE 0.1875 INCH FILLET WELDS, UNLESS NOTED OTHERWISE.
  - G. PRIOR TO FIELD WELDING GALVANIZING MATERIAL, CONTRACTOR SHALL GRIND OFF GALVANIZING 1/2" BEYOND ALL FIELD WELD SURFACES. AFTER WELD AND WELD INSPECTION IS COMPLETE, REPAIR ALL GROUND AND WELDED SURFACES WITH ZRC GALVILITE COLD GALVANIZING COMPOUND PER ASTM A780 AND MANUFACTURERS RECOMMENDATIONS.



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**370629**

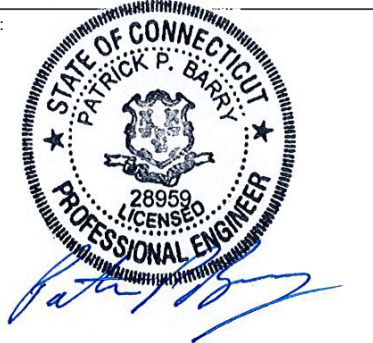
ATC SITE NAME:

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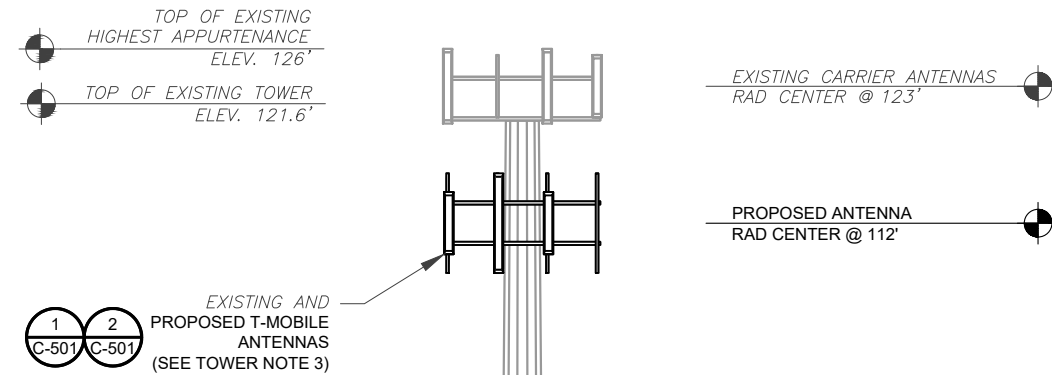
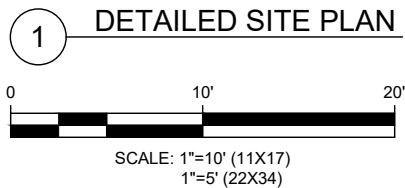
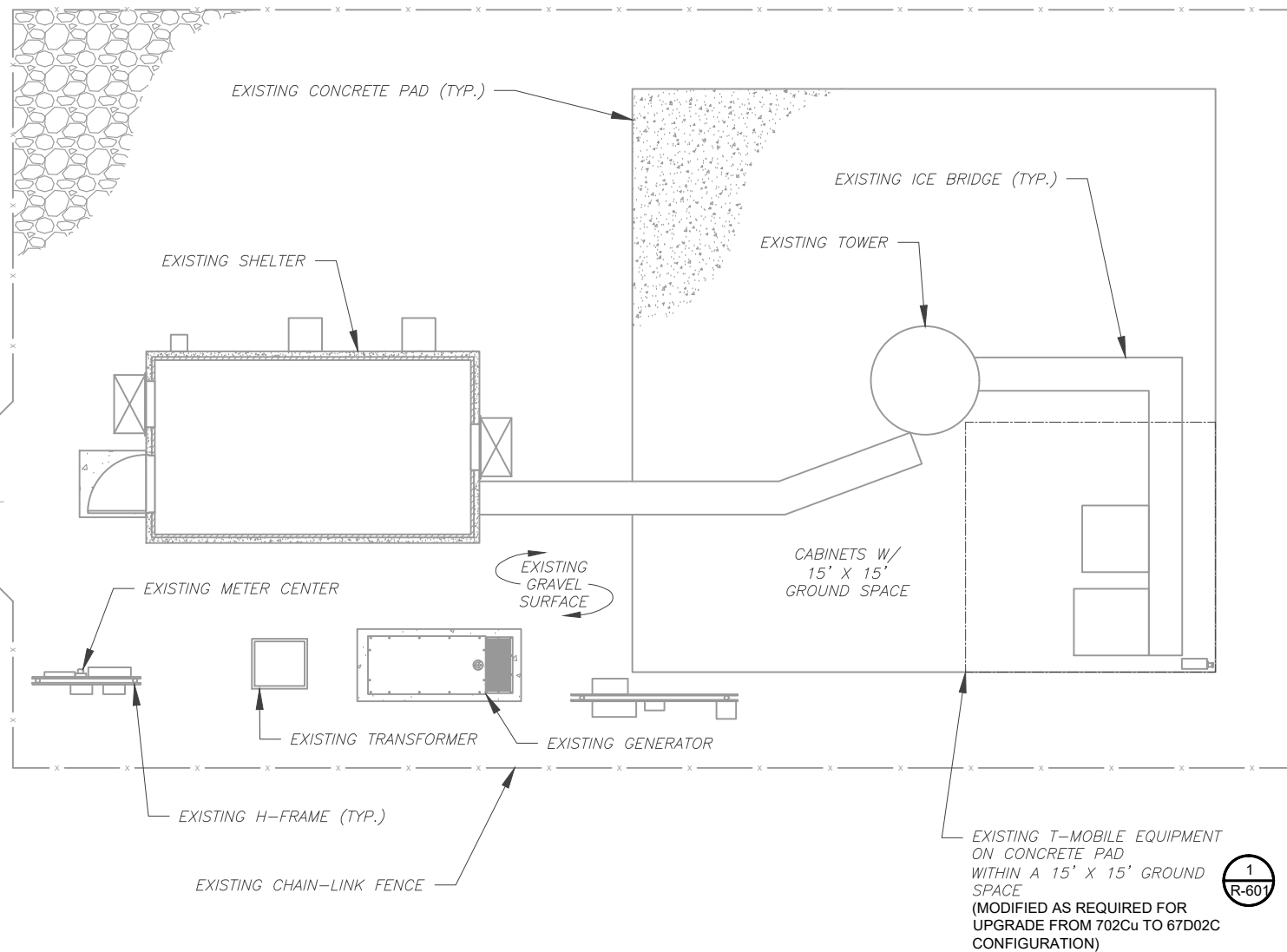
**GENERAL NOTES**

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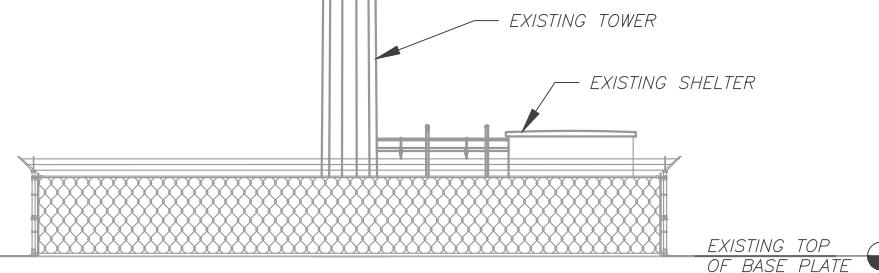
**SITE PLAN NOTES:**

1. THIS SITE PLAN REPRESENTS THE BEST PRESENT KNOWLEDGE AVAILABLE TO THE ENGINEER AT THE TIME OF THIS DESIGN. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO CONSTRUCTION AND VERIFY ALL EXISTING CONDITIONS RELATED TO THE SCOPE OF WORK FOR THIS PROJECT.
2. ICE BRIDGE, CABLE LADDER, COAX PORT, AND COAX CABLE ARE SHOWN FOR REFERENCE ONLY. CONTRACTOR SHALL CONFIRM THE EXACT LOCATION OF ALL PROPOSED AND EXISTING EQUIPMENT AND STRUCTURES DEPICTED ON THIS PLAN. BEFORE UTILIZING EXISTING CABLE SUPPORTS, COAX PORTS, INSTALLING NEW PORTS OR ANY OTHER EQUIPMENT, CONTRACTOR SHALL VERIFY ALL ASPECTS OF THE COMPONENTS MEET THE ATC SPECIFICATIONS.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE T-MOBILE REPRESENTATIVE AND LOCAL UTILITY COMPANY FOR THE INSTALLATION OF CONDUITS, CONDUCTORS, BREAKERS, DISCONNECTS, OR ANY OTHER EQUIPMENT REQUIRED FOR ELECTRICAL SERVICE. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH LATEST EDITION OF THE STATE AND NATIONAL CODES, ORDINANCES AND REGULATIONS APPLICABLE TO THIS PROJECT.



**TOWER NOTE:**

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONFIRM WITH THE AMERICAN TOWER CONSTRUCTION MANAGER THAT THEY HAVE THE MOST RECENT VERSION OF THE STRUCTURAL ANALYSIS BEFORE COMMENCING WORK. EXISTING AND PROPOSED TOWER APPURTENANCES, MOUNTS, AND ANTENNAS ARE SHOWN BASED ON THE STRUCTURAL ANALYSIS.
2. ROUTE PROPOSED CABLES ALONG SAME PATH AS EXISTING CABLES AND IN ACCORDANCE WITH STRUCTURAL ANALYSIS. IF ADEQUATE SPACE EXISTS, ROUTE CABLES THROUGH ENTRY PORT HOLE, UP INSIDE OF MONOPOLE, AND THROUGH EXIT PORT HOLE. IF ROUTING OUTSIDE THE MONOPOLE, ATTACH CABLES USING STAND-OFF ADAPTERS MOUNTED TO TOWER USING STAINLESS STEEL BANDING. ADEQUATELY SECURE CABLES USING EITHER APPROPRIATELY SIZED STAINLESS STEEL SNAP-INS OR MOUNTING HARDWARE AND BRACKETS AS SPECIFIED BY CABLE MANUFACTURER.
3. ESTIMATED LENGTH OF PROPOSED CABLE IS 175'. ESTIMATED LENGTH OF CABLE IS CALCULATED BY ADDING THE RAD CENTER AND THE DISTANCE FROM THE SHELTER ENTRY PLATE TO THE TOWER (ALONG THE ICE BRIDGE) AND A SAFETY FACTOR MEASUREMENT OF 15% (OF THE TWO PREVIOUS VALUES).
4. ATC DID NOT CONFIRM EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO, ANTENNA HEIGHTS, ANTENNA AZIMUTHS AND MOUNT CONFIGURATIONS.
5. TOWER ELEVATIONS ARE MEASURED FROM TOP OF BASE PLATE TO MATCH STRUCTURAL ANALYSIS. ELEVATIONS DO NOT REFLECT TRUE ABOVE GROUND LEVEL (A.G.L.)



**2 TOWER ELEVATION**  
SCALE: NOT TO SCALE

**AMERICAN TOWER®**  
**A.T. ENGINEERING SERVICE, PLLC**  
 3500 REGENCY PARKWAY  
 SUITE 100  
 CARY, NC 27518  
 PHONE: (919) 468-0112  
 COA: PEC.0001553

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ATC SITE NUMBER:  
**370629**  
 ATC SITE NAME:  
**NORTHAVEN I**

SITE ADDRESS:  
125 WASHINGTON AVE  
NORTH AVEN, CT 06473

SEAL:

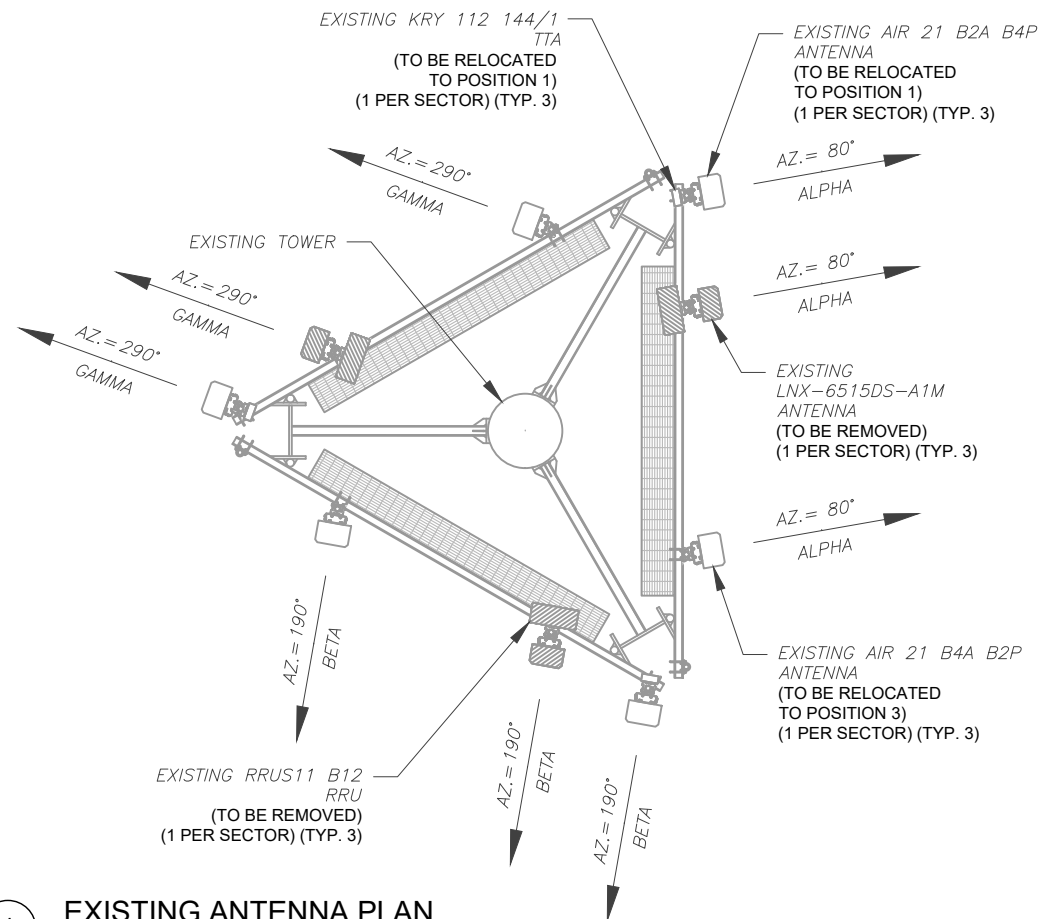
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**DETAILED SITE PLAN & TOWER ELEVATION**

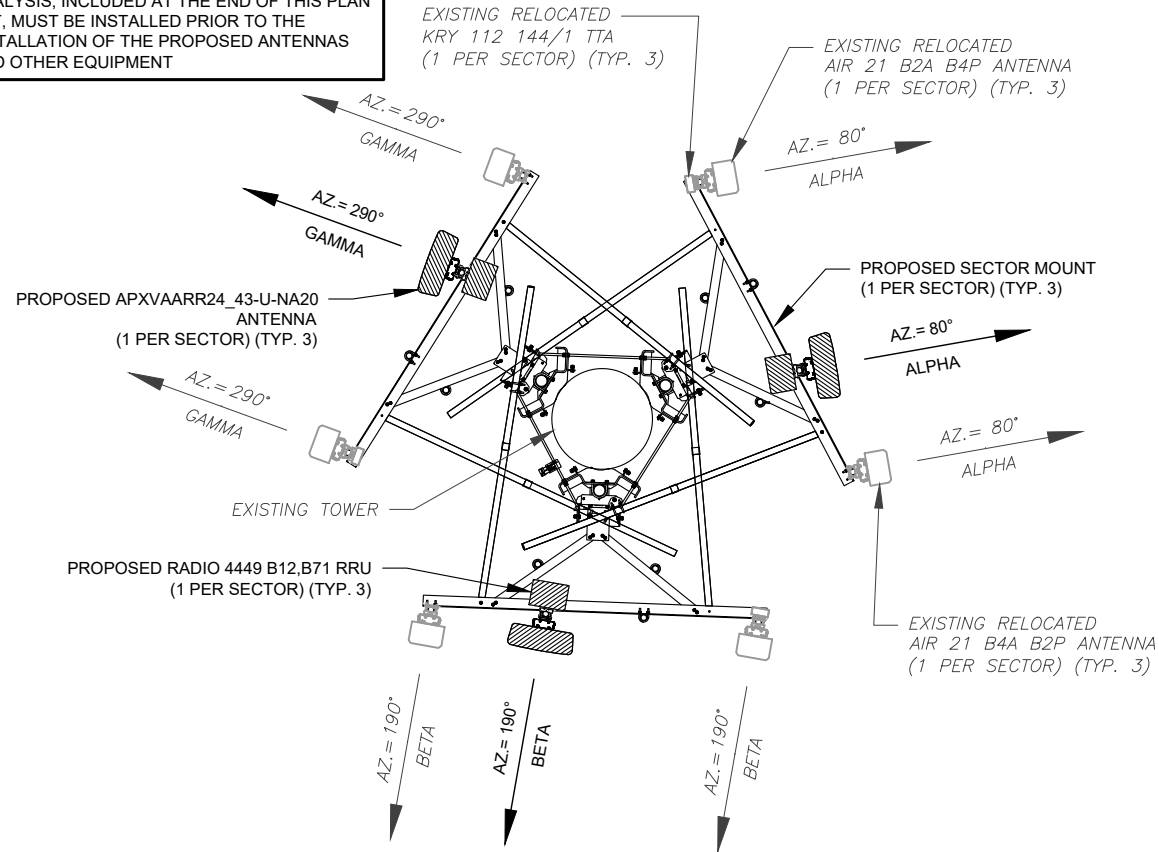
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1 EXISTING ANTENNA PLAN

PER MOUNT ANALYSIS COMPLETED BY CLS ENGINEERING, DATED 04/12/19, THE EXISTING MOUNT CAN NOT ADEQUATELY SUPPORT THE PROPOSED LOADING. THE MOUNT REPLACEMENT PROPOSED IN THE MOUNT ANALYSIS, INCLUDED AT THE END OF THIS PLAN SET, MUST BE INSTALLED PRIOR TO THE INSTALLATION OF THE PROPOSED ANTENNAS AND OTHER EQUIPMENT



2 FINAL ANTENNA PLAN

EXISTING ANTENNA / EQUIPMENT SCHEDULE

SECTOR	ANT.	MANUFACTURER (MODEL #)	RAD CENTER	AZIMUTH (TN)	MECH. D-TILT	ELEC. D-TILT	ADDITIONAL TOWER MOUNTED EQUIPMENT
ALPHA	A1	AIR 21 B2A B4P	112'-0"	80°	2°	3°	KRY 112 144/1
ALPHA	A2	LNX-6515DS-A1M	112'-0"	80°	0°	2°	RRUS11 B12
ALPHA	A4	AIR 21 B4A B2P	112'-0"	80°	2°	3°	-
BETA	B1	AIR 21 B2A B4P	112'-0"	190°	2°	3°	KRY 112 144/1
BETA	B2	LNX-6515DS-A1M	112'-0"	190°	0°	2°	RRUS11 B12
BETA	B4	AIR 21 B4A B2P	112'-0"	190°	2°	3°	-
GAMMA	C1	AIR 21 B2A B4P	112'-0"	290°	2°	3°	KRY 112 144/1
GAMMA	C2	LNX-6515DS-A1M	112'-0"	290°	0°	2°	RRUS11 B12
GAMMA	C4	AIR 21 B4A B2P	112'-0"	290°	2°	3°	-

NOTES

- BASED ON APPROVED ATC APPLICATION 12927192, DATED 04/02/19. CONFIRM WITH T-MOBILE REP FOR APPLICABLE UPDATES/REVISIONS AND MOST RECENT RFDS FOR NSN CONFIGURATION (CONFIG). GC TO CAP ALL UNUSED PORTS.
- ATC HAS NOT YET VERIFIED ANY EXISTING ANTENNA CONFIG OR MOUNT CONFIG. CONTRACTOR TO VERIFY MOUNT CONFIG HAS SUFFICIENT SPACE FOR PROPOSED LESSEE EQUIPMENT (EQUIP) (I.E. CLEARANCES, MOUNT PIPE, SUFFICIENT LENGTH, ETC.) ATC DID NOT ANALYZE ANTENNA MOUNT TO DETERMINE ADEQUATE STRUCTURAL CAPACITY FOR ANY LESSEE LOADING.
- ALL PROPOSED EQUIP INCLUDING ANTENNAS, COAX, ETC. SHALL BE MOUNTED IN ACCORDANCE WITH THE TOWER STRUCTURAL ANALYSIS ON FILE WITH ATC'S CM.
- CONFIRM SPACING OF PROPOSED EQUIP DOES NOT CAUSE TOWER CONFLICTS NOR IMPEDE TOWER CLIMBING PEGS.
- POSITIONS START WITH FIRST PIPE ON THE LEFT SIDE (AS VIEWED FROM BEHIND THE MOUNT).

FINAL ANTENNA / EQUIPMENT SCHEDULE

SECTOR	ANT.	MANUFACTURER (MODEL #)	RAD CENTER	AZIMUTH (TN)	MECH. D-TILT	ELEC. D-TILT	ADDITIONAL TOWER MOUNTED EQUIPMENT
ALPHA	A1	AIR 21 B2A B4P	112'-0"	80°	2°	3°	KRY 112 144/1
ALPHA	A3	APXVAARR24_43-U-NA20	112'-0"	80°	0°	2°	RADIO 4449 B12,B71
ALPHA	A4	AIR 21 B4A B2P	112'-0"	80°	2°	3°	-
BETA	B1	AIR 21 B2A B4P	112'-0"	190°	2°	3°	KRY 112 144/1
BETA	B3	APXVAARR24_43-U-NA20	112'-0"	190°	0°	2°	RADIO 4449 B12,B71
BETA	B4	AIR 21 B4A B2P	112'-0"	190°	2°	3°	-
GAMMA	C1	AIR 21 B2A B4P	112'-0"	290°	2°	3°	KRY 112 144/1
GAMMA	C3	APXVAARR24_43-U-NA20	112'-0"	290°	0°	2°	RADIO 4449 B12,B71
GAMMA	C4	AIR 21 B4A B2P	112'-0"	290°	2°	3°	-

CURRENT FIBER DISTRIBUTION/OVP BOX		CURRENT CABLING SUMMARY		
MODEL NUMBER	STATUS	COAX	HYBRID	STATUS
-	-	(9) 1-5/8"	(1) 1-1/4"	RMN
-	-	(3) 1-5/8"	-	RMV

STATUS ABBREVIATIONS	
RMV:	TO BE REMOVED
RMN:	TO REMAIN
REL:	TO BE RELOCATED
DSC:	TO BE DISCONNECTED & REMAIN
ADD:	TO BE ADDED

CABLE LENGTHS FOR JUMPERS  
FIBER DISTRIBUTION/OVP TO RRU: 15'  
RRU TO ANTENNA: 10'

PROPOSED FIBER DISTRIBUTION/OVP BOX		PROPOSED CABLING SUMMARY		
MODEL NUMBER	STATUS	COAX	HYBRID	STATUS
-	-	(6) 1-5/8"	(1) 1-1/4"	RMN
-	-	-	(3) 1-5/8"	ADD

3 ANTENNA SCHEDULE

**AMERICAN TOWER®**  
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3500 REGENCY PARKWAY  
SUITE 100  
CARY, NC 27518  
PHONE: (919) 468-0112  
COA: PEC.0001553

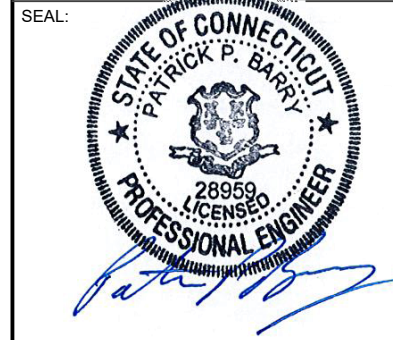
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ATC SITE NUMBER:  
**370629**

ATC SITE NAME:  
**NORTHAVEN I**

SITE ADDRESS:  
125 WASHINGTON AVE  
NORTHAVEN, CT 06473



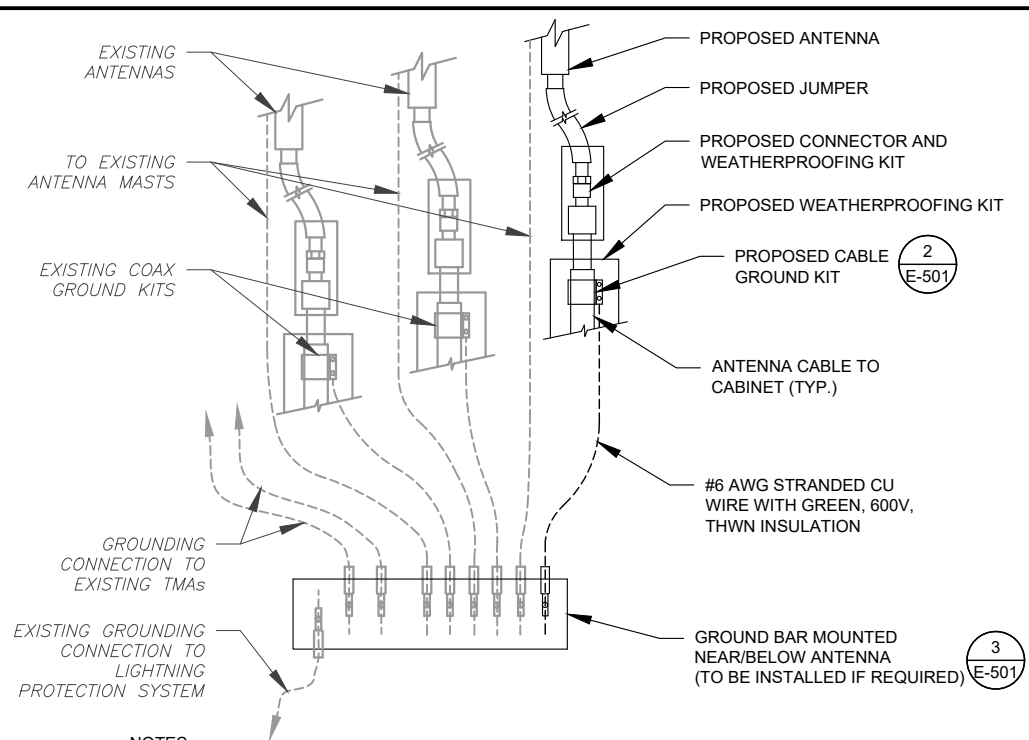
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ANTENNA INFORMATION & SCHEDULE

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**C-501**

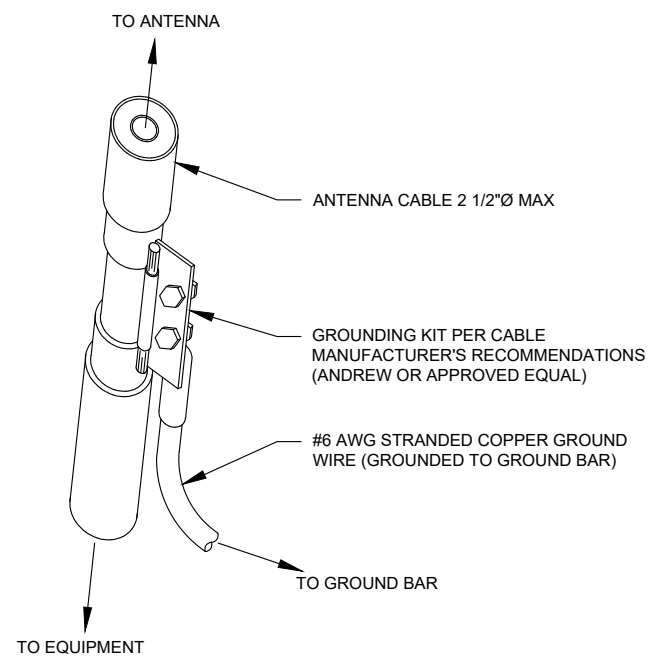
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**NOTES:**

1. THIS DETAIL IS INTENDED TO SHOW THE GENERAL GROUNDING REQUIREMENTS. SLIGHT ADJUSTMENTS MAY BE REQUIRED BASED ON EXISTING SITE CONDITIONS. THE CONTRACTOR SHALL MAKE FIELD ADJUSTMENTS AS NEEDED AND INFORM THE CONSTRUCTION MANAGER OF ANY CONFLICTS.
2. SITE GROUNDING SHALL COMPLY WITH T-MOBILE GROUNDING STANDARDS, LATEST EDITION, AND COMPLY WITH T-MOBILE GROUNDING CHECKLIST, LATEST VERSION. WHEN NATIONAL AND LOCAL GROUNDING CODES ARE MORE STRINGENT THEY SHALL GOVERN.

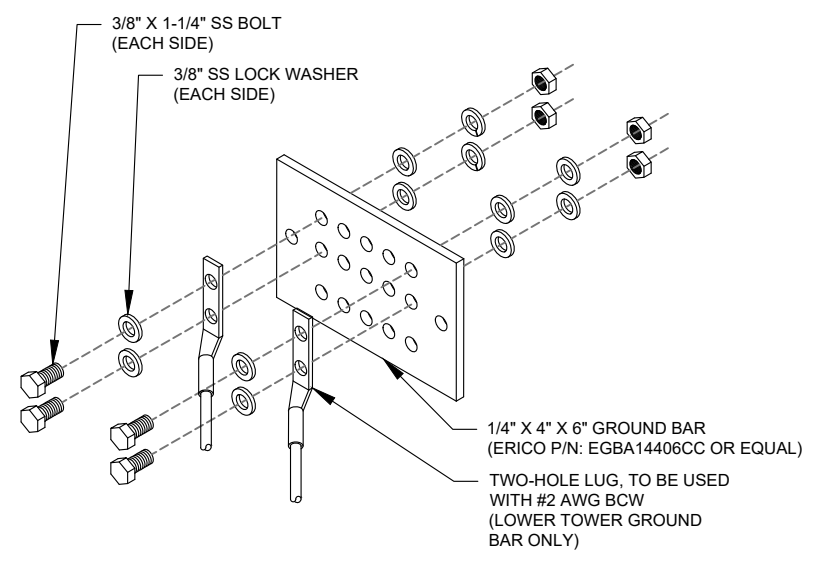
**1 TYPICAL ANTENNA GROUNDING DIAGRAM**  
SCALE: NOT TO SCALE



**GROUND KIT NOTES:**

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. CONTRACTOR SHALL PROVIDE WEATHERPROOFING KIT (ANDREW PART NUMBER 221213) AND INSTALL/TAPE PER MANUFACTURER'S SPECIFICATIONS.

**2 CABLE GROUND KIT CONNECTION DETAIL**  
SCALE: NOT TO SCALE



**GROUND BAR NOTES:**

1. GROUND BAR KITS COME WITH ALL HARDWARE, NUTS, BOLTS, WASHERS, ETC. EXCEPT THE STRUCTURAL MOUNTING MEMBER(S).
2. GROUND BAR TO BE BONDED DIRECTLY TO TOWER.

**3 TOWER GROUND BAR DETAIL**  
SCALE: NOT TO SCALE

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3500 REGENCY PARKWAY  
SUITE 100  
CARY, NC 27518  
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ATC SITE NAME:  
**NORTHHAVEN I**

SITE ADDRESS:  
125 WASHINGTON AVE  
NORTH HAVEN, CT 06473

SEAL:

STATE OF CONNECTICUT  
PATRICK P. BARRY  
28959  
LICENSED PROFESSIONAL ENGINEER

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**GROUNDING DETAILS**

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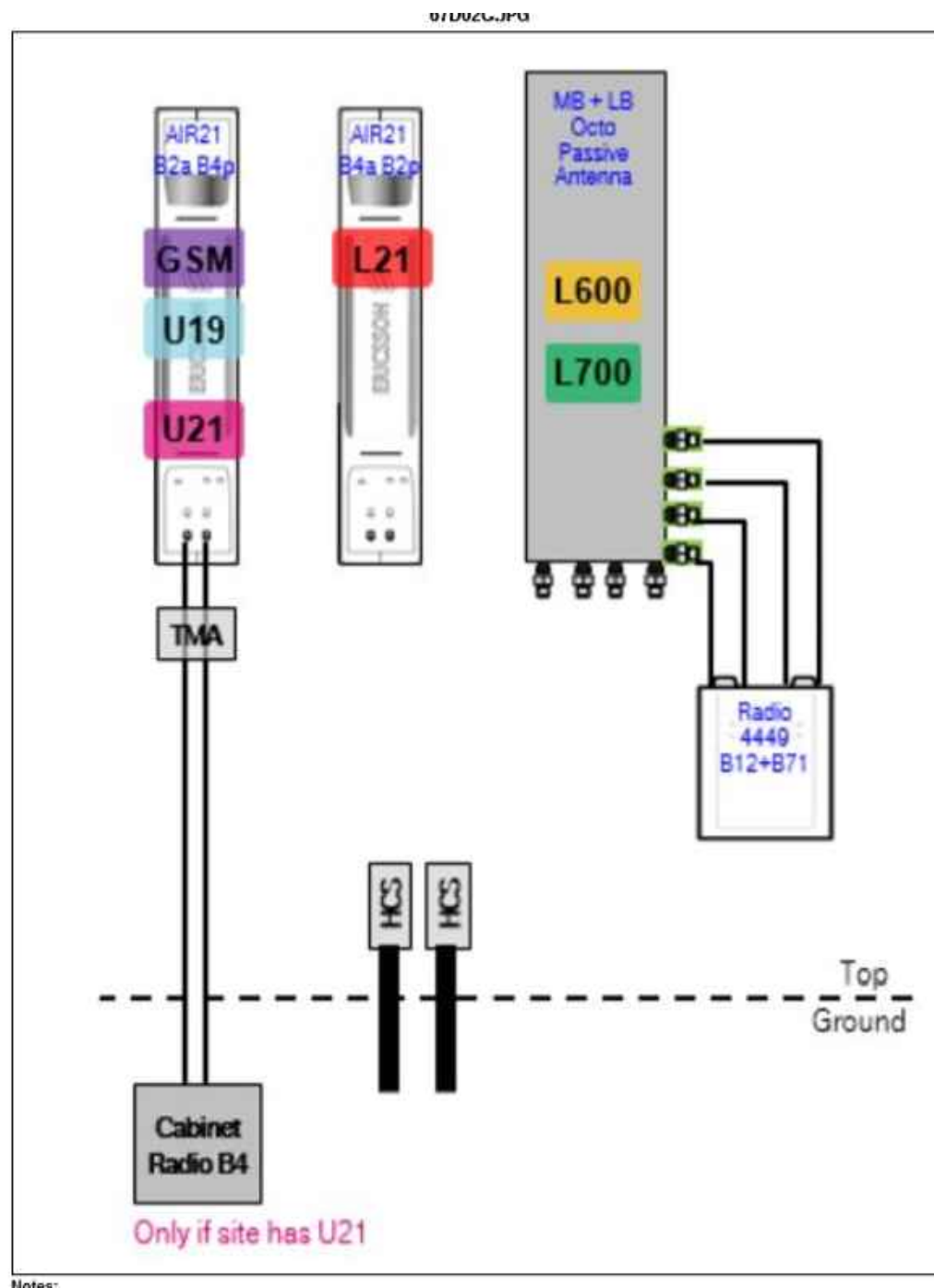
Existing RAN Equipment		
Template: 702Cu		
Enclosure	1	2
Enclosure Type	RBS 6131	S12000 Outdoor
Baseband	DUW30 (x2) DUG20 DUS41	
Hybrid Cable System	Ericsson 9x18 HCS *Select Length*	
Radio	RU22 (x 6)	

Proposed RAN Equipment		
Template: 67D02C Outdoor		
Enclosure	1	2
Enclosure Type	RBS 6131	S12000 Outdoor
Baseband	DUW30 U2100 DUW30 U1900 DUG20 G1900 BB 6630 L2100 L700 L600 BB 6630 N600 (DARK)	
Hybrid Cable System	Ericsson 9x18 HCS *Select Length* Ericsson 6x12 HCS *Select Length & AWG* (x 3)	
Radio	RUS01 B4 (x 3) U2100	

**RAN Scope of Work:**

Replace (1) DUS41 with (1) BB6630 for L2100, L700, and L600.  
 Add (1) BB6630 for future 5G N600.  
 Add (3) 6X12 HCS, Length and AWG will decide by Dev.  
 Swap (3) LNX 6515 Antennas @ P2 with (3) 8' Octoport antennas @ P3. Swap (3) RRU511 B12 with (3) Radios 4449.  
 Existing: (12) 1-5/8" Coaxial Lines; (1) 9X18. Remove (3) Coaxial lines.

1 CABINET CONFIGURATION  
SCALE: NOT TO SCALE



2 ANTENNA CONFIGURATION  
SCALE: NOT TO SCALE

NOTE: THIS SHEET CREATED BY OTHERS AND PROVIDED BY REQUEST OF CUSTOMER WITHOUT EDIT.



**Mount Analysis of Proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector  
Frames for American Tower on behalf of T-Mobile**  
**370629 - Northhaven I**  
**Project #: 12927192**  
**T-Mobile Site ID: CTNH735A**  
**Program: L600**

CLS Engineering PLLC Project #41124-12927192-01-MR  
 April 12, 2019

MOUNT DESCRIPTION	Proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector Frames at 109 ft AGL
ANTENNA ELEVATION	Nominal Rad. Elevation of 109 ft AGL
SITE DESCRIPTION	120 ft Monopole
SITE ADDRESS	125 Washington Ave., North Haven, CT 06473, New Haven County
GPS COORDINATES	41.39780, -72.85670
ANALYSIS STANDARD	2018 IBC / TIA-222-H
LOADING CRITERIA	120 mph, $V_{ult}$ (3-Second Gust) w/o ice & 50 mph (3-Second Gust) w/ 1" Ice

■ ANALYSIS RESULT: **Pass (Replacement)**

MEMBER USAGE	48%	Pass
--------------	-----	------

Existing mounts to be replaced; see conclusion for details.

Prepared by:  
 Lowden Kerns, E.I.

Reviewed and Approved by:  
 Tyler M. Barker, P.E.



Tyler M. Barker  
 CLS Engineering, PLLC  
 Director of Engineering  
 PE # 32402 Exp. 1/31/2020  
 COA # PEC.001613 Exp. 8/1/20

Digitally signed  
 by Tyler M.  
 Barker  
 Date:  
 2019.04.12  
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Mount Analysis for American Tower on behalf of T-Mobile  
 370629 - Northhaven I  
 April 12, 2019  
 CLS Engineering PLLC Project #41124-12927192-01-MR

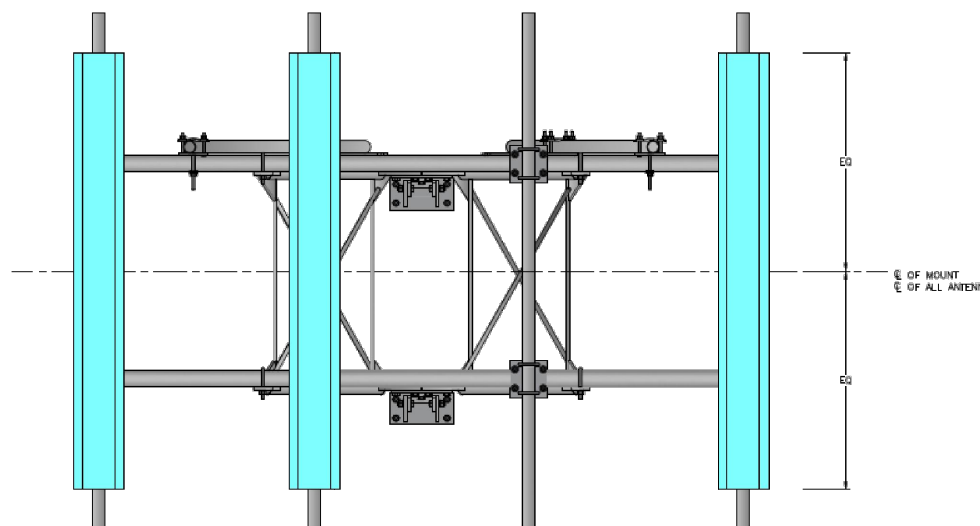
■ CONCLUSION AND RECOMMENDATIONS

According to our structural analysis, the mounts have been found to **PASS PENDING REPLACEMENT**. The mounting configuration considered in this analysis will be capable of supporting the referenced loading pursuant to referenced standards once the following scope is executed:

- Replace existing platform mount with (1) proposed Perfect Vision PV-MPM-SFA10-12-278X96 sector frame kit.
- Install (4) mount pipes included with kit at each sector frame mount (12 total). All mount pipes are to be installed equidistant from each other as shown in the assembly drawings.
- Install (2) stiff arms included in the sector frame kit at each sector frame mount (6 total). Connect to nearest adjacent universal pipe with Perfect Vision PV-SAM-U or equal (6 total). Connect to upper face horizontal member as shown in the following sketch.
- Install existing and proposed antennas such that they are vertically centered on the mounts. Install existing and proposed RRUs and TMAs behind the antennas.

NOTE:  
 MOUNT SHOWN IS REPRESENTATIVE.  
 ACTUAL GEOMETRY MAY DIFFER.

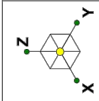
NOTE:  
 INSTALL ANTENNAS SUCH THAT THEY  
 ARE VERTICALLY CENTERED BETWEEN  
 MOUNT FACE HORIZONTALS.



See following sketches and Perfect Vision Assembly drawings for additional details.

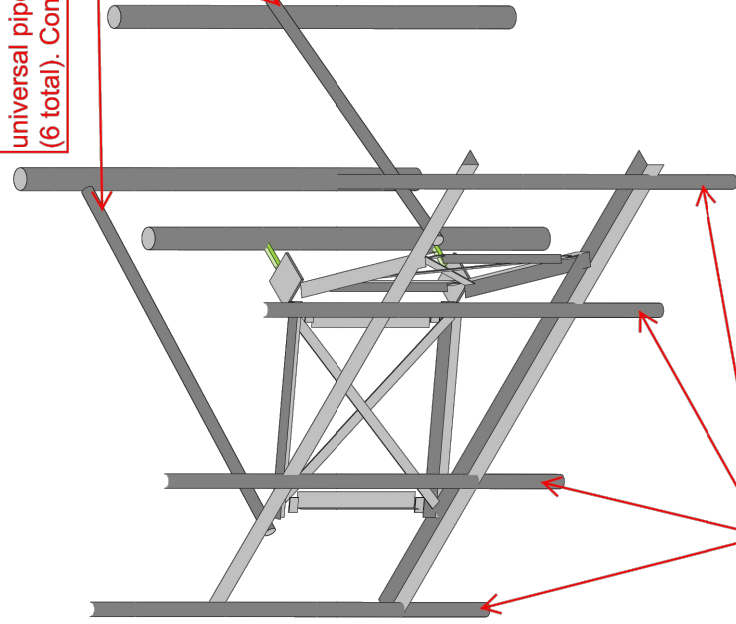
SUPPLEMENTAL

SHEET NUMBER:  
**R-602**  
 REVISION:  
**0**



Replace existing platform mount with (1) proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector Frame Kit.

Install (2) stiff arms included in the sector frame kit at each sector frame mount (6 total). Connect to nearest universal pipe with Perfect Vision PV-SAM-U or equal (6 total). Connect to upper face horizontal member.



Install (4) mount pipes included with kit at each sector frame mount (12 total). All mount pipes are to be installed equidistant from each other.

CLS

JLK

41124-12927192-01-MR

IN - 1

Apr 12, 2019 at 3:44 PM

41124-12927192-01-MR.r3d

41124-12927192-Northaven I

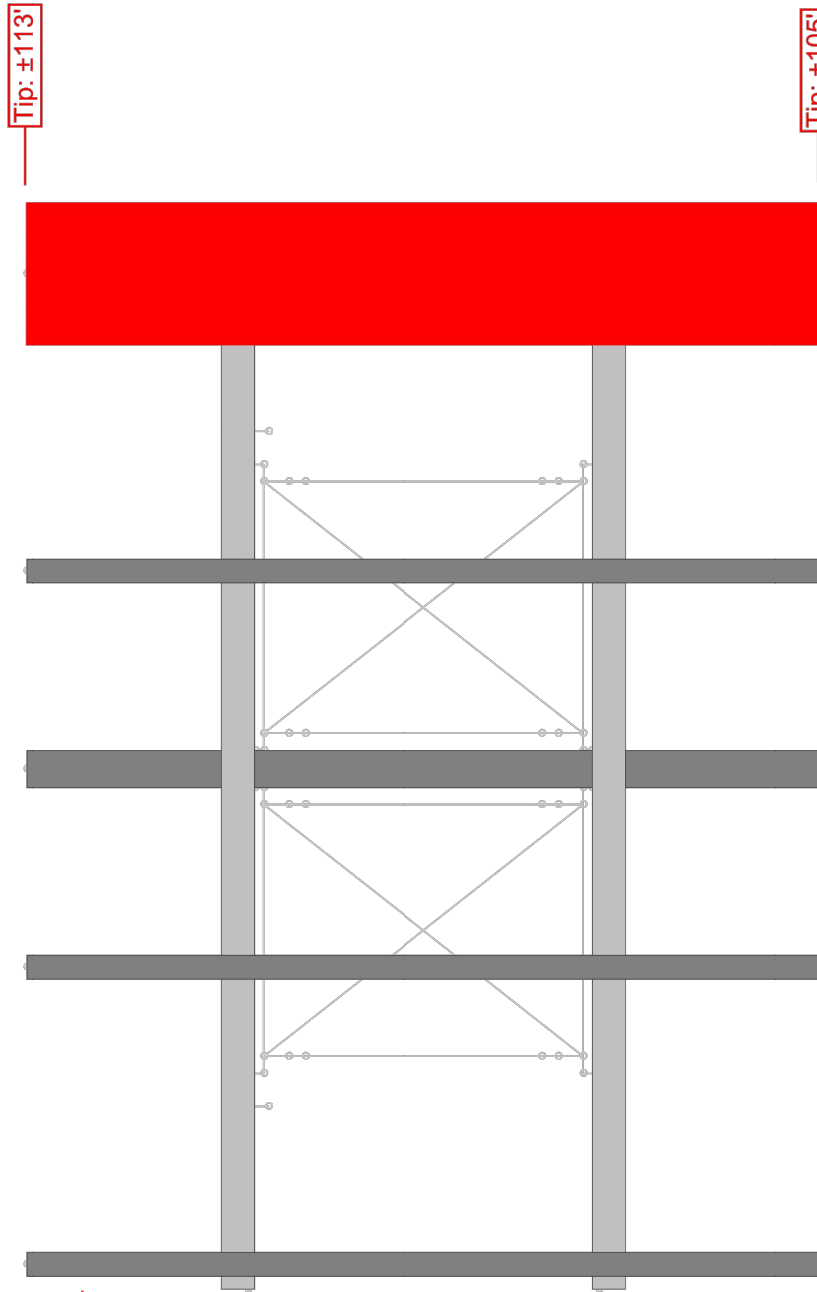
Installation Sketch



Top Collar:  
±112'

Mount/RAD:  
±109'

Bot Collar:  
±106'



Tip: ±113'

Tip: ±105'

CLS

JLK

Apr 10, 2019 at 12:22 AM

41124-12927192-01-MR.r3d

IN - 2

41124-12927192-Northaven I

Mount and Antenna Elevations

SUPPLEMENTAL

SHEET NUMBER:  
R-603

REVISION:  
0

# Exhibit D

## **Structural Analysis Report**



**AMERICAN TOWER®**  
CORPORATION

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## Structural Analysis Report

**Structure** : 120 ft Monopole  
**ATC Site Name** : Northhaven I, CT  
**ATC Site Number** : 370629  
**Engineering Number** : 12927192\_C3\_02  
**Proposed Carrier** : T-MOBILE  
**Carrier Site Name** : CT11051 Replacement  
**Carrier Site Number** : CTNH735A  
**Site Location** : 125 Washington Ave  
North Haven, CT 06473-0000  
41.397800,-72.856700  
**County** : New Haven  
**Date** : June 5, 2019  
**Max Usage** : 44%  
**Result** : Pass

Prepared By:  
Hussam Al Tahan, E.I.  
Structural Engineer I

*Hussam Al Tahan*

Reviewed By:



Authorized by "EOR"  
Jun 6 2019 9:34 AM

cosign

COA: PEC.0001553



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## Introduction

The purpose of this report is to summarize results of a structural analysis performed on the 120 ft monopole to reflect the change in loading by T-MOBILE.

## Supporting Documents

<b>Tower Drawings</b>	Valmont Project #F177, dated September 30, 1998
<b>Foundation Drawing</b>	Valmont Drawing #2652-F, dated October 9, 1998
<b>Geotechnical Report</b>	CTB Project #98143, dated September 30, 1998

## Analysis

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

<b>Basic Wind Speed:</b>	97 mph (3-Second Gust, $V_{asd}$ ) / 125 mph (3-Second Gust, $V_{ult}$ )
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-Second Gust) w/ 3/4" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-G / 2015 IBC / 2018 Connecticut State Building Code
<b>Structure Class:</b>	II
<b>Exposure Category:</b>	B
<b>Topographic Category:</b>	1
<b>Crest Height:</b>	0 ft
<b>Spectral Response:</b>	$S_s = 0.18$ , $S_1 = 0.06$
<b>Site Class:</b>	D - Stiff Soil

## Conclusion

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.



**Existing and Reserved Equipment**

Elev. <sup>1</sup> (ft)	Qty	Antenna	Mount Type	Lines	Carrier
122.0	2	Raycap DC6-48-60-18-8F ("Squid")	Platform with Handrails	(6) 0.78" (19.7mm) 8 AWG 6 (3) 3" conduit (2) 3/8" (0.38"- 9.5mm) RET Control Cable (12) 1 5/8" Coax (2) 0.39" (10mm) Fiber Trunk	AT&T MOBILITY
	3	Ericsson RRUS 11 (Band 12)			
	3	Ericsson RRUS 32 B66			
	6	Powerwave Allgon LGP21401			
	6	Powerwave Allgon 7020.00 Dual Band RET			
	3	Ericsson RRUS 32 B2			
	3	CCI HPA-65R-BUU-H6			
	3	Ericsson RRUS-32 (77 lbs)			
	3	Powerwave Allgon 7770.00			
	3	Quintel QS66512-2			
109.0	3	Ericsson KRY 112 144/1	-	-	T-MOBILE

**Equipment to be Removed**

Elev. <sup>1</sup> (ft)	Qty	Antenna	Mount Type	Lines	Carrier
112.0	3	Ericsson RRUS 11 B12	Platform with Handrails	(1) 1 1/4" Hybriflex Cable (12) 1 5/8" Coax	T-MOBILE
	3	Andrew LNX-6515DS-VTM			
	3	Ericsson AIR 21, 1.3M, B4A B2P			
	3	Ericsson AIR 21, 1.3M, B2A B4P (91.5 lbs)			

**Proposed Equipment**

Elev. <sup>1</sup> (ft)	Qty	Antenna	Mount Type	Lines	Carrier
109.0	3	Ericsson Radio 4449 B12,B71	Sector Frame (Perfect Vision PV-MPM-SFA10- 12-278X96) w/Work Platform	(1) 1 1/4" (1.25"- 31.8mm) Fiber (3) 1 5/8" (1.63"- 41.3mm) Fiber (9) 1 5/8" Coax	T-MOBILE
	3	Ericsson AIR 21, 1.3M, B2A B4P (91.5 lbs)			
	3	Ericsson AIR 21, 1.3M, B4A B2P			
	3	RFS APXVAARR24_43-U-NA20			

<sup>1</sup> Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed coax inside the pole shaft.





**Structure Usages**

Structural Component	Controlling Usage	Pass/Fail
Anchor Bolts	28%	Pass
Shaft	35%	Pass
Base Plate	18%	Pass

**Foundations**

Reaction Component	Original Design Reactions	Factored Design Reactions*	Analysis Reactions	% of Design
Moment (Kips-Ft)	4,149.0	5,601.2	1,813.6	32%
Shear (Kips)	37.1	50.1	22.3	44%

\* The design reactions are factored by 1.35 per ANSI/TIA-222-G, Sec. 15.5.1

The structure base reactions resulting from this analysis are acceptable when compared to those shown on the original structure drawings, therefore no modification or reinforcement of the foundation will be required.

**Deflection and Sway\***

Antenna Elevation (ft)	Antenna	Carrier	Deflection (ft)	Sway (Rotation) (°)
109.0	Ericsson Radio 4449 B12,B71	T-MOBILE	0.351	0.323
	Ericsson AIR 21, 1.3M, B2A B4P (91.5 lbs)			
	Ericsson AIR 21, 1.3M, B4A B2P			
	RFS APXVAARR24_43-U-NA20			

\*Deflection and Sway was evaluated considering a design wind speed of 60 mph (3-Second Gust) per ANSI/TIA-222-G



## **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

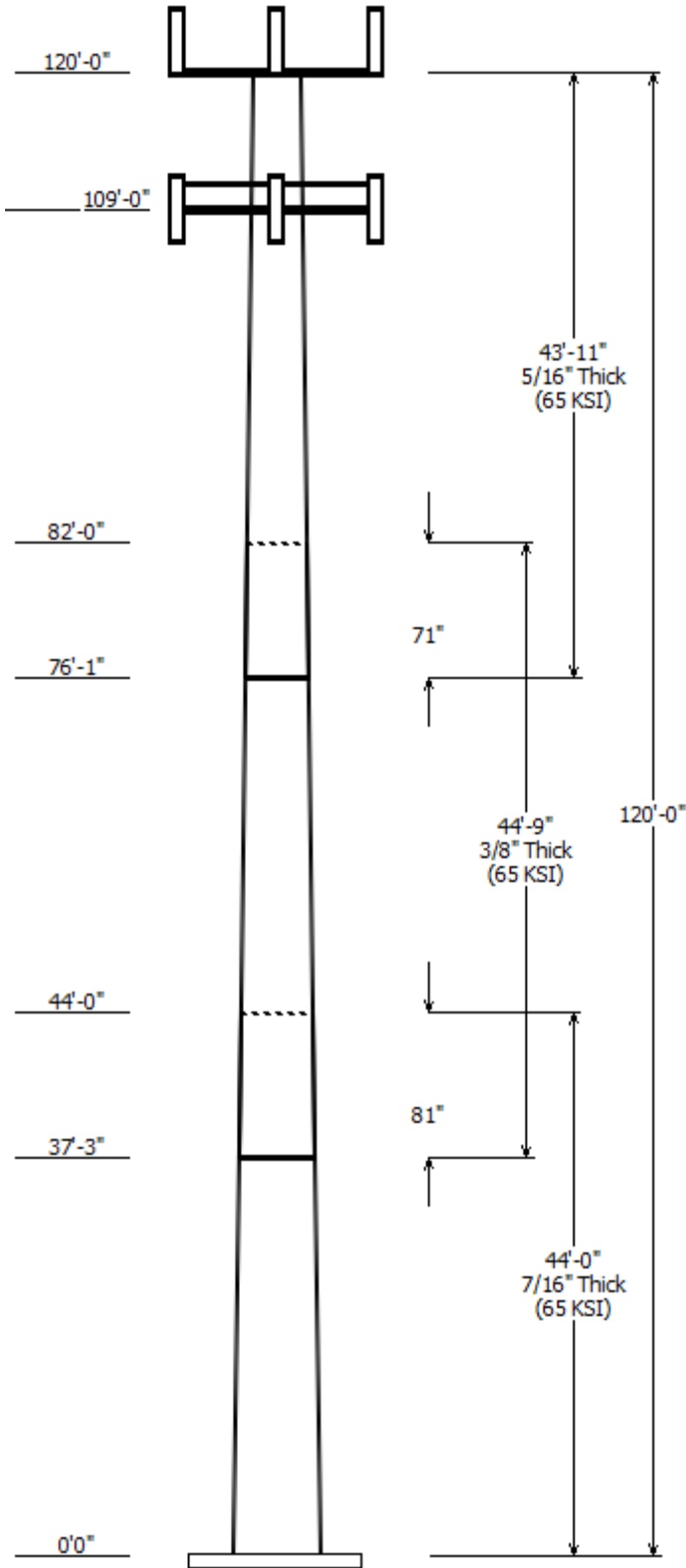
It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively "American Tower") are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.

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Job Information	
Client : T-MOBILE	Code: ANSI/TIA-222-G
Pole : 370629	
Location : Northhaven I, CT	Struct Class : II
Description : 120 ft Monopole	Exposure : B
Shape : 12 Sides	Topo : 1
Height : 120.00 (ft)	
Base Elev (ft): 0.00	
Taper: 0.20000 in/ft	

Sections Properties						
Shaft Section	Length (ft)	Diameter (in)		Thick Joint (in)	Overlap Length (in)	Steel Grade
		Across Top	Flats Bottom			
1	44.000	45.70	54.50	0.438	0.000	12 Sides 65
2	44.750	38.84	47.80	0.375	81.000	12 Sides 65
3	43.917	31.87	40.65	0.313	71.000	12 Sides 65

Discrete Appurtenance			
Attach Elev (ft)	Force Elev (ft)	Qty	Description
120.000	123.000	3	CCI HPA-65R-BUU-H6
120.000	123.000	3	Quintel QS66512-2
120.000	123.000	3	Powerwave Allgon 7770.00
120.000	123.000	3	Ericsson RRUS-32 (77 lbs)
120.000	123.000	3	Ericsson RRUS 32 B2
120.000	123.000	3	Ericsson RRUS 32 B66
120.000	123.000	6	Powerwave Allgon LGP21401
120.000	123.000	6	Powerwave Allgon 7020.00
120.000	123.000	3	Ericsson RRUS 11 (Band 12)
120.000	123.000	2	Raycap DC6-48-60-18-8F
120.000	120.000	1	Flat Platform w/ Handrails
109.000	109.000	3	Sector Frame (Perfect Vision
109.000	109.000	3	RFS APXVAARR24_43-U-NA20
109.000	109.000	3	Ericsson AIR 21, 1.3M, B4A B2P
109.000	109.000	3	Ericsson AIR 21, 1.3M, B2A B4P
109.000	109.000	3	Ericsson Radio 4449 B12,B71
109.000	109.000	3	Ericsson KRY 112 144/1

Linear Appurtenance			
Elev (ft) From	To	Description	Exposed To Wind
5.000	118.0	0.39" (10mm)	No
5.000	120.0	0.78" (19.7mm) 8	No
5.000	120.0	0.78" (19.7mm) 8	No
5.000	120.0	1 5/8" Coax	No
5.000	120.0	3" conduit	No
5.000	120.0	3/8" (0.38"-	No
0.000	109.0	1 1/4" (1.25"-	No
0.000	109.0	1 5/8" (1.63"-	No
0.000	109.0	1 5/8" Coax	No

Load Cases	
1.2D + 1.6W	97 mph with No Ice
0.9D + 1.6W	97 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Lateral
(0.9 - 0.2Sds) * DL + E	Seismic (Reduced DL) Equivalent Modal

1.0D + 1.0W

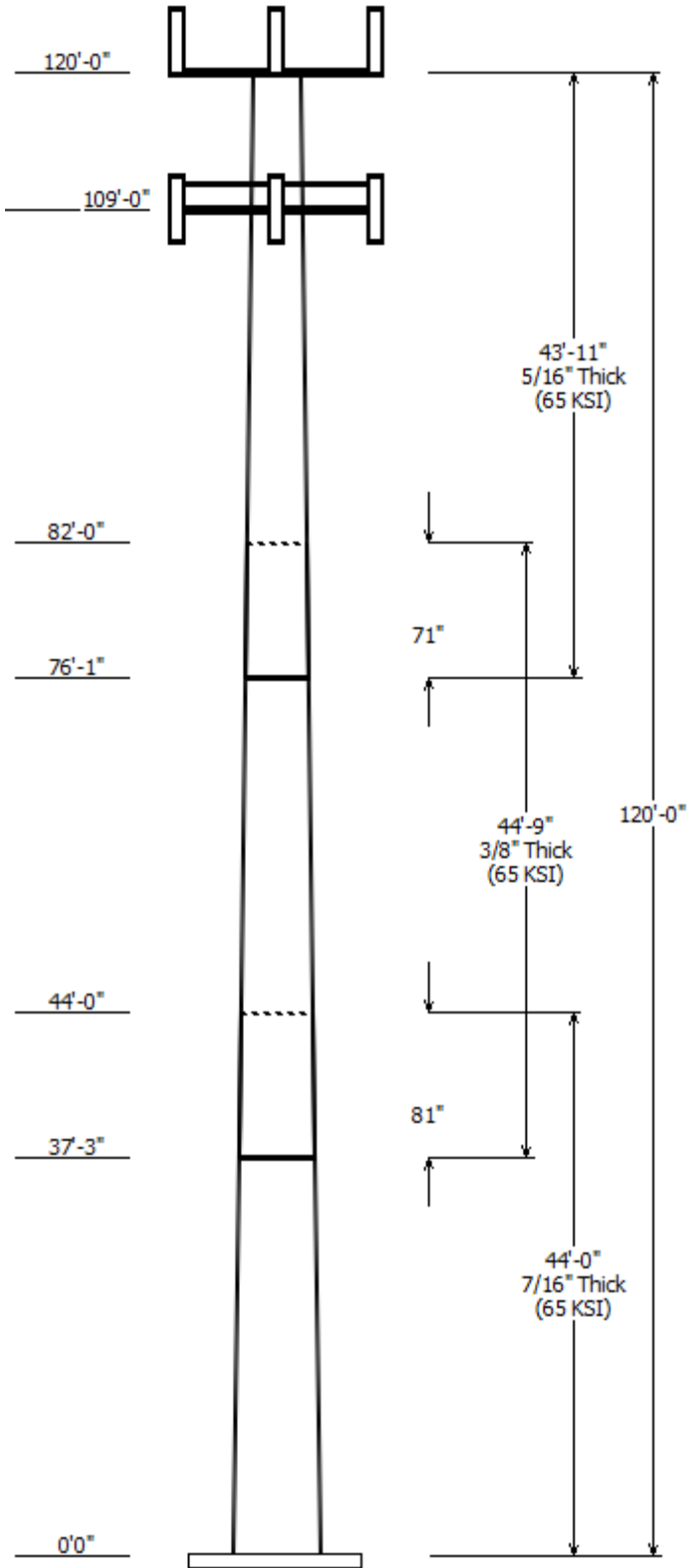
Serviceability 60 mph

**Reactions**

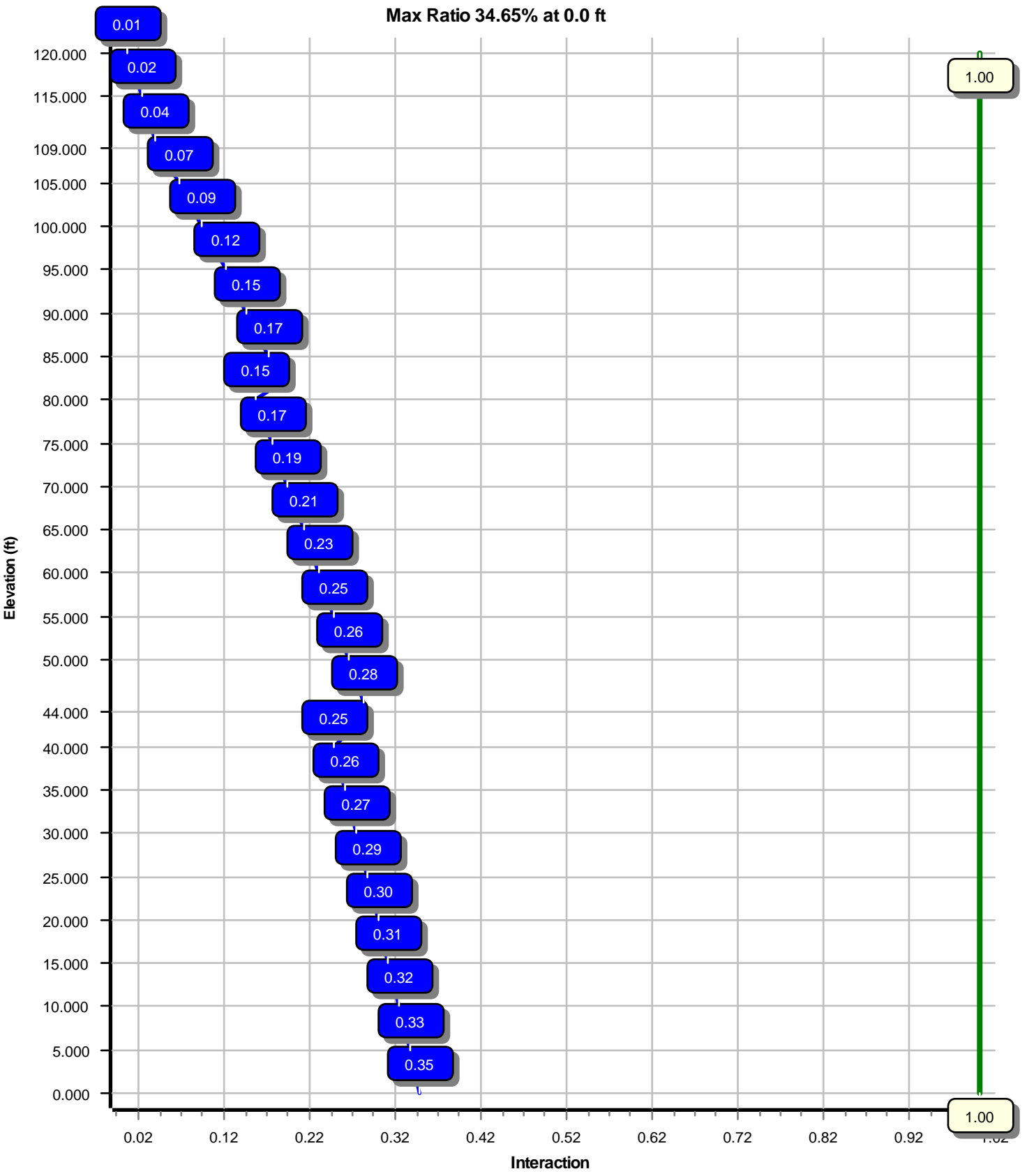
Load Case	Moment (kip-ft)	Shear (kip)	Axial (kip)
1.2D + 1.6W	1813.57	22.28	45.75
0.9D + 1.6W	1803.59	22.27	34.31
1.2D + 1.0Di + 1.0Wi	415.73	4.94	66.53
(1.2 + 0.2Sds) * DL + E ELFM	159.84	1.67	45.59
(1.2 + 0.2Sds) * DL + E EMAM	250.53	2.47	45.59
(0.9 - 0.2Sds) * DL + E ELFM	158.76	1.67	31.67
(0.9 - 0.2Sds) * DL + E EMAM	248.74	2.47	31.67
1.0D + 1.0W	386.62	4.77	38.14

**Dish Deflections**

Load Case	Attach Elev (ft)	Deflection (in)	Rotation (deg)
	0.00	0.000	0.000



Load Case : 1.2D + 1.6W  
Max Ratio 34.65% at 0.0 ft



Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

Analysis Parameters

Location :	New Haven County, CT	Height (ft) :	120
Code :	ANSI/TIA-222-G	Base Diameter (in) :	54.50
Shape :	12 Sides	Top Diameter (in) :	31.87
Pole Type :	Taper	Taper (in/ft) :	0.200
Pole Manufacturer :	Valmont	Rotation (deg) :	0.00

Ice & Wind Parameters

Structure Class:	II	Design Wind Speed Without Ice:	97 mph
Exposure Category:	B	Design Wind Speed With Ice:	50 mph
Topographic Category:	1	Operational Wind Speed:	60 mph
Crest Height:	0 ft	Design Ice Thickness:	0.75 in

Seismic Parameters

Analysis Method: Equivalent Modal Analysis & Equivalent Lateral Force Methods

Site Class: D - Stiff Soil

Period Based on Rayleigh Method (sec): 1.51

$T_L$ (sec):	6	$p$ :	1	$C_s$ :	0.044
$S_s$ :	0.184	$S_1$ :	0.062	$C_s$ Max:	0.044
$F_a$ :	1.600	$F_v$ :	2.400	$C_s$ Min:	0.030
$S_{ds}$ :	0.196	$S_{d1}$ :	0.099		

Load Cases

1.2D + 1.6W	97 mph with No Ice
0.9D + 1.6W	97 mph with No Ice (Reduced DL)
1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice
(1.2 + 0.2Sds) * DL + E ELFM	Seismic Equivalent Lateral Forces Method
(1.2 + 0.2Sds) * DL + E EMAM	Seismic Equivalent Modal Analysis Method
(0.9 - 0.2Sds) * DL + E ELFM	Seismic (Reduced DL) Equivalent Lateral Forces Method
(0.9 - 0.2Sds) * DL + E EMAM	Seismic (Reduced DL) Equivalent Modal Analysis Method
1.0D + 1.0W	Serviceability 60 mph

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

**Shaft Section Properties**

Sect Info	Length (ft)	Thick (in)	Fy (ksi)	Joint Type	Slip Joint Len (in)	Weight (lb)	Bottom				Top				Taper (in/ft)				
							Dia (in)	Elev (ft)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	Dia (in)	Elev (ft)		Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio
1-12	44.000	0.4375	65		0.00	10,475	54.50	0.00	76.16	28412.4	30.70	124.57	45.70	44.00	63.76	16673.4	25.31	104.46	0.200008
2-12	44.750	0.3750	65	Slip	81.00	7,897	47.80	37.25	57.27	16439.4	31.47	127.47	38.84	82.00	46.46	8777.8	25.08	103.60	0.200008
3-12	43.917	0.3125	65	Slip	71.00	5,406	40.65	76.08	40.60	8434.7	32.18	130.10	31.87	120.00	31.76	4038.0	24.65	102.00	0.200008
Shaft Weight						23,778													

**Discrete Appurtenance Properties**

Attach Elev (ft)	Description	Qty	Ka	Vert Ecc (ft)	Weight (lb)	No Ice EPAa (sf)	Orientation Factor	Weight (lb)	Ice EPAa (sf)	Orientation Factor
120.00	Powerwave Allgon 7020.00 Dual	6	0.75	3.000	2.20	0.340	0.50	12.19	0.741	0.50
120.00	Powerwave Allgon LGP21401	6	0.75	3.000	14.10	1.100	0.50	38.50	1.795	0.50
120.00	Raycap DC6-48-60-18-8F	2	0.75	3.000	31.80	1.470	0.50	92.13	2.153	0.50
120.00	Ericsson RRUS 11 (Band 12)	3	0.75	3.000	50.00	2.570	0.67	116.66	3.596	0.67
120.00	Ericsson RRUS 32 B66	3	0.75	3.000	53.00	2.740	0.67	124.92	3.882	0.67
120.00	Ericsson RRUS 32 B2	3	0.75	3.000	53.00	2.740	0.67	124.92	3.882	0.67
120.00	Ericsson RRUS-32 (77 lbs)	3	0.75	3.000	77.00	3.310	0.71	172.10	4.564	0.71
120.00	Powerwave Allgon 7770.00	3	0.75	3.000	35.00	5.510	0.65	166.19	6.538	0.65
120.00	Quintel QS66512-2	3	0.75	3.000	111.00	8.130	0.74	305.87	10.855	0.74
120.00	CCI HPA-65R-BUU-H6	3	0.75	3.000	51.00	9.660	0.69	265.54	12.371	0.69
120.00	Flat Platform w/ Handrails	1	1.00	0.000	2,000.00	42.400	1.00	3,389.74	62.908	1.00
109.00	Ericsson KRY 112 144/1	3	0.80	0.000	11.00	0.350	0.50	21.42	0.742	0.50
109.00	Ericsson Radio 4449 B12,B71	3	0.80	0.000	74.00	1.640	0.50	128.24	2.458	0.50
109.00	Ericsson AIR 21, 1.3M, B2A B4P	3	0.80	0.000	91.50	6.040	0.70	232.54	8.119	0.70
109.00	Ericsson AIR 21, 1.3M, B4A B2P	3	0.80	0.000	81.50	6.090	0.70	222.37	8.186	0.70
109.00	Sector Frame (Perfect Vision PV-	3	0.75	0.000	1,362.00	18.980	0.67	2,354.75	34.480	0.67
109.00	RFS APXVAARR24_43-U-NA20	3	0.80	0.000	127.90	20.240	0.63	508.22	23.833	0.63
Totals	Num Loadings:17	54			8,695.10			18,109.38		

**Linear Appurtenance Properties**

Load Case Azimuth (deg) :

Elev From (ft)	Elev To (ft)	Qty	Description	Coax Dia (in)	Coax Wt (lb/ft)	Max Coax / Flat Row	Dist Between Rows (in)	Dist Between Cols (in)	Azimuth (deg)	Dist From Face (in)	Exposed To Wind Carrier
5.00	120.00	4	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0.00	0	0.00	N AT&T MOBILITY
5.00	120.00	2	0.78" (19.7mm) 8 AWG	0.78	0.59	N	0	0.00	0	0.00	N AT&T MOBILITY
5.00	120.00	12	1 5/8" Coax	1.98	0.82	N	0	0.00	0	0.00	N AT&T MOBILITY
5.00	120.00	3	3" conduit	3.50	7.58	N	0	0.00	0	0.00	N AT&T MOBILITY
5.00	120.00	2	3/8" (0.38"- 9.5mm)	0.38	0.23	N	0	0.00	0	0.00	N AT&T MOBILITY
5.00	118.00	2	0.39" (10mm) Fiber	0.39	0.06	N	0	0.00	0	0.00	N AT&T MOBILITY
0.00	109.00	1	1 1/4" (1.25"- 31.8mm)	1.25	1.05	N	0	0.00	0	0.00	N T-MOBILE
0.00	109.00	3	1 5/8" (1.63"-41.3mm)	1.63	1.61	N	0	0.00	0	0.00	N T-MOBILE
0.00	109.00	9	1 5/8" Coax	1.98	0.82	N	0	0.00	0	0.00	N T-MOBILE



Segment Properties (Max Len : 5. ft)

Seg Top Elev (ft)	Description	Thick (in)	Flat Dia (in)	Area (in <sup>2</sup> )	Ix (in <sup>4</sup> )	W/t Ratio	D/t Ratio	F'y (ksi)	S (in <sup>3</sup> )	Z (in <sup>3</sup> )	Weight (lb)
0.00		0.4375	54.500	76.161	28,412.4	30.70	124.57	71.2	1007.	0.0	0.0
5.00		0.4375	53.500	74.752	26,864.7	30.09	122.29	71.9	970.1	0.0	1,283.8
10.00		0.4375	52.500	73.343	25,374.2	29.47	120.00	72.6	933.7	0.0	1,259.8
15.00		0.4375	51.500	71.934	23,939.9	28.86	117.71	73.2	898.0	0.0	1,235.9
20.00		0.4375	50.500	70.525	22,560.7	28.25	115.43	73.9	863.1	0.0	1,211.9
25.00		0.4375	49.500	69.117	21,235.5	27.64	113.14	74.6	828.8	0.0	1,187.9
30.00		0.4375	48.500	67.708	19,963.3	27.02	110.86	75.2	795.2	0.0	1,164.0
35.00		0.4375	47.500	66.299	18,742.9	26.41	108.57	75.9	762.3	0.0	1,140.0
37.25	Bot - Section 2	0.4375	47.050	65.665	18,210.4	26.14	107.54	76.2	747.7	0.0	505.2
40.00		0.4375	46.500	64.890	17,573.3	25.80	106.28	76.6	730.1	0.0	1,143.6
44.00	Top - Section 1	0.3750	46.450	55.635	15,075.1	30.51	123.87	71.4	627.0	0.0	1,639.4
45.00		0.3750	46.250	55.394	14,879.6	30.37	123.33	71.6	621.5	0.0	188.9
50.00		0.3750	45.250	54.186	13,927.5	29.65	120.67	72.4	594.6	0.0	932.2
55.00		0.3750	44.250	52.979	13,017.0	28.94	118.00	73.2	568.3	0.0	911.6
60.00		0.3750	43.250	51.771	12,147.0	28.22	115.33	73.9	542.6	0.0	891.1
65.00		0.3750	42.249	50.563	11,316.7	27.51	112.67	74.7	517.5	0.0	870.6
70.00		0.3750	41.249	49.356	10,525.1	26.79	110.00	75.5	492.9	0.0	850.0
75.00		0.3750	40.249	48.148	9,771.4	26.08	107.33	76.3	469.0	0.0	829.5
76.08	Bot - Section 3	0.3750	40.033	47.887	9,612.9	25.93	106.75	76.4	463.9	0.0	177.0
80.00		0.3750	39.249	46.941	9,054.4	25.37	104.66	77.1	445.7	0.0	1,167.7
82.00	Top - Section 2	0.3125	39.474	39.407	7,714.0	31.17	126.32	70.7	377.5	0.0	587.4
85.00		0.3125	38.874	38.803	7,364.8	30.65	124.40	71.3	366.0	0.0	399.2
90.00		0.3125	37.874	37.797	6,806.6	29.80	121.20	72.2	347.2	0.0	651.6
95.00		0.3125	36.874	36.790	6,277.3	28.94	118.00	73.2	328.9	0.0	634.5
100.0		0.3125	35.874	35.784	5,776.1	28.08	114.80	74.1	311.1	0.0	617.4
105.0		0.3125	34.874	34.778	5,302.4	27.22	111.60	75.0	293.7	0.0	600.3
109.0		0.3125	34.074	33.973	4,942.7	26.54	109.04	75.8	280.2	0.0	467.9
110.0		0.3125	33.874	33.771	4,855.3	26.37	108.40	76.0	276.9	0.0	115.3
115.0		0.3125	32.874	32.765	4,434.1	25.51	105.20	76.9	260.6	0.0	566.0
120.0		0.3125	31.874	31.759	4,038.0	24.65	102.00	77.8	244.7	0.0	548.9
23,778.4											

<b>Load Case:</b> 1.2D + 1.6W	97 mph with No Ice	18 Iterations
Gust Response Factor :1.10		Wind Importance Factor :1.00
Dead Load Factor :1.20		
Wind Load Factor :1.60		

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		328.3	0.0					0.0	0.0	328.3	0.0	0.0	0.0
5.00		650.6	1,540.6					0.0	79.6	650.6	1,620.1	0.0	0.0
10.00		638.4	1,511.8					0.0	299.8	638.4	1,811.6	0.0	0.0
15.00		626.3	1,483.0					0.0	299.8	626.3	1,782.8	0.0	0.0
20.00		614.1	1,454.3					0.0	299.8	614.1	1,754.0	0.0	0.0
25.00		602.0	1,425.5					0.0	299.8	602.0	1,725.3	0.0	0.0
30.00		596.8	1,396.7					0.0	299.8	596.8	1,696.5	0.0	0.0
35.00		435.4	1,368.0					0.0	299.8	435.4	1,667.7	0.0	0.0
37.25	Bot - Section 2	307.5	606.2					0.0	134.9	307.5	741.1	0.0	0.0
40.00		422.1	1,372.3					0.0	164.9	422.1	1,537.2	0.0	0.0
44.00	Top - Section 1	314.2	1,967.3					0.0	239.8	314.2	2,207.1	0.0	0.0
45.00		380.6	226.7					0.0	60.0	380.6	286.6	0.0	0.0
50.00		637.0	1,118.6					0.0	299.8	637.0	1,418.4	0.0	0.0
55.00		640.2	1,094.0					0.0	299.8	640.2	1,393.7	0.0	0.0
60.00		641.5	1,069.3					0.0	299.8	641.5	1,369.1	0.0	0.0
65.00		641.2	1,044.7					0.0	299.8	641.2	1,344.4	0.0	0.0
70.00		639.4	1,020.0					0.0	299.8	639.4	1,319.8	0.0	0.0
75.00		388.0	995.4					0.0	299.8	388.0	1,295.1	0.0	0.0
76.08	Bot - Section 3	321.1	212.4					0.0	64.9	321.1	277.4	0.0	0.0
80.00		380.5	1,401.3					0.0	234.8	380.5	1,636.1	0.0	0.0
82.00	Top - Section 2	319.9	704.8					0.0	119.9	319.9	824.7	0.0	0.0
85.00		508.7	479.0					0.0	179.9	508.7	658.9	0.0	0.0
90.00		630.8	782.0					0.0	299.8	630.8	1,081.7	0.0	0.0
95.00		623.7	761.4					0.0	299.8	623.7	1,061.2	0.0	0.0
100.00		615.8	740.9					0.0	299.8	615.8	1,040.6	0.0	0.0
105.00		547.2	720.3					0.0	299.8	547.2	1,020.1	0.0	0.0
109.00	Appurtenance(s)	301.2	561.5	3,344.2	0.0	0.0	6,292.4	0.0	239.8	3,645.4	7,093.7	0.0	0.0
110.00		356.1	138.3					0.0	44.0	356.1	182.4	0.0	0.0
115.00		587.3	679.2					0.0	220.2	587.3	899.4	0.0	0.0
120.00	Appurtenance(s)	291.0	658.7	4,241.9	0.0	7,392.4	4,141.7	0.0	219.9	4,532.9	5,020.3	0.0	0.0
Totals:										22,573.0	45,766.9	0.00	0.00

Load Case: 1.2D + 1.6W

97 mph with No Ice

18 Iterations

Gust Response Factor :1.10

Wind Importance Factor :1.00

Dead Load Factor :1.20

Wind Load Factor :1.60

Calculated Forces1

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-45.75	-22.28	0.00	-1,813.57	0.00	1,813.57	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.347
5.00	-44.10	-21.70	0.00	-1,702.17	0.00	1,702.17	4,837.22	2,418.61	10,592.2	5,231.13	0.05	-0.09	0.335
10.00	-42.25	-21.12	0.00	-1,593.69	0.00	1,593.69	4,790.15	2,395.07	10,289.9	5,081.80	0.19	-0.18	0.323
15.00	-40.44	-20.55	0.00	-1,488.10	0.00	1,488.10	4,741.38	2,370.69	9,987.88	4,932.64	0.42	-0.26	0.310
20.00	-38.66	-19.98	0.00	-1,385.38	0.00	1,385.38	4,690.93	2,345.46	9,686.42	4,783.76	0.74	-0.35	0.298
25.00	-36.91	-19.42	0.00	-1,285.49	0.00	1,285.49	4,638.77	2,319.39	9,385.73	4,635.26	1.15	-0.43	0.285
30.00	-35.20	-18.86	0.00	-1,188.39	0.00	1,188.39	4,584.93	2,292.46	9,086.02	4,487.24	1.64	-0.51	0.273
35.00	-33.51	-18.44	0.00	-1,094.10	0.00	1,094.10	4,529.39	2,264.69	8,787.51	4,339.82	2.23	-0.60	0.260
37.25	-32.76	-18.15	0.00	-1,052.61	0.00	1,052.61	4,503.84	2,251.92	8,653.62	4,273.70	2.52	-0.63	0.254
40.00	-31.21	-17.74	0.00	-1,002.70	0.00	1,002.70	4,472.15	2,236.08	8,490.40	4,193.09	2.89	-0.68	0.246
44.00	-29.00	-17.42	0.00	-931.74	0.00	931.74	3,577.05	1,788.53	6,802.04	3,359.27	3.49	-0.74	0.286
45.00	-28.70	-17.06	0.00	-914.33	0.00	914.33	3,569.30	1,784.65	6,757.59	3,337.32	3.64	-0.75	0.282
50.00	-27.27	-16.44	0.00	-829.04	0.00	829.04	3,529.49	1,764.75	6,535.38	3,227.58	4.48	-0.84	0.265
55.00	-25.86	-15.81	0.00	-746.84	0.00	746.84	3,488.00	1,744.00	6,313.42	3,117.96	5.40	-0.92	0.247
60.00	-24.49	-15.18	0.00	-667.77	0.00	667.77	3,444.81	1,722.40	6,091.92	3,008.57	6.41	-1.00	0.229
65.00	-23.13	-14.55	0.00	-591.86	0.00	591.86	3,399.92	1,699.96	5,871.09	2,899.51	7.49	-1.07	0.211
70.00	-21.81	-13.91	0.00	-519.13	0.00	519.13	3,353.34	1,676.67	5,651.14	2,790.89	8.65	-1.14	0.193
75.00	-20.52	-13.51	0.00	-449.59	0.00	449.59	3,305.07	1,652.54	5,432.28	2,682.80	9.88	-1.20	0.174
76.08	-20.24	-13.19	0.00	-434.96	0.00	434.96	3,294.39	1,647.20	5,385.03	2,659.46	10.15	-1.22	0.170
80.00	-18.60	-12.79	0.00	-383.30	0.00	383.30	3,255.11	1,627.55	5,214.73	2,575.36	11.17	-1.27	0.155
82.00	-17.78	-12.46	0.00	-357.73	0.00	357.73	2,508.23	1,254.11	4,054.62	2,002.42	11.71	-1.29	0.186
85.00	-17.12	-11.95	0.00	-320.36	0.00	320.36	2,489.39	1,244.70	3,962.03	1,956.70	12.53	-1.32	0.171
90.00	-16.05	-11.31	0.00	-260.63	0.00	260.63	2,456.65	1,228.32	3,807.70	1,880.48	13.95	-1.38	0.145
95.00	-14.99	-10.67	0.00	-204.10	0.00	204.10	2,422.21	1,211.10	3,653.54	1,804.35	15.42	-1.43	0.119
100.00	-13.96	-10.03	0.00	-150.77	0.00	150.77	2,386.07	1,193.04	3,499.76	1,728.40	16.93	-1.47	0.093
105.00	-12.95	-9.47	0.00	-100.60	0.00	100.60	2,348.24	1,174.12	3,346.58	1,652.75	18.49	-1.50	0.066
109.00	-5.95	-5.64	0.00	-62.74	0.00	62.74	2,316.76	1,158.38	3,224.60	1,592.51	19.75	-1.52	0.042
110.00	-5.78	-5.28	0.00	-57.10	0.00	57.10	2,308.72	1,154.36	3,194.20	1,577.49	20.07	-1.52	0.039
115.00	-4.90	-4.67	0.00	-30.72	0.00	30.72	2,267.51	1,133.75	3,042.83	1,502.74	21.67	-1.53	0.023
120.00	0.00	-4.53	0.00	-7.39	0.00	7.39	2,224.60	1,112.30	2,892.70	1,428.59	23.28	-1.54	0.005

<b>Load Case:</b> 0.9D + 1.6W	97 mph with No Ice (Reduced DL)	18 Iterations
Gust Response Factor :1.10		Wind Importance Factor :1.00
Dead Load Factor :0.90		
Wind Load Factor :1.60		

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		328.3	0.0					0.0	0.0	328.3	0.0	0.0	0.0
5.00		650.6	1,155.4					0.0	59.7	650.6	1,215.1	0.0	0.0
10.00		638.4	1,133.8					0.0	224.8	638.4	1,358.7	0.0	0.0
15.00		626.3	1,112.3					0.0	224.8	626.3	1,337.1	0.0	0.0
20.00		614.1	1,090.7					0.0	224.8	614.1	1,315.5	0.0	0.0
25.00		602.0	1,069.1					0.0	224.8	602.0	1,294.0	0.0	0.0
30.00		596.8	1,047.6					0.0	224.8	596.8	1,272.4	0.0	0.0
35.00		435.4	1,026.0					0.0	224.8	435.4	1,250.8	0.0	0.0
37.25	Bot - Section 2	307.5	454.7					0.0	101.2	307.5	555.8	0.0	0.0
40.00		422.1	1,029.2					0.0	123.7	422.1	1,152.9	0.0	0.0
44.00	Top - Section 1	314.2	1,475.4					0.0	179.9	314.2	1,655.3	0.0	0.0
45.00		380.6	170.0					0.0	45.0	380.6	215.0	0.0	0.0
50.00		637.0	839.0					0.0	224.8	637.0	1,063.8	0.0	0.0
55.00		640.2	820.5					0.0	224.8	640.2	1,045.3	0.0	0.0
60.00		641.5	802.0					0.0	224.8	641.5	1,026.8	0.0	0.0
65.00		641.2	783.5					0.0	224.8	641.2	1,008.3	0.0	0.0
70.00		639.4	765.0					0.0	224.8	639.4	989.8	0.0	0.0
75.00		388.0	746.5					0.0	224.8	388.0	971.3	0.0	0.0
76.08	Bot - Section 3	321.1	159.3					0.0	48.7	321.1	208.0	0.0	0.0
80.00		380.5	1,050.9					0.0	176.1	380.5	1,227.1	0.0	0.0
82.00	Top - Section 2	319.9	528.6					0.0	89.9	319.9	618.6	0.0	0.0
85.00		508.7	359.3					0.0	134.9	508.7	494.2	0.0	0.0
90.00		630.8	586.5					0.0	224.8	630.8	811.3	0.0	0.0
95.00		623.7	571.1					0.0	224.8	623.7	795.9	0.0	0.0
100.00		615.8	555.6					0.0	224.8	615.8	780.5	0.0	0.0
105.00		547.2	540.2					0.0	224.8	547.2	765.1	0.0	0.0
109.00	Appurtenance(s)	301.2	421.1	3,344.2	0.0	0.0	4,719.3	0.0	179.9	3,645.4	5,320.3	0.0	0.0
110.00		356.1	103.7					0.0	33.0	356.1	136.8	0.0	0.0
115.00		587.3	509.4					0.0	165.1	587.3	674.6	0.0	0.0
120.00	Appurtenance(s)	291.0	494.0	4,241.9	0.0	7,392.4	3,106.3	0.0	164.9	4,532.9	3,765.2	0.0	0.0
Totals:										22,573.0	34,325.2	0.00	0.00

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

6/5/2019 5:22:26 PM

Customer: T-MOBILE

Load Case: 0.9D + 1.6W

97 mph with No Ice (Reduced DL)

18 Iterations

Gust Response Factor :1.10

Wind Importance Factor :1.00

Dead Load Factor :0.90

Wind Load Factor :1.60

Calculated Forces1

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-34.31	-22.27	0.00	-1,803.59	0.00	1,803.59	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.342
5.00	-33.06	-21.67	0.00	-1,692.23	0.00	1,692.23	4,837.22	2,418.61	10,592.2	5,231.13	0.05	-0.09	0.330
10.00	-31.67	-21.08	0.00	-1,583.88	0.00	1,583.88	4,790.15	2,395.07	10,289.9	5,081.80	0.19	-0.17	0.318
15.00	-30.31	-20.49	0.00	-1,478.50	0.00	1,478.50	4,741.38	2,370.69	9,987.88	4,932.64	0.42	-0.26	0.306
20.00	-28.96	-19.91	0.00	-1,376.05	0.00	1,376.05	4,690.93	2,345.46	9,686.42	4,783.76	0.73	-0.34	0.294
25.00	-27.65	-19.34	0.00	-1,276.49	0.00	1,276.49	4,638.77	2,319.39	9,385.73	4,635.26	1.14	-0.43	0.281
30.00	-26.35	-18.77	0.00	-1,179.79	0.00	1,179.79	4,584.93	2,292.46	9,086.02	4,487.24	1.63	-0.51	0.269
35.00	-25.09	-18.35	0.00	-1,085.93	0.00	1,085.93	4,529.39	2,264.69	8,787.51	4,339.82	2.21	-0.59	0.256
37.25	-24.52	-18.05	0.00	-1,044.65	0.00	1,044.65	4,503.84	2,251.92	8,653.62	4,273.70	2.50	-0.63	0.250
40.00	-23.36	-17.64	0.00	-995.00	0.00	995.00	4,472.15	2,236.08	8,490.40	4,193.09	2.88	-0.67	0.243
44.00	-21.69	-17.32	0.00	-924.44	0.00	924.44	3,577.05	1,788.53	6,802.04	3,359.27	3.47	-0.73	0.281
45.00	-21.47	-16.96	0.00	-907.12	0.00	907.12	3,569.30	1,784.65	6,757.59	3,337.32	3.62	-0.75	0.278
50.00	-20.39	-16.33	0.00	-822.35	0.00	822.35	3,529.49	1,764.75	6,535.38	3,227.58	4.45	-0.83	0.261
55.00	-19.34	-15.70	0.00	-740.69	0.00	740.69	3,488.00	1,744.00	6,313.42	3,117.96	5.37	-0.91	0.243
60.00	-18.30	-15.07	0.00	-662.18	0.00	662.18	3,444.81	1,722.40	6,091.92	3,008.57	6.36	-0.99	0.225
65.00	-17.29	-14.43	0.00	-586.84	0.00	586.84	3,399.92	1,699.96	5,871.09	2,899.51	7.44	-1.06	0.208
70.00	-16.29	-13.79	0.00	-514.68	0.00	514.68	3,353.34	1,676.67	5,651.14	2,790.89	8.59	-1.13	0.189
75.00	-15.32	-13.39	0.00	-445.73	0.00	445.73	3,305.07	1,652.54	5,432.28	2,682.80	9.81	-1.20	0.171
76.08	-15.11	-13.08	0.00	-431.22	0.00	431.22	3,294.39	1,647.20	5,385.03	2,659.46	10.08	-1.21	0.167
80.00	-13.88	-12.68	0.00	-380.00	0.00	380.00	3,255.11	1,627.55	5,214.73	2,575.36	11.10	-1.26	0.152
82.00	-13.27	-12.35	0.00	-354.65	0.00	354.65	2,508.23	1,254.11	4,054.62	2,002.42	11.63	-1.28	0.182
85.00	-12.78	-11.84	0.00	-317.59	0.00	317.59	2,489.39	1,244.70	3,962.03	1,956.70	12.44	-1.31	0.168
90.00	-11.97	-11.20	0.00	-258.38	0.00	258.38	2,456.65	1,228.32	3,807.70	1,880.48	13.85	-1.37	0.142
95.00	-11.18	-10.57	0.00	-202.37	0.00	202.37	2,422.21	1,211.10	3,653.54	1,804.35	15.31	-1.42	0.117
100.00	-10.41	-9.94	0.00	-149.53	0.00	149.53	2,386.07	1,193.04	3,499.76	1,728.40	16.81	-1.46	0.091
105.00	-9.66	-9.38	0.00	-99.83	0.00	99.83	2,348.24	1,174.12	3,346.58	1,652.75	18.36	-1.49	0.065
109.00	-4.43	-5.59	0.00	-62.32	0.00	62.32	2,316.76	1,158.38	3,224.60	1,592.51	19.61	-1.50	0.041
110.00	-4.30	-5.24	0.00	-56.73	0.00	56.73	2,308.72	1,154.36	3,194.20	1,577.49	19.93	-1.51	0.038
115.00	-3.64	-4.63	0.00	-30.55	0.00	30.55	2,267.51	1,133.75	3,042.83	1,502.74	21.51	-1.52	0.022
120.00	0.00	-4.53	0.00	-7.39	0.00	7.39	2,224.60	1,112.30	2,892.70	1,428.59	23.11	-1.53	0.005

<b>Load Case:</b> 1.2D + 1.0Di + 1.0Wi	50 mph with 0.75 in Radial Ice	17 Iterations
Gust Response Factor :1.10	Ice Dead Load Factor :1.00	Wind Importance Factor :1.00
Dead Load Factor :1.20		Ice Importance Factor :1.00
Wind Load Factor :1.00		

**Applied Segment Forces Summary**

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		68.1	0.0					0.0	0.0	68.1	0.0	0.0	0.0
5.00		135.4	1,950.9					0.0	79.6	135.4	2,030.4	0.0	0.0
10.00		133.4	1,962.4					0.0	299.8	133.4	2,262.2	0.0	0.0
15.00		131.3	1,949.0					0.0	299.8	131.3	2,248.8	0.0	0.0
20.00		129.1	1,927.5					0.0	299.8	129.1	2,227.3	0.0	0.0
25.00		126.8	1,901.8					0.0	299.8	126.8	2,201.5	0.0	0.0
30.00		126.0	1,873.4					0.0	299.8	126.0	2,173.1	0.0	0.0
35.00		92.0	1,843.2					0.0	299.8	92.0	2,142.9	0.0	0.0
37.25	Bot - Section 2	65.1	820.4					0.0	134.9	65.1	955.3	0.0	0.0
40.00		89.4	1,637.0					0.0	164.9	89.4	1,801.9	0.0	0.0
44.00	Top - Section 1	66.6	2,349.2					0.0	239.8	66.6	2,589.0	0.0	0.0
45.00		80.8	322.3					0.0	60.0	80.8	382.3	0.0	0.0
50.00		135.4	1,590.1					0.0	299.8	135.4	1,889.8	0.0	0.0
55.00		136.4	1,560.1					0.0	299.8	136.4	1,859.9	0.0	0.0
60.00		136.9	1,529.6					0.0	299.8	136.9	1,829.3	0.0	0.0
65.00		137.1	1,498.6					0.0	299.8	137.1	1,798.3	0.0	0.0
70.00		137.1	1,467.1					0.0	299.8	137.1	1,766.8	0.0	0.0
75.00		83.3	1,435.2					0.0	299.8	83.3	1,735.0	0.0	0.0
76.08	Bot - Section 3	69.0	307.6					0.0	64.9	69.0	372.6	0.0	0.0
80.00		81.8	1,745.4					0.0	234.8	81.8	1,980.2	0.0	0.0
82.00	Top - Section 2	68.9	879.5					0.0	119.9	68.9	999.4	0.0	0.0
85.00		109.7	738.1					0.0	179.9	109.7	917.9	0.0	0.0
90.00		136.3	1,205.0					0.0	299.8	136.3	1,504.8	0.0	0.0
95.00		135.2	1,176.2					0.0	299.8	135.2	1,475.9	0.0	0.0
100.00		133.8	1,147.1					0.0	299.8	133.8	1,446.8	0.0	0.0
105.00		119.2	1,117.8					0.0	299.8	119.2	1,417.5	0.0	0.0
109.00	Appurtenance(s)	65.7	873.8	807.8	0.0	0.0	13,362.4	0.0	239.8	873.5	14,476.0	0.0	0.0
110.00		77.9	216.2					0.0	44.0	77.9	260.2	0.0	0.0
115.00		128.7	1,058.6					0.0	220.2	128.7	1,278.8	0.0	0.0
120.00	Appurtenance(s)	63.9	1,028.7	989.0	0.0	1,653.0	7,261.9	0.0	219.9	1,052.9	8,510.5	0.0	0.0
<b>Totals:</b>										4,997.15	66,534.6	0.00	0.00

Load Case: 1.2D + 1.0Di + 1.0Wi

50 mph with 0.75 in Radial Ice

17 Iterations

Gust Response Factor :1.10

Ice Dead Load Factor :1.00

Wind Importance Factor :1.00

Dead Load Factor :1.20

Ice Importance Factor :1.00

Wind Load Factor :1.00

Calculated Forces1

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-66.53	-4.94	0.00	-415.73	0.00	415.73	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.091
5.00	-64.50	-4.83	0.00	-391.03	0.00	391.03	4,837.22	2,418.61	10,592.2	5,231.13	0.01	-0.02	0.088
10.00	-62.24	-4.71	0.00	-366.89	0.00	366.89	4,790.15	2,395.07	10,289.9	5,081.80	0.04	-0.04	0.085
15.00	-59.99	-4.60	0.00	-343.32	0.00	343.32	4,741.38	2,370.69	9,987.88	4,932.64	0.10	-0.06	0.082
20.00	-57.76	-4.49	0.00	-320.31	0.00	320.31	4,690.93	2,345.46	9,686.42	4,783.76	0.17	-0.08	0.079
25.00	-55.56	-4.38	0.00	-297.86	0.00	297.86	4,638.77	2,319.39	9,385.73	4,635.26	0.26	-0.10	0.076
30.00	-53.38	-4.27	0.00	-275.97	0.00	275.97	4,584.93	2,292.46	9,086.02	4,487.24	0.38	-0.12	0.073
35.00	-51.24	-4.18	0.00	-254.63	0.00	254.63	4,529.39	2,264.69	8,787.51	4,339.82	0.51	-0.14	0.070
37.25	-50.28	-4.12	0.00	-245.23	0.00	245.23	4,503.84	2,251.92	8,653.62	4,273.70	0.58	-0.15	0.069
40.00	-48.48	-4.04	0.00	-233.89	0.00	233.89	4,472.15	2,236.08	8,490.40	4,193.09	0.67	-0.16	0.067
44.00	-45.89	-3.97	0.00	-217.73	0.00	217.73	3,577.05	1,788.53	6,802.04	3,359.27	0.80	-0.17	0.078
45.00	-45.51	-3.90	0.00	-213.76	0.00	213.76	3,569.30	1,784.65	6,757.59	3,337.32	0.84	-0.17	0.077
50.00	-43.62	-3.77	0.00	-194.27	0.00	194.27	3,529.49	1,764.75	6,535.38	3,227.58	1.03	-0.19	0.073
55.00	-41.76	-3.64	0.00	-175.40	0.00	175.40	3,488.00	1,744.00	6,313.42	3,117.96	1.25	-0.21	0.068
60.00	-39.93	-3.51	0.00	-157.19	0.00	157.19	3,444.81	1,722.40	6,091.92	3,008.57	1.48	-0.23	0.064
65.00	-38.13	-3.38	0.00	-139.63	0.00	139.63	3,399.92	1,699.96	5,871.09	2,899.51	1.73	-0.25	0.059
70.00	-36.36	-3.24	0.00	-122.74	0.00	122.74	3,353.34	1,676.67	5,651.14	2,790.89	2.00	-0.27	0.055
75.00	-34.63	-3.16	0.00	-106.52	0.00	106.52	3,305.07	1,652.54	5,432.28	2,682.80	2.29	-0.28	0.050
76.08	-34.25	-3.09	0.00	-103.10	0.00	103.10	3,294.39	1,647.20	5,385.03	2,659.46	2.35	-0.28	0.049
80.00	-32.27	-3.00	0.00	-91.00	0.00	91.00	3,255.11	1,627.55	5,214.73	2,575.36	2.59	-0.30	0.045
82.00	-31.27	-2.93	0.00	-84.99	0.00	84.99	2,508.23	1,254.11	4,054.62	2,002.42	2.71	-0.30	0.055
85.00	-30.36	-2.82	0.00	-76.19	0.00	76.19	2,489.39	1,244.70	3,962.03	1,956.70	2.91	-0.31	0.051
90.00	-28.85	-2.69	0.00	-62.07	0.00	62.07	2,456.65	1,228.32	3,807.70	1,880.48	3.24	-0.32	0.045
95.00	-27.38	-2.55	0.00	-48.64	0.00	48.64	2,422.21	1,211.10	3,653.54	1,804.35	3.58	-0.33	0.038
100.00	-25.93	-2.41	0.00	-35.90	0.00	35.90	2,386.07	1,193.04	3,499.76	1,728.40	3.94	-0.34	0.032
105.00	-24.51	-2.28	0.00	-23.85	0.00	23.85	2,348.24	1,174.12	3,346.58	1,652.75	4.30	-0.35	0.025
109.00	-10.04	-1.32	0.00	-14.72	0.00	14.72	2,316.76	1,158.38	3,224.60	1,592.51	4.59	-0.35	0.014
110.00	-9.78	-1.24	0.00	-13.40	0.00	13.40	2,308.72	1,154.36	3,194.20	1,577.49	4.67	-0.36	0.013
115.00	-8.50	-1.11	0.00	-7.18	0.00	7.18	2,267.51	1,133.75	3,042.83	1,502.74	5.04	-0.36	0.009
120.00	0.00	-1.05	0.00	-1.65	0.00	1.65	2,224.60	1,112.30	2,892.70	1,428.59	5.42	-0.36	0.001



<b>Load Case:</b> 1.0D + 1.0W	Serviceability 60 mph	17 Iterations
Gust Response Factor :1.10		Wind Importance Factor :1.00
Dead Load Factor :1.00		
Wind Load Factor :1.00		

Applied Segment Forces Summary

Seg Elev (ft)	Description	Shaft Forces		Discrete Forces			Linear Forces		Sum of Forces				
		Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Torsion MY (lb-ft)	Moment MZ (lb-ft)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Wind FX (lb)	Dead Load (lb)	Torsion MY (lb-ft)	Moment MZ (lb)
0.00		70.3	0.0					0.0	0.0	70.3	0.0	0.0	0.0
5.00		139.2	1,283.8					0.0	66.3	139.2	1,350.1	0.0	0.0
10.00		136.6	1,259.8					0.0	249.8	136.6	1,509.6	0.0	0.0
15.00		134.0	1,235.9					0.0	249.8	134.0	1,485.7	0.0	0.0
20.00		131.4	1,211.9					0.0	249.8	131.4	1,461.7	0.0	0.0
25.00		128.8	1,187.9					0.0	249.8	128.8	1,437.7	0.0	0.0
30.00		127.7	1,164.0					0.0	249.8	127.7	1,413.8	0.0	0.0
35.00		93.2	1,140.0					0.0	249.8	93.2	1,389.8	0.0	0.0
37.25	Bot - Section 2	65.8	505.2					0.0	112.4	65.8	617.6	0.0	0.0
40.00		90.3	1,143.6					0.0	137.4	90.3	1,281.0	0.0	0.0
44.00	Top - Section 1	67.2	1,639.4					0.0	199.8	67.2	1,839.2	0.0	0.0
45.00		81.4	188.9					0.0	50.0	81.4	238.9	0.0	0.0
50.00		136.3	932.2					0.0	249.8	136.3	1,182.0	0.0	0.0
55.00		137.0	911.6					0.0	249.8	137.0	1,161.4	0.0	0.0
60.00		137.3	891.1					0.0	249.8	137.3	1,140.9	0.0	0.0
65.00		137.2	870.6					0.0	249.8	137.2	1,120.4	0.0	0.0
70.00		136.8	850.0					0.0	249.8	136.8	1,099.8	0.0	0.0
75.00		83.0	829.5					0.0	249.8	83.0	1,079.3	0.0	0.0
76.08	Bot - Section 3	68.7	177.0					0.0	54.1	68.7	231.1	0.0	0.0
80.00		81.4	1,167.7					0.0	195.7	81.4	1,363.4	0.0	0.0
82.00	Top - Section 2	68.4	587.4					0.0	99.9	68.4	687.3	0.0	0.0
85.00		108.8	399.2					0.0	149.9	108.8	549.1	0.0	0.0
90.00		135.0	651.6					0.0	249.8	135.0	901.4	0.0	0.0
95.00		133.5	634.5					0.0	249.8	133.5	884.3	0.0	0.0
100.00		131.8	617.4					0.0	249.8	131.8	867.2	0.0	0.0
105.00		117.1	600.3					0.0	249.8	117.1	850.1	0.0	0.0
109.00	Appurtenance(s)	64.4	467.9	715.5	0.0	0.0	5,243.7	0.0	199.8	780.0	5,911.4	0.0	0.0
110.00		76.2	115.3					0.0	36.7	76.2	152.0	0.0	0.0
115.00		125.7	566.0					0.0	183.5	125.7	749.5	0.0	0.0
120.00	Appurtenance(s)	62.3	548.9	907.6	0.0	1,581.7	3,451.4	0.0	183.3	969.9	4,183.6	0.0	0.0
Totals:										4,829.76	38,139.1	0.00	0.00

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

Load Case: 1.0D + 1.0W

Serviceability 60 mph

17 Iterations

Gust Response Factor :1.10

Wind Importance Factor :1.00

Dead Load Factor :1.00

Wind Load Factor :1.00

Calculated Forces1

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-38.14	-4.77	0.00	-386.62	0.00	386.62	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.080
5.00	-36.79	-4.64	0.00	-362.80	0.00	362.80	4,837.22	2,418.61	10,592.2	5,231.13	0.01	-0.02	0.077
10.00	-35.28	-4.51	0.00	-339.60	0.00	339.60	4,790.15	2,395.07	10,289.9	5,081.80	0.04	-0.04	0.074
15.00	-33.79	-4.39	0.00	-317.04	0.00	317.04	4,741.38	2,370.69	9,987.88	4,932.64	0.09	-0.06	0.071
20.00	-32.33	-4.26	0.00	-295.11	0.00	295.11	4,690.93	2,345.46	9,686.42	4,783.76	0.16	-0.07	0.069
25.00	-30.89	-4.14	0.00	-273.78	0.00	273.78	4,638.77	2,319.39	9,385.73	4,635.26	0.24	-0.09	0.066
30.00	-29.47	-4.02	0.00	-253.06	0.00	253.06	4,584.93	2,292.46	9,086.02	4,487.24	0.35	-0.11	0.063
35.00	-28.08	-3.93	0.00	-232.95	0.00	232.95	4,529.39	2,264.69	8,787.51	4,339.82	0.47	-0.13	0.060
37.25	-27.46	-3.87	0.00	-224.10	0.00	224.10	4,503.84	2,251.92	8,653.62	4,273.70	0.54	-0.13	0.059
40.00	-26.18	-3.78	0.00	-213.46	0.00	213.46	4,472.15	2,236.08	8,490.40	4,193.09	0.62	-0.14	0.057
44.00	-24.34	-3.71	0.00	-198.34	0.00	198.34	3,577.05	1,788.53	6,802.04	3,359.27	0.74	-0.16	0.066
45.00	-24.10	-3.64	0.00	-194.63	0.00	194.63	3,569.30	1,784.65	6,757.59	3,337.32	0.78	-0.16	0.065
50.00	-22.92	-3.50	0.00	-176.45	0.00	176.45	3,529.49	1,764.75	6,535.38	3,227.58	0.95	-0.18	0.061
55.00	-21.76	-3.37	0.00	-158.94	0.00	158.94	3,488.00	1,744.00	6,313.42	3,117.96	1.15	-0.20	0.057
60.00	-20.62	-3.23	0.00	-142.10	0.00	142.10	3,444.81	1,722.40	6,091.92	3,008.57	1.36	-0.21	0.053
65.00	-19.50	-3.10	0.00	-125.94	0.00	125.94	3,399.92	1,699.96	5,871.09	2,899.51	1.60	-0.23	0.049
70.00	-18.40	-2.96	0.00	-110.46	0.00	110.46	3,353.34	1,676.67	5,651.14	2,790.89	1.84	-0.24	0.045
75.00	-17.32	-2.87	0.00	-95.66	0.00	95.66	3,305.07	1,652.54	5,432.28	2,682.80	2.10	-0.26	0.041
76.08	-17.09	-2.81	0.00	-92.55	0.00	92.55	3,294.39	1,647.20	5,385.03	2,659.46	2.16	-0.26	0.040
80.00	-15.72	-2.72	0.00	-81.56	0.00	81.56	3,255.11	1,627.55	5,214.73	2,575.36	2.38	-0.27	0.037
82.00	-15.04	-2.65	0.00	-76.12	0.00	76.12	2,508.23	1,254.11	4,054.62	2,002.42	2.49	-0.27	0.044
85.00	-14.49	-2.54	0.00	-68.16	0.00	68.16	2,489.39	1,244.70	3,962.03	1,956.70	2.67	-0.28	0.041
90.00	-13.59	-2.40	0.00	-55.46	0.00	55.46	2,456.65	1,228.32	3,807.70	1,880.48	2.97	-0.29	0.035
95.00	-12.70	-2.27	0.00	-43.43	0.00	43.43	2,422.21	1,211.10	3,653.54	1,804.35	3.28	-0.30	0.029
100.00	-11.83	-2.13	0.00	-32.09	0.00	32.09	2,386.07	1,193.04	3,499.76	1,728.40	3.61	-0.31	0.024
105.00	-10.99	-2.01	0.00	-21.42	0.00	21.42	2,348.24	1,174.12	3,346.58	1,652.75	3.94	-0.32	0.018
109.00	-5.08	-1.20	0.00	-13.37	0.00	13.37	2,316.76	1,158.38	3,224.60	1,592.51	4.21	-0.32	0.011
110.00	-4.93	-1.12	0.00	-12.17	0.00	12.17	2,308.72	1,154.36	3,194.20	1,577.49	4.27	-0.32	0.010
115.00	-4.18	-0.99	0.00	-6.55	0.00	6.55	2,267.51	1,133.75	3,042.83	1,502.74	4.61	-0.33	0.006
120.00	0.00	-0.97	0.00	-1.58	0.00	1.58	2,224.60	1,112.30	2,892.70	1,428.59	4.96	-0.33	0.001

### Equivalent Lateral Forces Method Analysis

(Based on ASCE7-10 Chapters 11, 12, 15)

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.18
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Long-Period Transition Period ( $T_L$ ):	6
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.20
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Seismic Response Coefficient ( $C_s$ ):	0.04
Upper Limit $C_s$	0.04
Lower Limit $C_s$	0.03
Period based on Rayleigh Method (sec):	1.51
Redundancy Factor ( $\rho$ ):	1.00
Seismic Force Distribution Exponent (k):	1.51
Total Unfactored Dead Load:	38.14 k
Seismic Base Shear (E):	1.67 k

Load Case (1.2 + 0.2Sds) \* DL + E ELFM

Seismic Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	$W_z$ (lb-ft)	$C_{vx}$	Horizontal Force (lb)	Vertical Force (lb)
29	117.50	732	956	0.040	66	907
28	112.50	750	917	0.038	64	929
27	109.50	152	178	0.007	12	188
26	107.00	668	757	0.031	53	827
25	102.50	850	904	0.038	63	1,053
24	97.50	867	855	0.036	59	1,075
23	92.50	884	806	0.033	56	1,096
22	87.50	901	755	0.031	52	1,117
21	83.50	549	429	0.018	30	680
20	81.00	687	513	0.021	36	852
19	78.04	1,363	962	0.040	67	1,690
18	75.54	231	155	0.006	11	286
17	72.50	1,079	681	0.028	47	1,337
16	67.50	1,100	624	0.026	43	1,363
15	62.50	1,120	566	0.024	39	1,388
14	57.50	1,141	508	0.021	35	1,414
13	52.50	1,161	451	0.019	31	1,439
12	47.50	1,182	395	0.016	27	1,465
11	44.50	239	72	0.003	5	296
10	42.00	1,839	511	0.021	35	2,279
9	38.63	1,281	313	0.013	22	1,587
8	36.13	618	137	0.006	9	765
7	32.50	1,390	262	0.011	18	1,722

6	27.50	1,414	207	0.009	14	1,752
5	22.50	1,438	156	0.006	11	1,782
4	17.50	1,462	109	0.005	8	1,811
3	12.50	1,486	67	0.003	5	1,841
2	7.50	1,510	31	0.001	2	1,871
1	2.50	1,350	5	0.000	0	1,673
Powerwave Allgon 702	120.00	13	18	0.001	1	16
Powerwave Allgon LGP	120.00	85	114	0.005	8	105
Raycap DC6-48-60-18-	120.00	64	86	0.004	6	79
Ericsson RRUS 11 (Ba	120.00	150	202	0.008	14	186
Ericsson RRUS 32 B66	120.00	159	214	0.009	15	197
Ericsson RRUS 32 B2	120.00	159	214	0.009	15	197
Ericsson RRUS-32 (77	120.00	231	311	0.013	22	286
Powerwave Allgon 777	120.00	105	142	0.006	10	130
Quintel QS66512-2	120.00	333	449	0.019	31	413
CCI HPA-65R-BUU-H6	120.00	153	206	0.009	14	190
Flat Platform w/ Han	120.00	2,000	2,696	0.112	187	2,479
Ericsson KRY 112 144	109.00	33	38	0.002	3	41
Ericsson Radio 4449	109.00	222	259	0.011	18	275
Ericsson AIR 21, 1.3	109.00	275	320	0.013	22	340
Ericsson AIR 21, 1.3	109.00	244	285	0.012	20	303
Sector Frame (Perfec	109.00	4,086	4,766	0.198	331	5,064
RFS APXVAARR24_43-U-	109.00	384	448	0.019	31	476
		38,139	24,051	1.000	1,670	47,264

Load Case (0.9 - 0.2Sds) \* DL + E ELFM

Seismic (Reduced DL) Equivalent Lateral Forces Method

Segment	Height Above Base (ft)	Weight (lb)	W <sub>z</sub> (lb-ft)	C <sub>vx</sub>	Horizontal Force (lb)	Vertical Force (lb)
29	117.50	732	956	0.040	66	630
28	112.50	750	917	0.038	64	645
27	109.50	152	178	0.007	12	131
26	107.00	668	757	0.031	53	575
25	102.50	850	904	0.038	63	732
24	97.50	867	855	0.036	59	746
23	92.50	884	806	0.033	56	761
22	87.50	901	755	0.031	52	776
21	83.50	549	429	0.018	30	473
20	81.00	687	513	0.021	36	592
19	78.04	1,363	962	0.040	67	1,174
18	75.54	231	155	0.006	11	199
17	72.50	1,079	681	0.028	47	929
16	67.50	1,100	624	0.026	43	947
15	62.50	1,120	566	0.024	39	964
14	57.50	1,141	508	0.021	35	982
13	52.50	1,161	451	0.019	31	1,000
12	47.50	1,182	395	0.016	27	1,017
11	44.50	239	72	0.003	5	206
10	42.00	1,839	511	0.021	35	1,583
9	38.63	1,281	313	0.013	22	1,103
8	36.13	618	137	0.006	9	532
7	32.50	1,390	262	0.011	18	1,196
6	27.50	1,414	207	0.009	14	1,217
5	22.50	1,438	156	0.006	11	1,238
4	17.50	1,462	109	0.005	8	1,258
3	12.50	1,486	67	0.003	5	1,279
2	7.50	1,510	31	0.001	2	1,299
1	2.50	1,350	5	0.000	0	1,162
Powerwave Allgon 702	120.00	13	18	0.001	1	11
Powerwave Allgon LGP	120.00	85	114	0.005	8	73

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

Raycap DC6-48-60-18-	120.00	64	86	0.004	6	55
Ericsson RRUS 11 (Ba	120.00	150	202	0.008	14	129
Ericsson RRUS 32 B66	120.00	159	214	0.009	15	137
Ericsson RRUS 32 B2	120.00	159	214	0.009	15	137
Ericsson RRUS-32 (77	120.00	231	311	0.013	22	199
Powerwave Allgon 777	120.00	105	142	0.006	10	90
Quintel QS66512-2	120.00	333	449	0.019	31	287
CCI HPA-65R-BUU-H6	120.00	153	206	0.009	14	132
Flat Platform w/ Han	120.00	2,000	2,696	0.112	187	1,721
Ericsson KRY 112 144	109.00	33	38	0.002	3	28
Ericsson Radio 4449	109.00	222	259	0.011	18	191
Ericsson AIR 21, 1.3	109.00	275	320	0.013	22	236
Ericsson AIR 21, 1.3	109.00	244	285	0.012	20	210
Sector Frame (Perfec	109.00	4,086	4,766	0.198	331	3,517
RFS APXVAARR24_43-U-	109.00	384	448	0.019	31	330
		38,139	24,051	1.000	1,670	32,828

Load Case (1.2 + 0.2Sds) \* DL + E ELFM Seismic Equivalent Lateral Forces Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-45.59	-1.67	0.00	-159.84	0.00	159.84	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.039
5.00	-43.72	-1.68	0.00	-151.48	0.00	151.48	4,837.22	2,418.61	10,592.2	5,231.13	0.00	-0.01	0.038
10.00	-41.88	-1.68	0.00	-143.10	0.00	143.10	4,790.15	2,395.07	10,289.9	5,081.80	0.02	-0.02	0.037
15.00	-40.07	-1.67	0.00	-134.72	0.00	134.72	4,741.38	2,370.69	9,987.88	4,932.64	0.04	-0.02	0.036
20.00	-38.28	-1.67	0.00	-126.36	0.00	126.36	4,690.93	2,345.46	9,686.42	4,783.76	0.07	-0.03	0.035
25.00	-36.53	-1.66	0.00	-118.02	0.00	118.02	4,638.77	2,319.39	9,385.73	4,635.26	0.10	-0.04	0.033
30.00	-34.81	-1.64	0.00	-109.74	0.00	109.74	4,584.93	2,292.46	9,086.02	4,487.24	0.15	-0.05	0.032
35.00	-34.04	-1.63	0.00	-101.53	0.00	101.53	4,529.39	2,264.69	8,787.51	4,339.82	0.20	-0.05	0.031
37.25	-32.46	-1.61	0.00	-97.85	0.00	97.85	4,503.84	2,251.92	8,653.62	4,273.70	0.23	-0.06	0.030
40.00	-30.18	-1.58	0.00	-93.42	0.00	93.42	4,472.15	2,236.08	8,490.40	4,193.09	0.26	-0.06	0.029
44.00	-29.88	-1.57	0.00	-87.11	0.00	87.11	3,577.05	1,788.53	6,802.04	3,359.27	0.31	-0.07	0.034
45.00	-28.42	-1.55	0.00	-85.53	0.00	85.53	3,569.30	1,784.65	6,757.59	3,337.32	0.33	-0.07	0.034
50.00	-26.98	-1.52	0.00	-77.79	0.00	77.79	3,529.49	1,764.75	6,535.38	3,227.58	0.41	-0.08	0.032
55.00	-25.56	-1.48	0.00	-70.20	0.00	70.20	3,488.00	1,744.00	6,313.42	3,117.96	0.49	-0.08	0.030
60.00	-24.17	-1.45	0.00	-62.78	0.00	62.78	3,444.81	1,722.40	6,091.92	3,008.57	0.58	-0.09	0.028
65.00	-22.81	-1.40	0.00	-55.55	0.00	55.55	3,399.92	1,699.96	5,871.09	2,899.51	0.68	-0.10	0.026
70.00	-21.47	-1.36	0.00	-48.53	0.00	48.53	3,353.34	1,676.67	5,651.14	2,790.89	0.79	-0.10	0.024
75.00	-21.19	-1.35	0.00	-41.75	0.00	41.75	3,305.07	1,652.54	5,432.28	2,682.80	0.90	-0.11	0.022
76.08	-19.50	-1.28	0.00	-40.29	0.00	40.29	3,294.39	1,647.20	5,385.03	2,659.46	0.93	-0.11	0.021
80.00	-18.65	-1.24	0.00	-35.29	0.00	35.29	3,255.11	1,627.55	5,214.73	2,575.36	1.02	-0.12	0.019
82.00	-17.97	-1.21	0.00	-32.81	0.00	32.81	2,508.23	1,254.11	4,054.62	2,002.42	1.07	-0.12	0.024
85.00	-16.85	-1.16	0.00	-29.18	0.00	29.18	2,489.39	1,244.70	3,962.03	1,956.70	1.15	-0.12	0.022
90.00	-15.75	-1.10	0.00	-23.39	0.00	23.39	2,456.65	1,228.32	3,807.70	1,880.48	1.28	-0.13	0.019
95.00	-14.68	-1.04	0.00	-17.90	0.00	17.90	2,422.21	1,211.10	3,653.54	1,804.35	1.41	-0.13	0.016
100.00	-13.63	-0.97	0.00	-12.70	0.00	12.70	2,386.07	1,193.04	3,499.76	1,728.40	1.55	-0.13	0.013
105.00	-12.80	-0.92	0.00	-7.83	0.00	7.83	2,348.24	1,174.12	3,346.58	1,652.75	1.69	-0.14	0.010
109.00	-6.11	-0.47	0.00	-4.14	0.00	4.14	2,316.76	1,158.38	3,224.60	1,592.51	1.81	-0.14	0.005
110.00	-5.18	-0.40	0.00	-3.68	0.00	3.68	2,308.72	1,154.36	3,194.20	1,577.49	1.84	-0.14	0.005
115.00	-4.28	-0.33	0.00	-1.67	0.00	1.67	2,267.51	1,133.75	3,042.83	1,502.74	1.98	-0.14	0.003
120.00	0.00	-0.32	0.00	0.00	0.00	0.00	2,224.60	1,112.30	2,892.70	1,428.59	2.13	-0.14	0.000

Load Case (0.9 - 0.2Sds) \* DL + E ELMF

Seismic (Reduced DL) Equivalent Lateral Forces Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-31.67	-1.67	0.00	-158.76	0.00	158.76	4,882.59	2,441.30	10,894.7	5,380.53	0.00	0.00	0.036
5.00	-30.37	-1.67	0.00	-150.41	0.00	150.41	4,837.22	2,418.61	10,592.2	5,231.13	0.00	-0.01	0.035
10.00	-29.09	-1.67	0.00	-142.04	0.00	142.04	4,790.15	2,395.07	10,289.9	5,081.80	0.02	-0.02	0.034
15.00	-27.83	-1.67	0.00	-133.68	0.00	133.68	4,741.38	2,370.69	9,987.88	4,932.64	0.04	-0.02	0.033
20.00	-26.59	-1.66	0.00	-125.35	0.00	125.35	4,690.93	2,345.46	9,686.42	4,783.76	0.07	-0.03	0.032
25.00	-25.37	-1.65	0.00	-117.05	0.00	117.05	4,638.77	2,319.39	9,385.73	4,635.26	0.10	-0.04	0.031
30.00	-24.18	-1.63	0.00	-108.81	0.00	108.81	4,584.93	2,292.46	9,086.02	4,487.24	0.15	-0.05	0.030
35.00	-23.65	-1.62	0.00	-100.65	0.00	100.65	4,529.39	2,264.69	8,787.51	4,339.82	0.20	-0.05	0.028
37.25	-22.54	-1.60	0.00	-96.99	0.00	96.99	4,503.84	2,251.92	8,653.62	4,273.70	0.22	-0.06	0.028
40.00	-20.96	-1.57	0.00	-92.59	0.00	92.59	4,472.15	2,236.08	8,490.40	4,193.09	0.26	-0.06	0.027
44.00	-20.75	-1.56	0.00	-86.32	0.00	86.32	3,577.05	1,788.53	6,802.04	3,359.27	0.31	-0.07	0.031
45.00	-19.74	-1.54	0.00	-84.75	0.00	84.75	3,569.30	1,784.65	6,757.59	3,337.32	0.33	-0.07	0.031
50.00	-18.74	-1.51	0.00	-77.07	0.00	77.07	3,529.49	1,764.75	6,535.38	3,227.58	0.40	-0.08	0.029
55.00	-17.75	-1.47	0.00	-69.53	0.00	69.53	3,488.00	1,744.00	6,313.42	3,117.96	0.49	-0.08	0.027
60.00	-16.79	-1.43	0.00	-62.17	0.00	62.17	3,444.81	1,722.40	6,091.92	3,008.57	0.58	-0.09	0.026
65.00	-15.84	-1.39	0.00	-55.01	0.00	55.01	3,399.92	1,699.96	5,871.09	2,899.51	0.68	-0.10	0.024
70.00	-14.91	-1.34	0.00	-48.05	0.00	48.05	3,353.34	1,676.67	5,651.14	2,790.89	0.78	-0.10	0.022
75.00	-14.72	-1.33	0.00	-41.34	0.00	41.34	3,305.07	1,652.54	5,432.28	2,682.80	0.89	-0.11	0.020
76.08	-13.54	-1.26	0.00	-39.89	0.00	39.89	3,294.39	1,647.20	5,385.03	2,659.46	0.92	-0.11	0.019
80.00	-12.95	-1.23	0.00	-34.94	0.00	34.94	3,255.11	1,627.55	5,214.73	2,575.36	1.01	-0.12	0.018
82.00	-12.48	-1.20	0.00	-32.48	0.00	32.48	2,508.23	1,254.11	4,054.62	2,002.42	1.06	-0.12	0.021
85.00	-11.70	-1.15	0.00	-28.88	0.00	28.88	2,489.39	1,244.70	3,962.03	1,956.70	1.14	-0.12	0.019
90.00	-10.94	-1.09	0.00	-23.16	0.00	23.16	2,456.65	1,228.32	3,807.70	1,880.48	1.27	-0.13	0.017
95.00	-10.19	-1.03	0.00	-17.71	0.00	17.71	2,422.21	1,211.10	3,653.54	1,804.35	1.40	-0.13	0.014
100.00	-9.46	-0.96	0.00	-12.57	0.00	12.57	2,386.07	1,193.04	3,499.76	1,728.40	1.54	-0.13	0.011
105.00	-8.89	-0.91	0.00	-7.75	0.00	7.75	2,348.24	1,174.12	3,346.58	1,652.75	1.68	-0.14	0.008
109.00	-4.25	-0.46	0.00	-4.10	0.00	4.10	2,316.76	1,158.38	3,224.60	1,592.51	1.79	-0.14	0.004
110.00	-3.60	-0.40	0.00	-3.64	0.00	3.64	2,308.72	1,154.36	3,194.20	1,577.49	1.82	-0.14	0.004
115.00	-2.97	-0.33	0.00	-1.65	0.00	1.65	2,267.51	1,133.75	3,042.83	1,502.74	1.97	-0.14	0.002
120.00	0.00	-0.32	0.00	0.00	0.00	0.00	2,224.60	1,112.30	2,892.70	1,428.59	2.11	-0.14	0.000



### Equivalent Modal Analysis Method

(Based on ASCE7-10 Chapters 11, 12 & 15 and ANSI/TIA-G, section 2.7)

Spectral Response Acceleration for Short Period ( $S_s$ ):	0.18
Spectral Response Acceleration at 1.0 Second Period ( $S_1$ ):	0.06
Importance Factor ( $I_E$ ):	1.00
Site Coefficient $F_a$ :	1.60
Site Coefficient $F_v$ :	2.40
Response Modification Coefficient (R):	1.50
Design Spectral Response Acceleration at Short Period ( $S_{ds}$ ):	0.20
Design Spectral Response Acceleration at 1.0 Second Period ( $S_{d1}$ ):	0.10
Period Based on Rayleigh Method (sec):	1.51
Redundancy Factor ( $\rho$ ):	1.00

### Load Case (1.2 + 0.2Sds) \* DL + E EMAM      Seismic Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
29	117.50	732	1.812	1.594	0.998	0.335	163	907
28	112.50	750	1.661	0.980	0.756	0.246	123	929
27	109.50	152	1.574	0.699	0.635	0.199	20	188
26	107.00	668	1.503	0.508	0.546	0.164	73	827
25	102.50	850	1.379	0.245	0.410	0.109	61	1,053
24	97.50	867	1.248	0.054	0.292	0.060	35	1,075
23	92.50	884	1.123	-0.056	0.201	0.024	14	1,096
22	87.50	901	1.005	-0.109	0.134	0.002	1	1,117
21	83.50	549	0.915	-0.121	0.093	-0.008	-3	680
20	81.00	687	0.861	-0.120	0.073	-0.011	-5	852
19	78.04	1,363	0.799	-0.112	0.054	-0.011	-10	1,690
18	75.54	231	0.749	-0.101	0.040	-0.008	-1	286
17	72.50	1,079	0.690	-0.084	0.028	-0.003	-2	1,337
16	67.50	1,100	0.598	-0.052	0.014	0.008	6	1,363
15	62.50	1,120	0.513	-0.021	0.008	0.021	16	1,388
14	57.50	1,141	0.434	0.007	0.006	0.032	24	1,414
13	52.50	1,161	0.362	0.030	0.008	0.040	31	1,439
12	47.50	1,182	0.296	0.046	0.013	0.044	35	1,465
11	44.50	239	0.260	0.054	0.016	0.045	7	296
10	42.00	1,839	0.232	0.058	0.019	0.046	56	2,279
9	38.63	1,281	0.196	0.063	0.024	0.045	39	1,587
8	36.13	618	0.171	0.066	0.027	0.045	18	765
7	32.50	1,390	0.139	0.069	0.032	0.044	40	1,722
6	27.50	1,414	0.099	0.071	0.037	0.042	39	1,752
5	22.50	1,438	0.066	0.072	0.041	0.040	38	1,782
4	17.50	1,462	0.040	0.070	0.042	0.037	36	1,811
3	12.50	1,486	0.021	0.064	0.038	0.034	33	1,841
2	7.50	1,510	0.007	0.050	0.029	0.027	27	1,871
1	2.50	1,350	0.001	0.022	0.012	0.012	11	1,673
Powerwave Allgon 702	120.00	13	1.890	1.980	1.140	0.384	3	16
Powerwave Allgon LGP	120.00	85	1.890	1.980	1.140	0.384	22	105
Raycap DC6-48-60-18-	120.00	64	1.890	1.980	1.140	0.384	16	79
Ericsson RRUS 11 (Ba	120.00	150	1.890	1.980	1.140	0.384	38	186
Ericsson RRUS 32 B66	120.00	159	1.890	1.980	1.140	0.384	41	197

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

Ericsson RRUS 32 B2	120.00	159	1.890	1.980	1.140	0.384	41	197
Ericsson RRUS-32 (77	120.00	231	1.890	1.980	1.140	0.384	59	286
Powerwave Allgon 777	120.00	105	1.890	1.980	1.140	0.384	27	130
Quintel QS66512-2	120.00	333	1.890	1.980	1.140	0.384	85	413
CCI HPA-65R-BUU-H6	120.00	153	1.890	1.980	1.140	0.384	39	190
Flat Platform w/ Han	120.00	2,000	1.890	1.980	1.140	0.384	513	2,479
Ericsson KRY 112 144	109.00	33	1.559	0.658	0.616	0.192	4	41
Ericsson Radio 4449	109.00	222	1.559	0.658	0.616	0.192	28	275
Ericsson AIR 21, 1.3	109.00	275	1.559	0.658	0.616	0.192	35	340
Ericsson AIR 21, 1.3	109.00	244	1.559	0.658	0.616	0.192	31	303
Sector Frame (Perfec	109.00	4,086	1.559	0.658	0.616	0.192	522	5,064
RFS APXVAARR24_43-U-	109.00	384	1.559	0.658	0.616	0.192	49	476
		38,139	48.899	29.777	20.864	7.034	2,481	47,264

Load Case (0.9 - 0.2Sds) \* DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Segment	Height Above Base (ft)	Weight (lb)	a	b	c	Saz	Horizontal Force (lb)	Vertical Force (lb)
29	117.50	732	1.812	1.594	0.998	0.335	163	630
28	112.50	750	1.661	0.980	0.756	0.246	123	645
27	109.50	152	1.574	0.699	0.635	0.199	20	131
26	107.00	668	1.503	0.508	0.546	0.164	73	575
25	102.50	850	1.379	0.245	0.410	0.109	61	732
24	97.50	867	1.248	0.054	0.292	0.060	35	746
23	92.50	884	1.123	-0.056	0.201	0.024	14	761
22	87.50	901	1.005	-0.109	0.134	0.002	1	776
21	83.50	549	0.915	-0.121	0.093	-0.008	-3	473
20	81.00	687	0.861	-0.120	0.073	-0.011	-5	592
19	78.04	1,363	0.799	-0.112	0.054	-0.011	-10	1,174
18	75.54	231	0.749	-0.101	0.040	-0.008	-1	199
17	72.50	1,079	0.690	-0.084	0.028	-0.003	-2	929
16	67.50	1,100	0.598	-0.052	0.014	0.008	6	947
15	62.50	1,120	0.513	-0.021	0.008	0.021	16	964
14	57.50	1,141	0.434	0.007	0.006	0.032	24	982
13	52.50	1,161	0.362	0.030	0.008	0.040	31	1,000
12	47.50	1,182	0.296	0.046	0.013	0.044	35	1,017
11	44.50	239	0.260	0.054	0.016	0.045	7	206
10	42.00	1,839	0.232	0.058	0.019	0.046	56	1,583
9	38.63	1,281	0.196	0.063	0.024	0.045	39	1,103
8	36.13	618	0.171	0.066	0.027	0.045	18	532
7	32.50	1,390	0.139	0.069	0.032	0.044	40	1,196
6	27.50	1,414	0.099	0.071	0.037	0.042	39	1,217
5	22.50	1,438	0.066	0.072	0.041	0.040	38	1,238
4	17.50	1,462	0.040	0.070	0.042	0.037	36	1,258
3	12.50	1,486	0.021	0.064	0.038	0.034	33	1,279
2	7.50	1,510	0.007	0.050	0.029	0.027	27	1,299
1	2.50	1,350	0.001	0.022	0.012	0.012	11	1,162
Powerwave Allgon 702	120.00	13	1.890	1.980	1.140	0.384	3	11
Powerwave Allgon LGP	120.00	85	1.890	1.980	1.140	0.384	22	73
Raycap DC6-48-60-18-	120.00	64	1.890	1.980	1.140	0.384	16	55
Ericsson RRUS 11 (Ba	120.00	150	1.890	1.980	1.140	0.384	38	129
Ericsson RRUS 32 B66	120.00	159	1.890	1.980	1.140	0.384	41	137
Ericsson RRUS 32 B2	120.00	159	1.890	1.980	1.140	0.384	41	137
Ericsson RRUS-32 (77	120.00	231	1.890	1.980	1.140	0.384	59	199
Powerwave Allgon 777	120.00	105	1.890	1.980	1.140	0.384	27	90
Quintel QS66512-2	120.00	333	1.890	1.980	1.140	0.384	85	287
CCI HPA-65R-BUU-H6	120.00	153	1.890	1.980	1.140	0.384	39	132
Flat Platform w/ Han	120.00	2,000	1.890	1.980	1.140	0.384	513	1,721
Ericsson KRY 112 144	109.00	33	1.559	0.658	0.616	0.192	4	28

Site Number: 370629

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Site Name: Northhaven I, CT

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Customer: T-MOBILE

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Ericsson Radio 4449	109.00	222	1.559	0.658	0.616	0.192	28	191
Ericsson AIR 21, 1.3	109.00	275	1.559	0.658	0.616	0.192	35	236
Ericsson AIR 21, 1.3	109.00	244	1.559	0.658	0.616	0.192	31	210
Sector Frame (Perfec	109.00	4,086	1.559	0.658	0.616	0.192	522	3,517
RFS APXVAARR24_43-U-	109.00	384	1.559	0.658	0.616	0.192	49	330
		38,139	48.899	29.777	20.864	7.034	2,481	32,828

Load Case (1.2 + 0.2Sds) \* DL + E EMAM Seismic Equivalent Modal Analysis Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-45.59	-2.47	0.00	-250.53	0.00	250.53	4,882.59	2,441.30	10,894.79	5,380.53	0.00	0.00	0.056
5.00	-43.72	-2.46	0.00	-238.16	0.00	238.16	4,837.22	2,418.61	10,592.28	5,231.13	0.01	-0.01	0.055
10.00	-41.88	-2.43	0.00	-225.88	0.00	225.88	4,790.15	2,395.07	10,289.91	5,081.80	0.03	-0.02	0.053
15.00	-40.07	-2.40	0.00	-213.73	0.00	213.73	4,741.38	2,370.69	9,987.88	4,932.64	0.06	-0.04	0.052
20.00	-38.28	-2.37	0.00	-201.71	0.00	201.71	4,690.93	2,345.46	9,686.42	4,783.76	0.10	-0.05	0.050
25.00	-36.53	-2.34	0.00	-189.86	0.00	189.86	4,638.77	2,319.39	9,385.73	4,635.26	0.16	-0.06	0.049
30.00	-34.81	-2.30	0.00	-178.17	0.00	178.17	4,584.93	2,292.46	9,086.02	4,487.24	0.23	-0.07	0.047
35.00	-34.04	-2.29	0.00	-166.65	0.00	166.65	4,529.39	2,264.69	8,787.51	4,339.82	0.32	-0.09	0.046
37.25	-32.46	-2.25	0.00	-161.50	0.00	161.50	4,503.84	2,251.92	8,653.62	4,273.70	0.36	-0.09	0.045
40.00	-30.18	-2.20	0.00	-155.31	0.00	155.31	4,472.15	2,236.08	8,490.40	4,193.09	0.41	-0.10	0.044
44.00	-29.88	-2.19	0.00	-146.53	0.00	146.53	3,577.05	1,788.53	6,802.04	3,359.27	0.50	-0.11	0.052
45.00	-28.41	-2.16	0.00	-144.34	0.00	144.34	3,569.30	1,784.65	6,757.59	3,337.32	0.52	-0.11	0.051
50.00	-26.97	-2.13	0.00	-133.55	0.00	133.55	3,529.49	1,764.75	6,535.38	3,227.58	0.65	-0.12	0.049
55.00	-25.56	-2.11	0.00	-122.90	0.00	122.90	3,488.00	1,744.00	6,313.42	3,117.96	0.78	-0.14	0.047
60.00	-24.17	-2.09	0.00	-112.36	0.00	112.36	3,444.81	1,722.40	6,091.92	3,008.57	0.93	-0.15	0.044
65.00	-22.81	-2.09	0.00	-101.88	0.00	101.88	3,399.92	1,699.96	5,871.09	2,899.51	1.10	-0.16	0.042
70.00	-21.47	-2.09	0.00	-91.43	0.00	91.43	3,353.34	1,676.67	5,651.14	2,790.89	1.28	-0.17	0.039
75.00	-21.18	-2.10	0.00	-80.97	0.00	80.97	3,305.07	1,652.54	5,432.28	2,682.80	1.46	-0.19	0.037
76.08	-19.49	-2.10	0.00	-78.70	0.00	78.70	3,294.39	1,647.20	5,385.03	2,659.46	1.51	-0.19	0.036
80.00	-18.64	-2.11	0.00	-70.46	0.00	70.46	3,255.11	1,627.55	5,214.73	2,575.36	1.67	-0.20	0.033
82.00	-17.96	-2.11	0.00	-66.25	0.00	66.25	2,508.23	1,254.11	4,054.62	2,002.42	1.75	-0.20	0.040
85.00	-16.84	-2.11	0.00	-59.92	0.00	59.92	2,489.39	1,244.70	3,962.03	1,956.70	1.88	-0.21	0.037
90.00	-15.75	-2.09	0.00	-49.39	0.00	49.39	2,456.65	1,228.32	3,807.70	1,880.48	2.10	-0.22	0.033
95.00	-14.67	-2.05	0.00	-38.94	0.00	38.94	2,422.21	1,211.10	3,653.54	1,804.35	2.34	-0.23	0.028
100.00	-13.62	-1.99	0.00	-28.67	0.00	28.67	2,386.07	1,193.04	3,499.76	1,728.40	2.58	-0.24	0.022
105.00	-12.79	-1.91	0.00	-18.72	0.00	18.72	2,348.24	1,174.12	3,346.58	1,652.75	2.83	-0.24	0.017
109.00	-6.11	-1.20	0.00	-11.06	0.00	11.06	2,316.76	1,158.38	3,224.60	1,592.51	3.03	-0.24	0.010
110.00	-5.18	-1.07	0.00	-9.87	0.00	9.87	2,308.72	1,154.36	3,194.20	1,577.49	3.08	-0.25	0.008
115.00	-4.27	-0.90	0.00	-4.51	0.00	4.51	2,267.51	1,133.75	3,042.83	1,502.74	3.34	-0.25	0.005
120.00	0.00	-0.88	0.00	0.00	0.00	0.00	2,224.60	1,112.30	2,892.70	1,428.59	3.60	-0.25	0.000

Load Case (0.9 - 0.2Sds) \* DL + E EMAM Seismic (Reduced DL) Equivalent Modal Analysis Method

Calculated Forces

Seg Elev (ft)	Pu FY (-) (kips)	Vu FX (-) (kips)	Tu MY (ft-kips)	Mu MZ (ft-kips)	Mu MX (ft-kips)	Resultant Moment (ft-kips)	phi Pn (kips)	phi Vn (kips)	phi Tn (ft-kips)	phi Mn (ft-kips)	Total Deflect (in)	Rotation (deg)	Ratio
0.00	-31.67	-2.47	0.00	-248.74	0.00	248.74	4,882.59	2,441.30	10,894.79	5,380.53	0.00	0.00	0.053
5.00	-30.37	-2.45	0.00	-236.37	0.00	236.37	4,837.22	2,418.61	10,592.28	5,231.13	0.01	-0.01	0.051
10.00	-29.09	-2.42	0.00	-224.12	0.00	224.12	4,790.15	2,395.07	10,289.91	5,081.80	0.03	-0.02	0.050
15.00	-27.83	-2.39	0.00	-211.99	0.00	211.99	4,741.38	2,370.69	9,987.88	4,932.64	0.06	-0.04	0.049
20.00	-26.59	-2.36	0.00	-200.03	0.00	200.03	4,690.93	2,345.46	9,686.42	4,783.76	0.10	-0.05	0.047
25.00	-25.37	-2.32	0.00	-188.23	0.00	188.23	4,638.77	2,319.39	9,385.73	4,635.26	0.16	-0.06	0.046
30.00	-24.18	-2.29	0.00	-176.61	0.00	176.61	4,584.93	2,292.46	9,086.02	4,487.24	0.23	-0.07	0.045
35.00	-23.64	-2.27	0.00	-165.17	0.00	165.17	4,529.39	2,264.69	8,787.51	4,339.82	0.31	-0.09	0.043
37.25	-22.54	-2.23	0.00	-160.05	0.00	160.05	4,503.84	2,251.92	8,653.62	4,273.70	0.36	-0.09	0.042
40.00	-20.96	-2.18	0.00	-153.91	0.00	153.91	4,472.15	2,236.08	8,490.40	4,193.09	0.41	-0.10	0.041
44.00	-20.75	-2.17	0.00	-145.19	0.00	145.19	3,577.05	1,788.53	6,802.04	3,359.27	0.50	-0.11	0.049
45.00	-19.73	-2.14	0.00	-143.02	0.00	143.02	3,569.30	1,784.65	6,757.59	3,337.32	0.52	-0.11	0.048
50.00	-18.73	-2.11	0.00	-132.32	0.00	132.32	3,529.49	1,764.75	6,535.38	3,227.58	0.64	-0.12	0.046
55.00	-17.75	-2.09	0.00	-121.77	0.00	121.77	3,488.00	1,744.00	6,313.42	3,117.96	0.78	-0.14	0.044
60.00	-16.79	-2.07	0.00	-111.33	0.00	111.33	3,444.81	1,722.40	6,091.92	3,008.57	0.93	-0.15	0.042
65.00	-15.84	-2.07	0.00	-100.95	0.00	100.95	3,399.92	1,699.96	5,871.09	2,899.51	1.09	-0.16	0.039
70.00	-14.91	-2.07	0.00	-90.61	0.00	90.61	3,353.34	1,676.67	5,651.14	2,790.89	1.26	-0.17	0.037
75.00	-14.71	-2.07	0.00	-80.25	0.00	80.25	3,305.07	1,652.54	5,432.28	2,682.80	1.45	-0.18	0.034
76.08	-13.54	-2.08	0.00	-78.00	0.00	78.00	3,294.39	1,647.20	5,385.03	2,659.46	1.49	-0.19	0.033
80.00	-12.95	-2.09	0.00	-69.85	0.00	69.85	3,255.11	1,627.55	5,214.73	2,575.36	1.65	-0.20	0.031
82.00	-12.47	-2.09	0.00	-65.68	0.00	65.68	2,508.23	1,254.11	4,054.62	2,002.42	1.74	-0.20	0.038
85.00	-11.70	-2.09	0.00	-59.41	0.00	59.41	2,489.39	1,244.70	3,962.03	1,956.70	1.86	-0.21	0.035
90.00	-10.94	-2.07	0.00	-48.98	0.00	48.98	2,456.65	1,228.32	3,807.70	1,880.48	2.08	-0.22	0.030
95.00	-10.19	-2.04	0.00	-38.62	0.00	38.62	2,422.21	1,211.10	3,653.54	1,804.35	2.32	-0.23	0.026
100.00	-9.46	-1.97	0.00	-28.44	0.00	28.44	2,386.07	1,193.04	3,499.76	1,728.40	2.56	-0.23	0.020
105.00	-8.88	-1.90	0.00	-18.58	0.00	18.58	2,348.24	1,174.12	3,346.58	1,652.75	2.81	-0.24	0.015
109.00	-4.24	-1.19	0.00	-10.99	0.00	10.99	2,316.76	1,158.38	3,224.60	1,592.51	3.01	-0.24	0.009
110.00	-3.60	-1.06	0.00	-9.80	0.00	9.80	2,308.72	1,154.36	3,194.20	1,577.49	3.06	-0.24	0.008
115.00	-2.97	-0.90	0.00	-4.49	0.00	4.49	2,267.51	1,133.75	3,042.83	1,502.74	3.31	-0.25	0.004
120.00	0.00	-0.88	0.00	0.00	0.00	0.00	2,224.60	1,112.30	2,892.70	1,428.59	3.57	-0.25	0.000

Site Number: 370629

Code: ANSI/TIA-222-G

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Site Name: Northhaven I, CT

Engineering Number: 12927192\_C3\_02

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Customer: T-MOBILE

## Analysis Summary

Load Case	Reactions						Max Usage	
	Shear FX (kips)	Shear FZ (kips)	Axial FY (kips)	Moment MX (ft-kips)	Moment MY (ft-kips)	Moment MZ (ft-kips)	Elev (ft)	Interaction Ratio
1.2D + 1.6W	22.28	0.00	45.75	0.00	0.00	1813.57	0.00	0.35
0.9D + 1.6W	22.27	0.00	34.31	0.00	0.00	1803.59	0.00	0.34
1.2D + 1.0Di + 1.0Wi	4.94	0.00	66.53	0.00	0.00	415.73	0.00	0.09
(1.2 + 0.2Sds) * DL + E ELFM	1.67	0.00	45.59	0.00	0.00	159.84	0.00	0.04
(1.2 + 0.2Sds) * DL + E EMAM	2.47	0.00	45.59	0.00	0.00	250.53	0.00	0.06
(0.9 - 0.2Sds) * DL + E ELFM	1.67	0.00	31.67	0.00	0.00	158.76	0.00	0.04
(0.9 - 0.2Sds) * DL + E EMAM	2.47	0.00	31.67	0.00	0.00	248.74	0.00	0.05
1.0D + 1.0W	4.77	0.00	38.14	0.00	0.00	386.62	0.00	0.08



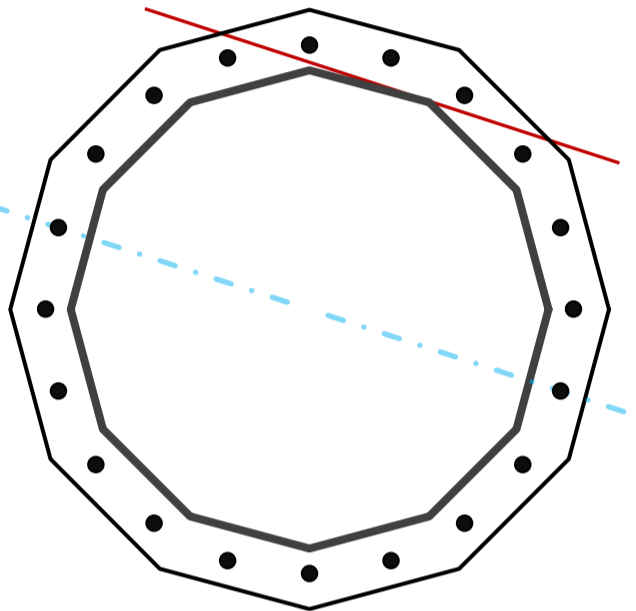
## Base Plate & Anchor Rod Analysis

Pole Dimensions		
Number of Sides	12	-
Diameter	54.5	in
Thickness	0.4375	in
Orientation Offset	0	°

Base Reactions		
Moment, Mu	1813.6	k-ft
Axial, Pu	45.8	k
Shear, Vu	22.3	k
Neutral Axis	342	°

Report Capacities		
Component	Capacity	Result
Base Plate	18%	Pass
Anchor Rods	28%	Pass
Dwyidag	-	-

Base Plate		
Number of Sides	12	-
Diameter, $\phi$	68.92	in
Thickness	2 3/4	in
Grade	Other	-
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	80	ksi
Clip	N/A	in
Orientation Offset	0	°
Anchor Rod Detail	c	$\eta=0.55$
Clear Distance	N/A	in
Applied Moment, Mu	612.2	k
Bending Stress, $\phi Mn$	3323.9	k



Original Anchor Rods		
Arrangement	Radial	-
Quantity	20	-
Diameter, $\phi$	2 1/4	in
Bolt Circle	62.92	in
Grade	A615-75	
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Spacing	9.9	in
Orientation Offset	0	°
Applied Force, Pu	71.4	k
Anchor Rods, $\phi Pn$	259.8	k

# Calculations for Monopole Base Plate & Anchor Rod Analysis

## Reaction Distribution

Reaction	Shear Vu	Moment Mu	Factor
-	k	k-ft	-
Base Forces	22.3	1813.6	1.00
Anchor Rod Forces	22.3	1813.6	1.00
Additional Bolt (Grp1) Forces	0.0	0.0	0.00
Additional Bolt (Grp2) Forces	0.0	0.0	0.00
Dywidag Forces	0.0	0.0	0.00
Stiffener Forces	0.0	0.0	0.00

## Geometric Properties

Section	Gross Area	Net Area	Individual Inertia	Threads per Inch	Moment of Inertia
-	in <sup>2</sup>	in <sup>2</sup>	in <sup>4</sup>	#	in <sup>4</sup>
Pole	73.4601	6.1217	0.3922		26842.94
Bolt	3.9761	3.2477	0.8393	4.5	32160.20
Bolt1	0.0000	0.0000	0.0000	0	0.00
Bolt2	0.0000	0.0000	0.0000	0	0.00
Dywidag	0.0000	0.0000	0.0000		0.00
Stiffener	0.0000	0.0000	0.0000		0.00

Base Plate		
Shape	12	-
Width, W	68.92	in
Thickness, t	2.75	in
Yield Strength, Fy	60	ksi
Tensile Strength, Fu	80	ksi
Base Plate Chord	42.187	in
Detail Type	c	-
Detail Factor	0.55	-
Clear Distance	N/A	-

Anchor Rods		
Anchor Rod Quantity, N	20	-
Rod Diameter, d	2.25	in
Bolt Circle, BC	62.92	in
Yield Strength, Fy	75	ksi
Tensile Strength, Fu	100	ksi
Applied Axial, Pu	71.4	k
Applied Shear, Vu	0.5	k
Compressive Capacity, $\phi P_n$	259.8	k
Tensile Capacity, $\phi R_n$	0.275	OK
Interaction Capacity	0.279	OK

External Base Plate		
Chord Length AA	42.468	in
Additional AA	5.500	in
Section Modulus, Z	90.689	in <sup>3</sup>
Applied Moment, Mu	612.2	k-ft
Bending Capacity, $\phi M_n$	4897.2	k-ft
Capacity, Mu/ $\phi M_n$	0.125	OK

Chord Length AB	40.527	in
Additional AB	5.500	in
Section Modulus, Z	87.021	in <sup>3</sup>
Applied Moment, Mu	410.9	k-ft
Bending Capacity, $\phi M_n$	4699.1	k-ft
Capacity, Mu/ $\phi M_n$	0.087	OK

Bend Line Length	32.557	in
Additional Bend Line	0.000	in
Section Modulus, Z	61.554	in <sup>3</sup>
Applied Moment, Mu	612.2	k-ft
Bending Capacity, $\phi M_n$	3323.9	k-ft
Capacity, Mu/ $\phi M_n$	0.184	OK

Internal Base Plate		
Arc Length	0.000	in
Section Modulus, Z	0.000	in <sup>3</sup>
Moment Arm	0.000	in
Applied Moment, Mu	0.0	k-ft
Bending Capacity, $\phi M_n$	0.0	k-ft
Capacity, Mu/ $\phi M_n$		



# Exhibit E

## **Mount Analysis**

**Mount Analysis of Proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector  
Frames for American Tower on behalf of T-Mobile**

**370629 - Northhaven I**

**Project #: 12927192**

T-Mobile Site ID: CTNH735A

Program: L600

CLS Engineering PLLC Project #41124-12927192-01-MR

April 12, 2019

MOUNT DESCRIPTION	Proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector Frames at 109 ft AGL
ANTENNA ELEVATION	Nominal Rad. Elevation of 109 ft AGL
SITE DESCRIPTION	120 ft Monopole
SITE ADDRESS	125 Washington Ave., North Haven, CT 06473, New Haven County
GPS COORDINATES	41.39780, -72.85670
ANALYSIS STANDARD	2018 IBC / TIA-222-H
LOADING CRITERIA	120 mph, $V_{ut}$ (3-Second Gust) w/o ice & 50 mph (3-Second Gust) w/ 1" Ice

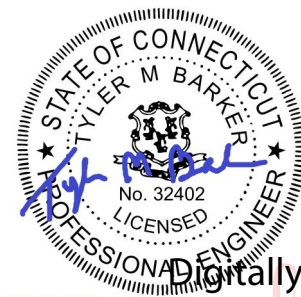
■ ANALYSIS RESULT: Pass (Replacement)

MEMBER USAGE	48%	Pass
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Existing mounts to be replaced; see conclusion for details.

Prepared by:  
Lowden Kerns, E.I.

Reviewed and Approved by:  
Tyler M. Barker, P.E.



Tyler M. Barker  
CLS Engineering, PLLC  
Director of Engineering  
PE # 32402 Exp. 1/31/2020  
COA # PEC.001833 Exp. 8/1/2020

Digitally signed  
by Tyler M.  
Barker

Date:  
2019.04.12

17:10:18 -04'00'

■ INTRODUCTION

The proposed equipment is to be mounted to the proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector Frames. This proposed mounting configuration was analyzed using RISA-3D, a commercially available finite element analysis software package. A selection of input and output from our analysis is attached to the end of this report.

■ STRUCTURAL DOCUMENTS PROVIDED

STRUCTURAL DATA	Site Photos date July 13, 2018 Perfect Vision assembly drawings, Document# MPM-SFA-ENG-01-R0, Rev. 0, dated January 2, 2018
PREVIOUS ANALYSES	Structural Analysis Report by Tower Engineering Professionals, Engineering# OAA720419_C3_01, dated January 15, 2018
LOADING DATA	ATC Application, Project# 12927192, dated April 2, 2019

■ ANALYSIS CRITERIA

STANDARD	2018 IBC / TIA-222-H
BASIC WIND SPEED	120 mph, $V_{ult}$ (3-Second Gust)
BASIC WIND SPEED W/ ICE	50 mph (3-Second Gust) w/ 1" Radial Ice (Escalating)
EXPOSURE CATEGORY	C
MAX. TOPOGRAPHIC FACTOR, $K_{zt}$	1.00
RISK CATEGORY	II
MAINTENANCE LIVE LOAD	$L_M$ : 500 lb

■ FINAL EQUIPMENT

ELEVATION (ft)		ANTENNAS	
MOUNT	RAD.	#	NAME
109.0	109.0	3	RFS Celwave APXVAARR24_43-U-NA20
		3	Ericsson AIR 21, 1.3M, B2A/B4P
		3	Ericsson AIR 21, 1.3M, B4A/B2P
		3	Ericsson RADIO 4449 B12/B71
		3	Ericsson KRY 112 144/1

■ RESULTS SUMMARY

Existing Mount Usages:

COMPONENT	PEAK USAGE	RESULT
Platform Base	143%	Fail
Collar Reactions	99%	Pass
Stand-Off Horizontals	87%	Pass
Mount Pipes	72%	Pass

Replacement Mount Usages:

COMPONENT	PEAK USAGE	RESULT
Mount Pipes	48%	Pass
Stand-Off Frames	46%	Pass
Face Horizontals	45%	Pass
Pivot Plate	32%	Pass

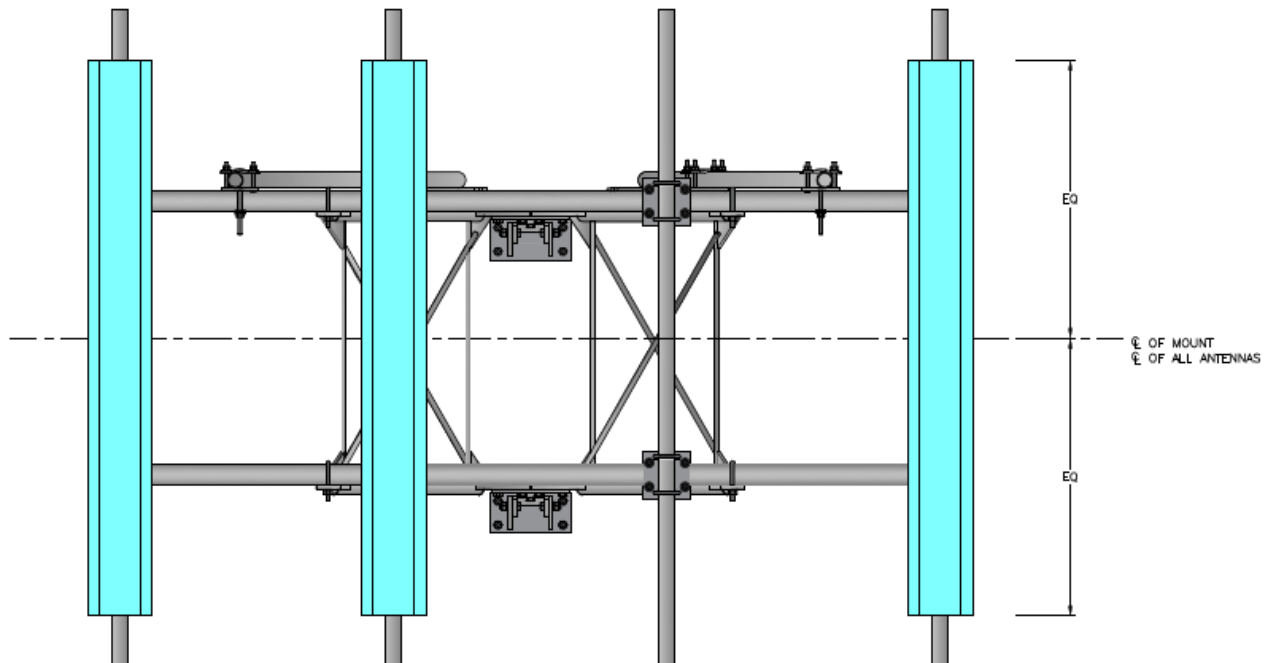
## ■ CONCLUSION AND RECOMMENDATIONS

According to our structural analysis, the mounts have been found to **PASS PENDING REPLACEMENT**. The mounting configuration considered in this analysis will be capable of supporting the referenced loading pursuant to referenced standards once the following scope is executed:

- Replace existing platform mount with (1) proposed Perfect Vision PV-MPM-SFA10-12-278X96 sector frame kit.
- Install (4) mount pipes included with kit at each sector frame mount (12 total). All mount pipes are to be installed equidistant from each other as shown in the assembly drawings.
- Install (2) stiff arms included in the sector frame kit at each sector frame mount (6 total). Connect to nearest adjacent universal pipe with Perfect Vision PV-SAM-U or equal (6 total). Connect to upper face horizontal member as shown in the following sketch.
- Install existing and proposed antennas such that they are vertically centered on the mounts. Install existing and proposed RRUs and TMAs behind the antennas.

NOTE:  
MOUNT SHOWN IS REPRESENTATIVE.  
ACTUAL GEOMETRY MAY DIFFER.

NOTE:  
INSTALL ANTENNAS SUCH THAT THEY  
ARE VERTICALLY CENTERED BETWEEN  
MOUNT FACE HORIZONTALS.



See following sketches and Perfect Vision Assembly drawings for additional details.

## ■ ASSUMPTIONS AND CONDITIONS

This analysis is inclusive of the antenna supporting frames/mounts and all recorded connections that will support the equipment listed in this report. It considers only the theoretical capacity of structural components and it is not a condition assessment. The validity of the analysis may be dependent on the accuracy of structural information supplied by others. The client is responsible for verifying this information. If any provided information is revised after completion of this analysis, CLS Engineering PLLC should be notified immediately to revise results.

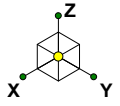
This analysis assumes the following:

1. The tower or other superstructure and mounts (if existing) were properly constructed as per the original design and have been properly maintained in accordance with applicable code standards.
2. Member sizes and strengths are accurate as supplied or are assumed as stated in the calculations.
3. In the absence of sufficient design information, all welds and connections are assumed to develop at least the capacity of the connected member, unless otherwise stated in this analysis.
4. All prior structural modifications, if any, are assumed to be correctly installed and fully effective.
5. The loading configuration is complete and accurate as supplied and/or as modeled in the previous analysis. All appurtenances are assumed to be properly installed and supported as per manufacturer requirements.
6. Some conservative assumptions may be used regarding appurtenances and their projected areas based on careful interpretation of data supplied, previous experience and standard industry practice.

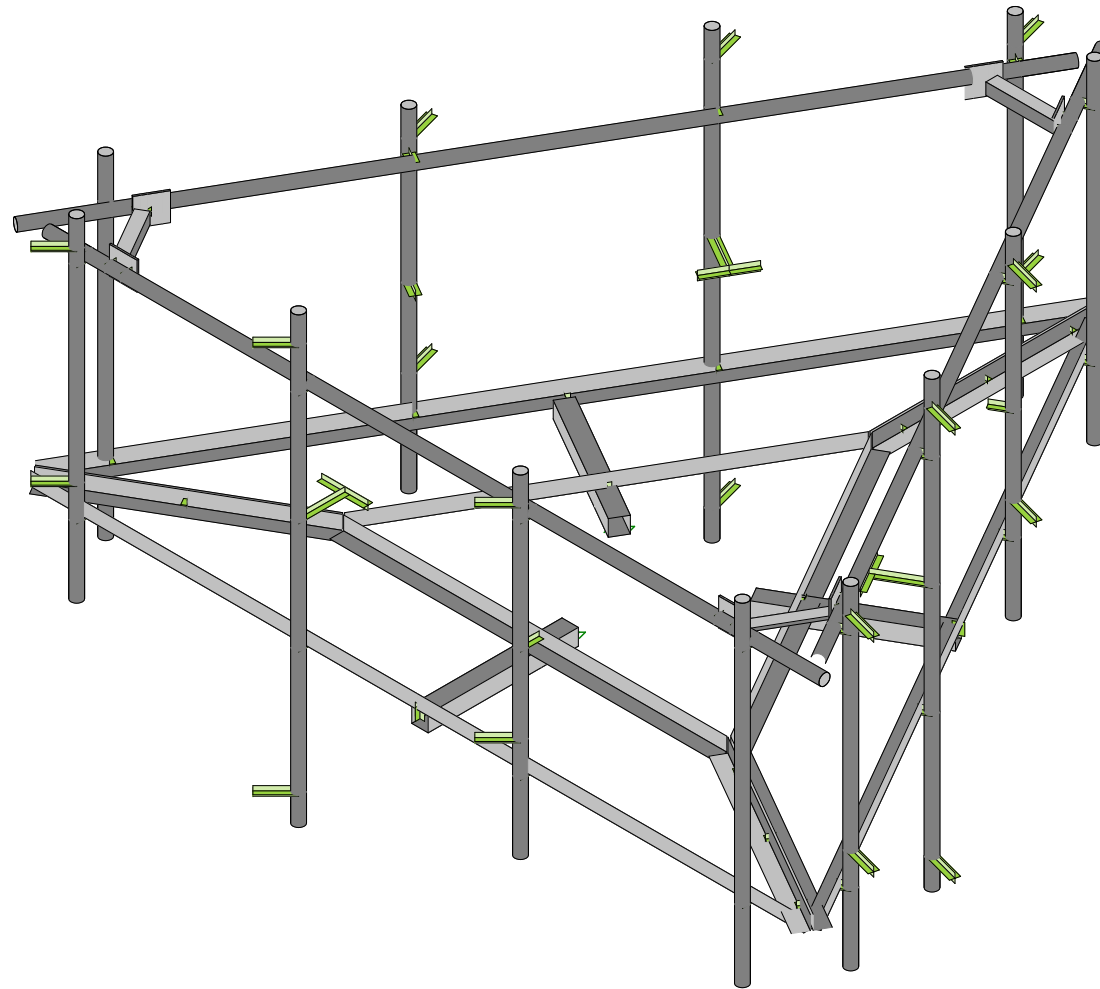
All opinions and conclusions are considered accurate to a reasonable degree of engineering certainty based upon the evidence available at the time of the report. All opinions and conclusions contained herein are subject to revision based upon receipt of new or updated information. All services are provided exercising a level of care and diligence equivalent to the standard of our profession. No warranty or guarantee, either expressed or implied, is offered. All services are confidential in nature and this report will not be released to any other party without the client's consent. The use of this analysis is limited to the expressed purpose for which it was commissioned and it may not be reused, copied or disseminated for any other purpose without consent from CLS Engineering PLLC.

All services were performed, results obtained and recommendations made in accordance with generally accepted engineering principles and practices. CLS Engineering PLLC is not responsible for the conclusions, opinions or recommendations made by others based on the information supplied in this analysis.

It is not possible to have the fully detailed information necessary to perform a complete and thorough analysis of every structural sub-component of an existing structure. The structural analysis by CLS Engineering PLLC verifies the adequacy of the primary members of the structure. CLS Engineering PLLC provides a limited scope of service in that we cannot verify the adequacy of every weld, bolt, gusset, etc.



Existing Mount - To Be Replaced

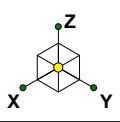


Envelope Only Solution

CLS
JLK
41124-12927192-01-MA

41124-12927192-Northhaven I
Rendered

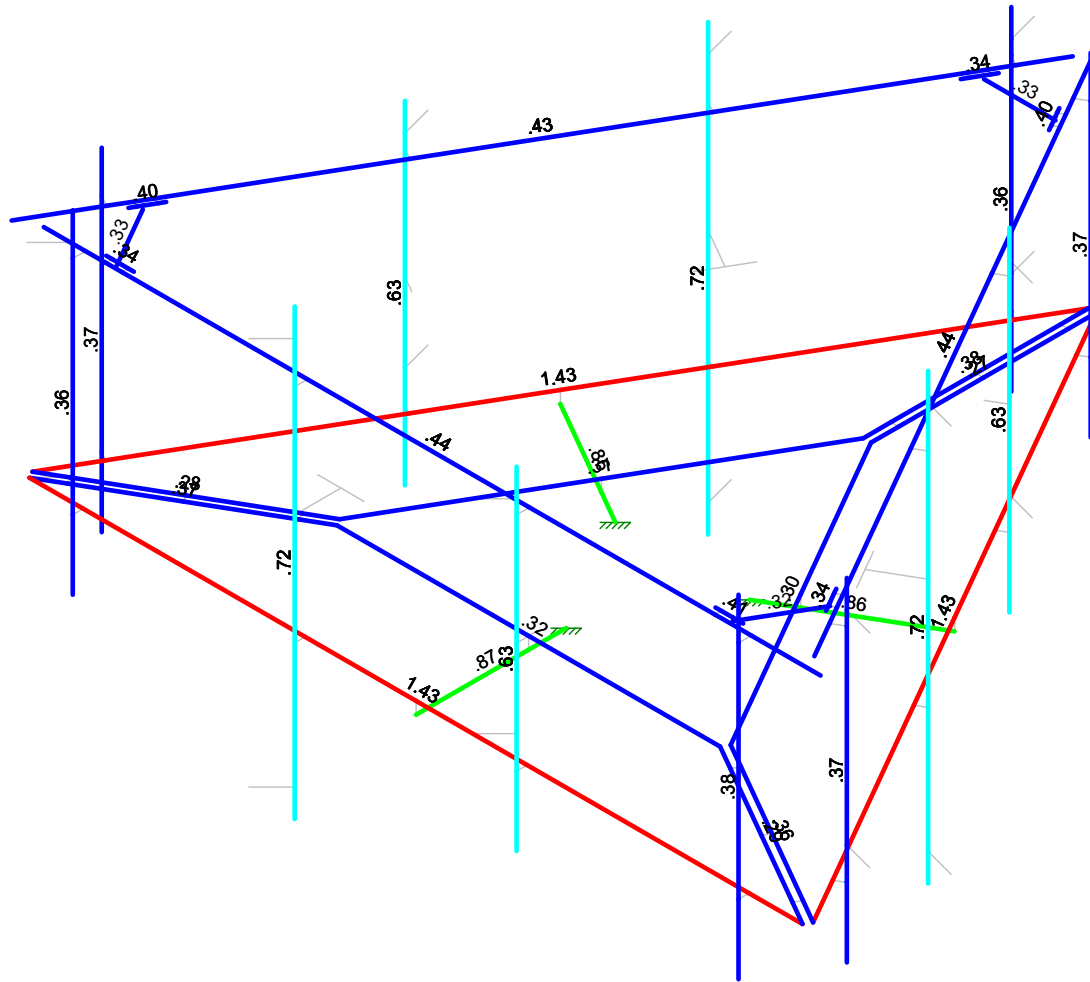
EX - 1
Apr 12, 2019 at 10:24 AM
41124-12927192-01-MA.r3d



Existing Mount - To Be Replaced

Code Check (Env)

- No Calc
- > 1.0
- .90-1.0
- .75-.90
- .50-.75
- 0-.50



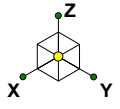
Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

CLS  
JLK  
41124-12927192-01-MA

41124-12927192-Northhaven I  
Envelope Member Untiy Check Results - Bending

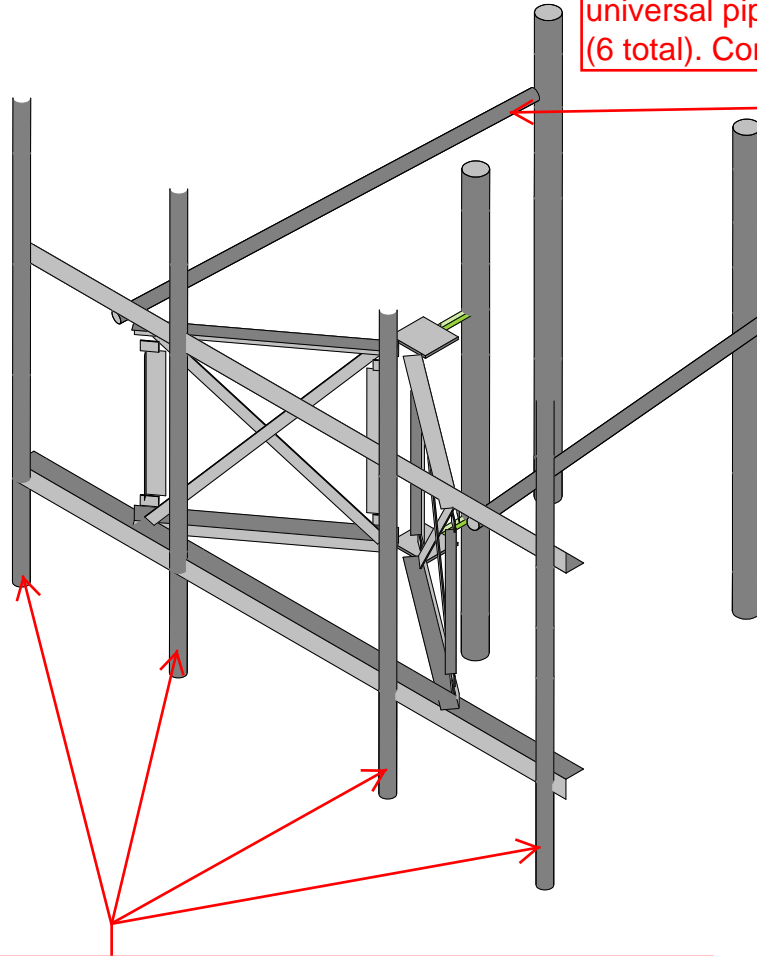
EX - 2  
Apr 12, 2019 at 10:26 AM  
41124-12927192-01-MA.r3d





Replace existing platform mount with (1) proposed Perfect Vision PV-MPM-SFA10-12-278X96 Sector Frame Kit.

Install (2) stiff arms included in the sector frame kit at each sector frame mount (6 total). Connect to nearest universal pipe with Perfect Vision PV-SAM-U or equal (6 total). Connect to upper face horizontal member.



Install (4) mount pipes included with kit at each sector frame mount (12 total). All mount pipes are to be installed equidistant from each other.

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41124-12927192-01-MR

41124-12927192-Northhaven I
Installation Sketch

IN - 1
Apr 12, 2019 at 3:44 PM
41124-12927192-01-MR.r3d



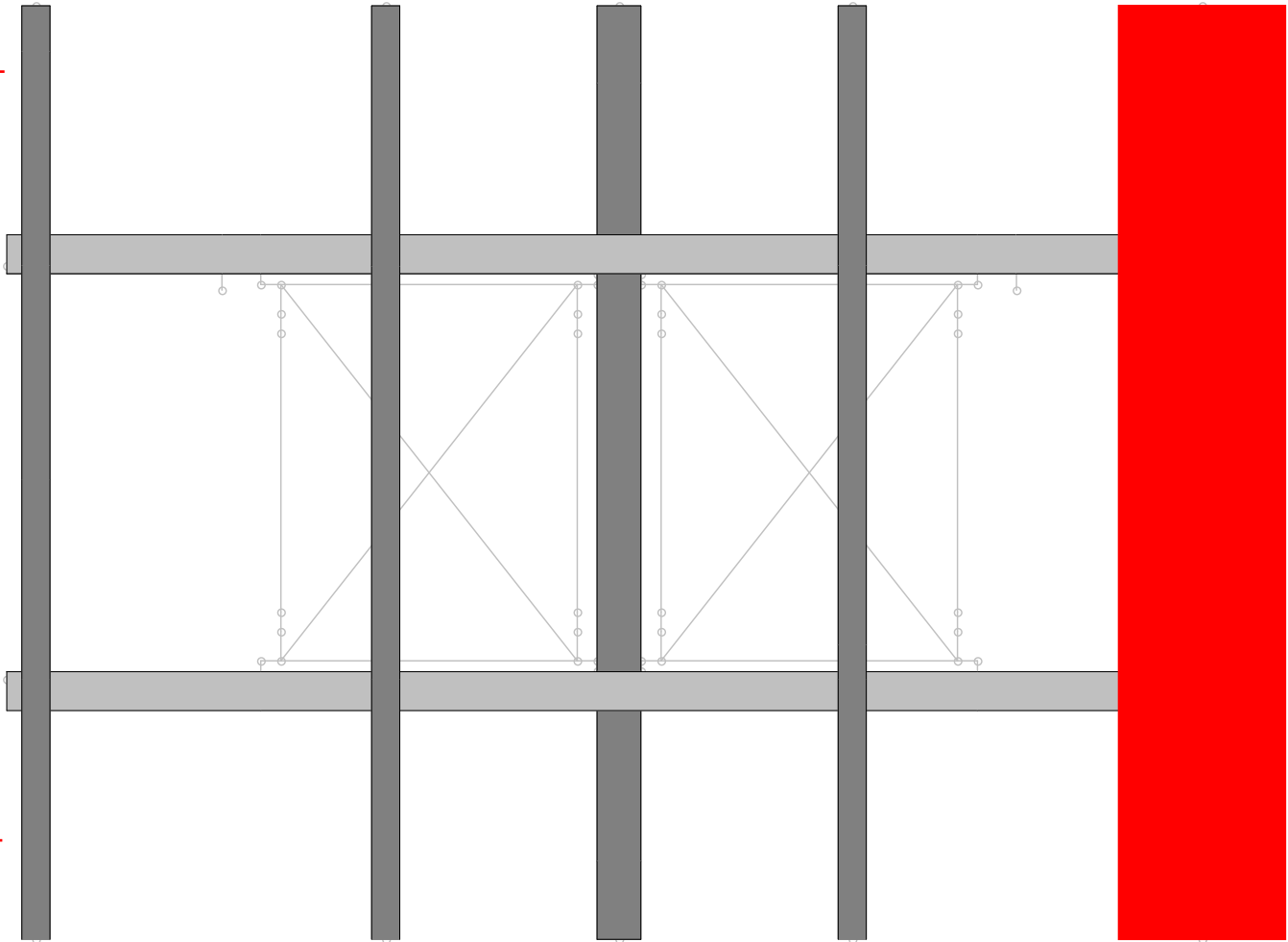
Top Collar:  
±112'

Mount/RAD:  
±109'

Bot Collar:  
±106'

Tip: ±113'

Tip: ±105'



CLS  
JLK

41124-12927192-Northhaven I  
Mount and Antenna Elevations

IN - 2  
Apr 10, 2019 at 12:22 AM  
41124-12927192-01-MR.r3d

# L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME

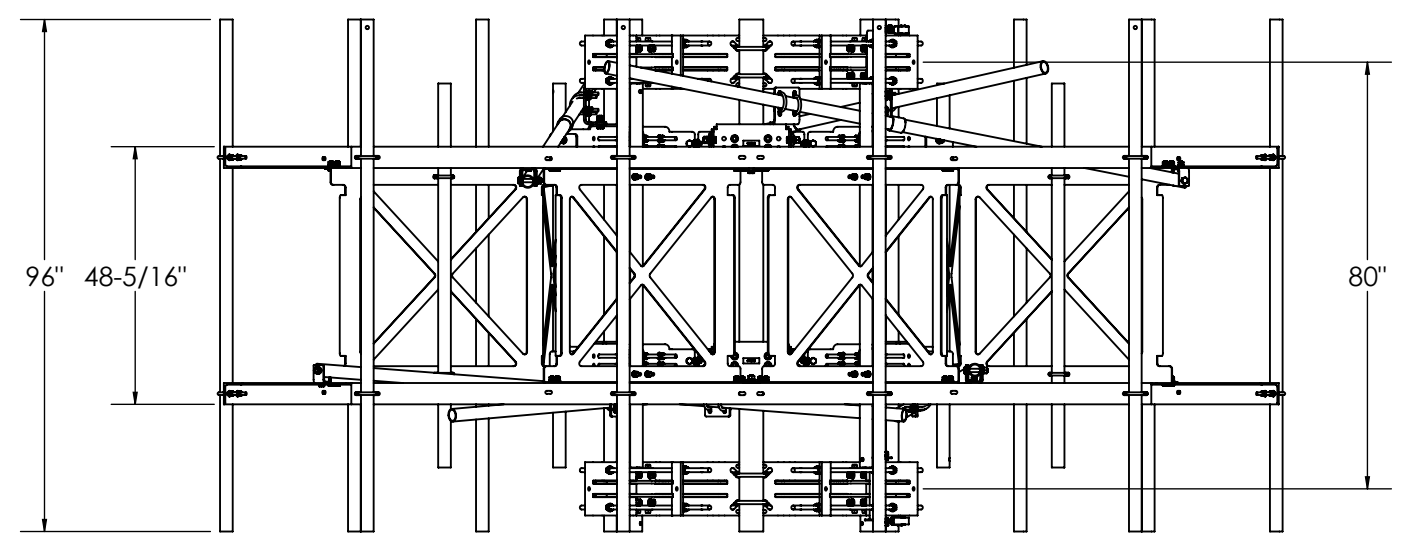
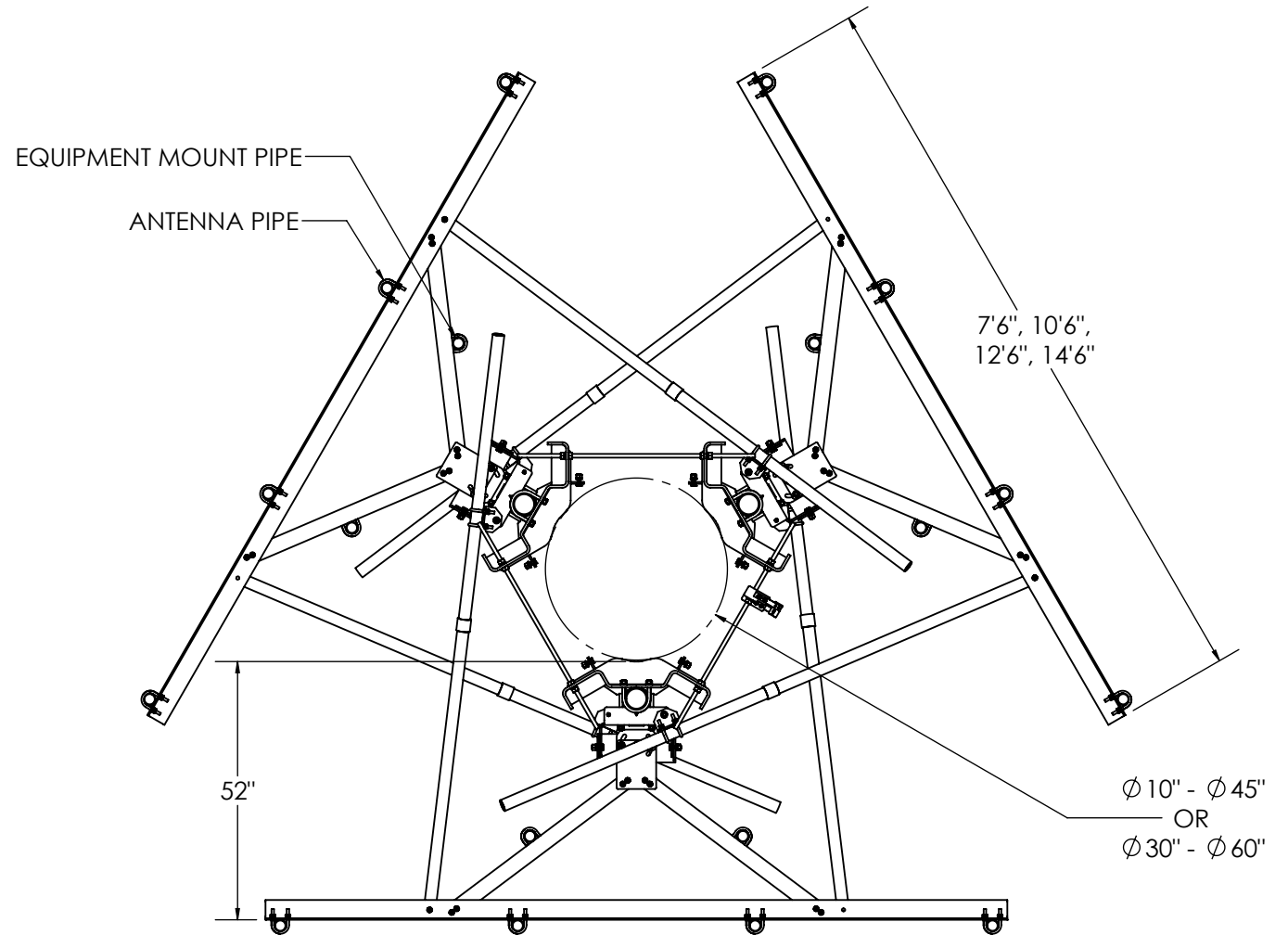
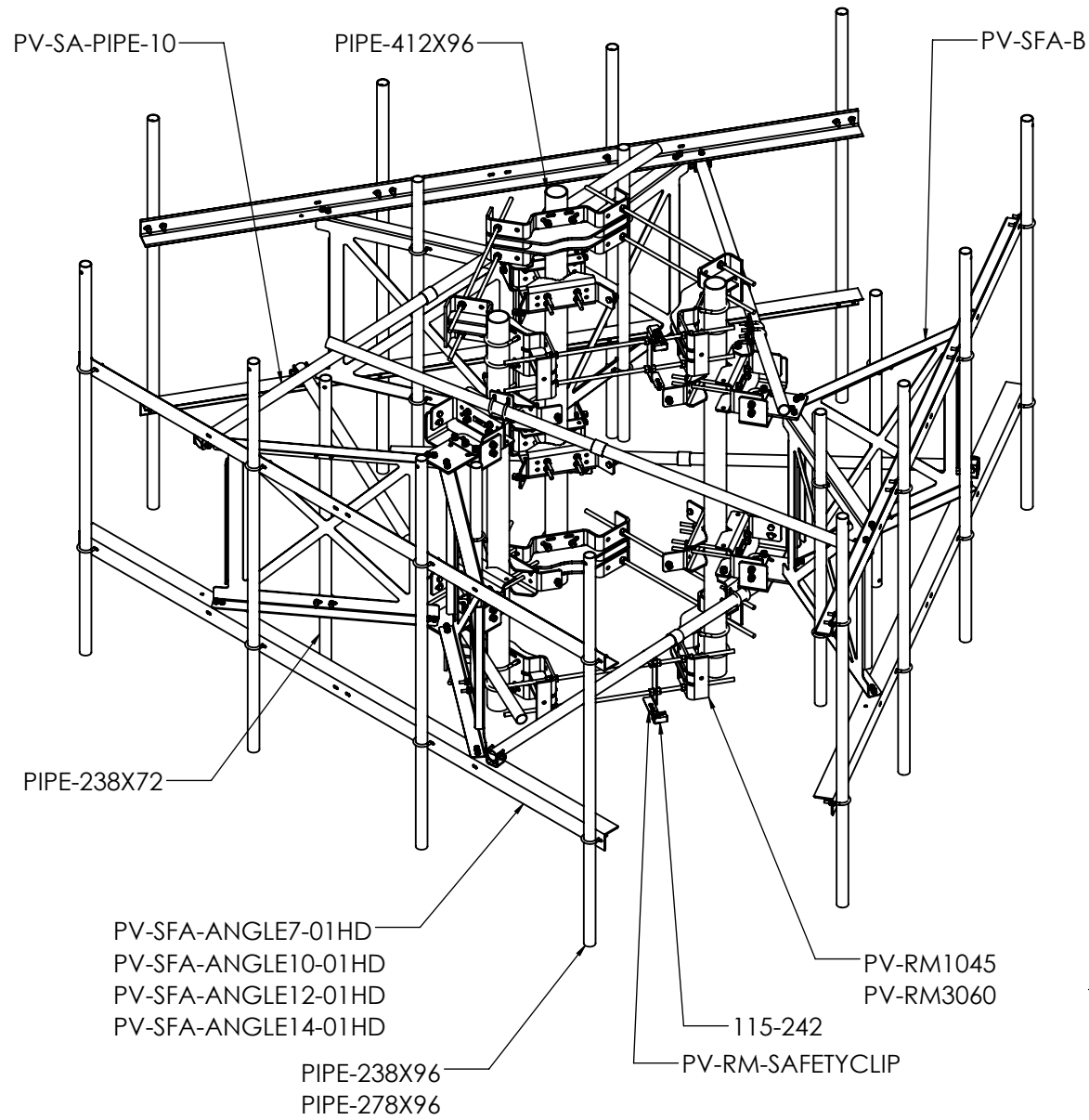


Table 1: Frame (EPA)

Face Angle	Front (ft <sup>2</sup> ) (EPA) <sub>MN</sub>		Side (ft <sup>2</sup> ) (EPA) <sub>MT</sub>	
	No Ice	0.5" Radial Ice	No Ice	0.5" Radial Ice
7'6"	9.9	11.3	5.2	7.4
10'6"	11.7	13.5	5.2	7.4
12'6"	13.0	15.1	5.2	7.4
14'6"	14.3	16.7	5.2	7.4

- FRAME EPA IS PER SECTOR
- FRAME EPA DOES NOT INCLUDE ANTENNA OR EQUIPMENT PIPES

Table 2: Antenna Pipe Spacing

Face Angle	3 Pipe Spacing	4 Pipe Spacing	5 Pipe Spacing
PV-SFA7-B	3'6"	2'4"	N/A
PV-SFA10-B	5'	3'4"	N/A
PV-SFA12-B	6'	4'	N/A
PV-SFA14-B	7'	4'8"	3'6"

SHEET 1 OF 4	THIRD ANGLE PROJECTION 	CATEGORY 02_Monopole	4	
1/2/2018	SCALE 1:36	SERIES 05_Sector Frames	3	
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ± 1/4°, BEND ± 2° ALL OTHERS: ± 1/16"		TYPE PV-MPM-SFA_Monopole Sector Frame	2	
		BY DJN	1	
		CHECKED SJS	0	INITIAL RELEASE
		STATUS APPROVED	REV	DESCRIPTION
			DATE	12/27/17
				L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME DOCUMENT NUMBER <b>MPM-SFA-ENG-01-R0</b>
				REV <b>0</b>



# L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME

Table 3: PV-MP-SFA Configurations

Part Number	Description	Compatible Pole OD	Weight (lbs)	Included Parts																
				PV-RM1045	PV-RM3060	PV-RM-SAFETY CLIP	PV-SFA-B	PV-SFA-ANGLE1-01HD	PV-SFA-ANGLE10-01HD	PV-SFA-ANGLE12-01HD	PV-SFA-ANGLE14-01HD	PV-SA-PIPE-150	PIPE-238X72	PIPE-238X96	PIPE-278X96	PIPE-412X96	PV-GUB-4352	PV-GUB-5456	115-242	PV-WPTA
PV-MPM-SFA7-B	Monopole Sector Frame, 7'6" Face, No Antenna Pipe	10" - 45"	2624	2	-	2	3	6	-	-	-	6	-	-	3	-	12	2	-	-
PV-MPM-SFA7-12-238X96	Monopole Sector Frame, 7'6" Face, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3108	2	-	2	3	6	-	-	-	6	6	12	-	3	-	12	2	-
PV-MPM-SFA7-12-278X96	Monopole Sector Frame, 7'6" Face, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3338	2	-	2	3	6	-	-	-	6	6	12	3	24	12	2	-	-
PV-MPM-SFA7-WP-12-238X96	Monopole Sector Frame, 7'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3611	2	-	2	3	6	-	-	-	6	6	12	-	3	-	12	2	3
PV-MPM-SFA7-WP-12-278X96	Monopole Sector Frame, 7'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3841	2	-	2	3	6	-	-	-	6	6	12	3	24	12	2	3	3
PV-MPM-SFA10-B	Monopole Sector Frame, 10'6" Face, No Antenna Pipe	10" - 45"	2771	2	-	2	3	-	6	-	-	6	-	-	3	-	12	2	-	-
PV-MPM-SFA10-12-238X96	Monopole Sector Frame, 10'6" Face, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3255	2	-	2	3	-	6	-	-	6	6	12	-	3	-	12	2	-
PV-MPM-SFA10-12-278X96	Monopole Sector Frame, 10'6" Face, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3485	2	-	2	3	-	6	-	-	6	6	12	3	24	12	2	-	-
PV-MPM-SFA10-WP-12-238X96	Monopole Sector Frame, 10'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3758	2	-	2	3	-	6	-	-	6	6	12	-	3	-	12	2	3
PV-MPM-SFA10-WP-12-278X96	Monopole Sector Frame, 10'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3988	2	-	2	3	-	6	-	-	6	6	12	3	24	12	2	3	3
PV-MPM-SFA12-B	Monopole Sector Frame, 12'6" Face, No Antenna Pipe	10" - 45"	2869	2	-	2	3	-	-	6	-	6	-	-	3	-	12	2	-	-
PV-MPM-SFA12-12-238X96	Monopole Sector Frame, 12'6" Face, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3353	2	-	2	3	-	-	6	-	6	6	12	-	3	-	12	2	-
PV-MPM-SFA12-12-278X96	Monopole Sector Frame, 12'6" Face, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3583	2	-	2	3	-	-	6	-	6	6	12	3	24	12	2	-	-
PV-MPM-SFA12-WP-12-238X96	Monopole Sector Frame, 12'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3856	2	-	2	3	-	-	6	-	6	6	12	-	3	-	12	2	3
PV-MPM-SFA12-WP-12-278X96	Monopole Sector Frame, 12'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	4086	2	-	2	3	-	-	6	-	6	6	12	3	24	12	2	3	3
PV-MPM-SFA14-B	Monopole Sector Frame, 14'6" Face, No Antenna Pipe	10" - 45"	2966	2	-	2	3	-	-	-	6	6	-	-	3	-	12	2	-	-
PV-MPM-SFA14-12-238X96	Monopole Sector Frame, 14'6" Face, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3449	2	-	2	3	-	-	-	6	6	6	12	-	3	-	12	2	-
PV-MPM-SFA14-12-278X96	Monopole Sector Frame, 14'6" Face, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	3679	2	-	2	3	-	-	-	6	6	6	12	3	24	12	2	-	-
PV-MPM-SFA14-WP-12-238X96	Monopole Sector Frame, 14'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	10" - 45"	3952	2	-	2	3	-	-	-	6	6	6	12	-	3	-	12	2	3
PV-MPM-SFA14-WP-12-278X96	Monopole Sector Frame, 14'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	10" - 45"	4182	2	-	2	3	-	-	-	6	6	6	12	3	24	12	2	3	3
PV-MPL-SFA7-B	Large Monopole Sector Frame, 7'6" Face, No Antenna Pipe	30" - 60"	2738	-	2	2	3	6	-	-	-	6	-	-	3	-	12	2	-	-
PV-MPL-SFA7-12-238X96	Large Monopole Sector Frame, 7'6" Face, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3222	-	2	2	3	6	-	-	-	6	6	12	-	3	-	12	2	-
PV-MPL-SFA7-12-278X96	Large Monopole Sector Frame, 7'6" Face, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	3452	-	2	2	3	6	-	-	-	6	6	12	-	3	24	12	2	-
PV-MPL-SFA7-WP-12-238X96	Large Monopole Sector Frame, 7'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3725	-	2	2	3	6	-	-	-	6	6	12	-	3	-	12	2	3
PV-MPL-SFA7-WP-12-278X96	Large Monopole Sector Frame, 7'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	3955	-	2	2	3	6	-	-	-	6	6	12	3	24	12	2	3	3
PV-MPL-SFA10-B	Large Monopole Sector Frame, 10'6" Face, No Antenna Pipe	30" - 60"	2885	-	2	2	3	-	6	-	-	6	-	-	3	-	12	2	-	-
PV-MPL-SFA10-12-238X96	Large Monopole Sector Frame, 10'6" Face, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3369	-	2	2	3	-	6	-	-	6	6	12	-	3	-	12	2	-
PV-MPL-SFA10-12-278X96	Large Monopole Sector Frame, 10'6" Face, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	3599	-	2	2	3	-	6	-	-	6	6	12	3	24	12	2	-	-
PV-MPL-SFA10-WP-12-238X96	Large Monopole Sector Frame, 10'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3872	-	2	2	3	-	6	-	-	6	6	12	-	3	-	12	2	3
PV-MPL-SFA10-WP-12-278X96	Large Monopole Sector Frame, 10'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	4102	-	2	2	3	-	6	-	-	6	6	12	3	24	12	2	3	3
PV-MPL-SFA12-B	Large Monopole Sector Frame, 12'6" Face, No Antenna Pipe	30" - 60"	2983	-	2	2	3	-	-	6	-	6	-	-	3	-	12	2	-	-
PV-MPL-SFA12-12-238X96	Large Monopole Sector Frame, 12'6" Face, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3467	-	2	2	3	-	-	6	-	6	6	12	-	3	-	12	2	-
PV-MPL-SFA12-12-278X96	Large Monopole Sector Frame, 12'6" Face, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	3697	-	2	2	3	-	-	6	-	6	6	12	3	24	12	2	-	-
PV-MPL-SFA12-WP-12-238X96	Large Monopole Sector Frame, 12'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3970	-	2	2	3	-	-	6	-	6	6	12	-	3	-	12	2	3
PV-MPL-SFA12-WP-12-278X96	Large Monopole Sector Frame, 12'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	4200	-	2	2	3	-	-	6	-	6	6	12	3	24	12	2	3	3
PV-MPL-SFA14-B	Large Monopole Sector Frame, 14'6" Face, No Antenna Pipe	30" - 60"	3080	-	2	2	3	-	-	-	6	6	-	-	3	-	12	2	-	-
PV-MPL-SFA14-12-238X96	Large Monopole Sector Frame, 14'6" Face, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	3563	-	2	2	3	-	-	-	6	6	6	12	-	3	-	12	2	-
PV-MPL-SFA14-12-278X96	Large Monopole Sector Frame, 14'6" Face, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	3793	-	2	2	3	-	-	-	6	6	6	12	3	24	12	2	-	-
PV-MPL-SFA14-WP-12-238X96	Large Monopole Sector Frame, 14'6" Face, Work Platform, (12) 2-3/8" x 96" Antenna Pipe	30" - 60"	4066	-	2	2	3	-	-	-	6	6	6	12	-	3	-	12	2	3
PV-MPL-SFA14-WP-12-278X96	Large Monopole Sector Frame, 14'6" Face, Work Platform, (12) 2-7/8" x 96" Antenna Pipe	30" - 60"	4296	-	2	2	3	-	-	-	6	6	6	12	3	24	12	2	3	3



SHEET 2 OF 4	THIRD ANGLE PROJECTION 	CATEGORY 02_Monopole	4
1/2/2018	SCALE 1:32	SERIES 05_Sector Frames	3
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ± 1/4°, BEND ± 2° ALL OTHERS: ± 1/16"		TYPE PV-MPM-SFA_Monopole Sector Frame	2
		BY DJN	1
		CHECKED SJS	0
		STATUS APPROVED	REV
		INITIAL RELEASE	12/27/17
		DESCRIPTION	DATE

**PERFECT VISION**  
MANUFACTURING

L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME

DOCUMENT NUMBER: MPM-SFA-ENG-01-R0

REV: 0



# MOUNT CLASSIFICATIONS

## MOUNT CLASSIFICATION INFORMATION

- MAX STRUCTURE HEIGHT: 400ft
- STRUCTURE CLASS: I OR II
- EXPOSURE CATEGORY: B OR C
- TOPOGRAPHIC CATEGORY: 1
- DESIGN WIND PRESSURE (NO ICE): 135psf
- DESIGN WIND PRESSURE (ICED): 15psf
- DESIGN ICE THICKNESS: 2.57in Radial

## APPROVED MOUNT CLASSIFICATIONS\*

APPROVED MOUNT CLASSIFICATIONS (4 PIPE)						
		REQUIRED LOAD (LBS)				
		700	750	1150	1550	2050
REQUIRED ICE LOAD (LBS)	0	M700R(0)-4[6]	M750R(0)-4[6]	M1150R(0)-4[6]	M1550R(0)-4[6]	M2050R(0)-4[6]
	600	M700R(600)-4[6]	M750R(600)-4[6]	M1150R(600)-4[6]	M1550R(600)-4[6]	M2050R(600)-4[6]
	800	M700R(800)-4[6]	M750R(800)-4[6]	M1150R(800)-4[6]	M1550R(800)-4[6]	M2050R(800)-4[6]
	1100	M700R(1100)-4[6]	M750R(1100)-4[6]	M1150R(1100)-4[6]	M1550R(1100)-4[6]	M2050R(1100)-4[6]
	1350	M700R(1350)-4[6]	M750R(1350)-4[6]	M1150R(1350)-4[6]	M1550R(1350)-4[6]	M2050R(1350)-4[6]

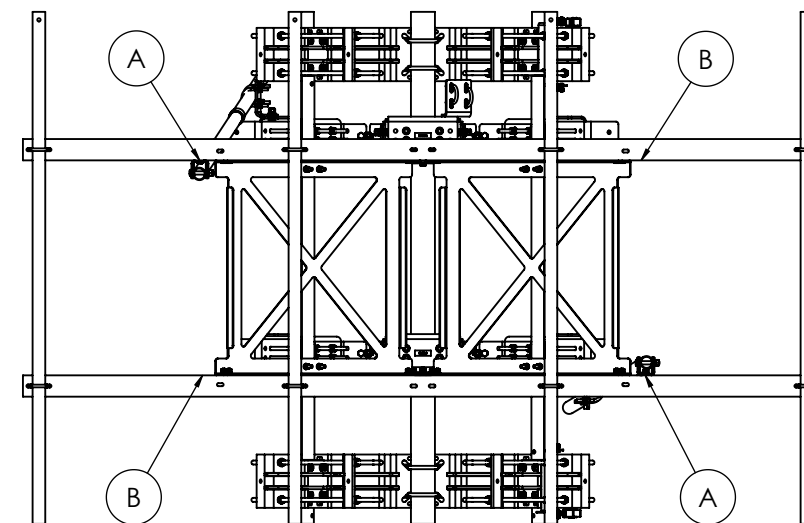
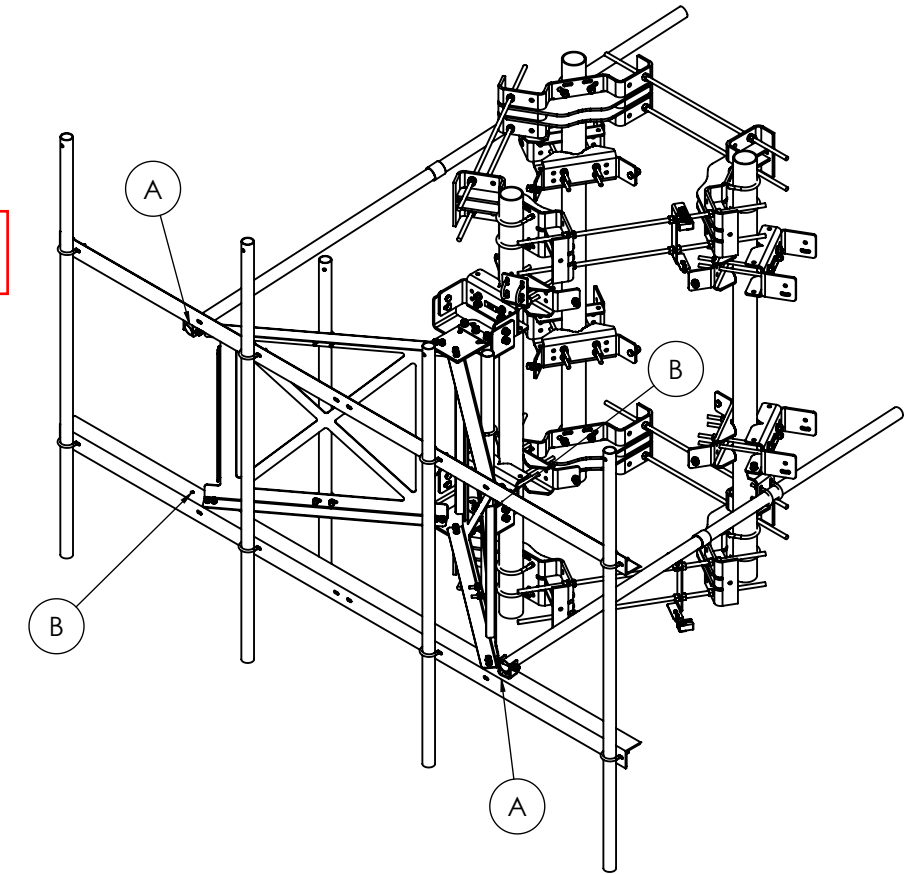
APPROVED MOUNT CLASSIFICATIONS (5 PIPE) (PV-MPM-SFA14-B ONLY)						
		REQUIRED LOAD (LBS)				
		700	750	1150	1550	2050
REQUIRED ICE LOAD (LBS)	0	M700R(0)-5[6]	M750R(0)-5[6]	M1150R(0)-5[6]	M1550R(0)-5[6]	M2050R(0)-5[6]
	600	M700R(600)-5[6]	M750R(600)-5[6]	M1150R(600)-5[6]	M1550R(600)-5[6]	M2050R(600)-5[6]
	800	M700R(800)-5[6]	M750R(800)-5[6]	M1150R(800)-5[6]	M1550R(800)-5[6]	
	1100	M700R(1100)-5[6]	M750R(1100)-5[6]	M1150R(1100)-5[6]		
	1350	M700R(1350)-5[6]	M750R(1350)-5[6]			

NOTES:  
\*UNLESS NOTED, APPLIES TO ALL PV-MPM-SFA MOUNTS

# STIFF ARM INSTALLATION

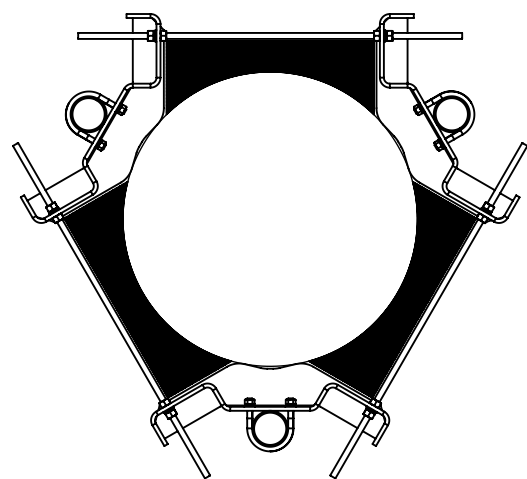
- 2 STIFF ARMS ARE REQUIRED PER SECTOR
- ~~STIFF ARMS MUST BE INSTALLED ON OPPOSITE CORNERS OF FRAME (LOCATIONS A-A OR B-B)~~
- ~~DO NOT INSTALL STIFF ARMS IN AN A-B CONFIGURATION~~

Install both stiff arms to upper face horizontal member in an A-B configuration.

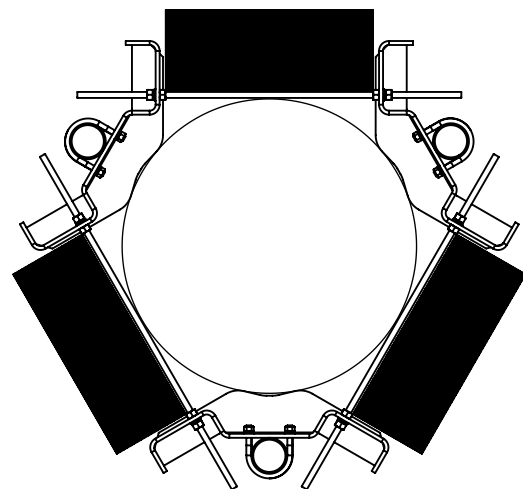


SHEET 3 OF 4	THIRD ANGLE PROJECTION 	CATEGORY 02_Monopole	4		
1/2/2018	SCALE 1:36	SERIES 05_Sector Frames	3		
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ± 1/4°, BEND ± 2° ALL OTHERS: ± 1/16"		TYPE PV-MPM-SFA_Monopole Sector Frame	2		
		BY DJN	1		
		CHECKED SJS	0	INITIAL RELEASE	12/27/17
		STATUS APPROVED	REV	DESCRIPTION	DATE
				 L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME DOCUMENT NUMBER MPM-SFA-ENG-01-R0 REV 0	

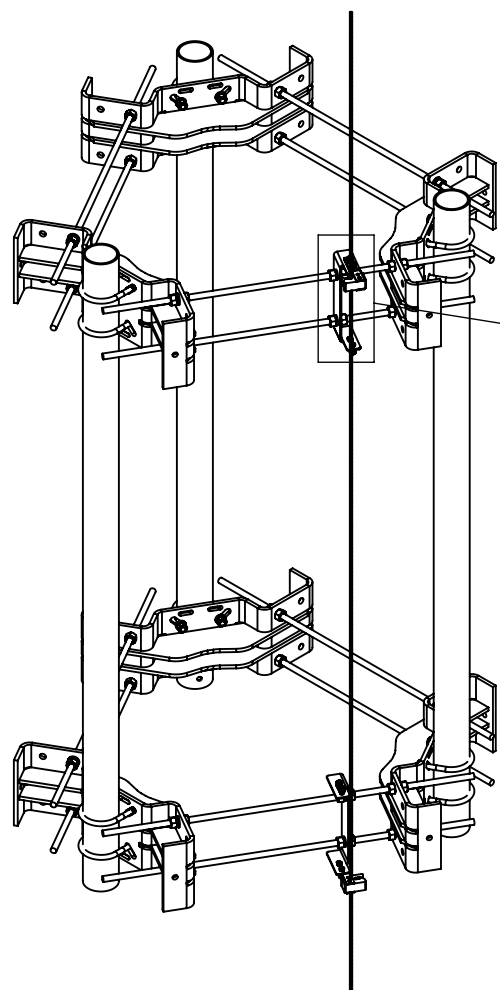
# SAFETY CLIMB ROUTING:



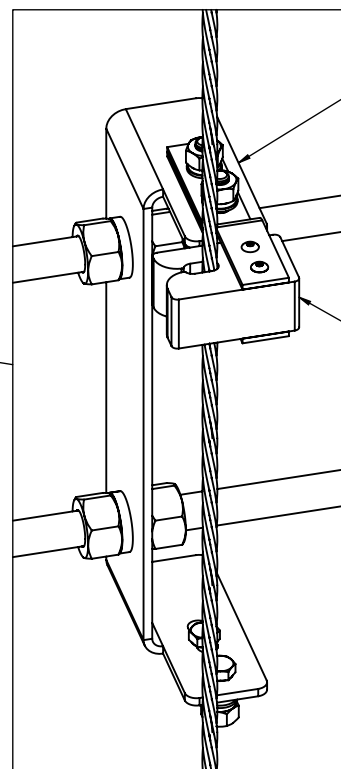
SAFETY CLIMB CABLE  
RECOMMENDED ROUTING  
(ALL THREAD IN EXTERIOR HOLES)



SAFETY CLIMB CABLE  
RECOMMENDED ROUTING  
(ALL THREAD IN INTERIOR HOLES)



SAFETY CLIMB CABLE GUIDE ATTACHMENT



DETAIL  
SCALE 1 : 4

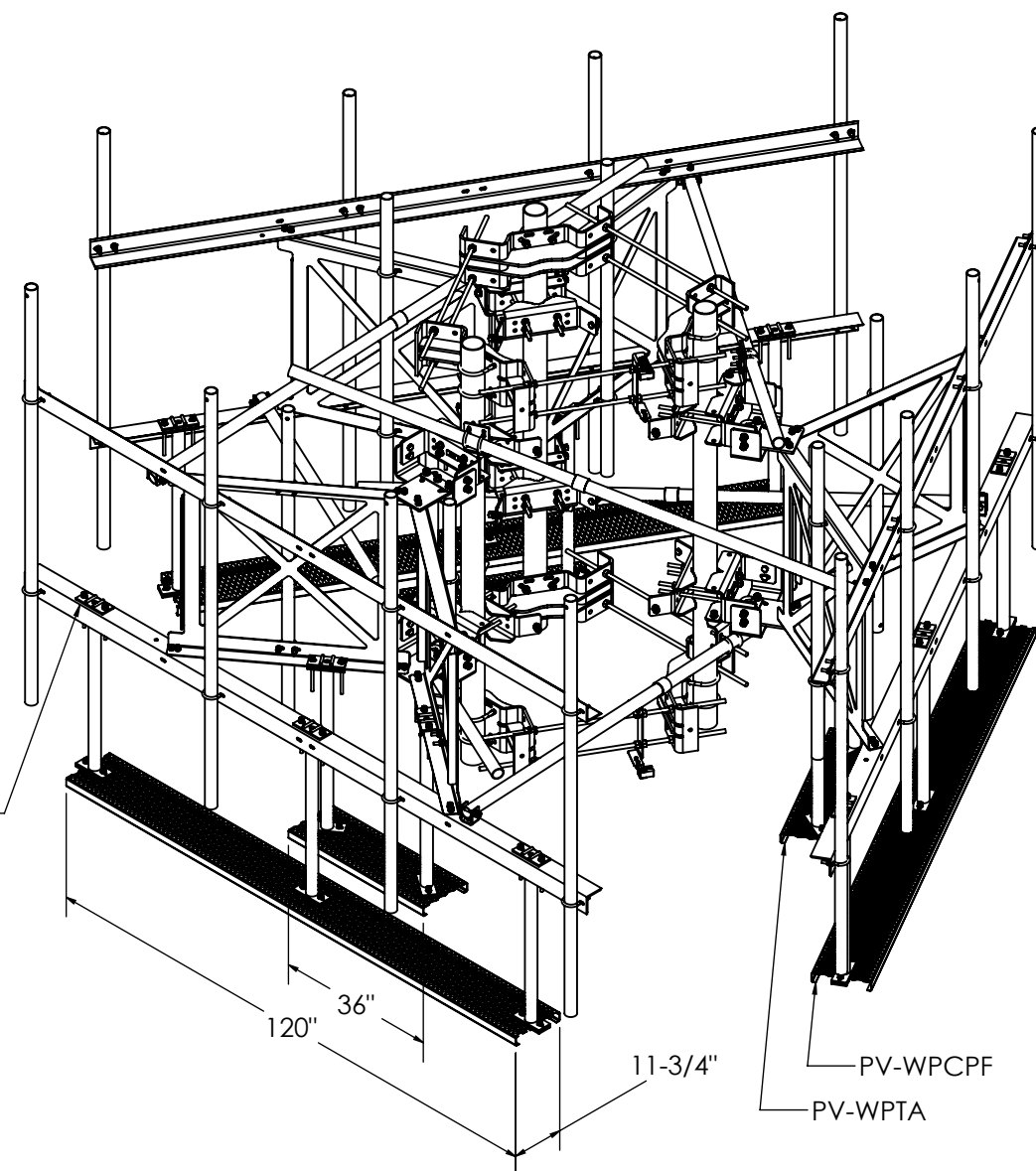
PV-RM-SAFETYCLIP

115-242

# WORK PLATFORM ATTACHMENT:

ADDITIONAL EPA (PER SECTOR):

	(EPA) <sub>N</sub>	(EPA) <sub>T</sub>
NO ICE	7.28	3.41
ICED	7.42	3.53



FIELD DRILL ATTACHMENT HOLES IN FACE ANGLE. APPLY 3 COATS ZINGA TO ALL FIELD CUT AND DRILLED SURFACES. MAINTAIN 1" MIN EDGE DISTANCE FOR ALL HOLES

120"

36"

11-3/4"

PV-WPCPF  
PV-WPTA



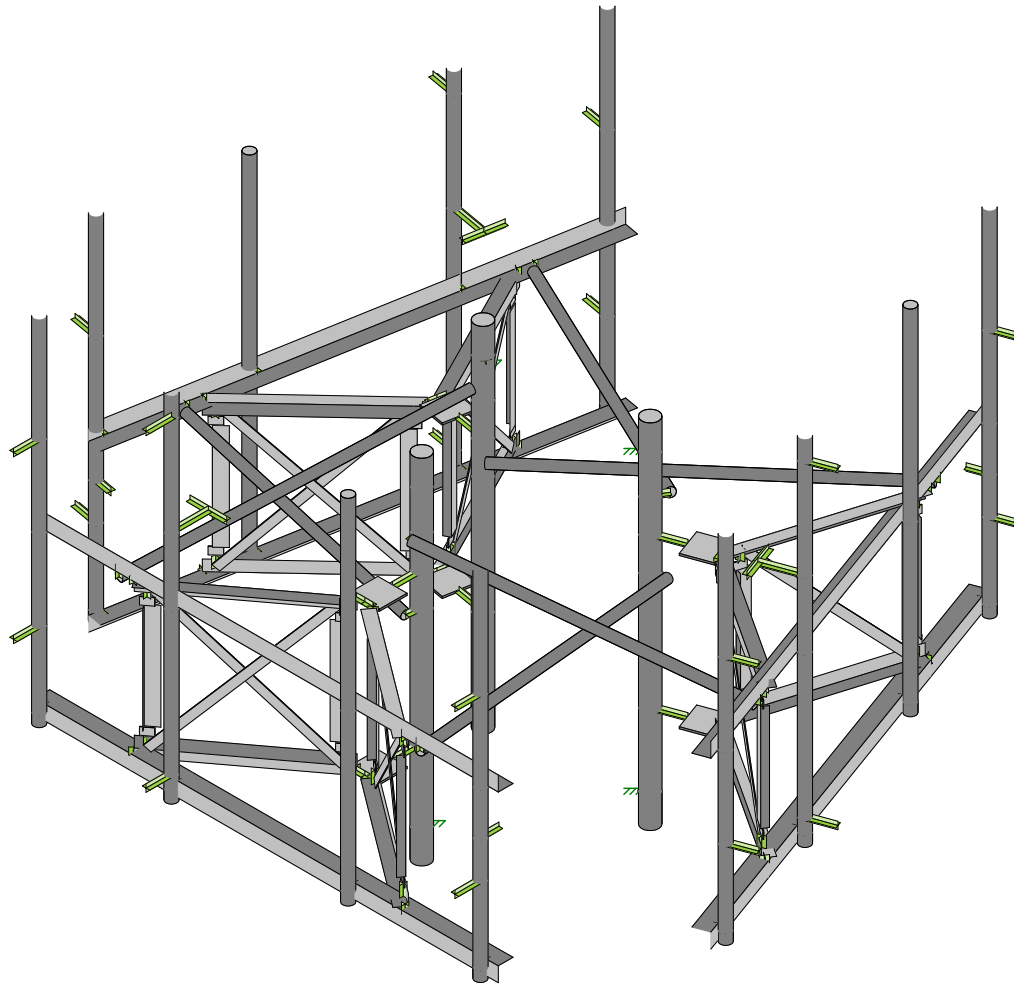
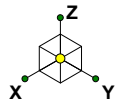
SHEET 4 OF 4	THIRD ANGLE PROJECTION 	CATEGORY 02_Monopole	4		
1/2/2018	SCALE NTS	SERIES 05_Sector Frames	3		
DIMENSIONS ARE IN INCHES TOLERANCES U.N.O. HOLES: +1/16", -1/32" ANGULAR: PROFILE ±1/4°, BEND ±2° ALL OTHERS: ±1/16"		TYPE PV-MPM-SFA_Monopole Sector Frame	2		
		BY DJN	1		
		CHECKED SJS	0	INITIAL RELEASE	12/27/17
		STATUS APPROVED	REV	DESCRIPTION	DATE
				 L.I.F.E. MOUNT™ MONOPOLE SECTOR FRAME DOCUMENT NUMBER MPM-SFA-ENG-01-R0 REV 0	

Wind & Ice Loading			
Nominal Mount Elevation (AGL), $z_{mount}$	109 ft	$K_a$	0.90
Nominal Rad Elevation (AGL), $z_{rad}$	109 ft	$K_d$	0.95
Elevation AMSL (ft)	32 ft	$K_e$	1.00
TIA Standard	H	$K_z$	1.28
Basic Wind Speed, $V_{ult}$ (bare)	120 mph	$K_{zt}$	1.00
Basic Wind Speed, $V$ (ice)	50 mph	$K_s$	1.00
Design Ice Thickness, $t_i$	1 in	$t_{iz}$	1.12 in
Exposure Category	C	$G_h$	1.00
Risk Category	II	$q_z$ (bare)	44.9 psf
Seismic Response Coeff., $C_s$	-	$q_z$ (ice)	7.8 psf

Live Loading	
At Mount Pipes, $L_M$	500 lb
Joint Labels Considered	M1
	M2
	M3
	M4

Section Set Label	Shape Label	$F_A$ (lb/ft)		Ice Wt. (lb/ft)
		Bare	Ice	
Offset Horiz	L3x3x3/16	20.21	1.84	6.69
Face Horiz	L4x4x5	26.94	1.93	8.44
Rear PL	PL 8x.5	53.89	7.20	8.98
Mount Pipe	PIPE 2.5	11.62	3.60	5.50
Offset Diag	PL 2 1/8x3/16	14.31	3.08	3.57
Offset Vert	L3.25x1.75x3/16	21.89	1.86	5.81
Offset Vert PL	PL3x.1875	20.21	3.69	4.33
Universal Pipe	PIPE 4.0	18.19	4.74	7.73
Stiff Arm	PIPE 2.0	9.60	3.24	4.81

Appurtenances																														
Appurtenance Model	Status	Azimuth Offset (°, U)	Rad Elev. Override (ft)	Swap Width & Depth	Area Factor		Qty. per Azimuth			Total Qty. Override	0° Joints		100° Joints		250° Joints		Height (in)	Width (in)	Depth (in)	Weight (Bare) (lb)	Shape	Weight of Ice (lb)	EPA <sub>A</sub> (Bare) (ft²)		EPA <sub>A</sub> (Ice) (ft²)		F <sub>A</sub> (Bare) (lb)		F <sub>A</sub> (Ice) (lb)	
					Front	Side	0°	100°	250°		1	2	1	2	1	2							N	T	N	T	N	T	N	T
AIR 21, 1.3M, B2A/B4P				<input type="checkbox"/>			1	1	1		A1	A2	B1	B2	G1	G2	55	12	7.9	91.5	Flat	99.57	5.92	4.22	7.18	5.41	240.38	171.19	50.60	38.09
KRY 112 144/1				<input type="checkbox"/>	0		1	1	1		A3		B3		G3		7	6	3	11	Flat	7.16	0.00	0.18	0.00	0.41	0.00	7.10	0.00	2.85
APXVAARR24_43-U-NA20				<input type="checkbox"/>			1	1	1		A4	A5	B4	B5	G4	G5	95.9	24	8.7	128	Flat	253.77	20.24	8.89	22.46	10.94	821.32	360.64	158.21	77.07
RADIO 4449 B12/B71				<input checked="" type="checkbox"/>	0.5		1	1	1		A6		B6		G6		15	13.2	10.4	75	Flat	38.78	0.65	1.65	0.91	2.22	26.37	66.95	6.41	15.65
AIR 21, 1.3M, B4A/B2P				<input type="checkbox"/>			1	1	1		A7	A8	B7	B8	G7	G8	55	12	7.9	83	Flat	99.57	5.92	4.22	7.18	5.41	240.38	171.19	50.60	38.09



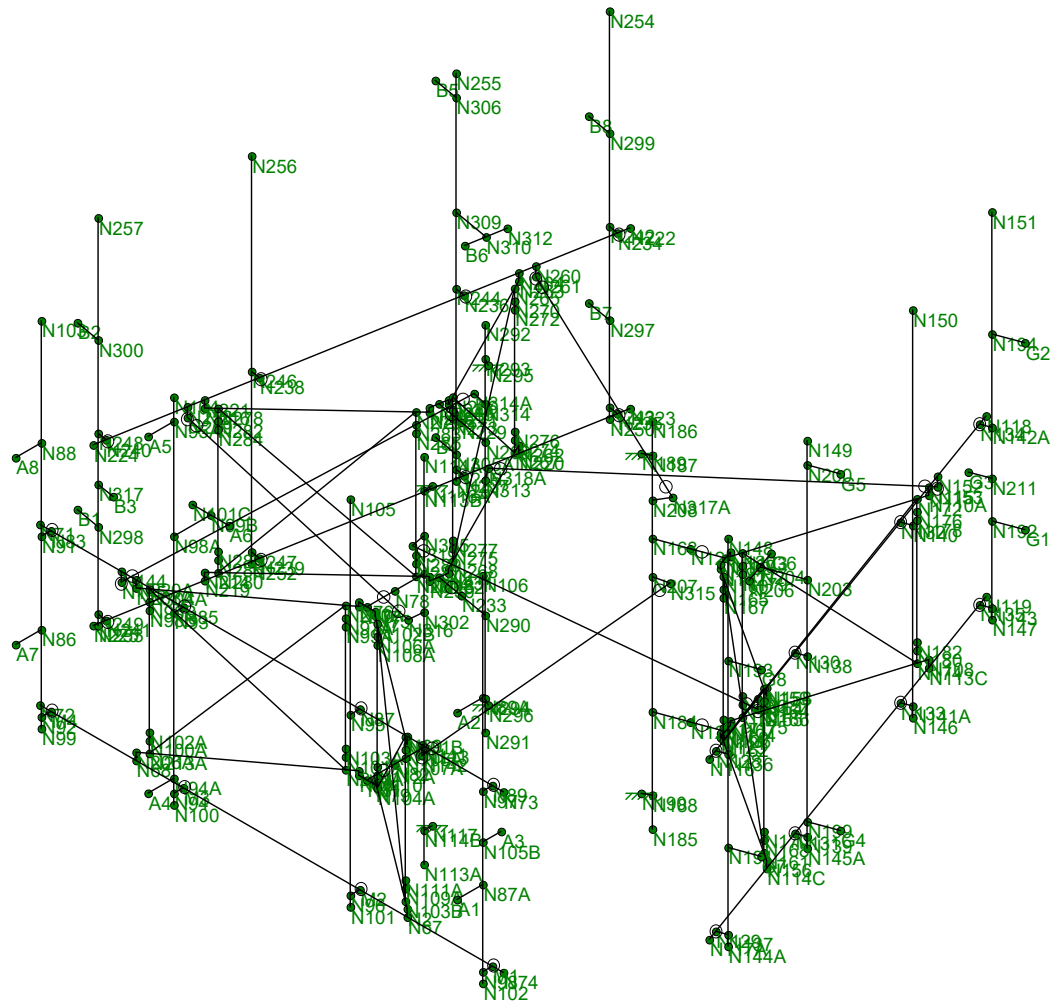
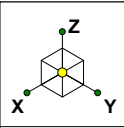
Envelope Only Solution

CLS
JLK
41124-12927192-01-MR

41124-12927192-Northhaven I
Rendered

SK - 1
Apr 12, 2019 at 3:31 PM
41124-12927192-01-MR.r3d





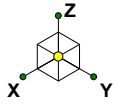
Envelope Only Solution

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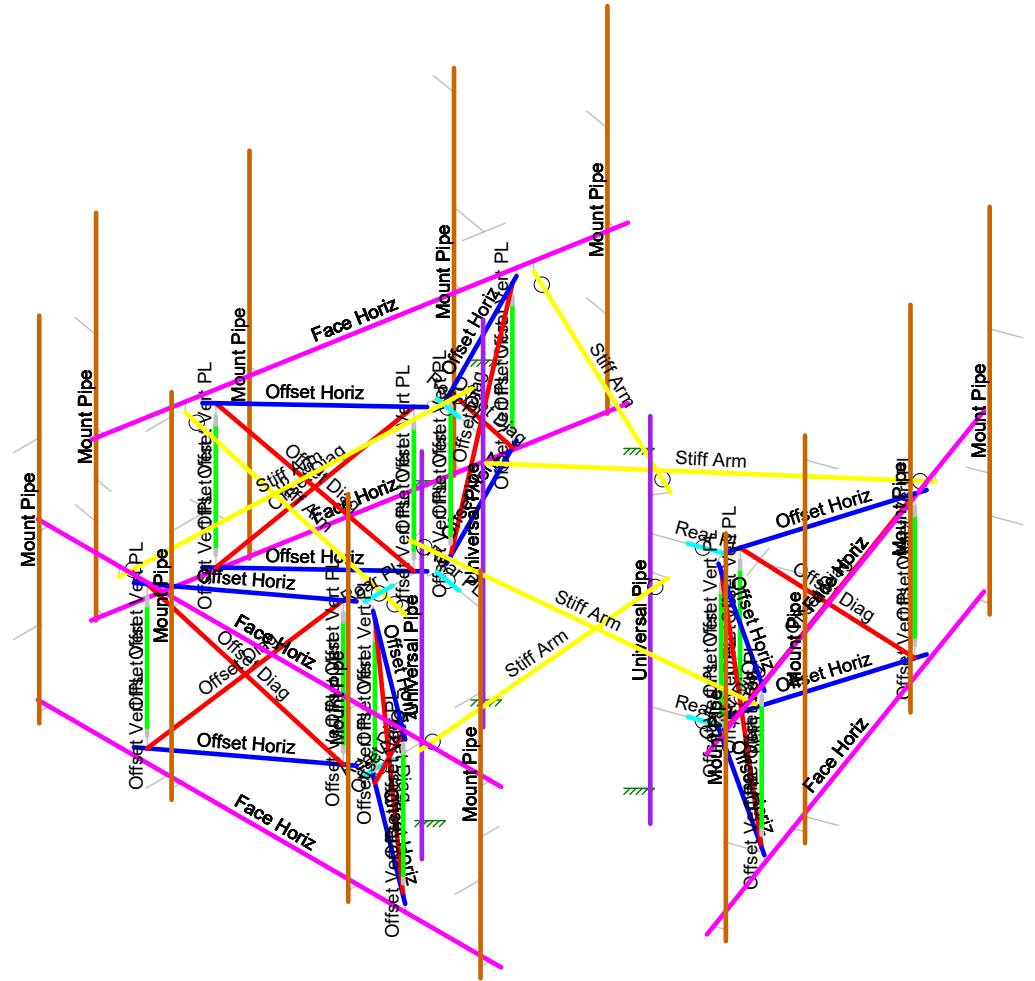
41124-12927192-Northhaven I
Joint Labels

SK - 2
Apr 12, 2019 at 3:32 PM
41124-12927192-01-MR.r3d





- Section Sets
- Offset Horiz
  - Offset Vert
  - Offset Diag
  - Offset Vert PL
  - Face Horiz
  - Rear PL
  - Mount Pipe
  - Stiff Arm
  - Universal Pipe
  - RIGID

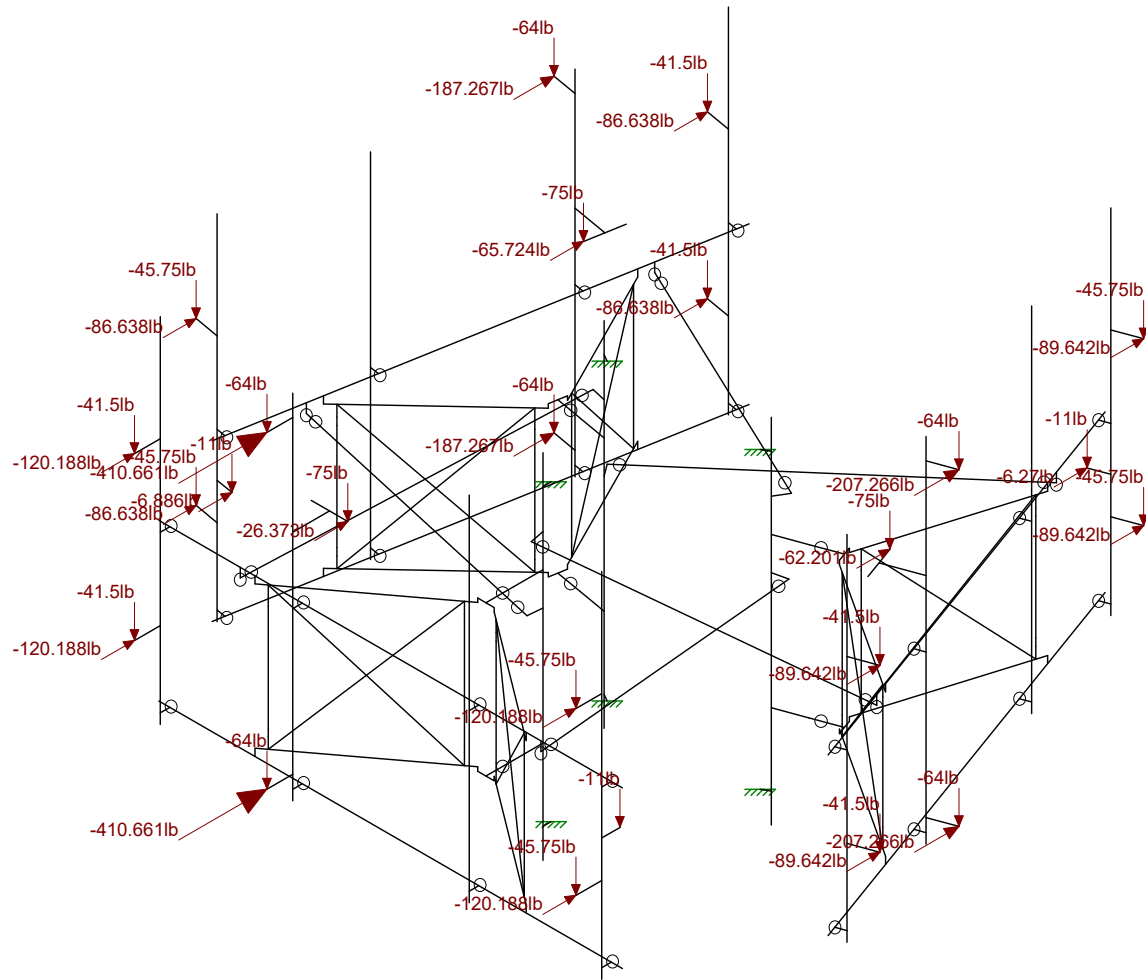
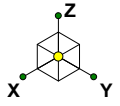


Envelope Only Solution

CLS
JLK
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41124-12927192-Northhaven I
Section Sets

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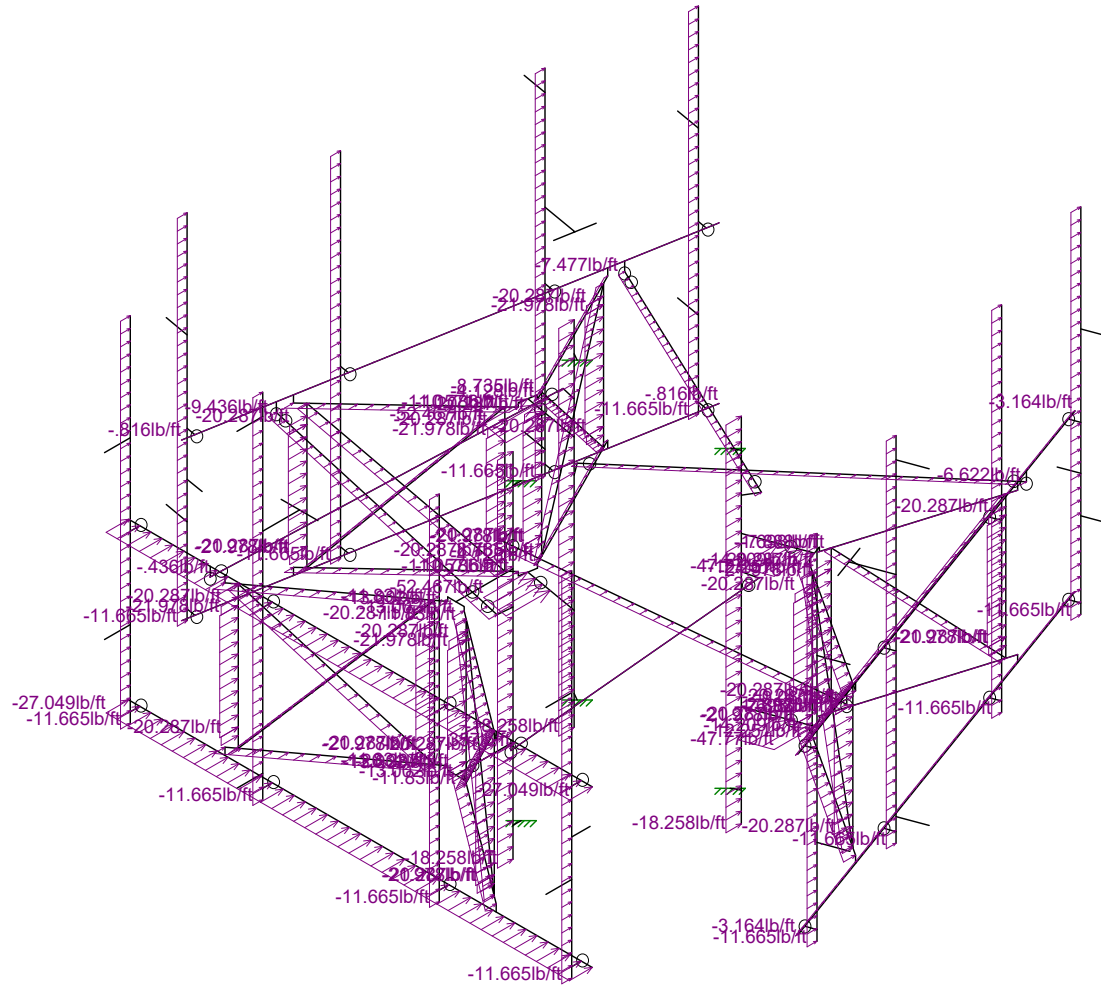
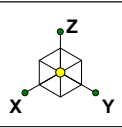


Loads: LC 1, DISPLAY (1.0D + 1.0W\_0°)  
Envelope Only Solution

CLS
JLK
41124-12927192-01-MR

41124-12927192-Northhaven I
Joint Loads - Dead and Normal Wind

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Apr 12, 2019 at 3:33 PM
41124-12927192-01-MR.r3d



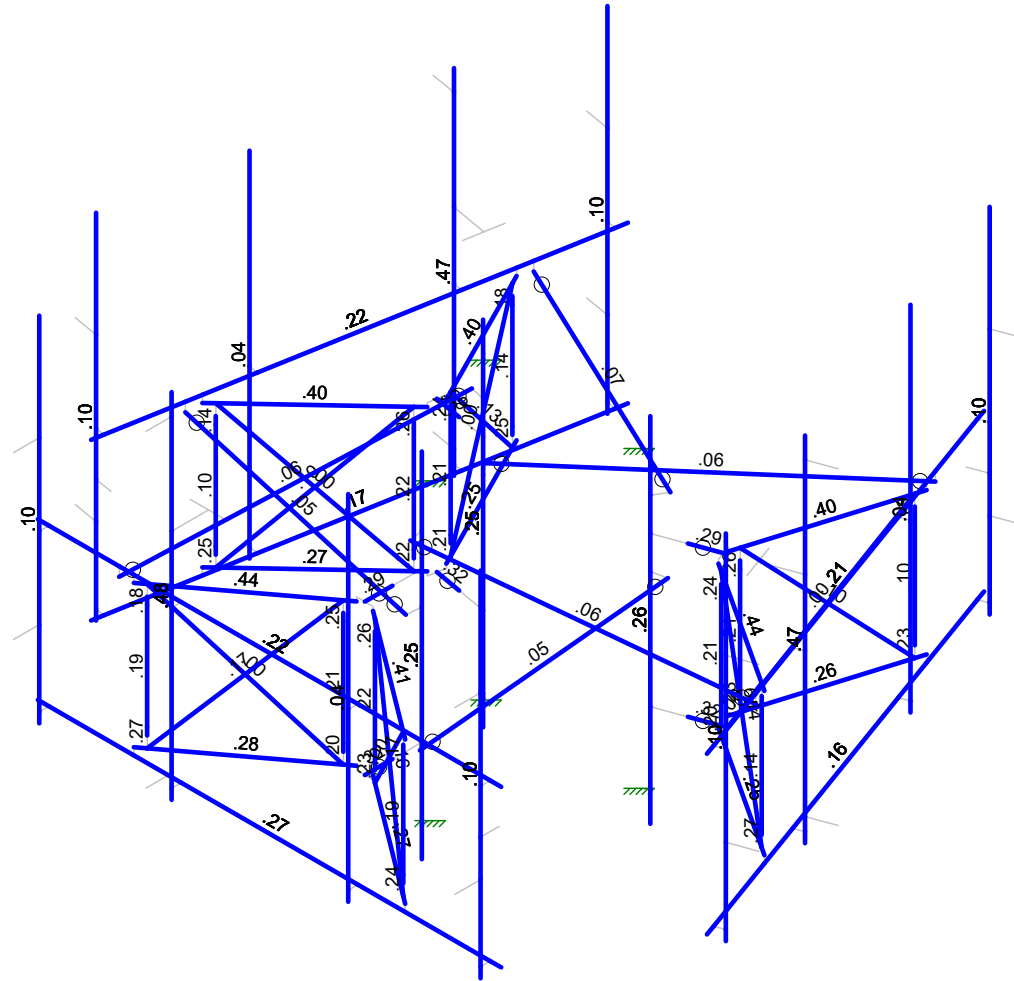
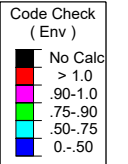
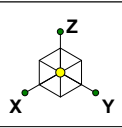
Loads: BLC 4, Structure Wind 0°  
Envelope Only Solution

CLS
JLK
41124-12927192-01-MR

41124-12927192-Northhaven I
Distributed Load - Normal Wind

SK - 6
Apr 12, 2019 at 3:33 PM
41124-12927192-01-MR.r3d



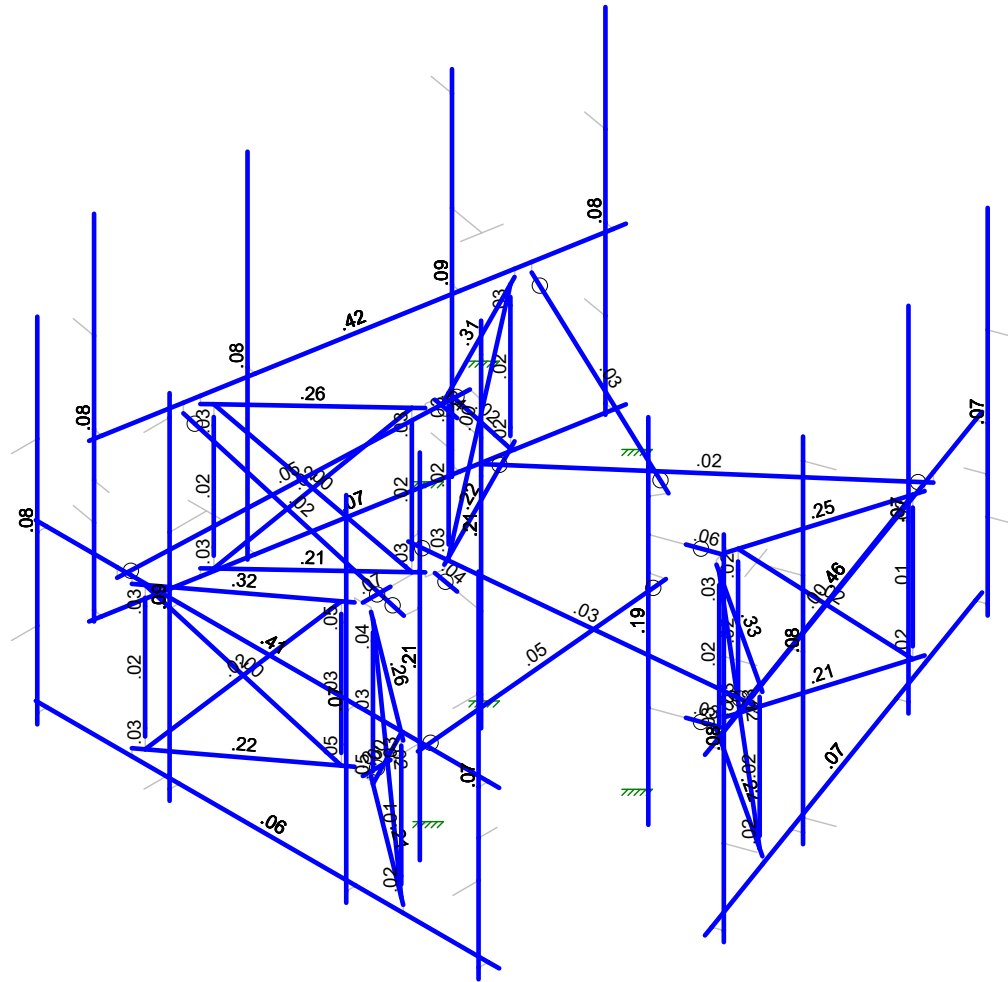
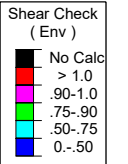
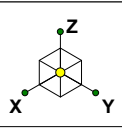


Member Code Checks Displayed (Enveloped)  
Envelope Only Solution

CLS
JLK
41124-12927192-01-MR

41124-12927192-Northhaven I  
Envelope Member Unity Check Results - Bending

SK - 8
Apr 12, 2019 at 3:34 PM
41124-12927192-01-MR.r3d



Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

CLS
JLK
41124-12927192-01-MR

41124-12927192-Northhaven I
Envelope Member Check Results - Shear

SK - 9
Apr 12, 2019 at 3:35 PM
41124-12927192-01-MR.r3d



**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed Area(Me...	Surface(...
1	Dead	DL			-1	24			
2	Ice Dead	RL				24		93	
4	Structure Wind 0°	None						91	
5	Structure Wind 30°	None						186	
6	Structure Wind 45°	None						186	
7	Structure Wind 60°	None						186	
8	Structure Wind 90°	None						91	
9	Structure Wind 120°	None						186	
10	Structure Wind 135°	None						186	
11	Structure Wind 150°	None						186	
12	Structure Wind w/ Ice 0°	None						91	
13	Structure Wind w/ Ice 30°	None						186	
14	Structure Wind w/ Ice 45°	None						186	
15	Structure Wind w/ Ice 60°	None						186	
16	Structure Wind w/ Ice 90°	None						91	
17	Structure Wind w/ Ice 120°	None						186	
18	Structure Wind w/ Ice 135°	None						186	
19	Structure Wind w/ Ice 150°	None						186	
20	Antenna Wind 0°	None				23			
21	Antenna Wind 30°	None				48			
22	Antenna Wind 45°	None				48			
23	Antenna Wind 60°	None				48			
24	Antenna Wind 90°	None				24			
25	Antenna Wind 120°	None				48			
26	Antenna Wind 135°	None				48			
27	Antenna Wind 150°	None				48			
28	Antenna Wind w/ Ice 0°	None				23			
29	Antenna Wind w/ Ice 30°	None				48			
30	Antenna Wind w/ Ice 45°	None				48			
31	Antenna Wind w/ Ice 60°	None				48			
32	Antenna Wind w/ Ice 90°	None				24			
33	Antenna Wind w/ Ice 120°	None				48			
34	Antenna Wind w/ Ice 135°	None				48			
35	Antenna Wind w/ Ice 150°	None				48			
39	Maintenance Live 500 (1)	OL1				1			
40	Maintenance Live 500 (2)	OL2				1			
41	Maintenance Live 500 (3)	OL3				1			
42	Maintenance Live 500 (4)	OL4				1			

**Load Combinations**

	Description	So...	PDelta	SRSS	BLCFactor	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...
1	DISPLAY (1.0D + ...	Yes	Y		DL	1	20	1					
2	1.4D	Yes	Y		DL	1.4							
3	1.2D + 1.0W_0°	Yes	Y		DL	1.2	4	1	20	1			
4	1.2D + 1.0W_30°	Yes	Y		DL	1.2	5	1	21	1			
5	1.2D + 1.0W_45°	Yes	Y		DL	1.2	6	1	22	1			
6	1.2D + 1.0W_60°	Yes	Y		DL	1.2	7	1	23	1			
7	1.2D + 1.0W_90°	Yes	Y		DL	1.2	8	1	24	1			
8	1.2D + 1.0W_120°	Yes	Y		DL	1.2	9	1	25	1			
9	1.2D + 1.0W_135°	Yes	Y		DL	1.2	10	1	26	1			
10	1.2D + 1.0W_150°	Yes	Y		DL	1.2	11	1	27	1			
11	1.2D + 1.0W_180°	Yes	Y		DL	1.2	4	-1	20	-1			
12	1.2D + 1.0W_210°	Yes	Y		DL	1.2	5	-1	21	-1			
13	1.2D + 1.0W_225°	Yes	Y		DL	1.2	6	-1	22	-1			

**Load Combinations (Continued)**

	Description	So...	PDelta	SRSS	BLCFactor	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...
14	1.2D + 1.0W_240°	Yes	Y		DL	1.2	7	-1	23	-1				
15	1.2D + 1.0W_270°	Yes	Y		DL	1.2	8	-1	24	-1				
16	1.2D + 1.0W_300°	Yes	Y		DL	1.2	9	-1	25	-1				
17	1.2D + 1.0W_315°	Yes	Y		DL	1.2	10	-1	26	-1				
18	1.2D + 1.0W_330°	Yes	Y		DL	1.2	11	-1	27	-1				
19	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	12	1	28	1	RL	1		
20	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	13	1	29	1	RL	1		
21	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	14	1	30	1	RL	1		
22	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	15	1	31	1	RL	1		
23	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	16	1	32	1	RL	1		
24	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	17	1	33	1	RL	1		
25	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	18	1	34	1	RL	1		
26	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	19	1	35	1	RL	1		
27	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	12	-1	28	-1	RL	1		
28	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	13	-1	29	-1	RL	1		
29	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	14	-1	30	-1	RL	1		
30	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	15	-1	31	-1	RL	1		
31	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	16	-1	32	-1	RL	1		
32	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	17	-1	33	-1	RL	1		
33	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	18	-1	34	-1	RL	1		
34	1.2D + 1.0Di + 1...	Yes	Y		DL	1.2	19	-1	35	-1	RL	1		
35	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	4	.066	20	.066	OL1	1.5		
36	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	5	.066	21	.066	OL1	1.5		
37	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	6	.066	22	.066	OL1	1.5		
38	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	7	.066	23	.066	OL1	1.5		
39	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	8	.066	24	.066	OL1	1.5		
40	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	9	.066	25	.066	OL1	1.5		
41	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	10	.066	26	.066	OL1	1.5		
42	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	11	.066	27	.066	OL1	1.5		
43	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	4	-.066	20	-.066	OL1	1.5		
44	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	5	-.066	21	-.066	OL1	1.5		
45	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	6	-.066	22	-.066	OL1	1.5		
46	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	7	-.066	23	-.066	OL1	1.5		
47	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	8	-.066	24	-.066	OL1	1.5		
48	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	9	-.066	25	-.066	OL1	1.5		
49	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	10	-.066	26	-.066	OL1	1.5		
50	1.2D + 1.5Lm_1 ...	Yes	Y		DL	1.2	11	-.066	27	-.066	OL1	1.5		
51	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	4	.066	20	.066	OL2	1.5		
52	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	5	.066	21	.066	OL2	1.5		
53	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	6	.066	22	.066	OL2	1.5		
54	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	7	.066	23	.066	OL2	1.5		
55	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	8	.066	24	.066	OL2	1.5		
56	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	9	.066	25	.066	OL2	1.5		
57	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	10	.066	26	.066	OL2	1.5		
58	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	11	.066	27	.066	OL2	1.5		
59	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	4	-.066	20	-.066	OL2	1.5		
60	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	5	-.066	21	-.066	OL2	1.5		
61	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	6	-.066	22	-.066	OL2	1.5		
62	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	7	-.066	23	-.066	OL2	1.5		
63	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	8	-.066	24	-.066	OL2	1.5		
64	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	9	-.066	25	-.066	OL2	1.5		
65	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	10	-.066	26	-.066	OL2	1.5		
66	1.2D + 1.5Lm_2 ...	Yes	Y		DL	1.2	11	-.066	27	-.066	OL2	1.5		
67	1.2D + 1.5Lm_3 ...	Yes	Y		DL	1.2	4	.066	20	.066	OL3	1.5		
68	1.2D + 1.5Lm_3 ...	Yes	Y		DL	1.2	5	.066	21	.066	OL3	1.5		
69	1.2D + 1.5Lm_3 ...	Yes	Y		DL	1.2	6	.066	22	.066	OL3	1.5		
70	1.2D + 1.5Lm_3 ...	Yes	Y		DL	1.2	7	.066	23	.066	OL3	1.5		

**Load Combinations (Continued)**

	Description	So...	PDelta	SRSS	BLCFactor	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...	BLCFa...
71	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	8 .066	24 .066	OL3	1.5					
72	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	9 .066	25 .066	OL3	1.5					
73	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	10 .066	26 .066	OL3	1.5					
74	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	11 .066	27 .066	OL3	1.5					
75	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	4 -.066	20 -.066	OL3	1.5					
76	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	5 -.066	21 -.066	OL3	1.5					
77	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	6 -.066	22 -.066	OL3	1.5					
78	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	7 -.066	23 -.066	OL3	1.5					
79	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	8 -.066	24 -.066	OL3	1.5					
80	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	9 -.066	25 -.066	OL3	1.5					
81	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	10 -.066	26 -.066	OL3	1.5					
82	1.2D + 1.5Lm_3 ...	Yes	Y		DL 1.2	11 -.066	27 -.066	OL3	1.5					
83	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	4 .066	20 .066	OL4	1.5					
84	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	5 .066	21 .066	OL4	1.5					
85	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	6 .066	22 .066	OL4	1.5					
86	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	7 .066	23 .066	OL4	1.5					
87	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	8 .066	24 .066	OL4	1.5					
88	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	9 .066	25 .066	OL4	1.5					
89	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	10 .066	26 .066	OL4	1.5					
90	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	11 .066	27 .066	OL4	1.5					
91	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	4 -.066	20 -.066	OL4	1.5					
92	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	5 -.066	21 -.066	OL4	1.5					
93	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	6 -.066	22 -.066	OL4	1.5					
94	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	7 -.066	23 -.066	OL4	1.5					
95	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	8 -.066	24 -.066	OL4	1.5					
96	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	9 -.066	25 -.066	OL4	1.5					
97	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	10 -.066	26 -.066	OL4	1.5					
98	1.2D + 1.5Lm_4 ...	Yes	Y		DL 1.2	11 -.066	27 -.066	OL4	1.5					

**Hot Rolled Steel Properties**

	Label	E [ksi]	G [ksi]	Nu	Therm (\1...	Density[lb/...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	490	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	490	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	490	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	490	50	1.4	65	1.3

**Hot Rolled Steel Section Sets**

	Label	Shape	Type	Design List	Material	Design R...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Offset Horiz	L3x3x3/16	Beam	None	A36 Gr.36	Typical	1.09	.962	.962	.012
2	Offset Vert	L3.25x1.75x3/16	Beam	None	A36 Gr.36	Typical	.902	.213	1.001	.01
3	Offset Diaq	PL 2 1/8x3/16	Beam	None	A36 Gr.36	Typical	.398	.001	.15	.004
4	Offset Vert PL	PL3x.1875	Beam	None	A36 Gr.36	Typical	.563	.002	.422	.006
5	Face Horiz	L4X4X5	Beam	None	A36 Gr.36	Typical	2.4	3.67	3.67	.083
6	Rear PL	PL 8x.5	Beam	None	A36 Gr.36	Typical	4	.083	21.333	.32
7	Mount Pipe	PIPE 2.5	Beam	None	A53 Gr.B	Typical	1.61	1.45	1.45	2.89
8	Stiff Arm	PIPE 2.0	Beam	None	A53 Gr.B	Typical	1.02	.627	.627	1.25
9	Universal Pipe	PIPE 4.0	Beam	None	A53 Gr.B	Typical	2.96	6.82	6.82	13.6

**Hot Rolled Steel Design Parameters**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
1	M1	Offset Horiz	43.25			Lbyy						Lateral
2	M4	Offset Horiz	43.25			Lbyy						Lateral
3	M61	Face Horiz	126	74	48	Lbyy						Lateral
4	M62	Face Horiz	126	74	48	Lbyy						Lateral
5	M67	Rear PL	7.5			Lbyy						Lateral
6	M72	Rear PL	7.5			Lbyy						Lateral
7	M81	Mount Pipe	96			Lbyy						Lateral
8	M82	Mount Pipe	96			Lbyy						Lateral
9	M83	Mount Pipe	96			Lbyy						Lateral
10	M84	Mount Pipe	96			Lbyy						Lateral
11	M125B	Offset Horiz	43.25			Lbyy						Lateral
12	M126B	Offset Horiz	43.25			Lbyy						Lateral
13	M196	Offset Diag	54.296			Lbyy			.65	.65		Lateral
14	M197	Offset Diag	54.296			Lbyy			.65	.65		Lateral
15	M183A	Offset Vert	28.688			Lbyy			.65	.65		Lateral
16	M184A	Offset Vert	28.688			Lbyy			.65	.65		Lateral
17	M67A	Offset Vert ...	2			Lbyy						Lateral
18	M68A	Offset Vert ...	2			Lbyy						Lateral
19	M71A	Offset Vert ...	2			Lbyy						Lateral
20	M72A	Offset Vert ...	2			Lbyy						Lateral
21	M69B	Offset Diag	54.296			Lbyy			.65	.65		Lateral
22	M70B	Offset Diag	54.296			Lbyy			.65	.65		Lateral
23	M71B	Offset Vert	28.688			Lbyy			.65	.65		Lateral
24	M72B	Offset Vert	28.688			Lbyy			.65	.65		Lateral
25	M75A	Offset Vert ...	2			Lbyy						Lateral
26	M76A	Offset Vert ...	2			Lbyy						Lateral
27	M79A	Offset Vert ...	2			Lbyy						Lateral
28	M80A	Offset Vert ...	2			Lbyy						Lateral
29	M83A	Universal Pi...	96			Lbyy						Lateral
30	M76B	Offset Horiz	43.25			Lbyy						Lateral
31	M77B	Offset Horiz	43.25			Lbyy						Lateral
32	M80B	Face Horiz	126	74	48	Lbyy						Lateral
33	M81B	Face Horiz	126	74	48	Lbyy						Lateral
34	M86	Rear PL	7.5			Lbyy						Lateral
35	M91	Rear PL	7.5			Lbyy						Lateral
36	M100	Mount Pipe	96			Lbyy						Lateral
37	M101	Mount Pipe	96			Lbyy						Lateral
38	M102	Mount Pipe	96			Lbyy						Lateral
39	M103	Mount Pipe	96			Lbyy						Lateral
40	M106	Offset Horiz	43.25			Lbyy						Lateral
41	M107A	Offset Horiz	43.25			Lbyy						Lateral
42	M110	Offset Diag	54.296			Lbyy			.65	.65		Lateral
43	M111	Offset Diag	54.296			Lbyy			.65	.65		Lateral
44	M112	Offset Vert	28.688			Lbyy			.65	.65		Lateral
45	M113	Offset Vert	28.688			Lbyy			.65	.65		Lateral
46	M116	Offset Vert ...	2			Lbyy						Lateral
47	M117	Offset Vert ...	2			Lbyy						Lateral
48	M120	Offset Vert ...	2			Lbyy						Lateral
49	M121	Offset Vert ...	2			Lbyy						Lateral
50	M122	Offset Diag	54.296			Lbyy			.65	.65		Lateral
51	M123	Offset Diag	54.296			Lbyy			.65	.65		Lateral
52	M124	Offset Vert	28.688			Lbyy			.65	.65		Lateral
53	M125	Offset Vert	28.688			Lbyy			.65	.65		Lateral
54	M128	Offset Vert ...	2			Lbyy						Lateral
55	M129	Offset Vert ...	2			Lbyy						Lateral
56	M132	Offset Vert ...	2			Lbyy						Lateral

**Hot Rolled Steel Design Parameters (Continued)**

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torq...	Kyy	Kzz	Cb	Function
57	M133	Offset Vert ...	2			Lbyy						Lateral
58	M136	Universal Pi...	96			Lbyy						Lateral
59	M151	Offset Horiz	43.25			Lbyy						Lateral
60	M152	Offset Horiz	43.25			Lbyy						Lateral
61	M155	Face Horiz	126	74	48	Lbyy						Lateral
62	M156	Face Horiz	126	74	48	Lbyy						Lateral
63	M161	Rear PL	7.5			Lbyy						Lateral
64	M166	Rear PL	7.5			Lbyy						Lateral
65	M175	Mount Pipe	96			Lbyy						Lateral
66	M176	Mount Pipe	96			Lbyy						Lateral
67	M177	Mount Pipe	96			Lbyy						Lateral
68	M178	Mount Pipe	96			Lbyy						Lateral
69	M181	Offset Horiz	43.25			Lbyy						Lateral
70	M182	Offset Horiz	43.25			Lbyy						Lateral
71	M185	Offset Diag	54.296			Lbyy			.65	.65		Lateral
72	M186	Offset Diag	54.296			Lbyy			.65	.65		Lateral
73	M187	Offset Vert	28.688			Lbyy			.65	.65		Lateral
74	M188	Offset Vert	28.688			Lbyy			.65	.65		Lateral
75	M191	Offset Vert ...	2			Lbyy						Lateral
76	M192	Offset Vert ...	2			Lbyy						Lateral
77	M195	Offset Vert ...	2			Lbyy						Lateral
78	M196A	Offset Vert ...	2			Lbyy						Lateral
79	M197A	Offset Diag	54.296			Lbyy			.65	.65		Lateral
80	M198	Offset Diag	54.296			Lbyy			.65	.65		Lateral
81	M199	Offset Vert	28.688			Lbyy			.65	.65		Lateral
82	M200	Offset Vert	28.688			Lbyy			.65	.65		Lateral
83	M203	Offset Vert ...	2			Lbyy						Lateral
84	M204	Offset Vert ...	2			Lbyy						Lateral
85	M207	Offset Vert ...	2			Lbyy						Lateral
86	M208	Offset Vert ...	2			Lbyy						Lateral
87	M211	Universal Pi...	96			Lbyy						Lateral
88	M221A	Stiff Arm	83.58			Lbyy						Lateral
89	M223	Stiff Arm	83.226			Lbyy						Lateral
90	M225A	Stiff Arm	71.393			Lbyy						Lateral
91	M226	Stiff Arm	92.984			Lbyy						Lateral
92	M229	Stiff Arm	88.268			Lbyy						Lateral
93	M230	Stiff Arm	77.964			Lbyy						Lateral

**Envelope Joint Reactions**

Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC	
1	N116A	max	1612.252	3	1869.188	13	1237.157	30	2116.785	17	2421.721	11	1369.992	13
2		min	-2773.058	11	-1780.151	5	441.931	5	-1966.456	9	-1883.686	3	-1306.575	5
3	N117	max	1685.261	19	757.466	49	1237.312	34	1144.322	9	1469.856	3	554.966	17
4		min	-107.017	11	-801.795	89	347.396	10	-1104.586	17	-512.383	11	-613.369	9
5	N189	max	1962.42	4	2049.237	15	1267.383	25	2047.454	15	2238.76	12	1079.309	11
6		min	-1684.159	12	-3070.671	7	346.407	16	-2559.49	7	-2206.397	4	-987.776	3
7	N190	max	533.788	4	1608.734	30	1244.118	29	397.09	7	983.109	4	424.719	12
8		min	-986.857	12	7.946	7	337.814	5	-1330.288	15	-1254.905	12	-526.654	4
9	N295	max	2489.173	18	2553.517	15	1230.934	20	2394.048	15	2034.391	10	1310.009	18
10		min	-2289.341	10	-1486.722	7	431.812	8	-1948.486	7	-2100.005	18	-1357.468	10
11	N296	max	309.904	18	215.211	15	1254.637	23	1625.96	7	606.24	18	465.165	6
12		min	-679.904	10	-1714.594	7	312.57	15	-624.181	15	-787.451	10	-437.864	14
13	Totals:	max	7222.516	3	7998.339	15	7213.423	27						
14		min	-7222.507	11	-7998.339	7	2972.31	1						



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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt	phi*Mn	phi*Mn	Cb	Eqn	
1	M83	PIPE 2.5	.481	45.474	3	.091	44.463		12	30038....	50715	3596.25	3596.25	1..	H1-1b
2	M102	PIPE 2.5	.472	45.474	14	.084	44.463		8	30038....	50715	3596.25	3596.25	1..	H1-1b
3	M177	PIPE 2.5	.472	45.474	7	.092	44.463		17	30038....	50715	3596.25	3596.25	1..	H1-1b
4	M107A	L3x3x3/16	.440	0	9	.326	40.974	y	13	25007....	35310....	1354.1...	2854.6...	2..	H2-1
5	M126B	L3x3x3/16	.437	0	14	.324	40.974	y	18	25007....	35310....	1354.1...	2854.6...	2..	H2-1
6	M4	L3x3x3/16	.411	0	17	.260	40.974	z	4	25007....	35310....	1354.1...	2914.2...	1..	H2-1
7	M152	L3x3x3/16	.402	0	5	.264	40.974	z	9	25007....	35310....	1354.1...	2887.9...	1..	H2-1
8	M182	L3x3x3/16	.397	0	18	.308	40.974	y	6	25007....	35310....	1354.1...	2854.6...	2..	H2-1
9	M77B	L3x3x3/16	.396	0	12	.247	40.974	z	15	25007....	35310....	1354.1...	2924.2...	2..	H2-1
10	M166	PL 8x.5	.324	7.5	23	.035	7.5	y	10	112219..	129600	1350	21600	1..	H1-1b
11	M91	PL 8x.5	.317	7.5	30	.031	7.5	y	4	112219..	129600	1350	21600	1..	H1-1b
12	M72	PL 8x.5	.316	7.5	19	.062	7.5	y	89	112219..	129600	1350	21600	1..	H1-1b
13	M67	PL 8x.5	.295	7.5	28	.069	7.5	y	97	112219..	129600	1350	21600	1..	H1-1b
14	M86	PL 8x.5	.294	7.5	23	.061	7.5	y	12	112219..	129600	1350	21600	1..	H1-1b
15	M161	PL 8x.5	.291	7.5	32	.042	7.5	y	9	112219..	129600	1350	21600	1..	H1-1b
16	M125B	L3x3x3/16	.278	0	84	.222	0	z	9	25007....	35310....	1354.1...	2906.8...	1..	H2-1
17	M1	L3x3x3/16	.271	2.276	17	.212	0	y	13	25007....	35310....	1354.1...	2854.6...	2..	H2-1
18	M151	L3x3x3/16	.270	2.276	6	.211	0	y	18	25007....	35310....	1354.1...	2854.6...	2..	H2-1
19	M62	L4X4X5	.267	100.8	43	.064	26.526	y	11	48416....	77760	3776.8...	6364.0...	1..	H2-1
20	M120	PL3x.1875	.266	0	5	.024	0	y	8	16927....	18225	71.191	1139.0...	1..	H1-1b
21	M71A	PL3x.1875	.265	0	10	.025	0	y	12	16927....	18225	71.191	1139.0...	1..	H1-1b
22	M76B	L3x3x3/16	.264	2.276	12	.213	0	y	8	25007....	35310....	1354.1...	2854.6...	2..	H2-1
23	M76A	PL3x.1875	.261	2	14	.045	2	y	83	16927....	18225	71.191	1139.0...	1..	H1-1b
24	M129	PL3x.1875	.260	2	8	.022	0	y	7	16927....	18225	71.191	1139.0...	1..	H1-1b
25	M204	PL3x.1875	.260	2	18	.026	0	y	17	16927....	18225	71.191	1139.0...	1..	H1-1b
26	M136	PIPE 4.0	.258	87.916	7	.191	76.8		12	75978....	93240	10631....	10631....	3..	H1-1b
27	M181	L3x3x3/16	.255	2.276	26	.223	40.974	z	15	25007....	35310....	1354.1...	2854.6...	2..	H2-1
28	M83A	PIPE 4.0	.255	87.916	12	.213	87.916		13	75978....	93240	10631....	10631....	3..	H1-1b
29	M211	PIPE 4.0	.255	87.916	17	.212	87.916		18	75978....	93240	10631....	10631....	3..	H1-1b
30	M207	PL3x.1875	.254	0	17	.025	0	y	17	16927....	18225	71.191	1139.0...	1..	H1-1b
31	M195	PL3x.1875	.253	0	14	.024	0	y	17	16927....	18225	71.191	1139.0...	1..	H1-1b
32	M68A	PL3x.1875	.251	2	8	.046	0	y	44	16927....	18225	71.191	1139.0...	1..	H1-1b
33	M106	L3x3x3/16	.248	2.276	32	.219	0	z	4	25007....	35310....	1354.1...	2854.6...	2..	H2-1
34	M117	PL3x.1875	.245	2	4	.026	2	y	15	16927....	18225	71.191	1139.0...	1..	H1-1b
35	M192	PL3x.1875	.244	2	13	.027	2	y	8	16927....	18225	71.191	1139.0...	1..	H1-1b
36	M79A	PL3x.1875	.243	0	12	.025	2	y	13	16927....	18225	71.191	1139.0...	1..	H1-1b
37	M132	PL3x.1875	.229	0	8	.024	2	y	8	16927....	18225	71.191	1139.0...	1..	H1-1b
38	M133	PL3x.1875	.225	0	8	.025	2	y	11	16927....	18225	71.191	1139.0...	1..	H1-1b
39	M80A	PL3x.1875	.225	0	14	.045	2	y	96	16927....	18225	71.191	1139.0...	1..	H1-1b
40	M200	L3.25x1.75x3/16	.225	0	5	.015	28.688	y	6	22948....	29235....	473.675	1869.8...	2..	H2-1
41	M155	L4X4X5	.223	26.526	15	.422	25.2	z	5	48416....	77760	3776.8...	6364.0...	1..	H2-1
42	M208	PL3x.1875	.223	0	18	.026	2	y	6	16927....	18225	71.191	1139.0...	1..	H1-1b
43	M72B	L3.25x1.75x3/16	.220	0	17	.025	28.688	y	96	22948....	29235....	473.675	1883.2...	2..	H2-1
44	M61	L4X4X5	.218	100.8	84	.414	103.4...	z	9	48416....	77760	3776.8...	8057.6...	1..	H2-1
45	M125	L3.25x1.75x3/16	.212	0	12	.015	28.688	y	11	22948....	29235....	473.675	1883.2...	2..	H2-1
46	M188	L3.25x1.75x3/16	.207	28.688	26	.019	0	y	9	22948....	29235....	473.675	1883.2...	2..	H2-1
47	M184A	L3.25x1.75x3/16	.207	28.688	22	.026	0	y	39	22948....	29235....	473.675	1883.2...	2..	H2-1
48	M80B	L4X4X5	.206	26.526	6	.457	103.4...	z	4	48416....	77760	3776.8...	6364.0...	1..	H2-1
49	M196A	PL3x.1875	.206	0	13	.034	2	y	9	16927....	18225	71.191	1139.0...	1..	H1-1b
50	M113	L3.25x1.75x3/16	.206	28.688	32	.019	0	y	15	22948....	29235....	473.675	1883.2...	2..	H2-1
51	M72A	PL3x.1875	.204	0	8	.046	2	y	39	16927....	18225	71.191	1139.0...	1..	H1-1b
52	M121	PL3x.1875	.200	0	3	.033	2	y	15	16927....	18225	71.191	1139.0...	1..	H1-1b
53	M116	PL3x.1875	.190	2	7	.032	0	y	8	16927....	18225	71.191	1139.0...	1..	H1-1b
54	M183A	L3.25x1.75x3/16	.189	28.688	92	.018	0	y	13	22948....	29235....	473.675	1883.2...	2..	H2-1
55	M71B	L3.25x1.75x3/16	.186	0	43	.014	28.688	y	9	22948....	29235....	473.675	1883.2...	2..	H2-1
56	M191	PL3x.1875	.184	2	16	.032	0	y	17	16927....	18225	71.191	1139.0...	1..	H1-1b

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

Member	Shape	Code	Loc[in]	LC	Shear	Loc[in]	Dir	LC	phi*Pnc	phi*Pnt	phi*Mn	phi*Mn	Cb	Eqn
57	M67A	PL3x.1875	.183	2	11	.033	0	y	13	16927....	18225	71.191	1139.0...	1.. H1-1b
58	M196	PL 2 1/8x3/16	.174	0	97	.016	0	y	18	211.664	12909....	50.428	452.205	2.. H1-1b*
59	M75A	PL3x.1875	.168	0	42	.026	0	y	9	16927....	18225	71.191	1139.0...	1.. H1-1b
60	M156	L4X4X5	.165	26.526	15	.066	26.526	y	15	48416....	77760	3776.8...	6364.0...	1 H2-1
61	M69B	PL 2 1/8x3/16	.164	0	43	.016	54.296	y	4	211.664	12909....	50.428	437.053	2.. H1-1b*
62	M81B	L4X4X5	.158	26.526	6	.069	26.526	y	6	48416....	77760	3776.8...	6364.0...	1 H2-1
63	M187	L3.25x1.75x3/16	.141	28.688	15	.018	0	y	17	22948....	29235....	473.675	1861.7...	2.. H2-1
64	M112	L3.25x1.75x3/16	.141	28.688	7	.018	0	y	8	22948....	29235....	473.675	1853.3	2.. H2-1
65	M203	PL3x.1875	.140	2	15	.028	0	y	14	16927....	18225	71.191	1139.0...	1.. H1-1b
66	M110	PL 2 1/8x3/16	.135	0	27	.016	0	y	13	211.664	12909....	50.428	387.887	2.. H1-1b*
67	M185	PL 2 1/8x3/16	.135	0	20	.015	0	y	7	211.664	12909....	50.428	380.259	2.. H1-1b*
68	M128	PL3x.1875	.134	2	6	.025	0	y	4	16927....	18225	71.191	1139.0...	1.. H1-1b
69	M103	PIPE 2.5	.101	44.463	5	.077	44.463		8	30038....	50715	3596.25	3596.25	1.. H1-1b
70	M122	PL 2 1/8x3/16	.100	0	22	.017	54.296	y	15	211.664	12909....	50.428	372.073	2.. H1-1b*
71	M175	PIPE 2.5	.100	44.463	16	.079	44.463		14	30038....	50715	3596.25	3596.25	1.. H1-1b
72	M197A	PL 2 1/8x3/16	.100	0	34	.017	54.296	y	8	211.664	12909....	50.428	370.774	2.. H1-1b*
73	M81	PIPE 2.5	.100	45.474	11	.073	44.463		10	30038....	50715	3596.25	3596.25	1.. H1-1b
74	M84	PIPE 2.5	.099	44.463	10	.082	44.463		12	30038....	50715	3596.25	3596.25	1.. H1-1b
75	M100	PIPE 2.5	.099	45.474	6	.071	44.463		4	30038....	50715	3596.25	3596.25	1.. H1-1b
76	M178	PIPE 2.5	.098	45.474	15	.080	44.463		17	30038....	50715	3596.25	3596.25	1.. H1-1b
77	M124	L3.25x1.75x3/16	.096	28.688	6	.014	28.688	y	4	22948....	29235....	515.02	2047.6...	2.. H2-1
78	M199	L3.25x1.75x3/16	.096	28.688	15	.015	28.688	y	14	22948....	29235....	515.02	2047.6...	2.. H2-1
79	M226	PIPE 2.0	.067	46.003	5	.034	92.984		6	15641....	32130	1871.6...	1871.6...	1.. H1-1b
80	M230	PIPE 2.0	.062	77.964	12	.034	77.964		11	19369....	32130	1871.6...	1871.6...	1.. H1-1b*
81	M221A	PIPE 2.0	.062	83.58	17	.047	83.58		97	17959....	32130	1871.6...	1871.6...	1.. H1-1b*
82	M229	PIPE 2.0	.059	44.599	18	.025	0		18	16794....	32130	1871.6...	1871.6...	1.. H1-1b
83	M223	PIPE 2.0	.054	42.051	7	.051	0		39	18048....	32130	1871.6...	1871.6...	1.. H1-1b
84	M225A	PIPE 2.0	.049	0	13	.019	0		12	21018....	32130	1871.6...	1871.6...	1.. H1-1b*
85	M176	PIPE 2.5	.040	44.463	7	.080	44.463		17	30038....	50715	3596.25	3596.25	1.. H1-1b
86	M82	PIPE 2.5	.039	44.463	3	.074	44.463		12	30038....	50715	3596.25	3596.25	1.. H1-1b
87	M101	PIPE 2.5	.039	44.463	14	.067	44.463		7	30038....	50715	3596.25	3596.25	1.. H1-1b
88	M197	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a
89	M70B	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a
90	M111	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a
91	M123	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a
92	M186	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a
93	M198	PL 2 1/8x3/16	.000	0	98	.000	0	y	98	211.664	12909....	50.428	177.687	1 H1-1a

# Exhibit F

## **Power Density/RF Emissions Report**



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

T-Mobile Existing Facility

Site ID: CTNH735A

CTI 1051 Replacement  
125 Washington Avenue  
North Haven, Connecticut 06473

**June 13, 2019**

**EBI Project Number: 6219002201**

<b>Site Compliance Summary</b>	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>12.27%</b>

June 13, 2019

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

Emissions Analysis for Site: CTNH735A - CT11051 Replacement

EBI Consulting was directed to analyze the proposed T-Mobile facility located at **125 Washington Avenue in North Haven, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  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 ( $\mu\text{W}/\text{cm}^2$ ). The general population exposure limits for the 600 MHz and 700 MHz frequency bands are approximately  $400 \mu\text{W}/\text{cm}^2$  and  $467 \mu\text{W}/\text{cm}^2$ , respectively. The general population exposure limit for the 1900 MHz (PCS), 2100 MHz (AWS) and 11 GHz frequency bands is  $1000 \mu\text{W}/\text{cm}^2$ . 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 125 Washington Avenue in North Haven, 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) 2 LTE channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 2 LTE channels (700 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 3) 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.
- 4) 2 UMTS 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.
- 5) 2 UMTS channels (AWS Band - 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

- 6) 2 LTE channels (AWS Band – 2100 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 60 Watts per Channel.
- 7) 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.
- 8) 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.
- 9) The antennas used in this modeling are the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-UNA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s) in Sector A, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-UNA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s) in Sector B, the Ericsson AIR 21 for the 1900 MHz / 1900 MHz / 2100 MHz channel(s), the RFS APXVAARR24\_43-UNA20 for the 600 MHz / 700 MHz channel(s), the Ericsson AIR 21 for the 2100 MHz channel(s) in Sector C. 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.
- 10) The antenna mounting height centerline of the proposed antennas is 109 feet above ground level (AGL).
- 11) 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.
- 12) 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:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21
Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz	Frequency Bands:	1900 MHz / 1900 MHz / 2100 MHz
Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd	Gain:	15.35 dBd / 15.35 dBd / 15.35 dBd
Height (AGL):	109 feet	Height (AGL):	109 feet	Height (AGL):	109 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts	Total TX Power (W):	240 Watts
ERP (W):	8,226.43	ERP (W):	8,226.43	ERP (W):	8,226.43
Antenna A1 MPE %:	2.49%	Antenna B1 MPE %:	2.49%	Antenna C1 MPE %:	2.49%
Antenna #:	3	Antenna #:	3	Antenna #:	3
Make / Model:	RFS APXVAARR24_43-UNA20	Make / Model:	RFS APXVAARR24_43-UNA20	Make / Model:	RFS APXVAARR24_43-UNA20
Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz	Frequency Bands:	600 MHz / 700 MHz
Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd	Gain:	12.95 dBd / 13.35 dBd
Height (AGL):	109 feet	Height (AGL):	109 feet	Height (AGL):	109 feet
Channel Count:	4	Channel Count:	4	Channel Count:	4
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	2,481.08	ERP (W):	2,481.08	ERP (W):	2,481.08
Antenna A3 MPE %:	1.74%	Antenna B3 MPE %:	1.74%	Antenna C3 MPE %:	1.74%
Antenna #:	4	Antenna #:	4	Antenna #:	4
Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21	Make / Model:	Ericsson AIR 21
Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz	Frequency Bands:	2100 MHz
Gain:	15.35 dBd	Gain:	15.35 dBd	Gain:	15.35 dBd
Height (AGL):	109 feet	Height (AGL):	109 feet	Height (AGL):	109 feet
Channel Count:	2	Channel Count:	2	Channel Count:	2
Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts	Total TX Power (W):	120 Watts
ERP (W):	4,113.21	ERP (W):	4,113.21	ERP (W):	4,113.21
Antenna A4 MPE %:	1.24%	Antenna B4 MPE %:	1.24%	Antenna C4 MPE %:	1.24%

Site Composite MPE %	
Carrier	MPE %
T-Mobile (Max at Sector A):	5.47%
AT&T	6.59%
XM Sat Radio	0.21%
<b>Site Total MPE % :</b>	<b>12.27%</b>

T-Mobile MPE % Per Sector	
T-Mobile Sector A Total:	5.47%
T-Mobile Sector B Total:	5.47%
T-Mobile Sector C Total:	5.47%
<b>Site Total MPE % :</b>	<b>12.27%</b>

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 ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
T-Mobile 1900 MHz GSM	4	1028.30	109.0	12.45	1900 MHz GSM	1000	1.24%
T-Mobile 1900 MHz UMTS	2	1028.30	109.0	6.22	1900 MHz UMTS	1000	0.62%
T-Mobile 2100 MHz UMTS	2	1028.30	109.0	6.22	2100 MHz UMTS	1000	0.62%
T-Mobile 600 MHz LTE	2	591.73	109.0	3.58	600 MHz LTE	400	0.90%
T-Mobile 700 MHz LTE	2	648.82	109.0	3.93	700 MHz LTE	467	0.84%
T-Mobile 2100 MHz LTE	2	2056.61	109.0	12.45	2100 MHz LTE	1000	1.24%
						<b>Total:</b>	<b>5.47%</b>

• 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:	5.47%
Sector B:	5.47%
Sector C:	5.47%
T-Mobile Maximum MPE % (Sector A):	5.47%
Site Total:	12.27%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **12.27%** 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 G

## **Mailing Receipts/Proof of Notice**



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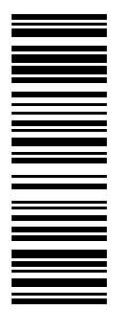
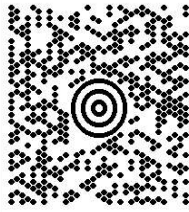
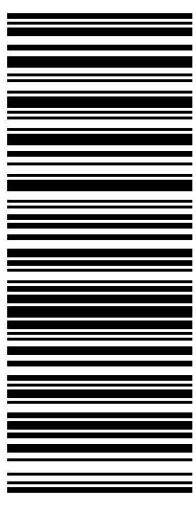

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<p>NEIL GUERRIERO 3473040176 TRANSCEND WIRELESS 10 INDUSTRIAL AVE MAHWAH NJ 07430</p> <p><b>SHIP TO:</b> MICHAEL J. FREDA, FIRST SELECTMAN TOWN OF NORTH HAVEN 18 CHURCH STREET NORTH HAVEN CT 06473-2503</p>	<p>1 OF 1</p> <p>1 LBS</p> <p><b>CT 065 2-03</b></p>  	<p><b>UPS NEXT DAY AIR</b></p> <p><b>1</b></p> <p>TRACKING #: 1Z V25 742 01 9305 9895</p>		<p>BILLING: P/P</p> <p>Reference#1: CTNH735A Reference#2: UPS- 1st Sel</p>  <p>UPS 21.1.23. WNTNV50 12.0A 04/2019</p>
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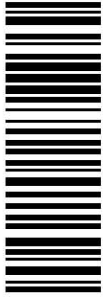
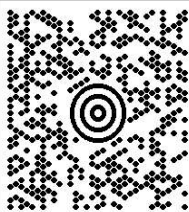
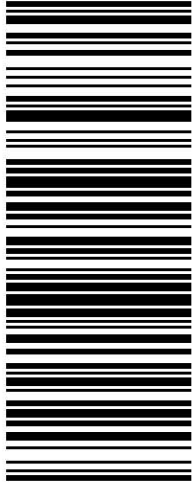

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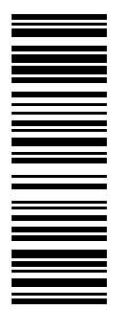
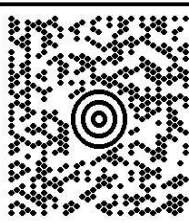
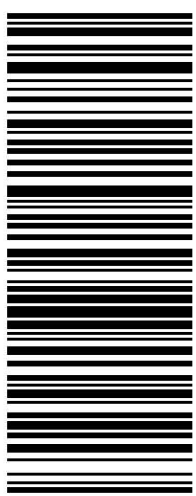

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<p>NEIL GUERRIERO 3473040176 TRANSCEND WIRELESS 10 INDUSTRIAL AVE MAHWAH NJ 07430</p> <p><b>SHIP TO:</b> ALAN FREDRICKSEN, LAND USE ADMINIST TOWN OF NORTH HAVEN 18 CHURCH STREET NORTH HAVEN CT 06473-2503</p>	<p>1 LBS</p> <p>1 OF 1</p> <p><b>CT 065 2-03</b></p>  	<p><b>UPS NEXT DAY AIR</b></p> <p><b>1</b></p> <p>TRACKING #: 1Z V25 742 01 9202 1908</p>		<p>BILLING: P/P</p> <p>Reference#1: CTNH735A Reference#2: UPS- LUA</p>  <p>UPS 21.1.23. WNTNVS0 12.0A 04/2019</p>
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