April 9, 2021

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

RE: **Notice of Exempt Modification for T-Mobile**
Crown Site ID# 881536; T-Mobile Site ID# CTNH037A
120 Universal Drive, North Haven, CT
Latitude: 41° 20′ 40.01″/ Longitude: -72° 52′ 14.92″

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 83-foot mount on the existing 120-foot monopole Tower located at 120 Universal Drive in North Haven. The property is owned by 120 Universal Drive Associates LLC and the Tower is owned by Crown Castle. T-Mobile now intends to replace three (3) existing antennas. This modification/proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times. T-Mobile is also proposing mount modifications as shown on the enclosed mount analysis.

Planned Modifications:
Tower:

Remove and Replace:
(3) Ericsson – AIR21 KRC118023-1_B2A_B4P Antennas **(REMOVE)** - (3) AIR6449 B41 Antennas **(REPLACE)**

Install New:
(3) Ericsson Radio 4415 B25
(1) Ericsson 6/24 4AWG hybrid trunk
(1) Site Pro 1HRK12 handrail kit

Remove:
(3) TMA
(12) 1 5/8'' coax

Ground:

Install New:
(1) SSC 6160 cabinet
(1) B160 battery cabinet
(1) BB6648
(1) BB6630
(1) PSU 4813 voltage booster

(1) IXRe router

Remove:
(1) Nortel S12000 outdoor cabinet

The facility was approved by the Town of North Haven Planning and Zoning Commission in Special Permit Application P2000-44 on November 13, 2000. This approval was granted with conditions and this modification complies with those conditions.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies §16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Michael Freda, First Selectman for the Town of North Haven, Alan Fredricksen, Land Use Administrator for the Town of North Haven, and the property owner.

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

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

3. The proposed modification 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 Communication 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-reference telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,

Richard Zajac
Site Acquisition Specialist
4545 East River Road, Suite 320
West Henrietta, NY
(585) 445-5896
Richard.zajac@crowncastle.com

cc:

Michael Freda, First Selectman *(via email only to firstselectman@northhaven-ct.gov)*
Town of North Haven
18 Church Street
North Haven, CT 06473

Alan Fredricksen, Land Use Administrator *(via email only to fredricksen.alan@northhaven-ct.gov)*
18 Church Street
North Haven, CT 06473

120 Universal Drive Associates, LLC *(via email only to william.berluti@gmail.com)*
120 Universal Drive
North Haven, CT 06473

Zajac, Richard

From: Zajac, Richard
Sent: Friday, April 9, 2021 2:23 PM
To: firstselectman@northhaven-ct.gov
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 120 Universal Drive.pdf

Good afternoon,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 120 Universal Drive in North Haven.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Friday, April 9, 2021 2:25 PM
To: fredricksen.alan@northhaven-ct.gov
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 120 Universal Drive.pdf

Good afternoon,
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T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Zajac, Richard

From: Zajac, Richard
Sent: Friday, April 9, 2021 2:32 PM
To: william.berluti@gmail.com
Subject: Connecticut Siting Council exempt modification application notification
Attachments: CSC Exempt Modification Application - 120 Universal Drive.pdf

Good afternoon,
Please see the attached application to the Connecticut Siting Council regarding antenna work on the existing cell tower located at 120 Universal Drive in North Haven.

Should you have any questions/comments/concerns regarding this application, please do not hesitate to contact me.

Thank you,
RICH ZAJAC
Site Acquisition Specialist
T: (585) 445-5896 M: (607) 346-7212
F: (724) 416-4461
CROWN CASTLE
4545 East River Road, Suite 320
West Henrietta, NY 14586

Exhibit A

Original Facility Approval

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

November 20, 2000

Mr. Stephen Longobardi
Candid Communications of North Haven, II LLC
110 Washington Avenue
North Haven, CT 06473

Re: #P2000-44 Special Permit application, (as authorized by Section 3A.6.), of Candid Communications of North Haven, II LLC, relative to 120 Universal Drive South, (Map 11, Route 1). Plan Entitled: Candid Communications, LLC, Multi-User Wireless Communications Facility, North Haven Tower Site, Universal Drive, North Haven, Connecticut, Prepared By URS Greiner Woodward Clyde A-E-S, Dated 9-8-00, Rev. 11-1-00 Scale 1" = 30'. IL-30 Zoning District.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, November 13, 2000, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit three (3) revised plans which include:
   a.) Revised plans must address/include all comments and conditions of this approval and the related Site Plan approval #P2000-45.
   b.) Live certification.

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.

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

Jeanne Pulleyn, Secretary
Planning & Zoning Commission

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

RECEIVED AND FILED
TOWN CLERKS OFFICE
NORTH HAVEN, CONN.
MAR 20 2001 @ 1:15 PM

Elaine L. Eisele
TOWN CLERK

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

November 20, 2000

Mr. Stephen Longobardi
Candid Communications of North Haven, II LLC
110 Washington Avenue
North Haven, CT 06473

Re: #P2000-45 Site Plan application of Candid Communications of North Haven, II LLC, relative to 120 Universal Drive South, (Map 11, Route 1). Plan Entitled: Candid Communications, LLC, Multi-User Wireless Communications Facility, North Haven Tower Site, Universal Drive, North Haven, Connecticut, Prepared By URS Greiner Woodward Clyde A-E-S, Dated 9-8-00, Rev. 11-1-00 Scale 1" = 30'. IL-30 Zoning District.

Dear Mr. Longobardi:

Please be advised that during the deliberation session of the Planning & Zoning Commission meeting held on Monday, November 13, 2000, the Commission unanimously voted to approve the above referenced application subject to the following conditions:

1. Submit eight (8) revised plans which include:
   a.) The zoning table must reference the following:

Minimum lot area (sq ft)	30,000	(req'd column),	130,929 (existing column)
Minimum lot width (ft.)	100	(req'd column)	
Building height	12'	(proposed column)	
Minimum side yard setback	30'	(existing column),	52' (proposed column)
Minimum rear yard setback	27'	(existing column)	
Minimum side yard tower setback	90'	(proposed column)	

   b.) Plans must be numbered to indicate a submission set of 5 sheets (1 of 5 through 5 of 5).
   c.) The boundary/survey plan must be referenced in the sheet index on Sheet T-1.
   d.) Provide all the information required by Section 3A.6. (b) (1) (iii) and (xi).
   e.) Siltation control must be provided along the rear property line.
   f.) The remaining access drive off the rear of the existing building must be marked as a fire lane.

g.) The proposed parking area must be permanently marked with signage and curbing/islands so that the area does not remain open for use as spillover storage of vehicles, etc.

h.) Limits of green (lawn or non-impervious) areas need to be more clearly indicated. Note, said areas must be protected by curbing.

i.) The relocated scrap metal recycle dumpster must include respective enclosure and island protection with landscaping.

j.) Curbing and grass/landscaped areas along the rear property line must be provided in order to discourage continuance of unapproved outside storage activities.

2. The property owner and/or applicant must remove all outside storage (several trailer bodies, steel hoist, debris) located at the west side of the property as well as on the railroad property. All outside storage must be removed from the site. No building permit will be issued until the cleanup of this area occurs.

3. Proposed contours and/or spot elevations must be provided.

4. Parking spaces must be line striped.

5. Proposed fencing must be reviewed by the Zoning Enforcement Officer prior to installation to insure zoning compliance.

6. Soil and erosion controls must be inspected by the Zoning Enforcement Officer before work may commence.

7. The property owner must maintain (repair/replace when necessary) the siltation control until all development activity is completed and all disturbed areas are permanently stabilized.

8. Submit an as-built prior to bond release.

9. Submit a bond in the amount of $15,000.00 (forms are enclosed). Note, two separate bonds (for $10,000.00 and $5,000.00) are recommended, considering that the $5,000.00 amount covering the required site cleanup work can be released prior to issuance of a building permit, contingent on completion and acceptance of said cleanup.

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

Jeanne Pulleyn, Secretary
Planning & Zoning Commission

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

Exhibit B

Property Card

120 UNIVERSAL DR

Location	120 UNIVERSAL DR	**Mblu**	011/ / 001/ /
Acct#	027540	**Owner**	120 UNIVERSAL DRIVE ASSOCIATES LLC
Assessment	$996,030	**Appraisal**	$1,422,900
PID	8457	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$1,025,400	$397,500	$1,422,900

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2014	$717,780	$278,250	$996,030

Owner of Record

Owner	120 UNIVERSAL DRIVE ASSOCIATES LLC	**Sale Price**	$0
Co-Owner		**Certificate**	
Address	120 UNIVERSAL DR NORTH HAVEN, CT 06473	**Book & Page**	799/ 46
		Sale Date	10/28/2008

Ownership History

Ownership History				
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Sale Date**
120 UNIVERSAL DRIVE ASSOCIATES LLC	$0		799/ 46	10/28/2008
BERLUTI MARIO	$0	1	482/ 458	07/18/1995
BERLUTI, MARIO & HELEN	$0	3		09/01/1990
BERLUTI MARIO & HELEN & SURV	$0	4	305/ 427	12/06/1978

Building Information

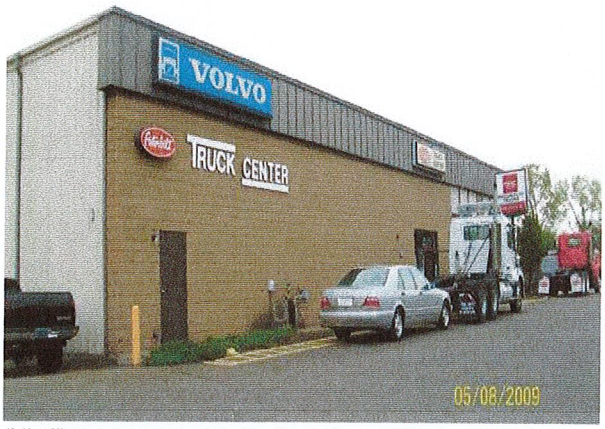
Building 1 : Section 1

Year Built:	1985
Living Area:	19,180
Replacement Cost:	$1,089,079

Building Percent Good: 78
Replacement Cost
Less Depreciation: $849,500

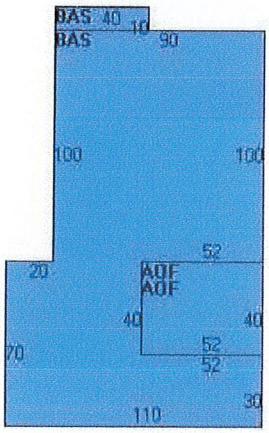
Building Attributes	
Field	**Description**
STYLE	Service Shop
MODEL	Comm/Ind
Grade	C +
Stories:	1
Occupancy	1
Exterior Wall 1	Metal
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Metal/Tin
Interior Wall 1	Drywall
Interior Wall 2	
Interior Floor 1	Average
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Air-no Duc
AC Type	None
Bldg Use	AUTO REPAIR
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	NONE
Frame Type	WOOD FRAME
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL/MN WL
Rooms/Prtns	AVERAGE
Wall Height	20
% Comn Wall	

Building Photo



(http://images.vgsi.com/photos/NorthHavenCTPhotos//\00\01\26/42.jpg)

Building Layout



Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	15,020	15,020
AOF	Office	4,160	4,160
		19,180	19,180

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
A/C	AIR CONDITION	6612 S.F.	$10,300	1
SPR1	SPRINKLERS-WET	19220 S.F.	$13,500	1
MEZ1	MEZZANINE-UNF	2500 S.F.	$17,600	1

Land

Land Use

Use Code	3320
Description	AUTO REPAIR
Zone	IL30
Neighborhood	305
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	3
Frontage	
Depth	
Assessed Value	$278,250
Appraised Value	$397,500

Outbuildings

Outbuildings — Legend

Code	Description	Sub Code	Sub Description	Size	Value	Bldg #
FN3	FENCE-6' CHAIN			640 L.F.	$2,900	1
PAV1	PAVING-ASPHALT			52000 S.F.	$35,100	1
SHD7	COMM GOOD			240 S.F.	$9,900	1
TWR1	COMMU-TOWER			1 UNITS	$112,500	1
SHD7	COMM GOOD			240 S.F.	$9,900	1

Valuation History

Appraisal

Valuation Year	Improvements	Land	Total
2013	$1,238,100	$450,000	$1,688,100
2008	$733,900	$450,000	$1,183,900
2007		$315,000	$828,730

Assessment

Valuation Year	Improvements	Land	Total
2013	$866,670	$315,000	$1,181,670
2008	$513,730	$315,000	$828,730
2007		$315,000	$828,730


LongHorn Steakhouse
Montowese Health & Rehab Center
Quinnipiac River
103
120 Universal Dr, North Haven, CT 06473
Grainger Industrial Supply
Airgas Store
Formosa Asian Fusion
Ryder Truck Rental
91
Sims Metal
Sing Hee
17
103
Buggy Car Wash
Little River
Nick's Char Pit

Exhibit C

Construction Drawings

T-Mobile

T-MOBILE SITE NUMBER: CTNH037A
T-MOBILE SITE NAME: CTNH037/CANDID N. HAVEN
SITE TYPE: MONOPOLE
TOWER HEIGHT: 120'-0"

BUSINESS UNIT #: 881536
SITE ADDRESS: 120 UNIVERSAL DRIVE NORTH HAVEN, CT 06473
COUNTY: NEW HAVEN
JURISDICTION: TOWN OF NORTH HAVEN

T-MOBILE ANCHOR SITE CONFIGURATION: 67D5A997DB OUTDOOR

SITE INFORMATION

CROWN CASTLE USA INC. SITE NAME:	NORTH HAVEN TOWER
SITE ADDRESS:	120 UNIVERSAL DRIVE NORTH HAVEN, CT 06473
COUNTY:	NEW HAVEN
MAP/PARCEL #:	002-001
AREA OF CONSTRUCTION:	EXISTING
LATITUDE:	41.344447°
LONGITUDE:	-72.870836°
LAT/LONG TYPE:	NAD83
GROUND ELEVATION:	22'
CURRENT ZONING:	IL30
JURISDICTION:	TOWN OF NORTH HAVEN
OCCUPANCY CLASSIFICATION:	U
TYPE OF CONSTRUCTION:	IIB
A.D.A. COMPLIANCE:	FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION
PROPERTY OWNER:	NEW YORK CENTRAL LINES LLC C/O CSX TRANSPORTATION INC 500 WATER ST (J-910)
TOWER OWNER:	CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317
CARRIER/APPLICANT:	T-MOBILE 4 SYLVAN WAY PARSIPPANY, NJ 07054
ELECTRIC PROVIDER:	NOT PROVIDED
TELCO PROVIDER:	NOT PROVIDED

PROJECT TEAM

A&E FIRM:	B+T GROUP 1717 S BOULDER AVE, SUITE 300 TULSA, OK 74119 JENNY PALL (918) 587-4630
CROWN CASTLE USA INC. DISTRICT CONTACTS:	3530 TORINGDON WAY, SUITE 300 CHARLOTTE, NC 28277

DRAWING INDEX

SHEET #	SHEET DESCRIPTION
T-1	TITLE SHEET
T-2	GENERAL NOTES
C-1.1	OVERALL SITE PLAN
C-1.2	SITE PLAN & ENLARGED SITE PLAN
C-2	TOWER ELEVATION & ANTENNA PLANS
C-3	ANTENNA & CABLE SCHEDULE
C-4	PLUMBING DIAGRAM
C-5	EQUIPMENT SPECS
E-1	AC PANEL SCHEDULES & ONE LINE DIAGRAM
G-1	ANTENNA GROUNDING DIAGRAM
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS

ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 24X36. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.

PROJECT DESCRIPTION

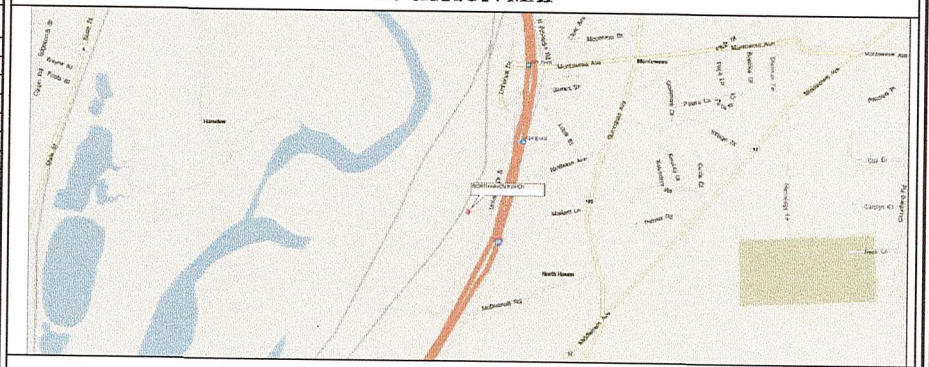
THE PURPOSE OF THIS PROJECT IS TO ENHANCE BROADBAND CONNECTIVITY AND CAPACITY TO THE EXISTING ELIGIBLE WIRELESS FACILITY.

TOWER SCOPE OF WORK:
- REMOVE (3) ANTENNAS
- REMOVE (3) TMAs
- REMOVE (12) 1 5/8" COAX
- REMOVE (1) 9x18 HCS HYBRID
- INSTALL (3) ANTENNAS
- INSTALL (3) RADIOs
- INSTALL (1) ERICSSON 6/24 #AWG HYBRID TRUNK

GROUND SCOPE OF WORK:
- REMOVE (1) NORTEL S12000 OUTDOOR CABINET
- INSTALL (1) 6160 SITE SUPPORT CABINET
- INSTALL (1) B160 BATTERY CABINET
- INSTALL (1) BB 6630 IN 6160 SSC
- INSTALL (1) BB 6648 IN 6160 SSC
- INSTALL (1) 1XRE ROUTER TO 6160 SSC
- INSTALL (1) PSM813 VOLTAGE BOOSTER 6160 SSC

NOTE:
PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN NOC AT (800) 788-7011 & CROWN CONSTRUCTION MANAGER

LOCATION MAP



NO SCALE

APPLICABLE CODES/REFERENCE DOCUMENTS

ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:

CODE TYPE	CODE
BUILDING	2015 IBC
MECHANICAL	2015 IMC
ELECTRICAL	2017 NEC

REFERENCE DOCUMENTS:

STRUCTURAL ANALYSIS: B+T GROUP
DATED: 2/2/21
MOUNT ANALYSIS: INFINIGY ENGINEERING, PLLC
DATED: 1/23/21
RFDS REVISION: 3
DATED: 1/14/21
ORDER ID: 534729
REVISION: 0

CALL CONNECTICUT ONE CALL (800) 922-4455 CBYD.COM CALL 2 WORKING DAYS BEFORE YOU DIG!

APPROVALS

APPROVAL	SIGNATURE	DATE
PROPERTY OWNER OR REP.		
LAND USE PLANNER		
T-MOBILE		
OPERATIONS		
RF		
NETWORK		
BACKHAUL		
CONSTRUCTION MANAGER		

THE PARTIES ABOVE HEREBY APPROVE AND ACCEPT THESE DOCUMENTS AND AUTHORIZE THE CONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL CONSTRUCTION DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT AND ANY CHANGES AND MODIFICATIONS THEY MAY IMPOSE.

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/17/21	LHT	PRELIMINARY	JMC
0	2/26/21	JJD	CONSTRUCTION	GEH
1	3/4/21	JJD	CONSTRUCTION	GEH

3/4/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
T-1	1

142202.1933.01 NORTH HAVEN TOWER_CC_TMO_NE_CD Upgrades.dwg -- Sheet:T-1 -- User: ghayes -- Mar 08, 2021 -- 8:24pm

CROWN CASTLE USA INC. SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED– NO WORK SHALL COMMENCE PRIOR TO CROWN CASTLE USA INC. WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE CROWN CASTLE USA INC. NOC AT 800–788–7011 & THE CROWN CASTLE USA INC. CONSTRUCTION MANAGER.
2. "LOOK UP" – CROWN CASTLE USA INC. SAFETY CLIMB REQUIREMENT:
   THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR CROWN CASTLE USA INC. POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.
3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.
4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND CROWN CASTLE USA INC. STANDARD CED–STD–10253, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).
5. ALL SITE WORK TO COMPLY WITH QAS–STD–10068 "INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON CROWN CASTLE USA INC. TOWER SITE," CED–STD–10294 "STANDARD FOR INSTALLATION OF MOUNTS AND APPURTENANCES," AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."
6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY CROWN CASTLE USA INC. PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES PRIOR TO THE START OF CONSTRUCTION.
10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.
11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.
13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF CONTRACTOR, TOWER OWNER, CROWN CASTLE USA INC., AND/OR LOCAL UTILITIES.
14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.
15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.
18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.
19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.
20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1. FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
   CONTRACTOR: GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION
   CARRIER: T–MOBILE
   TOWER OWNER: CROWN CASTLE USA INC.
2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.
3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.
4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.
5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.
6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CROWN CASTLE.
7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND CROWN CASTLE PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.
11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION AND IS TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.
12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF CROWN CASTLE USA INC.
13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.
14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST–IN–PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°F AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE–THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER–TO–CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER	40 ksi
#5 BARS AND LARGER	60 ksi

6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	3"
CONCRETE EXPOSED TO EARTH OR WEATHER:	
#6 BARS AND LARGER	2"
#5 BARS AND SMALLER	1–1/2"
CONCRETE NOT EXPOSED TO EARTH OR WEATHER:	
SLAB AND WALLS	3/4"
BEAMS AND COLUMNS	1–1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

GREENFIELD GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS. THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.
6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.
7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.
8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.
9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.
11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.
13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.
14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.
15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.
17. MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON–METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD–WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM. THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY).

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
   - 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
   - 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. ALL TIE WRAPS SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI–CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN–2, XHHW, XHHW–2, THW, THW–2, RHW, OR RHW–2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL–CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON–PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER–ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3R (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR CROWN CASTLE USA INC. BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "T–MOBILE".
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

CONDUCTOR COLOR CODE

SYSTEM	CONDUCTOR	COLOR
120/240V, 1Ø	A PHASE	BLACK
	B PHASE	RED
	NEUTRAL	WHITE
	GROUND	GREEN
120/208V, 3Ø	A PHASE	BLACK
	B PHASE	RED
	C PHASE	BLUE
	NEUTRAL	WHITE
	GROUND	GREEN
277/480V, 3Ø	A PHASE	BROWN
	B PHASE	ORANGE OR PURPLE
	C PHASE	YELLOW
	NEUTRAL	GREY
	GROUND	GREEN
DC VOLTAGE	POS (+)	RED**
	NEG (−)	BLACK**

* SEE NEC 210.5(C)(1) AND (2)
** POLARITY MARKED AT TERMINATION

APWA UNIFORM COLOR CODE:

WHITE	PROPOSED EXCAVATION
PINK	TEMPORARY SURVEY MARKINGS
RED	ELECTRIC POWER LINES, CABLES, CONDUIT, AND LIGHTING CABLES
YELLOW	GAS, OIL, STEAM, PETROLEUM, OR GASEOUS MATERIALS
ORANGE	COMMUNICATION, ALARM OR SIGNAL LINES, CABLES, OR CONDUIT AND TRAFFIC LOOPS
BLUE	POTABLE WATER
PURPLE	RECLAIMED WATER, IRRIGATION, AND SLURRY LINES
GREEN	SEWERS AND DRAIN LINES

ABBREVIATIONS:

ANT	ANTENNA
(E)	EXISTING
FIF	FACILITY INTERFACE FRAME
GEN	GENERATOR
GPS	GLOBAL POSITIONING SYSTEM
GSM	GLOBAL SYSTEM FOR MOBILE
LTE	LONG TERM EVOLUTION
MGB	MASTER GROUND BAR
MW	MICROWAVE
(N)	NEW
NEC	NATIONAL ELECTRIC CODE
(P)	PROPOSED
PP	POWER PLANT
QTY	QUANTITY
RECT	RECTIFIER
RBS	RADIO BASE STATION
RET	REMOTE ELECTRIC TILT
RFDS	RADIO FREQUENCY DATA SHEET
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
SIAD	SMART INTEGRATED DEVICE
TMA	TOWER MOUNTED AMPLIFIER
TYP	TYPICAL
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
W.P.	WORK POINT

T-Mobile
4 SYLVAN WAY
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B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES./QA
A	2/17/21	LHT	PRELIMINARY	RMC
0	2/26/21	JJD	CONSTRUCTION	GEH
1	3/4/21	JJD	CONSTRUCTION	GEH

3/4/21

B&T ENGINEERING, INC.
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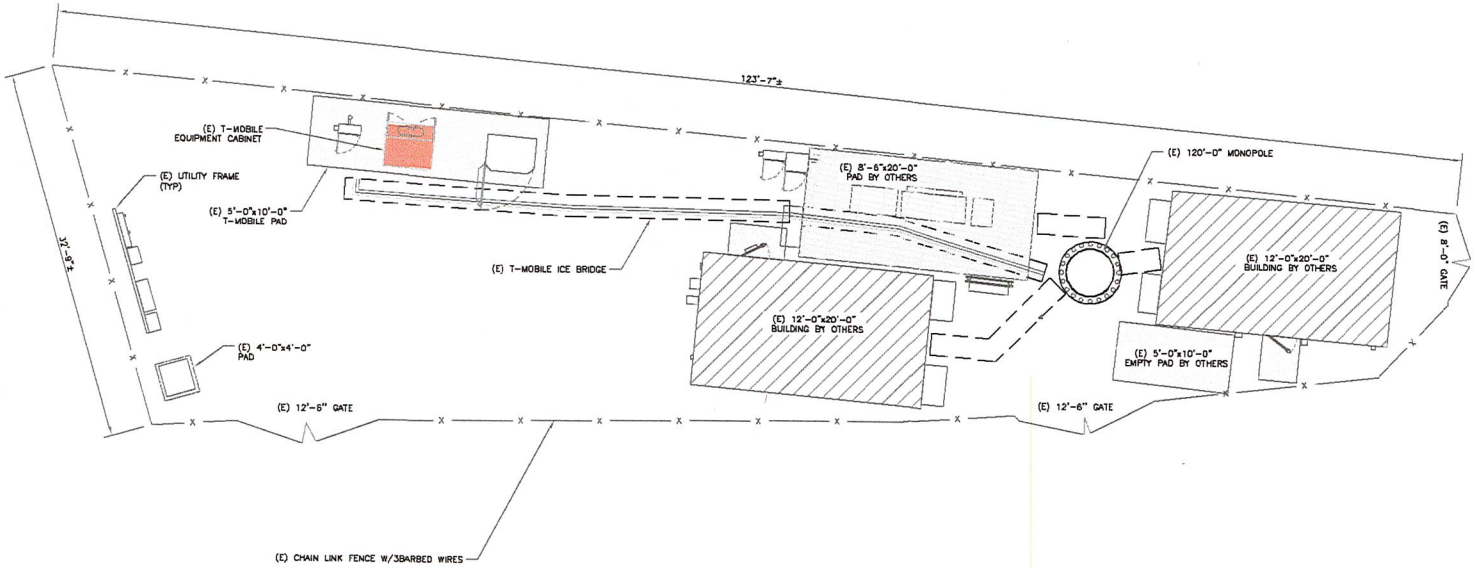
SHEET NUMBER:	REVISION:
T-2	1

SITE PLAN DISCLAIMER:

PROPERTY LINES AND STRUCTURES HAVE BEEN DIGITIZED FROM PREVIOUS PLAN SETS OR FROM ASSESSORS MAPS. CROWN CASTLE USA INC. HAS NOT COMPLETED A SITE SURVEY AND THEREFORE MAKES NO CLAIMS AS TO THE ACCURACY OF INFORMATION DEPICTED ON THIS SHEET



1 OVERALL SITE PLAN
SCALE: 3/16"=1'-0" (FULL SIZE) 3/32"=1'-0" (11x17)

N

T··Mobile···
4 SYLVAN WAY
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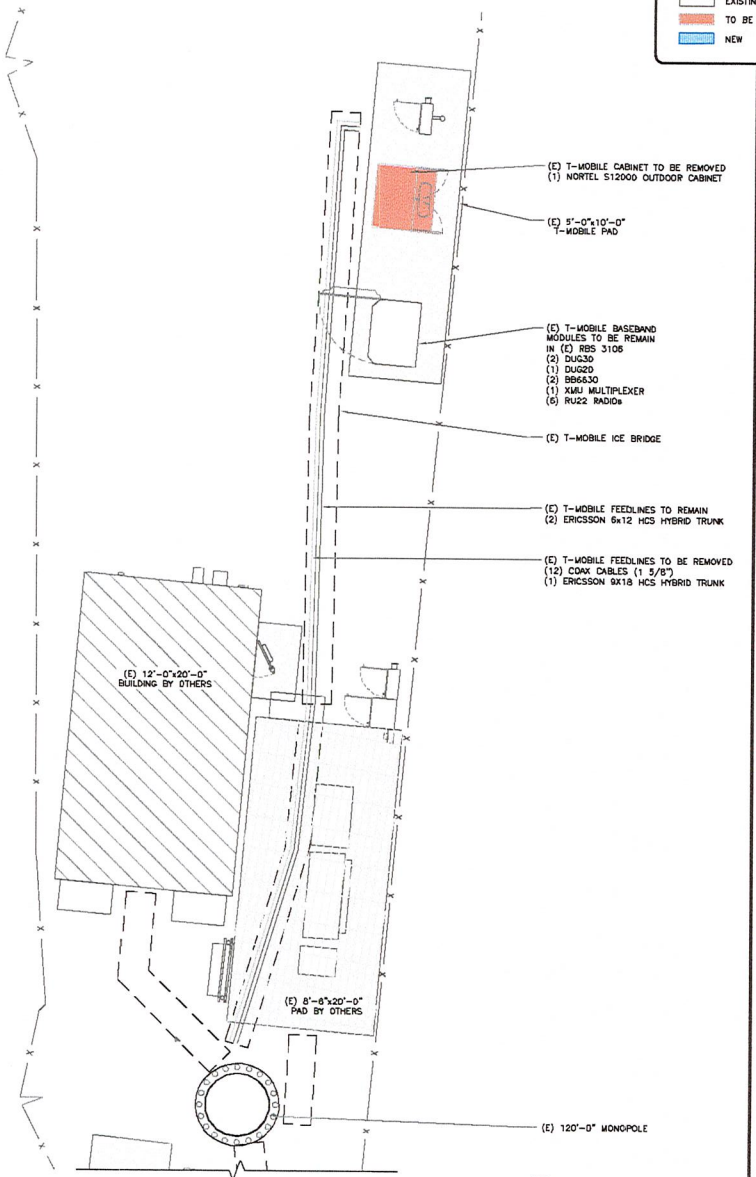
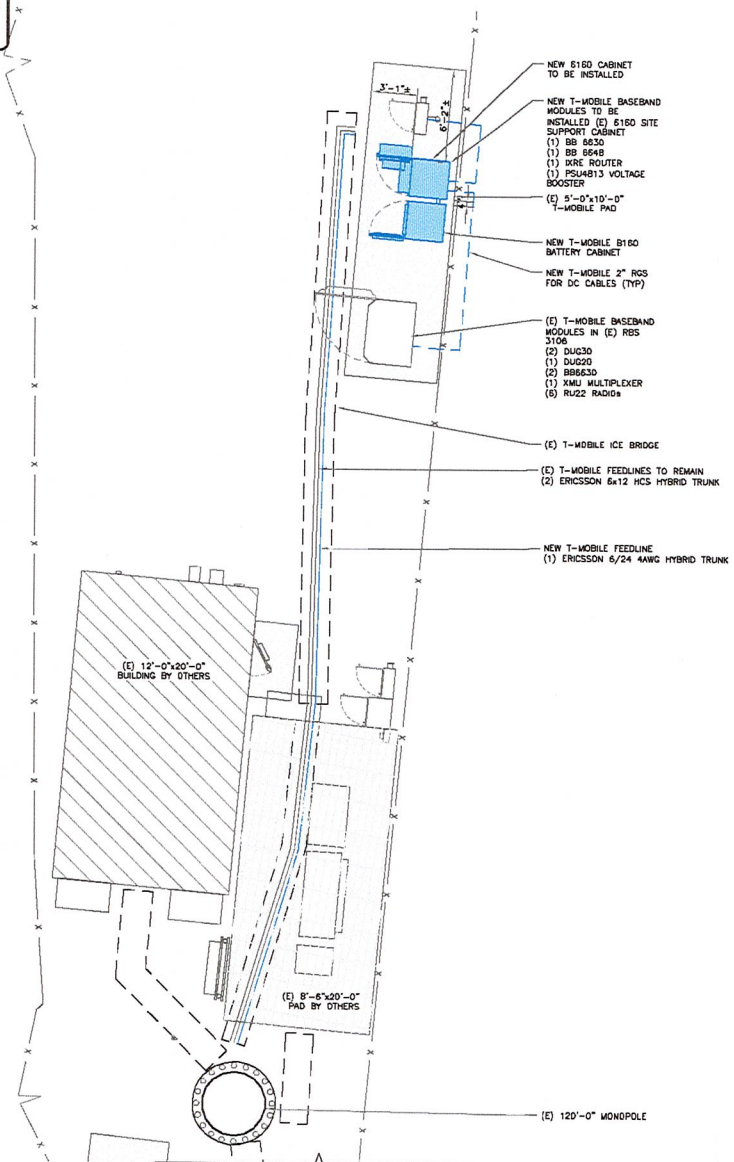
SHEET NUMBER: C-1.1
REVISION: 1

EQUIPMENT LEGEND:

- EXISTING
- TO BE RELOCATED/REMOVED
- NEW



1 EXISTING EQUIPMENT PLAN
SCALE: 1/4"=1'-0" (FULL SIZE) 1/8"=1'-0" (11x17)



2 FINAL EQUIPMENT PLAN
SCALE: 1/4"=1'-0" (FULL SIZE) 1/8"=1'-0" (11x17)

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T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

ISSUED FOR:

REV.	DATE	DRWN	DESCRIPTION	DES./QA
A	2/15/21	LHT	PRELIMINARY	RMC
0	2/26/21	JJD	CONSTRUCTION	GEH
1	3/4/21	JJD	CONSTRUCTION	GEH

3/4/22

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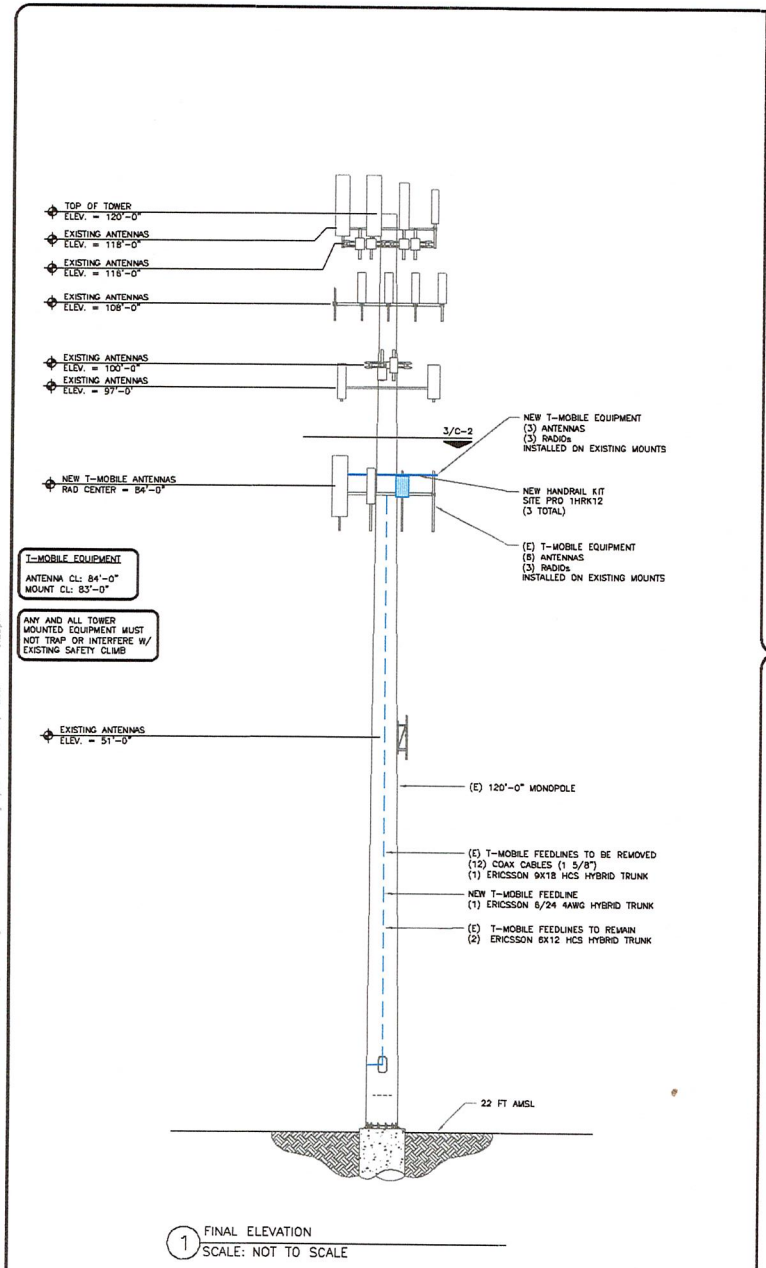
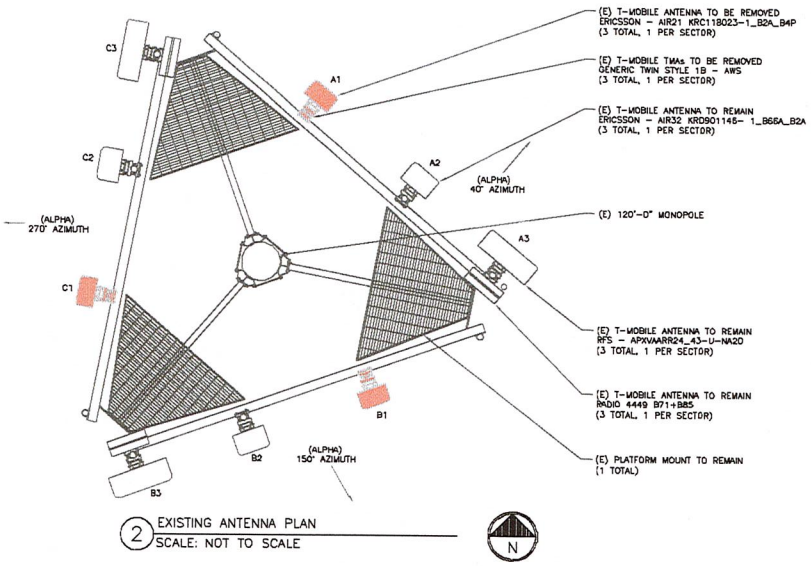
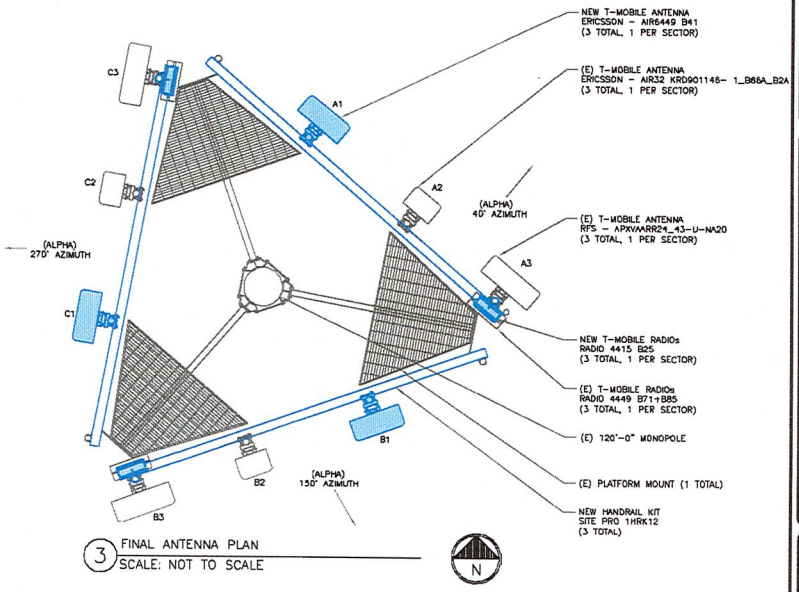
SHEET NUMBER: C-1.2
REVISION: 1



1 FINAL ELEVATION
SCALE: NOT TO SCALE



2 EXISTING ANTENNA PLAN
SCALE: NOT TO SCALE



3 FINAL ANTENNA PLAN
SCALE: NOT TO SCALE

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4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
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SUITE 300
TULSA, OK 74119
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T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

ISSUED FOR:

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0	2/26/21	JTD	CONSTRUCTION	GEH
1	3/4/21	JTD	CONSTRUCTION	GEH

3/4/21

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SHEET NUMBER: C-2
REVISION: 1

142302.003.01 NORTH HAVEN TOWER_CT_TMO_NE_DD Upgrades.dwg - Sheet C-2 - User: ghayes - Mar 04, 2021 - 8:33pm

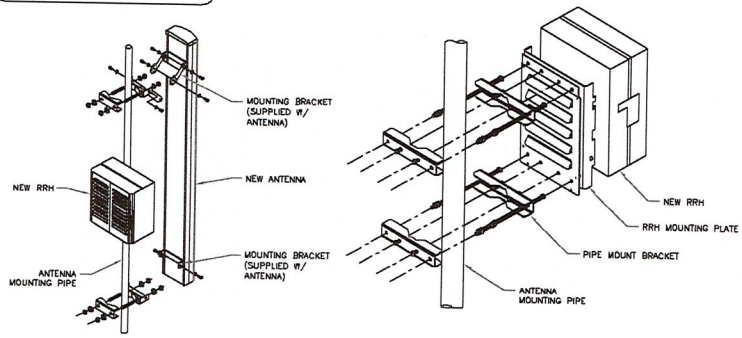
RF SYSTEM SCHEDULE

SECTOR	ANTENNA	TECH	MANUFACTURER	ANTENNA MODEL	AZIMUTH	M-TILT	E-TILT	RAD CENTER	TMA/RRU	CABLE TYPE	CABLE DIAMETER	CABLE LENGTH
ALPHA	A-1	L2500 / N2500	ERICSSON	AIR6449 B41	40°	0°	2°/2°	84'-0"	-	(1) HYBRID	-	-
	A-2	L2100 / L1900 / G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	40°	0°	2°/2°/2°/2	84'-0"	-	-	-	-
	A-3	L700 / L600 / N600 / L1900 / U1900	RFS	APXVAARR24_43-U-NA20	40°	0°	2°/2°/2°/2	84'-0"	(1) RADIO 4449 B71+B85 (1) RADIO 4415 B25	(3) COAX (1) HYBRID	-	-
BETA	B-1	L2500 / N2500	ERICSSON	AIR6449 B41	150°	0°	2°/2°	84'-0"	-	(1) HYBRID	-	-
	B-2	L2100 / L1900 / G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	150°	0°	2°/2°/2°/2	84'-0"	-	(4) COAX	-	-
	B-3	L700 / L600 / N600 / L1900 / U1900	RFS	APXVAARR24_43-U-NA20	150°	0°	2°/2°/2°/2	84'-0"	(1) RADIO 4449 B71+B85 (1) RADIO 4415 B25	-	-	-
GAMMA	C-1	L2500 / N2500	ERICSSON	AIR6449 B41	270°	0°	2°/2°	84'-0"	-	-	-	-
	C-2	L2100 / L1900 / G1900	ERICSSON	AIR32 KRD901146-1_B66A_B2A	270°	0°	2°/2°/2°/2	84'-0"	-	(3) COAX	-	-
	B-3	L700 / L600 / N600 / L1900 / U1900	RFS	APXVAARR24_43-U-NA20	270°	0°	2°/2°/2°/2	84'-0"	(1) RADIO 4449 B71+B85 (1) RADIO 4415 B25	(1)HYBRID	-	-

1 ANTENNA & FEEDLINE SCHEDULE
SCALE: NOT TO SCALE

INSTALLER NOTES:

1. COMPLY WITH MANUFACTURERS INSTRUCTIONS TO ENSURE THAT ALL RRHs RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING.
2. DO NOT OPEN RRH PACKAGES IN THE RAIN.
3. ALL PIPES, BRACKETS, AND MISCELLANEOUS HARDWARE TO BE GALVANIZED UNLESS NOTED OTHERWISE.



2 ANTENNA WITH RRH MOUNTING DETAIL
SCALE: NOT TO SCALE

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3/4/21

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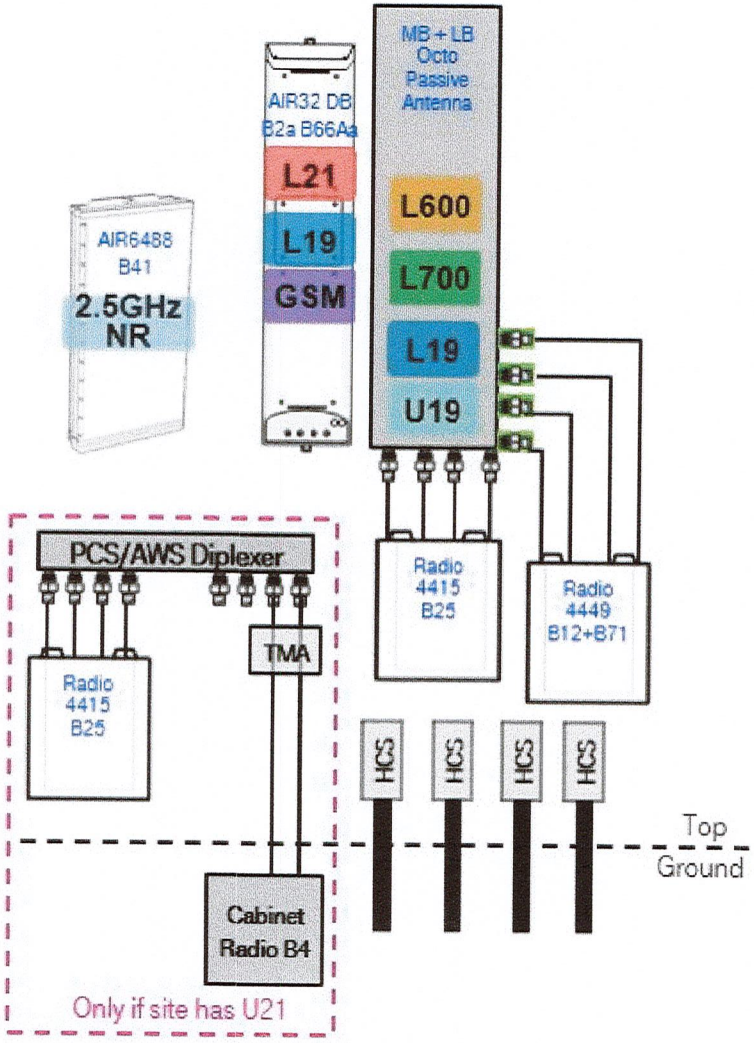
SHEET NUMBER: C-3

REVISION: 1



1 PLUMBING DIAGRAM
SCALE: NOT TO SCALE

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3/4/21

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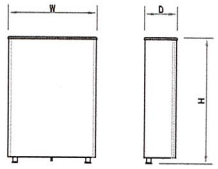
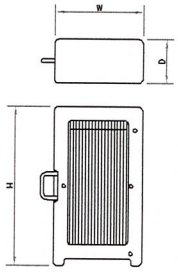
SHEET NUMBER: C-4
REVISION: 1



ANTENNA SPECS	
MANUFACTURER	ERICSSON
MODEL #	AIR6449 B41
WIDTH	20.51"
DEPTH	8.54"
HEIGHT	33.11"
WEIGHT	114.63 LBS

1 ANTENNA SPECS
SCALE: NOT TO SCALE



RRU SPECIFICATIONS	
MANUFACTURER	ERICCSON
MODEL #	RADIO 4415 B25
WIDTH	13.40"
DEPTH	5.90"
HEIGHT	16.50"
WEIGHT	46.00 LBS

2 RRU SPECS
SCALE: NOT TO SCALE

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NORTH HAVEN, CT 06473

EXISTING
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1	3/4/21	JJD	CONSTRUCTION	GEH

3/4/22

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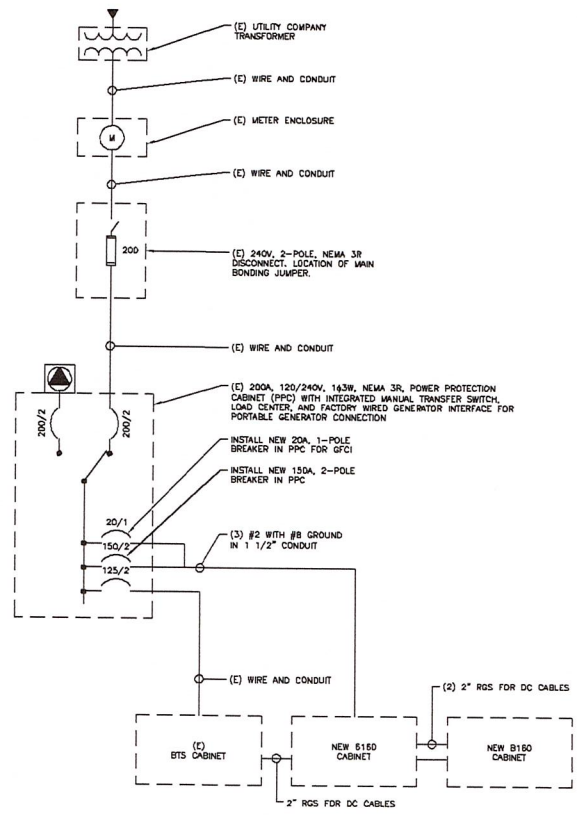
SHEET NUMBER:	REVISION:
C-5	1

FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS L1	BUS L2	AMPS	POLES	LOAD
SURGE PROTECTION	2	60A	1	2	20A	1	GFCI
3161	2	125A	3	4	60A	2	CABINET 1
			5	6			
LED LIGHT	1	20A	7	8	150A	2	8160
			9	10			
			11	12	20A	1	GFCI
			13	14			
			15	16			
			17	18			
			19	20			
			21	22			
			23	24			
			25	26			
			27	28			
			29	30			

RATED VOLTAGE: ■120/240 □ _____ 1 PHASE, 3 WIRE | BRANCH POLES: □12 □24 ■30 □42 | APPROVED MFRS
RATED AMPS: □100 ■200 □400 □ _____ | CABINET: ■SURFACE □FLUSH | NEMA □1 ■3R □4X
□MAIN LUGS ONLY/MAIN 200 AMPS ■BREAKER □FUSED SWITCH | ■HINGED DOOR | ■KEYED DOOR LATCH
□FUSED ■CIRCUIT BREAKER BRANCH DEVICES | □ TO BE GFCI BREAKERS | FULL NEUTRAL BUS | GROUND BAR
ALL BREAKERS MUST BE RATED TO INTERRUPT A SHORT CIRCUIT ISC OF 10,000 AMPS SYMMETRICAL

INSTALL A NEW 2P 150A BREAKER IN POSITION 8 AND 10
INSTALL A NEW 1P 20A BREAKER IN POSITION 12
REPLACE EXISTING WIRES FOR EXISTING 3161 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #2G AWG. MINIMUM CONDUIT SIZE TO BE 2".
IF 150A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL QO12040M200RB (OR APPROVED EQUAL).
UPGRADE FEEDER WIRES TO MEET AMPACITY IF NEW PANEL IS REQUIRED.
FINAL PANEL DESIGN AND CALCULATIONS FOR WIRE SIZE WERE BASED OFF OF EXISTING DOCUMENTS AND PHOTOS

1 AC PANEL SCHEDULE
SCALE: NOT TO SCALE



NOTES:

1. ALL NEW CONDUCTORS TO BE INSTALLED SHALL BE COPPER. ALL CONDUCTORS SHALL BE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 UNLESS NOTED OTHERWISE.
2. CONTRACTOR IS TO FIELD VERIFY ALL EXISTING ITEMS SHOWN ON THE ELECTRICAL ONE-LINE DIAGRAM AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES.
3. ALL GROUNDING AND BONDING PER THE NEC.

2 ONE LINE DIAGRAM
SCALE: NOT TO SCALE

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1	3/4/21	JJD	CONSTRUCTION	GEH

3/4/21

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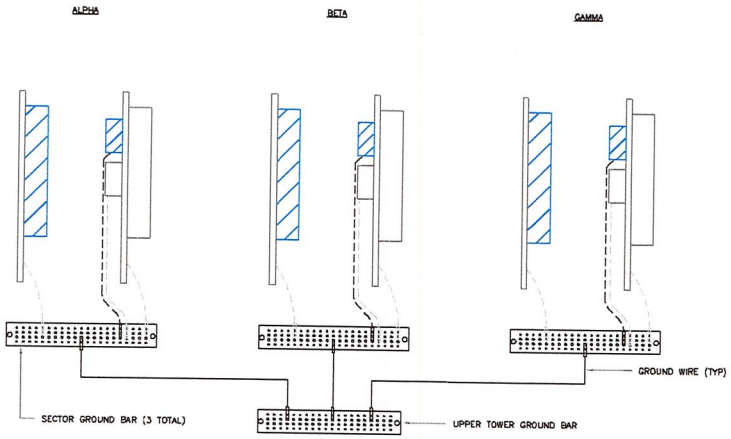
SHEET NUMBER: E-1
REVISION: 1



NOTE:

ALL NEW GROUNDS TO BE #6 STRANDED COPPER WITH GREEN INSULATION UNLESS NOTED OTHERWISE.

1 ANTENNA GROUNDING DIAGRAM
SCALE: NOT TO SCALE

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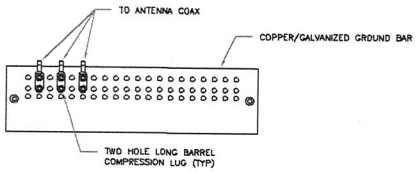
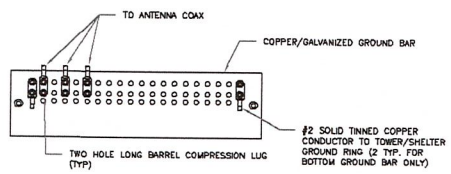
SHEET NUMBER:	REVISION:
G-1	1



NOTES:

1. DOUBLING UP "OR STACKING" OF CONNECTIONS IS NOT PERMITTED.
2. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
3. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO ANTENNA MOUNT STEEL.

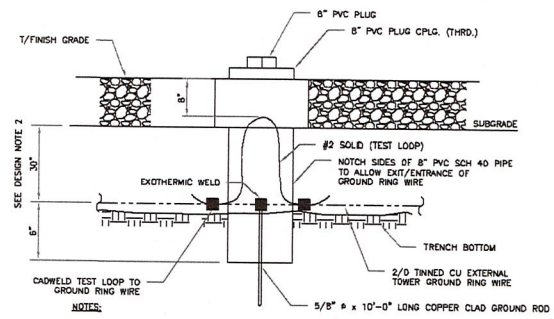
1 ANTENNA SECTOR GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. EXTERIOR ANTIOXIDANT JOINT COMPOUND TO BE USED ON ALL EXTERIOR CONNECTIONS.
2. GROUND BAR SHALL NOT BE ISOLATED FROM TOWER. MOUNT DIRECTLY TO TOWER STEEL (TOWER ONLY).
3. GROUND BAR SHALL BE ISOLATED FROM BUILDING OR SHELTER.

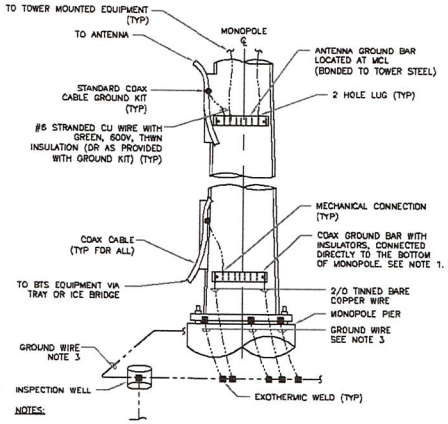
2 TOWER/SHELTER GROUND BAR DETAIL
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

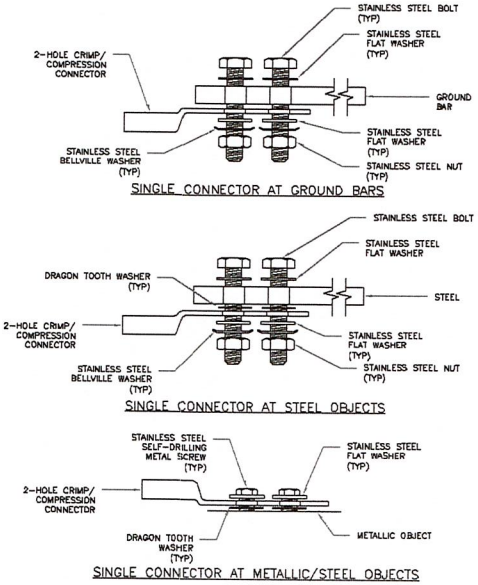
3 INSPECTION WELL DETAIL
SCALE: NOT TO SCALE



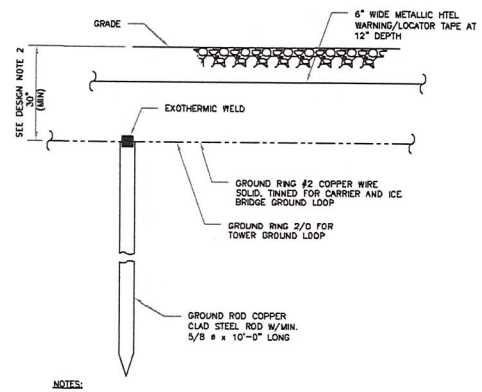
NOTES:

1. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATIONS AND CONNECTION ORIENTATION. COAXIAL CABLES EXCEEDING 200 FEET ON THE TOWER SHALL HAVE GROUND KITS AT THE MIDPOINT. PROVIDE AS REQUIRED.
2. ONLY MECHANICAL CONNECTIONS ARE ALLOWED TO BE MADE TO CROWN CASTLE USA INC. TOWERS. ALL MECHANICAL CONNECTIONS SHALL BE TREATED WITH AN ANTI-OXIDANT COATING.
3. ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE RECOGNIZED EDITION OF ANSI/TIA 222 AND NFPA 780.

4 TYPICAL ANTENNA CABLE GROUNDING
SCALE: NOT TO SCALE



5 HARDWARE DETAIL FOR EXTERIOR CONNECTIONS
SCALE: NOT TO SCALE



NOTES:

1. GROUND ROD SHALL BE DRIVEN VERTICALLY, NOT TO EXCEED 45 DEGREES FROM THE VERTICAL
2. GROUND WIRE SHALL BE MIN. 30" BELOW GRADE OR 6" BELOW FROST LINE. (WHICH EVER IS GREATER) AS PER N.E.C. ARTICLE 250-50(D)

6 GROUND ROD DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

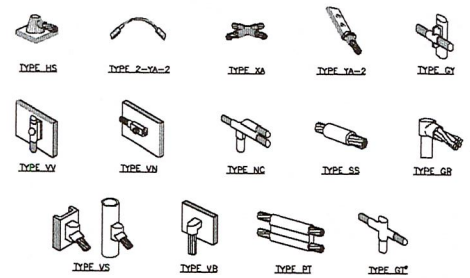
ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
A	2/17/21	LHY	PRELIMINARY	RMC
0	2/26/21	JID	CONSTRUCTION	GEH
1	3/4/21	JID	CONSTRUCTION	GEH

3/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

SHEET NUMBER: G-2
REVISION: 1

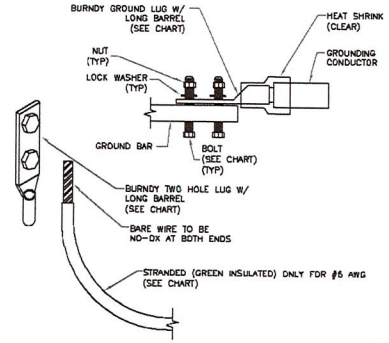


NOTE:

1. ERICO EXOTHERMIC "MOLD TYPES" SHOWN HERE ARE EXAMPLES. CONSULT WITH CONSTRUCTION MANAGER FOR SPECIFIC MOLDS TO BE USED FOR THIS PROJECT.
2. MOLD TYPE ONLY TO BE USED BELOW GRADE WHEN CONNECTING GROUND RING TO GROUND ROD.

1 CADWELD GROUNDING CONNECTIONS
SCALE: NOT TO SCALE

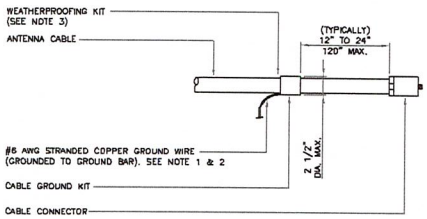
WIRE SIZE	BURNDY LUG	BOLT SIZE
#6 AWG GREEN INSULATED	YA6C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG SOLID TINNED	YA3C-2TC38	3/8" - 16 NC S 2 BOLT
#2 AWG STRANDED	YA2C-2TC38	3/8" - 16 NC S 2 BOLT
#2/0 AWG STRANDED	YA26-2TC38	3/8" - 16 NC S 2 BOLT
#4/0 AWG STRANDED	YA28-2N	1/2" - 16 NC S 2 BOLT



NOTES:

1. ALL GROUNDING LUGS ARE TO BE INSTALLED PER MANUFACTURER'S SPECIFICATIONS. ALL HARDWARE BOLTS, NUTS, LOCK WASHERS SHALL BE STAINLESS STEEL. ALL HARDWARE ARE TO BE AS FOLLOWS: BOLT, FLAT WASHER,GROUND BAR, GROUND LUG, FLAT WASHER AND NUT.

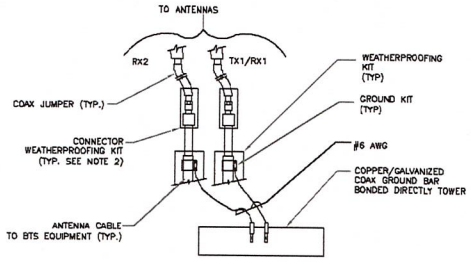
2 MECHANICAL LUG CONNECTION
SCALE: NOT TO SCALE



NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO GROUND BAR.
2. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
3. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

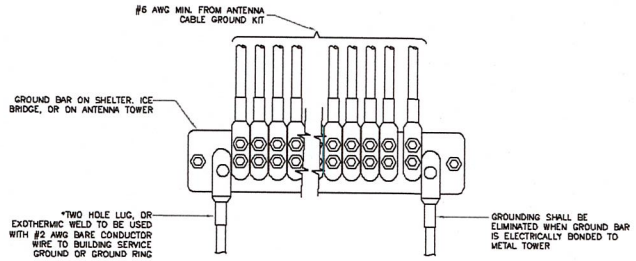
3 CABLE GROUND KIT CONNECTION
SCALE: NOT TO SCALE



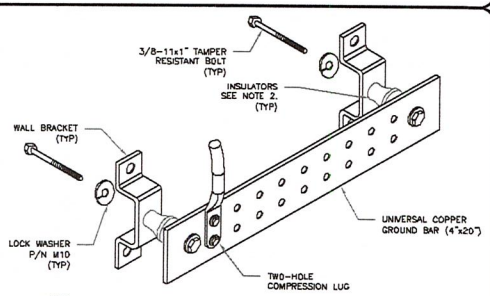
NOTES:

1. DO NOT INSTALL CABLE GROUND KIT AT A BEND AND ALWAYS DIRECT GROUND WIRE DOWN TO ANTENNA GROUND BAR.
2. WEATHER PROOFING SHALL BE TWO-PART TAPE KIT. COLD SHRINK SHALL NOT BE USED.

4 GROUND CABLE CONNECTION
SCALE: NOT TO SCALE



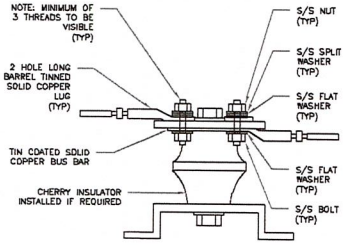
5 GROUNDWIRE INSTALLATION
SCALE: NOT TO SCALE



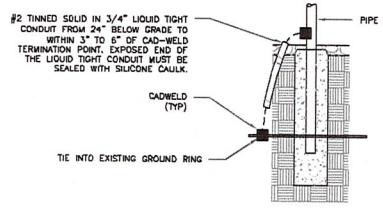
NOTES:

1. DOWN LEAD (HOME RUN) CONDUCTORS ARE NOT TO BE INSTALLED ON CROWN CASTLE USA INC. TOWER, PER THE GROUNDING DOWN CONDUCTOR POLICY OAS-STD-10091. NO MODIFICATION OR DRILLING TO TOWER STEEL IS ALLOWED IN ANY FORM OR FASHION, CAD-WELDING ON THE TOWER AND/OR IN THE AIR ARE NOT PERMITTED.
2. OMIT INSULATOR WHEN MOUNTING TO TOWER STEEL OR PLATFORM STEEL USE INSULATORS WHEN ATTACHING TO BUILDING OR SHELTERS.

6 GROUND BAR DETAIL
SCALE: NOT TO SCALE



7 LUG DETAIL
SCALE: NOT TO SCALE



8 TRANSITIONING GROUND DETAIL
SCALE: NOT TO SCALE

T-Mobile
4 SYLVAN WAY
PARSIPPANY, NJ 07054

CROWN CASTLE
3530 TORINGDON WAY, SUITE 300
CHARLOTTE, NC 28277

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

T-MOBILE SITE NUMBER:
CTNH037A

BU #: **881536**
NORTH HAVEN TOWER

120 UNIVERSAL DRIVE
NORTH HAVEN, CT 06473

EXISTING
120'-0" MONOPOLE

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION	DES/QA
A	2/17/21	LHT	PRELIMINARY	RMC
0	2/26/21	JID	CONSTRUCTION	GEH
1	3/4/21	JID	CONSTRUCTION	GEH

3/4/21

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/22

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

SHEET NUMBER:	REVISION:
G-3	1

142802.003.01 NORTH HAVEN TOWER_EE_TMO_NE_CD Upgrade.dwg - Sheet(s)-3 - User: gnguyen - Mar 04, 2021 - 8:03pm

Exhibit D

Structural Analysis Report

Date: **February 2, 2021**

B+T GRP

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

Subject:	**Structural Analysis Report**	
Carrier Designation:	***T-Mobile* Co-Locate**	
	Site Number:	CTNH037A
	Site Name:	CTNH037/Candid N. Haven
Crown Castle Designation:	**BU Number:**	881536
	Site Name:	North Haven Tower
	JDE Job Number:	624773
	Work Order Number:	1916881
	Order Number:	534729 Rev. 0
Engineering Firm Designation:	**B+T Group Project Number:**	142902.004.01
Site Data:	**120 Universal Drive, North Haven, New Haven County, CT** **Latitude *41° 20' 40.01"*, Longitude *-72° 52' 14.92"*** **120 Foot - Monopole Tower**	

B+T Group is pleased to submit this **"Structural Analysis Report"** to determine the structural integrity of the above-mentioned tower.

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

LC7: Proposed Equipment Configuration **Sufficient Capacity – 58.1%**

This analysis utilizes an ultimate 3-second gust wind speed of 125 mph as required by the 2015 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Brandon Sevier, P.E.

Respectfully submitted by: B+T Engineering, Inc.
COA: PEC.0001564; Expires: 02/10/2021

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
2/2/21

Chad E. Tuttle, P.E.

tnxTower Report - version 8.0.7.5

TABLE OF CONTENTS

1) INTRODUCTION

This is a 120 ft. Monopole tower designed by Engineered Endeavors, Inc., in February of 2001.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor:	1
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
83.0	84.0	3	Ericsson	AIR -32 B2A/B66AA	2 1	1-3/8 1-5/8
		3	Ericsson	AIR6449 B41_T-MOBILE		
		3	Ericsson	RADIO 4449 B71/B85A		
		3	Ericsson	RRUS 4415 B25_CCIV2		
		3	RFS Celwave	APXVAARR24_43-U-NA20		
	83.0	1	Site Pro 1	HRK12 Handrail Kit		
		1	–	Platform Mount [LP 303-1]		

Table 2 - Other Considered Equipment

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
118.0	121.0	3	CCI Antennas	OPA-65R-LCUU-H6	12 2 1	1-5/8 3/4 3/8
		6	CCI Antennas	TPX-070821		
		3	Commscope	CBC23SR-43		
		3	Commscope	ION-M23 SDARS		
		3	Ericsson	RRUS 32		
		3	Ericsson	RRUS 4449 B5/B12		
		6	Kathrein	80010966		
		3	Powerwave Tech.	7770.00		
		6	Powerwave Tech.	LGP21401		
		1	Raycap	DC6-48-60-0-8C-EV		
		1	Raycap	DC6-48-60-18-8F		
	118.0	3	Commscope	MCG22HDx14 Mount		
116.0	116.0	3	Ericsson	RRUS 4478 B14	4 1	3/4 3/8
		3	Ericsson	RRUS 8843 B2/B66A		
		2	Raycap	DC6-48-60-18-8F		
		1	–	Side Arm Mount [SO 104-3]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
108.0	110.0	12	Decibel	844G65VTZASX	12	1-1/4
	108.0	1	–	Platform Mount [LP 303-1]		
100.0	100.0	3	Alcatel Lucent	TME-1900MHZ RRH (65MHZ)	--	–
		1	–	Pipe Mount [PM 601-3]		
		1	–	Side Arm Mount [SO 102-3]		
	99.0	3	Alcatel Lucent	TME-800MHZ RRH		
97.0	99.0	3	Alcatel Lucent	TD-RRH8X20-25	3 1	1-1/4 1-5/8
	98.0	3	Alcatel Lucent	800 EXTERNAL NOTCH FILTER		
		2	Powerwave Tech.	P40-16-XLPP-RR-A		
		9	RFS Celwave	ACU-A20-N		
		1	RFS Celwave	APXVSPP18-C-A20		
		3	RFS Celwave	APXVTM14-C-120		
	97.0	1	–	Platform Mount [LP 601-1]		
51.0	52.0	1	Lucent	KS24019-L112A	1	1/2
	51.0	1	–	Side Arm Mount [SO 901-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
Online Order Information	534729	CCI Sites
Mount Analysis Report	9525212	CCI Sites
Tower Manufacturer Drawing	1405788	CCI Sites
Foundation Drawing	1405795	CCI Sites
Geotech Report	1405753	CCI Sites
Antenna Configuration	Date: 01/22/2021	CCI Sites

3.1) Analysis Method

tnxTower (version 8.0.7.5), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A. When applicable, Crown Castle has calculated and provided the effective area for panel antennas using approved methods following the intent of the TIA-222 standard.

3.2) Assumptions

1) The tower and structures were maintained in accordance with the - TIA-222 standard.
2) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 84.7161	Pole	TP32.531x24.094x0.375	1	-15.226	2271.118	26.8	Pass
L2	84.7161 - 41.6224	Pole	TP42.031x30.689x0.438	2	-30.432	3430.969	45.8	Pass
L3	41.6224 - 0	Pole	TP51x39.787x0.5	3	-48.429	4922.820	49.9	Pass
							Summary	
						Pole (L3)	49.9	Pass
						Rating =	49.9	Pass

Table 5 - Tower Component Stresses vs. Capacity – LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Anchor Rods	Base	47.6	Pass
1,2	Base Plate	Base	58.1	Pass
1,2	Base Foundation (Structure)	Base	46.8	Pass
1,2	Base Foundation (Soil Interaction)	Base	26.1	Pass

Structure Rating (max from all components) =	***58.1%***

Notes:
1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H Section 15.5.

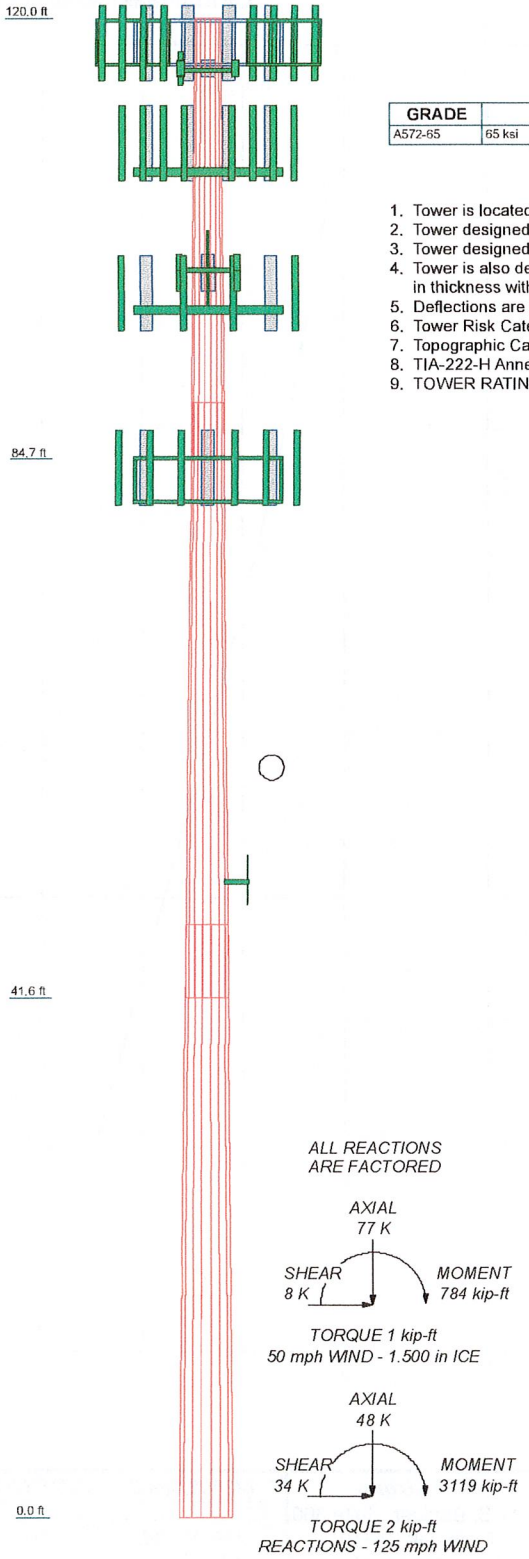
4.1) Recommendations

The tower and its foundations have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	35.284	47.661	47.378
Number of Sides	18	18	18
Thickness (in)	0.375	0.438	0.500
Socket Length (ft)	4.566	5.755	
Top Dia (in)	24.094	30.689	39.787
Bot Dia (in)	32.531	42.031	51.000
Grade	A572-65		
Weight (K)	4.0	8.1	11.5



MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 125 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TIA-222-H Annex S
9. TOWER RATING: 49.9%

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

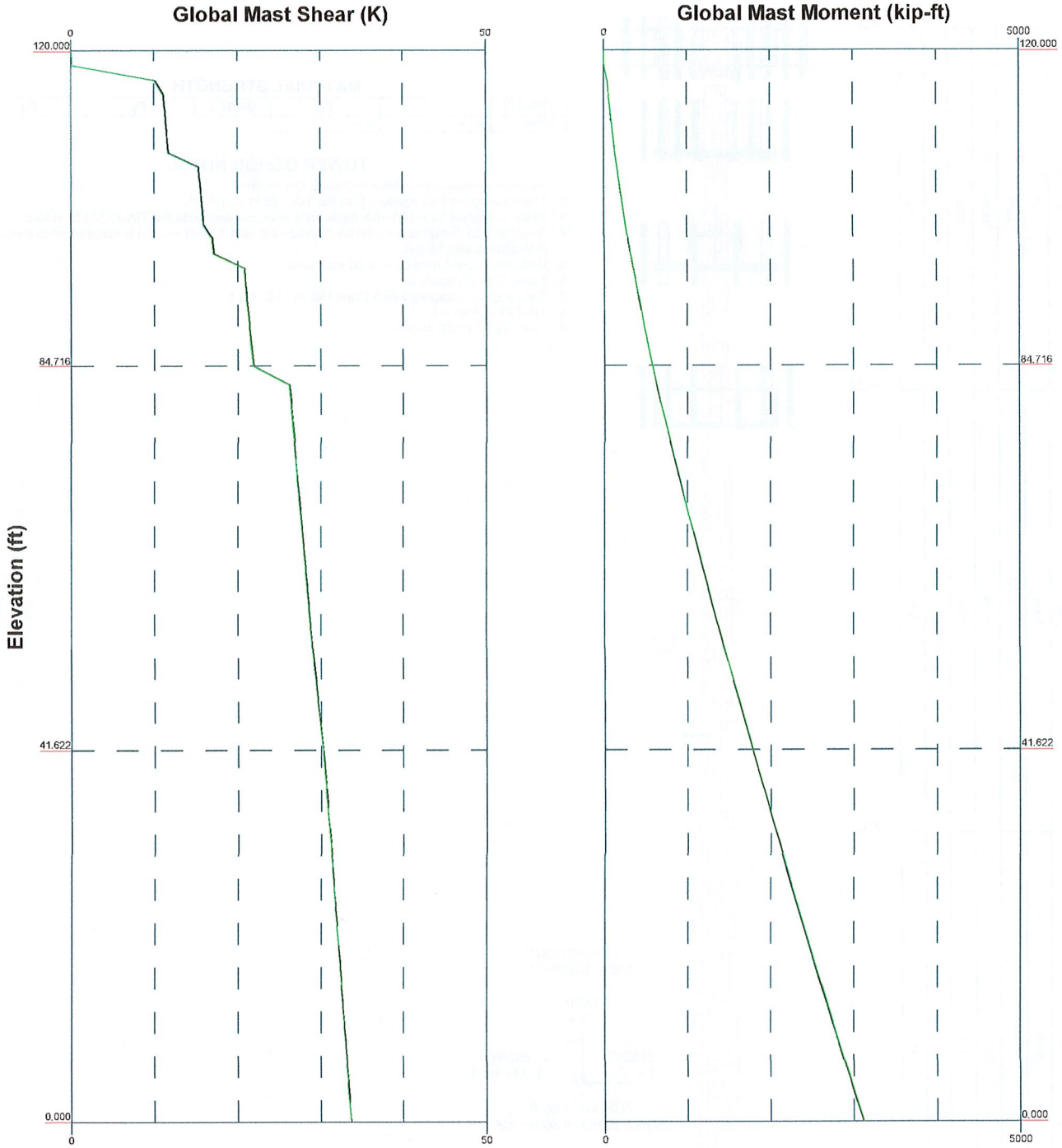
Job: 142902.004.01 - NORTH HAVEN TOWER, CT (BU# 88153			
Project:			
Client: Crown Castle	Drawn by: Suhas Poojary	App'd:	
Code: TIA-222-H	Date: 01/30/21	Scale: NTS	
Path:		Dwg No. E-1	

TIA-222-H - 125 mph/50 mph 1.500 in Ice Exposure C

Vx Vz

Maximum Values

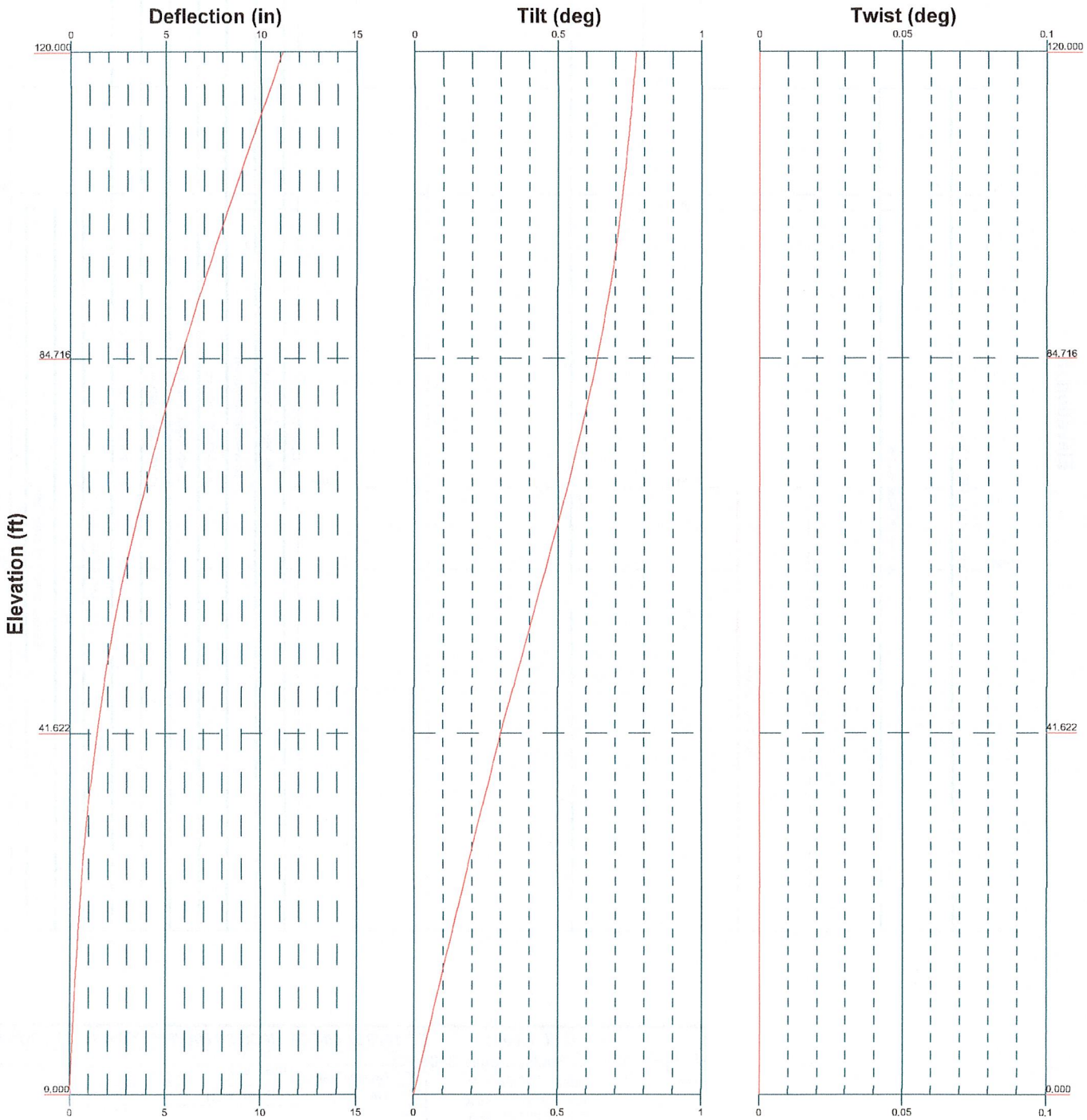
Mx Mz



B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: 142902.004.01 - NORTH HAVEN TOWER, CT (BU# 88153		
	Project:		
	Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Code: TIA-222-H	Date: 01/30/21	Scale: NTS
	Path:		Dwg No. E-4

TIA-222-H - Service - 60 mph

Maximum Values

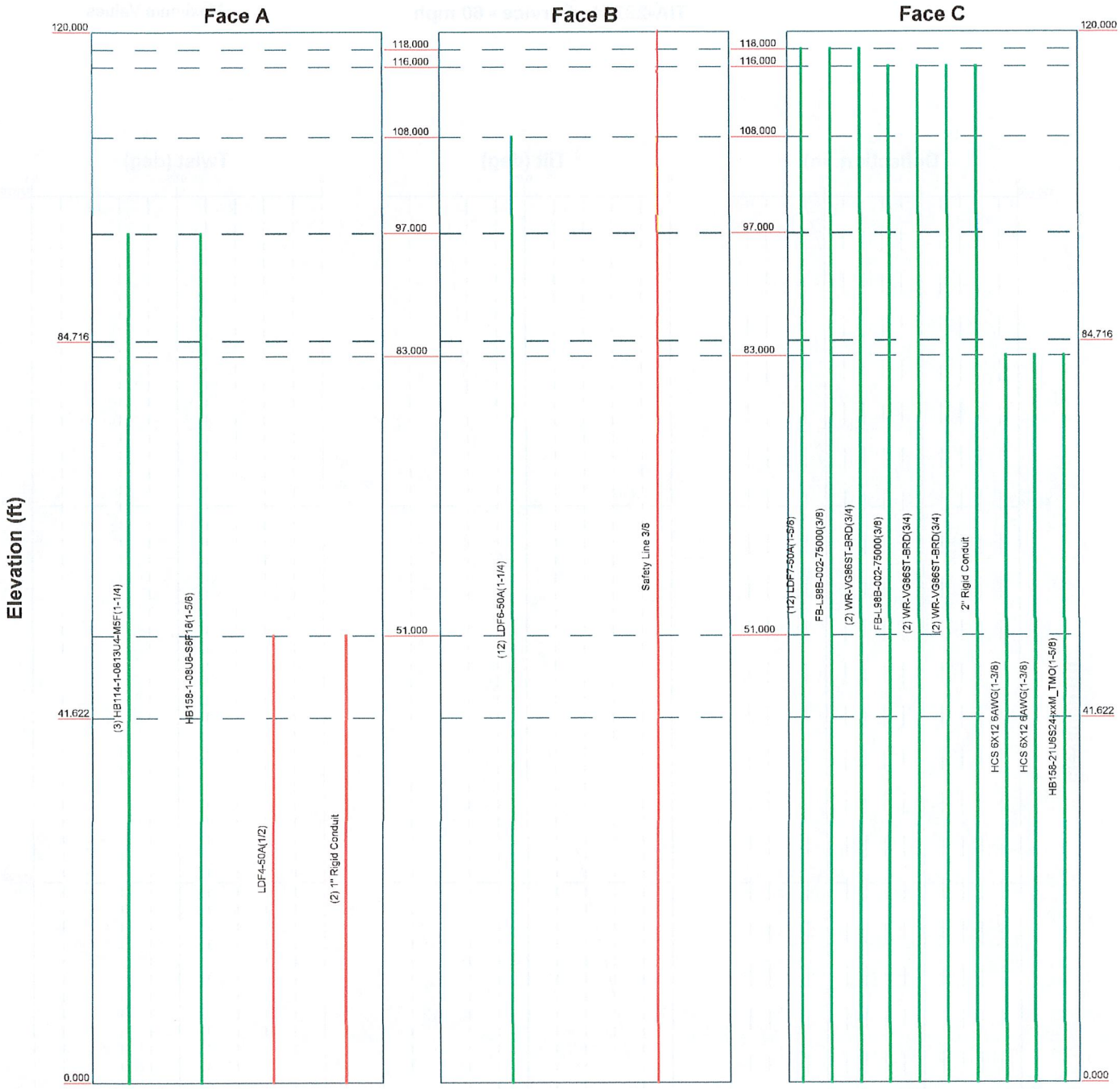


B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
Phone: (918) 587-4630
FAX: (918) 295-0265

Job:	***142902.004.01 - NORTH HAVEN TOWER, CT (BU# 88153***		
Project:			
Client: Crown Castle	Drawn by: Suhas Poojary	App'd:	
Code: TIA-222-H	Date: 01/30/21	Scale: NTS	
Path:		Dwg No. E-5	

Feed Line Distribution Chart
0' - 120'

Round | Flat | App In Face | App Out Face | Truss Leg



B+T Group 1717 S. Boulder, Suite 300 Tulsa, OK 74119 Phone: (918) 587-4630 FAX: (918) 295-0265	Job: 142902.004.01 - NORTH HAVEN TOWER, CT (BU# 88153		
	Project:		
	Client: Crown Castle	Drawn by: Suhas Poojary	App'd:
	Code: TIA-222-H	Date: 01/30/21	Scale: NTS
	Path:		Dwg No. E-7

Tower Input Data

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

Tower is located in New Haven County, Connecticut.
Tower base elevation above sea level: 18.000 ft.
Basic wind speed of 125 mph.
Risk Category II.
Exposure Category C.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.000 ft.
Nominal ice thickness of 1.500 in.
Ice thickness is considered to increase with height.
Ice density of 56.000 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50.000 °F.
Deflections calculated using a wind speed of 60 mph.
TIA-222-H Annex S.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in pole design is 1.05.
Tower analysis based on target reliabilities in accordance with Annex S.
Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs
Consider Moments - Horizontals
Consider Moments - Diagonals
Use Moment Magnification
Use Code Stress Ratios
√ Use Code Safety Factors - Guys
Escalate Ice
Always Use Max Kz
Use Special Wind Profile
Include Bolts In Member Capacity
Leg Bolts Are At Top Of Section
Secondary Horizontal Braces Leg
Use Diamond Inner Bracing (4 Sided)
SR Members Have Cut Ends
SR Members Are Concentric

Distribute Leg Loads As Uniform
Assume Legs Pinned
√ Assume Rigid Index Plate
√ Use Clear Spans For Wind Area
Use Clear Spans For KL/r
Retension Guys To Initial Tension
√ Bypass Mast Stability Checks
√ Use Azimuth Dish Coefficients
√ Project Wind Area of Appurt.
Autocalc Torque Arm Areas
Add IBC .6D+W Combination
Sort Capacity Reports By Component
Triangulate Diamond Inner Bracing
Treat Feed Line Bundles As Cylinder
Ignore KL/ry For 60 Deg. Angle Legs

Use ASCE 10 X-Brace Ly Rules
Calculate Redundant Bracing Forces
Ignore Redundant Members in FEA
SR Leg Bolts Resist Compression
All Leg Panels Have Same Allowable
Offset Girt At Foundation
√ Consider Feed Line Torque
Include Angle Block Shear Check
Use TIA-222-H Bracing Resist. Exemption
Use TIA-222-H Tension Splice Exemption

Poles

√ Include Shear-Torsion Interaction
Always Use Sub-Critical Flow
Use Top Mounted Sockets
Pole Without Linear Attachments
Pole With Shroud Or No Appurtenances
Outside and Inside Corner Radii Are Known

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.000-84.716	35.284	4.568	18	24.094	32.531	0.375	1.500	A572-65 (65 ksi)
L2	84.716-41.622	47.661	5.755	18	30.689	42.031	0.438	1.750	A572-65 (65 ksi)
L3	41.622-0.000	47.378		18	39.787	51.000	0.500	2.000	A572-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	24.408	28.231	2006.555	8.420	12.240	163.939	4015.750	14.118	3.580	9.548
	32.975	38.274	5000.021	11.415	16.526	302.557	10006.621	19.141	5.066	13.508
L2	32.199	42.008	4856.928	10.739	15.590	311.541	9720.247	21.008	4.631	10.586
	42.612	57.758	12624.281	14.766	21.352	591.249	25265.174	28.885	6.628	15.149
L3	41.706	62.348	12157.641	13.947	20.212	601.517	24331.279	31.180	6.122	12.245
	51.710	80.144	25821.919	17.927	25.908	996.677	51677.815	40.079	8.096	16.192

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 120.000-84.716				1	1	1			
L2 84.716-41.622				1	1	1			
L3 41.622-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
* LDF4-50A(1/2)	A	No	Surface Ar (CaAa)	51.000 - 0.000	1	1	0.200 0.220	0.000		0.000
1" Rigid Conduit *	A	No	Surface Ar (CaAa)	51.000 - 0.000	2	2	0.000 0.000	1.000		0.001
Safety Line 3/8 *	B	No	Surface Ar (CaAa)	120.000 - 0.000	1	1	0.400 0.410	0.375		0.000

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF7-50A(1-5/8)	C	No	No	Inside Pole	118.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
FB-L98B-002-75000 (3/8)	C	No	No	Inside Pole	118.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	118.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
*									
FB-L98B-002-75000 (3/8)	C	No	No	Inside Pole	116.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
							2" Ice	0.000	0.000
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	116.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	116.000 - 0.000	2	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
2" Rigid Conduit	C	No	No	Inside Pole	116.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
*									
LDF6-50A(1-1/4)	B	No	No	Inside Pole	108.000 - 0.000	12	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
*									
HB114-1-0813U4-M 5F(1-1/4)	A	No	No	Inside Pole	97.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001
							2" Ice	0.000	0.001
HB158-1-08U8-S8F 18(1-5/8)	A	No	No	Inside Pole	97.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
*									
HCS 6X12 6AWG(1-3/8)	C	No	No	Inside Pole	83.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
HCS 6X12 6AWG(1-3/8)	C	No	No	Inside Pole	83.000 - 0.000	1	No Ice	0.000	0.002
							1/2" Ice	0.000	0.002
							1" Ice	0.000	0.002
							2" Ice	0.000	0.002
HB158-21U6S24-xx M_TMO(1-5/8)	C	No	No	Inside Pole	83.000 - 0.000	1	No Ice	0.000	0.003
							1/2" Ice	0.000	0.003
							1" Ice	0.000	0.003
							2" Ice	0.000	0.003
*									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-84.716	A	0.000	0.000	0.000	0.000	0.065
		B	0.000	0.000	1.323	0.000	0.175
		C	0.000	0.000	0.000	0.000	0.531
L2	84.716-41.622	A	0.000	0.000	1.876	0.000	0.241
		B	0.000	0.000	1.616	0.000	0.320
		C	0.000	0.000	0.000	0.000	0.945
L3	41.622-0.000	A	0.000	0.000	8.324	0.000	0.277
		B	0.000	0.000	1.561	0.000	0.309
		C	0.000	0.000	0.000	0.000	0.922

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-84.716	A	1.427	0.000	0.000	0.000	0.000	0.065
		B		0.000	0.000	11.392	0.000	0.286
		C		0.000	0.000	0.000	0.000	0.531
L2	84.716-41.622	A	1.359	0.000	0.000	8.365	0.000	0.315
		B		0.000	0.000	13.913	0.000	0.455
		C		0.000	0.000	0.000	0.000	0.945
L3	41.622-0.000	A	1.218	0.000	0.000	35.864	0.000	0.581
		B		0.000	0.000	12.876	0.000	0.429
		C		0.000	0.000	0.000	0.000	0.922

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.000-84.716	0.286	0.096	1.262	0.425
L2	84.716-41.622	-0.054	-0.099	0.557	-0.109
L3	41.622-0.000	-1.056	-0.674	-1.342	-1.495

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	24	Safety Line 3/8	84.72 - 120.00	1.0000	1.0000
L2	21	LDF4-50A(1/2)	41.62 - 51.00	1.0000	1.0000
L2	22	1" Rigid Conduit	41.62 - 51.00	1.0000	1.0000
L2	24	Safety Line 3/8	41.62 - 84.72	1.0000	1.0000
L3	21	LDF4-50A(1/2)	0.00 - 41.62	1.0000	1.0000
L3	22	1" Rigid Conduit	0.00 - 41.62	1.0000	1.0000
L3	24	Safety Line 3/8	0.00 - 41.62	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.746 6.179 6.607 7.488	4.254 5.014 5.711 7.155	0.055 0.103 0.157 0.287
OPA-65R-LCUU-H6 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.190 9.940 10.710 12.300	6.210 6.930 7.660 9.170	0.106 0.175 0.256 0.451
OPA-65R-LCUU-H6 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.190 9.940 10.710 12.300	6.210 6.930 7.660 9.170	0.106 0.175 0.256 0.451
OPA-65R-LCUU-H6 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	9.190 9.940 10.710 12.300	6.210 6.930 7.660 9.170	0.106 0.175 0.256 0.451
(2) 80010966 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.610 15.470 16.350 18.140	6.840 7.630 8.420 10.060	0.159 0.267 0.389 0.677
(2) 80010966 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.610 15.470 16.350 18.140	6.840 7.630 8.420 10.060	0.159 0.267 0.389 0.677
(2) 80010966 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	118.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.610 15.470 16.350 18.140	6.840 7.630 8.420 10.060	0.159 0.267 0.389 0.677
(2) LGP21401	A	From Leg	4.000 0.000	0.000	118.000	No Ice 1/2" Ice	1.104 1.239	0.207 0.274	0.014 0.021

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			3.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
(2) LGP21401	B	From Leg	4.000	0.000	118.000	No Ice	1.104	0.207	0.014
			0.000			1/2" Ice	1.239	0.274	0.021
			3.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
(2) LGP21401	C	From Leg	4.000	0.000	118.000	No Ice	1.104	0.207	0.014
			0.000			1/2" Ice	1.239	0.274	0.021
			3.000			1" Ice	1.381	0.348	0.030
						2" Ice	1.688	0.521	0.055
RRUS 32	A	From Leg	4.000	0.000	118.000	No Ice	2.857	1.777	0.055
			0.000			1/2" Ice	3.083	1.968	0.077
			3.000			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	B	From Leg	4.000	0.000	118.000	No Ice	2.857	1.777	0.055
			0.000			1/2" Ice	3.083	1.968	0.077
			3.000			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
RRUS 32	C	From Leg	4.000	0.000	118.000	No Ice	2.857	1.777	0.055
			0.000			1/2" Ice	3.083	1.968	0.077
			3.000			1" Ice	3.316	2.166	0.103
						2" Ice	3.805	2.583	0.165
(2) TPX-070821	A	From Leg	4.000	0.000	118.000	No Ice	0.469	0.101	0.008
			0.000			1/2" Ice	0.559	0.147	0.011
			3.000			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
(2) TPX-070821	B	From Leg	4.000	0.000	118.000	No Ice	0.469	0.101	0.008
			0.000			1/2" Ice	0.559	0.147	0.011
			3.000			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
(2) TPX-070821	C	From Leg	4.000	0.000	118.000	No Ice	0.469	0.101	0.008
			0.000			1/2" Ice	0.559	0.147	0.011
			3.000			1" Ice	0.656	0.202	0.016
						2" Ice	0.872	0.334	0.030
RRUS 4449 B5/B12	A	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			3.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	B	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			3.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
RRUS 4449 B5/B12	C	From Leg	4.000	0.000	118.000	No Ice	1.968	1.408	0.071
			0.000			1/2" Ice	2.144	1.564	0.090
			3.000			1" Ice	2.328	1.727	0.111
						2" Ice	2.718	2.075	0.163
DC6-48-60-18-8F	A	From Leg	4.000	0.000	118.000	No Ice	1.212	1.212	0.033
			0.000			1/2" Ice	1.892	1.892	0.055
			3.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
CBC23SR-43	A	From Leg	4.000	0.000	118.000	No Ice	0.417	0.145	0.005
			0.000			1/2" Ice	0.500	0.202	0.009
			3.000			1" Ice	0.590	0.266	0.013
						2" Ice	0.792	0.420	0.026
CBC23SR-43	B	From Leg	4.000	0.000	118.000	No Ice	0.417	0.145	0.005
			0.000			1/2" Ice	0.500	0.202	0.009
			3.000			1" Ice	0.590	0.266	0.013

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	0.792	0.420	0.026
CBC23SR-43	C	From Leg	4.000	0.000	118.000	No Ice	0.417	0.145	0.005
			0.000			1/2" Ice	0.500	0.202	0.009
			3.000			1" Ice	0.590	0.266	0.013
						2" Ice	0.792	0.420	0.026
ION-M23 SDARS	A	From Leg	4.000	0.000	118.000	No Ice	1.838	1.764	0.048
			0.000			1/2" Ice	2.051	1.975	0.063
			3.000			1" Ice	2.270	2.193	0.082
						2" Ice	2.731	2.650	0.128
ION-M23 SDARS	B	From Leg	4.000	0.000	118.000	No Ice	1.838	1.764	0.048
			0.000			1/2" Ice	2.051	1.975	0.063
			3.000			1" Ice	2.270	2.193	0.082
						2" Ice	2.731	2.650	0.128
ION-M23 SDARS	C	From Leg	4.000	0.000	118.000	No Ice	1.838	1.764	0.048
			0.000			1/2" Ice	2.051	1.975	0.063
			3.000			1" Ice	2.270	2.193	0.082
						2" Ice	2.731	2.650	0.128
DC6-48-60-0-8C-EV	A	From Leg	4.000	0.000	118.000	No Ice	2.736	4.783	0.026
			0.000			1/2" Ice	2.962	5.063	0.063
			3.000			1" Ice	3.195	5.350	0.104
						2" Ice	3.683	5.947	0.200
10'6"x2-3/8" Pipe Mount	A	From Leg	4.000	0.000	118.000	No Ice	2.494	2.494	0.036
			0.000			1/2" Ice	3.572	3.572	0.055
			0.000			1" Ice	4.667	4.667	0.080
						2" Ice	6.317	6.317	0.152
10'6"x2-3/8" Pipe Mount	B	From Leg	4.000	0.000	118.000	No Ice	2.494	2.494	0.036
			0.000			1/2" Ice	3.572	3.572	0.055
			0.000			1" Ice	4.667	4.667	0.080
						2" Ice	6.317	6.317	0.152
10'6"x2-3/8" Pipe Mount	C	From Leg	4.000	0.000	118.000	No Ice	2.494	2.494	0.036
			0.000			1/2" Ice	3.572	3.572	0.055
			0.000			1" Ice	4.667	4.667	0.080
						2" Ice	6.317	6.317	0.152
(2) 5' x 2" Pipe Mount	A	From Leg	4.000	0.000	118.000	No Ice	1.188	1.188	0.018
			0.000			1/2" Ice	1.496	1.496	0.027
			0.000			1" Ice	1.807	1.807	0.040
						2" Ice	2.458	2.458	0.076
Pipe Mount [PM 601-3]	C	None		0.000	118.000	No Ice	3.170	3.170	0.195
						1/2" Ice	3.790	3.790	0.232
						1" Ice	4.420	4.420	0.279
						2" Ice	5.760	5.760	0.401
(2) Side Arm Mount [SO 102-3]	C	None		0.000	118.000	No Ice	3.600	3.600	0.075
						1/2" Ice	4.180	4.180	0.105
						1" Ice	4.750	4.750	0.135
						2" Ice	5.900	5.900	0.195
Sector Mount [SM 504-3]	C	None		0.000	118.000	No Ice	31.050	31.050	1.708
						1/2" Ice	43.830	43.830	2.326
						1" Ice	56.440	56.440	3.143
						2" Ice	81.280	81.280	5.358
*									
RRUS 4478 B14	A	From Leg	1.500	0.000	116.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	B	From Leg	1.500	0.000	116.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.566	1.656	0.140
RRUS 4478 B14	C	From Leg	1.500	0.000	116.000	No Ice	1.843	1.059	0.060
			0.000			1/2" Ice	2.012	1.197	0.076
			0.000			1" Ice	2.190	1.342	0.094
						2" Ice	2.566	1.656	0.140
RRUS 8843 B2/B66A	A	From Leg	1.500	0.000	116.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			0.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	B	From Leg	1.500	0.000	116.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			0.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
RRUS 8843 B2/B66A	C	From Leg	1.500	0.000	116.000	No Ice	1.639	1.353	0.072
			0.000			1/2" Ice	1.799	1.500	0.090
			0.000			1" Ice	1.966	1.655	0.110
						2" Ice	2.323	1.986	0.159
(2) DC6-48-60-18-8F	C	From Leg	1.500	0.000	116.000	No Ice	1.212	1.212	0.033
			0.000			1/2" Ice	1.892	1.892	0.055
			0.000			1" Ice	2.105	2.105	0.080
						2" Ice	2.570	2.570	0.138
(2) 4' x 2" Pipe Mount	A	From Leg	1.000	0.000	116.000	No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) 4' x 2" Pipe Mount	B	From Leg	1.000	0.000	116.000	No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
(2) 4' x 2" Pipe Mount	C	From Leg	1.000	0.000	116.000	No Ice	0.785	0.785	0.029
			0.000			1/2" Ice	1.028	1.028	0.035
			0.000			1" Ice	1.281	1.281	0.044
						2" Ice	1.814	1.814	0.072
4' x 2" Horizontal Face Mount Pipe	C	From Leg	1.000	0.000	116.000	No Ice	0.870	0.010	0.015
			0.000			1/2" Ice	1.110	0.050	0.022
			0.000			1" Ice	1.370	0.100	0.032
						2" Ice	1.900	0.240	0.061
Side Arm Mount [SO 104-3]	C	None		0.000	116.000	No Ice	2.620	2.620	0.288
						1/2" Ice	3.300	3.300	0.408
						1" Ice	3.980	3.980	0.528
						2" Ice	5.350	5.350	0.768
*									
(4) 844G65VTZASX w/ Mount Pipe	A	From Leg	4.000	0.000	108.000	No Ice	5.548	5.041	0.034
			0.000			1/2" Ice	5.941	5.667	0.087
			2.000			1" Ice	6.342	6.298	0.145
						2" Ice	7.168	7.611	0.283
(4) 844G65VTZASX w/ Mount Pipe	B	From Leg	4.000	0.000	108.000	No Ice	5.548	5.041	0.034
			0.000			1/2" Ice	5.941	5.667	0.087
			2.000			1" Ice	6.342	6.298	0.145
						2" Ice	7.168	7.611	0.283
(4) 844G65VTZASX w/ Mount Pipe	C	From Leg	4.000	0.000	108.000	No Ice	5.548	5.041	0.034
			0.000			1/2" Ice	5.941	5.667	0.087
			2.000			1" Ice	6.342	6.298	0.145
						2" Ice	7.168	7.611	0.283
Platform Mount [LP 303-1]	C	None		0.000	108.000	No Ice	14.690	14.690	1.250
						1/2" Ice	18.010	18.010	1.569
						1" Ice	21.340	21.340	1.942

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
								2" Ice	28.080	28.080	2.852
*											
TME-1900MHZ RRH (65MHZ)	A	From Leg	1.500	0.000	0.000	0.000	100.000	No Ice	2.313	2.375	0.060
								1/2" Ice	2.517	2.581	0.084
								1" Ice	2.728	2.794	0.111
								2" Ice	3.174	3.243	0.176
TME-1900MHZ RRH (65MHZ)	B	From Leg	1.500	0.000	0.000	0.000	100.000	No Ice	2.313	2.375	0.060
								1/2" Ice	2.517	2.581	0.084
								1" Ice	2.728	2.794	0.111
								2" Ice	3.174	3.243	0.176
TME-1900MHZ RRH (65MHZ)	C	From Leg	1.500	0.000	0.000	0.000	100.000	No Ice	2.313	2.375	0.060
								1/2" Ice	2.517	2.581	0.084
								1" Ice	2.728	2.794	0.111
								2" Ice	3.174	3.243	0.176
TME-800MHZ RRH	A	From Leg	1.500	0.000	-1.000	0.000	100.000	No Ice	2.134	1.773	0.053
								1/2" Ice	2.320	1.946	0.074
								1" Ice	2.512	2.127	0.098
								2" Ice	2.920	2.510	0.157
TME-800MHZ RRH	B	From Leg	1.500	0.000	-1.000	0.000	100.000	No Ice	2.134	1.773	0.053
								1/2" Ice	2.320	1.946	0.074
								1" Ice	2.512	2.127	0.098
								2" Ice	2.920	2.510	0.157
TME-800MHZ RRH	C	From Leg	1.500	0.000	-1.000	0.000	100.000	No Ice	2.134	1.773	0.053
								1/2" Ice	2.320	1.946	0.074
								1" Ice	2.512	2.127	0.098
								2" Ice	2.920	2.510	0.157
Pipe Mount [PM 601-3]	C	None				0.000	100.000	No Ice	3.170	3.170	0.195
								1/2" Ice	3.790	3.790	0.232
								1" Ice	4.420	4.420	0.279
								2" Ice	5.760	5.760	0.401
Side Arm Mount [SO 102-3]	C	None				0.000	100.000	No Ice	3.600	3.600	0.075
								1/2" Ice	4.180	4.180	0.105
								1" Ice	4.750	4.750	0.135
								2" Ice	5.900	5.900	0.195
*											
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000	0.000	1.000	0.000	97.000	No Ice	4.090	2.860	0.077
								1/2" Ice	4.480	3.230	0.127
								1" Ice	4.880	3.610	0.185
								2" Ice	5.710	4.400	0.331
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000	0.000	1.000	0.000	97.000	No Ice	4.090	2.860	0.077
								1/2" Ice	4.480	3.230	0.127
								1" Ice	4.880	3.610	0.185
								2" Ice	5.710	4.400	0.331
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000	0.000	1.000	0.000	97.000	No Ice	4.090	2.860	0.077
								1/2" Ice	4.480	3.230	0.127
								1" Ice	4.880	3.610	0.185
								2" Ice	5.710	4.400	0.331
P40-16-XLPP-RR-A w/ Mount Pipe	A	From Leg	4.000	0.000	1.000	0.000	97.000	No Ice	7.240	3.310	0.084
								1/2" Ice	7.730	3.730	0.147
								1" Ice	8.240	4.160	0.219
								2" Ice	9.280	5.060	0.393
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	0.000	1.000	0.000	97.000	No Ice	4.600	4.010	0.095
								1/2" Ice	5.050	4.450	0.160
								1" Ice	5.500	4.890	0.235
								2" Ice	6.440	5.820	0.419
P40-16-XLPP-RR-A w/ Mount Pipe	C	From Leg	4.000	0.000	0.000	0.000	97.000	No Ice	7.240	3.310	0.084
								1/2" Ice	7.730	3.730	0.147

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			1.000			1" Ice	8.240	4.160	0.219
						2" Ice	9.280	5.060	0.393
(3) ACU-A20-N	A	From Leg	4.000	0.000	97.000	No Ice	0.067	0.117	0.001
			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
(3) ACU-A20-N	B	From Leg	4.000	0.000	97.000	No Ice	0.067	0.117	0.001
			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
(3) ACU-A20-N	C	From Leg	4.000	0.000	97.000	No Ice	0.067	0.117	0.001
			0.000			1/2" Ice	0.104	0.162	0.002
			1.000			1" Ice	0.148	0.215	0.004
						2" Ice	0.259	0.343	0.012
800 EXTERNAL NOTCH FILTER	A	From Leg	4.000	0.000	97.000	No Ice	0.660	0.321	0.011
			0.000			1/2" Ice	0.763	0.398	0.017
			1.000			1" Ice	0.873	0.483	0.024
						2" Ice	1.115	0.674	0.045
800 EXTERNAL NOTCH FILTER	B	From Leg	4.000	0.000	97.000	No Ice	0.660	0.321	0.011
			0.000			1/2" Ice	0.763	0.398	0.017
			1.000			1" Ice	0.873	0.483	0.024
						2" Ice	1.115	0.674	0.045
800 EXTERNAL NOTCH FILTER	C	From Leg	4.000	0.000	97.000	No Ice	0.660	0.321	0.011
			0.000			1/2" Ice	0.763	0.398	0.017
			1.000			1" Ice	0.873	0.483	0.024
						2" Ice	1.115	0.674	0.045
TD-RRH8X20-25	A	From Leg	4.000	0.000	97.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	B	From Leg	4.000	0.000	97.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
TD-RRH8X20-25	C	From Leg	4.000	0.000	97.000	No Ice	4.045	1.535	0.070
			0.000			1/2" Ice	4.298	1.714	0.097
			2.000			1" Ice	4.557	1.901	0.128
						2" Ice	5.098	2.295	0.201
Climbing Ladder (Flat)	B	From Leg	3.000	0.000	97.000	No Ice	5.844	5.844	0.048
			0.000			1/2" Ice	10.300	10.300	0.071
			-3.000			1" Ice	14.756	14.756	0.094
						2" Ice	23.668	23.668	0.140
7'x2" Antenna Mount Pipe	A	From Leg	4.000	0.000	97.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
						2" Ice	3.706	3.706	0.105
7'x2" Antenna Mount Pipe	B	From Leg	4.000	0.000	97.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
						2" Ice	3.706	3.706	0.105
7'x2" Antenna Mount Pipe	C	From Leg	4.000	0.000	97.000	No Ice	1.663	1.663	0.026
			0.000			1/2" Ice	2.391	2.391	0.039
			0.000			1" Ice	2.825	2.825	0.056
						2" Ice	3.706	3.706	0.105
Platform Mount [LP 601-1]	C	None		0.000	97.000	No Ice	28.500	28.500	1.122
						1/2" Ice	31.690	31.690	1.676
						1" Ice	34.870	34.870	2.282

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	41.230	41.230	3.653
*									
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	6.747 7.202 7.648 8.565	6.070 6.867 7.583 9.063	0.153 0.214 0.282 0.441
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	14.690 15.460 16.230 17.820	6.870 7.550 8.250 9.670	0.186 0.315 0.458 0.788
RADIO 4449 B71/B85A	A	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	1.310 1.455 1.608 1.936	0.075 0.092 0.112 0.161
RADIO 4449 B71/B85A	B	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	1.310 1.455 1.608 1.936	0.075 0.092 0.112 0.161
RADIO 4449 B71/B85A	C	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.644 1.804 1.972 2.329	1.310 1.455 1.608 1.936	0.075 0.092 0.112 0.161
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	5.870 6.233 6.606 7.382	3.270 3.728 4.203 5.200	0.128 0.177 0.232 0.359
RRUS 4415 B25_CCIV2	A	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice 2" Ice	1.843 2.012 2.190 2.566	0.820 0.943 1.075 1.368	0.046 0.060 0.077 0.118
RRUS 4415 B25_CCIV2	B	From Leg	4.000 0.000 1.000	0.000	83.000	No Ice 1/2" Ice 1" Ice	1.843 2.012 2.190	0.820 0.943 1.075	0.046 0.060 0.077

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						2" Ice	2.566	1.368	0.118
RRUS 4415 B25_CCIV2	C	From Leg	4.000	0.000	83.000	No Ice	1.843	0.820	0.046
			0.000			1/2" Ice	2.012	0.943	0.060
			1.000			1" Ice	2.190	1.075	0.077
						2" Ice	2.566	1.368	0.118
8' x 2" Mount Pipe	A	From Leg	4.000	0.000	83.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
8' x 2" Mount Pipe	B	From Leg	4.000	0.000	83.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
8' x 2" Mount Pipe	C	From Leg	4.000	0.000	83.000	No Ice	1.900	1.900	0.029
			0.000			1/2" Ice	2.728	2.728	0.044
			0.000			1" Ice	3.401	3.401	0.063
						2" Ice	4.396	4.396	0.119
Platform Mount [LP 303-1_HR-1]	C	None		0.000	83.000	No Ice	17.090	17.090	1.495
						1/2" Ice	21.470	21.470	1.881
						1" Ice	25.720	25.720	2.346
						2" Ice	33.960	33.960	3.518
*									
KS24019-L112A	B	From Leg	2.000	0.000	51.000	No Ice	0.141	0.141	0.005
			0.000			1/2" Ice	0.198	0.198	0.007
			1.000			1" Ice	0.262	0.262	0.009
						2" Ice	0.415	0.415	0.018
2' x 2" Pipe Mount	B	From Leg	2.000	0.000	51.000	No Ice	0.023	0.023	0.007
			0.000			1/2" Ice	0.049	0.049	0.008
			0.000			1" Ice	0.085	0.085	0.009
						2" Ice	0.186	0.186	0.013
Side Arm Mount [SO 901-1]	B	From Leg	1.000	0.000	51.000	No Ice	0.330	0.620	0.105
			0.000			1/2" Ice	0.460	0.780	0.113
			0.000			1" Ice	0.620	0.970	0.123
						2" Ice	1.010	1.430	0.153
*									

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice

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

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 84.7161	Pole	Max Tension	14	0.000	0.000	0.000
			Max. Compression	26	-33.873	-0.080	1.355
			Max. Mx	8	-15.230	-477.074	1.226
			Max. My	2	-15.238	-1.007	473.949
			Max. Vy	8	21.400	-477.074	1.226
			Max. Vx	2	-21.339	-1.007	473.949
			Max. Torque	9			2.127
L2	84.7161 - 41.6224	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-56.005	-0.584	1.280
			Max. Mx	8	-30.435	-1609.639	4.291
			Max. My	2	-30.439	-4.569	1603.458
			Max. Vy	8	29.618	-1609.639	4.291
			Max. Vx	2	-29.563	-4.569	1603.458

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	22			-1.625
L3	41.6224 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-77.364	-0.184	1.795
			Max. Mx	8	-48.429	-3114.212	8.175
			Max. My	2	-48.429	-8.277	3105.679
			Max. Vy	8	33.689	-3114.212	8.175
			Max. Vx	2	-33.638	-8.277	3105.679
			Max. Torque	22			-1.622

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	28	77.364	-4.219	7.283
	Max. H_x	20	48.451	33.657	-0.079
	Max. H_z	2	48.451	-0.079	33.606
	Max. M_x	2	3105.679	-0.079	33.606
	Max. M_z	8	3114.212	-33.657	0.079
	Max. Torsion	10	1.621	-29.109	-16.735
	Min. Vert	25	36.338	16.760	29.064
	Min. H_x	8	48.451	-33.657	0.079
	Min. H_z	14	48.451	0.079	-33.606
	Min. M_x	14	-3105.241	0.079	-33.606
	Min. M_z	20	-3113.572	33.657	-0.079
	Min. Torsion	22	-1.621	29.109	16.735

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	40.376	0.000	0.000	-0.173	-0.257	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	48.451	0.079	-33.606	-3105.679	-8.277	1.052
0.9 Dead+1.0 Wind 0 deg - No Ice	36.338	0.079	-33.606	-3083.143	-8.138	1.051
1.2 Dead+1.0 Wind 30 deg - No Ice	48.451	16.897	-29.143	-2693.598	-1564.162	0.279
0.9 Dead+1.0 Wind 30 deg - No Ice	36.338	16.897	-29.143	-2674.044	-1552.751	0.278
1.2 Dead+1.0 Wind 60 deg - No Ice	48.451	29.188	-16.871	-1559.831	-2701.009	-0.569
0.9 Dead+1.0 Wind 60 deg - No Ice	36.338	29.188	-16.871	-1548.485	-2681.362	-0.569
1.2 Dead+1.0 Wind 90 deg - No Ice	48.451	33.657	-0.079	-8.174	-3114.212	-1.264
0.9 Dead+1.0 Wind 90 deg - No Ice	36.338	33.657	-0.079	-8.061	-3091.573	-1.264
1.2 Dead+1.0 Wind 120 deg - No Ice	48.451	29.109	16.735	1545.622	-2693.060	-1.621
0.9 Dead+1.0 Wind 120 deg - No Ice	36.338	29.109	16.735	1534.488	-2673.471	-1.620

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
1.2 Dead+1.0 Wind 150 deg - No Ice	48.451	16.760	29.064	2685.218	-1550.379	-1.543
0.9 Dead+1.0 Wind 150 deg - No Ice	36.338	16.760	29.064	2665.835	-1539.069	-1.542
1.2 Dead+1.0 Wind 180 deg - No Ice	48.451	-0.079	33.606	3105.241	7.644	-1.052
0.9 Dead+1.0 Wind 180 deg - No Ice	36.338	-0.079	33.606	3082.820	7.668	-1.051
1.2 Dead+1.0 Wind 210 deg - No Ice	48.451	-16.897	29.143	2693.160	1563.523	-0.279
0.9 Dead+1.0 Wind 210 deg - No Ice	36.338	-16.897	29.143	2673.720	1552.276	-0.278
1.2 Dead+1.0 Wind 240 deg - No Ice	48.451	-29.188	16.871	1559.398	2700.367	0.569
0.9 Dead+1.0 Wind 240 deg - No Ice	36.338	-29.188	16.871	1548.165	2680.885	0.569
1.2 Dead+1.0 Wind 270 deg - No Ice	48.451	-33.657	0.079	7.746	3113.572	1.264
0.9 Dead+1.0 Wind 270 deg - No Ice	36.338	-33.657	0.079	7.745	3091.098	1.264
1.2 Dead+1.0 Wind 300 deg - No Ice	48.451	-29.109	-16.735	-1546.050	2692.426	1.621
0.9 Dead+1.0 Wind 300 deg - No Ice	36.338	-29.109	-16.735	-1534.804	2673.000	1.620
1.2 Dead+1.0 Wind 330 deg - No Ice	48.451	-16.760	-29.064	-2685.650	1549.749	1.543
0.9 Dead+1.0 Wind 330 deg - No Ice	36.338	-16.760	-29.064	-2666.154	1538.600	1.542
1.2 Dead+1.0 Ice+1.0 Temp	77.364	0.000	0.000	-1.795	-0.184	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	77.364	0.015	-8.401	-782.033	-1.791	0.520
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	77.364	4.219	-7.283	-678.312	-392.491	0.394
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	77.364	7.292	-4.214	-393.358	-678.079	0.162
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	77.364	8.412	-0.015	-3.525	-782.033	-0.114
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	77.364	7.277	4.188	386.733	-676.497	-0.358
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	77.364	4.193	7.268	672.845	-389.751	-0.507
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	77.364	-0.015	8.401	778.148	1.373	-0.520
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	77.364	-4.219	7.283	674.426	392.072	-0.394
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	77.364	-7.292	4.214	389.472	677.660	-0.162
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	77.364	-8.412	0.015	-0.360	781.613	0.114
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	77.364	-7.277	-4.188	-390.617	676.078	0.358
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	77.364	-4.193	-7.268	-676.729	389.332	0.507
Dead+Wind 0 deg - Service	40.376	0.017	-7.292	-671.216	-1.985	0.229
Dead+Wind 30 deg - Service	40.376	3.667	-6.324	-582.175	-338.184	0.060
Dead+Wind 60 deg - Service	40.376	6.334	-3.661	-337.188	-583.838	-0.124
Dead+Wind 90 deg - Service	40.376	7.304	-0.017	-1.901	-673.124	-0.276
Dead+Wind 120 deg - Service	40.376	6.317	3.631	333.846	-582.118	-0.353
Dead+Wind 150 deg - Service	40.376	3.637	6.307	580.092	-335.205	-0.336
Dead+Wind 180 deg - Service	40.376	-0.017	7.292	670.853	1.455	-0.229
Dead+Wind 210 deg - Service	40.376	-3.667	6.324	581.812	337.653	-0.060

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead+Wind 240 deg - Service	40.376	-6.334	3.661	336.825	583.307	0.124
Dead+Wind 270 deg - Service	40.376	-7.304	0.017	1.539	672.593	0.276
Dead+Wind 300 deg - Service	40.376	-6.317	-3.631	-334.209	581.587	0.353
Dead+Wind 330 deg - Service	40.376	-3.637	-6.307	-580.455	334.674	0.336

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX K	PY K	PZ K	PX K	PY K	PZ K	% Error
1	0.000	-40.376	0.000	0.000	40.376	0.000	0.000%
2	0.079	-48.451	-33.606	-0.079	48.451	33.606	0.000%
3	0.079	-36.338	-33.606	-0.079	36.338	33.606	0.000%
4	16.897	-48.451	-29.143	-16.897	48.451	29.143	0.000%
5	16.897	-36.338	-29.143	-16.897	36.338	29.143	0.000%
6	29.188	-48.451	-16.871	-29.188	48.451	16.871	0.000%
7	29.188	-36.338	-16.871	-29.188	36.338	16.871	0.000%
8	33.657	-48.451	-0.079	-33.657	48.451	0.079	0.000%
9	33.657	-36.338	-0.079	-33.657	36.338	0.079	0.000%
10	29.109	-48.451	16.735	-29.109	48.451	-16.735	0.000%
11	29.109	-36.338	16.735	-29.109	36.338	-16.735	0.000%
12	16.760	-48.451	29.064	-16.760	48.451	-29.064	0.000%
13	16.760	-36.338	29.064	-16.760	36.338	-29.064	0.000%
14	-0.079	-48.451	33.606	0.079	48.451	-33.606	0.000%
15	-0.079	-36.338	33.606	0.079	36.338	-33.606	0.000%
16	-16.897	-48.451	29.143	16.897	48.451	-29.143	0.000%
17	-16.897	-36.338	29.143	16.897	36.338	-29.143	0.000%
18	-29.188	-48.451	16.871	29.188	48.451	-16.871	0.000%
19	-29.188	-36.338	16.871	29.188	36.338	-16.871	0.000%
20	-33.657	-48.451	0.079	33.657	48.451	-0.079	0.000%
21	-33.657	-36.338	0.079	33.657	36.338	-0.079	0.000%
22	-29.109	-48.451	-16.735	29.109	48.451	16.735	0.000%
23	-29.109	-36.338	-16.735	29.109	36.338	16.735	0.000%
24	-16.760	-48.451	-29.064	16.760	48.451	29.064	0.000%
25	-16.760	-36.338	-29.064	16.760	36.338	29.064	0.000%
26	0.000	-77.364	0.000	0.000	77.364	0.000	0.000%
27	0.015	-77.364	-8.401	-0.015	77.364	8.401	0.000%
28	4.219	-77.364	-7.283	-4.219	77.364	7.283	0.000%
29	7.292	-77.364	-4.214	-7.292	77.364	4.214	0.000%
30	8.412	-77.364	-0.015	-8.412	77.364	0.015	0.000%
31	7.277	-77.364	4.188	-7.277	77.364	-4.188	0.000%
32	4.193	-77.364	7.268	-4.193	77.364	-7.268	0.000%
33	-0.015	-77.364	8.401	0.015	77.364	-8.401	0.000%
34	-4.219	-77.364	7.283	4.219	77.364	-7.283	0.000%
35	-7.292	-77.364	4.214	7.292	77.364	-4.214	0.000%
36	-8.412	-77.364	0.015	8.412	77.364	-0.015	0.000%
37	-7.277	-77.364	-4.188	7.277	77.364	4.188	0.000%
38	-4.193	-77.364	-7.268	4.193	77.364	7.268	0.000%
39	0.017	-40.376	-7.292	-0.017	40.376	7.292	0.000%
40	3.667	-40.376	-6.324	-3.667	40.376	6.324	0.000%
41	6.334	-40.376	-3.661	-6.334	40.376	3.661	0.000%
42	7.304	-40.376	-0.017	-7.304	40.376	0.017	0.000%
43	6.317	-40.376	3.631	-6.317	40.376	-3.631	0.000%
44	3.637	-40.376	6.307	-3.637	40.376	-6.307	0.000%
45	-0.017	-40.376	7.292	0.017	40.376	-7.292	0.000%
46	-3.667	-40.376	6.324	3.667	40.376	-6.324	0.000%
47	-6.334	-40.376	3.661	6.334	40.376	-3.661	0.000%
48	-7.304	-40.376	0.017	7.304	40.376	-0.017	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
49	-6.317	-40.376	-3.631	6.317	40.376	3.631	0.000%
50	-3.637	-40.376	-6.307	3.637	40.376	6.307	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00022946
3	Yes	4	0.00000001	0.00014401
4	Yes	5	0.00000001	0.00015913
5	Yes	5	0.00000001	0.00007165
6	Yes	5	0.00000001	0.00016287
7	Yes	5	0.00000001	0.00007343
8	Yes	4	0.00000001	0.00037337
9	Yes	4	0.00000001	0.00023682
10	Yes	5	0.00000001	0.00015095
11	Yes	5	0.00000001	0.00006787
12	Yes	5	0.00000001	0.00016328
13	Yes	5	0.00000001	0.00007384
14	Yes	4	0.00000001	0.00017289
15	Yes	4	0.00000001	0.00010781
16	Yes	5	0.00000001	0.00015885
17	Yes	5	0.00000001	0.00007155
18	Yes	5	0.00000001	0.00015590
19	Yes	5	0.00000001	0.00007010
20	Yes	4	0.00000001	0.00031637
21	Yes	4	0.00000001	0.00020082
22	Yes	5	0.00000001	0.00016471
23	Yes	5	0.00000001	0.00007449
24	Yes	5	0.00000001	0.00015160
25	Yes	5	0.00000001	0.00006819
26	Yes	4	0.00000001	0.00000001
27	Yes	5	0.00000001	0.00008034
28	Yes	5	0.00000001	0.00009382
29	Yes	5	0.00000001	0.00009350
30	Yes	5	0.00000001	0.00008016
31	Yes	5	0.00000001	0.00009204
32	Yes	5	0.00000001	0.00009279
33	Yes	5	0.00000001	0.00007964
34	Yes	5	0.00000001	0.00009235
35	Yes	5	0.00000001	0.00009276
36	Yes	5	0.00000001	0.00008005
37	Yes	5	0.00000001	0.00009345
38	Yes	5	0.00000001	0.00009258
39	Yes	4	0.00000001	0.00001523
40	Yes	4	0.00000001	0.00006606
41	Yes	4	0.00000001	0.00007147
42	Yes	4	0.00000001	0.00002179
43	Yes	4	0.00000001	0.00005863
44	Yes	4	0.00000001	0.00007455
45	Yes	4	0.00000001	0.00001473
46	Yes	4	0.00000001	0.00006563
47	Yes	4	0.00000001	0.00006194
48	Yes	4	0.00000001	0.00002118
49	Yes	4	0.00000001	0.00007673

50	Yes	4	0.00000001	0.00005912

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 84.7161	11.142	41	0.775	0.002
L2	89.2839 - 41.6224	6.404	41	0.665	0.001
L3	47.3776 - 0	1.811	41	0.351	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	7770.00 w/ Mount Pipe	41	10.821	0.769	0.002	59628
116.000	RRUS 4478 B14	41	10.500	0.764	0.002	59628
108.000	(4) 844G65VTZASX w/ Mount Pipe	41	9.226	0.741	0.002	24845
100.000	TME-1900MHZ RRH (65MHZ)	41	7.984	0.714	0.001	14907
97.000	APXVTM14-C-120 w/ Mount Pipe	41	7.530	0.702	0.001	12962
83.000	AIR -32 B2A/B66AA w/ Mount Pipe	41	5.539	0.628	0.001	8778
51.000	KS24019-L112A	41	2.083	0.381	0.000	5907

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 84.7161	51.544	6	3.585	0.010
L2	89.2839 - 41.6224	29.632	6	3.079	0.005
L3	47.3776 - 0	8.380	6	1.624	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	7770.00 w/ Mount Pipe	6	50.059	3.560	0.010	12977
116.000	RRUS 4478 B14	6	48.576	3.535	0.009	12977
108.000	(4) 844G65VTZASX w/ Mount Pipe	6	42.687	3.430	0.008	5406
100.000	TME-1900MHZ RRH (65MHZ)	6	36.940	3.304	0.006	3243
97.000	APXVTM14-C-120 w/ Mount Pipe	6	34.841	3.248	0.006	2819
83.000	AIR -32 B2A/B66AA w/ Mount Pipe	6	25.633	2.909	0.004	1907
51.000	KS24019-L112A	6	9.642	1.761	0.002	1278

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	KL/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	120 - 84.7161 (1)	TP32.531x24.094x0.375	35.284	0.000	0.0	36.974	-15.226	2162.970	0.007
L2	84.7161 - 41.6224 (2)	TP42.031x30.689x0.438	47.661	0.000	0.0	55.856	-30.432	3267.590	0.009
L3	41.6224 - 0 (3)	TP51x39.787x0.5	47.378	0.000	0.0	80.144	-48.429	4688.400	0.010

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	120 - 84.7161 (1)	TP32.531x24.094x0.375	477.207	1747.400	0.273	0.000	1747.400	0.000
L2	84.7161 - 41.6224 (2)	TP42.031x30.689x0.438	1611.775	3422.258	0.471	0.000	3422.258	0.000
L3	41.6224 - 0 (3)	TP51x39.787x0.5	3119.058	6078.800	0.513	0.000	6078.800	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	120 - 84.7161 (1)	TP32.531x24.094x0.375	21.450	648.892	0.033	0.654	1765.258	0.000
L2	84.7161 - 41.6224 (2)	TP42.031x30.689x0.438	29.674	980.277	0.030	0.570	3453.150	0.000
L3	41.6224 - 0 (3)	TP51x39.787x0.5	33.745	1406.520	0.024	0.569	6220.375	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 84.7161 (1)	0.007	0.273	0.000	0.033	0.000	0.281 ✔	1.050	4.8.2 ✔

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	84.7161 - 41.6224 (2)	0.009	0.471	0.000	0.030	0.000	0.481 ✔	1.050	4.8.2 ✔
L3	41.6224 - 0 (3)	0.010	0.513	0.000	0.024	0.000	0.524 ✔	1.050	4.8.2 ✔

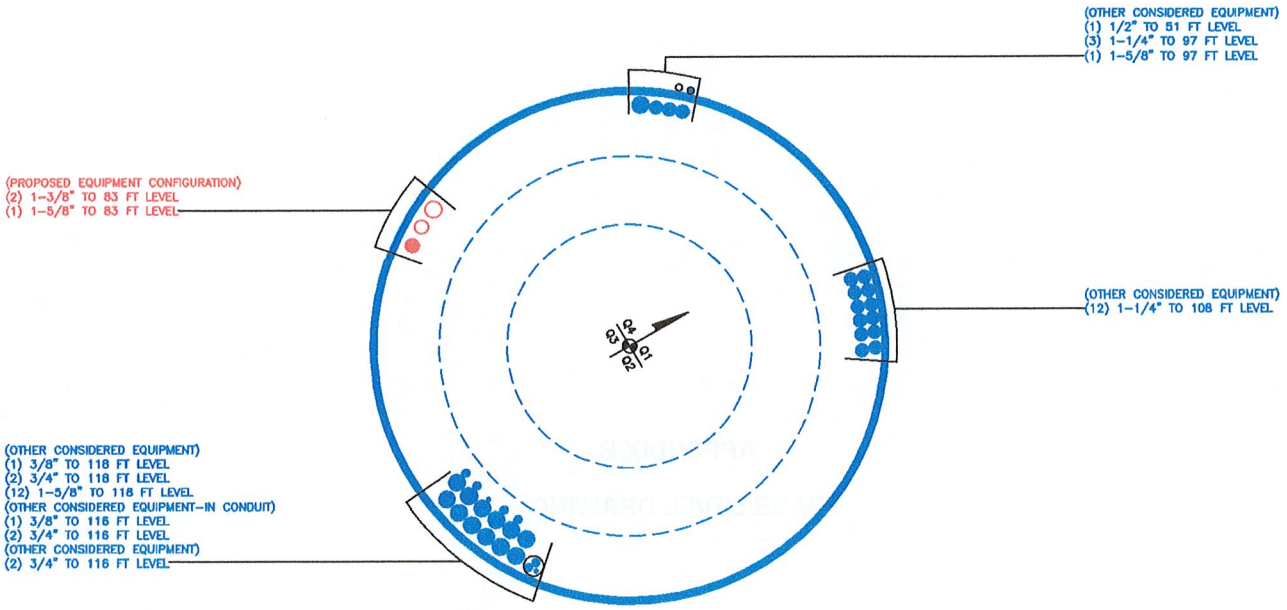
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 84.7161	Pole	TP32.531x24.094x0.375	1	-15.226	2271.118	26.8	Pass
L2	84.7161 - 41.6224	Pole	TP42.031x30.689x0.438	2	-30.432	3430.969	45.8	Pass
L3	41.6224 - 0	Pole	TP51x39.787x0.5	3	-48.429	4922.820	49.9	Pass
						Summary		
						Pole (L3)	49.9	Pass
						RATING =	**49.9**	**Pass**

Program Version 8.0.7.5

APPENDIX B

BASE LEVEL DRAWING



BUSINESS UNIT: 881536

APPENDIX C

ADDITIONAL CALCULATIONS

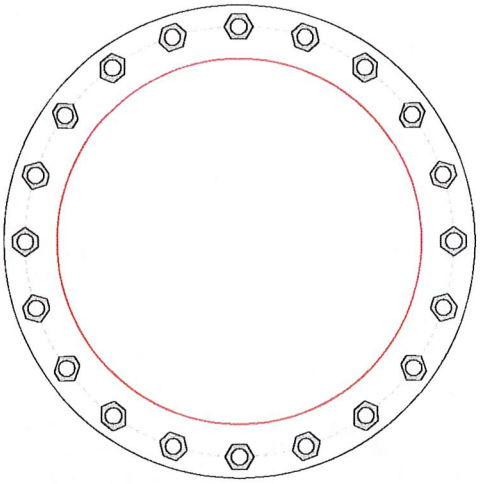
Monopole Base Plate Connection

Site Info	
BU #	881536
Site Name	ORTH HAVEN TOWER,
Order #	534729 Rev.0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	3

Applied Loads	
Moment (kip-ft)	3119.06
Axial Force (kips)	48.43
Shear Force (kips)	33.74

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(20) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 60" BC

Base Plate Data

66" OD x 2.25" Plate (A871 GR60; Fy=60 ksi, Fu=75 ksi)

Stiffener Data

N/A

Pole Data

51" x 0.5" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_c = 127.11	ϕPn_c = 268.39	**Stress Rating**
Vu = 1.69	ϕVn = 120.77	**47.6%**
Mu = 3.29	ϕMn = 128.14	**Pass**

Base Plate Summary

Max Stress (ksi):	32.92	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	**58.1%**	**Pass**

Drilled Pier Foundation

BU # :	881536
Site Name:	NORTH HAVEN TOWI
Order Number:	534729 Rev.0

TIA-222 Revison:	H
Tower Type:	Monopole

Applied Loads	Comp.	Uplift
Moment (kip-ft)	3119.06	
Axial Force (kips)	48.43	
Shear Force (kips)	33.74	

Material Properties		
Concrete Strength, f'c:	4	ksi
Rebar Strength, Fy:	60	ksi
Tie Yield Strength, Fyt:	60	ksi

Pier Design Data		
Depth	39	ft
Ext. Above Grade	1	ft
Pier Section 1		
From 1' above grade to 39' below grade		
Pier Diameter	7.5	ft
Rebar Quantity	25	
Rebar Size	11	
Rebar Cage Diameter	79	in
Tie Size	5	
Tie Spacing	12	in

Rebar & Pier Options

Embedded Pole Inputs

Belled Pier Inputs

Analysis Results		
Soil Lateral Check	*Compression*	*Uplift*
$D_{v=0}$ (ft from TOC)	8.18	-
Soil Safety Factor	4.86	-
Max Moment (kip-ft)	3343.60	-
Rating*	*26.1%*	-
Soil Vertical Check	*Compression*	*Uplift*
Skin Friction (kips)	565.51	-
End Bearing (kips)	530.14	-
Weight of Concrete (kips)	212.23	-
Total Capacity (kips)	1095.65	-
Axial (kips)	260.66	-
Rating*	*22.7%*	-
Reinforced Concrete Flexure	*Compression*	*Uplift*
Critical Depth (ft from TOC)	8.40	-
Critical Moment (kip-ft)	3343.27	-
Critical Moment Capacity	6803.65	-
Rating*	*46.8%*	-
Reinforced Concrete Shear	*Compression*	*Uplift*
Critical Depth (ft from TOC)	22.18	-
Critical Shear (kip)	264.97	-
Critical Shear Capacity	735.67	-
Rating*	*34.3%*	-

Soil Interaction Rating*	**26.1%**
Structural Foundation Rating*	**46.8%**

*Rating per TIA-222-H Section 15.5

Check Limitation	
Apply TIA-222-H Section 15.5:	☑
N/A	☐
Shear Design Options	
Check Shear along Depth of Pier:	☑
Utilize Shear-Friction Methodology:	☐
Override Critical Depth:	☐

Go to Soil Calculations

Soil Profile

Groundwater Depth	7	# of Layers	8

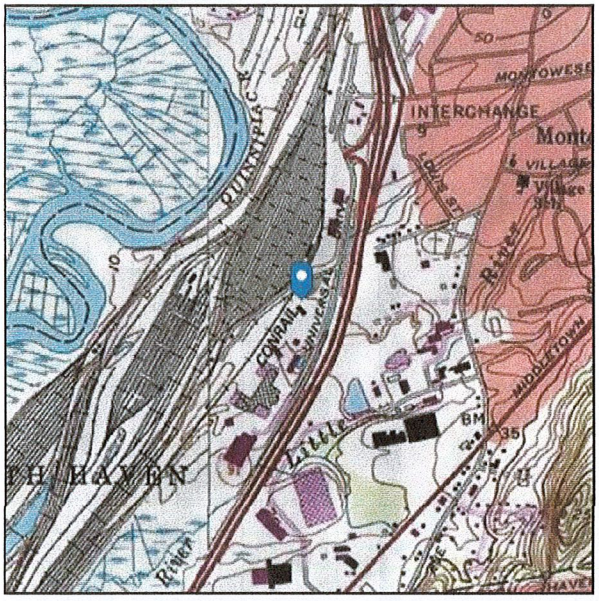
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	3.75	3.75	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	3.75	5	1.25	120	150	0	32	0.000	0.000	0.00	0.00			Cohesionless
3	5	7	2	120	150	0	32	0.000	0.000	1.40	1.40			Cohesionless
4	7	20	13	60	87.6	0	32	0.000	0.000	1.40	1.40			Cohesionless
5	20	25	5	60	87.6	0	30	1.014	1.014				10	Cohesionless
6	25	28	3	60	87.6	0	29	0.647	0.647				6	Cohesionless
7	28	35	7	60	87.6	0.75	0	0.41	0.41					Cohesive
8	35	39	4	60	87.6	0.5	0	0.28	0.28			16		Cohesive

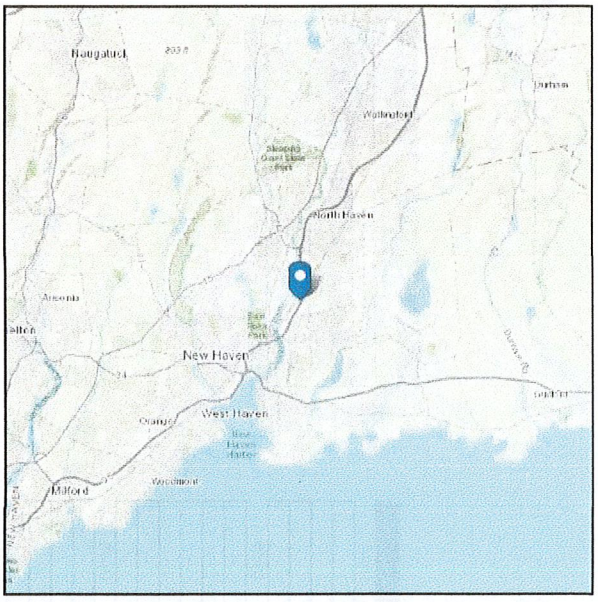
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 18.13 ft (NAVD 88)
Latitude: 41.344447
Longitude: -72.870811





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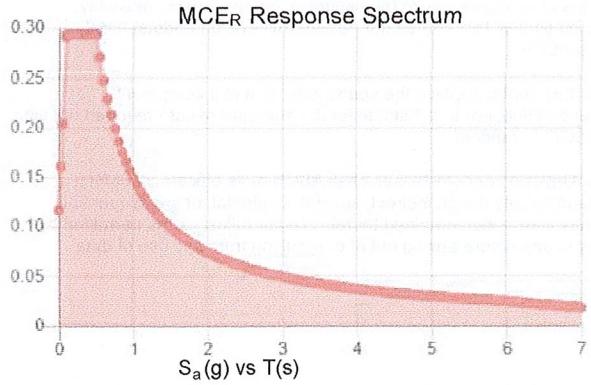
Seismic

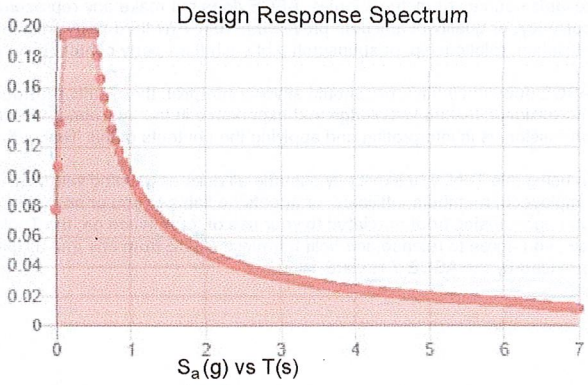
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.184	S_{DS} :	0.196
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.095
S_{MS} :	0.294	PGA_M :	0.152
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sat Jan 30 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Sat Jan 30 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

Date: **January 23, 2021**

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Infinigy Engineering, PLLC
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Albany, NY 12205
518-690-0790
structural@infinigy.com

Darcy Tarr
Crown Castle
3530 Toringdon Way, Suite 300
Charlotte, NC 28277
(704) 405-6589

Subject:	**Mount Analysis Report**	
Carrier Designation:	**T-Mobile Anchor**	
	Carrier Site Number:	CTNH037A
	Carrier Site Name:	CTNH037/Candid N. Haven
Crown Castle Designation:	**Crown Castle BU Number:**	881536
	Crown Castle Site Name:	NORTH HAVEN TOWER
	Crown Castle JDE Job Number:	624773
	Crown Castle Order Number:	534729 Rev. 0
Engineering Firm Designation:	**Infinigy Engineering, PLLC Report Designation:** 1039-Z0001-B	
Site Data:	**120 Universal Drive, North Haven, New Haven County, CT, 06473**	
	Latitude 41°20'40.01", Longitude -72°52'14.92"	
Structure Information:	**Tower Height & Type:**	**120.0 ft Monopole**
	Mount Elevation:	**83.0 ft**
	Mount Type:	**12.5 ft Platform**

Dear Darcy Tarr,

Infinigy Engineering, PLLC is pleased to submit this **"Mount Analysis Report"** to determine the structural integrity of T-Mobile's antenna mounting system with the proposed appurtenance and equipment addition on the abovementioned supporting tower structure. Analysis of the existing supporting tower structure is to be completed by others and therefore is not part of this analysis. Analysis of the antenna mounting system as a tie-off point for fall protection or rigging is not part of this document.

The purpose of the analysis is to determine acceptability of the mount stress level. Based on our analysis we have determined the mount stress level to be:

Platform **Sufficient - 75.1%**
***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code and Appendix N based upon an ultimate 3-second gust wind speed of 125 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Jacques S. Grimaldi, M.S., P.E.

Respectfully Submitted by:
Emmanuel Poulin, P.E.
518-690-0790
structural@infinigy.com
CT PE License No. 22947

STATE OF CONNECTICUT
EMMANUEL POULIN
No. 22947
LICENSED
PROFESSIONAL ENGINEER

1/27/21

TABLE OF CONTENTS

1) INTRODUCTION

This is an existing 3 sector 12.5 ft Platform.

2) ANALYSIS CRITERIA

Building Code:	2015 IBC / 2018 Connecticut State Building Code and Appendix N
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	125 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
Seismic S_s:	0.184
Seismic S_1:	0.062
Live Loading Wind Speed:	30 mph
Man Live Load at Mid/End-Points:	250 lb
Man Live Load at Mount Pipes:	500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
83.0	84.0	3	Ericsson	AIR -32 B2A/B66AA	12.5 ft Platform
		3	Ericsson	AIR6449 B41_T-MOBILE	
		3	RFS/Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	RADIO 4449 B71/B85A	
		3	Ericsson	RRUS 4415 B25_CCIV2	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	T-Mobile Application	534729 Rev. 0	CCI Sites
Loading Document	T-Mobile	RFDS Version: 3	TSA
Mount Manufacturer Drawings	Site Pro 1	RMQP-496	Infinigy

3.1) Analysis Method

RISA-3D (Version 19.0.1), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

Infinigy Mount Analysis Tool V2.1.4, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

This analysis was performed in accordance with Crown Castle's ENG-SOW-10208 *Tower Mount Analysis* (Revision B).

3.2) Assumptions

1) The antenna mounting system was properly fabricated, installed and maintained in good condition in accordance with its original design and manufacturer's specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the referenced drawings.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.
5) Prior structural modifications to the tower mounting system are assumed to be installed as shown per available data.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM A500 (GR B-46)
Pipe	ASTM A53 (GR 35)
Connection Bolts	ASTM A325

This analysis may be affected if any assumptions are not valid or have been made in error. Infinigy Engineering, PLLC should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 - Mount Component Stresses vs. Capacity (Platform, All Sectors)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Mount Pipe(s)	MP4	83.0	75.1	Pass
	Horizontal(s)	M35		17.4	Pass
	Handrail(s)	M29		41.5	Pass
	Standoff(s)	M4		36.8	Pass
	Mount Connection(s)	-		29.5	Pass

Structure Rating (max from all components) =	75.1%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in "Appendix D - Additional Calculations" for detailed mount connection calculations.

4.1) Recommendations

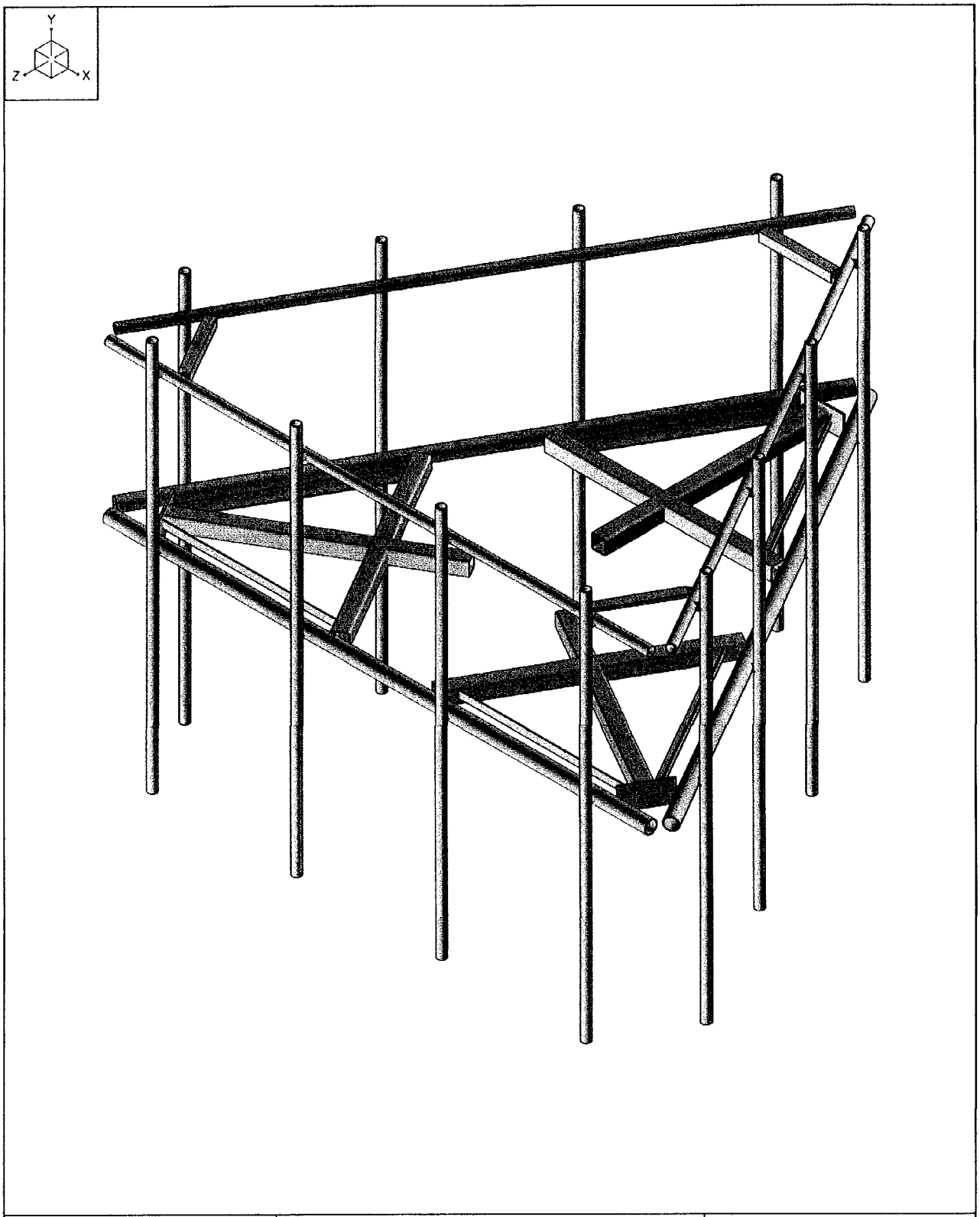
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the structural modifications listed below must be completed.

1. Installation of proposed Site Pro 1 HRK12 handrail kit.

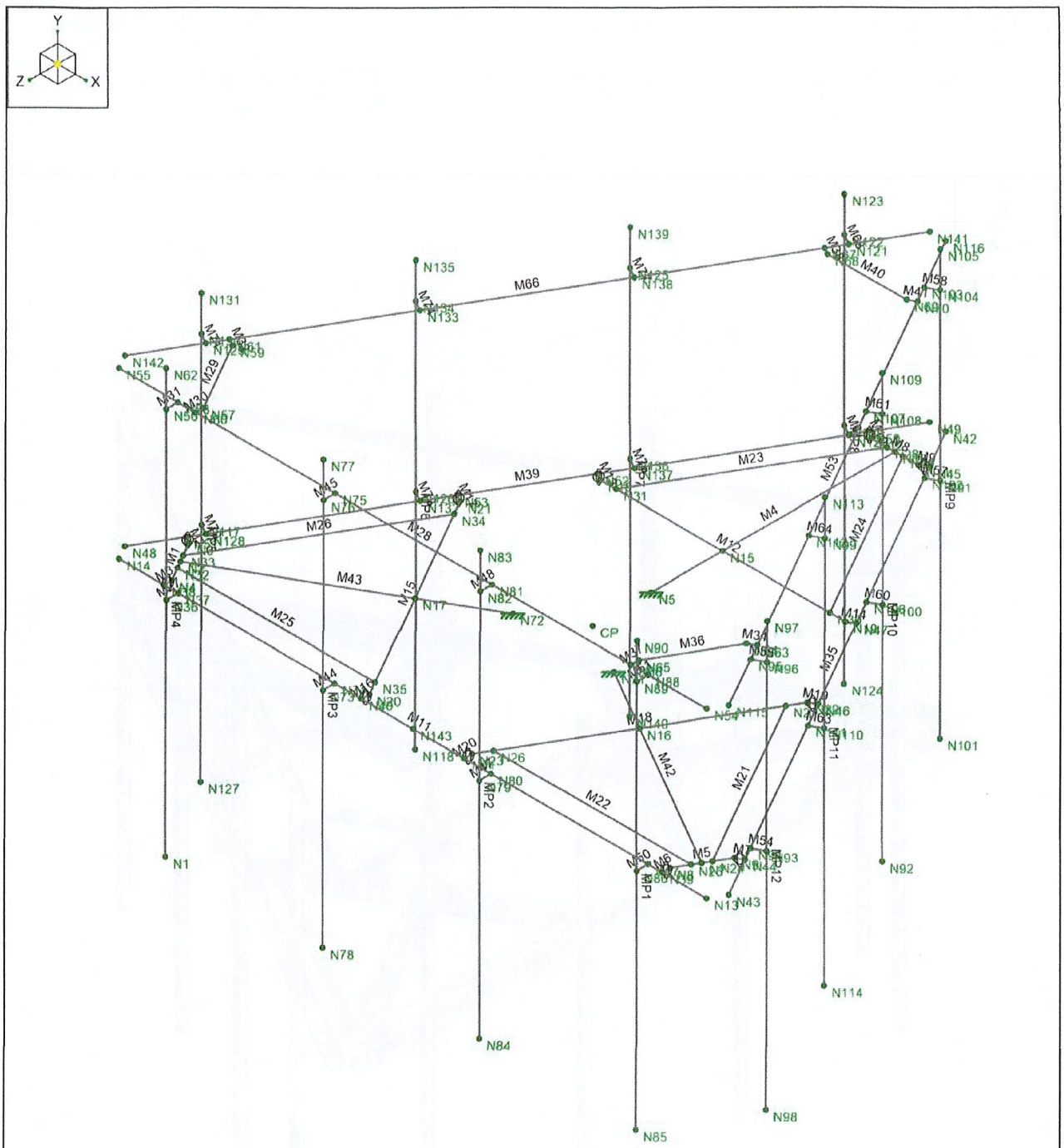
No structural modifications are required at this time, provided that the above-listed changes are implemented.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Infinigy Engineering, PLLC	881536	Render
JG		Jan 23, 2021
1039-Z0001-B		881536_loaded.r3d



Infinigy Engineering, PLLC	881536	Wireframe
JG		Jan 23, 2021
1039-Z0001-B		881536_loaded.r3d

APPENDIX B

SOFTWARE INPUT CALCULATIONS

Program Inputs

PROJECT INFORMATION	
Client:	Crown Castle
Carrier:	T-Mobile
Engineer:	Jacques Grimaldi

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	C	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil	
Ground Elevation:	18.13	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	83.0	ft
Tower Height AGL:	120.0	ft

TOPOGRAPHIC DATA		
Topo Feature:	N/A	
Slope Distance:	N/A	ft
Crest Distance:	N/A	ft
Crest Height:	N/A	ft

FACTORS		
Directionality Fact. (K_d):	0.95	
Ground Ele. Factor (K_e):	1.00	*Rev H Only
Rooftop Speed-Up (K_s):	1.00	*Rev H Only
Topographic Factor (K_{zt}):	1.00	
Gust Effect Factor (G_h):	1.0	

CODE STANDARDS		
Building Code:	2015 IBC	
TIA Standard:	TIA-222-H	
ASCE Standard:	ASCE 7-10	

WIND AND ICE DATA		
Ultimate Wind (V_{ult}):	125	mph
Design Wind (V):	N/A	mph
Ice Wind (V_{ice}):	50	mph
Base Ice Thickness (t_i):	1.5	in
Flat Pressure:	92.43	psf
Round Pressure:	55.46	psf
Ice Wind Pressure:	8.87	psf

SEISMIC DATA		
Short-Period Accel. (S_s):	0.184	g
1-Second Accel. (S_1):	0.062	g
Short-Period Design (S_{DS}):	0.20	
1-Second Design (S_{D1}):	0.10	
Short-Period Coeff. (F_a):	1.60	
1-Second Coeff. (F_v):	2.40	
Amplification Factor (a_p):	1.00	
Response Mod. (R_p):	2.50	
Overstrength (Ω_o):	1.00	

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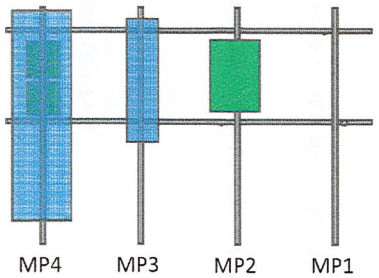
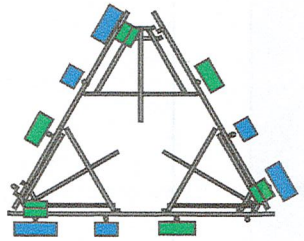
Infinigy Load Calculator V2.1.4

Program Inputs

ELEVATION VIEW



PLAN VIEW



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the solutions are endless

Infinigy Load Calculator V2.1.4

APPURTENANCE INFORMATION

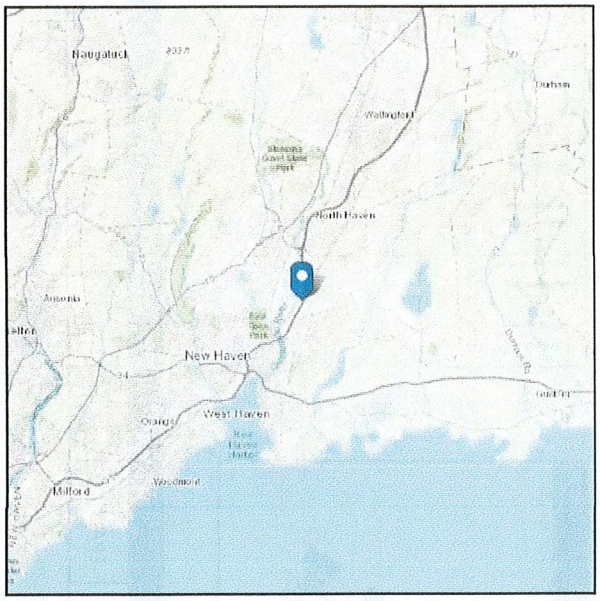
Appurtenance Name	Elevation	Qty.	K_a	q_z (psf)	EPA_N (ft^2)	EPA_T (ft^2)	Wind F_z (lbs)	Wind F_x (lbs)	Weight (lbs)	Seismic F (lbs)	Member (α sector)
ERICSSON AIR -32 B2A/B66AA	84.0	3	0.90	46.33	6.51	4.71	271.44	196.49	132.20	12.97	MP3
ERICSSON AIR6449 B41_T-MOBILE	84.0	3	0.90	46.33	5.66	2.48	235.96	103.26	114.63	11.25	MP2
RFS/CELWAVE APXVAARR24_43-U-NA20	84.0	3	0.90	46.33	14.69	6.87	612.67	286.60	128.00	12.56	MP4
ERICSSON RADIO 4449 B71/B85A	84.0	3	0.90	46.33	1.64	1.31	68.56	54.63	74.95	7.36	MP4
ERICSSON TME-RRUS 4415 B25_CCIV2	84.0	3	0.90	46.33	1.84	0.82	76.83	34.20	46.00	4.51	MP4

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-10
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 18.13 ft (NAVD 88)
Latitude: 41.344447
Longitude: -72.870811



Wind

Results:

Wind Speed:	125 Vmph
10-year MRI	77 Vmph
25-year MRI	87 Vmph
50-year MRI	94 Vmph
100-year MRI	102 Vmph
Data Source:	ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014
Date Accessed:	Sat Jan 23 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

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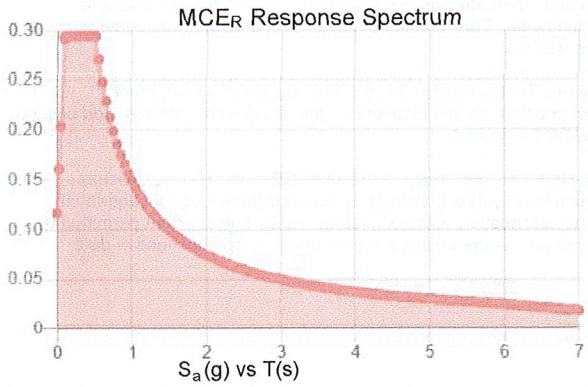
Seismic

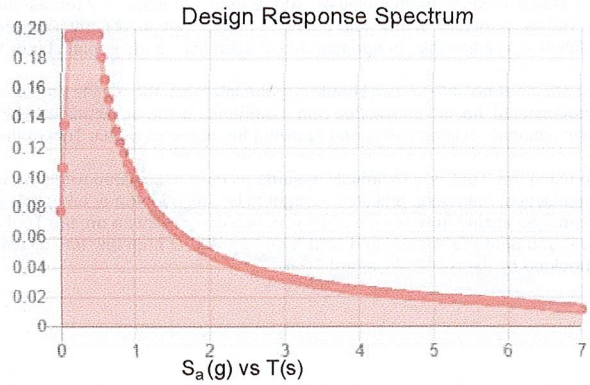
Site Soil Class: D - Stiff Soil

Results:

S_S :	0.184	S_{DS} :	0.196
S_1 :	0.062	S_{D1} :	0.099
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.095
S_{MS} :	0.294	PGA_M :	0.152
S_{M1} :	0.149	F_{PGA} :	1.6
		I_e :	1

Seismic Design Category B





Data Accessed: Sat Jan 23 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-10, incorporating Supplement 1 and errata of March 31, 2013, and ASCE/SEI 7-10 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-10 Ch. 21 are available from USGS.

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Ice

Results:

Ice Thickness:	0.75 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8
Date Accessed:	Sat Jan 23 2021

Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N3	N4		Corner Plate	Beam	RECT	A36 Gr.36	Typical
2	M2	N3	N51		RIGID	None	None	RIGID	Typical
3	M3	N4	N38		RIGID	None	None	RIGID	Typical
4	M4	N5	N10		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
5	M5	N8	N9		Corner Plate	Beam	RECT	A36 Gr.36	Typical
6	M6	N8	N39		RIGID	None	None	RIGID	Typical
7	M7	N9	N44		RIGID	None	None	RIGID	Typical
8	M8	N11	N12		Corner Plate	Beam	RECT	A36 Gr.36	Typical
9	M9	N11	N45		RIGID	None	None	RIGID	Typical
10	M10	N12	N50		RIGID	None	None	RIGID	Typical
11	M11	N14	N13		Face Horizontal	Beam	Pipe	A53 Gr.B	Typical
12	M12	N18	N19		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
13	M13	N18	N52		RIGID	None	None	RIGID	Typical
14	M14	N19	N47		RIGID	None	None	RIGID	Typical
15	M15	N20	N21		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
16	M16	N20	N40		RIGID	None	None	RIGID	Typical
17	M17	N21	N53		RIGID	None	None	RIGID	Typical
18	M18	N22	N23		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
19	M19	N22	N46		RIGID	None	None	RIGID	Typical
20	M20	N23	N41		RIGID	None	None	RIGID	Typical
21	M21	N24	N27	270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
22	M22	N25	N26		Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
23	M23	N28	N31	270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
24	M24	N29	N30		Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
25	M25	N32	N35	270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
26	M26	N33	N34		Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
27	M27	N37	N36		RIGID	None	None	RIGID	Typical
28	M28	N55	N54		Handrail	Beam	Pipe	A53 Gr.B	Typical
29	M29	N57	N59	180	Top Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
30	M30	N57	N60		RIGID	None	None	RIGID	Typical
31	M31	N58	N56		RIGID	None	None	RIGID	Typical
32	M32	N59	N61		RIGID	None	None	RIGID	Typical
33	MP4	N62	N1		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
34	M34	N64	N63		RIGID	None	None	RIGID	Typical
35	M35	N43	N42		Face Horizontal	Beam	Pipe	A53 Gr.B	Typical
36	M36	N64	N65	180	Top Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
37	M37	N65	N66		RIGID	None	None	RIGID	Typical
38	M38	N68	N67		RIGID	None	None	RIGID	Typical
39	M39	N49	N48		Face Horizontal	Beam	Pipe	A53 Gr.B	Typical
40	M40	N68	N69	180	Top Corner Angle	Beam	Single Angle	A36 Gr.36	Typical
41	M41	N69	N70		RIGID	None	None	RIGID	Typical
42	M42	N71	N7		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
43	M43	N72	N2		Standoff	Beam	Tube	A500 Gr.B Rect	Typical
44	M44	N74	N73		RIGID	None	None	RIGID	Typical
45	M45	N75	N76		RIGID	None	None	RIGID	Typical
46	MP3	N77	N78		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
47	M47	N80	N79		RIGID	None	None	RIGID	Typical
48	M48	N81	N82		RIGID	None	None	RIGID	Typical
49	MP2	N83	N84		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
50	M50	N87	N86		RIGID	None	None	RIGID	Typical
51	M51	N88	N89		RIGID	None	None	RIGID	Typical
52	MP1	N90	N85		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
53	M53	N115	N116		Handrail	Beam	Pipe	A53 Gr.B	Typical
54	M54	N94	N93		RIGID	None	None	RIGID	Typical
55	M55	N95	N96		RIGID	None	None	RIGID	Typical
56	MP12	N97	N98		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
57	M57	N102	N91		RIGID	None	None	RIGID	Typical
58	M58	N103	N104		RIGID	None	None	RIGID	Typical
59	MP9	N105	N101		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
60	M60	N106	N100		RIGID	None	None	RIGID	Typical
61	M61	N107	N108		RIGID	None	None	RIGID	Typical
62	MP10	N109	N92		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
63	M63	N111	N110		RIGID	None	None	RIGID	Typical
64	M64	N112	N99		RIGID	None	None	RIGID	Typical
65	MP11	N113	N114		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
66	M66	N141	N142		Handrail	Beam	Pipe	A53 Gr.B	Typical
67	M67	N120	N119		RIGID	None	None	RIGID	Typical
68	M68	N121	N122		RIGID	None	None	RIGID	Typical
69	MP8	N123	N124		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
70	M70	N128	N117		RIGID	None	None	RIGID	Typical
71	M71	N129	N130		RIGID	None	None	RIGID	Typical
72	MP5	N131	N127		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
73	M73	N132	N126		RIGID	None	None	RIGID	Typical
74	M74	N133	N134		RIGID	None	None	RIGID	Typical
75	MP6	N135	N118		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
76	M76	N137	N136		RIGID	None	None	RIGID	Typical
77	M77	N138	N125		RIGID	None	None	RIGID	Typical
78	MP7	N139	N140		Mount Pipe	Column	Pipe	A53 Gr.B	Typical

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General Members				
2	RIGID		42	108	0
3	Total General		42	108	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	6x0.5	3	36	30.625
7	A36 Gr.36	L2x2x4	6	303.1	81.141
8	A36 Gr.36	L2.5x2.5x3	3	60.4	15.421
9	A500 Gr.B Rect	HSS4X4X4	6	373.6	383.936
10	A53 Gr.B	PIPE_2.0	15	1746	505.006
11	A53 Gr.B	PIPE_3.0	3	450	264.141
12	Total HR Steel		36	2969	1280.269

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Nodal	Point	Distributed	Area(Member)
1	Self Weight	DL		-1			30		3
2	Wind Load AZI 0	WLZ					60		
3	Wind Load AZI 30	None					60		
4	Wind Load AZI 60	None					60		
5	Wind Load AZI 90	WLX					60		
6	Wind Load AZI 120	None					60		
7	Wind Load AZI 150	None					60		
8	Wind Load AZI 180	None					60		
9	Wind Load AZI 210	None					60		
10	Wind Load AZI 240	None					60		
11	Wind Load AZI 270	None					60		
12	Wind Load AZI 300	None					60		
13	Wind Load AZI 330	None					60		
14	Distr. Wind Load Z	WLZ						78	
15	Distr. Wind Load X	WLX						78	
16	Ice Weight	OL1					30	78	3
17	Ice Wind Load AZI 0	OL2					60		
18	Ice Wind Load AZI 30	None					60		
19	Ice Wind Load AZI 60	None					60		
20	Ice Wind Load AZI 90	OL3					60		
21	Ice Wind Load AZI 120	None					60		
22	Ice Wind Load AZI 150	None					60		
23	Ice Wind Load AZI 180	None					60		
24	Ice Wind Load AZI 210	None					60		
25	Ice Wind Load AZI 240	None					60		
26	Ice Wind Load AZI 270	None					60		
27	Ice Wind Load AZI 300	None					60		
28	Ice Wind Load AZI 330	None					60		
29	Distr. Ice Wind Load Z	OL2						78	
30	Distr. Ice Wind Load X	OL3						78	
31	Seismic Load Z	ELZ			-0.098		30		
32	Seismic Load X	ELX	-0.098				30		
33	Service Live Loads	LL				1			
34	Maintenance Load 1	LL				2			
35	Maintenance Load 2	LL				2			
36	Maintenance Load 3	LL				2			
37	Maintenance Load 4	LL				2			
38	Maintenance Load 5	LL				2			
39	Maintenance Load 6	LL				2			
40	Maintenance Load 7	LL				2			
41	Maintenance Load 8	LL				2			
42	Maintenance Load 9	LL				2			
43	Maintenance Load 10	LL				2			
44	Maintenance Load 11	LL				2			
45	Maintenance Load 12	LL				2			
46	BLC 1 Transient Area Loads	None						60	
47	BLC 16 Transient Area Loads	None						60	

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4DL	Yes	Y	1	1.4								
2	1.2DL + 1WL AZI 0	Yes	Y	1	1.2	2	1	14	1	15			
3	1.2DL + 1WL AZI 30	Yes	Y	1	1.2	3	1	14	0.866	15	0.5		
4	1.2DL + 1WL AZI 60	Yes	Y	1	1.2	4	1	14	0.5	15	0.866		
5	1.2DL + 1WL AZI 90	Yes	Y	1	1.2	5	1	14		15	1		
6	1.2DL + 1WL AZI 120	Yes	Y	1	1.2	6	1	14	-0.5	15	0.866		
7	1.2DL + 1WL AZI 150	Yes	Y	1	1.2	7	1	14	-0.866	15	0.5		
8	1.2DL + 1WL AZI 180	Yes	Y	1	1.2	8	1	14	-1	15			
9	1.2DL + 1WL AZI 210	Yes	Y	1	1.2	9	1	14	-0.866	15	-0.5		
10	1.2DL + 1WL AZI 240	Yes	Y	1	1.2	10	1	14	-0.5	15	-0.866		
11	1.2DL + 1WL AZI 270	Yes	Y	1	1.2	11	1	14		15	-1		
12	1.2DL + 1WL AZI 300	Yes	Y	1	1.2	12	1	14	0.5	15	-0.866		
13	1.2DL + 1WL AZI 330	Yes	Y	1	1.2	13	1	14	0.866	15	-0.5		
14	0.9DL + 1WL AZI 0	Yes	Y	1	0.9	2	1	14	1	15			
15	0.9DL + 1WL AZI 30	Yes	Y	1	0.9	3	1	14	0.866	15	0.5		
16	0.9DL + 1WL AZI 60	Yes	Y	1	0.9	4	1	14	0.5	15	0.866		
17	0.9DL + 1WL AZI 90	Yes	Y	1	0.9	5	1	14		15	1		
18	0.9DL + 1WL AZI 120	Yes	Y	1	0.9	6	1	14	-0.5	15	0.866		
19	0.9DL + 1WL AZI 150	Yes	Y	1	0.9	7	1	14	-0.866	15	0.5		
20	0.9DL + 1WL AZI 180	Yes	Y	1	0.9	8	1	14	-1	15			
21	0.9DL + 1WL AZI 210	Yes	Y	1	0.9	9	1	14	-0.866	15	-0.5		
22	0.9DL + 1WL AZI 240	Yes	Y	1	0.9	10	1	14	-0.5	15	-0.866		
23	0.9DL + 1WL AZI 270	Yes	Y	1	0.9	11	1	14		15	-1		
24	0.9DL + 1WL AZI 300	Yes	Y	1	0.9	12	1	14	0.5	15	-0.866		
25	0.9DL + 1WL AZI 330	Yes	Y	1	0.9	13	1	14	0.866	15	-0.5		
26	1.2D + 1.0Di	Yes	Y	1	1.2	16	1						
27	1.2D + 1.0Di +1.0Wi AZI 0	Yes	Y	1	1.2	16	1	17	1	29	1	30	
28	1.2D + 1.0Di +1.0Wi AZI 30	Yes	Y	1	1.2	16	1	18	1	29	0.866	30	0.5
29	1.2D + 1.0Di +1.0Wi AZI 60	Yes	Y	1	1.2	16	1	19	1	29	0.5	30	0.866
30	1.2D + 1.0Di +1.0Wi AZI 90	Yes	Y	1	1.2	16	1	20	1	29		30	1
31	1.2D + 1.0Di +1.0Wi AZI 120	Yes	Y	1	1.2	16	1	21	1	29	-0.5	30	0.866
32	1.2D + 1.0Di +1.0Wi AZI 150	Yes	Y	1	1.2	16	1	22	1	29	-0.866	30	0.5
33	1.2D + 1.0Di +1.0Wi AZI 180	Yes	Y	1	1.2	16	1	23	1	29	-1	30	
34	1.2D + 1.0Di +1.0Wi AZI 210	Yes	Y	1	1.2	16	1	24	1	29	-0.866	30	-0.5
35	1.2D + 1.0Di +1.0Wi AZI 240	Yes	Y	1	1.2	16	1	25	1	29	-0.5	30	-0.866
36	1.2D + 1.0Di +1.0Wi AZI 270	Yes	Y	1	1.2	16	1	26	1	29		30	-1
37	1.2D + 1.0Di +1.0Wi AZI 300	Yes	Y	1	1.2	16	1	27	1	29	0.5	30	-0.866
38	1.2D + 1.0Di +1.0Wi AZI 330	Yes	Y	1	1.2	16	1	28	1	29	0.866	30	-0.5
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.239	31	1	32					
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.239	31	0.866	32	0.5				
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.239	31	0.5	32	0.866				
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.239	31		32	1				
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.239	31	-0.5	32	0.866				
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.239	31	-0.866	32	0.5				
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.239	31	-1	32					
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.239	31	-0.866	32	-0.5				
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.239	31	-0.5	32	-0.866				
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.239	31		32	-1				
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.239	31	0.5	32	-0.866				

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.239	31	0.866	32	-0.5				
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.861	31	1	32					
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.861	31	0.866	32	0.5				
53	(0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.861	31	0.5	32	0.866				
54	(0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.861	31		32	1				
55	(0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.861	31	-0.5	32	0.866				
56	(0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.861	31	-0.866	32	0.5				
57	(0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.861	31	-1	32					
58	(0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.861	31	-0.866	32	-0.5				
59	(0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.861	31	-0.5	32	-0.866				
60	(0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.861	31		32	-1				
61	(0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.861	31	0.5	32	-0.866				
62	(0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.861	31	0.866	32	-0.5				
63	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 0	Yes	Y	1	1	2	0.23	14	0.23	15		33	1.5
64	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 30	Yes	Y	1	1	3	0.23	14	0.2	15	0.115	33	1.5
65	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 60	Yes	Y	1	1	4	0.23	14	0.115	15	0.2	33	1.5
66	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 90	Yes	Y	1	1	5	0.23	14		15	0.23	33	1.5
67	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 120	Yes	Y	1	1	6	0.23	14	-0.115	15	0.2	33	1.5
68	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 150	Yes	Y	1	1	7	0.23	14	-0.2	15	0.115	33	1.5
69	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 180	Yes	Y	1	1	8	0.23	14	-0.23	15		33	1.5
70	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 210	Yes	Y	1	1	9	0.23	14	-0.2	15	-0.115	33	1.5
71	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 240	Yes	Y	1	1	10	0.23	14	-0.115	15	-0.2	33	1.5
72	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 270	Yes	Y	1	1	11	0.23	14		15	-0.23	33	1.5
73	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 300	Yes	Y	1	1	12	0.23	14	0.115	15	-0.2	33	1.5
74	1.0DL + 1.5LL + 1.0SWL (60 mph) AZI 330	Yes	Y	1	1	13	0.23	14	0.2	15	-0.115	33	1.5
75	1.2DL + 1.5LL	Yes	Y	1	1.2	33	1.5						
76	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.058	14	0.058	15	
77	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.058	14	0.05	15	0.029
78	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.058	14	0.029	15	0.05
79	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.058	14		15	0.058
80	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.058	14	-0.029	15	0.05
81	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.058	14	-0.05	15	0.029
82	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.058	14	-0.058	15	
83	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.058	14	-0.05	15	-0.029
84	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.058	14	-0.029	15	-0.05
85	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.058	14		15	-0.058
86	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.058	14	0.029	15	-0.05
87	1.2DL + 1.5LM-MP1 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.058	14	0.05	15	-0.029
88	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.058	14	0.058	15	
89	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.058	14	0.05	15	0.029
90	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.058	14	0.029	15	0.05
91	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.058	14		15	0.058
92	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.058	14	-0.029	15	0.05
93	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.058	14	-0.05	15	0.029
94	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.058	14	-0.058	15	
95	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.058	14	-0.05	15	-0.029
96	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.058	14	-0.029	15	-0.05
97	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.058	14		15	-0.058
98	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.058	14	0.029	15	-0.05

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
99	1.2DL + 1.5LM-MP2 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.058	14	0.05	15	-0.029
100	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.058	14	0.058	15	
101	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.058	14	0.05	15	0.029
102	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.058	14	0.029	15	0.05
103	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.058	14		15	0.058
104	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.058	14	-0.029	15	0.05
105	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.058	14	-0.05	15	0.029
106	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.058	14	-0.058	15	
107	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.058	14	-0.05	15	-0.029
108	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.058	14	-0.029	15	-0.05
109	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.058	14		15	-0.058
110	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.058	14	0.029	15	-0.05
111	1.2DL + 1.5LM-MP3 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.058	14	0.05	15	-0.029
112	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.058	14	0.058	15	
113	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.058	14	0.05	15	0.029
114	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.058	14	0.029	15	0.05
115	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.058	14		15	0.058
116	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.058	14	-0.029	15	0.05
117	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.058	14	-0.05	15	0.029
118	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.058	14	-0.058	15	
119	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.058	14	-0.05	15	-0.029
120	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.058	14	-0.029	15	-0.05
121	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.058	14		15	-0.058
122	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.058	14	0.029	15	-0.05
123	1.2DL + 1.5LM-MP4 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.058	14	0.05	15	-0.029
124	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.058	14	0.058	15	
125	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.058	14	0.05	15	0.029
126	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.058	14	0.029	15	0.05
127	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.058	14		15	0.058
128	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.058	14	-0.029	15	0.05
129	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.058	14	-0.05	15	0.029
130	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.058	14	-0.058	15	
131	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.058	14	-0.05	15	-0.029
132	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.058	14	-0.029	15	-0.05
133	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.058	14		15	-0.058
134	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.058	14	0.029	15	-0.05
135	1.2DL + 1.5LM-MP5 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.058	14	0.05	15	-0.029
136	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.058	14	0.058	15	
137	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.058	14	0.05	15	0.029
138	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.058	14	0.029	15	0.05
139	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.058	14		15	0.058
140	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.058	14	-0.029	15	0.05
141	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.058	14	-0.05	15	0.029
142	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.058	14	-0.058	15	
143	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.058	14	-0.05	15	-0.029
144	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.058	14	-0.029	15	-0.05
145	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.058	14		15	-0.058
146	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.058	14	0.029	15	-0.05
147	1.2DL + 1.5LM-MP6 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.058	14	0.05	15	-0.029

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
148	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	40	1.5	2	0.058	14	0.058	15	
149	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	40	1.5	3	0.058	14	0.05	15	0.029
150	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	40	1.5	4	0.058	14	0.029	15	0.05
151	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	40	1.5	5	0.058	14		15	0.058
152	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	40	1.5	6	0.058	14	-0.029	15	0.05
153	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	40	1.5	7	0.058	14	-0.05	15	0.029
154	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	40	1.5	8	0.058	14	-0.058	15	
155	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	40	1.5	9	0.058	14	-0.05	15	-0.029
156	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	40	1.5	10	0.058	14	-0.029	15	-0.05
157	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	40	1.5	11	0.058	14		15	-0.058
158	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	40	1.5	12	0.058	14	0.029	15	-0.05
159	1.2DL + 1.5LM-MP7 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	40	1.5	13	0.058	14	0.05	15	-0.029
160	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	41	1.5	2	0.058	14	0.058	15	
161	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	41	1.5	3	0.058	14	0.05	15	0.029
162	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	41	1.5	4	0.058	14	0.029	15	0.05
163	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	41	1.5	5	0.058	14		15	0.058
164	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	41	1.5	6	0.058	14	-0.029	15	0.05
165	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	41	1.5	7	0.058	14	-0.05	15	0.029
166	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	41	1.5	8	0.058	14	-0.058	15	
167	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	41	1.5	9	0.058	14	-0.05	15	-0.029
168	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	41	1.5	10	0.058	14	-0.029	15	-0.05
169	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	41	1.5	11	0.058	14		15	-0.058
170	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	41	1.5	12	0.058	14	0.029	15	-0.05
171	1.2DL + 1.5LM-MP8 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	41	1.5	13	0.058	14	0.05	15	-0.029
172	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	42	1.5	2	0.058	14	0.058	15	
173	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	42	1.5	3	0.058	14	0.05	15	0.029
174	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	42	1.5	4	0.058	14	0.029	15	0.05
175	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	42	1.5	5	0.058	14		15	0.058
176	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	42	1.5	6	0.058	14	-0.029	15	0.05
177	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	42	1.5	7	0.058	14	-0.05	15	0.029
178	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	42	1.5	8	0.058	14	-0.058	15	
179	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	42	1.5	9	0.058	14	-0.05	15	-0.029
180	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	42	1.5	10	0.058	14	-0.029	15	-0.05
181	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	42	1.5	11	0.058	14		15	-0.058
182	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	42	1.5	12	0.058	14	0.029	15	-0.05
183	1.2DL + 1.5LM-MP9 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	42	1.5	13	0.058	14	0.05	15	-0.029
184	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	43	1.5	2	0.058	14	0.058	15	
185	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	43	1.5	3	0.058	14	0.05	15	0.029
186	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	43	1.5	4	0.058	14	0.029	15	0.05
187	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	43	1.5	5	0.058	14		15	0.058
188	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	43	1.5	6	0.058	14	-0.029	15	0.05
189	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	43	1.5	7	0.058	14	-0.05	15	0.029
190	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	43	1.5	8	0.058	14	-0.058	15	
191	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	43	1.5	9	0.058	14	-0.05	15	-0.029
192	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	43	1.5	10	0.058	14	-0.029	15	-0.05
193	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	43	1.5	11	0.058	14		15	-0.058
194	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	43	1.5	12	0.058	14	0.029	15	-0.05
195	1.2DL + 1.5LM-MP10 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	43	1.5	13	0.058	14	0.05	15	-0.029
196	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	44	1.5	2	0.058	14	0.058	15	

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
197	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	44	1.5	3	0.058	14	0.05	15	0.029
198	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	44	1.5	4	0.058	14	0.029	15	0.05
199	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	44	1.5	5	0.058	14		15	0.058
200	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	44	1.5	6	0.058	14	-0.029	15	0.05
201	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	44	1.5	7	0.058	14	-0.05	15	0.029
202	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	44	1.5	8	0.058	14	-0.058	15	
203	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	44	1.5	9	0.058	14	-0.05	15	-0.029
204	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	44	1.5	10	0.058	14	-0.029	15	-0.05
205	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	44	1.5	11	0.058	14		15	-0.058
206	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	44	1.5	12	0.058	14	0.029	15	-0.05
207	1.2DL + 1.5LM-MP11 + 1SWL (30 mph) AZI 330	Yes	Y	1	1.2	44	1.5	13	0.058	14	0.05	15	-0.029
208	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 0	Yes	Y	1	1.2	45	1.5	2	0.058	14	0.058	15	
209	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 30	Yes	Y	1	1.2	45	1.5	3	0.058	14	0.05	15	0.029
210	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 60	Yes	Y	1	1.2	45	1.5	4	0.058	14	0.029	15	0.05
211	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 90	Yes	Y	1	1.2	45	1.5	5	0.058	14		15	0.058
212	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 120	Yes	Y	1	1.2	45	1.5	6	0.058	14	-0.029	15	0.05
213	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 150	Yes	Y	1	1.2	45	1.5	7	0.058	14	-0.05	15	0.029
214	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 180	Yes	Y	1	1.2	45	1.5	8	0.058	14	-0.058	15	
215	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 210	Yes	Y	1	1.2	45	1.5	9	0.058	14	-0.05	15	-0.029
216	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 240	Yes	Y	1	1.2	45	1.5	10	0.058	14	-0.029	15	-0.05
217	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 270	Yes	Y	1	1.2	45	1.5	11	0.058	14		15	-0.058
218	1.2DL + 1.5LM-MP12 + 1SWL (30 mph) AZI 300	Yes	Y	1	1.2	45	1.5	12	0.058	14	0.029	15	-0.05

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	N5	max	1582.609	17	2939.292	27	2502.306	14	5698.791	27	1837.457	23	493.342	156
2		min	-1586.687	11	452.022	20	-2548.836	8	726.064	20	-1838.659	17	-609.614	210
3	N71	max	2150.545	5	2908.277	35	1360.474	4	-401.41	15	1459.825	19	4997.715	35
4		min	-2105.456	23	462.429	16	-1337.839	22	-2737.594	34	-1464.119	13	626.958	16
5	N72	max	2009.622	18	2914.111	31	1913.507	2	-291.592	25	1534.846	15	-721.873	24
6		min	-2050.187	12	463.815	24	-1889.932	20	-3000.181	32	-1540.113	9	-4862.904	31
7	Totals:	max	5561.153	5	8556.225	34	5695.857	14						
8		min	-5561.149	23	2422.366	53	-5695.862	8						

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
1	MP4	PIPE_2.0	0.751	51.75	20	0.054	50.625		2	12143.947	32130	1871.625	1871.625	3	H1-1b
2	MP8	PIPE_2.0	0.751	51.75	16	0.053	50.625		10	12143.947	32130	1871.625	1871.625	1.646	H1-1b
3	MP12	PIPE_2.0	0.751	51.75	24	0.053	50.625		6	12143.947	32130	1871.625	1871.625	1.641	H1-1b
4	M29	L2.5x2.5x3	0.415	0	2	0.039	20.12	y	3	26633.712	29192.4	872.574	1971.83	1.5	H2-1
5	M40	L2.5x2.5x3	0.414	0	10	0.039	20.12	y	11	26633.712	29192.4	872.574	1971.83	1.5	H2-1
6	M36	L2.5x2.5x3	0.406	0	6	0.039	20.12	y	7	26633.712	29192.4	872.574	1971.83	1.5	H2-1
7	M4	HSS4X4X4	0.368	0	29	0.094	0	y	209	135489.768	139518	16180.5	16180.5	1	H1-1b
8	M43	HSS4X4X4	0.367	0	33	0.095	0	y	93	135489.768	139518	16180.5	16180.5	1	H1-1b
9	M42	HSS4X4X4	0.359	0	34	0.094	0	y	169	135489.768	139518	16180.5	16180.5	1	H1-1b
10	MP3	PIPE_2.0	0.325	50.625	13	0.04	50.625		13	12143.947	32130	1871.625	1871.625	2.819	H1-1b
11	MP11	PIPE_2.0	0.324	50.625	5	0.04	50.625		5	12143.947	32130	1871.625	1871.625	2.508	H1-1b
12	MP7	PIPE_2.0	0.323	50.625	9	0.04	50.625		31	12143.947	32130	1871.625	1871.625	1.753	H1-1b

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-ft]	phi*Mn z-z [lb-ft]	Cb	Eqn
13	MP5	PIPE_2.0	0.273	50.625	37	0.051	50.625		2	12143.947	32130	1871.625	1871.625	3	H1-1b
14	MP1	PIPE_2.0	0.269	50.625	29	0.05	50.625		6	12143.947	32130	1871.625	1871.625	3	H1-1b
15	MP9	PIPE_2.0	0.266	50.625	33	0.05	50.625		10	12143.947	32130	1871.625	1871.625	3	H1-1b
16	M5	6x0.5	0.264	6	5	0.241	8	y	12	67551.643	97200	1012.5	12150	1.254	H1-1b
17	MP10	PIPE_2.0	0.263	50.625	10	0.05	50.625		11	12143.947	32130	1871.625	1871.625	2.923	H1-1b
18	M8	6x0.5	0.263	6	9	0.239	8	y	4	67551.643	97200	1012.5	12150	1.25	H1-1b
19	MP6	PIPE_2.0	0.26	50.625	2	0.049	50.625		3	12143.947	32130	1871.625	1871.625	3	H1-1b
20	M1	6x0.5	0.257	6	13	0.239	8	y	8	67551.643	97200	1012.5	12150	1.238	H1-1b
21	MP2	PIPE_2.0	0.254	50.625	2	0.05	50.625		7	12143.947	32130	1871.625	1871.625	3	H1-1b
22	M53	PIPE_2.0	0.227	54.687	28	0.217	18.75		6	6295.422	32130	1871.625	1871.625	3	H1-1b
23	M66	PIPE_2.0	0.226	54.687	32	0.218	18.75		10	6295.422	32130	1871.625	1871.625	3	H1-1b
24	M28	PIPE_2.0	0.222	54.688	35	0.217	18.75		2	6295.422	32130	1871.625	1871.625	3	H1-1b
25	M25	L2x2x4	0.21	50.52	19	0.01	50.52	y	7	20936.466	30585.6	690.934	1528.811	1.5	H2-1
26	M21	L2x2x4	0.208	50.52	23	0.009	50.52	y	11	20936.466	30585.6	690.934	1528.811	1.5	H2-1
27	M23	L2x2x4	0.203	50.52	15	0.009	50.52	y	3	20936.466	30585.6	690.934	1528.811	1.5	H2-1
28	M12	HSS4X4X4	0.19	31.26	35	0.044	58.612	y	29	136537.125	139518	16180.5	16180.5	1	H1-1b
29	M15	HSS4X4X4	0.186	31.26	28	0.041	3.907	z	7	136537.125	139518	16180.5	16180.5	1	H1-1b
30	M18	HSS4X4X4	0.185	31.26	33	0.042	3.907	z	11	136537.125	139518	16180.5	16180.5	1	H1-1b
31	M22	L2x2x4	0.177	50.52	21	0.011	50.52	z	2	20936.466	30585.6	690.934	1528.811	1.5	H2-1
32	M35	PIPE_3.0	0.174	87.5	27	0.125	89.062		30	59302.836	65205	5748.75	5748.75	1	H1-1b
33	M26	L2x2x4	0.173	50.52	17	0.011	0	y	30	20936.466	30585.6	690.934	1528.811	1.5	H2-1
34	M39	PIPE_3.0	0.163	87.5	31	0.128	89.062		34	59302.836	65205	5748.75	5748.75	1	H1-1b
35	M11	PIPE_3.0	0.162	87.5	35	0.128	89.063		38	59302.836	65205	5748.75	5748.75	1	H1-1b
36	M24	L2x2x4	0.138	50.52	25	0.011	50.52	y	31	20936.466	30585.6	690.934	1528.811	1.5	H2-1

APPENDIX D

ADDITIONAL CALCUATIONS

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless

Bolt Calculation Tool, V1.4

PROJECT DATA	
Site Name:	NORTH HAVEN TOWER
Site Number:	881536
Job Code:	1039-Z0001-B
Connection Description:	Standoff to Collar

APPLIED LOADS		
Bolt Tension:	5995.34	lbs
Bolt Shear:	816.50	lbs

BOLT PROPERTIES		
Bolt Type:	Bolt	-
Bolt Diameter:	0.625	in
Bolt Grade:	A325	-
# of Bolts:	4	-
Threads Excluded?	No	-

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Tensile Usage	29.5%	
Shear Usage	5.9%	
Interaction Check	0.09	***≤1.05***
Result	Pass	

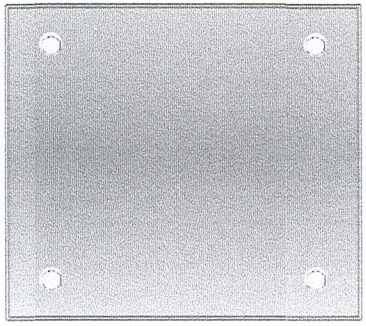


Exhibit F

Power Density/RF Emissions Report

INFINIGY

Non-Ionizing Radiation Report

Compiled For: Northeast Site Solutions on behalf of T-Mobile

Site Name: CTNH037A

Site ID: CTNH037A

120 Universal Drive, North Haven, CT 06473

Latitude: 41.344447; Longitude: -72.870856

Structure Type: Monopole

Report Date: February 22, 2021

Status: T-Mobile will be compliant with FCC rules on RF Exposure.

Table of Contents

1. Executive Summary:

Northeast Site Solutions on behalf of T-Mobile has contracted Infinigy Solutions, LLC to determine whether the site CTNH037A located at 120 Universal Drive in North Haven, CT Will Be Compliant with all Federal Communications Commission (FCC) rules and regulations for radio frequency (RF) exposure as indicated in **47CFR§1.1310**.

The report incorporates a theoretical RF field analysis in accordance with the FCC Rules and Regulations for all individuals classified as "Occupational or Controlled" and "General Public or Uncontrolled" (see Appendix A and B).

This document and the conclusions herein are based on information provided by Northeast Site Solutions on behalf of T-Mobile.

As a result of the analysis, **T-Mobile Will Be Compliant with FCC rules.**

T-Mobile, All Bands Cumulative Exposure %		
Uncontrolled / General Population	Exposure values at the site (mW/cm^2)	**0.0768**
	% Exposure	**9.34 %**
Controlled / Occupational	Exposure values at the site (mW/cm^2)	**0.0768**
	% Exposure	**1.88 %**

2. Site Summary:

Site Information	
Site Name: CTNH037A	
Site Address: 120 Universal Drive, North Haven, CT 06473	
Site Type: Monopole	
Compliance Status	Will Be Compliant
Mitigation Required	No
Signage Required	Yes
Barriers Required	No
Access Locked	No
Area Controlled or Uncontrolled	Uncontrolled

3. Site Compliance

This report also incorporates overview of the site information:

- Antenna Inventory Table
- Calculation Tables showing exposure for each carrier transmit frequency
- Total exposure for all carriers existing and proposed at ground level considering the centerline of all antennas and horizontal distance from the tower.
- Maximum Effective Radiated Power Assumed as Worst Case for Calculations used in this study
- Calculations based on flat ground around base of the structure

4. Site Compliance Recommendations

Infinigy recommends the following upon the installation of antennas at the site:

Base of tower

Install an RF caution sign. Note: The recommendation for alerting signage is moot if there is an RF caution, or greater already installed.

5. Antenna Inventory Table

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
1a	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	84	40	5060
1b	Alpha	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	84	40	5060
2a	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	84	40	4309
2b	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	84	40	6104
2c	Alpha	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	84	40	3052
3a	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	84	40	2256
3b	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	84	40	2058
3c	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	84	40	2058
3d	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	84	40	3052
3e	Alpha	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	84	40	6104
4a	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	84	150	5060
4b	Beta	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	84	150	5060
5a	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	84	150	4309
5b	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	84	150	6104
5c	Beta	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	84	150	3052
6a	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	84	150	2256
6b	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	84	150	2058
6c	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	84	150	2058
6d	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	84	150	3052
6e	Beta	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	84	150	6104
7a	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz LTE	84	270	5060
7b	Gamma	T-Mobile	Ericsson	AIR6449 B41	2500 MHz 5G	84	270	5060
8a	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	2100 MHz LTE	84	270	4309
8b	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz LTE	84	270	6104

Ant ID	Sector	Operator	Antenna manufacturer	Antenna Model	Operating Frequency/Technology	Rad Ctr (Ft)	Az (Deg)	Total ERP Power (Watts)
8c	Gamma	T-Mobile	Ericsson	AIR32 KRD901146-1_B66A_B2A	1900 MHz GSM	84	270	3052
9a	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	700 MHz LTE	84	270	2256
9b	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz LTE	84	270	2058
9c	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	600 MHz 5G	84	270	2058
9d	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz UMTS	84	270	3052
9e	Gamma	T-Mobile	RFS	APXVARR24_43-C-NA20	1900 MHz LTE	84	270	6104

6. RF Guidelines

To ensure safety of company workers, the following points need to be taken into consideration and implemented at wireless sites in accordance with the Carriers policies:

a) Worksite: Any employee at the site should avoid working directly in front of the antenna or in areas predicted to exceed general population exposure limits by 100%. Workers should insist that the transmitters be switched off during the work period.

b) RF Safety Training and Awareness: All employees working in areas exceeding the general population limits should have a basic awareness of RF safety measures. Videos, classroom lectures and online courses are all appropriate training methods on these topics.

c) Site Access: Restricting access to transmitting antenna locations is one of the most important elements of RF safety. This can be done with:
   - Locked doors/gates/ladder access
   - Alarmed doors
   - Restrictive barriers

d) Three-foot Buffer: There is an inverse relationship between the strength of the field and the distance from the antenna. The RF field diminishes with distance from the antenna. Workers should maintain a three-foot distance from the antennas.

e) Antennas: Workers should always assume that the antenna is transmitting and should never stop right in front of the antenna. If someone must pass by an antenna, he/she should move quickly, thus reducing RF exposure.

7. T-Mobile Exposure Analysis By Band and Technology

T-Mobile 600 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	0.4
	Exposure values at the site (mW/cm²)	0.0040
	% Exposure	1.01%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	2.0
	Exposure values at the site (mW/cm²)	0.0040
	% Exposure	0.20%

T-Mobile 600 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	0.4
	Exposure values at the site (mW/cm²)	0.0040
	% Exposure	1.01%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	2.0
	Exposure values at the site (mW/cm²)	0.0040
	% Exposure	0.20%

T-Mobile 700 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	0.5
	Exposure values at the site (mW/cm²)	0.0044
	% Exposure	0.89%
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	2.3
	Exposure values at the site (mW/cm²)	0.0044
	% Exposure	0.19%

T-Mobile 1900 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0240**
	% Exposure	**2.40%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0240**
	% Exposure	**0.48%**

T-Mobile 1900 MHz GSM		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0060**
	% Exposure	**0.60%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0060**
	% Exposure	**0.12%**

T-Mobile 1900 MHz UMTS		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0060**
	% Exposure	**0.60%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0060**
	% Exposure	**0.12%**

T-Mobile 2100 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0085**
	% Exposure	**0.85%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0085**
	% Exposure	**0.17%**

T-Mobile 2500 MHz LTE		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0099**
	% Exposure	**0.99%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0099**
	% Exposure	**0.20%**

T-Mobile 2500 MHz 5G		
Uncontrolled / General Population	FCC's exposure limits (mW/cm²)	**1.0**
	Exposure values at the site (mW/cm²)	**0.0099**
	% Exposure	**0.99%**
Controlled / Occupational	FCC's Exposure limits(mW/cm²)	**5.0**
	Exposure values at the site (mW/cm²)	**0.0099**
	% Exposure	**0.20%**

8. Appendix A: FCC Guidelines

FCC Policies

The Federal Communications Commission (FCC) in 1996 implemented regulations and policies for analysis of RF propagation to evaluate RF emissions. All the analysis and results of this report are compared with FCC's (Federal Communications Commission) rules to determine whether a site is compliant for Occupational/Controlled or General Public/Uncontrolled exposure. All the analysis of RF propagation is done in terms of a percentage. The limits primarily indicate the power density and are generally expressed in terms of milliwatts per centimeter square, mW/cm^2.

FCC guidelines incorporate two separate tiers of exposure limits that are dependent on the scenario/ situation in which that exposure takes place or the status of the individuals who are subjected to that exposure. The decision as to which tier is applied to a scenario is based on the following definitions:

Occupational / Controlled

These limits apply in situations when someone is exposed to RF energy through his/her occupation, is fully aware of the harmful effects of the RF exposure and has an ability to exercise control over this exposure. Occupational / controlled exposure limits also apply when 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. limits for Occupational/Controlled exposure can be found on Table 1(A).

General Population / Uncontrolled

These limits apply to situations in which the general public may be exposed or in which persons who are exposed because of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure to RF. Therefore, members of the general public would always be considered under this category, for example, in the case of a telecommunications tower that exposes people in a nearby residential area. Exposure limits for General Population/Uncontrolled can be found on Table 1(B).

Table 1. **LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

(A) Limits for Occupational/Controlled Exposure

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

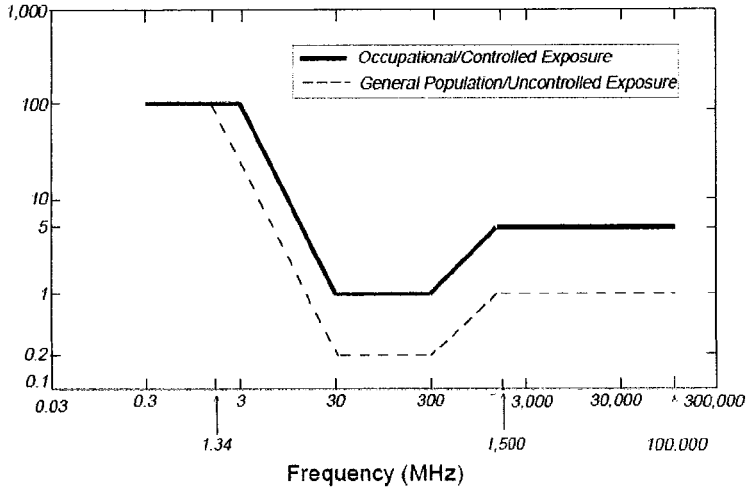
(B) Limits for General Population/Uncontrolled Exposure

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

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

Figure 1. *FCC Limits for Maximum Permissible Exposure (MPE)*

Plane-wave Equivalent Power Density



OSHA Statement:

The objective of the OSHA Act is to ensure the safety and health of the working men and women by enforcing certain standards. The act also assists and encourages the states in their efforts to ensure safe and healthy working conditions through means of research, information, education and training in the field of occupational safety and health and for other purposes.

According to OSHA Act section 5, important duties to be considered are:

(a) Each employer

1) Shall furnish to each of his employees' employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious harm to his employees
2) Shall comply with occupational safety and health standards promulgated under this act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations, and orders issued pursuant to this Act which are applicable to his own actions and conduct.

9. Preparer Certification

I, Tim Harris, preparer of this report, certify that I am fully trained and aware of the rules and regulations of both the Federal Communications Commission and the Occupational Safety and Heath Administration regarding Human Exposure to Radio Frequency Radiation. In addition, I have been trained in RF safety practices, rules, and regulations.

I certify that the information contained in this report is true and correct to the best of my knowledge.

Timothy A. Harris 2/22/2021

Signature Date