



Crown Castle
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065

January 21, 2021

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

RE: **Notice of Exempt Modification for T-Mobile:
826222 - T-Mobile Site ID: CT11217A
201 South Main Street, Newtown, CT 06470
Latitude: 41° 22' 41.32" / Longitude: -73° 16' 26.94"**

Dear Ms. Bachman:

T-Mobile currently maintains nine (9) antennas at the 148-foot mount on the existing 150-foot Monopole Tower, located at 201 South Main Street, Newtown, CT. The property is owned by Bluelink Corp and the Tower is owned by Crown Castle. T-Mobile now intends to replace six (6) existing antennas with three (3) new 1900/2100 MHz antennas and three (3) new 600/700 MHz antennas. Three of the new antennas will be capable of providing 5G services. The new antennas will be installed at the 148-ft level of the tower. T-Mobile is also proposing a mount replacement as shown on the enclosed Mount Replacement Analysis Report.

Planned Modifications:

Tower:

Remove:

(3) Coax

Remove and Replace:

(3) LNX 6515DS-A1M Antenna (**REMOVE**) - (3) RFS-APXVAARR24_43-U-NA20 Antenna 600/700 MHz (**REPLACE**)

(3) AIR21 KRC118023-1_B2P_B4A Antenna (**REMOVE**) – (3) AIR32_B66A_B2A Antenna 1900/2100 MHz (**REPLACE**)

(3) RRUS11 B12 (**REMOVE**) – (3) Radio 4449 B71/B12 (**REPLACE**)

Install New:

(3) 1 5/8" Hybrid Fiber Line

Existing to Remain:

(9) 1 5/8" Coax

(1) Fiber line

(3) AIR21 KRC118023-1_B2A_B4P Antenna 1900/2100 MHz

(3) TMA

Ground:

The Foundation for a Wireless World.

CrownCastle.com

Upgrade to existing ground cabinet. (Internally)

The original date and conditions of the zoning of this facility are unknown despite diligent search efforts to obtain same.

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 Daniel Rosenthal, First Selectman for the Town of Newtown, George Benson, Director of Planning, BlueLink Corp as the property owner and Crown Castle is the tower 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). Please send approval/rejection letter to Attn: Anne Marie Zsamba.

Sincerely,

Anne Marie Zsamba
Site Acquisition Specialist
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
(201) 236-9224
AnneMarie.Zsamba@crowncastle.com

Attachments

cc:

Daniel Rosenthal, First Selectman (*via email only to Daniel.rosenthal@newtown-ct.gov*)
Town of Newtown

Melanie A. Bachman

Page 3

3 Primrose Street
Newtown, CT 06470

George Benson, Director of Planning (*via email only to george.benson@newtown-ct.gov*)
Town of Newtown
3 Primrose Street
Newtown, CT 06470

BlueLink Corp
1950 Spectrum Circle
Suite 300
Marietta, GA 30067

Crown Castle, Tower Owner

From: [Zsamba, Anne Marie](#)
To: Daniel.rosenthal@newtown-ct.gov
Subject: Notice of Exempt Modification - T-Mobile - 201 South Main Street, Newtown
Date: Thursday, January 21, 2021 3:24:00 PM
Attachments: [EM-T-MOBILE-201 SOUTH MAIN ST NEWTOWN-826222-CT11206A-NOTICE.pdf](#)

Dear First Selectman Rosenthal:

Attached please find T-Mobile's exempt modification application that is being submitted to the Connecticut Siting Council today, January 21, 2021.

In light of the present circumstances with Covid-19, The Council has advised that electronic notification of this filing is acceptable. If you could kindly confirm receipt. Thank you.

Best,
Anne Marie Zsamba

ANNE MARIE ZSAMBA
Site Acquisition Specialist
T: (201) 236-9224
M: (518) 350-3639
F: (724) 416-6112

CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

From: [Zsamba, Anne Marie](#)
To: george.benson@newtown-ct.gov
Subject: Notice of Exempt Modification - T-Mobile - 201 South Main Street, Newtown
Date: Thursday, January 21, 2021 3:24:00 PM
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CROWN CASTLE
3 Corporate Park Drive, Suite 101
Clifton Park, NY 12065
CrownCastle.com

ORIGIN ID: SCHA (201) 236-9224
ANNE MARIE ZSAMBRA
CROWN CASTLE
21 HEATHER DRIVE
GANSEVOORT, NY 12831
UNITED STATES US

SHIP DATE: 21 JAN 21
ACTWG/T: 1.00 LB
CAD: 104924194/IN/ET4340

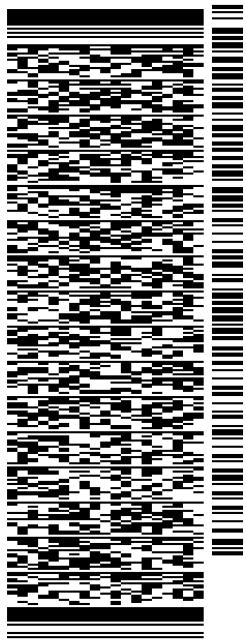
BILL SENDER

TO **BLUELINK CORP**

**1950 SPECTRUM CIRCLE
SUITE 300**

MARIETTA GA 30067

(201) 236-9224 REF: 1734.7890
INV: DEPT:
PO:



J211121011901uv

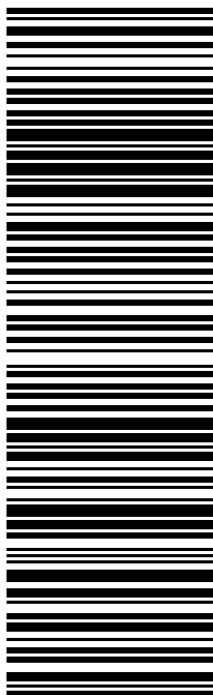
56DJ11136/FE4A

TRK# 7726 9458 8055
0201

FRI - 22 JAN 10:30A
PRIORITY OVERNIGHT

XHNCQA

30067
GA-US ATL



After printing this label:

1. Use the 'Print' button on this page to print your label to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

Use of this system constitutes your agreement to the service conditions in the current FedEx Service Guide, available on fedex.com. FedEx will not be responsible for any claim in excess of \$100 per package, whether the result of loss, damage, delay, non-delivery, misdelivery, or misinformation, unless you declare a higher value, pay an additional charge, document your actual loss and file a timely claim. Limitations found in the current FedEx Service Guide apply. Your right to recover from FedEx for any loss, including intrinsic value of the package, loss of sales, income interest, profit, attorney's fees, costs, and other forms of damage whether direct, incidental, consequential, or special is limited to the greater of \$100 or the authorized declared value. Recovery cannot exceed actual documented loss. Maximum for items of extraordinary value is \$1,000, e.g. jewelry, precious metals, negotiable instruments and other items listed in our Service Guide. Written claims must be filed within strict time limits, see current FedEx Service Guide.

Exhibit A

Property Card



Property Information

Property Location	201 SOUTH MAIN STREET
Owner	BLUELINX CORP
Co-Owner	CCTMO
Mailing Address	PMB 331- 4017 WASHINGTON ROAD MCMURRAY PA 15317
Land Use	4310 CELL SITE
Land Class	I
Zoning Code	M-1
Census Tract	
Sub Lot	
Neighborhood	
Acreage	0
Utilities	Well,Septic
Lot Setting/Desc	
Survey Map	
TC Survey Numbers	

Photo



Sketch

Primary Construction Details

Year Built	
Stories	
Building Style	
Building Use	
Building Condition	
Floors	
Total Rooms	

Bedrooms	
Full Bathrooms	
Half Bathrooms	
Bath Style	
Kitchen Style	
Roof Style	
Roof Cover	

Exterior Walls	
Interior Walls	
Heating Type	
Heating Fuel	
AC Type	
Gross Bldg Area	
Total Living Area	



Town of Newtown, CT

Property Listing Report

Map Block Lot

36-12-10-C

Account

00383600C

Valuation Summary (Assessed value = 70% of Appraised Value)

Item	Appraised	Assessed
Buildings		
Extras		
Outbuildings		
Land		
Total		

Outbuilding and Extra Items

Type	Description
Cell Tower	1 Units
Fence	200 L.F.
Cellular Shed	240 S.F.

Sub Areas

Subarea Type	Gross Area (sq ft)	Living Area (sq ft)
Total Area		0

Sales History

Owner of Record	Book/ Page	Sale Date	Sale Price
BLUELINX CORP	1005/ 848	3/22/2012	

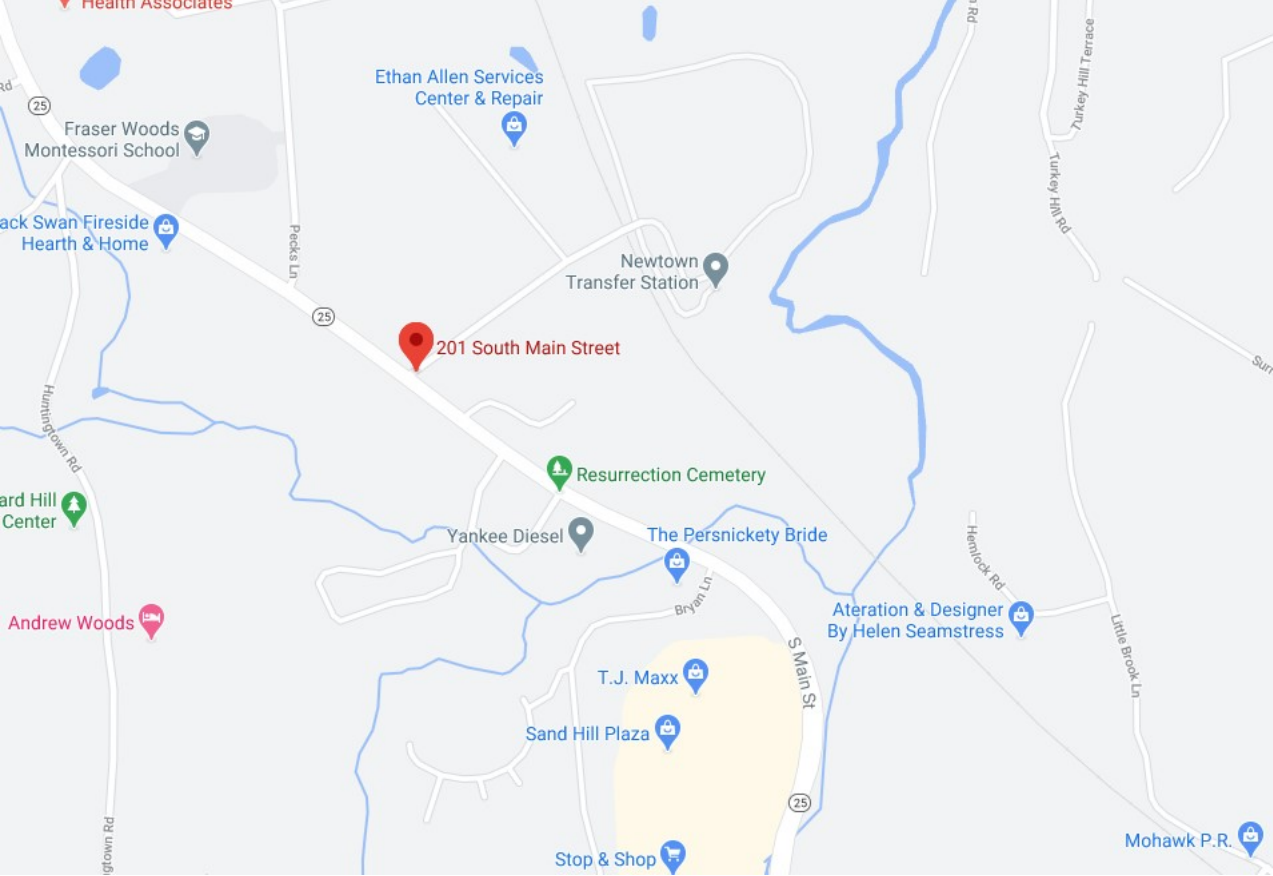


Exhibit B

Construction Drawings



T-MOBILE SITE NAME:
NEWTOWN/RT-25

T-MOBILE SITE NUMBER:
CT11217A

CROWN BU: 826222 / APP#: 479815
67D92DB CONFIGURATION

201 MAIN STREET
NEWTOWN, CT 06470

EXISTING 150'-0" MONOPOLE



CT11217A
BU #: 826222
NEWTOWN/RT-25
201 MAIN STREET
NEWTOWN, CT 06470
EXISTING 150'-0" MONOPOLE

PROJECT NO: 137087.002.01
CHECKED BY: MTJ

ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/21/19	JDP	CONSTRUCTION
1	12/22/20	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/20



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: **T-1** REVISION: **1**

PROJECT SUMMARY

SITE TYPE: EXISTING EQUIPMENT UPGRADE
SITE ADDRESS: 201 MAIN STREET
NEWTOWN, CT 06470
JURISDICTION: FAIRFIELD COUNTY

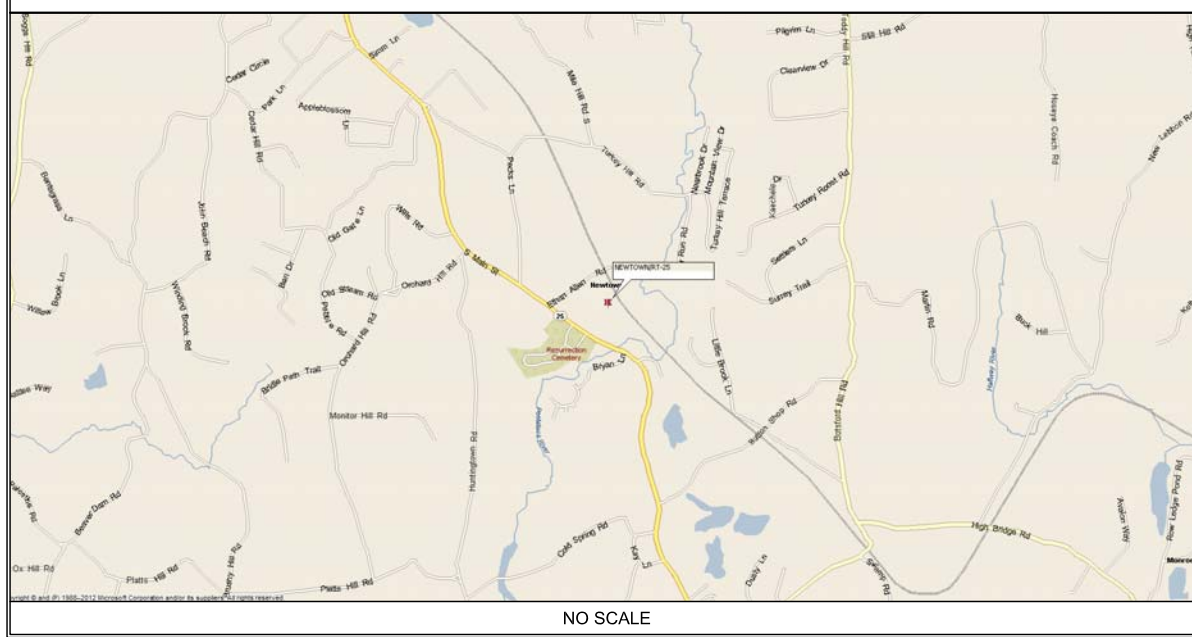
NAD83
LATITUDE: 41.378145° N
LONGITUDE: 73.274123° W

TOWER OWNER: CROWN CASTLE
3200 HORIZON DRIVE, SUITE 150
KING OF PRUSSIA, PA 19406
JASON SMITH
(610) 635-3225

CUSTOMER/APPLICANT: T-MOBILE
4 SYLVAN WAY
PARSIPPANY, NJ 07054
(973) 397-4800

OCCUPANCY TYPE: UNMANNED
A.D.A. COMPLIANCE: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION

LOCATION MAP



DRAWING INDEX

SHEET #	SHEET DESCRIPTION	REV. #
T-1	TITLE SHEET	1
A-1	OVERALL SITE PLAN	1
A-2	ANTENNA/CABLE SCHEDULE AND AZIMUTH PLANS	1
A-3	TOWER ELEVATION	1
A-4	ANTENNA AND RRU DETAILS	1
E-1	PANEL SCHEDULE AND ONE-LINE DIAGRAM	1

CONTACT INFORMATION

A&E FIRM: B+T GROUP
1717 S. BOULDER, STE. 300
TULSA, OK 74119
CONTACT: MIKE OAKES
PHONE: (918) 587-4630

ELECTRIC PROVIDER: CONNECTICUT LIGHT & POWER
(860) 947-2000

TELCO PROVIDER: PIONEER TELEPHONE
(800) 808-9000

DRIVING DIRECTIONS

DEPART HARTFORD-BRAINARD AIRPORT ON MAXIM RD. ROAD NAME CHANGES TO BRAINARD RD. TURN RIGHT ONTO AIRPORT RD. TURN LEFT ONTO RAMP. TAKE RAMP ONTO I-91. AT EXIT 18, TAKE RAMP ONTO I-691. AT EXIT 2, TAKE RAMP ONTO I-84. AT EXIT 10, TURN RIGHT ONTO RAMP. TURN RIGHT ONTO US-6. TURN LEFT ONTO CT-25. TURN LEFT ONTO ACCESS ROAD AND ARRIVE AT NEWTOWN/RT-25.

A/E DOCUMENT REVIEW STATUS

TITLE	SIGNATURE	DATE
T-MOBILE PROP:		
T-MOBILE R.F. MGR.:		
T-MOBILE NetOps:		
T-MOBILE CONST. MGR.:		
INTERCONNECT:		
T-MOBILE SITE DEV. MGR.:		
PROPERTY OWNER:		
PLANNING:		

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

CODE COMPLIANCE

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/DWELLING	2018 CONNECTICUT STATE BUILDING CODE
STRUCTURAL	2018 CONNECTICUT STATE BUILDING CODE
MECHANICAL	2018 CONNECTICUT STATE BUILDING CODE
ELECTRICAL	NEC 2017

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES:

- REMOVE (6) EXISTING ANTENNAS AT 148'-0".
- REMOVE (3) EXISTING RRUS AT 148'-0".
- REMOVE (3) EXISTING COAX LINES.
- REMOVE (1) DUS41 & (1) XMU FROM EXISTING RBS 6131.
- INSTALL (6) NEW ANTENNAS AT 148'-0".
- INSTALL (3) NEW RRUS AT 148'-0".
- INSTALL (3) NEW 6x12 HCS FIBER.
- INSTALL (2) NEW BB6630 IN EXISTING RBS 6131.
- REMOVE AND REPLACE MOUNTS PER MOUNT ANALYSIS BY GPD ENGINEERING DATED 11/24/20.

DO NOT SCALE DRAWINGS

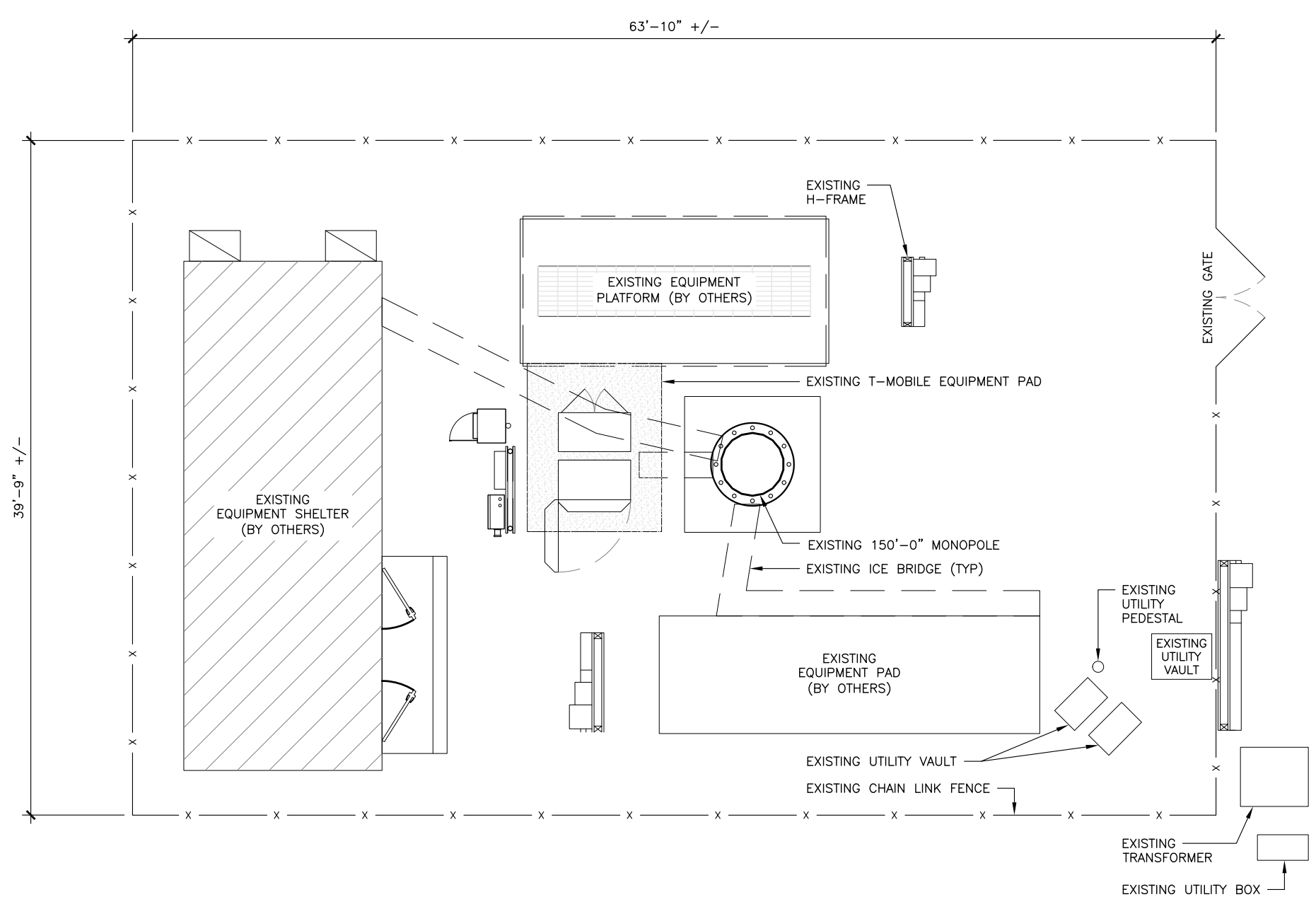
ALL DRAWINGS CONTAINED HEREIN ARE FORMATTED FOR 11X17. CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.



CALL CONNECTICUT ONE CALL
(800) 922-4455
CALL 3 WORKING DAYS
BEFORE YOU DIG!



137087_826222_Newtown-RT-25.dwg -- SheetA-1 -- User: jdunbar -- Dec 22, 2020 -- 12:47pm

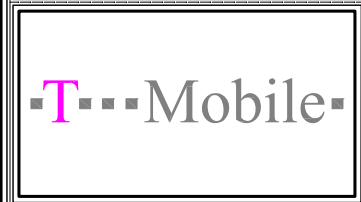


1 OVERALL SITE PLAN
 SCALE: 0' 1' 4' 8' 20'



- GENERAL NOTES:**
- SUBJECT PROPERTY IS SITUATED AT 201 MAIN STREET, NEWTOWN, CT 06470.
 - APPLICANT: T-MOBILE
 A DELAWARE LIMITED LIABILITY COMPANY
 4 SYLVAN WAY
 PARSIPPANY, NEW JERSEY 07054
 (973) 397-4800

 TOWER OWNER: CROWN CASTLE INTERNATIONAL
 - THE APPLICANT IS TO UPDATE THEIR NETWORK BY INSTALLING SIX (6) NEW PANEL ANTENNAS, THREE (3) RRUS, AND THREE (3) ADDITIONAL CABLES MOUNTED ON AN EXISTING MONOPOLE.
 - THIS FACILITY SHALL BE VISITED ON THE AVERAGE OF ONCE A MONTH FOR MAINTENANCE AND SHALL BE MONITORED FROM A REMOTE FACILITY.
 - THE EXISTING SITE IS LOCATED AT LATITUDE OF 41.378145' N± AND LONGITUDE OF 73.274123' W±. THE HORIZONTAL DATUM ARE IN TERMS OF NORTH AMERICAN DATUM OF 1983 (NAD 83).
 - THIS SET OF PLANS HAS BEEN PREPARED FOR THE PURPOSES OF MUNICIPAL AND AGENCY REVIEW AND APPROVAL. THIS SET OF PLANS SHALL NOT BE UTILIZED AS CONSTRUCTION DOCUMENTS UNTIL ALL CONDITIONS OF APPROVAL HAVE BEEN SATISFIED AND EACH OF THE DRAWINGS HAVE BEEN REVISED TO INDICATED "ISSUED FOR CONSTRUCTION"
 - ALL MATERIALS, WORKMANSHIP, AND CONSTRUCTION FOR THE SITE IMPROVEMENTS SHOWN HEREON SHALL BE IN ACCORDANCE WITH:
 - CURRENT PREVAILING MUNICIPAL AND/OR COUNTY SPECIFICATIONS, STANDARDS, AND REQUIREMENTS.
 - CURRENT PREVAILING UTILITY COMPANY AUTHORITY SPECIFICATIONS, STANDARDS AND REQUIREMENTS.
 - THE CONTRACTOR SHALL NOTIFY B+T GROUP, P.A. IMMEDIATELY IF ANY FIELD-CONDITIONS ENCOUNTERED DIFFER FROM THOSE REPRESENTED HEREON, AND/OR IF SUCH CONDITIONS WOULD OR COULD RENDER THE DESIGNS SHOWN HEREON INAPPROPRIATE AND/OR INEFFECTIVE.
 - THE CONTRACTOR IS RESPONSIBLE TO PROTECT, REPAIR AND/OR REPLACE ANY DAMAGED STRUCTURES, UTILITIES OR LANDSCAPED AREA WHICH MAY BE DISTURBED DURING THE CONSTRUCTION OF THIS FACILITY.
 - THE CONSTRUCTION CONTRACTOR IS SOLELY RESPONSIBLE FOR DETERMINING ALL CONSTRUCTION MEANS AND METHODS. THE CONSTRUCTION CONTRACTOR IS ALSO RESPONSIBLE FOR ALL JOB SITE SAFETY.
 - SITE INFORMATION SHOWN TAKEN FROM CROWN SITE PLANS AND FROM CROWN INSPECTION PHOTOS.
 - NO GUARANTEE IS MADE NOR SHOULD BE ASSUMED AS TO THE COMPLETENESS OR ACCURACY OF THE HORIZONTAL OR VERTICAL LOCATIONS. ALL PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS OF THE INFORMATION SHOWN PRIOR TO CONSTRUCTION ACTIVITIES.
 - ALL IMPROVEMENTS SHALL BE SUBJECT TO INSPECTION AND APPROVAL BY THE TOWNSHIP ENGINEER WHO WILL BE GIVEN PROPER NOTIFICATION PRIOR TO THE START OF ANY CONSTRUCTION.



CT11217A
 BU #: 826222
 NEWTOWN/RT-25
 201 MAIN STREET
 NEWTOWN, CT 06470
 EXISTING 150'-0" MONOPOLE

PROJECT NO: 137087.002.01
 CHECKED BY: MTJ

ISSUED FOR:

REV	DATE	DRWN	DESCRIPTION
0	8/21/19	JDP	CONSTRUCTION
1	12/22/20	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/20



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SHEET NUMBER: **A-1** REVISION: **1**



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 NEWTOWN/RT-25
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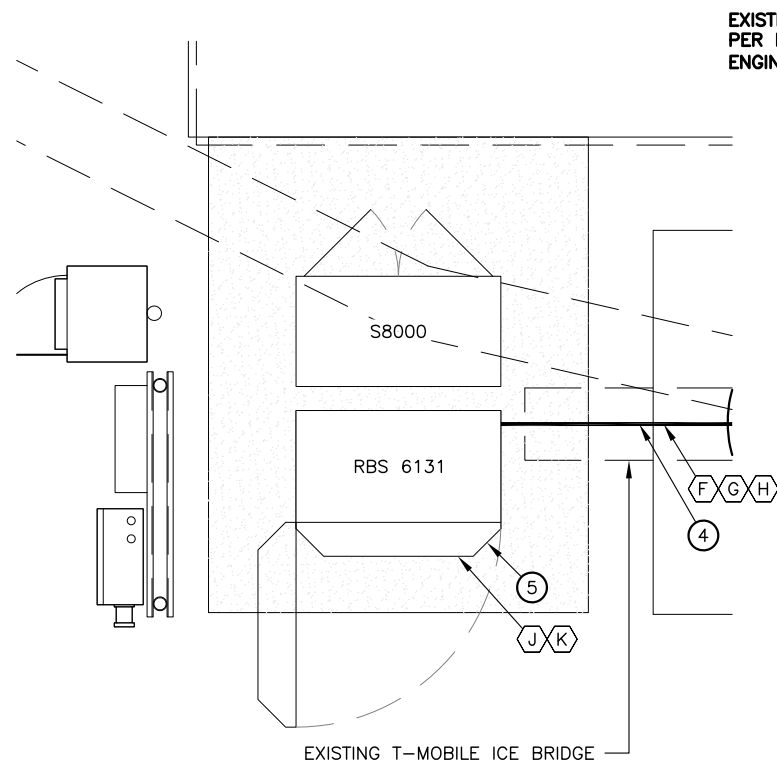


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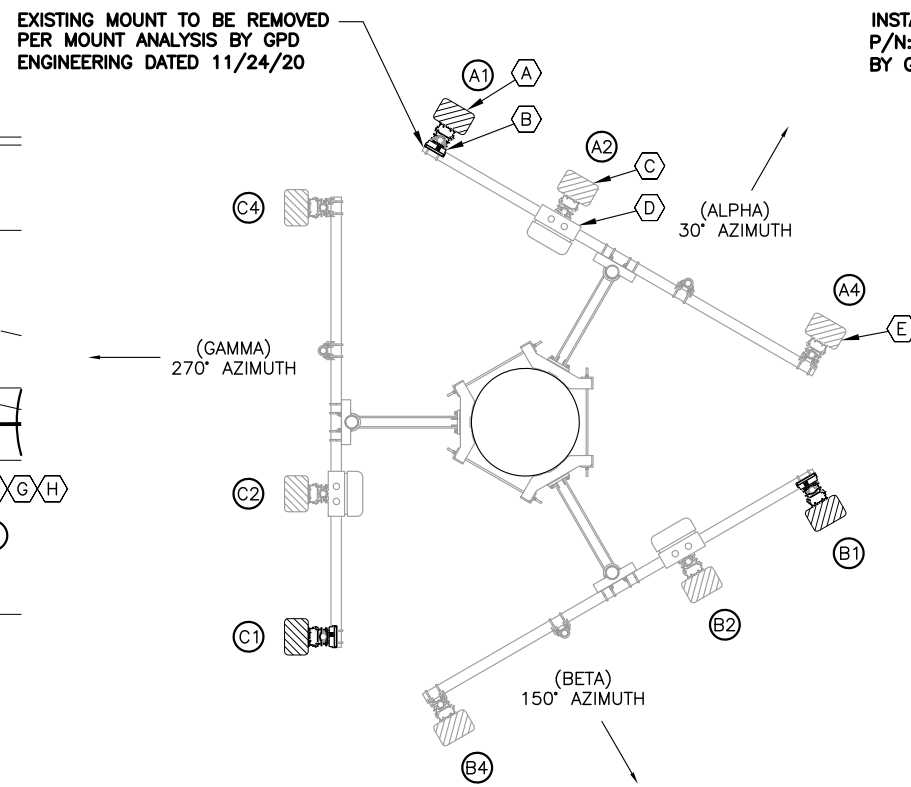
SHEET NUMBER: **A-2** REVISION: **1**

ANTENNA AND CABLE SCHEDULE											
SECTOR	POSITION	EXISTING ANTENNAS	PROPOSED ANTENNA CONFIGURATION		E-TILT	M-TILT	ANTENNA CENTERLINE	TMA/RRU	CABLES	JUMPER TYPE	CABLE LENGTH
30° - ALPHA	A1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UMTS	-	2°/2°	0°	148'-0"	1/0	(3) 1 5/8" COAX	DC/FIBER & 1/2" COAX	198'-0"
	A2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2°/2°	0°		0/1	(1) 6x12 HCS FIBER	DC/FIBER	198'-0"
	A4	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2°/2°	0°		0/0	(1) 9x18 HCS FIBER	DC/FIBER	198'-0"
150° - BETA	B1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UMTS	-	2°/2°	0°	148'-0"	1/0	(3) 1 5/8" COAX	DC/FIBER & 1/2" COAX	198'-0"
	B2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2°/2°	0°		0/1	(1) 6x12 HCS FIBER	DC/FIBER	198'-0"
	B4	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2°/2°	0°		0/0	(1) 9x18 HCS FIBER (SHARED)	DC/FIBER	-
270° - GAMMA	C1	ERICSSON AIR21 KRC118023-1_B2A_B4P	GSM UMTS	-	2°/2°	0°	148'-0"	1/0	(3) 1 5/8" COAX	DC/FIBER & 1/2" COAX	198'-0"
	C2	RFS APXVAARR24_43-U-NA20	LTE	B71 B12	2°/2°	0°		0/1	(1) 6x12 HCS FIBER	DC/FIBER	198'-0"
	C4	ERICSSON AIR32 KRD901146-1_B66A_B2A	LTE	-	2°/2°	0°		0/0	(1) 9x18 HCS FIBER (SHARED)	DC/FIBER	-

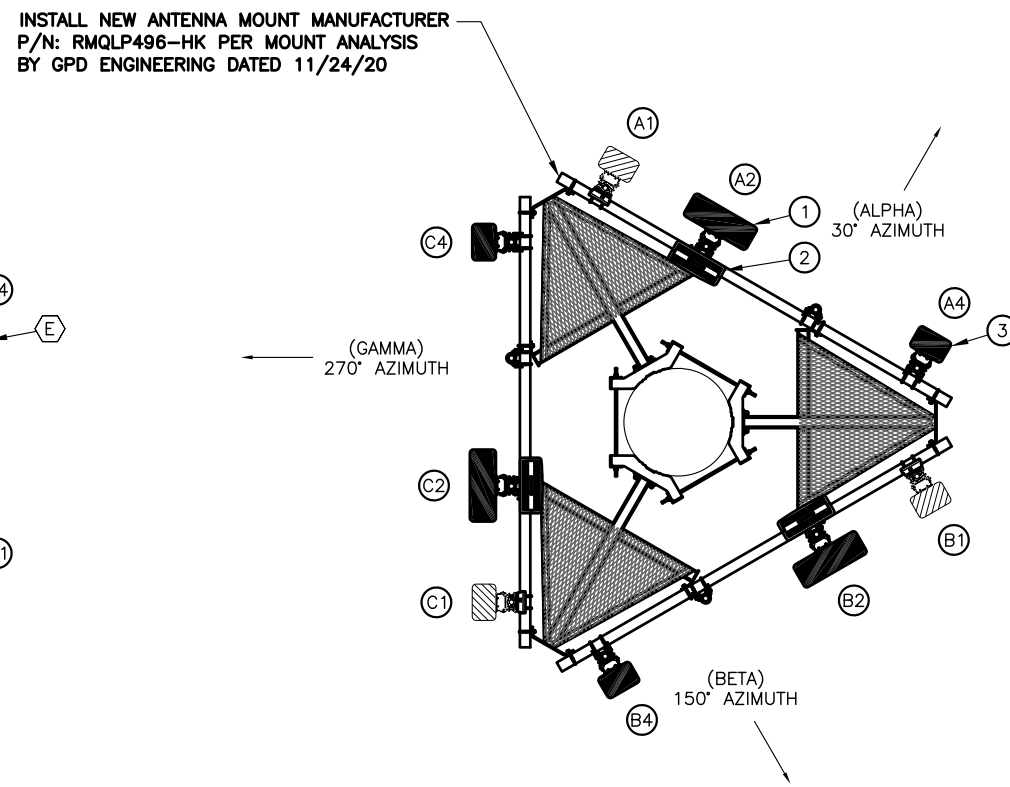
LEGEND	
EXISTING/DEMOLITION NOTES	INSTALLATION NOTES
(A) EXISTING ERICSSON AIR21 KRC118023-1_B2A_B4P ANTENNA TO REMAIN (TOTAL OF 3)	(1) INSTALL RFS APXVAARR24_43-U-NA20 (8 FT) ANTENNAS ON NEW MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(B) EXISTING TMA TO REMAIN	(2) INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	(3) INSTALL ERICSSON AIR32 KRD901146-1_B66A_B2A (5 FT) ANTENNAS ON NEW MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(D) EXISTING RRUS11 B12 RADIO TO BE REMOVED (TOTAL OF 3)	(4) INSTALL (3) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
(E) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO BE REMOVED (TOTAL OF 3)	(5) INSTALL (2) BB6630 IN EXISTING RBS 6131
(F) EXISTING (1) 9x18 HCS FIBER TO REMAIN	
(G) EXISTING (9) COAX TO REMAIN	
(H) REMOVE (3) EXISTING COAXIAL LINES	
(J) REMOVE (1) DUS41 FROM EXISTING RBS 6131	
(K) REMOVE (1) XMU FROM EXISTING RBS 6131	



1 ENLARGED AREA PLAN
 SCALE: 0' 1' 2' 4' 10'



2 EXISTING ANTENNA ORIENTATION
 SCALE: 0' 1' 4' 8' 16'



3 PROPOSED ANTENNA ORIENTATION
 SCALE: 0' 1' 4' 8' 16'



137087_826222_Newtown-RT-25.dwg - SheetA-2 - User: jdonbar - Dec 22, 2020 - 12:47pm

1:37087_826222_Newtown-RT-25.dwg -- Sheet: A-3 -- User: jdunbar -- Dec 22, 2020 -- 12:47pm

LEGEND	
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(B) EXISTING TMA TO REMAIN	(2) INSTALL RADIO 4449 B12/B71 (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(C) EXISTING ANDREW LNX-6515DS-A1M ANTENNA TO BE REMOVED (TOTAL OF 3)	(3) INSTALL ERICSSON AIR32 KRD901146-1_B66A_B2A (5 FT) ANTENNAS ON NEW MOUNT. (TYP. OF 1 PER SECTOR, TOTAL OF 3)
(D) EXISTING RRUS11 B12 RADIO TO BE REMOVED (TOTAL OF 3)	(4) INSTALL (3) 6x12 HCS FIBER. RUN FROM EQUIPMENT TO ANTENNAS FOLLOWING EXISTING ROUTING
(E) EXISTING ERICSSON AIR21 KRC118023-1_B2P_B4A ANTENNA TO BE REMOVED (TOTAL OF 3)	
(F) EXISTING (1) 9x18 HCS FIBER TO REMAIN	
(G) EXISTING (9) COAX TO REMAIN	
(H) REMOVE (3) EXISTING COAXIAL LINES	

EXISTING MOUNT TO BE REMOVED AND REPLACED PER MOUNT ANALYSIS BY GPD ENGINEERING DATED 11/24/20.

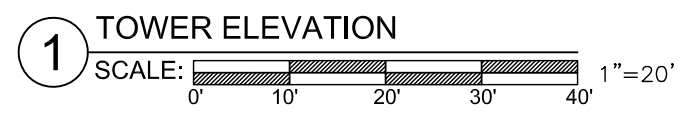
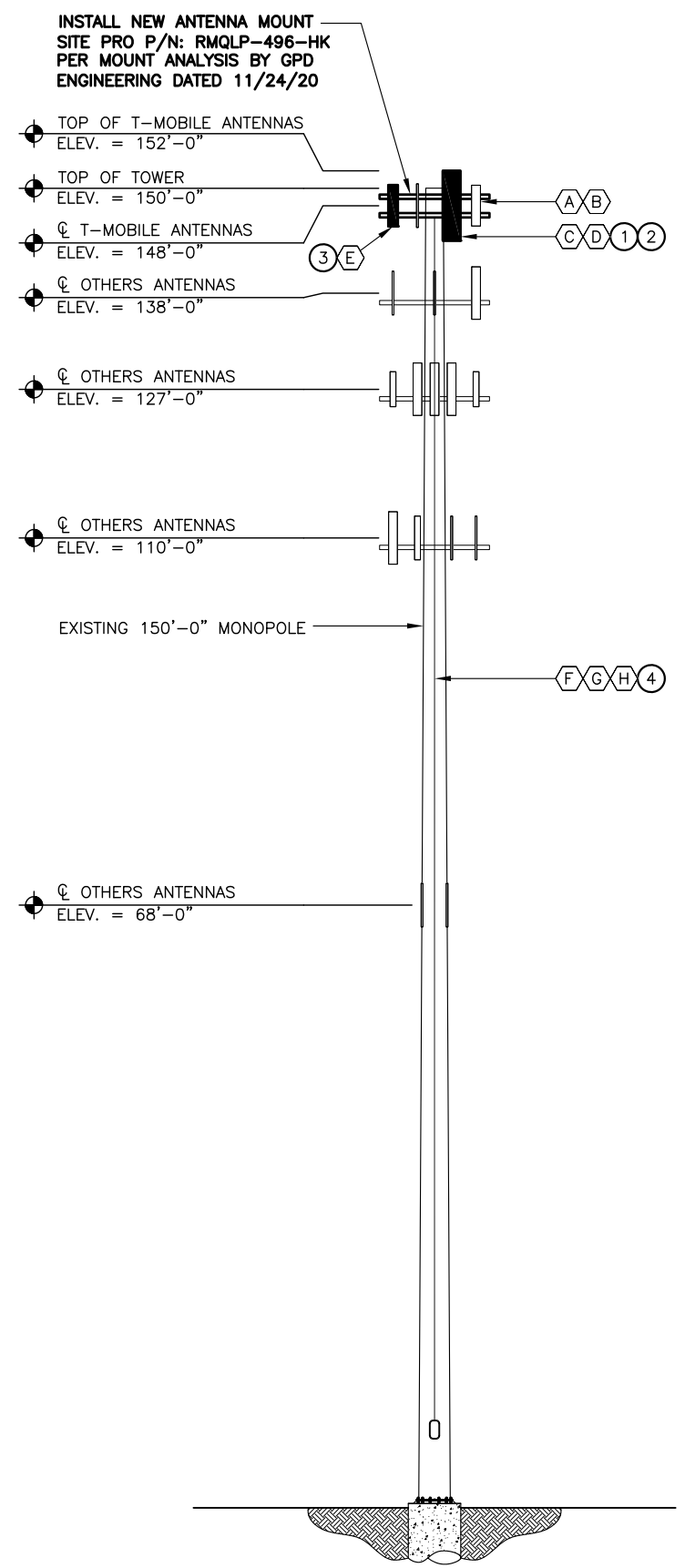
EXISTING TOWER IS SUFFICIENT PER STRUCTURAL ANALYSIS BY PAUL J FORD AND COMPANY DATED 7/15/19.

LEGEND:

■ NEW

□ EXISTING

□ FUTURE



CT11217A
 BU #: 826222
 NEWTOWN/RT-25
 201 MAIN STREET
 NEWTOWN, CT 06470
 EXISTING 150'-0" MONOPOLE

PROJECT NO: 137087.002.01
 CHECKED BY: MTJ

ISSUED FOR:

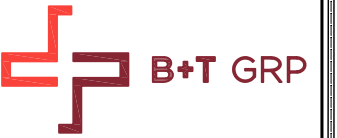
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0	8/21/19	JDP	CONSTRUCTION
1	12/22/20	JJD	CONSTRUCTION

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SHEET NUMBER: **A-3** REVISION: **1**



CT11217A
 BU #: 826222
 NEWTOWN/RT-25
 201 MAIN STREET
 NEWTOWN, CT 06470
 EXISTING 150'-0" MONOPOLE

PROJECT NO: 137087.002.01
 CHECKED BY: MTJ

ISSUED FOR:

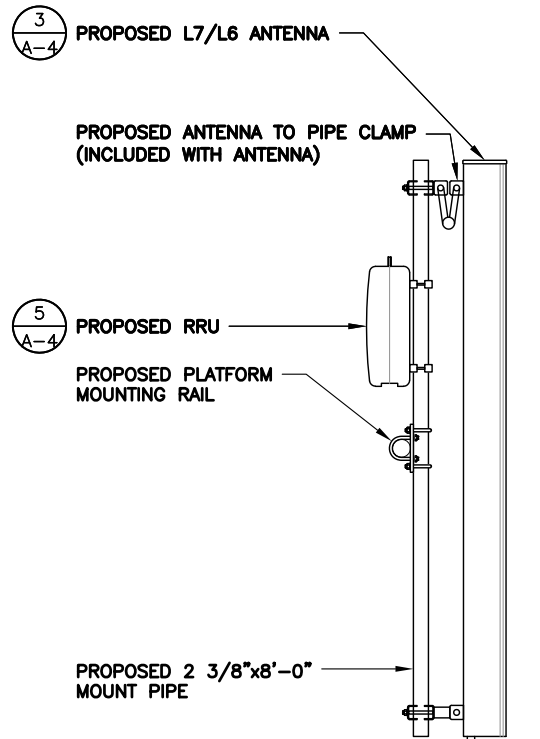
REV	DATE	DRWN	DESCRIPTION
0	8/21/19	JDP	CONSTRUCTION
1	12/22/20	JJD	CONSTRUCTION

B&T ENGINEERING, INC.
 PEC.0001564
 Expires 2/10/20

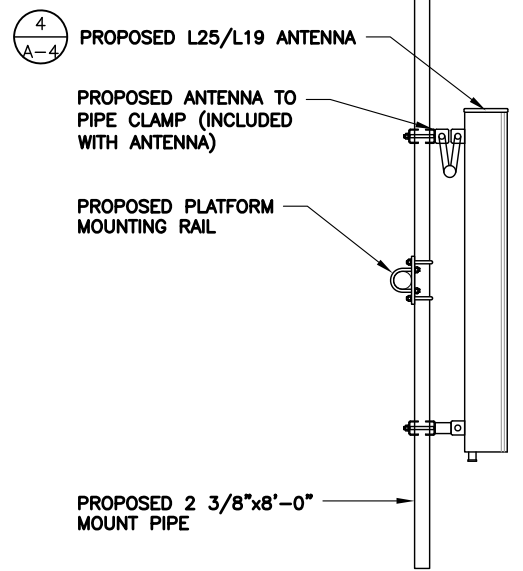


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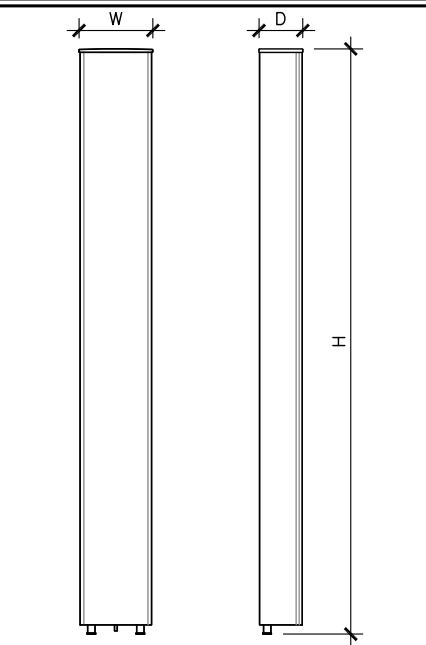
SHEET NUMBER: **A-4** REVISION: **1**



1 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL
 SCALE: 3/8" = 1'-0"



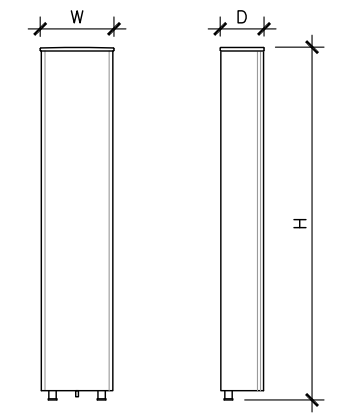
2 PROPOSED L7/L6 ANTENNA & RRU MOUNTING DETAIL
 SCALE: 3/8" = 1'-0"



ANTENNA SPECS

MANUFACTURER	RFS
MODEL #	APXVAARR24_43-U-NA20
WIDTH	24.0"
DEPTH	8.7"
HEIGHT	95.9"
WEIGHT	128.0 LBS

3 L7/L6 ANTENNA DETAIL
 SCALE: 3/8" = 1'-0"

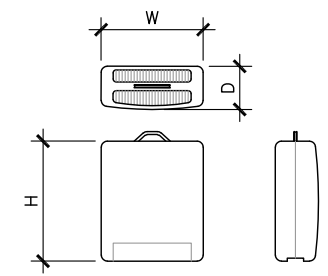


ANTENNA SPECS

MANUFACTURER	ERICSSON
MODEL #	AIR32 KFD901146-1_LB66A_B2A
WIDTH	12.9"
DEPTH	8.7"
HEIGHT	56.6"
WEIGHT	132.0 LBS

4 L19/L21 ANTENNA DETAIL
 SCALE: 3/8" = 1'-0"

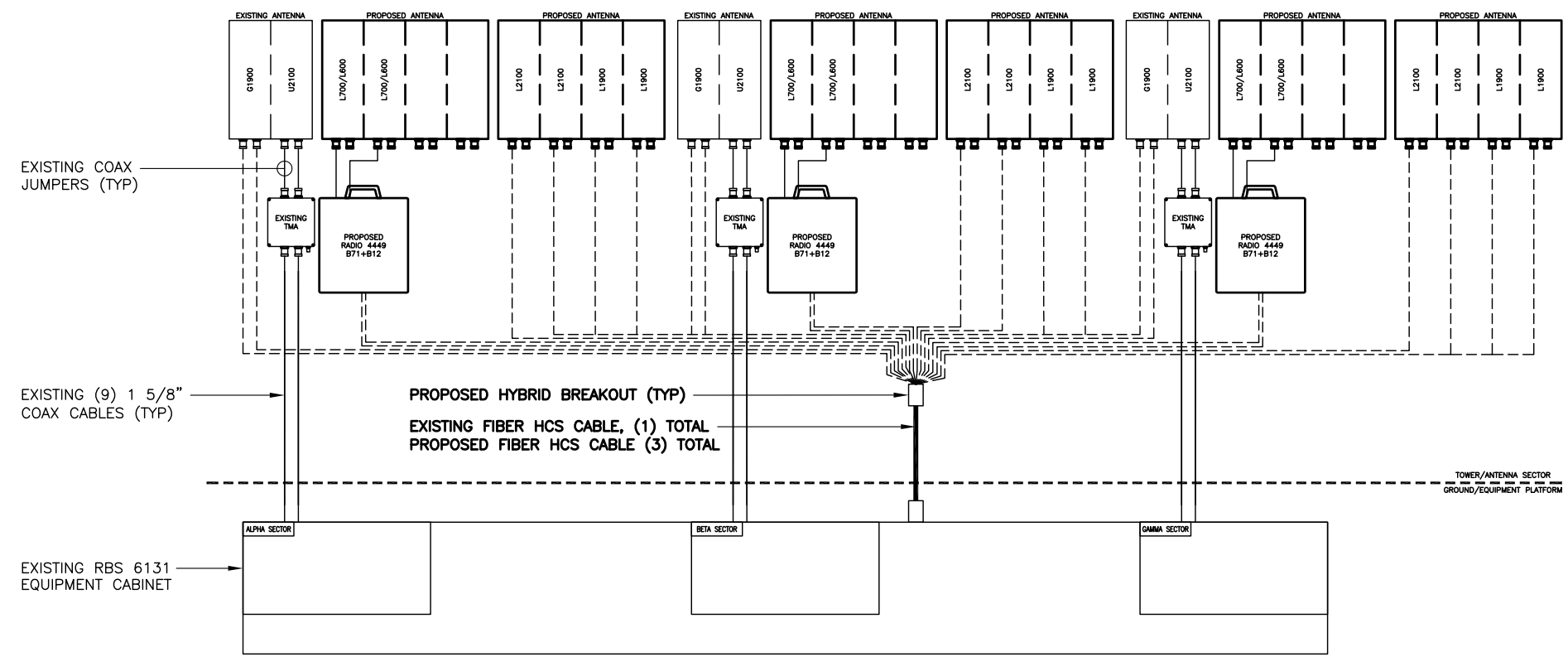
NOTES:
 1. TAG ALL EXISTING AND PROPOSED CABLES/JUMPERS PER T-MOBILE SPECIFICATIONS.
 2. SEE RF SCHEDULE FOR CABLE AND JUMPER LENGTHS.
 3. REFER TO ANTENNA ORIENTATION ON SHEET A-2 FOR EXACT ANTENNA POSITIONING.



RRU SPECIFICATIONS

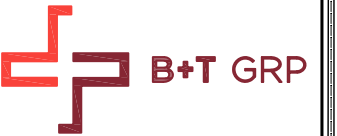
MANUFACTURER	ERICSSON
MODEL #	4449
WIDTH	13.2"
DEPTH	10.4"
HEIGHT	14.9"
WEIGHT	74 LBS

5 REMOTE RADIO UNIT (RRU)
 SCALE: 3/8" = 1'-0"



6 ANTENNA & CABLING SCHEMATIC
 SCALE: N.T.S.

137087_826222_Newtown-RT-25.dwg - SheetA-4 - User: jdunbar - Dec 22, 2020 - 12:47pm



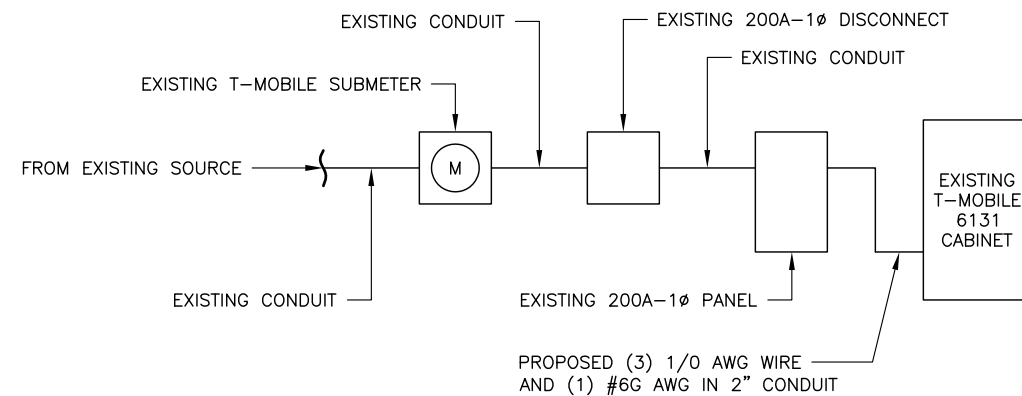
FINAL PANEL SCHEDULE							
LOAD	POLES	AMPS	BUS		AMPS	POLES	LOAD
			L1	L2			
TELCO GFCI	1	20A	1	2	125A	2	RBS 6131
BTS (DARK)	2	50A	3	4			
			5	6	20A	1	FLOOD LIGHT
FIBER	1	20A	7	8			

RATED VOLTAGE: 120/240 _____ 1 PHASE, 3 WIRE
 BRANCH POLES: 12 24 30 42 APPROVED MF'RS
 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

REPLACE EXISTING BREAKER IN POSITION 2 AND 4 WITH A NEW 2P 125A BREAKER
 REPLACE EXISTING WIRES FOR EXISTING 6131 CABINET WITH (3) 1/0 AWG THWN (COPPER) AND (1) #6G AWG. MINIMUM CONDUIT SIZE TO BE 2".
 IF 125A BREAKER WILL NOT PROPERLY FIT IN EXISTING PANEL, REPLACE (E) PANEL WITH SQUARE D PANEL Q012040M200RB (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 PHOTOS

1 FINAL T-MOBILE PANEL DETAIL

SCALE: N.T.S.



2 ONE-LINE DIAGRAM

SCALE: N.T.S.

CT11217A
 BU #: 826222
 NEWTOWN/RT-25
 201 MAIN STREET
 NEWTOWN, CT 06470
 EXISTING 150'-0" MONOPOLE

PROJECT NO: 137087.002.01
 CHECKED BY: MTJ

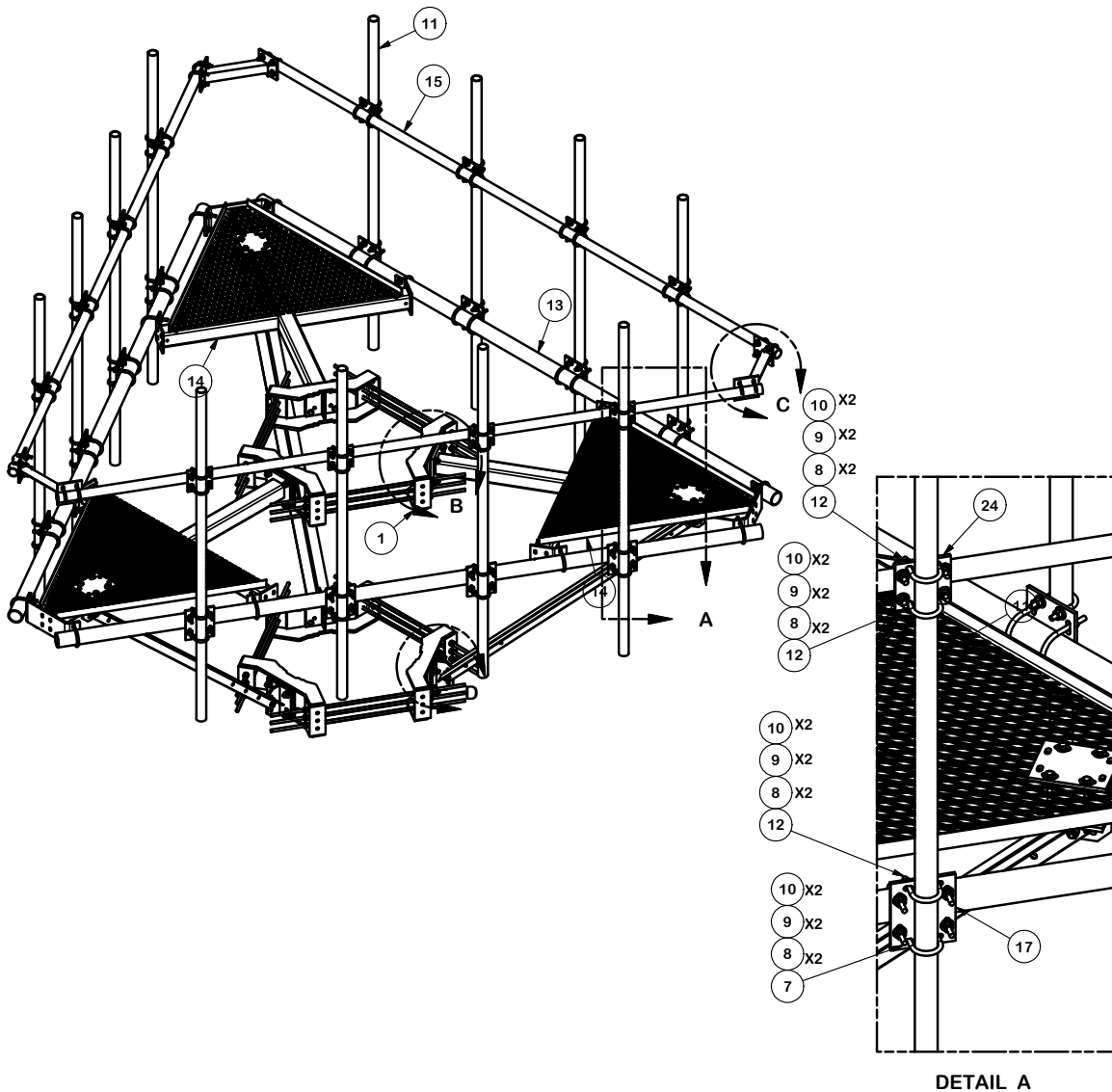
ISSUED FOR:			
REV	DATE	DRWN	DESCRIPTION
0	8/21/19	JDP	CONSTRUCTION
1	12/22/20	JJD	CONSTRUCTION

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 PEC.0001564
 Expires 2/10/20

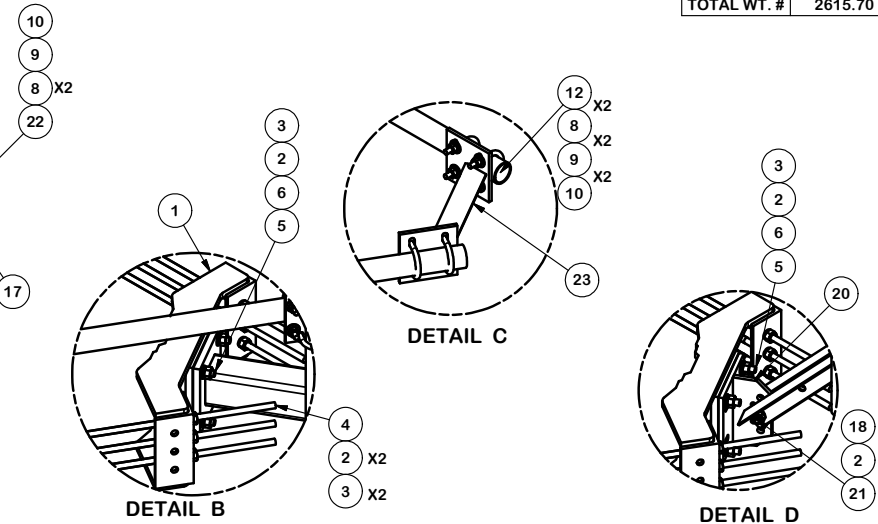


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SHEET NUMBER: **E-1** REVISION: **1**



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	50.17
13	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
14	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
15	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-254923	PLATFORM REINFORCEMENT KIT ANGLE	84 in	22.83	137.00
20	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
24	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
					TOTAL WT. #	2615.70



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION
 14' 6" LOW PROFILE PLATFORM
 WITH TWELVE 2-3/8" ANTENNA MOUNTING
 PIPES, AND HANDRAIL

SITE PRO 1
 Engineering Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

A valmont COMPANY

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018
REVISION HISTORY				

CPD NO. 4488	DRAWN BY CEK 7/15/2014	ENG. APPROVAL
CLASS 81	SUB 02	DRAWING USAGE CUSTOMER
		CHECKED BY BMC 7/23/2014

PART NO. RMQLP-496-HK	1 OF 3
DWG. NO. RMQLP-496-HK	

Exhibit C

Structural Analysis Report



Date: **December 04, 2020**

Denice Nicholson
Crown Castle
3 Corporate Dr
Clifton Park, NY 12065

Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: **Structural Analysis Report**

Carrier Designation: **T-Mobile Co-Locate**
Carrier Site Number: CT11217A
Carrier Site Name: Newtown/RT-25

Crown Castle Designation: **Crown Castle BU Number:** 826222
Crown Castle Site Name: Newtown/RT-25
Crown Castle JDE Job Number: 559243
Crown Castle Work Order Number: 1786401
Crown Castle Order Number: 479815 Rev. 4

Engineering Firm Designation: **Crown Castle Project Number:** 1786401

Site Data: **201 South Main Street, Newtown, Fairfield County, CT**
Latitude 41° 22' 41.32", Longitude -73° 16' 26.94"
150 Foot - Monopole Tower

Dear Denice Nicholson,

Crown Castle 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 – 99.8%**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Dolly Hsu, E.I.T.

Respectfully submitted by:

Terry P. Styran, P.E.
Senior Project Engineer

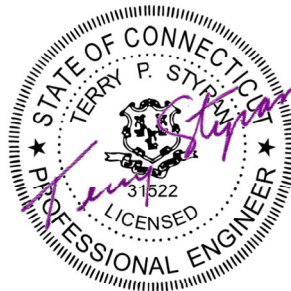


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Table 2 - Other Considered Equipment

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7) APPENDIX C

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1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by PIROD MANUFACTURES INC. The tower has been modified multiple times to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	120 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)
148.0	148.0	1	site pro 1	RMQLP-496-HK	13	1-5/8
		3	ericsson	ERICSSON AIR 21 B2A B4P w/ Mount Pipe		
		3	ericsson	KRY 112 144/1_T-MOBILE		
	146.0	3	ericsson	AIR -32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	RADIO 4449 B12/B71		
		3	rf s celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		

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)
138.0	138.0	1	tower mounts	Platform Mount [LP 601-1]	3	1-1/4
	137.0	3	alcatel lucent	1900MHZ RRH		
		3	alcatel lucent	800MHZ RRH		
		3	alcatel lucent	TD-RRH8X20-25		
		6	rf s celwave	APXVSPP18-C-A20 w/ Mount Pipe		
		3	rf s celwave	APXVTM14-C-120 w/ Mount Pipe		
127.0	127.0	3	alcatel lucent	RRH2X60-700	13	1-5/8
		3	alcatel lucent	RRH2X60-PCS		
		9	commscope	SBNHH-1D65B w/ Mount Pipe		
		1	raycap	RHSDC-3315-PF-48		
		6	rf s celwave	APL866513-42T0 w/ Mount Pipe		
		6	rf s celwave	FD9R6004/2C-3L		
		1	tower mounts	Platform Mount [LP 304-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
110.0	112.0	3	cci antennas	DMP65R-BU6D	2 1 4 6 1	3/8 5/8 7/8 1-1/4 Conduit
		3	cci antennas	OPA65R-BU6D		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 8843 B2/B66A_CCIV2		
		3	powerwave technologies	7770.00		
		6	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8C-EV		
	1	raycap	DC6-48-60-18-8F			
	110.0	1	tower mounts	Platform Mount [LP 301-1]		
68.0	68.0	1	gps	GPS_A	1	1/2

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti Geotechnical Engineering / FDH	3536527	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Pirod	3536528	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF	3963744	CCISITES
4-POST-MODIFICATION INSPECTION	SGS	5156735	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	PJF	5982445	CCISITES
4-POST-MODIFICATION INSPECTION	SGS	6139913	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Pirod	3917010	CCISITES

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) 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. Crown Castle 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	150 - 133	Pole	TP26x21.83x0.25	1	-8.00	1220.16	11.0	Pass
L2	133 - 98.42	Pole	TP34.0625x24.7837x0.3125	2	-18.84	1998.51	41.8	Pass
L3	98.42 - 64.75	Pole	TP41.75x32.4898x0.375	3	-26.69	2940.66	52.1	Pass
L4	64.75 - 31.92	Pole	TP49.0625x39.8468x0.375	4	-36.13	3460.78	63.9	Pass
L5	31.92 - 0	Pole	TP56.125x46.9609x0.375	5	-48.94	4075.94	73.3	Pass
							Summary	
						Pole (L5)	73.3	Pass
						Rating =	73.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC7

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	68.5	Pass
1	Base Plate	0	55.2	Pass
1	Base Foundation (Structure)	0	99.8	Pass
1	Base Foundation (Soil Interaction)	0	95.0	Pass

Structure Rating (max from all components) =	99.8%
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Notes:

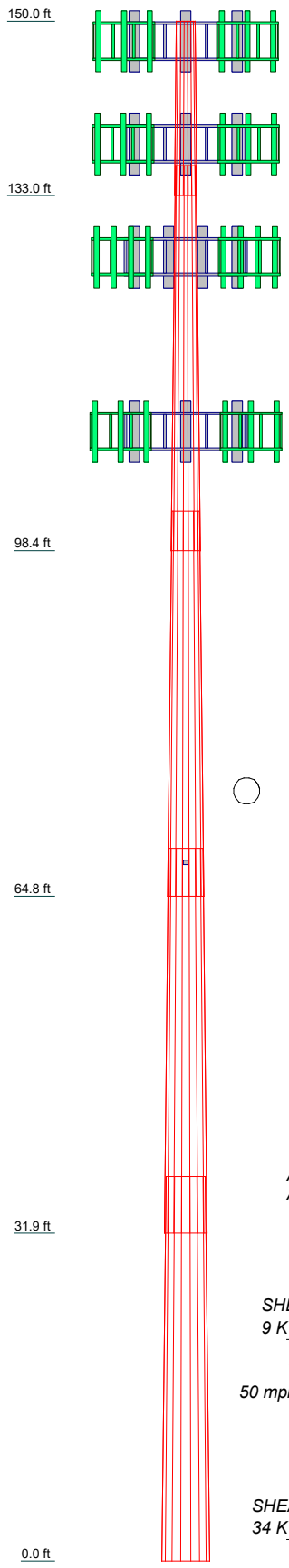
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	4	5
Length (ft)	17.0000	37.5000	37.5000	37.5000	37.4200
Number of Sides	18	18	18	18	18
Thickness (in)	0.2500	0.3125	0.3750	0.3750	0.3750
Socket Length (ft)	2.9200	3.8300	4.6700	5.5000	46.9609
Top Dia (in)	21.8300	24.7837	32.4888	39.8468	56.1250
Bot Dia (in)	26.0000	34.0625	41.7500	49.0625	
Grade		A572-65	A572-65	A572-65	A572-65
Weight (K)	1.1	3.7	5.6	6.7	7.8

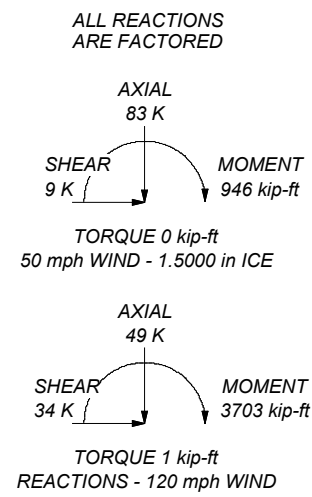


MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 120 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 0.0000 ft
8. TOWER RATING: 73.3%



Crown Castle
 2000 Corporate Drive
 Canonsburg, PA 15317
 Phone: (724) 416-2000
 FAX:

Job: BU# 826222		
Project:	Client: Crown Castle	Drawn by: Dolly Hsu
Code: TIA-222-H	Date: 12/01/20	App'd:
Path:	Scale: NTS	Dwg No. E-1

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Tower Input Data

The tower is a monopole.
 This tower is designed using the TIA-222-H standard.

The following design criteria apply:

- 3) Tower is located in Fairfield County, Connecticut.
- 4) Tower base elevation above sea level: 399.0000 ft.
- 5) Basic wind speed of 120 mph.
- 6) Risk Category II.
- 7) Exposure Category C.
- 8) Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- 9) Topographic Category: 1.
- 10) Crest Height: 0.0000 ft.
- 11) Nominal ice thickness of 1.5000 in.
- 12) Ice thickness is considered to increase with height.
- 13) Ice density of 56.00 pcf.
- 14) A wind speed of 50 mph is used in combination with ice.
- 15) Deflections calculated using a wind speed of 60 mph.
- 16) A non-linear (P-delta) analysis was used.
- 17) Pressures are calculated at each section.
- 18) Stress ratio used in pole design is 1.05.
- 19) Tower analysis based on target reliabilities in accordance with Annex S.
- 20) Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- 21) 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 <div style="text-align: center; background-color: #e0e0e0; padding: 2px;">Poles</div> ✓ 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
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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	150.0000- 133.0000	17.0000	2.92	18	21.8300	26.0000	0.2500	1.0000	A572-65 (65 ksi)
L2	133.0000-	37.5000	3.83	18	24.7837	34.0625	0.3125	1.2500	A572-65

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L3	98.4200 98.4200-64.7500	37.5000	4.67	18	32.4898	41.7500	0.3750	1.5000	(65 ksi) A572-65 (65 ksi)
L4	64.7500-31.9200	37.5000	5.50	18	39.8468	49.0625	0.3750	1.5000	A572-65 (65 ksi)
L5	31.9200-0.0000	37.4200		18	46.9609	56.1250	0.3750	1.5000	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	22.1282 26.3625	17.1237 20.4326	1007.4853 1711.6544	7.6609 9.1412	11.0896 13.2080	90.8492 129.5922	2016.2962 3425.5610	8.5635 10.2183	3.4021 4.1360	13.608 16.544
L2	25.8515 34.5398	24.2724 33.4758	1836.3793 4817.4335	8.6873 11.9812	12.5901 17.3038	145.8585 278.4040	3675.1749 9641.2058	12.1385 16.7411	3.8119 5.4450	12.198 17.424
L3	33.8935 42.3362	38.2247 49.2466	4980.7243 10650.982	11.4008 14.6881	16.5048 21.2090	301.7737 502.1916	9968.0023 21315.979	19.1160 24.6280	5.0582 6.6880	13.489 17.835
L4	41.5690 49.7615	46.9813 57.9503	9247.7576 17355.137	14.0125 17.2841	20.2422 24.9238	456.8559 696.3293	18507.683 34733.111	23.4951 28.9807	6.3530 7.9750	16.941 21.267
L5	48.9952 56.9330	55.4488 66.3564	15203.308 26056.150	16.5380 19.7913	23.8561 28.5115	637.2918 913.8821	30426.621 52146.586	27.7297 33.1845	7.6051 9.2180	20.28 24.581

Tower Elevation ft	Gusset Area (per face) ft ²	Gusset Thickness in	Gusset Grade	Adjust. Factor A _r	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 150.0000-133.0000				1	1	1			
L2 133.0000-98.4200				1	1	1			
L3 98.4200-64.7500				1	1	1			
L4 64.7500-31.9200				1	1	1			
L5 31.9200-0.0000				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 plf
LDF7-50A(1-5/8)	A	No	Surface Ar (CaAa)	148.0000 - 0.0000	13	6	-0.305 -0.142	1.9800		0.82
LDF4-50A(1/2)	A	No	Surface Ar (CaAa)	68.0000 - 0.0000	2	2	0.114 0.180	0.6300		0.15

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} ft ² /ft	Weight plf

HB114-1-0813U4- M5J(1-1/4)	C	No	No	Inside Pole	138.0000 - 0.0000	3	No Ice	0.0000	1.20
							1/2" Ice	0.0000	1.20
							1" Ice	0.0000	1.20
							2" Ice	0.0000	1.20

LDF7-50A(1-5/8)	C	No	No	Inside Pole	127.0000 - 0.0000	12	No Ice	0.0000	0.82
							1/2" Ice	0.0000	0.82
							1" Ice	0.0000	0.82
							2" Ice	0.0000	0.82
HB158-1-08U8- S8J18(1-5/8)	C	No	No	Inside Pole	127.0000 - 0.0000	1	No Ice	0.0000	1.30
							1/2" Ice	0.0000	1.30
							1" Ice	0.0000	1.30
							2" Ice	0.0000	1.30

LDF2-50A(3/8)	C	No	No	Inside Pole	110.0000 - 0.0000	2	No Ice	0.0000	0.08
							1/2" Ice	0.0000	0.08
							1" Ice	0.0000	0.08
							2" Ice	0.0000	0.08
LDF5-50A(7/8)	C	No	No	Inside Pole	110.0000 - 0.0000	4	No Ice	0.0000	0.33
							1/2" Ice	0.0000	0.33
							1" Ice	0.0000	0.33
							2" Ice	0.0000	0.33
LDF6-50A(1-1/4)	C	No	No	Inside Pole	110.0000 - 0.0000	6	No Ice	0.0000	0.60
							1/2" Ice	0.0000	0.60
							1" Ice	0.0000	0.60
							2" Ice	0.0000	0.60
9776(5/8)	C	No	No	Inside Pole	110.0000 - 0.0000	1	No Ice	0.0000	0.28
							1/2" Ice	0.0000	0.28
							1" Ice	0.0000	0.28
							2" Ice	0.0000	0.28
2" (Nominal) Conduit	C	No	No	Inside Pole	110.0000 - 0.0000	1	No Ice	0.0000	0.72
							1/2" Ice	0.0000	0.72
							1" Ice	0.0000	0.72
							2" Ice	0.0000	0.72

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	C_{AA} In Face ft ²	C_{AA} Out Face ft ²	Weight K
L1	150.0000- 133.0000	A	0.000	0.000	17.820	0.000	0.16
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.02
L2	133.0000- 98.4200	A	0.000	0.000	41.081	0.000	0.37
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.51
L3	98.4200-64.7500	A	0.000	0.000	40.409	0.000	0.36
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.70
L4	64.7500-31.9200	A	0.000	0.000	43.139	0.000	0.36
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.68
L5	31.9200-0.0000	A	0.000	0.000	41.943	0.000	0.35

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face	A_R <i>ft²</i>	A_F <i>ft²</i>	C_{AA} <i>In Face</i> <i>ft²</i>	C_{AA} <i>Out Face</i> <i>ft²</i>	Weight <i>K</i>
		B	0.000	0.000	0.000	0.000	0.00
		C	0.000	0.000	0.000	0.000	0.66

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face or Leg	Ice Thickness <i>in</i>	A_R <i>ft²</i>	A_F <i>ft²</i>	C_{AA} <i>In Face</i> <i>ft²</i>	C_{AA} <i>Out Face</i> <i>ft²</i>	Weight <i>K</i>
L1	150.0000-133.0000	A	1.475	0.000	0.000	27.805	0.000	0.54
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.02
L2	133.0000-98.4200	A	1.445	0.000	0.000	64.099	0.000	1.25
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.51
L3	98.4200-64.7500	A	1.395	0.000	0.000	63.845	0.000	1.22
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.70
L4	64.7500-31.9200	A	1.324	0.000	0.000	76.823	0.000	1.29
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.68
L5	31.9200-0.0000	A	1.186	0.000	0.000	73.561	0.000	1.21
		B		0.000	0.000	0.000	0.000	0.00
		C		0.000	0.000	0.000	0.000	0.66

Feed Line Center of Pressure

Section	Elevation <i>ft</i>	CP_x <i>in</i>	CP_z <i>in</i>	CP_x <i>Ice</i> <i>in</i>	CP_z <i>Ice</i> <i>in</i>
L1	150.0000-133.0000	-4.5357	-0.2534	-5.0171	-0.2803
L2	133.0000-98.4200	-5.9550	-0.3327	-5.7212	-0.3197
L3	98.4200-64.7500	-6.6518	-0.4175	-6.1510	-0.4547
L4	64.7500-31.9200	-7.4071	-0.8784	-6.6438	-1.3602
L5	31.9200-0.0000	-7.8940	-0.9428	-6.9589	-1.4144

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	5	LDF7-50A(1-5/8)	133.00 - 148.00	1.0000	1.0000
L2	5	LDF7-50A(1-5/8)	98.42 - 133.00	1.0000	1.0000
L3	5	LDF7-50A(1-5/8)	64.75 - 98.42	1.0000	1.0000
L3	21	LDF4-50A(1/2)	64.75 - 68.00	1.0000	1.0000
L4	5	LDF7-50A(1-5/8)	31.92 - 64.75	1.0000	1.0000
L4	21	LDF4-50A(1/2)	31.92 - 64.75	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L5	5	LDF7-50A(1-5/8)	0.00 - 31.92	1.0000	1.0000
L5	21	LDF4-50A(1/2)	0.00 - 31.92	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement		C _{AA} Front	C _{AA} Side	Weight
			Horz	Lateral				ft ²	ft ²	K
			ft	ft	°	ft				
AIR -32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.7474	6.0700	0.15
							1/2" Ice	7.2017	6.8671	0.21
							1" Ice	7.6475	7.5828	0.28
							2" Ice	8.5651	9.0629	0.44
AIR -32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.7474	6.0700	0.15
							1/2" Ice	7.2017	6.8671	0.21
							1" Ice	7.6475	7.5828	0.28
							2" Ice	8.5651	9.0629	0.44
AIR -32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.7474	6.0700	0.15
							1/2" Ice	7.2017	6.8671	0.21
							1" Ice	7.6475	7.5828	0.28
							2" Ice	8.5651	9.0629	0.44
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.3292	5.6424	0.11
							1/2" Ice	6.7751	6.4259	0.17
							1" Ice	7.2137	7.1313	0.23
							2" Ice	8.1168	8.5907	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.3292	5.6424	0.11
							1/2" Ice	6.7751	6.4259	0.17
							1" Ice	7.2137	7.1313	0.23
							2" Ice	8.1168	8.5907	0.38
ERICSSON AIR 21 B2A B4P w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	148.0000	No Ice	6.3292	5.6424	0.11
							1/2" Ice	6.7751	6.4259	0.17
							1" Ice	7.2137	7.1313	0.23
							2" Ice	8.1168	8.5907	0.38
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.0000	0.00	0.00	148.0000	No Ice	14.6900	6.8700	0.19
							1/2" Ice	15.4600	7.5500	0.31
							1" Ice	16.2300	8.2500	0.46
							2" Ice	17.8200	9.6700	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.0000	0.00	0.00	148.0000	No Ice	14.6900	6.8700	0.19
							1/2" Ice	15.4600	7.5500	0.31
							1" Ice	16.2300	8.2500	0.46
							2" Ice	17.8200	9.6700	0.79
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.0000	0.00	0.00	148.0000	No Ice	14.6900	6.8700	0.19
							1/2" Ice	15.4600	7.5500	0.31
							1" Ice	16.2300	8.2500	0.46
							2" Ice	17.8200	9.6700	0.79
KRY 112 144/1_T-MOBILE	A	From Leg	4.0000	0.00	0.00	148.0000	No Ice	0.3500	0.1750	0.01
							1/2" Ice	0.4259	0.2343	0.01
							1" Ice	0.5093	0.3009	0.02
							2" Ice	0.6981	0.4565	0.03

Description	Face or Leg	Offset Type	Offsets:		Azimuth Adjustment	Placement	C _{AA} Front	C _{AA} Side	Weight	
			Horz	Lateral Vert						ft
KRY 112 144/1_T-MOBILE	B	From Leg	4.0000	0.00	0.00	148.0000	No Ice	0.3500	0.1750	0.01
			0.00				1/2"	0.4259	0.2343	0.01
			0.00				Ice	0.5093	0.3009	0.02
							1" Ice	0.6981	0.4565	0.03
							2" Ice			
KRY 112 144/1_T-MOBILE	C	From Leg	4.0000	0.00	0.00	148.0000	No Ice	0.3500	0.1750	0.01
			0.00				1/2"	0.4259	0.2343	0.01
			0.00				Ice	0.5093	0.3009	0.02
							1" Ice	0.6981	0.4565	0.03
							2" Ice			
RADIO 4449 B12/B71	A	From Leg	4.0000	0.00	0.00	148.0000	No Ice	1.6500	1.1625	0.07
			0.00				1/2"	1.8104	1.3012	0.09
			-2.00				Ice	1.9781	1.4473	0.11
							1" Ice	2.3359	1.7618	0.16
							2" Ice			
RADIO 4449 B12/B71	B	From Leg	4.0000	0.00	0.00	148.0000	No Ice	1.6500	1.1625	0.07
			0.00				1/2"	1.8104	1.3012	0.09
			-2.00				Ice	1.9781	1.4473	0.11
							1" Ice	2.3359	1.7618	0.16
							2" Ice			
RADIO 4449 B12/B71	C	From Leg	4.0000	0.00	0.00	148.0000	No Ice	1.6500	1.1625	0.07
			0.00				1/2"	1.8104	1.3012	0.09
			-2.00				Ice	1.9781	1.4473	0.11
							1" Ice	2.3359	1.7618	0.16
							2" Ice			
RMQLP-496-HK	C	None			0.00	148.0000	No Ice	26.2900	26.2900	2.13
							1/2"	32.2500	32.2500	2.58
							Ice	37.9800	37.9800	3.17
							1" Ice	49.4400	49.4400	4.34
							2" Ice			
Miscellaneous [NA 509-1]	A	From Leg	2.0000	0.00	0.00	148.0000	No Ice	6.3200	4.8500	0.09
			0.00				1/2"	7.7900	6.3600	0.14
			0.00				Ice	9.3600	7.9400	0.20
							1" Ice	12.8100	11.3200	0.36
							2" Ice			
Miscellaneous [NA 509-1]	B	From Leg	2.0000	0.00	0.00	148.0000	No Ice	6.3200	4.8500	0.09
			0.00				1/2"	7.7900	6.3600	0.14
			0.00				Ice	9.3600	7.9400	0.20
							1" Ice	12.8100	11.3200	0.36
							2" Ice			
Miscellaneous [NA 509-1]	C	From Leg	2.0000	0.00	0.00	148.0000	No Ice	6.3200	4.8500	0.09
			0.00				1/2"	7.7900	6.3600	0.14
			0.00				Ice	9.3600	7.9400	0.20
							1" Ice	12.8100	11.3200	0.36
							2" Ice			

(2) APXVSP18-C-A20 w/ Mount Pipe	A	From Leg	4.0000	0.00	-1.00	138.0000	No Ice	4.6000	4.0100	0.10
			0.00				1/2"	5.0500	4.4500	0.16
							Ice	5.5000	4.8900	0.23
							1" Ice	6.4400	5.8200	0.42
							2" Ice			
(2) APXVSP18-C-A20 w/ Mount Pipe	B	From Leg	4.0000	0.00	-1.00	138.0000	No Ice	4.6000	4.0100	0.10
			0.00				1/2"	5.0500	4.4500	0.16
							Ice	5.5000	4.8900	0.23
							1" Ice	6.4400	5.8200	0.42
							2" Ice			
(2) APXVSP18-C-A20 w/ Mount Pipe	C	From Leg	4.0000	0.00	-1.00	138.0000	No Ice	4.6000	4.0100	0.10
			0.00				1/2"	5.0500	4.4500	0.16
							Ice	5.5000	4.8900	0.23
							1" Ice	6.4400	5.8200	0.42
							2" Ice			
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.0000	0.00	-1.00	138.0000	No Ice	4.0900	2.8600	0.08
			0.00				1/2"	4.4800	3.2300	0.13
							Ice	4.8800	3.6100	0.19
							1" Ice	5.7100	4.4000	0.33
							2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.0000 0.00 -1.00	0.00	138.0000	2" Ice			
						No Ice	4.0900	2.8600	0.08
						1/2"	4.4800	3.2300	0.13
						Ice	4.8800	3.6100	0.19
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.0000 0.00 -1.00	0.00	138.0000	1" Ice	5.7100	4.4000	0.33
						2" Ice			
						No Ice	4.0900	2.8600	0.08
						1/2"	4.4800	3.2300	0.13
1900MHZ RRH	A	From Leg	4.0000 0.00 -1.00	0.00	138.0000	Ice	4.8800	3.6100	0.19
						1" Ice	5.7100	4.4000	0.33
						2" Ice			
						No Ice	2.4917	3.2583	0.04
1900MHZ RRH	B	From Leg	4.0000 0.00 -1.00	0.00	138.0000	1/2"	2.6954	3.4843	0.08
						Ice	2.9065	3.7176	0.11
						1" Ice	3.3509	4.2065	0.19
						2" Ice			
1900MHZ RRH	C	From Leg	4.0000 0.00 -1.00	0.00	138.0000	No Ice	2.4917	3.2583	0.04
						1/2"	2.6954	3.4843	0.08
						Ice	2.9065	3.7176	0.11
						1" Ice	3.3509	4.2065	0.19
800MHZ RRH	A	From Leg	4.0000 0.00 -1.00	0.00	138.0000	2" Ice			
						No Ice	2.1342	1.7730	0.05
						1/2"	2.3195	1.9461	0.07
						Ice	2.5123	2.1267	0.10
800MHZ RRH	B	From Leg	4.0000 0.00 -1.00	0.00	138.0000	1" Ice	2.9201	2.5100	0.16
						2" Ice			
						No Ice	2.1342	1.7730	0.05
						1/2"	2.3195	1.9461	0.07
800MHZ RRH	C	From Leg	4.0000 0.00 -1.00	0.00	138.0000	Ice	2.5123	2.1267	0.10
						1" Ice	2.9201	2.5100	0.16
						2" Ice			
						No Ice	2.1342	1.7730	0.05
TD-RRH8X20-25	A	From Leg	4.0000 0.00 -1.00	0.00	138.0000	1/2"	4.2975	1.7142	0.10
						Ice	4.5570	1.9008	0.13
						1" Ice	5.0981	2.2951	0.20
						2" Ice			
TD-RRH8X20-25	B	From Leg	4.0000 0.00 -1.00	0.00	138.0000	No Ice	4.0455	1.5345	0.07
						1/2"	4.2975	1.7142	0.10
						Ice	4.5570	1.9008	0.13
						1" Ice	5.0981	2.2951	0.20
TD-RRH8X20-25	C	From Leg	4.0000 0.00 -1.00	0.00	138.0000	2" Ice			
						No Ice	4.0455	1.5345	0.07
						1/2"	4.2975	1.7142	0.10
						Ice	4.5570	1.9008	0.13
2.375" OD x 6' Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	138.0000	1" Ice	5.0981	2.2951	0.20
						2" Ice			
						No Ice	1.4250	1.4250	0.03
						1/2"	1.9250	1.9250	0.04
2.375" OD x 6' Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	138.0000	Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice			
						No Ice	1.4250	1.4250	0.03
2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	138.0000	1/2"	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice			

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K	
2.375" OD x 6' Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	138.0000	2" Ice			
						No Ice	1.4250	1.4250	0.03
						1/2"	1.9250	1.9250	0.04
						Ice	2.2939	2.2939	0.05
Platform Mount [LP 601-1]	C	None		0.00	138.0000	1" Ice	3.0596	3.0596	0.09
						2" Ice			
						No Ice	28.5000	28.5000	1.12
						1/2"	31.6900	31.6900	1.68
*** (3) SBNHH-1D65B w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	127.0000	Ice	2.2939	2.2939	0.05
						1" Ice	3.0596	3.0596	0.09
						2" Ice			
						No Ice	4.0900	3.3000	0.07
(3) SBNHH-1D65B w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	127.0000	1/2"	4.4900	3.6800	0.13
						Ice	4.8900	4.0700	0.20
						1" Ice	5.7200	4.8700	0.39
						2" Ice			
(3) SBNHH-1D65B w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	127.0000	No Ice	4.0900	3.3000	0.07
						1/2"	4.4900	3.6800	0.13
						Ice	4.8900	4.0700	0.20
						1" Ice	5.7200	4.8700	0.39
(2) APL866513-42T0 w/ Mount Pipe	A	From Leg	4.0000 0.00 0.00	0.00	127.0000	2" Ice			
						No Ice	3.9600	4.2500	0.03
						1/2"	4.4400	4.7400	0.07
						Ice	4.9300	5.2500	0.12
(2) APL866513-42T0 w/ Mount Pipe	B	From Leg	4.0000 0.00 0.00	0.00	127.0000	1" Ice	5.9800	6.3000	0.24
						2" Ice			
						No Ice	3.9600	4.2500	0.03
						1/2"	4.4400	4.7400	0.07
(2) APL866513-42T0 w/ Mount Pipe	C	From Leg	4.0000 0.00 0.00	0.00	127.0000	Ice	4.9300	5.2500	0.12
						1" Ice	5.9800	6.3000	0.24
						2" Ice			
						No Ice	3.9600	4.2500	0.03
(2) FD9R6004/2C-3L	A	From Leg	4.0000 0.00 0.00	0.00	127.0000	1/2"	4.4400	4.7400	0.07
						Ice	4.9300	5.2500	0.12
						1" Ice	5.9800	6.3000	0.24
						2" Ice			
(2) FD9R6004/2C-3L	B	From Leg	4.0000 0.00 0.00	0.00	127.0000	No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
						1" Ice	0.6468	0.2940	0.02
(2) FD9R6004/2C-3L	C	From Leg	4.0000 0.00 0.00	0.00	127.0000	2" Ice			
						No Ice	0.3142	0.0762	0.00
						1/2"	0.3862	0.1189	0.01
						Ice	0.4656	0.1685	0.01
RRH2X60-700	A	From Leg	4.0000 0.00 0.00	0.00	127.0000	1" Ice	0.6468	0.2940	0.02
						2" Ice			
						No Ice	3.5002	1.8157	0.06
						1/2"	3.7609	2.0519	0.08
RRH2X60-700	B	From Leg	4.0000 0.00 0.00	0.00	127.0000	Ice	4.0285	2.2894	0.11
						1" Ice	4.5849	2.7852	0.17
						2" Ice			
						No Ice	3.5002	1.8157	0.06
RRH2X60-700	B	From Leg	4.0000 0.00 0.00	0.00	127.0000	1/2"	3.7609	2.0519	0.08
						Ice	4.0285	2.2894	0.11
						Ice	4.0285	2.2894	0.11

Description	Face or Leg	Offset Type	Offsets:			Azimuth Adjustment °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			Horz ft	Lateral ft	Vert ft					
RRH2X60-700	C	From Leg	4.0000 0.00 0.00	0.00	127.0000		1" Ice	4.5849	2.7852	0.17
							2" Ice			
							No Ice	3.5002	1.8157	0.06
							1/2" Ice	3.7609	2.0519	0.08
							Ice	4.0285	2.2894	0.11
RRH2X60-PCS	A	From Leg	4.0000 0.00 0.00	0.00	127.0000		1" Ice	4.5849	2.7852	0.17
							2" Ice			
							No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
							Ice	2.5926	2.0870	0.10
RRH2X60-PCS	B	From Leg	4.0000 0.00 0.00	0.00	127.0000		1" Ice	3.0148	2.4804	0.16
							2" Ice			
							No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
							Ice	2.5926	2.0870	0.10
RRH2X60-PCS	C	From Leg	4.0000 0.00 0.00	0.00	127.0000		1" Ice	3.0148	2.4804	0.16
							2" Ice			
							No Ice	2.2000	1.7233	0.06
							1/2" Ice	2.3926	1.9015	0.08
							Ice	2.5926	2.0870	0.10
RHSDC-3315-PF-48	C	From Leg	4.0000 0.00 0.00	0.00	127.0000		1" Ice	3.0148	2.4804	0.16
							2" Ice			
							No Ice	3.3636	2.1921	0.03
							1/2" Ice	3.5972	2.3950	0.06
							Ice	3.8383	2.6056	0.09
Platform Mount [LP 304-1]	C	None		0.00	127.0000		1" Ice	4.3426	3.0491	0.17
							2" Ice			
							No Ice	17.4900	17.4900	1.35
							1/2" Ice	21.3700	21.3700	1.71
							Ice	25.2800	25.2800	2.13
*** 7770.00	A	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	6.9859	4.3517	0.20
							2" Ice			
							No Ice	5.5085	2.9282	0.04
							1/2" Ice	5.8673	3.2730	0.07
							Ice	6.2332	3.6252	0.11
7770.00	B	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	6.9859	4.3517	0.20
							2" Ice			
							No Ice	5.5085	2.9282	0.04
							1/2" Ice	5.8673	3.2730	0.07
							Ice	6.2332	3.6252	0.11
7770.00	C	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	6.9859	4.3517	0.20
							2" Ice			
							No Ice	5.5085	2.9282	0.04
							1/2" Ice	5.8673	3.2730	0.07
							Ice	6.2332	3.6252	0.11
DMP65R-BU6D	A	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	6.9859	4.3517	0.20
							2" Ice			
							No Ice	11.9300	4.4800	0.09
							1/2" Ice	12.6800	5.1200	0.16
							Ice	13.4500	5.7800	0.24
DMP65R-BU6D	B	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	15.0300	7.1600	0.43
							2" Ice			
							No Ice	11.9300	4.4800	0.09
							1/2" Ice	12.6800	5.1200	0.16
							Ice	13.4500	5.7800	0.24
DMP65R-BU6D	C	From Leg	4.0000 0.00 2.00	0.00	110.0000		1" Ice	15.0300	7.1600	0.43
							2" Ice			
							No Ice	11.9300	4.4800	0.09
							1/2" Ice	12.6800	5.1200	0.16
							Ice	13.4500	5.7800	0.24
OPA65R-BU6D	A	From Leg	4.0000 0.00	0.00	110.0000		1" Ice	15.0300	7.1600	0.43
							2" Ice			
							No Ice	12.2200	4.5400	0.06
							1/2" Ice	12.9800	5.1900	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustmen t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			2.00			Ice 13.7500	5.8600	0.22
						1" Ice 15.3500	7.2400	0.40
						2" Ice		
OPA65R-BU6D	B	From Leg	4.0000	0.00	110.0000	No Ice 12.2200	4.5400	0.06
			0.00			1/2" 12.9800	5.1900	0.14
			2.00			Ice 13.7500	5.8600	0.22
						1" Ice 15.3500	7.2400	0.40
						2" Ice		
OPA65R-BU6D	C	From Leg	4.0000	0.00	110.0000	No Ice 12.2200	4.5400	0.06
			0.00			1/2" 12.9800	5.1900	0.14
			2.00			Ice 13.7500	5.8600	0.22
						1" Ice 15.3500	7.2400	0.40
						2" Ice		
(2) LGP21401	A	From Leg	4.0000	0.00	110.0000	No Ice 1.1040	0.2070	0.01
			0.00			1/2" 1.2388	0.2738	0.02
			2.00			Ice 1.3810	0.3475	0.03
						1" Ice 1.6877	0.5208	0.05
						2" Ice		
(2) LGP21401	B	From Leg	4.0000	0.00	110.0000	No Ice 1.1040	0.2070	0.01
			0.00			1/2" 1.2388	0.2738	0.02
			2.00			Ice 1.3810	0.3475	0.03
						1" Ice 1.6877	0.5208	0.05
						2" Ice		
(2) LGP21401	C	From Leg	4.0000	0.00	110.0000	No Ice 1.1040	0.2070	0.01
			0.00			1/2" 1.2388	0.2738	0.02
			2.00			Ice 1.3810	0.3475	0.03
						1" Ice 1.6877	0.5208	0.05
						2" Ice		
RRUS 4449 B5/B12	A	From Leg	4.0000	0.00	110.0000	No Ice 1.9675	1.4081	0.07
			0.00			1/2" 2.1439	1.5637	0.09
			2.00			Ice 2.3278	1.7267	0.11
						1" Ice 2.7177	2.0749	0.16
						2" Ice		
RRUS 4449 B5/B12	B	From Leg	4.0000	0.00	110.0000	No Ice 1.9675	1.4081	0.07
			0.00			1/2" 2.1439	1.5637	0.09
			2.00			Ice 2.3278	1.7267	0.11
						1" Ice 2.7177	2.0749	0.16
						2" Ice		
RRUS 4449 B5/B12	C	From Leg	4.0000	0.00	110.0000	No Ice 1.9675	1.4081	0.07
			0.00			1/2" 2.1439	1.5637	0.09
			2.00			Ice 2.3278	1.7267	0.11
						1" Ice 2.7177	2.0749	0.16
						2" Ice		
RRUS 8843 B2/B66A_CCIV2	A	From Leg	4.0000	0.00	110.0000	No Ice 1.9800	1.6950	0.08
			0.00			1/2" 2.1570	1.8615	0.10
			2.00			Ice 2.3415	2.0354	0.12
						1" Ice 2.7326	2.4054	0.18
						2" Ice		
RRUS 8843 B2/B66A_CCIV2	B	From Leg	4.0000	0.00	110.0000	No Ice 1.9800	1.6950	0.08
			0.00			1/2" 2.1570	1.8615	0.10
			2.00			Ice 2.3415	2.0354	0.12
						1" Ice 2.7326	2.4054	0.18
						2" Ice		
RRUS 8843 B2/B66A_CCIV2	C	From Leg	4.0000	0.00	110.0000	No Ice 1.9800	1.6950	0.08
			0.00			1/2" 2.1570	1.8615	0.10
			2.00			Ice 2.3415	2.0354	0.12
						1" Ice 2.7326	2.4054	0.18
						2" Ice		
DC6-48-60-18-8C-EV	A	From Leg	4.0000	0.00	110.0000	No Ice 1.1445	1.1445	0.03
			0.00			1/2" 1.7918	1.7918	0.05
			2.00			Ice 2.0017	2.0017	0.07
						1" Ice 2.4505	2.4505	0.13
						2" Ice		
DC6-48-60-18-8F	A	From Leg	4.0000	0.00	110.0000	No Ice 1.2117	1.2117	0.02
			0.00			1/2" 1.8924	1.8924	0.04

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment t °	Placement ft	C _{AA} Front ft ²	C _{AA} Side ft ²	Weight K
			2.00			Ice 2.1051	2.1051	0.07
						1" Ice 2.5703	2.5703	0.13
						2" Ice		
Platform Mount [LP 301-1]	C	None		0.00	110.0000	No Ice 23.8100	23.8100	1.59
						1/2" 30.2400	30.2400	2.10
						Ice 36.3300	36.3300	2.73
						1" Ice 48.0500	48.0500	4.34
						2" Ice		
2.375" OD x 4' Mount Pipe	A	From Leg	4.0000	0.00	110.0000	No Ice 0.8657	0.8657	0.02
			0.00			1/2" 1.1106	1.1106	0.03
			0.00			Ice 1.3648	1.3648	0.04
						1" Ice 1.9008	1.9008	0.06
						2" Ice		
2.375" OD x 4' Mount Pipe	B	From Leg	4.0000	0.00	110.0000	No Ice 0.8657	0.8657	0.02
			0.00			1/2" 1.1106	1.1106	0.03
			0.00			Ice 1.3648	1.3648	0.04
						1" Ice 1.9008	1.9008	0.06
						2" Ice		
2.375" OD x 4' Mount Pipe	C	From Leg	4.0000	0.00	110.0000	No Ice 0.8657	0.8657	0.02
			0.00			1/2" 1.1106	1.1106	0.03
			0.00			Ice 1.3648	1.3648	0.04
						1" Ice 1.9008	1.9008	0.06
						2" Ice		
*** GPS_A	A	From Leg	4.0000	0.00	68.0000	No Ice 0.2550	0.2550	0.00
			0.00			1/2" 0.3205	0.3205	0.00
			0.00			Ice 0.3934	0.3934	0.01
						1" Ice 0.5614	0.5614	0.02
						2" Ice		

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
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

Comb. No.	Description
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice
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	150 - 133	Pole	Max Tension	8	0.00	0.00	-0.00
			Max. Compression	26	-19.51	0.57	0.33
			Max. Mx	20	-8.19	72.20	0.10
			Max. My	2	-8.00	0.14	80.20
			Max. Vy	20	-10.38	72.20	0.10
			Max. Vx	2	-11.54	0.14	80.20
			Max. Torque	14			-0.56
L2	133 - 98.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-42.98	3.08	2.15
			Max. Mx	20	-19.15	611.09	0.15
			Max. My	2	-18.84	0.37	677.87
			Max. Vy	20	-21.77	611.09	0.15
			Max. Vx	2	-23.98	0.37	677.87
			Max. Torque	15			-1.05
L3	98.42 - 64.75	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-53.73	5.32	3.46
			Max. Mx	20	-26.95	1378.93	-0.12
			Max. My	2	-26.69	0.41	1528.29
			Max. Vy	20	-24.97	1378.93	-0.12
			Max. Vx	2	-27.77	0.41	1528.29
			Max. Torque	15			-1.05
L4	64.75 - 31.92	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-66.28	7.85	5.03
			Max. Mx	20	-36.28	2229.30	-0.30
			Max. My	2	-36.13	0.56	2473.69
			Max. Vy	20	-28.06	2229.30	-0.30
			Max. Vx	2	-31.17	0.56	2473.69
			Max. Torque	15			-1.05
L5	31.92 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-82.65	10.91	6.79
			Max. Mx	20	-48.95	3340.31	-0.45
			Max. My	2	-48.94	0.85	3703.22
			Max. Vy	20	-31.12	3340.31	-0.45

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	2	-34.32	0.85	3703.22
			Max. Torque	15			-1.04

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	26	82.65	-0.00	-0.00
	Max. H _x	21	36.72	31.10	-0.02
	Max. H _z	3	36.72	-0.02	34.29
	Max. M _x	2	3703.22	-0.02	34.29
	Max. M _z	8	3333.44	-31.10	0.02
	Max. Torsion	3	1.04	-0.02	34.29
	Min. Vert	21	36.72	31.10	-0.02
	Min. H _x	9	36.72	-31.10	0.02
	Min. H _z	15	36.72	0.02	-34.29
	Min. M _x	14	-3698.96	0.02	-34.29
	Min. M _z	20	-3340.31	31.10	-0.02
	Min. Torsion	15	-1.04	0.02	-34.29

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	40.80	0.00	0.00	-1.70	2.74	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	48.96	0.02	-34.29	-3703.22	0.85	-1.04
0.9 Dead+1.0 Wind 0 deg - No Ice	36.72	0.02	-34.29	-3661.86	-0.01	-1.04
1.2 Dead+1.0 Wind 30 deg - No Ice	48.96	16.14	-27.91	-3004.09	-1732.73	-0.47
0.9 Dead+1.0 Wind 30 deg - No Ice	36.72	16.14	-27.91	-2970.42	-1714.46	-0.47
1.2 Dead+1.0 Wind 60 deg - No Ice	48.96	26.94	-15.56	-1671.58	-2888.12	-0.45
0.9 Dead+1.0 Wind 60 deg - No Ice	36.72	26.94	-15.56	-1652.58	-2857.06	-0.45
1.2 Dead+1.0 Wind 90 deg - No Ice	48.96	31.10	-0.02	-4.72	-3333.44	-0.30
0.9 Dead+1.0 Wind 90 deg - No Ice	36.72	31.10	-0.02	-4.14	-3297.64	-0.31
1.2 Dead+1.0 Wind 120 deg - No Ice	48.96	26.92	15.52	1662.83	-2885.54	-0.08
0.9 Dead+1.0 Wind 120 deg - No Ice	36.72	26.92	15.52	1644.99	-2854.52	-0.08
1.2 Dead+1.0 Wind 150 deg - No Ice	48.96	15.73	27.24	2928.19	-1688.38	0.16
0.9 Dead+1.0 Wind 150 deg - No Ice	36.72	15.73	27.24	2896.35	-1670.57	0.16
1.2 Dead+1.0 Wind 180 deg - No Ice	48.96	-0.02	34.29	3698.96	6.02	1.04
0.9 Dead+1.0 Wind 180 deg - No Ice	36.72	-0.02	34.29	3658.71	5.10	1.04
1.2 Dead+1.0 Wind 210 deg - No Ice	48.96	-16.14	27.91	2999.82	1739.61	0.47
0.9 Dead+1.0 Wind 210 deg - No Ice	36.72	-16.14	27.91	2967.25	1719.56	0.47
1.2 Dead+1.0 Wind 240 deg - No Ice	48.96	-26.94	15.56	1667.30	2894.99	0.45

Load Combination	Vertical	Shear _x	Shear _z	Overturing Moment, M _x	Overturing Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 240 deg - No Ice	36.72	-26.94	15.56	1649.41	2862.16	0.45
1.2 Dead+1.0 Wind 270 deg - No Ice	48.96	-31.10	0.02	0.45	3340.31	0.30
0.9 Dead+1.0 Wind 270 deg - No Ice	36.72	-31.10	0.02	0.98	3302.73	0.31
1.2 Dead+1.0 Wind 300 deg - No Ice	48.96	-26.92	-15.52	-1667.10	2892.41	0.08
0.9 Dead+1.0 Wind 300 deg - No Ice	36.72	-26.92	-15.52	-1648.15	2859.61	0.08
1.2 Dead+1.0 Wind 330 deg - No Ice	48.96	-15.73	-27.24	-2932.45	1695.26	-0.16
0.9 Dead+1.0 Wind 330 deg - No Ice	36.72	-15.73	-27.24	-2899.50	1675.67	-0.16
1.2 Dead+1.0 Ice	82.65	0.00	0.00	-6.79	10.91	-0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice	82.65	0.00	-8.58	-946.11	10.62	-0.19
1.2 Dead+1.0 Wind 30 deg+1.0 Ice	82.65	4.23	-7.33	-804.49	-449.93	-0.13
1.2 Dead+1.0 Wind 60 deg+1.0 Ice	82.65	7.33	-4.23	-467.70	-786.94	-0.14
1.2 Dead+1.0 Wind 90 deg+1.0 Ice	82.65	8.46	-0.00	-7.44	-910.11	-0.12
1.2 Dead+1.0 Wind 120 deg+1.0 Ice	82.65	7.33	4.23	452.96	-786.44	-0.07
1.2 Dead+1.0 Wind 150 deg+1.0 Ice	82.65	4.23	7.32	790.13	-449.05	0.01
1.2 Dead+1.0 Wind 180 deg+1.0 Ice	82.65	-0.00	8.58	932.25	11.63	0.19
1.2 Dead+1.0 Wind 210 deg+1.0 Ice	82.65	-4.23	7.33	790.63	472.19	0.13
1.2 Dead+1.0 Wind 240 deg+1.0 Ice	82.65	-7.33	4.23	453.84	809.20	0.14
1.2 Dead+1.0 Wind 270 deg+1.0 Ice	82.65	-8.46	0.00	-6.42	932.36	0.12
1.2 Dead+1.0 Wind 300 deg+1.0 Ice	82.65	-7.33	-4.23	-466.81	808.69	0.07
1.2 Dead+1.0 Wind 330 deg+1.0 Ice	82.65	-4.23	-7.32	-803.98	471.31	-0.01
Dead+Wind 0 deg - Service	40.80	0.00	-8.07	-867.79	2.24	-0.25
Dead+Wind 30 deg - Service	40.80	3.80	-6.57	-704.05	-403.31	-0.11
Dead+Wind 60 deg - Service	40.80	6.34	-3.66	-392.29	-673.55	-0.11
Dead+Wind 90 deg - Service	40.80	7.32	-0.00	-2.37	-777.84	-0.07
Dead+Wind 120 deg - Service	40.80	6.34	3.65	387.71	-672.95	-0.02
Dead+Wind 150 deg - Service	40.80	3.70	6.41	683.72	-392.92	0.04
Dead+Wind 180 deg - Service	40.80	-0.00	8.07	864.26	3.45	0.25
Dead+Wind 210 deg - Service	40.80	-3.80	6.57	700.52	409.01	0.11
Dead+Wind 240 deg - Service	40.80	-6.34	3.66	388.75	679.25	0.11
Dead+Wind 270 deg - Service	40.80	-7.32	0.00	-1.16	783.54	0.07
Dead+Wind 300 deg - Service	40.80	-6.34	-3.65	-391.24	678.65	0.02
Dead+Wind 330 deg - Service	40.80	-3.70	-6.41	-687.26	398.62	-0.04

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-40.80	0.00	-0.00	40.80	-0.00	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
2	0.02	-48.96	-34.30	-0.02	48.96	34.29	0.003%
3	0.02	-36.72	-34.30	-0.02	36.72	34.29	0.002%
4	16.14	-48.96	-27.91	-16.14	48.96	27.91	0.000%
5	16.14	-36.72	-27.91	-16.14	36.72	27.91	0.000%
6	26.94	-48.96	-15.56	-26.94	48.96	15.56	0.000%
7	26.94	-36.72	-15.56	-26.94	36.72	15.56	0.000%
8	31.10	-48.96	-0.02	-31.10	48.96	0.02	0.007%
9	31.10	-36.72	-0.02	-31.10	36.72	0.02	0.005%
10	26.92	-48.96	15.52	-26.92	48.96	-15.52	0.000%
11	26.92	-36.72	15.52	-26.92	36.72	-15.52	0.000%
12	15.73	-48.96	27.24	-15.73	48.96	-27.24	0.000%
13	15.73	-36.72	27.24	-15.73	36.72	-27.24	0.000%
14	-0.02	-48.96	34.30	0.02	48.96	-34.29	0.003%
15	-0.02	-36.72	34.30	0.02	36.72	-34.29	0.002%
16	-16.14	-48.96	27.91	16.14	48.96	-27.91	0.000%
17	-16.14	-36.72	27.91	16.14	36.72	-27.91	0.000%
18	-26.94	-48.96	15.56	26.94	48.96	-15.56	0.000%
19	-26.94	-36.72	15.56	26.94	36.72	-15.56	0.000%
20	-31.10	-48.96	0.02	31.10	48.96	-0.02	0.007%
21	-31.10	-36.72	0.02	31.10	36.72	-0.02	0.005%
22	-26.92	-48.96	-15.52	26.92	48.96	15.52	0.000%
23	-26.92	-36.72	-15.52	26.92	36.72	15.52	0.000%
24	-15.73	-48.96	-27.24	15.73	48.96	27.24	0.000%
25	-15.73	-36.72	-27.24	15.73	36.72	27.24	0.000%
26	0.00	-82.65	0.00	-0.00	82.65	-0.00	0.001%
27	0.00	-82.65	-8.58	-0.00	82.65	8.58	0.002%
28	4.24	-82.65	-7.33	-4.23	82.65	7.33	0.002%
29	7.33	-82.65	-4.23	-7.33	82.65	4.23	0.002%
30	8.46	-82.65	-0.00	-8.46	82.65	0.00	0.002%
31	7.33	-82.65	4.23	-7.33	82.65	-4.23	0.002%
32	4.23	-82.65	7.32	-4.23	82.65	-7.32	0.002%
33	-0.00	-82.65	8.58	0.00	82.65	-8.58	0.002%
34	-4.24	-82.65	7.33	4.23	82.65	-7.33	0.002%
35	-7.33	-82.65	4.23	7.33	82.65	-4.23	0.002%
36	-8.46	-82.65	0.00	8.46	82.65	-0.00	0.002%
37	-7.33	-82.65	-4.23	7.33	82.65	4.23	0.002%
38	-4.23	-82.65	-7.32	4.23	82.65	7.32	0.002%
39	0.00	-40.80	-8.08	-0.00	40.80	8.07	0.002%
40	3.80	-40.80	-6.57	-3.80	40.80	6.57	0.002%
41	6.34	-40.80	-3.66	-6.34	40.80	3.66	0.002%
42	7.32	-40.80	-0.00	-7.32	40.80	0.00	0.002%
43	6.34	-40.80	3.65	-6.34	40.80	-3.65	0.002%
44	3.70	-40.80	6.41	-3.70	40.80	-6.41	0.002%
45	-0.00	-40.80	8.08	0.00	40.80	-8.07	0.002%
46	-3.80	-40.80	6.57	3.80	40.80	-6.57	0.002%
47	-6.34	-40.80	3.66	6.34	40.80	-3.66	0.002%
48	-7.32	-40.80	0.00	7.32	40.80	-0.00	0.002%
49	-6.34	-40.80	-3.65	6.34	40.80	3.65	0.002%
50	-3.70	-40.80	-6.41	3.70	40.80	6.41	0.002%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	8	0.00003874	0.00009417
3	Yes	8	0.00002477	0.00007370
4	Yes	11	0.00000001	0.00011670
5	Yes	11	0.00000001	0.00008219
6	Yes	11	0.00000001	0.00010820
7	Yes	11	0.00000001	0.00007668
8	Yes	7	0.00010306	0.00010833
9	Yes	7	0.00006756	0.00009500
10	Yes	11	0.00000001	0.00010679
11	Yes	11	0.00000001	0.00007574

12	Yes	11	0.00000001	0.00011055
13	Yes	11	0.00000001	0.00007822
14	Yes	8	0.00003875	0.00010219
15	Yes	8	0.00002478	0.00007962
16	Yes	11	0.00000001	0.00011855
17	Yes	11	0.00000001	0.00008349
18	Yes	11	0.00000001	0.00010708
19	Yes	11	0.00000001	0.00007582
20	Yes	7	0.00010304	0.00010121
21	Yes	7	0.00006755	0.00009017
22	Yes	11	0.00000001	0.00010754
23	Yes	11	0.00000001	0.00007611
24	Yes	11	0.00000001	0.00011237
25	Yes	11	0.00000001	0.00007937
26	Yes	4	0.00000001	0.00000697
27	Yes	8	0.00014986	0.00001828
28	Yes	8	0.00014963	0.00008102
29	Yes	8	0.00014960	0.00008574
30	Yes	8	0.00014976	0.00001474
31	Yes	8	0.00014960	0.00007935
32	Yes	8	0.00014961	0.00007920
33	Yes	8	0.00014983	0.00001809
34	Yes	8	0.00014962	0.00008783
35	Yes	8	0.00014965	0.00008316
36	Yes	8	0.00014982	0.00001510
37	Yes	8	0.00014965	0.00008924
38	Yes	8	0.00014965	0.00008930
39	Yes	7	0.00000001	0.00003576
40	Yes	7	0.00000001	0.00007733
41	Yes	7	0.00000001	0.00007390
42	Yes	7	0.00000001	0.00002879
43	Yes	7	0.00000001	0.00007065
44	Yes	7	0.00000001	0.00007235
45	Yes	7	0.00000001	0.00003576
46	Yes	7	0.00000001	0.00008347
47	Yes	7	0.00000001	0.00007000
48	Yes	7	0.00000001	0.00002900
49	Yes	7	0.00000001	0.00007247
50	Yes	7	0.00000001	0.00007786

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 133	22.14	39	1.23	0.00
L2	135.92 - 98.42	18.53	39	1.21	0.00
L3	102.25 - 64.75	10.64	39	0.98	0.00
L4	69.42 - 31.92	4.91	39	0.67	0.00
L5	37.42 - 0	1.44	39	0.35	0.00

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	AIR -32 B2A/B66AA w/ Mount Pipe	39	21.62	1.23	0.00	48551
138.0000	(2) APXVSPP18-C-A20 w/ Mount Pipe	39	19.05	1.22	0.00	20285
127.0000	(3) SBNHH-1D65B w/ Mount Pipe	39	16.30	1.17	0.00	11431
110.0000	7770.00	39	12.31	1.05	0.00	6961
68.0000	GPS_A	39	4.71	0.65	0.00	6162

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 133	94.53	2	5.26	0.01
L2	135.92 - 98.42	79.11	2	5.18	0.01
L3	102.25 - 64.75	45.46	2	4.19	0.00
L4	69.42 - 31.92	20.97	2	2.85	0.00
L5	37.42 - 0	6.15	2	1.49	0.00

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
148.0000	AIR -32 B2A/B66AA w/ Mount Pipe	2	92.32	5.25	0.01	11523
138.0000	(2) APXVSP18-C-A20 w/ Mount Pipe	2	81.36	5.20	0.01	4813
127.0000	(3) SBNHH-1D65B w/ Mount Pipe	2	69.60	5.01	0.01	2710
110.0000	7770.00	2	52.57	4.48	0.00	1647
68.0000	GPS_A	2	20.11	2.79	0.00	1448

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	150 - 133 (1)	TP26x21.83x0.25	17.000	0.0000	0.0	19.864	-8.00	1162.06	0.007
L2	133 - 98.42 (2)	TP34.0625x24.7837x0.3125	37.500	0.0000	0.0	32.535	-18.84	1903.34	0.010
L3	98.42 - 64.75 (3)	TP41.75x32.4898x0.375	37.500	0.0000	0.0	47.874	-26.69	2800.63	0.010
L4	64.75 - 31.92 (4)	TP49.0625x39.8468x0.375	37.500	0.0000	0.0	56.341	-36.13	3295.98	0.011
L5	31.92 - 0 (5)	TP56.125x46.9609x0.375	37.420	0.0000	0.0	66.356	-48.94	3881.85	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	M _{ux} kip-ft	φM _{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M _{uy} kip-ft	φM _{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
L1	150 - 133 (1)	TP26x21.83x0.25	80.20	748.47	0.107	0.00	748.47	0.000
L2	133 - 98.42 (2)	TP34.0625x24.7837x0.3125	677.87	1587.37	0.427	0.00	1587.37	0.000
L3	98.42 - 64.75	TP41.75x32.4898x0.375	1528.29	2847.69	0.537	0.00	2847.69	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{rx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	M_{uy} kip-ft	ϕM_{ry} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ry}}$
	(3)							
L4	64.75 - 31.92	TP49.0625x39.8468x0.375	2473.68	3755.80	0.659	0.00	3755.80	0.000
	(4)							
L5	31.92 - 0 (5)	TP56.125x46.9609x0.375	3703.22	4897.52	0.756	0.00	4897.52	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	150 - 133 (1)	TP26x21.83x0.25	11.54	348.62	0.033	0.56	764.29	0.001
L2	133 - 98.42 (2)	TP34.0625x24.7837x0.3125	23.98	563.64	0.043	1.05	1640.30	0.001
L3	98.42 - 64.75 (3)	TP41.75x32.4898x0.375	27.77	831.88	0.033	1.04	2959.50	0.000
L4	64.75 - 31.92 (4)	TP49.0625x39.8468x0.375	31.17	981.00	0.032	1.04	4098.98	0.000
L5	31.92 - 0 (5)	TP56.125x46.9609x0.375	34.32	1155.96	0.030	1.04	5685.72	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{rx}}$	Ratio $\frac{M_{uy}}{\phi M_{ry}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 133 (1)	0.007	0.107	0.000	0.033	0.001	0.115	1.050	4.8.2
L2	133 - 98.42 (2)	0.010	0.427	0.000	0.043	0.001	0.439	1.050	4.8.2
L3	98.42 - 64.75 (3)	0.010	0.537	0.000	0.033	0.000	0.547	1.050	4.8.2
L4	64.75 - 31.92 (4)	0.011	0.659	0.000	0.032	0.000	0.671	1.050	4.8.2
L5	31.92 - 0 (5)	0.013	0.756	0.000	0.030	0.000	0.770	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	150 - 133	Pole	TP26x21.83x0.25	1	-8.00	1220.16	11.0	Pass
L2	133 - 98.42	Pole	TP34.0625x24.7837x0.3125	2	-18.84	1998.51	41.8	Pass
L3	98.42 - 64.75	Pole	TP41.75x32.4898x0.375	3	-26.69	2940.66	52.1	Pass
L4	64.75 - 31.92	Pole	TP49.0625x39.8468x0.375	4	-36.13	3460.78	63.9	Pass
L5	31.92 - 0	Pole	TP56.125x46.9609x0.375	5	-48.94	4075.94	73.3	Pass
Summary								
Pole (L5)							73.3	Pass
RATING =							73.3	Pass

APPENDIX B
BASE LEVEL DRAWING



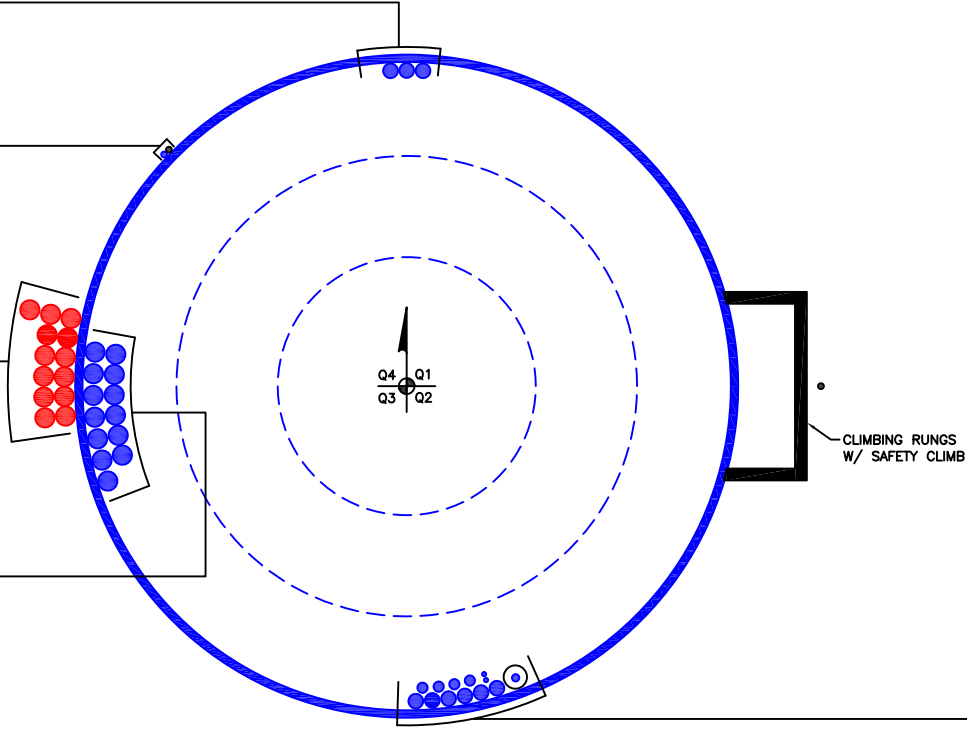
(OTHER CONSIDERED EQUIPMENT)
(3) 1-1/4" TO 138 FT LEVEL

(INSTALLED)
(1) GROUND TO 68 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 68 FT LEVEL

(PROPOSED EQUIPMENT CONFIGURATION)
(13) 1-5/8" TO 148 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(13) 1-5/8" TO 127 FT LEVEL



(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 5/8" TO 110 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(2) 3/8" TO 110 FT LEVEL
(4) 7/8" TO 110 FT LEVEL
(6) 1-1/4" TO 110 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

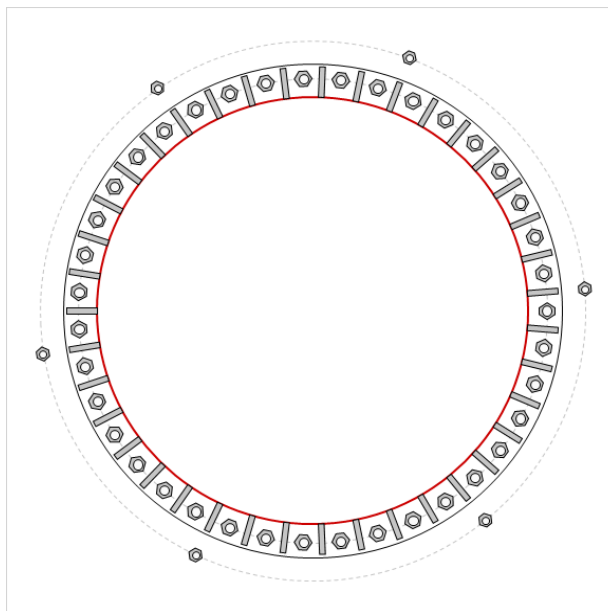


Site Info	
BU #	826222
Site Name	Newtown/RT-25
Order #	479815 Rev. 4

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	See Custom Sheet
I_{ar} (in)	See Custom Sheet

Applied Loads	
Moment (kip-ft)	3703.22
Axial Force (kips)	48.94
Shear Force (kips)	34.32

*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data
 GROUP 1: (39) 1-1/4" ϕ bolts (A687 N; $F_y=105$ ksi, $F_u=125$ ksi) on 61" BC
 GROUP 2: (6) 1" ϕ bolts (DWYIDAG N; $F_y=125$ ksi, $F_u=125$ ksi) on 71.13" BC

Base Plate Data
 65" OD x 1.5" Plate (A572-50; $F_y=50$ ksi, $F_u=65$ ksi)

Stiffener Data
 (39) 12"H x 4"W x 0.75"T, Notch: 0.5"
 plate: $F_y=50$ ksi ; weld: $F_y=70$ ksi
 horiz. weld: 0.5" fillet
 vert. weld: 0.5" fillet

Pole Data
 56.125" x 0.375" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

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

GROUP 1:		
$Pu_c = 67.32$	$\phi Pn_c = 115.97$	Stress Rating
$Vu = 0.88$	$\phi Vn = 52.19$	55.3%
$Mu = n/a$	$\phi Mn = n/a$	Pass

GROUP 2:		
$Pu_t = 48.18$	$\phi Pn_t = 56.81$	Stress Rating
$Vu = 0$	$\phi Vn = 36.82$	68.5%
$Mu = n/a$	$\phi Mn = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	5.61	(Shear)
Allowable Stress (ksi):	29.25	
Stress Rating:	18.3%	Pass

Stiffener Summary

Horizontal Weld:	55.2%	Pass
Vertical Weld:	18.4%	Pass
Plate Flexure+Shear:	8.5%	Pass
Plate Tension+Shear:	37.4%	Pass
Plate Compression:	38.9%	Pass

Pole Summary

Punching Shear:	6.6%	Pass
-----------------	-------------	-------------

Elevation (ft)	0
(Base)	

note: Bending interaction not considered when Grout Considered = "Yes"

Bolt Group	Resist Axial	Resist Shear	Induce Plate Bending	Grout Considered	Apply at BARB Elevation	BARB CL Elevation (ft)
1	Yes	Yes	Yes	No	No	
2	No	No	No	No	No	

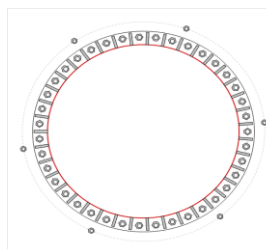
Custom Bolt Connection

Bolt	Bolt Group ID	Location (deg.)	Diameter (in)	Material	Bolt Circle (in)	Eta Factor, η	l_w (in)	Thread Type	Area Override, in ²	Tension Only
1	1	0	1.25	A687	61	0.5	1.25	N-Included		No
2	1	9.23076923	1.25	A687	61	0.5	1.25	N-Included		No
3	1	18.4615385	1.25	A687	61	0.5	1.25	N-Included		No
4	1	27.6923077	1.25	A687	61	0.5	1.25	N-Included		No
5	1	36.9230769	1.25	A687	61	0.5	1.25	N-Included		No
6	1	46.1538462	1.25	A687	61	0.5	1.25	N-Included		No
7	1	55.3846154	1.25	A687	61	0.5	1.25	N-Included		No
8	1	64.6153846	1.25	A687	61	0.5	1.25	N-Included		No
9	1	73.8461538	1.25	A687	61	0.5	1.25	N-Included		No
10	1	83.0769231	1.25	A687	61	0.5	1.25	N-Included		No
11	1	92.3076923	1.25	A687	61	0.5	1.25	N-Included		No
12	1	101.538462	1.25	A687	61	0.5	1.25	N-Included		No
13	1	110.769231	1.25	A687	61	0.5	1.25	N-Included		No
14	1	120	1.25	A687	61	0.5	1.25	N-Included		No
15	1	129.230769	1.25	A687	61	0.5	1.25	N-Included		No
16	1	138.461538	1.25	A687	61	0.5	1.25	N-Included		No
17	1	147.692308	1.25	A687	61	0.5	1.25	N-Included		No
18	1	156.923077	1.25	A687	61	0.5	1.25	N-Included		No
19	1	166.153846	1.25	A687	61	0.5	1.25	N-Included		No
20	1	175.384615	1.25	A687	61	0.5	1.25	N-Included		No
21	1	184.615385	1.25	A687	61	0.5	1.25	N-Included		No
22	1	193.846154	1.25	A687	61	0.5	1.25	N-Included		No
23	1	203.076923	1.25	A687	61	0.5	1.25	N-Included		No
24	1	212.307692	1.25	A687	61	0.5	1.25	N-Included		No
25	1	221.538462	1.25	A687	61	0.5	1.25	N-Included		No
26	1	230.769231	1.25	A687	61	0.5	1.25	N-Included		No
27	1	240	1.25	A687	61	0.5	1.25	N-Included		No
28	1	249.230769	1.25	A687	61	0.5	1.25	N-Included		No
29	1	258.461538	1.25	A687	61	0.5	1.25	N-Included		No
30	1	267.692308	1.25	A687	61	0.5	1.25	N-Included		No
31	1	276.923077	1.25	A687	61	0.5	1.25	N-Included		No
32	1	286.153846	1.25	A687	61	0.5	1.25	N-Included		No
33	1	295.384615	1.25	A687	61	0.5	1.25	N-Included		No
34	1	304.615385	1.25	A687	61	0.5	1.25	N-Included		No
35	1	313.846154	1.25	A687	61	0.5	1.25	N-Included		No
36	1	323.076923	1.25	A687	61	0.5	1.25	N-Included		No
37	1	332.307692	1.25	A687	61	0.5	1.25	N-Included		No
38	1	341.538462	1.25	A687	61	0.5	1.25	N-Included		No
39	1	350.769231	1.25	A687	61	0.5	1.25	N-Included		No
40	2	4.61538462	1	DWYDAG	71.13	0.5	0	N-Included		No
41	2	12.307692	1	DWYDAG	71.13	0.5	0	N-Included		No
42	2	124.615385	1	DWYDAG	71.13	0.5	0	N-Included		No
43	2	189.230769	1	DWYDAG	71.13	0.5	0	N-Included		No
44	2	244.615385	1	DWYDAG	71.13	0.5	0	N-Included		No
45	2	309.230769	1	DWYDAG	71.13	0.5	0	N-Included		No

Custom Stiffener Connection

Stiffener	Stiffener Group ID	Location (deg.)	Width (in)	Height (in)	Thickness (in)	H. Notch (in)	V. Notch (in)	Grade (ksi)	Weld Type	Groove Depth (in)	Groove Angle (deg.)	H. Fillet Weld Size (in)	V. Fillet Weld Size (in)	Weld Strength (ksi)
1	1	4.61538462	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
2	1	13.8461538	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
3	1	23.0769231	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
4	1	32.3076923	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
5	1	41.5384615	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
6	1	50.7692308	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
7	1	60	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
8	1	69.2307692	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
9	1	78.4615385	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
10	1	87.6923077	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
11	1	96.9230769	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
12	1	106.153846	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
13	1	115.384615	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
14	1	124.615385	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
15	1	133.846154	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
16	1	143.076923	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
17	1	152.307692	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
18	1	161.538462	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
19	1	170.769231	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
20	1	180	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
21	1	189.230769	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
22	1	198.461538	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
23	1	207.692308	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
24	1	216.923077	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
25	1	226.153846	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
26	1	235.384615	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
27	1	244.615385	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
28	1	253.846154	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
29	1	263.076923	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
30	1	272.307692	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
31	1	281.538462	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
32	1	290.769231	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
33	1	300	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
34	1	309.230769	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
35	1	318.461538	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
36	1	327.692308	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
37	1	336.923077	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
38	1	346.153846	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70
39	1	355.384615	4	12	0.75	0.5	0.5	50	Fillet			0.5	0.5	70

Plot Graphic



Pier and Pad Foundation



BU # :	826222
Site Name:	Newtown/RT-25
App. Number:	479815 Rev. 4

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp} :	48.96	kips
Base Shear, V_{u_comp} :	34.29	kips
Moment, M_u :	3703.22	ft-kips
Tower Height, H :	150	ft
BP Dist. Above Fdn, bp_{dist} :	3.625	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	186.12	34.29	17.5%	Pass
<i>Bearing Pressure (ksf)</i>	23.06	9.38	40.7%	Pass
<i>Overtuning (kip*ft)</i>	4143.22	3936.46	95.0%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	4728.85	3857.53	77.7%	Pass
<i>Pier Compression (kip)</i>	24494.62	80.13	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	1800.02	934.78	49.5%	Pass
<i>Pad Shear - 1-way (kips)</i>	466.18	348.15	71.1%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.000	0.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	2208.21	2314.52	99.8%	Pass

Pier Properties		
Pier Shape:	Circular	
Pier Diameter, $dpier$:	7	ft
Ext. Above Grade, E :	0.5	ft
Pier Rebar Size, Sc :	8	
Pier Rebar Quantity, mc :	36	
Pier Tie/Spiral Size, St :	4	
Pier Tie/Spiral Quantity, mt :	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier} :	3	in

*Rating per TIA-222-H Section 15.5

Soil Rating*:	95.0%
Structural Rating*:	99.8%

Pad Properties		
Depth, D :	6	ft
Pad Width, W_1 :	21	ft
Pad Thickness, T :	2	ft
Pad Rebar Size (Bottom dir. 2), Sp_2 :	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2 :	27	
Pad Clear Cover, cc_{pad} :	3	in

Material Properties		
Rebar Grade, F_y :	60	ksi
Concrete Compressive Strength, F'_c :	4	ksi
Dry Concrete Density, δ_c :	150	pcf

Soil Properties		
Total Soil Unit Weight, γ :	125	pcf
Ultimate Net Bearing, Q_{net} :	30.000	ksf
Cohesion, C_u :	0.000	ksf
Friction Angle, ϕ :	35	degrees
SPT Blow Count, N_{blows} :	29	
Base Friction, μ :	0.4	
Neglected Depth, N :	3.40	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, gw :	N/A	ft

<-- Toggle between Gross and Net

Pile Foundation

Checks the capacity of pile foundation configurations for monopoles or self-support towers with individual foundations in Rev. F, G, and H.



BU #:	826222
Site Name:	Newtown/RT-25
Order:	479815 Rev. 4

Tower Type:	Monopole
TIA Revision:	H

Top & Bot. Pad Rein. Different?:

Factored Design Reactions At Base		
Moment, M:	3703	ft-kips
Axial, Pu:	49	kips
Shear, Sc:	34	kips
Load Eccentricity, Ecc:	0	in

Pile Properties		
Pile Shape:	Round	
Pile Material:	Concrete	
Length of Pile, Lpile:	27	ft
Pile Diameter:	10.5	in
Pile (Soil) Capacity Given?	No	
Steel Grade, Fy:	87.24	ksi
Pile Rebar Size, Psize:	14	
Rebar Quantity, Pquan:	1	

Pile Group		
Group Configuration:	Rectangular	
Number of Columns, Nx:	2	
Number of Rows, Ny:	2	
Column Spacing, Dx:	126	in
Row Spacing, Dy:	126	in
Orientation of Neutral Axis, θ:	0	deg
Group Efficiency Given in Geotech?	No	

Program Calculated Group Efficiency, Eg: 1.00

Pile Cap		
Cap Type:	Pier and Pad	
Depth to Bottom of Pad, D:	6.00	ft
Thickness of Pad, T:	2.00	ft
Pad Width, Wx:	21.00	ft
Pad Length, Wy:	21.00	ft
Pad Rebar Size (Bot.), Spad:	8	
Pad Rebar Quantity (X-direction) (Bot.), Mpad _x :	27	
Pad Rebar Quantity (Y-direction) (Bot.), Mpad _y :	27	
Extension of Pier Above Grade, E:	0.50	ft
Pier Shape:	Circular	
Pier Diameter, di:	7.00	ft
Pier Rebar Size, Rs:	8	
Pier Rebar Quantity, mc:	36	
Pier Tie Size, St:	4	

Material Properties		
Rebar Grade, Fy:	60	ksi
Concrete Strength, Fc:	4	ksi
Clear Cover, cc:	3	in

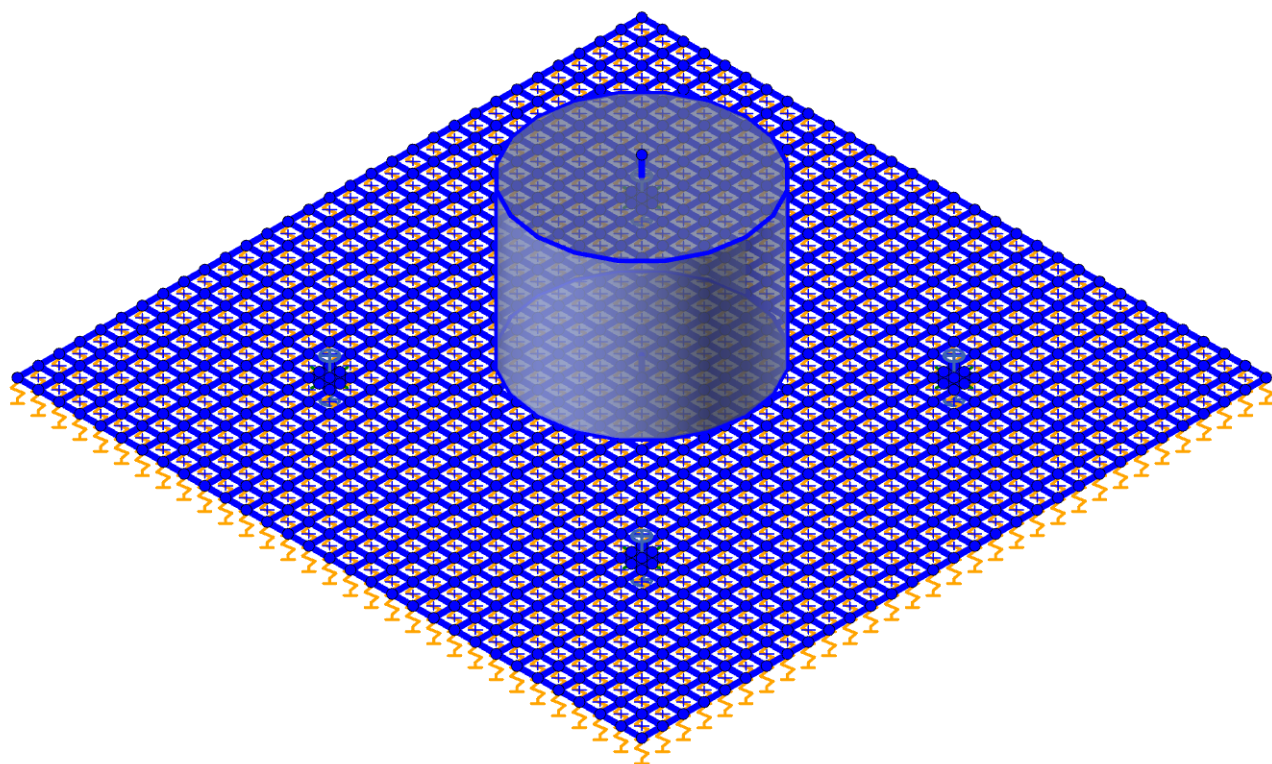
Soil Properties		
Groundwater Depth, GW:	99.00	ft
Soil Unit Weight:	125	pcf
Cohesion, Co:	0	ksf
Friction Angle, φ:	35	deg
Neglected Depth, ND:	3.4	ft
Negative Friction Force (per pile), Sw:		kips
SPT Blow Count, N _{blows} :	29	

Design Checks				
	Capacity	Demand	Rating*	Check
PILE CHECKS				
Soil Uplift (kips per pile):	192.96	120.76	59.6%	Pass
Pile Tensile Strength (kips):	174.48	120.76	65.9%	Pass
PAD CHECKS				
One-Way Shear (kips):	466.18	348.15	71.1%	Pass
Pad Shear - Comp Two-Way (ksi):	0.164	0.076	44.0%	Pass
Flexural Two-Way (Comp) (kip*ft):	2208.21	2313.60	99.8%	Pass
Pad Flexure (kip*ft):	1945.61	934.78	45.8%	Pass
PIER CHECKS				
Pier Compression (kips):	24494.62	80.17	0.3%	Pass
Pier Flexure (Comp.) (ft-kips):	4728.94	3856.00	77.7%	Pass

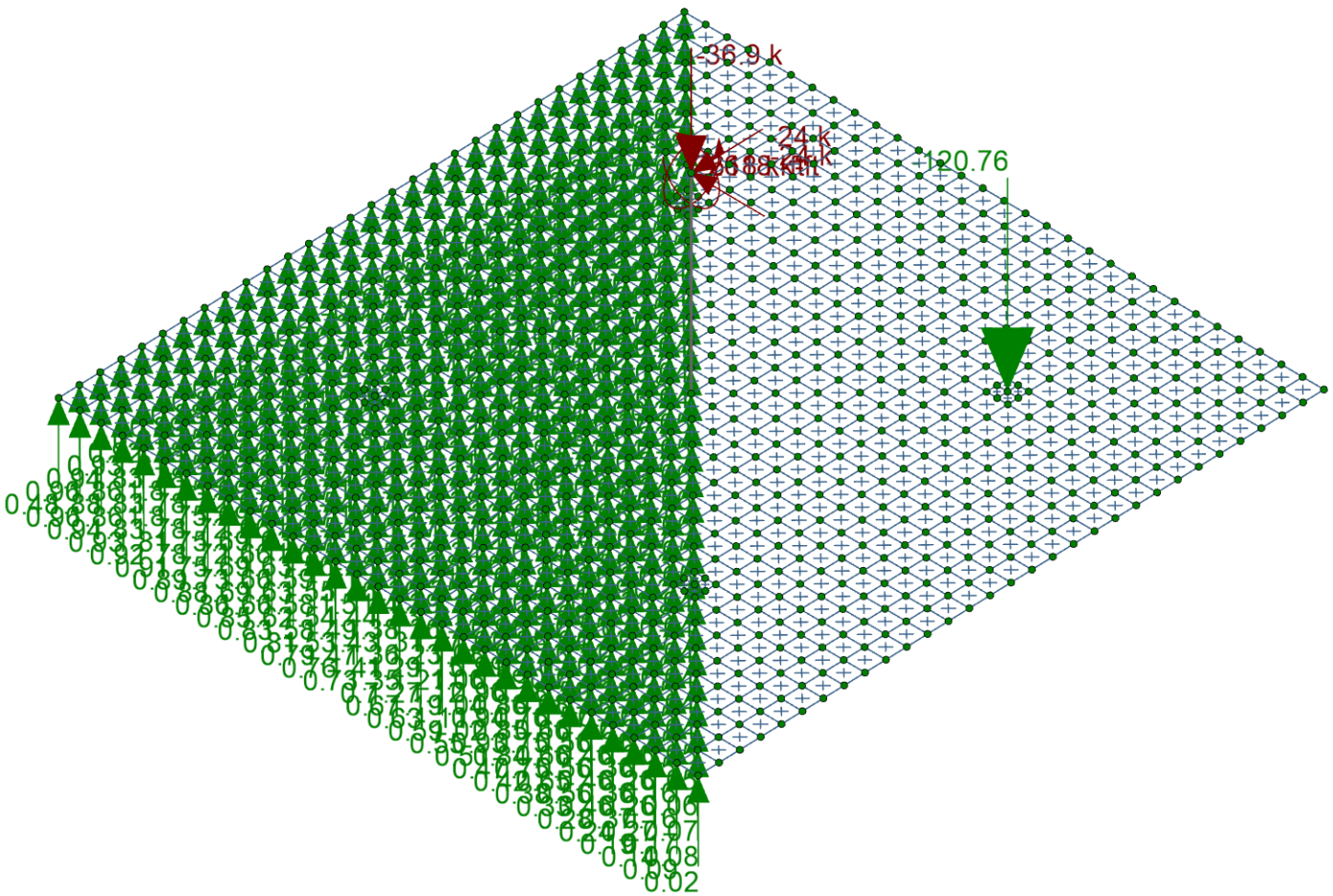
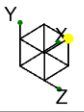
*Rating per TIA-222-H Section 15.5

Soil Rating:	59.6%
Structural Rating:	99.8%

Ultimate Pile Capacities Based on Soil Properties							
Depth (ft)		Cohesion	Friction Angle	Soil Weight	Skin Friction Given?		Yes
Top	Bottom	(ksf)	(deg)	(pcf)	Blows per Foot (N)	Ult. Comp. (ksf)	Ult. Uplift (ksf)
0	9	0	0	0	0	0.00	0.00
9	25	0	0	0	0	2.88	2.88
25	35	0	0	0	0	3.60	3.60
35	36	0	0	0	0	2.88	2.88
36	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
0	0	0	0	0	0	0.00	0.00
Ultimate End Bearing (ksf):						-	
Total Capacities (kips):						233.55	233.55

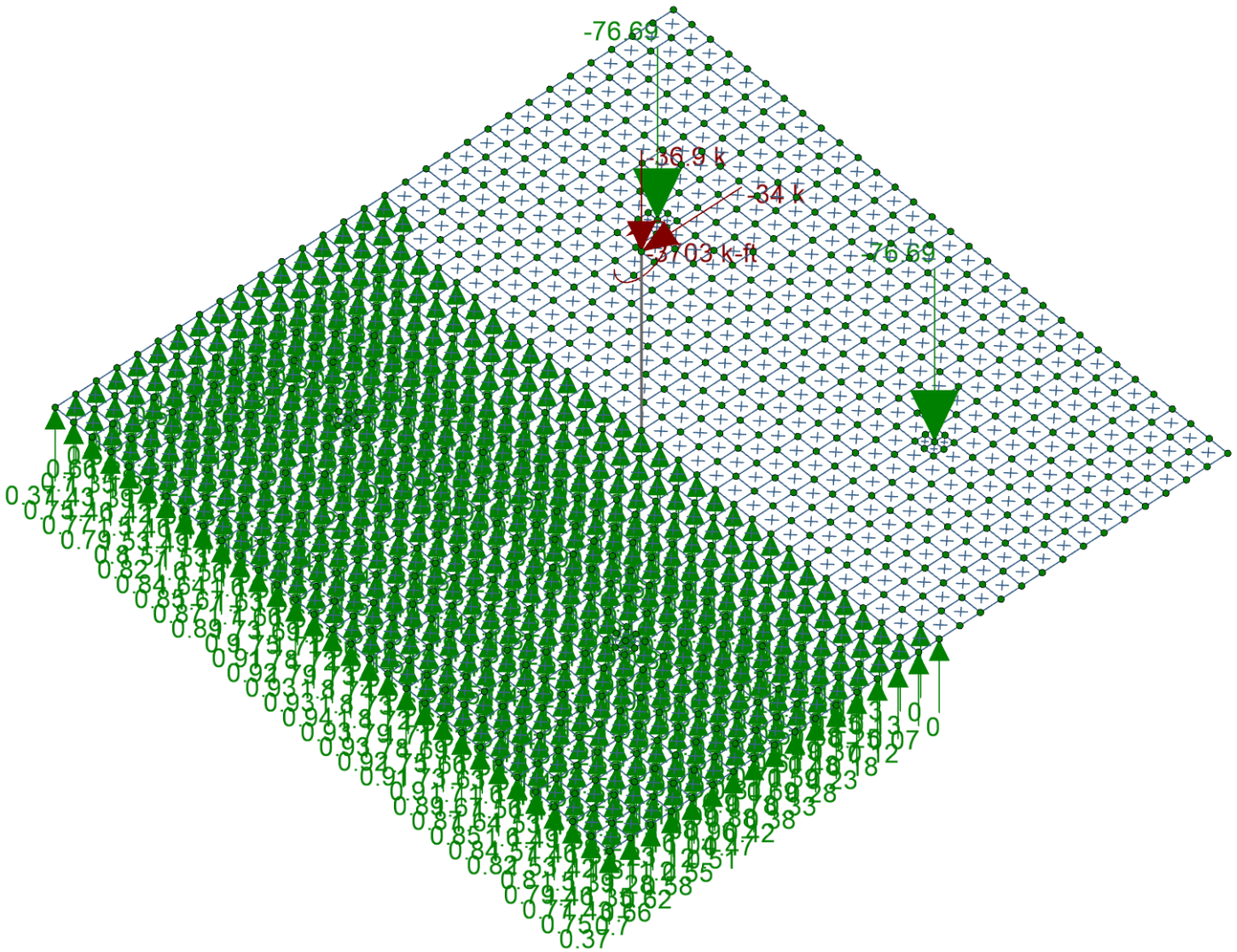
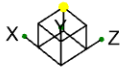


Crown Castle	BU# 826222	SK-1
AMonroy		Dec 04, 2020
		826222_RPA_PJFWAY (Rolando)....



Loads: LC 9, 0.9 Dead+1.0 Wind 45 deg (0.75 Dsoil)
 Results for LC 9, 0.9 Dead+1.0 Wind 45 deg (0.75 Dsoil)
 Y-direction Reaction Units are kips and kip-ft

Crown Castle	BU# 826222	SK-2
AMonroy		Dec 04, 2020
		826222_RPA_PJFWAY (Rolando)...



Loads: LC 7, 0.9 Dead+1.0 Wind 0 deg (0.75 Dsoil)
 Results for LC 7, 0.9 Dead+1.0 Wind 0 deg (0.75 Dsoil)
 Y-direction Reaction Units are kips and kip-ft

Crown Castle	BU# 826222	SK-3
AMonroy		Dec 04, 2020
		826222_RPA_PJFWAY (Rolando)...

Nodal Loads and Enforced Displacements

Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1 TOP	L	Y	-41

Nodal Loads and Enforced Displacements

Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1 TOP	L	Z	-34
2 TOP	L	MX	-3703

Nodal Loads and Enforced Displacements

Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1 TOP	L	Z	-24
2 TOP	L	X	-24
3 TOP	L	MZ	2618
4 TOP	L	MX	-2618

Nodal Loads and Enforced Displacements

Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s ² /ft, k*s ² *ft)]
1 TOP	L	Y	10

Basic Load Cases

BLC Description	Category	Nodal	Surface(Plate/Wall)
1 ASD DL-Tower	DL	1	
2 ASD DL Concrete	DL		912
3 ASD DL Soil	None		912
5 LRFD Wind 90	None	2	
7 LRFD Wind 45	None	4	
9 uplift test	None	1	

Load Combinations

Description	Solve PDelta	BLC Factor	BLC Factor	BLC Factor	BLC Factor	BLC	BLC	BLC	BLC	BLC	BLC	BLC	BLC
1 DL -Tower	Yes	Y	1	1					0	0	0	0	0
2 DL-Conc	Yes	Y	2	1					0	0	0	0	0
3 DL-Soil	Yes	Y	3	1					0	0	0	0	0
4 DL-All	Yes	Y	1	1	2	1	3	1	0	0	0	0	0
5 Uplift Test	Yes	Y	9	1					0	0	0	0	0
6 0.9 Dead+1.0 Wind 0 deg - No Ice	Yes	Y	L4	0.9	5	1				0	0	0	0
7 0.9 Dead+1.0 Wind 0 deg (0.75 Dsoil)	Yes	Y	1	0.9	2	0.9	3	0.75	5	1	0	0	0
8 0.9 Dead+1.0 Wind 45 deg - No Ice	Yes	Y	L4	0.9	7	1					0	0	0
9 0.9 Dead+1.0 Wind 45 deg (0.75 Dsoil)	Yes	Y	1	0.9	2	0.9	3	0.75	7	1	0	0	0

Load Combination Design

Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1 DL -Tower		Yes					Yes	Yes	Yes
2 DL-Conc		Yes					Yes	Yes	Yes
3 DL-Soil		Yes					Yes	Yes	Yes
4 DL-All		Yes					Yes	Yes	Yes
5 Uplift Test		Yes					Yes	Yes	Yes
6 0.9 Dead+1.0 Wind 0 deg - No Ice		Yes					Yes	Yes	Yes
7 0.9 Dead+1.0 Wind 0 deg (0.75 Dsoil)		Yes					Yes	Yes	Yes
8 0.9 Dead+1.0 Wind 45 deg - No Ice		Yes					Yes	Yes	Yes
9 0.9 Dead+1.0 Wind 45 deg (0.75 Dsoil)		Yes					Yes	Yes	Yes

Concrete Properties

Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e ⁵ F ⁻¹]	Density [k/ft ³]	f _c [ksi]	Lambda	Flex Steel [ksi]	Shear Steel [ksi]
1 Conc3000NW	3156	1372	0.15	0.6	0.145	3	1	60	60
2 Conc3500NW	3409	1482	0.15	0.6	0.145	3.5	1	60	60

Concrete Properties (Continued)

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [$1e^{-5}F^{-1}$]	Density [k/ft ³]	fc [ksi]	Lambda	Flex Steel [ksi]	Shear Steel [ksi]
3	Conc4000NW	3644	1584	0.15	0.6	0.145	4	1	60	60
4	Conc3000LW	2085	907	0.15	0.6	0.11	3	0.75	60	60
5	Conc3500LW	2252	979	0.15	0.6	0.11	3.5	0.75	60	60
6	Conc4000LW	2408	1047	0.15	0.6	0.11	4	0.75	60	60

Plate Forces (per ft) (By Combination)

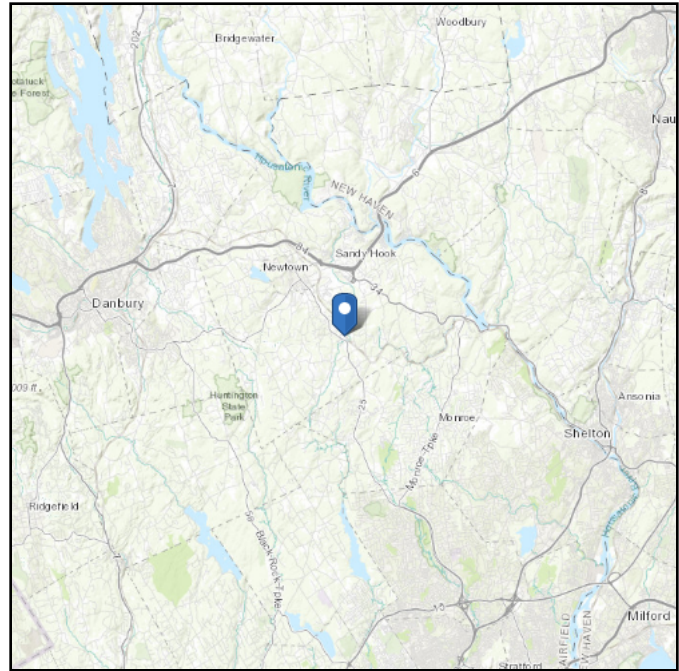
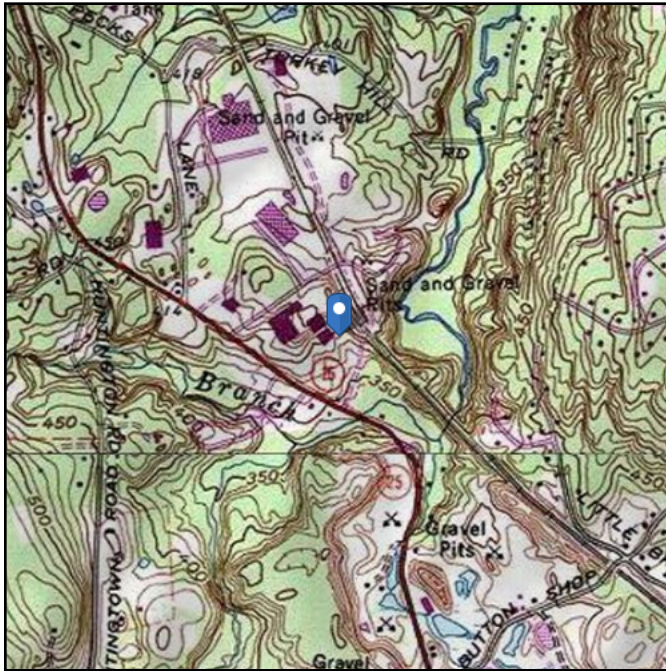
LC	Plate Label	Qx[k]	Qy[k]	Mx[k-ft]	My[k-ft]	Mxy[k-ft]	Fx[k]	Fy[k]	Fxy[k]	
1	9	P437	474.856	474.856	-934.775	-934.775	-1005.19	-7.972	-7.972	-10.332
2	9	P466	454.08	454.08	905.35	905.35	996.51	7.972	7.972	10.332
3	9	P467	297.873	277.443	-796.007	766.51	-5.887	-7.796	7.796	0
4	9	P436	277.443	297.873	766.51	-796.007	-5.887	7.796	-7.796	0
5	9	P438	292.406	81.79	-463.639	-1.546	-174.588	-4.988	1.101	-3.134
6	9	P465	282.45	79.175	442.374	-23.339	166.195	4.988	-1.101	3.134
7	9	P468	150.415	-144.24	-344.123	-32.962	11.179	-4.156	1.068	-0.107
8	9	P435	140.618	-142.477	322.694	7.891	-23.067	4.156	-1.068	0.107
9	9	P408	178.699	178.699	-294.468	-294.468	-238.51	-2.506	-2.506	-4.227
10	9	P495	171.714	171.714	273.173	273.173	231.312	2.506	2.506	4.227
11	9	P439	148.537	-24.058	-232.529	-99.005	-69.143	-3.229	0.443	-1.668
12	9	P464	141.776	-25.746	214.696	77.413	60.249	3.229	-0.443	1.668
13	9	P409	136.268	57.059	-206.235	-124.523	-84.614	-2.461	-0.377	-2.548
14	9	P469	87.518	-94.206	-194.625	-27.431	-38.822	-2.766	0.97	-0.46
15	9	P494	130.711	53.815	188.433	104.877	77.515	2.461	0.377	2.548
16	9	P434	80.792	-93.568	176.627	5.574	27.665	2.766	-0.97	0.46
17	9	P379	81.349	81.349	-150.012	-150.012	-70.105	-1.318	-1.318	-2.533
18	9	P440	86.296	-29.041	-137.02	-83.45	-48.823	-2.29	0.428	-1.14
19	9	P524	77.612	77.612	132.662	132.662	63.793	1.318	1.318	2.533
20	9	P410	89.071	11.874	-131.958	-107.955	-46.552	-2.021	-0.077	-1.759
21	9	P470	56.72	-62.495	-125.869	-49.893	-43.087	-2.019	0.596	-0.451
22	9	P378	57.059	136.268	-124.523	-206.235	-84.614	-0.377	-2.461	-2.548
23	9	P499	-0.628	-99.8	-122.673	5.363	-11.113	-1.605	0.741	0.094
24	9	P463	81.068	-30.096	121.373	64.54	39.813	2.29	-0.428	1.14
25	9	P493	84.56	10.067	116.28	90.23	39.251	2.021	0.077	1.759
26	9	P380	69.849	38.627	-114.685	-107.772	-37.267	-1.439	-0.588	-2.011
27	9	P433	51.434	-62.474	110.132	30.651	32.191	2.019	-0.596	0.451
28	9	P348	11.874	89.071	-107.955	-131.958	-46.552	-0.077	-2.021	-1.759
29	9	P349	38.627	69.849	-107.772	-114.685	-37.267	-0.588	-1.439	-2.011
30	9	P525	53.815	130.711	104.877	188.433	77.515	0.377	2.461	2.548
31	9	P404	-6.084	-97.285	104.387	-25.685	-1.718	1.605	-0.741	-0.094
32	9	P500	15.564	-69.3	-101.945	-8.561	-32.273	-1.397	0.574	-0.051
33	9	P523	66.548	36.597	99.091	91.508	31.181	1.439	0.588	2.011
34	9	P377	-24.058	148.537	-99.005	-232.529	-69.143	0.443	-3.229	-1.668
35	9	P350	45.319	45.319	-95.726	-95.726	-26.409	-0.923	-0.923	-1.945
36	9	P498	-65.87	-72.35	-94.04	72.291	-6.474	-1.514	1.514	0
37	9	P554	36.597	66.548	91.508	99.091	31.181	0.588	1.439	2.011
38	9	P555	10.067	84.56	90.23	116.28	39.251	0.077	2.021	1.759
39	9	P319	17.551	53.363	-90.214	-81.47	-25.603	-0.338	-1.296	-1.606
40	9	P441	55.677	-22.602	-89.426	-74.911	-41.315	-1.71	0.315	-0.864
41	9	P318	-0.52	60.018	-88.796	-87.169	-34.42	0	-1.602	-1.308
42	9	P411	60.018	-0.52	-87.169	-88.796	-34.42	-1.602	0	-1.308
43	9	P471	39.904	-39.931	-87.003	-48.878	-43.052	-1.539	0.453	-0.416
44	9	P403	10.866	-68.192	86.002	-10.033	19.809	1.397	-0.574	0.051
45	9	P347	-29.041	86.296	-83.45	-137.02	-48.823	0.428	-2.29	-1.14
46	9	P381	53.363	17.551	-81.47	-90.214	-25.603	-1.296	-0.338	-1.606
47	9	P553	43.486	43.486	80.573	80.573	21.02	0.923	0.923	1.945
48	9	P320	27.059	41.128	-80.563	-73.865	-17.521	-0.635	-0.966	-1.73
49	9	P501	18.505	-45.763	-79.843	-19.573	-38.12	-1.179	0.454	-0.112
50	9	P526	-25.746	141.776	77.413	214.696	60.249	-0.443	3.229	1.668
51	9	P289	8.328	40.287	-75.942	-57.096	-21.266	-0.245	-1.074	-1.281
52	9	P530	-15.638	-52.948	-75.604	20.458	-18.551	-0.834	0.505	0.038
53	9	P462	51.288	-23.278	75.394	58.28	32.148	1.71	-0.315	0.864
54	9	P584	16.801	50.458	75.361	66.96	19.369	0.338	1.296	1.606
55	9	P317	-22.602	55.677	-74.911	-89.426	-41.315	0.315	-1.71	-0.864
56	9	P288	-3.255	42.467	-74.749	-59.655	-29.572	0.036	-1.256	-1.007
57	9	P351	41.128	27.059	-73.865	-80.563	-17.521	-0.966	-0.635	-1.73
58	9	P432	35.408	-40.134	73.016	31.847	32.258	1.539	-0.453	0.416

ASCE 7 Hazards Report

Address:
No Address at This Location

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

Elevation: 398.5 ft (NAVD 88)
Latitude: 41.378144
Longitude: -73.27415



Wind

Results:

Wind Speed:	120 Vmph
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	97 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: Tue Nov 24 2020

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.

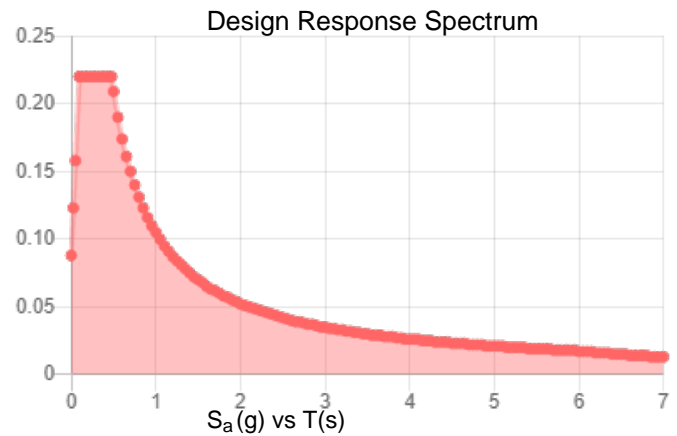
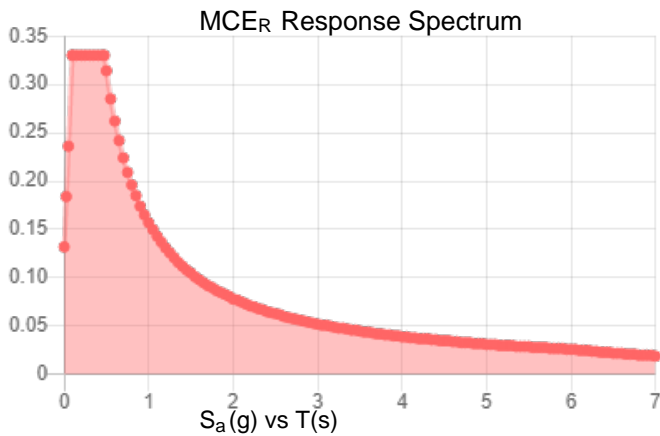
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.208	S_{DS} :	0.22
S_1 :	0.066	S_{D1} :	0.105
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.111
S_{MS} :	0.33	PGA _M :	0.175
S_{M1} :	0.157	F _{PGA} :	1.578
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Nov 24 2020

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.

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: Tue Nov 24 2020

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.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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Exhibit D

Mount Analysis

Date: **November 24, 2020**

Darcy Tarr
Crown Castle
6325 Ardrey Kell Road, Suite 600
Charlotte, NC 28277
(704) 405-6589



**GPD Engineering and Architecture
Professional Corporation**
520 South Main Street, Suite 2531
Akron, Ohio 44311
(216) 927-8663
CrownMA@gpdgroup.com

Subject: **Mount Replacement Analysis Report**

Carrier Designation: **T-Mobile Loading Modification**
Carrier Site Number: CT11217A
Carrier Site Name: Newtown/RT-25

Crown Castle Designation: **Crown Castle BU Number:** 826222
Crown Castle Site Name: Newtown/RT-25
Crown Castle JDE Job Number: 559243
Crown Castle Order Number: 479815 Rev. 4

Engineering Firm Designation: **GPD Report Designation:** 2021777.826222.03

Site Data: **201 South Main Street, Newtown, Fairfield County, CT 06470**
Latitude 41° 22' 41.32" Longitude -73° 16' 26.94"

Structure Information: **Tower Height & Type:** **150.0 ft Monopole Tower**
Mount Elevation: **148.0 ft**
Mount Type: **14.5 ft Platform Mount**

Dear Darcy Tarr,

GPD is pleased to submit this “**Mount Replacement Analysis Report**” to determine the structural integrity of T-Mobile’s antenna mounting system with the proposed appurtenance and equipment addition on the above mentioned 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 Mount **Sufficient***
***See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis utilizes an ultimate 3-second gust wind speed of 120 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Michael Hlava

Respectfully Submitted by:

Christopher J. Scheks, P.E.
Connecticut #: 0030026



11/24/2020

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1) INTRODUCTION

This is a proposed 14.5' Platform Mount designed by Site Pro 1 (Part #: RMQLP-496-HK Rev. A, dated 9/20/2018).

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	120 mph
Exposure Category:	C
Topographic Factor at Base:	1
Topographic Factor at Mount:	1
Ice Thickness:	1 in
Wind Speed with Ice:	50 mph
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 Details
148.0	148.0	3	Ericsson	ERICSSON AIR 21 B2A B4P	14.5 ft. Platform Mount
		3	Ericsson	KRY 112 144/1_T-MOBILE	
	146.0	3	Ericsson	AIR -32 B2A/B66AA	
		3	RFS/Celwave	APXVAARR24_43-U-NA20	
		3	Ericsson	RADIO 4449 B12/B71	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
CCI Application	Crown Order Number 479815 Rev. 4	-	CCI
RF Data Sheet	T-Mobile RFDS File: CT11217A_L600_3.2_draft, dated 4/25/2019	-	CCI
Previous Mount Analysis	Mastec Project #: 18810-MNT2, dated 6/20/2019	8484503	CCI
Mount Design	Site Pro 1 Part #: RMQLP-496-HK Rev. A, dated 9/20/2018	-	Site Pro 1

3.1) Analysis Method

RISA-3D Edition (Version 17.0.4), 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.

A tool internally developed by GPD, using Microsoft Excel, was used to calculate wind loading on all appurtenances, dishes, and mount members for various load cases. Selected output from the analysis is included in Appendix B.

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

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) This analysis assumes all information reference in Table 2 is current and correct.
- 5) Steel grades have been assumed as follows, unless noted otherwise:

Angle, Plate	ASTM A36 (GR 36)
HSS (Rectangular)	ASTM 500 (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. GPD 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 Mount)

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,3	Standoff Arm	M49	148.0	15.7	Pass
	Cross Arm	M2		10.7	Pass
	Grating Angle	M4		13.4	Pass
	Toe Rail	M5		8.9	Pass
	Corner Connection Plate	M54		28.8	Pass
	Inner Connection Plate	M10		30.6	Pass
	Support Rail	M83		9.9	Pass
	Support Rail Corner Connection	M90		13.0	Pass
	Platform Reinforcement	M51		12.3	Pass
	Pipe Mount	A2		51.0	Pass
2,3	Mount to Tower Connection	-	16.3	Pass	
	Reinforcement to Tower Connection	-	4.8	Pass	

Structure Rating (max from all components) =	51.0%³
---	--------------------------

Notes:

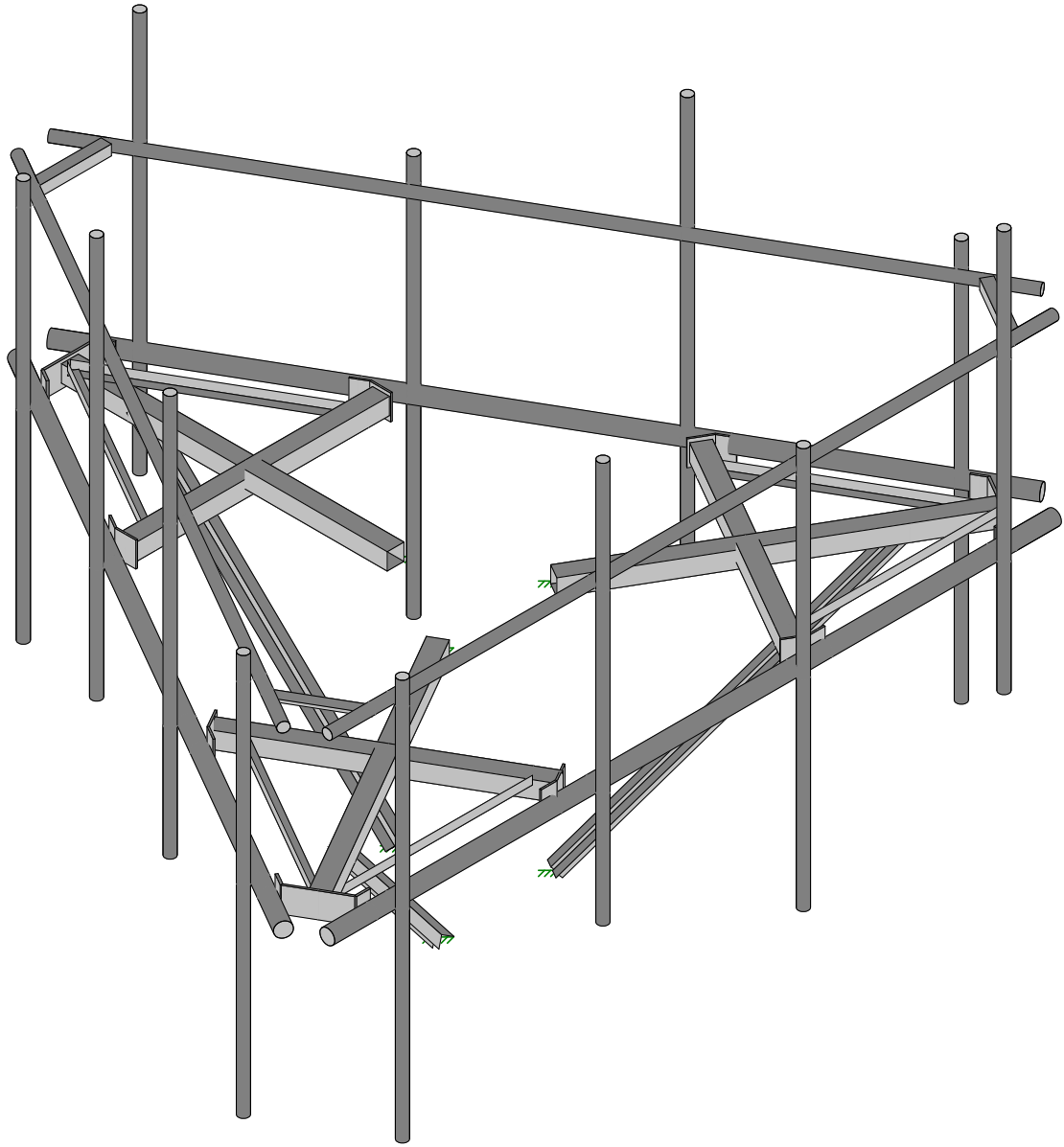
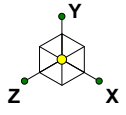
- 1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
- 2) See additional documentation in "Appendix D - Additional Calculations" for calculations supporting the % capacity consumed.
- 3) Ratings per TIA-222-H section 15.5.

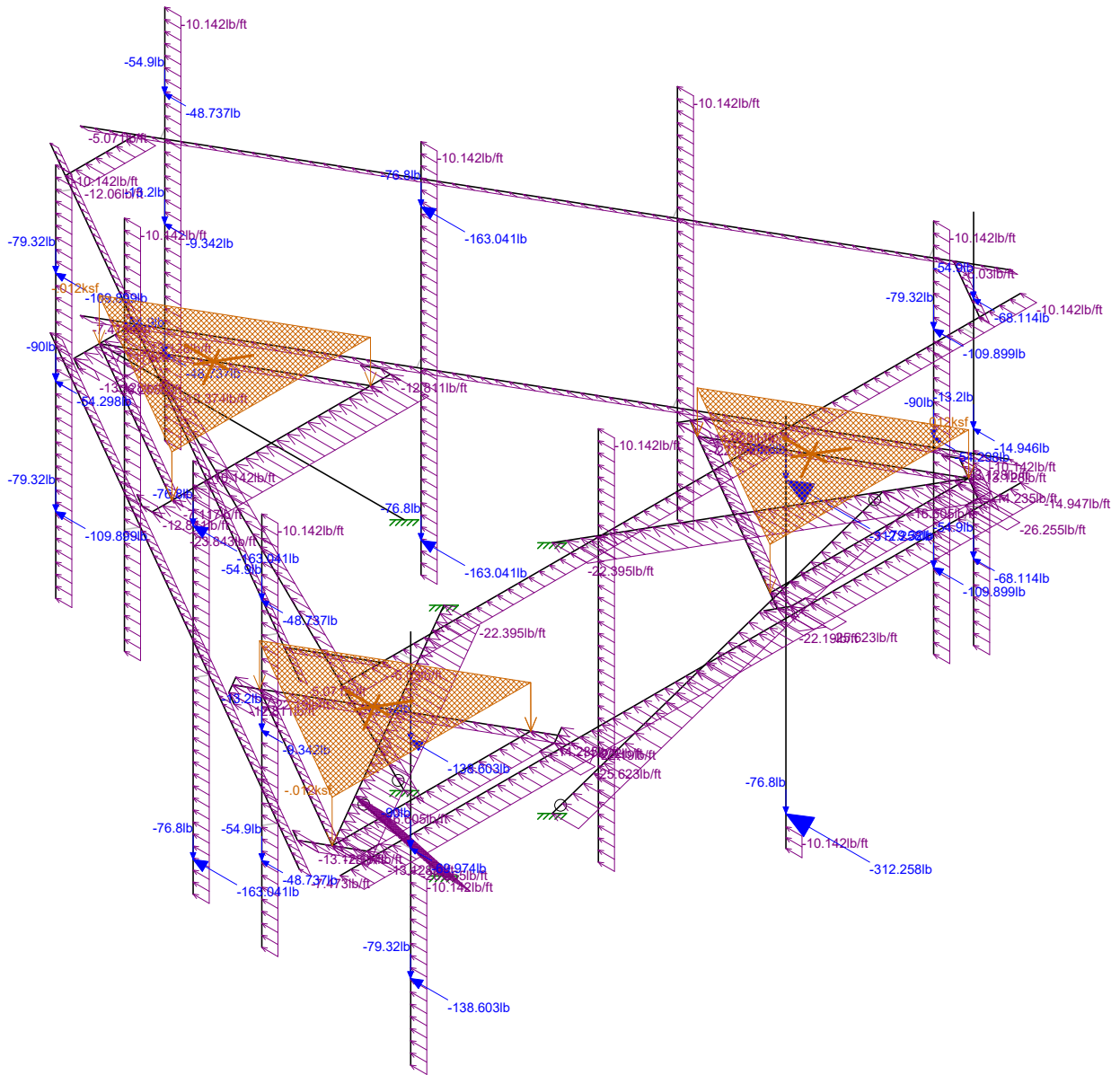
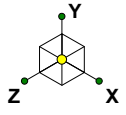
4.1) Recommendations

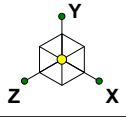
In order for the results of this analysis to be considered valid, the mount listed below shall be installed to support the proposed loading configuration.

Site Pro 1 – RMQLP-496-HK

APPENDIX A
WIRE FRAME AND RENDERED MODELS

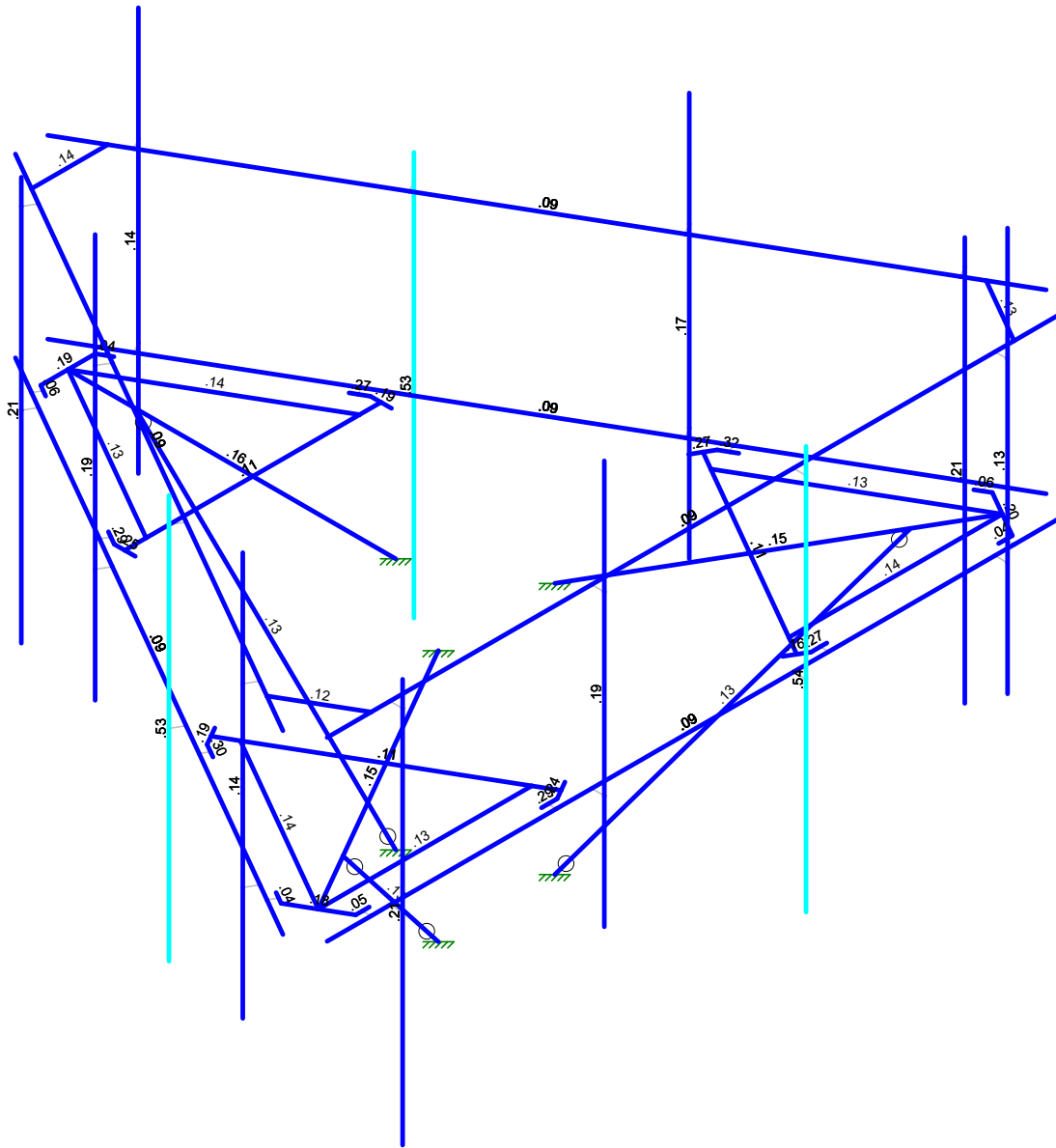






Code Check (Env)

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



APPENDIX B
SOFTWARE INPUT CALCULATIONS



Structure Information	
Structure Type:	Monopole
Structure Height:	150 ft
z (Mount Centerline) =	148 ft
Gh (Mount Gust Effect Factor) =	1.00
Risk Category:	II

Code Specifications	
TIA/EIA Code:	H
Ultimate Wind Speed (No Ice) =	120 mph (3-s gust)
Ultimate Wind Speed (With Ice) =	50 mph (3-s gust)
Ice Thickness	1.5 in
Exposure Category	C
Tower Base Elevation (AMSL)	397 ft

Topographic Inputs	
Topographic Feature:	N/A

Section Sets										No Ice		Ice Output	
Mount Components	Member Type	Length (in)	Side (Longest seeing wind) (in)	Other Side (in)	Calculated Dc, for ice weight (in)	Dc, for ice weight (in)	Area Type (Round or Flat)	K _s	User's Wind Multiplier	Normal Wind Force (lb/ft)*	Normal Ice Wind Force (lb/ft)*	Ice Weight (lb/ft)*	
Standoff Arm	Square/Rect.	78.000	4	4		5.66	Flat	0.90	1.00	28.73	6.25	15.76	
Cross Arm	Square/Rect.	61.000	4	4		5.66	Flat	0.90	1.00	26.49	5.92	15.76	
Grating Angle	Angle	52.000	2	2		2.83	Flat	0.90	1.00	15.82	4.08	9.73	
Toe Rail	Pipe	174.000	3.5	3.5		3.50	Round	0.90	1.00	16.61	5.74	11.16	
Corner Connection Plate	Square/Rect.	19.000	6	0.5		6.02	Flat	0.90	1.00	29.17	6.62	16.53	
Inner Connection Plate	Square/Rect.	9.000	6	0.375		6.01	Flat	0.90	1.00	28.47	6.62	16.51	
Support Rail	Pipe	174.000	2.375	2.375		2.38	Round	0.90	1.00	11.27	4.83	8.77	
Support Rail Corner Connection	Angle	15.000	2.5	2.5		3.54	Flat	0.90	1.00	13.40	3.74	11.24	
Platform Reinforcement	Other	84.000	2.5	5.5	5.5	5.50	Flat	0.90	1.00	19.77	5.09	15.42	
Pipe Mount	Pipe	96.000	2.375	2.375		2.38	Round	0.90	1.00	11.27	4.06	8.77	

*All forces are unfactored.

Appurtenances							Shielding			No Ice		Ice Output	
Appurtenance Model	Loading Elevation (ft)	Height (in)	Front Width (in)	Side Depth (in)	Wt (lbs)	Type for Area	Front Shielding (%)	Side Shielding (%)	K _s and/or block shielding	Normal Wind Force (lbs)*	Wt (lbs) (no ice)*	Normal Wind Force (lbs) (w/ ice)*	Wt (lbs) (only ice)*
(3) ERICSSON AIR 21 B2A B4P	148	56	12.1	7.87	91.5	CFD	0%	0%	0.90	136.23	91.50	32.40	170.50
(3) KRY 112 144/1_T-MOBILE	148	7	6	3	11	Flat	0%	0%	0.90	14.95	11.00	4.67	16.82
(3) AIR -32 B2A/B66AA	146	56.6	12.9	8.7	132.2	Flat	0%	0%	0.90	277.21	132.20	56.40	182.65
(3) APXVAARR24_43-U-NA20	146	95.9	24	8.7	128	CFD	0%	0%	0.90	624.52	128.00	128.65	433.30
(3) RADIO 4449 B12/B71	146	14.95	13.19	9.25	75	Flat	0%	0%	0.90	69.97	75.00	16.10	67.66

*All forces are unfactored.

APPENDIX C
SOFTWARE ANALYSIS OUTPUT



Company : GPD
 Designer : Hlava, Michael
 Job Number : 2021777.826222.03
 Model Name : 826222 - Newtown/RT-25

Nov 24, 2020
 9:40 AM
 Checked By: _____

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/1...	Density[k/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Standoff Arm	HSS4x4x1/4	None	None	A500 Gr.B Rect	Typical	3.75	8.828	8.828	13.184
2	Cross Arm	HSS4x4x1/4	None	None	A500 Gr.B Rect	Typical	3.75	8.828	8.828	13.184
3	Grating Angle	L2x2x4	None	None	A36 Gr.36	Typical	.944	.346	.346	.021
4	Toe Rail	P3 STD	None	None	A53 Gr.B	Typical	2.228	3.017	3.017	6.034
5	Corner Connection Plate	PL6x1/2	None	None	A36 Gr.36	Typical	3	.063	9	.237
6	Inner Connection Plate	PL6x3/8	None	None	A36 Gr.36	Typical	2.25	.026	6.75	.101
7	Support Rail	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331
8	Support Rail Corner Conne...	L2.5x2.5x4	None	None	A36 Gr.36	Typical	1.19	.692	.692	.026
9	Platform Reinforcement	LL2.5x2.5x3x4	None	None	A36 Gr.36	Typical	1.805	2.703	1.093	.02
10	Pipe Mount	P2Std	None	None	A53 Gr.B	Typical	1.075	.666	.666	1.331

Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
1	M1	N1	N2			Standoff Arm	None	None	A500 Gr.B Rect	Typical
2	M2	N3	N4			Cross Arm	None	None	A500 Gr.B Rect	Typical
3	M3	N6	N2			Grating Angle	None	None	A36 Gr.36	Typical
4	M4	N2	N7			Grating Angle	None	None	A36 Gr.36	Typical
5	M5	N8	N9			Toe Rail	None	None	A53 Gr.B	Typical
6	M6	N10	N11			Corner Connection Plate	None	None	A36 Gr.36	Typical
7	M7	N11	N12			Corner Connection Plate	None	None	A36 Gr.36	Typical
8	M8	N12	N13			Corner Connection Plate	None	None	A36 Gr.36	Typical
9	M9	N14	N15			Inner Connection Plate	None	None	A36 Gr.36	Typical
10	M10	N15	N16			Inner Connection Plate	None	None	A36 Gr.36	Typical
11	M11	N17	N18			Inner Connection Plate	None	None	A36 Gr.36	Typical
12	M12	N18	N19			Inner Connection Plate	None	None	A36 Gr.36	Typical
13	M13	N20	N21			RIGID	None	None	RIGID	Typical
14	M14	N22	N23			RIGID	None	None	RIGID	Typical
15	M15	N24	N25			RIGID	None	None	RIGID	Typical
16	M16	N26	N27			RIGID	None	None	RIGID	Typical
17	M17	N28	N29			RIGID	None	None	RIGID	Typical
18	M18	N30	N31			RIGID	None	None	RIGID	Typical
19	M19	N32	N33			RIGID	None	None	RIGID	Typical
20	M20	N34	N35			RIGID	None	None	RIGID	Typical
21	A1	N36	N40			Pipe Mount	None	None	A53 Gr.B	Typical
22	M25	N44	N45			Standoff Arm	None	None	A500 Gr.B Rect	Typical
23	M26	N46	N47			Cross Arm	None	None	A500 Gr.B Rect	Typical
24	M27	N49	N45			Grating Angle	None	None	A36 Gr.36	Typical
25	M28	N45	N50			Grating Angle	None	None	A36 Gr.36	Typical
26	M29	N51	N52			Toe Rail	None	None	A53 Gr.B	Typical
27	M30	N53	N54			Corner Connection Plate	None	None	A36 Gr.36	Typical
28	M31	N54	N55			Corner Connection Plate	None	None	A36 Gr.36	Typical
29	M32	N55	N56			Corner Connection Plate	None	None	A36 Gr.36	Typical
30	M33	N57	N58			Inner Connection Plate	None	None	A36 Gr.36	Typical



Company : GPD
 Designer : Hlava, Michael
 Job Number : 2021777.826222.03
 Model Name : 826222 - Newtown/RT-25

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 Checked By: _____

Member Primary Data (Continued)

Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
31	M34	N58	N59		Inner Connection Plate	None	None	A36 Gr.36	Typical
32	M35	N60	N61		Inner Connection Plate	None	None	A36 Gr.36	Typical
33	M36	N61	N62		Inner Connection Plate	None	None	A36 Gr.36	Typical
34	M37	N63	N64		RIGID	None	None	RIGID	Typical
35	M38	N65	N66		RIGID	None	None	RIGID	Typical
36	M39	N67	N68		RIGID	None	None	RIGID	Typical
37	M40	N69	N70		RIGID	None	None	RIGID	Typical
38	M41	N71	N72		RIGID	None	None	RIGID	Typical
39	M42	N73	N74		RIGID	None	None	RIGID	Typical
40	M43	N75	N76		RIGID	None	None	RIGID	Typical
41	M44	N77	N78		RIGID	None	None	RIGID	Typical
42	M49	N87	N88		Standoff Arm	None	None	A500 Gr.B Rect	Typical
43	M50	N89	N90		Cross Arm	None	None	A500 Gr.B Rect	Typical
44	M51	N92	N88		Grating Angle	None	None	A36 Gr.36	Typical
45	M52	N88	N93		Grating Angle	None	None	A36 Gr.36	Typical
46	M53	N94	N95		Toe Rail	None	None	A53 Gr.B	Typical
47	M54	N96	N97		Corner Connection Plate	None	None	A36 Gr.36	Typical
48	M55	N97	N98		Corner Connection Plate	None	None	A36 Gr.36	Typical
49	M56	N98	N99		Corner Connection Plate	None	None	A36 Gr.36	Typical
50	M57	N100	N101		Inner Connection Plate	None	None	A36 Gr.36	Typical
51	M58	N101	N102		Inner Connection Plate	None	None	A36 Gr.36	Typical
52	M59	N103	N104		Inner Connection Plate	None	None	A36 Gr.36	Typical
53	M60	N104	N105		Inner Connection Plate	None	None	A36 Gr.36	Typical
54	M61	N106	N107		RIGID	None	None	RIGID	Typical
55	M62	N108	N109		RIGID	None	None	RIGID	Typical
56	M63	N110	N111		RIGID	None	None	RIGID	Typical
57	M64	N112	N113		RIGID	None	None	RIGID	Typical
58	M65	N114	N115		RIGID	None	None	RIGID	Typical
59	M66	N116	N117		RIGID	None	None	RIGID	Typical
60	M67	N118	N119		RIGID	None	None	RIGID	Typical
61	M68	N120	N121		RIGID	None	None	RIGID	Typical
62	A2	N108A	N109A		Pipe Mount	None	None	A53 Gr.B	Typical
63	A3	N110A	N111A		Pipe Mount	None	None	A53 Gr.B	Typical
64	A4	N112A	N113A		Pipe Mount	None	None	A53 Gr.B	Typical
65	M65A	N114A	N115A		Support Rail	None	None	A53 Gr.B	Typical
66	M66A	N116A	N117A		RIGID	None	None	RIGID	Typical
67	M67A	N118A	N119A		RIGID	None	None	RIGID	Typical
68	M68A	N120A	N121A		RIGID	None	None	RIGID	Typical
69	M69	N122	N123		RIGID	None	None	RIGID	Typical
70	B1	N124	N125		Pipe Mount	None	None	A53 Gr.B	Typical
71	B2	N126	N127		Pipe Mount	None	None	A53 Gr.B	Typical
72	B3	N128	N129		Pipe Mount	None	None	A53 Gr.B	Typical
73	B4	N130	N131		Pipe Mount	None	None	A53 Gr.B	Typical
74	M74	N132	N133		Support Rail	None	None	A53 Gr.B	Typical
75	M75	N134	N135		RIGID	None	None	RIGID	Typical
76	M76	N136	N137		RIGID	None	None	RIGID	Typical
77	M77	N138	N139		RIGID	None	None	RIGID	Typical
78	M78	N140	N141		RIGID	None	None	RIGID	Typical
79	C1	N142	N143		Pipe Mount	None	None	A53 Gr.B	Typical
80	C2	N144	N145		Pipe Mount	None	None	A53 Gr.B	Typical
81	C3	N146	N147		Pipe Mount	None	None	A53 Gr.B	Typical
82	C4	N148	N149		Pipe Mount	None	None	A53 Gr.B	Typical
83	M83	N150	N151		Support Rail	None	None	A53 Gr.B	Typical
84	M84	N152	N153		RIGID	None	None	RIGID	Typical
85	M85	N154	N155		RIGID	None	None	RIGID	Typical
86	M86	N156	N157		RIGID	None	None	RIGID	Typical
87	M87	N158	N159		RIGID	None	None	RIGID	Typical



Company : GPD
 Designer : Hlava, Michael
 Job Number : 2021777.826222.03
 Model Name : 826222 - Newtown/RT-25

Nov 24, 2020
 9:40 AM
 Checked By: _____

Member Primary Data (Continued)

Label	I Joint	J Joint	K Joint	Rotat...	Section/Shape	Type	Design ...	Material	Design Rules
88	M88	N160	N161		180 Support Rail Corner Conn...	None	None	A36 Gr.36	Typical
89	M89	N162	N163		180 Support Rail Corner Conn...	None	None	A36 Gr.36	Typical
90	M90	N164	N165		180 Support Rail Corner Conn...	None	None	A36 Gr.36	Typical
91	M91	N166	N167		Platform Reinforcement	None	None	A36 Gr.36	Typical
92	M92	N168	N169		Platform Reinforcement	None	None	A36 Gr.36	Typical
93	M93	N170	N171		Platform Reinforcement	None	None	A36 Gr.36	Typical

Joint Boundary Conditions

Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N1	Reaction	Reaction	Reaction	Reaction	Reaction
2	N44	Reaction	Reaction	Reaction	Reaction	Reaction
3	N87	Reaction	Reaction	Reaction	Reaction	Reaction
4	N167	Reaction	Reaction	Reaction	Reaction	Reaction
5	N169	Reaction	Reaction	Reaction	Reaction	Reaction
6	N171	Reaction	Reaction	Reaction	Reaction	Reaction

Load Combinations

Description	Sol...	PDelta	SR...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4 Dead	Yes	Y		1	1.4	0	0	0	0	0	0	0	0	0	0	0	0	0
2	1.2 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	1.2	2	1	0	0	0	0	0	0	0	0	0	0	0
3	0.9 Dead + 1.0 Wind @ 0° - No Ice	Yes	Y		1	.9	2	1	0	0	0	0	0	0	0	0	0	0	0
4	1.2 Dead + 1.0 Wind @ 30° - No...	Yes	Y		1	1.2	3	1	0	0	0	0	0	0	0	0	0	0	0
5	0.9 Dead + 1.0 Wind @ 30° - No...	Yes	Y		1	.9	3	1	0	0	0	0	0	0	0	0	0	0	0
6	1.2 Dead + 1.0 Wind @ 60° - No...	Yes	Y		1	1.2	4	1	0	0	0	0	0	0	0	0	0	0	0
7	0.9 Dead + 1.0 Wind @ 60° - No...	Yes	Y		1	.9	4	1	0	0	0	0	0	0	0	0	0	0	0
8	1.2 Dead + 1.0 Wind @ 90° - No...	Yes	Y		1	1.2	5	1	0	0	0	0	0	0	0	0	0	0	0
9	0.9 Dead + 1.0 Wind @ 90° - No...	Yes	Y		1	.9	5	1	0	0	0	0	0	0	0	0	0	0	0
10	1.2 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	1.2	6	1	0	0	0	0	0	0	0	0	0	0	0
11	0.9 Dead + 1.0 Wind @ 120° - N...	Yes	Y		1	.9	6	1	0	0	0	0	0	0	0	0	0	0	0
12	1.2 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	1.2	7	1	0	0	0	0	0	0	0	0	0	0	0
13	0.9 Dead + 1.0 Wind @ 150° - N...	Yes	Y		1	.9	7	1	0	0	0	0	0	0	0	0	0	0	0
14	1.2 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	1.2	8	1	0	0	0	0	0	0	0	0	0	0	0
15	0.9 Dead + 1.0 Wind @ 180° - N...	Yes	Y		1	.9	8	1	0	0	0	0	0	0	0	0	0	0	0
16	1.2 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	1.2	9	1	0	0	0	0	0	0	0	0	0	0	0
17	0.9 Dead + 1.0 Wind @ 210° - N...	Yes	Y		1	.9	9	1	0	0	0	0	0	0	0	0	0	0	0
18	1.2 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	1.2	10	1	0	0	0	0	0	0	0	0	0	0	0
19	0.9 Dead + 1.0 Wind @ 240° - N...	Yes	Y		1	.9	10	1	0	0	0	0	0	0	0	0	0	0	0
20	1.2 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	1.2	11	1	0	0	0	0	0	0	0	0	0	0	0
21	0.9 Dead + 1.0 Wind @ 270° - N...	Yes	Y		1	.9	11	1	0	0	0	0	0	0	0	0	0	0	0
22	1.2 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	1.2	12	1	0	0	0	0	0	0	0	0	0	0	0
23	0.9 Dead + 1.0 Wind @ 300° - N...	Yes	Y		1	.9	12	1	0	0	0	0	0	0	0	0	0	0	0
24	1.2 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	1.2	13	1	0	0	0	0	0	0	0	0	0	0	0
25	0.9 Dead + 1.0 Wind @ 330° - N...	Yes	Y		1	.9	13	1	0	0	0	0	0	0	0	0	0	0	0
26	1.2 Dead + 1.0 Ice Wind @ 0° + 1..	Yes	Y		1	1.2	15	1	14	1	1	0	0	0	0	0	0	0	0
27	1.2 Dead + 1.0 Ice Wind @ 30° + ..	Yes	Y		1	1.2	16	1	14	1	1	0	0	0	0	0	0	0	0
28	1.2 Dead + 1.0 Ice Wind @ 60° + ...	Yes	Y		1	1.2	17	1	14	1	1	0	0	0	0	0	0	0	0
29	1.2 Dead + 1.0 Ice Wind @ 90° + ...	Yes	Y		1	1.2	18	1	14	1	1	0	0	0	0	0	0	0	0
30	1.2 Dead + 1.0 Ice Wind @ 120°...	Yes	Y		1	1.2	19	1	14	1	1	0	0	0	0	0	0	0	0
31	1.2 Dead + 1.0 Ice Wind @ 150°...	Yes	Y		1	1.2	20	1	14	1	1	0	0	0	0	0	0	0	0
32	1.2 Dead + 1.0 Ice Wind @ 180°...	Yes	Y		1	1.2	21	1	14	1	1	0	0	0	0	0	0	0	0
33	1.2 Dead + 1.0 Ice Wind @ 210°...	Yes	Y		1	1.2	22	1	14	1	1	0	0	0	0	0	0	0	0
34	1.2 Dead + 1.0 Ice Wind @ 240°...	Yes	Y		1	1.2	23	1	14	1	1	0	0	0	0	0	0	0	0
35	1.2 Dead + 1.0 Ice Wind @ 270°...	Yes	Y		1	1.2	24	1	14	1	1	0	0	0	0	0	0	0	0
36	1.2 Dead + 1.0 Ice Wind @ 300°...	Yes	Y		1	1.2	25	1	14	1	1	0	0	0	0	0	0	0	0



Load Combinations (Continued)

	Description	Sol	PD	Delta	SR	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa
94	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y			1	1.2	31	1.5	10	.063	0	0	0	0	0	0	0	0
95	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y			1	1.2	31	1.5	11	.063	0	0	0	0	0	0	0	0
96	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y			1	1.2	31	1.5	12	.063	0	0	0	0	0	0	0	0
97	1.2 Dead + 1.5 Live_M - B1 + 1.0..	Yes	Y			1	1.2	31	1.5	13	.063	0	0	0	0	0	0	0	0
98	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	2	.063	0	0	0	0	0	0	0	0
99	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	3	.063	0	0	0	0	0	0	0	0
100	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	4	.063	0	0	0	0	0	0	0	0
101	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	5	.063	0	0	0	0	0	0	0	0
102	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	6	.063	0	0	0	0	0	0	0	0
103	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	7	.063	0	0	0	0	0	0	0	0
104	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	8	.063	0	0	0	0	0	0	0	0
105	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	9	.063	0	0	0	0	0	0	0	0
106	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	10	.063	0	0	0	0	0	0	0	0
107	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	11	.063	0	0	0	0	0	0	0	0
108	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	12	.063	0	0	0	0	0	0	0	0
109	1.2 Dead + 1.5 Live_M - B2 + 1.0..	Yes	Y			1	1.2	32	1.5	13	.063	0	0	0	0	0	0	0	0
110	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	2	.063	0	0	0	0	0	0	0	0
111	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	3	.063	0	0	0	0	0	0	0	0
112	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	4	.063	0	0	0	0	0	0	0	0
113	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	5	.063	0	0	0	0	0	0	0	0
114	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	6	.063	0	0	0	0	0	0	0	0
115	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	7	.063	0	0	0	0	0	0	0	0
116	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	8	.063	0	0	0	0	0	0	0	0
117	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	9	.063	0	0	0	0	0	0	0	0
118	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	10	.063	0	0	0	0	0	0	0	0
119	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	11	.063	0	0	0	0	0	0	0	0
120	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	12	.063	0	0	0	0	0	0	0	0
121	1.2 Dead + 1.5 Live_M - B3 + 1.0..	Yes	Y			1	1.2	33	1.5	13	.063	0	0	0	0	0	0	0	0
122	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	2	.063	0	0	0	0	0	0	0	0
123	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	3	.063	0	0	0	0	0	0	0	0
124	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	4	.063	0	0	0	0	0	0	0	0
125	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	5	.063	0	0	0	0	0	0	0	0
126	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	6	.063	0	0	0	0	0	0	0	0
127	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	7	.063	0	0	0	0	0	0	0	0
128	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	8	.063	0	0	0	0	0	0	0	0
129	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	9	.063	0	0	0	0	0	0	0	0
130	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	10	.063	0	0	0	0	0	0	0	0
131	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	11	.063	0	0	0	0	0	0	0	0
132	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	12	.063	0	0	0	0	0	0	0	0
133	1.2 Dead + 1.5 Live_M - B4 + 1.0..	Yes	Y			1	1.2	34	1.5	13	.063	0	0	0	0	0	0	0	0
134	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	2	.063	0	0	0	0	0	0	0	0
135	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	3	.063	0	0	0	0	0	0	0	0
136	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	4	.063	0	0	0	0	0	0	0	0
137	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	5	.063	0	0	0	0	0	0	0	0
138	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	6	.063	0	0	0	0	0	0	0	0
139	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	7	.063	0	0	0	0	0	0	0	0
140	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	8	.063	0	0	0	0	0	0	0	0
141	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	9	.063	0	0	0	0	0	0	0	0
142	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	10	.063	0	0	0	0	0	0	0	0
143	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	11	.063	0	0	0	0	0	0	0	0
144	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	12	.063	0	0	0	0	0	0	0	0
145	1.2 Dead + 1.5 Live_M - C1 + 1.0..	Yes	Y			1	1.2	35	1.5	13	.063	0	0	0	0	0	0	0	0
146	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y			1	1.2	36	1.5	2	.063	0	0	0	0	0	0	0	0
147	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y			1	1.2	36	1.5	3	.063	0	0	0	0	0	0	0	0
148	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y			1	1.2	36	1.5	4	.063	0	0	0	0	0	0	0	0
149	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y			1	1.2	36	1.5	5	.063	0	0	0	0	0	0	0	0
150	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y			1	1.2	36	1.5	6	.063	0	0	0	0	0	0	0	0



Load Combinations (Continued)

	Description	Sol	PDelta	SR	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B	Fa	B
151	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	7	.063	0	0	0	0	0	0	0	0	0	0	0
152	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	8	.063	0	0	0	0	0	0	0	0	0	0	0
153	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	9	.063	0	0	0	0	0	0	0	0	0	0	0
154	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	10	.063	0	0	0	0	0	0	0	0	0	0	0
155	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	11	.063	0	0	0	0	0	0	0	0	0	0	0
156	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	12	.063	0	0	0	0	0	0	0	0	0	0	0
157	1.2 Dead + 1.5 Live_M - C2 + 1.0..	Yes	Y		1	1.2	36	1.5	13	.063	0	0	0	0	0	0	0	0	0	0	0
158	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	2	.063	0	0	0	0	0	0	0	0	0	0	0
159	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	3	.063	0	0	0	0	0	0	0	0	0	0	0
160	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	4	.063	0	0	0	0	0	0	0	0	0	0	0
161	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	5	.063	0	0	0	0	0	0	0	0	0	0	0
162	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	6	.063	0	0	0	0	0	0	0	0	0	0	0
163	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	7	.063	0	0	0	0	0	0	0	0	0	0	0
164	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	8	.063	0	0	0	0	0	0	0	0	0	0	0
165	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	9	.063	0	0	0	0	0	0	0	0	0	0	0
166	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	10	.063	0	0	0	0	0	0	0	0	0	0	0
167	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	11	.063	0	0	0	0	0	0	0	0	0	0	0
168	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	12	.063	0	0	0	0	0	0	0	0	0	0	0
169	1.2 Dead + 1.5 Live_M - C3 + 1.0..	Yes	Y		1	1.2	37	1.5	13	.063	0	0	0	0	0	0	0	0	0	0	0
170	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	2	.063	0	0	0	0	0	0	0	0	0	0	0
171	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	3	.063	0	0	0	0	0	0	0	0	0	0	0
172	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	4	.063	0	0	0	0	0	0	0	0	0	0	0
173	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	5	.063	0	0	0	0	0	0	0	0	0	0	0
174	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	6	.063	0	0	0	0	0	0	0	0	0	0	0
175	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	7	.063	0	0	0	0	0	0	0	0	0	0	0
176	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	8	.063	0	0	0	0	0	0	0	0	0	0	0
177	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	9	.063	0	0	0	0	0	0	0	0	0	0	0
178	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	10	.063	0	0	0	0	0	0	0	0	0	0	0
179	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	11	.063	0	0	0	0	0	0	0	0	0	0	0
180	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	12	.063	0	0	0	0	0	0	0	0	0	0	0
181	1.2 Dead + 1.5 Live_M - C4 + 1.0..	Yes	Y		1	1.2	38	1.5	13	.063	0	0	0	0	0	0	0	0	0	0	0
182	1.2 Dead + 1.5 Live_V - M1 (Start)	Yes	Y		1	1.2	39	1.5	0		0	0	0	0	0	0	0	0	0	0	0
183	1.2 Dead + 1.5 Live_V - M1 (Mid...	Yes	Y		1	1.2	40	1.5	0		0	0	0	0	0	0	0	0	0	0	0
184	1.2 Dead + 1.5 Live_V - M1 (End)	Yes	Y		1	1.2	41	1.5	0		0	0	0	0	0	0	0	0	0	0	0
185	1.2 Dead + 1.5 Live_V - M5 (Start)	Yes	Y		1	1.2	42	1.5	0		0	0	0	0	0	0	0	0	0	0	0
186	1.2 Dead + 1.5 Live_V - M5 (Mid...	Yes	Y		1	1.2	43	1.5	0		0	0	0	0	0	0	0	0	0	0	0
187	1.2 Dead + 1.5 Live_V - M5 (End)	Yes	Y		1	1.2	44	1.5	0		0	0	0	0	0	0	0	0	0	0	0
188	1.2 Dead + 1.5 Live_V - M25 (Sta...	Yes	Y		1	1.2	45	1.5	0		0	0	0	0	0	0	0	0	0	0	0
189	1.2 Dead + 1.5 Live_V - M25 (Mi...	Yes	Y		1	1.2	46	1.5	0		0	0	0	0	0	0	0	0	0	0	0
190	1.2 Dead + 1.5 Live_V - M25 (End)	Yes	Y		1	1.2	47	1.5	0		0	0	0	0	0	0	0	0	0	0	0
191	1.2 Dead + 1.5 Live_V - M29 (Sta...	Yes	Y		1	1.2	48	1.5	0		0	0	0	0	0	0	0	0	0	0	0
192	1.2 Dead + 1.5 Live_V - M29 (Mi...	Yes	Y		1	1.2	49	1.5	0		0	0	0	0	0	0	0	0	0	0	0
193	1.2 Dead + 1.5 Live_V - M29 (End)	Yes	Y		1	1.2	50	1.5	0		0	0	0	0	0	0	0	0	0	0	0
194	1.2 Dead + 1.5 Live_V - M49 (Sta...	Yes	Y		1	1.2	51	1.5	0		0	0	0	0	0	0	0	0	0	0	0
195	1.2 Dead + 1.5 Live_V - M49 (Mi...	Yes	Y		1	1.2	52	1.5	0		0	0	0	0	0	0	0	0	0	0	0
196	1.2 Dead + 1.5 Live_V - M49 (End)	Yes	Y		1	1.2	53	1.5	0		0	0	0	0	0	0	0	0	0	0	0
197	1.2 Dead + 1.5 Live_V - M53 (Sta...	Yes	Y		1	1.2	54	1.5	0		0	0	0	0	0	0	0	0	0	0	0
198	1.2 Dead + 1.5 Live_V - M53 (Mi...	Yes	Y		1	1.2	55	1.5	0		0	0	0	0	0	0	0	0	0	0	0
199	1.2 Dead + 1.5 Live_V - M53 (End)	Yes	Y		1	1.2	56	1.5	0		0	0	0	0	0	0	0	0	0	0	0

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu...	Area(M...	Surface...
1	Dead	DL		-1			30		3	
2	No Ice Wind 0 deg	None					30	54		
3	No Ice Wind 30 deg	None					60	92		



Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribu..	Area(M...)	Surface..
4	No Ice Wind 60 deg	None					60	108		
5	No Ice Wind 90 deg	None					30	46		
6	No Ice Wind 120 deg	None					60	108		
7	No Ice Wind 150 deg	None					60	92		
8	No Ice Wind 180 deg	None					30	54		
9	No Ice Wind 210 deg	None					60	92		
10	No Ice Wind 240 deg	None					60	108		
11	No Ice Wind 270 deg	None					30	46		
12	No Ice Wind 300 deg	None					60	108		
13	No Ice Wind 330 deg	None					60	92		
14	Ice Weight	None					30	57	3	
15	Ice Wind 0 deg	None					30	54		
16	Ice Wind 30 deg	None					60	92		
17	Ice Wind 60 deg	None					60	108		
18	Ice Wind 90 deg	None					30	46		
19	Ice Wind 120 deg	None					60	108		
20	Ice Wind 150 deg	None					60	92		
21	Ice Wind 180 deg	None					30	54		
22	Ice Wind 210 deg	None					60	92		
23	Ice Wind 240 deg	None					60	108		
24	Ice Wind 270 deg	None					30	46		
25	Ice Wind 300 deg	None					60	108		
26	Ice Wind 330 deg	None					60	92		
27	Live Load - A1	None					1			
28	Live Load - A2	None					1			
29	Live Load - A3	None					1			
30	Live Load - A4	None					1			
31	Live Load - B1	None					1			
32	Live Load - B2	None					1			
33	Live Load - B3	None					1			
34	Live Load - B4	None					1			
35	Live Load - C1	None					1			
36	Live Load - C2	None					1			
37	Live Load - C3	None					1			
38	Live Load - C4	None					1			
39	Live Load - M1 (Start)	None					1			
40	Live Load - M1 (Middle)	None					1			
41	Live Load - M1 (End)	None					1			
42	Live Load - M5 (Start)	None					1			
43	Live Load - M5 (Middle)	None					1			
44	Live Load - M5 (End)	None					1			
45	Live Load - M25 (Start)	None					1			
46	Live Load - M25 (Middle)	None					1			
47	Live Load - M25 (End)	None					1			
48	Live Load - M29 (Start)	None					1			
49	Live Load - M29 (Middle)	None					1			
50	Live Load - M29 (End)	None					1			
51	Live Load - M49 (Start)	None					1			
52	Live Load - M49 (Middle)	None					1			
53	Live Load - M49 (End)	None					1			
54	Live Load - M53 (Start)	None					1			
55	Live Load - M53 (Middle)	None					1			
56	Live Load - M53 (End)	None					1			
57	BLC 1 Transient Area Loads	None						18		
58	BLC 14 Transient Area Loads	None						18		

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	m...	1187.251	15	573.642	29	2974.291	20	.862	165	2.348	5	.848	51
2		min	-2097.086	2	71.107	185	-1407.173	9	-.006	39	-2.35	16	-.103	165
3	N44	m...	1037.073	15	571.494	188	1509.573	21	-.021	85	2.35	13	.798	73
4		min	-1943.683	2	71.116	191	-3078.765	8	-.892	103	-2.35	24	-.151	103
5	N87	m...	3514.239	14	573.469	26	1264.169	20	.578	155	2.644	21	-.107	197
6		min	-1697.799	3	71.08	197	-1261.893	8	-.522	113	-2.645	8	-.853	26
7	N167	m...	-663.987	3	2792.037	32	62.654	21	0	153	0	111	0	199
8		min	-2789.734	32	619.391	3	-62.692	9	0	111	0	153	0	1
9	N169	m...	1396.965	35	2784.193	35	-601.207	9	0	163	0	163	0	61
10		min	317.728	9	635.508	9	-2405.734	35	0	61	0	61	0	163
11	N171	m...	1395.403	29	2781.183	29	2403.722	28	0	71	0	71	0	71
12		min	328.036	21	655.526	21	604.775	19	0	8	0	8	0	8
13	Totals:	m...	5364.875	14	9846.135	27	5399.655	21						
14		min	-5364.873	3	2860.864	17	-5399.656	8						

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

Member	Shape	Code Check Actual	Code Check Allowable	Ratio (Act./Allow.)	Loc[in]	LC	Shear Check	Shear Check Allowable	Ratio (Act./Allow.)	Loc[in]	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Egn	
1	M1	HSS4x4x1/4	0.149	1.05	0.142*	0	4	0.051	1.05	0.049*	0	130476.44	155250	18.22	18.22	2.12	H1-1b
2	M2	HSS4x4x1/4	0.112	1.05	0.107*	30.5	35	0.034	1.05	0.032*	50.83	139590.48	155250	18.22	18.22	1.358	H1-1b
3	M3	L2x2x4	0.134	1.05	0.128*	0	20	0.009	1.05	0.009*	50.81	20846.253	30585.6	0.691	1.577	2.166	H2-1
4	M4	L2x2x4	0.141	1.05	0.134*	0	32	0.01	1.05	0.01*	0	20846.248	30585.6	0.691	1.577	2.962	H2-1
5	M5	P3 STD	0.093	1.05	0.089*	63.44	57	0.064	1.05	0.061*	56.19	22513.302	70196.802	6.124	6.124	2.439	H1-1b
6	M6	PL6x1/2	0.059	1.05	0.056*	3.25	8	0.294	1.05	0.28*	3.25	94639.954	97200	1.012	12.15	1.832	H1-1b
7	M7	PL6x1/2	0.202	1.05	0.192*	6.5	8	0.101	1.05	0.096*	6.5	63416.182	97200	1.012	12.15	1.19	H1-1b
8	M8	PL6x1/2	0.038	1.05	0.036*	0	12	0.275	1.05	0.262*	0	94639.954	97200	1.012	12.15	1.491	H1-1b
9	M9	PL6x3/8	0.267	1.05	0.254*	2.5	8	0.074	1.05	0.07*	2.5	65155.747	72900	0.57	9.113	2.273	H1-1b
10	M10	PL6x3/8	0.321	1.05	0.306*	2.148	8	0.129	1.05	0.123*	0	68437.107	72900	0.57	9.113	1.453	H1-1b
11	M11	PL6x3/8	0.162	1.05	0.154*	2.5	4	0.072	1.05	0.069*	2.5	65155.747	72900	0.57	9.113	1.4	H1-1b
12	M12	PL6x3/8	0.269	1.05	0.256*	2.148	14	0.117	1.05	0.111*	0	68437.107	72900	0.57	9.113	1.595	H1-1b
13	A1	P2Std	0.132	1.05	0.126*	69	16	0.058	1.05	0.055*	69	15814.703	33862.5	1.998	1.998	2.792	H1-1b
14	M25	HSS4x4x1/4	0.148	1.05	0.141*	0	24	0.051	1.05	0.049*	0	130476.44	155250	18.22	18.22	2.124	H1-1b
15	M26	HSS4x4x1/4	0.112	1.05	0.107*	30.5	29	0.033	1.05	0.031*	55.92	139590.48	155250	18.22	18.22	1.358	H1-1b
16	M27	L2x2x4	0.128	1.05	0.122*	0	2	0.009	1.05	0.009*	50.81	20846.255	30585.6	0.691	1.577	2.256	H2-1
17	M28	L2x2x4	0.141	1.05	0.134*	0	35	0.01	1.05	0.01*	0	20846.251	30585.6	0.691	1.577	2.968	H2-1
18	M29	P3 STD	0.093	1.05	0.089*	63.44	109	0.067	1.05	0.064*	56.19	22513.302	70196.802	6.124	6.124	2.437	H1-1b
19	M30	PL6x1/2	0.055	1.05	0.052*	3.25	16	0.298	1.05	0.284*	3.25	94639.954	97200	1.012	12.15	1.807	H1-1b
20	M31	PL6x1/2	0.184	1.05	0.175*	6.5	16	0.101	1.05	0.096*	6.5	63416.182	97200	1.012	12.15	1.178	H1-1b
21	M32	PL6x1/2	0.042	1.05	0.04*	0	20	0.278	1.05	0.265*	0	94639.954	97200	1.012	12.15	1.473	H1-1b
22	M33	PL6x3/8	0.237	1.05	0.226*	2.5	16	0.074	1.05	0.07*	2.5	65155.747	72900	0.57	9.113	2.816	H1-1b
23	M34	PL6x3/8	0.29	1.05	0.276*	2.148	16	0.13	1.05	0.124*	0	68437.107	72900	0.57	9.113	1.471	H1-1b
24	M35	PL6x3/8	0.186	1.05	0.177*	2.5	12	0.079	1.05	0.075*	2.5	65155.747	72900	0.57	9.113	1.405	H1-1b
25	M36	PL6x3/8	0.299	1.05	0.285*	2.148	20	0.119	1.05	0.113*	0	68437.107	72900	0.57	9.113	2.914	H1-1b
26	M49	HSS4x4x1/4	0.165	1.05	0.157*	0	20	0.051	1.05	0.049*	0	130476.44	155250	18.22	18.22	2.091	H1-1b
27	M50	HSS4x4x1/4	0.111	1.05	0.106*	30.5	33	0.034	1.05	0.032*	30.5	139590.48	155250	18.22	18.22	1.359	H1-1b
28	M51	L2x2x4	0.129	1.05	0.123*	50.81	32	0.009	1.05	0.009*	50.81	20846.258	30585.6	0.691	1.577	2.923	H2-1
29	M52	L2x2x4	0.14	1.05	0.133*	0	28	0.01	1.05	0.01*	0	20846.255	30585.6	0.691	1.577	2.935	H2-1
30	M53	P3 STD	0.093	1.05	0.089*	63.44	149	0.067	1.05	0.064*	56.19	22513.302	70196.802	6.124	6.124	2.437	H1-1b
31	M54	PL6x1/2	0.056	1.05	0.053*	3.25	24	0.302	1.05	0.288*	3.25	94639.954	97200	1.012	12.15	1.806	H1-1b
32	M55	PL6x1/2	0.19	1.05	0.181*	6.5	24	0.101	1.05	0.096*	6.5	63416.182	97200	1.012	12.15	1.22	H1-1b
33	M56	PL6x1/2	0.039	1.05	0.037*	1.625	14	0.278	1.05	0.265*	0	94639.954	97200	1.012	12.15	1.87	H1-1b
34	M57	PL6x3/8	0.249	1.05	0.237*	2.5	24	0.075	1.05	0.071*	2.5	65155.747	72900	0.57	9.113	2.621	H1-1b
35	M58	PL6x3/8	0.29	1.05	0.276*	2.148	24	0.131	1.05	0.125*	0	68437.107	72900	0.57	9.113	1.498	H1-1b
36	M59	PL6x3/8	0.185	1.05	0.176*	2.5	20	0.071	1.05	0.068*	2.5	65155.747	72900	0.57	9.113	1.388	H1-1b
37	M60	PL6x3/8	0.27	1.05	0.257*	2.148	4	0.119	1.05	0.113*	0	68437.107	72900	0.57	9.113	2.192	H1-1b
38	A2	P2Std	0.535	1.05	0.51*	48	14	0.04	1.05	0.038*	48	15814.703	33862.5	1.998	1.998	1.544	H1-1b
39	A3	P2Std	0.191	1.05	0.182*	69	14	0.034	1.05	0.032*	69	15814.703	33862.5	1.998	1.998	2.809	H1-1b
40	A4	P2Std	0.215	1.05	0.205*	48	2	0.057	1.05	0.054*	48	15814.703	33862.5	1.998	1.998	1.69	H1-1b
41	M65A	P2Std	0.091	1.05	0.087*	61.63	61	0.095	1.05	0.09*	10.88	4969.533	33862.5	1.998	1.998	3.062	H1-1b
42	B1	P2Std	0.14	1.05	0.133*	69	24	0.06	1.05	0.057*	27	15814.703	33862.5	1.998	1.998	3.476	H1-1b
43	B2	P2Std	0.533	1.05	0.508*	48	22	0.042	1.05	0.04*	48	15814.703	33862.5	1.998	1.998	1.54	H1-1b
44	B3	P2Std	0.188	1.05	0.179*	69	20	0.031	1.05	0.03*	69	15814.703	33862.5	1.998	1.998	2.511	H1-1b
45	B4	P2Std	0.207	1.05	0.197*	48	8	0.056	1.05	0.053*	48	15814.703	33862.5	1.998	1.998	2.085	H1-1b
46	M74	P2Std	0.092	1.05	0.088*	61.63	101	0.094	1.05	0.09*	163.1	4969.533	33862.5	1.998	1.998	3.073	H1-1b
47	C1	P2Std	0.144	1.05	0.137*	69	8	0.052	1.05	0.05*	69	15814.703	33862.5	1.998	1.998	2.752	H1-1b
48	C2	P2Std	0.533	1.05	0.508*	48	6	0.038	1.05	0.036*	48	15814.703	33862.5	1.998	1.998	1.553	H1-1b
49	C3	P2Std	0.174	1.05	0.166*	69	6	0.036	1.05	0.034*	69	15814.703	33862.5	1.998	1.998	2.801	H1-1b
50	C4	P2Std	0.208	1.05	0.198*	48	20	0.054	1.05	0.051*	48	15814.703	33862.5	1.998	1.998	1.831	H1-1b
51	M83	P2Std	0.092	1.05	0.088*	16.31	14	0.104	1.05	0.099*	10.88	4969.533	33862.5	1.998	1.998	4.011	H1-1b
52	M88	L2.5x2.5x4	0.129	1.05	0.123*	18.15	16	0.034	1.05	0.032*	0	35782.995	38556	1.114	2.537	2.2	H2-1
53	M89	L2.5x2.5x4	0.124	1.05	0.118*	18.15	24	0.034	1.05	0.032*	0	35782.991	38556	1.114	2.537	2.197	H2-1
54	M90	L2.5x2.5x4	0.136	1.05	0.13*	18.15	8	0.039	1.05	0.037*	0	35782.995	38556	1.114	2.537	2.204	H2-1
55	M91	LL2.5x2.5x3x4	0.129	1.05	0.123*	86.28	32	0.004	1.05	0.004*	0	30616.918	58482	4.246	2.574	1	H1-1b*
56	M92	LL2.5x2.5x3x4	0.129	1.05	0.123*	86.28	35	0.004	1.05	0.004*	86.28	30616.918	58482	4.246	2.574	1.136	H1-1b*
57	M93	LL2.5x2.5x3x4	0.128	1.05	0.122*	86.28	29	0.004	1.05	0.004*	0	30616.918	58482	4.246	2.574	1.136	H1-1b*

*Rating per TIA-222-H, Section 15.5

APPENDIX D
ADDITIONAL CALCULATIONS



TIA-222-H CONNECTION CHECK
Mount to Tower Connection - Typ. All Sectors
2021777.826222.03

Bolt Information	
Bolt Diameter (d)	0.625 in
Net Tensile Area (A _n)	0.226 in ²
# of Bolts Total (n)	4
Bolt Distance Up-Down	6 in
Bolt Distance Left-Right	6 in
Bolt Grade	A325N
Bolt Tensile Strength (F _{ub})	120 ksi

Flange Information	
Height (h)	8 in
Width (w)	8 in
Thickness (t)	0.75 in
Steel Grade	A36
Plate Yield Strength (F _y)	36 ksi
Support Arm Height	4 in
Support Arm Width	4 in

RISA 3D Reactions (Up-Down)	
Moment (M)	0.83 k-ft
Axial (T)	3.31 kips
Shear (V)	0.55 kips

RISA 3D Reactions (Left-Right)	
Moment (M)	2.64 k-ft
Axial (T)	1.12 kips
Shear (V)	1.28 kips

Bolt Capacity (Up-Down)	
Nominal Tensile Strength (R _{nt})	27.120 kips
Nominal Shear Strength (R _{nv})	18.41 kips
Bolt Tensile Force (T _{ub})	1.66 kips
Bolt Shear Force (V _{ub})	0.138 kips
T _{ub} /φR _{nt}	0.07782
V _{ub} /φR _{nv}	0.00955
(V _{ub} /φR _{nv}) ² +(T _{ub} /φR _{nt}) ²	0.00645
Bolt Capacity =	7.8% OK

Bolt Capacity (Left-Right)	
Nominal Tensile Strength (R _{nt})	27.120 kips
Nominal Shear Strength (R _{nv})	18.41 kips
Bolt Tensile Force (T _{ub})	2.92 kips
Bolt Shear Force (V _{ub})	0.320 kips
T _{ub} /φR _{nt}	0.13688
V _{ub} /φR _{nv}	0.02207
(V _{ub} /φR _{nv}) ² +(T _{ub} /φR _{nt}) ²	0.02019
Bolt Capacity =	13.7% OK

*Rating per TIA-222-H, Section 15.5

*Rating per TIA-222-H, Section 15.5

Plate Capacity (Up-Down)	
Bolt Circle (D _{BC})	8.485 in
Effective Width (B _{eff})	7.48 in
Flexural Moment (M _u)	3.32 k-in
Flexural Strength (φM _n)	34.10 k-in
Plate Capacity=	9.3% OK

Plate Capacity (Left-Right)	
Bolt Circle (D _{BC})	8.485 in
Effective Width (B _{eff})	7.48 in
Flexural Moment (M _u)	5.85 k-in
Flexural Strength (φM _n)	34.10 k-in
Plate Capacity=	16.3% OK

*Rating per TIA-222-H, Section 15.5

*Rating per TIA-222-H, Section 15.5



TIA-222-H CONNECTION CHECK
Reinforcement to Tower Connection - Typ. All Sectors
2021777.826222.03

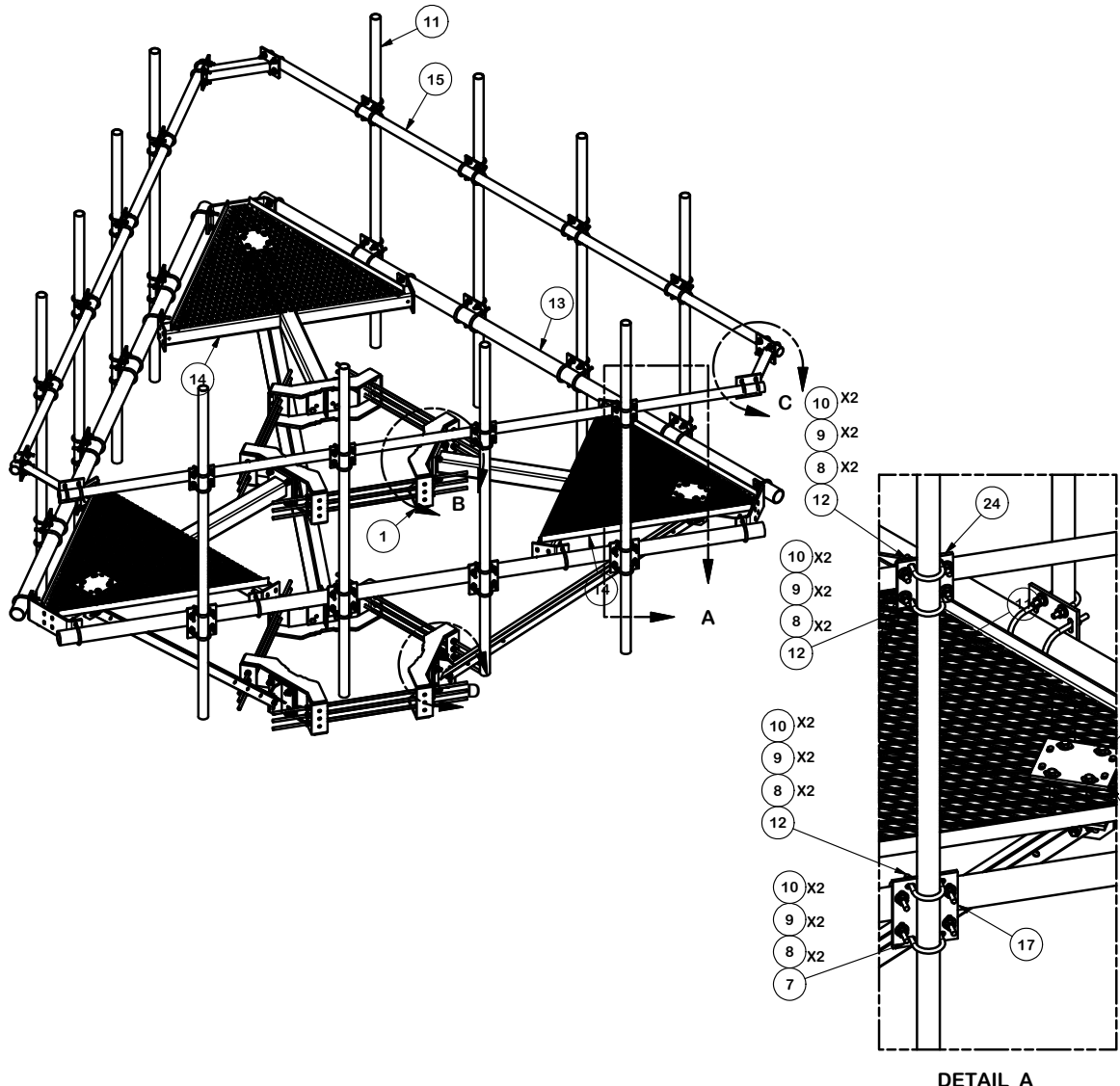
Bolt Information		
Bolt Diameter (d)	0.625	in
Net Tensile Area (A _n)	0.226	in ²
# of Bolts Total (n)	4	
Bolt Distance Up-Down	6	in
Bolt Distance Left-Right	6	in
Bolt Grade	A325N	
Bolt Tensile Strength (F _{ub})	120	ksi

RISA 3D Reactions		
Moment (M)	0.00	k-ft
Axial (T)	-2.79	kips
Shear (V)	2.79	kips

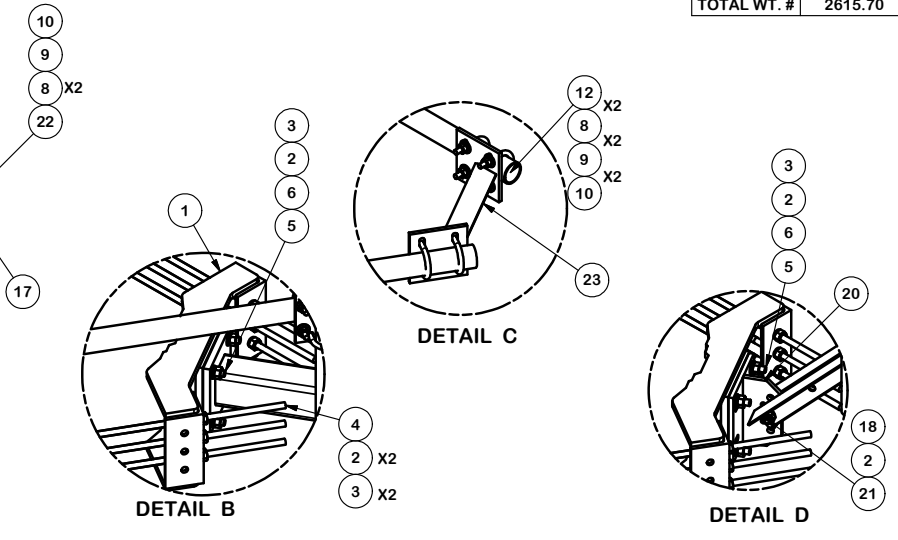
Bolt Capacity		
Nominal Tensile Strength (R _{nt})	27.120	kips
Nominal Shear Strength (R _{nv})	18.41	kips
Bolt Tensile Force (T _{ub})	-0.70	kips
Bolt Shear Force (V _{ub})	0.698	kips
$T_{ub}/\phi R_{nt}$	-0.03266	
$V_{ub}/\phi R_{nv}$	0.04815	
$(V_{ub}/\phi R_{nv})^2 + (T_{ub}/\phi R_{nt})^2$	0.00355	
Bolt Capacity =	4.8%	OK

*Rating per TIA-222-H, Section 15.5

APPENDIX E
SUPPLEMENTAL DRAWINGS



PARTS LIST						
ITEM	QTY	PART NO.	PART DESCRIPTION	LENGTH	UNIT WT.	NET WT.
1	6	X-LWRM	RING MOUNT WELDMENT		68.81	412.85
2	66	G58LW	5/8" HDG LOCKWASHER		0.03	1.72
3	60	A58NUT	5/8" HDG A325 HEX NUT		0.13	7.79
4	18	G58R-24	5/8" x 24" THREADED ROD (HDG.)		2.09	37.63
4	18	G58R-48	5/8" x 48" THREADED ROD (HDG.)		4.18	75.27
5	24	A58234	5/8" x 2-3/4" HDG A325 HEX BOLT	2 3/4 in	0.36	8.54
6	24	A58FW	5/8" HDG A325 FLATWASHER		0.03	0.82
7	36	X-UB1306	1/2" X 3-5/8" X 6" X 3" U-BOLT (HDG.)		0.83	29.82
8	264	G12FW	1/2" HDG USS FLATWASHER	3/32 in	0.03	9.00
9	252	G12LW	1/2" HDG LOCKWASHER	1/8 in	0.01	3.50
10	252	G12NUT	1/2" HDG HEAVY 2H HEX NUT		0.07	18.05
11	12	P296	2-3/8" X 96" SCH. 40 GALVANIZED PIPE	96 in	30.76	369.08
12	84	X-UB1212	1/2" X 2-1/2" X 4-1/2" X 2" U-BOLT (HDG.)		0.60	50.17
13	3	P3174	3-1/2" X 174" SCH 40 GALVANIZED PIPE	174 in	109.97	329.90
14	3	X-SV196L	LONG PLATFORM WELDMENT		230.94	692.81
15	3	P2174	2-3/8" OD X 174" SCH 40 GALVANIZED PIPE	174 in	55.75	167.24
17	15	SCX4	CROSSOVER PLATE	8 1/2 in	6.02	90.32
18	6	G58NUT	5/8" HDG HEAVY 2H HEX NUT		0.13	0.78
19	6	X-254923	PLATFORM REINFORCEMENT KIT ANGLE	84 in	22.83	137.00
20	6	X-TBW	T-BRACKET WELDMENT		13.60	81.60
21	6	G5802	5/8" x 2" HDG HEX BOLT GR5		0.27	1.62
22	12	G12065	1/2" x 6-1/2" HDG HEX BOLT GR5 FULL THREAD	5 1/2 in	0.41	4.91
23	3	X-AHCP	ANGLE HANDRAIL CORNER PLATE		12.92	38.76
24	12	SCX1	CROSSOVER PLATE 2-3/8" X 2-3/8"	6 in	3.71	44.50
					TOTAL WT. #	2615.70



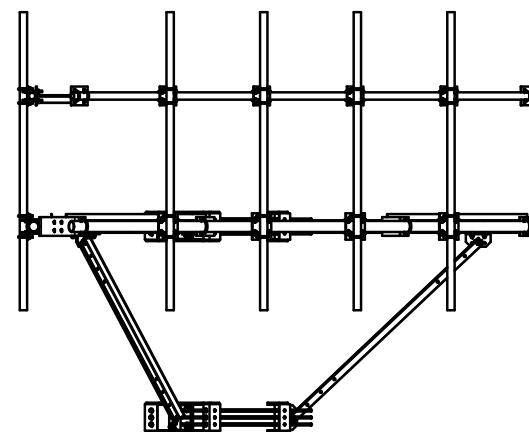
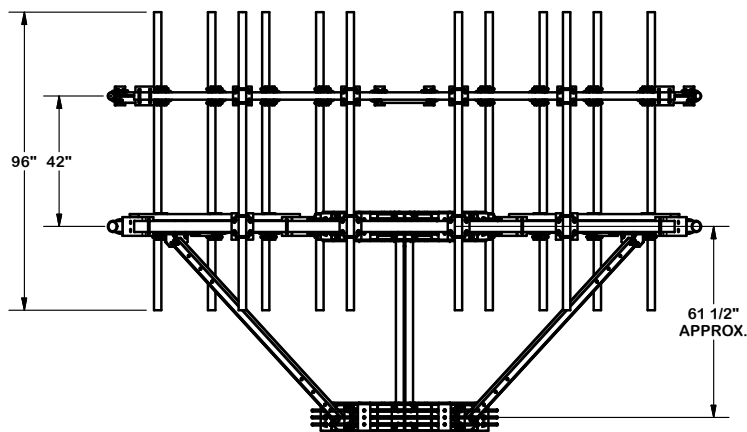
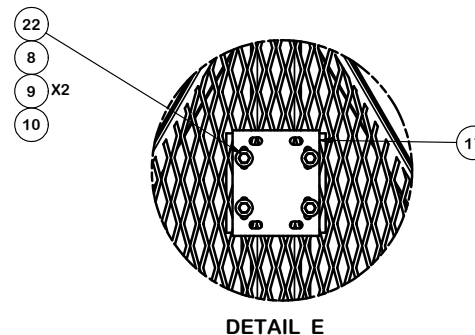
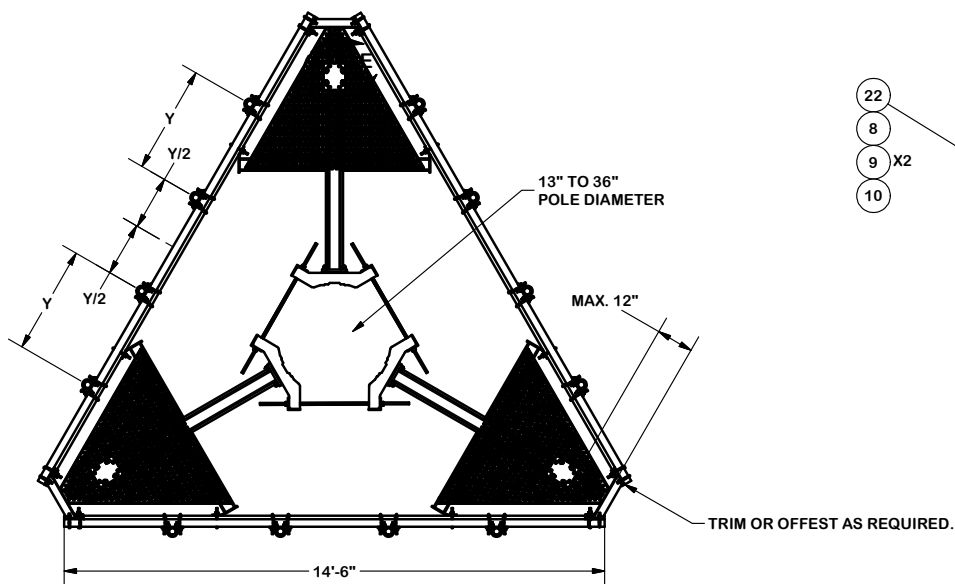
REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018
REVISION HISTORY				

TOLERANCE NOTES
 TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
 THE DATA AND TECHNIQUES CONTAINED IN THIS DRAWING ARE PROPRIETARY INFORMATION OF VALMONT INDUSTRIES AND CONSIDERED A TRADE SECRET. ANY USE OR DISCLOSURE WITHOUT THE CONSENT OF VALMONT INDUSTRIES IS STRICTLY PROHIBITED.

DESCRIPTION 14' 6" LOW PROFILE PLATFORM WITH TWELVE 2-3/8" ANTENNA MOUNTING PIPES, AND HANDRAIL	
CPD NO. 4488	DRAWN BY CEK 7/15/2014
CLASS 81	SUB 02
DRAWING USAGE CUSTOMER	ENG. APPROVAL BMC 7/23/2014

 A valmont COMPANY	Locations: New York, NY Atlanta, GA Los Angeles, CA Plymouth, IN Salem, OR Dallas, TX
	Engineering Support Team: 1-888-753-7446
PART NO. RMQLP-496-HK	DWG. NO. RMQLP-496-HK



TOLERANCE NOTES

TOLERANCES ON DIMENSIONS, UNLESS OTHERWISE NOTED ARE:
 SAWED, SHEARED AND GAS CUT EDGES ($\pm 0.030"$)
 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

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DESCRIPTION
 14' 6" LOW PROFILE PLATFORM
 WITH TWELVE 2-3/8" ANTENNA MOUNTING
 PIPES, AND HANDRAIL



Engineering Support Team:
 1-888-753-7446

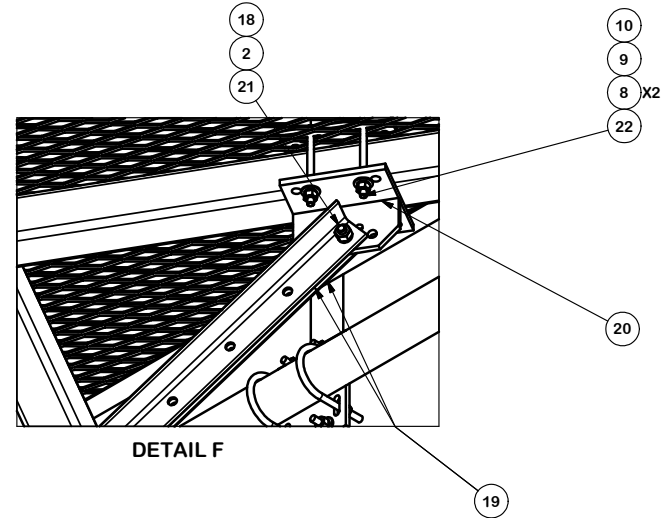
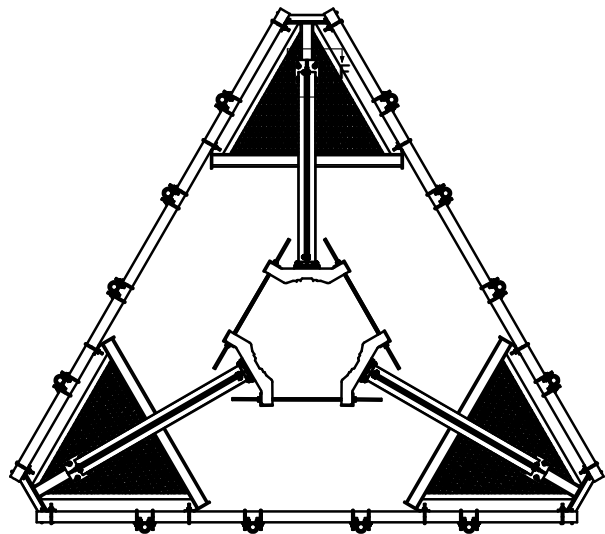
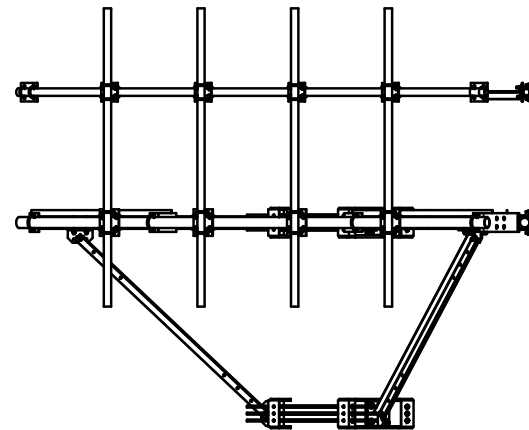
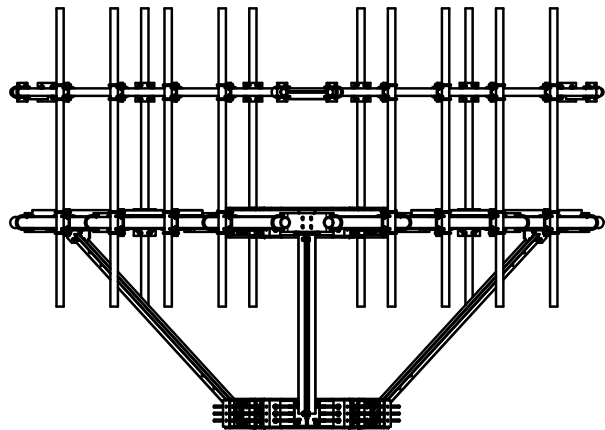
Locations:
 New York, NY
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 Salem, OR
 Dallas, TX

PART NO. RMQLP-496-HK

DWG. NO. RMQLP-496-HK

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

CPD NO. 4488	DRAWN BY CEK 7/15/2014	ENG. APPROVAL
CLASS 81	SUB 02	DRAWING USAGE CUSTOMER
CHECKED BY BMC 7/23/2014		



DETAIL F

TOLERANCE NOTES

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 DRILLED AND GAS CUT HOLES ($\pm 0.030"$) - NO CONING OF HOLES
 LASER CUT EDGES AND HOLES ($\pm 0.010"$) - NO CONING OF HOLES
 BENDS ARE $\pm 1/2$ DEGREE
 ALL OTHER MACHINING ($\pm 0.030"$)
 ALL OTHER ASSEMBLY ($\pm 0.060"$)

PROPRIETARY NOTE:
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DESCRIPTION
 14' 6" LOW PROFILE PLATFORM
 WITH TWELVE 2-3/8" ANTENNA MOUNTING
 PIPES, AND HANDRAIL



Engineering
 Support Team:
 1-888-753-7446

Locations:
 New York, NY
 Atlanta, GA
 Los Angeles, CA
 Plymouth, IN
 Salem, OR
 Dallas, TX

A valmont COMPANY

CPD NO. 4488 DRAWN BY CEK 7/15/2014

ENG. APPROVAL

PART NO. RMQLP-496-HK

CLASS SUB 81 02

DRAWING USAGE CUSTOMER

CHECKED BY BMC 7/23/2014

DWG. NO. RMQLP-496-HK

REV	DESCRIPTION OF REVISIONS	CPD	BY	DATE
A	CHANGED X-253992 TO X-TBW	4488	CEK	9/20/2018

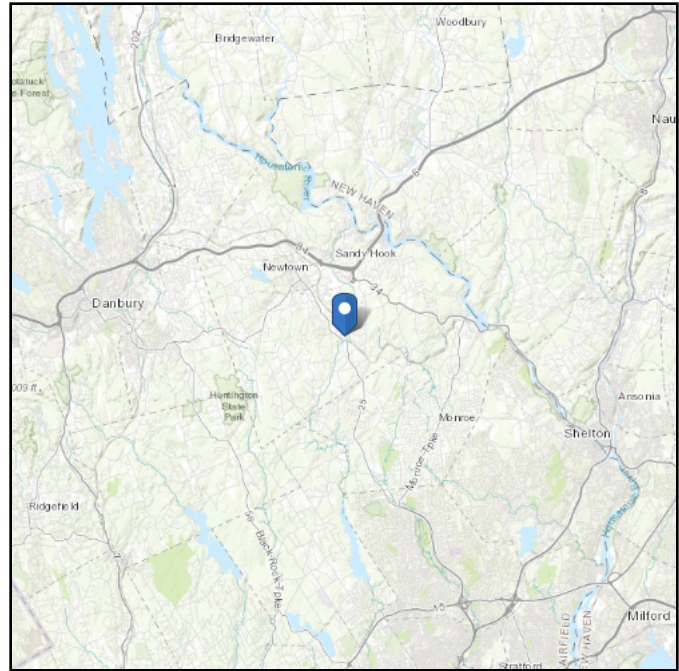
REVISION HISTORY

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 398.5 ft (NAVD 88)
Latitude: 41.378144
Longitude: -73.27415



Wind

Results:

Wind Speed:	119 Vmph 122 Vmph per 2018 Connecticut State Building Code
10-year MRI	76 Vmph
25-year MRI	86 Vmph
50-year MRI	91 Vmph
100-year MRI	97 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: Mon Nov 23 2020

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.

Site Soil Class:

D - Stiff Soil

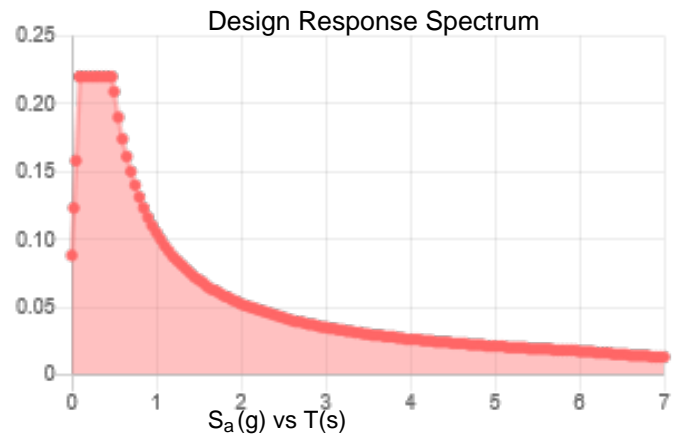
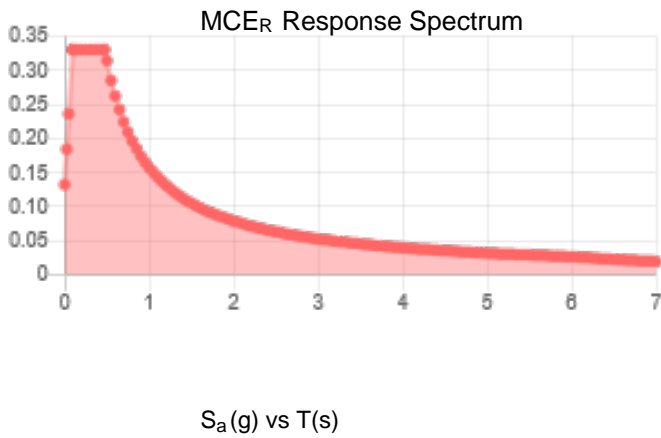
per 2018 Connecticut State Building Code

Results:

S_s :	0.206	0.208	S_{DS} :	0.22
S_1 :	0.065	0.066	S_{D1} :	0.105
F_a :	1.6		T_L :	6
F_v :	2.4		PGA :	0.111
S_{MS} :	0.33		PGA _M :	0.175
S_{M1} :	0.157		F _{PGA} :	1.578
			I_e :	1

Seismic Design Category

B



Data Accessed:

Mon Nov 23 2020

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.

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: Mon Nov 23 2020

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.

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Exhibit E

Power Density/RF Emissions Report

Transcom Engineering, Inc.

Wireless Network Design and Deployment

Radio Frequency Emissions Analysis Report

T-MOBILE Existing Facility

Site ID: CT11217A

Newtown/RT-25
201 Main Street
Newtown, CT 06470

June 7, 2019

Transcom Engineering Project Number: 737001-0151

Site Compliance Summary	
Compliance Status:	COMPLIANT
Site total MPE% of FCC general population allowable limit:	10.75 %

Transcom Engineering, Inc.

Wireless Network Design and Deployment

June 7, 2019

T-MOBILE

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

Emissions Analysis for Site: **CT11217A – Newtown/RT-25**

Transcom Engineering, Inc (“Transcom”) was directed to analyze the proposed upgrades to the T-MOBILE facility located at **201 Main Street, Newtown, CT**, for the purpose of determining whether the emissions from the Proposed T-MOBILE Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

Additional details can be found in FCC OET 65.

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CALCULATIONS

Calculations were performed for the proposed upgrades to the T-MOBILE antenna facility located at **201 Main Street, Newtown, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since T-MOBILE is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

For each sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
LTE	1900 MHz (PCS)	4	40
LTE	2100 MHz (AWS)	2	60
GSM	1900 MHz (PCS)	1	15
UMTS	2100 MHz (AWS)	1	40
LTE / 5G NR	600 MHz	2	40
LTE	700 MHz	2	20

Table 1: Channel Data Table

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

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Ericsson AIR32 B66A / B2A	148
A	2	Ericsson AIR21 B2A/B4P	148
A	3	RFS APXVAARR24_43-U-NA20	146
B	1	Ericsson AIR32 B66A / B2A	148
B	2	Ericsson AIR21 B2A/B4P	148
B	3	RFS APXVAARR24_43-U-NA20	146
C	1	Ericsson AIR32 B66A / B2A	148
C	2	Ericsson AIR21 B2A/B4P	148
C	3	RFS APXVAARR24_43-U-NA20	146

Table 2: Antenna Data

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

Cable losses were factored in the calculations for this site. Since all **2100 MHz (AWS) UMTS** radios are ground mounted the following cable loss values were used. For each ground mounted **2100 MHz (AWS)** radio there was **1.75 dB** of cable loss calculated into the system gains / losses for this site. These values were calculated based upon the manufacturers specifications for **165 feet** of **1-5/8"** coax.

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RESULTS

Per the calculations completed for the proposed T-MOBILE configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85 / 15.85	6	280	10,768.57	1.92
Antenna A2	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	2	55	1,623.63	0.29
Antenna A3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.06
Sector A Composite MPE%							3.27
Antenna B1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85 / 15.85	6	280	10,768.57	1.92
Antenna B2	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	2	55	1,623.63	0.29
Antenna B3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.06
Sector B Composite MPE%							3.27
Antenna C1	Ericsson AIR32 B66A / B2A	1900 MHz (PCS) / 2100 MHz (AWS)	15.85 / 15.85	6	280	10,768.57	1.92
Antenna C2	Ericsson AIR21 B2A/B4P	1900 MHz (PCS) / 2100 MHz (AWS)	15.9 / 15.9	2	55	1,623.63	0.29
Antenna C3	RFS APXVAARR24_43-U-NA20	600 MHz / 700 MHz	12.95 / 13.35	4	120	2,443.03	1.06
Sector C Composite MPE%							3.27

Table 3: T-MOBILE Emissions Levels

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

Site Composite MPE%	
Carrier	MPE%
T-MOBILE – Max Per Sector Value	3.27 %
AT&T	1.64 %
Sprint	3.10 %
Verizon Wireless	2.74 %
Site Total MPE %:	10.75 %

Table 4: All Carrier MPE Contributions

T-MOBILE Sector A Total:	3.27 %
T-MOBILE Sector B Total:	3.27 %
T-MOBILE Sector C Total:	3.27 %
Site Total:	10.75 %

Table 5: Site MPE Summary

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Wireless Network Design and Deployment

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated T-MOBILE sector(s). For this site, all three sectors have the same configuration yielding the same results on all three sectors.

T-MOBILE _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu\text{W}/\text{cm}^2$)	Frequency (MHz)	Allowable MPE ($\mu\text{W}/\text{cm}^2$)	Calculated % MPE
T-Mobile 1900 MHz (PCS) LTE	4	1,538.37	148	10.97	1900 MHz (PCS)	1000	1.10%
T-Mobile 2100 MHz (AWS) LTE	2	2,307.55	148	8.23	2100 MHz (AWS)	1000	0.82%
T-Mobile 1900 MHz (PCS) GSM	1	583.57	148	1.04	1900 MHz (PCS)	1000	0.10%
T-Mobile 2100 MHz (AWS) UMTS	1	1,040.06	148	1.85	2100 MHz (AWS)	1000	0.19%
T-Mobile 600 MHz LTE / 5G NR	2	788.97	146	2.89	600 MHz	400	0.72%
T-Mobile 700 MHz LTE	2	432.54	146	1.59	700 MHz	467	0.34%
						Total:	3.27%

Table 6: T-MOBILE Maximum Sector MPE Power Values

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Summary

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

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

T-MOBILE Sector	Power Density Value (%)
Sector A:	3.27 %
Sector B:	3.27 %
Sector C:	3.27 %
T-MOBILE Maximum Total (per sector):	3.27 %
Site Total:	10.75 %
Site Compliance Status:	COMPLIANT

The anticipated composite MPE value for this site assuming all carriers present is **10.75 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



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