NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
203-435-3640
denise@northeastsitesolutions.com

May 25, 2022

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

RE: Tower Share Application
23 Holland Road, Union, CT 06076
Latitude: 42.029411
Longitude: -72.139827
Site #: 876346_Crown_Dish

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 23 Holland Road, Union, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas and six (6) RRUs, at the 119-foot level of the existing 150-foot monopole tower, one (1) Fiber cable will also be installed. Dish Wireless LLC equipment cabinets will be placed within a 7' x 5' lease area within the fenced compound. Included are plans by NB+C, dated March 9, 2022, Exhibit C. Also included is a structural analysis prepared by Paul J. Ford & Company, dated September 20, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was originally approved by the Town of Union Planning & Zoning Commission on June 4, 1997. Please see attached Exhibit A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to David D. Eaton, First Selectman and Mathieu Silbermann, Planning & Zoning Commission Chair for the Town of Union as well as the tower owner (Crown Castle) and property owner (Transportation Alliance Bank).

The planned modifications of the facility fall squarely within those activities explicitly provided for in R.C.S.A. 16-50j-89.

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the existing tower is 150-feet and the Dish Wireless LLC antennas will be located at a center line height of 119-feet.

2. The proposed modifications will not result in an increase of the site boundary as depicted on the attached site plan.

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

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. The combined site operations will result in a total power density of 8.02% as evidenced by Exhibit F.

Connecticut General Statutes 16-50aa indicates that the Council must approve the shared use of a telecommunications facility provided it finds the shared use is technically, legally, environmentally, and economically feasible and meets public safety concerns. As demonstrated in this letter, Dish Wireless LLC respectfully submits that the shared use of this facility satisfies these criteria.

A. Technical Feasibility. The existing monopole has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included as Exhibit D.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this monopole tower in Union. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation. Further, a Letter of Authorization is included as Exhibit G, authorizing Dish Wireless LLC to file this application for shared use.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 119-foot level of the existing 150-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

D. Economic Feasibility. Dish Wireless LLC will be entering into an agreement with the owner of this facility to mutually agreeable terms. As previously mentioned, the Letter of Authorization has been provided by the owner to assist Dish Wireless LLC with this tower sharing application.

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading. Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Union.

Sincerely,

Denise Sabo

Denise Sabo
Mobile: 203-435-3640
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

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Turnkey Wireless Development

Attachments

Cc: David D. Eaton, First Selectman
Union Town Hall
1043 Buckley Highway
Union, CT 06076

Mathieu Silbermann, Planning & Zoning Commission Chair
Union Town Hall
1043 Buckley Highway
Union, CT 06076

Transportation Alliance Bank
4185 Harrison Blvd Suite 200P
Ogden, UT 84403

Crown Castle, Tower Owner

Exhibit A

Original Facility Approval

VOL 40 PAGE 38

PLANNING AND ZONING COMMISSION

TOWN OF UNION, CONNECTICUT

Mail Address: 1024 Buckley Highway, Union, CT 06076

SPECIAL PERMIT

Description of Premises: 23 HOLLAND RD
UNION CT

Nature of Special Permit: TO PERMIT THE CONSTRUCTION OF A TELECOMMUNICATIONS FACILITY

Applicable Regulation(s): P.Z.Z.E.G. SECTION 3.11

Owners of Record: LUCILLE GOODHALL

Date Issued: JUNE 4, 1997

Chairman Union Planning & Zoning

RECEIVED June 10 1997
AT 10:45A M. AND
RECORDED IN UNION LAND RECORDS
VOL 40 PAGE 38
Heidi Bradwick TOWN CLERK

Exhibit B

Property Card

23 HOLLAND RD

Location	23 HOLLAND RD	**Mblu**	11/ 05/ 002/ /
Acct#	00022000	**Owner**	TRANSPORTATION ALLIANCE BANK INC
Assessment	$80,780	**Appraisal**	$115,390
PID	364	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$115,390	$115,390

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$80,780	$80,780

Owner of Record

Owner	TRANSPORTATION ALLIANCE BANK INC	**Sale Price**	$300,000
Co-Owner		**Certificate**	
Address	DBA TAB BANK 4185 HARRISON BLVD SUITE 200 P OGDEN, UT 84403	**Book & Page**	66/232
		Sale Date	05/29/2018
		Instrument	13

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
TRANSPORTATION ALLIANCE BANK INC	$300,000		66/232	13	05/29/2018
NEW ENGLAND LAND & LUMBER CORP	$500,000		51/206	24	04/27/2005
UNION FUEL ASSOCIATES, LLC	$245,000		40/68	00	07/01/1997
GOODHALL	$0		0/0		01/01/1900

Building Information

Building 1 : Section 1

Year Built:
Living Area: 0

Replacement Cost: $0
Building Percent Good:
Replacement Cost Less Depreciation: $0

Building Attributes	
Field	**Description**
Style	Vacant Land
Model	
Grade:	
Stories:	
Occupancy	
Exterior Wall 1	
Exterior Wall 2	
Roof Structure:	
Roof Cover	
Interior Wall 1	
Interior Wall 2	
Interior Flr 1	
Interior Flr 2	
Heat Fuel	
Heat Type:	
AC Type:	
Total Bedrooms:	
Total Bthrms:	
Total Half Baths:	
Total Xtra Fixtrs:	
Total Rooms:	
Bath Style:	
Kitchen Style:	

Building Photo

Building Photo (http://images.vgsi.com/photos/UnionCTPhotos//84)

Building Layout

(ParcelSketch.ashx?pid=364&bid=364)

Building Sub-Areas (sq ft)	Legend
No Data for Building Sub-Areas	

Extra Features

Extra Features	Legend
No Data for Extra Features	

Land

Land Use

Use Code 3900
Description DEVEL LAND
Zone CI
Neighborhood 12
Alt Land Appr No

Land Line Valuation

Size (Acres) 7.85
Frontage 0
Depth 0
Assessed Value $80,780
Appraised Value $115,390

Category

Outbuildings

Outbuildings	Legend
No Data for Outbuildings	

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$115,390	$115,390
2017	$0	$125,770	$125,770
2013	$0	$125,770	$125,770

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2018	$0	$80,780	$80,780
2017	$0	$88,040	$88,040
2013	$0	$88,040	$88,040


23 Holland Road
Calvary Bible Church
Moffit Dr
Memory Ln
Holland Rd
28
28

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBOS00873A

DISH Wireless L.L.C. SITE ADDRESS:

23 HOLLAND ROAD
UNION, CT 06076

CONNECTICUT CODE OF 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	2018 CT STATE BUILDING CODE/2015 IBC W/ CT AMENDMENTS
MECHANICAL	2018 CT STATE BUILDING CODE/2015 IMC W/ CT AMENDMENTS
ELECTRICAL	2018 CT STATE BUILDING CODE/2017 NEC W/ CT AMENDMENTS

SHEET INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE
G-1	GROUNDING PLANS AND NOTES
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
GN-1	LEGEND AND ABBREVIATIONS
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES

SCOPE OF WORK

THIS IS NOT AN ALL INCLUSIVE LIST. CONTRACTOR SHALL UTILIZE SPECIFIED EQUIPMENT PART OR ENGINEER APPROVED EQUIVALENT. CONTRACTOR SHALL VERIFY ALL NEEDED EQUIPMENT TO PROVIDE A FUNCTIONAL SITE. THE PROJECT GENERALLY CONSISTS OF THE FOLLOWING:

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (1) PROPOSED ANTENNA PLATFORM MOUNT
- INSTALL PROPOSED JUMPERS
- INSTALL (6) PROPOSED RRUs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE
- INSTALL (3) DOUBLE Z-BRACKETS (1 PER SECTOR)

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
- INSTALL (1) PROPOSED METER SOCKET

SITE PHOTO

UNDERGROUND SERVICE ALERT CBYD 811
UTILITY NOTIFICATION CENTER OF CONNECTICUT
(800) 922-4455
WWW.CBYD.COM

CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTES

THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE. NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS PROPOSED.

11"x17" PLOT WILL BE HALF SCALE UNLESS OTHERWISE NOTED

CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

SITE INFORMATION

PROPERTY OWNER:	LANDING ROCK LLC
ADDRESS:	15 BALDWIN DR HAMPDEN, MA 01036
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	876346
TOWER APP NUMBER:	572902
COUNTY:	TOLLAND
LATITUDE (NAD 83):	42° 1' 45.94" N 42.029428 N
LONGITUDE (NAD 83):	-72° 8' 23.54" W -72.139872 W
ZONING JURISDICTION:	CONNECTICUT SITING COUNCIL
ZONING DISTRICT:	CI – COMMERCIAL/INDUSTRIAL
PARCEL NUMBER:	CT-145-11-05-000006
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	NARRAGANSETT ELECTRIC
TELEPHONE COMPANY:	T.B.D.

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	CROWN CASTLE USA INC. 2000 CORPORATE DR. CANONSBURG, PA 15317 (877) 486-9377
SITE DESIGNER:	NB+C ENGINEERING SERVICES, LLC 6095 MARSHALEE DRIVE, SUITE 300 ELKRIDGE, MD 21075 (410) 712-7092
SITE ACQUISITION:	CORWIN DIXON CORWIN.DIXON@CROWNCASTLE.COM
CONSTRUCTION MANAGER:	AARON CHANDLER AARON.CHANDLER@DISH.COM
RF ENGINEER:	ARVIN SEBASTIAN ARVIN.SEBASTIAN@DISH.COM

DIRECTIONS

DIRECTIONS FROM SOUTHBRIDGE MUNICIPAL AIRPORT:
START OUT GOING SOUTHEAST ON CLEMENCE HILL RD. TAKE THE 1ST RIGHT ONTO AIRPORT ACCESS RD. TURN LEFT ONTO PLEASANT ST. TURN LEFT ONTO MAIN ST. TAKE THE 1ST RIGHT ONTO WEST ST. TURN RIGHT ONTO SOUTH ST. SOUTH ST BECOMES MASHAPAUG RD. TURN RIGHT TO STAY ON MASHAPAUG RD. TURN LEFT TO STAY ON MASHAPAUG RD. MERGE ONTO I-84 W TOWARD HARTFORD CT. TAKE THE CT-171 EXIT, EXIT 74. TURN RIGHT ONTO HOLLAND RD. TAKE THE IMMEDIATE RIGHT INTO QUARRY AND FOLLOW ROAD TO THE LEFT. GO RIGHT AT THE FORK AND TAKE THE IMMEDIATE RIGHT. FOLLOW ROAD TO SITE AT END.

VICINITY MAP

NO SCALE

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT · KRUPAKARAN KOLANDAIVELU · PEN.0028997 · LICENSED PROFESSIONAL ENGINEER

03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/10/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876346

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

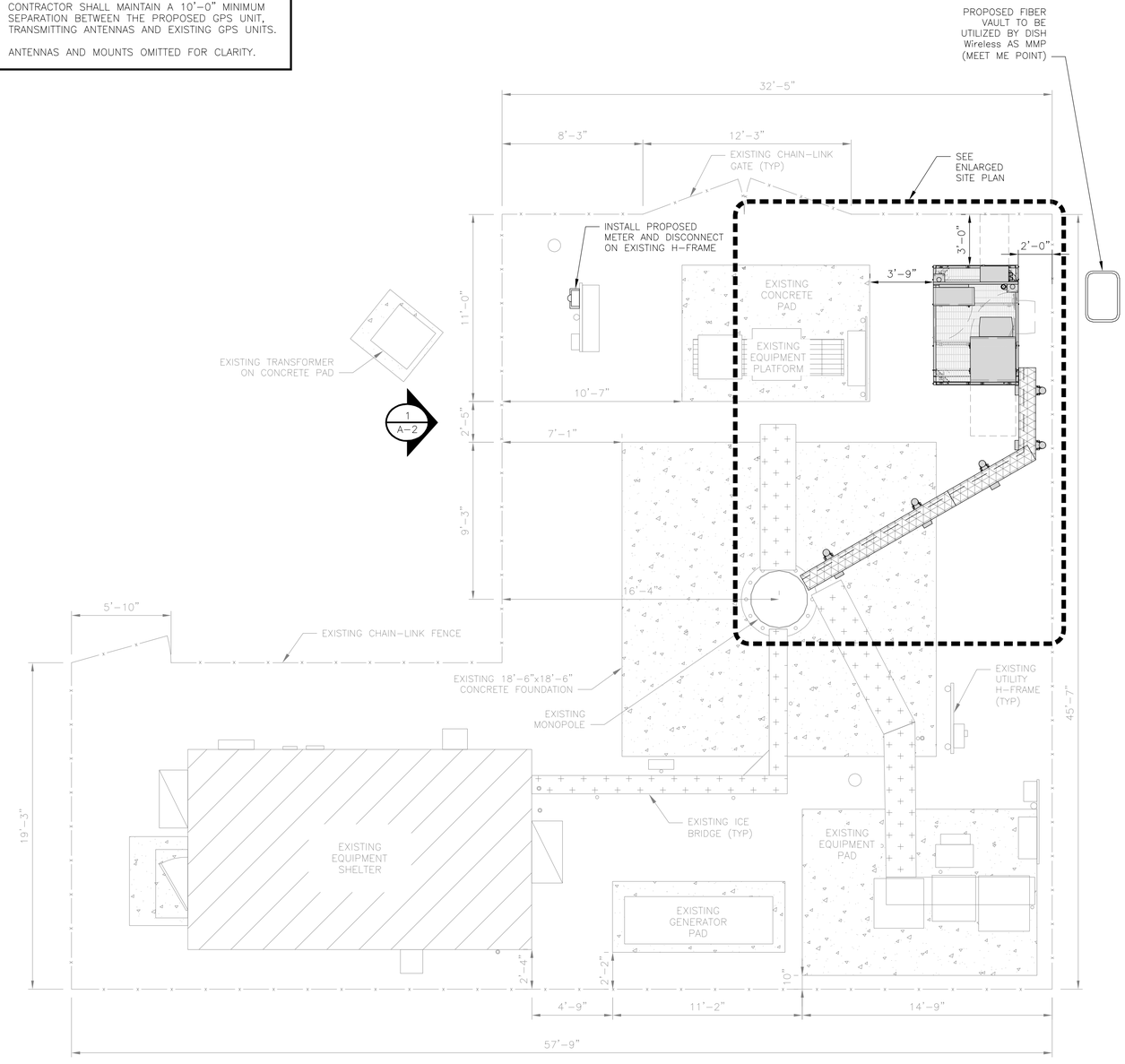
TITLE SHEET

SHEET NUMBER

T-1

NOTES

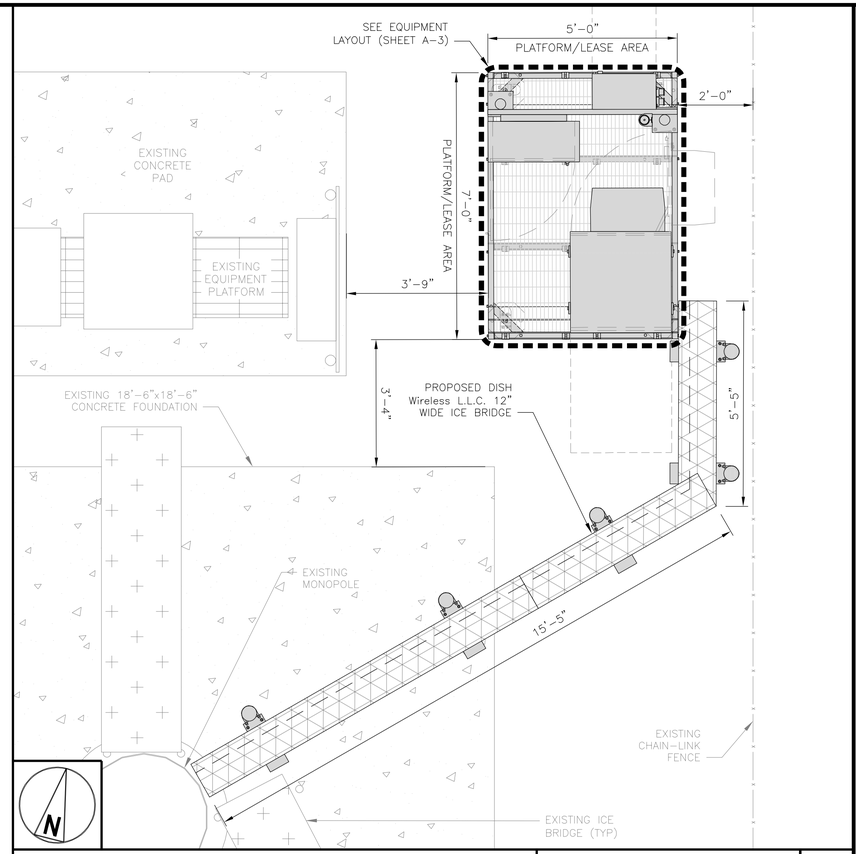
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



OVERALL SITE PLAN

4' 2' 0 4' 8'
1/4"=1'-0"

1



ENLARGED SITE PLAN

12" 6" 0 1' 2' 3' 4' 5' 6' 7'
3/8"=1'-0"

2

AERIAL VIEW

3

dish wireless.

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PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

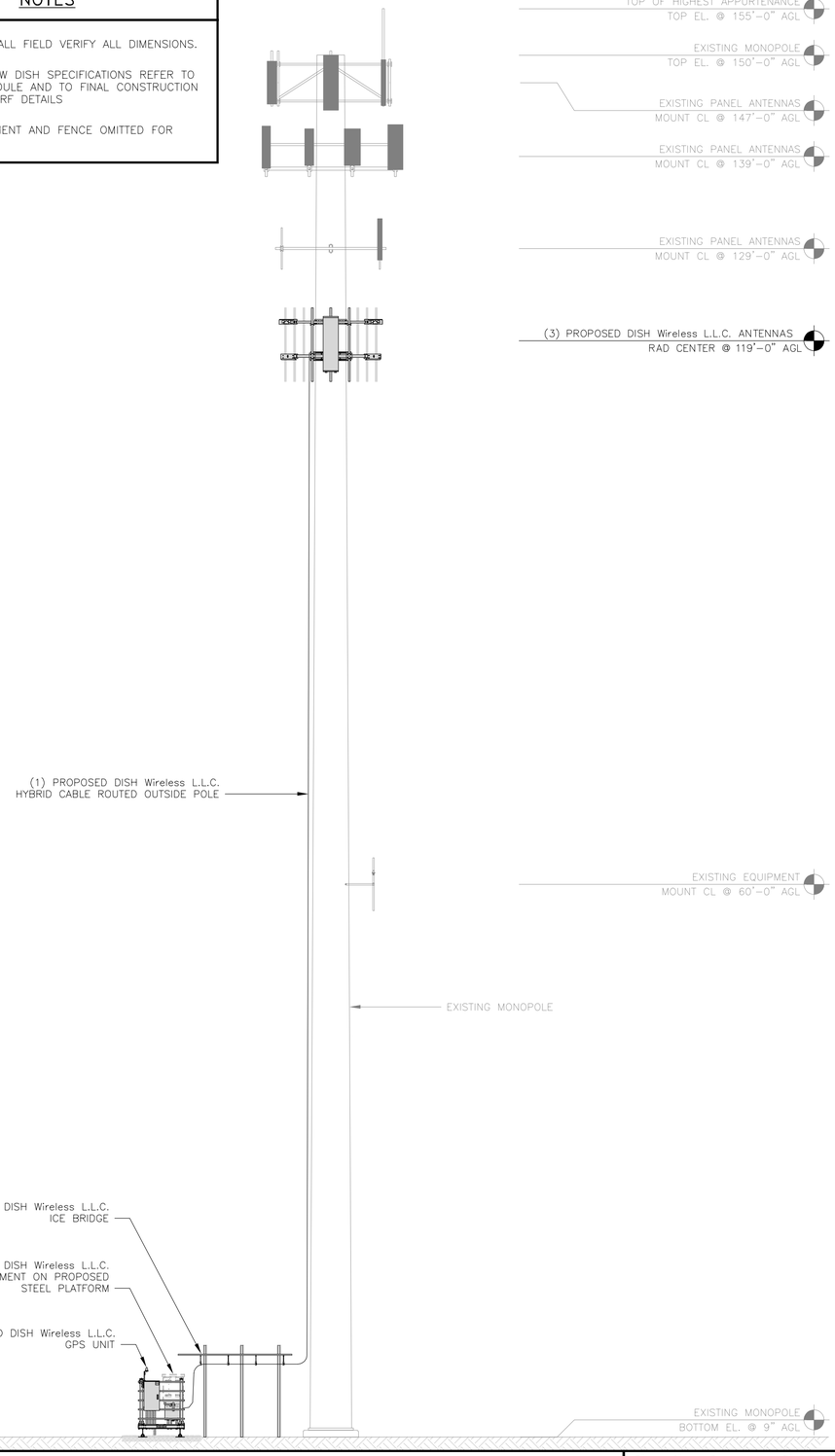
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

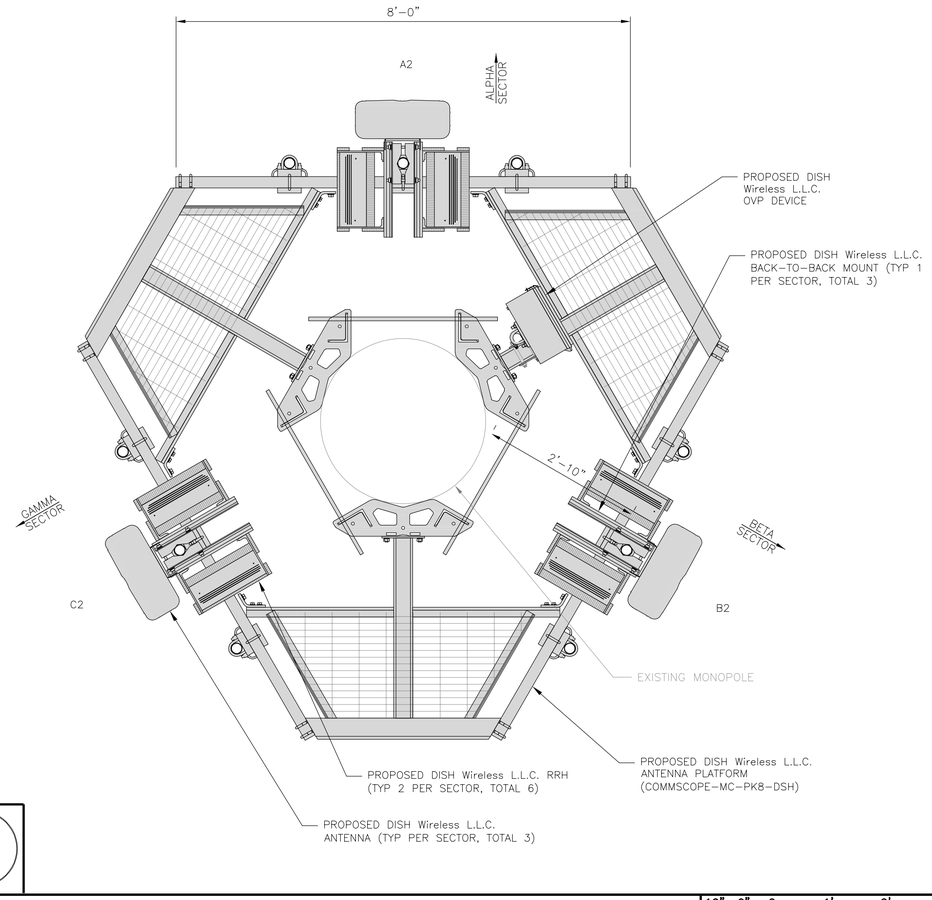
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH ELEVATION

8' 4' 0 8' 16'
1/8"=1'-0"

1



ANTENNA LAYOUT

12" 6" 0 1' 2' 3'
3/4"=1'-0"

2

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECH	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	MANUFACTURER – MODEL NUMBER	TECH	POS.	MANUFACTURER MODEL
A1	--	--	--	--	--	(1) HIGH-CAPACITY 1.5" DIA. HYBRID CABLE (171' LONG)	FUJITSU – TA08025-B604	5G	A2	RAYCAP – RDIDC-9181-PF-48
A2	PROPOSED	FFVV-65B-R2	5G	0°	119'-0"		FUJITSU – TA08025-B605	5G	A2	
A3	--	--	--	--	--		--	--	--	
B1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	B2	SHARED W/ALPHA
B2	PROPOSED	FFVV-65B-R2	5G	120°	119'-0"		FUJITSU – TA08025-B605	5G	B2	
B3	--	--	--	--	--		--	--	--	
C1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	C2	SHARED W/ALPHA
C2	PROPOSED	FFVV-65B-R2	5G	240°	119'-0"		FUJITSU – TA08025-B605	5G	C2	
C3	--	--	--	--	--		--	--	--	

NOTES

1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
2. ANTENNA AND RRH MODELS MAY CHANGE DUE TO EQUIPMENT AVAILABILITY. ALL EQUIPMENT CHANGES MUST BE APPROVED AND REMAIN IN COMPLIANCE WITH THE PROPOSED DESIGN AND STRUCTURAL ANALYSES.

ANTENNA SCHEDULE

NO SCALE

3

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
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DISH Wireless L.L.C.
PROJECT INFORMATION

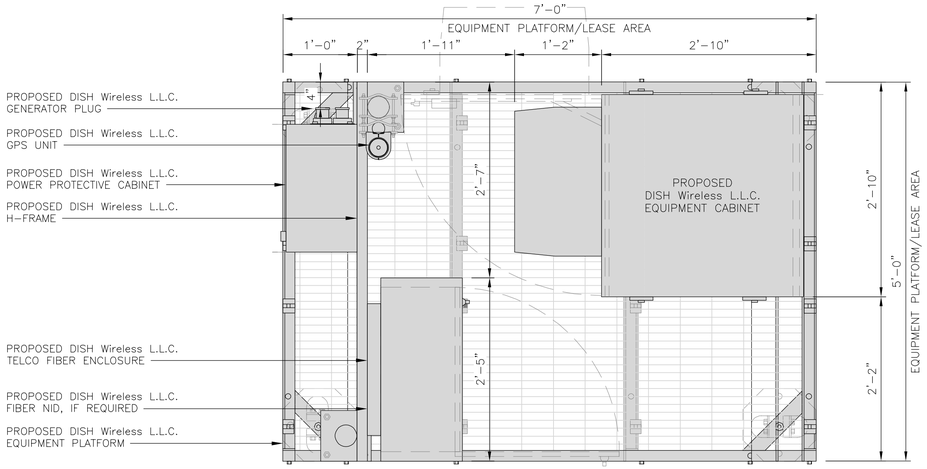
BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



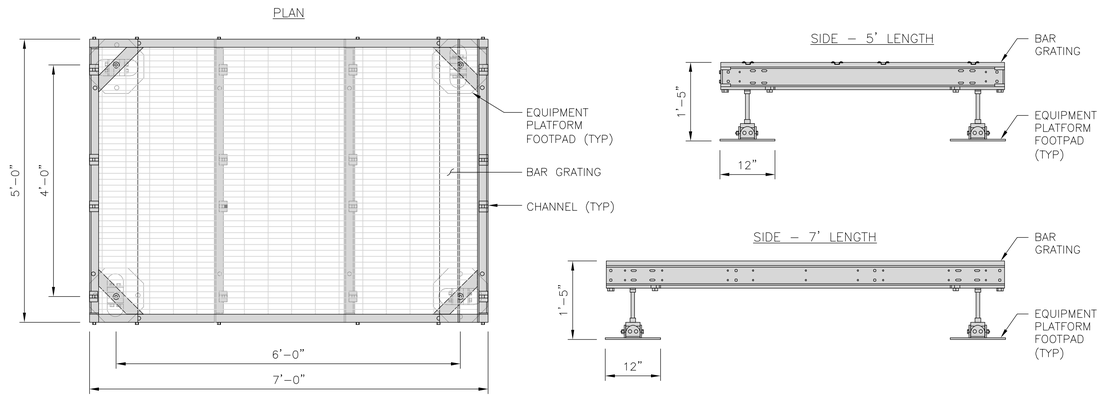
PLATFORM EQUIPMENT PLAN

12" 9" 6" 3" 0 1' 2"
1"=1'-0"

1

COMMSCOPE MTC4045LP 5X7 PLATFORM	
DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

NOTE:
GC TO PROVIDE EXTENDED THREAD FOR PLATFORM IF REQUIRED HEIGHT EXCEEDS 17"

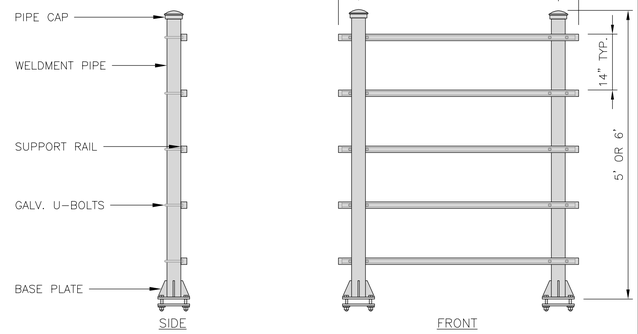


PLATFORM DETAIL

NO SCALE

2

COMMSCOPE MTC4045HFLD H-FRAME	
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs



H-FRAME DETAIL

NO SCALE

3

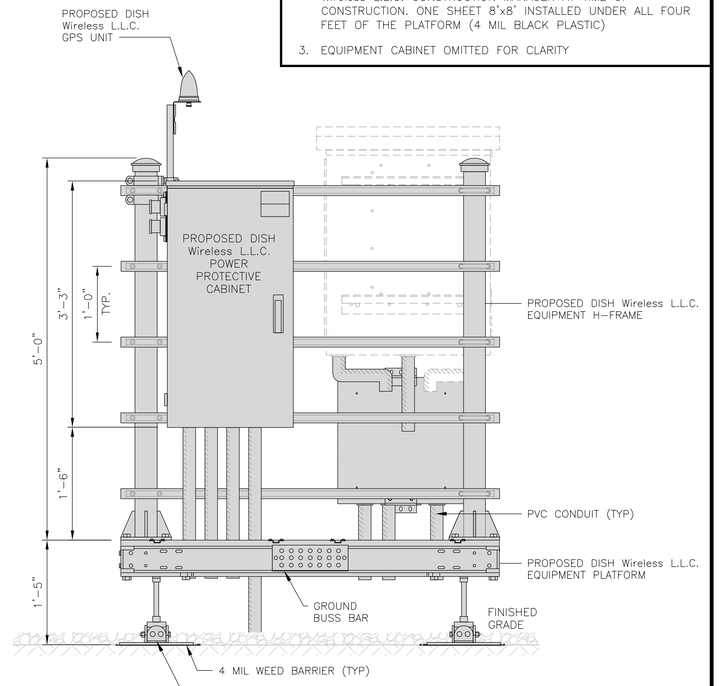
NOT USED

NO SCALE

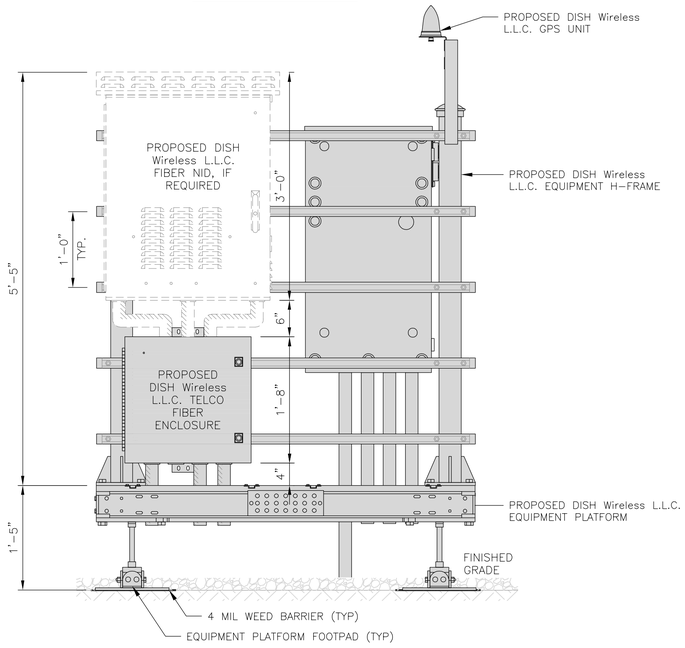
4

NOTES

1. CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
2. WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH Wireless L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)
3. EQUIPMENT CABINET OMITTED FOR CLARITY



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

12" 9" 6" 3" 0 1' 2"
1"=1'-0"

5

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NB+C TOTALLY COMMITTED.
NB+C ENGINEERING SERVICES, LLC.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/10/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876346

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

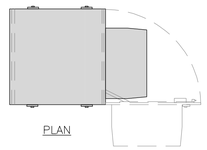
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER

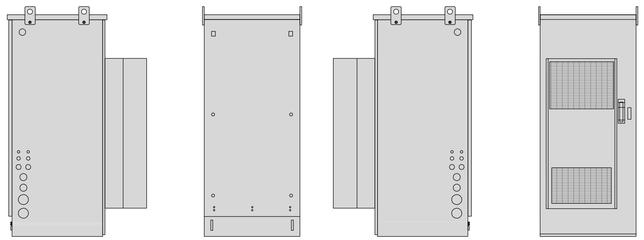
A-3

CHARLES INDUSTRY HEX CUBE–PM639155N4

DIMENSIONS (HxWxD):	74"x32"x32"
POWER PLANT:	–48VDC ABB/600W
TOTAL WEIGHT (EMPTY)	408 LBS



PLAN



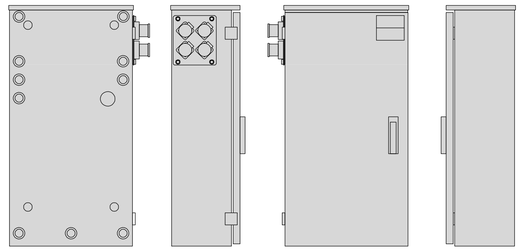
SIDE BACK SIDE FRONT

CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS

ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

TOP

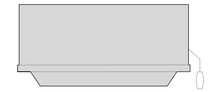


BACK SIDE FRONT SIDE

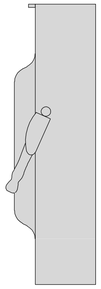
POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

SQUARE D SAFETY SWITCHES D224NRB

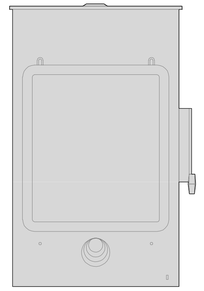
ENCLOSURE DIM (HxWxD)	29.25"x19.00"x8.50"
ENCLOSURE TYPE	NEMA 3R RAINPROOF
UL LISTED	FILE E–2875



TOP



SIDE

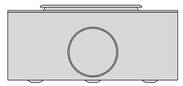


FRONT

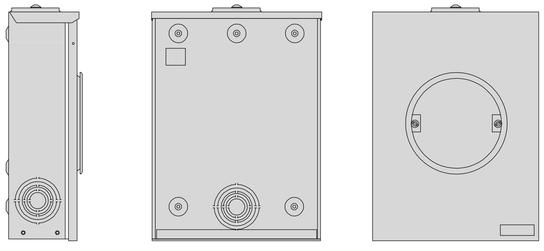
SAFETY SWITCH DETAIL | NO SCALE | 3

EATON METER SOCKET UNRRS213BEUSE

METER SOCKET TYPE	RING
ENCLOSURE DIM (HxWxD)	16"x12"x6"
MAIN AMPERE RATING	200A
WEIGHT	18 LBS



PLAN



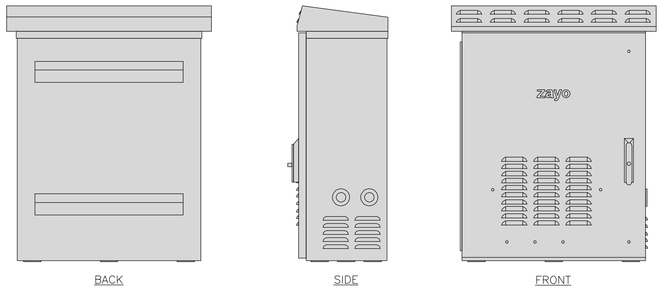
SIDE BACK FRONT

METER SOCKET DETAIL | NO SCALE | 4

ZAYO 5RU (LEFT SWING DOOR) FIBER NID ENCLOSURE

DIMENSIONS (HxWxD)	36.1"x29"x12.9"
WEIGHT	85 lbs

BOTTOM

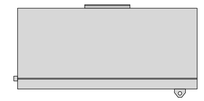


BACK SIDE FRONT

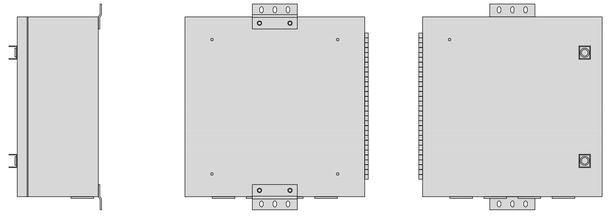
FIBER NID ENCLOSURE DETAIL | NO SCALE | 5

CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE

ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



FRONT



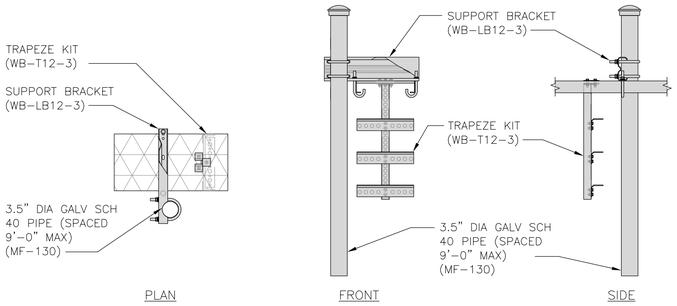
SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

COMMSCOPE WB–K110–B WAVEGUIDE BRIDGE KIT

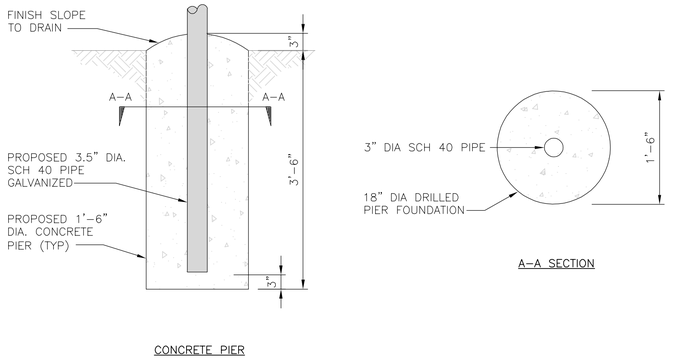
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

INCLUDED PRODUCTS:
- WB–T12–3 TRAPEZE KIT, 3 RUNGS
- WB–LB12–3 SUPPORT BRACKET
- MF–130 DIRECT BURIAL PIPE COLUMN, 13'–4"



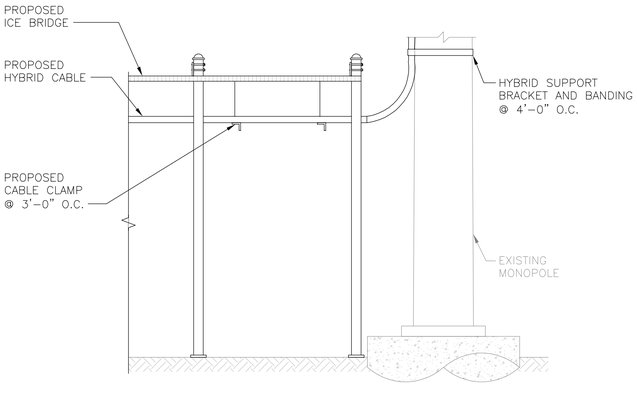
PLAN FRONT SIDE

ICE BRIDGE DETAIL | NO SCALE | 7



CONCRETE PIER A–A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

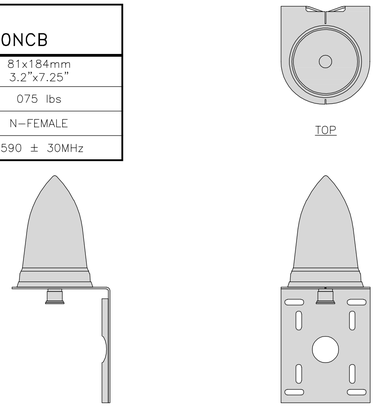
EQUIPMENT DETAILS

SHEET NUMBER

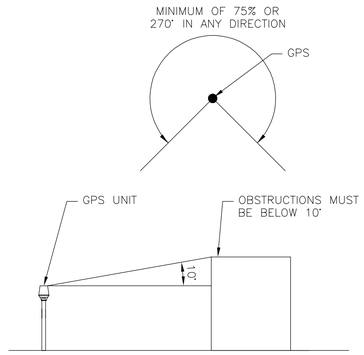
A-4

PCTEL GPSGL-TMG-SPI-40NCB

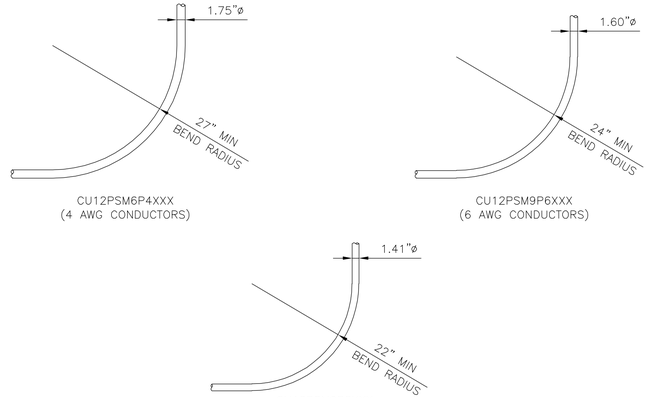
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



CABLES UNLIMITED HYBRID CABLE
MINIMUM BEND RADIUSES | NO SCALE | 3

DESC	QTY	
SITE ID #:	BOBOS00873A	
TWR TYPE:	MONOPOLE	
HYBRID BEND RADIUS	30"	The preparer must determine the lengths below.
RAD CENTER (ft)	119.0	This is the RAD center for the antennas on towers. For a rooftop, this is the total length of all vertical sections of the hybrid.
ICE BRIDGE HEIGHT (ft)	10.0	This is the height of the bridge coverings.
ICE BRIDGE LENGTH (ft)	21.0	This is the length of the total ice bridge coverings, if more than one ice bridge is used or total horizontal lengths of hybrid if this is inside a building.
LENGTH ACROSS PLATFORM (ft)	6.0	This is the length from the cabinet to the first bend up the ice bridge or inside a radio room.
LENGTH FROM TOWER TOP TO OVP (ft)	6.0	This is the horizontal length from the tower to the OVP at the antenna level or the total horizontal lengths of hybrid on a building or large self supporting tower.
VERTICAL LENGTH OF HYBRID INTO TOWER TOP OVP (ft)	3.0	This is the vertical length of hybrid that comes out to the tower top OVP to the beginning of the first bend that is going into the monopole port.
	LENGTH (ft)	
Additional Excess Hybrid to be added (To be determined by preparer)	0	
Total Hybrid Length to Order (Rounded up to nearest whole number)	171	

HYBRID CABLE CALCULATOR | NO SCALE | 4

SITEPRO1 BSF35 BASE SHOE FEET

DIMENSIONS (HxWxL)	8"x8"x1/2"
WEIGHT	15.0 LBS
POST SIZE:	2-7/8" OR 3-1/2"

ICE BRIDGE PIPE MOUNT DETAIL | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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DISH Wireless L.L.C.
PROJECT INFORMATION

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23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

EQUIPMENT DETAILS

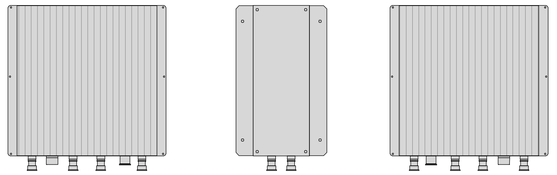
SHEET NUMBER

A-5

FUJITSU TRIPLE BAND TA08025-B605

DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V

PLAN

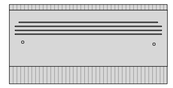


BACK SIDE FRONT

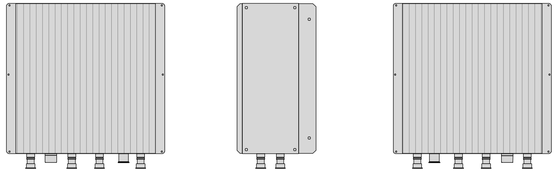
RRH DETAIL | NO SCALE | 1

FUJITSU DUAL BAND TA08025-B604

DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



PLAN



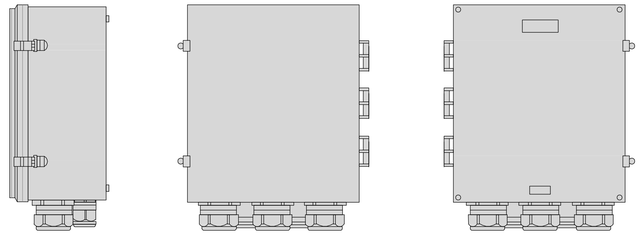
BACK SIDE FRONT

RRH DETAIL | NO SCALE | 2

RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)

DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS

PLAN



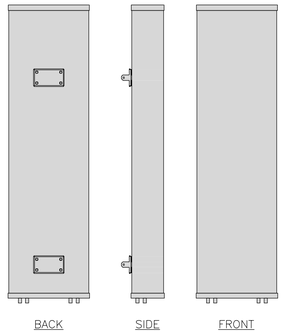
SIDE BACK FRONT

SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 3

COMMSCOPE FFVV-65B-R2

DIMENSIONS (HxWxD)(MM/IN)	1828x498x197 72"x19.6"x7.8"
RF CONNECTOR INTERFACE	4.3-10 FEMALE
WEIGHT	70.8 lbs
WEIGHT WITH BRACKETS	98.1 lbs

PLAN



BACK SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

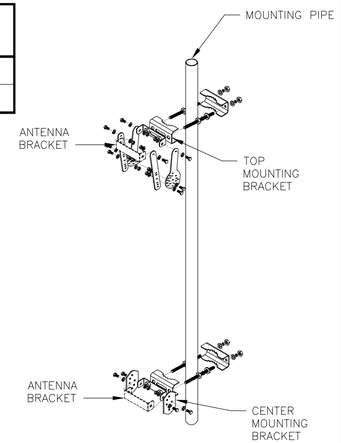
JMA ANTENNA MOUNT BRACKET #91900318

TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 Kg)
POLE DIAMETER RANGE	2.5" TO 4.5"

NOTE:
KIT #91900318: TOP AND BOTTOM BRACKETS FOR 4-,6-, AND 8-FOOT ANTENNAS

ANTENNA BRACKET NOT PART OF KIT

NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

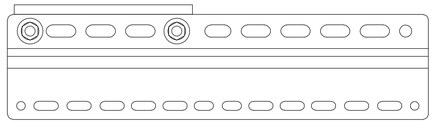


ANTENNA BRACKET DETAIL | NO SCALE | 5

SABRE DOUBLE Z-BRACKET C10123155

DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



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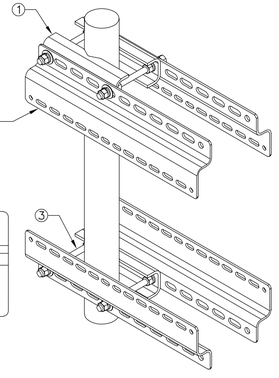
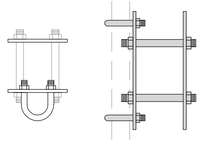


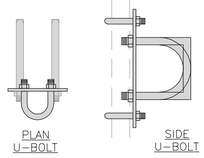
RRH MOUNT DETAIL | NO SCALE | 6

COMMSCOPE XP-2040 CROSSOVER PLATE

DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs



PLAN PLATE SIDE PLATE



PLAN U-BOLT SIDE U-BOLT

NOTE:
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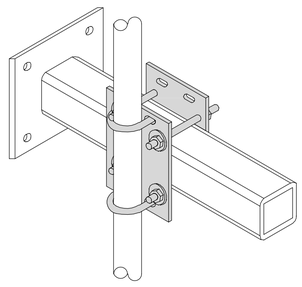
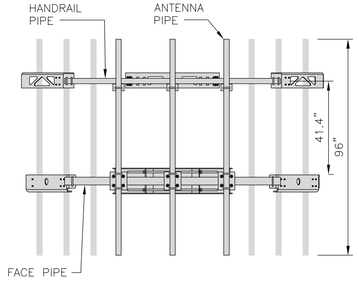


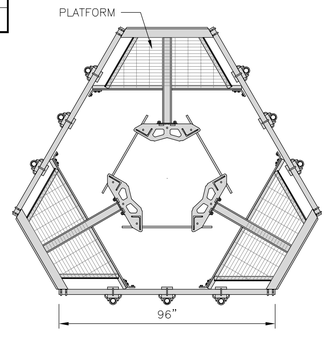
RRH/OVP MOUNT DETAIL | NO SCALE | 7

COMMSCOPE MC-PK8-DSH

FACE WIDTH	96"
WEIGHT	1373.08 lbs
NOTE: 15" TO 38" O.D.	

NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT





ANTENNA PLATFORM DETAIL | NO SCALE | 8

NOT USED | NO SCALE | 9

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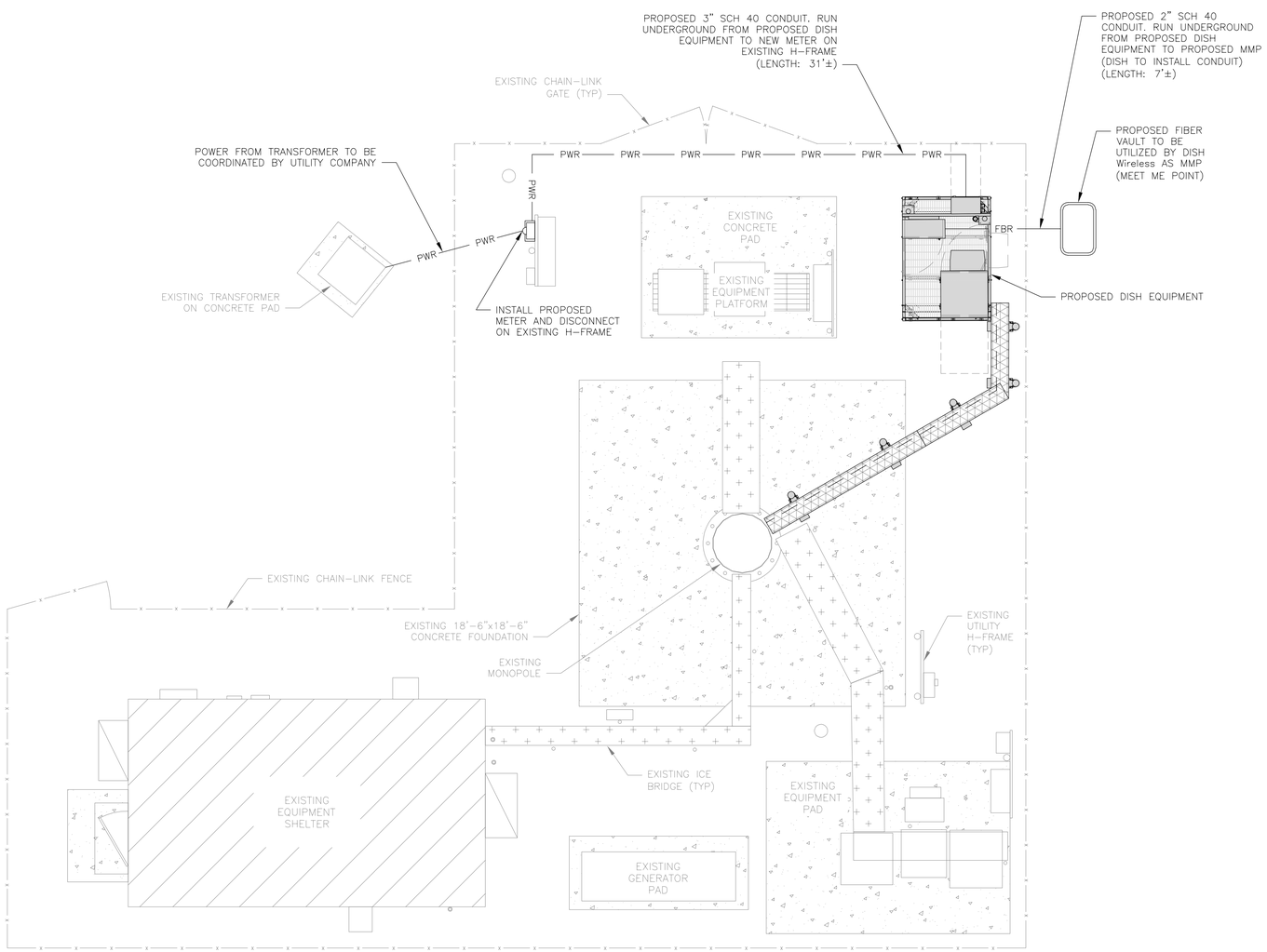
SHEET NUMBER

A-6

EASEMENT RIGHTS

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. DUE TO UTILITY EASEMENT RIGHTS SPECIFIED IN THE GROUND LEASE, CUSTOMER MAY INSTALL EQUIPMENT WITHIN SPECIFIED UTILITY EASEMENT AREA. "PWR" AND "FBR" PATH DEPICTED ON A–1 AND E–1 REPRESENT PLANNED ROUTING BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO A SURVEY, EXHIBITS, METES AND BOUNDS OF THE UTILITY EASEMENT, FIELD VERIFICATION, PRIOR PROJECT DOCUMENTATION AND OTHER REAL PROPERTY RIGHTS DOCUMENTS. WHEN INSTALLING THE UTILITIES PLEASE LOCATE AND FOLLOW EXISTING PATH. IF EXISTING PATH IS MATERIALLY INCONSISTENT WITH THE "PWR" AND "FBR" PATH DEPICTED ON A–1 AND E–1 AND SAID VARIANCE IS NOT NOTED ON CDS, PLEASE NOTIFY CROWN CASTLE REAL ESTATE AS FURTHER COORDINATION MAY BE NEEDED.



UTILITY ROUTE PLAN

4' 2' 0 4' 8'
1/4"=1'–0"

1

DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND –48V CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY –48V.

1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, NOT AFTER THE CONTRACT HAS BEEN AWARDED.
2. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL ELECTRICAL CODES AND ALL STATE AND LOCAL CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC STANDARDS.
3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH–IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
5. CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
6. CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
7. CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
8. ALL DISCONNECTS AND CONTROLLING DEVICES SHALL BE PROVIDED WITH ENGRAVED PHENOLIC NAMEPLATES INDICATING EQUIPMENT CONTROLLED, BRANCH CIRCUITS INSTALLED ON, AND PANEL FIELD LOCATIONS FED FROM.
9. INSTALL AN EQUIPMENT GROUNDING CONDUCTOR IN ALL CONDUITS PER THE SPECIFICATIONS AND NEC 250. THE EQUIPMENT GROUNDING CONDUCTORS SHALL BE BONDED AT ALL JUNCTION BOXES, PULL BOXES, AND ALL DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
10. ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
11. PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST–CONSTRUCTION EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR AS–BUILT PANEL SCHEDULE AND SITE DRAWINGS.
13. ALL TRENCHES IN COMPOUND TO BE HAND DUG

ELECTRICAL NOTES

NO SCALE

2

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STATE OF CONNECTICUT
KRISHNAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
STATE OF CONNECTICUT
PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

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A&E PROJECT NUMBER

876346

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

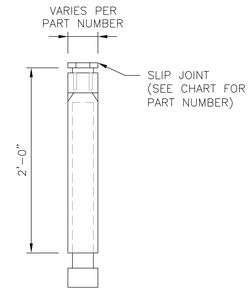
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER

E-1

CARLON EXPANSION FITTINGS

COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N	E945NX	4"	5	8"
E945P	E945PX	5"	1	8"
E945R	E945RX	6"	1	8"

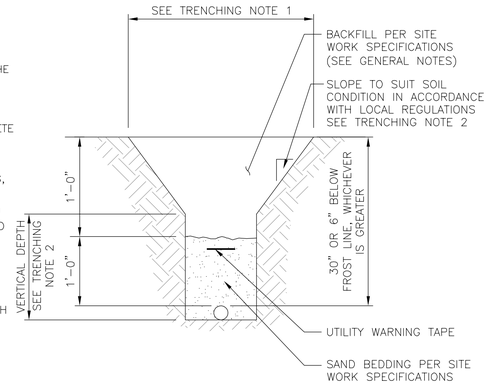


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

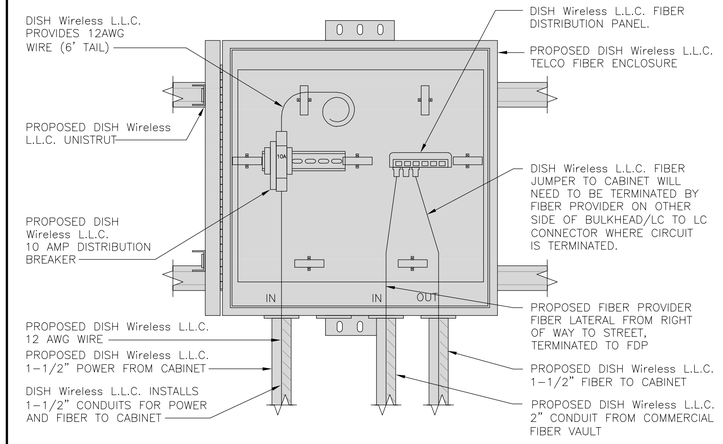
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

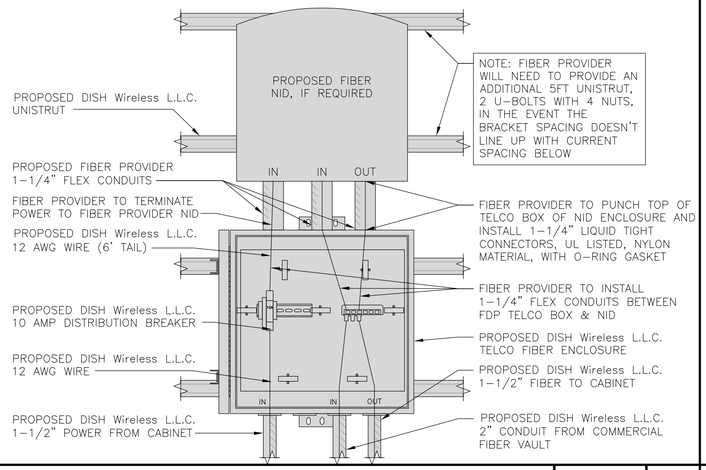
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
3. ALL CONDUITS SHALL BE INSTALLED IN COMPLIANCE WITH THE CURRENT NATIONAL ELECTRIC CODE (NEC) OR AS REQUIRED BY THE LOCAL JURISDICTION, WHICHEVER IS THE MOST STRINGENT.



TYPICAL UNDERGROUND TRENCH DETAIL | NO SCALE | 2



DARK TELCO BOX – INTERIOR WIRING LAYOUT | NO SCALE | 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL) | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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PROJECT INFORMATION

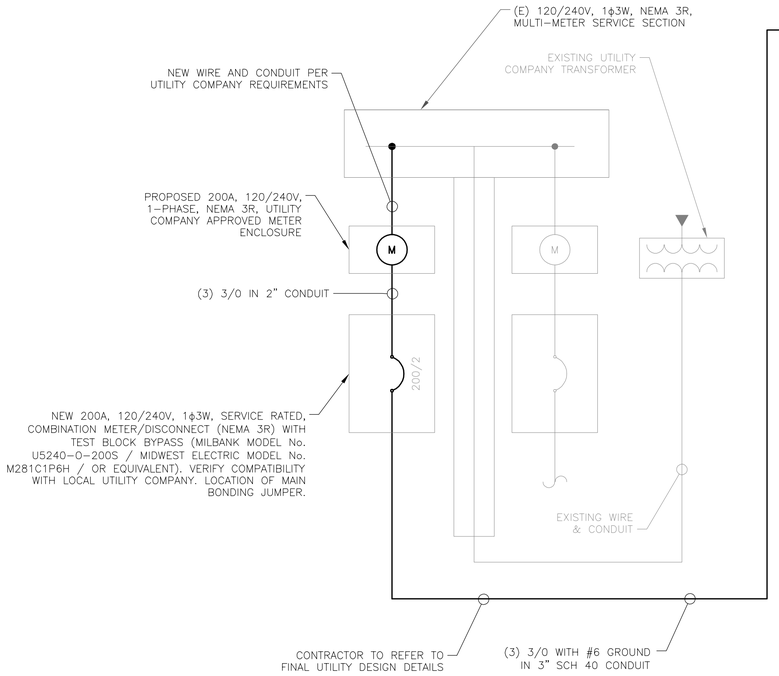
BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

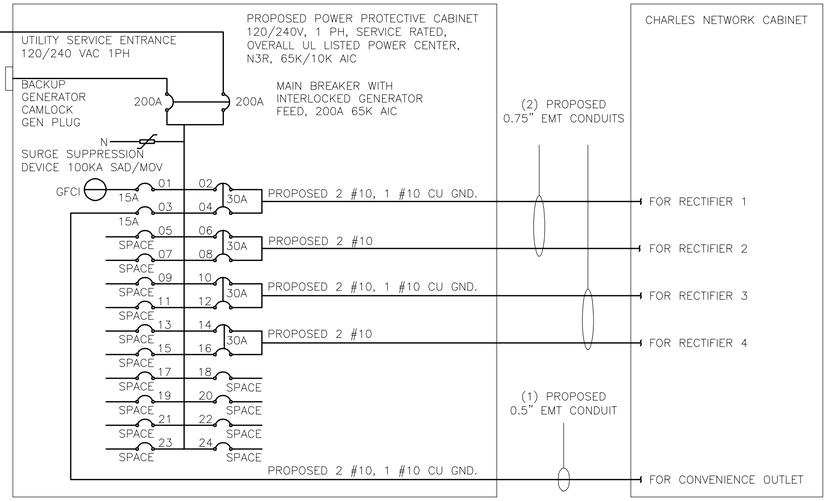
SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2





NOTE:
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED UL1015, 105°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM. CONTRACTOR MAY SUBSTITUTE UL1015 WIRE FOR THWN-2 FOR CONVENIENCE OUTLET BRANCH CIRCUIT.

BREAKERS REQUIRED:
(4) 30A, 2P BREAKER - SQUARE D P/N:QO230
(1) 15A, 1P BREAKER - SQUARE D P/N:QO115

NOTES

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED SHORT CIRCUIT CALCULATIONS AND THE AIC RATINGS FOR EACH DEVICE IS ADEQUATE TO PROTECT THE EQUIPMENT AND THE ELECTRICAL SYSTEM.

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED VOLTAGE DROP CALCULATIONS AND ALL BRANCH CIRCUIT AND FEEDERS COMPLY WITH THE NEC (LISTED ON T-1) ARTICLE 210.19(A)(1) FPN NO. 4.

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2014/17 NEC TABLE 310.15(B)(3)(a) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

#12 FOR 15A-20A/1P BREAKER: 0.8 x 30A = 24.0A
#10 FOR 25A-30A/2P BREAKER: 0.8 x 40A = 32.0A
#8 FOR 35A-40A/2P BREAKER: 0.8 x 55A = 44.0A
#6 FOR 45A-60A/2P BREAKER: 0.8 x 75A = 60.0A

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.
0.5" CONDUIT - 0.122 SQ. IN AREA
0.75" CONDUIT - 0.213 SQ. IN AREA
2.0" CONDUIT - 1.316 SQ. IN AREA
3.0" CONDUIT - 2.907 SQ. IN AREA

CABINET CONVENIENCE OUTLET CONDUCTORS (1 CONDUIT): USING THWN-2, CU.

#10 - 0.0211 SQ. IN X 2 = 0.0422 SQ. IN
#10 - 0.0211 SQ. IN X 1 = 0.0211 SQ. IN <GROUND
TOTAL = 0.0633 SQ. IN

0.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

RECTIFIER CONDUCTORS (2 CONDUITS): USING UL1015, CU.

#10 - 0.0266 SQ. IN X 4 = 0.1064 SQ. IN
#10 - 0.0082 SQ. IN X 1 = 0.0082 SQ. IN <BARE GROUND
TOTAL = 0.1146 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (5) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC FEED CONDUCTORS (1 CONDUIT): USING THWN, CU.

3/0 - 0.2679 SQ. IN X 3 = 0.8037 SQ. IN
#6 - 0.0507 SQ. IN X 1 = 0.0507 SQ. IN <GROUND
TOTAL = 0.8544 SQ. IN

3.0" SCH 40 PVC CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (4) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

PPC ONE-LINE DIAGRAM

NO SCALE | 1

PROPOSED CHARLES PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	30A	2880		ABB/GE INFINITY RECTIFIER 1
CHARLES GFCI OUTLET		180	15A	3	B	4			2880	
-SPACE-				5	A	6	30A	2880		ABB/GE INFINITY RECTIFIER 2
-SPACE-				7	B	8			2880	
-SPACE-				9	A	10	30A	2880		ABB/GE INFINITY RECTIFIER 3
-SPACE-				11	B	12			2880	
-SPACE-				13	A	14	30A	2880		ABB/GE INFINITY RECTIFIER 4
-SPACE-				15	B	16			2880	
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS	180	180						11520	11520	
200A MCB, 1ϕ, 24 SPACE, 120/240V			L1		L2					
MB RATING: 65,000 AIC			11700		11700		VOLTAGE AMPS			
			98		98		AMPS			
			98				MAX AMPS			
			123				MAX 125%			

PANEL SCHEDULE | NO SCALE | 2

NOT USED | NO SCALE | 3

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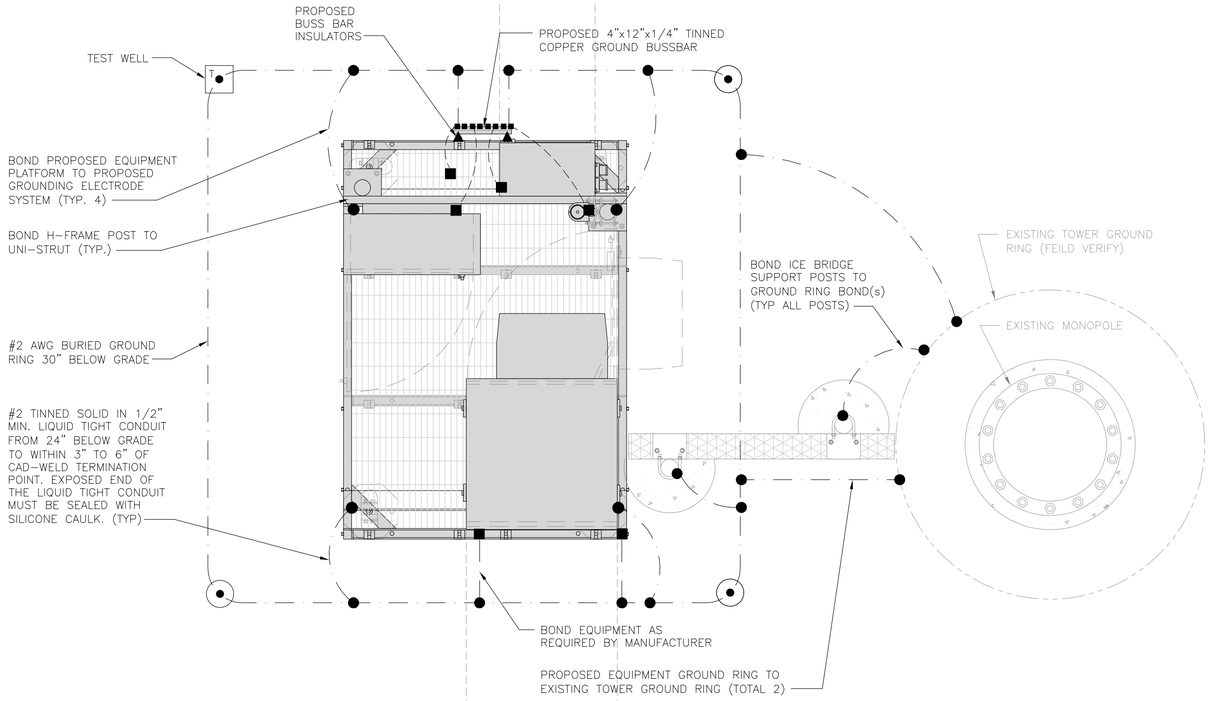
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE
ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

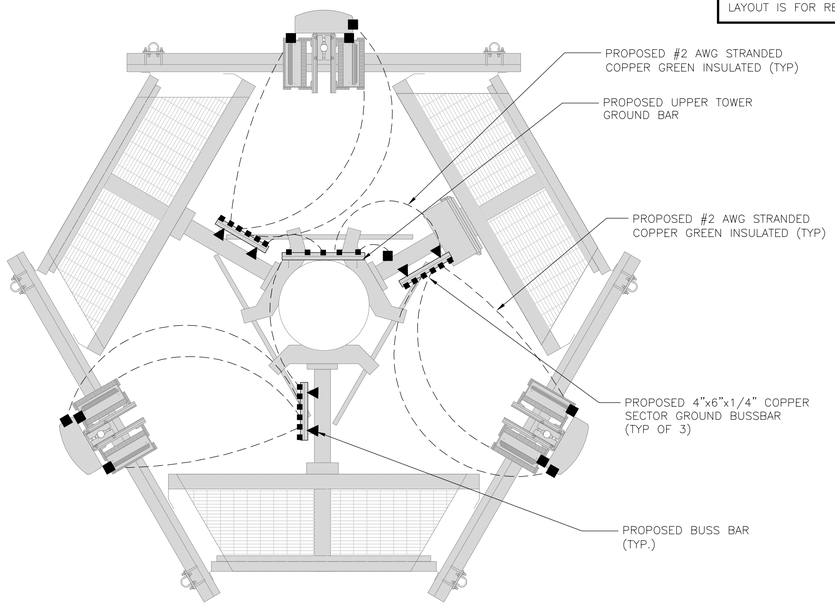
SHEET NUMBER
E-3



TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1

NOTES

ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE PURPOSES ONLY



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

EXOTHERMIC CONNECTION
MECHANICAL CONNECTION
GROUND BUS BAR
GROUND ROD
TEST GROUND ROD WITH INSPECTION SLEEVE
#6 AWG STRANDED & INSULATED
#2 AWG SOLID COPPER TINNED
BUSS BAR INSULATOR

GROUNDING LEGEND

1. GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
2. CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH Wireless L.L.C. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
3. ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

(A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 6 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.

(B) TOWER GROUND RING: THE GROUND RING SYSTEM SHALL BE INSTALLED AROUND AN ANTENNA TOWER'S LEGS, AND/OR GUY ANCHORS. WHERE SEPARATE SYSTEMS HAVE BEEN PROVIDED FOR THE TOWER AND THE BUILDING, AT LEAST TWO BONDS SHALL BE MADE BETWEEN THE TOWER RING GROUND SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.

(C) INTERIOR GROUND RING: #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTOR EXTENDED AROUND THE PERIMETER OF THE EQUIPMENT AREA. ALL NON-TELECOMMUNICATIONS RELATED METALLIC OBJECTS FOUND WITHIN A SITE SHALL BE GROUNDED TO THE INTERIOR GROUND RING WITH #6 AWG STRANDED GREEN INSULATED CONDUCTOR.

(D) BOND TO INTERIOR GROUND RING: #2 AWG SOLID TINNED COPPER WIRE PRIMARY BONDS SHALL BE PROVIDED AT LEAST AT FOUR POINTS ON THE INTERIOR GROUND RING, LOCATED AT THE CORNERS OF THE BUILDING.

(E) GROUND ROD: UL LISTED COPPER CLAD STEEL. MINIMUM 1/2" DIAMETER BY EIGHT FEET LONG. GROUND RODS SHALL BE INSTALLED WITH INSPECTION SLEEVES. GROUND RODS SHALL BE DRIVEN TO THE DEPTH OF GROUND RING CONDUCTOR.

(F) CELL REFERENCE GROUND BAR: POINT OF GROUND REFERENCE FOR ALL COMMUNICATIONS EQUIPMENT FRAMES. ALL BONDS ARE MADE WITH #2 AWG UNLESS NOTED OTHERWISE STRANDED GREEN INSULATED COPPER CONDUCTORS. BOND TO GROUND RING WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.

(G) HATCH PLATE GROUND BAR: BOND TO THE INTERIOR GROUND RING WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A HATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE HATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.

(H) EXTERIOR CABLE ENTRY PORT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE BUILDING. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH AN EXOTHERMIC WELD AND INSPECTION SLEEVE.

(I) TELCO GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.

(J) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.

(K) INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.

(L) FENCE AND GATE GROUNDING: METAL FENCES WITHIN 7 FEET OF THE EXTERIOR GROUND RING OR OBJECTS BONDED TO THE EXTERIOR GROUND RING SHALL BE BONDED TO THE GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.

(M) EXTERIOR UNIT BONDS: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE EXTERIOR GROUND RING. USING #2 TINNED SOLID COPPER WIRE

(N) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.

(O) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR

(P) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR.

REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES | NO SCALE | 3

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23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

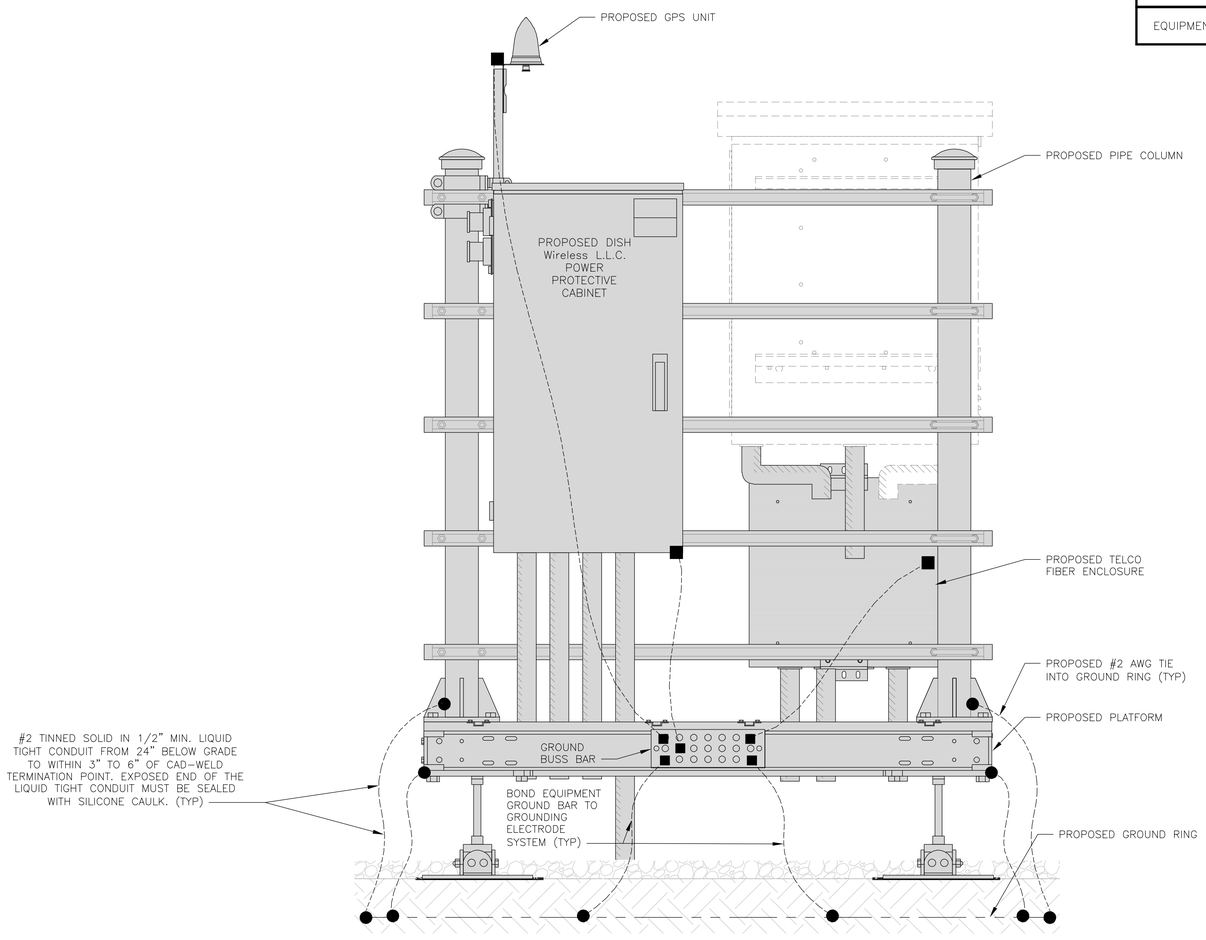
GROUNDING PLANS AND NOTES

SHEET NUMBER

G-1

NOTES

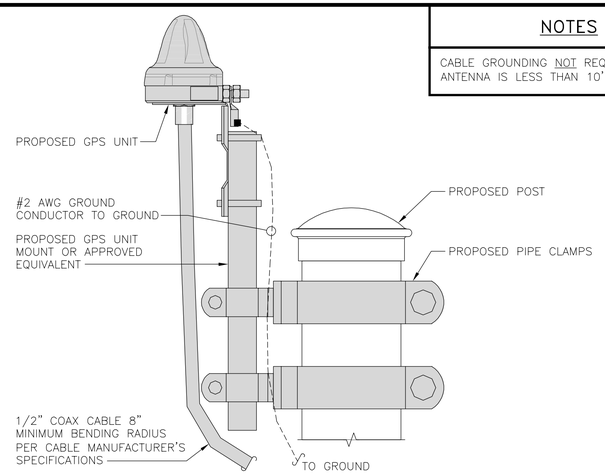
EQUIPMENT CABINET OMITTED FOR CLARITY



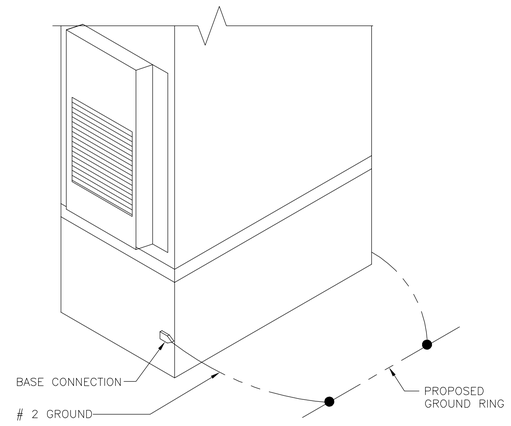
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

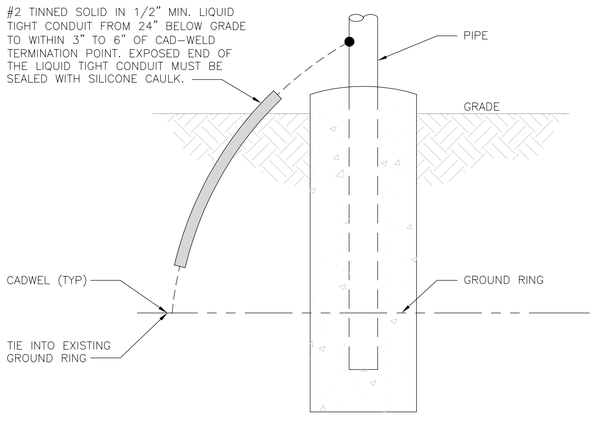
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



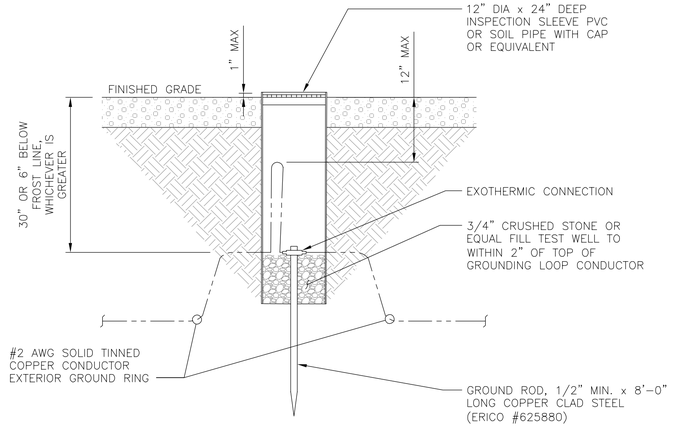
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



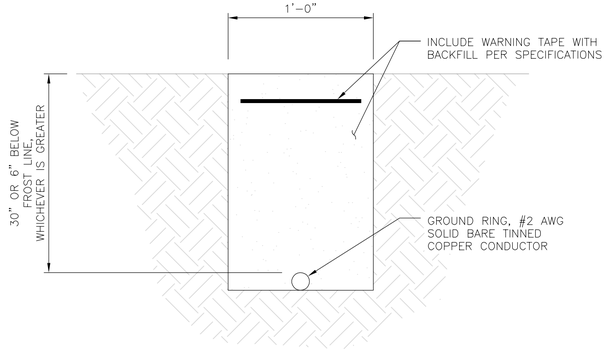
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE | NO SCALE | 5



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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PROFESSIONAL ENGINEER
LICENSE #PEN.0028997

DRAWN BY:	CHECKED BY:	APPROVED BY:
BPC	BRN	TA

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	11/10/2021	ISSUED FOR CONSTRUCTION
1	03/09/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876346

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

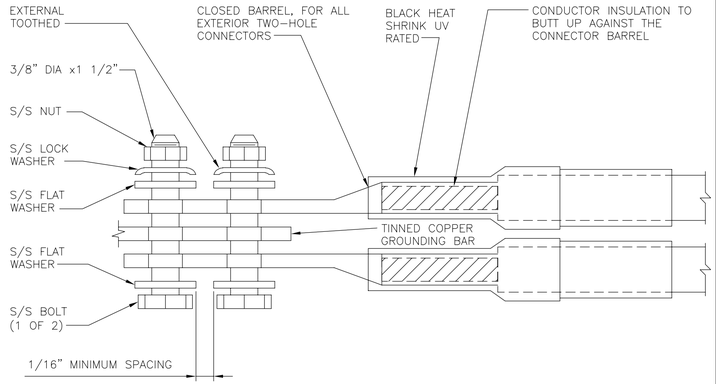
GROUNDING DETAILS

SHEET NUMBER

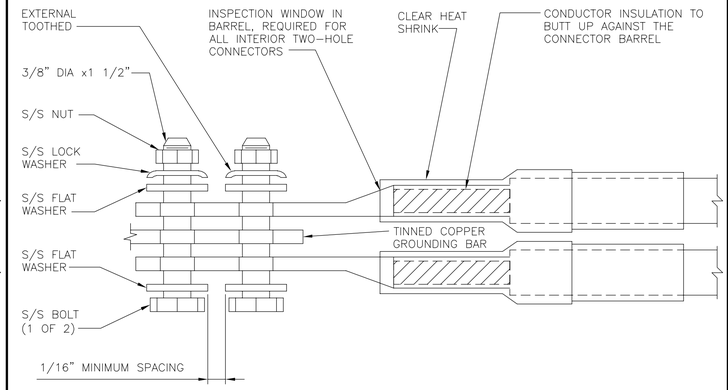
G-2

1. EXOTHERMIC WELD (2) TWO, #2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUND BAR, ROUTE CONDUCTORS TO BURIED GROUND RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. ALL EXTERIOR GROUNDING HARDWARE SHALL BE STAINLESS STEEL 3/8" DIAMETER OR LARGER. ALL HARDWARE 18-8 STAINLESS STEEL INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.
6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.
8. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).

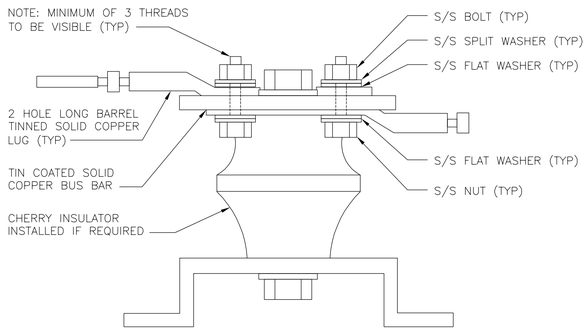
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.

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STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
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UNION, CT 06076

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

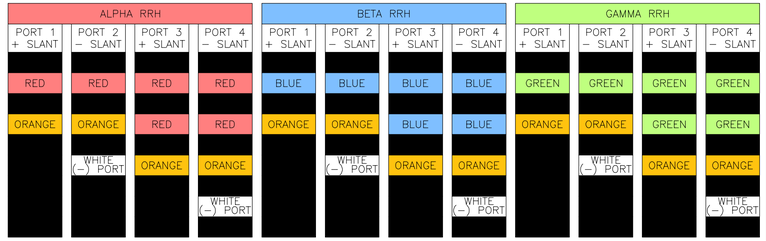
G-3

HYBRID/DISCREET CABLES

3/4" TAPE WIDTHS WITH 3/4" SPACING

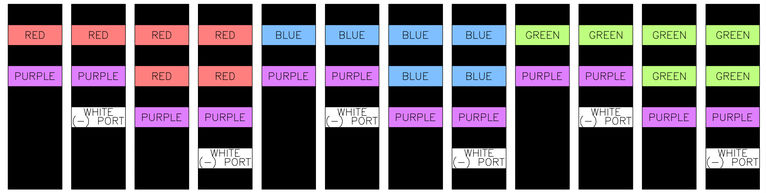
LOW-BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) - OPTIONAL PER MARKET

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BAND)



MID-BAND RRH
(AWS BANDS N66+N70)

ADD FREQUENCY COLOR TO SECTOR BAND
(CBRS WILL USE YELLOW BANDS)



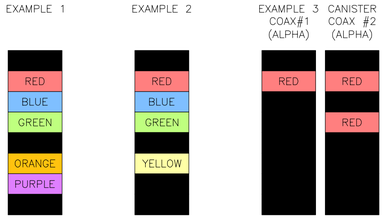
HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

EXAMPLE 1 - HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS.

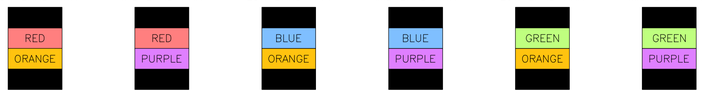
EXAMPLE 2 - HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.

EXAMPLE 3 - MAIN COAX WITH GROUND MOUNTED RRHs.



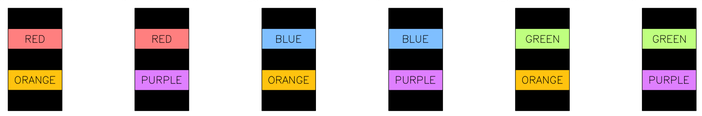
FIBER JUMPERS TO RRHs

LOW-BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.



POWER CABLES TO RRHs

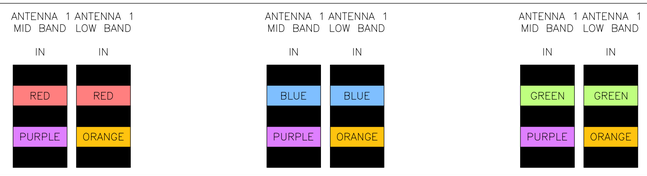
LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

RET CONTROL IS HANDLED BY THE MID-BAND RRH WHEN ONE SET OF RET PORTS EXIST ON ANTENNA.

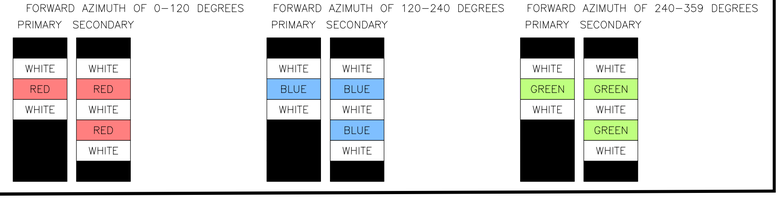
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.



MICROWAVE RADIO LINKS

LINKS WILL HAVE A 1.5-2 INCH WHITE WRAP WITH THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH ADDITIONAL MW RADIO.

MICROWAVE CABLES WILL REQUIRE P-TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE LOCAL AND REMOTE SITE ID's.



RF CABLE COLOR CODES | | 1

LOW BANDS (N71+N26) OPTIONAL - (N29)
ORANGE

AWS (N66+N70+H-BLOCK)
PURPLE

CBRS TECH (3 GHz)
YELLOW

NEGATIVE SLANT PORT ON ANT/RRH
WHITE

ALPHA SECTOR
RED

BETA SECTOR
BLUE

GAMMA SECTOR
GREEN

COLOR IDENTIFIER | | 2

NOT USED | | 3

NOT USED | | 4

dish wireless.

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STATE OF CONNECTICUT - KRISHNAN KOLANDAIVELU - PEN.0028997 - LICENSED PROFESSIONAL ENGINEER

03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
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DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE
RF
CABLE COLOR CODES

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE

FLUORESCENT LIGHTING FIXTURE
(2) TWO LAMPS 48–T8

SMOKE DETECTION (DC)

EMERGENCY LIGHTING (DC)

SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW
LED–1–25A400/51K–SR4–120–PE–DDBTXD

CHAIN LINK FENCE

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE

UNDERGROUND POWER

UNDERGROUND TELCO

OVERHEAD POWER

OVERHEAD TELCO

UNDERGROUND TELCO/POWER

ABOVE GROUND POWER

ABOVE GROUND TELCO

ABOVE GROUND TELCO/POWER

WORKPOINT

W.P.

SECTION REFERENCE

XX
X–X

DETAIL REFERENCE

XX
X–X

ABBREVIATIONS

AB	ANCHOR BOLT
ABV	ABOVE
AC	ALTERNATING CURRENT
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGL	ABOVE GROUND LEVEL
AIC	AMPERAGE INTERRUPTION CAPACITY
ALUM	ALUMINUM
ALT	ALTERNATE
ANT	ANTENNA
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BTC	BARE TINNED COPPER CONDUCTOR
BOF	BOTTOM OF FOOTING
CAB	CABINET
CANT	CANTILEVERED
CHG	CHARGING
CLG	CEILING
CLR	CLEAR
COL	COLUMN
COMM	COMMON
CONC	CONCRETE
CONSTR	CONSTRUCTION
DBL	DOUBLE
DC	DIRECT CURRENT
DEPT	DEPARTMENT
DF	DOUGLAS FIR
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DWG	DRAWING
DWL	DOWEL
EA	EACH
EC	ELECTRICAL CONDUCTOR
EL.	ELEVATION
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ENG	ENGINEER
EQ	EQUAL
EXP	EXPANSION
EXT	EXTERIOR
EW	EACH WAY
FAB	FABRICATION
FF	FINISH FLOOR
FG	FINISH GRADE
FIF	FACILITY INTERFACE FRAME
FIN	FINISH(ED)
FLR	FLOOR
FDN	FOUNDATION
FOC	FACE OF CONCRETE
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FS	FINISH SURFACE
FT	FOOT
FTG	FOOTING
GA	GAUGE
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GLB	GLUE LAMINATED BEAM
GLV	GALVANIZED
GPS	GLOBAL POSITIONING SYSTEM
GND	GROUND
GSM	GLOBAL SYSTEM FOR MOBILE
HDG	HOT DIPPED GALVANIZED
HDR	HEADER
HGR	HANGER
HVAC	HEAT/VENTILATION/AIR CONDITIONING
HT	HEIGHT
IGR	INTERIOR GROUND RING
IN	INCH
INT	INTERIOR
LB(S)	POUND(S)
LF	LINEAR FEET
LTE	LONG TERM EVOLUTION
MAS	MASONRY
MAX	MAXIMUM
MB	MACHINE BOLT
MECH	MECHANICAL
MFR	MANUFACTURER
MGB	MASTER GROUND BAR
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
MTS	MANUAL TRANSFER SWITCH
MW	MICROWAVE
NEC	NATIONAL ELECTRIC CODE
NM	NEWTON METERS
NO.	NUMBER
#	NUMBER
NTS	NOT TO SCALE
OC	ON–CENTER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OPNG	OPENING
P/C	PRECAST CONCRETE
PCS	PERSONAL COMMUNICATION SERVICES
PCU	PRIMARY CONTROL UNIT
PRC	PRIMARY RADIO CABINET
PP	POLARIZING PRESERVING
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED
PWR	POWER CABINET
QTY	QUANTITY
RAD	RADIUS
RECT	RECTIFIER
REF	REFERENCE
REINF	REINFORCEMENT
REQ'D	REQUIRED
RET	REMOTE ELECTRIC TILT
RF	RADIO FREQUENCY
RMC	RIGID METALLIC CONDUIT
RRH	REMOTE RADIO HEAD
RRU	REMOTE RADIO UNIT
RWY	RACEWAY
SCH	SCHEDULE
SHT	SHEET
SIAD	SMART INTEGRATED ACCESS DEVICE
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
TEMP	TEMPORARY
THK	THICKNESS
TMA	TOWER MOUNTED AMPLIFIER
TN	TOE NAIL
TOA	TOP OF ANTENNA
TOC	TOP OF CURB
TOF	TOP OF FOUNDATION
TOP	TOP OF PLATE (PARAPET)
TOS	TOP OF STEEL
TOW	TOP OF WALL
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
UMTS	UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM
UPS	UNITERRUPTIBLE POWER SYSTEM (DC POWER PLANT)
VIF	VERIFIED IN FIELD
W	WIDE
W/	WITH
WD	WOOD
WP	WEATHERPROOF
WT	WEIGHT

dish wireless.

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DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH Wireless L.L.C. AND TOWER OWNER NOC & THE DISH Wireless L.L.C. AND TOWER OWNER CONSTRUCTION MANAGER.

2. "LOOK UP" – DISH Wireless L.L.C. AND TOWER OWNER SAFETY CLIMB REQUIREMENT:

THE INTEGRITY OF THE SAFETY CLIMB AND ALL COMPONENTS OF THE CLIMBING FACILITY SHALL BE CONSIDERED DURING ALL STAGES OF DESIGN, INSTALLATION, AND INSPECTION. TOWER MODIFICATION, MOUNT REINFORCEMENTS, AND/OR EQUIPMENT INSTALLATIONS SHALL NOT COMPROMISE THE INTEGRITY OR FUNCTIONAL USE OF THE SAFETY CLIMB OR ANY COMPONENTS OF THE CLIMBING FACILITY ON THE STRUCTURE. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO: PINCHING OF THE WIRE ROPE, BENDING OF THE WIRE ROPE FROM ITS SUPPORTS, DIRECT CONTACT OR CLOSE PROXIMITY TO THE WIRE ROPE WHICH MAY CAUSE FRICTIONAL WEAR, IMPACT TO THE ANCHORAGE POINTS IN ANY WAY, OR TO IMPEDE/BLOCK ITS INTENDED USE. ANY COMPROMISED SAFETY CLIMB, INCLUDING EXISTING CONDITIONS MUST BE TAGGED OUT AND REPORTED TO YOUR DISH Wireless L.L.C. AND DISH Wireless L.L.C. AND TOWER OWNER POC OR CALL THE NOC TO GENERATE A SAFETY CLIMB MAINTENANCE AND CONTRACTOR NOTICE TICKET.

3. PRIOR TO THE START OF CONSTRUCTION, ALL REQUIRED JURISDICTIONAL PERMITS SHALL BE OBTAINED. THIS INCLUDES, BUT IS NOT LIMITED TO, BUILDING, ELECTRICAL, MECHANICAL, FIRE, FLOOD ZONE, ENVIRONMENTAL, AND ZONING. AFTER ONSITE ACTIVITIES AND CONSTRUCTION ARE COMPLETED, ALL REQUIRED PERMITS SHALL BE SATISFIED AND CLOSED OUT ACCORDING TO LOCAL JURISDICTIONAL REQUIREMENTS.

4. ALL CONSTRUCTION MEANS AND METHODS; INCLUDING BUT NOT LIMITED TO, ERECTION PLANS, RIGGING PLANS, CLIMBING PLANS, AND RESCUE PLANS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR RESPONSIBLE FOR THE EXECUTION OF THE WORK CONTAINED HEREIN, AND SHALL MEET ANSI/ASSE A10.48 (LATEST EDITION); FEDERAL, STATE, AND LOCAL REGULATIONS; AND ANY APPLICABLE INDUSTRY CONSENSUS STANDARDS RELATED TO THE CONSTRUCTION ACTIVITIES BEING PERFORMED. ALL RIGGING PLANS SHALL ADHERE TO ANSI/ASSE A10.48 (LATEST EDITION) AND DISH Wireless L.L.C. AND TOWER OWNER STANDARDS, INCLUDING THE REQUIRED INVOLVEMENT OF A QUALIFIED ENGINEER FOR CLASS IV CONSTRUCTION, TO CERTIFY THE SUPPORTING STRUCTURE(S) IN ACCORDANCE WITH ANSI/TIA–322 (LATEST EDITION).

5. ALL SITE WORK TO COMPLY WITH DISH Wireless L.L.C. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH Wireless L.L.C. AND TOWER OWNER TOWER SITE AND LATEST VERSION OF ANSI/TIA–1019–A–2012 "STANDARD FOR INSTALLATION, ALTERATION, AND MAINTENANCE OF ANTENNA SUPPORTING STRUCTURES AND ANTENNAS."

6. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY DISH Wireless L.L.C. AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

9. THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.

10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES WHERE ENCOUNTERED IN THE WORK, SHALL BE PROTECTED AT ALL TIMES AND WHERE REQUIRED FOR THE PROPER EXECUTION OF THE WORK, SHALL BE RELOCATED AS DIRECTED BY CONTRACTOR. EXTREME CAUTION SHOULD BE USED BY THE CONTRACTOR WHEN EXCAVATING OR DRILLING PIERS AROUND OR NEAR UTILITIES. CONTRACTOR SHALL PROVIDE SAFETY TRAINING FOR THE WORKING CREW. THIS WILL INCLUDE BUT NOT BE LIMITED TO A) FALL PROTECTION B) CONFINED SPACE C) ELECTRICAL SAFETY D) TRENCHING AND EXCAVATION E) CONSTRUCTION SAFETY PROCEDURES.

11. ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.

12. CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH AT THE COMPLETION OF THE WORK. IF NECESSARY, RUBBISH, STUMPS, DEBRIS, STICKS, STONES AND OTHER REFUSE SHALL BE REMOVED FROM THE SITE AND DISPOSED OF LEGALLY.

13. ALL EXISTING INACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER UTILITIES, WHICH INTERFERE WITH THE EXECUTION OF THE WORK, SHALL BE REMOVED AND/OR CAPPED, PLUGGED OR OTHERWISE DISCONTINUED AT POINTS WHICH WILL NOT INTERFERE WITH THE EXECUTION OF THE WORK, SUBJECT TO THE APPROVAL OF DISH Wireless L.L.C. AND TOWER OWNER, AND/OR LOCAL UTILITIES.

14. THE CONTRACTOR SHALL PROVIDE SITE SIGNAGE IN ACCORDANCE WITH THE TECHNICAL SPECIFICATION FOR SITE SIGNAGE REQUIRED BY LOCAL JURISDICTION AND SIGNAGE REQUIRED ON INDIVIDUAL PIECES OF EQUIPMENT, ROOMS, AND SHELTERS.

15. THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.

16. THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.

17. THE AREAS OF THE OWNERS PROPERTY DISTURBED BY THE WORK AND NOT COVERED BY THE TOWER, EQUIPMENT OR DRIVEWAY, SHALL BE GRADED TO A UNIFORM SLOPE, AND STABILIZED TO PREVENT EROSION AS SPECIFIED ON THE CONSTRUCTION DRAWINGS AND/OR PROJECT SPECIFICATIONS.

18. CONTRACTOR SHALL MINIMIZE DISTURBANCE TO EXISTING SITE DURING CONSTRUCTION. EROSION CONTROL MEASURES, IF REQUIRED DURING CONSTRUCTION, SHALL BE IN CONFORMANCE WITH THE LOCAL GUIDELINES FOR EROSION AND SEDIMENT CONTROL.

19. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF OWNER.

20. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS AND RADIOS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

21. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

22. NO FILL OR EMBANKMENT MATERIAL SHALL BE PLACED ON FROZEN GROUND. FROZEN MATERIALS, SNOW OR ICE SHALL NOT BE PLACED IN ANY FILL OR EMBANKMENT.

GENERAL NOTES:

1.FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

2. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE ENGINEERS IN THIS OR SIMILAR LOCALITIES. IT IS ASSUMED THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR AND/OR WORKPEOPLE WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR MISCELLANEOUS WORK NOT EXPLICITLY SHOWN.

3. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS OR METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY FOR PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, FORMWORK, SHORING, ETC. SITE VISITS BY THE ENGINEER OR HIS REPRESENTATIVE WILL NOT INCLUDE INSPECTION OF THESE ITEMS AND IS FOR STRUCTURAL OBSERVATION OF THE FINISHED STRUCTURE ONLY.

4. NOTES AND DETAILS IN THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL NOTES AND TYPICAL DETAILS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT, AND/OR AS PROVIDED FOR IN THE CONTRACT DOCUMENTS. WHERE DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL NOTES, AND SPECIFICATIONS, THE GREATER, MORE STRICT REQUIREMENTS, SHALL GOVERN. IF FURTHER CLARIFICATION IS REQUIRED CONTACT THE ENGINEER OF RECORD.

5. SUBSTANTIAL EFFORT HAS BEEN MADE TO PROVIDE ACCURATE DIMENSIONS AND MEASUREMENTS ON THE DRAWINGS TO ASSIST IN THE FABRICATION AND/OR PLACEMENT OF CONSTRUCTION ELEMENTS BUT IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO FIELD VERIFY THE DIMENSIONS, MEASUREMENTS, AND/OR CLEARANCES SHOWN IN THE CONSTRUCTION DRAWINGS PRIOR TO FABRICATION OR CUTTING OF ANY NEW OR EXISTING CONSTRUCTION ELEMENTS. IF IT IS DETERMINED THAT THERE ARE DISCREPANCIES AND/OR CONFLICTS WITH THE CONSTRUCTION DRAWINGS THE ENGINEER OF RECORD IS TO BE NOTIFIED AS SOON AS POSSIBLE.

6. PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING CONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CARRIER POC AND TOWER OWNER.

7. ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES. CONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.

8. UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.

9. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.

10. IF THE SPECIFIED EQUIPMENT CAN NOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CARRIER AND TOWER OWNER PRIOR TO PROCEEDING WITH ANY SUCH CHANGE OF INSTALLATION.

11. CONTRACTOR IS TO PERFORM A SITE INVESTIGATION, BEFORE SUBMITTING BIDS, TO DETERMINE THE BEST ROUTING OF ALL CONDUITS FOR POWER, AND TELCO AND FOR GROUNDING CABLES AS SHOWN IN THE POWER, TELCO, AND GROUNDING PLAN DRAWINGS.

12. THE CONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT CONTRACTOR'S EXPENSE TO THE SATISFACTION OF DISH Wireless L.L.C. AND TOWER OWNER

13. CONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER'S DESIGNATED LOCATION.

14. CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.

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03/09/2022

KRUPAKARAN KOLANDAIVELU, P.E.
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DRAWN BY:	CHECKED BY:	APPROVED BY:
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A&E PROJECT NUMBER

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DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.

2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.

3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.

4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.

5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.

2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.

3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.

4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.

4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.

4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.

5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.

6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).

7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.

8. TIE WRAPS ARE NOT ALLOWED.

9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.

12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.

13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).

14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.

15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.

18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.

19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.

20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.

21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).

22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).

23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.

25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.

27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.

28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.

29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.".

30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.

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RFDS REV #: ---

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A&E PROJECT NUMBER

876346

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00873A
23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

GROUNDING NOTES:

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.

2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.

3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.

4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #6 COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.

5. METAL RACEWAY SHALL NOT BE USED AS THE NEC REQUIRED EQUIPMENT GROUND CONDUCTOR. STRANDED COPPER CONDUCTORS WITH GREEN INSULATION, SIZED IN ACCORDANCE WITH THE NEC, SHALL BE FURNISHED AND INSTALLED WITH THE POWER CIRCUITS TO BTS EQUIPMENT.

6. EACH CABINET FRAME SHALL BE DIRECTLY CONNECTED TO THE MASTER GROUND BAR WITH GREEN INSULATED SUPPLEMENTAL EQUIPMENT GROUND WIRES, #6 STRANDED COPPER OR LARGER FOR INDOOR BTS; #2 BARE SOLID TINNED COPPER FOR OUTDOOR BTS.

7. CONNECTIONS TO THE GROUND BUS SHALL NOT BE DOUBLED UP OR STACKED BACK TO BACK CONNECTIONS ON OPPOSITE SIDE OF THE GROUND BUS ARE PERMITTED.

8. ALL EXTERIOR GROUND CONDUCTORS BETWEEN EQUIPMENT/GROUND BARS AND THE GROUND RING SHALL BE #2 SOLID TINNED COPPER UNLESS OTHERWISE INDICATED.

9. ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.

10. USE OF 90° BENDS IN THE PROTECTION GROUNDING CONDUCTORS SHALL BE AVOIDED WHEN 45° BENDS CAN BE ADEQUATELY SUPPORTED.

11. EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.

12. ALL GROUND CONNECTIONS ABOVE GRADE (INTERIOR AND EXTERIOR) SHALL BE FORMED USING HIGH PRESS CRIMPS.

13. COMPRESSION GROUND CONNECTIONS MAY BE REPLACED BY EXOTHERMIC WELD CONNECTIONS.

14. ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED TO THE BRIDGE AND THE TOWER GROUND BAR.

15. APPROVED ANTIOXIDANT COATINGS (i.e. CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.

16. ALL EXTERIOR GROUND CONNECTIONS SHALL BE COATED WITH A CORROSION RESISTANT MATERIAL.

17. MISCELLANEOUS ELECTRICAL AND NON-ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.

18. BOND ALL METALLIC OBJECTS WITHIN 6 ft OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.

19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.

20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).

21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.

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23 HOLLAND ROAD
UNION, CT 06076

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Date: **October 01, 2021**

Crown Castle
2000 Corporate Dr.
Canonsburg, PA
(724) 416-2000

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate** **Site Number:**	 BOBOS00873A
Crown Castle Designation:	**BU Number:** **Site Name:** **JDE Job Number:** **Work Order Number:** **Order Number:**	876346 UNION 671531 2013637 572902 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	2013637
Site Data:	**23 Holland Road, Union, Tolland County, CT** **Latitude *42° 1' 45.94"*, Longitude *-72° 8' 23.54"*** **150 Foot - Monopole Tower**	

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

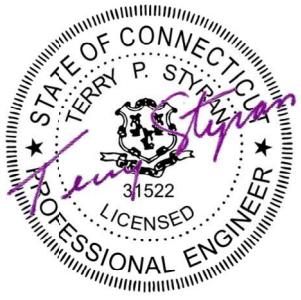
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity-98.9%**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 118 mph. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Alexander Greguric, E.I.T.

Respectfully submitted by:



Terry P Styran
2021.10.01
18:50:36 -04'00'

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

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1) INTRODUCTION

This tower is a 150 ft Monopole tower designed by ROHN. The tower has been modified in the past to accommodate additional loading.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	118 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)
119.0	119.0	3	fujitsu	TA08025-B604	1	1-1/2
		3	fujitsu	TA08025-B605		
		3	jma wireless	MX08FRO665-21 w/ Mount Pipe		
		1	raycap	RDIDC-9181-PF-48		
		1	tower mounts	Commscope MC-PK8-DSH		

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)
147.0	147.0	2	alcatel lucent	PCS 1900MHz 4x45W-65MHz	8	1-1/4
		4	alcatel lucent	RRH2X50-800		
		2	commscope	NNVV-65B-R4 w/ Mount Pipe		
		4	decibel	DB980H90E-M w/ Mount Pipe		
		2	nokia	FZHN		
		2	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe		
		1	tower mounts	Platform Mount [LP 502-1]		
139.0	140.0	3	cci antennas	HPA65R-BU4A w/ Mount Pipe	2 6 4 6	3/8 3/4 1-1/4 1-5/8
		3	cci antennas	OPA65R-BU4D w/ Mount Pipe		
		3	ericsson	RRUS 4449 B5/B12		
		3	ericsson	RRUS 4478 B14		
		3	ericsson	RRUS 8843 B2/B66A		
		3	kathrein	80010964 w/ Mount Pipe		
		2	powerwave technologies	7770.00 w/ Mount Pipe		
		4	powerwave technologies	LGP21401		
		1	raycap	DC6-48-60-18-8C		
		2	raycap	DC6-48-60-18-8F		
	139.0	1	tower mounts	Platform Mount [LP 1201-1_HR-1]		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
129.0	130.0	3	kathrein	800 10504 w/ Mount Pipe	1 6	3/8 1-5/8
		3	kathrein	860 10118		
	129.0	1	tower mounts	T-Arm Mount [TA 602-3]		
60.0	61.0	1	lucent	KS24019-L112A	1	1/2
	60.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1855010	CCISITES
4-POST-MODIFICATION INSPECTION	3716688	CCISITES
4-POST-MODIFICATION INSPECTION	7634325	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1447038	CCISITES
4-TOWER MANUFACTURER DRAWINGS	1406212	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	2425474	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	3252388	CCISITES

3.1) Analysis Method

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

tnxTower was used to determine the loads on the modified structure. Additional calculations were performed to determine the stresses in the pole and in the reinforcing elements. These calculations are included in Appendix C.

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.
3) Base and flange plate design methodology of the manufacturer has been reviewed and found to be an acceptable means of designing to resist the full capacity of the bolts and shaft.

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)

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
150 - 146	Pole	TP24x24x0.25	Pole	2.7%	Pass
146 - 142	Pole	TP24x24x0.25	Pole	5.1%	Pass
142 - 138	Pole	TP24x24x0.25	Pole	11.3%	Pass

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
138 - 134	Pole	TP24x24x0.25	Pole	19.6%	Pass
134 - 130	Pole	TP24x24x0.25	Pole	28.1%	Pass
130 - 126	Pole	TP24x24x0.25	Pole	37.9%	Pass
126 - 122	Pole	TP24x24x0.25	Pole	48.0%	Pass
122 - 120	Pole	TP24x24x0.25	Pole	53.2%	Pass
120 - 116	Pole	TP30x30x0.375	Pole	27.9%	Pass
116 - 112	Pole	TP30x30x0.375	Pole	33.7%	Pass
112 - 108	Pole	TP30x30x0.375	Pole	39.6%	Pass
108 - 104	Pole	TP30x30x0.375	Pole	45.6%	Pass
104 - 100	Pole	TP30x30x0.375	Pole	51.7%	Pass
100 - 96	Pole	TP30x30x0.375	Pole	57.9%	Pass
96 - 92	Pole	TP30x30x0.375	Pole	64.2%	Pass
92 - 90	Pole	TP30x30x0.375	Pole	67.4%	Pass
90 - 86	Pole	TP36x36x0.375	Pole	52.6%	Pass
86 - 82	Pole	TP36x36x0.375	Pole	57.3%	Pass
82 - 78	Pole	TP36x36x0.375	Pole	62.0%	Pass
78 - 74	Pole	TP36x36x0.375	Pole	66.9%	Pass
74 - 70	Pole	TP36x36x0.375	Pole	71.8%	Pass
70 - 66	Pole	TP36x36x0.375	Pole	76.8%	Pass
66 - 62	Pole	TP36x36x0.375	Pole	81.9%	Pass
62 - 60	Pole	TP36x36x0.375	Pole	84.5%	Pass
60 - 56	Pole	TP42x42x0.375	Pole	67.1%	Pass
56 - 52	Pole	TP42x42x0.375	Pole	71.0%	Pass
52 - 48	Pole	TP42x42x0.375	Pole	75.1%	Pass
48 - 44	Pole	TP42x42x0.375	Pole	79.1%	Pass
44 - 40.25	Pole	TP42x42x0.375	Pole	83.0%	Pass
40.25 - 40	Pole	TP42x42x0.375	Pole	83.3%	Pass
40 - 36	Pole	TP42x42x0.375	Pole	87.5%	Pass
36 - 32	Pole	TP42x42x0.375	Pole	91.7%	Pass
32 - 30	Pole	TP42x42x0.375	Pole	93.9%	Pass
30 - 29.75	Pole	TP42x42x0.5	Pole	68.6%	Pass
29.75 - 25.75	Pole	TP42x42x0.5	Pole	71.8%	Pass
25.75 - 21.75	Pole	TP42x42x0.5	Pole	75.0%	Pass
21.75 - 17.75	Pole	TP42x42x0.5	Pole	78.3%	Pass
17.75 - 13.75	Pole	TP42x42x0.5	Pole	81.6%	Pass
13.75 - 9.75	Pole	TP42x42x0.5	Pole	84.9%	Pass
9.75 - 7.92	Pole	TP42x42x0.5	Pole	86.4%	Pass
7.92 - 7.67	Pole	TP42x42x0.5	Pole	86.6%	Pass
7.67 - 3.67	Pole	TP42x42x0.5	Pole	90.0%	Pass
3.67 - 0	Pole	TP42x42x0.5	Pole	93.0%	Pass
				Summary	
			Pole	93.9%	Pass
			Reinforcement	0.0%	Pass
			Overall	93.9%	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1,2	Flange Connection	120	53.2	Pass
1,2	Flange Connection	90	67.4	Pass
1,2	Flange Connection	60	84.5	Pass
1,2	Flange Connection	30	93.9	Pass
1	Anchor Rods	0	98.9	Pass
1,2	Base Plate	0	98.9	Pass
1	Base Foundation (Structure)	0	30.8	Pass
1	Base Foundation (Soil Interaction)	0	87.8	Pass

Structure Rating (max from all components) =	98.9%

Notes:
1) See additional documentation in “Appendix C – Additional Calculations” for calculations supporting the % capacity consumed.
2) Base/Flange plates are assumed to have the same capacity as their respective splice bolts or shaft.

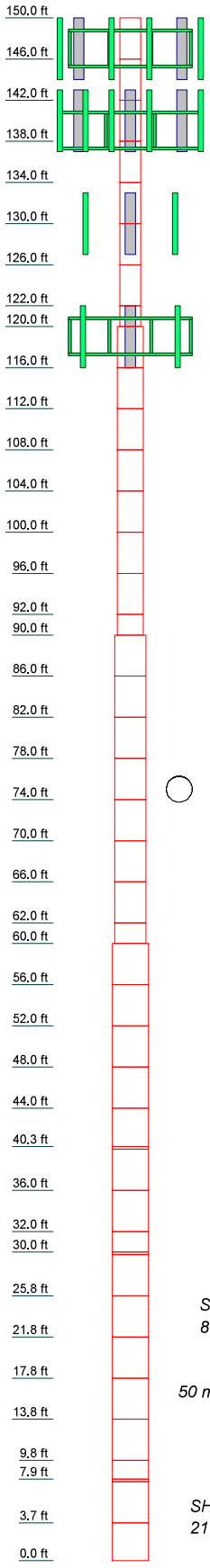
4.1) Recommendations

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

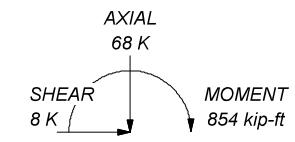
APPENDIX A

TNXTOWER OUTPUT

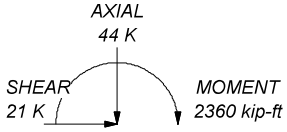
Section	Size	Length (ft)	Grade	Weight (K)
1	P24x0.25	4.00	A53-B-42	0.3
2	P24x0.25	4.00		0.3
3	P24x0.25	4.00		0.3
4	P24x0.25	4.00		0.3
5	P24x0.25	4.00		0.3
6	P24x0.25	4.00		0.3
7	P24x0.25	4.00		0.3
8	P24x0.25	2.00		0.1
9	P30x0.375	4.00		0.5
10	P30x0.375	4.00		0.5
11	P30x0.375	4.00		0.5
12	P30x0.375	4.00		0.5
13	P30x0.375	4.00		0.5
14	P30x0.375	4.00		0.5
15	P30x0.375	4.00		0.5
16	P30x0.375	2.00		0.2
17	P36x0.375	4.00		0.6
18	P36x0.375	4.00		0.6
19	P36x0.375	4.00		0.6
20	P36x0.375	4.00		0.6
21	P36x0.375	4.00		0.6
22	P36x0.375	4.00		0.6
23	P36x0.375	4.00		0.6
24	P36x0.375	2.00		0.3
25	P42x0.375	4.00		0.7
26	P42x0.375	4.00		0.7
27	P42x0.375	4.00		0.7
28	P42x0.375	4.00		0.7
29	P42x0.375	3.75		0.6
30	P42x0.375	0.25		0.0
31	P42x0.375	4.00		0.7
32	P42x0.375	4.00		0.7
33	P42x0.375	0.25		0.0
34	P42x0.375	0.25		0.0
35	P42x0.375	4.00		0.9
36	P42x0.375	4.00		0.9
37	P42x0.375	4.00		0.9
38	P42x0.375	4.00		0.9
39	P42x0.375	4.00		0.9
40	P42x0.375	0.25		0.0
41	P42x0.375	0.25		0.0
42	P42x0.375	4.00		0.9
43	P42x0.375	3.67		0.8
				21.4



ALL REACTIONS ARE FACTORED



TORQUE 1 kip-ft
50 mph WIND - 1.5000 in ICE



TORQUE 3 kip-ft
REACTIONS - 118 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A53-B-42	42 ksi	63 ksi			

TOWER DESIGN NOTES

1. Tower is located in Tolland County, Connecticut.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 118 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 0.00 ft
8. TOWER RATING: 93.9%

CROWN CASTLE
The Pathway to Possible

Crown Castle
2000 Corporate Dr.
Canonsburg, PA
Phone: (724) 416-2000
FAX:

Job:	***BU 876346***		
Project:			
Client: Crown Castle	Drawn by: AGreguric		App'd:
Code: TIA-222-H	Date: 10/01/21		Scale: NTS
Path: C:\Users\agreguric\OneDrive - Crown Castle USA Inc\Desktop\Work Area\876346\WO 2013657 - SA\Prod\LC0\876346_rent.er			Dwg No. E-1

Tower Input Data

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

- Tower is located in Tolland County, Connecticut.
- Tower base elevation above sea level: 840.00 ft.
- Basic wind speed of 118 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.00 ft.
- Nominal ice thickness of 1.5000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50 °F.
- Deflections calculated using a wind speed of 60 mph.
- TOWER RATING: %.
- A non-linear (P-delta) analysis was used.
- Pressures are calculated at each section.
- Stress ratio used in pole design is 1.
- Tower analysis based on target reliabilities in accordance with Annex S.
- Load Modification Factors used: $K_{es}(F_w) = 0.95$, $K_{es}(t_i) = 0.85$.
- Maximum demand-capacity ratio is: 1.05.
- Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Pole Section Geometry

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L1	150.00-146.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L2	146.00-142.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L3	142.00-138.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L4	138.00-134.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L5	134.00-130.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L6	130.00-126.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L7	126.00-122.00	4.00	P24x0.25	A53-B-42 (42 ksi)	
L8	122.00-120.00	2.00	P24x0.25	A53-B-42 (42 ksi)	
L9	120.00-116.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L10	116.00-112.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L11	112.00-108.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L12	108.00-104.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L13	104.00-100.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L14	100.00-96.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L15	96.00-92.00	4.00	P30x0.375	A53-B-42 (42 ksi)	
L16	92.00-90.00	2.00	P30x0.375	A53-B-42 (42 ksi)	
L17	90.00-86.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L18	86.00-82.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L19	82.00-78.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L20	78.00-74.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L21	74.00-70.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L22	70.00-66.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L23	66.00-62.00	4.00	P36x0.375	A53-B-42 (42 ksi)	
L24	62.00-60.00	2.00	P36x0.375	A53-B-42 (42 ksi)	
L25	60.00-56.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L26	56.00-52.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L27	52.00-48.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L28	48.00-44.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L29	44.00-40.25	3.75	P42x0.375	A53-B-42 (42 ksi)	
L30	40.25-40.00	0.25	P42x0.375	A53-B-42 (42 ksi)	
L31	40.00-36.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L32	36.00-32.00	4.00	P42x0.375	A53-B-42 (42 ksi)	
L33	32.00-30.00	2.00	P42x0.375	A53-B-42 (42 ksi)	
L34	30.00-29.75	0.25	P42x0.5	A53-B-42 (42 ksi)	
L35	29.75-25.75	4.00	P42x0.5	A53-B-42	

Section	Elevation ft	Section Length ft	Pole Size	Pole Grade	Socket Length ft
L36	25.75-21.75	4.00	P42x0.5	(42 ksi) A53-B-42 (42 ksi)	
L37	21.75-17.75	4.00	P42x0.5	A53-B-42 (42 ksi)	
L38	17.75-13.75	4.00	P42x0.5	A53-B-42 (42 ksi)	
L39	13.75-9.75	4.00	P42x0.5	A53-B-42 (42 ksi)	
L40	9.75-7.92	1.83	P42x0.5	A53-B-42 (42 ksi)	
L41	7.92-7.67	0.25	P42x0.5	A53-B-42 (42 ksi)	
L42	7.67-3.67	4.00	P42x0.5	A53-B-42 (42 ksi)	
L43	3.67-0.00	3.67	P42x0.5	A53-B-42 (42 ksi)	

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 150.00-146.00				1	1	1			
L2 146.00-142.00				1	1	1			
L3 142.00-138.00				1	1	1			
L4 138.00-134.00				1	1	1			
L5 134.00-130.00				1	1	1			
L6 130.00-126.00				1	1	1			
L7 126.00-122.00				1	1	1			
L8 122.00-120.00				1	1	1			
L9 120.00-116.00				1	1	1			
L10 116.00-112.00				1	1	1			
L11 112.00-108.00				1	1	1			
L12 108.00-104.00				1	1	1			
L13 104.00-100.00				1	1	1			
L14 100.00-96.00				1	1	1			
L15 96.00-92.00				1	1	1			
L16 92.00-90.00				1	1	1			
L17 90.00-86.00				1	1	1			
L18 86.00-82.00				1	1	1			
L19 82.00-78.00				1	1	1			
L20 78.00-74.00				1	1	1			
L21 74.00-70.00				1	1	1			
L22 70.00-66.00				1	1	1			

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L23 66.00-62.00				1	1	1			
L24 62.00-60.00				1	1	1			
L25 60.00-56.00				1	1	1			
L26 56.00-52.00				1	1	1			
L27 52.00-48.00				1	1	1			
L28 48.00-44.00				1	1	1			
L29 44.00-40.25				1	1	1			
L30 40.25-40.00				1	1	1			
L31 40.00-36.00				1	1	1			
L32 36.00-32.00				1	1	1			
L33 32.00-30.00				1	1	1			
L34 30.00-29.75				1	1	1			
L35 29.75-25.75				1	1	1			
L36 25.75-21.75				1	1	1			
L37 21.75-17.75				1	1	1			
L38 17.75-13.75				1	1	1			
L39 13.75-9.75				1	1	1			
L40 9.75-7.92				1	1	1			
L41 7.92-7.67				1	1	1			
L42 7.67-3.67				1	1	1			
L43 3.67-0.00				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
** miscl **										
Safety Line 3/8	A	No	Surface Ar (CaAa)	150.00 - 0.00	1	1	-0.250 -0.250	0.3750		0.22
*										
*										
LDF4-50A(1/2)	C	No	Surface Ar (CaAa)	60.00 - 0.00	1	1	0.000 0.050	0.6300		0.15
*										
CU12PSM9P6XXX(1-1/2)	B	No	Surface Ar (CaAa)	119.00 - 0.00	1	1	0.000 0.050	1.6000		2.35
*										
PL 1.25" x 3"	A	No	Surface Af (CaAa)	8.80 - 0.00	1	1	0.250 0.250	3.0000	8.5000	12.76
PL 1.25" x 3"	B	No	Surface Af (CaAa)	8.80 - 0.00	1	1	0.250 0.250	3.0000	8.5000	12.76
PL 1.25" x 3"	C	No	Surface Af (CaAa)	8.80 - 0.00	1	1	0.250 0.250	3.0000	8.5000	12.76
*										

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
PL 1.25" x 3"	A	No	Surface Af (CaAa)	41.20 - 30.20	1	1	0.250 0.250	3.0000	8.5000	12.76
PL 1.25" x 3"	B	No	Surface Af (CaAa)	41.20 - 30.20	1	1	0.250 0.250	3.0000	8.5000	12.76
PL 1.25" x 3"	C	No	Surface Af (CaAa)	41.20 - 30.20	1	1	0.250 0.250	3.0000	8.5000	12.76
*****										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight plf
*									
*									
LDF6-50A(1-1/4)	C	No	No	Inside Pole	147.00 - 0.00	8	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
HJ5-50A(7/8)	C	No	No	Inside Pole	147.00 - 0.00	1	No Ice	0.00	0.54
							1/2" Ice	0.00	0.54
							1" Ice	0.00	0.54
							2" Ice	0.00	0.54
*									
CR 50 1873(1-5/8)	C	No	No	Inside Pole	139.00 - 0.00	6	No Ice	0.00	0.83
							1/2" Ice	0.00	0.83
							1" Ice	0.00	0.83
							2" Ice	0.00	0.83
WR-VG86ST-BRD(3/4)	C	No	No	Inside Pole	137.00 - 0.00	6	No Ice	0.00	0.58
							1/2" Ice	0.00	0.58
							1" Ice	0.00	0.58
							2" Ice	0.00	0.58
FB-L98B-002-75000(3/8)	C	No	No	Inside Pole	139.00 - 0.00	2	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
LDF6-50A(1-1/4)	C	No	No	Inside Pole	139.00 - 0.00	4	No Ice	0.00	0.60
							1/2" Ice	0.00	0.60
							1" Ice	0.00	0.60
							2" Ice	0.00	0.60
2" Rigid Conduit	C	No	No	Inside Pole	139.00 - 0.00	1	No Ice	0.00	2.80
							1/2" Ice	0.00	2.80
							1" Ice	0.00	2.80
							2" Ice	0.00	2.80
*									
FB-L98B-009-50000(3/8)	C	No	No	Inside Pole	129.00 - 0.00	1	No Ice	0.00	0.06
							1/2" Ice	0.00	0.06
							1" Ice	0.00	0.06
							2" Ice	0.00	0.06
LDF7-50A(1 5/8")	C	No	No	Inside Pole	129.00 - 0.00	6	No Ice	0.00	0.82
							1/2" Ice	0.00	0.82
							1" Ice	0.00	0.82
							2" Ice	0.00	0.82
*****									

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-146.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L2	146.00-142.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L3	142.00-138.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L4	138.00-134.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L5	134.00-130.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L6	130.00-126.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L7	126.00-122.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L8	122.00-120.00	A	0.000	0.000	0.075	0.000	0
		B	0.000	0.000	0.000	0.000	0
		C	0.000	0.000	0.000	0.000	0
L9	120.00-116.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.480	0.000	0
		C	0.000	0.000	0.000	0.000	0
L10	116.00-112.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L11	112.00-108.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L12	108.00-104.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L13	104.00-100.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L14	100.00-96.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L15	96.00-92.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L16	92.00-90.00	A	0.000	0.000	0.075	0.000	0
		B	0.000	0.000	0.320	0.000	0
		C	0.000	0.000	0.000	0.000	0
L17	90.00-86.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L18	86.00-82.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L19	82.00-78.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L20	78.00-74.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L21	74.00-70.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L22	70.00-66.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0
L23	66.00-62.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.000	0.000	0

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L24	62.00-60.00	A	0.000	0.000	0.075	0.000	0
		B	0.000	0.000	0.320	0.000	0
		C	0.000	0.000	0.000	0.000	0
L25	60.00-56.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L26	56.00-52.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L27	52.00-48.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L28	48.00-44.00	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L29	44.00-40.25	A	0.000	0.000	0.616	0.000	0
		B	0.000	0.000	1.075	0.000	0
		C	0.000	0.000	0.711	0.000	0
L30	40.25-40.00	A	0.000	0.000	0.134	0.000	0
		B	0.000	0.000	0.165	0.000	0
		C	0.000	0.000	0.141	0.000	0
L31	40.00-36.00	A	0.000	0.000	2.150	0.000	0
		B	0.000	0.000	2.640	0.000	0
		C	0.000	0.000	2.252	0.000	0
L32	36.00-32.00	A	0.000	0.000	2.150	0.000	0
		B	0.000	0.000	2.640	0.000	0
		C	0.000	0.000	2.252	0.000	0
L33	32.00-30.00	A	0.000	0.000	0.975	0.000	0
		B	0.000	0.000	1.220	0.000	0
		C	0.000	0.000	1.026	0.000	0
L34	30.00-29.75	A	0.000	0.000	0.009	0.000	0
		B	0.000	0.000	0.040	0.000	0
		C	0.000	0.000	0.016	0.000	0
L35	29.75-25.75	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L36	25.75-21.75	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L37	21.75-17.75	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L38	17.75-13.75	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L39	13.75-9.75	A	0.000	0.000	0.150	0.000	0
		B	0.000	0.000	0.640	0.000	0
		C	0.000	0.000	0.252	0.000	0
L40	9.75-7.92	A	0.000	0.000	0.509	0.000	0
		B	0.000	0.000	0.733	0.000	0
		C	0.000	0.000	0.555	0.000	0
L41	7.92-7.67	A	0.000	0.000	0.134	0.000	0
		B	0.000	0.000	0.165	0.000	0
		C	0.000	0.000	0.141	0.000	0
L42	7.67-3.67	A	0.000	0.000	2.150	0.000	0
		B	0.000	0.000	2.640	0.000	0
		C	0.000	0.000	2.252	0.000	0
L43	3.67-0.00	A	0.000	0.000	1.973	0.000	0
		B	0.000	0.000	2.422	0.000	0
		C	0.000	0.000	2.066	0.000	0

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	150.00-146.00	A	1.481	0.000	0.000	1.335	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L2	146.00-142.00	A	1.477	0.000	0.000	1.332	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L3	142.00-138.00	A	1.473	0.000	0.000	1.329	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L4	138.00-134.00	A	1.469	0.000	0.000	1.325	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L5	134.00-130.00	A	1.465	0.000	0.000	1.322	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L6	130.00-126.00	A	1.460	0.000	0.000	1.318	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L7	126.00-122.00	A	1.455	0.000	0.000	1.314	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L8	122.00-120.00	A	1.452	0.000	0.000	0.656	0.000	0
		B		0.000	0.000	0.000	0.000	0
		C		0.000	0.000	0.000	0.000	0
L9	120.00-116.00	A	1.448	0.000	0.000	1.309	0.000	0
		B		0.000	0.000	1.349	0.000	0
		C		0.000	0.000	0.000	0.000	0
L10	116.00-112.00	A	1.443	0.000	0.000	1.305	0.000	0
		B		0.000	0.000	1.795	0.000	0
		C		0.000	0.000	0.000	0.000	0
L11	112.00-108.00	A	1.438	0.000	0.000	1.301	0.000	0
		B		0.000	0.000	1.791	0.000	0
		C		0.000	0.000	0.000	0.000	0
L12	108.00-104.00	A	1.433	0.000	0.000	1.296	0.000	0
		B		0.000	0.000	1.786	0.000	0
		C		0.000	0.000	0.000	0.000	0
L13	104.00-100.00	A	1.427	0.000	0.000	1.292	0.000	0
		B		0.000	0.000	1.782	0.000	0
		C		0.000	0.000	0.000	0.000	0
L14	100.00-96.00	A	1.422	0.000	0.000	1.287	0.000	0
		B		0.000	0.000	1.777	0.000	0
		C		0.000	0.000	0.000	0.000	0
L15	96.00-92.00	A	1.416	0.000	0.000	1.283	0.000	0
		B		0.000	0.000	1.773	0.000	0
		C		0.000	0.000	0.000	0.000	0
L16	92.00-90.00	A	1.411	0.000	0.000	0.639	0.000	0
		B		0.000	0.000	0.884	0.000	0
		C		0.000	0.000	0.000	0.000	0
L17	90.00-86.00	A	1.406	0.000	0.000	1.275	0.000	0
		B		0.000	0.000	1.765	0.000	0
		C		0.000	0.000	0.000	0.000	0
L18	86.00-82.00	A	1.400	0.000	0.000	1.270	0.000	0
		B		0.000	0.000	1.760	0.000	0
		C		0.000	0.000	0.000	0.000	0
L19	82.00-78.00	A	1.393	0.000	0.000	1.264	0.000	0
		B		0.000	0.000	1.754	0.000	0
		C		0.000	0.000	0.000	0.000	0
L20	78.00-74.00	A	1.386	0.000	0.000	1.259	0.000	0
		B		0.000	0.000	1.749	0.000	0
		C		0.000	0.000	0.000	0.000	0
L21	74.00-70.00	A	1.378	0.000	0.000	1.253	0.000	0
		B		0.000	0.000	1.743	0.000	0
		C		0.000	0.000	0.000	0.000	0
L22	70.00-66.00	A	1.371	0.000	0.000	1.246	0.000	0
		B		0.000	0.000	1.736	0.000	0
		C		0.000	0.000	0.000	0.000	0
L23	66.00-62.00	A	1.362	0.000	0.000	1.240	0.000	0
		B		0.000	0.000	1.730	0.000	0
		C		0.000	0.000	0.000	0.000	0

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L24	62.00-60.00	A	1.356	0.000	0.000	0.617	0.000	0
		B		0.000	0.000	0.862	0.000	0
		C		0.000	0.000	0.000	0.000	0
L25	60.00-56.00	A	1.349	0.000	0.000	1.229	0.000	0
		B		0.000	0.000	1.719	0.000	0
		C		0.000	0.000	1.331	0.000	0
L26	56.00-52.00	A	1.339	0.000	0.000	1.221	0.000	0
		B		0.000	0.000	1.711	0.000	0
		C		0.000	0.000	1.323	0.000	0
L27	52.00-48.00	A	1.329	0.000	0.000	1.213	0.000	0
		B		0.000	0.000	1.703	0.000	0
		C		0.000	0.000	1.315	0.000	0
L28	48.00-44.00	A	1.318	0.000	0.000	1.204	0.000	0
		B		0.000	0.000	1.694	0.000	0
		C		0.000	0.000	1.306	0.000	0
L29	44.00-40.25	A	1.307	0.000	0.000	1.834	0.000	0
		B		0.000	0.000	2.294	0.000	0
		C		0.000	0.000	1.930	0.000	0
L30	40.25-40.00	A	1.300	0.000	0.000	0.262	0.000	0
		B		0.000	0.000	0.293	0.000	0
		C		0.000	0.000	0.268	0.000	0
L31	40.00-36.00	A	1.293	0.000	0.000	4.182	0.000	0
		B		0.000	0.000	4.672	0.000	0
		C		0.000	0.000	4.284	0.000	0
L32	36.00-32.00	A	1.279	0.000	0.000	4.161	0.000	0
		B		0.000	0.000	4.651	0.000	0
		C		0.000	0.000	4.263	0.000	0
L33	32.00-30.00	A	1.267	0.000	0.000	1.923	0.000	0
		B		0.000	0.000	2.168	0.000	0
		C		0.000	0.000	1.974	0.000	0
L34	30.00-29.75	A	1.262	0.000	0.000	0.072	0.000	0
		B		0.000	0.000	0.103	0.000	0
		C		0.000	0.000	0.079	0.000	0
L35	29.75-25.75	A	1.253	0.000	0.000	1.152	0.000	0
		B		0.000	0.000	1.642	0.000	0
		C		0.000	0.000	1.254	0.000	0
L36	25.75-21.75	A	1.234	0.000	0.000	1.137	0.000	0
		B		0.000	0.000	1.627	0.000	0
		C		0.000	0.000	1.239	0.000	0
L37	21.75-17.75	A	1.211	0.000	0.000	1.119	0.000	0
		B		0.000	0.000	1.609	0.000	0
		C		0.000	0.000	1.221	0.000	0
L38	17.75-13.75	A	1.184	0.000	0.000	1.097	0.000	0
		B		0.000	0.000	1.587	0.000	0
		C		0.000	0.000	1.199	0.000	0
L39	13.75-9.75	A	1.150	0.000	0.000	1.070	0.000	0
		B		0.000	0.000	1.560	0.000	0
		C		0.000	0.000	1.172	0.000	0
L40	9.75-7.92	A	1.118	0.000	0.000	1.077	0.000	0
		B		0.000	0.000	1.301	0.000	0
		C		0.000	0.000	1.124	0.000	0
L41	7.92-7.67	A	1.104	0.000	0.000	0.235	0.000	0
		B		0.000	0.000	0.265	0.000	0
		C		0.000	0.000	0.241	0.000	0
L42	7.67-3.67	A	1.069	0.000	0.000	3.711	0.000	0
		B		0.000	0.000	4.201	0.000	0
		C		0.000	0.000	3.813	0.000	0
L43	3.67-0.00	A	0.955	0.000	0.000	3.279	0.000	0
		B		0.000	0.000	3.728	0.000	0
		C		0.000	0.000	3.372	0.000	0

Feed Line Center of Pressure

Section	Elevation	CP_X	CP_Z	CP_X Ice	CP_Z Ice
	ft	in	in	in	in
L1	150.00-146.00	-0.3693	0.0000	-1.3426	0.0000
L2	146.00-142.00	-0.3693	0.0000	-1.3400	0.0000
L3	142.00-138.00	-0.3693	0.0000	-1.3374	0.0000
L4	138.00-134.00	-0.3693	0.0000	-1.3347	0.0000
L5	134.00-130.00	-0.3693	0.0000	-1.3320	0.0000
L6	130.00-126.00	-0.3693	0.0000	-1.3291	0.0000
L7	126.00-122.00	-0.3693	0.0000	-1.3262	0.0000
L8	122.00-120.00	-0.3693	0.0000	-1.3240	0.0000
L9	120.00-116.00	0.6756	-0.5193	-0.0559	-0.6118
L10	116.00-112.00	0.9914	-0.6761	0.3353	-0.7920
L11	112.00-108.00	0.9914	-0.6761	0.3359	-0.7908
L12	108.00-104.00	0.9914	-0.6761	0.3364	-0.7895
L13	104.00-100.00	0.9914	-0.6761	0.3370	-0.7882
L14	100.00-96.00	0.9914	-0.6761	0.3376	-0.7869
L15	96.00-92.00	0.9914	-0.6761	0.3382	-0.7855
L16	92.00-90.00	0.9914	-0.6761	0.3387	-0.7844
L17	90.00-86.00	1.0003	-0.6837	0.3434	-0.8115
L18	86.00-82.00	1.0003	-0.6837	0.3441	-0.8098
L19	82.00-78.00	1.0003	-0.6837	0.3449	-0.8080
L20	78.00-74.00	1.0003	-0.6837	0.3456	-0.8061
L21	74.00-70.00	1.0003	-0.6837	0.3464	-0.8041
L22	70.00-66.00	1.0003	-0.6837	0.3473	-0.8020
L23	66.00-62.00	1.0003	-0.6837	0.3482	-0.7998
L24	62.00-60.00	1.0003	-0.6837	0.3489	-0.7981
L25	60.00-56.00	0.9502	-0.1027	0.2647	0.5109
L26	56.00-52.00	0.9502	-0.1027	0.2661	0.5076
L27	52.00-48.00	0.9502	-0.1027	0.2675	0.5042
L28	48.00-44.00	0.9502	-0.1027	0.2691	0.5004
L29	44.00-40.25	0.8185	-0.0885	0.2453	0.4498
L30	40.25-40.00	0.5810	-0.0628	0.1928	0.3507
L31	40.00-36.00	0.5810	-0.0628	0.1935	0.3491
L32	36.00-32.00	0.5810	-0.0628	0.1950	0.3457
L33	32.00-30.00	0.6045	-0.0654	0.2022	0.3531
L34	30.00-29.75	0.9502	-0.1027	0.2771	0.4813
L35	29.75-25.75	0.9502	-0.1027	0.2785	0.4781
L36	25.75-21.75	0.9502	-0.1027	0.2813	0.4713
L37	21.75-17.75	0.9502	-0.1027	0.2847	0.4635
L38	17.75-13.75	0.9502	-0.1027	0.2887	0.4539
L39	13.75-9.75	0.9502	-0.1027	0.2938	0.4417
L40	9.75-7.92	0.7278	-0.0787	0.2524	0.3634
L41	7.92-7.67	0.5810	-0.0628	0.2177	0.3076
L42	7.67-3.67	0.5810	-0.0628	0.2216	0.2985
L43	3.67-0.00	0.5810	-0.0628	0.2345	0.2677

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	2	Safety Line 3/8	146.00 - 150.00	1.0000	1.0000
L2	2	Safety Line 3/8	142.00 - 146.00	1.0000	1.0000
L3	2	Safety Line 3/8	138.00 - 142.00	1.0000	1.0000
L4	2	Safety Line 3/8	134.00 - 138.00	1.0000	1.0000
L5	2	Safety Line 3/8	130.00 - 134.00	1.0000	1.0000
L6	2	Safety Line 3/8	126.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L7	2	Safety Line 3/8	130.00 - 122.00	1.0000	1.0000
L8	2	Safety Line 3/8	126.00 - 120.00	1.0000	1.0000
L9	2	Safety Line 3/8	122.00 - 116.00	1.0000	1.0000
L9	20	CU12PSM9P6XXX(1-1/2)	120.00 - 116.00	1.0000	1.0000
L10	2	Safety Line 3/8	119.00 - 112.00	1.0000	1.0000
L10	20	CU12PSM9P6XXX(1-1/2)	116.00 - 112.00	1.0000	1.0000
L11	2	Safety Line 3/8	116.00 - 108.00	1.0000	1.0000
L11	20	CU12PSM9P6XXX(1-1/2)	112.00 - 108.00	1.0000	1.0000
L12	2	Safety Line 3/8	112.00 - 104.00	1.0000	1.0000
L12	20	CU12PSM9P6XXX(1-1/2)	108.00 - 104.00	1.0000	1.0000
L13	2	Safety Line 3/8	108.00 - 100.00	1.0000	1.0000
L13	20	CU12PSM9P6XXX(1-1/2)	104.00 - 100.00	1.0000	1.0000
L14	2	Safety Line 3/8	104.00 - 96.00	1.0000	1.0000
L14	20	CU12PSM9P6XXX(1-1/2)	100.00 - 96.00	1.0000	1.0000
L15	2	Safety Line 3/8	100.00 - 92.00	1.0000	1.0000
L15	20	CU12PSM9P6XXX(1-1/2)	96.00 - 92.00	1.0000	1.0000
L16	2	Safety Line 3/8	96.00 - 90.00	1.0000	1.0000
L16	20	CU12PSM9P6XXX(1-1/2)	92.00 - 90.00	1.0000	1.0000
L17	2	Safety Line 3/8	92.00 - 86.00	1.0000	1.0000
L17	20	CU12PSM9P6XXX(1-1/2)	90.00 - 86.00	1.0000	1.0000
L18	2	Safety Line 3/8	90.00 - 82.00	1.0000	1.0000
L18	20	CU12PSM9P6XXX(1-1/2)	86.00 - 82.00	1.0000	1.0000
L19	2	Safety Line 3/8	86.00 - 78.00	1.0000	1.0000
L19	20	CU12PSM9P6XXX(1-1/2)	82.00 - 78.00	1.0000	1.0000
L20	2	Safety Line 3/8	82.00 - 74.00	1.0000	1.0000
L20	20	CU12PSM9P6XXX(1-1/2)	78.00 - 74.00	1.0000	1.0000
L21	2	Safety Line 3/8	78.00 - 70.00	1.0000	1.0000
L21	20	CU12PSM9P6XXX(1-1/2)	74.00 - 70.00	1.0000	1.0000
L22	2	Safety Line 3/8	74.00 - 66.00	1.0000	1.0000
L22	20	CU12PSM9P6XXX(1-1/2)	70.00 - 66.00	1.0000	1.0000
L23	2	Safety Line 3/8	70.00 - 62.00	1.0000	1.0000
L23	20	CU12PSM9P6XXX(1-1/2)	66.00 - 62.00	1.0000	1.0000
L24	2	Safety Line 3/8	66.00 - 60.00	1.0000	1.0000
L24	20	CU12PSM9P6XXX(1-1/2)	62.00 - 60.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L25	2	Safety Line 3/8	56.00 - 60.00	1.0000	1.0000
L25	18	LDF4-50A(1/2)	56.00 - 60.00	1.0000	1.0000
L25	20	CU12PSM9P6XXX(1-1/2)	56.00 - 60.00	1.0000	1.0000
L26	2	Safety Line 3/8	52.00 - 56.00	1.0000	1.0000
L26	18	LDF4-50A(1/2)	52.00 - 56.00	1.0000	1.0000
L26	20	CU12PSM9P6XXX(1-1/2)	52.00 - 56.00	1.0000	1.0000
L27	2	Safety Line 3/8	48.00 - 52.00	1.0000	1.0000
L27	18	LDF4-50A(1/2)	48.00 - 52.00	1.0000	1.0000
L27	20	CU12PSM9P6XXX(1-1/2)	48.00 - 52.00	1.0000	1.0000
L28	2	Safety Line 3/8	44.00 - 48.00	1.0000	1.0000
L28	18	LDF4-50A(1/2)	44.00 - 48.00	1.0000	1.0000
L28	20	CU12PSM9P6XXX(1-1/2)	44.00 - 48.00	1.0000	1.0000
L29	2	Safety Line 3/8	40.25 - 44.00	1.0000	1.0000
L29	18	LDF4-50A(1/2)	40.25 - 44.00	1.0000	1.0000
L29	20	CU12PSM9P6XXX(1-1/2)	40.25 - 44.00	1.0000	1.0000
L29	26	PL 1.25" x 3"	40.25 - 41.20	1.0000	1.0000
L29	27	PL 1.25" x 3"	40.25 - 41.20	1.0000	1.0000
L29	28	PL 1.25" x 3"	40.25 - 41.20	1.0000	1.0000
L30	2	Safety Line 3/8	40.00 - 40.25	1.0000	1.0000
L30	18	LDF4-50A(1/2)	40.00 - 40.25	1.0000	1.0000
L30	20	CU12PSM9P6XXX(1-1/2)	40.00 - 40.25	1.0000	1.0000
L30	26	PL 1.25" x 3"	40.00 - 40.25	1.0000	1.0000
L30	27	PL 1.25" x 3"	40.00 - 40.25	1.0000	1.0000
L30	28	PL 1.25" x 3"	40.00 - 40.25	1.0000	1.0000
L31	2	Safety Line 3/8	36.00 - 40.00	1.0000	1.0000
L31	18	LDF4-50A(1/2)	36.00 - 40.00	1.0000	1.0000
L31	20	CU12PSM9P6XXX(1-1/2)	36.00 - 40.00	1.0000	1.0000
L31	26	PL 1.25" x 3"	36.00 - 40.00	1.0000	1.0000
L31	27	PL 1.25" x 3"	36.00 - 40.00	1.0000	1.0000
L31	28	PL 1.25" x 3"	36.00 - 40.00	1.0000	1.0000
L32	2	Safety Line 3/8	32.00 - 36.00	1.0000	1.0000
L32	18	LDF4-50A(1/2)	32.00 - 36.00	1.0000	1.0000
L32	20	CU12PSM9P6XXX(1-1/2)	32.00 - 36.00	1.0000	1.0000
L32	26	PL 1.25" x 3"	32.00 - 36.00	1.0000	1.0000
L32	27	PL 1.25" x 3"	32.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			36.00		
L32	28	PL 1.25" x 3"	32.00 - 36.00	1.0000	1.0000
L33	2	Safety Line 3/8	30.00 - 32.00	1.0000	1.0000
L33	18	LDF4-50A(1/2)	30.00 - 32.00	1.0000	1.0000
L33	20	CU12PSM9P6XXX(1-1/2)	30.00 - 32.00	1.0000	1.0000
L33	26	PL 1.25" x 3"	30.20 - 32.00	1.0000	1.0000
L33	27	PL 1.25" x 3"	30.20 - 32.00	1.0000	1.0000
L33	28	PL 1.25" x 3"	30.20 - 32.00	1.0000	1.0000
L34	2	Safety Line 3/8	29.75 - 30.00	1.0000	1.0000
L34	18	LDF4-50A(1/2)	29.75 - 30.00	1.0000	1.0000
L34	20	CU12PSM9P6XXX(1-1/2)	29.75 - 30.00	1.0000	1.0000
L35	2	Safety Line 3/8	25.75 - 29.75	1.0000	1.0000
L35	18	LDF4-50A(1/2)	25.75 - 29.75	1.0000	1.0000
L35	20	CU12PSM9P6XXX(1-1/2)	25.75 - 29.75	1.0000	1.0000
L36	2	Safety Line 3/8	21.75 - 25.75	1.0000	1.0000
L36	18	LDF4-50A(1/2)	21.75 - 25.75	1.0000	1.0000
L36	20	CU12PSM9P6XXX(1-1/2)	21.75 - 25.75	1.0000	1.0000
L37	2	Safety Line 3/8	17.75 - 21.75	1.0000	1.0000
L37	18	LDF4-50A(1/2)	17.75 - 21.75	1.0000	1.0000
L37	20	CU12PSM9P6XXX(1-1/2)	17.75 - 21.75	1.0000	1.0000
L38	2	Safety Line 3/8	13.75 - 17.75	1.0000	1.0000
L38	18	LDF4-50A(1/2)	13.75 - 17.75	1.0000	1.0000
L38	20	CU12PSM9P6XXX(1-1/2)	13.75 - 17.75	1.0000	1.0000
L39	2	Safety Line 3/8	9.75 - 13.75	1.0000	1.0000
L39	18	LDF4-50A(1/2)	9.75 - 13.75	1.0000	1.0000
L39	20	CU12PSM9P6XXX(1-1/2)	9.75 - 13.75	1.0000	1.0000
L40	2	Safety Line 3/8	7.92 - 9.75	1.0000	1.0000
L40	18	LDF4-50A(1/2)	7.92 - 9.75	1.0000	1.0000
L40	20	CU12PSM9P6XXX(1-1/2)	7.92 - 9.75	1.0000	1.0000
L40	22	PL 1.25" x 3"	7.92 - 8.80	1.0000	1.0000
L40	23	PL 1.25" x 3"	7.92 - 8.80	1.0000	1.0000
L40	24	PL 1.25" x 3"	7.92 - 8.80	1.0000	1.0000
L41	2	Safety Line 3/8	7.67 - 7.92	1.0000	1.0000
L41	18	LDF4-50A(1/2)	7.67 - 7.92	1.0000	1.0000
L41	20	CU12PSM9P6XXX(1-1/2)	7.67 - 7.92	1.0000	1.0000
L41	22	PL 1.25" x 3"	7.67 - 7.92	1.0000	1.0000
L41	23	PL 1.25" x 3"	7.67 - 7.92	1.0000	1.0000
L41	24	PL 1.25" x 3"	7.67 - 7.92	1.0000	1.0000
L42	2	Safety Line 3/8	3.67 - 7.67	1.0000	1.0000
L42	18	LDF4-50A(1/2)	3.67 - 7.67	1.0000	1.0000
L42	20	CU12PSM9P6XXX(1-1/2)	3.67 - 7.67	1.0000	1.0000
L42	22	PL 1.25" x 3"	3.67 - 7.67	1.0000	1.0000
L42	23	PL 1.25" x 3"	3.67 - 7.67	1.0000	1.0000
L42	24	PL 1.25" x 3"	3.67 - 7.67	1.0000	1.0000
L43	2	Safety Line 3/8	0.00 - 3.67	1.0000	1.0000
L43	18	LDF4-50A(1/2)	0.00 - 3.67	1.0000	1.0000
L43	20	CU12PSM9P6XXX(1-1/2)	0.00 - 3.67	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L43	22	PL 1.25" x 3"	0.00 - 3.67	1.0000	1.0000
L43	23	PL 1.25" x 3"	0.00 - 3.67	1.0000	1.0000
L43	24	PL 1.25" x 3"	0.00 - 3.67	1.0000	1.0000

Effective Width of Flat Linear Attachments / Feed Lines

Tower Section	Attachment Record No.	Description	Attachment Segment Elev.	Ratio Calculation Method	Effective Width Ratio
L29	26	PL 1.25" x 3"	40.25 - 41.20	Auto	1.0000
L29	27	PL 1.25" x 3"	40.25 - 41.20	Auto	1.0000
L29	28	PL 1.25" x 3"	40.25 - 41.20	Auto	1.0000
L30	26	PL 1.25" x 3"	40.00 - 40.25	Auto	1.0000
L30	27	PL 1.25" x 3"	40.00 - 40.25	Auto	1.0000
L30	28	PL 1.25" x 3"	40.00 - 40.25	Auto	1.0000
L31	26	PL 1.25" x 3"	36.00 - 40.00	Auto	1.0000
L31	27	PL 1.25" x 3"	36.00 - 40.00	Auto	1.0000
L31	28	PL 1.25" x 3"	36.00 - 40.00	Auto	1.0000
L32	26	PL 1.25" x 3"	32.00 - 36.00	Auto	1.0000
L32	27	PL 1.25" x 3"	32.00 - 36.00	Auto	1.0000
L32	28	PL 1.25" x 3"	32.00 - 36.00	Auto	1.0000
L33	26	PL 1.25" x 3"	30.20 - 32.00	Auto	1.0000
L33	27	PL 1.25" x 3"	30.20 - 32.00	Auto	1.0000
L33	28	PL 1.25" x 3"	30.20 - 32.00	Auto	1.0000
L40	22	PL 1.25" x 3"	7.92 - 8.80	Auto	1.0000
L40	23	PL 1.25" x 3"	7.92 - 8.80	Auto	1.0000
L40	24	PL 1.25" x 3"	7.92 - 8.80	Auto	1.0000
L41	22	PL 1.25" x 3"	7.67 - 7.92	Auto	1.0000
L41	23	PL 1.25" x 3"	7.67 - 7.92	Auto	1.0000
L41	24	PL 1.25" x 3"	7.67 - 7.92	Auto	1.0000
L42	22	PL 1.25" x 3"	3.67 - 7.67	Auto	1.0000
L42	23	PL 1.25" x 3"	3.67 - 7.67	Auto	1.0000
L42	24	PL 1.25" x 3"	3.67 - 7.67	Auto	1.0000
L43	22	PL 1.25" x 3"	0.00 - 3.67	Auto	1.0000
L43	23	PL 1.25" x 3"	0.00 - 3.67	Auto	1.0000
L43	24	PL 1.25" x 3"	0.00 - 3.67	Auto	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
2.4" Dia x 8-ft Mount Pipe	A	From Leg	0.00 0.00 4.00	0.0000	150.00
***					
DB980H90E-M w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00
DB980H90E-M w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00
DB980H90E-M w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00
NNVV-65B-R4 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00
NNVV-65B-R4 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00
PCS 1900MHz 4x45W-65MHz	A	From Leg	4.00 0.00 0.00	0.0000	147.00
PCS 1900MHz 4x45W-65MHz	C	From Leg	4.00 0.00 0.00	0.0000	147.00
(2) RRH2X50-800	A	From Leg	4.00 0.00 0.00	0.0000	147.00
(2) RRH2X50-800	C	From Leg	4.00 0.00 0.00	0.0000	147.00
FZHN	A	From Leg	4.00 0.00 0.00	0.0000	147.00
FZHN	C	From Leg	4.00 0.00 0.00	0.0000	147.00
(3) 6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	147.00
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	147.00
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	147.00
Platform Mount [LP 502-1]	C	None		0.0000	147.00
** 137 **					
80010964 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	0.0000	139.00
80010964 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	0.0000	139.00
80010964 w/ Mount Pipe	C	From Leg	4.00 0.00	0.0000	139.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft
OPA65R-BU4D w/ Mount Pipe	A	From Leg	1.00 4.00 0.00	0.0000	139.00
OPA65R-BU4D w/ Mount Pipe	B	From Leg	1.00 4.00 0.00	0.0000	139.00
OPA65R-BU4D w/ Mount Pipe	C	From Leg	1.00 4.00 0.00	0.0000	139.00
HPA65R-BU4A w/ Mount Pipe	A	From Leg	1.00 4.00 0.00	0.0000	139.00
HPA65R-BU4A w/ Mount Pipe	B	From Leg	1.00 4.00 0.00	0.0000	139.00
HPA65R-BU4A w/ Mount Pipe	C	From Leg	1.00 4.00 0.00	0.0000	139.00
7770.00 w/ Mount Pipe	A	From Leg	1.00 4.00 0.00	0.0000	139.00
7770.00 w/ Mount Pipe	C	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4449 B5/B12	A	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4449 B5/B12	B	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4449 B5/B12	C	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 8843 B2/B66A	A	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 8843 B2/B66A	B	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 8843 B2/B66A	C	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4478 B14	A	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4478 B14	B	From Leg	1.00 4.00 0.00	0.0000	139.00
RRUS 4478 B14	C	From Leg	1.00 4.00 0.00	0.0000	139.00
(2) DC6-48-60-18-8F	A	From Leg	1.00 4.00 0.00	0.0000	139.00
DC6-48-60-18-8C	A	From Leg	1.00 4.00 0.00	0.0000	139.00
(2) LGP21401	A	From Leg	1.00 4.00 0.00	0.0000	139.00
(2) LGP21401	C	From Leg	1.00 4.00 0.00	0.0000	139.00
2.4" Dia x 6-ft Pipe	B	From Leg	1.00 4.00	0.0000	139.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft Vert ft ft	Azimuth Adjustment °	Placement ft
			0.00 0.00		
Platform Mount [LP 1201-1_HR-1] ** 129 **	C	None		0.0000	139.00
800 10504 w/ Mount Pipe	A	From Leg	4.00 0.00 1.00	30.0000	129.00
800 10504 w/ Mount Pipe	B	From Leg	4.00 0.00 1.00	30.0000	129.00
800 10504 w/ Mount Pipe	C	From Leg	4.00 0.00 1.00	30.0000	129.00
860 10118	A	From Leg	4.00 0.00 1.00	30.0000	129.00
860 10118	B	From Leg	4.00 0.00 1.00	30.0000	129.00
860 10118	C	From Leg	4.00 0.00 1.00	30.0000	129.00
6' x 2" Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	129.00
6' x 2" Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	129.00
6' x 2" Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	129.00
T-Arm Mount [TA 602-3] *	A	None		0.0000	129.00
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.00 0.00 0.00	0.0000	119.00
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.00 0.00 0.00	0.0000	119.00
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B604	A	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B604	B	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B604	C	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B605	A	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B605	B	From Leg	4.00 0.00 0.00	0.0000	119.00
TA08025-B605	C	From Leg	4.00 0.00 0.00	0.0000	119.00
RDIDC-9181-PF-48	A	From Leg	4.00 0.00 0.00	0.0000	119.00
(2) 8' x 2" Mount Pipe	A	From Leg	4.00 0.00	0.0000	119.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
(2) 8' x 2" Mount Pipe	B	From Leg	0.00 4.00 0.00	0.0000	119.00
(2) 8' x 2" Mount Pipe	C	From Leg	0.00 4.00 0.00	0.0000	119.00
Commscope MC-PK8-DSH	C	None	0.00	0.0000	119.00
*					
KS24019-L112A	C	From Face	3.00 0.00 1.00	10.0000	60.00
Side Arm Mount [SO 701-1]	C	From Face	1.50 0.00 0.00	0.0000	60.00
*					
Bridge Stiffener (56" x 12" x 1")	A	From Leg	0.50 0.00 0.00	0.0000	30.00
Bridge Stiffener (56" x 12" x 1")	C	From Face	0.50 0.00 0.00	0.0000	30.00
Bridge Stiffener (56" x 12" x 1")	B	From Leg	0.50 0.00 0.00	0.0000	30.00
Bridge Stiffener (56" x 12" x 1")	C	From Leg	0.50 0.00 0.00	0.0000	30.00
*****					

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
25	0.9 Dead+1.0 Wind 330 deg - No Ice

Comb. No.	Description
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	150 - 146	Pole	Max Tension	33	0	0	0
			Max. Compression	26	-7	5	3
			Max. Mx	36	-7	6	3
			Max. My	2	-2	2	6
			Max. Vy	20	-3	6	1
			Max. Vx	2	-3	2	6
			Max. Torque	4			2
L2	146 - 142	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-8	5	3
			Max. Mx	20	-3	19	1
			Max. My	2	-3	1	19
			Max. Vy	20	-3	19	1
			Max. Vx	2	-4	1	19
			Max. Torque	4			2
L3	142 - 138	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-18	6	6
			Max. Mx	20	-8	41	1
			Max. My	2	-7	1	42
			Max. Vy	20	-8	41	1
			Max. Vx	2	-8	1	42
			Max. Torque	6			3
L4	138 - 134	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-19	6	6
			Max. Mx	20	-8	75	1
			Max. My	2	-8	1	76
			Max. Vy	20	-9	75	1
			Max. Vx	2	-9	1	76
			Max. Torque	6			3
L5	134 - 130	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-20	6	6
			Max. Mx	20	-8	109	0
			Max. My	2	-8	0	111
			Max. Vy	20	-9	109	0
			Max. Vx	2	-9	0	111
			Max. Torque	6			3
L6	130 - 126	Pole	Max Tension	1	0	0	0

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	26	-23	6	6
			Max. Mx	20	-10	149	0
			Max. My	2	-10	0	151
			Max. Vy	20	-10	149	0
			Max. Vx	2	-10	0	151
			Max. Torque	6			3
L7	126 - 122	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-23	6	6
			Max. Mx	20	-10	190	-1
			Max. My	2	-10	-1	193
			Max. Vy	20	-10	190	-1
			Max. Vx	2	-11	-1	193
			Max. Torque	6			3
L8	122 - 120	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-24	6	6
			Max. Mx	20	-10	211	-1
			Max. My	2	-10	-1	214
			Max. Vy	20	-10	211	-1
			Max. Vx	2	-11	-1	214
			Max. Torque	6			3
L9	120 - 116	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-30	6	7
			Max. Mx	20	-14	262	-2
			Max. My	2	-14	-1	266
			Max. Vy	20	-14	262	-2
			Max. Vx	2	-14	-1	266
			Max. Torque	6			4
L10	116 - 112	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-31	6	7
			Max. Mx	20	-15	318	-2
			Max. My	2	-15	-2	323
			Max. Vy	20	-14	318	-2
			Max. Vx	2	-14	-2	323
			Max. Torque	6			4
L11	112 - 108	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-32	6	7
			Max. Mx	20	-15	375	-2
			Max. My	2	-15	-2	380
			Max. Vy	20	-14	375	-2
			Max. Vx	2	-15	-2	380
			Max. Torque	6			4
L12	108 - 104	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-33	6	7
			Max. Mx	20	-16	433	-3
			Max. My	2	-16	-3	439
			Max. Vy	20	-15	433	-3
			Max. Vx	2	-15	-3	439
			Max. Torque	6			4
L13	104 - 100	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-34	6	7
			Max. Mx	20	-17	492	-3
			Max. My	2	-17	-3	499
			Max. Vy	20	-15	492	-3
			Max. Vx	2	-15	-3	499
			Max. Torque	6			4
L14	100 - 96	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-35	6	7
			Max. Mx	20	-18	552	-4
			Max. My	2	-18	-4	560
			Max. Vy	20	-15	552	-4
			Max. Vx	2	-15	-4	560
			Max. Torque	6			4
L15	96 - 92	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-36	6	7
			Max. Mx	20	-18	614	-4
			Max. My	2	-18	-4	622
			Max. Vy	20	-15	614	-4
			Max. Vx	2	-16	-4	622
			Max. Torque	6			4

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L16	92 - 90	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-37	6	7
			Max. Mx	20	-19	645	-5
			Max. My	2	-19	-5	654
			Max. Vy	20	-16	645	-5
			Max. Vx	2	-16	-5	654
			Max. Torque	6			4
L17	90 - 86	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-38	6	7
			Max. Mx	20	-20	708	-5
			Max. My	2	-20	-5	717
			Max. Vy	20	-16	708	-5
			Max. Vx	2	-16	-5	717
			Max. Torque	6			4
L18	86 - 82	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-39	6	7
			Max. Mx	20	-20	772	-6
			Max. My	2	-20	-6	782
			Max. Vy	20	-16	772	-6
			Max. Vx	2	-16	-6	782
			Max. Torque	6			4
L19	82 - 78	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-40	6	7
			Max. Mx	20	-21	837	-6
			Max. My	2	-21	-6	848
			Max. Vy	20	-16	837	-6
			Max. Vx	2	-17	-6	848
			Max. Torque	6			4
L20	78 - 74	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-41	6	7
			Max. Mx	20	-22	903	-7
			Max. My	2	-22	-7	916
			Max. Vy	20	-17	903	-7
			Max. Vx	2	-17	-7	916
			Max. Torque	6			4
L21	74 - 70	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-42	6	8
			Max. Mx	20	-23	971	-7
			Max. My	2	-23	-7	984
			Max. Vy	20	-17	971	-7
			Max. Vx	2	-17	-7	984
			Max. Torque	6			4
L22	70 - 66	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-43	6	8
			Max. Mx	20	-24	1040	-8
			Max. My	2	-24	-8	1053
			Max. Vy	20	-17	1040	-8
			Max. Vx	2	-17	-8	1053
			Max. Torque	6			4
L23	66 - 62	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-44	6	8
			Max. Mx	20	-25	1109	-8
			Max. My	2	-25	-8	1124
			Max. Vy	20	-18	1109	-8
			Max. Vx	2	-18	-8	1124
			Max. Torque	6			4
L24	62 - 60	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-45	6	8
			Max. Mx	20	-25	1144	-8
			Max. My	2	-25	-9	1159
			Max. Vy	20	-18	1144	-8
			Max. Vx	2	-18	-9	1159
			Max. Torque	6			4
L25	60 - 56	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-46	6	7
			Max. Mx	20	-26	1216	-9
			Max. My	2	-26	-9	1231
			Max. Vy	20	-18	1216	-9
			Max. Vx	2	-18	-9	1231

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Torque	6			4
L26	56 - 52	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-48	6	7
			Max. Mx	20	-27	1288	-10
			Max. My	2	-27	-10	1304
			Max. Vy	20	-18	1288	-10
			Max. Vx	2	-18	-10	1304
			Max. Torque	6			3
L27	52 - 48	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-49	6	7
			Max. Mx	20	-28	1362	-10
			Max. My	2	-28	-10	1379
			Max. Vy	20	-19	1362	-10
			Max. Vx	2	-19	-10	1379
			Max. Torque	6			3
L28	48 - 44	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-50	6	7
			Max. Mx	20	-29	1437	-11
			Max. My	2	-29	-11	1454
			Max. Vy	20	-19	1437	-11
			Max. Vx	2	-19	-11	1454
			Max. Torque	6			3
L29	44 - 40.25	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-51	6	8
			Max. Mx	20	-30	1508	-11
			Max. My	2	-30	-11	1526
			Max. Vy	20	-19	1508	-11
			Max. Vx	2	-19	-11	1526
			Max. Torque	6			3
L30	40.25 - 40	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-51	6	8
			Max. Mx	20	-30	1513	-11
			Max. My	2	-30	-11	1531
			Max. Vy	20	-19	1513	-11
			Max. Vx	2	-19	-11	1531
			Max. Torque	6			3
L31	40 - 36	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-53	6	8
			Max. Mx	20	-31	1590	-12
			Max. My	2	-31	-12	1608
			Max. Vy	20	-19	1590	-12
			Max. Vx	2	-20	-12	1608
			Max. Torque	6			3
L32	36 - 32	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-54	6	8
			Max. Mx	20	-32	1668	-12
			Max. My	2	-32	-12	1687
			Max. Vy	20	-20	1668	-12
			Max. Vx	2	-20	-12	1687
			Max. Torque	6			3
L33	32 - 30	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-55	6	8
			Max. Mx	20	-33	1707	-12
			Max. My	2	-33	-13	1726
			Max. Vy	20	-20	1707	-12
			Max. Vx	2	-20	-13	1726
			Max. Torque	6			3
L34	30 - 29.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-56	6	7
			Max. Mx	20	-34	1712	-13
			Max. My	2	-34	-13	1731
			Max. Vy	20	-20	1712	-13
			Max. Vx	2	-20	-13	1731
			Max. Torque	6			3
L35	29.75 - 25.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-58	6	7
			Max. Mx	20	-35	1793	-13
			Max. My	2	-35	-13	1812

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vy	20	-20	1793	-13
			Max. Vx	2	-20	-13	1812
			Max. Torque	6			3
L36	25.75 - 21.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-59	6	7
			Max. Mx	20	-36	1875	-14
			Max. My	2	-36	-14	1894
			Max. Vy	20	-21	1875	-14
			Max. Vx	2	-21	-14	1894
			Max. Torque	6			3
L37	21.75 - 17.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-61	6	7
			Max. Mx	20	-38	1958	-14
			Max. My	2	-38	-14	1977
			Max. Vy	20	-21	1958	-14
			Max. Vx	2	-21	-14	1977
			Max. Torque	6			3
L38	17.75 - 13.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-62	6	7
			Max. Mx	20	-39	2041	-15
			Max. My	2	-39	-15	2060
			Max. Vy	20	-21	2041	-15
			Max. Vx	2	-21	-15	2060
			Max. Torque	6			3
L39	13.75 - 9.75	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-64	6	7
			Max. Mx	20	-40	2125	-15
			Max. My	2	-40	-15	2144
			Max. Vy	20	-21	2125	-15
			Max. Vx	2	-21	-15	2144
			Max. Torque	6			3
L40	9.75 - 7.92	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-65	6	7
			Max. Mx	20	-41	2163	-16
			Max. My	2	-41	-15	2182
			Max. Vy	20	-21	2163	-16
			Max. Vx	2	-21	-15	2182
			Max. Torque	6			3
L41	7.92 - 7.67	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-65	6	7
			Max. Mx	20	-41	2169	-16
			Max. My	2	-41	-15	2188
			Max. Vy	20	-21	2169	-16
			Max. Vx	2	-21	-15	2188
			Max. Torque	6			3
L42	7.67 - 3.67	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-66	6	7
			Max. Mx	20	-42	2253	-16
			Max. My	2	-42	-16	2272
			Max. Vy	20	-21	2253	-16
			Max. Vx	2	-21	-16	2272
			Max. Torque	6			3
L43	3.67 - 0	Pole	Max Tension	1	0	0	0
			Max. Compression	26	-68	6	7
			Max. Mx	20	-44	2331	-16
			Max. My	2	-44	-16	2350
			Max. Vy	20	-21	2331	-16
			Max. Vx	2	-21	-16	2350
			Max. Torque	6			3

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	33	68	0	-8
	Max. H_x	21	33	21	0
	Max. H_z	2	44	0	21
	Max. M_x	2	2350	0	21
	Max. M_z	8	2327	-21	0
	Max. Torsion	6	3	-19	11
	Min. Vert	11	33	-18	-11
	Min. H_x	9	33	-21	0
	Min. H_z	15	33	0	-21
	Min. M_x	14	-2347	0	-21
	Min. M_z	20	-2331	21	0
	Min. Torsion	18	-3	19	-11

Tower Mast Reaction Summary

Load Combination	Vertical K	$Shear_x$ K	$Shear_z$ K	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	36	0	0	-1	2	0
1.2 Dead+1.0 Wind 0 deg - No Ice	44	0	-21	-2350	-16	-2
0.9 Dead+1.0 Wind 0 deg - No Ice	33	0	-21	-2316	-17	-2
1.2 Dead+1.0 Wind 30 deg - No Ice	44	11	-19	-2045	-1178	-3
0.9 Dead+1.0 Wind 30 deg - No Ice	33	11	-19	-2015	-1162	-3
1.2 Dead+1.0 Wind 60 deg - No Ice	44	19	-11	-1192	-2024	-3
0.9 Dead+1.0 Wind 60 deg - No Ice	33	19	-11	-1174	-1996	-3
1.2 Dead+1.0 Wind 90 deg - No Ice	44	21	0	-20	-2327	-2
0.9 Dead+1.0 Wind 90 deg - No Ice	33	21	0	-19	-2294	-2
1.2 Dead+1.0 Wind 120 deg - No Ice	44	18	11	1157	-2006	-1
0.9 Dead+1.0 Wind 120 deg - No Ice	33	18	11	1140	-1978	-1
1.2 Dead+1.0 Wind 150 deg - No Ice	44	11	18	2023	-1147	1
0.9 Dead+1.0 Wind 150 deg - No Ice	33	11	18	1994	-1131	1
1.2 Dead+1.0 Wind 180 deg - No Ice	44	0	21	2347	20	2
0.9 Dead+1.0 Wind 180 deg - No Ice	33	0	21	2313	19	2
1.2 Dead+1.0 Wind 210 deg - No Ice	44	-11	19	2041	1182	3
0.9 Dead+1.0 Wind 210 deg - No Ice	33	-11	19	2012	1165	3
1.2 Dead+1.0 Wind 240 deg - No Ice	44	-19	11	1188	2028	3
0.9 Dead+1.0 Wind 240 deg - No Ice	33	-19	11	1172	1998	3
1.2 Dead+1.0 Wind 270 deg - No Ice	44	-21	0	16	2331	2
0.9 Dead+1.0 Wind 270 deg - No Ice	33	-21	0	17	2297	2
1.2 Dead+1.0 Wind 300 deg - No Ice	44	-18	-11	-1160	2010	1
0.9 Dead+1.0 Wind 300 deg - No Ice	33	-18	-11	-1143	1980	1
1.2 Dead+1.0 Wind 330 deg - No Ice	44	-11	-18	-2027	1151	-1

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 330 deg - No Ice	33	-11	-18	-1997	1134	-1
1.2 Dead+1.0 Ice+1.0 Temp	68	0	0	-7	6	0
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	68	0	-8	-854	1	-1
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	68	4	-7	-743	-419	-1
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	68	7	-4	-435	-726	-1
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	68	8	0	-12	-836	-1
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	68	7	4	412	-721	0
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	68	4	7	724	-411	0
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	68	0	8	840	11	1
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	68	-4	7	729	431	1
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	68	-7	4	420	738	1
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	68	-8	0	-2	848	1
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	68	-7	-4	-427	733	0
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	68	-4	-7	-738	423	0
Dead+Wind 0 deg - Service	36	0	-5	-569	-3	-1
Dead+Wind 30 deg - Service	36	3	-5	-495	-284	-1
Dead+Wind 60 deg - Service	36	5	-3	-289	-488	-1
Dead+Wind 90 deg - Service	36	5	0	-6	-561	-1
Dead+Wind 120 deg - Service	36	4	3	278	-484	0
Dead+Wind 150 deg - Service	36	3	4	488	-276	0
Dead+Wind 180 deg - Service	36	0	5	566	6	1
Dead+Wind 210 deg - Service	36	-3	5	492	287	1
Dead+Wind 240 deg - Service	36	-5	3	286	491	1
Dead+Wind 270 deg - Service	36	-5	0	3	565	1
Dead+Wind 300 deg - Service	36	-4	-3	-281	487	0
Dead+Wind 330 deg - Service	36	-3	-4	-491	279	0

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	K	K	K	K	K	K	
1	0	-36	0	0	36	0	0.000%
2	0	-44	-21	0	44	21	0.000%
3	0	-33	-21	0	33	21	0.000%
4	11	-44	-19	-11	44	19	0.000%
5	11	-33	-19	-11	33	19	0.000%
6	19	-44	-11	-19	44	11	0.000%
7	19	-33	-11	-19	33	11	0.000%
8	21	-44	0	-21	44	0	0.000%
9	21	-33	0	-21	33	0	0.000%
10	18	-44	11	-18	44	-11	0.000%
11	18	-33	11	-18	33	-11	0.000%
12	11	-44	18	-11	44	-18	0.000%
13	11	-33	18	-11	33	-18	0.000%

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
14	0	-44	21	0	44	-21	0.000%
15	0	-33	21	0	33	-21	0.000%
16	-11	-44	19	11	44	-19	0.000%
17	-11	-33	19	11	33	-19	0.000%
18	-19	-44	11	19	44	-11	0.000%
19	-19	-33	11	19	33	-11	0.000%
20	-21	-44	0	21	44	0	0.000%
21	-21	-33	0	21	33	0	0.000%
22	-18	-44	-11	18	44	11	0.000%
23	-18	-33	-11	18	33	11	0.000%
24	-11	-44	-18	11	44	18	0.000%
25	-11	-33	-18	11	33	18	0.000%
26	0	-68	0	0	68	0	0.000%
27	0	-68	-8	0	68	8	0.000%
28	4	-68	-7	-4	68	7	0.000%
29	7	-68	-4	-7	68	4	0.000%
30	8	-68	0	-8	68	0	0.000%
31	7	-68	4	-7	68	-4	0.000%
32	4	-68	7	-4	68	-7	0.000%
33	0	-68	8	0	68	-8	0.000%
34	-4	-68	7	4	68	-7	0.000%
35	-7	-68	4	7	68	-4	0.000%
36	-8	-68	0	8	68	0	0.000%
37	-7	-68	-4	7	68	4	0.000%
38	-4	-68	-7	4	68	7	0.000%
39	0	-36	-5	0	36	5	0.000%
40	3	-36	-5	-3	36	5	0.000%
41	5	-36	-3	-5	36	3	0.000%
42	5	-36	0	-5	36	0	0.000%
43	4	-36	3	-4	36	-3	0.000%
44	3	-36	4	-3	36	-4	0.000%
45	0	-36	5	0	36	-5	0.000%
46	-3	-36	5	3	36	-5	0.000%
47	-5	-36	3	5	36	-3	0.000%
48	-5	-36	0	5	36	0	0.000%
49	-4	-36	-3	4	36	3	0.000%
50	-3	-36	-4	3	36	4	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000668
2	Yes	5	0.00000001	0.00085253
3	Yes	5	0.00000001	0.00040913
4	Yes	6	0.00000001	0.00055537
5	Yes	6	0.00000001	0.00019140
6	Yes	6	0.00000001	0.00064998
7	Yes	6	0.00000001	0.00022697
8	Yes	6	0.00000001	0.00009014
9	Yes	5	0.00000001	0.00065608
10	Yes	6	0.00000001	0.00054912
11	Yes	6	0.00000001	0.00019125
12	Yes	6	0.00000001	0.00055837
13	Yes	6	0.00000001	0.00019460
14	Yes	6	0.00000001	0.00008029
15	Yes	5	0.00000001	0.00057979
16	Yes	6	0.00000001	0.00065203
17	Yes	6	0.00000001	0.00022744
18	Yes	6	0.00000001	0.00055357
19	Yes	6	0.00000001	0.00019091
20	Yes	6	0.00000001	0.00006699
21	Yes	5	0.00000001	0.00048691
22	Yes	6	0.00000001	0.00059199
23	Yes	6	0.00000001	0.00020630

24	Yes	6	0.00000001	0.00058659
25	Yes	6	0.00000001	0.00020395
26	Yes	5	0.00000001	0.00020819
27	Yes	7	0.00000001	0.00014080
28	Yes	7	0.00000001	0.00016282
29	Yes	7	0.00000001	0.00016519
30	Yes	6	0.00000001	0.00098600
31	Yes	7	0.00000001	0.00015445
32	Yes	7	0.00000001	0.00015527
33	Yes	6	0.00000001	0.00098953
34	Yes	7	0.00000001	0.00016483
35	Yes	7	0.00000001	0.00016168
36	Yes	7	0.00000001	0.00013970
37	Yes	7	0.00000001	0.00016631
38	Yes	7	0.00000001	0.00016624
39	Yes	5	0.00000001	0.00006738
40	Yes	5	0.00000001	0.00013599
41	Yes	5	0.00000001	0.00019229
42	Yes	5	0.00000001	0.00007760
43	Yes	5	0.00000001	0.00012910
44	Yes	5	0.00000001	0.00013332
45	Yes	5	0.00000001	0.00007005
46	Yes	5	0.00000001	0.00019157
47	Yes	5	0.00000001	0.00013718
48	Yes	5	0.00000001	0.00007490
49	Yes	5	0.00000001	0.00015792
50	Yes	5	0.00000001	0.00015149

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 146	22.119	40	1.2226	0.0111
L2	146 - 142	21.099	40	1.2221	0.0110
L3	142 - 138	20.081	40	1.2188	0.0104
L4	138 - 134	19.065	40	1.2122	0.0097
L5	134 - 130	18.057	40	1.1989	0.0088
L6	130 - 126	17.063	40	1.1784	0.0079
L7	126 - 122	16.088	40	1.1501	0.0069
L8	122 - 120	15.140	40	1.1132	0.0060
L9	120 - 116	14.679	40	1.0915	0.0056
L10	116 - 112	13.771	40	1.0742	0.0052
L11	112 - 108	12.880	40	1.0529	0.0049
L12	108 - 104	12.008	40	1.0275	0.0045
L13	104 - 100	11.160	40	0.9980	0.0042
L14	100 - 96	10.338	40	0.9641	0.0039
L15	96 - 92	9.546	40	0.9259	0.0035
L16	92 - 90	8.788	40	0.8833	0.0032
L17	90 - 86	8.423	40	0.8603	0.0030
L18	86 - 82	7.714	40	0.8318	0.0028
L19	82 - 78	7.030	40	0.8008	0.0026
L20	78 - 74	6.373	40	0.7670	0.0024
L21	74 - 70	5.745	40	0.7305	0.0022
L22	70 - 66	5.150	40	0.6911	0.0020
L23	66 - 62	4.588	40	0.6489	0.0018
L24	62 - 60	4.063	40	0.6038	0.0016
L25	60 - 56	3.815	40	0.5802	0.0015
L26	56 - 52	3.342	40	0.5492	0.0014
L27	52 - 48	2.896	40	0.5163	0.0013
L28	48 - 44	2.478	40	0.4814	0.0011
L29	44 - 40.25	2.090	40	0.4447	0.0010
L30	40.25 - 40	1.755	40	0.4084	0.0009
L31	40 - 36	1.733	40	0.4059	0.0009
L32	36 - 32	1.410	40	0.3652	0.0008
L33	32 - 30	1.122	40	0.3224	0.0007
L34	30 - 29.75	0.992	40	0.3002	0.0006
L35	29.75 - 25.75	0.976	40	0.2981	0.0006

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L36	25.75 - 21.75	0.741	40	0.2633	0.0005
L37	21.75 - 17.75	0.535	40	0.2269	0.0004
L38	17.75 - 13.75	0.361	40	0.1888	0.0004
L39	13.75 - 9.75	0.219	40	0.1491	0.0003
L40	9.75 - 7.92	0.112	40	0.1078	0.0002
L41	7.92 - 7.67	0.074	40	0.0883	0.0002
L42	7.67 - 3.67	0.070	40	0.0856	0.0002
L43	3.67 - 0	0.016	40	0.0417	0.0001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	2.4" Dia x 8-ft Mount Pipe	40	22.119	1.2226	0.0111	77890
147.00	DB980H90E-M w/ Mount Pipe	40	21.354	1.2224	0.0111	77890
139.00	80010964 w/ Mount Pipe	40	19.319	1.2144	0.0099	25867
129.00	800 10504 w/ Mount Pipe	40	16.817	1.1720	0.0076	8697
119.00	MX08FRO665-21 w/ Mount Pipe	40	14.450	1.0846	0.0054	8763
60.00	KS24019-L112A	40	3.815	0.5802	0.0015	5902
30.00	Bridge Stiffener (56" x 12" x 1")	40	0.992	0.3002	0.0006	5836

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	150 - 146	91.408	4	5.0310	0.0454
L2	146 - 142	87.203	4	5.0300	0.0447
L3	142 - 138	83.002	4	5.0202	0.0423
L4	138 - 134	78.814	4	4.9969	0.0395
L5	134 - 130	74.656	4	4.9465	0.0358
L6	130 - 126	70.552	4	4.8660	0.0321
L7	126 - 122	66.529	4	4.7532	0.0283
L8	122 - 120	62.614	4	4.6045	0.0245
L9	120 - 116	60.707	4	4.5165	0.0226
L10	116 - 112	56.959	4	4.4454	0.0213
L11	112 - 108	53.277	4	4.3578	0.0199
L12	108 - 104	49.675	4	4.2530	0.0185
L13	104 - 100	46.167	4	4.1309	0.0171
L14	100 - 96	42.769	4	3.9910	0.0157
L15	96 - 92	39.495	4	3.8330	0.0143
L16	92 - 90	36.360	4	3.6567	0.0129
L17	90 - 86	34.850	4	3.5616	0.0122
L18	86 - 82	31.918	4	3.4440	0.0114
L19	82 - 78	29.088	4	3.3155	0.0106
L20	78 - 74	26.371	4	3.1756	0.0098
L21	74 - 70	23.776	4	3.0244	0.0089
L22	70 - 66	21.311	4	2.8615	0.0081
L23	66 - 62	18.988	4	2.6868	0.0073
L24	62 - 60	16.816	4	2.5001	0.0065
L25	60 - 56	15.789	4	2.4022	0.0061
L26	56 - 52	13.831	4	2.2737	0.0056
L27	52 - 48	11.984	4	2.1374	0.0051
L28	48 - 44	10.254	4	1.9932	0.0047
L29	44 - 40.25	8.648	4	1.8408	0.0042
L30	40.25 - 40	7.261	4	1.6906	0.0037
L31	40 - 36	7.173	4	1.6803	0.0037
L32	36 - 32	5.835	4	1.5115	0.0032
L33	32 - 30	4.643	4	1.3343	0.0027
L34	30 - 29.75	4.103	4	1.2426	0.0025

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L35	29.75 - 25.75	4.038	4	1.2338	0.0025
L36	25.75 - 21.75	3.065	4	1.0896	0.0021
L37	21.75 - 17.75	2.215	4	0.9388	0.0018
L38	17.75 - 13.75	1.494	4	0.7813	0.0015
L39	13.75 - 9.75	0.908	4	0.6170	0.0011
L40	9.75 - 7.92	0.462	4	0.4459	0.0008
L41	7.92 - 7.67	0.307	4	0.3653	0.0007
L42	7.67 - 3.67	0.288	4	0.3542	0.0006
L43	3.67 - 0	0.067	4	0.1726	0.0003

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	2.4" Dia x 8-ft Mount Pipe	4	91.408	5.0310	0.0454	28277
147.00	DB980H90E-M w/ Mount Pipe	4	88.254	5.0308	0.0450	28277
139.00	80010964 w/ Mount Pipe	4	79.859	5.0048	0.0403	7442
129.00	800 10504 w/ Mount Pipe	4	69.538	4.8407	0.0311	2225
119.00	MX08FRO665-21 w/ Mount Pipe	4	59.763	4.4883	0.0220	2187
60.00	KS24019-L112A	4	15.789	2.4022	0.0061	1431
30.00	Bridge Stiffener (56" x 12" x 1")	4	4.103	1.2426	0.0025	1411

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 - 149	P24x0.25	4.00	0.00	0.0	18.6532	0	662	0.000
	149 - 148					18.6532	0	662	0.000
	148 - 147					18.6532	0	662	0.000
	147 - 146					18.6532	-7	662	0.011
L2	146 - 145	P24x0.25	4.00	0.00	0.0	18.6532	-7	662	0.011
	145 - 144					18.6532	-3	662	0.004
	144 - 143					18.6532	-3	662	0.004
	143 - 142					18.6532	-3	662	0.004
L3	142 - 141	P24x0.25	4.00	0.00	0.0	18.6532	-3	662	0.004
	141 - 140					18.6532	-3	662	0.004
	140 - 139					18.6532	-3	662	0.005
	139 - 138					18.6532	-7	662	0.011
L4	138 - 137	P24x0.25	4.00	0.00	0.0	18.6532	-8	662	0.011
	137 - 136					18.6532	-8	662	0.012

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
	136 - 135					18.6532	-8	662	0.012
	135 - 134					18.6532	-8	662	0.012
L5	134 - 133	P24x0.25	4.00	0.00	0.0	18.6532	-8	662	0.012
	133 - 132					18.6532	-8	662	0.012
	132 - 131					18.6532	-8	662	0.012
	131 - 130					18.6532	-8	662	0.012
L6	130 - 129	P24x0.25	4.00	0.00	0.0	18.6532	-8	662	0.013
	129 - 128					18.6532	-10	662	0.014
	128 - 127					18.6532	-10	662	0.015
	127 - 126					18.6532	-10	662	0.015
L7	126 - 125	P24x0.25	4.00	0.00	0.0	18.6532	-10	662	0.015
	125 - 124					18.6532	-10	662	0.015
	124 - 123					18.6532	-10	662	0.015
	123 - 122					18.6532	-10	662	0.015
L8	122 - 121	P24x0.25	2.00	0.00	0.0	18.6532	-10	662	0.015
	121 - 120					18.6532	-10	662	0.016
L9	120 - 119	P30x0.375	4.00	0.00	0.0	34.9011	-11	1311	0.008
	119 - 118					34.9011	-14	1311	0.010
	118 - 117					34.9011	-14	1311	0.011
	117 - 116					34.9011	-14	1311	0.011
L10	116 - 115	P30x0.375	4.00	0.00	0.0	34.9011	-14	1311	0.011
	115 - 114					34.9011	-14	1311	0.011
	114 - 113					34.9011	-15	1311	0.011
	113 - 112					34.9011	-15	1311	0.011
L11	112 - 111	P30x0.375	4.00	0.00	0.0	34.9011	-15	1311	0.011
	111 - 110					34.9011	-15	1311	0.012
	110 - 109					34.9011	-15	1311	0.012
	109 - 108					34.9011	-15	1311	0.012
L12	108 - 107	P30x0.375	4.00	0.00	0.0	34.9011	-16	1311	0.012
	107 - 106					34.9011	-16	1311	0.012
	106 - 105					34.9011	-16	1311	0.012
	105 - 104					34.9011	-16	1311	0.012
L13	104 - 103	P30x0.375	4.00	0.00	0.0	34.9011	-16	1311	0.012
	103 - 102					34.9011	-17	1311	0.013
	102 - 101					34.901	-17	1311	0.013

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
	101 - 100					1 34.901 1	-17	1311	0.013
L14	100 - 99	P30x0.375	4.00	0.00	0.0	34.901 1	-17	1311	0.013
	99 - 98					34.901 1	-17	1311	0.013
	98 - 97					34.901 1	-17	1311	0.013
	97 - 96					34.901 1	-18	1311	0.013
L15	96 - 95	P30x0.375	4.00	0.00	0.0	34.901 1	-18	1311	0.014
	95 - 94					34.901 1	-18	1311	0.014
	94 - 93					34.901 1	-18	1311	0.014
	93 - 92					34.901 1	-18	1311	0.014
L16	92 - 91	P30x0.375	2.00	0.00	0.0	34.901 1	-18	1311	0.014
	91 - 90					34.901 1	-19	1311	0.014
L17	90 - 89	P36x0.375	4.00	0.00	0.0	41.969 7	-19	1490	0.013
	89 - 88					41.969 7	-19	1490	0.013
	88 - 87					41.969 7	-19	1490	0.013
	87 - 86					41.969 7	-20	1490	0.013
L18	86 - 85	P36x0.375	4.00	0.00	0.0	41.969 7	-20	1490	0.013
	85 - 84					41.969 7	-20	1490	0.013
	84 - 83					41.969 7	-20	1490	0.014
	83 - 82					41.969 7	-20	1490	0.014
L19	82 - 81	P36x0.375	4.00	0.00	0.0	41.969 7	-21	1490	0.014
	81 - 80					41.969 7	-21	1490	0.014
	80 - 79					41.969 7	-21	1490	0.014
	79 - 78					41.969 7	-21	1490	0.014
L20	78 - 77	P36x0.375	4.00	0.00	0.0	41.969 7	-21	1490	0.014
	77 - 76					41.969 7	-22	1490	0.014
	76 - 75					41.969 7	-22	1490	0.015
	75 - 74					41.969 7	-22	1490	0.015
L21	74 - 73	P36x0.375	4.00	0.00	0.0	41.969 7	-22	1490	0.015
	73 - 72					41.969 7	-22	1490	0.015
	72 - 71					41.969 7	-23	1490	0.015
	71 - 70					41.969 7	-23	1490	0.015
L22	70 - 69	P36x0.375	4.00	0.00	0.0	41.969 7	-23	1490	0.015
	69 - 68					41.969 7	-23	1490	0.016
	68 - 67					41.969 7	-23	1490	0.016

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	K	K	
	67 - 66					41.9697	-24	1490	0.016
L23	66 - 65	P36x0.375	4.00	0.00	0.0	41.9697	-24	1490	0.016
	65 - 64					41.9697	-24	1490	0.016
	64 - 63					41.9697	-24	1490	0.016
	63 - 62					41.9697	-25	1490	0.016
L24	62 - 61	P36x0.375	2.00	0.00	0.0	41.9697	-25	1490	0.017
	61 - 60					41.9697	-25	1490	0.017
L25	60 - 59	P42x0.375	4.00	0.00	0.0	49.0383	-25	1669	0.015
	59 - 58					49.0383	-26	1669	0.015
	58 - 57					49.0383	-26	1669	0.015
	57 - 56					49.0383	-26	1669	0.016
L26	56 - 55	P42x0.375	4.00	0.00	0.0	49.0383	-26	1669	0.016
	55 - 54					49.0383	-27	1669	0.016
	54 - 53					49.0383	-27	1669	0.016
	53 - 52					49.0383	-27	1669	0.016
L27	52 - 51	P42x0.375	4.00	0.00	0.0	49.0383	-27	1669	0.016
	51 - 50					49.0383	-27	1669	0.016
	50 - 49					49.0383	-28	1669	0.017
	49 - 48					49.0383	-28	1669	0.017
L28	48 - 47	P42x0.375	4.00	0.00	0.0	49.0383	-28	1669	0.017
	47 - 46					49.0383	-28	1669	0.017
	46 - 45					49.0383	-29	1669	0.017
	45 - 44					49.0383	-29	1669	0.017
L29	44 - 42.75	P42x0.375	3.75	0.00	0.0	49.0383	-29	1669	0.018
	42.75 - 41.5					49.0383	-30	1669	0.018
	41.5 - 40.25					49.0383	-30	1669	0.018
L30	40.25 - 40 (30)	P42x0.375	0.25	0.00	0.0	49.0383	-30	1669	0.018
L31	40 - 39	P42x0.375	4.00	0.00	0.0	49.0383	-30	1669	0.018
	39 - 38					49.0383	-31	1669	0.018
	38 - 37					49.0383	-31	1669	0.018
	37 - 36					49.0383	-31	1669	0.019
L32	36 - 35	P42x0.375	4.00	0.00	0.0	49.0383	-31	1669	0.019
	35 - 34					49.0383	-32	1669	0.019
	34 - 33					49.0383	-32	1669	0.019
	33 - 32					49.038	-32	1669	0.019

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L33	32 - 31	P42x0.375	2.00	0.00	0.0	49.0383	-33	1669	0.020
	31 - 30					49.0383	-33	1669	0.020
L34	30 - 29.75 (34)	P42x0.5	0.25	0.00	0.0	65.1880	-34	2410	0.014
L35	29.75 - 28.75	P42x0.5	4.00	0.00	0.0	65.1880	-34	2410	0.014
	28.75 - 27.75					65.1880	-34	2410	0.014
	27.75 - 26.75					65.1880	-35	2410	0.014
	26.75 - 25.75					65.1880	-35	2410	0.015
L36	25.75 - 24.75	P42x0.5	4.00	0.00	0.0	65.1880	-35	2410	0.015
	24.75 - 23.75					65.1880	-36	2410	0.015
	23.75 - 22.75					65.1880	-36	2410	0.015
	22.75 - 21.75					65.1880	-36	2410	0.015
L37	21.75 - 20.75	P42x0.5	4.00	0.00	0.0	65.1880	-37	2410	0.015
	20.75 - 19.75					65.1880	-37	2410	0.015
	19.75 - 18.75					65.1880	-37	2410	0.015
	18.75 - 17.75					65.1880	-38	2410	0.016
L38	17.75 - 16.75	P42x0.5	4.00	0.00	0.0	65.1880	-38	2410	0.016
	16.75 - 15.75					65.1880	-38	2410	0.016
	15.75 - 14.75					65.1880	-39	2410	0.016
	14.75 - 13.75					65.1880	-39	2410	0.016
L39	13.75 - 12.75	P42x0.5	4.00	0.00	0.0	65.1880	-39	2410	0.016
	12.75 - 11.75					65.1880	-39	2410	0.016
	11.75 - 10.75					65.1880	-40	2410	0.016
	10.75 - 9.75					65.1880	-40	2410	0.017
L40	9.75 - 7.92 (40)	P42x0.5	1.83	0.00	0.0	65.1880	-41	2410	0.017
L41	7.92 - 7.67 (41)	P42x0.5	0.25	0.00	0.0	65.1880	-41	2410	0.017
L42	7.67 - 6.67	P42x0.5	4.00	0.00	0.0	65.1880	-41	2410	0.017
	6.67 - 5.67					65.1880	-42	2410	0.017
	5.67 - 4.67					65.1880	-42	2410	0.017
	4.67 - 3.67					65.1880	-42	2410	0.018
L43	3.67 - 2.44667	P42x0.5	3.67	0.00	0.0	65.1880	-43	2410	0.018
	2.44667 - 1.22333					65.1880	-43	2410	0.018
	1.22333 - 0					65.1880	-44	2410	0.018

Pole Bending Design Data

Section No.	Elevation	Size	M_{ux}	ϕM_{nx}	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy}	ϕM_{ny}	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	ft		kip-ft	kip-ft		kip-ft	kip-ft	
L1	150 - 149	P24x0.25	1	397	0.001	0	397	0.000
	149 - 148		1	397	0.002	0	397	0.000
	148 - 147		1	397	0.002	0	397	0.000
	147 - 146		7	397	0.018	0	397	0.000
L2	146 - 145	P24x0.25	8	397	0.021	0	397	0.000
	145 - 144		13	397	0.032	0	397	0.000
	144 - 143		16	397	0.041	0	397	0.000
	143 - 142		20	397	0.049	0	397	0.000
L3	142 - 141	P24x0.25	23	397	0.058	0	397	0.000
	141 - 140		27	397	0.067	0	397	0.000
	140 - 139		30	397	0.076	0	397	0.000
	139 - 138		42	397	0.106	0	397	0.000
L4	138 - 137	P24x0.25	50	397	0.127	0	397	0.000
	137 - 136		59	397	0.148	0	397	0.000
	136 - 135		67	397	0.170	0	397	0.000
	135 - 134		76	397	0.192	0	397	0.000
L5	134 - 133	P24x0.25	85	397	0.214	0	397	0.000
	133 - 132		94	397	0.236	0	397	0.000
	132 - 131		102	397	0.258	0	397	0.000
	131 - 130		111	397	0.280	0	397	0.000
L6	130 - 129	P24x0.25	120	397	0.303	0	397	0.000
	129 - 128		131	397	0.329	0	397	0.000
	128 - 127		141	397	0.354	0	397	0.000
	127 - 126		151	397	0.381	0	397	0.000
L7	126 - 125	P24x0.25	161	397	0.407	0	397	0.000
	125 - 124		172	397	0.433	0	397	0.000
	124 - 123		182	397	0.459	0	397	0.000
	123 - 122		193	397	0.486	0	397	0.000
L8	122 - 121	P24x0.25	203	397	0.513	0	397	0.000
	121 - 120		214	397	0.540	0	397	0.000
L9	120 - 119	P30x0.375	225	948	0.237	0	948	0.000
	119 - 118		239	948	0.252	0	948	0.000
	118 - 117		253	948	0.267	0	948	0.000
	117 - 116		267	948	0.281	0	948	0.000
L10	116 - 115	P30x0.375	281	948	0.296	0	948	0.000
	115 - 114		295	948	0.311	0	948	0.000
	114 - 113		309	948	0.326	0	948	0.000
	113 - 112		324	948	0.341	0	948	0.000
L11	112 - 111	P30x0.375	338	948	0.357	0	948	0.000
	111 - 110		352	948	0.372	0	948	0.000
	110 - 109		367	948	0.387	0	948	0.000
	109 - 108		382	948	0.403	0	948	0.000
L12	108 - 107	P30x0.375	396	948	0.418	0	948	0.000
	107 - 106		411	948	0.434	0	948	0.000
	106 - 105		426	948	0.449	0	948	0.000
	105 - 104		441	948	0.465	0	948	0.000
L13	104 - 103	P30x0.375	456	948	0.481	0	948	0.000
	103 - 102		471	948	0.497	0	948	0.000
	102 - 101		486	948	0.512	0	948	0.000
	101 - 100		501	948	0.528	0	948	0.000
L14	100 - 99	P30x0.375	516	948	0.545	0	948	0.000
	99 - 98		531	948	0.561	0	948	0.000
	98 - 97		547	948	0.577	0	948	0.000
	97 - 96		562	948	0.593	0	948	0.000
L15	96 - 95	P30x0.375	578	948	0.609	0	948	0.000
	95 - 94		593	948	0.626	0	948	0.000
	94 - 93		609	948	0.642	0	948	0.000
	93 - 92		625	948	0.659	0	948	0.000
L16	92 - 91	P30x0.375	640	948	0.675	0	948	0.000
	91 - 90		656	948	0.692	0	948	0.000
L17	90 - 89	P36x0.375	672	1339	0.502	0	1339	0.000
	89 - 88		688	1339	0.514	0	1339	0.000
	88 - 87		704	1339	0.526	0	1339	0.000
	87 - 86		720	1339	0.538	0	1339	0.000
L18	86 - 85	P36x0.375	736	1339	0.550	0	1339	0.000
	85 - 84		752	1339	0.562	0	1339	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
	84 - 83		769	1339	0.574	0	1339	0.000
	83 - 82		785	1339	0.586	0	1339	0.000
L19	82 - 81	P36x0.375	802	1339	0.599	0	1339	0.000
	81 - 80		818	1339	0.611	0	1339	0.000
	80 - 79		835	1339	0.623	0	1339	0.000
	79 - 78		851	1339	0.636	0	1339	0.000
L20	78 - 77	P36x0.375	868	1339	0.648	0	1339	0.000
	77 - 76		885	1339	0.661	0	1339	0.000
	76 - 75		902	1339	0.674	0	1339	0.000
	75 - 74		919	1339	0.686	0	1339	0.000
L21	74 - 73	P36x0.375	936	1339	0.699	0	1339	0.000
	73 - 72		953	1339	0.712	0	1339	0.000
	72 - 71		970	1339	0.725	0	1339	0.000
	71 - 70		987	1339	0.738	0	1339	0.000
L22	70 - 69	P36x0.375	1005	1339	0.751	0	1339	0.000
	69 - 68		1022	1339	0.763	0	1339	0.000
	68 - 67		1040	1339	0.777	0	1339	0.000
	67 - 66		1057	1339	0.790	0	1339	0.000
L23	66 - 65	P36x0.375	1075	1339	0.803	0	1339	0.000
	65 - 64		1092	1339	0.816	0	1339	0.000
	64 - 63		1110	1339	0.829	0	1339	0.000
	63 - 62		1128	1339	0.842	0	1339	0.000
L24	62 - 61	P36x0.375	1146	1339	0.856	0	1339	0.000
	61 - 60		1163	1339	0.869	0	1339	0.000
L25	60 - 59	P42x0.375	1181	1797	0.657	0	1797	0.000
	59 - 58		1199	1797	0.668	0	1797	0.000
	58 - 57		1217	1797	0.678	0	1797	0.000
	57 - 56		1236	1797	0.688	0	1797	0.000
L26	56 - 55	P42x0.375	1254	1797	0.698	0	1797	0.000
	55 - 54		1272	1797	0.708	0	1797	0.000
	54 - 53		1291	1797	0.718	0	1797	0.000
	53 - 52		1309	1797	0.729	0	1797	0.000
L27	52 - 51	P42x0.375	1328	1797	0.739	0	1797	0.000
	51 - 50		1346	1797	0.749	0	1797	0.000
	50 - 49		1365	1797	0.760	0	1797	0.000
	49 - 48		1384	1797	0.770	0	1797	0.000
L28	48 - 47	P42x0.375	1403	1797	0.781	0	1797	0.000
	47 - 46		1422	1797	0.791	0	1797	0.000
	46 - 45		1441	1797	0.802	0	1797	0.000
	45 - 44		1460	1797	0.813	0	1797	0.000
L29	44 - 42.75	P42x0.375	1484	1797	0.826	0	1797	0.000
	42.75 - 41.5		1508	1797	0.839	0	1797	0.000
	41.5 - 40.25		1532	1797	0.853	0	1797	0.000
L30	40.25 - 40 (30)	P42x0.375	1537	1797	0.855	0	1797	0.000
L31	40 - 39	P42x0.375	1556	1797	0.866	0	1797	0.000
	39 - 38		1575	1797	0.877	0	1797	0.000
	38 - 37		1595	1797	0.888	0	1797	0.000
	37 - 36		1614	1797	0.899	0	1797	0.000
L32	36 - 35	P42x0.375	1634	1797	0.910	0	1797	0.000
	35 - 34		1654	1797	0.920	0	1797	0.000
	34 - 33		1673	1797	0.931	0	1797	0.000
	33 - 32		1693	1797	0.942	0	1797	0.000
L33	32 - 31	P42x0.375	1713	1797	0.954	0	1797	0.000
	31 - 30		1733	1797	0.965	0	1797	0.000
L34	30 - 29.75 (34)	P42x0.5	1738	2464	0.705	0	2464	0.000
L35	29.75 - 28.75	P42x0.5	1758	2464	0.714	0	2464	0.000
	28.75 - 27.75		1778	2464	0.722	0	2464	0.000
	27.75 - 26.75		1799	2464	0.730	0	2464	0.000
	26.75 - 25.75		1819	2464	0.738	0	2464	0.000
L36	25.75 - 24.75	P42x0.5	1840	2464	0.747	0	2464	0.000
	24.75 - 23.75		1860	2464	0.755	0	2464	0.000
	23.75 - 22.75		1881	2464	0.763	0	2464	0.000
	22.75 - 21.75		1901	2464	0.772	0	2464	0.000
L37	21.75 - 20.75	P42x0.5	1922	2464	0.780	0	2464	0.000
	20.75 - 19.75		1943	2464	0.789	0	2464	0.000
	19.75 - 18.75		1964	2464	0.797	0	2464	0.000
	18.75 - 17.75		1984	2464	0.806	0	2464	0.000

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L38	17.75 - 16.75	P42x0.5	2005	2464	0.814	0	2464	0.000
	16.75 - 15.75		2026	2464	0.822	0	2464	0.000
	15.75 - 14.75		2047	2464	0.831	0	2464	0.000
	14.75 - 13.75		2068	2464	0.839	0	2464	0.000
L39	13.75 - 12.75	P42x0.5	2089	2464	0.848	0	2464	0.000
	12.75 - 11.75		2110	2464	0.857	0	2464	0.000
	11.75 - 10.75		2131	2464	0.865	0	2464	0.000
	10.75 - 9.75		2153	2464	0.874	0	2464	0.000
L40	9.75 - 7.92 (40)	P42x0.5	2191	2464	0.889	0	2464	0.000
L41	7.92 - 7.67 (41)	P42x0.5	2197	2464	0.892	0	2464	0.000
L42	7.67 - 6.67	P42x0.5	2218	2464	0.900	0	2464	0.000
	6.67 - 5.67		2239	2464	0.909	0	2464	0.000
	5.67 - 4.67		2260	2464	0.917	0	2464	0.000
	4.67 - 3.67		2282	2464	0.926	0	2464	0.000
L43	3.67 - 2.44667	P42x0.5	2308	2464	0.937	0	2464	0.000
	2.44667 - 1.22333		2334	2464	0.947	0	2464	0.000
	1.22333 - 0		2360	2464	0.958	0	2464	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 - 149	P24x0.25	0	202	0.001	0	324	0.000
	149 - 148		0	202	0.001	0	324	0.000
	148 - 147		0	202	0.001	0	324	0.000
	147 - 146		1	202	0.005	0	324	0.001
L2	146 - 145	P24x0.25	1	202	0.006	0	324	0.001
	145 - 144		3	202	0.016	1	324	0.002
	144 - 143		3	202	0.017	1	324	0.002
	143 - 142		3	202	0.017	1	324	0.002
L3	142 - 141	P24x0.25	4	202	0.017	1	324	0.002
	141 - 140		4	202	0.018	1	324	0.002
	140 - 139		4	202	0.018	1	324	0.002
	139 - 138		8	202	0.042	2	324	0.007
L4	138 - 137	P24x0.25	8	202	0.042	2	324	0.007
	137 - 136		9	202	0.042	2	324	0.007
	136 - 135		9	202	0.043	2	324	0.007
	135 - 134		9	202	0.043	2	324	0.007
L5	134 - 133	P24x0.25	9	202	0.043	2	324	0.007
	133 - 132		9	202	0.044	2	324	0.007
	132 - 131		9	202	0.044	2	324	0.007
	131 - 130		9	202	0.044	2	324	0.007
L6	130 - 129	P24x0.25	9	202	0.044	2	324	0.007
	129 - 128		10	202	0.050	2	324	0.007
	128 - 127		10	202	0.051	3	324	0.010
	127 - 126		10	202	0.051	3	324	0.010
L7	126 - 125	P24x0.25	10	202	0.052	3	324	0.010
	125 - 124		10	202	0.052	3	324	0.010
	124 - 123		11	202	0.052	3	324	0.010
	123 - 122		11	202	0.052	3	324	0.010
L8	122 - 121	P24x0.25	11	202	0.053	3	324	0.010
	121 - 120		11	202	0.053	3	324	0.010
L9	120 - 119	P30x0.375	11	396	0.027	3	995	0.003
	119 - 118		14	396	0.035	3	995	0.003
	118 - 117		14	396	0.035	3	995	0.003
	117 - 116		14	396	0.036	3	995	0.003
L10	116 - 115	P30x0.375	14	396	0.036	3	995	0.003
	115 - 114		14	396	0.036	3	995	0.003
	114 - 113		14	396	0.036	3	995	0.003
	113 - 112		14	396	0.036	3	995	0.003

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 $\frac{T_u}{\phi T_n}$
L11	112 - 111	P30x0.375	14	396	0.036	3	995	0.003
	111 - 110		14	396	0.037	3	995	0.003
	110 - 109		15	396	0.037	3	995	0.003
	109 - 108		15	396	0.037	3	995	0.003
L12	108 - 107	P30x0.375	15	396	0.037	3	995	0.003
	107 - 106		15	396	0.037	3	995	0.003
	106 - 105		15	396	0.038	3	995	0.003
	105 - 104		15	396	0.038	3	995	0.003
L13	104 - 103	P30x0.375	15	396	0.038	3	995	0.003
	103 - 102		15	396	0.038	3	995	0.003
	102 - 101		15	396	0.038	3	995	0.003
	101 - 100		15	396	0.038	3	995	0.003
L14	100 - 99	P30x0.375	15	396	0.039	3	995	0.003
	99 - 98		15	396	0.039	3	995	0.003
	98 - 97		15	396	0.039	3	995	0.003
	97 - 96		15	396	0.039	3	995	0.003
L15	96 - 95	P30x0.375	16	396	0.039	3	995	0.003
	95 - 94		16	396	0.039	3	995	0.003
	94 - 93		16	396	0.040	3	995	0.003
	93 - 92		16	396	0.040	3	995	0.003
L16	92 - 91	P30x0.375	16	396	0.040	3	995	0.003
	91 - 90		16	396	0.040	3	995	0.003
L17	90 - 89	P36x0.375	16	454	0.035	3	1094	0.003
	89 - 88		16	454	0.035	3	1094	0.003
	88 - 87		16	454	0.035	3	1094	0.003
	87 - 86		16	454	0.036	3	1094	0.003
L18	86 - 85	P36x0.375	16	454	0.036	3	1094	0.003
	85 - 84		16	454	0.036	3	1094	0.003
	84 - 83		16	454	0.036	3	1094	0.003
	83 - 82		16	454	0.036	3	1094	0.003
L19	82 - 81	P36x0.375	17	454	0.036	3	1094	0.003
	81 - 80		17	454	0.037	3	1094	0.003
	80 - 79		17	454	0.037	3	1094	0.003
	79 - 78		17	454	0.037	3	1094	0.003
L20	78 - 77	P36x0.375	17	454	0.037	3	1094	0.003
	77 - 76		17	454	0.037	3	1094	0.003
	76 - 75		17	454	0.037	3	1094	0.003
	75 - 74		17	454	0.037	3	1094	0.003
L21	74 - 73	P36x0.375	17	454	0.038	3	1094	0.003
	73 - 72		17	454	0.038	3	1094	0.003
	72 - 71		17	454	0.038	3	1094	0.003
	71 - 70		17	454	0.038	3	1094	0.003
L22	70 - 69	P36x0.375	17	454	0.038	3	1094	0.003
	69 - 68		17	454	0.038	3	1094	0.003
	68 - 67		17	454	0.038	3	1094	0.003
	67 - 66		18	454	0.039	3	1094	0.003
L23	66 - 65	P36x0.375	18	454	0.039	3	1094	0.003
	65 - 64		18	454	0.039	3	1094	0.003
	64 - 63		18	454	0.039	3	1094	0.003
	63 - 62		18	454	0.039	3	1094	0.003
L24	62 - 61	P36x0.375	18	454	0.039	3	1094	0.003
	61 - 60		18	454	0.039	3	1094	0.003
L25	60 - 59	P42x0.375	18	429	0.042	3	1208	0.003
	59 - 58		18	429	0.042	3	1208	0.003
	58 - 57		18	429	0.042	3	1208	0.003
	57 - 56		18	429	0.043	3	1208	0.003
L26	56 - 55	P42x0.375	18	429	0.043	3	1208	0.003
	55 - 54		18	429	0.043	3	1208	0.003
	54 - 53		18	429	0.043	3	1208	0.003
	53 - 52		19	429	0.043	3	1208	0.003
L27	52 - 51	P42x0.375	19	429	0.043	3	1208	0.003
	51 - 50		19	429	0.044	3	1208	0.003
	50 - 49		19	429	0.044	3	1208	0.003
	49 - 48		19	429	0.044	3	1208	0.003
L28	48 - 47	P42x0.375	19	429	0.044	3	1208	0.003
	47 - 46		19	429	0.044	3	1208	0.003
	46 - 45		19	429	0.044	3	1208	0.003
	45 - 44		19	429	0.044	3	1208	0.003
L29	44 - 42.75	P42x0.375	19	429	0.045	3	1208	0.003

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 $\frac{T_u}{\phi T_n}$
	42.75 - 41.5		19	429	0.045	3	1208	0.003
	41.5 - 40.25		19	429	0.045	3	1208	0.003
L30	40.25 - 40 (30)	P42x0.375	19	429	0.045	3	1208	0.003
L31	40 - 39	P42x0.375	19	429	0.045	3	1208	0.003
	39 - 38		19	429	0.045	3	1208	0.003
	38 - 37		20	429	0.045	3	1208	0.003
	37 - 36		20	429	0.046	3	1208	0.003
L32	36 - 35	P42x0.375	20	429	0.046	3	1208	0.003
	35 - 34		20	429	0.046	3	1208	0.003
	34 - 33		20	429	0.046	3	1208	0.003
	33 - 32		20	429	0.046	3	1208	0.003
L33	32 - 31	P42x0.375	20	429	0.046	3	1208	0.003
	31 - 30		20	429	0.046	3	1208	0.003
L34	30 - 29.75 (34)	P42x0.5	20	739	0.027	3	2419	0.001
L35	29.75 - 28.75	P42x0.5	20	739	0.028	3	2419	0.001
	28.75 - 27.75		20	739	0.028	3	2419	0.001
	27.75 - 26.75		20	739	0.028	3	2419	0.001
	26.75 - 25.75		20	739	0.028	3	2419	0.001
L36	25.75 - 24.75	P42x0.5	21	739	0.028	3	2419	0.001
	24.75 - 23.75		21	739	0.028	3	2419	0.001
	23.75 - 22.75		21	739	0.028	3	2419	0.001
	22.75 - 21.75		21	739	0.028	3	2419	0.001
L37	21.75 - 20.75	P42x0.5	21	739	0.028	3	2419	0.001
	20.75 - 19.75		21	739	0.028	3	2419	0.001
	19.75 - 18.75		21	739	0.028	3	2419	0.001
	18.75 - 17.75		21	739	0.028	3	2419	0.001
L38	17.75 - 16.75	P42x0.5	21	739	0.028	3	2419	0.001
	16.75 - 15.75		21	739	0.028	3	2419	0.001
	15.75 - 14.75		21	739	0.028	3	2419	0.001
	14.75 - 13.75		21	739	0.028	3	2419	0.001
L39	13.75 - 12.75	P42x0.5	21	739	0.028	3	2419	0.001
	12.75 - 11.75		21	739	0.029	3	2419	0.001
	11.75 - 10.75		21	739	0.029	3	2419	0.001
	10.75 - 9.75		21	739	0.029	3	2419	0.001
L40	9.75 - 7.92 (40)	P42x0.5	21	739	0.029	3	2419	0.001
L41	7.92 - 7.67 (41)	P42x0.5	21	739	0.029	3	2419	0.001
L42	7.67 - 6.67	P42x0.5	21	739	0.029	3	2419	0.001
	6.67 - 5.67		21	739	0.029	3	2419	0.001
	5.67 - 4.67		21	739	0.029	3	2419	0.001
	4.67 - 3.67		21	739	0.029	3	2419	0.001
L43	3.67 - 2.44667	P42x0.5	21	739	0.029	3	2419	0.001
	2.44667 - 1.22333		21	739	0.029	3	2419	0.001
	1.22333 - 0		21	739	0.029	3	2419	0.001

Pole Interaction Design Data

Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	150 - 149	0.000	0.001	0.000	0.001	0.000	0.001	1.050	4.8.2
	149 - 148	0.000	0.002	0.000	0.001	0.000	0.002	1.050	4.8.2
	148 - 147	0.000	0.002	0.000	0.001	0.000	0.003	1.050	4.8.2
	147 - 146	0.011	0.018	0.000	0.005	0.001	0.029	1.050	4.8.2
L2	146 - 145	0.011	0.021	0.000	0.006	0.001	0.032	1.050	4.8.2
	145 - 144	0.004	0.032	0.000	0.016	0.002	0.037	1.050	4.8.2
	144 - 143	0.004	0.041	0.000	0.017	0.002	0.045	1.050	4.8.2
	143 - 142	0.004	0.049	0.000	0.017	0.002	0.054	1.050	4.8.2

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L3	142 - 141	0.004	0.058	0.000	0.017	0.002	0.063	1.050	4.8.2
	141 - 140	0.004	0.067	0.000	0.018	0.002	0.072	1.050	4.8.2
	140 - 139	0.005	0.076	0.000	0.018	0.002	0.081	1.050	4.8.2
	139 - 138	0.011	0.106	0.000	0.042	0.007	0.119	1.050	4.8.2
L4	138 - 137	0.011	0.127	0.000	0.042	0.007	0.141	1.050	4.8.2
	137 - 136	0.012	0.148	0.000	0.042	0.007	0.163	1.050	4.8.2
	136 - 135	0.012	0.170	0.000	0.043	0.007	0.184	1.050	4.8.2
	135 - 134	0.012	0.192	0.000	0.043	0.007	0.206	1.050	4.8.2
L5	134 - 133	0.012	0.214	0.000	0.043	0.007	0.228	1.050	4.8.2
	133 - 132	0.012	0.236	0.000	0.044	0.007	0.250	1.050	4.8.2
	132 - 131	0.012	0.258	0.000	0.044	0.007	0.273	1.050	4.8.2
	131 - 130	0.012	0.280	0.000	0.044	0.007	0.295	1.050	4.8.2
L6	130 - 129	0.013	0.303	0.000	0.044	0.007	0.318	1.050	4.8.2
	129 - 128	0.014	0.329	0.000	0.050	0.007	0.347	1.050	4.8.2
	128 - 127	0.015	0.354	0.000	0.051	0.010	0.373	1.050	4.8.2
	127 - 126	0.015	0.381	0.000	0.051	0.010	0.399	1.050	4.8.2
L7	126 - 125	0.015	0.407	0.000	0.052	0.010	0.425	1.050	4.8.2
	125 - 124	0.015	0.433	0.000	0.052	0.010	0.452	1.050	4.8.2
	124 - 123	0.015	0.459	0.000	0.052	0.010	0.479	1.050	4.8.2
	123 - 122	0.015	0.486	0.000	0.052	0.010	0.505	1.050	4.8.2
L8	122 - 121	0.015	0.513	0.000	0.053	0.010	0.532	1.050	4.8.2
	121 - 120	0.016	0.540	0.000	0.053	0.010	0.559	1.050	4.8.2
L9	120 - 119	0.008	0.237	0.000	0.027	0.003	0.246	1.050	4.8.2
	119 - 118	0.010	0.252	0.000	0.035	0.003	0.264	1.050	4.8.2
	118 - 117	0.011	0.267	0.000	0.035	0.003	0.279	1.050	4.8.2
	117 - 116	0.011	0.281	0.000	0.036	0.003	0.294	1.050	4.8.2
L10	116 - 115	0.011	0.296	0.000	0.036	0.003	0.309	1.050	4.8.2
	115 - 114	0.011	0.311	0.000	0.036	0.003	0.324	1.050	4.8.2
	114 - 113	0.011	0.326	0.000	0.036	0.003	0.339	1.050	4.8.2
	113 - 112	0.011	0.341	0.000	0.036	0.003	0.354	1.050	4.8.2
L11	112 - 111	0.011	0.357	0.000	0.036	0.003	0.370	1.050	4.8.2
	111 - 110	0.012	0.372	0.000	0.037	0.003	0.385	1.050	4.8.2
	110 - 109	0.012	0.387	0.000	0.037	0.003	0.400	1.050	4.8.2
	109 - 108	0.012	0.403	0.000	0.037	0.003	0.416	1.050	4.8.2
L12	108 - 107	0.012	0.418	0.000	0.037	0.003	0.432	1.050	4.8.2
	107 - 106	0.012	0.434	0.000	0.037	0.003	0.447	1.050	4.8.2
	106 - 105	0.012	0.449	0.000	0.038	0.003	0.463	1.050	4.8.2
	105 - 104	0.012	0.465	0.000	0.038	0.003	0.479	1.050	4.8.2
L13	104 - 103	0.012	0.481	0.000	0.038	0.003	0.495	1.050	4.8.2
	103 - 102	0.013	0.497	0.000	0.038	0.003	0.511	1.050	4.8.2
	102 - 101	0.013	0.512	0.000	0.038	0.003	0.527	1.050	4.8.2
	101 - 100	0.013	0.528	0.000	0.038	0.003	0.543	1.050	4.8.2
L14	100 - 99	0.013	0.545	0.000	0.039	0.003	0.559	1.050	4.8.2
	99 - 98	0.013	0.561	0.000	0.039	0.003	0.576	1.050	4.8.2
	98 - 97	0.013	0.577	0.000	0.039	0.003	0.592	1.050	4.8.2
	97 - 96	0.013	0.593	0.000	0.039	0.003	0.608	1.050	4.8.2
L15	96 - 95	0.014	0.609	0.000	0.039	0.003	0.625	1.050	4.8.2
	95 - 94	0.014	0.626	0.000	0.039	0.003	0.641	1.050	4.8.2
	94 - 93	0.014	0.642	0.000	0.040	0.003	0.658	1.050	4.8.2
	93 - 92	0.014	0.659	0.000	0.040	0.003	0.675	1.050	4.8.2
L16	92 - 91	0.014	0.675	0.000	0.040	0.003	0.691	1.050	4.8.2
	91 - 90	0.014	0.692	0.000	0.040	0.003	0.708	1.050	4.8.2
L17	90 - 89	0.013	0.502	0.000	0.035	0.003	0.516	1.050	4.8.2
	89 - 88	0.013	0.514	0.000	0.035	0.003	0.528	1.050	4.8.2
	88 - 87	0.013	0.526	0.000	0.035	0.003	0.540	1.050	4.8.2
	87 - 86	0.013	0.538	0.000	0.036	0.003	0.552	1.050	4.8.2
L18	86 - 85	0.013	0.550	0.000	0.036	0.003	0.565	1.050	4.8.2
	85 - 84	0.013	0.562	0.000	0.036	0.003	0.577	1.050	4.8.2
	84 - 83	0.014	0.574	0.000	0.036	0.003	0.589	1.050	4.8.2
	83 - 82	0.014	0.586	0.000	0.036	0.003	0.602	1.050	4.8.2
L19	82 - 81	0.014	0.599	0.000	0.036	0.003	0.614	1.050	4.8.2
	81 - 80	0.014	0.611	0.000	0.037	0.003	0.627	1.050	4.8.2
	80 - 79	0.014	0.623	0.000	0.037	0.003	0.639	1.050	4.8.2
	79 - 78	0.014	0.636	0.000	0.037	0.003	0.652	1.050	4.8.2
L20	78 - 77	0.014	0.648	0.000	0.037	0.003	0.664	1.050	4.8.2
	77 - 76	0.014	0.661	0.000	0.037	0.003	0.677	1.050	4.8.2
	76 - 75	0.015	0.674	0.000	0.037	0.003	0.690	1.050	4.8.2
	75 - 74	0.015	0.686	0.000	0.037	0.003	0.703	1.050	4.8.2
L21	74 - 73	0.015	0.699	0.000	0.038	0.003	0.716	1.050	4.8.2

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	73 - 72	0.015	0.712	0.000	0.038	0.003	0.729	1.050	4.8.2
	72 - 71	0.015	0.725	0.000	0.038	0.003	0.742	1.050	4.8.2
	71 - 70	0.015	0.738	0.000	0.038	0.003	0.755	1.050	4.8.2
L22	70 - 69	0.015	0.751	0.000	0.038	0.003	0.768	1.050	4.8.2
	69 - 68	0.016	0.763	0.000	0.038	0.003	0.781	1.050	4.8.2
	68 - 67	0.016	0.777	0.000	0.038	0.003	0.794	1.050	4.8.2
	67 - 66	0.016	0.790	0.000	0.039	0.003	0.807	1.050	4.8.2
L23	66 - 65	0.016	0.803	0.000	0.039	0.003	0.821	1.050	4.8.2
	65 - 64	0.016	0.816	0.000	0.039	0.003	0.834	1.050	4.8.2
	64 - 63	0.016	0.829	0.000	0.039	0.003	0.847	1.050	4.8.2
	63 - 62	0.016	0.842	0.000	0.039	0.003	0.861	1.050	4.8.2
L24	62 - 61	0.017	0.856	0.000	0.039	0.003	0.874	1.050	4.8.2
	61 - 60	0.017	0.869	0.000	0.039	0.003	0.888	1.050	4.8.2
L25	60 - 59	0.015	0.657	0.000	0.042	0.003	0.675	1.050	4.8.2
	59 - 58	0.015	0.668	0.000	0.042	0.003	0.685	1.050	4.8.2
	58 - 57	0.015	0.678	0.000	0.042	0.003	0.695	1.050	4.8.2
	57 - 56	0.016	0.688	0.000	0.043	0.003	0.705	1.050	4.8.2
L26	56 - 55	0.016	0.698	0.000	0.043	0.003	0.716	1.050	4.8.2
	55 - 54	0.016	0.708	0.000	0.043	0.003	0.726	1.050	4.8.2
	54 - 53	0.016	0.718	0.000	0.043	0.003	0.737	1.050	4.8.2
	53 - 52	0.016	0.729	0.000	0.043	0.003	0.747	1.050	4.8.2
L27	52 - 51	0.016	0.739	0.000	0.043	0.003	0.758	1.050	4.8.2
	51 - 50	0.016	0.749	0.000	0.044	0.003	0.768	1.050	4.8.2
	50 - 49	0.017	0.760	0.000	0.044	0.003	0.779	1.050	4.8.2
	49 - 48	0.017	0.770	0.000	0.044	0.003	0.789	1.050	4.8.2
L28	48 - 47	0.017	0.781	0.000	0.044	0.003	0.800	1.050	4.8.2
	47 - 46	0.017	0.791	0.000	0.044	0.003	0.811	1.050	4.8.2
	46 - 45	0.017	0.802	0.000	0.044	0.003	0.821	1.050	4.8.2
	45 - 44	0.017	0.813	0.000	0.044	0.003	0.832	1.050	4.8.2
L29	44 - 42.75	0.018	0.826	0.000	0.045	0.003	0.846	1.050	4.8.2
	42.75 - 41.5	0.018	0.839	0.000	0.045	0.003	0.859	1.050	4.8.2
	41.5 - 40.25	0.018	0.853	0.000	0.045	0.003	0.873	1.050	4.8.2
L30	40.25 - 40 (30)	0.018	0.855	0.000	0.045	0.003	0.876	1.050	4.8.2
L31	40 - 39	0.018	0.866	0.000	0.045	0.003	0.887	1.050	4.8.2
	39 - 38	0.018	0.877	0.000	0.045	0.003	0.898	1.050	4.8.2
	38 - 37	0.018	0.888	0.000	0.045	0.003	0.909	1.050	4.8.2
	37 - 36	0.019	0.899	0.000	0.046	0.003	0.920	1.050	4.8.2
L32	36 - 35	0.019	0.910	0.000	0.046	0.003	0.931	1.050	4.8.2
	35 - 34	0.019	0.920	0.000	0.046	0.003	0.942	1.050	4.8.2
	34 - 33	0.019	0.931	0.000	0.046	0.003	0.953	1.050	4.8.2
	33 - 32	0.019	0.942	0.000	0.046	0.003	0.964	1.050	4.8.2
L33	32 - 31	0.020	0.954	0.000	0.046	0.003	0.975	1.050	4.8.2
	31 - 30	0.020	0.965	0.000	0.046	0.003	0.987	1.050	4.8.2
L34	30 - 29.75 (34)	0.014	0.705	0.000	0.027	0.001	0.720	1.050	4.8.2
L35	29.75 - 28.75	0.014	0.714	0.000	0.028	0.001	0.729	1.050	4.8.2
	28.75 - 27.75	0.014	0.722	0.000	0.028	0.001	0.737	1.050	4.8.2
	27.75 - 26.75	0.014	0.730	0.000	0.028	0.001	0.745	1.050	4.8.2
	26.75 - 25.75	0.015	0.738	0.000	0.028	0.001	0.754	1.050	4.8.2
L36	25.75 - 24.75	0.015	0.747	0.000	0.028	0.001	0.762	1.050	4.8.2
	24.75 - 23.75	0.015	0.755	0.000	0.028	0.001	0.771	1.050	4.8.2
	23.75 - 22.75	0.015	0.763	0.000	0.028	0.001	0.779	1.050	4.8.2
	22.75 - 21.75	0.015	0.772	0.000	0.028	0.001	0.788	1.050	4.8.2
L37	21.75 - 20.75	0.015	0.780	0.000	0.028	0.001	0.796	1.050	4.8.2
	20.75 - 19.75	0.015	0.789	0.000	0.028	0.001	0.805	1.050	4.8.2
	19.75 - 18.75	0.015	0.797	0.000	0.028	0.001	0.813	1.050	4.8.2
	18.75 - 17.75	0.016	0.806	0.000	0.028	0.001	0.822	1.050	4.8.2
L38	17.75 - 16.75	0.016	0.814	0.000	0.028	0.001	0.831	1.050	4.8.2
	16.75 - 15.75	0.016	0.822	0.000	0.028	0.001	0.839	1.050	4.8.2
	15.75 - 14.75	0.016	0.831	0.000	0.028	0.001	0.848	1.050	4.8.2
	14.75 - 13.75	0.016	0.839	0.000	0.028	0.001	0.856	1.050	4.8.2
L39	13.75 - 12.75	0.016	0.848	0.000	0.028	0.001	0.865	1.050	4.8.2
	12.75 - 11.75	0.016	0.857	0.000	0.029	0.001	0.874	1.050	4.8.2
	11.75 - 10.75	0.016	0.865	0.000	0.029	0.001	0.883	1.050	4.8.2
	10.75 - 9.75	0.017	0.874	0.000	0.029	0.001	0.891	1.050	4.8.2
L40	9.75 - 7.92 (40)	0.017	0.889	0.000	0.029	0.001	0.907	1.050	4.8.2
L41	7.92 - 7.67	0.017	0.892	0.000	0.029	0.001	0.909	1.050	4.8.2

Section No.	Elevation ft	Ratio P_u / ϕP_n	Ratio M_{ux} / ϕM_{nx}	Ratio M_{uy} / ϕM_{ny}	Ratio V_u / ϕV_n	Ratio T_u / ϕT_n	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
	(41)								
L42	7.67 - 6.67	0.017	0.900	0.000	0.029	0.001	0.918	1.050	4.8.2
	6.67 - 5.67	0.017	0.909	0.000	0.029	0.001	0.927	1.050	4.8.2
	5.67 - 4.67	0.017	0.917	0.000	0.029	0.001	0.936	1.050	4.8.2
	4.67 - 3.67	0.018	0.926	0.000	0.029	0.001	0.945	1.050	4.8.2
L43	3.67 - 2.44667	0.018	0.937	0.000	0.029	0.001	0.955	1.050	4.8.2
	2.44667 - 1.22333	0.018	0.947	0.000	0.029	0.001	0.966	1.050	4.8.2
	1.22333 - 0	0.018	0.958	0.000	0.029	0.001	0.977	1.050	4.8.2

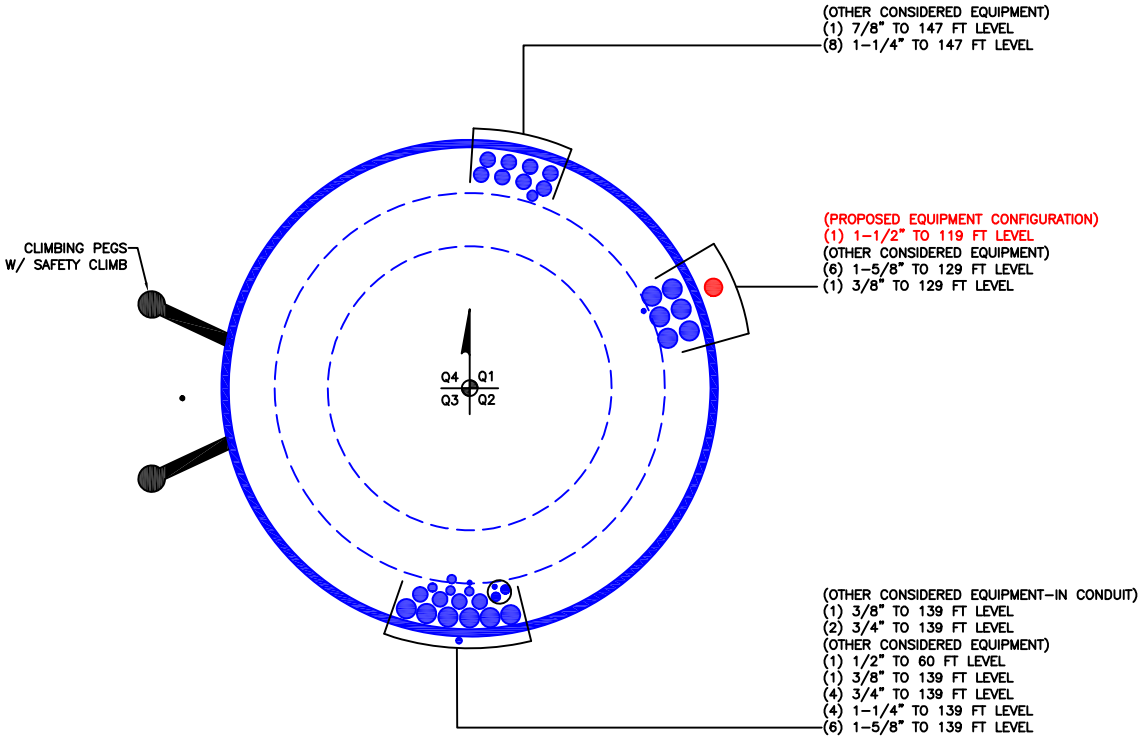
Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	150 - 146	Pole	P24x0.25	1	-7	695	2.7	Pass
L2	146 - 142	Pole	P24x0.25	2	-3	695	5.1	Pass
L3	142 - 138	Pole	P24x0.25	3	-7	695	11.4	Pass
L4	138 - 134	Pole	P24x0.25	4	-8	695	19.6	Pass
L5	134 - 130	Pole	P24x0.25	5	-8	695	28.1	Pass
L6	130 - 126	Pole	P24x0.25	6	-10	695	38.0	Pass
L7	126 - 122	Pole	P24x0.25	7	-10	695	48.1	Pass
L8	122 - 120	Pole	P24x0.25	8	-10	695	53.3	Pass
L9	120 - 116	Pole	P30x0.375	9	-14	1377	28.0	Pass
L10	116 - 112	Pole	P30x0.375	10	-15	1377	33.7	Pass
L11	112 - 108	Pole	P30x0.375	11	-15	1377	39.6	Pass
L12	108 - 104	Pole	P30x0.375	12	-16	1377	45.6	Pass
L13	104 - 100	Pole	P30x0.375	13	-17	1377	51.7	Pass
L14	100 - 96	Pole	P30x0.375	14	-18	1377	57.9	Pass
L15	96 - 92	Pole	P30x0.375	15	-18	1377	64.3	Pass
L16	92 - 90	Pole	P30x0.375	16	-19	1377	67.5	Pass
L17	90 - 86	Pole	P36x0.375	17	-20	1565	52.6	Pass
L18	86 - 82	Pole	P36x0.375	18	-20	1565	57.3	Pass
L19	82 - 78	Pole	P36x0.375	19	-21	1565	62.1	Pass
L20	78 - 74	Pole	P36x0.375	20	-22	1565	66.9	Pass
L21	74 - 70	Pole	P36x0.375	21	-23	1565	71.9	Pass
L22	70 - 66	Pole	P36x0.375	22	-24	1565	76.9	Pass
L23	66 - 62	Pole	P36x0.375	23	-25	1565	82.0	Pass
L24	62 - 60	Pole	P36x0.375	24	-25	1565	84.5	Pass
L25	60 - 56	Pole	P42x0.375	25	-26	1752	67.2	Pass
L26	56 - 52	Pole	P42x0.375	26	-27	1752	71.1	Pass
L27	52 - 48	Pole	P42x0.375	27	-28	1752	75.2	Pass
L28	48 - 44	Pole	P42x0.375	28	-29	1752	79.2	Pass
L29	44 - 40.25	Pole	P42x0.375	29	-30	1752	83.1	Pass
L30	40.25 - 40	Pole	P42x0.375	30	-30	1752	83.4	Pass
L31	40 - 36	Pole	P42x0.375	31	-31	1752	87.6	Pass
L32	36 - 32	Pole	P42x0.375	32	-32	1752	91.8	Pass
L33	32 - 30	Pole	P42x0.375	33	-33	1752	94.0	Pass
L34	30 - 29.75	Pole	P42x0.5	34	-34	2531	68.6	Pass
L35	29.75 - 25.75	Pole	P42x0.5	35	-35	2531	71.8	Pass
L36	25.75 - 21.75	Pole	P42x0.5	36	-36	2531	75.0	Pass
L37	21.75 - 17.75	Pole	P42x0.5	37	-38	2531	78.3	Pass
L38	17.75 - 13.75	Pole	P42x0.5	38	-39	2531	81.6	Pass
L39	13.75 - 9.75	Pole	P42x0.5	39	-40	2531	84.9	Pass
L40	9.75 - 7.92	Pole	P42x0.5	40	-41	2531	86.4	Pass
L41	7.92 - 7.67	Pole	P42x0.5	41	-41	2531	86.6	Pass
L42	7.67 - 3.67	Pole	P42x0.5	42	-42	2531	90.0	Pass
L43	3.67 - 0	Pole	P42x0.5	43	-44	2531	93.0	Pass
							Summary	
						Pole (L33)	94.0	Pass
						RATING =	**94.0**	**Pass**

***NOTE: Above stress ratios for reinforced sections are approximate. More exact calculations are presented in Appendix C.**

APPENDIX B

BASE LEVEL DRAWING


(OTHER CONSIDERED EQUIPMENT)
(1) 7/8" TO 147 FT LEVEL
(8) 1-1/4" TO 147 FT LEVEL
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-1/2" TO 119 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(6) 1-5/8" TO 129 FT LEVEL
(1) 3/8" TO 129 FT LEVEL
CLIMBING PEGS
W/ SAFETY CLIMB
Q4
Q1
Q3
Q2
(OTHER CONSIDERED EQUIPMENT-IN CONDUIT)
(1) 3/8" TO 139 FT LEVEL
(2) 3/4" TO 139 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 60 FT LEVEL
(1) 3/8" TO 139 FT LEVEL
(4) 3/4" TO 139 FT LEVEL
(4) 1-1/4" TO 139 FT LEVEL
(6) 1-5/8" TO 139 FT LEVEL

APPENDIX C

ADDITIONAL CALCULATIONS

CCIpole

per TIA-222- H

Site BU: 876346

Work Order: 2013637

CROWN CASTLE

Pole Geometry

	Pole Height Above Base (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Bend Radius (in)	Pole Material
1	150	30		0	24	24	0.25		A53-B-42
2	120	30		0	30.00	30	0.375		A53-B-42
3	90	30		0	36.00	36	0.375		A53-B-42
4	60	30		0	42.00	42	0.375		A53-B-42
5	30	30		0	42.00	42	0.5		A53-B-42

Reinforcement Configuration

	Bottom Effective Elevation (ft)	Top Effective Elevation (ft)	Type	Model	Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	0	7.92	plate	PL 3x1.25	4	40	140	220	320														
2	30	40.25	plate	PL 3x1.25	3	100	220	340															
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							

Reinforcement Details

	B (in)	H (in)	Gross Area (in^2)	Pole Face to Centroid (in)	Bottom Termination Type	Bottom Termination Length (in)	Top Termination Type	Top Termination Length (in)	Lu (in)	Net Area (in2)	Bolt Hole Size (in)	Reinforcement Material
1	3	1.25	3.75	0.625	PC 8.8 - M20 (100)	11	PC 8.8 - M20 (100)	11.000	24.000	2.109	1.2500	A572-65
2	3	1.25	3.75	0.625	PC 8.8 - M20 (100)	11	PC 8.8 - M20 (100)	11.000	24.000	2.109	1.2500	A572-65

Connection Details for Custom Reinforcements

Reinforcement	End	# Bolts	N or X	Bolt Spacing (in)	Edge Dist (in)	Weld Grade (ksi)	Transverse (Horiz.) Weld Type	Horiz. Weld Length (in)	Horiz. Groove Depth (in)	Horiz. Groove Angle (deg)	Horiz. Fillet Size (in)	Vertical Weld Length (in)	Vertical Fillet Size (in)	Rev H Connection Capacity (kip)
PL 3x1.25	Top	4	N	3	2	-	-	-	-	-	-	-	-	-
	Bottom	4	N	3	2	-	-	-	-	-	-	-	-	-

TNX Geometry Input

Increment (ft): 4 Export to TNX

	Section Height (ft)	Section Length (ft)	Lap Splice Length (ft)	Number of Sides	Top Diameter (in)	Bottom Diameter (in)	Wall Thickness (in)	Tapered Pole Grade	Weight Multiplier
1	150 - 146	4		0	24.000	24.000	0.25	A53-B-42	1.000
2	146 - 142	4		0	24.000	24.000	0.25	A53-B-42	1.000
3	142 - 138	4		0	24.000	24.000	0.25	A53-B-42	1.000
4	138 - 134	4		0	24.000	24.000	0.25	A53-B-42	1.000
5	134 - 130	4		0	24.000	24.000	0.25	A53-B-42	1.000
6	130 - 126	4		0	24.000	24.000	0.25	A53-B-42	1.000
7	126 - 122	4		0	24.000	24.000	0.25	A53-B-42	1.000
8	122 - 120	2	0	0	24.000	24.000	0.25	A53-B-42	1.000
9	120 - 116	4		0	30.000	30.000	0.375	A53-B-42	1.000
10	116 - 112	4		0	30.000	30.000	0.375	A53-B-42	1.000
11	112 - 108	4		0	30.000	30.000	0.375	A53-B-42	1.000
12	108 - 104	4		0	30.000	30.000	0.375	A53-B-42	1.000
13	104 - 100	4		0	30.000	30.000	0.375	A53-B-42	1.000
14	100 - 96	4		0	30.000	30.000	0.375	A53-B-42	1.000
15	96 - 92	4		0	30.000	30.000	0.375	A53-B-42	1.000
16	92 - 90	2	0	0	30.000	30.000	0.375	A53-B-42	1.000
17	90 - 86	4		0	36.000	36.000	0.375	A53-B-42	1.000
18	86 - 82	4		0	36.000	36.000	0.375	A53-B-42	1.000
19	82 - 78	4		0	36.000	36.000	0.375	A53-B-42	1.000
20	78 - 74	4		0	36.000	36.000	0.375	A53-B-42	1.000
21	74 - 70	4		0	36.000	36.000	0.375	A53-B-42	1.000
22	70 - 66	4		0	36.000	36.000	0.375	A53-B-42	1.000
23	66 - 62	4		0	36.000	36.000	0.375	A53-B-42	1.000
24	62 - 60	2	0	0	36.000	36.000	0.375	A53-B-42	1.000
25	60 - 56	4		0	42.000	42.000	0.375	A53-B-42	1.000
26	56 - 52	4		0	42.000	42.000	0.375	A53-B-42	1.000
27	52 - 48	4		0	42.000	42.000	0.375	A53-B-42	1.000
28	48 - 44	4		0	42.000	42.000	0.375	A53-B-42	1.000
29	44 - 40.25	3.75		0	42.000	42.000	0.375	A53-B-42	1.000
30	40.25 - 40	0.25		0	42.000	42.000	0.375	A53-B-42	1.000
31	40 - 36	4		0	42.000	42.000	0.375	A53-B-42	1.000
32	36 - 32	4		0	42.000	42.000	0.375	A53-B-42	1.000
33	32 - 30	2	0	0	42.000	42.000	0.375	A53-B-42	1.000
34	30 - 29.75	0.25		0	42.000	42.000	0.5	A53-B-42	1.000
35	29.75 - 25.75	4		0	42.000	42.000	0.5	A53-B-42	1.000
36	25.75 - 21.75	4		0	42.000	42.000	0.5	A53-B-42	1.000
37	21.75 - 17.75	4		0	42.000	42.000	0.5	A53-B-42	1.000
38	17.75 - 13.75	4		0	42.000	42.000	0.5	A53-B-42	1.000
39	13.75 - 9.75	4		0	42.000	42.000	0.5	A53-B-42	1.000
40	9.75 - 7.92	1.83		0	42.000	42.000	0.5	A53-B-42	1.000
41	7.92 - 7.67	0.25		0	42.000	42.000	0.5	A53-B-42	1.000
42	7.67 - 3.67	4		0	42.000	42.000	0.5	A53-B-42	1.000
43	3.67 - 0	3.67		0	42.000	42.000	0.5	A53-B-42	1.000

TNX Section Forces

Increment (ft):	4	TNX Output		
	Section Height (ft)	P_u (K)	M_{ux} (kip-ft)	V_u (K)
1	150 - 146	7.05	7.11	1.11
2	146 - 142	2.76	19.54	3.45
3	142 - 138	7.48	41.97	8.41
4	138 - 134	7.86	76.09	8.66
5	134 - 130	8.25	111.20	8.90
6	130 - 126	9.72	151.02	10.29
7	126 - 122	10.14	192.83	10.59
8	122 - 120	10.36	214.10	10.70
9	120 - 116	14.04	266.77	14.05
10	116 - 112	14.74	323.58	14.35
11	112 - 108	15.44	381.56	14.64
12	108 - 104	16.15	440.69	14.92
13	104 - 100	16.86	500.92	15.20
14	100 - 96	17.58	562.21	15.46
15	96 - 92	18.31	624.51	15.70
16	92 - 90	18.68	656.03	15.82
17	90 - 86	19.50	719.93	16.14
18	86 - 82	20.33	785.07	16.44
19	82 - 78	21.17	851.40	16.73
20	78 - 74	22.01	918.89	17.02
21	74 - 70	22.86	987.48	17.29
22	70 - 66	23.71	1057.12	17.54
23	66 - 62	24.56	1127.75	17.79
24	62 - 60	24.99	1163.43	17.90
25	60 - 56	26.04	1235.60	18.25
26	56 - 52	27.00	1309.19	18.55
27	52 - 48	27.96	1383.93	18.83
28	48 - 44	28.93	1459.75	19.09
29	44 - 40.25	29.88	1531.78	19.33
30	40.25 - 40	29.96	1536.61	19.34
31	40 - 36	31.12	1614.45	19.59
32	36 - 32	32.29	1693.21	19.81
33	32 - 30	32.86	1732.91	19.91
34	30 - 29.75	33.85	1737.53	20.27
35	29.75 - 25.75	35.08	1819.04	20.49
36	25.75 - 21.75	36.33	1901.37	20.69
37	21.75 - 17.75	37.57	1984.45	20.87
38	17.75 - 13.75	38.82	2068.19	21.02
39	13.75 - 9.75	40.08	2152.50	21.16
40	9.75 - 7.92	40.69	2191.26	21.23
41	7.92 - 7.67	40.79	2196.56	21.21
42	7.67 - 3.67	42.23	2281.66	21.35
43	3.67 - 0	43.55	2360.14	21.45

Analysis Results

Elevation (ft)	Component Type	Size	Critical Element	% Capacity	Pass / Fail
150 - 146	Pole	TP24x24x0.25	Pole	2.7%	Pass
146 - 142	Pole	TP24x24x0.25	Pole	5.1%	Pass
142 - 138	Pole	TP24x24x0.25	Pole	11.3%	Pass
138 - 134	Pole	TP24x24x0.25	Pole	19.6%	Pass
134 - 130	Pole	TP24x24x0.25	Pole	28.1%	Pass
130 - 126	Pole	TP24x24x0.25	Pole	37.9%	Pass
126 - 122	Pole	TP24x24x0.25	Pole	48.0%	Pass
122 - 120	Pole	TP24x24x0.25	Pole	53.2%	Pass
120 - 116	Pole	TP30x30x0.375	Pole	27.9%	Pass
116 - 112	Pole	TP30x30x0.375	Pole	33.7%	Pass
112 - 108	Pole	TP30x30x0.375	Pole	39.6%	Pass
108 - 104	Pole	TP30x30x0.375	Pole	45.6%	Pass
104 - 100	Pole	TP30x30x0.375	Pole	51.7%	Pass
100 - 96	Pole	TP30x30x0.375	Pole	57.9%	Pass
96 - 92	Pole	TP30x30x0.375	Pole	64.2%	Pass
92 - 90	Pole	TP30x30x0.375	Pole	67.4%	Pass
90 - 86	Pole	TP36x36x0.375	Pole	52.6%	Pass
86 - 82	Pole	TP36x36x0.375	Pole	57.3%	Pass
82 - 78	Pole	TP36x36x0.375	Pole	62.0%	Pass
78 - 74	Pole	TP36x36x0.375	Pole	66.9%	Pass
74 - 70	Pole	TP36x36x0.375	Pole	71.8%	Pass
70 - 66	Pole	TP36x36x0.375	Pole	76.8%	Pass
66 - 62	Pole	TP36x36x0.375	Pole	81.9%	Pass
62 - 60	Pole	TP36x36x0.375	Pole	84.5%	Pass
60 - 56	Pole	TP42x42x0.375	Pole	67.1%	Pass
56 - 52	Pole	TP42x42x0.375	Pole	71.0%	Pass
52 - 48	Pole	TP42x42x0.375	Pole	75.1%	Pass
48 - 44	Pole	TP42x42x0.375	Pole	79.1%	Pass
44 - 40.25	Pole	TP42x42x0.375	Pole	83.0%	Pass
40.25 - 40	Pole	TP42x42x0.375	Pole	83.3%	Pass
40 - 36	Pole	TP42x42x0.375	Pole	87.5%	Pass
36 - 32	Pole	TP42x42x0.375	Pole	91.7%	Pass
32 - 30	Pole	TP42x42x0.375	Pole	93.9%	Pass
30 - 29.75	Pole	TP42x42x0.5	Pole	68.6%	Pass
29.75 - 25.75	Pole	TP42x42x0.5	Pole	71.8%	Pass
25.75 - 21.75	Pole	TP42x42x0.5	Pole	75.0%	Pass
21.75 - 17.75	Pole	TP42x42x0.5	Pole	78.3%	Pass
17.75 - 13.75	Pole	TP42x42x0.5	Pole	81.6%	Pass
13.75 - 9.75	Pole	TP42x42x0.5	Pole	84.9%	Pass
9.75 - 7.92	Pole	TP42x42x0.5	Pole	86.4%	Pass
7.92 - 7.67	Pole	TP42x42x0.5	Pole	86.6%	Pass
7.67 - 3.67	Pole	TP42x42x0.5	Pole	90.0%	Pass
3.67 - 0	Pole	TP42x42x0.5	Pole	93.0%	Pass
				Summary	
			Pole	93.9%	Pass
			Reinforcement	0.0%	Pass
			Overall	93.9%	Pass

Additional Calculations

Section Elevation (ft)	Moment of Inertia (in^4)			Area (in^2)			% Capacity*		
	Pole	Reinf.	Total	Pole	Reinf.	Total	Pole	R1	R2
150 - 146	1315	n/a	1315	18.65	n/a	18.65	2.7%		
146 - 142	1315	n/a	1315	18.65	n/a	18.65	5.1%		
142 - 138	1315	n/a	1315	18.65	n/a	18.65	11.3%		
138 - 134	1315	n/a	1315	18.65	n/a	18.65	19.6%		
134 - 130	1315	n/a	1315	18.65	n/a	18.65	28.1%		
130 - 126	1315	n/a	1315	18.65	n/a	18.65	37.9%		
126 - 122	1315	n/a	1315	18.65	n/a	18.65	48.0%		
122 - 120	1315	n/a	1315	18.65	n/a	18.65	53.2%		
120 - 116	3829	n/a	3829	34.90	n/a	34.90	27.9%		
116 - 112	3829	n/a	3829	34.90	n/a	34.90	33.7%		
112 - 108	3829	n/a	3829	34.90	n/a	34.90	39.6%		
108 - 104	3829	n/a	3829	34.90	n/a	34.90	45.6%		
104 - 100	3829	n/a	3829	34.90	n/a	34.90	51.7%		
100 - 96	3829	n/a	3829	34.90	n/a	34.90	57.9%		
96 - 92	3829	n/a	3829	34.90	n/a	34.90	64.2%		
92 - 90	3829	n/a	3829	34.90	n/a	34.90	67.4%		
90 - 86	6659	n/a	6659	41.97	n/a	41.97	52.6%		
86 - 82	6659	n/a	6659	41.97	n/a	41.97	57.3%		
82 - 78	6659	n/a	6659	41.97	n/a	41.97	62.0%		
78 - 74	6659	n/a	6659	41.97	n/a	41.97	66.9%		
74 - 70	6659	n/a	6659	41.97	n/a	41.97	71.8%		
70 - 66	6659	n/a	6659	41.97	n/a	41.97	76.8%		
66 - 62	6659	n/a	6659	41.97	n/a	41.97	81.9%		
62 - 60	6659	n/a	6659	41.97	n/a	41.97	84.5%		
60 - 56	10622	n/a	10622	49.04	n/a	49.04	67.1%		
56 - 52	10622	n/a	10622	49.04	n/a	49.04	71.0%		
52 - 48	10622	n/a	10622	49.04	n/a	49.04	75.1%		
48 - 44	10622	n/a	10622	49.04	n/a	49.04	79.1%		
44 - 40.25	10622	n/a	10622	49.04	n/a	49.04	83.0%		
40.25 - 40	10622	n/a	10622	49.04	n/a	49.04	83.3%		
40 - 36	10622	n/a	10622	49.04	n/a	49.04	87.5%		
36 - 32	10622	n/a	10622	49.04	n/a	49.04	91.7%		
32 - 30	10622	n/a	10622	49.04	n/a	49.04	93.9%		
30 - 29.75	14036	n/a	14036	65.19	n/a	65.19	68.6%		
29.75 - 25.75	14036	n/a	14036	65.19	n/a	65.19	71.8%		
25.75 - 21.75	14036	n/a	14036	65.19	n/a	65.19	75.0%		
21.75 - 17.75	14036	n/a	14036	65.19	n/a	65.19	78.3%		
17.75 - 13.75	14036	n/a	14036	65.19	n/a	65.19	81.6%		
13.75 - 9.75	14036	n/a	14036	65.19	n/a	65.19	84.9%		
9.75 - 7.92	14036	n/a	14036	65.19	n/a	65.19	86.4%		
7.92 - 7.67	14036	n/a	14036	65.19	n/a	65.19	86.6%		
7.67 - 3.67	14036	n/a	14036	65.19	n/a	65.19	90.0%		
3.67 - 0	14036	n/a	14036	65.19	n/a	65.19	93.0%		

Note: Section capacity checked using 5 degree increments.
Rating per TIA-222-H Section 15.5.

Monopole Flange Plate Connection

Elevation = 120 ft.

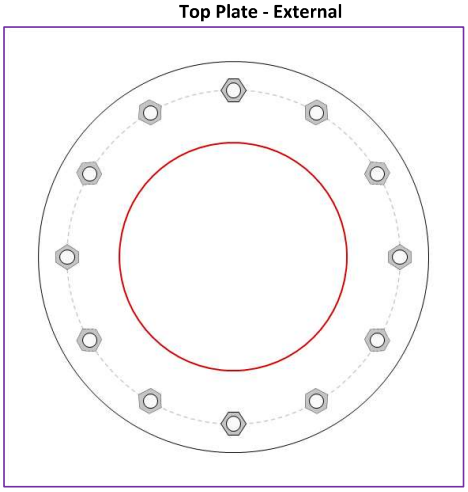
BU #	876346
Site Name	Union
Order #	572902 rev. 0

TIA-222 Revision	H

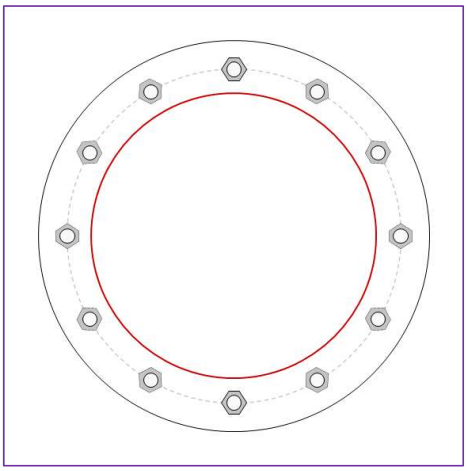
Applied Loads	
Moment (kip-ft)	214.10
Axial Force (kips)	10.36
Shear Force (kips)	10.70

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(12) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=120 ksi) on 35" BC

Top Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

41" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

24" x 0.25" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	23.59	
Allowable (kips)	126.89	
Stress Rating:	**17.7%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Monopole Flange Plate Connection

Elevation = 90 ft.

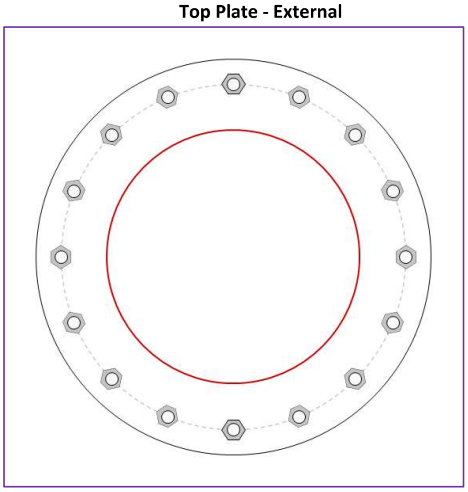
BU #	876346
Site Name	Union
Order #	572902 rev. 0

TIA-222 Revision	H

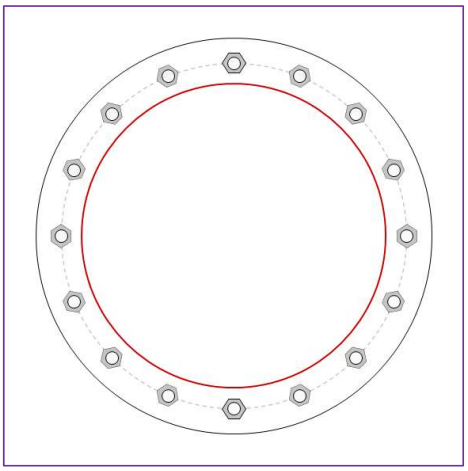
Applied Loads	
Moment (kip-ft)	656.03
Axial Force (kips)	18.68
Shear Force (kips)	15.82

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(16) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=120 ksi) on 41" BC

Top Plate Data

47" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

47" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

30" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	46.81	
Allowable (kips)	126.89	
Stress Rating:	**35.1%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Monopole Flange Plate Connection

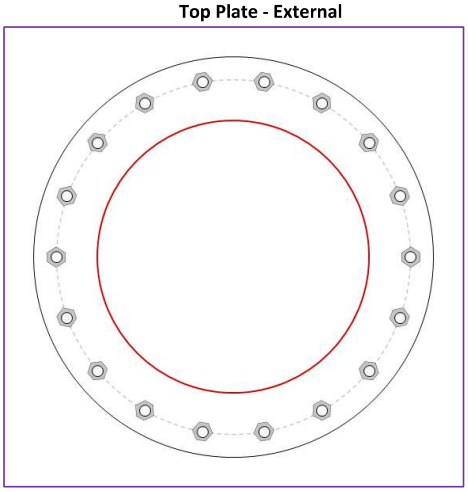
Elevation = 60 ft.

BU #	876346
Site Name	Union
Order #	572902 rev. 0
TIA-222 Revision	H

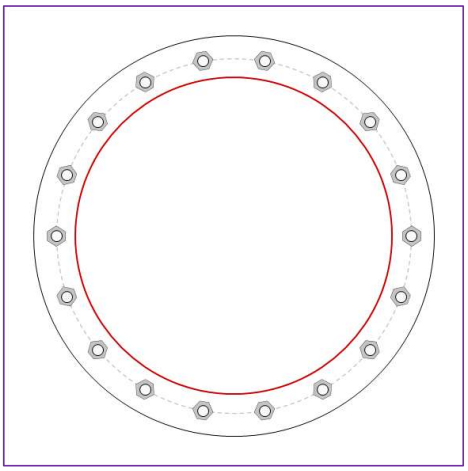
Applied Loads	
Moment (kip-ft)	1163.43
Axial Force (kips)	24.99
Shear Force (kips)	17.90

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(18) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=120 ksi) on 47" BC

Top Plate Data

53" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

53" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

36" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	64.59	
Allowable (kips)	126.89	
Stress Rating:	**48.5%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Monopole Flange Plate Connection

Elevation = 30 ft.

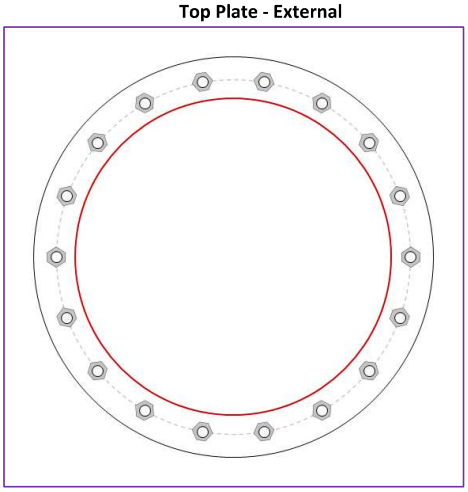
BU #	876346
Site Name	Union
Order #	572902 rev. 0

TIA-222 Revision	H

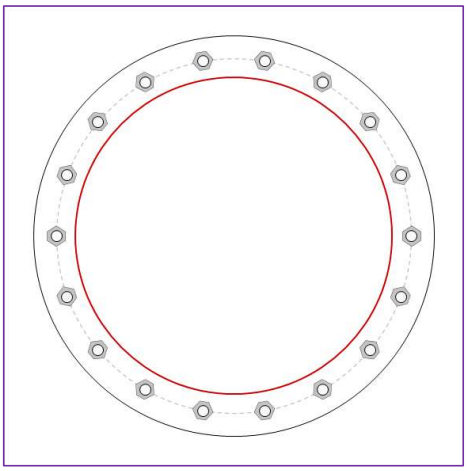
Applied Loads	
Moment (kip-ft)	1732.91
Axial Force (kips)	32.86
Shear Force (kips)	19.91

**TIA-222-H Section 15.5 Applied*

Top Plate - External



Bottom Plate - External



Connection Properties

Bolt Data

(18) 1-1/2" ø bolts (A325 N; Fy=81 ksi, Fu=120 ksi) on 47" BC

Top Plate Data

53" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Bottom Plate Data

53" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Top Stiffener Data

N/A

Bottom Stiffener Data

N/A

Top Pole Data

42" x 0.375" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Bottom Pole Data

42" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

Bolt Capacity

Max Load (kips)	96.46	
Allowable (kips)	126.89	
Stress Rating:	**72.4%**	Pass

Top Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

Bottom Plate Capacity

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**
Tension Side Stress Rating:	**Rohn OK**

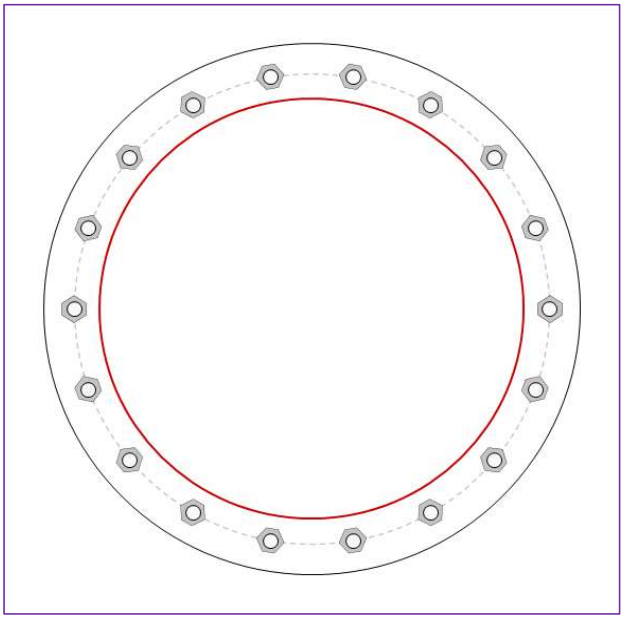
Monopole Base Plate Connection

Site Info	
BU #	876346
Site Name	Union
Order #	572902 rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	1.75

Applied Loads	
Moment (kip-ft)	2360.14
Axial Force (kips)	43.55
Shear Force (kips)	21.45

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(18) 1-1/2" ø bolts (A354-BC N; Fy=109 ksi, Fu=125 ksi) on 47" BC

Base Plate Data

53" OD x 2" Plate (A36; Fy=36 ksi, Fu=58 ksi)

Stiffener Data

N/A

Pole Data

42" x 0.5" round pole (A53-B-42; Fy=42 ksi, Fu=63 ksi)

Analysis Results

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

Pu_t = 131.43	ϕPn_t = 132.19	**Stress Rating**
Vu = 1.19	ϕVn = 82.83	**98.9%**
Mu = 1.36	ϕMn = 55.18	**Pass**

Base Plate Summary

Max Stress (ksi):	-
Allowable Stress (ksi):	-
Stress Rating:	**Rohn OK**

Pier and Pad Foundation

BU # :	876346
Site Name:	Union
App. Number:	572902 rev. 0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	44	kips
Base Shear, Vu_comp:	22	kips
Moment, M_u:	2488	ft-kips
Tower Height, **H**:	150	ft
BP Dist. Above Fdn, bp_{dist}:	3.25	in
Bolt Circle / Bearing Plate Width, **BC**:	47	in

Foundation Analysis Checks	Capacity	Demand	Rating*	Check
Lateral (Sliding) (kips)	207.32	22.00	**10.1%**	**Pass**
Bearing Pressure (ksf)	22.50	6.11	**27.2%**	**Pass**
*Overturning (kip*ft)*	2989.64	2625.96	**87.8%**	**Pass**
*Pad Flexure (kip*ft)*	4739.72	1532.22	**30.8%**	**Pass**
Pad Shear - 1-way (kips)	1231.14	182.35	**14.1%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.000	**0.0%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	9049.52	0.00	**0.0%**	**Pass**

**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**30.8%**
Soil Rating*:	**87.8%**

Pad Properties		
Depth, **D**:	5.5	ft
Pad Width, W_1:	18.5	ft
Pad Thickness, **T**:	6	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	8	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	20	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δc:	164	pcf

Soil Properties		
Total Soil Unit Weight, γ:	140	pcf
Ultimate Gross Bearing, Qult:	30.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	42	degrees
SPT Blow Count, N_{blows}:	14	
Base Friction, μ:	0.45	
Neglected Depth, **N**:	3.33	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	N/A	ft

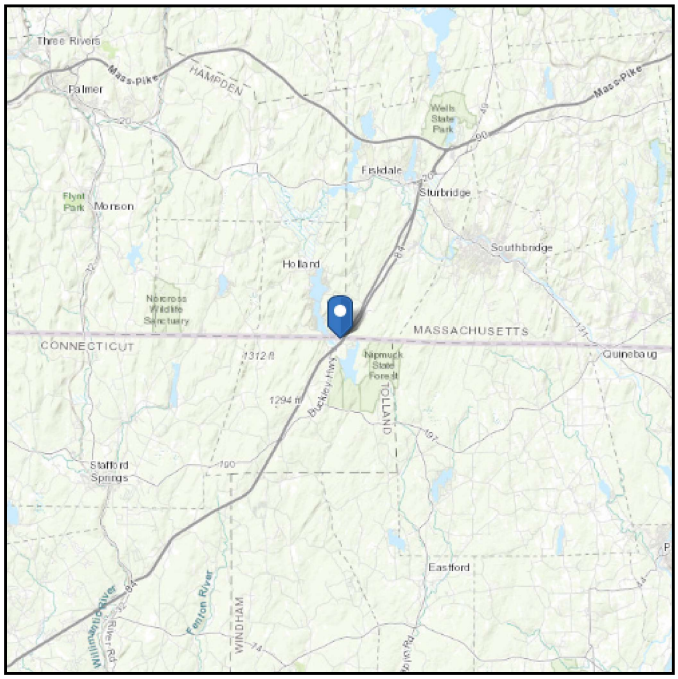
<--Toggle between Gross and Net

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 0 ft (NAVD 88)
Latitude: 42.029428
Longitude: -72.139872



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source:	ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed:	Wed Sep 29 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

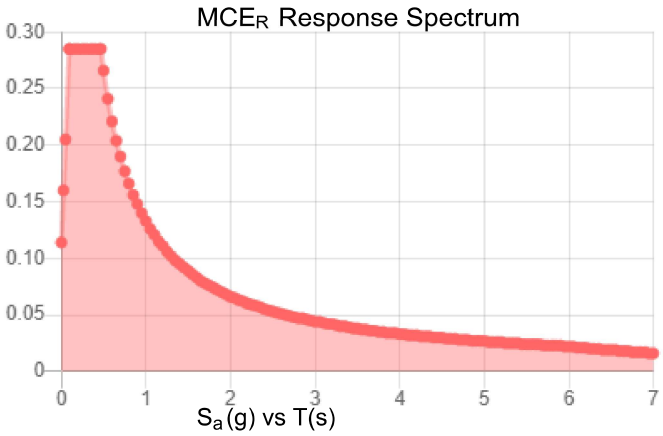
Seismic

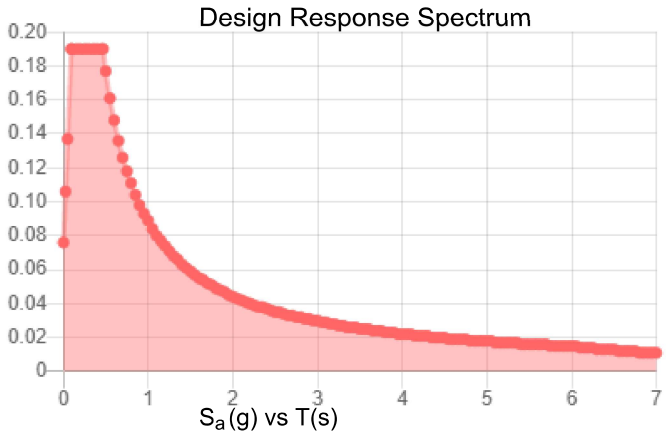
Site Soil Class: D - Stiff Soil

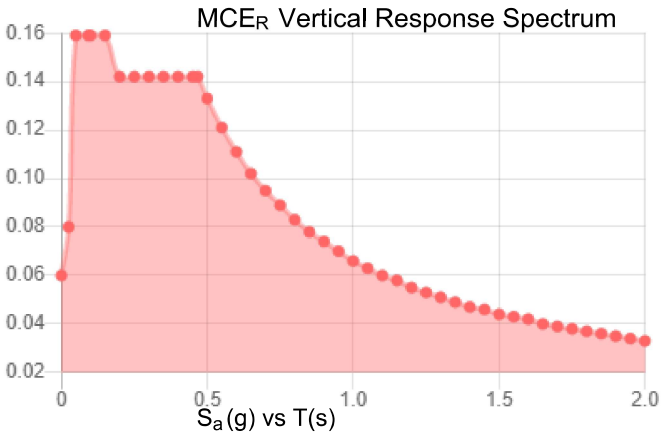
Results:

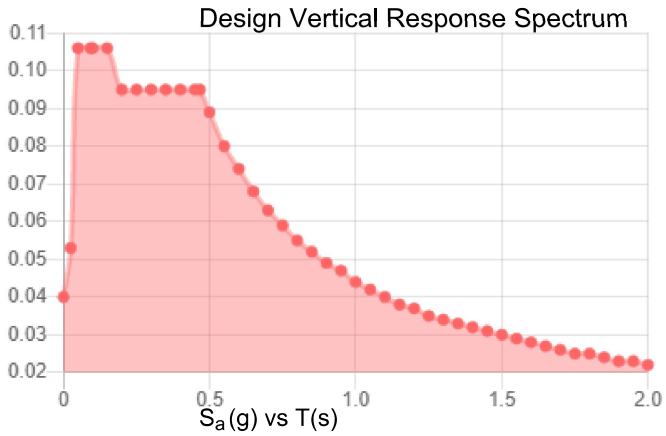
S_S :	0.178	S_{D1} :	0.089
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.094
F_v :	2.4	PGA_M :	0.151
S_{MS} :	0.285	F_{PGA} :	1.6
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.19	C_v :	0.7

Seismic Design Category B









Data Accessed: Wed Sep 29 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Wed Sep 29 2021

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Exhibit E

Mount Analysis

Date: **November 2, 2021**

Kimley-Horn and Associates, Inc.
421 Fayetteville Street, Suite 600
Raleigh, NC 27601
(919) 677-2000
CrownMounts@kimley-horn.com

Subject:	**Mount Analysis - Conditional Passing Report**	
Carrier Designation:	**DISH Network Equipment Change-Out**	
	Carrier Site Number:	BOBOS00873A
	Carrier Site Name:	N/A
Crown Castle Designation:	**BU Number:**	876346
	Site Name:	UNION
	JDE Job Number:	671531
	Order Number:	572902, Rev. 2
Engineering Firm Designation:	**Kimley-Horn Project Number:**	019558057
Site Data:	**23 Holland Road, Union, Tolland County, CT 06076**	
	Latitude 42° 1' 45.94" Longitude -72° 8' 23.54"	
Structure Information:	**Tower Height & Type:**	**150 ft Monopole**
	Mount Elevation:	**119 ft**
	Mount Type:	**8 ft Platform w/ Support Rails**

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

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

Platform w/ Support Rails **Sufficient**

*** See Section 4.1 for loading and structural modifications required for the mount to support the loading listed in Table 1.**

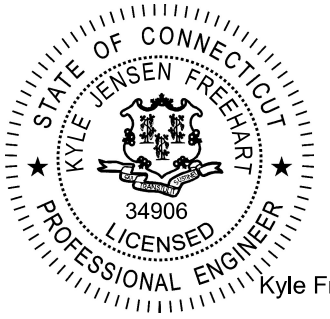
This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 118 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Saja Alkhafaji, E.I.

Respectfully Submitted by:

Kyle Freehart, P.E.

Lic. #PEN.0034906, Exp. 1/31/2022
Kimley-Horn and Associates, Inc. COA #PEC.0000738



Kyle Freehart

Digitally signed by Kyle Freehart
DN: C=US, E=kyle.freehart@kimley-horn.com, CN=Kyle Freehart
Date: 2021.11.03 08:37:59-04'00'

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1) INTRODUCTION

The mounting configuration consists of a proposed 8 ft Platform w/ Support Rails designed by CommScope.

2) ANALYSIS CRITERIA

Building Code:	2018 Connecticut State BuildingCode
TIA-222 Revision:	TIA-222-H
Risk Category:	II
Ultimate Wind Speed:	118 mph
Exposure Category:	C
Topographic Factor at Base:	1.0
Topographic Factor at Mount:	1.0
Ice Thickness:	1.5 in
Wind Speed with Ice:	50 mph
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

Elevation (ft)		Antennas			Mount / Modification Details
Mount	Centerline	#	Manufacturer	Model	
119	119	3	Fujitsu	TA08025-B604	Proposed 8 ft Platform w/ Support Rails designed by CommScope
		3	Fujitsu	TA08025-B605	
		3	Jma wireless	MX08FRO665-21	
		1	Raycap	RDIDC-9181-PF-48	

3) ANALYSIS PROCEDURE

Table 2 – Documents Provided

Document	Remarks	Reference	Source
Mount Design Drawing	CommScope	MC-PK8-DSH	On File
Photos	-	-	CCISites

3.1) Analysis Method

RISA-3D (version 17.02.00), 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 proprietary tool internally developed by Kimley-Horn 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 *Mount Analysis* (Revision D).

3.2) Assumptions

1) The antenna mounting system (including any considered modifications) was properly fabricated, installed and maintained in good condition in accordance with its original design, TIA standards, and/or manufacturer specifications.
2) The configuration of antennas, mounts, and other appurtenances are as specified in Table 1 and the provided reference information.
3) All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
4) The analysis will be required to be revised if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members that could not be verified at this time.
5) Any referenced prior structural modifications to the tower mounting system are assumed to be installed as shown per available data unless noted otherwise.
6) Steel grades have been assumed as follows, unless noted otherwise:

Channel, Solid Round, Angle, Plate	ASTM A36 (Gr. 36)
HSS (Rectangular)	ASTM A36 (Gr. 36)
Pipe	ASTM A53 (Gr. B-35)
Connection Bolts	ASTM A325
Threaded Rods	ASTM A36 (Gr. 36)

This analysis may be affected if any assumptions are not valid or have been made in error. Kimley-Horn 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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2	Connections	-	119	33%	Pass
1, 2	Stand Off Horizontals	M12		21%	Pass
1, 2	Mount Pipes	MP8		19%	Pass
1, 2	Support Rails	M25		13%	Pass
1, 2	Platform Base	M48		10%	Pass

Structure Rating (max from all components) =	33%

Notes:
1) See additional documentation in Appendix C and Appendix D for calculations supporting the % capacity consumed.
2) Rating per TIA-222-H, Section 15.5.

4.1) Recommendations

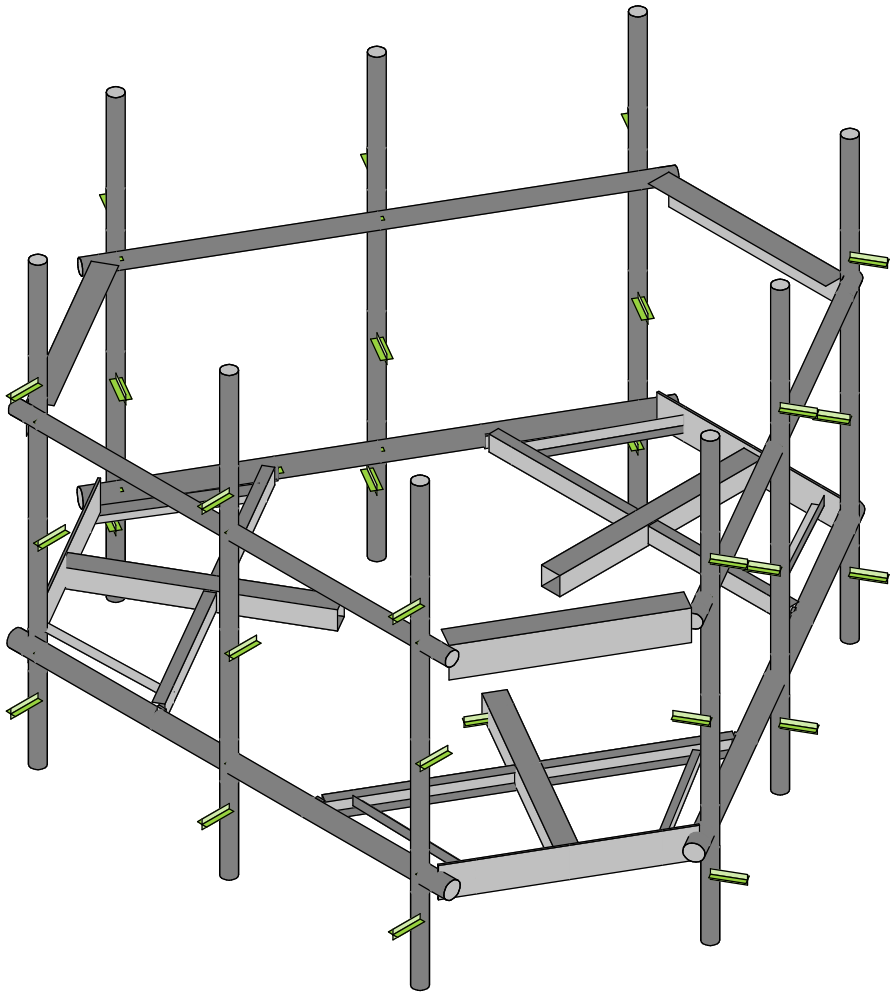
The mounting configuration will have sufficient capacity to carry the referenced loading once the following modifications are completed:

- **Install a new Commscope MC-PK8-DSH platform. Vertically center antennas and mount pipes on mount face horizontals.**

No additional modifications are required at this time provided that the above-listed changes are completed.

APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

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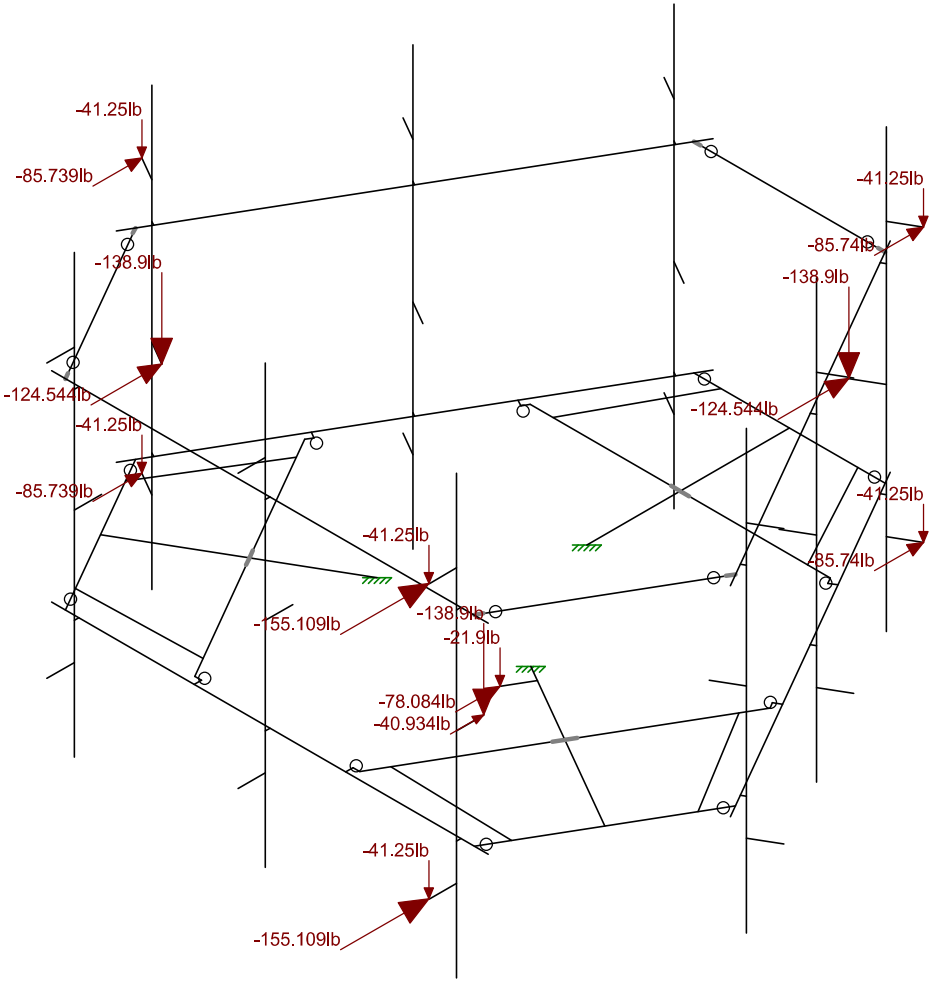

Loads: LC 1, Summary: 1.0D + 1.0W
Envelope Only Solution

Kimley-Horn and Associates, Inc.	876346	SK - 1
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APPENDIX B

SOFTWARE INPUT CALCULATIONS

General Criteria	
TIA Standard	H
IBC Edition	2018
Structure Class	-
Risk Category	II

Site-Specific Criteria	
Exposure Category	C
Topographic Factor, K_{zt}	1.00
Structure Base Elev. (AMSL), z_s (ft)	840.52
Ground Effect Factor, K_e	0.97

Mount & Structure Criteria	
Mount Elevation (AGL) (ft)	119.00
Structure Height (ft)	150.00
Structure Type	Monopole

Constants	
Wind Direction Probability Factor, K_d	0.95
Gust Effect Factor, G_h	1
Shielding Factor, K_a (antenna)	0.9
Shielding Factor, K_a (mount)	0.9

Wind Summary	
Basic Wind Speed w/o Ice, V (mph)	118.00
Velocity Pressure Coeff., K_z	1.31
Velocity Pressure, q_z (w/o Ice) (psf)	43.12

Ice Load Summary	
Basic Wind Speed w/ Ice, V_i (mph)	50.00
Design Ice Thick. (ASCE 7-16) , t_i (in)	1.5
Velocity Pressure, q_z (w/ Ice) (psf)	7.74
Escalated Ice Thick. @ Mount, t_{iz} (in)	1.71

Seismic Load Summary	
Spectral Response (Short Periods), S_s	-
Spectral Response (1-Sec. Period), S_1	-
Site Class	-
Seismic Design Category	-
Seismic Risk Category	-

Snow Load Summary	
Ground Snow Load, p_g (psf)	-
Snow Load on Flat Roofs, p_f (psf)	-

Kimley»Horn

Date	November 02, 2021
Client	Crown Castle
Site #	876346
Site Name	UNION
Project #	19558057

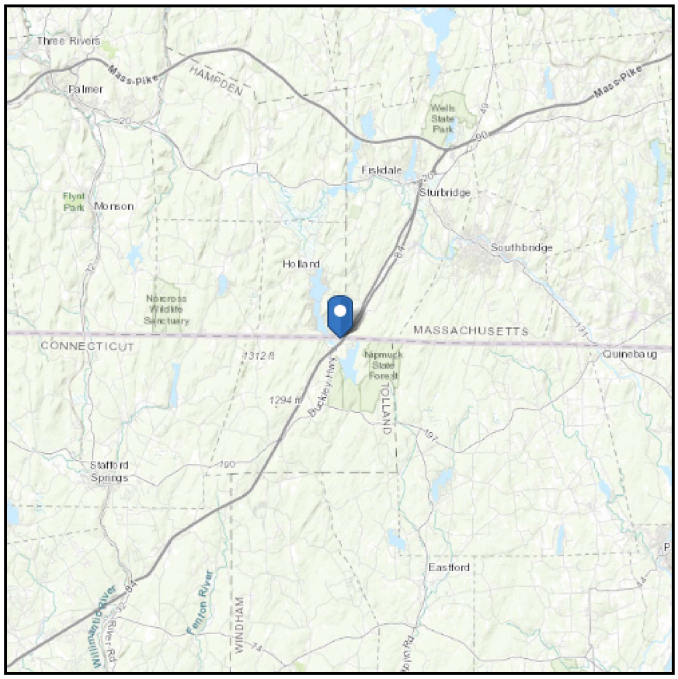
Antenna Name	Qty	Shape	Dimensions (in)			Weight (lb)	Joint Labels								EPA (ft²)		Wind Force, F_A (lb)			
																	No Ice		With Ice	
			H	W	D		Alpha		Beta		Gamma		Delta		Front	Side	Front	Side	Front	Side
MX08FRO665-21	3	Flat	72	20	8	82.5	A1B	A1T	B1B	B1T	G1B	G1T			7.99	3.23	310.22	125.23	67.36	31.67
TA08025-B604	3	Flat	15	15.8	7.9	63.9	A1R		B1R		G1R				0.49	1.96	19.04	76.21	6.02	20.44
TA08025-B605	3	Flat	15	15.8	9.1	75	A1R		B1R		G1R				0.56	1.96	21.89	76.21	6.65	20.44
RDIDC-9181-PF-48	1	Flat	16.6	14.6	8.5	21.9	RC								2.01	1.17	78.08	45.34	20.86	13.77

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Stiff Soil

Elevation: 840.52 ft (NAVD 88)
Latitude: 42.029428
Longitude: -72.139872



Wind

Results:

Wind Speed:	118 Vmph
10-year MRI	75 Vmph
25-year MRI	84 Vmph
50-year MRI	90 Vmph
100-year MRI	98 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1B and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Tue Nov 02 2021

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 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 7-16 Section 26.2. Glazed openings need not be protected against wind-borne debris.

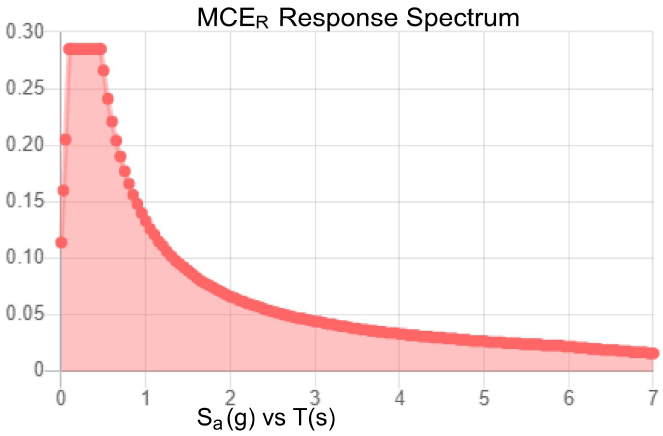
Seismic

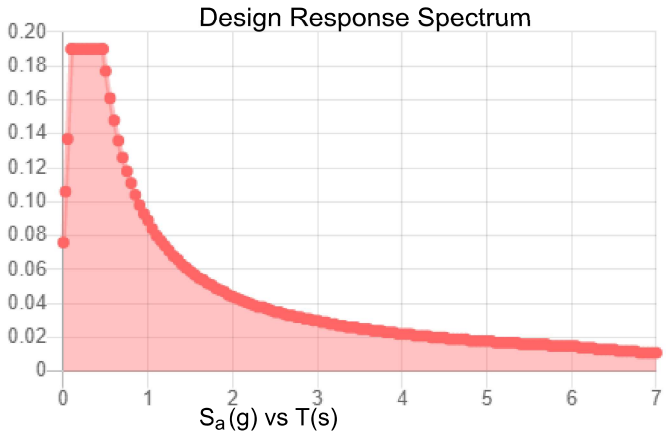
Site Soil Class: D - Stiff Soil

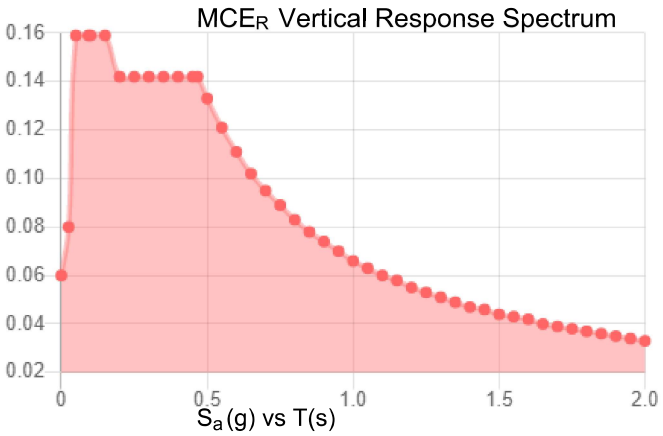
Results:

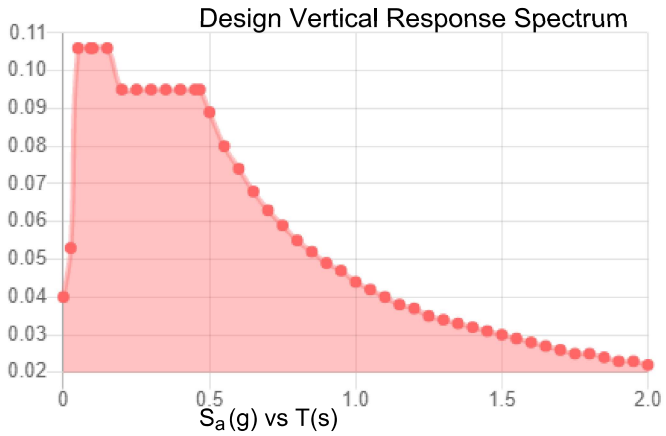
S_S :	0.178	S_{D1} :	0.089
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.094
F_v :	2.4	PGA_M :	0.151
S_{MS} :	0.285	F_{PGA} :	1.6
S_{M1} :	0.133	I_e :	1
S_{DS} :	0.19	C_v :	0.7

Seismic Design Category B









Data Accessed: Tue Nov 02 2021

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

Ice Thickness:	1.50 in.
Concurrent Temperature:	5 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Tue Nov 02 2021

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (\1E..Density[lb/f...	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	490	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	490	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	490	50	1.1	65	1.1
4	A500 Gr.B Rnd	29000	11154	.3	.65	527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	490	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	490	50	1.4	65	1.3
8	A913 Gr.65	29000	11154	.3	.65	490	65	1.1	80	1.1
9	A500 Gr.C Rnd	29000	11154	.3	.65	490	46	1.6	62	1.2
10	A500 Gr.C Rect	29000	11154	.3	.65	490	50	1.5	62	1.2
11	A529 Gr. 50	29000	11154	.3	.65	490	50	1.1	65	1.1
12	A1011-33 ksi	29000	11154	.3	.65	490	33	1.5	58	1.2
13	A1011 36 ksi	29000	11154	.3	.65	490	36	1.5	58	1.2
14	A1018 50 ksi	29000	11154	.3	.65	490	50	1.5	65	1.2
15	Q235	29000	11154	.3	.65	490	35	1.5	58	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Ru...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Corner Plate	PL6-1/2x3/8	Beam	None	A1011 36 ksi	Typical	2.438	.029	8.582	.11
2	Side Plate	PL2-3/8x1/2	Beam	None	A1011 36 ksi	Typical	1.188	.025	.558	.086
3	Grating Horiz	L2x2x4	Beam	None	A529 Gr. 50	Typical	.944	.346	.346	.021
4	Face Horiz	HSS3.500x0.1...	Beam	None	A500 Gr.C Rnd	Typical	1.729	2.409	2.409	4.819
5	Mount Pipe	HSS2.875x0.1...	Column	None	A500 Gr.C Rnd	Typical	1.039	.987	.987	1.975
6	Cross Horiz	C3.38x2.06x1/4	Beam	None	A1011 36 ksi	Typical	1.75	.715	3.026	.034
7	Stand-Off Horiz	HSS4X4X6	Beam	None	A500 Gr.C Rect	Typical	4.78	10.3	10.3	17.5
8	Support Rail	HSS2.875x0.1...	Beam	None	A500 Gr.C Rnd	Typical	1.039	.987	.987	1.975
9	SR Corner Brace	L6.6x4.46x0.25	Beam	None	A1011 36 ksi	Typical	2.703	4.759	12.473	.055

Hot Rolled Steel Design Parameters

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
1	M3	Grating Horiz	27.295			Lbyy						Lateral
2	M8	Grating Horiz	27.295			Lbyy						Lateral
3	M13	Grating Horiz	27.295			Lbyy						Lateral
4	M28	SR Corner ...	42			Lbyy						Lateral
5	M29	SR Corner ...	42			Lbyy						Lateral
6	M30	SR Corner ...	42			Lbyy						Lateral
7	M63A	Cross Horiz	33			Lbyy						Lateral
8	M61B	Cross Horiz	33			Lbyy						Lateral
9	M63B	Cross Horiz	33			Lbyy						Lateral
10	M25	Support Rail	96			Lbyy						Lateral
11	M51	Support Rail	96			Lbyy						Lateral
12	M65A	Support Rail	96			Lbyy						Lateral
13	M2	Stand-Off H...	44.5			Lbyy						Lateral
14	M7	Stand-Off H...	44.5			Lbyy						Lateral
15	M12	Stand-Off H...	44.5			Lbyy						Lateral
16	MP9	Mount Pipe	96			Lbyy						Lateral
17	MP7	Mount Pipe	96			Lbyy						Lateral
18	MP8	Mount Pipe	96			Lbyy						Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length[in]	Lbyy[in]	Lbzz[in]	Lcomp top[in]	Lcomp bot[in]	L-torqu...	Kyy	Kzz	Cb	Function
19	MP3	Mount Pipe	96			Lbyy						Lateral
20	MP1	Mount Pipe	96			Lbyy						Lateral
21	MP6	Mount Pipe	96			Lbyy						Lateral
22	MP4	Mount Pipe	96			Lbyy						Lateral
23	MP2	Mount Pipe	96			Lbyy						Lateral
24	MP5	Mount Pipe	96			Lbyy						Lateral
25	M4	Grating Horiz	27.295			Lbyy						Lateral
26	M9	Grating Horiz	27.295			Lbyy						Lateral
27	M14	Grating Horiz	27.295			Lbyy						Lateral
28	M18	Face Horiz	96			Lbyy						Lateral
29	M48	Face Horiz	96			Lbyy						Lateral
30	M62	Face Horiz	96			Lbyy						Lateral
31	M61A	Cross Horiz	33			Lbyy						Lateral
32	M60A	Cross Horiz	33			Lbyy						Lateral
33	M62A	Cross Horiz	33			Lbyy						Lateral
34	M5	Corner Plate	42			Lbyy						Lateral
35	M10	Corner Plate	42			Lbyy						Lateral
36	M15	Corner Plate	42			Lbyy						Lateral
37	M88A	Side Plate	1.5			Lbyy						Lateral
38	M89A	Side Plate	1.5			Lbyy						Lateral
39	M90A	Side Plate	1.5			Lbyy						Lateral
40	M91A	Side Plate	1.5			Lbyy						Lateral
41	M92A	Side Plate	1.5			Lbyy						Lateral
42	M93A	Side Plate	1.5			Lbyy						Lateral

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area (Me...	Surface(...
1	Dead	DL			-1	13				
2	Dead of Ice	RL				13		42		
4	Structure Wind (0)	None						84		
5	Structure Wind (30)	None						84		
6	Structure Wind (45)	None						84		
7	Structure Wind (60)	None						84		
8	Structure Wind (90)	None						84		
9	Structure Wind (120)	None						84		
10	Structure Wind (135)	None						84		
11	Structure Wind (150)	None						84		
12	Structure Wind w/ Ice (0)	None						84		
13	Structure Wind w/ Ice (30)	None						84		
14	Structure Wind w/ Ice (45)	None						84		
15	Structure Wind w/ Ice (60)	None						84		
16	Structure Wind w/ Ice (90)	None						84		
17	Structure Wind w/ Ice (120)	None						84		
18	Structure Wind w/ Ice (135)	None						84		
19	Structure Wind w/ Ice (150)	None						84		
20	Antenna Wind (0)	None				26				
21	Antenna Wind (30)	None				26				
22	Antenna Wind (45)	None				26				
23	Antenna Wind (60)	None				26				
24	Antenna Wind (90)	None				26				

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area (Me...	Surface(...
25	Antenna Wind (120)	None				26				
26	Antenna Wind (135)	None				26				
27	Antenna Wind (150)	None				26				
28	Antenna Wind w/ Ice (0)	None				26				
29	Antenna Wind w/ Ice (30)	None				26				
30	Antenna Wind w/ Ice (45)	None				26				
31	Antenna Wind w/ Ice (60)	None				26				
32	Antenna Wind w/ Ice (90)	None				26				
33	Antenna Wind w/ Ice (120)	None				26				
34	Antenna Wind w/ Ice (135)	None				26				
35	Antenna Wind w/ Ice (150)	None				26				
36	Maintenance Live Lm (1)	OL1				1				
37	Maintenance Live Lm (2)	OL2				1				
38	Maintenance Live Lm (3)	OL3				1				
41	Maintenance Live Lv (1)	OL6					1			

Load Combinations

	Description	So..	P...	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
1	Summary: 1.0D + 1...	Yes	Y		DL	1	20	1																		
2	1.4D	Yes	Y		DL	1.4																				
3	1.2D + 1.0W(0)	Yes	Y		DL	1.2	4	1	20	1																
4	1.2D + 1.0W(30)	Yes	Y		DL	1.2	5	1	21	1																
5	1.2D + 1.0W(45)	Yes	Y		DL	1.2	6	1	22	1																
6	1.2D + 1.0W(60)	Yes	Y		DL	1.2	7	1	23	1																
7	1.2D + 1.0W(90)	Yes	Y		DL	1.2	8	1	24	1																
8	1.2D + 1.0W(120)	Yes	Y		DL	1.2	9	1	25	1																
9	1.2D + 1.0W(135)	Yes	Y		DL	1.2	10	1	26	1																
10	1.2D + 1.0W(150)	Yes	Y		DL	1.2	11	1	27	1																
11	1.2D + 1.0W(180)	Yes	Y		DL	1.2	4	-1	20	-1																
12	1.2D + 1.0W(210)	Yes	Y		DL	1.2	5	-1	21	-1																
13	1.2D + 1.0W(225)	Yes	Y		DL	1.2	6	-1	22	-1																
14	1.2D + 1.0W(240)	Yes	Y		DL	1.2	7	-1	23	-1																
15	1.2D + 1.0W(270)	Yes	Y		DL	1.2	8	-1	24	-1																
16	1.2D + 1.0W(300)	Yes	Y		DL	1.2	9	-1	25	-1																
17	1.2D + 1.0W(315)	Yes	Y		DL	1.2	10	-1	26	-1																
18	1.2D + 1.0W(330)	Yes	Y		DL	1.2	11	-1	27	-1																
19	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	12	1	28	1														
20	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	13	1	29	1														
21	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	14	1	30	1														
22	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	15	1	31	1														
23	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	16	1	32	1														
24	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	17	1	33	1														
25	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	18	1	34	1														
26	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	19	1	35	1														
27	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	12	-1	28	-1														
28	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	13	-1	39	-1														
29	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	14	-1	30	-1														
30	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	15	-1	31	-1														
31	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	16	-1	32	-1														
32	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	17	-1	33	-1														

Load Combinations (Continued)

	Description	So..	P...	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
33	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	18	-1	34	-1														
34	1.2D + 1.0Di + 1.0...	Yes	Y		DL	1.2	RL	1	19	-1	35	-1														
35	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	4	.065	20	.065	OL1	1.5														
36	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	5	.065	21	.065	OL1	1.5														
37	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	6	.065	22	.065	OL1	1.5														
38	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	7	.065	23	.065	OL1	1.5														
39	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	8	.065	24	.065	OL1	1.5														
40	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	9	.065	25	.065	OL1	1.5														
41	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	10	.065	26	.065	OL1	1.5														
42	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	11	.065	27	.065	OL1	1.5														
43	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	4	-.065	20	-.065	OL1	1.5														
44	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	5	-.065	21	-.065	OL1	1.5														
45	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	6	-.065	22	-.065	OL1	1.5														
46	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	7	-.065	23	-.065	OL1	1.5														
47	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	8	-.065	24	-.065	OL1	1.5														
48	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	9	-.065	25	-.065	OL1	1.5														
49	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	10	-.065	26	-.065	OL1	1.5														
50	1.2D + 1.5Lm(1) + ..	Yes	Y		DL	1.2	11	-.065	27	-.065	OL1	1.5														
51	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	4	.065	20	.065	OL2	1.5														
52	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	5	.065	21	.065	OL2	1.5														
53	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	6	.065	22	.065	OL2	1.5														
54	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	7	.065	23	.065	OL2	1.5														
55	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	8	.065	24	.065	OL2	1.5														
56	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	9	.065	25	.065	OL2	1.5														
57	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	10	.065	26	.065	OL2	1.5														
58	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	11	.065	27	.065	OL2	1.5														
59	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	4	-.065	20	-.065	OL2	1.5														
60	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	5	-.065	21	-.065	OL2	1.5														
61	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	6	-.065	22	-.065	OL2	1.5														
62	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	7	-.065	23	-.065	OL2	1.5														
63	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	8	-.065	24	-.065	OL2	1.5														
64	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	9	-.065	25	-.065	OL2	1.5														
65	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	10	-.065	26	-.065	OL2	1.5														
66	1.2D + 1.5Lm(2) + ..	Yes	Y		DL	1.2	11	-.065	27	-.065	OL2	1.5														
67	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	4	.065	20	.065	OL3	1.5														
68	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	5	.065	21	.065	OL3	1.5														
69	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	6	.065	22	.065	OL3	1.5														
70	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	7	.065	23	.065	OL3	1.5														
71	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	8	.065	24	.065	OL3	1.5														
72	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	9	.065	25	.065	OL3	1.5														
73	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	10	.065	26	.065	OL3	1.5														
74	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	11	.065	27	.065	OL3	1.5														
75	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	4	-.065	20	-.065	OL3	1.5														
76	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	5	-.065	21	-.065	OL3	1.5														
77	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	6	-.065	22	-.065	OL3	1.5														
78	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	7	-.065	23	-.065	OL3	1.5														
79	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	8	-.065	24	-.065	OL3	1.5														
80	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	9	-.065	25	-.065	OL3	1.5														
81	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	10	-.065	26	-.065	OL3	1.5														
82	1.2D + 1.5Lm(3) + ..	Yes	Y		DL	1.2	11	-.065	27	-.065	OL3	1.5														
83	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	4	.065	20	.065	OL6	1.5														
84	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	5	.065	21	.065	OL6	1.5														

Load Combinations (Continued)

	Description	So..	P ...	SRSS	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac..	BLC	Fac...
85	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	6	.065	22	.065	OL6	1.5												
86	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	7	.065	23	.065	OL6	1.5												
87	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	8	.065	24	.065	OL6	1.5												
88	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	9	.065	25	.065	OL6	1.5												
89	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	10	.065	26	.065	OL6	1.5												
90	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	11	.065	27	.065	OL6	1.5												
91	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	4	-.065	20	-.065	OL6	1.5												
92	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	5	-.065	21	-.065	OL6	1.5												
93	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	6	-.065	22	-.065	OL6	1.5												
94	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	7	-.065	23	-.065	OL6	1.5												
95	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	8	-.065	24	-.065	OL6	1.5												
96	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	9	-.065	25	-.065	OL6	1.5												
97	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	10	-.065	26	-.065	OL6	1.5												
98	1.2D + 1.5Lv(1) + 1..	Yes	Y		DL	1.2	11	-.065	27	-.065	OL6	1.5												

Envelope Joint Reactions

	Joint		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-ft]	LC	MY [lb-ft]	LC	MZ [lb-ft]	LC
1	P24	max	1066.707	18	892.062	16	1934.775	30	333.566	6	450.6	6	1838.333	18
2		min	-1065.112	10	-891.219	8	29.371	6	-4791.159	30	-2779.788	78	-1832.144	10
3	P13	max	681.589	3	1239.839	15	1889.538	19	898.541	31	4943.991	19	1798.47	7
4		min	-692.011	11	-1245.094	7	19.762	11	74.377	7	-512.763	11	-1795.427	15
5	P1	max	1221.596	3	821.97	15	1942.689	24	3683.671	24	60.509	16	1772.849	12
6		min	-1214.058	11	-816.254	7	36.662	16	-603.782	16	-3302.921	40	-1781.647	4
7	Totals:	max	2957.704	3	2925.581	15	5234.191	27						
8		min	-2957.7	11	-2925.525	7	1663.554	1						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
1	M62A	C3.38x2.06...	.275	0	30	.059	26.1...	y	21	48281.4...	56700	2203.138	5751	1...	H1-1b
2	M61A	C3.38x2.06...	.268	0	24	.057	26.1...	y	32	48281.4...	56700	2203.138	5751	1...	H1-1b
3	M60A	C3.38x2.06...	.264	0	19	.057	26.1...	y	27	48281.4...	56700	2203.138	5751	1...	H1-1b
4	M63A	C3.38x2.06...	.260	0	9	.039	0	y	19	48281.4...	56700	2203.138	5751	1...	H1-1b
5	M61B	C3.38x2.06...	.256	0	3	.039	0	y	29	48281.4...	56700	2203.138	5751	1...	H1-1b
6	M63B	C3.38x2.06...	.248	0	14	.038	0	y	24	48281.4...	56700	2203.138	5751	1...	H1-1b
7	M10	PL6-1/2x3/8	.237	21	3	.131	36.0...	y	31	3658.14	78975	616.993	8113.613	1...	H1-1b
8	M15	PL6-1/2x3/8	.233	21	14	.112	36.0...	y	8	3658.14	78975	616.993	8108.21	1...	H1-1b
9	M5	PL6-1/2x3/8	.225	21	8	.119	36.0...	y	3	3658.14	78975	616.993	8118.285	1...	H1-1b
10	M12	HSS4X4X6	.219	44.5	31	.074	23.8...	y	27	201121....	215100	23962.5	23962.5	2...	H1-1b
11	M7	HSS4X4X6	.215	44.5	21	.076	23.8...	y	32	201121....	215100	23962.5	23962.5	2...	H1-1b
12	M2	HSS4X4X6	.205	44.5	23	.097	44.5	y	39	201121....	215100	23962.5	23962.5	2...	H1-1b
13	MP8	HSS2.875x...	.201	26.2...	4	.059	26.2...		12	22397.2...	43014.6	3142.95	3142.95	4...	H1-1b
14	M93A	PL2-3/8x1/2	.200	1.5	3	.246	0	y	22	38256.8...	38475	400.783	1903.711	1...	H1-1b
15	M89A	PL2-3/8x1/2	.199	1.5	16	.254	0	y	27	38256.8...	38475	400.783	1903.711	2...	H1-1b
16	M91A	PL2-3/8x1/2	.197	1.5	5	.249	0	y	34	38256.8...	38475	400.783	1903.711	2...	H1-1b
17	M92A	PL2-3/8x1/2	.196	1.5	18	.173	0	y	21	38256.8...	38475	400.783	1903.711	2...	H1-1b
18	MP2	HSS2.875x...	.194	26.2...	15	.061	26.2...		7	22397.2...	43014.6	3142.95	3142.95	4...	H1-1b
19	M88A	PL2-3/8x1/2	.192	1.5	7	.192	0	y	58	38256.8...	38475	400.783	1903.711	2...	H1-1b
20	M90A	PL2-3/8x1/2	.190	1.5	12	.182	0	y	31	38256.8...	38475	400.783	1903.711	2...	H1-1b
21	MP6	HSS2.875x...	.185	26.2...	10	.062	26.2...		7	22397.2...	43014.6	3142.95	3142.95	3...	H1-1b

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc ...	phi*Pnt ...	phi*Mn ...	phi*Mn ...	Cb	Eqn
22	MP5	HSS2.875x...	.184	26.2...	10	.067	26.2...		18	22397.2...	43014.6	3142.95	3142.95	4...	H1-1b
23	MP3	HSS2.875x...	.177	26.2...	7	.063	26.2...		13	22397.2...	43014.6	3142.95	3142.95	3...	H1-1b
24	M8	L2x2x4	.177	0	3	.012	0	y	11	29527.5...	42480	959.63	2190.068	2...	H2-1
25	MP9	HSS2.875x...	.175	26.2...	4	.080	26.2...		3	22397.2...	43014.6	3142.95	3142.95	3...	H1-1b
26	MP4	HSS2.875x...	.171	26.2...	18	.064	26.2...		12	22397.2...	43014.6	3142.95	3142.95	3...	H1-1b
27	M3	L2x2x4	.166	0	9	.012	0	y	16	29527.5...	42480	959.63	2190.068	2...	H2-1
28	M13	L2x2x4	.163	0	14	.012	0	y	6	29527.5...	42480	959.63	2190.068	2...	H2-1
29	MP1	HSS2.875x...	.160	26.2...	7	.067	26.2...		9	22397.2...	43014.6	3142.95	3142.95	4...	H1-1b
30	MP7	HSS2.875x...	.156	26.2...	12	.068	26.2...		15	22397.2...	43014.6	3142.95	3142.95	4...	H1-1b
31	M29	L6.6x4.46x...	.155	39	3	.021	39	z	11	51434.5...	87561	2464.809	7125.374	1...	H2-1
32	M30	L6.6x4.46x...	.146	39	8	.021	39	z	16	51434.5...	87561	2464.809	7125.374	1...	H2-1
33	M28	L6.6x4.46x...	.142	0	8	.021	39	z	6	51434.5...	87561	2464.809	7125.374	1...	H2-1
34	M4	L2x2x4	.139	0	16	.019	27.2...	y	20	29527.5...	42480	959.63	2190.068	2...	H2-1
35	M14	L2x2x4	.139	0	6	.019	27.2...	y	26	29527.5...	42480	959.63	2190.068	2...	H2-1
36	M25	HSS2.875x...	.136	6.063	12	.062	92.4...		9	22397.2...	43014.6	3142.95	3142.95	1...	H1-1b
37	M65A	HSS2.875x...	.132	6.063	18	.063	92.4...		7	22397.2...	43014.6	3142.95	3142.95	1...	H1-1b
38	M51	HSS2.875x...	.130	6.063	7	.060	3.537		16	22397.2...	43014.6	3142.95	3142.95	1...	H1-1b
39	M9	L2x2x4	.128	0	11	.019	27.2...	y	31	29527.5...	42480	959.63	2190.068	2...	H2-1
40	M62	HSS3.500x...	.107	31.3...	3	.047	48		17	45873.0...	71580.6	6337.65	6337.65	1...	H1-1b
41	M48	HSS3.500x...	.104	31.3...	8	.045	48		15	45873.0...	71580.6	6337.65	6337.65	2...	H1-1b
42	M18	HSS3.500x...	.104	31.3...	14	.038	48		5	45873.0...	71580.6	6337.65	6337.65	1...	H1-1b

APPENDIX D

ADDITIONAL CALCULATIONS

Square/Rectangular Flange Connection

TIA-222-H

Kimley»Horn

Site Number	876346
Job number	19558057
Code	TIA-222-H

Member/Node Under Consideration	P24
Controlling Load Combination (X-Direction)	LC 30
Controlling Load Combination (Y-Direction)	

Normalize usages per TIA-222-H, Sec. 15.5	☑

X and Y Reactions Simultaneous?	No

REACTIONS (ABOUT X - HORIZONTAL)	
Moment, Mu (kip-ft)	5.074
Axial, Pu (kips) - *Negative for tension*	-0.173
Shear, Vu (kips)	1.934

REACTIONS (ABOUT Y - VERTICAL)	
Moment, Mu (kip-ft)	0.089
Axial, Pu (kips) - *Negative for tension*	0.730
Shear, Vu (kips)	0.061

BOLT CONFIGURATION	
Bolt Quantity, n_b	4
Bolt Diameter, d_b (in)	0.625
Bolt Grade	A325
Width between bolts, s (in)	7.00

BOLT USAGE	
Maximum Tension in Bolt, Tub (kip)	4.392
Nominal Tensile Strength, ϕRnt (kip)	20.340
Tensile Usage (Section 4.9.6.1)	**21%**

PLATE CONFIGURATION	
Plate Shape	Square
Plate Grade	A572-50
Thickness of plate, t (in)	0.750
Width of plate, w (in)	9.00

PLATE USAGE	
Ultimate flexural load in plate, Mu (kip-in)	9.867
Factored flexural capacity, ϕMn (kip-in)	28.430
Flexural Usage	**33%**

SUPPORT ARM CONFIGURATION	
Member Shape	Square
Member Grade	A500-50
Thickness of Member, t (in)	0.375
Width of member, w (in)	4.000

SUPPORT ARM USAGE	
Ultimate flexural load in member, Mu (kip-ft)	5.074
Factored flexural capacity, ϕMn (kip-ft)	27.817
Flexural Usage	**17%**

Stiffeners present?	☐

APPENDIX E

SUPPLEMENTAL DRAWINGS

NOTES:

1.0 GENERAL
- 1.1 ALL METRIC DIMENSIONS ARE IN BRACKETS
- 1.2 FOR PATENTS, SEE WWW.CS-PAT.COM

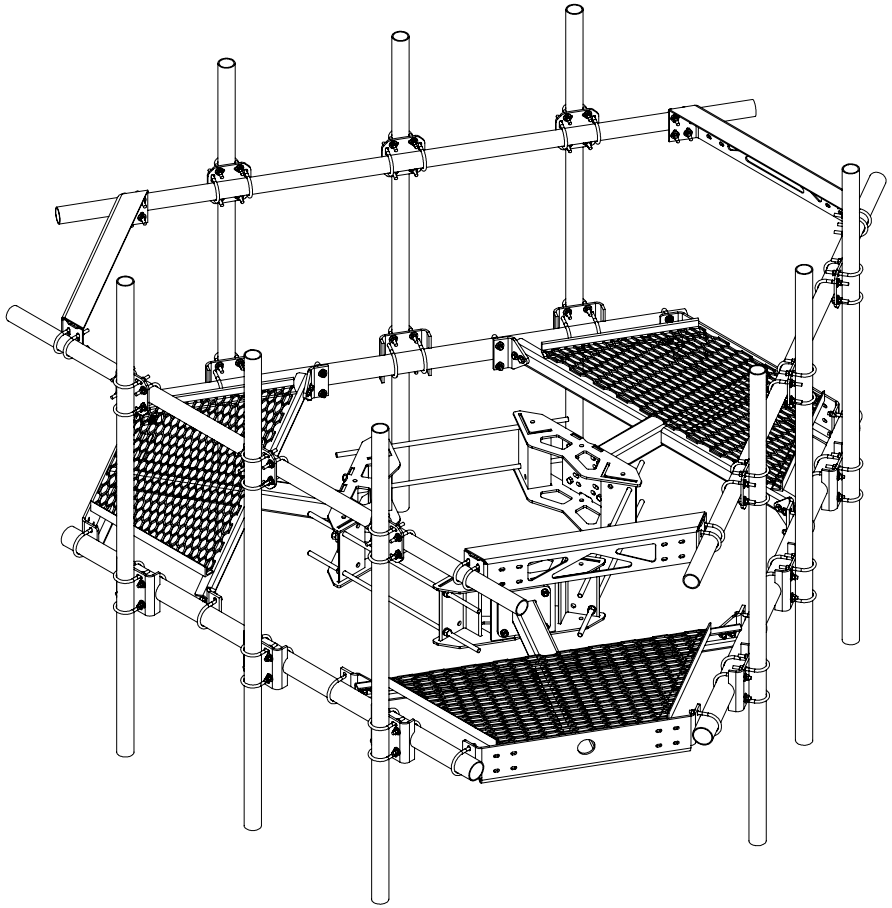
2.0 DESIGN NOTES
- 2.1 TORQUE U-BOLTS TO 44 FT-LBS

3.0 MANUFACTURING/SPECIAL REQUIREMENTS

4.0 TEST

5.0 PACKAGING

REVISIONS				
REV.	ECN	DESCRIPTION	BY	DATE
A	10272PC	INITIAL RELEASE	HDAI	03/08/2021



PATENT PENDING

DENSITY	lbs/in³
MASS	lbs
VOLUME	in³
SURFACE AREA	in²
HEIGHT	96"
LENGTH	46"
WIDTH	29"

COMMSCOPE, INC. OF NORTH CAROLINA

TOLERANCES
1 PLACE .X ± .25
2 PLACE .XX ± 0.12
3 PLACE .XXX ± 0.06
ANGLES ± 2°

SAP MATERIAL MASTER: MC-PK8-DSH

FINISH: GALV A123

MATERIAL: A500, A1011/A1018

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES INTERPRET PER ANSI Y 14.5M-1994

	NAME	DATE
CE	MRC	02/17/20
RW	ROGHANSON	03/16/2021
AD	BCROSS	03/17/2021
RE	FA1024	02/27/2020

ECN 10272PC

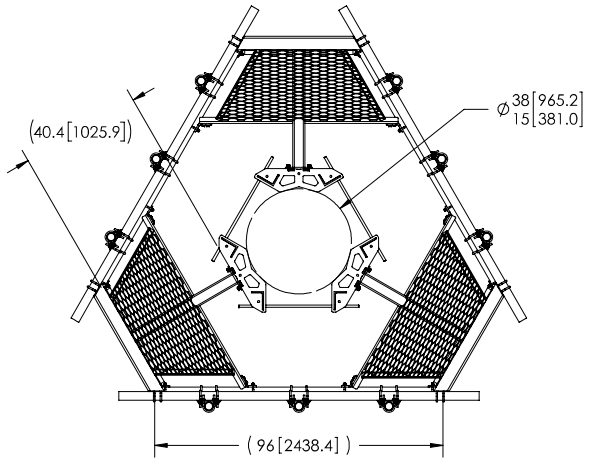
TITLE: LOW PROFILE PLATFORM FACE

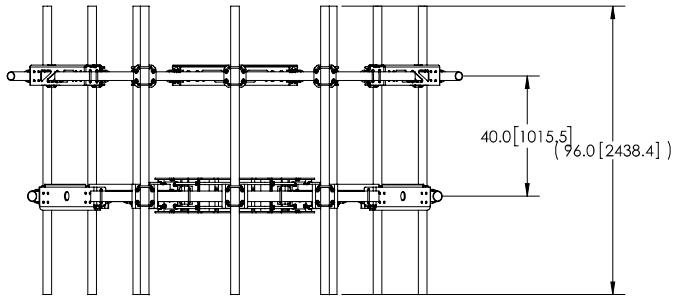
SCALE: 1:32

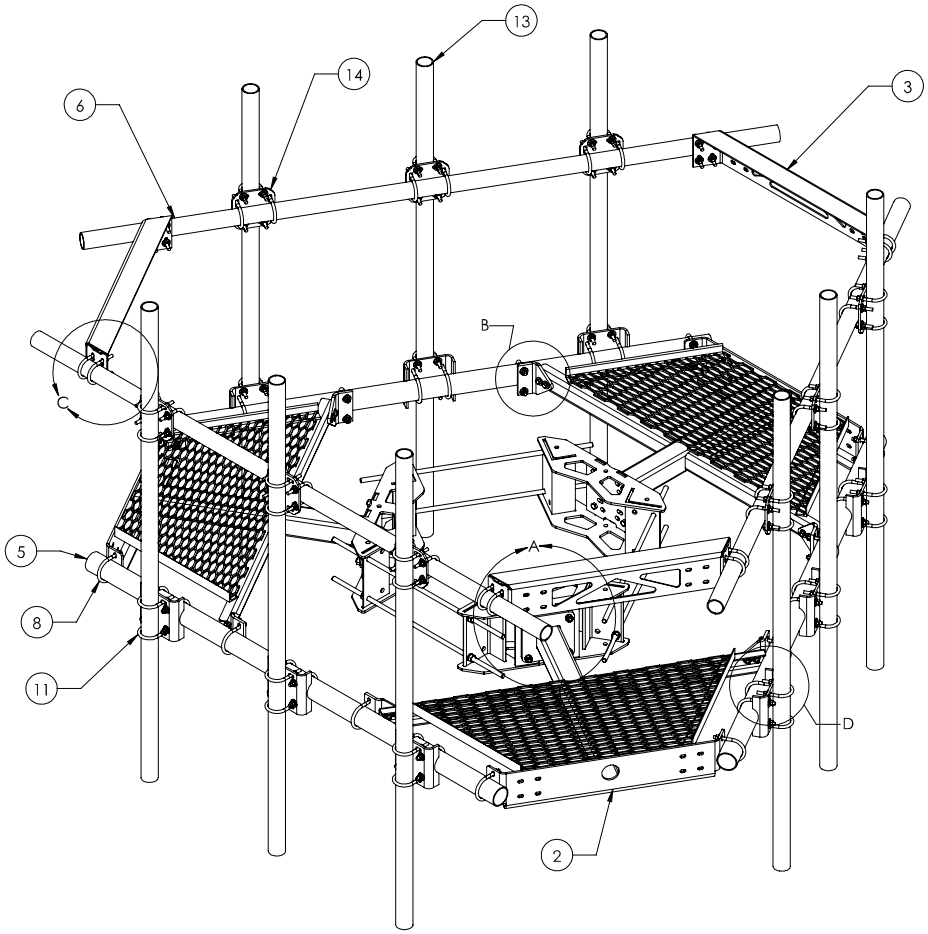
DOCUMENT NO.: MC-PK8-DSH

SIZE	Auth Group	MODEL			DRAWING			SHEET
	INSL	VERSION	STATUS	REVISION	VERSION	STATUS	REVISION	
C		01	AD		00	AD	A	1 OF 3

NOTES:







ITEM	PART NO.	DESCRIPTION	QTY.
1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1
2	MTC300602	SECTOR WELDMENT FOR SNUB NOSE PLATFORM	3
3	MT195801	Corner Weldment Snub Nose Handrail	3
4	GB-0520A	5/8" X 2" GALV BOLT KIT (A325)	12
5	MT54796	3.50" OD X 96" GALV PIPE	3
6	MT546120	2.875" O.D. X 120" PIPE	3
7	GWF-04	1/2" GALV FLAT WASHER	12
8	GUB-4355	1/2" X 3-5/8" X 5" GALV U-BOLT	12
9	MTC300618	MOUNTING PLATE FOR MT-196	6
10	GB-04205	1/2" X 2" GALV BOLT KIT	12
11	MT-219M-H	3.5" OD X 2-7/8" OD Clamp Bracket Assembly	9
12	GUB-4352	1/2" X 3" X 5-1/4" GALV U-BOLT	12
13	MT54696	Ø2.875" O.D. X 96 PIPE	9
14	XP-2525	CROSSOVER PLATE KIT, 2-7/8 OD X 2-7/8 OD	9

COMMSCOPE, INC. OF NORTH CAROLINA

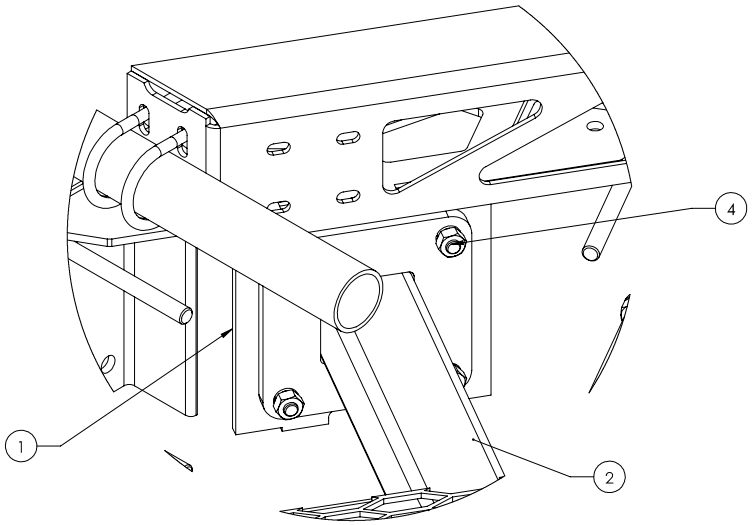
TITLE

LOW PROFILE PLATFORM FACE

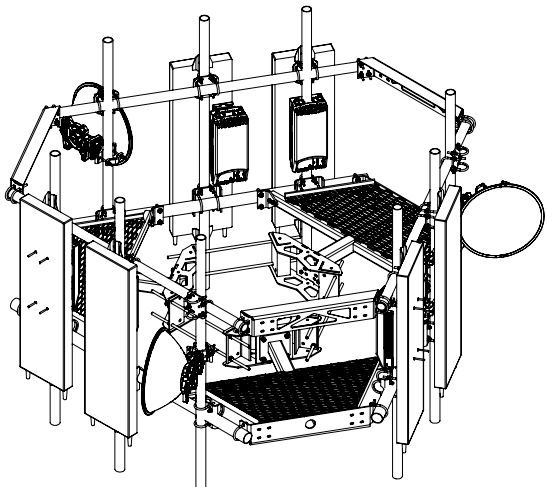
SIZE	SCALE	DOCUMENT NO.	
C	1:32	MC-PK8-DSH	

DRAWING			SHEET
VERSION	STATUS	REVISION	
00	AD	A	

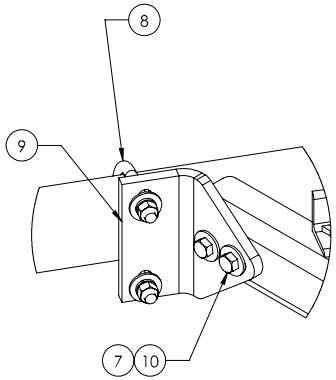
NOTES:



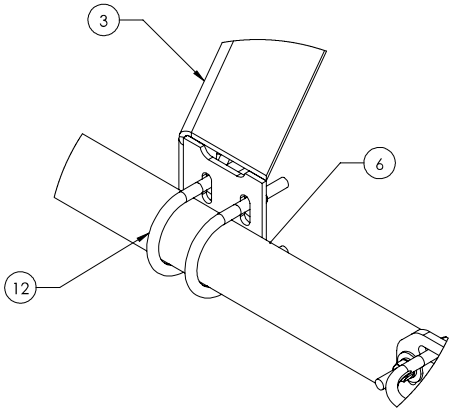
DETAIL A
SCALE 1 : 4



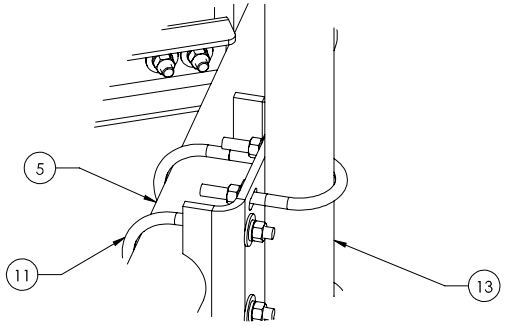
WITH ANTENNAS



DETAIL B
SCALE 1 : 4



DETAIL C
SCALE 1 : 4



DETAIL D
SCALE 1 : 4

COMMSCOPE, INC. OF NORTH CAROLINA			
TITLE: LOW PROFILE PLATFORM FACE			
SIZE: C	SCALE: 1:24	DOCUMENT NO.: MC-PK8-DSH	
		DRAWING: VERSION 00 / STATUS AD / REVISION A	SHEET: 3 OF 3

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: 876346

BOBOS00873A
23 Holland Road
Union, Connecticut 06076

May 19, 2022

EBI Project Number: 6222003234

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**8.02%**

May 19, 2022

Attn: Dish Wireless

Emissions Analysis for Site: 876346 - BOBOS00873A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **23 Holland Road** in **Union, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

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

Occupational/controlled exposure limits apply to situations in which persons are exposed as a consequence of their employment and in which those persons who are exposed have been made fully aware of the potential for exposure and can exercise control over their exposure.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 23 Holland Road in Union, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 4 n71 channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 4 n70 channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

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

5) The antennas used in this modeling are the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector A, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector B, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

6) The antenna mounting height centerline of the proposed antennas is 119 feet above ground level (AGL).

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

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

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21
Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz	Frequency Bands:	600 MHz / 1900 MHz
Gain:	11.35 dBd / 15.75 dBd	Gain:	11.35 dBd / 15.75 dBd	Gain:	11.35 dBd / 15.75 dBd
Height (AGL):	119 feet	Height (AGL):	119 feet	Height (AGL):	119 feet
Channel Count:	8	Channel Count:	8	Channel Count:	8
Total TX Power (W):	280.00 Watts	Total TX Power (W):	280.00 Watts	Total TX Power (W):	280.00 Watts
ERP (W):	1,424.17	ERP (W):	1,424.17	ERP (W):	1,424.17
Antenna A1 MPE %:	**0.59%**	Antenna B1 MPE %:	**0.59%**	Antenna C1 MPE %:	**0.59%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	0.59%
AT&T	4.26%
Metro PCS	0.51%
Sprint	2.66%
Site Total MPE % :	8.02%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	0.59%
Dish Wireless Sector B Total:	0.59%
Dish Wireless Sector C Total:	0.59%
Site Total MPE % :	8.02%

Dish Wireless Maximum MPE Power Values (Sector A)

Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Dish Wireless 600 MHz n71	4	110.82	119.0	1.25	600 MHz n71	400	0.31%
Dish Wireless 1900 MHz n70	4	245.22	119.0	2.76	1900 MHz n70	1000	0.28%
						Total:	**0.59%**

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

Summary

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

The anticipated maximum composite contributions from the Dish Wireless 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:

Dish Wireless Sector	Power Density Value (%)
Sector A:	0.59%
Sector B:	0.59%
Sector C:	0.59%
Dish Wireless Maximum MPE % (Sector A):	0.59%
Site Total:	8.02%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **8.02%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Letter of Authorization

4545 E River Rd, Suite 320
West Henrietta, NY 14586

Phone: (585) 445-5896
Fax: (724) 416-4461
www.crowncastle.com

Crown Castle Letter of Authorization

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

Re: Tower Share Application
Crown Castle telecommunications site at:
23 HOLLAND ROAD, UNION, CT 06076

GLOBAL SIGNAL ACQUISITIONS II LLC ("Crown Castle") hereby authorizes DISH Wireless LLC, including their Agent, to act as our Agent in the processing of all zoning applications, building permits and approvals through the CT - CONNECTICUT SITING COUNCIL for the existing wireless communications site described below:

Crown Site ID/Name: **876346/UNION**
Customer Site ID: **BOBOS00873A/**
Site Address: **23 Holland Road, Union, CT 06076**

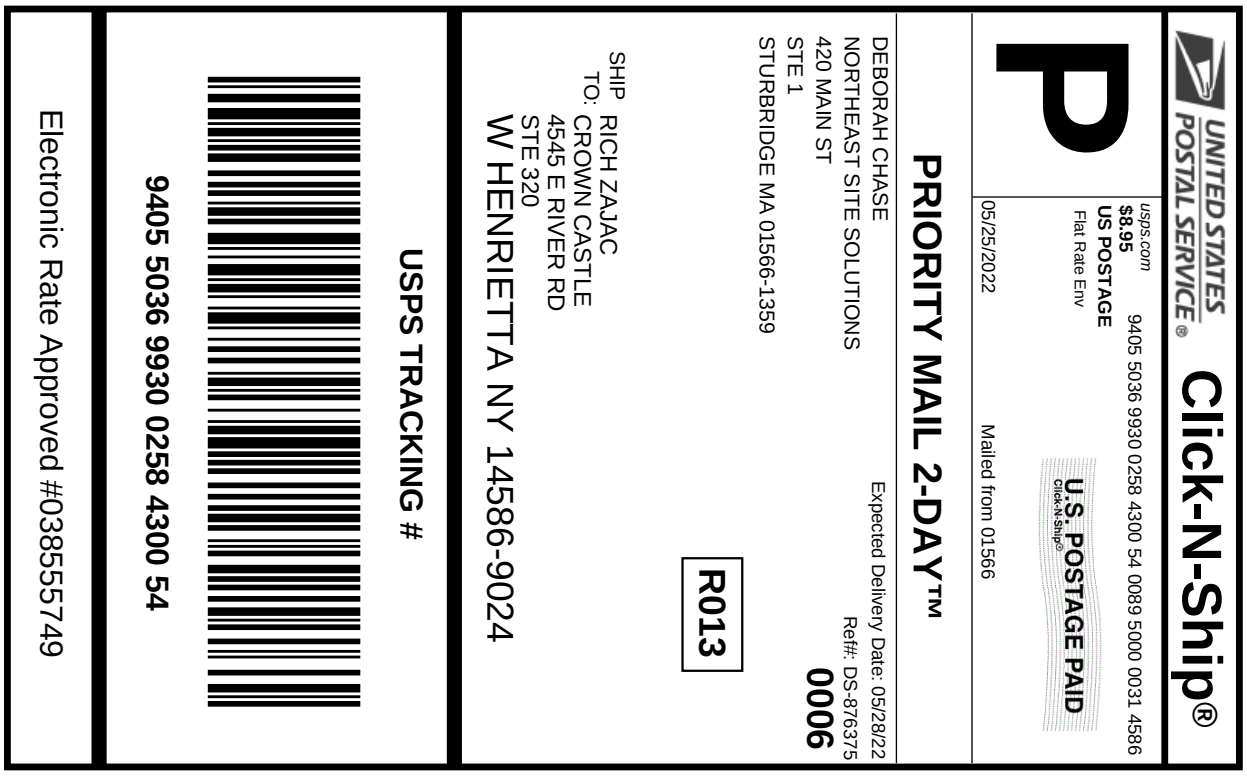
Crown Castle

By: _____ Date: 5/24/2022

Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



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Instructions

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2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 4300 54

Trans. #:	564320608
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/28/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876375

To: RICH ZAJAC
CROWN CASTLE
4545 E RIVER RD
STE 320
W HENRIETTA NY 14586-9024

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

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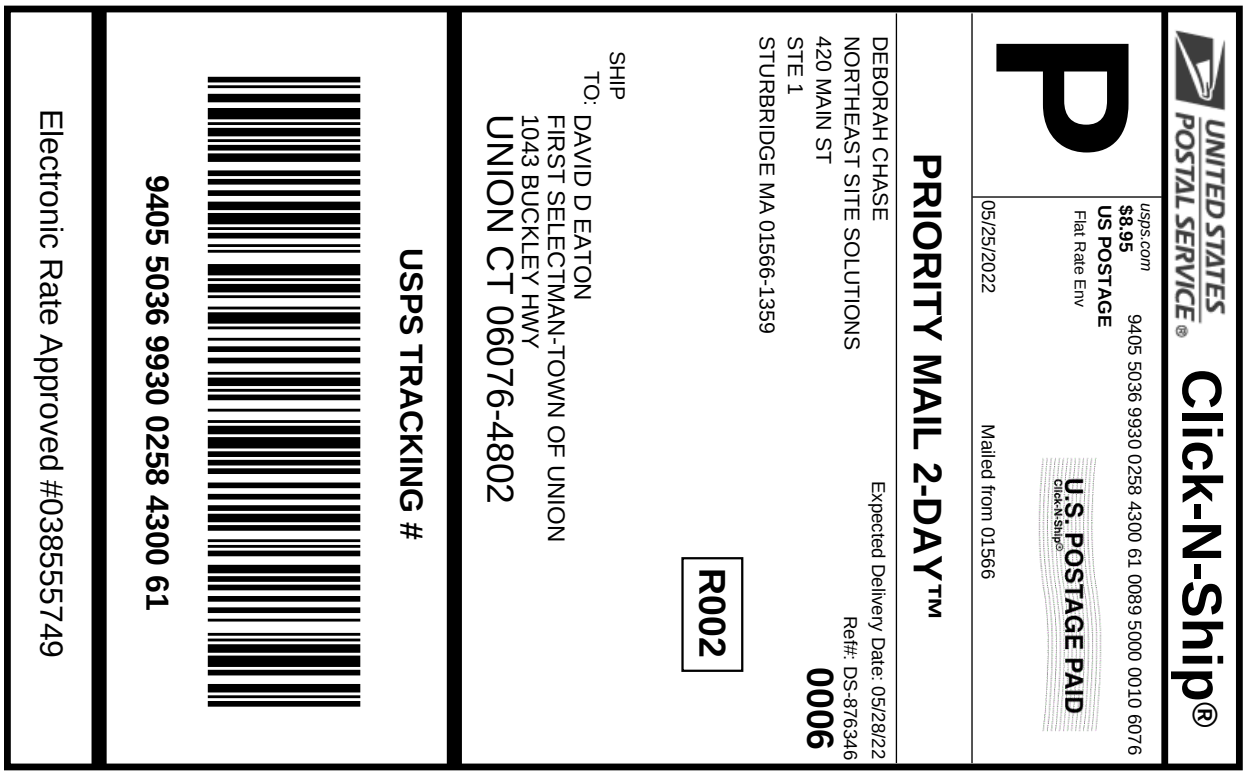

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Trans. #:	564320608
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/28/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876346

To: DAVID D EATON
FIRST SELECTMAN-TOWN OF UNION
1043 BUCKLEY HWY
UNION CT 06076-4802

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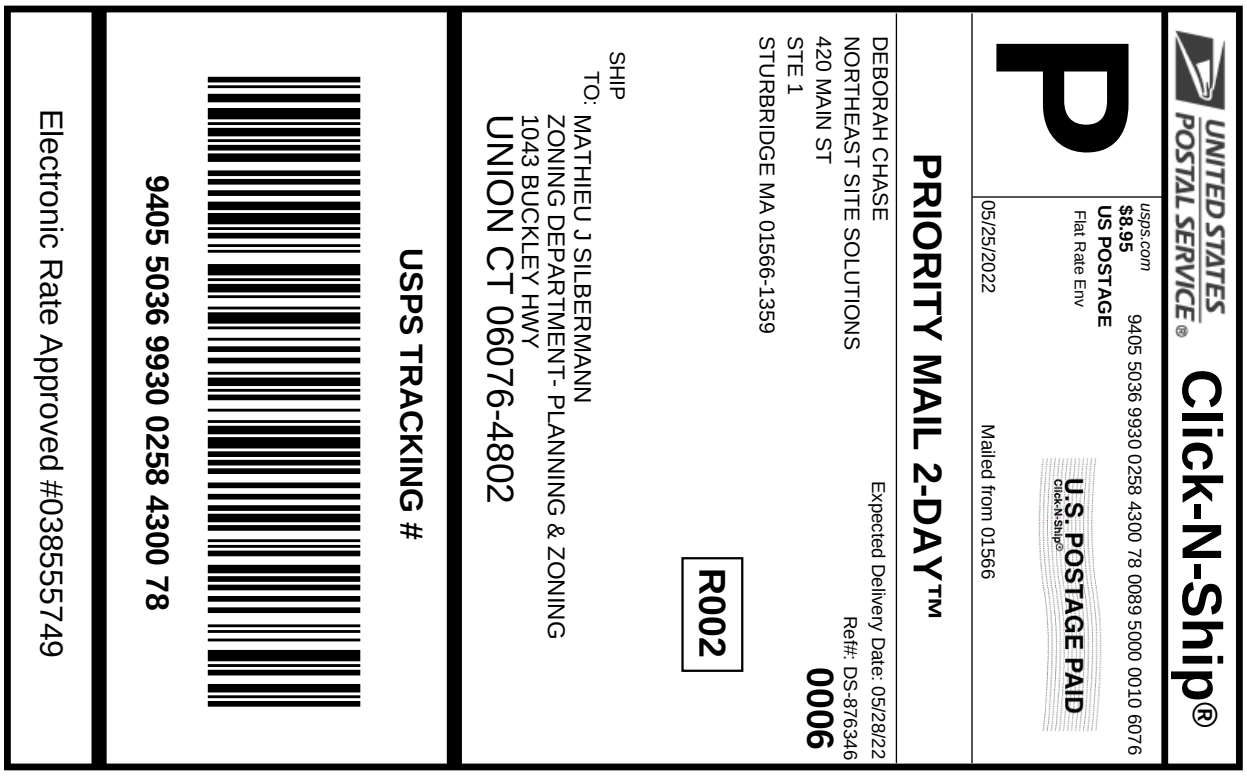

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2. **Place your label so it does not wrap around the edge of the package.**
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4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
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Click-N-Ship® Label Record

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Trans. #:	564320608
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/28/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876346

To: MATHIEU J SILBERMANN
ZONING DEPARTMENT- PLANNING & ZONING COMMISSIONER
1043 BUCKLEY HWY
UNION CT 06076-4802

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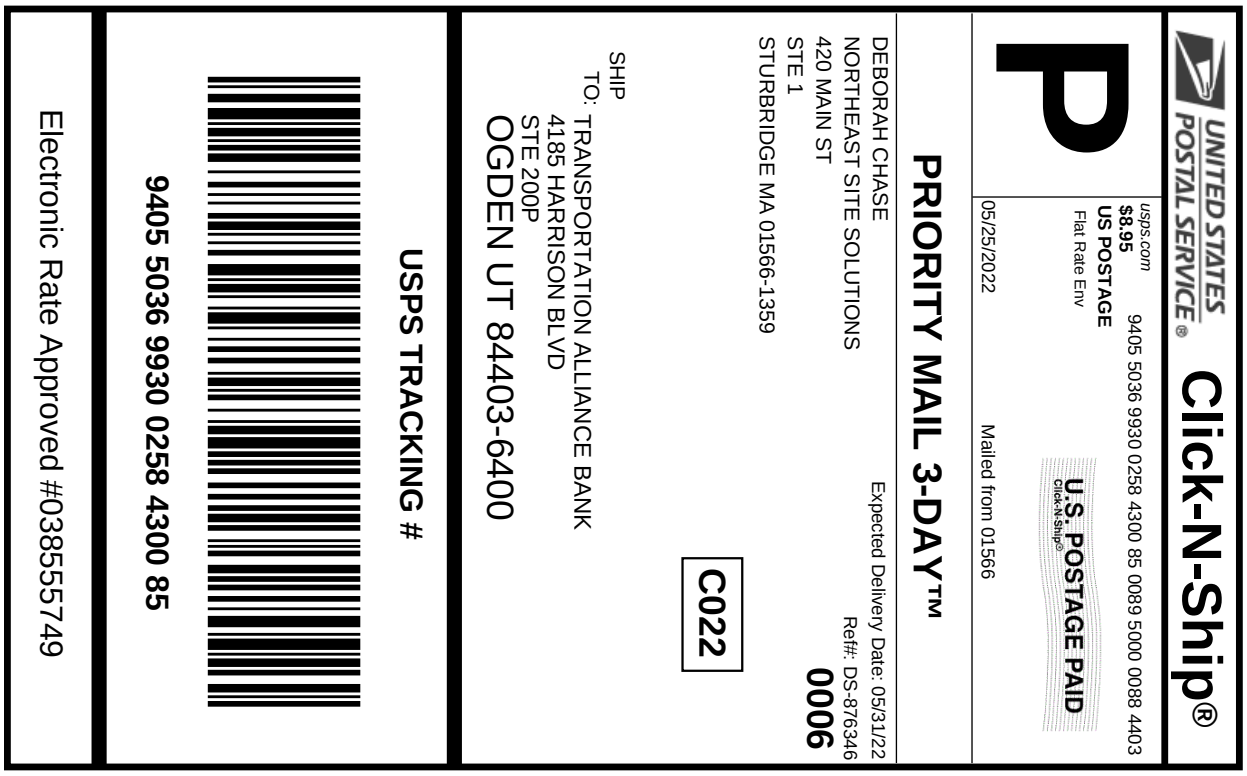

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Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 4300 85

Trans. #:	564320608
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/31/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876346

To: TRANSPORTATION ALLIANCE BANK
4185 HARRISON BLVD
STE 200P
OGDEN UT 84403-6400

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

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

876346 Crown Dish

UNITED STATES POSTAL SERVICE.

FARMINGTON
210 MAIN ST
FARMINGTON, CT 06032-9998
(800)275-8777

05/27/2022 03:32 PM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 2.00 oz Acceptance Date: Fri 05/27/2022 Tracking #: 9405 5036 9930 0258 4300 54	1		$0.00
Prepaid Mail Stafford Springs, CT 06076 Weight: 0 lb 8.50 oz Acceptance Date: Fri 05/27/2022 Tracking #: 9405 5036 9930 0258 4300 61	1		$0.00
Prepaid Mail Stafford Springs, CT 06076 Weight: 0 lb 8.50 oz Acceptance Date: Fri 05/27/2022 Tracking #: 9405 5036 9930 0258 4300 78	1		$0.00
Prepaid Mail Ogden, UT 84403 Weight: 0 lb 8.50 oz Acceptance Date: Fri 05/27/2022 Tracking #: 9405 5036 9930 0258 4300 85	1		$0.00
Grand Total:			$0.00

****
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or scan this code with your mobile device.