NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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

June 17, 2022

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

RE: Tower Share Application
10 Toelles Road (a/k/a 39 Toelles Road), Wallingford, CT 06492
Latitude: 41.429166
Longitude: -72.848611
Site #: 876311_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 10 Toelles Road (a/k/a 39 Toelles Road), Wallingford, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas and six (6) RRUs, at the 106-foot level of the existing 120-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 existing fenced compound. Included are plans by B+T, dated June 7, 2022, Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated October 5, 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 Wallingford but a copy of the decisions was not available.

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 Mayor William Dickinson and Amy Torre, Zoning Enforcement Officer for the Town of Wallingford, as well as the tower owner (Crown Castle) and property owner (Suzio Concrete, Inc.).

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 120-feet and the Dish Wireless LLC antennas will be located at a centerline height of 106-feet.

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

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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 2.30% 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 tower 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 tower in Wallingford. 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 106-foot level of the existing 120-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 Wallingford.

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

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Attachments

Cc: Mayor William Dickinson
Wallingford Town Hall
45 South Main Street
Wallingford, CT 06492

Amy Torre, Zoning Enforcement Officer
Wallingford Town Hall
45 South Main Street
Wallingford, CT 06492

Suzio Concrete, Inc.- Property Owner
975 Westfield Road
Meriden, CT 06450

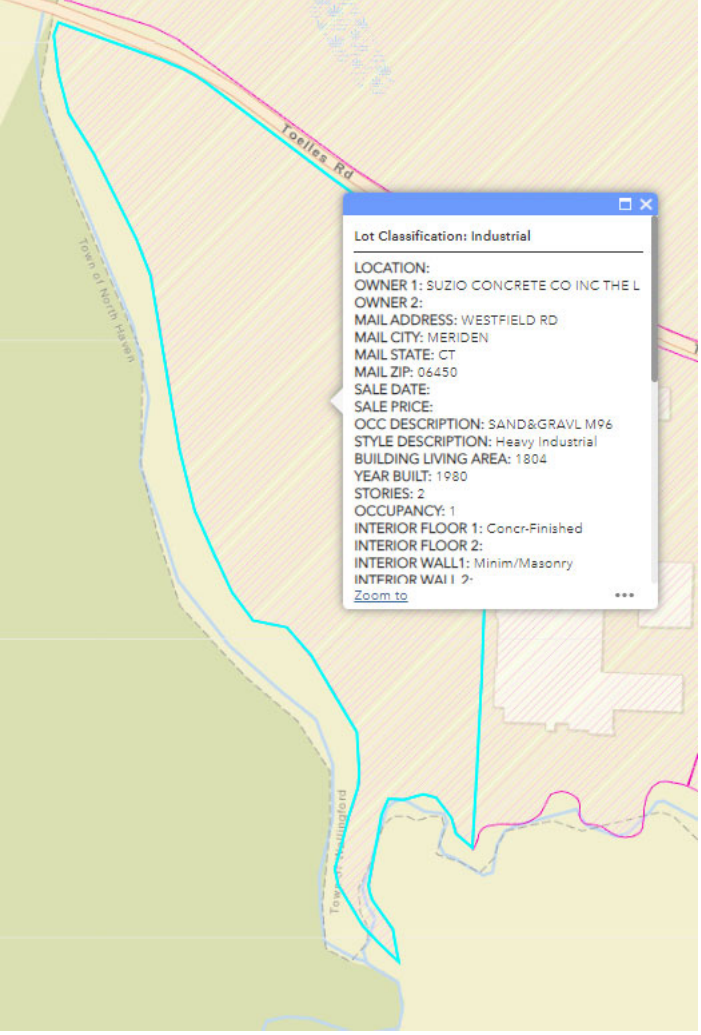
Crown Castle, Tower Owner

Exhibit A

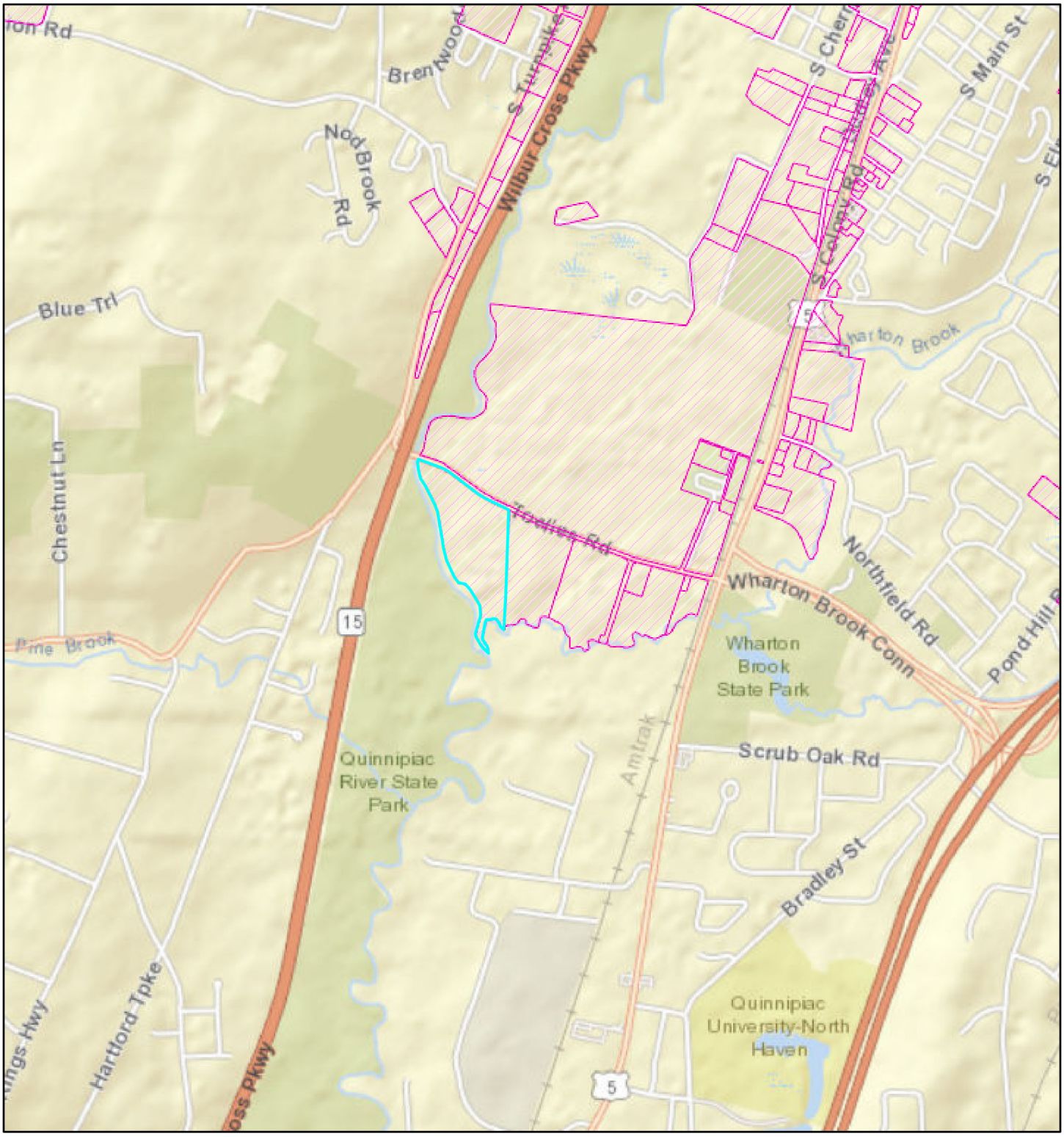
Original Facility Approval

Exhibit B

Property Card


Toelles Rd
Town of North Haven
Town of Wallingford
Lot Classification: Industrial
LOCATION:
OWNER 1: SUZIO CONCRETE CO INC THE L
OWNER 2:
MAIL ADDRESS: WESTFIELD RD
MAIL CITY: MERIDEN
MAIL STATE: CT
MAIL ZIP: 06450
SALE DATE:
SALE PRICE:
OCC DESCRIPTION: SAND&GRAVL M96
STYLE DESCRIPTION: Heavy Industrial
BUILDING LIVING AREA: 1804
YEAR BUILT: 1980
STORIES: 2
OCCUPANCY: 1
INTERIOR FLOOR 1: Concr-Finished
INTERIOR FLOOR 2:
INTERIOR WALL1: Minim/Masonry
Zoom to

39 TOELLES ROAD



6/16/2022, 11:10:46 AM

1:27,560

Lot Boundaries

0 0.17 0.35 0.7 mi

0 0.28 0.55 1.1 km

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOHVN00163A

DISH Wireless L.L.C. SITE ADDRESS:

39 TOELLES RD

WALLINGFORD, CT 06492

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

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 FIBER NID (IF REQUIRED)
- INSTALL (1) PROPOSED SAFETY SWITCH (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:	THE L SUZIO CONCRETE CO INC
ADDRESS:	975 WESTFIELD RD MERIDEN, CT 06450
TOWER TYPE:	MONOPOLE
TOWER CO SITE ID:	876311
TOWER APP NUMBER:	553380
COUNTY:	NEW HAVEN
LATITUDE (NAD 83):	41° 25' 44.62" N 41.42906 N
LONGITUDE (NAD 83):	-72° 50' 54.81" W -72.84856 W
ZONING JURISDICTION:	TOWN OF WALLINGFORD
ZONING DISTRICT:	I-40 - INDUSTRIAL
PARCEL NUMBER:	N/A
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	WALLINGFORD ELECTRIC
TELEPHONE COMPANY:	TBD

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:	VICTOR NUNEZ VICTOR.NUNEZ@CROWNCASTLE.COM
CONSTRUCTION MANAGER:	JAVIER SOTO JAVIER.SOTO@DISH.COM
RF ENGINEER:	SYED ZAIDI SYED.ZAIDI@DISH.COM

DIRECTIONS

DIRECTIONS FROM TWEED NEW HAVEN AIRPORT:

START OUT GOING NORTHEAST ON BURR ST TOWARD FOREST ST. TAKE THE 2ND LEFT ONTO JAMES ST. TURN RIGHT ONTO CHARTER OAK AVE. TURN LEFT ONTO MAIN ST. MAIN ST BECOMES MAIN STREET ANX. MERGE ONTO I-95 S. MERGE ONTO I-91 N TOWARD HARTFORD. TAKE EXIT 13 ON THE LEFT TOWARD US-5/WALLINGFORD/NORTH HAVEN. MERGE ONTO TOELLES RD. TURN LEFT ONTO S COLONY RD/US-5 S. TAKE THE 1ST RIGHT ONTO TOELLES RD. 39 TOELLES RD IS ON THE LEFT. FOLLOW ACCESS ROAD TO SITE.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

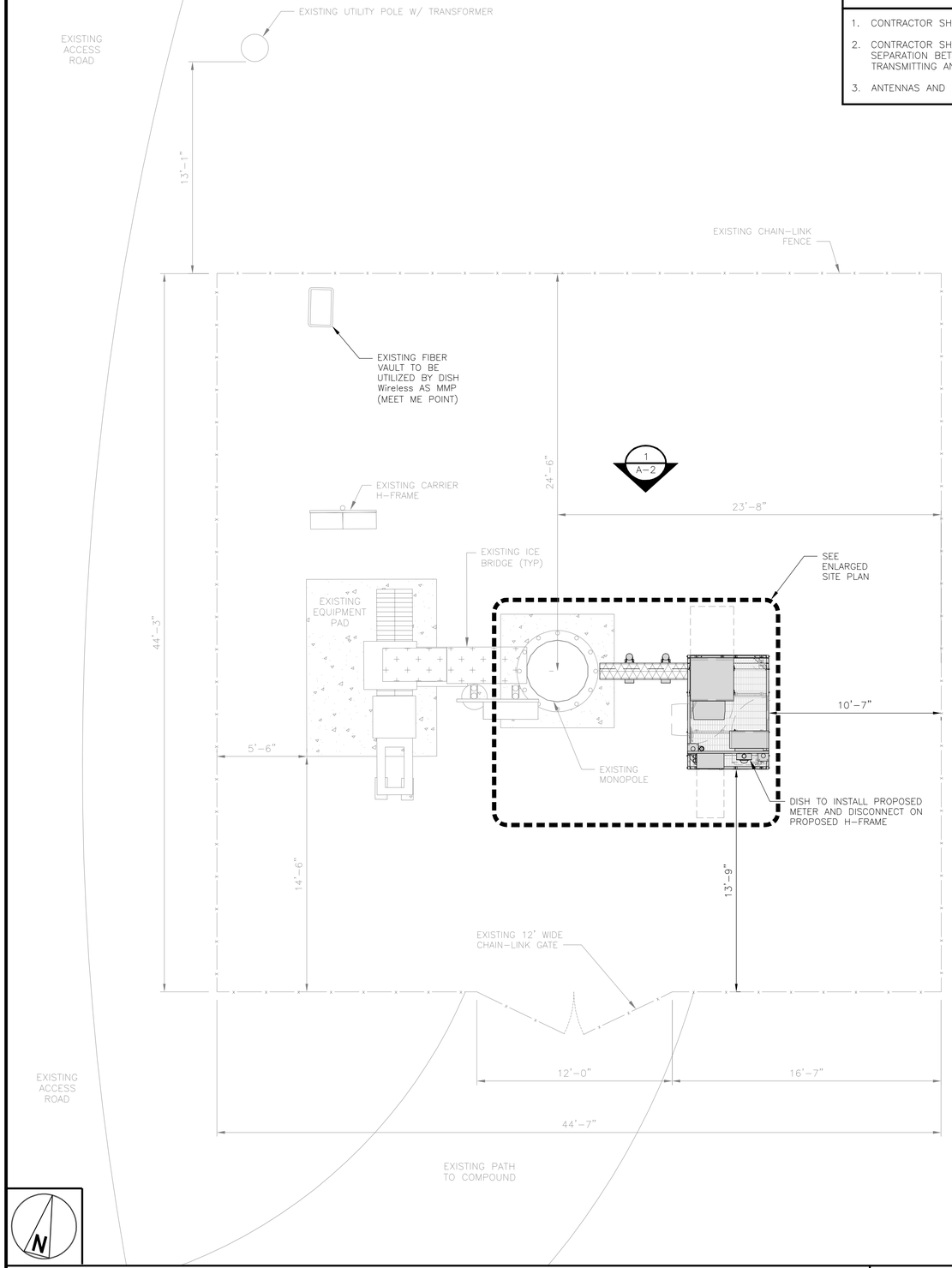
TITLE SHEET

SHEET NUMBER

T-1

NOTES

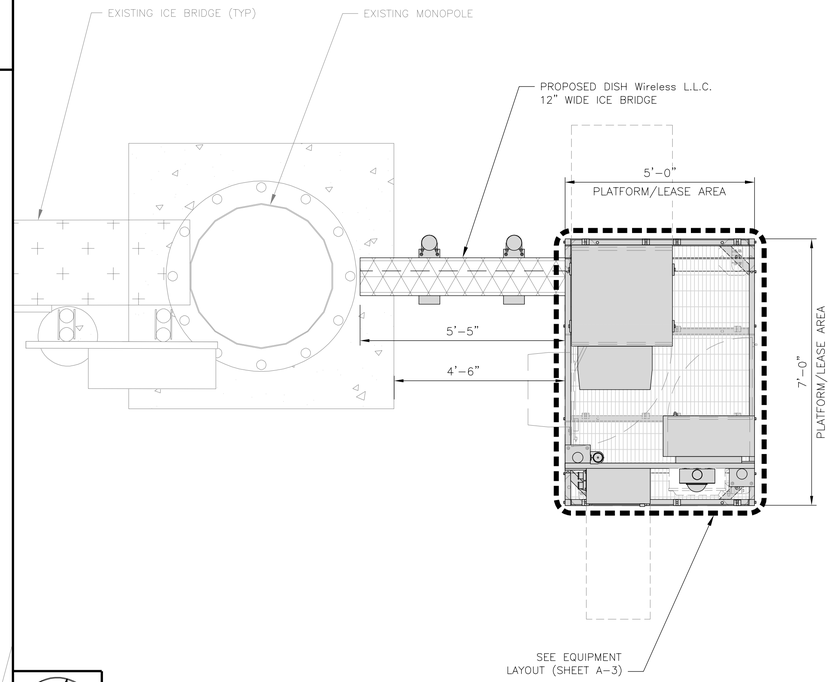
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



OVERALL SITE PLAN

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

1



ENLARGED SITE PLAN

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

2

AERIAL VIEW

3

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
PEN.0028997
LICENSED PROFESSIONAL ENGINEER

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

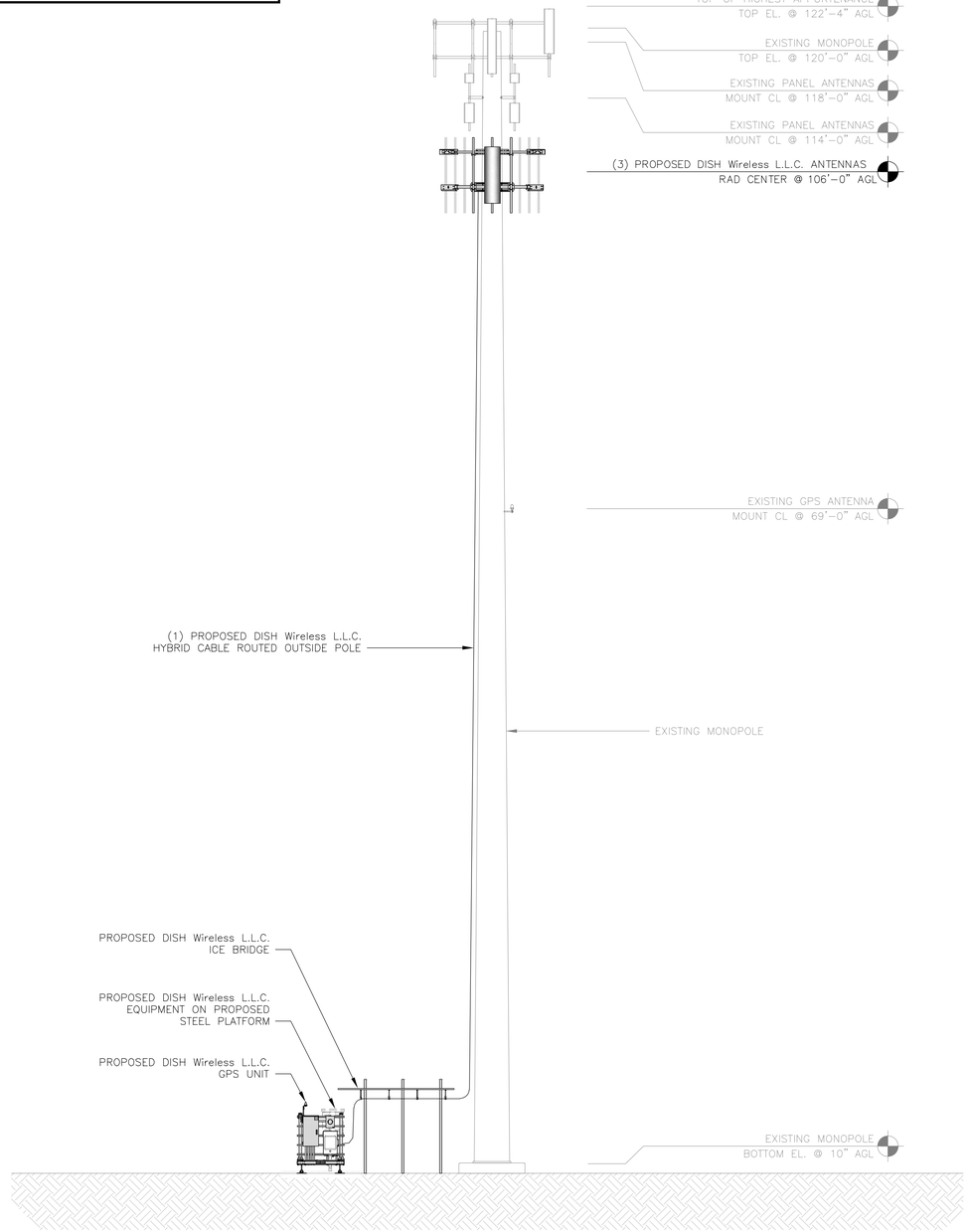
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

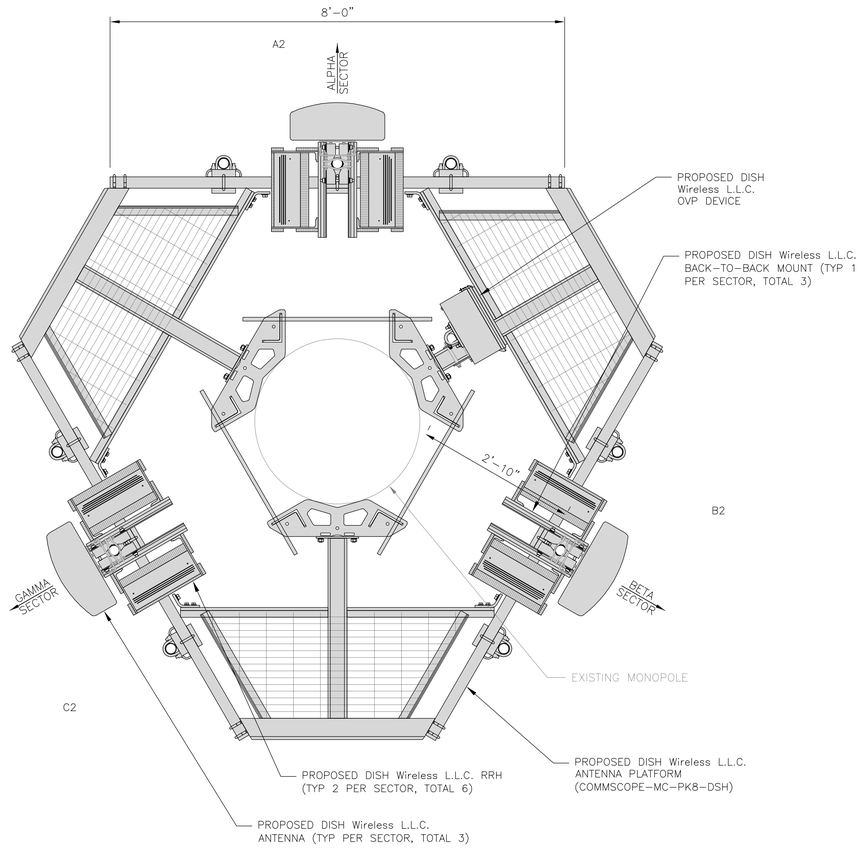
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH ELEVATION

6' 4' 2' 0 5' 10'
3/16"=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 (143' LONG)	FUJITSU – TA08025-B604	5G	A2	RAYCAP – RDIDC-9181-PF-48
A2	PROPOSED	JMA – MX08FR0665-21	5G	0°	106'-0"		FUJITSU – TA08025-B605	5G	A2	
A3	--	--	--	--	--		--	--	--	
B1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	B2	SHARED W/ALPHA
B2	PROPOSED	JMA – MX08FR0665-21	5G	120°	106'-0"		FUJITSU – TA08025-B605	5G	B2	
B3	--	--	--	--	--		--	--	--	
C1	--	--	--	--	--	SHARED W/ALPHA	FUJITSU – TA08025-B604	5G	C2	SHARED W/ALPHA
C2	PROPOSED	JMA – MX08FR0665-21	5G	240°	106'-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.
6095 MARSHALEE DRIVE, SUITE 300
ELKRIDGE, MD 21075
(410) 712-7092

STATE OF CONNECTICUT
KRUPAKARAN KOLANDAIVELU
PEN.0028997
LICENSED
PROFESSIONAL ENGINEER

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

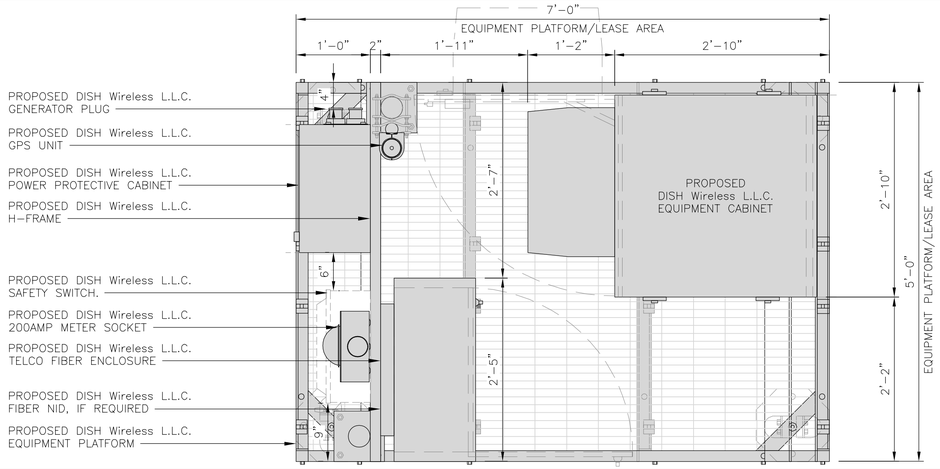
BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



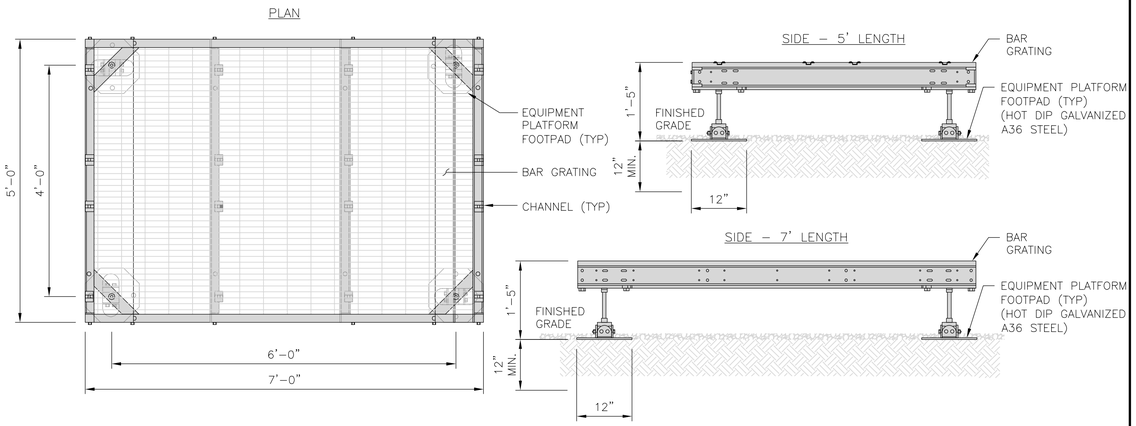
PLATFORM EQUIPMENT PLAN

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"

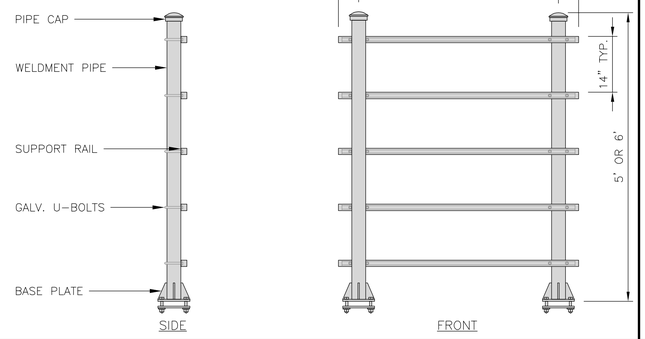


PLATFORM DETAIL

NO SCALE

2

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



H-FRAME DETAIL

NO SCALE

3

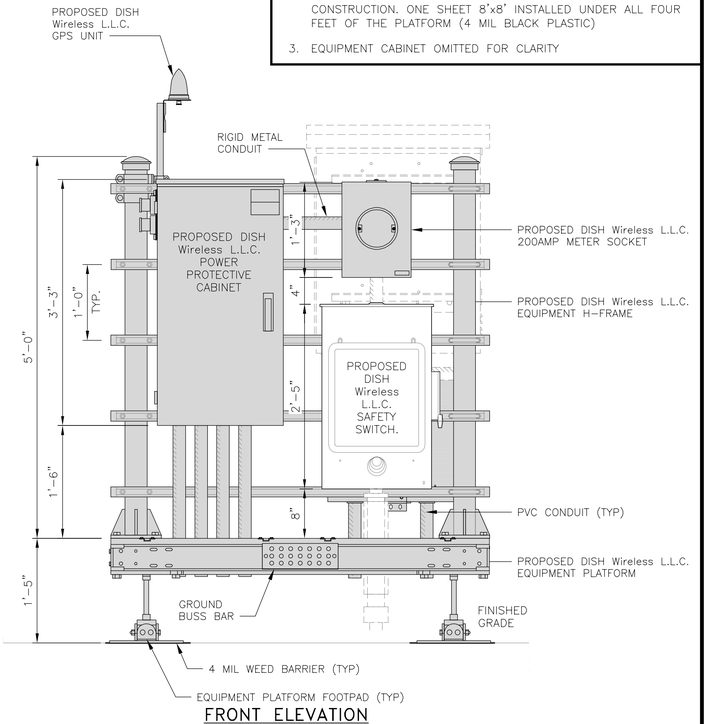
NOT USED

NO SCALE

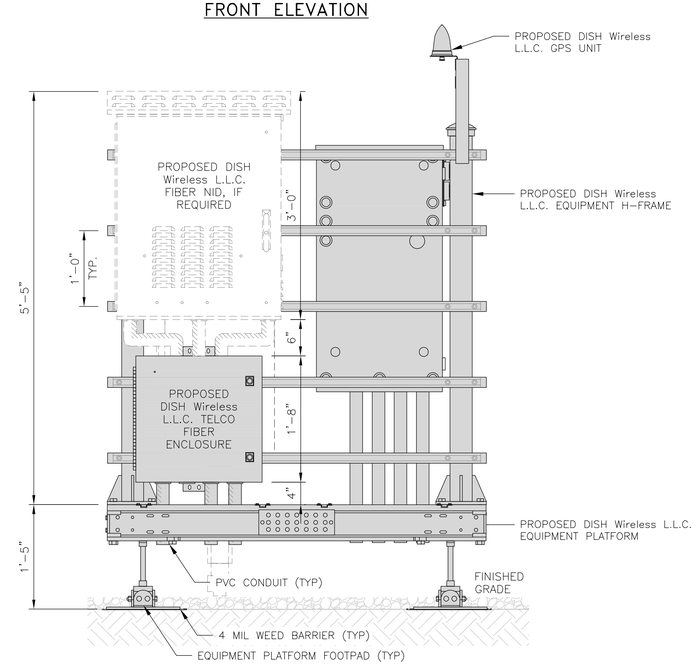
4

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

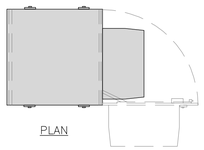
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER

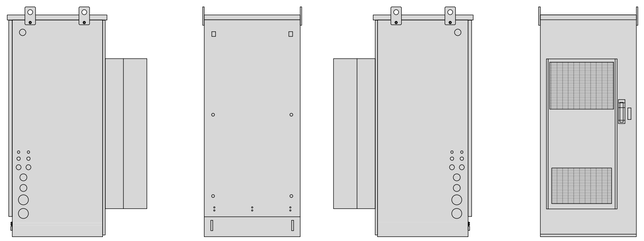
A-3

CHARLES INDUSTRY HEX CUBE–PM639155N4

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



PLAN



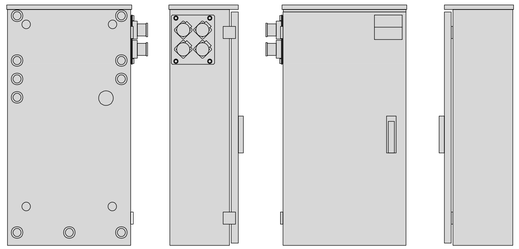
SIDE BACK SIDE FRONT

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

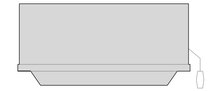


BACK SIDE FRONT SIDE

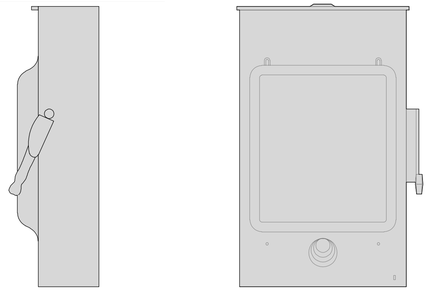
POWER PROTECTION CABINET (PPC) DETAIL | NO SCALE | 2

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

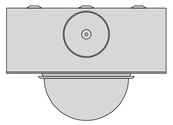


SIDE FRONT

SAFETY SWITCH DETAIL | NO SCALE | 3

EATON METER SOCKET UNRRS213BEUSE

DIMENSIONS (HxWxD)	16"x12"x6"
TYPE	RING
AMPERAGE RATING	200 CONT. AMP
WEIGHT	18 lbs



TOP

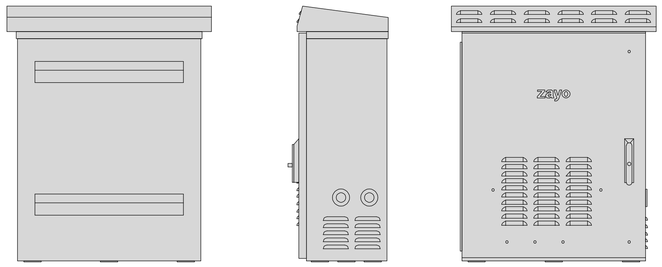
BACK SIDE FRONT

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

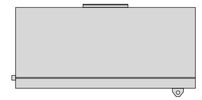


BACK SIDE FRONT

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

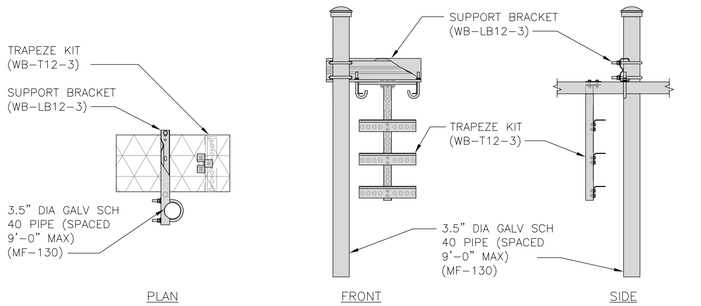
SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

COMMSCOPE WB–K110–B WAVEGUIDE BRIDGE KIT

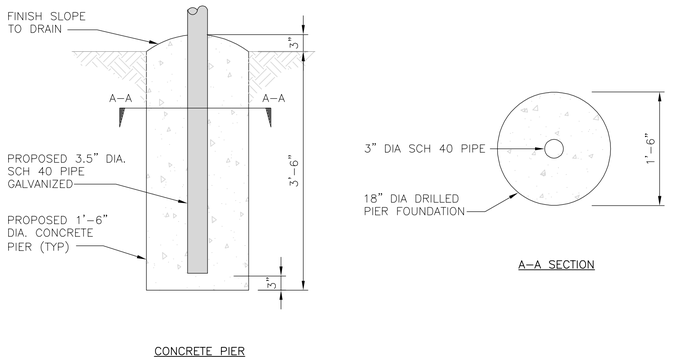
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

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

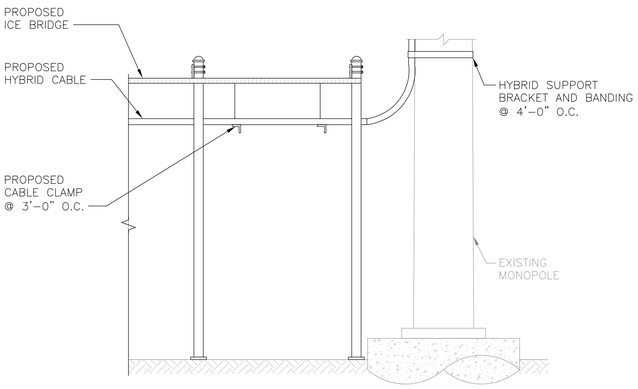
ICE BRIDGE DETAIL | NO SCALE | 7



CONCRETE PIER

A–A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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 LICENSED PROFESSIONAL ENGINEER PEN.0028997

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

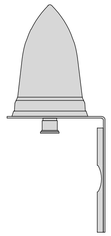
EQUIPMENT DETAILS

SHEET NUMBER

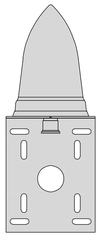
A-4

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

TOP

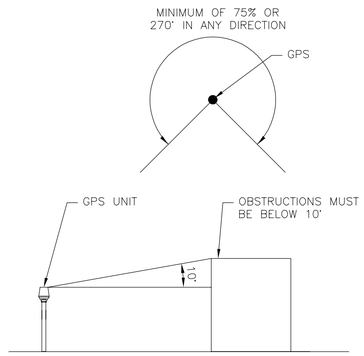


BACK

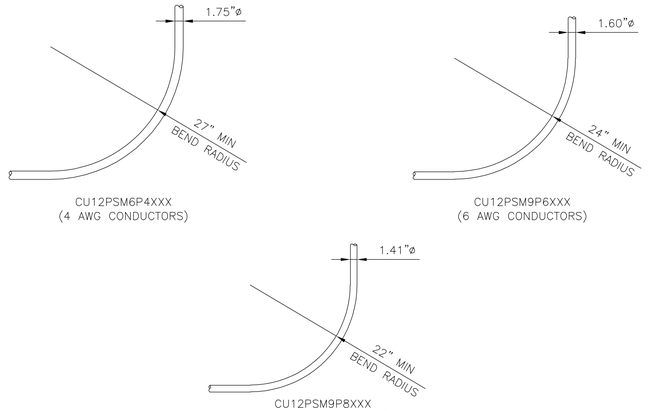


SIDE

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 #:	BOHVN00163A
TWR TYPE:	MONOPOLE
HYBRID BEND RADIUS	30"
RAD CENTER (ft)	106.0
ICE BRIDGE HEIGHT (ft)	10.0
ICE BRIDGE LENGTH (ft)	5.5
LENGTH ACROSS PLATFORM (ft)	6.0
LENGTH FROM TOWER TOP TO OVP (ft)	6.0
VERTICAL LENGTH OF HYBRID INTO TOWER TOP OVP (ft)	3.0
	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)	143

The preparer must determine the lengths below.
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.
This is the height of the bridge coverings.
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.
This is the length from the cabinet to the first bend up the ice bridge or inside a radio room.
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.
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.

HYBRID CABLE CALCULATOR | 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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

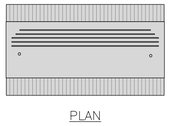
EQUIPMENT DETAILS

SHEET NUMBER

A-5

FUJITSU TRIPLE BAND TA08025-B605

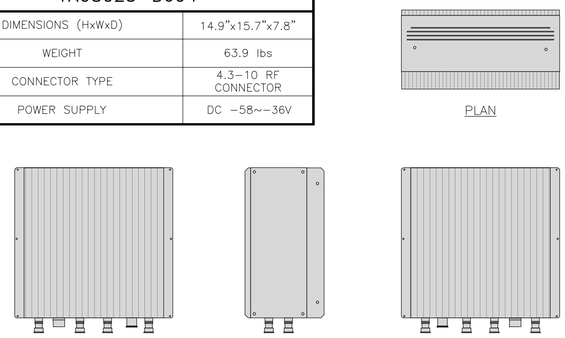
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



RRH DETAIL | NO SCALE | 1

FUJITSU DUAL BAND TA08025-B604

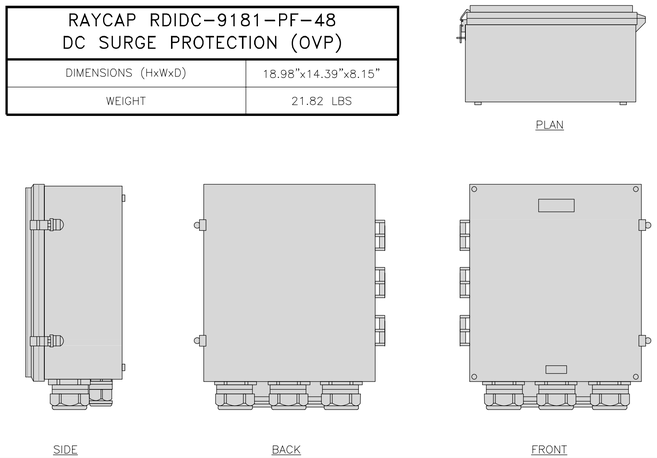
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



RRH DETAIL | NO SCALE | 2

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

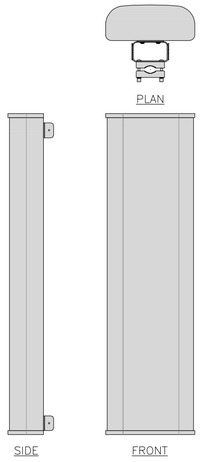
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 3

JMA MX08FRO665-21

DIMENSIONS (HxWxD)	72"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs



ANTENNA DETAIL | NO SCALE | 4

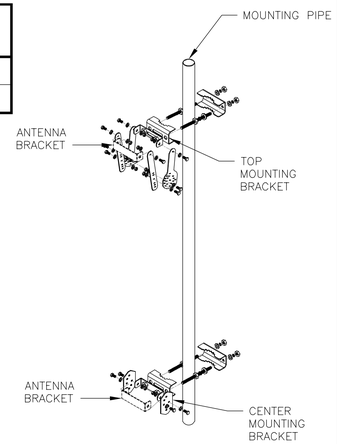
JMA ANTENNA MOUNT BRACKET #91900318

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

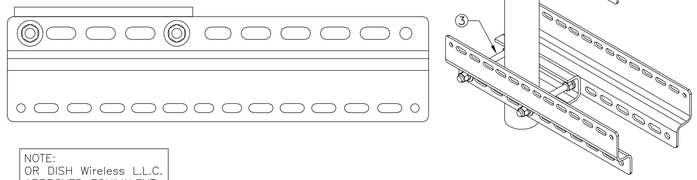


ANTENNA BRACKET DETAIL | NO SCALE | 5

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"

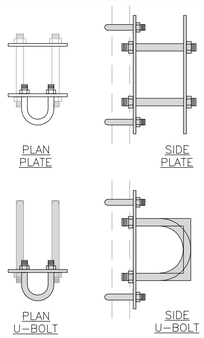


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

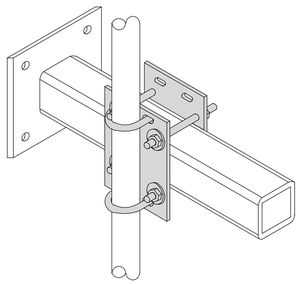
RRH MOUNT DETAIL | NO SCALE | 6

COMMSCOPE XP-2040 CROSSOVER PLATE

DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs



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

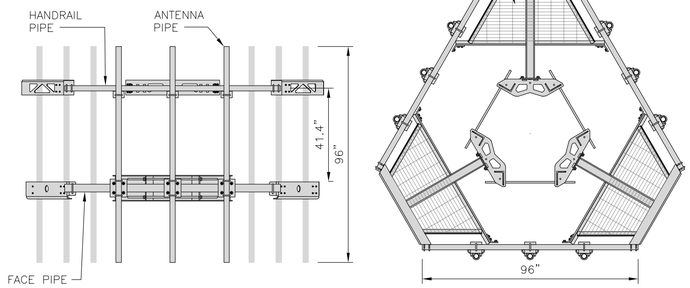


RRH/OVP MOUNT DETAIL | NO SCALE | 7

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

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

06/07/2022

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	06/07/2022	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

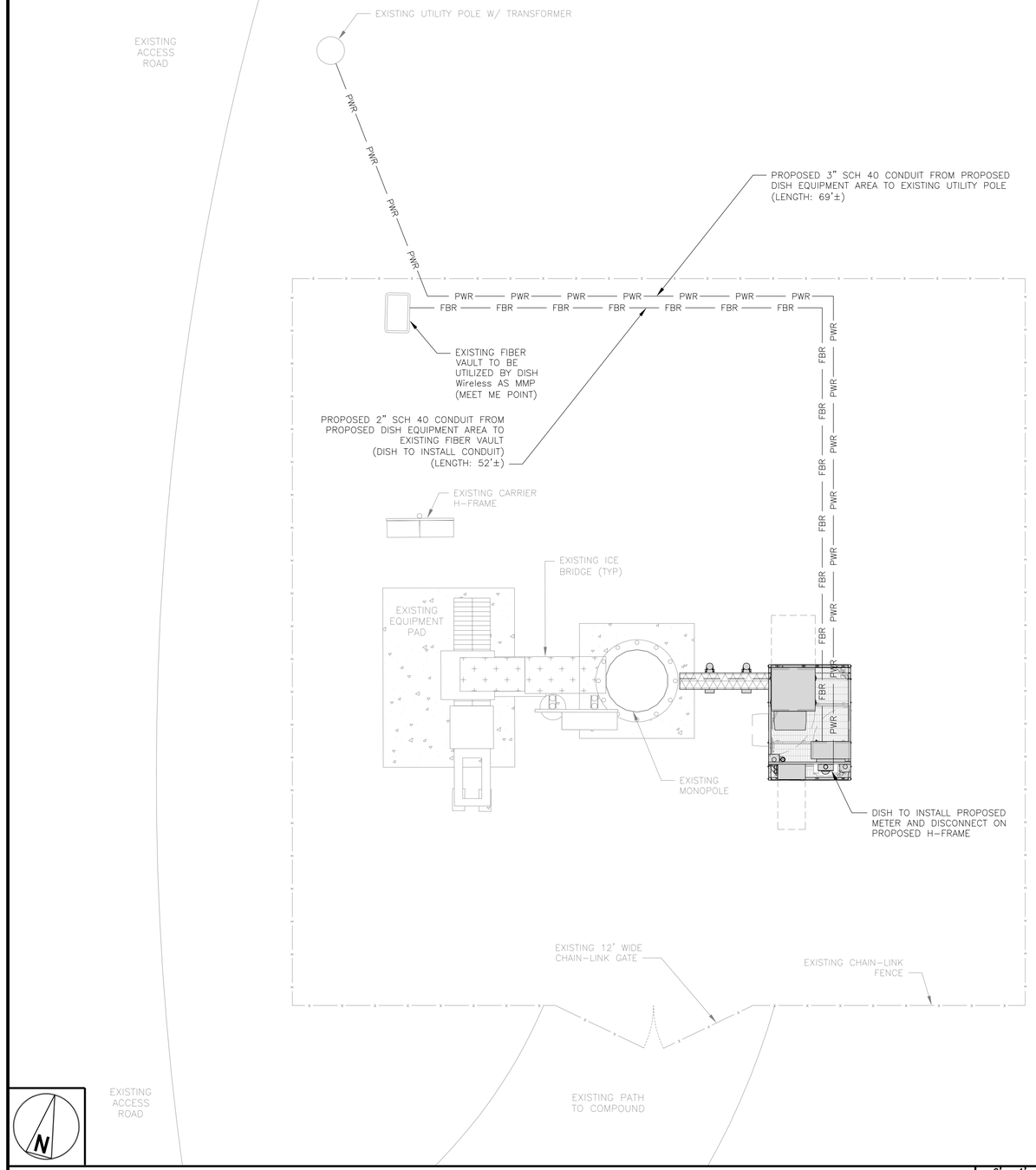
EQUIPMENT DETAILS

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. THE GROUND LEASE DOES NOT SPECIFY OUR UTILITY RIGHTS. "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 ARE BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO 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 NOT AN OPTION, PLEASE NOTIFY CROWN CASTLE REAL ESTATE AS FURTHER COORDINATION MAY BE NEEDED.



UTILITY ROUTE PLAN

6' 4' 2' 0 5' 10'
3/16"=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

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

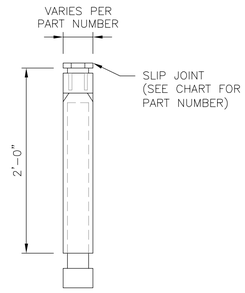
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

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"

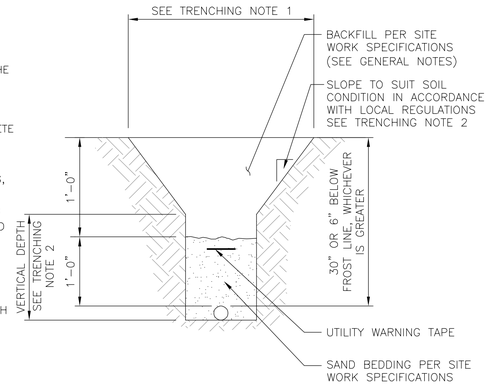


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

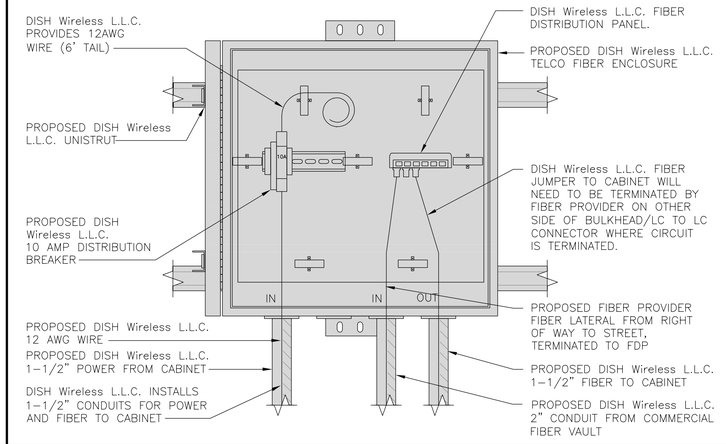
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

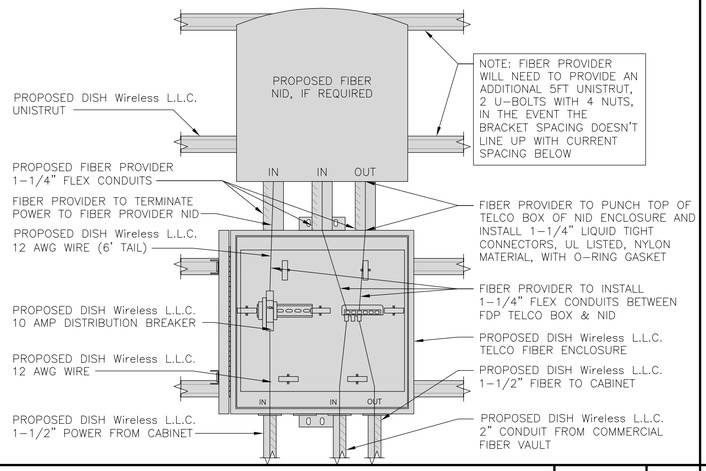
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT 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

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

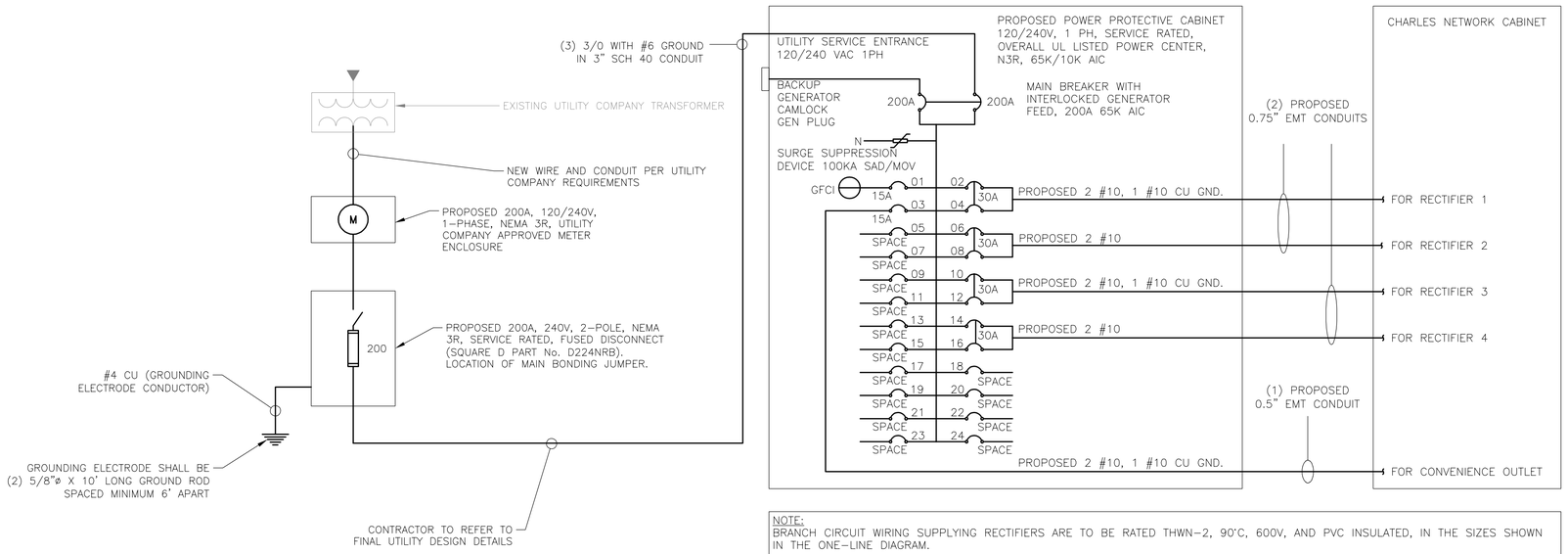
BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2



NOTE:
BRANCH CIRCUIT WIRING SUPPLYING RECTIFIERS ARE TO BE RATED THWN-2, 90°C, 600V, AND PVC INSULATED, IN THE SIZES SHOWN IN THE ONE-LINE DIAGRAM.

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 THWN-2 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 THWN-2, 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

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

06/07/2022

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

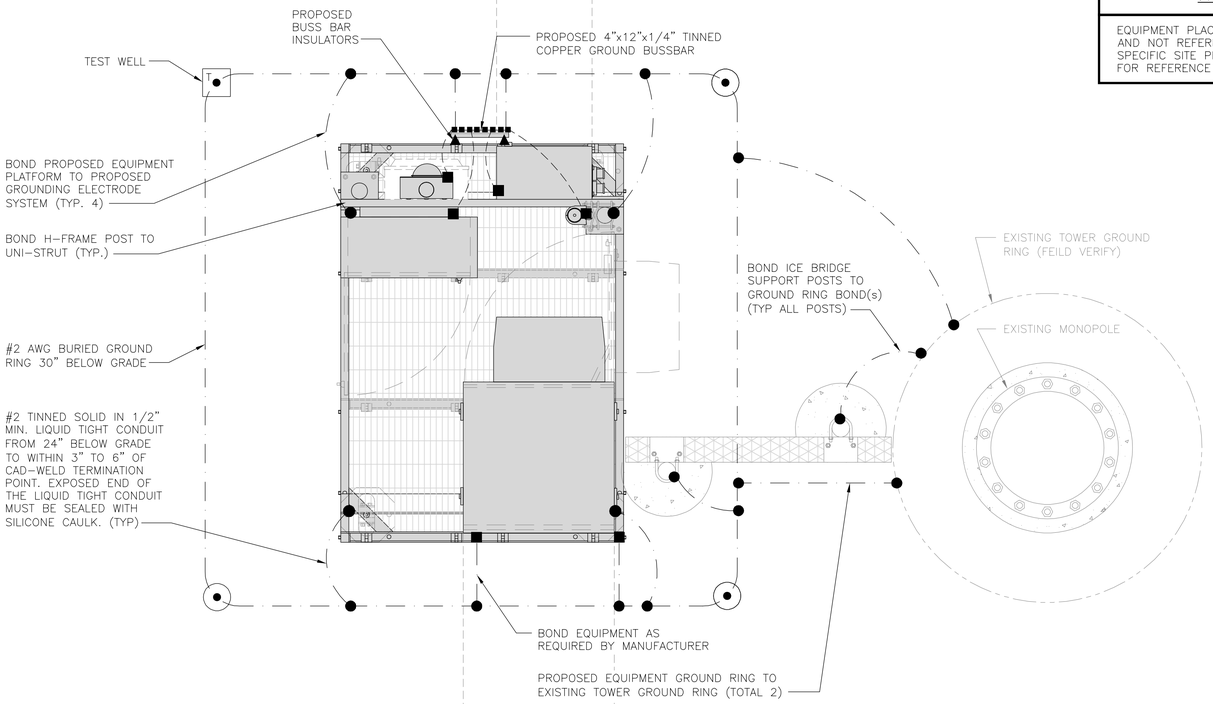
REV	DATE	DESCRIPTION
0	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER
876311

DISH Wireless L.L.C.
PROJECT INFORMATION
BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

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

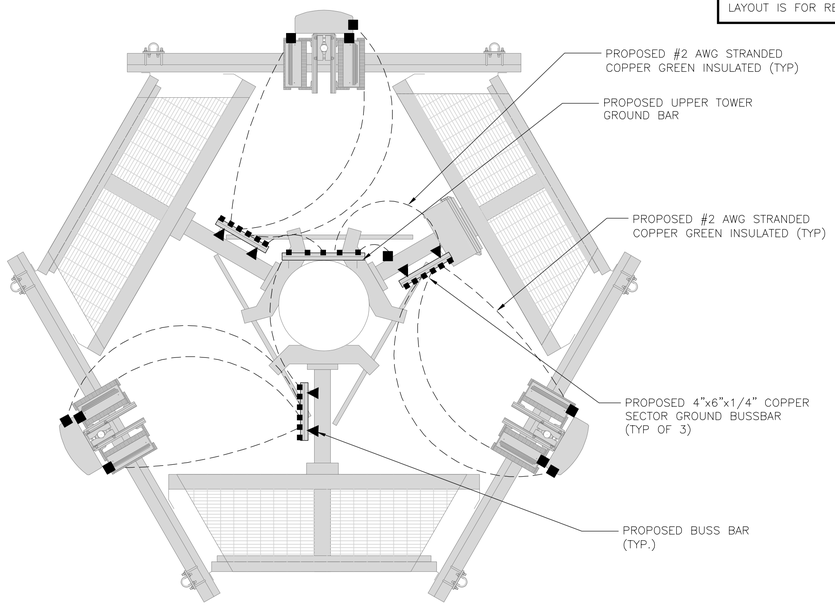
SHEET NUMBER
E-3



TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1

NOTES

EQUIPMENT PLACEMENT IS GENERIC AND NOT REFERENCING TO A SPECIFIC SITE PLAN. THIS LAYOUT IS FOR REFERENCE PURPOSES ONLY.



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

NOTES

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

- 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

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

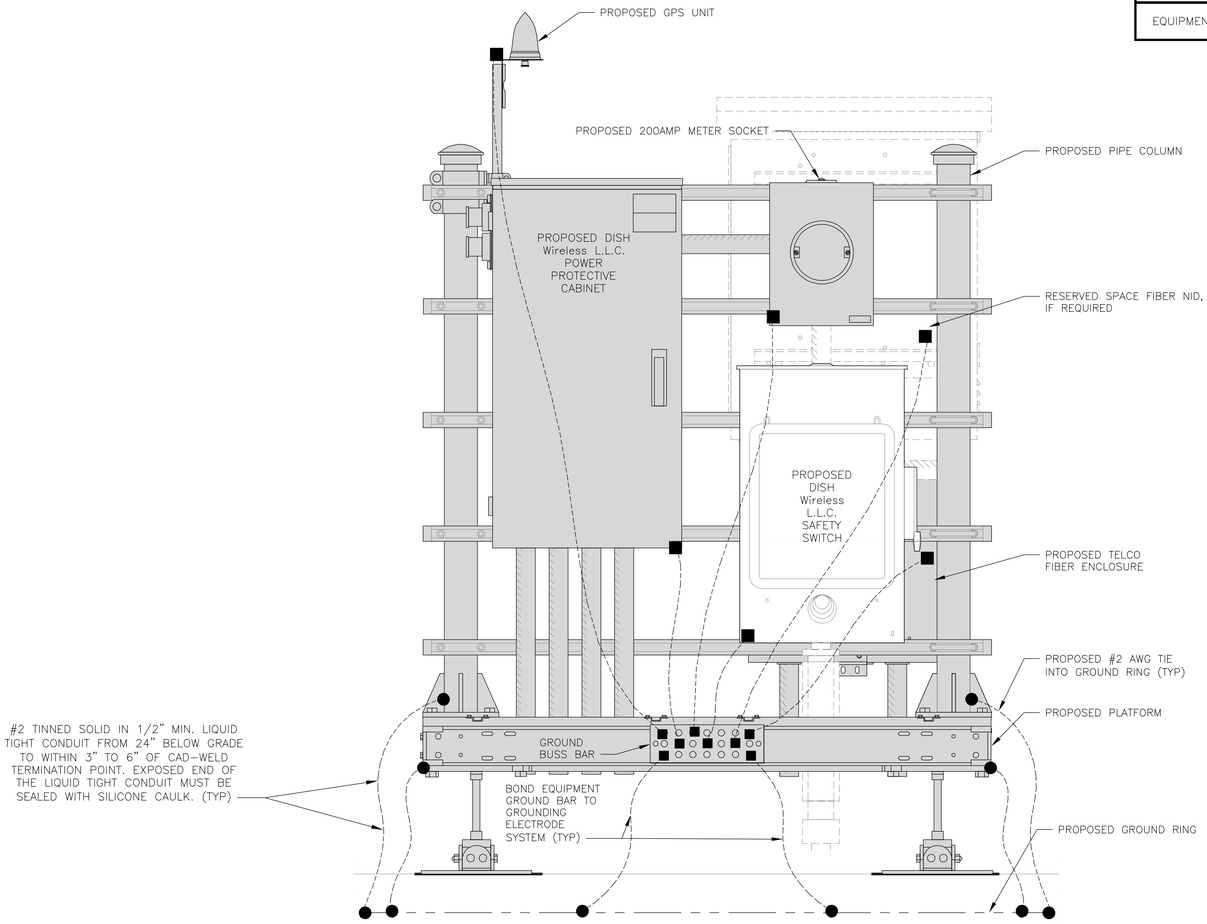
GROUNDING PLANS AND NOTES

SHEET NUMBER

G-1

NOTES

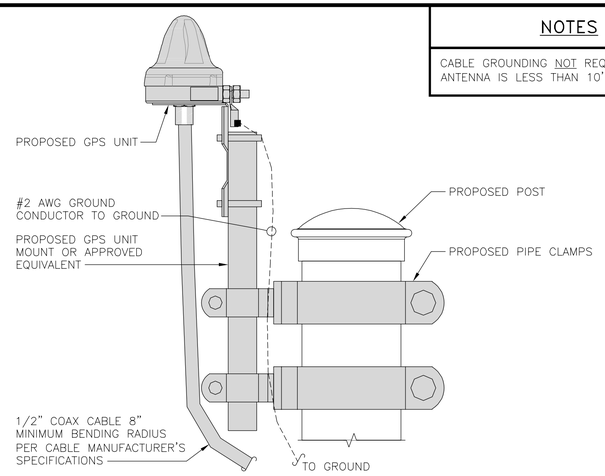
EQUIPMENT CABINET OMITTED FOR CLARITY



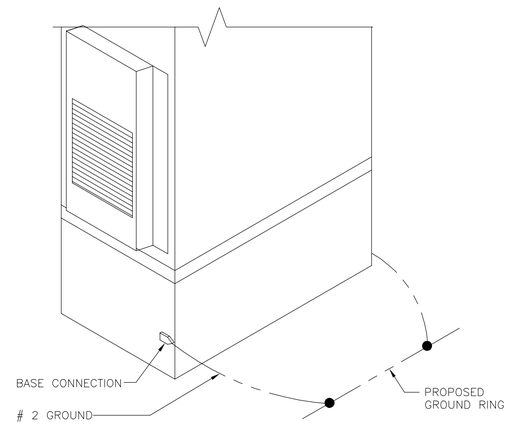
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

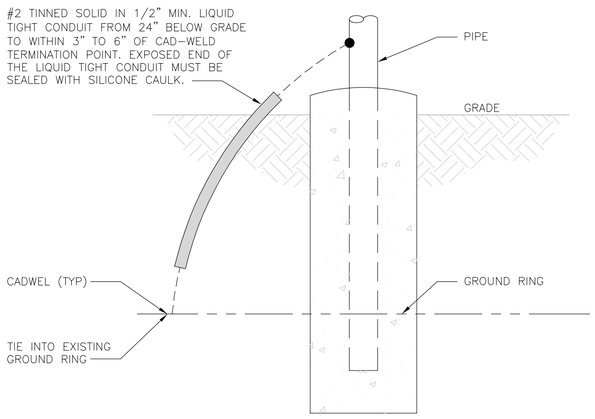
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



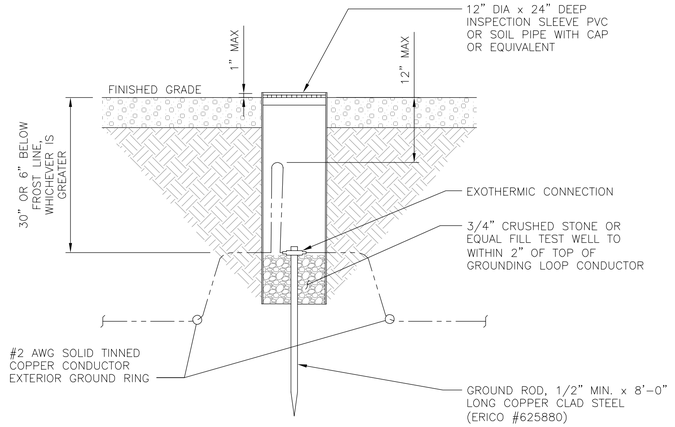
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



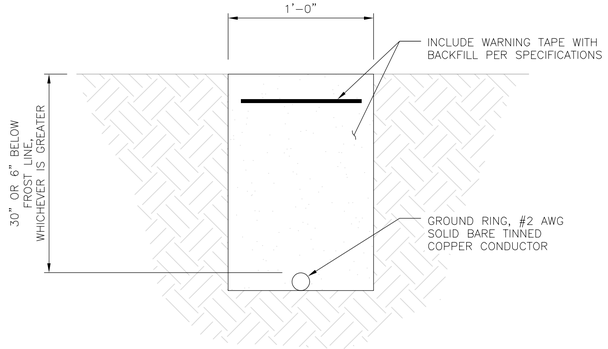
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



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



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

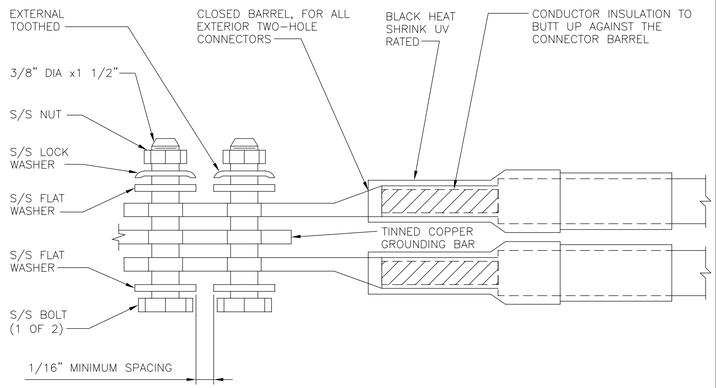
GROUNDING DETAILS

SHEET NUMBER

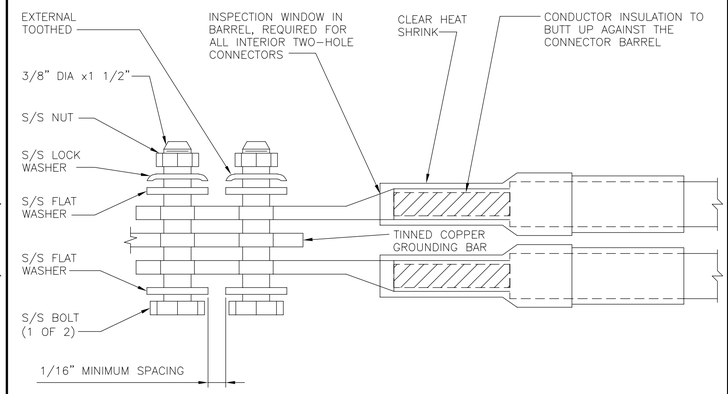
G-2

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).

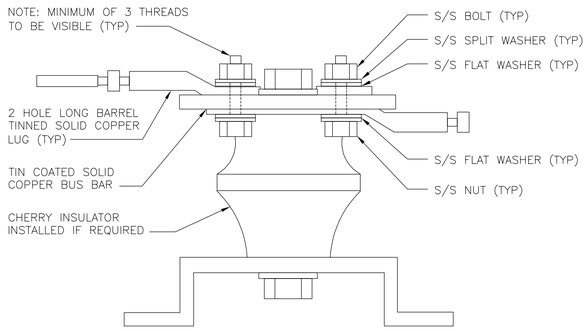
TYPICAL GROUNDING NOTES | NO SCALE | 1



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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

GROUNDING DETAILS

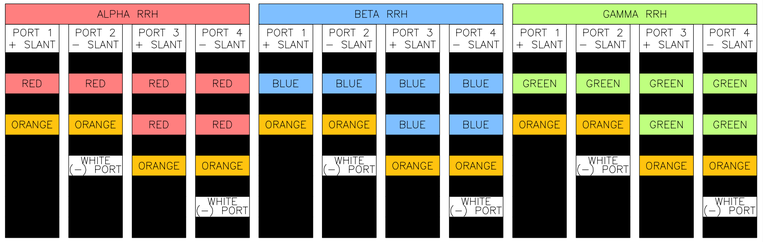
SHEET NUMBER

G-3

HYBRID/DISCREET CABLES — 3/4" TAPE WIDTHS WITH 3/4" SPACING

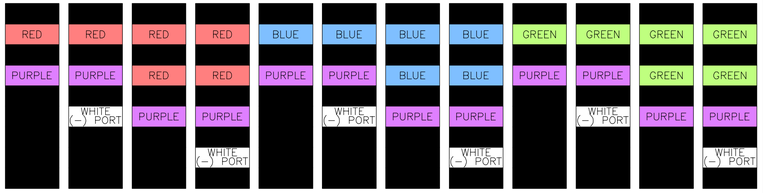
LOW–BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) – OPTIONAL PER MARKET

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)



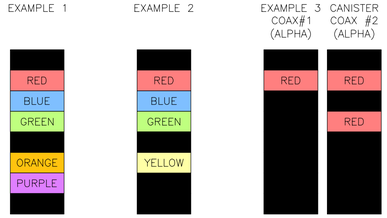
HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

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

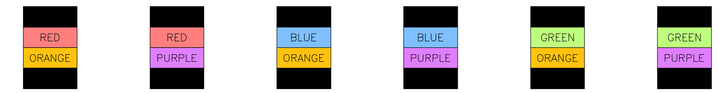
EXAMPLE 2 – HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.

EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.



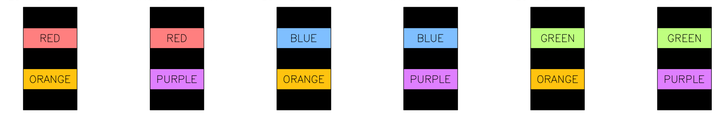
FIBER JUMPERS TO RRHs

LOW–BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.



POWER CABLES TO RRHs

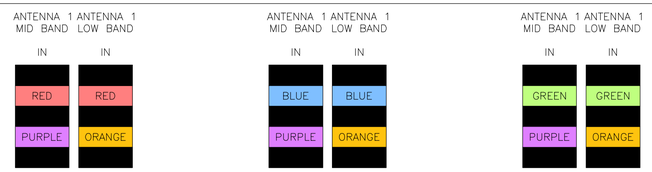
LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

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

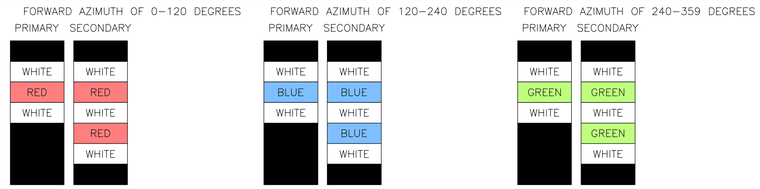
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.



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.



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

RF CABLE COLOR CODES | | 1

NOT USED | | 4

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

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 — T

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE — T

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE — GFCI

FLUORESCENT LIGHTING FIXTURE
(2) TWO LAMPS 48–T8 — F

SMOKE DETECTION (DC) — SD

EMERGENCY LIGHTING (DC)

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

CHAIN LINK FENCE — X — X — X — X

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE — W — W — W — W — W

UNDERGROUND POWER — UGP — UGP — UGP — UGP — UGP

UNDERGROUND TELCO — UGT — UGT — UGT — UGT — UGT

OVERHEAD POWER — OHP — OHP — OHP — OHP

OVERHEAD TELCO — OHT — OHT — OHT — OHT

UNDERGROUND TELCO/POWER — UGT/P — UGT/P — UGT/P — UGT/P

ABOVE GROUND POWER — AGP — AGP — AGP — AGP — AGP

ABOVE GROUND TELCO — AGT — AGT — AGT — AGT — AGT

ABOVE GROUND TELCO/POWER — AGT/P — AGT/P — AGT/P — AGT/P

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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SIGN TYPES		
TYPE	COLOR	COLOR CODE PURPOSE
INFORMATION	GREEN	"INFORMATIONAL SIGN" TO NOTIFY OTHERS OF SITE OWNERSHIP & CONTACT NUMBER AND POTENTIAL RF EXPOSURE.
NOTICE	BLUE	"NOTICE BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)
CAUTION	YELLOW	"CAUTION BEYOND THIS POINT" RF FIELDS BEYOND THIS POINT MAY EXCEED THE FCC GENERAL PUBLIC EXPOSURE LIMIT. OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)
WARNING	ORANGE/RED	"WARNING BEYOND THIS POINT" RF FIELDS AT THIS SITE EXCEED FCC RULES FOR HUMAN EXPOSURE. FAILURE TO OBEY ALL POSTED SIGNS AND SITE GUIDELINES FOR WORKING IN RF ENVIRONMENTS COULD RESULT IN SERIOUS INJURY. IN ACCORDANCE WITH FEDERAL COMMUNICATIONS COMMISSION RULES ON RADIO FREQUENCY EMISSIONS 47 CFR-1.1307(b)

SIGN PLACEMENT:

- RF SIGNAGE PLACEMENT SHALL FOLLOW THE RECOMMENDATIONS OF AN EXISTING EME REPORT, CREATED BY A THIRD PARTY PREVIOUSLY AUTHORIZED BY DISH Wireless L.L.C.
- INFORMATION SIGN (GREEN) SHALL BE LOCATED ON EXISTING DISH Wireless L.L.C EQUIPMENT.
  A) IF THE INFORMATION SIGN IS A STICKER, IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C EQUIPMENT CABINET.
  B) IF THE INFORMATION SIGH IS A METAL SIGN IT SHALL BE PLACED ON EXISTING DISH Wireless L.L.C H-FRAME WITH A SECURE ATTACH METHOD.
- IF EME REPORT IS NOT AVAILABLE AT THE TIME OF CREATION OF CONSTRUCTION DOCUMENTS; PLEASE CONTACT DISH Wireless L.L.C. CONSTRUCTION MANAGER FOR FURTHER INSTRUCTION ON HOW TO PROCEED.

NOTES:

1. FOR DISH Wireless L.L.C. LOGO, SEE DISH Wireless L.L.C. DESIGN SPECIFICATIONS (PROVIDED BY DISH Wireless L.L.C.)
2. SITE ID SHALL BE APPLIED TO SIGNS USING "LASER ENGRAVING" OR ANY OTHER WEATHER RESISTANT METHOD (DISH Wireless L.L.C. APPROVAL REQUIRED)
3. TEXT FOR SIGNAGE SHALL INDICATE CORRECT SITE NAME AND NUMBER AS PER DISH Wireless L.L.C. CONSTRUCTION MANAGER RECOMMENDATIONS.
4. CABINET/SHELTER MOUNTING APPLICATION REQUIRES ANOTHER PLATE APPLIED TO THE FACE OF THE CABINET WITH WATER PROOF POLYURETHANE ADHESIVE
5. ALL SIGNS WILL BE SECURED WITH EITHER STAINLESS STEEL ZIP TIES OR STAINLESS STEEL TECH SCREWS
6. ALL SIGNS TO BE 8.5"x11" AND MADE WITH 0.04" OF ALUMINUM MATERIAL

INFORMATION

This is an access point to an area with transmitting antennas.

Obey all signs and barriers beyond this point.
Call the DISH Wireless L.L.C. NOC at 1-866-624-6874

Site ID: _____

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

NOTICE

Transmitting Antenna(s)

Radio frequency fields beyond this point MAY *EXCEED* the FCC Occupational exposure limit.

Obey all posted signs and site guidelines for working in radio frequency environments.

Call the DISH Wireless L.L.C. NOC at 1-866-624-6874 prior to working beyond this point.

Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

⚠ CAUTION

Transmitting Antenna(s)

Radio frequency fields beyond this point MAY *EXCEED* the FCC Occupational exposure limit.

Obey all posted signs and site guidelines for working in radio frequency environments.

Call the DISH Wireless L.L.C. NOC at 1-866-624-6874 prior to working beyond this point.

Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

⚠ WARNING

Transmitting Antenna(s)

Radio frequency fields beyond this point *EXCEED* the FCC Occupational exposure limit.

Obey all posted signs and site guidelines for working in radio frequency environments.

Call the DISH Wireless L.L.C. NOC at 1-866-624-6874 prior to working beyond this point.

Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

RF SIGNAGE

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

RF SIGNAGE

SHEET NUMBER

GN-2

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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CONRSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

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.

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

06/07/2022

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	06/07/2022	ISSUED FOR CORNSTRUCTION

A&E PROJECT NUMBER

876311

DISH Wireless L.L.C.
PROJECT INFORMATION

BOHVN00163A
39 TOELLES RD
WALLINGFORD, CT 06492

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-5

Exhibit D

Structural Analysis Report

Date: **October 04, 2021**

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

Subject:	**Structural Analysis Report**	
Carrier Designation:	***DISH Network* Co-Locate**	
	Site Number:	BOHVN00163A
	Site Name:	CT-CCI-T-876311
Crown Castle Designation:	**BU Number:**	876311
	Site Name:	SUZIO CONCRETE
	JDE Job Number:	645171
	Work Order Number:	1966162
	Order Number:	553380 Rev. 0
Engineering Firm Designation:	**Crown Castle Project Number:**	1966162
Site Data:	**39 Toelles Rd, Wallingford, New Haven County, CT** **Latitude *41° 25' 44.62"*, Longitude *-72° 50' 54.81"*** **120 Foot - Monopole Tower**	

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

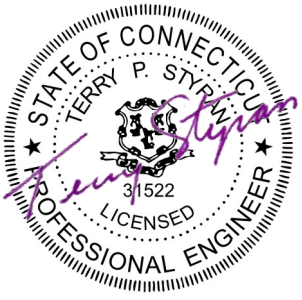
The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC5: Proposed Equipment Configuration **Sufficient Capacity - 31.3%**

This analysis utilizes an ultimate 3-second gust wind speed of 119 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Structural analysis prepared by: Randall Ashworth, EIT

Respectfully submitted by:



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

TABLE OF CONTENTS

1) INTRODUCTION

This tower is a 120 ft Monopole tower designed by Summit.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	119 mph
Exposure Category:	B
Topographic Factor:	1
Ice Thickness:	1 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)
106.0	106.0	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)
118.0	120.0	3	rfs celwave	APXVTM14-C-120 w/ Mount Pipe	1 3	5/8 1-1/4
	119.0	3	alcatel lucent	TD-RRH8X20-25		
		9	rfs celwave	ACU-A20-N		
		3	rfs celwave	APXVSPP18-C-A20 w/ Mount Pipe		
	118.0	1	tower mounts	Platform Mount [LP 1201-1_HR-1]		
114.0	115.0	3	alcatel lucent	800 EXTERNAL NOTCH FILTER	-	-
		3	alcatel lucent	RRH2X50-800		
	114.0	1	tower mounts	Pipe Mount [PM 601-3]		
	113.0	3	alcatel lucent	PCS 1900MHZ 4X45W-65MHZ		
69.0	71.0	1	kathrein	OG-860/1920/GPS-A w/ Mount Pipe	1	1/2
	69.0	1	tower mounts	Side Arm Mount [SO 701-1]		

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	1530925	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	1609567	CCISITES
4-TOWER MANUFACTURER DRAWINGS	2052194	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.

3.2) Assumptions

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

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

4) ANALYSIS RESULTS

Table 4 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	120 - 73.75	Pole	TP31.711x22.37x0.313	1	-12.500	1890.777	20.8	Pass
L2	73.75 - 42.75	Pole	TP37.346x30.278x0.375	2	-18.294	2671.021	26.5	Pass
L3	42.75 - 0	Pole	TP45.23x35.637x0.438	3	-30.643	3876.001	31.3	Pass
							Summary	
						Pole (L3)	31.3	Pass
						Rating =	31.3	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	27.0	Pass
1	Base Plate	0	27.4	Pass
1	Base Foundation (Structure)	0	16.9	Pass
1	Base Foundation (Soil Interaction)	0	30.8	Pass

Structure Rating (max from all components) =	31.3%

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

4.1) Recommendations

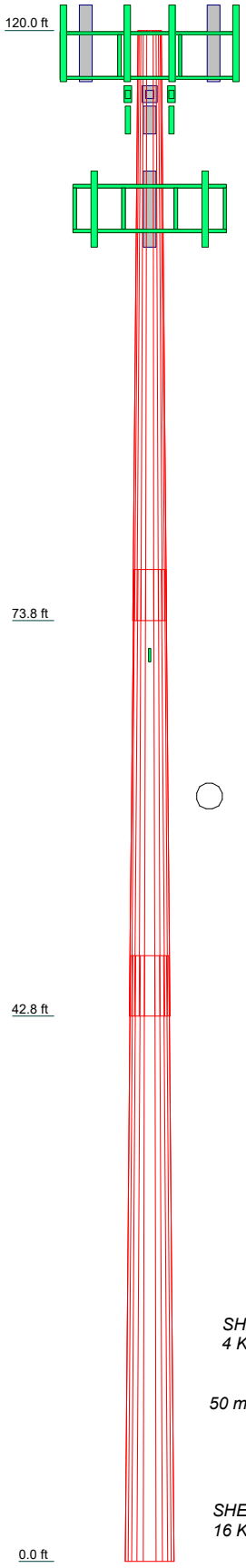
The tower and its foundation have sufficient capacity to carry the proposed load configuration. No modifications are required at this time.

APPENDIX A

TNXTOWER OUTPUT

Section	1	2	3
Length (ft)	46.250	35.000	47.500
Number of Sides	12	12	12
Thickness (in)	0.313	0.375	0.438
Socket Length (ft)	4.000	4.750	
Top Dia (in)	22.370	30.278	35.637
Bot Dia (in)	31.711	37.346	45.230
Grade		A607-65	
Weight (K)	4.2	4.8	9.1

18.1



ALL REACTIONS ARE FACTORED

AXIAL 41 K
SHEAR 4 K
MOMENT 334 kip-ft
TORQUE 0 kip-ft
50 mph WIND - 1.000 in ICE

AXIAL 31 K
SHEAR 16 K
MOMENT 1257 kip-ft
TORQUE 0 kip-ft
REACTIONS - 119 mph WIND

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A607-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in New Haven County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 119 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 31.3%

CROWN CASTLE
The Pathway to Possible

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

Job: ***BU# 876311***			
Project:			
Client: Crown Castle	Drawn by: Rashworth		App'd:
Code: TIA-222-H	Date: 10/04/21		Scale: NTS
Path: C:\NEW Directory\876311\WO 1966162 - SA\Prod\876311_RPA.eri			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 New Haven County, Connecticut.
- Tower base elevation above sea level: 20.000 ft.
- Basic wind speed of 119 mph.
- Risk Category II.
- Exposure Category B.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- Nominal ice thickness of 1.000 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.000 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.000 °F.
- Deflections calculated using a wind speed of 60 mph.
- 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

Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	120.000-73.750	46.250	4.000	12	22.370	31.711	0.313	1.250	A607-65 (65 ksi)
L2	73.750-42.750	35.000	4.750	12	30.278	37.346	0.375	1.500	A607-65 (65 ksi)
L3	42.750-0.000	47.500		12	35.637	45.230	0.438	1.750	A607-65 (65 ksi)

Tapered Pole Properties

Section	Tip Dia. in	Area in^2	I in^4	r in	C in	I/C in^3	J in^4	It/Q in^2	w in	w/t
L1	23.049	22.195	1378.354	7.897	11.588	118.950	2792.918	10.924	5.158	16.505
	32.719	31.595	3975.745	11.241	16.426	242.035	8055.938	15.550	7.661	24.515
L2	32.050	36.108	4121.194	10.705	15.684	262.763	8350.656	17.771	7.110	18.959
	38.531	44.642	7788.551	13.236	19.345	402.608	15781.716	21.972	9.004	24.01
L3	37.733	49.587	7841.905	12.601	18.460	424.809	15889.825	24.405	8.378	19.15
	46.671	63.101	16159.793	16.036	23.429	689.731	32744.121	31.057	10.949	25.027

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
L1 120.000-73.750				1	1	1			
L2 73.750-42.750				1	1	1			
L3 42.750-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Start/End Position	Width or Diameter in	Perimeter in	Weight klf
*** CU12PSM9P6XXX(1-1/2) *** ***	B	No	Surface Ar (CaAa)	106.000 - 0.000	1	1	-0.200 -0.200	1.600		0.002

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		C_AA_A ft^2/ft	Weight klf
LDF4-50A(1/2)	A	No	No	Inside Pole	69.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
FIBER ONLY CABLE 16(5/8)	A	No	No	Inside Pole	118.000 - 0.000	1	No Ice	0.000	0.000
							1/2" Ice	0.000	0.000
							1" Ice	0.000	0.000
HB114-1-0813U4-M5J(1-1/4)	A	No	No	Inside Pole	118.000 - 0.000	3	No Ice	0.000	0.001
							1/2" Ice	0.000	0.001
							1" Ice	0.000	0.001

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	C_AA_A ft^2/ft	Weight klf
***								
***								

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-73.750	A	0.000	0.000	0.000	0.000	0.170
		B	0.000	0.000	5.160	0.000	0.076
		C	0.000	0.000	0.000	0.000	0.000
L2	73.750-42.750	A	0.000	0.000	0.000	0.000	0.123
		B	0.000	0.000	4.960	0.000	0.073
		C	0.000	0.000	0.000	0.000	0.000
L3	42.750-0.000	A	0.000	0.000	0.000	0.000	0.171
		B	0.000	0.000	6.840	0.000	0.100
		C	0.000	0.000	0.000	0.000	0.000

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
L1	120.000-73.750	A	0.946	0.000	0.000	0.000	0.000	0.170
		B		0.000	0.000	11.260	0.000	0.171
		C		0.000	0.000	0.000	0.000	0.000
L2	73.750-42.750	A	0.899	0.000	0.000	0.000	0.000	0.123
		B		0.000	0.000	10.823	0.000	0.164
		C		0.000	0.000	0.000	0.000	0.000
L3	42.750-0.000	A	0.811	0.000	0.000	0.000	0.000	0.171
		B		0.000	0.000	14.530	0.000	0.218
		C		0.000	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	120.000-73.750	0.425	-0.585	0.668	-0.919
L2	73.750-42.750	0.570	-0.785	0.906	-1.246
L3	42.750-0.000	0.571	-0.786	0.899	-1.238

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	5	CU12PSM9P6XXX(1-1/2)	73.75 - 106.00	1.0000	1.0000
L2	5	CU12PSM9P6XXX(1-1/2)	42.75 - 73.75	1.0000	1.0000
L3	5	CU12PSM9P6XXX(1-1/2)	0.00 - 42.75	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.600 5.050 5.500	4.010 4.450 4.890	0.095 0.160 0.235
APXVTM14-C-120 w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.090 4.480 4.880	2.860 3.230 3.610	0.077 0.127 0.185
APXVTM14-C-120 w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.090 4.480 4.880	2.860 3.230 3.610	0.077 0.127 0.185
APXVTM14-C-120 w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.090 4.480 4.880	2.860 3.230 3.610	0.077 0.127 0.185
(3) ACU-A20-N	A	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
(3) ACU-A20-N	B	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
(3) ACU-A20-N	C	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	0.067 0.104 0.148	0.117 0.162 0.215	0.001 0.002 0.004
TD-RRH8X20-25	A	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8X20-25	B	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice 1" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128
TD-RRH8X20-25	C	From Leg	4.000 0.000 1.000	0.000	118.000	No Ice 1/2" Ice	4.045 4.298 4.557	1.535 1.714 1.901	0.070 0.097 0.128

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
						1" Ice			
Platform Mount [LP 1201-1_HR-1]	C	None		0.000	118.000	No Ice	26.390	26.390	2.356
						1/2" Ice	31.400	31.400	3.061
						1" Ice	36.200	36.200	3.864
(3) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	118.000	No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
(3) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	118.000	No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
(3) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	118.000	No Ice	1.900	1.900	0.029
						1/2" Ice	2.728	2.728	0.044
						1" Ice	3.401	3.401	0.063
***									
RRH2X50-800	A	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	1.701	1.282	0.053
						1/2" Ice	1.864	1.428	0.070
						1" Ice	2.035	1.580	0.090
RRH2X50-800	B	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	1.701	1.282	0.053
						1/2" Ice	1.864	1.428	0.070
						1" Ice	2.035	1.580	0.090
RRH2X50-800	C	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	1.701	1.282	0.053
						1/2" Ice	1.864	1.428	0.070
						1" Ice	2.035	1.580	0.090
PCS 1900MHZ 4X45W-65MHZ	A	From Leg	1.000 0.000 -1.000	0.000	114.000	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
PCS 1900MHZ 4X45W-65MHZ	B	From Leg	1.000 0.000 -1.000	0.000	114.000	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
PCS 1900MHZ 4X45W-65MHZ	C	From Leg	1.000 0.000 -1.000	0.000	114.000	No Ice	2.322	2.238	0.060
						1/2" Ice	2.527	2.441	0.083
						1" Ice	2.739	2.651	0.110
800 EXTERNAL NOTCH FILTER	A	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	B	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
800 EXTERNAL NOTCH FILTER	C	From Leg	1.000 0.000 1.000	0.000	114.000	No Ice	0.660	0.321	0.011
						1/2" Ice	0.763	0.398	0.017
						1" Ice	0.873	0.483	0.024
Pipe Mount [PM 601-3]	C	None		0.000	114.000	No Ice	3.170	3.170	0.195
						1/2" Ice	3.790	3.790	0.232
						1" Ice	4.420	4.420	0.279
***									
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice	8.010	4.230	0.108
						1/2" Ice	8.520	4.690	0.194
						1" Ice	9.040	5.160	0.292
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000	0.000	106.000	No Ice	8.010	4.230	0.108
						1/2" Ice	8.520	4.690	0.194

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.000			Ice	9.040	5.160	0.292
						1" Ice			
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	8.010 8.520 9.040	4.230 4.690 5.160	0.108 0.194 0.292
TA08025-B604	A	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B604	B	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	0.981 1.112 1.250	0.064 0.081 0.100
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.964 2.138 2.320	1.129 1.267 1.411	0.075 0.093 0.114
RDIDC-9181-PF-48	A	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	2.312 2.502 2.700	1.293 1.448 1.610	0.022 0.041 0.063
Commscope MC-PK8-DSH	C	None		0.000	106.000	No Ice 1/2" Ice 1" Ice	34.240 62.950 91.660	34.240 62.950 91.660	1.749 2.099 2.450
(2) 8' x 2" Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	106.000	No Ice 1/2" Ice 1" Ice	1.900 2.728 3.401	1.900 2.728 3.401	0.029 0.044 0.063
***									
OG-860/1920/GPS-A w/ Mount Pipe	C	From Face	1.500 0.000 2.000	0.000	69.000	No Ice 1/2" Ice 1" Ice	0.540 0.753 0.985	0.540 0.753 0.985	0.009 0.017 0.027
Side Arm Mount [SO 701-1]	C	From Face	3.000 0.000 0.000	0.000	69.000	No Ice 1/2" Ice 1" Ice	0.850 1.140 1.430	1.670 2.340 3.010	0.065 0.079 0.093

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
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	120 - 73.75	Pole	Max Tension	36	0.000	-0.000	-0.000
			Max. Compression	26	-18.925	-0.184	0.438
			Max. Mx	8	-12.501	-279.575	0.180
			Max. My	2	-12.500	-0.094	280.522
			Max. Vy	8	9.326	-279.575	0.180
			Max. Vx	14	9.356	-0.094	-280.150
			Max. Torque	21			-0.188
L2	73.75 -	Pole	Max Tension	1	0.000	0.000	0.000

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
	42.75						
			Max. Compression	26	-26.120	-0.397	0.034
			Max. Mx	8	-18.294	-601.763	-0.124
			Max. My	14	-18.294	-0.202	-602.886
			Max. Vy	8	11.917	-601.763	-0.124
			Max. Vx	14	11.920	-0.202	-602.886
			Max. Torque	21			-0.188
L3	42.75 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	26	-40.598	-0.797	0.265
			Max. Mx	8	-30.643	-1256.141	-0.008
			Max. My	14	-30.643	-0.408	-1257.109
			Max. Vy	8	15.642	-1256.141	-0.008
			Max. Vx	14	15.645	-0.408	-1257.109
			Max. Torque	21			0.092

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	29	40.598	-3.442	1.986
	Max. H_x	20	30.650	15.628	0.000
	Max. H_z	2	30.650	0.000	15.631
	Max. M_x	2	1257.094	0.000	15.631
	Max. M_z	8	1256.141	-15.628	0.000
	Max. Torsion	21	0.092	15.628	0.000
	Min. Vert	19	22.987	13.534	-7.816
	Min. H_x	8	30.650	-15.628	0.000
	Min. H_z	14	30.650	0.000	-15.631
	Min. M_x	14	-1257.109	0.000	-15.631
	Min. M_z	20	-1255.325	15.628	0.000
	Min. Torsion	9	-0.092	-15.628	0.000

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	25.541	0.000	0.000	0.005	-0.330	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	30.650	0.000	-15.631	-1257.094	-0.408	-0.000
0.9 Dead+1.0 Wind 0 deg - No Ice	22.987	0.000	-15.631	-1248.455	-0.304	-0.000
1.2 Dead+1.0 Wind 30 deg - No Ice	30.650	7.814	-13.537	-1088.675	-628.275	0.046
0.9 Dead+1.0 Wind 30 deg - No Ice	22.987	7.814	-13.537	-1081.193	-623.857	0.046
1.2 Dead+1.0 Wind 60 deg - No Ice	30.650	13.534	-7.816	-628.544	-1087.905	0.080
0.9 Dead+1.0 Wind 60 deg - No Ice	22.987	13.534	-7.816	-624.225	-1080.330	0.080
1.2 Dead+1.0 Wind 90 deg - No Ice	30.650	15.628	0.000	0.008	-1256.141	0.092
0.9 Dead+1.0 Wind 90 deg - No Ice	22.987	15.628	0.000	0.005	-1247.410	0.092
1.2 Dead+1.0 Wind 120 deg - No Ice	30.650	13.534	7.816	628.559	-1087.905	0.079
0.9 Dead+1.0 Wind 120 deg - No Ice	22.987	13.534	7.816	624.236	-1080.330	0.079
1.2 Dead+1.0 Wind 150 deg - No Ice	30.650	7.814	13.537	1088.690	-628.275	0.046

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 150 deg - No Ice	22.987	7.814	13.537	1081.204	-623.857	0.046
1.2 Dead+1.0 Wind 180 deg - No Ice	30.650	0.000	15.631	1257.109	-0.408	0.000
0.9 Dead+1.0 Wind 180 deg - No Ice	22.987	0.000	15.631	1248.466	-0.304	0.000
1.2 Dead+1.0 Wind 210 deg - No Ice	30.650	-7.814	13.537	1088.690	627.459	-0.046
0.9 Dead+1.0 Wind 210 deg - No Ice	22.987	-7.814	13.537	1081.204	623.249	-0.046
1.2 Dead+1.0 Wind 240 deg - No Ice	30.650	-13.534	7.816	628.559	1087.090	-0.079
0.9 Dead+1.0 Wind 240 deg - No Ice	22.987	-13.534	7.816	624.236	1079.723	-0.079
1.2 Dead+1.0 Wind 270 deg - No Ice	30.650	-15.628	0.000	0.008	1255.325	-0.092
0.9 Dead+1.0 Wind 270 deg - No Ice	22.987	-15.628	0.000	0.005	1246.803	-0.092
1.2 Dead+1.0 Wind 300 deg - No Ice	30.650	-13.534	-7.816	-628.544	1087.090	-0.080
0.9 Dead+1.0 Wind 300 deg - No Ice	22.987	-13.534	-7.816	-624.225	1079.723	-0.080
1.2 Dead+1.0 Wind 330 deg - No Ice	30.650	-7.814	-13.537	-1088.675	627.459	-0.046
0.9 Dead+1.0 Wind 330 deg - No Ice	22.987	-7.814	-13.537	-1081.193	623.249	-0.046
1.2 Dead+1.0 Ice+1.0 Temp	40.598	0.000	0.000	-0.265	-0.797	0.000
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	40.598	0.000	-3.971	-333.821	-0.831	-0.000
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	40.598	1.987	-3.439	-289.135	-167.598	0.023
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	40.598	3.442	-1.986	-167.051	-289.680	0.039
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	40.598	3.974	-0.000	-0.280	-334.366	0.045
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	40.598	3.442	1.986	166.490	-289.680	0.039
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	40.598	1.987	3.439	288.574	-167.598	0.023
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	40.598	0.000	3.971	333.260	-0.831	0.000
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	40.598	-1.987	3.439	288.574	165.936	-0.023
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	40.598	-3.442	1.986	166.490	288.018	-0.039
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	40.598	-3.974	-0.000	-0.280	332.703	-0.045
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	40.598	-3.442	-1.986	-167.051	288.018	-0.039
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	40.598	-1.987	-3.439	-289.135	165.936	-0.023
Dead+Wind 0 deg - Service	25.541	0.000	-3.743	-299.663	-0.338	-0.000
Dead+Wind 30 deg - Service	25.541	1.871	-3.241	-259.515	-150.010	0.011
Dead+Wind 60 deg - Service	25.541	3.241	-1.871	-149.828	-259.577	0.019
Dead+Wind 90 deg - Service	25.541	3.742	0.000	0.006	-299.682	0.022
Dead+Wind 120 deg - Service	25.541	3.241	1.871	149.841	-259.577	0.019
Dead+Wind 150 deg - Service	25.541	1.871	3.241	259.527	-150.010	0.011
Dead+Wind 180 deg - Service	25.541	0.000	3.743	299.675	-0.338	0.000
Dead+Wind 210 deg - Service	25.541	-1.871	3.241	259.527	149.333	-0.011
Dead+Wind 240 deg - Service	25.541	-3.241	1.871	149.841	258.901	-0.019
Dead+Wind 270 deg - Service	25.541	-3.742	0.000	0.006	299.005	-0.022
Dead+Wind 300 deg - Service	25.541	-3.241	-1.871	-149.828	258.901	-0.019

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
Dead+Wind 330 deg - Service	25.541	-1.871	-3.241	-259.515	149.333	-0.011

Solution Summary

Load Comb.	Sum of Applied Forces PX K	PY K	PZ K	Sum of Reactions PX K	PY K	PZ K	% Error
1	0.000	-25.541	0.000	0.000	25.541	0.000	0.000%
2	0.000	-30.650	-15.631	0.000	30.650	15.631	0.000%
3	0.000	-22.987	-15.631	0.000	22.987	15.631	0.000%
4	7.814	-30.650	-13.537	-7.814	30.650	13.537	0.000%
5	7.814	-22.987	-13.537	-7.814	22.987	13.537	0.000%
6	13.534	-30.650	-7.816	-13.534	30.650	7.816	0.000%
7	13.534	-22.987	-7.816	-13.534	22.987	7.816	0.000%
8	15.628	-30.650	0.000	-15.628	30.650	0.000	0.000%
9	15.628	-22.987	0.000	-15.628	22.987	0.000	0.000%
10	13.534	-30.650	7.816	-13.534	30.650	-7.816	0.000%
11	13.534	-22.987	7.816	-13.534	22.987	-7.816	0.000%
12	7.814	-30.650	13.537	-7.814	30.650	-13.537	0.000%
13	7.814	-22.987	13.537	-7.814	22.987	-13.537	0.000%
14	0.000	-30.650	15.631	0.000	30.650	-15.631	0.000%
15	0.000	-22.987	15.631	0.000	22.987	-15.631	0.000%
16	-7.814	-30.650	13.537	7.814	30.650	-13.537	0.000%
17	-7.814	-22.987	13.537	7.814	22.987	-13.537	0.000%
18	-13.534	-30.650	7.816	13.534	30.650	-7.816	0.000%
19	-13.534	-22.987	7.816	13.534	22.987	-7.816	0.000%
20	-15.628	-30.650	0.000	15.628	30.650	0.000	0.000%
21	-15.628	-22.987	0.000	15.628	22.987	0.000	0.000%
22	-13.534	-30.650	-7.816	13.534	30.650	7.816	0.000%
23	-13.534	-22.987	-7.816	13.534	22.987	7.816	0.000%
24	-7.814	-30.650	-13.537	7.814	30.650	13.537	0.000%
25	-7.814	-22.987	-13.537	7.814	22.987	13.537	0.000%
26	0.000	-40.598	0.000	0.000	40.598	0.000	0.000%
27	0.000	-40.598	-3.971	-0.000	40.598	3.971	0.000%
28	1.987	-40.598	-3.439	-1.987	40.598	3.439	0.000%
29	3.442	-40.598	-1.986	-3.442	40.598	1.986	0.000%
30	3.974	-40.598	0.000	-3.974	40.598	0.000	0.000%
31	3.442	-40.598	1.986	-3.442	40.598	-1.986	0.000%
32	1.987	-40.598	3.439	-1.987	40.598	-3.439	0.000%
33	0.000	-40.598	3.971	-0.000	40.598	-3.971	0.000%
34	-1.987	-40.598	3.439	1.987	40.598	-3.439	0.000%
35	-3.442	-40.598	1.986	3.442	40.598	-1.986	0.000%
36	-3.974	-40.598	0.000	3.974	40.598	0.000	0.000%
37	-3.442	-40.598	-1.986	3.442	40.598	1.986	0.000%
38	-1.987	-40.598	-3.439	1.987	40.598	3.439	0.000%
39	0.000	-25.541	-3.743	0.000	25.541	3.743	0.000%
40	1.871	-25.541	-3.241	-1.871	25.541	3.241	0.000%
41	3.241	-25.541	-1.871	-3.241	25.541	1.871	0.000%
42	3.742	-25.541	0.000	-3.742	25.541	0.000	0.000%
43	3.241	-25.541	1.871	-3.241	25.541	-1.871	0.000%
44	1.871	-25.541	3.241	-1.871	25.541	-3.241	0.000%
45	0.000	-25.541	3.743	0.000	25.541	-3.743	0.000%
46	-1.871	-25.541	3.241	1.871	25.541	-3.241	0.000%
47	-3.241	-25.541	1.871	3.241	25.541	-1.871	0.000%
48	-3.742	-25.541	0.000	3.742	25.541	0.000	0.000%
49	-3.241	-25.541	-1.871	3.241	25.541	1.871	0.000%
50	-1.871	-25.541	-3.241	1.871	25.541	3.241	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00005376
3	Yes	4	0.00000001	0.00002677
4	Yes	5	0.00000001	0.00004630
5	Yes	4	0.00000001	0.00087095
6	Yes	5	0.00000001	0.00004601
7	Yes	4	0.00000001	0.00086546
8	Yes	4	0.00000001	0.00005654
9	Yes	4	0.00000001	0.00002937
10	Yes	5	0.00000001	0.00004632
11	Yes	4	0.00000001	0.00087141
12	Yes	5	0.00000001	0.00004613
13	Yes	4	0.00000001	0.00086772
14	Yes	4	0.00000001	0.00005376
15	Yes	4	0.00000001	0.00002677
16	Yes	5	0.00000001	0.00004606
17	Yes	4	0.00000001	0.00086667
18	Yes	5	0.00000001	0.00004626
19	Yes	4	0.00000001	0.00087056
20	Yes	4	0.00000001	0.00005650
21	Yes	4	0.00000001	0.00002936
22	Yes	5	0.00000001	0.00004595
23	Yes	4	0.00000001	0.00086461
24	Yes	5	0.00000001	0.00004623
25	Yes	4	0.00000001	0.00086990
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00079334
28	Yes	4	0.00000001	0.00083019
29	Yes	4	0.00000001	0.00083002
30	Yes	4	0.00000001	0.00079365
31	Yes	4	0.00000001	0.00082879
32	Yes	4	0.00000001	0.00082807
33	Yes	4	0.00000001	0.00079109
34	Yes	4	0.00000001	0.00082538
35	Yes	4	0.00000001	0.00082497
36	Yes	4	0.00000001	0.00078956
37	Yes	4	0.00000001	0.00082620
38	Yes	4	0.00000001	0.00082751
39	Yes	4	0.00000001	0.00001021
40	Yes	4	0.00000001	0.00002551
41	Yes	4	0.00000001	0.00002523
42	Yes	4	0.00000001	0.00001025
43	Yes	4	0.00000001	0.00002557
44	Yes	4	0.00000001	0.00002534
45	Yes	4	0.00000001	0.00001021
46	Yes	4	0.00000001	0.00002522
47	Yes	4	0.00000001	0.00002548
48	Yes	4	0.00000001	0.00001023
49	Yes	4	0.00000001	0.00002515
50	Yes	4	0.00000001	0.00002539

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 73.75	7.431	40	0.506	0.000
L2	77.75 - 42.75	3.292	44	0.390	0.000
L3	47.5 - 0	1.252	44	0.241	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	APXVSPP18-C-A20 w/ Mount Pipe	40	7.222	0.502	0.000	103732
114.000	RRH2X50-800	44	6.803	0.494	0.000	86444
106.000	MX08FRO665-21 w/ Mount Pipe	44	5.974	0.476	0.000	37047
69.000	OG-860/1920/GPS-A w/ Mount Pipe	44	2.593	0.351	0.000	10932

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	120 - 73.75	31.213	2	2.126	0.001
L2	77.75 - 42.75	13.819	14	1.639	0.000
L3	47.5 - 0	5.254	14	1.010	0.000

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
118.000	APXVSPP18-C-A20 w/ Mount Pipe	2	30.332	2.109	0.001	24757
114.000	RRH2X50-800	14	28.573	2.073	0.000	20631
106.000	MX08FRO665-21 w/ Mount Pipe	14	25.089	2.000	0.000	8841
69.000	OG-860/1920/GPS-A w/ Mount Pipe	14	10.885	1.476	0.000	2605

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
L1	120 - 73.75 (1)	TP31.711x22.37x0.313	46.250	0.000	0.0	30.782	-12.500	1800.740	0.007
L2	73.75 - 42.75 (2)	TP37.346x30.278x0.375	35.000	0.000	0.0	43.484	-18.294	2543.830	0.007
L3	42.75 - 0 (3)	TP45.23x35.637x0.438	47.500	0.000	0.0	63.101	-30.643	3691.430	0.008

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	120 - 73.75 (1)	TP31.711x22.37x0.313	280.522	1331.083	0.211	0.000	1331.083	0.000
L2	73.75 - 42.75 (2)	TP37.346x30.278x0.375	602.886	2228.717	0.271	0.000	2228.717	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 $\frac{M_{uy}}{\phi M_{ny}}$
L3	42.75 - 0 (3)	TP45.23x35.637x0.438	1257.108	3929.292	0.320	0.000	3929.292	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	120 - 73.75 (1)	TP31.711x22.37x0.313	9.356	540.221	0.017	0.000	1453.650	0.000
L2	73.75 - 42.75 (2)	TP37.346x30.278x0.375	11.921	763.148	0.016	0.000	2417.425	0.000
L3	42.75 - 0 (3)	TP45.23x35.637x0.438	15.645	1107.430	0.014	0.000	4363.367	0.000

Pole Interaction Design Data

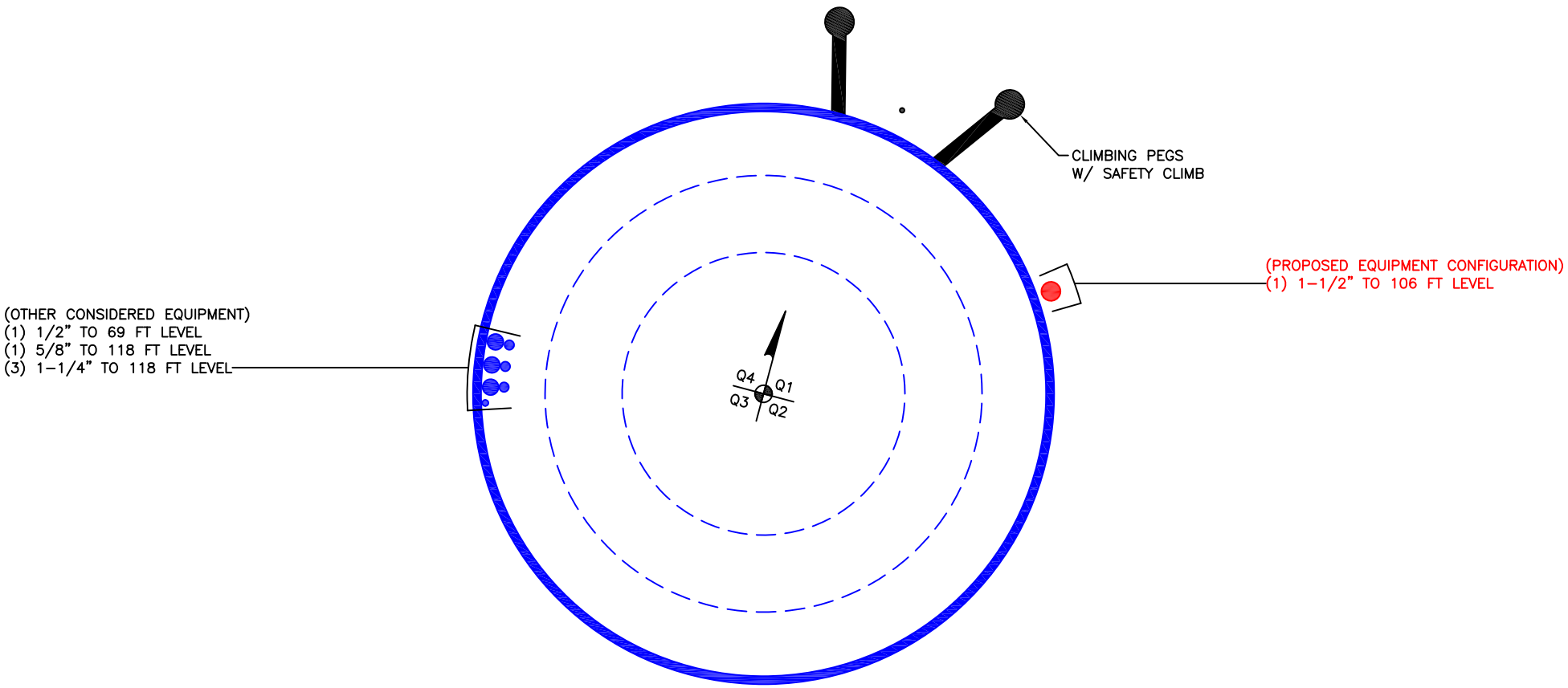
Section No.	Elevation ft	Ratio $\frac{P_u}{\phi P_n}$	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	Ratio $\frac{M_{uy}}{\phi M_{ny}}$	Ratio $\frac{V_u}{\phi V_n}$	Ratio $\frac{T_u}{\phi T_n}$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	120 - 73.75 (1)	0.007	0.211	0.000	0.017	0.000	0.218	1.050	4.8.2
L2	73.75 - 42.75 (2)	0.007	0.271	0.000	0.016	0.000	0.278	1.050	4.8.2
L3	42.75 - 0 (3)	0.008	0.320	0.000	0.014	0.000	0.328	1.050	4.8.2

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	120 - 73.75	Pole	TP31.711x22.37x0.313	1	-12.500	1890.777	20.8	Pass
L2	73.75 - 42.75	Pole	TP37.346x30.278x0.375	2	-18.294	2671.021	26.5	Pass
L3	42.75 - 0	Pole	TP45.23x35.637x0.438	3	-30.643	3876.001	31.3	Pass
							Summary	
						Pole (L3)	31.3	Pass
						RATING =	**31.3**	**Pass**

APPENDIX B

BASE LEVEL DRAWING


CLIMBING PEGS
W/ SAFETY CLIMB
(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1–1/2" TO 106 FT LEVEL
(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 69 FT LEVEL
(1) 5/8" TO 118 FT LEVEL
(3) 1–1/4" TO 118 FT LEVEL
Q4
Q1
Q3
Q2

APPENDIX C

ADDITIONAL CALCULATIONS

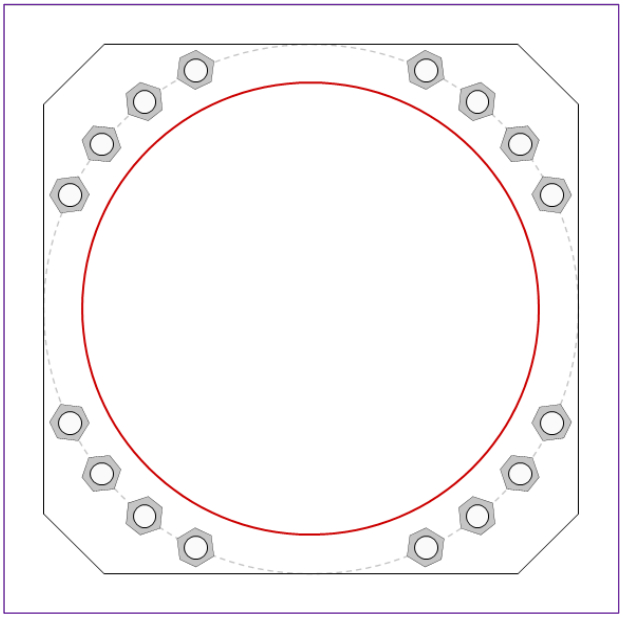
Monopole Base Plate Connection

Site Info	
BU #	876311
Site Name	SUZIO CONCRETE
Order #	553380 Rev 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
l_{ar} (in)	0.5

Applied Loads	
Moment (kip-ft)	1257.11
Axial Force (kips)	30.64
Shear Force (kips)	15.64

**TIA-222-H Section 15.5 Applied*



Connection Properties

Anchor Rod Data

(16) 2-1/4" ø bolts (A615-75 N; Fy=75 ksi, Fu=100 ksi) on 53" BC

Anchor Spacing: 6 in

Base Plate Data

53" W x 3" Plate (A572-50; Fy=50 ksi, Fu=65 ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

45.23" x 0.4375" 12-sided pole (A607-65; Fy=65 ksi, Fu=80 ksi)

Analysis Results

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

Pu_t = 69.19	ϕPn_t = 243.75	**Stress Rating**
Vu = 0.98	ϕVn = 149.1	**27.0%**
Mu = n/a	ϕMn = n/a	**Pass**

Base Plate Summary

Max Stress (ksi):	12.94	(Flexural)
Allowable Stress (ksi):	45	
Stress Rating:	**27.4%**	**Pass**

Pier and Pad Foundation

BU # :	876311
Site Name:	SUZIO CONCRET
Order Number:	553380 Rev 0

TIA-222 Revision:	H
Tower Type:	Monopole

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

Superstructure Analysis Reactions		
Compression, P_{comp}:	30.64	kips
Base Shear, Vu_comp:	15.64	kips
Moment, M_u:	1257.11	ft-kips
Tower Height, **H**:	120	ft
BP Dist. Above Fdn, bp_{dist}:	2.75	in

Pier Properties		
Pier Shape:	Square	
Pier Diameter, **dpier**:	7	ft
Ext. Above Grade, **E**:	0.5	ft
Pier Rebar Size, **Sc**:	11	
Pier Rebar Quantity, **mc**:	32	
Pier Tie/Spiral Size, **St**:	5	
Pier Tie/Spiral Quantity, **mt**:	12	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, cc_{pier}:	3	in

Pad Properties		
Depth, **D**:	8.5	ft
Pad Width, W_1:	28	ft
Pad Thickness, **T**:	4	ft
Pad Rebar Size (Bottom dir. 2), Sp_2:	11	
Pad Rebar Quantity (Bottom dir. 2), mp_2:	28	
Pad Clear Cover, cc_{pad}:	3	in

Material Properties		
Rebar Grade, **Fy**:	60	ksi
Concrete Compressive Strength, **F'c**:	3	ksi
Dry Concrete Density, δ**c**:	150	pcf

Soil Properties		
Total Soil Unit Weight, γ:	112	pcf
Ultimate Gross Bearing, Qult:	6.000	ksf
Cohesion, **Cu**:	0.000	ksf
Friction Angle, φ:	34	degrees
SPT Blow Count, N_{blows}:	11	
Base Friction, μ:		
Neglected Depth, **N**:	3.50	ft
Foundation Bearing on Rock?	No	
Groundwater Depth, **gw**:	6	ft

<--Toggle between Gross and Net

Foundation Analysis Checks				
	Capacity	**Demand**	**Rating***	**Check**
Lateral (Sliding) (kips)	430.25	15.64	**3.5%**	**Pass**
Bearing Pressure (ksf)	4.50	1.46	**30.8%**	**Pass**
*Overturning (kip*ft)*	7922.26	1401.45	**17.7%**	**Pass**
*Pier Flexure (Comp.) (kip*ft)*	7533.90	1335.31	**16.9%**	**Pass**
Pier Compression (kip)	23390.64	74.74	**0.3%**	**Pass**
*Pad Flexure (kip*ft)*	8128.85	532.23	**6.2%**	**Pass**
Pad Shear - 1-way (kips)	1183.85	67.07	**5.4%**	**Pass**
Pad Shear - 2-way (Comp) (ksi)	0.164	0.010	**5.8%**	**Pass**
*Flexural 2-way (Comp) (kip*ft)*	10883.53	801.19	**7.0%**	**Pass**

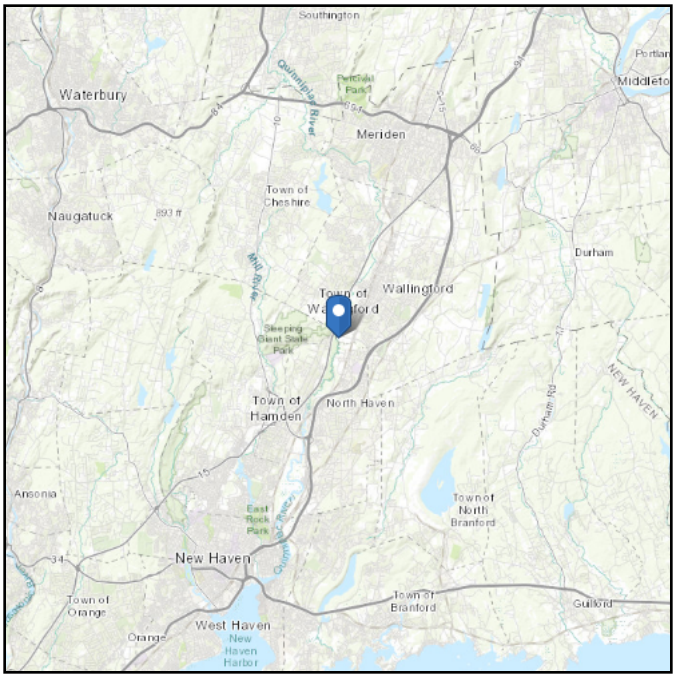
**Rating per TIA-222-H Section 15.5*

Structural Rating*:	**16.9%**
Soil Rating*:	**30.8%**

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard:	ASCE/SEI 7-16	**Elevation:**	19.9 ft (NAVD 88)
Risk Category:	II	**Latitude:**	41.429061
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-72.848558



Wind

Results:

Wind Speed:	119 Vmph
10-year MRI	75 Vmph
25-year MRI	85 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:	Mon Oct 04 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.

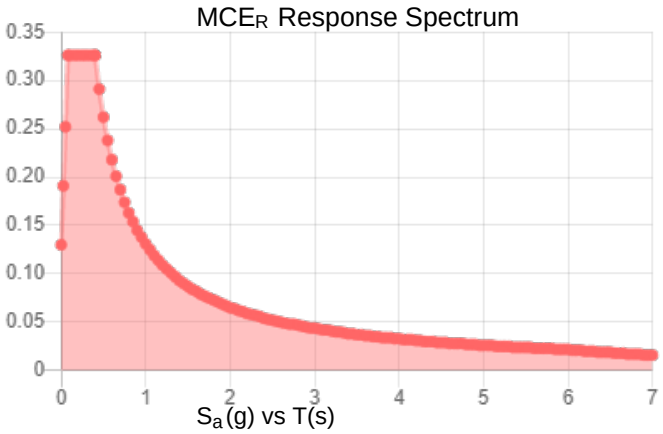
Seismic

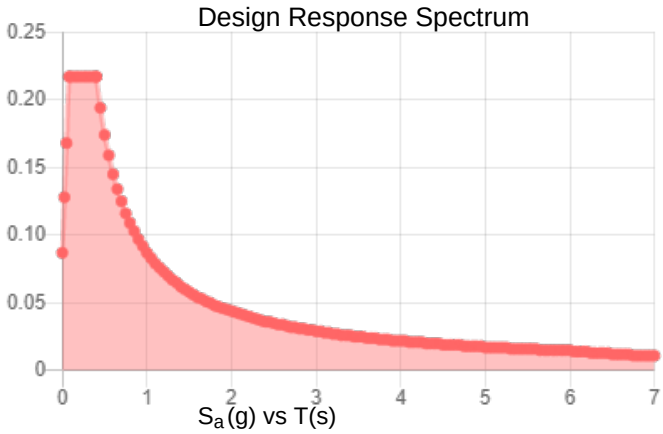
Site Soil Class: D - Default (see Section 11.4.3)

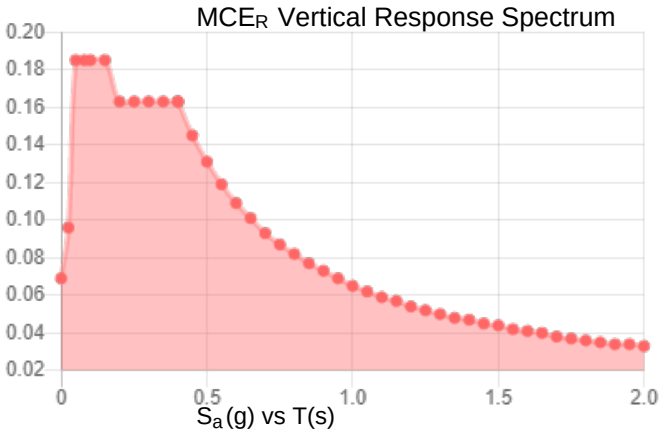
Results:

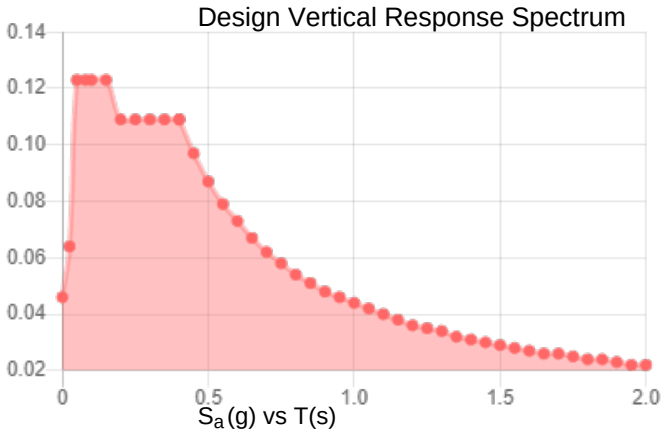
S_S :	0.204	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.114
F_v :	2.4	PGA_M :	0.179
S_{MS} :	0.326	F_{PGA} :	1.573
S_{M1} :	0.131	I_e :	1
S_{DS} :	0.217	C_v :	0.708

Seismic Design Category B









Data Accessed: Mon Oct 04 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:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed:	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Mon Oct 04 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: **June 3, 2022**

Trylon
1825 W. Walnut Hill Lane,
Suite 302
Irving, TX 75038
214-930-1730

Subject:	**Mount Analysis Report**	
Carrier Designation:	**Dish Network Equipment Change-Out**	
	Carrier Site Number:	BOHVN00163A
	Carrier Site Name:	CT-CCI-T-876311
Crown Castle Designation:	**BU Number:**	876311
	Site Name:	Suzio Concrete
	JDE Job Number:	645171
	Order Number:	553380 Rev. 2
Engineering Firm Designation:	**Trylon Report Designation:**	211068
Site Data:	**39 Toelles Rd, Wallingford, New Haven County, CT, 06492** **Latitude 41°25'44.62" Longitude -72°50'54.81"**	
Structure Information:	**Tower Height & Type:**	**120.0 ft Monopole**
	Mount Elevation:	**106.0 ft**
	Mount Width & Type:	**8.0 ft Platform**

Trylon is pleased to submit this **"Mount Analysis 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 **Sufficient***

***Sufficient upon completion of the changes listed in the 'Recommendations' section of this report.**

This analysis has been performed in accordance with the 2018 Connecticut State Building Code based upon an ultimate 3-second gust wind speed of 119 mph. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Dan Deaconu

Respectfully Submitted by:
Cliff Abernathy, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

This is an existing 3 sector 8.0 ft Platform, designed by Commscope.

2) ANALYSIS CRITERIA

Building Code: 2018 IBC
TIA-222 Revision: TIA-222-H
Risk Category: II
Ultimate Wind Speed: 119 mph
Exposure Category: B
Topographic Factor at Base: 1.00
Topographic Factor at Mount: 1.00
Ice Thickness: 1.00 in
Wind Speed with Ice: 50 mph
Seismic S_s: 0.204
Seismic S_1: 0.054
Live Loading Wind Speed: 50 mph
Man Live Load at Mid/End-Points: 250 lb
Man Live Load at Mount Pipes: 500 lb

Table 1 - Proposed Equipment Configuration

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
106.0	106.0	3	JMA Wireless	MX08FRO665-21	8.0 ft Platform **[Commscope, MC-PK8-DSH]**
		3	Fujitsu	TA08025-B604	
		3	Fujitsu	TA08025-B605	
		1	Raycap	RDIDC-9181-PF-48	

3) ANALYSIS PROCEDURE

Table 2 - Documents Provided

Document	Remarks	Reference	Source
Crown Application	DISH Network Application	553380, Rev. 2	CCI Sites
Structural Analysis Report	Crown Castle	10003596	CCI Sites
Mount Manufacturer Drawings	Commscope	MC-PK8-DSH	Trylon

3.1) Analysis Method

RISA-3D (Version 17.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the antenna mounting system and calculate member stresses for various loading cases.

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

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

3.2) Assumptions

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

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

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

4) ANALYSIS RESULTS

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1, 2, 3	Mount Pipe(s)	MP3	106.0	10.4	Pass
	Horizontal(s)	H1		9.9	Pass
	Standoff(s)	M41A		23.5	Pass
	Bracing(s)	M40A		24.5	Pass
	Handrail(s)	M50A		6.6	Pass
	Plate(s)	M44A		16.7	Pass
	Mount Connection(s)	-		18.7	Pass

Structure Rating (max from all components) =	24.5%

Notes:
1) See additional documentation in "Appendix C - Software Analysis Output" for calculations supporting the % capacity consumed.
2) See additional documentation in “Appendix D – Additional Calculations” for detailed mount connection calculations.
3) Rating per TIA-222-H, Section 15.5

4.1) Recommendations

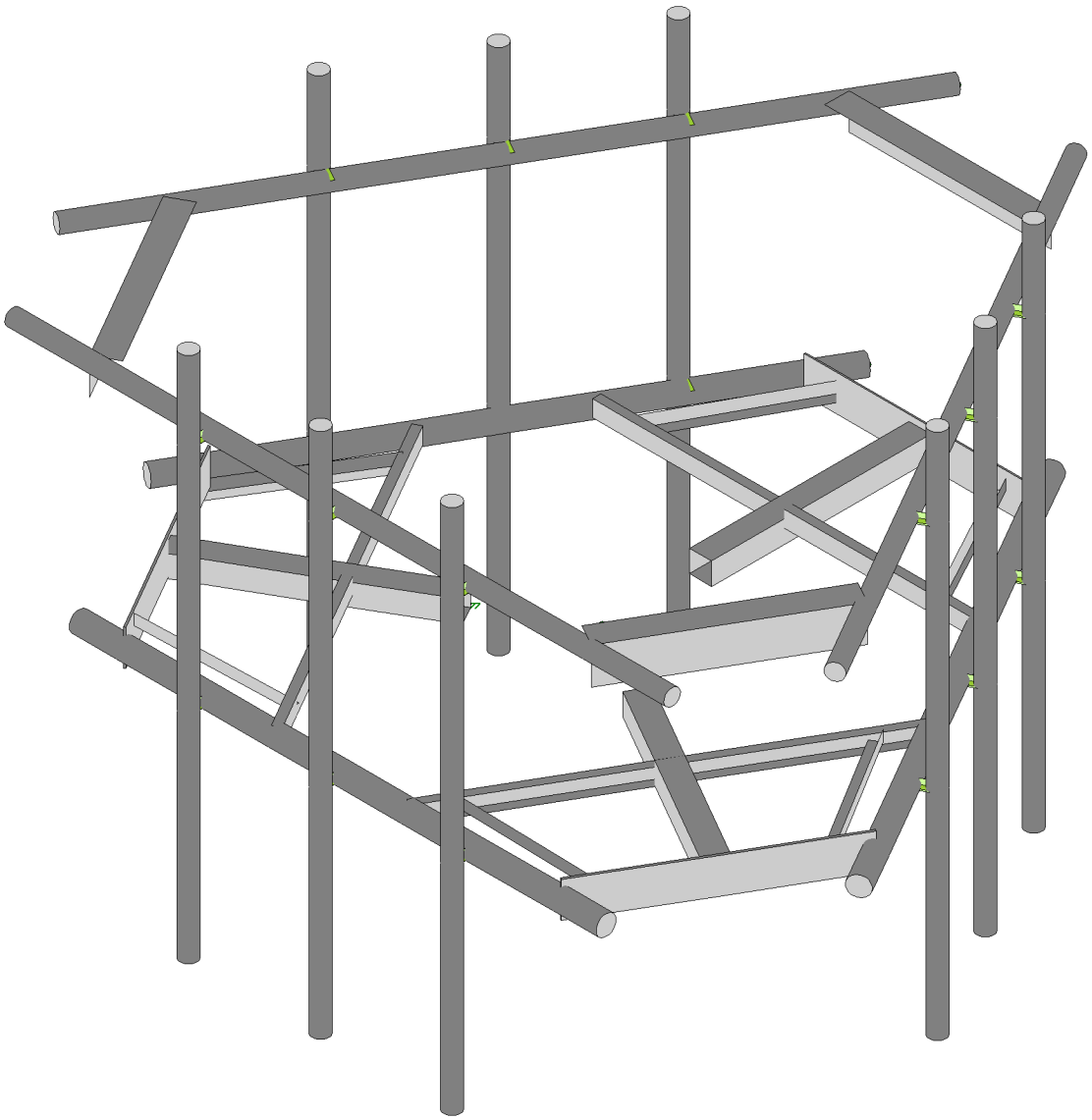
The mount has sufficient capacity to carry the proposed loading configuration. In order for the results of the analysis to be considered valid, the proposed mount listed below must be installed.

1. Commscope, MC-PK8-DSH.

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

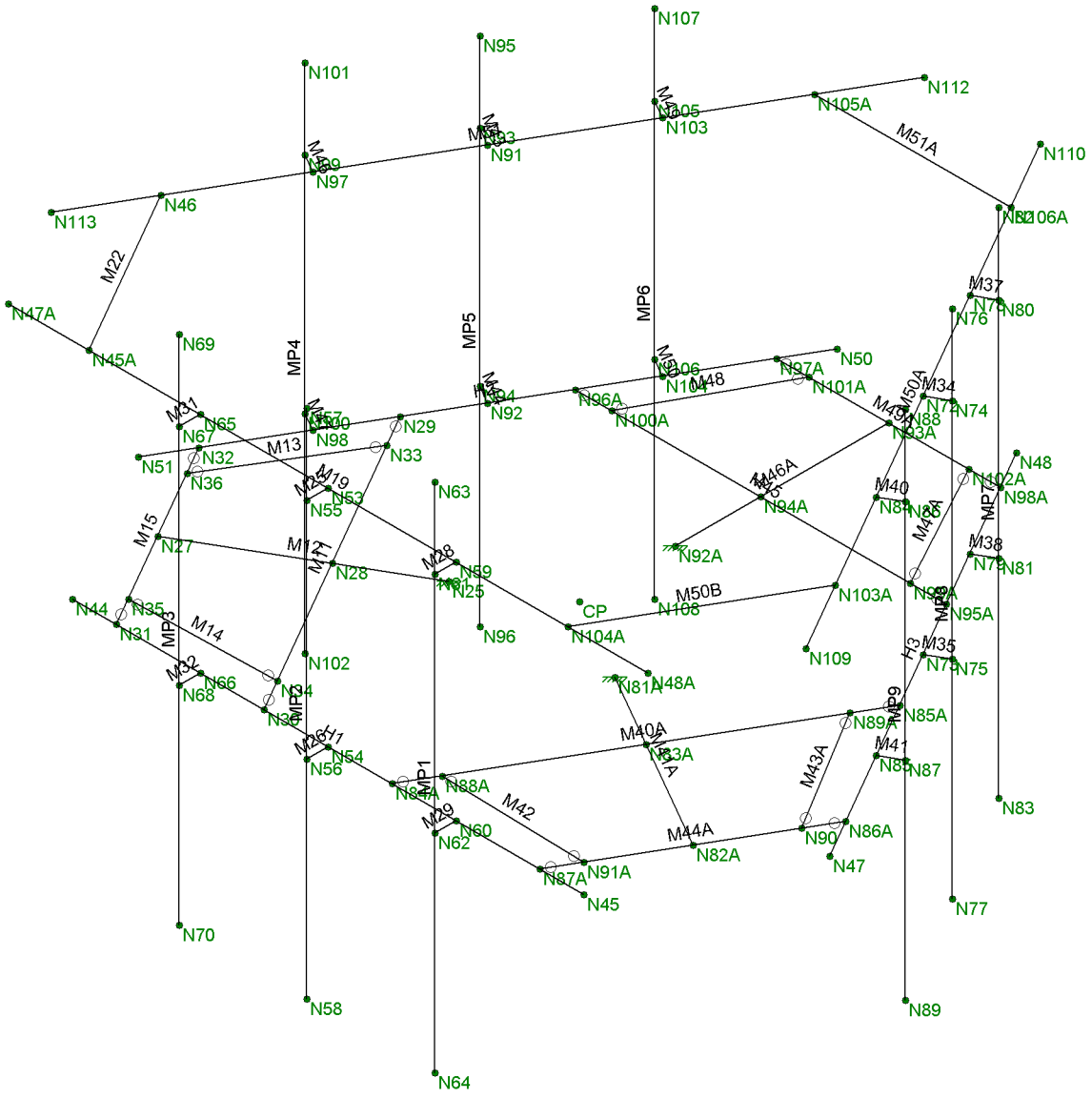
APPENDIX A

WIRE FRAME AND RENDERED MODELS



Envelope Only Solution

Trylon	876311	SK - 1
DD		June 3, 2022 at 3:12 PM
211068		876311.r3d



Envelope Only Solution

Trylon	876311	SK - 2
DD		June 3, 2022 at 3:12 PM
211068		876311.r3d

APPENDIX B

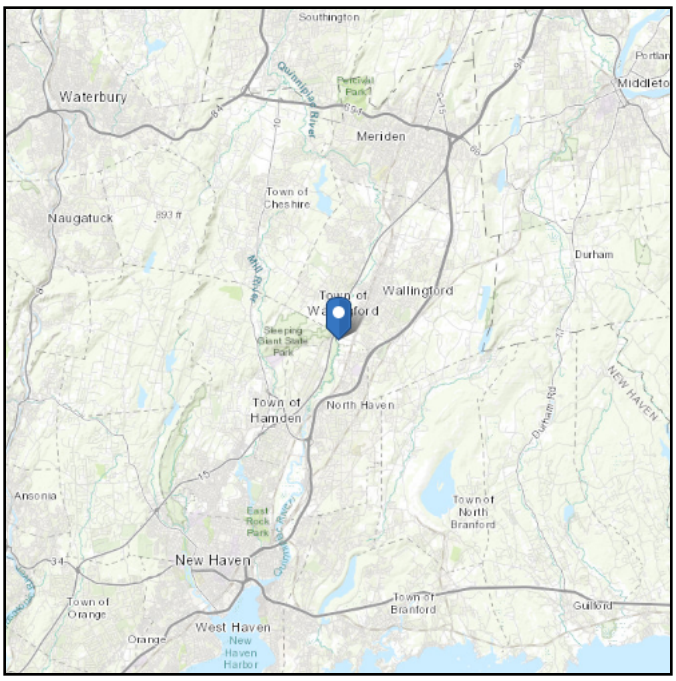
SOFTWARE INPUT CALCULATIONS

ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: II
Soil Class: D - Default (see Section 11.4.3)

Elevation: 19.9 ft (NAVD 88)
Latitude: 41.429061
Longitude: -72.848558



Wind

Results:

Wind Speed	119 Vmph
10-year MRI	75 Vmph
25-year MRI	85 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: Fri Jun 03 2022

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.

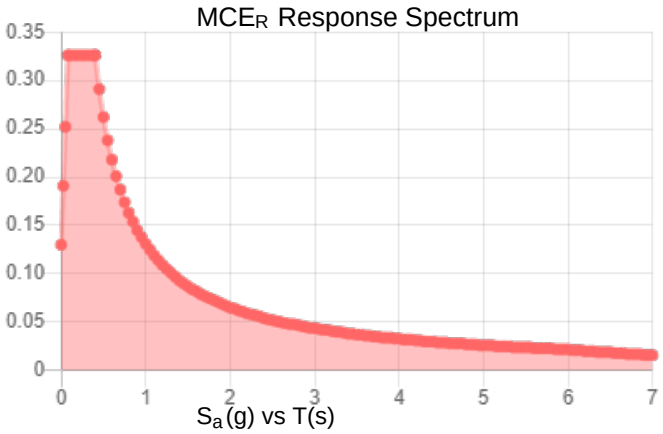
Seismic

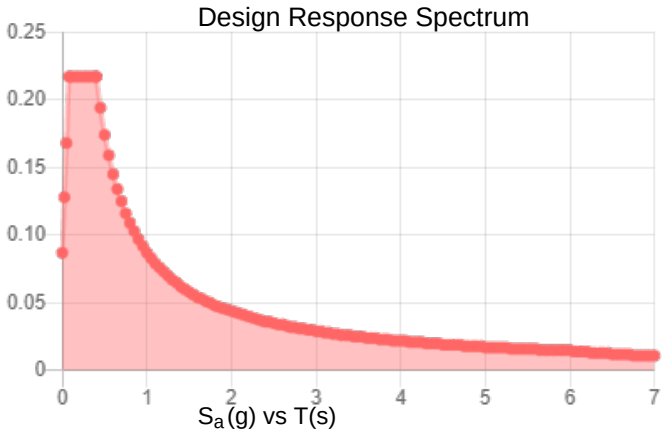
Site Soil Class: D - Default (see Section 11.4.3)

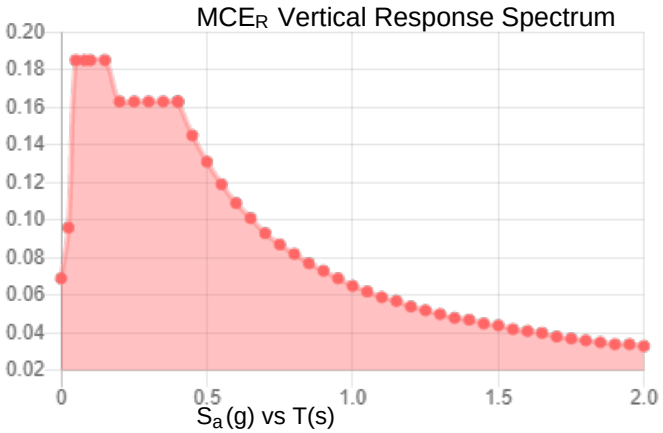
Results:

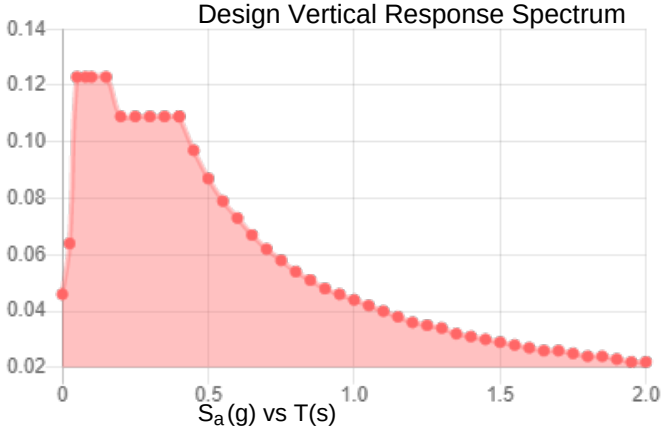
S_S :	0.204	S_{D1} :	0.087
S_1 :	0.054	T_L :	6
F_a :	1.6	PGA :	0.114
F_v :	2.4	PGA_M :	0.179
S_{MS} :	0.326	F_{PGA} :	1.573
S_{M1} :	0.131	I_e :	1
S_{DS} :	0.217	C_v :	0.708

Seismic Design Category B









Data Accessed: **Fri Jun 03 2022**

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:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Fri Jun 03 2022

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.

Trylon
1825 W. Walnut Hill Lane Suite 120
Irving, TX 75038

TIA LOAD CALCULATOR 2.2

PROJECT DATA	
Job Code:	211068
Carrier Site ID:	BOHVN00163A
Carrier Site Name:	CT-CCI-T-876311

CODES AND STANDARDS	
Building Code:	2018 IBC
Local Building Code:	2018 CSBC
Design Standard:	TIA-222-H

STRUCTURE DETAILS		
Mount Type:	Platform	--
Mount Elevation:	106.0	ft.
Number of Sectors:	3	--
Structure Type:	Monopole	--
Structure Height:	120.0	ft.

ANALYSIS CRITERIA		
Structure Risk Category:	II	--
Exposure Category:	B	--
Site Class:	D - Default	--
Ground Elevation:	19.9	ft.

TOPOGRAPHIC DATA		
Topographic Category:	1.00	--
Topographic Feature:	N/A	--
Crest Point Elevation:	0.00	ft.
Base Point Elevation:	0.00	ft.
Crest to Mid-Height (L/2):	0.00	ft.
Distance from Crest (x):	0.00	ft.
Base Topo Factor (K_{zt}):	1.00	--
Mount Topo Factor (K_{zt}):	1.00	--

WIND PARAMETERS		
Design Wind Speed:	119	mph
Wind Escalation Factor (K_s):	1.00	--
Velocity Coefficient (K_z):	1.00	--
Directionality Factor (K_d):	0.95	--
Gust Effect Factor (Gh):	1.00	--
Shielding Factor (K_a):	0.90	--
Velocity Pressure (q_z):	34.58	psf
Ground Elevation Factor (K_e):	1.00	--

ICE PARAMETERS		
Design Ice Wind Speed:	50	mph
Design Ice Thickness (t_i):	1.00	in
Importance Factor (I_i):	1.00	--
Ice Velocity Pressure (q_{zi}):	6.83	psf
Mount Ice Thickness (t_{iz}):	1.12	in

WIND STRUCTURE CALCULATIONS		
Flat Member Pressure:	62.25	psf
Round Member Pressure:	37.35	psf
Ice Wind Pressure:	7.37	psf

SEISMIC PARAMETERS		
Importance Factor (I_e):	1.00	--
Short Period Accel .(S_s):	0.204	g
1 Second Accel (S_1):	0.054	g
Short Period Des. (S_{DS}):	0.22	g
1 Second Des. (S_{D1}):	0.09	g
Short Period Coeff. (F_a):	1.60	--
1 Second Coeff. (F_v):	2.40	--
Response Coefficient (Cs):	0.11	--
Amplification Factor (A_S):	1.20	--

LOAD COMBINATIONS [LRFD]

#	Description
1	1.4DL
2	1.2DL + 1WL 0 AZI
3	1.2DL + 1WL 30 AZI
4	1.2DL + 1WL 45 AZI
5	1.2DL + 1WL 60 AZI
6	1.2DL + 1WL 90 AZI
7	1.2DL + 1WL 120 AZI
8	1.2DL + 1WL 135 AZI
9	1.2DL + 1WL 150 AZI
10	1.2DL + 1WL 180 AZI
11	1.2DL + 1WL 210 AZI
12	1.2DL + 1WL 225 AZI
13	1.2DL + 1WL 240 AZI
14	1.2DL + 1WL 270 AZI
15	1.2DL + 1WL 300 AZI
16	1.2DL + 1WL 315 AZI
17	1.2DL + 1WL 330 AZI
18	0.9DL + 1WL 0 AZI
19	0.9DL + 1WL 30 AZI
20	0.9DL + 1WL 45 AZI
21	0.9DL + 1WL 60 AZI
22	0.9DL + 1WL 90 AZI
23	0.9DL + 1WL 120 AZI
24	0.9DL + 1WL 135 AZI
25	0.9DL + 1WL 150 AZI
26	0.9DL + 1WL 180 AZI
27	0.9DL + 1WL 210 AZI
28	0.9DL + 1WL 225 AZI
29	0.9DL + 1WL 240 AZI
30	0.9DL + 1WL 270 AZI
31	0.9DL + 1WL 300 AZI
32	0.9DL + 1WL 315 AZI
33	0.9DL + 1WL 330 AZI
34	1.2DL + 1DLi + 1WLi 0 AZI
35	1.2DL + 1DLi + 1WLi 30 AZI
36	1.2DL + 1DLi + 1WLi 45 AZI
37	1.2DL + 1DLi + 1WLi 60 AZI
38	1.2DL + 1DLi + 1WLi 90 AZI
39	1.2DL + 1DLi + 1WLi 120 AZI
40	1.2DL + 1DLi + 1WLi 135 AZI
41	1.2DL + 1DLi + 1WLi 150 AZI

#	Description
42	1.2DL + 1DLi + 1WLi 180 AZI
43	1.2DL + 1DLi + 1WLi 210 AZI
44	1.2DL + 1DLi + 1WLi 225 AZI
45	1.2DL + 1DLi + 1WLi 240 AZI
46	1.2DL + 1DLi + 1WLi 270 AZI
47	1.2DL + 1DLi + 1WLi 300 AZI
48	1.2DL + 1DLi + 1WLi 315 AZI
49	1.2DL + 1DLi + 1WLi 330 AZI
50	(1.2+0.2Sds) + 1.0E 0 AZI
51	(1.2+0.2Sds) + 1.0E 30 AZI
52	(1.2+0.2Sds) + 1.0E 45 AZI
53	(1.2+0.2Sds) + 1.0E 60 AZI
54	(1.2+0.2Sds) + 1.0E 90 AZI
55	(1.2+0.2Sds) + 1.0E 120 AZI
56	(1.2+0.2Sds) + 1.0E 135 AZI
57	(1.2+0.2Sds) + 1.0E 150 AZI
58	(1.2+0.2Sds) + 1.0E 180 AZI
59	(1.2+0.2Sds) + 1.0E 210 AZI
60	(1.2+0.2Sds) + 1.0E 225 AZI
61	(1.2+0.2Sds) + 1.0E 240 AZI
62	(1.2+0.2Sds) + 1.0E 270 AZI
63	(1.2+0.2Sds) + 1.0E 300 AZI
64	(1.2+0.2Sds) + 1.0E 315 AZI
65	(1.2+0.2Sds) + 1.0E 330 AZI
66	(0.9-0.2Sds) + 1.0E 0 AZI
67	(0.9-0.2Sds) + 1.0E 30 AZI
68	(0.9-0.2Sds) + 1.0E 45 AZI
69	(0.9-0.2Sds) + 1.0E 60 AZI
70	(0.9-0.2Sds) + 1.0E 90 AZI
71	(0.9-0.2Sds) + 1.0E 120 AZI
72	(0.9-0.2Sds) + 1.0E 135 AZI
73	(0.9-0.2Sds) + 1.0E 150 AZI
74	(0.9-0.2Sds) + 1.0E 180 AZI
75	(0.9-0.2Sds) + 1.0E 210 AZI
76	(0.9-0.2Sds) + 1.0E 225 AZI
77	(0.9-0.2Sds) + 1.0E 240 AZI
78	(0.9-0.2Sds) + 1.0E 270 AZI
79	(0.9-0.2Sds) + 1.0E 300 AZI
80	(0.9-0.2Sds) + 1.0E 315 AZI
81	(0.9-0.2Sds) + 1.0E 330 AZI
82-88	1.2D + 1.5 Lv1

#	Description
89	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP1
90	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP1
91	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP1
92	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP1
93	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP1
94	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP1
95	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP1
96	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP1
97	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP1
98	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP1
99	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP1
100	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP1
101	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP1
102	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP1
103	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP1
104	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP1
105	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP2
106	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP2
107	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP2
108	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP2
109	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP2
110	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP2
111	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP2
112	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP2
113	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP2
114	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP2
115	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP2
116	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP2
117	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP2
118	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP2
119	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP2
120	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP2

#	Description
121	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP3
122	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP3
123	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP3
124	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP3
125	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP3
126	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP3
127	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP3
128	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP3
129	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP3
130	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP3
131	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP3
132	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP3
133	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP3
134	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP3
135	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP3
136	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP3
137	1.2D + 1.5Lm + 1.0Wm 0 AZI - MP4
138	1.2D + 1.5Lm + 1.0Wm 30 AZI - MP4
139	1.2D + 1.5Lm + 1.0Wm 45 AZI - MP4
140	1.2D + 1.5Lm + 1.0Wm 60 AZI - MP4
141	1.2D + 1.5Lm + 1.0Wm 90 AZI - MP4
142	1.2D + 1.5Lm + 1.0Wm 120 AZI - MP4
143	1.2D + 1.5Lm + 1.0Wm 135 AZI - MP4
144	1.2D + 1.5Lm + 1.0Wm 150 AZI - MP4
145	1.2D + 1.5Lm + 1.0Wm 180 AZI - MP4
146	1.2D + 1.5Lm + 1.0Wm 210 AZI - MP4
147	1.2D + 1.5Lm + 1.0Wm 225 AZI - MP4
148	1.2D + 1.5Lm + 1.0Wm 240 AZI - MP4
149	1.2D + 1.5Lm + 1.0Wm 270 AZI - MP4
150	1.2D + 1.5Lm + 1.0Wm 300 AZI - MP4
151	1.2D + 1.5Lm + 1.0Wm 315 AZI - MP4
152	1.2D + 1.5Lm + 1.0Wm 330 AZI - MP4

*This page shows an example of maintenance loads for (4) pipes, the number of mount pipe LCs may vary per site

EQUIPMENT LOADING

Appurtenance Name	Qty.	Elevation [ft]	--	EPA $_N$ (ft2)	EPA $_T$ (ft2)	Weight (lbs)
MX08FRO665-21	3	106	No Ice	8.01	3.21	82.50
--	--	--	w/ Ice	9.06	4.13	175.23
TA08025-B604	3	106	No Ice	1.96	0.98	63.90
--	--	--	w/ Ice	2.23	1.19	41.45
TA08025-B605	3	106	No Ice	1.96	1.13	75.00
--	--	--	w/ Ice	2.23	1.34	44.31
RDIDC-9181-PF-48	1	106	No Ice	2.01	1.17	21.85
--	--	--	w/ Ice	2.28	1.39	43.62
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT LOADING [CONT.]

Appurtenance Name	Qty.	Elevation [ft]	--	EPA_N (ft2)	EPA_T (ft2)	Weight (lbs)
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			
			No Ice			
--	--	--	w/ Ice			

EQUIPMENT WIND CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	K_{zt}	K_z	K_d	t_d	q_z [psf]	q_{zi} [psf]
MX08FRO665-21	3	106	1.00	1.00	0.95	1.12	34.58	6.10
TA08025-B604	3	106	1.00	1.00	0.95	1.12	34.58	6.10
TA08025-B605	3	106	1.00	1.00	0.95	1.12	34.58	6.10
RDIDC-9181-PF-48	1	106	1.00	1.00	0.95	1.12	34.58	6.10

EQUIPMENT LATERAL WIND FORCE CALCULATIONS

Appurtenance Name	Qty.	--	0° 180°	30° 210°	60° 240°	90° 270°	120° 300°	150° 330°
MX08FRO665-21	3	No Ice	249.29	137.25	211.94	99.90	211.94	137.25
--	--	w/ Ice	49.78	29.45	43.00	22.68	43.00	29.45
TA08025-B604	3	No Ice	61.11	38.18	53.47	30.54	53.47	38.18
--	--	w/ Ice	12.25	7.95	10.81	6.51	10.81	7.95
TA08025-B605	3	No Ice	61.11	41.64	54.62	35.15	54.62	41.64
--	--	w/ Ice	12.25	8.60	11.03	7.38	11.03	8.60
RDIDC-9181-PF-48	1	No Ice	62.61	42.92	56.05	36.36	56.05	42.92
--	--	w/ Ice	12.54	8.86	11.31	7.64	11.31	8.86
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

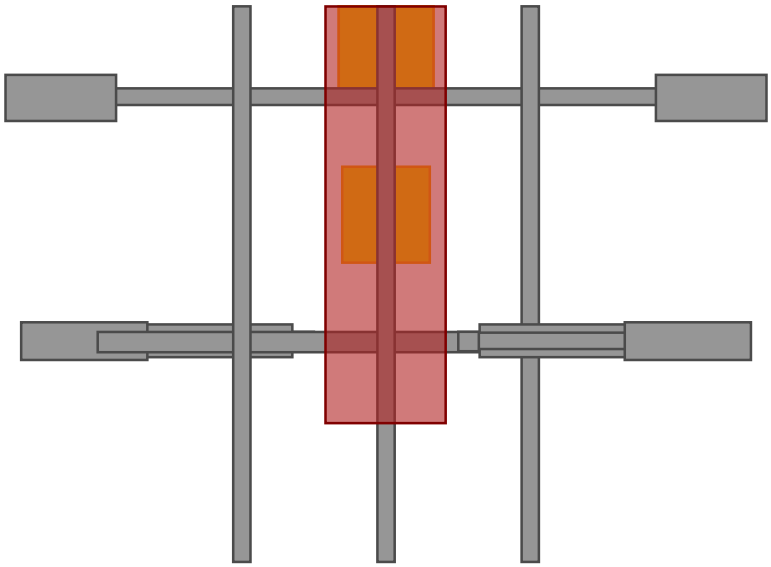
EQUIPMENT LATERAL WIND FORCE CALCULATIONS [CONT.]

Appurtenance Name	*Qty.*	*--*	*0° 180°*	*30° 210°*	*60° 240°*	*90° 270°*	*120° 300°*	*150° 330°*
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						
		No Ice						
--	--	w/ Ice						

EQUIPMENT SEISMIC FORCE CALCULATIONS

Appurtenance Name	Qty.	Elevation [ft]	Weight [lbs]	F_p [lbs]
MX08FRO665-21	3	106	82.5	10.77
TA08025-B604	3	106	63.9	8.34
TA08025-B605	3	106	75	9.79
RDIDC-9181-PF-48	1	106	21.85	2.85

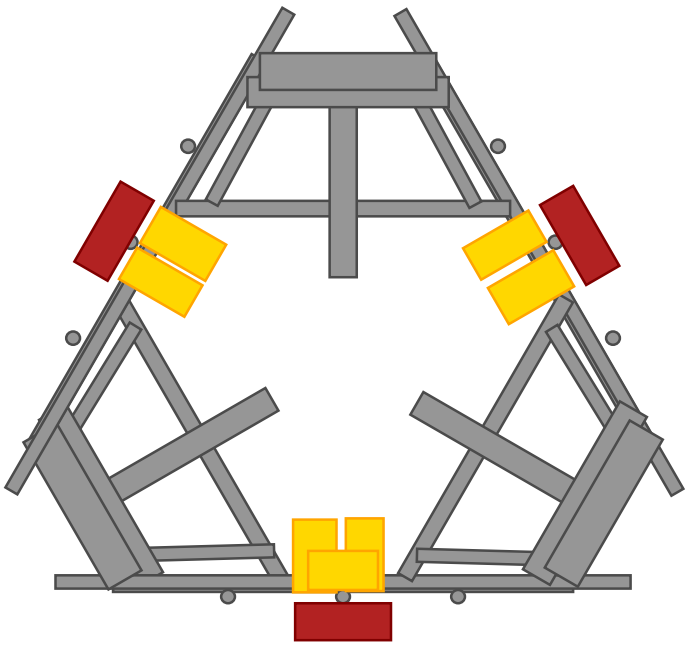
ELEVATION VIEW



MP3 MP2 MP1

*Elevation View Shows Alpha Sector Only

PLAN VIEW



1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

Equipment Name	Total Quantity	Antenna Centerline	Mount Pipe Positions	Equipment Azimuths
MX08FRO665-21	3	106	MP2/MP5/MP8	0/120/240
TA08025-B604	3	106	MP2/MP5/MP8	90/210/330
TA08025-B605	3	106	MP2/MP5/MP8	90/210/330
RDIDC-9181-PF-48	1	106	MP2	0

APPENDIX C

SOFTWARE ANALYSIS OUTPUT

(Global) Model Settings

Display Sections for Member Calcs	5
Max Internal Sections for Member Calcs	97
Include Shear Deformation?	Yes
Increase Nailing Capacity for Wind?	Yes
Include Warping?	Yes
Trans Load Btwn Intersecting Wood Wall?	Yes
Area Load Mesh (in^2)	144
Merge Tolerance (in)	.12
P-Delta Analysis Tolerance	0.50%
Include P-Delta for Walls?	Yes
Automatically Iterate Stiffness for Walls?	Yes
Max Iterations for Wall Stiffness	3
Gravity Acceleration (in/sec^2)	386.4
Wall Mesh Size (in)	24
Eigensolution Convergence Tol. (1.E-)	4
Vertical Axis	Z
Global Member Orientation Plane	XY
Static Solver	Sparse Accelerated
Dynamic Solver	Accelerated Solver

Hot Rolled Steel Code	AISC 15th(360-16): LRFD
Adjust Stiffness?	Yes(Iterative)
RISAConnection Code	AISC 15th(360-16): LRFD
Cold Formed Steel Code	AISI S100-16: LRFD
Wood Code	None
Wood Temperature	< 100F
Concrete Code	None
Masonry Code	None
Aluminum Code	None - Building
Stainless Steel Code	AISC 14th(360-10): LRFD
Adjust Stiffness?	Yes(Iterative)

Number of Shear Regions	4
Region Spacing Increment (in)	4
Biaxial Column Method	Exact Integration
Parme Beta Factor (PCA)	.65
Concrete Stress Block	Rectangular
Use Cracked Sections?	Yes
Use Cracked Sections Slab?	No
Bad Framing Warnings?	No
Unused Force Warnings?	Yes
Min 1 Bar Diam. Spacing?	No
Concrete Rebar Set	REBAR_SET_ASTMA615
Min % Steel for Column	1
Max % Steel for Column	8

(Global) Model Settings, Continued

Seismic Code	ASCE 7-10
Seismic Base Elevation (in)	Not Entered
Add Base Weight?	Yes
Ct X	.02
Ct Z	.02
T X (sec)	Not Entered
T Z (sec)	Not Entered
R X	3
R Z	3
Ct Exp. X	.75
Ct Exp. Z	.75
SD1	1
SDS	1
S1	1
TL (sec)	5
Risk Cat	I or II
Drift Cat	Other
Om Z	1
Om X	1
Cd Z	1
Cd X	1
Rho Z	1
Rho X	1

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm (/...	Density[k/ft^3]	Yield[ksi]	Ry	Fu[ksi]	Rt
1	A992	29000	11154	.3	.65	.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	.3	.65	.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	.3	.65	.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	.3	.65	.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	.3	.65	.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	.3	.65	.49	35	1.6	60	1.2
7	A1085	29000	11154	.3	.65	.49	50	1.4	65	1.3
8	A500 Gr. C	29000	11154	.3	.65	.49	46	1.5	62	1.2

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design ...	A [in2]	Iyy [in4]	Izz [in4]	J [in4]
1	Plates	6.5"x0.37" Plate	Beam	RECT	A53 Gr.B	Typical	2.405	.027	8.468	.106
2	Grating Bracing	L2x2x3	Beam	Single Angle	A36 Gr.36	Typical	.722	.271	.271	.009
3	Standoffs	HSS4X4X4	Beam	Tube	A500 Gr.B R...	Typical	3.37	7.8	7.8	12.8
4	Standoff Bracing	C3X5	Beam	Channel	A36 Gr.36	Typical	1.47	.241	1.85	.043
5	Handrails	PIPE_2.5	Beam	Pipe	A500 Gr. C	Typical	1.61	1.45	1.45	2.89
6	Handrail Corners	L6.6"X4.46"X0.25"	Beam	Single Angle	A36 Gr.36	Typical	2.703	4.759	12.473	.055
7	Horizontals	Pipe 3.5x0.165	Beam	Pipe	A500 Gr. C	Typical	1.729	2.409	2.409	4.819
8	Mount Pipes	PIPE_2.5	Beam	Pipe	A500 Gr. C	Typical	1.61	1.45	1.45	2.89

Joint Boundary Conditions

	Joint Label	X [k/in]	Y [k/in]	Z [k/in]	X Rot.[k-ft/rad]	Y Rot.[k-ft/rad]	Z Rot.[k-ft/rad]
1	N25	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
2	N81A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction
3	N92A	Reaction	Reaction	Reaction	Reaction	Reaction	Reaction

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
1	Self Weight	DL			-1		13		3	
2	Structure Wind X	WLX						51		
3	Structure Wind Y	WLY						51		
4	Wind Load 0 AZI	WLX					26			
5	Wind Load 30 AZI	None					26			
6	Wind Load 45 AZI	None					26			
7	Wind Load 60 AZI	None					26			
8	Wind Load 90 AZI	WLY					26			
9	Wind Load 120 AZI	None					26			
10	Wind Load 135 AZI	None					26			
11	Wind Load 150 AZI	None					26			
12	Ice Weight	OL1					13	51	3	
13	Ice Structure Wind X	OL2						51		
14	Ice Structure Wind Y	OL3						51		
15	Ice Wind Load 0 AZI	OL2					26			
16	Ice Wind Load 30 AZI	None					26			
17	Ice Wind Load 45 AZI	None					26			
18	Ice Wind Load 60 AZI	None					26			
19	Ice Wind Load 90 AZI	OL3					26			
20	Ice Wind Load 120 AZI	None					26			
21	Ice Wind Load 135 AZI	None					26			
22	Ice Wind Load 150 AZI	None					26			
23	Seismic Load X	ELX	-.131				13			
24	Seismic Load Y	ELY		-.131			13			
25	Live Load 1 (Lv)	None					1			
26	Live Load 2 (Lv)	None					1			
27	Live Load 3 (Lv)	None					1			
28	Live Load 4 (Lv)	None					1			
29	Live Load 5 (Lv)	None					1			
30	Live Load 6 (Lv)	None					1			
31	Live Load 7 (Lv)	None					1			
32	Live Load 8 (Lv)	None					1			
33	Live Load 9 (Lv)	None					1			
34	Maintenance Load 1 (Lm)	None					1			
35	Maintenance Load 2 (Lm)	None					1			
36	Maintenance Load 3 (Lm)	None					1			
37	Maintenance Load 4 (Lm)	None					1			
38	Maintenance Load 5 (Lm)	None					1			
39	Maintenance Load 6 (Lm)	None					1			
40	Maintenance Load 7 (Lm)	None					1			
41	Maintenance Load 8 (Lm)	None					1			
42	Maintenance Load 9 (Lm)	None					1			
43	BLC 1 Transient Area Loads	None						9		

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distributed	Area(Me...	Surface(...
44	BLC 12 Transient Area Loads	None						9		

Load Combinations

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
1	1.4DL	Yes	Y		DL	1.4																		
2	1.2DL + 1WL 0 AZI	Yes	Y		DL	1.2	2	1	3		4	1												
3	1.2DL + 1WL 30 AZI	Yes	Y		DL	1.2	2	.866	3	.5	5	1												
4	1.2DL + 1WL 45 AZI	Yes	Y		DL	1.2	2	.707	3	.707	6	1												
5	1.2DL + 1WL 60 AZI	Yes	Y		DL	1.2	2	.5	3	.866	7	1												
6	1.2DL + 1WL 90 AZI	Yes	Y		DL	1.2	2		3	1	8	1												
7	1.2DL + 1WL 120 AZI	Yes	Y		DL	1.2	2	-.5	3	.866	9	1												
8	1.2DL + 1WL 135 AZI	Yes	Y		DL	1.2	2	-.707	3	.707	10	1												
9	1.2DL + 1WL 150 AZI	Yes	Y		DL	1.2	2	-.866	3	.5	11	1												
10	1.2DL + 1WL 180 AZI	Yes	Y		DL	1.2	2	-1	3		4	-1												
11	1.2DL + 1WL 210 AZI	Yes	Y		DL	1.2	2	-.866	3	-.5	5	-1												
12	1.2DL + 1WL 225 AZI	Yes	Y		DL	1.2	2	-.707	3	-.707	6	-1												
13	1.2DL + 1WL 240 AZI	Yes	Y		DL	1.2	2	-.5	3	-.866	7	-1												
14	1.2DL + 1WL 270 AZI	Yes	Y		DL	1.2	2		3	-1	8	-1												
15	1.2DL + 1WL 300 AZI	Yes	Y		DL	1.2	2	.5	3	-.866	9	-1												
16	1.2DL + 1WL 315 AZI	Yes	Y		DL	1.2	2	.707	3	-.707	10	-1												
17	1.2DL + 1WL 330 AZI	Yes	Y		DL	1.2	2	.866	3	-.5	11	-1												
18	0.9DL + 1WL 0 AZI	Yes	Y		DL	.9	2	1	3		4	1												
19	0.9DL + 1WL 30 AZI	Yes	Y		DL	.9	2	.866	3	.5	5	1												
20	0.9DL + 1WL 45 AZI	Yes	Y		DL	.9	2	.707	3	.707	6	1												
21	0.9DL + 1WL 60 AZI	Yes	Y		DL	.9	2	.5	3	.866	7	1												
22	0.9DL + 1WL 90 AZI	Yes	Y		DL	.9	2		3	1	8	1												
23	0.9DL + 1WL 120 AZI	Yes	Y		DL	.9	2	-.5	3	.866	9	1												
24	0.9DL + 1WL 135 AZI	Yes	Y		DL	.9	2	-.707	3	.707	10	1												
25	0.9DL + 1WL 150 AZI	Yes	Y		DL	.9	2	-.866	3	.5	11	1												
26	0.9DL + 1WL 180 AZI	Yes	Y		DL	.9	2	-1	3		4	-1												
27	0.9DL + 1WL 210 AZI	Yes	Y		DL	.9	2	-.866	3	-.5	5	-1												
28	0.9DL + 1WL 225 AZI	Yes	Y		DL	.9	2	-.707	3	-.707	6	-1												
29	0.9DL + 1WL 240 AZI	Yes	Y		DL	.9	2	-.5	3	-.866	7	-1												
30	0.9DL + 1WL 270 AZI	Yes	Y		DL	.9	2		3	-1	8	-1												
31	0.9DL + 1WL 300 AZI	Yes	Y		DL	.9	2	.5	3	-.866	9	-1												
32	0.9DL + 1WL 315 AZI	Yes	Y		DL	.9	2	.707	3	-.707	10	-1												
33	0.9DL + 1WL 330 AZI	Yes	Y		DL	.9	2	.866	3	-.5	11	-1												
34	1.2DL + 1DLi + 1WLi 0 A...	Yes	Y		DL	1.2	O...	1	13	1	14		15	1										
35	1.2DL + 1DLi + 1WLi 30 ...	Yes	Y		DL	1.2	O...	1	13	.866	14	.5	16	1										
36	1.2DL + 1DLi + 1WLi 45 ...	Yes	Y		DL	1.2	O...	1	13	.707	14	.707	17	1										
37	1.2DL + 1DLi + 1WLi 60 ...	Yes	Y		DL	1.2	O...	1	13	.5	14	.866	18	1										
38	1.2DL + 1DLi + 1WLi 90 ...	Yes	Y		DL	1.2	O...	1	13		14	1	19	1										
39	1.2DL + 1DLi + 1WLi 12...	Yes	Y		DL	1.2	O...	1	13	-.5	14	.866	20	1										
40	1.2DL + 1DLi + 1WLi 13...	Yes	Y		DL	1.2	O...	1	13	-.707	14	.707	21	1										
41	1.2DL + 1DLi + 1WLi 15...	Yes	Y		DL	1.2	O...	1	13	-.866	14	.5	22	1										
42	1.2DL + 1DLi + 1WLi 18...	Yes	Y		DL	1.2	O...	1	13	-1	14		15	-1										
43	1.2DL + 1DLi + 1WLi 21...	Yes	Y		DL	1.2	O...	1	13	-.866	14	-.5	16	-1										
44	1.2DL + 1DLi + 1WLi 22...	Yes	Y		DL	1.2	O...	1	13	-.707	14	-.707	17	-1										
45	1.2DL + 1DLi + 1WLi 24...	Yes	Y		DL	1.2	O...	1	13	-.5	14	-.866	18	-1										
46	1.2DL + 1DLi + 1WLi 27...	Yes	Y		DL	1.2	O...	1	13		14	-1	19	-1										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
47	1.2DL + 1DLi + 1W Li 30...	Yes	Y		DL	1.2	O...	1	13	.5	14	-.866	20	-1										
48	1.2DL + 1DLi + 1W Li 31...	Yes	Y		DL	1.2	O...	1	13	.707	14	-.707	21	-1										
49	1.2DL + 1DLi + 1W Li 33...	Yes	Y		DL	1.2	O...	1	13	.866	14	-.5	22	-1										
50	(1.2+0.2Sds)DL + 1E 0 ...	Yes	Y		DL	1.244	23	1	24															
51	(1.2+0.2Sds)DL + 1E 30 ...	Yes	Y		DL	1.244	23	.866	24	.5														
52	(1.2+0.2Sds)DL + 1E 45 ...	Yes	Y		DL	1.244	23	.707	24	.707														
53	(1.2+0.2Sds)DL + 1E 60 ...	Yes	Y		DL	1.244	23	.5	24	.866														
54	(1.2+0.2Sds)DL + 1E 90 ...	Yes	Y		DL	1.244	23		24	1														
55	(1.2+0.2Sds)DL + 1E 12...	Yes	Y		DL	1.244	23	-.5	24	.866														
56	(1.2+0.2Sds)DL + 1E 13...	Yes	Y		DL	1.244	23	-.707	24	.707														
57	(1.2+0.2Sds)DL + 1E 15...	Yes	Y		DL	1.244	23	-.866	24	.5														
58	(1.2+0.2Sds)DL + 1E 18...	Yes	Y		DL	1.244	23	-1	24															
59	(1.2+0.2Sds)DL + 1E 21...	Yes	Y		DL	1.244	23	-.866	24	-.5														
60	(1.2+0.2Sds)DL + 1E 22...	Yes	Y		DL	1.244	23	-.707	24	-.707														
61	(1.2+0.2Sds)DL + 1E 24...	Yes	Y		DL	1.244	23	-.5	24	-.866														
62	(1.2+0.2Sds)DL + 1E 27...	Yes	Y		DL	1.244	23		24	-1														
63	(1.2+0.2Sds)DL + 1E 30...	Yes	Y		DL	1.244	23	.5	24	-.866														
64	(1.2+0.2Sds)DL + 1E 31...	Yes	Y		DL	1.244	23	.707	24	-.707														
65	(1.2+0.2Sds)DL + 1E 33...	Yes	Y		DL	1.244	23	.866	24	-.5														
66	(0.9-0.2Sds)DL + 1E 0 AZ	Yes	Y		DL	.856	23	1	24															
67	(0.9-0.2Sds)DL + 1E 30 ...	Yes	Y		DL	.856	23	.866	24	.5														
68	(0.9-0.2Sds)DL + 1E 45 ...	Yes	Y		DL	.856	23	.707	24	.707														
69	(0.9-0.2Sds)DL + 1E 60 ...	Yes	Y		DL	.856	23	.5	24	.866														
70	(0.9-0.2Sds)DL + 1E 90 ...	Yes	Y		DL	.856	23		24	1														
71	(0.9-0.2Sds)DL + 1E 120...	Yes	Y		DL	.856	23	-.5	24	.866														
72	(0.9-0.2Sds)DL + 1E 135...	Yes	Y		DL	.856	23	-.707	24	.707														
73	(0.9-0.2Sds)DL + 1E 150...	Yes	Y		DL	.856	23	-.866	24	.5														
74	(0.9-0.2Sds)DL + 1E 180...	Yes	Y		DL	.856	23	-1	24															
75	(0.9-0.2Sds)DL + 1E 210...	Yes	Y		DL	.856	23	-.866	24	-.5														
76	(0.9-0.2Sds)DL + 1E 225...	Yes	Y		DL	.856	23	-.707	24	-.707														
77	(0.9-0.2Sds)DL + 1E 240...	Yes	Y		DL	.856	23	-.5	24	-.866														
78	(0.9-0.2Sds)DL + 1E 270...	Yes	Y		DL	.856	23		24	-1														
79	(0.9-0.2Sds)DL + 1E 300...	Yes	Y		DL	.856	23	.5	24	-.866														
80	(0.9-0.2Sds)DL + 1E 315...	Yes	Y		DL	.856	23	.707	24	-.707														
81	(0.9-0.2Sds)DL + 1E 330...	Yes	Y		DL	.856	23	.866	24	-.5														
82	1.2DL + 1Lv1	Yes	Y		DL	1.2	25	1.5																
83	1.2DL + 1Lv2	Yes	Y		DL	1.2	26	1.5																
84	1.2DL + 1Lv3	Yes	Y		DL	1.2	27	1.5																
85	1.2DL + 1Lv4	Yes	Y		DL	1.2	28	1.5																
86	1.2DL + 1Lv5	Yes	Y		DL	1.2	29	1.5																
87	1.2DL + 1Lv6	Yes	Y		DL	1.2	30	1.5																
88	1.2DL + 1Lv7	Yes	Y		DL	1.2	31	1.5																
89	1.2DL + 1Lv8	Yes	Y		DL	1.2	32	1.5																
90	1.2DL + 1Lv9	Yes	Y		DL	1.2	33	1.5																
91	1.2DL + 1.5Lm + 1Wm 0...	Yes	Y		DL	1.2	34	1.5	2	.064	3		4	.064										
92	1.2DL + 1.5Lm + 1Wm 3...	Yes	Y		DL	1.2	34	1.5	2	.055	3	.032	5	.064										
93	1.2DL + 1.5Lm + 1Wm 4...	Yes	Y		DL	1.2	34	1.5	2	.045	3	.045	6	.064										
94	1.2DL + 1.5Lm + 1Wm 6...	Yes	Y		DL	1.2	34	1.5	2	.032	3	.055	7	.064										
95	1.2DL + 1.5Lm + 1Wm 9...	Yes	Y		DL	1.2	34	1.5	2		3	.064	8	.064										
96	1.2DL + 1.5Lm + 1Wm 1...	Yes	Y		DL	1.2	34	1.5	2	-.032	3	.055	9	.064										
97	1.2DL + 1.5Lm + 1Wm 1...	Yes	Y		DL	1.2	34	1.5	2	-.045	3	.045	10	.064										
98	1.2DL + 1.5Lm + 1Wm 1...	Yes	Y		DL	1.2	34	1.5	2	-.055	3	.032	11	.064										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
99	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	34	1.5	2	-.064	3		4	-.064										
100	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	34	1.5	2	-.055	3	-.032	5	-.064										
101	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	34	1.5	2	-.045	3	-.045	6	-.064										
102	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	34	1.5	2	-.032	3	-.055	7	-.064										
103	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	34	1.5	2		3	-.064	8	-.064										
104	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	34	1.5	2	.032	3	-.055	9	-.064										
105	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	34	1.5	2	.045	3	-.045	10	-.064										
106	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	34	1.5	2	.055	3	-.032	11	-.064										
107	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	35	1.5	2	.064	3		4	.064										
108	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	35	1.5	2	.055	3	.032	5	.064										
109	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	35	1.5	2	.045	3	.045	6	.064										
110	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	35	1.5	2	.032	3	.055	7	.064										
111	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	35	1.5	2		3	.064	8	.064										
112	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	35	1.5	2	-.032	3	.055	9	.064										
113	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	35	1.5	2	-.045	3	.045	10	.064										
114	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	35	1.5	2	-.055	3	.032	11	.064										
115	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	35	1.5	2	-.064	3		4	-.064										
116	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	35	1.5	2	-.055	3	-.032	5	-.064										
117	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	35	1.5	2	-.045	3	-.045	6	-.064										
118	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	35	1.5	2	-.032	3	-.055	7	-.064										
119	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	35	1.5	2		3	-.064	8	-.064										
120	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	35	1.5	2	.032	3	-.055	9	-.064										
121	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	35	1.5	2	.045	3	-.045	10	-.064										
122	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	35	1.5	2	.055	3	-.032	11	-.064										
123	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	36	1.5	2	.064	3		4	.064										
124	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	36	1.5	2	.055	3	.032	5	.064										
125	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	36	1.5	2	.045	3	.045	6	.064										
126	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	36	1.5	2	.032	3	.055	7	.064										
127	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	36	1.5	2		3	.064	8	.064										
128	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	36	1.5	2	-.032	3	.055	9	.064										
129	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	36	1.5	2	-.045	3	.045	10	.064										
130	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	36	1.5	2	-.055	3	.032	11	.064										
131	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	36	1.5	2	-.064	3		4	-.064										
132	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	36	1.5	2	-.055	3	-.032	5	-.064										
133	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	36	1.5	2	-.045	3	-.045	6	-.064										
134	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	36	1.5	2	-.032	3	-.055	7	-.064										
135	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	36	1.5	2		3	-.064	8	-.064										
136	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	36	1.5	2	.032	3	-.055	9	-.064										
137	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	36	1.5	2	.045	3	-.045	10	-.064										
138	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	36	1.5	2	.055	3	-.032	11	-.064										
139	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	37	1.5	2	.064	3		4	.064										
140	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	37	1.5	2	.055	3	.032	5	.064										
141	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	37	1.5	2	.045	3	.045	6	.064										
142	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	37	1.5	2	.032	3	.055	7	.064										
143	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	37	1.5	2		3	.064	8	.064										
144	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	37	1.5	2	-.032	3	.055	9	.064										
145	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	37	1.5	2	-.045	3	.045	10	.064										
146	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	37	1.5	2	-.055	3	.032	11	.064										
147	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	37	1.5	2	-.064	3		4	-.064										
148	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	37	1.5	2	-.055	3	-.032	5	-.064										
149	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	37	1.5	2	-.045	3	-.045	6	-.064										
150	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	37	1.5	2	-.032	3	-.055	7	-.064										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac..	B...	Fac...	BLC	Fac..	BLC	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac..	B...	Fac...
151	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	37	1.5	2		3	-.064	8	-.064										
152	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	37	1.5	2	.032	3	-.055	9	-.064										
153	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	37	1.5	2	.045	3	-.045	10	-.064										
154	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	37	1.5	2	.055	3	-.032	11	-.064										
155	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	38	1.5	2	.064	3		4	.064										
156	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	38	1.5	2	.055	3	.032	5	.064										
157	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	38	1.5	2	.045	3	.045	6	.064										
158	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	38	1.5	2	.032	3	.055	7	.064										
159	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	38	1.5	2		3	.064	8	.064										
160	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	38	1.5	2	-.032	3	.055	9	.064										
161	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	38	1.5	2	-.045	3	.045	10	.064										
162	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	38	1.5	2	-.055	3	.032	11	.064										
163	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	38	1.5	2	-.064	3		4	-.064										
164	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	38	1.5	2	-.055	3	-.032	5	-.064										
165	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	38	1.5	2	-.045	3	-.045	6	-.064										
166	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	38	1.5	2	-.032	3	-.055	7	-.064										
167	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	38	1.5	2		3	-.064	8	-.064										
168	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	38	1.5	2	.032	3	-.055	9	-.064										
169	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	38	1.5	2	.045	3	-.045	10	-.064										
170	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	38	1.5	2	.055	3	-.032	11	-.064										
171	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	39	1.5	2	.064	3		4	.064										
172	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	39	1.5	2	.055	3	.032	5	.064										
173	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	39	1.5	2	.045	3	.045	6	.064										
174	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	39	1.5	2	.032	3	.055	7	.064										
175	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	39	1.5	2		3	.064	8	.064										
176	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	39	1.5	2	-.032	3	.055	9	.064										
177	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	39	1.5	2	-.045	3	.045	10	.064										
178	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	39	1.5	2	-.055	3	.032	11	.064										
179	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	39	1.5	2	-.064	3		4	-.064										
180	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	39	1.5	2	-.055	3	-.032	5	-.064										
181	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	39	1.5	2	-.045	3	-.045	6	-.064										
182	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	39	1.5	2	-.032	3	-.055	7	-.064										
183	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	39	1.5	2		3	-.064	8	-.064										
184	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	39	1.5	2	.032	3	-.055	9	-.064										
185	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	39	1.5	2	.045	3	-.045	10	-.064										
186	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	39	1.5	2	.055	3	-.032	11	-.064										
187	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	40	1.5	2	.064	3		4	.064										
188	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	40	1.5	2	.055	3	.032	5	.064										
189	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	40	1.5	2	.045	3	.045	6	.064										
190	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	40	1.5	2	.032	3	.055	7	.064										
191	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	40	1.5	2		3	.064	8	.064										
192	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	40	1.5	2	-.032	3	.055	9	.064										
193	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	40	1.5	2	-.045	3	.045	10	.064										
194	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	40	1.5	2	-.055	3	.032	11	.064										
195	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	40	1.5	2	-.064	3		4	-.064										
196	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	40	1.5	2	-.055	3	-.032	5	-.064										
197	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	40	1.5	2	-.045	3	-.045	6	-.064										
198	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	40	1.5	2	-.032	3	-.055	7	-.064										
199	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	40	1.5	2		3	-.064	8	-.064										
200	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	40	1.5	2	.032	3	-.055	9	-.064										
201	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	40	1.5	2	.045	3	-.045	10	-.064										
202	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	40	1.5	2	.055	3	-.032	11	-.064										

Load Combinations (Continued)

	Description	S...	P...	S...	B...	Factor	B...	Fac...	B...	Fac...	BLC	Fac...	BLC	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...	B...	Fac...
203	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	41	1.5	2	.064	3		4	.064										
204	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	41	1.5	2	.055	3	.032	5	.064										
205	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	41	1.5	2	.045	3	.045	6	.064										
206	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	41	1.5	2	.032	3	.055	7	.064										
207	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	41	1.5	2		3	.064	8	.064										
208	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	41	1.5	2	-.032	3	.055	9	.064										
209	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	41	1.5	2	-.045	3	.045	10	.064										
210	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	41	1.5	2	-.055	3	.032	11	.064										
211	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	41	1.5	2	-.064	3		4	-.064										
212	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	41	1.5	2	-.055	3	-.032	5	-.064										
213	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	41	1.5	2	-.045	3	-.045	6	-.064										
214	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	41	1.5	2	-.032	3	-.055	7	-.064										
215	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	41	1.5	2		3	-.064	8	-.064										
216	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	41	1.5	2	.032	3	-.055	9	-.064										
217	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	41	1.5	2	.045	3	-.045	10	-.064										
218	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	41	1.5	2	.055	3	-.032	11	-.064										
219	1.2DL + 1.5Lm + 1Wm 0..	Yes	Y		DL	1.2	42	1.5	2	.064	3		4	.064										
220	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	42	1.5	2	.055	3	.032	5	.064										
221	1.2DL + 1.5Lm + 1Wm 4..	Yes	Y		DL	1.2	42	1.5	2	.045	3	.045	6	.064										
222	1.2DL + 1.5Lm + 1Wm 6..	Yes	Y		DL	1.2	42	1.5	2	.032	3	.055	7	.064										
223	1.2DL + 1.5Lm + 1Wm 9..	Yes	Y		DL	1.2	42	1.5	2		3	.064	8	.064										
224	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	42	1.5	2	-.032	3	.055	9	.064										
225	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	42	1.5	2	-.045	3	.045	10	.064										
226	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	42	1.5	2	-.055	3	.032	11	.064										
227	1.2DL + 1.5Lm + 1Wm 1..	Yes	Y		DL	1.2	42	1.5	2	-.064	3		4	-.064										
228	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	42	1.5	2	-.055	3	-.032	5	-.064										
229	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	42	1.5	2	-.045	3	-.045	6	-.064										
230	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	42	1.5	2	-.032	3	-.055	7	-.064										
231	1.2DL + 1.5Lm + 1Wm 2..	Yes	Y		DL	1.2	42	1.5	2		3	-.064	8	-.064										
232	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	42	1.5	2	.032	3	-.055	9	-.064										
233	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	42	1.5	2	.045	3	-.045	10	-.064										
234	1.2DL + 1.5Lm + 1Wm 3..	Yes	Y		DL	1.2	42	1.5	2	.055	3	-.032	11	-.064										

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	N25	max	1427.3...	3	838.892	4	1624.51	39	146.705	31	176.367	33	1852.7...	3
2		min	-1426.53	27	-839.984	28	55.911	31	-3280....	208	-2265....	130	-1849....	27
3	N81A	max	1427.3...	17	839.98	24	1624.51	45	3280.8...	182	176.384	19	1849.9...	25
4		min	-1426....	25	-838.887	16	55.901	21	-146.724	21	-2265....	116	-1852....	17
5	N92A	max	188.815	18	1499.7...	6	1576.5...	34	619.482	167	3645.5...	34	1581.9...	30
6		min	-191.397	10	-1499....	14	20.496	26	-619.484	223	-264.642	26	-1581....	22
7	Totals:	max	2706.6...	2	2556.2...	6	4469.5...	41						
8		min	-2706....	26	-2556....	30	1574.4...	81						

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
1	M40A	C3X5	.258	34.856	45	.037	34.856	y	42	3228...	47628	981....	4104	...	H1-...
2	M11	C3X5	.258	34.856	39	.037	34.856	y	42	3228...	47628	981....	4104	...	H1-...
3	M45	C3X5	.248	34.856	35	.036	34.856	y	37	3228...	47628	981....	4104	...	H1-...

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

	Member	Shape	Code Check	Loc[in]	LC	Shear Ch...	Loc[in]	...	LC	phi*P...	phi*P...	phi*...	phi*...	...	Eqn
4	M41A	HSS4X4X4	.247	40	42	.083	40	y	115	1136...	1395...	1618...	1618...	....	H1-...
5	M12	HSS4X4X4	.247	40	42	.083	40	y	131	1136...	1395...	1618...	1618...	....	H1-...
6	M46A	HSS4X4X4	.237	40	36	.081	40	y	222	1136...	1395...	1618...	1618...	....	H1-...
7	M44A	6.5"x0.37" P...	.176	21	13	.062	21	y	47	2754...	7575...	583....	6712...	....	H1-...
8	M15	6.5"x0.37" P...	.176	21	7	.062	21	y	37	2754...	7575...	583....	6712...	....	H1-...
9	M49A	6.5"x0.37" P...	.175	21	2	.060	21	y	220	2754...	7575...	583....	6679...	....	H1-...
10	MP3	PIPE_2.5	.110	57	5	.027	57		3	3348...	66654	4726.5	4726.5	1	H1-...
11	MP1	PIPE_2.5	.110	57	15	.027	57		17	3348...	66654	4726.5	4726.5	....	H1-...
12	MP9	PIPE_2.5	.109	57	10	.025	57		8	3348...	66654	4726.5	4726.5	....	H1-...
13	MP4	PIPE_2.5	.109	57	10	.025	57		12	3348...	66654	4726.5	4726.5	1	H1-...
14	H1	Pipe 3.5x0....	.104	24	126	.064	24		11	4587...	7156...	6336...	6336...	1	H1-...
15	MP7	PIPE_2.5	.103	57	5	.023	57		6	3348...	66654	4726.5	4726.5	1	H1-...
16	MP6	PIPE_2.5	.103	57	15	.023	57		14	3348...	66654	4726.5	4726.5	....	H1-...
17	H3	Pipe 3.5x0....	.103	24	179	.062	24		16	4587...	7156...	6336...	6336...	1	H1-...
18	H2	Pipe 3.5x0....	.103	72	211	.062	72		4	4587...	7156...	6336...	6336...	1	H1-...
19	MP2	PIPE_2.5	.079	57	6	.037	57		6	3348...	66654	4726.5	4726.5	1	H1-...
20	MP8	PIPE_2.5	.075	57	10	.037	57		11	3348...	66654	4726.5	4726.5	....	H1-...
21	MP5	PIPE_2.5	.075	57	10	.037	57		9	3348...	66654	4726.5	4726.5	1	H1-...
22	M50A	PIPE_2.5	.070	60	10	.046	83.75		2	2274...	66654	4726.5	4726.5	1	H1-...
23	M51	PIPE_2.5	.070	60	10	.046	36.25		2	2274...	66654	4726.5	4726.5	1	H1-...
24	M19	PIPE_2.5	.070	60	5	.047	83.75		12	2274...	66654	4726.5	4726.5	1	H1-...
25	M50B	L6.6"X4.46"...	.070	36.804	18	.018	36.804	y	17	5117...	87561	2464...	7125...	1	H2-1
26	M22	L6.6"X4.46"...	.070	0	18	.018	0	y	3	5117...	87561	2464...	7125...	1	H2-1
27	M51A	L6.6"X4.46"...	.055	0	29	.017	0	y	14	5117...	87561	2464...	7125...	1	H2-1
28	M14	L2x2x3	.025	13.932	42	.014	27.295	y	38	1808...	2339...	557....	1182...	1	H2-1
29	M42	L2x2x3	.025	13.932	42	.014	27.295	z	46	1808...	2339...	557....	1208...	....	H2-1
30	M43A	L2x2x3	.025	13.932	46	.014	27.295	y	43	1808...	2339...	557....	1182...	1	H2-1
31	M48	L2x2x3	.025	13.932	38	.014	27.295	y	49	1808...	2339...	557....	1182...	1	H2-1
32	M13	L2x2x3	.025	13.932	38	.014	27.295	z	41	1808...	2339...	557....	1208...	....	H2-1
33	M47A	L2x2x3	.025	13.932	46	.014	27.295	z	35	1808...	2339...	557....	1208...	....	H2-1

APPENDIX D

ADDITIONAL CALCULATIONS

Trylon

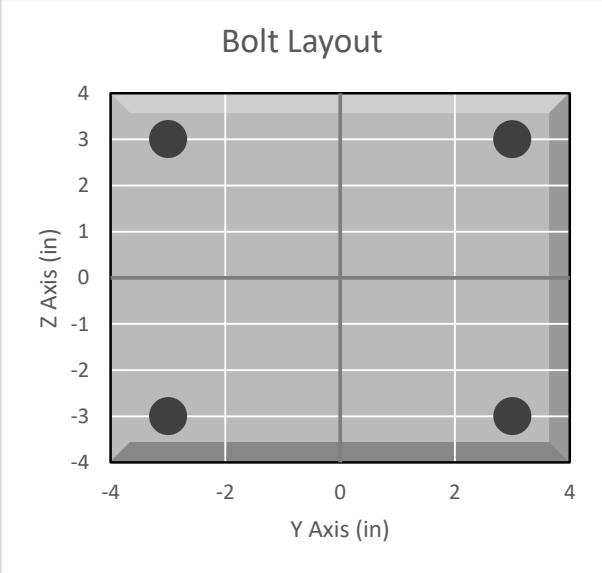
Analysis date: 6/3/2022

BOLT TOOL 1.5.2

Project Data	
Job Code:	211068
Carrier Site ID:	BOHVN00163A
Carrier Site Name:	CT-CCI-T-876311

Code	
Design Standard:	TIA-222-H
Slip Check:	No
Pretension Standard:	AISC

Bolt Properties		
Connection Type:	Bolt	
Diameter:	0.625	in
Grade:	A325	--
Yield Strength (Fy):	92	ksi
Ultimate Strength (Fu):	120	ksi
Number of Bolts:	4	--
Threads Included:	Yes	--
Double Shear:	No	--
Connection Pipe Size:	-	in



Connection Description
Standoff to Monopole

Bolt Check*		
Tensile Capacity (ϕT_n):	20340.1	lbs
Shear Capacity (ϕV_n):	13805.8	lbs
Tension Force (T_u):	4001.0	lbs
Shear Force (V_u):	697.6	lbs
Tension Usage:	18.7%	--
Shear Usage:	4.8%	--
Interaction:	18.7%	Pass
Controlling Member:	M41A	--
Controlling LC:	10	--

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

1825 W. Walnut Hill Lane, Suite 120
Irving, Texas 75038

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

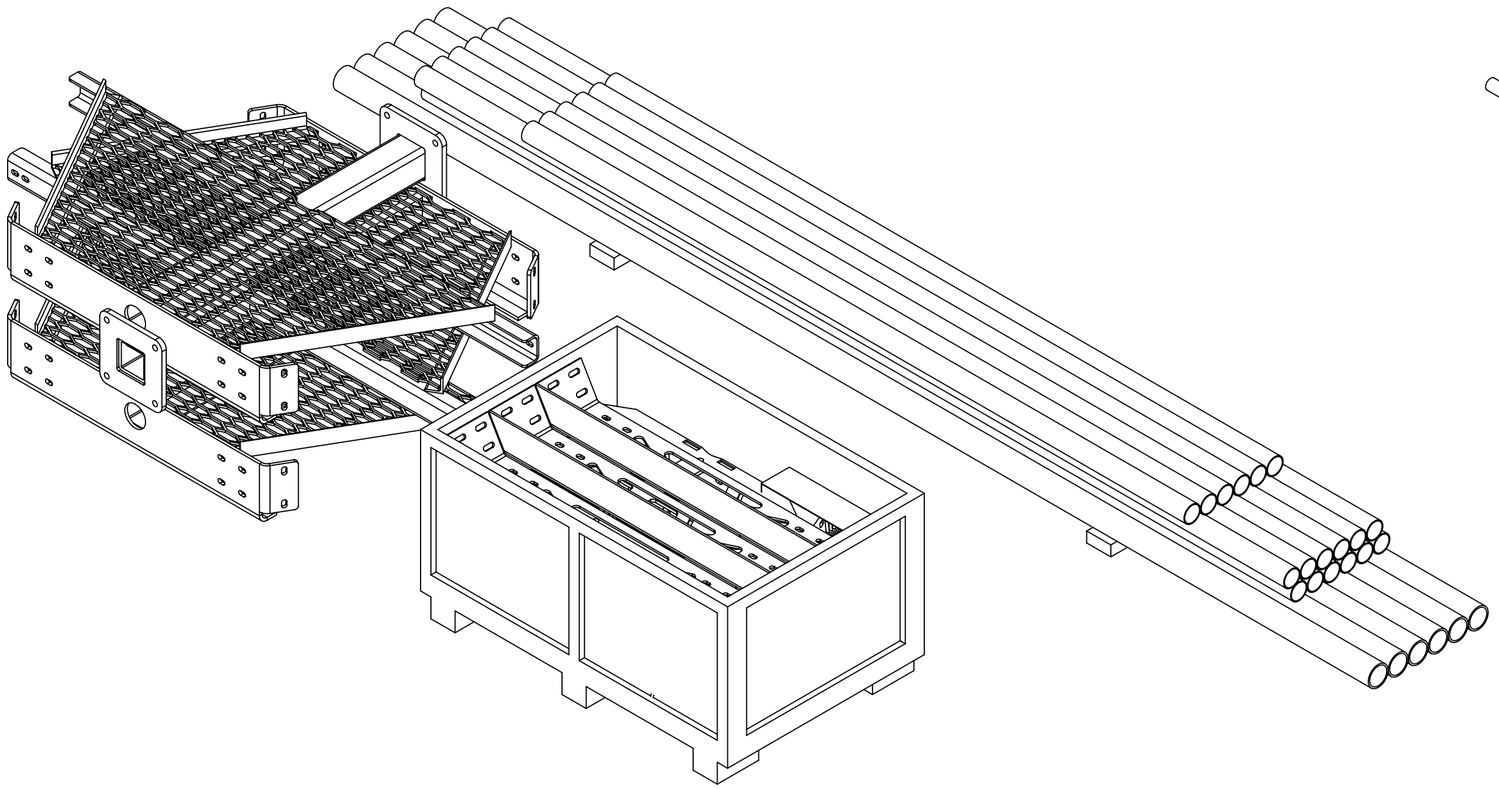
2.0 DESIGN NOTES
- 2.1 TIGHTEN ALL BOLTS SECURING FLAT PLATES BY THE TURN-OF-NUT METHOD. TIGHTEN ALL U-BOLTS USING TURN-OF-NUT METHOD WITH ATTENTION TO LEAVE EQUAL DISTANCE AND EQUAL FORCE ON EACH LEG OF THE U-BOLT.

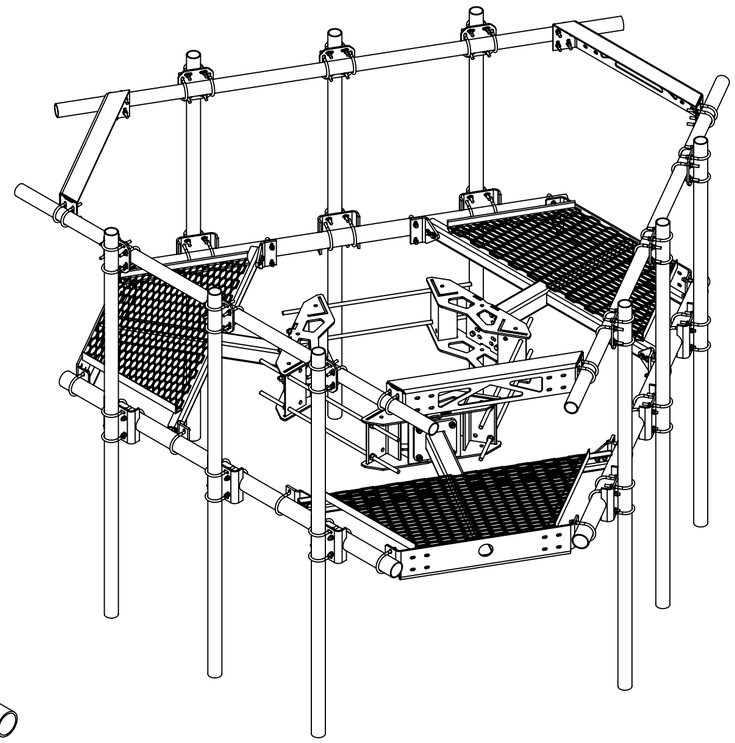
3.0 MANUFACTURING/SPECIAL REQUIREMENTS

4.0 TEST

5.0 PACKAGING
- 5.1 PACKAGING SHALL MEET COMMSCOPE REQUIREMENTS PER DOCUMENT IS-PL-3005.
- 5.2 PRINTED DOCUMENT TO BE PLACED INSIDE POLYBAG AND THEN IN SHIPPING CONTAINER.
- 5.3 EXTRA HARDWARE MAYBE SUPPLIED, BAGGED AND SHIPPED.

REVISIONS				
REV.	ECN	DESCRIPTION	BY	DATE
A	10272PC	INITIAL RELEASE	HDAI	03/08/2021
B	14762	SHEET 1: UPDATED NOTE 2.1 & ADDED NOTE 5.1 TO 5.2 SHEET2: REPOSITION ANTENNA PIPES; CHANGED HAND RAIL DISTANCE FORM PLATFORM: 42" WAS 40" IN ZONE B3; DIM ∅12 WAS ∅15 IN ZONE D3; UPDATED ITEM 4: GB-0522A WAS GB-0520A	JL1183	09/10/2021
c	40139639CMO	ADDED WEIGHT AND MASS INFORMATION	LL1090	12/07/2021





PATENT PENDING

DENSITY		lbs/in³
MASS	1801.56	lbs
VOLUME	6362.00	in³
SURFACE AREA	55884.77	in²
HEIGHT	96"	
LENGTH	46"	
WIDTH	29'	

COMMSCOPE, INC. OF NORTH CAROLINA

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

SAP MATERIAL MASTER: MC-PK8-DSH

FINISH: GALV A123

MATERIAL: SEE SEPARATE BILLS OF MATERIAL

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

	NAME	DATE
CE	MRC	02/17/20
RW	LL1090	12/07/2021
AD	VCORTEZ1	12/09/2021
RE	VCORTEZ1	12/09/2021

ECN 40139639CMO

TITLE: **LOW PROFILE PLATFORM FACE**

SCALE: 1:32

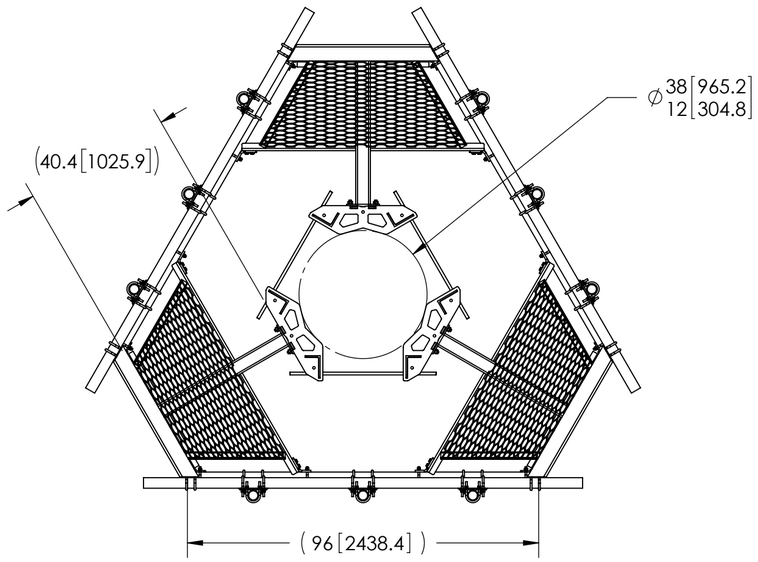
DOCUMENT NO.: MC-PK8-DSH

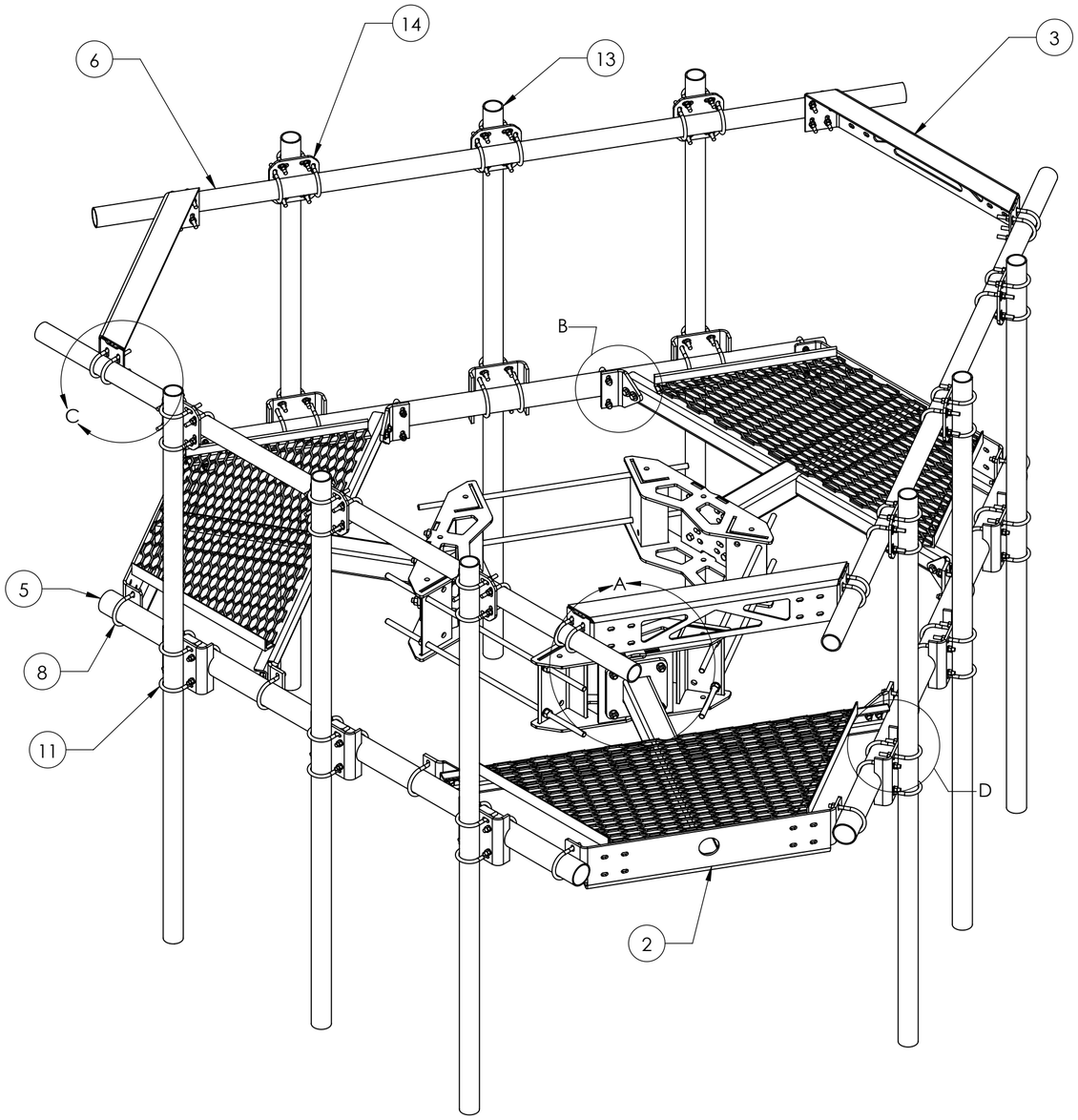
SIZE: C

Auth Group: INSL

MODEL			DRAWING			SHEET
VERSION	STATUS	REVISION	VERSION	STATUS	REVISION	
03	RE	B	02	RE	C	1 OF 3

NOTES:





BOM IS FOR REFERENCE ONLY, PART NUMBER SUBSTITUTIONS MAY BE MADE

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-0522A	5/8" X 2-1/4" 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 ASSY	9
12	GUB-4352	1/2" X 3" X 5-1/4" GALV U-BOLT	12
13	MT54696	∅2.875" O.D. X 96 PIPE	9
14	XP-2525	CROSSOVER PLATE KIT, 2-7/8 OD X 2-7/8 OD	9

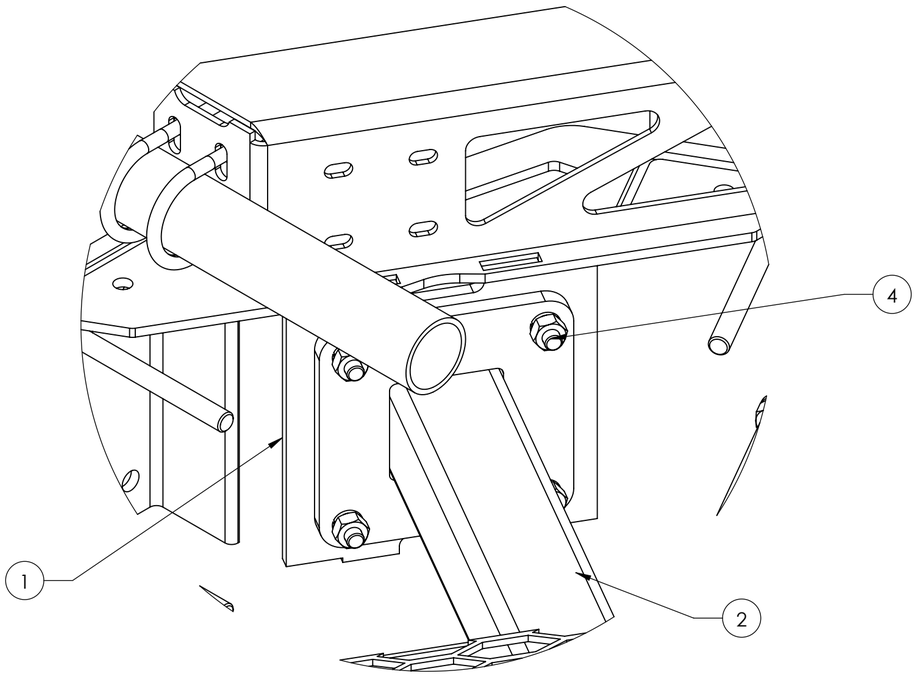
COMMSCOPE, INC. OF NORTH CAROLINA

TITLE

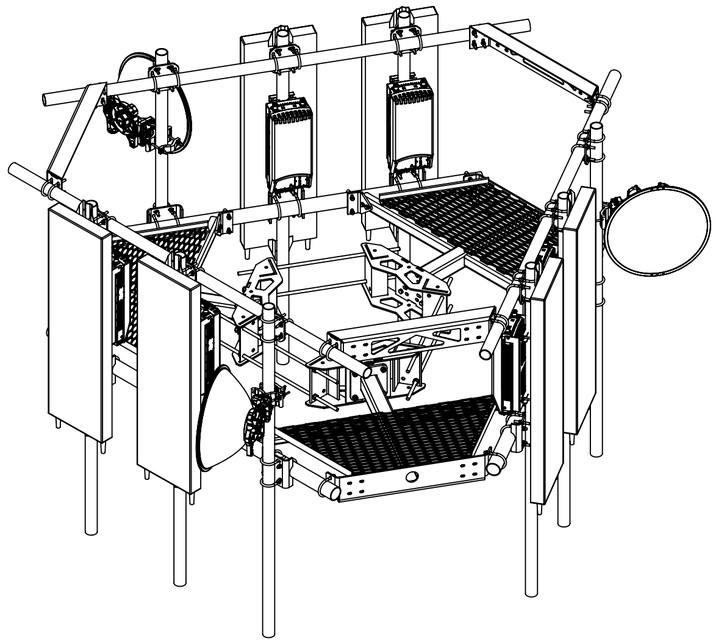
LOW PROFILE PLATFORM FACE

SIZE	SCALE	DOCUMENT NO.			
C	1:32	MC-PK8-DSH			
		DRAWING			SHEET
		VERSION	STATUS	REVISION	
		02	RE	C	

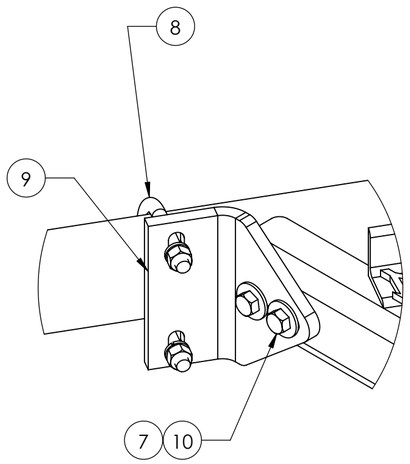
NOTES:



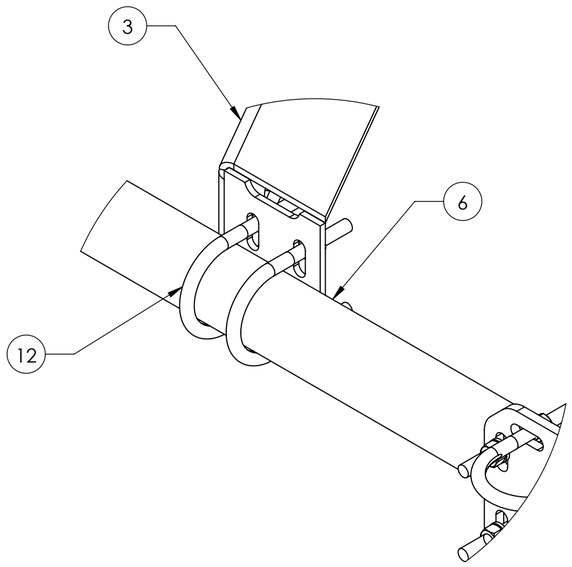
DETAIL A
SCALE 1 : 4



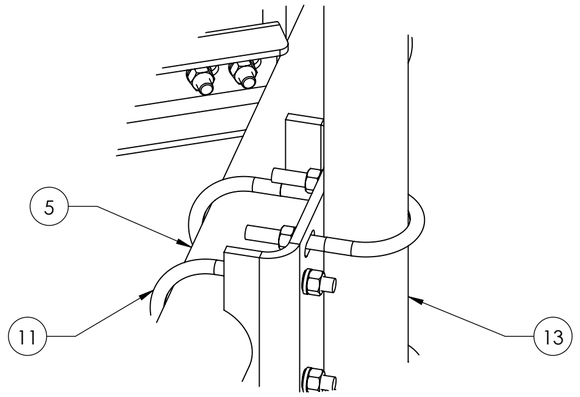
WITH ANTENNAS



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		SHEET
		VERSION: 02	STATUS: RE	REVISION: C
				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: 876311

BOHVN00163A
39 Toelles Road
Wallingford, Connecticut 06492

June 16, 2022

EBI Project Number: 6222004124

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**2.30%**

June 16, 2022

Attn: Dish Wireless

Emissions Analysis for Site: 876311 - BOHVN00163A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **39 Toelles Road** in **Wallingford, 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 39 Toelles Road in Wallingford, 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) 4 n66 channels (AWS Band - 2190 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 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.

6) The antennas used in this modeling are the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector A, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector B, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 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.

7) The antenna mounting height centerline of the proposed antennas is 106 feet above ground level (AGL).

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

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

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 / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz
Gain:	11.35 dBd / 15.75 dBd / 16.75 dBd	Gain:	11.35 dBd / 15.75 dBd / 16.75 dBd	Gain:	11.35 dBd / 15.75 dBd / 16.75 dBd
Height (AGL):	106 feet	Height (AGL):	106 feet	Height (AGL):	106 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	440.00 Watts	Total TX Power (W):	440.00 Watts	Total TX Power (W):	440.00 Watts
ERP (W):	2,524.75	ERP (W):	2,524.75	ERP (W):	2,524.75
Antenna A1 MPE %:	**1.15%**	Antenna B1 MPE %:	**1.15%**	Antenna C1 MPE %:	**1.15%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	1.15%
Sprint	1.15%
Site Total MPE % :	2.30%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	1.15%
Dish Wireless Sector B Total:	1.15%
Dish Wireless Sector C Total:	1.15%
Site Total MPE % :	2.30%

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	106.0	1.59	600 MHz n71	400	0.40%
Dish Wireless 1900 MHz n70	4	245.22	106.0	3.53	1900 MHz n70	1000	0.35%
Dish Wireless 2190 MHz n66	4	275.14	106.0	3.96	2190 MHz n66	1000	0.40%
						Total:	**1.15%**

• 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:	1.15%
Sector B:	1.15%
Sector C:	1.15%
Dish Wireless Maximum MPE % (Sector A):	1.15%
Site Total:	2.30%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **2.30%** 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:
39 TOELLES RD, WALLINGFORD, CT 06492

GLOBAL SIGNAL ACQUISITIONS III 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:	**876311/SUZIO CONCRETE**
Customer Site ID:	**BOHVN00163A/CT-CCI-T-876311**
Site Address:	**39 TOELLES RD, WALLINGFORD, CT 06492**

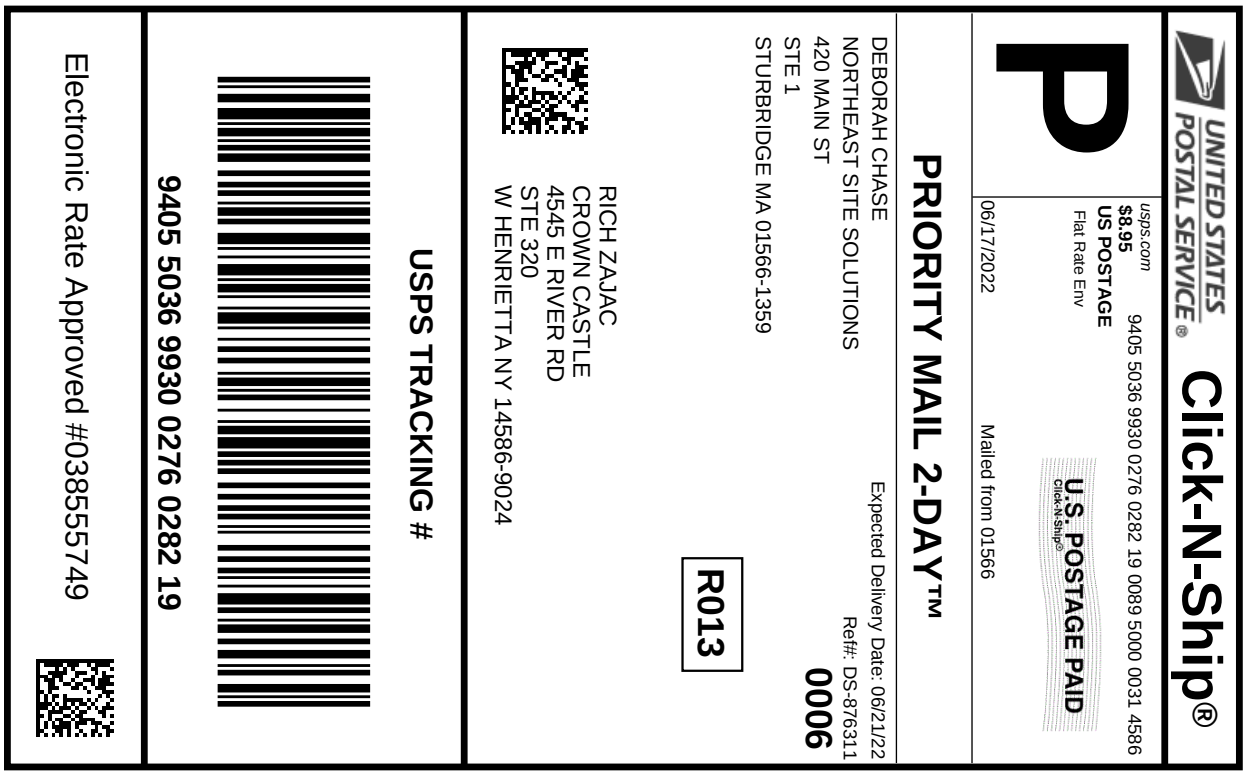
Crown Castle

By: _____ Date: 6/17/2022

Richard Zajac
Site Acquisition Specialist

Exhibit H

Recipient Mailings



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0276 0282 19

Trans. #:	565834920
Print Date:	06/17/2022
Ship Date:	06/17/2022
Expected Delivery Date:	06/21/2022

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

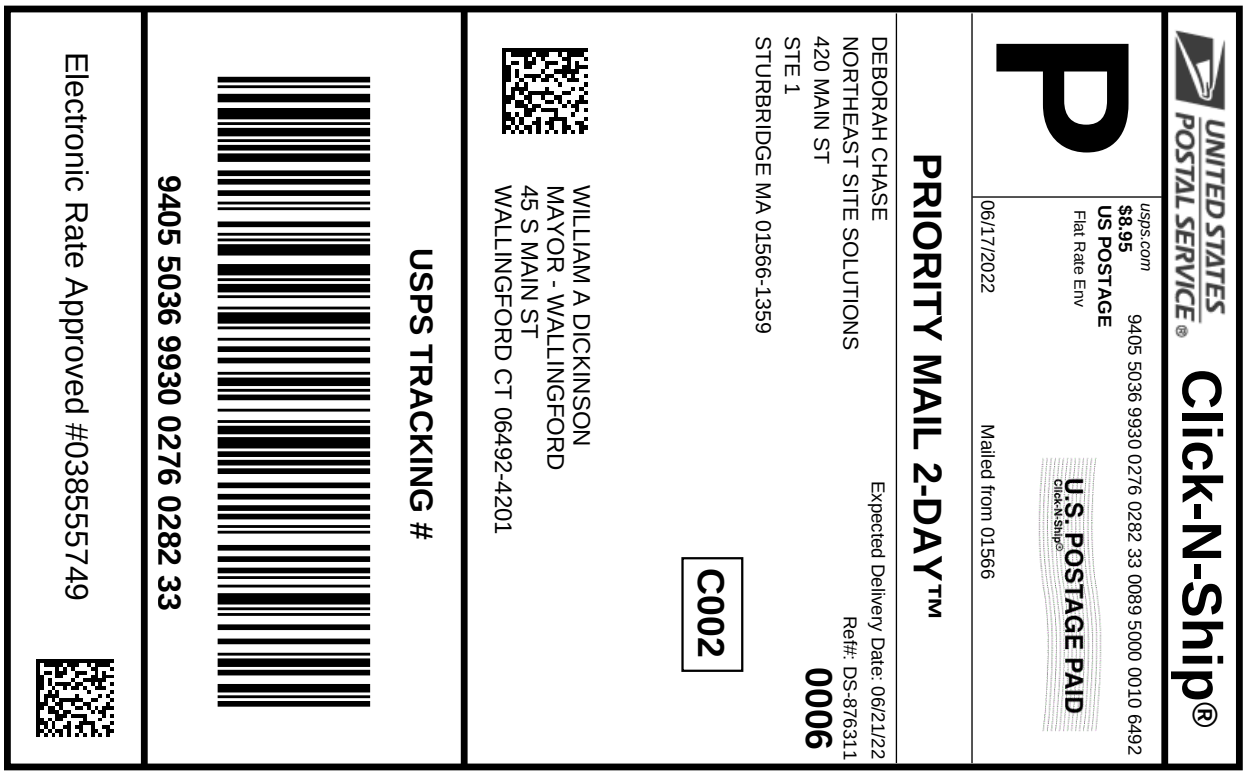
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: DS-876311

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.

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0276 0282 33

Trans. #:	565834920
Print Date:	06/17/2022
Ship Date:	06/17/2022
Expected Delivery Date:	06/21/2022

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-876311

To: WILLIAM A DICKINSON
MAYOR - WALLINGFORD
45 S MAIN ST
WALLINGFORD CT 06492-4201

* 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

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0276 0282 57 0089 5000 0010 6492

usps.com
$8.95
US POSTAGE
Flat Rate Env

06/17/2022 Mailed from 01566

U.S. POSTAGE PAID
Click-N-Ship®

PRIORITY MAIL 2-DAY™

Expected Delivery Date: 06/21/22

Ref#: DS-876311

0006

C002

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

AMY TORRE
ZONING ENFORCEMENT OFFICER
45 S MAIN ST
WALLINGFORD CT 06492-4201

USPS TRACKING #

9405 5036 9930 0276 0282 57

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0276 0282 57

Trans. #:	565834920
Print Date:	06/17/2022
Ship Date:	06/17/2022
Expected Delivery Date:	06/21/2022

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

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

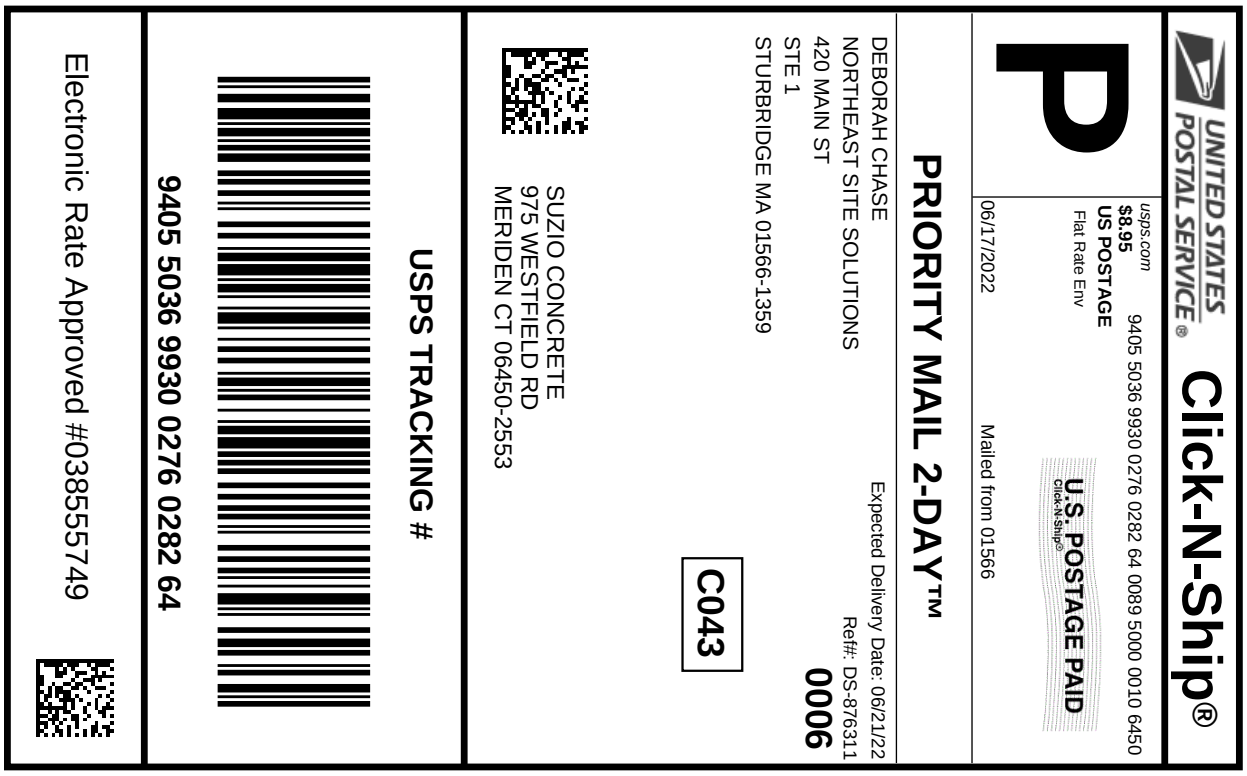
Ref#: DS-876311

To: AMY TORRE
ZONING ENFORCEMENT OFFICER
45 S MAIN ST
WALLINGFORD CT 06492-4201

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

UNITED STATES POSTAL SERVICE®

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



Cut on dotted line.

Instructions

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

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0276 0282 64

Trans. #:	565834920
Print Date:	06/17/2022
Ship Date:	06/17/2022
Expected Delivery Date:	06/21/2022

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-876311

To: SUZIO CONCRETE
975 WESTFIELD RD
MERIDEN CT 06450-2553

* 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

UNITED STATES POSTAL SERVICE.

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

06/22/2022 10:41 AM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 2.00 oz Acceptance Date: Wed 06/22/2022 Tracking #: 9405 5036 9930 0276 0282 19	1		$0.00
Prepaid Mail Wallingford, CT 06492 Weight: 0 lb 10.50 oz Acceptance Date: Wed 06/22/2022 Tracking #: 9405 5036 9930 0276 0282 33	1		$0.00
Prepaid Mail Meriden, CT 06450 Weight: 0 lb 10.40 oz Acceptance Date: Wed 06/22/2022 Tracking #: 9405 5036 9930 0276 0282 64	1		$0.00
Prepaid Mail Wallingford, CT 06492 Weight: 0 lb 10.50 oz Acceptance Date: Wed 06/22/2022 Tracking #: 9405 5036 9930 0276 0282 57	1		$0.00
Grand Total:			$0.00

****
Every household in the U.S. is now
eligible to receive a third set
of 8 free test kits.
Go to www.covidtests.gov
****

Preview your Mail
Track your Packages
Sign up for FREE @
https://informeddelivery.usps.com

All sales final on stamps and postage.
Refunds for guaranteed services only.
Thank you for your business.

Tell us about your experience.
Go to: https://postalexperience.com/Pos
or scan this code with your mobile device,

or call 1-800-410-7420.