



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

May 31, 2022

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

RE: Tower Share Application  
363 Riversville Road, Greenwich, CT 06831  
Latitude: 41.066322  
Longitude: -73.671516  
Site #: 841290\_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 363 Riversville Road, Greenwich, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas and six (6) RRUs, at the 132-foot level of the existing 160-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 compound. Included are plans by Kimley Horn, dated December 3, 2021, Exhibit C. Also included is a structural analysis prepared by Crown Castle, dated September 19, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was approved by the Connecticut Siting Council, Docket No. 50 on July 9, 1985. Please see attached Exhibit A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Fred Camillo, First Selectman and Katie DeLuca, Director of Planning & Zoning for the Town of Greenwich, as well as the tower owner (Crown Castle) and property owner (Greenwich Council of Boy Scouts 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 160-feet and the Dish Wireless LLC antennas will be located at a center line height of 132-feet.
2. The proposed modifications will not result in an increase of the site boundary as depicted on the attached site plan.



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 38.28% as evidenced by Exhibit F.

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

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

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this monopole tower in Greenwich. 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 132-foot level of the existing 160-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 Greenwich.

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](mailto:denise@northeastsitesolutions.com)



**NSS**

**NORTHEAST**  
SITE SOLUTIONS

*Turnkey Wireless Development*

Attachments

Cc: Fred Camillo, First Selectman  
Town Hall  
101 Field Point Road  
Greenwich, CT 06830

Katie DeLuca, Director of Planning & Zoning  
Town Hall  
101 Field Point Road  
Greenwich, CT 06830

Greenwich Council of Boy Scouts Inc – Property Owner  
63 Mason Street  
Greenwich, CT 06830

Crown Castle, Tower Owner

# Exhibit A

## **Original Facility Approval**

## Terry, Dashanna

---

**From:** Patrick LaRow <Patrick.LaRow@greenwichct.org>  
**Sent:** Thursday, January 21, 2016 12:08 PM  
**To:** Terry, Dashanna  
**Cc:** Barbadora, Jeff  
**Subject:** Re: Zoning Documents - Tower at 363 Riversville Road

The Planning and Zoning office does not have any documents related to a telecommunications facility at this address.

Patrick LaRow, AICP  
Deputy Director / Assistant Town Planner

Town of Greenwich  
Planning and Zoning  
101 Field Point Road  
Greenwich, CT 06830

Phone: (203) 622-7894 Fax: (203) 622-3795

[Patrick.LaRow@greenwichct.org](mailto:Patrick.LaRow@greenwichct.org)

From: "Terry, Dashanna" <[Dashanna.Terry@crowncastle.com](mailto:Dashanna.Terry@crowncastle.com)>  
To: "[patrick.larow@greenwichct.org](mailto:patrick.larow@greenwichct.org)" <[patrick.larow@greenwichct.org](mailto:patrick.larow@greenwichct.org)>  
Cc: "Barbadora, Jeff" <[Jeff.Barbadora@crowncastle.com](mailto:Jeff.Barbadora@crowncastle.com)>  
Date: 01/21/2016 10:29 AM  
Subject: Zoning Documents - Tower at 363 Riversville Road

Hello Patrick,

Thank you for speaking with me this morning regarding zoning documents for the tower at 363 Riversville Road. Could you please confirm here that you do not have original zoning documents for this tower?

Best,  
Dashanna

DASHANNA TERRY  
Real Estate Project Coordinator  
T: (781) 970-0067 | M: (571) 241-0984

<cid:image001.png@01CF9124.0525FEA0>

12 Gill Street, Suite 5800, Woburn, MA 01801 Crowncastle.com

# Exhibit B

## Property Card

ADMINISTRATIVE INFORMATION

OWNERSHIP

Tax ID 081/014

Card No. 1 of 1

PARCEL NUMBER

10-4035

GREENWICH COUNCIL OF BOY SCOUTS INC

TRANSFER OF OWNERSHIP

63 MASON STREET  
GREENWICH, CT 06830

Date

Parent Parcel Number

LOT NO PT 25 RIVERSVILLE E51

01/07/2011	GREENWICH COUNCIL OF BOY SCOUTS INC	Bk/Pg: 6081, 35
		\$0
02/21/1974	NA	Bk/Pg: 880, 287
		\$0

Property Address

RIVERSVILLE ROAD 0363

Neighborhood

162100 MID COUNTRY WEST - DIST 10 [3]

Property Class

699 Exempt Open Space

TAXING DISTRICT INFORMATION

Jurisdiction 57 Greenwich, CT

Area 001

Corporation 057

District 10

Section & Plat 091

Routing Number 7227E0051

# EXEMPT

VALUATION RECORD

Assessment Year	10/01/2005	10/01/2007	10/01/2010	10/01/2015	10/01/2015	10/01/2016
Reason for Change	2005 Reval	2007 List	2010 Reval	2015 Prelim	2015 Final	2016 List
VALUATION	L 7866600	7866600	7162500	3010000	3810000	4710000
Market	B 271100	82200	44600	63500	63500	63500
	T 8137700	7948800	7207100	3073500	3873500	4773500
VALUATION	L 5506620	5506620	5013750	2107000	2667000	3297000
70% Assessed	B 189770	57540	31220	44450	44450	44450
	T 5696390	5564160	5044970	2151450	2711450	3341450

LAND DATA AND CALCULATIONS

Public Utilities:  
Electric

Street or Road:

Neighborhood:

Zoning:

RA-2 Single Family 2 1 Residential Land

Legal Acres:

91.0000

Land Type	Rating	Measured	Table	Prod. Factor	Base	Adjusted	Extended	Influence	Value
	Soil ID	Acreage		-or-	Rate	Rate	Value	Factor	
	-or-		Effective	Depth					
	Actual	Effective	Depth	-or-					
	Frontage	Frontage	Depth	Square Feet					
1 Residential Land		4.0000		1.00	525000.00	525000.00	2100000		2100000
2 Open Space 1		87.0000		1.00	30000.00	30000.00	2610000		2610000

BP15: 15-1382: 3 antennas: \$15,000

BP16: 16-0675 nvc \$20,000 replace 3 antennas

DBA: Portion of Seton Boy Scout Reservation southeast of Merritt Parkway. Supporting parcel w/ most improvements on 10-4036, northwest of Merritt.

GEN: Revised NBHD from 180100 to 162100. RCS - 11/30/15.

Permit Number	FilingDate	Est. Cost	Field Visit
Type		Est. Sqft	

Supplemental Cards

TRUE TAX VALUE 4710000

Supplemental Cards

TOTAL LAND VALUE 4710000

1:9000  
1"=750'



7/12/2017 9:22:51 AM

This map was produced from the Town of Greenwich GIS. The Town expressly disclaims any liability that may result from the use of this map. Basemap: 4/2/08. Parcels: 10/1/12. Copyright: 2005 Town of Greenwich





# Exhibit C

## **Construction Drawings**



DISH Wireless L.L.C. SITE ID:

**NJJER01093A**

DISH Wireless L.L.C. SITE ADDRESS:

**363 RIVERSVILLE ROAD  
GREENWICH, CT 06831**

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:
<b>TOWER SCOPE OF WORK:</b>
<ul style="list-style-type: none"> <li>• INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)</li> <li>• INSTALL (1) PROPOSED ANTENNA PLATFORM MOUNT</li> <li>• INSTALL PROPOSED JUMPERS</li> <li>• INSTALL (6) PROPOSED RRUs (2 PER SECTOR)</li> <li>• INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)</li> <li>• INSTALL (1) PROPOSED HYBRID CABLE</li> </ul>
<b>GROUND SCOPE OF WORK:</b>
<ul style="list-style-type: none"> <li>• INSTALL (1) PROPOSED METAL PLATFORM</li> <li>• INSTALL (1) PROPOSED ICE BRIDGE</li> <li>• INSTALL (1) PROPOSED PPC CABINET</li> <li>• INSTALL (1) PROPOSED EQUIPMENT CABINET</li> <li>• INSTALL (1) PROPOSED POWER CONDUIT</li> <li>• INSTALL (1) PROPOSED TELCO CONDUIT</li> <li>• INSTALL (1) PROPOSED TELCO-FIBER BOX</li> <li>• INSTALL (1) PROPOSED GPS UNIT</li> <li>• INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)</li> <li>• INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)</li> <li>• INSTALL (1) PROPOSED METER SOCKET</li> <li>• DISH Wireless L.L.C. TO REMOVE ABANDONED METER</li> </ul>

SITE INFORMATION	PROJECT DIRECTORY
PROPERTY OWNER: GREENWICH COUNCIL OF BOY SCOUTS INC. ADDRESS: 63 MASON ST. GREENWICH, CT 06830 TOWER TYPE: MONOPOLE CROWN CASTLE SITE ID: 841290 CROWN CASTLE 548690 APP NUMBER: COUNTY: FAIRFIELD LATITUDE (NAD 83): 41° 3' 58.60" N 41.066278° N LONGITUDE (NAD 83): 73° 40' 17.40" W 73.671500° W ZONING JURISDICTION: CONNECTICUT SITING COUNCIL ZONING DISTRICT: RA-4 PARCEL NUMBER: 445888-506919 OCCUPANCY GROUP: U CONSTRUCTION TYPE: II-B POWER COMPANY: EVERSOURCE TELEPHONE COMPANY: LIGHTOWER	APPLICANT: DISH WIRELESS, LLC. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120 TOWER OWNER: CROWN CASTLE 2000 CORPORATE DRIVE CANONSBURG, PA 15317 (877) 486-9377 SITE DESIGNER: KIMLEY-HORN & ASSOCIATES 3875 EMBASSY PKWY, SUITE 280 AKRON, OH 44333 (216) 505-7771 COA #: PEC.0000738 SITE ACQUISITION: VICTOR NUNEZ (917) 563-3682 VICTOR.NUNEZ@CROWNCastle.COM CONSTRUCTION MANAGER: JOSEPH DIPIAZZA JOSEPH.DIPIAZZA@DISH.COM RF ENGINEER: MURUGABIRAN JAYAPAL MURUGABIRAN.JAYAPAL@DISH.COM



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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

DRAWN BY: DRD	CHECKED BY: MCK	APPROVED BY: MCK
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RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
0	11/30/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

NJJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
TITLE SHEET

SHEET NUMBER  
**T-1**



NEW JERSEY ONE CALL  
UTILITY NOTIFICATION CENTER OF NEW JERSEY  
(800) 272-1000  
WWW.NJ1-CALL.ORG  
CALL 3 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

**GENERAL NOTES**

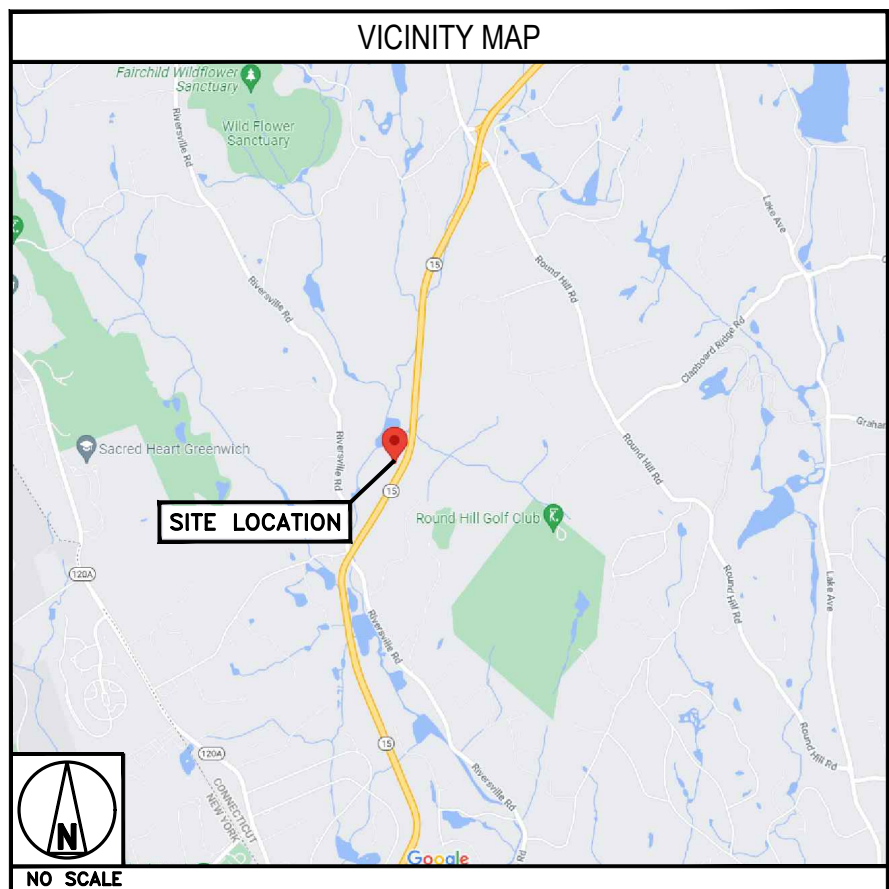
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE. NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE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

**DIRECTIONS**

DIRECTIONS FROM 3 ADP BOULEVARD, ROSELAND, NJ 07068: 12/03/21  
 x GET ON I-280 W FROM LIVINGSTON AVE  
 x CONTINUE ON I-280 W. TAKE I-287 N TO CT-15 S IN GREENWICH Exp. 01/31/22



**NEW JERSEY CODE OF COMPLIANCE**

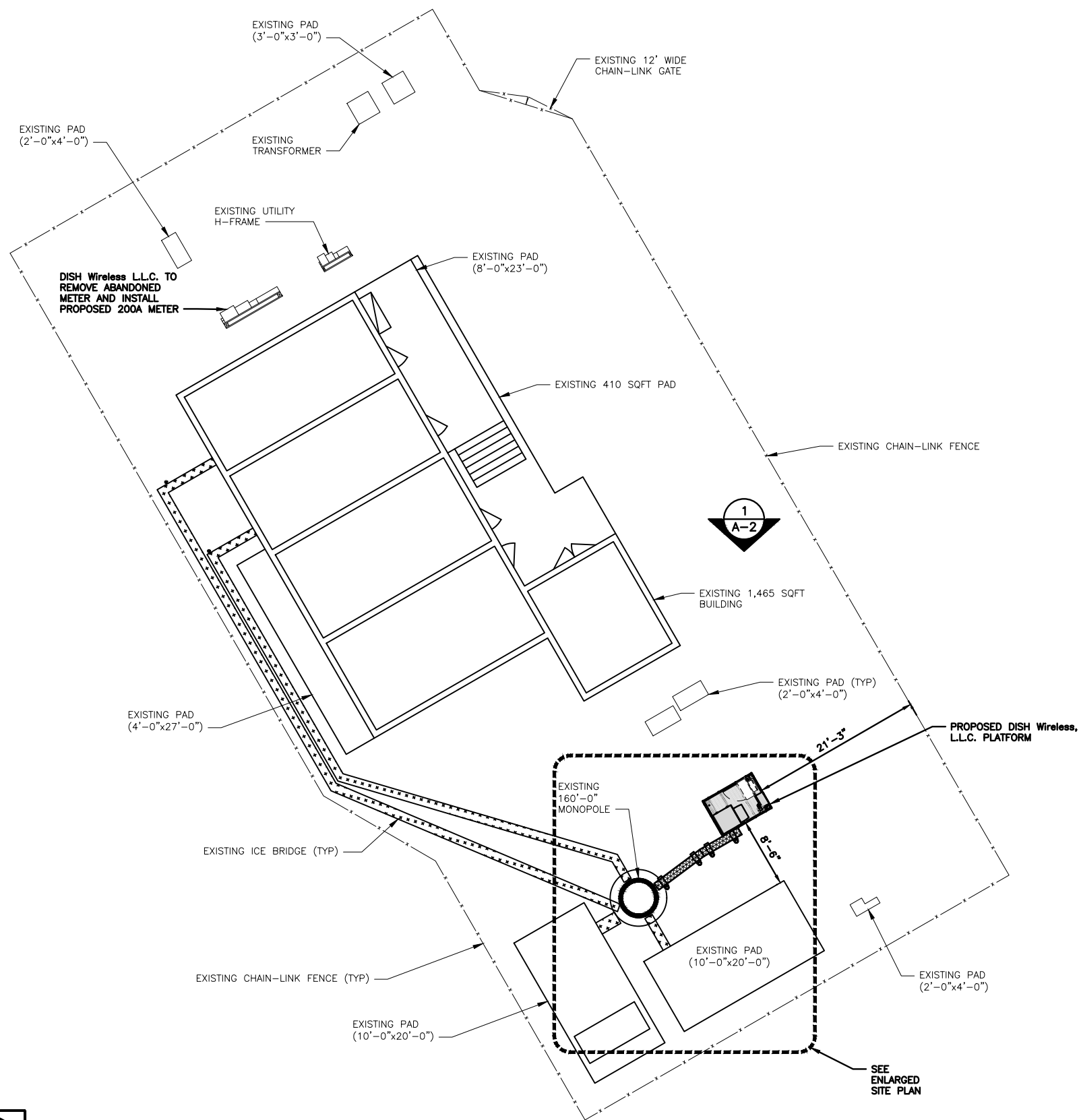
ALL WORK SHALL BE PERFORMED AND MATERIALS INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES

CODE TYPE	CODE
BUILDING	2018 IBC W/ NJ AMENDMENTS
MECHANICAL	NJ MECHANICAL SUBCODE/2018 IMC
ELECTRICAL	NJ ELECTRICAL SUBCODE/2017 NEC

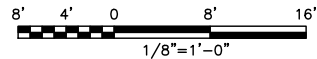
SHEET INDEX	
SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS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

**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



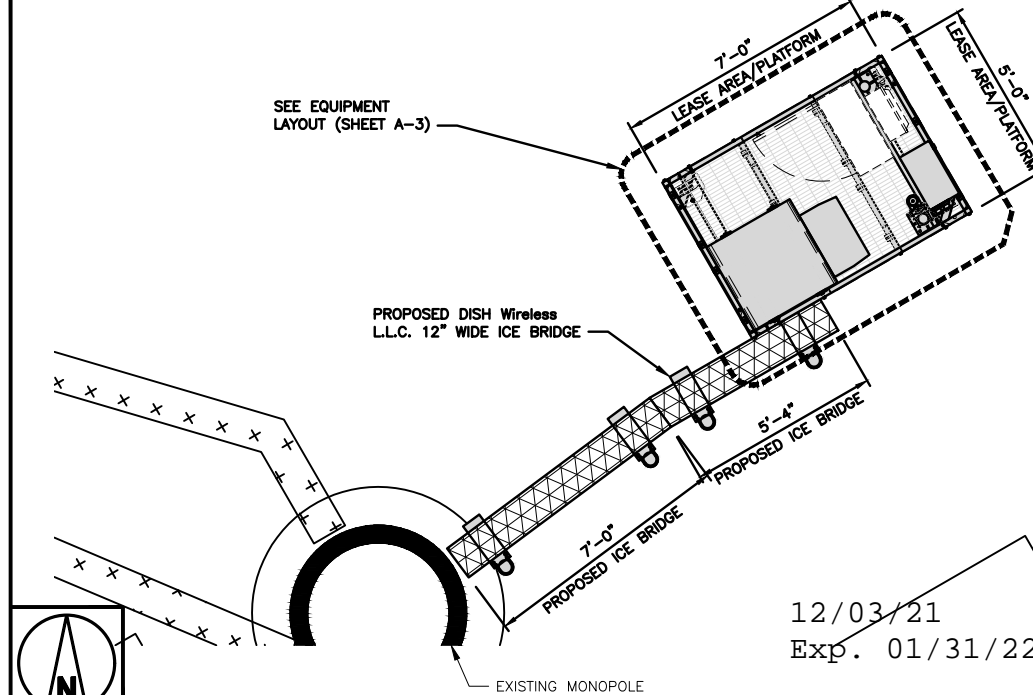
**OVERALL SITE PLAN**



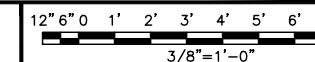
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**NOTES**

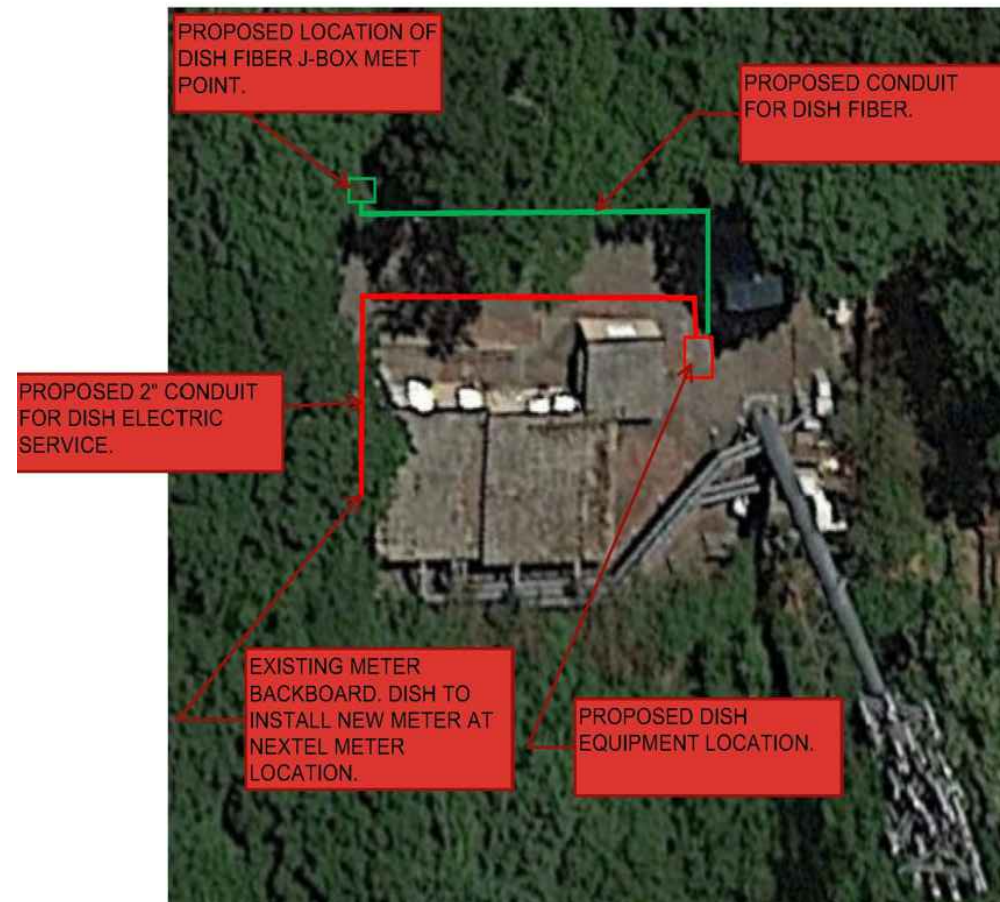
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



**ENLARGED SITE PLAN**



2



**OVERALL UTILITY ROUTE PLAN**

NO SCALE

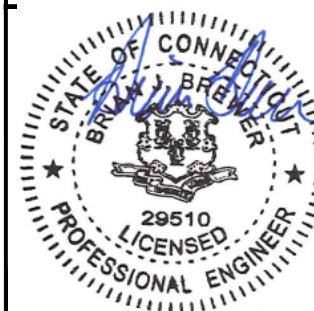
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5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



12/03/21  
Exp. 01/31/22

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DRAWN BY: CHECKED BY: APPROVED BY:  
DRD MCK MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
0	11/30/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

NJERO1093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

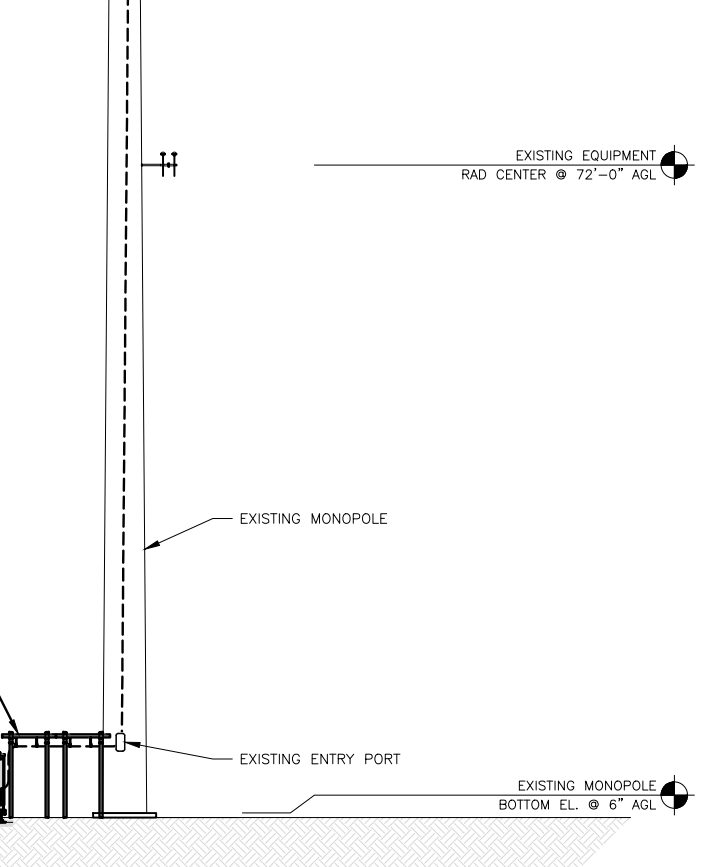
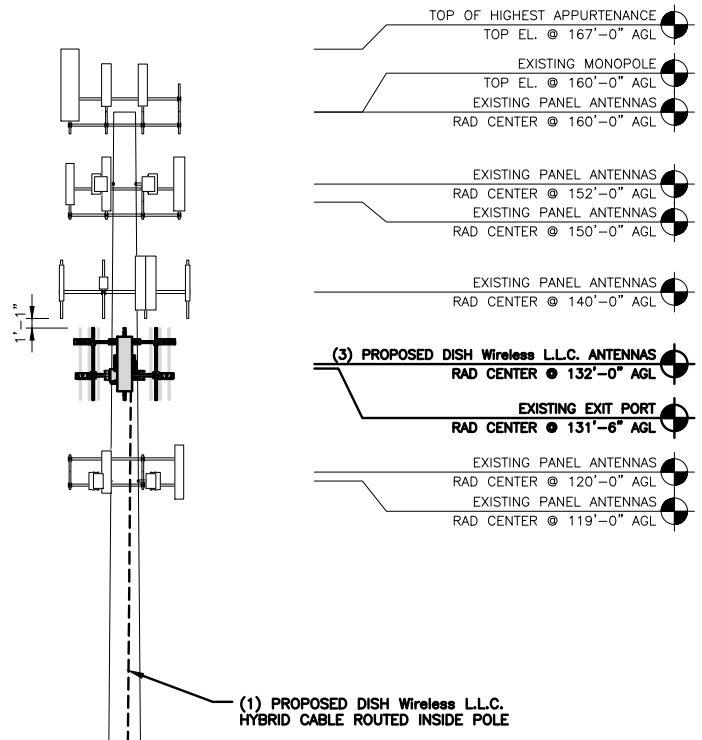
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OVERALL AND ENLARGED  
SITE PLAN

SHEET NUMBER

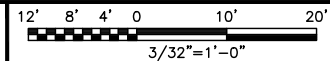
**A-1**

**NOTES**

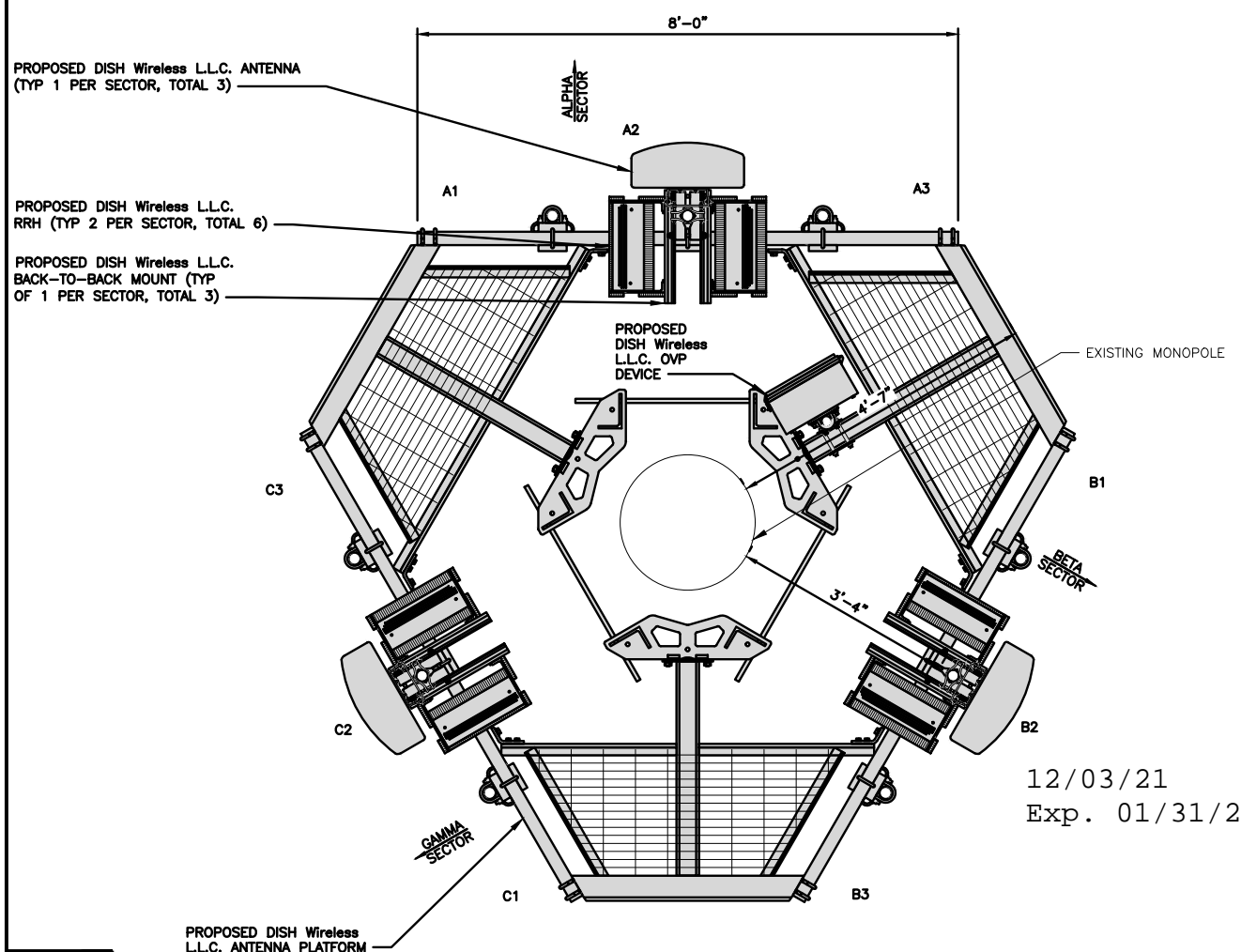
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



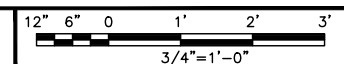
**PROPOSED NORTH ELEVATION**



1



**ANTENNA LAYOUT**



2

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECH	AZIMUTH	RAD CENTER		MANUFACTURER - MODEL NUMBER	TECH	POS.	
A1	---	---	---	---	---	(1) HIGH-CAPACITY HYBRID CABLE (170'-0" LONG)	FUJITSU - TA08025-B604	5G	A2	RAYCAP RDIDC-9181-PF-48
A2	PROPOSED	JMA - MX08FRO665-21	5G	0°	132'-0"		FUJITSU - TA08025-B605	5G	A2	
A3	---	---	---	---	---		---	---	---	
B1	---	---	---	---	---	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	B2	SHARED W/ALPHA
B2	PROPOSED	JMA - MX08FRO665-21	5G	120°	132'-0"		FUJITSU - TA08025-B605	5G	B2	
B3	---	---	---	---	---		---	---	---	
C1	---	---	---	---	---	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	C2	SHARED W/ALPHA
C2	PROPOSED	JMA - MX08FRO665-21	5G	240°	132'-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



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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DRAWN BY:	CHECKED BY:	APPROVED BY:
DRD	MCK	MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

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DISH Wireless L.L.C. PROJECT INFORMATION  
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363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER  
**A-2**



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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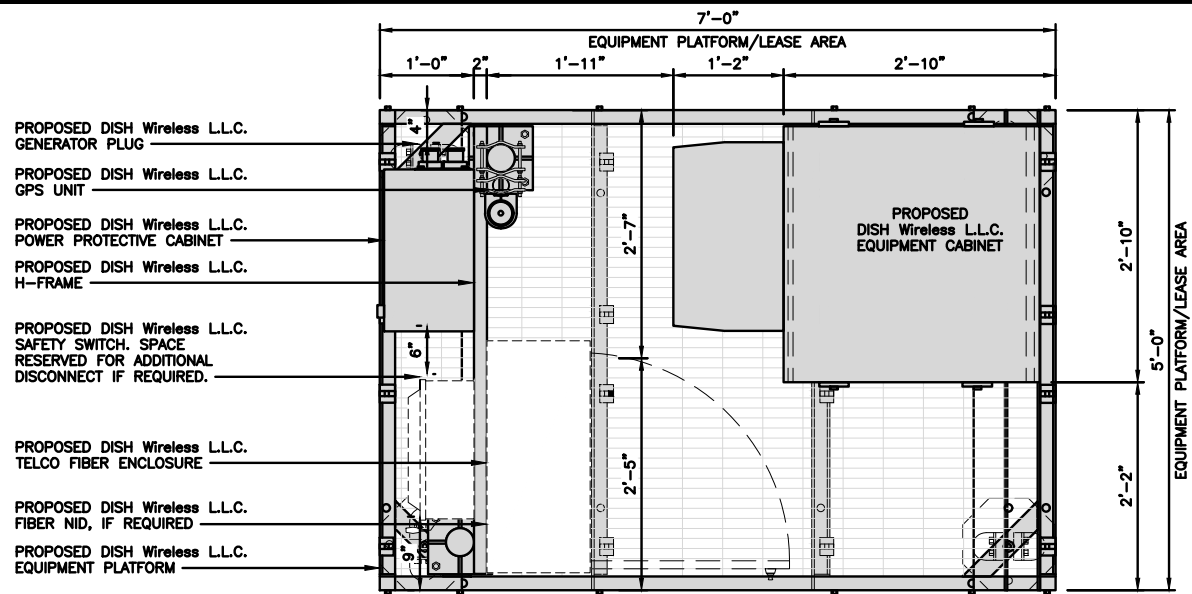
SHEET TITLE  
EQUIPMENT PLATFORM AND  
H-FRAME DETAILS

SHEET NUMBER

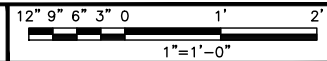
**A-3**

**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



PLATFORM EQUIPMENT PLAN

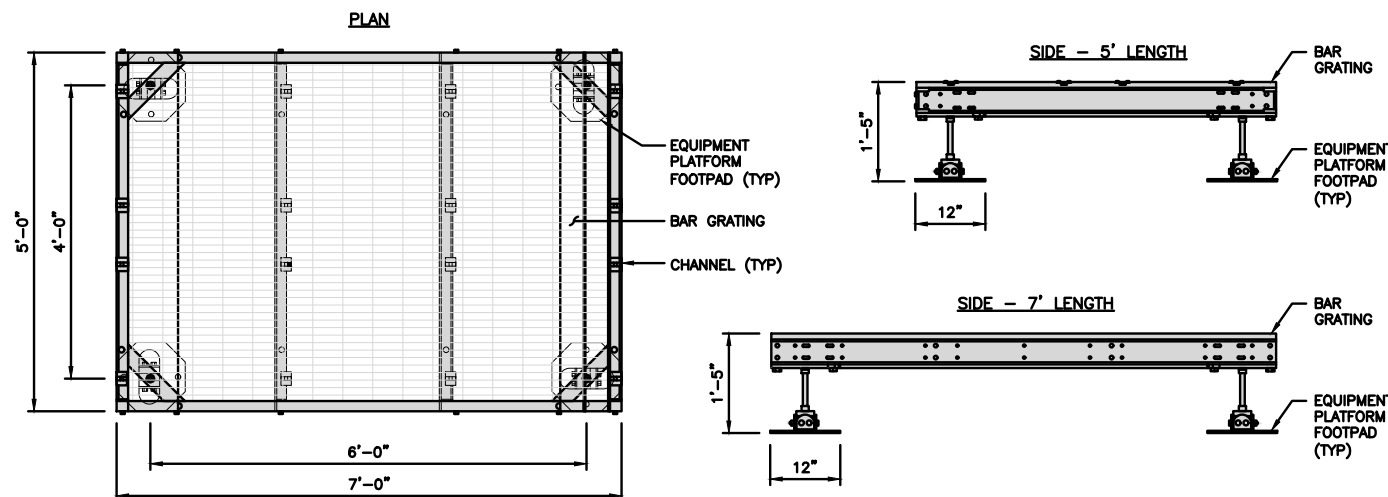


1

**COMMSCOPE MTC4045LP  
5X7 PLATFORM**

DIMENSIONS (HxWxD)	16"x84"x60"
TOTAL WEIGHT	423 LBS

- NOTE:**  
1. GC TO PROVIDE EXTENDED THREAD FOR PLATFORM IF REQUIRED HEIGHT EXCEEDS 17"  
2. PLATFORM TO BE LEVEL WITHIN 1"

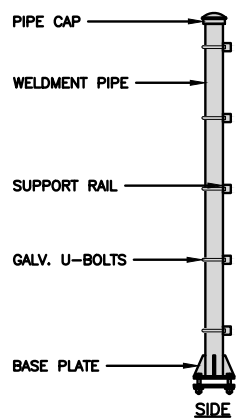


PLATFORM DETAIL

NO SCALE 2

**COMMSCOPE MTC4045HFLD  
H-FRAME**

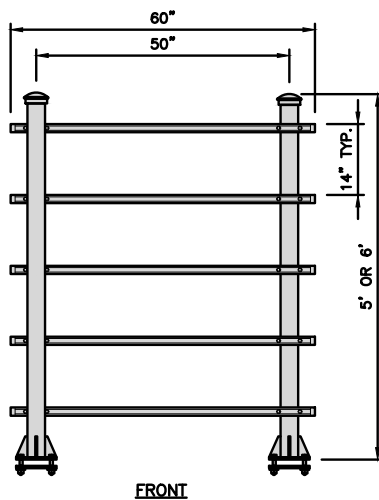
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs



H-FRAME DETAIL

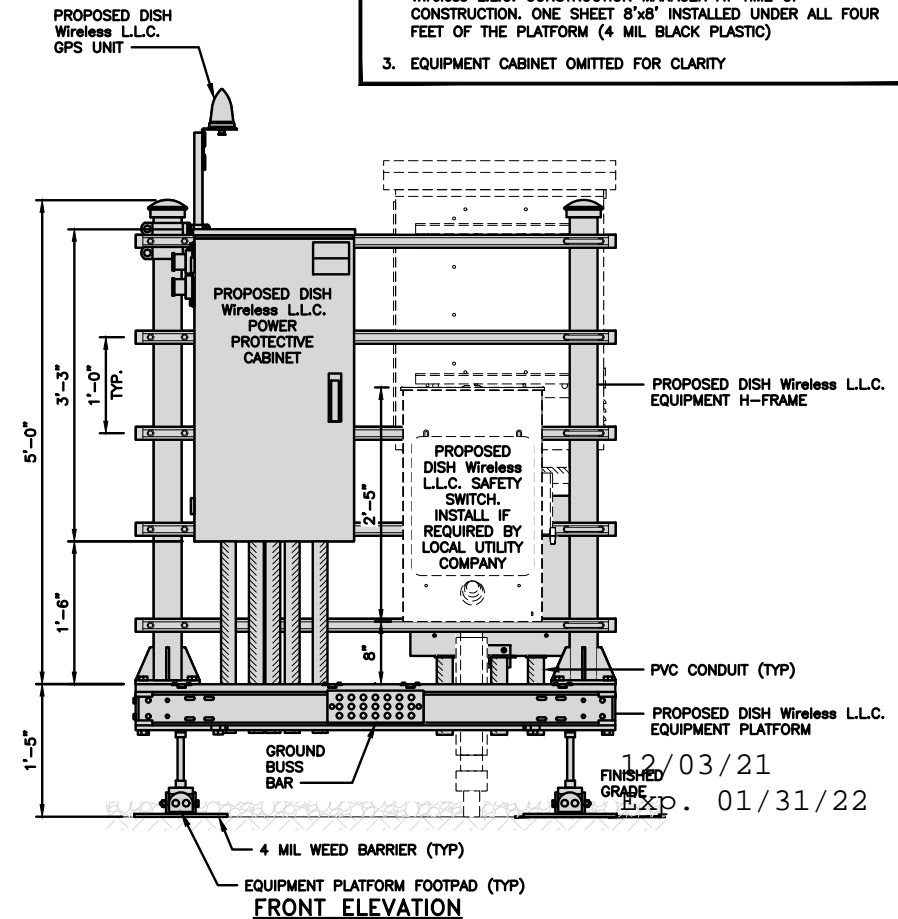
NO SCALE 3

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

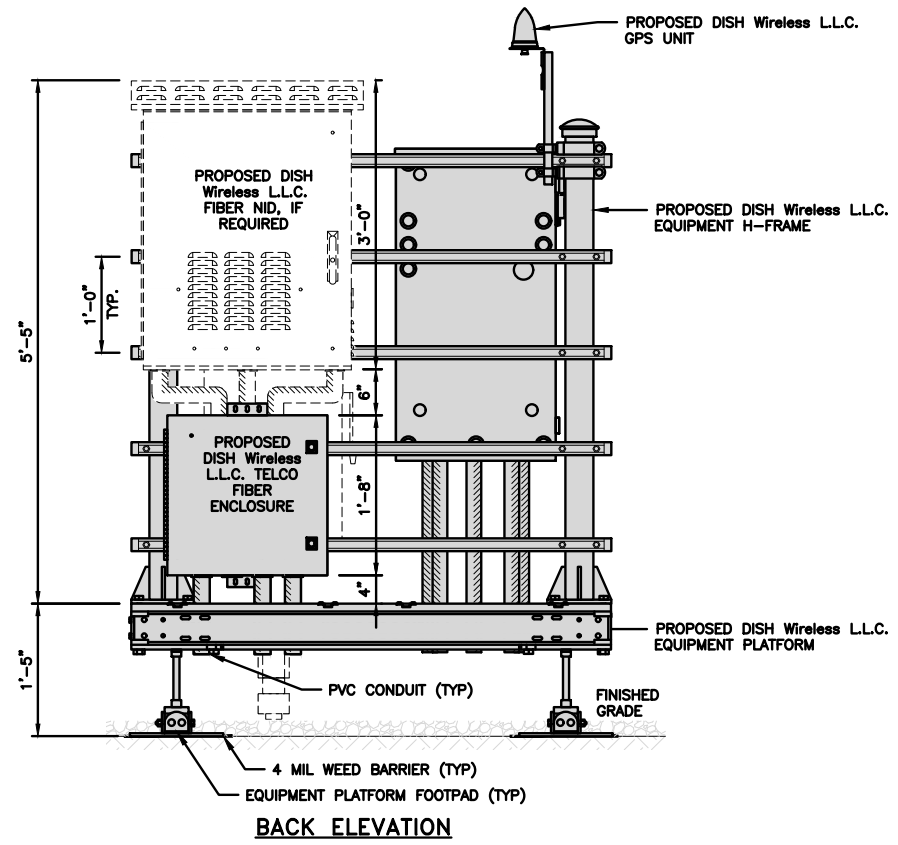


NOT USED

NO SCALE 4

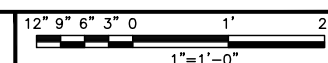


FRONT ELEVATION



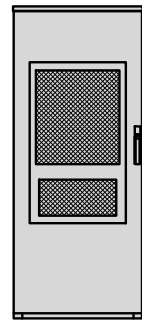
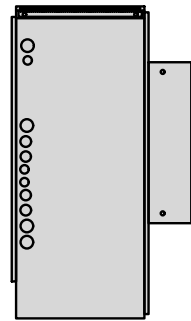
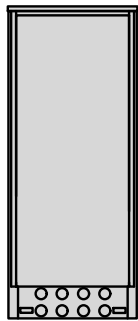
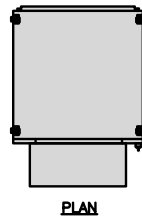
BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION



5

ENERSYS HEX 20000059996	
DIMENSIONS (HxWxD)	73"x30"x32"
POWER SYSTEM	-48V ALPHA/600A
HEATER	800W
TOTAL WEIGHT (EMPTY)	376 lbs

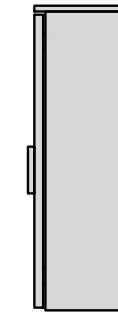
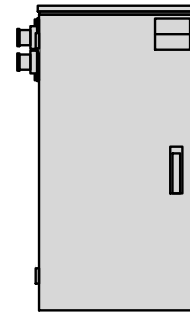
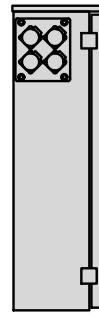
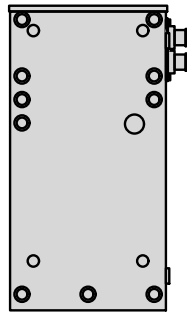
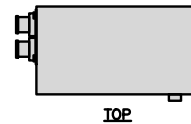


CABINET DETAIL

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

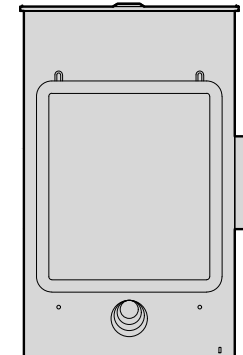
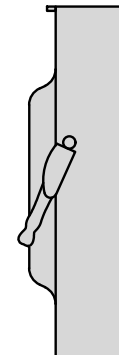
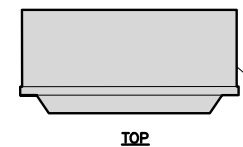


POWER PROTECTION CABINET (PPC) DETAIL

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



SAFETY SWITCH DETAIL

NO SCALE

3

NOT USED

NO SCALE

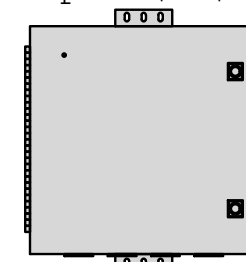
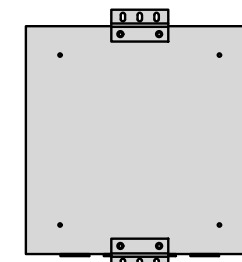
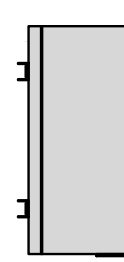
4

NOT USED

NO SCALE

5

CHARLES CFIT-PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



12/03 FRONT  
Exp. 01/31/22

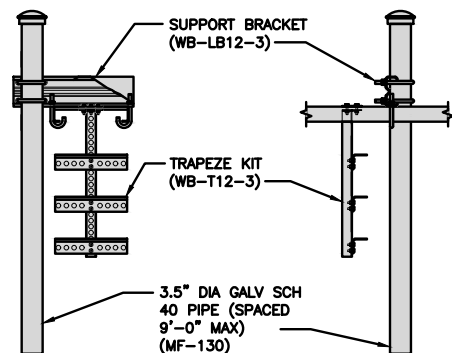
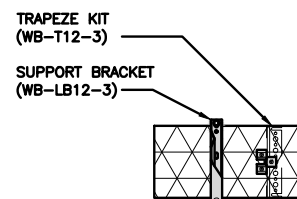
FIBER TELCO ENCLOSURE DETAIL

NO SCALE

6

COMMSCOPE WB-K110-B WAVEGUIDE BRIDGE KIT	
DIMENSIONS (HxL)	160"x10"
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

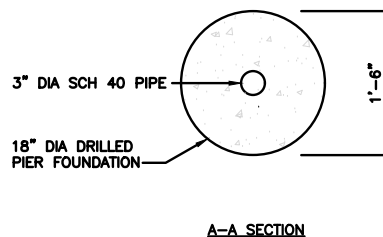
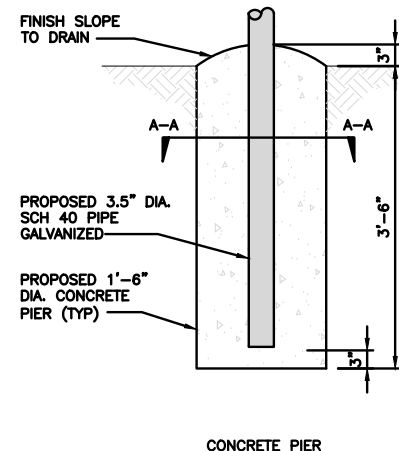
INCLUDED PRODUCTS:  
WB-T12-3 TRAPEZE KIT, 3 RUNGS  
WB-LB12-3 SUPPORT BRACKET  
MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"



ICE BRIDGE DETAIL

NO SCALE

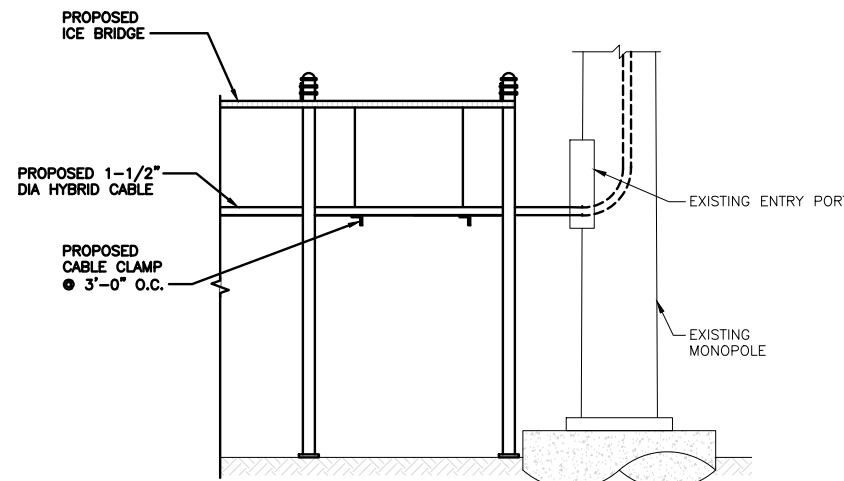
7



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

**Kimley»Horn**

COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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

DRAWN BY: CHECKED BY: APPROVED BY:  
DRD MCK MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
0	11/30/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

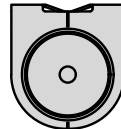
NJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
EQUIPMENT DETAILS

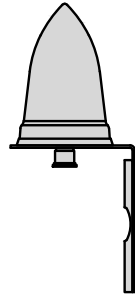
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**A-4**

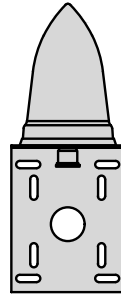
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



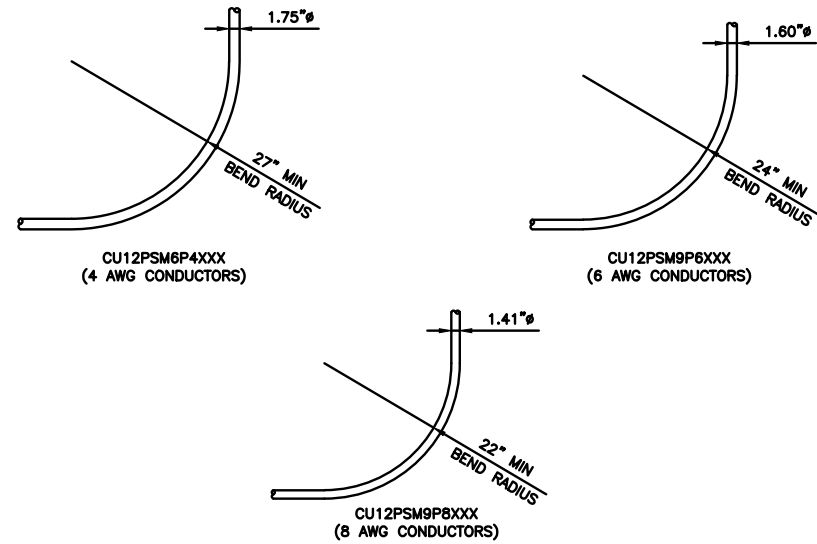
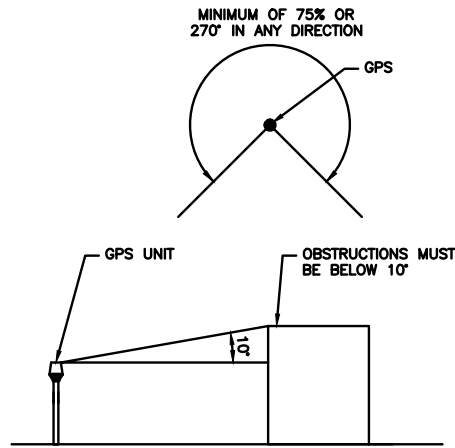
TOP



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

12/03/21  
Exp. 01/31/22



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DRAWN BY:	CHECKED BY:	APPROVED BY:
DRD	MCK	MCK

RFDS REV #: ---

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KHCL-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

NJGER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER

A-5

NOT USED

NO SCALE

4

NOT USED

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

NOT USED

NO SCALE

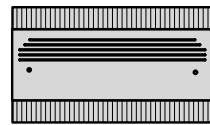
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NOT USED

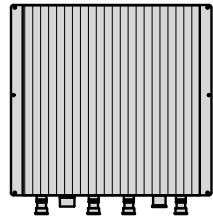
NO SCALE

9

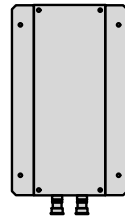
FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



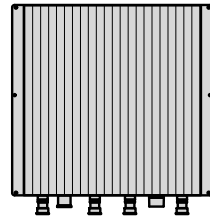
PLAN



BACK

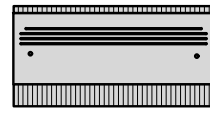


SIDE

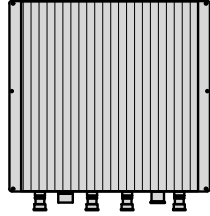


FRONT

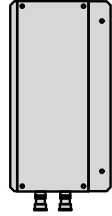
FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



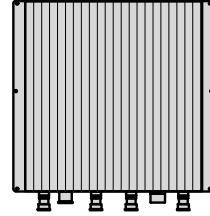
PLAN



BACK



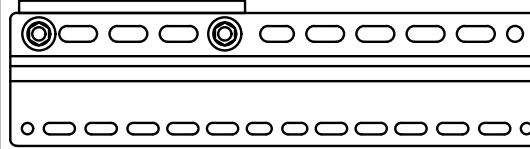
SIDE



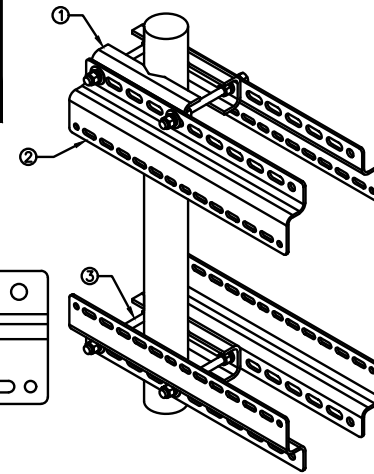
FRONT

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 DETAIL

NO SCALE

1

RRH DETAIL

NO SCALE

2

RRH MOUNT DETAIL

NO SCALE

3

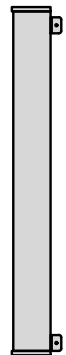
JMA WIRELESS MX08FRO665-21 ANTENNA	
DIMENSIONS (HxWxD)	72.0"x20.0"x8.0"
TOTAL WEIGHT	82.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE



PLAN



BACK



SIDE



FRONT

ANTENNA DETAIL

NO SCALE

4

NOT USED

NO SCALE

5

ANTENNA BRACKET DETAIL

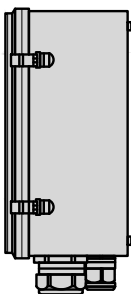
NO SCALE

6

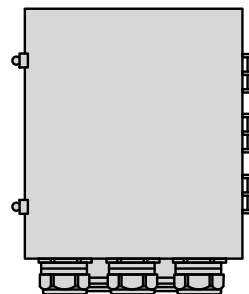
RAYCAP RDIC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



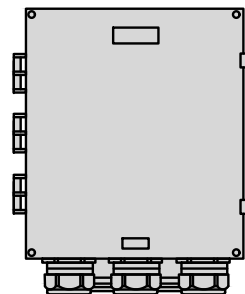
PLAN



SIDE



BACK



FRONT

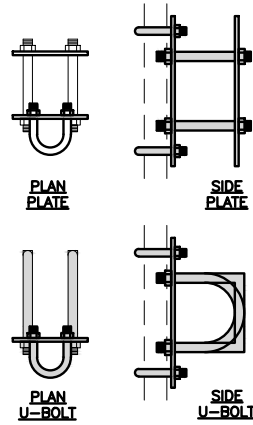
SURGE SUPPRESSION DETAIL (OVP)

NO SCALE

7

COMMSCOPE XP-2040 CROSSOVER PLATE	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11 lbs

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



PLAN  
U-BOLT

SIDE  
U-BOLT

PLAN  
U-BOLT

SIDE  
U-BOLT

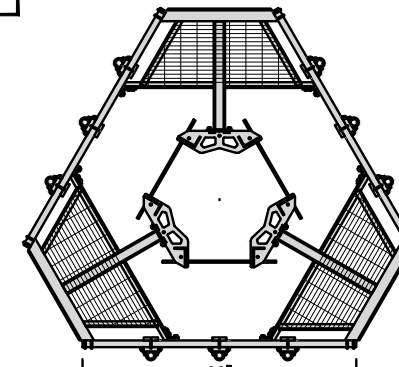
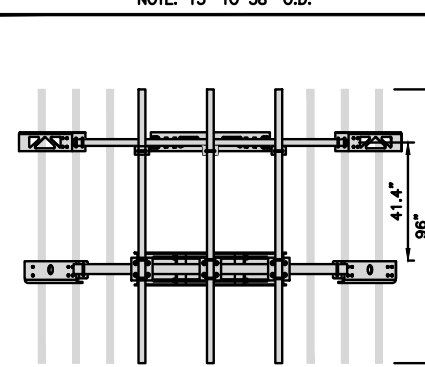
RRH/OVP MOUNT DETAIL

NO SCALE

8

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

9



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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DRAWN BY: CHECKED BY: APPROVED BY:  
DRD MCK MCK

RFDS REV #: ---

CONSTRUCTION  
DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
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A&E PROJECT NUMBER  
KHCLE-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

NJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
EQUIPMENT DETAILS

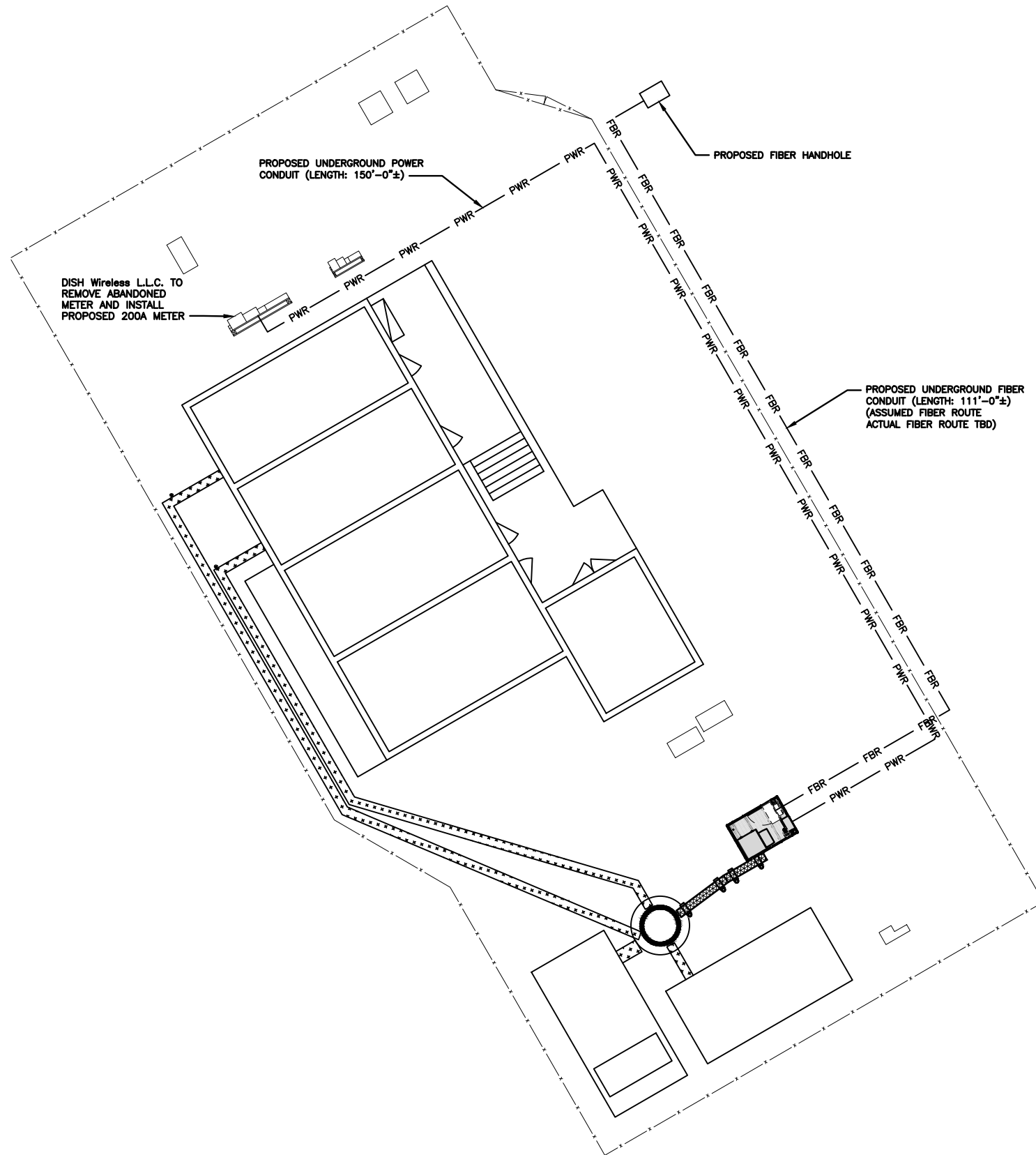
SHEET NUMBER

A-6

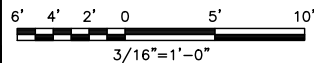


**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. THE GROUND LEASE PROVIDES BROAD/BLANKET 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 TOWER OWNER AS FURTHER COORDINATION MAY BE NEEDED.



**UTILITY ROUTE PLAN**



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**

12/03/21

Exp. 01/31/22  
NO SCALE 2



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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DRAWN BY:	CHECKED BY:	APPROVED BY:
DRD	MCK	MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
0	11/30/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION

NJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
ELECTRICAL/FIBER ROUTE  
PLAN AND NOTES

SHEET NUMBER

**E-1**

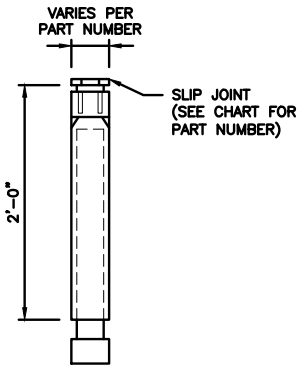
**NOT USED**

NO SCALE

3

**CARLON EXPANSION FITTINGS**

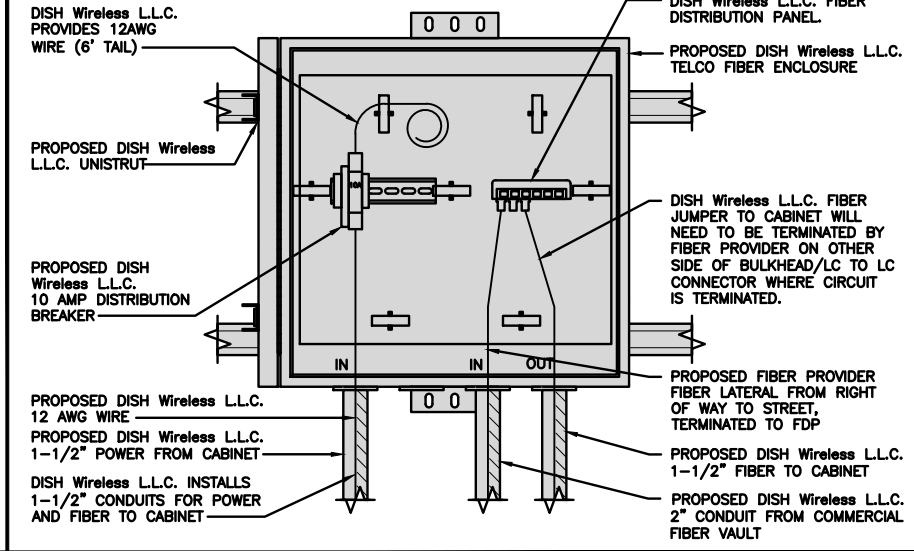
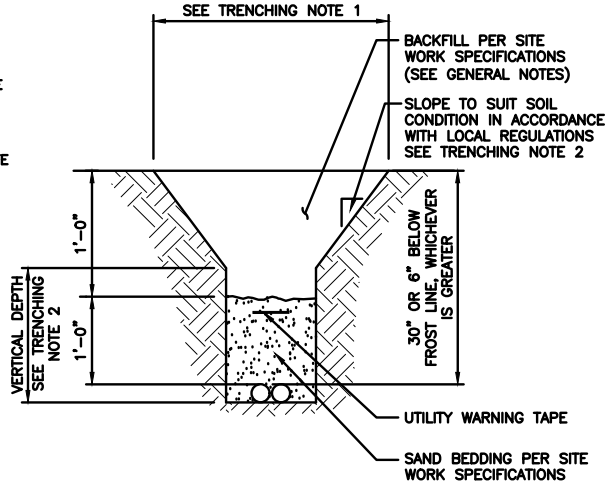
COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"
E945M	E945MX	3 1/2"	5	8"
E945N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

**TRENCHING NOTES**

- 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.
- TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT OSHA TRENCHING AND EXCAVATION SAFETY STANDARDS.
- 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.



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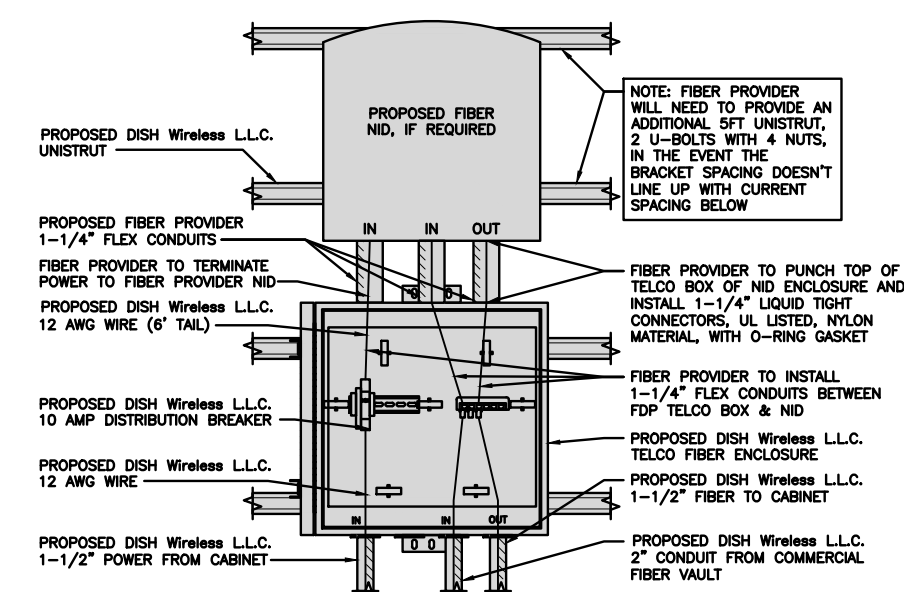
SHEET TITLE  
ELECTRICAL  
DETAILS

SHEET NUMBER  
**E-2**

EXPANSION JOINT DETAIL NO SCALE 1

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

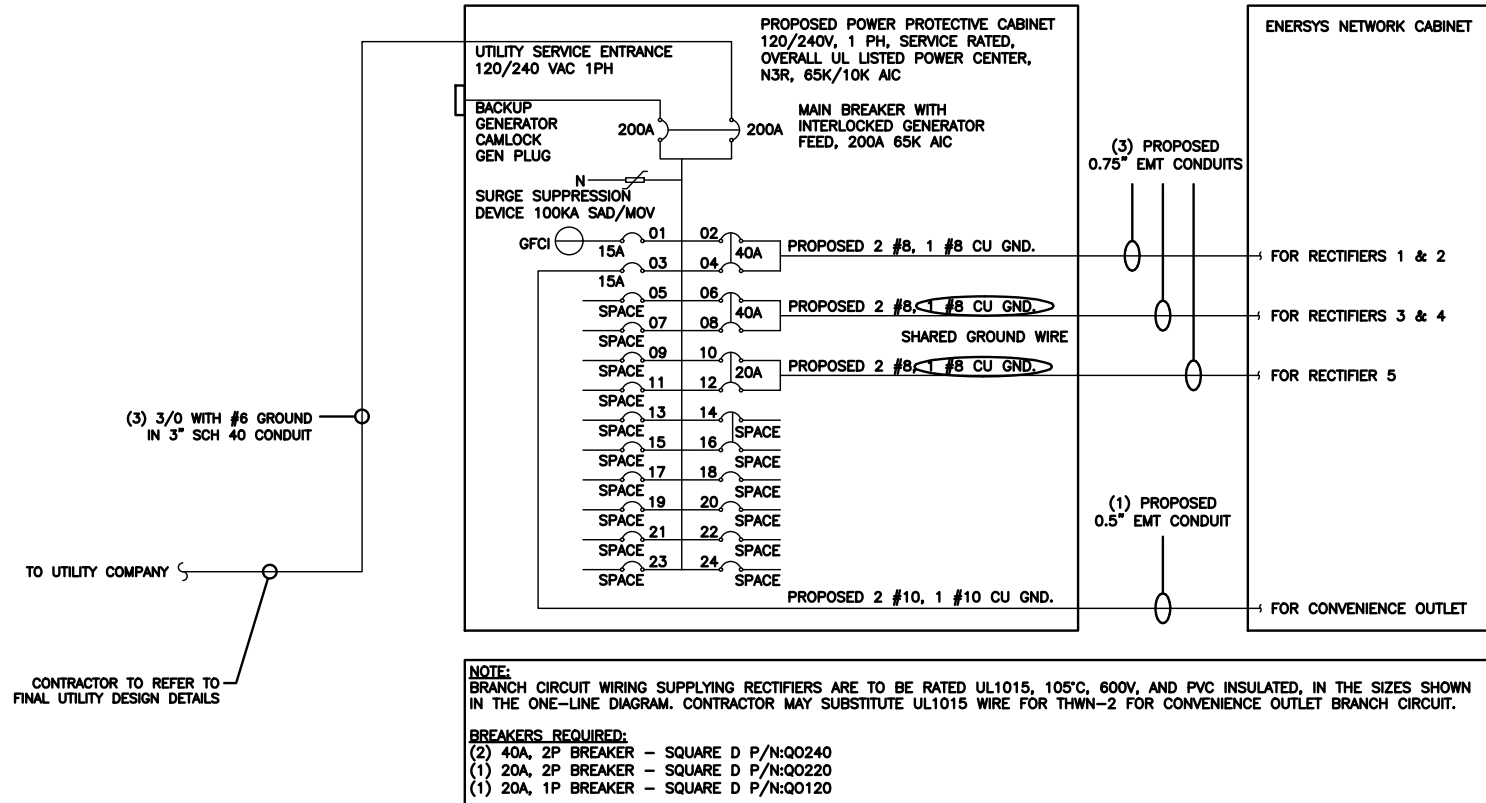
NOT USED NO SCALE 5

NOT USED NO SCALE 6

NOT USED NO SCALE 7

NOT USED NO SCALE 8

NOT USED NO SCALE 9



**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.

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 (3 CONDUITS): USING UL1015, CU.  
 #8 - 0.0552 SQ. IN X 2 = 0.1103 SQ. IN  
 #8 - 0.0131 SQ. IN X 1 = 0.0131 SQ. IN <BARE GROUND  
 TOTAL = 0.1234 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) 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.

12/03/21  
 Exp. 01/31/22



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 LITTLETON, CO 80120



COA #: PEC.0000738  
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 RALEIGH, NC 27601



**PPC ONE-LINE DIAGRAM**

NO SCALE 1

PROPOSED ENERSYS PANEL SCHEDULE												
LOAD SERVED	VOLT AMPS (WATTS)		TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS)		LOAD SERVED		
	L1	L2						L1	L2			
PPC GFCI OUTLET	180	180	15A	1	A	2	40A	3840	3840	ENERSYS ALPHA CORDEX RECTIFIERS 1 & 2		
ENERSYS GFCI OUTLET			15A	3	B	4	40A	3840	3840	ENERSYS ALPHA CORDEX RECTIFIER 3 & 4		
-SPACE-				5	A	6	40A	3840	3840	ENERSYS ALPHA CORDEX RECTIFIER 3 & 4		
-SPACE-				7	B	8	20A	1920	1920	ENERSYS ALPHA CORDEX RECTIFIER 5		
-SPACE-				9	A	10				-SPACE-		
-SPACE-				11	B	12				-SPACE-		
-SPACE-				13	A	14				-SPACE-		
-SPACE-				15	B	16				-SPACE-		
-SPACE-				17	A	18				-SPACE-		
-SPACE-				19	B	20				-SPACE-		
-SPACE-				21	A	22				-SPACE-		
-SPACE-				23	B	24				-SPACE-		
VOLTAGE AMPS			180	180			9500	9500				
200A MCB, 1φ, 24 SPACE, 120/240V			L1		L2							
MB RATING: 65,000 AIC			9680	9680	VOLTAGE AMPS							
			81	81	AMPS							
				81	MAX AMPS							
				102	MAX 125%							

**PANEL SCHEDULE**

NO SCALE 2

NOT USED

NO SCALE 3

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DRAWN BY: CHECKED BY: APPROVED BY:  
 DRD MCK MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

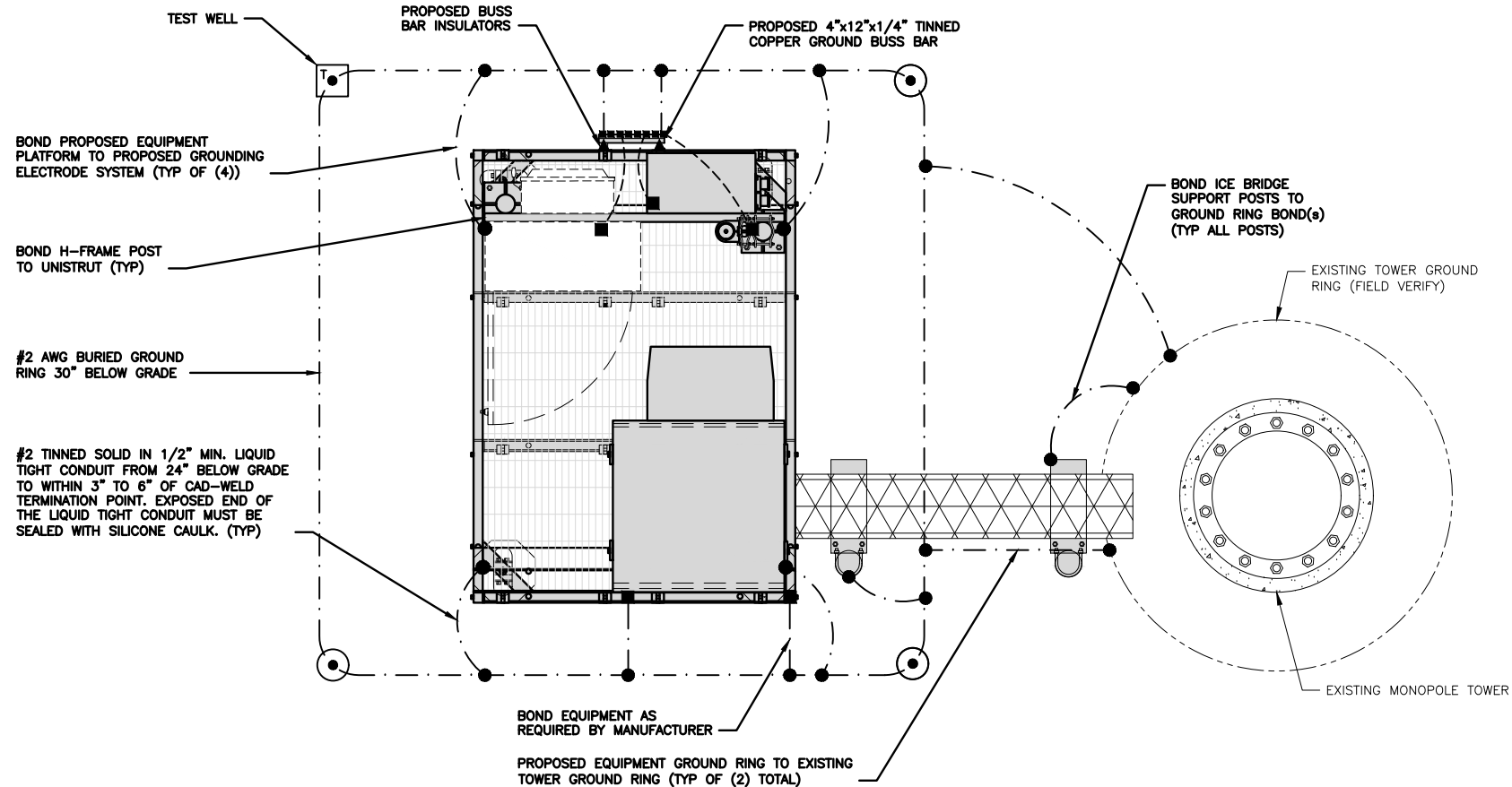
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DISH Wireless L.L.C.  
 PROJECT INFORMATION  
 NJJER01093A  
 363 RIVERSVILLE ROAD  
 GREENWICH, CT 06831

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

SHEET NUMBER  
**E-3**

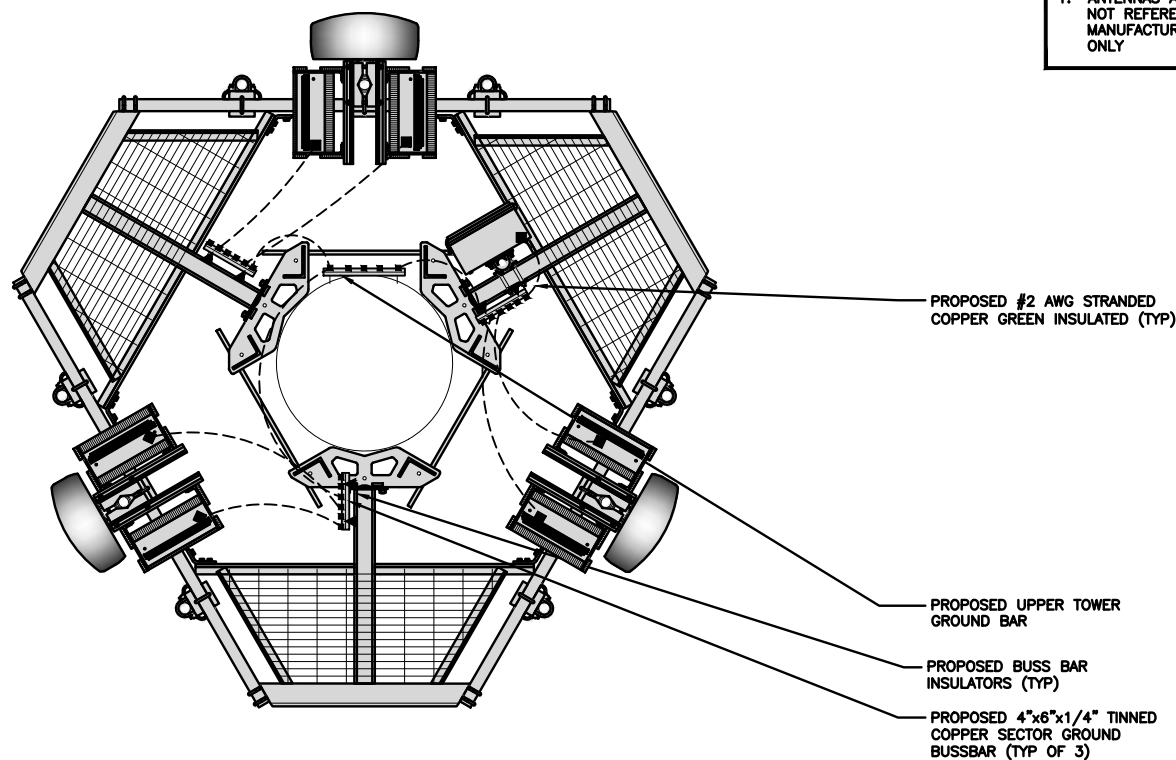


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE 1

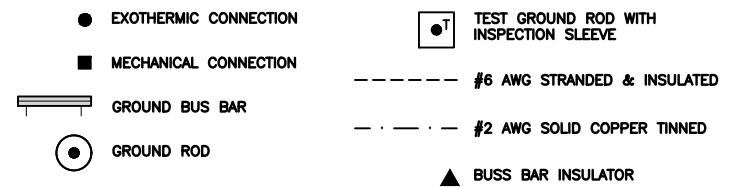
NOTES

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



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE 2



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

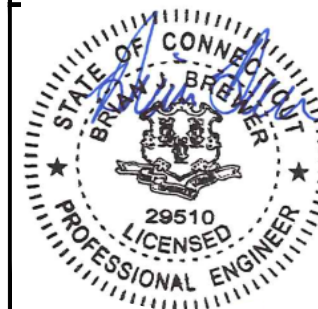
NO SCALE 3



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
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RALEIGH, NC 27601



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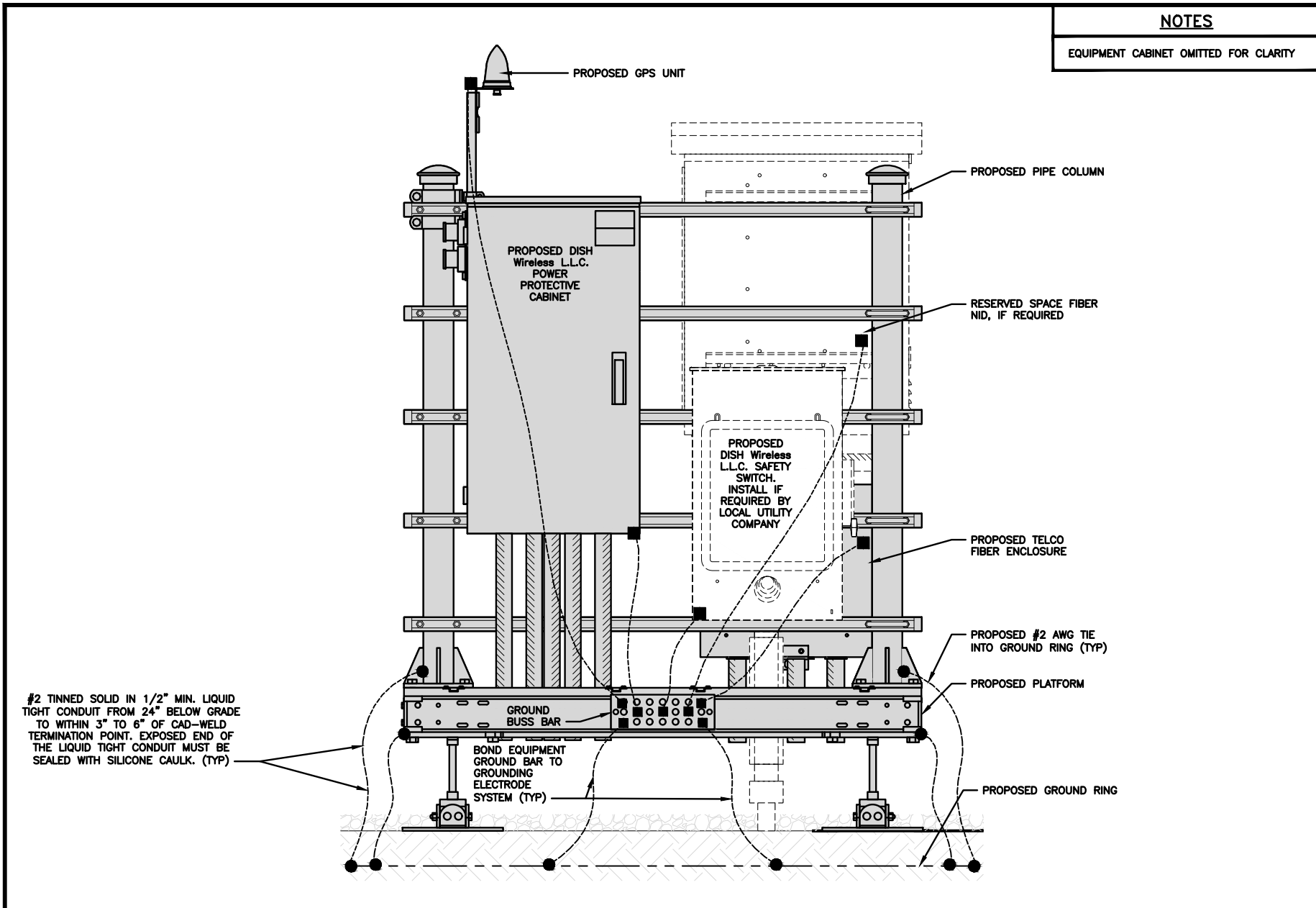
DISH Wireless L.L.C.  
PROJECT INFORMATION

NJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

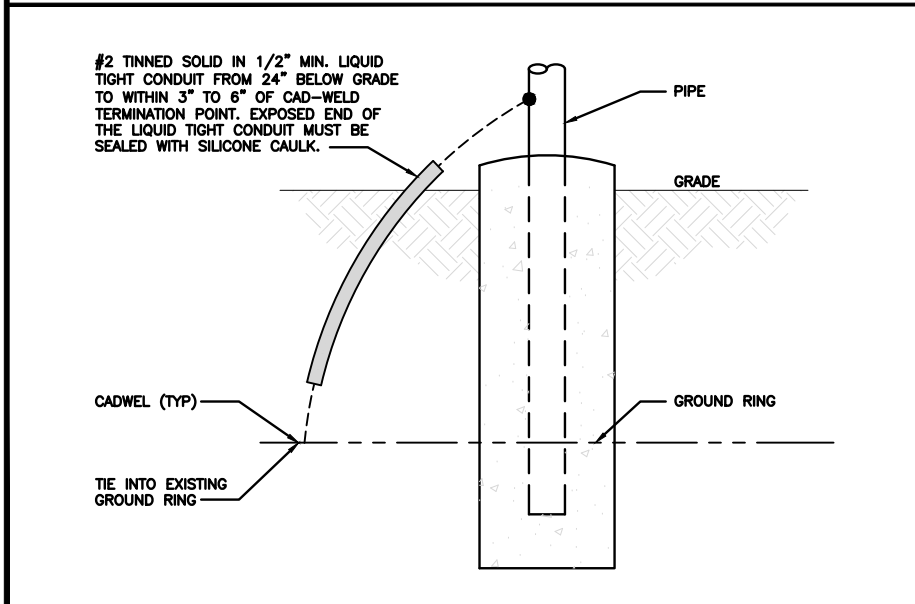
SHEET NUMBER

G-1



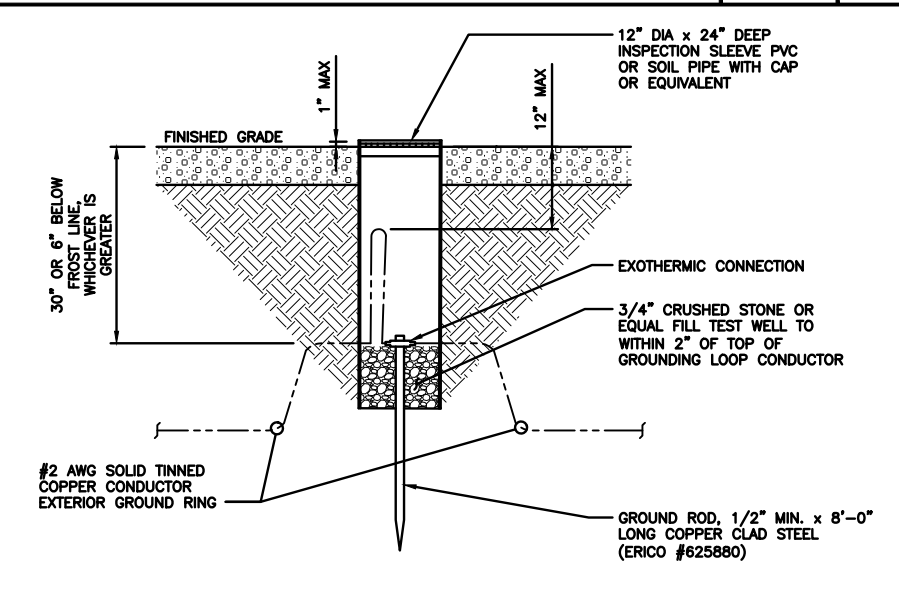
**H-FRAME GROUNDING DETAIL**

NO SCALE 1



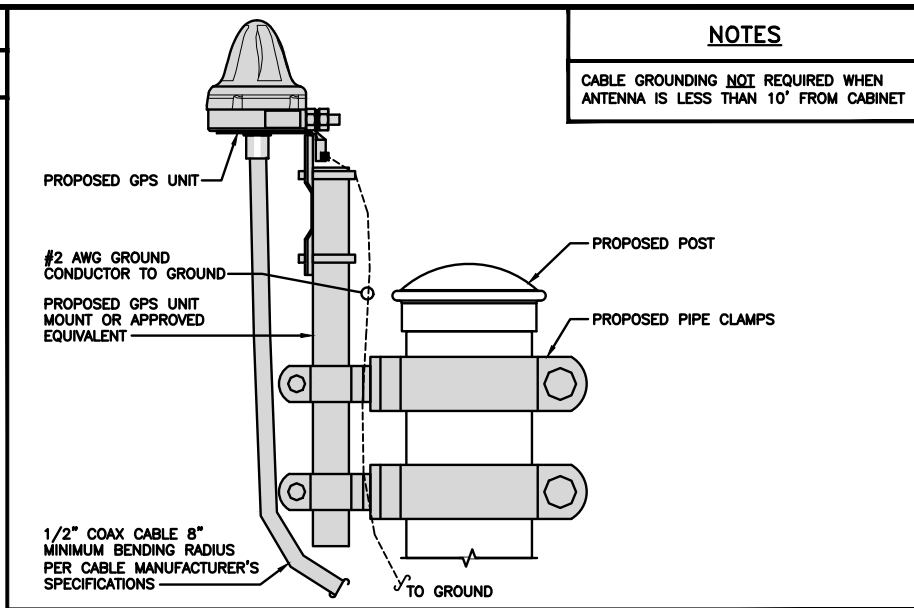
**TRANSITIONING GROUND DETAIL**

NO SCALE 4



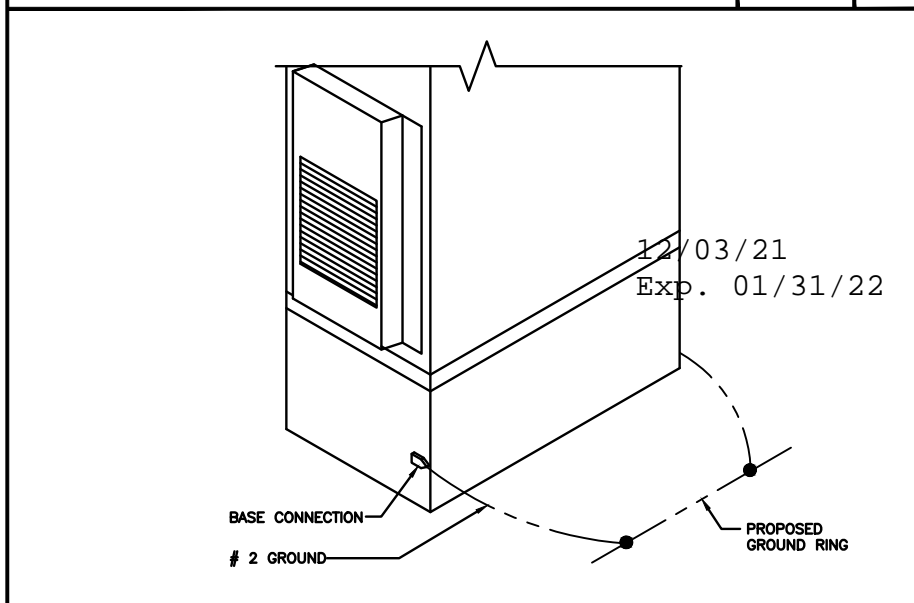
**TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE**

NO SCALE 5



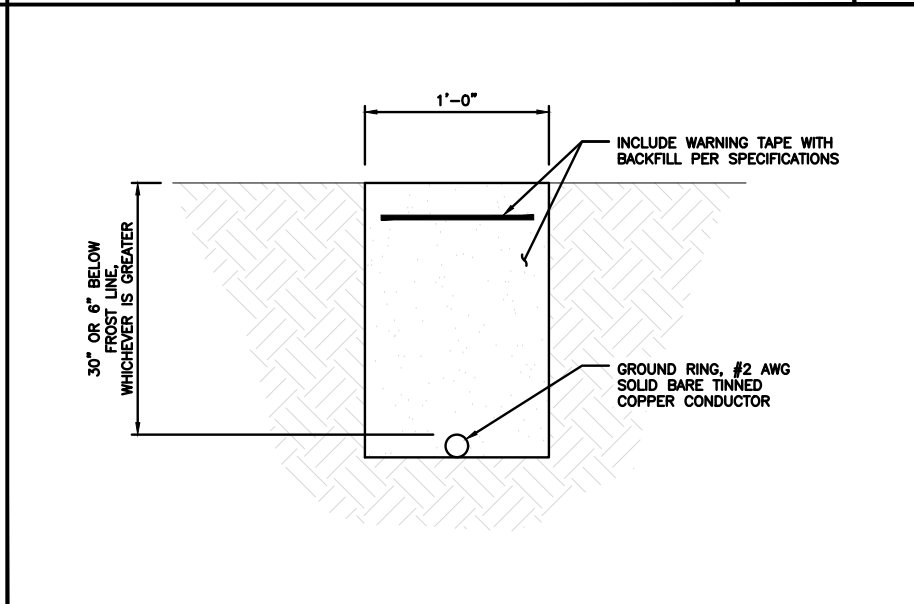
**TYPICAL GPS UNIT GROUNDING**

NO SCALE 2



**OUTDOOR CABINET GROUNDING**

NO SCALE 3



**TYPICAL GROUND RING TRENCH**

NO SCALE 6



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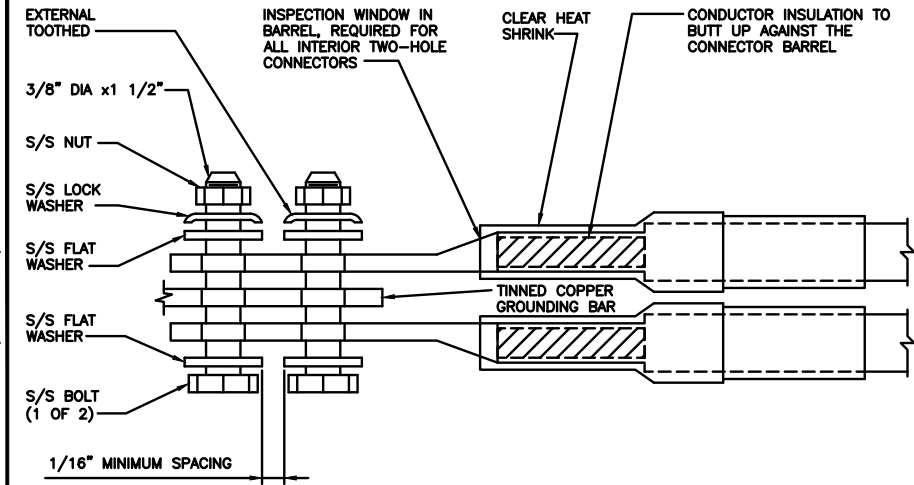
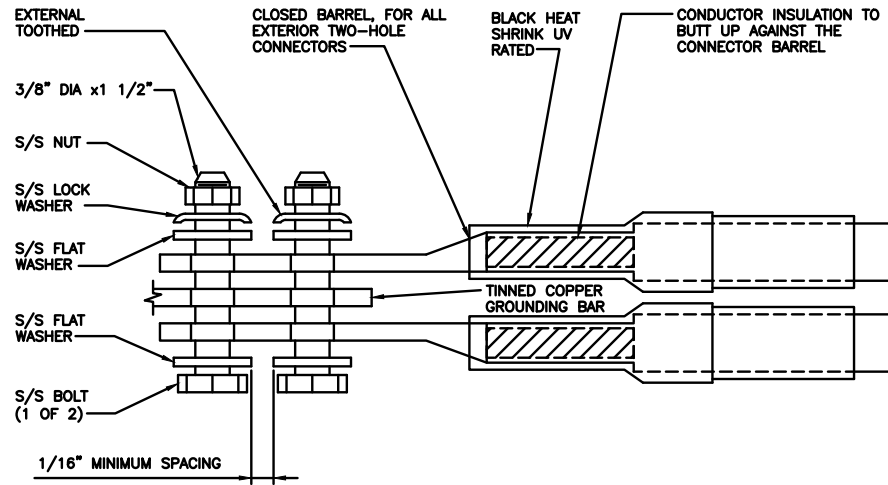
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PROJECT INFORMATION

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GREENWICH, CT 06831

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

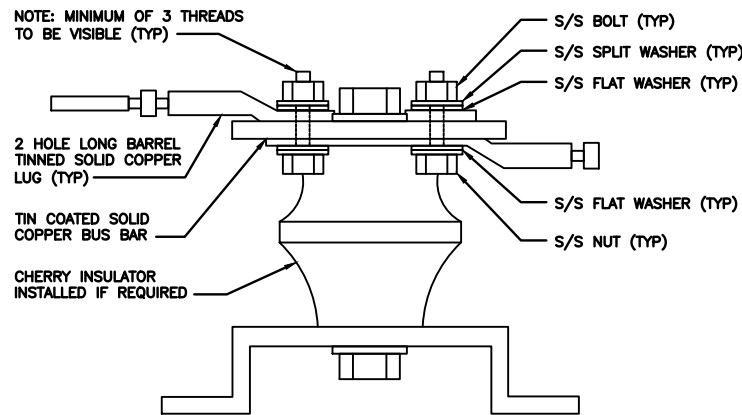
NO SCALE

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

**Kimley»Horn**

COA #: PEC.0000738  
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GREENWICH, CT 06831

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER

**G-3**

**RF JUMPER COLOR CODING**

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

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

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

ALPHA RRH				BETA RRH				GAMMA RRH			
PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT
RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
ORANGE	ORANGE	RED	RED	ORANGE	ORANGE	BLUE	BLUE	ORANGE	ORANGE	GREEN	GREEN
	WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE		WHITE (-) PORT	ORANGE	ORANGE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

MID-BAND RRH -  
(AWS BANDS N66+N70)

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

RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN
PURPLE	PURPLE	RED	RED	PURPLE	PURPLE	BLUE	BLUE	PURPLE	PURPLE	GREEN	GREEN
	WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE		WHITE (-) PORT	PURPLE	PURPLE
			WHITE (-) PORT				WHITE (-) PORT				WHITE (-) PORT

**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 1	EXAMPLE 2	EXAMPLE 3
RED	RED	RED
BLUE	BLUE	
GREEN	GREEN	ORANGE
ORANGE	YELLOW	PURPLE
PURPLE		

**FIBER JUMPERS TO RRHs**

LOW-BAND RRH FIBER CABLES HAVE SECTOR  
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**POWER CABLES TO RRHs**

LOW-BAND RRH POWER CABLES HAVE SECTOR  
STRIPE ONLY

LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH	LOW BAND RRH	HIGH BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**RET MOTORS AT ANTENNAS**

ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"	ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"	ANTENNA 1 LOW BAND/ "IN"	ANTENNA 1 HIGH BAND/ "IN"
RED	RED	BLUE	BLUE	GREEN	GREEN
	PURPLE		PURPLE		PURPLE

**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

FORWARD AZIMUTH OF 0-120 DEGREES		FORWARD AZIMUTH OF 120-240 DEGREES		FORWARD AZIMUTH OF 240-360 DEGREES	
PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
RED	RED	BLUE	BLUE	GREEN	GREEN
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED		BLUE		GREEN
	WHITE		WHITE		WHITE

**RF CABLE COLOR CODES**

NO SCALE

1

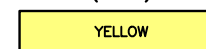
LOW BANDS (N71+N26)  
OPTIONAL - (N29)



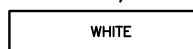
AWS  
(N66+N70+H-BLOCK)



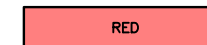
CBRS TECH  
(3 GHz)



NEGATIVE SLANT PORT  
ON ANT/RRH



ALPHA SECTOR



BETA SECTOR



GAMMA SECTOR



COLOR IDENTIFIER

NO SCALE

2

NOT USED

NO SCALE

3

NOT USED

NO SCALE

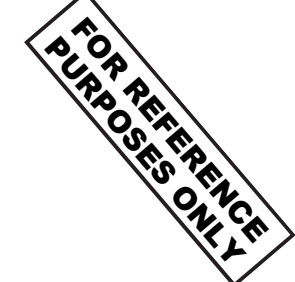
4



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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DRD MCK MCK

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KHCLC-16296

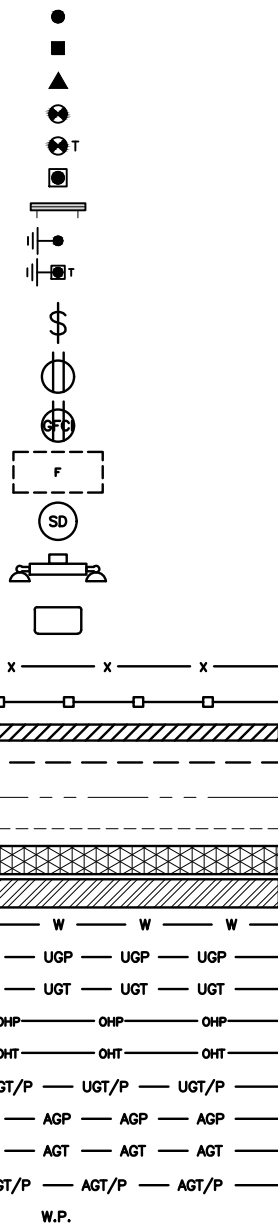
DISH Wireless L.L.C.  
PROJECT INFORMATION

NJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

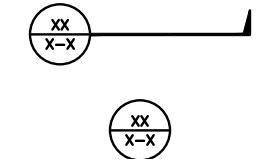
SHEET TITLE  
RF  
CABLE COLOR CODES

SHEET NUMBER  
**RF-1**

EXOTHERMIC CONNECTION  
 MECHANICAL CONNECTION  
 BUSS BAR INSULATOR  
 CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM  
 EXOTHERMIC WITH INSPECTION SLEEVE  
 GROUNDING BAR  
 GROUND ROD  
 TEST GROUND ROD WITH INSPECTION SLEEVE  
 SINGLE POLE SWITCH  
 DUPLEX RECEPTACLE  
 DUPLEX GFCI RECEPTACLE  
 FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8  
 SMOKE DETECTION (DC)  
 EMERGENCY LIGHTING (DC)  
 SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW  
 LED-1-25A400/51K-SR4-120-PE-DBBTXD  
 CHAIN LINK FENCE  
 WOOD/WROUGHT IRON FENCE  
 WALL STRUCTURE  
 LEASE AREA  
 PROPERTY LINE (PL)  
 SETBACKS  
 ICE BRIDGE  
 CABLE TRAY  
 WATER LINE  
 UNDERGROUND POWER  
 UNDERGROUND TELCO  
 OVERHEAD POWER  
 OVERHEAD TELCO  
 UNDERGROUND TELCO/POWER  
 ABOVE GROUND POWER  
 ABOVE GROUND TELCO  
 ABOVE GROUND TELCO/POWER  
 WORKPOINT



SECTION REFERENCE  
 DETAIL REFERENCE



**LEGEND**

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

**ABBREVIATIONS**



5701 SOUTH SANTA FE DRIVE  
 LITTLETON, CO 80120



COA #: PEC.0000738  
 421 FAYETTEVILLE ST, SUITE 600  
 RALEIGH, NC 27601



12/03/21  
 Exp. 01/31/22

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DISH Wireless L.L.C.  
 PROJECT INFORMATION  
 NJJER01093A  
 363 RIVERSVILLE ROAD  
 GREENWICH, CT 06831

SHEET TITLE  
 LEGEND AND ABBREVIATIONS

SHEET NUMBER  
**GN-1**



**SITE ACTIVITY REQUIREMENTS:**

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

**GENERAL NOTES:**

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



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



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DISH Wireless L.L.C.  
PROJECT INFORMATION

NJJE01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-2**

**CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 336, ASTM A184, ASTM A185 AND THE DESIGN AND CONSTRUCTION SPECIFICATION FOR CAST-IN-PLACE CONCRETE.
2. UNLESS NOTED OTHERWISE, SOIL BEARING PRESSURE USED FOR DESIGN OF SLABS AND FOUNDATIONS IS ASSUMED TO BE 1000 psf.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH (f'c) OF 3000 psi AT 28 DAYS, UNLESS NOTED OTHERWISE. NO MORE THAN 90 MINUTES SHALL ELAPSE FROM BATCH TIME TO TIME OF PLACEMENT UNLESS APPROVED BY THE ENGINEER OF RECORD. TEMPERATURE OF CONCRETE SHALL NOT EXCEED 90°f AT TIME OF PLACEMENT.
4. CONCRETE EXPOSED TO FREEZE-THAW CYCLES SHALL CONTAIN AIR ENTRAINING ADMIXTURES. AMOUNT OF AIR ENTRAINMENT TO BE BASED ON SIZE OF AGGREGATE AND F3 CLASS EXPOSURE (VERY SEVERE). CEMENT USED TO BE TYPE II PORTLAND CEMENT WITH A MAXIMUM WATER-TO-CEMENT RATIO (W/C) OF 0.45.
5. ALL STEEL REINFORCING SHALL CONFORM TO ASTM A615. ALL WELDED WIRE FABRIC (WWF) SHALL CONFORM TO ASTM A185. ALL SPLICES SHALL BE CLASS "B" TENSION SPLICES, UNLESS NOTED OTHERWISE. ALL HOOKS SHALL BE STANDARD 90 DEGREE HOOKS, UNLESS NOTED OTHERWISE. YIELD STRENGTH (Fy) OF STANDARD DEFORMED BARS ARE AS FOLLOWS:
  - #4 BARS AND SMALLER 40 ksi
  - #5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:
  - CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"
  - CONCRETE EXPOSED TO EARTH OR WEATHER:
    - #6 BARS AND LARGER 2"
    - #5 BARS AND SMALLER 1-1/2"
  - CONCRETE NOT EXPOSED TO EARTH OR WEATHER:
    - SLAB AND WALLS 3/4"
    - BEAMS AND COLUMNS 1-1/2"
7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.

**ELECTRICAL INSTALLATION NOTES:**

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.
3. WIRING, RACEWAY AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC.
4. ALL CIRCUITS SHALL BE SEGREGATED AND MAINTAIN MINIMUM CABLE SEPARATION AS REQUIRED BY THE NEC.
- 4.1. ALL EQUIPMENT SHALL BEAR THE UNDERWRITERS LABORATORIES LABEL OF APPROVAL, AND SHALL CONFORM TO REQUIREMENT OF THE NATIONAL ELECTRICAL CODE.
- 4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERIFY AVAILABLE SHORT CIRCUIT CURRENT DOES NOT EXCEED THE RATING OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH ARTICLE 110.24 NEC OR THE MOST CURRENT ADOPTED CODE PRE THE GOVERNING JURISDICTION.
5. EACH END OF EVERY POWER PHASE CONDUCTOR, GROUNDING CONDUCTOR, AND TELCO CONDUCTOR OR CABLE SHALL BE LABELED WITH COLOR-CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2" PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC AND OSHA.
6. ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH LAMICOID TAGS SHOWING THEIR RATED VOLTAGE, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING AND BRANCH CIRCUIT ID NUMBERS (i.e. PANEL BOARD AND CIRCUIT ID'S).
7. PANEL BOARDS (ID NUMBERS) SHALL BE CLEARLY LABELED WITH PLASTIC LABELS.
8. TIE WRAPS ARE NOT ALLOWED.
9. ALL POWER AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE COPPER CONDUCTOR (#14 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
10. SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE COPPER CONDUCTOR (#6 OR LARGER) WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
11. POWER AND CONTROL WIRING IN FLEXIBLE CORD SHALL BE MULTI-CONDUCTOR, TYPE SOOW CORD (#14 OR LARGER) UNLESS OTHERWISE SPECIFIED.
12. POWER AND CONTROL WIRING FOR USE IN CABLE TRAY SHALL BE MULTI-CONDUCTOR, TYPE TC CABLE (#14 OR LARGER), WITH TYPE THHW, THWN, THWN-2, XHHW, XHHW-2, THW, THW-2, RHW, OR RHW-2 INSULATION UNLESS OTHERWISE SPECIFIED.
13. ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP-STYLE, COMPRESSION WIRE LUGS AND WIRE NUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRE NUTS SHALL BE RATED FOR OPERATION NOT LESS THAN 75° C (90° C IF AVAILABLE).
14. RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND NEC.
15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.

16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
17. SCHEDULE 40 PVC UNDERGROUND ON STRAIGHTS AND SCHEDULE 80 PVC FOR ALL ELBOWS/90s AND ALL APPROVED ABOVE GRADE PVC CONDUIT.
18. LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID-TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
19. CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION-TYPE AND APPROVED FOR THE LOCATION USED. SET SCREW FITTINGS ARE NOT ACCEPTABLE.
20. CABINETS, BOXES AND WIRE WAYS SHALL BE LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE AND THE NEC.
21. WIREWAYS SHALL BE METAL WITH AN ENAMEL FINISH AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARDS (WIREMOLD SPECMATE WIREWAY).
22. SLOTTED WIRING DUCT SHALL BE PVC AND INCLUDE COVER (PANDUIT TYPE E OR EQUAL).
23. CONDUITS SHALL BE FASTENED SECURELY IN PLACE WITH APPROVED NON-PERFORATED STRAPS AND HANGERS. EXPLOSIVE DEVICES (i.e. POWDER-ACTUATED) FOR ATTACHING HANGERS TO STRUCTURE WILL NOT BE PERMITTED. CLOSELY FOLLOW THE LINES OF THE STRUCTURE, MAINTAIN CLOSE PROXIMITY TO THE STRUCTURE AND KEEP CONDUITS IN TIGHT ENVELOPES. CHANGES IN DIRECTION TO ROUTE AROUND OBSTACLES SHALL BE MADE WITH CONDUIT OUTLET BODIES. CONDUIT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER. PARALLEL AND PERPENDICULAR TO STRUCTURE WALL AND CEILING LINES. ALL CONDUIT SHALL BE FISHED TO CLEAR OBSTRUCTIONS. ENDS OF CONDUITS SHALL BE TEMPORARILY CAPPED FLUSH TO FINISH GRADE TO PREVENT CONCRETE, PLASTER OR DIRT FROM ENTERING. CONDUITS SHALL BE RIGIDLY CLAMPED TO BOXES BY GALVANIZED MALLEABLE IRON BUSHING ON INSIDE AND GALVANIZED MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.
24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless L.L.C. AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY. 12/03/21
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH Wireless L.L.C.". Exp. 01/31/22
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



COA #: PEC.0000738  
421 FAYETTEVILLE ST, SUITE 600  
RALEIGH, NC 27601



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DRAWN BY:	CHECKED BY:	APPROVED BY:
DRD	MCK	MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
A	09/28/2021	ISSUED FOR REVIEW
0	11/30/2021	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION  
  
NJJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-3**

**GROUNDING NOTES:**

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



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12/03/21  
Exp. 01/31/22

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DRAWN BY:	CHECKED BY:	APPROVED BY:
DRD	MCK	MCK

RFDS REV #: ---

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
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A&E PROJECT NUMBER  
KHCLC-16296

DISH Wireless L.L.C.  
PROJECT INFORMATION  
NJJER01093A  
363 RIVERSVILLE ROAD  
GREENWICH, CT 06831

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
**GN-4**

# Exhibit D

## **Structural Analysis Report**

Date: **September 18, 2021**



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

**Subject:** **Structural Analysis Report**

**Carrier Designation:** **DISH Network Co-Locate**  
**Site Number:** NJJER01093A  
**Site Name:** CT-CCI-T-841290

**Crown Castle Designation:** **BU Number:** 841290  
**Site Name:** GREENWICH NORTH  
**JDE Job Number:** 640185  
**Work Order Number:** 1975473  
**Order Number:** 548690 Rev. 1

**Engineering Firm Designation:** **Crown Castle Project Number:** 1975473

**Site Data:** **363 RIVERSVILLE ROAD, GREENWICH, Fairfield County, CT**  
**Latitude 41° 3' 58.6", Longitude -73° 40' 17.4"**  
**160 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:

LC7: Proposed Equipment Configuration

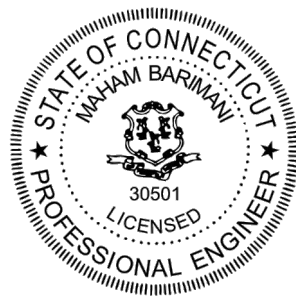
**Sufficient Capacity\_60.3%**

This analysis utilizes an ultimate 3-second gust wind speed of 116 mph as required by the 2015 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Kayla Weimert

Respectfully submitted by:

Maham Barimani, P.E.  
Senior Project Engineer



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## 1) INTRODUCTION

This tower is a 160 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC.

## 2) ANALYSIS CRITERIA

<b>TIA-222 Revision:</b>	TIA-222-H
<b>Risk Category:</b>	II
<b>Wind Speed:</b>	116 mph
<b>Exposure Category:</b>	B
<b>Topographic Factor:</b>	1
<b>Ice Thickness:</b>	1.5 in
<b>Wind Speed with Ice:</b>	50 mph
<b>Service Wind Speed:</b>	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)
132.0	132.0	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)
160.0	163.0	3	commscope	SDX1926Q-43	6 3	1-5/8 1-3/8
		3	ericsson	AIR 32 B2A/B66AA w/ Mount Pipe		
		3	ericsson	AIR6449 B41_T-MOBILE w/ Mount Pipe		
		3	ericsson	RADIO 4449 B71 B85A_T-MOBILE		
		3	ericsson	RRUS 4415 B25		
		3	rfs celwave	APXVAARR24_43-U-NA20 w/ Mount Pipe		
	3	rfs celwave	ATMAA1412D-1A20			
	160.0	1	tower mounts	Platform Mount [LP 602-1]		
152.0	152.0	3	ericsson	RRUS 11	-	-
		3	ericsson	RRUS 32 B2		
		1	tower mounts	Side Arm Mount [SO 102-3]		
150.0	152.0	3	cci antennas	HPA-65R-BUU-H6 w/ Mount Pipe	12 4 2	1-5/8 3/4 3/8
		3	ericsson	RADIO 4426		
		3	ericsson	RRUS 32		
		3	kaelus	DBC0061F1V51-2		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	
	150.0	3	powerwave technologies	7770.00 w/ Mount Pipe			
		6	powerwave technologies	LGP21401			
		3	quintel technology	QS66512-2 w/ Mount Pipe			
		1	raycap	DC6-48-60-18-8C			
		1	raycap	DC6-48-60-18-8F			
		1	tower mounts	Platform Mount [LP 712-1]			
		1	tower mounts	Side Arm Mount [SO 701-3]			
140.0	141.0	3	commscope	CBC78T-DS-43-2X	8	1-5/8	
		6	commscope	JAHH-65B-R3B w/ Mount Pipe			
		2	commscope	RC2DC-3315-PF-48			
		2	decibel	DB844H80E-XY w/ Mount Pipe			
		4	rfs celwave	APL868013-42T0 w/ Mount Pipe			
		3	samsung telecommunications	20W CBRS			
		3	samsung telecommunications	CBRS w/ Mount Pipe			
		3	samsung telecommunications	RFV01U-D1A			
	140.0	140.0	3	samsung telecommunications			RFV01U-D2A
			1	tower mounts			Platform Mount [LP 712-1]
120.0	120.0	1	tower mounts	Side Arm Mount [SO 701-3]			
		3	alcatel lucent	TD-RRH8X20-25	3	1-1/4	
		3	rfs celwave	APXVSP18-C-A20 w/ Mount Pipe			
		3	rfs celwave	APXVTM14-ALU-I20 w/ Mount Pipe			
		1	tower mounts	Platform Mount [LP 712-1]			
1	tower mounts	Side Arm Mount [SO 701-3]					
119.0	119.0	3	alcatel lucent	1900MHZ RRH	-	-	
		3	alcatel lucent	800MHZ RRH			
		1	tower mounts	Side Arm Mount [SO 102-3]			
72.0	73.0	2	gps	GPS_A	3	1/2	
	72.0	1	tower mounts	Side Arm Mount [SO 601-1]			



### 3) ANALYSIS PROCEDURE

**Table 3 - Documents Provided**

Document	Reference	Source
4-TOWER MANUFACTURER DRAWINGS	5164738	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	5121536	CCISITES
4-GEOTECHNICAL REPORTS	5121535	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	160 - 152	Pole	TP30.62x29x0.188	1	-4.37	1112.47	6.3	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-23.18	1828.41	35.5	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.313	3	-30.88	2653.22	47.3	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.236x0.438	4	-44.88	4330.74	41.6	Pass
L5	36.46 - 0	Pole	TP59x50.335x0.5	5	-64.57	5702.67	42.1	Pass
							Summary	
						Pole (L3)	47.3	Pass
						Rating =	47.3	Pass

**Table 5 - Tower Component Stresses vs. Capacity - LC7**

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Flange Bolts	152	8.0	Pass
1	Flange Plate		6.8	Pass
1	Anchor Rods	0	38.2	Pass
1	Base Plate		45.5	Pass
1	Base Foundation (Structure)	0	60.3	Pass
1	Base Foundation (Soil Interaction)		40.4	Pass

<b>Structure Rating (max from all components) =</b>	<b>60.3%</b>
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Notes:

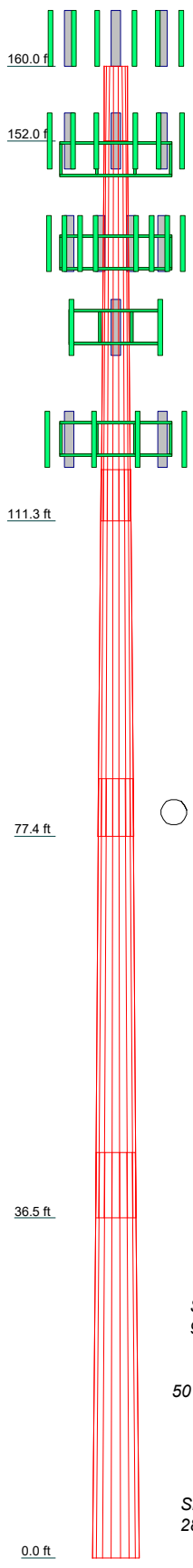
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.

#### 4.1) Recommendations

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

**APPENDIX A**  
**TNXTOWER OUTPUT**

Section	1	2	3	4	5
Length (ft)	8.000	40.710	39.290	47.130	43.540
Number of Sides	18	18	18	18	18
Thickness (in)	0.188	0.250	0.313	0.438	0.500
Socket Length (ft)		5.420	6.170	7.080	
Top Dia (in)	29.000	30.620	37.263	43.236	50.335
Bot Dia (in)	30.620	38.860	45.090	52.620	59.000
Grade			A572-65		
Weight (K)	0.5	3.8	5.4	10.6	12.7

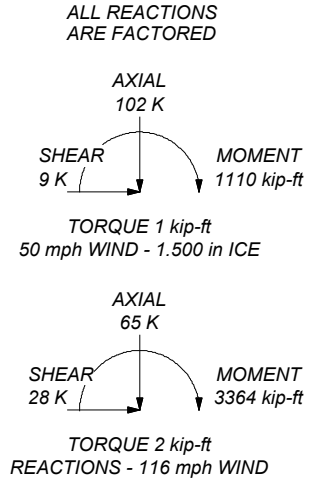



**MATERIAL STRENGTH**

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

**TOWER DESIGN NOTES**

1. Tower is located in Fairfield County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 116 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.50 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.000 ft
8. TOWER RATING: 47.3%



 <p><b>CROWN CASTLE</b> The Pathway to Possible</p>	<p><b>Crown Castle</b> 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416-2000 FAX:</p>		<p>Job: <b>BU 841290</b></p>
	<p>Project:</p>	<p>Client: Crown Castle</p>	<p>Drawn by: Kayla Weimert</p>
	<p>Code: TIA-222-H</p>	<p>Date: 09/18/21</p>	<p>App'd:</p>
	<p>Path:</p>	<p>Scale: NTS</p>	<p>Dwg No. E-1</p>
	<p><small>C:\Users\KWeimert\Desktop\SAPI WORK\841290\WO 1975473 - SAIProd\841290.dwg</small></p>		

## 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 Fairfield County, Connecticut.
- Tower base elevation above sea level: 223.000 ft.
- Basic wind speed of 116 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 1.500 in.
- Ice thickness is considered to increase with height.
- Ice density of 56.00 pcf.
- A wind speed of 50 mph is used in combination with ice.
- Temperature drop of 50.00 °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 Consider Moments - Horizontals Consider Moments - Diagonals Use Moment Magnification ✓ Use Code Stress Ratios ✓ Use Code Safety Factors - Guys Escalate Ice Always Use Max Kz Use Special Wind Profile  Include Bolts In Member Capacity  Leg Bolts Are At Top Of Section Secondary Horizontal Braces Leg Use Diamond Inner Bracing (4 Sided) SR Members Have Cut Ends SR Members Are Concentric	Distribute Leg Loads As Uniform Assume Legs Pinned ✓ Assume Rigid Index Plate ✓ Use Clear Spans For Wind Area Use Clear Spans For KL/r Retension Guys To Initial Tension ✓ Bypass Mast Stability Checks ✓ Use Azimuth Dish Coefficients ✓ Project Wind Area of Appurt.  Autocalc Torque Arm Areas  Add IBC .6D+W Combination ✓ Sort Capacity Reports By Component Triangulate Diamond Inner Bracing Treat Feed Line Bundles As Cylinder Ignore KL/ry For 60 Deg. Angle Legs	Use ASCE 10 X-Brace Ly Rules Calculate Redundant Bracing Forces Ignore Redundant Members in FEA SR Leg Bolts Resist Compression All Leg Panels Have Same Allowable Offset Girt At Foundation ✓ Consider Feed Line Torque Include Angle Block Shear Check Use TIA-222-H Bracing Resist. Exemption Use TIA-222-H Tension Splice Exemption  <div style="text-align: center; background-color: #e0e0e0; padding: 2px;"><b>Poles</b></div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets ✓ Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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## Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	160.000-152.000	8.000	0.00	18	29.000	30.620	0.188	0.750	A572-65 (65 ksi)
L2	152.000-111.290	40.710	5.42	18	30.620	38.860	0.250	1.000	A572-65 (65 ksi)
L3	111.290-77.420	39.290	6.17	18	37.263	45.090	0.313	1.250	A572-65 (65 ksi)
L4	77.420-36.460	47.130	7.08	18	43.236	52.620	0.438	1.750	A572-65 (65 ksi)
L5	36.460-0.000	43.540		18	50.335	59.000	0.500	2.000	A572-65 (65 ksi)

**Tapered Pole Properties**

Section	Tip Dia. in	Area in <sup>2</sup>	I in <sup>4</sup>	r in	C in	I/C in <sup>3</sup>	J in <sup>4</sup>	It/Q in <sup>2</sup>	w in	w/t
L1	29.418	17.147	1798.409	10.228	14.732	122.075	3599.184	8.575	4.774	25.461
	31.063	18.111	2119.135	10.804	15.555	136.235	4241.058	9.057	5.059	26.982
L2	31.054	24.099	2808.140	10.781	15.555	180.530	5619.975	12.052	4.949	19.796
	39.421	30.637	5770.106	13.707	19.741	292.292	11547.804	15.321	6.399	25.597
L3	38.886	36.650	6321.988	13.117	18.930	333.974	12652.295	18.329	6.008	19.226
	45.737	44.414	11250.554	15.896	22.906	491.168	22515.912	22.211	7.386	23.635
L4	45.083	59.431	13753.202	15.193	21.964	626.175	27524.502	29.721	6.840	15.633
	53.364	72.462	24928.553	18.525	26.731	932.572	49889.908	36.238	8.491	19.408
L5	52.465	79.089	24815.630	17.692	25.570	970.485	49663.913	39.552	7.979	15.958
	59.833	92.840	40140.426	20.767	29.972	1339.264	80333.669	46.429	9.504	19.008

Tower Elevation ft	Gusset Area (per face) ft <sup>2</sup>	Gusset Thickness in	Gusset Grade	Adjust. Factor A <sub>r</sub>	Adjust. Factor A <sub>r</sub>	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontal in	Double Angle Stitch Bolt Spacing Redundants in
L1 160.000-152.000				1	1	1			
L2 152.000-111.290				1	1	1			
L3 111.290-77.420				1	1	1			
L4 77.420-36.460				1	1	1			
L5 36.460-0.000				1	1	1			

**Feed Line/Linear Appurtenances - Entered As Round Or Flat**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter r in	Perimeter r in	Weight plf
***											
***											
***											
***											

**Feed Line/Linear Appurtenances - Entered As Area**

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number		CAAA ft <sup>2</sup> /ft	Weight plf
***									
***									
Safety Line 3/8	B	No	No	CaAa (Out Of Face)	160.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.037 0.137 0.238 0.437	0.22 0.75 1.28 2.34
5/8 rod/step	B	No	No	CaAa (Out Of Face)	160.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.020 0.120 0.220 0.420	0.27 0.70 1.74 5.65
***									
***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	160.000 - 0.000	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.82 0.82 0.82 0.82
HCS 6X12 6AWG(1-3/8)	A	No	No	Inside Pole	160.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.70 1.70 1.70 1.70
HCS 6X12 6AWG(1-3/8)	A	No	No	Inside Pole	160.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.70 1.70 1.70 1.70
***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	150.000 - 0.000	12	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.82 0.82 0.82 0.82
FB-L98B-034-XXX(3/8)	A	No	No	Inside Pole	150.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.06 0.06 0.06 0.06
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	150.000 - 0.000	4	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.58 0.58 0.58 0.58
2" Flex Conduit	A	No	No	Inside Pole	150.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.36 0.36 0.36 0.36
***									
LDF7-50A(1-5/8)	A	No	No	Inside Pole	140.000 - 0.000	6	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.82 0.82 0.82 0.82
HB158-1-08U8-S8J18(1-5/8)	A	No	No	Inside Pole	140.000 - 0.000	2	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	1.30 1.30 1.30 1.30
***									
CU12PSM9P6XXX (1-1/2)	B	No	No	Inside Pole	132.000 - 0.000	1	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	2.35 2.35 2.35 2.35
***									
HB114-1-05U3-S3J(1-1/4)	C	No	No	Inside Pole	120.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.90 0.90 0.90 0.90
***									
LDF4-50A(1/2)	C	No	No	Inside Pole	72.000 - 0.000	3	No Ice 1/2" Ice 1" Ice 2" Ice	0.000 0.000 0.000 0.000	0.15 0.15 0.15 0.15
***									
***									

### Feed Line/Linear Appurtenances Section Areas

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face	$A_R$ <i>ft<sup>2</sup></i>	$A_F$ <i>ft<sup>2</sup></i>	$C_{AA}$ In Face <i>ft<sup>2</sup></i>	$C_{AA}$ Out Face <i>ft<sup>2</sup></i>	Weight <i>K</i>
L1	160.000-152.000	A	0.000	0.000	0.000	0.000	0.08
		B	0.000	0.000	0.000	0.460	0.00
		C	0.000	0.000	0.000	0.000	0.00
L2	152.000-111.290	A	0.000	0.000	0.000	0.000	1.13
		B	0.000	0.000	0.000	2.341	0.07
		C	0.000	0.000	0.000	0.000	0.02
L3	111.290-77.420	A	0.000	0.000	0.000	0.000	1.03
		B	0.000	0.000	0.000	1.948	0.10
		C	0.000	0.000	0.000	0.000	0.09
L4	77.420-36.460	A	0.000	0.000	0.000	0.000	1.25
		B	0.000	0.000	0.000	2.355	0.12
		C	0.000	0.000	0.000	0.000	0.13
L5	36.460-0.000	A	0.000	0.000	0.000	0.000	1.11
		B	0.000	0.000	0.000	2.096	0.10
		C	0.000	0.000	0.000	0.000	0.11

### Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section <i>n</i>	Tower Elevation <i>ft</i>	Face or Leg	Ice Thickness <i>in</i>	$A_R$ <i>ft<sup>2</sup></i>	$A_F$ <i>ft<sup>2</sup></i>	$C_{AA}$ In Face <i>ft<sup>2</sup></i>	$C_{AA}$ Out Face <i>ft<sup>2</sup></i>	Weight <i>K</i>
L1	160.000-152.000	A	1.489	0.000	0.000	0.000	0.000	0.08
		B		0.000	0.000	0.000	5.226	0.04
		C		0.000	0.000	0.000	0.000	0.00
L2	152.000-111.290	A	1.464	0.000	0.000	0.000	0.000	1.13
		B		0.000	0.000	0.000	26.173	0.27
		C		0.000	0.000	0.000	0.000	0.02
L3	111.290-77.420	A	1.416	0.000	0.000	0.000	0.000	1.03
		B		0.000	0.000	0.000	21.776	0.26
		C		0.000	0.000	0.000	0.000	0.09
L4	77.420-36.460	A	1.346	0.000	0.000	0.000	0.000	1.25
		B		0.000	0.000	0.000	25.553	0.30
		C		0.000	0.000	0.000	0.000	0.13
L5	36.460-0.000	A	1.199	0.000	0.000	0.000	0.000	1.11
		B		0.000	0.000	0.000	21.732	0.26
		C		0.000	0.000	0.000	0.000	0.11

### Feed Line Center of Pressure

Section	Elevation <i>ft</i>	$CP_x$ <i>in</i>	$CP_z$ <i>in</i>	$CP_x$ Ice <i>in</i>	$CP_z$ Ice <i>in</i>
L1	160.000-152.000	0.451	0.260	2.280	1.316
L2	152.000-111.290	0.453	0.262	2.335	1.348
L3	111.290-77.420	0.456	0.263	2.429	1.402
L4	77.420-36.460	0.458	0.264	2.436	1.406
L5	36.460-0.000	0.459	0.265	2.397	1.384

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



### Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment  °	Placement  ft
*** ***					
AIR 32 B2A/B66AA w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000
AIR 32 B2A/B66AA w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000
AIR 32 B2A/B66AA w/ Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000
AIR6449 B41_T-MOBILE w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000
AIR6449 B41_T-MOBILE w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000
AIR6449 B41_T-MOBILE w/ Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	A	From Leg	4.000 0.00 3.00	0.00	160.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000
APXVAARR24_43-U-NA20 w/ Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000
ATMAA1412D-1A20	A	From Leg	4.000 0.00 3.00	0.00	160.000
ATMAA1412D-1A20	B	From Leg	4.000 0.00 3.00	0.00	160.000
ATMAA1412D-1A20	C	From Leg	4.000 0.00 3.00	0.00	160.000
SDX1926Q-43	A	From Leg	4.000 0.00 3.00	0.00	160.000
SDX1926Q-43	B	From Leg	4.000 0.00 3.00	0.00	160.000
SDX1926Q-43	C	From Leg	4.000 0.00 3.00	0.00	160.000
RADIO 4449 B71 B85A_T-MOBILE	A	From Leg	4.000 0.00 3.00	0.00	160.000
RADIO 4449 B71 B85A_T-MOBILE	B	From Leg	4.000 0.00 3.00	0.00	160.000
RADIO 4449 B71 B85A_T-MOBILE	C	From Leg	4.000 0.00 3.00	0.00	160.000
RRUS 4415 B25	A	From Leg	4.000 0.00 3.00	0.00	160.000
RRUS 4415 B25	B	From Leg	4.000 0.00 3.00	0.00	160.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment  °	Placement  ft
RRUS 4415 B25	C	From Leg	4.000 0.00 3.00	0.00	160.000
Platform Mount [LP 602-1] 6' x 2" Mount Pipe	C A	None From Leg	4.000 0.00 3.00	0.00 0.00	160.000 160.000
6' x 2" Mount Pipe	B	From Leg	4.000 0.00 3.00	0.00	160.000
6' x 2" Mount Pipe	C	From Leg	4.000 0.00 3.00	0.00	160.000
***					
RRUS 11	A	From Leg	2.000 0.00 0.00	0.00	152.000
RRUS 11	B	From Leg	2.000 0.00 0.00	0.00	152.000
RRUS 11	C	From Leg	2.000 0.00 0.00	0.00	152.000
RRUS 32 B2	A	From Leg	2.000 0.00 0.00	0.00	152.000
RRUS 32 B2	B	From Leg	2.000 0.00 0.00	0.00	152.000
RRUS 32 B2	C	From Leg	2.000 0.00 0.00	0.00	152.000
Side Arm Mount [SO 102-3] (2) 6' x 2" Mount Pipe	C A	None From Leg	2.000 0.00 0.00	0.00 0.00	152.000 152.000
(2) 6' x 2" Mount Pipe	B	From Leg	2.000 0.00 0.00	0.00	152.000
(2) 6' x 2" Mount Pipe	C	From Leg	2.000 0.00 0.00	0.00	152.000
***					
HPA-65R-BUU-H6 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000
HPA-65R-BUU-H6 w/ Mount Pipe	B	From Leg	4.000 0.00 2.00	0.00	150.000
HPA-65R-BUU-H6 w/ Mount Pipe	C	From Leg	4.000 0.00 2.00	0.00	150.000
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.00 2.00	0.00	150.000
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.00 2.00	0.00	150.000
QS66512-2 w/ Mount Pipe	A	From Leg	4.000 0.00 2.00	0.00	150.000
QS66512-2 w/ Mount Pipe	B	From Leg	4.000	0.00	150.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
			0.00		
			2.00		
QS66512-2 w/ Mount Pipe	C	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RRUS 32	A	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RRUS 32	B	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RRUS 32	C	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RADIO 4426	A	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RADIO 4426	B	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
RADIO 4426	C	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
DBC0061F1V51-2	A	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
DBC0061F1V51-2	B	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
DBC0061F1V51-2	C	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
(2) LGP21401	A	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
(2) LGP21401	B	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
(2) LGP21401	C	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
DC6-48-60-18-8F	A	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
DC6-48-60-18-8C	B	From Leg	4.000	0.00	150.000
			0.00		
			2.00		
Side Arm Mount [SO 701-3]	C	None		0.00	150.000
Platform Mount [LP 712-1]	C	None		0.00	150.000
***					
(2) APL868013-42T0 w/ Mount Pipe	A	From Leg	4.000	0.00	140.000
			0.00		
			1.00		
(2) APL868013-42T0 w/ Mount Pipe	B	From Leg	4.000	0.00	140.000
			0.00		
			1.00		
(2) DB844H80E-XY w/ Mount Pipe	C	From Leg	4.000	0.00	140.000
			0.00		
			1.00		
(2) JAHH-65B-R3B w/ Mount Pipe	A	From Leg	4.000	0.00	140.000
			0.00		
			1.00		
(2) JAHH-65B-R3B w/ Mount Pipe	B	From Leg	4.000	0.00	140.000
			0.00		
			1.00		

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment  °	Placement  ft
(2) JAHH-65B-R3B w/ Mount Pipe	C	From Leg	4.000 0.00 1.00	0.00	140.000
CBRS w/ Mount Pipe	A	From Leg	4.000 0.00 1.00	0.00	140.000
CBRS w/ Mount Pipe	B	From Leg	4.000 0.00 1.00	0.00	140.000
CBRS w/ Mount Pipe	C	From Leg	4.000 0.00 1.00	0.00	140.000
RC2DC-3315-PF-48	A	From Leg	4.000 0.00 1.00	0.00	140.000
RC2DC-3315-PF-48	C	From Leg	4.000 0.00 1.00	0.00	140.000
(3) RFV01U-D1A	A	From Leg	4.000 0.00 1.00	0.00	140.000
RFV01U-D2A	A	From Leg	4.000 0.00 1.00	0.00	140.000
(2) RFV01U-D2A	B	From Leg	4.000 0.00 1.00	0.00	140.000
(3) 20W CBRS	B	From Leg	4.000 0.00 1.00	0.00	140.000
(3) CBC78T-DS-43-2X	B	From Leg	4.000 0.00 1.00	0.00	140.000
Side Arm Mount [SO 701-3]	C	None		0.00	140.000
Platform Mount [LP 712-1] ***	C	None		0.00	140.000
MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.00 0.00	0.00	132.000
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.00 0.00	0.00	132.000
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B604	A	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B604	B	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B604	C	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B605	A	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B605	B	From Leg	4.000 0.00 0.00	0.00	132.000
TA08025-B605	C	From Leg	4.000 0.00 0.00	0.00	132.000
RDIDC-9181-PF-48	B	From Leg	4.000 0.00	0.00	132.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment  °	Placement  ft
			0.00		
Commscope MC-PK8-DSH	C	None		0.00	132.000
(2) 8' x 2" Mount Pipe	A	From Leg	4.000	0.00	132.000
			0.00		
(2) 8' x 2" Mount Pipe	B	From Leg	4.000	0.00	132.000
			0.00		
(2) 8' x 2" Mount Pipe	C	From Leg	4.000	0.00	132.000
			0.00		
***					
APXVTM14-ALU-I20 w/ Mount Pipe	A	From Leg	4.000	0.00	120.000
			0.00		
APXVTM14-ALU-I20 w/ Mount Pipe	B	From Leg	4.000	0.00	120.000
			0.00		
APXVTM14-ALU-I20 w/ Mount Pipe	C	From Leg	4.000	0.00	120.000
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	A	From Leg	4.000	0.00	120.000
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	B	From Leg	4.000	0.00	120.000
			0.00		
APXVSPP18-C-A20 w/ Mount Pipe	C	From Leg	4.000	0.00	120.000
			0.00		
TD-RRH8X20-25	A	From Leg	4.000	0.00	120.000
			0.00		
TD-RRH8X20-25	B	From Leg	4.000	0.00	120.000
			0.00		
TD-RRH8X20-25	C	From Leg	4.000	0.00	120.000
			0.00		
Side Arm Mount [SO 701-3]	C	None		0.00	120.000
Platform Mount [LP 712-1]	C	None		0.00	120.000
(2) 6' x 2" Mount Pipe	A	From Leg	4.000	0.00	120.000
			0.00		
(2) 6' x 2" Mount Pipe	B	From Leg	4.000	0.00	120.000
			0.00		
(2) 6' x 2" Mount Pipe	C	From Leg	4.000	0.00	120.000
			0.00		
***					
800MHZ RRH	A	From Leg	2.000	0.00	119.000
			0.00		
800MHZ RRH	B	From Leg	2.000	0.00	119.000
			0.00		
800MHZ RRH	C	From Leg	2.000	0.00	119.000
			0.00		
1900MHZ RRH	A	From Leg	2.000	0.00	119.000
			0.00		
1900MHZ RRH	B	From Leg	2.000	0.00	119.000
			0.00		

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
1900MHZ RRH	C	From Leg	0.00 2.000 0.00 0.00	0.00	119.000
Side Arm Mount [SO 102-3] (2) 4' x 2" Pipe Mount	C A	None From Leg	0.00 2.000 0.00 0.00	0.00 0.00	119.000 119.000
(2) 4' x 2" Pipe Mount	B	From Leg	2.000 0.00 0.00	0.00	119.000
(2) 4' x 2" Pipe Mount	C	From Leg	2.000 0.00 0.00	0.00	119.000
*** (2) GPS_A	B	From Leg	4.000 0.00 1.00	0.00	72.000
Side Arm Mount [SO 601-1] *** ***	B	From Leg	2.000 0.00 0.00	0.00	72.000

### 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

Comb. No.	Description
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	160 - 152	Pole	Max Tension	26	0.00	0.00	-0.00
			Max. Compression	26	-10.34	-0.07	-0.02
			Max. Mx	8	-4.37	-43.37	0.00
			Max. My	14	-4.37	-0.01	-43.36
			Max. Vy	8	4.68	-43.37	0.00
			Max. Vx	2	-4.68	-0.01	43.36
			Max. Torque	28			-0.05
L2	152 - 111.29	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-50.34	-3.29	2.09
			Max. Mx	8	-23.19	-525.55	0.76
			Max. My	2	-23.18	-1.10	526.25
			Max. Vy	8	20.21	-525.55	0.76
			Max. Vx	2	-20.25	-1.10	526.25
			Max. Torque	13			1.14
L3	111.29 - 77.42	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-60.81	-3.74	2.00
			Max. Mx	8	-30.88	-1234.86	0.11
			Max. My	2	-30.88	-0.54	1236.74
			Max. Vy	8	22.56	-1234.86	0.11
			Max. Vx	2	-22.60	-0.54	1236.74
			Max. Torque	13			1.19
L4	77.42 - 36.46	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-78.61	-5.33	1.08
			Max. Mx	8	-44.89	-2198.01	0.57
			Max. My	2	-44.88	-2.09	2202.13
			Max. Vy	8	25.35	-2198.01	0.57
			Max. Vx	2	-25.45	-2.09	2202.13
			Max. Torque	3			-1.80
L5	36.46 - 0	Pole	Max Tension	1	0.00	0.00	0.00
			Max. Compression	26	-102.29	-5.74	0.84
			Max. Mx	8	-64.57	-3355.68	2.16
			Max. My	2	-64.57	-3.78	3364.13
			Max. Vy	8	27.71	-3355.68	2.16
			Max. Vx	2	-27.81	-3.78	3364.13
			Max. Torque	3			-1.92

### Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	29	102.29	-7.91	4.59
	Max. H <sub>x</sub>	20	64.58	27.69	-0.04
	Max. H <sub>z</sub>	2	64.58	-0.04	27.79
	Max. M <sub>x</sub>	2	3364.13	-0.04	27.79
	Max. M <sub>z</sub>	8	3355.68	-27.69	0.04
	Max. Torsion	15	1.91	0.04	-27.79
	Min. Vert	23	48.44	23.96	13.86
	Min. H <sub>x</sub>	8	64.58	-27.69	0.04
	Min. H <sub>z</sub>	14	64.58	0.04	-27.79
	Min. M <sub>x</sub>	14	-3362.65	0.04	-27.79
	Min. M <sub>z</sub>	20	-3350.97	27.69	-0.04
	Min. Torsion	3	-1.92	-0.04	27.79

### Tower Mast Reaction Summary

Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturing Moment, M <sub>x</sub> kip-ft	Overturing Moment, M <sub>z</sub> kip-ft	Torque kip-ft
Dead Only	53.82	0.00	0.00	-0.56	-1.85	0.00
1.2 Dead+1.0 Wind 0 deg - No Ice	64.58	0.04	-27.79	-3364.13	-3.78	1.91
0.9 Dead+1.0 Wind 0 deg - No Ice	48.44	0.04	-27.79	-3329.13	-3.16	1.92
1.2 Dead+1.0 Wind 30 deg - No Ice	64.58	13.88	-24.08	-2914.25	-1680.26	1.63
0.9 Dead+1.0 Wind 30 deg - No Ice	48.44	13.88	-24.08	-2883.91	-1662.28	1.63
1.2 Dead+1.0 Wind 60 deg - No Ice	64.58	24.00	-13.93	-1683.68	-2907.15	0.92
0.9 Dead+1.0 Wind 60 deg - No Ice	48.44	24.00	-13.93	-1666.08	-2876.46	0.91
1.2 Dead+1.0 Wind 90 deg - No Ice	64.58	27.69	-0.04	-2.16	-3355.68	-0.05
0.9 Dead+1.0 Wind 90 deg - No Ice	48.44	27.69	-0.04	-1.97	-3320.35	-0.06
1.2 Dead+1.0 Wind 120 deg - No Ice	64.58	23.96	13.86	1679.74	-2905.72	-1.00
0.9 Dead+1.0 Wind 120 deg - No Ice	48.44	23.96	13.86	1662.53	-2875.03	-1.01
1.2 Dead+1.0 Wind 150 deg - No Ice	64.58	13.81	24.05	2911.35	-1677.79	-1.68
0.9 Dead+1.0 Wind 150 deg - No Ice	48.44	13.81	24.05	2881.40	-1659.81	-1.69
1.2 Dead+1.0 Wind 180 deg - No Ice	64.58	-0.04	27.79	3362.65	-0.93	-1.91
0.9 Dead+1.0 Wind 180 deg - No Ice	48.44	-0.04	27.79	3328.05	-0.31	-1.91
1.2 Dead+1.0 Wind 210 deg - No Ice	64.58	-13.88	24.08	2912.77	1675.54	-1.63
0.9 Dead+1.0 Wind 210 deg - No Ice	48.44	-13.88	24.08	2882.82	1658.80	-1.63
1.2 Dead+1.0 Wind 240 deg - No Ice	64.58	-24.00	13.93	1682.20	2902.43	-0.91
0.9 Dead+1.0 Wind 240 deg - No Ice	48.44	-24.00	13.93	1665.00	2872.98	-0.91
1.2 Dead+1.0 Wind 270 deg - No Ice	64.58	-27.69	0.04	0.68	3350.97	0.04
0.9 Dead+1.0 Wind 270 deg - No Ice	48.44	-27.69	0.04	0.89	3316.87	0.05
1.2 Dead+1.0 Wind 300 deg - No Ice	64.58	-23.96	-13.86	-1681.21	2901.01	0.99
0.9 Dead+1.0 Wind 300 deg - No Ice	48.44	-23.96	-13.86	-1663.60	2871.55	1.00
1.2 Dead+1.0 Wind 330 deg	64.58	-13.81	-24.05	-2912.82	1673.08	1.68



Load Combination	Vertical K	Shear <sub>x</sub> K	Shear <sub>z</sub> K	Overturning Moment, M <sub>x</sub> kip-ft	Overturning Moment, M <sub>z</sub> kip-ft	Torque kip-ft
- No Ice						
0.9 Dead+1.0 Wind 330 deg	48.44	-13.81	-24.05	-2882.48	1656.33	1.69
- No Ice						
1.2 Dead+1.0 Ice+1.0 Temp	102.29	0.00	-0.00	-0.84	-5.74	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	102.29	0.01	-9.15	-1106.54	-6.64	1.34
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	102.29	4.57	-7.93	-958.72	-558.08	1.40
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	102.29	7.91	-4.59	-554.25	-961.59	1.08
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	102.29	9.12	-0.01	-1.51	-1109.06	0.47
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	102.29	7.90	4.56	551.39	-960.97	-0.26
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp	102.29	4.55	7.92	956.31	-557.01	-0.92
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	102.29	-0.01	9.15	1104.75	-5.41	-1.34
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	102.29	-4.57	7.93	956.93	546.03	-1.40
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	102.29	-7.91	4.59	552.46	949.54	-1.08
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	102.29	-9.12	0.01	-0.28	1097.01	-0.47
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	102.29	-7.90	-4.56	-553.18	948.92	0.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	102.29	-4.55	-7.92	-958.10	544.95	0.92
Dead+Wind 0 deg - Service	53.82	0.01	-7.00	-843.18	-2.31	0.49
Dead+Wind 30 deg - Service	53.82	3.50	-6.07	-730.48	-422.28	0.42
Dead+Wind 60 deg - Service	53.82	6.05	-3.51	-422.21	-729.63	0.23
Dead+Wind 90 deg - Service	53.82	6.98	-0.01	-0.97	-842.00	-0.02
Dead+Wind 120 deg - Service	53.82	6.04	3.49	420.36	-729.27	-0.26
Dead+Wind 150 deg - Service	53.82	3.48	6.06	728.90	-421.66	-0.43
Dead+Wind 180 deg - Service	53.82	-0.01	7.00	841.96	-1.59	-0.49
Dead+Wind 210 deg - Service	53.82	-3.50	6.07	729.26	418.38	-0.42
Dead+Wind 240 deg - Service	53.82	-6.05	3.51	420.99	725.73	-0.23
Dead+Wind 270 deg - Service	53.82	-6.98	0.01	-0.25	838.08	0.02
Dead+Wind 300 deg - Service	53.82	-6.04	-3.49	-421.58	725.37	0.26
Dead+Wind 330 deg - Service	53.82	-3.48	-6.06	-730.12	417.76	0.43

## Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.00	-53.82	0.00	0.00	53.82	0.00	0.000%
2	0.04	-64.58	-27.79	-0.04	64.58	27.79	0.000%
3	0.04	-48.44	-27.79	-0.04	48.44	27.79	0.000%
4	13.88	-64.58	-24.08	-13.88	64.58	24.08	0.000%
5	13.88	-48.44	-24.08	-13.88	48.44	24.08	0.000%
6	24.00	-64.58	-13.93	-24.00	64.58	13.93	0.000%
7	24.00	-48.44	-13.93	-24.00	48.44	13.93	0.000%
8	27.69	-64.58	-0.04	-27.69	64.58	0.04	0.000%
9	27.69	-48.44	-0.04	-27.69	48.44	0.04	0.000%
10	23.96	-64.58	13.86	-23.96	64.58	-13.86	0.000%
11	23.96	-48.44	13.86	-23.96	48.44	-13.86	0.000%
12	13.81	-64.58	24.05	-13.81	64.58	-24.05	0.000%

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
13	13.81	-48.44	24.05	-13.81	48.44	-24.05	0.000%
14	-0.04	-64.58	27.79	0.04	64.58	-27.79	0.000%
15	-0.04	-48.44	27.79	0.04	48.44	-27.79	0.000%
16	-13.88	-64.58	24.08	13.88	64.58	-24.08	0.000%
17	-13.88	-48.44	24.08	13.88	48.44	-24.08	0.000%
18	-24.00	-64.58	13.93	24.00	64.58	-13.93	0.000%
19	-24.00	-48.44	13.93	24.00	48.44	-13.93	0.000%
20	-27.69	-64.58	0.04	27.69	64.58	-0.04	0.000%
21	-27.69	-48.44	0.04	27.69	48.44	-0.04	0.000%
22	-23.96	-64.58	-13.86	23.96	64.58	13.86	0.000%
23	-23.96	-48.44	-13.86	23.96	48.44	13.86	0.000%
24	-13.81	-64.58	-24.05	13.81	64.58	24.05	0.000%
25	-13.81	-48.44	-24.05	13.81	48.44	24.05	0.000%
26	0.00	-102.29	0.00	-0.00	102.29	0.00	0.000%
27	0.01	-102.29	-9.15	-0.01	102.29	9.15	0.000%
28	4.57	-102.29	-7.93	-4.57	102.29	7.93	0.000%
29	7.91	-102.29	-4.59	-7.91	102.29	4.59	0.000%
30	9.12	-102.29	-0.01	-9.12	102.29	0.01	0.000%
31	7.90	-102.29	4.56	-7.90	102.29	-4.56	0.000%
32	4.55	-102.29	7.92	-4.55	102.29	-7.92	0.000%
33	-0.01	-102.29	9.15	0.01	102.29	-9.15	0.000%
34	-4.57	-102.29	7.93	4.57	102.29	-7.93	0.000%
35	-7.91	-102.29	4.59	7.91	102.29	-4.59	0.000%
36	-9.12	-102.29	0.01	9.12	102.29	-0.01	0.000%
37	-7.90	-102.29	-4.56	7.90	102.29	4.56	0.000%
38	-4.55	-102.29	-7.92	4.55	102.29	7.92	0.000%
39	0.01	-53.82	-7.00	-0.01	53.82	7.00	0.000%
40	3.50	-53.82	-6.07	-3.50	53.82	6.07	0.000%
41	6.05	-53.82	-3.51	-6.05	53.82	3.51	0.000%
42	6.98	-53.82	-0.01	-6.98	53.82	0.01	0.000%
43	6.04	-53.82	3.49	-6.04	53.82	-3.49	0.000%
44	3.48	-53.82	6.06	-3.48	53.82	-6.06	0.000%
45	-0.01	-53.82	7.00	0.01	53.82	-7.00	0.000%
46	-3.50	-53.82	6.07	3.50	53.82	-6.07	0.000%
47	-6.05	-53.82	3.51	6.05	53.82	-3.51	0.000%
48	-6.98	-53.82	0.01	6.98	53.82	-0.01	0.000%
49	-6.04	-53.82	-3.49	6.04	53.82	3.49	0.000%
50	-3.48	-53.82	-6.06	3.48	53.82	6.06	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	0.00084582
3	Yes	4	0.00000001	0.00056426
4	Yes	5	0.00000001	0.00066512
5	Yes	5	0.00000001	0.00032524
6	Yes	5	0.00000001	0.00064658
7	Yes	5	0.00000001	0.00031570
8	Yes	4	0.00000001	0.00040166
9	Yes	4	0.00000001	0.00024304
10	Yes	5	0.00000001	0.00063445
11	Yes	5	0.00000001	0.00030961
12	Yes	5	0.00000001	0.00067159
13	Yes	5	0.00000001	0.00032902
14	Yes	4	0.00000001	0.00085083
15	Yes	4	0.00000001	0.00056787
16	Yes	5	0.00000001	0.00063211
17	Yes	5	0.00000001	0.00030899
18	Yes	5	0.00000001	0.00064920
19	Yes	5	0.00000001	0.00031789
20	Yes	4	0.00000001	0.00040659
21	Yes	4	0.00000001	0.00024709
22	Yes	5	0.00000001	0.00066441

23	Yes	5	0.00000001	0.00032562
24	Yes	5	0.00000001	0.00062871
25	Yes	5	0.00000001	0.00030684
26	Yes	4	0.00000001	0.00002906
27	Yes	5	0.00000001	0.00042965
28	Yes	5	0.00000001	0.00052951
29	Yes	5	0.00000001	0.00052165
30	Yes	5	0.00000001	0.00042940
31	Yes	5	0.00000001	0.00051875
32	Yes	5	0.00000001	0.00052455
33	Yes	5	0.00000001	0.00042671
34	Yes	5	0.00000001	0.00050795
35	Yes	5	0.00000001	0.00051358
36	Yes	5	0.00000001	0.00042161
37	Yes	5	0.00000001	0.00051577
38	Yes	5	0.00000001	0.00051194
39	Yes	4	0.00000001	0.00007478
40	Yes	4	0.00000001	0.00026255
41	Yes	4	0.00000001	0.00024191
42	Yes	4	0.00000001	0.00005744
43	Yes	4	0.00000001	0.00022938
44	Yes	4	0.00000001	0.00026982
45	Yes	4	0.00000001	0.00007452
46	Yes	4	0.00000001	0.00022678
47	Yes	4	0.00000001	0.00024421
48	Yes	4	0.00000001	0.00005701
49	Yes	4	0.00000001	0.00026171
50	Yes	4	0.00000001	0.00022442

### Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	16.34	40	0.89	0.00
L2	152 - 111.29	14.86	40	0.88	0.00
L3	116.71 - 77.42	8.77	40	0.73	0.00
L4	83.59 - 36.46	4.41	40	0.50	0.00
L5	43.54 - 0	1.20	40	0.25	0.00

### Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	AIR 32 B2A/B66AA w/ Mount Pipe	40	16.34	0.89	0.00	61519
152.000	RRUS 11	40	14.86	0.88	0.00	39306
150.000	HPA-65R-BUU-H6 w/ Mount Pipe	40	14.49	0.88	0.00	32321
140.000	(2) APL868013-42T0 w/ Mount Pipe	40	12.68	0.85	0.00	17828
132.000	MX08FRO665-21 w/ Mount Pipe	40	11.28	0.82	0.00	13140
120.000	APXVTM14-ALU-I20 w/ Mount Pipe	40	9.29	0.75	0.00	9428
119.000	800MHZ RRH	40	9.13	0.75	0.00	9232
72.000	(2) GPS_A	40	3.24	0.42	0.00	8373

### Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	160 - 152	65.16	2	3.53	0.01
L2	152 - 111.29	59.26	2	3.50	0.01
L3	116.71 - 77.42	35.00	2	2.92	0.00
L4	83.59 - 36.46	17.59	2	1.99	0.00
L5	43.54 - 0	4.79	2	0.99	0.00

### Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
160.000	AIR 32 B2A/B66AA w/ Mount Pipe	2	65.16	3.53	0.01	15736
152.000	RRUS 11	2	59.26	3.50	0.01	10047
150.000	HPA-65R-BUU-H6 w/ Mount Pipe	2	57.80	3.49	0.01	8255
140.000	(2) APL868013-42T0 w/ Mount Pipe	2	50.58	3.39	0.01	4538
132.000	MX08FRO665-21 w/ Mount Pipe	2	44.99	3.26	0.00	3338
120.000	APXVTM14-ALU-I20 w/ Mount Pipe	2	37.06	3.00	0.00	2391
119.000	800MHZ RRH	2	36.42	2.98	0.00	2341
72.000	(2) GPS_A	2	12.92	1.68	0.00	2100

### Compression Checks

### Pole Design Data

Section No.	Elevation ft	Size	L ft	L <sub>u</sub> ft	KI/r	A in <sup>2</sup>	P <sub>u</sub> K	φP <sub>n</sub> K	Ratio $\frac{P_u}{\phi P_n}$
L1	160 - 152 (1)	TP30.62x29x0.188	8.000	0.000	0.0	18.111	-4.37	1059.50	0.004
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	40.710	0.000	0.0	29.767	-23.18	1741.34	0.013
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	39.290	0.000	0.0	43.194	-30.88	2526.88	0.012
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	47.130	0.000	0.0	70.504	-44.88	4124.51	0.011
L5	36.46 - 0 (5)	TP59x50.335x0.5	43.540	0.000	0.0	92.840	-64.57	5431.11	0.012

### Pole Bending Design Data

Section No.	Elevation ft	Size	M <sub>ux</sub> kip-ft	φM <sub>nx</sub> kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M <sub>uy</sub> kip-ft	φM <sub>ny</sub> kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	160 - 152 (1)	TP30.62x29x0.188	43.37	701.24	0.062	0.00	701.24	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	526.25	1472.44	0.357	0.00	1472.44	0.000
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	1236.74	2556.32	0.484	0.00	2556.32	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	2202.13	5177.14	0.425	0.00	5177.14	0.000
L5	36.46 - 0 (5)	TP59x50.335x0.5	3364.13	7835.57	0.429	0.00	7835.57	0.000

### Pole Shear Design Data

Section No.	Elevation ft	Size	Actual $V_u$ K	$\phi V_n$ K	Ratio $\frac{V_u}{\phi V_n}$	Actual $T_u$ kip-ft	$\phi T_n$ kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	160 - 152 (1)	TP30.62x29x0.188	4.68	317.85	0.015	0.00	847.11	0.000
L2	152 - 111.29 (2)	TP38.86x30.62x0.25	20.25	517.17	0.039	0.95	1716.19	0.001
L3	111.29 - 77.42 (3)	TP45.09x37.263x0.313	22.60	752.73	0.030	1.04	2891.07	0.000
L4	77.42 - 36.46 (4)	TP52.62x43.236x0.438	25.45	1237.35	0.021	1.79	5501.79	0.000
L5	36.46 - 0 (5)	TP59x50.335x0.5	27.81	1629.33	0.017	1.91	8347.33	0.000

### Pole Interaction Design Data

Section No.	Elevation ft	Ratio $P_u$ $\phi P_n$	Ratio $M_{ux}$ $\phi M_{nx}$	Ratio $M_{uy}$ $\phi M_{ny}$	Ratio $V_u$ $\phi V_n$	Ratio $T_u$ $\phi T_n$	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	160 - 152 (1)	0.004	0.062	0.000	0.015	0.000	0.066	1.050	4.8.2
L2	152 - 111.29 (2)	0.013	0.357	0.000	0.039	0.001	0.372	1.050	4.8.2
L3	111.29 - 77.42 (3)	0.012	0.484	0.000	0.030	0.000	0.497	1.050	4.8.2
L4	77.42 - 36.46 (4)	0.011	0.425	0.000	0.021	0.000	0.437	1.050	4.8.2
L5	36.46 - 0 (5)	0.012	0.429	0.000	0.017	0.000	0.442	1.050	4.8.2

### Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	$\phi P_{allow}$ K	% Capacity	Pass Fail
L1	160 - 152	Pole	TP30.62x29x0.188	1	-4.37	1112.47	6.3	Pass
L2	152 - 111.29	Pole	TP38.86x30.62x0.25	2	-23.18	1828.41	35.5	Pass
L3	111.29 - 77.42	Pole	TP45.09x37.263x0.313	3	-30.88	2653.22	47.3	Pass
L4	77.42 - 36.46	Pole	TP52.62x43.236x0.438	4	-44.88	4330.74	41.6	Pass
L5	36.46 - 0	Pole	TP59x50.335x0.5	5	-64.57	5702.67	42.1	Pass
Summary								
Pole (L3)							47.3	Pass
<b>RATING =</b>							<b>47.3</b>	<b>Pass</b>

**APPENDIX B**  
**BASE LEVEL DRAWING**



(PROPOSED EQUIPMENT CONFIGURATION)  
(1) 1-1/2" TO 132 FT LEVEL

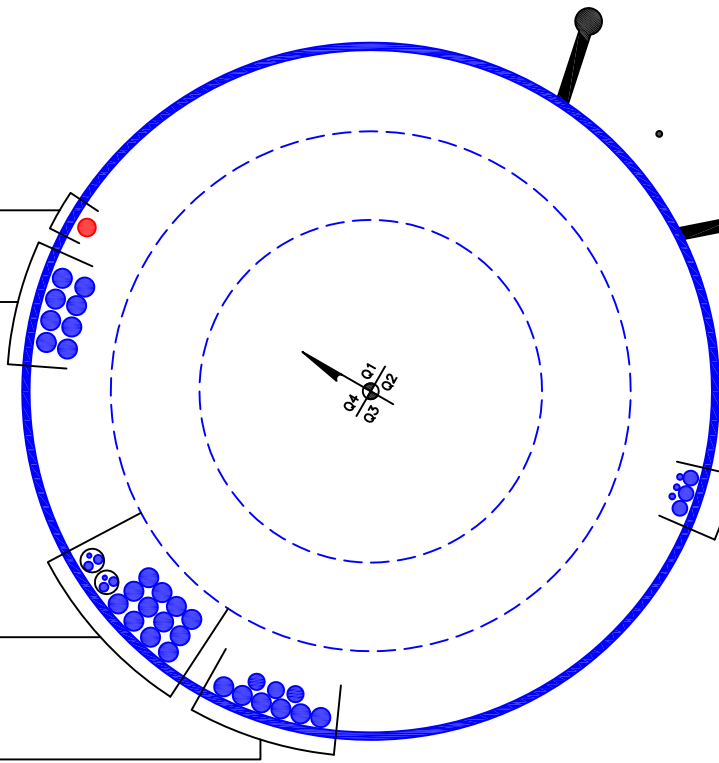
(OTHER CONSIDERED EQUIPMENT)  
(8) 1-5/8" TO 140 FT LEVEL

(OTHER CONSIDERED EQUIPMENT—IN CONDUIT)  
(2) 3/8" TO 150 FT LEVEL  
(4) 3/4" TO 150 FT LEVEL  
(OTHER CONSIDERED EQUIPMENT)  
(12) 1-5/8" TO 150 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)  
(3) 1-3/8" TO 160 FT LEVEL  
(6) 1-5/8" TO 160 FT LEVEL

CLIMBING PEGS  
W/ SAFETY CLIMB

(OTHER CONSIDERED EQUIPMENT)  
(3) 1/2" TO 72 FT LEVEL  
(3) 1-1/4" TO 120 FT LEVEL



**APPENDIX C**  
**ADDITIONAL CALCULATIONS**



# Monopole Flange Plate Connection

Elevation = 152 ft.



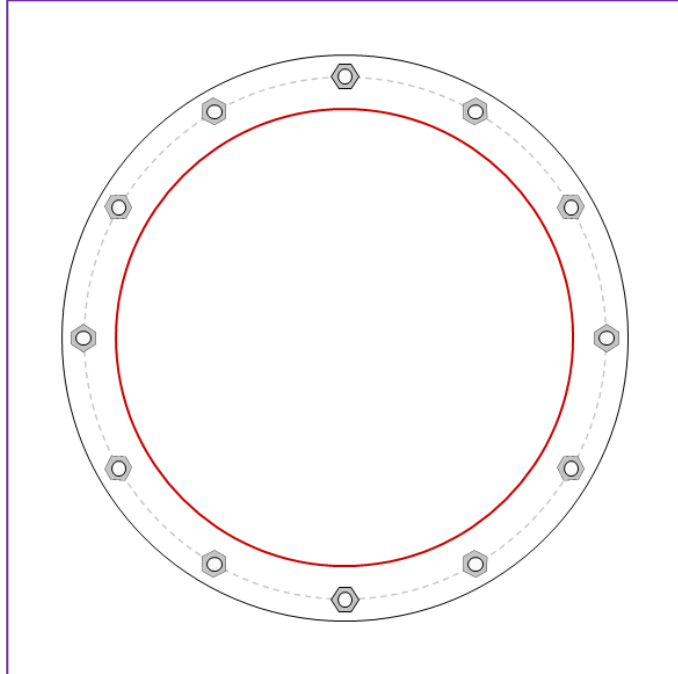
BU #	841290
Site Name	GREENWICH NORTH
Order #	548690 Rev. 1

TIA-222 Revision	H
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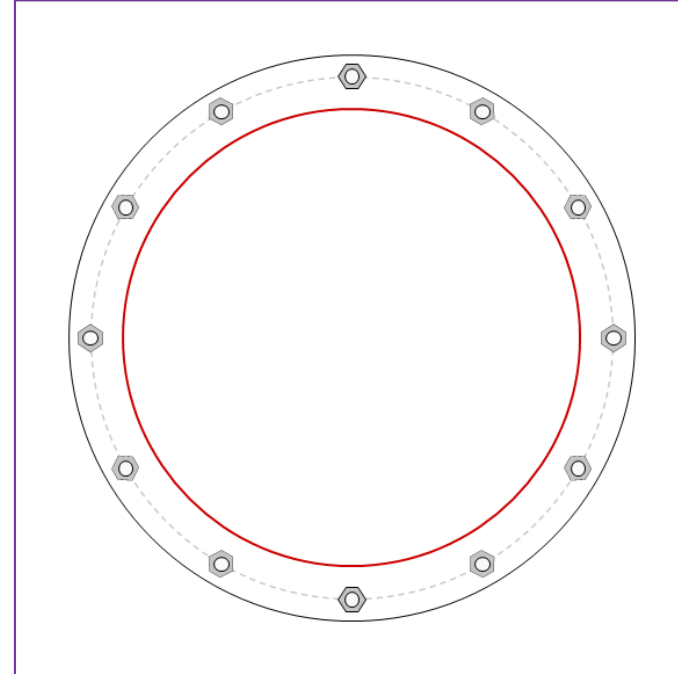
Applied Loads	
Moment (kip-ft)	43.37
Axial Force (kips)	4.37
Shear Force (kips)	4.68

\*TIA-222-H Section 15.5 Applied

Top Plate - External



Bottom Plate - External



### Connection Properties

#### Bolt Data

(12) 1"  $\phi$  bolts (A325 N; Fy=92 ksi, Fu=120 ksi) on 35" BC

#### Top Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

#### Top Stiffener Data

N/A

#### Top Pole Data

30.62" x 0.1875" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

#### Bottom Plate Data

38" OD x 1" Plate (A572-60; Fy=60 ksi, Fu=75 ksi)

#### Bottom Stiffener Data

N/A

#### Bottom Pole Data

30.62" x 0.25" 18-sided pole (A572-65; Fy=65 ksi, Fu=80 ksi)

### Analysis Results

#### Bolt Capacity

Max Load (kips)	4.59
Allowable (kips)	54.54
Stress Rating:	<b>8.0%</b> Pass

#### Top Plate Capacity

Max Stress (ksi):	3.87	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.8%</b>	Pass
Tension Side Stress Rating:	<b>2.9%</b>	Pass

#### Bottom Plate Capacity

Max Stress (ksi):	3.87	(Flexural)
Allowable Stress (ksi):	54.00	
Stress Rating:	<b>6.8%</b>	Pass
Tension Side Stress Rating:	<b>2.9%</b>	Pass

# Monopole Base Plate Connection

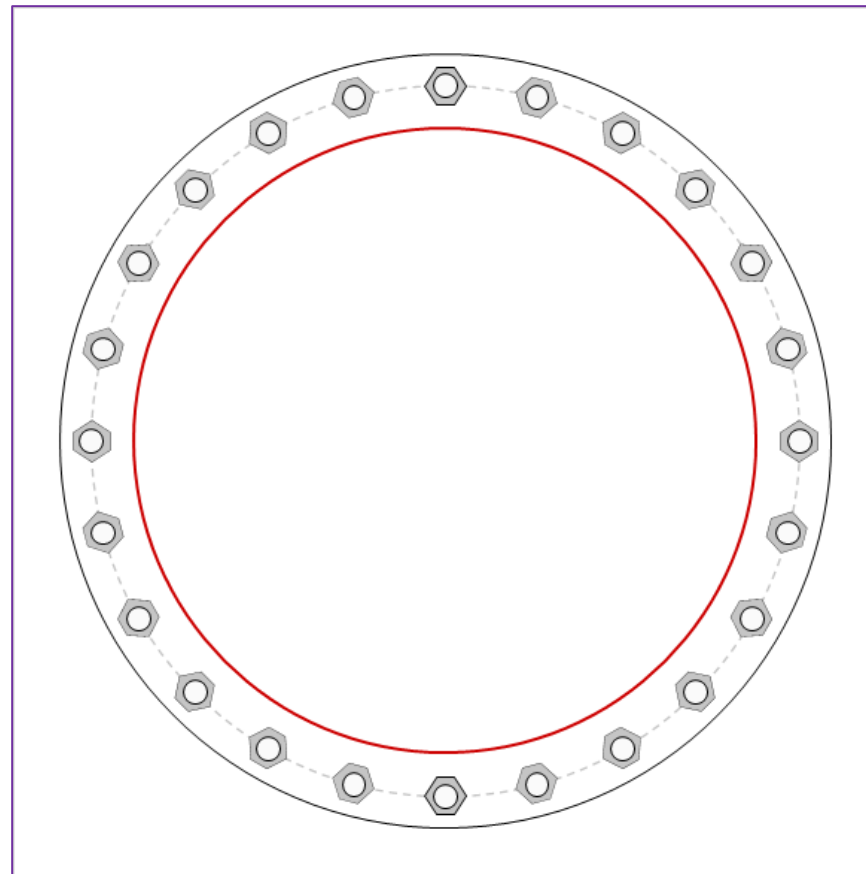


Site Info	
BU #	841290
Site Name	GREENWICH NORTH
Order #	548690 Rev. 1

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
$l_{ar}$ (in)	0

Applied Loads	
Moment (kip-ft)	3364.13
Axial Force (kips)	64.57
Shear Force (kips)	27.81

\*TIA-222-H Section 15.5 Applied



Connection Properties	Analysis Results	
<b>Anchor Rod Data</b>	<b>Anchor Rod Summary</b> <span style="float: right;"><i>(units of kips, kip-in)</i></span>	
(24) 2-1/4" $\phi$ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 67" BC	$Pu_t = 97.69$	$\phi Pn_t = 243.75$ <b>Stress Rating</b>
<b>Base Plate Data</b>	$Vu = 1.16$	$\phi Vn = 149.1$ <b>38.2%</b>
73" OD x 2.25" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi)	$Mu = n/a$	$\phi Mn = n/a$ <b>Pass</b>
<b>Stiffener Data</b>	<b>Base Plate Summary</b>	
N/A	Max Stress (ksi):	25.78 (Flexural)
<b>Pole Data</b>	Allowable Stress (ksi):	54
59" x 0.5" 18-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)	Stress Rating:	<b>45.5%</b> <b>Pass</b>

# Pier and Pad Foundation



**BU #:** 841290  
**Site Name:** GREENWICH NOR  
**App. Number:** 548690 Rev. 1

**TIA-222 Revision:** H  
**Tower Type:** Monopole

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

Superstructure Analysis Reactions		
Compression, $P_{comp}$ :	64.58	kips
Base Shear, $Vu_{comp}$ :	27.79	kips
Moment, $M_u$ :	3364.13	ft-kips
Tower Height, $H$ :	160	ft
BP Dist. Above Fdn, $bp_{dist}$ :	2.75	in

Foundation Analysis Checks				
	Capacity	Demand	Rating*	Check
<i>Lateral (Sliding) (kips)</i>	375.98	27.79	7.0%	Pass
<i>Bearing Pressure (ksf)</i>	22.50	3.04	13.5%	Pass
<i>Overturning (kip*ft)</i>	9023.50	3648.40	40.4%	Pass
<i>Pier Flexure (Comp.) (kip*ft)</i>	5556.72	3516.98	60.3%	Pass
<i>Pier Compression (kip)</i>	31187.52	113.09	0.3%	Pass
<i>Pad Flexure (kip*ft)</i>	6340.37	1204.11	18.1%	Pass
<i>Pad Shear - 1-way (kips)</i>	1397.27	153.45	10.5%	Pass
<i>Pad Shear - 2-way (Comp) (ksi)</i>	0.190	0.018	9.0%	Pass
<i>Flexural 2-way (Comp) (kip*ft)</i>	10196.70	2110.19	19.7%	Pass

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, $mc$ :	22	
Pier Tie/Spiral Size, $St$ :	4	
Pier Tie/Spiral Quantity, $mt$ :	9	
Pier Reinforcement Type:	Tie	
Pier Clear Cover, $cc_{pier}$ :	4	in

\*Rating per TIA-222-H Section 15.5

Structural Rating*:	60.3%
Soil Rating*:	40.4%

Pad Properties		
Depth, $D$ :	9.5	ft
Pad Width, $W_1$ :	25	ft
Pad Thickness, $T$ :	4.5	ft
Pad Rebar Size (Bottom dir. 2), $Sp_2$ :	10	
Pad Rebar Quantity (Bottom dir. 2), $mp_2$ :	23	
Pad Clear Cover, $cc_{pad}$ :	3	in

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

Soil Properties		
Total Soil Unit Weight, $\gamma$ :	120	pcf
Ultimate Gross Bearing, $Q_{ult}$ :	30.000	ksf
Cohesion, $C_u$ :	0.000	ksf
Friction Angle, $\phi$ :	34	degrees
SPT Blow Count, $N_{blows}$ :	16	
Base Friction, $\mu$ :	0.2	
Neglected Depth, $N$ :	5.00	ft
Foundation Bearing on Rock?	Yes	
Groundwater Depth, $gw$ :	None	ft

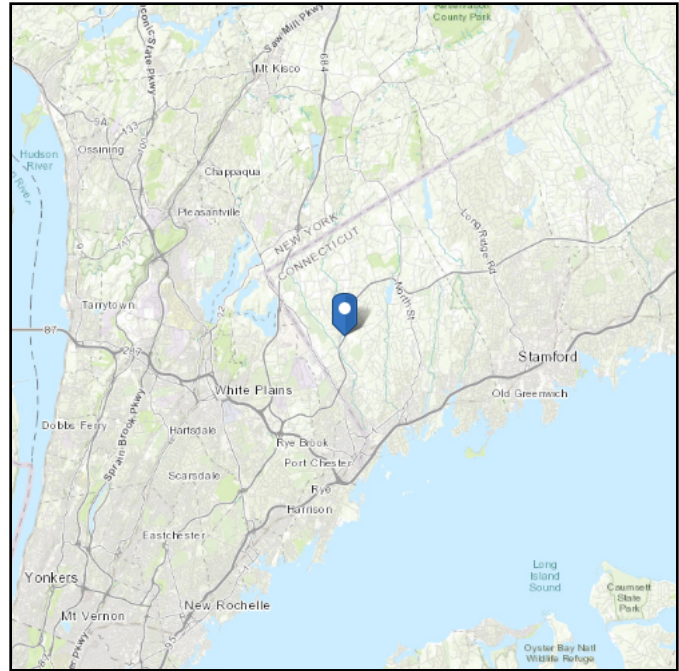
--Toggle between Gross and Net

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 223.31 ft (NAVD 88)  
**Latitude:** 41.066278  
**Longitude:** -73.6715



## Wind

### Results:

Wind Speed:	116 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, incorporating errata of March 12, 2014

**Date Accessed:** Thu Oct 08 2020

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

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

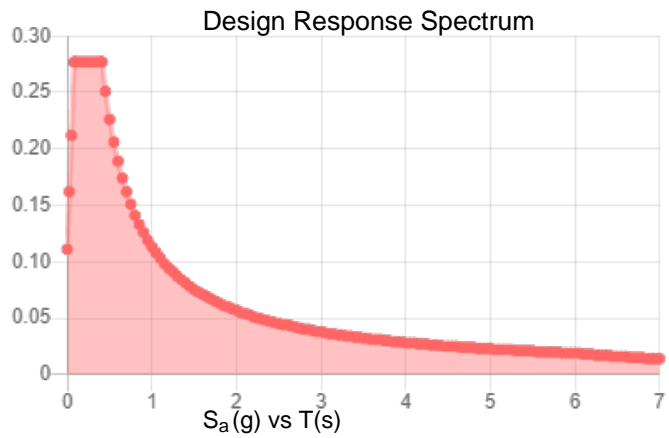
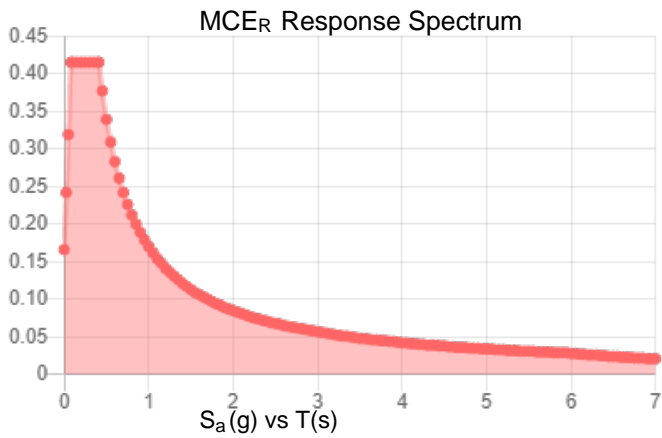
Mountainous terrain, gorges, ocean promontories, and special wind regions should be examined for unusual wind conditions.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.261	$S_{DS}$ :	0.277
$S_1$ :	0.071	$S_{D1}$ :	0.113
$F_a$ :	1.591	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.154
$S_{MS}$ :	0.415	PGA <sub>M</sub> :	0.23
$S_{M1}$ :	0.17	F <sub>PGA</sub> :	1.492
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Thu Oct 08 2020

**Date Source:**

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

## Ice

---

**Results:**

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Thu Oct 08 2020

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

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

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

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# Exhibit E

## **Mount Analysis**

Date: **March 11, 2022**

# INFINIGY

Infinigy  
1033 Watervliet Shaker Road  
Albany, NY 12205  
518-690-0790  
structural@infinigy.com

**Subject:** **Mount Analysis Report**

**Carrier Designation:** **DISH Network 5G**  
**Carrier Site Number:** NJJER01093A  
**Carrier Site Name:** CT-CCI-T-841290

**Crown Castle Designation:** **Crown Castle BU Number:** 841290  
**Crown Castle Site Name:** GREENWICH NORTH  
**Crown Castle JDE Job Number:** 640185  
**Crown Castle Order Number:** 548690 Rev.2

**Engineering Firm Designation:** **Infinigy Report Designation:** 1039-Z0001-B

**Site Data:** **363 Riversville Road, Greenwich, Fairfield County, CT, 06831**  
**Latitude 41°3'58.60" Longitude -73°40'17.40"**

**Structure Information:** **Tower Height & Type:** **160.0 ft Monopole**  
**Mount Elevation:** **132.0 ft**  
**Mount Type:** **8.0 ft Platform**

Infinigy 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**

**\*See Section 4.1 of this report for the loading and structural modifications required in order for the mount to support the loading listed in Table 1.**

This analysis utilizes an ultimate 3-second gust wind speed of 116 mph as required by the 2018 Connecticut State Building Code. Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

Mount analysis prepared by: Alex Mercado, E.I.T.

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



3/11/22



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Mount Modification Design Drawings (MDD) / Supplemental Drawings

**1) INTRODUCTION**

This is a proposed 3 sector 8.0 ft Platform, designed by Commscope.

**2) ANALYSIS CRITERIA**

**Building Code:** 2015 IBC / 2018 Connecticut State Building Code  
**TIA-222 Revision:** TIA-222-H  
**Risk Category:** II  
**Ultimate Wind Speed:** 116 mph  
**Exposure Category:** B  
**Topographic Factor at Base:** 1.0  
**Topographic Factor at Mount:** 1.0  
**Ice Thickness:** 1.5 in  
**Wind Speed with Ice:** 50 mph  
**Seismic S<sub>s</sub>:** 0.261  
**Seismic S<sub>1</sub>:** 0.071  
**Live Loading Wind Speed:** 30 mph  
**Man Live Load at Mid/End-Points:** 250 lb  
**Man Live Load at Mount Pipes:** 500 lb

**Table 1 - Proposed Equipment Configuration**

Mount Centerline (ft)	Antenna Centerline (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Mount / Modification Details
132.0	132.0	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	548690 Rev.2	CCI Sites
Mount Manufacturer Drawings	Commscope	MC-PK8-DSH	CCI Sites

#### 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.

Infinigy Mount Analysis Tool V2.1.7, a tool internally developed by Infinigy, was used to calculate wind loading on all appurtenances, dishes and mount members for various loading cases. Selected output from the analysis is included in Appendix B "Software Input Calculations".

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

#### 3.2) Assumptions

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

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

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

**4) ANALYSIS RESULTS**

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

Notes	Component	Critical Member	Centerline (ft)	% Capacity	Pass / Fail
1,2	Mount Pipe(s)	MP5	132.0	12.7	Pass
	Horizontal(s)	H1		10.3	Pass
	Standoff(s)	S2		29.5	Pass
	Handrail(s)	HR1		10.9	Pass
	Bracing(s)	CA1		31.6	Pass
	Mount Connection(s)	--		23.5	Pass

<b>Structure Rating (max from all components) =</b>	<b>31.6%</b>
---	--------------

Notes:

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

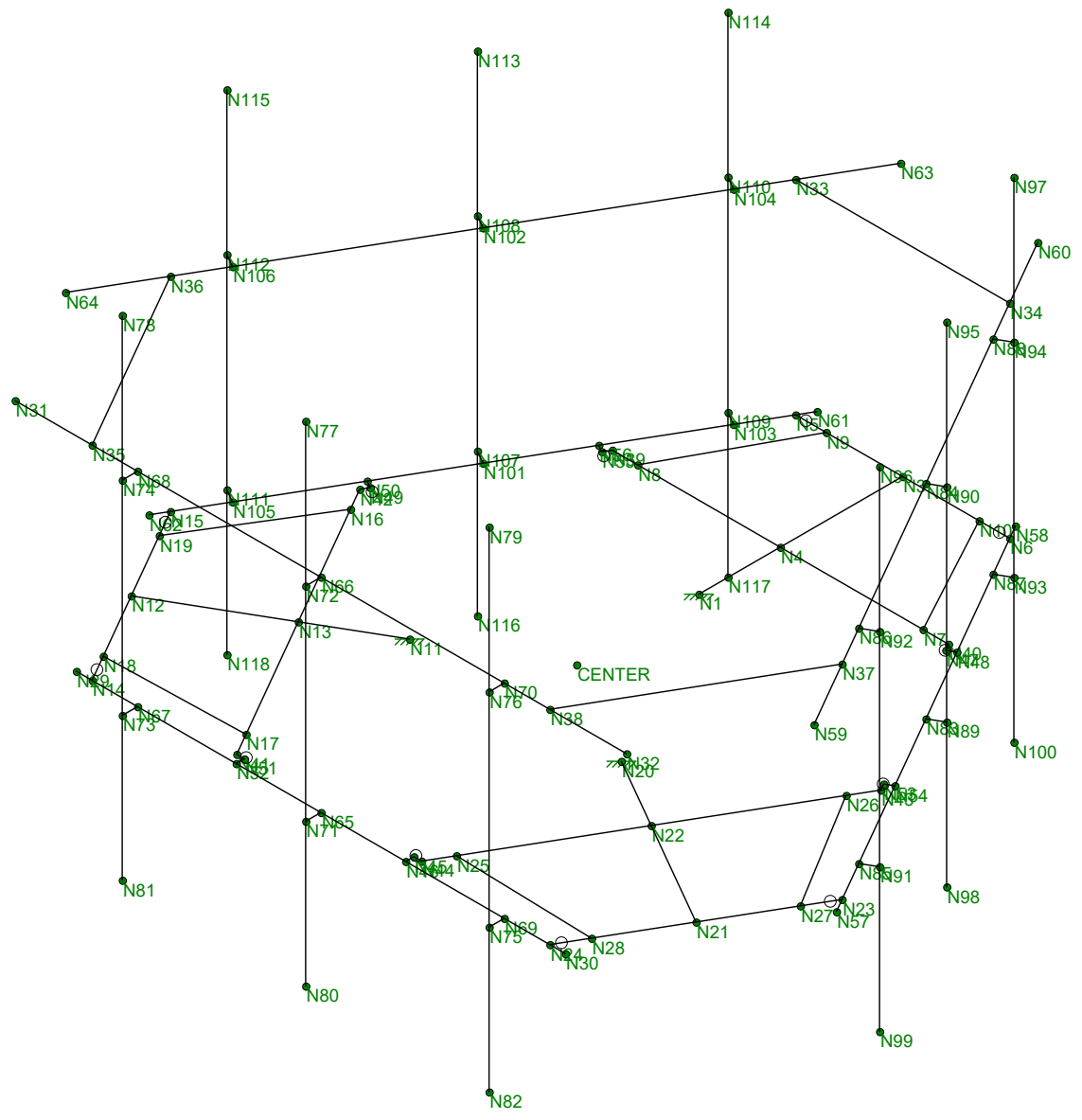
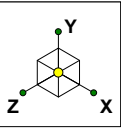
**4.1) Recommendations**

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

1. (1) Commscope MC-PK8-DSH Platform

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

**APPENDIX A**  
**WIRE FRAME AND RENDERED MODELS**



Infinigy Engineering

AM

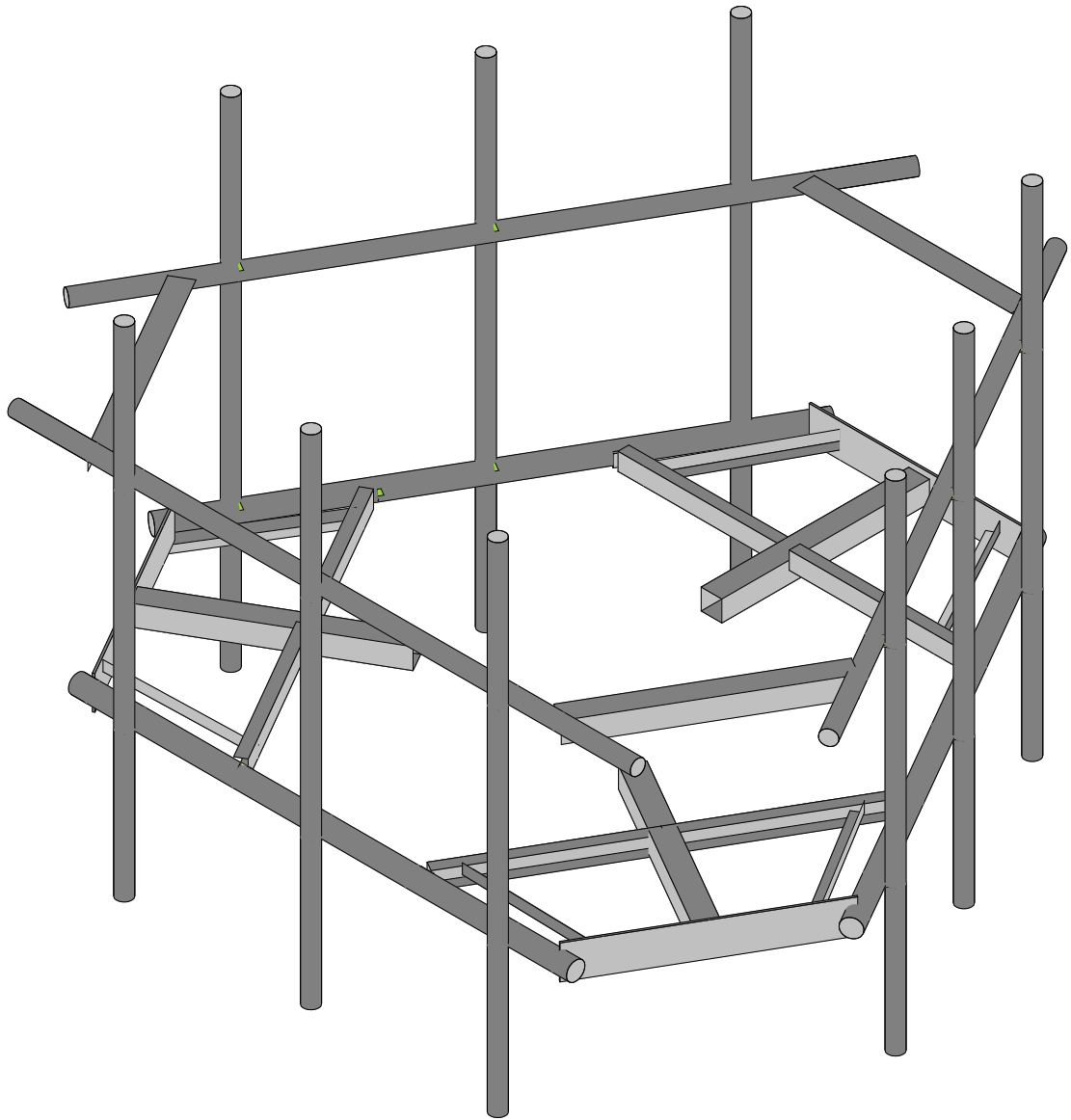
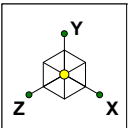
1039-Z0001-B

841290

Wireframe

Mar 11, 2022 at 2:56 PM

840290\_loaded.r3d



Infinigy Engineering	841290	Rendered
AM		Mar 11, 2022 at 2:57 PM
1039-Z0001-B		840290_loaded.r3d

**APPENDIX B**  
**SOFTWARE INPUT CALCULATIONS**



## Program Inputs

PROJECT INFORMATION		
Client:	Crown Castle	
Carrier:	DISH Network	
Engineer:	Alex Mercado	

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	B	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	223.31	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Platform	
Num Sectors:	3	
Centerline AGL:	132.00	ft
Tower Height AGL:	160.00	ft

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

FACTORS		
Directionality Fact. ( $K_d$ ):	0.950	
Ground Ele. Factor ( $K_e$ ):	0.992	*Rev H Only
Rooftop Speed-Up ( $K_s$ ):	1.000	*Rev H Only
Topographic Factor ( $K_{zt}$ ):	1.000	
Gust Effect Factor ( $G_h$ ):	1.000	

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

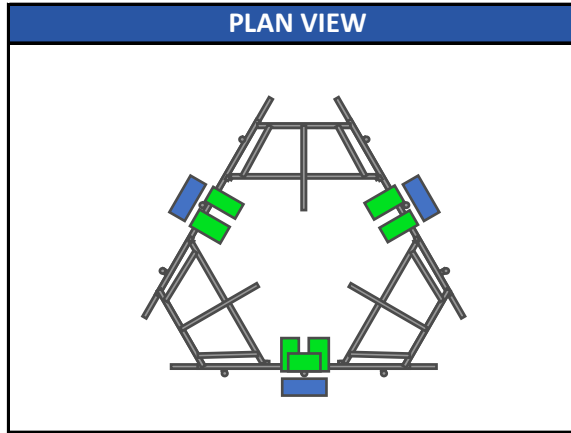
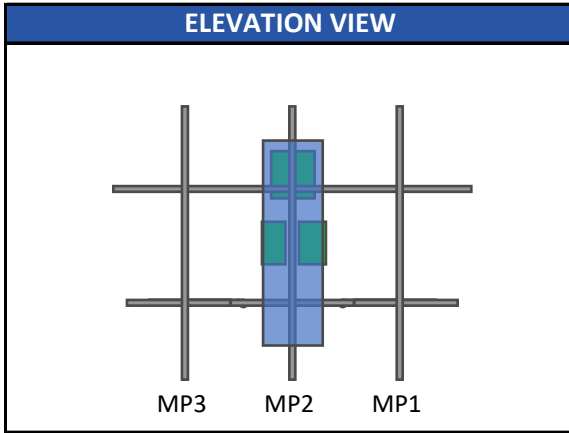
WIND AND ICE DATA		
Ultimate Wind ( $V_{ult}$ ):	116	mph
Design Wind ( $V$ ):	N/A	mph
Ice Wind ( $V_{ice}$ ):	50	mph
Base Ice Thickness ( $t_i$ ):	1.5	in
Flat Pressure:	69.456	psf
Round Pressure:	41.673	psf
Ice Wind Pressure:	7.743	psf

SEISMIC DATA		
Short-Period Accel. ( $S_s$ ):	0.261	g
1-Second Accel. ( $S_1$ ):	0.071	g
Short-Period Design ( $S_{DS}$ ):	0.277	
1-Second Design ( $S_{D1}$ ):	0.114	
Short-Period Coeff. ( $F_a$ ):	1.591	
1-Second Coeff. ( $F_v$ ):	2.400	
Amplification Factor ( $A_s$ ):	3.000	
Response Mod. Coeff. ( $R$ ):	2.000	



Infinigy Load Calculator V2.1.7

# Program Inputs



Infinigy Load Calculator V2.1.7

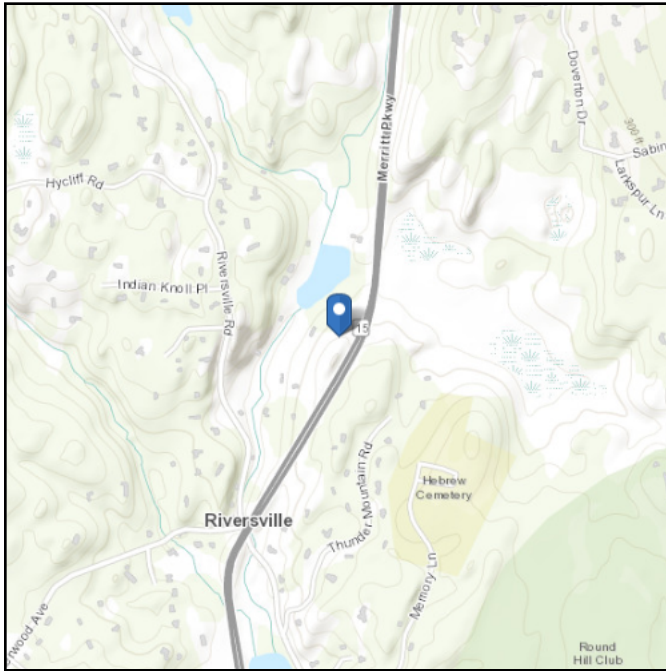
APPURTENANCE INFORMATION												
Appurtenance Name	Elevation	Qty.	$K_a$	$q_z$ (psf)	$EPA_N$ (ft <sup>2</sup> )	$EPA_T$ (ft <sup>2</sup> )	Wind $F_z$ (lbs)	Wind $F_x$ (lbs)	Weight (lbs)	Seismic F (lbs)	Member ( $\alpha$ sector)	
JMA WIRELESS MX08FRO665-21	132.0	3	0.90	34.73	8.01	3.21	250.35	100.33	82.50	34.26	MP2	
FUJITSU TA08025-B604	132.0	3	0.90	34.73	1.96	0.98	61.37	30.67	63.90	26.54	MP2	
FUJITSU TA08025-B605	132.0	3	0.90	34.73	1.96	1.13	61.37	35.30	75.00	31.15	MP2	
RAYCAP RDIDC-9181-PF-48	132.0	1	0.90	34.73	2.01	1.17	62.88	36.51	21.85	9.07	MP2	

# ASCE 7 Hazards Report

**Address:**  
No Address at This Location

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

**Elevation:** 223.31 ft (NAVD 88)  
**Latitude:** 41.066278  
**Longitude:** -73.6715



## Wind

### Results:

Wind Speed	116 Vmph
10-year MRI	76 Vmph
25-year MRI	85 Vmph
50-year MRI	90 Vmph
100-year MRI	96 Vmph

**Data Source:** ASCE/SEI 7-10, Fig. 26.5-1A and Figs. CC-1–CC-4, and Section 26.5.2, incorporating errata of March 12, 2014

**Date Accessed:** Fri Mar 11 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 7-10 Standard. Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (annual exceedance probability = 0.00143, MRI = 700 years).

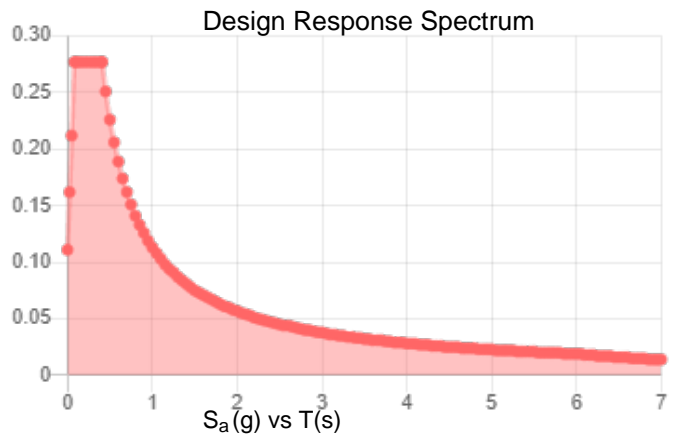
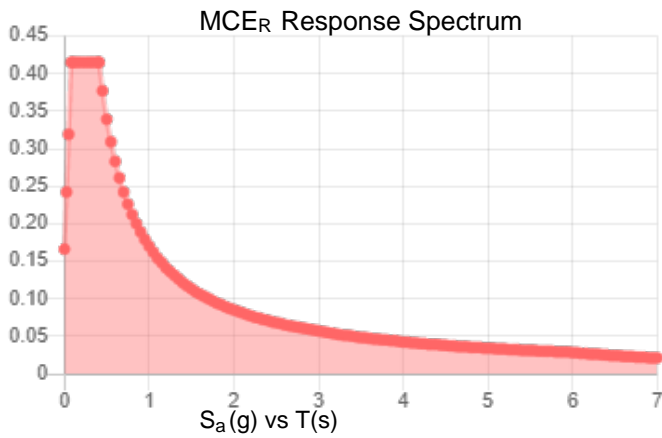
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

**Site Soil Class:** D - Stiff Soil

**Results:**

$S_s$ :	0.261	$S_{DS}$ :	0.277
$S_1$ :	0.071	$S_{D1}$ :	0.113
$F_a$ :	1.591	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.154
$S_{MS}$ :	0.415	PGA <sub>M</sub> :	0.23
$S_{M1}$ :	0.17	F <sub>PGA</sub> :	1.492
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:** Fri Mar 11 2022

**Date Source:**

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

## Ice

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### Results:

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed 50 mph

**Data Source:** Standard ASCE/SEI 7-10, Figs. 10-2 through 10-8

**Date Accessed:** Fri Mar 11 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 50-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

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

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**APPENDIX C**  
**SOFTWARE ANALYSIS OUTPUT**

**Member Primary Data**

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
1	S3	N1	N3			Standoff	Beam	Tube	A500 Gr...	Typical
2	GA4	N7	N10		270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
3	GA3	N8	N9			Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
4	P3	N5	N6			Corner Plates	Beam	RECT	A36 Gr.36	Typical
5	S2	N11	N12			Standoff	Beam	Tube	A500 Gr...	Typical
6	GA2	N16	N19		270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
7	GA1	N17	N18			Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
8	P2	N14	N15			Corner Plates	Beam	RECT	A36 Gr.36	Typical
9	S1	N20	N21			Standoff	Beam	Tube	A500 Gr...	Typical
10	GA6	N25	N28		270	Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
11	GA5	N26	N27			Grating Angle	Beam	Single Angle	A36 Gr.36	Typical
12	P1	N23	N24			Corner Plates	Beam	RECT	A36 Gr.36	Typical
13	H1	N29	N30			Horizontal	Beam	Pipe	A53 Gr.B	Typical
14	HR1	N31	N32			Handrail	Beam	Pipe	A53 Gr.B	Typical
15	CA8	N36	N35		180	Handrail Connector	Beam	Single Angle	A36 Gr.36	Typical
16	CA9	N34	N33		180	Handrail Connector	Beam	Single Angle	A36 Gr.36	Typical
17	CA7	N38	N37		180	Handrail Connector	Beam	Single Angle	A36 Gr.36	Typical
18	CA3	N4	N39			Channel	Beam	Channel	A36 Gr.36	Typical
19	CA4	N40	N4			Channel	Beam	Channel	A36 Gr.36	Typical
20	CA1	N13	N41			Channel	Beam	Channel	A36 Gr.36	Typical
21	CA2	N42	N13			Channel	Beam	Channel	A36 Gr.36	Typical
22	CA5	N22	N43			Channel	Beam	Channel	A36 Gr.36	Typical
23	CA6	N44	N22			Channel	Beam	Channel	A36 Gr.36	Typical
24	M64	N46	N45			RIGID	None	None	RIGID	Typical
25	M65	N44	N45			RIGID	None	None	RIGID	Typical
26	M66	N48	N47			RIGID	None	None	RIGID	Typical
27	M67	N40	N47			RIGID	None	None	RIGID	Typical
28	M68	N50	N49			RIGID	None	None	RIGID	Typical
29	M69	N42	N49			RIGID	None	None	RIGID	Typical
30	M70	N52	N51			RIGID	None	None	RIGID	Typical
31	M71	N41	N51			RIGID	None	None	RIGID	Typical
32	M72	N54	N53			RIGID	None	None	RIGID	Typical
33	M73	N43	N53			RIGID	None	None	RIGID	Typical
34	M74	N56	N55			RIGID	None	None	RIGID	Typical
35	M75	N39	N55			PL 2.375x0.5	None	None	A36 Gr.36	Typical
36	H3	N57	N58			Horizontal	Beam	Pipe	A53 Gr.B	Typical
37	HR3	N59	N60			Handrail	Beam	Pipe	A53 Gr.B	Typical
38	H2	N61	N62			Horizontal	Beam	Pipe	A53 Gr.B	Typical
39	HR2	N63	N64			Handrail	Beam	Pipe	A53 Gr.B	Typical
40	M40	N68	N74			RIGID	None	None	RIGID	Typical
41	M41	N67	N73			RIGID	None	None	RIGID	Typical
42	M42	N66	N72			RIGID	None	None	RIGID	Typical
43	M43	N65	N71			RIGID	None	None	RIGID	Typical
44	M44	N70	N76			RIGID	None	None	RIGID	Typical
45	M45	N69	N75			RIGID	None	None	RIGID	Typical
46	MP3	N78	N81			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
47	MP2	N77	N80			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
48	MP1	N79	N82			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
49	M49	N86	N92			RIGID	None	None	RIGID	Typical
50	M50	N85	N91			RIGID	None	None	RIGID	Typical
51	M51	N84	N90			RIGID	None	None	RIGID	Typical
52	M52	N83	N89			RIGID	None	None	RIGID	Typical
53	M53	N88	N94			RIGID	None	None	RIGID	Typical
54	M54	N87	N93			RIGID	None	None	RIGID	Typical
55	MP9	N96	N99			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
56	MP8	N95	N98			Mount Pipe	Column	Pipe	A53 Gr.B	Typical

**Member Primary Data (Continued)**

	Label	I Joint	J Joint	K Joint	Rotate(d...	Section/Shape	Type	Design List	Material	Design Ru...
57	MP7	N97	N100			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
58	M58	N104	N110			RIGID	None	None	RIGID	Typical
59	M59	N103	N109			RIGID	None	None	RIGID	Typical
60	M60	N102	N108			RIGID	None	None	RIGID	Typical
61	M61	N101	N107			RIGID	None	None	RIGID	Typical
62	M62	N106	N112			RIGID	None	None	RIGID	Typical
63	M63	N105	N111			RIGID	None	None	RIGID	Typical
64	MP6	N114	N117			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
65	MP5	N113	N116			Mount Pipe	Column	Pipe	A53 Gr.B	Typical
66	MP4	N115	N118			Mount Pipe	Column	Pipe	A53 Gr.B	Typical

**Material Takeoff**

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General				
2	RIGID		29	71.1	0
3	Total General		29	71.1	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	C3.38x2.06x0.25	6	198	98.255
7	A36 Gr.36	L2x2x4	6	163.8	43.838
8	A36 Gr.36	PL6.5x0.375	3	126	87.09
9	A36 Gr.36	L4X4X4	3	126	68.957
10	A36 Gr.36	PL 2.375x0.5	1	1.5	.505
11	A500 Gr.B Rect	HSS4X4X4	3	120	123.333
12	A53 Gr.B	PIPE 2.5	12	1224	558.804
13	A53 Gr.B	PIPE 3.0	3	288	169.05
14	Total HR Steel		37	2247.3	1149.833

**Basic Load Cases**

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface(Plate/Wall)
1	Self Weight	DL		-1			13		3	
2	Wind Load AZI 0	WLZ					26			
3	Wind Load AZI 30	None					26			
4	Wind Load AZI 60	None					26			
5	Wind Load AZI 90	WLX					26			
6	Wind Load AZI 120	None					26			
7	Wind Load AZI 150	None					26			
8	Wind Load AZI 180	None					26			
9	Wind Load AZI 210	None					26			
10	Wind Load AZI 240	None					26			
11	Wind Load AZI 270	None					26			
12	Wind Load AZI 300	None					26			
13	Wind Load AZI 330	None					26			
14	Distr. Wind Load Z	WLZ						66		
15	Distr. Wind Load X	WLX						66		
16	Ice Weight	OL1					13	66	3	
17	Ice Wind Load AZI 0	OL2					26			
18	Ice Wind Load AZI ...	None					26			
19	Ice Wind Load AZI ...	None					26			
20	Ice Wind Load AZI ...	OL3					26			
21	Ice Wind Load AZI ...	None					26			
22	Ice Wind Load AZI ...	None					26			
23	Ice Wind Load AZI ...	None					26			
24	Ice Wind Load AZI ...	None					26			



**Basic Load Cases (Continued)**

BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Joint	Point	Distribut...	Area(M...	Surface(Plate/Wall)
25 Ice Wind Load AZI ...	None					26			
26 Ice Wind Load AZI ...	None					26			
27 Ice Wind Load AZI ...	None					26			
28 Ice Wind Load AZI ...	None					26			
29 Distr. Ice Wind Loa...	OL2						66		
30 Distr. Ice Wind Loa...	OL3						66		
31 Seismic Load Z	ELZ			-.415		13			
32 Seismic Load X	ELX	-.415				13			
33 Service Live Loads	LL				1				
34 Maintenance Load 1	LL				1				
35 Maintenance Load 2	LL				1				
36 Maintenance Load 3	LL				1				
37 Maintenance Load 4	LL				1				
38 Maintenance Load 5	LL				1				
39 Maintenance Load 6	LL				1				
40 Maintenance Load 7	LL				1				
41 Maintenance Load 8	LL				1				
42 Maintenance Load 9	LL				1				
43 BLC 1 Transient Ar...	None						9		
44 BLC 16 Transient ...	None						9		

**Load Combinations**

Description	Solve	PDelta	SRSS	BLC Factor	BLC Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...
1 1.4DL	Yes	Y		1 1.4											
2 1.2DL + 1WL AZI 0	Yes	Y		1 1.2 2	1 14	1 15									
3 1.2DL + 1WL AZI 30	Yes	Y		1 1.2 3	1 14	.866 15	.5								
4 1.2DL + 1WL AZI 60	Yes	Y		1 1.2 4	1 14	.5 15	.866								
5 1.2DL + 1WL AZI 90	Yes	Y		1 1.2 5	1 14	15	1								
6 1.2DL + 1WL AZI 120	Yes	Y		1 1.2 6	1 14	-.5 15	.866								
7 1.2DL + 1WL AZI 150	Yes	Y		1 1.2 7	1 14	-.8... 15	.5								
8 1.2DL + 1WL AZI 180	Yes	Y		1 1.2 8	1 14	-1 15									
9 1.2DL + 1WL AZI 210	Yes	Y		1 1.2 9	1 14	-.8... 15	-.5								
10 1.2DL + 1WL AZI 240	Yes	Y		1 1.2 10	1 14	-.5 15	-.8...								
11 1.2DL + 1WL AZI 270	Yes	Y		1 1.2 11	1 14	15	-1								
12 1.2DL + 1WL AZI 300	Yes	Y		1 1.2 12	1 14	.5 15	-.8...								
13 1.2DL + 1WL AZI 330	Yes	Y		1 1.2 13	1 14	.866 15	-.5								
14 0.9DL + 1WL AZI 0	Yes	Y		1 .9 2	1 14	1 15									
15 0.9DL + 1WL AZI 30	Yes	Y		1 .9 3	1 14	.866 15	.5								
16 0.9DL + 1WL AZI 60	Yes	Y		1 .9 4	1 14	.5 15	.866								
17 0.9DL + 1WL AZI 90	Yes	Y		1 .9 5	1 14	15	1								
18 0.9DL + 1WL AZI 120	Yes	Y		1 .9 6	1 14	-.5 15	.866								
19 0.9DL + 1WL AZI 150	Yes	Y		1 .9 7	1 14	-.8... 15	.5								
20 0.9DL + 1WL AZI 180	Yes	Y		1 .9 8	1 14	-1 15									
21 0.9DL + 1WL AZI 210	Yes	Y		1 .9 9	1 14	-.8... 15	-.5								
22 0.9DL + 1WL AZI 240	Yes	Y		1 .9 10	1 14	-.5 15	-.8...								
23 0.9DL + 1WL AZI 270	Yes	Y		1 .9 11	1 14	15	-1								
24 0.9DL + 1WL AZI 300	Yes	Y		1 .9 12	1 14	.5 15	-.8...								
25 0.9DL + 1WL AZI 330	Yes	Y		1 .9 13	1 14	.866 15	-.5								
26 1.2D + 1.0Di	Yes	Y		1 1.2 16	1										
27 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 17	1 29	1 30								
28 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 18	1 29	.866 30	.5							
29 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 19	1 29	.5 30	.866							
30 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 20	1 29	30	1							
31 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 21	1 29	-.5 30	.866							
32 1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1 1.2 16	1 22	1 29	-.8... 30	.5							

**Load Combinations (Continued)**

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...
33	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	23	1	29	-1	30			
34	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	24	1	29	-8...	30	-5		
35	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	25	1	29	-5	30	-8...		
36	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	26	1	29		30	-1		
37	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	27	1	29	.5	30	-8...		
38	1.2D + 1.0Di + 1.0Wi A...	Yes	Y		1	1.2	16	1	28	1	29	.866	30	-5		
39	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	1	32							
40	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.866	32	.5						
41	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.5	32	.866						
42	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31		32	1						
43	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.5	32	.866						
44	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.8...	32	.5						
45	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-1	32							
46	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.8...	32	-.5						
47	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	-.5	32	-.8...						
48	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31		32	-1						
49	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.5	32	-.8...						
50	(1.2 + 0.2Sds)DL + 1.0...	Yes	Y		1	1.255	31	.866	32	-.5						
51	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	1	32							
52	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.866	32	.5						
53	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.5	32	.866						
54	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31		32	1						
55	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.5	32	.866						
56	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.8...	32	.5						
57	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-1	32							
58	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.8...	32	-.5						
59	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	-.5	32	-.8...						
60	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31		32	-1						
61	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.5	32	-.8...						
62	(0.9 - 0.2Sds)DL + 1.0...	Yes	Y		1	.845	31	.866	32	-.5						
63	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	2	.268	14	.268	15		33	1.5		
64	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	3	.268	14	.232	15	.134	33	1.5		
65	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	4	.268	14	.134	15	.232	33	1.5		
66	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	5	.268	14		15	.268	33	1.5		
67	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	6	.268	14	-.1...	15	.232	33	1.5		
68	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	7	.268	14	-.2...	15	.134	33	1.5		
69	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	8	.268	14	-.2...	15		33	1.5		
70	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	9	.268	14	-.2...	15	-.1...	33	1.5		
71	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	10	.268	14	-.1...	15	-.2...	33	1.5		
72	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	11	.268	14		15	-.2...	33	1.5		
73	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	12	.268	14	.134	15	-.2...	33	1.5		
74	1.0DL + 1.5LL + 1.0SW...	Yes	Y		1	1	13	.268	14	.232	15	-.1...	33	1.5		
75	1.2DL + 1.5LL	Yes	Y		1	1.2	33	1.5								
76	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	2	.067	14	.067	15			
77	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	3	.067	14	.058	15	.033		
78	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	4	.067	14	.033	15	.058		
79	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	5	.067	14		15	.067		
80	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	6	.067	14	-.0...	15	.058		
81	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	7	.067	14	-.0...	15	.033		
82	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	8	.067	14	-.0...	15			
83	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	9	.067	14	-.0...	15	-.0...		
84	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	10	.067	14	-.0...	15	-.0...		
85	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	11	.067	14		15	-.0...		
86	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	12	.067	14	.033	15	-.0...		
87	1.2DL + 1.5LM-MP1 + ...	Yes	Y		1	1.2	34	1.5	13	.067	14	.058	15	-.0...		
88	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	2	.067	14	.067	15			
89	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	3	.067	14	.058	15	.033		

**Load Combinations (Continued)**

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...
90	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	4	.067	14	.033	15	.058		
91	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	5	.067	14		15	.067		
92	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	6	.067	14	-.0...	15	.058		
93	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	7	.067	14	-.0...	15	.033		
94	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	8	.067	14	-.0...	15			
95	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	9	.067	14	-.0...	15	-.0...		
96	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	10	.067	14	-.0...	15	-.0...		
97	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	11	.067	14		15	-.0...		
98	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	12	.067	14	.033	15	-.0...		
99	1.2DL + 1.5LM-MP2 + ...	Yes	Y		1	1.2	35	1.5	13	.067	14	.058	15	-.0...		
100	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	2	.067	14	.067	15			
101	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	3	.067	14	.058	15	.033		
102	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	4	.067	14	.033	15	.058		
103	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	5	.067	14		15	.067		
104	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	6	.067	14	-.0...	15	.058		
105	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	7	.067	14	-.0...	15	.033		
106	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	8	.067	14	-.0...	15			
107	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	9	.067	14	-.0...	15	-.0...		
108	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	10	.067	14	-.0...	15	-.0...		
109	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	11	.067	14		15	-.0...		
110	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	12	.067	14	.033	15	-.0...		
111	1.2DL + 1.5LM-MP3 + ...	Yes	Y		1	1.2	36	1.5	13	.067	14	.058	15	-.0...		
112	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	2	.067	14	.067	15			
113	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	3	.067	14	.058	15	.033		
114	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	4	.067	14	.033	15	.058		
115	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	5	.067	14		15	.067		
116	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	6	.067	14	-.0...	15	.058		
117	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	7	.067	14	-.0...	15	.033		
118	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	8	.067	14	-.0...	15			
119	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	9	.067	14	-.0...	15	-.0...		
120	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	10	.067	14	-.0...	15	-.0...		
121	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	11	.067	14		15	-.0...		
122	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	12	.067	14	.033	15	-.0...		
123	1.2DL + 1.5LM-MP4 + ...	Yes	Y		1	1.2	37	1.5	13	.067	14	.058	15	-.0...		
124	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	2	.067	14	.067	15			
125	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	3	.067	14	.058	15	.033		
126	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	4	.067	14	.033	15	.058		
127	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	5	.067	14		15	.067		
128	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	6	.067	14	-.0...	15	.058		
129	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	7	.067	14	-.0...	15	.033		
130	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	8	.067	14	-.0...	15			
131	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	9	.067	14	-.0...	15	-.0...		
132	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	10	.067	14	-.0...	15	-.0...		
133	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	11	.067	14		15	-.0...		
134	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	12	.067	14	.033	15	-.0...		
135	1.2DL + 1.5LM-MP5 + ...	Yes	Y		1	1.2	38	1.5	13	.067	14	.058	15	-.0...		
136	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	2	.067	14	.067	15			
137	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	3	.067	14	.058	15	.033		
138	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	4	.067	14	.033	15	.058		
139	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	5	.067	14		15	.067		
140	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	6	.067	14	-.0...	15	.058		
141	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	7	.067	14	-.0...	15	.033		
142	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	8	.067	14	-.0...	15			
143	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	9	.067	14	-.0...	15	-.0...		
144	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	10	.067	14	-.0...	15	-.0...		
145	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	11	.067	14		15	-.0...		
146	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	12	.067	14	.033	15	-.0...		

**Load Combinations (Continued)**

	Description	Solve	PDelta	SRSS	BLC	Factor	BLC	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...	Fa...B...
147	1.2DL + 1.5LM-MP6 + ...	Yes	Y		1	1.2	39	1.5	13	.067	14	.058	15	-.0...		
148	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	2	.067	14	.067	15			
149	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	3	.067	14	.058	15	.033		
150	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	4	.067	14	.033	15	.058		
151	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	5	.067	14		15	.067		
152	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	6	.067	14	-.0...	15	.058		
153	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	7	.067	14	-.0...	15	.033		
154	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	8	.067	14	-.0...	15			
155	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	9	.067	14	-.0...	15	-.0...		
156	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	10	.067	14	-.0...	15	-.0...		
157	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	11	.067	14		15	-.0...		
158	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	12	.067	14	.033	15	-.0...		
159	1.2DL + 1.5LM-MP7 + ...	Yes	Y		1	1.2	40	1.5	13	.067	14	.058	15	-.0...		
160	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	2	.067	14	.067	15			
161	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	3	.067	14	.058	15	.033		
162	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	4	.067	14	.033	15	.058		
163	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	5	.067	14		15	.067		
164	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	6	.067	14	-.0...	15	.058		
165	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	7	.067	14	-.0...	15	.033		
166	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	8	.067	14	-.0...	15			
167	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	9	.067	14	-.0...	15	-.0...		
168	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	10	.067	14	-.0...	15	-.0...		
169	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	11	.067	14		15	-.0...		
170	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	12	.067	14	.033	15	-.0...		
171	1.2DL + 1.5LM-MP8 + ...	Yes	Y		1	1.2	41	1.5	13	.067	14	.058	15	-.0...		
172	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	2	.067	14	.067	15			
173	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	3	.067	14	.058	15	.033		
174	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	4	.067	14	.033	15	.058		
175	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	5	.067	14		15	.067		
176	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	6	.067	14	-.0...	15	.058		
177	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	7	.067	14	-.0...	15	.033		
178	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	8	.067	14	-.0...	15			
179	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	9	.067	14	-.0...	15	-.0...		
180	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	10	.067	14	-.0...	15	-.0...		
181	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	11	.067	14		15	-.0...		
182	1.2DL + 1.5LM-MP9 + ...	Yes	Y		1	1.2	42	1.5	12	.067	14	.033	15	-.0...		

**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	N20	max	821.071	18	2176.676	35	1281.713	13	119.766	15	1657.223	19	3927.571	35
2		min	-819.788	12	82.097	16	-1280.2...	19	-2376.3...	107	-1659.76	13	-139.342	16
3	N11	max	821.134	4	2179.257	31	1283.193	3	119.585	25	1661.823	3	136.959	24
4		min	-822.41	22	82.955	24	-1281.7...	21	-2376.5...	81	-1659.3...	21	-3933.7...	31
5	N1	max	1337.448	17	2106.052	27	496.215	14	4437.787	27	1471.862	23	728.404	145
6		min	-1337.451	23	45.146	20	-500.878	8	-249.547	20	-1471.8...	17	-717.99	151
7	Totals:	max	2709.018	5	6048.613	27	2865.417	2						
8		min	-2709.018	11	1582.411	57	-2865.4...	20						

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

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*...	phi*...	phi*...	phi*...	Eqn
1	CA1	C3.38x2.0...	.316	0	.048	28.188	y	38	4776.	.56700	2202.	.5751...	H1...
2	CA6	C3.38x2.0...	.315	33	.048	4.813	y	28	4776.	.56700	2202.	.5751...	H1...
3	CA2	C3.38x2.0...	.313	33	.048	4.813	y	36	4776.	.56700	2202.	.5751...	H1...
4	CA5	C3.38x2.0...	.312	0	.047	28.188	y	30	4776.	.56700	2202.	.5751...	H1...

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

Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*	phi*	phi*	phi*	Eqn	
5	CA4	C3.38x2.0...	.304	33	27	.046	4.813	y	32	4776.	56700	2202.	5751.	H1-...
6	CA3	C3.38x2.0...	.302	0	27	.046	28.188	y	34	4776.	56700	2202.	5751.	H1-...
7	S2	HSS4X4X4	.295	0	33	.093	0	y	82	1331.	1395.	1618.	1618.	H1-...
8	S1	HSS4X4X4	.294	0	33	.094	0	y	106	1331.	1395.	1618.	1618.	H1-...
9	S3	HSS4X4X4	.284	0	29	.092	0	y	146	1331.	1395.	1618.	1618.	H1-...
10	M75	PL 2.375x...	.163	1.5	12	.270	0	y	28	3825.	38475	400.	1903.	H1-...
11	P2	PL6.5x0.3...	.154	21	6	.075	5.687	y	3	3658.	78975	616.	7475.	H1-...
12	P3	PL6.5x0.3...	.153	21	2	.069	5.687	y	157	3658.	78975	616.	7429.	H1-...
13	P1	PL6.5x0.3...	.153	21	10	.075	36.312	y	13	3658.	78975	616.	7475.	H1-...
14	GA2	L2x2x4	.151	0	6	.024	27.295	z	30	2353.	3058.	690.	1576.	H2-1
15	GA5	L2x2x4	.149	0	10	.024	27.295	y	36	2353.	3058.	690.	1576.	H2-1
16	GA4	L2x2x4	.142	0	2	.024	27.295	z	38	2353.	3058.	690.	1576.	H2-1
17	GA3	L2x2x4	.141	0	2	.023	27.295	y	28	2353.	3058.	690.	1576.	H2-1
18	GA1	L2x2x4	.133	0	6	.024	27.295	y	32	2353.	3058.	690.	1576.	H2-1
19	GA6	L2x2x4	.133	0	10	.024	27.295	z	34	2353.	3058.	690.	1576.	H2-1
20	CA7	L4X4X4	.128	0	13	.022	42	y	13	4698.	62532	3137.	6897.	H2-1
21	CA8	L4X4X4	.128	42	3	.022	0	y	3	4698.	62532	3137.	6897.	H2-1
22	MP5	PIPE 2.5	.127	68	7	.061	68		7	3003.	50715	3596.	3596.	H1-...
23	MP8	PIPE 2.5	.127	68	9	.061	68		9	3003.	50715	3596.	3596.	H1-...
24	MP2	PIPE 2.5	.124	68	5	.058	68		5	3003.	50715	3596.	3596.	H1-...
25	MP4	PIPE 2.5	.120	28	8	.041	68		9	3003.	50715	3596.	3596.	H1-...
26	MP9	PIPE 2.5	.120	28	8	.041	68		7	3003.	50715	3596.	3596.	H1-...
27	MP1	PIPE 2.5	.119	28	12	.048	68		2	3003.	50715	3596.	3596.	H1-...
28	MP3	PIPE 2.5	.119	28	4	.048	68		2	3003.	50715	3596.	3596.	H1-...
29	MP6	PIPE 2.5	.117	68	13	.040	68		10	3003.	50715	3596.	3596.	H1-...
30	MP7	PIPE 2.5	.117	68	3	.040	68		6	3003.	50715	3596.	3596.	H1-...
31	CA9	L4X4X4	.113	0	5	.020	0	y	11	4698.	62532	3137.	6897.	H2-1
32	H1	PIPE 3.0	.103	48	90	.051	32		5	4629.	65205	5748.	5748.	H1-...
33	H2	PIPE 3.0	.101	48	166	.053	64		7	4629.	65205	5748.	5748.	H1-...
34	H3	PIPE 3.0	.101	48	130	.053	32		9	4629.	65205	5748.	5748.	H1-...
35	HR1	PIPE 2.5	.097	96.25	7	.109	16.25		8	2237.	50715	3596.	3596.	H1-...
36	HR3	PIPE 2.5	.097	23.75	13	.104	23.75		13	2237.	50715	3596.	3596.	H1-...
37	HR2	PIPE 2.5	.096	96.25	3	.104	96.25		3	2237.	50715	3596.	3596.	H1-...

**APPENDIX D**  
**ADDITIONAL CALCUATIONS**

# INFINIGY<sup>8</sup>

## Bolt Calculation Tool, V1.6.1

PROJECT DATA	
Site Name:	GREENWICH NORTH
Site Number:	841290
Connection Description:	Platform to Tower

MAXIMUM BOLT LOADS		
Bolt Tension:	4782.03	lbs
Bolt Shear:	841.22	lbs

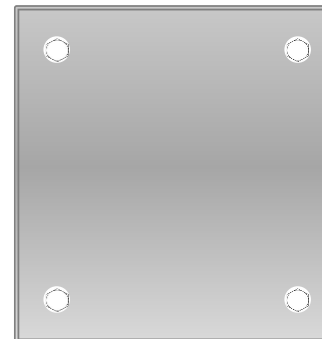
WORST CASE BOLT LOADS <sup>1</sup>		
Bolt Tension:	4782.03	lbs
Bolt Shear:	486.21	lbs

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

<sup>1</sup> Worst case bolt loads correspond to Load combination #33 on member S2 in RISA-3D, which causes the maximum demand on the bolts.

Member Information
I nodes of S3, S2, S1,

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Max Tensile Usage	23.5%	
Max Shear Usage	6.1%	
Interaction Check (Worst Case)	0.06	≤1.05
Result	Pass	



**APPENDIX E**

**MOUNT MODIFICATION DESIGN DRAWINGS (MDD) / SUPPLEMENTAL DRAWINGS**



4

3

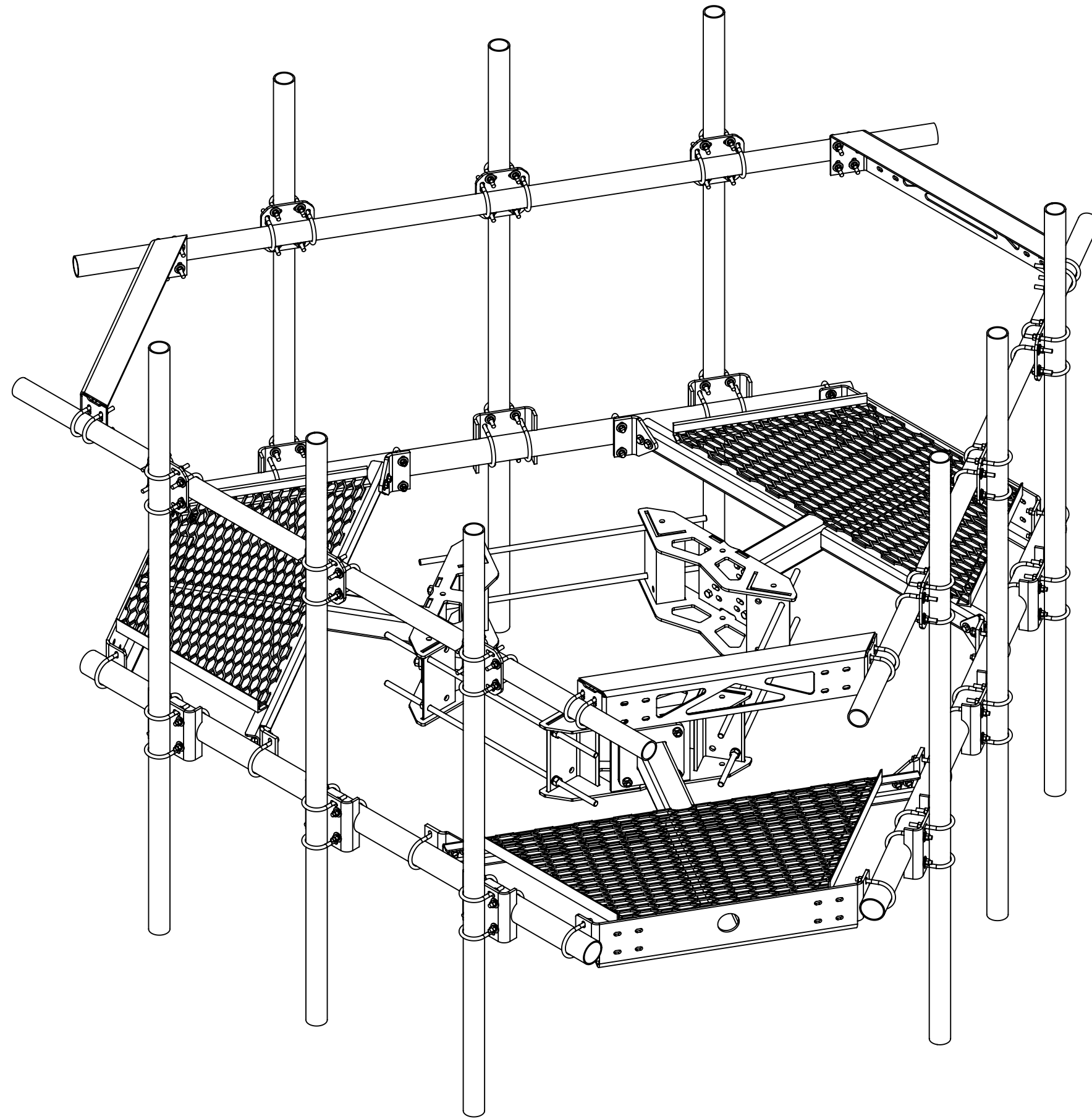
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1

NOTES:

- 1.0 GENERAL
  - 1.1 ALL METRIC DIMENSIONS ARE IN BRACKETS
  - 1.2 FOR PATENTS, SEE WWW.CS-PAT.COM
- 2.0 DESIGN NOTES
  - 2.1 TORQUE U-BOLTS TO 44 FT-LBS
- 3.0 MANUFACTURING/SPECIAL REQUIREMENTS
- 4.0 TEST
- 5.0 PACKAGING

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



**PATENT PENDING**

**COMMSCOPE, INC. OF NORTH CAROLINA**

TOLERANCES		SAP MATERIAL MASTER
1 PLACE .X ± .25	3 PLACE .XXX ± 0.06	<b>MC-PK8-DSH</b>
2 PLACE .XX ± 0.12	ANGLES ± 2°	

FINISH GALV A123	MATERIAL A500, A1011/A1018
---------------------	-------------------------------

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES INTERPRET PER ANSI Y 14.5M-1994	NAME	DATE	TITLE
	CE MRC	02/17/20	<b>LOW PROFILE PLATFORM FACE</b>
	RW ROGHANSON	03/16/2021	
	AD BCROSS	03/17/2021	
	RE FA1024	02/27/2020	
ECN 10272PC	SCALE <b>1:32</b>	DOCUMENT NO.	<b>MC-PK8-DSH</b>

DENSITY	lbs/in <sup>3</sup>
MASS	lbs
VOLUME	in <sup>3</sup>
SURFACE AREA	in <sup>2</sup>
HEIGHT	96"
LENGTH	46"
WIDTH	29'

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

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4

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1

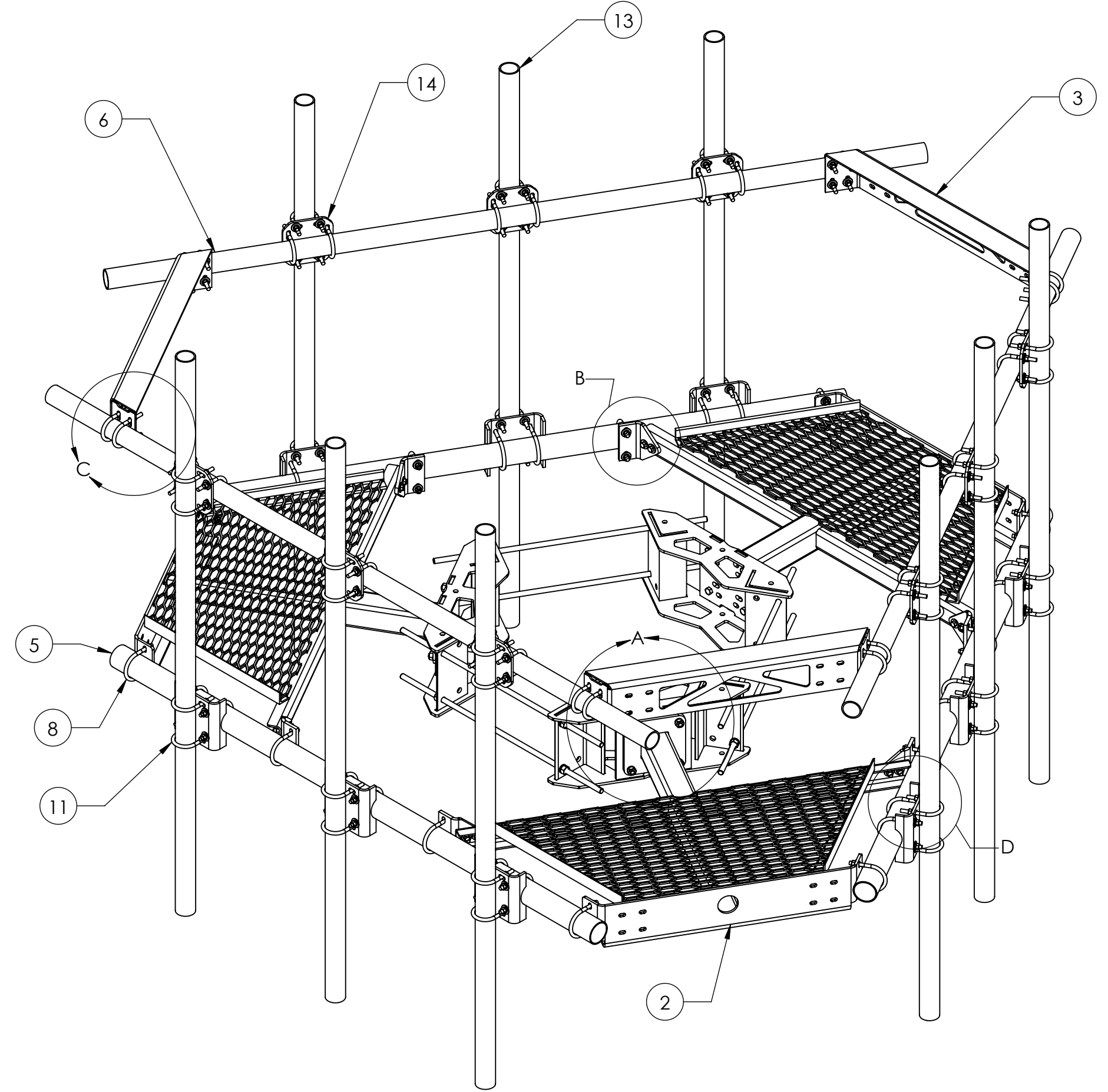
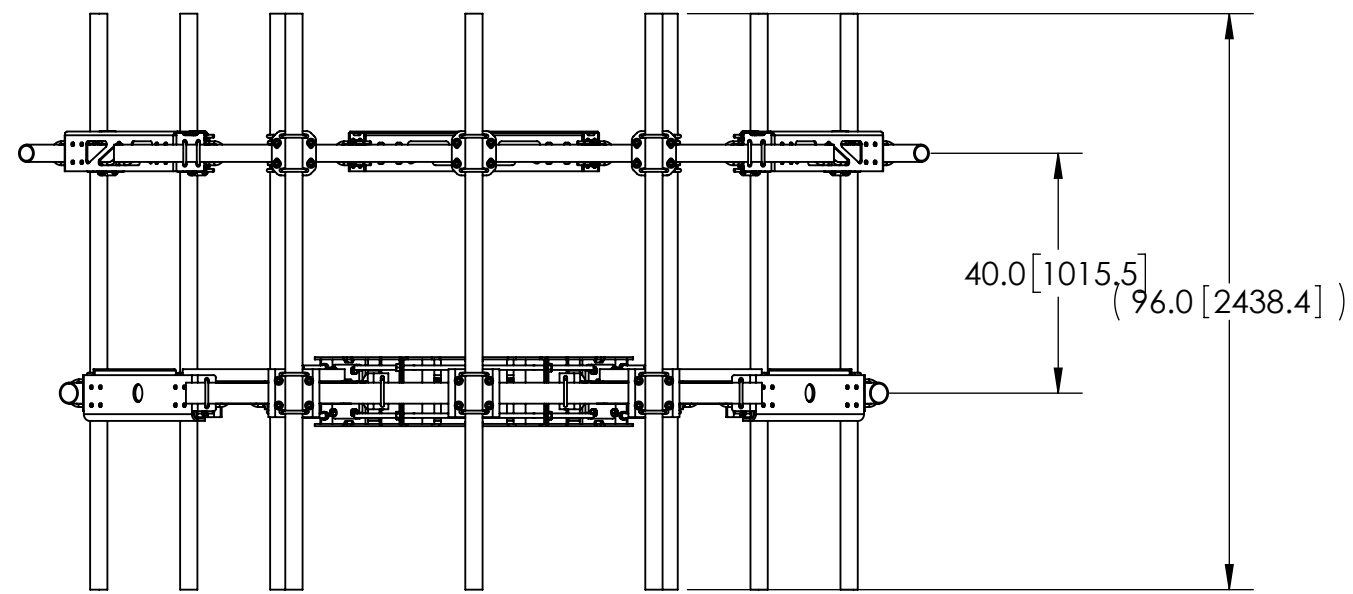
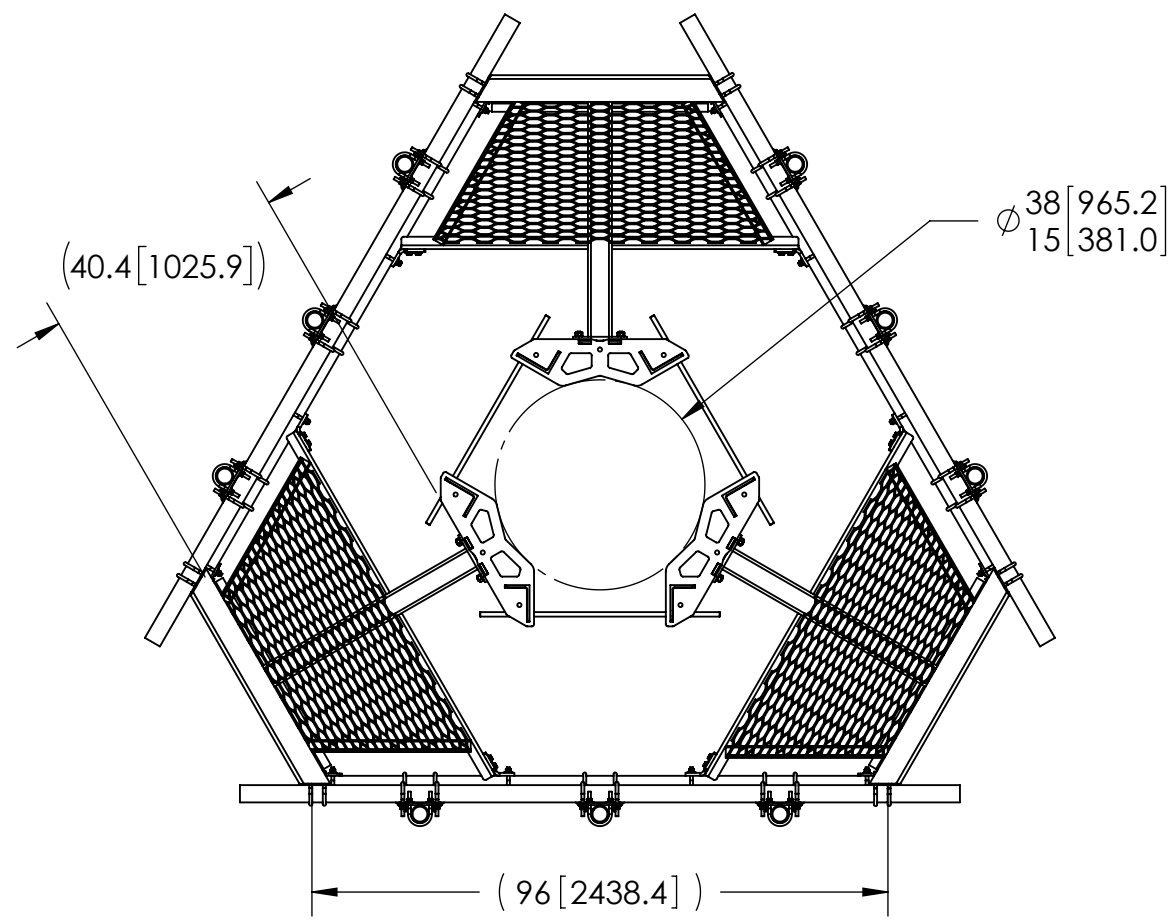
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1

NOTES:



ITEM	PART NO.	DESCRIPTION	QTY.
1	MC-RM1550-3	12" - 50" OD RINGMOUNT	1
2	MTC300602	SECTOR WELDMENT FOR SNUB NOSE PLATFORM	3
3	MT195801	Corner Weldment Snub Nose Handrail	3
4	GB-0520A	5/8" X 2" GALV BOLT KIT (A325)	12
5	MT54796	3.50" OD X 96" GALV PIPE	3
6	MT546120	2.875" O.D. X 120" PIPE	3
7	GWF-04	1/2" GALV FLAT WASHER	12
8	GUB-4355	1/2" X 3-5/8" X 5" GALV U-BOLT	12
9	MTC300618	MOUNTING PLATE FOR MT-196	6
10	GB-04205	1/2" X 2" GALV BOLT KIT	12
11	MT-219M-H	3.5" OD X 2-7/8" OD Clamp Bracket Assembly	9
12	GUB-4352	1/2" X 3" X 5-1/4" GALV U-BOLT	12
13	MT54696	Ø 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 C	SCALE 1:32	DOCUMENT NO. MC-PK8-DSH	
DRAWING			SHEET
VERSION 00	STATUS AD	REVISION A	

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4

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A

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D

A

B

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D

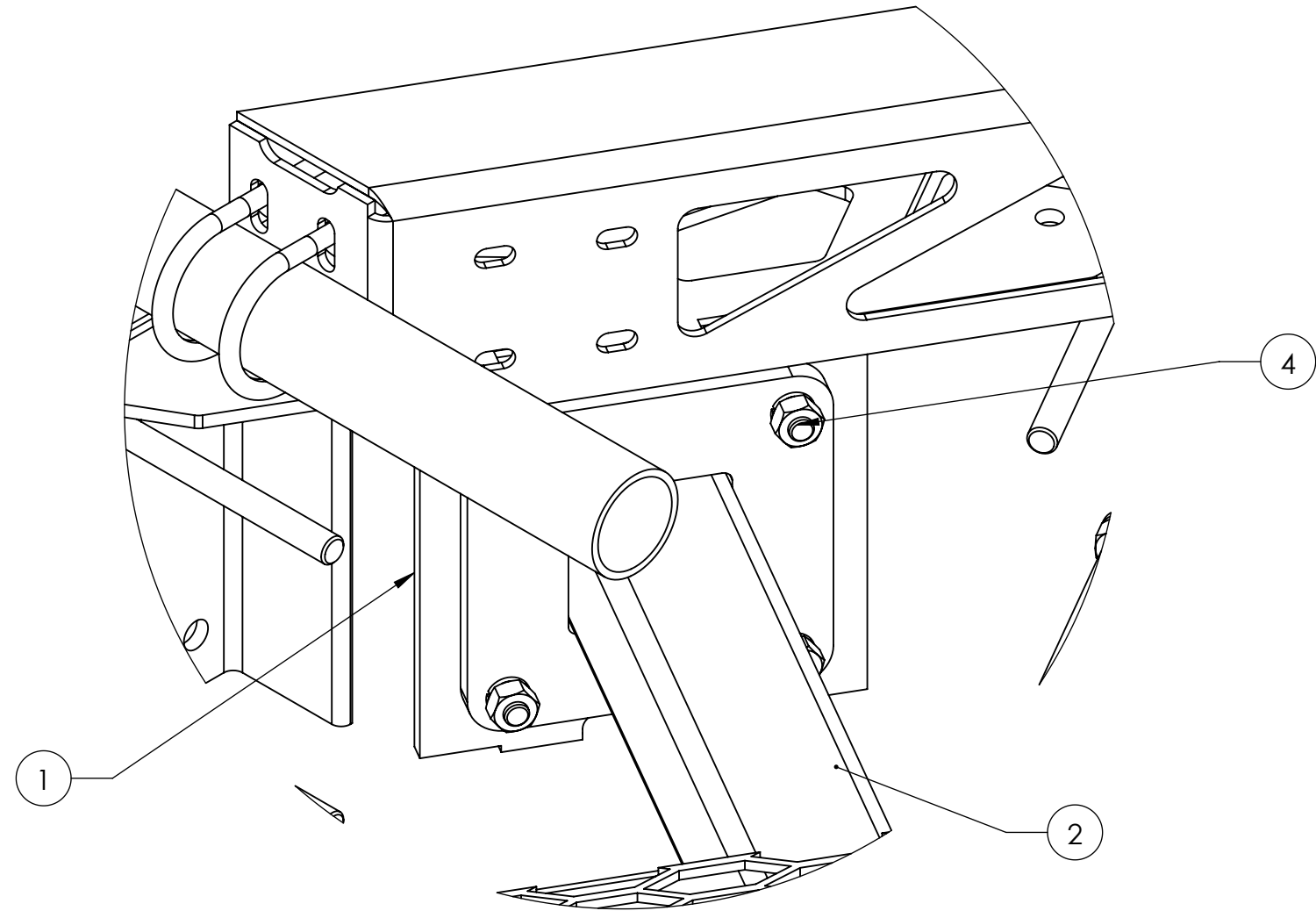
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3

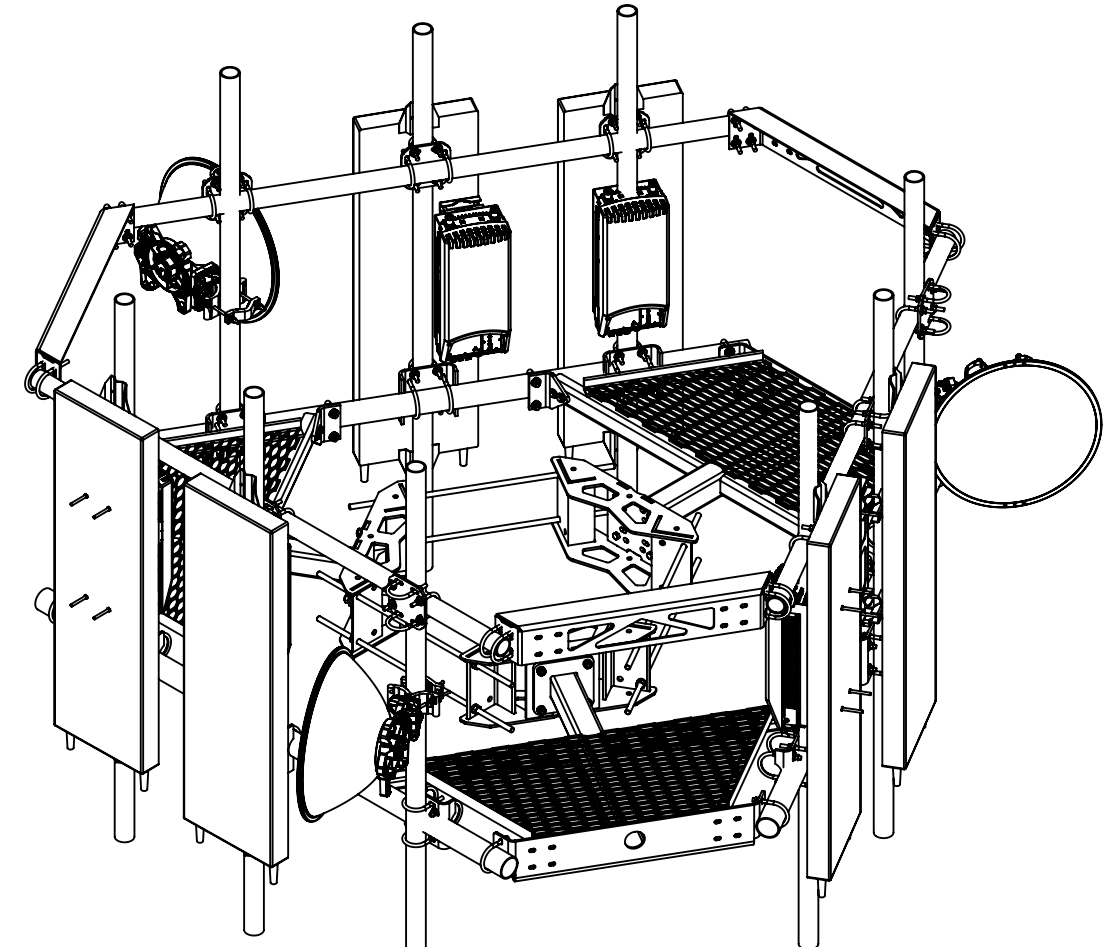
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1

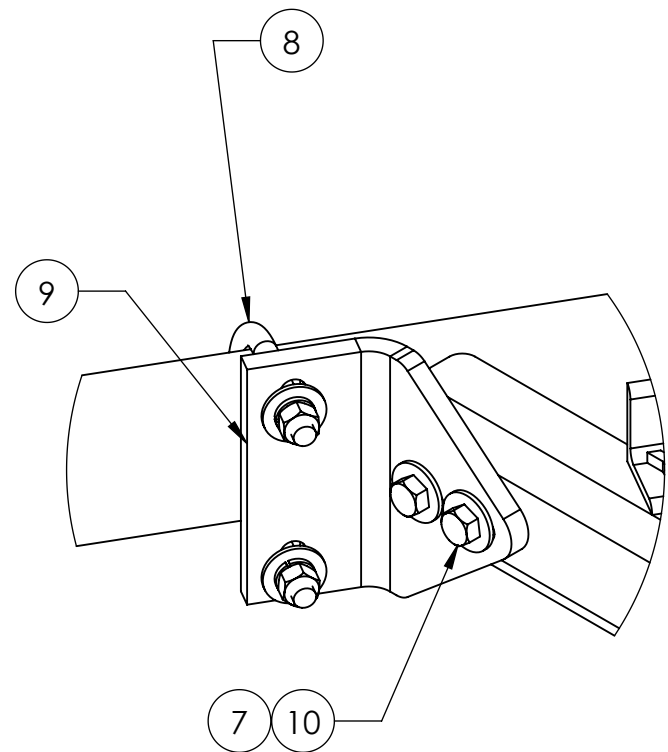
NOTES:



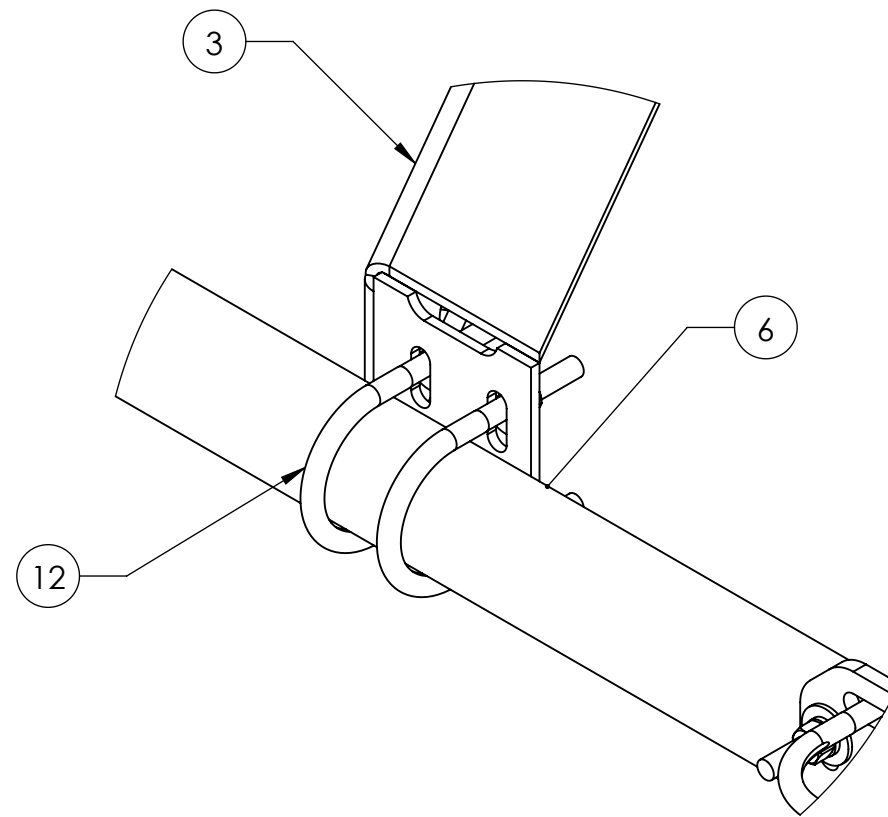
DETAIL A  
SCALE 1 : 4



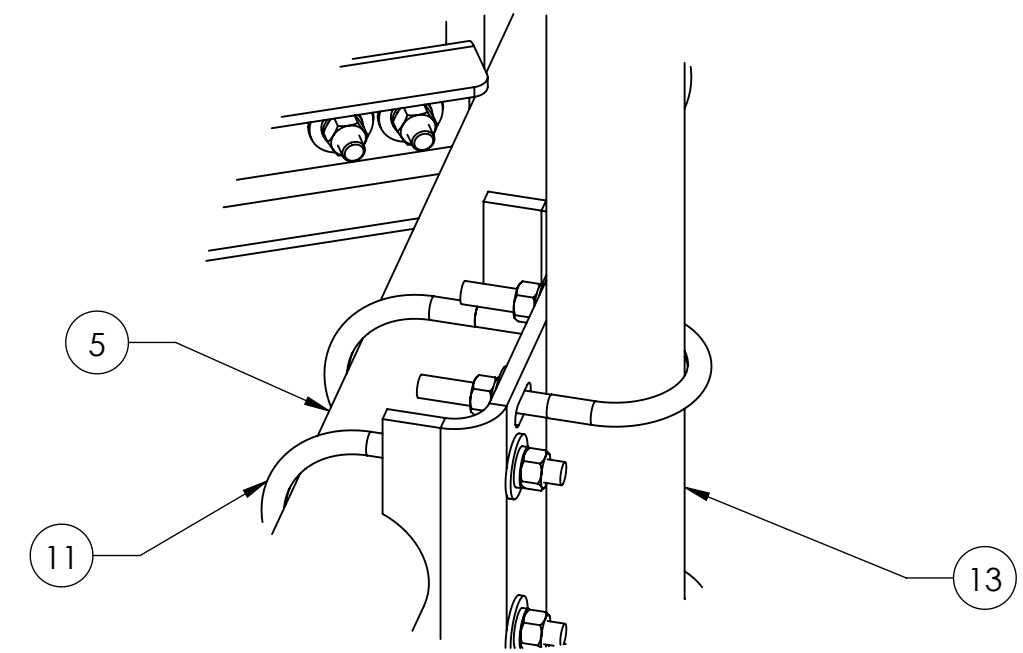
**WITH ANTENNAS**



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 <b>C</b>	SCALE <b>1:24</b>	DOCUMENT NO. <b>MC-PK8-DSH</b>
------------------	----------------------	-----------------------------------

DRAWING			SHEET 3 OF 3
VERSION 00	STATUS AD	REVISION A	

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D

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C

B

B

A

A

# Exhibit F

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

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

Dish Wireless Existing Facility

Site ID: 841290

NJJER01093A  
363 Riversville Road  
Greenwich, Connecticut 06831

**May 27, 2022**

**EBI Project Number: 6222003441**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>38.28%</b>

May 27, 2022

Attn: Dish Wireless

Emissions Analysis for Site: 841290 - NJJER01093A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **363 Riversville Road in Greenwich, 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 97-01 and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter ( $\mu\text{W}/\text{cm}^2$ ). The number of  $\mu\text{W}/\text{cm}^2$  calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits; therefore, it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

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

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

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

Additional details can be found in FCC OET 65.

## **CALCULATIONS**

Calculations were done for the proposed Dish Wireless Wireless antenna facility located at 363 Riversville Road in Greenwich, 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 132 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):	132 feet	Height (AGL):	132 feet	Height (AGL):	132 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 AI MPE %:	<b>0.72%</b>	Antenna BI MPE %:	<b>0.72%</b>	Antenna CI MPE %:	<b>0.72%</b>

Site Composite MPE %	
Carrier	MPE %
Dish Wireless (Max at Sector A):	0.72%
AT&T	3.57%
T-Mobile	8.05%
Verizon	21.62%
Nextel	0.37%
Sprint	3.95%
<b>Site Total MPE % :</b>	<b>38.28%</b>

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	0.72%
Dish Wireless Sector B Total:	0.72%
Dish Wireless Sector C Total:	0.72%
Site Total MPE % :	38.28%

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 ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Dish Wireless 600 MHz n71	4	110.82	132.0	1.00	600 MHz n71	400	0.25%
Dish Wireless 1900 MHz n70	4	245.22	132.0	2.22	1900 MHz n70	1000	0.22%
Dish Wireless 2190 MHz n66	4	275.14	132.0	2.49	2190 MHz n66	1000	0.25%
						<b>Total:</b>	<b>0.72%</b>

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

## Summary

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

The anticipated maximum composite contributions from the Dish Wireless facility as well as the site composite emissions value with regards to compliance with FCC's allowable limits for general population exposure to RF Emissions are shown here:

Dish Wireless Sector	Power Density Value (%)
Sector A:	0.72%
Sector B:	0.72%
Sector C:	0.72%
Dish Wireless Maximum MPE % (Sector A):	0.72%
Site Total:	38.28%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **38.28%** 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**



1200 MacArthur Blvd, Suite 200  
Mahwah, NJ 07430

Phone: (862) 226-6914  
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:**  
**363 RIVERSVILLE ROAD, GREENWICH, CT 06831**

NEW CINGULAR WIRELESS PCS, LLC ("Crown Castle") hereby authorizes DISH NETWORK, 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: 841290/GREENWICH NORTH**  
**Customer Site ID: NJJER01093A/CT-CCI-T-841290**  
**Site Address: 363 RIVERSVILLE ROAD, GREENWICH, CT 06831**

Crown Castle

By:  \_\_\_\_\_ Date: 04/11/2022  
Robin Cannizzaro  
Real Estate Specialist

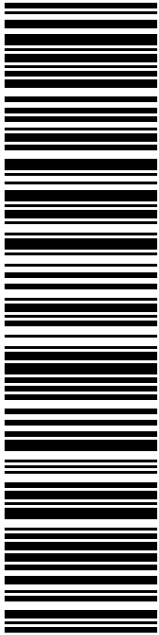
# Exhibit H

## Recipient Mailings



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

**USPS TRACKING #**



**9405 5036 9930 0262 4496 53**

**P**

06/01/2022

**U.S. POSTAGE PAID**  
click-n-ship®

USPS.com 9405 5036 9930 0262 4496 53 0089 5000 0031 4586  
**US POSTAGE**  
Flat Rate Env  
**\$8.95**

Mailed from 01566


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

**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 06/03/22  
Ref#: DS-841290  
**0006**

**R013**

Electronic Rate Approved #038555749





Cut on dotted line.

### Instructions

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

### Click-N-Ship® Label Record

**USPS TRACKING # :**  
**9405 5036 9930 0262 4496 53**

Trans. #: 564664079	Priority Mail® Postage: <b>\$8.95</b>
Print Date: 06/01/2022	Total: <b>\$8.95</b>
Ship Date: 06/01/2022	
Expected Delivery Date: 06/03/2022	

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

Ref#: DS-841290


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

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



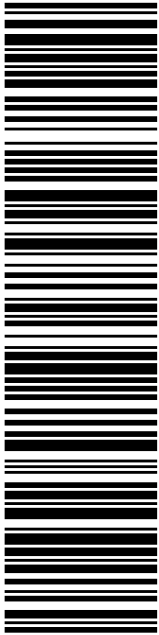
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FRED CAMILLO  
FIRST SELECTMAN-GREENWICH  
101 FIELD POINT RD  
GREENWICH CT 06830-6463

**USPS TRACKING #**



**9405 5036 9930 0262 4496 77**

**P**

06/01/2022

Expected Delivery Date: 06/03/22  
Ref#: DS-841290

**0006**

**C027**

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

**PRIORITY MAIL 2-DAY™**

USPS.com  
**US POSTAGE**  
Flat Rate Env

9405 5036 9930 0262 4496 77 0089 5000 0020 6830

**\$8.95**

**U.S. POSTAGE PAID**  
Click-N-Ship®

Mailed from 01566

06/01/2022

**Click-N-Ship®**

UNITED STATES  
POSTAL SERVICE®



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Print Date:	06/01/2022	Total:	<b>\$8.95</b>
Ship Date:	06/01/2022		
Expected			
Delivery Date:	06/03/2022		

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

**To:** FRED CAMILLO  
FIRST SELECTMAN-GREENWICH  
101 FIELD POINT RD  
GREENWICH CT 06830-6463


Ref#: DS-841290

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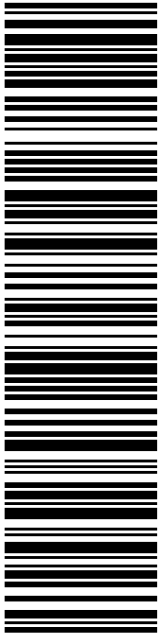
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KATIE DELUCA  
PLANNING & ZONING-ZEO-TOWN PLANNER  
101 FIELD POINT RD  
GREENWICH CT 06830-6463

**USPS TRACKING #**



**9405 5036 9930 0262 4496 84**

**P**

06/01/2022

Expected Delivery Date: 06/03/22  
Ref#: DS-841290  
**0006**

**C027**

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

**PRIORITY MAIL 2-DAY™**

USPS.com  
**US POSTAGE**  
Flat Rate Env  
**U.S. POSTAGE PAID**  
Click-N-Ship®


06/01/2022

Mailed from 01566

**Click-N-Ship®**

9405 5036 9930 0262 4496 84 0089 5000 0020 6830  
**\$8.95**

Electronic Rate Approved #038555749



USPS TRACKING #

USPS TRACKING #



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Trans. #: 564664079	Priority Mail® Postage: <b>\$8.95</b>
Print Date: 06/01/2022	Total: <b>\$8.95</b>
Ship Date: 06/01/2022	
Expected Delivery Date: 06/03/2022	

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


Ref#: DS-841290

**To:** KATIE DELUCA  
PLANNING & ZONING-ZEO-TOWN PLANNER  
101 FIELD POINT RD  
GREENWICH CT 06830-6463

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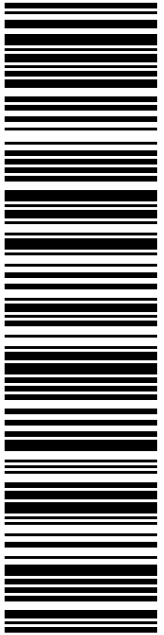


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GREENWICH COUNCIL OF BOY SCOUTS, INC  
63 MASON ST  
GREENWICH CT 06830-5501

**USPS TRACKING #**



**9405 5036 9930 0262 4497 07**

**P**

USPS.com  
**US POSTAGE**  
Flat Rate Env

06/01/2022

Mailed from 01566


**U.S. POSTAGE PAID**  
click-n-ship®

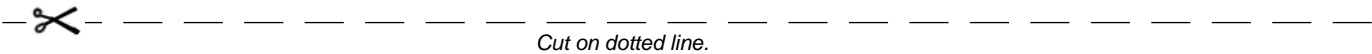
**PRIORITY MAIL 2-DAY™**

Expected Delivery Date: 06/03/22  
Ref#: DS-841290  
**0006**

C051

Electronic Rate Approved #038555749





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**USPS TRACKING # :**  
**9405 5036 9930 0262 4497 07**

Trans. #: 564664079	Priority Mail® Postage: <b>\$8.95</b>
Print Date: 06/01/2022	Total: <b>\$8.95</b>
Ship Date: 06/01/2022	
Expected Delivery Date: 06/03/2022	

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

Ref#: DS-841290

**To:** GREENWICH COUNCIL OF BOY SCOUTS, INC  
63 MASON ST  
GREENWICH CT 06830-5501

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841290 CRM DUSL



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

06/01/2022 03:16 PM

Product	Qty	Unit Price	Price
Prepaid Mail West Henrietta, NY 14586 Weight: 0 lb 1.90 oz Acceptance Date: Wed 06/01/2022 Tracking #: 9405 5036 9930 0262 4496 53	1		\$0.00
Prepaid Mail Greenwich, CT 06830 Weight: 0 lb 8.20 oz Acceptance Date: Wed 06/01/2022 Tracking #: 9405 5036 9930 0262 4496 77	1		\$0.00
Prepaid Mail Greenwich, CT 06830 Weight: 0 lb 8.20 oz Acceptance Date: Wed 06/01/2022 Tracking #: 9405 5036 9930 0262 4496 84	1		\$0.00
Prepaid Mail Greenwich, CT 06830 Weight: 0 lb 8.20 oz Acceptance Date: Wed 06/01/2022 Tracking #: 9405 5036 9930 0262 4497 07	1		\$0.00
Grand Total:			\$0.00

\*\*\*\*\*  
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eligible to receive a third set  
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