



CITY OF EL MIRAGE

DEVELOPMENT APPLICATION FORM

Official Use

Case No: **PZ22-01-02** Date Received: **1/10/2022** Planning & Zoning Commission Meeting: **2/8/2022** City Council Meeting: **3/1/2022**

PURPOSE

Development Applications are reviewed by the Technical Advisory Committee (TAC) with the intent to provide the applicant specific information in preparation to meeting the City's technical standards and requirements for the proposed development project. Information provided by TAC is based on applicant submittals and should be considered actual and detailed in nature.

ACTION REQUESTED (Check one)

- Conditional Use Permit
- General Plan Amendment: Major Minor
- Planned Area Development (PAD)
- Planned Area Development Amendment
- Rezoning
- Site Plan Approval
- Site Plan Amendment
- Preliminary Plat
- Final Plat
- Other: _____

PROPERTY INFORMATION:

Name of Project: El Mirage / 846102 Acreage: 2

Property Address/Location: 14010 North El Mirage Road

Assessor's Parcel Number: 501-33-013K

APPLICANT / OWNER INFORMATION:

Applicant: <u>Tom Wilkerson / Tower Engineering Professionals</u>	Owner: <u>Crown Castle (Tower Owner)</u>
Address: <u>4710 E Elwood St. Suite 9</u>	Address: <u>200 Spectrum Center Dr. Suite 1700</u>
City/ST/Zip: <u>Phoenix, AZ 85040</u>	City/ST/Zip: <u>Irvine, CA 92618</u>
Phone: <u>(303) 358-3142</u>	Phone: <u>(949) 930-7467</u>
Email: <u>twilkerson@tepgroup.net</u>	Email: <u>lorena.martinez@crowncastle.com</u>
Signature: <u>Tom Wilkerson</u>	Signature: <u>Lorena Martinez</u>
(Agreement to act as agent for owner)	(Authorization for agent to act for owner)

- Application Form
- Comprehensive Site Plan
- Deed and/or Title Report
- Drainage Report
- A.L.T.A. Survey
- Phase I Environment Site Assessment
- Preliminary Landscape Plans
- Filing Fee (see Fee Schedule starting on page 9)



4710 E Elwood St. Suite 9
Phoenix, AZ 85040

Phone: (303) 358-3142
www.crowncastle.com

January 5, 2022

CITY OF EL MIRAGE, AZ
Senior Planner | GIS
Jose A. Macias
10000 N. EL MIRAGE ROAD
EL MIRAGE, AZ 85335

Via Electronic

*******NOTICE OF ELIGIBLE FACILITIES REQUEST*******

RE: Request for Minor Modification to Existing Wireless Facility – Section 6409
Site Address: 14010 NORTH EL MIRAGE ROAD, EL MIRAGE, AZ 85335
Crown Site Number: 846102 / Crown Site Name: EL MIRAGE
Customer Site Number: PXPX00138A / Application Number: 561440

Dear Jose A. Macias:

On behalf of DISH Wireless L.L.C. (“Dish Wireless” or “Applicant”), Crown Castle USA Inc. (“Crown Castle”) is pleased to submit this request to modify the existing wireless facility noted above through the collocation, replacement and/or removal of the Applicant’s equipment as an eligible facilities request for a minor modification under Section 6409¹ and the rules of the Federal Communications Commission (“FCC”).²

Section 6409 mandates that state and local governments must approve any eligible facilities request for the modification of an existing wireless tower or base station that does not substantially change the physical dimensions of such tower or base station. Under Section 6409, to toll the review period, if the reviewing authority determines that the application is incomplete, it must provide written notice to the applicant within 30 days, which clearly and specifically delineates all missing documents or information reasonably related to whether the request meets the federal requirements.³ Additionally, if a state or local government, fails to issue any approvals required for this request within 60 days, these approvals are deemed granted. The FCC has clarified that the 30-day and 60-day deadlines begins when an applicant: (1) takes the first step required under state or local law; and (2) submits information sufficient to inform the jurisdiction that this modification qualifies under the federal law⁴. Please note that with the submission of this letter and enclosed items, the thirty and sixty-day review periods have started. Based on this filing, the deadline for written notice of incomplete application is February 4, 2022, and the deadline for issuance of approval is March 6, 2022.

The proposed scope of work for this project includes:

¹ Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, § 6409 (2012) (codified at 47 U.S.C. § 1455).

² *Acceleration of Broadband Deployment by Improving Wireless Facility Siting Policies*, 29 FCC Rcd. 12865 (2014) (codified at 47 CFR § 1.6100); and *Implementation of State & Local Governments’ Obligation to Approve Certain Wireless Facility Modification Requests Under Section 6409(a) of the Spectrum Act of 2012*, WT Docket No. 19-250 (June 10, 2020).

³ See 47 CFR § 1.6100 (c)(3). ⁴ See 2020 Upgrade Order at paragraph 16.



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Collocation of antennas, ancillary equipment and ground equipment as per plans for a new carrier on an existing wireless communication facility.

At the end of this letter is a checklist of the applicable substantial change criteria under Section 6409. Additionally, please find enclosed the following information in support of this request:

- (1) Zoning Application;
- (2) Dish Wireless Cover Letter;
- (3) Construction Drawings;
- (4) Structural Analysis; and
- (5) Section 6409 Substantial Change Checklist.

As these documents indicate, (i) the modification involves the collocation, removal or replacement of transmission equipment; and (ii) such modification will not substantially change the physical dimensions of such tower or base station. As such, it is an “eligible facilities request” as defined in the FCC’s rules to which the 60-day deadline for approval applies. Accordingly, Applicant requests all authorization necessary for this proposed minor modification under Section 6409.

Our goal is to work with you to obtain approvals earlier than the deadline. We will respond promptly to any request for related information you may have in connection with this request. Please let us know how we can work with you to expedite the approval process. We look forward to working with you on this important project, which will improve wireless telecommunication services in your community using collocation on existing infrastructure. If you have any questions, please do not hesitate to contact me.

Regards,

Tom Wilkerson

Tom Wilkerson

Site Acquisition Specialist

Tower Engineering Professionals on behalf of Crown Castle for Dish

Agent for Applicant

(303) 358-3142

twilkeron@tepgrup.net



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**Section 6409 Substantial Change Checklist
Towers Outside of the Public Right of Way**

The Federal Communications Commission has determined that a modification substantially changes the physical dimension of a wireless tower or base station under 47 U.S.C. § 1455(a) if it meets one of six enumerated criteria under 47 C.F.R. § 1.6100.

Criteria for Towers Outside the Public Rights of Way

YES/NO NO	Does the modification increase the height of the tower by more than the greater of: (a) 10% (b) or, the height of an additional antenna array plus separation of up to 20 feet from the top of the nearest existing antenna?
YES/NO NO	Does the modification add an appurtenance to the body of the tower that would protrude from the edge of the tower more than 20 feet or more than the width of the tower structure at the level of the appurtenance, whichever is greater?
YES/NO NO	Does the modification involve the installation of more than the standard number of new equipment cabinets for the technology involved or add more than four new equipment cabinets?
YES/NO NO	Does the modification entail any excavation or deployment outside the current site by more than 30 feet in any direction, not including any access or utility easements?
YES/NO NO	Does the modification defeat the concealment elements of the eligible support structure?
YES/NO NO	Does the modification violate conditions associated with the siting approval with the prior approval the tower or base station other than as specified in 47 C.F.R. § 1.6100(c)(7)(i) – (iv)?

If all questions in the above section are answered “NO,” then the modification does not constitute a substantial change to the existing tower under 47 C.F.R. § 1.6100.

Re: Minor Modification to Existing Wireless Facility

As it moves to deploy a new, national 5G broadband network, DISH Wireless L.L.C. ("Dish Wireless") is pleased to submit the attached application to install equipment and initiate operations at the above wireless communications facility. In addition to the important details contained in the submittal package, please know that the equipment being installed is an important part of the national network Dish is building.

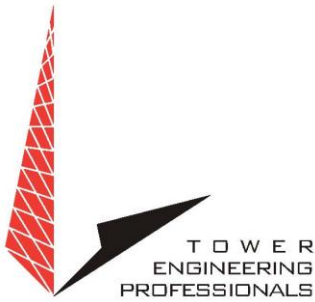
This project will help support the 5G connectivity needs of residents, traditional and home based businesses, public services, education, health care and first responders. DISH Wireless looks forward to working cooperatively with you to advance these important efforts in your community.

Dish Wireless appreciates the dedication and devotion of public servants across our nation to process our applications during what continue to be challenging times. COVID-19 has changed the way many people work, and can present significant difficulties in the continuation and provision of public services. It has also highlighted the importance of wireless connectivity. Please continue to work with our representatives and agents about any questions you have on the details of the application or your local process. However, Dish Wireless would welcome the opportunity to discuss and answer questions or concerns you may have about our network and the connectivity it will bring to your community.

We look forward to developing a long-term, collaborative working relationship with you, as well as enhancing communications and networking services in your community.

Respectfully submitted,

Robert E. Smith
Zoning Manager



TEP PHOENIX OFFICE
4710 E. ELWOOD, SUITE 9
PHOENIX, AZ 85040
(303) 358-3142
WWW.TEPGROUP.NET

January 5, 2022

RE: NARRATIVE FOR DISH WIRELESS MODIFICATION PROJECT - CROWN CASTLE BU #846102

**COLLOCATION FOR WIRELESS TELECOMMUNICATION FACILITY (WTF) APPLICATION
14010 N EL MIRAGE RD EL MIRAGE, AZ 85335 (PARCEL #501-33-013K)**

City of El Mirage,

Please accept the enclosed Wireless Telecommunication Facility Collocation Application along with the other submittal materials including the EFR Notice Cover Letter, Construction Drawings, the Engineering Structural Analysis.

The scope of working includes the following:

SCOPE OF WORK
<p>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:</p> <p>TOWER SCOPE OF WORK:</p> <ul style="list-style-type: none">• INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)• INSTALL (1) PROPOSED PLATFORM MOUNT (MC-PK8-DSH)• INSTALL (6) PROPOSED RRUs (2 PER SECTOR)• INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)• INSTALL (1) PROPOSED HYBRID CABLE• INSTALL PROPOSED JUMPERS <p>GROUND SCOPE OF WORK:</p> <ul style="list-style-type: none">• INSTALL (1) PROPOSED METAL PLATFORM• INSTALL (1) PROPOSED ICE BRIDGE• INSTALL (1) PROPOSED PPC CABINET• INSTALL (1) PROPOSED EQUIPMENT CABINET• INSTALL (1) PROPOSED POWER CONDUIT• INSTALL (1) PROPOSED TELCO CONDUIT• INSTALL (1) PROPOSED TELCO-FIBER BOX• INSTALL (1) PROPOSED GPS UNIT• INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)• INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)• INSTALL (1) PROPOSED 200A METER AND METER SOCKET

This project is considered an Eligible Facility Request, per Section 6409 of the Spectrum Act. As the primary point of contact for the application, please let me know what else is needed to obtain approval in a timely and compliant fashion.

Thank you for your assistance.

Tom Wilkerson
Site Acquisition Agent
twilkerson@tepgroup.net
(303) 358-3142

Date: **September 30, 2021**



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

Subject: **Structural Analysis Report**

Carrier Designation: **DISH Network Co-locate**
Site Number: PXPXH00138A
Site Name: AZ-CCI-T-846102

Crown Castle Designation: **BU Number:** 846102
Site Name: EL MIRAGE
JDE Job Number: 659576
Work Order Number: 1972937
Order Number: 561440 Rev. 0

Engineering Firm Designation: **Crown Castle Project Number:** 1972937

Site Data: **14010 NORTH EL MIRAGE ROAD, EL MIRAGE, MARICOPA County, AZ**
Latitude 33° 36' 35.719", Longitude -112° 19' 33.091"
100 Foot - Monopole Tower

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

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


LC5: Proposed Equipment Configuration


Sufficient Capacity

This analysis utilizes an ultimate 3-second gust wind speed of 115 mph as required by the 2012 International Building Code. Applicable Standard references and design criteria are listed in Section 2 - "Analysis Criteria".

Structural analysis prepared by: Nicholas A. Palladino

Respectfully submitted by:


Digitally signed by Maham Barimani
Date: 2021.09.30 14:37:08



Registered Professional Engineer (Civil)
CERTIFICATE NO.
62854
MAHAM BARIMANI
Date Signed.....
ARIZONA, U.S.A.
EXPIRES: 12-31-2022

Maham Barimani, P.E.
Senior Project Engineer

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1) INTRODUCTION

This tower is a 100 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC.

2) ANALYSIS CRITERIA

TIA-222 Revision:	TIA-222-H
Risk Category:	II
Wind Speed:	115 mph
Exposure Category:	C
Topographic Factor:	1
Service Wind Speed:	60 mph

Table 1 - Proposed Equipment Configuration

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
81.0	81.0	3	fujitsu	TA08025-B604	1	1-3/8
		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)
100.0	104.0	1	andrew	HP2-102	1 2 6 6	5/16 3/8 3/4 1-5/8
	102.0	3	alcatel lucent	B25 RRH4x30-4R		
		3	alcatel lucent	RRH4X25-WCS		
		4	powerwave technologies	LGP 17501		
		1	powerwave technologies	LGP18601		
	101.0	3	alcatel lucent	B66A RRH4X45		
		3	alcatel lucent	RRH2X40-07-L		
		3	cci antennas	DPA-65R-BUUUU-H8 w/ Mount Pipe		
		3	kathrein	800 10766 K w/ Mount Pipe		
		3	kmw communications	EPBQ-654L8H8-L2 w/ Mount Pipe		
		1	raycap	DC6-48-60-0-8F		
		1	raycap	DC6-48-60-0-8F		
		1	raycap	DC6-48-60-18-8F		
	97.0	3	alcatel lucent	9442 RRH AWS		
	98.0	1	tower mounts	Sector Mount [SM 504-3]		
88.0	89.0	1	sigfox	CXL 900-3LW	1	1/2
	88.0	1	sigfox	CAVITY FILTER		

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
		1	sigfox	LNA		
		1	site pro 1	MM04		
75.0	75.0	1	andrew	HP2-102	1	1
		1	tower mounts	Pipe Mount [PM 601-1]		
70.0	70.0	3	kmw communications	HB-X-ID-17-65-00T w/ Mount Pipe	6	7/8
		1	tower mounts	Side Arm Mount [SO 103-3]		
45.0	45.0	4	-	2' Stadium Light	1	2

3) ANALYSIS PROCEDURE

Table 3 - Documents Provided

Document	Reference	Source
4-GEOTECHNICAL REPORTS	4720456	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	4720459	CCISITES
4-TOWER MANUFACTURER DRAWINGS	4301482	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	100 - 64.21	Pole	TP40.13x31x0.281	1	-13.460	2137.852	19.0	Pass
L2	64.21 - 26.663	Pole	TP49.01x38.143x0.344	2	-22.552	3195.066	30.8	Pass
L3	26.663 - 0	Pole	TP55x46.643x0.375	3	-33.082	3946.005	38.5	Pass
							Summary	
						Pole (L3)	38.5	Pass
						Rating =	38.5	Pass

Table 5 - Tower Component Stresses vs. Capacity - LC5

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	59.0	Pass
1	Base Plate	0	79.6	Pass
1	Base Foundation (Structure)	0	86.3	Pass
1	Base Foundation (Soil Interaction)	0	17.3	Pass
Structure Rating (max from all components) =				86.3%

Notes:

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

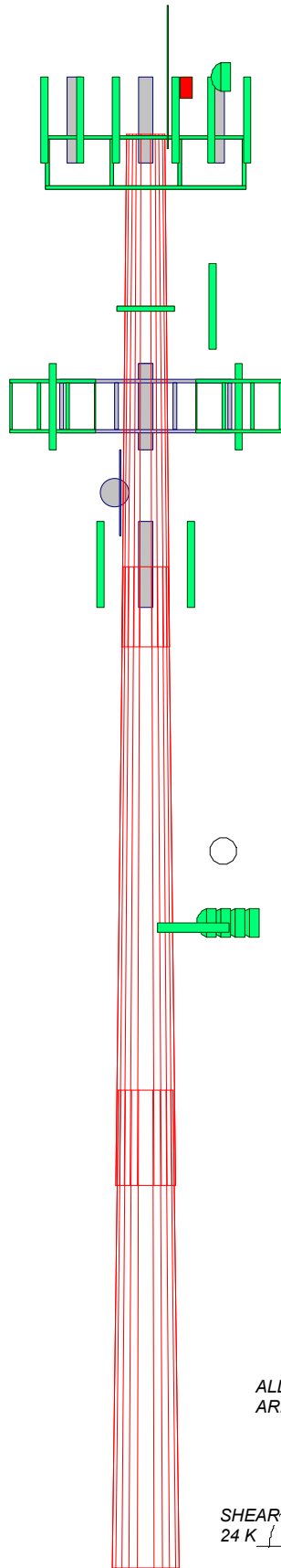
4.1) Recommendations

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

APPENDIX A
TNXTOWER OUTPUT

Section	1	2	3	17.8
Length (ft)	35.790	43.130	33.330	17.8
Number of Sides	12	12	12	
Thickness (in)	0.281	0.344	0.375	
Socket Length (ft)	5.583	6.667	46.643	
Top Dia (in)	31.000	38.143	55.000	
Bot Dia (in)	40.130	49.010	55.000	
Grade		A572-65		
Weight (K)	3.9	7.0	6.9	

100.0 ft
64.2 ft
26.7 ft
0.0 ft



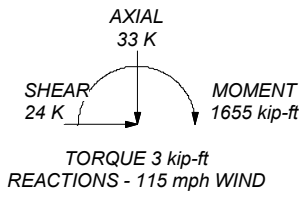
MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower is located in Maricopa County, Arizona.
2. Tower designed for Exposure C to the TIA-222-H Standard.
3. Tower designed for a 115 mph basic wind in accordance with the TIA-222-H Standard.
4. Deflections are based upon a 60 mph wind.
5. Tower Risk Category II.
6. Topographic Category 1 with Crest Height of 0.000 ft
7. TOWER RATING: 38.5%

ALL REACTIONS ARE FACTORED



Crown Castle
2000 Corporate Drive
Canonsburg, PA
The Pathway to Possible Phone: (724) 416-2000
FAX:

Job: **BU 846102**

Project:	Client: Crown Castle	Drawn by: NPalladino	App'd:
Code: TIA-222-H	Date: 09/30/21	Scale: NTS	Dwg No. E-1

Path: C:\Users\NPalladino\Desktop\Local SA Production\846102\W0 1972937 - SA\Prod\846102.ic5.en

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 Maricopa County, Arizona.
- Tower base elevation above sea level: 1142.000 ft.
- Basic wind speed of 115 mph.
- Risk Category II.
- Exposure Category C.
- Simplified Topographic Factor Procedure for wind speed-up calculations is used.
- Topographic Category: 1.
- Crest Height: 0.000 ft.
- 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: $K_{es}(F_w) = 0.95$.
- 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;">Poles</div> ✓ Include Shear-Torsion Interaction Always Use Sub-Critical Flow Use Top Mounted Sockets Pole Without Linear Attachments Pole With Shroud Or No Appurtenances Outside and Inside Corner Radii Are Known
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Tapered Pole Section Geometry

Section	Elevation ft	Section Length ft	Splice Length ft	Number of Sides	Top Diameter in	Bottom Diameter in	Wall Thickness in	Bend Radius in	Pole Grade
L1	100.000- 64.210	35.790	5.583	12	31.000	40.130	0.281	1.125	A572-65 (65 ksi)
L2	64.210-26.663	43.130	6.667	12	38.143	49.010	0.344	1.375	A572-65 (65 ksi)
L3	26.663-0.000	33.330		12	46.643	55.000	0.375	1.500	A572-65

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	(65 ksi)

Tapered Pole Properties

Section	Tip Dia.	Area	I	r	C	I/C	J	It/Q	w	w/t
	in	in ²	in ⁴	in	in	in ³	in ⁴	in ²	in	
L1	31.994	27.825	3351.352	10.997	16.058	208.703	6790.748	13.694	7.554	26.854
	41.446	36.094	7315.669	14.266	20.787	351.929	14823.528	17.765	10.001	35.553
L2	40.824	41.845	7631.357	13.532	19.758	386.238	15463.198	20.595	9.301	27.053
	50.618	53.875	16286.584	17.422	25.387	641.528	33001.035	26.516	12.213	35.524
L3	49.886	55.868	15265.269	16.564	24.161	631.818	30931.573	27.497	11.495	30.654
	56.808	65.960	25121.608	19.556	28.490	881.769	50903.189	32.463	13.735	36.627

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor Ar	Adjust. Factor Ar	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals	Double Angle Stitch Bolt Spacing Horizontals	Double Angle Stitch Bolt Spacing Redundants
ft	ft ²	in					in	in	in
L1 100.000-64.210				1	1	1			
L2 64.210-26.663				1	1	1			
L3 26.663-0.000				1	1	1			

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Sector	Exclude From Torque Calculation	Component Type	Placement	Total Number	Number Per Row	Start/End Position	Width or Diameter	Perimeter	Weight
				ft				in	in	klf
WR-VG86ST-BRD(3/4)	A	No	Surface Ar (CaAa)	100.000 - 0.000	2	2	0.200 - 0.240	0.795		0.001

EC4-50(1/2)	B	No	Surface Ar (CaAa)	88.000 - 0.000	1	1	0.250 - 0.250	0.630		0.000

CU12PSM9P8XXX(1-3/8)	A	No	Surface Ar (CaAa)	81.000 - 0.000	1	1	0.500 - 0.500	1.411		0.002

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement	Total Number	CAAA	Weight
					ft		ft ² /ft	klf
LDF7-50A(1-5/8)	A	No	No	Inside Pole	100.000 - 0.000	6	No Ice	0.001
WR-VG86ST-BRD(3/4)	A	No	No	Inside Pole	100.000 - 0.000	4	No Ice	0.001
FB-L98B-002-XXX(3/8)	A	No	No	Inside Pole	100.000 - 0.000	2	No Ice	0.000
123-171-XX(5/16)	A	No	No	Inside Pole	100.000 - 0.000	1	No Ice	0.000

LDF2-2R(1)	A	No	No	Inside Pole	75.000 - 0.000	1	No Ice	0.000

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	No Ice	C _{AA} ft ² /ft	Weight klf
LDF5-50A(7/8) ***	B	No	No	Inside Pole	70.000 - 0.000	6	No Ice	0.000	0.000
WC166(2)	A	No	No	Inside Pole	45.000 - 0.000	1	No Ice	0.000	0.003

Feed Line/Linear Appurtenances Section Areas

Tower Section n	Tower Elevation ft	Face	A _R ft ²	A _F ft ²	C _{AA} In Face ft ²	C _{AA} Out Face ft ²	Weight K
L1	100.000-64.210	A	0.000	0.000	8.060	0.000	0.340
		B	0.000	0.000	1.499	0.000	0.015
		C	0.000	0.000	0.000	0.000	0.000
L2	64.210-26.663	A	0.000	0.000	11.268	0.000	0.449
		B	0.000	0.000	2.365	0.000	0.080
		C	0.000	0.000	0.000	0.000	0.000
L3	26.663-0.000	A	0.000	0.000	8.002	0.000	0.357
		B	0.000	0.000	1.680	0.000	0.057
		C	0.000	0.000	0.000	0.000	0.000

Feed Line Center of Pressure

Section	Elevation ft	CP _x in	CP _z in	CP _x Ice in	CP _z Ice in
L1	100.000-64.210	-0.255	-1.169	-0.206	-0.942
L2	64.210-26.663	-0.143	-1.559	-0.115	-1.258
L3	26.663-0.000	-0.144	-1.574	-0.116	-1.267

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

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K _a No Ice	K _a Ice
L1	9	WR-VG86ST-BRD(3/4)	64.21 - 100.00	1.0000	1.0000
L1	17	EC4-50(1/2)	64.21 - 88.00	1.0000	1.0000
L1	19	CU12PSM9P8XXX(1-3/8)	64.21 - 81.00	1.0000	1.0000
L2	9	WR-VG86ST-BRD(3/4)	26.66 - 64.21	1.0000	1.0000
L2	17	EC4-50(1/2)	26.66 - 64.21	1.0000	1.0000
L2	19	CU12PSM9P8XXX(1-3/8)	26.66 - 64.21	1.0000	1.0000
L3	9	WR-VG86ST-BRD(3/4)	0.00 - 26.66	1.0000	1.0000
L3	17	EC4-50(1/2)	0.00 - 26.66	1.0000	1.0000
L3	19	CU12PSM9P8XXX(1-3/8)	0.00 - 26.66	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
Lightning Rod 5/8" x 8'	B	From Leg	0.500 0.000 4.000	0.000	100.000
Flash Beacon Lighting	B	From Leg	2.000 0.000 2.500	0.000	100.000
Beacon Mount	B	From Leg	2.000 0.000 2.000	0.000	100.000

800 10766 K w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	100.000
800 10766 K w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	100.000
800 10766 K w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	100.000
DPA-65R-BUUUU-H8 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	100.000
DPA-65R-BUUUU-H8 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	100.000
DPA-65R-BUUUU-H8 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	100.000
(2) LGP 17501	A	From Leg	4.000 0.000 2.000	0.000	100.000
(2) LGP 17501	B	From Leg	4.000 0.000 2.000	0.000	100.000
LGP18601	C	From Leg	4.000 0.000 2.000	0.000	100.000
RRH4X25-WCS	A	From Leg	4.000 0.000 2.000	0.000	100.000
RRH4X25-WCS	B	From Leg	4.000 0.000 2.000	0.000	100.000
RRH4X25-WCS	C	From Leg	4.000 0.000 2.000	0.000	100.000
9442 RRH AWS	A	From Leg	1.000 0.000 -3.000	0.000	100.000
9442 RRH AWS	B	From Leg	1.000 0.000 -3.000	0.000	100.000
9442 RRH AWS	C	From Leg	1.000 0.000 -3.000	0.000	100.000
B25 RRH4x30-4R	A	From Leg	4.000 0.000 2.000	0.000	100.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
B25 RRH4x30-4R	B	From Leg	4.000 0.000 2.000	0.000	100.000
B25 RRH4x30-4R	C	From Leg	4.000 0.000 2.000	0.000	100.000
DC6-48-60-18-8F	A	From Leg	4.000 0.000 1.000	0.000	100.000
DC6-48-60-0-8F	C	From Leg	4.000 0.000 1.000	0.000	100.000
EPBQ-654L8H8-L2 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	100.000
EPBQ-654L8H8-L2 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	100.000
EPBQ-654L8H8-L2 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	100.000
RRH2X40-07-L	A	From Leg	4.000 0.000 1.000	0.000	100.000
RRH2X40-07-L	B	From Leg	4.000 0.000 1.000	0.000	100.000
RRH2X40-07-L	C	From Leg	4.000 0.000 1.000	0.000	100.000
B66A RRH4X45	A	From Leg	4.000 0.000 1.000	0.000	100.000
B66A RRH4X45	B	From Leg	4.000 0.000 1.000	0.000	100.000
B66A RRH4X45	C	From Leg	4.000 0.000 1.000	0.000	100.000
DC6-48-60-0-8F	B	From Leg	4.000 0.000 1.000	0.000	100.000
6' x 2" Mount Pipe	A	From Leg	0.500 0.000 0.000	0.000	100.000
6' x 2" Mount Pipe	B	From Leg	0.500 0.000 0.000	0.000	100.000
6' x 2" Mount Pipe	C	From Leg	0.500 0.000 0.000	0.000	100.000
4'x4" Pipe Mount	A	From Leg	0.500 0.000 0.000	0.000	98.000
4'x4" Pipe Mount	B	From Leg	0.500 0.000 0.000	0.000	98.000
4'x4" Pipe Mount	C	From Leg	0.500 0.000 0.000	0.000	98.000
Sector Mount [SM 504-3]	C	None		0.000	98.000
Side Arm Mount [SO 103-3]	C	None		0.000	99.000
Side Arm Mount [SO 103-3]	C	None		0.000	97.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
CAVITY FILTER	B	From Leg	4.000 0.000 0.000	0.000	88.000
CXL 900-3LW	B	From Leg	4.000 0.000 1.000	0.000	88.000
LNA	B	From Leg	4.000 0.000 0.000	0.000	88.000
Side Arm Mount [SO 701-1]	B	None		0.000	88.000
Side Arm Mount [SO 102-3]	B	None		0.000	88.000
*** Pipe Mount [PM 601-1]	A	From Face	0.500 0.000 0.000	0.000	75.000
*** HB-X-ID-17-65-00T w/ Mount Pipe	A	From Leg	2.000 0.000 0.000	0.000	70.000
HB-X-ID-17-65-00T w/ Mount Pipe	B	From Leg	2.000 0.000 0.000	0.000	70.000
HB-X-ID-17-65-00T w/ Mount Pipe	C	From Leg	2.000 0.000 0.000	0.000	70.000
Side Arm Mount [SO 103-3]	C	None		0.000	70.000
6' x 2" Mount Pipe	A	From Leg	2.000 0.000 0.000	0.000	70.000
6' x 2" Mount Pipe	B	From Leg	2.000 0.000 0.000	0.000	70.000
6' x 2" Mount Pipe	C	From Leg	2.000 0.000 0.000	0.000	70.000
*** T-Arm Mount [TA 601-1]	B	From Leg	2.000 0.000 0.000	0.000	45.000
*** *** MX08FRO665-21 w/ Mount Pipe	A	From Leg	4.000 0.000 0.000	0.000	81.000
MX08FRO665-21 w/ Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	81.000
MX08FRO665-21 w/ Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	81.000
TA08025-B604	A	From Leg	4.000 0.000 0.000	0.000	81.000
TA08025-B604	B	From Leg	4.000 0.000 0.000	0.000	81.000
TA08025-B604	C	From Leg	4.000 0.000 0.000	0.000	81.000
TA08025-B605	A	From Leg	4.000 0.000 0.000	0.000	81.000
TA08025-B605	B	From Leg	4.000 0.000 0.000	0.000	81.000

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft
TA08025-B605	C	From Leg	4.000 0.000 0.000	0.000	81.000
RDIDC-9181-PF-48	A	From Leg	4.000 0.000 0.000	0.000	81.000
Commscope MC-PK8-DSH (2) 8' x 2" Mount Pipe	C A	None From Leg	4.000 0.000 0.000	0.000 0.000	81.000 81.000
(2) 8' x 2" Mount Pipe	B	From Leg	4.000 0.000 0.000	0.000	81.000
(2) 8' x 2" Mount Pipe	C	From Leg	4.000 0.000 0.000	0.000	81.000

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft
HP2-102	B	Paraboloid w/Shroud (HP)	From Leg	4.000 0.000 4.000	0.000		100.000	2.000
*** HP2-102	A	Paraboloid w/Shroud (HP)	From Face	1.000 0.000 0.000	0.000		75.000	2.000
*** 2' Stadium Light	B	Paraboloid w/Shroud (HP)	From Leg	4.000 -3.000 0.000	0.000		45.000	2.000
2' Stadium Light	B	Paraboloid w/Shroud (HP)	From Leg	4.000 -1.000 0.000	0.000		45.000	2.000
2' Stadium Light	B	Paraboloid w/Shroud (HP)	From Leg	4.000 1.000 0.000	0.000		45.000	2.000
2' Stadium Light	B	Paraboloid w/Shroud (HP)	From Leg	4.000 3.000 0.000	0.000		45.000	2.000

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

Comb. No.	Description
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	Dead+Wind 0 deg - Service
27	Dead+Wind 30 deg - Service
28	Dead+Wind 60 deg - Service
29	Dead+Wind 90 deg - Service
30	Dead+Wind 120 deg - Service
31	Dead+Wind 150 deg - Service
32	Dead+Wind 180 deg - Service
33	Dead+Wind 210 deg - Service
34	Dead+Wind 240 deg - Service
35	Dead+Wind 270 deg - Service
36	Dead+Wind 300 deg - Service
37	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	100 - 64.21	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	16	-13.468	152.491	-265.056
			Max. Mx	20	-13.462	310.178	2.934
			Max. My	2	-13.466	3.656	307.228
			Max. Vy	20	-14.517	310.178	2.934
			Max. Vx	2	-14.416	3.656	307.228
			Max. Torque	4			-0.940
L2	64.21 - 26.663	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	16	-22.561	454.002	-794.410
			Max. Mx	8	-22.554	-930.232	-11.023
			Max. My	14	-22.559	-14.680	-920.580
			Max. Vy	20	-19.708	926.870	8.952
			Max. Vx	2	-19.351	11.219	918.323
			Max. Torque	4			-2.511
L3	26.663 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	16	-33.082	803.968	-1403.496
			Max. Mx	20	-33.082	1647.145	21.648
			Max. My	14	-33.082	-28.211	-1627.826
			Max. Vy	20	-23.436	1647.145	21.648
			Max. Vx	2	-23.081	28.648	1626.648
			Max. Torque	4			-2.511

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	22	33.087	20.401	11.781
	Max. H _x	20	33.087	23.428	0.375
	Max. H _z	2	33.087	0.515	23.074
	Max. M _x	2	1626.648	0.515	23.074
	Max. M _z	8	1646.443	-23.318	-0.342
	Max. Torsion	16	2.510	11.408	-19.860
	Min. Vert	17	24.815	11.408	-19.860
	Min. H _x	8	33.087	-23.318	-0.342
	Min. H _z	14	33.087	-0.409	-23.049
	Min. M _x	14	-1627.826	-0.409	-23.049
	Min. M _z	20	-1647.145	23.428	0.375
	Min. Torsion	4	-2.511	-11.491	19.811

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturing Moment, M _x kip-ft	Overturing Moment, M _z kip-ft	Torque kip-ft
Dead Only	27.573	0.000	0.000	1.041	-2.178	0.000
1.2 Dead+1.0 Wind 0 deg - No Ice	33.087	-0.515	-23.074	-1626.648	28.648	1.690
0.9 Dead+1.0 Wind 0 deg - No Ice	24.815	-0.515	-23.074	-1622.008	29.237	1.686
1.2 Dead+1.0 Wind 30 deg - No Ice	33.087	11.491	-19.811	-1398.322	-813.846	2.511
0.9 Dead+1.0 Wind 30 deg - No Ice	24.815	11.491	-19.811	-1394.373	-810.701	2.507
1.2 Dead+1.0 Wind 60 deg - No Ice	33.087	20.161	-11.170	-789.878	-1424.232	1.780
0.9 Dead+1.0 Wind 60 deg - No Ice	24.815	20.161	-11.170	-787.779	-1419.232	1.777
1.2 Dead+1.0 Wind 90 deg - No Ice	33.087	23.318	0.342	22.345	-1646.443	0.602
0.9 Dead+1.0 Wind 90 deg - No Ice	24.815	23.318	0.342	21.969	-1640.767	0.601
1.2 Dead+1.0 Wind 120 deg - No Ice	33.087	20.307	11.727	827.041	-1433.095	-0.322
0.9 Dead+1.0 Wind 120 deg - No Ice	24.815	20.307	11.727	824.209	-1428.071	-0.321
1.2 Dead+1.0 Wind 150 deg - No Ice	33.087	11.955	20.028	1414.133	-842.802	-1.159
0.9 Dead+1.0 Wind 150 deg - No Ice	24.815	11.955	20.028	1409.508	-839.581	-1.157
1.2 Dead+1.0 Wind 180 deg - No Ice	33.087	0.409	23.049	1627.826	-28.211	-2.101
0.9 Dead+1.0 Wind 180 deg - No Ice	24.815	0.409	23.049	1622.548	-27.472	-2.097
1.2 Dead+1.0 Wind 210 deg - No Ice	33.087	-11.408	19.860	1403.496	803.968	-2.510
0.9 Dead+1.0 Wind 210 deg - No Ice	24.815	-11.408	19.860	1398.899	802.177	-2.506
1.2 Dead+1.0 Wind 240 deg - No Ice	33.087	-20.235	11.091	788.117	1422.972	-1.368
0.9 Dead+1.0 Wind 240 deg - No Ice	24.815	-20.235	11.091	785.387	1419.305	-1.365
1.2 Dead+1.0 Wind 270 deg - No Ice	33.087	-23.428	-0.375	-21.648	1647.145	-0.646
0.9 Dead+1.0 Wind 270 deg - No Ice	24.815	-23.428	-0.375	-21.909	1642.797	-0.645
1.2 Dead+1.0 Wind 300 deg - No Ice	33.087	-20.401	-11.781	-827.473	1432.927	0.321
0.9 Dead+1.0 Wind 300 deg - No Ice	24.815	-20.401	-11.781	-825.275	1429.234	0.320
1.2 Dead+1.0 Wind 330 deg - No Ice	33.087	-12.039	-20.106	-1415.883	842.092	1.203

Load Combination	Vertical	Shear _x	Shear _z	Overturning Moment, M _x	Overturning Moment, M _z	Torque
	K	K	K	kip-ft	kip-ft	kip-ft
0.9 Dead+1.0 Wind 330 deg - No Ice	24.815	-12.039	-20.106	-1411.889	840.201	1.200
Dead+Wind 0 deg - Service	27.573	-0.132	-5.932	-416.881	5.805	0.434
Dead+Wind 30 deg - Service	27.573	2.954	-5.093	-358.271	-210.466	0.642
Dead+Wind 60 deg - Service	27.573	5.183	-2.872	-202.075	-367.159	0.454
Dead+Wind 90 deg - Service	27.573	5.994	0.088	6.449	-424.205	0.152
Dead+Wind 120 deg - Service	27.573	5.220	3.015	213.046	-369.428	-0.084
Dead+Wind 150 deg - Service	27.573	3.073	5.149	363.778	-217.878	-0.297
Dead+Wind 180 deg - Service	27.573	0.105	5.925	418.642	-8.748	-0.538
Dead+Wind 210 deg - Service	27.573	-2.933	5.105	361.054	204.883	-0.642
Dead+Wind 240 deg - Service	27.573	-5.202	2.852	203.084	363.782	-0.350
Dead+Wind 270 deg - Service	27.573	-6.023	-0.096	-4.811	421.330	-0.164
Dead+Wind 300 deg - Service	27.573	-5.244	-3.028	-211.698	366.331	0.084
Dead+Wind 330 deg - Service	27.573	-3.095	-5.169	-362.767	214.641	0.310

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	0.000	-27.573	0.000	0.000	27.573	0.000	0.000%
2	-0.515	-33.087	-23.074	0.515	33.087	23.074	0.000%
3	-0.515	-24.815	-23.074	0.515	24.815	23.074	0.000%
4	11.491	-33.087	-19.811	-11.491	33.087	19.811	0.000%
5	11.491	-24.815	-19.811	-11.491	24.815	19.811	0.000%
6	20.161	-33.087	-11.170	-20.161	33.087	11.170	0.000%
7	20.161	-24.815	-11.170	-20.161	24.815	11.170	0.000%
8	23.318	-33.087	0.342	-23.318	33.087	-0.342	0.000%
9	23.318	-24.815	0.342	-23.318	24.815	-0.342	0.000%
10	20.307	-33.087	11.727	-20.307	33.087	-11.727	0.000%
11	20.307	-24.815	11.727	-20.307	24.815	-11.727	0.000%
12	11.955	-33.087	20.028	-11.955	33.087	-20.028	0.000%
13	11.955	-24.815	20.028	-11.955	24.815	-20.028	0.000%
14	0.409	-33.087	23.049	-0.409	33.087	-23.049	0.000%
15	0.409	-24.815	23.049	-0.409	24.815	-23.049	0.000%
16	-11.408	-33.087	19.860	11.408	33.087	-19.860	0.000%
17	-11.408	-24.815	19.860	11.408	24.815	-19.860	0.000%
18	-20.235	-33.087	11.091	20.235	33.087	-11.091	0.000%
19	-20.235	-24.815	11.091	20.235	24.815	-11.091	0.000%
20	-23.428	-33.087	-0.375	23.428	33.087	0.375	0.000%
21	-23.428	-24.815	-0.375	23.428	24.815	0.375	0.000%
22	-20.401	-33.087	-11.781	20.401	33.087	11.781	0.000%
23	-20.401	-24.815	-11.781	20.401	24.815	11.781	0.000%
24	-12.039	-33.087	-20.106	12.039	33.087	20.106	0.000%
25	-12.039	-24.815	-20.106	12.039	24.815	20.106	0.000%
26	-0.132	-27.573	-5.932	0.132	27.573	5.932	0.000%
27	2.954	-27.573	-5.093	-2.954	27.573	5.093	0.000%
28	5.183	-27.573	-2.872	-5.183	27.573	2.872	0.000%
29	5.994	-27.573	0.088	-5.994	27.573	-0.088	0.000%
30	5.220	-27.573	3.015	-5.220	27.573	-3.015	0.000%
31	3.073	-27.573	5.149	-3.073	27.573	-5.149	0.000%
32	0.105	-27.573	5.925	-0.105	27.573	-5.925	0.000%
33	-2.933	-27.573	5.105	2.933	27.573	-5.105	0.000%
34	-5.202	-27.573	2.852	5.202	27.573	-2.852	0.000%
35	-6.023	-27.573	-0.096	6.023	27.573	0.096	0.000%
36	-5.244	-27.573	-3.028	5.244	27.573	3.028	0.000%
37	-3.095	-27.573	-5.169	3.095	27.573	5.169	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	0.00002511
3	Yes	4	0.00000001	0.00001569
4	Yes	4	0.00000001	0.00013391
5	Yes	4	0.00000001	0.00008602
6	Yes	4	0.00000001	0.00010211
7	Yes	4	0.00000001	0.00006487
8	Yes	4	0.00000001	0.00001473
9	Yes	4	0.00000001	0.00000842
10	Yes	4	0.00000001	0.00011416
11	Yes	4	0.00000001	0.00007246
12	Yes	4	0.00000001	0.00012833
13	Yes	4	0.00000001	0.00008189
14	Yes	4	0.00000001	0.00003814
15	Yes	4	0.00000001	0.00002439
16	Yes	4	0.00000001	0.00010009
17	Yes	4	0.00000001	0.00006371
18	Yes	4	0.00000001	0.00012178
19	Yes	4	0.00000001	0.00007798
20	Yes	4	0.00000001	0.00001169
21	Yes	4	0.00000001	0.00000613
22	Yes	4	0.00000001	0.00012067
23	Yes	4	0.00000001	0.00007697
24	Yes	4	0.00000001	0.00010958
25	Yes	4	0.00000001	0.00006968
26	Yes	4	0.00000001	0.00000001
27	Yes	4	0.00000001	0.00000001
28	Yes	4	0.00000001	0.00000001
29	Yes	4	0.00000001	0.00000001
30	Yes	4	0.00000001	0.00000001
31	Yes	4	0.00000001	0.00000001
32	Yes	4	0.00000001	0.00000001
33	Yes	4	0.00000001	0.00000001
34	Yes	4	0.00000001	0.00000001
35	Yes	4	0.00000001	0.00000001
36	Yes	4	0.00000001	0.00000001
37	Yes	4	0.00000001	0.00000001

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 64.21	4.225	30	0.337	0.001
L2	69.793 - 26.663	2.222	30	0.280	0.001
L3	33.33 - 0	0.545	30	0.142	0.000

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.000	HP2-102	30	4.225	0.337	0.001	118770
100.000	Lightning Rod 5/8" x 8'	30	4.225	0.337	0.001	118770
99.000	Side Arm Mount [SO 103-3]	30	4.155	0.336	0.001	118770
98.000	4'x4" Pipe Mount	30	4.086	0.334	0.001	118770

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
97.000	Side Arm Mount [SO 103-3]	30	4.017	0.333	0.001	118770
88.000	CAVITY FILTER	30	3.398	0.319	0.001	49487
81.000	MX08FRO665-21 w/ Mount Pipe	30	2.930	0.306	0.001	31255
75.000	HP2-102	30	2.543	0.293	0.001	23754
70.000	HB-X-ID-17-65-00T w/ Mount Pipe	30	2.234	0.280	0.001	19949
45.000	2' Stadium Light	30	0.952	0.192	0.000	12592

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	100 - 64.21	16.379	10	1.307	0.005
L2	69.793 - 26.663	8.611	10	1.084	0.003
L3	33.33 - 0	2.113	10	0.552	0.001

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
104.000	HP2-102	10	16.379	1.307	0.005	30565
100.000	Lightning Rod 5/8" x 8'	10	16.379	1.307	0.005	30565
99.000	Side Arm Mount [SO 103-3]	10	16.110	1.301	0.004	30565
98.000	4'x4" Pipe Mount	10	15.841	1.296	0.004	30565
97.000	Side Arm Mount [SO 103-3]	10	15.572	1.290	0.004	30565
88.000	CAVITY FILTER	10	13.172	1.235	0.004	12735
81.000	MX08FRO665-21 w/ Mount Pipe	10	11.356	1.186	0.003	8043
75.000	HP2-102	10	9.856	1.135	0.003	6112
70.000	HB-X-ID-17-65-00T w/ Mount Pipe	10	8.659	1.086	0.003	5134
45.000	2' Stadium Light	10	3.692	0.743	0.002	3250

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	KI/r	A in ²	P _u K	φP _n K	Ratio P _u / φP _n
L1	100 - 64.21	TP40.13x31x0.281	35.790	0.000	0.0	34.804	-13.460	2036.050	0.007
L2	64.21 - 26.663 (2)	TP49.01x38.143x0.344	43.130	0.000	0.0	52.016	-22.552	3042.920	0.007
L3	26.663 - 0 (3)	TP55x46.643x0.375	33.330	0.000	0.0	65.960	-33.082	3758.100	0.009

Pole Bending Design Data

Section No.	Elevation ft	Size	M_{ux} kip-ft	ϕM_{nx} kip-ft	Ratio $\frac{M_{ux}}{\phi M_{nx}}$	M_{uy} kip-ft	ϕM_{ny} kip-ft	Ratio $\frac{M_{uy}}{\phi M_{ny}}$
L1	100 - 64.21 (1)	TP40.13x31x0.281	311.112	1618.292	0.192	0.000	1618.292	0.000
L2	64.21 - 26.663 (2)	TP49.01x38.143x0.344	934.033	2956.542	0.316	0.000	2956.542	0.000
L3	26.663 - 0 (3)	TP55x46.643x0.375	1654.692	4186.617	0.395	0.000	4186.617	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V_u K	ϕV_n K	Ratio $\frac{V_u}{\phi V_n}$	Actual T_u kip-ft	ϕT_n kip-ft	Ratio $\frac{T_u}{\phi T_n}$
L1	100 - 64.21 (1)	TP40.13x31x0.281	14.559	610.816	0.024	0.321	2064.517	0.000
L2	64.21 - 26.663 (2)	TP49.01x38.143x0.344	19.731	912.875	0.022	0.322	3772.967	0.000
L3	26.663 - 0 (3)	TP55x46.643x0.375	23.566	1157.590	0.020	0.321	5562.208	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P_u	Ratio M_{ux}	Ratio M_{uy}	Ratio V_u	Ratio T_u	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
		ϕP_n	ϕM_{nx}	ϕM_{ny}	ϕV_n	ϕT_n			
L1	100 - 64.21 (1)	0.007	0.192	0.000	0.024	0.000	0.199	1.050	4.8.2
L2	64.21 - 26.663 (2)	0.007	0.316	0.000	0.022	0.000	0.324	1.050	4.8.2
L3	26.663 - 0 (3)	0.009	0.395	0.000	0.020	0.000	0.404	1.050	4.8.2

Section Capacity Table

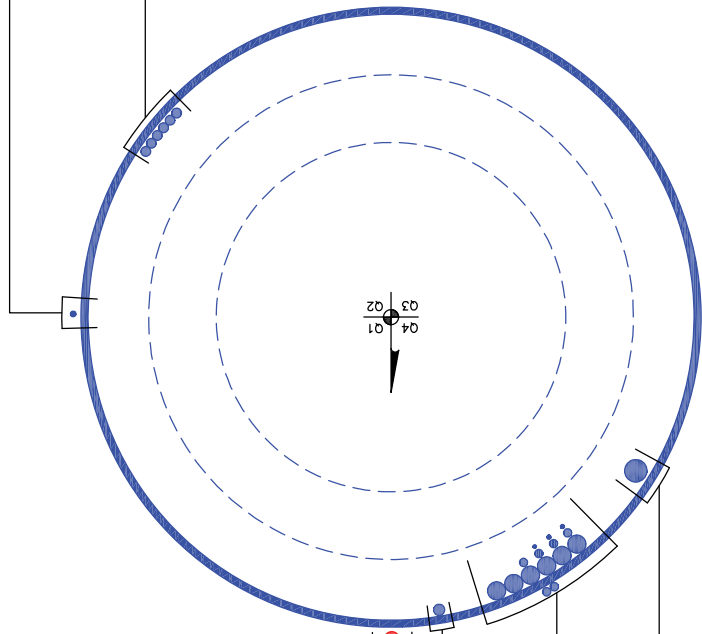
Section No.	Elevation ft	Component Type	Size	Critical Element	P K	ϕP_{allow} K	% Capacity	Pass Fail
L1	100 - 64.21	Pole	TP40.13x31x0.281	1	-13.460	2137.852	19.0	Pass
L2	64.21 - 26.663	Pole	TP49.01x38.143x0.344	2	-22.552	3195.066	30.8	Pass
L3	26.663 - 0	Pole	TP55x46.643x0.375	3	-33.082	3946.005	38.5	Pass
Summary								
Pole (L3)							38.5	Pass
RATING =							38.5	Pass

APPENDIX B
BASE LEVEL DRAWING



(OTHER CONSIDERED EQUIPMENT)
(1) 1/2" TO 88 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(6) 7/8" TO 70 FT LEVEL



(PROPOSED EQUIPMENT CONFIGURATION)
(1) 1-3/8" TO 81 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(1) 1" TO 75 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(1) 5/16" TO 100 FT LEVEL
(2) 3/8" TO 100 FT LEVEL
(6) 3/4" TO 100 FT LEVEL
(6) 1-5/8" TO 100 FT LEVEL

(OTHER CONSIDERED EQUIPMENT)
(1) 2" TO 45 FT LEVEL

APPENDIX C
ADDITIONAL CALCULATIONS

Monopole Base Plate Connection

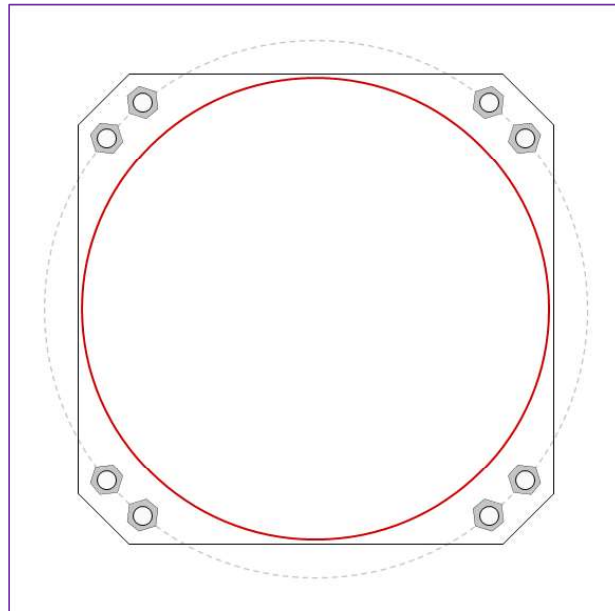


Site Info	
BU #	846102
Site Name	EL MIRAGE
Order #	561440 Rev. 0

Analysis Considerations	
TIA-222 Revision	H
Grout Considered:	No
I_{ar} (in)	0.875

Applied Loads	
Moment (kip-ft)	1654.69
Axial Force (kips)	33.08
Shear Force (kips)	23.57

*TIA-222-H Section 15.5 Applied



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

Anchor Rod Data

(8) 2-1/4" ϕ bolts (A615-75 N; $F_y=75$ ksi, $F_u=100$ ksi) on 64" BC
Anchor Spacing: 6 in

Base Plate Data

56" W x 2.25" Plate (A572-60; $F_y=60$ ksi, $F_u=75$ ksi); Clip: 6 in

Stiffener Data

N/A

Pole Data

55" x 0.375" 12-sided pole (A572-65; $F_y=65$ ksi, $F_u=80$ ksi)

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

$P_{u,t} = 150.91$	$\phi P_{n,t} = 243.75$	Stress Rating
$V_u = 2.95$	$\phi V_n = 149.1$	59.0%
$M_u = n/a$	$\phi M_n = n/a$	Pass

Base Plate Summary

Max Stress (ksi):	45.12	(Flexural)
Allowable Stress (ksi):	54	
Stress Rating:	79.6%	Pass

Drilled Pier Foundation

BU # : 846102
Site Name: EL MIRAGE
Order Number: 561440 Rev. 0
TIA-222 Revision: H
Tower Type: Monopole



Check Limitation	
Apply TIA-222-H Section 15.5:	<input checked="" type="checkbox"/>
	N/A
Additional Longitudinal Rebar	
Input Effective Depths (else Actual):	<input type="checkbox"/>
Shear Design Options	
Check Shear along Depth of Pier:	<input checked="" type="checkbox"/>
Utilize Shear-Friction Methodology:	<input type="checkbox"/>
Override Critical Depth:	<input type="checkbox"/>

[Go to Soil Calculations](#)

Analysis Results		
Soil Lateral Check		
D_{red} (ft from TOC)	Compression	Uplift
Soil Safety Factor	8.25	-
Max Moment (kip-ft)	9.97	-
Rating*	1811.14	-
	12.7%	-
Soil Vertical Check		
Compression		
Skin Friction (kips)	664.35	-
End Bearing (kips)	569.47	-
Weight of Concrete (kips)	190.50	-
Total Capacity (kips)	1233.83	-
Axial (kips)	223.59	-
Rating*	17.3%	-
Reinforced Concrete Flexure		
Compression		
Critical Depth (ft from TOC)	7.59	-
Critical Moment (kip-ft)	1809.21	-
Critical Moment Capacity	1996.71	-
Rating*	86.3%	-
Reinforced Concrete Shear		
Compression		
Critical Depth (ft from TOC)	20.43	-
Critical Shear (kip)	201.43	-
Critical Shear Capacity	526.20	-
Rating*	36.5%	-
Structural Foundation Rating*		
Soil Interaction Rating*	86.3%	-
	17.3%	-

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

Rebar & Pier Options

Embedded Pole Inputs

Bolted Pier Inputs

Pier Design Data	
Depth	27 ft
Ext. Above Grade	0.5 ft
Pier Section 1	
From 0.5' above grade to 27' below grade	
Pier Diameter	7 ft
Rebar Quantity	14
Rebar Size	9
Clear Cover to Ties	3 in
Tie Size	4
Tie Spacing	in

Soil Profile

# of Layers	9
-------------	---

Groundwater Depth N/A

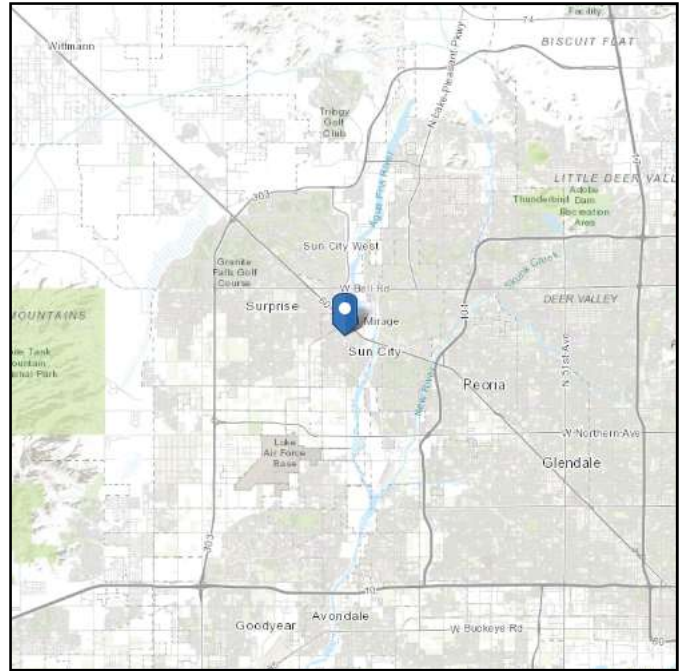
Layer	Top (ft)	Bottom (ft)	Thickness (ft)	γ_{soil} (pcf)	$\gamma_{concrete}$ (pcf)	Cohesion (ksf)	Angle of Friction (degrees)	Calculated Ultimate Skin Friction Comp (ksf)	Calculated Ultimate Skin Friction Uplift (ksf)	Ultimate Skin Friction Comp Override (ksf)	Ultimate Skin Friction Uplift Override (ksf)	Ult. Gross Bearing Capacity (ksf)	SPT Blow Count	Soil Type
1	0	2	2	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
2	2	3.5	1.5	120	150	0	0	0.000	0.000	0.00	0.00			Cohesionless
3	3.5	4	0.5	120	150	0	34	0.000	0.000	0.00	0.00			Cohesionless
4	4	6	2	115	150	0	32	0.000	0.000	0.00	0.00			Cohesionless
5	6	8.5	2.5	130	150	0	40	0.000	0.000	0.96	0.72			Cohesionless
6	8.5	13.5	5	130	150	0	40	0.000	0.000	1.43	1.07			Cohesionless
7	13.5	18.5	5	130	150	0	40	0.000	0.000	1.93	1.44			Cohesionless
8	18.5	23.5	5	130	150	0	40	0.000	0.000	2.34	1.76			Cohesionless
9	23.5	27	3.5	130	150	0	40	0.000	0.000	2.68	2.01	19.73		Cohesionless

ASCE 7 Hazards Report

Address:
No Address at This
Location

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

Elevation: 1142.25 ft (NAVD 88)
Latitude: 33.609922
Longitude: -112.325859



Wind

Results:

Wind Speed:	115 Vmph
10-year MRI	76 Vmph
25-year MRI	84 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

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).

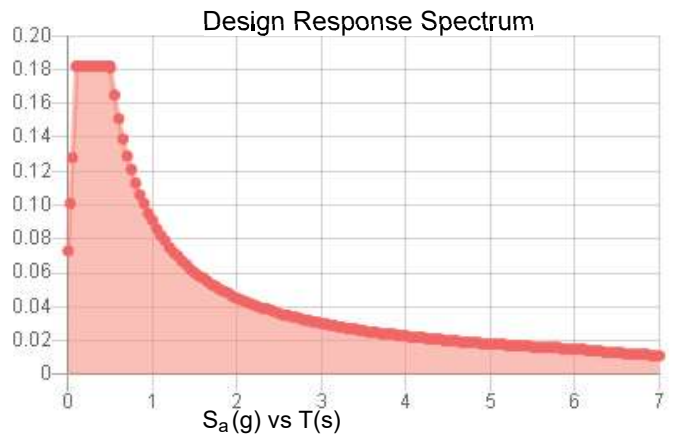
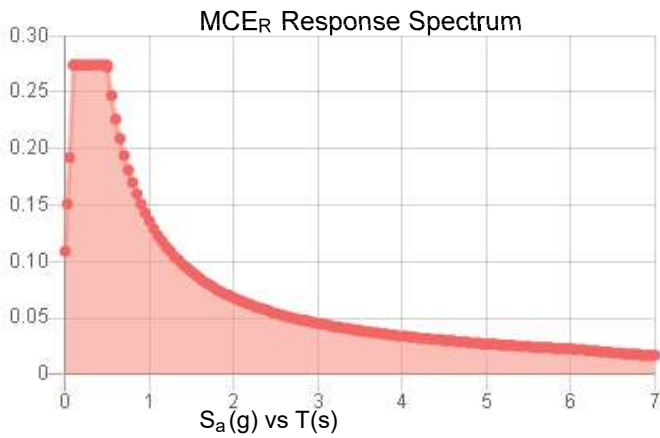
Site is not in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2.

Site Soil Class: D - Stiff Soil

Results:

S_s :	0.171	S_{DS} :	0.182
S_1 :	0.057	S_{D1} :	0.091
F_a :	1.6	T_L :	6
F_v :	2.4	PGA :	0.069
S_{MS} :	0.274	PGA _M :	0.111
S_{M1} :	0.136	F _{PGA} :	1.6
		I_e :	1

Seismic Design Category B



Data Accessed:

Tue Jul 20 2021

Date Source:

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

Ice

Results:

Ice Thickness: 0.00 in.
Concurrent Temperature: 25 F
Gust Speed: 30 mph

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

Date Accessed: Tue Jul 20 2021

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

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

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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DISH WIRELESS, L.L.C. SITE ID:

PXPHX00138A

DISH WIRELESS, L.L.C. SITE ADDRESS:

**14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335**

ARIZONA - CITY OF EL MIRAGE CODE COMPLIANCE

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

CODE TYPE	CODE
BUILDING	2018 IBC
MECHANICAL	2018 IMC
ELECTRICAL	2017 NEC

PROPOSED WORK IS COMPLIANT WITH 6409(o) ELIGIBLE FACILITIES REQUEST CRITERIA

SHEET INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1.1	OVERALL SITE PLAN
A-1.2	OVERALL AND ENLARGED SITE PLAN
A-2.1	TOWER ELEVATIONS
A-2.2	TOWER ELEVATIONS
A-2.3	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-1.1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-1.2	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	RF SIGNAGE
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES
GN-5	GENERAL NOTES

SCOPE OF WORK

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

- TOWER SCOPE OF WORK:**
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
 - INSTALL (1) PROPOSED PLATFORM MOUNT (MC-PK8-DSH)
 - INSTALL (6) PROPOSED RRUS (2 PER SECTOR)
 - INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
 - INSTALL (1) PROPOSED HYBRID CABLE
 - INSTALL PROPOSED JUMPERS

- GROUND SCOPE OF WORK:**
- INSTALL (1) PROPOSED METAL PLATFORM
 - INSTALL (1) PROPOSED ICE BRIDGE
 - INSTALL (1) PROPOSED PPC CABINET
 - INSTALL (1) PROPOSED EQUIPMENT CABINET
 - INSTALL (1) PROPOSED POWER CONDUIT
 - INSTALL (1) PROPOSED TELCO CONDUIT
 - INSTALL (1) PROPOSED TELCO-FIBER BOX
 - INSTALL (1) PROPOSED GPS UNIT
 - INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)
 - INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
 - INSTALL (1) PROPOSED 200A METER AND METER SOCKET

SITE INFORMATION

PROPERTY OWNER: EL MIRAGE CITY OF
ADDRESS: 10000 N EL MIRAGE RD
EL MIRAGE, AZ 85335

TOWER TYPE: MONOPOLE

TOWER CO SITE ID: 846102

TOWER APP NUMBER: 561440

COUNTY: MARICOPA

LATITUDE (NAD 83): 33.609922° N

LONGITUDE (NAD 83): 112.325858° W

ZONING JURISDICTION: CITY OF EL MIRAGE

ZONING DISTRICT: NR

PARCEL NUMBER: 501-33-013K

OCCUPANCY GROUP: U

CONSTRUCTION TYPE: II-C

POWER COMPANY: ARIZONA PUBLIC SERVICE

TELEPHONE COMPANY: TBD

PROJECT DIRECTORY

APPLICANT: DISH WIRELESS, L.L.C.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

TOWER OWNER: CROWN CASTLE
2000 CORPORATE DRIVE
CANONSBURG, PA 15317
(877) 486-9377

SITE DESIGNER: TOWER ENGINEERING PROFESSIONALS
326 TRYON RD.
RALEIGH, NC 27603
(919) 661-6351

SITE ACQUISITION: BECCA QUISENBERRY
REBECCA.QUISENBERRY@CROWNCastle.COM

CONSTRUCTION MANAGER: TERRY DUFFIELD
TERRY.DUFFIELD@DISH.COM

RF ENGINEER: ARIEL CURA
(602) 214-5613
ARIEL.CURA@DISH.COM

ZONING MANAGER: ROBERT E. SMITH
(602) 791-3787
ROBERTE.SMITH@DISH.COM

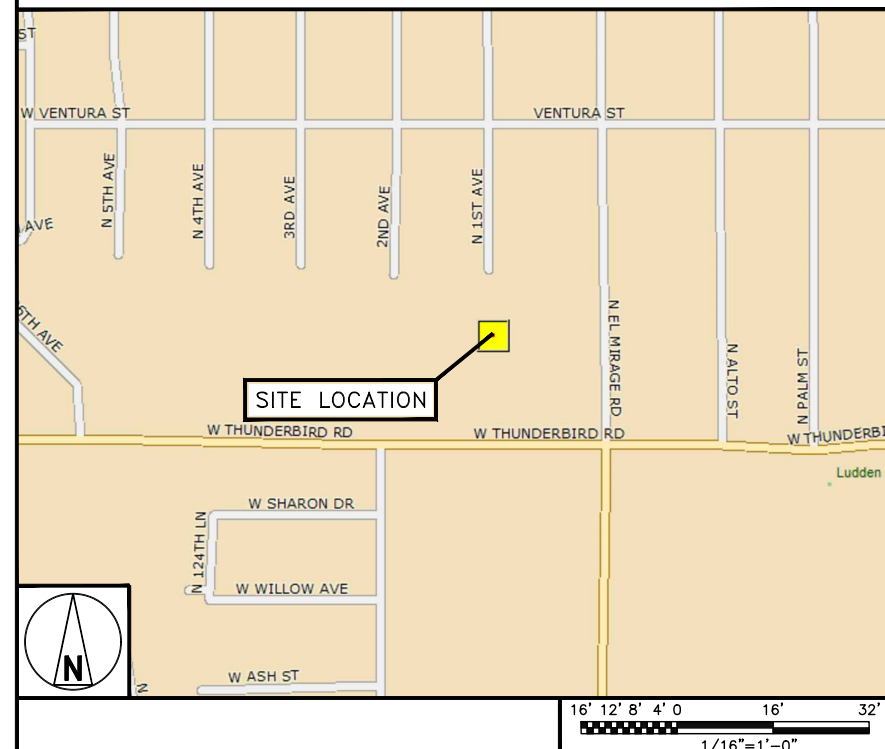
SITE PHOTO



DIRECTIONS

DIRECTIONS FROM PHOENIX SKY HARBOR INTERNATIONAL AIRPORT:
GET ON I-10 W. HEAD EAST ON E SKY HARBOR BLVD. USE THE LEFT LANE TO STAY ON E SKY HARBOR BLVD. SLIGHT LEFT TOWARD E SKY HARBOR BLVD. TURN LEFT ONTO E SKY HARBOR BLVD. USE THE LEFT LANE TO MERGE WITH I-10 W VIA THE RAMP TO DOWNTOWN/PHOENIX/AZ-51/AZ-202 LOOP. FOLLOW I-10 W AND AZ-101 LOOP N TO US-60 W/GRAND AVE IN PEORIA. TAKE EXIT 11 FROM AZ-101 LOOP N. MERGE WITH I-10 W. TAKE EXIT 133B FOR AZ-101 LOOP N. CONTINUE ONTO AZ-101 LOOP N. TAKE EXIT 11 FOR US-60/GRAND AVE. CONTINUE ON US-60 W/GRAND AVE. DRIVE TO N 1ST AVE IN EL MIRAGE. USE THE LEFT 2 LANES TO TURN LEFT ONTO US-60 W/GRAND AVE. TURN LEFT ONTO N PRIMROSE ST. TURN RIGHT ONTO W VENTURA ST. TURN LEFT ONTO N 1ST AVE.

VICINITY MAP



UNDERGROUND SERVICE ALERT
UTILITY NOTIFICATION CENTER OF ARIZONA
(602) 659-7504
WWW.ARIZONA811.COM



CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION

GENERAL NOTES

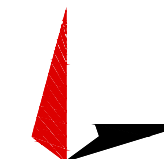
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE, NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE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

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

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



5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



TOWER ENGINEERING PROFESSIONALS
326 TRYON RD. RALEIGH, NC 27603
OFFICE: (919) 661-6351
NC LIC# P-1403



Expires: 06/30/2023

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DRAWN BY:	CHECKED BY:	APPROVED BY:
ODS	GVM	GSM

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	11-05-21	PRELIMINARY
0	12-06-21	CONSTRUCTION

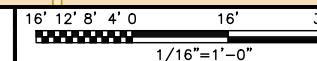
A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
TITLE SHEET

SHEET NUMBER

T-1



SITE PLAN DISCLAIMER

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

**PARCEL#:
501-33-109**

**PARCEL#:
501-33-013G**

**PARCEL#:
501-33-013K
ZONING: NR**

**PARCEL#:
501-33-013J**

**PARCEL#:
501-27-024**

**PARCEL#:
501-27-025**

**PARCEL#:
501-27-026**

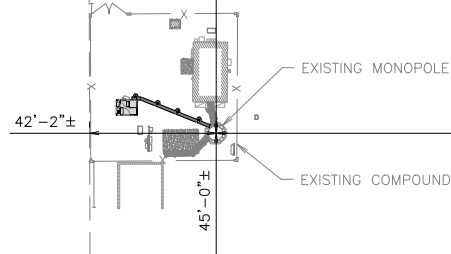
**PARCEL#:
501-27-027**

**PARCEL#:
501-27-028**

**PARCEL#:
501-27-029**

**PARCEL#:
501-27-030**

**PARCEL#:
501-34-083**



**N EL MIRAGE RD
(PUBLIC R/W)**

**W THUNDERBIRD RD
(PUBLIC R/W)**



OVERALL SITE PLAN



5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



TOWER ENGINEERING PROFESSIONALS
326 TRYON RD. RALEIGH, NC 27603
OFFICE: (919) 661-6351
NC LIC# P-1403



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ODS	GVM	GSM

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

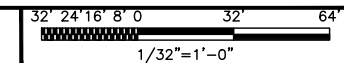
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REV	DATE	DESCRIPTION
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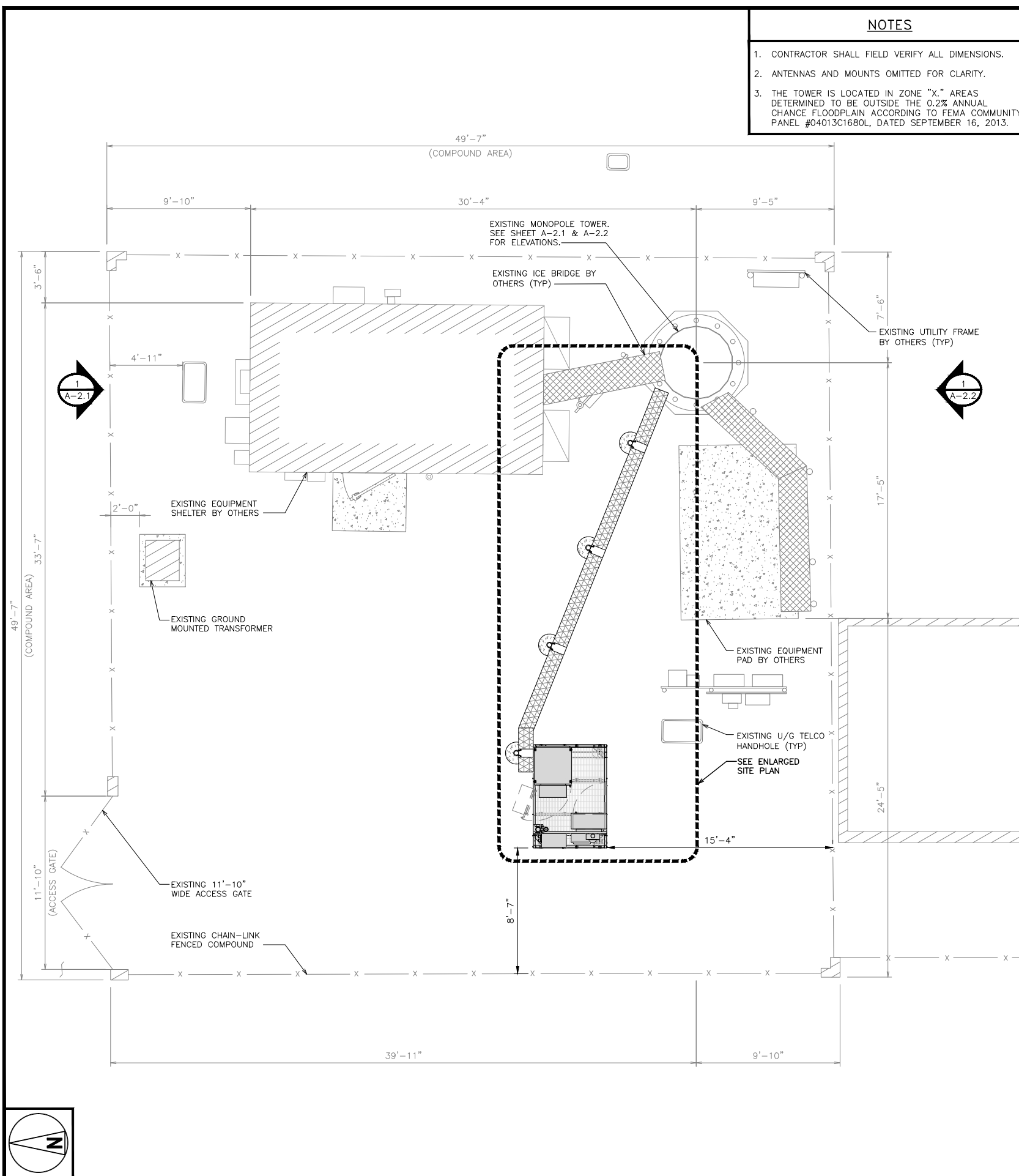
A&E PROJECT NUMBER
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AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

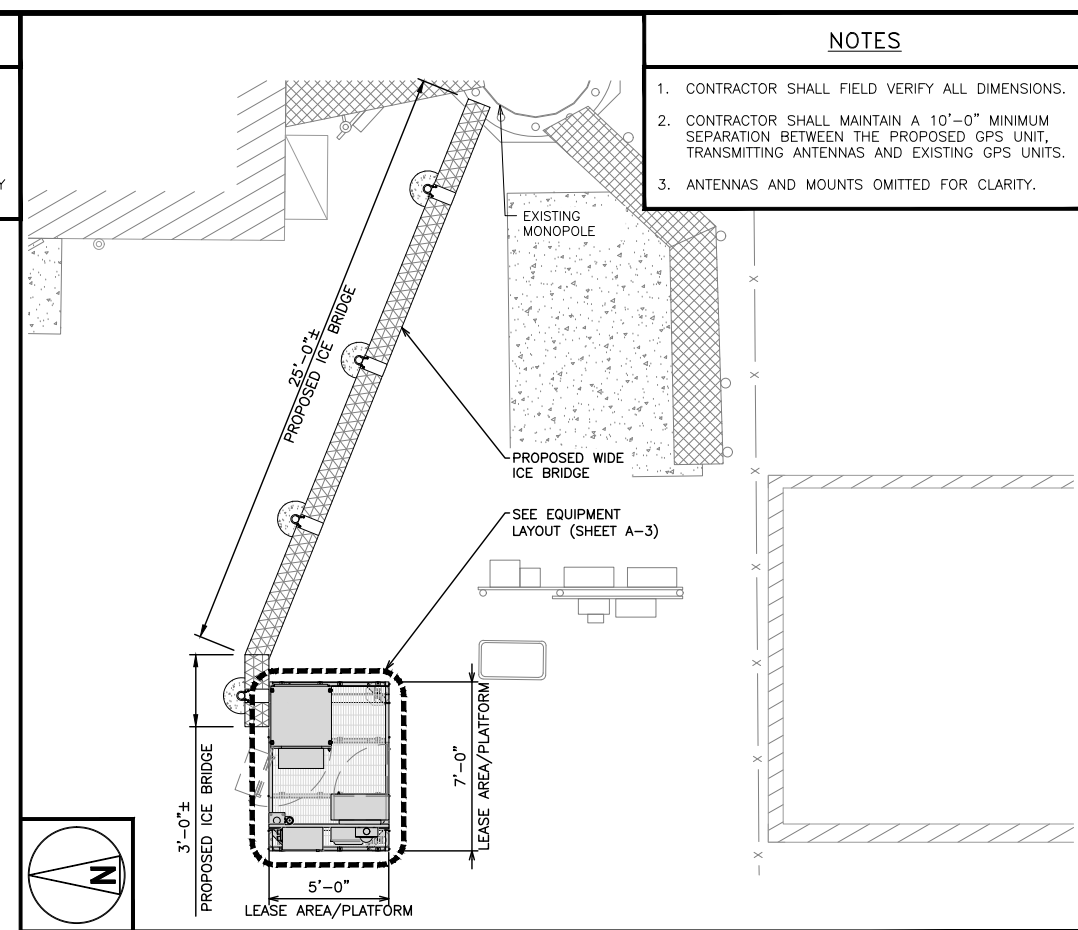
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OVERALL SITE PLAN

SHEET NUMBER
A-1.1

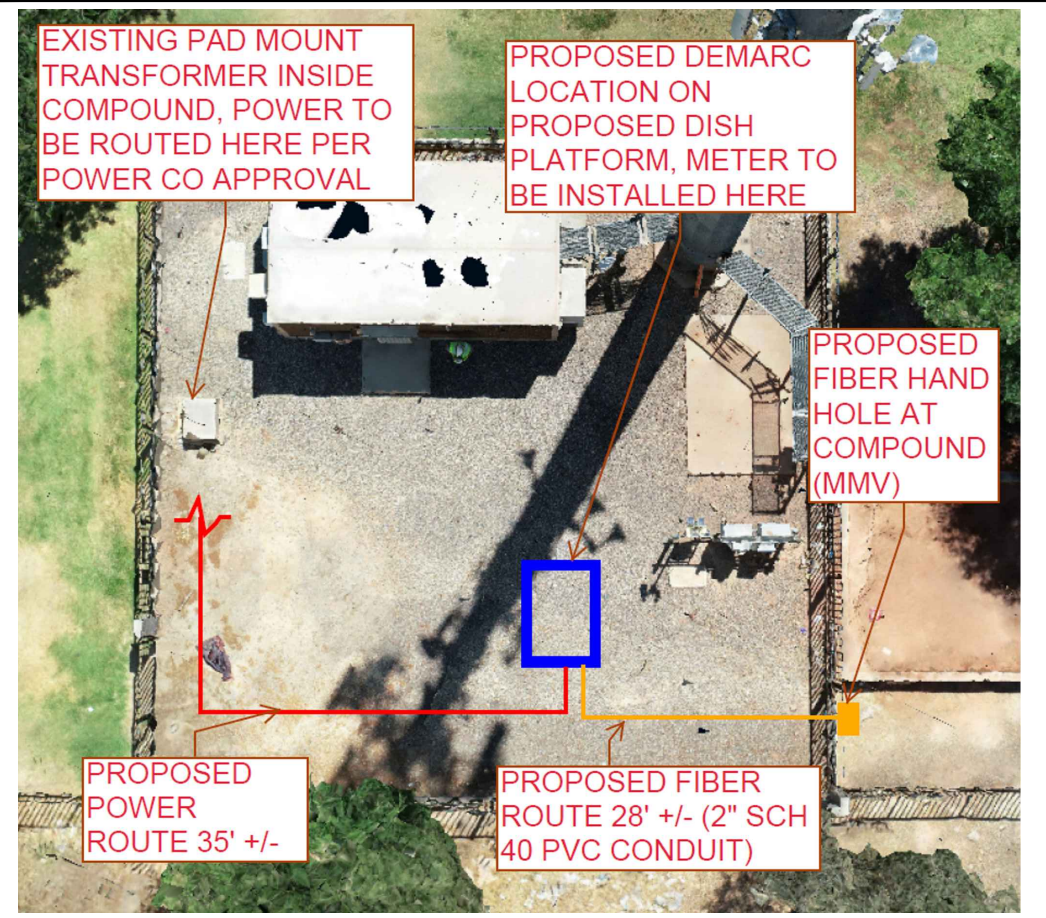




SITE PLAN



ENLARGED SITE PLAN



UTILITY VIEW

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

TOWER ENGINEERING PROFESSIONALS
326 TRYON RD. RALEIGH, NC 27603
OFFICE: (919) 661-6351
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DRAWN BY: ODS CHECKED BY: GVM APPROVED BY: GSM

RFDS REV #: 1

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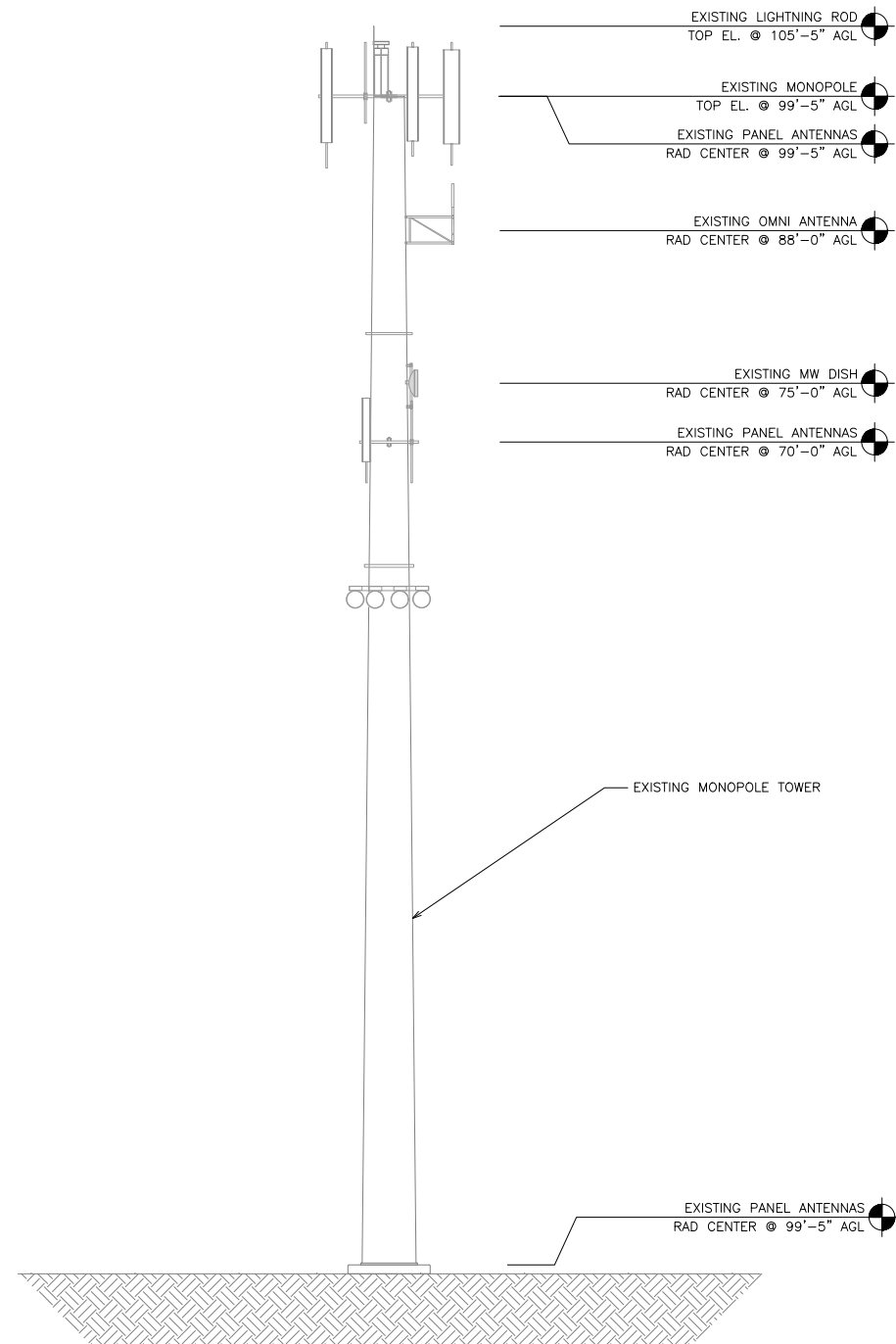
DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
SITE AND ENLARGED SITE PLAN

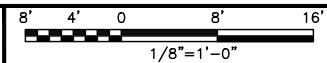
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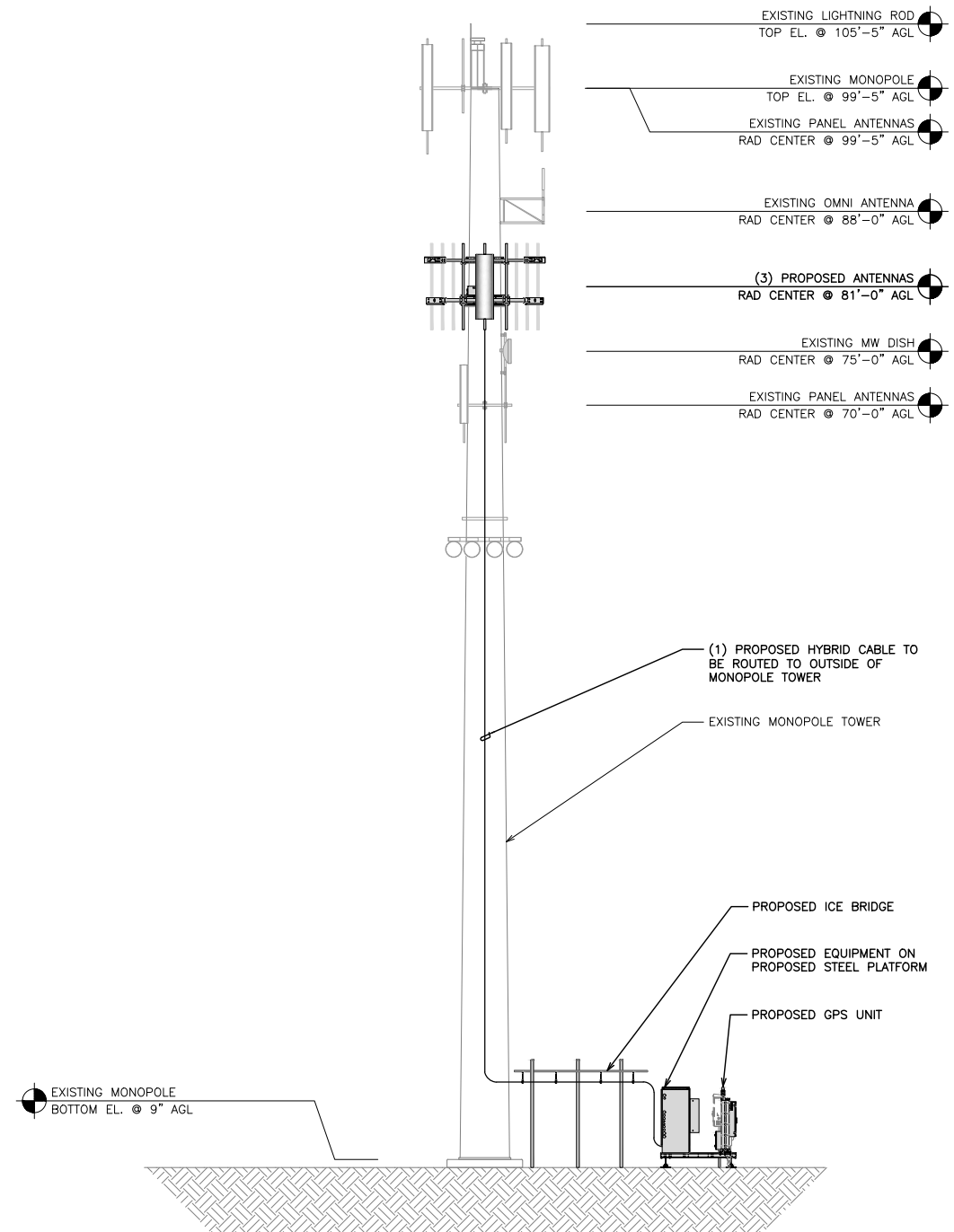
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2. ANTENNA SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.



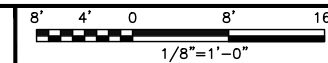
EXISTING NORTH ELEVATION



1



PROPOSED NORTH ELEVATION



2



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LITTLETON, CO 80120



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RFDS REV #: 1

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230889.300493

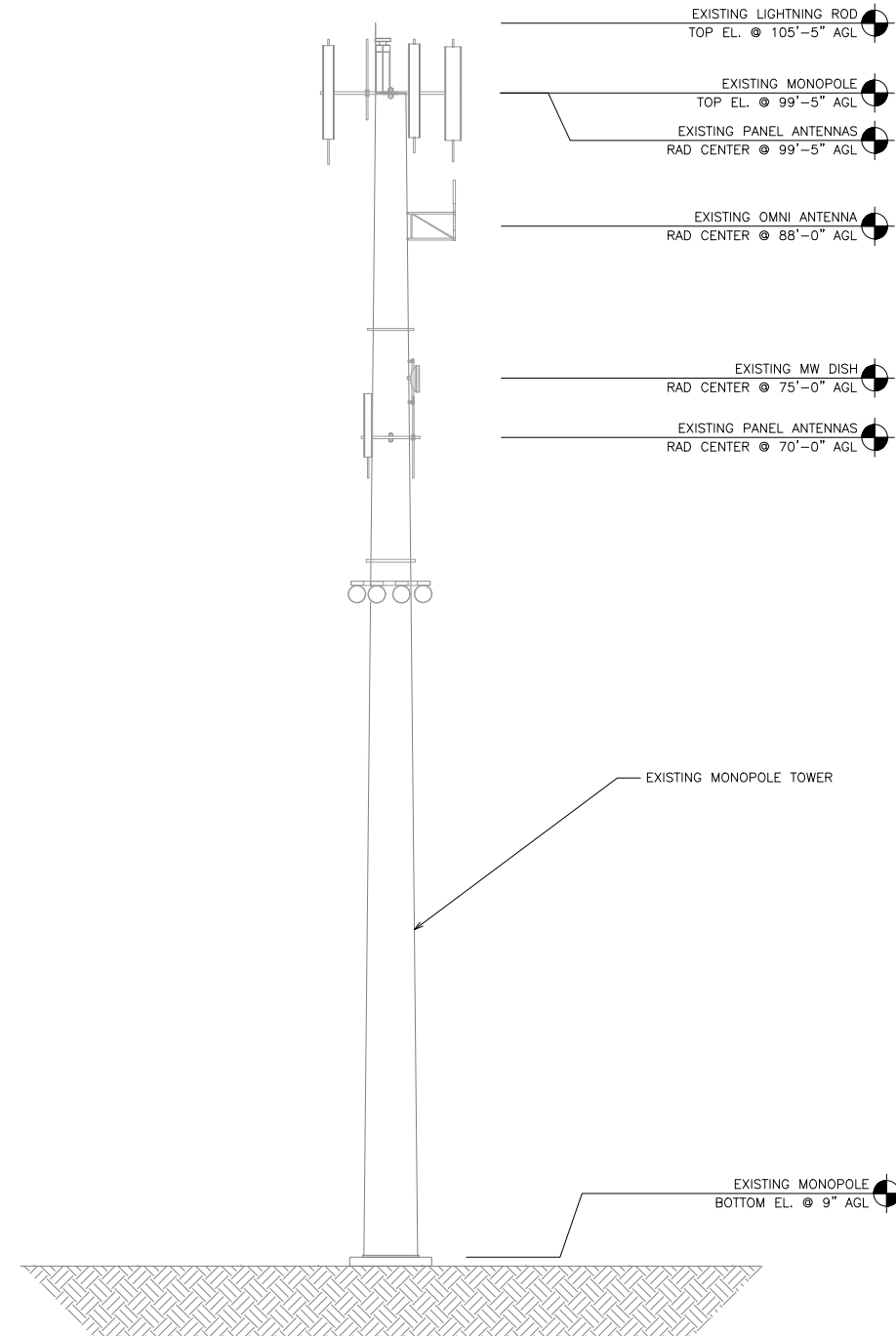
DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
NORTH ELEVATION

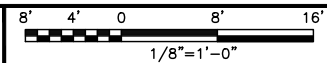
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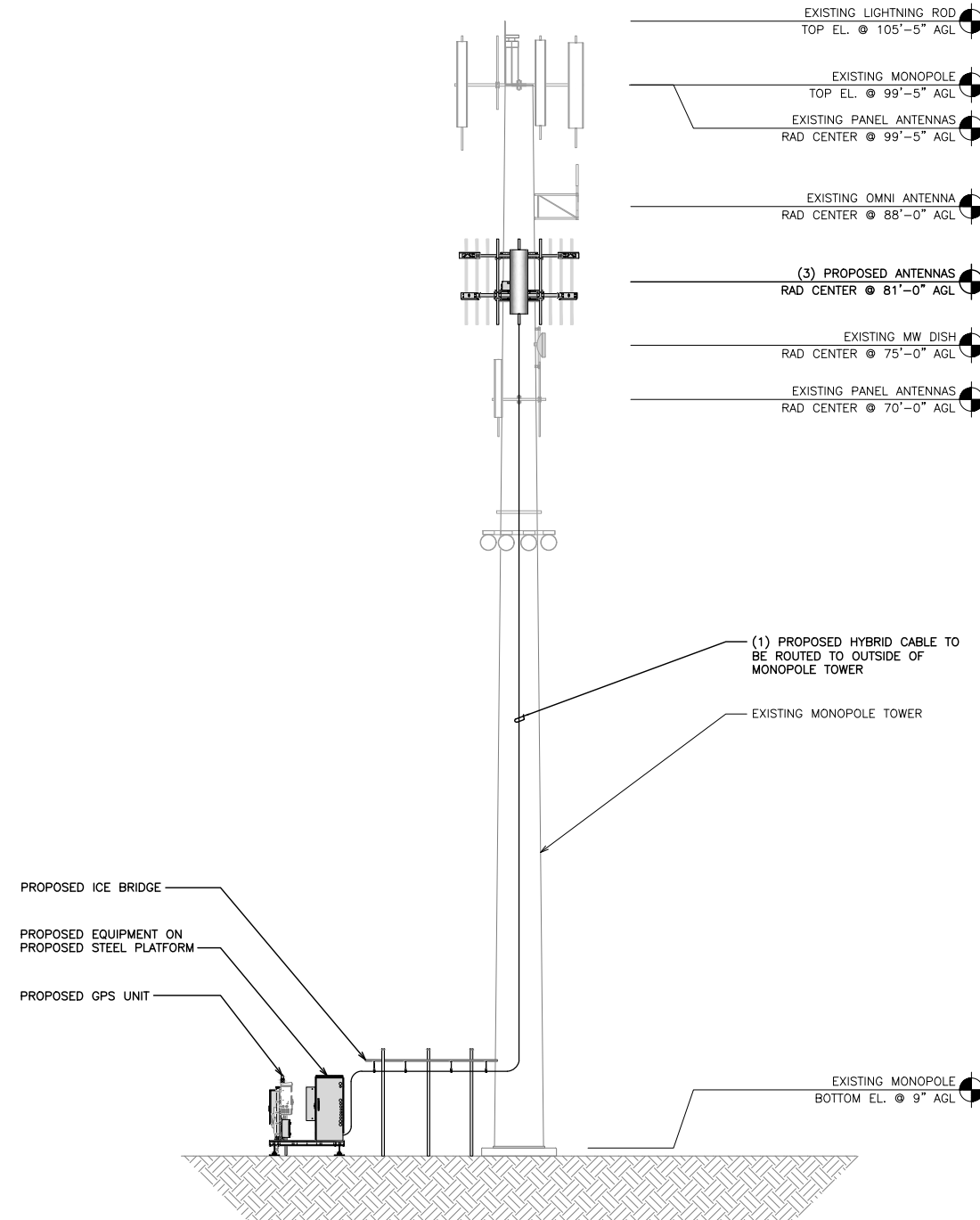
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.



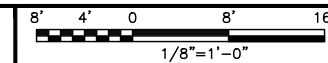
EXISTING SOUTH ELEVATION



1



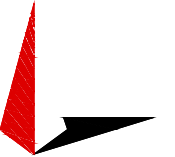
PROPOSED SOUTH ELEVATION



2



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LITTLETON, CO 80120



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0	12-06-21	CONSTRUCTION

A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
SOUTH ELEVATION

SHEET NUMBER

A-2.2



Expires: 06/30/2023

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RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

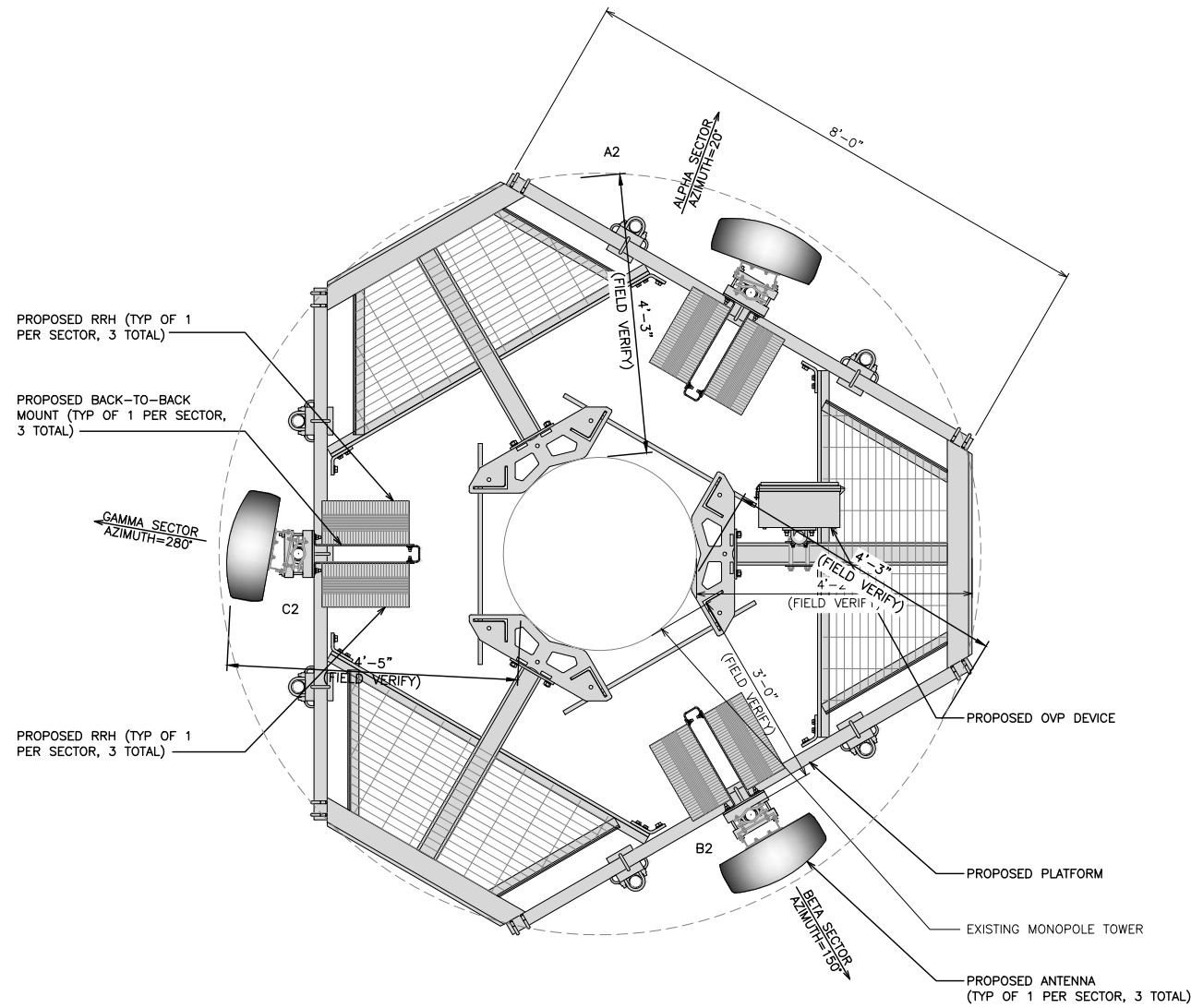
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0	12-06-21	CONSTRUCTION

A&E PROJECT NUMBER
230889.300493

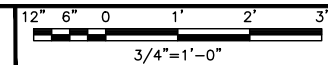
DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2.3



ANTENNA LAYOUT



1

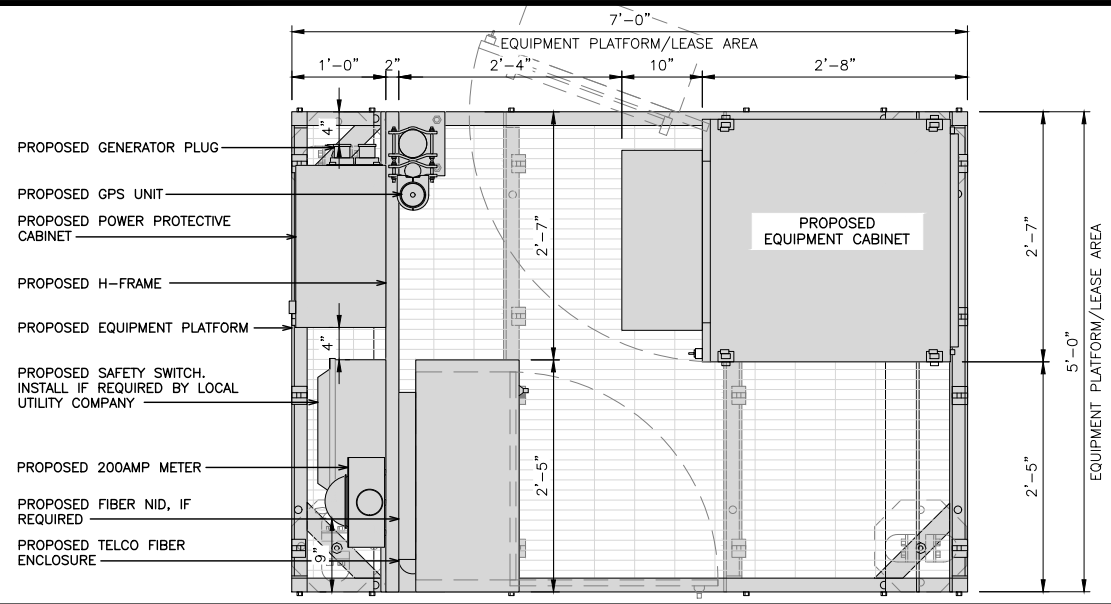
SECTOR POS.	EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	ANTENNA				AZIMUTH	RAD CENTER	TRANSMISSION CABLE	RRH			OVP MANUFACTURER MODEL
			TECH	M-TILT	LOWBAND E-TILT (PART 1-4)	MIDBAND E-TILT (PART 5-8)				MANUFACTURER - MODEL NUMBER	TECH	POS.	
A1	---	---	---	---	---	---	---	(1) HIGH-CAPACITY HYBRID CABLE (140' LONG)	FUJITSU - TA08025-B604	5G	A2	RAYCAP RDIDC-9181-PF-48	
A2	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	0	5	5	20'		81'-0"	FUJITSU - TA08025-B605	5G		A2
A3	---	---	---	---	---	---	---		---	---	---		---
B1	---	---	---	---	---	---	---	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	B2	SHARED W/ALPHA	
B2	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	0	2	2	150'		81'-0"	FUJITSU - TA08025-B605	5G		B2
B3	---	---	---	---	---	---	---		---	---	---		---
C1	---	---	---	---	---	---	---	SHARED W/ALPHA	FUJITSU - TA08025-B604	5G	C2	SHARED W/ALPHA	
C2	PROPOSED	JMA WIRELESS-MX08FR0665-21	5G	0	2	2	280'		81'-0"	FUJITSU - TA08025-B605	5G		C2
C3	---	---	---	---	---	---	---		---	---	---		---

- NOTES**
- CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
 - 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.

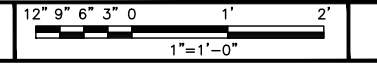
ANTENNA SCHEDULE

NO SCALE

2

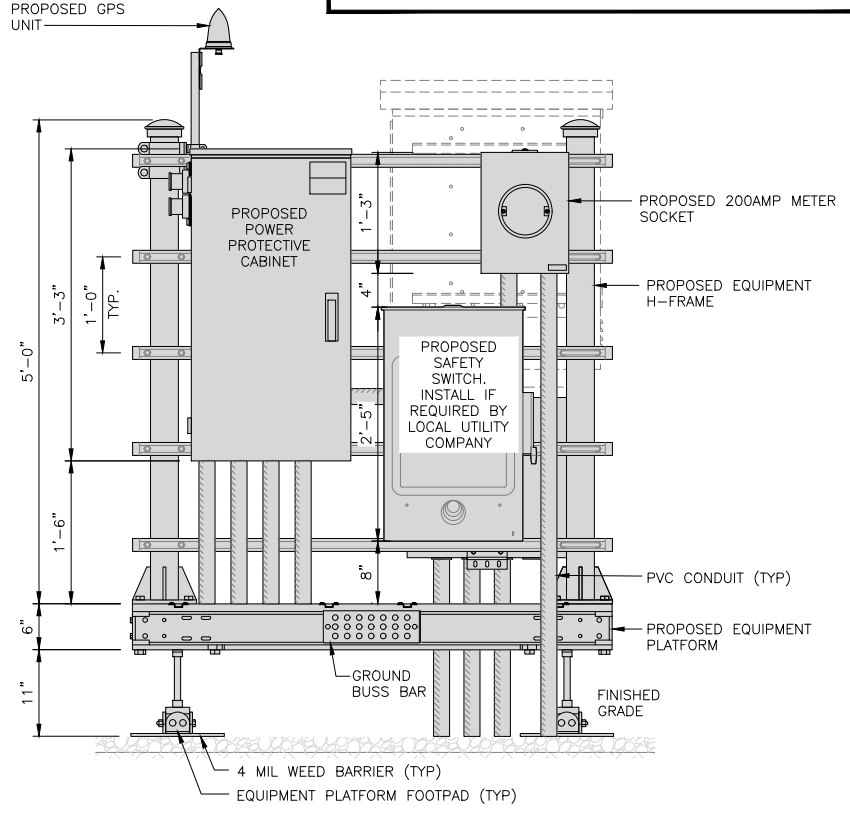


PLATFORM EQUIPMENT PLAN

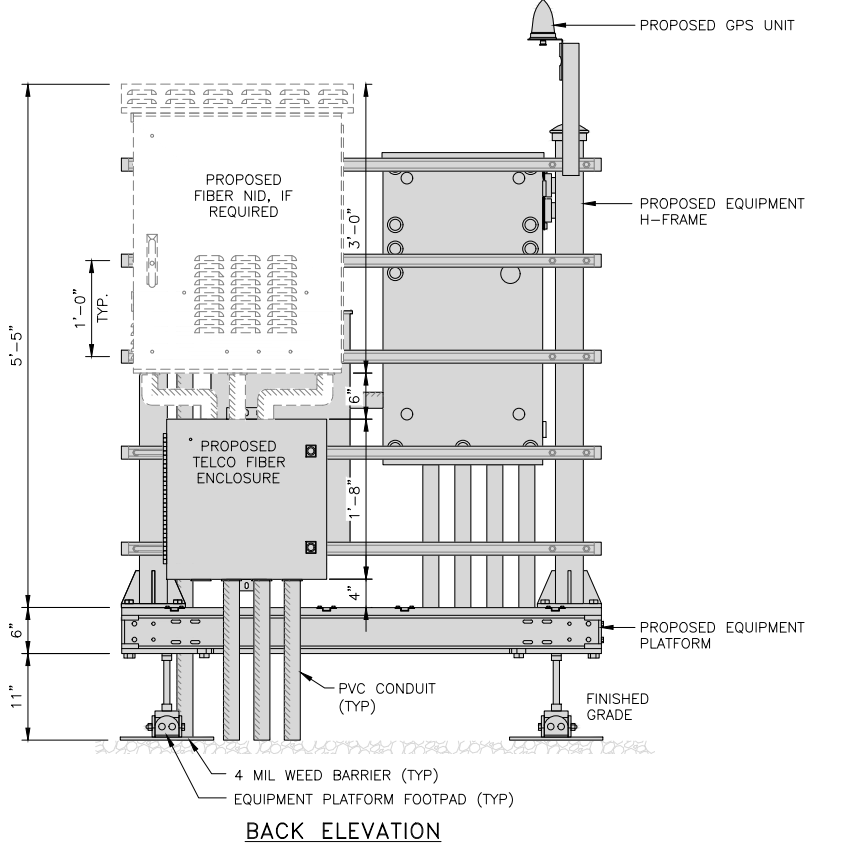


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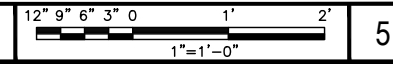
- NOTES**
- CONTRACTOR TO BURY PLATFORM FEET WITH A MINIMUM OF 2" OF FILL PER EXISTING SITE SURFACE
 - WEED BARRIER FABRIC TO BE ADDED AT DISCRETION OF DISH WIRELESS, L.L.C. CONSTRUCTION MANAGER AT TIME OF CONSTRUCTION. ONE SHEET 8'x8' INSTALLED UNDER ALL FOUR FEET OF THE PLATFORM (4 MIL BLACK PLASTIC)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



FRONT ELEVATION



BACK ELEVATION

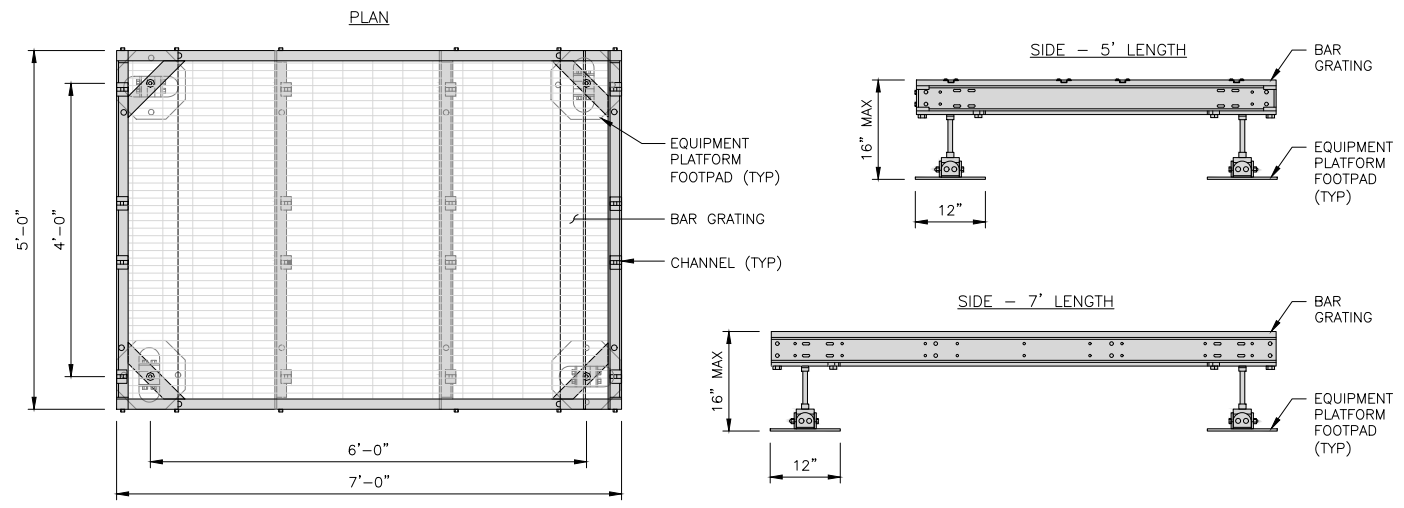


5

COMMSCOPE MTC4045LP 5X7 PLATFORM

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

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



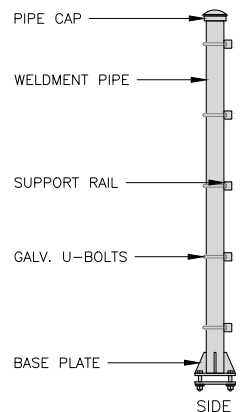
PLATFORM DETAIL

NO SCALE 2

COMMSCOPE MTC4045HFLD H-FRAME

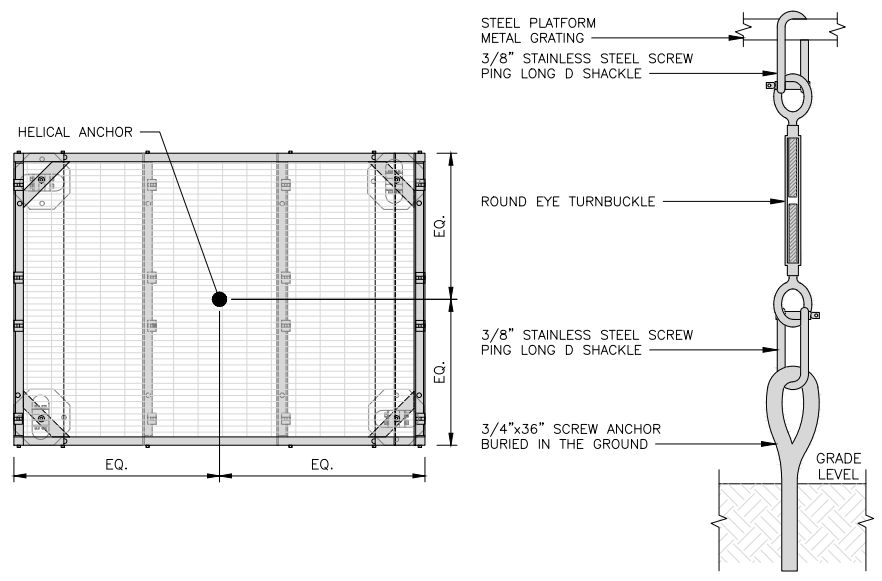
UNISTRUT/SUPPORT RAILS QTY	5
WEIGHT	59.74 lbs

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



H-FRAME DETAIL

NO SCALE 3

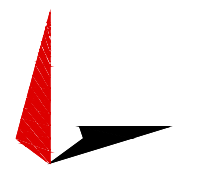


PLATFORM NOTCH USAGE DETAIL

NO SCALE 4



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CHECKED BY: GVM
APPROVED BY: GSM

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
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0	12-06-21	CONSTRUCTION

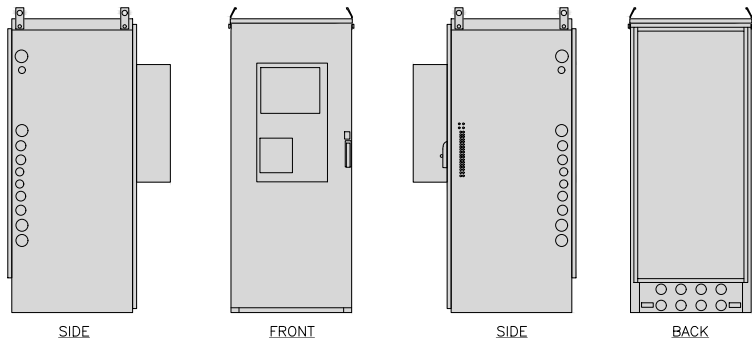
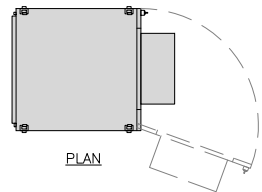
A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

ENERSYS HVAC CABINET 2000005995	
DIMENSIONS (HxWxD):	73"x30"x32"
WEIGHT EMPTY:	371 lbs
HVAC	600W
POWER SYSTEM	-48V ALPHA/600A

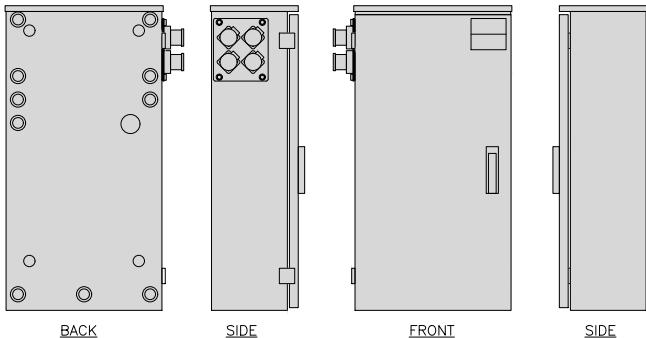
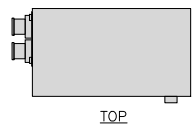


CABINET DETAIL

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

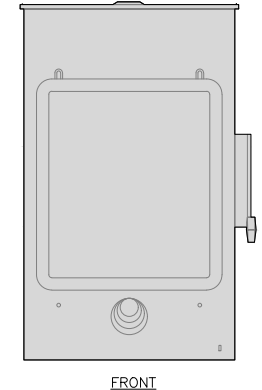
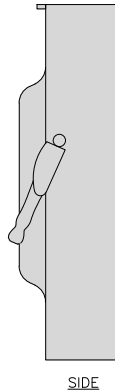
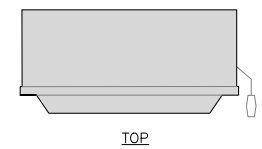


POWER PROTECTION CABINET (PPC) DETAIL

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

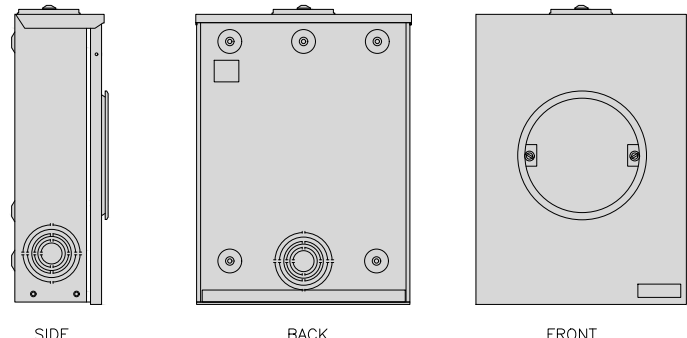
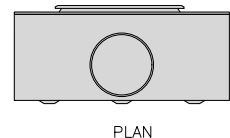


SAFETY SWITCH DETAIL

NO SCALE

3

EATON METER SOCKET UNRRS213BEUSE	
METER SOCKET TYPE	RING
ENCLOSURE DIM (HxWxD)	16"x12"x6"
MAIN AMPERE RATING	200A
WEIGHT	18 LBS

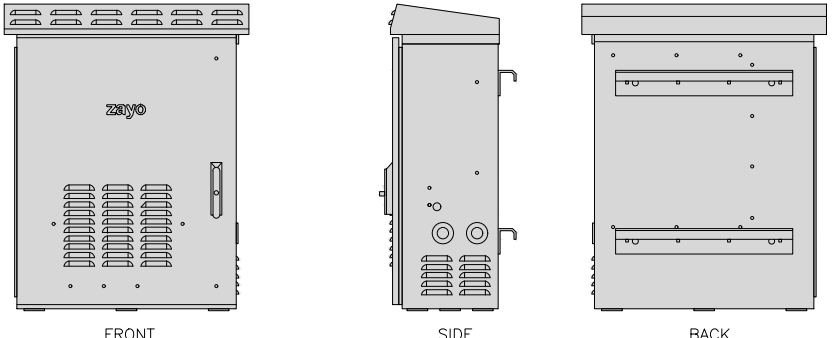
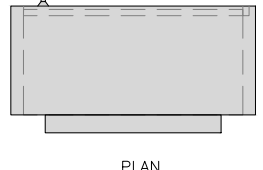


METER SOCKET DETAIL

NO SCALE

4

ZAYO 5RU CABINET LEFT SWING DOOR ("LIT" SITES)	
DIMENSIONS (HxWxD)	36.115"x29"x12.9"
WEIGHT	85 LBS
POWER INPUT	20A, -48VDC

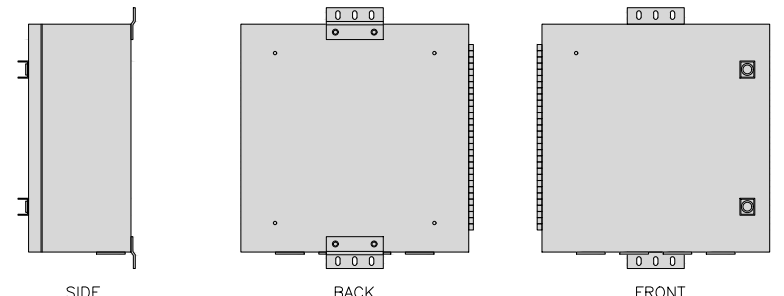
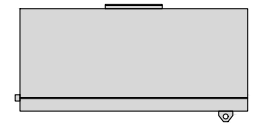


NETWORK INTERFACE UNIT DETAIL

NO SCALE

5

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

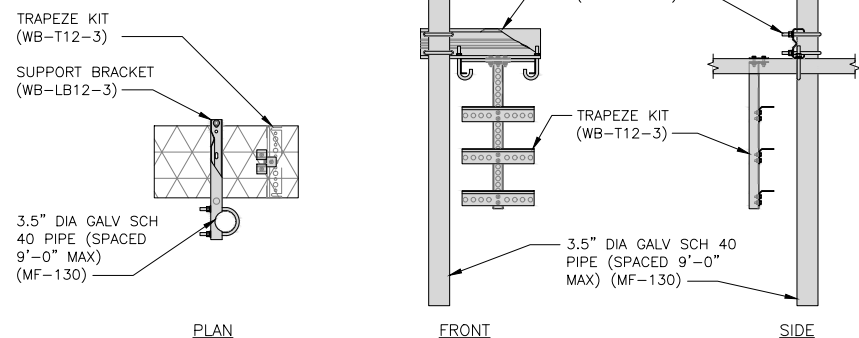


FIBER TELCO ENCLOSURE DETAIL

NO SCALE

6

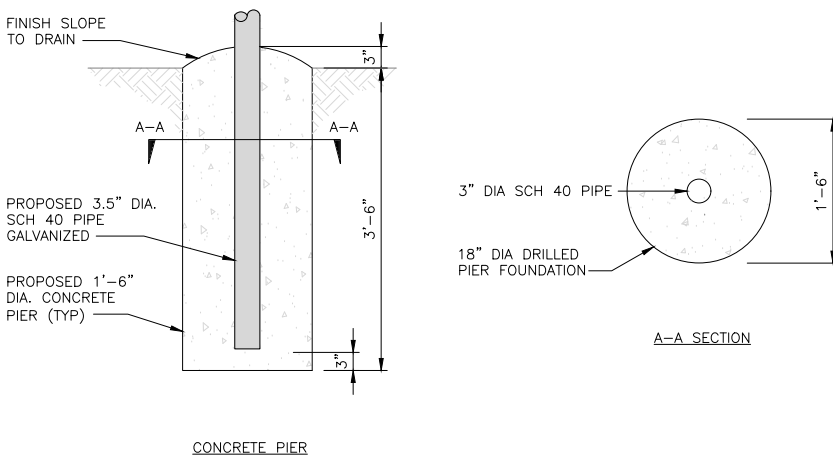
COMMSCOPE WB-K110-B WAVEGUIDE BRIDGE KIT		INCLUDED PRODUCTS: WB-T12-3 TRAPEZE KIT, 3 RUNGS WB-LB12-3 SUPPORT BRACKET MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"
DIMENSIONS (HxL)	160"x10"	
WEIGHT/ VOLUME	325.0 LBS	
CABLE RUN (QTY)	12	



ICE BRIDGE DETAIL

NO SCALE

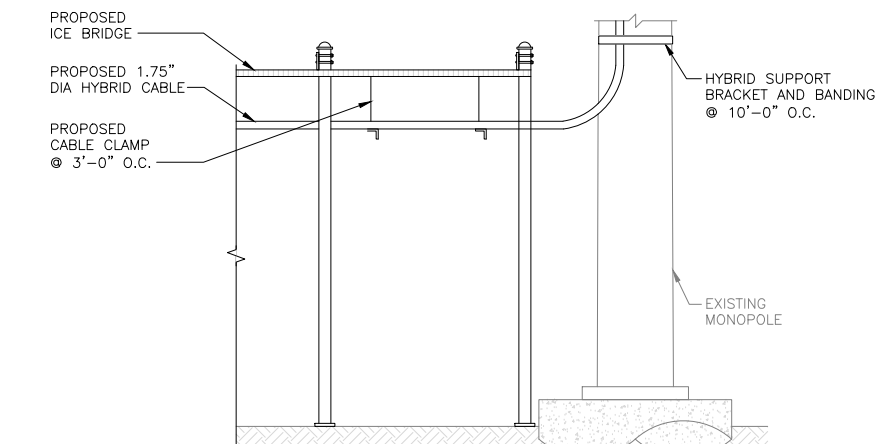
7



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



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OFFICE: (919) 661-6351
NC LIC# P-1403



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ODS GVM GSM

RFDS REV #: 1

CONSTRUCTION
DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	11-05-21	PRELIMINARY
0	12-06-21	CONSTRUCTION

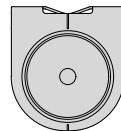
A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

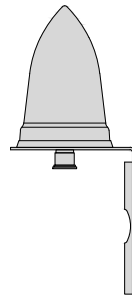
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

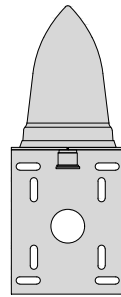
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	0.75 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



TOP



BACK

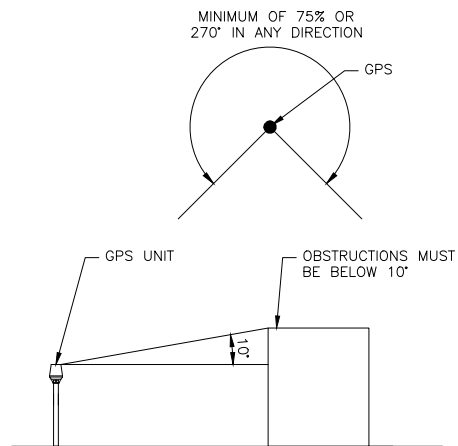


SIDE

GPS DETAIL

NO SCALE

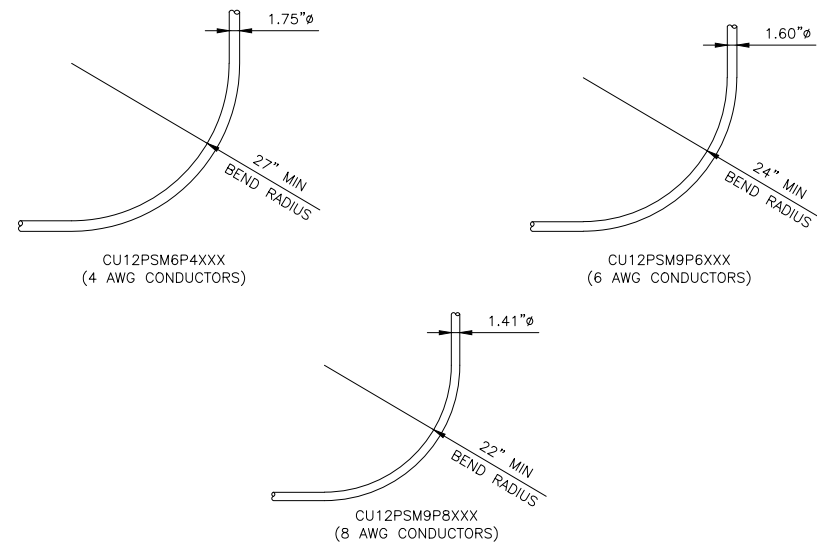
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GPS MINIMUM SKY VIEW REQUIREMENTS

NO SCALE

2

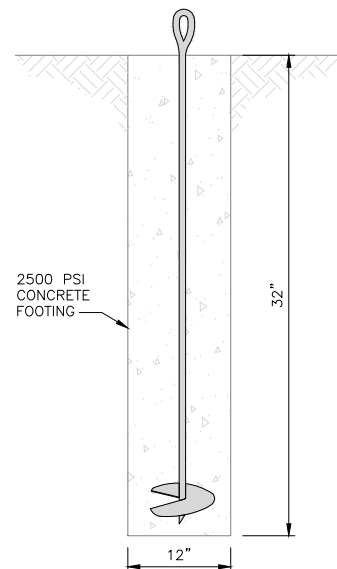
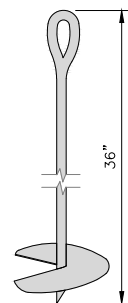


CABLES UNLIMITED HYBRID CABLE
MINIMUM BEND RADIUS

NO SCALE

3

AUGER STYLE EARTH ANCHORS	
LENGTH / THICKNESS	36" / 3/4"
SCREW OD	7"
WEIGHT	11 lbs



ANCHOR DETAIL

NO SCALE

4

NOT USED

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

NOT USED

NO SCALE

8

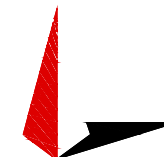
NOT USED

NO SCALE

9

dish
wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



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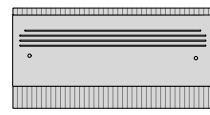
DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
EQUIPMENT DETAILS

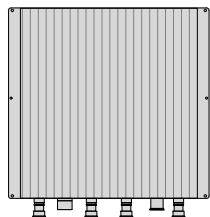
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A-5

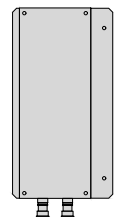
FUJITSU DUAL BAND TA08025-B604	
DIMENSIONS (HxWxD)	14.9"x15.7"x7.8"
WEIGHT	63.9 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



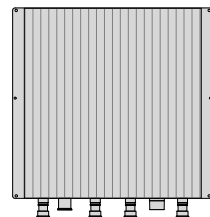
PLAN



BACK

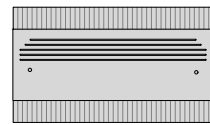


SIDE

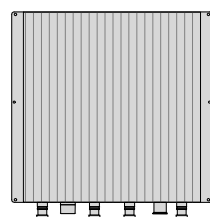


FRONT

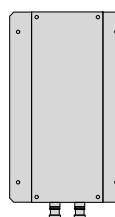
FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



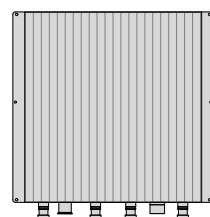
PLAN



BACK



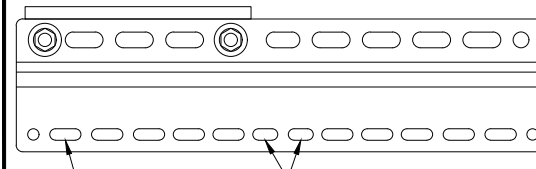
SIDE



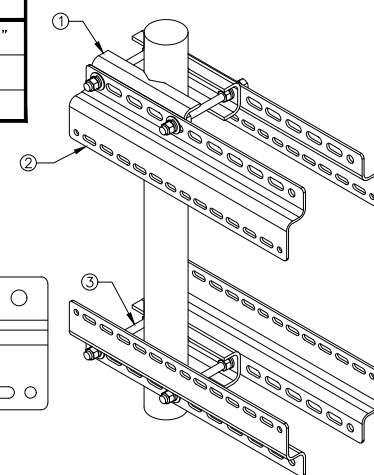
FRONT

SABRE INDUSTRIES RRU BRACKET MOUNT C10123155	
DIMENSIONS (HxWxD) (1 BRACKET)	5"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

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



11MM x 30MM SLOTS
40MM ON CENTER
11MM x 24MM SLOTS



RRH DETAIL

NO SCALE

1

RRH DETAIL

NO SCALE

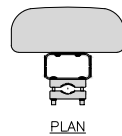
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REMOTE RADIO MOUNT DETAIL

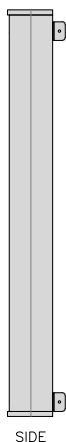
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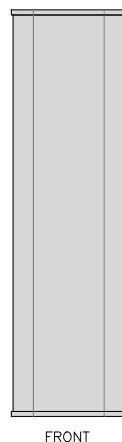
JMA MX08FRO665-21	
DIMENSIONS (HxWxD)	72"x20.0"x8.0"
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE
WEIGHT	64.5 lbs
WEIGHT WITH BRACKETS	82.5 lbs



PLAN



SIDE



FRONT

ANTENNA DETAIL

NO SCALE

4

NOT USED

NO SCALE

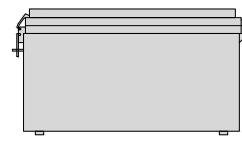
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ANTENNA MOUNTING DETAIL

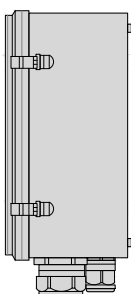
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6

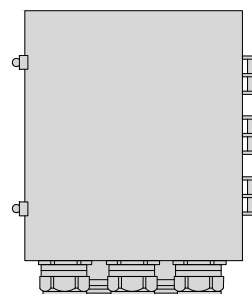
RAYCAP RDIC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



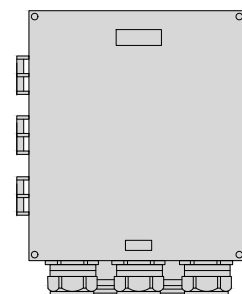
PLAN



SIDE



BACK



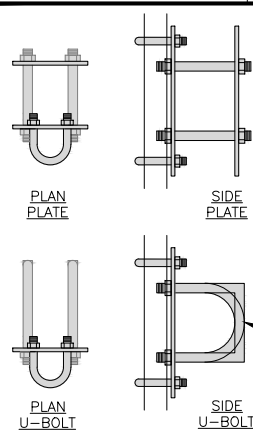
FRONT

SURGE SUPPRESSION DETAIL

NO SCALE

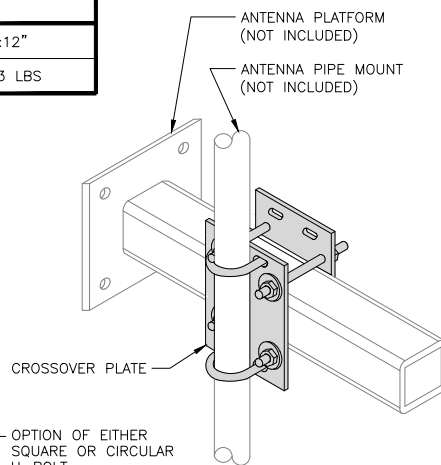
7

COMMSCOPE XP-2040 CROSSOVER PLATE	
DIMENSIONS (HxW)	10"x12"
WEIGHT	11.023 LBS



PLAN U-BOLT

SIDE U-BOLT



ANTENNA PLATFORM (NOT INCLUDED)
ANTENNA PIPE MOUNT (NOT INCLUDED)
CROSSOVER PLATE
OPTION OF EITHER SQUARE OR CIRCULAR U-BOLT

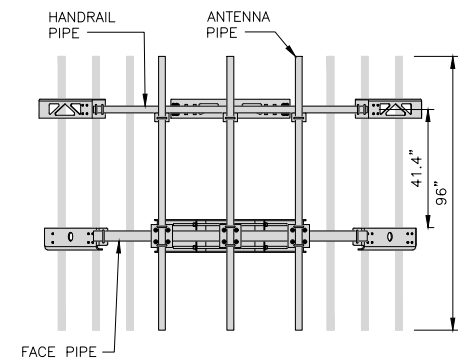
RRH/OVP MOUNT DETAIL

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



FACE PIPE

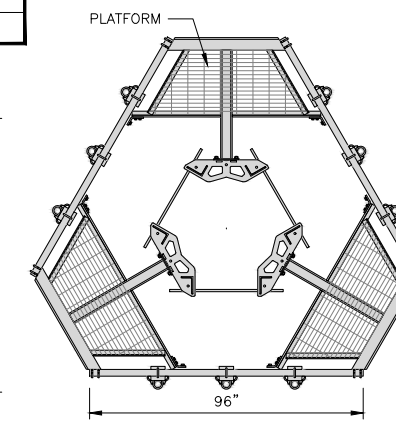
HANDRAIL PIPE

ANTENNA PIPE

41.4"

96"

PLATFORM



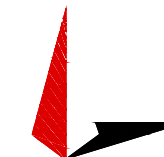
ANTENNA PLATFORM DETAIL

NO SCALE

9



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LITTLETON, CO 80120



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230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER

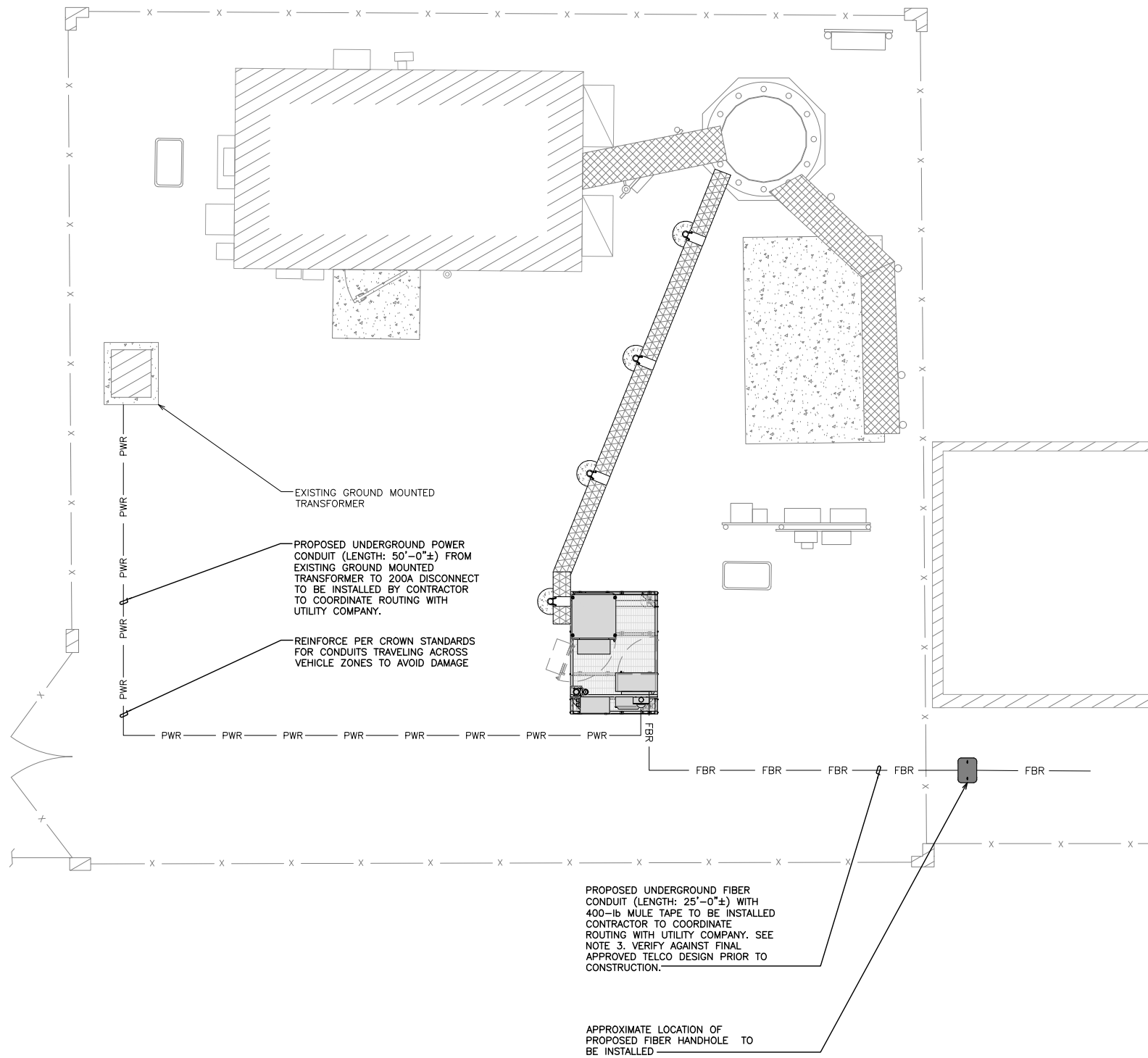
A-6

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 CROWN CASTLE REAL ESTATE AS FURTHER COORDINATION MAY BE NEEDED.

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

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



ELECTRICAL NOTES

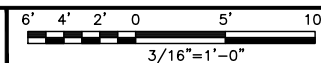
NO SCALE 2



UTILITY VIEW

NO SCALE 3

UTILITY ROUTE PLAN



1



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PROJECT INFORMATION
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AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
ELECTRICAL/FIBER ROUTE
PLAN AND NOTES

SHEET NUMBER
E-1.1

NOTES

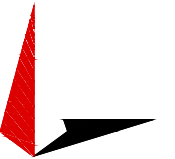
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3. LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
4. CONDUIT ROUGH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. 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.
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13. ALL TRENCHES IN COMPOUND TO BE HAND DUG.



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ELECTRICAL NOTES

NO SCALE 2

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RFDS REV #: 1

CONSTRUCTION DOCUMENTS

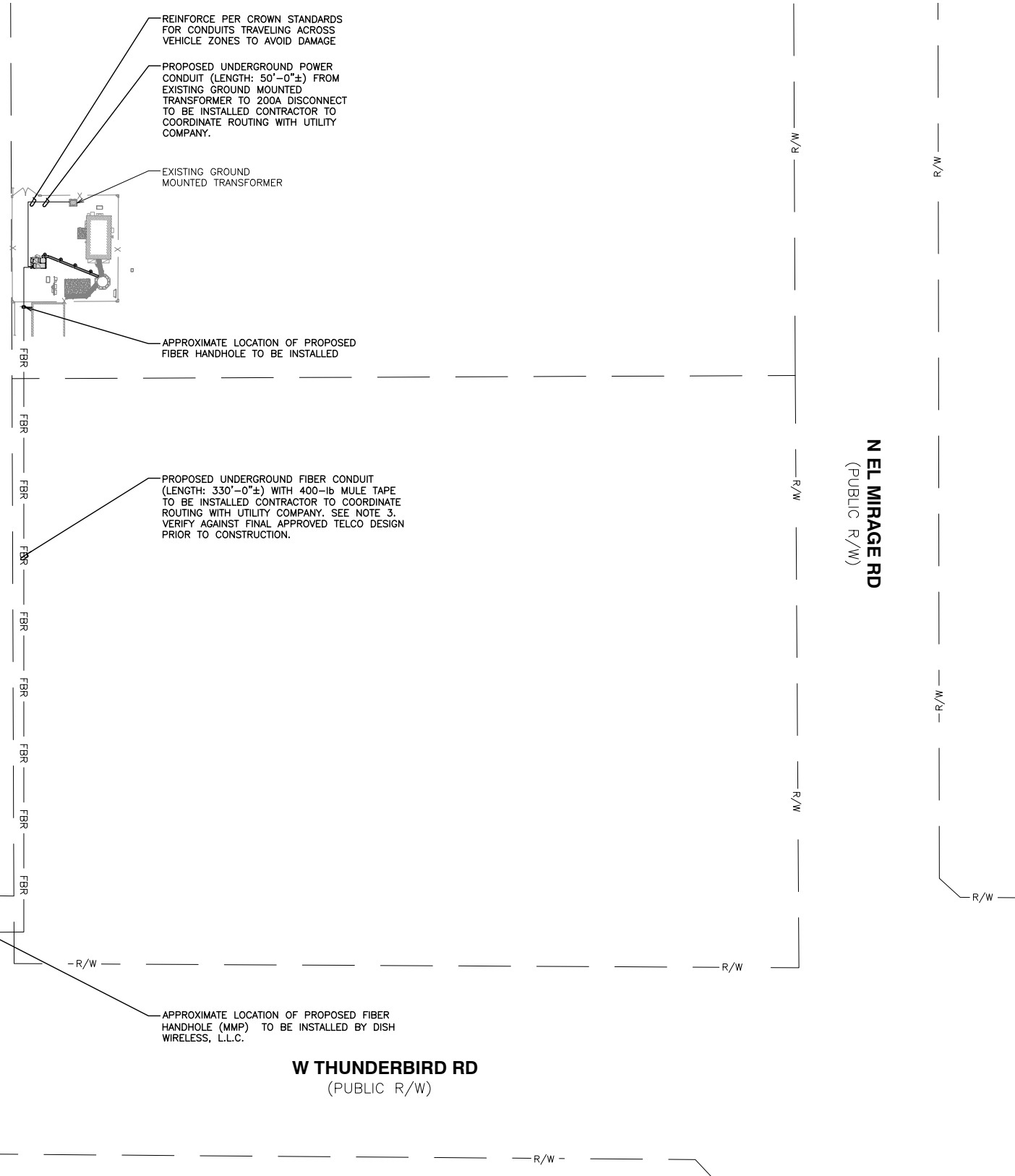
SUBMITTALS		
REV	DATE	DESCRIPTION
A	11-05-21	PRELIMINARY
0	12-06-21	CONSTRUCTION

A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
**ELECTRICAL/FIBER ROUTE
PLAN AND NOTES**

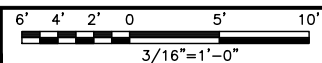
SHEET NUMBER
E-1.2



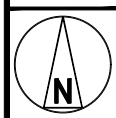
UTILITY VIEW

NO SCALE 3

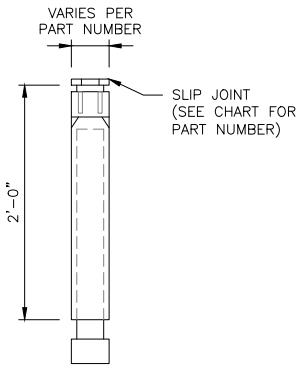
UTILITY ROUTE PLAN



1



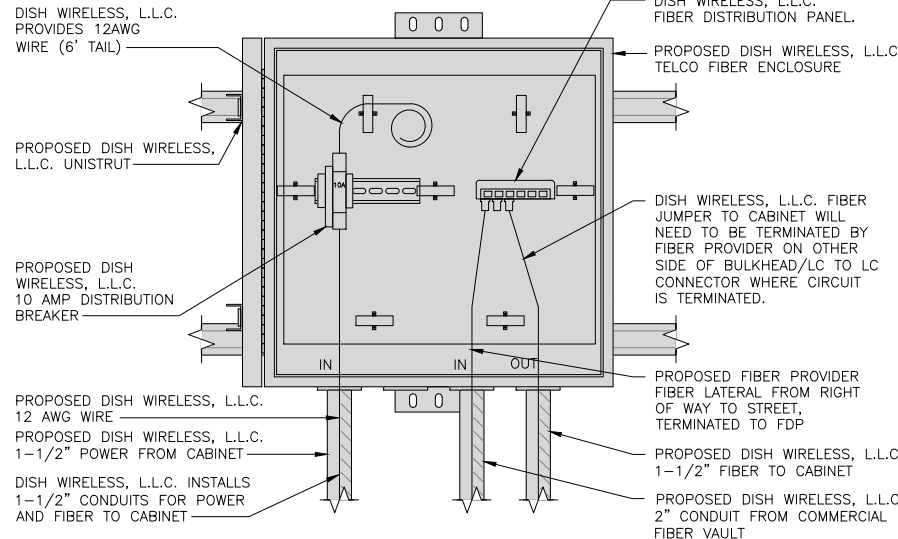
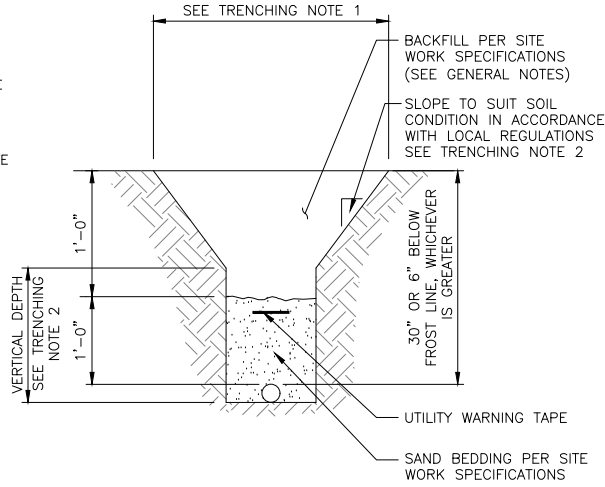
CARLON EXPANSION FITTINGS				
COUPLING END PART#	MALE TERMINAL ADAPTER END PART#	SIZE	STD CTN QTY.	TRAVEL LENGTH
E945D	E945DX	1/2"	20	4"
E945E	E945EX	3/4"	15	4"
E945F	E945FX	1"	10	4"
E945G	E945GX	1 1/4"	5	4"
E945H	E945HX	1 1/2"	5	4"
E945J	E945JX	2"	15	8"
E945K	E945KX	2 1/2"	10	8"
E945L	E945LX	3"	10	8"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



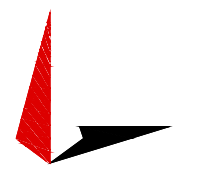
NOTE: CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

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.



5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120



TOWER ENGINEERING PROFESSIONALS
326 TRYON RD. RALEIGH, NC 27603
OFFICE: (919) 661-6351
NC LIC# P-1403



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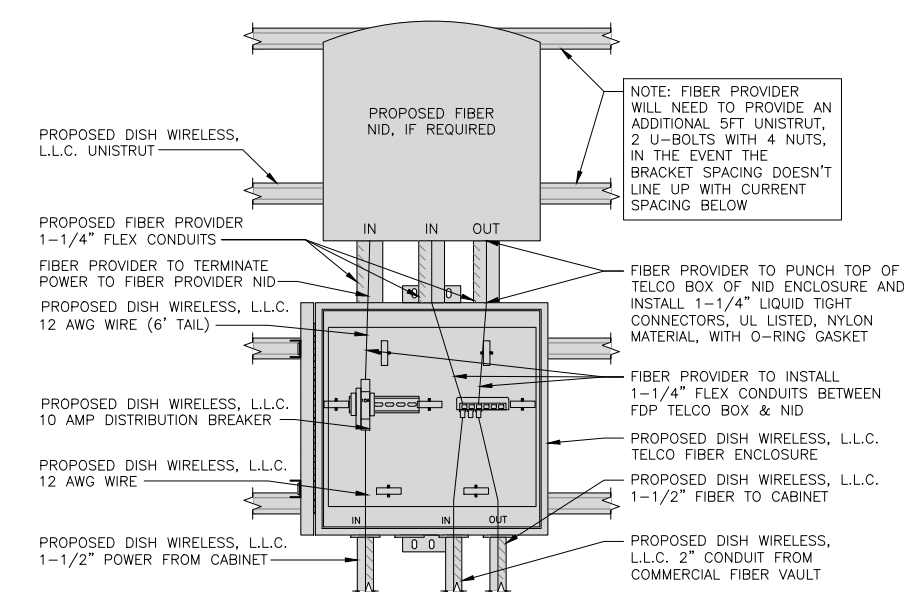
SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E-2

EXPANSION JOINT DETAIL NO SCALE 1

TYPICAL UNDERGROUND TRENCH DETAIL NO SCALE 2

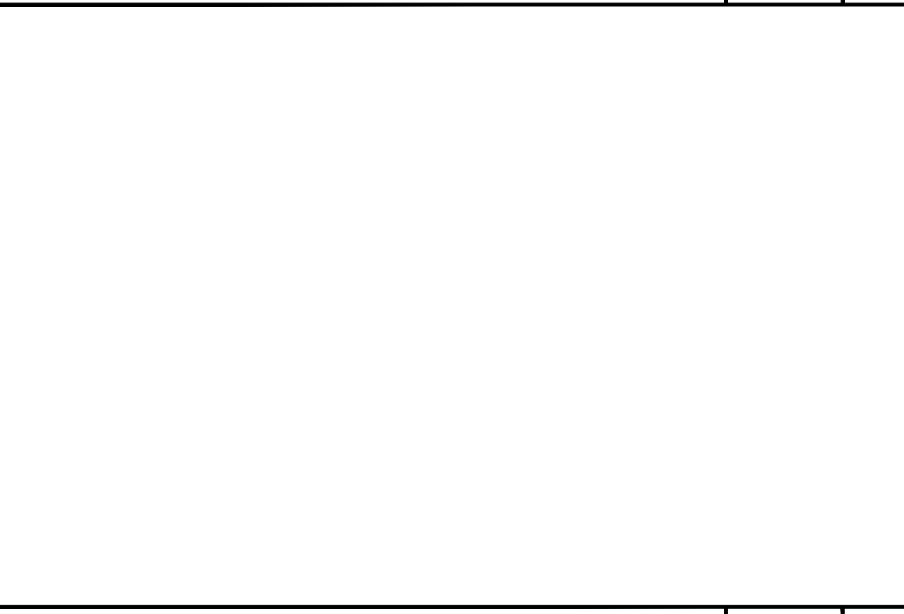
DARK TELCO BOX – INTERIOR WIRING LAYOUT NO SCALE 3



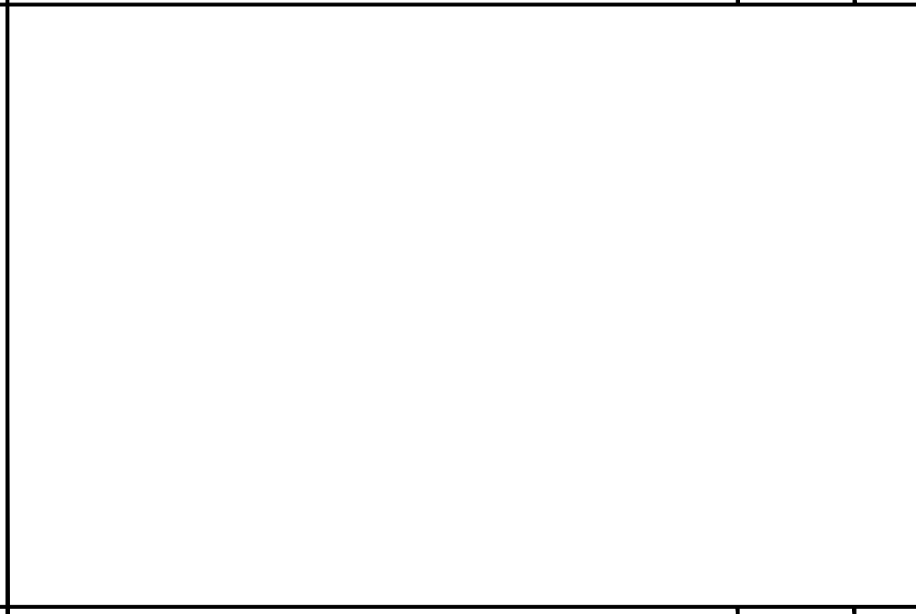
LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL) NO SCALE 4

NOT USED NO SCALE 5

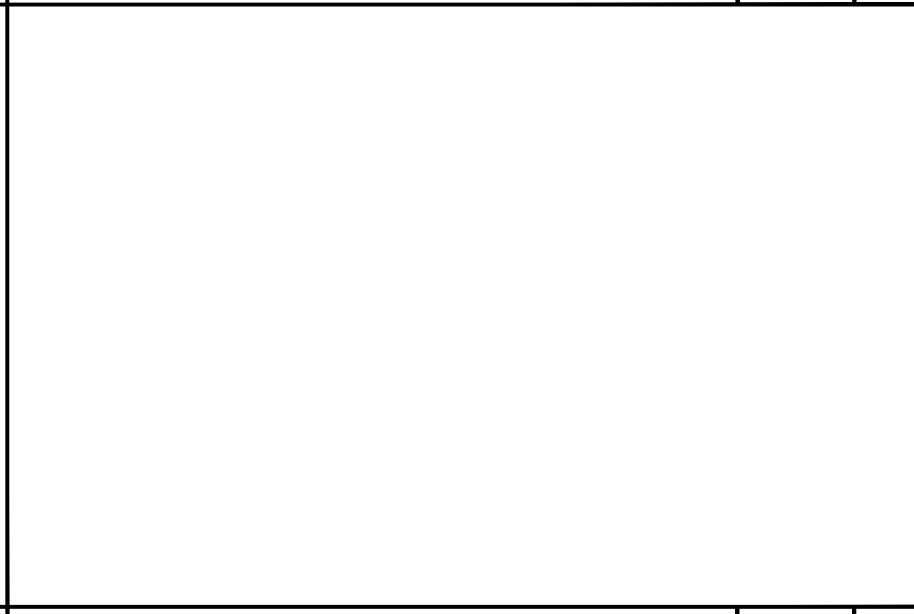
NOT USED NO SCALE 6



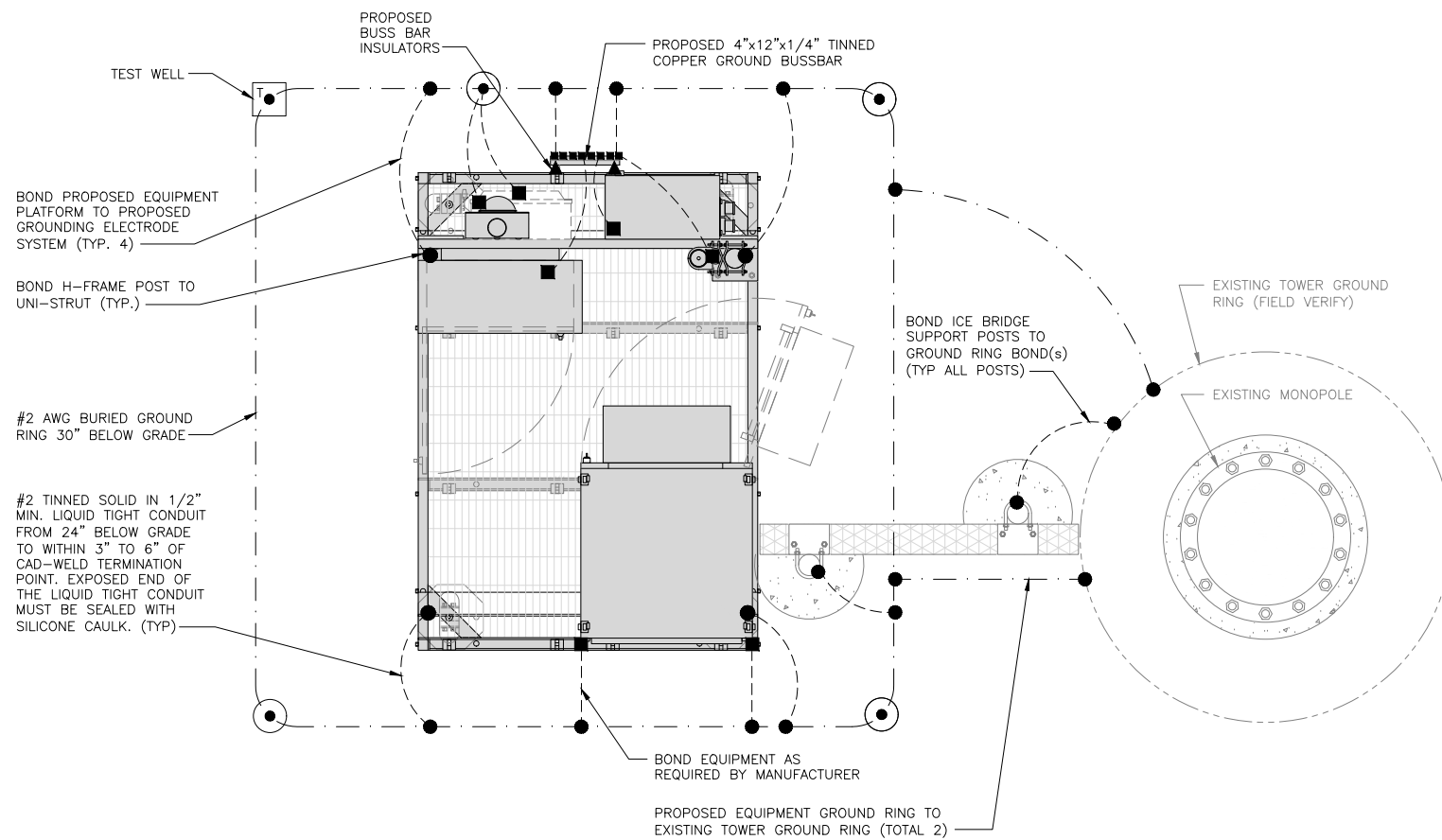
NOT USED NO SCALE 7



NOT USED NO SCALE 8



NOT USED NO SCALE 9

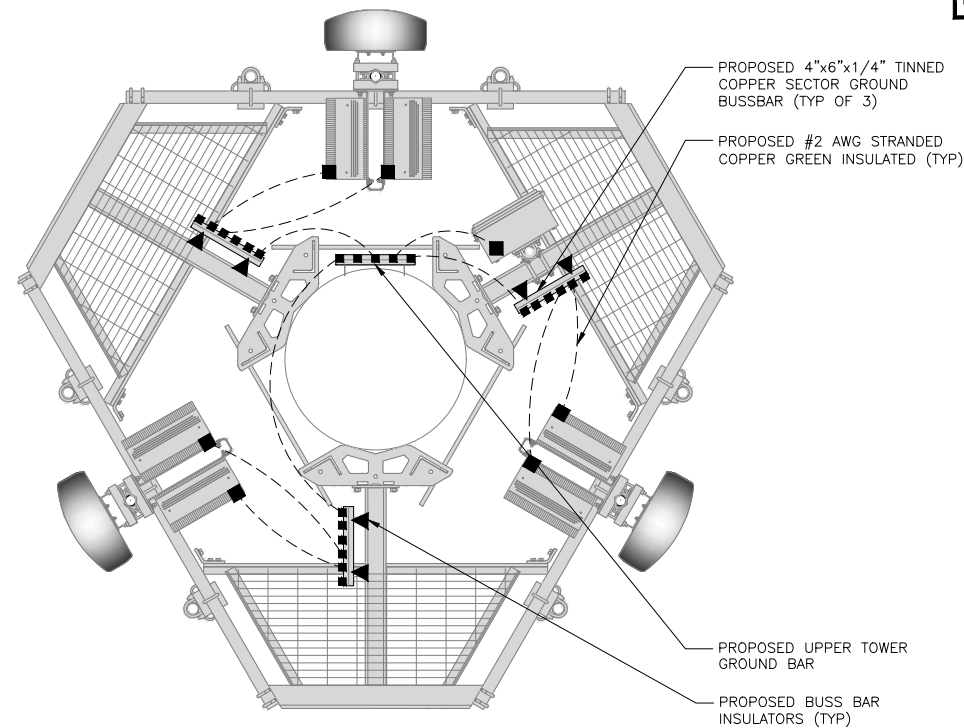


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE 1

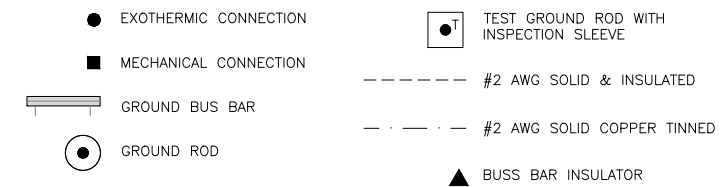
NOTE

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

- GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
- 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.
- 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, LLC. GROUNDING NOTES.

GROUNDING KEY NOTES

NO SCALE 3



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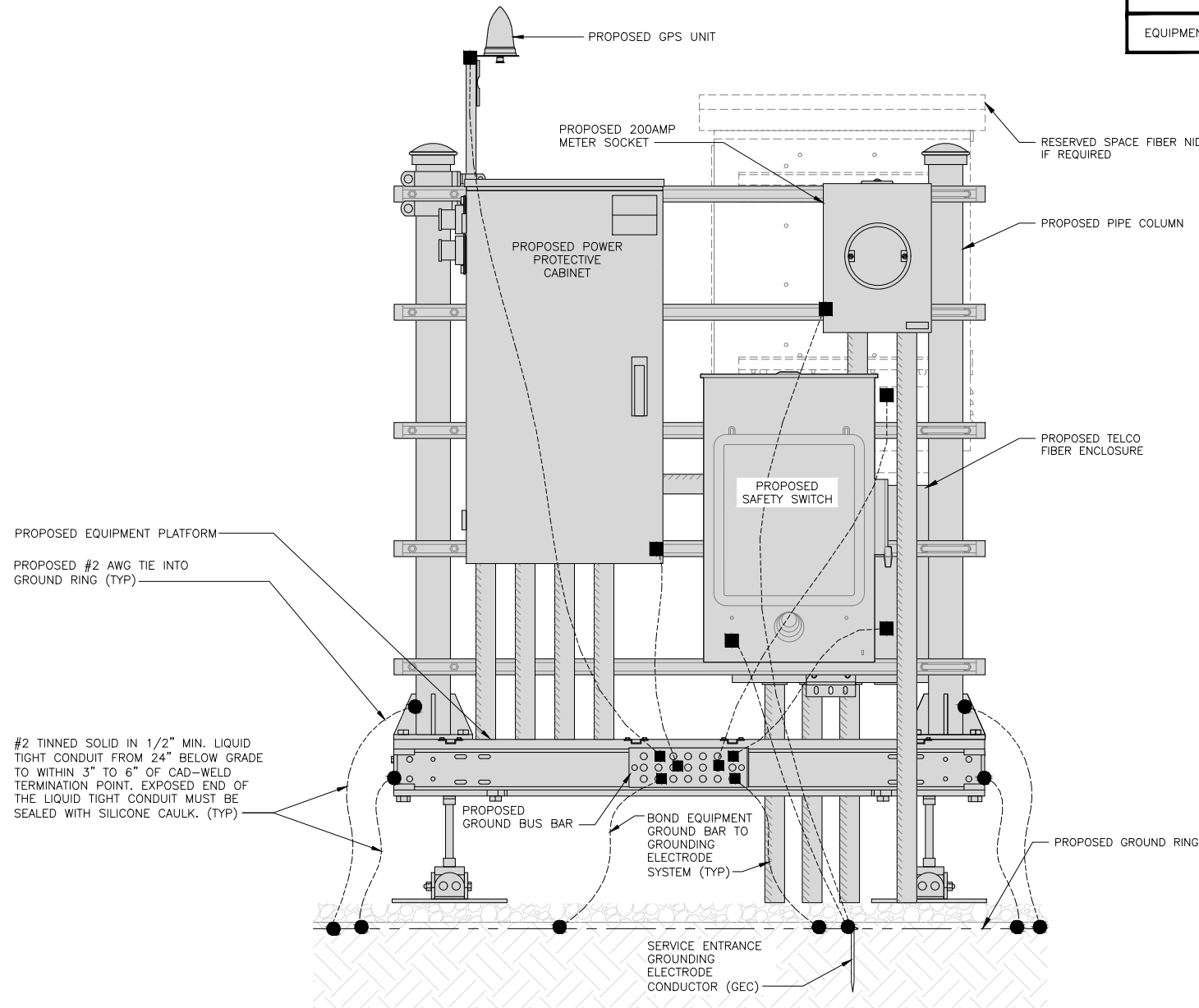
SHEET TITLE
GROUNDING PLANS
AND NOTES

SHEET NUMBER

G-1

NOTE

EQUIPMENT CABINET OMITTED FOR CLARITY

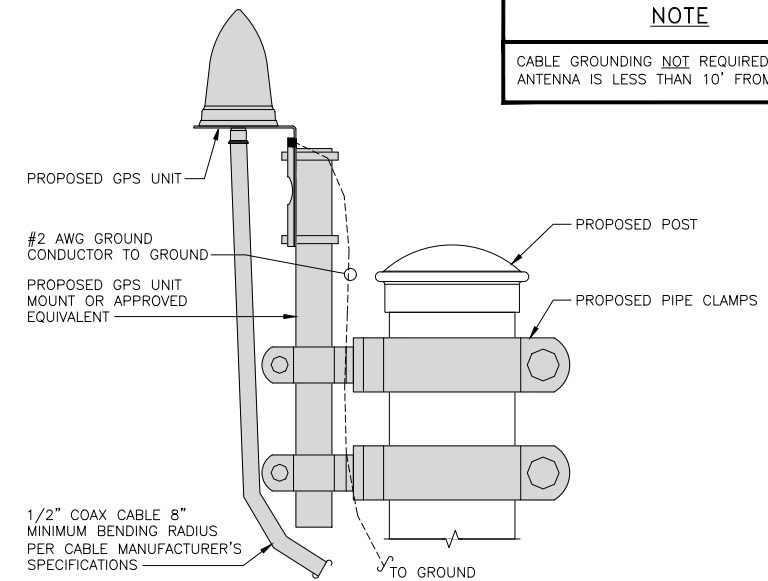


H-FRAME GROUNDING DETAIL

NO SCALE 1

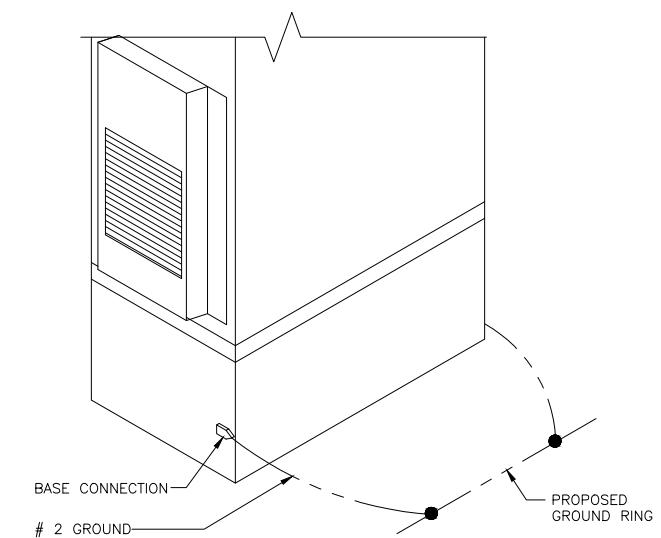
NOTE

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



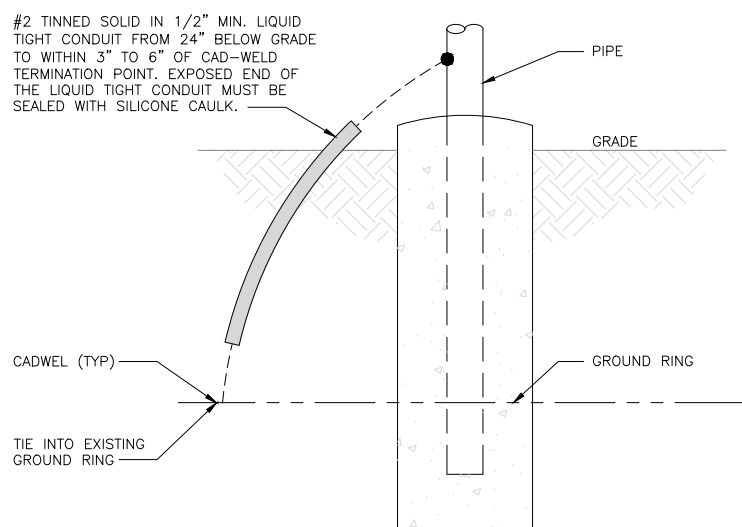
TYPICAL GPS UNIT GROUNDING

NO SCALE 2



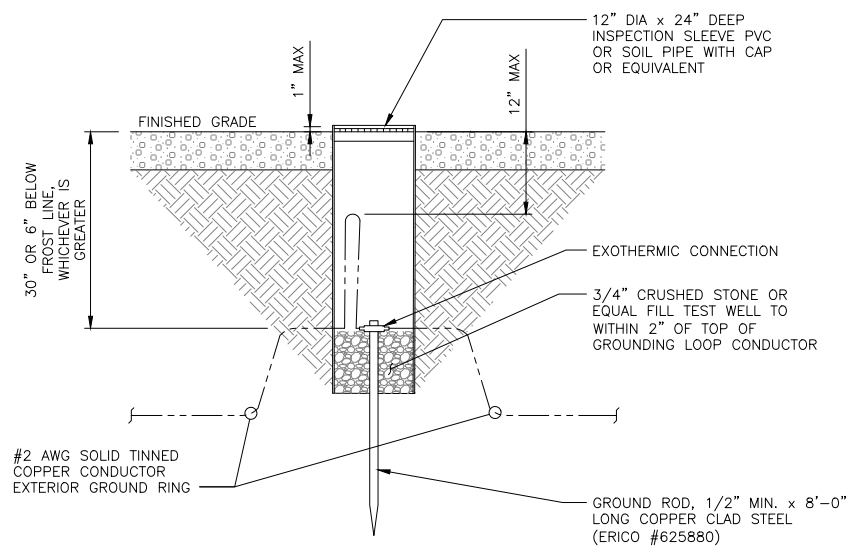
OUTDOOR CABINET GROUNDING

NO SCALE 3



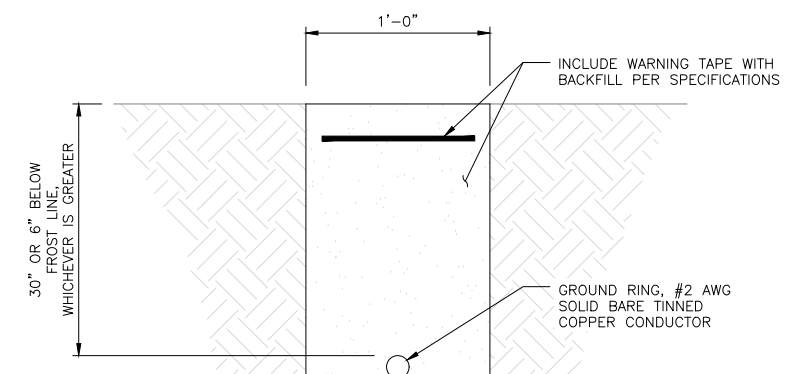
TRANSITIONING GROUND DETAIL

NO SCALE 4



TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE

NO SCALE 5

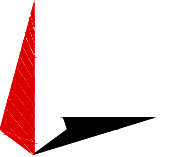


TYPICAL GROUND RING TRENCH

NO SCALE 6

dish
wireless.

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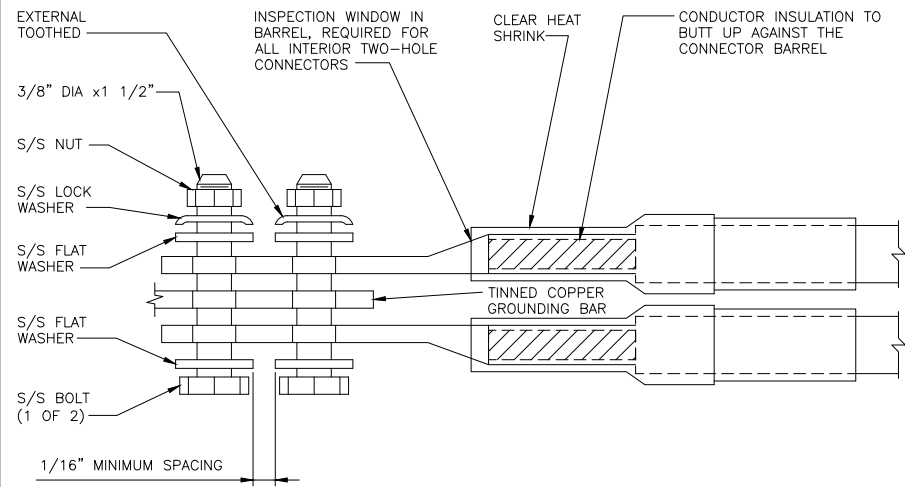
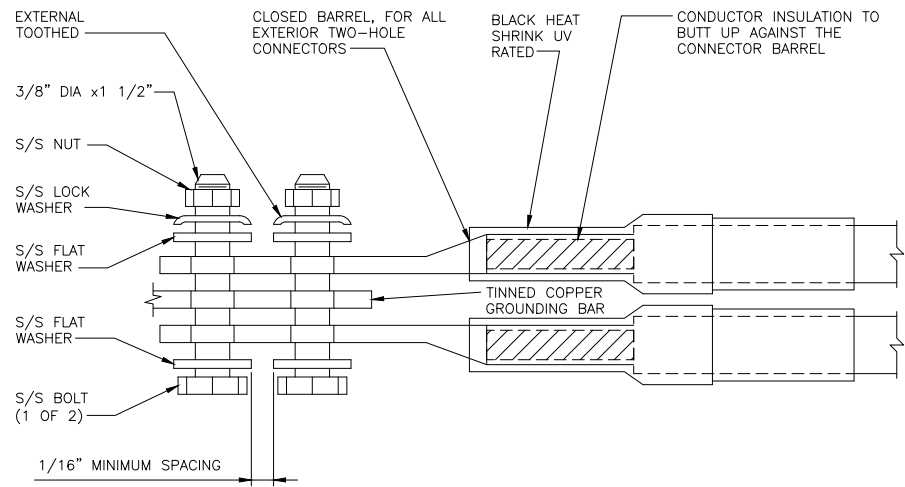
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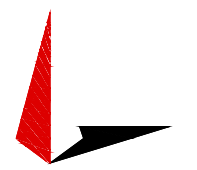
SHEET TITLE
GROUNDING DETAILS

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).



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SHEET TITLE
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SHEET NUMBER
G-3

TYPICAL GROUNDING NOTES

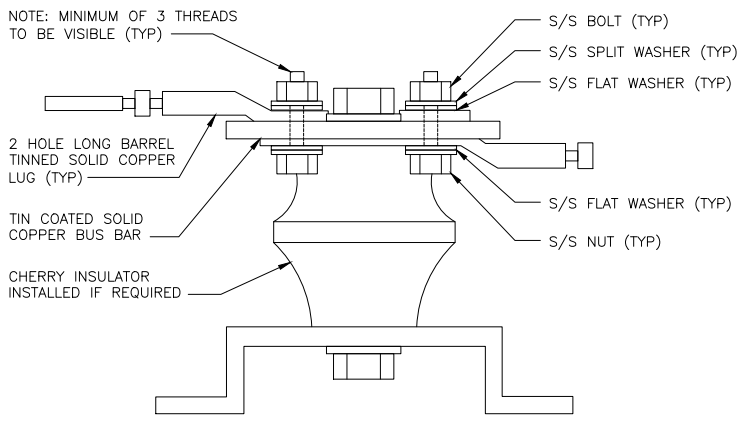
NO SCALE 1

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

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)

ORANGE

AWS
(N66+N70+H-BLOCK)

PURPLE

CBRS TECH
(3 GHz)

YELLOW

NEGATIVE SLANT PORT
ON ANT/RRH

WHITE

ALPHA SECTOR

RED

BETA SECTOR

BLUE

GAMMA SECTOR

GREEN

COLOR IDENTIFIER

NO SCALE

2

NOT USED

NO SCALE

3

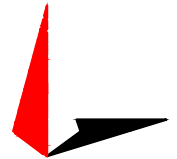
NOT USED

NO SCALE

4

dish
wireless.

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DRAWN BY:	CHECKED BY:	APPROVED BY:
ODS	GVM	GSM

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	11-05-21	PRELIMINARY
0	12-06-21	CONSTRUCTION

A&E PROJECT NUMBER
230889.300493

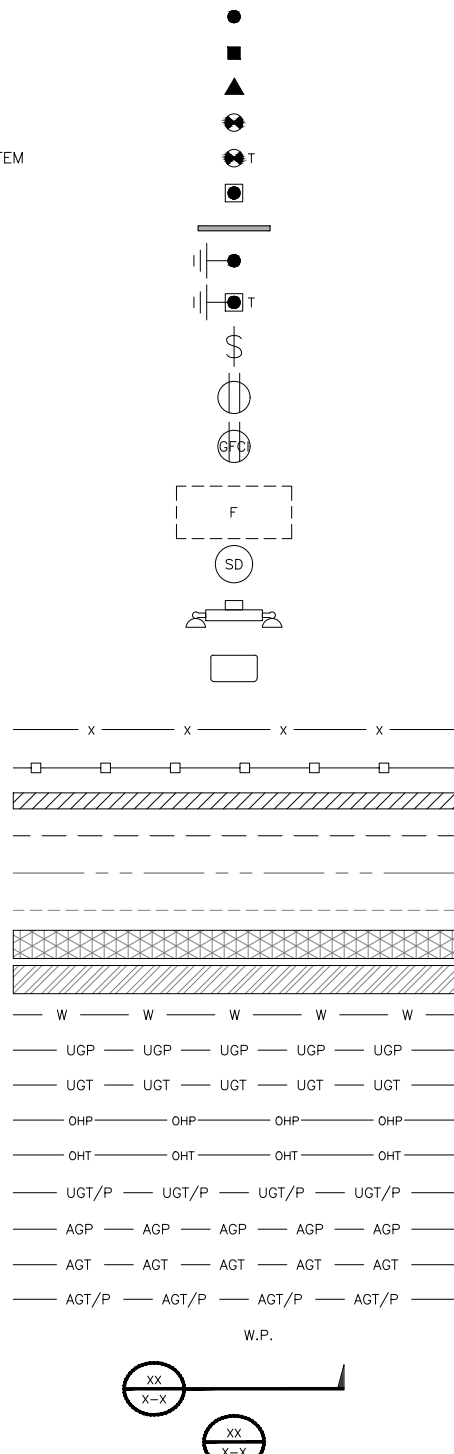
DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

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-DEBTDX
 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



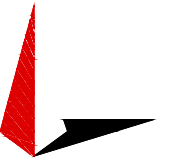
LEGEND

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

ABBREVIATIONS



5701 SOUTH SANTA FE DRIVE
 LITTLETON, CO 80120



TOWER ENGINEERING PROFESSIONALS
 326 TRYON RD. RALEIGH, NC 27603
 OFFICE: (919) 661-6351
 NC LIC# P-1403



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DISH WIRELESS, L.L.C.
 PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

! CAUTION




Transmitting Antenna(s)
 Radio frequency fields beyond this point **MAY EXCEED** the FCC Occupational exposure limit.
 Obey all posted signs and site guidelines for working in radio frequency environments.
 Call the Dish NOC at 1-866.624.6874 prior to working beyond this point.

Site ID: _____

dish

NOTICE




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 Radio frequency fields beyond this point **MAY EXCEED** the FCC Occupational exposure limit.
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Site ID: _____

dish

! WARNING



Transmitting Antenna(s)
 Radio frequency fields beyond this point **EXCEED** the FCC Occupational exposure limit.
 Obey all posted signs and site guidelines for working in radio frequency environments.
 Call the Dish NOC at 1-866.624.6874 prior to working beyond this point.

Site ID: _____


dish

INFORMATION

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

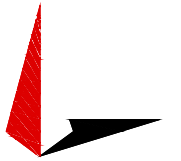
Obey all signs and barriers beyond this point.
 Call the DISH NOC at 1-866-624-6874

Site ID: _____



dish
 wireless.

5701 SOUTH SANTA FE DRIVE
 LITTLETON, CO 80120



TOWER ENGINEERING PROFESSIONALS
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 OFFICE: (919) 661-6351
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Expires: 06/30/2023

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DISH WIRELESS, L.L.C.
 PROJECT INFORMATION
 PXPX00138A
 AZ-CCI-T-846102
 14010 N EL MIRAGE RD
 EL MIRAGE, AZ 85335

SHEET TITLE
 RF
 SIGNAGE

SHEET NUMBER

GN-2

SITE ACTIVITY REQUIREMENTS:

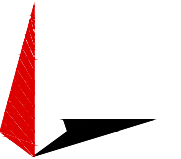
1. NOTICE TO PROCEED – NO WORK SHALL COMMENCE PRIOR TO CONTRACTOR RECEIVING A WRITTEN NOTICE TO PROCEED (NTP) AND THE ISSUANCE OF A PURCHASE ORDER. PRIOR TO ACCESSING/ENTERING THE SITE YOU MUST CONTACT THE DISH WIRELESS, L.L.C. AND TOWER OWNER NOC & THE DISH WIRELESS, L.L.C. AND TOWER OWNER CONSTRUCTION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

GENERAL NOTES:

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



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LITTLETON, CO 80120



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PROJECT INFORMATION
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14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-3

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

ELECTRICAL INSTALLATION NOTES:

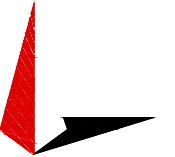
1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.
2. CONDUIT ROUTINGS ARE SCHEMATIC. CONTRACTOR SHALL INSTALL CONDUITS SO THAT ACCESS TO EQUIPMENT IS NOT BLOCKED AND TRIP HAZARDS ARE ELIMINATED.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

MALLEABLE IRON LOCKNUT ON OUTSIDE AND INSIDE.

24. EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES AND PULL BOXES SHALL BE GALVANIZED OR EPOXY-COATED SHEET STEEL. SHALL MEET OR EXCEED UL 50 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND NEMA 3 (OR BETTER) FOR EXTERIOR LOCATIONS.
25. METAL RECEPTACLE, SWITCH AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY-COATED OR NON-CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1 AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
26. NONMETALLIC RECEPTACLE, SWITCH AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2 (NEWEST REVISION) AND BE RATED NEMA 1 (OR BETTER) FOR INTERIOR LOCATIONS AND WEATHER PROTECTED (WP OR BETTER) FOR EXTERIOR LOCATIONS.
27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH WIRELESS, L.L.C., AND TOWER OWNER BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
28. THE CONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD LIFE AND PROPERTY.
29. INSTALL LAMICOID LABEL ON THE METER CENTER TO SHOW "DISH WIRELESS, L.L.C."
30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.



5701 SOUTH SANTA FE DRIVE
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NC LIC# P-1403



Expires: 06/30/2023

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DRAWN BY:	CHECKED BY:	APPROVED BY:
ODS	GVM	GSM

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
A	11-05-21	PRELIMINARY
0	12-06-21	CONSTRUCTION

A&E PROJECT NUMBER
230889.300493

DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPHX00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
GENERAL NOTES

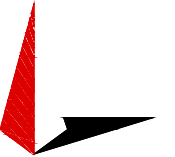
SHEET NUMBER
GN-4

GROUNDING NOTES:

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



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DISH WIRELESS, L.L.C.
PROJECT INFORMATION
PXPXH00138A
AZ-CCI-T-846102
14010 N EL MIRAGE RD
EL MIRAGE, AZ 85335

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-5

I do hereby certify that the within named instrument was recorded at request of Statler
Docket # 8578 Page 826 Records of Maricopa
WITNESS my hand and official seal the day and
MAR 15 '71 - 10 65
PAUL H. MARSTON, Maricopa County Recorder, By *[Signature]*

15954 N.W. GRAND AVE
GLANDALE, AZ. 85301

WARRANTY DEED
48912 01-DEED

RECORDED

KNOW ALL MEN BY THESE PRESENTS: That VERNON LEROY STATLER, husband of Virginia Statler, doing business with his sole and separate property, for and in consideration of the

sum of ---TEN & no/100--- DOLLARS

to him in hand paid by TOWN OF EL MIRAGE, a municipal corporation, within the County of Maricopa, State of Arizona, has granted, sold and conveyed, and by these presents does grant, sell and convey unto the said TOWN OF EL MIRAGE all that certain premises situated in Maricopa County, State of Arizona, described as follows, viz:

The South 235.85 feet of the North 707.55 feet of the East 393 feet of Section 11, Township 3 North, Range 1 West of the O & S R B & M, lying South of WEST EL MIRAGE, according to Book 66 of Maps, page 26, records of Maricopa County, Arizona.

Subject to restrictions, reservations, easements and rights-of-way of record.

TO HAVE AND TO HOLD, the above described premises, together with all and singular the rights and appurtenances thereto in any wise belonging unto the said TOWN OF EL MIRAGE, its heirs and assigns forever.

And I hereby bind myself, my heirs, executors and administrators to warrant and forever defend, all and singular, the premises unto the said TOWN OF EL MIRAGE, its heirs and assigns, against every person whomsoever, lawfully claiming or to claim the same or any part thereof.

WITNESS, by hand this 21st day of March, 1966

Vernon Leroy Statler (S) (S) (S)

STATE OF ARIZONA
County of Maricopa
by VERNON LEROY STATLER

This instrument was acknowledged before me this 21st day of March 1966

[Signature]
(Notary Public)

My Commission will expire
My Commission Expires Dec 19 1967