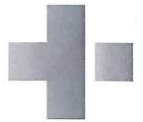




TOTALLY COMMITTED.



October 11, 2021

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

Re: Request of DISH Wireless LLC for an Order to Approve the Shared Use of an Existing Tower  
131 Little City Road, Killingworth, CT 06419-1015  
Latitude: 41°33'44.1" /Longitude: -72°34'25.6"

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, DISH Wireless LLC ("DISH") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by DISH of an existing telecommunication tower at 131 Little City Road in Killingworth (the "Property"). The existing 302.11-foot monopole tower is owned by American Tower Corporation ("ATC"). The underlying property is owned by American Tower. DISH requests that the Council find that the proposed shared use of American Tower satisfies the criteria of C.G.S. §16-50aa and issue an order approving the proposed shared use. A copy of this filing is being sent to Catherine Lino, First Selectwoman for the Town of Killingworth, Jerry Russ, Town of Killingworth Building Official and American Tower as the property owner.

## Background

The existing ATC facility consists of a 302.11-foot self-support tower located within an existing leased area. AT&T currently maintains antennas at the 272-foot level, Sprint Nextel currently maintains antennas at the 261-foot level, T-Mobile currently maintains antennas at the 245-foot level, Verizon currently maintains antennas at the 171-foot level. There are antennas located at the 145' level maintained by others. Equipment associated with these antennas are located at various positions within the tower and compound.

DISH is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. DISH and American Tower have agreed to the proposed shared use of the 131 Little City Road tower pursuant to mutually acceptable terms and conditions. Likewise, DISH and ATC have agreed to the proposed installation of equipment cabinets on the ground on the south side of the tower within the existing compound. ATC has authorized DISH to apply for all necessary permits and approvals that may be required to share the existing tower. (See attached Letter of Authorization)



DISH proposes to Install (3) Proposed panel antennas, (3) Proposed antenna mounts, install jumpers, install (6) proposed RRU's, install (1) Over voltage protection device (OVP), Install (1) proposed Hybrid cable. Groundwork: Install (1) metal platform, install (1) ice bridge, install (1) PPC cabinet, install (1) equipment cabinet, install (1) power conduit, install (1) telco conduit, install (1) Telco-fiber box, install (1) GPS unit, install (1) Safety Switch (if required), install (1) Ciena box (if required) and install (1) meter socket. DISH's Construction Drawings provide project specifications for all proposed site improvement locations. The construction drawings also include specifications for DISH's proposed antenna and groundwork.

C.G.S. § 16-50aa(c)(1) provides that, upon written request for approval of a proposed shared use, "if the Council finds that the proposed shared use of the facility is technically, legally, environmentally and economically feasible and meets public safety concerns, the council shall issue an order approving such a shared use." DISH respectfully submits that the shared use of the tower satisfies these criteria.

**A. Technical Feasibility.** The existing ATC tower is structurally capable of supporting DISH's proposed improvements. The proposed shared use of this tower is, therefore, technically feasible. A Feasibility Structural Analysis Report ("Structural Report") prepared for this project confirms that this tower can support DISH's proposed loading. A copy of the Structural Report has been included in this application.

**B. Legal Feasibility.** Under C.G.S. § 16-50aa, the Council has been authorized to issue order approving the shared use of an existing tower such as the ATC tower. This authority complements the Council's prior-existing authority under C.G.S. § 16-50p to issue orders approving the construction of new towers that are subject to the Council's jurisdiction. In addition, § 16-50x(a) directs the Council to "give such consideration to the other state laws and municipal regulations as it shall deem appropriate" in ruling on requests for the shared use of existing tower facilities. Under the statutory authority vested in the Council, an order by the Council approving the requested shared use would permit the Applicant to obtain a building permit for the proposed installations.

**C. Environmental Feasibility.** The proposed shared use of the ATC tower would have a minimal environmental effect for the following reasons:

1. The proposed installation will have no visual impact on the area of the tower. DISH's equipment cabinet would be installed within the existing facility compound. DISH's shared use of this tower therefore will not cause any significant change or alteration in the physical or environmental characteristics of the existing site.
2. Operation of DISH's antennas at this site would not exceed the RF emissions standard adopted by the Federal Communications Commission ("FCC"). Included in the EME report of this filing are the approximation tables that demonstrate that DISH's proposed facility will operate well within the FCC RF emissions safety standards.
3. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the ATC facility other than periodic maintenance. The proposed shared use of the ATC tower, would, therefore, have a minimal environmental effect, and is environmentally feasible.





D. **Economic Feasibility.** As previously mentioned, DISH has entered into an agreement with ATC for the shared use of the existing facility subject to mutually agreeable terms. The proposed tower sharing is, therefore, economically feasible.

E. **Public Safety Concerns.** As discussed above, the tower is structurally capable of supporting DISH's full array of (3) antennas, (3) antenna mounts, (6) Remote radio units, (1) over voltage protection device (OVP) and (1) Hybrid cable and all related equipment. DISH is not aware of any public safety concerns relative to the proposed sharing of the existing ATC tower

### Conclusion

For the reasons discussed above, the proposed shared use of the existing ATC tower at 131 Little City Road satisfies the criteria stated in C.G.S. §16-50aa and advances the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use.

Sincerely,

*Margie Weber*

Margie Weber  
Program Manager  
215.416.0363  
[mweber@nbcllc.com](mailto:mweber@nbcllc.com)



## LETTER OF AUTHORIZATION

**ATC SITE#/NAME/PROJECT: 88013 / Killingworth / 13681397**  
**SITE ADDRESS: 133 LITTLE CITY RD KILLINGWORTH, CT 06419-1015**  
**APN: KILL-000006-000000-000011A**  
**LICENSEE: DISH WIRELESS L.L.C.**

I, Margaret Robinson, Senior Counsel for American Tower\*, owner of the tower facility located at the address identified above (the "Tower Facility"), do hereby authorize DISH WIRELESS L.L.C. its successors and assigns, and/or its agent, (collectively, the "Licensee") to act as American Tower's non-exclusive agent for the sole purpose of filing and consummating any land-use or building permit application(s) as may be required by the applicable permitting authorities for Licensee's telecommunications' installation.

We understand that this application may be denied, modified or approved with conditions. The above authorization is limited to the acceptance by Licensee only of conditions related to Licensee's installation and any such conditions of approval or modifications will be Licensee's sole responsibility.

Signature:

Print Name: Margaret Robinson  
Senior Counsel  
American Tower\*

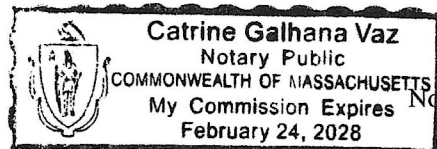
### **NOTARY BLOCK**

Commonwealth of MASSACHUSETTS  
County of Middlesex

This instrument was acknowledged before me by Margaret Robinson, Senior Counsel for American Tower\*, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to the within instrument and acknowledged to me that he executed the same.

WITNESS my hand and official seal, this 11<sup>th</sup> day of August 2021.

NOTARY SEAL



Notary Public

My Commission Expires: February 24, 2028

\*American Tower includes all affiliates and subsidiaries of American Tower Corporation.





# EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: BOBDL00028A

131 Little City Road  
Killingworth, Connecticut 06419

**August 16, 2021**

**EBI Project Number: 6221003984**

Site Compliance Summary	
Compliance Status:	<b>COMPLIANT</b>
Site total MPE% of FCC general population allowable limit:	<b>5.25%</b>

August 16, 2021

Dish Wireless

## Emissions Analysis for Site: BOBDL00028A -

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **131 Little City Road in Killingworth, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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





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

Additional details can be found in FCC OET 65.

## CALCULATIONS

Calculations were done for the proposed Dish Wireless antenna facility located at 131 Little City Road in Killingworth, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

- 1) 4 n71 channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.
- 2) 4 n70 channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 3) 4 n66 channels (AWS Band - 2190 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.
- 4) All radios at the proposed installation were considered to be running at full power and were uncombined in their RF transmissions paths per carrier prescribed configuration. Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. This is rarely the case, and if so, is never continuous.
- 5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative



estimate as gain reductions for these particular antennas are typically much higher in this direction.

- 6) The antennas used in this modeling are the JMA MX08FRO665-2I for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector A, the JMA MX08FRO665-2I for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector B, the JMA MX08FRO665-2I for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.
- 7) The antenna mounting height centerline of the proposed antennas is 200 feet above ground level (AGL).
- 8) Emissions values for additional carriers were taken from the Connecticut Siting Council active database. Values in this database are provided by the individual carriers themselves.
- 9) All calculations were done with respect to uncontrolled / general population threshold limits.





## Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	I	Antenna #:	I	Antenna #:	I
Make / Model:	JMA MX08FRO665-2I	Make / Model:	JMA MX08FRO665-2I	Make / Model:	JMA MX08FRO665-2I
Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz
Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd
Height (AGL):	200 feet	Height (AGL):	200 feet	Height (AGL):	200 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	5,236.31	ERP (W):	5,236.31	ERP (W):	5,236.31
Antenna AI MPE %:	0.63%	Antenna BI MPE %:	0.63%	Antenna CI MPE %:	0.63%



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Site Composite MPE %	
Carrier	MPE %
Dish Wireless (Max at Sector A):	0.63%
Nextel	0.1%
AT&T	0.5%
Verizon	4.02%
Site Total MPE % :	5.25%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	0.63%
Dish Wireless Sector B Total:	0.63%
Dish Wireless Sector C Total:	0.63%
Site Total MPE % :	5.25%

Dish Wireless Maximum MPE Power Values (Sector A)							
Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ( $\mu\text{W}/\text{cm}^2$ )	Frequency (MHz)	Allowable MPE ( $\mu\text{W}/\text{cm}^2$ )	Calculated % MPE
Dish Wireless 600 MHz n71	4	223.68	200.0	0.85	600 MHz n71	400	0.21%
Dish Wireless 1900 MHz n70	4	542.70	200.0	2.07	1900 MHz n70	1000	0.21%
Dish Wireless 2190 MHz n66	4	542.70	200.0	2.07	2190 MHz n66	1000	0.21%
						Total:	0.63%

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



## Summary

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

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

Dish Wireless Sector	Power Density Value (%)
Sector A:	0.63%
Sector B:	0.63%
Sector C:	0.63%
Dish Wireless Maximum MPE % (Sector A):	0.63%
Site Total:	5.25%
Site Compliance Status:	<b>COMPLIANT</b>

The anticipated composite MPE value for this site assuming all carriers present is **5.25%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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



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C O R P O R A T I O N

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## Structural Analysis Report

**Structure** : 302.5 ft Self Supported Tower  
**ATC Site Name** : Killingworth, CT  
**ATC Asset Number** : 88013  
**Engineering Number** : 13681397\_C3\_02  
**Proposed Carrier** : DISH WIRELESS L.L.C.  
**Carrier Site Name** : BOBDL00028A  
**Carrier Site Number** : BOBDL00028A  
**Site Location** : 131 Little City Road  
Killingworth, CT 06419-1014  
41.428800, -72.603800  
**County** : Middlesex  
**Date** : July 27, 2021  
**Max Usage** : 74%  
**Result** : Pass

Prepared By:  
Isaac P. Dodson  
Structural Engineer III

Reviewed By:



**COA: PEC.0001553**



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## **Introduction**

The purpose of this report is to summarize results of a structural analysis performed on the 302.5 ft self supported tower to reflect the change in loading by DISH WIRELESS L.L.C..

## **Supporting Documents**

<b>Tower Drawings</b>	Mapping by TEP Job #080167, dated February 1, 2008
<b>Foundation Drawing</b>	Mapping by Geotel Report #E08-150-F, dated February 20, 2008
<b>Geotechnical Report</b>	Geotel Report #E08-150-G, dated February 20, 2008
<b>Modifications</b>	ATC Project #50481632, dated November 12, 2012

## **Analysis**

The tower was analyzed using American Tower Corporation's tower analysis software. This program considers an elastic three-dimensional model and second-order effects per ANSI/TIA-222.

<b>Basic Wind Speed:</b>	121 mph (3-Second Gust)
<b>Basic Wind Speed w/ Ice:</b>	50 mph (3-Second Gust) w/ 1" radial ice concurrent
<b>Code:</b>	ANSI/TIA-222-H / 2015 IBC / 2018 Connecticut State Building Code
<b>Exposure Category:</b>	B
<b>Risk Category:</b>	II
<b>Topographic Factor Procedure:</b>	Method 1
<b>Topographic Category:</b>	1

## **Conclusion**

Based on the analysis results, the structure meets the requirements per the applicable codes listed above. The tower and foundation can support the equipment as described in this report.

If you have any questions or require additional information, please contact American Tower via email at [Engineering@americantower.com](mailto:Engineering@americantower.com). Please include the American Tower site name, site number, and engineering number in the subject line for any questions.

### Existing and Reserved Equipment

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
272.0	3	Kaelus DBC0061F1V51-2	Sector Frame	(2) 0.39" Fiber Trunk (4) 0.92" Cable (6) 1 5/8" Coax (1) 1.16" SOOW	AT&T MOBILITY
	1	Raycap DC6-48-60-18-8F			
	1	CCI OPA65R-BU8D			
	1	CCI DMP65R-BU8D			
	1	CCI TPA-65R-LCUUUU-H8			
	2	CCI OPA65R-BU6D			
	2	CCI DMP65R-BU6DA			
	2	Quintel QS66512-2			
	3	Powerwave Allgon 7770.00			
	3	Ericsson RRUS-32 B30 (77 lbs)			
	3	Ericsson RRUS 32 B2			
	2	Raycap DC6-48-60-18-8F ("Squid")			
	3	Ericsson RRUS 4426 B66			
	6	Powerwave Allgon LGP17201			
	3	Ericsson RRUS 4449 B5, B12			
	3	Ericsson RRUS 4478 B14			
261.0	6	Swedcom ALP 9011-DIN	Sector Frame	(6) 1 5/8" Coax	SPRINT NEXTEL
245.0	3	Ericsson Radio 4460 B25+B66	Sector Frame	(3) 1.99" Hybrid	T-MOBILE
	3	Ericsson Radio 4480 B71+B85A			
	3	Ericsson Air6449 B41			
	3	RFS APXVAALL24 43-U-NA20			
171.0	2	Raycap RC3DC-3315-PF-48	Sector Frame	(10) 1 5/8" Coax (2) 1 5/8" Hybriflex	VERIZON WIRELESS
	3	Samsung B2/B66A RRH-BR049			
	3	Commscope CBC78T-DS-43-2X			
	3	Samsung B5/B13 RRH-BR04C			
	6	Commscope JAHH-65B-R3B			
	6	Antel LPA-80080/6CF ____			
	3	Samsung MT6407-77A			
145.0	3	Generic 36" x 6" Panel	Leg	(6) 1 5/8" Coax	OTHER
	6	Generic TTA			

### Equipment to be Removed

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
No loading was considered as removed as part of this analysis.					

**Proposed Equipment**

Elev. <sup>1</sup> (ft)	Qty	Equipment	Mount Type	Lines	Carrier
200.0	1	Commscope RDIDC-9181-PF-48	Sector Frame	(1) 1.60" Hybrid	DISH WIRELESS L.L.C.
	3	Fujitsu TA08025-B604			
	3	Fujitsu TA08025-B605			
	3	JMA Wireless MX08FRO665-21			

<sup>1</sup> Contracted elevations are shown for appurtenances within contracted installation tolerances. Appurtenances outside of contract limits are shown at installed elevations.

Install proposed coax on the tower face with the least amount of existing coax.

**Structure Usages**

Structural Component	Controlling Usage	Pass/Fail
Legs	72%	Pass
Diagonals	73%	Pass
Truss Diagonals	62%	Pass
Horizontals	74%	Pass
Truss Horizontals	41%	Pass
Anchor Bolts	57%	Pass

**Foundations**

Reaction Component	Analysis Reactions	% of Usage
Uplift (Kips)	262.6	63%
Axial (Kips)	408.9	21%

The structure base reactions resulting from this analysis were found to be acceptable through analysis based on geotechnical and foundation information, therefore no modification or reinforcement of the foundation will be required.



## **Standard Conditions**

All engineering services performed by A.T. Engineering Service, PLLC are prepared on the basis that the information used is current and correct. This information may consist of, but is not limited to the following:

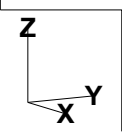
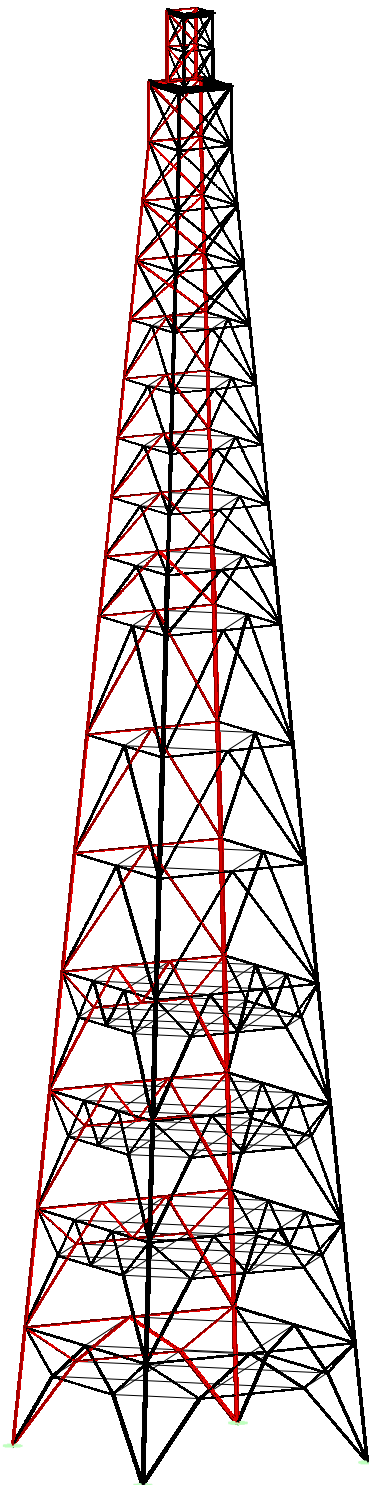
- Information supplied by the client regarding antenna, mounts and feed line loading
- Information from drawings, design and analysis documents, and field notes in the possession of A.T. Engineering Service, PLLC

It is the responsibility of the client to ensure that the information provided to A.T. Engineering Service, PLLC and used in the performance of our engineering services is correct and complete.

All assets of American Tower Corporation, its affiliates and subsidiaries (collectively “American Tower”) are inspected at regular intervals. Based upon these inspections and in the absence of information to the contrary, American Tower assumes that all structures were constructed in accordance with the drawings and specifications.

Unless explicitly agreed by both the client and A.T. Engineering Service, PLLC, all services will be performed in accordance with the current revision of ANSI/TIA-222.

All services are performed, results obtained, and recommendations made in accordance with generally accepted engineering principles and practices. A.T. Engineering Service, PLLC is not responsible for the conclusions, opinions and recommendations made by others based on the information supplied herein.





Project Name : 88013 - Killingworth, CT  
Project Notes : 0AA72011  
Project File : X:\J-M\Killingworth, CT (88013)\Structural Info\88013 - Killingworth, CT.tow  
Date run : 11:40:15 AM Tuesday, July 27, 2021  
by : Tower Version 16.01  
Licensed to : American Tower Corp.

Successfully performed nonlinear analysis

Member check option: ANSI/TIA 222-G-1  
Connection rupture check: Not Checked  
Crossing diagonal check: Fixed  
Included angle check: None  
Climbing load check: None  
Redundant members checked with: Actual Force  
Loads from file: X:\J-M\Killingworth, CT (88013)\Structural Info\88013 - Killingworth, CT.eia

\*\*\* Analysis Results:

Maximum element usage is 74.31% For Angle "H 3P" in load case "W -90"

Foundation Design Forces For All Load Cases:

Note: loads are factored.

Load Case	Foundation	Axial	Shear	Bending	Foundation
Description	Force	Force	Moment	Usage	
(kips)	(kips)	(ft-k)		%	
W 0	OP	303.86	57.19	2.75	0.00
W 0	OX	292.78	54.98	2.70	0.00
W 0	OXY	-146.50	31.59	3.68	0.00
W 0	OY	-150.28	33.12	3.77	0.00
W 180	OP	-145.02	32.87	3.83	0.00
W 180	OX	-141.36	31.39	3.74	0.00
W 180	OXY	287.64	54.74	2.77	0.00
W 180	OY	298.60	56.88	2.82	0.00
W 45	OP	408.91	75.12	2.27	0.00
W 45	OX	77.53	22.14	3.39	0.00
W 45	OXY	-262.59	52.33	4.20	0.00
W 45	OY	76.00	21.75	3.35	0.00
W -45	OP	83.46	23.41	3.50	0.00
W -45	OX	402.98	74.46	2.30	0.00
W -45	OXY	74.58	21.43	3.30	0.00
W -45	OY	-261.17	52.46	4.24	0.00
W 90	OP	304.76	57.42	2.79	0.00
W 90	OX	-149.66	33.24	3.80	0.00
W 90	OXY	-145.60	31.41	3.67	0.00
W 90	OY	290.35	54.68	2.69	0.00
W -90	OP	-145.94	33.05	3.84	0.00
W -90	OX	301.05	57.20	2.83	0.00
W -90	OXY	286.71	54.52	2.73	0.00
W -90	OY	-141.97	31.28	3.72	0.00
W 0 Ice	OP	161.78	23.27	2.62	0.00
W 0 Ice	OX	155.03	22.34	2.73	0.00
W 0 Ice	OXY	47.54	3.51	3.47	0.00
W 0 Ice	OY	49.90	3.32	3.48	0.00
W 180 Ice	OP	56.52	4.04	3.54	0.00
W 180 Ice	OX	53.96	4.14	3.54	0.00
W 180 Ice	OXY	148.60	22.00	2.68	0.00
W 180 Ice	OY	155.16	22.82	2.59	0.00
W 45 Ice	OP	187.00	27.75	2.52	0.00
W 45 Ice	OX	105.08	13.43	3.07	0.00
W 45 Ice	OXY	19.00	2.90	3.66	0.00
W 45 Ice	OY	103.15	13.26	3.05	0.00
W -45 Ice	OP	110.02	13.98	3.12	0.00
W -45 Ice	OX	182.07	27.35	2.48	0.00
W -45 Ice	OXY	98.92	13.07	3.02	0.00
W -45 Ice	OY	23.23	2.64	3.70	0.00
W 90 Ice	OP	161.94	23.32	2.63	0.00
W 90 Ice	OX	21.67	3.46	3.50	0.00
W 90 Ice	OXY	47.71	3.58	3.47	0.00
W 90 Ice	OY	152.92	22.18	2.71	0.00
W -90 Ice	OP	56.29	3.96	3.53	0.00
W -90 Ice	OX	187.32	23.00	2.61	0.00
W -90 Ice	OXY	148.37	21.94	2.67	0.00
W -90 Ice	OY	52.25	4.02	3.53	0.00

Summary of Joint Support Reactions For All Load Cases:

Load Case	Joint	Long.	Tran.	Vert.	Shear	Tran.	Long.	Bending	Foundation
Label		(kips)	(kips)	(kips)	Force	Moment	Moment	Moment	Usage
		(kips)	(kips)	(kips)	(kips)	(ft-k)	(ft-k)	(ft-k)	%
W 0	OP	-48.55	-30.22	-303.86	57.19	-0.57	-2.69	2.75	-3.35 0.00
W 0	OX	-46.19	29.82	-292.78	54.98	0.78	2.59	2.70	-2.37 0.00
W 0	OXY	-28.72	-13.15	146.50	31.59	0.58	-3.63	3.68	3.12 0.00
W 0	OY	-30.23	13.55	150.28	33.12	-0.57	-3.73	3.77	-3.07 0.00
W 180	OP	30.19	13.00	145.02	32.87	-0.56	3.79	3.83	3.09 0.00
W 180	OX	28.73	-12.66	141.36	31.39	0.58	3.70	3.74	-3.14 0.00
W 180	OXY	46.23	29.32	-287.64	54.74	0.78	2.66	2.77	-3.39 0.00
W 180	OY	48.54	-29.66	-298.60	56.88	-0.58	2.76	2.82	3.37 0.00
W 45	OP	-52.93	-53.31	408.91	75.12	1.62	-1.58	2.27	0.00 0.00
W 45	OX	-21.95	-2.92	-77.53	22.14	2.81	-1.89	3.39	4.75 0.00
W 45	OXY	-37.10	-36.90	262.59	52.33	2.96	-2.98	4.20	-0.00 0.00
W 45	OY	-2.73	-58.76	76.00	21.75	1.87	2.77	3.35	-4.74 0.00
W -45	OP	-23.19	3.15	-83.46	23.41	-2.91	-1.95	3.50	-4.76 0.00
W -45	OX	-51.69	53.60	-402.98	74.46	-1.72	-1.53	2.30	-0.01 0.00
W -45	OXY	-2.29	21.31	-74.58	21.43	-1.87	-2.72	3.30	4.76 0.00
W -45	OY	-37.53	36.65	-161.17	52.46	-2.96	3.03	4.24	0.02 0.00
W 90	OP	-30.04	-48.93	-304.76	57.42	2.72	0.60	2.79	3.35 0.00
W 90	OX	13.36	-30.43	149.66	33.24	3.75	0.56	3.80	3.07 0.00
W 90	OXY	-13.18	29.51	-145.60	31.41	3.62	0.59	3.67	3.12 0.00
W 90	OY	29.86	-45.81	-290.35	54.68	2.58	-0.75	2.69	-3.37 0.00
W -90	OP	12.97	30.40	145.94	33.05	-3.80	0.55	3.84	-3.08 0.00
W -90	OX	-29.64	48.92	-301.05	57.20	-2.77	0.61	2.83	-3.37 0.00
W -90	OXY	29.51	48.84	-286.71	54.52	-2.63	0.75	2.73	3.38 0.00
W -90	OY	-12.84	28.52	141.97	31.28	-3.67	-0.59	3.72	3.14 0.00
W 0 Ice	OP	-18.36	-14.29	-161.78	23.27	-2.11	1.56	2.62	-0.67 0.00
W 0 Ice	OX	-17.32	14.10	-155.03	22.34	2.21	1.59	2.73	-0.59 0.00
W 0 Ice	OXY	0.14	3.51	-47.54	3.51	2.16	-2.72	3.47	0.66 0.00
W 0 Ice	OY	0.08	-3.32	-49.90	3.32	-2.15	-2.74	3.48	-0.63 0.00
W 180 Ice	OP	-0.14	-4.03	-56.52	4.04	-2.13	2.82	3.54	0.66 0.00
W 180 Ice	OX	-0.12	4.14	-53.96	4.14	2.16	2.81	3.54	-0.69 0.00
W 180 Ice	OXY	17.39	13.47	-148.60	22.00	2.21	-1.51	2.68	-0.69 0.00
W 180 Ice	OY	18.34	-13.58	-155.16	22.82	-2.12	-1.48	2.59	0.69 0.00
W 45 Ice	OP	-19.54	-19.71	-187.00	27.75	-1.77	1.79	2.52	0.00 0.00
W 45 Ice	OX	-11.74	6.51	-105.08	13.43	2.54	1.72	3.07	0.97 0.00
W 45 Ice	OXY	-2.03	-2.07	-19.00	2.90	2.59	-2.59	3.66	-0.00 0.00
W 45 Ice	OY	6.47	-11.58	-103.15	13.26	-1.72	-2.53	3.05	0.97 0.00
W -45 Ice	OP	-12.40	-6.46	-110.02	13.98	-2.61	1.71	3.12	-0.99 0.00
W -45 Ice	OX	-18.88	19.80	-182.07	27.35	1.70	1.80	2.48	-0.02 0.00
W -45 Ice	OXY	6.17	11.52	-98.92	13.07	1.67	-2.52	3.02	0.99 0.00
W -45 Ice	OY	-1.73	1.99	-23.23	2.64	-2.64	-2.59	3.70	0.02 0.00
W 90 Ice	OP	-14.16	-18.53	-161.94	23.32	-1.55	2.13	2.63	0.67 0.00
W 90 Ice	OX	-3.45	0.13	-51.67	3.46	2.75	2.16	3.50	0.63 0.00
W 90 Ice	OXY	3.58	0.10	-47.71	3.58	2.73	-2.15	3.47	-0.67 0.00
W 90 Ice	OY	14.03	-17.17	-152.92	22.18	-1.59	-2.20	2.71	-0.67 0.00
W -90 Ice	OP	-3.96	-0.17	-56.29	3.96	-2.81	2.14	3.53	-0.65 0.00
W -90 Ice	OX	-13.66	18.51	-157.32	23.00	1.49	2.14	2.61	-0.69 0.00
W -90 Ice	OXY	13.59	17.22	-148.37	21.94	1.52	-2.19	2.67	0.68 0.00
W -90 Ice	OY	4.02	-0.08	-52.25	4.02	-2.79	-2.15	3.53	0.69 0.00

Summary of Joint Support Reactions For All Load Cases in Direction of Leg:

Load Case	Support	Origin	Leg	Force	In	Residual	Shear	Residual	Shear	Residual	Shear	Total	Total	Total
Joint	Joint	Member	Leg	Dir.	Perpendicular	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Horizontal	Long.	Tran.	Vert.
					(kips)	To Leg	To Leg	To Leg	To Leg	To Leg	To Leg	(kips)	(kips)	(kips)
W 0	OP	1P	L 1P		308.030	26.752	26.867	25.806	7.474	-48.55	-30.22	-303.86		
W 0	OX	1X	L 1X		252.814	24.271	25.527	24.271	7.909	-46.19	29.82	-292.78		
W 0	OXY	1XY	L 1XY		-148.806	17.824	17.885	17.751	2.187	-28.72	-13.15	146.50		
W 0	OY	1Y	L 1Y		-152.703	19.053	19.118	19.118	-2.298	-30.23	13.55	150.28		
W 180	OP	1P	L 1P		-147.424	19.385	19.451	-19.332	-2.144	30.19	13.00	145.02		
W 180	OX	1X	L 1X		-143.656	18.203	18.265	-18.146	-2.079	28.73	-12.66	141.36		
W 180	OXY	1XY	L 1XY		291.660	25.784	25.897	-24.698	-7.787	46.23	29.32	-287.64		
W 180	OY	1Y	L 1Y		302.757	27.074	27.189	-26.189	7.306	48.54	-29.66	-298.60		
W 45	OP	1P	L 1P		414.547	31.663	31.840	24.271	22.326	-52.93	-53.31	-408.91		
W 45	OX	1X	L 1X		78.518	18.342	18.350	16.146	8.721	-21.95	-2.92	-77.53		
W 45	OXY	1XY	L 1XY		-266.640	24.396	24.532	17.444	17.249	-37.10	-36.90	262.59		
W 45	OY	1Y	L 1Y		76.984	17.973	17.982	8.416	15.890	-2.73	-21.58	-76.00		
W -45	OP	1P	L 1P		84.492	18.369	18.377	16.945	-9.397	-23.19	3.15	-83.46		
W -45	OX	1X	L 1X		408.582	31.645	31.822	21.524	-23.438	-51.69	53.60	-402.98		
W -45	OXY	1XY	L 1XY		75.577	17.579	17.589	7.875	-15.727	-2.29	21.31	-74.58		
W -45	OY	1Y	L 1Y		-245.240	24.680	24.817	17.986	22.701	-52.93	-53.31	-408.91		
W 90	OP	1P	L 1P		308.948	26.991	27.105	7.232	26.122	-30.04	-48.93	-304.76		
W 90	OX	1X	L 1X		-152.085	19.287	19.352	-2.163	19.231	13.36	-30.43	149.66		
W 90	OXY	1XY	L 1XY		-147.896	17.693	17.757	-2.284	-17.610	-13.10	-28.51	145.60		
W 90	OY	1Y	L 1Y		294.369	25.296	25.409	-8.129	24.074	29.86	-45.81	-290.35		
W -90	OP	1P	L 1P		-148.360	19.518	19.583	-2.050	-19.476	12.97	30.40	145.94		
W -90	OX	1X	L 1X		305.227	27.215	27.329	7.109	-26.388	-29.64	48.92	-301.05		

W -90	OXY	1XY	L 1XY	290.725	25.560	25.674	-8.047	-24.380	29.51	45.84	-286.71
W -90	OXY	1Y	L 1Y	144.963	16.661	16.829	-2.216	-17.893	-12.84	18.52	141.97
W 0 tce	OP	1P	L 1P	163.307	6.592	6.622	6.253	2.180	-18.36	-14.29	-161.78
W 0 tce	OX	1X	L 1X	156.504	6.218	6.248	5.728	-2.495	-17.33	14.10	-155.03
W 0 tce	OXY	1XY	L 1XY	47.545	3.411	3.421	3.421	0.047	0.14	3.51	-47.54
W 0 tce	OXY	1Y	L 1Y	18.873	3.653	3.653	3.653	-0.413	0.08	-3.32	-49.90
W 180 tce	OP	1P	L 1P	56.517	4.080	4.092	-4.088	-0.197	-0.14	-4.03	-56.52
W 180 tce	OX	1X	L 1X	53.976	3.910	3.921	-3.919	-0.103	-0.12	4.14	-53.96
W 180 tce	OXY	1XY	L 1XY	18.074	4.695	4.695	-6.272	-2.344	17.39	13.47	-148.60
W 180 tce	OXY	1Y	L 1Y	156.670	6.978	7.008	-6.728	1.962	18.34	-13.58	-155.16
W 45 tce	OP	1P	L 1P	188.886	7.910	7.954	5.538	5.709	-19.54	-19.71	-187.00
W 45 tce	OX	1X	L 1X	105.859	4.101	4.106	3.877	1.352	-11.74	6.51	-105.08
W 45 tce	OXY	1XY	L 1XY	18.593	4.883	4.910	4.554	3.489	-2.03	-2.07	-19.00
W 45 tce	OXY	1Y	L 1Y	103.916	4.050	4.054	1.248	3.858	6.47	-11.58	-103.15
W -45 tce	OP	1P	L 1P	110.816	4.525	4.528	4.166	-1.774	-12.40	-6.46	-110.02
W -45 tce	OX	1X	L 1X	183.932	5.055	5.099	5.248	6.169	-18.88	19.80	-182.07
W -45 tce	OXY	1XY	L 1XY	99.686	4.288	4.294	1.232	-4.113	6.17	11.52	-98.92
W -45 tce	OXY	1Y	L 1Y	22.824	5.063	5.091	3.471	-3.724	-1.73	1.99	-23.23
W 90 tce	OP	1P	L 1P	163.478	6.693	6.723	2.041	6.405	-14.16	-18.53	-161.94
W 90 tce	OX	1X	L 1X	51.649	3.750	3.762	4.114	3.739	-3.45	0.13	-51.67
W 90 tce	OXY	1XY	L 1XY	47.714	3.463	3.472	-0.010	3.472	3.58	0.10	-47.71
W 90 tce	OXY	1Y	L 1Y	154.392	6.254	6.285	-2.589	5.727	14.03	-17.17	-152.92
W -90 tce	OP	1P	L 1P	156.286	6.256	6.286	-0.257	-4.041	-3.96	-0.17	-56.29
W -90 tce	OX	1X	L 1X	158.844	6.963	6.993	1.883	-6.734	-13.66	18.51	-157.32
W -90 tce	OXY	1XY	L 1XY	149.844	6.569	6.600	-2.488	-6.113	13.59	17.22	-148.37
W -90 tce	OXY	1Y	L 1Y	52.263	3.819	3.829	-0.111	-3.827	4.02	-0.08	-52.25

Overturning Moment Summary For All Load Cases:

Load Case	Transverse Moment (ft-k)	Longitudinal Moment (ft-k)	Torsional Moment (ft-k)	Resultant Moment (ft-k)	Transverse Force (kips)	Longitudinal Force (kips)	Vertical Force (kips)
W 0	195.774	-23973.640	82.869	23974.439	-153.680	299.855	0.000
W 180	196.021	23415.081	-82.987	23415.901	-0.000	-153.680	299.855
W 45	17977.707	-18059.783	-30.310	25482.419	114.708	299.855	0.000
W -45	-17583.041	-18060.032	148.664	25205.716	-114.708	299.855	0.000
W 90	23891.733	-127.945	125.770	23893.350	-299.855	0.000	153.680
W -90	-23497.259	-278.141	125.858	23498.906	-153.680	-0.000	299.855
W 0 tce	244.491	-5886.304	18.912	5891.380	-0.000	35.473	414.238
W 180 tce	244.589	5148.994	-18.922	5891.380	0.000	-35.473	414.238
W 45 tce	4456.020	-4560.048	-6.944	6375.747	26.838	26.838	414.238
W -45 tce	-3964.156	-4560.078	33.893	6042.255	-26.838	26.838	414.238
W 90 tce	5782.318	-348.554	-28.733	5792.813	-35.473	-0.000	414.238
W -90 tce	-5290.472	-348.657	28.745	5301.949	-35.473	0.000	414.238

EIA Sections Information:

Section Label	Top Z (ft)	Bottom Z (ft)	Joint Z (ft)	Member Count	Top Width (ft)	Bottom Width (ft)	Gross Area (ft^2)	Face A Factor	Face B Factor	Dead Load (kips)
295.1-302.6	302.600	295.100	8	20	7.00	7.00	52.50	1.0000	1.0000	1.200
287.6-295.1	295.100	287.600	8	16	7.00	7.00	52.50	1.0000	1.0000	1.200
287.5-287.6	287.600	287.500	8	16	7.00	12.50	0.98	1.0000	1.0000	1.200
275.0-287.5	287.500	275.000	8	16	12.50	12.50	156.25	1.1150	1.1150	1.338
262.5-275.0	275.000	262.500	8	16	12.50	14.37	167.95	1.1840	1.1840	1.421
250.0-262.5	262.500	250.000	8	16	14.37	16.24	191.34	1.1970	1.1970	1.437
237.5-250.0	250.000	237.500	8	16	14.37	18.11	214.71	1.2060	1.2060	1.447
225.0-237.5	237.500	225.000	16	24	18.11	19.98	238.12	1.2650	1.2650	1.518
212.5-225.0	225.000	212.500	16	24	19.98	21.86	261.51	1.2790	1.2790	1.535
200.0-212.5	212.500	200.000	16	24	21.86	23.73	284.90	1.2850	1.2850	1.542
187.5-200.0	200.000	187.500	16	24	23.73	25.60	308.29	1.2900	1.2900	1.548
175.0-187.5	187.500	175.000	16	24	25.60	27.47	331.68	1.2780	1.2780	1.533
150.0-175.0	175.000	150.000	16	24	27.47	31.21	373.53	1.3590	1.3590	1.631
125.0-150.0	150.000	125.000	16	32	31.21	34.95	427.09	1.3640	1.3640	1.637
100.0-125.0	125.000	100.000	20	32	34.95	38.70	920.65	1.3320	1.3320	1.599
75.00-100.0	100.000	75.000	36	76	38.70	42.44	1014.21	1.3010	1.3010	1.561
50.00-75.00	75.000	50.000	36	76	42.44	46.18	1107.77	1.3640	1.3640	1.637
25.00-50.00	50.000	25.000	32	68	46.18	49.92	1201.33	1.1750	1.1750	1.410
0.000-25.00	25.000	0.000	20	40	49.92	53.67	1294.89	1.2340	1.2340	1.481

Printed capacities do not include the strength factor entered for each load case.  
The Group Summary reports on the member and load case that resulted in maximum usage which may not necessarily be the same as that which produces maximum force.

Group Summary (Compression Portion):

Group Label	Group Desc.	Type	Angle Size	Steel Strength	Max Usage	Comp. Use In Member	Comp. Force Control	Comp. Load Case	L/r	Comp. Capacity	Comp. Shear Capacity (kips)	Comp. Connect.	Comp. Connect.	RLX	RLY	RLZ	L/r	KL/r Length	Curve	No. Member	No. Of Bolts		
				(ksi)	%	Comp. %	(kips)			(kips)	(kips)	(kips)	(kips)						(ft)				
Leg S1	L 8" x 8" x 1.125"	SAR	8X8X1.13	33.0	72.45	Comp 72.45	1 P	-352.508	W 45	486.535	0.000	0.000	0.333	0.333	0.333	64.45	64.45	25.140	1	0			
Leg S2	L 8" x 8" x 1.125"	SAR	8X8X1.13	33.0	68.61	Comp 68.61	1 P	-333.830	W 45	486.535	0.000	0.000	0.333	0.333	0.333	64.45	64.45	25.140	1	0			
Leg S3	L 8" x 8" x 1.125"	SAR	8X8X1.13	33.0	55.03	Comp 55.03	1 P	-294.845	W 45	535.809	0.000	0.000	0.167	0.167	0.167	32.24	32.24	25.140	1	0			
Leg S4	L 8" x 8" x 1.125"	SAR	8X8X1.13	33.0	48.92	Comp 48.92	1 P	-255.854	W 45	523.034	0.000	0.000	0.222	0.222	0.222	42.97	42.97	25.140	1	0			
Leg S5	L 8" x 8" x 1.125"	SAR	8X8X1.13	33.0	45.21	Comp 45.21	1 P	-219.961	W 45	486.537	0.000	0.000	0.333	0.333	0.333	64.45	64.45	25.140	1	0			
Leg S6	L 8" x 8" x 1"	SAR	8X8X1	33.0	42.10	Comp 42.10	6 P	-183.731	W 45	436.384	0.000	0.000	0.333	0.333	0.333	64.45	64.45	25.140	1	0			
Leg S7	L 8" x 8" x 0.875"	SAR	8X8X0.88	33.0	38.27	Comp 38.27	7 P	-147.462	W 45	385.330	0.000	0.000	0.333	0.333	0.333	64.04	64.04	25.140	1	0			
Leg S8	L 8" x 8" x 0.75"	SAR	8X8X0.75	33.0	36.16	Comp 36.16	8 P	-127.517	W 45	352.634	0.000	0.000	0.500	0.500	0.500	47.73	47.73	12.570	1	0			
Leg S9	L 6" x 6" x 0.75"	SAR	6X6X0.88	33.0	38.74	Comp 38.74	9 P	-109.631	W 45	282.972	0.000	0.000	0.500	0.500	0.500	64.46	64.46	12.570	1	0			
Leg S10	L 6" x 6" x 0.875"	SAR	6X6X0.88	33.0	33.07	Comp 33.07	7 P	-93.589	W 45	282.972	0.000	0.000	0.500	0.500	0.500	64.46	64.46	12.570	1	0			
Leg S11	L 6" x 6" x 0.75"	SAR	6X6X0.75	33.0	30.33	Comp 30.33	11 P	-74.442	W 45	245.466	0.000	0.000	0.500	0.500	0.500	64.46	64.46	12.570	1	0			
Leg S12	L 6" x 6" x 0.75"	SAR	6X6X0.75	33.0	28.20	Comp 28.20	12 P	-69.393	W 45	245.466	0.000	0.000	0.500	0.500	0.500	64.46	64.46	12.570	1	0			
Leg S13	L 6" x 6" x 0.625"	SAR	6X6X0.63	33.0	28.16	Comp 28.16	13 P	-58.316	W 45	207.060	0.000	0.000	0.500	0.500	0.500	63.91	63.91	12.570	1	0			
Leg S14	L 6" x 6" x 0.625"	SAR	6X6X0.63	33.0	21.00	Comp 21.00	14 X	-43.476	W 45	207.060	0.000	0.000	0.500	0.500	0.500	63.91	63.91	12.570	1	0			
Leg S15	L 6" x 6" x 0.5625"	SAR	6X6X0.56	33.0	16.08	Comp 16.08	15 X	-30.152	W 45	187.505	0.000	0.000	0.500	0.500	0.500	63.91	63.91	12.570	1	0			
Leg S16	L 6" x 6" x 0.5625"	SAR	6X6X0.56	33.0	15.44	Comp 15.44	16 X	-25.464	W 45	187.505	0.000	0.000	0.500	0.500	0.500	63.56	63.56	12.500	1	0			
Leg S17	L 6" x 6" x 0.5625"	SAR	6X6X0.56	33.0	3.96	Comp 3.96	17 P	-8.210	W 45	207.027	0.000	0.000	1.000	1.000	1.000	39.56	39.56	3.890	1	0			
Leg S18	L 6" x 6" x 0.5"	SAR	6X6X0.5	33.0	4.56	Comp 4.56	18 P	-7.213	W 45	158.188	0.000	0.000	1.000	1.000	1.000	76.27	76.27	7.500	1	0			
Leg S19	L 6" x 6" x 0.5"	SAR	6X6X0.5	33.0	0.003	Comp 0.003	19 P	-0.496	W 45	158.188	0.000	0.000	1.000	1.000	1.000	76.27	76.27	7.500	1	0			
Diag S1	B/B 13.5"x4"x0.4375"	DAS	5X3.5X0.44	33.0	34.63	Comp 34.63	2 X	-43.581	W -90	125.862	0.000	0.000	0.500	0.500	0.500	130.87	126.69	22.030	6	0			
Diag S2	B/B 13.5"x4"x0.3125"	DAS	4X3X0.31	33.0	48.29	Comp 48.29	4 X	-31.229	W -90	64.665	0.000	0.000	0.500	0.500	0.500	137.27	130.62	20.294	6	0			
Diag S3	B/B 13.5"x4"x0.3125"	DAS	4X3X0.31	33.0	45.57	Comp 45.57	6 X	-40.345	W -90	66.745	0.000	0.000	0.500	0.500	0.500	123.32	122.04	19.834	6	0			
Diag S4	B/B 13.5"x4"x0.3125"	DAS	4X3X0.31	33.0	41.01	Comp 41.01	8 X	-30.885	W -90	66.745	0.000	0.000	0.333	0.333	0.333	191.00	163.00	19.834	6	0			
Diag S5	B/B 13.5"x4"x0.25"	DAS	4X3X0.25	33.0	72.65	Comp 72.65	9 X	-29.402	W -90	40.472	0.000	0.000	0.333	0.333	0.333	197.92	167.92	31.368	6	0			
Diag S6	B/B 13.5"x4"x0.25"	DAS	4X3X0.25	33.0	68.85	Comp 68.85	11 X	-29.397	W -90	42.698	0.000	0.000	0.333	0.333	0.333	191.00	163.00	30.561	6	0			
Diag S7	B/B 13.5"x4"x0.25"	DAS	4X3X0.25	33.0	65.01	Comp 65.01	13 X	-29.397	W -90	42.698	0.000	0.000	0.333	0.333	0.333	159.71	159.71	30.561	6	0			
Diag S8	B/B 12.5"x3"x0.3125"	DAS	3X2.5X0.31	33.0	42.67	Comp 42.67	15 X	-16.732	W -90	39.210	0.000	0.000	0.500	0.500	0.500	152.84	140.19	18.595	6	0			
Diag S9	B/B 12.5"x2.5"x0.25"	DAS	2.5X2.5X0.25	33.0	62.75	Comp 62.75	18 X	-14.679	W 180	23.392	0.000	0.000	0.500	0.500	0.500	180.66	157.30	10.915	6	0			
Diag S10	B/B 12.5"x2.5"x0.25"	DAS	2.5X2.5X0.25	33.0	59.62	Comp 59.62	20 X	-14.679	W 180	23.392	0.000	0.000	0.500	0.500	0.500	180.66	157.30	10.915	6	0			
Diag S11	B/B 12.5"x2.5"x0.25"	DAS	2.5X2.5X0.25	33.0	47.07	Comp 47.07	21 X	-12.302	W -90	26.134	0.000	0.000	0.500	0.500	0.500	167.69	149.33	16.630	6	0			
Diag S12	B/B 12.5"x2.5"x0.25"	DAS	2.5X2.5X0.25	33.0	45.38	Comp 45.38	23 X	-12.514	W -90	27.579	0.000	0.000	0.500	0.500	0.500	161.65	145.62	16.630	6	0			
Diag S13	B/B 12.5"x2.5"x0.25"	DAS	2.5X2.5X0.25	33.0	43.00	Comp 43.00	25 X	-12.514	W -90	27.579	0.000	0.000	0.500	0.500	0.500	161.65	145.62	16.630	6	0			
Diag S14	L 3" x 4" x 0.25"	SAU	4X3X0.25	33.0	26.03	Tens 0	0.28 Y	0.000	0.001	0.001	0.000	0.000	0.520	0.500	0.520	189.64	162.83	9.784	6	0			
Diag S15	L 3" x 3.5" x 0.25"	SAU	3.5X3X0.25	33.0	24.72	Tens 0	0.30 Y	0.000	0.001	0.001	0.000	0.000	0.520	0.500	0.520	181.71	157.95	8.375	6	0			
Diag S16	L 3.5" x 3.5" x 0.25"	SAU	3.5X3.5X0.25	33.0	14.88	Tens 0	0.32 Y	0.000	0.001	0.001	0.000	0.000	0.520	0.500	0.520	158.95	143.95	1.678	6	0			
Diag S17	L 3" x 3" x 0.25"	SAU	3.5X3X0.25	33.0	15.00	Tens 0	0.32 Y	0.000	0.001	0.001	0.000	0.000	0.520	0.500	0.520	149.29	139.63	1.678	6	0			
Diag S18	L 3" x 2" x 0.25"	SAU	3X2X0.25	33.0	4.83	Tens 0	0.36 Y	0.000	0.001	0.001	0.000	0.000	0.520	0.500	0.520	147.17	136.71	10.259	6	0			
Diag S19	L 3" x 2" x 0.25"	SAU	3X2X0.25	33.0	8.35	Comp 8.35	0.37 X	-0.000	-90	0.001	0.000	0.000	0.520	0.500	0.520	147.17	136.71	10.259	6	0			
Horiz S1	B/B 13.5"x4"x0.375"	DAL	4X3.5X0.38	33.0	73.41	Comp 73.41	3 P	-54.071	W -90	72.764	0.000	0.000	1.000	1.000	1.000	146.61	136.37	35.914	6	0			
Horiz S2	B/B 13.5"x4"x0.3125"	DAL	4X3X0.31	33.0	73.00	Comp 73.00	5 P	-54.644	W -90	68.007	0.000	0.000	1.000	1.000	1.000	133.67	128.41	14.147	6	0			
Horiz S3	B/B 13.5"x4"x0.25"	DAL	3.5X3X0.31	33.0	45.94	Comp 45.94	9 P	-15.330	W -90	33.766	0.000	0.000	1.000	1.000	1.000	146.61	136.37	35.914	6	0			
Horiz S4	B/B 13.5"x4"x0.25"	DAL	3.5X3X0.25	33.0	45.40	Comp 45.40	9 P	-15.330	W -90	33.766	0.000	0.000	1.000	1.000	1.000	188.94	162.40	10.477	6	0			
Horiz S5	B/B 13.5"x4"x0.25"	DAL	3.5X2.5X0.25	33.0	45.94	Comp 45.94	11 P	-14.653	W -90	31.895	0.000	0.000	1.000	1.000	1.000	171.81	151.86	10.605	6	0			
Horiz S6	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	41.72	Comp 41.72	13 P	-13.317	W -90	31.922	0.000	0.000	1.000	1.000	1.000	174.41	153.46	13.735	6	0			
Horiz S7	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	41.72	Comp 41.72	13 P	-13.317	W -90	31.922	0.000	0.000	1.000	1.000	1.000	174.41	153.46	13.735	6	0			
Horiz S8	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	35.32	Comp 35.32	18 P	-9.381	W 180	26.560	0.000	0.000	1.000	1.000	1.000	185.13	160.05	11.864	6	0			
Horiz S9	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	27.86	Comp 27.86	19 P	-8.305	W -90	29.810	0.000	0.000	1.000	1.000	1.000	170.53	151.08	10.928	6	0			
Horiz S10	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	24.59	Comp 24.59	21 P	-11.195	W -90	29.810	0.000	0.000	1.000	1.000	1.000	170.53	151.08	10.928	6	0			
Horiz S11	B/B 12.5"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	21.86	Comp 21.86	23 P	-13.189	W -90	53.628	0.000	0.000	1.000	1.000	1.000	115.01	115.01	9.057	1	0			
Horiz S12	B/B 13"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	28.59	Comp 28.59	25 P	-11.436	W -90	37.252	0.000	0.000	0.500	0.500	0.800	55.00	37.99	131.06	16.242	6	0		
Horiz S13	B/B 13"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	30.70	Comp 30.70	25 P	-11.436	W -90	37.252	0.000	0.000	0.500	0.500	0.800	55.00	37.99	131.06	16.242	6	0		
Horiz S14	B/B 13"x2.5"x0.25"	DAL	3X2.5X0.25	33.0	18.15	Comp 18.15	25 P	-11.436	W -90	37.252	0.000	0.000	0.500	0.500	0.800	55.00	37.99	131.06	16.242	6	0		
Horiz S15	B/B 13"x2.5"x0.3125"	DAL	3.5X3X0.31	33.0	8.15	Comp 8.15	30 P	-7.632	W 180	93.612	0.000	0.000	0.500	0.500	0.800	88.89	88.89	12.500	1	0			
Horiz S16	C15X33.9	CHN	C15X33.9	33.0	2.15	Comp 2.15	32 X	-2.197	W 45	102.383	0.000	0.000	0.000	1.000	1.000	0.500	165.93	148					

Group Label	Group Angle Desc. Type	Angle Size	Steel Strength	Max Usage	Usage Control	Max Tension Use Control	Tension Force Control	Tension Load Case	Net Section Capacity	Tension Connect. Shear	Tension Connect. Bearing	Tension Connect. Rupture	Length Member	No. Of Tens.	No. Of Bolt Holes	Hole Diameter
			(ksi)	%	Tens. %	(kips)			(kips)	Capacity (kips)	Capacity (kips)	Capacity (kips)	(ft)	Tens.		(in)
Leg 51	L 8" x 8" x 1.125"	SAB	8X8X1.13	33.0 72.45	Comp 45.03	L 1XV 223.742	W 45	496.880	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 52	L 8" x 8" x 1.125"	SAB	8X8X1.13	33.0 68.61	Comp 36.74	L 2XV 182.537	W 45	496.880	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 53	L 8" x 8" x 1.125"	SAB	8X8X1.13	33.0 55.03	Comp 31.83	L 3XV 158.139	W 45	496.880	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 54	L 8" x 8" x 1.125"	SAB	8X8X1.13	33.0 48.92	Comp 27.08	L 4XV 134.559	W 45	496.880	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 55	L 8" x 8" x 1.125"	SAB	8X8X1.13	33.0 45.21	Comp 28.67	L 5XV 142.451	W 45	496.880	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 56	L 8" x 8" x 1"	SAB	8X8X1	33.0 42.10	Comp 26.31	L 6XV 117.195	W 45	445.499	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 57	L 8" x 8" x 0.875"	SAB	8X8X0.88	33.0 38.27	Comp 23.33	L 7XV 91.663	W 45	392.930	0.000	0.000	0.000	0.000	25.140	0 0.000	0	
Leg 58	L 6" x 6" x 0.75"	SAB	6X6X0.75	33.0 36.16	Comp 23.65	L 8XV 80.352	W 45	339.767	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 59	L 6" x 6" x 0.875"	SAB	6X6X0.88	33.0 38.74	Comp 23.88	L 9XV 69.021	W 45	288.981	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 60	L 6" x 6" x 0.875"	SAB	6X6X0.88	33.0 33.07	Comp 20.09	L 10XV 58.069	W 45	288.981	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 61	L 6" x 6" x 0.75"	SAB	6X6X0.75	33.0 30.33	Comp 18.77	L 11XV 47.046	W 45	250.668	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 62	L 6" x 6" x 0.75"	SAB	6X6X0.75	33.0 24.20	Comp 14.37	L 12XV 36.023	W 45	250.668	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 63	L 6" x 6" x 0.625"	SAB	6X6X0.63	33.0 28.16	Comp 11.91	L 13XV 25.156	W 45	211.167	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 64	L 6" x 6" x 0.625"	SAB	6X6X0.63	33.0 21.00	Comp 7.11	L 14XV 15.009	W 45	211.167	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 65	L 6" x 6" x 0.5625"	SAB	6X6X0.56	33.0 16.08	Comp 2.90	L 15XV 5.535	W 45	190.971	0.000	0.000	0.000	0.000	12.570	0 0.000	0	
Leg 66	L 6" x 6" x 0.5625"	SAB	6X6X0.56	33.0 8.24	Comp 0.00	L 16V 0.000		190.971	0.000	0.000	0.000	0.000	12.500	0 0.000	0	
Leg 67	L 6" x 6" x 0.5625"	SAB	6X6X0.56	33.0 3.96	Comp 0.15	L 17V 0.292	W -45	190.971	0.000	0.000	0.000	0.000	3.890	0 0.000	0	
Leg 68	L 6" x 6" x 0.5"	SAB	6X6X0.5	33.0 4.56	Comp 0.28	L 18V 0.473	W -45	170.775	0.000	0.000	0.000	0.000	7.500	0 0.000	0	
Leg 69	L 6" x 6" x 0.5"	SAB	6X6X0.5	33.0 3.03	Comp 0.00	L 19V 0.000		170.775	0.000	0.000	0.000	0.000	7.500	0 0.000	0	
Diag 51	B/B L3.5"x3"x0.4375"	DAS	5X3.5X0.44	33.0 34.63	Comp 14.79	D 2P 30.960	W -90	209.385	0.000	0.000	0.000	0.000	22.030	0 0.000	0	
Diag 52	B/B L3"x3"x0.3125"	DAS	4X3X0.31	33.0 48.29	Comp 41.55	D 4P 51.579	W -90	124.146	0.000	0.000	0.000	0.000	20.294	0 0.000	0	
Diag 53	B/B L3"x3"x0.3125"	DAS	4X3X0.31	33.0 45.57	Comp 40.96	D 6P 50.844	W -90	124.146	0.000	0.000	0.000	0.000	19.834	0 0.000	0	
Diag 54	B/B L3"x3"x0.3125"	DAS	4X3X0.31	33.0 44.01	Comp 40.41	D 8P 50.173	W -90	124.146	0.000	0.000	0.000	0.000	19.399	0 0.000	0	
Diag 55	B/B L3"x3"x0.25"	DAS	4X3X0.25	33.0 72.65	Comp 26.26	D 9P 26.357	W -90	100.386	0.000	0.000	0.000	0.000	31.668	0 0.000	0	
Diag 56	B/B L3"x3"x0.25"	DAS	4X3X0.25	33.0 68.85	Comp 26.34	D 11P 26.445	W -90	100.386	0.000	0.000	0.000	0.000	30.561	0 0.000	0	
Diag 57	B/B L3"x3"x0.25"	DAS	4X3X0.25	33.0 63.03	Comp 26.21	D 13P 26.307	W -90	100.386	0.000	0.000	0.000	0.000	29.531	0 0.000	0	
Diag 58	B/B L2.5"x2.5"x0.3125"	DAS	3X2.5X0.31	33.0 42.67	Comp 15.71	D 15P 15.116	W -90	96.228	0.000	0.000	0.000	0.000	18.595	0 0.000	0	
Diag 59	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 62.75	Comp 18.81	D 18P 13.299	W 180	70.686	0.000	0.000	0.000	0.000	17.915	0 0.000	0	
Diag 60	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 52.69	Comp 16.76	D 19P 11.844	W -90	70.686	0.000	0.000	0.000	0.000	17.259	0 0.000	0	
Diag 61	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 47.07	Comp 15.88	D 21P 11.227	W -90	70.686	0.000	0.000	0.000	0.000	16.630	0 0.000	0	
Diag 62	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 45.38	Comp 16.14	D 23P 11.409	W -90	70.686	0.000	0.000	0.000	0.000	16.030	0 0.000	0	
Diag 63	L 3" x 4" x 0.25"	SAU	4X3X0.25	33.0 30.55	Tens 30.55	D 26P 15.333	W -90	50.193	0.000	0.000	0.000	0.000	21.265	0 0.000	0	
Diag 64	L 3" x 4" x 0.25"	SAU	4X3X0.25	33.0 26.03	Tens 26.03	D 28P 13.066	W -90	50.193	0.000	0.000	0.000	0.000	19.784	0 0.000	0	
Diag 65	L 3" x 3.5" x 0.25"	SAU	3.5X3X0.25	33.0 24.72	Tens 24.72	D 30P 11.453	W -90	46.332	0.000	0.000	0.000	0.000	18.375	0 0.000	0	
Diag 66	L 3" x 3.5" x 0.25"	SAU	3.5X3X0.25	33.0 14.88	Tens 14.88	D 32P 7.467	W -90	50.193	0.000	0.000	0.000	0.000	17.678	0 0.000	0	
Diag 67	L 3.5" x 3.5" x 0.25"	SAB	3.5X3.5X0.25	33.0 3.37	Tens 3.37	D 33XV 1.691	W 90	50.193	0.000	0.000	0.000	0.000	10.131	0 0.000	0	
Diag 68	L 3" x 2" x 0.25"	SAU	3X2X0.25	33.0 4.83	Tens 4.83	D 36XV 1.705	W 90	35.343	0.000	0.000	0.000	0.000	10.259	0 0.000	0	
Diag 69	L 3" x 2" x 0.25"	SAU	3X2X0.25	33.0 8.35	Tens 7.46	D 38V 2.635	W -90	35.343	0.000	0.000	0.000	0.000	10.259	0 0.000	0	
Horiz 1	B/B L4"x3"x0.375"	DAL	4X3.5X0.38	33.0 33.54	Comp 18.49	H 1X 29.327	W -45	158.598	0.000	0.000	0.000	0.000	24.962	0 0.000	0	
Horiz 2	B/B L4"x3"x0.375"	DAL	4X3X0.38	33.0 74.31	Comp 10.35	H 3P 15.278	W 90	147.609	0.000	0.000	0.000	0.000	15.394	0 0.000	0	
Horiz 3	B/B L4"x3"x0.3125"	DAL	4X3X0.31	33.0 73.00	Comp 11.57	H 5X 14.361	W -90	124.146	0.000	0.000	0.000	0.000	14.147	0 0.000	0	
Horiz 4	B/B L3.5"x3"x0.3125"	DAL	3.5X3X0.31	33.0 64.57	Comp 15.46	H 7X 17.775	W -90	114.939	0.000	0.000	0.000	0.000	12.899	0 0.000	0	
Horiz 5	B/B L3.5"x3"x0.25"	DAL	3.5X3X0.25	33.0 45.40	Comp 17.61	H 9X 16.374	W -90	92.961	0.000	0.000	0.000	0.000	17.477	0 0.000	0	
Horiz 6	B/B L3.5"x2.5"x0.25"	DAL	3.5X2.5X0.25	33.0 45.94	Comp 17.27	H 11P 14.768	W 90	85.536	0.000	0.000	0.000	0.000	15.606	0 0.000	0	
Horiz 7	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 41.72	Comp 17.60	H 13X 13.748	W -90	78.111	0.000	0.000	0.000	0.000	13.735	0 0.000	0	
Horiz 8	B/B L3.5"x2.5"x0.3125"	DAB	3.5X2.5X0.31	33.0 21.07	Comp 10.84	H 15X 11.429	W -90	105.435	0.000	0.000	0.000	0.000	12.798	0 0.000	0	
Horiz 9	B/B L3.5"x2.5"x0.25"	DAB	3.5X2.5X0.25	33.0 35.32	Comp 13.65	H 18V 9.647	W 180	70.686	0.000	0.000	0.000	0.000	11.864	0 0.000	0	
Horiz 10	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 27.86	Comp 11.34	H 19P 8.018	W 90	70.686	0.000	0.000	0.000	0.000	10.928	0 0.000	0	
Horiz 11	B/B L2.5"x2.5"x0.25"	DAB	2.5X2.5X0.25	33.0 21.11	Comp 10.70	H 21X 7.563	W -90	70.686	0.000	0.000	0.000	0.000	9.992	0 0.000	0	
Horiz 12	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 24.59	Comp 1.58	H 24P 1.232	W 0	78.111	0.000	0.000	0.000	0.000	9.057	0 0.000	0	
Horiz 13	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 30.70	Comp 0.00	H 26X 0.000		78.111	0.000	0.000	0.000	0.000	16.242	0 0.000	0	
Horiz 14	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 14.29	Comp 0.00	H 28X 0.000		78.111	0.000	0.000	0.000	0.000	14.371	0 0.000	0	
Horiz 15	B/B L3.5"x3"x0.3125"	DAL	3.5X3X0.31	33.0 8.15	Comp 0.00	H 30X 0.000		114.939	0.000	0.000	0.000	0.000	12.500	0 0.000	0	
Horiz 16	C15x33.9	CHN	C15x33.9	33.0 2.15	Comp 1.23	H 31V 3.628W 180 Ic		295.812	0.000	0.000	0.000	0.000	12.500	0 0.000	0	
Horiz 17	B/B L2.5"x2"x0.25"	DAL	2.5X2X0.25	33.0 16.29	Comp 0.00	H 34X 0.000		63.261	0.000	0.000	0.000	0.000	7.000	0 0.000	0	
Horiz 18	B/B L2.5"x2"x0.25"	DAL	2.5X2X0.25	33.0 10.62	Comp 0.00	H 36X 0.000		63.261	0.000	0.000	0.000	0.000	7.000	0 0.000	0	
Horiz 19	C15x33.9	CHN	C15x33.9	33.0 0.36	Comp 0.11	H 38P 0.335	W 90	295.812	0.000	0.000	0.000	0.000	7.000	0 0.000	0	
LD 1	B/B L3.5"x2.5"x0.25"	DAL	3.5X2.5X0.25	33.0 60.05	Comp 16.62	LD 2Y 14.215	W -45	85.536	0.000	0.000	0.000	0.000	15.020	0 0.000	0	
LD 2	B/B L5"x3.5"x0.4375"	DAL	5X3.5X0.44	33.0 34.29	Comp 17.71	LD 3P 37.085	W -90	209.385	0.000	0.000	0.000	0.000	15.020	0 0.000	0	
LD 4	B/B L3"x2"x0.25"	DAL	3X2X0.25	33.0 50.06	Tens 50.06	LD 7P 35.385	W -90	70.686	0.000	0.000	0.000	0.000	12.757	0 0.000	0	
LD 5	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 53.47	Comp 31.16	LD 9P 24.340	W -90	78.111	0.000	0.000	0.000	0.000	10.146	0 0.000	0	
LD 6	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 62.15	Comp 39.46	LD 11X 30.826	W -90	78.111	0.000	0.000	0.000	0.000	11.361	0 0.000	0	
LD 7	B/B L2.5"x2"x0.25"	DAL	2.5X2X0.25	33.0 53.34	Tens 53.34	LD 13P 33.742	W -90	63.261	0.000	0.000	0.000	0.000	12.141	0 0.000	0	
LD 8	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 51.45	Comp 30.85	LD 15P 24.100	W -90	78.111	0.000	0.000	0.000	0.000	9.916	0 0.000	0	
LD 9	B/B L3"x2.5"x0.25"	DAL	3X2.5X0.25	33.0 56.10	Comp 38.12	LD 17X 29.774	W -90	78.111	0.000	0.000	0.000	0.000	10.948	0 0.000	0	
LD 10	B/B L2.5"x2"x0.25"	DAL	2.5X2X0.25	33.0 51.47	Tens 51.47	LD 19P 32.558	W -90	63.261	0.000	0.000	0.000	0.000</				



## Legs

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/2021
Carrier:	-

When inputting thickness values, include all decimal places.

Tower Section #	Section Elevations  (ft)	Type of Shape <sup>[1]</sup>	Diameter or Length  (in)	Thickness <sup>[2]</sup>  (in)	F <sub>y</sub>  (ksi)
1	0.000-25.00	L	8	1.125	33
2	25.00-50.00	L	8	1.125	33
3	50.00-75.00	L	8	1.125	33
4	75.00-100.0	L	8	1.125	33
5	100.0-125.0	L	8	1.125	33
6	125.0-150.0	L	8	1	33
7	150.0-175.0	L	8	0.875	33
8	175.0-187.5	L	8	0.75	33
9	187.5-200.0	L	6	0.875	33
10	200.0-212.5	L	6	0.875	33
11	212.5-225.0	L	6	0.75	33
12	225.0-237.5	L	6	0.75	33
13	237.5-250.0	L	6	0.625	33
14	250.0-262.5	L	6	0.625	33
15	262.5-275.0	L	6	0.5625	33
16	275.0-287.5	L	6	0.5625	33
17	287.5-287.6	L	6	0.5625	33
18	287.6-295.1	L	6	0.5	33
19	295.1-302.6	L	6	0.5	33

### Notes:

<sup>[1]</sup> Type of Leg Shape: **R** = Round or **P** = Bent Plate or **S** = Schifflerized Angle. **L** = Even Leg

<sup>[2]</sup> For Solid Round Leg Shapes Thickness Equals Zero.

<sup>[3]</sup> Adjust for Bent Plate Leg Shapes.



## Diagonals

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/2021
Carrier:	-

When inputting thickness values, include all decimal places.

Tower Section #	Section Elevations  (ft)	Type of Shape <sup>[1]</sup>	Diameter <sup>[2]</sup>  (in)	Web Length <sup>[3]</sup>  (in)	Flange Length <sup>[3]</sup>  (in)	Thickness  (in)	F <sub>y</sub>  (ksi)	Is Diag. Tension Only? (Y/N)
1	0.000-25.00	2L		3.5	5	0.4375	33	
2	25.00-50.00	2L		3	4	0.3125	33	
3	50.00-75.00	2L		3	4	0.3125	33	
4	75.00-100.0	2L		3	4	0.3125	33	
5	100.0-125.0	2L		3	4	0.25	33	
6	125.0-150.0	2L		3	4	0.25	33	
7	150.0-175.0	2L		3	4	0.25	33	
8	175.0-187.5	2L		2.5	3	0.3125	33	
9	187.5-200.0	2L		2.5	2.5	0.25	33	
10	200.0-212.5	2L		2.5	2.5	0.25	33	
11	212.5-225.0	2L		2.5	2.5	0.25	33	
12	225.0-237.5	2L		2.5	2.5	0.25	33	
13	237.5-250.0	L		3	4	0.25	33	Y
14	250.0-262.5	L		3	4	0.25	33	Y
15	262.5-275.0	L		3	3.5	0.25	33	Y
16	275.0-287.5	L		3.5	3.5	0.25	33	Y
17	287.5-287.6	L		3.5	3.5	0.25	33	Y
18	287.6-295.1	L		3	2	0.25	33	Y
19	295.1-302.6	L		3	2	0.25	33	Y

### Notes:

<sup>[1]</sup> Type of Diagonal Shape: **R** = Round, **L** = Single-Angle or **2L** = Double-Angle.

<sup>[2]</sup> Applies to Pipes and Solid Round Shapes only. For Solid Round Shapes Thickness Equals Zero.

<sup>[3]</sup> Applies to Single-Angle and Double-Angle Shapes only.

<sup>[4]</sup> Applies to Double-Angle Shapes only.

<sup>[5]</sup> Applies to Single-Angle Shapes only.

## Horizontals

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/2021
Carrier:	-

When inputting thickness values, include all decimal places.

Tower Section #	Section Elevations  (ft)	Type of Shape <sup>[1]</sup>	Diameter <sup>[2]</sup>  (in)	Web Length <sup>[3]</sup>  (in)	Flange Length <sup>[3]</sup>  (in)	Thickness  (in)	F <sub>y</sub>  (ksi)	B/B Spacing (in.)
1	0.000-25.00	2L		4	3.5	0.375	33	0.375
2	25.00-50.00	2L		4	3	0.375	33	0.375
3	50.00-75.00	2L		4	3	0.3125	33	0.375
4	75.00-100.0	2L		3.5	3	0.3125	33	0.375
5	100.0-125.0	2L		3.5	3	0.25	33	0.375
6	125.0-150.0	2L		3.5	2.5	0.25	33	0.375
7	150.0-175.0	2L		3	2.5	0.25	33	0.375
8	175.0-187.5	2L		3.5	2.5	0.3125	33	0.375
9	187.5-200.0	2L		2.5	2.5	0.25	33	0.375
10	200.0-212.5	2L		2.5	2.5	0.25	33	0.375
11	212.5-225.0	2L		2.5	2.5	0.25	33	0.375
12	225.0-237.5	2L		3	2.5	0.25	33	0.375
13	237.5-250.0	2L		3	2.5	0.25	33	0.375
14	250.0-262.5	2L		3	2.5	0.25	33	0.375
15	262.5-275.0	2L		3.5	3	0.3125	33	0.375
16	275.0-287.5	C		15	33.9		33	
17	287.5-287.6	2L		2.5	2	0.25	33	0.375
18	287.6-295.1	2L		2.5	2	0.25	33	0.375
19	295.1-302.6	C		15	33.9		33	

### Notes:

<sup>[1]</sup> Type of Horizontal Shape: **R** = Round, **L** = Single-Angle, **2L** = Double-Angle, **C** = Channel, **W** = W Shape

<sup>[2]</sup> Applies to Pipes and Solid Round Shapes only. For Solid Round Shapes Thickness Equals Zero.

<sup>[3]</sup> Applies to Single-Angle and Double-Angle Shapes only.

<sup>[4]</sup> Applies to Double-Angle Shapes only.

<sup>[5]</sup> Applies to Single-Angle Shapes only.

## Built-up Diagonals

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/2021
Carrier:	-

When inputting thickness values, include all decimal places.

Input diags. from left to center & from base section upward.

Tower Built-up Diag. #	Section Elevations  (ft)	Type of Shape <sup>[1]</sup>	Diameter <sup>[2]</sup>  (in)	Web Length <sup>[3]</sup>  (in)	Flange Length <sup>[3]</sup>  (in)	Thickness  (in)	F <sub>y</sub>  (ksi)
1	0.000-25.00	2L		3.5	2.5	0.25	33
2	0.000-25.00	2L		5	3.5	0.4375	33
3	25.00-50.00	2L		3	2	0.25	33
4	25.00-50.00	2L		3	2.5	0.25	33
5	25.00-50.00	2L		3	2.5	0.25	33
6	50.00-75.00	2L		2.5	2	0.25	33
7	50.00-75.00	2L		3	2.5	0.25	33
8	50.00-75.00	2L		3	2.5	0.25	33
9	75.00-100.0	2L		2.5	2	0.25	33
10	75.00-100.0	2L		3	2.5	0.25	33
11	75.00-100.0	2L		3.5	3.5	0.25	33

### Notes:

<sup>[1]</sup> Type of Diagonal Shape: **R** = Round, **L** = Single-Angle or **2L** = Double-Angle.

<sup>[2]</sup> Applies to Pipes and Solid Round Shapes only. For Solid Round Shapes Thickness Equals Zero.

<sup>[3]</sup> Applies to Single-Angle and Double-Angle Shapes only.

<sup>[4]</sup> Applies to Double-Angle Shapes only.

<sup>[5]</sup> Applies to Single-Angle Shapes only.

## Built-up Horizontals

<b>Site No.:</b>	88013
<b>Engineer:</b>	I. Dodson
<b>Date:</b>	07/27/2021
<b>Carrier:</b>	-

**When inputting thickness values, include all decimal places.**

Tower Section #	Section Elevations  (ft)	Type of Shape	Diameter <sup>[2]</sup>  (in)	Web Length <sup>[3]</sup>  (in)	Flange Length <sup>[3]</sup>  (in)	Thickness  (in)	F <sub>y</sub>  (ksi)	Is Horiz. Tension Only? (Y/N)
1	0.000-25.00	2L		3	3.5	0.5	33	
2	25.00-50.00	2L		3	4	0.25	33	Y
3	50.00-75.00	2L		3	3.5	0.3125	33	Y
4	75.00-100.0	2L		3	3.5	0.25	33	Y

**Notes:**

<sup>[1]</sup> Type of Horizontal Shape: **R** = Round, **L** = Single-Angle or **2L** = Double-Angle.

<sup>[2]</sup> Applies to Pipes and Solid Round Shapes only. For Solid Round Shapes Thickness Equals Zero.

<sup>[3]</sup> Applies to Single-Angle and Double-Angle Shapes only.

<sup>[4]</sup> Applies to Double-Angle Shapes only.

<sup>[5]</sup> Applies to Single-Angle Shapes only.

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/21
Carrier:	-

Description	From (ft)	To (ft)	Quantity	Shape	Width or Diameter** (in)	Perimeter (in)	Unit Weight (lb/ft)	In Face Zone? (Yes/No)	Include in Wind Load (Yes/No)
1 Ladder	0	271	1	Flat	2	8.0	6	No	Yes
2 COAX CAGE1	8.3333	33.3333	1	Flat	12	48.0	25	Yes	Yes
3 COAX CAGE2	8.3333	33.3333	1	Flat	12	48.0	25	Yes	Yes
4 COAX CAGE3	8.3333	33.3333	4	Flat	12	48.0	25	Yes	Yes
6 WG-1	15	272	1	Flat	1.5	6.0	6	Yes	Yes
7 AT&T-1	15	272	2	Round	0.39	1.2	0.17	Yes	Yes
8 AT&T-2	15	272	4	Round	0.92	2.9	0.89	Yes	Yes
9 AT&T-3	15	272	6	Round	1.98	6.2	0.82	Yes	Yes
10 AT&T-4	15	272	1	Round	1.16	3.6	0.96	Yes	Yes
12 Sprint	17.5	259	6	Round	1.98	6.2	0.82	Yes	Yes
14 WG-2	17.5	250	1	Flat	1.5	6.0	6	Yes	Yes
15 WG-3	15	171	1	Flat	1.5	6.0	6	Yes	Yes
16 VZW	15	171	2	Round	1.98	6.2	0.82	Yes	Yes
17 VZW	15	171	1	Flat	7.0725	37.7	8.2	Yes	Yes
19 Other	15	145	6	Round	1.98	6.2	0.82	Yes	Yes
21 TMO	0	245	3	Round	1.99	6.3	1.9	Yes	Yes
23 DISH	0	200	1	Round	1.6	5.0	2.34	Yes	Yes



Ke	0.977806	
$\alpha$	$7\ k_z\text{max}$	2.01
$z_g$	$1200\ k_z\text{min}$	0.7
$K_c$	$0.9\ K_t$	

[illegible]

Ice Thick:	1	in
Topographic Category (1-4):	1	
Exposure Category (B-D):	B	
Risk Category (1-4):	2	
Height of Crest (H) if Topo Cat. >1:	0	ft
Load Factor; Wind:	1	
Load Factor; Dead:	1.2	

Site No.:
Engineer:
Date:
Carrier:

No.	Carrier	Elevation (°)	Quantity	# of Azimuths	Proposed?	Manufacturer	Model	Height (m)	Width (m)	Depth (m)	Weight (lbs/ea)	Flat/Round (F/R)	Reduction	C <sub>A</sub> (ft <sup>2</sup> )	Weight (K)	Ka
1	--	302.5	1	4		--	--	0.001	0.001	0.001	0.001	R	0.001			1
2	--	302.5	1	4		--	Platform				1.000			60.00	4.00	1
	--	287.5	1	4		--	Platform	0.001	0.001	0.001	0.001	R	0.001			1
	--	287.5	1	4		--	Platform				1.000			60.00	4.00	1
3	--	268.75	1	4		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	268.75	1	4		--	Catwalk				1.000			45.00	2.50	1
4	--	237.5	1	1		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	237.5	1	1		--	Rest Platform				1.000			15.00	0.50	1
5	--	212.5	1	1		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	212.5	1	1		--	Platform				1.000			15.00	4.00	1
6	--	200	1	2		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	200	1	3		--	Platform				1.000			45.00	2.50	1
7	--	187.5	1	2		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	187.5	1	3		--	Platform				1.000			45.00	2.50	1
8	--	187.5	2	2		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	187.5	2	2		--	Horn Platform				1.000			25.00	1.25	1
9	--	175	2	2		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	175	2	2		--	Horn Platform				1.000			15.00	1.00	1
10	--	150	1	1		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	150	1	1		--	Rest Platform				1.000			15.00	0.50	1
11	--	100	1	2		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	100	1	3		--	Platform				1.000			45.00	4.00	1
12	--	50	1	1		--	--	0.001	0.001	0.001	0.001	R	0.001			1
	--	50	1	1		--	Rest Platform				1.000			15.00	0.50	1
13	AT&T MOBILITY	272	1	1	Proposed	Raycap	DC6-48-60-18-8F	23.5	9.7	9.7	20	R	1.000			0.8
	AT&T MOBILITY	272	1	1		--	-				0.001			0.00	0.00	1
14	AT&T MOBILITY	272	2	2	Proposed	Raycap	DC6-48-60-18-8F ("Squid")	24	11	11	31.8	R	1.000			0.8
	AT&T MOBILITY	272	2	2		--	-				0.001			0.00	0.00	1
15	AT&T MOBILITY	272	6	3		Powerwave Allgon	LGP17201	13.9	14.4	3.7	31	F	0.500			0.8
	AT&T MOBILITY	272	3	3		--	Flat Sector Frames				0.750			17.90	0.40	0.75
16	AT&T MOBILITY	272	3	3	Proposed	Ericsson	RRUS 4426 B66	15	13.2	5.8	48.4	F	0.670			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
17	AT&T MOBILITY	272	3	3		Powerwave Allgon	7770	55	11	5	35	F	0.650			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
18	AT&T MOBILITY	272	3	3	Proposed	Ericsson	RRUS 4449 B5, B12	17.9	13.2	9.4	71	F	0.670			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
19	AT&T MOBILITY	272	3	3	Proposed	Ericsson	RRUS 4478 B14	18.1	13.4	8.3	59.4	F	0.670			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
20	AT&T MOBILITY	272	3	3		Kaelus	DBC0061F1V51-2	8	6.5	6.2	25.5	F	0.500			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
21	AT&T MOBILITY	272	3	3	Proposed	Ericsson	RRUS-32 B30 (77 lbs)	29.9	13.3	9.5	77	F	0.710			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
22	AT&T MOBILITY	272	3	3		Ericsson	RRUS 32 B2	27.2	12.1	7	53	F	0.670			0.8
	AT&T MOBILITY	272	3	3		--	-				0.001			0.00	0.00	1
23	AT&T MOBILITY	272	2	2	Proposed	CCI	DMP65R-BU6DA	71.2	20.7	7.7	79.4	F	0.720			0.8
	AT&T MOBILITY	272	2	2	Proposed	CCI	OAP65R-BU6D				0.720			12.87	0.06	0.8
24	AT&T MOBILITY	272	2	2		Quintel	QS66512-2	72	12	9.6	111	F	0.740			0.8
	AT&T MOBILITY	272	1	1		--	-				0.001			0.00	0.00	1
25	AT&T MOBILITY	272	1	1	Proposed	CCI	DMP65R-BU8D	96	20.7	7.7	95.7	F	0.720			0.8
	AT&T MOBILITY	272	1	1	Proposed	CCI	OAP65R-BU8D				0.720			18.09	0.08	0.8
26	AT&T MOBILITY	272	1	1		CCI	TPA-65R-LCUUUU-H8	96	14.4	8.6	81.6	F	0.690			0.8
	AT&T MOBILITY	272	1	1		--	-				0.001			0.00	0.00	1
27	SPRINT NEXTEL	259	6	3		Swedcom	ALP 9011-DIN	43	6.5	8	10	F	0.740			0.8
	SPRINT NEXTEL	259	3	3		--	Flat Sector Frames				0.750			17.90	0.40	0.75
28	VERIZON WIRELESS	171	3	3		Samsung	MT6407-77A	35.1	16.1	5.5	81.6	F	0.500			0.8
	VERIZON WIRELESS	171	3	3		--	Flat Sector Frames				0.750			17.90	0.40	0.75
29	VERIZON WIRELESS	171	3	3		Commscope	CBC78T-DS-43-2X	9.6	6.9	6.4	20.7	F	0.500			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
30	VERIZON WIRELESS	171	3	3		Samsung	B5/B13 RRH-BR04C	15	15	8.1	70.3	F	0.500			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
31	VERIZON WIRELESS	171	3	3		Samsung	B2/B66A RRH-BR049	15	15	10	84.4	F	0.500			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
32	VERIZON WIRELESS	171	3	3		Alcatel-Lucent	RRH2x60 700	21.5	12	9	56.7	F	0.670			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
33	VERIZON WIRELESS	171	2	2		Raycap	RC3DC-3315-PF-48	28.9	15.7	10.3	32	F	0.650			0.8
	VERIZON WIRELESS	171	2	2		--	-				0.001			0.00	0.00	1
34	VERIZON WIRELESS	171	6	3		Antel	LPA-80080/6CF	70.9	5.5	13.2	21	F	0.690			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
35	VERIZON WIRELESS	171	6	3		Commscope	JAHH-65B-R3B	72	13.8	8.2	60.6	F	0.500			0.8
	VERIZON WIRELESS	171	3	3		--	-				0.001			0.00	0.00	1
36	OTHER	145	6	3		Generic	TTA	12	12	6	10	F	0.670			0.8
	OTHER	145	3	3		--	-				0.001			0.00	0.00	1
37	OTHER	145	3	3		Generic	36" x 6" Panel	36	6	3	20	F	0.789			0.8
	OTHER	145	3	3		--	-				0.001			0.00	0.00	1
38	T-MOBILE	245	3	3	Proposed	Ericsson	Radio 4460 B25+B66	19.6	15.7	12.1	109	F	0.670			0.8
	T-MOBILE	245	3	3		--	Flat Sector Frames				0.750			17.90	0.40	0.75
39	T-MOBILE	245	3	3	Proposed	Ericsson	Radio 4480 B71+B85A	21.8	15.7	7.5	84	F	0.670			0.8
	T-MOBILE	245	3	3		--	-				0.001			0.00	0.00	1
40	T-MOBILE	245	2	3	Proposed	Ericsson	Air6449 B41	33.1	20.6	8.6	104	F	0.744			0.8
	T-MOBILE	245	3	3		--	-				0.001			0.00	0.00	1
41	T-MOBILE	245	3	3	Proposed	RFS	APXVAALL24 43-U-NA20	95.9	24	8.5	122.8	F	0.716			0.8
	T-MOBILE	245	3	3		--	-				0.001			0.00	0.00	1
42	DISH WIRELESS L.L.C.	200	1	1	Proposed	Commscope	RDIDC-9181-PF-48	16	14	8	21.9	F	0.500			0.8
	DISH WIRELESS L.L.C.	200	1	1		--	-				0.001			0.00	0.00	1
43	DISH WIRELESS L.L.C.	200	3	3	Proposed	Fujitsu	TA08025-B604	15.7	15	7.9	63.9	F	0.500			0.8
	DISH WIRELESS L.L.C.	200	3	3		--	Flat Sector Frames				0.750			17.90	0.40	0.75
44	DISH WIRELESS L.L.C.	200	3	3	Proposed	Fujitsu	TA08025-B605	15.7	15	9.1	75	F	0.500			0.8
	DISH WIRELESS L.L.C.	200	3	3		--	-				0.001			0.00	0.00	1
45	DISH WIRELESS L.L.C.	200	3	3	Proposed	JMA Wireless	MX08FRO665-21	72	20	8	64.5	F	0.735			0.8
	DISH WIRELESS L.L.C.	200	3	3		--	-				0.001			0.00	0.00	1
46																1
47																1
48																1
49																1
50																1

No.	Elevation (ft)	C <sub>d</sub> A <sub>c</sub> (ft <sup>2</sup> )	C <sub>d</sub> A <sub>c</sub> (ice) (ft <sup>2</sup> )	Force (lb)	Force (ice) (lb)	Weight (lb)	Weight (ice) (lb)	60 Azi Mult.	Force mean	F (ice) mean	Height Flag	Sum of Forces (No I	
												60 Azi.	180 Azi.
1	302.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	302.5	60.00	81.00	2154.077	496.551	4800	6240	1.00	1184.74	273.10			
2	287.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	287.5	60.00	81.00	2123.002	489.388	4800	6240	1.00	1167.65	269.16			
3	268.75	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	268.75	45.00	60.75	1561.864	360.036	3000	3900	1.00	859.03	198.02			
4	237.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	237.5	15.00	20.25	502.555	115.847	600	780	1.00	276.41	63.72			
5	212.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	212.5	15.00	20.25	486.835	112.224	4800	6240	1.00	267.76	61.72			
6	200	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	200	45.00	60.75	1435.426	330.890	3000	3900	1.00	789.48	181.99			
7	187.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	187.5	45.00	60.75	1409.200	324.845	3000	3900	1.00	775.06	178.66			
8	187.5	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	187.5	50.00	67.50	1565.778	360.939	3000	3900	1.00	861.18	198.52			
9	175	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	175	30.00	40.50	921.129	212.336	2400	3120	1.00	506.62	116.78			
10	150	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	150	15.00	20.25	440.720	101.593	600	780	1.00	242.40	55.88			
11	100	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	100	45.00	60.75	1177.531	271.441	4800	6240	1.00	647.64	149.29			
12	50	0.00	0.00	0.000	0.000	0	0	1.00	0.00	0.00			
	50	15.00	20.25	321.990	74.224	600	780	1.00	177.09	40.82			
13	272	1.01	1.33	35.284	7.886	24	82	1.00	19.41	4.34			
	272	0.00	0.00	0.000	0.000	1	2	1.00	0.00	0.00			
14	272	2.35	3.00	81.729	17.867	76	152	1.00	44.95	9.83			
	272	0.00	0.00	0.000	0.000	2	3	1.00	0.00	0.00			
15	272	4.00	6.08	139.421	36.183	223	302	1.00	76.68	19.90			
	272	30.21	40.78	789.006	181.879	1440	1872	1.00	433.95	100.03			
16	272	2.65	4.04	92.404	24.023	174	245	1.00	50.82	13.21			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
17	272	8.59	11.24	299.281	66.834	126	262	1.00	164.60	36.76			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
18	272	3.17	4.73	110.269	28.122	256	354	1.00	60.65	15.47			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
19	272	3.25	4.84	113.191	28.778	214	303	1.00	62.25	15.83			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
20	272	0.58	0.99	20.154	5.897	92	122	1.00	11.08	3.24			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
21	272	5.65	8.09	196.668	48.085	277	412	1.00	108.17	26.45			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
22	272	4.41	6.44	153.597	38.278	191	291	1.00	84.48	21.05			
	272	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
23	272	14.64	18.61	509.918	110.674	191	479	1.00	280.46	60.87			
	272	14.83	20.02	413.089	95.224	152	197	1.00	227.20	52.37			
24	272	9.63	11.93	335.384	70.920	266	500	1.00	184.46	39.01			
	272	0.00	0.00	0.000	0.000	1	2	1.00	0.00	0.00			
25	272	10.29	12.46	358.506	74.085	115	476	1.00	197.18	40.75			
	272	10.42	14.07	290.302	66.919	92	119	1.00	159.67	36.81			
26	272	7.34	8.63	255.647	51.294	98	378	1.00	140.61	28.21			
	272	0.00	0.00	0.000	0.000	1	2	1.00	0.00	0.00			
27	259	11.88	15.54	407.983	91.131	72	161	1.00	224.39	50.12			
	259	30.21	40.78	778.043	179.352	1440	1872	1.00	427.92	98.64			
28	171	5.65	7.83	172.371	40.804	294	444	1.00	94.80	22.44			
	171	30.21	40.78	691.016	159.291	1440	1872	1.00	380.06	87.61			
29	171	0.72	1.20	21.864	6.273	75	104	1.00	12.03	3.45			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
30	171	2.25	3.37	68.630	17.561	253	343	1.00	37.75	9.66			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
31	171	2.25	3.37	68.630	17.561	304	406	1.00	37.75	9.66			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
32	171	3.46	5.14	105.452	26.788	204	295	1.00	58.00	14.73			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
33	171	3.93	5.53	119.944	28.802	77	175	1.00	65.97	15.84			
	171	0.00	0.00	0.000	0.000	2	3	1.00	0.00	0.00			
34	171	30.14	35.68	919.192	185.835	151	339	1.00	505.56	102.21			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
35	171	21.87	27.28	667.143	142.090	436	702	1.00	366.93	78.15			
	171	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
36	145	3.86	6.13	112.295	30.449	72	111	1.00	61.76	16.75			
	145	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
37	145	3.85	5.60	112.028	27.805	72	127	1.00	61.62	15.29			
	145	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
38	245	4.12	5.98	139.383	34.498	392	532	1.00	76.66	18.97			
	245	30.21	40.78	765.787	176.527	1440	1872	1.00	421.18	97.09			
39	245	4.59	6.59	155.028	38.012	302	423	1.00	85.27	20.91			
	245	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
40	245	10.14	13.76	342.746	79.434	374	566	1.00	188.51	43.69			
	245	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
41	245	34.77	42.51	1175.345	245.352	442	913	1.00	646.44	134.94			
	245	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
42	200	0.75	1.12	23.817	6.100	26	72	1.00	13.10	3.36			
	200	0.00	0.00	0.000	0.000	1	2	1.00	0.00	0.00			
43	200	2.36	3.51	75.121	19.121	230	318	1.00	41.32	10.52			
	200	30.21	40.78	722.647	166.583	1440	1872	1.00	397.46	91.62			
44	200	2.36	3.51	75.121	19.121	270	367	1.00	41.32	10.52			
	200	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
45	200	22.03	27.92	702.615	152.049	232	518	1.00	386.44	83.63			
	200	0.00	0.00	0.000	0.000	4	5	1.00	0.00	0.00			
46					#VALUE!			1.00	#VALUE!	#VALUE!			
								1.00	#VALUE!	#VALUE!			
47								1.00	#VALUE!	#VALUE!			
								1.00	#VALUE!	#VALUE!			
48								1.00	#VALUE!	#VALUE!			
								1.00	#VALUE!	#VALUE!			
49								1.00	#VALUE!	#VALUE!			
								1.00	#VALUE!	#VALUE!			
50								1.00	#VALUE!	#VALUE!			
								1.00	#VALUE!	#VALUE!			

Foundation

Design Loads (Factored)

Compression/Leg:	408.91	k
Uplift/Leg:	262.59	k
Shear/Leg	75.12	k

Face Width @ Top of Pier ( $d_1$ ):	4.00	ft
Face Width @ Bottom of Pier ( $d_2$ ):	7.00	ft
Total Length of Pier ( $l$ ):	9.00	ft
Height of Pedestal Above Ground ( $h$ ):	0.67	ft
Width of Pad ( $W$ ):	11.00	ft
Length of Pad ( $L$ ):	11.00	ft
Thickness of Pad ( $t$ ):	2.00	ft
Water Table Depth ( $w$ ):	30.00	ft
Unit Weight of Concrete:	150.0	pcf
Unit Weight of Soil (Above Water Table):	120.0	pcf
Unit Weight of Soil (Below Water Table):	57.6	pcf
Friction Angle of Uplift ( $A$ ):	35	°
Ultimate Compressive Bearing Pressure:	21534	psf
Ultimate Skin Friction:	886	psf

Volume Pier (Total):	279.00	ft <sup>3</sup>
Volume Pad (Total):	242.00	ft <sup>3</sup>
Volume Soil (Total):	2105.93	ft <sup>3</sup>
Volume Pier (Buoyant):	0.00	ft <sup>3</sup>
Volume Pad (Buoyant):	0.00	ft <sup>3</sup>
Volume Soil (Buoyant):	0.00	ft <sup>3</sup>
Weight Pier:	41.85	k
Weight Pad:	205.05	k
Weight Soil:	252.71	k
Uplift Skin Friction:	58.48	k

Uplift Check

$\phi$ s Uplift Resistance (k)	Ratio	Result
418.57	0.63	OK

Axial Check

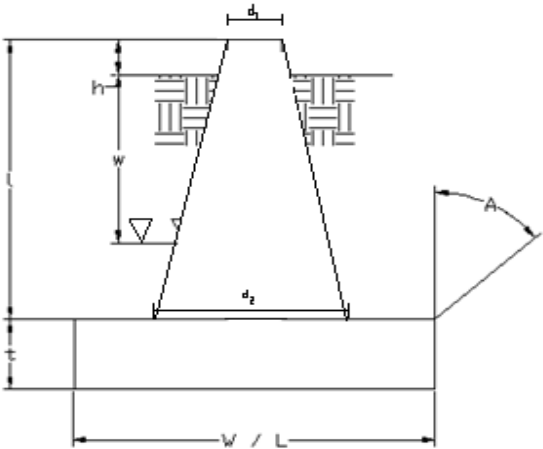
$\phi$ s Axial Resistance (k)	Ratio	Result
1954.21	0.21	OK

Anchor Bolt Check

Bolt Diameter (in)	2
# of Bolts	6
Steel Grade	A36
Steel Fy	36
Steel Fu	58
Detail Type	C

Usage Ratio	Result
0.57	OK

Site No.:	88013
Engineer:	I. Dodson
Date:	07/27/21
Carrier:	-



Berms/Leg: 1125 ft<sup>3</sup>

Volume

# INFINIGY8

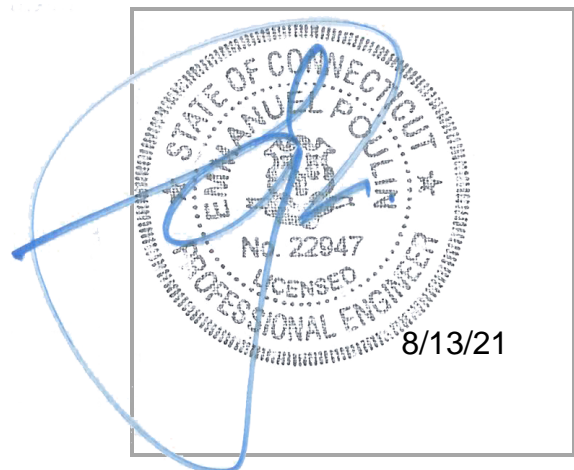
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## MOUNT ANALYSIS REPORT

August 13, 2021

Dish Wireless Site Name	BOBOS00028A
Dish Wireless Site Number	BOBOS00028A
ATC Site Name	Killingworth, CT
ATC Site Number	88013
Infinigy Job Number	1197-F0001-C
Client	ATC
Carrier	Dish Wireless
Site Location	131 Little City Road Killingworth, CT 06419 Middlesex County 41.42877800 N NAD83 72.60380556 W NAD83
Mount Type	8.0 ft Sector Frames
Mount Elevation	200.0 ft AGL
Structural Usage Ratio	<b>43.8</b>
<b>Overall Result</b>	<b>Pass</b>

The enclosed mount structural analysis has been performed in accordance with the 2018 Connecticut State Building Code (2015 IBC) based on an ultimate 3-second gust wind speed of 130 mph. The evaluation criteria and applicable codes are presented in the next section of this report.



## **CONTENTS**

1. Introduction
2. Design/Analysis Parameters
3. Proposed Loading Configuration
4. Supporting Documentation
5. Results
6. Recommendations
7. Assumptions
8. Liability Waiver and Limitations
9. Calculations



## 1. INTRODUCTION

Infinigy performed a structural analysis on the Dish Wireless proposed telecommunication equipment supporting Sector Frames mounted to the existing structure located at the aforementioned address. All referenced supporting documents have been obtained from the client and are assumed to be accurate and applicable to this site. The mount was analyzed using Risa-3D version 17.0.4 analysis software.

## 2. DESIGN/ANALYSIS PARAMETERS

Wind Speed	130 mph (3-Second Gust)
Wind Speed w/ ice	50 mph (3-Second Gust) w/ 1.5" ice
Code / Standard	TIA-222-H
Adopted Code	2018 Connecticut State Building Code (2015 IBC)
Risk Category	II
Exposure Category	B
Topographic Category	1
Calculated Crest Height	0 ft.
Seismic Spectral Response	$S_s = 0.176 \text{ g} / S_1 = 0.061 \text{ g}$
Live Load Wind Speed	60 mph
Man Live Load at Mid/End Points	250 lbs
Man Live Load at Mount Pipes	500 lbs

## 3. PROPOSED LOADING CONFIGURATION - 200.0 ft. AGL Sector Frames

Antenna Centerline (ft)	Qty.	Appurtenance Manufacturers	Appurtenance Models
200.0	3	JMA WIRELESS	MX08FRO665-21
	3	FUJITSU	TA08025-B605
	3	FUJITSU	TA08025-B604
	1	RAYCAP	RDIDC-9181-PF-48

## 4. SUPPORTING DOCUMENTATION

Proposed Loading	Dish Wireless Asset ID CT-ATC-T-88013 Rev 2, Site #BOBDL00028A, dated July 07, 2021
Mount Manufacturer Drawings	Commscope Document # MTC3975083, dated March 17, 2021
Structural Analysis Report	American Tower Corporation, Site #88013, dated July 27, 2021

## 5. RESULTS

Components	Capacity	Pass/Fail
Mount Pipes	27.2%	Pass
Horizontals	15.8%	Pass
Standoffs	43.8%	Pass
Connections	6.3%	Pass
<b>MOUNT RATING =</b>	<b>43.8 %</b>	<b>Pass</b>

Notes:

1. See additional documentation in Appendix for calculations supporting the capacity consumed and detailed mount connection calculations.

## 6. RECOMMENDATIONS

Infinigy recommends installing Dish Wireless's proposed equipment loading configuration on the mount at 200.0 ft. The installation shall be performed in accordance with the construction documents issued for this site.

Pradin Suinyal Magar  
Project Engineer II | **INFINIGY**

## 7. ASSUMPTIONS

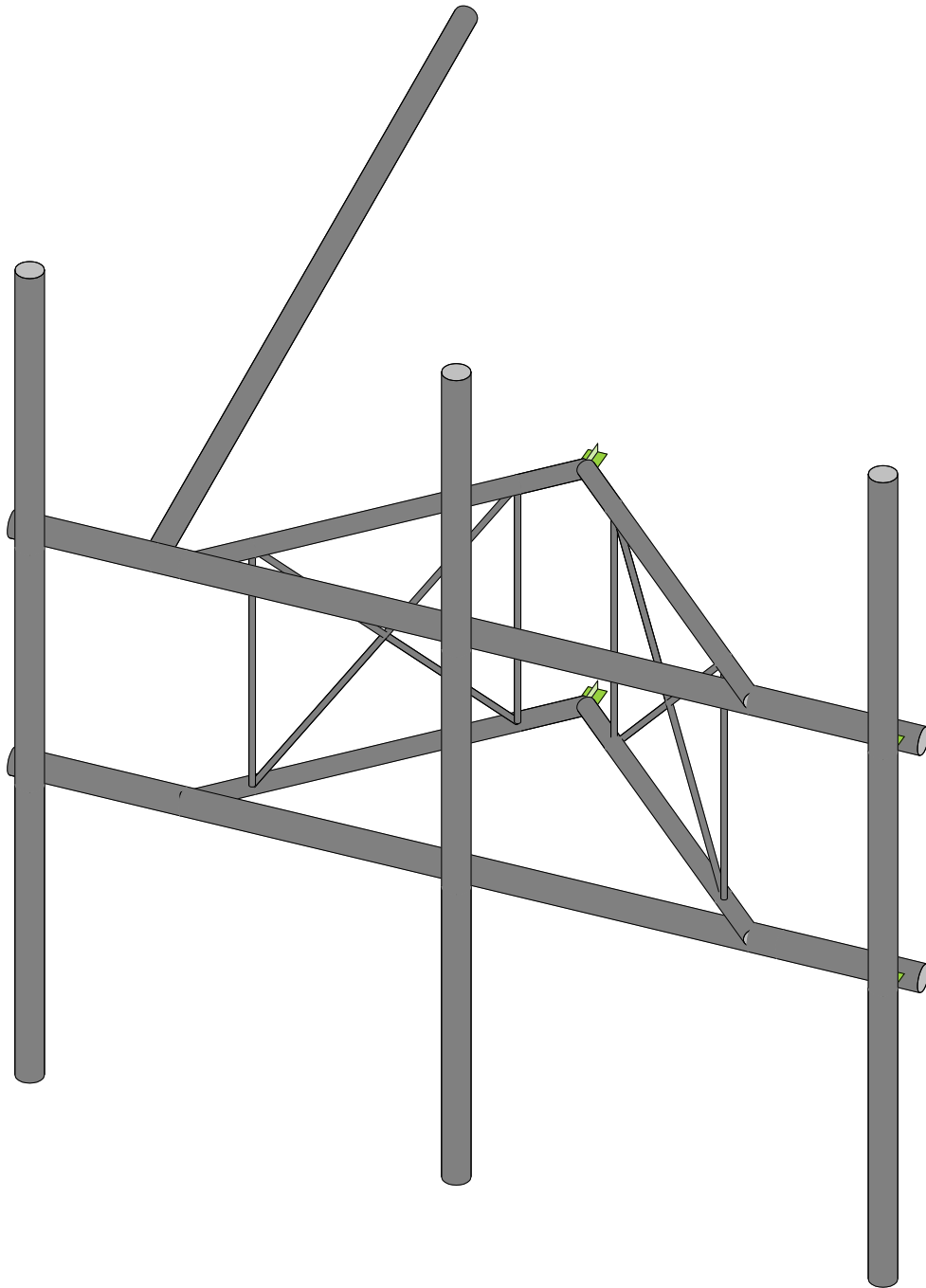
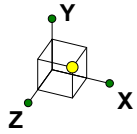
The antenna mounting system was properly fabricated, installed and maintained in accordance with its original design and manufacturer's specifications.	
The configuration of antennas, mounts, and other appurtenances are as specified in the proposed loading configuration table.	
All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.	
The analysis will require revisions if the existing conditions in the field differ from those shown in the above-referenced documents or assumed in this analysis. No allowance was made for any damaged, missing, or rusted members.	
Steel grades have been assumed as follows, unless noted otherwise:	
Channel, Plate, Built-up Angle	ASTM A1011 36 KSI
Solid Round	ASTM A529 Gr 50
Structural Angle	ASTM A529 Gr. 50
HSS (Rectangular)	ASTM A500-B GR 46
HSS (Circular)	ASTM A500-B GR 42
Pipe	ASTM A500 Gr 46
Connection Bolts	ASTM A449
U-Bolts	ASTM A307
All bolted connections are pretensioned in accordance with Table 8.2 of the RCSC 2014 Standard	

## 8. LIABILITY WAIVER AND LIMITATIONS

Our structural calculations are completed assuming all information provided to Infinigy is accurate and applicable to this site. For the purposes of calculations, we assume an overall structure condition as erected and all members and connections to be free of corrosion and/or structural defects. The structure owner and/or contractor shall verify the structure's condition prior to installation of any proposed equipment. If actual conditions differ from those described in this report, Infinigy should be notified immediately to assess the impact on the results of this report.

Our evaluation is completed using industry standard methods and procedures. The structural results, conclusions and recommendations contained in this report are proprietary and should not be used by others as their own. Infinigy is not responsible for decisions made by others that are or are not based on the stated assumptions and conclusions in this report.

This report is an evaluation of the mount structure only and does not determine the adequacy of the supporting structure, other carrier mounts or cable mounting attachments. The analysis of these elements is outside the scope of this analysis, are assumed to be adequate for the purpose of this report and to have been installed per their manufacturer requirements. This document is not for construction purposes.



Envelope Only Solution

Infinigy Engineering, PLLC

PSM

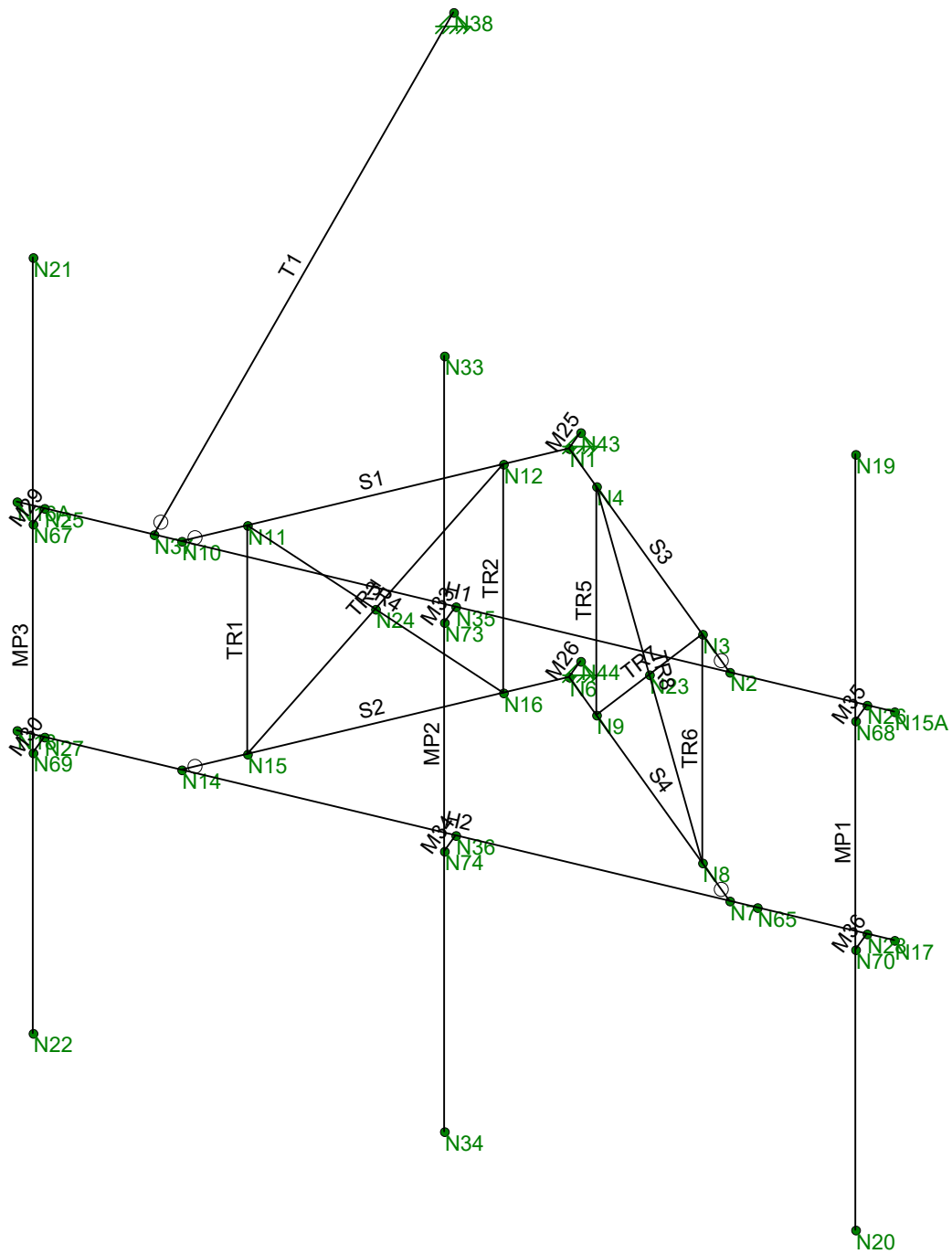
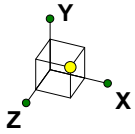
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Envelope Only Solution

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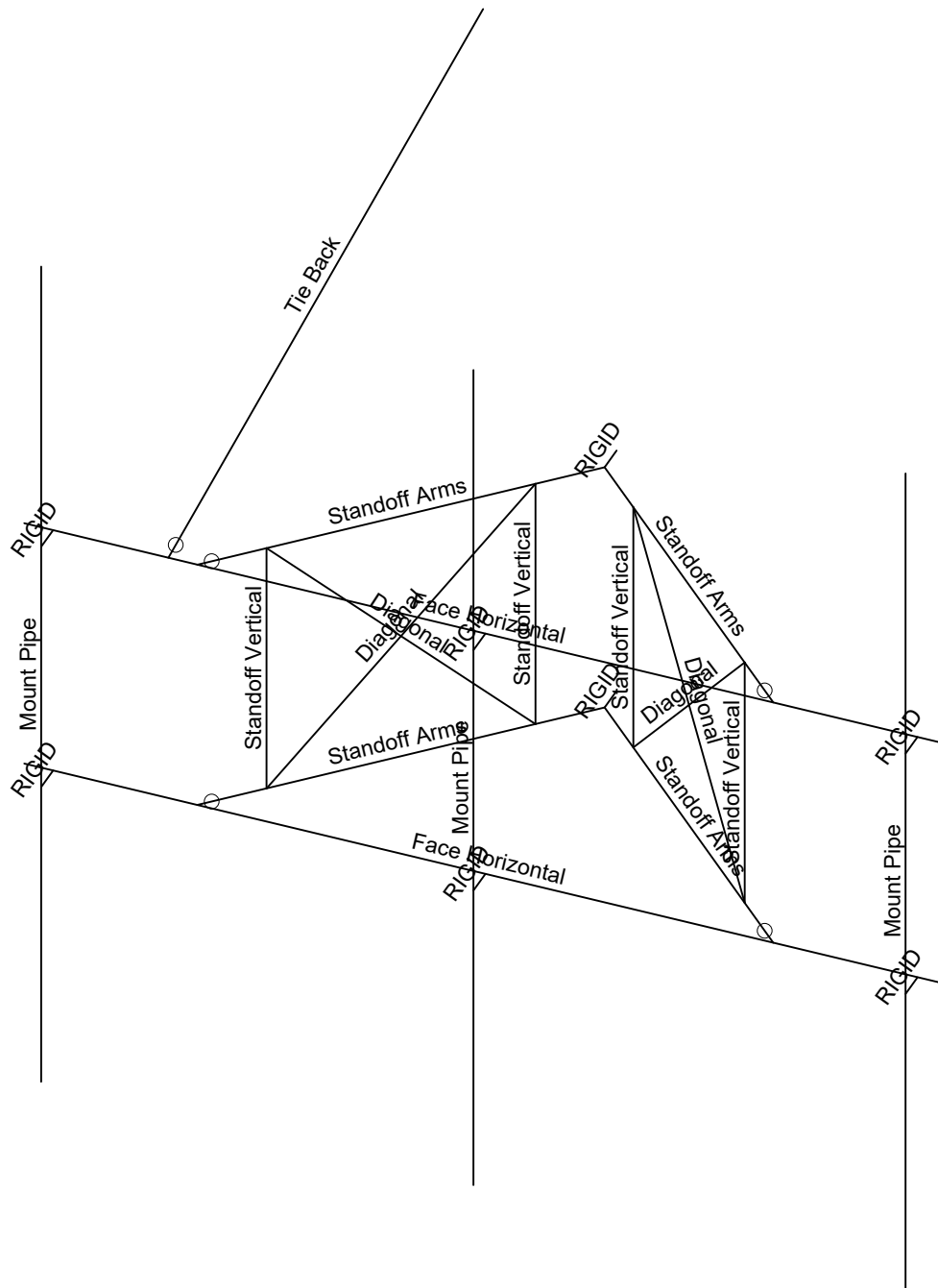
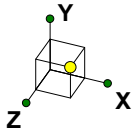
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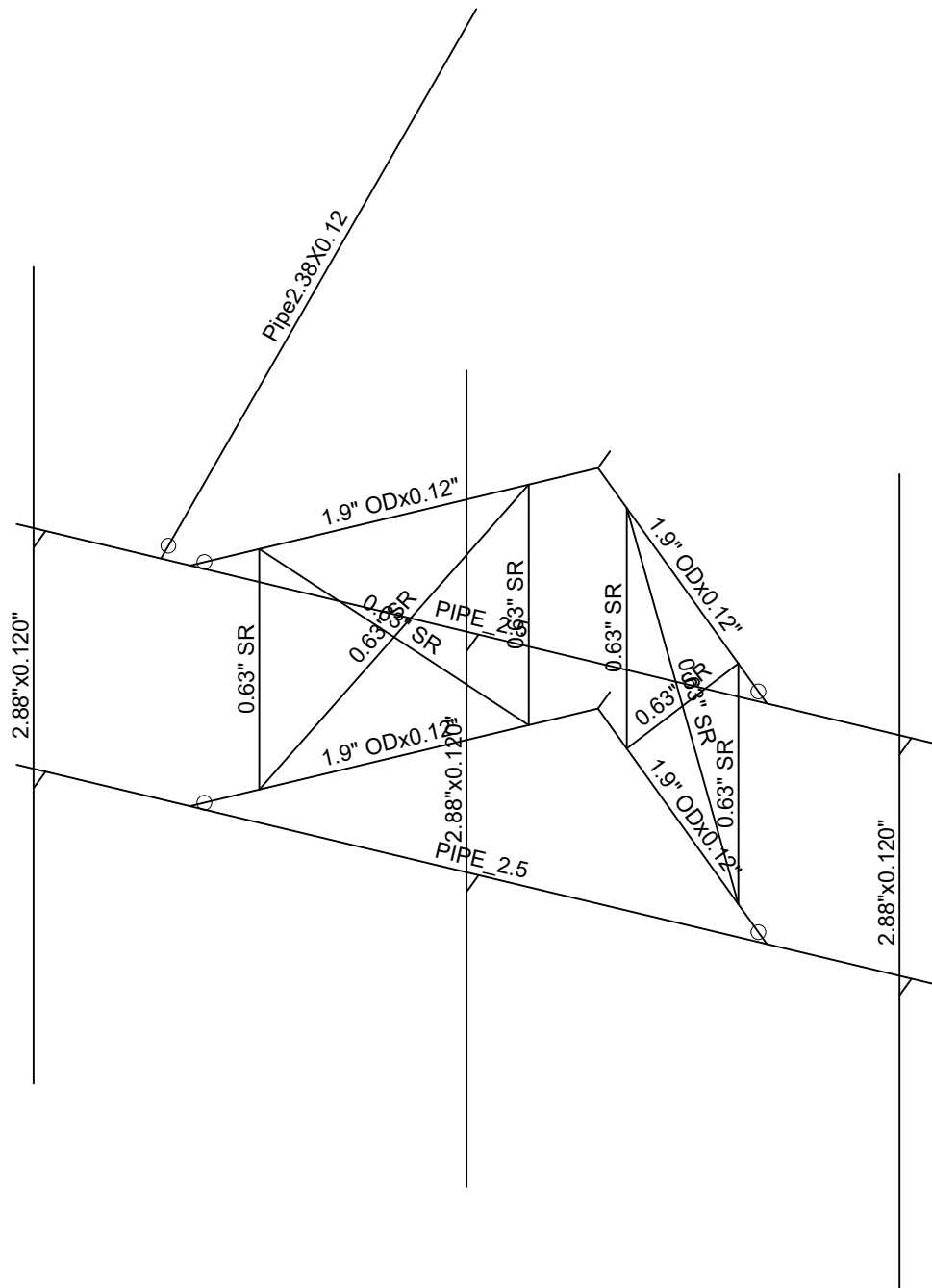
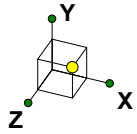
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PSM
1197-F0001-C

BOBDL00028A

Section Sets

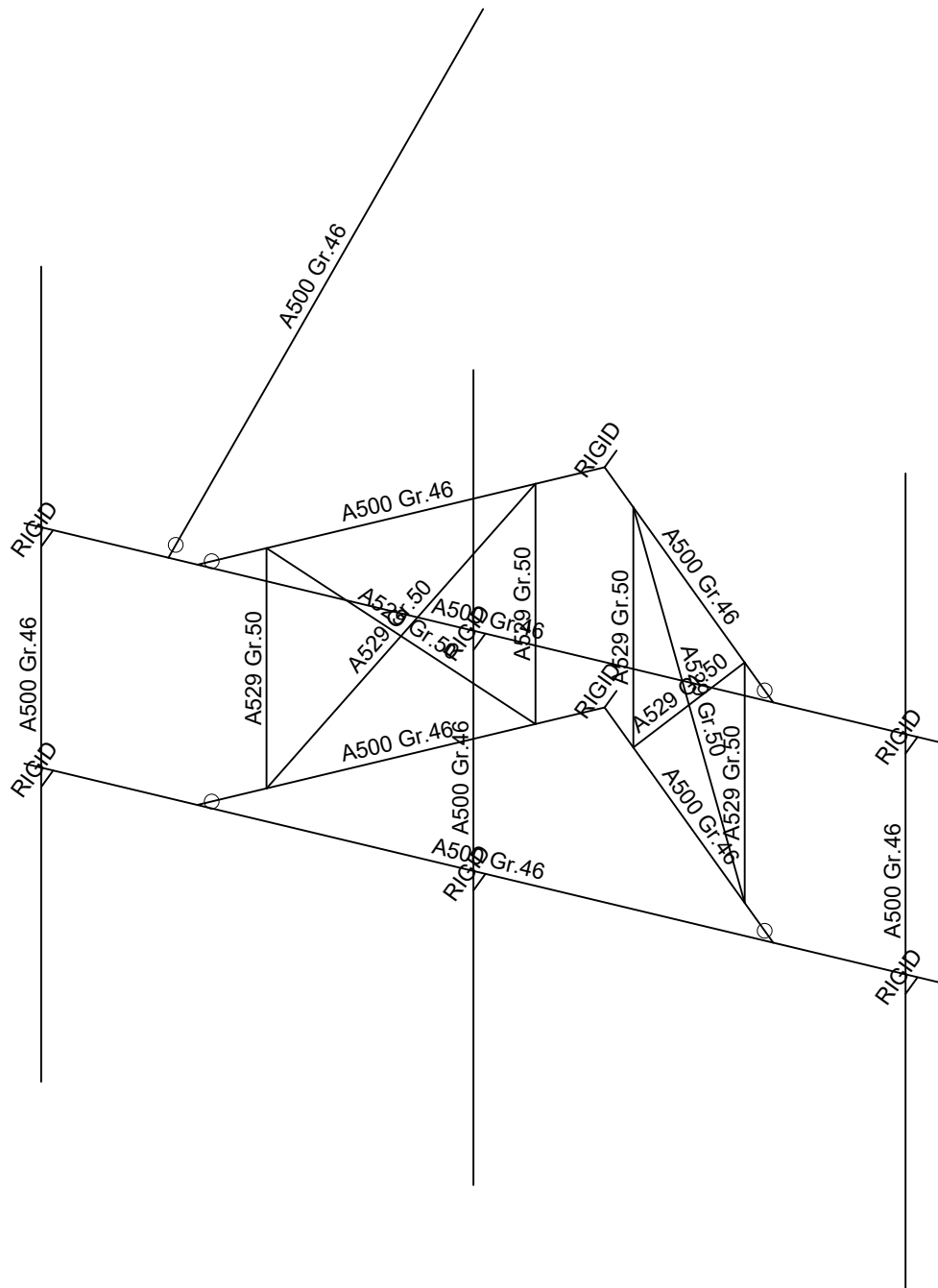
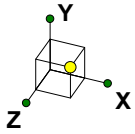
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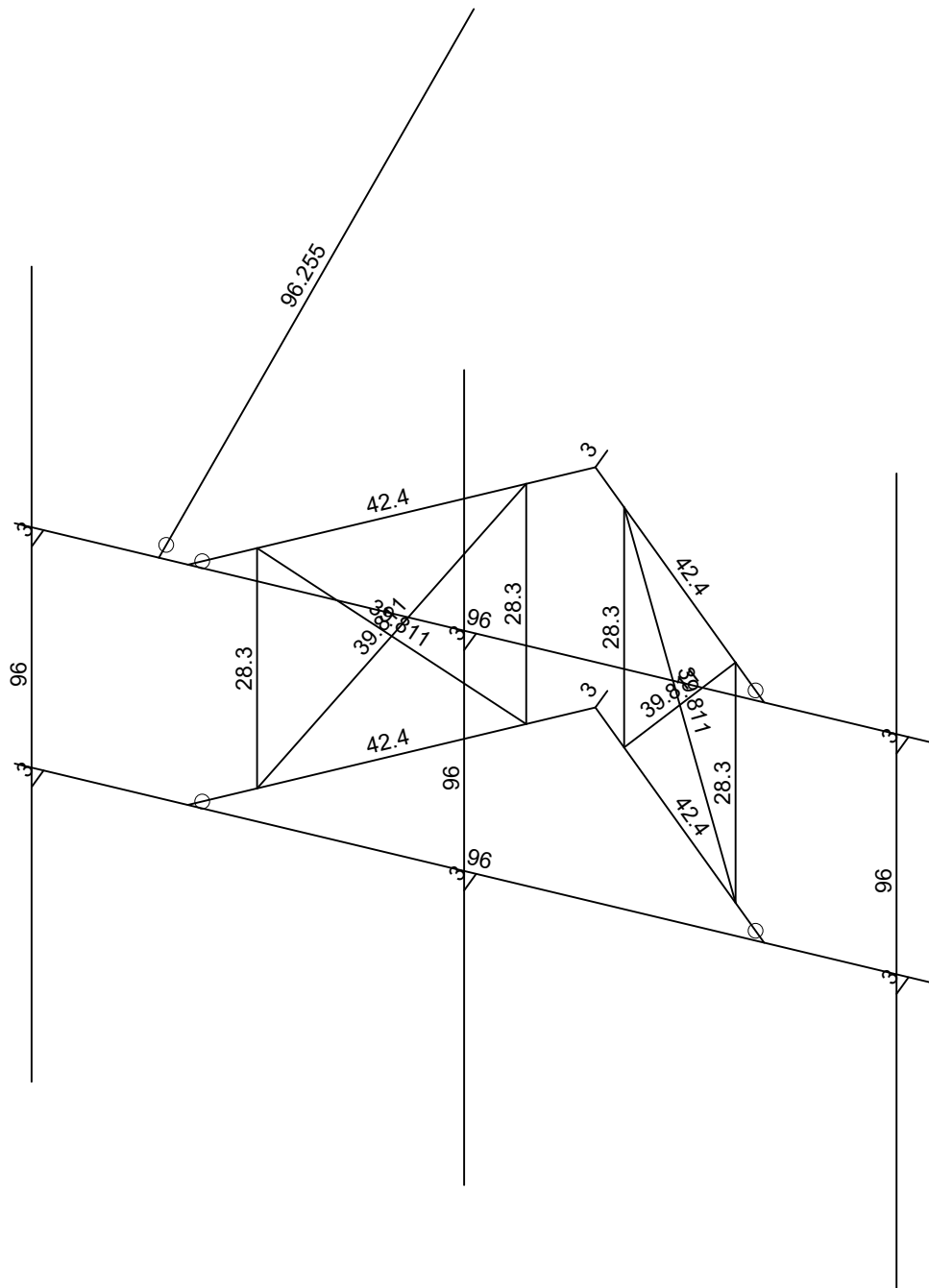
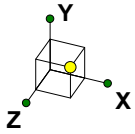
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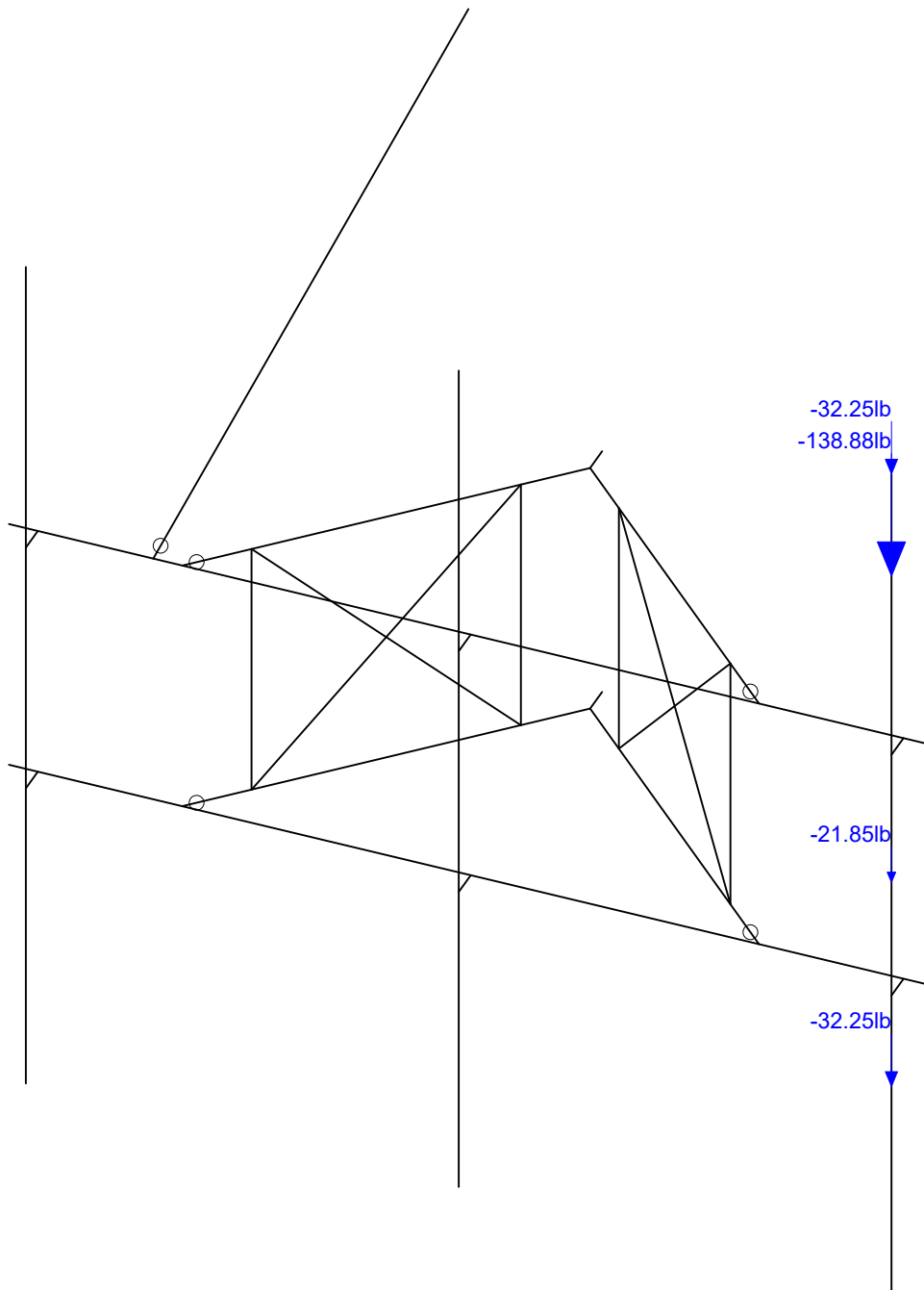
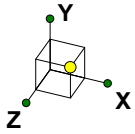
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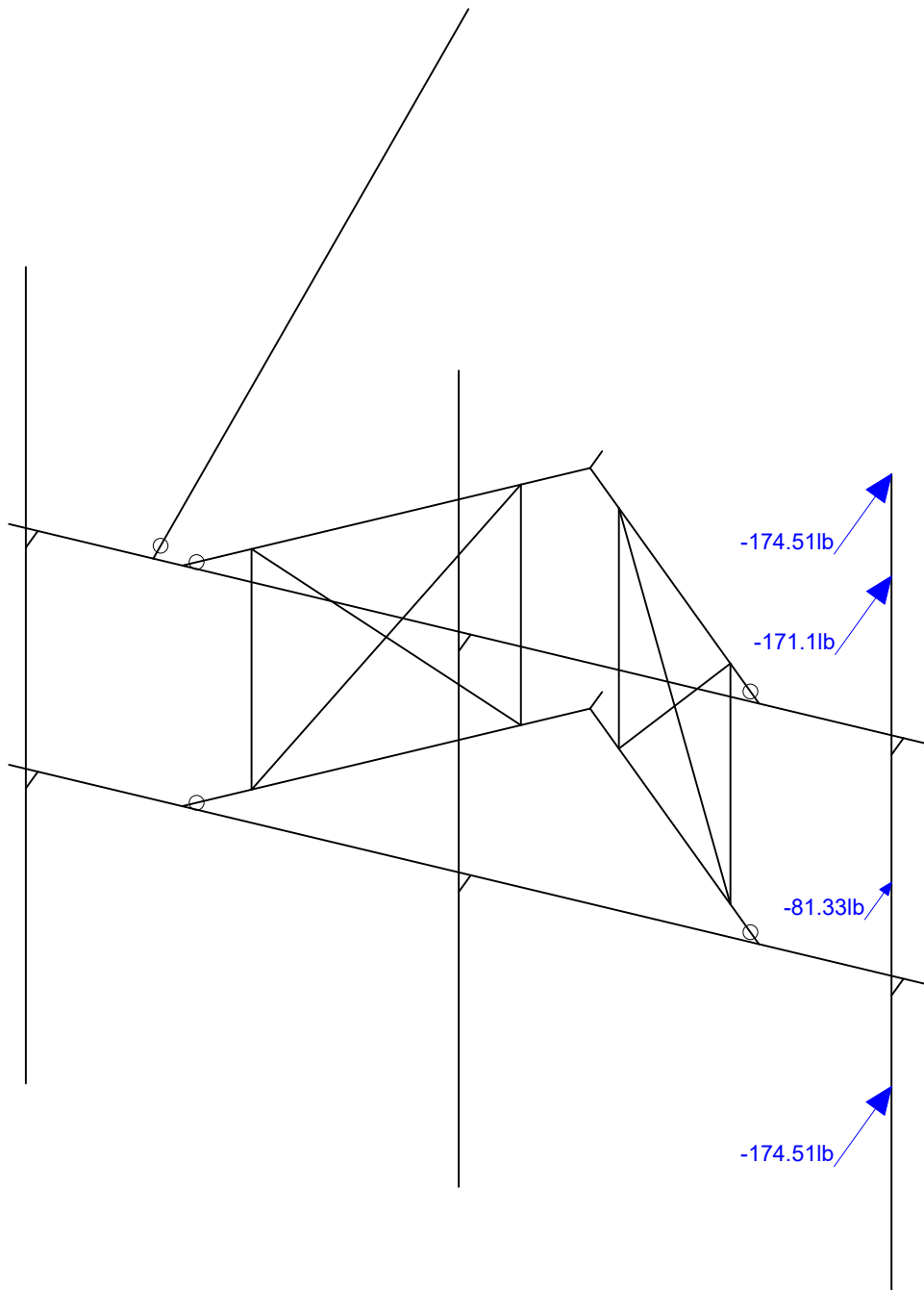
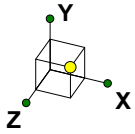
Member Length (in) Displayed  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Member Lengths
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Loads: BLC 1, Self Weight  
Envelope Only Solution

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Loads: BLC 2, Wind Load AZI 0  
Envelope Only Solution

Infinigy Engineering, PLLC

PSM

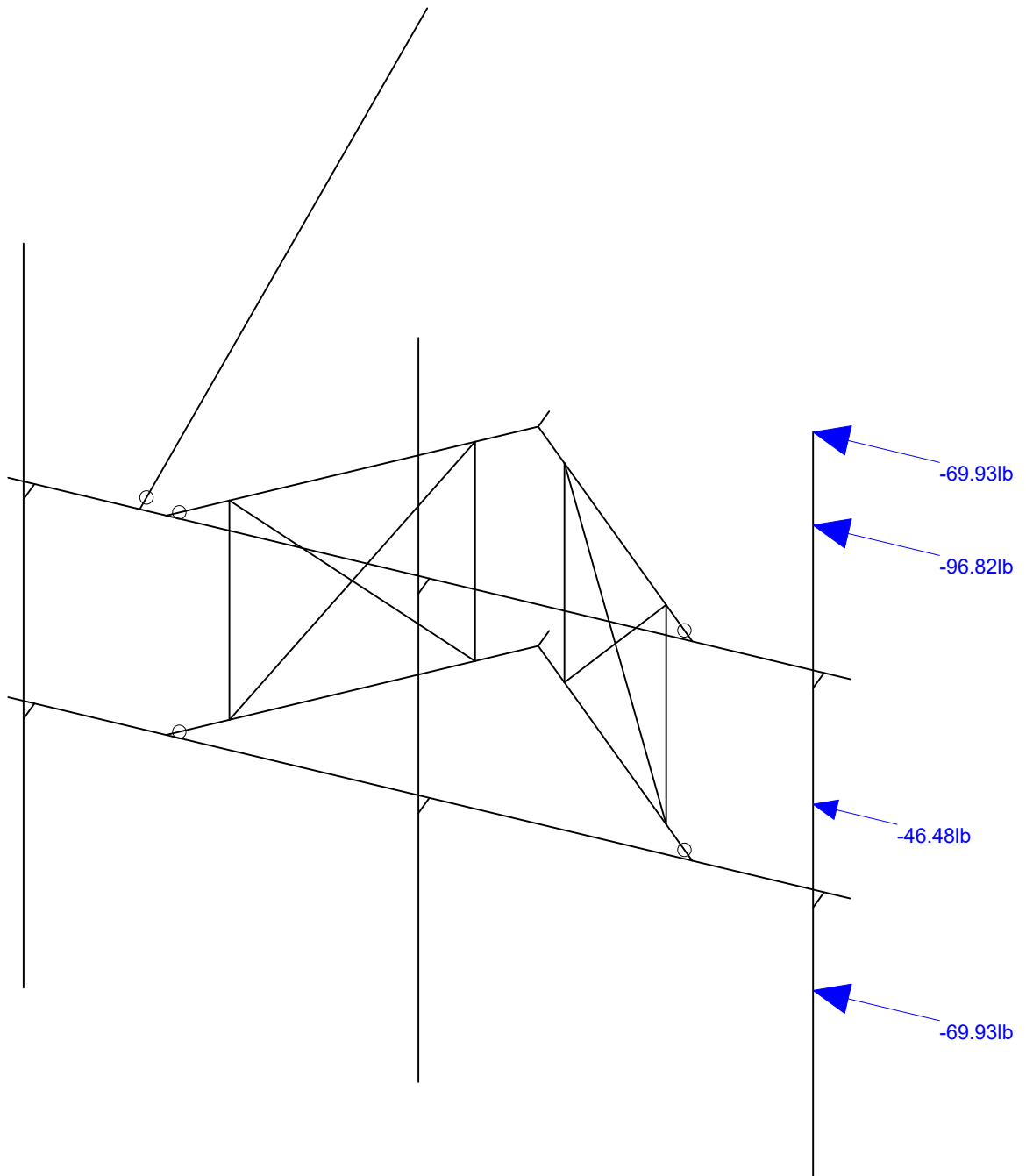
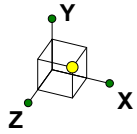
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Wind Load AZI 000

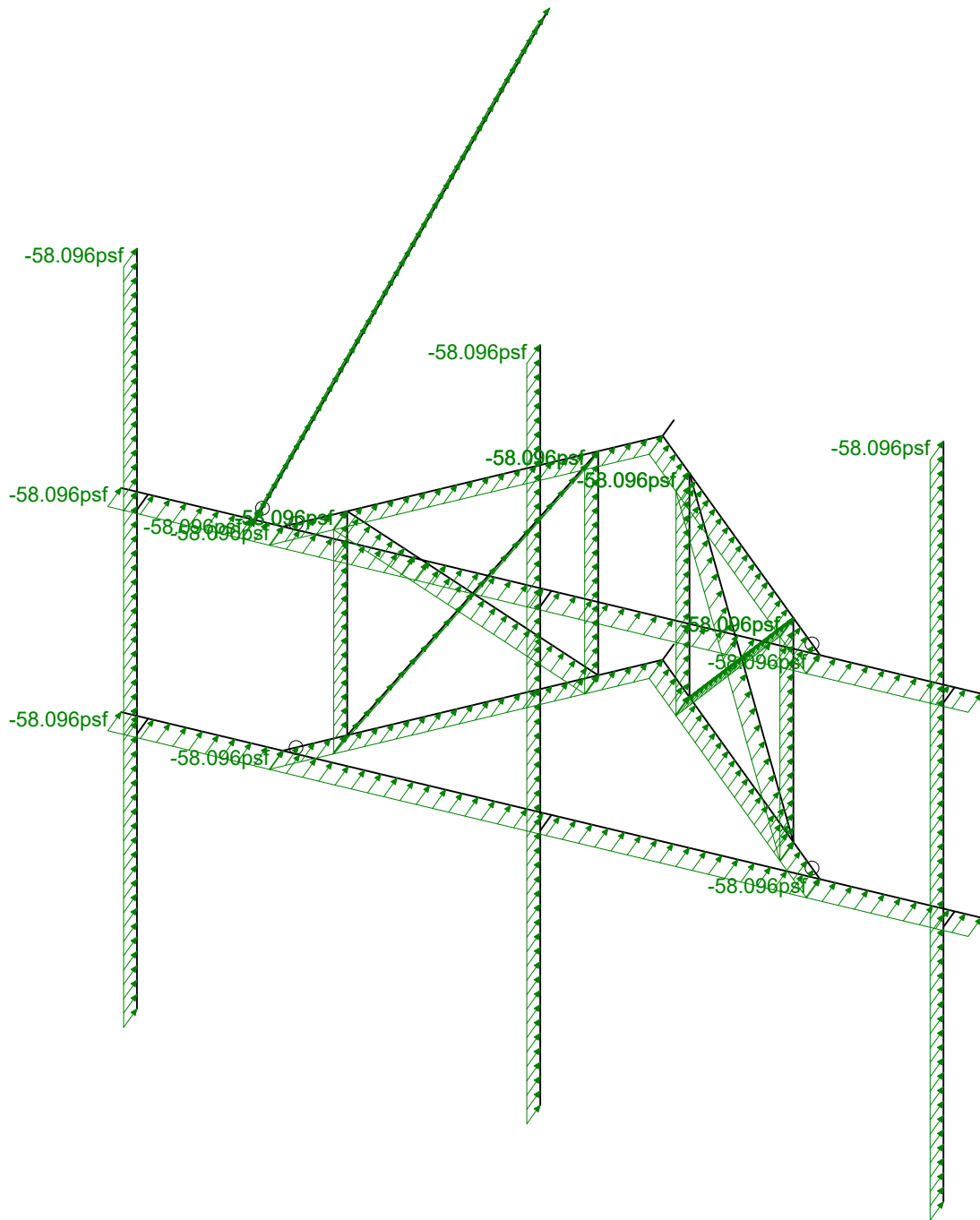
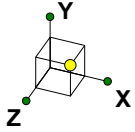
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Loads: BLC 5, Wind Load AZI 90  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Wind Load AZI 090
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Loads: BLC 14, Distr. Wind Load Z  
Envelope Only Solution

Infinigy Engineering, PLLC

PSM

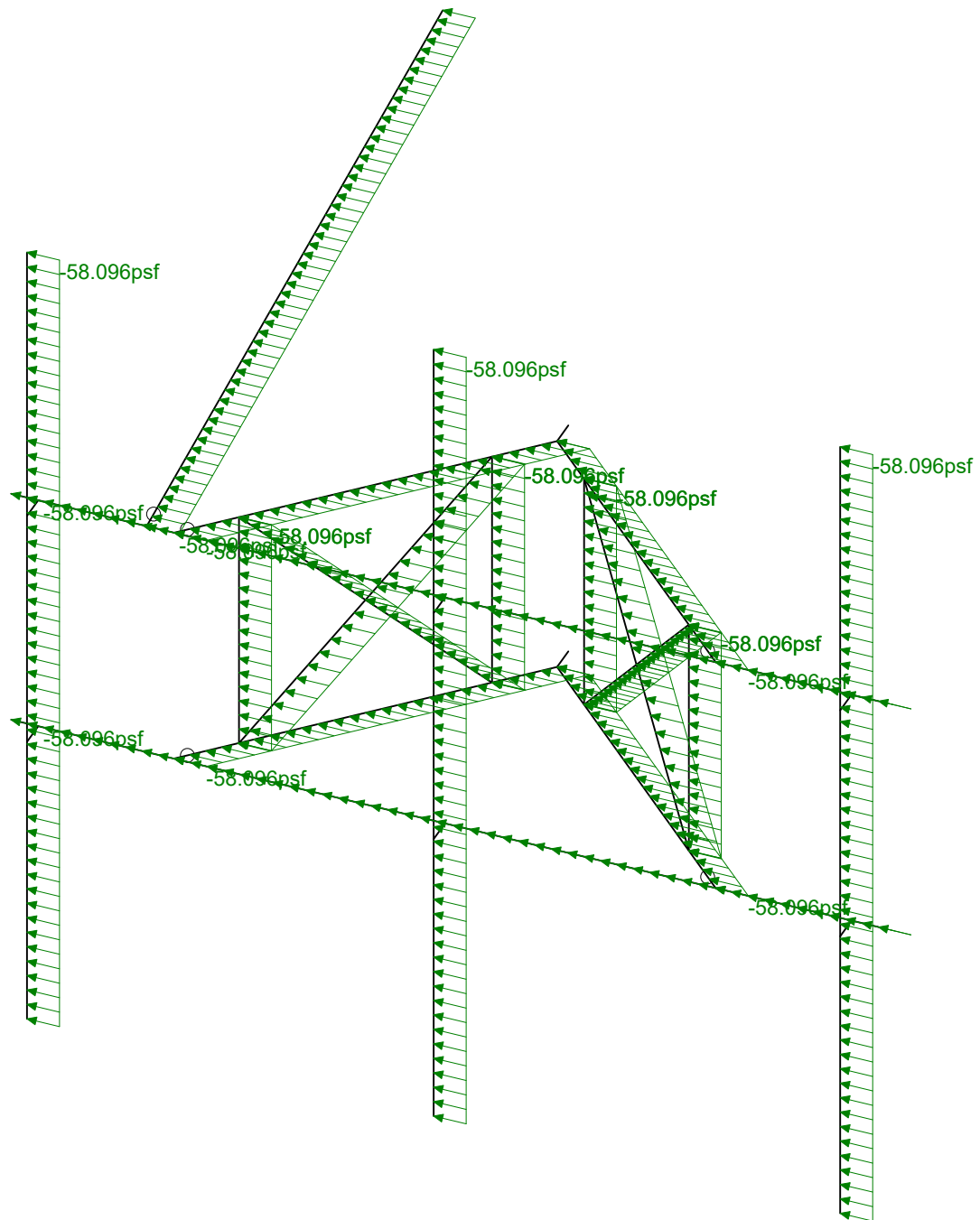
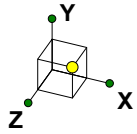
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Distr Wind Load AZI 000

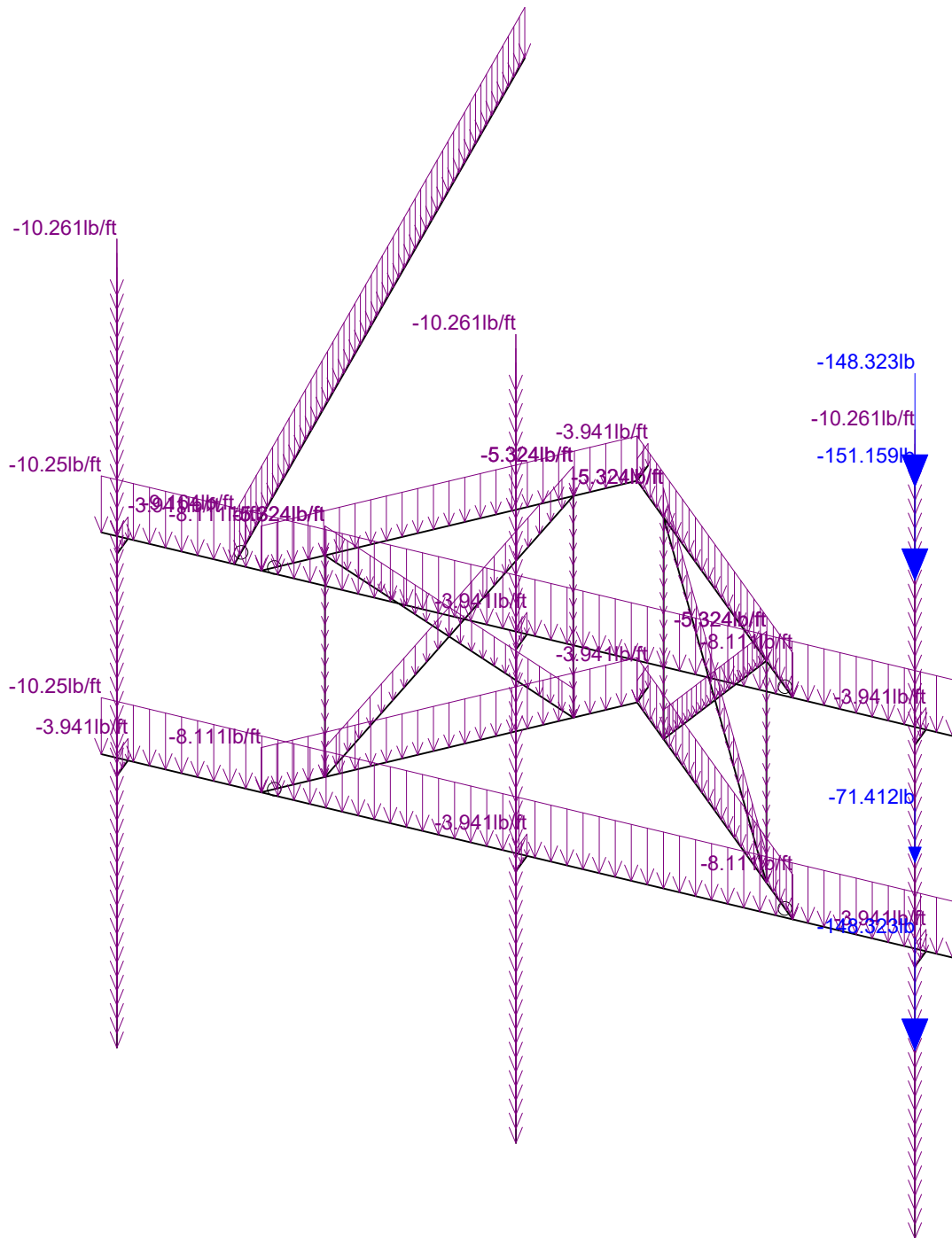
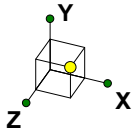
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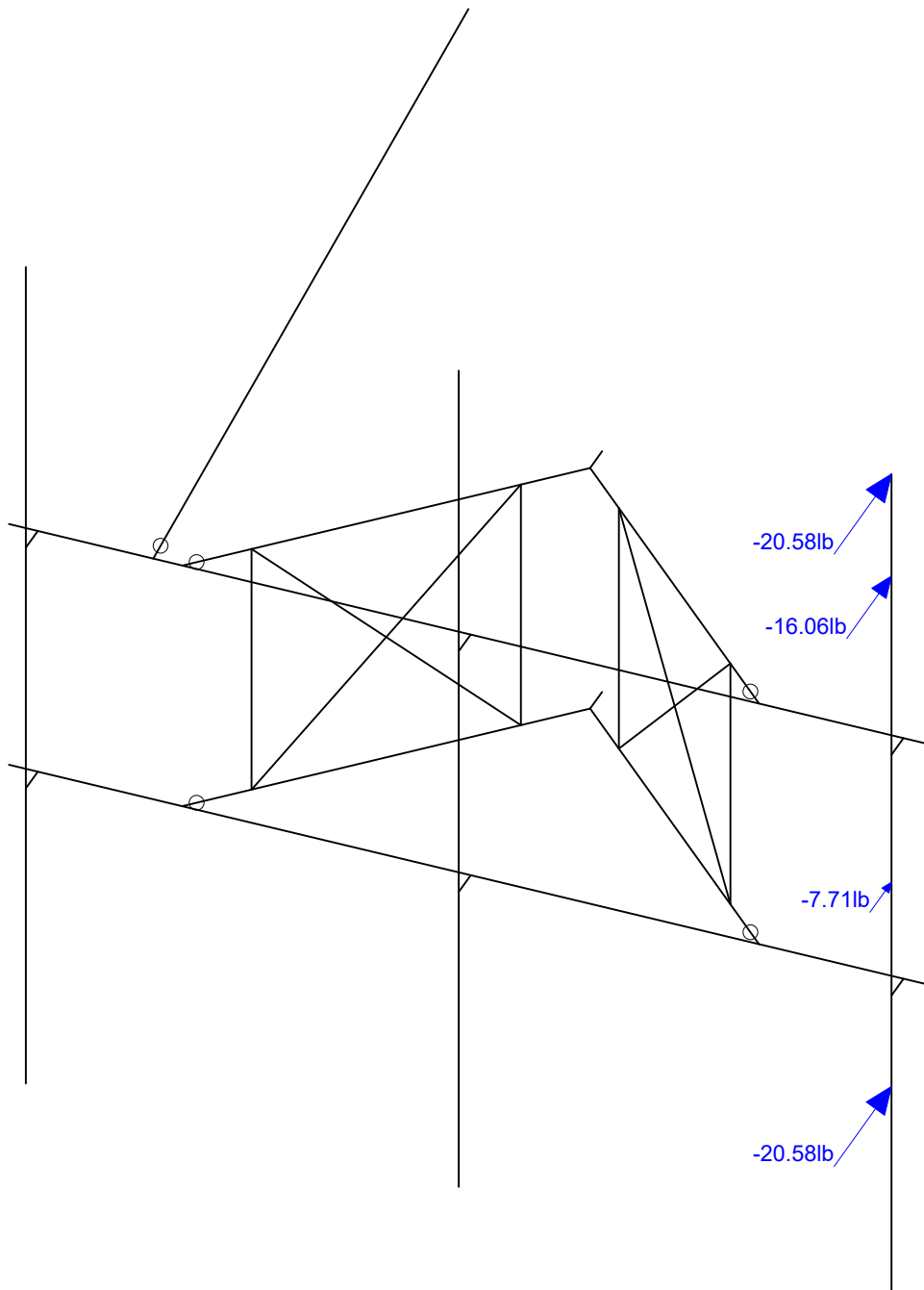
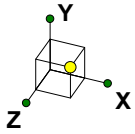
Loads: BLC 15, Distr. Wind Load X  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Distr Wind Load AZI 090
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Loads: BLC 16, Ice Weight  
Envelope Only Solution

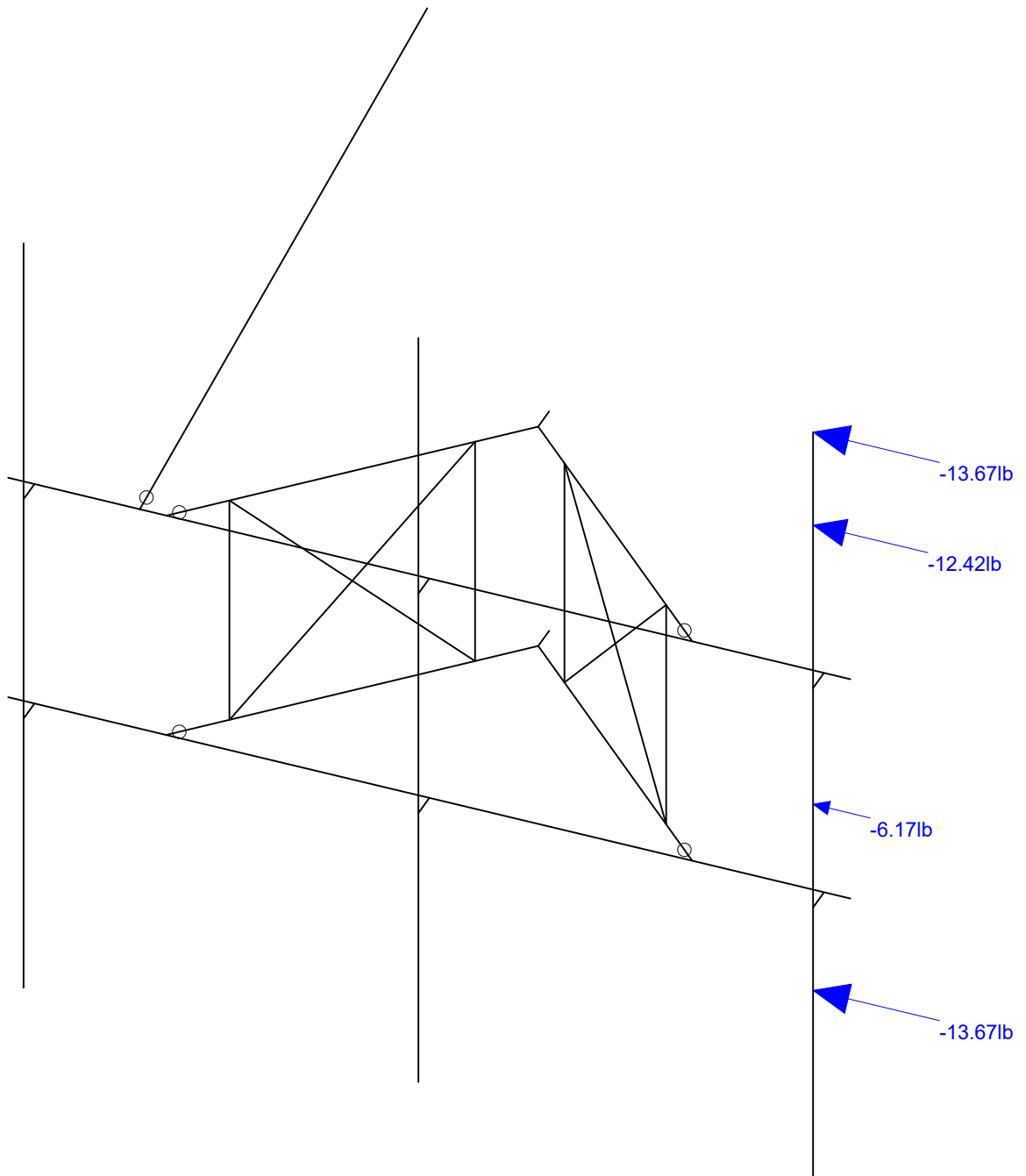
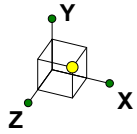
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Loads: BLC 17, Ice Wind Load AZI 0  
Envelope Only Solution

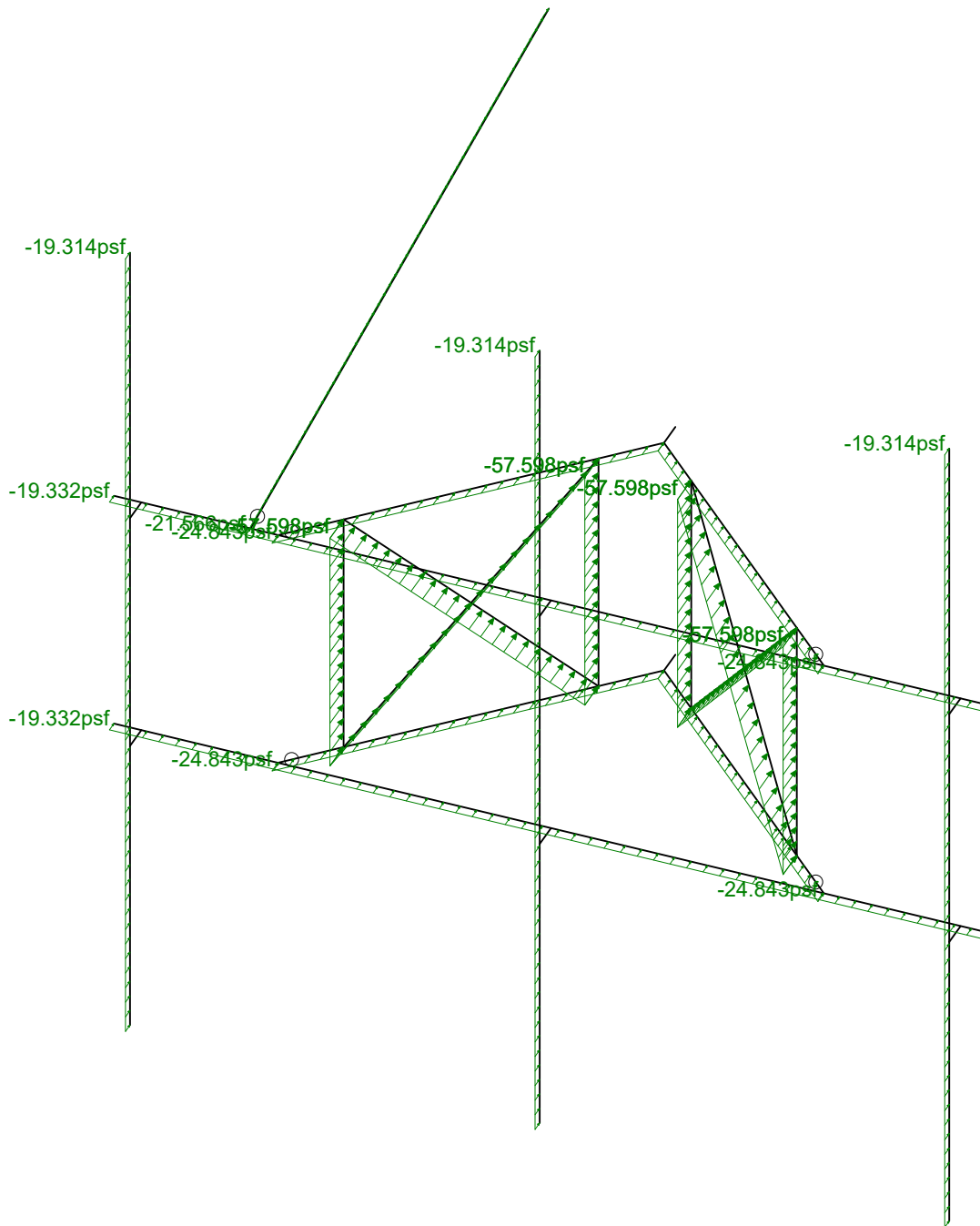
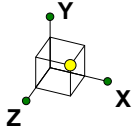
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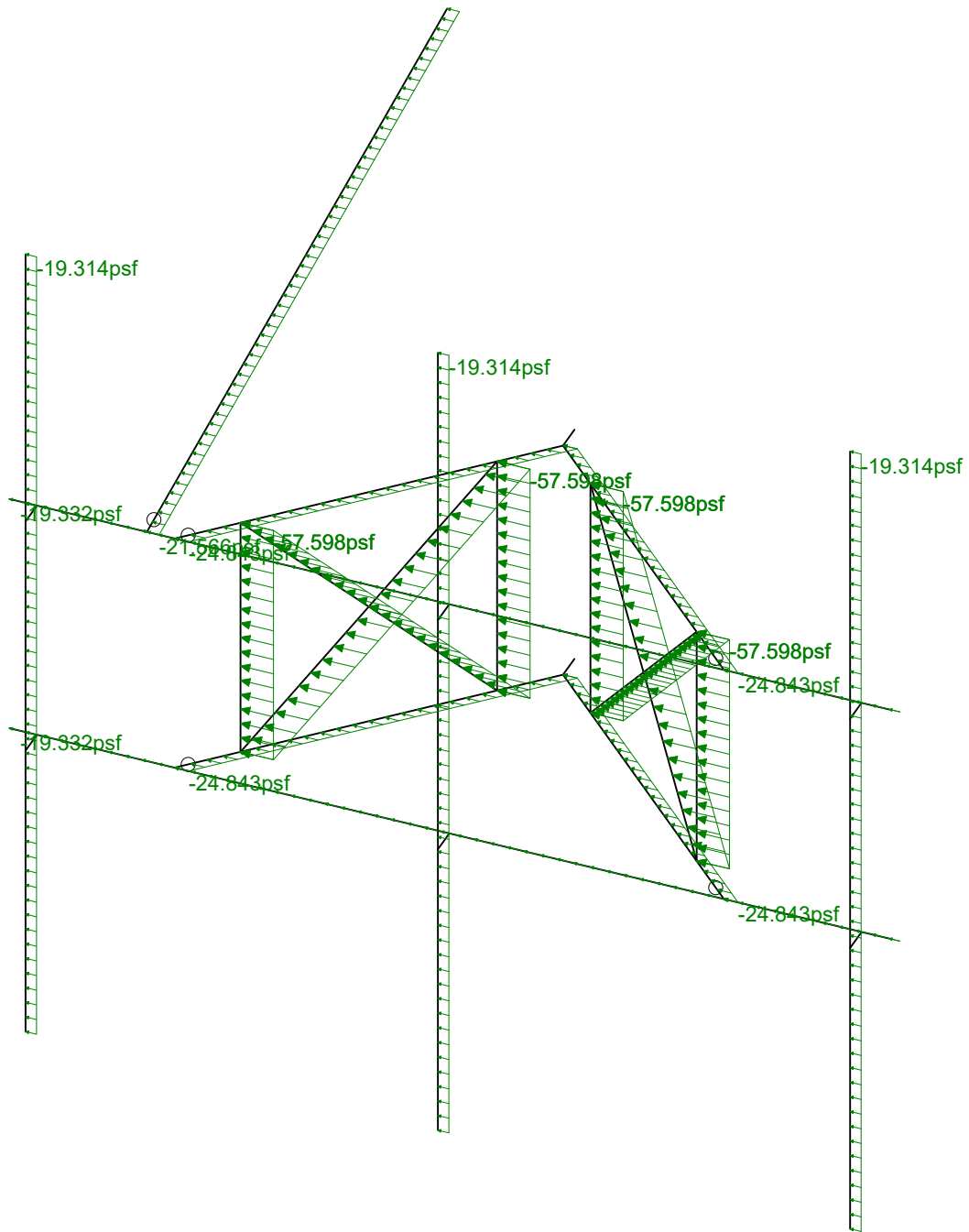
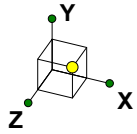
Loads: BLC 20, Ice Wind Load AZI 90  
Envelope Only Solution

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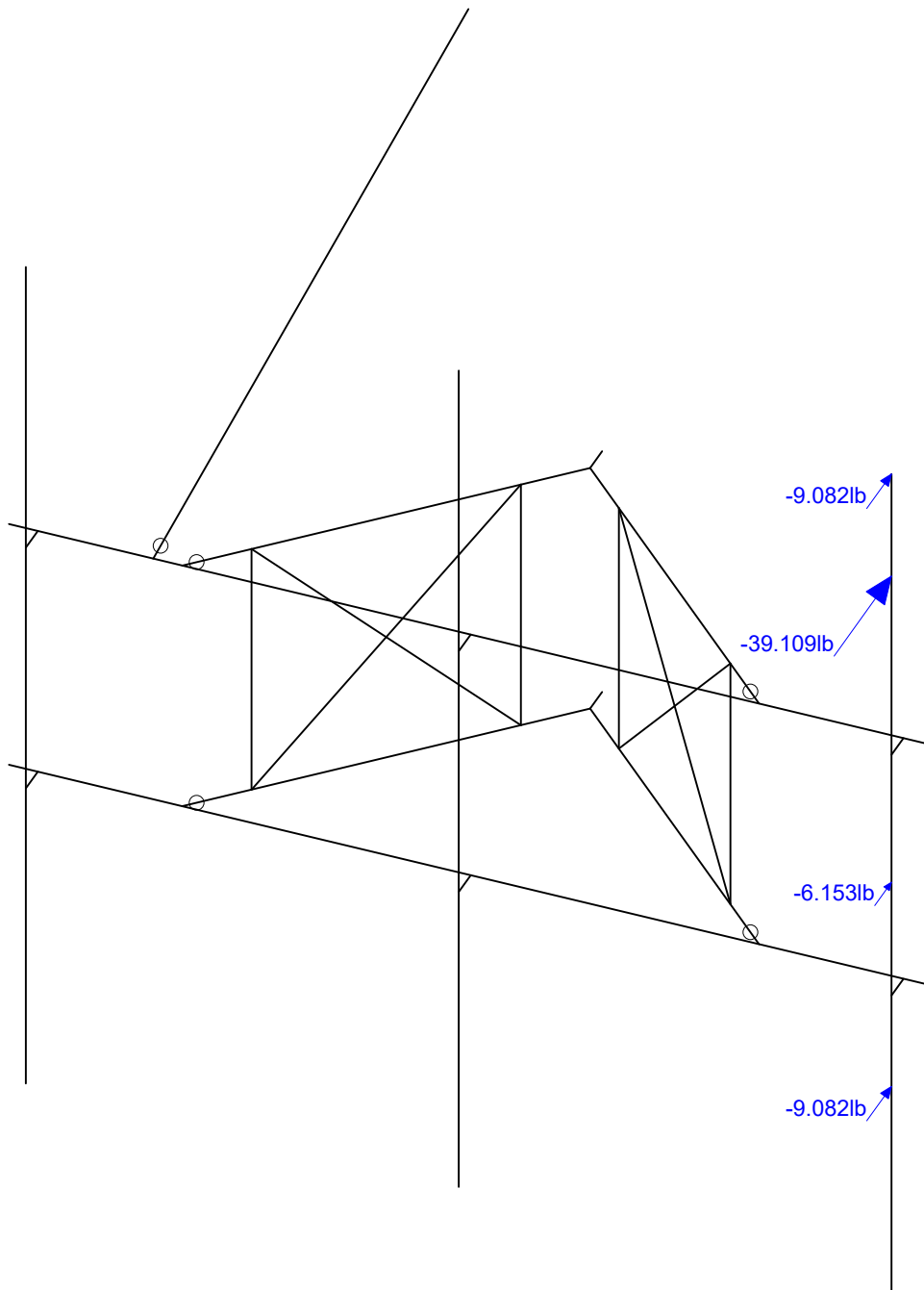
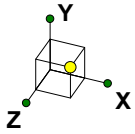
Loads: BLC 29, Distr. Ice Wind Load Z  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Distr Wind + Ice Load AZI 000
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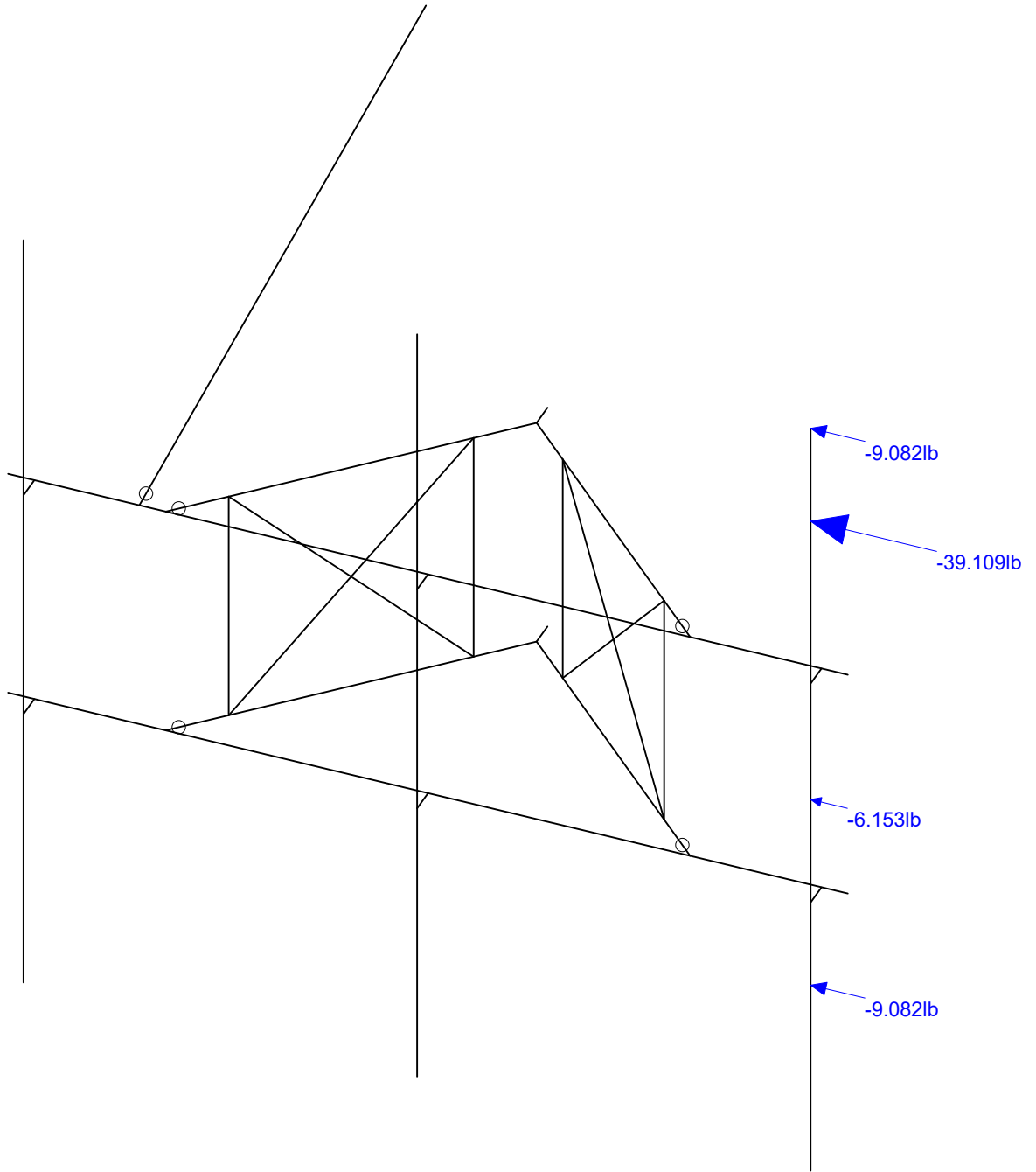
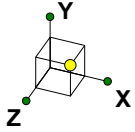
Loads: BLC 30, Distr. Ice Wind Load X  
Envelope Only Solution

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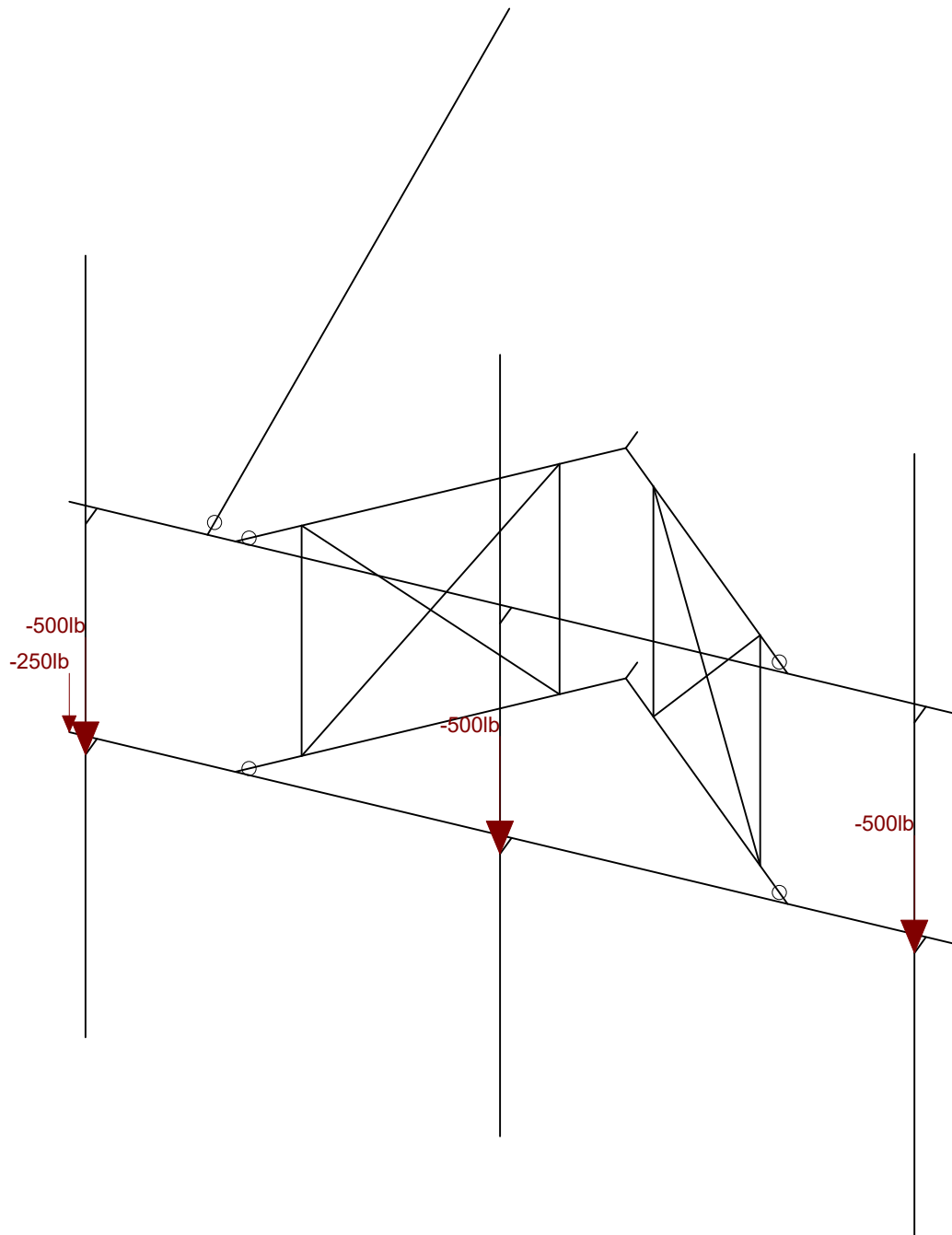
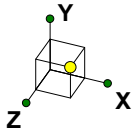
Loads: BLC 31, Seismic Load Z  
Envelope Only Solution

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1197-F0001-C		BOBDL00028A_loaded.r3d



Loads: BLC 32, Seismic Load X  
Envelope Only Solution

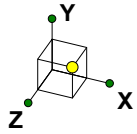
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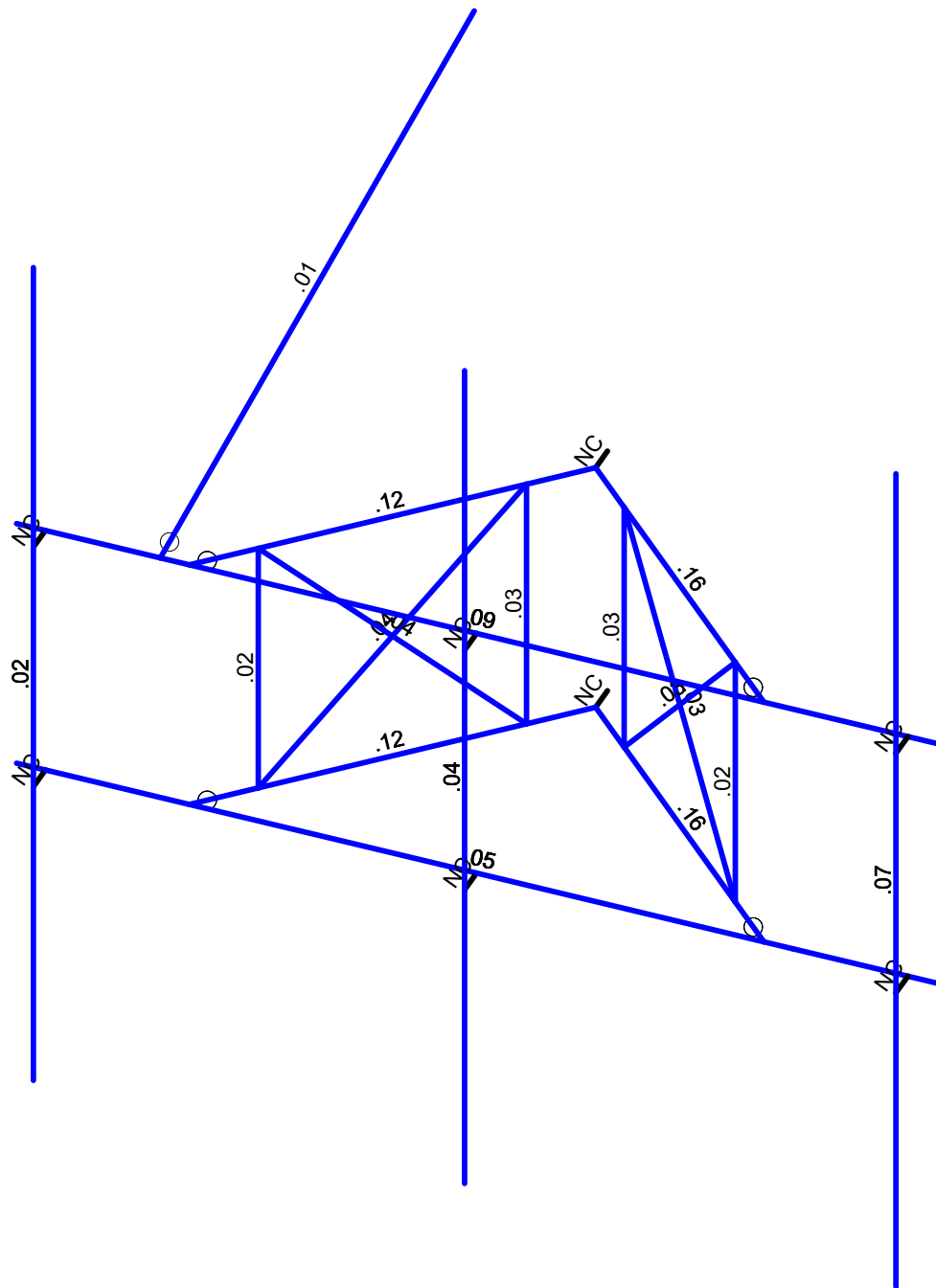
Loads: LL - Live Load  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Non-concurrent Live Loads
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<span style="display:inline-block; width:10px; height:10px; background-color:cyan; border:1px solid black;"></span>	.50-.75
<span style="display:inline-block; width:10px; height:10px; background-color:blue; border:1px solid black;"></span>	0-.50



Member Shear Checks Displayed (Enveloped)  
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00028A	Shear Check
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## Program Inputs

PROJECT INFORMATION		
Client:	ATC	
Carrier:	Dish Wireless	
Engineer:	Pradin Suinyal Magar, M.S	

SITE INFORMATION		
Risk Category:	II	
Exposure Category:	B	
Topo Factor Procedure:	Method 1, Category 1	
Site Class:	D - Stiff Soil (Assumed)	
Ground Elevation:	620.41	ft *Rev H

MOUNT INFORMATION		
Mount Type:	Sector Frame	
Num Sectors:	3	
Centerline AGL:	200.00	ft
Tower Height AGL:	302.50	ft

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

FACTORS		
Directionality Fact. ( $K_d$ ):	0.950	
Ground Ele. Factor ( $K_e$ ):	0.978	*Rev H Only
Rooftop Speed-Up ( $K_s$ ):	1.000	*Rev H Only
Topographic Factor ( $K_{zt}$ ):	1.000	
Gust Effect Factor ( $G_h$ ):	1.000	

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

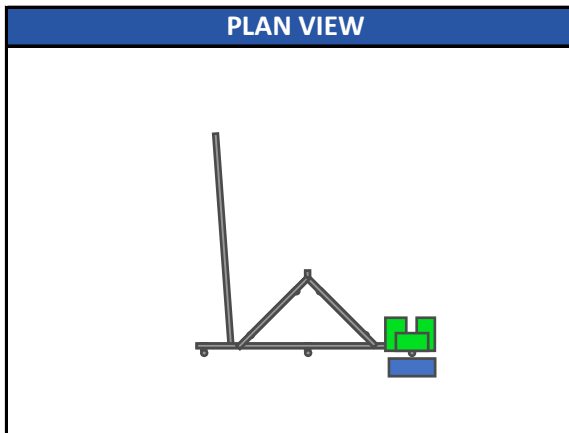
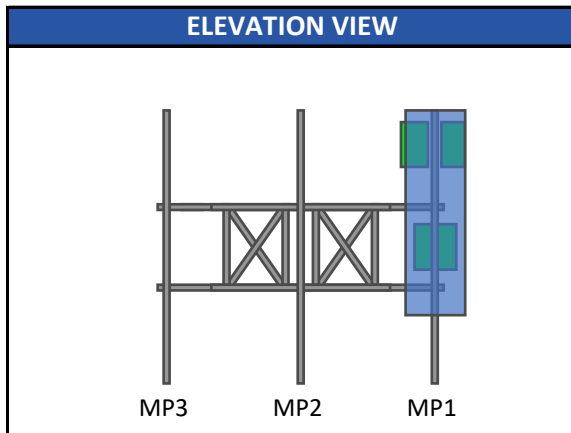
WIND AND ICE DATA		
Ultimate Wind ( $V_{ult}$ ):	130	mph
Design Wind ( $V$ ):	N/A	mph
Ice Wind ( $V_{ice}$ ):	50	mph
Base Ice Thickness ( $t_i$ ):	1.5	in
Flat Pressure:	96.826	psf
Round Pressure:	58.096	psf
Ice Wind Pressure:	8.594	psf

SEISMIC DATA		
Short-Period Accel. ( $S_s$ ):	0.176	g
1-Second Accel. ( $S_1$ ):	0.061	g
Short-Period Design ( $S_{DS}$ ):	0.188	
1-Second Design ( $S_{D1}$ ):	0.098	
Short-Period Coeff. ( $F_a$ ):	1.600	
1-Second Coeff. ( $F_v$ ):	2.400	
Amplification Factor ( $A_s$ ):	3.000	
Response Mod. Coeff. ( $R$ ):	2.000	



Infinigy Load Calculator V2.1.7

## Program Inputs



Infinigy Load Calculator V2.1.7

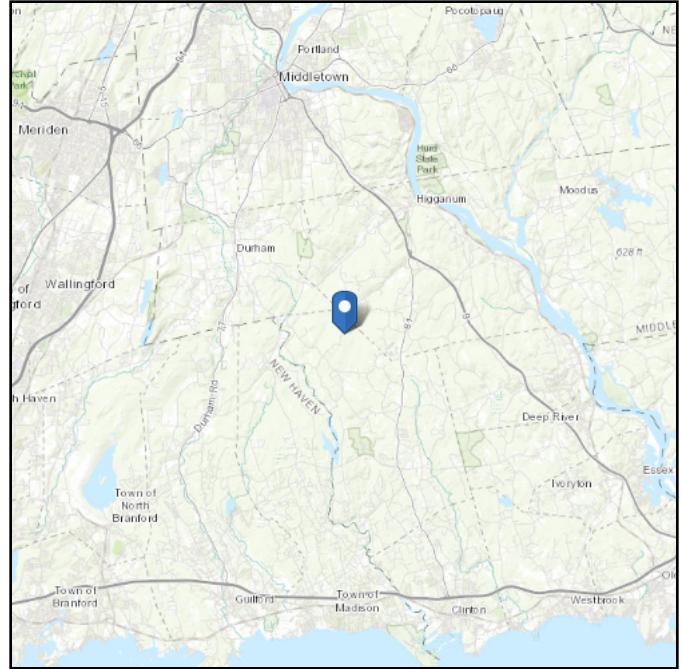
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# ASCE 7 Hazards Report

**Address:**  
No Address at This  
Location

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

**Elevation:** 620.41 ft (NAVD 88)  
**Latitude:** 41.428778  
**Longitude:** -72.603806



## Wind

### Results:

Wind Speed:	130 mph per Killingworth City Requirements in WSEL
10-year MRI	78 Vmph
25-year MRI	88 Vmph
50-year MRI	95 Vmph
100-year MRI	104 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).

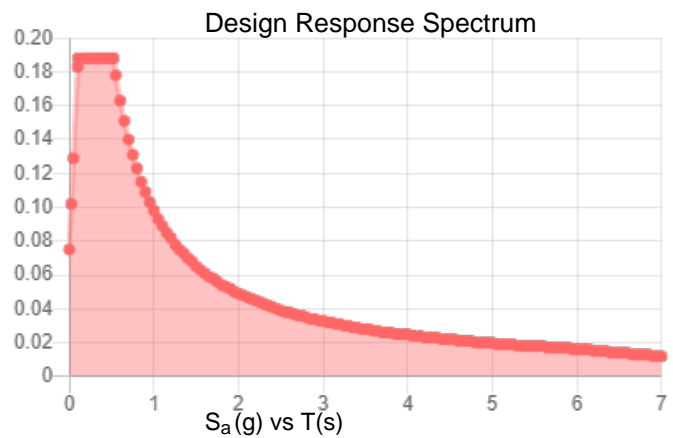
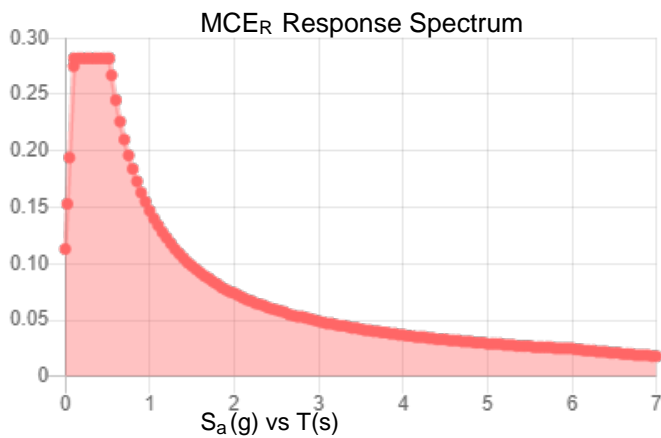
Site is in a hurricane-prone region as defined in ASCE/SEI 7-10 Section 26.2. Glazed openings need not be protected against wind-borne debris.

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

**Results:**

$S_S$ :	0.176	$S_{DS}$ :	0.188
$S_1$ :	0.061	$S_{D1}$ :	0.098
$F_a$ :	1.6	$T_L$ :	6
$F_v$ :	2.4	PGA :	0.09
$S_{MS}$ :	0.282	$PGA_M$ :	0.143
$S_{M1}$ :	0.147	$F_{PGA}$ :	1.6
		$I_e$ :	1

**Seismic Design Category** B



**Data Accessed:**

Fri Aug 13 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.

**Results:**

Ice Thickness: 0.75 in.

Concurrent Temperature: 15 F

Gust Speed: 50 mph

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

**Date Accessed:** Fri Aug 13 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.

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

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.

### Member Primary Data

	Label	I Joint	J Joint	K Joint	Rotate(...	Section/Shape	Type	Design List	Material	Design Rules
1	S3	N2	N1			Standoff Arms	Beam	Pipe	A500 Gr.46	Typical
2	S4	N7	N6			Standoff Arms	Beam	Pipe	A500 Gr.46	Typical
3	TR6	N3	N8			Standoff Vertical	None	None	A529 Gr.50	Typical
4	TR5	N4	N9			Standoff Vertical	None	None	A529 Gr.50	Typical
5	TR8	N4	N8			Diagonal	None	None	A529 Gr.50	Typical
6	TR7	N3	N9			Diagonal	None	None	A529 Gr.50	Typical
7	S1	N10	N1			Standoff Arms	Beam	Pipe	A500 Gr.46	Typical
8	S2	N14	N6			Standoff Arms	Beam	Pipe	A500 Gr.46	Typical
9	TR1	N11	N15			Standoff Vertical	None	None	A529 Gr.50	Typical
10	TR2	N12	N16			Standoff Vertical	None	None	A529 Gr.50	Typical
11	TR3	N12	N15			Diagonal	None	None	A529 Gr.50	Typical
12	TR4	N11	N16			Diagonal	None	None	A529 Gr.50	Typical
13	H1	N16A	N15A			Face Horizontal	Beam	Pipe	A500 Gr.46	Typical
14	H2	N18	N17			Face Horizontal	Beam	Pipe	A500 Gr.46	Typical
15	MP3	N21	N22			Mount Pipe	Colu...	Pipe	A500 Gr.46	Typical
16	MP1	N19	N20			Mount Pipe	Colu...	Pipe	A500 Gr.46	Typical
17	MP2	N33	N34			Mount Pipe	Colu...	Pipe	A500 Gr.46	Typical
18	T1	N37	N38			Tie Back	None	None	A500 Gr.46	Typical
19	M29	N25	N67			RIGID	None	None	RIGID	Typical
20	M30	N27	N69			RIGID	None	None	RIGID	Typical
21	M33	N35	N73			RIGID	None	None	RIGID	Typical
22	M34	N36	N74			RIGID	None	None	RIGID	Typical
23	M35	N26	N68			RIGID	None	None	RIGID	Typical
24	M36	N28	N70			RIGID	None	None	RIGID	Typical
25	M25	N43	N1			RIGID	None	None	RIGID	Typical
26	M26	N44	N6			RIGID	None	None	RIGID	Typical

### Hot Rolled Steel Design Parameters

	Label	Shape	Lengt...	Lbyy[in]	Lbzz[in]	Lcomp t...	Lcomp b...	L-tor...	Kyy	Kzz	Cb	Func...
1	S3	Standoff Arms	42.4			Lbyy						Late...
2	S4	Standoff Arms	42.4			Lbyy						Late...
3	TR6	Standoff Vertical	28.3			Lbyy			.65	.65		Late...
4	TR5	Standoff Vertical	28.3			Lbyy			.65	.65		Late...
5	TR8	Diagonal	39.811			Lbyy			.7	.7		Late...
6	TR7	Diagonal	39.811			Lbyy			.5	.5		Late...
7	S1	Standoff Arms	42.4			Lbyy						Late...
8	S2	Standoff Arms	42.4			Lbyy						Late...
9	TR1	Standoff Vertical	28.3			Lbyy			.65	.65		Late...
10	TR2	Standoff Vertical	28.3			Lbyy			.65	.65		Late...
11	TR3	Diagonal	39.811			Lbyy			.7	.7		Late...



### Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Lengt...	Lbyy[in]	Lbzz[in]	Lcomp t...	Lcomp b...	L-tor...	Kyy	Kzz	Cb	Func...
12	TR4	Diagonal	39.811			Lbyy			.5	.5		Late...
13	H1	Face Horizontal	96			Lbyy						Late...
14	H2	Face Horizontal	96			Lbyy						Late...
15	MP3	Mount Pipe	96			Lbyy						Late...
16	MP1	Mount Pipe	96			Lbyy						Late...
17	MP2	Mount Pipe	96			Lbyy						Late...
18	T1	Tie Back	96.255			Lbyy						Late...

### Member Advanced Data

	Label	I Release	J Release	I Offset[in]	J Offset[in]	T/C Only	Physical	Defl Ra...	Analysis ...	Inactive	Seismi...
1	S3	BenPIN					Yes	Default			None
2	S4	BenPIN					Yes	Default			None
3	TR6						Yes	** NA **			None
4	TR5						Yes	** NA **			None
5	TR8						Yes	** NA **			None
6	TR7						Yes	** NA **			None
7	S1	BenPIN					Yes	Default			None
8	S2	BenPIN					Yes	Default			None
9	TR1						Yes	** NA **			None
10	TR2						Yes	** NA **			None
11	TR3						Yes	** NA **			None
12	TR4						Yes	** NA **			None
13	H1						Yes				None
14	H2						Yes				None
15	MP3						Yes	** NA **			None
16	MP1						Yes	** NA **			None
17	MP2						Yes	** NA **			None
18	T1	BenPIN					Yes	** NA **			None
19	M29						Yes	** NA **			None
20	M30						Yes	** NA **			None
21	M33						Yes	** NA **			None
22	M34						Yes	** NA **			None
23	M35						Yes	** NA **			None
24	M36						Yes	** NA **			None
25	M25						Yes	** NA **			None
26	M26						Yes	** NA **			None

### Material Takeoff

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General				
2	RIGID		8	24	0
3	Total General		8	24	0
4					
5	Hot Rolled Steel				
6	A500 Gr.46	1.9" ODx0.12"	4	169.6	32.27
7	A500 Gr.46	PIPE 2.5	2	192	87.656
8	A500 Gr.46	2.88"x0.120"	3	288	84.933
9	A500 Gr.46	Pipe2.38X0.12	1	96.3	23.255
10	A529 Gr.50	0.63" SR	8	272.4	24.082
11	Total HR Steel		18	1018.3	252.196

### Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design...	A [in2]	Iyy [in...]	Izz [in...]	J [in4]
1	Face Horizontal	PIPE 2.5	Beam	Pipe	A500 G...	Typical	1.61	1.45	1.45	2.89
2	Standoff Arms	1.9" ODx0.12"	Beam	Pipe	A500 G...	Typical	.671	.267	.267	.534
3	Diagonal	0.63" SR	None	None	A529 G...	Typical	.312	.008	.008	.015
4	Mount Pipe	2.88"x0.120"	Colu...	Pipe	A500 G...	Typical	1.04	.993	.993	1.985
5	Tie Back	Pipe2.38X0.12	None	None	A500 G...	Typical	.852	.545	.545	1.091
6	End Support Pipe	3.5"x0.120	None	None	A500 G...	Typical	1.274	1.822	1.822	3.644
7	Standoff Vertical	0.63" SR	None	None	A529 G...	Typical	.312	.008	.008	.015

### Basic Load Cases

	BLC Description	Category	X Gr...	Y Gr...	Z Gr...	Joint	Point	Distributed	Area(Memb...	Surface(Plate/Wall)
1	Self Weight	DL		-1			5			
2	Wind Load AZI 0	WLZ					10			
3	Wind Load AZI 30	None					10			
4	Wind Load AZI 60	None					10			
5	Wind Load AZI 90	WLX					10			
6	Wind Load AZI 1...	None					10			
7	Wind Load AZI 1...	None					10			
8	Wind Load AZI 1...	None					10			
9	Wind Load AZI 2...	None					10			
10	Wind Load AZI 2...	None					10			
11	Wind Load AZI 2...	None					10			
12	Wind Load AZI 3...	None					10			
13	Wind Load AZI 3...	None					10			
14	Distr. Wind Load Z	WLZ						26		

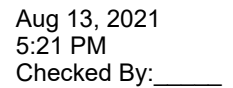


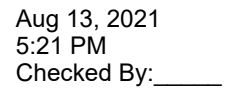
### Basic Load Cases (Continued)

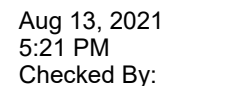
	BLC Description	Category	X Gr...	Y Gr...	Z Gr...	Joint	Point	Distributed	Area(Memb...	Surface(Plate/Wall)
15	Distr. Wind Load X	WLX						26		
16	Ice Weight	OL1					5	26		
17	Ice Wind Load A...	OL2					10			
18	Ice Wind Load A...	None					10			
19	Ice Wind Load A...	None					10			
20	Ice Wind Load A...	OL3					10			
21	Ice Wind Load A...	None					10			
22	Ice Wind Load A...	None					10			
23	Ice Wind Load A...	None					10			
24	Ice Wind Load A...	None					10			
25	Ice Wind Load A...	None					10			
26	Ice Wind Load A...	None					10			
27	Ice Wind Load A...	None					10			
28	Ice Wind Load A...	None					10			
29	Distr. Ice Wind L...	OL2						26		
30	Distr. Ice Wind L...	OL3						26		
31	Seismic Load Z	ELZ			-.282		5			
32	Seismic Load X	ELX	-.282				5			
33	Service Live Loa...	LL				1				
34	Maintenance Loa...	LL				1				
35	Maintenance Loa...	LL				1				
36	Maintenance Loa...	LL				1				

### Load Combinations

	Description	S...	P...	S...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...	B...	Fa...
1	1.4DL	Y...	Y		1	1.4														
2	1.2DL + 1WL AZI 0	Y...	Y		1	1.2	2	1	14	1	15									
3	1.2DL + 1WL AZI 30	Y...	Y		1	1.2	3	1	14	.866	15	.5								
4	1.2DL + 1WL AZI 60	Y...	Y		1	1.2	4	1	14	.5	15	.866								
5	1.2DL + 1WL AZI 90	Y...	Y		1	1.2	5	1	14		15	1								
6	1.2DL + 1WL AZI 120	Y...	Y		1	1.2	6	1	14	-.5	15	.866								
7	1.2DL + 1WL AZI 150	Y...	Y		1	1.2	7	1	14	-.8...	15	.5								
8	1.2DL + 1WL AZI 180	Y...	Y		1	1.2	8	1	14	-.1	15									
9	1.2DL + 1WL AZI 210	Y...	Y		1	1.2	9	1	14	-.8...	15	-.5								
10	1.2DL + 1WL AZI 240	Y...	Y		1	1.2	10	1	14	-.5	15	-.8...								
11	1.2DL + 1WL AZI 270	Y...	Y		1	1.2	11	1	14		15	-.1								
12	1.2DL + 1WL AZI 300	Y...	Y		1	1.2	12	1	14	.5	15	-.8...								
13	1.2DL + 1WL AZI 330	Y...	Y		1	1.2	13	1	14	.866	15	-.5								
14	0.9DL + 1WL AZI 0	Y...	Y		1	.9	2	1	14	1	15									
15	0.9DL + 1WL AZI 30	Y...	Y		1	.9	3	1	14	.866	15	.5								
16	0.9DL + 1WL AZI 60	Y...	Y		1	.9	4	1	14	.5	15	.866								







**Member Point Loads (BLC 2 : Wind Load AZI 0)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	0	0
2	MP1	Z	-174.51	0
3	MP1	X	0	72
4	MP1	Z	-174.51	72
5	MP1	X	0	12
6	MP1	Z	-85.55	12
7	MP1	X	0	12
8	MP1	Z	-85.55	12
9	MP1	X	0	48
10	MP1	Z	-81.33	48

**Member Point Loads (BLC 3 : Wind Load AZI 30)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-74.18	0
2	MP1	Z	-128.49	0
3	MP1	X	-74.18	72
4	MP1	Z	-128.49	72
5	MP1	X	-38.56	12
6	MP1	Z	-66.79	12
7	MP1	X	-37.71	12
8	MP1	Z	-65.31	12
9	MP1	X	-36.31	48
10	MP1	Z	-62.89	48

**Member Point Loads (BLC 4 : Wind Load AZI 60)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-83.2	0
2	MP1	Z	-48.04	0
3	MP1	X	-83.2	72
4	MP1	Z	-48.04	72
5	MP1	X	-52.18	12
6	MP1	Z	-30.12	12
7	MP1	X	-47.76	12
8	MP1	Z	-27.57	12
9	MP1	X	-47.8	48
10	MP1	Z	-27.6	48

**Member Point Loads (BLC 5 : Wind Load AZI 90)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-69.93	0
2	MP1	Z	0	0

**Member Point Loads (BLC 5 : Wind Load AZI 90) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
3	MP1	X	-69.93	72
4	MP1	Z	0	72
5	MP1	X	-51.81	12
6	MP1	Z	0	12
7	MP1	X	-45.01	12
8	MP1	Z	0	12
9	MP1	X	-46.48	48
10	MP1	Z	0	48

**Member Point Loads (BLC 6 : Wind Load AZI 120)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-83.2	0
2	MP1	Z	48.04	0
3	MP1	X	-83.2	72
4	MP1	Z	48.04	72
5	MP1	X	-52.18	12
6	MP1	Z	30.12	12
7	MP1	X	-47.76	12
8	MP1	Z	27.57	12
9	MP1	X	-47.8	48
10	MP1	Z	27.6	48

**Member Point Loads (BLC 7 : Wind Load AZI 150)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-74.18	0
2	MP1	Z	128.49	0
3	MP1	X	-74.18	72
4	MP1	Z	128.49	72
5	MP1	X	-38.56	12
6	MP1	Z	66.79	12
7	MP1	X	-37.71	12
8	MP1	Z	65.31	12
9	MP1	X	-36.31	48
10	MP1	Z	62.89	48

**Member Point Loads (BLC 8 : Wind Load AZI 180)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	0	0
2	MP1	Z	174.51	0
3	MP1	X	0	72
4	MP1	Z	174.51	72

**Member Point Loads (BLC 8 : Wind Load AZI 180) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
5	MP1	X	0	12
6	MP1	Z	85.55	12
7	MP1	X	0	12
8	MP1	Z	85.55	12
9	MP1	X	0	48
10	MP1	Z	81.33	48

**Member Point Loads (BLC 9 : Wind Load AZI 210)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	74.18	0
2	MP1	Z	128.49	0
3	MP1	X	74.18	72
4	MP1	Z	128.49	72
5	MP1	X	38.56	12
6	MP1	Z	66.79	12
7	MP1	X	37.71	12
8	MP1	Z	65.31	12
9	MP1	X	36.31	48
10	MP1	Z	62.89	48

**Member Point Loads (BLC 10 : Wind Load AZI 240)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	83.2	0
2	MP1	Z	48.04	0
3	MP1	X	83.2	72
4	MP1	Z	48.04	72
5	MP1	X	52.18	12
6	MP1	Z	30.12	12
7	MP1	X	47.76	12
8	MP1	Z	27.57	12
9	MP1	X	47.8	48
10	MP1	Z	27.6	48

**Member Point Loads (BLC 11 : Wind Load AZI 270)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	69.93	0
2	MP1	Z	0	0
3	MP1	X	69.93	72
4	MP1	Z	0	72
5	MP1	X	51.81	12
6	MP1	Z	0	12

**Member Point Loads (BLC 11 : Wind Load AZI 270) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
7	MP1	X	45.01	12
8	MP1	Z	0	12
9	MP1	X	46.48	48
10	MP1	Z	0	48

**Member Point Loads (BLC 12 : Wind Load AZI 300)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	83.2	0
2	MP1	Z	-48.04	0
3	MP1	X	83.2	72
4	MP1	Z	-48.04	72
5	MP1	X	52.18	12
6	MP1	Z	-30.12	12
7	MP1	X	47.76	12
8	MP1	Z	-27.57	12
9	MP1	X	47.8	48
10	MP1	Z	-27.6	48

**Member Point Loads (BLC 13 : Wind Load AZI 330)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	74.18	0
2	MP1	Z	-128.49	0
3	MP1	X	74.18	72
4	MP1	Z	-128.49	72
5	MP1	X	38.56	12
6	MP1	Z	-66.79	12
7	MP1	X	37.71	12
8	MP1	Z	-65.31	12
9	MP1	X	36.31	48
10	MP1	Z	-62.89	48

**Member Point Loads (BLC 16 : Ice Weight)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Y	-148.323	0
2	MP1	Y	-148.323	72
3	MP1	Y	-77.956	12
4	MP1	Y	-73.204	12
5	MP1	Y	-71.412	48

**Member Point Loads (BLC 17 : Ice Wind Load AZI 0)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
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### Member Point Loads (BLC 17 : Ice Wind Load AZI 0) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	0	0
2	MP1	Z	-20.58	0
3	MP1	X	0	72
4	MP1	Z	-20.58	72
5	MP1	X	0	12
6	MP1	Z	-8.03	12
7	MP1	X	0	12
8	MP1	Z	-8.03	12
9	MP1	X	0	48
10	MP1	Z	-7.71	48

### Member Point Loads (BLC 18 : Ice Wind Load AZI 30)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-9.43	0
2	MP1	Z	-16.33	0
3	MP1	X	-9.43	72
4	MP1	Z	-16.33	72
5	MP1	X	-3.81	12
6	MP1	Z	-6.6	12
7	MP1	X	-3.77	12
8	MP1	Z	-6.53	12
9	MP1	X	-3.66	48
10	MP1	Z	-6.35	48

### Member Point Loads (BLC 19 : Ice Wind Load AZI 60)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-13.33	0
2	MP1	Z	-7.7	0
3	MP1	X	-13.33	72
4	MP1	Z	-7.7	72
5	MP1	X	-5.88	12
6	MP1	Z	-3.39	12
7	MP1	X	-5.67	12
8	MP1	Z	-3.27	12
9	MP1	X	-5.68	48
10	MP1	Z	-3.28	48

### Member Point Loads (BLC 20 : Ice Wind Load AZI 90)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-13.67	0
2	MP1	Z	0	0

**Member Point Loads (BLC 20 : Ice Wind Load AZI 90) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
3	MP1	X	-13.67	72
4	MP1	Z	0	72
5	MP1	X	-6.37	12
6	MP1	Z	0	12
7	MP1	X	-6.05	12
8	MP1	Z	0	12
9	MP1	X	-6.17	48
10	MP1	Z	0	48

**Member Point Loads (BLC 21 : Ice Wind Load AZI 120)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-13.33	0
2	MP1	Z	7.7	0
3	MP1	X	-13.33	72
4	MP1	Z	7.7	72
5	MP1	X	-5.88	12
6	MP1	Z	3.39	12
7	MP1	X	-5.67	12
8	MP1	Z	3.27	12
9	MP1	X	-5.68	48
10	MP1	Z	3.28	48

**Member Point Loads (BLC 22 : Ice Wind Load AZI 150)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-9.43	0
2	MP1	Z	16.33	0
3	MP1	X	-9.43	72
4	MP1	Z	16.33	72
5	MP1	X	-3.81	12
6	MP1	Z	6.6	12
7	MP1	X	-3.77	12
8	MP1	Z	6.53	12
9	MP1	X	-3.66	48
10	MP1	Z	6.35	48

**Member Point Loads (BLC 23 : Ice Wind Load AZI 180)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	0	0
2	MP1	Z	20.58	0
3	MP1	X	0	72
4	MP1	Z	20.58	72

**Member Point Loads (BLC 23 : Ice Wind Load AZI 180) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
5	MP1	X	0	12
6	MP1	Z	8.03	12
7	MP1	X	0	12
8	MP1	Z	8.03	12
9	MP1	X	0	48
10	MP1	Z	7.71	48

**Member Point Loads (BLC 24 : Ice Wind Load AZI 210)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	9.43	0
2	MP1	Z	16.33	0
3	MP1	X	9.43	72
4	MP1	Z	16.33	72
5	MP1	X	3.81	12
6	MP1	Z	6.6	12
7	MP1	X	3.77	12
8	MP1	Z	6.53	12
9	MP1	X	3.66	48
10	MP1	Z	6.35	48

**Member Point Loads (BLC 25 : Ice Wind Load AZI 240)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	13.33	0
2	MP1	Z	7.7	0
3	MP1	X	13.33	72
4	MP1	Z	7.7	72
5	MP1	X	5.88	12
6	MP1	Z	3.39	12
7	MP1	X	5.67	12
8	MP1	Z	3.27	12
9	MP1	X	5.68	48
10	MP1	Z	3.28	48

**Member Point Loads (BLC 26 : Ice Wind Load AZI 270)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	13.67	0
2	MP1	Z	0	0
3	MP1	X	13.67	72
4	MP1	Z	0	72
5	MP1	X	6.37	12
6	MP1	Z	0	12

### Member Point Loads (BLC 26 : Ice Wind Load AZI 270) (Continued)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
7	MP1	X	6.05	12
8	MP1	Z	0	12
9	MP1	X	6.17	48
10	MP1	Z	0	48

### Member Point Loads (BLC 27 : Ice Wind Load AZI 300)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	13.33	0
2	MP1	Z	-7.7	0
3	MP1	X	13.33	72
4	MP1	Z	-7.7	72
5	MP1	X	5.88	12
6	MP1	Z	-3.39	12
7	MP1	X	5.67	12
8	MP1	Z	-3.27	12
9	MP1	X	5.68	48
10	MP1	Z	-3.28	48

### Member Point Loads (BLC 28 : Ice Wind Load AZI 330)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	9.43	0
2	MP1	Z	-16.33	0
3	MP1	X	9.43	72
4	MP1	Z	-16.33	72
5	MP1	X	3.81	12
6	MP1	Z	-6.6	12
7	MP1	X	3.77	12
8	MP1	Z	-6.53	12
9	MP1	X	3.66	48
10	MP1	Z	-6.35	48

### Member Point Loads (BLC 31 : Seismic Load Z)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	Z	-9.082	0
2	MP1	Z	-9.082	72
3	MP1	Z	-21.106	12
4	MP1	Z	-18.003	12
5	MP1	Z	-6.153	48

### Member Point Loads (BLC 32 : Seismic Load X)

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
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**Member Point Loads (BLC 32 : Seismic Load X) (Continued)**

	Member Label	Direction	Magnitude[lb,lb-ft]	Location[in,%]
1	MP1	X	-9.082	0
2	MP1	X	-9.082	72
3	MP1	X	-21.106	12
4	MP1	X	-18.003	12
5	MP1	X	-6.153	48

**Joint Loads and Enforced Displacements (BLC 33 : Service Live Loads)**

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N18	L	Y	-250

**Joint Loads and Enforced Displacements (BLC 34 : Maintenance Load 1)**

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N69	L	Y	-500

**Joint Loads and Enforced Displacements (BLC 35 : Maintenance Load 2)**

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N70	L	Y	-500

**Joint Loads and Enforced Displacements (BLC 36 : Maintenance Load 3)**

	Joint Label	L,D,M	Direction	Magnitude[(lb,lb-ft), (in,rad), (lb*s^2/in, lb*s^2*in)]
1	N74	L	Y	-500

**Member Distributed Loads (BLC 14 : Distr. Wind Load Z)**

	Member Label	Direction	Start Magnitude[lb/ft,...]	End Magn...	Start Location...	End Location[in,%]
1	S3	SZ	-58.096	-58.096	0	%100
2	S4	SZ	-58.096	-58.096	0	%100
3	TR6	SZ	-58.096	-58.096	0	%100
4	TR5	SZ	-58.096	-58.096	0	%100
5	TR8	SZ	-58.096	-58.096	0	%100
6	TR7	SZ	-58.096	-58.096	0	%100
7	S1	SZ	-58.096	-58.096	0	%100
8	S2	SZ	-58.096	-58.096	0	%100
9	TR1	SZ	-58.096	-58.096	0	%100
10	TR2	SZ	-58.096	-58.096	0	%100
11	TR3	SZ	-58.096	-58.096	0	%100
12	TR4	SZ	-58.096	-58.096	0	%100
13	H1	SZ	-58.096	-58.096	0	%100
14	H2	SZ	-58.096	-58.096	0	%100

**Member Distributed Loads (BLC 14 : Distr. Wind Load Z) (Continued)**

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in, %]
15	MP3	SZ	-58.096	-58.096	0	%100
16	MP1	SZ	-58.096	-58.096	0	%100
17	MP2	SZ	-58.096	-58.096	0	%100
18	T1	SZ	-58.096	-58.096	0	%100
19	M29	SZ	0	0	0	%100
20	M30	SZ	0	0	0	%100
21	M33	SZ	0	0	0	%100
22	M34	SZ	0	0	0	%100
23	M35	SZ	0	0	0	%100
24	M36	SZ	0	0	0	%100
25	M25	SZ	0	0	0	%100
26	M26	SZ	0	0	0	%100

**Member Distributed Loads (BLC 15 : Distr. Wind Load X)**

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in, %]
1	S3	SX	-58.096	-58.096	0	%100
2	S4	SX	-58.096	-58.096	0	%100
3	TR6	SX	-58.096	-58.096	0	%100
4	TR5	SX	-58.096	-58.096	0	%100
5	TR8	SX	-58.096	-58.096	0	%100
6	TR7	SX	-58.096	-58.096	0	%100
7	S1	SX	-58.096	-58.096	0	%100
8	S2	SX	-58.096	-58.096	0	%100
9	TR1	SX	-58.096	-58.096	0	%100
10	TR2	SX	-58.096	-58.096	0	%100
11	TR3	SX	-58.096	-58.096	0	%100
12	TR4	SX	-58.096	-58.096	0	%100
13	H1	SX	-58.096	-58.096	0	%100
14	H2	SX	-58.096	-58.096	0	%100
15	MP3	SX	-58.096	-58.096	0	%100
16	MP1	SX	-58.096	-58.096	0	%100
17	MP2	SX	-58.096	-58.096	0	%100
18	T1	SX	-58.096	-58.096	0	%100
19	M29	SX	0	0	0	%100
20	M30	SX	0	0	0	%100
21	M33	SX	0	0	0	%100
22	M34	SX	0	0	0	%100
23	M35	SX	0	0	0	%100
24	M36	SX	0	0	0	%100
25	M25	SX	0	0	0	%100
26	M26	SX	0	0	0	%100

### Member Distributed Loads (BLC 16 : Ice Weight)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in, %]
1	S3	Y	-8.111	-8.111	0	%100
2	S4	Y	-8.111	-8.111	0	%100
3	TR6	Y	-5.324	-5.324	0	%100
4	TR5	Y	-5.324	-5.324	0	%100
5	TR8	Y	-5.324	-5.324	0	%100
6	TR7	Y	-5.324	-5.324	0	%100
7	S1	Y	-8.111	-8.111	0	%100
8	S2	Y	-8.111	-8.111	0	%100
9	TR1	Y	-5.324	-5.324	0	%100
10	TR2	Y	-5.324	-5.324	0	%100
11	TR3	Y	-5.324	-5.324	0	%100
12	TR4	Y	-5.324	-5.324	0	%100
13	H1	Y	-10.25	-10.25	0	%100
14	H2	Y	-10.25	-10.25	0	%100
15	MP3	Y	-10.261	-10.261	0	%100
16	MP1	Y	-10.261	-10.261	0	%100
17	MP2	Y	-10.261	-10.261	0	%100
18	T1	Y	-9.164	-9.164	0	%100
19	M29	Y	-3.941	-3.941	0	%100
20	M30	Y	-3.941	-3.941	0	%100
21	M33	Y	-3.941	-3.941	0	%100
22	M34	Y	-3.941	-3.941	0	%100
23	M35	Y	-3.941	-3.941	0	%100
24	M36	Y	-3.941	-3.941	0	%100
25	M25	Y	-3.941	-3.941	0	%100
26	M26	Y	-3.941	-3.941	0	%100

### Member Distributed Loads (BLC 29 : Distr. Ice Wind Load Z)

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in, %]
1	S3	SZ	-24.843	-24.843	0	%100
2	S4	SZ	-24.843	-24.843	0	%100
3	TR6	SZ	-57.598	-57.598	0	%100
4	TR5	SZ	-57.598	-57.598	0	%100
5	TR8	SZ	-57.598	-57.598	0	%100
6	TR7	SZ	-57.598	-57.598	0	%100
7	S1	SZ	-24.843	-24.843	0	%100
8	S2	SZ	-24.843	-24.843	0	%100
9	TR1	SZ	-57.598	-57.598	0	%100
10	TR2	SZ	-57.598	-57.598	0	%100
11	TR3	SZ	-57.598	-57.598	0	%100
12	TR4	SZ	-57.598	-57.598	0	%100
13	H1	SZ	-19.332	-19.332	0	%100

**Member Distributed Loads (BLC 29 : Distr. Ice Wind Load Z) (Continued)**

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in,%]
14	H2	SZ	-19.332	-19.332	0	%100
15	MP3	SZ	-19.314	-19.314	0	%100
16	MP1	SZ	-19.314	-19.314	0	%100
17	MP2	SZ	-19.314	-19.314	0	%100
18	T1	SZ	-21.566	-21.566	0	%100
19	M29	SZ	0	0	0	%100
20	M30	SZ	0	0	0	%100
21	M33	SZ	0	0	0	%100
22	M34	SZ	0	0	0	%100
23	M35	SZ	0	0	0	%100
24	M36	SZ	0	0	0	%100
25	M25	SZ	0	0	0	%100
26	M26	SZ	0	0	0	%100

**Member Distributed Loads (BLC 30 : Distr. Ice Wind Load X)**

	Member Label	Direction	Start Magnitude[lb/ft,...	End Magn...	Start Location...	End Location[in,%]
1	S3	SX	-24.843	-24.843	0	%100
2	S4	SX	-24.843	-24.843	0	%100
3	TR6	SX	-57.598	-57.598	0	%100
4	TR5	SX	-57.598	-57.598	0	%100
5	TR8	SX	-57.598	-57.598	0	%100
6	TR7	SX	-57.598	-57.598	0	%100
7	S1	SX	-24.843	-24.843	0	%100
8	S2	SX	-24.843	-24.843	0	%100
9	TR1	SX	-57.598	-57.598	0	%100
10	TR2	SX	-57.598	-57.598	0	%100
11	TR3	SX	-57.598	-57.598	0	%100
12	TR4	SX	-57.598	-57.598	0	%100
13	H1	SX	-19.332	-19.332	0	%100
14	H2	SX	-19.332	-19.332	0	%100
15	MP3	SX	-19.314	-19.314	0	%100
16	MP1	SX	-19.314	-19.314	0	%100
17	MP2	SX	-19.314	-19.314	0	%100
18	T1	SX	-21.566	-21.566	0	%100
19	M29	SX	0	0	0	%100
20	M30	SX	0	0	0	%100
21	M33	SX	0	0	0	%100
22	M34	SX	0	0	0	%100
23	M35	SX	0	0	0	%100
24	M36	SX	0	0	0	%100
25	M25	SX	0	0	0	%100
26	M26	SX	0	0	0	%100



### Member Area Loads

Joint A	Joint B	Joint C	Joint D	Direction	Distribution	Magnitude[psf]
No Data to Print ...						

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

	Member	Shape	Code Check	Loc[in]	LC	She...	Loc[in]	Dir	LC	phi*P...	phi*P...	phi*M...	phi*Mn z-z [lb...	Cb	Eqn
1	TR7	0.63" SR	.438	39.811	27	.025	19.905		85	4409...	1402...	147.2...	147.295	2....	H1-1a
2	S4	1.9" ODx0.1...	.425	35.333	30	.162	42.4		28	2049...	2777...	1314...	1314.45	1....	H1-1b
3	S3	1.9" ODx0.1...	.404	35.333	31	.163	42.4		30	2049...	2777...	1314...	1314.45	1....	H1-1b
4	TR4	0.63" SR	.311	39.811	87	.039	19.905		30	4409...	1402...	147.2...	147.295	2....	H1-1a
5	S2	1.9" ODx0.1...	.299	35.333	85	.117	42.4		84	2049...	2777...	1314...	1314.45	1....	H1-1b
6	S1	1.9" ODx0.1...	.287	35.333	81	.118	42.4		87	2049...	2777...	1314...	1314.45	1.83	H1-1b
7	MP1	2.88"x0.120"	.272	33	2	.074	33		2	2249...	43056	3156...	3156.75	3....	H1-1b
8	TR8	0.63" SR	.181	0	32	.025	19.905		81	2249...	1402...	147.2...	147.295	2.15	H1-1b
9	TR5	0.63" SR	.164	28.3	27	.034	0		95	5162...	1402...	147.2...	147.295	2....	H1-1b
10	H1	PIPE 2.5	.158	77	8	.089	78		2	3348...	66654	4726.5	4726.5	1....	H1-1b
11	TR2	0.63" SR	.143	0	32	.035	0		95	5162...	1402...	147.2...	147.295	2....	H1-1b
12	TR3	0.63" SR	.122	0	81	.038	19.905		36	2249...	1402...	147.2...	147.295	2....	H1-1b
13	MP3	2.88"x0.120"	.109	33	81	.022	61		87	2249...	43056	3156...	3156.75	4....	H1-1b
14	H2	PIPE 2.5	.090	93	96	.049	78		94	3348...	66654	4726.5	4726.5	2....	H1-1b
15	MP2	2.88"x0.120"	.087	33	8	.039	33		93	2249...	43056	3156...	3156.75	4....	H1-1b
16	T1	Pipe2.38X0....	.080	0	7	.005	96.255		36	1328...	3527...	2114...	2114.85	1....	H1-1...
17	TR6	0.63" SR	.078	0	32	.016	28.3		98	5162...	1402...	147.2...	147.295	2....	H1-1b
18	TR1	0.63" SR	.054	28.3	77	.015	0		98	5162...	1402...	147.2...	147.295	2....	H1-1b

**Bolt Calculation Tool, V1.5.1**

PROJECT DATA		
Site Name:	BOBDL00028A	
Site Number:	BOBDL00028A	
Connection Description:	Sector Frame to Tower Leg	

MAXIMUM BOLT LOADS		
Bolt Tension:	1251.30	lbs
Bolt Shear:	876.46	lbs

WORST CASE BOLT LOADS <sup>1</sup>		
Bolt Tension:	802.68	lbs
Bolt Shear:	876.46	lbs

BOLT PROPERTIES		
Bolt Type:	Threaded Rod	-
Bolt Diameter:	0.625	in
Bolt Grade:	A449	-
# of Threaded Rods:	2	-
Threads Excluded?	No	-

<sup>1</sup> Worst case bolt loads correspond to Load combination #96 on member M25 in RISA-3D, which causes the maximum demand on the bolts.

Member Information	
I nodes of M25, M26	

BOLT CHECK		
Tensile Strength	20340.15	
Shear Strength	13805.83	
Max Tensile Usage	6.2%	
Max Shear Usage	6.3%	
Interaction Check (Worst Case)	0.01	≤1.05
Result	Pass	





DISH WIRELESS, LLC. SITE ID:

**BOBDL00028A**

DISH WIRELESS, LLC. SITE ADDRESS:

**131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419**

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

SHEET INDEX

SHEET NO.	SHEET TITLE
T-1	TITLE SHEET
A-1	OVERALL AND ENLARGED SITE PLAN
A-2	ELEVATION, ANTENNA LAYOUT AND SCHEDULE
A-3	EQUIPMENT PLATFORM AND H-FRAME DETAILS
A-4	EQUIPMENT DETAILS
A-5	EQUIPMENT DETAILS
A-6	EQUIPMENT DETAILS
A-7	EQUIPMENT DETAILS
E-1	ELECTRICAL/FIBER ROUTE PLAN AND NOTES
E-2	ELECTRICAL DETAILS
E-3	ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE
G-1	GROUNDING PLANS AND NOTES
G-2	GROUNDING DETAILS
G-3	GROUNDING DETAILS
RF-1	RF CABLE COLOR CODE
GN-1	LEGEND AND ABBREVIATIONS
GN-2	GENERAL NOTES
GN-3	GENERAL NOTES
GN-4	GENERAL NOTES

SCOPE OF WORK

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

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

- 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 CIENA BOX (IF REQUIRED)
  - INSTALL (1) PROPOSED METER SOCKET

SITE PHOTO



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

CALL 2 WORKING DAYS UTILITY NOTIFICATION PRIOR TO CONSTRUCTION



GENERAL NOTES

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

THE PROJECT DEPICTED IN THESE PLANS QUALIFIES AS AN ELIGIBLE FACILITIES REQUEST ENTITLED TO EXPEDITED REVIEW UNDER 47 U.S.C. § 1455(A) AS A MODIFICATION OF AN EXISTING WIRELESS TOWER THAT INVOLVES THE COLLOCATION, REMOVAL, AND/OR REPLACEMENT OF TRANSMISSION EQUIPMENT THAT IS NOT A SUBSTANTIAL CHANGE UNDER CFR § 1.61000 (B)(7).

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

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

SITE INFORMATION

PROPERTY OWNER: AMERICAN TOWER  
ADDRESS: 10 PRESIDENTIAL WAY  
WOBURN, MA 01801

TOWER TYPE: SELF SUPPORT TOWER

TOWER CO SITE ID: 88013

TOWER APP NUMBER: 13681397\_D2

COUNTY: MIDDLESEX

LATITUDE (NAD 83): 41° 25' 43.600" N  
41.42877778

LONGITUDE (NAD 83): 72° 36' 13.700" W  
-72.60380556

ZONING JURISDICTION: SITING COUNCIL

ZONING DISTRICT: RESIDENTIAL

PARCEL NUMBER: KILL-000006-000000-000011A

OCCUPANCY GROUP: U

CONSTRUCTION TYPE: V-B

POWER COMPANY: EVERSOURCE

TELEPHONE COMPANY: FRONTIER COMMUNICATIONS

PROJECT DIRECTORY

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

TOWER OWNER: AMERICAN TOWER  
10 PRESIDENTIAL WAY  
WOBURN, MA 01801

ENGINEER: ATC TOWER SERVICES, LLC  
3500 REGENCY PARKWAY SUITE 100  
CARY, NC 27518

SITE ACQUISITION: ALLAN WOLFF  
ALLAN.WOLFF@DISH.COM

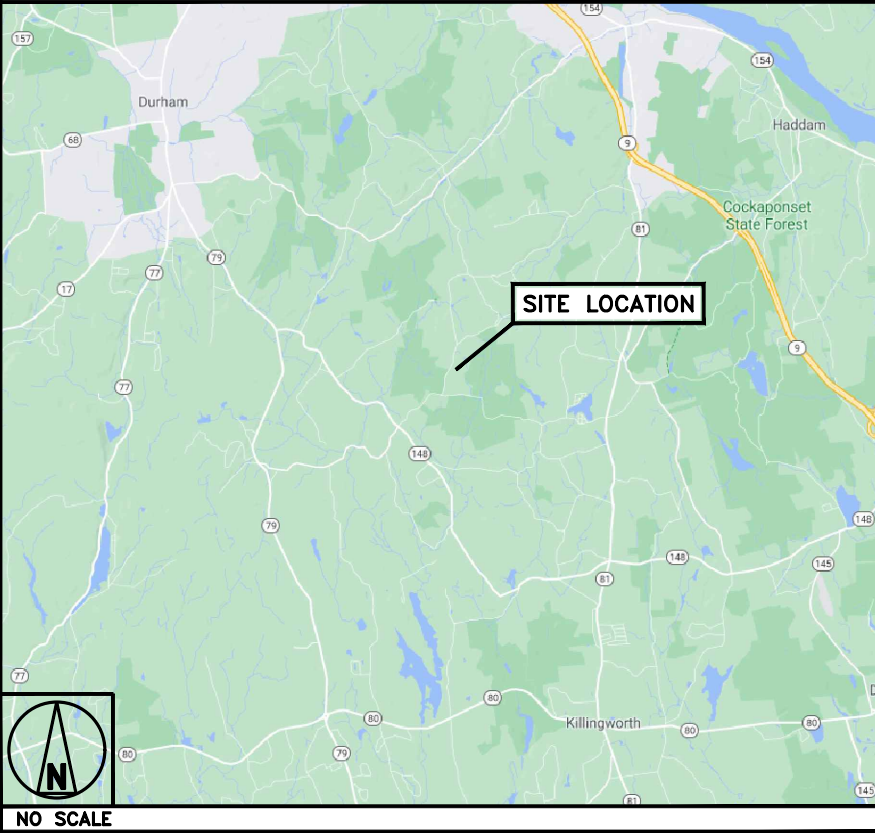
CONSTRUCTION MANAGER: NIKHIL GANU  
NIKHIL.GANU@DISH.COM

RF ENGINEER: JOSE MANRIQUEZ  
JOSE.MANRIQUEZ@DISH.COM

DIRECTIONS

I-91 SOUTH TO 9 SOUTH TO EXIT 11 (ROUTE 148). FOLLOW ROUTE 148 UNTIL 2.3 MILES AFTER JUNCTION 79 TO LITTLE CITY ROAD. NOTE THE SIGN FOR LITTLE CITY ROAD IS NOT A NORMAL STREET SIGN, BUT A WOODEN ENGRAVED POLE. TURN LEFT ON LITTLE CITY AND FOLLOW 1.2 MILES

VICINITY MAP



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



DRAWN BY: CHECKED BY: APPROVED BY:

JD SRF SRF

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
0	08/09/2021	ISSUED FOR CONSTRUCTION



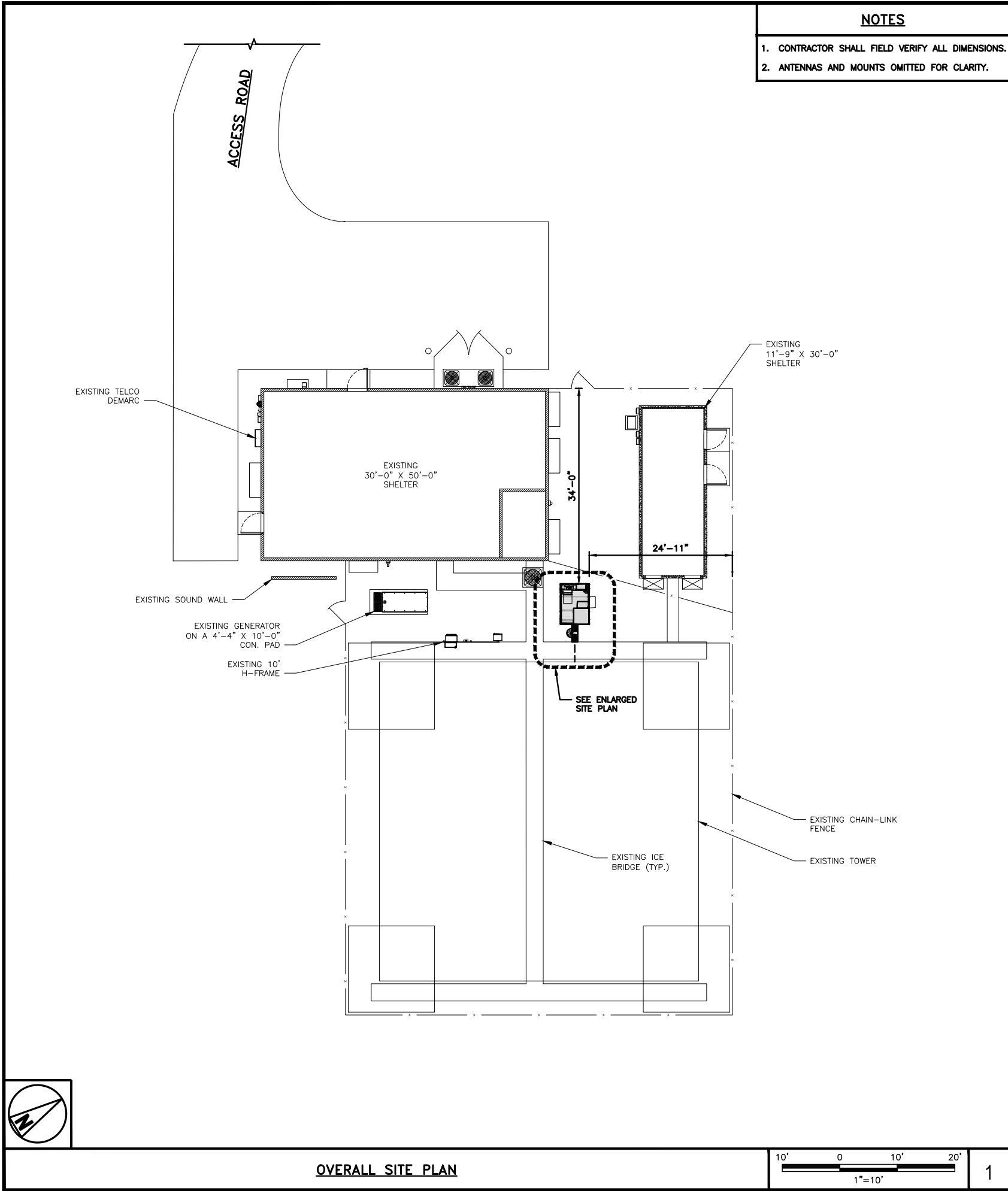
IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.

A&E PROJECT NUMBER  
88013-13681397\_D2

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
TITLE SHEET

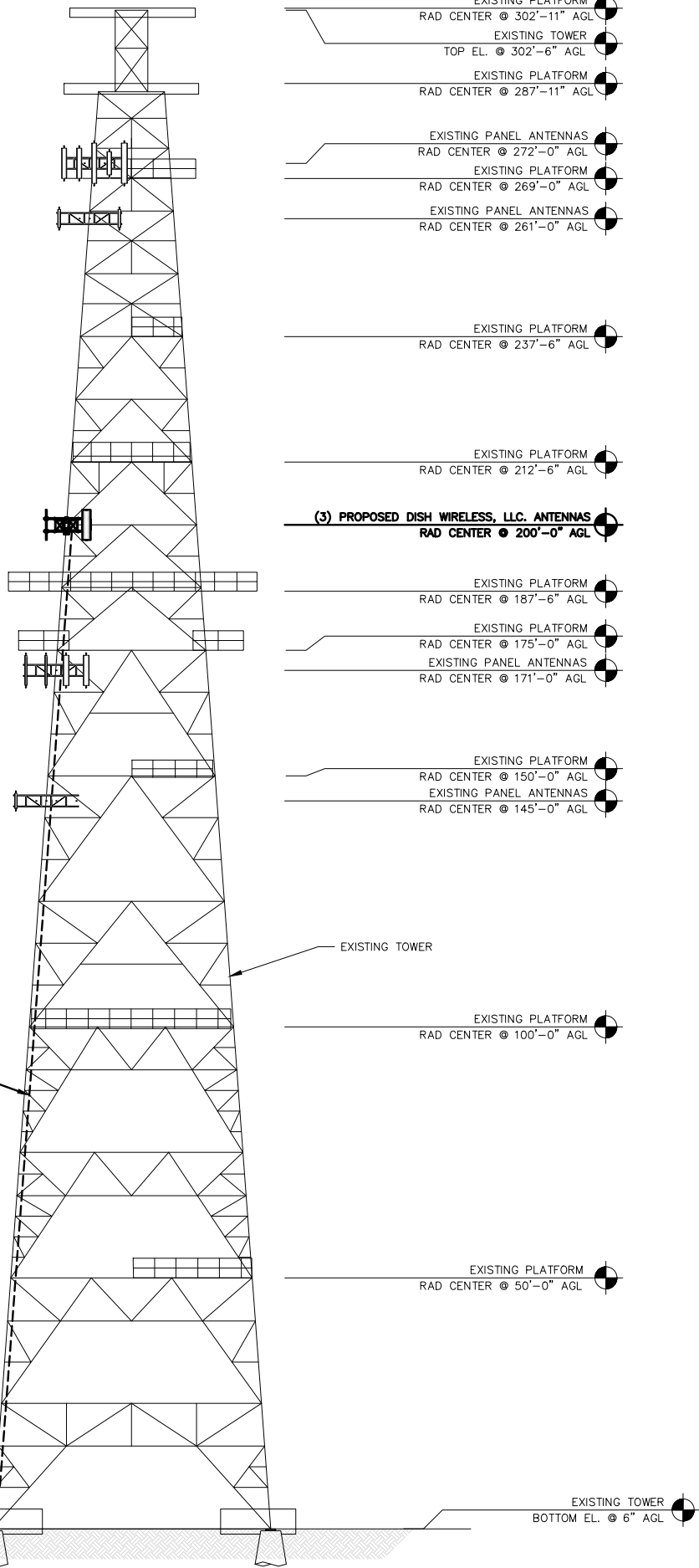
SHEET NUMBER  
**T-1**



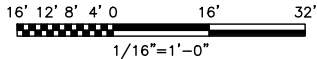


NOTES

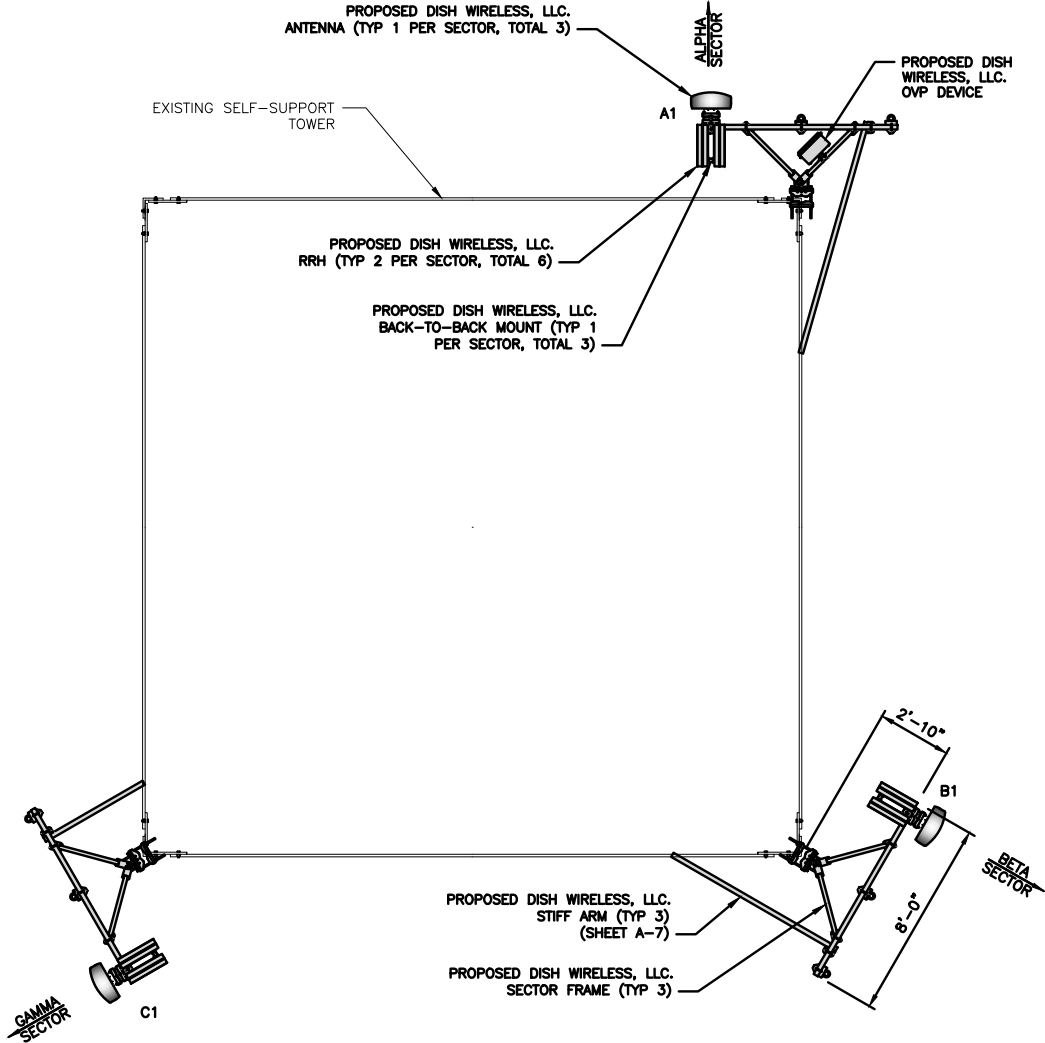
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH ELEVATION



1



ANTENNA LAYOUT

2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE	
		EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	
ALPHA	A1	PROPOSED	MX08FRO665-21	5G	72.0" x 20.0"	0°	200'-0"	(1) HIGH-CAPACITY HYBRID CABLE (237' LONG)	
BETA	B1	PROPOSED	MX08FRO665-21	5G	72.0" x 20.0"	120°	200'-0"		
GAMMA	C1	PROPOSED	MX08FRO665-21	5G	72.0" x 20.0"	240°	200'-0"		

SECTOR	POSITION	RRH		NOTES
		MANUFACTURER - MODEL NUMBER	TECHNOLOGY	
ALPHA	A1	TA08025-B604	LTE	1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
	A1	TA08025-B605	LTE	
BETA	B1	TA08025-B604	LTE	
	B1	TA08025-B605	LTE	
GAMMA	C1	TA08025-B604	LTE	
	C1	TA08025-B605	LTE	

ANTENNA SCHEDULE

NO SCALE

3

dish  
wireless.

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PHONE: (919) 468-0112

DRAWN BY: CHECKED BY: APPROVED BY:

JD SRF SRF

RFDS REV #: - - - -

CONSTRUCTION  
DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
0	08/09/2021	ISSUED FOR CONSTRUCTION



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A&E PROJECT NUMBER

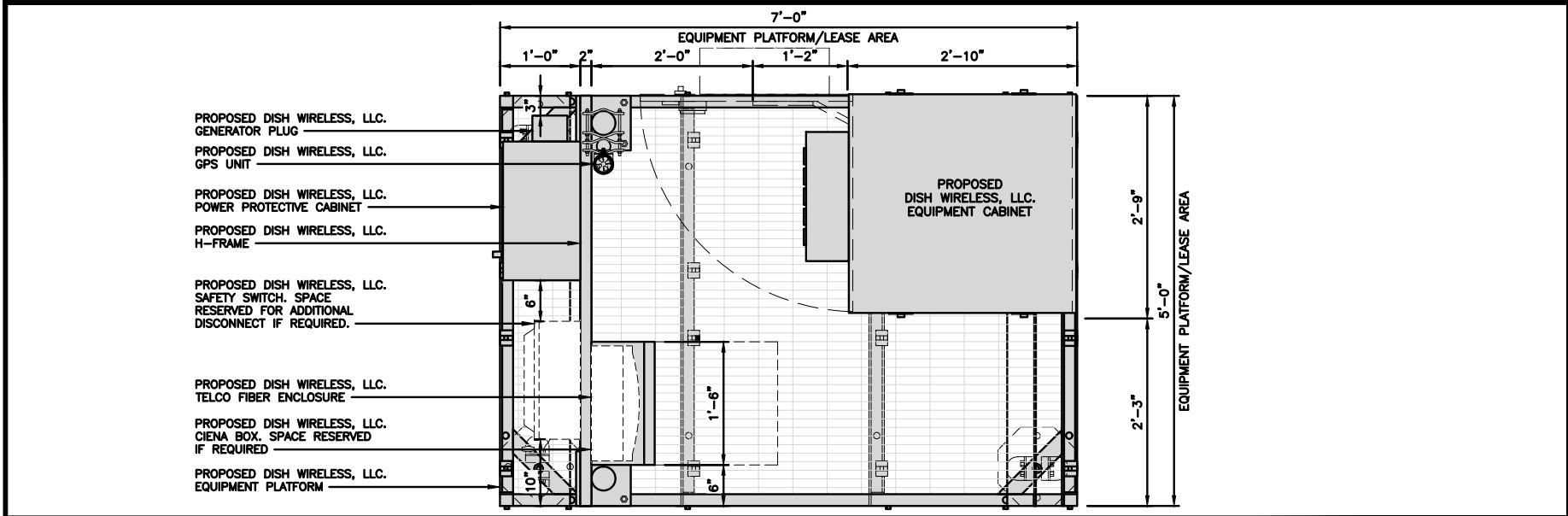
88013-13681397\_D2

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

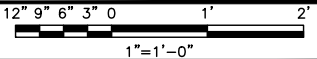
SHEET TITLE  
ELEVATION, ANTENNA  
LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



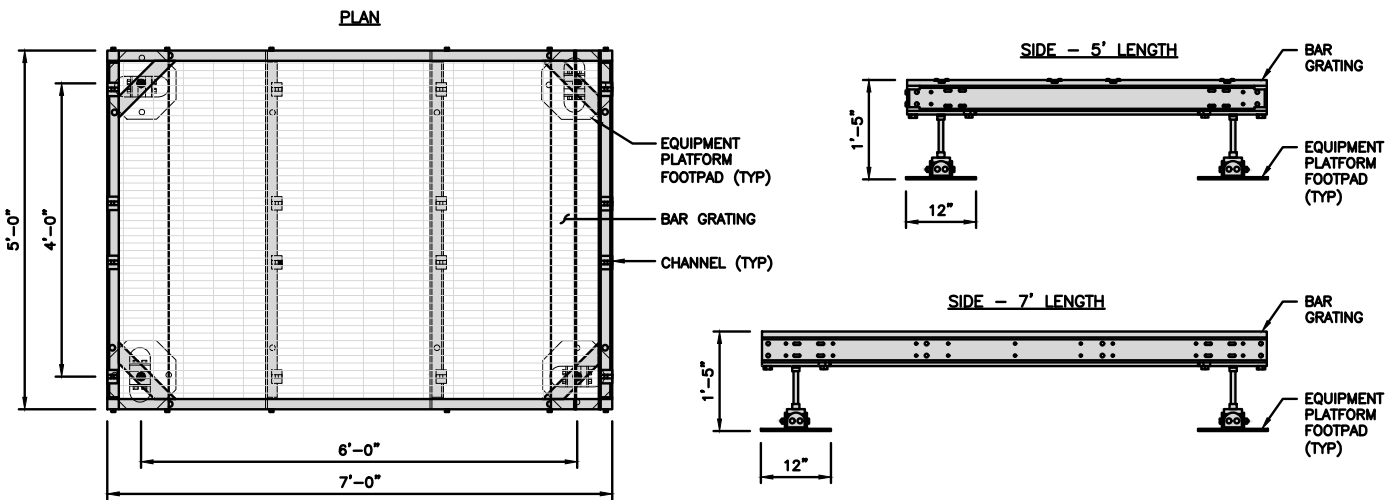
PLATFORM EQUIPMENT PLAN



1

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

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

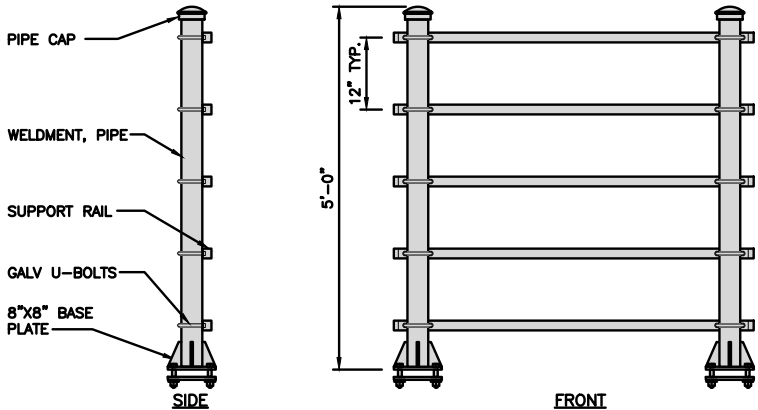


PLATFORM DETAIL

NO SCALE

2

KENWOOD T1701KT5-5S H-FRAME	
UNISTRUT/SUPPORT RAIL	5
WEIGHT/ VOLUME	173.6 LBS



H-FRAME DETAIL

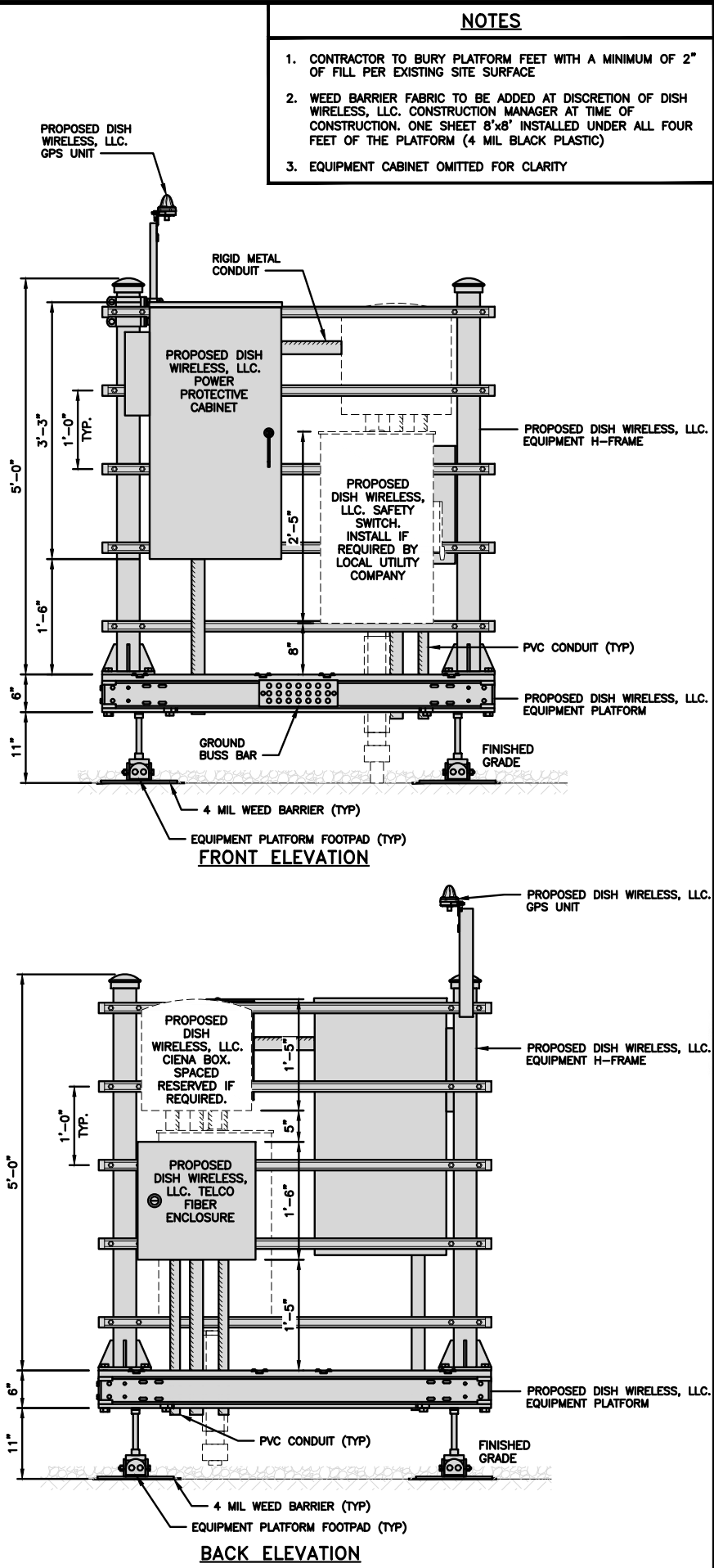
NO SCALE

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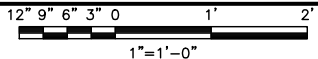
NOT USED

NO SCALE

4



H-FRAME EQUIPMENT ELEVATION



5

NOTES

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

**dish**  
wireless.

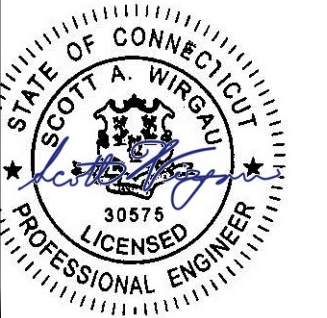
5701 SOUTH SANTA FE DRIVE  
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PHONE: (919) 468-0112

DRAWN BY:	CHECKED BY:	APPROVED BY:
JD	SRF	SRF
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PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
EQUIPMENT PLATFORM AND  
H-FRAME DETAILS

SHEET NUMBER  
**A-3**

CHARLES INDUSTRY HEX CUBE-PM639155N4

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

PLAN

SIDE

BACK

SIDE

FRONT

CABINET DETAIL

NO SCALE

1

RAYCAP RDIAC-6512-P-240-MTS POWER & TELCO PROTECTION CABINET

DIMENSIONS (HxWxD)	40"x20"x10"
WEIGHT/ VOLUME	124 LBS
MANUAL TRANSFER SWITCH	200A
LOAD CENTER	30 POSITION
MAIN BREAKER	200A, 65kA AIC
GENERATOR RECEPTACLE	CAMLOCK
NEMA RATING	3R POWDER COATED ALUMINUM
SURGE PROTECTION DEVICE	UL 1449 4TH EDITION LISTED

PLAN

SIDE

FRONT

POWER PROTECTION CABINET (PPC) DETAIL

NO SCALE

2

SQUARE D SAFETY SWITCH D324NRB

ENCLOSURE DIM (HxWxD)	29.25"x17.25"x8.25"
TOTAL WEIGHT (EMPTY)	45.33 LBS
MAX VOLTAGE/AMPS/WATT	240V/200A/48000W
ENCLOSURE RATING	OUTDOOR NEMA 3R

PLAN

SIDE

BACK

FRONT

SAFETY SWITCH

NO SCALE

3

EATON METER SOCKET UNRRS213BEUSE

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

PLAN

SIDE

BACK

FRONT

METER SOCKET DETAIL

NO SCALE

4

CIENA 3931 SERVICE DELIVERY SWITCH

DIMENSIONS (HxWxD)	17.0"x16.8"x7.0" 431x427x178mm
WEIGHT	28.6 LBS/13.0 KG
POWER INPUT	60W MAX

PLAN

FRONT

SIDE

BACK

CIENA DETAIL

NO SCALE

5

CHARLES FIBER TELCO ENCLOSURE CUBE-MP1818WB-A

ENCLOSURE DIM (HxWxD)	18.0"x18.0"x9.25"
NEMA RATING	4X
THERMAL	SEALED
MOUNTING BACKBOARD	WOOD

PLAN

SIDE

BACK

FRONT

FIBER TELCO ENCLOSURE DETAIL

NO SCALE

6

COMMSCOPE WB-K110-B WAVEGUIDE BRIDGE KIT

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

INCLUDED PRODUCTS:

WB-T12-3 TRAPEZE KIT, 3 RUNGS

WB-LB12-3 SUPPORT BRACKET

MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"

TRAPEZE KIT (WB-T12-3)

SUPPORT BRACKET (WB-LB12-3)

3.5" DIA GALV SCH 40 PIPE (SPACED 9'-0" MAX) (MF-130)

FRONT

SIDE

ICE BRIDGE DETAIL

NO SCALE

7

FINISH SLOPE TO DRAIN

A-A

PROPOSED 3.5" DIA. SCH 40 PIPE GALVANIZED

PROPOSED 1'-6" DIA. CONCRETE PIER (TYP)

CONCRETE PIER

3" DIA SCH 40 PIPE

18" DIA DRILLED PIER FOUNDATION

A-A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL

NO SCALE

8

PROPOSED ICE BRIDGE

PROPOSED X" DIA HYBRID CABLE

PROPOSED CABLE CLAMP 3'-0" O.C.

EXISTING SELF SUPPORT TOWER

HYBRID CABLE RUN

NO SCALE

9

dish wireless.

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DRAWN BY: JD

CHECKED BY: SRF

APPROVED BY: SRF

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

REV

DATE

DESCRIPTION

0

08/09/2021

ISSUED FOR CONSTRUCTION

STATE OF CONNECTICUT

SCOTT A. WIRGAU

30575

PROFESSIONAL ENGINEER

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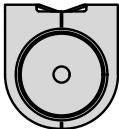
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88013-13681397\_D2

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KILLINGWORTH, CT 06419

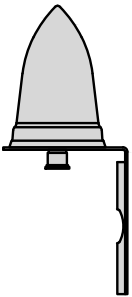
SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER  
A-4

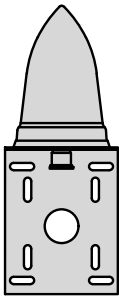
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



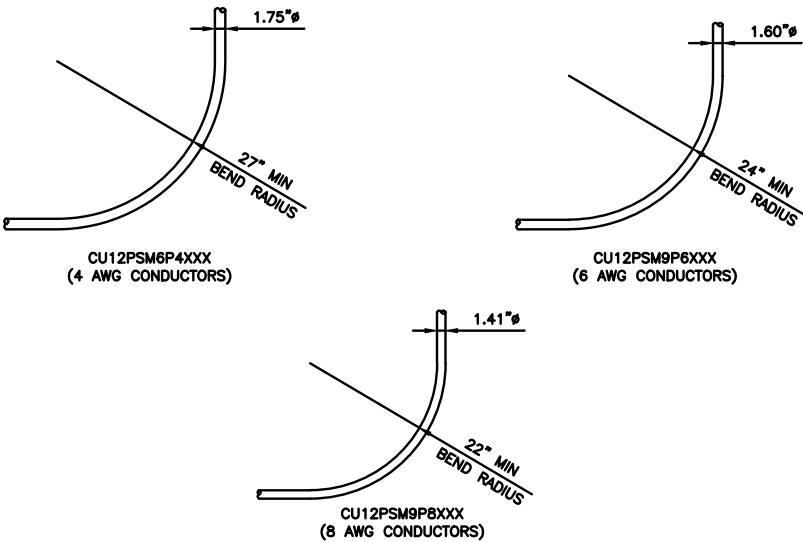
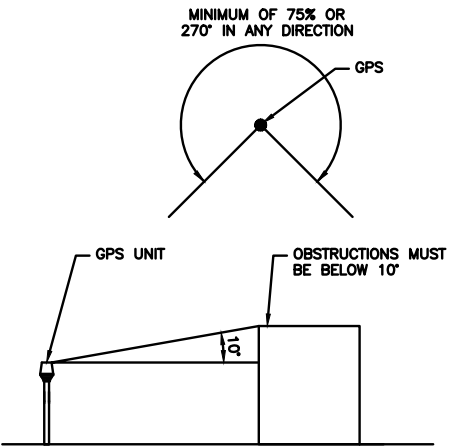
TOP



BACK



SIDE



GPS DETAIL

NO SCALE

1

GPS MINIMUM SKY VIEW REQUIREMENTS

NO SCALE

2

CABLES UNLIMITED HYBRID CABLE  
MINIMUM BEND RADIUSES

NO SCALE

3

NOT USED

NO SCALE

4

NOT USED

NO SCALE

5

NOT USED

NO SCALE

6

NOT USED

NO SCALE

7

NOT USED

NO SCALE

8

NOT USED

NO SCALE

9



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JD SRF SRF

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131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

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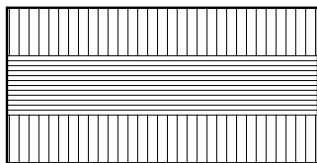
EQUIPMENT DETAILS

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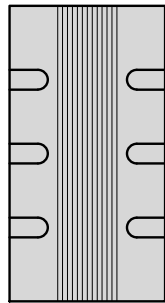
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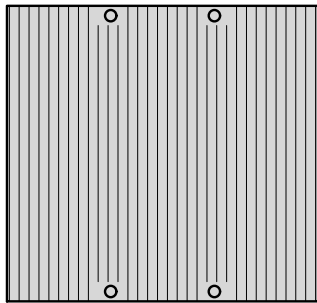
FUJITSU TA08025-B604 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x200/14.9"x15.7"x7.8"
WEIGHT(KG,LB)/ VOLUME	29kg,63.9lb/ 30L
POWER SUPPLY	DC-58~-36V



PLAN

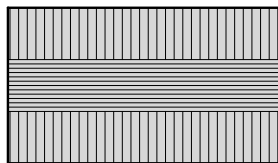


SIDE

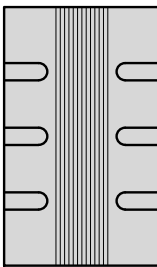


FRONT

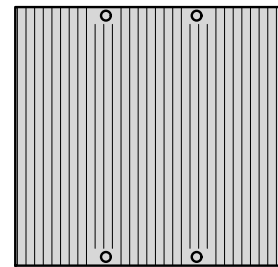
FUJITSU TA08025-B605 RRH	
DIMENSIONS (HxWxD) (KG/IN)	380x400x230/14.9"x15.7"x9.0"
WEIGHT(KG,LB)/ VOLUME	34kg,74.9lb/ 35L
POWER SUPPLY	DC-58~-36V



PLAN



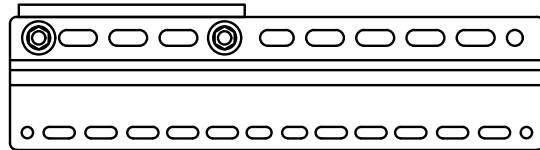
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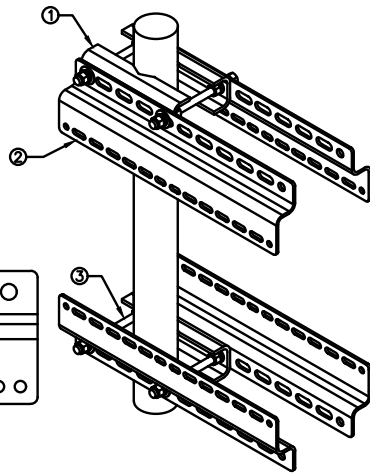
FRONT

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

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



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



REMOTE RADIO HEAD DETAIL

NO SCALE

1

REMOTE RADIO HEAD DETAIL

NO SCALE

2

RRH MOUNT DETAIL

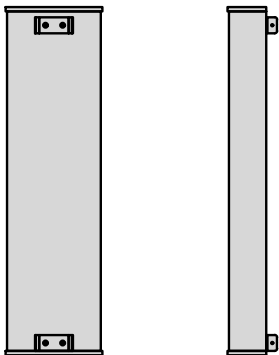
NO SCALE

3

JMA WIRELESS MX08FRO665-21 ANTENNA	
DIMENSIONS (HxWxD)	72.0"x20.0"x8.0"
TOTAL WEIGHT	64.5 LB
RF PORTS, CONNECTOR TYPE	8 x 4.3-10 FEMALE

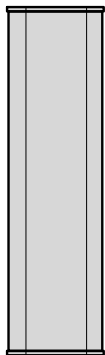


PLAN



BACK

SIDE



FRONT

ANTENNA DETAIL

NO SCALE

4

NOT USED

NO SCALE

5

ANTENNA BRACKET DETAIL

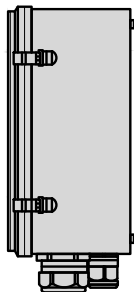
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6

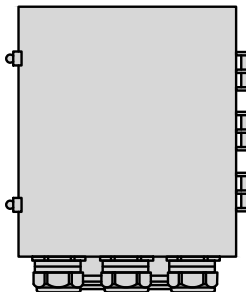
RAYCAP RDIDC-9181-PF-48 DC SURGE PROTECTION (OVP)	
DIMENSIONS (HxWxD)	18.98"x14.39"x8.15"
WEIGHT	21.82 LBS



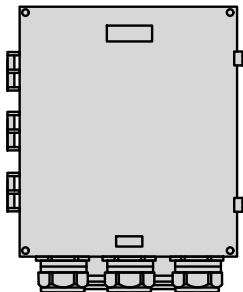
PLAN



SIDE



BACK



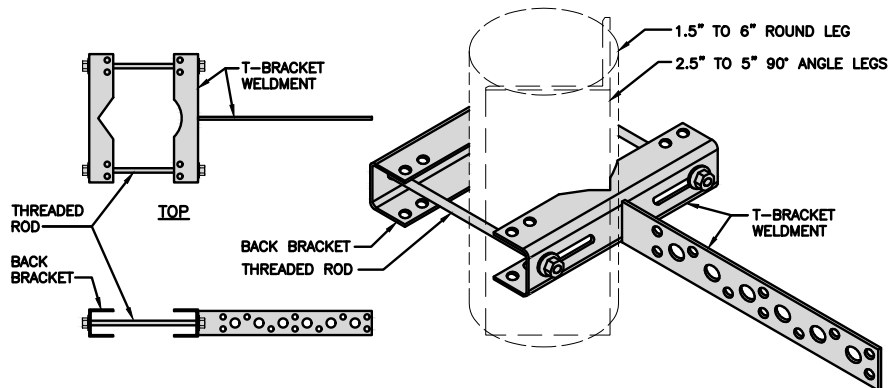
FRONT

SURGE SUPPRESSION DETAIL (OVP)

NO SCALE

7

SITEPRO1 T600 UNIVERSAL T-BRACKET	
DIMENSIONS (HxWxL)	2.25"x10.0"x15.25"
WEIGHT/ VOLUME	5.60 LBS



SIDE

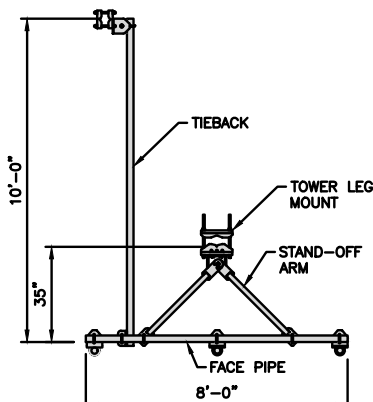
ISOMETRIC

VERTICAL CABLE SUPPORT DETAIL

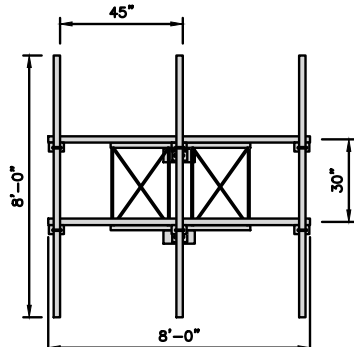
NO SCALE

8

COMMSCOPE V-FRAME MTC3975083	
FACE SIZE	8'-0"
WEIGHT	352.136 lbs



PLAN



FRONT

ANTENNA FRAME DETAIL

NO SCALE

9

**dish**  
wireless.

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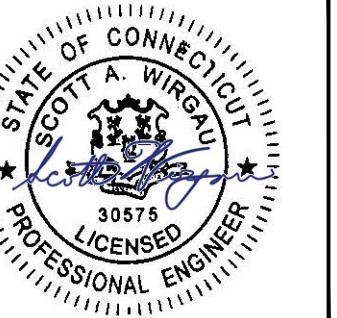
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RFDS REV #: ----

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131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
EQUIPMENT DETAILS

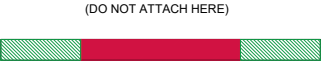
SHEET NUMBER

**A-6**

STIFF ARM LOCATION NOTES:

- TIE BACK SHALL BE CONNECTED PER MANUFACTURER SPECIFICATIONS. IF THE ANGLE OF ATTACHMENT DEVIATES FROM THE MANUFACTURER RANGES, A SITE SPECIFIC ANALYSIS THAT CONSIDERS THESE EFFECTS ON BOTH THE TOWER AND THE MOUNT WILL BE NEEDED.
- ACCEPTABLE STIFF ARM TO TOWER MEMBER ATTACHMENT LOCATIONS:
  - A) INTERIOR BRACING MEMBERS:
    - WITHIN 25% OF EITHER END OF THE MEMBER'S LENGTH.
  - B) TOWER LEGS:
    - WITHIN 25% OF EITHER END OF THE MEMBER'S LENGTH. IF ATTACHMENT IS NOT WITHIN 25% OF EITHER END OF THE MEMBERS LENGTH THEN ADJUST ATTACHMENT POINT TO MINIMIZE DISTANCE TO END OF MEMBER WHILE FOLLOWING MANUFACTURERS SPECIFICATIONS.

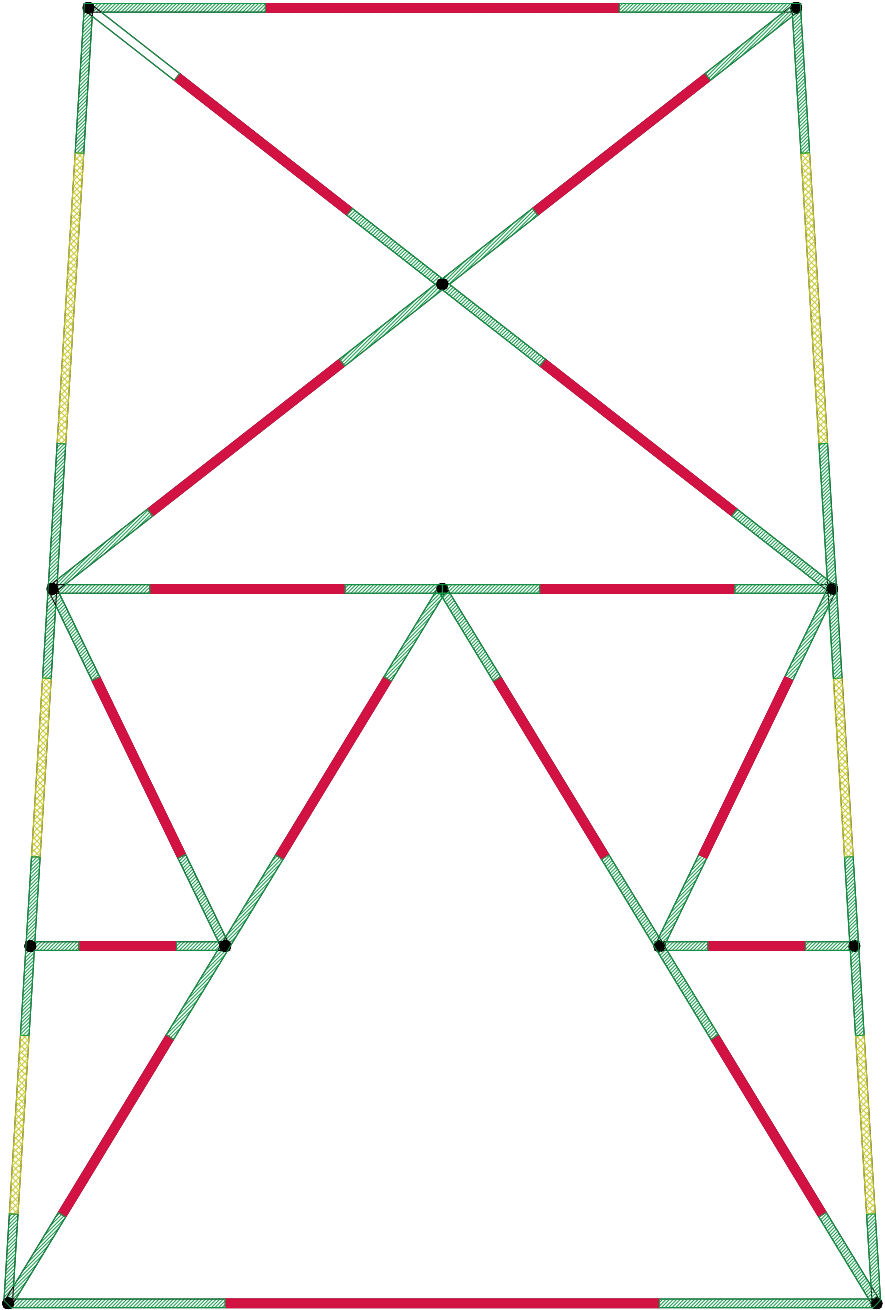
- ACCEPTABLE ATTACHMENT REGION & FORCE
- ACCEPTABLE ATTACHMENT REGION & FORCE
- DO NOT ATTACH HERE



INTERIOR BRACING



TOWER LEG



TOWER SECTION



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



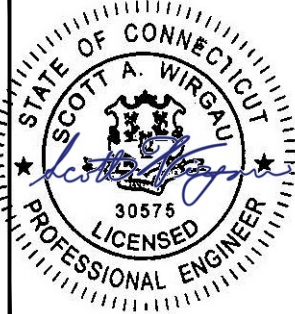
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PHONE: (919) 468-0112

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KILLINGWORTH, CT 06419

SHEET TITLE

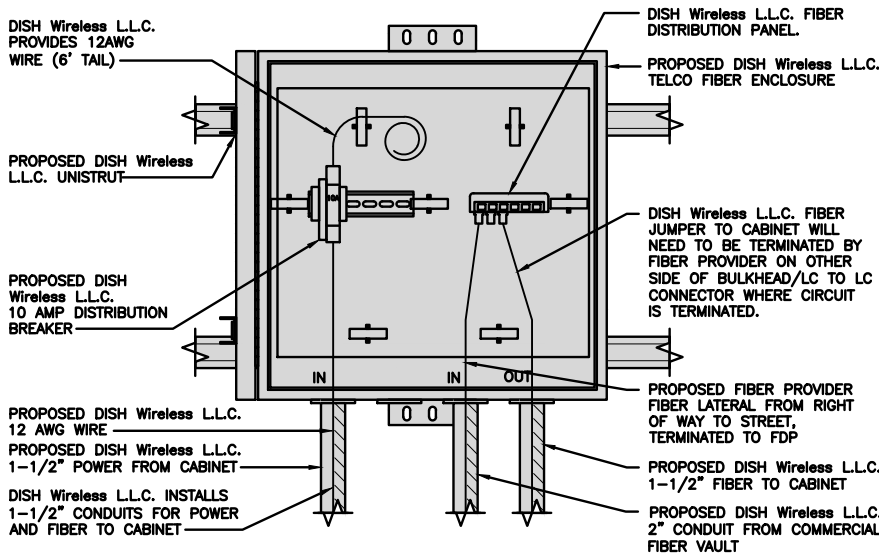
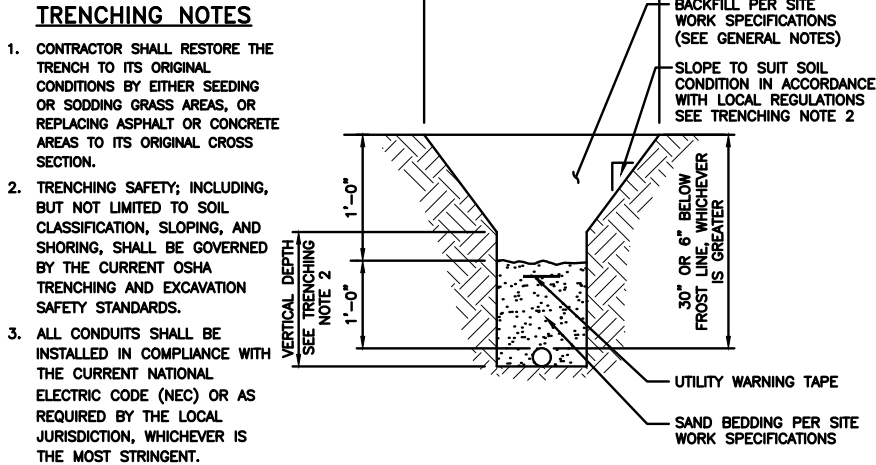
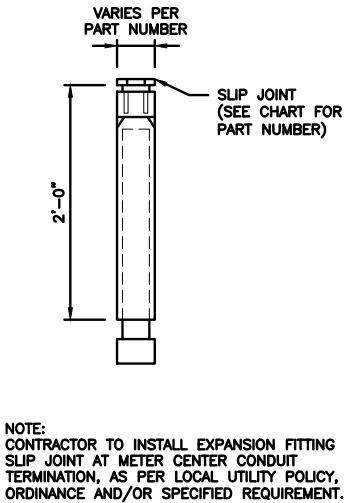
EQUIPMENT DETAILS

SHEET NUMBER

A-7



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"



EXPANSION JOINT DETAIL

NO SCALE

1

TYPICAL UNDERGROUND TRENCH DETAIL

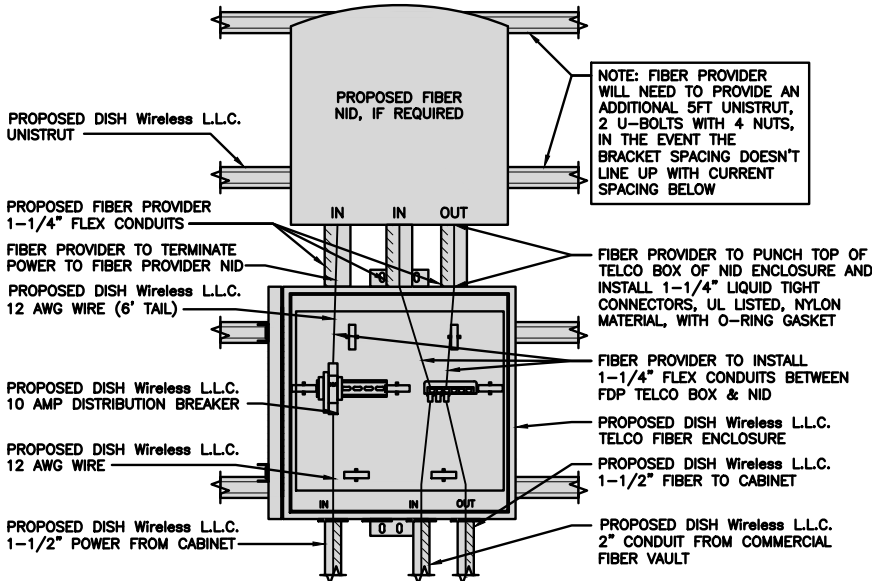
NO SCALE

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



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



A.T. ENGINEERING SERVICE, PLLC  
3500 REGENCY PARKWAY  
SUITE 100  
CARY, NC 27518  
PHONE: (919) 468-0112

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A&E PROJECT NUMBER  
88013-13681397\_D2

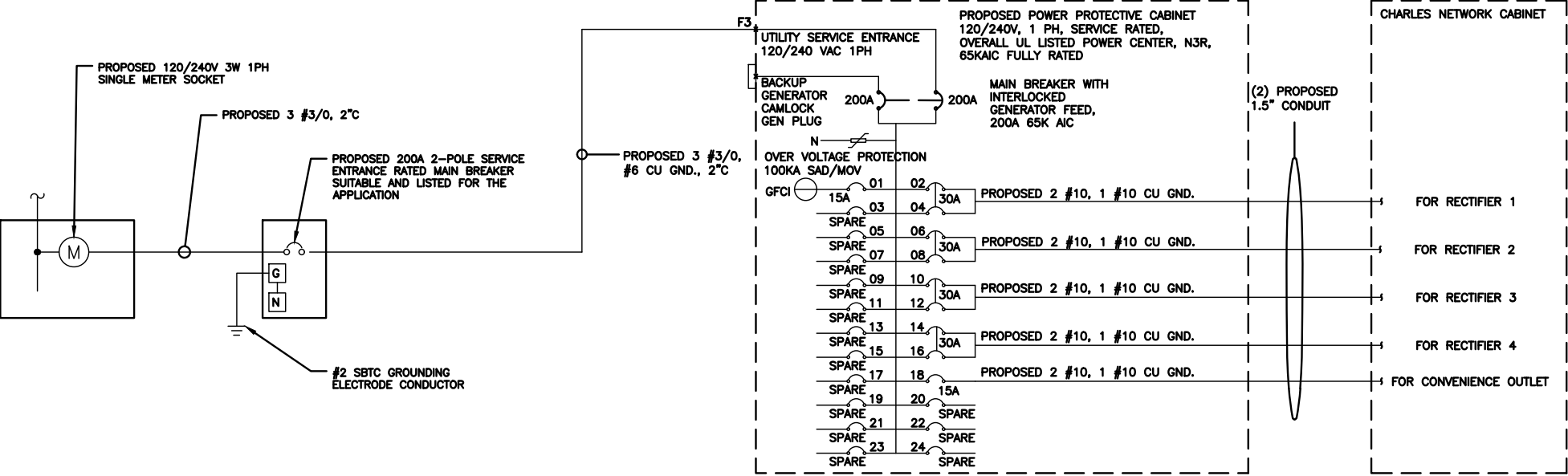
DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
ELECTRICAL  
DETAILS

SHEET NUMBER

E-2





(CHARLES ABB GE INFINITY) WITH STAND ALONE METER 120V240V 1PH SOURCE

NO SCALE

1

PROPOSED PANEL SCHEDULE											
LOAD SERVED	VOLT AMPS (WATTS)		TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS)		LOAD SERVED	
	L1	L2						L1	L2		
GFCI IN PPC CAB.	1440A		15A	1	A	2		2880	2880	ABB/GE INFINITY RECTIFIER 1	
-SPARE-				3	B	4	30A	2880	2880	ABB/GE INFINITY RECTIFIER 2	
-SPARE-				5	A	6		2880	2880	ABB/GE INFINITY RECTIFIER 3	
-SPARE-				7	B	8	30A	2880	2880	ABB/GE INFINITY RECTIFIER 4	
-SPARE-				9	A	10		2880	2880	CHARLES GFCI OUTLET	
-SPARE-				11	B	12	30A	2880	2880	-SPARE-	
-SPARE-				13	A	14		2880	2880	-SPARE-	
-SPARE-				15	B	16	30A	2880	2880	-SPARE-	
-SPARE-				17	A	18	15A	1920		-SPARE-	
-SPARE-				19	B	20				-SPARE-	
-SPARE-				21	A	22				-SPARE-	
-SPARE-				23	B	24				-SPARE-	
VOLT AMPS	1440							12960A	11520		
200A MCB, 1ϕ, 3W, 120/240V				L1	L2						
MB RATING: 65,000 AIC	14400	11520		120	96			VOLT AMPS			
				120				AMPS			
				150				MAX AMPS			
								MAX 125%			

PANEL SCHEDULE

(CHARLES ABB GE INFINITY) WITH STAND ALONE METER 120V240V 1PH SOURCE

NO SCALE

2

NOT USED

NO SCALE

3

NOT USED

NO SCALE

4

dish  
wireless.

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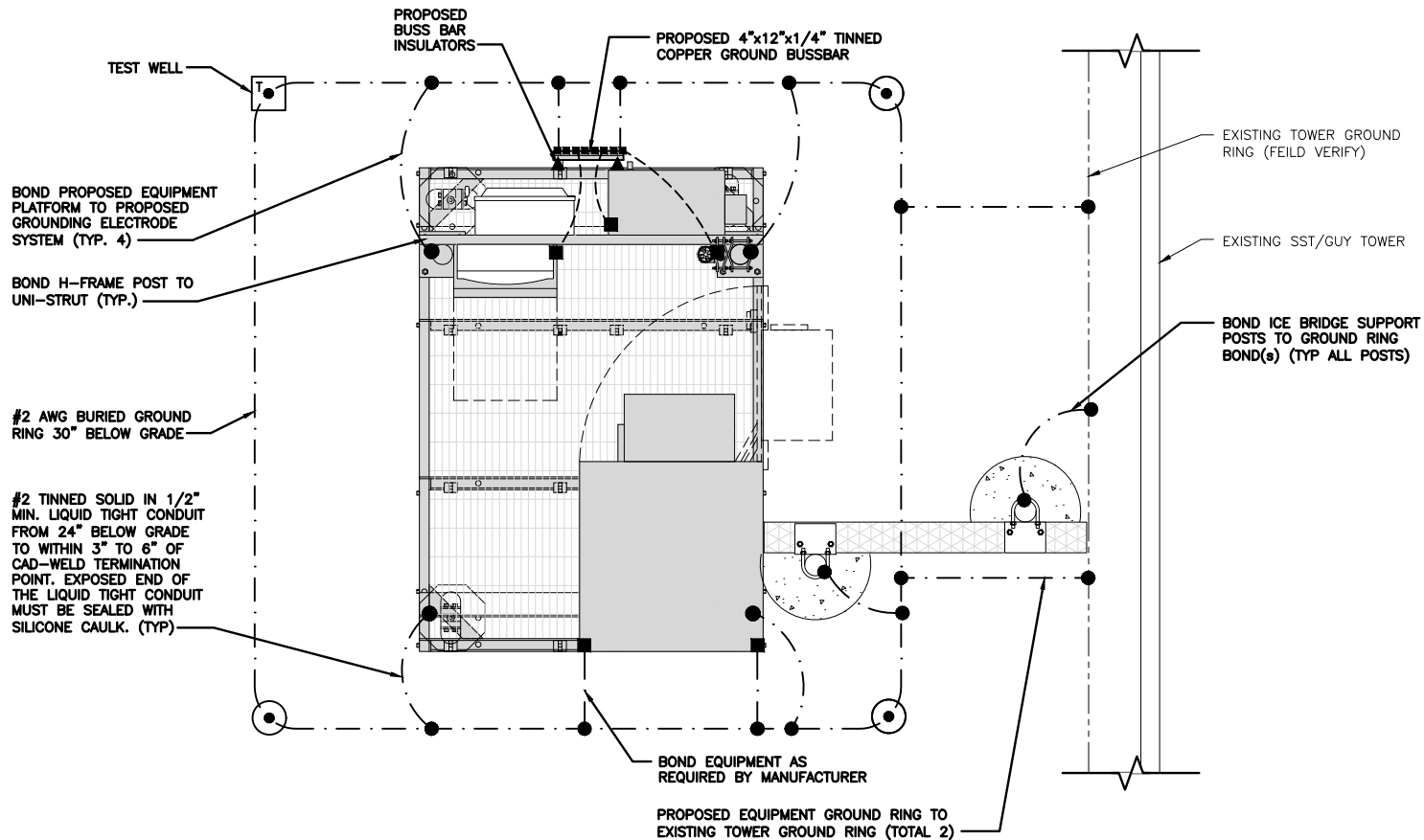
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DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

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

SHEET NUMBER

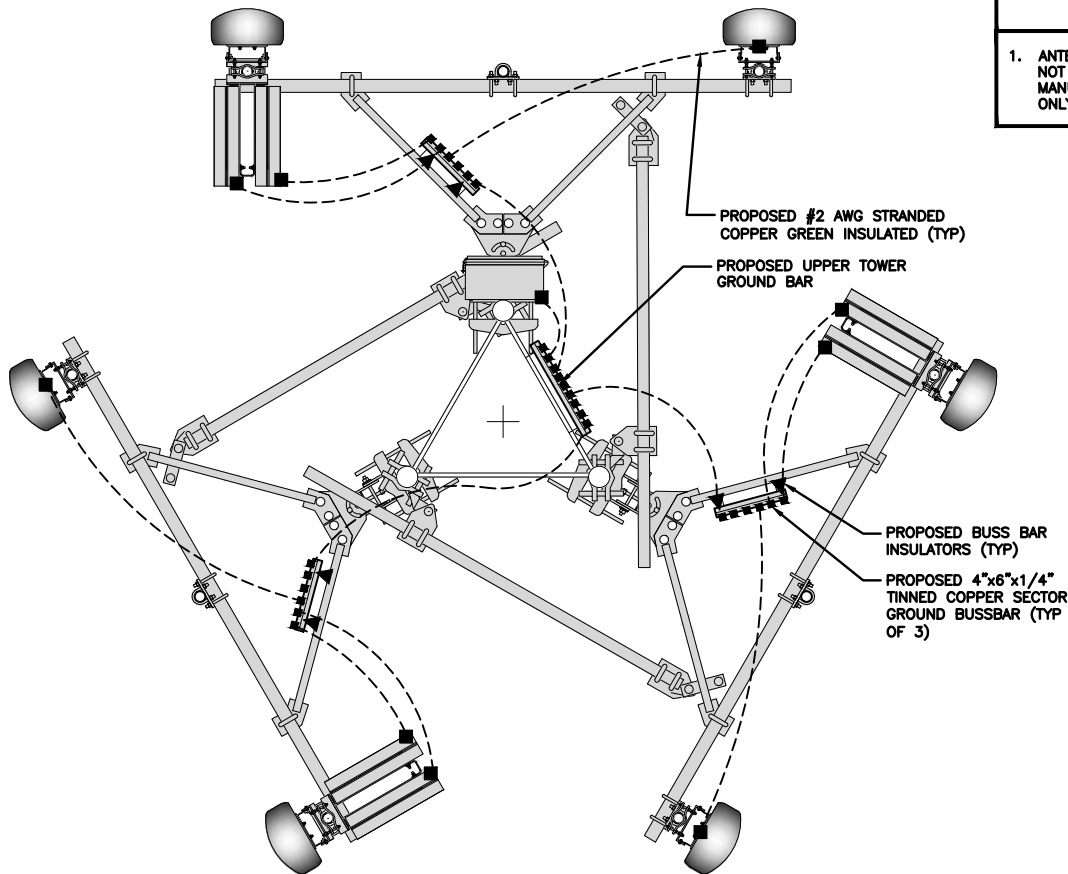
E-3



TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE

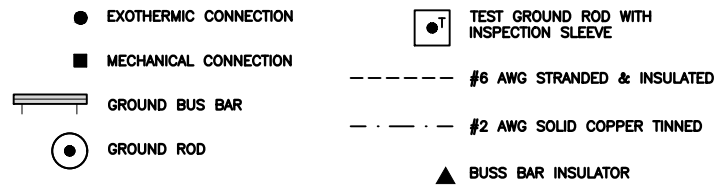
1



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, LLC. 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 5/8" 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.
- (J) **TELCO GROUND BAR:** BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- (K) **FRAME BONDING:** THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENTS METAL FRAMEWORK.
- (L) **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.
- (M) **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.
- (N) **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
- (P) **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.
- (Q) **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
- (R) **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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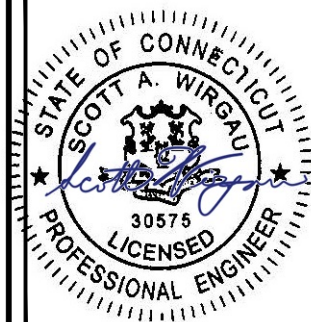
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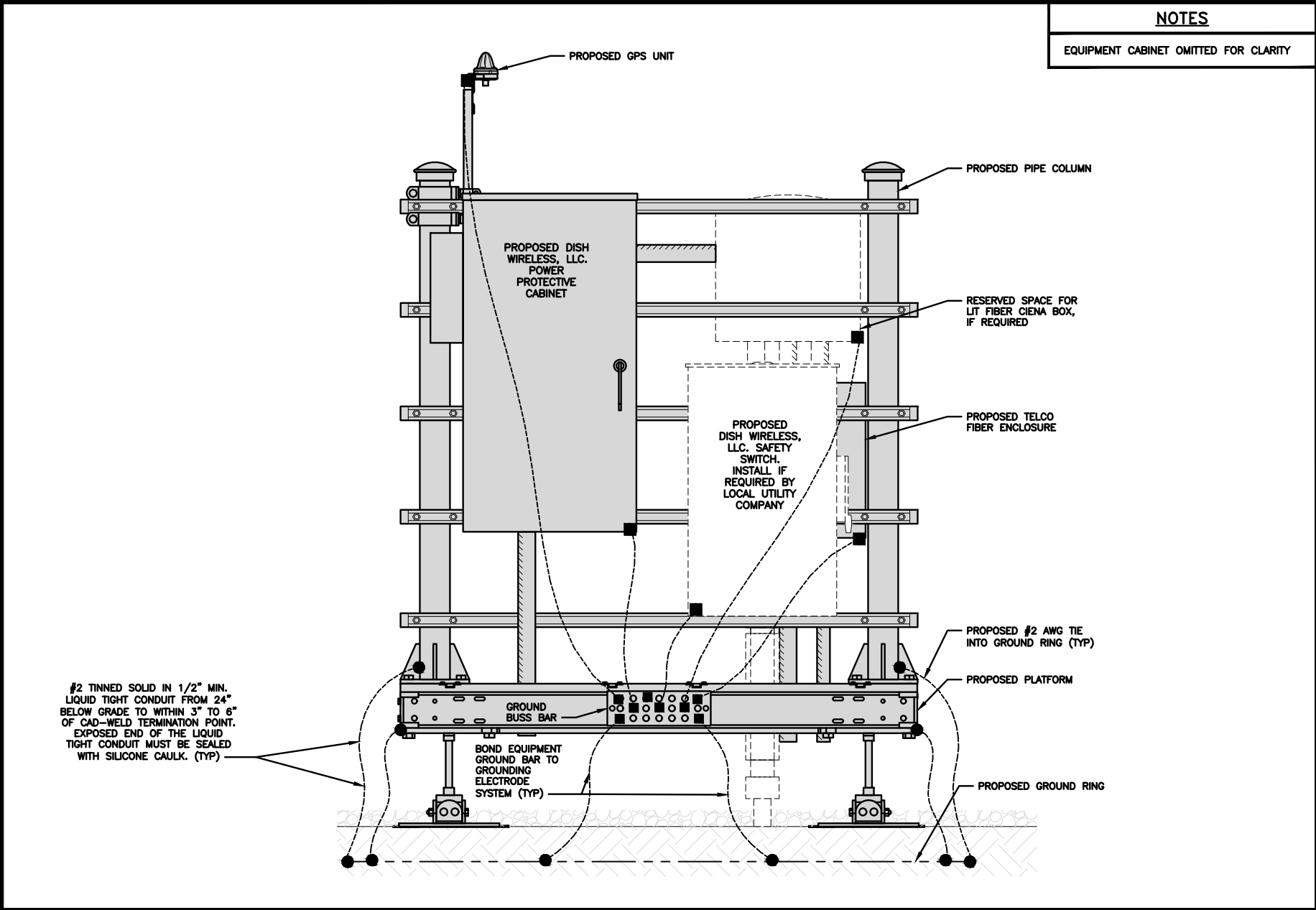
A&E PROJECT NUMBER  
88013-13681397\_D2

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

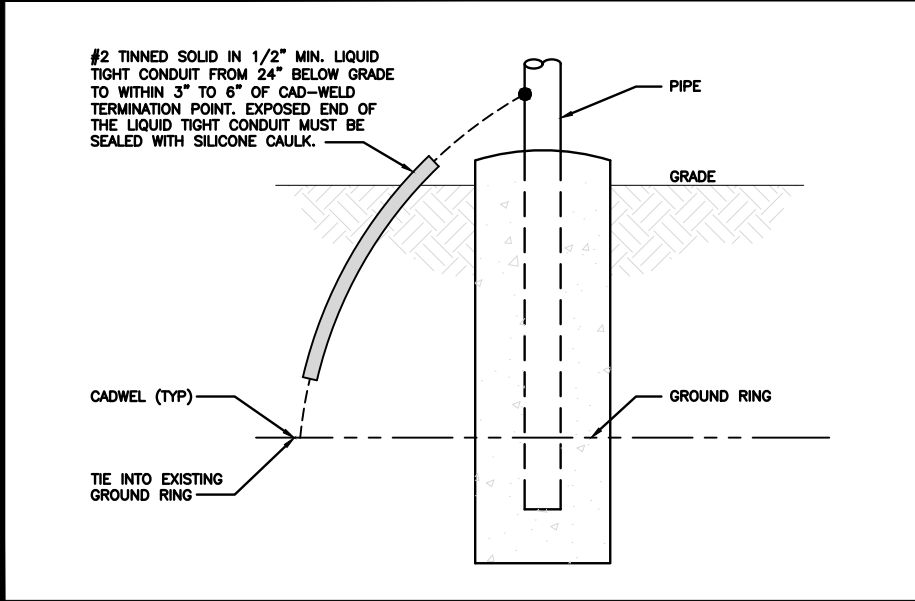
SHEET NUMBER

**G-1**



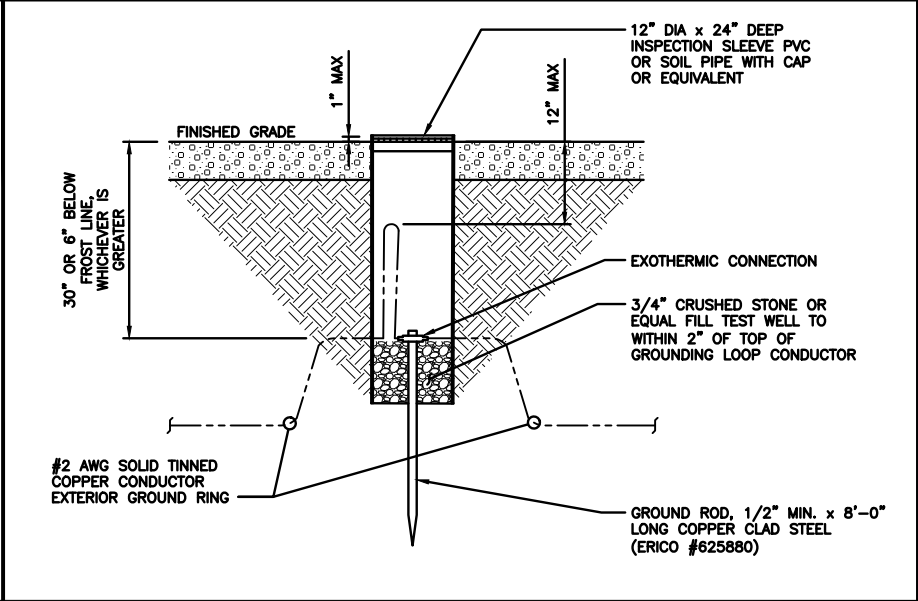
H-FRAME GROUNDING DETAIL

NO SCALE 1



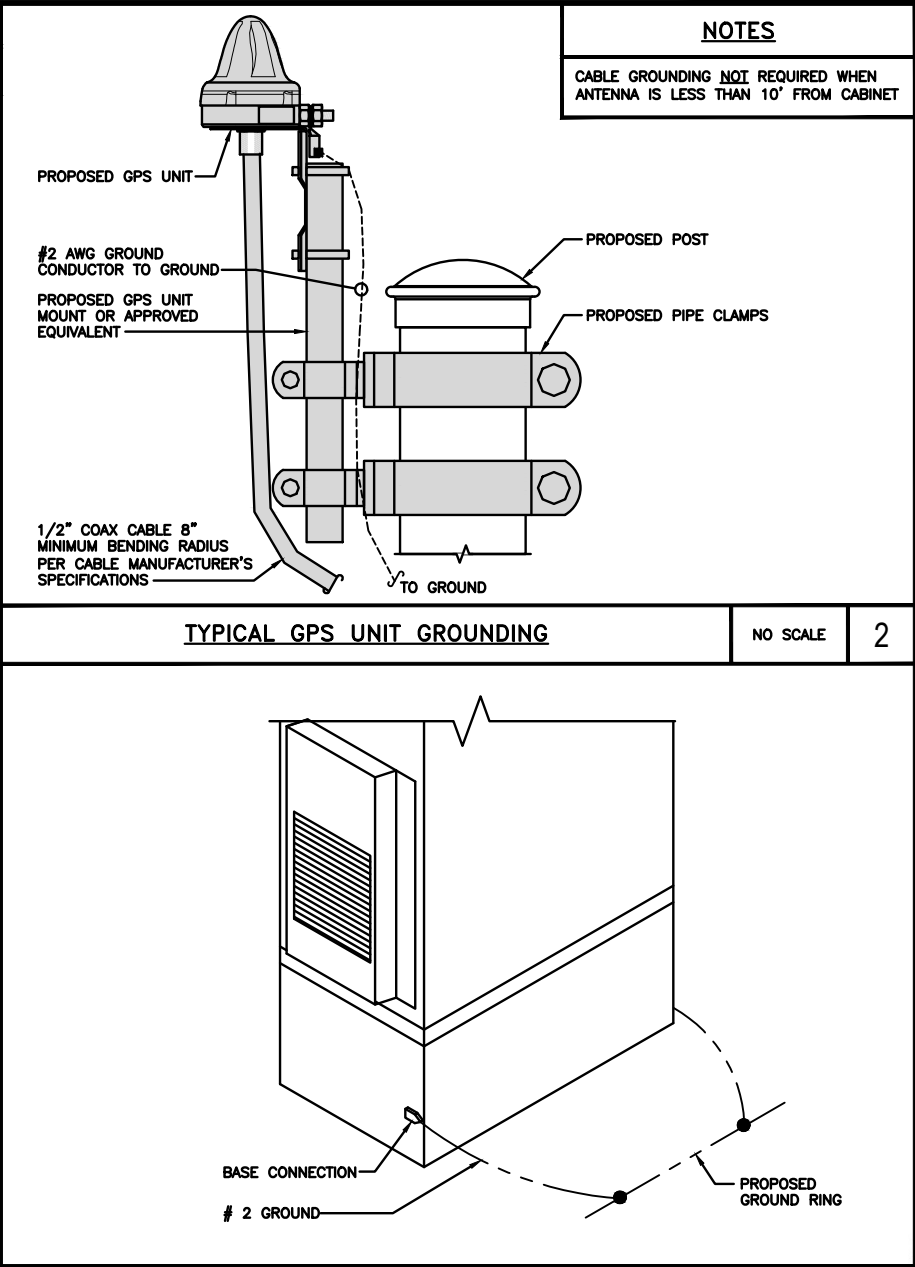
TRANSITIONING GROUND DETAIL

NO SCALE 4



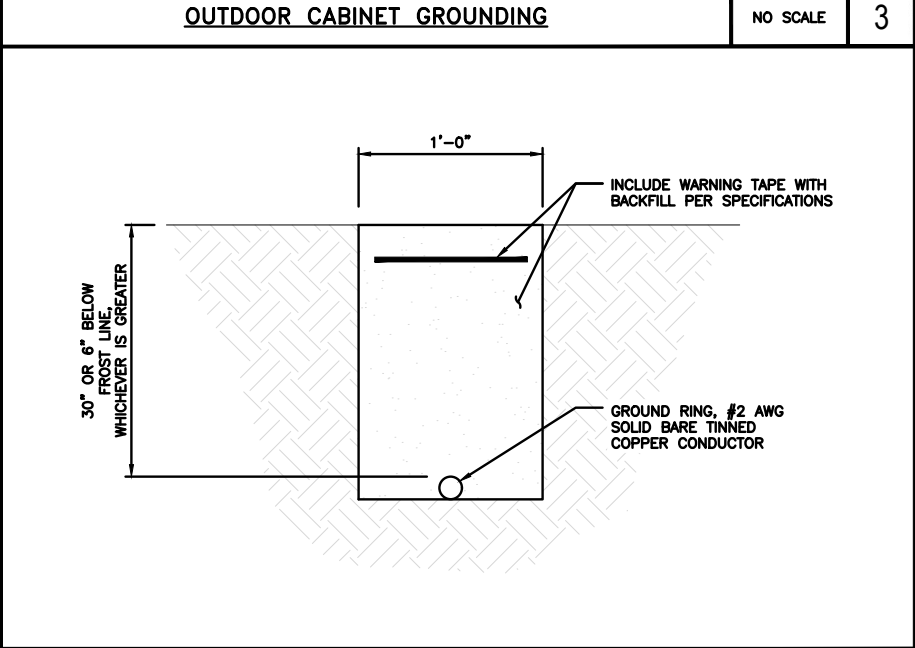
TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE

NO SCALE 5



TYPICAL GPS UNIT GROUNDING

NO SCALE 2



OUTDOOR CABINET GROUNDING

NO SCALE 3

TYPICAL GROUND RING TRENCH

NO SCALE 6

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LITTLETON, CO 80120

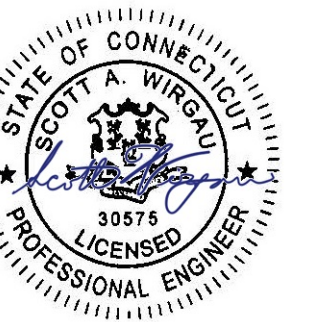
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3500 REGENCY PARKWAY  
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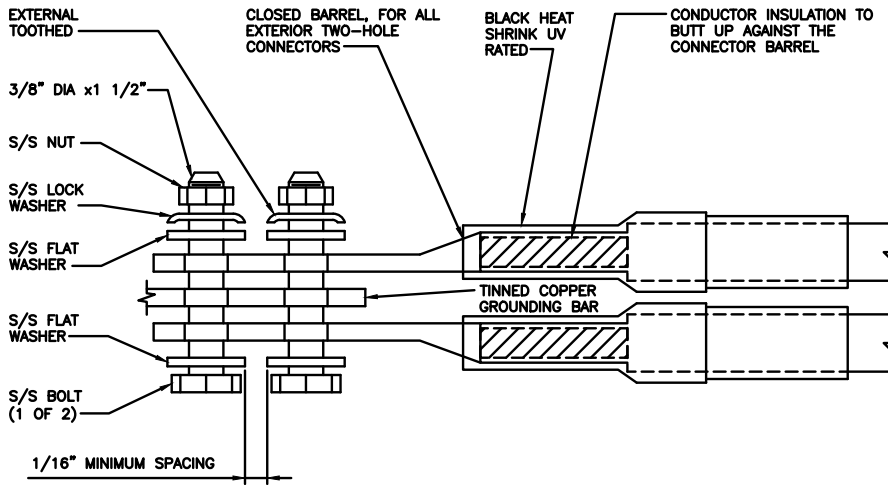
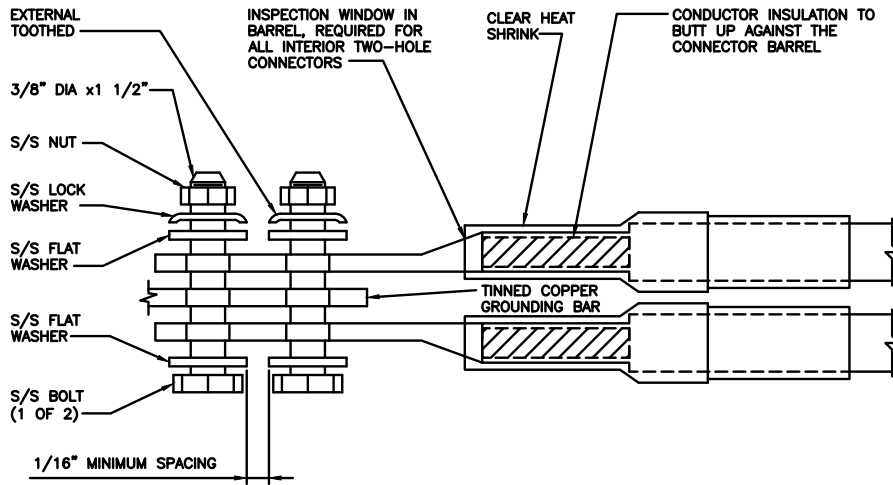
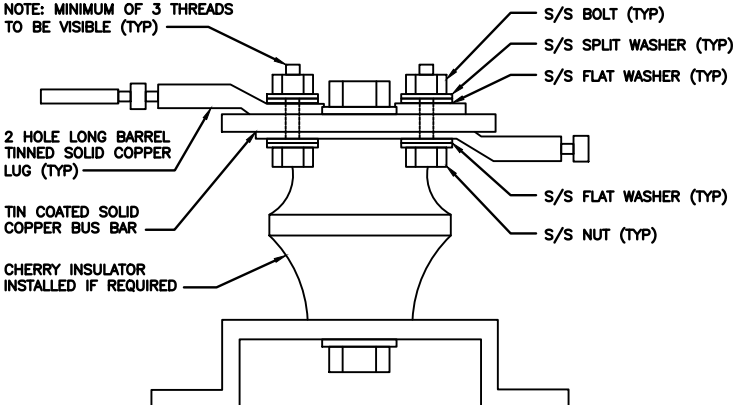
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88013-13681397\_D2

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
G-2

<div>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.</div> <div>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.</div> <div>3. FOR GROUND BOND TO STEEL ONLY: COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.</div> <div>4. DO NOT INSTALL CABLE GROUNDING KIT AT A BEND AND ALWAYS DIRECT GROUND CONDUCTOR DOWN TO GROUNDING BUS.</div> <div>5. NUT &amp; WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUND BAR AND BOLTED ON THE BACK SIDE.</div> <div>6. ALL GROUNDING PARTS AND EQUIPMENT TO BE SUPPLIED AND INSTALLED BY CONTRACTOR.</div> <div>7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUND BAR AS REQUIRED.</div> <div>9. ENSURE THE WIRE INSULATION TERMINATION IS WITHIN 1/8" OF THE BARREL (NO SHINERS).</div>														
TYPICAL GROUNDING NOTES			NO SCALE	1	TYPICAL EXTERIOR TWO HOLE LUG			NO SCALE	2	TYPICAL INTERIOR TWO HOLE LUG			NO SCALE	3
														
LUG DETAIL			NO SCALE	4	NOT USED			NO SCALE	5	NOT USED			NO SCALE	6
NOT USED			NO SCALE	7	NOT USED			NO SCALE	8	NOT USED			NO SCALE	9

dish

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STATE OF CONNECTICUT

SCOTT A. WIRGAU

30575

PROFESSIONAL ENGINEER

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SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER  
G-3



RF JUMPER COLOR CODING				3/4" TAPE WIDTHS WITH 3/4" SPACING								
LOW-BAND RRH – (600MHz N71 BASEBAND) + (850MHz N26 BAND) + (700MHz N29 BAND) – OPTIONAL PER MARKET	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)	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	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		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		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	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	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED	RED	WHITE	RED	BLUE	BLUE	WHITE	BLUE	GREEN	GREEN	WHITE	GREEN
	WHITE	RED	RED	WHITE	WHITE	BLUE	WHITE	WHITE	WHITE	GREEN	WHITE	WHITE
MICROWAVE CABLES WILL REQUIRE P-TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE LOCAL AND REMOTE SITE ID'S												

RF CABLE COLOR CODES

NO SCALE

1

NOT USED

NO SCALE

4

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

dish  
wireless.

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SHEET TITLE  
RF  
CABLE COLOR CODES

SHEET NUMBER

RF-1

<div><div>EXOTHERMIC CONNECTION</div><div>MECHANICAL CONNECTION</div><div>BUSS BAR INSULATOR</div><div>CHEMICAL ELECTROLYTIC GROUNDING SYSTEM</div><div>TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM</div><div>EXOTHERMIC WITH INSPECTION SLEEVE</div><div>GROUNDING BAR</div><div>GROUND ROD</div><div>TEST GROUND ROD WITH INSPECTION SLEEVE</div><div>SINGLE POLE SWITCH</div><div>DUPLEX RECEPTACLE</div><div>DUPLEX GFCI RECEPTACLE</div><div>FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48-T8</div><div>SMOKE DETECTION (DC)</div><div>EMERGENCY LIGHTING (DC)</div><div>SECURITY LIGHT W/PHOTOCELL LITHONIA ALXW LED-1-25A400/51K-SR4-120-PE-DDBTXD</div><div>CHAIN LINK FENCE</div><div>WOOD/WROUGHT IRON FENCE</div><div>WALL STRUCTURE</div><div>LEASE AREA</div><div>PROPERTY LINE (PL)</div><div>SETBACKS</div><div>ICE BRIDGE</div><div>CABLE TRAY</div><div>WATER LINE</div><div>UNDERGROUND POWER</div><div>UNDERGROUND TELCO</div><div>OVERHEAD POWER</div><div>OVERHEAD TELCO</div><div>UNDERGROUND TELCO/POWER</div><div>ABOVE GROUND POWER</div><div>ABOVE GROUND TELCO</div><div>ABOVE GROUND TELCO/POWER</div><div>WORKPOINT</div><div>SECTION REFERENCE</div><div>DETAIL REFERENCE</div></div> <div><div><div><div>●</div></div><div><div>■</div></div><div><div>▲</div></div><div><div>⊗</div></div><div><div>⊗ T</div></div><div><div>⊗</div></div><div><div><div><div></div><div></div></div></div></div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div></div><div><div>\$</div></div><div><div><div><div></div><div></div></div></div></div><div><div><div><div></div><div></div></div></div></div><div><div>F</div></div><div><div>SD</div></div><div><div><div><div></div><div></div></div></div></div><div><div></div></div><div><div>X</div><div>X</div><div>X</div><div>X</div></div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div></div><div><div><div><div></div><div></div></div></div></div><div><div><div><div></div><div></div></div></div></div><div><div>W</div><div>W</div><div>W</div><div>W</div><div>W</div></div><div><div>UGP</div><div>UGP</div><div>UGP</div><div>UGP</div><div>UGP</div></div><div><div>UGT</div><div>UGT</div><div>UGT</div><div>UGT</div><div>UGT</div></div><div><div>OHP</div><div>OHP</div><div>OHP</div><div>OHP</div></div><div><div>OHT</div><div>OHT</div><div>OHT</div><div>OHT</div></div><div><div>UGT/P</div><div>UGT/P</div><div>UGT/P</div><div>UGT/P</div></div><div><div>AGP</div><div>AGP</div><div>AGP</div><div>AGP</div><div>AGP</div></div><div><div>AGT</div><div>AGT</div><div>AGT</div><div>AGT</div><div>AGT</div></div><div><div>AGT/P</div><div>AGT/P</div><div>AGT/P</div><div>AGT/P</div></div><div><div>W.P.</div></div><div><div><div><div>XX</div><div>X-X</div></div></div></div><div><div><div><div>XX</div><div>X-X</div></div></div></div></div></div>
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LEGEND

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, LLC. AND TOWER OWNER NOC & THE DISH WIRELESS, LLC. AND TOWER OWNER CONSTRUCTION MANAGER.

2. "LOOK UP" – DISH WIRELESS, LLC. 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, LLC. AND DISH WIRELESS, LLC. 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, LLC. 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, LLC. AND TOWER OWNER INSTALLATION STANDARDS FOR CONSTRUCTION ACTIVITIES ON DISH WIRELESS, LLC. 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, LLC. 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, LLC. 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, LLC.

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, LLC. AND TOWER OWNER

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

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



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



**AMERICAN TOWER®**  
A.T. ENGINEERING SERVICE, PLLC  
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SUITE 100  
CARY, NC 27518  
PHONE: (919) 468-0112

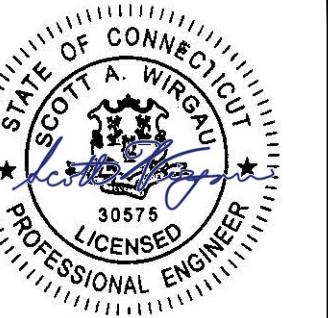
DRAWN BY: CHECKED BY: APPROVED BY:

JD SRF SRF

RFDS REV #: ----

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
0	08/09/2021	ISSUED FOR CONSTRUCTION



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

A&E PROJECT NUMBER  
88013–13681397\_D2

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
GN-2



CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi
6. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR REINFORCING STEEL UNLESS SHOWN OTHERWISE ON DRAWINGS:

• CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH 3"

• CONCRETE EXPOSED TO EARTH OR WEATHER:

• #6 BARS AND LARGER 2"

• #5 BARS AND SMALLER 1-1/2"

• CONCRETE NOT EXPOSED TO EARTH OR WEATHER:

• SLAB AND WALLS 3/4"

• BEAMS AND COLUMNS 1-1/2"

7. A TOOLED EDGE OR A 3/4" CHAMFER SHALL BE PROVIDED AT ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE, IN ACCORDANCE WITH ACI 301 SECTION 4.2.4.
- ELECTRICAL INSTALLATION NOTES:
1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, NEC AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES/ORDINANCES.

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

15. ELECTRICAL METALLIC TUBING (EMT), INTERMEDIATE METAL CONDUIT (IMC), OR RIGID METAL CONDUIT (RMC) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
16. ELECTRICAL METALLIC TUBING (EMT) OR METAL-CLAD CABLE (MC) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.

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

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

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

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

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

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

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

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

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

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

27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH WIRELESS, LLC. 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, LLC.".

30. ALL EMPTY/SPARE CONDUITS THAT ARE INSTALLED ARE TO HAVE A METERED MULE TAPE PULL CORD INSTALLED.
- 
- 5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120
- 
- DRAWN BY: CHECKED BY: APPROVED BY:
- JD SRF SRF
- RFDS REV #: ----
- CONSTRUCTION DOCUMENTS
- | SUBMITTALS |            |                         |
|------------|------------|-------------------------|
| REV        | DATE       | DESCRIPTION             |
| 0          | 08/09/2021 | ISSUED FOR CONSTRUCTION |
|            |            |                         |
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- IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS DOCUMENT.
- A&E PROJECT NUMBER  
88013-13681397\_D2
- DISH WIRELESS, LLC.  
PROJECT INFORMATION  
BOBDL00028A  
131 LITTLE CITY ROAD  
KILLINGWORTH, CT 06419
- SHEET TITLE  
GENERAL NOTES
- SHEET NUMBER  
GN-3

GROUNDING NOTES:

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



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



**AMERICAN TOWER®**  
A.T. ENGINEERING SERVICE, PLLC  
3500 REGENCY PARKWAY  
SUITE 100  
CARY, NC 27518  
PHONE: (919) 468-0112

DRAWN BY: CHECKED BY: APPROVED BY:

JD

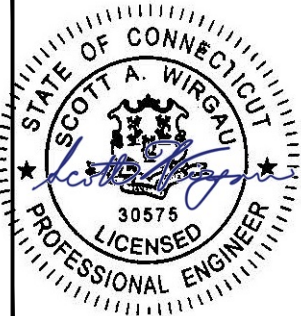
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SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4



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284851149910



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Delivered



**DELIVERED**

Signed for by: M.MONEY

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**FROM**  
BLUE BELL, PA US

**TO**  
KILLINGWORTH, CT US

Travel History

**TIME ZONE**  
Local Scan Time



Friday, October 15,  
2021

10:30 AM	KILLINGWORTH, CT	Delivered
6:12 AM	WALLINGFORD, CT	On FedEx vehicle for delivery
5:42 AM	WALLINGFORD, CT	At local FedEx facility

Thursday, October 14,  
2021

1:30 PM	KEASBEY, NJ	Arrived at FedEx hub
6:59 AM	NORTHAMPTON, PA	Departed FedEx hub

Wednesday, October 13,  
2021

11:21 PM	NORTHAMPTON, PA	Arrived at FedEx hub
9:05 PM	FORT WASHINGTON, PA	Left FedEx origin facility
6:46 PM	FORT WASHINGTON, PA	Picked up



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**FROM**  
BLUE BELL, PA US

**TO**  
KILLINGWORTH, CT US

Travel History

**TIME ZONE**  
Local Scan Time



Friday, October 15,  
2021

10:30 AM	KILLINGWORTH, CT	Delivered
8:23 AM	WALLINGFORD, CT	On FedEx vehicle for delivery
6:53 AM	WALLINGFORD, CT	At local FedEx facility

Thursday, October 14,  
2021

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6:59 AM	NORTHAMPTON, PA	Departed FedEx hub

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