December 13, 2023

Melanie Bachman
Connecticut Siting Council
Ten Franklin Square
New Britain, CT 06051

RE: Tower Share Application

131 Gifford Lane Bozrah, CT 06334
Latitude: Lat.: 41.552517
Longitude: -72.150708
Site#: SBA_CT01105-S _BOBOS01169A_DISH

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the newly constructed tower site located at 131 Gifford Lane, Bozrah, CT.

Dish Wireless LLC proposes to install three (3)600/1900/2100 MHz antennas and six (6) RRUs, at the 150-foot level of the newly constructed/existing 196-foot self support tower, one (1) Fiber cables will also be installed. Dish Wireless LLC equipment cabinets will be placed within 7' x 5' lease area. Included are plans by TEP Northeast dated September 25, 2023 Exhibit 10. Also included is a structural analysis prepared by SBA engineering, dated August 31, 2023, confirming that the existing tower is structurally capable of supporting the proposed equipment, attached as Exhibit 8. Also included is a mount analysis prepared by TEP Northeast dated September 15, 2023 confirming that the mount is structurally capable of supporting the proposed equipment, attached as Exhibit 9. This facility was approved by the CT Siting Council on February 11, 1999. Please see attached Exhibit 6.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mr. Glenn Pianka - First Selectman and to Mr. Doug Colter Building Official. (Separate notice is not being sent to SBA, as SBA is the tower owner making this submission).

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

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the existing tower is 196-feet and the Dish Wireless LLC antennas will be located at a center line height of 150-feet.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels

that exceed local and state criteria. The incremental effect of the proposed changes will be negligent.

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 9.89% as evidenced by Exhibit 7.

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

A. Technical Feasibility. The existing monopole has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included as Exhibit 8.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this support tower in Sterling. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 150-foot level of the existing 196-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit 7, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

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

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading.

Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing guyed tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Sterling .

Sincerely,

Catherine Ware

Catherine Ware
Site Development Specialist
SBA Communications Corporation
134 Flanders Road, Suite 125
Westborough, MA 01581

917.868.8365 + **T**
CWare@sbasite.com
Attachments:

cc:
Mr. Glenn Pianka, First Selectman
Bozrah Town Hall 1 River Road Bozrah, CT 06334
(860)889-2689

Mr. Doug Colter, Building Official Bozrah
Town Hall 1 River Road Bozrah, CT 06334
(860)889-2689

EXHIBIT LIST

Exhibit 1	Copy of Check	X
Exhibit 2	Notification Receipts	x
Exhibit 3	Property Card	x
Exhibit 4	Property Map	x
Exhibit 5	Original Zoning Approval	March 2,2023 Petition #1547
Exhibit 6	Construction Drawings	TEP Northeast
Exhibit 7	Structural Analysis	SBA Engineering 8/31/2023
Exhibit 8	Mount Analysis	TEP Northeast 9/15/2023
Exhibit 9	EME	Fox Hill Telecom – 12/04/2023

EXHIBIT 1

Copy of check

EXHIBIT 2
Letter of Intent

December 11, 2023

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

RE: **Notice of Intent to Allow Shared Use of the Existing SBA Telecommunications Site**
Location: 131 Gifford Lane, Bozrah, CT
Dish Wireless Site No: BOBOS01169A
SBA Site No: CT01105-S

Dear Ms. Bachman:

Please let the following serve as Evidence of Intent to allow Dish's shared use of the existing SBA telecommunications site at **131 Gifford Lane, Bozrah, CT**.

SBA Properties, LLC ("Owner") and Dish Wireless ("Tenant") are entering into a Site Lease Agreement. Tenant will be provided ground space within the existing site compound for its base station equipment and space at the height of 150' for antennas and associated equipment.

Thank you,

Catherine Ware

Catherine Ware
Site Development Specialist
SBA COMMUNICATIONS CORPORATION
134 Flanders Road, Suite 125
Westboro, MA 01581

(917)868-8365 + C
CWare@sbasite.com

EXHIBIT 3

Fedex Labels

ORIGIN ID:ZRPA (917) 868-8365
CATHERINE WARE
SBA COMMUNICATIONS CORPORATION
101 INTERCHANGE PLAZA
CRANBURY, NJ 08512
UNITED STATES US

SHIP DATE: 18DEC23
ACTWGT: 2.00 LB
CAD: 255382542/INET4535

BILL SENDER

TO **MR. DOUG COLTER**
TOWN OF BOZRAH BUILDING OFFICIAL
BOZRAH TOWN HALL
1 RIVER ROAD
BOZRAH CT 06334
(860) 889-2689

REF: 10-56-92009-6089
INV:
PO:
DEPT:

583J4/2BE4/9AE3

FedEx Express

J234023101501uv

TUE - 19 DEC 5:00P
STANDARD OVERNIGHT

TRK# 0201 **7745 0418 7406**

EB SKKA

CT-US BDL

06334

DELIVERY DATE

Tuesday

12/19/23 before 5:00 PM
Estimated between
9:30 AM - 1:30 PM

ON TIME

Want updates on this shipment? Enter your email and we will do the rest!

YOUR EMAIL
Jomorrison@sbasite.com

SUBMIT

MORE OPTIONS

Manage Delivery

DELIVERY STATUS

On the way

TRACKING ID

774504187406

FROM
CRANBURY, NJ US

Label Created
12/15/23 2:30 PM

WE HAVE YOUR PACKAGE
FRAMINGHAM, MA
12/18/23 5:59 PM

ON THE WAY
At FedEx destination facility
NORWICH, CT
12/19/23 8:27 AM

OUT FOR DELIVERY

TO
BOZRAH, CT US

Delivery Date
12/19/23 before 5:00 PM
Estimated between
9:30 AM - 1:30 PM

ORIGIN ID:ZRPA (917) 868-8365
CATHERINE WARE
SBA COMMUNICATIONS CORPORATION
101 INTERCHANGE PALZA

CRANBURY, NJ 08512
UNITED STATES US

SHIP DATE: 18DEC23
ACTWGT: 2.00 LB
CAD: 255382542/INET4535

BILL SENDER

TO **MR. GLENN PIANKA**
TOWN OF BOZRAH - FIRST SELECTMAN
TOWN HALL - TOWN OF BOZRAH
1 RIVER ROAD
BOZRAH CT 06334

(860) 889-2689 REF: 10-56-92009-6089
INV:
PO: DEPT:

583J4/2BE4/9AE3

FedEx Express

J234023101501uv

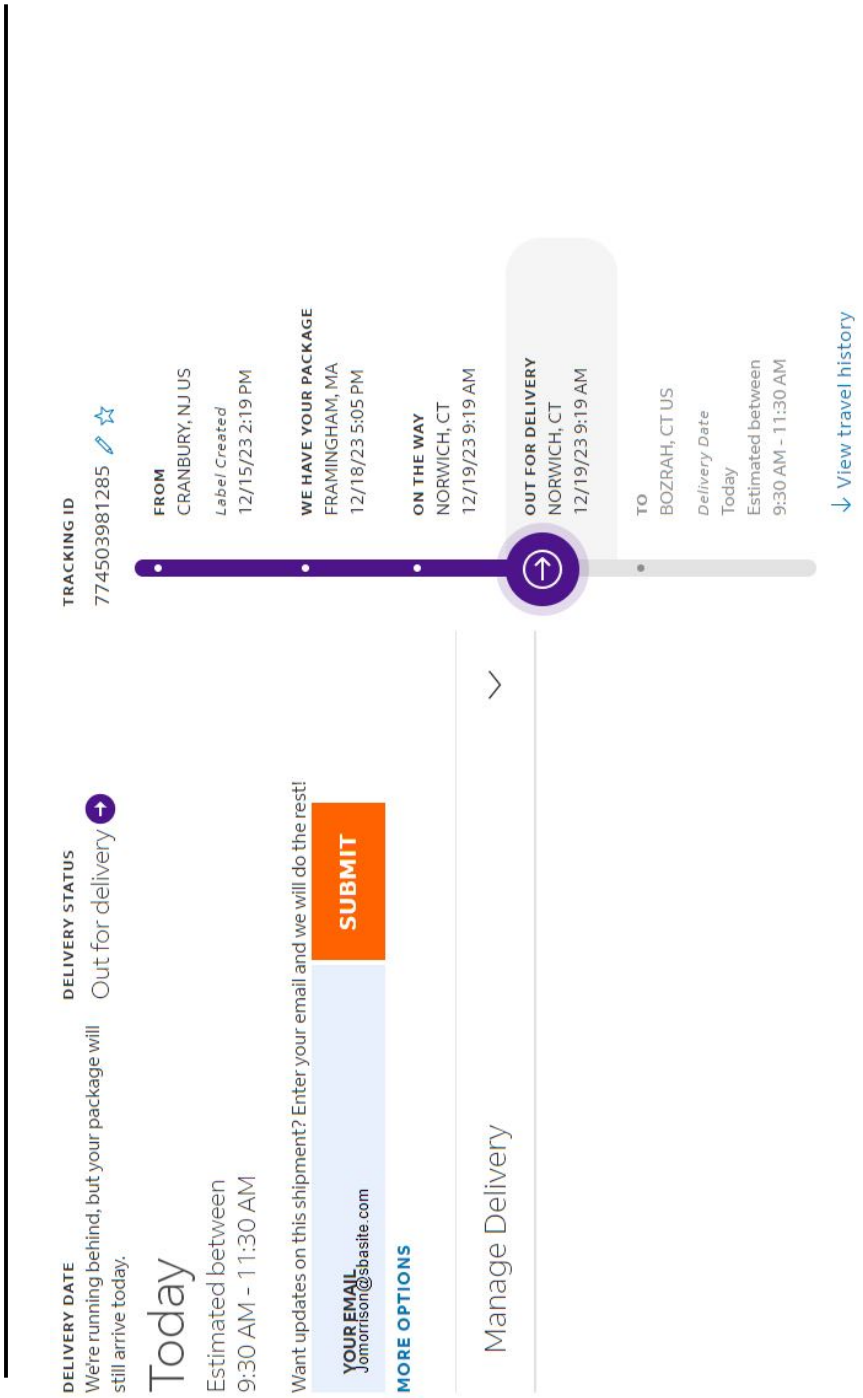
TUE - 19 DEC 12:00P
PRIORITY OVERNIGHT

TRK# 0201 **7745 0398 1285**

06334

EB SKKA

CT-US BDL



ORIGIN ID:ZRPA (917) 868-8365
CATHERINE WARE
SBA COMMUNICATIONS CORPORATION
101 INTERCHANGE PLAZA
CRANBURY, NJ 08512
UNITED STATES US

SHIP DATE: 18DEC23
ACTWGT: 2.00 LB
CAD: 255382542/INET4535

BILL SENDER

TO **MS. MELANIE BACHMAN**
CONNECTICUT SITING COUNCIL
10 FRANKLIN SQUARE
NEW BRITAIN CT 06051
(860) 827-2935

REF: 10-56-92009-6089
INV:
PO:
DEPT:

583J4/2BE4/9AE3

J234023101501uv

FedEx Express

TRK# 0201 **7745 0387 7809**

TUE - 19 DEC 5:00P
STANDARD OVERNIGHT

EB BDLA

CT-US BDL 06051

After printing this label:
CONSIGNEE COPY - PLEASE PLACE IN FRONT OF POUCH
1. Fold the printed page along the horizontal line.
2. Place label in shipping pouch and affix it to your shipment.

EXHIBIT 4

Property Card

All information is for assessment purposes only. Assessments are calculated at 70% of the estimated October 1, 2017 market value which was the date of the last revaluation as completed by eQuality Valuation Services, LLC.

Information on the Property Records for the Municipality of Bozrah was last updated on 10/22/2021.

Parcel Information

Location:	141 GIFFORD LA	Property Use:	Vacant Land	Primary Use:	Residential Vacant Land
Unique ID:	24000633	Map Block Lot:	07/119	Acres:	61.21
490 Acres:	61.21	Zone:	R-1	Volume / Page:	0090/0519
Developers Map / Lot:		Census:	7131		

Value Information

	Appraised Value	Assessed Value
Land	89,244	17,140
Buildings	0	0
Detached Outbuildings	0	0
Total	89,244	17,140

Owner's Information

Owner's Data
NGA CAPITAL LLC 38 BOZRAH ST BOZRAH, CT 06334

EXHIBIT 5

Property Map

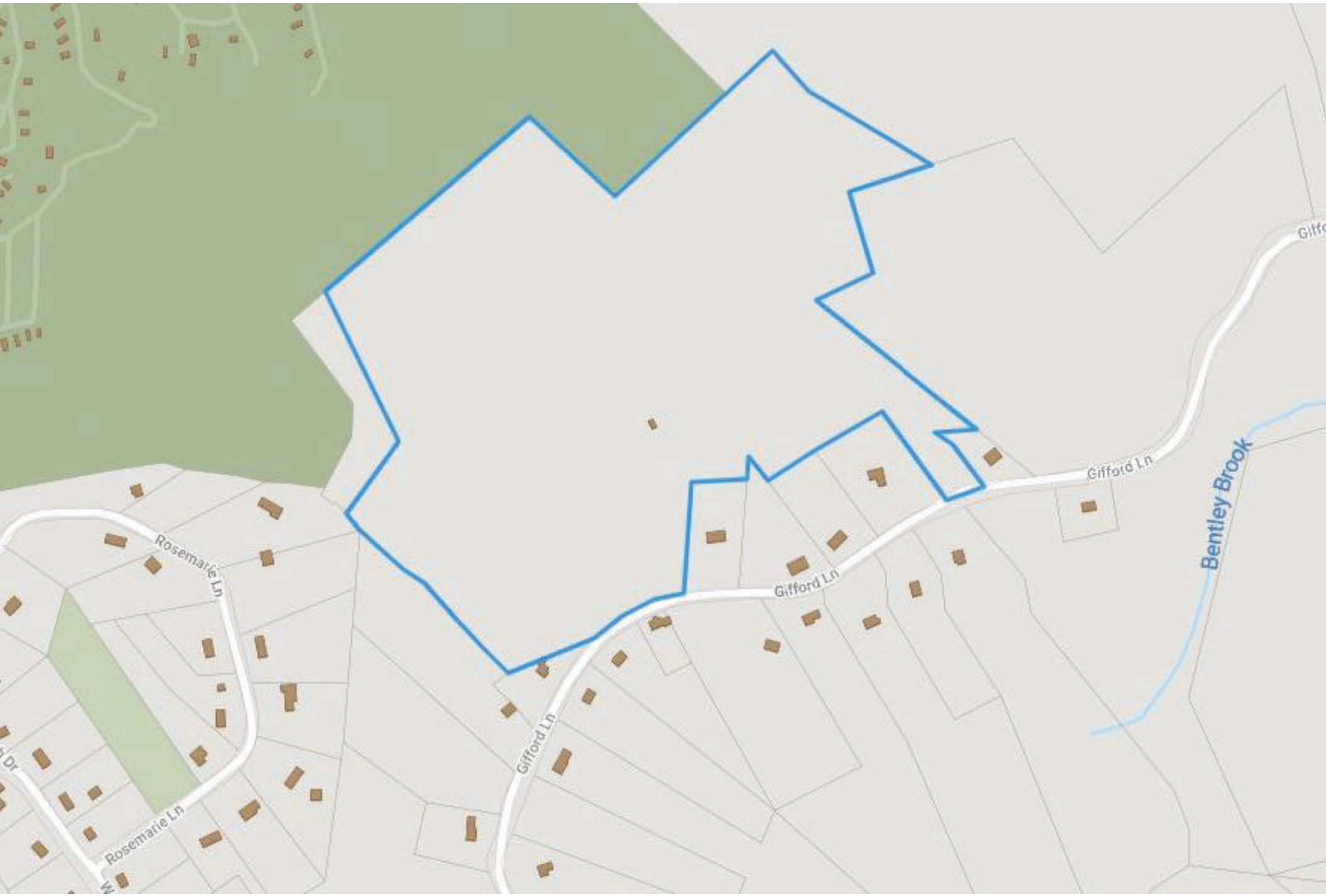

Rosemarie Ln
Rosemarie Ln
Gifford Ln
Gifford Ln
Gifford Ln
Bentley Brook

EXHIBIT 6

Zoning Approval

TOWN OF BOZRAH
PLANNING & ZONING COMMISSION
TOWN HALL, 1 RIVER ROAD
BOZRAH, CONNECTICUT 06334

Notice of Decision

At their regular meeting of February 11, 1999 the Bozrah Planning & Zoning Commission rendered the following decisions:

Fargo Family Partnership, Stockhouse Road. Subdivision creating two building lots on Stockhouse Road which is zoned for Industrial use. **ACTION - Approved.**

SBA Inc., Boca Roton, Florida. Application for a special permit to construct a 196' telecommunications tower at 131 Gifford Lane on property owned by John and Betty Orr. **ACTION - Approved with conditions.**

Town of Bozrah. Proposal to extend a 16" water main northeasterly along Stockhouse Road. This application is submitted in accordance with Section 8-24 of the Connecticut General Statutes as a municipal improvement. **ACTION - The Commission approved the plan and strongly supports the proposal to extend this water main along Stockhouse Road.**

Seymour Adelman, Chairman
Stephen Seder, Vice-Chairman
Planning & Zoning Commission

****

PLEASE PUBLISH THE "BULLETIN" "ONCE AS SOON AS POSSIBLE".

cc:: First Selectman
Applicant by "Certified Mail"
Bulletin Board
Town Clerk
File

Post-it® Fax Note 7671	Date 2/12/99	# of pages ▶ 1
To R. Barker, First Selectman	From R. Seder	
Co./Dept. Town of Bozrah	Co. SCCOG	
Phone #	Phone # 889-2324	
Fax # 887-5449	Fax # 889-1222	

TRANSMISSION VERIFICATION REPORT

TIME : 02/12/1999 10:09
NAME : SCCOG
FAX : 860-889-1222
TEL : 860-889-2324

DATE, TIME	02/12 10:09
FAX NO. /NAME	BULLETIN
DURATION	00:00:37
PAGE(S)	01
RESULT	OK
MODE	STANDARD ECM

TOWN OF BOZRAH
BOZRAH, CONNECTICUT

DRIVEWAY PERMIT

ISSUED TO SBA, Inc. DATE _____

ADDRESS 125 Shaw Street, New London CT 06320

FOR: driveway/acess road to telecommunications site at 131 Gifford Lane

YOUR REQUEST TO CONSTRUCT A DRIVEWAY ON LOT NO. 119

MAP NO. 7 TO: Gifford Lane

WHICH IS TOWN PROPERTY, IS GRANTED SUBJECT TO THE FOLLOWING PROVISIONS:

1. THE DRIVEWAY SHALL BE CONSTRUCTED IN SUCH A MANNER THAT IT DOES NOT INTERFERE WITH THE EXISTING DRAINAGE, THE MOVEMENT OF TRAFFIC, OR THE REMOVAL OF SNOW FROM _____.

2. THE DRIVEWAY SHALL BE CONSTRUCTED IN SUCH A MANNER THAT IT DOES NOT PERMIT THE RUNOFF OF WATER FROM _____ TO ENTER INTO THE PROPERTY OF THE OWNER THEREBY CREATING A NUISANCE TO THE TOWN AND THE OWNER.

3. THE OWNER AND THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CLAIMS OF DAMAGE RESULTING FROM THE CONSTRUCTION OF THE DRIVEWAY.

4. THE DRIVEWAY SHALL BE STABILIZED FOR A SUFFICIENT DISTANCE IN FROM TOWN PROPERTY TO PREVENT EROSION ON TO TOWN PROPERTY AND SHALL BE DESIGNED IN A MANNER TO CONFINE THE SURFACE WATER TO THE GUTTER AREAS AND PERMIT FREE FLOWAGE OF THE WATER IN THE WATERWAYS.

5. IF THE DRIVEWAY IS TO BE HARDTOPPED AT A LATER DATE ALLOWANCES MUST BE MADE FOR THE ADDITIONAL CHANGE OF GRADE WHERE THE DRIVEWAY CONNECTS WITH EXISTING WATERWAYS OR TRAVELLED PORTION OF THE TOWN ROAD.

6. THE DISTURBED AREAS WITHIN THE TOWN'S RIGHT-OF-WAY SHALL BE REPAIRED BY THE OWNER OR THE CONTRACTOR

7. WHERE EXISTING EXCAVATIONS OR FILLS WITHIN THE TOWN'S RIGHT-OF-WAY ENDANGER THE LIFE OF EXISTING TREES OR OTHER GROWTHS OR STONES EXIST AS OBSTACLES TO THE ACCESS OR EGRESS TO PROPERTY, SUCH OBSTACLES, TREES, OR GROWTHS, SHALL BE REMOVED AT THE OWNER'S EXPENSE.

K McNary

APPLICANT

FIRST SELECTMAN

EXHIBIT 7

EME Report

FOX HILL TELECOM

Radio Frequency Emissions Analysis Report

Site ID: BOBOS01169A

131 Gifford lane
Bozrah, CT 06334

December 4, 2023

Fox Hill Telecom Project Number: 231063

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**9.89 %**

FOX HILL TELECOM

December 4, 2023

Dish Wireless
5701 South Santa Fe Drive
Littleton, CO 80120

Emissions Analysis for Site: **BOBOS01169A**

Fox Hill Telecom, Inc ("Fox Hill") was directed to analyze the proposed radio installation for Dish Wireless, LLC (Dish) facility located at **131 Gifford lane, Bozrah, CT**, for the purpose of determining whether the emissions from the Proposed Dish radio and antenna installation located on this property are within specified federal limits.

All information used in this report was analyzed as a percentage of current Maximum Permissible Exposure (% MPE) as listed in the FCC OET Bulletin 65 Edition 97-01and ANSI/IEEE Std C95.1. The FCC regulates Maximum Permissible Exposure in units of microwatts per square centimeter (μW/cm2). The number of $\mu W/cm^2$ calculated at each sample point is called the power density. The exposure limit for power density varies depending upon the frequencies being utilized. Wireless Carriers and Paging Services use different frequency bands each with different exposure limits, therefore it is necessary to report results and limits in terms of percent MPE rather than power density.

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limit for the 600 MHz band is approximately 400 $\mu W/cm^2$. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS / AWS-4) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report the percentage 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 performed for the proposed upgrades to the Dish Wireless antenna facility located at **131 Gifford lane, Bozrah, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65 for far field modeling calculations.

In OET-65, plane wave power densities in the Far Field of an antenna are calculated by considering antenna gain and reflective waves that would contribute to exposure.

Since the radiation pattern of an antenna has developed in the **Far Field** region the power gain in specific directions needs to be considered in exposure predictions to yield an Effective Radiated Power (ERP) in each specific direction from the antenna. Also, since the vertical radiation pattern of the antenna is considered, the exposure calculations would most likely be reduced significantly at ground level, resulting in a more realistic estimate of the actual exposure levels. To determine a worst-case scenario at each point along the calculation radials, each point was calculated using the antenna gain value at each angle of incident and compared against the result using an isotropic radiator at the antenna height with the greater of the two used to yield the more pessimistic far field value for each point along the calculation radial.

Additionally, to model a truly "worst case" prediction of exposure levels at or near a surface, such as at ground-level or on a rooftop, reflection off the surface of antenna radiation power can be assumed, resulting in a potential 1.6 times increase in power density in calculating far field power density values.

With these factors Considered, the worst case **Far Field prediction model** utilized in this analysis is determined by the following equation:

Equation 9 per FCC OET65 for Far Field Modeling

$$S = \frac{33.4\ ERP}{R^2}$$

S = Power Density (in μw/cm^2)
ERP = Effective Radiated Power from antenna (watts)
R = Distance from the antenna (meters)

Predicted far field power density values for all carriers identified in this report were calculated 6 feet above the ground level and are displayed as a percentage of the applicable FCC standards. All emissions values for other carriers were calculated using the same Far Field model outlined above, using industry standard radio configurations and frequency band selection based upon available licenses in this geographic area for emissions contribution estimates.

For each Dish sector the following channel counts, frequency bands and power levels were utilized as shown in *Table 1*:

Technology	Frequency Band	Channel Count	Transmit Power per Channel (W)
5G	n71 (600 MHz)	4	61.5
5G	n70 (AWS-4 / 1995-2020)	4	40
5G	n66 (AWS-4 / 2180-2200)	4	40

Table 1: Channel Data Table

The following **Dish** antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz (n71) frequency band and the 2100 MHz (AWS 4) frequency bands at 1995-2020 MHz (n70) and 2180-2200 MHz (n66). This is based on feedback from Dish regarding anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Commscope FFVV-65B-R2	150
B	1	Commscope FFVV-65B-R2	150
C	1	Commscope FFVV-65B-R2	150

Table 2: Antenna Data

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

RESULTS

Per the calculations completed for the proposed **Dish** configurations *Table 3* shows resulting emissions power levels and percentages of the FCC's allowable general population limit.

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	1.64
						Sector A Composite MPE%	**1.64**
Antenna B1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	1.64
						Sector B Composite MPE%	**1.64**
Antenna C1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	1.64
						Sector C Composite MPE%	**1.64**

Table 3: Dish Emissions Levels

The Following table (*Table 4*) shows all additional carriers on site and their emissions contribution estimates, along with the newly calculated **Dish** far field emissions contributions per this report. FCC OET 65 specifies that for carriers utilizing directional antennas, the highest recorded sector value be used for composite site emissions values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. For this site, all three sectors have the same configuration yielding the same results for all three sectors. *Table 5* below shows a summary for each **Dish** Sector as well as the composite emissions value for the site.

Site Composite MPE%	
Carrier	**MPE%**
Dish – Max Per Sector Value	**1.64 %**
T-Mobile	1.86 %
AT&T	2.92 %
Sprint	0.59 %
Verizon Wireless	2.88 %
Site Total MPE %:	**9.89 %**

Table 4: All Carrier MPE Contributions

Dish Sector A Total:	1.64 %
Dish Sector B Total:	1.64 %
Dish Sector C Total:	1.64 %
Site Total:	9.89 %

Table 5: Site MPE Summary

Table 6 below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated **Dish** sector(s). For this site, all three sectors have the same configuration yielding the same results for all three sectors.

Dish _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Dish n71 (600 MHz) 5G	4	1,008.96	150	4.32	n71 (600 MHz)	400	1.08%
Dish n70 (AWS-4 / 1995-2020) 5G	4	1,574.20	150	2.80	n70 (AWS-4 / 1995-2020)	1000	0.28%
Dish n66 (AWS-4 / 2180-2200) 5G	4	1,686.79	150	2.80	n66 (AWS-4 / 2180-2200)	1000	0.28%
						Total:	**1.64 %**

Table 6: Dish Maximum Sector MPE Power Values

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 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 Sector	Power Density Value (%)
Sector A:	1.64 %
Sector B:	1.64 %
Sector C:	1.64 %
Dish Maximum Total (per sector):	1.64 %
Site Total:	9.89 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite emissions value for this site, assuming all carriers present, is **9.89 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon the far field calculations performed for all carriers identified in this report.

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.

Scott Heffernan
Principal RF Engineer
Fox Hill Telecom, Inc
Worcester, MA 01609
(978)660-3998

EXHIBIT 8

Structural Analysis

SBA Communications Corporation
8051 Congress Avenue
Boca Raton, FL 33487-1307

T + 561.995.7670
F + 561.995.7626

sbasite.com

Structural Analysis Report

Client: Dish Wireless

Client Site ID / Name: BOBOS01169A / 0
Application #: 234501, v1

SBA Site ID / Name: CT01105-S / BOZRAH

193' Self Supporting Tower

131 Gifford Lane
Bozrah, CT 06334-1318
Lat: 41.552517 Long: -72.150708

Project number: CT01105-DSW-082423

Analysis Results

Tower	72.5%	Pass
Foundation	58.1%	Pass

Change in tower stress due to mount modification / replacement	N/A

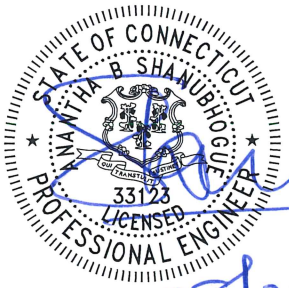
Prepared by:

Breann Parreira
Structural Engineer II
561-981-7388
BParreira@sbasite.com

Reviewed by:

Anantha (Shan) Shanubhogue, P.E.
Senior Manager, Structural Engineering
561-981-7390
SShanubhogue@sbasite.com

August 31, 2023



08/31/23

Table of Contents

Introduction

The purpose of this report is to summarize the analysis results on the 193' Self Supporting Tower to support the proposed antennas and transmissions lines in addition to those currently installed.

Table 1 List of Documents Used

Item	Document
Tower Design	Pirod, File # A-115466, dated 4/1/1999
Foundation Design	Pirod, File # A-115466, dated 4/1/1999
Geotechnical report	Jaworski Geotech, Inc., Project # C98492G, dated 12/14/1998
Modification drawings	N/A
Mount Analysis	N/A
Latest SA Report	TES, Project # 129196_R2, dated 5/27/2022

Analysis Criteria

Table 2 Code Related Data

Jurisdiction (State/County/City)	Connecticut / New London / Bozrah
Governing Codes	ANSI/TIA-222-H, 2022 CSBC, 2021 IBC
Ultimate Wind Speed (3-Sec gust)	123 mph
Wind Speed with Ice (3-Sec gust)	50 mph
Service Wind Speed (3-Sec gust)	60 mph
Ice Thickness	1 in
Risk category	II
Exposure Category	B
Topographic Category	1
Crest Height	0 ft.
Ground Elevation	449 ft.
Seismic Parameter S_s	0.197
Seismic Parameter S_1	0.054

This structural analysis is based upon the tower being classified as a Risk category II; however, if a different classification is required subsequent to the date hereof, the tower classification will be changed to meet such requirement and a new structural analysis will be run.

Appurtenance Loading

Existing Loading:

Table 3 Existing Appurtenances

Mount Elev. (ft)	CL Elev. (ft)	Type	Qty	Manufacturer	Model	Feed Line Size	Mount Type Qty.	Carrier
191	191	Panel	3	EMS	RR90-17-02DP	(8) 1-5/8" (3) 1.9" Fiber	Modified Low Profile Platform w/ (1) PRK-1245L, (3) TAP472 and (1) HRK12-U and (3) Sitepro1 SFS-V-L (V-BraceKit)	T-Mobile
		Panel	3	RFS	APXVAALL24_43-U-NA20			
		Panel	3	Ericsson	AIR6419 B41			
		Diplexer	3	Commscope	SDX1926Q-43			
		RRU	3	Ericsson	4449 B71+B85			
		RRU	3	Ericsson	4460 B25 + B66			
		RRU	3	Ericsson	4415 B66A			
182	182	Panel	3	Powerwave	7770	(12) 1-5/8" (4) 3/4" DC (3) 3/8" RET (2) 5/8" Fiber	(3) Sector Frame [Commscope MTC3615]	AT&T
		Panel	3	CCI	HPA-65R-BUU-H8			
		Panel	3	CCI	DMP65R-BU8DA			
		TMA	6	Powerwave	LGP21401			
		Diplexer	6	Powerwave	LGP21902			
		RRU	3	Ericsson	4449 B5/B12			
		RRU	3	Ericsson	RRUS 12			
		RRU	3	Ericsson	RRUS 11			
		RRU	3	Ericsson	RRUS 32			
		RRU	3	Ericsson	RRUS A2			
		OVP	1	Raycap	DC6-48-60-18-8F			
		OVP	1	Raycap	DC6-48-60-0-8C-EV			
175	175	Panel	3	RFS	APXVTM14-C-I20	(4) 1-1/4" Fiber	(3) Sector Frame w/ Support Rail (3) Sitepro SFSH-L	T-Mobile Sprint
		Panel	3	Commscope	NNVV-65B-R4			
		RRU	3	ALU	1900 MHz			
		RRU	6	ALU	800 MHz			
		RRU	3	ALU	TD-RRH 8X20-25			
160	160	Panel	3	Commscope	LNX-6514DS-A1M	(12) 1-5/8" (3) 1-5/8" Hybrid	(3) Modified Sector Frame w/ Support Rail w/ (3) Site Pro 1 SFS-V (V Style Reinforcement Kit), (12) Site Pro 1 Puck (Crossover Plate Assembly), (6) Site Pro 1 SCX7-U (Crossover Plate Assembly), (3) 4'-0" (F.V.) P2 STD Pipe & (3) 8'-0" P2.5 STD Pipe	Verizon
		Panel	6	Andrew	SBNHH-1D65B			
		Panel	3	Samsung	MT6407-77A			
		RRU	3	Samsung	B2/B66A RRH-BR049 (RFV01U-D1A)			
		RRU	3	Samsung	B5/B13 RRH-BR04C (RFV01U-D2A)			
		OVP	3	Raycap	DB-B1-6C-12AB-0Z			
100	100	GPS	1	Alcatel Lucent	KS24019-L112A	(1) GPS line	Direct Mount	
30	30	Omni	2	Andrew	PC1N0F-0190B-002M (E-911 Equipment)	(2) 1/2"	Direct Mount	T-Mobile

Note: AT&T loading includes FirstNET equipment

Proposed Loading:

Information pertaining to proposed antennas and transmission lines were based upon the Application #: 234501, v1 from Dish Wireless and is listed in Table 4.

Table 4 Proposed Appurtenances

Mount Elev. (ft)	CL Elev. (ft)	Type	Qty	Manufacturer	Model	Feed Line Size	Mount Type Qty.	Carrier
150	150	Panel	3	Commscope	FFVV-65B-R2	(1) 1.6" Hybrid	(3) Sector Frames [Commscope MTC3975083]	Dish Wireless
		RRU	3	Samsung	RF4450t-71A			
		RRU	3	Samsung	RF4451d-70A			
		OVP	1	Raycap	RDIDC-9181-PF-48			

Analysis Results

Tower

The results of the structural analysis are shown below in table 5. Additional information for the tower analysis is provided within the Appendix.

Table 5 Tower Analysis Summary

Structural Component	% capacity	Analysis Result
Leg	72.5	Pass
Diagonal	72.2	Pass
Horizontal	19.8	Pass
Top girt	4.8	Pass
Bottom girt	12.3	Pass
Mid Girt	2.5	Pass
Bolt	72.2	Pass
Anchor Bolt	38.2	Pass

Foundation

The results of the foundation analysis are shown below in table 6. Additional information for the foundation analysis is provided within the Appendix.

Table 6 Foundation Analysis Summary

Structural Component	Max Usage (%)	Analysis Result
Foundation	58.1	Pass

Conclusions

Based on the analysis results, the existing tower and foundation were found to be sufficient to safely support the equipment listed in this analysis. No modification to the tower and foundation is needed at this time.

Installation Requirements

This analysis was performed under the assumption that the carrier will place the proposed equipment and feed lines at the installation height listed in Table 4 and in accordance with the coax layout shown. TMAs and RRUs are to be installed on existing mounts behind tenant's antennas unless otherwise noted. No equipment is to be installed directly in the climbing path. All equipment is to be installed per mount manufacturer specifications. In case site conditions do not allow for the required installation parameters to be met the carrier must notify SBA Communications Corporation engineers for approval of an alternative placement.

Assumptions and Limitations

Assumptions

This analysis was completed based on the following assumptions:

- Tower and foundation were built in accordance to manufacturer specifications.
- Tower and foundation has been properly maintained in accordance with the manufacturer's specifications
- All existing structural members were assumed to be in good condition with no physical damage or deterioration associated with corrosion
- Welds and bolts are assumed able to carry their intended original design loads.
- The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Table 3 and 4.
- This analysis may be affected if any assumptions are not valid or have been made in error. SBA should be notified to determine the effect on the structural integrity of the tower.

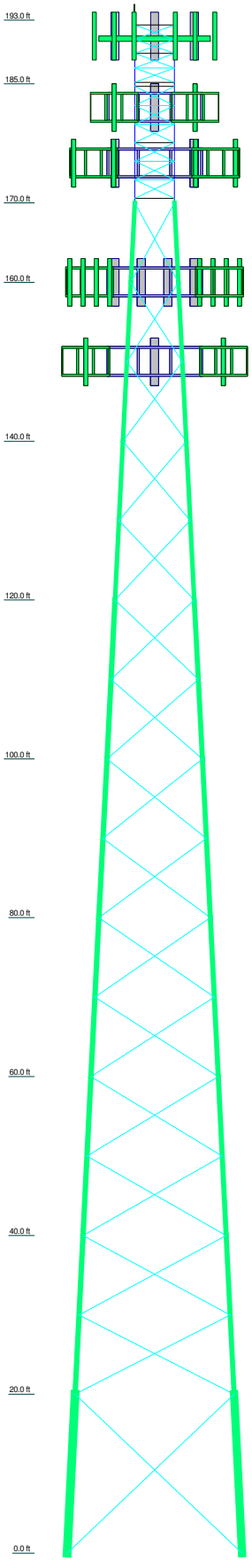
Limitations

The computer generated analysis performed by the tower software is limited to theoretical capacities of the towers structural members and does not account for any missing or damaged members or connections. The tower and foundation are assumed to have been properly designed, fabricated, installed and maintained, barring any conflicting findings from the most recent inspection.

SBA Communications Corporation has used its due diligence to verify the information provided to perform this analysis. It is unreasonable to perform a more detailed inspection of a tower and its components. This report is not a condition assessment of the tower or foundation.

Appendix

Section	T11	T10	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs	#18 - 2.50" (Prod 112738 Base Only)	#12 - 2.25" - 1.25" conn. (Prod 105220)	#12 - 2.00" - 1.25" conn. (Prod 105219)	#12 - 1.75" - 1.25" conn. (Prod 105218)			#12 - 1.50" - 1.00" conn. (Prod 105217)		A	SR 2	
Leg Grade							A572-50				
Diagonals	2L3 1/2x3 1/2x5/16x3/8	L3 1/2x3 1/2x5/16		L3x3x5/16			L3x3x3/16		L2 1/2x2 1/2x3/16	SR 1	
Diagonal Grade				A36						A572-50	
Top Girts					N.A.					SR 1 1/4	
Mid Girts					N.A.					SR 1 1/4	
Bottom Girts					N.A.					SR 1 1/4	
Horizontals					N.A.					SR 7/8	
Face Width (ft)	22	20	18	16	14	12	10	8	6	5	
# Panels @ (ft)	1 @ 20					15 @ 10			6 @ 2.34028	4 @ 1.8125	
Weight (K)	38.3	7.9	5.3	5.2	4.5	4.2	3.3	2.4	2.4	1.1	1.3	0.8



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
Lightning Rod	193	1900 MHz RRH (25"x11.1"x11.4")	175
SL1	193	1900 MHz RRH (25"x11.1"x11.4")	175
RR90-17-02DP [56x8x2.75] w/ mount pipe	191	(2) 800 MHz RRH (19.7"x13"x10.8")	175
RR90-17-02DP [56x8x2.75] w/ mount pipe	191	(2) 800 MHz RRH (19.7"x13"x10.8")	175
APXVAALL24-43-U-NA20 [95.9x24x8.5] w/ mount pipe	191	(2) 800 MHz RRH (19.7"x13"x10.8")	175
APXVAALL24-43-U-NA20 [95.9x24x8.5] w/ mount pipe	191	TD-RRH8x20-25 (26.1"x18.6"x6.7")	175
APXVAALL24-43-U-NA20 [95.9x24x8.5] w/ mount pipe	191	TD-RRH8x20-25 (26.1"x18.6"x6.7")	175
AIR6419 B41 (36.3x20.9x9) w/ mount pipe	191	TD-RRH8x20-25 (26.1"x18.6"x6.7")	175
AIR6419 B41 (36.3x20.9x9) w/ mount pipe	191	Sector Frame w/ Support Rail	175
AIR6419 B41 (36.3x20.9x9) w/ mount pipe	191	Sector Frame w/ Support Rail	175
SDX1926Q-43 [6.9x4.1x2.9]	191	Sector Frame w/ Support Rail	175
SDX1926Q-43 [6.9x4.1x2.9]	191	(3) V-Brace	175
SDX1926Q-43 [6.9x4.1x2.9]	191	SL3	170
4449 B71 + B85 (17.9x13.1x10.6)	191	RRH2x60-700 [37x11x5]	160
4449 B71 + B85 (17.9x13.1x10.6)	191	T-Frame	160
4449 B71 + B85 (17.9x13.1x10.6)	191	T-Frame	160
4460 B25+B66 (17x15.11x11.85)	191	T-Frame	160
4460 B25+B66 (17x15.11x11.85)	191	(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	160
4460 B25+B66 (17x15.11x11.85)	191	LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	160
4415 B66A [16.5x13.4x6.2]	191	LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	160
4415 B66A [16.5x13.4x6.2]	191	LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	160
4415 B66A [16.5x13.4x6.2]	191	QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	160
(1) Low Profile Platform	191	QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	160
RR90-17-02DP [56x8x2.75] w/ mount pipe	191	QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	160
SL2	185	DB-T1-6Z-8AB-0Z [24x24x10]	160
7770 [55x11x5] w/ mount pipe	182	DB-T1-6Z-8AB-0Z [24x24x10]	160
HPA-65R-BUU-H8 (92.4"x14.8"x7.4") w/ mount pipe	182	(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	160
HPA-65R-BUU-H8 (92.4"x14.8"x7.4") w/ mount pipe	182	(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	160
HPA-65R-BUU-H8 (92.4"x14.8"x7.4") w/ mount pipe	182	(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	160
DMP65R-BU8DA [96x20.7x7.7] w/ mount pipe	182	RRH2x60-AWS [37x11x5]	160
DMP65R-BU8DA [96x20.7x7.7] w/ mount pipe	182	RRH2x60-AWS [37x11x5]	160
DMP65R-BU8DA [96x20.7x7.7] w/ mount pipe	182	RRH2x60-AWS [37x11x5]	160
(2) LGP21401 (14.4"x9.2"x2.6")	182	RRH2X60-1900 [20.08x11.2x7.2]	160
(2) LGP21401 (14.4"x9.2"x2.6")	182	RRH2X60-1900 [20.08x11.2x7.2]	160
(2) LGP21401 (14.4"x9.2"x2.6")	182	RRH2X60-1900 [20.08x11.2x7.2]	160
(2) LGP21902 [6.3x4.4x3]	182	RRH2x60-700 [37x11x5]	160
(2) LGP21902 [6.3x4.4x3]	182	(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	160
(2) LGP21902 [6.3x4.4x3]	182	(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	160
4449 B5/B12 (17.9x13.19x9.44)	182	RRH2x60-700 [37x11x5]	160
4449 B5/B12 (17.9x13.19x9.44)	182	SL4	160
4449 B5/B12 (17.9x13.19x9.44)	182	FVV-65B-R3 (96.5x11.85x7.13) w/ Mount pipe	150
RRUS 12 (20.4"x18.5"x7.5")	182	FVV-65B-R3 (96.5x11.85x7.13) w/ Mount pipe	150
RRUS 12 (20.4"x18.5"x7.5")	182	RF4450t-71A [16.5x15x11]	150
RRUS 12 (20.4"x18.5"x7.5")	182	RF4450t-71A [16.5x15x11]	150
RRUS 11 (19.7 x 17" x 7.2")	182	RF4450t-71A [16.5x15x11]	150
RRUS 11 (19.7 x 17" x 7.2")	182	RF4451d-70A [15x15x8.9]	150
RRUS 11 (19.7 x 17" x 7.2")	182	RF4451d-70A [15x15x8.9]	150
RRUS 32 [29.9x13.3x9.5]	182	RF4451d-70A [15x15x8.9]	150
RRUS 32 [29.9x13.3x9.5]	182	RDIDC-9181-PF-48 [16.57x14.57x8.15]	150
RRUS 32 [29.9x13.3x9.5]	182	Commscope MTC3975083	150
RRUS A2 (16.4"x15.1"x3.3")	182	Commscope MTC3975083	150
RRUS A2 (16.4"x15.1"x3.3")	182	Commscope MTC3975083	150
RRUS A2 (16.4"x15.1"x3.3")	182	(2) Empty Mount Pipe	150
DC6-48-60-18-8F (24"x18.5"x11")	182	(2) Empty Mount Pipe	150
DC6-48-60-0-8C-EV [31.4x10.24x10.24]	182	(2) Empty Mount Pipe	150
(Commscope P/N: MTC3615)	182	FVV-65B-R3 (96.5x11.85x7.13) w/ Mount pipe	150
(Commscope P/N: MTC3615)	182	SL5	140
(Commscope P/N: MTC3615)	182	SL6	120
7770 [55x11x5] w/ mount pipe	182	KS24019-L112A [8x2x2]	100
7770 [55x11x5] w/ mount pipe	182	SL7	100
APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	175	SL8	80
APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	175	SL9	60
APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	175	SL10	40
NNVV-65B-R4 [72x19.6x7.8] w/ mount pipe	175	PC1N0F-0190B-002M [3.9x1.6]	30
NNVV-65B-R4 [72x19.6x7.8] w/ mount pipe	175	PC1N0F-0190B-002M [3.9x1.6]	30
NNVV-65B-R4 [72x19.6x7.8] w/ mount pipe	175	SL11	20
1900 MHz RRH (25"x11.1"x11.4")	175		

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	#12 - 1.25" - 1.00" conn. (Pirod 105244)		

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-50	50 ksi	65 ksi	A36	36 ksi	58 ksi

TOWER DESIGN NOTES

1. Tower is located in New London County, Connecticut.
2. Tower designed for Exposure B to the TIA-222-H Standard.
3. Tower designed for a 123 mph basic wind in accordance with the TIA-222-H Standard.
4. Tower is also designed for a 50 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
5. Deflections are based upon a 60 mph wind.
6. Tower Risk Category II.
7. Topographic Category 1 with Crest Height of 0.00 ft
8. TOWER RATING: 72.5%

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 382 K
SHEAR: 45 K

UPLIFT: -327 K
SHEAR: 38 K

AXIAL 86 K
SHEAR 6 K *MOMENT 833 kip-ft*
TORQUE 0 kip-ft
SEISMIC

AXIAL 157 K
SHEAR 15 K *MOMENT 1821 kip-ft*
TORQUE 6 kip-ft
50 mph WIND - 1.0000 in ICE

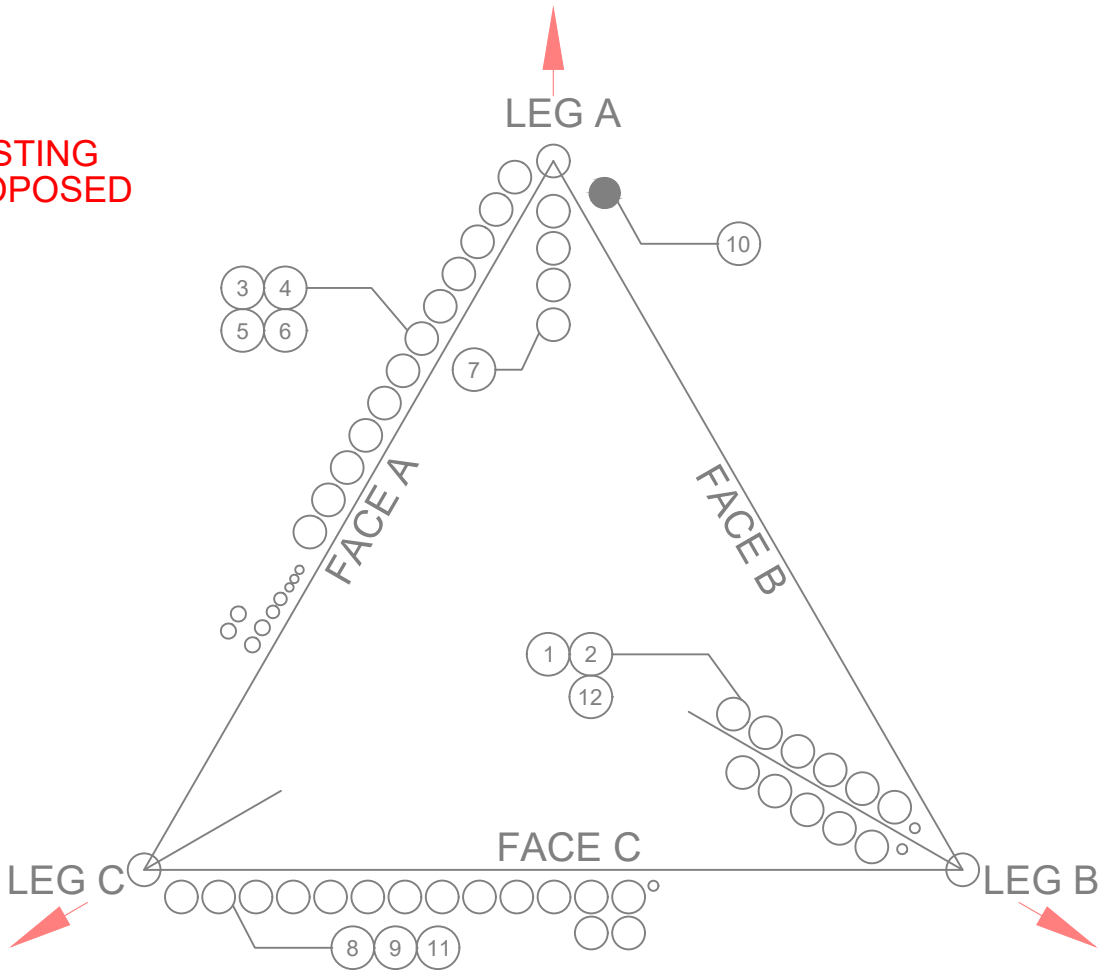
AXIAL 82 K
SHEAR 58 K *MOMENT 6927 kip-ft*
TORQUE 29 kip-ft
REACTIONS - 123 mph WIND

SBA Communications
8051 Congress Avenue
Boca Raton, Florida
Phone: (561) 981-7388
FAX:

Job:
Project: **CT01105-S Bozrah**
Client: Drawn by: Breann Parreira App'd:
Code: TIA-222-H Date: 08/31/23 Scale: NTS
Path: Dwg No. E-1

COAX LAYOUT

○ EXISTING
● PROPOSED



CT01105-S					
#	CARRIER	SIZE	QTY.	ELEVATION	NOTES
1	T-Mobile	1-5/8"	8	191	
2	T-Mobile	1.9"	3	191	Fiber
3	AT&T	1-5/8"	12	182	
4	AT&T	3/4"	4	182	DC Power
5	AT&T	3/8"	3	182	RET
6	AT&T	5/8"	2	182	Fiber
7	TMS	1-1/4"	4	175	Fiber
8	Verizon	1-5/8"	12	160	
9	Verizon	1-5/8"	3	160	Hybrid
10	Dish	1.6"	1	150	Hybrid [Proposed]
11	Verizon	3/8"	1	100	GPS
12	T-Mobile	1/2"	2	30	

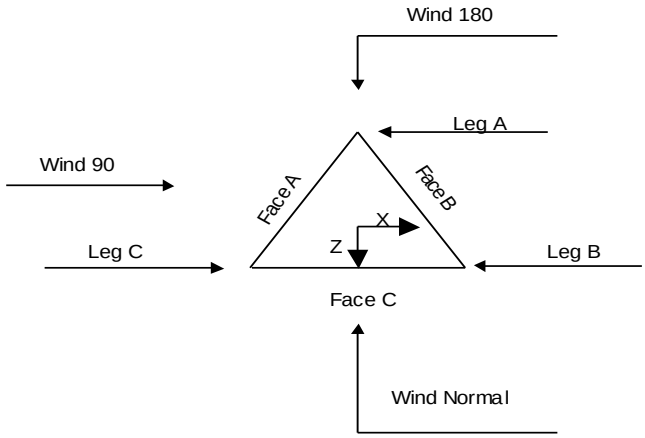
Tower Input Data

The main tower is a 3x free standing tower with an overall height of 193.00 ft above the ground line.
The base of the tower is set at an elevation of 0.00 ft above the ground line.
The face width of the tower is 5.00 ft at the top and 22.00 ft at the base.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower is located in New London County, Connecticut.
Tower base elevation above sea level: 449.80 ft.
Basic wind speed of 123 mph.
Risk Category II.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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



Triangular Tower

Tower Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
T1	193.00-185.00			5.00	1	8.00
T2	185.00-170.00			5.00	1	15.00
T3	170.00-160.00			5.00	1	10.00
T4	160.00-140.00			6.00	1	20.00
T5	140.00-120.00			8.00	1	20.00
T6	120.00-100.00			10.00	1	20.00
T7	100.00-80.00			12.00	1	20.00
T8	80.00-60.00			14.00	1	20.00
T9	60.00-40.00			16.00	1	20.00
T10	40.00-20.00			18.00	1	20.00
T11	20.00-0.00			20.00	1	20.00

Tower Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
T1	193.00-185.00	1.81	X Brace	No	Steps	7.0000	2.0000
T2	185.00-170.00	2.34	X Brace	No	Steps	4.5000	7.0000
T3	170.00-160.00	10.00	X Brace	No	No	0.0000	0.0000
T4	160.00-140.00	10.00	X Brace	No	No	0.0000	0.0000

Tower Section	Tower Elevation ft	Diagonal Spacing ft	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset in	Bottom Girt Offset in
T5	140.00-120.00	10.00	X Brace	No	No	0.0000	0.0000
T6	120.00-100.00	10.00	X Brace	No	No	0.0000	0.0000
T7	100.00-80.00	10.00	X Brace	No	No	0.0000	0.0000
T8	80.00-60.00	10.00	X Brace	No	No	0.0000	0.0000
T9	60.00-40.00	10.00	X Brace	No	No	0.0000	0.0000
T10	40.00-20.00	10.00	X Brace	No	No	0.0000	0.0000
T11	20.00-0.00	20.00	X Brace	No	No	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 193.00-185.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	2	A572-50 (50 ksi)	Solid Round	1	A572-50 (50 ksi)
T3 170.00-160.00	Truss Leg	#12 - 1.25" - 1.00" conn. (Pirod 105244)	A572-50 (50 ksi)	Equal Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T4 160.00-140.00	Truss Leg	#12 - 1.50" - 1.00" conn. (Pirod 105217)	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T5 140.00-120.00	Truss Leg	#12 - 1.50" - 1.00" conn. (Pirod 105217)	A572-50 (50 ksi)	Equal Angle	L3x3x3/16	A36 (36 ksi)
T6 120.00-100.00	Truss Leg	#12 - 1.75" - 1.25" conn. (Pirod 105218)	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T7 100.00-80.00	Truss Leg	#12 - 2.00" - 1.25" conn. (Pirod 105219)	A572-50 (50 ksi)	Equal Angle	L3x3x5/16	A36 (36 ksi)
T8 80.00-60.00	Truss Leg	#12 - 2.00" - 1.25" conn. (Pirod 105219)	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T9 60.00-40.00	Truss Leg	#12 - 2.25" - 1.25" conn. (Pirod 105220)	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T10 40.00-20.00	Truss Leg	#12 - 2.25" - 1.25" conn. (Pirod 105220)	A572-50 (50 ksi)	Equal Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T11 20.00-0.00	Truss Leg	#18 - 2.50" (Pirod 112738-Base Only)	A572-50 (50 ksi)	Double Equal Angle	2L3 1/2x3 1/2x5/16x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T1 193.00-185.00	Solid Round	1 1/4	A572-50 (50 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)
T2 185.00-170.00	Solid Round	1 1/4	A572-50 (50 ksi)	Solid Round	1 1/4	A572-50 (50 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	No. of Mid Girts	Mid Girt Type	Mid Girt Size	Mid Girt Grade	Horizontal Type	Horizontal Size	Horizontal Grade
T1 193.00-185.00	1	Solid Round	1 1/4	A36 (36 ksi)	Solid Round	7/8	A36 (36 ksi)
T2 185.00-170.00	1	Solid Round	1 1/4	A572-50 (50 ksi)	Solid Round	7/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Gusset Area (per face) ft^2	Gusset Thickness in	Gusset Grade	Adjust. Factor A_f	Adjust. Factor A_r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in	Double Angle Stitch Bolt Spacing Redundants in
T1 193.00-185.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T2 185.00-170.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T3 170.00-160.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T4 160.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T5 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T6 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T7 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T8 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T9 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T10 40.00-20.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	36.0000	36.0000	36.0000
T11 20.00-0.00	0.00	0.0000	A36 (36 ksi)	1	1	1.05	Mid-Pt	36.0000	36.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X	X Brace Diags Y	K Single Diags X	K Single Diags Y	Girts X	Girts Y	Horiz. X	Horiz. Y	Sec. Horiz. X	Sec. Horiz. Y	Inner Brace X	Inner Brace Y
T1	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
193.00-185.00				1	1	1	1	1	1	1	1	1	1	1	1
T2	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
185.00-170.00				1	1	1	1	1	1	1	1	1	1	1	1
T3	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
170.00-160.00				1	1	1	1	1	1	1	1	1	1	1	1
T4	Yes	Yes	1	1	1	1	1	1	1	1	1	1	1	1	1
160.00-140.00				1	1	1	1	1	1	1	1	1	1	1	1

Tower Elevation ft	Calc K Single Angles	Calc K Solid Rounds	K Factors[1] Legs	X Brace Diags X Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T5	Yes	Yes	1	1	1	1	1	1	1	1
140.00-120.00				1	1	1	1	1	1	1
T6	Yes	Yes	1	1	1	1	1	1	1	1
120.00-100.00				1	1	1	1	1	1	1
T7	Yes	Yes	1	1	1	1	1	1	1	1
100.00-80.00				1	1	1	1	1	1	1
T8	Yes	Yes	1	1	1	1	1	1	1	1
80.00-60.00				1	1	1	1	1	1	1
T9	Yes	Yes	1	1	1	1	1	1	1	1
60.00-40.00				1	1	1	1	1	1	1
T10	Yes	Yes	1	1	1	1	1	1	1	1
40.00-20.00				1	1	1	1	1	1	1
T11	Yes	Yes	1	1	1	1	1	1	1	1
20.00-0.00				1	1	1	1	1	1	1

[1]*Note: K factors are applied to member segment lengths. K-braces without inner supporting members will have the K factor in the out-of-plane direction applied to the overall length.*

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Truss-Leg K Factors: Truss-Legs Used As Leg Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals	Truss-Legs Used As Inner Members — Leg Panels	X Brace Diagonals	Z Brace Diagonals
T3	1	0.5	0.85	1	0.5	0.7
170.00-160.00						
T4	1	0.5	0.85	1	0.5	0.7
160.00-140.00						
T5	1	0.5	0.85	1	0.5	0.7
140.00-120.00						
T6	1	0.5	0.85	1	0.5	0.7
120.00-100.00						
T7	1	0.5	0.85	1	0.5	0.7
100.00-80.00						
T8	1	0.5	0.85	1	0.5	0.7
80.00-60.00						
T9	1	0.5	0.85	1	0.5	0.7
60.00-40.00						
T10	1	0.5	0.85	1	0.5	0.7
40.00-20.00						
T11	1	0.5	0.85	1	0.5	1
20.00-0.00						

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 193.00-185.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75
T2 185.00-170.00	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	1	0.0000	0.75
T3 170.00-160.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 160.00-140.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140.00-120.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-80.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	1	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Elevation ft	Redundant Horizontal		Redundant Diagonal		Redundant Sub-Diagonal		Redundant Sub-Horizontal		Redundant Vertical		Redundant Hip		Redundant Hip Diagonal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1 193.00-185.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T2 185.00-170.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T3 170.00-160.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T4 160.00-140.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T5 140.00-120.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T6 120.00-100.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T7 100.00-80.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T8 80.00-60.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T9 60.00-40.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T10 40.00-20.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75
T11 20.00-0.00	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75	0.0000	0.75

Tower Section Geometry *(cont'd)*

Tower Elevation	Connection Offsets							
	Diagonal				K-Bracing			
	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.	Vert. Top	Horiz. Top	Vert. Bot.	Horiz. Bot.
ft	in	in	in	in	in	in	in	in
T1 193.00-185.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T2 185.00-170.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T3 170.00-160.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T4 160.00-140.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T5 140.00-120.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T6 120.00-100.00	5.0000	10.7500	5.0000	10.7500	0.0000	0.0000	0.0000	0.0000
T7 100.00-80.00	5.0000	12.2500	5.0000	12.2500	0.0000	0.0000	0.0000	0.0000
T8 80.00-60.00	5.0000	12.2500	5.0000	12.2500	0.0000	0.0000	0.0000	0.0000
T9 60.00-40.00	5.0000	12.2500	5.0000	12.2500	0.0000	0.0000	0.0000	0.0000
T10 40.00-20.00	5.0000	12.2500	5.0000	12.2500	0.0000	0.0000	0.0000	0.0000
T11 20.00-0.00	6.5000	15.2500	6.5000	15.2500	0.0000	0.0000	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T1 193.00-185.00	Sleeve DS	0.6250 A325N	5	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 185.00-170.00	Flange	1.0000 A325N	6	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 170.00-160.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T4 160.00-140.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T5 140.00-120.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T6 120.00-100.00	Flange	1.0000 A325N	6	1.0000 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T7 100.00-80.00	Flange	1.2500 A325N >1"	6	1.2500 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T8 80.00-60.00	Flange	1.2500 A325N >1"	6	1.2500 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T9 60.00-40.00	Flange	1.2500 A325N >1"	6	1.2500 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0
T10 40.00-20.00	Flange	1.2500 A325N >1"	12	1.2500 A325N	1	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0

Tower Elevation ft	Leg Connection Type	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
		Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.	Bolt Size in	No.
T11 20.00-0.00	Flange	0.0000 A325N	0	1.0000 A325N	2	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.0000 A325N	0	1.2500 A325N	0

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	# Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
Safety Line (3/8") ***	B	No	No	Ar (CaAa)	193.00 - 8.00	0.0000	0.5	1	1	0.3750	0.3750		0.18
Feedline Ladder (Af)	A	No	No	Af (CaAa)	182.00 - 5.00	0.0000	0.25	1	1	3.0000	1.5000		8.40
1 5/8	A	No	No	Ar (CaAa)	182.00 - 5.00	0.0000	0	12	12	0.5000	1.9800		1.04
3/4" DC Power	A	No	No	Ar (CaAa)	182.00 - 5.00	0.0000	0	4	2	0.5000	0.9950		0.47
3/8" Fiber	A	No	No	Ar (CaAa)	182.00 - 5.00	0.0000	0	3	3	0.5000	0.4400		0.08
5/8" ***	A	No	No	Ar (CaAa)	182.00 - 5.00	0.0000	0	2	1	0.5000	0.8800		0.40
Feedline Ladder (Af)	B	No	No	Af (CaAa)	175.00 - 5.00	-5.0000	0	1	1	3.0000	1.5000		8.40
LDF6-50A (1-1/4 FOAM) ***	B	No	No	Ar (CaAa)	175.00 - 5.00	-5.0000	0	4	4	0.5000	1.5500		0.66
Feedline Ladder (Af)	C	No	No	Af (CaAa)	162.00 - 5.00	0.0000	0	1	1	3.0000	1.5000		8.40
1 5/8	C	No	No	Ar (CaAa)	162.00 - 5.00	0.0000	0	12	10	0.5000	1.9800		1.04
1 5/8 Hybrid	C	No	No	Ar (CaAa)	162.00 - 5.00	0.0000	0	3	3	0.5000	1.9800		1.04
3/8" ***	C	No	No	Ar (CaAa)	100.00 - 5.00	0.0000	0	1	1	0.3750	0.3750		0.18
1 5/8	C	No	No	Ar (CaAa)	191.00 - 5.00	-5.0000	0	8	4	0.5000	1.9800		1.04
1.9" Fiber	C	No	No	Ar (CaAa)	191.00 - 5.00	-5.0000	0	3	2	0.5000	1.9000		1.04
1/2 ***	C	No	No	Ar (CaAa)	30.00 - 5.00	-5.0000	0	2	1	0.5000	0.5800		0.25
Feedline Ladder (Af) ***	C	No	No	Af (CaAa)	193.00 - 5.00	0.0000	0	1	1	3.0000	1.5000		8.40
Feedline Ladder (Af)	B	No	No	Af (CaAa)	150.00 - 5.00	0.0000	0	1	1	3.0000	1.5000		8.40
1.6" Hybrid	B	No	No	Ar (CaAa)	150.00 - 5.00	0.0000	0	1	1	0.5000	1.9800		1.04

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	193.00-185.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	0.300	0.000	0.00
		C	0.000	0.000	14.924	0.000	0.14
T2	185.00-170.00	A	0.000	0.000	39.984	0.000	0.29
		B	0.000	0.000	4.912	0.000	0.06
		C	0.000	0.000	36.060	0.000	0.30
T3	170.00-160.00	A	0.000	0.000	33.320	0.000	0.24
		B	0.000	0.000	9.075	0.000	0.11
		C	0.000	0.000	30.480	0.000	0.25
T4	160.00-140.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	22.630	0.000	0.32
		C	0.000	0.000	112.480	0.000	0.88
T5	140.00-120.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	112.480	0.000	0.88
T6	120.00-100.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	112.480	0.000	0.88
T7	100.00-80.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	113.230	0.000	0.88
T8	80.00-60.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	113.230	0.000	0.88
T9	60.00-40.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	113.230	0.000	0.88
T10	40.00-20.00	A	0.000	0.000	66.640	0.000	0.48
		B	0.000	0.000	27.110	0.000	0.41
		C	0.000	0.000	114.390	0.000	0.89
T11	20.00-0.00	A	0.000	0.000	49.980	0.000	0.36
		B	0.000	0.000	20.220	0.000	0.31
		C	0.000	0.000	86.662	0.000	0.67

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
T1	193.00-185.00	A	1.191	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	2.205	0.000	0.02
		C		0.000	0.000	21.222	0.000	0.36
T2	185.00-170.00	A	1.183	0.000	0.000	80.699	0.000	1.00
		B		0.000	0.000	13.296	0.000	0.17
		C		0.000	0.000	50.515	0.000	0.82
T3	170.00-160.00	A	1.175	0.000	0.000	67.118	0.000	0.83
		B		0.000	0.000	21.047	0.000	0.29
		C		0.000	0.000	44.008	0.000	0.69
T4	160.00-140.00	A	1.163	0.000	0.000	133.895	0.000	1.65
		B		0.000	0.000	51.068	0.000	0.77
		C		0.000	0.000	170.897	0.000	2.56
T5	140.00-120.00	A	1.147	0.000	0.000	133.391	0.000	1.63
		B		0.000	0.000	59.830	0.000	0.94
		C		0.000	0.000	170.325	0.000	2.54
T6	120.00-100.00	A	1.128	0.000	0.000	132.811	0.000	1.61

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft^2	A_F ft^2	C_AA_A In Face ft^2	C_AA_A Out Face ft^2	Weight K
		B		0.000	0.000	59.403	0.000	0.93
		C		0.000	0.000	169.667	0.000	2.51
T7	100.00-80.00	A	1.106	0.000	0.000	132.128	0.000	1.59
		B		0.000	0.000	58.900	0.000	0.92
		C		0.000	0.000	174.064	0.000	2.53
T8	80.00-60.00	A	1.078	0.000	0.000	131.292	0.000	1.56
		B		0.000	0.000	58.285	0.000	0.90
		C		0.000	0.000	173.006	0.000	2.49
T9	60.00-40.00	A	1.042	0.000	0.000	130.206	0.000	1.53
		B		0.000	0.000	57.484	0.000	0.88
		C		0.000	0.000	171.630	0.000	2.44
T10	40.00-20.00	A	0.991	0.000	0.000	128.626	0.000	1.47
		B		0.000	0.000	56.320	0.000	0.85
		C		0.000	0.000	175.193	0.000	2.42
T11	20.00-0.00	A	0.887	0.000	0.000	94.122	0.000	1.03
		B		0.000	0.000	39.865	0.000	0.60
		C		0.000	0.000	132.055	0.000	1.73

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	193.00-185.00	0.2765	3.9604	0.7756	2.8722
T2	185.00-170.00	-3.4682	-1.4645	-2.6288	-1.0462
T3	170.00-160.00	-2.5682	-1.6392	-1.9503	-1.2769
T4	160.00-140.00	-1.9954	-0.1555	-1.5063	-0.0385
T5	140.00-120.00	-1.9823	-0.3665	-1.2861	-0.2173
T6	120.00-100.00	-2.2104	-0.3691	-1.4242	-0.2230
T7	100.00-80.00	-2.4777	-0.2534	-1.6050	0.2558
T8	80.00-60.00	-2.6327	-0.2429	-1.7381	0.2744
T9	60.00-40.00	-2.8213	-0.2375	-1.8870	0.2767
T10	40.00-20.00	-3.0131	0.0063	-2.0316	0.8154
T11	20.00-0.00	-2.7583	0.1927	-2.0662	0.9736

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	Safety Line (3/8")	185.00 - 193.00	0.6000	0.4916
T1	17	1 5/8	185.00 - 191.00	0.6000	0.4916
T1	18	1.9" Fiber	185.00 - 191.00	0.6000	0.4916
T1	21	Feedline Ladder (Af)	185.00 - 193.00	0.6000	0.4916
T2	1	Safety Line (3/8")	170.00 - 185.00	0.6000	0.5867
T2	3	Feedline Ladder (Af)	170.00 - 182.00	0.6000	0.5867

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T2	4	1 5/8	170.00 - 182.00	0.6000	0.5867
T2	5	3/4" DC Power	170.00 - 182.00	0.6000	0.5867
T2	6	3/8" Fiber	170.00 - 182.00	1.0000	1.0000
T2	7	5/8"	170.00 - 182.00	0.6000	0.5867
T2	9	Feedline Ladder (Af)	170.00 - 175.00	0.6000	0.5867
T2	10	LDF6-50A (1-1/4 FOAM)	170.00 - 175.00	0.6000	0.5867
T2	17	1 5/8	170.00 - 185.00	0.6000	0.5867
T2	18	1.9" Fiber	170.00 - 185.00	0.6000	0.5867
T2	21	Feedline Ladder (Af)	170.00 - 185.00	0.6000	0.5867
T3	1	Safety Line (3/8")	160.00 - 170.00	0.6000	0.4337
T3	3	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.4337
T3	4	1 5/8	160.00 - 170.00	0.6000	0.4337
T3	5	3/4" DC Power	160.00 - 170.00	0.6000	0.4337
T3	6	3/8" Fiber	160.00 - 170.00	1.0000	1.0000
T3	7	5/8"	160.00 - 170.00	0.6000	0.4337
T3	9	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.4337
T3	10	LDF6-50A (1-1/4 FOAM)	160.00 - 170.00	0.6000	0.4337
T3	12	Feedline Ladder (Af)	160.00 - 162.00	0.6000	0.4337
T3	13	1 5/8	160.00 - 162.00	0.6000	0.4337
T3	14	1 5/8 Hybrid	160.00 - 162.00	0.6000	0.4337
T3	17	1 5/8	160.00 - 170.00	0.6000	0.4337
T3	18	1.9" Fiber	160.00 - 170.00	0.6000	0.4337
T3	21	Feedline Ladder (Af)	160.00 - 170.00	0.6000	0.4337
T4	1	Safety Line (3/8")	140.00 - 160.00	0.6000	0.5033
T4	3	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5033
T4	4	1 5/8	140.00 - 160.00	0.6000	0.5033
T4	5	3/4" DC Power	140.00 - 160.00	0.6000	0.5033
T4	6	3/8" Fiber	140.00 - 160.00	1.0000	1.0000
T4	7	5/8"	140.00 - 160.00	0.6000	0.5033
T4	9	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5033
T4	10	LDF6-50A (1-1/4 FOAM)	140.00 - 160.00	0.6000	0.5033

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T4	12	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5033
T4	13	1 5/8	140.00 - 160.00	0.6000	0.5033
T4	14	1 5/8 Hybrid	140.00 - 160.00	0.6000	0.5033
T4	17	1 5/8	140.00 - 160.00	0.6000	0.5033
T4	18	1.9" Fiber	140.00 - 160.00	0.6000	0.5033
T4	21	Feedline Ladder (Af)	140.00 - 160.00	0.6000	0.5033
T4	23	Feedline Ladder (Af)	140.00 - 150.00	0.6000	0.5033
T4	24	1.6" Hybrid	140.00 - 150.00	0.6000	0.5033
T5	1	Safety Line (3/8")	120.00 - 140.00	0.6000	0.5919
T5	3	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5919
T5	4	1 5/8	120.00 - 140.00	0.6000	0.5919
T5	5	3/4" DC Power	120.00 - 140.00	0.6000	0.5919
T5	6	3/8" Fiber	120.00 - 140.00	1.0000	1.0000
T5	7	5/8"	120.00 - 140.00	0.6000	0.5919
T5	9	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5919
T5	10	LDF6-50A (1-1/4 FOAM)	120.00 - 140.00	0.6000	0.5919
T5	12	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5919
T5	13	1 5/8	120.00 - 140.00	0.6000	0.5919
T5	14	1 5/8 Hybrid	120.00 - 140.00	0.6000	0.5919
T5	17	1 5/8	120.00 - 140.00	0.6000	0.5919
T5	18	1.9" Fiber	120.00 - 140.00	0.6000	0.5919
T5	21	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5919
T5	23	Feedline Ladder (Af)	120.00 - 140.00	0.6000	0.5919
T5	24	1.6" Hybrid	120.00 - 140.00	0.6000	0.5919
T6	1	Safety Line (3/8")	100.00 - 120.00	0.6000	0.6000
T6	3	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	4	1 5/8	100.00 - 120.00	0.6000	0.6000
T6	5	3/4" DC Power	100.00 - 120.00	0.6000	0.6000
T6	6	3/8" Fiber	100.00 - 120.00	1.0000	1.0000
T6	7	5/8"	100.00 - 120.00	0.6000	0.6000
T6	9	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T6	10	LDF6-50A (1-1/4 FOAM)	100.00 - 120.00	0.6000	0.6000
T6	12	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	13	1 5/8	100.00 - 120.00	0.6000	0.6000
T6	14	1 5/8 Hybrid	100.00 - 120.00	0.6000	0.6000
T6	17	1 5/8	100.00 - 120.00	0.6000	0.6000
T6	18	1.9" Fiber	100.00 - 120.00	0.6000	0.6000
T6	21	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	23	Feedline Ladder (Af)	100.00 - 120.00	0.6000	0.6000
T6	24	1.6" Hybrid	100.00 - 120.00	0.6000	0.6000
T7	1	Safety Line (3/8")	80.00 - 100.00	0.6000	0.6000
T7	3	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	4	1 5/8	80.00 - 100.00	0.6000	0.6000
T7	5	3/4" DC Power	80.00 - 100.00	0.6000	0.6000
T7	6	3/8" Fiber	80.00 - 100.00	1.0000	1.0000
T7	7	5/8"	80.00 - 100.00	0.6000	0.6000
T7	9	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	10	LDF6-50A (1-1/4 FOAM)	80.00 - 100.00	0.6000	0.6000
T7	12	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	13	1 5/8	80.00 - 100.00	0.6000	0.6000
T7	14	1 5/8 Hybrid	80.00 - 100.00	0.6000	0.6000
T7	15	3/8"	80.00 - 100.00	0.6000	0.6000
T7	17	1 5/8	80.00 - 100.00	0.6000	0.6000
T7	18	1.9" Fiber	80.00 - 100.00	0.6000	0.6000
T7	21	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	23	Feedline Ladder (Af)	80.00 - 100.00	0.6000	0.6000
T7	24	1.6" Hybrid	80.00 - 100.00	0.6000	0.6000
T8	1	Safety Line (3/8")	60.00 - 80.00	0.6000	0.6000
T8	3	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	4	1 5/8	60.00 - 80.00	0.6000	0.6000
T8	5	3/4" DC Power	60.00 - 80.00	0.6000	0.6000
T8	6	3/8" Fiber	60.00 - 80.00	1.0000	1.0000
T8	7	5/8"	60.00 - 80.00	0.6000	0.6000
T8	9	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	10	LDF6-50A (1-1/4 FOAM)	60.00 - 80.00	0.6000	0.6000
T8	12	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	13	1 5/8	60.00 - 80.00	0.6000	0.6000
T8	14	1 5/8 Hybrid	60.00 - 80.00	0.6000	0.6000
T8	15	3/8"	60.00 - 80.00	0.6000	0.6000
T8	17	1 5/8	60.00 - 80.00	0.6000	0.6000
T8	18	1.9" Fiber	60.00 - 80.00	0.6000	0.6000
T8	21	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	23	Feedline Ladder (Af)	60.00 - 80.00	0.6000	0.6000
T8	24	1.6" Hybrid	60.00 - 80.00	0.6000	0.6000
T9	1	Safety Line (3/8")	40.00 - 60.00	0.6000	0.6000
T9	3	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	4	1 5/8	40.00 - 60.00	0.6000	0.6000
T9	5	3/4" DC Power	40.00 - 60.00	0.6000	0.6000
T9	6	3/8" Fiber	40.00 - 60.00	1.0000	1.0000
T9	7	5/8"	40.00 - 60.00	0.6000	0.6000
T9	9	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	10	LDF6-50A (1-1/4 FOAM)	40.00 - 60.00	0.6000	0.6000
T9	12	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	13	1 5/8	40.00 - 60.00	0.6000	0.6000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T9	14	1 5/8 Hybrid	40.00 - 60.00	0.6000	0.6000
T9	15	3/8"	40.00 - 60.00	0.6000	0.6000
T9	17	1 5/8	40.00 - 60.00	0.6000	0.6000
T9	18	1.9" Fiber	40.00 - 60.00	0.6000	0.6000
T9	21	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	23	Feedline Ladder (Af)	40.00 - 60.00	0.6000	0.6000
T9	24	1.6" Hybrid	40.00 - 60.00	0.6000	0.6000
T10	1	Safety Line (3/8")	20.00 - 40.00	0.6000	0.6000
T10	3	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	4	1 5/8	20.00 - 40.00	0.6000	0.6000
T10	5	3/4" DC Power	20.00 - 40.00	0.6000	0.6000
T10	6	3/8" Fiber	20.00 - 40.00	1.0000	1.0000
T10	7	5/8"	20.00 - 40.00	0.6000	0.6000
T10	9	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	10	LDF6-50A (1-1/4 FOAM)	20.00 - 40.00	0.6000	0.6000
T10	12	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	13	1 5/8	20.00 - 40.00	0.6000	0.6000
T10	14	1 5/8 Hybrid	20.00 - 40.00	0.6000	0.6000
T10	15	3/8"	20.00 - 40.00	0.6000	0.6000
T10	17	1 5/8	20.00 - 40.00	0.6000	0.6000
T10	18	1.9" Fiber	20.00 - 40.00	0.6000	0.6000
T10	19	1/2	20.00 - 30.00	0.6000	0.6000
T10	21	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	23	Feedline Ladder (Af)	20.00 - 40.00	0.6000	0.6000
T10	24	1.6" Hybrid	20.00 - 40.00	0.6000	0.6000
T11	1	Safety Line (3/8")	8.00 - 20.00	0.6000	0.6000
T11	3	Feedline Ladder (Af)	5.00 - 20.00	0.6000	0.6000
T11	4	1 5/8	5.00 - 20.00	0.6000	0.6000
T11	5	3/4" DC Power	5.00 - 20.00	0.6000	0.6000
T11	6	3/8" Fiber	5.00 - 20.00	1.0000	1.0000
T11	7	5/8"	5.00 - 20.00	0.6000	0.6000
T11	9	Feedline Ladder (Af)	5.00 - 20.00	0.6000	0.6000
T11	10	LDF6-50A (1-1/4 FOAM)	5.00 - 20.00	0.6000	0.6000
T11	12	Feedline Ladder (Af)	5.00 - 20.00	0.6000	0.6000
T11	13	1 5/8	5.00 - 20.00	0.6000	0.6000
T11	14	1 5/8 Hybrid	5.00 - 20.00	0.6000	0.6000
T11	15	3/8"	5.00 - 20.00	0.6000	0.6000
T11	17	1 5/8	5.00 - 20.00	0.6000	0.6000
T11	18	1.9" Fiber	5.00 - 20.00	0.6000	0.6000
T11	19	1/2	5.00 - 20.00	0.6000	0.6000
T11	21	Feedline Ladder (Af)	5.00 - 20.00	0.6000	0.6000
T11	23	Feedline Ladder (Af)	5.00 - 20.00	0.6000	0.6000
T11	24	1.6" Hybrid	5.00 - 20.00	0.6000	0.6000

User Defined Loads - Seismic

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
SL1	193.00	0.00	0.0000	0.28	0.00	0.00	0.64
SL2	185.00	0.00	0.0000	0.48	0.00	0.00	1.12
SL3	170.00	0.00	0.0000	0.27	0.00	0.00	0.52
SL4	160.00	0.00	0.0000	0.45	0.00	0.00	0.87
SL5	140.00	0.00	0.0000	0.36	0.00	0.00	0.59

Description	Elevation	Offset From Centroid	Azimuth Angle	E_v	E_{hx}	E_{hz}	E_h
	ft	ft	°	K	K	K	K
SL6	120.00	0.00	0.0000	0.40	0.00	0.00	0.55
SL7	100.00	0.00	0.0000	0.43	0.00	0.00	0.48
SL8	80.00	0.00	0.0000	0.45	0.00	0.00	0.39
SL9	60.00	0.00	0.0000	0.49	0.00	0.00	0.31
SL10	40.00	0.00	0.0000	0.48	0.00	0.00	0.19
SL11	20.00	0.00	0.0000	0.50	0.00	0.00	0.09

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert	Azimuth Adjustment	Placement		C_AA_A Front	C_AA_A Side	Weight
			ft ft ft	°	ft		ft^2	ft^2	K
Lightning Rod	C	From Leg	0.00	0.0000	193.00	No Ice	0.25	0.25	0.03
			0.00			1/2" Ice	0.66	0.66	0.03
			0.00			1" Ice	0.97	0.97	0.04
***									
RR90-17-02DP [56x8x2.75]	A	From Leg	3.00	0.0000	191.00	No Ice	5.31	4.27	0.06
w/ mount pipe			0.00			1/2" Ice	6.01	5.44	0.11
			0.00			1" Ice	6.57	6.28	0.17
RR90-17-02DP [56x8x2.75]	B	From Leg	3.00	0.0000	191.00	No Ice	5.31	4.27	0.06
w/ mount pipe			0.00			1/2" Ice	6.01	5.44	0.11
			0.00			1" Ice	6.57	6.28	0.17
RR90-17-02DP [56x8x2.75]	C	From Leg	3.00	0.0000	191.00	No Ice	5.31	4.27	0.06
w/ mount pipe			0.00			1/2" Ice	6.01	5.44	0.11
			0.00			1" Ice	6.57	6.28	0.17
APXVAALL24-43-U-NA20	A	From Leg	3.00	0.0000	191.00	No Ice	20.24	11.03	0.17
[95.9x24x8.5] w/ mount pipe			0.00			1/2" Ice	20.89	12.46	0.31
			0.00			1" Ice	21.55	13.56	0.45
APXVAALL24-43-U-NA20	B	From Leg	3.00	0.0000	191.00	No Ice	20.24	11.03	0.17
[95.9x24x8.5] w/ mount pipe			0.00			1/2" Ice	20.89	12.46	0.31
			0.00			1" Ice	21.55	13.56	0.45
APXVAALL24-43-U-NA20	C	From Leg	3.00	0.0000	191.00	No Ice	20.24	11.03	0.17
[95.9x24x8.5] w/ mount pipe			0.00			1/2" Ice	20.89	12.46	0.31
			0.00			1" Ice	21.55	13.56	0.45
AIR6419 B41 (36.3x20.9x9)	A	From Leg	3.00	0.0000	191.00	No Ice	7.50	4.78	0.11
w/ mount pipe			0.00			1/2" Ice	8.34	5.85	0.18
			0.00			1" Ice	9.09	6.78	0.25
AIR6419 B41 (36.3x20.9x9)	B	From Leg	3.00	0.0000	191.00	No Ice	7.50	4.78	0.11
w/ mount pipe			0.00			1/2" Ice	8.34	5.85	0.18
			0.00			1" Ice	9.09	6.78	0.25
AIR6419 B41 (36.3x20.9x9)	C	From Leg	3.00	0.0000	191.00	No Ice	7.50	4.78	0.11
w/ mount pipe			0.00			1/2" Ice	8.34	5.85	0.18
			0.00			1" Ice	9.09	6.78	0.25
SDX1926Q-43 [6.9x4.1x2.9]	A	From Leg	3.00	0.0000	191.00	No Ice	0.24	0.17	0.06
			0.00			1/2" Ice	0.30	0.22	0.06
			0.00			1" Ice	0.37	0.29	0.07
SDX1926Q-43 [6.9x4.1x2.9]	B	From Leg	3.00	0.0000	191.00	No Ice	0.24	0.17	0.06
			0.00			1/2" Ice	0.30	0.22	0.06
			0.00			1" Ice	0.37	0.29	0.07
SDX1926Q-43 [6.9x4.1x2.9]	C	From Leg	3.00	0.0000	191.00	No Ice	0.24	0.17	0.06
			0.00			1/2" Ice	0.30	0.22	0.06

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1" Ice	0.37	0.29	0.07
4449 B71 + B85	A	From Leg	3.00	0.0000	191.00	No Ice	1.95	1.58	0.08
(17.9x13.1x10.6)			0.00			1/2" Ice	2.13	1.74	0.09
			0.00			1" Ice	2.31	1.91	0.12
4449 B71 + B85	B	From Leg	3.00	0.0000	191.00	No Ice	1.95	1.58	0.08
(17.9x13.1x10.6)			0.00			1/2" Ice	2.13	1.74	0.09
			0.00			1" Ice	2.31	1.91	0.12
4449 B71 + B85	C	From Leg	3.00	0.0000	191.00	No Ice	1.95	1.58	0.08
(17.9x13.1x10.6)			0.00			1/2" Ice	2.13	1.74	0.09
			0.00			1" Ice	2.31	1.91	0.12
4460 B25+B66	A	From Leg	3.00	0.0000	191.00	No Ice	2.14	1.68	0.11
(17x15.11x11.85)			0.00			1/2" Ice	2.32	1.84	0.13
			0.00			1" Ice	2.51	2.01	0.16
4460 B25+B66	B	From Leg	3.00	0.0000	191.00	No Ice	2.14	1.68	0.11
(17x15.11x11.85)			0.00			1/2" Ice	2.32	1.84	0.13
			0.00			1" Ice	2.51	2.01	0.16
4460 B25+B66	C	From Leg	3.00	0.0000	191.00	No Ice	2.14	1.68	0.11
(17x15.11x11.85)			0.00			1/2" Ice	2.32	1.84	0.13
			0.00			1" Ice	2.51	2.01	0.16
4415 B66A [16.5x13.4x6.2]	A	From Leg	3.00	0.0000	191.00	No Ice	1.84	0.86	0.05
			0.00			1/2" Ice	2.01	0.98	0.06
			0.00			1" Ice	2.19	1.12	0.08
4415 B66A [16.5x13.4x6.2]	B	From Leg	3.00	0.0000	191.00	No Ice	1.84	0.86	0.05
			0.00			1/2" Ice	2.01	0.98	0.06
			0.00			1" Ice	2.19	1.12	0.08
4415 B66A [16.5x13.4x6.2]	C	From Leg	3.00	0.0000	191.00	No Ice	1.84	0.86	0.05
			0.00			1/2" Ice	2.01	0.98	0.06
			0.00			1" Ice	2.19	1.12	0.08
(1) Low Profile Platform	A	None		0.0000	191.00	No Ice	27.65	27.65	2.17
						1/2" Ice	34.74	34.74	2.83
						1" Ice	41.83	41.83	3.50
***									
7770 [55x11x5] w/ mount	A	From Leg	3.00	0.0000	182.00	No Ice	6.49	5.23	0.08
pipe			0.00			1/2" Ice	7.21	6.41	0.14
			0.00			1" Ice	7.78	7.25	0.20
7770 [55x11x5] w/ mount	B	From Leg	3.00	0.0000	182.00	No Ice	6.49	5.23	0.08
pipe			0.00			1/2" Ice	7.21	6.41	0.14
			0.00			1" Ice	7.78	7.25	0.20
7770 [55x11x5] w/ mount	C	From Leg	3.00	0.0000	182.00	No Ice	6.49	5.23	0.08
pipe			0.00			1/2" Ice	7.21	6.41	0.14
			0.00			1" Ice	7.78	7.25	0.20
HPA-65R-BUU-H8	A	From Leg	3.00	0.0000	182.00	No Ice	13.11	9.46	0.10
(92.4"x14.8"x7.4") w/ mount			0.00			1/2" Ice	13.72	10.86	0.19
pipe			0.00			1" Ice	14.33	12.11	0.30
HPA-65R-BUU-H8	B	From Leg	3.00	0.0000	182.00	No Ice	13.11	9.46	0.10
(92.4"x14.8"x7.4") w/ mount			0.00			1/2" Ice	13.72	10.86	0.19
pipe			0.00			1" Ice	14.33	12.11	0.30
HPA-65R-BUU-H8	C	From Leg	3.00	0.0000	182.00	No Ice	13.11	9.46	0.10
(92.4"x14.8"x7.4") w/ mount			0.00			1/2" Ice	13.72	10.86	0.19
pipe			0.00			1" Ice	14.33	12.11	0.30
DMP65R-BU8DA	A	From Leg	3.00	0.0000	182.00	No Ice	17.87	10.42	0.14
[96x20.7x7.7] w/ mount pipe			0.00			1/2" Ice	18.50	11.85	0.26
			0.00			1" Ice	19.14	12.94	0.40
DMP65R-BU8DA	B	From Leg	3.00	0.0000	182.00	No Ice	17.87	10.42	0.14
[96x20.7x7.7] w/ mount pipe			0.00			1/2" Ice	18.50	11.85	0.26
			0.00			1" Ice	19.14	12.94	0.40
DMP65R-BU8DA	C	From Leg	3.00	0.0000	182.00	No Ice	17.87	10.42	0.14

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
[96x20.7x7.7] w/ mount pipe			0.00				1/2" Ice	18.50	11.85	0.26
			0.00				1" Ice	19.14	12.94	0.40
(2) LGP21401	A	From Leg	3.00	0.0000	182.00		No Ice	1.10	0.35	0.01
(14.4"x9.2"x2.6")			0.00				1/2" Ice	1.24	0.44	0.02
			0.00				1" Ice	1.38	0.54	0.03
(2) LGP21401	B	From Leg	3.00	0.0000	182.00		No Ice	1.10	0.35	0.01
(14.4"x9.2"x2.6")			0.00				1/2" Ice	1.24	0.44	0.02
			0.00				1" Ice	1.38	0.54	0.03
(2) LGP21401	C	From Leg	3.00	0.0000	182.00		No Ice	1.10	0.35	0.01
(14.4"x9.2"x2.6")			0.00				1/2" Ice	1.24	0.44	0.02
			0.00				1" Ice	1.38	0.54	0.03
(2) LGP21902 [6.3x4.4x3]	A	From Leg	3.00	0.0000	182.00		No Ice	0.23	0.16	0.01
			0.00				1/2" Ice	0.29	0.21	0.01
			0.00				1" Ice	0.36	0.28	0.01
(2) LGP21902 [6.3x4.4x3]	B	From Leg	3.00	0.0000	182.00		No Ice	0.23	0.16	0.01
			0.00				1/2" Ice	0.29	0.21	0.01
			0.00				1" Ice	0.36	0.28	0.01
(2) LGP21902 [6.3x4.4x3]	C	From Leg	3.00	0.0000	182.00		No Ice	0.23	0.16	0.01
			0.00				1/2" Ice	0.29	0.21	0.01
			0.00				1" Ice	0.36	0.28	0.01
4449 B5/B12	A	From Leg	3.00	0.0000	182.00		No Ice	0.21	0.15	0.07
(17.9x13.19x9.44)			0.00				1/2" Ice	0.30	0.22	0.08
			0.00				1" Ice	0.39	0.29	0.09
4449 B5/B12	B	From Leg	3.00	0.0000	182.00		No Ice	0.21	0.15	0.07
(17.9x13.19x9.44)			0.00				1/2" Ice	0.30	0.22	0.08
			0.00				1" Ice	0.39	0.29	0.09
4449 B5/B12	C	From Leg	3.00	0.0000	182.00		No Ice	0.21	0.15	0.07
(17.9x13.19x9.44)			0.00				1/2" Ice	0.30	0.22	0.08
			0.00				1" Ice	0.39	0.29	0.09
RRUS 12 (20.4"x18.5"x7.5")	A	From Leg	3.00	0.0000	182.00		No Ice	3.15	1.29	0.05
			0.00				1/2" Ice	3.36	1.44	0.07
			0.00				1" Ice	3.59	1.60	0.10
RRUS 12 (20.4"x18.5"x7.5")	B	From Leg	3.00	0.0000	182.00		No Ice	3.15	1.29	0.05
			0.00				1/2" Ice	3.36	1.44	0.07
			0.00				1" Ice	3.59	1.60	0.10
RRUS 12 (20.4"x18.5"x7.5")	C	From Leg	3.00	0.0000	182.00		No Ice	3.15	1.29	0.05
			0.00				1/2" Ice	3.36	1.44	0.07
			0.00				1" Ice	3.59	1.60	0.10
RRUS 11 (19.7 x 17" x 7.2")	A	From Leg	3.00	0.0000	182.00		No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
RRUS 11 (19.7 x 17" x 7.2")	B	From Leg	3.00	0.0000	182.00		No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
RRUS 11 (19.7 x 17" x 7.2")	C	From Leg	3.00	0.0000	182.00		No Ice	2.79	1.19	0.05
			0.00				1/2" Ice	3.00	1.34	0.07
			0.00				1" Ice	3.21	1.50	0.10
RRUS 32 [29.9x13.3x9.5]	A	From Leg	3.00	0.0000	182.00		No Ice	3.31	2.42	0.08
			0.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
RRUS 32 [29.9x13.3x9.5]	B	From Leg	3.00	0.0000	182.00		No Ice	3.31	2.42	0.08
			0.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
RRUS 32 [29.9x13.3x9.5]	C	From Leg	3.00	0.0000	182.00		No Ice	3.31	2.42	0.08
			0.00				1/2" Ice	3.56	2.64	0.10
			0.00				1" Ice	3.81	2.86	0.14
RRUS A2 (16.4"x15.1"x3.3")	A	From Leg	3.00	0.0000	182.00		No Ice	2.06	0.49	0.02

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
			0.00			1/2" Ice	2.24	0.60	0.03
			0.00			1" Ice	2.43	0.72	0.05
RRUS A2 (16.4"x15.1"x3.3")	B	From Leg	3.00	0.0000	182.00	No Ice	2.06	0.49	0.02
			0.00			1/2" Ice	2.24	0.60	0.03
			0.00			1" Ice	2.43	0.72	0.05
RRUS A2 (16.4"x15.1"x3.3")	C	From Leg	3.00	0.0000	182.00	No Ice	2.06	0.49	0.02
			0.00			1/2" Ice	2.24	0.60	0.03
			0.00			1" Ice	2.43	0.72	0.05
DC6-48-60-18-8F (24"x18.5"x11")	A	From Leg	3.00	0.0000	182.00	No Ice	3.70	2.20	0.03
			0.00			1/2" Ice	3.94	2.40	0.06
			0.00			1" Ice	4.19	2.60	0.10
DC6-48-60-0-8C-EV [31.4x10.24x10.24]	B	From Leg	3.00	0.0000	182.00	No Ice	2.74	2.74	0.03
			0.00			1/2" Ice	2.96	2.96	0.05
			0.00			1" Ice	3.20	3.20	0.08
(Commscope P/N: MTC3615)	A	From Leg	3.00	0.0000	182.00	No Ice	27.10	12.02	0.52
			0.00			1/2" Ice	34.40	17.38	0.80
			0.00			1" Ice	41.70	22.74	1.09
(Commscope P/N: MTC3615)	B	From Leg	3.00	0.0000	182.00	No Ice	27.10	12.02	0.52
			0.00			1/2" Ice	34.40	17.38	0.80
			0.00			1" Ice	41.70	22.74	1.09
(Commscope P/N: MTC3615)	C	From Leg	3.00	0.0000	182.00	No Ice	27.10	12.02	0.52
			0.00			1/2" Ice	34.40	17.38	0.80
			0.00			1" Ice	41.70	22.74	1.09
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(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	A	From Leg	4.00	0.0000	160.00	No Ice	8.95	7.14	0.07
			0.00			1/2" Ice	9.60	8.44	0.14
			0.00			1" Ice	10.23	9.58	0.22
(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	B	From Leg	4.00	0.0000	160.00	No Ice	8.95	7.14	0.07
			0.00			1/2" Ice	9.60	8.44	0.14
			0.00			1" Ice	10.23	9.58	0.22
(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	C	From Leg	4.00	0.0000	160.00	No Ice	8.95	7.14	0.07
			0.00			1/2" Ice	9.60	8.44	0.14
			0.00			1" Ice	10.23	9.58	0.22
LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	A	From Leg	4.00	0.0000	160.00	No Ice	8.73	7.71	0.09
			0.00			1/2" Ice	9.39	8.99	0.16
			0.00			1" Ice	9.98	9.95	0.25
LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	B	From Leg	4.00	0.0000	160.00	No Ice	8.73	7.71	0.09
			0.00			1/2" Ice	9.39	8.99	0.16
			0.00			1" Ice	9.98	9.95	0.25
LNX-6514DS-AIM [72.7x11.9x7.1] w/ mount pipe	C	From Leg	4.00	0.0000	160.00	No Ice	8.73	7.71	0.09
			0.00			1/2" Ice	9.39	8.99	0.16
			0.00			1" Ice	9.98	9.95	0.25
QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	A	From Leg	4.00	0.0000	160.00	No Ice	13.76	7.92	0.10
			0.00			1/2" Ice	14.46	9.22	0.20
			0.00			1" Ice	15.09	10.18	0.31
QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	B	From Leg	4.00	0.0000	160.00	No Ice	13.76	7.92	0.10
			0.00			1/2" Ice	14.46	9.22	0.20
			0.00			1" Ice	15.09	10.18	0.31
QUAD656C0000x [74.4x20.5x7.2] w/ mount pipe	C	From Leg	4.00	0.0000	160.00	No Ice	13.76	7.92	0.10
			0.00			1/2" Ice	14.46	9.22	0.20
			0.00			1" Ice	15.09	10.18	0.31
DB-T1-6Z-8AB-0Z [24x24x10]	A	From Leg	4.00	0.0000	160.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12
DB-T1-6Z-8AB-0Z [24x24x10]	B	From Leg	4.00	0.0000	160.00	No Ice	4.80	2.00	0.04
			0.00			1/2" Ice	5.07	2.19	0.08
			0.00			1" Ice	5.35	2.39	0.12

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.09 0.13 0.19	0.00 0.01 0.01
(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.09 0.13 0.19	0.00 0.01 0.01
(2) FD9R6004/2CL-3CL [6.5x5.8x1.5]	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	0.31 0.39 0.47	0.09 0.13 0.19	0.00 0.01 0.01
RRH2x60-AWS [37x11x5]	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-AWS [37x11x5]	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-AWS [37x11x5]	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2X60-1900 [20.08x11.2x7.2]	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900 [20.08x11.2x7.2]	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2X60-1900 [20.08x11.2x7.2]	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	1.87 2.05 2.24	1.22 1.37 1.52	0.04 0.06 0.08
RRH2x60-700 [37x11x5]	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700 [37x11x5]	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
RRH2x60-700 [37x11x5]	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	3.50 3.76 4.03	1.82 2.05 2.29	0.06 0.08 0.11
T-Frame	A	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	10.25 15.26 20.27	7.90 11.61 15.32	0.32 0.45 0.59
T-Frame	B	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	10.25 15.26 20.27	7.90 11.61 15.32	0.32 0.45 0.59
T-Frame	C	From Leg	4.00 0.00 0.00	0.0000	160.00	No Ice 1/2" Ice 1" Ice	10.25 15.26 20.27	7.90 11.61 15.32	0.32 0.45 0.59
KS24019-L112A [8x2x2]	A	None		0.0000	100.00	No Ice 1/2" Ice 1" Ice	0.14 0.20 0.26	0.14 0.20 0.26	0.01 0.01 0.01
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APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	A	From Leg	3.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice	7.13 7.84 8.50	5.51 6.69 7.73	0.09 0.15 0.21
APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	B	From Leg	3.00 0.00 0.00	0.0000	175.00	No Ice 1/2" Ice 1" Ice	7.13 7.84 8.50	5.51 6.69 7.73	0.09 0.15 0.21
APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount	C	From Leg	3.00 0.00	0.0000	175.00	No Ice 1/2" Ice	7.13 7.84	5.51 6.69	0.09 0.15

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
pipe			0.00				1" Ice	8.50	7.73	0.21
NNVV-65B-R4	A	From Leg	3.00		0.0000	175.00	No Ice	12.85	8.05	0.12
[72x19.6x7.8] w/ mount pipe			0.00				1/2" Ice	13.55	9.34	0.22
			0.00				1" Ice	14.17	10.29	0.33
NNVV-65B-R4	B	From Leg	3.00		0.0000	175.00	No Ice	12.85	8.05	0.12
[72x19.6x7.8] w/ mount pipe			0.00				1/2" Ice	13.55	9.34	0.22
			0.00				1" Ice	14.17	10.29	0.33
NNVV-65B-R4	C	From Leg	3.00		0.0000	175.00	No Ice	12.85	8.05	0.12
[72x19.6x7.8] w/ mount pipe			0.00				1/2" Ice	13.55	9.34	0.22
			0.00				1" Ice	14.17	10.29	0.33
1900 MHz RRH	A	From Leg	3.00		0.0000	175.00	No Ice	2.31	2.38	0.06
(25"x11.1"x11.4")			0.00				1/2" Ice	2.52	2.58	0.08
			0.00				1" Ice	2.73	2.79	0.11
1900 MHz RRH	B	From Leg	3.00		0.0000	175.00	No Ice	2.31	2.38	0.06
(25"x11.1"x11.4")			0.00				1/2" Ice	2.52	2.58	0.08
			0.00				1" Ice	2.73	2.79	0.11
1900 MHz RRH	C	From Leg	3.00		0.0000	175.00	No Ice	2.31	2.38	0.06
(25"x11.1"x11.4")			0.00				1/2" Ice	2.52	2.58	0.08
			0.00				1" Ice	2.73	2.79	0.11
(2) 800 MHz RRH	A	From Leg	3.00		0.0000	175.00	No Ice	2.13	1.77	0.05
(19.7"x13"x10.8")			0.00				1/2" Ice	2.32	1.95	0.07
			0.00				1" Ice	2.51	2.13	0.10
(2) 800 MHz RRH	B	From Leg	3.00		0.0000	175.00	No Ice	2.13	1.77	0.05
(19.7"x13"x10.8")			0.00				1/2" Ice	2.32	1.95	0.07
			0.00				1" Ice	2.51	2.13	0.10
(2) 800 MHz RRH	C	From Leg	3.00		0.0000	175.00	No Ice	2.13	1.77	0.05
(19.7"x13"x10.8")			0.00				1/2" Ice	2.32	1.95	0.07
			0.00				1" Ice	2.51	2.13	0.10
TD-RRH8x20-25	A	From Leg	3.00		0.0000	175.00	No Ice	4.05	1.53	0.07
(26.1"x18.6"x6.7")			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	B	From Leg	3.00		0.0000	175.00	No Ice	4.05	1.53	0.07
(26.1"x18.6"x6.7")			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
TD-RRH8x20-25	C	From Leg	3.00		0.0000	175.00	No Ice	4.05	1.53	0.07
(26.1"x18.6"x6.7")			0.00				1/2" Ice	4.30	1.71	0.10
			0.00				1" Ice	4.56	1.90	0.13
Sector Frame w/ Support Rail	A	From Leg	3.00		0.0000	175.00	No Ice	8.50	9.75	0.36
			0.00				1/2" Ice	12.26	13.18	0.48
			0.00				1" Ice	16.02	16.61	0.61
Sector Frame w/ Support Rail	B	From Leg	3.00		0.0000	175.00	No Ice	8.50	9.75	0.36
			0.00				1/2" Ice	12.26	13.18	0.48
			0.00				1" Ice	16.02	16.61	0.61
Sector Frame w/ Support Rail	C	From Leg	3.00		0.0000	175.00	No Ice	8.50	9.75	0.36
			0.00				1/2" Ice	12.26	13.18	0.48
			0.00				1" Ice	16.02	16.61	0.61
(3) V-Brace	C	None			0.0000	175.00	No Ice	6.70	6.70	0.23
							1/2" Ice	13.84	13.84	0.56
							1" Ice	20.97	20.97	0.88
***										
PC1N0F-0190B-002M	A	From Leg	3.00		0.0000	30.00	No Ice	0.03	0.03	0.01
[3.9x1.6]			0.00				1/2" Ice	0.06	0.06	0.01
			0.00				1" Ice	0.10	0.10	0.01
PC1N0F-0190B-002M	B	From Leg	3.00		0.0000	30.00	No Ice	0.03	0.03	0.01
[3.9x1.6]			0.00				1/2" Ice	0.06	0.06	0.01
			0.00				1" Ice	0.10	0.10	0.01
***										

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft / Vert ft / ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight K
FVV-65B-R3	A	From Leg	3.00	0.0000	150.00	No Ice	11.42	9.63	0.08
(96.5x11.85x7.13) w/ Mount pipe			0.00			1/2" Ice	12.04	11.05	0.17
			0.00			1" Ice	12.67	12.32	0.27
FVV-65B-R3	B	From Leg	3.00	0.0000	150.00	No Ice	11.42	9.63	0.08
(96.5x11.85x7.13) w/ Mount pipe			0.00			1/2" Ice	12.04	11.05	0.17
			0.00			1" Ice	12.67	12.32	0.27
FVV-65B-R3	C	From Leg	3.00	0.0000	150.00	No Ice	11.42	9.63	0.08
(96.5x11.85x7.13) w/ Mount pipe			0.00			1/2" Ice	12.04	11.05	0.17
			0.00			1" Ice	12.67	12.32	0.27
RF4450t-71A [16.5x15x11]	A	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.51	0.09
			0.00			1/2" Ice	2.24	1.67	0.12
			0.00			1" Ice	2.43	1.83	0.14
RF4450t-71A [16.5x15x11]	B	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.51	0.09
			0.00			1/2" Ice	2.24	1.67	0.12
			0.00			1" Ice	2.43	1.83	0.14
RF4450t-71A [16.5x15x11]	C	From Leg	3.00	0.0000	150.00	No Ice	2.06	1.51	0.09
			0.00			1/2" Ice	2.24	1.67	0.12
			0.00			1" Ice	2.43	1.83	0.14
RF4451d-70A [15x15x8.9]	A	From Leg	3.00	0.0000	150.00	No Ice	1.88	1.11	0.06
			0.00			1/2" Ice	2.05	1.25	0.08
			0.00			1" Ice	2.22	1.39	0.10
RF4451d-70A [15x15x8.9]	B	From Leg	3.00	0.0000	150.00	No Ice	1.88	1.11	0.06
			0.00			1/2" Ice	2.05	1.25	0.08
			0.00			1" Ice	2.22	1.39	0.10
RF4451d-70A [15x15x8.9]	C	From Leg	3.00	0.0000	150.00	No Ice	1.88	1.11	0.06
			0.00			1/2" Ice	2.05	1.25	0.08
			0.00			1" Ice	2.22	1.39	0.10
RDIDC-9181-PF-48 [16.57x14.57x8.15]	A	From Leg	3.00	0.0000	150.00	No Ice	2.01	1.13	0.02
			0.00			1/2" Ice	2.19	1.27	0.04
			0.00			1" Ice	2.37	1.41	0.06
Commscope MTC3975083	A	From Leg	3.00	0.0000	150.00	No Ice	10.60	8.10	0.41
			0.00			1/2" Ice	16.40	12.60	0.54
			0.00			1" Ice	22.20	17.10	0.66
Commscope MTC3975083	B	From Leg	3.00	0.0000	150.00	No Ice	10.60	8.10	0.41
			0.00			1/2" Ice	16.40	12.60	0.54
			0.00			1" Ice	22.20	17.10	0.66
Commscope MTC3975083	C	From Leg	3.00	0.0000	150.00	No Ice	10.60	8.10	0.41
			0.00			1/2" Ice	16.40	12.60	0.54
			0.00			1" Ice	22.20	17.10	0.66
(2) Empty Mount Pipe	A	From Leg	3.00	0.0000	150.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
(2) Empty Mount Pipe	B	From Leg	3.00	0.0000	150.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05
(2) Empty Mount Pipe	C	From Leg	3.00	0.0000	150.00	No Ice	1.43	1.43	0.02
			0.00			1/2" Ice	1.92	1.92	0.03
			0.00			1" Ice	2.29	2.29	0.05

Truss-Leg Properties

Section Designation	Area in^2	Area Ice in^2	Self Weight K	Ice Weight K	Equiv. Diameter in	Equiv. Diameter Ice in	Leg Area in^2
#12 - 1.25" - 1.00" conn. (Pirod 105244)	999.6067	2632.6682	0.59	0.36	6.9417	18.2824	3.6816
#12 - 1.50" - 1.00" conn. (Pirod 105217)	1907.4792	5512.2974	0.62	0.67	6.6232	19.1399	5.3014
#12 - 1.50" - 1.00" conn. (Pirod 105217)	1907.4792	5486.8299	0.62	0.66	6.6232	19.0515	5.3014
#12 - 1.75" - 1.25" conn. (Pirod 105218)	2269.1322	6102.1483	0.76	0.63	7.8789	21.1880	7.2158
#12 - 2.00" - 1.25" conn. (Pirod 105219)	2260.7557	5628.3939	1.03	0.64	7.8498	19.5430	9.4248
#12 - 2.00" - 1.25" conn. (Pirod 105219)	2260.7557	5588.0059	1.03	0.62	7.8498	19.4028	9.4248
#12 - 2.25" - 1.25" conn. (Pirod 105220)	2387.7320	5603.4756	1.20	0.61	8.2907	19.4565	11.9282
#12 - 2.25" - 1.25" conn. (Pirod 105220)	2387.7320	5535.5406	1.20	0.57	8.2907	19.2206	11.9282
#18 - 2.50" (Pirod 112738- Base Only)	3724.8211	6903.2459	1.82	0.76	12.9334	23.9696	14.7262

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp

Comb. No.	Description
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service
51	1.2 Dead+1.0 Ev+1.0 Eh 0 deg
52	0.9 Dead-1.0 Ev+1.0 Eh 0 deg
53	1.2 Dead+1.0 Ev+1.0 Eh 30 deg
54	0.9 Dead-1.0 Ev+1.0 Eh 30 deg
55	1.2 Dead+1.0 Ev+1.0 Eh 60 deg
56	0.9 Dead-1.0 Ev+1.0 Eh 60 deg
57	1.2 Dead+1.0 Ev+1.0 Eh 90 deg
58	0.9 Dead-1.0 Ev+1.0 Eh 90 deg
59	1.2 Dead+1.0 Ev+1.0 Eh 120 deg
60	0.9 Dead-1.0 Ev+1.0 Eh 120 deg
61	1.2 Dead+1.0 Ev+1.0 Eh 150 deg
62	0.9 Dead-1.0 Ev+1.0 Eh 150 deg
63	1.2 Dead+1.0 Ev+1.0 Eh 180 deg
64	0.9 Dead-1.0 Ev+1.0 Eh 180 deg
65	1.2 Dead+1.0 Ev+1.0 Eh 210 deg
66	0.9 Dead-1.0 Ev+1.0 Eh 210 deg
67	1.2 Dead+1.0 Ev+1.0 Eh 240 deg
68	0.9 Dead-1.0 Ev+1.0 Eh 240 deg
69	1.2 Dead+1.0 Ev+1.0 Eh 270 deg
70	0.9 Dead-1.0 Ev+1.0 Eh 270 deg
71	1.2 Dead+1.0 Ev+1.0 Eh 300 deg
72	0.9 Dead-1.0 Ev+1.0 Eh 300 deg
73	1.2 Dead+1.0 Ev+1.0 Eh 330 deg
74	0.9 Dead-1.0 Ev+1.0 Eh 330 deg

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	193 - 185	5.630	44	0.2336	0.0131
T2	185 - 170	5.236	44	0.2326	0.0130
T3	170 - 160	4.490	44	0.2167	0.0125
T4	160 - 140	3.857	44	0.2133	0.0119
T5	140 - 120	2.766	44	0.1914	0.0103
T6	120 - 100	1.913	44	0.1518	0.0079
T7	100 - 80	1.278	44	0.1179	0.0064
T8	80 - 60	0.786	44	0.0908	0.0049
T9	60 - 40	0.430	44	0.0626	0.0035
T10	40 - 20	0.190	44	0.0402	0.0021
T11	20 - 0	0.043	44	0.0175	0.0007

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.00	Lightning Rod	44	5.630	0.2336	0.0131	32921
191.00	RR90-17-02DP [56x8x2.75] w/ mount pipe	44	5.530	0.2338	0.0131	32921
185.00	SL2	44	5.236	0.2326	0.0130	30299
182.00	7770 [55x11x5] w/ mount pipe	44	5.095	0.2302	0.0129	178046
175.00	APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	44	4.760	0.2218	0.0127	10508
170.00	SL3	44	4.490	0.2167	0.0125	7433
160.00	(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	44	3.857	0.2133	0.0119	15614
150.00	FVV-65B-R3 (96.5x11.85x7.13) w/ Mount pipe	44	3.274	0.2058	0.0112	15783
140.00	SL5	44	2.766	0.1914	0.0103	23843
120.00	SL6	44	1.913	0.1518	0.0079	19745
100.00	KS24019-L112A [8x2x2]	44	1.278	0.1179	0.0064	39034
80.00	SL8	44	0.786	0.0908	0.0049	33643
60.00	SL9	44	0.430	0.0626	0.0035	41140
40.00	SL10	44	0.190	0.0402	0.0021	58950
30.00	PC1N0F-0190B-002M [3.9x1.6]	44	0.103	0.0286	0.0014	44863
20.00	SL11	44	0.043	0.0175	0.0007	37346

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	193 - 185	23.647	12	0.9815	0.0551
T2	185 - 170	21.989	12	0.9777	0.0545
T3	170 - 160	18.854	12	0.9107	0.0528
T4	160 - 140	16.195	12	0.8961	0.0502
T5	140 - 120	11.611	12	0.8039	0.0433
T6	120 - 100	8.027	12	0.6371	0.0335
T7	100 - 80	5.362	12	0.4946	0.0271
T8	80 - 60	3.299	12	0.3809	0.0206
T9	60 - 40	1.806	12	0.2626	0.0149
T10	40 - 20	0.796	12	0.1685	0.0089
T11	20 - 0	0.180	12	0.0734	0.0031

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
193.00	Lightning Rod	12	23.647	0.9815	0.0551	7852
191.00	RR90-17-02DP [56x8x2.75] w/ mount pipe	12	23.226	0.9824	0.0549	7852
185.00	SL2	12	21.989	0.9777	0.0545	7230

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
182.00	7770 [55x11x5] w/ mount pipe	12	21.395	0.9675	0.0543	42971
175.00	APXVTM14-C-I20 (56.3"x12.6"x6.3") w/ mount pipe	12	19.988	0.9321	0.0537	2502
170.00	SL3	12	18.854	0.9107	0.0528	1770
160.00	(2) HBXX-6517DS-A2M (74.9x12x6.5) w/ mount pipe	12	16.195	0.8961	0.0502	3710
150.00	FVV-65B-R3 (96.5x11.85x7.13) w/ Mount pipe	12	13.743	0.8644	0.0471	3752
140.00	SL5	12	11.611	0.8039	0.0433	5668
120.00	SL6	12	8.027	0.6371	0.0335	4697
100.00	KS24019-L112A [8x2x2]	12	5.362	0.4946	0.0271	9294
80.00	SL8	12	3.299	0.3809	0.0206	8013
60.00	SL9	12	1.806	0.2626	0.0149	9805
40.00	SL10	12	0.796	0.1685	0.0089	14058
30.00	PC1N0F-0190B-002M [3.9x1.6]	12	0.432	0.1201	0.0058	10695
20.00	SL11	12	0.180	0.0734	0.0031	8901

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	193	Leg	A325N	0.6250	5	1.60	27.61	0.058 ✔	1	Bolt DS
T2	185	Leg	A325N	1.0000	6	6.02	54.52	0.110 ✔	1	Bolt Tension
T3	170	Leg	A325N	1.0000	6	7.08	54.52	0.130 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	7.37	10.66	0.691 ✔	1	Member Block Shear
T4	160	Leg	A325N	1.0000	6	15.39	54.52	0.282 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	8.43	11.68	0.722 ✔	1	Member Block Shear
T5	140	Leg	A325N	1.0000	6	22.72	54.52	0.417 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	7.81	11.68	0.669 ✔	1	Member Block Shear
T6	120	Leg	A325N	1.0000	6	29.03	54.52	0.532 ✔	1	Bolt Tension
		Diagonal	A325N	1.0000	1	7.61	19.47	0.391 ✔	1	Member Block Shear
T7	100	Leg	A325N >1"	1.2500	6	34.64	76.32	0.454 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	7.48	20.30	0.369 ✔	1	Member Block Shear
T8	80	Leg	A325N >1"	1.2500	6	39.81	76.32	0.522 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	7.91	23.70	0.334 ✔	1	Member Block Shear
T9	60	Leg	A325N >1"	1.2500	6	44.64	76.32	0.585 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	8.28	23.70	0.349 ✔	1	Member Block Shear
T10	40	Leg	A325N >1"	1.2500	12	24.76	76.32	0.324 ✔	1	Bolt Tension
		Diagonal	A325N	1.2500	1	10.48	23.70	0.442 ✔	1	Member Block Shear

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt K	Allowable Load per Bolt K	Ratio Load / Allowable	Allowable Ratio	Criteria
T11	20	Diagonal	A325N	1.0000	2	8.89	35.53	0.250 ✔	1	Member Block Shear

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	2	8.00	0.17	4.0 K=1.00	3.1416	-7.99	141.21	0.057 [1] ✔
T2	185 - 170	2	15.00	2.34	56.2 K=1.00	3.1416	-40.91	112.25	0.364 [1] ✔
T3	170 - 160	#12 - 1.25" - 1.00" conn. (Pirod 105244)	10.02	10.02	45.4 K=1.00	3.6816	-51.40	142.49	0.361 [1] ✔
T4	160 - 140	#12 - 1.50" - 1.00" conn. (Pirod 105217)	20.03	10.02	37.8 K=1.00	5.3014	-107.97	214.86	0.503 [1] ✔
T5	140 - 120	#12 - 1.50" - 1.00" conn. (Pirod 105217)	20.03	10.02	37.8 K=1.00	5.3014	-155.77	214.86	0.725 [1] ✔
T6	120 - 100	#12 - 1.75" - 1.25" conn. (Pirod 105218)	20.03	10.02	32.4 K=1.00	7.2158	-198.05	300.68	0.659 [1] ✔
T7	100 - 80	#12 - 2.00" - 1.25" conn. (Pirod 105219)	20.03	10.02	28.4 K=1.00	9.4248	-236.72	399.87	0.592 [1] ✔
T8	80 - 60	#12 - 2.00" - 1.25" conn. (Pirod 105219)	20.03	10.02	28.4 K=1.00	9.4248	-273.14	399.87	0.683 [1] ✔
T9	60 - 40	#12 - 2.25" - 1.25" conn. (Pirod 105220)	20.03	10.02	25.2 K=1.00	11.9282	-308.24	512.38	0.602 [1] ✔
T10	40 - 20	#12 - 2.25" - 1.25" conn. (Pirod 105220)	20.03	10.02	25.2 K=1.00	11.9282	-344.47	512.38	0.672 [1] ✔
T11	20 - 0	#18 - 2.50" (Pirod 112738-Base Only)	20.03	20.03	32.6 K=1.00	14.7262	-355.05	613.14	0.579 [1] ✔

[1] P_u / ϕP_n controls

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T3	170 - 160	0.5	1.48	121.0	165.67	0.1963	1.45	3.29	0.442 ✔
T4	160 - 140	0.5	1.47	120.0	238.57	0.1963	1.96	3.34	0.586 ✔

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	1.23	3.34	0.369 ✔
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.97	3.38	0.288 ✔
T7	100 - 80	0.625	1.45	94.4	424.12	0.3068	1.19	6.96	0.172 ✔
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.73	6.96	0.105 ✔
T9	60 - 40	0.625	1.43	93.6	536.77	0.3068	0.68	7.01	0.097 ✔
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	3.55	7.01	0.507 ✔
T11	20 - 0	0.75	1.73	93.9	662.68	0.4418	1.29	14.36	0.090 ✔

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1	5.32	2.57	111.0 K=0.90	0.7854	-1.93	14.35	0.134 [1] ✔
T2	185 - 170	1	5.52	2.67	115.3 K=0.90	0.7854	-5.99	13.35	0.449 [1] ✔
T3	170 - 160	L2 1/2x2 1/2x3/16	9.89	5.19	125.8 K=1.00	0.9020	-8.04	16.32	0.493 [1] ✔
T4	160 - 140	L3x3x3/16	10.80	5.55	113.9 K=1.02	1.0900	-8.97	22.98	0.390 [1] ✔
T5	140 - 120	L3x3x3/16	11.98	6.10	122.8 K=1.00	1.0900	-8.11	20.56	0.395 [1] ✔
T6	120 - 100	L3x3x5/16	13.35	6.76	137.7 K=1.00	1.7800	-8.12	26.86	0.302 [1] ✔
T7	100 - 80	L3x3x5/16	14.68	7.36	149.9 K=1.00	1.7800	-7.96	22.66	0.351 [1] ✔
T8	80 - 60	L3 1/2x3 1/2x5/16	16.29	8.16	141.8 K=1.00	2.0900	-8.36	29.73	0.281 [1] ✔
T9	60 - 40	L3 1/2x3 1/2x5/16	17.97	8.99	156.4 K=1.00	2.0900	-8.45	24.45	0.345 [1] ✔
T10	40 - 20	L3 1/2x3 1/2x5/16	19.72	9.86	171.5 K=1.00	2.0900	-9.26	20.33	0.455 [1] ✔
T11	20 - 0	2L3 1/2x3 1/2x5/16x3/8 2L 'a' > 74.1952 in - 209	26.44	13.56	155.7 K=1.00	4.1800	-20.39	48.15	0.423 [1] ✔

[1] P_u / ϕP_n controls

Horizontal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	7/8	5.00	4.83	185.6 K=0.70	0.6013	-0.33	3.94	0.084 [1] ✔
T2	185 - 170	7/8	5.00	4.83	185.6 K=0.70	0.6013	-0.78	3.94	0.198 [1] ✔

[1] P_u / ϕP_n controls

Top Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-0.22	16.42	0.014 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-0.79	16.42	0.048 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-0.78	16.42	0.048 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-2.02	16.42	0.123 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-0.40	16.35	0.025 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	129.9 K=0.70	1.2272	-0.31	16.42	0.019 [1] ✔

[1] P_u / ϕP_n controls

Tension Checks

Leg Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	2	8.00	0.17	4.0	1.7942	4.50	87.47	0.051 [1] [#] ✔
T2	185 - 170	2	15.00	0.58	14.0	3.1416	36.13	141.37	0.256 [1] ✔
T3	170 - 160	#12 - 1.25" - 1.00" conn. (Pirod 105244)	10.02	10.02	45.4	3.6816	42.50	165.67	0.257 [1] ✔
T4	160 - 140	#12 - 1.50" - 1.00" conn. (Pirod 105217)	20.03	10.02	37.8	5.3014	92.34	238.57	0.387 [1] ✔
T5	140 - 120	#12 - 1.50" - 1.00" conn. (Pirod 105217)	20.03	10.02	37.8	5.3014	136.31	238.57	0.571 [1] ✔
T6	120 - 100	#12 - 1.75" - 1.25" conn. (Pirod 105218)	20.03	10.02	32.4	7.2158	174.15	324.71	0.536 [1] ✔
T7	100 - 80	#12 - 2.00" - 1.25" conn. (Pirod 105219)	20.03	10.02	28.4	9.4248	207.83	424.12	0.490 [1] ✔
T8	80 - 60	#12 - 2.00" - 1.25" conn. (Pirod 105219)	20.03	10.02	28.4	9.4248	238.86	424.12	0.563 [1] ✔
T9	60 - 40	#12 - 2.25" - 1.25" conn. (Pirod 105220)	20.03	10.02	25.2	11.9282	267.85	536.77	0.499 [1] ✔
T10	40 - 20	#12 - 2.25" - 1.25" conn. (Pirod 105220)	20.03	10.02	25.2	11.9282	297.10	536.77	0.553 [1] ✔
T11	20 - 0	#18 - 2.50" (Pirod 112738-Base Only)	20.03	20.03	32.6	14.7262	307.22	662.68	0.464 [1] ✔

[1] P_u / ϕP_n controls
[#] Based on net area of leg in section below

Truss-Leg Diagonal Data

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T3	170 - 160	0.5	1.48	121.0	165.67	0.1963	1.45	3.29	0.442 ✔
T4	160 - 140	0.5	1.47	120.0	238.57	0.1963	1.96	3.34	0.586 ✔
T5	140 - 120	0.5	1.47	120.0	238.57	0.1963	1.23	3.34	0.369 ✔
T6	120 - 100	0.5	1.46	119.0	324.71	0.1963	0.97	3.38	0.288 ✔
T7	100 - 80	0.625	1.45	94.4	424.12	0.3068	1.19	6.96	0.172 ✔
T8	80 - 60	0.625	1.45	94.4	424.12	0.3068	0.73	6.96	0.105

Section No.	Elevation ft	Diagonal Size	L_d ft	Kl/r	ϕP_n K	A in^2	V_u K	ϕV_n K	Stress Ratio
T9	60 - 40	0.625	1.43	93.6	536.77	0.3068	0.68	7.01	0.097
T10	40 - 20	0.625	1.43	93.6	536.77	0.3068	3.55	7.01	0.507
T11	20 - 0	0.75	1.73	93.9	662.68	0.4418	1.29	14.36	0.090

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1	5.32	2.57	123.4	0.7854	1.88	35.34	0.053 [1]
T2	185 - 170	1	5.52	2.67	128.1	0.7854	5.91	35.34	0.167 [1]
T3	170 - 160	L2 1/2x2 1/2x3/16	9.89	5.19	83.2	0.5183	7.37	22.55	0.327 [1]
T4	160 - 140	L3x3x3/16	10.80	5.55	73.6	0.6593	8.43	28.68	0.294 [1]
T5	140 - 120	L3x3x3/16	11.36	5.81	76.9	0.6593	7.81	28.68	0.272 [1]
T6	120 - 100	L3x3x5/16	13.35	6.76	90.7	1.0713	7.61	46.60	0.163 [1]
T7	100 - 80	L3x3x5/16	14.68	7.36	99.0	1.0127	7.48	44.05	0.170 [1]
T8	80 - 60	L3 1/2x3 1/2x5/16	16.29	8.16	93.4	1.2452	7.91	54.17	0.146 [1]
T9	60 - 40	L3 1/2x3 1/2x5/16	17.97	8.99	102.7	1.2452	8.28	54.17	0.153 [1]
T10	40 - 20	L3 1/2x3 1/2x5/16	19.72	9.86	112.4	1.2452	10.48	54.17	0.194 [1]
T11	20 - 0	2L3 1/2x3 1/2x5/16x3/8 2L 'a' > 74.1952 in - 212	26.44	13.56	153.9	2.6077	17.78	113.43	0.157 [1]

[1] $P_u / \phi P_n$ controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	7/8	5.00	4.83	265.1	0.6013	0.38	19.48	0.019 [1]
T2	185 - 170	7/8	5.00	4.83	265.1	0.6013	0.78	19.48	0.040 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$

[1] P_u / ϕP_n controls

Top Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	185.6	1.2272	0.18	55.22	0.003 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	185.6	1.2272	0.79	55.22	0.014 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	185.6	1.2272	0.83	55.22	0.015 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	185.6	1.2272	2.08	55.22	0.038 [1] ✔

[1] P_u / ϕP_n controls

Mid Girt Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u K	ϕP_n K	Ratio $\frac{P_u}{\phi P_n}$
T1	193 - 185	1 1/4	5.00	4.83	185.6	1.2272	0.44	39.76	0.011 [1] ✔
T2	185 - 170	1 1/4	5.00	4.83	185.6	1.2272	0.54	55.22	0.010 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	øP$_{allow}$ K	% Capacity	Pass Fail
T1	193 - 185	Leg	2	1	-7.99	141.21	5.7 5.8 (b)	Pass
T2	185 - 170	Leg	2	41	-40.91	112.25	36.4	Pass
T3	170 - 160	Leg	#12 - 1.25" - 1.00" conn. (Pirod 105244)	92	-51.21	142.49	44.2	Pass
T4	160 - 140	Leg	#12 - 1.50" - 1.00" conn. (Pirod 105217)	101	-79.47	214.86	58.6	Pass
T5	140 - 120	Leg	#12 - 1.50" - 1.00" conn. (Pirod 105217)	117	-155.77	214.86	72.5	Pass
T6	120 - 100	Leg	#12 - 1.75" - 1.25" conn. (Pirod 105218)	132	-198.05	300.68	65.9	Pass
T7	100 - 80	Leg	#12 - 2.00" - 1.25" conn. (Pirod 105219)	147	-236.72	399.87	59.2	Pass
T8	80 - 60	Leg	#12 - 2.00" - 1.25" conn. (Pirod 105219)	162	-273.14	399.87	68.3	Pass
T9	60 - 40	Leg	#12 - 2.25" - 1.25" conn. (Pirod 105220)	177	-308.24	512.38	60.2	Pass
T10	40 - 20	Leg	#12 - 2.25" - 1.25" conn. (Pirod 105220)	192	-344.47	512.38	67.2	Pass
T11	20 - 0	Leg	#18 - 2.50" (Pirod 112738- Base Only)	207	-355.05	613.14	57.9	Pass
T1	193 - 185	Diagonal	1	14	-1.93	14.35	13.4	Pass
T2	185 - 170	Diagonal	1	52	-5.99	13.35	44.9	Pass
T3	170 - 160	Diagonal	L2 1/2x2 1/2x3/16	95	-8.04	16.32	49.3 69.1 (b)	Pass
T4	160 - 140	Diagonal	L3x3x3/16	106	-8.97	22.98	39.0 72.2 (b)	Pass
T5	140 - 120	Diagonal	L3x3x3/16	121	-8.11	20.56	39.5 66.9 (b)	Pass
T6	120 - 100	Diagonal	L3x3x5/16	136	-8.12	26.86	30.2 39.1 (b)	Pass
T7	100 - 80	Diagonal	L3x3x5/16	151	-7.96	22.66	35.1 36.9 (b)	Pass
T8	80 - 60	Diagonal	L3 1/2x3 1/2x5/16	166	-8.36	29.73	28.1 33.4 (b)	Pass
T9	60 - 40	Diagonal	L3 1/2x3 1/2x5/16	181	-8.45	24.45	34.5 34.9 (b)	Pass
T10	40 - 20	Diagonal	L3 1/2x3 1/2x5/16	193	-9.26	20.33	45.5	Pass
T11	20 - 0	Diagonal	2L3 1/2x3 1/2x5/16x3/8	209	-20.39	48.15	42.3	Pass
T1	193 - 185	Horizontal	7/8	32	-0.33	3.94	8.4	Pass
T2	185 - 170	Horizontal	7/8	64	-0.78	3.94	19.8	Pass
T1	193 - 185	Top Girt	1 1/4	5	-0.22	16.42	1.4	Pass
T2	185 - 170	Top Girt	1 1/4	43	-0.79	16.42	4.8	Pass
T1	193 - 185	Bottom Girt	1 1/4	9	-0.78	16.42	4.8	Pass
T2	185 - 170	Bottom Girt	1 1/4	47	-2.02	16.42	12.3	Pass
T1	193 - 185	Mid Girt	1 1/4	11	-0.40	16.35	2.5	Pass
T2	185 - 170	Mid Girt	1 1/4	48	-0.31	16.42	1.9	Pass
							Summary	
						Leg (T5)	72.5	Pass
						Diagonal (T4)	72.2	Pass
						Horizontal (T2)	19.8	Pass
						Top Girt (T2)	4.8	Pass
						Bottom Girt (T2)	12.3	Pass
						Mid Girt (T1)	2.5	Pass
						Bolt Checks	72.2	Pass
						RATING =	**72.5**	**Pass**

Loading for Seismic Analysis - Rev H (2.7.7.1 Equivalent Lateral Force Procedure) *V3.0 - 03/13/2020*

Project# : CT01105-DSW-082423 Analysis complete

Tower Data		Structure Date			
Tower type :	SST	Risk category :	II	I =	1.00
Height (ft) :	193	Site class :	D (default)	F_a =	1.60
Base face width (ft) :	22	Seismic Date		F_v =	2.40
Number of sections :	11	Short period (S_s):	0.197	T (sec) =	0.82
		1sec period (S_1) :	0.054	R =	3.00
		Long period transition (T_L) (Fig B-19):	6	Ke =	1.16
				C_s =	0.05
				V_s (kip) =	5.75
				Ts (sec) =	0.41

Note:

1: Get self weight & add weight (feedline) from "Mast Forces table (tnxTower Reports)"

2: Get appurtenance weight from "Appurt. Pressure table (tnxTower Reports)"

3: Get the guy weight from "WEIGHTAUXDATA" excel file from the tnx out put files

								Tnx User Forces	
Section	Top Elev	Top width	Self Weight	Add Weight (feedline)	Appurtenance Weight	Guy Weight	Total Weight	E_h (F_x)	*E_v
	ft	ft	kip	kip	kip	kip	kip	kip	kip
1	193	5	0.7	1.9	4.12		6.72	**0.64**	**0.28**
2	185	5	1.3	3.94	6.14		11.38	**1.12**	**0.48**
3	170	5	1.07	2.79	2.58		6.44	**0.52**	**0.27**
4	160	6	2.43	6.07	2.12		10.62	**0.87**	**0.45**
5	140	8	2.49	6.16			8.65	**0.59**	**0.36**
6	120	10	3.4	6.16			9.56	**0.55**	**0.40**
7	100	12	4.09	6.17			10.26	**0.48**	**0.43**
8	80	14	4.45	6.17			10.62	**0.39**	**0.45**
9	60	16	5.41	6.17			11.58	**0.31**	**0.49**
10	40	18	5.29	6.17	0.02		11.48	**0.19**	**0.48**
11	20	20	7.89	3.97			11.86	**0.09**	**0.50**
		11.8	*38.52*	*55.67*	*14.98*		*109.17*	*5.75*	

V3.6 - 08/10/2021

Self Support Anchor Bolt Check

Project Information

SBA Project # :	CT01105-DSW-082423
Code :	H

Leg Reaction

Uplift(kips):	327	Shear (kips) :	38
Comp(kips):	382	Shear (kips) :	45

Grout

- [x] 5,000 psi Grout Present
- [x] Use Section 15.7 exemption

Strength Reduction Factors

Tension :	0.75
Compression :	0.90
Shear :	0.75
Flexure :	0.9

Bolt Capacity : 38.2% ***Pass***

Bolt Information

Quantity :	6
Diameter (in) :	2
Assumed lar (in) :	3
Bolt Fy (ksi) :	105
Bolt Fu (AISC Table 2-6) (ksi):	125
# of threads (AISC Table 7-17) :	4.5

Mat Foundation Design for Self Supporting Tower

			Date: 8/24/2023
Customer Name:	SBA Communications Corp	TIA Standard:	TIA-222-H
Site Name:	Bozrah	Structure Height (Ft.):	193
Site Nmber:	CT01105-S	Engineer Name:	SBA Enginee
Engr. Number:		Engineer Login ID:	

Foundation Info Obtained from: Drawings/Calculations

Analysis or Design? Analysis

Number of Tower Legs: 3 Legs

Base Reactions (Factored):

(1). Individual Leg:

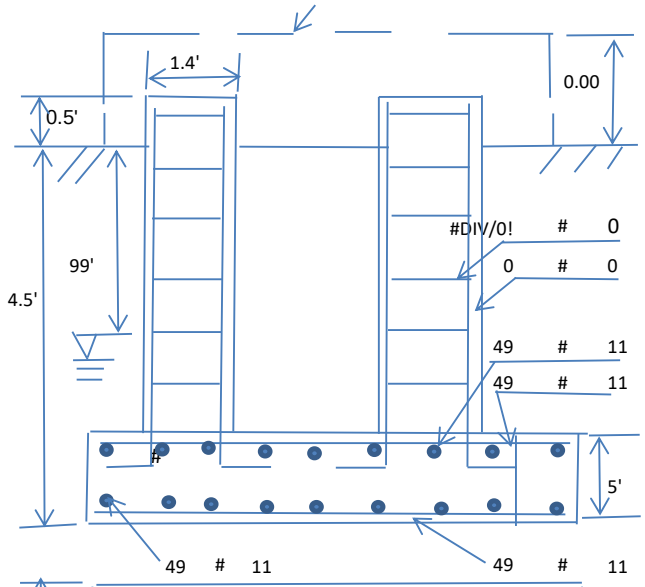
Axial Load (Kips):	382.0	Uplift Force (Kips):	327.0
Shear Force (Kips):	45.0		

(2). Tower Base:

Total Vertical Load (Kips):	82.0	Total Shear Force (Kips):	58.0
Moment (Kips-ft):	6927.0		

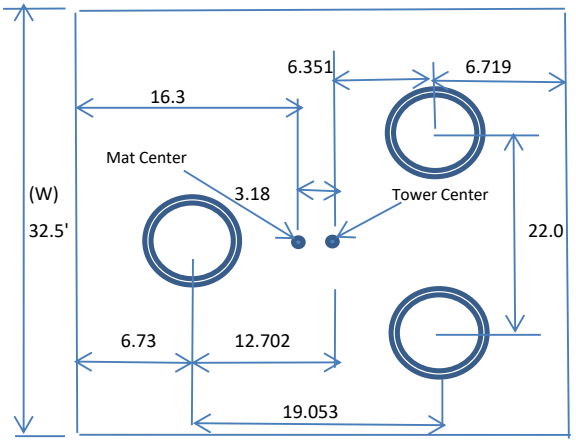
Foundation Geometries:

Leg distance (Center-to-Center ft.):		22.0	Mods required -Yes/No ?:	No
Diameter of Pier (ft.):	Round	1.3	Pier Height A. G. (ft.):	0.50
Tower center to mat center (ft):		3.18	Depth of Base BG (ft.):	4.5
Length of Pad (ft.):		32.5	Width of Pad (ft.):	32.5
Thickness of Pad (ft):		5.00		



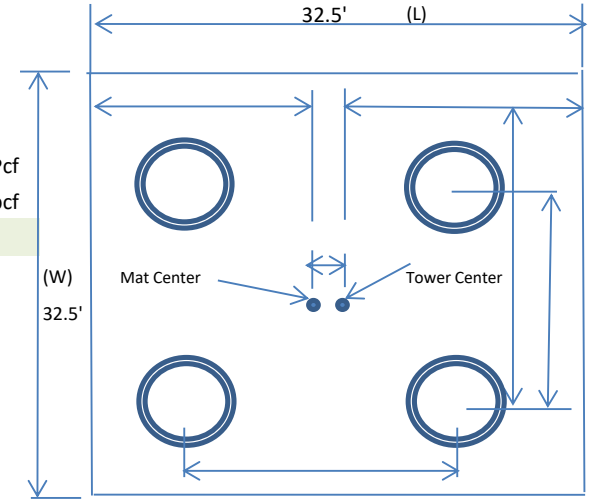
Material Properties and Reabr Info:

Concrete Strength (psi):	4000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)		Tie steel yield (ksi):		
Vertical Rebar Size #:		Tie / Stirrup Size #:		
Qty. of Vertical Rebars:		Tie Spacing (in):		
Pad Rebar Yield (Ksi):	60	Pad Steel Rebar Size (#):	11	
Concrete Cover (in.):	3	Unit Weight of Concrete:	150.0	pcf
Rebar at the bottom of the concrete pad:				
Qty. of Rebar in Pad (L):	49	Qty. of Rebar in Pad (W):	49	
Rebar at the top of the concrete pad:				
Qty. of Rebar in Pad (L):	49	Qty. of Rebar in Pad (W):	49	



Soil Design Parameters:

Soil Unit Weight (pcf):	120.0	Soil Buoyant Weight:	50.0	Pcf
Water Table B.G.S. (ft):	99.0	Unit Weight of Water:	62.4	pcf
Ultimate Bearing Pressure (psf):	40000	Consider ties in concrete shear strength:		
Consider Soil Lateral Resistance ?	No			



Apply 1.35 for e/w per G/H: 1.35

Foundation Analysis and Design:	Uplift Strength Reduction Factor:	0.75	Compression Strength Reduction Factor:	0.75			
Total Dry Soil Volume (cu. Ft.):		2.10	Total Dry Soil Weight (Kips):	0.25			
Total Buoyant Soil Volume (cu. Ft.):		0.00	Total Buoyant Soil Weight (Kips):	0.00			
Total Effective Soil Weight (Kips):		0.25	Weight from the Concrete Block at Top (K):	0.00			
Total Dry Concrete Volume (cu. Ft.):		5283.34	Total Dry Concrete Weight (Kips):	792.50			
Total Buoyant Concrete Volume (cu. Ft.):		0.00	Total Buoyant Concrete Weight (Kips):	0.00			
Total Effective Concrete Weight (Kips):		792.50	Total Vertical Load on Base (Kips):	874.75			

Check Soil Capacities:					Load/ Capacity Ratio	
Calculated Maxium Net Soil Pressure under the base (psf):	2435.21	<	Allowable Factored Soil Bearing (psf):	30000	0.08	OK!
Allowable Foundation Overturning Resistance (kips-ft.):	12926.5	>	Design Factored Momont (kips-ft):	7507	0.58	OK!
Factor of Safety Against Overturning (O. R. Moment/Design Moment):	1.72	OK!				

Check the capacities of Reinforceing Concrete:			
Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75
Strength reduction factor (Axial compresion):	0.65	Wind Load Factor on Concrete Design:	1.00

(2).Concrete Pad:

One-Way Design Shear Capacity (L or W Direction, Kips):	2083.5	>	One-Way Factored Shear (L/W-Dir Kips	297.3	0.14	OK!
One-Way Design Shear Capacity (Diagonal Dir., Kips):	1788.3	>	One-Way Factored Shear (Dia. Dir, Kips	430.8	0.24	OK!
Lower Steel Pad Reinforcement Ratio (L or W-Direct.):	0.0035		Lower Steel Reinf. Ratio (Dia. Dir.):	0.0030		
Lower Steel Pad Moment Capacity (L or W-Dir. Kips-ft):	18775.5	>	Moment at Bottom (L-Direct. K-Ft):	1769.9	0.09	OK!
Lower Steel Pad Moment Capacity (Dia. Direction,K-ft):	18855.2	>	Moment at Bottom (Dia. Dir. K-Ft):	3104.2	0.16	OK!
Upper Steel Pad Reinforcement Ratio (L or W -Direction):	0.0035		Upper Steel Reinf. Ratio (Dia. Dir.):	0.0030		
Upper Steel Pad Moment Capacity (L or W-Dir., Kips-ft):	18775.5	>	Moment at the top (L-Dir Kips-Ft):	901.2	0.05	OK!
Upper Steel Pad Moment Capacity (Dia. Direction, K-ft):	18855.2	>	Moment at the top (Dia. Dir., K-Ft):	1228.3	0.07	OK!
Punching Failure Capacity From Down Load (Kips):	2425.9	>	Punch. Failure Factored Shear (K):	382.0	0.16	OK!
Punching Failure Capacity From Uplift (Kips):	2224.5	>	Punch. Failure Factored Shear (K):	327.0	0.15	OK!

(3). Check Max. eccentricity of Loading:

The maximum eccentricity of Loading:	8.58	ft.	Allowable eccentricity (0.45 W, ft.):	14.625	OK!

EXHIBIT 9

Antenna Mount Analysis

September 15, 2023

Dish Wireless
5701 South Santa Fe Drive
Littleton, CO 80120

RE: Dish Site Number: BOBOS01169A
TEP Project Number: 273838.881212
Site Address: 131 Gifford Lane
Bozrah, CT 06334

To Whom It May Concern:

TEP Northeast (TEP NE) has been authorized by Dish Wireless to perform a mount analysis on the proposed Dish Wireless antenna/RRH mounts to determine their capability of supporting the following loading:

- **(3) FFVV-65B-R2 Antennas (72.0"x19.6"x7.8" – Wt. = 71 lbs. /each)**
- **(3) RF4450t-71A RRH's (16.5"x15.0"x11.0" – Wt. = 95 lbs. /each)**
- **(3) RF4451d-70A RRH's (15.0"x15.0"x8.9" – Wt. = 61 lbs. /each)**
- **(1) RDIDC-9181-PF-48 OVP (16.6"x14.6"x8.2" – Wt. = 22 lbs.)**

**Proposed equipment shown in bold*

Mount fabrication drawings prepared by Commscope, P/N MTC3975083, dated November 19, 2014, were used to perform this analysis.

Mount Analysis Methods:

- This analysis was conducted in accordance with EIA/TIA-222-H, Structural Standards for Steel Antenna Towers and Antenna Supporting Structures, the International Building Code 2021 with 2022 Connecticut State Building Code, and AT&T Mount Technical Directive – R22.

- TEP NE considers this mount to be asymmetrical and has applied wind loads in 30 degree increments all around the mount. Per TIA-222-H and Appendix P of the Connecticut State Building Code, the max basic wind speed for this site is equal to 125 mph with a max basic wind speed with ice of 50 mph and a max ice thickness of 1.0 in. An escalated ice thickness of 1.16 in was used for this analysis.

- TEP NE considers this site to be exposure category B; tower is located in an urban/suburban or wooded area with numerous closely spaced obstructions.

- TEP NE considers this site to be topographic category 1; tower is located on flat terrain or the bottom of a hill or ridge.

- TEP NE considers this site to have a spectral response acceleration parameter at short periods, S_S, of 0.197 and a spectral response acceleration parameter at a period of 1 second, S_1, of 0.054.

- The mount has been analyzed with load combinations consisting of 500 lbs live load using a service wind speed of 30 mph wind on the worst case antenna. Analysis performed on each antenna pipe to determine worst case location; worst case location was antenna position 2.

- The mount has been analyzed with load combinations consisting of a 250 lbs live load in a worst case location on the mount.

- The proposed mounts will be secured to the existing self supporting tower with threaded rods and steel plates tightened around the tower leg. TEP NE considers the threaded rods as the governing connection members.

Based on our evaluation, we have determined that the Proposed Commscope P/N MTC3975083 mounts **ARE CAPABLE** of supporting the proposed installation.

	Component	Controlling Load Case	Stress Ratio	Pass/Fail
Proposed Mount Rating	14	LC40	36%	**PASS**

Reference Documents:

- Mount fabrication drawings prepared by Commscope, P/N MTC3975083, dated November 19, 2014.

This determination was based on the following limitations and assumptions:

1. TEP NE is not responsible for any modifications completed prior to and hereafter which TEP NE was not directly involved.
2. All structural members and their connections are assumed to be in good condition and are free from defects with no deterioration to its member capacities.
3. All antennas, coax cables and waveguide cables are assumed to be properly installed and supported as per the manufacturer's requirements.
4. The proposed mounts will be adequately secured to the tower structure per the mount manufacturer's specifications.
5. All components pertaining to Dish Wireless' mounts must be tightened and re-plumbed prior to the installation of new appurtenances.
6. TEP NE performed a localized analysis on the mount itself and not on the supporting tower structure.

Please feel free to contact our office should you have any questions.

Respectfully Submitted,
TEP Northeast

Michael Cabral
Director

Daniel P. Hamm, PE
Vice President

Wind & Ice
Calculations

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM **Checked By:** MSC

2.6.5.2 Velocity Pressure Coeff:

$K_z = 2.01\ (z/z_g)^{2/\alpha}$

z=	150 (ft)
z_g=	1200 (ft)
α=	7.0

K_z= 1.110

Kzmin ≤ Kz ≤ 2.01

Table 2-4

Exposure	Z_g	α	K_{zmin}	K_c
B	1200 ft	7.0	0.70	0.9
C	900 ft	9.5	0.85	1.0
D	700 ft	11.5	1.03	1.1

2.6.6.2 Topographic Factor:

Table 2-5

Topo. Category	K_t	f
2	0.43	1.25
3	0.53	2.0
4	0.72	1.5

$K_{zt} = [1+(K_c K_t/K_h)]^2$

$K_h = e^{(f*z/H)}$

K_{zt}= 1

(If Category 1 then K_{zt}=1.0)

Category= **1**

K_h=	1
K_c=	0.9 (from Table 2-4)
K_t=	0 (from Table 2-5)
f=	0 (from Table 2-5)
z=	150
z_s=	446 (Mean elevation of base of structure above sea level)
H=	0 (Ht. of the crest above surrounding terrain)
K_{zt}=	1.00 (from 2.6.6.2.1)
K_e=	0.98 (from 2.6.8)

2.6.10 Design Ice Thickness

Max Ice Thickness =	t_i = 1.00 in
Importance Factor =	I= 1.00 (from Table 2-3)
	K_{iz} = 1.16 (from Sec. 2.6.10)

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

2.6.9 Gust Effect Factor

2.6.9.1 Self Supporting Lattice Structures

G_h = 1.0 Latticed Structures > 600 ft

G_h = 0.85 Latticed Structures 450 ft or less

G_h = 0.85 + 0.15 [h/150 - 3.0] h= ht. of structure

h=	193	G_h=	0.85

2.6.9.2 Guyed Masts G_h= 0.85

2.6.9.3 Pole Structures G_h= 1.1

2.6.9 Appurtenances G_h= 1.0

2.6.9.4 Structures Supported on Other Structures

(Cantilivered tubular or latticed spines, pole, structures on buildings (ht. : width ratio > 5)

G_h=	1.35	**Gh=**	**1.00**

2.6.11.2 Design Wind Force on Appurtenances

$F = q_z * G_h * (EPA)_A$

$q_z = 0.00256 * K_z * K_{zt} * K_s * K_e * K_d * V_{max}^2$

		K_z=	1.110	(from 2.6.5.2)
		K_{zt}=	1.0	(from 2.6.6.2.1)
		K_s=	1.0	(from 2.6.7)
q_z=	**41.49**	K_e=	0.98	(from 2.6.8)
$q_{z\ (ice)}$=	**6.64**	K_d=	0.95	(from Table 2-2)
$q_{z\ (30)}$=	**2.39**	V_{max}=	125	mph (Ultimate Wind Speed)
		$V_{max\ (ice)}$=	50	mph
		V_{30}=	30	mph

Table 2-2

Structure Type	Wind Direction Probability Factor, Kd
Latticed structures with triangular, square or rectangular cross sections	0.85
Tubular pole structures, latticed structures with other cross sections, appurtenances	0.95
Tubular pole structures supporting antennas enclosed within a cylindrical shroud	1.00

Date: 9/8/2023
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Designed By: KM Checked By: MSC

Determine Ca:

Table 2-9

Force Coefficients (Ca) for Appurtenances				
Member Type		Aspect Ratio ≤ 2.5	Aspect Ratio = 7	Aspect Ratio ≥ 25
		Ca	Ca	Ca
Flat		1.2	1.4	2.0
Square/Rectangular HSS		1.2 - 2.8(r_s) ≥ 0.85	1.4 - 4.0(r_s) ≥ 0.90	2.0 - 6.0(r_s) ≥ 1.25
Round	**C < 39** (Subcritical)	0.7	0.8	1.2
	39 ≤ C ≤ 78 (Transitional)	$4.14/(C^{0.485})$	$3.66/(C^{0.415})$	$46.8/(C^{-1.0})$
	C > 78 (Supercritical)	0.5	0.6	0.6

Aspect Ratio is the overall length/width ratio in the plane normal to the wind direction.
(Aspect ratio is independent of the spacing between support points of a linear appurtenance,

Note: Linear interpolation may be used for aspect ratios other than those shown.

Ice Thickness = **1.16** in **Angle =** **0 (deg)** **Equivalent Angle =** **180 (deg)**

Appurtenances	Height	Width	Depth	Flat Area	Aspect Ratio	Ca	Force (lbs)	Force (lbs) (w/ Ice)	Force (lbs) (30 mph)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.67	1.25	**509**	**94**	**29**
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.10	1.20	**86**	**18**	**5**
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.50	1.20	**63**	**14**	**4**
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	3.00	1.22	**32**	**8**	**2**
RF4451d-70A RRH	15.0	15.0	8.9	1.56	1.00	1.20	**78**	**17**	**4**
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.69	1.20	**46**	**11**	**3**
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	3.37	1.24	**24**	**7**	**1**
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	1.14	1.20	**84**	**18**	**5**
2-1/2" Pipe	2.9	12.0	-	0.24	0.24	1.20	**12**		
2" Pipe	2.4	12.0	-	0.20	0.20	1.20	**10**		
1-1/2" Pipe	1.9	12.0	-	0.16	0.16	1.20	**8**		
5/8" Round Bar	0.6	12.0	-	0.05	0.05	1.20	**3**		
1/2" Round Bar	0.5	12.0	-	0.04	0.04	1.20	**2**		

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	30	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	210	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Aspect Ratio	Aspect Ratio	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	509	239	441
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	86	63	80
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	63	86	68
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	32	86	45
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	78	46	70
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	46	78	54
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	24	78	37
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	84	47	75

WIND LOADS WITH ICE:

FFVV-65B-R2 Antenna	74.3	21.9	10.1	11.32	5.23	3.39	7.34	1.24	1.41	93	49	82
RF4450t-71A RRH	18.8	17.3	13.3	2.27	1.74	1.09	1.41	1.20	1.20	18	14	17
RF4450t-71A RRH (Side)	18.8	13.3	17.3	1.74	2.27	1.41	1.09	1.20	1.20	14	18	15
RF4450t-71A RRH (Shielded)	18.8	7.8	17.3	1.02	2.27	2.41	1.09	1.20	1.20	8	18	11
RF4451d-70A RRH	17.3	17.3	11.2	2.08	1.35	1.00	1.54	1.20	1.20	17	11	15
RF4451d-70A RRH (Side)	17.3	11.2	17.3	1.35	2.08	1.54	1.00	1.20	1.20	11	17	12
RF4451d-70A RRH (Shielded)	17.3	6.8	17.3	0.82	2.08	2.56	1.00	1.20	1.20	7	17	9
RDIDC-9181-PF-48 OVP	18.9	16.9	10.5	2.22	1.38	1.12	1.80	1.20	1.20	18	11	16

WIND LOADS AT 30 MPH:

FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	25
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	5	4	5
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	4	5	4
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	2	5	3
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	4	3	4
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	3	4	3
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	1	4	2
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	5	3	4

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	60	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	240	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	509	239	306
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	86	63	68
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	63	86	80
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	32	86	72
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	78	46	54
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	46	78	70
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	24	78	64
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	84	47	56

WIND LOADS WITH ICE:

FFVV-65B-R2 Antenna	74.3	21.9	10.1	11.32	5.23	3.39	7.34	1.24	1.41	93	49	60
RF4450t-71A RRH	18.8	17.3	13.3	2.27	1.74	1.09	1.41	1.20	1.20	18	14	15
RF4450t-71A RRH (Side)	18.8	13.3	17.3	1.74	2.27	1.41	1.09	1.20	1.20	14	18	17
RF4450t-71A RRH (Shielded)	18.8	7.8	17.3	1.02	2.27	2.41	1.09	1.20	1.20	8	18	16
RF4451d-70A RRH	17.3	17.3	11.2	2.08	1.35	1.00	1.54	1.20	1.20	17	11	12
RF4451d-70A RRH (Side)	17.3	11.2	17.3	1.35	2.08	1.54	1.00	1.20	1.20	11	17	15
RF4451d-70A RRH (Shielded)	17.3	6.8	17.3	0.82	2.08	2.56	1.00	1.20	1.20	7	17	14
RDIDC-9181-PF-48 OVP	18.9	16.9	10.5	2.22	1.38	1.12	1.80	1.20	1.20	18	11	13

WIND LOADS AT 30 MPH:

FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	18
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	5	4	4
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	4	5	5
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	2	5	4
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	4	3	3
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	3	4	4
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	1	4	4
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	5	3	3

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	90	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	270	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	509	239	239
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	86	63	63
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	63	86	86
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	32	86	86
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	78	46	46
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	46	78	78
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	24	78	78
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	84	47	47

WIND LOADS WITH ICE:

FFVV-65B-R2 Antenna	74.3	21.9	10.1	11.32	5.23	3.39	7.34	1.24	1.41	93	49	49
RF4450t-71A RRH	18.8	17.3	13.3	2.27	1.74	1.09	1.41	1.20	1.20	18	14	14
RF4450t-71A RRH (Side)	18.8	13.3	17.3	1.74	2.27	1.41	1.09	1.20	1.20	14	18	18
RF4450t-71A RRH (Shielded)	18.8	7.8	17.3	1.02	2.27	2.41	1.09	1.20	1.20	8	18	18
RF4451d-70A RRH	17.3	17.3	11.2	2.08	1.35	1.00	1.54	1.20	1.20	17	11	11
RF4451d-70A RRH (Side)	17.3	11.2	17.3	1.35	2.08	1.54	1.00	1.20	1.20	11	17	17
RF4451d-70A RRH (Shielded)	17.3	6.8	17.3	0.82	2.08	2.56	1.00	1.20	1.20	7	17	17
RDIDC-9181-PF-48 OVP	18.9	16.9	10.5	2.22	1.38	1.12	1.80	1.20	1.20	18	11	11

WIND LOADS AT 30 MPH:

FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	14
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	5	4	4
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	4	5	5
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	2	5	5
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	4	3	3
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	3	4	4
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	1	4	4
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	5	3	3

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	120	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	300	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	509	239	306
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	86	63	68
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	63	86	80
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	32	86	72
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	78	46	54
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	46	78	70
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	24	78	64
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	84	47	56

WIND LOADS WITH ICE:

FFVV-65B-R2 Antenna	74.3	21.9	10.1	11.32	5.23	3.39	7.34	1.24	1.41	93	49	60
RF4450t-71A RRH	18.8	17.3	13.3	2.27	1.74	1.09	1.41	1.20	1.20	18	14	15
RF4450t-71A RRH (Side)	18.8	13.3	17.3	1.74	2.27	1.41	1.09	1.20	1.20	14	18	17
RF4450t-71A RRH (Shielded)	18.8	7.8	17.3	1.02	2.27	2.41	1.09	1.20	1.20	8	18	16
RF4451d-70A RRH	17.3	17.3	11.2	2.08	1.35	1.00	1.54	1.20	1.20	17	11	12
RF4451d-70A RRH (Side)	17.3	11.2	17.3	1.35	2.08	1.54	1.00	1.20	1.20	11	17	15
RF4451d-70A RRH (Shielded)	17.3	6.8	17.3	0.82	2.08	2.56	1.00	1.20	1.20	7	17	14
RDIDC-9181-PF-48 OVP	18.9	16.9	10.5	2.22	1.38	1.12	1.80	1.20	1.20	18	11	13

WIND LOADS AT 30 MPH:

FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	18
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	5	4	4
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	4	5	5
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	2	5	4
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	4	3	3
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	3	4	4
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	1	4	4
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	5	3	3

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM Checked By: MSC

WIND LOADS

Angle =	150	(deg)	Ice Thickness =	1.16	in.	Equivalent Angle =	330	(deg)

WIND LOADS WITH NO ICE:

Appurtenances	Height	Width	Depth	Flat Area (normal)	Flat Area (side)	Ratio (normal)	Ratio (side)	Ca (normal)	Ca (side)	Force (lbs) (normal)	Force (lbs) (side)	Force (lbs) (angle)
FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	509	239	441
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	86	63	80
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	63	86	68
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	32	86	45
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	78	46	70
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	46	78	54
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	24	78	37
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	84	47	75

WIND LOADS WITH ICE:

FFVV-65B-R2 Antenna	74.3	21.9	10.1	11.32	5.23	3.39	7.34	1.24	1.41	93	49	82
RF4450t-71A RRH	18.8	17.3	13.3	2.27	1.74	1.09	1.41	1.20	1.20	18	14	17
RF4450t-71A RRH (Side)	18.8	13.3	17.3	1.74	2.27	1.41	1.09	1.20	1.20	14	18	15
RF4450t-71A RRH (Shielded)	18.8	7.8	17.3	1.02	2.27	2.41	1.09	1.20	1.20	8	18	11
RF4451d-70A RRH	17.3	17.3	11.2	2.08	1.35	1.00	1.54	1.20	1.20	17	11	15
RF4451d-70A RRH (Side)	17.3	11.2	17.3	1.35	2.08	1.54	1.00	1.20	1.20	11	17	12
RF4451d-70A RRH (Shielded)	17.3	6.8	17.3	0.82	2.08	2.56	1.00	1.20	1.20	7	17	9
RDIDC-9181-PF-48 OVP	18.9	16.9	10.5	2.22	1.38	1.12	1.80	1.20	1.20	18	11	16

WIND LOADS AT 30 MPH:

FFVV-65B-R2 Antenna	72.0	19.6	7.8	9.80	3.90	3.67	9.23	1.25	1.47	29	14	25
RF4450t-71A RRH	16.5	15.0	11.0	1.72	1.26	1.10	1.50	1.20	1.20	5	4	5
RF4450t-71A RRH (Side)	16.5	11.0	15.0	1.26	1.72	1.50	1.10	1.20	1.20	4	5	4
RF4450t-71A RRH (Shielded)	16.5	5.5	15.0	0.63	1.72	3.00	1.10	1.22	1.20	2	5	3
RF4451d-70A RRH	15.0	15.0	8.9	1.56	0.93	1.00	1.69	1.20	1.20	4	3	4
RF4451d-70A RRH (Side)	15.0	8.9	15.0	0.93	1.56	1.69	1.00	1.20	1.20	3	4	3
RF4451d-70A RRH (Shielded)	15.0	4.5	15.0	0.46	1.56	3.37	1.00	1.24	1.20	1	4	2
RDIDC-9181-PF-48 OVP	16.6	14.6	8.2	1.68	0.95	1.14	2.02	1.20	1.20	5	3	4

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM **Checked By:** MSC

ICE WEIGHT CALCULATIONS

Thickness of ice:	1.16	in.
Density of ice:	56	pcf

FFVV-65B-R2 Antenna

Weight of ice based on total radial SF area:

Height (in):	72.0	
Width (in):	19.6	
Depth (in):	7.8	
Total weight of ice on object:	189	lbs
Weight of object:	71.0	lbs
Combined weight of ice and object:	260	lbs

RF4450t-71A RRH

Weight of ice based on total radial SF area:

Height (in):	16.5	
Width (in):	15.0	
Depth (in):	11.0	
Total weight of ice on object:	39	lbs
Weight of object:	95.0	lbs
Combined weight of ice and object:	134	lbs

RF4451d-70A RRH

Weight of ice based on total radial SF area:

Height (in):	15.0	
Width (in):	15.0	
Depth (in):	8.9	
Total weight of ice on object:	33	lbs
Weight of object:	61.0	lbs
Combined weight of ice and object:	94	lbs

RDIDC-9181-PF-48 OVP

Weight of ice based on total radial SF area:

Height (in):	16.6	
Width (in):	14.6	
Depth (in):	8.2	
Total weight of ice on object:	35	lbs
Weight of object:	22.0	lbs
Combined weight of ice and object:	57	lbs

2-1/2" Pipe

Per foot weight of ice:

diameter (in):	2.88	
Per foot weight of ice on object:	6	plf

2" Pipe

Per foot weight of ice:

diameter (in):	2.38	
Per foot weight of ice on object:	5	plf

1-1/2" Pipe

Per foot weight of ice:

diameter (in):	1.9	
Per foot weight of ice on object:	4	plf

5/8" Round Bar

Per foot weight of ice:

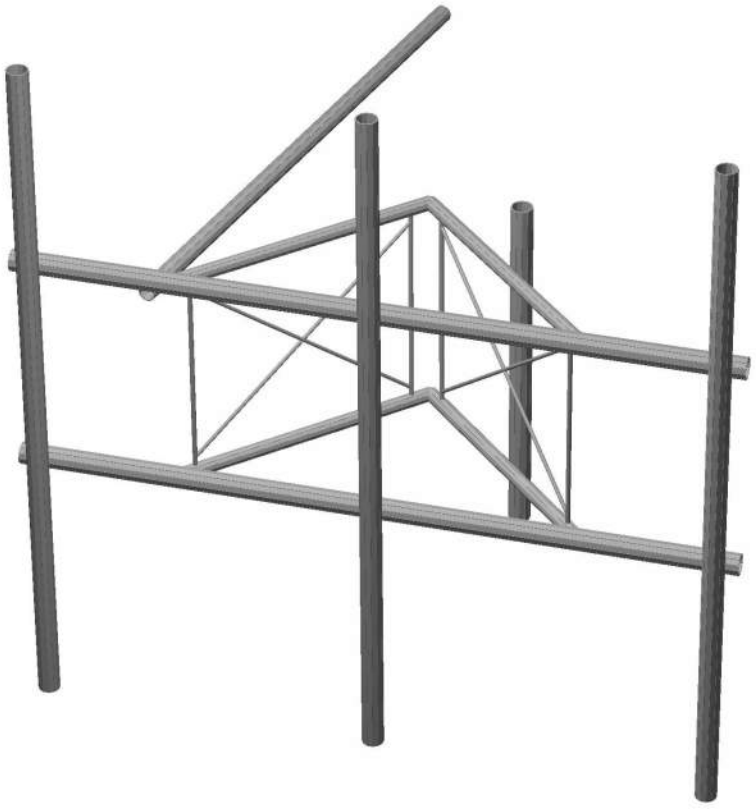
diameter (in):	0.625	
Per foot weight of ice on object:	3	plf

1/2" Round Bar

Per foot weight of ice:

diameter (in):	0.5	
Per foot weight of ice on object:	2	plf

Mount Calculations
(Proposed Conditions)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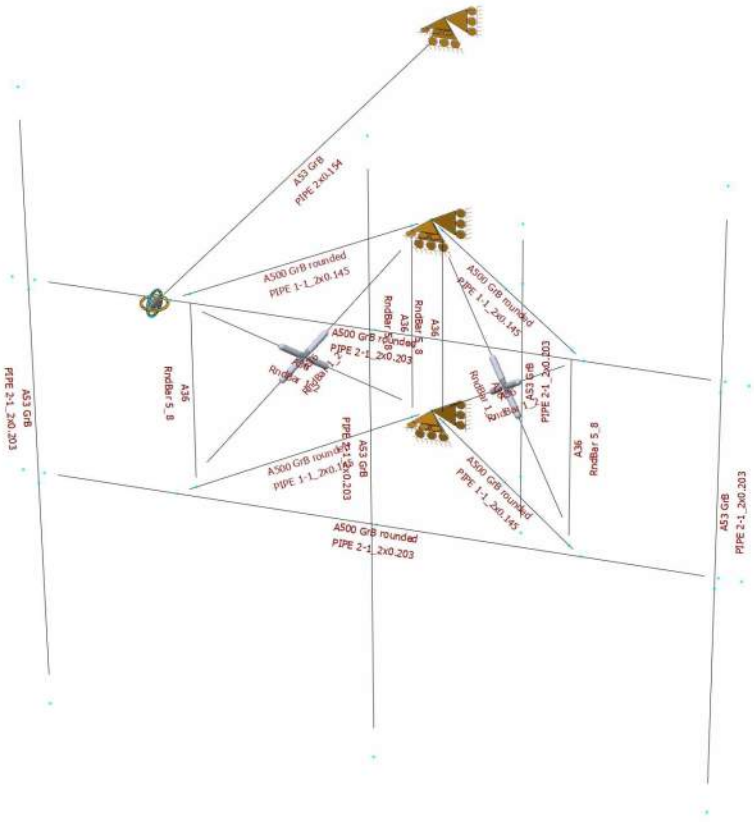
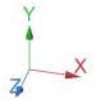
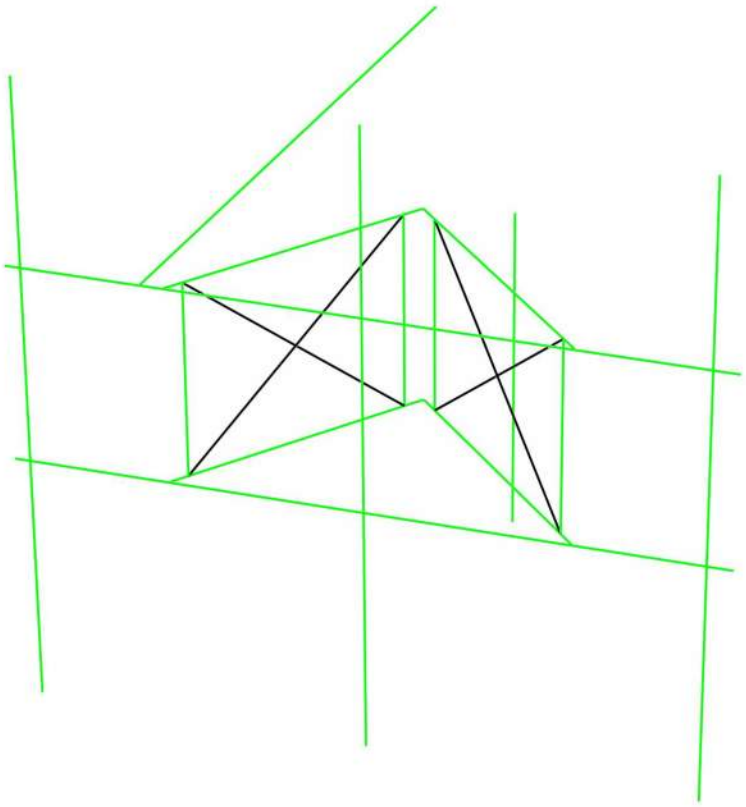
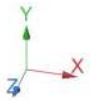
X
Z

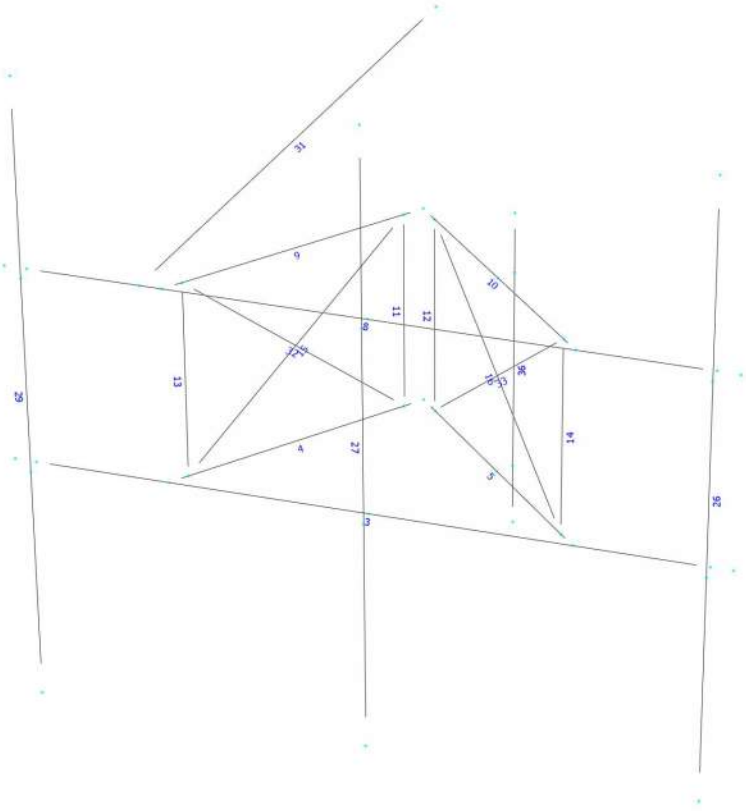

A53 GrB
PIPE 2x0.154
A500 GrB rounded
PIPE 1-1_2x0.145
A500 GrB rounded
PIPE 2-1_2x0.203
A36
RndBar 5_8
A53 GrB
PIPE 2-1_2x0.203
A500 GrB rounded
PIPE 1-1_2x0.145
A500 GrB rounded
PIPE 2-1_2x0.203


Y
X
Z

Design status
- Not designed
- Error on design
- Design O.K.
- With warnings






31
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Z

RAM® Elements
CONNECT Edition

Current Date: 9/8/2023 1:10 PM
Units system: English

Load data

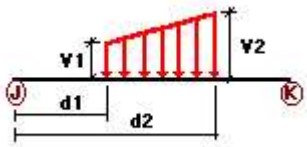
GLOSSARY

Comb : Indicates if load condition is a load combination

Load Conditions

Condition	Description	Comb.	Category
D	Dead Load	No	DL
Wo	Wind Load (NO ICE)	No	WIND
W30	WL 30deg	No	WIND
W60	WL 60deg	No	WIND
W90	WL 90deg	No	WIND
W120	WL 120deg	No	WIND
W150	WL 150deg	No	WIND
Di	Ice Load	No	LL
WI0	WL ICE 0deg	No	WIND
WI30	WL ICE 30deg	No	WIND
WI60	WL ICE 60deg	No	WIND
WI90	WL ICE 90deg	No	WIND
WI120	WL ICE 120deg	No	WIND
WI150	WL ICE 150deg	No	WIND
WL0	WL 30 mph 0deg	No	WIND
WL30	WL 30 mph 30deg	No	WIND
WL60	WL 30 mph 60deg	No	WIND
WL90	WL 30 mph 90deg	No	WIND
WL120	WL 30 mph 120deg	No	WIND
WL150	WL 30 mph 150deg	No	WIND
LL1	250 lb Live Load Center of Mount	No	LL
LL2	250 lb Live Load Right End of Mount	No	LL
LL3	250 lb Live Load Left End of Mount	No	LL
LLa1	500 lb Live Load Antenna 1	No	LL
LLa2	500 lb Live Load Antenna 2	No	LL
LLa3	500 lb Live Load Antenna 3	No	LL

Distributed force on members

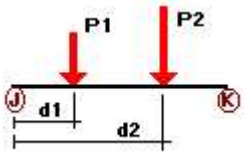


Condition	Member	Dir1	Val1 [Kip/ft]	Val2 [Kip/ft]	Dist1 [ft]	%	Dist2 [ft]	%
Wo	3	z	-0.012	-0.012	0.00	No	100.00	Yes
	4	z	-0.008	-0.008	0.00	No	100.00	Yes
	5	z	-0.008	-0.008	0.00	No	100.00	Yes
	8	z	-0.012	-0.012	0.00	No	100.00	Yes
	9	z	-0.008	-0.008	0.00	No	100.00	Yes
	10	z	-0.008	-0.008	0.00	No	100.00	Yes
	11	z	-0.003	-0.003	0.00	No	100.00	Yes
	12	z	-0.003	-0.003	0.00	No	100.00	Yes
	13	z	-0.003	-0.003	0.00	No	100.00	Yes
	14	z	-0.003	-0.003	0.00	No	100.00	Yes
	15	z	-0.002	-0.002	0.00	No	100.00	Yes
	16	z	-0.002	-0.002	0.00	No	100.00	Yes
	26	z	-0.012	-0.012	0.00	No	100.00	Yes
	27	z	-0.012	-0.012	90.00	Yes	100.00	Yes
		z	-0.012	-0.012	0.00	No	10.00	Yes
	29	z	-0.012	-0.012	0.00	No	100.00	Yes
	31	z	-0.01	-0.01	0.00	No	100.00	Yes
	32	z	-0.002	-0.002	0.00	No	100.00	Yes
	33	z	-0.002	-0.002	0.00	No	100.00	Yes
	36	z	-0.012	-0.012	0.00	No	100.00	Yes
W30	3	z	-0.012	-0.012	0.00	No	100.00	Yes
	4	z	-0.008	-0.008	0.00	No	100.00	Yes
	5	z	-0.008	-0.008	0.00	No	100.00	Yes
	8	z	-0.012	-0.012	0.00	No	100.00	Yes
	9	z	-0.008	-0.008	0.00	No	100.00	Yes
	10	z	-0.008	-0.008	0.00	No	100.00	Yes
	11	z	-0.003	-0.003	0.00	No	100.00	Yes
	12	z	-0.003	-0.003	0.00	No	100.00	Yes
	13	z	-0.003	-0.003	0.00	No	100.00	Yes
	14	z	-0.003	-0.003	0.00	No	100.00	Yes
	15	z	-0.002	-0.002	0.00	No	100.00	Yes
	16	z	-0.002	-0.002	0.00	No	100.00	Yes
	26	z	-0.012	-0.012	0.00	No	100.00	Yes
	27	z	-0.012	-0.012	0.00	No	100.00	Yes
	29	z	-0.012	-0.012	0.00	No	100.00	Yes
	31	z	-0.01	-0.01	0.00	No	100.00	Yes
	32	z	-0.002	-0.002	0.00	No	100.00	Yes
	33	z	-0.002	-0.002	0.00	No	100.00	Yes
	36	z	-0.012	-0.012	0.00	No	100.00	Yes
W60	3	x	-0.012	-0.012	0.00	No	100.00	Yes
	4	x	-0.008	-0.008	0.00	No	100.00	Yes
	5	x	-0.008	-0.008	0.00	No	100.00	Yes
	8	x	-0.012	-0.012	0.00	No	100.00	Yes
	9	x	-0.008	-0.008	0.00	No	100.00	Yes
	10	x	-0.008	-0.008	0.00	No	100.00	Yes
	11	x	-0.003	-0.003	0.00	No	100.00	Yes
	12	x	-0.003	-0.003	0.00	No	100.00	Yes
	13	x	-0.003	-0.003	0.00	No	100.00	Yes
	14	x	-0.003	-0.003	0.00	No	100.00	Yes
	15	x	-0.002	-0.002	0.00	No	100.00	Yes
	16	x	-0.002	-0.002	0.00	No	100.00	Yes
	26	x	-0.012	-0.012	0.00	No	100.00	Yes
	27	x	-0.012	-0.012	0.00	No	100.00	Yes
	29	x	-0.012	-0.012	0.00	No	100.00	Yes
	31	x	-0.01	-0.01	0.00	No	100.00	Yes
	32	x	-0.002	-0.002	0.00	No	100.00	Yes
	33	x	-0.002	-0.002	0.00	No	100.00	Yes
	36	x	-0.012	-0.012	0.00	No	100.00	Yes
W90	3	x	-0.012	-0.012	0.00	No	100.00	Yes
	4	x	-0.008	-0.008	0.00	No	100.00	Yes

	5	x	-0.008	-0.008	0.00	No	100.00	Yes
	8	x	-0.012	-0.012	0.00	No	100.00	Yes
	9	x	-0.008	-0.008	0.00	No	100.00	Yes
	10	x	-0.008	-0.008	0.00	No	100.00	Yes
	11	x	-0.003	-0.003	0.00	No	100.00	Yes
	12	x	-0.003	-0.003	0.00	No	100.00	Yes
	13	x	-0.003	-0.003	0.00	No	100.00	Yes
	14	x	-0.003	-0.003	0.00	No	100.00	Yes
	15	x	-0.002	-0.002	0.00	No	100.00	Yes
	16	x	-0.002	-0.002	0.00	No	100.00	Yes
	26	x	-0.012	-0.012	0.00	No	100.00	Yes
	27	x	-0.012	-0.012	0.00	No	100.00	Yes
	29	x	-0.012	-0.012	0.00	No	100.00	Yes
	31	x	-0.01	-0.01	0.00	No	100.00	Yes
	32	x	-0.002	-0.002	0.00	No	100.00	Yes
	33	x	-0.002	-0.002	0.00	No	100.00	Yes
	36	x	-0.012	-0.012	0.00	No	100.00	Yes
W120	3	x	-0.012	-0.012	0.00	No	100.00	Yes
	4	x	-0.008	-0.008	0.00	No	100.00	Yes
	5	x	-0.008	-0.008	0.00	No	100.00	Yes
	8	x	-0.012	-0.012	0.00	No	100.00	Yes
	9	x	-0.008	-0.008	0.00	No	100.00	Yes
	10	x	-0.008	-0.008	0.00	No	100.00	Yes
	11	x	-0.003	-0.003	0.00	No	100.00	Yes
	12	x	-0.003	-0.003	0.00	No	100.00	Yes
	13	x	-0.003	-0.003	0.00	No	100.00	Yes
	14	x	-0.003	-0.003	0.00	No	100.00	Yes
	15	x	-0.002	-0.002	0.00	No	100.00	Yes
	16	x	-0.002	-0.002	0.00	No	100.00	Yes
	26	x	-0.012	-0.012	0.00	No	100.00	Yes
	27	x	-0.012	-0.012	0.00	No	100.00	Yes
	29	x	-0.012	-0.012	0.00	No	100.00	Yes
	31	x	-0.01	-0.01	0.00	No	100.00	Yes
	32	x	-0.002	-0.002	0.00	No	100.00	Yes
	33	x	-0.002	-0.002	0.00	No	100.00	Yes
	36	x	-0.012	-0.012	0.00	No	100.00	Yes
W150	3	z	0.012	0.012	0.00	No	100.00	Yes
	4	z	0.008	0.008	0.00	No	100.00	Yes
	5	z	0.008	0.008	0.00	No	100.00	Yes
	8	z	0.012	0.012	0.00	No	100.00	Yes
	9	z	0.008	0.008	0.00	No	100.00	Yes
	10	z	0.008	0.008	0.00	No	100.00	Yes
	11	z	0.003	0.003	0.00	No	100.00	Yes
	12	z	0.003	0.003	0.00	No	100.00	Yes
	13	z	0.003	0.003	0.00	No	100.00	Yes
	14	z	0.003	0.003	0.00	No	100.00	Yes
	15	z	0.002	0.002	0.00	No	100.00	Yes
	16	z	0.002	0.002	0.00	No	100.00	Yes
	26	z	0.012	0.012	0.00	No	100.00	Yes
	27	z	0.012	0.012	0.00	No	100.00	Yes
	29	z	0.012	0.012	0.00	No	100.00	Yes
	31	z	0.01	0.01	0.00	No	100.00	Yes
	32	z	0.002	0.002	0.00	No	100.00	Yes
	33	z	0.002	0.002	0.00	No	100.00	Yes
	36	z	0.012	0.012	0.00	No	100.00	Yes
Di	3	y	-0.006	-0.006	0.00	No	100.00	Yes
	4	y	-0.004	-0.004	0.00	No	100.00	Yes
	5	y	-0.004	-0.004	0.00	No	100.00	Yes
	8	y	-0.006	-0.006	0.00	No	100.00	Yes
	9	y	-0.004	-0.004	0.00	No	100.00	Yes

10	y	-0.004	-0.004	0.00	No	100.00	Yes
11	y	-0.003	-0.003	0.00	No	100.00	Yes
12	y	-0.003	-0.003	0.00	No	100.00	Yes
13	y	-0.003	-0.003	0.00	No	100.00	Yes
14	y	-0.003	-0.003	0.00	No	100.00	Yes
15	y	-0.002	-0.002	0.00	No	100.00	Yes
16	y	-0.002	-0.002	0.00	No	100.00	Yes
26	y	-0.006	-0.006	0.00	No	100.00	Yes
27	y	-0.006	-0.006	0.00	No	100.00	Yes
29	y	-0.006	-0.006	0.00	No	100.00	Yes
31	y	-0.005	-0.005	0.00	No	100.00	Yes
32	y	-0.002	-0.002	0.00	No	100.00	Yes
33	y	-0.002	-0.002	0.00	No	100.00	Yes
36	y	-0.006	-0.006	0.00	No	100.00	Yes

Concentrated forces on members



Condition	Member	Dir1	Value1 [Kip]	Dist1 [ft]	%
D	27	y	-0.036	1.50	No
		y	-0.036	6.50	No
		y	-0.095	4.00	No
		y	-0.061	4.00	No
	36	y	-0.022	2.00	No
Wo	27	z	-0.255	1.50	No
		z	-0.255	6.50	No
		z	-0.032	4.00	No
		z	-0.024	4.00	No
	36	z	-0.084	2.00	No
W30	27	3	-0.221	1.50	No
		3	-0.221	6.50	No
		3	-0.045	4.00	No
	36	3	-0.075	2.00	No
W60	27	3	-0.153	1.50	No
		3	-0.153	6.50	No
		3	-0.072	4.00	No
	36	3	-0.056	2.00	No
W90	27	x	-0.12	1.50	No
		x	-0.12	6.50	No
		x	-0.086	4.00	No
	36	x	-0.047	2.00	No
W120	27	2	-0.153	1.50	No
		2	-0.153	6.50	No
		2	-0.072	4.00	No
	36	2	-0.056	2.00	No
W150	27	2	-0.221	1.50	No
		2	-0.221	6.50	No
		2	-0.045	4.00	No
	36	2	-0.075	2.00	No
Di	27	y	-0.095	1.50	No

		y	-0.095	6.50	No
		y	-0.039	4.00	No
		y	-0.033	4.00	No
	36	y	-0.035	2.00	No
WI0	27	z	-0.047	1.50	No
		z	-0.047	6.50	No
		z	-0.008	4.00	No
		z	-0.007	4.00	No
	36	z	-0.018	2.00	No
WI30	27	3	-0.041	1.50	No
		3	-0.041	6.50	No
		3	-0.011	4.00	No
	36	3	-0.016	2.00	No
WI60	27	3	-0.03	1.50	No
		3	-0.03	6.50	No
		3	-0.016	4.00	No
	36	3	-0.013	2.00	No
WI90	27	x	-0.025	1.50	No
		x	-0.025	6.50	No
		x	-0.018	4.00	No
	36	x	-0.011	2.00	No
WI120	27	2	-0.03	1.50	No
		2	-0.03	6.50	No
		2	-0.016	4.00	No
	36	2	-0.013	2.00	No
WI150	27	2	-0.041	1.50	No
		2	-0.041	6.50	No
		2	-0.011	4.00	No
	36	2	-0.016	2.00	No
WL0	27	z	-0.015	1.50	No
		z	-0.015	6.50	No
		z	-0.002	4.00	No
		z	-0.001	4.00	No
	36	z	-0.005	2.00	No
WL30	27	3	-0.013	1.50	No
		3	-0.013	6.50	No
		3	-0.003	4.00	No
	36	3	-0.004	2.00	No
WL60	27	3	-0.009	1.50	No
		3	-0.009	6.50	No
		3	-0.004	4.00	No
	36	3	-0.003	2.00	No
WL90	27	x	-0.007	1.50	No
		x	-0.007	6.50	No
		x	-0.005	4.00	No
	36	x	-0.003	2.00	No
WL120	27	2	-0.009	1.50	No
		2	-0.009	6.50	No
		2	-0.004	4.00	No
	36	2	-0.003	2.00	No
WL150	27	2	-0.013	1.50	No
		2	-0.013	6.50	No
		2	-0.003	4.00	No
	36	2	-0.004	2.00	No
LL1	3	y	-0.25	50.00	Yes
LL2	3	y	-0.25	100.00	Yes
LL3	3	y	-0.25	0.00	Yes
LLa1	26	y	-0.50	50.00	Yes
LLa2	27	y	-0.50	50.00	Yes
LLa3	29	y	-0.50	50.00	Yes

Self weight multipliers for load conditions

Condition	Description	Self weight multiplier			
		Comb.	MultX	MultY	MultZ
D	Dead Load	No	0.00	-1.00	0.00
Wo	Wind Load (NO ICE)	No	0.00	0.00	0.00
W30	WL 30deg	No	0.00	0.00	0.00
W60	WL 60deg	No	0.00	0.00	0.00
W90	WL 90deg	No	0.00	0.00	0.00
W120	WL 120deg	No	0.00	0.00	0.00
W150	WL 150deg	No	0.00	0.00	0.00
Di	Ice Load	No	0.00	0.00	0.00
WI0	WL ICE 0deg	No	0.00	0.00	0.00
WI30	WL ICE 30deg	No	0.00	0.00	0.00
WI60	WL ICE 60deg	No	0.00	0.00	0.00
WI90	WL ICE 90deg	No	0.00	0.00	0.00
WI120	WL ICE 120deg	No	0.00	0.00	0.00
WI150	WL ICE 150deg	No	0.00	0.00	0.00
WL0	WL 30 mph 0deg	No	0.00	0.00	0.00
WL30	WL 30 mph 30deg	No	0.00	0.00	0.00
WL60	WL 30 mph 60deg	No	0.00	0.00	0.00
WL90	WL 30 mph 90deg	No	0.00	0.00	0.00
WL120	WL 30 mph 120deg	No	0.00	0.00	0.00
WL150	WL 30 mph 150deg	No	0.00	0.00	0.00
LL1	250 lb Live Load Center of Mount	No	0.00	0.00	0.00
LL2	250 lb Live Load Right End of Mount	No	0.00	0.00	0.00
LL3	250 lb Live Load Left End of Mount	No	0.00	0.00	0.00
LLa1	500 lb Live Load Antenna 1	No	0.00	0.00	0.00
LLa2	500 lb Live Load Antenna 2	No	0.00	0.00	0.00
LLa3	500 lb Live Load Antenna 3	No	0.00	0.00	0.00

RAM® Elements
CONNECT Edition

Current Date: 9/8/2023 1:11 PM
Units system: English

Steel Code Check

Report: Summary - Group by member

Load conditions to be included in design :

LC1=1.2D+Wo
LC2=1.2D+W30
LC3=1.2D+W60
LC4=1.2D+W90
LC5=1.2D+W120
LC6=1.2D+W150
LC7=1.2D-Wo
LC8=1.2D-W30
LC9=1.2D-W60
LC10=1.2D-W90
LC11=1.2D-W120
LC12=1.2D-W150
LC13=0.9D+Wo
LC14=0.9D+W30
LC15=0.9D+W60
LC16=0.9D+W90
LC17=0.9D+W120
LC18=0.9D+W150
LC19=0.9D-Wo
LC20=0.9D-W30
LC21=0.9D-W60
LC22=0.9D-W90
LC23=0.9D-W120
LC24=0.9D-W150
LC25=1.2D+Di+WI0
LC26=1.2D+Di+WI30
LC27=1.2D+Di+WI60
LC28=1.2D+Di+WI90
LC29=1.2D+Di+WI120
LC30=1.2D+Di+WI150
LC31=1.2D+Di-WI0
LC32=1.2D+Di-WI30
LC33=1.2D+Di-WI60
LC34=1.2D+Di-WI90
LC35=1.2D+Di-WI120
LC36=1.2D+Di-WI150
LC37=1.2D+1.6LL1
LC38=1.2D+1.6LL2
LC39=1.2D+1.6LL3
LC40=1.2D+WL0+1.6LLa1
LC41=1.2D+WL30+1.6LLa1
LC42=1.2D+WL60+1.6LLa1
LC43=1.2D+WL90+1.6LLa1
LC44=1.2D+WL120+1.6LLa1
LC45=1.2D+WL150+1.6LLa1
LC46=1.2D-WL0+1.6LLa1
LC47=1.2D-WL30+1.6LLa1
LC48=1.2D-WL60+1.6LLa1
LC49=1.2D-WL90+1.6LLa1
LC50=1.2D-WL120+1.6LLa1
LC51=1.2D-WL150+1.6LLa1
LC52=1.2D+WL0+1.6LLa2
LC53=1.2D+WL30+1.6LLa2
LC54=1.2D+WL60+1.6LLa2

LC55=1.2D+WL90+1.6LLa2
LC56=1.2D+WL120+1.6LLa2
LC57=1.2D+WL150+1.6LLa2
LC58=1.2D-WL0+1.6LLa2
LC59=1.2D-WL30+1.6LLa2
LC60=1.2D-WL60+1.6LLa2
LC61=1.2D-WL90+1.6LLa2
LC62=1.2D-WL120+1.6LLa2
LC63=1.2D-WL150+1.6LLa2
LC64=1.2D+WL0+1.6LLa3
LC65=1.2D+WL30+1.6LLa3
LC66=1.2D+WL60+1.6LLa3
LC67=1.2D+WL90+1.6LLa3
LC68=1.2D+WL120+1.6LLa3
LC69=1.2D+WL150+1.6LLa3
LC70=1.2D-WL0+1.6LLa3
LC71=1.2D-WL30+1.6LLa3
LC72=1.2D-WL60+1.6LLa3
LC73=1.2D-WL90+1.6LLa3
LC74=1.2D-WL120+1.6LLa3
LC75=1.2D-WL150+1.6LLa3

Description	Section	Member	Ctrl Eq.	Ratio	Status	Reference
	PIPE 1-1_2x0.145	**4**	LC70 at 6.25%	0.18	OK	
		5	LC46 at 6.25%	0.17	OK	
		9	LC70 at 93.75%	**0.20**	**OK**	
		10	LC41 at 93.75%	0.19	OK	
	PIPE 2-1_2x0.203	**3**	LC45 at 78.13%	0.13	OK	
		8	LC58 at 50.00%	0.12	OK	
		26	LC47 at 60.42%	0.10	OK	
		27	LC7 at 62.50%	**0.16**	**OK**	
		29	LC69 at 60.42%	0.10	OK	
		36	LC49 at 18.75%	0.02	OK	
	PIPE 2x0.154	**31**	LC4 at 75.00%	**0.12**	**OK**	
	RndBar 1_2	**15**	LC71 at 0.00%	**0.35**	**With warnings**	
		16	LC41 at 100.00%	0.35	With warnings	
		32	LC12 at 100.00%	0.05	With warnings	
		33	LC3 at 0.00%	0.05	With warnings	
	RndBar 5_8	**11**	LC53 at 0.00%	0.08	OK	
		12	LC46 at 100.00%	0.11	OK	
		13	LC64 at 0.00%	0.35	OK	
		14	LC40 at 0.00%	**0.36**	**OK**	

RAM® Elements
CONNECT Edition

Current Date: 9/8/2023 1:11 PM
Units system: English

Geometry data

GLOSSARY

Cb22, Cb33	: Moment gradient coefficients
Cm22, Cm33	: Coefficients applied to bending term in interaction formula
d0	: Tapered member section depth at J end of member
DJX	: Rigid end offset distance measured from J node in axis X
DJY	: Rigid end offset distance measured from J node in axis Y
DJZ	: Rigid end offset distance measured from J node in axis Z
DKX	: Rigid end offset distance measured from K node in axis X
DKY	: Rigid end offset distance measured from K node in axis Y
DKZ	: Rigid end offset distance measured from K node in axis Z
dL	: Tapered member section depth at K end of member
Ig factor	: Inertia reduction factor (Effective Inertia/Gross Inertia) for reinforced concrete members
K22	: Effective length factor about axis 2
K33	: Effective length factor about axis 3
L22	: Member length for calculation of axial capacity
L33	: Member length for calculation of axial capacity
LB pos	: Lateral unbraced length of the compression flange in the positive side of local axis 2
LB neg	: Lateral unbraced length of the compression flange in the negative side of local axis 2
RX	: Rotation about X
RY	: Rotation about Y
RZ	: Rotation about Z
TO	: 1 = Tension only member 0 = Normal member
TX	: Translation in X
TY	: Translation in Y
TZ	: Translation in Z

Nodes

Node	X [ft]	Y [ft]	Z [ft]	Rigid Floor
2	4.00	0.00	0.00	0
3	-4.00	0.00	0.00	0
4	3.75	0.00	0.00	0
5	-3.75	0.00	0.00	0
6	3.75	0.00	0.20	0
7	-3.75	0.00	0.20	0
8	-2.25	0.00	0.00	0
9	2.25	0.00	0.00	0
10	0.00	0.00	-2.25	0
16	4.00	2.50	0.00	0
17	-4.00	2.50	0.00	0
18	3.75	2.50	0.00	0
19	-3.75	2.50	0.00	0
20	3.75	2.50	0.20	0
21	-3.75	2.50	0.20	0
22	-2.25	2.50	0.00	0
23	2.25	2.50	0.00	0
24	0.00	2.50	-2.25	0
33	-3.75	5.00	0.20	0
34	3.75	5.00	0.20	0
35	-3.75	-3.00	0.20	0
36	3.75	-3.00	0.20	0
38	0.00	0.00	0.00	0

39	0.00	0.00	0.20	0
40	0.00	2.50	0.00	0
41	0.00	2.50	0.20	0
42	0.00	5.00	0.20	0
43	0.00	-3.00	0.20	0
52	-2.50	2.50	0.00	0
88	0.1731	2.50	-2.0769	0
120	2.0769	2.50	-0.1731	0
121	-2.0769	0.00	-0.1731	0
122	-0.1731	0.00	-2.0769	0
123	0.1731	0.00	-2.0769	0
124	2.0769	0.00	-0.1731	0
126	-0.1731	2.50	-2.0769	0
156	-2.0769	2.50	-0.1731	0
157	1.125	2.50	-1.125	0
158	1.125	0.00	-1.125	0
159	1.27	2.50	-1.27	0
160	1.27	0.00	-1.27	0
161	1.27	3.25	-1.27	0
162	1.27	-0.75	-1.27	0
51	-1.00	2.50	-6.50	0

Restraints

Node	TX	TY	TZ	RX	RY	RZ
10	1	1	1	0	0	0
24	1	1	1	0	0	0
51	1	1	1	0	0	0

Members

Member	NJ	NK	Description	Section	Material	d0 [in]	dL [in]	lg factor
3	3	2		PIPE 2-1_2x0.203	A500 GrB rounded	0.00	0.00	0.00
4	8	10		PIPE 1-1_2x0.145	A500 GrB rounded	0.00	0.00	0.00
5	9	10		PIPE 1-1_2x0.145	A500 GrB rounded	0.00	0.00	0.00
8	17	16		PIPE 2-1_2x0.203	A500 GrB rounded	0.00	0.00	0.00
9	22	24		PIPE 1-1_2x0.145	A500 GrB rounded	0.00	0.00	0.00
10	23	24		PIPE 1-1_2x0.145	A500 GrB rounded	0.00	0.00	0.00
11	126	122		RndBar 5_8	A36	0.00	0.00	0.00
12	88	123		RndBar 5_8	A36	0.00	0.00	0.00
13	156	121		RndBar 5_8	A36	0.00	0.00	0.00
14	120	124		RndBar 5_8	A36	0.00	0.00	0.00
15	126	121		RndBar 1_2	A36	0.00	0.00	0.00
16	88	124		RndBar 1_2	A36	0.00	0.00	0.00
26	34	36		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
27	42	43		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
29	33	35		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00
31	52	51		PIPE 2x0.154	A53 GrB	0.00	0.00	0.00
32	156	122		RndBar 1_2	A36	0.00	0.00	0.00
33	120	123		RndBar 1_2	A36	0.00	0.00	0.00

36	161	162		PIPE 2-1_2x0.203	A53 GrB	0.00	0.00	0.00

Orientation of local axes

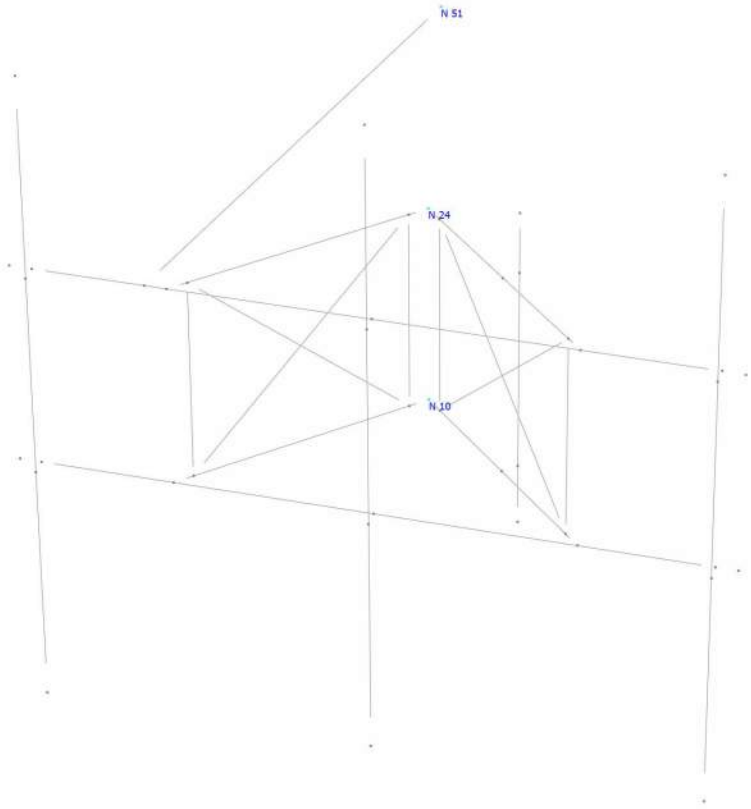
Member	Rotation [Deg]	Axes23	NX	NY	NZ
12	315.00	0	0.00	0.00	0.00
26	315.00	0	0.00	0.00	0.00
27	315.00	0	0.00	0.00	0.00
29	315.00	0	0.00	0.00	0.00
36	315.00	0	0.00	0.00	0.00

Rigid end offsets

Member	DJX [in]	DJY [in]	DJZ [in]	DKX [in]	DKY [in]	DKZ [in]
15	0.00	-2.00	0.00	0.00	2.00	0.00
16	0.00	-2.00	0.00	0.00	2.00	0.00
31	0.00	-2.00	0.00	0.00	-2.00	0.00
32	0.00	-2.00	0.00	0.00	2.00	0.00
33	0.00	-2.00	0.00	0.00	2.00	0.00

Hinges

	Node-J				Node-K						
Member	M33	M22	V3	V2	M33	M22	V3	V2	TOR	AXL	Axial rigidity
15	0	0	0	0	0	0	0	0	0	0	Tension only
16	0	0	0	0	0	0	0	0	0	0	Tension only
31	1	1	0	0	0	0	0	0	0	0	Full
32	0	0	0	0	0	0	0	0	0	0	Tension only
33	0	0	0	0	0	0	0	0	0	0	Tension only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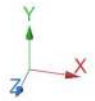
N 24
N 10

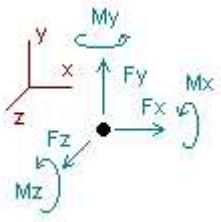

Y
X
Z

RAM® Elements
CONNECT Edition

Current Date: 9/8/2023 1:11 PM
Units system: English

Analysis result

Reactions



Direction of positive forces and moments

	Forces [Kip]			Moments [Kip*ft]		
Node	**FX**	**FY**	**FZ**	**MX**	**MY**	**MZ**
Condition **LC1=1.2D+Wo**						
10	0.01513	0.13099	1.27791	0.00000	0.00000	0.00000
24	-0.03248	0.53867	0.03107	0.00000	0.00000	0.00000
51	0.01736	0.01529	-0.06771	0.00000	0.00000	0.00000
SUM	0.00000	0.68494	1.24127	0.00000	0.00000	0.00000
Condition **LC2=1.2D+W30**						
10	0.24329	0.13231	1.15491	0.00000	0.00000	0.00000
24	0.24582	0.54949	-0.49418	0.00000	0.00000	0.00000
51	-0.09172	0.00314	0.40474	0.00000	0.00000	0.00000
SUM	0.39739	0.68494	1.06547	0.00000	0.00000	0.00000
Condition **LC3=1.2D+W60**						
10	0.44972	0.12307	0.72806	0.00000	0.00000	0.00000
24	0.53847	0.56903	-1.23388	0.00000	0.00000	0.00000
51	-0.15523	-0.00716	0.81270	0.00000	0.00000	0.00000
SUM	0.83296	0.68494	0.30688	0.00000	0.00000	0.00000
Condition **LC4=1.2D+W90**						
10	0.48760	0.12065	0.54349	0.00000	0.00000	0.00000
24	0.59012	0.57405	-1.45750	0.00000	0.00000	0.00000
51	-0.17864	-0.00975	0.91401	0.00000	0.00000	0.00000
SUM	0.89907	0.68494	0.00000	0.00000	0.00000	0.00000
Condition **LC5=1.2D+W120**						
10	0.44920	0.11646	0.36551	0.00000	0.00000	0.00000
24	0.55057	0.57693	-1.53529	0.00000	0.00000	0.00000
51	-0.16681	-0.00844	0.86290	0.00000	0.00000	0.00000
SUM	0.83296	0.68494	-0.30688	0.00000	0.00000	0.00000

Condition **LC6=1.2D+W150**

10	0.24224	0.08543	-0.02845	0.00000	0.00000	0.00000
24	0.27218	0.59882	-1.53631	0.00000	0.00000	0.00000
51	-0.11702	0.00069	0.49929	0.00000	0.00000	0.00000
SUM	0.39739	0.68494	-1.06547	0.00000	0.00000	0.00000

Condition **LC7=1.2D-Wo**

10	0.01367	0.07891	-0.11204	0.00000	0.00000	0.00000
24	0.00365	0.59425	-1.19678	0.00000	0.00000	0.00000
51	-0.01732	0.01179	0.06754	0.00000	0.00000	0.00000
SUM	0.00000	0.68494	-1.24127	0.00000	0.00000	0.00000

Condition **LC8=1.2D-W30**

10	-0.21447	0.07739	0.01103	0.00000	0.00000	0.00000
24	-0.27441	0.58362	-0.67239	0.00000	0.00000	0.00000
51	0.09149	0.02393	-0.40411	0.00000	0.00000	0.00000
SUM	-0.39739	0.68494	-1.06547	0.00000	0.00000	0.00000

Condition **LC9=1.2D-W60**

10	-0.42087	0.08644	0.43817	0.00000	0.00000	0.00000
24	-0.56701	0.56419	0.06781	0.00000	0.00000	0.00000
51	0.15492	0.03431	-0.81287	0.00000	0.00000	0.00000
SUM	-0.83296	0.68494	-0.30688	0.00000	0.00000	0.00000

Condition **LC10=1.2D-W90**

10	-0.45874	0.08877	0.62286	0.00000	0.00000	0.00000
24	-0.61877	0.55923	0.29203	0.00000	0.00000	0.00000
51	0.17844	0.03695	-0.91489	0.00000	0.00000	0.00000
SUM	-0.89907	0.68494	0.00000	0.00000	0.00000	0.00000

Condition **LC11=1.2D-W120**

10	-0.42036	0.09303	0.80080	0.00000	0.00000	0.00000
24	-0.57937	0.55627	0.37027	0.00000	0.00000	0.00000
51	0.16677	0.03564	-0.86418	0.00000	0.00000	0.00000
SUM	-0.83296	0.68494	0.30688	0.00000	0.00000	0.00000

Condition **LC12=1.2D-W150**

10	-0.21342	0.12430	1.19455	0.00000	0.00000	0.00000
24	-0.30118	0.53420	0.37158	0.00000	0.00000	0.00000
51	0.11721	0.02645	-0.50066	0.00000	0.00000	0.00000
SUM	-0.39739	0.68494	1.06547	0.00000	0.00000	0.00000

Condition **LC13=0.9D+Wo**

10	0.01152	0.10499	1.13215	0.00000	0.00000	0.00000
24	-0.02888	0.39682	0.17685	0.00000	0.00000	0.00000
51	0.01736	0.01190	-0.06772	0.00000	0.00000	0.00000
SUM	0.00000	0.51371	1.24127	0.00000	0.00000	0.00000

Condition **LC14=0.9D+W30**

10	0.23972	0.10633	1.00916	0.00000	0.00000	0.00000
24	0.24939	0.40761	-0.34841	0.00000	0.00000	0.00000
51	-0.09171	-0.00024	0.40472	0.00000	0.00000	0.00000
SUM	0.39739	0.51371	1.06547	0.00000	0.00000	0.00000

Condition **LC15=0.9D+W60**

10	0.44620	0.09672	0.58236	0.00000	0.00000	0.00000
24	0.54199	0.42751	-1.08817	0.00000	0.00000	0.00000
51	-0.15522	-0.01052	0.81269	0.00000	0.00000	0.00000
SUM	0.83296	0.51371	0.30688	0.00000	0.00000	0.00000

Condition **LC16=0.9D+W90**

10	0.48408	0.09205	0.39780	0.00000	0.00000	0.00000
24	0.59363	0.43477	-1.31179	0.00000	0.00000	0.00000
51	-0.17864	-0.01311	0.91400	0.00000	0.00000	0.00000
SUM	0.89907	0.51371	0.00000	0.00000	0.00000	0.00000

Condition **LC17=0.9D+W120**

10	0.44567	0.09006	0.21982	0.00000	0.00000	0.00000
24	0.55409	0.43545	-1.38959	0.00000	0.00000	0.00000
51	-0.16680	-0.01180	0.86289	0.00000	0.00000	0.00000
SUM	0.83296	0.51371	-0.30688	0.00000	0.00000	0.00000

Condition **LC18=0.9D+W150**

10	0.23868	0.05891	-0.17412	0.00000	0.00000	0.00000
24	0.27573	0.45748	-1.39064	0.00000	0.00000	0.00000
51	-0.11702	-0.00268	0.49929	0.00000	0.00000	0.00000
SUM	0.39739	0.51371	-1.06547	0.00000	0.00000	0.00000

Condition **LC19=0.9D-Wo**

10	0.01008	0.05235	-0.25772	0.00000	0.00000	0.00000
24	0.00724	0.45296	-1.05110	0.00000	0.00000	0.00000
51	-0.01732	0.00840	0.06755	0.00000	0.00000	0.00000
SUM	0.00000	0.51371	-1.24127	0.00000	0.00000	0.00000

Condition **LC20=0.9D-W30**

10	-0.21810	0.05065	-0.13468	0.00000	0.00000	0.00000
24	-0.27078	0.44252	-0.52669	0.00000	0.00000	0.00000
51	0.09148	0.02054	-0.40410	0.00000	0.00000	0.00000
SUM	-0.39739	0.51371	-1.06547	0.00000	0.00000	0.00000

Condition **LC21=0.9D-W60**

10	-0.42454	0.05990	0.29242	0.00000	0.00000	0.00000
24	-0.56334	0.42289	0.21356	0.00000	0.00000	0.00000
51	0.15492	0.03091	-0.81286	0.00000	0.00000	0.00000
SUM	-0.83296	0.51371	-0.30688	0.00000	0.00000	0.00000

Condition **LC22=0.9D-W90**

10	-0.46241	0.06225	0.47710	0.00000	0.00000	0.00000
24	-0.61510	0.41792	0.43779	0.00000	0.00000	0.00000
51	0.17843	0.03355	-0.91489	0.00000	0.00000	0.00000
SUM	-0.89907	0.51371	0.00000	0.00000	0.00000	0.00000

Condition **LC23=0.9D-W120**

10	-0.42403	0.06654	0.65503	0.00000	0.00000	0.00000
24	-0.57570	0.41494	0.51603	0.00000	0.00000	0.00000
51	0.16677	0.03224	-0.86418	0.00000	0.00000	0.00000
SUM	-0.83296	0.51371	0.30688	0.00000	0.00000	0.00000

Condition **LC24=0.9D-W150**

10	-0.21706	0.09826	1.04877	0.00000	0.00000	0.00000
24	-0.29754	0.39239	0.51737	0.00000	0.00000	0.00000
51	0.11721	0.02305	-0.50067	0.00000	0.00000	0.00000
SUM	-0.39739	0.51371	1.06547	0.00000	0.00000	0.00000

Condition **LC25=1.2D+Di+WI0**

10	0.01559	0.18527	1.06232	0.00000	0.00000	0.00000
24	-0.01825	0.96797	-0.92382	0.00000	0.00000	0.00000
51	0.00265	0.03051	-0.01150	0.00000	0.00000	0.00000
SUM	0.00000	1.18375	0.12700	0.00000	0.00000	0.00000

Condition **LC26=1.2D+Di+WI30**

10	0.05973	0.18532	1.02904	0.00000	0.00000	0.00000
24	0.03575	0.97027	-1.03169	0.00000	0.00000	0.00000
51	-0.01840	0.02816	0.07972	0.00000	0.00000	0.00000
SUM	0.07707	1.18375	0.07707	0.00000	0.00000	0.00000

Condition **LC27=1.2D+Di+WI60**

10	0.05161	0.18501	1.02141	0.00000	0.00000	0.00000
24	0.02636	0.97021	-1.02364	0.00000	0.00000	0.00000
51	-0.01504	0.02853	0.06516	0.00000	0.00000	0.00000
SUM	0.06293	1.18375	0.06293	0.00000	0.00000	0.00000

Condition **LC28=1.2D+Di+WI90**

10	0.06082	0.18451	0.98350	0.00000	0.00000	0.00000
24	0.03886	0.97134	-1.07308	0.00000	0.00000	0.00000
51	-0.02068	0.02790	0.08958	0.00000	0.00000	0.00000
SUM	0.07900	1.18375	0.00000	0.00000	0.00000	0.00000

Condition **LC29=1.2D+Di+WI120**

10	0.05149	0.18358	0.94721	0.00000	0.00000	0.00000
24	0.02920	0.97194	-1.08708	0.00000	0.00000	0.00000
51	-0.01776	0.02823	0.07694	0.00000	0.00000	0.00000
SUM	0.06293	1.18375	-0.06293	0.00000	0.00000	0.00000

Condition **LC30=1.2D+Di+WI150**

10	0.05958	0.18347	0.93819	0.00000	0.00000	0.00000
24	0.03924	0.97250	-1.10947	0.00000	0.00000	0.00000
51	-0.02175	0.02778	0.09421	0.00000	0.00000	0.00000
SUM	0.07707	1.18375	-0.07707	0.00000	0.00000	0.00000

Condition **LC31=1.2D+Di-WI0**

10	0.01536	0.18232	0.91252	0.00000	0.00000	0.00000
24	-0.01269	0.97152	-1.05109	0.00000	0.00000	0.00000
51	-0.00267	0.02991	0.01156	0.00000	0.00000	0.00000
SUM	0.00000	1.18375	-0.12700	0.00000	0.00000	0.00000

Condition **LC32=1.2D+Di-WI30**

10	-0.02877	0.18226	0.94581	0.00000	0.00000	0.00000
24	-0.06669	0.96922	-0.94323	0.00000	0.00000	0.00000
51	0.01838	0.03227	-0.07966	0.00000	0.00000	0.00000
SUM	-0.07707	1.18375	-0.07707	0.00000	0.00000	0.00000

Condition **LC33=1.2D+Di-WI60**

10	-0.02066	0.18257	0.95344	0.00000	0.00000	0.00000
24	-0.05730	0.96929	-0.95127	0.00000	0.00000	0.00000
51	0.01502	0.03189	-0.06510	0.00000	0.00000	0.00000
SUM	-0.06293	1.18375	-0.06293	0.00000	0.00000	0.00000

Condition **LC34=1.2D+Di-WI90**

10	-0.02986	0.18307	0.99135	0.00000	0.00000	0.00000
24	-0.06980	0.96816	-0.90183	0.00000	0.00000	0.00000
51	0.02066	0.03252	-0.08953	0.00000	0.00000	0.00000
SUM	-0.07900	1.18375	0.00000	0.00000	0.00000	0.00000

Condition **LC35=1.2D+Di-WI120**

10	-0.02054	0.18400	1.02764	0.00000	0.00000	0.00000
24	-0.06014	0.96755	-0.88782	0.00000	0.00000	0.00000
51	0.01774	0.03220	-0.07688	0.00000	0.00000	0.00000
SUM	-0.06293	1.18375	0.06293	0.00000	0.00000	0.00000

Condition **LC36=1.2D+Di-WI150**

10	-0.02862	0.18411	1.03667	0.00000	0.00000	0.00000
24	-0.07018	0.96700	-0.86543	0.00000	0.00000	0.00000
51	0.02173	0.03264	-0.09416	0.00000	0.00000	0.00000
SUM	-0.07707	1.18375	0.07707	0.00000	0.00000	0.00000

Condition **LC37=1.2D+1.6LL1**

10	0.01441	0.16127	0.94292	0.00000	0.00000	0.00000
24	-0.01440	0.91014	-0.94294	0.00000	0.00000	0.00000
51	-0.00001	0.01353	0.00002	0.00000	0.00000	0.00000
SUM	0.00000	1.08494	0.00000	0.00000	0.00000	0.00000

Condition **LC38=1.2D+1.6LL2**

10	0.65421	0.16637	0.94306	0.00000	0.00000	0.00000
24	-0.65417	0.90505	-0.94326	0.00000	0.00000	0.00000
51	-0.00005	0.01353	0.00020	0.00000	0.00000	0.00000
SUM	0.00000	1.08494	0.00000	0.00000	0.00000	0.00000

Condition **LC39=1.2D+1.6LL3**

10	-0.62541	0.12516	0.94303	0.00000	0.00000	0.00000
24	0.62537	0.94625	-0.94287	0.00000	0.00000	0.00000
51	0.00004	0.01354	-0.00016	0.00000	0.00000	0.00000
SUM	0.00000	1.08494	0.00000	0.00000	0.00000	0.00000

Condition **LC40=1.2D+WL0+1.6LLa1**

10	1.21423	0.21970	1.38955	0.00000	0.00000	0.00000
24	-1.21488	1.25164	-1.34875	0.00000	0.00000	0.00000
51	0.00065	0.01361	-0.00280	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	0.03800	0.00000	0.00000	0.00000

Condition **LC41=1.2D+WL30+1.6LLa1**

10	1.22763	0.21976	1.37976	0.00000	0.00000	0.00000
24	-1.19844	1.25231	-1.38180	0.00000	0.00000	0.00000
51	-0.00585	0.01288	0.02537	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Condition **LC42=1.2D+WL60+1.6LLa1**

10	1.22438	0.21963	1.37669	0.00000	0.00000	0.00000
24	-1.20224	1.25227	-1.37836	0.00000	0.00000	0.00000
51	-0.00446	0.01304	0.01934	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC43=1.2D+WL90+1.6LLa1**

10	1.22682	0.21944	1.36604	0.00000	0.00000	0.00000
24	-1.19896	1.25262	-1.39143	0.00000	0.00000	0.00000
51	-0.00586	0.01288	0.02539	0.00000	0.00000	0.00000
SUM	0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC44=1.2D+WL120+1.6LLa1**

10	1.22435	0.21927	1.35578	0.00000	0.00000	0.00000
24	-1.20158	1.25271	-1.39550	0.00000	0.00000	0.00000
51	-0.00509	0.01297	0.02205	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC45=1.2D+WL150+1.6LLa1**

10	1.22759	0.21925	1.35216	0.00000	0.00000	0.00000
24	-1.19757	1.25290	-1.40447	0.00000	0.00000	0.00000
51	-0.00669	0.01279	0.02898	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC46=1.2D-WL0+1.6LLa1**

10	1.21416	0.21884	1.34465	0.00000	0.00000	0.00000
24	-1.21333	1.25267	-1.38623	0.00000	0.00000	0.00000
51	-0.00083	0.01344	0.00359	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	-0.03800	0.00000	0.00000	0.00000

Condition **LC47=1.2D-WL30+1.6LLa1**

10	1.20076	0.21878	1.35443	0.00000	0.00000	0.00000
24	-1.22977	1.25200	-1.35318	0.00000	0.00000	0.00000
51	0.00567	0.01417	-0.02458	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC48=1.2D-WL60+1.6LLa1**

10	1.20402	0.21890	1.35750	0.00000	0.00000	0.00000
24	-1.22598	1.25203	-1.35662	0.00000	0.00000	0.00000
51	0.00428	0.01401	-0.01856	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC49=1.2D-WL90+1.6LLa1**

10	1.20158	0.21909	1.36816	0.00000	0.00000	0.00000
24	-1.22926	1.25169	-1.34355	0.00000	0.00000	0.00000
51	0.00568	0.01417	-0.02461	0.00000	0.00000	0.00000
SUM	-0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC50=1.2D-WL120+1.6LLa1**

10	1.20405	0.21926	1.37842	0.00000	0.00000	0.00000
24	-1.22663	1.25160	-1.33948	0.00000	0.00000	0.00000
51	0.00491	0.01408	-0.02127	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC51=1.2D-WL150+1.6LLa1**

10	1.20080	0.21928	1.38204	0.00000	0.00000	0.00000
24	-1.23064	1.25140	-1.33051	0.00000	0.00000	0.00000
51	0.00651	0.01426	-0.02820	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Condition **LC52=1.2D+WL0+1.6LLa2**

10	0.01446	0.21609	1.38941	0.00000	0.00000	0.00000
24	-0.01519	1.25524	-1.34825	0.00000	0.00000	0.00000
51	0.00073	0.01362	-0.00316	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	0.03800	0.00000	0.00000	0.00000

Condition **LC53=1.2D+WL30+1.6LLa2**

10	0.02788	0.21618	1.37959	0.00000	0.00000	0.00000
24	0.00122	1.25588	-1.38125	0.00000	0.00000	0.00000
51	-0.00577	0.01289	0.02499	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Condition **LC54=1.2D+WL60+1.6LLa2**

10	0.02462	0.21604	1.37653	0.00000	0.00000	0.00000
24	-0.00257	1.25586	-1.37783	0.00000	0.00000	0.00000
51	-0.00438	0.01304	0.01897	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC55=1.2D+WL90+1.6LLa2**

10	0.02707	0.21586	1.36586	0.00000	0.00000	0.00000
24	0.00071	1.25619	-1.39089	0.00000	0.00000	0.00000
51	-0.00578	0.01289	0.02503	0.00000	0.00000	0.00000
SUM	0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC56=1.2D+WL120+1.6LLa2**

10	0.02460	0.21568	1.35561	0.00000	0.00000	0.00000
24	-0.00191	1.25629	-1.39498	0.00000	0.00000	0.00000
51	-0.00501	0.01297	0.02169	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC57=1.2D+WL150+1.6LLa2**

10	0.02785	0.21567	1.35198	0.00000	0.00000	0.00000
24	0.00209	1.25647	-1.40394	0.00000	0.00000	0.00000
51	-0.00660	0.01280	0.02862	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC58=1.2D-WL0+1.6LLa2**

10	0.01440	0.21523	1.34451	0.00000	0.00000	0.00000
24	-0.01365	1.25627	-1.38576	0.00000	0.00000	0.00000
51	-0.00075	0.01345	0.00325	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	-0.03800	0.00000	0.00000	0.00000

Condition **LC59=1.2D-WL30+1.6LLa2**

10	0.00098	0.21513	1.35434	0.00000	0.00000	0.00000
24	-0.03006	1.25563	-1.35276	0.00000	0.00000	0.00000
51	0.00575	0.01418	-0.02491	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC60=1.2D-WL60+1.6LLa2**

10	0.00424	0.21527	1.35740	0.00000	0.00000	0.00000
24	-0.02627	1.25566	-1.35618	0.00000	0.00000	0.00000
51	0.00436	0.01402	-0.01889	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC61=1.2D-WL90+1.6LLa2**

10	0.00179	0.21545	1.36806	0.00000	0.00000	0.00000
24	-0.02955	1.25532	-1.34312	0.00000	0.00000	0.00000
51	0.00576	0.01418	-0.02494	0.00000	0.00000	0.00000
SUM	-0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC62=1.2D-WL120+1.6LLa2**

10	0.00426	0.21563	1.37831	0.00000	0.00000	0.00000
24	-0.02693	1.25523	-1.33903	0.00000	0.00000	0.00000
51	0.00499	0.01409	-0.02161	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC63=1.2D-WL150+1.6LLa2**

10	0.00101	0.21564	1.38194	0.00000	0.00000	0.00000
24	-0.03093	1.25504	-1.33007	0.00000	0.00000	0.00000
51	0.00659	0.01427	-0.02854	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Condition **LC64=1.2D+WL0+1.6LLa3**

10	-1.18537	0.15271	1.38950	0.00000	0.00000	0.00000
24	1.18455	1.31861	-1.34794	0.00000	0.00000	0.00000
51	0.00082	0.01363	-0.00356	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	0.03800	0.00000	0.00000	0.00000

Condition **LC65=1.2D+WL30+1.6LLa3**

10	-1.17198	0.15288	1.37964	0.00000	0.00000	0.00000
24	1.20099	1.31917	-1.38092	0.00000	0.00000	0.00000
51	-0.00568	0.01289	0.02462	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Condition **LC66=1.2D+WL60+1.6LLa3**

10	-1.17523	0.15273	1.37659	0.00000	0.00000	0.00000
24	1.19720	1.31916	-1.37751	0.00000	0.00000	0.00000
51	-0.00429	0.01305	0.01860	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC67=1.2D+WL90+1.6LLa3**

10	-1.17279	0.15257	1.36591	0.00000	0.00000	0.00000
24	1.20048	1.31949	-1.39058	0.00000	0.00000	0.00000
51	-0.00569	0.01289	0.02466	0.00000	0.00000	0.00000
SUM	0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC68=1.2D+WL120+1.6LLa3**

10	-1.17525	0.15237	1.35567	0.00000	0.00000	0.00000
24	1.19785	1.31959	-1.39468	0.00000	0.00000	0.00000
51	-0.00492	0.01298	0.02133	0.00000	0.00000	0.00000
SUM	0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC69=1.2D+WL150+1.6LLa3**

10	-1.17201	0.15238	1.35203	0.00000	0.00000	0.00000
24	1.20186	1.31977	-1.40363	0.00000	0.00000	0.00000
51	-0.00652	0.01279	0.02826	0.00000	0.00000	0.00000
SUM	0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC70=1.2D-WL0+1.6LLa3**

10	-1.18542	0.15186	1.34460	0.00000	0.00000	0.00000
24	1.18609	1.31963	-1.38548	0.00000	0.00000	0.00000
51	-0.00066	0.01346	0.00288	0.00000	0.00000	0.00000
SUM	0.00000	1.48494	-0.03800	0.00000	0.00000	0.00000

Condition **LC71=1.2D-WL30+1.6LLa3**

10	-1.19882	0.15168	1.35446	0.00000	0.00000	0.00000
24	1.16965	1.31906	-1.35250	0.00000	0.00000	0.00000
51	0.00584	0.01420	-0.02530	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	-0.02333	0.00000	0.00000	0.00000

Condition **LC72=1.2D-WL60+1.6LLa3**

10	-1.19557	0.15183	1.35751	0.00000	0.00000	0.00000
24	1.17344	1.31907	-1.35592	0.00000	0.00000	0.00000
51	0.00445	0.01404	-0.01928	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	-0.01768	0.00000	0.00000	0.00000

Condition **LC73=1.2D-WL90+1.6LLa3**

10	-1.19801	0.15200	1.36819	0.00000	0.00000	0.00000
24	1.17016	1.31875	-1.34285	0.00000	0.00000	0.00000
51	0.00585	0.01420	-0.02534	0.00000	0.00000	0.00000
SUM	-0.02200	1.48494	0.00000	0.00000	0.00000	0.00000

Condition **LC74=1.2D-WL120+1.6LLa3**

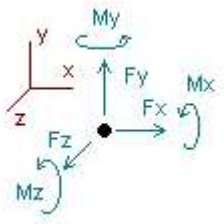
10	-1.19555	0.15219	1.37843	0.00000	0.00000	0.00000
24	1.17279	1.31864	-1.33874	0.00000	0.00000	0.00000
51	0.00508	0.01411	-0.02201	0.00000	0.00000	0.00000
SUM	-0.01768	1.48494	0.01768	0.00000	0.00000	0.00000

Condition **LC75=1.2D-WL150+1.6LLa3**

10	-1.19879	0.15218	1.38207	0.00000	0.00000	0.00000
24	1.16878	1.31847	-1.32979	0.00000	0.00000	0.00000
51	0.00668	0.01429	-0.02894	0.00000	0.00000	0.00000
SUM	-0.02333	1.48494	0.02333	0.00000	0.00000	0.00000

Envelope for nodal reactions

Note.- **lc** is the controlling load condition



Direction of positive forces and moments

Envelope of nodal reactions for :

LC1=1.2D+Wo
LC2=1.2D+W30
LC3=1.2D+W60
LC4=1.2D+W90
LC5=1.2D+W120
LC6=1.2D+W150
LC7=1.2D-Wo
LC8=1.2D-W30
LC9=1.2D-W60
LC10=1.2D-W90
LC11=1.2D-W120
LC12=1.2D-W150
LC13=0.9D+Wo
LC14=0.9D+W30
LC15=0.9D+W60
LC16=0.9D+W90
LC17=0.9D+W120
LC18=0.9D+W150
LC19=0.9D-Wo
LC20=0.9D-W30
LC21=0.9D-W60
LC22=0.9D-W90
LC23=0.9D-W120
LC24=0.9D-W150
LC25=1.2D+Di+WI0
LC26=1.2D+Di+WI30
LC27=1.2D+Di+WI60
LC28=1.2D+Di+WI90
LC29=1.2D+Di+WI120
LC30=1.2D+Di+WI150
LC31=1.2D+Di-WI0
LC32=1.2D+Di-WI30
LC33=1.2D+Di-WI60
LC34=1.2D+Di-WI90
LC35=1.2D+Di-WI120
LC36=1.2D+Di-WI150
LC37=1.2D+1.6LL1
LC38=1.2D+1.6LL2
LC39=1.2D+1.6LL3
LC40=1.2D+WL0+1.6LLa1
LC41=1.2D+WL30+1.6LLa1
LC42=1.2D+WL60+1.6LLa1
LC43=1.2D+WL90+1.6LLa1
LC44=1.2D+WL120+1.6LLa1
LC45=1.2D+WL150+1.6LLa1
LC46=1.2D-WL0+1.6LLa1
LC47=1.2D-WL30+1.6LLa1
LC48=1.2D-WL60+1.6LLa1
LC49=1.2D-WL90+1.6LLa1
LC50=1.2D-WL120+1.6LLa1
LC51=1.2D-WL150+1.6LLa1
LC52=1.2D+WL0+1.6LLa2
LC53=1.2D+WL30+1.6LLa2
LC54=1.2D+WL60+1.6LLa2
LC55=1.2D+WL90+1.6LLa2
LC56=1.2D+WL120+1.6LLa2
LC57=1.2D+WL150+1.6LLa2
LC58=1.2D-WL0+1.6LLa2
LC59=1.2D-WL30+1.6LLa2
LC60=1.2D-WL60+1.6LLa2
LC61=1.2D-WL90+1.6LLa2
LC62=1.2D-WL120+1.6LLa2
LC63=1.2D-WL150+1.6LLa2

LC64=1.2D+WL0+1.6LLa3
LC65=1.2D+WL30+1.6LLa3
LC66=1.2D+WL60+1.6LLa3
LC67=1.2D+WL90+1.6LLa3
LC68=1.2D+WL120+1.6LLa3
LC69=1.2D+WL150+1.6LLa3
LC70=1.2D-WL0+1.6LLa3
LC71=1.2D-WL30+1.6LLa3
LC72=1.2D-WL60+1.6LLa3
LC73=1.2D-WL90+1.6LLa3
LC74=1.2D-WL120+1.6LLa3
LC75=1.2D-WL150+1.6LLa3

		Forces						Moments					
Node		**Fx** [Kip]	**lc**	**Fy** [Kip]	**lc**	**Fz** [Kip]	**lc**	**Mx** [Kip*ft]	**lc**	**My** [Kip*ft]	**lc**	**Mz** [Kip*ft]	**lc**
10	Max	1.228	LC41	0.220	LC41	1.390	LC40	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-1.199	LC71	0.051	LC20	-0.258	LC19	0.00000	LC1	0.00000	LC1	0.00000	LC1
24	Max	1.202	LC69	1.320	LC69	0.517	LC24	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-1.231	LC51	0.392	LC24	-1.536	LC6	0.00000	LC1	0.00000	LC1	0.00000	LC1
51	Max	0.178	LC10	0.037	LC10	0.914	LC4	0.00000	LC1	0.00000	LC1	0.00000	LC1
	Min	-0.179	LC4	-0.013	LC16	-0.915	LC10	0.00000	LC1	0.00000	LC1	0.00000	LC1

Connection Check

Date: 9/8/2023
Project No.: BOBOS01169A
Designed By: KM **Checked By:** MSC

CHECK CONNECTION CAPACITY (Worst Case)

Reference: AISC Steel Construction Manual 14th Edition (ASD)

Bolt Type = A36 5/8" Threaded Rod

Allowable Tensile Load =

F_{Tall} = 6673 lbs.

Allowable Shear Load =

F_{vall} = 4004 lbs.

TENSILE FORCES

Reaction **F =** 1536 lbs. (See Bentley Output)

SHEAR FORCES

Reactions in X direction: 1231 lbs. (See Bentley Output)
Reactions in Y direction: 1320 lbs. (See Bentley Output)

Resultant: 1805 lbs.

No. of Supports = 1
No. of Rods / Support = 2

Tension Design Load / Rods =

f_t= 768.00 lbs. < 6673 lbs. **Therefore, OK !**

Shear Design Load / Rods =

f_v= 902.46 lbs. < 4004 lbs. **Therefore, OK !**

CHECK COMBINED TENSION AND SHEAR

f_t / F_T	+	f_v / F_V	≤	1.0			
0.115	+	0.225	=	0.341	<	1.0	**Therefore, OK !**

EXHIBIT 10

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBOS01169A

DISH Wireless L.L.C. SITE ADDRESS:

131 GIFFORD LANE
BOZRAH, CT 06334

SBA APPROVED

By Stephen Roth at 3:55:58 PM, 10/4/2023

SCOPE OF WORK

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

TOWER SCOPE OF WORK:
- INSTALL (3) PROPOSED PANEL ANTENNAS (1 PER SECTOR)
- INSTALL (1) PROPOSED ANTENNA MOUNT
- 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 PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED SAFETY SWITCH (IF REQUIRED)
- INSTALL (1) PROPOSED FIBER NID (IF REQUIRED)
- INSTALL (1) PROPOSED METER IN EXISTING SOCKET

SITE INFORMATION

PROPERTY OWNER:	RICHARD ORR AND PATTI DUERRLER
ADDRESS:	131 GIFFORD LANE BOZRAH, CT 06334
COUNTY:	NEW LONDON
TOWER TYPE:	SELF SUPPORTING TOWER
TOWER HEIGHT:	196'-0" AGL
HIGHEST APPURTENANCE:	200'-0" AGL
GROUND ELEVATION:	451'-0" AMSL
TOTAL AMSL:	651'-0" AMSL
SBA SITE ID:	CT01105-S
SBA SITE NAME:	BOZRAH
LATITUDE (NAD 83):	41° 33' 09.06" N 41.552517
LONGITUDE (NAD 83):	72° 09' 02.54" W -72.150708
ZONING JURISDICTION:	TOWN OF BOZRAH, CT
ZONING DISTRICT:	RESIDENTIAL
PARCEL NUMBER:	13-07/119-B
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	BOZRAH LIGHT & POWER
TELEPHONE COMPANY:	TBD

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	SBA TOWERS, LLC 8501 CONGRESS AVE BOCA RATON, FL 33487 PHONE # 561-226-9523
SITE DESIGNER:	TEP NORTHEAST 45 BEECHWOOD DRIVE NORTH ANDOVER, MA 01845 PHONE # 978-557-5553
SITE ACQUISITION:	GREGORY COSTELLO GREG.COSTELLO@DISH.COM
CONSTRUCTION MANAGER:	RICHARD BUKER RICHARD.BUKER@DISH.COM
RF ENGINEER:	IRMA SEBASTIAN IRMA.SEBASTIAN@DISH.COM

CONNECTICUT CODE OF COMPLIANCE

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

CODE TYPE	CODE
BUILDING	2022 CT STATE BUILDING CODE/2021 IBC W/ CT AMENDMENTS
MECHANICAL	2022 CT STATE BUILDING CODE/2021 IMC W/ CT AMENDMENTS
ELECTRICAL	2022 CT STATE BUILDING CODE/NFPA 70, 2020 NEC

SHEET INDEX

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

811

GENERAL NOTES

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

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

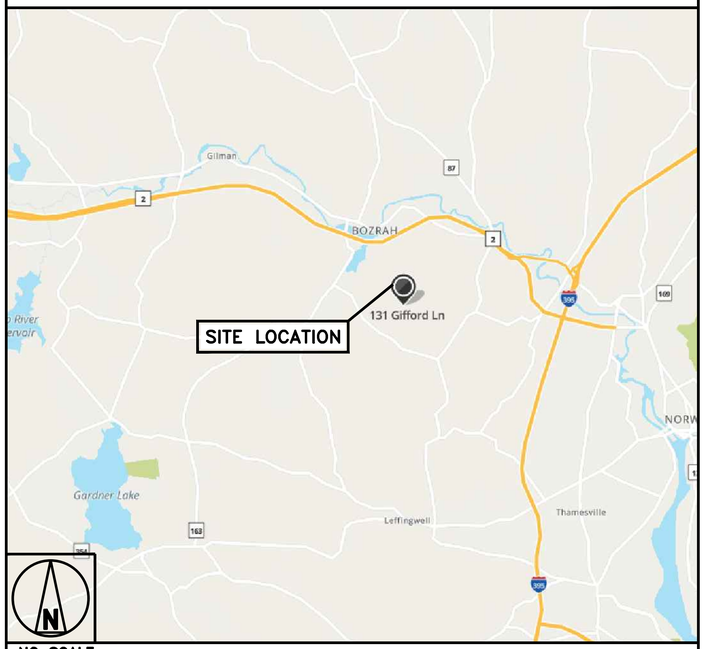
CONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS, AND CONDITIONS ON THE JOB SITE, AND SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK.

DIRECTIONS

DIRECTIONS FROM BRADLEY INTERNATIONAL AIRPORT:

TURN RIGHT ONTO BEACON HILL RD, TURN RIGHT ONTO CT-75/ELLA GRASSO TPKE, TAKE RAMP ON RIGHT FOR I-91/CT-20 E AND HEAD TOWARD HARTFORD/SPRINGFIELD. TAKE RAMP FOR I-91 S AND HEAD FOR HARTFORD,AT EXIT 33 HEAD ON RAMP RIGHT AND FOLLOW SIGNS FOR JENNINGS RD. KEEP STRAIGHT TO GET ONTO I-91 S, TAKE RAMP FOR I-84 E/US-6 E/US-44 E. AT EXIT 55 HEAD RIGHT FOR CT-2 E TOWARD NEW LONDON/NORWICH. AT EXIT 23 HEAD RIGHT FOR RAMP FOR CT-163 TOWARDS BOZRAH/MONTVILLE, KEEP STRAIGHT, HEADING TOWARD BERA HILL WILDLIFE MANAGEMENT AREA/CAMP TADMA SCOUT RESERVATION/MONTVILLE. TURN LEFT ONTO GAGER RD, TURN LEFT ONTO GIFFORD LN.

VICINITY MAP



NO SCALE

dish wireless.
5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

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SBA COMMUNICATIONS CORP.
134 FLANDERS ROAD, SUITE 125
WESTBOROUGH, MA 01581
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TEP OPCO, LLC.
45 BEECHWOOD DRIVE, NORTH ANDOVER, MA 01845
TEL: (978) 557-5553

STATE OF CONNECTICUT · DANIEL P. HAUM · 29128 · LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
TR	VD	DPH

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

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A&E PROJECT NUMBER

BOBOS01169A

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

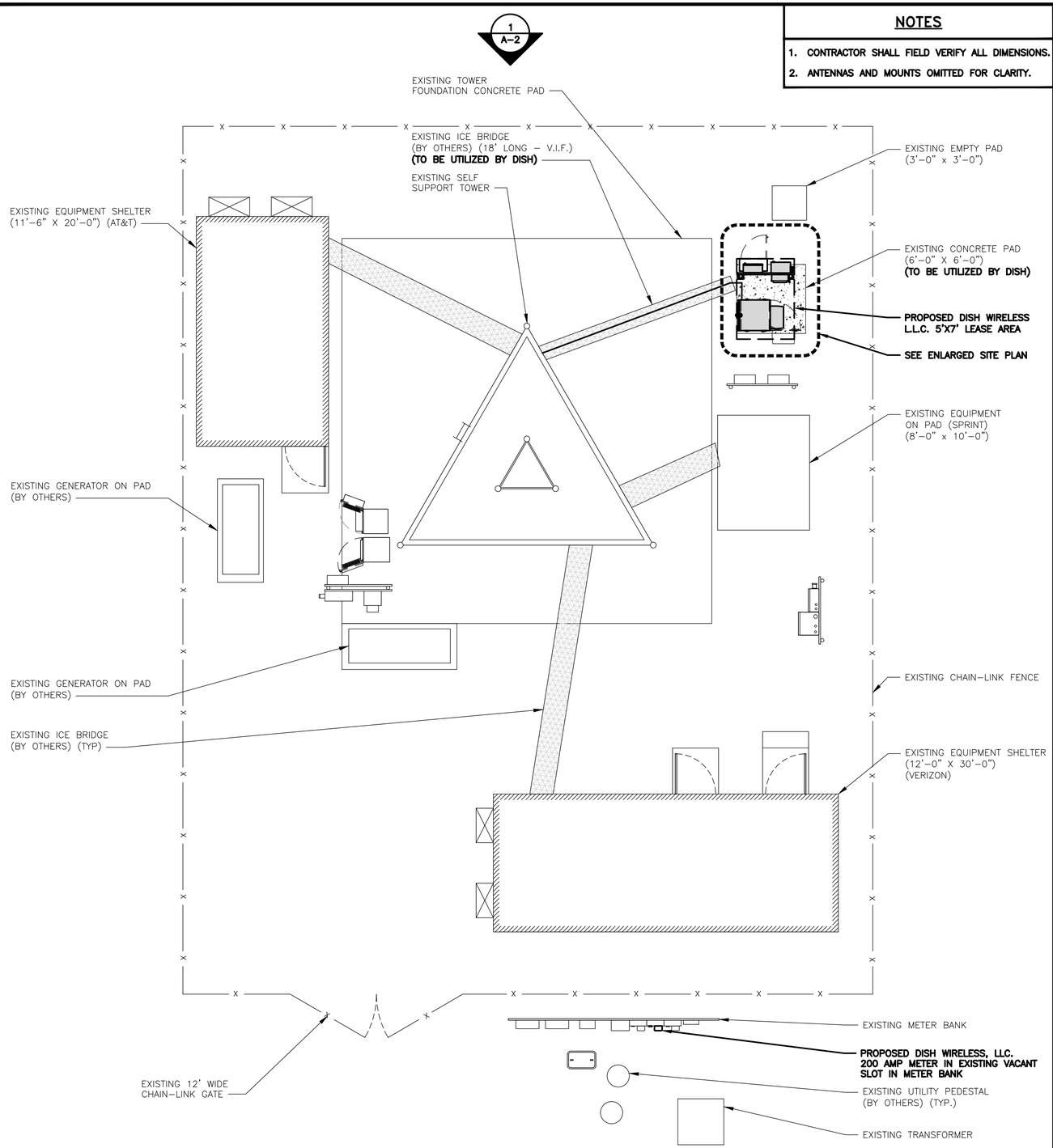
TITLE SHEET

SHEET NUMBER

T-1

NOTES

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



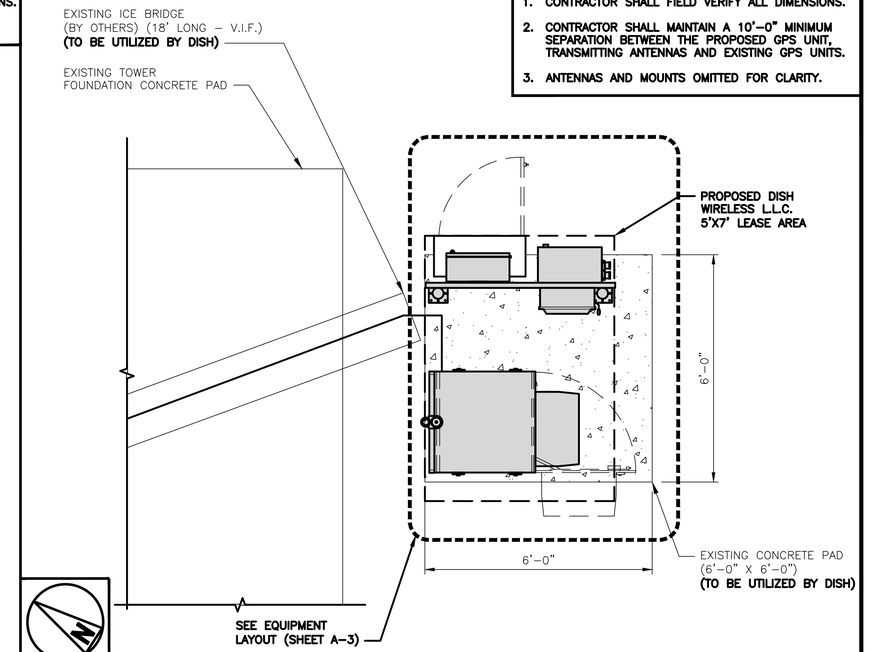
OVERALL SITE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

NOTES

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



ENLARGED SITE PLAN

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

2

AERIAL PHOTO

NO SCALE

3

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BOZRAH, CT 06334

SHEET TITLE

OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

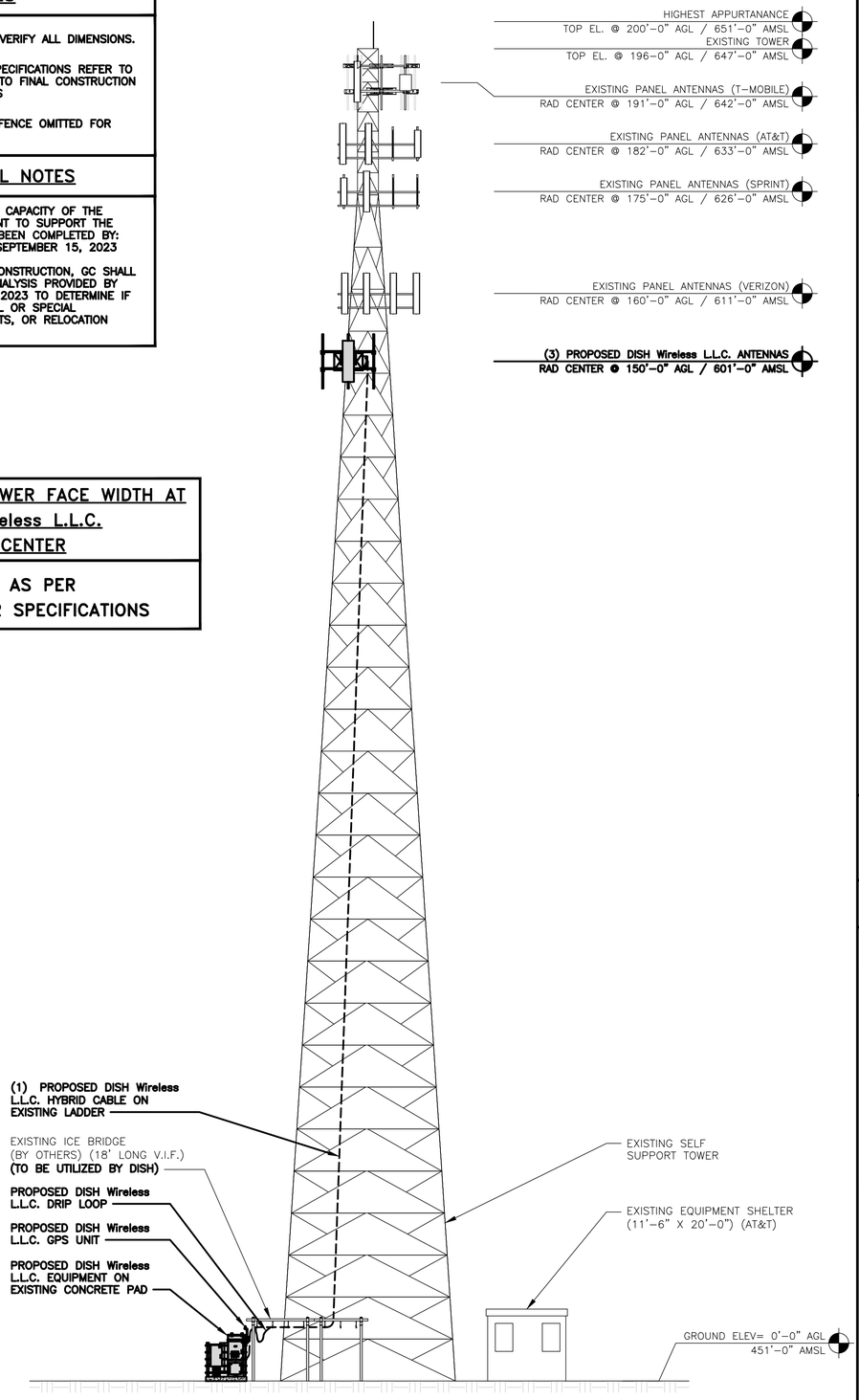
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.

STRUCTURAL NOTES

- AN ASSESSMENT FOR THE CAPACITY OF THE PROPOSED ANTENNA MOUNT TO SUPPORT THE PROPOSED LOADING HAS BEEN COMPLETED BY: TEP NORTHEAST, DATED: SEPTEMBER 15, 2023
- PRIOR TO COMMENCING CONSTRUCTION, GC SHALL REFER TO STRUCTURAL ANALYSIS PROVIDED BY SBA, DATED: AUGUST 31, 2023 TO DETERMINE IF THERE ANY SUPPLEMENTAL OR SPECIAL INSTALLATION REQUIREMENTS, OR RELOCATION ARRANGEMENTS.

SELF SUPPORT TOWER FACE WIDTH AT DISH Wireless L.L.C. RAD CENTER

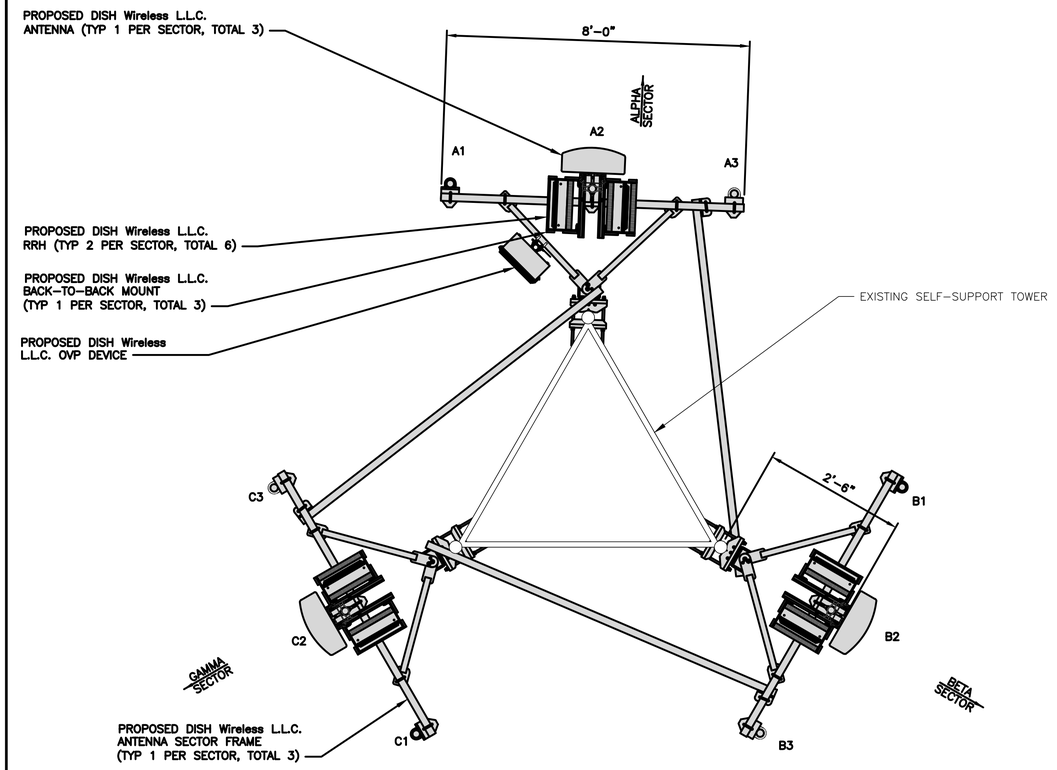
7'-0" AS PER TOWER OWNER SPECIFICATIONS



PROPOSED NORTHEAST ELEVATION

12' 8' 4' 0 10' 20'
3/32"=1'-0"

1



ANTENNA LAYOUT

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

2

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECH	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	MANUFACTURER – MODEL NUMBER	TECH	POS.	MANUFACTURER MODEL
A1	--	--	--	--	--	(1) HIGH-CAPACITY HYBRID CABLE (180'± LONG)	SAMSUNG – RF4450T-71A SFG-ARR3J601DI	5G	A2	RAYCAP-RDIDC-9181-PF-48
A2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	60°	150'-0"		SAMSUNG – RF4451D-70A SFG-ARR3KM01DI	5G	A2	
A3	--	--	--	--	--		--	--	--	
B1	--	--	--	--	--	SHARED W/ALPHA	SAMSUNG – RF4450T-71A SFG-ARR3J601DI	5G	B2	SHARED W/ALPHA
B2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	180°	150'-0"		SAMSUNG – RF4451D-70A SFG-ARR3KM01DI	5G	B2	
B3	--	--	--	--	--		--	--	--	
C1	--	--	--	--	--	SHARED W/ALPHA	SAMSUNG – RF4450T-71A SFG-ARR3J601DI	5G	C2	SHARED W/ALPHA
C2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	300°	150'-0"		SAMSUNG – RF4451D-70A SFG-ARR3KM01DI	5G	C2	
C3	--	--	--	--	--		--	--	--	

NOTES

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

ANTENNA SCHEDULE

NO SCALE

3

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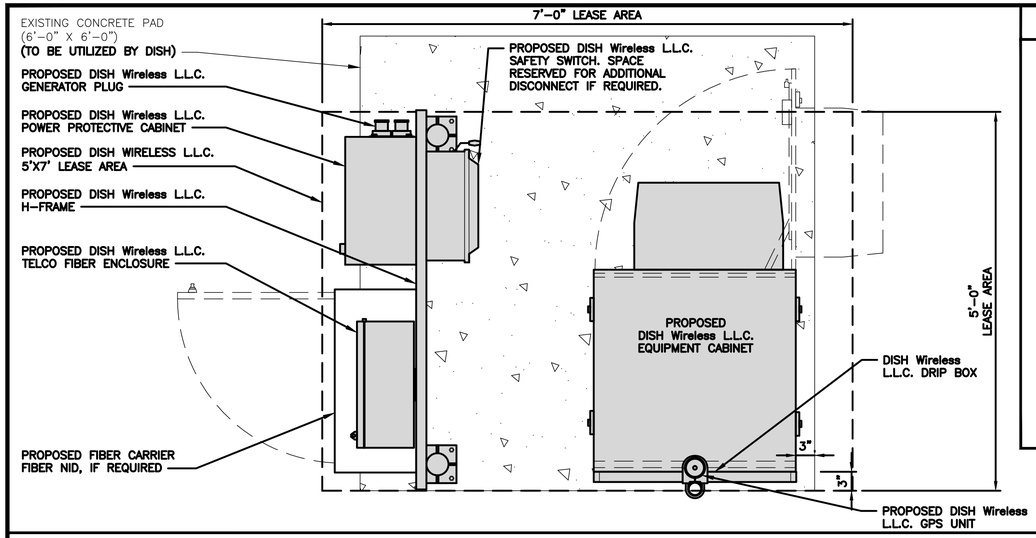
BOZRAH, CT 06334

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



PLATFORM EQUIPMENT PLAN

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

1

NOTES

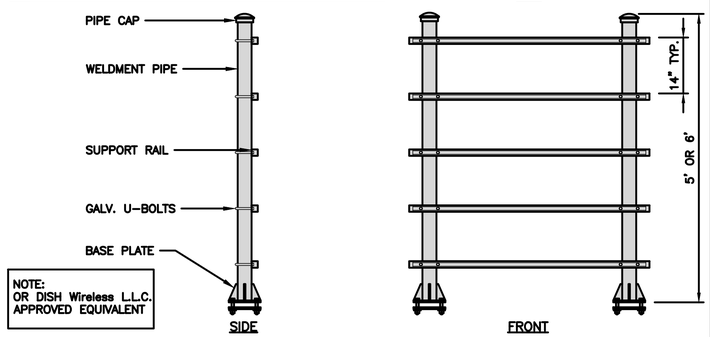
1. GPS MAY BE MOVED TO ICE BRIDGE OR H-FRAME.
2. ALL CONDUIT TO BE ROUTED UNDERGROUND IN PVC COUPLERS. CONDUIT QUANTITY AND SIZES ARE PER ONE-LINE DIAGRAM ON E-3 SHEET OF CDS. (DC PLANT DEPENDENT.)
3. CONTRACTOR MAY FIELD INSTALL CONDUIT HOLES IN BOTTOM OF PPC CABINET TO MATCH CONDUIT SIZES. (SEAL TO PPC MANUFACTURER SPECIFICATIONS).
4. H-FRAME POSTS ARE STAGGERED TO ALLOW FIBER NID BOXES TO BE INSTALLED CLOSE TO PERIMETER FRAME OF PLATFORM.
5. CONDUITS FROM PPC/FIBER DEMARK CABINETS TO EQUIPMENT CABINET (BBU) TO BE ROUTED ON TOP OF EXISTING CONCRETE PAD USING LIQUID TIGHT OR EMT CONDUIT.

NOT USED

NO SCALE

2

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



H-FRAME DETAIL

NO SCALE

3

NOTE FOR THE FIELD CREWS:
CONSULT WITH DISH CM FOR H-FRAME POSTS AND UNISTRUT PLACEMENTS.

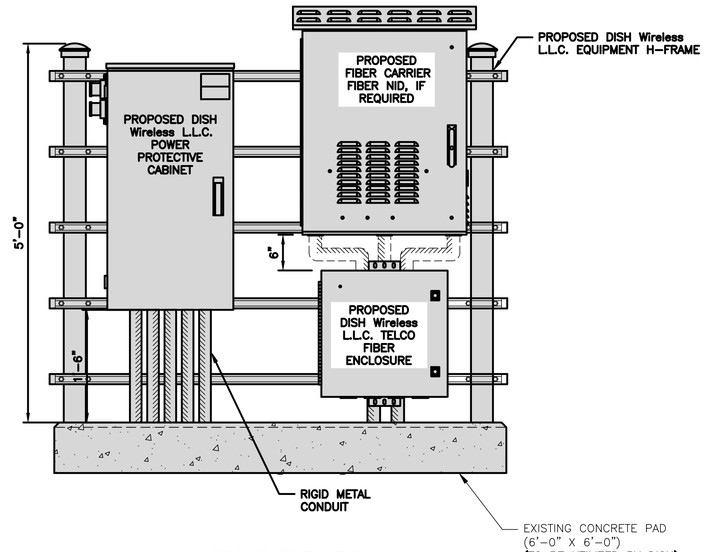
NOT USED

NO SCALE

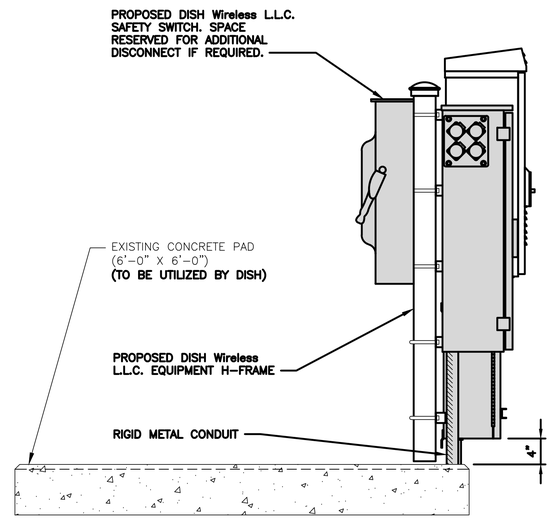
4

NOTES

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



FRONT ELEVATION



SIDE ELEVATION

H-FRAME EQUIPMENT ELEVATION

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

5

DISH Wireless L.L.C. TEMPLATE VERSION 56 - 09/01/2023

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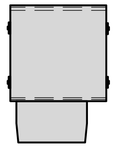
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

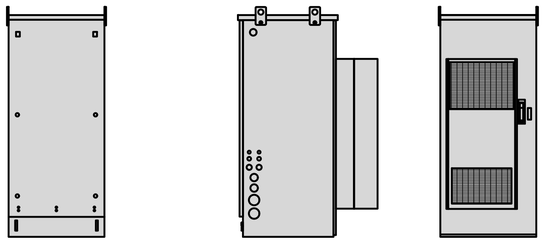
SHEET TITLE
EQUIPMENT AND H-FRAME DETAILS

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

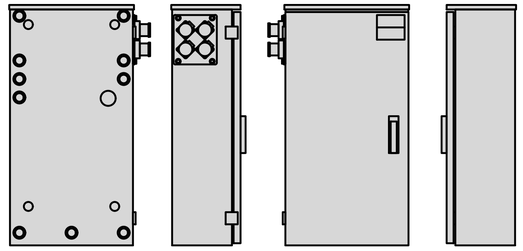


BACK SIDE FRONT

CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS	
ENCLOSURE DIMENSIONS (HxWxD):	39"x22.855"x12.593
WEIGHT:	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3W+G

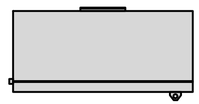
TOP



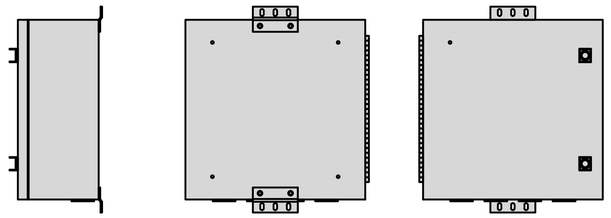
BACK SIDE FRONT SIDE

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

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



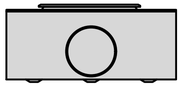
FRONT



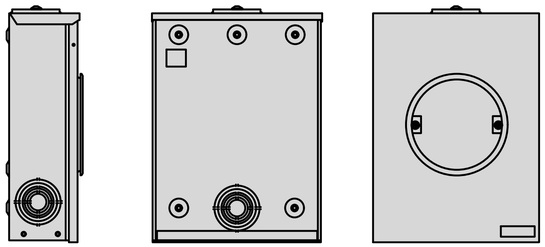
SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 3

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



PLAN



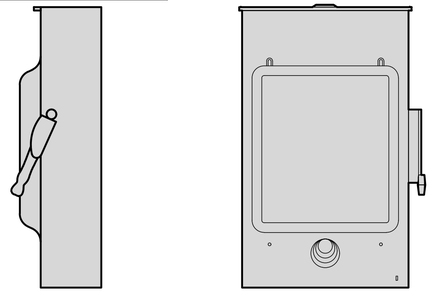
SIDE BACK FRONT

METER SOCKET DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

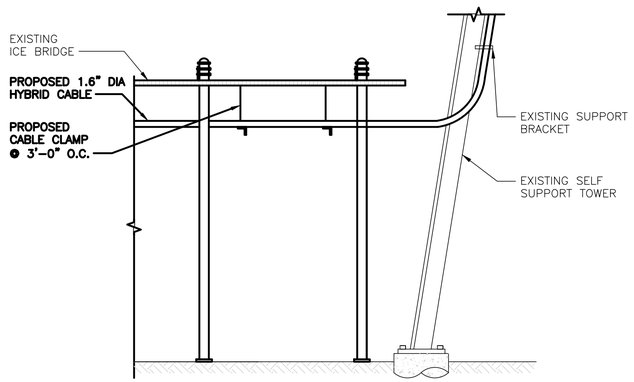
SQUARE D SAFETY SWITCHES D224NRB	
ENCLOSURE DIM (HxWxD)	29.25"x19.00"x8.50"
ENCLOSURE TYPE	NEMA 3R RAINPROOF
UL LISTED	FILE E–2875

TOP



SIDE FRONT

SAFETY SWITCH DETAIL | NO SCALE | 6



HYBRID CABLE RUN | NO SCALE | 8

NO SCALE | 7

NO SCALE | 9

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131 GIFFORD LANE
BOZRAH, CT 06334

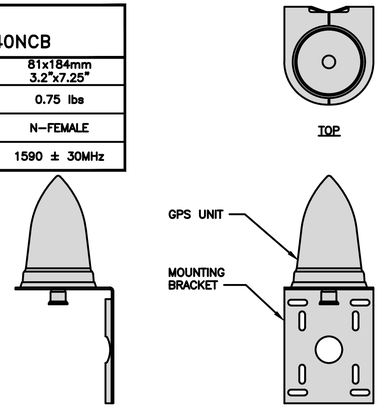
SHEET TITLE

EQUIPMENT DETAILS

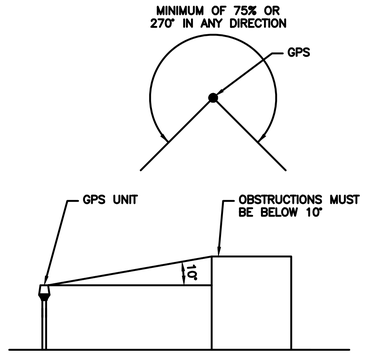
SHEET NUMBER

A-4

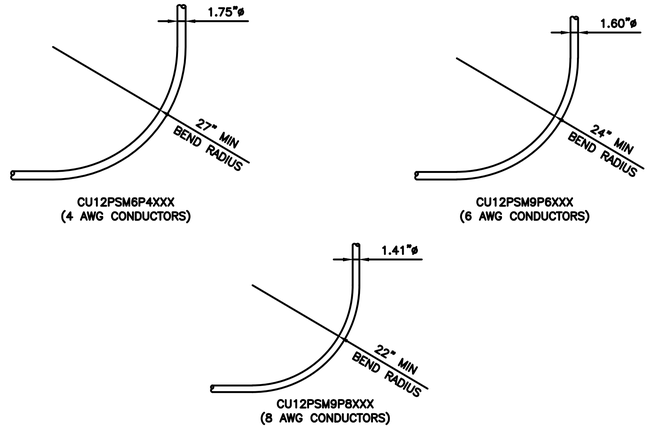
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	0.75 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL — NO SCALE — 1



GPS MINIMUM SKY VIEW REQUIREMENTS — NO SCALE — 2

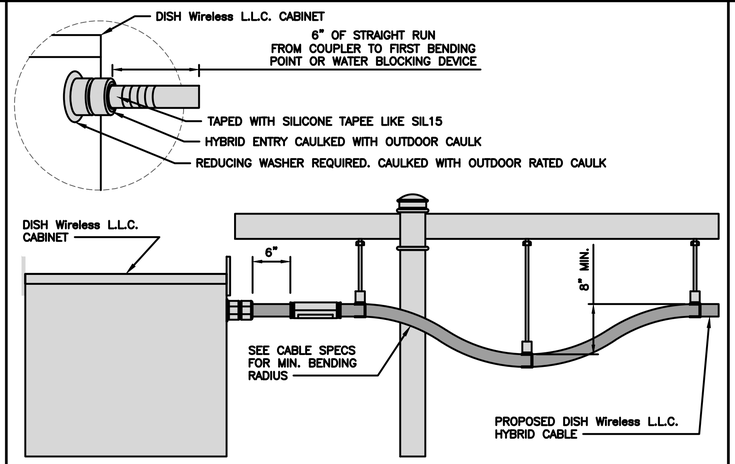


CABLES UNLIMITED HYBRID CABLE MINIMUM BEND RADIUSES — NO SCALE — 3

NOTE:

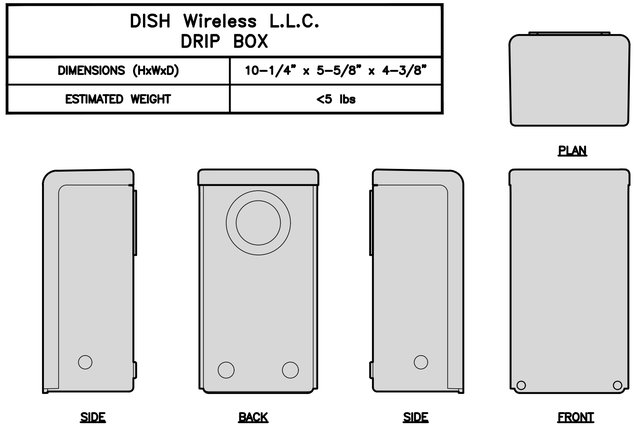
CONTRACTOR SHALL NOT LOOP EXCESS HYBRID OUTSIDE CABINET. EXCESS HYBRID LENGTH IS TO BE ADJUSTED BY STRIPPING JACKET AND SHIELDING AND TERMINATING DC CABLE TO LENGTH. FIBER EXCESS IS TO BE COILED IN FIBER SLACK TRAY INSIDE NETWORK CABINET.

HYBRID CABLE INSTALLATION NOTE — NO SCALE — 4

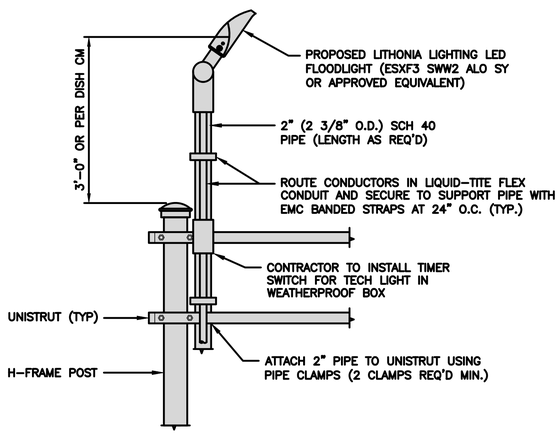


HYBRID CABLE INSTALLATION DETAIL — NO SCALE — 5

DISH Wireless L.L.C. DRIP BOX	
DIMENSIONS (HxWxD)	10-1/4" x 5-5/8" x 4-3/8"
ESTIMATED WEIGHT	<5 lbs



DISH Wireless L.L.C. DRIP BOX DETAIL — NO SCALE — 6



TECH LIGHT DETAIL — NO SCALE — 7

NOT USED — NO SCALE — 8

NOT USED — NO SCALE — 9

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BOBOS01169A

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

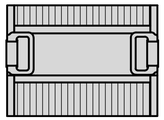
EQUIPMENT DETAILS

SHEET NUMBER

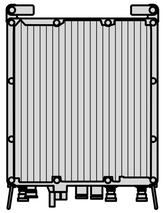
A-5

SAMSUNG – LOW BAND
SFG–ARR3J601DI_RF4450T–71A

DIMENSIONS (HxWxD)	15"x16.5"x11"
WEIGHT	94.6 lbs
CONNECTOR TYPE	4.3–10 RF CONNECTOR
INPUT VOLTAGE	–48VDC (–36 to 58 VDC)



PLAN



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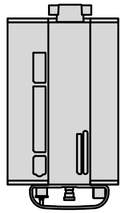

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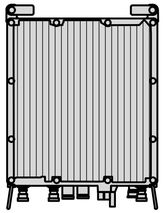
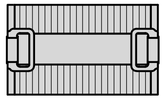


FRONT

RRH DETAIL | NO SCALE | 1

SAMSUNG – MID BAND
SFG–ARR3KM01DI_RF4451D–70A

DIMENSIONS (HxWxD)	15"x15"x8.9"
WEIGHT	61.3 lbs
CONNECTOR TYPE	4.3–10 RF CONNECTOR
INPUT VOLTAGE	–48VDC (–36 to 58 VDC)



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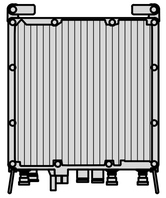

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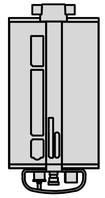

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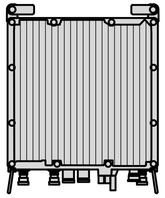


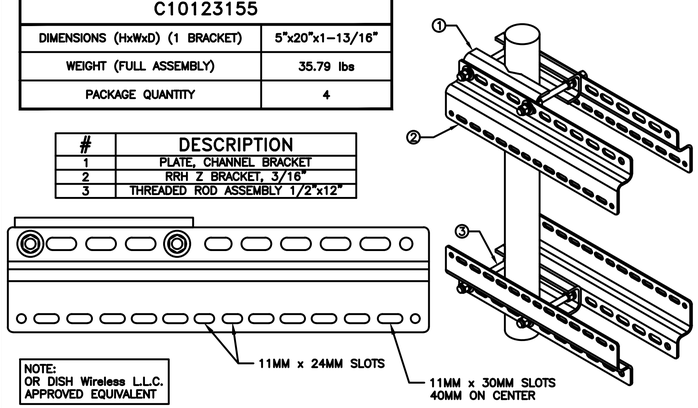
FRONT

RRH DETAIL | NO SCALE | 2

SABRE DOUBLE Z–BRACKET
C10123155

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

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



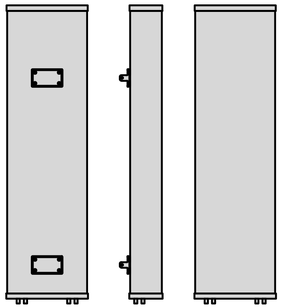
NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

RRH MOUNT DETAIL | NO SCALE | 3

COMMSCOPE
FFVV–65B–R2

DIMENSIONS (HxWxD)	72"x19.6"x7.8"
ANTENNA WEIGHT	70.5 lbs
WEIGHT WITH BRACKETS	84.169 lbs

PLAN



BACK SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

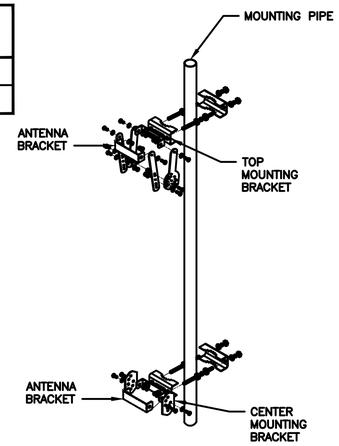
NOT USED | NO SCALE | 5

JMA ANTENNA MOUNT BRACKET
#91900318

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

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

ANTENNA BRACKET NOT PART OF KIT



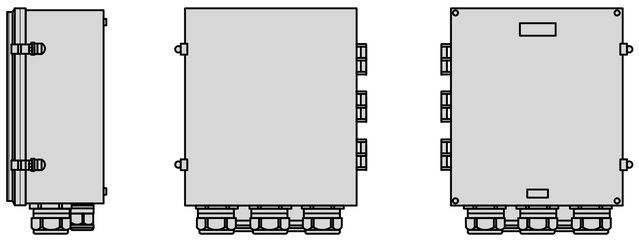
NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

ANTENNA BRACKET DETAIL | NO SCALE | 6

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

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

PLAN

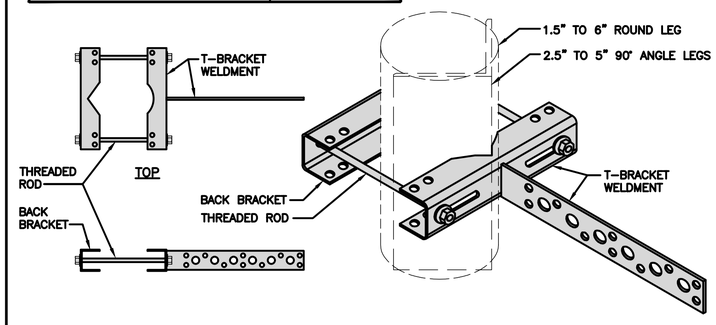


SIDE BACK FRONT

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

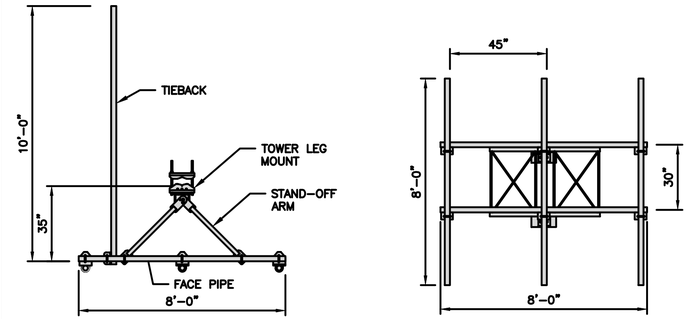


VERTICAL CABLE SUPPORT DETAIL | NO SCALE | 8

COMMSCOPE V–FRAME
MTC3975083

FACE SIZE	8'–0"
WEIGHT	352.136 lbs

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



ANTENNA FRAME DETAIL | NO SCALE | 9

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5701 SOUTH SANTA FE DRIVE
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STATE OF CONNECTICUT · DANIEL P. HAUM · 24128 · LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
TR	VD	DPH

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

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A	09/11/2023	ISSUED FOR REVIEW
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A&E PROJECT NUMBER

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PROJECT INFORMATION

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131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

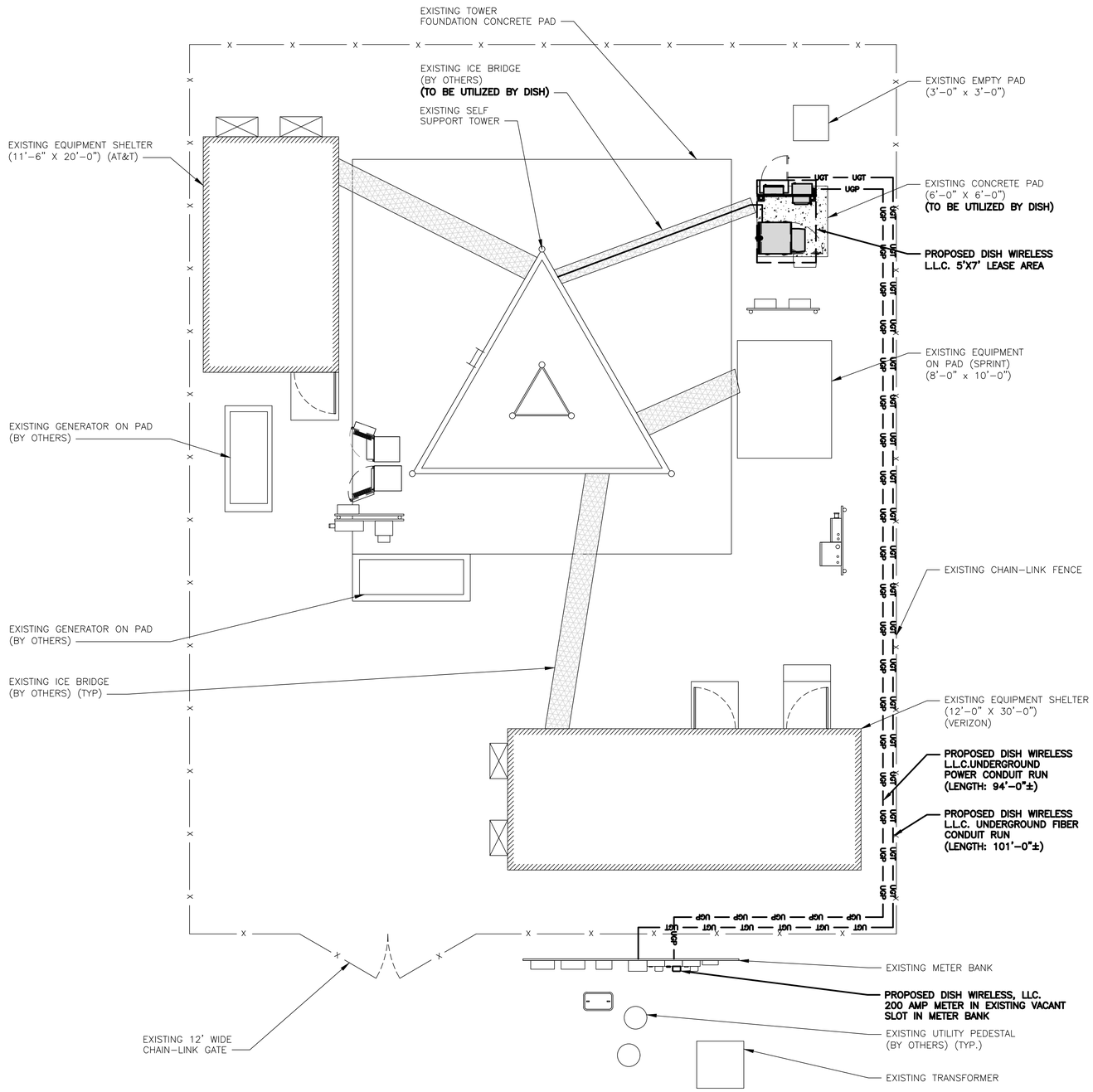
EQUIPMENT DETAILS

SHEET NUMBER

A-6

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.
3. THE GROUND LEASE PROVIDES BROAD/BLANKET UTILITY RIGHTS. "PWR" AND "FBR" PATH DEPICTED ON A-1 AND E-1 ARE BASED ON BEST AVAILABLE INFORMATION INCLUDING BUT NOT LIMITED TO FIELD VERIFICATION, PRIOR PROJECT DOCUMENTATION AND OTHER REAL PROPERTY RIGHTS DOCUMENTS. WHEN INSTALLING THE UTILITIES PLEASE LOCATE AND FOLLOW EXISTING PATH. IF EXISTING PATH IS NOT AN OPTION, PLEASE NOTIFY TOWER OWNER AS FURTHER COORDINATION MAY BE NEEDED.



UTILITY ROUTE PLAN

6' 4' 2' 0 5' 10'
3/16"=1'-0"

1

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

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

ELECTRICAL NOTES

NO SCALE

2

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No. 24128
LICENSED PROFESSIONAL ENGINEER

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RFDS REV #: 0

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131 GIFFORD LANE
BOZRAH, CT 06334

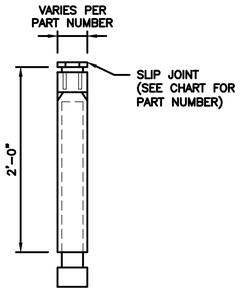
SHEET TITLE

ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER

E-1

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



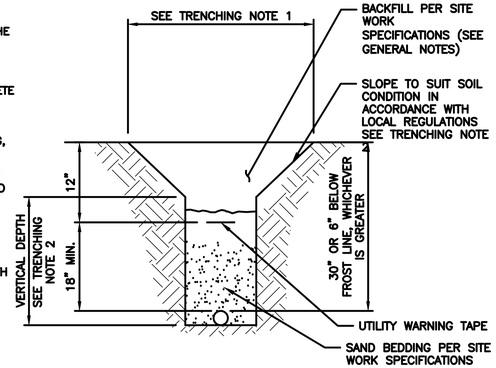
NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

EXPANSION JOINT DETAIL

NO SCALE | 1

TRENCHING NOTES

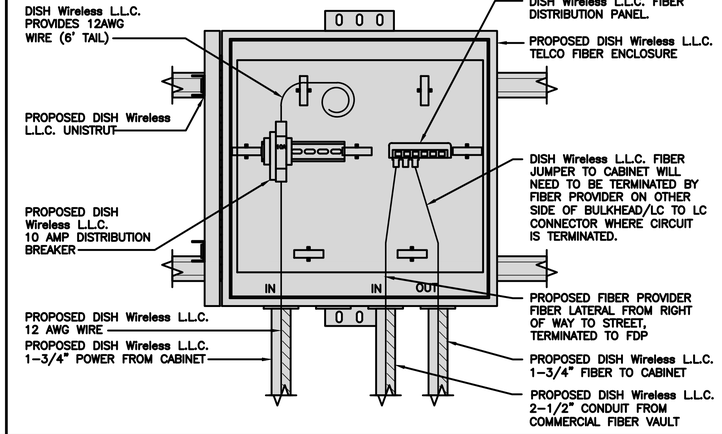
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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



IMPORTANT: UNDERGROUND WARNING/MARKING TAPE SHALL BE BURIED AT A DEPTH OF 12 IN (30 CM) OR LESS BELOW GRADE. THE MINIMUM DISTANCE FROM THE TOP OF THE PIPELINE SHOULD BE 12 IN (30 CM). REQUIRED DEPTH OF PIPELINE SHALL BE 30" BELOW GRADE OR 6" BELOW FROSTLINE, WHICHEVER IS GREATER. EACH RUN OF UNDERGROUND WARNING/MARKING TAPE MUST BE OVERLAPPED BY A MINIMUM OF 20 FT (6 M) OR MUST BE JOINED.

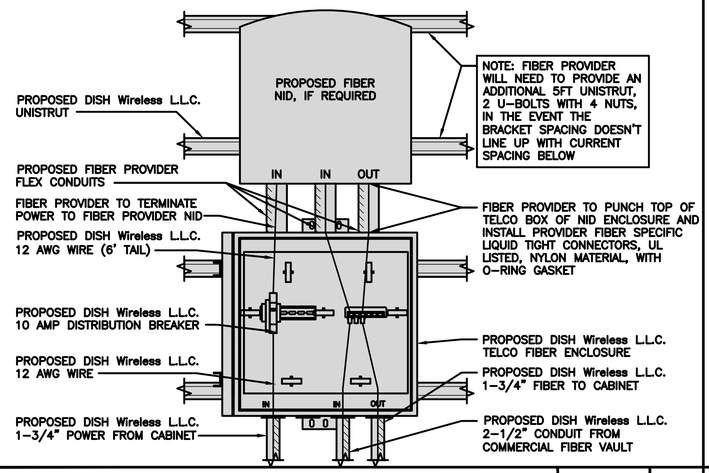
TYPICAL UNDERGROUND TRENCH DETAIL

NO SCALE | 2



DARK TELCO BOX – INTERIOR WIRING LAYOUT

NO SCALE | 3



LIT TELCO BOX – INTERIOR WIRING LAYOUT (OPTIONAL)

NO SCALE | 4

NOT USED

NO SCALE | 5

NOT USED

NO SCALE | 6

NOT USED

NO SCALE | 7

NOT USED

NO SCALE | 8

NOT USED

NO SCALE | 9

dish wireless.
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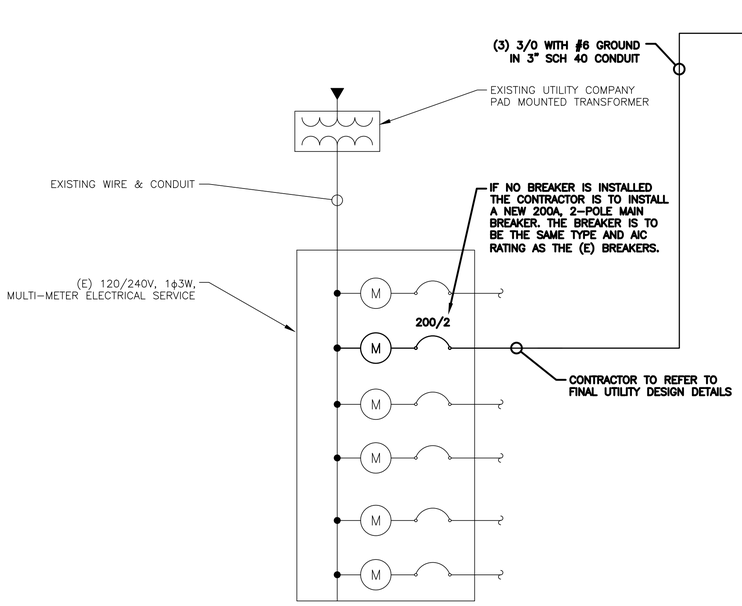
BOZRAH, CT 06334

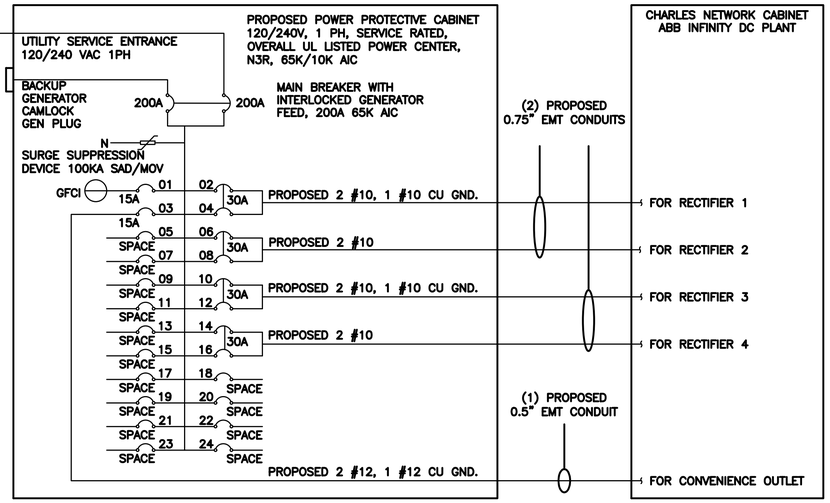
SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2





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

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

SERVICE/FEEDER CONDUCTOR LENGTH TABLE
(BASED ON INDUSTRY STANDARD 3% VOLTAGE DROP AND 5% NEC ALLOWABLE LIMIT)

	CONDUCTOR SIZES					
DESIGN LOADS	250 kcmil AL	300 kcmil AL	3/0 CU	4/0 CU	250 kcmil CU	300 kcmil CU
DISH Wireless L.L.C. MAXIMUM CONTINUOUS LOAD (160A) (NEC ARTICLE 220 & 230 3% VOLTAGE DROP)	130'	155'	145'	180'	215'	255'
DISH Wireless L.L.C. MAXIMUM CONTINUOUS LOAD (160A) (NEC ARTICLE 220 & 230 5% VOLTAGE DROP)	220'	260'	240'	300'	360'	425'

NOTES:
1. 250 MCM/KCMIL AL + #2 AL GRD MAY BE USED AS A REPLACEMENT FOR 3/0 CU + #6 CU GRD SERVICE CONDUCTOR FROM THE DISH Wireless L.L.C. FIRST MEANS OF DISCONNECT/UTILITY COMPANY MEET-ME POINT. REFER TO VALUES ABOVE TO LIMIT VOLTAGE DROP TO 3%.
2. ALUMINUM/COPPER CONDUCTORS MUST BE RATED 75°C.
3. ALUMINUM TO COPPER BUSS CONNECTIONS MUST MEET AND CONFORM TO ANSI AND BE UL LISTED. USE ANTI CORROSION CONDUCTIVE LUBRICANT ON CONNECTIONS
4. PPC MAIN DISCONNECT CIRCUIT BREAKERS ACCEPT #4 – 300KCMIL AL OR CU CONDUCTORS.
5. VOLTAGE DROP FOR SINGLE METER ENCLOSURE FED FROM TRANSFORMER WITH MULTIPLE CUSTOMERS IS CALCULATED FROM THE TRANSFORMER TO PPC. (SERVICE AND FEEDER CONDUCTOR LENGTH)
6. VOLTAGE DROP FOR MULTI-METER ENCLOSURE IS CALCULATED FROM THE METER TO PPC. (FEEDER CONDUCTOR LENGTH)
7. VOLTAGE DROP CALCULATIONS ARE BASED ON A POWER FACTOR OF 1, A LINE TO GROUND VOLTAGE PER CONDUCTOR OF 120V, NO CORRECTION FACTOR FOR AMBIENT TEMPERATURE OR ADJUSTMENT FACTOR FOR MORE THAN THREE CURRENT-CARRYING CONDUCTORS IN A SINGLE CONDUCT OR RACEWAY. A POWER FACTOR LESS THAN 1 OR VOLTAGE LESS THAN 120 WILL RESULT IN SHORTER DISTANCES THAN SHOWN IN TABLE.

NOTES

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

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

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

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

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

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

#12 – 0.0050 SQ. IN X 2 = 0.0100 SQ. IN
#12 – 0.0050 SQ. IN X 1 = 0.0050 SQ. IN <GROUND
TOTAL = 0.0150 SQ. IN

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

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

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

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

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

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

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

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

250kcmil AL – 0.3970 SQ. IN X 3 = 1.191 SQ. IN
#4 AL – 0.0824 SQ. IN X 1 = 0.0824 SQ.IN <GROUND
TOTAL = 1.2734 SQ. IN

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

PPC ONE-LINE DIAGRAM | NO SCALE | 1

PROPOSED CHARLES PANEL SCHEDULE

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

PANEL SCHEDULE | NO SCALE | 2

SHORT CIRCUIT CALCULATIONS | NO SCALE | 3

DISH Wireless L.L.C. TEMPLATE VERSION 56 – 09/01/2023

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STATE OF CONNECTICUT
DANIEL P. HAUM
No. 24128
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
TR	VD	DPH

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS

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B	09/25/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
BOBOS01169A

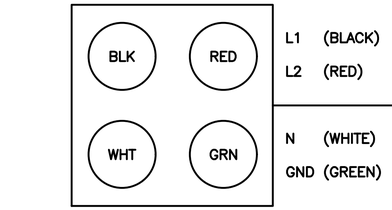
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

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

SHEET NUMBER
E-3

NOTES:

1. HAZARD OF ELECTRICAL SHOCK OR BURN. TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE.
2. 100 OR 200 AMP, 240 VOLTS, SINGLE PHASE ALTERNATING CURRENT CIRCUIT ONLY
3. GENERATOR SHORT CIRCUIT RATING: 10,000 / 20,000 AMPS RMS SYMMETRICAL, AMPERES AT 240 VOLTS
4. UTILITY SHORT CIRCUIT RATING: 65,000 AMPS RMS SYMMETRICAL, AMPERES AT 240 VOLTS
5. SUITABLE FOR USE AS SERVICE EQUIPMENT
6. SUITABLE FOR USE IN ACCORDANCE WITH ARTICLE 702 OF THE NATIONAL ELECTRIC CODE ANSI/NFPA 70
7. BONDED NEUTRAL WHEN INSTALLED AS SHOWN IN WIRING DIAGRAM
8. RAIN PROOF TYPE 3R
9. USE CU–AL WIRE 60–75 °C
10. EQUIPPED WITH SLIDE BAR MECHANICAL INTERLOCK
11. INTERLOCK PROHIBITS BOTH POWER SOURCES FROM BEING IN THE ON POSITION SIMULTANEOUSLY
12. EQUIPPED WITH SQUARE D BREAKERS OR ALTERNATIVE MANUFACTURER EQUIVALENT
13. WHEN REPLACE LOAD CENTER BREAKERS, USE ONLY SQUARE D (QO TYPE) OF THE SAME RATING OR EQUIVALENT
14. WHEN RESETTING BREAKERS TURN TO OFF POSITION, THEN TO ON POSITION
15. WARNING: MAKE CONTINUITY CHECK WITH OHM METER TO VERIFY CORRECT PHASING AND GROUNDING CONNECTIONS BEFORE POWER UP
16. VERIFY PIN OUT CONFIGURATION OF GENERATOR PRIOR TO USE.
17. RISK OF ELECTRIC SHOCK, BOTH ENDS OF DISCONNECTING MEANS MAY BE ENERGIZED. TEST BEFORE SERVICING
18. THIS SWITCH BOARD MAY CONTAIN A TAP ON THE SERVICE SIDE OF THE MAIN POWER DISCONNECT FOR REMOTE MONITORING OF UTILITY/STANDBY POWER
19. THE NORMAL AC POWER MONITORING CIRCUIT MUST UTILIZE A DISCONNECTING MEANS WITH A SHORT CIRCUIT RATING GREATER THAN THE AVAILABLE INTERRUPTING CURRENT
20. A RED PUSH–TO–TRIP BUTTON PROVIDES A MEANS TO MECHANICALLY TRIP THE CIRCUIT BREAKER. THIS ACTION EXERCISES THE TRIPPING PORTION OF THE MECHANISM AND ALLOWS MAINTENANCE CHECK ON THE BREAKER



CAM–LOCK GENERATOR RECEPTACLE

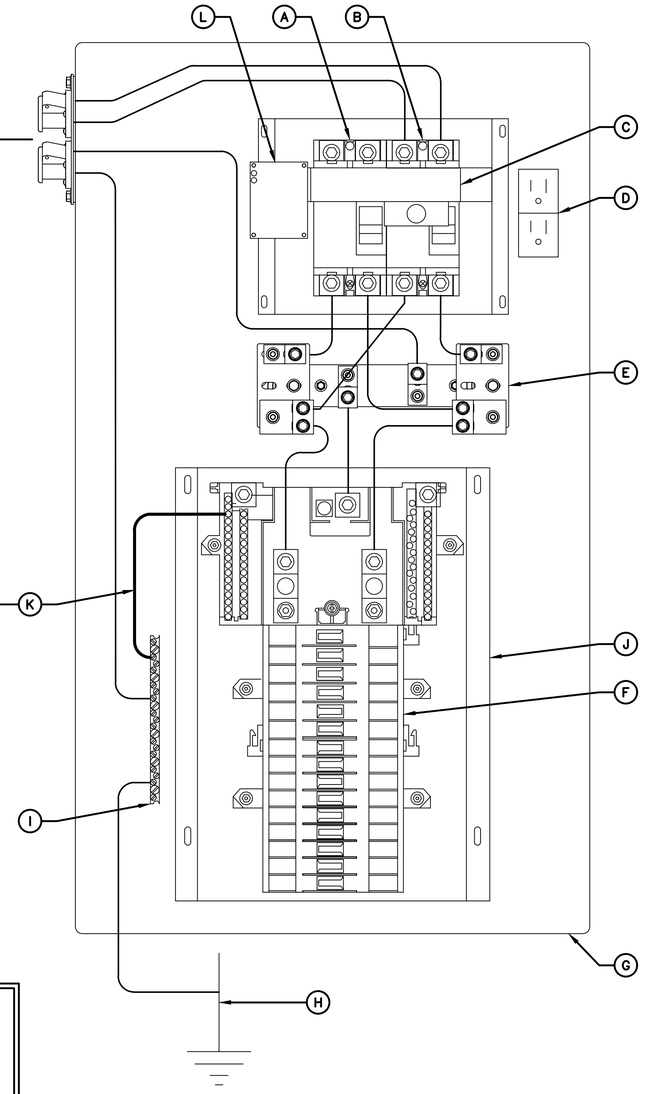
(AS VIEWED FROM OUTSIDE OF ENCLOSURE)
USE LINE UP PIN AS REFERENCE

REFER TO RECEPTACLE FOR MODEL NUMBER

DANGER:

HAZARD OF ELECTRICAL SHOCK OR BURN. TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE.

RAYCAP CUSTOMER SERVICE
(800) 890–2569



SUITABLE FOR USE AS SERVICE EQUIPMENT

ELECTRICAL RATING 120/240 VOLTS SINGLE PHASE 60 Hz	
NORMAL AC POWER 100A□ 200A□	GENERATOR POWER 100A□ 200A□

CAUTION:

- THE OPERATING HANDLE ASSUMES A CENTER POSITION WHEN THE CIRCUIT BREAKER IS TRIPPED
- THE BREAKER CAN BE RESET BY OPERATING THE HANDLE TO THE EXTREME OFF POSITION AND THEN TO ON
- SLIDE BAR MECHANICAL INTERLOCK TRANSFERS NORMAL AC POWER TO GENERATOR POWER. THE SLIDE BAR MECHANICAL INTERLOCK PROHIBITS BOTH POWER SOURCES FROM BEING IN THE ON POSITION SIMULTANEOUSLY
- TO TRANSFER FROM ON POWER SOURCE TO THE OTHER POWER SOURCE, SWITCH ON BREAKER TO THE OFF POSITION, MOVE THE SLIDE BAR TO THE OTHER SIDE AND THE SWITCH THE OTHER BREAKER TO THE ON POSITION

THIS SWITCHBOARD UTILITY MAN BREAKER IS SUITABLE FOR USE ON CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 65,000 RMS SYMMETRICAL AMPS, 240 VOLTS MAXIMUM.

200A UTILITY FEED

LOAD SIZE CIRCUIT BREAKERS				LINE SIDE MAIN CIRCUIT BREAKER					
MFR.	TYPE	POLES	AMP RATING	MFR.	TYPE	AMP RATING	SYMMET. AMP RMS	VOLTS AC	PHASES
SQ–D	QO	1 2	15–100A	SQ–D	QGL	200A	65,000A	240V	2

THIS SWITCHBOARD GENERATOR POWER CIRCUIT IS SUITABLE FOR USE ON A CIRCUIT CAPABLE OF DELIVERING NOT MORE THAN 10,000 RMS SYMMETRICAL AMPS, 240 VOLTS MAXIMUM.

200A GENERATOR FEED

LOAD SIZE CIRCUIT BREAKERS				LINE SIDE MAIN CIRCUIT BREAKER					
MFR.	TYPE	POLES	AMP RATING	MFR.	TYPE	AMP RATING	SYMMET. AMP RMS	VOLTS AC	PHASES
SQ–D	QO	1 2	15–100A	SQ–D	QGL	200A	65,000A	240V	2

MAXIMUM CONTINUOUS LOADS NOT TO EXCEED 80% OF THE OVER–CURRENT PROTECTIVE DEVICE (CIRCUIT BREAKER AND FUSES) RATINGS EMPLOYED IN OTHER THAN MOTOR CIRCUITS, EXCEPT FOR THOSE CIRCUITS EMPLOYING CIRCUIT BREAKERS MARKED AS SUITABLE FOR CONTINUOUS OPERATION AT 100% OF THEIR RATINGS. CONDUCTORS ARE NOT TO ENTER OR LEAVE THE ENCLOSURE DIRECTLY OPPOSITE THE WIRING TERMINAL

NEUTRAL–TO–GROUND NOTES:

- WHEN THE PPC IS USED AS THE SERVICE ENTRANCE DEVICE, THE NEUTRAL TO GROUND BOND NEEDS TO BE ESTABLISHED IN THE PPC.
- WHEN THE SERVICE ENTRY DEVICE IS A MULTI–METER CENTER OR A PRE–PPC DISCONNECT IS USED AND HAS "NEUTRAL TO GROUND" ACCOMMODATIONS, THE NEUTRAL TO GROUND WIRE IN THE PPC IS NOT REQUIRED.
- THE GREEN #6 WIRE IS PROVIDED WITH THE PPC CABINET AS A SEPARATE UNINSTALLED PART TO BE INSTALLED BY CONTRACTOR IF NEEDED.

NEUTRAL–TO–GROUND CONDING JUMPER

INSTALLTION INSTRUCTIONS:

- IF REQUIRED, THE N–G BONDING KIT SHOULD BE INSTALLED BY QUALIFIED PERSONNEL
- ENSURE THE MAIN BREAKERS ARE OFF
- USE THE GREEN #6 WIRE PROVIDED WITH THE PPC
- INSTALL THE JUMPER AS SHOWN IN THE WIRING DIAGRAM
- TIGHTEN TERMINALS TO TORQUE VALUE SHOWN IN TORQUE TABLE
- PLACE THE PROVIDED "SERVICE" LABEL IN THE SPACE BELOW THE WORDS "AC POWER" LOCATED ABODE THE MAIN CIRCUIT BREAKER IN THE UPPER PORTION OF THE DEAD FRONT

LEGEND:

A. UTILITY DISCONNECT (SERVICE RATED)
B. GENERATOR DISCONNECT
C. MAIN DISCONNECT CIRCUIT BREAKERS W/ MECHANICAL INTERLOCK
D. GFCI RECEPTACLE 15A
E. SPD STRIKESORB KELVIN CONNECTION (TYP OF 2)
F. BREAKER PANEL – 24 POSITION (CONTRACTOR TO ADD APPROPRIATE BREAKER PER ONE–LINE DIAGRAM PANEL SCHEDULE)
G. POWER PROTECTION CABINET (PPC) (FULLY ASSEMBLED FROM MANUFACTURER)
H. CONTRACTOR TO ATTACH TO UNDERGROUND GROUNDING HALO OR INSTALL GROUND ROD WHEN REQUIRED BY CODE
I. GROUND BAR
J. SQUARE D Q SERIES LOAD CENTER
K. NETURAL–TO–GROUND (N–G) BONDING JUMPER (CONTRACTOR INSTALLED IF REQUIRED)
L. OPTIONAL SPD STATUS INDICATORS

RAYCAP POWER PROTECTION CABINET – RDIAC–2465–P–240–MTS (NEUTRAL–TO–GROUND)

NO SCALE

1

dish wireless.

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DISH Wireless L.L.C.
PROJECT INFORMATION

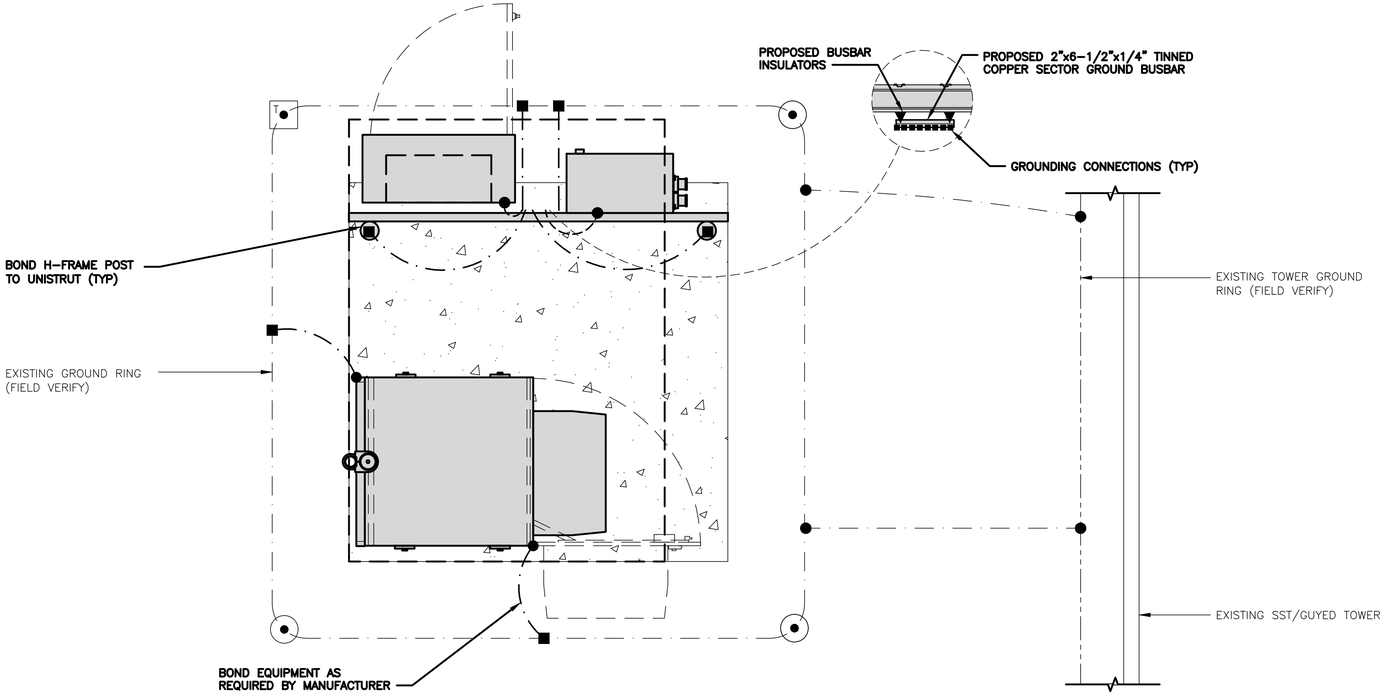
BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

PPC NEUTRAL–TO–GROUND SCHEMATIC

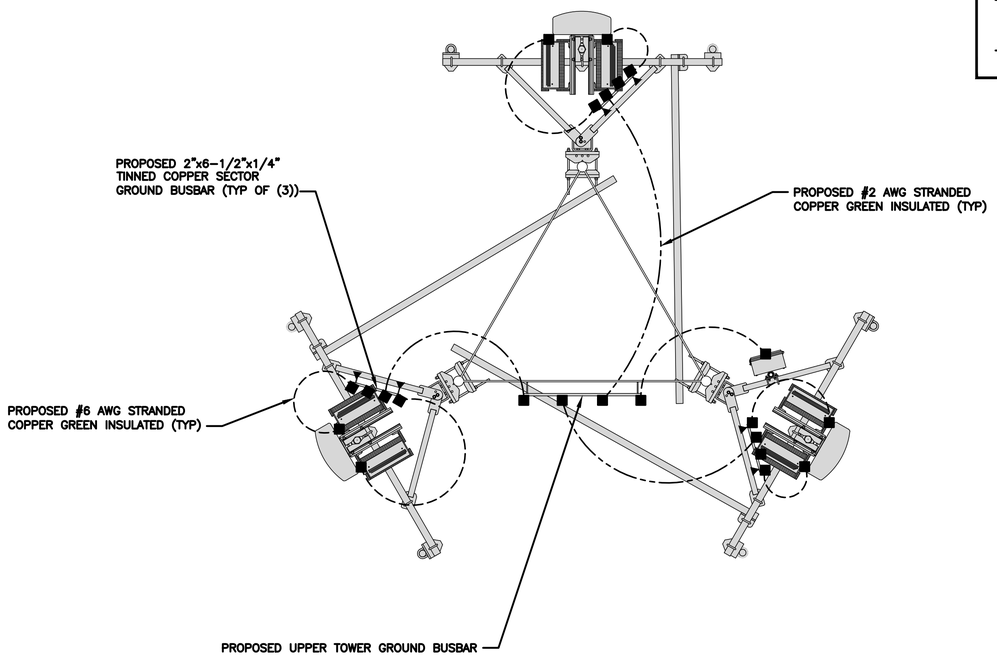
SHEET NUMBER

E-4



TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2

NOTES

- ANTENNAS AND OVP SHOWN ARE GENERIC AND NOT REFERENCING TO A SPECIFIC MANUFACTURER. THIS LAYOUT IS FOR REFERENCE PURPOSES ONLY
- UPPER TOWER BUSSBAR SHALL BE INSTALLED WITHOUT INSULATORS

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

GROUNDING LEGEND

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

GROUNDING KEY NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

(P) TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO TOWER STEEL.

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

GROUNDING KEY NOTES

NO SCALE | 3

dish wireless.
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DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

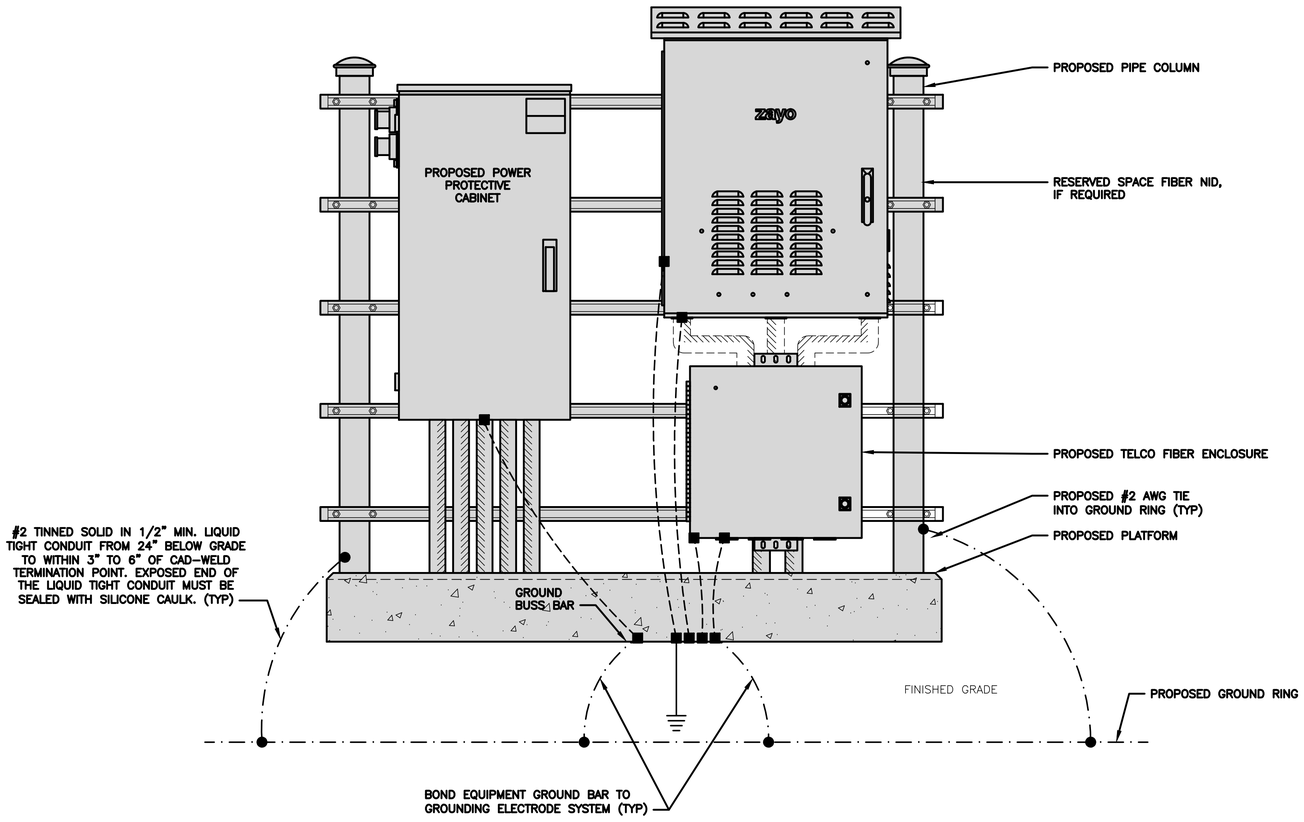
GROUNDING PLANS AND NOTES

SHEET NUMBER

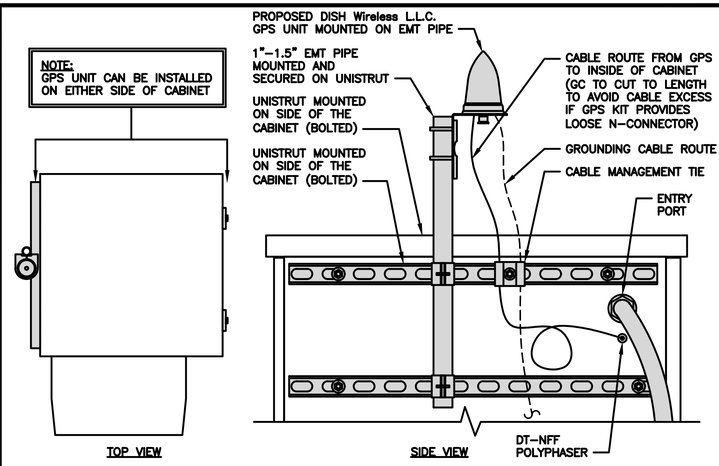
G-1

NOTES

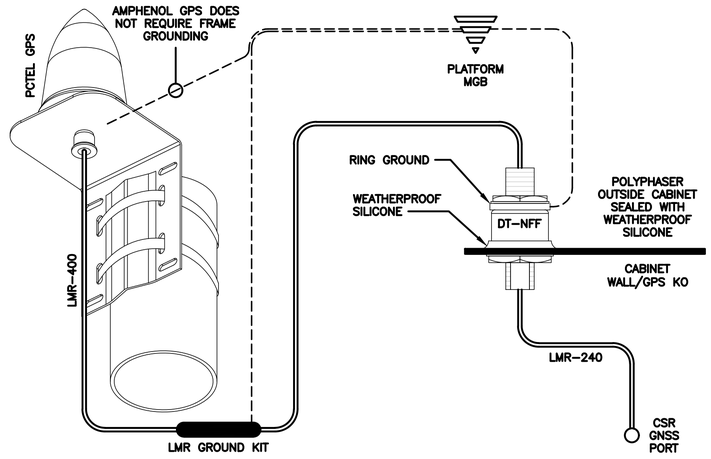
EQUIPMENT CABINET OMITTED FOR CLARITY



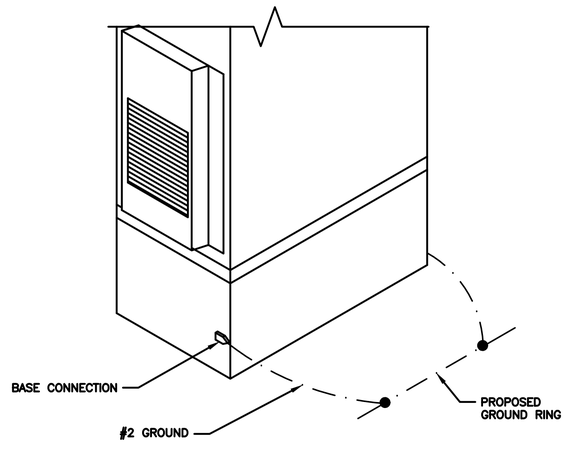
H-FRAME GROUNDING DETAIL | NO SCALE | 1



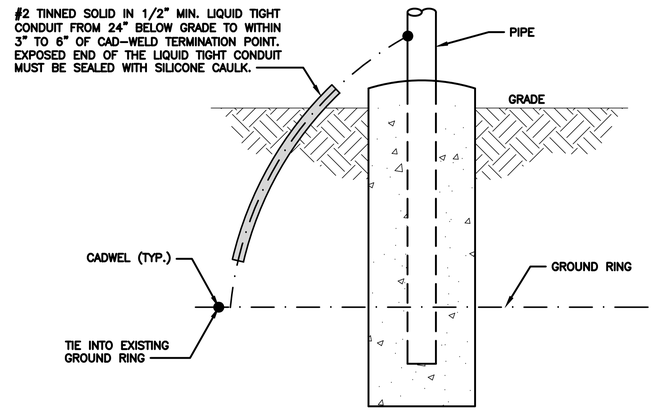
TYPICAL PCTEL GPS UNIT GROUNDING | NO SCALE | 2



TYPICAL PCTEL GPS UNIT GROUNDING DIAGRAM | NO SCALE | 3



OUTDOOR CABINET GROUNDING | NO SCALE | 4



TRANSITIONING GROUND DETAIL | NO SCALE | 5

NOT USED | NO SCALE | 6

dish wireless.

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PROJECT INFORMATION

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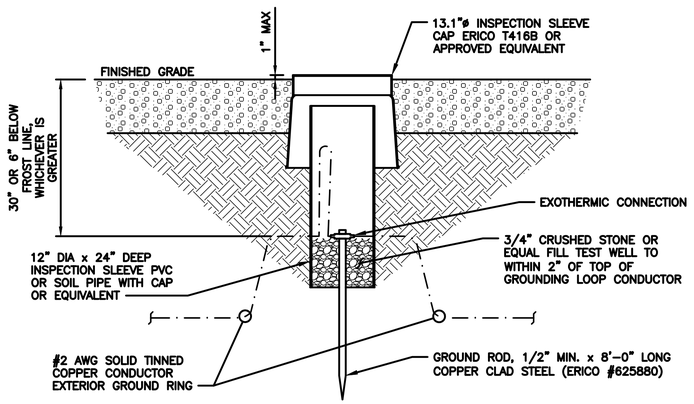
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

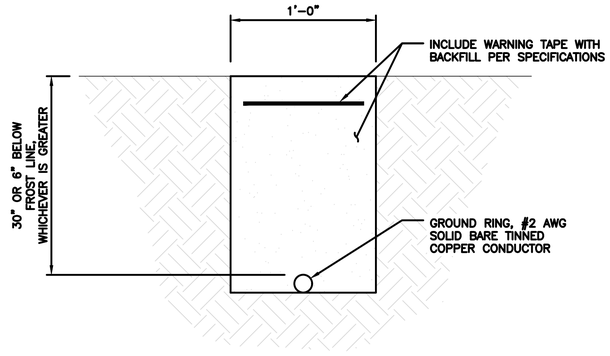
GROUNDING DETAILS

SHEET NUMBER

G-2



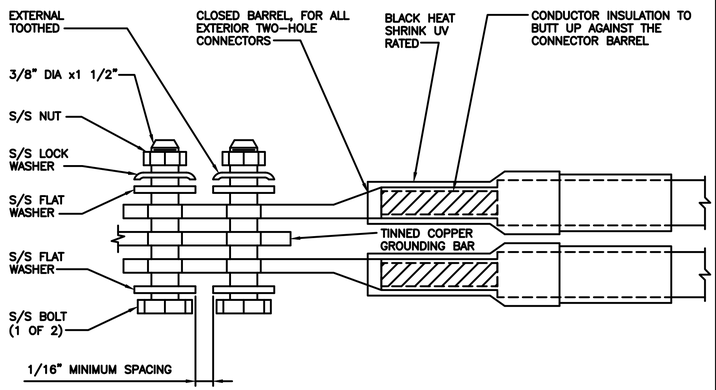
TYPICAL TEST GROUND ROD WITH INSPECTION SLEEVE | NO SCALE | 1



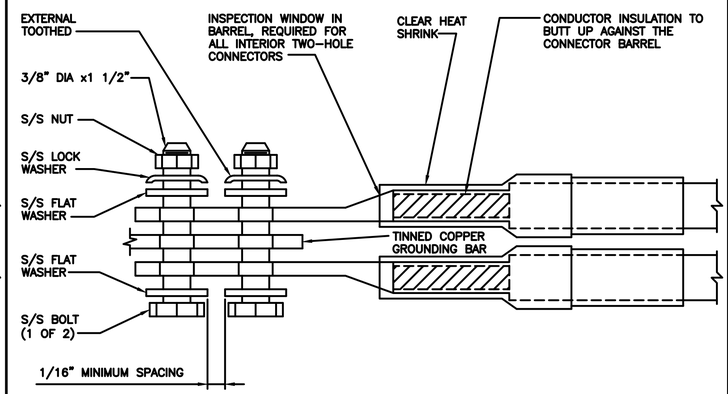
TYPICAL GROUND RING TRENCH | NO SCALE | 2

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

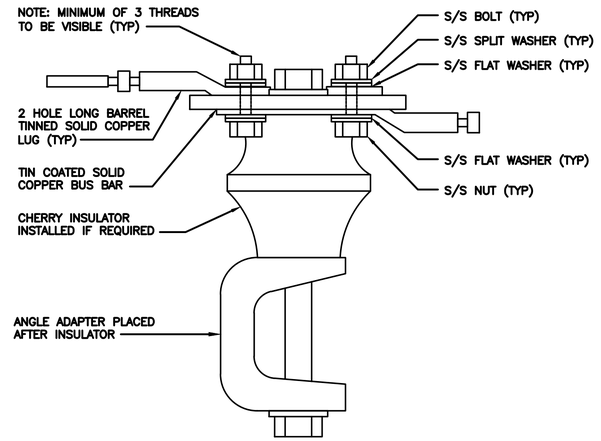
TYPICAL GROUNDING NOTES | NO SCALE | 3



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 4



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 5



LUG DETAIL | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

DISH Wireless L.L.C. TEMPLATE VERSION 56 – 09/01/2023

dish wireless.
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STATE OF CONNECTICUT · DANIEL P. HAUM · No. 24128 · LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
TR	VD	DPH

RFDS REV #: 0

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BOZRAH, CT 06334

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-3

HYBRID/DISCREET CABLES

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

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

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

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

MID-BAND RRH
(AWS BANDS N66+N70)

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

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

HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

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

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

EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.

EXAMPLE 1	EXAMPLE 2	EXAMPLE 3 COAX#1 (ALPHA)	CANISTER COAX #2 (ALPHA)
RED	RED	RED	RED
BLUE	BLUE		RED
GREEN	GREEN		
ORANGE	YELLOW		
PURPLE			

FIBER JUMPERS TO RRHs

LOW-BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.

LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY

LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH
RED	RED	BLUE	BLUE	GREEN	GREEN
ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE

RET MOTORS AT ANTENNAS

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

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

ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN	ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN	ANTENNA 1 MID BAND IN	ANTENNA 1 LOW BAND IN
RED	RED	BLUE	BLUE	GREEN	GREEN
PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE

MICROWAVE RADIO LINKS

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

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

FORWARD AZIMUTH OF 0–120 DEGREES		FORWARD AZIMUTH OF 120–240 DEGREES		FORWARD AZIMUTH OF 240–359 DEGREES	
PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
RED	RED	BLUE	BLUE	GREEN	GREEN
WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
	RED		BLUE		GREEN
	WHITE		WHITE		WHITE

RF CABLE COLOR CODES | NO SCALE | 1

LOW BANDS (N71+N26) OPTIONAL – (N29): ORANGE

AWS (N66+N70+H-BLOCK): PURPLE

CBRS TECH (3 GHz): YELLOW

NEGATIVE SLANT PORT ON ANT/RRH: WHITE

ALPHA SECTOR: RED

BETA SECTOR: BLUE

GAMMA SECTOR: GREEN

COLOR IDENTIFIER | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

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SHEET TITLE
RF
CABLE COLOR CODE

SHEET NUMBER
RF-1

LEGEND

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE

FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48–T8

SMOKE DETECTION (DC)

EMERGENCY LIGHTING (DC)

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

CHAIN LINK FENCE

WOOD/WROUGHT IRON FENCE

WALL STRUCTURE

LEASE AREA

PROPERTY LINE (PL)

SETBACKS

ICE BRIDGE

CABLE TRAY

WATER LINE

UNDERGROUND POWER

UNDERGROUND TELCO

OVERHEAD POWER

OVERHEAD TELCO

UNDERGROUND TELCO/POWER

ABOVE GROUND POWER

ABOVE GROUND TELCO

ABOVE GROUND TELCO/POWER

WORKPOINT

SECTION REFERENCE

DETAIL REFERENCE

ABBREVIATIONS

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

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STATE OF CONNECTICUT · DANIEL P. HAUM · No. 24128 · LICENSED PROFESSIONAL ENGINEER

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TR	VD	DPH

RFDS REV #: 0

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A&E PROJECT NUMBER

BOBOS01169A

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS01169A
131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

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

SIGN PLACEMENT:

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

NOTES:

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

INFORMATION

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

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

Site ID: _____

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

NOTICE

Transmitting Antenna(s)

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

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

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

Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

⚠ CAUTION

Transmitting Antenna(s)

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

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

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

Site ID: _____

dish

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⚠ WARNING

Transmitting Antenna(s)

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

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

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Site ID: _____

dish

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RF SIGNAGE

dish wireless.
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SHEET TITLE
RF SIGNAGE

SHEET NUMBER
GN-2

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES:

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

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

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

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

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

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

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

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

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

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

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

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

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

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

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

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DISH Wireless L.L.C.
PROJECT INFORMATION

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131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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STATE OF CONNECTICUT
DANIEL P. HAUM
No. 24128
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
TR	VD	DPH

RFDS REV #: 0

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DISH Wireless L.L.C.
PROJECT INFORMATION

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131 GIFFORD LANE
BOZRAH, CT 06334

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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