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

October 25, 2021

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

RE: Tower Share Application
497 Old Post Road Tolland, CT 06084
Latitude: 41.860556
Longitude: -72.403333
Site# BOBDL00101A_Dish_Tolland_TS_Zoning

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 497 Old Post Road Tolland, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/19005G MHz antenna and six (6) RRUs, at the 113-foot level of the existing 150-foot monopole tower, one (1) Fiber cables will also be installed. Dish Wireless LLC equipment cabinets will be placed within 7x5 lease area. Included are plans by Infinigy, dated September 24,2021 Exhibit C. Also included is a structural analysis prepared by Centek dated October 20, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. This facility was approved by the Town of Tolland, Planning & Zoning Commission on July 19, 1999. Please see attached Exhibit A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to The Honorable Tammy Nuccio, Chairperson, Town Council for the Town of Tolland, David Corcoran, Director of Planning & Development for the Town of Tolland, as well as the property owner Clearview Tower Company II, LLC and Clearview Company II tower owner.

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 modifications will not result in an increase in the height of the existing structure. The top of the tower is 150 feet; Dish Wireless LLC proposed antennas will be located at a center line height of 113-feet.

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

3.The proposed modification will not increase the 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 density of 23.93% as evidenced by Exhibit F.

Connecticut General Statutes 16-50-aa 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 guyed tower has been deemed structurally capable of supporting Dish Wireless LLC proposed loading. The structural analysis is included in Exhibit D.

B. Legal Feasibility. As referenced above, C.G.S. 16-50aa has been authorized to issue orders approving the shared use of an existing tower such as this guyed tower in Tolland. Under the authority granted to the Council, an order of the Council approving the requested shared use would permit Dish Wireless LLC to obtain a building permit for the proposed installation. Further, a letter of Authorization is included as Exhibit G, authorizing Dish Wireless LLC to file this application for shared use.

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 113-foot level of the existing 150-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

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

E. Public Safety Concerns. As discussed above, the tower is structurally capable of supporting Dish Wireless LLC proposed loading. Dish Wireless LLC is not aware of any public safety concerns relative to the proposed sharing of the existing tower. Dish Wireless LLC intentions of providing new and improved wireless service through the shared use of this facility is expected to enhance the safety and welfare of local residents and individuals traveling through Tolland.

Sincerely,

Denise Sabo

Denise Sabo
Mobile: 203-435-3640
Fax: 413-521-0558
Office: Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

Attachments
Cc: The Honorable Tammy Nuccio
Chairperson, Town Council
Town of Tolland
Hicks Memorial Municipal Center
21 Tolland Green, 5th Level
Tolland, CT 06084

David Corcoran, Director
Planning & Development
Town of Tolland
Hicks Memorial Municipal Center
21 Tolland Green, 3rd Level
Tolland, CT 06084

Clearview Tower Company II, LLC
26 Yolanda Drive
Edison, NJ 08817

Clearview Company II, Tower Owner

Exhibit A

Original Facility Approval

TOWN of TOLLAND / 21 tolland green, tolland, connecticut 06084

Ronald E. Blake
Town Planner

CERTIFIED MAIL
Z 336 011 847
July 19, 1999

Julie M. Cashin, Esq.
Hurwitz & Sagarin LLC
147 Broad Srtreet,PO Box 113
Milford, CT 06460-0112

RE: P&Z App. #614 – Sprint PCS, Site Plan approval - 497 Old Post Road, Tolland, CT.

Dear Attorney Cashin:

You are hereby advised that the Planning & Zoning Commission, at a meeting on July 12, 1999 APPROVED the Sprint PCS request as described below:

1. Sprint PCS is permitted to co-locate panel antennas on the existing 150-foot tower and to install equipment cabinets. The height of the panel installation, the design of the antenna arrays and panels, and the size, shape and location of the equipment structures must be as shown on the approved plan entitled in part "...Sprint PCS SITE I.D. #CT03XC212 TOLLAND MESSAGE CENTER...URS Greiner Woodward Clyde...Rocky Hill, Connecticut..." The plans (Drawing numbers T1, S1 & Z1 & 2) are all revised to 7-6-99.
2. The installation may not begin until Zoning and Building Permits have been issued by the Town.
3. Please note that the conditions of approval are subject to an annual review to assure Zoning compliance. I have enclosed as copy of the related Zoning Regulation (§170-93 R).
4. Note also, that upon completion of the Sprint PSC project, an "as-built" plan must be submitted before a Certificate of Compliance (Certificate of Occupancy) will be issued. The as-built must be prepared by a licensed engineer and must demonstrate that the structure has been built and sited in accordance with the APPROVED plan that is on file in the Planning Office. The maximum height of the panel assemblies and supports must be ascertained. No part of the panels or the mounts may exceed 150 feet above grade.
5. A copy of the APPROVED plan, dated and endorsed by the PZC Chairperson, is enclosed for your files.

If you have any questions, please contact me at 871-3601 Monday through Wednesday 9:00am to 4:30pm, Thursday 9:00am to 4:30pm and 5:30pm to 8:30pm and Friday 9:00am to 12:30pm.

Very truly yours,

R. E. Blake

Ronald E. Blake
Town Planner

Enclosures: 2

SUBAPPRV1.DOC 072099/0800 REB

application shall be deemed incomplete until these fees have been submitted.

(3) For the purpose of this section "outside consultant" means a professional who is not an employee of the town. "Outside consultants" shall be, but will not be limited to, engineering, traffic, environmental and planning professionals.

(4) Any portion of the surcharge fee not expended by the town on the project shall be returned to the applicant upon completion of the review, evaluation and processing of the application.

(5) The Commission shall bill the applicant for any costs incurred by the town in excess of the surcharge fee. This bill shall be paid by the applicant before the issuance of a zoning permit for the project.

R. Annual review, inspection and fee. The Commission or its agent will review the approved special permit and site plan and inspect the WTS annually to determine if all conditions of approval are being strictly addressed. If improvements or maintenance is required, the property owner will be directed make the required corrections. To help defray the cost for the review, an annual fee shall be paid to the Town of Tolland, via the Planning Office. The fee shall be paid by the property owner or providers using the equipment. The annual review dates and fee payment requirements will be determined by the Commission based on the approval date.

~~(Cont'd on page 17093)~~

Exhibit B

Property Card

497 OLD POST ROAD

Location	497 OLD POST ROAD	**Mblu**	20/ K/ 30/00 /
Acct#	1186	**Owner**	CLEARVIEW TOWER COMPANY II LLC
Assessment	$437,200	**Appraisal**	$624,600
PID	3167	**Building Count**	1

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$67,200	$557,400	$624,600
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2019	$47,000	$390,200	$437,200

Owner of Record

Owner	CLEARVIEW TOWER COMPANY II LLC	**Sale Price**	$671,000
Co-Owner		**Certificate**	
		Book & Page	1480/0256

Address	26 YOLANDA DR EDISON, NJ 08817	**Sale Date**	05/20/2019
		Instrument	00

Ownership History

Ownership History					
Owner	**Sale Price**	**Certificate**	**Book & Page**	**Instrument**	**Sale Date**
CLEARVIEW TOWER COMPANY II LLC	$671,000		1480/0256	00	05/20/2019
OLD POST ROAD HOLDINGS LLC	$825,000		0642/0286	00	12/06/1999

Building Information

Building 1 : Section 1

Year Built:	1966
Living Area:	2,841
Replacement Cost:	$229,338
Building Percent Good:	25
Replacement Cost Less Depreciation:	$57,300

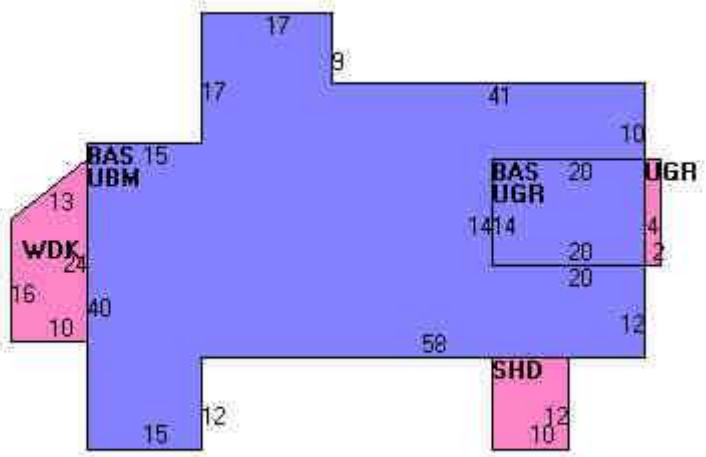
Building Attributes	
Field	**Description**
Style:	Ranch
Model	Residential
Grade:	Average +20
Stories:	1 Story
Occupancy	1
Exterior Wall 1	Wood on Sheath

Building Photo

(http://images.vgsi.com/photos/TollandCTPhotos//\00\00\82\77.jpg)

Building Layout

Exterior Wall 2	Aluminum Sidng
Roof Structure:	Gable/Hip
Roof Cover	Architect Shin
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Flr 1	Minimum/Plywd
Interior Flr 2	
Heat Fuel	None
Heat Type:	None
AC Type:	Partial
Total Bedrooms:	3 Bedrooms
Total Bthrms:	0
Total Half Baths:	0
Total Xtra Fixtrs:	0
Total Rooms:	7 Rooms
Bath Style:	Modern
Kitchen Style:	Average
Num Kitchens	
Cndtn	
Func Code	
Econ Code	
Num Park	
Fireplaces	
Solar	
Solar Type	



(http://images.vgsi.com/photos/TollandCTPhotos//Sketches/3167_3190.jpg

Building Sub-Areas (sq ft)			Legend
Code	Description	Gross Area	Living Area
BAS	Main Floor	2,841	2,841
SHD	Shed-Attached	120	0
UBM	Basement	2,561	0
UGR	Garage Under	308	0
WDK	Wood Deck	200	0
		6,030	2,841

Fndtn Cndtn	
Basement	

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
FPL3	FIREPLACE 2 ST	1.00 UNITS	$1,000	1
A/C	AIR CONDITIONING	198.00 S.F.	$100	1

Land

Land Use

Use Code	200R
Description	Commercial
Zone	RDD
Neighborhood	R35
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	0.84
Frontage	165
Depth	
Assessed Value	$390,200
Appraised Value	$557,400

Outbuildings

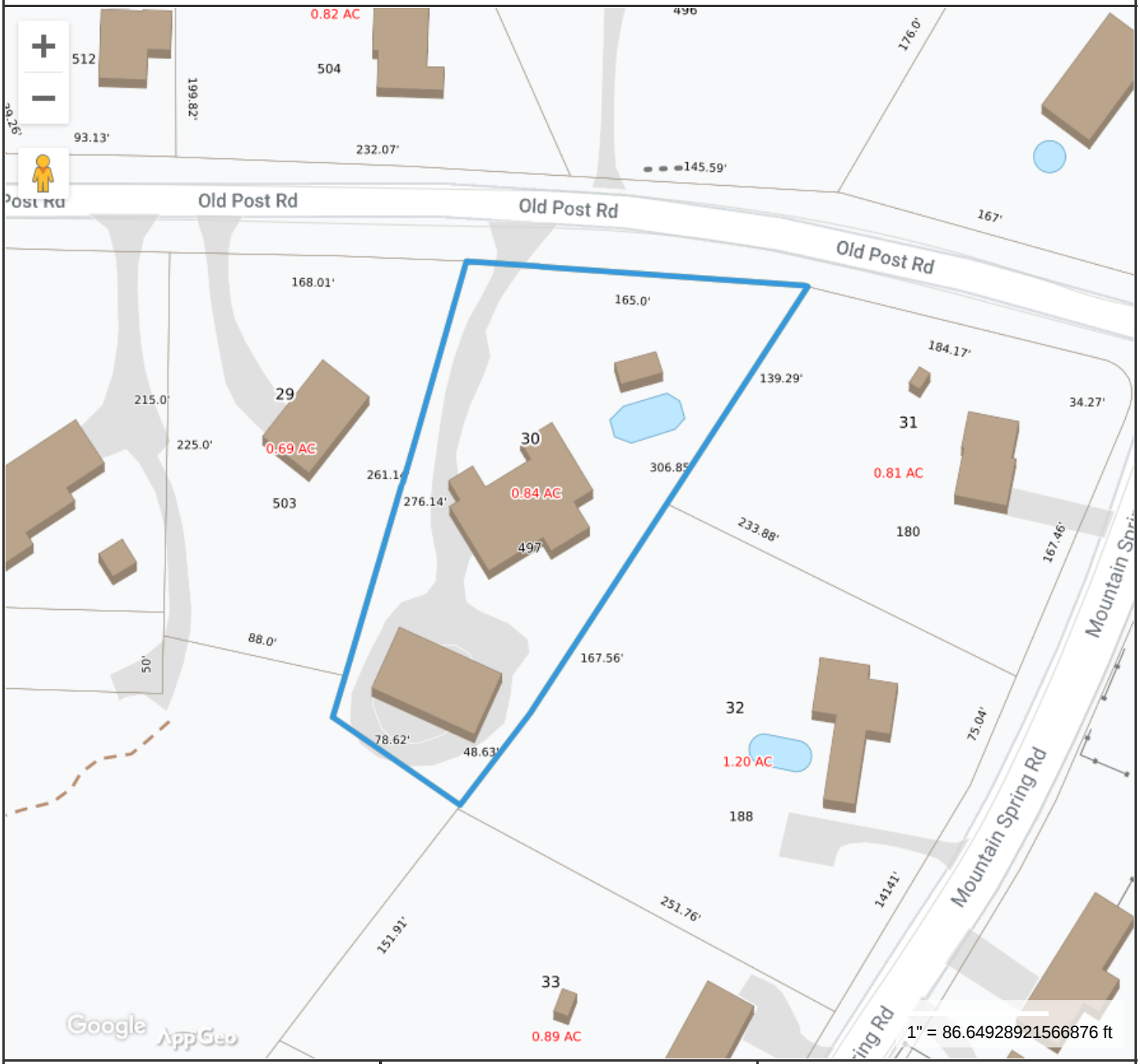
Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
SHD	SHED	1F	1 Stry Frame	472.00 S.F.	$900	1
SHD	SHED	1BQ	BQ Shed	196.00 S.F.	$2,900	1
FDN	FOUNDATION	G	Garage	1.00 UNITS	$5,000	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
4000	$67,200	$557,400	$624,600
2020	$67,200	$557,400	$624,600
2019	$67,200	$557,400	$624,600

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
4000	$47,000	$390,200	$437,200
2020	$47,000	$390,200	$437,200
2019	$47,000	$390,200	$437,200

BOBDL00101A Map



Property Information

Property ID	20/K/030
Location	497 OLD POST ROAD
Owner	CLEARVIEW TOWER COMPANY II LLC

MAP FOR REFERENCE ONLY
NOT A LEGAL DOCUMENT

Town of Tolland, CT makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Geometry updated 08/03/2020
Data updated 11/19/2018

Print map scale is approximate. Critical layout or measurement activities should not be done using this resource.

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBDL00101A

DISH Wireless L.L.C. SITE ADDRESS:

497 OLD POST ROAD
TOLLAND, CT 06084

CONNECTICUT CODE COMPLIANCE

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

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

SHEET INDEX

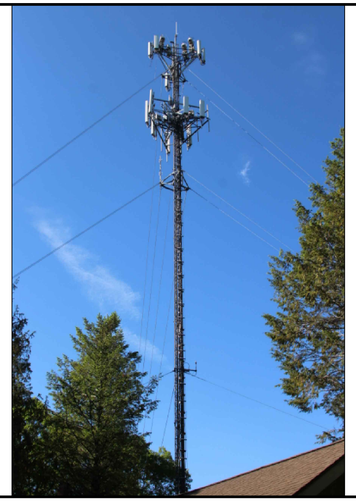
SCOPE OF WORK

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

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

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

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.

SITE INFORMATION

PROPERTY OWNER:	CLEARVIEW TOWER COMPANY,LLC
ADDRESS:	497 OLD POST RD TOLLAND, CT 06084
TOWER TYPE:	GUYED TOWER
TOWER CO SITE ID:	TBD
TOWER APP NUMBER:	TBD
COUNTY:	TOLLAND
LATITUDE (NAD 83):	41° 51' 38.0" N 41.860556 N
LONGITUDE (NAD 83):	72° 24' 12.0" W 72.403333 W
ZONING JURISDICTION:	RDD
ZONING DISTRICT:	R35
PARCEL NUMBER:	3167
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	V-B
POWER COMPANY:	EVERSOURCE
TELEPHONE COMPANY:	AT&T

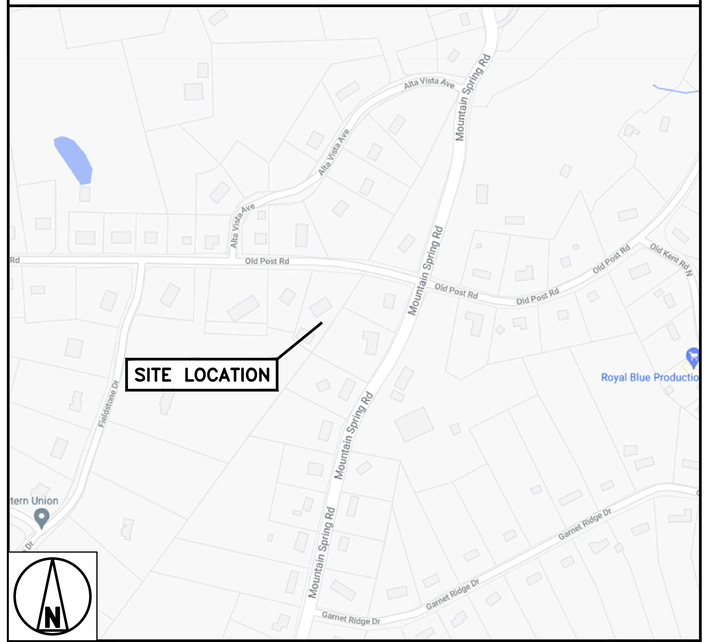
PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	EVEREST 100 SUMMER STREET, SUITE 1600 BOSTON, MA 02110
SITE DESIGNER:	INFINIGY 1033 WATERVLIET SHAKER RD ALBANY, NY 12205 (518) 690-0790
SITE ACQUISITION:	APRIL PARROTT (203) 927-4317
CONSTRUCTION MANAGER:	JAVIER SOTO (617) 839-6514
RF ENGINEER:	BOSSENER CHARLES TBD

DIRECTIONS

DIRECTIONS FROM TOURS OF DISTINCTION AIRPORT:
DEPART AND HEAD TOWARD MASSACO ST, TURN RIGHT ONTO MASSACO ST, TURN LEFT ONTO US-202 E / CT-10 / HOPMEADOW ST, TURN RIGHT ONTO CT-315 / TARIFFVILLE RD, KEEP RIGHT TO STAY ON CT-315 / ELM ST, TURN RIGHT ONTO CT-189 / STATE HIGHWAY 189, TAKE THE RAMP ON THE RIGHT FOR CT-187 SOUTH AND HEAD TOWARD BLOOMFIELD / HARTFORD, BEAR LEFT ONTO DAY HILL RD, TAKE THE RAMP ON THE RIGHT FOR I-91 SOUTH AND HEAD TOWARD HARTFORD, AT EXIT 35A, HEAD RIGHT ON THE RAMP FOR I-291 TOWARD MANCHESTER, TAKE THE RAMP ON THE LEFT FOR I-84 EAST AND HEAD TOWARD BOSTON AT EXIT 67, HEAD RIGHT ON THE RAMP FOR CT-31 TOWARD COVENTRY, TURN RIGHT ONTO CT-31 / RESERVOIR RD TOWARD COVENTRY, TURN LEFT ONTO LOEHR RD, BEAR LEFT ONTO REED RD, ROAD NAME CHANGES TO MOUNTAIN SPRING RD, TURN LEFT ONTO OLD POST RD, ARRIVE AT, 497 OLD POST ROAD, TOLLAND, CT 06084.

VICINITY MAP



NO SCALE

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

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
2500 W. HIGGINS RD. SUITE 500 | HOFFMAN ESTATES, IL 60169
PHONE: 847-648-4068 | FAX: 518-690-0793
WWW.INFINIGY.COM

STATE OF CONNECTICUT
TSUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT

A&E PROJECT NUMBER
1197-F0001-C

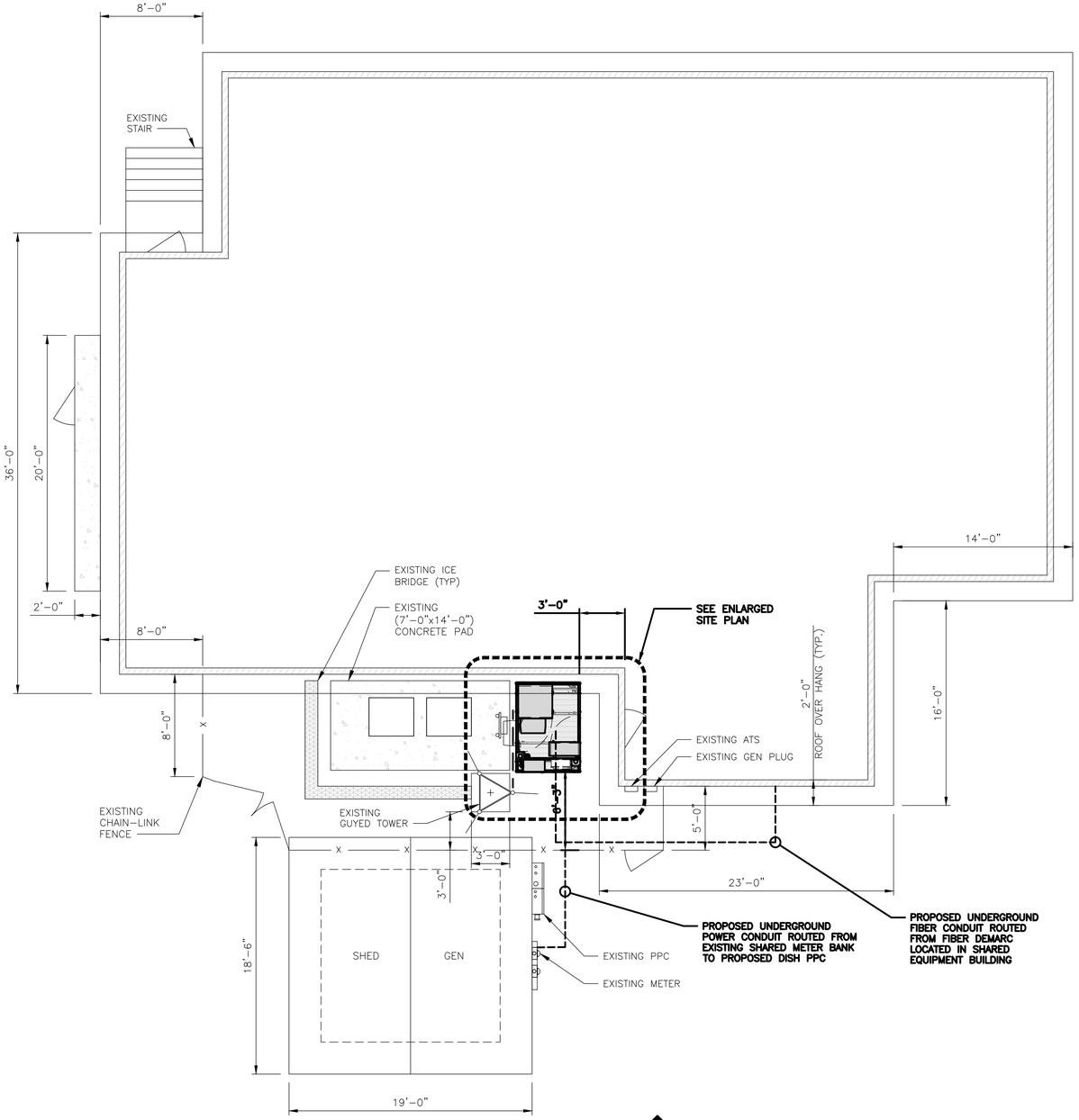
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

NOTES

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



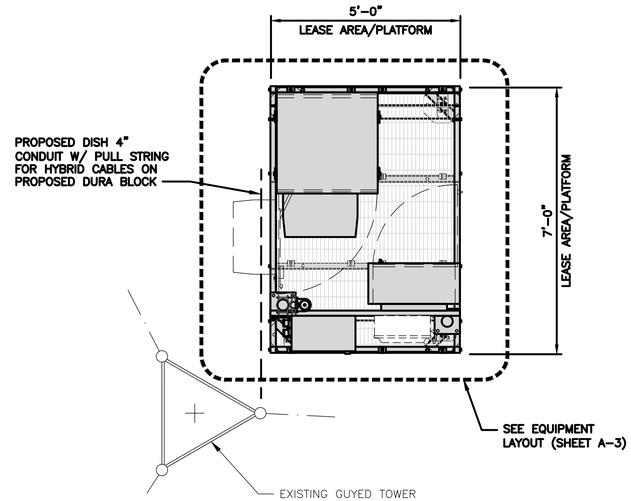
OVERALL SITE PLAN

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

1

NOTES

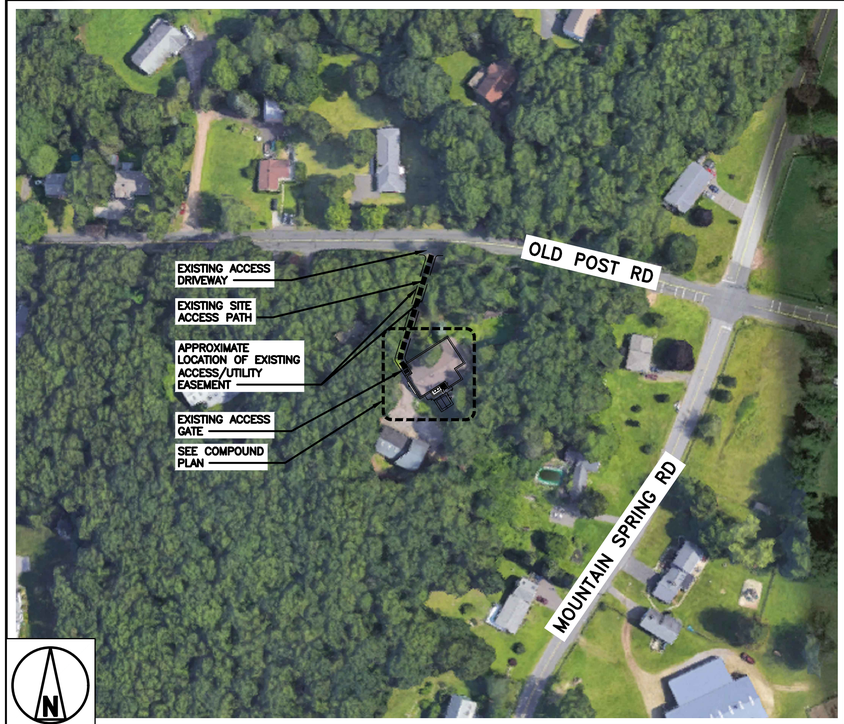
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED GPS UNIT, TRANSMITTING ANTENNAS AND EXISTING GPS UNITS.
3. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



ENLARGED SITE PLAN

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

2



SITE PLAN

100' 50' 0 100' 200'
1"=100'

3

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

NSS NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

INFINIGY
FROM ZERO TO INFINIGY
the solutions are endless
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HOFFMAN ESTATES, IL 60169
PHONE: 847-648-4068 | FAX: 518-690-0793
WWW.INFINIGY.COM

STATE OF CONNECTICUT
TSUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT

A&E PROJECT NUMBER

1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE

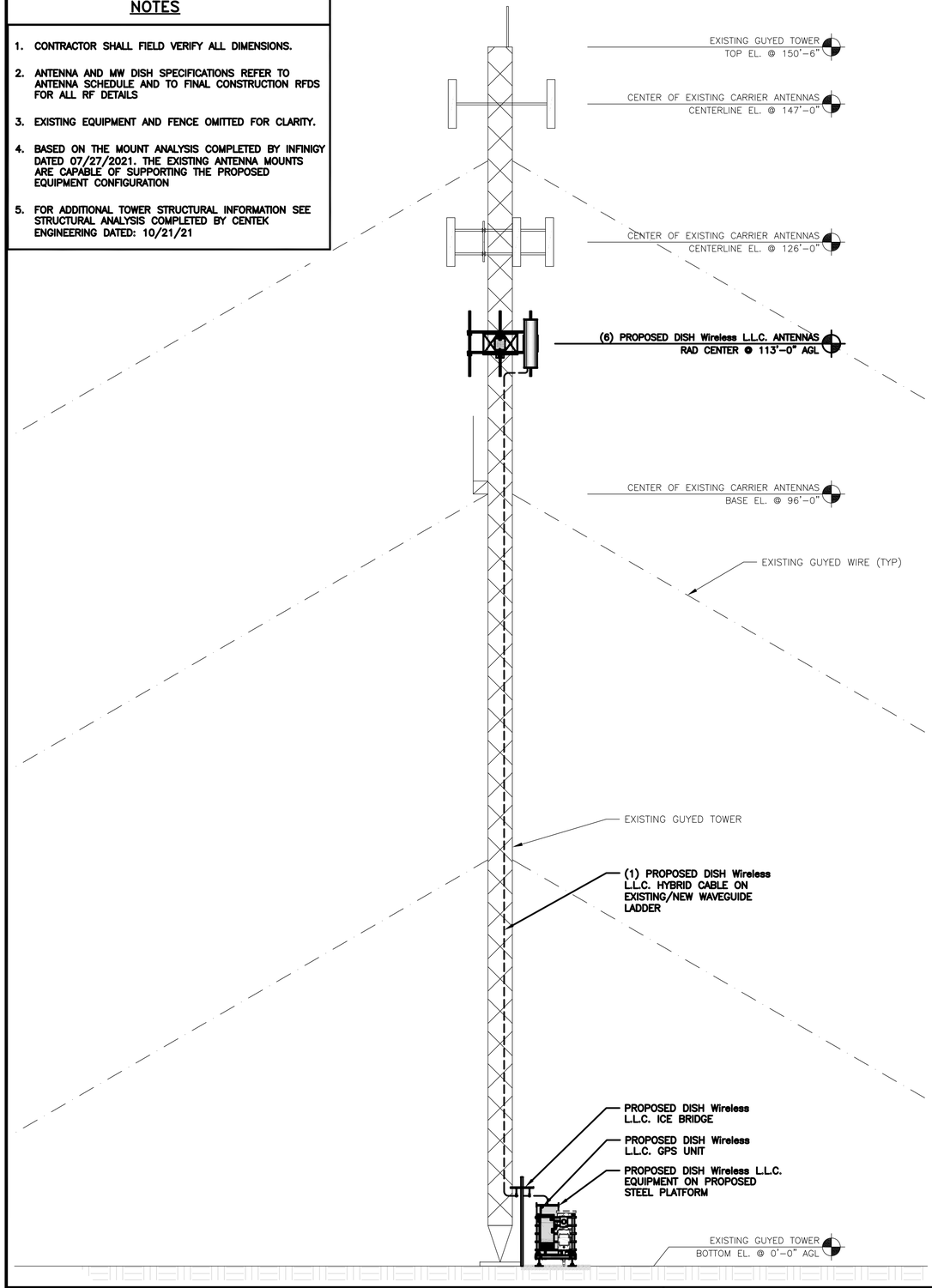
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

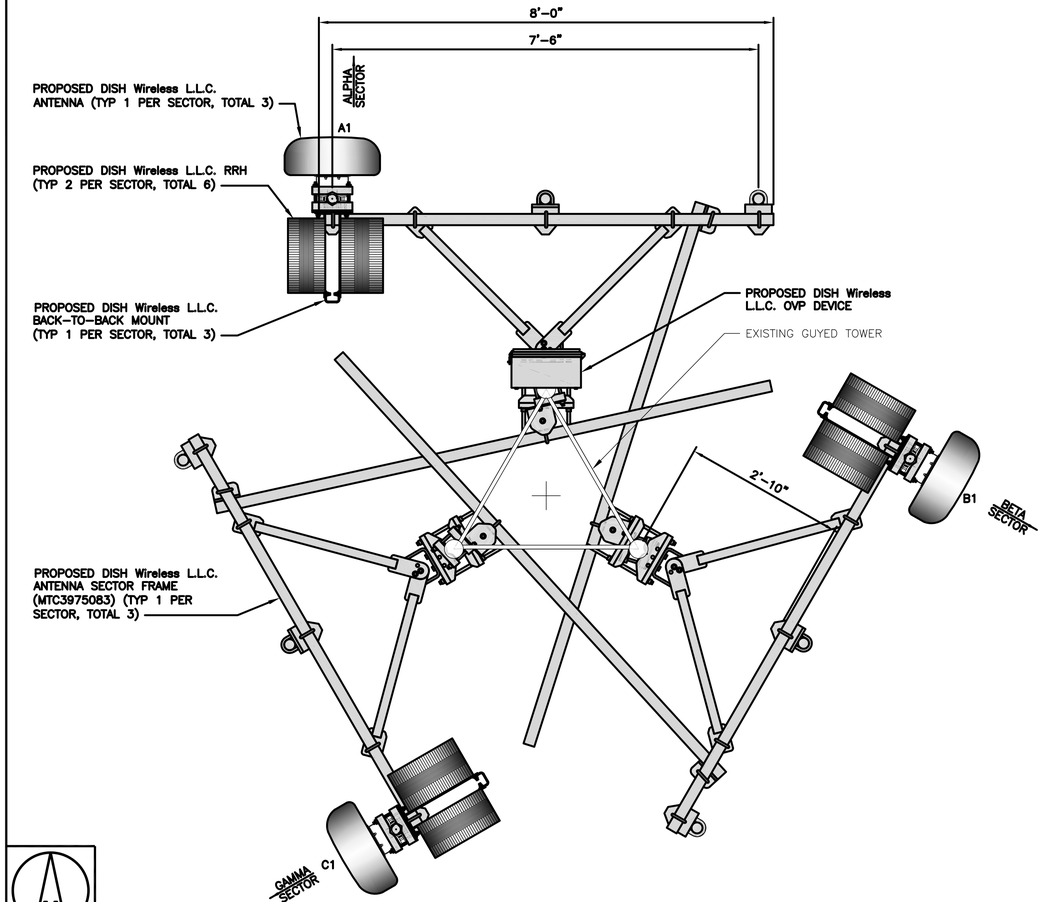
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.
4. BASED ON THE MOUNT ANALYSIS COMPLETED BY INFINIGY DATED 07/27/2021. THE EXISTING ANTENNA MOUNTS ARE CAPABLE OF SUPPORTING THE PROPOSED EQUIPMENT CONFIGURATION
5. FOR ADDITIONAL TOWER STRUCTURAL INFORMATION SEE STRUCTURAL ANALYSIS COMPLETED BY CENTEK ENGINEERING DATED: 10/21/21



PROPOSED SOUTH ELEVATION

8' 4' 0 8' 16'
1/8"=1'-0"

1



ANTENNA LAYOUT

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

2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZMUITH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A1	PROPOSED	JMA WIRELESS – MX08FRO665-21	5G	72.0" x 20.0"	0°	113'-0"	(1) HIGH-CAPACITY HYBRID CABLE (150' LONG)
BETA	B1	PROPOSED	JMA WIRELESS – MX08FRO665-21	5G	72.0" x 20.0"	120°	113'-0"	
GAMMA	C1	PROPOSED	JMA WIRELESS – MX08FRO665-21	5G	72.0" x 20.0"	240°	113'-0"	

NOTES

1. CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
2. ANTENNA OR 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.

SECTOR	POSITION	RRH	
		MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	A1	FUJITSU – TA08025-B604	5G
	A1	FUJITSU – TA08025-B605	5G
BETA	B1	FUJITSU – TA08025-B604	5G
	B1	FUJITSU – TA08025-B605	5G
GAMMA	C1	FUJITSU – TA08025-B604	5G
	C1	FUJITSU – TA08025-B605	5G

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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STATE OF CONNECTICUT
MUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

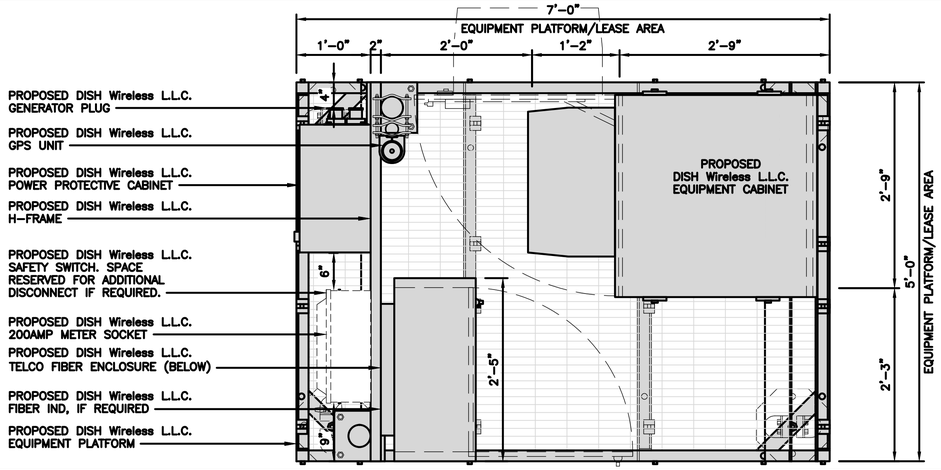
REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT
1	10/18/2021	REVISED PER COMMENT

A&E PROJECT NUMBER
1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2



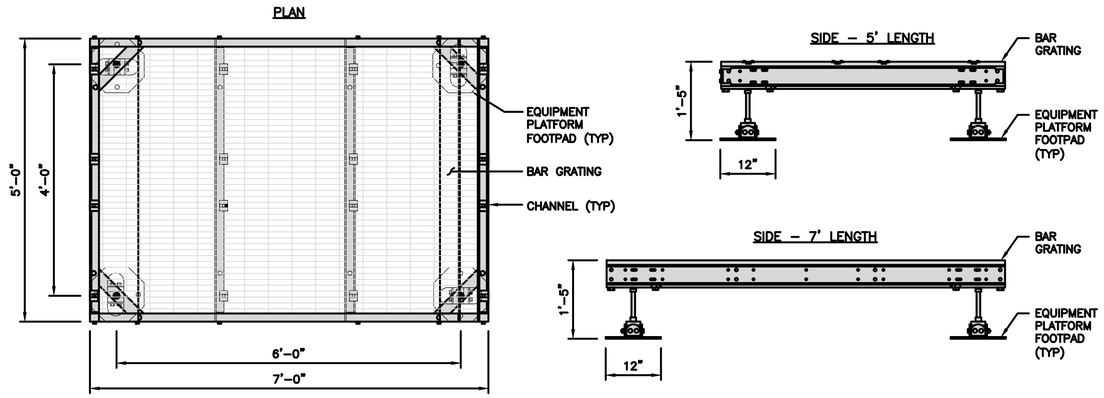
PLATFORM EQUIPMENT PLAN

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

1

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

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



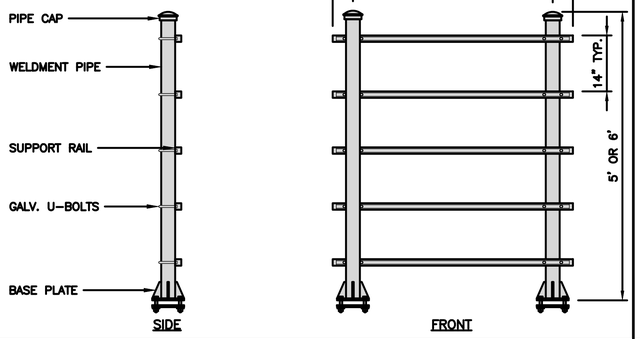
PLATFORM DETAIL

NO SCALE

2

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

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



H-FRAME DETAIL

NO SCALE

3

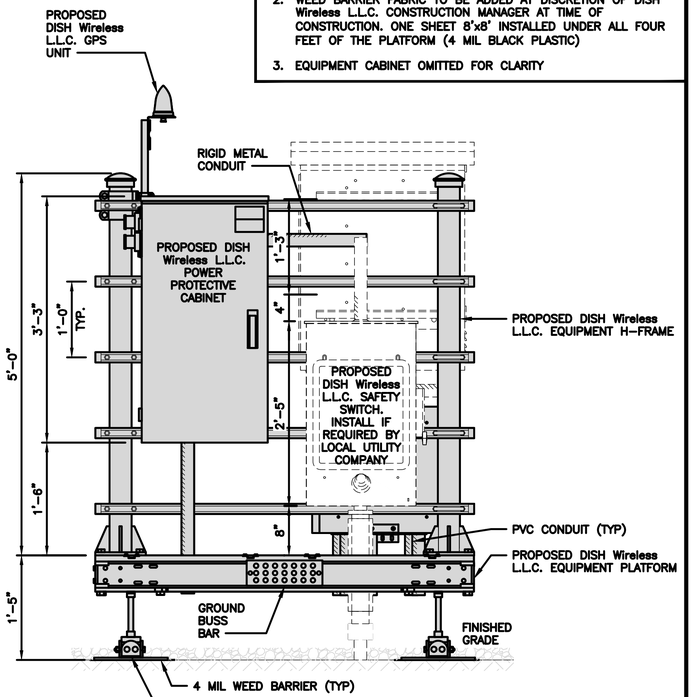
NOT USED

NO SCALE

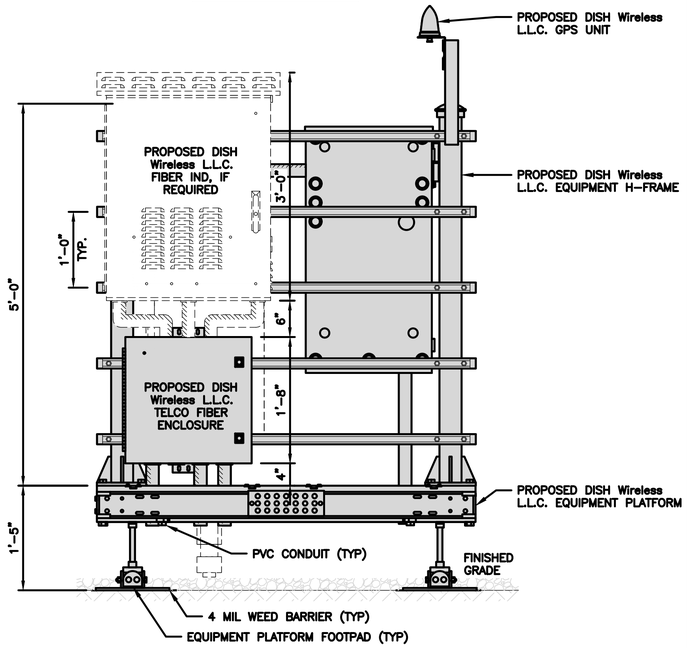
4

NOTES

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



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

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

5

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9/29/2021

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RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

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A&E PROJECT NUMBER
1197-F0001-C

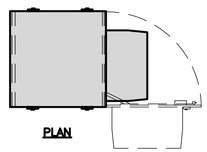
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

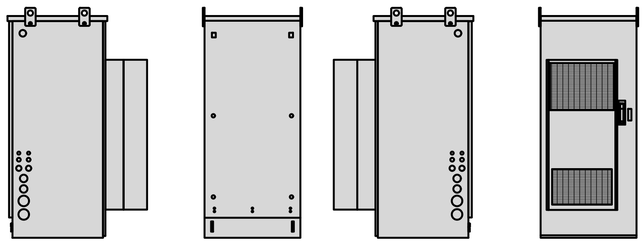
SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

CHARLES INDUSTRY HEX CUBE–PM639155N4

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


PLAN

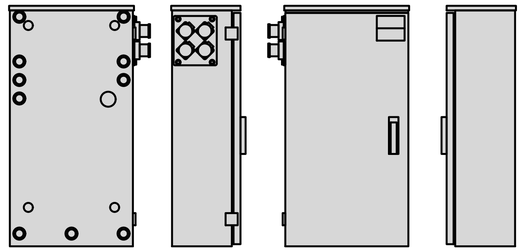

SIDE BACK SIDE FRONT

CABINET DETAIL | NO SCALE | 1

RAYCAP PPC RDIAC–2465–P–240–MTS

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


TOP

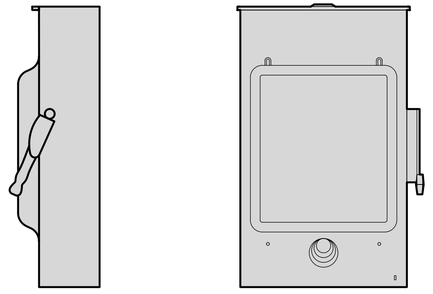

BACK SIDE FRONT SIDE

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

SQUARE D SAFETY SWITCHES D224NRB

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

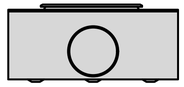

TOP

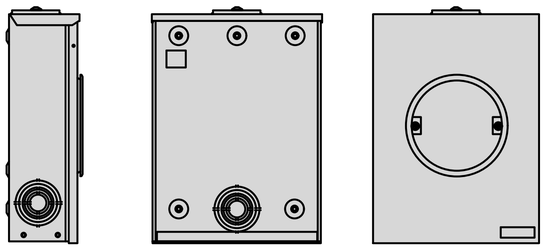

SIDE FRONT

SAFETY SWITCH DETAIL | NO SCALE | 3

EATON METER SOCKET UNRRS213BEUSE

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


PLAN

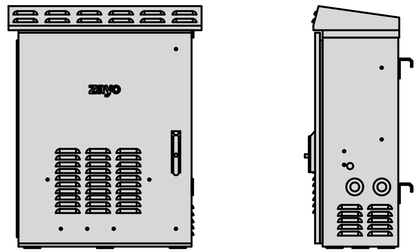

SIDE BACK FRONT

METER SOCKET DETAIL | NO SCALE | 4

ZAYO 5RU CABINET LEFT SWING DOOR ("LIT" SITES)

DIMENSIONS (HxWxD)	36.115"x29"x12.9"
WEIGHT	85 LBS
POWER INPUT	20A, –48VDC


PLAN

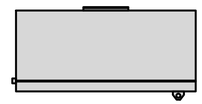


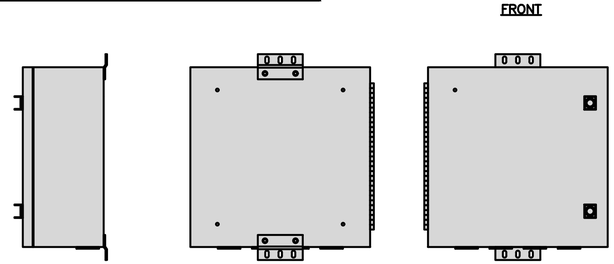
FRONT SIDE BACK

NETWORK INTERFACE UNIT DETAIL | NO SCALE | 5

CHARLES CFIT–PF2020DSH1 FIBER TELCO ENCLOSURE

ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4


FRONT


SIDE BACK FRONT

FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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RFDS REV #: N/A

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SUBMITTALS

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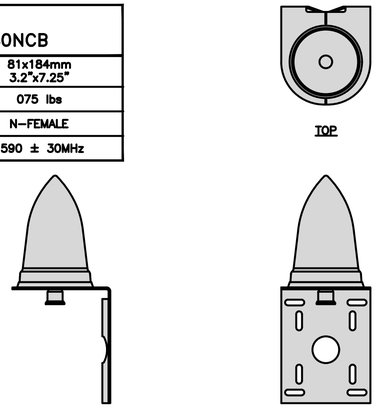
1197–F0001–C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

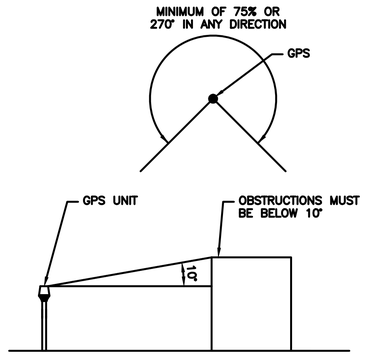
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-4

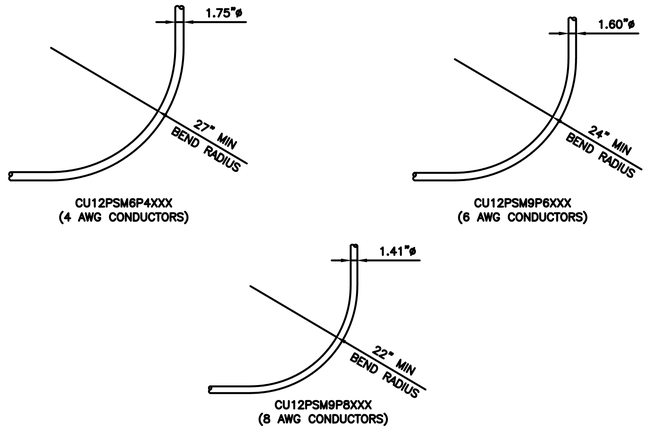
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



GPS DETAIL | NO SCALE | 1



GPS MINIMUM SKY VIEW REQUIREMENTS | NO SCALE | 2



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

NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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LICENSED PROFESSIONAL ENGINEER
9/29/2021

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RFDS REV #: N/A

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1197-F0001-C

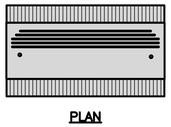
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
EQUIPMENT DETAILS

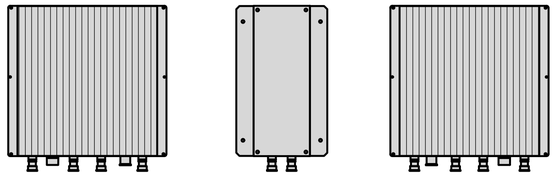
SHEET NUMBER
A-5

FUJITSU TRIPLE BAND TA08025-B605

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



PLAN

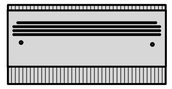


BACK SIDE FRONT

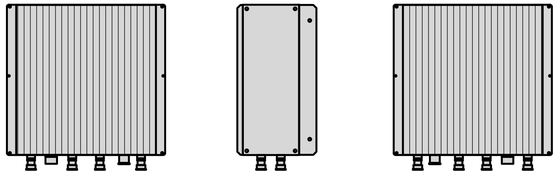
RRH DETAIL | NO SCALE | 1

FUJITSU DUAL BAND TA08025-B604

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



PLAN



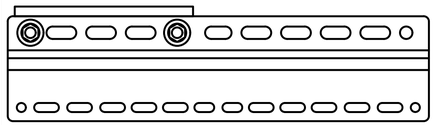
BACK SIDE FRONT

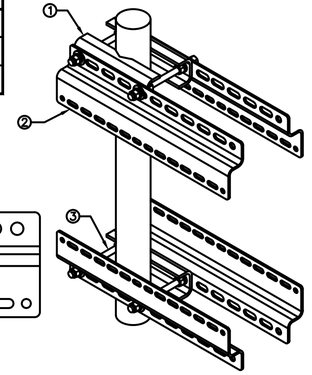
RRH DETAIL | NO SCALE | 2

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"





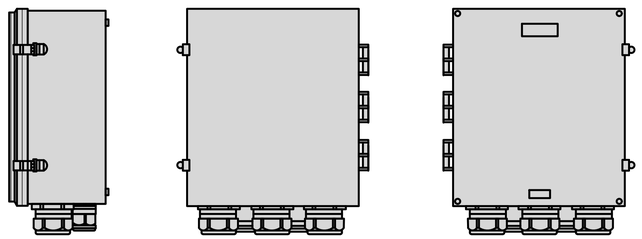
NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

RRH MOUNT DETAIL | NO SCALE | 3

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

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

PLAN



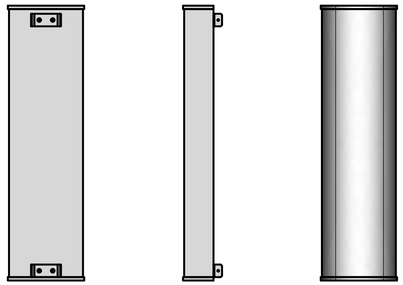
SIDE BACK FRONT

SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 4

JMA WIRELESS MX08FRO665-21 ANTENNA

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

PLAN



BACK SIDE FRONT

NOTES

FINAL ANTENNA SPECIFICATIONS TO BE CONFIRMED BY GC

ANTENNA DETAIL | NO SCALE | 5

NOT USED | NO SCALE | 6

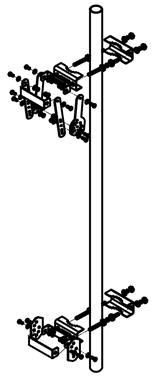
JMA ANTENNA MOUNT BRACKET #91900318

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

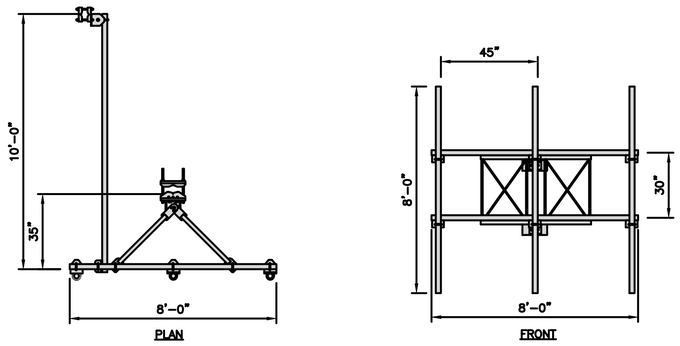


ANTENNA BRACKET DETAIL | NO SCALE | 7

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 | 8

NOT USED | NO SCALE | 9

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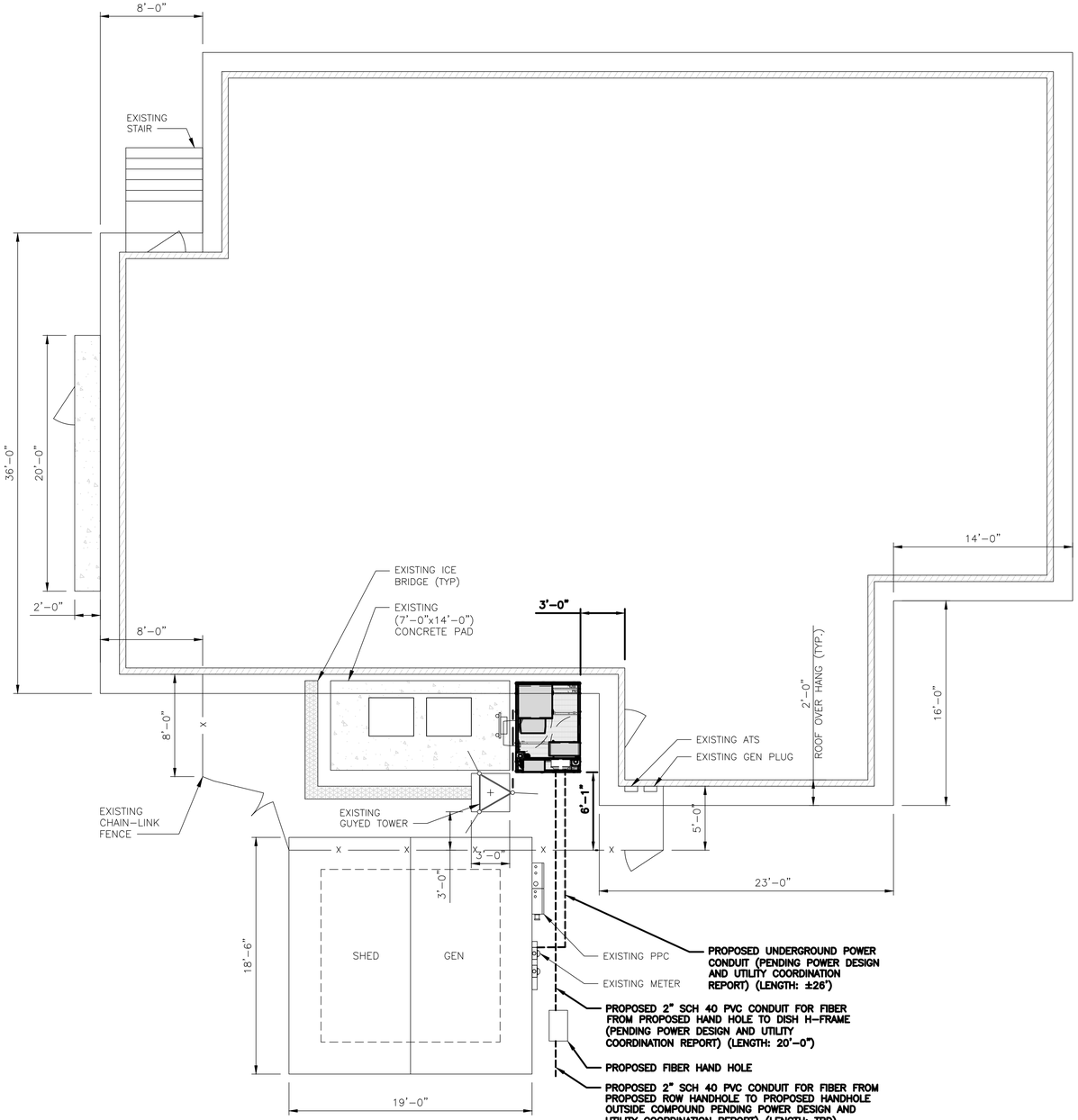
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

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.



UTILITY ROUTE PLAN

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

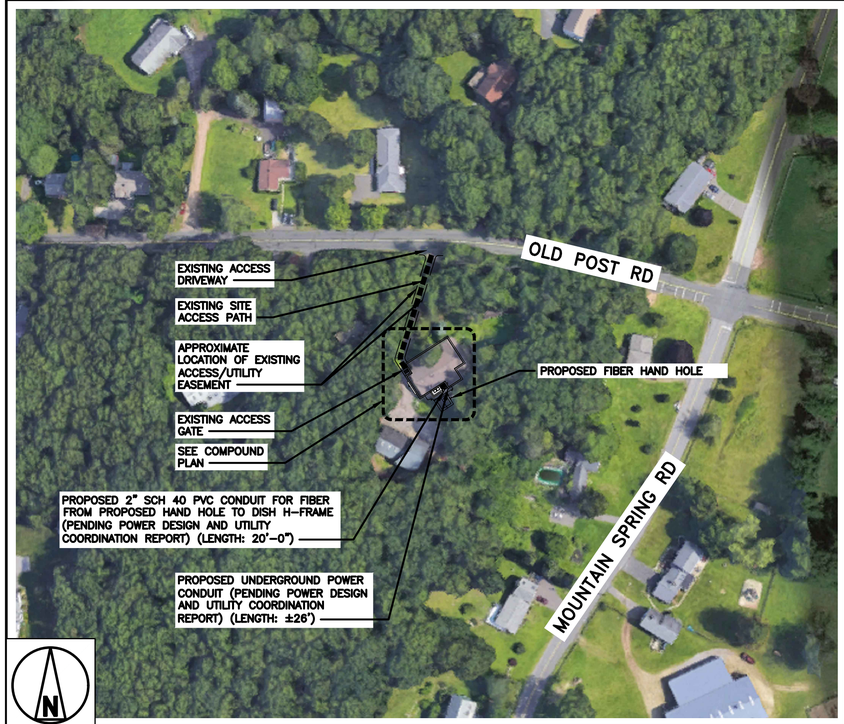
1

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

2



OVERALL UTILITY ROUTE PLAN

100' 50' 0 100' 200'
1"=100'

3

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LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT

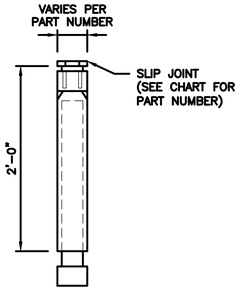
A&E PROJECT NUMBER
1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

SHEET NUMBER
E-1

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

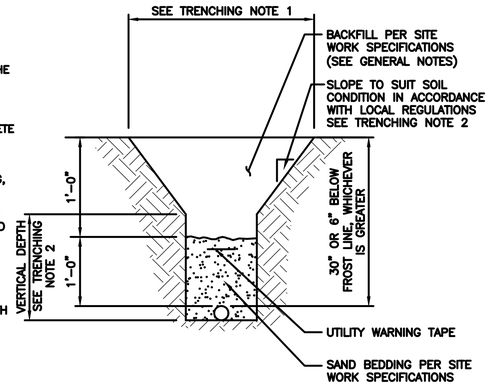


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

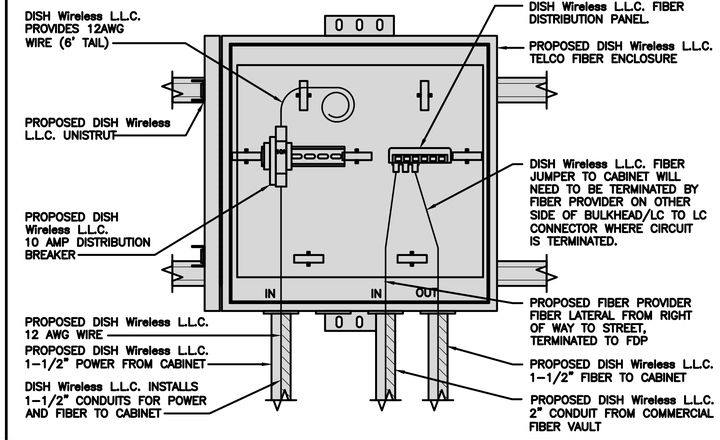
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

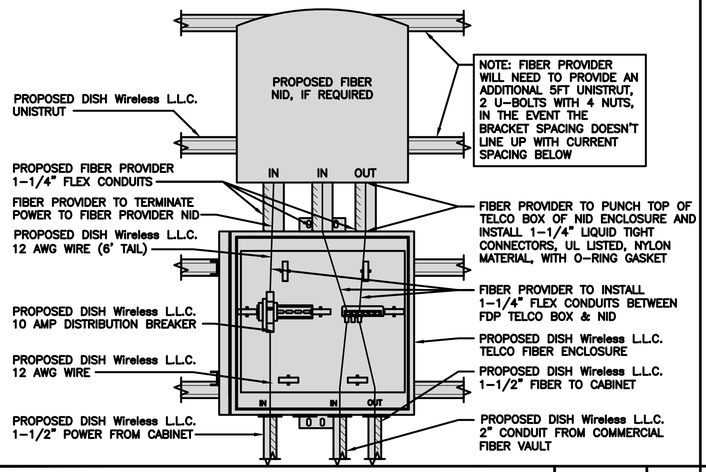
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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



TYPICAL UNDERGROUND TRENCH DETAIL | NO SCALE | 2



DARK TELCO BOX – INTERIOR WIRING LAYOUT | NO SCALE | 3



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

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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TBD
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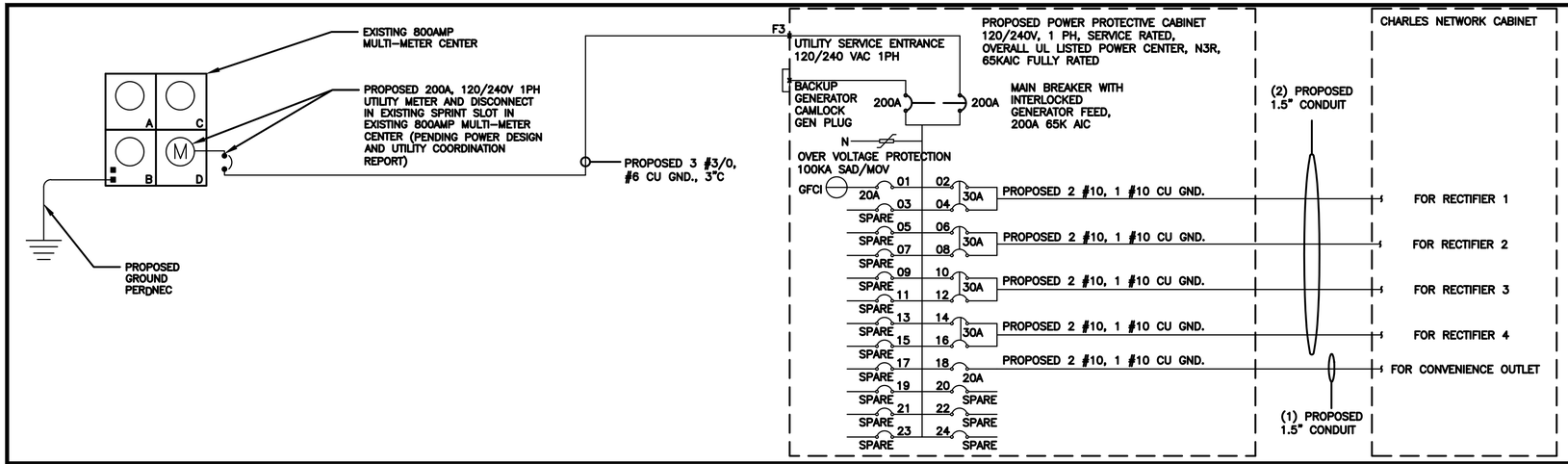
TOLLAND, CT 06084

SHEET TITLE
ELECTRICAL DETAILS

SHEET NUMBER
E-2



NOTES

THERE ARE A TOTAL OF (10) CURRENT CARRYING CONDUCTORS IN A SINGLE CONDUIT. ADJUSTABLE FACTOR OF 50% PER NEC TABLE 310.15(B)(3)(a) SHALL APPLY.

#10 FOR 15A/1P BREAKER: 0.5 x 40A = 15.0A
#8 FOR 20A-25A/2P BREAKER: 0.5 x 55A = 27.5A

CONDUIT SIZING: ASSUME 1.5" EMT
AT 40% FILL PER NEC 358, TABLE 4 – 0.814A SQ. IN AREA

WIRES: USING THWN-2, CU. (INCLUDING 3 GROUND WIRES)
#6 – 0.0507 SQ. IN X 8 = 0.4056 SQ. IN
#8 – 0.0366 SQ. IN X 2 = 0.0732 SQ. IN
#10 – 0.0211 SQ. IN X 4 = 0.0844 SQ. IN <GROUND
#12 – 0.0133 SQ. IN X 1 = 0.0133 SQ. IN <GROUND
TOTAL = 0.5765 SQ. IN

1.5" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OR (15) WIRES, INCLUDING GROUND WIRE, AS INDICATED ABOVE.

CONDUIT SIZING: ASSUME 3.0" SCH 40 PVC
AT 40% FILL PER NEC 352,TABLE 4 – 1.216A SQ. IN AREA

WIRES: USING THHN, CU. (INCLUDING 2 GROUND WIRES)
#3/0 – 0.1318 SQ. IN X 3 = 0.3954 SQ. IN
#2 – 0.0521 SQ. IN X 1 = 0.0521 SQ. IN
TOTAL = 0.4475 SQ. IN

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

(CHARLES ABB GE INFINITY DC PLANT) WITH MULTI-METER CENTER 120V240V 1PH SOURCE | NO SCALE | 1

PROPOSED 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
–SPARE–				1	A	2		2880		ABB/GE INFINITY RECTIFIER 1
–SPARE–				3	B	4	30A		2880	
–SPARE–				5	A	6		2880		ABB/GE INFINITY RECTIFIER 2
–SPARE–				7	B	8	30A		2880	
–SPARE–				9	A	10		2880		ABB/GE INFINITY RECTIFIER 3
–SPARE–				11	B	12	30A		2880	
–SPARE–				13	A	14		2880		ABB/GE INFINITY RECTIFIER 4
–SPARE–				15	B	16	30A		2880	
–SPARE–				17	A	18	20A	1920		CHARLES GFCI OUTLET
–SPARE–				19	B	20				–SPARE–
–SPARE–				21	A	22				–SPARE–
–SPARE–				23	B	24				–SPARE–
VOLT AMPS								13440	11520	

200A MCB, 1ϕ, 3W, 120/240V	L1	L2	
MB RATING: 65,000 AIC	13440	11520	VOLT AMPS
	140	96	AMPS
	140		MAX AMPS
	175		MAX 125%

PANEL SCHEDULE
(CHARLES ABB GE INFINITY DC PLANT) WITH MULTI-METER CENTER 120V240V 1PH SOURCE | NO SCALE | 2

NOT USED | NO SCALE | 3

FAULT CALCULATIONS | NO SCALE | 4

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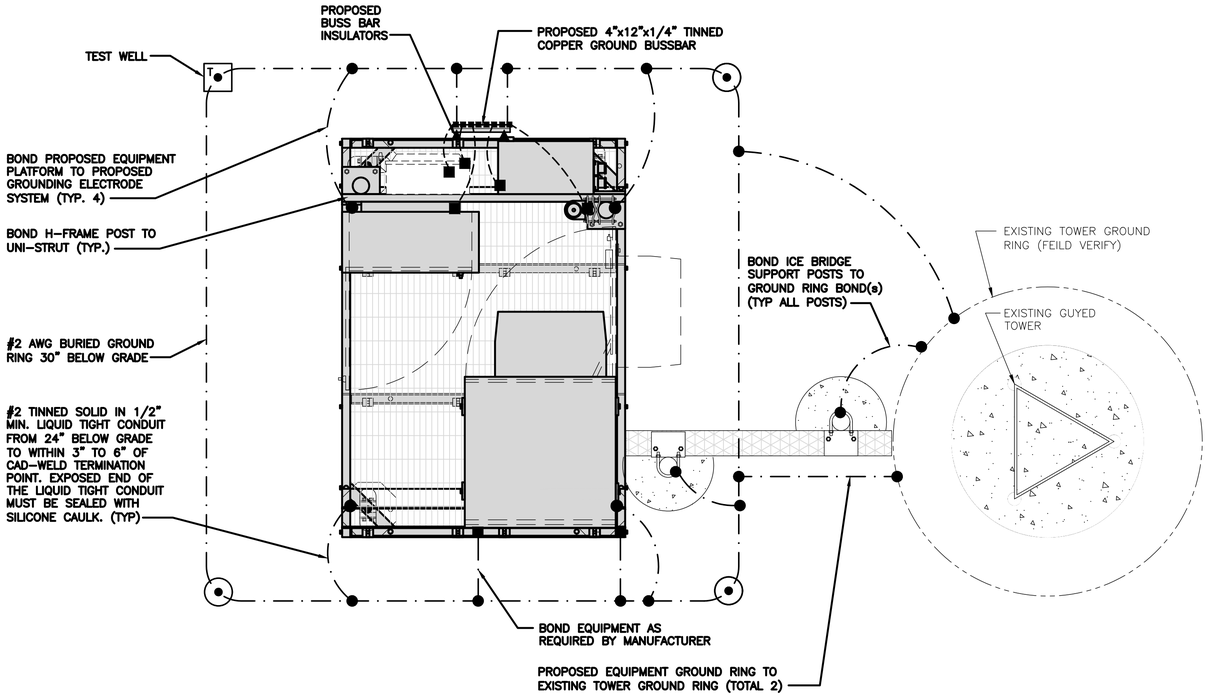
1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

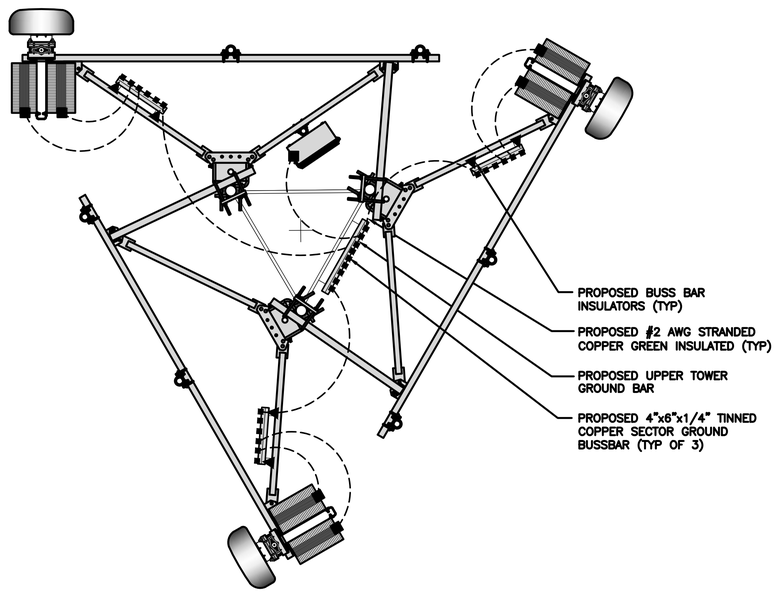
SHEET TITLE
ELECTRICAL ONE-LINE, FAULT CALCS & PANEL SCHEDULE

SHEET NUMBER
E-3



TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1



NO SCALE | 2

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

GROUNDING LEGEND

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

GROUNDING KEY NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GROUNDING KEY NOTES

NO SCALE | 3

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RFDS REV #: N/A

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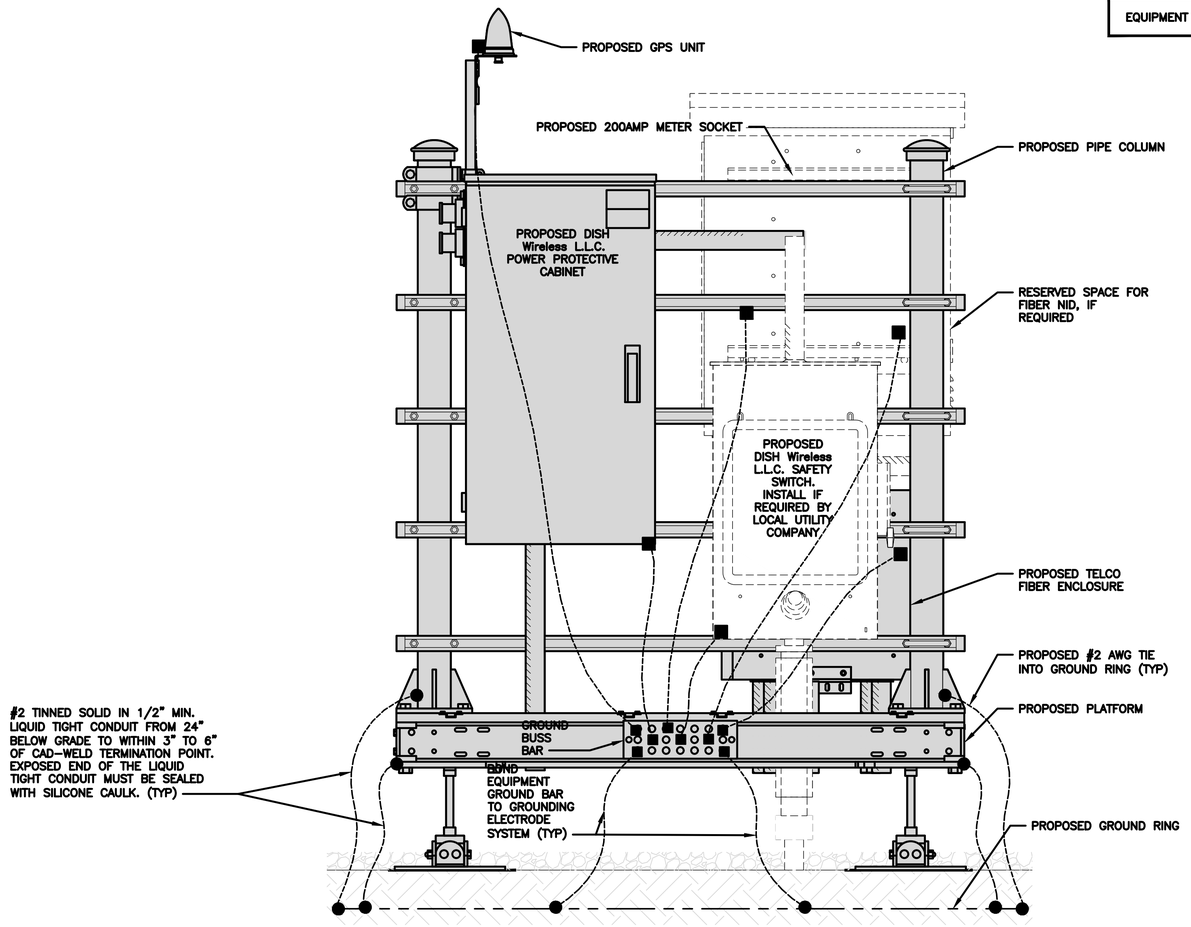
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

NOTES

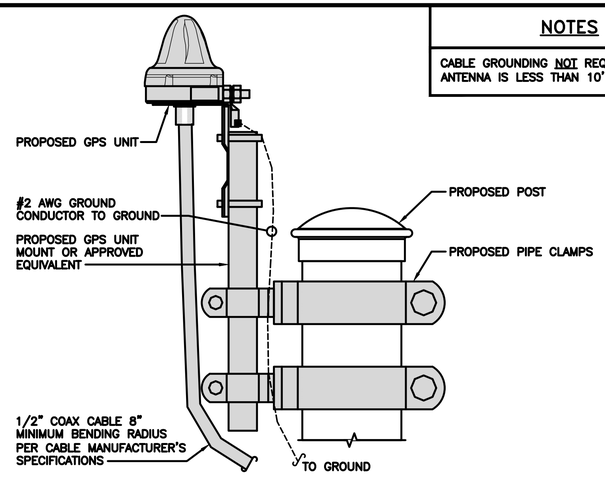
EQUIPMENT CABINET OMITTED FOR CLARITY



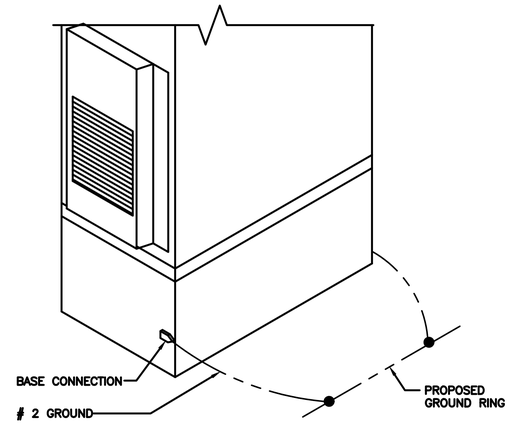
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

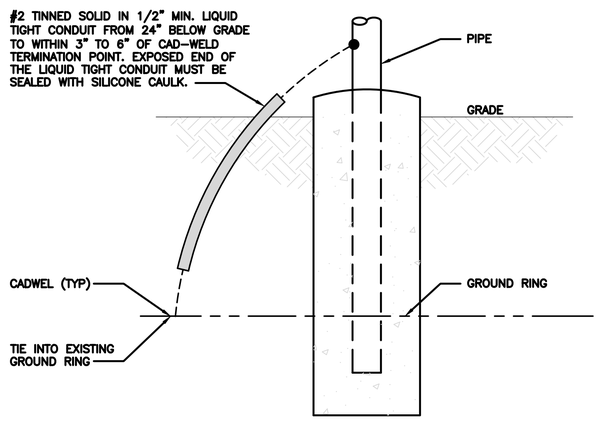
CABLE GROUNDING NOT REQUIRED WHEN ANTENNA IS LESS THAN 10' FROM CABINET



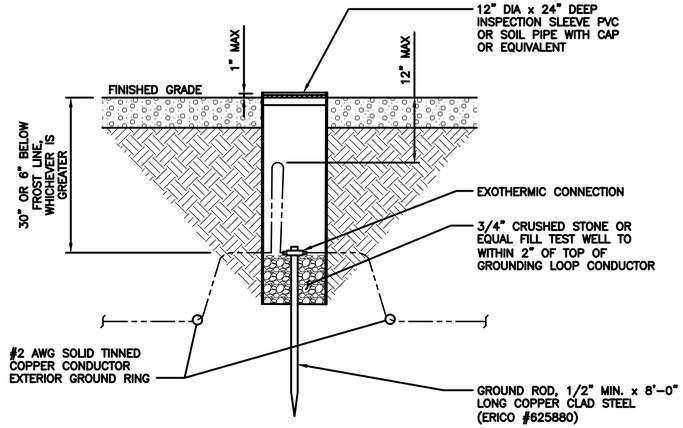
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



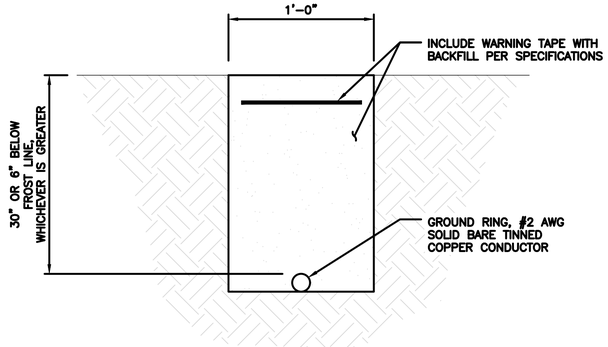
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



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



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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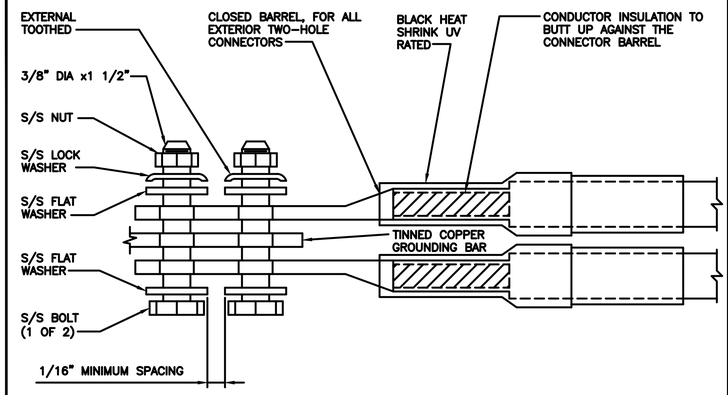
SHEET TITLE
GROUNDING DETAILS

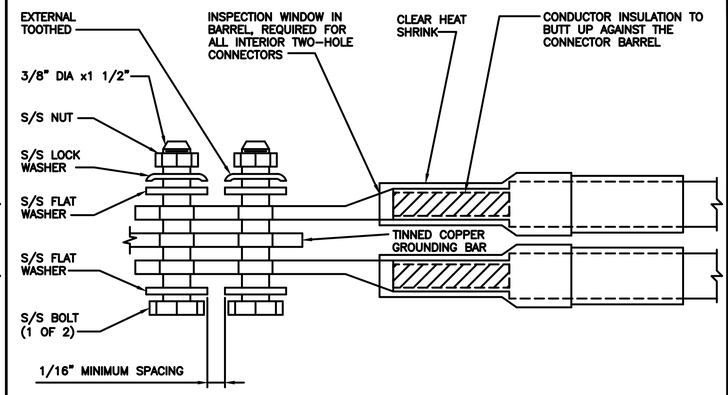
SHEET NUMBER
G-2

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

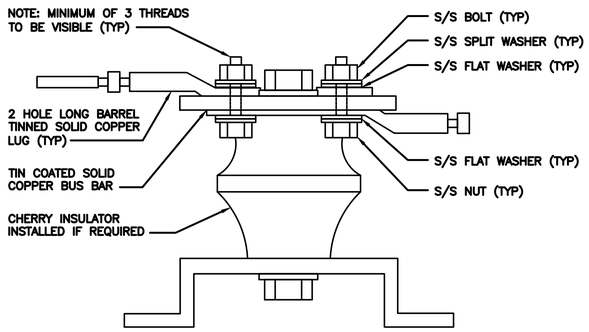
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

dish wireless.
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STATE OF CONNECTICUT
TSUHEI SAKAMOTO
34916
LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT

A&E PROJECT NUMBER
1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
GROUNDING DETAILS

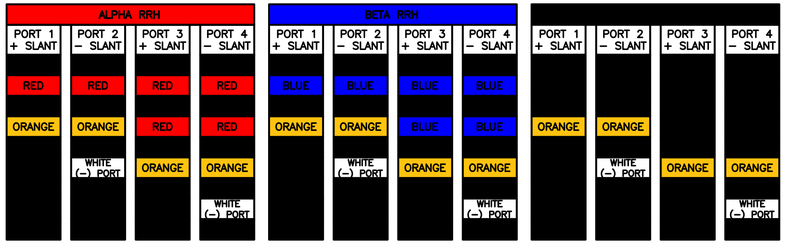
SHEET NUMBER
G-3

RF JUMPER COLOR CODING

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

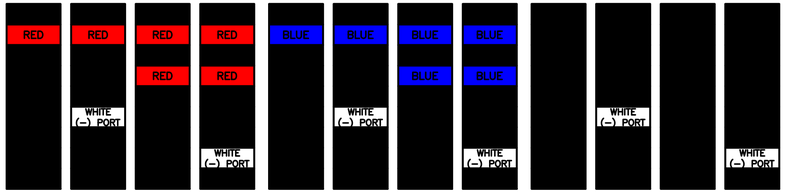
LOW-BAND RRH –
(600MHz N71 BASEBAND) +
(850MHz N26 BAND) +
(700MHz N29 BAND) – OPTIONAL PER MARKET

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



MID-BAND RRH –
(AWS BANDS N66+N70)

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

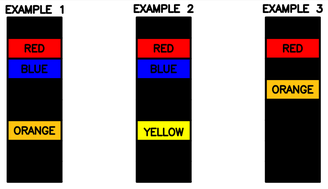


HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED
ALONG WITH FREQUENCY BANDS

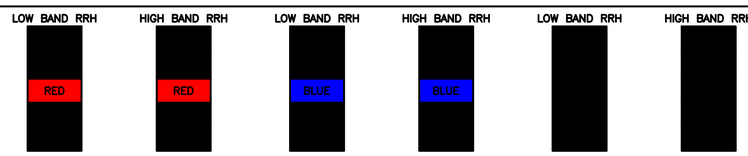
EXAMPLE 1 – HYBRID, OR DISCREET, SUPPORTS
ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS

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



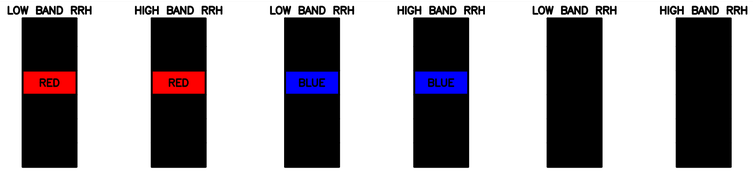
FIBER JUMPERS TO RRHs

LOW-BAND RRH FIBER CABLES HAVE SECTOR
STRIPE ONLY

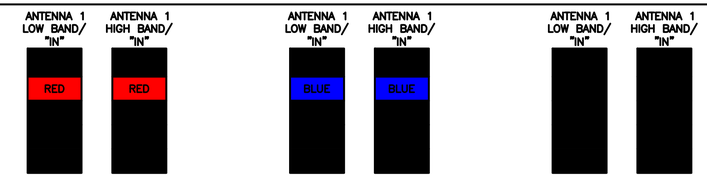


POWER CABLES TO RRHs

LOW-BAND RRH POWER CABLES HAVE SECTOR
STRIPE ONLY



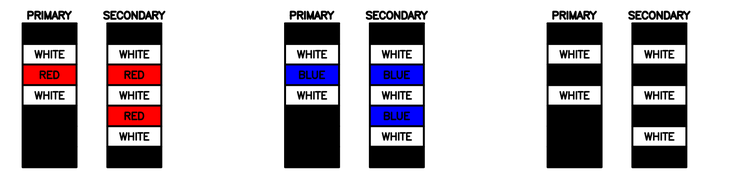
RET MOTORS AT ANTENNAS



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



RF CABLE COLOR CODES | NO SCALE | 1

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

AWS
(N66+N70+H-BLOCK)

CBRS TECH
(3 GHz)
YELLOW

NEGATIVE SLANT PORT
ON ANT/RRH
WHITE

ALPHA SECTOR
RED

BETA SECTOR
BLUE

GAMMA SECTOR

COLOR IDENTIFIER | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

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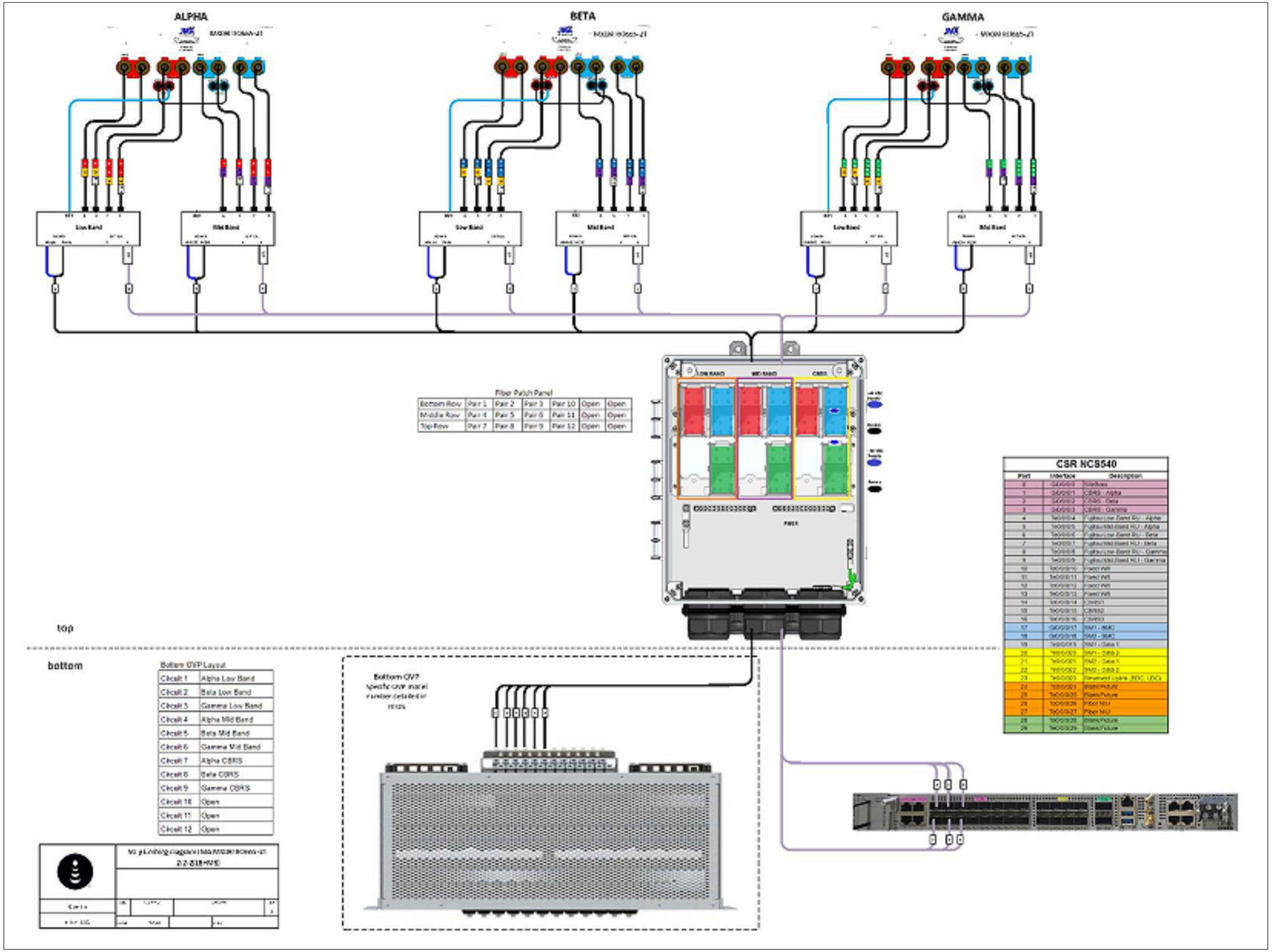
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
RF
CABLE COLOR CODE

SHEET NUMBER
RF-1



PLUMBING DIAGRAM

NO SCALE

1

DISH Wireless L.L.C. TEMPLATE VERSION 34 – 06/11/2021

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SHEET TITLE
RF
PLUMBING DIAGRAM

SHEET NUMBER
RF-2

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

LEGEND

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

ABBREVIATIONS

dish wireless.

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9/29/2021

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RFDS REV #: N/A

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SUBMITTALS

REV	DATE	DESCRIPTION
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A&E PROJECT NUMBER

1197–F0001–C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER AUTILITIES 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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9/29/2021

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RCD	SS	CJW

RFDS REV #: N/A

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PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

4.2. ALL OVERCURRENT DEVICES SHALL HAVE AN INTERRUPTING CURRENT RATING THAT SHALL BE GREATER THAN THE SHORT CIRCUIT CURRENT TO WHICH THEY ARE SUBJECTED, 22,000 AIC MINIMUM. VERYIFY 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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LICENSED PROFESSIONAL ENGINEER
9/29/2021

DRAWN BY:	CHECKED BY:	APPROVED BY:
RCD	SS	CJW

RFDS REV #: N/A

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
0	09/24/2021	ISSUED FOR PERMIT

A&E PROJECT NUMBER
1197-F0001-C

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-3

GROUNDING NOTES:

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

2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTAL 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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BOBDL00101A
TBD
497 OLD POST ROAD
TOLLAND, CT 06084

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

CENTEK engineering

Centered on Solutions℠

Structural Analysis Report

150-ft Existing Guyed Lattice Tower

Proposed Dish
Antenna Installation

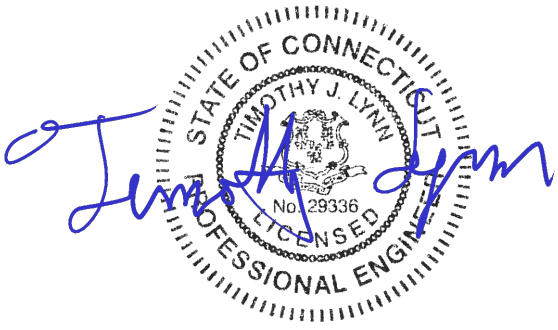
Dish Site Ref: BOBDL00101A

497 Old Post Road
Tolland, CT

Centek Project No. 21078.01

~~Date: June 18, 2021~~
Rev 1: October 20, 2021

Max Stress Ratio = 84%



Prepared for:

Clearview Company II
26 Yolanda Drive
Edison, NJ 08817

Table of Contents

Introduction

The purpose of this report is to summarize the results of the non-linear, P-Δ structural analysis of the antenna installation proposed by Dish on the existing guyed lattice tower located in Tolland, Connecticut.

The host tower is a 150-ft, three legged, guyed steel lattice tower. The original tower designer and manufacturer are unknown. The tower geometry, structure member sizes and foundation information were obtained from a previous structural analysis report prepared by Raymaker & Associates dated December 7, 2017.

Antenna and appurtenance inventory were obtained from a previous structural analysis report prepared by Centek Engineering dated May 4, 2021 and a Dish Colocation Application.

The tower consists of nine (9) 20-ft long vertical sections constructed of solid round legs. Diagonal and horizontal lateral support bracing consists of solid rounds. The vertical tower sections are connected by sleeve bolts. Diagonal and horizontal bracing connections to the legs consist of fully welded connections. The width of the tower face is 1.5-ft throughout its length with a 5'-3" tapered base.

Antenna and Appurtenance Summary

The proposed loads considered in the analysis consist of the following:

- UNKNOWN (Existing):
  Antennas: One (1) 6-ft omni-directional whip and one (1) 20-ft omni-directional whip antenna leg mounted to the top of the tower.
  Coax Cables: Two (2) 7/8" ∅ coaxial cables running on a face of the tower.
- T-MOBILE (Existing/Reserved):
  Antennas: Three (3) Ericsson AIR6449 panel antennas, three (3) RFS APX16DWV-16DWVS panel antennas, three (3) RFS APXVAALL24_43 panel antennas, three (3) Ericsson 4449 remote radio heads, three (3) Ericsson 4415 remote radio heads and three (3) Ericsson 4424 remote radio heads mounted to the tower with a RAD center elevation of ±147-ft above grade level.
  Coax Cables: Three (3) 6x24 ∅ fiber cable running on a face of the existing tower as specified in Section 3 of this report.
- AT&T (Existing):
  Antennas: Two (2) CCI HPA-65R-BUU-H6 panel antennas, four (4) CCI HPA-65R-BUU-H8 panel antennas, two (2) Commcope SBNH-1D6565C panel antennas, two (2) CCI DTMABP7819VG12A TMAs, three (3) Ericsson RRUS-11 remote radio heads, six (6) Ericsson RRUS-32 remote radio heads, two (2) Ericsson 4478-B14 remote radio heads and two (2) surge arrestors mounted on three (3) 12-ft V-Frames with a RAD center elevation of 126-ft above the existing tower base.
  Coax Cables: Nine (9) 7/8" ∅ coaxial cables, one (1) Fiber trunk and two (2) DC trunks running on a face of the tower.
- UNKNOWN (Existing):
  Antennas: One 8-ft dipole antenna leg mounted to the tower with an elevation of 95-ft AGL.
  Coax Cables: One (1) 7/8" ∅ coaxial cable running on a face of the tower.

- UNKNOWN (Existing):
  Antennas: One (1) GPS antenna leg mounted to the tower with an elevation of 50-ft AGL.
  Coax Cables: One (1) 1/2" ∅ coaxial cable running on a face of the tower.
- **Dish (Proposed):**
  Antennas: Three (3) JMA MX08FRO665-21 panel antennas, three (3) Fujitsu TA08025-B605 remote radio heads, three (3) Fujitsu TA08025-B604 remote radio heads and and one (1) Raycap surge arrestor mounted on three (3) Commscoe 8-ft V-frames (p/n MTC3975083) to the tower with a RAD center elevation of ±113-ft above grade level.
  Coax Cables: One (1) hybrid cable running on a face of the existing tower as specified in Section 3 of this report.

Primary Assumptions Used in the Analysis

- The tower structure's theoretical capacity not including any assessment of the condition of the tower.
- The tower carries the horizontal and vertical loads due to the weight of antennas, ice load and wind.
- Tower is properly installed and maintained.
- Tower is in plumb condition.
- Tower loading for antennas and mounts as listed in this report.
- All bolts are appropriately tightened providing the necessary connection continuity.
- All welds are fabricated with ER-70S-6 electrodes.
- All members are assumed to be as specified in the original tower design documents.
- All members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
- All member protective coatings are in good condition.
- All tower members were properly designed, detailed, fabricated, installed and have been properly maintained since erection.
- Any deviation from the analyzed antenna loading will require a new analysis for verification of structural adequacy.
- All coax cables routed as specified in Section 3 of this report.

Analysis

The existing tower was analyzed using a comprehensive computer program entitled tnxTower. The program analyzes the tower, considering the worst case loading condition. The tower is considered as loaded by concentric forces along the tower, and the model assumes that the tower members are subjected to bending, axial, and shear forces.

The existing tower was analyzed for the controlling basic wind speed (3-second gust) with no ice and the applicable wind and ice combination to determine stresses in members as per guidelines of TIA-222-G-2005 entitled "Structural Standard for Antenna Support Structures and Antennas", the American Institute of Steel Construction (AISC) and the Manual of Steel Construction; Load and Resistance Factor Design (LRFD).

The controlling wind speed is determined by evaluating the local available wind speed data as provided in Appendix N of the CSBC[1] and the wind speed data available in the TIA-222-G-2005 Standard.

Tower Loading

Tower loading was determined by the basic wind speed as applied to projected surface areas with modification factors per TIA-222-G-2005, gravity loads of the tower structure and its components, and the application of 1.00" radial ice on the tower structure and its components.

Basic Wind Speed:	Tolland; v = 105 mph (Vasd – Risk Cat III)	*[Appendix N of the 2018 CT Building Code]*
Load Cases:	Load Case 1; 105 mph wind speed w/ no ice plus gravity load – used in calculation of tower stresses and rotation.	*[Appendix N of the 2018 CT Building Code]*
	Load Case 2; 40 mph wind speed w/ 1.00" radial ice plus gravity load – used in calculation of tower stresses.	*[Annex B of TIA-222-G-2005]*

[1] The 2015 International Building Code as amended by the 2018 Connecticut State Building Code (CSBC).

Tower Capacity

Tower stresses were calculated utilizing the structural analysis software tnxTower. Design flexural strength was determined based on section 4.7 and Table 4-8 of the TIA-222-G.

- Calculated stresses **were found to be within allowable limits**.

Tower Section	Elevation	Stress Ratio (percentage of capacity)	Result
Leg (T4)	80'-0" - 100'-0"	80.9%	**PASS**
Diagonal (T2)	120'-0" - 140'-0"	83.4%	**PASS**
Guy Wire C (T2)	136'-0"	69.6%	**PASS**

Foundation and Anchors

- The foundation was found to be within allowable limits.

Foundation	Design Limit	Original Design Reactions[1]	Modified Original Reactions[2]	Proposed Reactions	Result
Tower Base	Compression	115.3 kips	155.7 kips	134.2 kips	**PASS**
	Shear	2.6 kips	3.5 kips	0.8 kips	**PASS**
Guy Anchor	Uplift	69.6 kips	94.0 kips	53.3 kips	**PASS**
	Shear	36.6 kips	49.4 kips	24.1 kips	**PASS**

Note 1: Original design reactions taken from aforementioned structural report prepared by Raymaker.
Note 2: Original design reactions multiplied by 1.35 for comparison to proposed reactions per section 15.5 of TIA-222-G

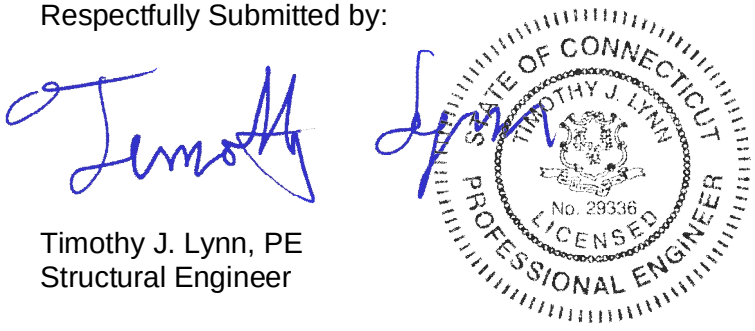
C o n c l u s i o n

This analysis shows that the subject tower **is adequate** to support the proposed antenna configuration with the below recommendations.

The analysis is based, in part, on the information provided to this office by Clearview Company. If the existing conditions are different than the information in this report, Centek Engineering, Inc. must be contacted for resolution of any potential issues.

Please feel free to call with any questions or comments.

Respectfully Submitted by:



Timothy J. Lynn, PE
Structural Engineer

Standard Conditions for Furnishing of Professional Engineering Services on Existing Structures

All engineering services are performed on the basis that the information used is current and correct. This information may consist of, but is not necessarily limited to:

- Information supplied by the client regarding the structure itself, its foundations, the soil conditions, the antenna and feed line loading on the structure and its components, or other relevant information.
- Information from the field and/or drawings in the possession of Centek Engineering, Inc. or generated by field inspections or measurements of the structure.
- It is the responsibility of the client to ensure that the information provided to Centek Engineering, Inc. and used in the performance of our engineering services is correct and complete. In the absence of information to the contrary, we assume that all structures were constructed in accordance with the drawings and specifications and are in an un-corroded condition and have not deteriorated. It is therefore assumed that its capacity has not significantly changed from the “as new” condition.
- All services will be performed to the codes specified by the client, and we do not imply to meet any other codes or requirements unless explicitly agreed in writing. If wind and ice loads or other relevant parameters are to be different from the minimum values recommended by the codes, the client shall specify the exact requirement. In the absence of information to the contrary, all work will be performed in accordance with the latest revision of ANSI/ASCE10 & ANSI/EIA-222
- All services performed, results obtained, and recommendations made are in accordance with generally accepted engineering principles and practices. Centek Engineering, Inc. is not responsible for the conclusions, opinions and recommendations made by others based on the information we supply.

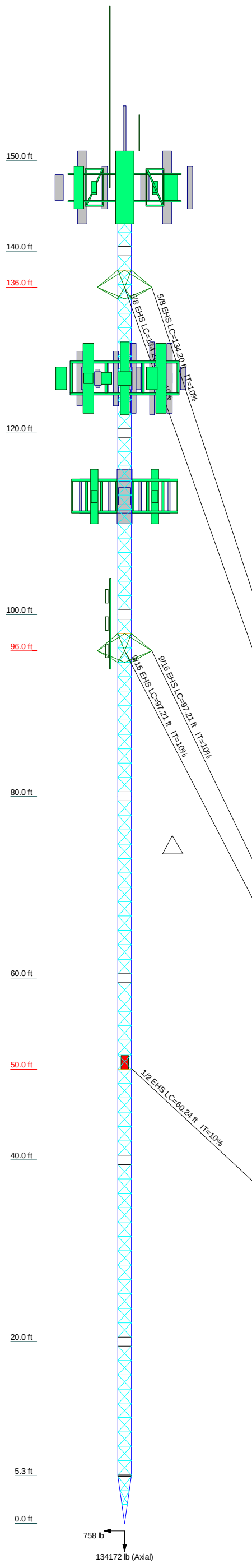
GENERAL DESCRIPTION OF STRUCTURAL ANALYSIS PROGRAM

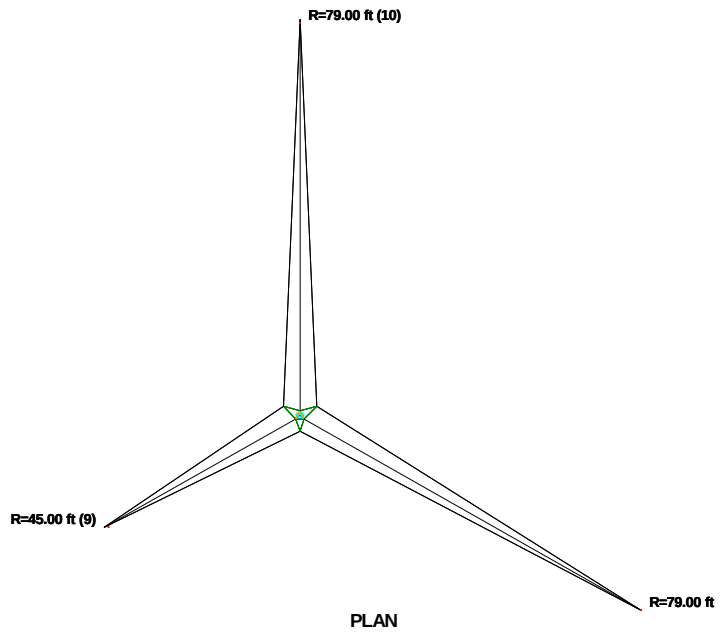
TnxTower, is an integrated structural analysis and design software package for Designed specifically for the telecommunications industry, TnxTower, formerly ERITower, automates much of the tower analysis and design required by the TIA/EIA 222 Standard.

TnxTower Features:

- TnxTower can analyze and design 3- and 4-sided guyed towers, 3- and 4-sided self-supporting towers and either round or tapered ground mounted poles with or without guys.
- The program analyzes towers using the TIA-222-G (2005) standard or any of the previous TIA/EIA standards back to RS-222 (1959). Steel design is checked using the AISC ASD 9th Edition or the AISC LRFD specifications.
- Linear and non-linear (P-delta) analyses can be used in determining displacements and forces in the structure. Wind pressures and forces are automatically calculated.
- Extensive graphics plots include material take-off, shear-moment, leg compression, displacement, twist, feed line, guy anchor and stress plots.
- TnxTower contains unique features such as True Cable behavior, hog rod take-up, foundation stiffness and much more.

Section	T9	T8	T7	T6	T5	T4	T3	T2	T1
Legs					SR 1 3/4				
Leg Grade					A572-50				
Diagonals					SR 5/8				
Diagonal Grade					A36				
Top Girts					SR 3/4				
Bottom Girts	N.A.				SR 3/4				
Horizontals					SR 3/4				
Top Guy Pull-Offs		N.A.			N.A.	SR 5/8	N.A.	SR 5/8	N.A.
Face Width (ft)									1.5
# Panels @ (ft)	3 @ 1.55556	9 @ 1.57407							84 @ 1.58333
Weight (lb)	5693.2								
	166.2	516.3	693.4	695.8	693.4	940.3	693.4	940.3	352.3





PLAN

DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
6' x 3" Dia Omni	150	HPA-65R-BUU-H8 (AT⌶)	126
4'x5/8" Lightning Rod	150	DTMABP7819VG12A TMA (AT⌶)	126
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	DTMABP7819VG12A TMA (AT⌶)	126
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	RRUS-11 (AT⌶)	126
12.5' x 2 Std. Horz. Pipe (T-Mobile)	148.5	RRUS-11 (AT⌶)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	RRUS-11 (AT⌶)	126
AIR6449 (T-Mobile)	147	(2) RRUS-32 (AT⌶)	126
APXVAALL24-43 (T-Mobile)	147	(2) RRUS-32 (AT⌶)	126
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	(2) RRUS-32 (AT⌶)	126
4415 B25 (T-Mobile)	147	4478 B14 (AT⌶)	126
4424 B25 (T-Mobile)	147	4478 B14 (AT⌶)	126
4449 B12,B71 (T-Mobile)	147	DC6-48-60-18-8F Surge Arrestor (AT⌶)	126
4415 B25 (T-Mobile)	147	DC6-48-60-18-8F Surge Arrestor (AT⌶)	126
4424 B25 (T-Mobile)	147	12' V-Frame (AT⌶)	126
4449 B12,B71 (T-Mobile)	147	12' V-Frame (AT⌶)	126
4415 B25 (T-Mobile)	147	12' V-Frame (AT⌶)	126
4424 B25 (T-Mobile)	147	HPA-65R-BUU-H6 (AT⌶)	126
4449 B12,B71 (T-Mobile)	147	HPA-65R-BUU-H6 (AT⌶)	126
Rohn 6' Side-Arm(1) (T-Mobile)	147	HPA-65R-BUU-H8 (AT⌶)	126
Rohn 6' Side-Arm(1) (T-Mobile)	147	MX08FRO665-21 (Dish)	113
Rohn 6' Side-Arm(1) (T-Mobile)	147	MX08FRO665-21 (Dish)	113
APX16DWV-16DWVS-E-A20 (T-Mobile)	147	MX08FRO665-21 (Dish)	113
AIR6449 (T-Mobile)	147	TA08025-B605 (Dish)	113
APXVAALL24-43 (T-Mobile)	147	TA08025-B605 (Dish)	113
AIR6449 (T-Mobile)	147	TA08025-B605 (Dish)	113
APXVAALL24-43 (T-Mobile)	147	TA08025-B604 (Dish)	113
20' x 3" Dia Omni	147	TA08025-B604 (Dish)	113
12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5	TA08025-B604 (Dish)	113
12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5	RC2DC-3315-PF-48 (Dish)	113
12.5' x 2 Std. Horz. Pipe (T-Mobile)	145.5	Commscope MTC3975083 8-ft V-Frame (Dish)	113
SBNH-1D6565C (AT⌶)	126	Commscope MTC3975083 8-ft V-Frame (Dish)	113
HPA-65R-BUU-H8 (AT⌶)	126	Commscope MTC3975083 8-ft V-Frame (Dish)	113
HPA-65R-BUU-H8 (AT⌶)	126	8' dipole antenna	95
SBNH-1D6565C (AT⌶)	126	GPS	50

MATERIAL STRENGTH

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

TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-G Standard.
2. Tower designed for a 105 mph basic wind in accordance with the TIA-222-G Standard.
3. Tower is also designed for a 40 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 60 mph wind.
5. Tower Structure Class II.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. TOWER RATING: 83.4%

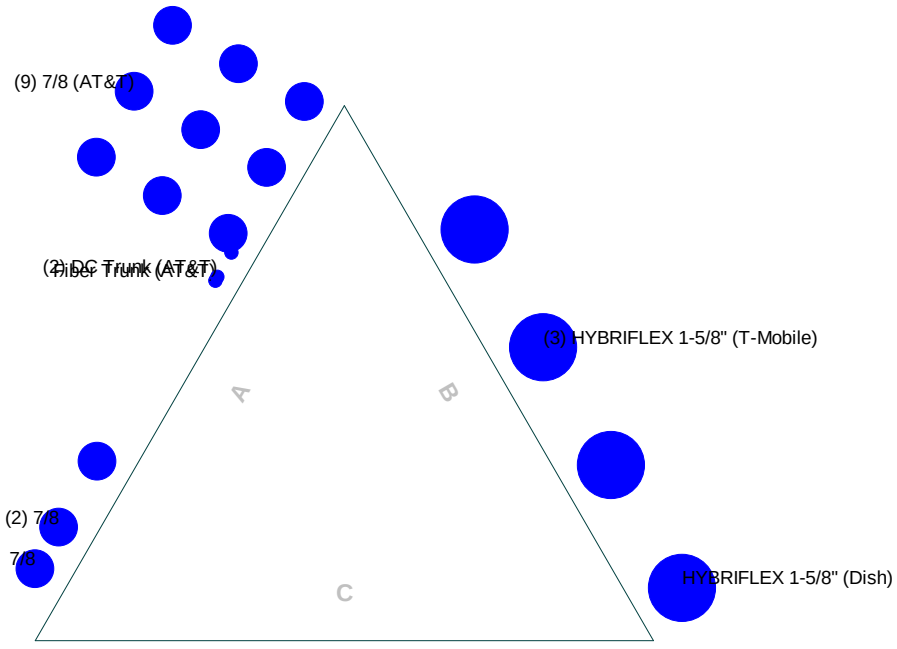
ALL REACTIONS ARE FACTORED

Centek Engineering Inc.
63-2 North Branford Rd.
Branford, CT 06405
Phone: (203) 488-0580
FAX: (203) 488-8587

Job: 21078.01 - BOBDL00101A			
Project: 150' Guyed Tower - Tolland, CT			
Client: Dish	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 10/20/21	Scale: NTS	
Path: J:\Jobs\21078\00W\01_CT101 Tolland\05_Structural\Backup Documentation\Rev (11)\Calcs\ER\150' Guyed Tower.er		Dwg No. E-1	

Feed Line Plan

Round Flat App In Face App Out Face



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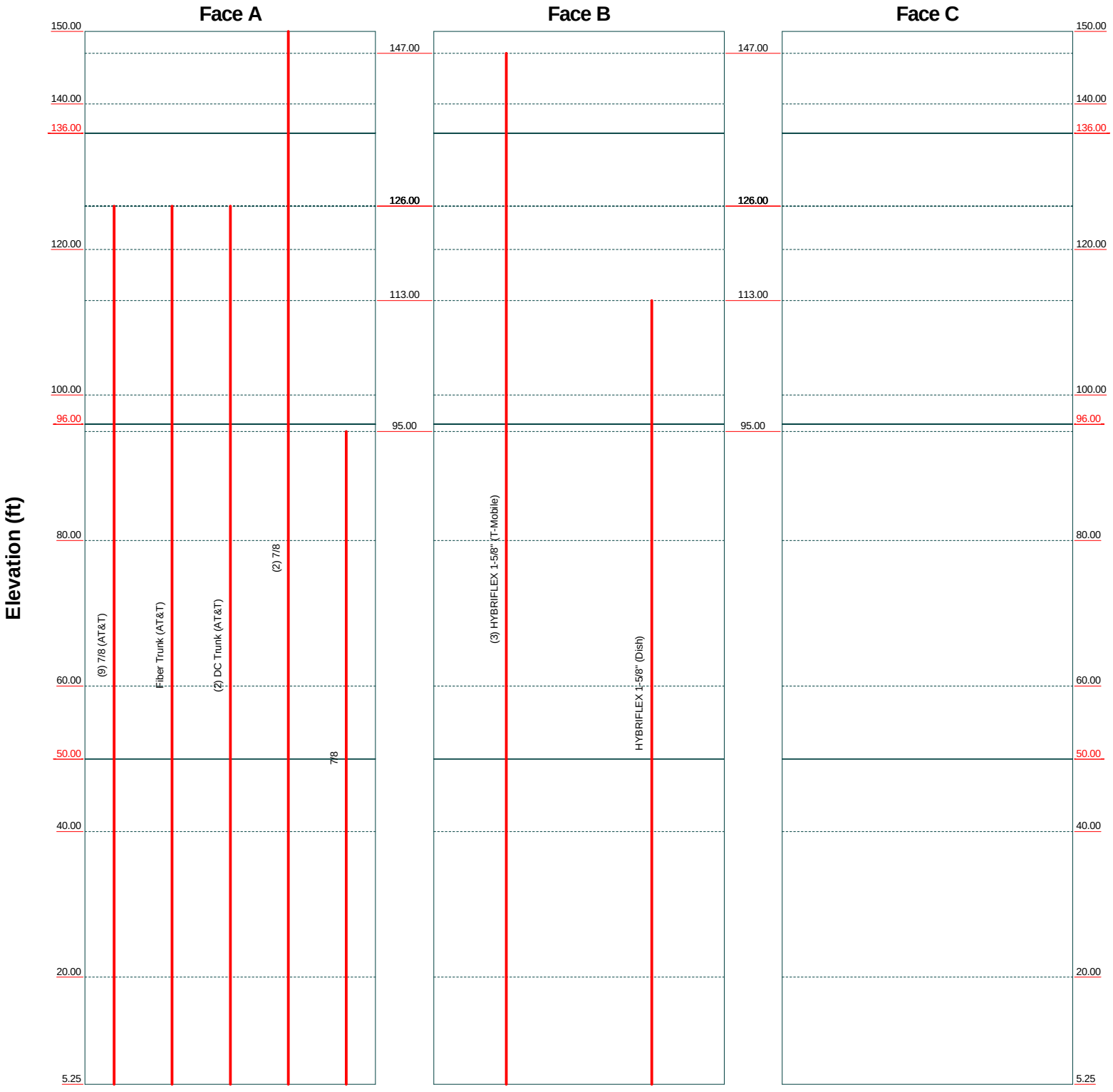
Job:	***21078.01 - BOBDL00101A***		
Project:	***150' Guyed Tower - Tolland, CT***		
Client: Dish	Drawn by: TJL	App'd:	
Code: TIA-222-G	Date: 10/20/21	Scale: NTS	
Path: J:\Jobs\21078\00\M\01_CT\101 Tolland\05_Structural\Backup Documentation\Rev (1)\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-7	

Feed Line Distribution Chart
5'3" - 150'

Round | Flat | App In Face | App Out Face | Truss Leg



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Code: TIA-222-G	Date: 10/20/21	Scale: NTS
Path: J:\Jobs\21078\00\WI\01_CT\101 Tolland\05_Structural\Backup Documentation\Rev (1)\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-7

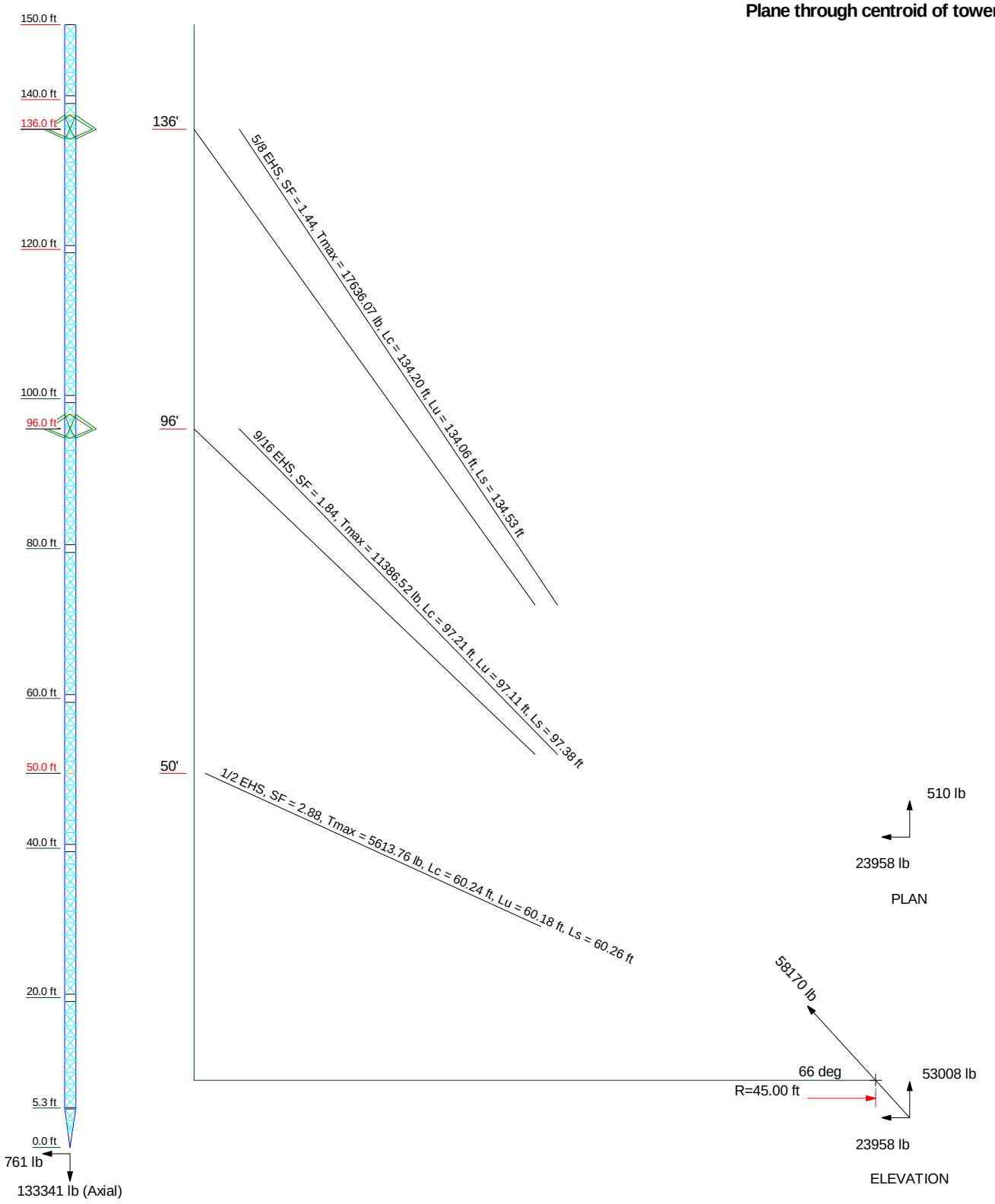
Guy Tensions and Tower Reactions

TIA-222-G - 105 mph/40 mph 1.0000 in Ice Exposure B

Maximum Values

Anchor 'C'@45 ft Azimuth 240 deg Elev 9 ft

Plane through centroid of tower



Centek Engineering Inc. 63-2 North Branford Rd. Branford, CT 06405 Phone: (203) 488-0580 FAX: (203) 488-8587	Job: ***21078.01 - BOBDL00101A***		
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	Client: Dish	Drawn by: TJL	App'd:
	Code: TIA-222-G	Date: 10/20/21	Scale: NTS
	Path: J:\Jobs\21078\00\M\01_CT101 Tolland\05_Structural\Backup Documentation\Rev (1)\Calcs\ERI\150' Guyed Tower.eri		Dwg No. E-6

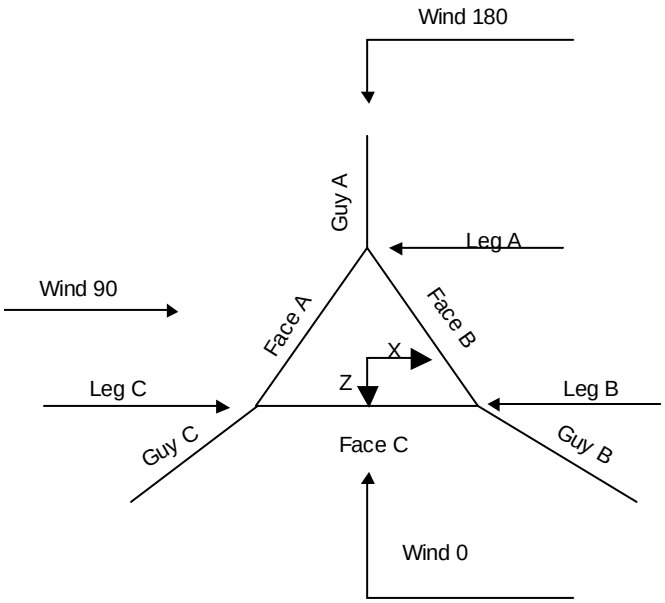
Tower Input Data

The main tower is a 3x guyed tower with an overall height of 150.00 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 1.50 ft at the top and tapered at the base.
This tower is designed using the TIA-222-G standard.
The following design criteria apply:

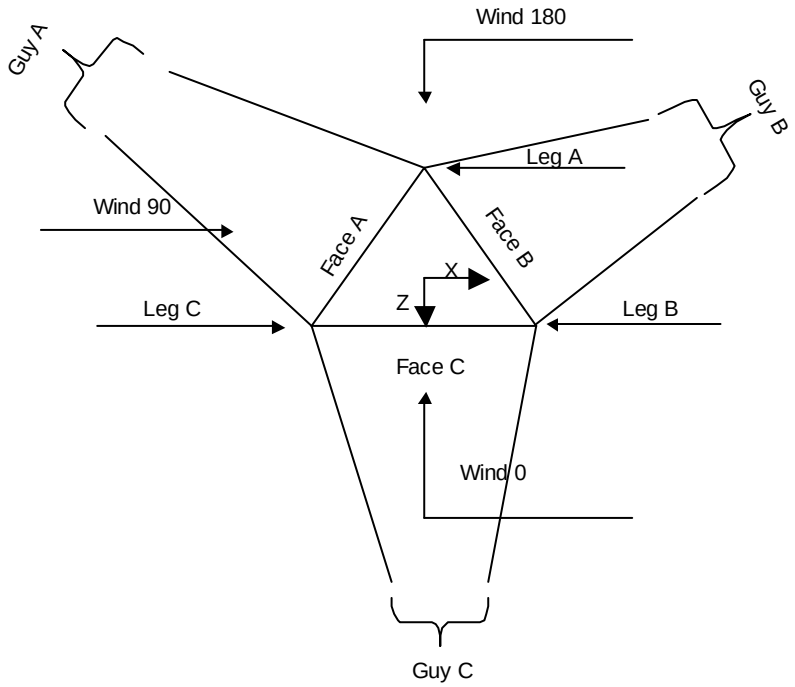
Basic wind speed of 105 mph.
Structure Class II.
Exposure Category B.
Topographic Category 1.
Crest Height 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 40 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Pressures are calculated at each section.
Stress ratio used in tower member design is 1.
Safety factor used in guy 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-G Bracing Resist. Exemption
√	Include Bolts In Member Capacity	√	Autocalc Torque Arm Areas		Use TIA-222-G 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



Corner & Starmount Guyed Tower



Face Guyed

Tower Section Geometry

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	150.00-140.00			1.50	1	10.00
T2	140.00-120.00			1.50	1	20.00
T3	120.00-100.00			1.50	1	20.00
T4	100.00-80.00			1.50	1	20.00
T5	80.00-60.00			1.50	1	20.00
T6	60.00-40.00			1.50	1	20.00
T7	40.00-20.00			1.50	1	20.00
T8	20.00-5.25			1.50	1	14.75
T9	5.25-0.00			1.50	1	5.25

Tower Section Geometry *(cont'd)*

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
T1	150.00-140.00	1.58	X Brace	No	Steps	0.0000	6.0000
T2	140.00-120.00	1.58	X Brace	No	Steps	6.0000	6.0000
T3	120.00-100.00	1.58	X Brace	No	Steps	6.0000	6.0000
T4	100.00-80.00	1.58	X Brace	No	Steps	6.0000	6.0000
T5	80.00-60.00	1.58	X Brace	No	Steps	6.0000	6.0000
T6	60.00-40.00	1.58	X Brace	No	Steps	6.0000	6.0000
T7	40.00-20.00	1.58	X Brace	No	Steps	6.0000	6.0000
T8	20.00-5.25	1.57	X Brace	No	Steps	6.0000	1.0000
T9	5.25-0.00	1.56	X Brace	No	Yes	1.0000	6.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 150.00-140.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T2 140.00-120.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T3 120.00-100.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T4 100.00-80.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T5 80.00-60.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T6 60.00-40.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T7 40.00-20.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T8 20.00-5.25	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	A36 (36 ksi)
T9 5.25-0.00	Solid Round	1 3/4	A572-50 (50 ksi)	Solid Round	5/8	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 150.00-140.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	Solid Round	3/4	A572-50	Solid Round	3/4	A572-50

Tower Elevation ft	Top Girt Type	Top Girt Size	Top Girt Grade	Bottom Girt Type	Bottom Girt Size	Bottom Girt Grade
T8 20.00-5.25	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)	Solid Round	3/4	(50 ksi) A572-50 (50 ksi)
T9 5.25-0.00	Solid Round	3/4	A572-50 (50 ksi)	Solid Round	3/4	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 150.00-140.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T2 140.00-120.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T3 120.00-100.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T4 100.00-80.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T5 80.00-60.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T6 60.00-40.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T7 40.00-20.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T8 20.00-5.25	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 ksi)
T9 5.25-0.00	None	Single Angle		A36 (36 ksi)	Solid Round	3/4	A572-50 (50 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 150.00-140.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 140.00-120.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 120.00-100.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 100.00-80.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 80.00-60.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 60.00-40.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 40.00-20.00	0.00	0.0000	A36	1	1	1	36.0000	36.0000	36.0000

Tower Elevation ft	Gusset Area (per face) ft²	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
T8 20.00-5.25	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T9 5.25-0.00	0.00	0.0000	(36 ksi) A36 (36 ksi)	1	1	1	36.0000	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 Y	K Brace Diags X Y	Single Diags X Y	Girts X Y	Horiz. X Y	Sec. Horiz. X Y	Inner Brace X Y
T1 150.00-140.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T2 140.00-120.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T3 120.00-100.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T4 100.00-80.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T5 80.00-60.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T6 60.00-40.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T7 40.00-20.00	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T8 20.00-5.25	Yes	Yes	1	1 1	1 1	1 1	1 1	1 1	1 1	1 1
T9 5.25-0.00	Yes	Yes	1	1 1	1 1	1 1	1 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	Leg Net Width Deduct in	Leg U	Diagonal Net Width Deduct in	Diagonal U	Top Girt Net Width Deduct in	Top Girt U	Bottom Girt Net Width Deduct in	Bottom Girt U	Mid Girt Net Width Deduct in	Mid Girt U	Long Horizontal Net Width Deduct in	Long Horizontal U	Short Horizontal Net Width Deduct in	Short Horizontal U
T1 150.00-140.00	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
T2 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
T3 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

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
T4 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
T5 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
T6 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
T7 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
T8 20.00-5.25	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 5.25-0.00	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 150.00-140.00	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
T2 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
T3 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
T4 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
T5 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
T6 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
T7 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
T8 20.00-5.25	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 5.25-0.00	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 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 150.00-140.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T2 140.00-120.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T3 120.00-100.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T4 100.00-80.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T5 80.00-60.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T6 60.00-40.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T7 40.00-20.00	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Tower Elevation ft	Leg Connection Type	Leg Bolt Size in	Leg No.	Diagonal Bolt Size in	Diagonal No.	Top Girt Bolt Size in	Top Girt No.	Bottom Girt Bolt Size in	Bottom Girt No.	Mid Girt Bolt Size in	Mid Girt No.	Long Horizontal Bolt Size in	Long Horizontal No.	Short Horizontal Bolt Size in	Short Horizontal No.
T8 20.00-5.25	Sleeve DS	0.6250 A325N	4	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0
T9 5.25-0.00	Sleeve DS	0.6250 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.0000 A325N	0	0.6250 A325N	0	0.6250 A325N	0	0.6250 A325N	0

Guy Data

Guy Elevation ft	Guy Grade		Guy Size	Initial Tension lb	%	Guy Modulus ksi	Guy Weight plf	L_u ft	Anchor Radius ft	Anchor Azimuth Adj. °	Anchor Elevation ft	End Fitting Efficiency %
136	EHS	A	5/8	4240.00	10%	21000	0.813	147.71	79.00	0.0000	10.00	100%
		B	5/8	4240.00	10%	21000	0.813	156.31	79.00	0.0000	0.00	100%
		C	5/8	4240.00	10%	21000	0.813	134.09	45.00	0.0000	9.00	100%
96	EHS	A	9/16	3500.00	10%	21000	0.671	115.55	79.00	0.0000	10.00	100%
		B	9/16	3500.00	10%	21000	0.671	123.16	79.00	0.0000	0.00	100%
		C	9/16	3500.00	10%	21000	0.671	97.13	45.00	0.0000	9.00	100%
50	EHS	A	1/2	2690.00	10%	21000	0.517	87.70	79.00	0.0000	10.00	100%
		B	1/2	2690.00	10%	21000	0.517	92.68	79.00	0.0000	0.00	100%
		C	1/2	2690.00	10%	21000	0.517	60.19	45.00	0.0000	9.00	100%

Guy Data *(cont'd)*

Guy Elevation ft	Mount Type	Torque-Arm Spread ft	Torque-Arm Leg Angle °	Torque-Arm Style	Torque-Arm Grade	Torque-Arm Type	Torque-Arm Size
136	Torque Arm	6.00	20.0000	Wing	A53-B-35 (35 ksi)	Pipe	P2.5x.203
96	Torque Arm	6.00	20.0000	Wing	A53-B-35 (35 ksi)	Pipe	P2.5x.203
50	Corner						

Guy Data *(cont'd)*

Guy Elevation ft	Diagonal Grade	Diagonal Type	Upper Diagonal Size	Lower Diagonal Size	Is Strap.	Pull-Off Grade	Pull-Off Type	Pull-Off Size
136.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8
96.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8
50.00	A53-B-42 (42 ksi)	Pipe			No	A36 (36 ksi)	Solid Round	5/8

Guy Data *(cont'd)*

Guy Elevation ft	Cable Weight A lb	Cable Weight B lb	Cable Weight C lb	Cable Weight D lb	Tower Intercept A ft	Tower Intercept B ft	Tower Intercept C ft	Tower Intercept D ft
136	120.09	127.08	109.01		2.07 2.5 sec/pulse	2.31 2.6 sec/pulse	1.70 2.3 sec/pulse	
96	77.54	82.64	65.17		1.27 1.9 sec/pulse	1.44 2.1 sec/pulse	0.90 1.6 sec/pulse	
50	45.34	47.92	31.12		0.74 1.5 sec/pulse	0.82 1.6 sec/pulse	0.35 1.0 sec/pulse	

Guy Data *(cont'd)*

Guy Elevation ft	Calc K Single Angles	Calc K Solid Rounds	Torque Arm K_x	Torque Arm K_y	Pull Off K_x	Pull Off K_y	Diagonal K_x	Diagonal K_y
136	No	No	1	1	1	1	1	1
96	No	No	1	1	1	1	1	1
50	No	No			1	1	1	1

Guy Data *(cont'd)*

Guy Elevation ft	Torque-Arm Bolt Size in	Torque-Arm Number	Torque-Arm Net Width Deduct in	Torque-Arm U	Pull Off Bolt Size in	Pull Off Number	Pull Off Net Width Deduct in	Pull Off U	Diagonal Bolt Size in	Diagonal Number	Diagonal Net Width Deduct in	Diagonal U
136	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
96	0.0000 A325N	0	0.0000	1	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75
50	0.6250 A325N	0	0.0000	0.75	0.0000 A325N	0	0.0000	0.75	0.6250 A325N	0	0.0000	0.75

Guy Pressures

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
136	A	73.00	22	3	2.1653
	B	68.00	21	3	2.1500
	C	72.50	22	3	2.1638
96	A	53.00	20	3	2.0970
	B	48.00	19	3	2.0764
	C	52.50	20	3	2.0951
50	A	30.00	17	2	1.9810

Guy Elevation ft	Guy Location	z ft	q_z psf	q_z Ice psf	Ice Thickness in
	B	25.00	17	2	1.9452
	C	29.50	17	2	1.9777

Guy-Mast Forces (Excluding Wind) - No Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
136	A	58.4626	4342.35 4240.00	-87.07	3717.36	-2242.68	-6.44	6.88	-11.15
	A	58.4626	4342.35 4240.00	87.07	3717.36	-2242.68	-6.44	-6.88	11.15
	B	60.3785	4350.47 4240.00	1878.22	3797.39	989.29	13.15	6.51	0.00
	B	60.3785	4350.47 4240.00	1795.86	3797.39	1131.94	-6.58	-6.51	-11.39
	C	71.1444	4343.16 4240.00	-1150.24	4115.77	774.86	-7.13	4.32	12.35
	C	71.1444	4343.16 4240.00	-1246.17	4115.77	608.71	14.26	-4.32	0.00
			Sum:	**1277.67**	23261.06	**-980.57**	**0.83**	0.00	**0.96**
96	A	48.0400	3557.66 3500.00	-91.53	2662.82	-2357.52	-4.61	7.23	-7.99
	A	48.0400	3557.66 3500.00	91.53	2662.82	-2357.52	-4.61	-7.23	7.99
	B	51.1492	3564.36 3500.00	1960.30	2792.10	1032.52	9.67	6.79	0.00
	B	51.1492	3564.36 3500.00	1874.34	2792.10	1181.41	-4.84	-6.79	-8.38
	C	63.5025	3558.33 3500.00	-1305.85	3191.01	879.69	-5.53	4.90	9.57
	C	63.5025	3558.33 3500.00	-1414.76	3191.01	691.06	11.05	-4.90	0.00
			Sum:	**1114.02**	17291.86	**-930.37**	**1.14**	0.00	**1.20**
50	A	27.1098	2710.66 2690.00	0.00	1253.18	-2403.59	-1.09	0.00	0.00
	B	32.6163	2715.83 2690.00	1971.58	1480.84	1138.29	0.64	0.00	-1.11
	C	42.8918	2711.18 2690.00	-1713.46	1853.61	989.27	0.80	0.00	1.39
			Sum:	**258.12**	4587.63	**-276.03**	**0.36**	0.00	**0.28**

Guy-Mast Forces (Excluding Wind) - Ice

Guy Elevation ft	Guy Location	Chord Angle °	Guy Tension Top / Bottom lb	F_x lb	F_y lb	F_z lb	M_x kip-ft	M_y kip-ft	M_z kip-ft
136	A	58.4626	7901.46 6870.18	-149.50	6898.16	-3850.46	-11.95	11.81	-20.69

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	kip-ft	kip-ft	kip-ft
	A	58.4626	7901.46 6870.18	149.50	6898.16	-3850.46	-11.95	-11.81	20.69
	B	60.3785	7915.25 6814.68	3211.89	7033.70	1691.76	24.37	11.13	0.00
	B	60.3785	7915.25 6814.68	3071.05	7033.70	1935.70	-12.18	-11.13	-21.10
	C	71.1444	7025.35 5986.84	-1739.52	6704.95	1171.83	-11.61	6.53	20.11
	C	71.1444	7025.35 5986.84	-1884.60	6704.95	920.55	23.23	-6.53	0.00
			Sum:	**2658.81**	41273.62	**-1981.07**	**-0.10**	-0.00	**-0.99**
96	A	48.0400	6594.11 5951.20	-162.40	5095.18	-4182.70	-8.83	12.83	-15.29
	A	48.0400	6594.11 5951.20	162.40	5095.18	-4182.70	-8.83	-12.83	15.29
	B	51.1492	6598.01 5891.81	3458.71	5315.28	1821.76	18.41	11.98	0.00
	B	51.1492	6598.01 5891.81	3307.05	5315.28	2084.45	-9.21	-11.98	-15.95
	C	63.5025	5774.81 5125.30	-2013.40	5239.75	1356.33	-9.08	7.56	15.72
	C	63.5025	5774.81 5125.30	-2181.32	5239.75	1065.49	18.15	-7.56	0.00
			Sum:	**2571.04**	31300.43	**-2037.37**	**0.63**	-0.00	**-0.23**
50	A	27.1098	5170.07 4909.54	0.00	2581.63	-4479.38	-2.24	0.00	0.00
	B	32.6163	5147.59 4831.58	3633.98	2981.59	2098.08	1.29	0.00	-2.24
	C	42.8918	4433.19 4166.81	-2725.90	3121.82	1573.80	1.35	0.00	2.34
			Sum:	**908.09**	8685.05	**-807.50**	**0.41**	0.00	**0.11**

Guy-Mast Forces (Excluding Wind) - Service

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom lb	F_x	F_y	F_z	M_x	M_y	M_z
ft		°		lb	lb	lb	kip-ft	kip-ft	kip-ft
136	A	58.4626	4342.35 4240.00	-87.07	3717.36	-2242.68	-6.44	6.88	-11.15
	A	58.4626	4342.35 4240.00	87.07	3717.36	-2242.68	-6.44	-6.88	11.15
	B	60.3785	4350.47 4240.00	1878.22	3797.39	989.29	13.15	6.51	0.00
	B	60.3785	4350.47 4240.00	1795.86	3797.39	1131.94	-6.58	-6.51	-11.39
	C	71.1444	4343.16 4240.00	-1150.24	4115.77	774.86	-7.13	4.32	12.35
	C	71.1444	4343.16 4240.00	-1246.17	4115.77	608.71	14.26	-4.32	0.00
			Sum:	**1277.67**	23261.06	**-980.57**	**0.83**	0.00	**0.96**
96	A	48.0400	3557.66 3500.00	-91.53	2662.82	-2357.52	-4.61	7.23	-7.99

Guy Elevation	Guy Location	Chord Angle	Guy Tension Top Bottom	F_x	F_y	F_z	M_x	M_y	M_z
ft		°	lb	lb	lb	lb	kip-ft	kip-ft	kip-ft
	A	48.0400	3557.66 3500.00	91.53	2662.82	-2357.52	-4.61	-7.23	7.99
	B	51.1492	3564.36 3500.00	1960.30	2792.10	1032.52	9.67	6.79	0.00
	B	51.1492	3564.36 3500.00	1874.34	2792.10	1181.41	-4.84	-6.79	-8.38
	C	63.5025	3558.33 3500.00	-1305.85	3191.01	879.69	-5.53	4.90	9.57
	C	63.5025	3558.33 3500.00	-1414.76	3191.01	691.06	11.05	-4.90	0.00
			Sum:	**1114.02**	17291.86	**-930.37**	**1.14**	0.00	**1.20**
50	A	27.1098	2710.66 2690.00	0.00	1253.18	-2403.59	-1.09	0.00	0.00
	B	32.6163	2715.83 2690.00	1971.58	1480.84	1138.29	0.64	0.00	-1.11
	C	42.8918	2711.18 2690.00	-1713.46	1853.61	989.27	0.80	0.00	1.39
			Sum:	**258.12**	4587.63	**-276.03**	**0.36**	0.00	**0.28**

Guy-Tensioning Information

Guy Elevation		H	V	Temperature At Time Of Tensioning													
				0 F		20 F		40 F		60 F		80 F		100 F		120 F	
				Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept	Initial Tension	Intercept
ft		ft	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft	lb	ft
136	A	77.33	126.00	4760	1.84	4586	1.91	4413	1.99	4240	2.07	4068	2.16	3896	2.25	3725	2.35
	B	77.33	136.00	4704	2.09	4549	2.16	4394	2.23	4240	2.31	4086	2.40	3933	2.49	3780	2.59
	C	43.37	127.00	4441	1.63	4374	1.65	4307	1.68	4240	1.70	4173	1.73	4106	1.76	4040	1.79
96	A	77.33	86.00	4201	1.06	3967	1.12	3733	1.19	3500	1.27	3268	1.36	3037	1.46	2808	1.58
	B	77.33	96.00	4117	1.23	3911	1.29	3705	1.36	3500	1.44	3296	1.53	3093	1.63	2890	1.74
	C	43.37	87.00	3815	0.82	3710	0.85	3605	0.87	3500	0.90	3395	0.93	3290	0.95	3185	0.99
50	A	78.13	40.00	3649	0.54	3328	0.60	3008	0.66	2690	0.74	2374	0.83	2062	0.96	1757	1.13
	B	78.13	50.00	3549	0.62	3261	0.68	2975	0.74	2690	0.82	2407	0.92	2127	1.04	1851	1.19
	C	44.13	41.00	3346	0.28	3127	0.30	2908	0.32	2690	0.35	2472	0.38	2255	0.41	2039	0.46

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
HYBRIFLEX 1-5/8" (T-Mobile)	B	No	No	Ar (CaAa)	147.00 - 3.00	0.5000	0	3	3	1.9800	1.9800		1.90
7/8 (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.35	9	3	1.1100	1.1100		0.54
Fiber Trunk (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.15	1	1	0.4000	0.4000		1.00
DC Trunk (AT&T)	A	No	No	Ar (CaAa)	126.00 - 3.00	0.5000	0.18	2	2	0.4000	0.4000		0.11
7/8	A	No	No	Ar (CaAa)	150.00 -	0.5000	-0.26	2	2	1.1100	1.1100		0.54

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
					3.00								
7/8	A	No	No	Ar (CaAa)	95.00 - 3.00	0.5000	-0.4	1	1	1.1100	1.1100		0.54
HYBRIFLEX 1-5/8" (Dish)	B	No	No	Ar (CaAa)	113.00 - 3.00	0.5000	0.45	1	1	1.9800	1.9800		1.90

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 lb
T1	150.00-140.00	A	0.000	0.000	2.220	0.000	10.80
		B	0.000	0.000	4.158	0.000	39.90
		C	0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	0.000	0.000	11.154	0.000	58.08
		B	0.000	0.000	11.880	0.000	114.00
		C	0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	0.000	0.000	26.820	0.000	143.20
		B	0.000	0.000	14.454	0.000	138.70
		C	0.000	0.000	0.000	0.000	0.00
T4	100.00-80.00	A	0.000	0.000	28.485	0.000	151.30
		B	0.000	0.000	15.840	0.000	152.00
		C	0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	15.840	0.000	152.00
		C	0.000	0.000	0.000	0.000	0.00
T6	60.00-40.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	15.840	0.000	152.00
		C	0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	0.000	0.000	29.040	0.000	154.00
		B	0.000	0.000	15.840	0.000	152.00
		C	0.000	0.000	0.000	0.000	0.00
T8	20.00-5.25	A	0.000	0.000	21.417	0.000	113.58
		B	0.000	0.000	11.682	0.000	112.10
		C	0.000	0.000	0.000	0.000	0.00
T9	5.25-0.00	A	0.000	0.000	3.267	0.000	17.32
		B	0.000	0.000	1.782	0.000	17.10
		C	0.000	0.000	0.000	0.000	0.00

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 lb
T1	150.00-140.00	A	2.319	0.000	0.000	12.281	0.000	153.82
		B		0.000	0.000	13.977	0.000	251.09
		C		0.000	0.000	0.000	0.000	0.00
T2	140.00-120.00	A	2.294	0.000	0.000	43.863	0.000	642.57
		B		0.000	0.000	39.767	0.000	710.23
		C		0.000	0.000	0.000	0.000	0.00
T3	120.00-100.00	A	2.256	0.000	0.000	88.352	0.000	1407.58
		B		0.000	0.000	47.955	0.000	875.96
		C		0.000	0.000	0.000	0.000	0.00

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 lb
T4	100.00-80.00	A	2.211	0.000	0.000	95.526	0.000	1519.08
		B		0.000	0.000	52.024	0.000	951.33
		C		0.000	0.000	0.000	0.000	0.00
T5	80.00-60.00	A	2.156	0.000	0.000	96.695	0.000	1521.66
		B		0.000	0.000	51.442	0.000	927.55
		C		0.000	0.000	0.000	0.000	0.00
T6	60.00-40.00	A	2.085	0.000	0.000	94.620	0.000	1464.29
		B		0.000	0.000	50.687	0.000	897.07
		C		0.000	0.000	0.000	0.000	0.00
T7	40.00-20.00	A	1.981	0.000	0.000	91.601	0.000	1383.02
		B		0.000	0.000	49.589	0.000	853.61
		C		0.000	0.000	0.000	0.000	0.00
T8	20.00-5.25	A	1.817	0.000	0.000	64.034	0.000	929.13
		B		0.000	0.000	35.294	0.000	580.41
		C		0.000	0.000	0.000	0.000	0.00
T9	5.25-0.00	A	1.553	0.000	0.000	8.905	0.000	121.00
		B		0.000	0.000	5.072	0.000	77.11
		C		0.000	0.000	0.000	0.000	0.00

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
T1	150.00-140.00	0.3961	-0.6834	0.0000	0.0000
T2	140.00-120.00	0.1496	-2.1837	0.0000	0.0000
T3	120.00-100.00	-0.5162	-3.7010	0.0000	0.0000
T4	100.00-80.00	-0.5133	-3.3760	0.0000	0.0000
T5	80.00-60.00	-0.5839	-3.3207	0.0000	0.0000
T6	60.00-40.00	-0.5842	-3.3220	0.0000	0.0000
T7	40.00-20.00	-0.5839	-3.3207	-0.0566	-0.1758
T8	20.00-5.25	-0.5826	-3.3131	-0.1049	-0.3417
T9	5.25-0.00	-0.4590	-2.1175	0.0000	0.0000

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T1	1	HYBRIFLEX 1-5/8"	140.00 - 147.00	0.6000	0.0000
T1	5	7/8	140.00 - 150.00	0.6000	0.0000
T2	1	HYBRIFLEX 1-5/8"	120.00 - 140.00	0.6000	0.0000
T2	2	7/8	120.00 - 126.00	0.6000	0.0000
T2	3	Fiber Trunk	120.00 - 126.00	0.6000	0.0000
T2	4	DC Trunk	120.00 - 126.00	0.6000	0.0000
T2	5	7/8	120.00 -	0.6000	0.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			140.00		
T3	1	HYBRIFLEX 1-5/8"	100.00 - 120.00	0.6000	0.0000
T3	2	7/8	100.00 - 120.00	0.6000	0.0000
T3	3	Fiber Trunk	100.00 - 120.00	0.6000	0.0000
T3	4	DC Trunk	100.00 - 120.00	0.6000	0.0000
T3	5	7/8	100.00 - 120.00	0.6000	0.0000
T3	7	HYBRIFLEX 1-5/8"	100.00 - 113.00	0.6000	0.0000
T4	1	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.0000
T4	2	7/8	80.00 - 100.00	0.6000	0.0000
T4	3	Fiber Trunk	80.00 - 100.00	0.6000	0.0000
T4	4	DC Trunk	80.00 - 100.00	0.6000	0.0000
T4	5	7/8	80.00 - 100.00	0.6000	0.0000
T4	6	7/8	80.00 - 95.00	0.6000	0.0000
T4	7	HYBRIFLEX 1-5/8"	80.00 - 100.00	0.6000	0.0000
T5	1	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.0000
T5	2	7/8	60.00 - 80.00	0.6000	0.0000
T5	3	Fiber Trunk	60.00 - 80.00	0.6000	0.0000
T5	4	DC Trunk	60.00 - 80.00	0.6000	0.0000
T5	5	7/8	60.00 - 80.00	0.6000	0.0000
T5	6	7/8	60.00 - 80.00	0.6000	0.0000
T5	7	HYBRIFLEX 1-5/8"	60.00 - 80.00	0.6000	0.0000
T6	1	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.0000
T6	2	7/8	40.00 - 60.00	0.6000	0.0000
T6	3	Fiber Trunk	40.00 - 60.00	0.6000	0.0000
T6	4	DC Trunk	40.00 - 60.00	0.6000	0.0000
T6	5	7/8	40.00 - 60.00	0.6000	0.0000
T6	6	7/8	40.00 - 60.00	0.6000	0.0000
T6	7	HYBRIFLEX 1-5/8"	40.00 - 60.00	0.6000	0.0000
T7	1	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.0342
T7	2	7/8	20.00 - 40.00	0.6000	0.0342
T7	3	Fiber Trunk	20.00 - 40.00	0.6000	0.0342
T7	4	DC Trunk	20.00 - 40.00	0.6000	0.0342
T7	5	7/8	20.00 - 40.00	0.6000	0.0342
T7	6	7/8	20.00 - 40.00	0.6000	0.0342
T7	7	HYBRIFLEX 1-5/8"	20.00 - 40.00	0.6000	0.0342
T8	1	HYBRIFLEX 1-5/8"	5.25 - 20.00	0.6000	0.0689
T8	2	7/8	5.25 - 20.00	0.6000	0.0689
T8	3	Fiber Trunk	5.25 - 20.00	0.6000	0.0689
T8	4	DC Trunk	5.25 - 20.00	0.6000	0.0689
T8	5	7/8	5.25 - 20.00	0.6000	0.0689
T8	6	7/8	5.25 - 20.00	0.6000	0.0689
T8	7	HYBRIFLEX 1-5/8"	5.25 - 20.00	0.6000	0.0689
T9	1	HYBRIFLEX 1-5/8"	3.00 - 5.25	0.5642	0.0000
T9	2	7/8	3.00 - 5.25	0.5642	0.0000
T9	3	Fiber Trunk	3.00 - 5.25	0.5642	0.0000
T9	4	DC Trunk	3.00 - 5.25	0.5642	0.0000
T9	5	7/8	3.00 - 5.25	0.5642	0.0000
T9	6	7/8	3.00 - 5.25	0.5642	0.0000
T9	7	HYBRIFLEX 1-5/8"	3.00 - 5.25	0.5642	0.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
AIR6449	A	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	A	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	A	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
(T-Mobile)			5.00			1/2" Ice	6.83	2.49	73.95
			0.00			1" Ice	7.21	2.84	111.77
AIR6449	B	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	B	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	B	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
(T-Mobile)			5.00			1/2" Ice	6.83	2.49	73.95
			0.00			1" Ice	7.21	2.84	111.77
AIR6449	C	From Face	5.00	0.0000	147.00	No Ice	5.65	2.42	103.00
(T-Mobile)			-5.00			1/2" Ice	5.96	2.64	141.45
			0.00			1" Ice	6.26	2.87	184.10
APXVAALL24-43	C	From Face	5.00	0.0000	147.00	No Ice	20.24	8.89	153.00
(T-Mobile)			0.00			1/2" Ice	20.89	9.49	265.59
			0.00			1" Ice	21.54	10.09	386.72
APX16DWV-16DWVS-E-A20	C	From Face	5.00	0.0000	147.00	No Ice	6.46	2.15	41.00
(T-Mobile)			5.00			1/2" Ice	6.83	2.49	73.95
			0.00			1" Ice	7.21	2.84	111.77
4415 B25	A	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	A	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	A	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85
4415 B25	B	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	B	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	B	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85
4415 B25	C	From Leg	3.00	0.0000	147.00	No Ice	1.84	0.82	46.00
(T-Mobile)			0.00			1/2" Ice	2.01	0.94	60.07
			0.00			1" Ice	2.19	1.07	76.66
4424 B25	C	From Leg	3.00	0.0000	147.00	No Ice	2.05	1.61	86.00
(T-Mobile)			0.00			1/2" Ice	2.23	1.77	106.93
			0.00			1" Ice	2.42	1.94	130.84
4449 B12,B71	C	From Leg	3.00	0.0000	147.00	No Ice	1.65	1.16	80.00
(T-Mobile)			0.00			1/2" Ice	1.81	1.29	96.12
			0.00			1" Ice	1.98	1.44	114.85

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 lb
Rohn 6' Side-Arm(1)	A	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
Rohn 6' Side-Arm(1)	B	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
Rohn 6' Side-Arm(1)	C	From Leg	3.00	0.0000	147.00	No Ice	6.00	6.00	140.00
(T-Mobile)			0.00			1/2" Ice	8.50	8.50	212.00
			0.00			1" Ice	11.00	11.00	284.00
12.5' x 2 Std. Horz. Pipe	A	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	A	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	B	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	B	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	C	From Face	3.00	0.0000	148.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
12.5' x 2 Std. Horz. Pipe	C	From Face	3.00	0.0000	145.50	No Ice	2.97	0.05	45.00
(T-Mobile)			0.00			1/2" Ice	3.82	0.08	73.32
			0.00			1" Ice	4.68	0.11	111.87
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	126.00	No Ice	9.66	6.45	51.00
(AT&T)			-4.00			1/2" Ice	10.13	6.91	113.99
			0.00			1" Ice	10.61	7.38	183.38
HPA-65R-BUU-H6	A	From Face	3.00	0.0000	126.00	No Ice	9.66	6.45	51.00
(AT&T)			4.00			1/2" Ice	10.13	6.91	113.99
			0.00			1" Ice	10.61	7.38	183.38
HPA-65R-BUU-H8	B	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			-4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
SBNH-1D6565C	B	From Face	3.00	0.0000	126.00	No Ice	11.41	7.70	60.85
(AT&T)			0.00			1/2" Ice	12.03	8.29	126.56
			0.00			1" Ice	12.65	8.89	199.94
HPA-65R-BUU-H8	B	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
HPA-65R-BUU-H8	C	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			-4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
SBNH-1D6565C	C	From Face	3.00	0.0000	126.00	No Ice	11.41	7.70	60.85
(AT&T)			0.00			1/2" Ice	12.03	8.29	126.56
			0.00			1" Ice	12.65	8.89	199.94
HPA-65R-BUU-H8	C	From Face	3.00	0.0000	126.00	No Ice	12.98	7.52	68.00
(AT&T)			4.00			1/2" Ice	13.56	8.09	141.77
			0.00			1" Ice	14.15	8.67	223.17
DTMABP7819VG12A TMA	B	From Face	3.00	0.0000	126.00	No Ice	1.36	0.51	20.00
(AT&T)			4.00			1/2" Ice	1.51	0.61	29.77
			0.00			1" Ice	1.66	0.72	41.67
DTMABP7819VG12A TMA	C	From Face	3.00	0.0000	126.00	No Ice	1.36	0.51	20.00
(AT&T)			4.00			1/2" Ice	1.51	0.61	29.77
			0.00			1" Ice	1.66	0.72	41.67

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 lb
RRUS-11	A	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	B	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
RRUS-11	C	From Face	3.00	0.0000	126.00	No Ice	2.57	1.07	50.00
(AT&T)			0.00			1/2" Ice	2.76	1.21	69.57
			0.00			1" Ice	2.97	1.36	92.08
(2) RRUS-32	A	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) RRUS-32	B	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
(2) RRUS-32	C	From Face	3.00	0.0000	126.00	No Ice	3.31	2.42	77.00
(AT&T)			2.00			1/2" Ice	3.56	2.64	104.93
			0.00			1" Ice	3.81	2.86	136.47
4478 B14	B	From Face	3.00	0.0000	126.00	No Ice	1.84	1.06	60.00
(AT&T)			2.00			1/2" Ice	2.01	1.20	75.88
			0.00			1" Ice	2.19	1.34	94.39
4478 B14	C	From Face	3.00	0.0000	126.00	No Ice	1.84	1.06	60.00
(AT&T)			2.00			1/2" Ice	2.01	1.20	75.88
			0.00			1" Ice	2.19	1.34	94.39
DC6-48-60-18-8F Surge	A	From Face	3.00	0.0000	126.00	No Ice	1.91	1.91	20.00
Arrestor			0.00			1/2" Ice	2.10	2.10	39.36
(AT&T)			0.00			1" Ice	2.29	2.29	61.70
DC6-48-60-18-8F Surge	B	From Face	3.00	0.0000	126.00	No Ice	1.91	1.91	20.00
Arrestor			0.00			1/2" Ice	2.10	2.10	39.36
(AT&T)			0.00			1" Ice	2.29	2.29	61.70
12' V-Frame	A	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00
			0.00			1" Ice	9.22	12.97	500.00
12' V-Frame	B	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00
			0.00			1" Ice	9.22	12.97	500.00
12' V-Frame	C	From Face	3.00	0.0000	126.00	No Ice	9.22	12.97	300.00
(AT&T)			0.00			1/2" Ice	9.22	12.97	400.00
			0.00			1" Ice	9.22	12.97	500.00
6' x 3" Dia Omni	A	From Leg	1.00	0.0000	150.00	No Ice	1.77	1.77	20.00
			0.00			1/2" Ice	2.13	2.13	33.24
			3.00			1" Ice	2.50	2.50	50.59
4'x5/8" Lightning Rod	B	From Leg	1.00	0.0000	150.00	No Ice	0.25	0.25	10.00
			0.00			1/2" Ice	0.66	0.66	12.82
			3.00			1" Ice	0.97	0.97	18.29
20' x 3" Dia Omni	C	From Leg	1.00	0.0000	147.00	No Ice	6.00	6.00	50.00
			0.00			1/2" Ice	8.03	8.03	93.17
			10.00			1" Ice	10.08	10.08	149.01
8' dipole antenna	C	From Leg	1.00	0.0000	95.00	No Ice	2.00	2.00	10.00
			0.00			1/2" Ice	3.00	3.00	20.00
			4.00			1" Ice	4.00	4.00	30.00
GPS	A	From Leg	1.00	0.0000	50.00	No Ice	1.00	1.00	10.00
			0.00			1/2" Ice	1.50	1.50	15.00
			0.00			1" Ice	2.00	2.00	20.00
MX08FRO665-21	A	From Leg	3.00	0.0000	113.00	No Ice	12.49	5.87	65.00
(Dish)			0.00			1/2" Ice	12.99	6.32	138.79
			0.00			1" Ice	13.49	6.79	219.26

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft²	C_AA_A Side ft²	Weight lb
MX08FRO665-21 (Dish)	B	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.49 12.99 13.49	5.87 6.32 6.79	65.00 138.79 219.26
MX08FRO665-21 (Dish)	C	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.49 12.99 13.49	5.87 6.32 6.79	65.00 138.79 219.26
TA08025-B605 (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.20 1.34 1.49	75.00 93.09 113.96
TA08025-B605 (Dish)	B	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.20 1.34 1.49	75.00 93.09 113.96
TA08025-B605 (Dish)	C	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.20 1.34 1.49	75.00 93.09 113.96
TA08025-B604 (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.04 1.18 1.32	65.00 81.85 101.41
TA08025-B604 (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.04 1.18 1.32	65.00 81.85 101.41
TA08025-B604 (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	1.98 2.15 2.33	1.04 1.18 1.32	65.00 81.85 101.41
RC2DC-3315-PF-48 (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	3.01 3.23 3.46	1.96 2.15 2.35	25.00 51.21 80.79
Commscope MTC3975083 8-ft V-Frame (Dish)	A	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.00 18.00 24.00	12.00 18.00 24.00	360.00 500.00 640.00
Commscope MTC3975083 8-ft V-Frame (Dish)	B	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.00 18.00 24.00	12.00 18.00 24.00	360.00 500.00 640.00
Commscope MTC3975083 8-ft V-Frame (Dish)	C	From Leg	3.00 0.00 0.00	0.0000	113.00	No Ice 1/2" Ice 1" Ice	12.00 18.00 24.00	12.00 18.00 24.00	360.00 500.00 640.00

Tower Pressures - No Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1 150.00-140.00	145.00	1.099	26	16.458	A	0.000	4.317	2.917	67.57	2.220	0.000
					B	0.000	4.317		67.57	4.158	0.000
					C	0.000	4.740		61.54	0.000	0.000
T2 140.00-120.00	130.00	1.065	26	32.917	A	0.000	8.534	5.833	68.35	11.154	0.000
					B	0.000	8.534		68.35	11.880	0.000

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
					C	0.000	9.381		62.18	0.000	0.000
T3	110.00	1.016	24	32.917	A	0.000	8.464	5.833	68.92	26.820	0.000
120.00-100.00					B	0.000	8.464		68.92	14.454	0.000
					C	0.000	9.395		62.09	0.000	0.000
T4	90.00	0.959	23	32.917	A	0.000	8.534	5.833	68.35	28.485	0.000
100.00-80.00					B	0.000	8.534		68.35	15.840	0.000
					C	0.000	9.381		62.18	0.000	0.000
T5 80.00-60.00	70.00	0.892	21	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	15.840	0.000
					C	0.000	9.395		62.09	0.000	0.000
T6 60.00-40.00	50.00	0.811	19	32.917	A	0.000	8.534	5.833	68.35	29.040	0.000
					B	0.000	8.534		68.35	15.840	0.000
					C	0.000	9.381		62.18	0.000	0.000
T7 40.00-20.00	30.00	0.701	17	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	15.840	0.000
					C	0.000	9.395		62.09	0.000	0.000
T8 20.00-5.25	12.63	0.7	17	24.276	A	0.000	6.312	4.302	68.16	21.417	0.000
					B	0.000	6.312		68.16	11.682	0.000
					C	0.000	6.989		61.56	0.000	0.000
T9 5.25-0.00	2.63	0.7	17	4.711	A	0.000	2.053	1.552	75.59	3.267	0.000
					B	0.000	2.053		75.59	1.782	0.000
					C	0.000	2.053		75.59	0.000	0.000

Tower Pressure - With Ice

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	145.00	1.099	4	2.3191	20.323	A	0.000	22.226	10.647	47.90	12.281	0.000
150.00-140.00						B	0.000	22.226		47.90	13.977	0.000
						C	0.000	25.266		42.14	0.000	0.000
T2	130.00	1.065	4	2.2939	40.563	A	0.000	43.447	21.126	48.62	43.863	0.000
140.00-120.00						B	0.000	43.447		48.62	39.767	0.000
						C	0.000	49.470		42.70	0.000	0.000
T3	110.00	1.016	4	2.2559	40.436	A	0.000	42.289	20.873	49.36	88.352	0.000
120.00-100.00						B	0.000	42.289		49.36	47.955	0.000
						C	0.000	48.820		42.75	0.000	0.000
T4 100.00-80.00	90.00	0.959	3	2.2111	40.287	A	0.000	42.186	20.574	48.77	95.526	0.000
						B	0.000	42.186		48.77	52.024	0.000
						C	0.000	48.023		42.84	0.000	0.000
T5 80.00-60.00	70.00	0.892	3	2.1562	40.104	A	0.000	40.794	20.208	49.54	96.695	0.000
						B	0.000	40.794		49.54	51.442	0.000
						C	0.000	47.078		42.92	0.000	0.000
T6 60.00-40.00	50.00	0.811	3	2.0849	39.866	A	0.000	40.265	19.732	49.01	94.620	0.000
						B	0.000	40.265		49.01	50.687	0.000
						C	0.000	45.817		43.07	0.000	0.000
T7 40.00-20.00	30.00	0.701	2	1.9810	39.520	A	0.000	38.167	19.040	49.89	91.601	0.000
						B	0.000	38.167		49.89	49.589	0.000
						C	0.000	44.017		43.26	0.000	0.000
T8 20.00-5.25	12.63	0.7	2	1.8168	28.742	A	0.000	26.763	13.235	49.45	64.034	0.000
						B	0.000	26.763		49.45	35.294	0.000
						C	0.000	30.720		43.08	0.000	0.000
T9 5.25-0.00	2.63	0.7	2	1.5527	6.083	A	0.000	7.159	4.306	60.14	8.905	0.000

Section Elevation ft	z ft	K_Z	q_z psf	t_Z in	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
						B	0.000	7.159		60.14	5.072	0.000
						C	0.000	7.159		60.14	0.000	0.000

Tower Pressure - Service

$G_H = 0.850$

Section Elevation ft	z ft	K_Z	q_z psf	A_G ft²	Face	A_F ft²	A_R ft²	A_{leg} ft²	Leg %	C_AA_A In Face ft²	C_AA_A Out Face ft²
T1	145.00	1.099	9	16.458	A	0.000	4.317	2.917	67.57	2.220	0.000
150.00-140.00					B	0.000	4.317		67.57	4.158	0.000
					C	0.000	4.740		61.54	0.000	0.000
T2	130.00	1.065	8	32.917	A	0.000	8.534	5.833	68.35	11.154	0.000
140.00-120.00					B	0.000	8.534		68.35	11.880	0.000
					C	0.000	9.381		62.18	0.000	0.000
T3	110.00	1.016	8	32.917	A	0.000	8.464	5.833	68.92	26.820	0.000
120.00-100.00					B	0.000	8.464		68.92	14.454	0.000
					C	0.000	9.395		62.09	0.000	0.000
T4	90.00	0.959	8	32.917	A	0.000	8.534	5.833	68.35	28.485	0.000
100.00-80.00					B	0.000	8.534		68.35	15.840	0.000
					C	0.000	9.381		62.18	0.000	0.000
T5 80.00-60.00	70.00	0.892	7	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	15.840	0.000
					C	0.000	9.395		62.09	0.000	0.000
T6 60.00-40.00	50.00	0.811	6	32.917	A	0.000	8.534	5.833	68.35	29.040	0.000
					B	0.000	8.534		68.35	15.840	0.000
					C	0.000	9.381		62.18	0.000	0.000
T7 40.00-20.00	30.00	0.701	5	32.917	A	0.000	8.464	5.833	68.92	29.040	0.000
					B	0.000	8.464		68.92	15.840	0.000
					C	0.000	9.395		62.09	0.000	0.000
T8 20.00-5.25	12.63	0.7	5	24.276	A	0.000	6.312	4.302	68.16	21.417	0.000
					B	0.000	6.312		68.16	11.682	0.000
					C	0.000	6.989		61.56	0.000	0.000
T9 5.25-0.00	2.63	0.7	5	4.711	A	0.000	2.053	1.552	75.59	3.267	0.000
					B	0.000	2.053		75.59	1.782	0.000
					C	0.000	2.053		75.59	0.000	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	26	1	1	2.539	232.97	23.30	C
150.00-140.00			B	0.262	2.401		1	1	2.539			
			C	0.288	2.328		1	1	2.821			
T2	172.08	695.80	A	0.259	2.41	26	1	1	5.012	583.19	29.16	C
140.00-120.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T3	281.90	693.35	A	0.257	2.416	24	1	1	4.966	782.96	39.15	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
120.00-100.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T4	303.30	695.80	A	0.259	2.41	23	1	1	5.012	774.82	38.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T5	306.00	693.35	A	0.257	2.416	21	1	1	4.966	727.48	36.37	C
80.00-60.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T6	306.00	695.80	A	0.259	2.41	19	1	1	5.012	660.54	33.03	C
60.00-40.00			B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T7	306.00	693.35	A	0.257	2.416	17	1	1	4.966	571.07	28.55	C
40.00-20.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	17	1	1	3.708	421.76	28.59	C
			B	0.26	2.408		1	1	3.708			
			C	0.288	2.329		1	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	17	1	1	1.340	78.85	15.02	C
			B	0.436	1.997		1	1	1.340			
			C	0.436	1.997		1	1	1.340			
Sum Weight:	1986.08	5693.21								4833.64		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	26	0.8	1	2.539	232.97	23.30	C
150.00-140.00			B	0.262	2.401		0.8	1	2.539			
			C	0.288	2.328		0.8	1	2.821			
T2	172.08	695.80	A	0.259	2.41	26	0.8	1	5.012	583.19	29.16	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T3	281.90	693.35	A	0.257	2.416	24	0.8	1	4.966	782.96	39.15	C
120.00-100.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T4	303.30	695.80	A	0.259	2.41	23	0.8	1	5.012	774.82	38.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T5	306.00	693.35	A	0.257	2.416	21	0.8	1	4.966	727.48	36.37	C
80.00-60.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T6	306.00	695.80	A	0.259	2.41	19	0.8	1	5.012	660.54	33.03	C
60.00-40.00			B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T7	306.00	693.35	A	0.257	2.416	17	0.8	1	4.966	571.07	28.55	C
40.00-20.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	17	0.8	1	3.708	421.76	28.59	C
			B	0.26	2.408		0.8	1	3.708			
			C	0.288	2.329		0.8	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	17	0.8	1	1.340	78.85	15.02	C
			B	0.436	1.997		0.8	1	1.340			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
Sum Weight:	1986.08	5693.21	C	0.436	1.997		0.8	1	1.340	4833.64		

Tower Forces - No Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	26	0.85	1	2.539	232.97	23.30	C
150.00-140.00			B	0.262	2.401		0.85	1	2.539			
			C	0.288	2.328		0.85	1	2.821			
T2	172.08	695.80	A	0.259	2.41	26	0.85	1	5.012	583.19	29.16	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T3	281.90	693.35	A	0.257	2.416	24	0.85	1	4.966	782.96	39.15	C
120.00-100.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T4	303.30	695.80	A	0.259	2.41	23	0.85	1	5.012	774.82	38.74	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T5	306.00	693.35	A	0.257	2.416	21	0.85	1	4.966	727.48	36.37	C
80.00-60.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T6	306.00	695.80	A	0.259	2.41	19	0.85	1	5.012	660.54	33.03	C
60.00-40.00			B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T7	306.00	693.35	A	0.257	2.416	17	0.85	1	4.966	571.07	28.55	C
40.00-20.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	17	0.85	1	3.708	421.76	28.59	C
			B	0.26	2.408		0.85	1	3.708			
			C	0.288	2.329		0.85	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	17	0.85	1	1.340	78.85	15.02	C
			B	0.436	1.997		0.85	1	1.340			
			C	0.436	1.997		0.85	1	1.340			
Sum Weight:	1986.08	5693.21								4833.64		

Tower Forces - With Ice - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	404.91	1496.60	A	1	2.1	4	1	1	22.226	138.80*	13.88	C
150.00-140.00			B	1	2.1		1	1	22.226			
			C	1	2.1		1	1	25.266			
T2	1352.80	2901.91	A	1	2.1	4	1	1	43.447	268.51*	13.43	C
140.00-120.00		TA 855.26	B	1	2.1		1	1	43.447			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	1	2.1		1	1	49.470			
T3	2283.54	2813.90	A	1	2.1	4	1	1	42.289	255.20*	12.76	C
120.00-100.00			B	1	2.1		1	1	42.289			
			C	1	2.1		1	1	48.820			
T4	2470.42	2767.33	A	1	2.1	3	1	1	42.186	240.09*	12.00	C
100.00-80.00		TA 823.78	B	1	2.1		1	1	42.186			
			C	1	2.1		1	1	48.023			
T5	2449.22	2656.49	A	1	2.1	3	1	1	40.794	222.44*	11.12	C
80.00-60.00			B	1	2.1		1	1	40.794			
			C	1	2.1		1	1	47.078			
T6	2361.37	2570.14	A	1	2.1	3	1	1	40.265	200.85*	10.04	C
60.00-40.00			B	1	2.1		1	1	40.265			
			C	1	2.1		1	1	45.817			
T7	2236.63	2394.18	A	0.966	2.032	2	1	1	38.167	172.07*	8.60	C
40.00-20.00			B	0.966	2.032		1	1	38.167			
			C	1	2.1		1	1	44.017			
T8 20.00-5.25	1509.53	1622.64	A	0.931	1.972	2	1	1	26.536	125.04*	8.48	C
			B	0.931	1.972		1	1	26.536			
			C	1	2.1		1	1	30.720			
T9 5.25-0.00	198.12	401.95	A	1	2.1	2	1	1	7.159	26.46*	5.04	C
			B	1	2.1		1	1	7.159			
			C	1	2.1		1	1	7.159			
Sum Weight:	15266.52	21304.18			*2.1A_g limit					1649.44		

Tower Forces - With Ice - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	404.91	1496.60	A	1	2.1	4	0.8	1	22.226	138.80*	13.88	C
150.00-140.00			B	1	2.1		0.8	1	22.226			
			C	1	2.1		0.8	1	25.266			
T2	1352.80	2901.91	A	1	2.1	4	0.8	1	43.447	268.51*	13.43	C
140.00-120.00		TA 855.26	B	1	2.1		0.8	1	43.447			
			C	1	2.1		0.8	1	49.470			
T3	2283.54	2813.90	A	1	2.1	4	0.8	1	42.289	255.20*	12.76	C
120.00-100.00			B	1	2.1		0.8	1	42.289			
			C	1	2.1		0.8	1	48.820			
T4	2470.42	2767.33	A	1	2.1	3	0.8	1	42.186	240.09*	12.00	C
100.00-80.00		TA 823.78	B	1	2.1		0.8	1	42.186			
			C	1	2.1		0.8	1	48.023			
T5	2449.22	2656.49	A	1	2.1	3	0.8	1	40.794	222.44*	11.12	C
80.00-60.00			B	1	2.1		0.8	1	40.794			
			C	1	2.1		0.8	1	47.078			
T6	2361.37	2570.14	A	1	2.1	3	0.8	1	40.265	200.85*	10.04	C
60.00-40.00			B	1	2.1		0.8	1	40.265			
			C	1	2.1		0.8	1	45.817			
T7	2236.63	2394.18	A	0.966	2.032	2	0.8	1	38.167	172.07*	8.60	C
40.00-20.00			B	0.966	2.032		0.8	1	38.167			
			C	1	2.1		0.8	1	44.017			
T8 20.00-5.25	1509.53	1622.64	A	0.931	1.972	2	0.8	1	26.536	125.04*	8.48	C
			B	0.931	1.972		0.8	1	26.536			

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
			C	1	2.1		0.8	1	30.720			
T9 5.25-0.00	198.12	401.95	A	1	2.1	2	0.8	1	7.159	26.46*	5.04	C
			B	1	2.1		0.8	1	7.159			
			C	1	2.1		0.8	1	7.159			
Sum Weight:	15266.52	21304.18			*2.1A_g limit					1649.44		

Tower Forces - With Ice - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	404.91	1496.60	A	1	2.1	4	0.85	1	22.226	138.80*	13.88	C
150.00-140.00			B	1	2.1		0.85	1	22.226			
			C	1	2.1		0.85	1	25.266			
T2	1352.80	2901.91	A	1	2.1	4	0.85	1	43.447	268.51*	13.43	C
140.00-120.00		TA 855.26	B	1	2.1		0.85	1	43.447			
			C	1	2.1		0.85	1	49.470			
T3	2283.54	2813.90	A	1	2.1	4	0.85	1	42.289	255.20*	12.76	C
120.00-100.00			B	1	2.1		0.85	1	42.289			
			C	1	2.1		0.85	1	48.820			
T4	2470.42	2767.33	A	1	2.1	3	0.85	1	42.186	240.09*	12.00	C
100.00-80.00		TA 823.78	B	1	2.1		0.85	1	42.186			
			C	1	2.1		0.85	1	48.023			
T5	2449.22	2656.49	A	1	2.1	3	0.85	1	40.794	222.44*	11.12	C
80.00-60.00			B	1	2.1		0.85	1	40.794			
			C	1	2.1		0.85	1	47.078			
T6	2361.37	2570.14	A	1	2.1	3	0.85	1	40.265	200.85*	10.04	C
60.00-40.00			B	1	2.1		0.85	1	40.265			
			C	1	2.1		0.85	1	45.817			
T7	2236.63	2394.18	A	0.966	2.032	2	0.85	1	38.167	172.07*	8.60	C
40.00-20.00			B	0.966	2.032		0.85	1	38.167			
			C	1	2.1		0.85	1	44.017			
T8 20.00-5.25	1509.53	1622.64	A	0.931	1.972	2	0.85	1	26.536	125.04*	8.48	C
			B	0.931	1.972		0.85	1	26.536			
			C	1	2.1		0.85	1	30.720			
T9 5.25-0.00	198.12	401.95	A	1	2.1	2	0.85	1	7.159	26.46*	5.04	C
			B	1	2.1		0.85	1	7.159			
			C	1	2.1		0.85	1	7.159			
Sum Weight:	15266.52	21304.18			*2.1A_g limit					1649.44		

Tower Forces - Service - Wind Normal To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	9	1	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		1	1	2.539			
			C	0.288	2.328		1	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	1	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T3	281.90	693.35	A	0.257	2.416	8	1	1	4.966	255.66	12.78	C
120.00-100.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T4	303.30	695.80	A	0.259	2.41	8	1	1	5.012	253.00	12.65	C
100.00-80.00		TA 244.49	B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T5	306.00	693.35	A	0.257	2.416	7	1	1	4.966	237.55	11.88	C
80.00-60.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T6	306.00	695.80	A	0.259	2.41	6	1	1	5.012	215.69	10.78	C
60.00-40.00			B	0.259	2.41		1	1	5.012			
			C	0.285	2.337		1	1	5.576			
T7	306.00	693.35	A	0.257	2.416	5	1	1	4.966	186.47	9.32	C
40.00-20.00			B	0.257	2.416		1	1	4.966			
			C	0.285	2.336		1	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	5	1	1	3.708	137.72	9.34	C
			B	0.26	2.408		1	1	3.708			
			C	0.288	2.329		1	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	5	1	1	1.340	25.75	4.90	C
			B	0.436	1.997		1	1	1.340			
			C	0.436	1.997		1	1	1.340			
Sum Weight:	1986.08	5693.21								1578.33		

Tower Forces - Service - Wind 60 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft^2	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	9	0.8	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		0.8	1	2.539			
			C	0.288	2.328		0.8	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	0.8	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T3	281.90	693.35	A	0.257	2.416	8	0.8	1	4.966	255.66	12.78	C
120.00-100.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T4	303.30	695.80	A	0.259	2.41	8	0.8	1	5.012	253.00	12.65	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T5	306.00	693.35	A	0.257	2.416	7	0.8	1	4.966	237.55	11.88	C
80.00-60.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T6	306.00	695.80	A	0.259	2.41	6	0.8	1	5.012	215.69	10.78	C
60.00-40.00			B	0.259	2.41		0.8	1	5.012			
			C	0.285	2.337		0.8	1	5.576			
T7	306.00	693.35	A	0.257	2.416	5	0.8	1	4.966	186.47	9.32	C

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
40.00-20.00			B	0.257	2.416		0.8	1	4.966			
			C	0.285	2.336		0.8	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	5	0.8	1	3.708	137.72	9.34	C
			B	0.26	2.408		0.8	1	3.708			
			C	0.288	2.329		0.8	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	5	0.8	1	1.340	25.75	4.90	C
			B	0.436	1.997		0.8	1	1.340			
			C	0.436	1.997		0.8	1	1.340			
Sum Weight:	1986.08	5693.21								1578.33		

Tower Forces - Service - Wind 90 To Face

Section Elevation ft	Add Weight lb	Self Weight lb	Face	e	C_F	q_z psf	D_F	D_R	A_E ft²	F lb	w plf	Ctrl. Face
T1	50.70	352.31	A	0.262	2.401	9	0.85	1	2.539	76.07	7.61	C
150.00-140.00			B	0.262	2.401		0.85	1	2.539			
			C	0.288	2.328		0.85	1	2.821			
T2	172.08	695.80	A	0.259	2.41	8	0.85	1	5.012	190.43	9.52	C
140.00-120.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T3	281.90	693.35	A	0.257	2.416	8	0.85	1	4.966	255.66	12.78	C
120.00-100.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T4	303.30	695.80	A	0.259	2.41	8	0.85	1	5.012	253.00	12.65	C
100.00-80.00		TA 244.49	B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T5	306.00	693.35	A	0.257	2.416	7	0.85	1	4.966	237.55	11.88	C
80.00-60.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T6	306.00	695.80	A	0.259	2.41	6	0.85	1	5.012	215.69	10.78	C
60.00-40.00			B	0.259	2.41		0.85	1	5.012			
			C	0.285	2.337		0.85	1	5.576			
T7	306.00	693.35	A	0.257	2.416	5	0.85	1	4.966	186.47	9.32	C
40.00-20.00			B	0.257	2.416		0.85	1	4.966			
			C	0.285	2.336		0.85	1	5.585			
T8 20.00-5.25	225.68	516.32	A	0.26	2.408	5	0.85	1	3.708	137.72	9.34	C
			B	0.26	2.408		0.85	1	3.708			
			C	0.288	2.329		0.85	1	4.160			
T9 5.25-0.00	34.42	168.16	A	0.436	1.997	5	0.85	1	1.340	25.75	4.90	C
			B	0.436	1.997		0.85	1	1.340			
			C	0.436	1.997		0.85	1	1.340			
Sum Weight:	1986.08	5693.21								1578.33		

Force Totals (Does not include forces on guys)

Load Case	*Vertical Forces* lb	*Sum of Forces X* lb	*Sum of Forces Z* lb	*Sum of Torques* kip-ft
Leg Weight	3684.84			
Bracing Weight	2008.37			
Total Member Self-Weight	5693.21			
Guy Weight	1287.44			
Total Weight	15211.43			
Wind 0 deg - No Ice		73.44	-11312.32	0.06
Wind 30 deg - No Ice		5645.18	-9833.47	-0.53
Wind 60 deg - No Ice		9704.31	-5719.76	-0.97
Wind 90 deg - No Ice		11163.17	-73.44	-1.15
Wind 120 deg - No Ice		9516.66	5526.62	-1.03
Wind 150 deg - No Ice		5452.05	9645.83	-0.63
Wind 180 deg - No Ice		-73.44	11180.44	-0.06
Wind 210 deg - No Ice		-5579.24	9719.26	0.53
Wind 240 deg - No Ice		-9590.09	5653.82	0.97
Wind 270 deg - No Ice		-11031.29	73.44	1.15
Wind 300 deg - No Ice		-9516.66	-5526.62	1.03
Wind 330 deg - No Ice		-5452.05	-9645.83	0.63
Member Ice	15610.97			
Guy Ice	12406.87			
Total Weight Ice	73717.39			
Wind 0 deg - Ice		11.04	-3220.58	0.00
Wind 30 deg - Ice		1607.99	-2794.62	0.02
Wind 60 deg - Ice		2774.09	-1619.85	0.03
Wind 90 deg - Ice		3196.87	-11.04	0.04
Wind 120 deg - Ice		2759.82	1598.87	0.03
Wind 150 deg - Ice		1587.01	2780.35	0.02
Wind 180 deg - Ice		-11.04	3216.85	0.00
Wind 210 deg - Ice		-1606.12	2791.39	-0.01
Wind 240 deg - Ice		-2770.85	1617.98	-0.02
Wind 270 deg - Ice		-3193.13	11.04	-0.03
Wind 300 deg - Ice		-2759.82	-1598.87	-0.03
Wind 330 deg - Ice		-1587.01	-2780.35	-0.02
Total Weight	15211.43			
Wind 0 deg - Service		23.98	-3693.82	0.02
Wind 30 deg - Service		1843.32	-3210.93	-0.17
Wind 60 deg - Service		3168.75	-1867.68	-0.32
Wind 90 deg - Service		3645.12	-23.98	-0.38
Wind 120 deg - Service		3107.48	1804.61	-0.34
Wind 150 deg - Service		1780.26	3149.66	-0.20
Wind 180 deg - Service		-23.98	3650.76	-0.02
Wind 210 deg - Service		-1821.79	3173.64	0.17
Wind 240 deg - Service		-3131.46	1846.14	0.32
Wind 270 deg - Service		-3602.05	23.98	0.38
Wind 300 deg - Service		-3107.48	-1804.61	0.34
Wind 330 deg - Service		-1780.26	-3149.66	0.20

Load Combinations

Comb. No.	*Description*
1	Dead Only
2	1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy
3	1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy
4	1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy

Comb. No.	Description
5	1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy
6	1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy
7	1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy
8	1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy
9	1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy
10	1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy
11	1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy
12	1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy
13	1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy
14	1.2 Dead+1.0 Ice+1.0 Temp+Guy
15	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy
16	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy
17	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy
18	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy
19	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy
20	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy
21	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy
22	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy
23	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy
24	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy
25	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy
26	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy
27	Dead+Wind 0 deg - Service+Guy
28	Dead+Wind 30 deg - Service+Guy
29	Dead+Wind 60 deg - Service+Guy
30	Dead+Wind 90 deg - Service+Guy
31	Dead+Wind 120 deg - Service+Guy
32	Dead+Wind 150 deg - Service+Guy
33	Dead+Wind 180 deg - Service+Guy
34	Dead+Wind 210 deg - Service+Guy
35	Dead+Wind 240 deg - Service+Guy
36	Dead+Wind 270 deg - Service+Guy
37	Dead+Wind 300 deg - Service+Guy
38	Dead+Wind 330 deg - Service+Guy

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T1	150 - 140	Leg	Max Tension	4	22278.76	0.60	-0.39
			Max. Compression	2	-24498.90	0.00	0.05
			Max. Mx	5	-21347.78	0.72	0.02
			Max. My	2	-24493.58	0.07	-0.72
			Max. Vy	5	1503.34	-0.03	-0.03
			Max. Vx	2	-1530.81	0.00	0.05
		Diagonal	Max Tension	3	2941.95	0.00	0.00
			Max. Compression	3	-2946.44	0.00	0.00
			Max. Mx	23	348.71	-0.00	0.00
			Max. My	12	-1631.86	0.00	-0.00
			Max. Vy	23	5.04	-0.00	0.00
			Max. Vx	12	-0.73	0.00	0.00
		Horizontal	Max Tension	8	506.80	0.00	0.00
			Max. Compression	2	-390.23	0.00	0.00
			Max. Mx	23	277.09	0.00	0.00
			Max. Vy	23	-7.87	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	9	49.43	0.00	0.00
			Max. Compression	4	-48.46	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Mx	23	-5.32	0.00	0.00
			Max. Vy	23	-7.87	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	8	1142.20	0.00	0.00
			Max. Compression	2	-1215.36	0.00	0.00
			Max. Mx	25	-13.10	0.00	0.00
			Max. My	6	627.57	0.00	-0.00
			Max. Vy	25	-7.87	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
T2	140 - 120	Leg	Max Tension	8	25383.31	0.06	-0.81
			Max. Compression	3	-40433.81	-0.08	0.09
			Max. Mx	5	-21357.94	-0.78	-0.07
			Max. My	2	-24505.44	-0.07	0.81
			Max. Vy	5	1501.27	-0.78	-0.07
			Max. Vx	2	-1527.23	-0.07	0.81
		Diagonal	Max Tension	3	4934.64	0.00	0.00
			Max. Compression	5	-5759.31	0.00	0.00
			Max. Mx	7	-3058.74	-0.01	0.00
			Max. My	7	-4751.72	-0.01	-0.01
			Max. Vy	7	-7.57	-0.01	0.00
			Max. Vx	7	-5.32	0.00	0.00
		Horizontal	Max Tension	8	2623.27	0.00	0.00
			Max. Compression	2	-4406.75	0.00	0.00
			Max. Mx	24	824.45	0.00	0.00
			Max. My	6	979.28	0.00	-0.00
			Max. Vy	24	-7.75	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Top Girt	Max Tension	10	714.29	0.00	0.00
			Max. Compression	4	-1014.89	0.00	0.00
			Max. Mx	23	-162.89	0.00	0.00
			Max. My	2	-710.60	0.00	-0.00
			Max. Vy	25	-7.75	0.00	0.00
			Max. Vx	2	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	720.06	0.00	0.00
			Max. Compression	5	-118.46	0.00	0.00
			Max. Mx	23	283.81	0.00	0.00
			Max. My	6	484.84	0.00	-0.00
			Max. Vy	23	7.75	0.00	0.00
			Max. Vx	6	0.00	0.00	0.00
		Guy A	Bottom Tension	9	11781.68		
			Top Tension	9	11883.10		
			Top Cable Vert	9	10175.65		
			Top Cable Norm	9	6137.02		
			Top Cable Tan	9	33.57		
			Bot Cable Vert	9	-9963.59		
			Bot Cable Norm	9	6286.93		
			Bot Cable Tan	9	96.50		
		Guy B	Bottom Tension	11	12175.85		
			Top Tension	11	12285.30		
			Top Cable Vert	11	10725.65		
			Top Cable Norm	11	5990.62		
			Top Cable Tan	11	37.29		
			Bot Cable Vert	11	-10505.45		
			Bot Cable Norm	11	6154.43		
			Bot Cable Tan	11	99.35		
		Guy C	Bottom Tension	3	17595.52		
			Top Tension	3	17696.26		
			Top Cable Vert	3	16741.67		
			Top Cable Norm	3	5733.46		
			Top Cable Tan	3	40.42		
			Bot Cable Vert	3	-16572.46		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Bot Cable Norm	3	5909.80		
			Bot Cable Tan	3	173.07		
		Top Guy Pull-Off	Max Tension	4	7555.58	0.00	0.00
			Max. Compression	10	-4666.92	0.00	0.00
			Max. Mx	23	2067.74	0.00	0.00
			Max. My	2	4678.44	0.00	-0.00
			Max. Vy	23	7.07	0.00	0.00
			Max. Vx	2	-0.00	0.00	0.00
		Torque Arm Top	Max Tension	2	17179.21	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	6692.85	0.03	0.00
			Max. My	2	6140.49	0.00	0.00
			Max. Vy	18	-33.53	0.00	0.00
			Max. Vx	2	-0.09	0.00	0.00
		Torque Arm Bottom	Max Tension	2	4459.30	0.00	0.00
			Max. Compression	3	-18461.95	0.00	0.00
			Max. Mx	17	-3022.74	0.03	0.00
			Max. My	2	4459.30	0.00	-0.00
			Max. Vy	17	-33.53	0.00	0.00
			Max. Vx	2	0.03	0.00	0.00
T3	120 - 100	Leg	Max Tension	4	20890.02	0.72	-0.49
			Max. Compression	2	-60748.67	-0.00	0.09
			Max. Mx	5	-16076.12	0.86	-0.01
			Max. My	2	-4932.20	0.10	-0.89
			Max. Vy	5	1854.85	-0.07	-0.04
			Max. Vx	2	-1854.10	-0.00	0.09
		Diagonal	Max Tension	3	3310.39	0.00	0.00
			Max. Compression	5	-4165.23	0.00	0.00
			Max. Mx	2	2498.55	-0.00	0.00
			Max. My	7	-3428.47	0.00	-0.00
			Max. Vy	16	6.75	-0.00	0.00
			Max. Vx	7	-1.15	0.00	-0.00
		Horizontal	Max Tension	21	1565.03	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	1423.70	0.00	0.00
			Max. My	5	1193.93	0.00	-0.00
			Max. Vy	24	-7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	2	1211.50	0.00	0.00
			Max. Compression	4	-392.28	0.00	0.00
			Max. Mx	23	191.98	0.00	0.00
			Max. My	5	699.98	0.00	-0.00
			Max. Vy	23	7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	3	1689.47	0.00	0.00
			Max. Compression	6	-1264.33	0.00	0.00
			Max. Mx	17	712.41	0.00	0.00
			Max. My	5	670.98	0.00	-0.00
			Max. Vy	17	7.57	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T4	100 - 80	Leg	Max Tension	4	25465.75	-0.80	0.55
			Max. Compression	2	-70014.39	0.00	0.13
			Max. Mx	5	-55494.20	-0.99	-0.07
			Max. My	2	-60756.86	-0.06	1.01
			Max. Vy	5	1835.76	-0.99	-0.07
			Max. Vx	2	-1826.80	-0.06	1.01
		Diagonal	Max Tension	3	2570.58	0.00	0.00
			Max. Compression	3	-4269.40	0.00	0.00
			Max. Mx	6	-2202.14	-0.01	0.00
			Max. My	5	-3724.30	-0.00	0.00
			Max. Vy	21	7.70	-0.00	-0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Vx	5	2.93	0.00	0.00
		Horizontal	Max Tension	8	2944.17	0.00	0.00
			Max. Compression	2	-2723.16	0.00	0.00
			Max. Mx	24	1912.74	0.00	0.00
			Max. My	5	196.11	0.00	-0.00
			Max. Vy	24	-7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	2	1179.24	0.00	0.00
			Max. Compression	4	-447.92	0.00	0.00
			Max. Mx	17	344.47	0.00	0.00
			Max. My	5	324.41	0.00	-0.00
			Max. Vy	17	7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1145.17	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	434.26	0.00	0.00
			Max. My	5	876.02	0.00	-0.00
			Max. Vy	18	7.35	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Guy A	Bottom Tension	9	6748.26		
			Top Tension	9	6805.73		
			Top Cable Vert	9	5104.89		
			Top Cable Norm	9	4500.78		
			Top Cable Tan	9	33.04		
			Bot Cable Vert	9	-4966.74		
			Bot Cable Norm	9	4568.20		
			Bot Cable Tan	9	43.82		
		Guy B	Bottom Tension	11	7381.99		
			Top Tension	11	7446.13		
			Top Cable Vert	11	5841.99		
			Top Cable Norm	11	4616.78		
			Top Cable Tan	11	35.85		
			Bot Cable Vert	11	-5695.93		
			Bot Cable Norm	11	4695.53		
			Bot Cable Tan	11	45.99		
		Guy C	Bottom Tension	5	11365.64		
			Top Tension	5	11423.38		
			Top Cable Vert	5	10236.32		
			Top Cable Norm	5	5070.60		
			Top Cable Tan	5	13.04		
			Bot Cable Vert	5	-10126.09		
			Bot Cable Norm	5	5161.01		
			Bot Cable Tan	5	63.00		
		Top Guy Pull-Off	Max Tension	4	7298.54	0.00	0.00
			Max. Compression	6	-3501.80	0.00	0.00
			Max. Mx	17	3556.46	0.00	0.00
			Max. My	5	2049.52	0.00	-0.00
			Max. Vy	17	6.69	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Torque Arm Top	Max Tension	2	9795.27	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	16	6522.71	0.03	0.00
			Max. My	5	6933.10	0.00	-0.00
			Max. Vy	16	-32.38	0.00	0.00
			Max. Vx	5	0.10	0.00	0.00
		Torque Arm Bottom	Max Tension	2	3453.91	0.00	0.00
			Max. Compression	3	-11520.92	0.00	0.00
			Max. Mx	17	-3253.64	0.03	0.00
			Max. My	5	1492.14	0.00	0.00
			Max. Vy	17	-32.38	0.00	0.00
			Max. Vx	5	-0.04	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
T5	80 - 60	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	2	-49118.52	0.03	-0.08
			Max. Mx	11	-17987.30	-0.36	0.04
			Max. My	3	-9575.71	-0.01	-0.27
			Max. Vy	11	725.47	0.00	0.03
			Max. Vx	10	-553.97	0.03	-0.05
		Diagonal	Max Tension	4	1014.09	0.00	0.00
			Max. Compression	19	-1926.38	0.00	0.00
			Max. Mx	18	-563.34	-0.00	-0.00
			Max. My	5	-1687.50	0.00	0.00
			Max. Vy	18	7.49	-0.00	-0.00
			Max. Vx	5	1.60	0.00	0.00
		Horizontal	Max Tension	19	2426.44	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2324.59	0.00	0.00
			Max. My	5	1802.89	0.00	-0.00
			Max. Vy	24	-7.09	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	21	1193.68	0.00	0.00
			Max. Compression	10	-83.49	0.00	0.00
			Max. Mx	18	401.83	0.00	0.00
			Max. My	5	888.01	0.00	-0.00
			Max. Vy	18	7.09	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	20	1189.54	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	21	458.94	0.00	0.00
			Max. My	5	865.12	0.00	-0.00
			Max. Vy	21	7.09	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T6	60 - 40	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	15	-44160.37	-0.01	-0.07
			Max. Mx	5	-27600.36	-0.29	0.05
			Max. My	2	-32786.21	-0.02	0.28
			Max. Vy	5	-584.66	-0.29	0.05
			Max. Vx	3	476.33	-0.08	0.19
		Diagonal	Max Tension	10	1022.07	0.00	0.00
			Max. Compression	18	-2144.78	0.00	0.00
			Max. Mx	16	-542.44	-0.01	-0.00
			Max. My	5	-1181.40	0.00	0.00
			Max. Vy	16	7.74	-0.01	-0.00
			Max. Vx	5	1.15	0.00	0.00
		Horizontal	Max Tension	16	2718.54	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	2715.05	0.00	0.00
			Max. My	5	1789.77	0.00	-0.00
			Max. Vy	18	-6.77	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Top Girt	Max Tension	16	1182.80	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	21	400.09	0.00	0.00
			Max. My	5	886.03	0.00	-0.00
			Max. Vy	21	-6.77	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1388.52	0.00	0.00
			Max. Compression	12	-3.92	0.00	0.00
			Max. Mx	26	497.15	0.00	0.00
			Max. Vy	26	-6.77	0.00	0.00
			Max. Vx	11	-0.00	0.00	0.00
		Guy A	Bottom Tension	21	4340.80		
			Top Tension	21	4601.08		

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Top Cable Vert	21	2328.04		
			Top Cable Norm	21	3968.64		
			Top Cable Tan	21	2.16		
			Bot Cable Vert	21	-1741.10		
			Bot Cable Norm	21	3976.32		
			Bot Cable Tan	21	2.16		
		Guy B	Bottom Tension	25	4519.48		
			Top Tension	25	4835.22		
			Top Cable Vert	25	2821.63		
			Top Cable Norm	25	3926.55		
			Top Cable Tan	25	2.57		
			Bot Cable Vert	25	-2214.53		
			Bot Cable Norm	25	3939.75		
			Bot Cable Tan	25	2.57		
		Guy C	Bottom Tension	17	5334.49		
			Top Tension	17	5600.45		
			Top Cable Vert	17	3920.71		
			Top Cable Norm	17	3999.13		
			Top Cable Tan	17	0.78		
			Bot Cable Vert	17	-3510.47		
			Bot Cable Norm	17	4016.64		
			Bot Cable Tan	17	0.78		
		Top Guy Pull-Off	Max Tension	15	3799.96	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	15	2735.53	0.00	0.00
			Max. Vy	15	-6.12	0.00	0.00
			Max. Vx	5	0.00	0.00	0.00
T7	40 - 20	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-46138.88	-0.00	-0.11
			Max. Mx	5	-27641.14	0.29	0.05
			Max. My	3	-27135.08	0.08	-0.28
			Max. Vy	5	-580.39	0.00	0.05
			Max. Vx	3	466.77	0.00	-0.04
		Diagonal	Max Tension	3	797.33	0.00	0.00
			Max. Compression	15	-2186.42	0.00	0.00
			Max. Mx	21	-583.38	-0.01	-0.00
			Max. My	5	-1208.13	0.00	0.00
			Max. Vy	21	7.64	-0.01	-0.00
			Max. Vx	5	1.09	0.00	0.00
		Horizontal	Max Tension	15	2886.80	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	24	2766.46	0.00	0.00
			Max. Vy	24	-6.31	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Top Girt	Max Tension	20	1342.30	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	26	482.26	0.00	0.00
			Max. Vy	26	-6.31	0.00	0.00
			Max. Vx	10	0.00	0.00	0.00
		Bottom Girt	Max Tension	15	1424.19	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	472.23	0.00	0.00
			Max. Vy	18	-6.31	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
T8	20 - 5.25	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	20	-46336.63	-0.00	0.07
			Max. Mx	15	-45188.97	0.26	0.11
			Max. My	20	-45143.44	-0.00	-0.25
			Max. Vy	26	-3397.02	0.26	0.11
			Max. Vx	20	4535.32	-0.00	-0.25
		Diagonal	Max Tension	7	507.49	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
			Max. Compression	15	-2185.09	0.00	0.00
			Max. Mx	20	348.15	-0.00	0.00
			Max. My	5	-539.42	0.00	0.00
			Max. Vy	20	6.82	-0.00	0.00
			Max. Vx	5	0.74	0.00	0.00
		Horizontal	Max Tension	15	2896.13	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	22	2626.47	0.00	0.00
			Max. My	11	1506.17	0.00	-0.00
			Max. Vy	22	5.63	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Top Girt	Max Tension	15	1401.97	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	18	515.93	0.00	0.00
			Max. Vy	18	5.63	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Bottom Girt	Max Tension	16	3297.29	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	2946.34	0.00	0.00
			Max. My	11	1796.51	0.00	-0.00
			Max. Vy	14	5.63	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
T9	5.25 - 0	Leg	Max Tension	1	0.00	0.00	0.00
			Max. Compression	19	-46040.44	-0.02	-0.00
			Max. Mx	15	-45246.48	0.28	-0.04
			Max. My	18	-44539.45	0.27	0.04
			Max. Vy	15	3357.39	-0.00	-0.01
			Max. Vx	15	272.89	-0.01	0.01
		Diagonal	Max Tension	1	0.00	0.00	0.00
			Max. Compression	16	-3650.77	0.00	0.00
			Max. Mx	5	-2403.50	0.00	-0.00
			Max. My	18	-2477.36	-0.00	0.00
			Max. Vy	5	4.65	0.00	0.00
			Max. Vx	5	0.75	0.00	0.00
		Horizontal	Max Tension	18	3052.39	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	3013.35	0.00	0.00
			Max. Vy	14	3.18	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00
		Top Girt	Max Tension	16	3472.83	0.00	0.00
			Max. Compression	1	0.00	0.00	0.00
			Max. Mx	14	2951.40	0.00	0.00
			Max. My	11	1893.37	0.00	-0.00
			Max. Vy	14	-4.56	0.00	0.00
			Max. Vx	11	0.00	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Mast	Max. Vert	16	134171.61	104.14	-18.71
	Max. H_x	11	73362.44	749.08	-3.62
	Max. H_z	2	92623.75	64.04	622.78
	Max. M_x	1	0.00	37.45	-15.05
	Max. M_z	1	0.00	37.45	-15.05
	Max. Torsion	1	0.00	37.45	-15.05

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
	Min. Vert	28	58481.79	-34.14	121.15
	Min. H_x	5	89120.82	-599.60	1.40
	Min. H_z	8	69554.99	39.56	-757.08
	Min. M_x	1	0.00	37.45	-15.05
	Min. M_z	1	0.00	37.45	-15.05
	Min. Torsion	1	0.00	37.45	-15.05
Guy C @ 45 ft Elev 9 ft Azimuth 240 deg	Max. Vert	10	-4295.04	-1688.50	972.58
	Max. H_x	10	-4295.04	-1688.50	972.58
	Max. H_z	3	-53226.08	-20646.78	12324.20
	Min. Vert	3	-53226.08	-20646.78	12324.20
	Min. H_x	5	-52805.51	-20857.48	11684.55
	Min. H_z	10	-4295.04	-1688.50	972.58
Guy B @ 79 ft Elev 0 ft Azimuth 120 deg	Max. Vert	6	-2053.90	1429.95	827.72
	Max. H_x	11	-32971.04	20906.35	11789.41
	Max. H_z	12	-32715.10	20834.43	12055.81
	Min. Vert	11	-32971.04	20906.35	11789.41
	Min. H_x	6	-2053.90	1429.95	827.72
	Min. H_z	6	-2053.90	1429.95	827.72
Guy A @ 79 ft Elev 10 ft Azimuth 0 deg	Max. Vert	2	-1490.78	-1.87	-1399.98
	Max. H_x	11	-16758.60	531.54	-13460.24
	Max. H_z	2	-1490.78	-1.87	-1399.98
	Min. Vert	8	-30718.50	-15.84	-24834.51
	Min. H_x	5	-15752.33	-578.10	-12804.77
	Min. H_z	8	-30718.50	-15.84	-24834.51

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x kip-ft	Overturning Moment, M_z kip-ft	Torque kip-ft
Dead Only	58717.97	-37.45	15.05	0.00	0.00	0.00
1.2 Dead+1.6 Wind 0 deg - No Ice+1.0 Guy	92623.75	-64.04	-622.78	0.00	0.00	0.00
1.2 Dead+1.6 Wind 30 deg - No Ice+1.0 Guy	90867.78	283.54	-530.90	0.00	0.00	0.00
1.2 Dead+1.6 Wind 60 deg - No Ice+1.0 Guy	79968.89	547.15	-341.09	0.00	0.00	0.00
1.2 Dead+1.6 Wind 90 deg - No Ice+1.0 Guy	89120.82	599.60	-1.40	0.00	0.00	0.00
1.2 Dead+1.6 Wind 120 deg - No Ice+1.0 Guy	89727.25	503.37	356.26	0.00	0.00	0.00
1.2 Dead+1.6 Wind 150 deg - No Ice+1.0 Guy	79638.73	290.78	644.28	0.00	0.00	0.00
1.2 Dead+1.6 Wind 180 deg - No Ice+1.0 Guy	69554.99	-39.56	757.08	0.00	0.00	0.00
1.2 Dead+1.6 Wind 210 deg - No Ice+1.0 Guy	73217.78	-390.55	648.94	0.00	0.00	0.00
1.2 Dead+1.6 Wind 240 deg - No Ice+1.0 Guy	76946.29	-640.68	367.28	0.00	0.00	0.00
1.2 Dead+1.6 Wind 270 deg - No Ice+1.0 Guy	73362.44	-749.08	3.62	0.00	0.00	0.00

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	kip-ft	kip-ft	kip-ft
1.2 Dead+1.6 Wind 300 deg - No Ice+1.0 Guy	69127.09	-666.95	-356.00	0.00	0.00	0.00
1.2 Dead+1.6 Wind 330 deg - No Ice+1.0 Guy	81412.71	-408.68	-571.47	0.00	0.00	0.00
1.2 Dead+1.0 Ice+1.0 Temp+Guy	132116.79	-156.20	117.24	0.00	0.00	0.00
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp+1.0 Guy	133811.44	-160.37	4.77	0.00	0.00	0.00
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp+1.0 Guy	134171.61	-104.14	18.71	0.00	0.00	0.00
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp+1.0 Guy	134091.36	-60.50	61.71	0.00	0.00	0.00
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp+1.0 Guy	133875.61	-44.70	121.55	0.00	0.00	0.00
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp+1.0 Guy	133329.58	-61.79	176.98	0.00	0.00	0.00
1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp+1.0 Guy	132349.32	-99.61	215.66	0.00	0.00	0.00
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp+1.0 Guy	131612.53	-155.38	227.72	0.00	0.00	0.00
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp+1.0 Guy	131445.63	-213.43	212.74	0.00	0.00	0.00
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp+1.0 Guy	131501.43	-254.04	174.34	0.00	0.00	0.00
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp+1.0 Guy	131593.28	-266.83	119.49	0.00	0.00	0.00
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp+1.0 Guy	131921.78	-251.05	61.36	0.00	0.00	0.00
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp+1.0 Guy	132803.29	-212.90	19.72	0.00	0.00	0.00
Dead+Wind 0 deg - Service+Guy	58496.34	-41.80	-143.87	0.00	0.00	0.00
Dead+Wind 30 deg - Service+Guy	58481.79	34.14	-121.15	0.00	0.00	0.00
Dead+Wind 60 deg - Service+Guy	58549.11	90.93	-61.72	0.00	0.00	0.00
Dead+Wind 90 deg - Service+Guy	58626.36	113.08	18.19	0.00	0.00	0.00
Dead+Wind 120 deg - Service+Guy	58752.49	91.64	94.97	0.00	0.00	0.00
Dead+Wind 150 deg - Service+Guy	58943.28	38.53	150.30	0.00	0.00	0.00
Dead+Wind 180 deg - Service+Guy	59132.07	-35.42	169.30	0.00	0.00	0.00
Dead+Wind 210 deg - Service+Guy	59237.04	-110.14	147.11	0.00	0.00	0.00
Dead+Wind 240 deg - Service+Guy	59215.39	-165.40	89.67	0.00	0.00	0.00
Dead+Wind 270 deg - Service+Guy	59078.41	-186.59	12.08	0.00	0.00	0.00
Dead+Wind 300 deg - Service+Guy	58861.25	-168.19	-65.15	0.00	0.00	0.00
Dead+Wind 330 deg - Service+Guy	58637.52	-115.09	-121.08	0.00	0.00	0.00

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
1	-0.00	-15211.21	0.00	-0.49	15211.20	-0.71	0.006%
2	202.01	-18011.57	-20292.45	-201.67	18011.47	20290.80	0.006%
3	10264.96	-17905.05	-17713.35	-10264.66	17904.97	17711.90	0.005%
4	17615.68	-17826.34	-10345.08	-17616.06	17826.33	10344.18	0.004%
5	20217.32	-17890.61	-188.57	-20215.89	17890.52	188.97	0.005%
6	17190.31	-17985.54	9866.24	-17188.83	17985.46	-9865.82	0.006%
7	9788.92	-17981.57	17266.01	-9787.76	17981.51	-17265.70	0.004%
8	-202.01	-17980.45	20081.45	202.74	17980.44	-20081.45	0.003%
9	-10159.45	-18086.96	17530.61	10158.57	18086.92	-17530.18	0.004%
10	-17432.94	-18165.68	10239.58	17431.97	18165.62	-10239.09	0.004%
11	-20006.31	-18101.41	188.57	20005.26	18101.35	-188.03	0.004%
12	-17190.31	-18006.47	-9866.24	17190.69	18006.46	9865.58	0.003%
13	-9788.92	-18010.45	-17266.01	9789.22	18010.38	17264.61	0.005%
14	0.00	-76499.82	0.00	0.18	76499.81	-0.19	0.000%
15	73.78	-76511.85	-4839.38	-73.69	76511.82	4838.77	0.001%
16	2519.32	-76432.91	-4256.59	-2519.19	76432.89	4256.06	0.001%
17	4319.19	-76374.58	-2501.32	-4318.96	76374.56	2501.08	0.000%
18	4940.25	-76423.76	-63.58	-4939.88	76423.75	63.59	0.000%
19	4212.40	-76495.19	2354.48	-4212.00	76495.17	-2354.38	0.001%
20	2374.62	-76490.68	4133.13	-2373.94	76490.65	-4132.94	0.001%
21	-73.78	-76487.80	4835.65	74.12	76487.79	-4835.52	0.000%
22	-2517.45	-76566.74	4253.36	2517.79	76566.72	-4253.24	0.000%
23	-4315.96	-76625.07	2499.46	4315.99	76625.05	-2499.59	0.000%
24	-4936.51	-76575.88	63.58	4936.49	76575.86	-64.17	0.001%
25	-4212.40	-76504.46	-2354.48	4212.42	76504.44	2353.95	0.001%
26	-2374.62	-76508.97	-4133.13	2374.67	76508.95	4132.71	0.001%
27	41.23	-15214.38	-4141.32	-40.84	15214.39	4140.77	0.004%
28	2094.89	-15192.65	-3614.97	-2094.49	15192.65	3614.71	0.003%
29	3595.04	-15176.58	-2111.24	-3594.47	15176.58	2110.95	0.004%
30	4125.98	-15189.70	-38.48	-4125.54	15189.70	38.31	0.003%
31	3508.23	-15209.07	2013.52	-3507.53	15209.08	-2013.58	0.004%
32	1997.74	-15208.26	3523.68	-1997.52	15208.26	-3523.63	0.001%
33	-41.23	-15208.03	4098.25	41.35	15208.03	-4098.17	0.001%
34	-2073.35	-15229.77	3577.68	2073.34	15229.77	-3577.58	0.001%
35	-3557.74	-15245.84	2089.71	3557.64	15245.83	-2089.65	0.001%
36	-4082.92	-15232.72	38.48	4082.81	15232.72	-38.51	0.001%
37	-3508.23	-15213.34	-2013.52	3508.19	15213.34	2013.40	0.001%
38	-1997.74	-15214.16	-3523.68	1997.85	15214.16	3523.17	0.003%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	13	0.00000001	0.00004847
2	Yes	26	0.00007952	0.00007316
3	Yes	26	0.00006876	0.00006446
4	Yes	22	0.00007357	0.00004974
5	Yes	25	0.00007071	0.00006869
6	Yes	25	0.00007734	0.00007150
7	Yes	23	0.00008831	0.00006491
8	Yes	17	0.00000001	0.00004535
9	Yes	18	0.00000001	0.00006663
10	Yes	19	0.00000001	0.00006542
11	Yes	18	0.00000001	0.00007750
12	Yes	18	0.00000001	0.00004872
13	Yes	24	0.00009525	0.00007125

14	Yes	17	0.00000001	0.00004768
15	Yes	18	0.00000001	0.00004847
16	Yes	18	0.00000001	0.00004446
17	Yes	18	0.00000001	0.00003682
18	Yes	18	0.00000001	0.00003875
19	Yes	18	0.00000001	0.00004014
20	Yes	17	0.00000001	0.00006259
21	Yes	17	0.00000001	0.00004944
22	Yes	16	0.00000001	0.00008325
23	Yes	16	0.00000001	0.00007699
24	Yes	16	0.00000001	0.00008282
25	Yes	17	0.00000001	0.00005440
26	Yes	18	0.00000001	0.00003945
27	Yes	11	0.00000001	0.00009200
28	Yes	12	0.00000001	0.00005046
29	Yes	12	0.00000001	0.00006174
30	Yes	12	0.00000001	0.00005136
31	Yes	11	0.00000001	0.00009648
32	Yes	12	0.00000001	0.00004166
33	Yes	12	0.00000001	0.00004668
34	Yes	12	0.00000001	0.00005391
35	Yes	12	0.00000001	0.00005863
36	Yes	12	0.00000001	0.00005636
37	Yes	12	0.00000001	0.00004942
38	Yes	11	0.00000001	0.00009989

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	2.732	29	0.1089	0.0114
T2	140 - 120	2.500	29	0.0919	0.0082
T3	120 - 100	2.050	29	0.1627	0.0350
T4	100 - 80	1.243	29	0.1626	0.0370
T5	80 - 60	0.743	29	0.0973	0.1021
T6	60 - 40	0.391	29	0.0673	0.1833
T7	40 - 20	0.219	29	0.0298	0.2378
T8	20 - 5.25	0.151	27	0.0255	0.2689
T9	5.25 - 0	0.050	32	0.0414	0.2773

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	6' x 3" Dia Omni	29	2.732	0.1089	0.0114	20165
148.50	12.5' x 2 Std. Horz. Pipe	29	2.696	0.1048	0.0090	20165
147.00	AIR6449	29	2.659	0.1009	0.0068	20165
145.50	12.5' x 2 Std. Horz. Pipe	29	2.624	0.0974	0.0050	20165
136.00	Guy	29	2.421	0.0984	0.0117	12876
126.00	HPA-65R-BUU-H6	29	2.218	0.1386	0.0283	10584
113.00	MX08FRO665-21	29	1.782	0.1763	0.0346	17715
96.00	Guy	29	1.111	0.1506	0.0449	9182
95.00	8' dipole antenna	29	1.082	0.1472	0.0474	9786

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
50.00	Guy	29	0.283	0.0432	0.2140	27077

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
T1	150 - 140	19.153	3	1.2720	0.1024
T2	140 - 120	16.534	3	1.1875	0.1376
T3	120 - 100	11.709	3	1.3171	0.2863
T4	100 - 80	5.936	3	1.1621	0.3416
T5	80 - 60	2.534	3	0.5511	0.6680
T6	60 - 40	1.087	17	0.2257	1.0644
T7	40 - 20	0.824	12	0.1035	1.3316
T8	20 - 5.25	0.743	12	0.1020	1.4859
T9	5.25 - 0	0.244	12	0.2018	1.5272

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
150.00	6' x 3" Dia Omni	3	19.153	1.2720	0.1024	4094
148.50	12.5' x 2 Std. Horz. Pipe	3	18.750	1.2549	0.1058	4094
147.00	AIR6449	3	18.347	1.2384	0.1095	4094
145.50	12.5' x 2 Std. Horz. Pipe	3	17.948	1.2231	0.1137	4094
136.00	Guy	3	15.575	1.1911	0.1669	3410
126.00	HPA-65R-BUU-H6	3	13.245	1.2665	0.2542	3162
113.00	MX08FRO665-21	3	9.667	1.3304	0.2843	6009
96.00	Guy	3	5.021	1.0542	0.3849	1408
95.00	8' dipole antenna	3	4.814	1.0240	0.3980	1458
50.00	Guy	4	0.839	0.1307	1.2147	6031

Bolt Design Data

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T1	150	Leg	A325N	0.6250	4	5569.69	24850.50	0.224 ✔	1	Bolt DS
T2	140	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T3	120	Leg	A325N	0.6250	4	5222.50	24850.50	0.210 ✔	1	Bolt DS
T4	100	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T5	80	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T6	60	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS

Section No.	Elevation ft	Component Type	Bolt Grade	Bolt Size in	Number Of Bolts	Maximum Load per Bolt lb	Allowable Load per Bolt lb	Ratio Load / Allowable	Allowable Ratio	Criteria
T7	40	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS
T8	20	Leg	A325N	0.6250	4	0.00	24850.50	0.000 ✔	1	Bolt DS

Guy Design Data

Section No.	Elevation ft	Size	Initial Tension lb	Breaking Load lb	Actual T_u lb	Allowable ϕT_n lb	Required S.F.	Actual S.F.
T2	136.00 (A) (712)	5/8 EHS	4240.00	42399.99	11883.10	25440.00	1.000	2.141 ✔
	136.00 (A) (713)	5/8 EHS	4240.00	42399.99	11511.60	25440.00	1.000	2.210 ✔
	136.00 (B) (706)	5/8 EHS	4240.00	42399.99	12021.90	25440.00	1.000	2.116 ✔
	136.00 (B) (707)	5/8 EHS	4240.00	42399.99	12285.30	25440.00	1.000	2.071 ✔
	136.00 (C) (698)	5/8 EHS	4240.00	42399.99	17523.10	25440.00	1.000	1.452 ✔
	136.00 (C) (699)	5/8 EHS	4240.00	42399.99	17696.30	25440.00	1.000	1.438 ✔
T4	96.00 (A) (732)	9/16 EHS	3500.00	35000.04	6805.73	21000.00	1.000	3.086 ✔
	96.00 (A) (733)	9/16 EHS	3500.00	35000.04	6664.55	21000.00	1.000	3.151 ✔
	96.00 (B) (726)	9/16 EHS	3500.00	35000.04	7098.03	21000.00	1.000	2.959 ✔
	96.00 (B) (727)	9/16 EHS	3500.00	35000.04	7446.13	21000.00	1.000	2.820 ✔
	96.00 (C) (718)	9/16 EHS	3500.00	35000.04	11423.40	21000.00	1.000	1.838 ✔
	96.00 (C) (719)	9/16 EHS	3500.00	35000.04	11248.80	21000.00	1.000	1.867 ✔
T6	50.00 (A) (742)	1/2 EHS	2690.00	26900.04	4601.08	16140.00	1.000	3.508 ✔
	50.00 (B) (741)	1/2 EHS	2690.00	26900.04	4835.22	16140.00	1.000	3.338 ✔
	50.00 (C) (738)	1/2 EHS	2690.00	26900.04	5600.45	16140.00	1.000	2.882 ✔

Compression Checks

Leg Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $P_u / \phi P_n$
T1	150 - 140	1 3/4	10.00	1.58	43.4 K=1.00	2.4053	1.00	-24498.90	94294.90	0.260 [1] ✔

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	Mast Stability Index	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.93	-40433.80	87674.20	0.461 [1] ✔
T3	120 - 100	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.95	-60748.70	89958.70	0.675 [1] ✔
T4	100 - 80	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.92	-70014.40	86577.40	0.809 [1] ✔
T5	80 - 60	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.88	-49118.50	83062.80	0.591 [1] ✔
T6	60 - 40	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.69	-44160.40	65458.90	0.675 [1] ✔
T7	40 - 20	1 3/4	20.00	1.58	43.4 K=1.00	2.4053	0.70	-46138.90	65876.70	0.700 [1] ✔
T8	20 - 5.25	1 3/4	14.75	1.57	43.2 K=1.00	2.4053	0.70	-46336.60	65822.60	0.704 [1] ✔
T9	5.25 - 0	1 3/4	5.32	2.08	57.1 K=1.00	2.4053	0.77	-46040.40	65241.00	0.706 [1] ✔

[1] P_u / ϕP_n controls

Diagonal Design Data (Compression)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2946.44	6906.26	0.427 [1] ✔
T2	140 - 120	5/8	2.18	0.98	83.2 K=1.10	0.3068	-5759.31	6906.26	0.834 [1] ✔
T3	120 - 100	5/8	2.18	0.98	83.2 K=1.10	0.3068	-4165.23	6906.26	0.603 [1] ✔
T4	100 - 80	5/8	2.18	0.98	83.2 K=1.10	0.3068	-4269.40	6906.26	0.618 [1] ✔
T5	80 - 60	5/8	2.18	0.98	83.2 K=1.10	0.3068	-1926.38	6906.26	0.279 [1] ✔
T6	60 - 40	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2144.78	6906.26	0.311 [1] ✔
T7	40 - 20	5/8	2.18	0.98	83.2 K=1.10	0.3068	-2186.42	6906.26	0.317 [1] ✔
T8	20 - 5.25	5/8	2.17	0.98	82.9 K=1.10	0.3068	-2185.09	6921.74	0.316 [1] ✔
T9	5.25 - 0	5/8	1.76	0.96	81.4 K=1.10	0.3068	-3650.77	7010.43	0.521 [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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-422.79	12110.70	0.035 [1] ✔
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-4406.75	12110.70	0.364 [1] ✔
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1011.84	12110.70	0.084 [1] ✔
T4	100 - 80	3/4	1.50	1.35	82.3 K=0.95	0.4418	-2723.16	12110.70	0.225 [1] ✔
T5	80 - 60	3/4	1.50	1.35	82.3 K=0.95	0.4418	-819.25	12110.70	0.068 [1] ✔
T6	60 - 40	3/4	1.50	1.35	82.3 K=0.95	0.4418	-764.88	12110.70	0.063 [1] ✔
T7	40 - 20	3/4	1.50	1.35	82.3 K=0.95	0.4418	-798.73	12110.70	0.066 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	82.3 K=0.95	0.4418	-798.74	12110.70	0.066 [1] ✔
T9	5.25 - 0	3/4	1.03	0.89	56.7 K=1.00	0.4418	-805.48	15716.10	0.051 [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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-48.46	12110.70	0.004 [1] ✔
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1014.89	12110.70	0.084 [1] ✔
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1052.20	12110.70	0.087 [1] ✔
T4	100 - 80	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1212.68	12110.70	0.100 [1] ✔
T5	80 - 60	3/4	1.50	1.35	82.3 K=0.95	0.4418	-850.76	12110.70	0.070 [1] ✔
T6	60 - 40	3/4	1.50	1.35	82.3 K=0.95	0.4418	-764.88	12110.70	0.063 [1] ✔
T7	40 - 20	3/4	1.50	1.35	82.3 K=0.95	0.4418	-799.15	12110.70	0.066 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	82.3 K=0.95	0.4418	-802.57	12110.70	0.066 [1] ✔
T9	5.25 - 0	3/4	1.48	1.33	81.9 K=0.96	0.4418	-805.48	12179.90	0.066 [1] ✔

[1] P_u / ϕP_n controls

Bottom Girt Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T1	150 - 140	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1215.36	12110.70	0.100 [1] ✔
T2	140 - 120	3/4	1.50	1.35	82.3 K=0.95	0.4418	-700.33	12110.70	0.058 [1] ✔
T3	120 - 100	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1264.33	12110.70	0.104 [1] ✔
T4	100 - 80	3/4	1.50	1.35	82.3 K=0.95	0.4418	-1212.68	12110.70	0.100 [1] ✔
T5	80 - 60	3/4	1.50	1.35	82.3 K=0.95	0.4418	-850.76	12110.70	0.070 [1] ✔
T6	60 - 40	3/4	1.50	1.35	82.3 K=0.95	0.4418	-764.88	12110.70	0.063 [1] ✔
T7	40 - 20	3/4	1.50	1.35	82.3 K=0.95	0.4418	-799.15	12110.70	0.066 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	82.3 K=0.95	0.4418	-802.57	12110.70	0.066 [1] ✔

[1] $P_u / \phi P_n$ controls

Top Guy Pull-Off Design Data (Compression)

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T2	140 - 120	5/8	1.50	1.35	104.0 K=1.00	0.3068	-4666.92	5624.79	0.830 [1] ✔
T4	100 - 80	5/8	1.50	1.35	104.0 K=1.00	0.3068	-3501.80	5624.79	0.623 [1] ✔

[1] $P_u / \phi P_n$ controls

Torque-Arm Bottom Design Data

Section No.	Elevation	Size	L	L_u	Kl/r	A	P_u	ϕP_n	Ratio $\frac{P_u}{\phi P_n}$
	ft		ft	ft		in^2	lb	lb	
T2	140 - 120 (704)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-18461.90	49126.40	0.376 [1] ✔
T2	140 - 120 (705)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11998.00	49126.40	0.244 [1] ✔
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-12024.70	49126.40	0.245 [1] ✔
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6	1.7040	-16847.00	49126.40	0.343 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (716)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-13469.90	49126.40	0.274 [1] ✔
T2	140 - 120 (717)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11962.40	49126.40	0.244 [1] ✔
T4	100 - 80 (724)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-11520.90	49126.40	0.235 [1] ✔
T4	100 - 80 (725)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-6797.65	49126.40	0.138 [1] ✔
T4	100 - 80 (730)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-6251.86	49126.40	0.127 [1] ✔
T4	100 - 80 (731)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-9860.97	49126.40	0.201 [1] ✔
T4	100 - 80 (736)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-7459.07	49126.40	0.152 [1] ✔
T4	100 - 80 (737)	P2.5x.203	3.36	3.28	41.6 K=1.00	1.7040	-6604.01	49126.40	0.134 [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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	1 3/4	10.00	1.58	43.4	1.2339	22278.80	60150.90	0.370 [1 #] ✔
T2	140 - 120	1 3/4	20.00	1.58	43.4	2.4053	25383.30	108238.00	0.235 [1 #] ✔
T3	120 - 100	1 3/4	20.00	1.58	43.4	1.2339	20890.00	60150.90	0.347 [1 #] ✔
T4	100 - 80	1 3/4	20.00	1.58	43.4	2.4053	25465.80	108238.00	0.235 [1 #] ✔

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

Diagonal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	5/8	2.18	0.98	75.6	0.3068	2941.95	9940.20	0.296 [1]

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	2.18	0.98	75.6	0.3068	4934.64	9940.20	0.496 [1]
T3	120 - 100	5/8	2.18	0.98	75.6	0.3068	3310.39	9940.20	0.333 [1]
T4	100 - 80	5/8	2.18	0.98	75.6	0.3068	2570.58	9940.20	0.259 [1]
T5	80 - 60	5/8	2.18	0.98	75.6	0.3068	1014.09	9940.20	0.102 [1]
T6	60 - 40	5/8	2.18	0.98	75.6	0.3068	1022.07	9940.20	0.103 [1]
T7	40 - 20	5/8	2.18	0.98	75.6	0.3068	797.33	9940.20	0.080 [1]
T8	20 - 5.25	5/8	2.17	0.98	75.4	0.3068	507.49	9940.20	0.051 [1]

[1] P_u / ϕP_n controls

Horizontal Design Data (Tension)

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	506.80	19880.40	0.025 [1]
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	2623.27	19880.40	0.132 [1]
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1565.03	19880.40	0.079 [1]
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	2944.17	19880.40	0.148 [1]
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	2426.44	19880.40	0.122 [1]
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	2718.54	19880.40	0.137 [1]
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	2886.80	19880.40	0.145 [1]
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	2896.13	19880.40	0.146 [1]
T9	5.25 - 0	3/4	1.03	0.89	56.7	0.4418	3052.39	19880.40	0.154 [1]

[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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	49.43	19880.40	0.002 [1] ✔
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	714.29	19880.40	0.036 [1] ✔
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1211.50	19880.40	0.061 [1] ✔
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	1212.68	19880.40	0.061 [1] ✔
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1193.68	19880.40	0.060 [1] ✔
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1182.80	19880.40	0.059 [1] ✔
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1342.30	19880.40	0.068 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	1401.97	19880.40	0.071 [1] ✔
T9	5.25 - 0	3/4	1.48	1.33	85.1	0.4418	3472.83	19880.40	0.175 [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 lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T1	150 - 140	3/4	1.50	1.35	86.7	0.4418	1142.20	19880.40	0.057 [1] ✔
T2	140 - 120	3/4	1.50	1.35	86.7	0.4418	720.06	19880.40	0.036 [1] ✔
T3	120 - 100	3/4	1.50	1.35	86.7	0.4418	1689.47	19880.40	0.085 [1] ✔
T4	100 - 80	3/4	1.50	1.35	86.7	0.4418	1212.68	19880.40	0.061 [1] ✔
T5	80 - 60	3/4	1.50	1.35	86.7	0.4418	1189.54	19880.40	0.060 [1] ✔
T6	60 - 40	3/4	1.50	1.35	86.7	0.4418	1388.52	19880.40	0.070 [1] ✔
T7	40 - 20	3/4	1.50	1.35	86.7	0.4418	1424.19	19880.40	0.072 [1] ✔
T8	20 - 5.25	3/4	1.50	1.35	86.7	0.4418	3297.29	19880.40	0.166 [1] ✔

[1] P_u / ϕP_n controls

Top Guy Pull-Off Design Data (Tension)

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120	5/8	1.50	1.35	104.0	0.3068	7555.58	9940.20	0.760 [1] ✔
T4	100 - 80	5/8	1.50	1.35	104.0	0.3068	7298.54	9940.20	0.734 [1] ✔
T6	60 - 40	5/8	1.50	1.35	104.0	0.3068	3799.96	9940.20	0.382 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Top Design Data

Section No.	Elevation (ft)	Size	L (ft)	L_u (ft)	Kl/r	A (in^2)	P_u (lb)	ϕP_n (lb)	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (700)	P2.5x.203	3.66	3.58	45.3	1.7040	16996.10	53677.60	0.317 [1] ✔
T2	140 - 120 (701)	P2.5x.203	3.66	3.58	45.3	1.7040	11780.60	53677.60	0.219 [1] ✔
T2	140 - 120 (708)	P2.5x.203	3.66	3.58	45.3	1.7040	12973.90	53677.60	0.242 [1] ✔
T2	140 - 120 (709)	P2.5x.203	3.66	3.58	45.3	1.7040	17179.20	53677.60	0.320 [1] ✔
T2	140 - 120 (714)	P2.5x.203	3.66	3.58	45.3	1.7040	12067.90	53677.60	0.225 [1] ✔
T2	140 - 120 (715)	P2.5x.203	3.66	3.58	45.3	1.7040	11446.90	53677.60	0.213 [1] ✔
T4	100 - 80 (720)	P2.5x.203	3.66	3.58	45.3	1.7040	9031.19	53677.60	0.168 [1] ✔
T4	100 - 80 (721)	P2.5x.203	3.66	3.58	45.3	1.7040	9163.72	53677.60	0.171 [1] ✔
T4	100 - 80 (728)	P2.5x.203	3.66	3.58	45.3	1.7040	9426.16	53677.60	0.176 [1] ✔
T4	100 - 80 (729)	P2.5x.203	3.66	3.58	45.3	1.7040	9795.27	53677.60	0.182 [1] ✔
T4	100 - 80 (734)	P2.5x.203	3.66	3.58	45.3	1.7040	7025.77	53677.60	0.131 [1] ✔
T4	100 - 80 (735)	P2.5x.203	3.66	3.58	45.3	1.7040	7491.59	53677.60	0.140 [1] ✔

[1] P_u / ϕP_n controls

Torque-Arm Bottom Design Data

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

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T2	140 - 120 (704)	P2.5x.203	3.36	3.28	41.6	1.7040	2301.35	53677.60	0.043 [1] ✔
T2	140 - 120 (705)	P2.5x.203	3.36	3.28	41.6	1.7040	3363.26	53677.60	0.063 [1] ✔
T2	140 - 120 (710)	P2.5x.203	3.36	3.28	41.6	1.7040	1649.80	53677.60	0.031 [1] ✔
T2	140 - 120 (711)	P2.5x.203	3.36	3.28	41.6	1.7040	1822.07	53677.60	0.034 [1] ✔
T2	140 - 120 (716)	P2.5x.203	3.36	3.28	41.6	1.7040	3030.68	53677.60	0.056 [1] ✔
T2	140 - 120 (717)	P2.5x.203	3.36	3.28	41.6	1.7040	4459.30	53677.60	0.083 [1] ✔
T4	100 - 80 (724)	P2.5x.203	3.36	3.28	41.6	1.7040	2018.36	53677.60	0.038 [1] ✔
T4	100 - 80 (725)	P2.5x.203	3.36	3.28	41.6	1.7040	3362.19	53677.60	0.063 [1] ✔
T4	100 - 80 (730)	P2.5x.203	3.36	3.28	41.6	1.7040	1923.79	53677.60	0.036 [1] ✔
T4	100 - 80 (731)	P2.5x.203	3.36	3.28	41.6	1.7040	1197.79	53677.60	0.022 [1] ✔
T4	100 - 80 (736)	P2.5x.203	3.36	3.28	41.6	1.7040	2683.69	53677.60	0.050 [1] ✔
T4	100 - 80 (737)	P2.5x.203	3.36	3.28	41.6	1.7040	3453.91	53677.60	0.064 [1] ✔

[1] P_u / ϕP_n controls

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T1	150 - 140	Leg	1 3/4	1	22278.80	60150.90	37.0	Pass
T2	140 - 120	Leg	1 3/4	51	-40433.80	87674.20	46.1	Pass
T3	120 - 100	Leg	1 3/4	145	-60748.70	89958.70	67.5	Pass
T4	100 - 80	Leg	1 3/4	237	-70014.40	86577.40	80.9	Pass
T5	80 - 60	Leg	1 3/4	329	-49118.50	83062.80	59.1	Pass
T6	60 - 40	Leg	1 3/4	420	-44160.40	65458.90	67.5	Pass
T7	40 - 20	Leg	1 3/4	513	-46138.90	65876.70	70.0	Pass
T8	20 - 5.25	Leg	1 3/4	605	-46336.60	65822.60	70.4	Pass
T9	5.25 - 0	Leg	1 3/4	676	-46040.40	65241.00	70.6	Pass
T1	150 - 140	Diagonal	5/8	14	-2946.44	6906.26	42.7	Pass
T2	140 - 120	Diagonal	5/8	123	-5759.31	6906.26	83.4	Pass
T3	120 - 100	Diagonal	5/8	153	-4165.23	6906.26	60.3	Pass
T4	100 - 80	Diagonal	5/8	325	-4269.40	6906.26	61.8	Pass
T5	80 - 60	Diagonal	5/8	337	-1926.38	6906.26	27.9	Pass
T6	60 - 40	Diagonal	5/8	428	-2144.78	6906.26	31.1	Pass
T7	40 - 20	Diagonal	5/8	520	-2186.42	6906.26	31.7	Pass
T8	20 - 5.25	Diagonal	5/8	668	-2185.09	6921.74	31.6	Pass
T9	5.25 - 0	Diagonal	5/8	683	-3650.77	7010.43	52.1	Pass
T1	150 - 140	Horizontal	3/4	16	-422.79	12110.70	3.5	Pass
T2	140 - 120	Horizontal	3/4	122	-4406.75	12110.70	36.4	Pass
T3	120 - 100	Horizontal	3/4	165	-1011.84	12110.70	8.4	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
T4	100 - 80	Horizontal	3/4	306	-2723.16	12110.70	22.5	Pass
T5	80 - 60	Horizontal	3/4	342	2426.44	19880.40	12.2	Pass
T6	60 - 40	Horizontal	3/4	434	2718.54	19880.40	13.7	Pass
T7	40 - 20	Horizontal	3/4	526	2886.80	19880.40	14.5	Pass
T8	20 - 5.25	Horizontal	3/4	667	2896.13	19880.40	14.6	Pass
T9	5.25 - 0	Horizontal	3/4	691	3052.39	19880.40	15.4	Pass
T1	150 - 140	Top Girt	3/4	5	-48.46	12110.70	0.4	Pass
T2	140 - 120	Top Girt	3/4	55	-1014.89	12110.70	8.4	Pass
T3	120 - 100	Top Girt	3/4	147	-1052.20	12110.70	8.7	Pass
T4	100 - 80	Top Girt	3/4	239	-1212.68	12110.70	10.0	Pass
T5	80 - 60	Top Girt	3/4	331	-850.76	12110.70	7.0	Pass
T6	60 - 40	Top Girt	3/4	422	-764.88	12110.70	6.3	Pass
T7	40 - 20	Top Girt	3/4	514	1342.30	19880.40	6.8	Pass
T8	20 - 5.25	Top Girt	3/4	606	1401.97	19880.40	7.1	Pass
T9	5.25 - 0	Top Girt	3/4	677	3472.83	19880.40	17.5	Pass
T1	150 - 140	Bottom Girt	3/4	7	-1215.36	12110.70	10.0	Pass
T2	140 - 120	Bottom Girt	3/4	59	-700.33	12110.70	5.8	Pass
T3	120 - 100	Bottom Girt	3/4	151	-1264.33	12110.70	10.4	Pass
T4	100 - 80	Bottom Girt	3/4	242	-1212.68	12110.70	10.0	Pass
T5	80 - 60	Bottom Girt	3/4	334	-850.76	12110.70	7.0	Pass
T6	60 - 40	Bottom Girt	3/4	425	1388.52	19880.40	7.0	Pass
T7	40 - 20	Bottom Girt	3/4	517	1424.19	19880.40	7.2	Pass
T8	20 - 5.25	Bottom Girt	3/4	609	3297.29	19880.40	16.6	Pass
T2	140 - 120	Guy A@136	5/8	712	11883.10	25440.00	46.7	Pass
T4	100 - 80	Guy A@96	9/16	732	6805.73	21000.00	32.4	Pass
T6	60 - 40	Guy A@50	1/2	742	4601.08	16140.00	28.5	Pass
T2	140 - 120	Guy B@136	5/8	707	12285.30	25440.00	48.3	Pass
T4	100 - 80	Guy B@96	9/16	727	7446.13	21000.00	35.5	Pass
T6	60 - 40	Guy B@50	1/2	741	4835.22	16140.00	30.0	Pass
T2	140 - 120	Guy C@136	5/8	699	17696.30	25440.00	69.6	Pass
T4	100 - 80	Guy C@96	9/16	718	11423.40	21000.00	54.4	Pass
T6	60 - 40	Guy C@50	1/2	738	5600.45	16140.00	34.7	Pass
T2	140 - 120	Top Guy Pull-Off@136	5/8	702	-4666.92	5624.79	83.0	Pass
T4	100 - 80	Top Guy Pull-Off@96	5/8	722	7298.54	9940.20	73.4	Pass
T6	60 - 40	Top Guy Pull-Off@50	5/8	469	3799.96	9940.20	38.2	Pass
T2	140 - 120	Torque Arm Top@136	P2.5x.203	709	17179.20	53677.60	32.0	Pass
T4	100 - 80	Torque Arm Top@96	P2.5x.203	729	9795.27	53677.60	18.2	Pass
T2	140 - 120	Torque Arm Bottom@136	P2.5x.203	704	-18461.90	49126.40	37.6	Pass
T4	100 - 80	Torque Arm Bottom@96	P2.5x.203	724	-11520.90	49126.40	23.5	Pass

Summary		
Leg (T4)	80.9	Pass
Diagonal (T2)	83.4	Pass
Horizontal (T2)	36.4	Pass
Top Girt (T9)	17.5	Pass
Bottom Girt (T8)	16.6	Pass
Guy A (T2)	46.7	Pass
Guy B (T2)	48.3	Pass
Guy C (T2)	69.6	Pass
Top Guy Pull-Off (T2)	83.0	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
						Torque Arm Top (T2)	32.0	Pass
						Torque Arm Bottom (T2)	37.6	Pass
						Bolt Checks	22.4	Pass
						RATING =	**83.4**	**Pass**

RF DESIGN SHEET

Issue Date	6/11/2021
Revision	1

RFDS Status	Preliminary
Created By	Charles, Bossener [Outlook]

SITE INFORMATION	
DISH Site Number	BOBDL00101A
DISH Site Name	0
Prequal Asset ID	CT-CLE-T-CT01
AOI	Hartford-East Hartford-Springfield
PEA	1
Latitude	41.860556
Longitude	-72.403333
Address	497 Old Post Road
City	Tolland
State	CT
ZIP Code	06084
County	Tolland
Centerline RC (ft.)	113
RAD Confirmed	***No Confirmed RAD***
Structure Type	Guyed

PROJECT ASSIGNMENTS	
Market Manager	Michael Lawton
Site Development Mgr.	Jean Cottrell
RF Engineer	Bossener Charles
Site Acq Specialist/Develop. Cord.	April Parrott /
SAQ Vendor/A&E Vendor	Northeast Site Solutions, LLC / Northeast Site Solutions, LLC
Asset Owner/Asset #	Clearview Tower Company / CT01
Construction Mgr. (Lead/Field)	Javier Soto /
Contractor (General/Tower/Civil)	/ /
Power Company / Fiber Provider	/ Crown Castle

EMERGENCY CONTACT INFORMATION	
Name	Temporary Emergency Line
Phone	866-624-6874

LEASE AREA	
Dimensions (ft.)	5x7
Type	Steel Platform
Baseband Cabinet	EnerSys(Purcell)-HVAC
Dimensions (in)	32" x 30" x 73"
Baseband	gNB-CU
Generator Required	No
Make/Model	

DESIGN COMMENTS

This RFDS is preliminary and for planning purposes only.Once site design complete and antenna center line is confirmed please request Final RFD from Dish Market RF.

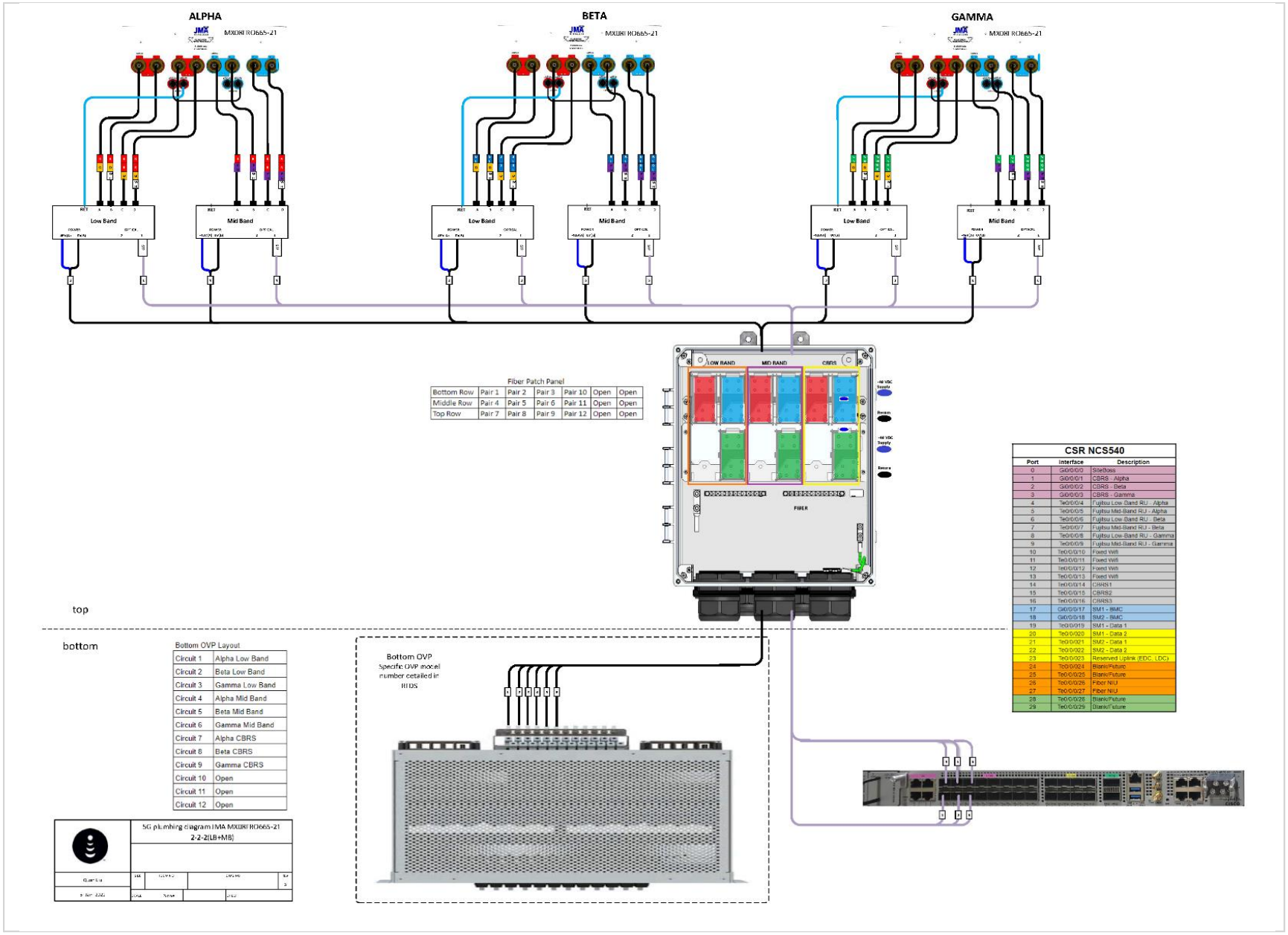
RF EQUIPMENT INFORMATION

Issue Date/Revision	6/11/2021 **Revision:** 1	**Latitude**	41.860556 **Longitude** -72.403333
Site ID	BOBDL00101A	**Prequal Asset ID**	CT-CLE-T-CT01
Site Address	497 Old Post Road, Tolland CT 06084	**SOW / RF Comments**	Dish proposes to place 3 antennas, 6 RRUs, 1 junction box(s), and 1 cable(s) at the 113 foot RAD. Dish will require a 5x7 lease area for ground equipment. This RFDS is preliminary and for planning purposes only.Once site design complete and antenna
Structure Type	Guyed		
sectors >20' apart?	No ***Confirmed RAD?*** ***No Confirmed RAD*** 113		

	Sector 1 (alpha)			Sector 2 (beta)			Sector 3 (gamma)		
ANTENNA									
Antenna #	1	4	7	2	5	8	3	6	9
Manufacturer	JMA			JMA			JMA		
Model Number	MX08FRO665-21			MX08FRO665-21			MX08FRO665-21		
Dimensions H x W x D (in)	72.0" x 20.0" x 8.0"			72.0" x 20.0" x 8.0"			72.0" x 20.0" x 8.0"		
Weight (lbs.)	64.5			64.5			64.5		
TX Power Output (watts)	40000			40000			40000		
ERP (dBm)	76.02			76.02			76.02		
RAD Centerline Height (ft.)	113			113			113		
Azimuths (True North)	0°			120°			240°		
Mech Down Tilt	0			0			0		
Default Mount	Generic								
LOW BAND/RADIO #1									
Manufacturer	Fujitsu			Fujitsu			Fujitsu		
Model Number	TA08025-B605			TA08025-B605			TA08025-B605		
Dimensions H x W x D (in.)	15.75" x 14.96" x 9.06"			15.75" x 14.96" x 9.06"			15.75" x 14.96" x 9.06"		
Weight (lbs.)	74.95			74.95			74.95		
Location	Antenna			Antenna			Antenna		
Technology	n71 | |			n71 | |			n71 | |		
Quantity	1			1			1		
Port Assignment	Port 1-4			Port 1-4			Port 1-4		
Elec Down Tilt	2			2			2		
MID BAND/RADIO #2									
Manufacturer	Fujitsu			Fujitsu			Fujitsu		
Model Number	TA08025-B604			TA08025-B604			TA08025-B604		
Dimensions H x W x D (in)	15.75" x 14.96" x 7.87"			15.75" x 14.96" x 7.87"			15.75" x 14.96" x 7.87"		
Weight (lbs.)	63.93			63.93			63.93		
Location	Antenna			Antenna			Antenna		
Quantity	1			1			1		
Technology	n70 |n66			n70 |n66			n70 |n66		
Port Assignment	Port 5-8			Port 5-8			Port 5-8		
Elec Down Tilt	4			4			4		
OVP (Junction Box)									
Manufacturer	Raycap								
Model Number	RDIDC-9181-PF-48								
Dimensions H x W x D (in.)	16" x 14" x 8"								
Weight (lbs.)	21.85								
Quantity	1								
LINE DETAILS									
Line Type	Hybrid								
Manufacturer	Cables Unlimited								
Model Number	CU12PSM9P6XXX_6AWG								
Diameter (O.D. in.)	1.60"								
Weight (lbs. per ft.)	2.346 lbs/ft								
Quantity	1								
Approx. Cable Length	143								
OTHER EQUIPMENT									
Type of Equipment									
Manufacturer									
Model Number									
Dimensions H x W x D (in)									
Weight (lbs.)									
Equipment Location									
Quantity									

Frequencies	**n29**	**n66**	**n70**	**n71**
Downlink (TX)	0 - 0	2180 - 2200	1995 - 2020	632 - 652
Uplink (RX)	-	-	1915 - 1920	678 - 698

PLUMBING DIAGRAM



Fiber Patch Panel

Bottom Row	Pair 1	Pair 2	Pair 3	Pair 10	Open	Open
Middle Row	Pair 4	Pair 5	Pair 6	Pair 11	Open	Open
Top Row	Pair 7	Pair 8	Pair 9	Pair 12	Open	Open

Bottom OVP Layout

Circuit 1	Alpha Low Band
Circuit 2	Beta Low Band
Circuit 3	Gamma Low Band
Circuit 4	Alpha Mid Band
Circuit 5	Beta Mid Band
Circuit 6	Gamma Mid Band
Circuit 7	Alpha CBRS
Circuit 8	Beta CBRS
Circuit 9	Gamma CBRS
Circuit 10	Open
Circuit 11	Open
Circuit 12	Open

5G plumbing diagram | MA MXORIRO665-21
2-2-2(LB+MB)

CSR NCS540

Port	Interface	Description
0	Gi0/0/0/0	SiteBoss
1	Gi0/0/0/1	CBRS - Alpha
2	Gi0/0/0/2	CBRS - Beta
3	Gi0/0/0/3	CBRS - Gamma
4	Te0/0/0/4	Fujitsu Low Band RU - Alpha
5	Te0/0/0/5	Fujitsu Mid-Band RU - Alpha
6	Te0/0/0/6	Fujitsu Low Band RU - Beta
7	Te0/0/0/7	Fujitsu Mid-Band RU - Beta
8	Te0/0/0/8	Fujitsu Low-Band RU - Gamma
9	Te0/0/0/9	Fujitsu Mid-Band RU - Gamma
10	Te0/0/0/10	Fixed Wifi
11	Te0/0/0/11	Fixed Wifi
12	Te0/0/0/12	Fixed Wifi
13	Te0/0/0/13	Fixed Wifi
14	Te0/0/0/14	CRAN1
15	Te0/0/0/15	CBRS2
16	Te0/0/0/16	CRAN3
17	Gi0/0/0/17	SM1 - BMC
18	Gi0/0/0/18	SM2 - BMC
19	Te0/0/0/19	SM1 - Data 1
20	Te0/0/0/20	SM1 - Data 2
21	Te0/0/0/21	SM2 - Data 1
22	Te0/0/0/22	SM2 - Data 2
23	Te0/0/0/23	Reserved Uplink (EDC, LDC)
24	Te0/0/0/24	Blank/Future
25	Te0/0/0/25	Blank/Future
26	Te0/0/0/26	Fiber NIU
27	Te0/0/0/27	Fiber NIU
28	Te0/0/0/28	Blank/Future
29	Te0/0/0/29	Blank/Future

RF COLOR CODING

Exhibit E

Mount Analysis

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1033 WATERVLIET SHAKER RD, ALBANY, NY 12205

Mount Analysis Report

August 3, 2021

Dish Wireless Site Number	BOBDL00101A
Infinigy Job Number	1197-F0001-C
Client	Northeast Site Solutions
Carrier	Dish Wireless
Site Location	497 Old Post Road, Tolland, CT 06084 41.860556 N NAD83 72.403333 W NAD83
Mount Centerline EL.	113 ft
Mount Classification	Sector Frame
Structural Usage Ratio	**63%**
Overall Result	**Pass**

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA and ASCE code requirements. The proposed mounts for the proposed carrier is therefore deemed **adequate** to support the final loading configuration as listed in this report.

08-03-21
Dmitriy Albul, P.E.
Engineering Consultant to Infinigy

Contents

Introduction

Infinigy Engineering has been requested to perform a mount analysis of proposed antenna mount from the Dish Wireless equipment. All supporting documents have been obtained from the client and are assumed to be accurate and applicable to this site. The mount was analyzed using RISA-3D Version 19.0 analysis software.

Supporting Documentation

Mount Details	Mount Specification Commscope MTC3975083
Construction Drawings	Infinigy Engineering PLLC, Job No. 1197-F0001-C, dated June 18, 2021
RF Design Sheet	Dish Wireless, dated June 11, 2021

Analysis Code Requirements

Wind Speed	125 mph (3-second Gust, Vult.)
Wind Speed w/ ice	50 mph (3-Second Gust) w/ 1" ice
TIA Revision	ANSI/TIA-222-G / 2018 Connecticut State Building Code (2015 IBC)
Structure Class	II
Exposure Category	B
Topographic Method	Method 2
Topographic Category	1
Spectral Response	Ss=0.175, S_1=0.064
Site Class	D – Stiff Soil
HMSL	892.76 ft.

Conclusion

Upon reviewing the results of this analysis, it is our opinion that the structure meets the specified TIA code requirements. The proposed mounts are therefore deemed adequate to support the final loading configuration as listed in this report.

If you have any questions, require additional information, or actual conditions differ from those as detailed in this report please contact me via the information below:

Dmitriy Albul, P.E.
Professional Engineer | Engineering Consultant to Infinigy
1033 Watervliet Shaker Road, Albany, NY 12205
(O) (518) 690-0790 | (M) (518) 699-4428
www.infinigy.com

Final Configuration Loading

Mount CL (ft)	Rad. HT (ft)	Vert. O/S (ft)	Horiz. O/S (ft)*	Qty	Appurtenance	Carrier
113.0	113.0	-	7.75	3	JMA MX08FRO665-20	Dish Wireless
			7.75	3	Fujitsu TA08025-B605	
			7.75	3	Fujitsu TA08025-B604	
			-	1	Raycap RDIDC-9181-PF-48	

***Horizontal Offset is defined as the distance from the left most edge of the mount face horizontal when viewed facing the tower.**

Structure Usages

Bracing	63%	Pass
Plates	19%	Pass
Arms	17%	Pass
Frame Rails	16%	Pass
Mount Pipes	14%	Pass
Connections	7%	Pass
Stabilizer	4%	Pass
Rating	**63%**	Pass

Assumptions and Limitations

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

Our evaluation is completed using standard TIA, AISC, ACI, and ASCE methods and procedures. Our structural results are proprietary and should not be used by others as their own. Infinigy Engineering is not responsible for decisions made by others that are or are not based on our supplied assumptions and conclusions.

This report is an evaluation of the proposed carriers mount structure only and does not reflect adequacy of the existing tower, other mounts, or coax mounting attachments. These elements are assumed to be adequate for the purposes of this analysis and are assumed to have been installed per their manufacturer requirements.

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Date:	7/30/2021
Site Name:	BOBDL00101A
Project Engineer:	DVA
Project No:	1197-F0001-C
Customer:	Northeast Site Solutions
Carrier:	Dish Wireless

Building Code:	2015	
ASCE Standard:	ASCE 7-10	
TIA Standard:	G	
Mount Type:	Sector Frame	
	Proposed	
Mount Centerline:	113	ft
Superstructure Height:	N/A	ft
Structure Type:	Tower	

Factors	
Gh:	1.000
K_{zmin}:	0.700
K_z:	1.023
K_d:	0.950
K_{zt}:	1.000
Ka:	0.900
I wind:	1.000
I ice:	1.000

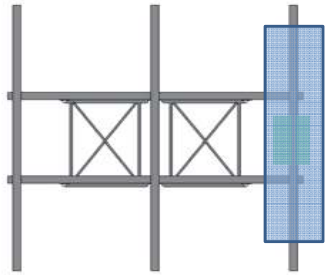
q_z:	23.33	psf
Surface Wind Pressure:	0.00	psf

Site Information		
Exposure Category:	B	
Risk Category:	II	
Ultimate Wind Speed:	125	mph
Design Wind Speed:	97	mph
Ice Thickness:	1.00	in
Ice Wind Speed:	50.0	mph
Escalated Ice Thickness:	2.26	in
Topographic Method:	2	
Topographic Category:	1	

Run Seismic?	Yes
Site Soil:	D (Default)
Short-Period Accel. (Ss):	0.1750
1-Second Accel. (S1):	0.0640
Short-Period Design (SDS):	0.1880
1-Second Design (SD1):	0.1020
Short-Period Coeff. (Fa):	1.6000
1-Second Coeff. (Fv):	2.4000
Cs	0.0940
Cs min	0.0300
Amplification Factor (ap):	1.00
Response Mod. (Rp):	2.50
Overstrength (Ωo):	1.00

Service Wind:	30.0	mph
Lm (man live load) =	500.0	lb
Lv (man live load) =	250.0	lb

ELEVATION VIEW



PLAN VIEW

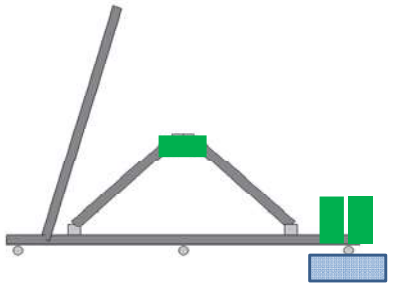


Table 1. Equipment Specifications and Wind Pressure

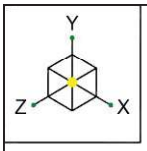
Manufacturer	Model	Elevation	Pipe Label	Weight (lb)	Height (in)	Width (in)	Depth (in)	EPA_N	EPA_T	$EPA_{N\ w/\ ice}$	$EPA_{T\ w/\ ice}$	q_z:	$q_{z\ ice}$:	$q_{z\ live}$:
JMA	MX08FRO665-20	113	16	64.50	72	20	8	8.01	3.21	9.08	4.15	23.33	6.22	2.24
Fujitsu	TA08025-B605	113	16	74.95	15.75	14.96	9.06	1.86	1.16	3.11	2.21	23.33	6.22	2.24
Fujitsu	TA08025-B604	113	16	63.93	15.75	14.96	8.87	1.86	1.13	3.11	2.18	23.33	6.22	2.24
Raycap	RDIDC-9181-PF-48	113		21.85	18.98	14.39	8.15	2.18	1.28	3.53	2.42	23.33	6.22	2.24

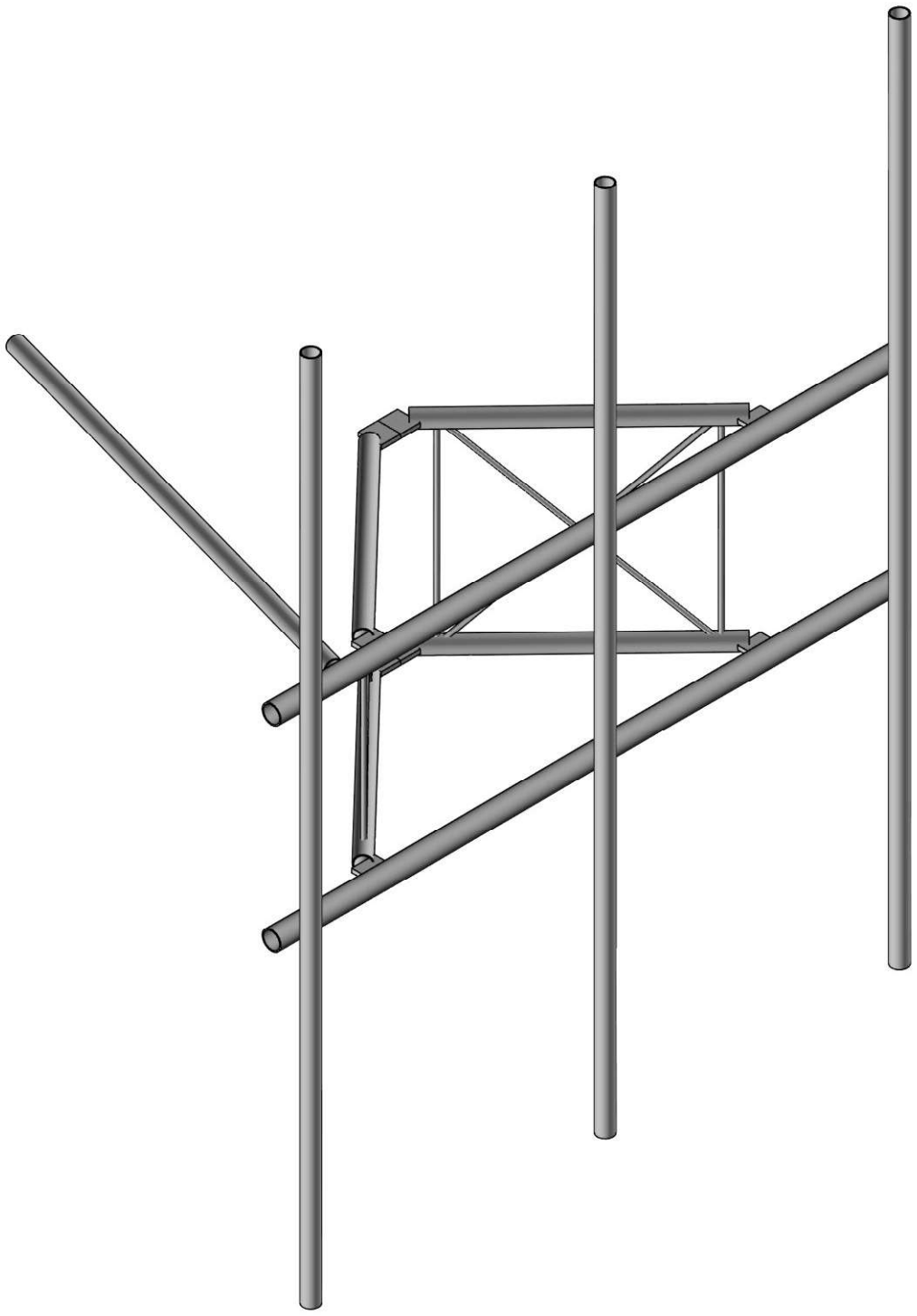
Table 2. Equipment Wind and Seismic Loads

Manufacturer	Model	Wind Load (F_A), lb		Wind Load Ice Case (F_A), lb			Wind Load Service Case		Seismic
JMA	MX08FRO665-20	168	67	51	23	403	16	6	6.1
Fujitsu	TA08025-B605	39	24	17	12	73	4	2	7.0
Fujitsu	TA08025-B604	39	24	17	12	73	4	2	6.0
Raycap	RDIDC-9181-PF-48	46	27	20	14	84	4	3	2.1

Table 3. Member Capacities

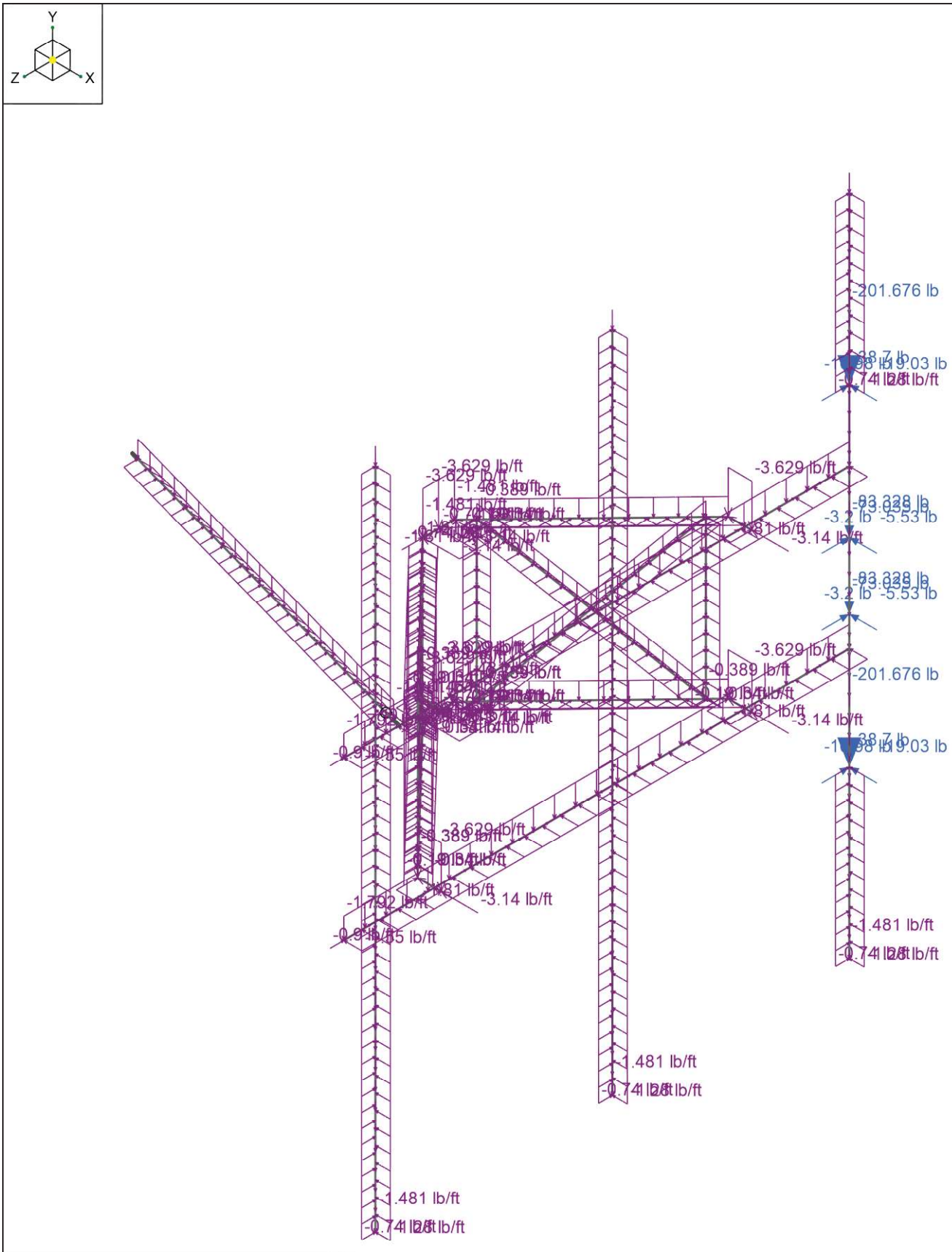
Member Name	Member Shape	Wind load (plf)	Wind Load Ice (plf)	Weight Ice (plf)	Bending Check	Shear Check	Total Capacity	Controlling Capacity
Frame Rail	PIPE_2.5	6.72	1.79	1.74	16%	10%	16%	63%
Mount Pipe	PIPE_2.0	5.55	1.48	1.62	14%	6%	14%	
Arm	PIPE_2.0	5.55	1.48	1.62	17%	8%	17%	
Bracing	0.625" SR	1.46	0.39	1.21	63%	2%	63%	
Plate	3.5"x0.625" Plate	13.61	3.63	1.89	19%	16%	19%	
Stabilizer	PIPE_2.0	5.55	1.48	1.62	4%	1%	4%	





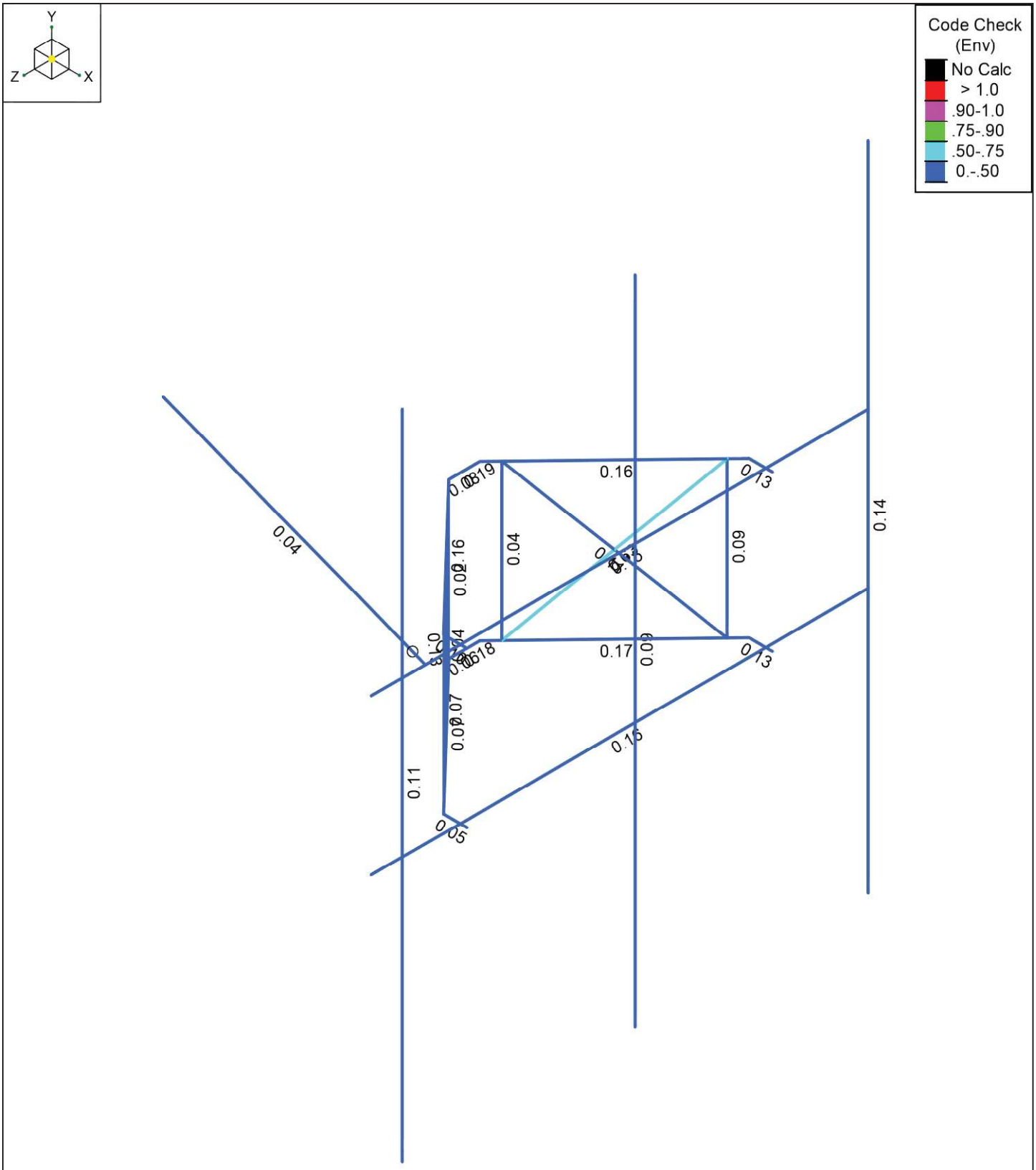
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00101A	SK-1
DVA		Jul 30, 2021
1197-F0001-C	Proposed Configuration Model	BOBDL00101A.R3D



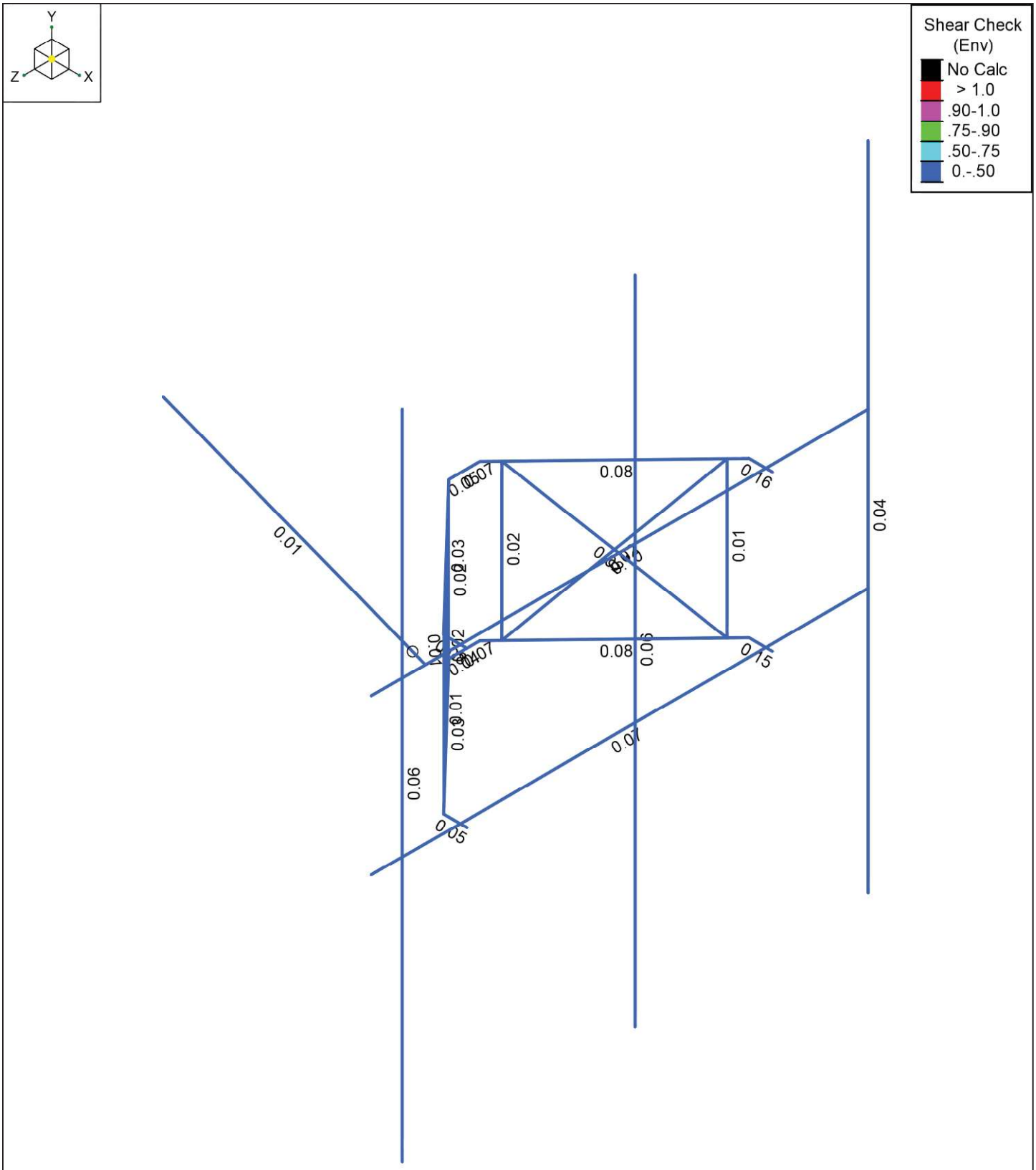
Loads: LC 28, 1.2D + 1.0Di +1.0Wi AZI 30
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00101A	SK-2
DVA		Jul 30, 2021
1197-F0001-C	Controlling Load Case	BOBDL00101A.R3D



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00101A	SK-3
DVA		Jul 30, 2021
1197-F0001-C	Member Bending Check	BOBDL00101A.R3D



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

Infinigy Engineering, PLLC	BOBDL00101A	SK-4
DVA		Jul 30, 2021
1197-F0001-C	Member Shear Check	BOBDL00101A.R3D

Model Settings

Solution

Members

Number of Reported Sections	5
Number of Internal Sections	100
Member Area Load Mesh Size (in^2)	144
Consider Shear Deformation	Yes
Consider Torsional Warping	Yes

Wall Panels

Approximate Mesh Size (in)	24
Transfer Forces Between Intersecting Wood Walls	Yes
Increase Wood Wall Nailing Capacity for Wind Loads	Yes
Include P-Delta for Walls	Yes
Optimize Masonry and Wood Walls	Yes
Maximum Number of Iterations	3

Processor Core Utilization

Single	No
Multiple (Optimum)	Yes
Maximum	No

Axis

Vertical Global Axis

Global Axis corresponding to vertical direction	Y
Convert Existing Data	Yes

Default Member Orientation

Default Global Plane for z-axis	XZ

Plate Axis

Plate Local Axis Orientation	Nodal

Codes

Hot Rolled Steel	AISC 14th (360-10): LRFD
Stiffness Adjustment	Yes (Iterative)
Notional Annex	None
Connections	AISC 14th (360-10): LRFD
Cold Formed Steel	AISI S100-12: LRFD
Stiffness Adjustment	Yes (Iterative)
Wood	AWC NDS-12: ASD
Temperature	< 100F
Concrete	ACI 318-11
Masonry	ACI 530-11: Strength
Aluminum	AA ADM1-10: LRFD
Structure Type	Building
Stiffness Adjustment	Yes (Iterative)
Stainless	AISC 14th (360-10): LRFD
Stiffness Adjustment	Yes (Iterative)

Concrete

Column Design

Analysis Methodology	Exact Integration Method
Parme Beta Factor	0.65

Compression Stress Block	Rectangular Stress Block
Analyze using Cracked Sections	Yes
Leave room for horizontal rebar splices (2*d bar spacing)	No

Model Settings (Continued)

List forces which were ignored for design in the Detail Report	Yes

Rebar

Column Min Steel	1
Column Max Steel	8
Rebar Material Spec	ASTM A615
Warn if beam-column framing arrangement is not understood	No

Shear Reinforcement

Number of Shear Regions	4
Region 2 & 3 Spacing Increase Increment (in)	4

Seismic

RISA-3D Seismic Load Options

Code	ASCE 7-10
Risk Category	I or II
Drift Cat	Other
Base Elevation (ft)	
Include the weight of the structure in base shear calcs	Yes

Site Parameters

S_1 (g)	1
SD_1 (g)	1
SD_S (g)	1
T_L (sec)	5

Structure Characteristics

T Z (sec)	
T X (sec)	
C_tX	0.02
C_tExp. Z	0.75
C_tExp. X	0.75
R Z	3
R X	3
Ω_0Z	1
Ω_0X	1
C_dZ	4
C_dX	4
ρ Z	1
ρ X	1

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N1	N2		Frame Rail	Beam	Pipe	A53 Gr.B	Typical
2	M2	N11	N3	90	Plate	Beam	RECT	A36 Gr.36	Typical
3	M3	N13	N5	90	Plate	Beam	RECT	A36 Gr.36	Typical
4	M4	N29	N3		Arm	Beam	Pipe	A53 Gr.B	Typical
5	M5	N27	N5		Arm	Beam	Pipe	A53 Gr.B	Typical
6	M6	N6	N7		Frame Rail	Beam	Pipe	A53 Gr.B	Typical
7	M7	N17	N8	90	Plate	Beam	RECT	A36 Gr.36	Typical
8	M8	N15	N10	90	Plate	Beam	RECT	A36 Gr.36	Typical
9	M9	N30	N8		Arm	Beam	Pipe	A53 Gr.B	Typical
10	M10	N28	N10		Arm	Beam	Pipe	A53 Gr.B	Typical
11	M11	N11	N12		RIGID	None	None	RIGID	Typical
12	M12	N13	N14		RIGID	None	None	RIGID	Typical
13	M13	N15	N16		RIGID	None	None	RIGID	Typical
14	M14	N17	N18		RIGID	None	None	RIGID	Typical
15	M15	N20	N19		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
16	M16	N22	N21		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
17	M17	N30	N9	90	Plate	Beam	RECT	A36 Gr.36	Typical
18	M18	N29	N4	90	Plate	Beam	RECT	A36 Gr.36	Typical
19	M19	N9	N28	90	Plate	Beam	RECT	A36 Gr.36	Typical
20	M20	N4	N27	90	Plate	Beam	RECT	A36 Gr.36	Typical
21	M21	N25	N33		RIGID	None	None	RIGID	Typical
22	M22	N23	N31		RIGID	None	None	RIGID	Typical
23	M23	N24	N32		RIGID	None	None	RIGID	Typical
24	M24	N26	N34		RIGID	None	None	RIGID	Typical
25	M25	N39	N40		Bracing	VBrace	BAR	A36 Gr.36	Typical
26	M26	N38	N35		Bracing	VBrace	BAR	A36 Gr.36	Typical
27	M27	N37	N36		Bracing	VBrace	BAR	A36 Gr.36	Typical
28	M28	N41	N42		Bracing	VBrace	BAR	A36 Gr.36	Typical
29	M29	N39	N35		Bracing	VBrace	BAR	A36 Gr.36	Typical
30	M30	N40	N38		Bracing	VBrace	BAR	A36 Gr.36	Typical
31	M31	N37	N42		Bracing	VBrace	BAR	A36 Gr.36	Typical
32	M32	N36	N41		Bracing	VBrace	BAR	A36 Gr.36	Typical
33	M33	N51	N52		Stabilizer	HBrace	Pipe	A53 Gr.B	Typical
34	M34	N46	N45		Mount Pipe	Column	Pipe	A53 Gr.B	Typical
35	M35	N48	N50		RIGID	None	None	RIGID	Typical
36	M36	N47	N49		RIGID	None	None	RIGID	Typical

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[LB]
1	General Members				
2	RIGID		10	23	0
3	Total General		10	23	0
4					
5	Hot Rolled Steel				
6	A36 Gr.36	0.625" SR	8	291.9	25.396
7	A36 Gr.36	3.5"x0.625" Plate	8	30	18.609
8	A53 Gr.B	PIPE_2.0	8	594.9	172.079
9	A53 Gr.B	PIPE_2.5	2	192	87.656
10	Total HR Steel		26	1108.9	303.739

Basic Load Cases

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Point	Distributed
1	Self Weight	DL		-1		6	
2	Wind Load AZI 0	WLX				12	74
3	Wind Load AZI 30	None				12	74
4	Wind Load AZI 60	None				12	74
5	Wind Load AZI 90	WLZ				12	74

Basic Load Cases (Continued)

	BLC Description	Category	X Gravity	Y Gravity	Z Gravity	Point	Distributed
6	Wind Load AZI 120	None				12	74
7	Wind Load AZI 150	None				12	74
8	Wind Load AZI 180	None				12	74
9	Wind Load AZI 210	None				12	74
10	Wind Load AZI 240	None				12	74
11	Wind Load AZI 270	None				12	74
12	Wind Load AZI 300	None				12	74
13	Wind Load AZI 330	None				12	74
14	Ice Weight	OL1				6	36
15	Ice Wind Load AZI 0	OL2				12	74
16	Ice Wind Load AZI 30	None				12	74
17	Ice Wind Load AZI 60	None				12	74
18	Ice Wind Load AZI 90	OL3				12	74
19	Ice Wind Load AZI 120	None				12	74
20	Ice Wind Load AZI 150	None				12	74
21	Ice Wind Load AZI 180	None				12	74
22	Ice Wind Load AZI 210	None				12	74
23	Ice Wind Load AZI 240	None				12	74
24	Ice Wind Load AZI 270	None				12	74
25	Ice Wind Load AZI 300	None				12	74
26	Ice Wind Load AZI 330	None				12	74
27	Seismic Load X	ELX			-0.094	6	
28	Seismic Load Z	ELZ	-0.094			6	
29	Service Live Loads	LL					
30	Maintenance Load 1	LL				1	
31	Maintenance Load 2	LL				1	
32	Maintenance Load 3	LL				1	
33	Maintenance Load 4	LL				1	
34	Maintenance Load 5	LL				1	
35	Maintenance Load 6	LL				1	

Load Combinations

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4DL	Yes	Y	1	1.4				
2	1.2DL + 1.6WL AZI 0	Yes	Y	1	1.2	2	1.6		
3	1.2DL + 1.6WL AZI 30	Yes	Y	1	1.2	3	1.6		
4	1.2DL + 1.6WL AZI 60	Yes	Y	1	1.2	4	1.6		
5	1.2DL + 1.6WL AZI 90	Yes	Y	1	1.2	5	1.6		
6	1.2DL + 1.6WL AZI 120	Yes	Y	1	1.2	6	1.6		
7	1.2DL + 1.6WL AZI 150	Yes	Y	1	1.2	7	1.6		
8	1.2DL + 1.6WL AZI 180	Yes	Y	1	1.2	8	1.6		
9	1.2DL + 1.6WL AZI 210	Yes	Y	1	1.2	9	1.6		
10	1.2DL + 1.6WL AZI 240	Yes	Y	1	1.2	10	1.6		
11	1.2DL + 1.6WL AZI 270	Yes	Y	1	1.2	11	1.6		
12	1.2DL + 1.6WL AZI 300	Yes	Y	1	1.2	12	1.6		
13	1.2DL + 1.6WL AZI 330	Yes	Y	1	1.2	13	1.6		
14	0.9DL + 1.6WL AZI 0	Yes	Y	1	0.9	2	1.6		
15	0.9DL + 1.6WL AZI 30	Yes	Y	1	0.9	3	1.6		
16	0.9DL + 1.6WL AZI 60	Yes	Y	1	0.9	4	1.6		
17	0.9DL + 1.6WL AZI 90	Yes	Y	1	0.9	5	1.6		
18	0.9DL + 1.6WL AZI 120	Yes	Y	1	0.9	6	1.6		
19	0.9DL + 1.6WL AZI 150	Yes	Y	1	0.9	7	1.6		
20	0.9DL + 1.6WL AZI 180	Yes	Y	1	0.9	8	1.6		
21	0.9DL + 1.6WL AZI 210	Yes	Y	1	0.9	9	1.6		
22	0.9DL + 1.6WL AZI 240	Yes	Y	1	0.9	10	1.6		
23	0.9DL + 1.6WL AZI 270	Yes	Y	1	0.9	11	1.6		
24	0.9DL + 1.6WL AZI 300	Yes	Y	1	0.9	12	1.6		
25	0.9DL + 1.6WL AZI 330	Yes	Y	1	0.9	13	1.6		

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor
26	1.2D + 1.0Di	Yes	Y	1	1.2	14	1		
27	1.2D + 1.0Di +1.0Wi AZI 0	Yes	Y	1	1.2	14	1	15	1
28	1.2D + 1.0Di +1.0Wi AZI 30	Yes	Y	1	1.2	14	1	16	1
29	1.2D + 1.0Di +1.0Wi AZI 60	Yes	Y	1	1.2	14	1	17	1
30	1.2D + 1.0Di +1.0Wi AZI 90	Yes	Y	1	1.2	14	1	18	1
31	1.2D + 1.0Di +1.0Wi AZI 120	Yes	Y	1	1.2	14	1	19	1
32	1.2D + 1.0Di +1.0Wi AZI 150	Yes	Y	1	1.2	14	1	20	1
33	1.2D + 1.0Di +1.0Wi AZI 180	Yes	Y	1	1.2	14	1	21	1
34	1.2D + 1.0Di +1.0Wi AZI 210	Yes	Y	1	1.2	14	1	22	1
35	1.2D + 1.0Di +1.0Wi AZI 240	Yes	Y	1	1.2	14	1	23	1
36	1.2D + 1.0Di +1.0Wi AZI 270	Yes	Y	1	1.2	14	1	24	1
37	1.2D + 1.0Di +1.0Wi AZI 300	Yes	Y	1	1.2	14	1	25	1
38	1.2D + 1.0Di +1.0Wi AZI 330	Yes	Y	1	1.2	14	1	26	1
39	(1.2 + 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	1.238	27	1	28	
40	(1.2 + 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	1.238	27	0.866	28	0.5
41	(1.2 + 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	1.238	27	0.5	28	0.866
42	(1.2 + 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	1.238	27		28	1
43	(1.2 + 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	1.238	27	-0.5	28	0.866
44	(1.2 + 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	1.238	27	-0.866	28	0.5
45	(1.2 + 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	1.238	27	-1	28	
46	(1.2 + 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	1.238	27	-0.866	28	-0.5
47	(1.2 + 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	1.238	27	-0.5	28	-0.866
48	(1.2 + 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	1.238	27		28	-1
49	(1.2 + 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	1.238	27	0.5	28	-0.866
50	(1.2 + 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	1.238	27	0.866	28	-0.5
51	(0.9 - 0.2Sds)DL + 1.0E AZI 0	Yes	Y	1	0.862	27	1	28	
52	(0.9 - 0.2Sds)DL + 1.0E AZI 30	Yes	Y	1	0.862	27	0.866	28	0.5
53	(0.9 - 0.2Sds)DL + 1.0E AZI 60	Yes	Y	1	0.862	27	0.5	28	0.866
54	(0.9 - 0.2Sds)DL + 1.0E AZI 90	Yes	Y	1	0.862	27		28	1
55	(0.9 - 0.2Sds)DL + 1.0E AZI 120	Yes	Y	1	0.862	27	-0.5	28	0.866
56	(0.9 - 0.2Sds)DL + 1.0E AZI 150	Yes	Y	1	0.862	27	-0.866	28	0.5
57	(0.9 - 0.2Sds)DL + 1.0E AZI 180	Yes	Y	1	0.862	27	-1	28	
58	(0.9 - 0.2Sds)DL + 1.0E AZI 210	Yes	Y	1	0.862	27	-0.866	28	-0.5
59	(0.9 - 0.2Sds)DL + 1.0E AZI 240	Yes	Y	1	0.862	27	-0.5	28	-0.866
60	(0.9 - 0.2Sds)DL + 1.0E AZI 270	Yes	Y	1	0.862	27		28	-1
61	(0.9 - 0.2Sds)DL + 1.0E AZI 300	Yes	Y	1	0.862	27	0.5	28	-0.866
62	(0.9 - 0.2Sds)DL + 1.0E AZI 330	Yes	Y	1	0.862	27	0.866	28	-0.5
63	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 0	Yes	Y	1	1	2	0.096	29	1.5
64	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 30	Yes	Y	1	1	3	0.096	29	1.5
65	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 60	Yes	Y	1	1	4	0.096	29	1.5
66	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 90	Yes	Y	1	1	5	0.096	29	1.5
67	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 120	Yes	Y	1	1	6	0.096	29	1.5
68	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 150	Yes	Y	1	1	7	0.096	29	1.5
69	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 180	Yes	Y	1	1	8	0.096	29	1.5
70	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 210	Yes	Y	1	1	9	0.096	29	1.5
71	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 240	Yes	Y	1	1	10	0.096	29	1.5
72	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 270	Yes	Y	1	1	11	0.096	29	1.5
73	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 300	Yes	Y	1	1	12	0.096	29	1.5
74	1.0DL + 1.5LL + 1.0SWL (30 mph) AZI 330	Yes	Y	1	1	13	0.096	29	1.5
75	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	34	1.5	2	0.154
76	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	34	1.5	3	0.154
77	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	34	1.5	4	0.154
78	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	34	1.5	5	0.154
79	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	34	1.5	6	0.154
80	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	34	1.5	7	0.154
81	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	34	1.5	8	0.154
82	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	34	1.5	9	0.154
83	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	34	1.5	10	0.154

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor
84	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	34	1.5	11	0.154
85	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	34	1.5	12	0.154
86	1.2DL + 1.5LM1 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	34	1.5	13	0.154
87	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	35	1.5	2	0.154
88	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	35	1.5	3	0.154
89	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	35	1.5	4	0.154
90	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	35	1.5	5	0.154
91	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	35	1.5	6	0.154
92	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	35	1.5	7	0.154
93	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	35	1.5	8	0.154
94	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	35	1.5	9	0.154
95	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	35	1.5	10	0.154
96	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	35	1.5	11	0.154
97	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	35	1.5	12	0.154
98	1.2DL + 1.5LM2 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	35	1.5	13	0.154
99	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	36	1.5	2	0.154
100	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	36	1.5	3	0.154
101	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	36	1.5	4	0.154
102	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	36	1.5	5	0.154
103	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	36	1.5	6	0.154
104	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	36	1.5	7	0.154
105	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	36	1.5	8	0.154
106	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	36	1.5	9	0.154
107	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	36	1.5	10	0.154
108	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	36	1.5	11	0.154
109	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	36	1.5	12	0.154
110	1.2DL + 1.5LM3 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	36	1.5	13	0.154
111	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	37	1.5	2	0.154
112	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	37	1.5	3	0.154
113	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	37	1.5	4	0.154
114	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	37	1.5	5	0.154
115	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	37	1.5	6	0.154
116	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	37	1.5	7	0.154
117	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	37	1.5	8	0.154
118	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	37	1.5	9	0.154
119	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	37	1.5	10	0.154
120	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	37	1.5	11	0.154
121	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	37	1.5	12	0.154
122	1.2DL + 1.5LM4 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	37	1.5	13	0.154
123	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	38	1.5	2	0.154
124	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	38	1.5	3	0.154
125	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	38	1.5	4	0.154
126	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	38	1.5	5	0.154
127	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	38	1.5	6	0.154
128	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	38	1.5	7	0.154
129	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	38	1.5	8	0.154
130	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	38	1.5	9	0.154
131	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	38	1.5	10	0.154
132	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	38	1.5	11	0.154
133	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	38	1.5	12	0.154
134	1.2DL + 1.5LM5 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	38	1.5	13	0.154
135	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 0	Yes	Y	1	1.2	39	1.5	2	0.154
136	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 30	Yes	Y	1	1.2	39	1.5	3	0.154
137	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 60	Yes	Y	1	1.2	39	1.5	4	0.154
138	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 90	Yes	Y	1	1.2	39	1.5	5	0.154
139	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 120	Yes	Y	1	1.2	39	1.5	6	0.154
140	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 150	Yes	Y	1	1.2	39	1.5	7	0.154
141	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 180	Yes	Y	1	1.2	39	1.5	8	0.154

Load Combinations (Continued)

	Description	Solve	PDelta	BLC	Factor	BLC	Factor	BLC	Factor
142	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 210	Yes	Y	1	1.2	39	1.5	9	0.154
143	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 240	Yes	Y	1	1.2	39	1.5	10	0.154
144	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 270	Yes	Y	1	1.2	39	1.5	11	0.154
145	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 300	Yes	Y	1	1.2	39	1.5	12	0.154
146	1.2DL + 1.5LM6 + 1.6SWL (30 mph) AZI 330	Yes	Y	1	1.2	39	1.5	13	0.154

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [lb-in]	LC	MY [lb-in]	LC	MZ [lb-in]	LC
1	N9	max	746.189	15	633.845	27	1203.783	29	1423.39	35	0	146	476.947	85
2		min	-1737.93	9	208.147	20	-389.756	22	217.341	16	0	1	-51.776	91
3	N4	max	1351.553	27	629.465	33	74.878	18	1430.283	35	0	146	476.603	83
4		min	21.298	20	208.107	14	-1144.042	37	179.778	16	0	1	-96.538	89
5	N52	max	769.588	10	20.411	35	196.046	10	59.384	81	0	146	366.67	10
6		min	-771.801	4	9.495	16	-195.433	4	-229.502	27	0	1	27.994	16
7	Totals:	max	952.213	2	1278.561	28	755.521	18						
8		min	-952.211	20	437.331	58	-755.523	12						

Envelope AISC 14TH (360-10): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	Dir	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [lb-in]	phi*Mn z-z [lb-in]	Cb	Eqn
1	M31	0.625" SR	0.632	42.979	28	0.017	42.979		3	1869.479	9940.19	1242.501	1242.501	2.754	H1-1a
2	M19	3.5"x0.625" Plate	0.191	0	34	0.067	0	y	31	69850.881	70875	11074.223	62015.641	2.087	H1-1b
3	M20	3.5"x0.625" Plate	0.181	0	38	0.067	0	y	27	69850.881	70875	11074.223	62015.641	2.196	H1-1b
4	M5	PIPE_2.0	0.165	33.712	33	0.078	0		28	30405.086	32130	22459.5	22459.5	2.04	H1-1b
5	M10	PIPE_2.0	0.163	33.712	29	0.08	0		29	30405.086	32130	22459.5	22459.5	2.04	H1-1b
6	M1	PIPE_2.5	0.158	78	33	0.067	18		4	30038.461	50715	43155	43155	1.97	H1-1b
7	M9	PIPE_2.0	0.158	36.776	10	0.028	0		83	30405.086	32130	22459.5	22459.5	2.282	H1-1b
8	M6	PIPE_2.5	0.155	78	27	0.099	18		4	30038.461	50715	43155	43155	1.975	H1-1b
9	M16	PIPE_2.0	0.139	77.438	9	0.035	77.438		34	8922.084	32130	22459.5	22459.5	2.57	H1-1b
10	M30	0.625" SR	0.135	42.979	76	0.008	21.489		10	1869.479	9940.19	1242.501	1242.501	1.579	H1-1b*
11	M8	3.5"x0.625" Plate	0.132	4.5	33	0.156	4.5	y	31	68591.516	70875	11074.223	62015.641	1.667	H1-1b
12	M3	3.5"x0.625" Plate	0.13	4.5	27	0.153	0	y	28	68591.516	70875	11074.223	62015.641	1.667	H1-1b
13	M15	PIPE_2.0	0.113	48.563	4	0.06	48.563		4	8922.084	32130	22459.5	22459.5	3	H1-1b
14	M32	0.625" SR	0.107	42.979	32	0.017	21.489		4	1869.479	9940.19	1242.501	1242.501	2.71	H1-1b
15	M7	3.5"x0.625" Plate	0.102	4.5	10	0.082	4.5	y	10	68591.516	70875	11074.223	62015.641	1.669	H1-1b
16	M34	PIPE_2.0	0.09	77.438	9	0.056	77.438		4	8922.084	32130	22459.5	22459.5	2.589	H1-1b
17	M28	0.625" SR	0.086	30	3	0.013	30		10	3836.923	9940.19	1242.501	1242.501	2.321	H1-1b
18	M17	3.5"x0.625" Plate	0.078	3	9	0.053	3	y	10	69850.881	70875	11074.223	62015.641	1.405	H1-1b
19	M4	PIPE_2.0	0.074	0	38	0.032	34.095		82	30405.086	32130	22459.5	22459.5	1.694	H1-1b
20	M25	0.625" SR	0.07	30	4	0.008	30		4	3836.923	9940.19	1242.501	1242.501	2.29	H1-1b
21	M18	3.5"x0.625" Plate	0.059	3	76	0.038	3	y	28	69850.881	70875	11074.223	62015.641	1.353	H1-1b
22	M2	3.5"x0.625" Plate	0.052	4.5	10	0.05	4.5	y	10	68591.516	70875	11074.223	62015.641	1.677	H1-1b
23	M29	0.625" SR	0.043	42.979	6	0.022	21.489		4	1869.479	9940.19	1242.501	1242.501	1.32	H1-1b
24	M33	PIPE_2.0	0.039	0	10	0.01	69.836		28	21406.935	32130	22459.5	22459.5	2.859	H1-1b*
25	M27	0.625" SR	0.038	30	29	0.021	30		29	3836.923	9940.19	1242.501	1242.501	2.287	H1-1b
26	M26	0.625" SR	0.025	0	3	0.021	0		4	3836.923	9940.19	1242.501	1242.501	2.507	H1-1b

INFINIGY

FROM ZERO TO INFINIGY

the solutions are endless

BOLT CONNECTION CALCULATION

BOLT PROPERTIES

Date:	7/30/2021
Site:	*BOBDL00101A*
Engineer:	*DVA*
Project No:	*1197-F0001-C*
Connection Location:	*Mount to Bracket*

Bolt Capacity Equation	TIA-222-G	
Connection Type	Steel	
Bolt Size, **d**	5/8	in
Threads per Inch, **n**	11	
Steel Grade	A325	
Bolt Ultimate Tensile Stress, F_u	120	ksi
Threads Exclusion	N	
Shear Plane	1	

Net Bolt Cross-Sectional Area, **An**	0.226	in^2
Gross Bolt Cross-Sectional Area, **Ag**	0.307	in^2
Tensile Steel Strength (per bolt), φR_{nt}	20340	lbs
Shear Steel Strength (per bolt), φR_{nv}	12425	lbs

INFINIGY

FROM ZERO TO INFINIGY

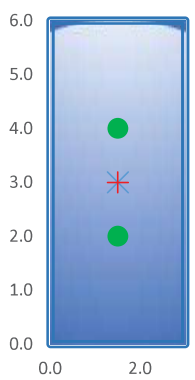
the solutions are endless

BOLT CONNECTION CALCULATION

BOLT GROUP CHECK

Date:	*7/30/2021*
Site:	*BOBDL00101A*
Engineer:	*DVA*
Project No:	*1197-F0001-C*
Connection Location:	*Mount to Bracket*

Bolt Group Pattern



Loads Properties					
Controlling LC:	34				
Load Point Number:	N9				
X-Coordinate (in.)	1.50				
Y-Coordinate (in.)	3.00				
Z-Coordinate (in.)	0.00				
Shear Load, Px (lbs)	999.000	0	0	0	0
Shear Load, Py (lbs)	1504.000	0	0	0	0
Axial Load, Pz (lbs)	629.000	0	0	0	0
Moment, Mx (lb-in)	-8.000	0	0	0	0
Moment, My (lb-in)	-1423.000	0	0	0	0
Moment, Mz (lb-in)	0.000	0	0	0	0

Member Properties	***X***	***Y***
Start Coordinates:	0.0	0.0
Dimentions:	3.0	6.0

Number of Bolts: 2

		Bolt Coordinates		***Bolt Loads***		***Steel Bolt Usage***			
No.	***Bolt Type***	***Xo (in)***	***Yo (in)***	***Axial (lbs)***	***Shear (lbs)***	***Tension***	***Shear***	***Combined***	***Max. Capacity***
1	Main Type	1.5	2.0	792.83	902.78	3.9%	7.3%	7.3%	7.3%
2	Main Type	1.5	4.0	784.83	902.78	3.9%	7.3%	7.3%	7.3%

Bolt Group Properties:

Xc =	1.50	in.
Yc =	3.00	in.
Ic.y =	0.00	in.^2
Ic.x =	0.61	in.^2
Ic.xy =	0.61	in.^2

Loads at Center of Gravity of Bolt Group:

Pz =	629.00	lbs
Px =	999.00	lbs
Py =	1504.00	lbs
Mx =	-8.00	lb-in
My =	-1423.00	lb-in
Mz =	0.00	lb-in

Total Capacity of Bolt Group: 7.3%

dish wireless

COMMSCOPE®

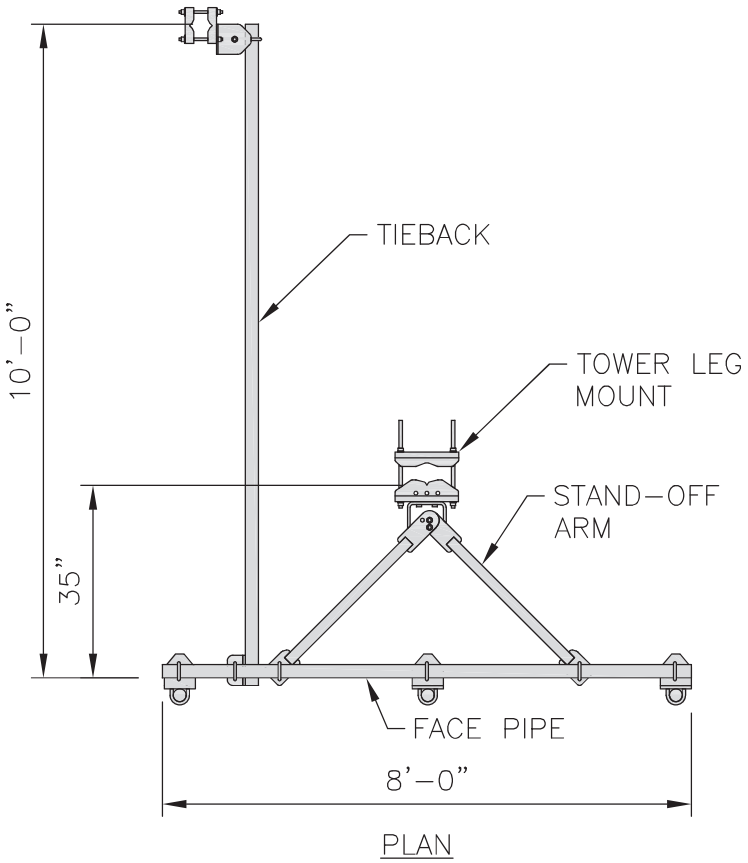
MTC Sector Frame
(Tier 1, 2, 3)

* **Primary Sector Frame Option 1-** **this is to be utilized on all Colo applications***

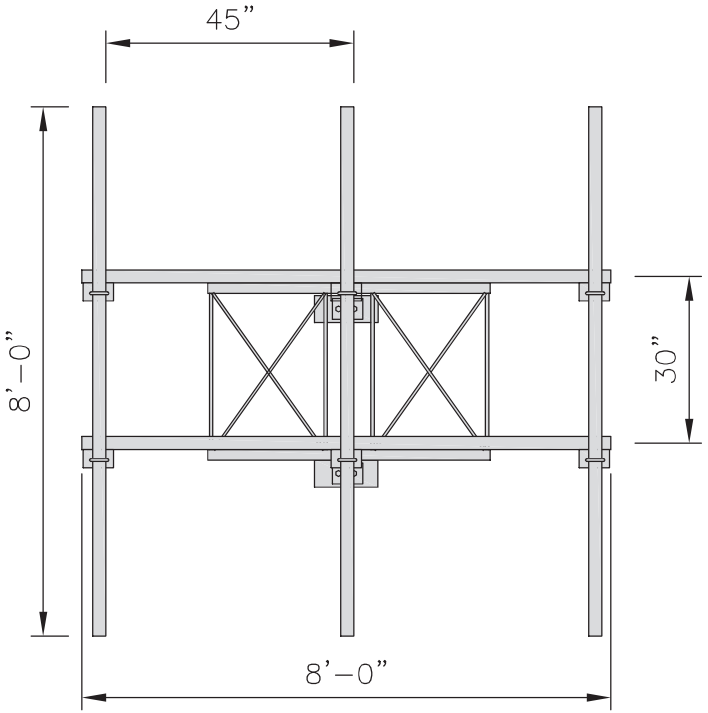
MTC3975083

- **MTC3975083 Sector Frame**
- 8 ft Face with 2.88in OD Face Pipes
- Integrated 4G/5G Antenna/Radio Mount
- Adaptable to straight or tapered tower legs up to 203.2mm (8 in) OD
- Height 126 in, Face Width 8 ft, Pipe Length 126 in, Stand-off distance 35 in
- Mounting Diameter max. 8.6 in, Mounting Diameter min. 1.5 in, Pipe Outer Diameter 2.4 in
- Hot dipped galvanized steel
- Wind Rating Test Method TIA/EIA-222-G

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



PLAN



FRONT

ANTENNA FRAME DETAIL

Exhibit F

Power Density/RF Emissions Report

EBI Consulting

environmental | engineering | due diligence

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

Dish Wireless Existing Facility

Site ID: BOBDL00101A

BOBDL00101A
497 Old Post Road
Tolland, Connecticut 06084

October 6, 2021

EBI Project Number: 6221005578

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**23.93%**

October 6, 2021

Dish Wireless

Emissions Analysis for Site: BOBDL00101A - BOBDL00101A

EBI Consulting was directed to analyze the proposed Dish Wireless facility located at **497 Old Post Road** in **Tolland, Connecticut** for the purpose of determining whether the emissions from the Proposed Dish Wireless Antenna Installation located on this property are within specified federal limits.

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

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

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

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

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

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were done for the proposed Dish Wireless antenna facility located at 497 Old Post Road in Tolland, Connecticut using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since Dish Wireless is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was focused at the base of the tower. For this report, the sample point is the top of a 6-foot person standing at the base of the tower.

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

1) 4 n71 channels (600 MHz Band) were considered for each sector of the proposed installation. These Channels have a transmit power of 30 Watts per Channel.

2) 4 n70 channels (PCS Band - 1900 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

3) 4 n66 channels (AWS Band - 2190 MHz) were considered for each sector of the proposed installation. These Channels have a transmit power of 40 Watts per Channel.

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

5) For the following calculations, the sample point was the top of a 6-foot person standing at the base of the tower. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used in this direction. This value is a very conservative

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

6) The antennas used in this modeling are the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector A, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector B, the JMA MX08FRO665-21 for the 600 MHz / 1900 MHz / 2190 MHz channel(s) in Sector C. This is based on feedback from the carrier with regard to anticipated antenna selection. All Antenna gain values and associated transmit power levels are shown in the Site Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufacturer's supplied specifications, minus 20 dB for directional panel antennas and 20 dB for highly focused parabolic microwave dishes, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

7) The antenna mounting height centerline of the proposed antennas is 113 feet above ground level (AGL).

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

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

Dish Wireless Site Inventory and Power Data

Sector:	A	Sector:	B	Sector:	C
Antenna #:	1	Antenna #:	1	Antenna #:	1
Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21	Make / Model:	JMA MX08FRO665-21
Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz	Frequency Bands:	600 MHz / 1900 MHz / 2190 MHz
Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd	Gain:	17.45 dBd / 22.65 dBd / 22.65 dBd
Height (AGL):	113 feet	Height (AGL):	113 feet	Height (AGL):	113 feet
Channel Count:	12	Channel Count:	12	Channel Count:	12
Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts	Total TX Power (W):	440 Watts
ERP (W):	5,236.31	ERP (W):	5,236.31	ERP (W):	5,236.31
Antenna A1 MPE %:	**2.07%**	Antenna B1 MPE %:	**2.07%**	Antenna C1 MPE %:	**2.07%**

Site Composite MPE %	
Carrier	**MPE %**
Dish Wireless (Max at Sector A):	2.07%
NE Paging	0.06%
Hamden Comm	0.36%
Conn Radio	0.53%
Airtouch	0.07%
Verizon	4.58%
T-Mobile	10.73%
AT&T	5.53%
Site Total MPE % :	23.93%

Dish Wireless MPE % Per Sector	
Dish Wireless Sector A Total:	2.07%
Dish Wireless Sector B Total:	2.07%
Dish Wireless Sector C Total:	2.07%
Site Total MPE % :	23.93%

Dish Wireless Maximum MPE Power Values (Sector A)

Dish Wireless Frequency Band / Technology (Sector A)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density (μW/cm²)	Frequency (MHz)	Allowable MPE (μW/cm²)	Calculated % MPE
Dish Wireless 600 MHz n71	4	223.68	113.0	2.81	600 MHz n71	400	0.70%
Dish Wireless 1900 MHz n70	4	542.70	113.0	6.82	1900 MHz n70	1000	0.68%
Dish Wireless 2190 MHz n66	4	542.70	113.0	6.82	2190 MHz n66	1000	0.68%
						Total:	**2.07%**

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

Summary

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

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

Dish Wireless Sector	Power Density Value (%)
Sector A:	2.07%
Sector B:	2.07%
Sector C:	2.07%
Dish Wireless Maximum MPE % (Sector A):	2.07%
Site Total:	23.93%
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **23.93%** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Exhibit G

Letter of Authorization

CLEARVIEW
Tower Company

Clearview Tower Company II, LLC Letter of Authorization

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

Re: Tower Share Application
Clearview Tower Company II, LLC - telecommunications site at:
497 Old Post Road, Tolland CT 06084

Clearview Tower Company II, LLC ("Clearview") hereby authorizes DISH Wireless LLC, including their Agent, to act as our Agent in the processing of all zoning applications, building permits and approvals through the CT - CONNECTICUT SITING COUNCIL for the existing wireless communications site described below:

Clearview Site ID/Name: CT01 Tolland
Customer Site ID: BOBDL00101A / CLE - Old Post Road
Site Address: 497 Old Post Road, Tolland CT 06084

Clearview Tower Company II, LLC

By: Thomas C Gomprecht Date: 9/24/2021
Name: Thomas C Gomprecht
Title: Vice President

324 GARRISON FOREST RD • OWINGS MILLS, MD 21117
410-461-6355 • FAX: 410-461-7963

Exhibit H

Recipient Mailings

BOBDL00101A

UNITED STATES POSTAL SERVICE.

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

10/25/2021 03:30 PM

Product	Qty	Unit Price	Price
Prepaid Mail Edison, NJ 08817 Weight: 0 lb 2.00 oz Acceptance Date: Mon 10/25/2021 Tracking #: 9405 5036 9930 0040 6609 59	1		$0.00
Prepaid Mail Tolland, CT 06084 Weight: 0 lb 13.10 oz Acceptance Date: Mon 10/25/2021 Tracking #: 9405 5036 9930 0040 6609 42	1		$0.00
Prepaid Mail Tolland, CT 06084 Weight: 0 lb 13.10 oz Acceptance Date: Mon 10/25/2021 Tracking #: 9405 5036 9930 0040 6609 35	1		$0.00
Grand Total:			$0.00

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USPS is experiencing unprecedented volume increases and limited employee availability due to the impacts of