DEVELOPMENT

Jan. 23, 2023

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

RE: Request of DISH Wireless LLC for an Order to Approve the Shared Use of an Existing Tower
20 Barnabas Road, Newtown, CT 06470- NJJER02057A

Dear Ms. Bachman:

Pursuant to Connecticut General Statutes ("C.G.S.") §16-50aa, as amended, DISH Wireless LLC ("DISH") hereby requests an order from the Connecticut Siting Council ("Council") to approve the shared use by DISH of an existing telecommunication tower at 20 Barnabas Rd in Newtown (the "Property"). The existing 180'-0" Self-Support tower is owned by Connecticut Power & Light Company ("Eversouce Energy"). The underlying property is owned by Eversource Energy. DISH requests that the Council find that the proposed shared use of the Eversource Energy tower satisfies the criteria of C.G.S. §16-50aa and issue an order approving the proposed shared use. This modification/proposal includes hardware that is both 4G(LTE) and 5G capable through remote software configuration and either or both services may be turned on or off at various times. A copy of this filing is being sent to Dennis Bloom, Chairman of Planning and Zoning – Town of Newtown, John Poeltl, Chief Building Official – Town of Newtown, Steven Florio, Construction Manager – Eversource Energy.

Background

DISH is licensed by the Federal Communications Commission ("FCC") to provide wireless services throughout the State of Connecticut. DISH and Eversource Energy have agreed to the proposed shared use of the 20 Barnabas Road tower pursuant to mutually acceptable terms and conditions. Likewise, DISH and Eversource Energy have agreed to the proposed installation of equipment cabinets on the ground on the East side of the tower within the existing compound. Eversource Energy has authorized DISH to apply for all necessary permits and approvals that may be required to share the existing tower.

DISH proposes to install 3 Antennas, 6 RRHs, 1 OVP at the 90-foot level. In addition, DISH will install a ground equipment cabinet on an existing 13'-4" x 18'-4" concrete slab. Included in the Construction Drawings are DISH's project specifications for locations of all proposed site improvements. The Construction Drawings also contain specifications for DISH's proposed antennas and groundwork.

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

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the tower is 180-feet; Dish Wireless LLC proposed antennas will be located at a center line height of 90-feet.

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

3. The proposed modifications will not increase noise levels at the facility by six decibels or more, or to levels that exceed local and state criteria. The incremental effect of the proposed changes will be negligent

4. The operation of the proposed antennas will not increase radio frequency emissions at the facility to a level at or above the Federal Communications Commission safety standard. As indicated in the attached power density calculations, the combined site operations will result in a total power density of 9.7402% as evidenced by Exhibit F.

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

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

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

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

1. The proposed installation will have no visual impact on the area of the tower. DISH's equipment cabinet would be installed within the existing facility compound. DISH's shared use of this tower therefore will not cause any significant change or alteration in the physical or environmental characteristics of the existing site.

2. Operation of DISH's antennas at this site would not exceed the RF emissions standard adopted by the Federal Communications Commission ("FCC"). Included in the EME report of this filing are the approximation tables that demonstrate that DISH's proposed facility will operate well within the FCC RF emissions safety standards.

3. Under ordinary operating conditions, the proposed installation would not require the use of any water or sanitary facilities and would not generate air emissions or discharges to water bodies or sanitary facilities. After construction is complete the proposed installations would not generate any increased traffic to the Eversource Energy facility other than periodic maintenance. The proposed shared use of the Eversource Energy tower, would, therefore, have a minimal environmental effect, and is environmentally feasible.

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

E. **Public Safety Concerns.** As discussed above, the tower is structurally capable of supporting DISH's full array of 3 antennas, 6 RRU radios, 1 OVP and 1 cable and all related equipment. DISH is not aware of any public safety concerns relative to the proposed sharing of the existing Eversource Energy tower

Conclusion

For the reasons discussed above, the proposed shared use of the existing Eversource Energy tower at 20 Barnabas Road satisfies the criteria stated in C.G.S. §16-50aa and advances the General Assembly's and the Council's goal of preventing the unnecessary proliferation of towers in Connecticut. The Applicant, therefore, respectfully requests that the Council issue an order approving the proposed shared use.

Sincerely,

Michael Jones
President, M+K Development
140 Beach 137th St
Rockaway Beach, NY 11694
732-677-8881

Cc:
Dennis Bloom, Chairman of Planning and Zoning – Town of Newtown
John Poeltl, Chief Building Official – Town of Newtown
Steven Florio, Construction Manager – Eversource Energy

MK DEVELOPMENT

EXHIBIT A

Letter of Authorization

Steven Florio
Telecom Engineering
Construction Manager

107 Selden St
Berlin, CT 06037
Office: (860) 728-5611
Steven Florio@Eversource.com

Mr. Michael Jones
President
M&K Development
137 Beach 137th Street
Rockaway, NY 11694

RE: **Letter of Authorization**

Project: **Dish Wireless**
20 Barnabas Road
Newtown, CT

Owner: **The Connecticut Light and Power Company d/b/a Eversource Energy**

Dear Mr. Jones

Eversource Energy, owner of the tower facility located at the address identified above, does hereby authorize Dish Wireless, and/ or it's agent to use this authorization letter for the sole purpose of filing and consummating any land-use or building permit application(s) as may be required by the applicable permitting authorities for the Licensee's telecommunication's installation.

Sincerely,
Steven J. Florio

Steven J. Florio
Eversource Energy

REF: **M & K Development**
CD'S: Project # NJJER02057A
Dated 11/16/22
Structural: Project # NJJER02057A
Dated: 11/6/22

MK DEVELOPMENT

EXHIBIT B

Property Card

20 BARNABAS ROAD

Location	20 BARNABAS ROAD	**M/B/L**	5/ 7/ 11/ 1/
Acct#	00696701	**Owner**	CONNECTICUT LIGHT & POWER COMPANY
Assessment	$6,105,000	**Appraisal**	$8,721,430
PID	2346	**Building Count**	3

Current Value

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$6,170,930	$2,550,500	$8,721,430
Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$4,319,650	$1,785,350	$6,105,000

Owner of Record

Owner	CONNECTICUT LIGHT & POWER COMPANY	**Sale Price**	$9,030,000
Co-Owner	C/O EVERSOURCE, LORI HUBER	**Book & Page**	1186/0139
Address	107 SELDEN STREET BERLIN, CT 06037	**Sale Date**	12/13/2021
		Instrument	00

Ownership History

Ownership History

Owner	Sale Price	Book & Page	Instrument	Sale Date
CONNECTICUT LIGHT & POWER COMPANY	$9,030,000	1186/0139	00	12/13/2021
BARNABAS REALTY GROUP GEN PRTSHP	$0	0423/0805	00	09/25/1990

Building Information

Building 1 : Section 1

Year Built: 1991
Living Area: 40,066

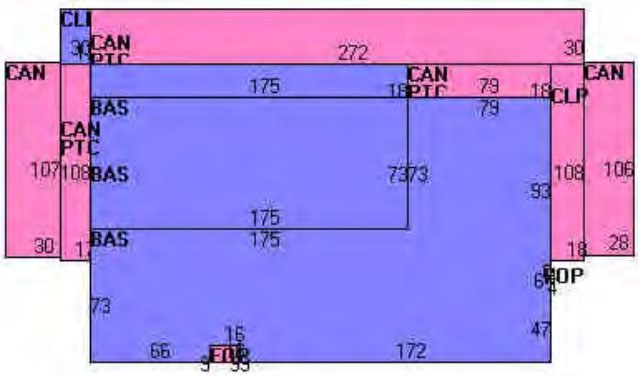
Building Attributes	
Field	**Description**
Style:	Office
Model	Comm/Ind
Grade	B+
Stories:	1
Occupancy	1.00
Exterior Wall 1	Concr/CinderBk
Exterior Wall 2	Pre-Fin Metal
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Carpet
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Hot Water
AC Type	Central
Struct Class	
Bldg Use	OFFICE
Total Rooms	

Building Photo


(https://images.vgsi.com/photos/NewtownCTPhotos//\00\02\10\14.jpg)

Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	HEAT/AC SPLIT
Frame Type	MASONRY
Baths/Plumbing	AVERAGE
Ceiling/Wall	SUS-CEIL & WL
Rooms/Prtns	ABOVE AVERAGE
Wall Height	14.00
% Comn Wall	

Building Layout



(https://images.vgsi.com/photos/NewtownCTPhotos//Sketches/2346_2346.

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	40,066	40,066
CAN	Canopy	17,596	0
CLP	Loading Platform	2,454	0
FOP	Open Porch	168	0
PTC	Patio - Concrete	11,418	0
		71,702	40,066

Building 2 : Section 1

Year Built: 1991
Living Area: 9,216

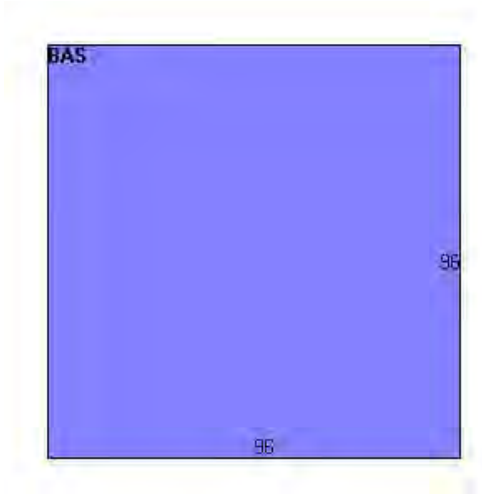
Building Attributes : Bldg 2 of 3	
Field	**Description**
Style:	Light Indust
Model	Comm/Ind
Grade	B

Stories:	1
Occupancy	1.00
Exterior Wall 1	Pre-Fin Metal
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Drywall/Sheet
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Susp. Space
AC Type	Central
Struct Class	
Bldg Use	AUTO REPR
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	HEAT/AC SPLIT
Frame Type	STEEL
Baths/Plumbing	AVERAGE
Ceiling/Wall	Average
Rooms/Prtns	LIGHT
Wall Height	17.00
% Comn Wall	

Building Photo

(https://images.vgsi.com/photos/NewtownCTPhotos//default.jpg)

Building Layout



(https://images.vgsi.com/photos/NewtownCTPhotos//Sketches/2346_2011

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	9,216	9,216
		9,216	9,216

Building 3 : Section 1

Year Built: 1995
Living Area: 200

Building Attributes : Bldg 3 of 3	
Field	**Description**
Style:	Light Indust
Model	Ind/Comm
Grade	B
Stories:	1
Occupancy	1.00
Exterior Wall 1	Pre-cast Concr
Exterior Wall 2	
Roof Structure	Flat
Roof Cover	Rolled Compos
Interior Wall 1	Minim/Masonry
Interior Wall 2	
Interior Floor 1	Concr-Finished
Interior Floor 2	
Heating Fuel	Gas
Heating Type	Susp. Space
AC Type	Central
Struct Class	
Bldg Use	UTILITY BUILDING
Total Rooms	
Total Bedrms	
Total Baths	
1st Floor Use:	
Heat/AC	HEAT/AC SPLIT
Frame Type	REINF. CONCR

Building Photo

(https://images.vgsi.com/photos/NewtownCTPhotos//00\00\92\84.JPG)

Building Layout

(https://images.vgsi.com/photos/NewtownCTPhotos//Sketches/2346_2011

Building Sub-Areas (sq ft)			Legend
Code	**Description**	**Gross Area**	**Living Area**
BAS	First Floor	200	200

Baths/Plumbing	AVERAGE
Ceiling/Wall	Average
Rooms/Prtns	LIGHT
Wall Height	10.00
% Comn Wall	

		200	200

Extra Features

Extra Features				Legend
Code	**Description**	**Size**	**Value**	**Bldg #**
GN3	Gen 30+ kw	1.00 UNITS	$12,900	1

Land

Land Use

Use Code	3400
Description	OFFICE
Zone	M-1
Neighborhood	C090
Alt Land Appr	No
Category	

Land Line Valuation

Size (Acres)	23.88
Frontage	
Depth	
Assessed Value	$1,785,350
Appraised Value	$2,550,500

Outbuildings

Outbuildings						Legend
Code	**Description**	**Sub Code**	**Sub Description**	**Size**	**Value**	**Bldg #**
FN1	Fence			19200.00 L.F.	$80,640	1
FN1	Fence			1600.00 L.F.	$6,720	1
PAV1	Paving	AS	Asphalt	340000.00 S.F.	$306,000	1
TWR	Tower			1.00 UNITS	$6,000	1
LT1	Lights			12.00 UNITS	$7,200	1

Valuation History

Appraisal			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$6,170,930	$2,550,500	$8,721,430
2021	$5,184,160	$2,872,800	$8,056,960
2020	$5,184,160	$2,872,800	$8,056,960

Assessment			
Valuation Year	**Improvements**	**Land**	**Total**
2022	$4,319,650	$1,785,350	$6,105,000
2021	$3,628,910	$2,010,960	$5,639,870
2020	$3,628,910	$2,010,960	$5,639,870

MK DEVELOPMENT

EXHIBIT C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

NJJER02057A

DISH Wireless L.L.C. SITE ADDRESS:

20 BARNABAS ROAD
NEWTOWN, CT 06470

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	2022 CT STATE BUILDING CODE/2021 IBC W/ CT AMENDMENTS
MECHANICAL	2022 CT STATE BUILDING CODE/2021 IMC W/ CT AMENDMENTS
ELECTRICAL	2022 CT STATE BUILDING CODE/2020 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 RRHs (2 PER SECTOR)
- INSTALL (1) PROPOSED OVER VOLTAGE PROTECTION DEVICE (OVP)
- INSTALL (1) PROPOSED HYBRID CABLE

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

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:	BARNABAS REALTY GROUP GEN PRTSHP.
ADDRESS:	107 SELDEN STREET BERLIN, CT 06037
TOWER TYPE:	SELF SUPPORT TOWER
TOWER CO SITE ID:	N/A
TOWER APP NUMBER:	N/A
COUNTY:	FAIRFIELD COUNTY
LATITUDE (NAD 83):	41° 25' 39.5" N 41.427638 N
LONGITUDE (NAD 83):	73° 20' 36.7" W 73.343533 W
ZONING JURISDICTION:	CITY OF NEWTOWN
ZONING DISTRICT:	M-1
PARCEL NUMBER:	5-7-11-1
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	CL&P
TELEPHONE COMPANY:	TBD

PROJECT DIRECTORY

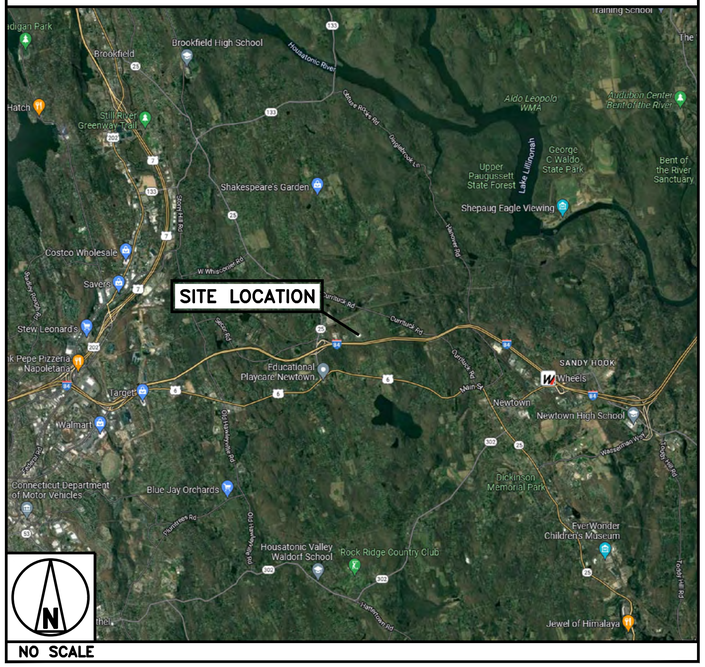
APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120 (303) 706-5008
SITE DESIGNER:	M+K DEVELOPMENT 140 BEACH 137TH STREET ROCKAWAY, NY 11694
SITE ACQUISITION:	AUSTIN PAPPAS AUSTIN.PAPPAS@DISH.COM
CONSTRUCTION MANAGER:	OMAR ZEERBAN OMAR.ZEERBAN@DISH.COM
RF ENGINEER:	RAFAEL

DIRECTIONS

DIRECTIONS FROM DANBURY MUNICIPAL AIRPORT:

GET ON I-84 E/US-7 N FROM SUGAR HOLLOW RD, HEAD NORTH TOWARD WIBLING RD, CONTINUE ONTO WIBLING RD, TURN RIGHT ONTO SUGAR HOLLOW RD, TURN LEFT ONTO WOOSTER HTS RD, TURN LEFT TO MERGE ONTO US-7 N TOWARD I-84/NEW MILFORD, KEEP RIGHT AT THE FORK, FOLLOW SIGNS FOR US-7 N/I-84 E/NEW, MILFORD/WATERBURY AND MERGE ONTO I-84 E/US-7 N, FOLLOW I-84 E TO CT-25 N/HAWLEYVILLE RD IN NEWTOWN. TAKE EXIT 9 FROM I-84 E, MERGE ONTO I-84 E/US-7 N, CONTINUE TO FOLLOW I-84 E, TAKE EXIT 9 TOWARD CT-25 N/HAWLEYVILLE RD, KEEP LEFT AT THE FORK, FOLLOW SIGNS FOR HAWLEYVILLE/BROOKFIELD/CT-25 N, CONTINUE ON CT-25 N/HAWLEYVILLE RD TO YOUR DESTINATION, TURN LEFT ONTO CT-25 N/HAWLEYVILLE RD, TURN RIGHT ONTO BARNABAS RD, TURN LEFT, TURN RIGHT, TURN LEFT, 20 BARNABAS RD.

VICINITY MAP



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

M+K DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRETT J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
0	01/21/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

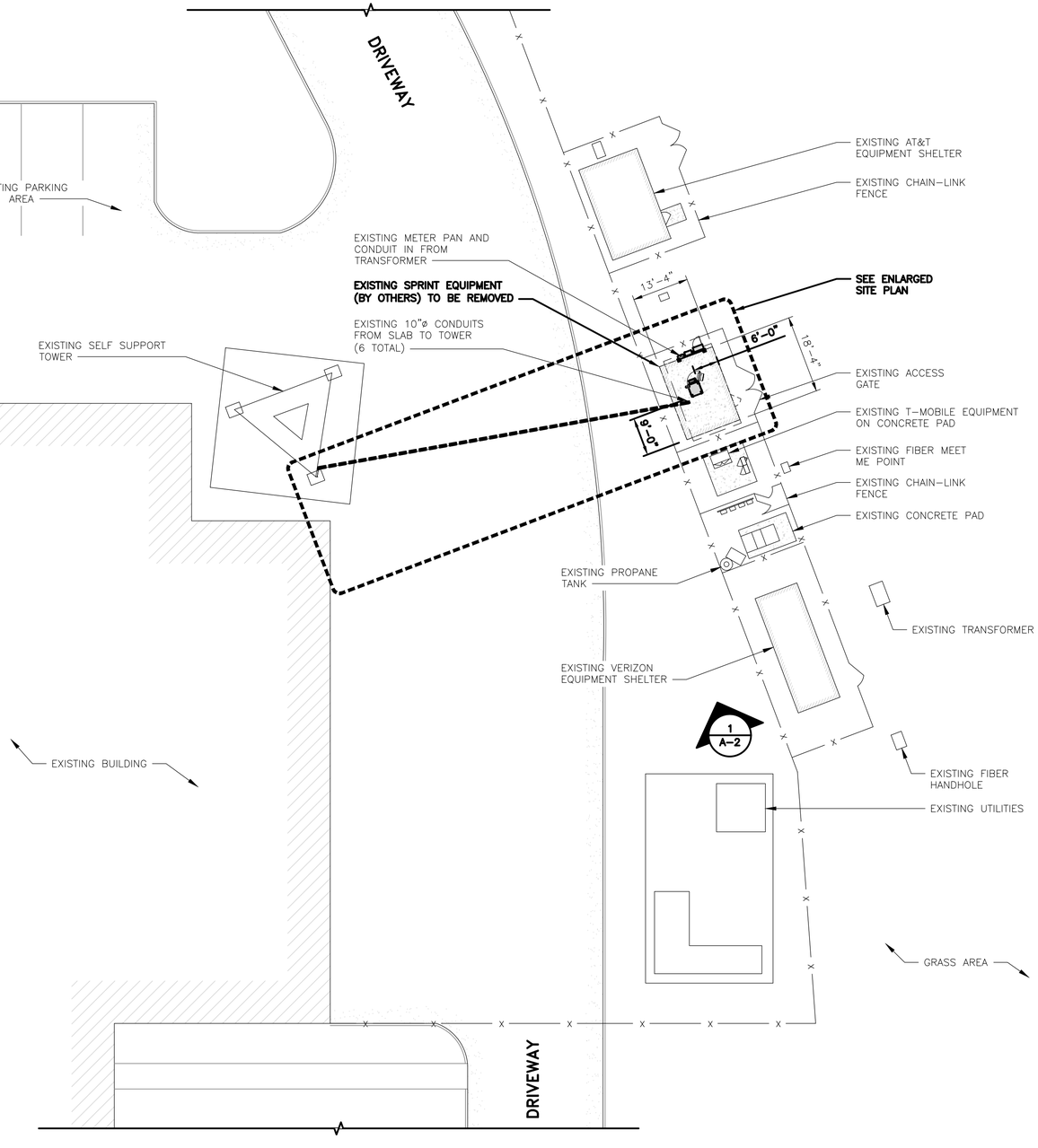
TITLE SHEET

SHEET NUMBER

T-1

NOTES

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



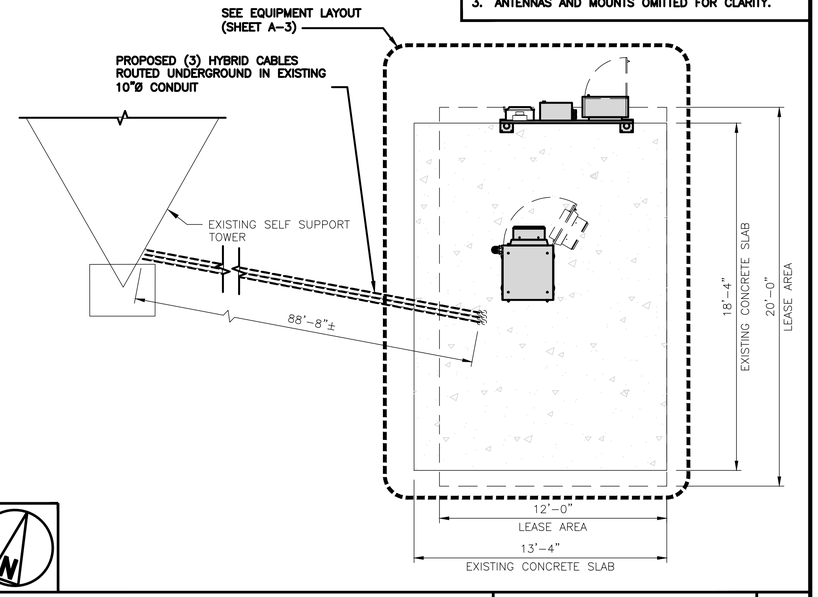
OVERALL SITE PLAN

16' 12' 8' 4' 0 16' 32'
1/16"=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

4' 2' 0 4' 8'
1/4"=1'-0"

2

AERIAL VIEW

NO SCALE

3

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRETT J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
0	01/21/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

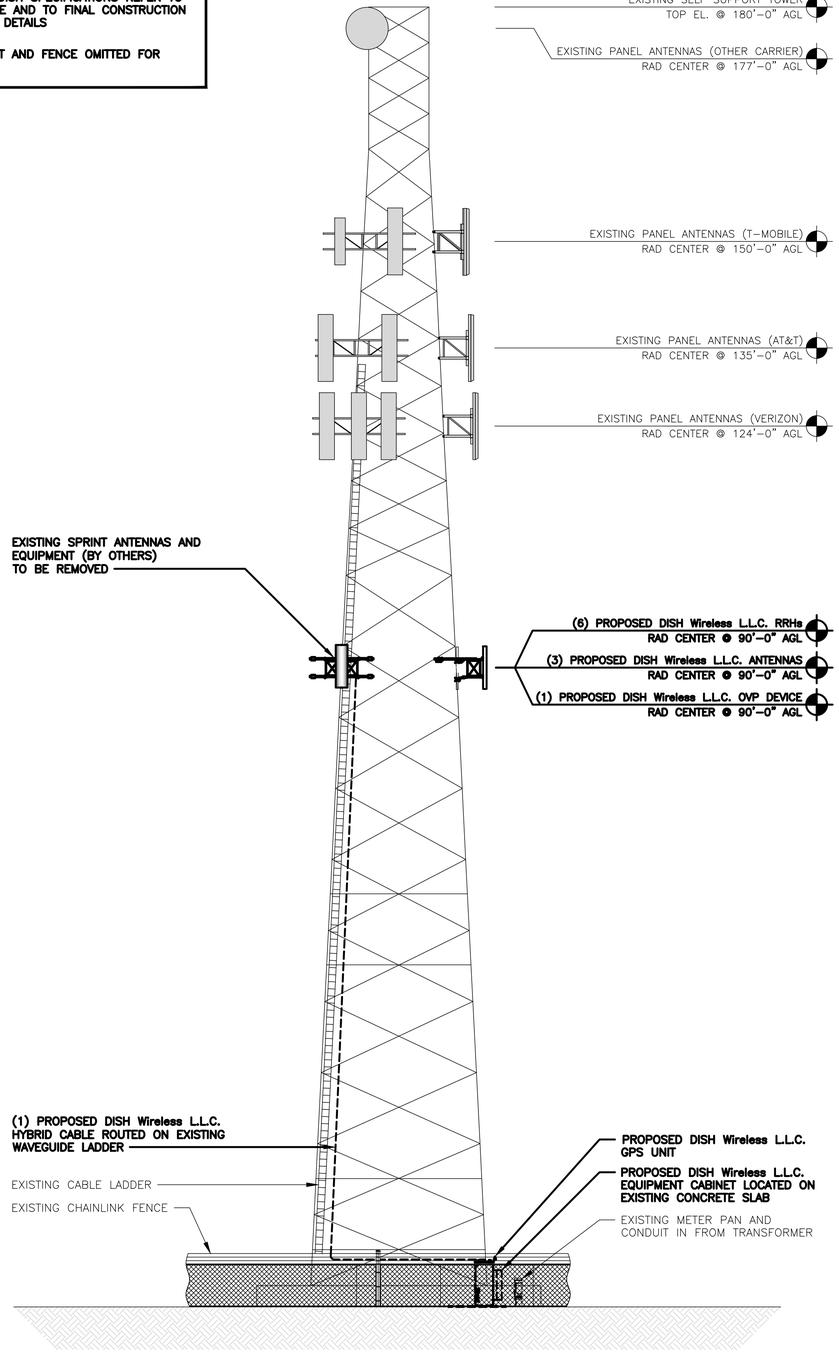
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

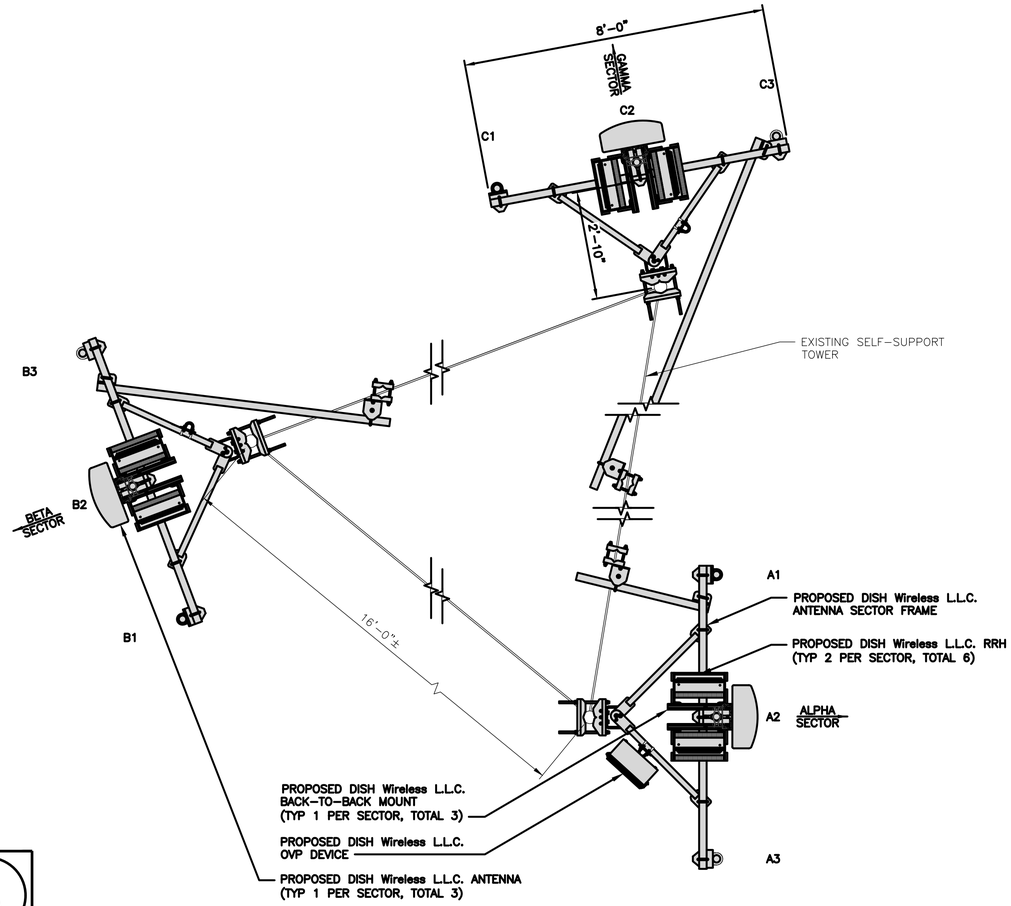
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED SOUTHEAST ELEVATION

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

1



ANTENNA LAYOUT

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

2

SECTOR POS.	ANTENNA					TRANSMISSION CABLE	RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECH	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	MANUFACTURER – MODEL NUMBER	TECH	POS.	MANUFACTURER MODEL
A1	–	–	–	–	–	(1) HIGH-CAPACITY HYBRID CABLE (205' LONG)	(1) FUJITSU – TA08025-B605 (1) FUJITSU – TA08025-B604	5G	A1 A2 A3	RAYCAP RDIDC -9181-PF-48
A2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	90°	90'-0"					
A3	–	–	–	–	–					
B1	–	–	–	–	–	SHARED W/ ALPHA	(1) FUJITSU – TA08025-B605 (1) FUJITSU – TA08025-B604	5G	B1 B2 B3	SHARED W/ APLHA
B2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	250°	90'-0"					
B3	–	–	–	–	–					
C1	–	–	–	–	–	SHARED W/ ALPHA	(1) FUJITSU – TA08025-B605 (1) FUJITSU – TA08025-B604	5G	C1 C2 C3	SHARED W/ APLHA
C2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	350°	90'-0"					
C3	–	–	–	–	–					

NOTES

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

ANTENNA SCHEDULE

NO SCALE

3

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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRIAN J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

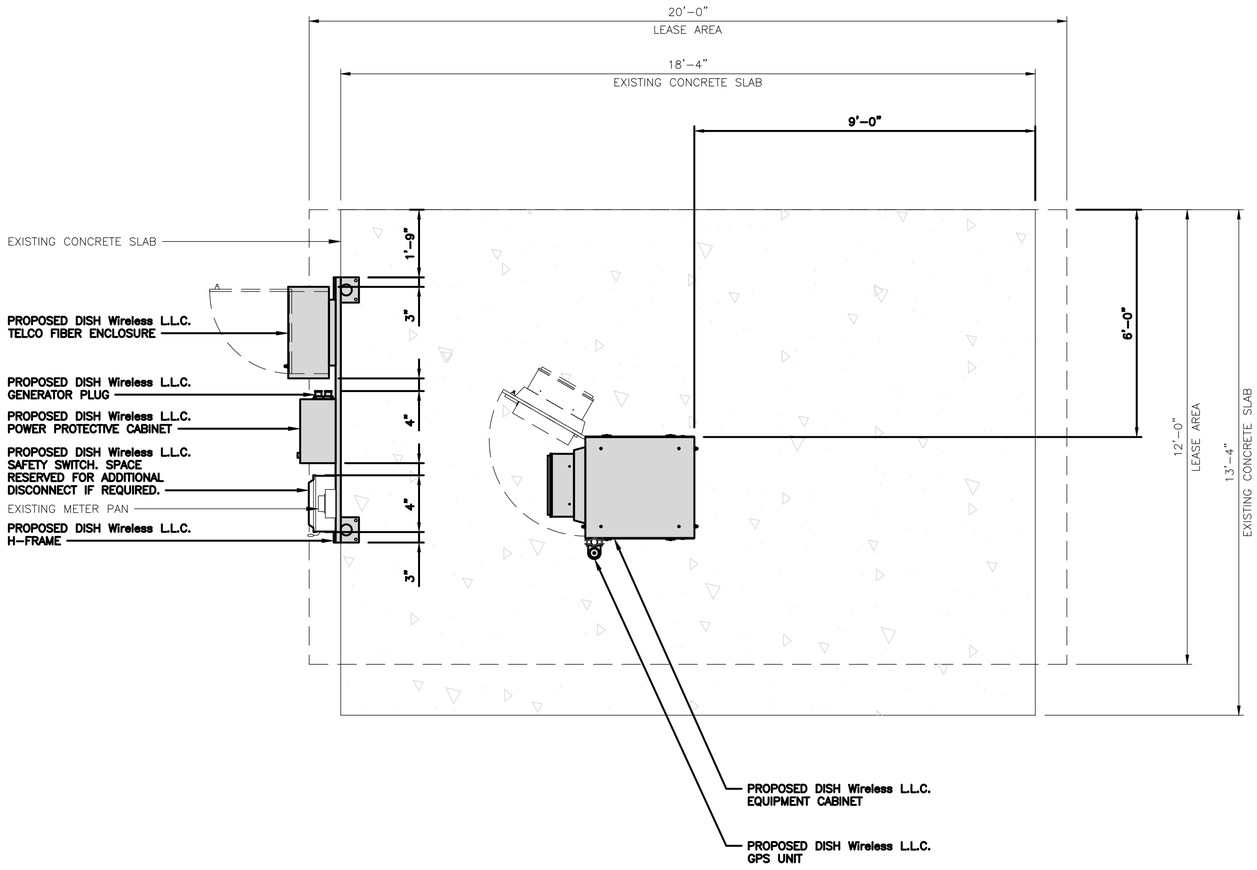
REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
0	01/21/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE
ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER
A-2

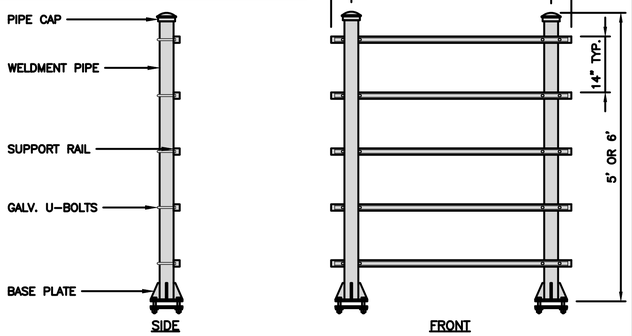


PLATFORM EQUIPMENT PLAN

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

1

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

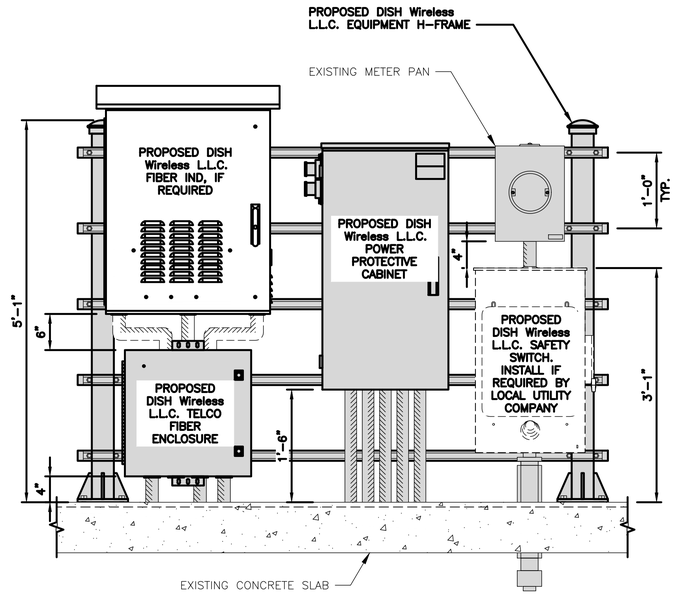


H-FRAME DETAIL | NO SCALE | 2

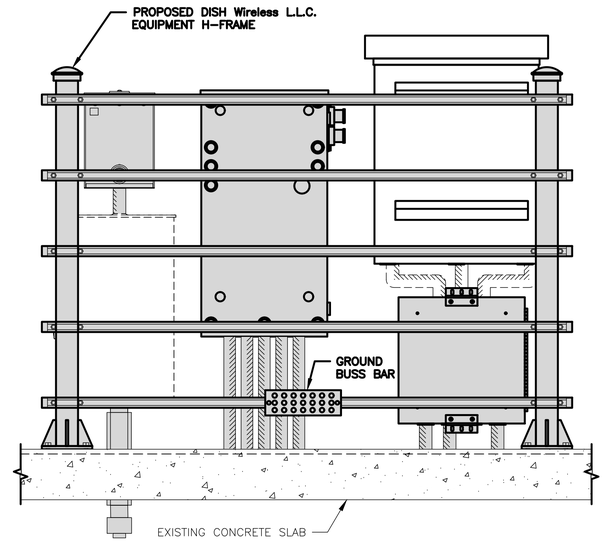
NOT USED | NO SCALE | 3

NOTES

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



FRONT ELEVATION



BACK ELEVATION

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

4

H-FRAME EQUIPMENT ELEVATION

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STATE OF CONNECTICUT
MATTHEW J MAGAN
1/23/2023
33678
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PROFESSIONAL ENGINEER

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PROJECT INFORMATION
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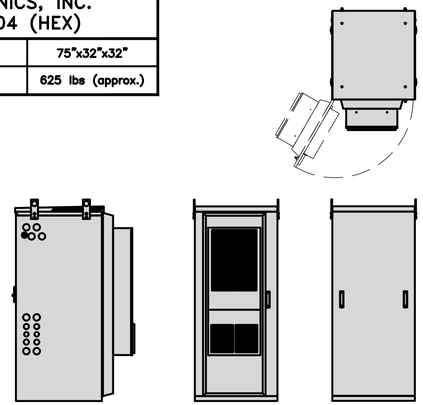
NEWTOWN, CT 06470

SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

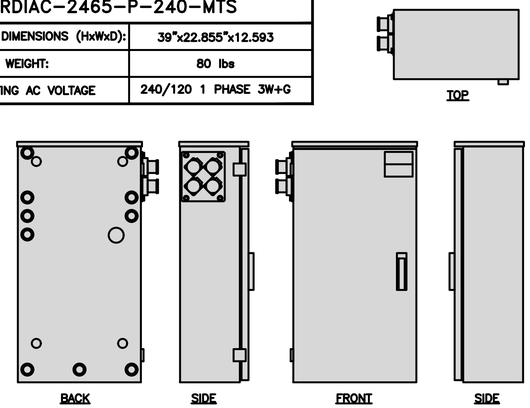
SHEET NUMBER
A-3

DELTA ELECTRONICS, INC. ESOA600-HCB04 (HEX)	
DIMENSIONS (HxWxD)	75"x32"x32"
WEIGHT (EMPTY)	625 lbs (approx.)



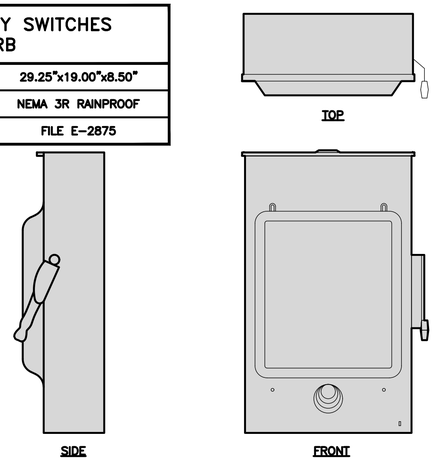
CABINET DETAIL | NO SCALE | 1

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



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

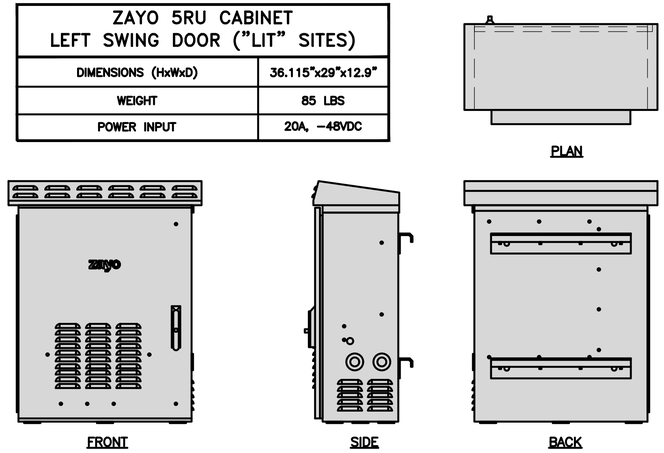
SQUARE D SAFETY SWITCHES D224NRB	
ENCLOSURE DIM (HxWxD)	29.25"x19.00"x8.50"
ENCLOSURE TYPE	NEMA 3R RAINPROOF
UL LISTED	FILE E-2875



SAFETY SWITCH DETAIL | NO SCALE | 3

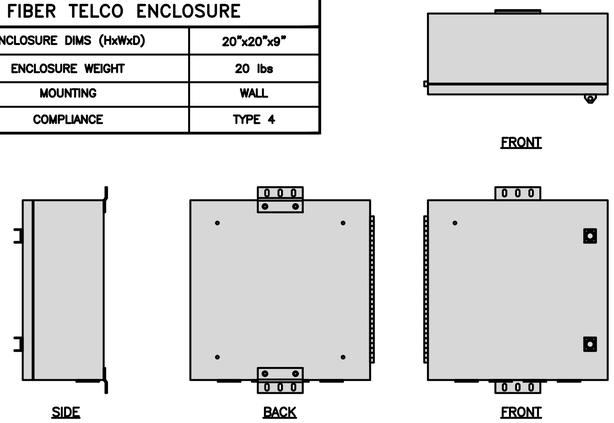
NOT USED | NO SCALE | 4

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



NETWORK INTERFACE UNIT DETAIL | NO SCALE | 5

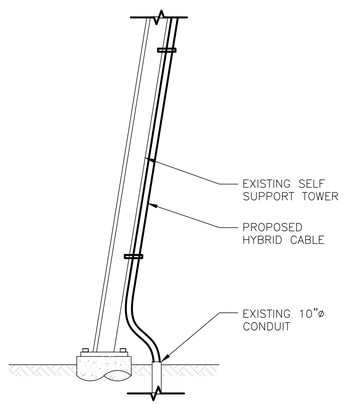
CHARLES CFIT-PF2020DSH1 FIBER TELCO ENCLOSURE	
ENCLOSURE DIMS (HxWxD)	20"x20"x9"
ENCLOSURE WEIGHT	20 lbs
MOUNTING	WALL
COMPLIANCE	TYPE 4



FIBER TELCO ENCLOSURE DETAIL | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8



HYBRID CABLE RUN | NO SCALE | 9

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BRETT J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

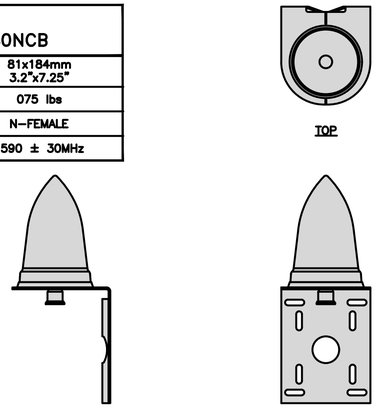
SHEET TITLE

EQUIPMENT DETAILS

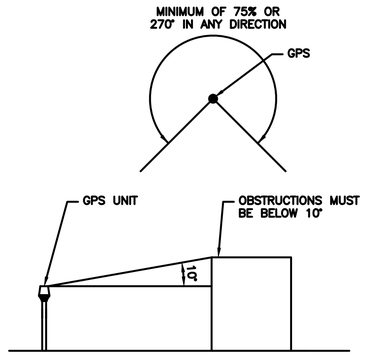
SHEET NUMBER

A-4

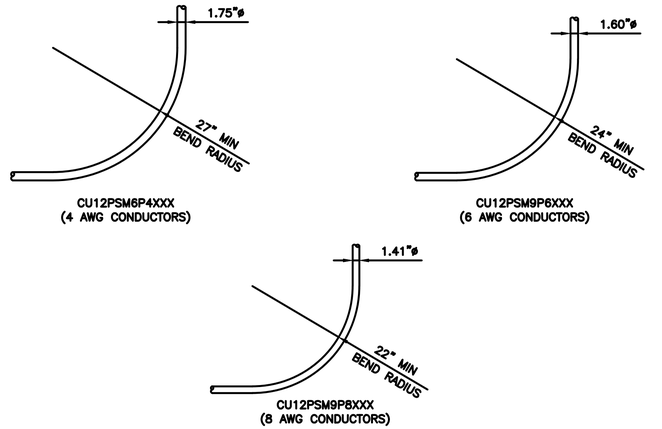
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



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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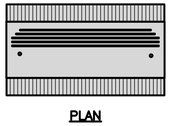
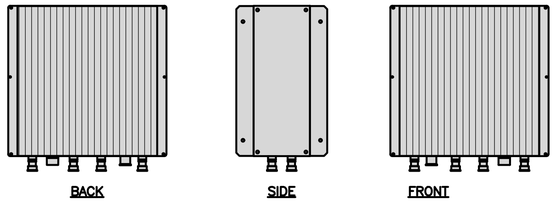
SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-5

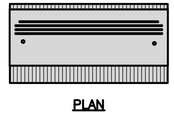
FUJITSU TRIPLE BAND TA08025-B605	
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V

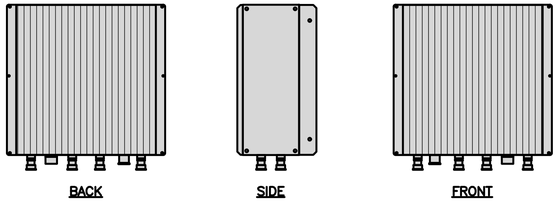

PLAN


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

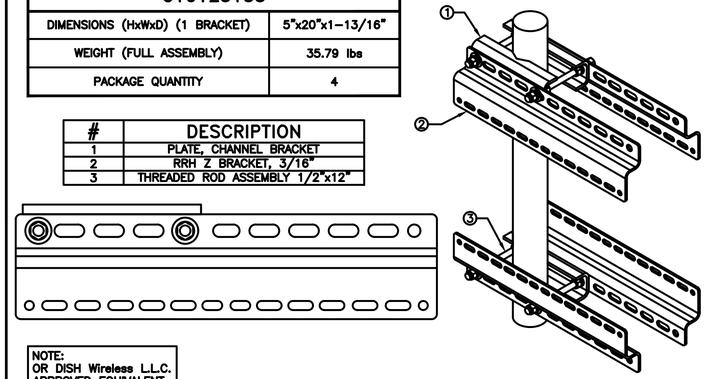

PLAN


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

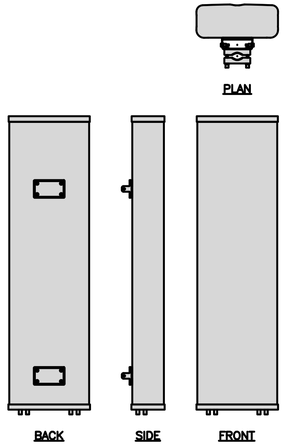
#	DESCRIPTION
1	PLATE, CHANNEL BRACKET
2	RRH Z BRACKET, 3/16"
3	THREADED ROD ASSEMBLY 1/2"x12"



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

RRH MOUNT DETAIL | NO SCALE | 3

COMMSCOPE FFVV-65B-R2	
DIMENSIONS (HxWxD)(MM/IN)	1828x498x197 72"x19.6"x7.8"
RF CONNECTOR INTERFACE	4.3-10 FEMALE
WEIGHT	70.8 lbs
WEIGHT WITH BRACKETS	98.1 lbs

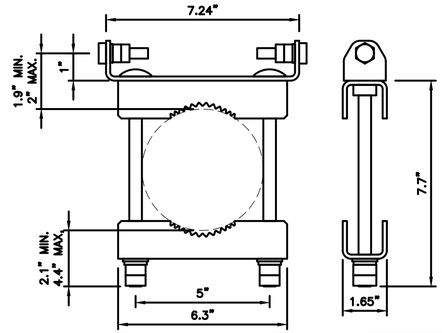

PLAN

BACK SIDE FRONT

ANTENNA DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

COMMSCOPE ANTENNA BRACKET BSAMNT-F	
DIAMETER COMPATIBILITY	2.402" - 4.5"
NET WEIGHT	7.937 lbs

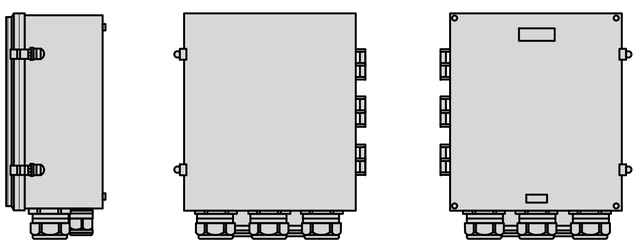


NOTE:
OR DISH Wireless L.L.C.
APPROVED EQUIVALENT

ANTENNA BRACKET DETAIL | NO SCALE | 6

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


PLAN

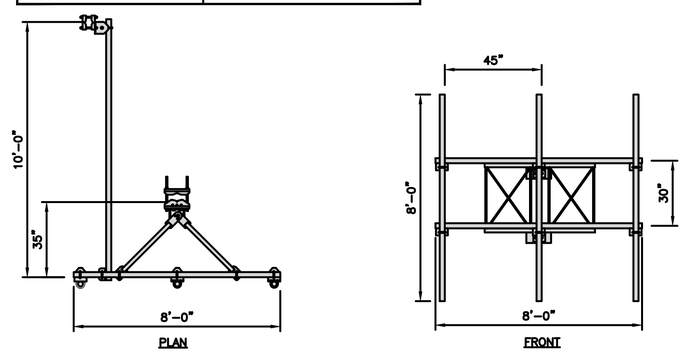

SIDE BACK FRONT

SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 7

NOT USED | NO SCALE | 8

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

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



ANTENNA FRAME DETAIL | NO SCALE | 9

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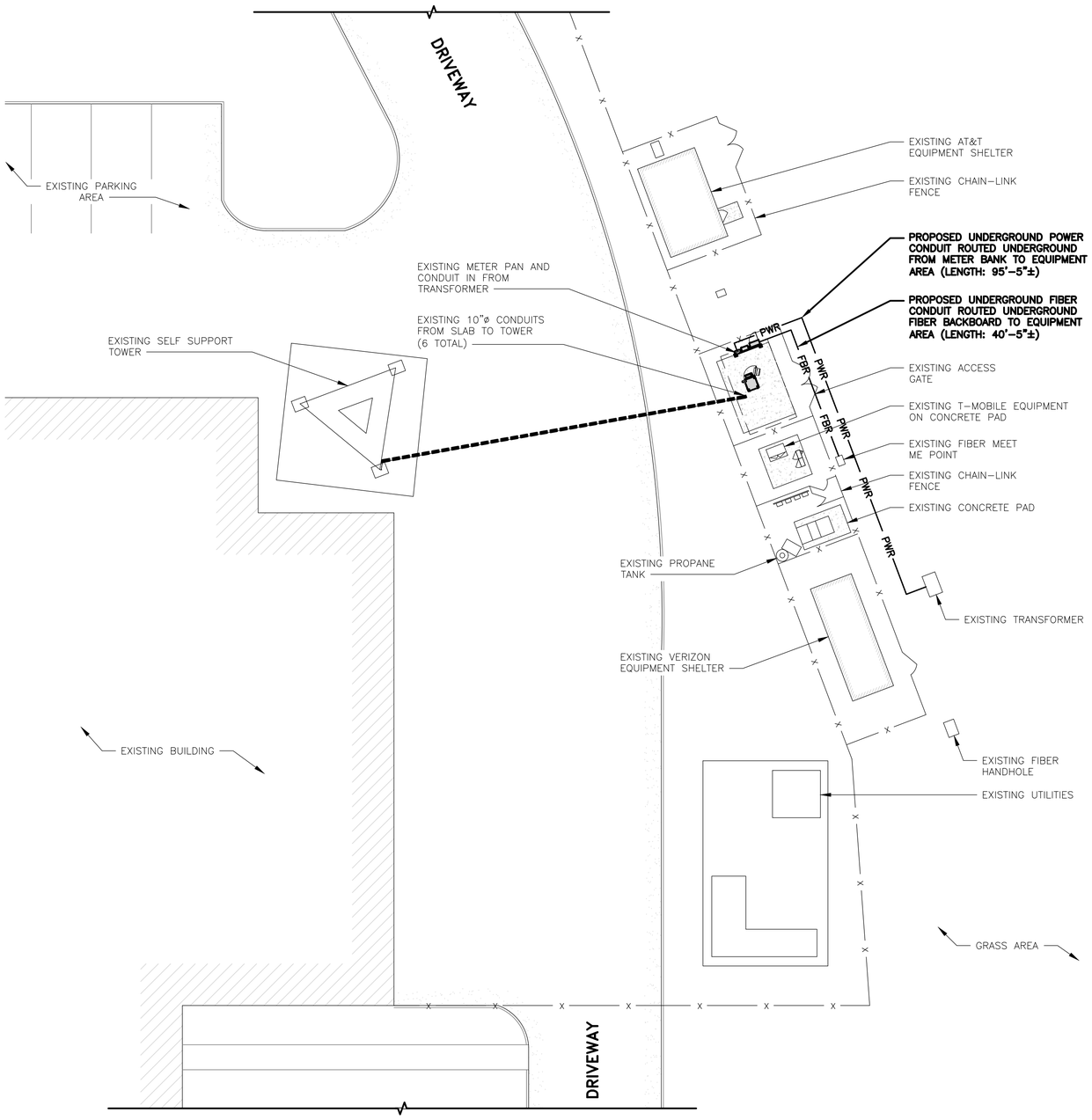
NEWTOWN, CT 06470

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6

NOTES

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



UTILITY ROUTE PLAN

16' 12' 8' 4' 0 16' 32'
1/16"=1'-0"

1

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

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

ELECTRICAL NOTES

NO SCALE

2

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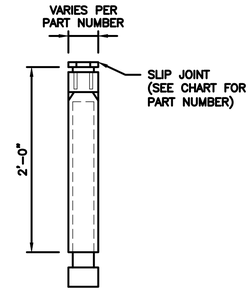
SHEET TITLE
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

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"

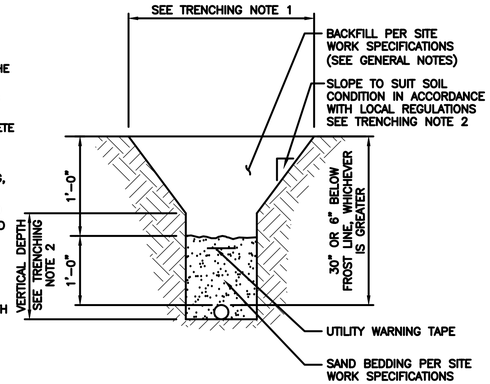


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

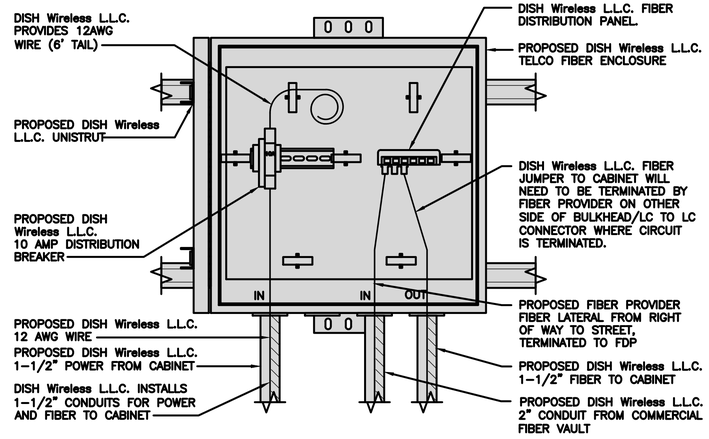
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

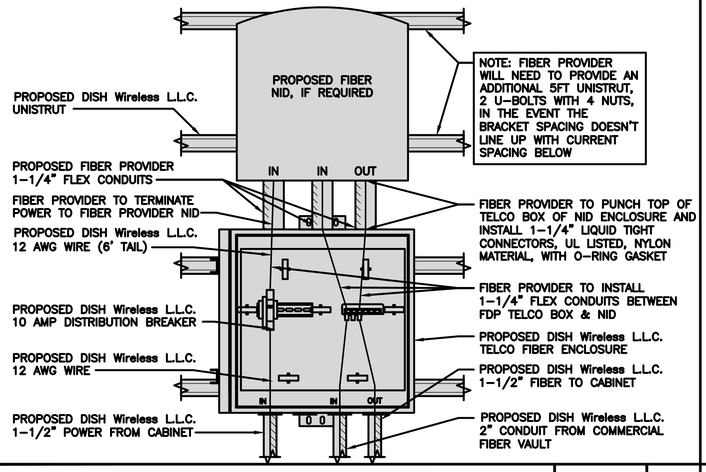
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT 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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5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
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A&E PROJECT NUMBER

NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION

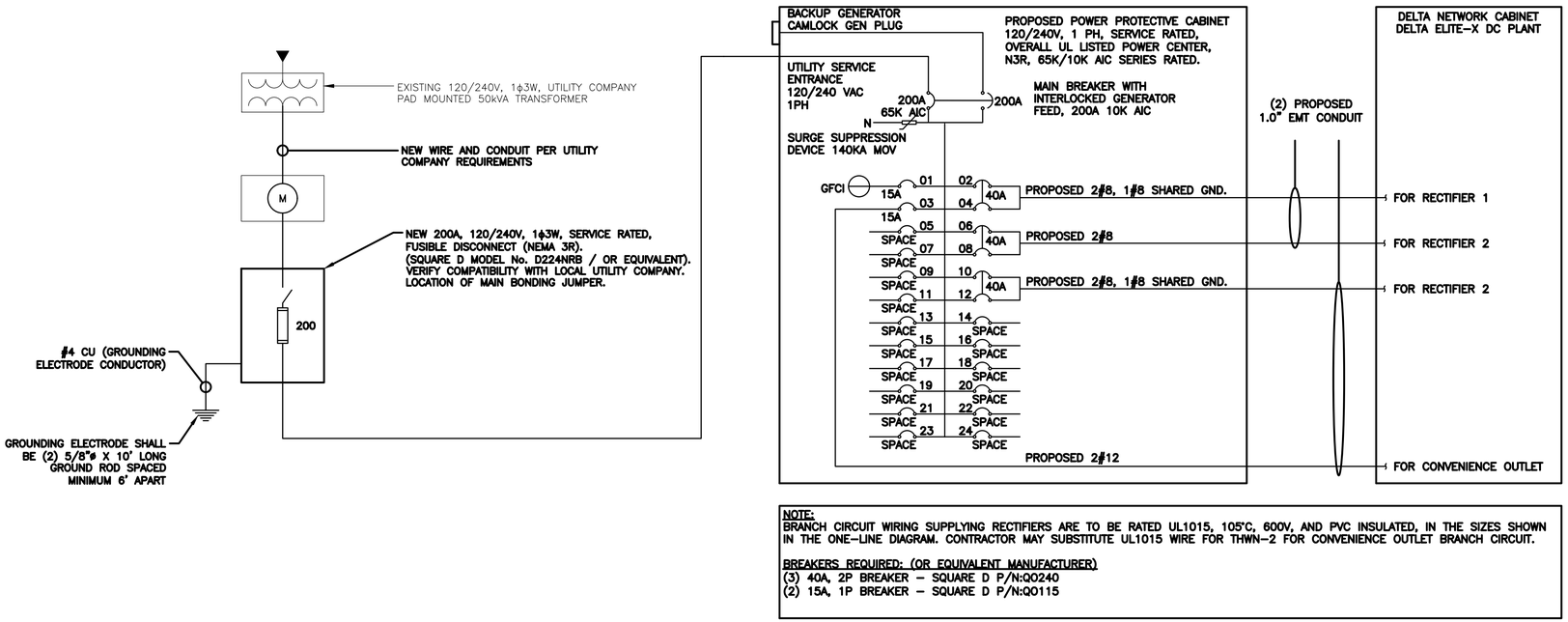
NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

ELECTRICAL DETAILS

SHEET NUMBER

E-2



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

BREAKERS REQUIRED: (OR EQUIVALENT MANUFACTURER)
(3) 40A, 2P BREAKER – SQUARE D P/N:QO240
(2) 15A, 1P BREAKER – SQUARE D P/N:QO115

NOTES

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 80% PER 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE. (ALL WIRE AND TERMINATION HARDWARE TO BE RATED 75°C)

#12 FOR 20A OCPD WIRE DERATING: 0.8 x 25A = 20.0A
#8 FOR 40A OCPD WIRE DERATING: 0.8 x 50A = 40.0A

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.

1.0" CONDUIT – .3460 SQ. IN AREA
3.0" CONDUIT – 3.538 SQ. IN AREA

(2 CONDUIT): USING THWN-2, CU.
RECTIFIER CONDUCTORS

#8 – 0.0366 SQ. IN X 4 = 0.1464 SQ. IN
#8 – 0.0366 SQ. IN X 1 = 0.0366 SQ. IN <GROUND
TOTAL = 0.1830 SQ. IN

RECTIFIER & GFCI CONDUCTORS

#12 – 0.0133 SQ. IN X 2 = 0.0266 SQ. IN
#8 – 0.0366 SQ. IN X 2 = 0.0732 SQ. IN
#8 – 0.0366 SQ. IN X 1 = 0.0366 SQ. IN <GROUND
TOTAL = 0.1364 SQ. IN

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

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

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

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

(1) OPTIONAL ALUMINUM SERVICE CONDUCTOR:
- 4/0 AL + #2 GRD MAY BE USED INSTEAD OF 3/0 CU + #6 GRD IF THE TOTAL LENGTH OF THE CONDUCTOR IS LESS THAN 300 FT FROM THE TRANSFORMER.
- ALUMINUM CONDUCTORS MUST BE 90°C TO CARRY THE FULL 200A LOAD REQUIRED
- ALUMINUM TO COPPER BUSS CONNECTIONS MUST MEET AND CONFORM TO ANSI AND BE UL LISTED. USE ANTI CORROSION CONDUCTIVE LUBRICANT ON CONNECTIONS

PPC ONE-LINE DIAGRAM

NO SCALE | 1

PANEL SCHEDULE

PANEL NAME	LOCATION	VOLTAGE: 240/120 1Ø MAIN C/B: 200 AMPS BUS RATING: 200 AMPS	MOUNTING/ENCLOSURE: SURFACE/NEMA 3R AVAIL. FAULT CURRENT: SHORT CIRCUIT RATING: 65,000 / 10,000 SERIES RATED
DELTA	EQUIPMENT PLATFORM		

AMPS POLES	WIRE & CONDUIT	TYPE	DESCRIPTION	KVA	CKT	A		B	CKT	KVA	DESCRIPTION	TYPE	WIRE & CONDUIT	AMPS POLES
15/1	2 #12, 1 #12G	R	INTERNAL GFCI	0.18	1	1.68			2	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
15/1	SEE ONE LINE	R	CONVENIENCE OUTLET	0.18	3			1.68	4	1.50		EQ		
			SPACE		5	1.50			6	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
			SPACE		7			1.50	8	1.50		EQ		
			SPACE		9	1.50			10	1.50	RECTIFIER	EQ	SEE ONE LINE	40/2
			SPACE		11			1.50	12	1.50		EQ		
			SPACE		13				14		SPACE			
			SPACE		15				16		SPACE			
			SPACE		17				18		SPACE			
			SPACE		19				20		SPACE			
			SPACE		21				22		SPACE			
			SPACE		23				24		SPACE			
			PHASED LOAD			4.7		4.7	KVA					

TOTAL CONNECTED LOAD	9.4 kVA	39 A
TOTAL DEMAND LOAD	9.4 kVA	39 A

LOAD TYPE	DESCRIPTION	CONN. LOAD KVA	CONN. LOAD AMPS	DEMAND FACTOR	DESIGN LOAD KVA	DESIGN LOAD AMPS
L	LIGHTING	0.0	0.0	1.25	0.0	0.0
R	RECEPTACLE	0.4	1.5	NEC	0.4	1.5
M	MOTOR	0.0	0.0	NEC	0.0	0.0
H	HEATING	0.0	0.0	1.00	0.0	0.0
AC	HVAC	0.0	0.0	1.00	0.0	0.0
EQ	EQUIPMENT	9.0	37.5	1.00	9.0	37.5
E	EXISTING	0.0	0.0	1.25	0.0	0.0

*ALL EQUIPMENT LOADS CONSIDERED CONTINUOUS LOADS

PANEL SCHEDULE | NO SCALE | 2

NOT USED

NO SCALE | 3

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MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

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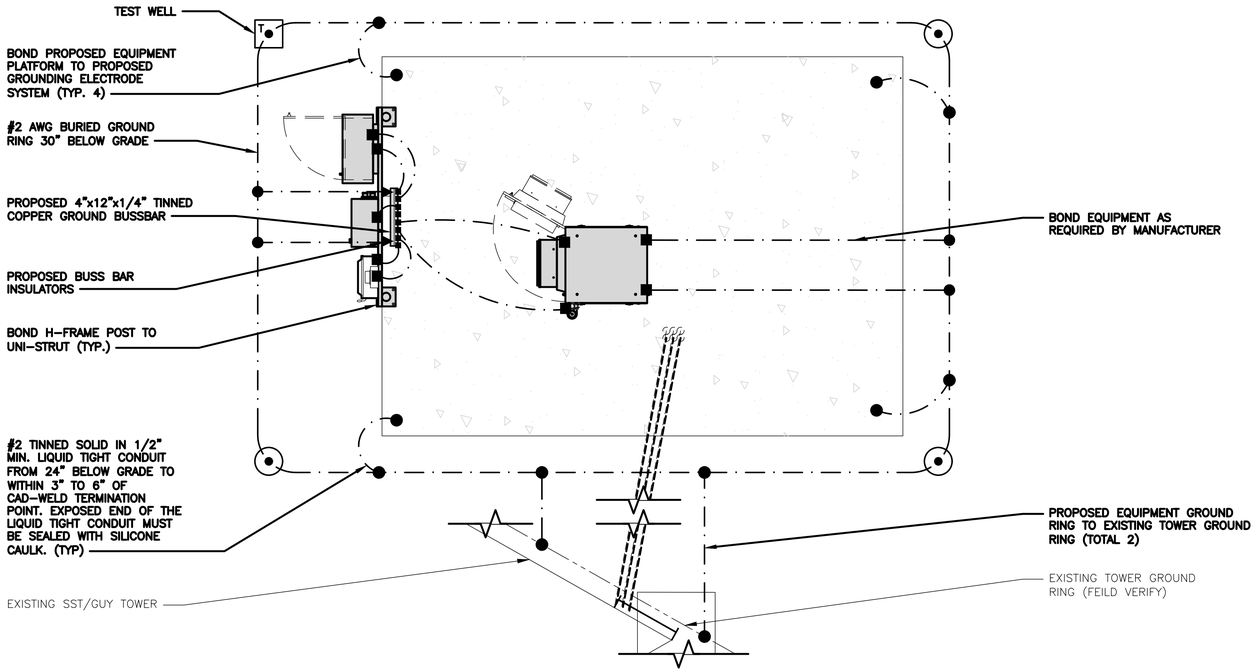
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

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

SHEET NUMBER
E-3

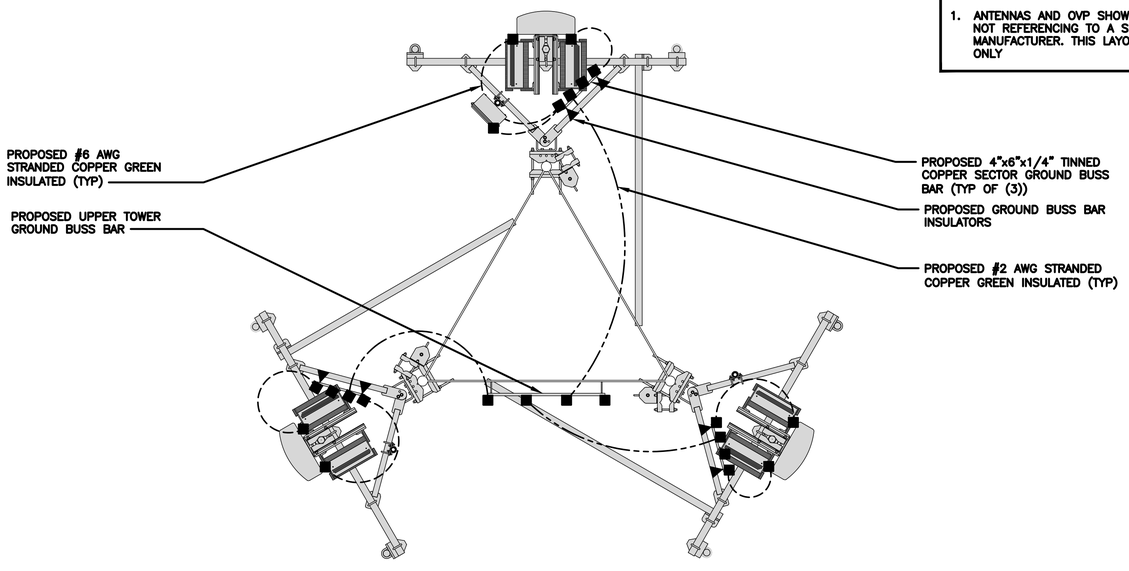


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE | 1

NOTES

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



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE | 2

- 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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LITTLETON, CO 80120

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRIAN J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

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NJJER02057A

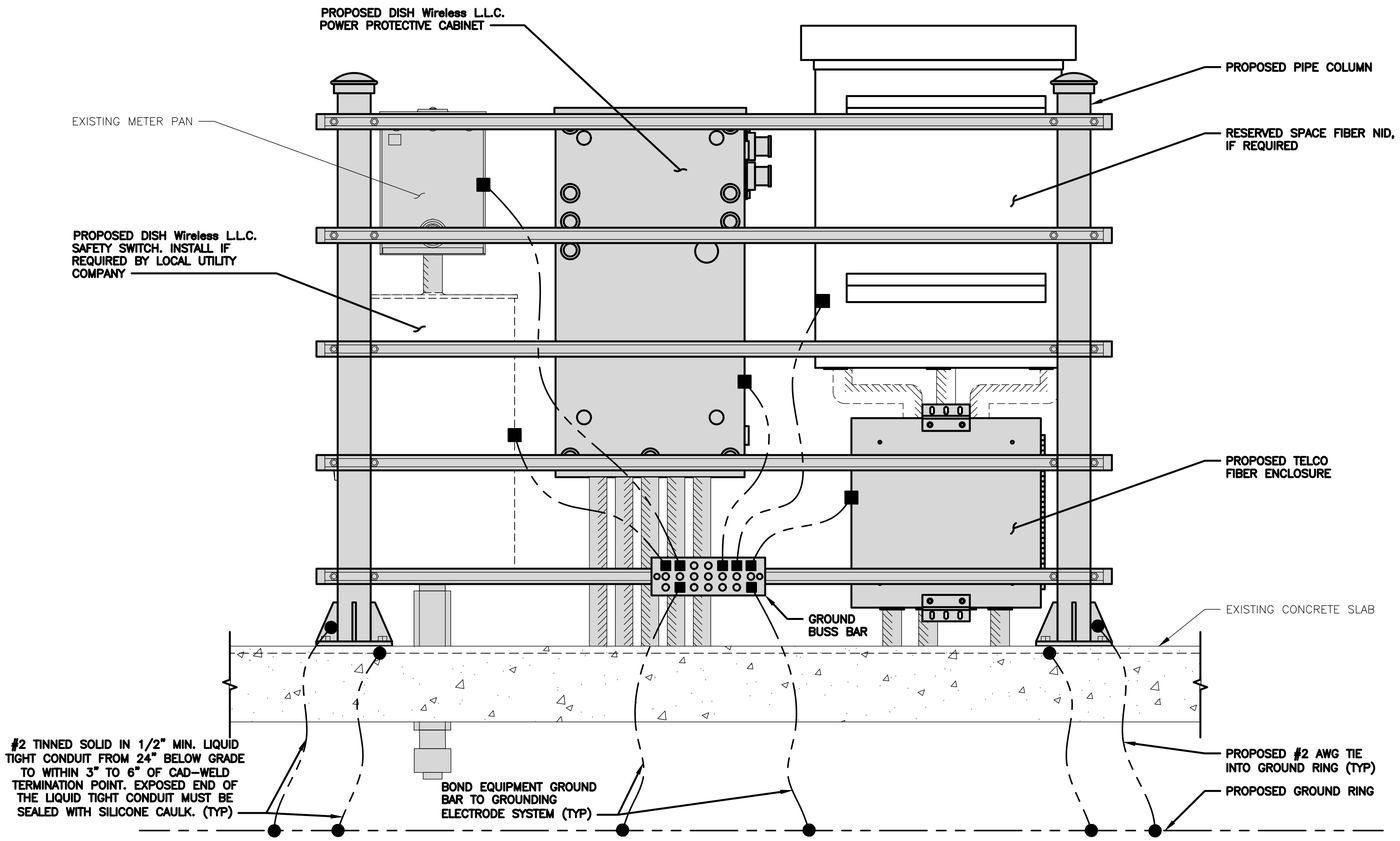
DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE
GROUNDING PLANS AND NOTES

SHEET NUMBER
G-1

NOTES

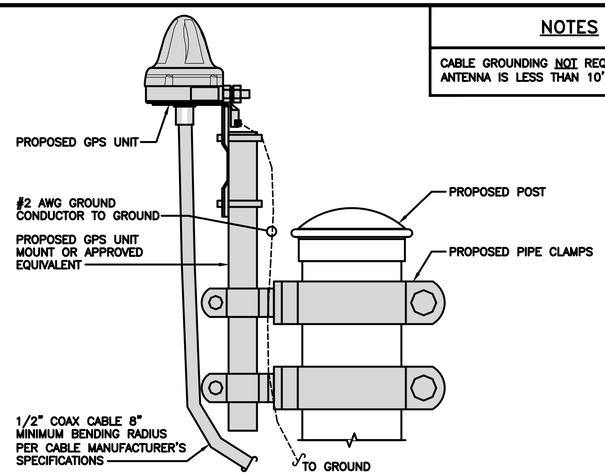
EQUIPMENT CABINET OMITTED FOR CLARITY



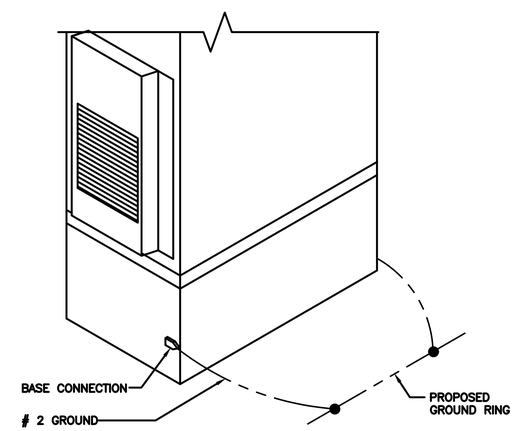
H-FRAME GROUNDING DETAIL | NO SCALE | 1

NOTES

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



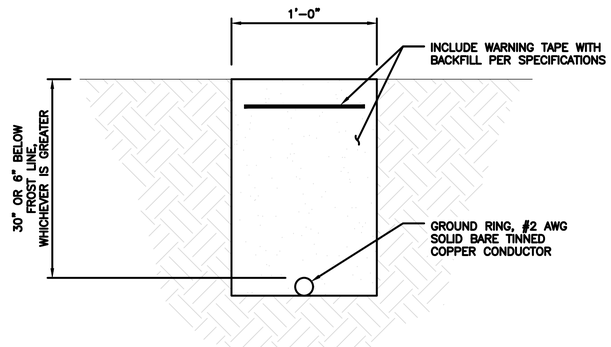
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



OUTDOOR CABINET GROUNDING | NO SCALE | 3

NOT USED | NO SCALE | 4

NOT USED | NO SCALE | 5



TYPICAL GROUND RING TRENCH | NO SCALE | 6

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20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

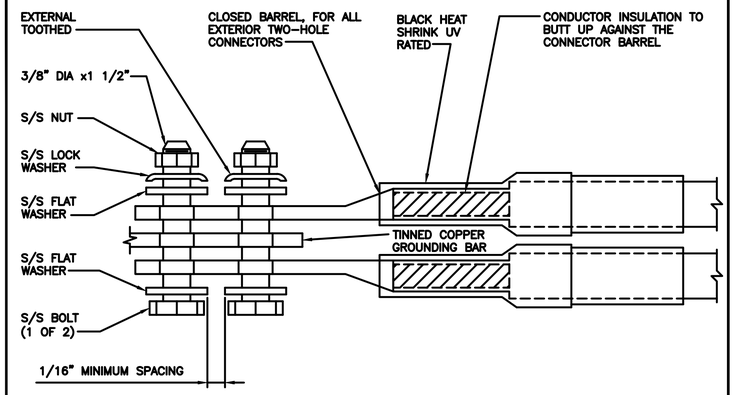
GROUNDING DETAILS

SHEET NUMBER

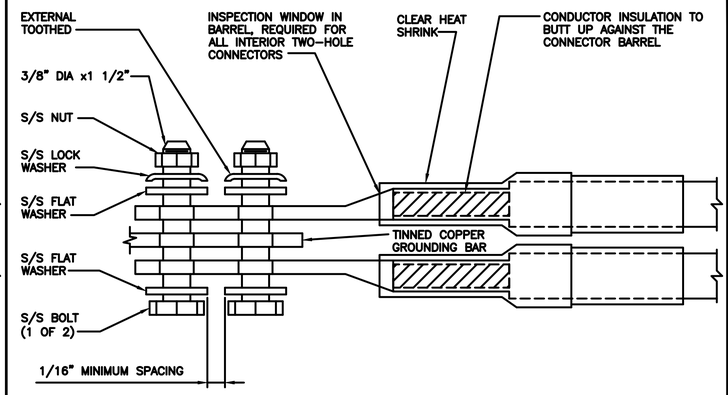
G-2

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).

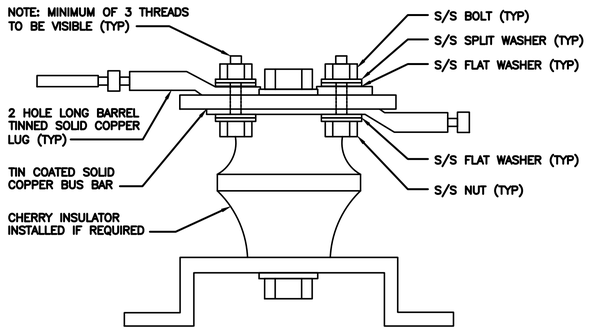
TYPICAL GROUNDING NOTES | NO SCALE | 1



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

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SHEET TITLE

GROUNDING DETAILS

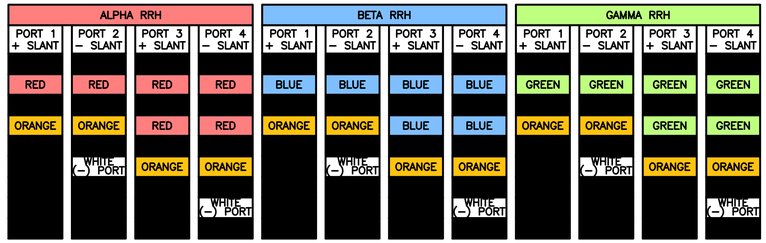
SHEET NUMBER

G-3

HYBRID/DISCREET CABLES — 3/4" TAPE WIDTHS WITH 3/4" SPACING

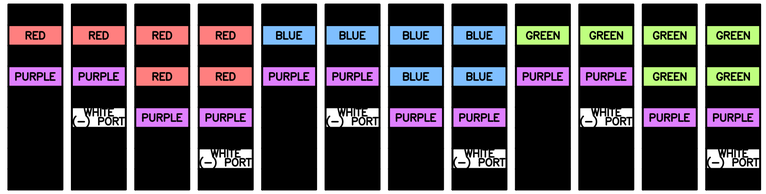
LOW–BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) – OPTIONAL PER MARKET

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



MID–BAND RRH
(AWS BANDS N66+N70)

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



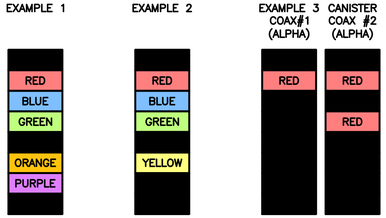
HYBRID/DISCREET CABLES

INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.

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

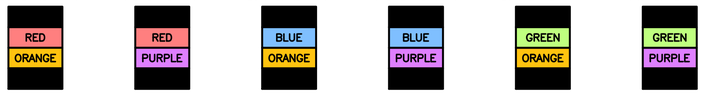
EXAMPLE 2 – HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.

EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.



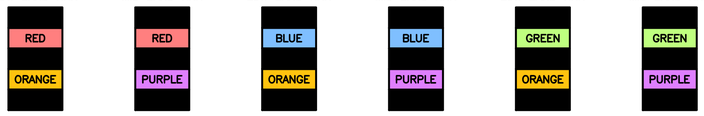
FIBER JUMPERS TO RRHs

LOW–BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.



POWER CABLES TO RRHs

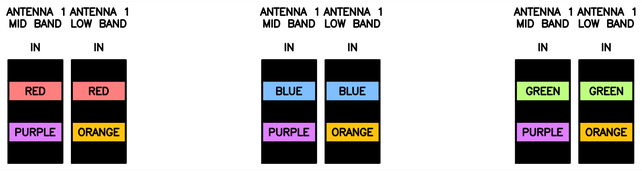
LOW–BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

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

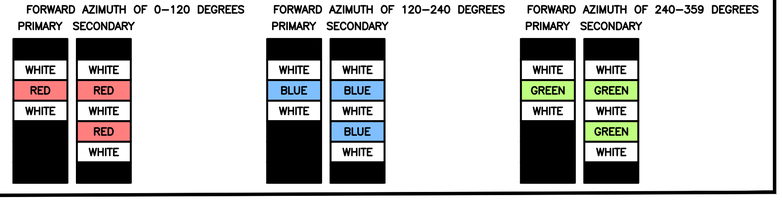
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.

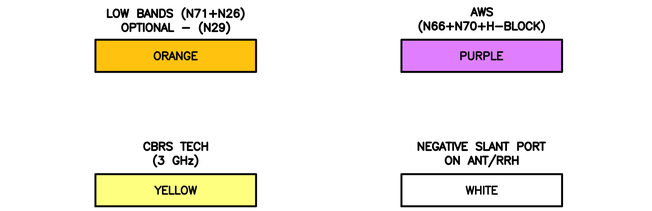


MICROWAVE RADIO LINKS

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.





COLOR IDENTIFIER		2
NOT USED		3
RF CABLE COLOR CODES		1
NOT USED		4

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

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
0	01/21/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION
NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE
RF
CABLE COLOR CODE

SHEET NUMBER
RF-1

EXOTHERMIC CONNECTION

MECHANICAL CONNECTION

BUSS BAR INSULATOR

CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

TEST CHEMICAL ELECTROLYTIC GROUNDING SYSTEM

EXOTHERMIC WITH INSPECTION SLEEVE

GROUNDING BAR

GROUND ROD

TEST GROUND ROD WITH INSPECTION SLEEVE

SINGLE POLE SWITCH

DUPLEX RECEPTACLE

DUPLEX GFCI RECEPTACLE

FLUORESCENT LIGHTING FIXTURE (2) TWO LAMPS 48–T8

SMOKE DETECTION (DC)

EMERGENCY LIGHTING (DC)

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

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRETT J MAGAN
1/23/2023
33678
LICENSED
PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

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20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

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

SIGN PLACEMENT:

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

NOTES:

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

INFORMATION

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

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

Site ID: _____

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

NOTICE

Transmitting Antenna(s)

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

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

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

Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

CAUTION

Transmitting Antenna(s)

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

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dish

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Site ID: _____

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

RF SIGNAGE

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

MK DEVELOPMENT
140 BEACH 137TH STREET
ROCKAWAY, NY 11694

STATE OF CONNECTICUT
BRIAN J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
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20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE
RF SIGNAGE

SHEET NUMBER
GN-2

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GENERAL NOTES:

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

CONTRACTOR:GENERAL CONTRACTOR RESPONSIBLE FOR CONSTRUCTION

CARRIER:DISH Wireless L.L.C.

TOWER OWNER:TOWER OWNER

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.
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LITTLETON, CO 80120

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140 BEACH 137TH STREET
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STATE OF CONNECTICUT
BRETT J MAGAN
1/23/2023
33678
LICENSED
PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/16/2022	ISSUED FOR REVIEW
0	01/21/2023	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

NJJER02057A

DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.
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MK DEVELOPMENT
140 BEACH 137TH STREET
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STATE OF CONNECTICUT
BRIAN J MAGAN
1/23/2023
33678
LICENSED PROFESSIONAL ENGINEER

DRAWN BY:	CHECKED BY:	APPROVED BY:
NOA	---	---

RFDS REV #: ---

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A&E PROJECT NUMBER

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DISH Wireless L.L.C.
PROJECT INFORMATION

NJJER02057A
20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

dish wireless.

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STATE OF CONNECTICUT
MATTHEW J MAGAN
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1/23/2023

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PROJECT INFORMATION

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20 BARNABAS ROAD
NEWTOWN, CT 06470

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-5

MK DEVELOPMENT

EXHIBIT D

Structural Analysis

January 19, 2023

PASS

RE: **Structural Analysis for Tower**

Location: **20 Barnabas Road Newtown, CT 06470**

Site ID: **NJJER02057A**

Dish Wireless LLC,

Per your request, we have performed a structural analysis of the existing tower. This site consists of an existing self-support tower that has multiple carriers co-located on the tower. This review determines if the tower can support the existing and proposed loads.

1.0 Assumptions:

CATEGORY	DATA	CODE
Structure Type	Self-Support	
RAD Center	180'-0"	
Structure Class	II	ASCE 7-16
Exposure Class	B	ASCE 7-16
Kzt Factor	1.0	ASCE 7-16
Basic Wind Speed	130	2022 CSBC
Ice Thickness	1"	ASCE 7-16
Ice Windspeed	50 MPH	ASCE 7-16
Seismic Design Category	B	ASCE 7-16
S_{DS}	.225	ASCE 7-16

2.0 Existing Documents:

DOCUMENT	COMPANY	DATE
Existing Structural Analysis	Centek Engineering	4/13/2022
Site Visit Photos	M&K Development	8/9/2022

3.0 Proposed Equipment:

MANUFACTURER	EQUIPMENT	WEIGHTS
CommScope	**(3) MTC3975083**	**352 lbs**
CommScope	**(3) FFVV-65B-R2**	**70.54 lbs**
Fujitsu	**(3) TA08025-B604**	**63.9 lbs**
Fujitsu	**(3) TA08025-B605**	**74.9 lbs**
RayCap	**(3) OVP RDIDC-9181-PF-48**	**32 lbs**
CommScope	**(3) HYBRID CABLE**	**N.A.**

Bold represents equipment to be added

It is assumed that all information from the previous analysis performed by Centek Engineering on April 13, 2022 is still accurate and correct. We have been informed that Dish Wireless will replace Sprint Wireless at a RAD center of 90 feet. This is the only variation from the previous structural. If this assumption is not true, please contact our office for an amended report.

We are installing (3) proposed MTC-3975083 mount on the existing tower that will support all the proposed equipment. After performing an analysis on the tower in TNxTower, it has been determined that the tower is **ADEQUATE** for the existing and proposed loads on the structure which passes at 80.1% of its capacity.

This report does not address the structural stability of any mounts, nor does it provide any warranty either express or implied, for any portion of the proposed mounts or structure.

Please note that we have not had a professional engineer perform an independent visit to confirm existing structural conditions and the outcome of this analysis is based solely on the information provided in the previous structural analysis, photos and drawing details. If the existing conditions are modified, in disrepair or not properly represented, contact our office immediately for an amended report since this analysis may be inaccurate.

If you have any questions, feel free to contact us at any time.

Sincerely,

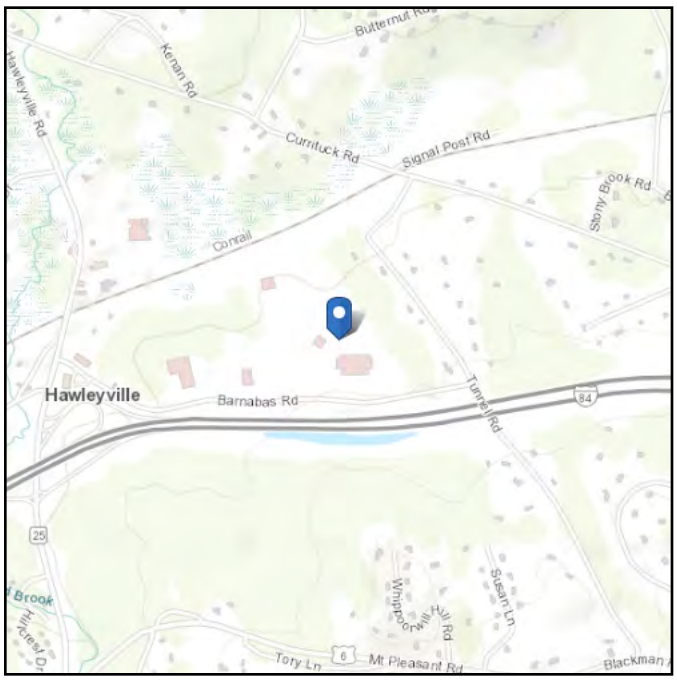
Magaram Engineering

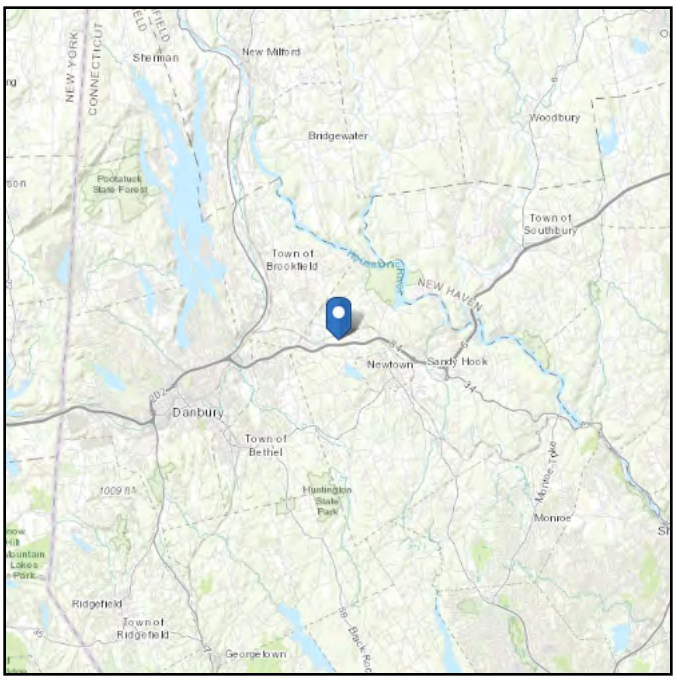
Brett Magaram
Connecticut License # 33678
Brett@MagaramEngineering.com
Phone: 914-450-8416

ASCE 7 Hazards Report

Address:
20 Barnabas Rd
Newtown, Connecticut
06470

Standard:	ASCE/SEI 7-16	**Elevation:**	446.48 ft (NAVD 88)
Risk Category:	III	**Latitude:**	41.428055
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-73.344932





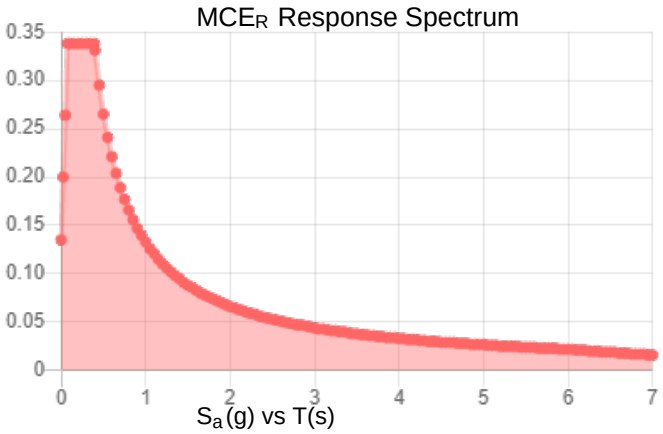
Seismic

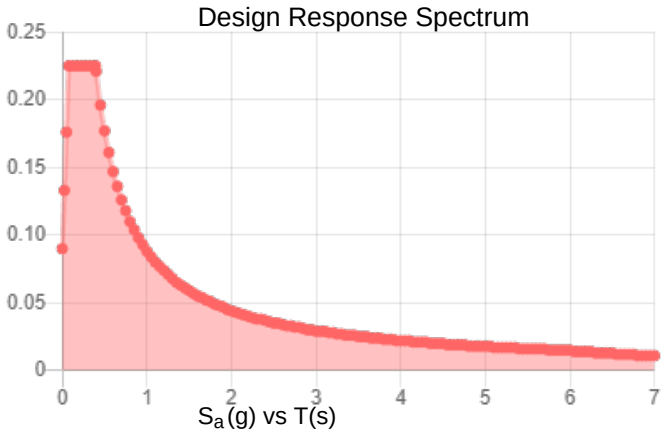
Site Soil Class: D - Default (see Section 11.4.3)

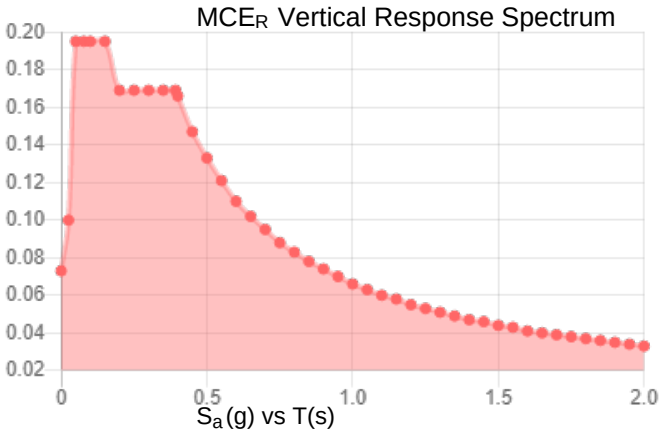
Results:

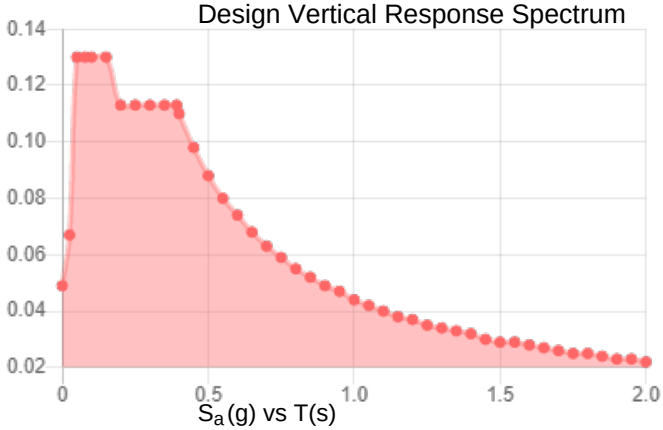
S_S :	0.211	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.12
F_v :	2.4	PGA_M :	0.187
S_{MS} :	0.338	F_{PGA} :	1.56
S_{M1} :	0.133	I_e :	1.25
S_{DS} :	0.225	C_v :	0.722

Seismic Design Category B









Data Accessed: **Sat Nov 05 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

Results:

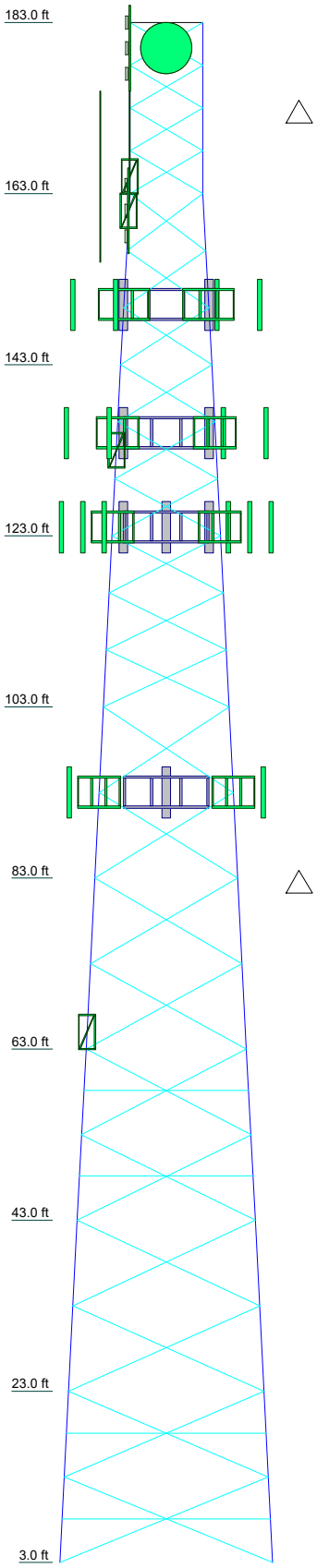
Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Sat Nov 05 2022

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

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Municipality	Basic Design Wind Speeds, V (mph)				Allowable Stress Design Wind Speeds, V_{asd} (mph)				Ground Snow Load p_g (psf)	MCE Ground Accelerations		Wind-Borne Debris Region[1]		Hurricane-Prone Region
	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV		S_S (g)	S_1 (g)	Risk Cat. III Occup. I-2	Risk Cat. IV	
New Milford	110	115	125	130	85	89	97	101	35	0.198	0.055			
Newington	110	120	130	135	85	93	101	105	30	0.195	0.055			Yes
Newtown	110	120	130	130	85	93	101	101	30	0.209	0.055			Yes
Norfolk	105	115	125	130	81	89	97	101	40	0.165	0.054			
North Branford	115	125	135	135	89	97	105	105	30	0.204	0.054			Yes
North Canaan	105	115	125	130	81	89	97	101	40	0.164	0.054			
North Haven	110	120	130	135	85	93	101	105	30	0.204	0.054			Yes
North Stonington	120	130	140	140	93	101	108	108	30	0.186	0.052			Yes
Norwalk	110	120	130	135	85	93	101	105	30	0.240	0.056		Type B	Yes
Norwich	115	125	135	140	89	97	105	108	30	0.194	0.054			Yes
Old Lyme	120	130	135	140	93	101	105	108	30	0.201	0.053	Type B	Type B	Yes
Old Saybrook	120	130	135	140	93	101	105	108	30	0.202	0.053	Type B	Type B	Yes
Orange	110	120	130	135	85	93	101	105	30	0.201	0.054			Yes
Oxford	110	120	130	135	85	93	101	105	30	0.199	0.054			Yes
Plainfield	115	125	135	140	89	97	105	108	30	0.187	0.054			Yes
Plainville	110	120	130	135	85	93	101	105	35	0.191	0.055			Yes
Plymouth	110	120	125	130	85	93	97	101	35	0.185	0.054			Yes
Pomfret	115	125	130	135	89	97	101	105	40	0.182	0.055			Yes
Portland	110	120	130	135	85	93	101	105	30	0.208	0.056			Yes
Preston	120	125	135	140	93	97	105	108	30	0.191	0.053			Yes
Prospect	110	120	130	135	85	93	101	105	30	0.197	0.054			Yes
Putnam	115	125	130	135	89	97	101	105	40	0.184	0.055			Yes
Redding	110	120	125	130	85	93	97	101	30	0.228	0.056			Yes
Ridgefield	110	120	125	130	85	93	97	101	30	0.243	0.057			Yes
Rocky Hill	110	120	130	135	85	93	101	105	30	0.200	0.055			Yes
Roxbury	110	120	125	130	85	93	97	101	35	0.196	0.054			Yes
Salem	115	125	135	140	89	97	105	108	30	0.205	0.055			Yes
Salisbury	105	115	125	130	81	89	97	101	40	0.116	0.054			
Scotland	115	125	135	135	89	97	105	105	30	0.188	0.054			Yes
Seymour	110	120	130	135	85	93	101	105	30	0.200	0.054			Yes
Sharon	105	115	125	130	81	89	97	101	40	0.171	0.054			
Shelton	110	120	130	135	85	93	101	105	30	0.203	0.054			Yes

Section		T8	T7	T6	T5	T4	T3	T2	T1	L1
Legs		P6x.432		P5x.375		P5x.258	P4x.337	P3x.216	P2.5x.276	P2.5x.203
Leg Grade		A572-50								
Diagonals		L4x4x3/8		L3 1/2x3 1/2x3/8	L3 1/2x3 1/2x5/16	A	L2 1/2x2 1/2x5/16	L2 1/2x2 1/2x3/16	L2x2x1/4	L1 3/4x1 3/4x3/16
Diagonal Grade		A36								
Top Girts		N.A.								L2 1/2x2 1/2x3/16
Sec. Horizontals		L4x4x1/4	N.A.	L3 1/2x3 1/2x1/4		N.A.				
Face Width (ft)	24.86	22.8225	20.785	18.7475	16.71	14.6725	12.635	10.5975	8.56	8.56
# Panels @ (ft)		10 @ 10				9 @ 6.66667				4 @ 5
Weight (lb)	25276.7	5682.4	4520.7	4175.2	2987.4	2393.4	2260.5	1196.0	1131.7	929.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
10' Dipole	180	800-10121 [P2.0][96"] (ATT)	135
15' Omni	180	RRUS11 (ATT)	135
Empty Pipe [2.0][60"]	180	(2) LGP21401 TMA (ATT)	135
Empty Pipe [2.0][60"]	180	DC6-48-60-18-8F (ATT)	135
6 FT DISH	180	Pirod 10' PCS Frame (1) (ATT)	135
Empty Pipe [P2.0][72"]	177	P65-16-XLH-RR (ATT)	135
Empty Pipe [P4.0][72"]	177	Pirod 4' Side Mount Standoff (1)	133
Empty Pipe [P4.0][102"]	177	10' Dipole	133
20' Omni	173	CBRS Antenna (VZW)	124
SP2D03P36D-D (20' Omni) (Eversource)	165	B2/66 RRH (VZW)	124
		B5/15 RRH -BRO4C (VZW)	124
USF-4U (4ft Standoff) (Eversource)	165	RVZDC-6627-PF-48 (VZW)	124
10' Dipole	161	Pirod 10' PCS Frame (1) (VZW)	124
Pirod 4' Side Mount Standoff (1)	161	(2) MX08FRO660 [P2.0][96"] (VZW)	124
5' Omni	160	CBRS Antenna (VZW)	124
AIR6419 (TMO)	150	B2/66 RRH (VZW)	124
Radio 4480 (TMO)	150	B5/15 RRH -BRO4C (VZW)	124
Radio 4460 (TMO)	150	Pirod 10' PCS Frame (1) (VZW)	124
VFA12-HD (12ft V-Frame) (TMO)	150	(2) MX08FRO660 [P2.0][96"] (VZW)	124
APXVAARR24_43-U-NA20 (TMO)	150	CBRS Antenna (VZW)	124
AIR6419 (TMO)	150	B2/66 RRH (VZW)	124
Radio 4480 (TMO)	150	B5/15 RRH -BRO4C (VZW)	124
Radio 4460 (TMO)	150	Pirod 10' PCS Frame (1) (VZW)	124
VFA12-HD (12ft V-Frame) (TMO)	150	(2) MX08FRO660 [P2.0][96"] (VZW)	124
APXVAARR24_43-U-NA20 (TMO)	150	TA08025-B605 (DISH)	93
AIR6419 (TMO)	150	TA08025-B604 (DISH)	93
Radio 4480 (TMO)	150	RDIDC-3045-PF-48 (DISH)	93
Radio 4460 (TMO)	150	MTC6975083 [P2.0][96"] (DISH)	93
VFA12-HD (12ft V-Frame) (TMO)	150	FFVV-65B-R2 (DISH)	93
APXVAARR24_43-U-NA20 (TMO)	150	TA08025-B605 (DISH)	93
800-10121 [P2.0][96"] (ATT)	135	TA08025-B604 (DISH)	93
RRUS11 (ATT)	135	RDIDC-3045-PF-48 (DISH)	93
(2) LGP21401 TMA (ATT)	135	MTC6975083 [P2.0][96"] (DISH)	93
Pirod 10' PCS Frame (1) (ATT)	135	FFVV-65B-R2 (DISH)	93
P65-16-XLH-RR (ATT)	135	TA08025-B605 (DISH)	93
800-10121 [P2.0][96"] (ATT)	135	TA08025-B604 (DISH)	93
RRUS11 (ATT)	135	RDIDC-3045-PF-48 (DISH)	93
(2) LGP21401 TMA (ATT)	135	MTC6975083 [P2.0][96"] (DISH)	93
Pirod 10' PCS Frame (1) (ATT)	135	FFVV-65B-R2 (DISH)	93
P65-16-XLH-RR (ATT)	135	Pirod 4' Side Mount Standoff (1)	65

SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L3x3x3/16 + L2-1/2x2-1/2x3/16		

MATERIAL STRENGTH

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

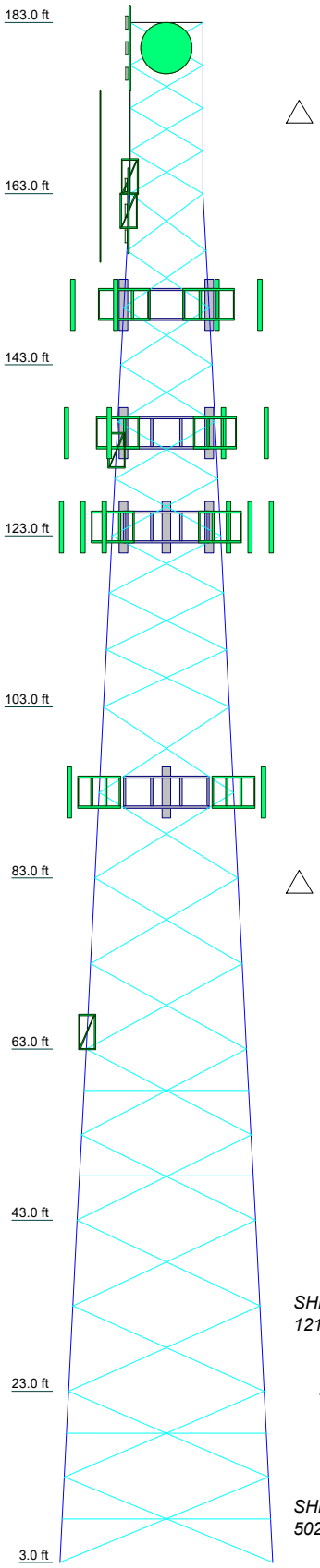
TOWER DESIGN NOTES

1. Tower designed for Exposure B to the TIA-222-H Standard.
2. Tower designed for a 130 mph basic wind in accordance with the TIA-222-H Standard.
3. Tower is also designed for a 50 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 Risk Category III.
6. Topographic Category 1 with Crest Height of 0.00 ft
7. Weld together tower sections have flange connections.
8. Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications.
9. Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards.
10. Welds are fabricated with ER-70S-6 electrodes.

Magaram Engineering
13705 Stone Shadow
Clifton VA
Phone: 914-450-8416
FAX:

Job: ***NJJER02057A***		
Project: ***Dish Wireless LLC***		
Client:	Drawn by:	App'd:
Code: TIA-222-H	Date: 11/06/22	Scale: NTS
Path: C:\Users\Brett Laptop 2019\Desktop\Magaram Engineering\MK Development\NJJER02057A\Tower Analysis\NJJER02057A 11.5.2022.eri		Dwg No. E-1

Section	T8	T7	T6	T5	T4	T3	T2	T1	L1
Legs		P6x.432	P5x.375		P5x.258	P4x.337	P3x.216	P2.5x.276	P2.5x.203
Leg Grade					A572-50				
Diagonals		L4x4x3/8	L3 1/2x3 1/2x3/8	L3 1/2x3 1/2x5/16	A	L2 1/2x2 1/2x5/16	L2 1/2x2 1/2x3/16	L2x2x1/4	L1 3/4x1 3/4x3/16
Diagonal Grade					A36				
Top Girts				N.A.					L2 1/2x2 1/2x3/16
Sec. Horizontals	L4x4x1/4	N.A.	L3 1/2x3 1/2x1/4		N.A.				
Face Width (ft)	22.8225	20.785	18.7475	16.71	14.6725	12.635	10.5975	8.56	8.56
# Panels @ (ft)			10 @ 10			9 @ 6.66667			4 @ 5
Weight (lb)	5682.4	4520.7	4175.2	2987.4	2393.4	2260.5	1196.0	1131.7	929.6
25276.7									



SYMBOL LIST

MARK	SIZE	MARK	SIZE
A	L3x3x3/16 + L2-1/2x2-1/2x3/16		

ALL REACTIONS ARE FACTORED

MAX. CORNER REACTIONS AT BASE:
DOWN: 239177 lb
SHEAR: 30908 lb

UPLIFT: -201148 lb
SHEAR: 26391 lb

AXIAL 92432 lb
SHEAR 12182 lb *MOMENT 1173683 lb-ft*
TORQUE 5274 lb-ft
50 mph WIND - 1.0000 in ICE

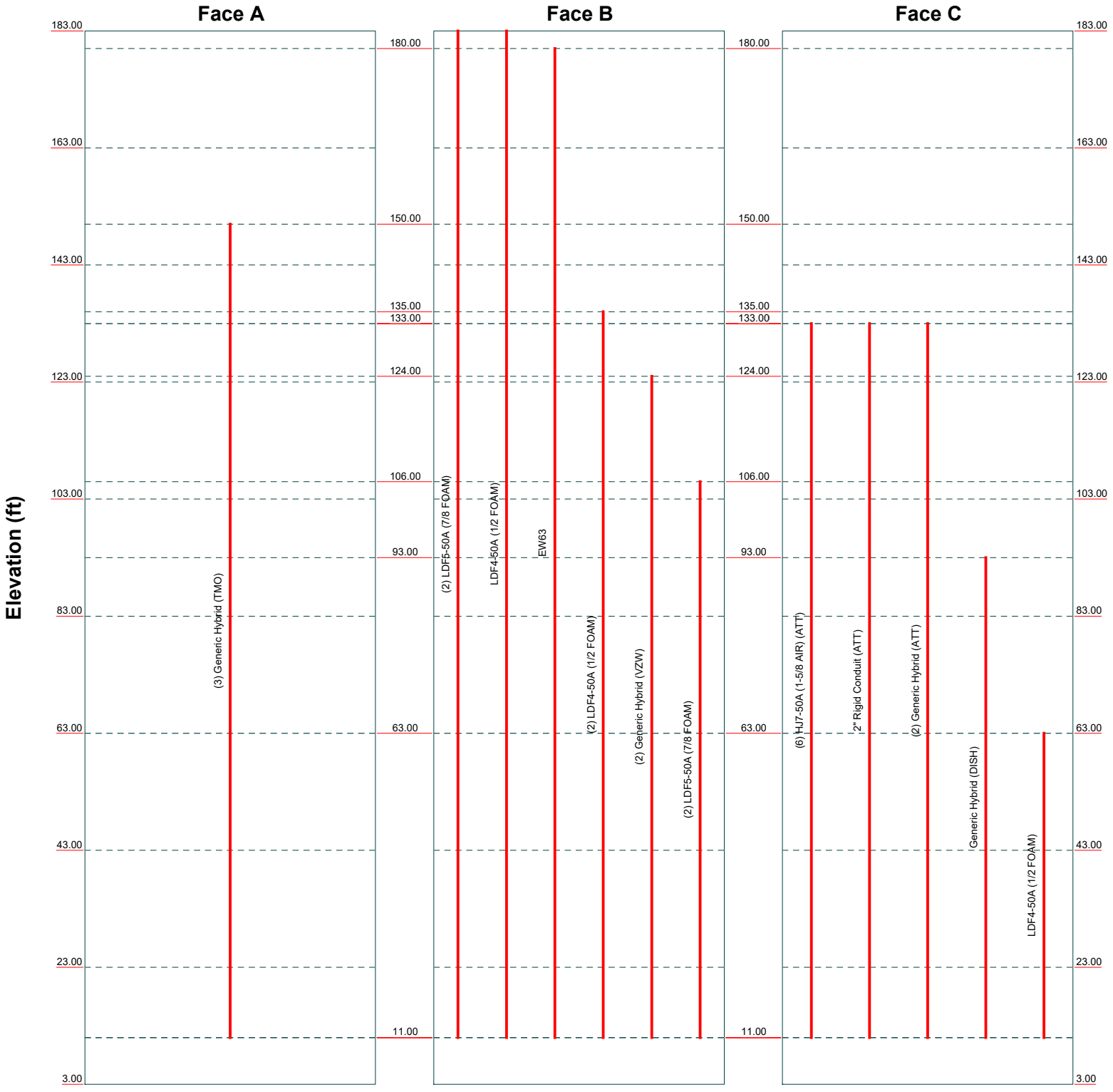
AXIAL 45542 lb
SHEAR 50286 lb *MOMENT 4822521 lb-ft*
TORQUE 17446 lb-ft
REACTIONS - 130 mph WIND

Magaram Engineering
13705 Stone Shadow
Clifton VA
Phone: 914-450-8416
FAX:

Job: **NJJER02057A**		
Project: **Dish Wireless LLC**		
Client:	Drawn by:	App'd:
Code: TIA-222-H	Date: 11/06/22	Scale: NTS
Path: C:\Users\Brett Laptop 2019\Desktop\Magaram Engineering\MK Development\NJJER02057A\Tower Analysis\NJJER02057A 11.5.2022.eri		Dwg No. E-1

Feed Line Distribution Chart
3' - 183'

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



Magaram Engineering
13705 Stone Shadow
Clifton VA
Phone: 914-450-8416
FAX:

Job: ***NJJER02057A***		
Project: ***Dish Wireless LLC***		
Client:	Drawn by:	App'd:
Code: TIA-222-H	Date: 11/06/22	Scale: NTS
Path: C:\Users\Brett Laptop 2019\Desktop\Magaram Engineering\MK Development\NJJER02057A\Tower Analysis\NJJER02057A 11.5.2022.eri		Dwg No. E-7

Tower Input Data

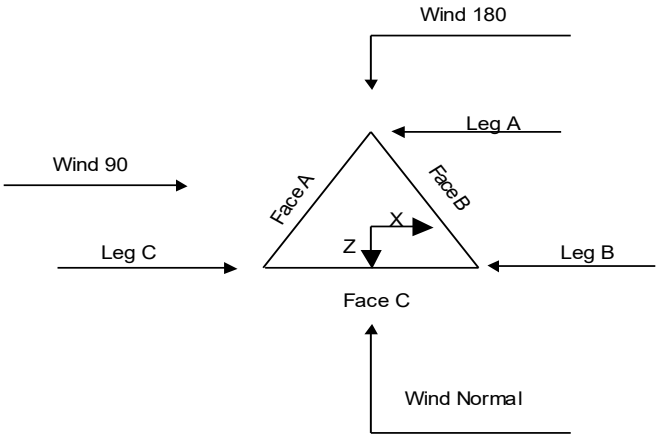
The main tower is a 3x free standing tower with an overall height of 183.00 ft above the ground line.
The base of the tower is set at an elevation of 3.00 ft above the ground line.
The face width of the tower is 8.56 ft at the top and 24.86 ft at the base.
There is a 3 sided latticed pole with a face width of 8.56 ft.
This tower is designed using the TIA-222-H standard.
The following design criteria apply:

Tower base elevation above sea level: 3.00 ft.
Basic wind speed of 130 mph.
Risk Category III.
Exposure Category B.
Simplified Topographic Factor Procedure for wind speed-up calculations is used.
Topographic Category: 1.
Crest Height: 0.00 ft.
Nominal ice thickness of 1.0000 in.
Ice thickness is considered to increase with height.
Ice density of 56 pcf.
A wind speed of 50 mph is used in combination with ice.
Temperature drop of 50 °F.
Deflections calculated using a wind speed of 60 mph.
Weld together tower sections have flange connections..
Connections use galvanized A325 bolts, nuts and locking devices. Installation per TIA/EIA-222 and AISC Specifications..
Tower members are "hot dipped" galvanized in accordance with ASTM A123 and ASTM A153 Standards..
Welds are fabricated with ER-70S-6 electrodes..
A non-linear (P-delta) analysis was used.
Pressures are calculated at each section.
Stress ratio used in latticed pole member design is 1.
Stress ratio used in tower member design is 1.
Local bending stresses due to climbing loads, feed line supports, and appurtenance mounts are not considered.

Options

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

Known



Triangular Tower

3 Sided Latticed Pole Section Geometry

Tower Section	Tower Elevation	Assembly Database	Description	Section Width	Number of Sections	Section Length
	ft			ft		ft
L1	183.00-163.00			8.56	1	20.00

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Section	Tower Elevation	Diagonal Spacing	Bracing Type	Has K Brace End Panels	Has Horizontals	Top Girt Offset	Bottom Girt Offset
	ft	ft				in	in
L1	183.00-163.00	5.00	X Brace	No	No	0.0000	0.0000

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
L1 183.00-163.00	Pipe	P2.5x.203	A572-50 (50 ksi)	Single Angle	L1 3/4x1 3/4x3/16	A36 (36 ksi)

3 Sided Latticed Pole 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
L1 183.00-163.00	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)	Flat Bar		A36 (36 ksi)

3 Sided Latticed Pole 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
L1 183.00-163.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

3 Sided Latticed Pole 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
L1 183.00-163.00	No	No	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.*

3 Sided Latticed Pole Section Geometry *(cont'd)*

Tower Elevation ft	Leg		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
L1 183.00-163.00	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
L1 183.00-163.00	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

Tower Section	Tower Elevation ft	Assembly Database	Description	Section Width ft	Number of Sections	Section Length ft
T1	163.00-143.00			8.56	1	20.00
T2	143.00-123.00			10.60	1	20.00
T3	123.00-103.00			12.64	1	20.00
T4	103.00-83.00			14.67	1	20.00
T5	83.00-63.00			16.71	1	20.00
T6	63.00-43.00			18.75	1	20.00
T7	43.00-23.00			20.79	1	20.00
T8	23.00-3.00			22.82	1	20.00

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	163.00-143.00	6.67	X Brace	No	No	0.0000	0.0000
T2	143.00-123.00	6.67	X Brace	No	No	0.0000	0.0000
T3	123.00-103.00	6.67	X Brace	No	No	0.0000	0.0000
T4	103.00-83.00	10.00	X Brace	No	No	0.0000	0.0000
T5	83.00-63.00	10.00	X Brace	No	No	0.0000	0.0000
T6	63.00-43.00	10.00	X Brace	No	Yes	0.0000	0.0000
T7	43.00-23.00	10.00	X Brace	No	No	0.0000	0.0000
T8	23.00-3.00	10.00	X Brace	No	Yes	0.0000	0.0000

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Leg Type	Leg Size	Leg Grade	Diagonal Type	Diagonal Size	Diagonal Grade
T1 163.00-143.00	Pipe	P2.5x.276	A572-50 (50 ksi)	Single Angle	L2x2x1/4	A36 (36 ksi)
T2 143.00-123.00	Pipe	P3x.216	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x3/16	A36 (36 ksi)
T3 123.00-103.00	Pipe	P4x.337	A572-50 (50 ksi)	Single Angle	L2 1/2x2 1/2x5/16	A36 (36 ksi)
T4 103.00-83.00	Pipe	P5x.258	A572-50 (50 ksi)	Arbitrary Shape	L3x3x3/16 + L2-1/2x2-1/2x3/16	A36 (36 ksi)
T5 83.00-63.00	Pipe	P5x.375	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x5/16	A36 (36 ksi)
T6 63.00-43.00	Pipe	P5x.375	A572-50 (50 ksi)	Single Angle	L3 1/2x3 1/2x3/8	A36 (36 ksi)
T7 43.00-23.00	Pipe	P6x.432	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A36 (36 ksi)
T8 23.00-3.00	Pipe	P6x.432	A572-50 (50 ksi)	Single Angle	L4x4x3/8	A36 (36 ksi)

Tower Section Geometry *(cont'd)*

Tower Elevation ft	Secondary Horizontal Type	Secondary Horizontal Size	Secondary Horizontal Grade	Inner Bracing Type	Inner Bracing Size	Inner Bracing Grade
T6 63.00-43.00	Single Angle	L3 1/2x3 1/2x1/4	A572-50 (50 ksi)	Solid Round		A572-50 (50 ksi)
T8 23.00-3.00	Single Angle	L4x4x1/4	A572-50 (50 ksi)	Solid Round		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 163.00-143.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T2 143.00-123.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T3 123.00-103.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T4 103.00-83.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T5 83.00-63.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T6 63.00-43.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000
T7 43.00-23.00	0.00	0.0000	A36 (36 ksi)	1	1	1	36.0000	36.0000	36.0000

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
T8 23.00-3.00	0.00	0.0000	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	No	No	1	1	1	1	1	1	1	1
163.00-143.00				1	1	1	1	1	1	1
T2	No	No	1	1	1	1	1	1	1	1
143.00-123.00				1	1	1	1	1	1	1
T3	No	No	1	1	1	1	1	1	1	1
123.00-103.00				1	1	1	1	1	1	1
T4	No	No	1	1	1	1	1	1	1	1
103.00-83.00				1	1	1	1	1	1	1
T5	No	No	1	1	1	1	1	1	1	1
83.00-63.00				1	1	1	1	1	1	1
T6	No	No	1	1	1	1	1	1	1	1
63.00-43.00				1	1	1	1	1	1	1
T7	No	No	1	1	1	1	1	1	1	1
43.00-23.00				1	1	1	1	1	1	1
T8 23.00-3.00	No	No	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		Diagonal		Top Girt		Bottom Girt		Mid Girt		Long Horizontal		Short Horizontal	
	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U	Net Width Deduct in	U
T1	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
163.00-143.00														
T2	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
143.00-123.00														
T3	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
123.00-103.00														
T4	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
103.00-83.00														
T5 83.00-63.00	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 63.00-43.00	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 43.00-23.00	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 23.00-3.00	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 163.00-143.00	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 143.00-123.00	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 123.00-103.00	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 103.00-83.00	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 83.00-63.00	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 63.00-43.00	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 43.00-23.00	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 23.00-3.00	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

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Exclude From Torque Calculation	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight plf
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	183.00 - 11.00	2	2	0.5000	1.0900		0.33
LDF4-50A (1/2 FOAM)	B	No	No	Ar (CaAa)	183.00 - 11.00	1	1	0.5000	0.6300		0.15
EW63	B	No	No	Ar (CaAa)	180.00 - 11.00	1	1	0.5000	1.5742		0.51
Generic Hybrid (TMO)	A	No	No	Ar (CaAa)	150.00 - 11.00	3	3	0.5000	1.9800		1.90
LDF4-50A (1/2 FOAM)	B	No	No	Ar (CaAa)	135.00 - 11.00	2	2	0.5000	0.6300		0.15
HJ7-50A (1-5/8 AIR) (ATT)	C	No	No	Ar (CaAa)	133.00 - 11.00	6	6	0.5000	1.9800		1.04
2" Rigid Conduit (ATT)	C	No	No	Ar (CaAa)	133.00 - 11.00	1	1	0.5000	2.0000		2.80
Generic Hybrid (ATT)	C	No	No	Ar (CaAa)	133.00 - 11.00	2	2	0.5000	1.9800		1.90
Generic Hybrid (VZW)	B	No	No	Ar (CaAa)	124.00 - 11.00	2	2	0.5000	1.9800		1.90
LDF5-50A (7/8 FOAM)	B	No	No	Ar (CaAa)	106.00 - 11.00	2	2	0.5000	1.0900		0.33
Generic Hybrid (DISH)	C	No	No	Ar (CaAa)	93.00 - 11.00	1	1	0.5000	1.9800		1.90
LDF4-50A (1/2 FOAM)	C	No	No	Ar (CaAa)	63.00 - 11.00	1	1	0.5000	0.6300		0.15

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
L1	183.00-163.00	A	0.000	0.000	0.000	0.000	0.00
		B	0.000	0.000	8.296	0.000	24.87
		C	0.000	0.000	0.000	0.000	0.00
T1	163.00-143.00	A	0.000	0.000	4.158	0.000	39.90
		B	0.000	0.000	8.768	0.000	26.40
		C	0.000	0.000	0.000	0.000	0.00
T2	143.00-123.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	10.676	0.000	33.80
		C	0.000	0.000	17.840	0.000	128.40
T3	123.00-103.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	19.862	0.000	110.38
		C	0.000	0.000	35.680	0.000	256.80
T4	103.00-83.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	23.568	0.000	121.60
		C	0.000	0.000	37.660	0.000	275.80
T5	83.00-63.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	23.568	0.000	121.60
		C	0.000	0.000	39.640	0.000	294.80
T6	63.00-43.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	23.568	0.000	121.60
		C	0.000	0.000	40.900	0.000	297.80
T7	43.00-23.00	A	0.000	0.000	11.880	0.000	114.00
		B	0.000	0.000	23.568	0.000	121.60
		C	0.000	0.000	40.900	0.000	297.80
T8	23.00-3.00	A	0.000	0.000	7.128	0.000	68.40
		B	0.000	0.000	14.141	0.000	72.96
		C	0.000	0.000	24.540	0.000	178.68

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
L1	183.00-163.00	A	1.357	0.000	0.000	0.000	0.000	0.00
		B		0.000	0.000	30.482	0.000	294.35
		C		0.000	0.000	0.000	0.000	0.00
T1	163.00-143.00	A	1.341	0.000	0.000	9.355	0.000	124.15
		B		0.000	0.000	31.521	0.000	305.45
		C		0.000	0.000	0.000	0.000	0.00
T2	143.00-123.00	A	1.322	0.000	0.000	26.603	0.000	351.15
		B		0.000	0.000	40.533	0.000	369.48
		C		0.000	0.000	37.290	0.000	484.45
T3	123.00-103.00	A	1.301	0.000	0.000	26.460	0.000	347.10
		B		0.000	0.000	67.951	0.000	650.63
		C		0.000	0.000	74.217	0.000	956.73
T4	103.00-83.00	A	1.276	0.000	0.000	26.293	0.000	342.37
		B		0.000	0.000	80.744	0.000	742.65
		C		0.000	0.000	78.320	0.000	1012.26
T5	83.00-63.00	A	1.245	0.000	0.000	26.090	0.000	336.66
		B		0.000	0.000	79.651	0.000	722.93
		C		0.000	0.000	82.209	0.000	1061.50
T6	63.00-43.00	A	1.206	0.000	0.000	25.829	0.000	329.38
		B		0.000	0.000	78.246	0.000	697.99
		C		0.000	0.000	87.468	0.000	1092.50
T7	43.00-23.00	A	1.150	0.000	0.000	25.458	0.000	319.17
		B		0.000	0.000	76.250	0.000	663.29
		C		0.000	0.000	86.073	0.000	1051.84
T8	23.00-3.00	A	1.048	0.000	0.000	14.868	0.000	180.50

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
		B		0.000	0.000	43.556	0.000	361.23
		C		0.000	0.000	50.112	0.000	587.57

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	183.00-163.00	3.3335	-2.2711	5.9459	-3.8024
T1	163.00-143.00	2.4683	-3.9106	5.3759	-5.5174
T2	143.00-123.00	0.6108	-1.8668	3.3339	-2.7130
T3	123.00-103.00	2.8494	-0.8220	5.7884	-1.3043
T4	103.00-83.00	4.1241	-0.7790	7.5865	-1.4733
T5	83.00-63.00	4.1646	0.0881	8.0427	-0.4540
T6	63.00-43.00	3.7736	0.5913	7.5196	1.0222
T7	43.00-23.00	4.3593	0.6786	8.4278	1.0937
T8	23.00-3.00	2.5568	0.3932	5.3246	0.6228

Shielding Factor Ka

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
L1	1	LDF5-50A (7/8 FOAM)	163.00 - 183.00	1.0000	1.0000
L1	2	LDF4-50A (1/2 FOAM)	163.00 - 183.00	1.0000	1.0000
L1	3	EW63	163.00 - 180.00	1.0000	1.0000
T1	1	LDF5-50A (7/8 FOAM)	143.00 - 163.00	1.0000	1.0000
T1	2	LDF4-50A (1/2 FOAM)	143.00 - 163.00	1.0000	1.0000
T1	3	EW63	143.00 - 163.00	1.0000	1.0000
T1	4	Generic Hybrid	143.00 - 150.00	1.0000	1.0000
T2	1	LDF5-50A (7/8 FOAM)	123.00 - 143.00	1.0000	1.0000
T2	2	LDF4-50A (1/2 FOAM)	123.00 - 143.00	1.0000	1.0000
T2	3	EW63	123.00 - 143.00	1.0000	1.0000
T2	4	Generic Hybrid	123.00 - 143.00	1.0000	1.0000
T2	5	LDF4-50A (1/2 FOAM)	123.00 - 135.00	1.0000	1.0000
T2	6	HJ7-50A (1-5/8 AIR)	123.00 - 133.00	1.0000	1.0000
T2	7	2" Rigid Conduit	123.00 - 133.00	1.0000	1.0000
T2	8	Generic Hybrid	123.00 -	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
			133.00		
T2	9	Generic Hybrid	123.00 - 124.00	1.0000	1.0000
T3	1	LDF5-50A (7/8 FOAM)	103.00 - 123.00	1.0000	1.0000
T3	2	LDF4-50A (1/2 FOAM)	103.00 - 123.00	1.0000	1.0000
T3	3	EW63	103.00 - 123.00	1.0000	1.0000
T3	4	Generic Hybrid	103.00 - 123.00	1.0000	1.0000
T3	5	LDF4-50A (1/2 FOAM)	103.00 - 123.00	1.0000	1.0000
T3	6	HJ7-50A (1-5/8 AIR)	103.00 - 123.00	1.0000	1.0000
T3	7	2" Rigid Conduit	103.00 - 123.00	1.0000	1.0000
T3	8	Generic Hybrid	103.00 - 123.00	1.0000	1.0000
T3	9	Generic Hybrid	103.00 - 123.00	1.0000	1.0000
T3	10	LDF5-50A (7/8 FOAM)	103.00 - 106.00	1.0000	1.0000
T4	1	LDF5-50A (7/8 FOAM)	83.00 - 103.00	1.0000	1.0000
T4	2	LDF4-50A (1/2 FOAM)	83.00 - 103.00	1.0000	1.0000
T4	3	EW63	83.00 - 103.00	1.0000	1.0000
T4	4	Generic Hybrid	83.00 - 103.00	1.0000	1.0000
T4	5	LDF4-50A (1/2 FOAM)	83.00 - 103.00	1.0000	1.0000
T4	6	HJ7-50A (1-5/8 AIR)	83.00 - 103.00	1.0000	1.0000
T4	7	2" Rigid Conduit	83.00 - 103.00	1.0000	1.0000
T4	8	Generic Hybrid	83.00 - 103.00	1.0000	1.0000
T4	9	Generic Hybrid	83.00 - 103.00	1.0000	1.0000
T4	10	LDF5-50A (7/8 FOAM)	83.00 - 103.00	1.0000	1.0000
T4	11	Generic Hybrid	83.00 - 93.00	1.0000	1.0000
T5	1	LDF5-50A (7/8 FOAM)	63.00 - 83.00	1.0000	1.0000
T5	2	LDF4-50A (1/2 FOAM)	63.00 - 83.00	1.0000	1.0000
T5	3	EW63	63.00 - 83.00	1.0000	1.0000
T5	4	Generic Hybrid	63.00 - 83.00	1.0000	1.0000
T5	5	LDF4-50A (1/2 FOAM)	63.00 - 83.00	1.0000	1.0000
T5	6	HJ7-50A (1-5/8 AIR)	63.00 - 83.00	1.0000	1.0000
T5	7	2" Rigid Conduit	63.00 - 83.00	1.0000	1.0000
T5	8	Generic Hybrid	63.00 - 83.00	1.0000	1.0000
T5	9	Generic Hybrid	63.00 - 83.00	1.0000	1.0000
T5	10	LDF5-50A (7/8 FOAM)	63.00 - 83.00	1.0000	1.0000
T5	11	Generic Hybrid	63.00 - 83.00	1.0000	1.0000
T6	1	LDF5-50A (7/8 FOAM)	43.00 - 63.00	1.0000	1.0000
T6	2	LDF4-50A (1/2 FOAM)	43.00 - 63.00	1.0000	1.0000
T6	3	EW63	43.00 - 63.00	1.0000	1.0000
T6	4	Generic Hybrid	43.00 - 63.00	1.0000	1.0000
T6	5	LDF4-50A (1/2 FOAM)	43.00 - 63.00	1.0000	1.0000
T6	6	HJ7-50A (1-5/8 AIR)	43.00 - 63.00	1.0000	1.0000
T6	7	2" Rigid Conduit	43.00 - 63.00	1.0000	1.0000
T6	8	Generic Hybrid	43.00 - 63.00	1.0000	1.0000
T6	9	Generic Hybrid	43.00 - 63.00	1.0000	1.0000
T6	10	LDF5-50A (7/8 FOAM)	43.00 - 63.00	1.0000	1.0000
T6	11	Generic Hybrid	43.00 - 63.00	1.0000	1.0000
T6	12	LDF4-50A (1/2 FOAM)	43.00 - 63.00	1.0000	1.0000
T7	1	LDF5-50A (7/8 FOAM)	23.00 - 43.00	1.0000	1.0000
T7	2	LDF4-50A (1/2 FOAM)	23.00 - 43.00	1.0000	1.0000
T7	3	EW63	23.00 - 43.00	1.0000	1.0000
T7	4	Generic Hybrid	23.00 - 43.00	1.0000	1.0000
T7	5	LDF4-50A (1/2 FOAM)	23.00 - 43.00	1.0000	1.0000

Tower Section	Feed Line Record No.	Description	Feed Line Segment Elev.	K_a No Ice	K_a Ice
T7	6	HJ7-50A (1-5/8 AIR)	23.00 - 43.00	1.0000	1.0000
T7	7	2" Rigid Conduit	23.00 - 43.00	1.0000	1.0000
T7	8	Generic Hybrid	23.00 - 43.00	1.0000	1.0000
T7	9	Generic Hybrid	23.00 - 43.00	1.0000	1.0000
T7	10	LDF5-50A (7/8 FOAM)	23.00 - 43.00	1.0000	1.0000
T7	11	Generic Hybrid	23.00 - 43.00	1.0000	1.0000
T7	12	LDF4-50A (1/2 FOAM)	23.00 - 43.00	1.0000	1.0000
T8	1	LDF5-50A (7/8 FOAM)	11.00 - 23.00	1.0000	1.0000
T8	2	LDF4-50A (1/2 FOAM)	11.00 - 23.00	1.0000	1.0000
T8	3	EW63	11.00 - 23.00	1.0000	1.0000
T8	4	Generic Hybrid	11.00 - 23.00	1.0000	1.0000
T8	5	LDF4-50A (1/2 FOAM)	11.00 - 23.00	1.0000	1.0000
T8	6	HJ7-50A (1-5/8 AIR)	11.00 - 23.00	1.0000	1.0000
T8	7	2" Rigid Conduit	11.00 - 23.00	1.0000	1.0000
T8	8	Generic Hybrid	11.00 - 23.00	1.0000	1.0000
T8	9	Generic Hybrid	11.00 - 23.00	1.0000	1.0000
T8	10	LDF5-50A (7/8 FOAM)	11.00 - 23.00	1.0000	1.0000
T8	11	Generic Hybrid	11.00 - 23.00	1.0000	1.0000
T8	12	LDF4-50A (1/2 FOAM)	11.00 - 23.00	1.0000	1.0000

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
10' Dipole	C	From Leg	0.00	0.00	0.0000	180.00	No Ice	2.00	2.00	25.00
			0.00	0.00			1/2" Ice	3.02	3.02	40.56
			0.00	0.00			1" Ice	4.05	4.05	56.13
15' Omni	C	From Leg	0.00	0.00	0.0000	180.00	No Ice	4.90	4.90	117.00
			0.00	0.00			1/2" Ice	6.79	6.79	154.17
			0.00	0.00			1" Ice	8.34	8.34	201.01
Empty Pipe [2.0][60"]	C	From Leg	0.00	0.00	0.0000	180.00	No Ice	1.29	1.29	18.30
			0.00	0.00			1/2" Ice	1.60	1.60	28.58
			0.00	0.00			1" Ice	1.91	1.91	42.36
Empty Pipe [2.0][60"]	C	From Leg	0.00	0.00	0.0000	180.00	No Ice	1.29	1.29	18.30
			0.00	0.00			1/2" Ice	1.60	1.60	28.58
			0.00	0.00			1" Ice	1.91	1.91	42.36
***										
Empty Pipe [P4.0][102"]	C	From Leg	0.00	0.00	0.0000	177.00	No Ice	2.71	2.71	91.80
			0.00	0.00			1/2" Ice	4.17	4.17	118.53
			0.00	0.00			1" Ice	4.69	4.69	151.07
Empty Pipe [P2.0][72"]	C	From Leg	0.00	0.00	0.0000	177.00	No Ice	1.43	1.43	21.96
			0.00	0.00			1/2" Ice	1.92	1.92	32.79
			0.00	0.00			1" Ice	2.29	2.29	47.67
Empty Pipe [P4.0][72"]	C	From Leg	0.00	0.00	0.0000	177.00	No Ice	1.77	1.77	64.80
			0.00	0.00			1/2" Ice	2.62	2.62	83.90
			0.00	0.00			1" Ice	3.00	3.00	107.27
20' Omni	C	From Leg	0.00	0.00	0.0000	173.00	No Ice	6.56	6.56	150.00
			0.00	0.00			1/2" Ice	9.04	9.04	199.38
			0.00	0.00			1" Ice	11.09	11.09	261.50
***										

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
USF-4U (4ft Standoff)	C	From Leg	0.00	0.0000	165.00	No Ice	2.50	5.70	164.00
(Eversource)			0.00			1/2" Ice	3.15	6.80	188.00
			0.00			1" Ice	3.89	8.10	268.00
SP2D03P36D-D (20' Omni)	C	From Leg	4.00	0.0000	165.00	No Ice	6.26	6.26	75.00
(Eversource)			0.00			1/2" Ice	8.59	8.59	121.94
			0.00			1" Ice	10.54	10.54	181.00
***									
Pirod 4' Side Mount Standoff	C	From Leg	0.00	0.0000	161.00	No Ice	2.72	2.72	50.00
(1)			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
10' Dipole	C	From Leg	0.00	0.0000	161.00	No Ice	2.00	2.00	25.00
			0.00			1/2" Ice	3.02	3.02	40.56
			0.00			1" Ice	4.05	4.05	56.13
5' Omni	C	From Leg	0.00	0.0000	160.00	No Ice	1.19	1.19	18.30
			0.00			1/2" Ice	1.50	1.50	27.37
			0.00			1" Ice	1.81	1.81	39.89
***									
APXVAARR24_43-U-NA20	A	From Leg	4.00	0.0000	150.00	No Ice	20.18	10.91	182.50
(TMO)			0.00			1/2" Ice	20.83	12.33	316.65
			0.00			1" Ice	21.48	13.61	461.40
AIR6419	A	From Leg	4.00	0.0000	150.00	No Ice	3.80	1.94	77.00
(TMO)			0.00			1/2" Ice	4.05	2.14	104.86
			0.00			1" Ice	4.31	2.34	136.30
Radio 4480	A	From Leg	4.00	0.0000	150.00	No Ice	2.85	1.38	84.00
(TMO)			0.00			1/2" Ice	3.06	1.54	105.70
			0.00			1" Ice	3.28	1.71	130.51
Radio 4460	A	From Leg	4.00	0.0000	150.00	No Ice	2.56	1.98	110.00
(TMO)			0.00			1/2" Ice	2.76	2.97	130.00
			0.00			1" Ice	2.97	2.34	160.00
VFA12-HD (12ft V-Frame)	A	From Leg	0.00	0.0000	150.00	No Ice	13.20	9.20	658.00
(TMO)			0.00			1/2" Ice	19.50	14.60	804.00
			0.00			1" Ice	25.80	19.50	1015.00
*									
APXVAARR24_43-U-NA20	B	From Leg	4.00	0.0000	150.00	No Ice	20.18	10.91	182.50
(TMO)			0.00			1/2" Ice	20.83	12.33	316.65
			0.00			1" Ice	21.48	13.61	461.40
AIR6419	B	From Leg	4.00	0.0000	150.00	No Ice	3.80	1.94	77.00
(TMO)			0.00			1/2" Ice	4.05	2.14	104.86
			0.00			1" Ice	4.31	2.34	136.30
Radio 4480	B	From Leg	4.00	0.0000	150.00	No Ice	2.85	1.38	84.00
(TMO)			0.00			1/2" Ice	3.06	1.54	105.70
			0.00			1" Ice	3.28	1.71	130.51
Radio 4460	B	From Leg	4.00	0.0000	150.00	No Ice	2.56	1.98	110.00
(TMO)			0.00			1/2" Ice	2.76	2.97	130.00
			0.00			1" Ice	2.97	2.34	160.00
VFA12-HD (12ft V-Frame)	B	From Leg	0.00	0.0000	150.00	No Ice	13.20	9.20	658.00
(TMO)			0.00			1/2" Ice	19.50	14.60	804.00
			0.00			1" Ice	25.80	19.50	1015.00
*									
APXVAARR24_43-U-NA20	C	From Leg	4.00	0.0000	150.00	No Ice	20.18	10.91	182.50
(TMO)			0.00			1/2" Ice	20.83	12.33	316.65
			0.00			1" Ice	21.48	13.61	461.40
AIR6419	C	From Leg	4.00	0.0000	150.00	No Ice	3.80	1.94	77.00
(TMO)			0.00			1/2" Ice	4.05	2.14	104.86
			0.00			1" Ice	4.31	2.34	136.30
Radio 4480	C	From Leg	4.00	0.0000	150.00	No Ice	2.85	1.38	84.00
(TMO)			0.00			1/2" Ice	3.06	1.54	105.70

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
			0.00				1" Ice	3.28	1.71	130.51
Radio 4460	C	From Leg	4.00		0.0000	150.00	No Ice	2.56	1.98	110.00
(TMO)			0.00				1/2" Ice	2.76	2.97	130.00
			0.00				1" Ice	2.97	2.34	160.00
VFA12-HD (12ft V-Frame)	C	From Leg	0.00		0.0000	150.00	No Ice	13.20	9.20	658.00
(TMO)			0.00				1/2" Ice	19.50	14.60	804.00
			0.00				1" Ice	25.80	19.50	1015.00
***										
P65-16-XLH-RR	A	From Leg	4.00		0.0000	135.00	No Ice	12.26	10.26	87.20
(ATT)			0.00				1/2" Ice	12.93	11.58	188.60
			0.00				1" Ice	13.58	12.74	299.15
800-10121 [P2.0][96"]	A	From Leg	4.00		0.0000	135.00	No Ice	5.53	3.54	46.30
(ATT)			0.00				1/2" Ice	5.90	3.90	81.04
			0.00				1" Ice	6.28	4.27	120.78
RRUS11	A	From Leg	4.00		0.0000	135.00	No Ice	2.57	1.07	50.70
(ATT)			0.00				1/2" Ice	2.76	1.21	70.00
			0.00				1" Ice	2.97	1.36	90.00
(2) LGP21401 TMA	A	From Leg	4.00		0.0000	135.00	No Ice	1.05	0.39	14.10
(ATT)			0.00				1/2" Ice	1.18	0.47	21.29
			0.00				1" Ice	1.32	0.57	30.37
Pirod 10' PCS Frame (1)	A	From Leg	0.00		0.0000	135.00	No Ice	9.00	9.00	250.00
(ATT)			0.00				1/2" Ice	13.20	13.20	350.00
			0.00				1" Ice	17.40	17.40	450.00
*										
P65-16-XLH-RR	B	From Leg	4.00		0.0000	135.00	No Ice	12.26	10.26	87.20
(ATT)			0.00				1/2" Ice	12.93	11.58	188.60
			0.00				1" Ice	13.58	12.74	299.15
800-10121 [P2.0][96"]	B	From Leg	4.00		0.0000	135.00	No Ice	5.53	3.54	46.30
(ATT)			0.00				1/2" Ice	5.90	3.90	81.04
			0.00				1" Ice	6.28	4.27	120.78
RRUS11	B	From Leg	4.00		0.0000	135.00	No Ice	2.57	1.07	50.70
(ATT)			0.00				1/2" Ice	2.76	1.21	70.00
			0.00				1" Ice	2.97	1.36	90.00
(2) LGP21401 TMA	B	From Leg	4.00		0.0000	135.00	No Ice	1.05	0.39	14.10
(ATT)			0.00				1/2" Ice	1.18	0.47	21.29
			0.00				1" Ice	1.32	0.57	30.37
Pirod 10' PCS Frame (1)	B	From Leg	0.00		0.0000	135.00	No Ice	9.00	9.00	250.00
(ATT)			0.00				1/2" Ice	13.20	13.20	350.00
			0.00				1" Ice	17.40	17.40	450.00
*										
P65-16-XLH-RR	C	From Leg	4.00		0.0000	135.00	No Ice	12.26	10.26	87.20
(ATT)			0.00				1/2" Ice	12.93	11.58	188.60
			0.00				1" Ice	13.58	12.74	299.15
800-10121 [P2.0][96"]	C	From Leg	4.00		0.0000	135.00	No Ice	5.53	3.54	46.30
(ATT)			0.00				1/2" Ice	5.90	3.90	81.04
			0.00				1" Ice	6.28	4.27	120.78
RRUS11	C	From Leg	4.00		0.0000	135.00	No Ice	2.57	1.07	50.70
(ATT)			0.00				1/2" Ice	2.76	1.21	70.00
			0.00				1" Ice	2.97	1.36	90.00
(2) LGP21401 TMA	C	From Leg	4.00		0.0000	135.00	No Ice	1.05	0.39	14.10
(ATT)			0.00				1/2" Ice	1.18	0.47	21.29
			0.00				1" Ice	1.32	0.57	30.37
DC6-48-60-18-8F	C	From Leg	4.00		0.0000	135.00	No Ice	1.91	1.91	20.00
(ATT)			0.00				1/2" Ice	2.10	2.10	40.00
			0.00				1" Ice	2.29	2.29	60.00
Pirod 10' PCS Frame (1)	C	From Leg	0.00		0.0000	135.00	No Ice	9.00	9.00	250.00
(ATT)			0.00				1/2" Ice	13.20	13.20	350.00

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
			0.00			1" Ice	17.40	17.40	450.00
***									
10' Dipole	C	From Leg	0.00	0.0000	133.00	No Ice	2.00	2.00	25.00
			0.00			1/2" Ice	3.02	3.02	40.56
			0.00			1" Ice	4.05	4.05	56.13
Pirod 4' Side Mount Standoff (1)	C	From Leg	0.00	0.0000	133.00	No Ice	2.72	2.72	50.00
			0.00			1/2" Ice	4.91	4.91	89.00
			0.00			1" Ice	7.10	7.10	128.00
***									
(2) MX08FRO660 [P2.0][96"] (VZW)	A	From Leg	4.00	0.0000	124.00	No Ice	9.87	7.34	75.00
			0.00			1/2" Ice	10.34	7.78	143.84
			0.00			1" Ice	10.82	8.24	219.18
CBRS Antenna (VZW)	A	From Leg	4.00	0.0000	124.00	No Ice	1.80	0.78	30.00
			0.00			1/2" Ice	2.00	0.92	40.00
			0.00			1" Ice	2.20	1.06	60.00
B2/66 RRH (VZW)	A	From Leg	4.00	0.0000	124.00	No Ice	2.54	1.61	60.00
			0.00			1/2" Ice	2.75	1.79	80.00
			0.00			1" Ice	2.97	1.98	100.00
B5/15 RRH -BRO4C (VZW)	A	From Leg	4.00	0.0000	124.00	No Ice	1.87	1.02	70.00
			0.00			1/2" Ice	2.03	1.15	90.00
			0.00			1" Ice	2.21	1.29	110.00
RVZDC-6627-PF-48 (VZW)	A	From Leg	4.00	0.0000	124.00	No Ice	4.06	3.10	32.00
			0.00			1/2" Ice	4.32	3.34	68.49
			0.00			1" Ice	4.58	3.58	108.97
Pirod 10' PCS Frame (1) (VZW)	A	From Leg	0.00	0.0000	124.00	No Ice	9.00	9.00	250.00
			0.00			1/2" Ice	13.20	13.20	350.00
			0.00			1" Ice	17.40	17.40	450.00
*									
(2) MX08FRO660 [P2.0][96"] (VZW)	B	From Leg	4.00	0.0000	124.00	No Ice	9.87	7.34	75.00
			0.00			1/2" Ice	10.34	7.78	143.84
			0.00			1" Ice	10.82	8.24	219.18
CBRS Antenna (VZW)	B	From Leg	4.00	0.0000	124.00	No Ice	1.80	0.78	30.00
			0.00			1/2" Ice	2.00	0.92	40.00
			0.00			1" Ice	2.20	1.06	60.00
B2/66 RRH (VZW)	B	From Leg	4.00	0.0000	124.00	No Ice	2.54	1.61	60.00
			0.00			1/2" Ice	2.75	1.79	80.00
			0.00			1" Ice	2.97	1.98	100.00
B5/15 RRH -BRO4C (VZW)	B	From Leg	4.00	0.0000	124.00	No Ice	1.87	1.02	70.00
			0.00			1/2" Ice	2.03	1.15	90.00
			0.00			1" Ice	2.21	1.29	110.00
Pirod 10' PCS Frame (1) (VZW)	B	From Leg	0.00	0.0000	124.00	No Ice	9.00	9.00	250.00
			0.00			1/2" Ice	13.20	13.20	350.00
			0.00			1" Ice	17.40	17.40	450.00
*									
(2) MX08FRO660 [P2.0][96"] (VZW)	C	From Leg	4.00	0.0000	124.00	No Ice	9.87	7.34	75.00
			0.00			1/2" Ice	10.34	7.78	143.84
			0.00			1" Ice	10.82	8.24	219.18
CBRS Antenna (VZW)	C	From Leg	4.00	0.0000	124.00	No Ice	1.80	0.78	30.00
			0.00			1/2" Ice	2.00	0.92	40.00
			0.00			1" Ice	2.20	1.06	60.00
B2/66 RRH (VZW)	C	From Leg	4.00	0.0000	124.00	No Ice	2.54	1.61	60.00
			0.00			1/2" Ice	2.75	1.79	80.00
			0.00			1" Ice	2.97	1.98	100.00
B5/15 RRH -BRO4C (VZW)	C	From Leg	4.00	0.0000	124.00	No Ice	1.87	1.02	70.00
			0.00			1/2" Ice	2.03	1.15	90.00
			0.00			1" Ice	2.21	1.29	110.00
Pirod 10' PCS Frame (1)	C	From Leg	0.00	0.0000	124.00	No Ice	9.00	9.00	250.00

Description	Face or Leg	Offset Type	Offsets: Horz Lateral ft	Vert ft	Azimuth Adjustment °	Placement ft		C_AA_A Front ft^2	C_AA_A Side ft^2	Weight lb
(VZW)			0.00				1/2" Ice	13.20	13.20	350.00
			0.00				1" Ice	17.40	17.40	450.00
***										
FFVV-65B-R2	A	From Leg	4.00		0.0000	93.00	No Ice	12.75	7.65	100.00
(DISH)			0.00				1/2" Ice	13.45	8.94	193.24
			0.00				1" Ice	14.12	10.07	295.20
TA08025-B605	A	From Leg	4.00		0.0000	93.00	No Ice	1.96	1.13	80.00
(DISH)			0.00				1/2" Ice	2.14	1.27	90.00
			0.00				1" Ice	2.32	1.41	100.00
TA08025-B604	A	From Leg	4.00		0.0000	93.00	No Ice	1.96	0.98	60.00
(DISH)			0.00				1/2" Ice	2.14	1.11	80.00
			0.00				1" Ice	2.32	1.25	100.00
RDIDC-3045-PF-48	A	From Leg	4.00		0.0000	93.00	No Ice	2.01	1.17	20.00
(DISH)			0.00				1/2" Ice	2.19	1.31	40.00
			0.00				1" Ice	2.38	1.46	60.00
MTC6975083 [P2.0][96"]	A	From Leg	0.00		0.0000	93.00	No Ice	14.50	6.50	352.00
(DISH)			0.00				1/2" Ice	20.70	9.70	375.00
			0.00				1" Ice	27.00	12.80	410.00
*										
FFVV-65B-R2	B	From Leg	4.00		0.0000	93.00	No Ice	12.75	7.65	100.00
(DISH)			0.00				1/2" Ice	13.45	8.94	193.24
			0.00				1" Ice	14.12	10.07	295.20
TA08025-B605	B	From Leg	4.00		0.0000	93.00	No Ice	1.96	1.13	80.00
(DISH)			0.00				1/2" Ice	2.14	1.27	90.00
			0.00				1" Ice	2.32	1.41	100.00
TA08025-B604	B	From Leg	4.00		0.0000	93.00	No Ice	1.96	0.98	60.00
(DISH)			0.00				1/2" Ice	2.14	1.11	80.00
			0.00				1" Ice	2.32	1.25	100.00
RDIDC-3045-PF-48	B	From Leg	4.00		0.0000	93.00	No Ice	2.01	1.17	20.00
(DISH)			0.00				1/2" Ice	2.19	1.31	40.00
			0.00				1" Ice	2.38	1.46	60.00
MTC6975083 [P2.0][96"]	B	From Leg	0.00		0.0000	93.00	No Ice	14.50	6.50	352.00
(DISH)			0.00				1/2" Ice	20.70	9.70	375.00
			0.00				1" Ice	27.00	12.80	410.00
*										
FFVV-65B-R2	C	From Leg	4.00		0.0000	93.00	No Ice	12.75	7.65	100.00
(DISH)			0.00				1/2" Ice	13.45	8.94	193.24
			0.00				1" Ice	14.12	10.07	295.20
TA08025-B605	C	From Leg	4.00		0.0000	93.00	No Ice	1.96	1.13	80.00
(DISH)			0.00				1/2" Ice	2.14	1.27	90.00
			0.00				1" Ice	2.32	1.41	100.00
TA08025-B604	C	From Leg	4.00		0.0000	93.00	No Ice	1.96	0.98	60.00
(DISH)			0.00				1/2" Ice	2.14	1.11	80.00
			0.00				1" Ice	2.32	1.25	100.00
RDIDC-3045-PF-48	C	From Leg	4.00		0.0000	93.00	No Ice	2.01	1.17	20.00
(DISH)			0.00				1/2" Ice	2.19	1.31	40.00
			0.00				1" Ice	2.38	1.46	60.00
MTC6975083 [P2.0][96"]	C	From Leg	0.00		0.0000	93.00	No Ice	14.50	6.50	352.00
(DISH)			0.00				1/2" Ice	20.70	9.70	375.00
			0.00				1" Ice	27.00	12.80	410.00
***										
***										
Pirod 4' Side Mount Standoff	C	From Leg	0.00		0.0000	65.00	No Ice	2.72	2.72	50.00
(1)			0.00				1/2" Ice	4.91	4.91	89.00
			0.00				1" Ice	7.10	7.10	128.00

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft		Aperture Area ft²	Weight lb
6 FT DISH		Paraboloid w/o Radome	None		0.0000		180.00	6.00	No Ice	28.27	143.00
									1/2" Ice	29.05	292.13
									1" Ice	29.83	441.25

Tower Pressures - No Ice

G_H = 0.850 (base tower), 0.850 (upper structure)

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
L1	173.00	1.156	43	175.992	A	12.975	9.583	9.583	42.48	0.000	0.000
183.00-163.00					B	12.975	9.583		42.48	8.296	0.000
					C	12.975	9.583		42.48	0.000	0.000
T1	153.00	1.116	41	196.373	A	11.384	9.600	9.600	45.75	4.158	0.000
163.00-143.00					B	11.384	9.600		45.75	8.768	0.000
					C	11.384	9.600		45.75	0.000	0.000
T2	133.00	1.072	39	238.166	A	16.326	11.687	11.687	41.72	11.880	0.000
143.00-123.00					B	16.326	11.687		41.72	10.676	0.000
					C	16.326	11.687		41.72	17.840	0.000
T3	113.00	1.023	38	280.585	A	18.475	15.026	15.026	44.85	11.880	0.000
123.00-103.00					B	18.475	15.026		44.85	19.862	0.000
					C	18.475	15.026		44.85	35.680	0.000
T4	93.00	0.968	36	323.109	A	18.061	18.575	18.575	50.70	11.880	0.000
103.00-83.00					B	18.061	18.575		50.70	23.568	0.000
					C	18.061	18.575		50.70	37.660	0.000
T5 83.00-63.00	73.00	0.903	33	363.859	A	23.130	18.575	18.575	44.54	11.880	0.000
					B	23.130	18.575		44.54	23.568	0.000
					C	23.130	18.575		44.54	39.640	0.000
T6 63.00-43.00	53.00	0.824	30	404.609	A	36.494	18.575	18.575	33.73	11.880	0.000
					B	36.494	18.575		33.73	23.568	0.000
					C	36.494	18.575		33.73	40.900	0.000
T7 43.00-23.00	33.00	0.72	26	447.131	A	31.177	22.121	22.121	41.50	11.880	0.000
					B	31.177	22.121		41.50	23.568	0.000
					C	31.177	22.121		41.50	40.900	0.000
T8 23.00-3.00	13.00	0.7	26	487.881	A	49.195	22.121	22.121	31.02	7.128	0.000
					B	49.195	22.121		31.02	14.141	0.000
					C	49.195	22.121		31.02	24.540	0.000

Tower Pressure - With Ice

G_H = 0.850 (base tower), 0.850 (upper structure)

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
L1	173.00	1.156	6	1.3572	180.516	A	12.975	37.951	18.631	36.59	0.000	0.000
183.00-163.00						B	12.975	37.951		36.59	30.482	0.000
						C	12.975	37.951		36.59	0.000	0.000
T1	153.00	1.116	6	1.3407	200.848	A	11.384	33.815	18.553	41.05	9.355	0.000
163.00-143.00						B	11.384	33.815		41.05	31.521	0.000
						C	11.384	33.815		41.05	0.000	0.000
T2	133.00	1.072	6	1.3220	242.578	A	16.326	37.782	20.515	37.92	26.603	0.000
143.00-123.00						B	16.326	37.782		37.92	40.533	0.000
						C	16.326	37.782		37.92	37.290	0.000
T3	113.00	1.023	6	1.3006	284.926	A	18.475	42.935	23.712	38.61	26.460	0.000
123.00-103.00						B	18.475	42.935		38.61	67.951	0.000
						C	18.475	42.935		38.61	74.217	0.000
T4 103.00-83.00	93.00	0.968	5	1.2755	327.366	A	28.300	27.094	27.094	48.91	26.293	0.000
						B	28.300	27.094		48.91	80.744	0.000
						C	28.300	27.094		48.91	78.320	0.000
T5 83.00-63.00	73.00	0.903	5	1.2450	368.014	A	23.130	43.346	26.890	40.45	26.090	0.000
						B	23.130	43.346		40.45	79.651	0.000
						C	23.130	43.346		40.45	82.209	0.000
T6 63.00-43.00	53.00	0.824	4	1.2058	408.633	A	36.494	51.773	26.628	30.17	25.829	0.000
						B	36.494	51.773		30.17	78.246	0.000
						C	36.494	51.773		30.17	87.468	0.000
T7 43.00-23.00	33.00	0.72	4	1.1500	450.969	A	31.177	47.728	29.801	37.77	25.458	0.000
						B	31.177	47.728		37.77	76.250	0.000
						C	31.177	47.728		37.77	86.073	0.000
T8 23.00-3.00	13.00	0.7	4	1.0477	491.378	A	49.195	54.889	29.118	27.98	14.868	0.000
						B	49.195	54.889		27.98	43.556	0.000
						C	49.195	54.889		27.98	50.112	0.000

Tower Pressure - Service

G_H = 0.850 (base tower), 0.850 (upper structure)

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
L1	173.00	1.156	9	175.992	A	12.975	9.583	9.583	42.48	0.000	0.000
183.00-163.00					B	12.975	9.583		42.48	8.296	0.000
					C	12.975	9.583		42.48	0.000	0.000
T1	153.00	1.116	9	196.373	A	11.384	9.600	9.600	45.75	4.158	0.000
163.00-143.00					B	11.384	9.600		45.75	8.768	0.000
					C	11.384	9.600		45.75	0.000	0.000
T2	133.00	1.072	8	238.166	A	16.326	11.687	11.687	41.72	11.880	0.000
143.00-123.00					B	16.326	11.687		41.72	10.676	0.000
					C	16.326	11.687		41.72	17.840	0.000
T3	113.00	1.023	8	280.585	A	18.475	15.026	15.026	44.85	11.880	0.000
123.00-103.00					B	18.475	15.026		44.85	19.862	0.000
					C	18.475	15.026		44.85	35.680	0.000
T4	93.00	0.968	8	323.109	A	18.061	18.575	18.575	50.70	11.880	0.000
103.00-83.00					B	18.061	18.575		50.70	23.568	0.000
					C	18.061	18.575		50.70	37.660	0.000
T5 83.00-63.00	73.00	0.903	7	363.859	A	23.130	18.575	18.575	44.54	11.880	0.000
					B	23.130	18.575		44.54	23.568	0.000
					C	23.130	18.575		44.54	39.640	0.000
T6 63.00-43.00	53.00	0.824	6	404.609	A	36.494	18.575	18.575	33.73	11.880	0.000

Section Elevation	z	K_Z	q_z	A_G	Face	A_F	A_R	A_{leg}	Leg %	C_AA_A In Face	C_AA_A Out Face
ft	ft		psf	ft^2		ft^2	ft^2	ft^2		ft^2	ft^2
					B	36.494	18.575		33.73	23.568	0.000
					C	36.494	18.575		33.73	40.900	0.000
T7 43.00-23.00	33.00	0.72	6	447.131	A	31.177	22.121	22.121	41.50	11.880	0.000
					B	31.177	22.121		41.50	23.568	0.000
					C	31.177	22.121		41.50	40.900	0.000
T8 23.00-3.00	13.00	0.7	5	487.881	A	49.195	22.121	22.121	31.02	7.128	0.000
					B	49.195	22.121		31.02	14.141	0.000
					C	49.195	22.121		31.02	24.540	0.000

Tower Forces - No Ice - Wind Normal To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	q_z	D_F	D_R	A_E	F	w	Ctrl. Face
ft	lb	lb				psf			ft^2	lb	plf	
L1	24.87	929.56	A	0.128	2.853	43	1	1	18.396	2196.13	109.81	B
183.00-163.00			B	0.128	2.853		1	1	18.396			
			C	0.128	2.853		1	1	18.396			
T1	66.30	1131.73	A	0.107	2.937	41	1	1	16.804	2149.77	107.49	A
163.00-143.00			B	0.107	2.937		1	1	16.804			
			C	0.107	2.937		1	1	16.804			
T2	276.20	1195.95	A	0.118	2.894	39	1	1	22.917	3419.59	170.98	C
143.00-123.00			B	0.118	2.894		1	1	22.917			
			C	0.118	2.894		1	1	22.917			
T3	481.18	2260.46	A	0.119	2.887	38	1	1	26.326	4388.96	219.45	C
123.00-103.00			B	0.119	2.887		1	1	26.326			
			C	0.119	2.887		1	1	26.326			
T4	511.40	2393.40	A	0.113	2.911	36	1	1	26.970	4382.39	219.12	C
103.00-83.00			B	0.113	2.911		1	1	26.970			
			C	0.113	2.911		1	1	26.970			
T5	530.40	2987.43	A	0.115	2.906	33	1	1	32.202	4570.92	228.55	C
83.00-63.00			B	0.115	2.906		1	1	32.202			
			C	0.115	2.906		1	1	32.202			
T6	533.40	4175.15	A	0.136	2.823	30	1	1	45.856	5128.47	256.42	C
63.00-43.00			B	0.136	2.823		1	1	45.856			
			C	0.136	2.823		1	1	45.856			
T7	533.40	4520.65	A	0.119	2.888	26	1	1	41.674	4274.23	213.71	C
43.00-23.00			B	0.119	2.888		1	1	41.674			
			C	0.119	2.888		1	1	41.674			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	26	1	1	59.946	4567.25	228.36	C
			B	0.146	2.786		1	1	59.946			
			C	0.146	2.786		1	1	59.946			
Sum Weight:	3277.19	25276.74						OTM	2767841.9 4 lb-ft	35077.70		

Tower Forces - No Ice - Wind 60 To Face

Section Elevation	Add Weight	Self Weight	Face	e	C_F	q_z	D_F	D_R	A_E	F	w	Ctrl. Face
ft	lb	lb				psf			ft^2	lb	plf	

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
L1	24.87	929.56	A	0.128	2.853	43	0.8	1	15.801	1928.62	96.43	C
183.00-163.00			B	0.128	2.853		0.8	1	15.801			
			C	0.128	2.853		0.8	1	15.801			
T1	66.30	1131.73	A	0.107	2.937	41	0.8	1	14.527	1916.55	95.83	B
163.00-143.00			B	0.107	2.937		0.8	1	14.527			
			C	0.107	2.937		0.8	1	14.527			
T2	276.20	1195.95	A	0.118	2.894	39	0.8	1	19.652	3102.88	155.14	A
143.00-123.00			B	0.118	2.894		0.8	1	19.652			
			C	0.118	2.894		0.8	1	19.652			
T3	481.18	2260.46	A	0.119	2.887	38	0.8	1	22.631	4047.69	202.38	A
123.00-103.00			B	0.119	2.887		0.8	1	22.631			
			C	0.119	2.887		0.8	1	22.631			
T4	511.40	2393.40	A	0.113	2.911	36	0.8	1	23.358	4064.26	203.21	A
103.00-83.00			B	0.113	2.911		0.8	1	23.358			
			C	0.113	2.911		0.8	1	23.358			
T5	530.40	2987.43	A	0.115	2.906	33	0.8	1	27.576	4191.37	209.57	A
83.00-63.00			B	0.115	2.906		0.8	1	27.576			
			C	0.115	2.906		0.8	1	27.576			
T6	533.40	4175.15	A	0.136	2.823	30	0.8	1	38.557	4597.53	229.88	A
63.00-43.00			B	0.136	2.823		0.8	1	38.557			
			C	0.136	2.823		0.8	1	38.557			
T7	533.40	4520.65	A	0.119	2.888	26	0.8	1	35.438	3868.97	193.45	A
43.00-23.00			B	0.119	2.888		0.8	1	35.438			
			C	0.119	2.888		0.8	1	35.438			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	26	0.8	1	50.107	3967.54	198.38	A
			B	0.146	2.786		0.8	1	50.107			
			C	0.146	2.786		0.8	1	50.107			
Sum Weight:	3277.19	25276.74						OTM	2508767.85 lb-ft	31685.41		

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 ft^2	F lb	w plf	Ctrl. Face
L1	24.87	929.56	A	0.128	2.853	43	0.85	1	16.450	1995.49	99.77	C
183.00-163.00			B	0.128	2.853		0.85	1	16.450			
			C	0.128	2.853		0.85	1	16.450			
T1	66.30	1131.73	A	0.107	2.937	41	0.85	1	15.096	1997.22	99.86	C
163.00-143.00			B	0.107	2.937		0.85	1	15.096			
			C	0.107	2.937		0.85	1	15.096			
T2	276.20	1195.95	A	0.118	2.894	39	0.85	1	20.468	3260.31	163.02	B
143.00-123.00			B	0.118	2.894		0.85	1	20.468			
			C	0.118	2.894		0.85	1	20.468			
T3	481.18	2260.46	A	0.119	2.887	38	0.85	1	23.554	4146.80	207.34	B
123.00-103.00			B	0.119	2.887		0.85	1	23.554			
			C	0.119	2.887		0.85	1	23.554			
T4	511.40	2393.40	A	0.113	2.911	36	0.85	1	24.261	4138.99	206.95	A
103.00-83.00			B	0.113	2.911		0.85	1	24.261			
			C	0.113	2.911		0.85	1	24.261			
T5	530.40	2987.43	A	0.115	2.906	33	0.85	1	28.732	4281.77	214.09	A
83.00-63.00			B	0.115	2.906		0.85	1	28.732			
			C	0.115	2.906		0.85	1	28.732			

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
T6	533.40	4175.15	A	0.136	2.823	30	0.85	1	40.382	4726.18	236.31	A
63.00-43.00			B	0.136	2.823		0.85	1	40.382			
			C	0.136	2.823		0.85	1	40.382			
T7	533.40	4520.65	A	0.119	2.888	26	0.85	1	36.997	3966.71	198.34	A
43.00-23.00			B	0.119	2.888		0.85	1	36.997			
			C	0.119	2.888		0.85	1	36.997			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	26	0.85	1	52.567	4115.38	205.77	A
			B	0.146	2.786		0.85	1	52.567			
			C	0.146	2.786		0.85	1	52.567			
Sum Weight:	3277.19	25276.74						OTM	2587502.05 lb-ft	32628.85		

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 ft^2	F lb	w plf	Ctrl. Face
L1	294.35	3070.76	A	0.282	2.345	6	1	1	35.501	591.64	29.58	B
183.00-163.00			B	0.282	2.345		1	1	35.501			
			C	0.282	2.345		1	1	35.501			
T1	429.59	2981.92	A	0.225	2.514	6	1	1	30.973	577.18	28.86	A
163.00-143.00			B	0.225	2.514		1	1	30.973			
			C	0.225	2.514		1	1	30.973			
T2	1205.08	3556.06	A	0.223	2.521	6	1	1	38.198	877.76	43.89	C
143.00-123.00			B	0.223	2.521		1	1	38.198			
			C	0.223	2.521		1	1	38.198			
T3	1954.46	4916.67	A	0.216	2.545	6	1	1	43.265	1146.67	57.33	C
123.00-103.00			B	0.216	2.545		1	1	43.265			
			C	0.216	2.545		1	1	43.265			
T4	2097.28	4363.33	A	0.169	2.702	5	1	1	43.738	1174.63	58.73	C
103.00-83.00			B	0.169	2.702		1	1	43.738			
			C	0.169	2.702		1	1	43.738			
T5	2121.09	5911.82	A	0.181	2.662	5	1	1	47.896	1147.45	57.37	C
83.00-63.00			B	0.181	2.662		1	1	47.896			
			C	0.181	2.662		1	1	47.896			
T6	2119.87	8260.06	A	0.216	2.543	4	1	1	66.391	1220.35	61.02	C
63.00-43.00			B	0.216	2.543		1	1	66.391			
			C	0.216	2.543		1	1	66.391			
T7	2034.30	7930.41	A	0.175	2.682	4	1	1	58.408	1014.94	50.75	C
43.00-23.00			B	0.175	2.682		1	1	58.408			
			C	0.175	2.682		1	1	58.408			
T8 23.00-3.00	1129.29	10162.51	A	0.212	2.557	4	1	1	80.847	946.11	47.31	C
			B	0.212	2.557		1	1	80.847			
			C	0.212	2.557		1	1	80.847			
Sum Weight:	13385.32	51153.53						OTM	714363.22 lb-ft	8696.74		

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
L1	294.35	3070.76	A	0.282	2.345	6	0.8	1	32.906	559.12	27.96	C
183.00-163.00			B	0.282	2.345		0.8	1	32.906			
			C	0.282	2.345		0.8	1	32.906			
T1	429.59	2981.92	A	0.225	2.514	6	0.8	1	28.697	547.63	27.38	B
163.00-143.00			B	0.225	2.514		0.8	1	28.697			
			C	0.225	2.514		0.8	1	28.697			
T2	1205.08	3556.06	A	0.223	2.521	6	0.8	1	34.933	836.96	41.85	A
143.00-123.00			B	0.223	2.521		0.8	1	34.933			
			C	0.223	2.521		0.8	1	34.933			
T3	1954.46	4916.67	A	0.216	2.545	6	0.8	1	39.570	1102.18	55.11	A
123.00-103.00			B	0.216	2.545		0.8	1	39.570			
			C	0.216	2.545		0.8	1	39.570			
T4	2097.28	4363.33	A	0.169	2.702	5	0.8	1	38.077	1106.18	55.31	A
103.00-83.00			B	0.169	2.702		0.8	1	38.077			
			C	0.169	2.702		0.8	1	38.077			
T5	2121.09	5911.82	A	0.181	2.662	5	0.8	1	43.270	1096.02	54.80	A
83.00-63.00			B	0.181	2.662		0.8	1	43.270			
			C	0.181	2.662		0.8	1	43.270			
T6	2119.87	8260.06	A	0.216	2.543	4	0.8	1	59.092	1149.60	57.48	A
63.00-43.00			B	0.216	2.543		0.8	1	59.092			
			C	0.216	2.543		0.8	1	59.092			
T7	2034.30	7930.41	A	0.175	2.682	4	0.8	1	52.173	959.28	47.96	A
43.00-23.00			B	0.175	2.682		0.8	1	52.173			
			C	0.175	2.682		0.8	1	52.173			
T8 23.00-3.00	1129.29	10162.51	A	0.212	2.557	4	0.8	1	71.008	864.68	43.23	A
			B	0.212	2.557		0.8	1	71.008			
			C	0.212	2.557		0.8	1	71.008			
Sum Weight:	13385.32	51153.53						OTM	678421.62 lb-ft	8221.64		

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
L1	294.35	3070.76	A	0.282	2.345	6	0.85	1	33.555	561.94	28.10	C
183.00-163.00			B	0.282	2.345		0.85	1	33.555			
			C	0.282	2.345		0.85	1	33.555			
T1	429.59	2981.92	A	0.225	2.514	6	0.85	1	29.266	559.68	27.98	C
163.00-143.00			B	0.225	2.514		0.85	1	29.266			
			C	0.225	2.514		0.85	1	29.266			
T2	1205.08	3556.06	A	0.223	2.521	6	0.85	1	35.749	847.43	42.37	B
143.00-123.00			B	0.223	2.521		0.85	1	35.749			
			C	0.223	2.521		0.85	1	35.749			
T3	1954.46	4916.67	A	0.216	2.545	6	0.85	1	40.494	1086.79	54.34	A
123.00-103.00			B	0.216	2.545		0.85	1	40.494			
			C	0.216	2.545		0.85	1	40.494			
T4	2097.28	4363.33	A	0.169	2.702	5	0.85	1	39.493	1105.78	55.29	A
103.00-83.00			B	0.169	2.702		0.85	1	39.493			
			C	0.169	2.702		0.85	1	39.493			
T5	2121.09	5911.82	A	0.181	2.662	5	0.85	1	44.427	1092.53	54.63	A
83.00-63.00			B	0.181	2.662		0.85	1	44.427			

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	0.181	2.662		0.85	1	44.427			
T6	2119.87	8260.06	A	0.216	2.543	4	0.85	1	60.917	1152.37	57.62	A
63.00-43.00			B	0.216	2.543		0.85	1	60.917			
			C	0.216	2.543		0.85	1	60.917			
T7	2034.30	7930.41	A	0.175	2.682	4	0.85	1	53.732	960.17	48.01	A
43.00-23.00			B	0.175	2.682		0.85	1	53.732			
			C	0.175	2.682		0.85	1	53.732			
T8 23.00-3.00	1129.29	10162.51	A	0.212	2.557	4	0.85	1	73.468	877.44	43.87	A
			B	0.212	2.557		0.85	1	73.468			
			C	0.212	2.557		0.85	1	73.468			
Sum Weight:	13385.32	51153.53						OTM	680390.01 lb-ft	8244.13		

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
L1	24.87	929.56	A	0.128	2.853	9	1	1	18.396	467.81	23.39	B
183.00-163.00			B	0.128	2.853		1	1	18.396			
			C	0.128	2.853		1	1	18.396			
T1	66.30	1131.73	A	0.107	2.937	9	1	1	16.804	457.94	22.90	A
163.00-143.00			B	0.107	2.937		1	1	16.804			
			C	0.107	2.937		1	1	16.804			
T2	276.20	1195.95	A	0.118	2.894	8	1	1	22.930	728.69	36.43	C
143.00-123.00			B	0.118	2.894		1	1	22.930			
			C	0.118	2.894		1	1	22.930			
T3	481.18	2260.46	A	0.119	2.887	8	1	1	26.967	947.54	47.38	C
123.00-103.00			B	0.119	2.887		1	1	26.967			
			C	0.119	2.887		1	1	26.967			
T4	511.40	2393.40	A	0.113	2.911	8	1	1	28.553	963.23	48.16	C
103.00-83.00			B	0.113	2.911		1	1	28.553			
			C	0.113	2.911		1	1	28.553			
T5	530.40	2987.43	A	0.115	2.906	7	1	1	33.623	998.53	49.93	C
83.00-63.00			B	0.115	2.906		1	1	33.623			
			C	0.115	2.906		1	1	33.623			
T6	533.40	4175.15	A	0.136	2.823	6	1	1	47.012	1110.38	55.52	C
63.00-43.00			B	0.136	2.823		1	1	47.012			
			C	0.136	2.823		1	1	47.012			
T7	533.40	4520.65	A	0.119	2.888	6	1	1	43.679	938.24	46.91	C
43.00-23.00			B	0.119	2.888		1	1	43.679			
			C	0.119	2.888		1	1	43.679			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	5	1	1	61.742	996.22	49.81	C
			B	0.146	2.786		1	1	61.742			
			C	0.146	2.786		1	1	61.742			
Sum Weight:	3277.19	25276.74						OTM	597395.04 lb-ft	7608.58		

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 ft²	F lb	w plf	Ctrl. Face
L1	24.87	929.56	A	0.128	2.853	9	0.8	1	15.801	410.83	20.54	C
183.00-163.00			B	0.128	2.853		0.8	1	15.801			
			C	0.128	2.853		0.8	1	15.801			
T1	66.30	1131.73	A	0.107	2.937	9	0.8	1	14.527	408.26	20.41	B
163.00-143.00			B	0.107	2.937		0.8	1	14.527			
			C	0.107	2.937		0.8	1	14.527			
T2	276.20	1195.95	A	0.118	2.894	8	0.8	1	19.665	661.23	33.06	A
143.00-123.00			B	0.118	2.894		0.8	1	19.665			
			C	0.118	2.894		0.8	1	19.665			
T3	481.18	2260.46	A	0.119	2.887	8	0.8	1	23.272	874.85	43.74	A
123.00-103.00			B	0.119	2.887		0.8	1	23.272			
			C	0.119	2.887		0.8	1	23.272			
T4	511.40	2393.40	A	0.113	2.911	8	0.8	1	24.941	895.46	44.77	A
103.00-83.00			B	0.113	2.911		0.8	1	24.941			
			C	0.113	2.911		0.8	1	24.941			
T5	530.40	2987.43	A	0.115	2.906	7	0.8	1	28.997	917.68	45.88	A
83.00-63.00			B	0.115	2.906		0.8	1	28.997			
			C	0.115	2.906		0.8	1	28.997			
T6	533.40	4175.15	A	0.136	2.823	6	0.8	1	39.714	997.28	49.86	A
63.00-43.00			B	0.136	2.823		0.8	1	39.714			
			C	0.136	2.823		0.8	1	39.714			
T7	533.40	4520.65	A	0.119	2.888	6	0.8	1	37.443	851.92	42.60	A
43.00-23.00			B	0.119	2.888		0.8	1	37.443			
			C	0.119	2.888		0.8	1	37.443			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	5	0.8	1	51.903	868.47	43.42	A
			B	0.146	2.786		0.8	1	51.903			
			C	0.146	2.786		0.8	1	51.903			
Sum Weight:	3277.19	25276.74						OTM	542207.66 lb-ft	6885.96		

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
L1	24.87	929.56	A	0.128	2.853	9	0.85	1	16.450	425.08	21.25	C
183.00-163.00			B	0.128	2.853		0.85	1	16.450			
			C	0.128	2.853		0.85	1	16.450			
T1	66.30	1131.73	A	0.107	2.937	9	0.85	1	15.096	425.44	21.27	C
163.00-143.00			B	0.107	2.937		0.85	1	15.096			
			C	0.107	2.937		0.85	1	15.096			
T2	276.20	1195.95	A	0.118	2.894	8	0.85	1	20.481	694.76	34.74	B
143.00-123.00			B	0.118	2.894		0.85	1	20.481			
			C	0.118	2.894		0.85	1	20.481			
T3	481.18	2260.46	A	0.119	2.887	8	0.85	1	24.196	895.96	44.80	B
123.00-103.00			B	0.119	2.887		0.85	1	24.196			
			C	0.119	2.887		0.85	1	24.196			
T4	511.40	2393.40	A	0.113	2.911	8	0.85	1	25.844	911.38	45.57	A
103.00-83.00			B	0.113	2.911		0.85	1	25.844			
			C	0.113	2.911		0.85	1	25.844			

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
T5	530.40	2987.43	A	0.115	2.906	7	0.85	1	30.154	936.94	46.85	A
83.00-63.00			B	0.115	2.906		0.85	1	30.154			
			C	0.115	2.906		0.85	1	30.154			
T6	533.40	4175.15	A	0.136	2.823	6	0.85	1	41.538	1024.68	51.23	A
63.00-43.00			B	0.136	2.823		0.85	1	41.538			
			C	0.136	2.823		0.85	1	41.538			
T7	533.40	4520.65	A	0.119	2.888	6	0.85	1	39.002	872.74	43.64	A
43.00-23.00			B	0.119	2.888		0.85	1	39.002			
			C	0.119	2.888		0.85	1	39.002			
T8 23.00-3.00	320.04	5682.41	A	0.146	2.786	5	0.85	1	54.362	899.96	45.00	A
			B	0.146	2.786		0.85	1	54.362			
			C	0.146	2.786		0.85	1	54.362			
Sum Weight:	3277.19	25276.74						OTM	558979.44 lb-ft	7086.93		

Force Totals

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Leg Weight	8983.40					
Bracing Weight	16293.34					
Total Member Self-Weight	25276.74			7739.80	5018.48	
Total Weight	37951.09			7739.80	5018.48	
Wind 0 deg - No Ice		-49.39	-50286.14	-4810167.21	13019.16	354.98
Wind 30 deg - No Ice		23729.39	-41226.56	-3982268.93	-2287470.39	16729.27
Wind 60 deg - No Ice		39123.34	-22603.62	-2206520.64	-3826892.93	12096.49
Wind 90 deg - No Ice		45240.85	49.39	15740.48	-4436109.45	2723.59
Wind 120 deg - No Ice		42329.93	24511.97	2377276.15	-4079837.35	11741.51
Wind 150 deg - No Ice		23878.78	41386.54	4019870.65	-2309481.00	17366.37
Wind 180 deg - No Ice		49.39	46893.85	4566572.71	-2982.20	-354.98
Wind 210 deg - No Ice		-23729.39	41226.56	3997748.52	2297507.34	-16729.27
Wind 240 deg - No Ice		-42061.16	24299.77	2351537.28	4061294.63	-12096.49
Wind 270 deg - No Ice		-45240.85	-49.39	-260.89	4446146.40	-2723.59
Wind 300 deg - No Ice		-39392.12	-22815.82	-2232259.52	3865509.56	-11741.51
Wind 330 deg - No Ice		-23878.78	-41386.54	-4004391.06	2319517.95	-17366.37
Member Ice	25876.79					
Total Weight Ice	84842.24			20945.61	2001.04	
Wind 0 deg - Ice		-10.24	-12182.47	-1159005.21	3660.63	1939.42
Wind 30 deg - Ice		5843.71	-10146.36	-970328.59	-568096.48	5277.86
Wind 60 deg - Ice		9800.20	-5660.61	-536849.79	-963611.77	3476.02
Wind 90 deg - Ice		11281.02	10.24	22605.19	-1112215.44	742.79
Wind 120 deg - Ice		10173.61	5888.03	597931.74	-993531.93	1536.60
Wind 150 deg - Ice		5833.58	10108.33	1011013.61	-569316.41	1918.68
Wind 180 deg - Ice		10.24	11707.37	1164954.82	341.45	-1939.42
Wind 210 deg - Ice		-5843.71	10146.36	1012219.80	572098.56	-5277.86
Wind 240 deg - Ice		-10211.65	5898.16	596711.80	998740.19	-3476.02
Wind 270 deg - Ice		-11281.02	-10.24	19286.02	1116217.52	-742.79
Wind 300 deg - Ice		-9762.16	-5650.48	-538069.73	966407.67	-1536.60
Wind 330 deg - Ice		-5833.58	-10108.33	-969122.40	573318.49	-1918.68
Total Weight	37951.09			7739.80	5018.48	
Wind 0 deg - Service		-10.52	-10848.25	-1031599.42	6650.03	75.62
Wind 30 deg - Service		5122.99	-8900.12	-854197.98	-487292.87	3563.63

Load Case	Vertical Forces lb	Sum of Forces X lb	Sum of Forces Z lb	Sum of Overturning Moments, M_x lb-ft	Sum of Overturning Moments, M_z lb-ft	Sum of Torques lb-ft
Wind 60 deg - Service		8452.10	-4883.18	-473078.69	-818070.57	2576.77
Wind 90 deg - Service		9773.51	10.52	4200.16	-948888.91	580.17
Wind 120 deg - Service		9135.16	5289.69	511146.97	-871952.23	2501.15
Wind 150 deg - Service		5154.81	8934.20	863902.13	-491981.52	3699.35
Wind 180 deg - Service		10.52	10125.63	981403.79	3241.46	-75.62
Wind 210 deg - Service		-5122.99	8900.12	859189.73	497184.35	-3563.63
Wind 240 deg - Service		-9077.91	5244.49	505664.13	875755.73	-2576.77
Wind 270 deg - Service		-9773.51	-10.52	791.59	958780.40	-580.17
Wind 300 deg - Service		-8509.35	-4928.38	-478561.53	834050.04	-2501.15
Wind 330 deg - Service		-5154.81	-8934.20	-858910.38	501873.00	-3699.35

Load Combinations

Comb. No.	Description
1	Dead Only
2	1.2 Dead+1.0 Wind 0 deg - No Ice
3	0.9 Dead+1.0 Wind 0 deg - No Ice
4	1.2 Dead+1.0 Wind 30 deg - No Ice
5	0.9 Dead+1.0 Wind 30 deg - No Ice
6	1.2 Dead+1.0 Wind 60 deg - No Ice
7	0.9 Dead+1.0 Wind 60 deg - No Ice
8	1.2 Dead+1.0 Wind 90 deg - No Ice
9	0.9 Dead+1.0 Wind 90 deg - No Ice
10	1.2 Dead+1.0 Wind 120 deg - No Ice
11	0.9 Dead+1.0 Wind 120 deg - No Ice
12	1.2 Dead+1.0 Wind 150 deg - No Ice
13	0.9 Dead+1.0 Wind 150 deg - No Ice
14	1.2 Dead+1.0 Wind 180 deg - No Ice
15	0.9 Dead+1.0 Wind 180 deg - No Ice
16	1.2 Dead+1.0 Wind 210 deg - No Ice
17	0.9 Dead+1.0 Wind 210 deg - No Ice
18	1.2 Dead+1.0 Wind 240 deg - No Ice
19	0.9 Dead+1.0 Wind 240 deg - No Ice
20	1.2 Dead+1.0 Wind 270 deg - No Ice
21	0.9 Dead+1.0 Wind 270 deg - No Ice
22	1.2 Dead+1.0 Wind 300 deg - No Ice
23	0.9 Dead+1.0 Wind 300 deg - No Ice
24	1.2 Dead+1.0 Wind 330 deg - No Ice
25	0.9 Dead+1.0 Wind 330 deg - No Ice
26	1.2 Dead+1.0 Ice+1.0 Temp
27	1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp
28	1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp
29	1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp
30	1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp
31	1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp
32	1.2 Dead+1.0 Wind 150 deg+1.0 Ice+1.0 Temp
33	1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp
34	1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp
35	1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp
36	1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp
37	1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp
38	1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp
39	Dead+Wind 0 deg - Service
40	Dead+Wind 30 deg - Service
41	Dead+Wind 60 deg - Service

Comb. No.	Description
42	Dead+Wind 90 deg - Service
43	Dead+Wind 120 deg - Service
44	Dead+Wind 150 deg - Service
45	Dead+Wind 180 deg - Service
46	Dead+Wind 210 deg - Service
47	Dead+Wind 240 deg - Service
48	Dead+Wind 270 deg - Service
49	Dead+Wind 300 deg - Service
50	Dead+Wind 330 deg - Service

Maximum Member Forces

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
L1	183 - 163	Latticed Pole Leg	Max Tension	15	6137.26	40.97	-61.53
			Max. Compression	18	-7989.81	149.57	-87.31
			Max. Mx	20	-537.79	-648.90	36.84
			Max. My	2	-284.99	30.79	-691.07
			Max. Vy	8	544.71	-420.65	-31.77
			Max. Vx	2	-588.58	30.79	462.63
		Latticed Pole Diagonal	Max Tension	23	2011.89	0.00	0.00
			Max. Compression	10	-2160.01	0.00	0.00
			Max. Mx	36	8.69	26.62	0.09
			Max. My	24	-1363.61	5.75	3.67
			Max. Vy	36	-24.41	26.62	0.09
			Max. Vx	24	-0.74	5.75	3.67
		Latticed Pole Top Girt	Max Tension	1	0.00	0.00	0.00
			Max. Compression	37	-101.12	0.00	0.00
			Max. Mx	26	-86.12	-108.04	0.00
			Max. My	12	-26.86	0.00	0.00
			Max. Vy	26	50.49	0.00	0.00
			Max. Vx	12	-0.00	0.00	0.00
T1	163 - 143	Leg	Max Tension	23	17421.32	-318.08	-7.63
			Max. Compression	18	-22925.15	-164.16	-0.82
			Max. Mx	18	-17299.64	325.87	-3.15
			Max. My	12	-1582.01	-23.60	341.24
			Max. Vy	14	1280.06	-318.66	4.51
			Max. Vx	8	-1140.94	3.20	48.17
		Diagonal	Max Tension	8	3671.17	0.00	0.00
			Max. Compression	8	-3768.50	0.00	0.00
			Max. Mx	34	-49.37	44.23	-6.06
			Max. My	16	-3714.01	8.52	-14.98
			Max. Vy	36	35.14	43.55	5.66
			Max. Vx	16	2.86	0.00	0.00
T2	143 - 123	Leg	Max Tension	23	37733.55	-372.10	26.13
			Max. Compression	18	-46865.00	773.28	-21.03
			Max. Mx	2	-46285.14	775.01	-7.92
			Max. My	12	-4061.85	-48.09	824.79
			Max. Vy	14	1045.40	-758.89	9.09
			Max. Vx	8	-936.01	10.07	351.63
		Diagonal	Max Tension	4	5223.03	0.00	0.00
			Max. Compression	4	-5248.23	0.00	0.00
			Max. Mx	36	589.85	73.99	8.55
			Max. My	16	-4713.60	4.12	-17.62
			Max. Vy	35	46.28	70.76	9.03
			Max. Vx	16	3.06	0.00	0.00

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
T3	123 - 103	Leg	Max Tension	15	64297.62	-274.15	7.49
			Max. Compression	18	-76364.48	283.59	22.20
			Max. Mx	2	-55491.83	775.01	-7.88
			Max. My	16	-5341.84	-15.85	559.10
			Max. Vy	2	192.78	775.01	-7.88
			Max. Vx	16	-187.23	-15.85	559.10
		Diagonal	Max Tension	4	6464.67	0.00	0.00
			Max. Compression	4	-6523.86	0.00	0.00
			Max. Mx	34	1373.28	98.96	12.34
			Max. My	14	-5464.73	34.34	-16.23
			Max. Vy	34	61.99	96.59	-12.71
			Max. Vx	37	3.38	0.00	0.00
T4	103 - 83	Leg	Max Tension	15	89048.95	-391.66	25.54
			Max. Compression	2	-104861.62	407.56	-21.51
			Max. Mx	2	-104861.62	407.56	-21.51
			Max. My	16	-5797.71	-15.84	559.10
			Max. Vy	6	-909.12	-397.21	-33.38
			Max. Vx	16	888.52	-22.10	409.22
		Diagonal	Max Tension	4	8237.54	0.00	0.00
			Max. Compression	4	-8440.89	0.00	0.00
			Max. Mx	33	1832.27	-143.46	-19.06
			Max. My	32	-1011.18	-138.69	19.75
			Max. Vy	33	-73.48	-143.46	-19.06
			Max. Vx	31	4.08	0.00	0.00
T5	83 - 63	Leg	Max Tension	15	116929.30	-527.15	16.20
			Max. Compression	2	-137103.65	15.19	1.56
			Max. Mx	14	115068.41	-534.64	15.88
			Max. My	12	-9132.84	-23.32	-681.30
			Max. Vy	3	148.95	525.29	-18.39
			Max. Vx	12	170.40	-23.32	-681.30
		Diagonal	Max Tension	4	8525.40	0.00	0.00
			Max. Compression	4	-8740.65	0.00	0.00
			Max. Mx	33	1422.90	223.13	-27.35
			Max. My	34	-1001.31	197.91	29.31
			Max. Vy	33	103.96	211.61	28.31
			Max. Vx	34	5.59	0.00	0.00
T6	63 - 43	Leg	Max Tension	15	143763.56	747.60	7.11
			Max. Compression	2	-168700.05	-139.10	-12.14
			Max. Mx	2	-168579.96	1574.70	0.26
			Max. My	16	-10343.41	-179.17	1052.07
			Max. Vy	2	-595.00	1574.70	0.26
			Max. Vx	16	-317.92	-179.18	1052.07
		Diagonal	Max Tension	4	8993.03	0.00	0.00
			Max. Compression	2	-9433.44	0.00	0.00
			Max. Mx	33	1147.90	295.54	-29.57
			Max. My	34	2932.37	251.46	34.05
			Max. Vy	33	122.26	260.97	31.89
			Max. Vx	34	-6.19	0.00	0.00
		Secondary Horizontal	Max Tension	16	592.19	72.47	3.91
			Max. Compression	17	-599.45	65.52	20.89
			Max. Mx	38	-2.34	205.55	29.96
			Max. My	32	-86.75	205.07	31.21
			Max. Vy	35	-98.64	180.11	28.21
			Max. Vx	34	-5.55	0.00	0.00
T7	43 - 23	Leg	Max Tension	15	170187.40	-867.02	18.85
			Max. Compression	2	-200448.73	-30.88	-12.15
			Max. Mx	31	-72664.69	-2192.43	2.00
			Max. My	16	-12392.59	-66.04	815.23
			Max. Vy	27	422.09	1981.86	-9.64
			Max. Vx	16	142.26	-66.04	815.23

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Axial lb	Major Axis Moment lb-ft	Minor Axis Moment lb-ft
		Diagonal	Max Tension	4	9540.86	0.00	0.00
			Max. Compression	4	-9796.73	0.00	0.00
			Max. Mx	33	826.93	418.04	45.49
			Max. My	34	-1851.65	373.19	47.49
			Max. Vy	33	150.45	418.04	45.49
			Max. Vx	34	7.72	0.00	0.00
T8	23 - 3	Leg	Max Tension	15	194884.76	1245.19	5.59
			Max. Compression	2	-231127.50	0.00	-0.33
			Max. Mx	33	21479.52	3233.07	1.11
			Max. My	12	-14098.79	-313.35	-2020.70
			Max. Vy	2	-897.65	2294.48	0.47
			Max. Vx	16	-519.74	-312.11	2016.17
		Diagonal	Max Tension	4	9787.33	0.00	0.00
			Max. Compression	2	-10896.82	0.00	0.00
			Max. Mx	33	-233.47	497.92	47.25
			Max. My	29	-4541.38	472.78	-51.88
			Max. Vy	33	159.08	497.92	47.25
			Max. Vx	29	-7.88	0.00	0.00
		Secondary Horizontal	Max Tension	12	917.39	117.59	13.61
			Max. Compression	13	-889.23	109.81	26.06
			Max. Mx	34	-371.64	356.61	45.31
			Max. My	34	-371.64	356.61	45.31
			Max. Vy	34	-126.76	356.61	45.31
			Max. Vx	32	6.71	0.00	0.00

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical lb	Horizontal, X lb	Horizontal, Z lb
Leg C	Max. Vert	18	233869.86	26084.60	-14735.15
	Max. H_x	18	233869.86	26084.60	-14735.15
	Max. H_z	5	-173543.93	-19149.26	12825.31
	Min. Vert	7	-194282.45	-22139.03	12458.56
	Min. H_x	7	-194282.45	-22139.03	12458.56
	Min. H_z	18	233869.86	26084.60	-14735.15
Leg B	Max. Vert	10	235135.27	-26250.06	-14834.24
	Max. H_x	23	-196398.88	22314.88	12574.98
	Max. H_z	25	-175312.12	19273.19	12887.33
	Min. Vert	23	-196398.88	22314.88	12574.98
	Min. H_x	10	235135.27	-26250.06	-14834.24
	Min. H_z	10	235135.27	-26250.06	-14834.24
Leg A	Max. Vert	2	239176.57	3.05	30908.03
	Max. H_x	21	11432.39	3523.44	1142.18
	Max. H_z	2	239176.57	3.05	30908.03
	Min. Vert	15	-201148.02	-12.91	-26390.56
	Min. H_x	9	10686.97	-3531.40	1078.69
	Min. H_z	15	-201148.02	-12.91	-26390.56

Tower Mast Reaction Summary

Load Combination	Vertical lb	$Shear_x$ lb	$Shear_z$ lb	Overturning Moment, M_x lb-ft	Overturning Moment, M_z lb-ft	Torque lb-ft
Dead Only	37951.09	0.00	-0.00	7740.18	5018.85	-0.17
1.2 Dead+1.0 Wind 0 deg - No Ice	45541.31	-49.39	-50285.60	-4822500.40	14112.60	297.51
0.9 Dead+1.0 Wind 0 deg - No Ice	34155.97	-49.39	-50284.55	-4821173.86	12583.39	312.20
1.2 Dead+1.0 Wind 30 deg - No Ice	45541.31	23729.09	-41226.09	-3992244.85	-2293077.11	16713.25
0.9 Dead+1.0 Wind 30 deg - No Ice	34155.97	23728.45	-41225.19	-3991523.30	-2292834.15	16715.47
1.2 Dead+1.0 Wind 60 deg - No Ice	45541.31	39122.85	-22603.34	-2211381.49	-3837042.47	12111.39
0.9 Dead+1.0 Wind 60 deg - No Ice	34155.98	39122.97	-22603.40	-2212091.97	-3835748.96	12107.34
1.2 Dead+1.0 Wind 90 deg - No Ice	45541.31	45240.30	49.42	17372.21	-4448068.99	2765.17
0.9 Dead+1.0 Wind 90 deg - No Ice	34155.97	45239.23	49.51	15035.09	-4446145.88	2758.08
1.2 Dead+1.0 Wind 120 deg - No Ice	45541.88	42329.18	24512.14	2385784.51	-4090639.13	11814.12
0.9 Dead+1.0 Wind 120 deg - No Ice	34155.97	42328.57	24511.18	2381632.91	-4089035.15	11797.19
1.2 Dead+1.0 Wind 150 deg - No Ice	45541.31	23878.53	41386.04	4033113.87	-2315111.22	17446.31
0.9 Dead+1.0 Wind 150 deg - No Ice	34155.97	23878.05	41385.03	4027683.01	-2314863.33	17421.79
1.2 Dead+1.0 Wind 180 deg - No Ice	45541.31	49.38	46893.26	4581381.56	-1954.52	-300.09
0.9 Dead+1.0 Wind 180 deg - No Ice	34155.98	49.38	46893.40	4575713.63	-3467.61	-313.87
1.2 Dead+1.0 Wind 210 deg - No Ice	45541.31	-23729.14	41226.06	4010899.91	2305172.49	-16713.64
0.9 Dead+1.0 Wind 210 deg - No Ice	34155.97	-23728.68	41225.05	4005487.41	2301903.40	-16713.64
1.2 Dead+1.0 Wind 240 deg - No Ice	45541.87	-42060.41	24299.94	2359940.02	4074102.41	-12112.06
0.9 Dead+1.0 Wind 240 deg - No Ice	34155.97	-42059.81	24298.98	2355810.35	4069477.50	-12110.09
1.2 Dead+1.0 Wind 270 deg - No Ice	45541.31	-45240.30	-49.35	1306.90	4460185.84	-2764.88
0.9 Dead+1.0 Wind 270 deg - No Ice	34155.97	-45239.22	-49.26	-1013.28	4455218.48	-2757.85
1.2 Dead+1.0 Wind 300 deg - No Ice	45541.31	-39391.62	-22815.53	-2237190.17	3877833.81	-11810.41
0.9 Dead+1.0 Wind 300 deg - No Ice	34155.98	-39391.74	-22815.60	-2237878.51	3873475.59	-11792.85
1.2 Dead+1.0 Wind 330 deg - No Ice	45541.31	-23878.47	-41386.07	-4014420.62	2327315.44	-17446.18
0.9 Dead+1.0 Wind 330 deg - No Ice	34155.97	-23877.84	-41385.15	-4013677.16	2324000.95	-17421.66
1.2 Dead+1.0 Ice+1.0 Temp	92432.46	0.25	-0.33	22623.71	3073.06	0.59
1.2 Dead+1.0 Wind 0 deg+1.0 Ice+1.0 Temp	92432.46	-10.24	-12182.15	-1164494.58	4786.52	1920.14
1.2 Dead+1.0 Wind 30 deg+1.0 Ice+1.0 Temp	92432.46	5843.55	-10146.09	-974700.65	-570479.40	5274.20
1.2 Dead+1.0 Wind 60 deg+1.0 Ice+1.0 Temp	92432.46	9799.93	-5660.46	-538577.00	-968459.54	3485.13
1.2 Dead+1.0 Wind 90 deg+1.0 Ice+1.0 Temp	92432.46	11280.71	10.24	24332.09	-1117994.80	768.44
1.2 Dead+1.0 Wind 120 deg+1.0 Ice+1.0 Temp	92432.46	10173.34	5887.86	603195.67	-998541.86	1569.02
1.2 Dead+1.0 Wind 150	92432.46	5833.43	10108.04	1018812.41	-571713.50	1947.97

Load Combination	Vertical	$Shear_x$	$Shear_z$	Overturning Moment, M_x	Overturning Moment, M_z	Torque
	lb	lb	lb	lb-ft	lb-ft	lb-ft
deg+1.0 Ice+1.0 Temp						
1.2 Dead+1.0 Wind 180 deg+1.0 Ice+1.0 Temp	92432.46	10.25	11707.03	1173681.63	1441.39	-1920.49
1.2 Dead+1.0 Wind 210 deg+1.0 Ice+1.0 Temp	92432.46	-5843.54	10146.07	1020016.62	576706.99	-5274.06
1.2 Dead+1.0 Wind 240 deg+1.0 Ice+1.0 Temp	92432.46	-10211.36	5897.99	601959.33	1005974.63	-3489.28
1.2 Dead+1.0 Wind 270 deg+1.0 Ice+1.0 Temp	92432.46	-11280.69	-10.25	20984.07	1124224.99	-768.45
1.2 Dead+1.0 Wind 300 deg+1.0 Ice+1.0 Temp	92432.46	-9761.88	-5650.33	-539816.05	973483.16	-1568.26
1.2 Dead+1.0 Wind 330 deg+1.0 Ice+1.0 Temp	92432.46	-5833.41	-10108.06	-973496.10	577946.90	-1948.07
Dead+Wind 0 deg - Service	37951.09	-10.51	-10847.85	-1028764.35	6754.27	65.34
Dead+Wind 30 deg - Service	37951.09	5122.94	-8900.04	-850987.07	-488378.61	3560.34
Dead+Wind 60 deg - Service	37951.09	8452.02	-4883.13	-468959.36	-819964.32	2579.40
Dead+Wind 90 deg - Service	37951.09	9773.42	10.52	9472.77	-951104.27	588.08
Dead+Wind 120 deg - Service	37951.09	9134.82	5289.48	517621.43	-873925.94	2514.21
Dead+Wind 150 deg - Service	37951.09	5154.76	8934.11	871243.75	-493074.00	3713.19
Dead+Wind 180 deg - Service	37951.09	10.52	10125.53	989026.85	3334.89	-65.71
Dead+Wind 210 deg - Service	37951.09	-5122.94	8900.04	866517.38	498461.16	-3560.34
Dead+Wind 240 deg - Service	37951.09	-9077.82	5244.44	512144.73	877948.62	-2579.61
Dead+Wind 270 deg - Service	37951.09	-9773.42	-10.52	6052.96	961192.39	-588.10
Dead+Wind 300 deg - Service	37951.09	-8509.27	-4928.33	-474456.95	836156.03	-2513.23
Dead+Wind 330 deg - Service	37951.09	-5154.76	-8934.12	-855711.62	503170.81	-3713.20

Solution Summary

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX	PY	PZ	PX	PY	PZ	% Error
	lb	lb	lb	lb	lb	lb	
1	0.00	-37951.09	-0.00	-0.00	37951.09	0.00	0.000%
2	-49.39	-45541.31	-50286.14	49.39	45541.31	50285.60	0.001%
3	-49.39	-34155.98	-50286.14	49.39	34155.97	50284.55	0.003%
4	23729.39	-45541.31	-41226.56	-23729.09	45541.31	41226.09	0.001%
5	23729.39	-34155.98	-41226.56	-23728.45	34155.97	41225.19	0.003%
6	39123.34	-45541.31	-22603.62	-39122.85	45541.31	22603.34	0.001%
7	39123.34	-34155.98	-22603.62	-39122.97	34155.98	22603.40	0.001%
8	45240.85	-45541.31	49.39	-45240.30	45541.31	-49.42	0.001%
9	45240.85	-34155.98	49.39	-45239.23	34155.97	-49.51	0.003%
10	42329.93	-45541.31	24511.97	-42329.18	45541.88	-24512.14	0.001%
11	42329.93	-34155.98	24511.97	-42328.57	34155.97	-24511.18	0.003%
12	23878.78	-45541.31	41386.54	-23878.53	45541.31	-41386.04	0.001%
13	23878.78	-34155.98	41386.54	-23878.05	34155.97	-41385.03	0.003%
14	49.39	-45541.31	46893.84	-49.38	45541.31	-46893.26	0.001%
15	49.39	-34155.98	46893.84	-49.38	34155.98	-46893.40	0.001%
16	-23729.39	-45541.31	41226.56	23729.14	45541.31	-41226.06	0.001%
17	-23729.39	-34155.98	41226.56	23728.68	34155.97	-41225.05	0.003%
18	-42061.16	-45541.31	24299.77	42060.41	45541.87	-24299.94	0.001%
19	-42061.16	-34155.98	24299.77	42059.81	34155.97	-24298.98	0.003%
20	-45240.85	-45541.31	-49.39	45240.30	45541.31	49.35	0.001%
21	-45240.85	-34155.98	-49.39	45239.22	34155.97	49.26	0.003%
22	-39392.12	-45541.31	-22815.82	39391.62	45541.31	22815.53	0.001%
23	-39392.12	-34155.98	-22815.82	39391.74	34155.98	22815.60	0.001%
24	-23878.78	-45541.31	-41386.54	23878.47	45541.31	41386.07	0.001%
25	-23878.78	-34155.98	-41386.54	23877.84	34155.97	41385.15	0.003%
26	0.00	-92432.46	-0.00	-0.25	92432.46	0.33	0.000%
27	-10.24	-92432.46	-12182.47	10.24	92432.46	12182.15	0.000%

	Sum of Applied Forces			Sum of Reactions			
Load Comb.	PX lb	PY lb	PZ lb	PX lb	PY lb	PZ lb	% Error
28	5843.71	-92432.46	-10146.36	-5843.55	92432.46	10146.09	0.000%
29	9800.20	-92432.46	-5660.61	-9799.93	92432.46	5660.46	0.000%
30	11281.02	-92432.46	10.24	-11280.71	92432.46	-10.24	0.000%
31	10173.61	-92432.46	5888.03	-10173.34	92432.46	-5887.86	0.000%
32	5833.58	-92432.46	10108.33	-5833.43	92432.46	-10108.04	0.000%
33	10.24	-92432.46	11707.37	-10.25	92432.46	-11707.03	0.000%
34	-5843.71	-92432.46	10146.36	5843.54	92432.46	-10146.07	0.000%
35	-10211.65	-92432.46	5898.16	10211.36	92432.46	-5897.99	0.000%
36	-11281.02	-92432.46	-10.24	11280.69	92432.46	10.25	0.000%
37	-9762.16	-92432.46	-5650.48	9761.88	92432.46	5650.33	0.000%
38	-5833.58	-92432.46	-10108.33	5833.41	92432.46	10108.06	0.000%
39	-10.52	-37951.09	-10848.25	10.51	37951.09	10847.85	0.001%
40	5122.99	-37951.09	-8900.12	-5122.94	37951.09	8900.04	0.000%
41	8452.10	-37951.09	-4883.18	-8452.02	37951.09	4883.13	0.000%
42	9773.51	-37951.09	10.52	-9773.42	37951.09	-10.52	0.000%
43	9135.16	-37951.09	5289.69	-9134.82	37951.09	-5289.48	0.001%
44	5154.81	-37951.09	8934.20	-5154.76	37951.09	-8934.11	0.000%
45	10.52	-37951.09	10125.63	-10.52	37951.09	-10125.53	0.000%
46	-5122.99	-37951.09	8900.12	5122.94	37951.09	-8900.04	0.000%
47	-9077.91	-37951.09	5244.49	9077.82	37951.09	-5244.44	0.000%
48	-9773.51	-37951.09	-10.52	9773.42	37951.09	10.52	0.000%
49	-8509.35	-37951.09	-4928.38	8509.27	37951.09	4928.33	0.000%
50	-5154.81	-37951.09	-8934.20	5154.76	37951.09	8934.12	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	6	0.00000001	0.00000001
2	Yes	9	0.00000001	0.00005791
3	Yes	8	0.00000001	0.00013405
4	Yes	9	0.00000001	0.00006174
5	Yes	8	0.00000001	0.00014594
6	Yes	9	0.00000001	0.00006545
7	Yes	9	0.00000001	0.00004978
8	Yes	9	0.00000001	0.00006211
9	Yes	8	0.00000001	0.00014683
10	Yes	9	0.00000001	0.00005815
11	Yes	8	0.00000001	0.00013461
12	Yes	9	0.00000001	0.00006193
13	Yes	8	0.00000001	0.00014630
14	Yes	9	0.00000001	0.00006547
15	Yes	9	0.00000001	0.00004977
16	Yes	9	0.00000001	0.00006195
17	Yes	8	0.00000001	0.00014639
18	Yes	9	0.00000001	0.00005823
19	Yes	8	0.00000001	0.00013475
20	Yes	9	0.00000001	0.00006233
21	Yes	8	0.00000001	0.00014730
22	Yes	9	0.00000001	0.00006571
23	Yes	9	0.00000001	0.00004995
24	Yes	9	0.00000001	0.00006194
25	Yes	8	0.00000001	0.00014632
26	Yes	6	0.00000001	0.00008169
27	Yes	9	0.00000001	0.00010897
28	Yes	9	0.00000001	0.00010793

29	Yes	9	0.00000001	0.00010792
30	Yes	9	0.00000001	0.00010795
31	Yes	9	0.00000001	0.00010932
32	Yes	9	0.00000001	0.00011085
33	Yes	9	0.00000001	0.00011235
34	Yes	9	0.00000001	0.00011231
35	Yes	9	0.00000001	0.00011210
36	Yes	9	0.00000001	0.00011161
37	Yes	9	0.00000001	0.00011139
38	Yes	9	0.00000001	0.00011010
39	Yes	8	0.00000001	0.00014967
40	Yes	9	0.00000001	0.00004775
41	Yes	9	0.00000001	0.00004839
42	Yes	9	0.00000001	0.00004787
43	Yes	8	0.00000001	0.00014990
44	Yes	9	0.00000001	0.00004820
45	Yes	9	0.00000001	0.00004896
46	Yes	9	0.00000001	0.00004835
47	Yes	9	0.00000001	0.00004786
48	Yes	9	0.00000001	0.00004851
49	Yes	9	0.00000001	0.00004906
50	Yes	9	0.00000001	0.00004822

Maximum Tower Deflections - Service Wind

Section No.	*Elevation*	*Horz. Deflection*	*Gov. Load Comb.*	*Tilt*	*Twist*
	ft	*in*		°	°
L1	183 - 163	2.829	47	0.1315	0.0147
T1	163 - 143	2.276	47	0.1272	0.0120
T2	143 - 123	1.752	47	0.1158	0.0083
T3	123 - 103	1.292	39	0.0964	0.0053
T4	103 - 83	0.898	39	0.0818	0.0036
T5	83 - 63	0.580	39	0.0625	0.0026
T6	63 - 43	0.333	39	0.0468	0.0018
T7	43 - 23	0.158	39	0.0290	0.0011
T8	23 - 3	0.049	39	0.0149	0.0005

Critical Deflections and Radius of Curvature - Service Wind

Elevation	*Appurtenance*	*Gov. Load Comb.*	*Deflection*	*Tilt*	*Twist*	*Radius of Curvature*
ft			*in*	°	°	*ft*
180.00	6 FT DISH	47	2.745	0.1311	0.0143	714139
177.00	Empty Pipe [P4.0][102"]	47	2.662	0.1306	0.0140	595114
173.00	20' Omni	47	2.551	0.1298	0.0135	357068
165.00	USF-4U (4ft Standoff)	47	2.330	0.1278	0.0123	197433
161.00	Pirod 4' Side Mount Standoff (1)	47	2.222	0.1265	0.0117	155002
160.00	5' Omni	47	2.195	0.1261	0.0115	146031
150.00	APXVAARR24_43-U-NA20	47	1.930	0.1210	0.0096	91134
135.00	P65-16-XLH-RR	39	1.559	0.1082	0.0069	72810
133.00	10' Dipole	39	1.513	0.1061	0.0066	72983
124.00	(2) MX08FRO660 [P2.0][96"]	39	1.313	0.0973	0.0054	73308
93.00	FFVV-65B-R2	39	0.730	0.0723	0.0031	62973
65.00	Pirod 4' Side Mount Standoff (1)	39	0.355	0.0484	0.0019	65434

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	183 - 163	13.146	2	0.5954	0.0690
T1	163 - 143	10.641	2	0.5797	0.0564
T2	143 - 123	8.235	2	0.5352	0.0390
T3	123 - 103	6.076	2	0.4504	0.0247
T4	103 - 83	4.219	2	0.3839	0.0169
T5	83 - 63	2.721	2	0.2944	0.0124
T6	63 - 43	1.561	2	0.2199	0.0085
T7	43 - 23	0.737	2	0.1360	0.0052
T8	23 - 3	0.229	2	0.0700	0.0025

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
180.00	6 FT DISH	2	12.768	0.5937	0.0673	202810
177.00	Empty Pipe [P4.0][102"]	2	12.391	0.5919	0.0656	169008
173.00	20' Omni	2	11.889	0.5892	0.0632	101405
165.00	USF-4U (4ft Standoff)	2	10.890	0.5819	0.0579	55750
161.00	Pirod 4' Side Mount Standoff (1)	2	10.394	0.5772	0.0549	41743
160.00	5' Omni	2	10.271	0.5758	0.0540	38687
150.00	APXVAARR24_43-U-NA20	2	9.056	0.5565	0.0453	21727
135.00	P65-16-XLH-RR	2	7.337	0.5023	0.0326	16478
133.00	10' Dipole	2	7.120	0.4933	0.0311	16445
124.00	(2) MX08FRO660 [P2.0][96"]	2	6.177	0.4543	0.0253	16199
93.00	FFVV-65B-R2	2	3.426	0.3400	0.0145	13569
65.00	Pirod 4' Side Mount Standoff (1)	2	1.662	0.2276	0.0088	13935

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 $\frac{P_u}{\phi P_n}$
L1	183 - 163	P2.5x.203	20.00	5.00	63.3 K=1.00	1.7040	1.00	-7989.81	57192.30	0.140 [1] ✔
T1	163 - 143	P2.5x.276	20.03	6.68	86.7 K=1.00	2.2535	1.00	-22925.20	58512.20	0.392 [1] ✔
T2	143 - 123	P3x.216	20.03	6.68	68.9 K=1.00	2.2285	1.00	-46865.00	70891.80	0.661 [1] ✔
T3	123 - 103	P4x.337	20.03	6.68	54.3	4.4074	1.00	-76364.50	159910.00	0.478 [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 $\frac{P_u}{\phi P_n}$
					K=1.00					✔
T4	103 - 83	P5x.258	20.03	10.02	64.0 K=1.00	4.2999	1.00	-104862.00	143398.00	0.731 [1] ✔
T5	83 - 63	P5x.375	20.03	10.02	65.4 K=1.00	6.1120	1.00	-137104.00	201243.00	0.681 [1] ✔
T6	63 - 43	P5x.375	20.03	5.14	33.5 K=1.00	6.1120	1.00	-168700.00	253313.00	0.666 [1] ✔
T7	43 - 23	P6x.432	20.03	10.02	54.8 K=1.00	8.4049	1.00	-200449.00	303740.00	0.660 [1] ✔
T8	23 - 3	P6x.432	20.03	5.12	28.0 K=1.00	8.4049	1.00	-231128.00	357178.00	0.647 [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 $\frac{P_u}{\phi P_n}$
L1	183 - 163	L1 3/4x1 3/4x3/16	9.91	4.82	168.3 K=1.00	0.6211	-2160.01	6273.31	0.344 [1] ✔
T1	163 - 143	L2x2x1/4	12.24	6.18	189.6 K=1.00	0.9380	-3768.50	7469.25	0.505 [1] ✔
T2	143 - 123	L2 1/2x2 1/2x3/16	13.99	7.02	170.2 K=1.00	0.9020	-5248.23	8911.05	0.589 [1] ✔
T3	123 - 103	L2 1/2x2 1/2x5/16	15.81	7.88	193.5 K=1.00	1.4600	-6523.86	11161.40	0.585 [1] ✔
T4	103 - 83	L3x3x3/16 + L2-1/2x2-1/2x3/16 KL/R > 200 (C) - 101	19.04	9.55	206.6 K=1.00	1.9922	-8440.89	10540.30	0.801 [1] ✔
T5	83 - 63	L3 1/2x3 1/2x5/16	20.80	10.43	181.3 K=1.00	2.0900	-8740.65	18191.00	0.480 [1] ✔
T6	63 - 43	L3 1/2x3 1/2x3/8	22.61	11.33	197.9 K=1.00	2.4800	-9433.44	18122.50	0.521 [1] ✔
T7	43 - 23	L4x4x3/8	24.45	12.20	185.8 K=1.00	2.8600	-9796.73	23702.90	0.413 [1] ✔
T8	23 - 3	L4x4x3/8 KL/R > 200 (C) - 166	26.33	13.14	200.1 K=1.00	2.8600	-10896.80	20444.60	0.533 [1] ✔

[1] P_u / ϕP_n controls

Secondary 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 $\frac{P_u}{\phi P_n}$

Section No.	Elevation ft	Size	L ft	L_u ft	Kl/r	A in^2	P_u lb	ϕP_n lb	Ratio $\frac{P_u}{\phi P_n}$
T6	63 - 43	L3 1/2x3 1/2x1/4	20.26	19.80	218.0 K=1.00	1.6900	-2925.76	10180.70	0.287 [1] ✔
T8	23 - 3	L4x4x1/4	24.34	23.79	228.4 K=1.00	1.9400	-4008.43	10647.40	0.376 [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 $\frac{P_u}{\phi P_n}$
L1	183 - 163	L2 1/2x2 1/2x3/16 KL/R > 200 (C) - 6	8.56	8.32	201.7 K=1.00	0.9020	-101.12	6345.44	0.016 [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 $\frac{P_u}{\phi P_n}$
L1	183 - 163	P2.5x.203	20.00	5.00	63.3	1.7040	6137.26	76682.30	0.080 [1] ✔
T1	163 - 143	P2.5x.276	20.03	6.68	86.7	2.2535	17421.30	101409.00	0.172 [1] ✔
T2	143 - 123	P3x.216	20.03	6.68	68.9	2.2285	37733.60	100281.00	0.376 [1] ✔
T3	123 - 103	P4x.337	20.03	6.68	54.3	4.4074	64297.60	198335.00	0.324 [1] ✔
T4	103 - 83	P5x.258	20.03	10.02	64.0	4.2999	88548.50	193494.00	0.458 [1] ✔
T5	83 - 63	P5x.375	20.03	10.02	65.4	6.1120	116929.00	275039.00	0.425 [1] ✔
T6	63 - 43	P5x.375	20.03	5.14	33.5	6.1120	143764.00	275039.00	0.523 [1] ✔
T7	43 - 23	P6x.432	20.03	10.02	54.8	8.4049	170187.00	378222.00	0.450 [1] ✔
T8	23 - 3	P6x.432	20.03	5.12	28.0	8.4049	194885.00	378222.00	0.515 [1] ✔

[1] P_u / ϕP_n controls

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 $\frac{P_u}{\phi P_n}$
L1	183 - 163	L1 3/4x1 3/4x3/16	9.91	4.82	107.7	0.6211	2011.89	20123.40	0.100 [1] ✔
T1	163 - 143	L2x2x1/4	12.24	6.18	121.7	0.9380	3671.17	30391.20	0.121 [1] ✔
T2	143 - 123	L2 1/2x2 1/2x3/16	13.99	7.02	108.3	0.9020	5223.03	29224.80	0.179 [1] ✔
T3	123 - 103	L2 1/2x2 1/2x5/16	15.20	7.58	119.5	1.4600	6464.67	47304.00	0.137 [1] ✔
T4	103 - 83	L3x3x3/16 + L2-1/2x2-1/2x3/16	19.04	9.55	206.6	1.9922	8237.54	64547.30	0.128 [1] ✔
T5	83 - 63	L3 1/2x3 1/2x5/16	20.80	10.43	115.9	2.0900	8525.40	67716.00	0.126 [1] ✔
T6	63 - 43	L3 1/2x3 1/2x3/8	22.61	11.33	127.1	2.4800	8993.03	80352.00	0.112 [1] ✔
T7	43 - 23	L4x4x3/8	24.45	12.20	119.1	2.8600	9540.86	92664.00	0.103 [1] ✔
T8	23 - 3	L4x4x3/8	26.33	13.14	128.2	2.8600	9787.33	92664.00	0.106 [1] ✔

[1] P_u / ϕP_n controls

Secondary 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 $\frac{P_u}{\phi P_n}$
T6	63 - 43	L3 1/2x3 1/2x1/4	19.24	18.78	206.8	1.2675	2925.76	61790.60	0.047 [1] ✔
T8	23 - 3	L4x4x1/4	24.34	23.79	228.4	1.4550	4008.43	70931.30	0.057 [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
L1	183 - 163	Latticed Pole Leg	P2.5x.203	1	-7989.81	57192.30	14.0	Pass
		Latticed Pole Diagonal	L1 3/4x1 3/4x3/16	8	-2160.01	6273.31	34.4	Pass
		Latticed Pole Top	L2 1/2x2 1/2x3/16	6	-101.12	6345.44	1.6	Pass

Section No.	Elevation ft	Component Type	Size	Critical Element	P lb	ϕP_{allow} lb	% Capacity	Pass Fail
		Girt						
T1	163 - 143	Leg	P2.5x.276	31	-22925.20	58512.20	39.2	Pass
		Diagonal	L2x2x1/4	35	-3768.50	7469.25	50.5	Pass
T2	143 - 123	Leg	P3x.216	52	-46865.00	70891.80	66.1	Pass
		Diagonal	L2 1/2x2 1/2x3/16	59	-5248.23	8911.05	58.9	Pass
T3	123 - 103	Leg	P4x.337	73	-76364.50	159910.00	47.8	Pass
		Diagonal	L2 1/2x2 1/2x5/16	80	-6523.86	11161.40	58.5	Pass
T4	103 - 83	Leg	P5x.258	96	-104862.00	143398.00	73.1	Pass
		Diagonal	L3x3x3/16 + L2-1/2x2-1/2x3/16	101	-8440.89	10540.30	80.1	Pass
T5	83 - 63	Leg	P5x.375	111	-137104.00	201243.00	68.1	Pass
		Diagonal	L3 1/2x3 1/2x5/16	116	-8740.65	18191.00	48.0	Pass
T6	63 - 43	Leg	P5x.375	126	-168700.00	253313.00	66.6	Pass
		Diagonal	L3 1/2x3 1/2x3/8	131	-9433.44	18122.50	52.1	Pass
		Secondary Horizontal	L3 1/2x3 1/2x1/4	134	-2925.76	10180.70	28.7	Pass
T7	43 - 23	Leg	P6x.432	147	-200449.00	303740.00	66.0	Pass
		Diagonal	L4x4x3/8	152	-9796.73	23702.90	41.3	Pass
T8	23 - 3	Leg	P6x.432	162	-231128.00	357178.00	64.7	Pass
		Diagonal	L4x4x3/8	166	-10896.80	20444.60	53.3	Pass
		Secondary Horizontal	L4x4x1/4	170	-4008.43	10647.40	37.6	Pass
							Summary	
						Latticed Pole Leg (L1)	14.0	Pass
						Latticed Pole Diagonal (L1)	34.4	Pass
						Latticed Pole Top Girt (L1)	1.6	Pass
						Leg (T4)	73.1	Pass
						Diagonal (T4)	80.1	Pass
						Secondary Horizontal (T8)	37.6	Pass
						RATING =	**80.1**	**Pass**

Tower Reactions

$T := 211.9\ kip$ Leg Uplift

$C := 253.2\ kip$ Leg Compression

$V := 33.00\ kip$ Leg Shear

Anchor Rod Check

Anchor Bolt Data

$N := 6$ Number of Anchor Bolts

$F_u := 120\ ksi$ Bolt Ultimate Strength

$F_y := 90\ ksi$ Bolt Yield Strength

$E := 29000\ ksi$ Steel Modulus of Elasticity

$D := 1.0\ in$ Anchor Bolt Diameter

$n := \frac{8}{in}$ Anchor Bolt Thread Pitch

$L_{ar} := 0\ in$ Anchor Bolt Unbraced Length

Anchor Bolt Properties

$A_g := \pi \cdot \frac{D^2}{4} = 0.8\ in^2$ Gross Bolt Area

$A_n := \frac{\pi}{4} \cdot \left(D - \frac{0.9743}{n} \right)^2 = 0.6\ in^2$ Net Bolt Area

$D_n := 2 \cdot \sqrt{\frac{A_n}{\pi}} = 0.9\ in$ Net Bolt Diameter

$r := \frac{D_n}{4} = 0.2\ in$ Bolt Radius of Gyration

$S_X := \frac{\pi \cdot D_n^3}{32} = 0.1\ in^3$ Bolt Section Modulus

$Z_x := \frac{\pi \cdot D_n^3}{6} = 0.4\ in^3$ Bolt Plastic Modulus

Anchor Bolt Design Strength

$\phi_f := 0.9$ Reduction Factor in Flexure

$\phi_c := 0.9$ Reduction Factor in Compression

$\phi_t := 0.75$ Reduction Factor in Bolt Tension

$\phi_v := 0.75$ Reduction Factor in Bolt Shear

$\phi R_{nt} := \phi_t \cdot F_u \cdot A_n = 54.5\ kip$ Bolt Design Tensile Load

$\phi R_{nc} := \phi_c \cdot F_y \cdot A_g = 63.6\ kip$ Bolt Design Compressive Load

$\phi R_{nv} := \phi_v \cdot 0.5 \cdot F_u \cdot A_g = 35.3\ kip$ Bolt Design Shear Load

$\phi R_{nvc} := \phi_c \cdot 0.6 \cdot F_y \cdot A_g \cdot 0.75 = 28.6\ kip$ Bolt Design Compression Shear Load

Anchor Bolt Check

$P_{ut} := \frac{T}{N} = 35.3\ kip$ Bolt Tension Load

$P_{uc} := \frac{C}{N} = 42.2\ kip$ Bolt Compression Load

$V_u := \frac{V}{N} = 5.5\ kip$ Bolt Shear Load

$$TCheck := \text{if } \left(\left(\frac{P_{ut}}{\phi R_{nt}}\right)^2 + \left(\frac{V_u}{\phi R_{nv}}\right)^2\right) \le 1.0 = \text{"OK"}$$
"OK"
else
"NG"

$$CCheck := \text{if } \left(\left(\frac{P_{uc}}{\phi R_{nc}}\right)^2 + \left(\frac{V_u}{\phi R_{nvc}}\right)^2\right) \le 1.0 = \text{"OK"}$$
"OK"
else
"NG"

$$Usg := \text{Max}\left(\left(\frac{P_{ut}}{\phi R_{nt}}\right)^2 + \left(\frac{V_u}{\phi R_{nv}}\right)^2, \left(\frac{P_{uc}}{\phi R_{nc}}\right) + \left(\frac{V_u}{\phi R_{nvc}}\right)^2\right) = 70.0\ \%$$

Foundation Check

Input Data

$T = 211.9\ kip$	Leg Uplift	$\Sigma W := 45.5\ kip$	Total Tower Weight
$C = 253.2\ kip$	Leg Compression	$\Sigma V := 54.0\ lbf$	Total Tower Lateral
$V = 33.0\ kip$	Leg Shear	$M := 5125\ kip\ ft$	Overturning Moment

$H_t := 180\ ft$

Foundation Data (Governing Leg)

$D_f := 7.1\ ft$	Depth to Footing
$L_p := 10\ ft$	Total Peir Height
$P_p := 4.9\ ft$	Peir Projection
$d_p := 2.5\ ft$	Peir Width
$B := 10\ ft$	Pad Width
$t := 2\ ft$	Pad Thickness

Soil Data

$\phi_s := 34\ deg$	Angle of Internal Friction
$q_s := 6000\ psf$	Ultimate Soil Bearing
$q_{s\_all} := 3000\ psf$	Allowable Soil Bearing
$\gamma_s := 125\ pcf$	Soil Unit Weight
$\gamma_c := 150\ pcf$	Concrete Unit Weight

Soil Properties

$$LF := \text{Max}\left(1.333, \text{Min}\left(1.333 + 0.4 \cdot \left(\frac{H_t - 700\ ft}{1200\ ft - 700\ ft}\right), 1.7\right)\right) = 1.3$$ Load Factor (Tower Height)

$$K_a := \frac{1 - \sin\left(\phi_s\right)}{1 + \sin\left(\phi_s\right)} = 0.3$$ Coefficient of Active Earth Pressure

$$P_a := \frac{1}{2} \cdot t^2 \cdot B \cdot \gamma_s \cdot K_a = 0.7\ kip$$ Active Earth Pressure

$$K_p := \frac{1 + \sin\left(\phi_s\right)}{1 - \sin\left(\phi_s\right)} = 3.5$$ Coefficient of Passive Earth Pressure

$$P_p := \frac{1}{2} \cdot t^2 \cdot B \cdot \gamma_s \cdot K_p = 8.8\ kip$$ Passivce Earth Pressure

$$A_b := B^2 - d_p^2 = 93.8\ ft^2$$ Soil Area at Top of Pad

$$A_{t\_u} := \left(2 \cdot D_f \cdot \sin\left(30\ deg\right) + B\right)^2 - d_p^2 = 286.2\ ft^2$$ Soil Area at Grade (Uplift)

$$V_{s\_b} := A_b \cdot D_f = 665.6\ ft^3$$ Volume of Soil (Bearing)

$$V_{s\_u} := \frac{\left(A_b + A_{t\_u}\right)}{2} \cdot D_f = 1348.7\ ft^3$$ Volume of Soil (Uplift)

$$W_{s\_b} := \gamma_s \cdot V_{s\_b} = 83.2\ kip$$ Weight of Soil (Bearing)

$$W_{s\_u} := \gamma_s \cdot V_{s\_u} = 168.6\ kip$$ Weight of Soil (Uplift)

Foundation Properties

$V_C := B^2 \cdot t + d_p^2 \cdot L_p = 262.5\ ft^3$ — Volume of Concrete (Each Leg)

$W_c := V_C \cdot \gamma_c = 39.4\ kip$ — Weight of Concrete (Each Leg)

$A_B := B^2 = 100.0\ ft^2$ — Pad Bearing Area

Check Bearing

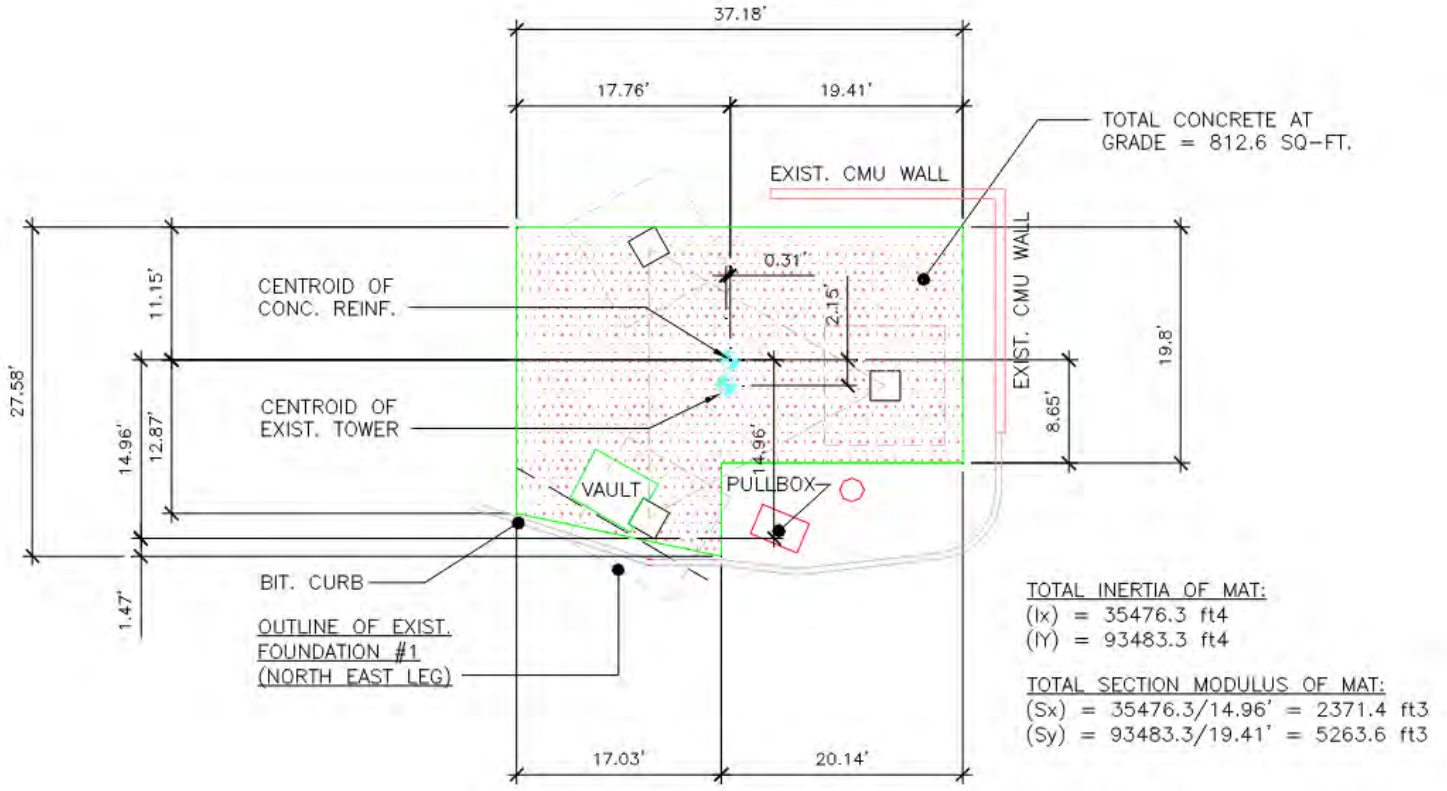
$W_b := 1.2 \cdot \left(W_{s\_b} + W_c \right) + C = 400.3\ kip$ — Total Bearing Weight

$F_b := B^2 \cdot q_s = 600.0\ kip$ — Bearing Strength

$UpCheck :=$ if $W_b \le F_b$ = "Bearing OK"
"Bearing OK"
else
"Bearing NG"

$\frac{W_b}{F_b} = 66.7\ \%$

Reinforcement Mat



$A_{mat} := 812.6\ ft^2$ — Area of Reinforcement Concrete

$t_m := 4\ ft$ — Thickness of Reinforcement Concrete

$I_{xx\_mat} := 35476.3\ ft^4$ — Moment of Inertia (X Direction)

$I_{yy\_mat} := 93483.3\ ft^4$ — Moment of Inertia (Y Direction)

$S_{x\_mat} := \frac{I_{xx\_mat}}{14.96\ ft} = 2371.4\ ft^3$ — Section Modulus (X Direction)

$S_{y\_mat} := \frac{I_{yy\_mat}}{19.41\ ft} = 4816.2\ ft^3$ — Section Modulus (Y Direction)

Check Overturning

$P_{OT} := \frac{M}{\text{Min}\left(S_{x\_mat}, S_{y\_mat}\right)} = 2161.2\ \text{psf}$

Overturning Pressure

$OTCheck := \text{if}\ P_{OT} \le q_{s\_all}$ = "Overturning OK"
"Overturning OK"
else
"Overturning NG"

$\frac{P_{OT}}{q_{s\_all}} = 72.0\ \%$

MK DEVELOPMENT

EXHIBIT E

Antenna Mount Analysis

January 24, 2023

PASS

RE: **Mount Analysis**

Location: **20 Barnabas Rd Newtown, CT 06470**

Site ID: **NJJER02057A**

Dish Wireless LLC,

Per your request, we have performed a structural analysis of the proposed antenna mounts. This site consists of three (3) proposed antenna mounts that will be installed on the existing self-support tower. This review determines if the antenna mounts can support the proposed loads.

1.0 Assumptions:

CATEGORY	DATA	CODE
Structure Type	Self-Support	
RAD Center	90'-0"	
Structure Class	III	ASCE 7-16
Exposure Class	B	ASCE 7-16
Kzt Factor	1.0	ASCE 7-16
Basic Wind Speed	130	2022 CSBC
Ice Thickness	1"	ASCE 7-16
Ice Windspeed	50 MPH	ASCE 7-16
Seismic Design Category	B	ASCE 7-16
S_{DS}	.225	ASCE 7-16

2.0 Existing Documents:

DOCUMENT	COMPANY	DATE
Proposed Drawings	M&K Development	9/16/2022
Site Visit Photos	M&K Development	8/9/2022

3.0 Proposed Equipment:

MANUFACTURER	EQUIPMENT	WEIGHTS
CommScope	**(3) MTC3975083**	**352 lbs**
CommScope	**(3) FFVV-65B-R2**	**70.54 lbs**
Fujitsu	**(3) TA08025-B604**	**63.9 lbs**
Fujitsu	**(3) TA08025-B605**	**74.9 lbs**
RayCap	**(3) OVP RDIDC-9181-PF-48**	**32 lbs**
CommScope	**(3) HYBRID CABLE**	**N.A.**

Bold represents equipment to be added

We are installing (3) proposed MTC3975083 mounts on the existing self-support tower. After performing an analysis on the proposed mounts, it has been determined that they are **ADEQUATE** for the proposed loads and the mounts are at 20% of their capacity.

This report does not address the structural stability of any other mounts, or portion of the structure, nor does it provide any warranty either express or implied, for any portion of the proposed mounts or structure.

Please note that we have not had a professional engineer perform an independent visit to confirm existing structural conditions and the outcome of this analysis is based solely on the information provided in the previous photos and drawing details. If the existing conditions are modified, in disrepair or not properly represented, contact our office immediately for an amended report since this analysis may be inaccurate.

If you have any questions, feel free to contact us at any time.

Sincerely,

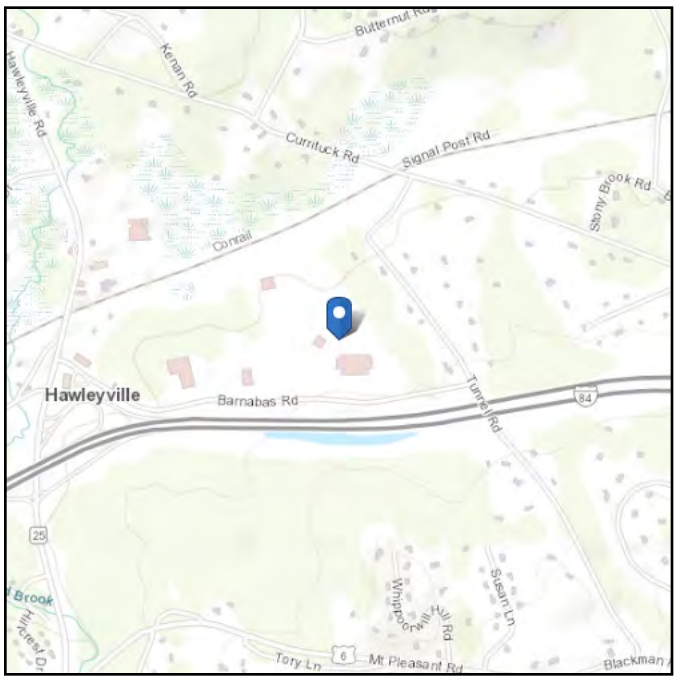
Magaram Engineering

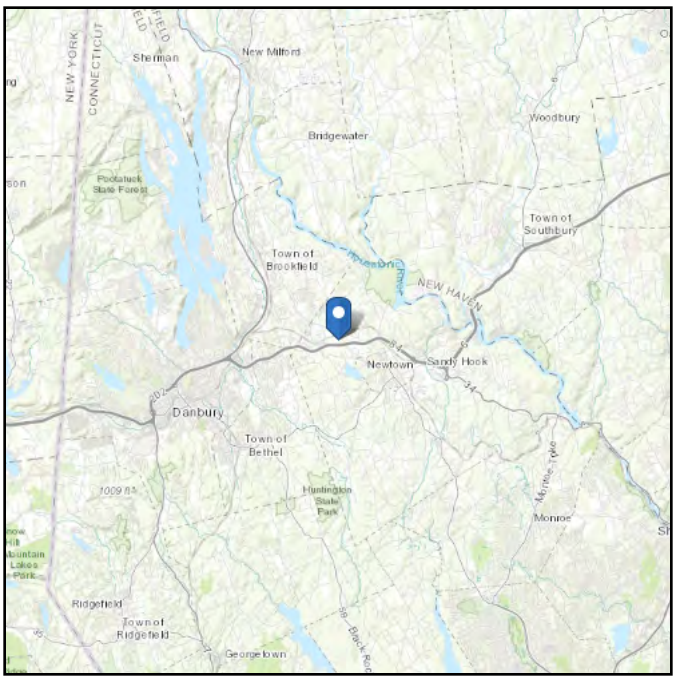
Brett Magaram
Connecticut License # 33678
Brett@MagaramEngineering.com
Phone: 914-450-8416

ASCE 7 Hazards Report

Address:
20 Barnabas Rd
Newtown, Connecticut
06470

Standard:	ASCE/SEI 7-16	**Elevation:**	446.48 ft (NAVD 88)
Risk Category:	III	**Latitude:**	41.428055
Soil Class:	D - Default (see Section 11.4.3)	**Longitude:**	-73.344932





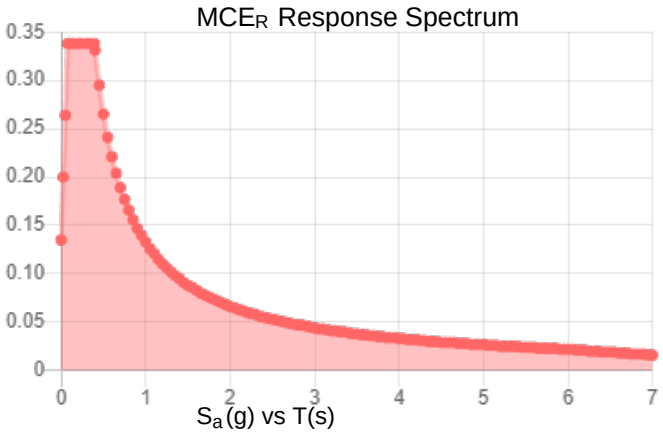
Seismic

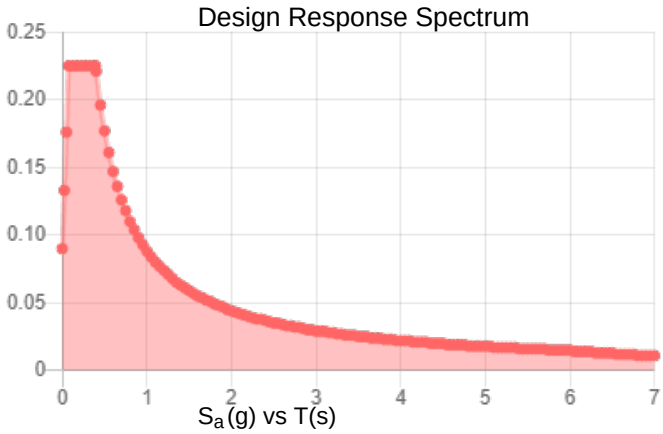
Site Soil Class: D - Default (see Section 11.4.3)

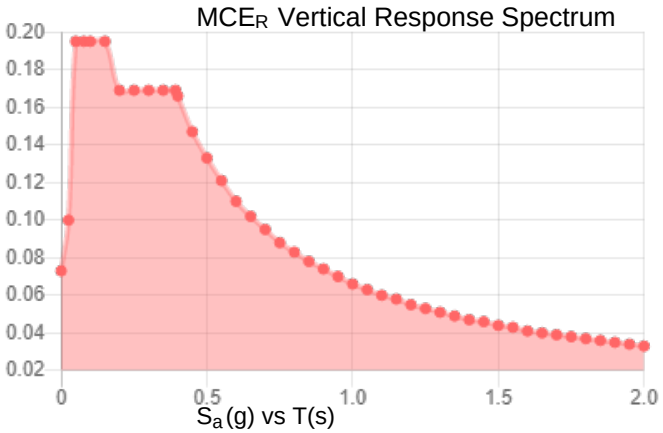
Results:

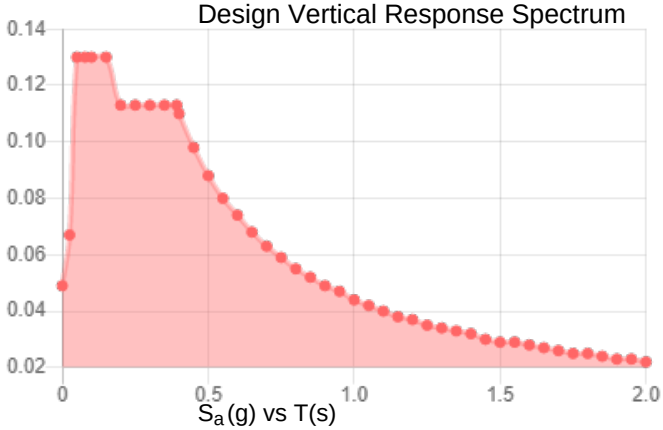
S_S :	0.211	S_{D1} :	0.088
S_1 :	0.055	T_L :	6
F_a :	1.6	PGA :	0.12
F_v :	2.4	PGA_M :	0.187
S_{MS} :	0.338	F_{PGA} :	1.56
S_{M1} :	0.133	I_e :	1.25
S_{DS} :	0.225	C_v :	0.722

Seismic Design Category B









Data Accessed: **Sat Nov 05 2022**

Date Source:

USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

Ice

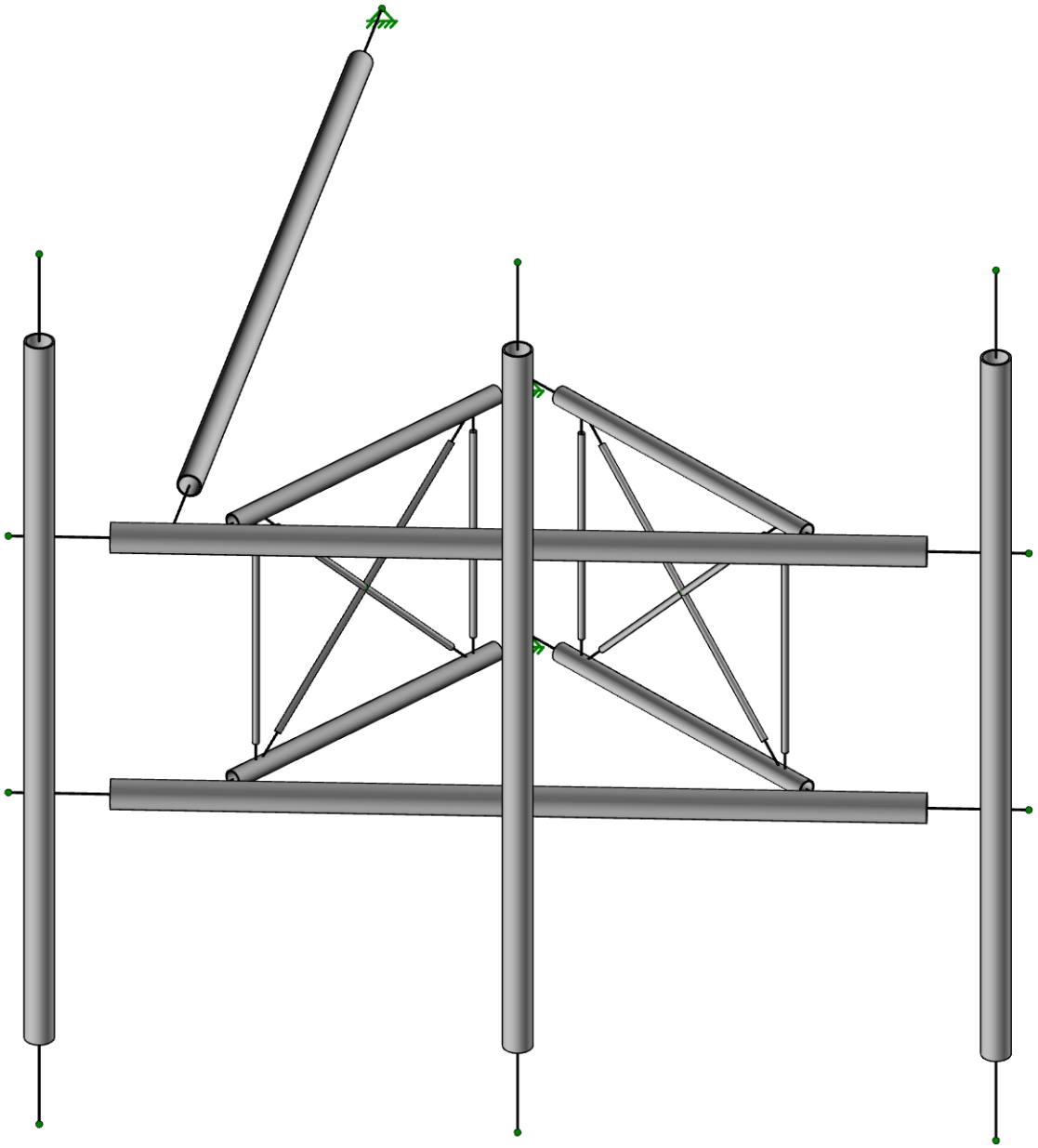
Results:

Ice Thickness:	1.00 in.
Concurrent Temperature:	15 F
Gust Speed	50 mph
Data Source:	Standard ASCE/SEI 7-16, Figs. 10-2 through 10-8
Date Accessed:	Sat Nov 05 2022

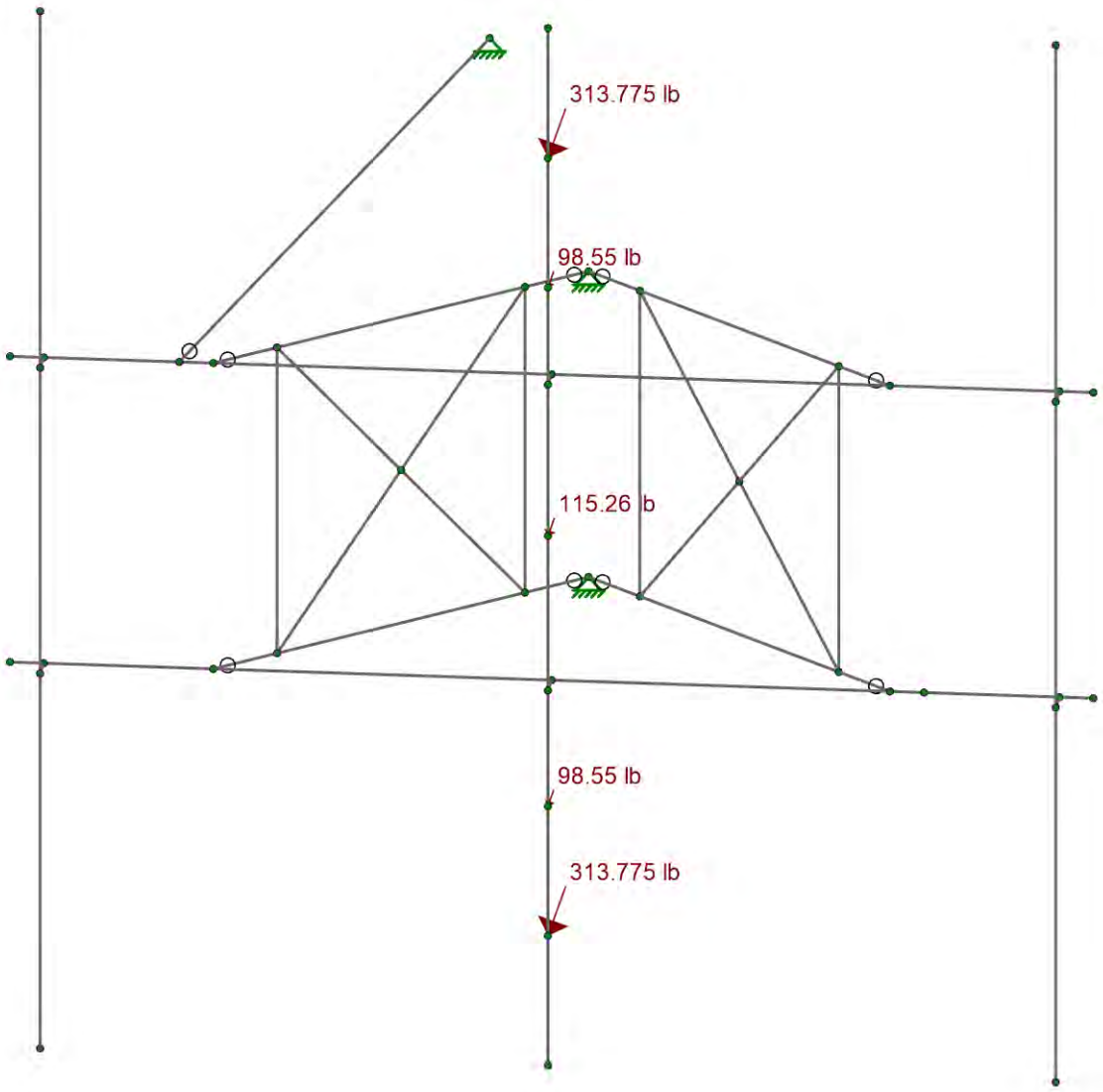
Ice thicknesses on structures in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Values provided are equivalent radial ice thicknesses due to freezing rain with concurrent 3-second gust speeds, for a 500-year mean recurrence interval, and temperatures concurrent with ice thicknesses due to freezing rain. Thicknesses for ice accretions caused by other sources shall be obtained from local meteorological studies. Ice thicknesses in exposed locations at elevations higher than the surrounding terrain and in valleys and gorges may exceed the mapped values.

Municipality	Basic Design Wind Speeds, V (mph)				Allowable Stress Design Wind Speeds, V_{asd} (mph)				Ground Snow Load p_g (psf)	MCE Ground Accelerations		Wind-Borne Debris Region[1]		Hurricane-Prone Region
	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV	Risk Cat. I	Risk Cat. II	Risk Cat. III	Risk Cat. IV		S_S (g)	S_1 (g)	Risk Cat. III Occup. I-2	Risk Cat. IV	
New Milford	110	115	125	130	85	89	97	101	35	0.198	0.055			
Newington	110	120	130	135	85	93	101	105	30	0.195	0.055			Yes
Newtown	110	120	130	130	85	93	101	101	30	0.209	0.055			Yes
Norfolk	105	115	125	130	81	89	97	101	40	0.165	0.054			
North Branford	115	125	135	135	89	97	105	105	30	0.204	0.054			Yes
North Canaan	105	115	125	130	81	89	97	101	40	0.164	0.054			
North Haven	110	120	130	135	85	93	101	105	30	0.204	0.054			Yes
North Stonington	120	130	140	140	93	101	108	108	30	0.186	0.052			Yes
Norwalk	110	120	130	135	85	93	101	105	30	0.240	0.056		Type B	Yes
Norwich	115	125	135	140	89	97	105	108	30	0.194	0.054			Yes
Old Lyme	120	130	135	140	93	101	105	108	30	0.201	0.053	Type B	Type B	Yes
Old Saybrook	120	130	135	140	93	101	105	108	30	0.202	0.053	Type B	Type B	Yes
Orange	110	120	130	135	85	93	101	105	30	0.201	0.054			Yes
Oxford	110	120	130	135	85	93	101	105	30	0.199	0.054			Yes
Plainfield	115	125	135	140	89	97	105	108	30	0.187	0.054			Yes
Plainville	110	120	130	135	85	93	101	105	35	0.191	0.055			Yes
Plymouth	110	120	125	130	85	93	97	101	35	0.185	0.054			Yes
Pomfret	115	125	130	135	89	97	101	105	40	0.182	0.055			Yes
Portland	110	120	130	135	85	93	101	105	30	0.208	0.056			Yes
Preston	120	125	135	140	93	97	105	108	30	0.191	0.053			Yes
Prospect	110	120	130	135	85	93	101	105	30	0.197	0.054			Yes
Putnam	115	125	130	135	89	97	101	105	40	0.184	0.055			Yes
Redding	110	120	125	130	85	93	97	101	30	0.228	0.056			Yes
Ridgefield	110	120	125	130	85	93	97	101	30	0.243	0.057			Yes
Rocky Hill	110	120	130	135	85	93	101	105	30	0.200	0.055			Yes
Roxbury	110	120	125	130	85	93	97	101	35	0.196	0.054			Yes
Salem	115	125	135	140	89	97	105	108	30	0.205	0.055			Yes
Salisbury	105	115	125	130	81	89	97	101	40	0.116	0.054			
Scotland	115	125	135	135	89	97	105	105	30	0.188	0.054			Yes
Seymour	110	120	130	135	85	93	101	105	30	0.200	0.054			Yes
Sharon	105	115	125	130	81	89	97	101	40	0.171	0.054			
Shelton	110	120	130	135	85	93	101	105	30	0.203	0.054			Yes

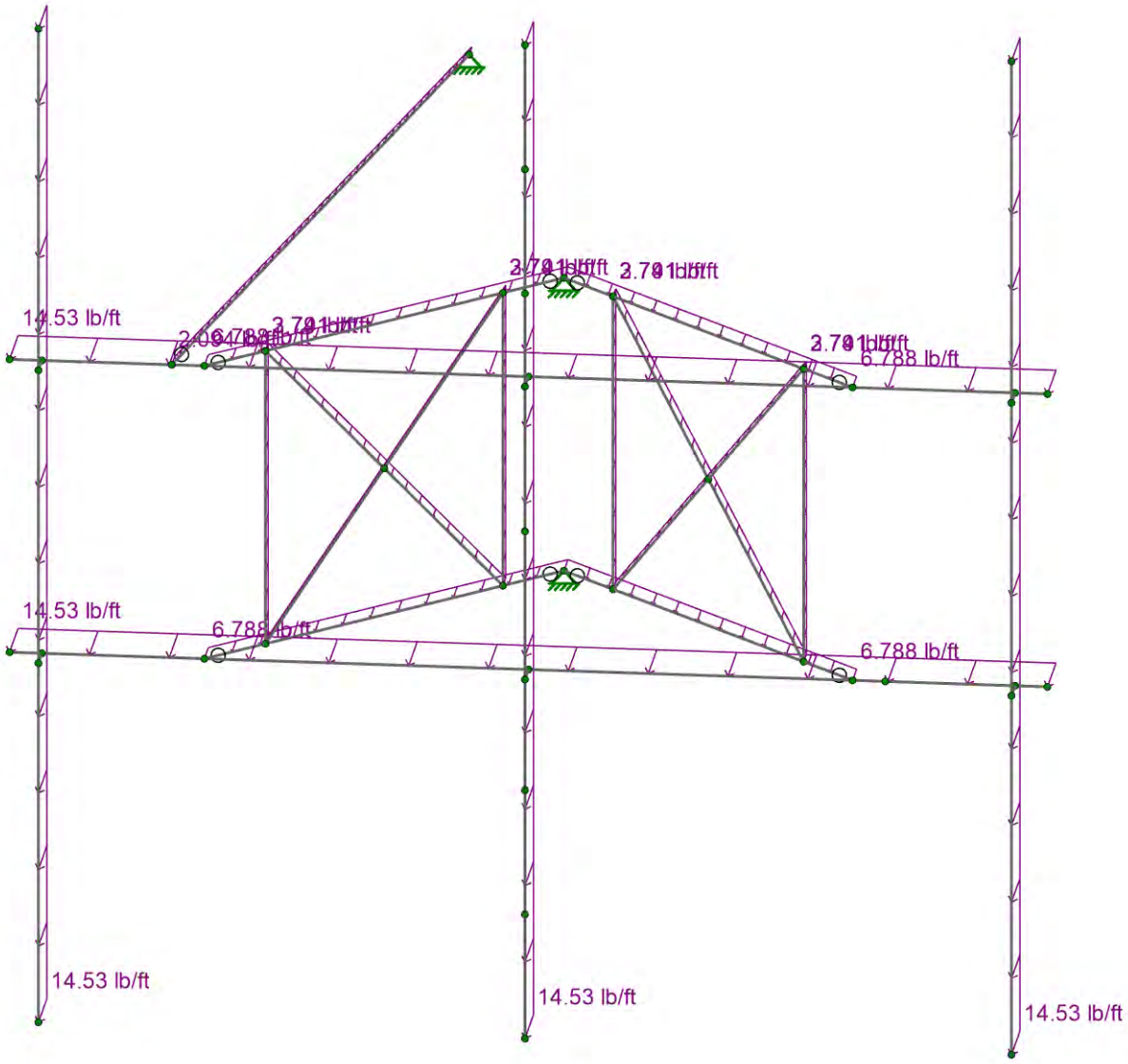


Magaram Engineering	NJJER02057A	SK-1
BJM		Nov 05, 2022
		NJJER02057A 11.5.2022.r3d



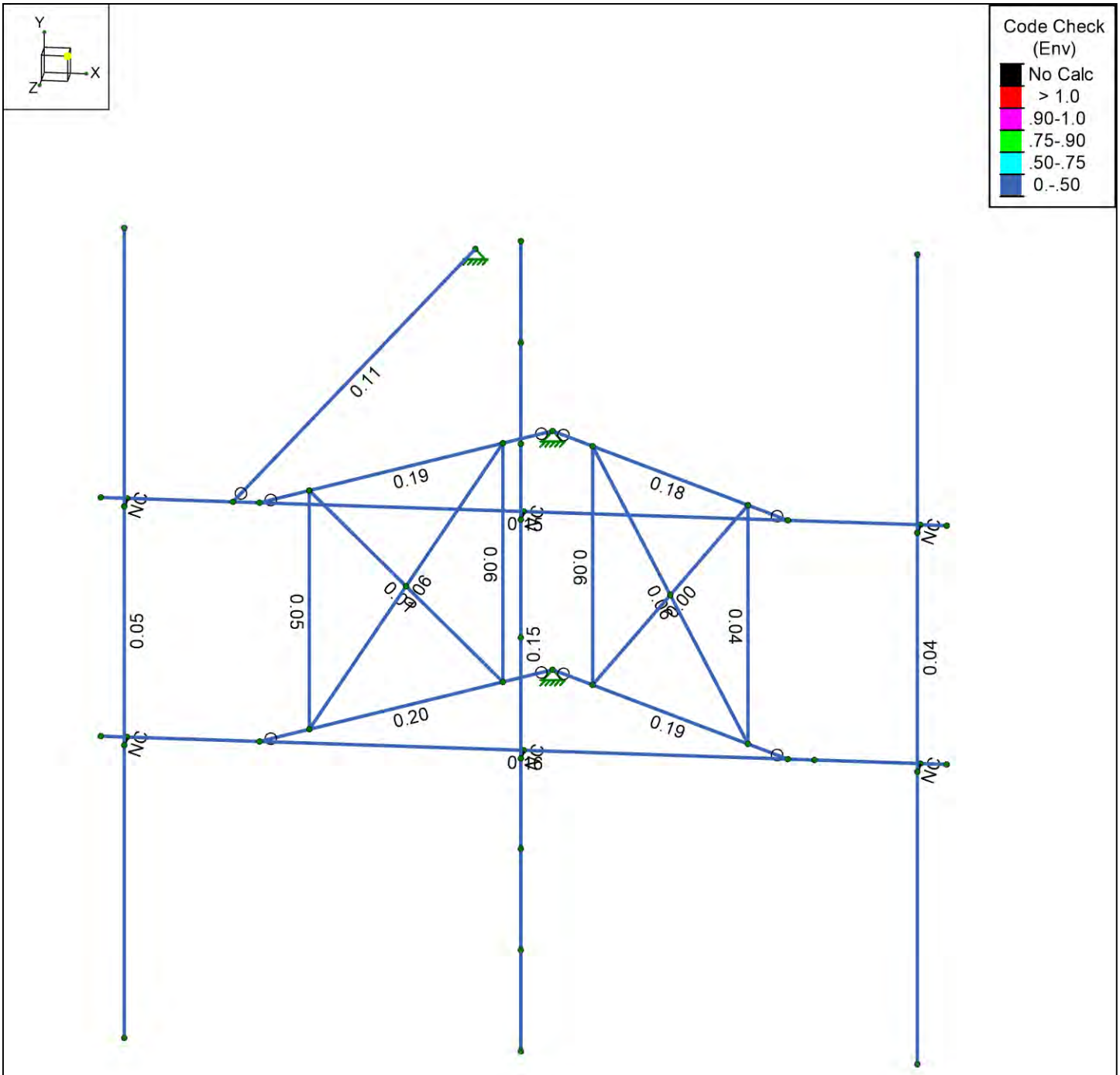
Loads: BLC 4, Telco Wz

Magaram Engineering	NJJER02057A	SK-2
BJM		Nov 05, 2022
		NJJER02057A 11.5.2022.r3d



Loads: BLC 13, Mount Wz

Magaram Engineering	NJJER02057A	SK-3
BJM		Nov 05, 2022
		NJJER02057A 11.5.2022.r3d



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

Magaram Engineering	NJJER02057A	SK-4
BJM		Nov 05, 2022
		NJJER02057A 11.5.2022.r3d

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
2	A529 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
3	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.4	58	1.3
5	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.4	58	1.3
6	A53 Gr B	29000	11154	0.3	0.65	0.49	35	1.5	58	1.2

General Materials Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e⁵°F⁻¹]	Density [k/ft³]	Plate Methodology
1	gen_Conc3NW	3155	1372	0.15	0.6	0.145	Isotropic
2	gen_Conc4NW	3644	1584	0.15	0.6	0.145	Isotropic
3	gen_Conc3LW	2085	906	0.15	0.6	0.11	Isotropic
4	gen_Conc4LW	2408	1047	0.15	0.6	0.11	Isotropic
5	gen_Alum	10100	4077	0.3	1.29	0.173	Isotropic
6	gen_Steel	29000	11154	0.3	0.65	0.49	Isotropic
7	gen_Plywood	1800	38	0	0.3	0.035	Isotropic
8	RIGID	1e+6		0.3	0	0	Isotropic

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	Face Horizontal	PIPE_2.5	None	None	A500 Gr.46	Typical	1.61	1.45	1.45	2.89
2	Standoff Arms	PIPE_1.5	VBrace	None	A500 Gr.46	Typical	0.749	0.293	0.293	0.586
3	Diagonal	BAR0.625	HBrace	None	A529 Gr.50	Typical	0.307	0.007	0.007	0.015
4	Mount Pipe	PIPE_2.5	HBrace	Pipe	A500 Gr.46	Typical	1.61	1.45	1.45	2.89
5	Tie Back	PIPE_2.0	VBrace	None	A500 Gr.46	Typical	1.02	0.627	0.627	1.25
6	Standoff Vertical	BAR0.625	HBrace	None	A529 Gr.50	Typical	0.307	0.007	0.007	0.015

General Section Sets

	Label	Shape	Type	Material	Area [in²]	Iyy [in⁴]	Izz [in⁴]	J [in⁴]
1	GEN1A	RE4X4	Beam	gen_Conc3NW	16	21.333	21.333	31.573
2	RIGID		None	RIGID	1e+06	1e+06	1e+06	1e+06

Member Primary Data

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
1	M1	N2	N1	Standoff Arms	VBrace	None	A500 Gr.46	Typical
2	M2	N7	N6	Standoff Arms	VBrace	None	A500 Gr.46	Typical
3	M3	N3	N8	Standoff Vertical	HBrace	None	A529 Gr.50	Typical
4	M4	N4	N9	Standoff Vertical	HBrace	None	A529 Gr.50	Typical
5	M5	N4	N8	Diagonal	HBrace	None	A529 Gr.50	Typical
6	M6	N3	N9	Diagonal	HBrace	None	A529 Gr.50	Typical
7	M7	N10	N1	Standoff Arms	VBrace	None	A500 Gr.46	Typical
8	M8	N14	N6	Standoff Arms	VBrace	None	A500 Gr.46	Typical
9	M9	N11	N15	Standoff Vertical	HBrace	None	A529 Gr.50	Typical
10	M10	N12	N16	Standoff Vertical	HBrace	None	A529 Gr.50	Typical
11	M11	N12	N15	Diagonal	HBrace	None	A529 Gr.50	Typical
12	M12	N11	N16	Diagonal	HBrace	None	A529 Gr.50	Typical
13	M13	N16A	N15A	Face Horizontal	None	None	A500 Gr.46	Typical
14	M14	N18	N17	Face Horizontal	None	None	A500 Gr.46	Typical
15	MP1	N22	N21	Mount Pipe	HBrace	Pipe	A500 Gr.46	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Section/Shape	Type	Design List	Material	Design Rule
16	MP3	N20	N19	Mount Pipe	HBrace	Pipe	A500 Gr.46	Typical
17	MP2	N34	N33	Mount Pipe	HBrace	Pipe	A500 Gr.46	Typical
18	M27A	N37	N38	Tie Back	VBrace	None	A500 Gr.46	Typical
19	M29	N25	N67	RIGID	None	None	RIGID	Typical
20	M30	N27	N69	RIGID	None	None	RIGID	Typical
21	M33	N35	N73	RIGID	None	None	RIGID	Typical
22	M34	N36	N74	RIGID	None	None	RIGID	Typical
23	M35	N26	N68	RIGID	None	None	RIGID	Typical
24	M36	N28	N70	RIGID	None	None	RIGID	Typical

Member Advanced Data

	Label	I Release	J Release	T/C Only	Physical	Deflection Ratio Options	Seismic DR
1	M1	BenPIN	BenPIN		Yes	** NA **	None
2	M2	BenPIN	BenPIN		Yes	** NA **	None
3	M3				Yes	** NA **	None
4	M4				Yes	** NA **	None
5	M5			Euler Buckling	Yes	** NA **	None
6	M6			Euler Buckling	Yes	** NA **	None
7	M7	BenPIN	BenPIN		Yes	** NA **	None
8	M8	BenPIN	BenPIN		Yes	** NA **	None
9	M9				Yes	** NA **	None
10	M10				Yes	** NA **	None
11	M11			Euler Buckling	Yes	** NA **	None
12	M12			Euler Buckling	Yes	** NA **	None
13	M13				Yes	** NA **	None
14	M14				Yes	** NA **	None
15	MP1				Yes	** NA **	None
16	MP3				Yes	** NA **	None
17	MP2				Yes	** NA **	None
18	M27A	BenPIN			Yes	** NA **	None
19	M29				Yes	** NA **	None
20	M30				Yes	** NA **	None
21	M33				Yes	** NA **	None
22	M34				Yes	** NA **	None
23	M35				Yes	** NA **	None
24	M36				Yes	** NA **	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	Lcomp bot [in]	L-Torque [in]	K y-y	K z-z	Function
1	M1	Standoff Arms	42.4			Lbyy					Lateral
2	M2	Standoff Arms	42.4			Lbyy					Lateral
3	M3	Standoff Vertical	28.3			Lbyy			0.65	0.65	Lateral
4	M4	Standoff Vertical	28.3			Lbyy			0.65	0.65	Lateral
5	M5	Diagonal	39.811			Lbyy			0.7	0.7	Lateral
6	M6	Diagonal	39.811			Lbyy			0.5	0.5	Lateral
7	M7	Standoff Arms	42.4			Lbyy					Lateral
8	M8	Standoff Arms	42.4			Lbyy					Lateral
9	M9	Standoff Vertical	28.3			Lbyy			0.65	0.65	Lateral
10	M10	Standoff Vertical	28.3			Lbyy			0.65	0.65	Lateral
11	M11	Diagonal	39.811			Lbyy			0.7	0.7	Lateral
12	M12	Diagonal	39.811			Lbyy			0.5	0.5	Lateral
13	M13	Face Horizontal	96	Segment	Segment	Segment	Segment	Segment			Lateral
14	M14	Face Horizontal	96			Lbyy					Lateral

Hot Rolled Steel Design Parameters (Continued)

	Label	Shape	Length [in]	Lb y-y [in]	Lb z-z [in]	Lcomp top [in]	Lcomp bot [in]	L-Torque [in]	K y-y	K z-z	Function
15	MP1	Mount Pipe	96			Lbyy					Lateral
16	MP3	Mount Pipe	96			Lbyy					Lateral
17	MP2	Mount Pipe	96			Lbyy					Lateral
18	M27A	Tie Back	97.494								Lateral

Member RISAConnection Properties

	Label	Shape	Start Conn	End Conn	Start Release	End Release
1	M1	PIPE_1.5	None	None	Pinned	Pinned
2	M2	PIPE_1.5	None	None	Pinned	Pinned
3	M3	BAR0.625	None	None	Fixed	Fixed
4	M4	BAR0.625	None	None	Fixed	Fixed
5	M5	BAR0.625	None	None	Fixed	Fixed
6	M6	BAR0.625	None	None	Fixed	Fixed
7	M7	PIPE_1.5	None	None	Pinned	Pinned
8	M8	PIPE_1.5	None	None	Pinned	Pinned
9	M9	BAR0.625	None	None	Fixed	Fixed
10	M10	BAR0.625	None	None	Fixed	Fixed
11	M11	BAR0.625	None	None	Fixed	Fixed
12	M12	BAR0.625	None	None	Fixed	Fixed
13	M13	PIPE_2.5	None	None	Fixed	Fixed
14	M14	PIPE_2.5	None	None	Fixed	Fixed
15	MP1	PIPE_2.5	None	None	Fixed	Fixed
16	MP3	PIPE_2.5	None	None	Fixed	Fixed
17	MP2	PIPE_2.5	None	None	Fixed	Fixed
18	M27A	PIPE_2.0	None	None	Pinned	Fixed

Design Size and Code Check Parameters

	Label	Max Axial/Bending Chk	Max Shear Chk
1	Typical	1	1

Concrete Rebar Parameters

	Label	Optimize Rebar ?	Min Flex Bar	Max Flex Bar	Shear Bar	Legs per Stirrup	Top (Column) Cover [in]	Bottom Cover [in]	Side Cover [in]	Top/Bottom Bars	Add'l Side Bars	Shear Bar Spacing [in]
1	Typical	Optimize	#6	#10	#4	2	1.5	1.5	1.5	2	1	12

Deflection Design

	Label	LC	Ratio	LC	Ratio	LC	Ratio
1	Typical	None	N/A	None	N/A	None	N/A

Wall Panel U.C. Parameters

	Label	Max Bending Chk	Max Shear Chk
1	Typical	1	1

Frame / HR Column Seismic Design Rule

	Label	Frame Ductility	Overstrength Reqd
1	OCBF	Minimal	Yes
2	SCBF	High	Yes
3	OMF	Minimal	Yes

Frame / HR Column Seismic Design Rule (Continued)

	Label	Frame Ductility	Overstrength Reqd
4	IMF	Moderate	Yes
5	SMF-RBS	High	Yes
6	SMF-Kaiser	High	Yes

HR Beam Seismic Design Rule

	Label	Connection	Overstrength Reqd	Z Factor	Hinge Location [in]
1	OCBF	Other/None			
2	SCBF	Other/None	Yes		
3	OMF	BUEEP			12
4	IMF	BFP			12
5	SMF-RBS	RBS		0.685	14.625
6	SMF-Kaiser	KBB-B			12

HR Brace Seismic Design Rule

	Label	Overstrength Reqd	KL/r
1	OCBF		
2	SCBF		Yes
3	OMF		
4	IMF		
5	SMF-RBS		
6	SMF-Kaiser		

Connection Design Rules

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn	Eccentricity
1	Col/Bm Single Angle Shear	Shear	Column/Beam Clip Single Angle Shear	Bolted	Bolted	1.5
2	Col/Bm Double Angle Shear	Shear	Column/Beam Clip Double Angle Shear	Bolted	Bolted	0
3	Col/Bm Two Side Clip Angle Shear	Shear	Column/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
4	Col/Bm End Plate Shear	Shear	Column/Beam End-Plate Shear	N/A	Bolted	N/A
5	Col/Bm Shear Tab Shear	Shear	Column/Beam Shear Tab Shear	Bolted	N/A	0
6	Girder/Bm Single Angle Shear	Shear	Girder/Beam Clip Single Angle Shear	Bolted	Bolted	N/A
7	Girder/Bm Double Angle Shear	Shear	Girder/Beam Clip Double Angle Shear	Bolted	Bolted	N/A
8	Grd/Bm Two Side Clip Angle Shear	Shear	Girder/Beam Clip Double Angle (Both Side) Shear	Bolted	Bolted	N/A
9	Girder/Bm End Plate Shear	Shear	Girder/Beam End-Plate Shear	N/A	Bolted	N/A
10	Girder/Bm Shear Tab Shear	Shear	Girder/Beam Shear Tab Shear	Bolted	N/A	N/A
11	Beam Shear Splice	Shear	Beam Shear Tab Splice	Bolted	N/A	N/A
12	Column Shear Splice	Shear	Column Shear Tab Splice	N/A	Bolted	N/A
13	Col/Bm Ext. End Plate Moment	Moment	Column/Beam Extended End-Plate Moment	N/A	N/A	N/A
14	Col/Bm PartExt. End Plate Moment	Moment	Column/Beam Partially Extended End-Plate Moment (Tension side)	N/A	N/A	N/A
15	Col/Bm Flush End Plate Moment	Moment	Column/Beam Flush End-Plate Moment	N/A	N/A	N/A
16	Col/Bm Flange Plate Moment	Moment	Column/Beam Flange Plate Moment	Bolted	N/A	N/A
17	Col/Bm Direct Weld Moment	Moment	Column/Beam Direct Weld Moment	Bolted	N/A	N/A
18	Col/Bm Seismic Moment	Moment	Column/Beam Seismic Moment	N/A	N/A	N/A
19	Beam Moment Plate Splice	Moment	Beam Moment Plate Splice	Bolted	N/A	N/A
20	Column Moment Plate Splice	Moment	Column Moment Plate Splice	N/A	N/A	N/A
21	Beam Direct Weld Moment Splice	Moment	Beam Direct Weld Splice	Bolted	N/A	N/A
22	Col Direct Weld Moment Splice	Moment	Column Direct Weld Splice	N/A	Bolted	N/A
23	Bm Ext. End Plate Moment Splice	Moment	Beam Extended End Plate Splice	Bolted	N/A	N/A
24	Col Ext. End Plate Moment Splice	Moment	Column Extended End Plate Splice	N/A	Bolted	N/A
25	Diagonal Vertical Brace	Brace	Diagonal Vertical Brace	N/A	N/A	N/A
26	Chevron Vertical Brace	Brace	Chevron Vertical Brace	N/A	N/A	N/A
27	Seismic Diagonal Brace	Brace	Diagonal Brace Seismic	N/A	N/A	N/A
28	Seismic Chevron Brace	Brace	Chevron Brace Seismic	N/A	N/A	N/A

Connection Design Rules (Continued)

	Label	Conn Type	Type	Beam Conn	Col/Girder Conn	Eccentricity
29	Knee Brace	Brace	Knee Brace	N/A	N/A	N/A
30	Single Column Base Plate	Baseplate	Single Column Baseplate	N/A	N/A	N/A
31	Base Plate with Vertical Brace	Baseplate	Brace to Column Base Plate	N/A	N/A	N/A
32	HSS Truss Connection	Truss	HSS T-Connection	N/A	N/A	N/A

Node Loads and Enforced Displacements (BLC 1 : Telco DL)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	Y	-62.3
2	N43	L	Y	-62.3
3	N44	L	Y	-75
4	N45	L	Y	-63.9
5	N47	L	Y	-21.8

Node Loads and Enforced Displacements (BLC 2 : Telco DLi)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	Y	-119.57
2	N43	L	Y	-119.57
3	N44	L	Y	-42.95
4	N45	L	Y	-41.7
5	N47	L	Y	-50.49

Node Loads and Enforced Displacements (BLC 3 : Telco Wx)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	X	313.775
2	N43	L	X	313.775
3	N44	L	X	98.55
4	N45	L	X	98.55
5	N47	L	X	115.26

Node Loads and Enforced Displacements (BLC 4 : Telco Wz)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	Z	313.775
2	N43	L	Z	313.775
3	N44	L	Z	98.55
4	N45	L	Z	98.55
5	N47	L	Z	115.26

Node Loads and Enforced Displacements (BLC 5 : Telco Wxi)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	X	28.575
2	N43	L	X	28.575
3	N44	L	X	9.29
4	N45	L	X	9.29
5	N47	L	X	10.95

Node Loads and Enforced Displacements (BLC 6 : Telco Wzi)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	Z	28.575
2	N43	L	Z	28.575
3	N44	L	Z	9.29
4	N45	L	Z	9.29
5	N47	L	Z	10.95

Node Loads and Enforced Displacements (BLC 7 : Telco Wxm)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N44	L	X	5.25
2	N45	L	X	5.25
3	N47	L	X	6.14
4	N42	L	X	16.71
5	N43	L	X	16.71

Node Loads and Enforced Displacements (BLC 8 : Telco Wzm)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N44	L	Z	5.25
2	N45	L	Z	5.25
3	N47	L	Z	6.14
4	N42	L	Z	16.71
5	N43	L	Z	16.71

Node Loads and Enforced Displacements (BLC 19 : Lm)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N42	L	Y	-250
2	N43	L	Y	-250

Node Loads and Enforced Displacements (BLC 20 : Lv)

	Node Label	L, D, M	Direction	Magnitude [(lb, k-ft), (in, rad), (lb*s²/in, lb*s²*in)]
1	N17	L	Y	-250

Member Point Loads

No Data to Print...

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Distributed
1	Telco DL	DL		5	
2	Telco DLi	OL1		5	
3	Telco Wx	WLX		5	
4	Telco Wz	WLZ		5	
5	Telco Wxi	WLXP1		5	
6	Telco Wzi	WLZP1		5	
7	Telco Wxm	WLXP2		5	
8	Telco Wzm	WLZP2		5	
9	-	None			
10	Mount DL	DL	-1.1		
11	Mount DLi	OL1			18

Basic Load Cases (Continued)

	BLC Description	Category	Y Gravity	Nodal	Distributed
12	Mount Wx	WLX			18
13	Mount Wz	WLZ			18
14	Mount Wxi	WLXP1			18
15	Mount Wzi	WLZP1			18
16	Mount Wxm	WLXP2			18
17	Mount Wzm	WLZP2			18
18	-	None			
19	Lm	None		2	
20	Lv	None		1	

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4D	Yes	Y	DL	1.4						
2	Wind LCs (Case 1)										
3	1.2D +1.0W (0)	Yes	Y	DL	1.2			WLX	1	WLZ	
4	1.2D + 1.0W (30)	Yes	Y	DL	1.2			WLX	0.866	WLZ	0.5
5	1.2D + 1.0W (45)	Yes	Y	DL	1.2			WLX	0.707	WLZ	0.707
6	1.2D + 1.0W (60)	Yes	Y	DL	1.2			WLX	0.5	WLZ	0.866
7	1.2D + 1.0W (90)	Yes	Y	DL	1.2			WLX		WLZ	1
8	1.2D + 1.0W (120)	Yes	Y	DL	1.2			WLX	-0.5	WLZ	0.866
9	1.2D + 1.0W (135)	Yes	Y	DL	1.2			WLX	-0.707	WLZ	0.707
10	1.2D + 1.0W (150)	Yes	Y	DL	1.2			WLX	-0.866	WLZ	0.5
11	1.2D + 1.0W (180)	Yes	Y	DL	1.2			WLX	-1	WLZ	
12	1.2D + 1.0W (210)	Yes	Y	DL	1.2			WLX	-0.866	WLZ	-0.5
13	1.2D + 1.0W (225)	Yes	Y	DL	1.2			WLX	-0.707	WLZ	-0.707
14	1.2D + 1.0W (240)	Yes	Y	DL	1.2			WLX	-0.5	WLZ	-0.866
15	1.2D + 1.0W (270)	Yes	Y	DL	1.2			WLX		WLZ	-1
16	1.2D + 1.0W (300)	Yes	Y	DL	1.2			WLX	0.5	WLZ	-0.866
17	1.2D + 1.0W (315)	Yes	Y	DL	1.2			WLX	0.707	WLZ	-0.707
18	1.2D + 1.0W (330)	Yes	Y	DL	1.2			WLX	0.866	WLZ	-0.5
19	Uplift LCs (Case 2)										
20	1.2D +1.0W (0)	Yes	Y	DL	0.9			WLX	1	WLZ	
21	1.2D + 1.0W (30)	Yes	Y	DL	0.9			WLX	0.866	WLZ	0.5
22	1.2D + 1.0W (45)	Yes	Y	DL	0.9			WLX	0.707	WLZ	0.707
23	1.2D + 1.0W (60)	Yes	Y	DL	0.9			WLX	0.5	WLZ	0.866
24	1.2D + 1.0W (90)	Yes	Y	DL	0.9			WLX		WLZ	1
25	1.2D + 1.0W (120)	Yes	Y	DL	0.9			WLX	-0.5	WLZ	0.866
26	1.2D + 1.0W (135)	Yes	Y	DL	0.9			WLX	-0.707	WLZ	0.707
27	1.2D + 1.0W (150)	Yes	Y	DL	0.9			WLX	-0.866	WLZ	0.5
28	1.2D + 1.0W (180)	Yes	Y	DL	0.9			WLX	-1	WLZ	
29	1.2D + 1.0W (210)	Yes	Y	DL	0.9			WLX	-0.866	WLZ	-0.5
30	1.2D + 1.0W (225)	Yes	Y	DL	0.9			WLX	-0.707	WLZ	-0.707
31	1.2D + 1.0W (240)	Yes	Y	DL	0.9			WLX	-0.5	WLZ	-0.866
32	1.2D + 1.0W (270)	Yes	Y	DL	0.9			WLX		WLZ	-1
33	1.2D + 1.0W (300)	Yes	Y	DL	0.9			WLX	0.5	WLZ	-0.866
34	1.2D + 1.0W (315)	Yes	Y	DL	0.9			WLX	0.707	WLZ	-0.707
35	1.2D + 1.0W (330)	Yes	Y	DL	0.9			WLX	0.866	WLZ	-0.5
36	Ice LCs (Case 3)										
37	1.2D + 1.0Di +1.0Wi (0)	Yes	Y	DL	1.2	OL1	1	WLXP1	1	WLZP1	
38	1.2D + 1.0W (30)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.866	WLZP1	0.5
39	1.2D + 1.0W (45)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.707	WLZP1	0.707
40	1.2D + 1.0W (60)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.5	WLZP1	0.866
41	1.2D + 1.0W (90)	Yes	Y	DL	1.2	OL1	1	WLXP1		WLZP1	1
42	1.2D + 1.0W (120)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.5	WLZP1	0.866
43	1.2D + 1.0W (135)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.707	WLZP1	0.707

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
44	1.2D + 1.0W (150)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.866	WLZP1	0.5
45	1.2D + 1.0W (180)	Yes	Y	DL	1.2	OL1	1	WLXP1	-1	WLZP1	
46	1.2D + 1.0W (210)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.866	WLZP1	-0.5
47	1.2D + 1.0W (225)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.707	WLZP1	-0.707
48	1.2D + 1.0W (240)	Yes	Y	DL	1.2	OL1	1	WLXP1	-0.5	WLZP1	-0.866
49	1.2D + 1.0W (270)	Yes	Y	DL	1.2	OL1	1	WLXP1		WLZP1	-1
50	1.2D + 1.0W (300)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.5	WLZP1	-0.866
51	1.2D + 1.0W (315)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.707	WLZP1	-0.707
52	1.2D + 1.0W (330)	Yes	Y	DL	1.2	OL1	1	WLXP1	0.866	WLZP1	-0.5
53	Maintenance LCs (Case 3)										
54	1.2D + 1.0Di +1.0Wi (0)	Yes	Y	DL	1.2	19	1.5	WLXP2	1	WLZP2	
55	1.2D + 1.0W (30)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.866	WLZP2	0.5
56	1.2D + 1.0W (45)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.707	WLZP2	0.707
57	1.2D + 1.0W (60)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.5	WLZP2	0.866
58	1.2D + 1.0W (90)	Yes	Y	DL	1.2	19	1.5	WLXP2		WLZP2	1
59	1.2D + 1.0W (120)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.5	WLZP2	0.866
60	1.2D + 1.0W (135)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.707	WLZP2	0.707
61	1.2D + 1.0W (150)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.866	WLZP2	0.5
62	1.2D + 1.0W (180)	Yes	Y	DL	1.2	19	1.5	WLXP2	-1	WLZP2	
63	1.2D + 1.0W (210)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.866	WLZP2	-0.5
64	1.2D + 1.0W (225)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.707	WLZP2	-0.707
65	1.2D + 1.0W (240)	Yes	Y	DL	1.2	19	1.5	WLXP2	-0.5	WLZP2	-0.866
66	1.2D + 1.0W (270)	Yes	Y	DL	1.2	19	1.5	WLXP2		WLZP2	-1
67	1.2D + 1.0W (300)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.5	WLZP2	-0.866
68	1.2D + 1.0W (315)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.707	WLZP2	-0.707
69	1.2D + 1.0W (330)	Yes	Y	DL	1.2	19	1.5	WLXP2	0.866	WLZP2	-0.5
70	1.2D + 1.5Lv	Yes	Y	DL	1.2	20	1.5				

Load Combination Design

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
1	1.4D		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2	Wind LCs (Case 1)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3	1.2D +1.0W (0)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4	1.2D + 1.0W (30)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5	1.2D + 1.0W (45)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6	1.2D + 1.0W (60)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
7	1.2D + 1.0W (90)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
8	1.2D + 1.0W (120)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
9	1.2D + 1.0W (135)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
10	1.2D + 1.0W (150)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
11	1.2D + 1.0W (180)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
12	1.2D + 1.0W (210)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
13	1.2D + 1.0W (225)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
14	1.2D + 1.0W (240)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
15	1.2D + 1.0W (270)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	1.2D + 1.0W (300)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	1.2D + 1.0W (315)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
18	1.2D + 1.0W (330)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
19	Uplift LCs (Case 2)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	1.2D +1.0W (0)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
21	1.2D + 1.0W (30)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
22	1.2D + 1.0W (45)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	1.2D + 1.0W (60)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
24	1.2D + 1.0W (90)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
25	1.2D + 1.0W (120)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Load Combination Design (Continued)

	Description	Service	Hot Rolled	Cold Formed	Wood	Concrete	Masonry	Aluminum	Stainless	Connection
26	1.2D + 1.0W (135)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
27	1.2D + 1.0W (150)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
28	1.2D + 1.0W (180)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
29	1.2D + 1.0W (210)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
30	1.2D + 1.0W (225)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
31	1.2D + 1.0W (240)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
32	1.2D + 1.0W (270)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
33	1.2D + 1.0W (300)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
34	1.2D + 1.0W (315)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
35	1.2D + 1.0W (330)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
36	Ice LCs (Case 3)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
37	1.2D + 1.0Di +1.0Wi (0)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
38	1.2D + 1.0W (30)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
39	1.2D + 1.0W (45)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
40	1.2D + 1.0W (60)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
41	1.2D + 1.0W (90)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
42	1.2D + 1.0W (120)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
43	1.2D + 1.0W (135)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
44	1.2D + 1.0W (150)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
45	1.2D + 1.0W (180)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
46	1.2D + 1.0W (210)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
47	1.2D + 1.0W (225)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
48	1.2D + 1.0W (240)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
49	1.2D + 1.0W (270)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
50	1.2D + 1.0W (300)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
51	1.2D + 1.0W (315)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
52	1.2D + 1.0W (330)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
53	Maintenance LCs (Case 3)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
54	1.2D + 1.0Di +1.0Wi (0)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
55	1.2D + 1.0W (30)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
56	1.2D + 1.0W (45)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
57	1.2D + 1.0W (60)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
58	1.2D + 1.0W (90)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
59	1.2D + 1.0W (120)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
60	1.2D + 1.0W (135)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
61	1.2D + 1.0W (150)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
62	1.2D + 1.0W (180)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
63	1.2D + 1.0W (210)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
64	1.2D + 1.0W (225)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
65	1.2D + 1.0W (240)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
66	1.2D + 1.0W (270)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
67	1.2D + 1.0W (300)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
68	1.2D + 1.0W (315)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
69	1.2D + 1.0W (330)		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
70	1.2D + 1.5Lv		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

AISC 15TH (360-16): LRFD Member Steel Code Checks

No Data to Print...

Envelope Node Reactions

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	N1	max	1060.542	11	814.551	48	1267.348	35	0	70	LOCKED		0	70
2		min	-1022.576	20	253.338	24	-2641.167	10	0	1	LOCKED		0	1
3	N6	max	746.935	28	794.79	40	1825.809	49	0	70	LOCKED		0	70

Envelope Node Reactions (Continued)

	Node Label		X [lb]	LC	Y [lb]	LC	Z [lb]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
4		min	-784.556	3	250.322	32	-290.647	24	0	1	LOCKED		0	1
5	N38	max	248.903	3	46.247	37	1676.44	28	0	70	0	70	0	70
6		min	-249.268	11	13.801	30	-1679.139	20	0	1	0	1	0	1
7	Totals:	max	1552.785	11	1652.178	45	1706.203	15						
8		min	-1552.785	20	560.762	20	-1706.203	24						

Envelope Node Displacements

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
1	N1	max	0	20	0	24	0	10	1.382e-3	59	0	70	1.886e-3	3
2		min	0	11	0	48	0	35	-3.679e-4	33	0	1	-1.831e-3	28
3	N2	max	0.023	21	-0.006	21	0.026	11	1.551e-3	6	3.53e-3	23	1.537e-3	54
4		min	-0.025	12	-0.055	70	-0.023	20	-1.285e-3	31	-3.551e-3	14	-5.949e-4	70
5	N3	max	0.02	20	-0.002	20	0.024	11	2.178e-3	55	6.747e-4	22	1.024e-3	21
6		min	-0.022	11	-0.035	45	-0.02	20	-1.815e-5	29	-7.259e-4	13	-1.767e-3	70
7	N4	max	0.005	20	-0.002	20	0.006	11	2.355e-3	37	1.007e-3	20	8.789e-4	20
8		min	-0.006	11	-0.026	45	-0.005	20	2.435e-4	30	-1.154e-3	11	-1.906e-3	70
9	N6	max	0	3	0	32	0	24	1.385e-3	65	0	70	8.927e-4	3
10		min	0	28	0	40	0	49	-4.229e-4	23	0	1	-9.576e-4	70
11	N7	max	0.058	20	0.001	20	0.057	28	1.656e-3	16	3.841e-3	23	1.51e-3	55
12		min	-0.059	11	-0.055	70	-0.058	3	-1.381e-3	25	-3.907e-3	14	-6.327e-4	70
13	N8	max	0.05	20	-0.002	20	0.049	28	2.164e-3	65	1.648e-3	21	1.167e-3	35
14		min	-0.051	11	-0.035	45	-0.05	3	3.078e-4	23	-1.697e-3	12	-1.883e-3	70
15	N9	max	0.012	3	-0.002	20	0.011	28	2.316e-3	45	2.235e-3	3	3.94e-4	35
16		min	-0.012	11	-0.027	45	-0.012	3	3.377e-4	24	-2.206e-3	28	-2.044e-3	70
17	N10	max	0.022	21	-0.011	27	0.018	21	1.861e-3	9	2.842e-3	31	5.29e-4	20
18		min	-0.024	12	-0.056	52	-0.018	12	-1.633e-3	34	-2.946e-3	6	-1.498e-3	62
19	N11	max	0.021	21	-0.007	28	0.017	4	2.211e-3	62	3.104e-4	20	1.753e-3	18
20		min	-0.022	12	-0.036	37	-0.017	29	-3.095e-4	20	-4.116e-4	11	-1.142e-3	27
21	N12	max	0.006	21	-0.003	28	0.005	4	2.415e-3	45	1.063e-3	4	2.03e-3	3
22		min	-0.006	12	-0.028	37	-0.005	30	1.109e-5	35	-1.03e-3	29	-9.75e-4	28
23	N14	max	0.058	20	-0.004	28	0.056	20	1.965e-3	13	2.662e-3	32	-2.091e-5	35
24		min	-0.059	11	-0.056	37	-0.059	11	-1.716e-3	22	-2.699e-3	7	-1.464e-3	61
25	N15	max	0.05	20	-0.006	28	0.048	20	2.157e-3	65	1.619e-3	20	1.826e-3	4
26		min	-0.051	11	-0.036	37	-0.051	11	3.257e-4	23	-1.661e-3	11	-1.279e-3	29
27	N16	max	0.012	20	-0.003	28	0.011	21	2.311e-3	52	2.195e-3	20	1.533e-3	4
28		min	-0.012	11	-0.028	37	-0.012	12	3.063e-4	23	-2.3e-3	11	-5.035e-4	29
29	N15A	max	0.023	21	0.016	20	0.086	13	1.441e-3	4	3.502e-3	23	1.277e-3	3
30		min	-0.025	12	-0.07	70	-0.081	22	-1.215e-3	29	-3.614e-3	14	-1.074e-3	28
31	N16A	max	0.022	21	0.012	28	0.035	32	2.074e-3	10	2.429e-3	15	1.182e-3	20
32		min	-0.024	12	-0.05	37	-0.036	7	-1.91e-3	35	-2.442e-3	24	-1.339e-3	11
33	N17	max	0.058	20	0.016	20	0.112	29	1.535e-3	18	3.548e-3	6	1.097e-3	3
34		min	-0.059	11	-0.072	70	-0.112	4	-1.304e-3	27	-3.527e-3	31	-1.018e-3	70
35	N18	max	0.058	20	0.012	28	0.069	35	2.181e-3	12	2.368e-3	32	1.014e-3	20
36		min	-0.059	11	-0.05	37	-0.073	10	-1.99e-3	21	-2.503e-3	7	-1.138e-3	11
37	N19	max	0.024	70	0.009	20	0.034	14	1.559e-3	5	3.502e-3	23	1.061e-3	3
38		min	-0.022	15	-0.067	70	-0.021	23	-1.333e-3	30	-3.614e-3	14	-8.583e-4	28
39	N20	max	0.109	3	0.009	20	0.127	28	1.671e-3	17	3.549e-3	6	1.348e-3	3
40		min	-0.103	28	-0.067	70	-0.136	3	-1.441e-3	26	-3.527e-3	31	-1.142e-3	28
41	N21	max	0.02	70	0.002	28	0.064	11	2.182e-3	10	2.429e-3	15	9.665e-4	20
42		min	-0.014	20	-0.05	37	-0.06	20	-2.019e-3	35	-2.442e-3	24	-1.124e-3	11
43	N22	max	0.099	20	0.002	28	0.125	20	2.306e-3	12	2.368e-3	32	1.264e-3	20
44		min	-0.106	11	-0.05	37	-0.136	11	-2.115e-3	21	-2.503e-3	7	-1.388e-3	11
45	N23	max	0.029	20	-0.002	20	0.03	11	5.638e-4	20	1.31e-3	20	7.042e-4	3
46		min	-0.03	11	-0.03	45	-0.029	20	-1.e-3	11	-1.362e-3	11	-2.757e-4	28
47	N24	max	0.03	3	-0.004	28	0.028	4	6.945e-4	28	1.225e-3	20	2.693e-4	20

Envelope Node Displacements (Continued)

	Node Label		X [in]	LC	Y [in]	LC	Z [in]	LC	X Rotation [rad]	LC	Y Rotation [rad]	LC	Z Rotation [rad]	LC
48		min	-0.029	12	-0.032	37	-0.028	12	-1.17e-3	3	-1.282e-3	11	-7.064e-4	11
49	N25	max	0.022	21	0.008	28	0.028	32	2.074e-3	10	2.429e-3	15	1.182e-3	20
50		min	-0.024	12	-0.05	37	-0.029	7	-1.91e-3	35	-2.442e-3	24	-1.339e-3	11
51	N26	max	0.023	21	0.013	20	0.076	13	1.441e-3	4	3.502e-3	23	1.277e-3	3
52		min	-0.025	12	-0.068	70	-0.07	22	-1.215e-3	29	-3.614e-3	14	-1.074e-3	28
53	N27	max	0.058	20	0.008	28	0.065	35	2.181e-3	12	2.368e-3	32	1.014e-3	20
54		min	-0.059	11	-0.05	37	-0.07	10	-1.99e-3	21	-2.503e-3	7	-1.138e-3	11
55	N28	max	0.058	20	0.013	20	0.102	29	1.535e-3	18	3.549e-3	6	1.098e-3	3
56		min	-0.059	11	-0.069	70	-0.102	4	-1.304e-3	27	-3.527e-3	31	-9.682e-4	70
57	N33	max	0.093	20	-0.028	20	0.211	7	4.836e-3	7	1.218e-3	20	2.542e-3	11
58		min	-0.096	11	-0.096	62	-0.193	32	-4.439e-3	32	-1.282e-3	11	-2.501e-3	20
59	N34	max	0.206	20	-0.028	20	0.221	24	5.482e-3	15	2.106e-3	20	4.652e-3	3
60		min	-0.206	11	-0.096	62	-0.239	15	-5.075e-3	24	-2.149e-3	11	-4.625e-3	28
61	N35	max	0.023	21	-0.022	23	0.067	7	2.442e-3	7	1.218e-3	20	1.495e-4	11
62		min	-0.025	12	-0.095	65	-0.062	32	-2.046e-3	32	-1.282e-3	11	-5.568e-4	70
63	N36	max	0.058	20	-0.022	33	0.065	24	2.664e-3	15	2.106e-3	20	1.834e-3	3
64		min	-0.059	11	-0.094	59	-0.068	15	-2.257e-3	24	-2.149e-3	11	-1.806e-3	28
65	N37	max	0.022	21	-0.007	27	0.011	20	1.872e-3	9	2.794e-3	31	7.017e-4	20
66		min	-0.024	12	-0.054	37	-0.011	11	-1.657e-3	34	-2.868e-3	6	-1.332e-3	11
67	N38	max	0	11	0	30	0	20	3.148e-3	45	2.813e-3	20	1.088e-3	20
68		min	0	3	0	37	0	28	8.807e-4	20	-2.833e-3	11	-1.351e-3	11
69	N65	max	0.058	20	0.003	20	0.064	28	1.597e-3	16	3.732e-3	23	1.272e-3	55
70		min	-0.059	11	-0.057	70	-0.064	3	-1.331e-3	25	-3.772e-3	14	-8.151e-4	70
71	N67	max	0.02	20	0.002	28	0.028	32	2.074e-3	10	2.429e-3	15	1.182e-3	20
72		min	-0.021	11	-0.05	37	-0.029	7	-1.91e-3	35	-2.442e-3	24	-1.339e-3	11
73	N68	max	0.032	21	0.009	20	0.076	13	1.441e-3	4	3.502e-3	23	1.277e-3	3
74		min	-0.035	12	-0.067	70	-0.07	22	-1.215e-3	29	-3.614e-3	14	-1.074e-3	28
75	N69	max	0.058	20	0.002	28	0.065	35	2.181e-3	12	2.368e-3	32	1.014e-3	20
76		min	-0.059	11	-0.05	37	-0.07	10	-1.99e-3	21	-2.503e-3	7	-1.138e-3	11
77	N70	max	0.064	20	0.009	20	0.102	29	1.535e-3	18	3.549e-3	6	1.098e-3	3
78		min	-0.065	11	-0.067	70	-0.102	4	-1.304e-3	27	-3.527e-3	31	-9.682e-4	70
79	N73	max	0.026	21	-0.027	20	0.067	7	2.442e-3	7	1.218e-3	20	1.495e-4	11
80		min	-0.028	12	-0.096	62	-0.062	32	-2.046e-3	32	-1.282e-3	11	-5.568e-4	70
81	N74	max	0.064	20	-0.027	20	0.065	24	2.664e-3	15	2.106e-3	20	1.834e-3	3
82		min	-0.066	11	-0.096	62	-0.068	15	-2.257e-3	24	-2.149e-3	11	-1.806e-3	28
83	N42	max	0.063	20	-0.028	20	0.153	7	4.826e-3	7	1.218e-3	20	2.531e-3	11
84		min	-0.066	11	-0.096	62	-0.14	32	-4.429e-3	32	-1.282e-3	11	-2.491e-3	20
85	N43	max	0.15	20	-0.028	20	0.16	24	5.471e-3	15	2.106e-3	20	4.642e-3	3
86		min	-0.151	11	-0.096	62	-0.173	15	-5.065e-3	24	-2.149e-3	11	-4.615e-3	28
87	N44	max	0.035	20	-0.028	20	0.098	7	4.081e-3	7	1.218e-3	20	1.787e-3	11
88		min	-0.038	11	-0.096	62	-0.089	32	-3.684e-3	32	-1.282e-3	11	-1.746e-3	20
89	N45	max	0.097	20	-0.028	20	0.102	24	4.728e-3	15	2.106e-3	20	3.899e-3	3
90		min	-0.098	11	-0.096	62	-0.11	15	-4.322e-3	24	-2.149e-3	11	-3.872e-3	28
91	N47	max	0.039	20	-0.027	20	0.05	6	3.696e-4	54	1.657e-3	20	1.579e-3	3
92		min	-0.04	11	-0.096	62	-0.05	31	1.476e-7	28	-1.711e-3	11	-1.549e-3	28

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	M1	PIPE_1.5	0.182	35.333	45	0.045	7.067	62	22762.755	31008.6	1.452	1.452	1.794	H1-1b
2	M2	PIPE_1.5	0.191	35.333	45	0.045	7.067	62	22762.755	31008.6	1.452	1.452	1.799	H1-1b
3	M3	BAR0.625	0.044	28.3	12	0.006	28.3	11	5000.693	13805.827	0.144	0.144	2.129	H1-1b
4	M4	BAR0.625	0.06	28.3	47	0.007	28.3	3	5000.693	13805.827	0.144	0.144	2.288	H1-1b
5	M5	BAR0.625	0.059	0	70	0.008	19.905	14	2178.887	13805.827	0.144	0.144	2.154	H1-1b*
6	M6	BAR0.625	0	39.811	70	0.007	0	8	4270.618	13805.827	0.144	0.144	2.16	H1-1a
7	M7	PIPE_1.5	0.188	35.333	39	0.047	7.067	38	22762.755	31008.6	1.452	1.452	1.797	H1-1b

Envelope AISC 15TH (360-16): LRFD Member Steel Code Checks (Continued)

	Member	Shape	Code Check	Loc[in]	LC	Shear Check	Loc[in]	LC	phi*Pnc [lb]	phi*Pnt [lb]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
8	M8	PIPE_1.5	0.201	35.333	37	0.046	42.4	37	22762.755	31008.6	1.452	1.452	1.8	H1-1b
9	M9	BAR0.625	0.049	28.3	18	0.007	28.3	3	5000.693	13805.827	0.144	0.144	2.147	H1-1b
10	M10	BAR0.625	0.063	28.3	51	0.008	28.3	11	5000.693	13805.827	0.144	0.144	2.289	H1-1b
11	M11	BAR0.625	0.06	0	40	0.008	0	9	2178.887	13805.827	0.144	0.144	1.982	H1-1b*
12	M12	BAR0.625	0.007	39.811	28	0.008	39.811	13	4270.618	13805.827	0.144	0.144	1.661	H1-1b*
13	M13	PIPE_2.5	0.148	48	6	0.107	18	3	62325.909	66654	4.727	4.727	2.768	H1-1b
14	M14	PIPE_2.5	0.156	48	6	0.057	19	17	33487.322	66654	4.727	4.727	1.742	H1-1b
15	MP1	PIPE_2.5	0.049	35	17	0.021	63	3	33487.322	66654	4.727	4.727	3	H1-1b
16	MP3	PIPE_2.5	0.043	35	13	0.013	63	62	33487.322	66654	4.727	4.727	3	H1-1b
17	MP2	PIPE_2.5	0.153	34	11	0.043	63	3	33487.322	66654	4.727	4.727	2.023	H1-1b
18	M27A	PIPE_2.0	0.115	0	28	0.004	97.494	3	14902.367	42228	2.46	2.46	1.136	H1-1b*

Material Take-Off

	Material	Size	Pieces	Length[in]	Weight[K]
1	General Members				
2	RIGID		6	18	0
3	Total General		6	18	0
4					
5	Hot Rolled Steel				
6	A500 Gr.46	PIPE_1.5	4	169.6	0.036
7	A500 Gr.46	PIPE_2.5	5	480	0.219
8	A500 Gr.46	PIPE_2.0	1	97.5	0.028
9	A529 Gr.50	BAR0.625	8	272.4	0.024
10	Total HR Steel		18	1019.5	0.307

Warning Log

No Data to Print...

MK DEVELOPMENT

EXHIBIT F

NIERS Study

APPROVED
By Pawan Madahar at 5:38 pm, Jan 17, 2023

Pinnacle Telecom Group

Professional and Technical Services

Antenna Site FCC RF Compliance Assessment and Report for Municipal Submission

Prepared for:	DISH Wireless, LLC
Site ID:	NJJER02057A
Site Address:	20 Barnabus Road Newtown, CT
Latitude:	N 41.427638
Longitude:	W 73.343533
Structure type:	Lattice tower
Report date:	January 16, 2023
Compliance Conclusion:	DISH Wireless, LLC will be in compliance with the rules and regulations as described in OET Bulletin 65, following the implementation of the proposed mitigation as detailed in the report.

14 Ridgedale Avenue - Suite 260 • Cedar Knolls, NJ 07927 • 973-451-1630

Contents

Introduction and Summary

At the request of DISH Wireless, LLC ("DISH"), Pinnacle Telecom Group has performed an independent expert assessment of radiofrequency (RF) levels and related FCC compliance for proposed wireless base station antenna operations on an existing lattice tower located at 20 Barnabas Road in Newtown CT. DISH refers to the antenna site by the code "NJJER02057A", and its proposed operation involves directional panel antennas and transmission in the 600 MHz, 2000 MHz and 2100 MHz frequency bands licensed to it by the FCC.

The FCC requires all wireless antenna operators to perform an assessment of potential human exposure to radiofrequency (RF) fields emanating from all the transmitting antennas at a site whenever antenna operations are added or modified, and to ensure compliance with the Maximum Permissible Exposure (MPE) limit in the FCC's regulations. In this case, the compliance assessment needs to take into account the RF effects of other existing antenna operations at the site by AT&T, T-Mobile, Verizon Wireless, Eversource Energy Service Company and the Town of Newtown. Note that FCC regulations require any future antenna collocators to assess and assure continuing compliance based on the cumulative effects of all then-proposed and then-existing antennas at the site.

This report describes a mathematical analysis of RF levels resulting around the site in areas of unrestricted public access, that is, at street level around the site. The compliance analysis employs a standard FCC formula for calculating the effects of the antennas in a very conservative manner, in order to overstate the RF levels and to ensure "safe-side" conclusions regarding compliance with the FCC limit for safe continuous exposure of the general public.

The results of a compliance assessment can be described in layman's terms by expressing the calculated RF levels as simple percentages of the FCC MPE limit. If the normalized reference for that limit is 100 percent, then calculated RF levels higher than 100 percent indicate the MPE limit is exceeded and there is a need to mitigate the potential exposure. On the other hand, calculated RF levels consistently below 100 percent serve as a clear and sufficient demonstration of

compliance with the MPE limit. We can (and will) also describe the overall worst-case result via the “plain-English” equivalent “times-below-the-limit” factor.

The result of the RF compliance assessment in this case is as follows:

- At street level, the conservatively calculated maximum RF level from the combination of proposed and existing antenna operations at the site is 9.7402 percent of the FCC general population MPE limit – well below the 100-percent reference for compliance. In other words, the worst-case calculated RF level – intentionally and significantly overstated by the calculations – is still more than ten times below the FCC limit for safe, continuous exposure of the general public.
- A supplemental analysis of the RF levels at the same height as the DISH antennas indicate that the FCC MPE limit is potentially exceeded. Therefore, it is recommended that three Caution signs and NOC Information signs be installed at the base of the tower.
- The results of the calculations, along with the proposed mitigation, combine to satisfy the FCC requirements and associated guidelines on RF compliance at street level around the site. Moreover, because of the significant conservatism incorporated in the analysis, RF levels actually caused by the antennas will be lower than these calculations indicate.

The remainder of this report provides the following:

- relevant technical data on the proposed DISH antenna operations at the site, as well as on the other existing antenna operations;
- a description of the applicable FCC mathematical model for calculating RF levels, and application of the relevant technical data to that model;
- analysis of the results of the calculations against the FCC MPE limit, and the compliance conclusion for the site.

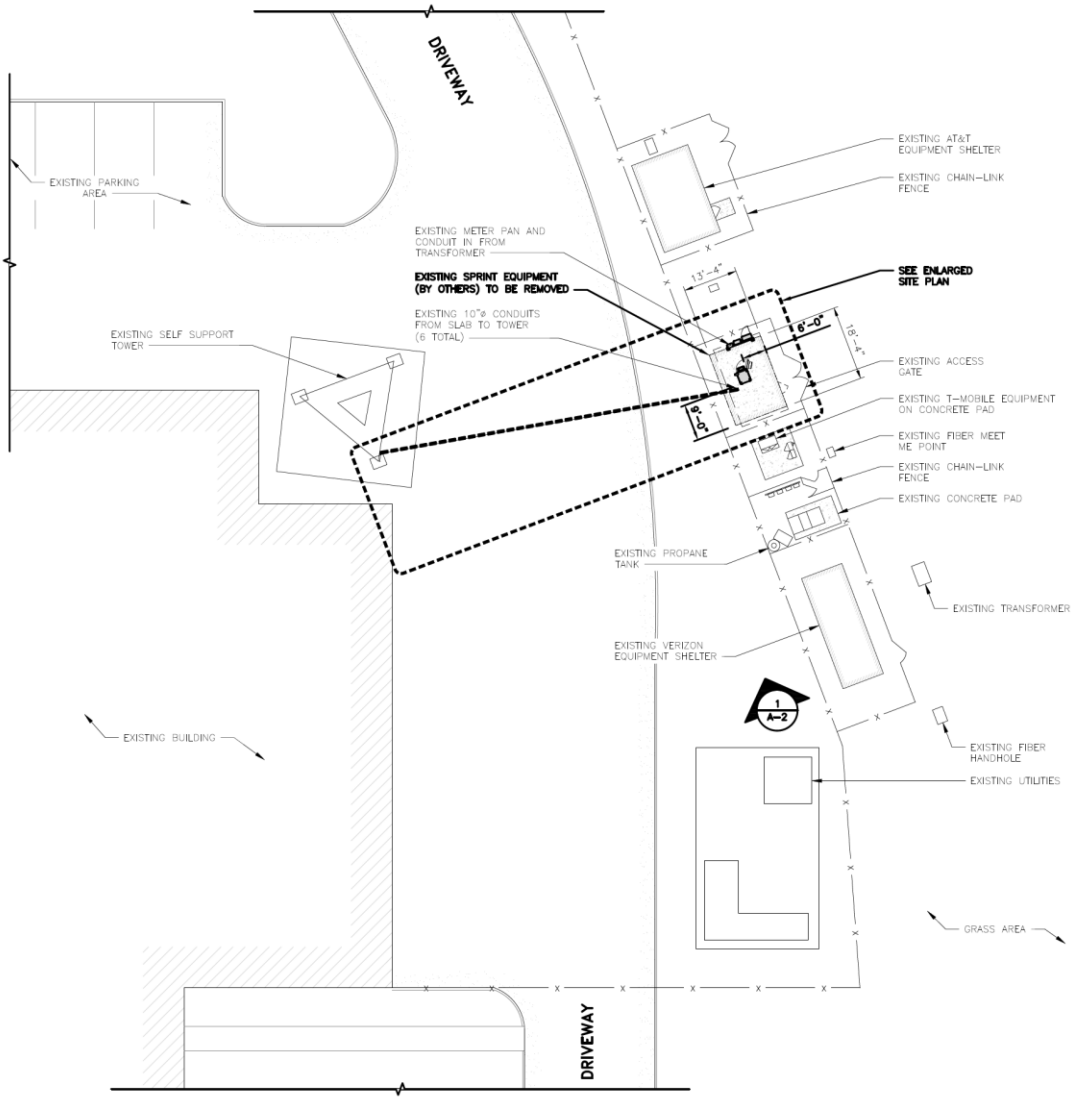
In addition, four Appendices are included. Appendix A provides information on the documents used to prepare the analysis. Appendix B provides background on the FCC MPE limit. Appendix C details the proposed mitigation to satisfy the FCC

requirements and associated guidelines on RF compliance. Appendix D provides a summary of the qualifications of the expert certifying FCC compliance for this site.

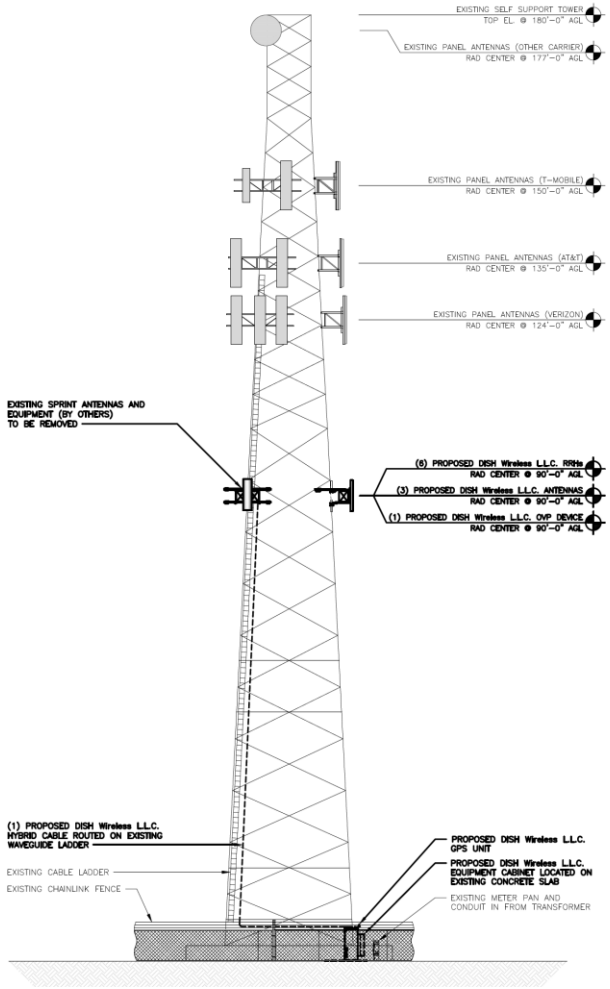
Antenna and Transmission Data

The plan and elevation views that follow, extracted from the site drawings, illustrate the mounting positions of the DISH antennas at the site.

Plan View:



Elevation View:



The table that follows summarizes the relevant data for the proposed DISH antenna operations. Note that the "Z" height references the centerline of the antenna.

Ant. ID	Carrier	Antenna Manufacturer	Antenna Model	Type	Freq (MHz)	Ant. Dim. (ft.)	Total Input Power (watts)	Total ERP (watts)	Z AGL (ft)	Ant. Gain (dBd)	B/W	Azimuth	EDT	MDT
❶	DISH	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	90.0	12.46	64	90	2	0
❶	DISH	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	90.0	16.66	67	90	2	0
❶	DISH	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	90.0	16.66	67	90	2	0
❷	DISH	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	90.0	12.46	64	250	2	0
❷	DISH	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	90.0	16.66	67	250	2	0
❷	DISH	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	90.0	16.66	67	250	2	0
❸	DISH	Commscope	FFVV-65B-R2	Panel	600	6	120	2110	90.0	12.46	64	350	2	0
❸	DISH	Commscope	FFVV-65B-R2	Panel	2000	6	160	7396	90.0	16.66	67	350	2	0
❸	DISH	Commscope	FFVV-65B-R2	Panel	2100	6	160	7396	90.0	16.66	67	350	2	0

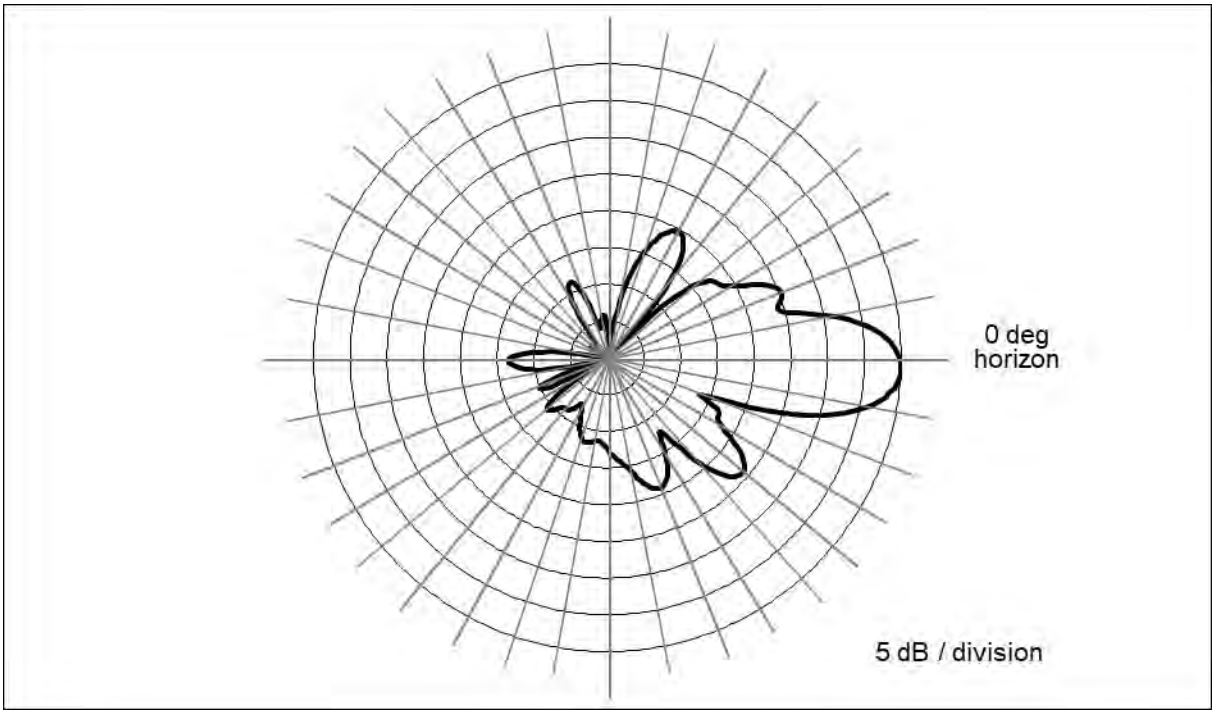
The area below the antennas, at street level, is of interest in terms of potential "uncontrolled" exposure of the general public, so the antenna's vertical-plane emission characteristic is used in the calculations, as it is a key determinant of the relative amount of RF emissions in the "downward" direction.

By way of illustration, Figure 1 that follows shows the vertical-plane radiation pattern of the proposed antenna model in the 600 MHz frequency band. In this type of antenna radiation pattern diagram, the antenna is effectively pointed at the three o'clock position (the horizon) and the relative strength of the pattern at different angles is described using decibel units.

Note that the use of a decibel scale to describe the relative pattern at different angles actually serves to significantly understate the actual focusing effects of the antenna. Where the antenna pattern reads 20 dB the relative RF energy emitted at the corresponding downward angle is 1/100th of the maximum that occurs in the main beam (at 0 degrees); at 30 dB, the energy is only 1/1000th of the maximum.

Finally, note that the automatic pattern-scaling feature of our internal software may skew side-by-side visual comparisons of different antenna models, or even different parties' depictions of the same antenna model.

Figure 1. Commscope FFVV-65B-R2 – 600 MHz Vertical-plane Pattern



As noted at the outset, there are existing antenna operations to include in the compliance assessment. For each of the wireless operators, we will conservatively assume operation with maximum channel capacity and at maximum transmitter power per channel to be used by each wireless operator in each of their respective FCC-licensed frequency bands. For each of the other operators, we will rely on the transmission parameters in their respective FCC licenses.

The table that follows summarizes the relevant data for the collocated antenna operations.

Carrier	*Antenna Manufacturer*	*Antenna Model*	*Type*	*Freq (MHz)*	*Total ERP (watts)*	*Ant. Gain (dBd)*	*Azimuth*
AT&T	Generic	Generic	Panel	700	4945	11.26	N/A
AT&T	Generic	Generic	Panel	850	2400	11.76	N/A
AT&T	Generic	Generic	Panel	1900	5756	15.56	N/A
AT&T	Generic	Generic	Panel	2100	5890	15.66	N/A
AT&T	Generic	Generic	Panel	2300	4131	16.16	N/A
T-Mobile	Generic	Generic	Panel	600	3163	12.96	N/A
T-Mobile	Generic	Generic	Panel	700	867	13.36	N/A
T-Mobile	Generic	Generic	Panel	1900	4123	15.36	N/A
T-Mobile	Generic	Generic	Panel	1900	1452	15.60	N/A
T-Mobile	Generic	Generic	Panel	2100	4626	15.86	N/A
T-Mobile	Generic	Generic	Panel	1900	1419	15.50	N/A
T-Mobile	Generic	Generic	Panel	2500	12804	22.35	N/A
Verizon Wireless	Generic	Generic	Panel	746	2400	11.76	N/A
Verizon Wireless	Generic	Generic	Panel	869	5166	12.36	N/A
Verizon Wireless	Generic	Generic	Panel	1900	5372	15.26	N/A
Verizon Wireless	Generic	Generic	Panel	2100	5625	15.46	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Omnidirectional	48	379	0	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Omnidirectional	37	670	0	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Omnidirectional	37	370	0	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Omnidirectional	154	990	0	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Dish	5945	5970	39.46	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Dish	6034	5970	39.46	N/A
Eversource Energy Svcs. Co.	Generic	Generic	Omnidirectional	935	240	9	N/A
Town of Newton	Generic	Generic	Omnidirectional	151	100	0	N/A
Town of Newton	Generic	Generic	Omnidirectional	152	50	0	N/A

Compliance Analysis

FCC Office of Engineering and Technology Bulletin 65 ("OET Bulletin 65") provides guidelines for mathematical models to calculate the RF levels at various points around transmitting antennas. Different models apply in different areas around antennas, with one model applying to street level around a site, and another applying to the same height as the antennas. We will address each area of interest in turn in the subsections that follow.

Street Level Analysis

At street-level around an antenna site (in what is called the "far field" of the antennas), the RF levels are directly proportional to the total antenna input power and the relative antenna gain in the downward direction of interest – and the levels are otherwise inversely proportional to the square of the straight-line distance to the antenna.

Conservative calculations also assume the potential RF exposure is enhanced by reflection of the RF energy from the intervening ground. Our calculations will assume a 100% "perfect", mirror-like reflection, which is the absolute worst-case scenario.

The formula for street-level compliance assessment for any given wireless antenna operation is as follows:

$$MPE\% = (100 * Chans * TxPower * 10^{(Gmax-Vdisc/10)} * 4) / (MPE * 4\pi * R^2)$$

where

MPE%	=	RF level, expressed as a percentage of the MPE limit applicable to continuous exposure of the general public
100	=	factor to convert the raw result to a percentage
Chans	=	maximum number of RF channels per sector
TxPower	=	maximum transmitter power per channel, in milliwatts

$10^{(Gmax-Vdisc/10)}$	=	numeric equivalent of the relative antenna gain in the downward direction of interest; data on the antenna vertical-plane pattern is taken from manufacturer specifications
4	=	factor to account for a 100-percent-efficient energy reflection from the ground, and the squared relationship between RF field strength and power density ($2^2 = 4$)
MPE	=	FCC general population MPE limit
R	=	straight-line distance from the RF source to the point of interest, centimeters

The MPE% calculations are performed out to a distance of 500 feet from the facility to points 6.5 feet (approximately two meters, the FCC-recommended standing height) off the ground, as illustrated in Figure 2, below.

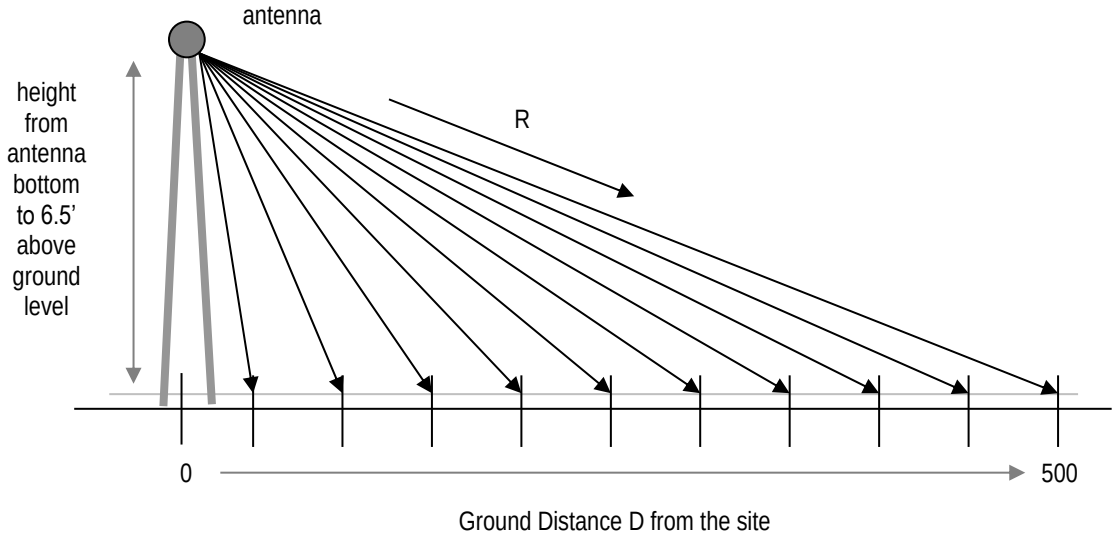


Figure 2. Street-level MPE% Calculation Geometry

It is popularly understood that the farther away one is from an antenna, the lower the RF level – which is generally but not universally correct. The results of MPE% calculations fairly close to the site will reflect the variations in the vertical-plane antenna pattern as well as the variation in straight-line distance to the antenna.

Therefore, RF levels may actually increase slightly with increasing distance within the range of zero to 500 feet from the site. As the distance approaches 500 feet and beyond, though, the antenna pattern factor becomes less significant, the RF levels become primarily distance-controlled and, as a result, the RF levels generally decrease with increasing distance. In any case, the RF levels more than 500 feet from a wireless antenna site are well understood to be sufficiently low to be comfortably in compliance.

According to the FCC, when directional antennas (such as panels) are used, compliance assessments are based on the RF effect of a single (facing) antenna sector, as the effects of directional antennas pointed away from the point(s) of interest are considered insignificant. If the different parameters apply in the different sectors, compliance is based on the worst-case parameters.

Street level FCC compliance for a collocated antenna site is assessed in the following manner. At each distance point along the ground, an MPE% calculation is made for each antenna operation (including each frequency band), and the sum of the individual MPE% contributions at each point is compared to 100 percent, the normalized reference for compliance with the MPE limit. We refer to the sum of the individual MPE% contributions as “total MPE%”, and any calculated total MPE% result exceeding 100 percent is, by definition, higher than the FCC limit and represents non-compliance and a need to mitigate the potential exposure. If all results are consistently below 100 percent, on the other hand, that set of results serves as a clear and sufficient demonstration of compliance with the MPE limit.

Note that the following conservative methodology and assumptions are incorporated into the MPE% calculations on a general basis:

1. The antennas are assumed to be operating continuously at maximum power and maximum channel capacity.
2. The power-attenuation effects of shadowing or other obstructions to the line-of-sight path from the antenna to the point of interest are ignored.
3. The calculations intentionally minimize the distance factor (R) by assuming a 6’6” human and performing the calculations from the bottom (rather than

the centerline) of each operator's lowest-mounted antenna, as applicable.

4. The calculations also conservatively take into account, when applicable, the different technical characteristics and related RF effects of the use of multiple antennas for transmission in the same frequency band.
5. The RF exposure at ground level is assumed to be 100-percent enhanced (increased) via a "perfect" field reflection from the intervening ground.

The net result of these assumptions is to intentionally and significantly overstate the calculated RF levels relative to the levels that will actually result from the antenna operations – and the purpose of this conservatism is to allow very "safe-side" conclusions about compliance.

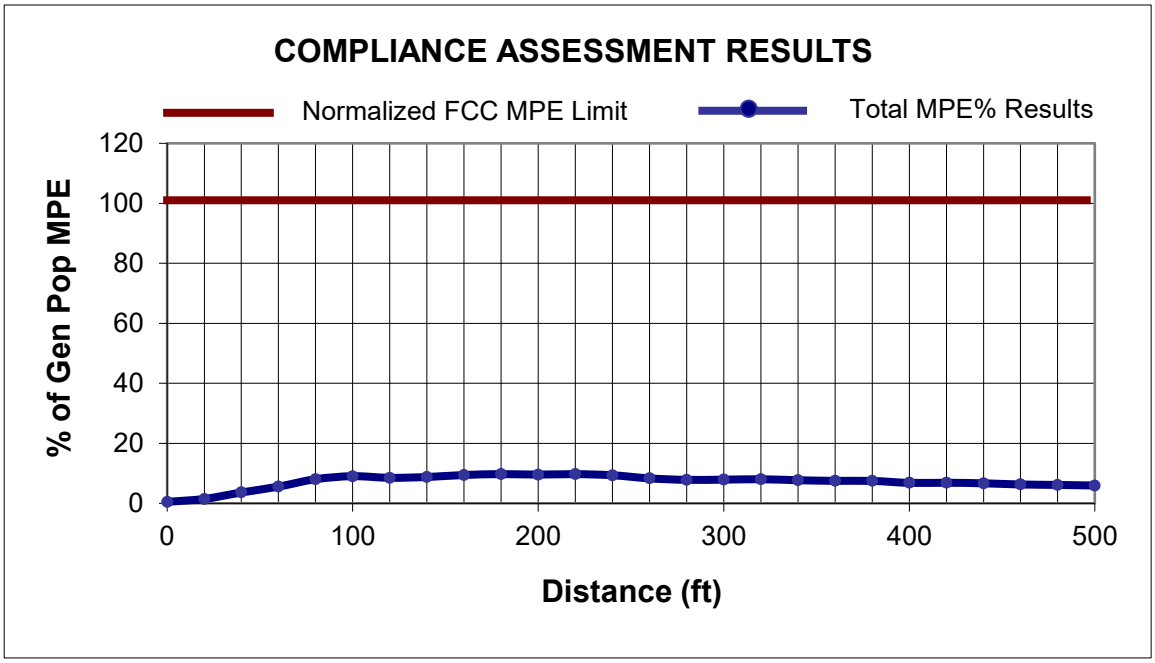
The tables that follow provides the results of the MPE% calculations for each antenna operation, with the overall worst-case calculated result highlighted in bold in the last column of the last table. Note that the transmission parameters for each DISH antenna sector are identical, and the calculations reflect the worst-case result for any/all sectors.

Ground Distance (ft)	DISH 600 MHz MPE%	DISH 2000 MHz MPE%	DISH 2100 MHz MPE%	AT&T MPE%	T-Mobile MPE%	Subtotal MPE%
0	0.0751	0.0035	0.0006	0.0839	0.3040	0.4671
20	0.1936	0.0159	0.0285	0.0947	0.4430	0.7757
40	0.2153	0.1313	0.0529	0.2102	0.8932	1.5029
60	0.0589	0.2693	0.0102	0.3429	0.9821	1.6634
80	0.3967	0.2923	0.5859	0.4995	0.7111	2.4855
100	0.3967	0.3190	0.5234	0.3833	0.4059	2.0283
120	0.1311	0.0435	0.0075	0.2021	0.5317	0.9159
140	0.0555	0.0061	0.0715	0.3686	0.7305	1.2322
160	0.0429	0.1662	0.1392	0.7106	1.1098	2.1687
180	0.0266	0.0514	0.1991	0.8932	1.6118	2.7821
200	0.0169	0.1437	0.0399	0.8388	1.9846	3.0239
220	0.0279	0.1792	0.1080	0.7078	2.6338	3.6567
240	0.1004	0.0908	0.1858	0.6025	2.6944	3.6739
260	0.1562	0.0278	0.1189	0.4705	2.2757	3.0491
280	0.2252	0.0072	0.0508	0.3523	2.3878	3.0233
300	0.3069	0.0066	0.0154	0.2341	2.9088	3.4718
320	0.3976	0.0051	0.0049	0.1175	3.4939	4.0190
340	0.4940	0.0101	0.0031	0.1648	3.3794	4.0514
360	0.5924	0.0385	0.0148	0.2773	3.2365	4.1595
380	0.6883	0.0873	0.0512	0.4374	3.0938	4.3580
400	0.6238	0.0791	0.0464	0.3980	2.8092	3.9565
420	0.7067	0.1073	0.0860	0.5585	2.7231	4.1816
440	0.6459	0.0981	0.0786	0.7095	2.6605	4.1926
460	0.7158	0.0777	0.0848	0.6527	2.4572	3.9882
480	0.6590	0.0715	0.0780	0.7891	2.4230	4.0206
500	0.6086	0.0660	0.0721	0.9459	2.3026	3.9952

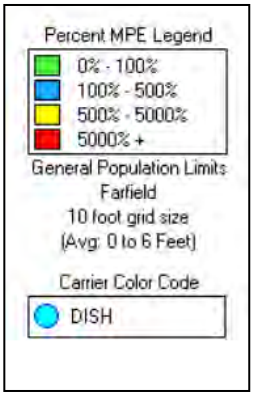
Ground Distance (ft)	**Subtotal MPE%**	**Verizon Wireless MPE%**	**Eversource Energy Svcs. MPE%**	**Town of Newtown MPE%**	**Total MPE%**
0	0.4671	0.0099	0.0121	0.0007	0.4898
20	0.7757	0.0269	0.6082	0.0605	1.4713
40	1.5029	0.0496	1.8563	0.2129	3.6217
60	1.6634	0.0639	3.4769	0.3728	5.5770
80	2.4855	0.3005	4.7613	0.5033	8.0506
100	2.0283	0.7003	5.7173	0.6004	9.0463
120	0.9159	0.5447	6.4026	0.6419	8.5051
140	1.2322	0.2549	6.6658	0.6283	8.7812
160	2.1687	0.1382	6.5379	0.6004	9.4452
180	**2.7821**	**0.0561**	**6.3447**	**0.5573**	**9.7402**
200	3.0239	0.1027	5.9396	0.5110	9.5772
220	3.6567	0.1558	5.4552	0.4633	9.7310
240	3.6739	0.1913	5.0750	0.4187	9.3589
260	3.0491	0.1945	4.6998	0.3772	8.3206
280	3.0233	0.1793	4.2827	0.3441	7.8294
300	3.4718	0.1607	3.9531	0.3082	7.8938
320	4.0190	0.1133	3.6155	0.2837	8.0315
340	4.0514	0.0825	3.3130	0.2563	7.7032
360	4.1595	0.0763	3.0214	0.2325	7.4897
380	4.3580	0.0921	2.8162	0.2117	7.4780
400	3.9565	0.0838	2.5841	0.1950	6.8194
420	4.1816	0.0980	2.4026	0.1816	6.8638
440	4.1926	0.0916	2.2266	0.1670	6.6778
460	3.9882	0.0843	2.0604	0.1541	6.2870
480	4.0206	0.0571	1.9194	0.1426	6.1397
500	3.9952	0.0343	1.7848	0.1323	5.9466

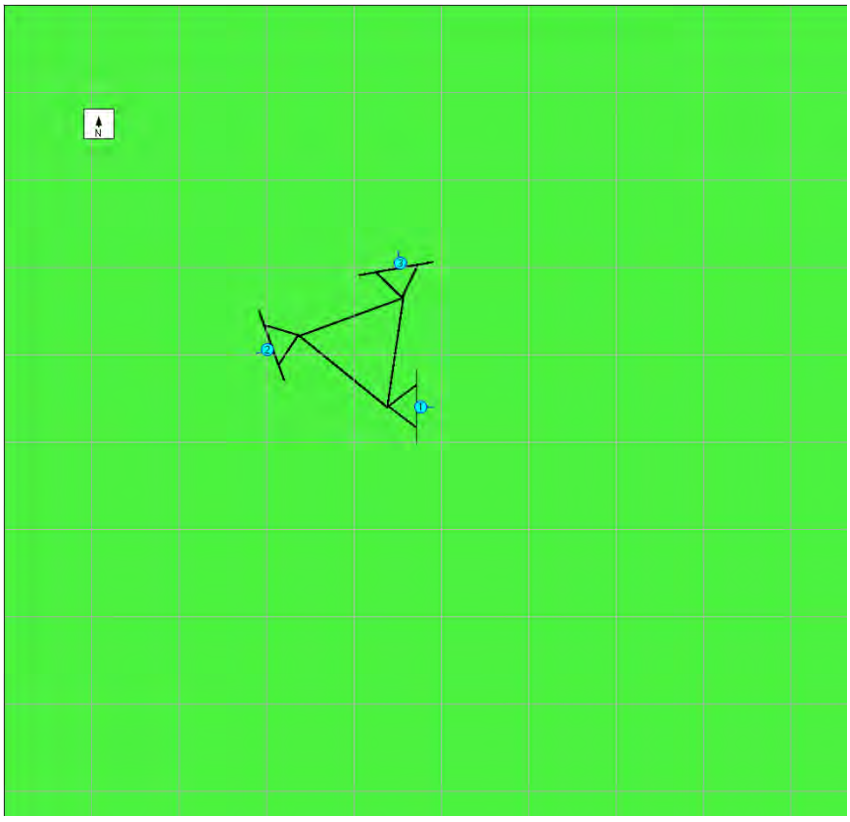
As indicated, the maximum calculated overall RF level is 9.7402 percent of the FCC MPE limit – well below the 100-percent reference for compliance.

A graph of the overall calculation results, provided on the next page, perhaps provides a clearer *visual* illustration of the relative compliance of the calculated RF levels. The line representing the overall calculation results shows an obviously clear, consistent margin to the FCC MPE limit.



The graphic output for the areas at street level surrounding the site is reproduced on the next page.



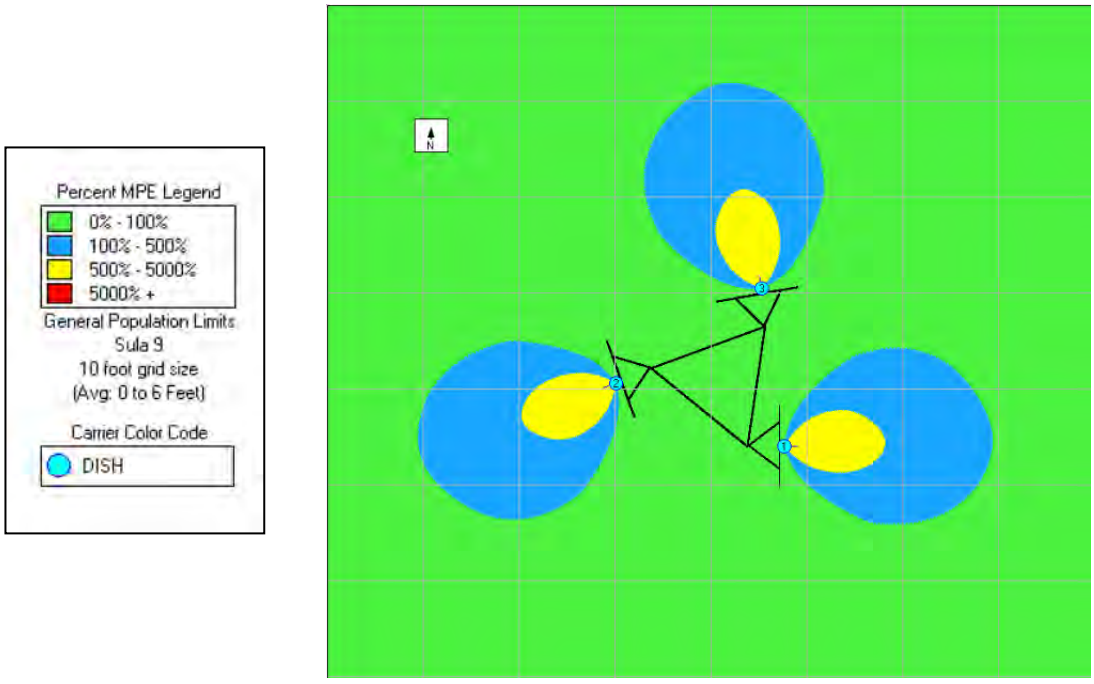


Near-field Analysis

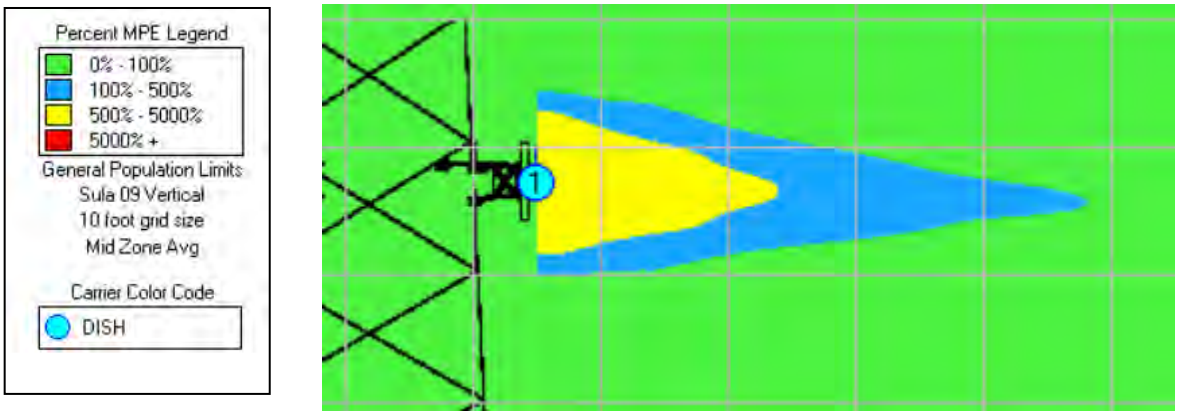
The compliance analysis for the same height as the antennas is performed using the RoofMaster program by Waterford Consultants.

RF levels in the near field of an antenna depend on the power input to the antenna, the antenna's length and horizontal beamwidth, the mounting height of the antenna above nearby standing level, and one's position and distance from the antenna. RF levels in front of a directional antenna are higher than they are to the sides or rear, and in any given horizontal direction are inversely proportional to the straight-line distance to the antenna.

The RoofMaster graphic outputs for the same height as the DISH antennas are reproduced below and on the next page.



RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors



RoofMaster – Same Height as the Antennas – Alpha / Beta / Gamma sectors

Compliance Conclusion

According to the FCC, the MPE limit has been constructed in such a manner that continuous human exposure to RF fields up to and including 100 percent of the MPE limit is acceptable and safe.

The conservative analysis in this case shows that the maximum calculated RF level from the combination of proposed and existing antenna operations at street level around the site is 9.7402 percent of the FCC general population MPE limit. At the same height as the antennas, the analysis shows that the calculated RF levels potentially exceed the FCC MPE limit. Per DISH guidelines, and consistent with FCC guidance on compliance, it is recommended that three Caution signs and NOC Information signs be installed at the base of the tower.

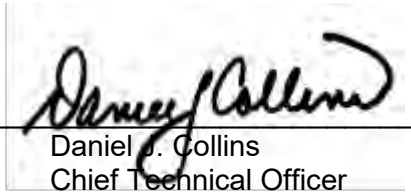
The results of the calculations, along with the described RF mitigation, combine to satisfy the FCC's RF compliance requirements and associated guidelines on compliance.

Moreover, because of the extremely conservative calculation methodology and operational assumptions we applied in the analysis, RF levels actually caused by the antennas will be significantly lower than the calculation results here indicate.

Certification

It is the policy of Pinnacle Telecom Group that all FCC RF compliance assessments are reviewed, approved, and signed by the firm's Chief Technical Officer who certifies as follows:

1. I have read and fully understand the FCC regulations concerning RF safety and the control of human exposure to RF fields (47 CFR 1.1301 *et seq*).
2. To the best of my knowledge, the statements and information disclosed in this report are true, complete and accurate.
3. The analysis of site RF compliance provided herein is consistent with the applicable FCC regulations, additional guidelines issued by the FCC, and industry practice.
4. The results of the analysis indicate that the subject antenna operations will be in compliance with the FCC regulations concerning the control of potential human exposure to the RF emissions from antennas.



Daniel J. Collins
Chief Technical Officer
Pinnacle Telecom Group, LLC

01/16/23
Date

Appendix A. Documents Used to Prepare the Analysis

RFDS: RFDS-NJJER02057A-Final-20230113-v.0_20230113145513

CD: NJJER02057A_FinalStampedCDs_20230109073742

Appendix B. Background on the FCC MPE Limit

As directed by the Telecommunications Act of 1996, the FCC has established limits for maximum continuous human exposure to RF fields.

The FCC maximum permissible exposure (MPE) limits represent the consensus of federal agencies and independent experts responsible for RF safety matters. Those agencies include the National Council on Radiation Protection and Measurements (NCRP), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), the American National Standards Institute (ANSI), the Environmental Protection Agency (EPA), and the Food and Drug Administration (FDA). In formulating its guidelines, the FCC also considered input from the public and technical community – notably the Institute of Electrical and Electronics Engineers (IEEE).

The FCC's RF exposure guidelines are incorporated in Section 1.301 *et seq* of its Rules and Regulations (47 CFR 1.1301-1.1310). Those guidelines specify MPE limits for both occupational and general population exposure.

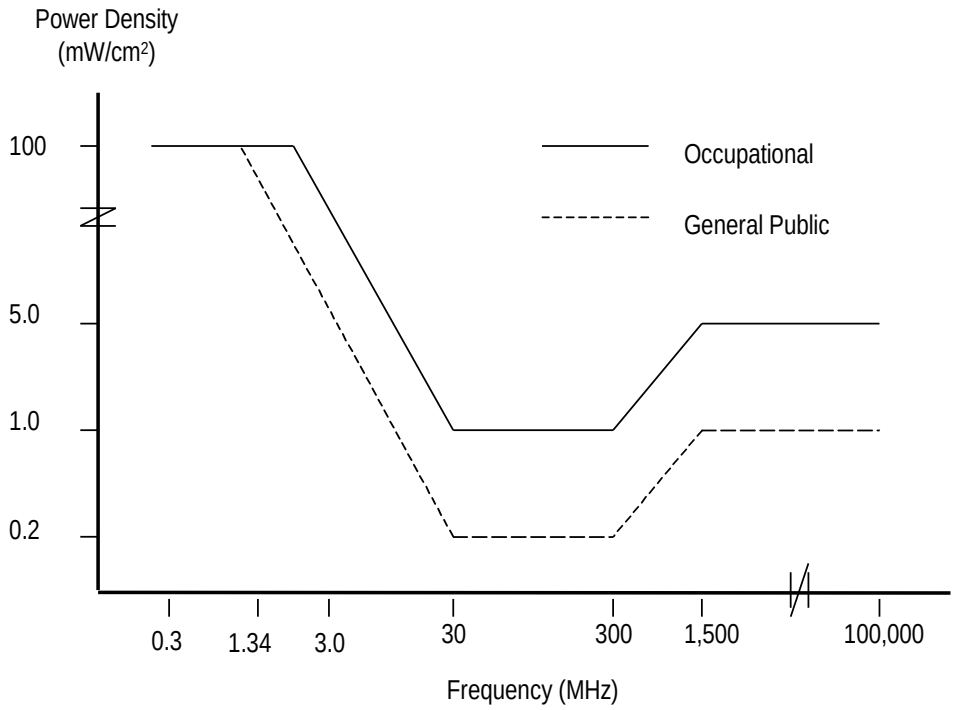
The specified continuous exposure MPE limits are based on known variation of human body susceptibility in different frequency ranges, and a Specific Absorption Rate (SAR) of 4 watts per kilogram, which is universally considered to accurately represent human capacity to dissipate incident RF energy (in the form of heat). The occupational MPE guidelines incorporate a safety factor of 10 or greater with respect to RF levels known to represent a health hazard, and an additional safety factor of five is applied to the MPE limits for general population exposure. Thus, the general population MPE limit has a built-in safety factor of more than 50. The limits were constructed to appropriately protect humans of both sexes and all ages and sizes and under all conditions – and continuous exposure at levels equal to or below the applicable MPE limits is considered to result in no adverse health effects or even health risk.

The reason for *two* tiers of MPE limits is based on an understanding and assumption that members of the general public are unlikely to have had appropriate RF safety training and may not be aware of the exposures they receive; occupational exposure in controlled environments, on the other hand, is assumed to involve individuals who have had such training, are aware of the exposures, and know how to maintain a safe personal work environment.

The FCC's RF exposure limits are expressed in two equivalent forms, using alternative units of field strength (expressed in volts per meter, or V/m), and power density (expressed in milliwatts per square centimeter, or mW/cm^2). The table on the next page lists the FCC limits for both occupational and general population exposures, using the mW/cm^2 reference, for the different radio frequency ranges.

Frequency Range (F) (MHz)	Occupational Exposure (mW/cm^2)	General Public Exposure (mW/cm^2)
0.3 - 1.34	100	100
1.34 - 3.0	100	$180 / F^2$
3.0 - 30	$900 / F^2$	$180 / F^2$
30 - 300	1.0	0.2
300 - 1,500	F / 300	F / 1500
1,500 - 100,000	5.0	1.0

The diagram below provides a graphical illustration of both the FCC's occupational and general population MPE limits.



Because the FCC's RF exposure limits are frequency-shaped, the exact MPE limits applicable to the instant situation depend on the frequency range used by the systems of interest.

The most appropriate method of determining RF compliance is to calculate the RF power density attributable to a particular system and compare that to the MPE limit applicable to the operating frequency in question. The result is usually expressed as a percentage of the MPE limit.

For potential exposure from multiple systems, the respective percentages of the MPE limits are added, and the total percentage compared to 100 (percent of the limit). If the result is less than 100, the total exposure is in compliance; if it is more than 100, exposure mitigation measures are necessary to achieve compliance.

Note that the FCC "categorically excludes" all "non-building-mounted" wireless antenna operations whose mounting heights are more than 10 meters (32.8 feet) from the routine requirement to demonstrate compliance with the MPE limit, because such operations "are deemed, individually and cumulatively, to have no significant effect on the human environment". The categorical exclusion also applies to *all* point-to-point antenna operations, regardless of the type of structure they're mounted on. Note that the FCC considers any facility qualifying for the categorical exclusion to be automatically in compliance.

In addition, FCC Rules and Regulations Section 1.1307(b)(3) describes a provision known in the industry as "the 5% rule". It describes that when a specific location – like a spot on a rooftop – is subject to an overall exposure level exceeding the applicable MPE limit, operators with antennas whose MPE% contributions at the point of interest are less than 5% are exempted from the obligation otherwise shared by all operators to bring the site into compliance, and those antennas are automatically deemed by the FCC to satisfy the rooftop compliance requirement.

FCC References on RF Compliance

47 CFR, FCC Rules and Regulations, Part 1 (Practice and Procedure), Section 1.1310 (Radiofrequency radiation exposure limits).

FCC Second Memorandum Opinion and Order and Notice of Proposed Rulemaking (FCC 97-303), *In the Matter of Procedures for Reviewing Requests for Relief From State and Local Regulations Pursuant to Section 332(c)(7)(B)(v) of the Communications Act of 1934 (WT Docket 97-192), Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation (ET Docket 93-62), and Petition for Rulemaking of the Cellular Telecommunications Industry Association Concerning Amendment of the Commission's Rules to Preempt State and Local Regulation of Commercial Mobile Radio Service Transmitting Facilities*, released August 25, 1997.

FCC First Memorandum Opinion and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released December 24, 1996.

FCC Report and Order, ET Docket 93-62, *In the Matter of Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation*, released August 1, 1996.

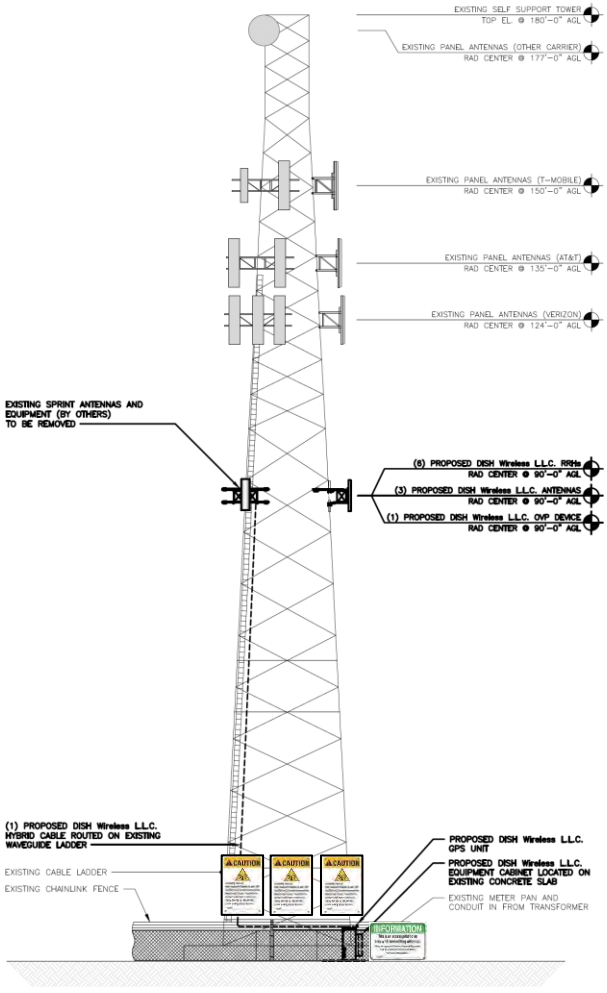
FCC Report and Order, Notice of Proposed Rulemaking, Memorandum Opinion and Order (FCC 19-126), *Proposed Changes in the Commission's Rules Regarding Human Exposure to Radiofrequency Electromagnetic Fields; Reassessment of Federal Communications Commission Radiofrequency Exposure Limits and Policies,* released December 4, 2019.

FCC Office of Engineering and Technology (OET) Bulletin 65, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, Edition 97-01, August 1997.

FCC Office of Engineering and Technology (OET) Bulletin 56, “Questions and Answers About Biological Effects and Potential Hazards of RF Radiation”, edition 4, August 1999.

Appendix C. Proposed Signage

Final Compliance Configuration							
	GUIDELINES	NOTICE	CAUTION	WARNING	NOC INFO	BARRIER/MARKER	
Access Point(s)	0	0	0	0	1	0	
Alpha	0	0	1	0	0	0	
Beta	0	0	1	0	0	0	
Gamma	0	0	1	0	0	0	



Appendix D. Summary of Expert Qualifications

Daniel J. Collins, Chief Technical Officer, Pinnacle Telecom Group, LLC

Synopsis:	• 40+ years of experience in all aspects of wireless system engineering, related regulation, and RF exposure • Has performed or led RF exposure compliance assessments on more than 20,000 antenna sites since the latest FCC regulations went into effect in 1997 • Has provided testimony as an RF compliance expert more than 1,500 times since 1997 • Have been accepted as an FCC compliance expert in New York, New Jersey, Connecticut, Pennsylvania and more than 40 other states, as well as by the FCC
Education:	• B.E.E., City College of New York (Sch. Of Eng.), 1971 • M.B.A., 1982, Fairleigh Dickinson University, 1982 • Bronx High School of Science, 1966
Current Responsibilities:	• Leads all PTG staff work involving RF safety and FCC compliance, microwave and satellite system engineering, and consulting on wireless technology and regulation
Prior Experience:	• Edwards & Kelcey, VP – RF Engineering and Chief Information Technology Officer, 1996-99 • Bellcore (a Bell Labs offshoot after AT&T's 1984 divestiture), Executive Director – Regulation and Public Policy, 1983-96 • AT&T (Corp. HQ), Division Manager – RF Engineering, and Director – Radio Spectrum Management, 1977-83 • AT&T Long Lines, Group Supervisor – Microwave Radio System Design, 1972-77
Specific RF Safety / Compliance Experience:	• Involved in RF exposure matters since 1972 • Have had lead corporate responsibility for RF safety and compliance at AT&T, Bellcore, Edwards & Kelcey, and PTG • While at AT&T, helped develop the mathematical models for calculating RF exposure levels • Have been relied on for compliance by all major wireless carriers, as well as by the federal government, several state and local governments, equipment manufacturers, system integrators, and other consulting / engineering firms
Other Background:	• Author, *Microwave System Engineering* (AT&T, 1974) • Co-author and executive editor, *A Guide to New Technologies and Services* (Bellcore, 1993) • National Spectrum Management Association (NSMA) – former three-term President and Chairman of the Board of Directors; was founding member, twice-elected Vice President, long-time member of the Board, and was named an NSMA Fellow in 1991 • Have published more than 35 articles in industry magazines

MK DEVELOPMENT

EXHIBIT G

Proof of Notification

February 02, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 771136469948

Delivery Information:

Status:	Delivered	**Delivered To:**	Receptionist/Front Desk
Signed for by:	H.HELEN	**Delivery Location:**	3 PRIMROSE ST
Service type:	FedEx 2Day		
Special Handling:	Deliver Weekday; Adult Signature Required		NEWTOWN, CT, 06470
		Delivery date:	Jan 30, 2023 11:40

Shipping Information:

Tracking number:	771136469948	**Ship Date:**	Jan 26, 2023
		Weight:	2.0 LB/0.91 KG

Recipient:
Dennis Bloom, Newtown Planning Department
3 Primrose Street
NEWTOWN, CT, US, 06470

Shipper:
Michael Jones,
140 Beach 137th Street
ROCKAWAY PARK, NY, US, 11694

Purchase Order NJJER02057A

Thank you for choosing FedEx

February 02, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 771136397110

Delivery Information:

Status:	Delivered	**Delivered To:**	Shipping/Receiving
Signed for by:	J.POELTL	**Delivery Location:**	3 PRIMROSE ST
Service type:	FedEx 2Day		
Special Handling:	Deliver Weekday; Adult Signature Required		NEWTOWN, CT, 06470
		Delivery date:	Jan 30, 2023 09:55

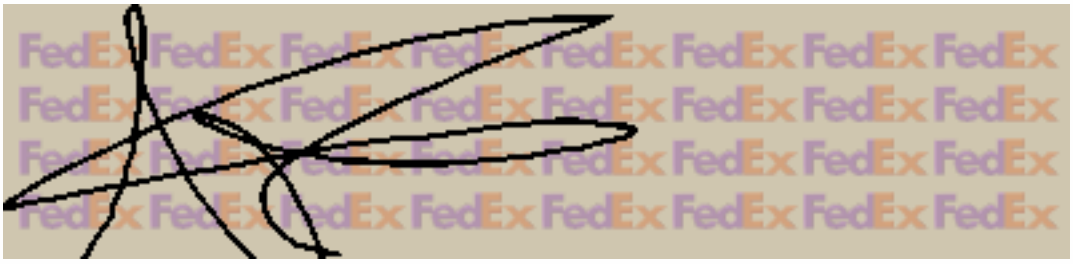
Shipping Information:

Tracking number:	771136397110	**Ship Date:**	Jan 26, 2023
		Weight:	3.0 LB/1.36 KG

Recipient:
John Poeltl, Newtown Building Department
3 Primrose Street
NEWTOWN, CT, US, 06470

Shipper:
Michael Jones,
140 Beach 137th Street
ROCKAWAY PARK, NY, US, 11694

Purchase Order NJJER02057A



Thank you for choosing FedEx

February 02, 2023

Dear Customer,

The following is the proof-of-delivery for tracking number: 771136511912

Delivery Information:

Status:	Delivered	**Delivered To:**	Mailroom
Signed for by:	K.HAJ	**Delivery Location:**	107 SELDEN ST
Service type:	FedEx 2Day		
Special Handling:	Deliver Weekday; Adult Signature Required		BERLIN, CT, 06037
		Delivery date:	Jan 30, 2023 10:20

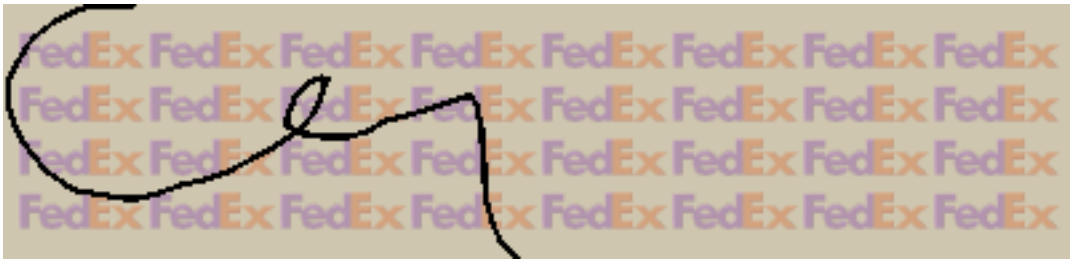
Shipping Information:

Tracking number:	771136511912	**Ship Date:**	Jan 26, 2023
		Weight:	1.0 LB/0.45 KG

Recipient:
Steve Florio, Eversource
107 Selden Street
BERLIN, CT, US, 06037

Shipper:
Michael Jones,
140 Beach 137th Street
ROCKAWAY PARK, NY, US, 11694

Purchase Order NJJER02057A



Thank you for choosing FedEx