NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

Northeast Site Solutions
Denise Sabo
4 Angela's Way, Burlington CT 06013
203-435-3640
denise@northeastsitesolutions.com

May 13, 2022

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

RE: Tower Share Application
63 Industrial Park Road, Putnam, CT 06260
Latitude: 41.897222
Longitude: -71.892222
Site #: CT00802-S_BOBOS00043A_SBA_DISH

Dear Ms. Bachman:

This letter and attachments are submitted on behalf of Dish Wireless LLC. Dish Wireless LLC plans to install antennas and related equipment to the tower site located at 63 Industrial Park Road, Putnam, Connecticut.

Dish Wireless LLC proposes to install three (3) 600/1900 MHz 5G antennas and six (6) RRUs, at the 166-foot level of the existing 196-foot self-support tower, one (1) Fiber cable will also be installed. Dish Wireless LLC equipment cabinets will be placed within a 7' x 5' lease area within the fenced compound. Included are plans by B+T, dated January 5, 2022, Exhibit C. Also included is a structural analysis prepared by TES, dated November 22, 2021, confirming that the existing tower is structurally capable of supporting the proposed equipment. Attached as Exhibit D. The facility was approved by the Town of Putnam on May 16, 2002. Please see attached Exhibit A.

Please accept this letter as notification pursuant to Regulations of Connecticut State Agencies 16-50aa, of Dish Wireless LLC intent to share a telecommunications facility pursuant to R.C.S.A. 16-50j-88. In accordance with R.C.S.A., a copy of this letter is being sent to Mayor Barney Seney and Bruce Fitzback, Land Use Agent for the Town of Putnam, as well as the tower owner (SBA) and property owner (DMW Putnam LLC).

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

1. The proposed modification will not result in an increase in the height of the existing structure. The top of the existing tower is 196-feet and the Dish Wireless LLC antennas will be located at a center line height of 166-feet.

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

NORTHEAST SITE SOLUTIONS
Turnkey Wireless Development

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. The combined site operations will result in a total power density of 11.03% as evidenced by Exhibit F.

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

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

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

C. Environmental Feasibility. The proposed shared use of this facility would have a minimal environmental impact. The installation of Dish Wireless LLC equipment at the 166-foot level of the existing 196-foot tower would have an insignificant visual impact on the area around the tower. Dish Wireless LLC ground equipment would be installed within the existing facility compound. Dish Wireless LLC shared use would therefore not cause any significant alteration in the physical or environmental characteristics of the existing site. Additionally, as evidenced by Exhibit F, the proposed antennas would not increase radio frequency emissions to a level at or above the Federal Communications Commission safety standard.

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

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

Sincerely,

Denise Sabo

Denise Sabo
Mobile: 203-435-3640
Fax: 413-521-0558
Office: 4 Angela's Way, Burlington CT 06013
Email: denise@northeastsitesolutions.com

NORTHEAST SITE SOLUTIONS

Turnkey Wireless Development

Attachments

Cc: Mayor Barney Seney
Town of Putnam
200 School Street
Putnam, CT 06260

Bruce Fitzback, Land Use Agent
Town of Putnam
200 School Street
Putnam, CT 06260

DMW Putnam LLC – Property Owner
643 Manley Street
West Bridgewater, MA 02379

SBA - Tower Owner

Exhibit A

Original Facility Approval

DATE: 5/16/2002

6262
BP

TOWN OF PUTNAM
126 CHURCH STREET • PUTNAM, CT 06260
DEPARTMENT OF BUILDING INSPECTION
APPLICATION FOR BUILDING PERMIT AND PLAN EXAMINATION

Acres 18

1. Location of building 63 INDUSTRIAL PK RD Map 113 Lot 73 Zone I
2. Owner SBA Phone No. 860-659-9101
   Address 80 EASTERN BLVD. GLASTONBURY, CT
3. Applicant AT.T WIRELESS Phone No.
   Address 12 OMEGA DRIVE STAMFORD, CT
4. Electrical Contractor _____ Lic. # _____
5. Plumbing Contractor N/A Lic. # _____
6. Sprinkler Contractor N/A Lic. # _____
7. Heating/Cooling Contractor N/A Lic. # _____
8. Arch./Engineer NATCOMM LLC # 203-488-0580
9. Home Improvement/General Contractor SBA Lic. # _____

OFFICE USE:

A Certificate of Zoning Compliance shall be required prior to any of the following:
CHECK ONE:
_____ a. Use and occupancy of any building or other structure hereafter erected or altered.
_____ b. Change in use of any building or structure.
_____ c. Use of land or change in the use thereof except cultivation of vacant land.
_____ d. Change in use or extension of a nonconforming use.

10. Type of Improvement CONSTRUCTION OF A 7'X16' LEASE AREA W/AT&T RADIO CABINETS ON A CONCRETE PAD W/ICE BRIDGE. POSTS DIRECTIONAL PANEL ANTENNAS ON AN EXISTING MONOBILE
11. Proposed Use WIRELESS COMMUNICATION FACILITY
    Two or more family—number of units N/A

Floor area 1st floor _____ 2nd floor _____ Total

RECEIVED
JUN 18 2002
ASSESSOR'S OFFICE
TOWN OF PUTNAM, CT

Type of heat: Hot Water ☐ Hot Air ☐ Steam ☐ Electric ☐ Wood ☐

Type of work: Original ☐ Alteration ☐ Addition ☐ Repair ☐ Demolish ☐

Approvals: Septic Perc ☐ Wetlands ☐ Driveway ☐ Fire Marshal ☐ Planning ☐

12. Type of Sewage: Private _____ Public _____ Number of Bedrooms _____
13. Type of Water Supply: Private _____ Public _____
14. Principal Type of Frame: Wood _____ Concrete _____ Steel _____ Other _____

OFFICE USE:

Inspections:
Excavation _____ Elec. Service _____ Heating _____
Foundation _____ Chimney _____ Insulation _____
Framing, Plumbing, Electric _____ Final _____
Comments: _____

OFFICE USE:

ZONING COMPLIANCE 100

_____
_____
_____
_____

Robert Parker 5/16/02
Approved Date

FEES:

Zoning: $ _____
State $ _____
Building sq. ft. _____ x _____ cost
30,000 x .0075 = _____ fee
Minimum Permit Fee $10.00 229.80 TOTAL DUE

PD
Ck # 7841

The owner of this building and the undersigned agree to conform to the State of Connecticut Basic Building Code and the laws of this jurisdiction and to notify the Building Official of any changes in plans for which this permit is requested.

Jason Pulot
Signature of Applicant Date

Exhibit B

Property Card

Property Location: 63 INDUSTRIAL PARK RD | **MAP ID:** 038/ / 087/ 000/ | **Bldg Name:** | **State Use:** 3-1

Vision ID: 3164 | **Account #** 000013 | **Bldg #:** 1 of 1 | **Sec #:** 1 of 1 | **Card** 1 of 1 | **Print Date:** 12/05/2019 11:55

CURRENT OWNER

DMW PUTNAM LLC

643 MANLEY STREET

WEST BRIDGEWATER, MA 02379

Additional Owners:

TOPO.	UTILITIES	STRT./ROAD	LOCATION

SUPPLEMENTAL DATA

Other ID:	113/073-00	L.O.	X
Survey		I/E	M
Traffic	Light	NBHD Group	
Census	9032	NHBD	Town
District	2	Unsold Code	
Class	Warehouse-Storage		
GIS ID:	038-087	*ASSOC PID#*	

CURRENT ASSESSMENT

Description	Code	Appraised Value	Assessed Value
IND.	300	198,000	138,600
IND.	300	121,000	84,700
IND.	300	145,700	102,000
	Total	464,700	325,300

6116
PUTNAM, CT

VISION

RECORD OF OWNERSHIP

	BK-VOL/PAGE	SALE DATE	q/u	v/i	SALE PRICE	V.C.
DMW PUTNAM LLC	791/ 090	10/19/2016	U	I	200,000	14
PUTNAM FINANCIAL ASSOCIATES LLC	738/ 012	04/09/2014	U	I	0	11
PUTNAM PARK ASSOCIATES LLC	0310/0159	07/17/1997	U	I	170,000	

PREVIOUS ASSESSMENTS (HISTORY)

Yr.	Code	Assessed Value	Yr.	Code	Assessed Value	Yr.	Code	Assessed Value
2019	300	138,600	2018	300	97,600	2017	300	97,600
2019	300	84,700	2018	300	117,600	2017	300	117,600
2019	300	102,000	2018	300	100,200	2017	300	100,200
	Total:	325,300		*Total:*	315,400		*Total:*	315,400

EXEMPTIONS

Year	Type	Description	Amount
		Total:	

OTHER ASSESSMENTS

Code	Description	Number	Amount	Comm. Int.

This signature acknowledges a visit by a Data Collector or Assessor

APPRAISED VALUE SUMMARY

Appraised Bldg. Value (Card)	324,300
Appraised XF (B) Value (Bldg)	3,400
Appraised OB (L) Value (Bldg)	145,700
Appraised Land Value (Bldg)	121,000
Special Land Value	0
Total Appraised Parcel Value	464,700
Valuation Method:	I
Adjustment:	0
Net Total Appraised Parcel Value	464,700

ASSESSING NEIGHBORHOOD

NBHD/ SUB	NBHD Name	Street Index Name	Tracing	Batch
0001/A			2014	DM3

NOTES

M&M TRUCKING

SBA CELL TOWER LOCATED

ON PROPERTY

BP11212 VERIZON CELL TOWER REPLACEMENTS

AQUIFER PROTECTION AREA REG # 2012-01

'16BP10375 ELEC. WORK

BP10228 ELECTRICAL

BP11568 ELECTRICAL WORK

BP11900 MODIFY EXISTING ATT FACILITY

BUILDING PERMIT RECORD

Permit ID	Issue Date	Type	Description	Amount	Insp. Date	% Comp.	Date Comp.	Comments
10178		CM	Commercial	70,000		100		WIRELESS ANTENNAS
10424	06/07/2016	CM	Commercial	128,000		100		DEMO EXIST. WALL, M
10016	06/25/2015	CM	Commercial	25,000		100		ADD ANTENNAS & SIT
9200	11/07/2012	CM	Commercial	25,000		100		SITE MODIFICATIONS
8147	10/10/2008	CM	Commercial	0	10/08/2009	100	10/08/2009	FRAME GARAGE DOO
7026	03/16/2005	CM	Commercial	0	11/15/2005	100	09/22/2006	Interior demolition. pern
2002-20	07/15/2002	4		0		100		CO

VISIT/ CHANGE HISTORY

Date	Type	IS	ID	Cd.	Purpose/Result
01/11/2017			AS	57	HOUSE PERMIT
12/09/2014			GG	41	Hearing Change
07/11/2013			DB	02	2nd List Attempt
06/19/2013			DB	99	VACANT
09/17/2008			SS	57	HOUSE PERMIT

LAND LINE VALUATION SECTION

B #	Use Code	Use Description	Zone	D	Front	Depth	Units		Unit Price	I. Factor	S.A.	Acre Disc	C. Factor	ST. Idx	Adj.	Notes- Adj	Special Pricing		S Adj Fact	Adj. Unit Price	Land Value
1	3-1	Industrial	I				2.39	AC	75,000.00	1.0000	5	1.0000	0.75	2	0.90	SHAPE/SIZE			1.00	50,625.00	121,000

Total Card Land Units: 2.39 AC | **Parcel Total Land Area:** 2.39 AC | **Total Land Value:** 121,000

Property Location: 63 INDUSTRIAL PARK RD **MAP ID:** 038/ / 087/ 000/ **Bldg Name:** **State Use:** 3-1

Vision ID: 3164 **Account #** 000013 **Bldg #:** 1 of 1 **Sec #:** 1 of 1 **Card** 1 of 1 **Print Date:** 12/05/2019 11:55

CONSTRUCTION DETAIL

Element	Cd.	Ch.	Description
Style	48		Warehouse
Model	96		Ind/Comm
Grade	11		C
Stories	1		
Occupancy	1		
Exterior Wall 1	27		Pre-finsh Metl
Exterior Wall 2			
Roof Structure	03		Gable
Roof Cover	09		Enamel Metal
Interior Wall 1	01		Minim/Masonry
Interior Wall 2			
Interior Floor 1	03		Concrete
Interior Floor 2			
Heating Fuel	03		Gas
Heating Type	04		Forced Air-Duc
AC Type	01		None
Bldg Use	3-1		Industrial
Total Rooms			
Total Bedrms	00		
Total Baths	2		
Extra Fixtur			
Heat/AC	02		Heat/AC Split
Frame Type	05		Steel
Baths/Plumbing	02		Average
Ceiling/Wall	03		Susp-Ceil/Mn W
Rooms/Prtns	02		Average
Wall Height	14		
% Comn Wall			

CONSTRUCTION DETAIL (CONTINUED)

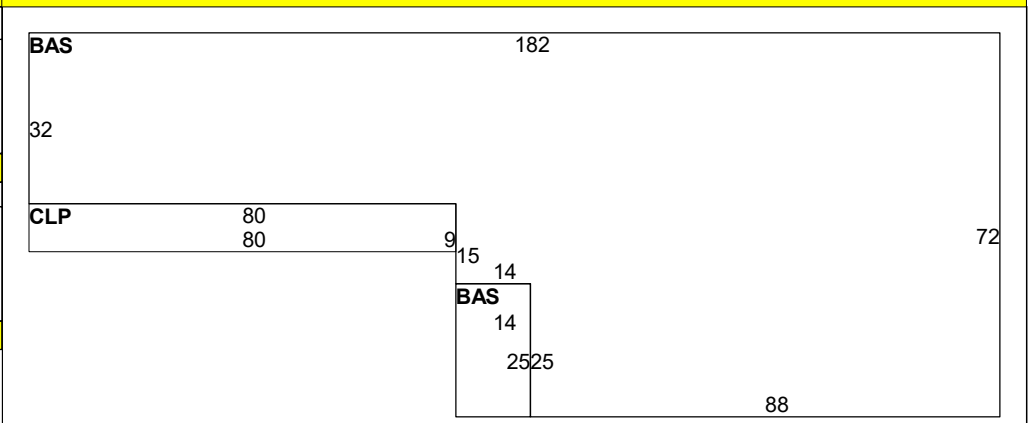
Element	Cd.	Ch.	Description

MIXED USE

Code	Description	Percentage
3-1	Industrial	100

COST/MARKET VALUATION

Adj. Base Rate:	43.30
	438,196
Net Other Adj:	0.00
Replace Cost	438,196
AYB	1956
EYB	1993
Dep Code	A
Remodel Rating	
Year Remodeled	
Dep %	26
Functional Obslnc	0
External Obslnc	0
Cost Trend Factor	1
Condition	
% Complete	
Overall % Cond	74
Apprais Val	324,300
Dep % Ovr	0
Dep Ovr Comment	
Misc Imp Ovr	0
Misc Imp Ovr Comment	
Cost to Cure Ovr	0
Cost to Cure Ovr Comment	



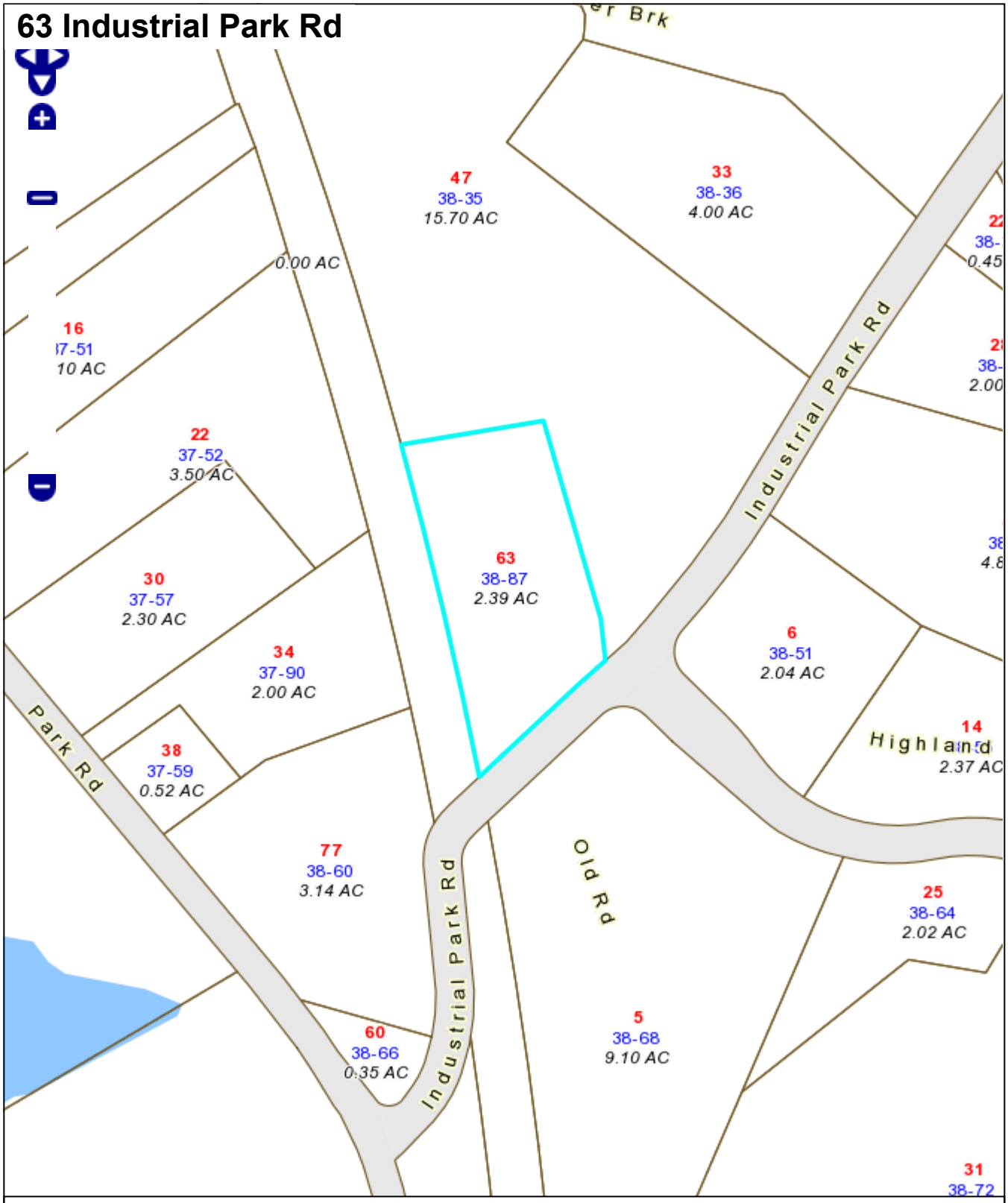
OB-OUTBUILDING & YARD ITEMS(L) / XF-BUILDING EXTRA FEATURES(B)

Code	Description	Sub	Sub Descript	L/B	Units	Unit Price	Yr	Gde	Dp Rt	Cnd	%Cnd	Apr Value
PAV2	Paving Cement			L	10,000	4.50	1999	C		E	90	40,500
TWR1	Cell Tower			L	1	200,000.00	1999	C		A	50	100,000
FN4	Fence 8'			L	360	29.00	1999	C		A	50	5,200
OVD	Overhead Door			B	456	10.00	1993		1		100	3,400

BUILDING SUB-AREA SUMMARY SECTION

Code	Description	Living Area	Gross Area	Eff. Area	Unit Cost	Undeprec. Value
BAS	First Floor	9,904	9,904		43.30	428,843
CLP	Loading Platform Covered	0	720		12.99	9,353
	Ttl. Gross Liv/Lease Area:	9,904	10,624			438,196

63 Industrial Park Rd



Town of Putnam, Connecticut

50 m
200 ft

N

MainStreetMaps
MainStreetGIS, LLC
www.mainstreetgis.com

Selected Parcel: 63 INDUSTRIAL PARK RD ID: 038-087

Printed on 1/14/2022

Exhibit C

Construction Drawings

DISH Wireless L.L.C. SITE ID:

BOBOS00043A

DISH Wireless L.L.C. SITE ADDRESS:

63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

CONNECTICUT CODE OF COMPLIANCE

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

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

SHEET INDEX

SCOPE OF WORK

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

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

GROUND SCOPE OF WORK:
- INSTALL (1) PROPOSED METAL PLATFORM
- INSTALL (1) PROPOSED ICE BRIDGE
- INSTALL (1) PROPOSED PPC CABINET
- INSTALL (1) PROPOSED EQUIPMENT CABINET
- INSTALL (1) PROPOSED POWER CONDUIT
- INSTALL (1) PROPOSED TELCO CONDUIT
- INSTALL (1) PROPOSED TELCO-FIBER BOX
- INSTALL (1) PROPOSED GPS UNIT
- INSTALL (1) PROPOSED 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

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:	DMW PUTNAM LLC
ADDRESS:	643 MANLEY STREET WEST BRIDGEWATER, MA 02379
TOWER TYPE:	SELF-SUPPORT TOWER
TOWER CO SITE ID:	CT00802-S
TOWER APP NUMBER:	177006
COUNTY:	WINDHAM
LATITUDE (NAD 83):	41° 53' 49.71" N 41.897141
LONGITUDE (NAD 83):	71° 53' 32.09" W -71.892247
ZONING JURISDICTION:	WINDHAM COUNTY
ZONING DISTRICT:	I
PARCEL NUMBER:	038-087
OCCUPANCY GROUP:	U
CONSTRUCTION TYPE:	II-B
POWER COMPANY:	EVERSOURCE
TELEPHONE COMPANY:	AT&T

PROJECT DIRECTORY

APPLICANT:	DISH Wireless L.L.C. 5701 SOUTH SANTA FE DRIVE LITTLETON, CO 80120
TOWER OWNER:	SBA COMMUNICATAIONS CORP. 8051 CONGRESS AVENUE BOCA RATON, FL 33487 (800) 487-7483
SITE DESIGNER:	B+T GROUP 1717 S. BOULDER AVE, SUITE 300 TULSA, OK 74119 (918) 587-4630
SITE ACQUISITION:	DAVE EVANS devans@sbasite.com
CONST. MANAGER:	CHAD WILCOX chad.wilcox@dish.com
RF ENGINEER:	ARVIN SEBASTIAN arvin.sebastian@dish.com

DIRECTIONS

DIRECTIONS FROM RHODE ISLAND T.F. GREEN INTERNATIONAL AIRPORT:

HEAD SOUTHWEST TOWARD WARWICK INDUSTRIAL DR, RESTRICTED USAGE ROAD, TAKE I-295 N, US-6 W AND HARTFORD PIKE TO CHESTNUT HILL RD IN KILLINGLY, TURN RIGHT ONTO WARWICK INDUSTRIAL DR, TURN RIGHT ONTO MAIN AVE, CONTINUE ONTO EAST AVE, TURN RIGHT ONTO BALD HILL RD, PASS BY ON THE BORDER MEXICAN GRILL & CANTINA , SLIGHT RIGHT ONTO THE INTERSTATE 295 N RAMP, MERGE WITH I-295 N, TAKE EXIT 9 FOR US-6 E TOWARD PROVIDENCE, KEEP LEFT AT THE Y JUNCTION TO CONTINUE TOWARD US-6 W, KEEP LEFT AT THE Y JUNCTION TO CONTINUE TOWARD US-6 W, KEEP RIGHT TO CONTINUE ON EXIT 9C, FOLLOW SIGNS FOR US-6 W AND MERGE WITH US-6 W, CONTINUE STRAIGHT TO STAY ON US-6 W, CONTINUE STRAIGHT ONTO RI-101 W/HARTFORD PIKE, CONTINUE TO FOLLOW HARTFORD PIKE, ENTERING CONNECTICUT, CONTINUE ON CHESTNUT HILL RD TO CT-21 N, TURN RIGHT ONTO CHESTNUT HILL RD, SLIGHT LEFT ONTO WARE RD, CONTINUE ON CT-21 N. DRIVE TO HERITAGE RD IN PUTNAM, TURN RIGHT ONTO CT-21 N, TURN LEFT ONTO HERITAGE RD AND ARRIVE AT BOBOS00043A.

VICINITY MAP

NO SCALE

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD WILCOX
No. 23924
LICENSED
PROFESSIONAL ENGINEER

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

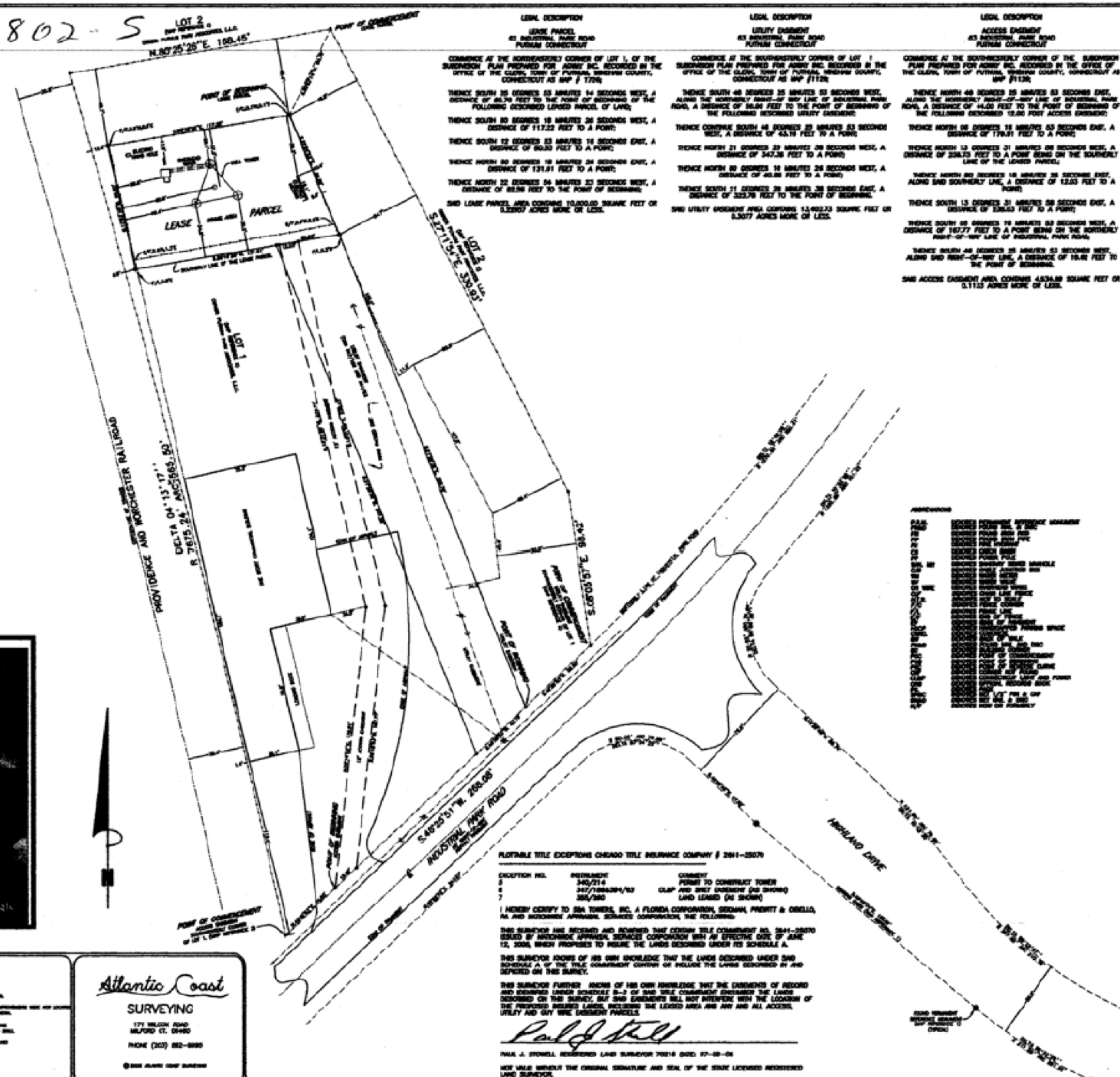
TITLE SHEET

SHEET NUMBER

T-1

CT00802-S

IMPROVEMENT LOCATION SURVEY AND EASEMENT MAP
63 INDUSTRIAL PARK ROAD
PUTNAM, CT
PREPARED FOR
SBA TOWERS INC.



NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTION 20-300b-1 THROUGH 20-300b-20 AND THE STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996;

THIS SURVEY CONFORMS TO A CLASS A-2 HORIZONTAL ACCURACY

SURVEY TYPE: IMPROVEMENT LOCATION SURVEY AND EASEMENT MAP

BOUNDARY DETERMINATION CATEGORY:
RESURVEY

THE BOUNDARY LINES INDICATED HEREON REFLECT THE INFORMATION CONTAINED IN THE BELOW NAMED MAP REFERENCES. NO CORNERS WERE FOUND RELATING TO MAP REFERENCE 2. THE GEOMETRY FOR THIS SURVEY HAS BEEN RUN IN FROM THE PERMANENT REFERENCE MONUMENTS FOUND IN MAP REFERENCE 1 AND THE BEARINGS INDICATED HEREON ARE BASED ON SAID MAP REFERENCE.

PROPERTY OWNER: PUTNAM PARK ASSOCIATES, L.L.C.

LEASE PARCEL, ACCESS EASEMENT AND UTILITY EASEMENT ARE A PORTION OF LOT 1 AS SHOWN ON MAP REFERENCE 2.

MAP REFERENCES:
1. RESUBDIVISION PLAN PREPARED FOR THE TOWN OF PUTNAM ECONOMIC DEVELOPMENT COMMISSION, ON FILE IN THE OFFICE OF THE CLERK AS MAP NUMBER 905.

2. SUBDIVISION PLAN PREPARED FOR AGWAY, INC. ON FILE IN THE OFFICE OF THE CLERK AS MAP NUMBERS 1126 AND 1127.

3. MAP SHOWING PROPERTY AND RIGHT ACQUIRED BY THE TOWN OF PUTNAM FROM ABRAHAM SACK REALTY. ON FILE IN THE OFFICE OF THE CLERK AS MAP NUMBER 811.

4. MAP SHOWING PROPERTY AND RIGHTS ACQUIRED BY THE TOWN OF PUTNAM FROM EASTERN FARMER EXCHANGE INC. ON FILE IN THE OFFICE OF THE CLERK AS MAP NUMBER 814.

GENERAL NOTES

1. FIELD SURVEY DATE: 7-6-06
2. VERTICAL DATUM: NAVD 88
3. HORIZONTAL DATUM: NAD 83
4. TOWER COORDINATES
   - LATITUDE 41 DEGREES 53 MINUTES 49.71 SECONDS
   - LONGITUDE 71 DEGREES 53 MINUTES 32.04" SECONDS
   - ELEVATION 285.0 FEET
   - HEIGHT OF TOWER 190'
   - HEIGHT OF SPIRE ON TOWER 190'
5. PROPERTY OWNER: PUTNAM PARK ASSOCIATES L.L.C.
6. SITE NAME PUTNAM FREIGHT
7. SITE NUMBER CT00802 S
8. SITE ADDRESS 63 INDUSTRIAL PARK ROAD PUTNAM, CT
9. JURISDICTION TOWN OF PUTNAM WINDHAM COUNTY, CT
10. THE MAJOR IMPROVEMENTS ON THIS PROPERTY AREA NOT LOCATED WITHIN THE 100 YEAR FLOOD HAZARD AREA AS SHOWN ON THE FIRM MAP FOR THE TOWN OF PUTNAM, COMMUNITY PANEL NO. 090184 0004 B DATED OCTOBER 1, 1984

ZONE I (INDUSTRIAL)

ADDRESS 63 INDUSTRIAL PARK ROAD

DEED VOL. 310, PG. 159

ASSESSORS ID MAP #113, LOT #70

FLOOD ZONE X "FIRM" MAP #090184 0004 B, DATED 10-15-1984.

AREA OF LEASE PARCEL 10000 SQUARE FEET

AREA OF ACCESS EASEMENT 4638 SQUARE FEET

Scale 1" = 30'

VICINITY MAP NOT TO SCALE

LEGAL DESCRIPTION

LEASE PARCEL
63 INDUSTRIAL PARK ROAD
PUTNAM CONNECTICUT

COMMENCE AT THE NORTHEASTERLY CORNER OF LOT 1, OF THE SUBDIVISION PLAN PREPARED FOR AGWAY INC. RECORDED IN THE OFFICE OF THE CLERK, TOWN OF PUTNAM, WINDHAM COUNTY, CONNECTICUT AS MAP # 1126;

THENCE SOUTH 25 DEGREES 53 MINUTES 14 SECONDS WEST, A DISTANCE OF 46.70 FEET TO THE POINT OF BEGINNING OF THE FOLLOWING DESCRIBED LEASED PARCEL OF LAND;

THENCE SOUTH 80 DEGREES 18 MINUTES 26 SECONDS WEST, A DISTANCE OF 117.22 FEET TO A POINT;

THENCE SOUTH 12 DEGREES 53 MINUTES 14 SECONDS EAST, A DISTANCE OF 80.50 FEET TO A POINT;

THENCE NORTH 80 DEGREES 18 MINUTES 26 SECONDS EAST, A DISTANCE OF 131.81 FEET TO A POINT;

THENCE NORTH 22 DEGREES 54 MINUTES 23 SECONDS WEST, A DISTANCE OF 85.76 FEET TO THE POINT OF BEGINNING.

SAID LEASE PARCEL AREA CONTAINS 10,000.00 SQUARE FEET OR 0.22957 ACRES MORE OR LESS.

LEGAL DESCRIPTION

UTILITY EASEMENT
63 INDUSTRIAL PARK ROAD
PUTNAM CONNECTICUT

COMMENCE AT THE SOUTHEASTERLY CORNER OF LOT 1 SUBDIVISION PLAN PREPARED FOR AGWAY INC. RECORDED IN THE OFFICE OF THE CLERK, TOWN OF PUTNAM, WINDHAM COUNTY, CONNECTICUT AS MAP #1126;

THENCE SOUTH 46 DEGREES 25 MINUTES 53 SECONDS WEST, ALONG THE NORTHERLY RIGHT-OF-WAY LINE OF INDUSTRIAL PARK ROAD, A DISTANCE OF 58.04 FEET TO THE POINT OF BEGINNING OF THE FOLLOWING DESCRIBED UTILITY EASEMENT;

THENCE CONTINUE SOUTH 46 DEGREES 25 MINUTES 53 SECONDS WEST, A DISTANCE OF 43.16 FEET TO A POINT;

THENCE NORTH 21 DEGREES 29 MINUTES 38 SECONDS WEST, A DISTANCE OF 347.36 FEET TO A POINT;

THENCE NORTH 80 DEGREES 18 MINUTES 26 SECONDS WEST, A DISTANCE OF 40.86 FEET TO A POINT;

THENCE SOUTH 21 DEGREES 29 MINUTES 38 SECONDS EAST, A DISTANCE OF 323.78 FEET TO THE POINT OF BEGINNING.

SAID UTILITY EASEMENT AREA CONTAINS 13,402.73 SQUARE FEET OR 0.3077 ACRES MORE OR LESS.

LEGAL DESCRIPTION

ACCESS EASEMENT
63 INDUSTRIAL PARK ROAD
PUTNAM CONNECTICUT

COMMENCE AT THE SOUTHWESTERLY CORNER OF THE SUBDIVISION PLAN PREPARED FOR AGWAY INC. RECORDED IN THE OFFICE OF THE CLERK, TOWN OF PUTNAM, WINDHAM COUNTY, CONNECTICUT AS MAP #1126;

THENCE NORTH 46 DEGREES 25 MINUTES 53 SECONDS EAST, ALONG THE NORTHERLY RIGHT-OF-WAY LINE OF INDUSTRIAL PARK ROAD, A DISTANCE OF 14.00 FEET TO THE POINT OF BEGINNING OF THE FOLLOWING DESCRIBED 12.00 FOOT ACCESS EASEMENT;

THENCE NORTH 06 DEGREES 15 MINUTES 53 SECONDS EAST, A DISTANCE OF 179.81 FEET TO A POINT;

THENCE NORTH 13 DEGREES 31 MINUTES 58 SECONDS WEST, A DISTANCE OF 238.73 FEET TO A POINT BEING ON THE SOUTHERLY LINE OF THE LEASED PARCEL;

THENCE NORTH 80 DEGREES 18 MINUTES 26 SECONDS EAST, ALONG SAID SOUTHERLY LINE, A DISTANCE OF 12.03 FEET TO A POINT;

THENCE SOUTH 13 DEGREES 31 MINUTES 58 SECONDS EAST, A DISTANCE OF 236.03 FEET TO A POINT;

THENCE SOUTH 06 DEGREES 15 MINUTES 53 SECONDS WEST, A DISTANCE OF 167.77 FEET TO A POINT BEING ON THE NORTHERLY RIGHT-OF-WAY LINE OF INDUSTRIAL PARK ROAD;

THENCE SOUTH 46 DEGREES 25 MINUTES 53 SECONDS WEST, ALONG SAID RIGHT-OF-WAY LINE, A DISTANCE OF 18.62 FEET TO THE POINT OF BEGINNING.

SAID ACCESS EASEMENT AREA CONTAINS 4,634.88 SQUARE FEET OR 0.1133 ACRES MORE OR LESS.

PLOTTABLE TITLE EXCEPTIONS CHICAGO TITLE INSURANCE COMPANY # 2641-25070

EXCEPTION NO.	INSTRUMENT	COMMENT
5	340/214	PERMIT TO CONSTRUCT TOWER
6	347/1089&394/63	CL&P AND SNET EASEMENT (AS SHOWN)
7	355/280	LAND LEASED (AS SHOWN)

I HEREBY CERTIFY TO SBA TOWERS, INC. A FLORIDA CORPORATION, SEIDMAN, PREWITT & DIBELLO, PA AND NATIONWIDE APPRAISAL SERVICES CORPORATION, THE FOLLOWING:

THIS SURVEYOR HAS RECEIVED AND REVIEWED THAT CERTAIN TITLE COMMITMENT NO. 2641-25070 ISSUED BY NATIONWIDE APPRAISAL SERVICES CORPORATION WITH AN EFFECTIVE DATE OF JUNE 12, 2006, WHICH PROPOSES TO INSURE THE LANDS DESCRIBED UNDER ITS SCHEDULE A.

THIS SURVEYOR KNOWS OF HIS OWN KNOWLEDGE THAT THE LANDS DESCRIBED UNDER SAID SCHEDULE A OF THE TITLE COMMITMENT CONTAIN OR INCLUDE THE LANDS DESCRIBED IN AND DEPICTED ON THIS SURVEY.

THIS SURVEYOR FURTHER KNOWS OF HIS OWN KNOWLEDGE THAT THE EASEMENTS OF RECORD AND IDENTIFIED UNDER SCHEDULE B-2 OF SAID TITLE COMMITMENT ENCUMBER THE LANDS DESCRIBED ON THIS SURVEY, BUT SAID EASEMENTS WILL NOT INTERFERE WITH THE LOCATION OF THE PROPOSED INSURED LANDS, INCLUDING THE LEASED AREA AND ANY AND ALL ACCESS, UTILITY AND GUY WIRE EASEMENT PARCELS.

Paul J. Stowell

PAUL J. STOWELL REGISTERED LAND SURVEYOR 70216 DATE: 07-09-06

NOT VALID WITHOUT THE ORIGINAL SIGNATURE AND SEAL OF THE STATE LICENSED REGISTERED LAND SURVEYOR.

NOTES

NOT VALID WITHOUT THE SIGNATURE AND THE ORIGINAL EMBOSSED SEAL OF A CONNECTICUT LICENSED SURVEYOR

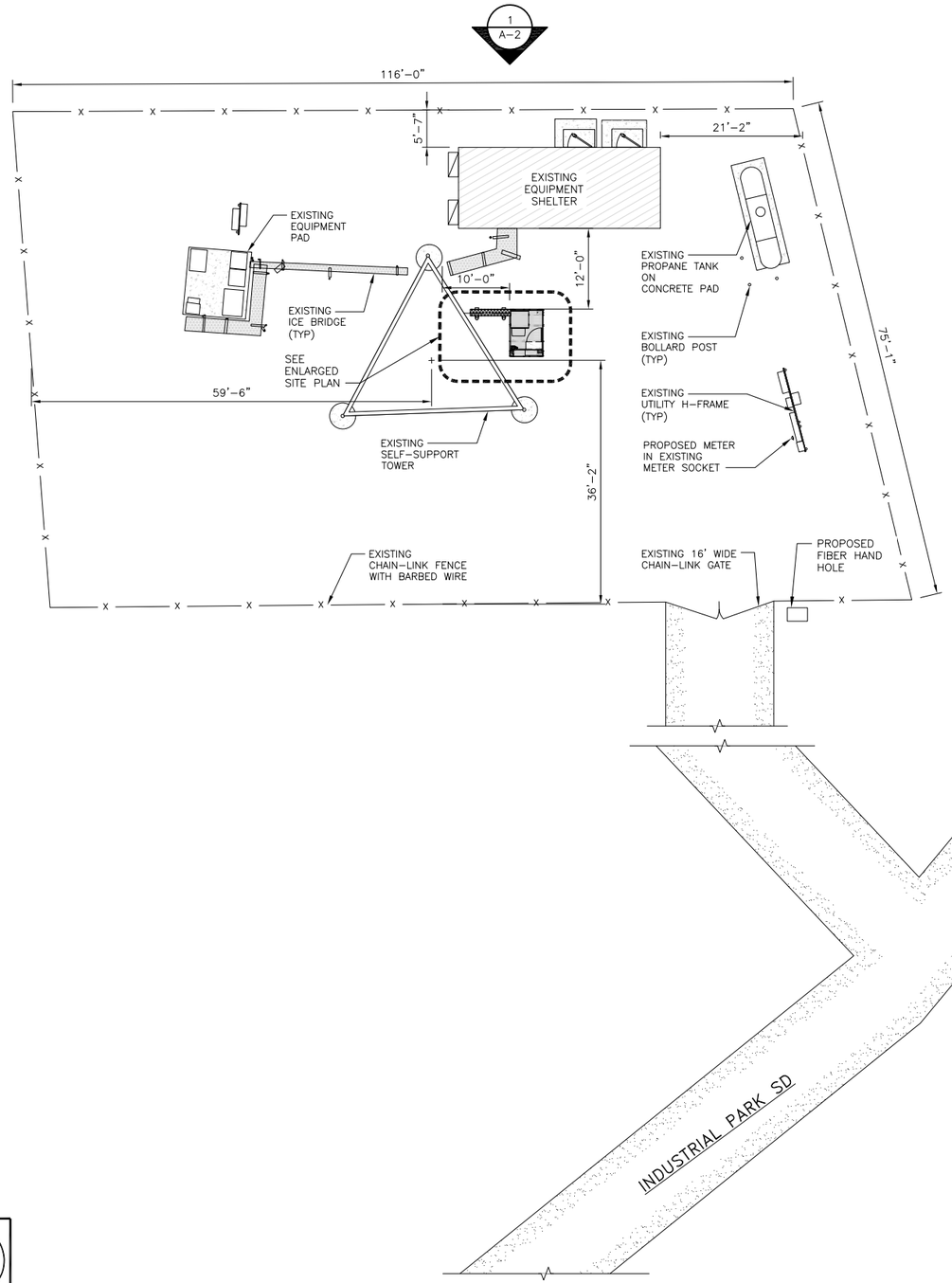
BY Paul J. Stowell DATE 7-09-06

PAUL J. STOWELL PROFESSIONAL LAND SURVEYOR CONNECTICUT LICENSE NO. 70216

Atlantic Coast
SURVEYING
171 WILCOX ROAD
MILFORD CT. 06460
PHONE (203) 882-0995

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UNDERGROUND UTILITY CONDUIT ROUTE.
2. ANTENNAS AND MOUNTS OMITTED FOR CLARITY.



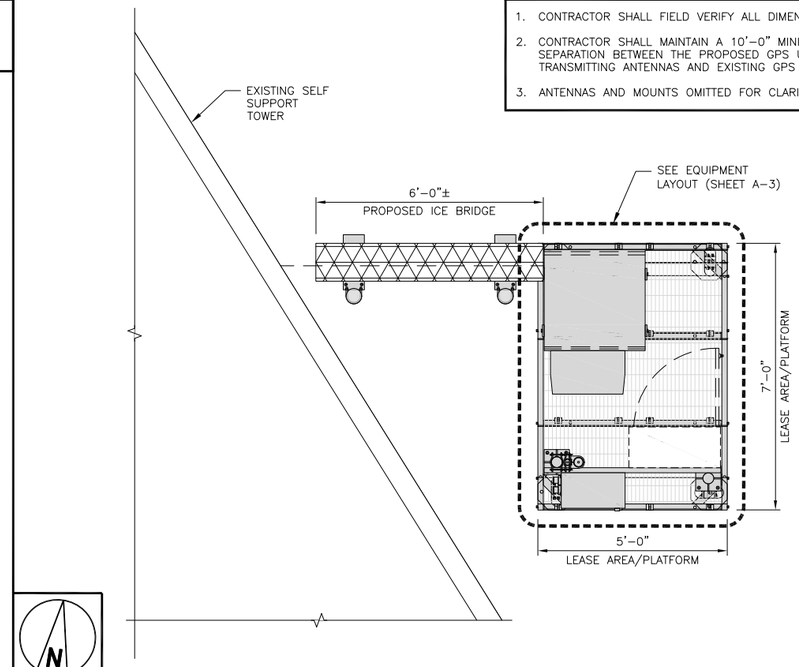
OVERALL SITE PLAN

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

1

NOTES

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



ENLARGED SITE PLAN

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

2

NOT USED

NO SCALE

3

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

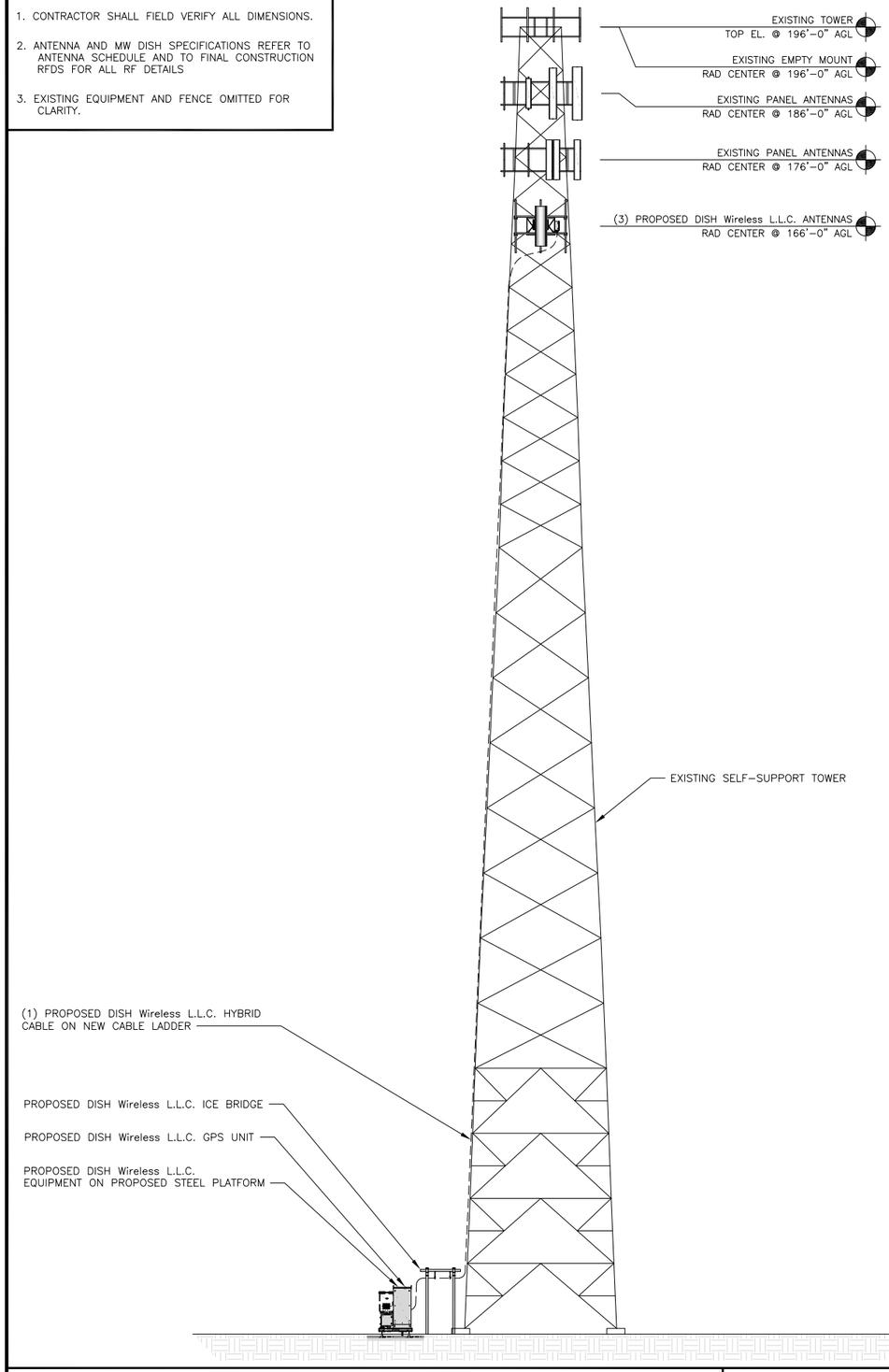
OVERALL AND ENLARGED SITE PLAN

SHEET NUMBER

A-1

NOTES

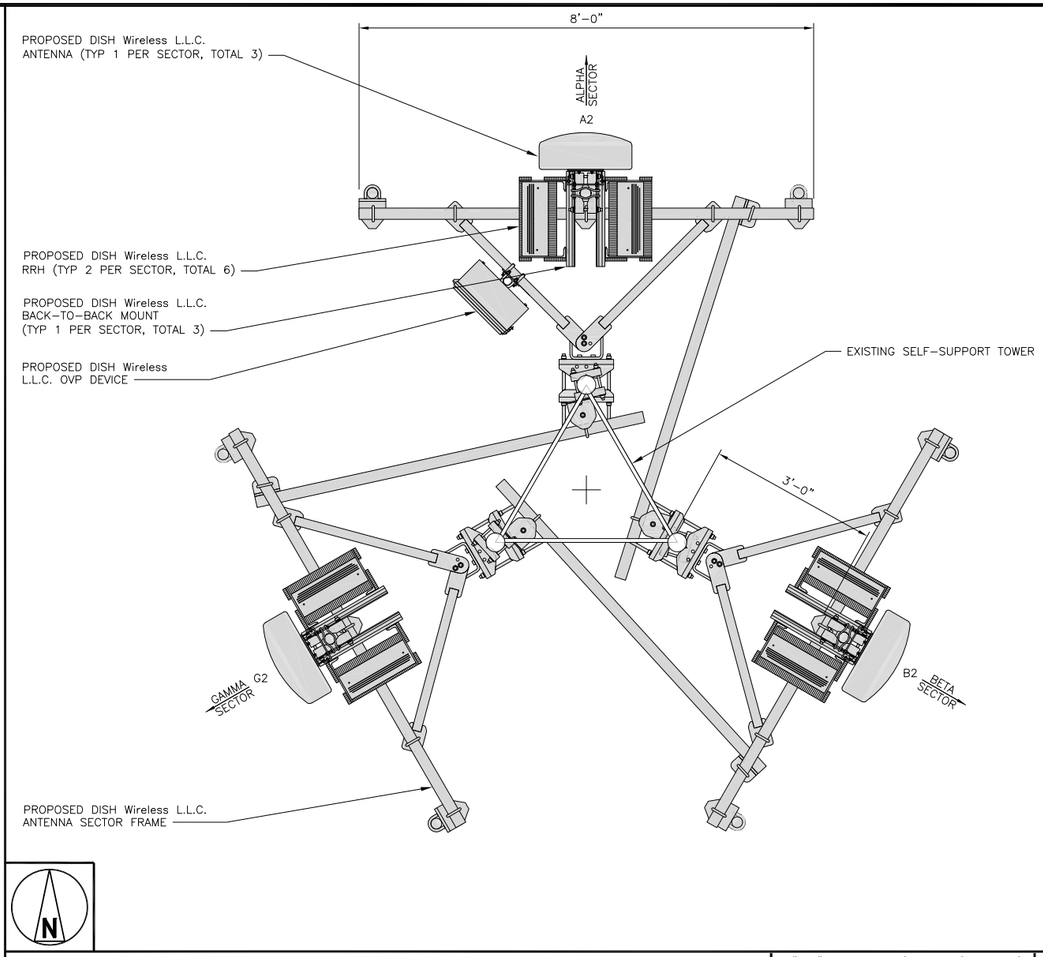
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA AND MW DISH SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS
3. EXISTING EQUIPMENT AND FENCE OMITTED FOR CLARITY.



PROPOSED NORTH ELEVATION

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

1



ANTENNA LAYOUT

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

2

SECTOR	POSITION	ANTENNA						TRANSMISSION CABLE
		EXISTING OR PROPOSED	MANUFACTURER – MODEL NUMBER	TECHNOLOGY	SIZE (HxW)	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH
ALPHA	A2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	72.0" x 19.6"	0°	166'-0"	(1) HIGH-CAPACITY HYBRID CABLE (195' LONG)
BETA	B2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	72.0" x 19.6"	120°	166'-0"	
GAMMA	G2	PROPOSED	COMMSCOPE – FFVV-65B-R2	5G	72.0" x 19.6"	240°	166'-0"	

SECTOR	POSITION	RRH	
		MANUFACTURER – MODEL NUMBER	TECHNOLOGY
ALPHA	A2	FUJITSU – TA08025-B605	5G
	A2	FUJITSU – TA08025-B604	5G
BETA	B2	FUJITSU – TA08025-B605	5G
	B2	FUJITSU – TA08025-B604	5G
GAMMA	G2	FUJITSU – TA08025-B605	5G
	G2	FUJITSU – TA08025-B604	5G

NOTES

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

ANTENNA SCHEDULE

NO SCALE

3

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

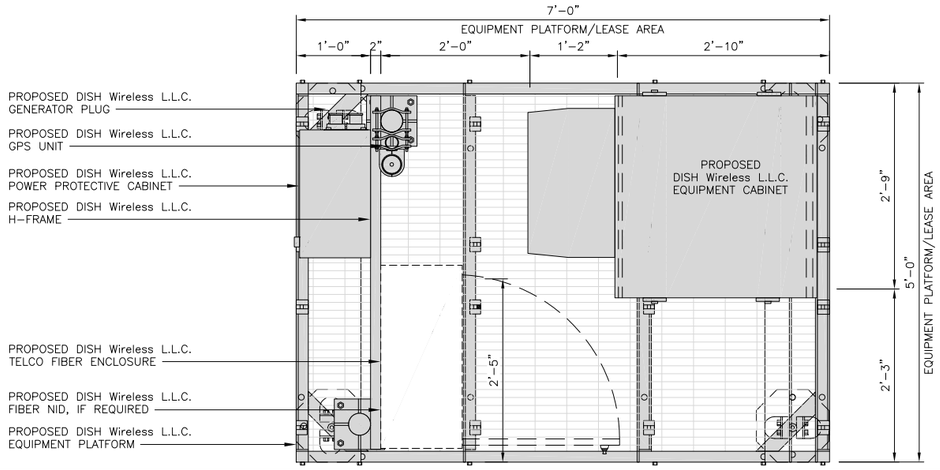
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

ELEVATION, ANTENNA LAYOUT AND SCHEDULE

SHEET NUMBER

A-2



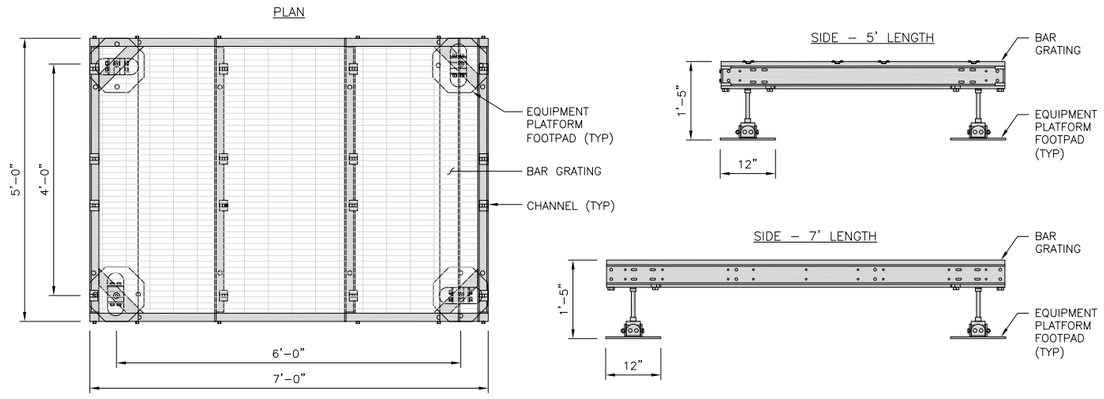
PLATFORM EQUIPMENT PLAN

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

1

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

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



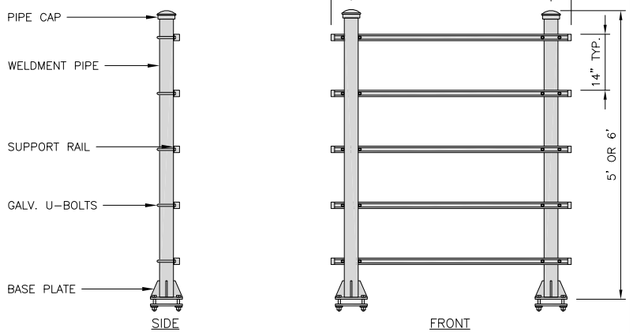
PLATFORM DETAIL

NO SCALE

2

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

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



H-FRAME DETAIL

NO SCALE

3

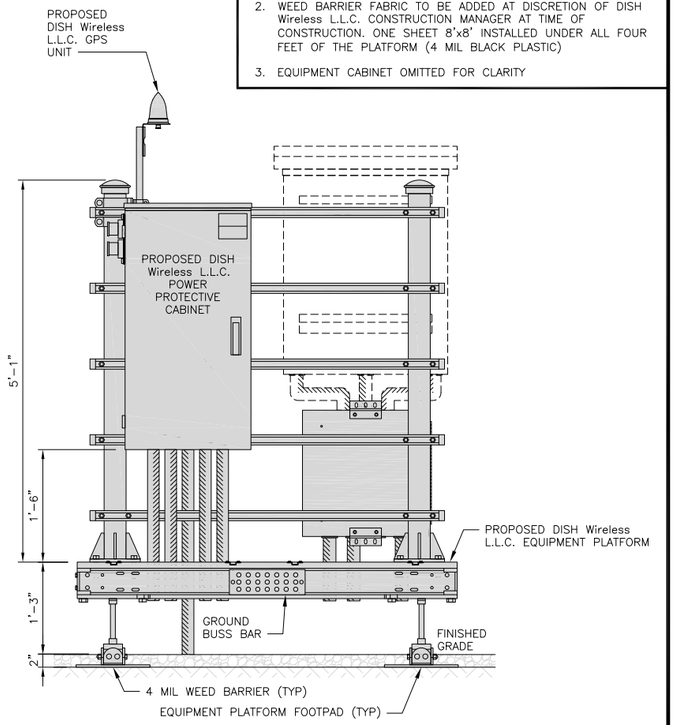
NOT USED

NO SCALE

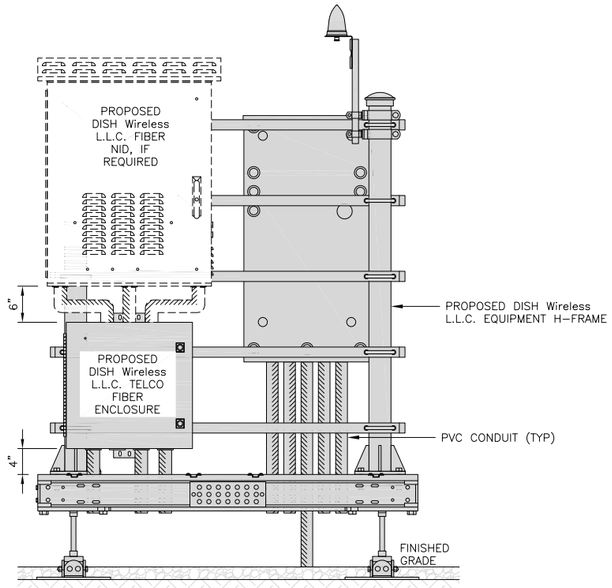
4

NOTES

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



FRONT ELEVATION



BACK ELEVATION

H-FRAME EQUIPMENT ELEVATION

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

5

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

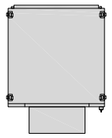
A&E PROJECT NUMBER
149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

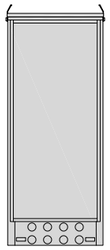
SHEET TITLE
EQUIPMENT PLATFORM AND H-FRAME DETAILS

SHEET NUMBER
A-3

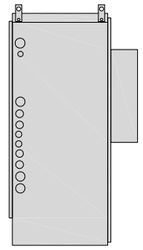
ENERSYS HVAC 2000005995	
DIMENSIONS (HxWxD)	73"x30"x32"
POWER SYSTEM	-48V ALPHA/600A
HVAC	600W
TOTAL WEIGHT (EMPTY)	371 lbs



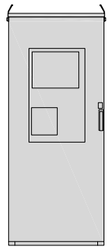
PLAN



BACK



SIDE

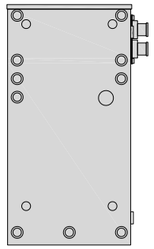


FRONT

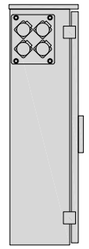
CABINET DETAIL — NO SCALE — 1

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

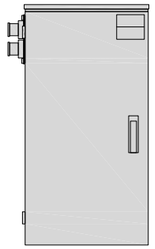
TOP



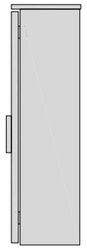
BACK



SIDE



FRONT



SIDE

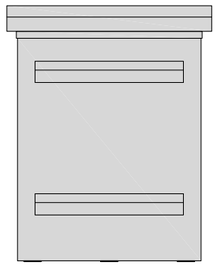
POWER PROTECTION CABINET (PPC) DETAIL — NO SCALE — 2

NOT USED — NO SCALE — 3

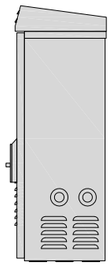
NOT USED — NO SCALE — 4

ZAYO 5RU (LEFT SWING DOOR) FIBER NID ENCLOSURE	
DIMENSIONS (HxWxD)	36.1"x29"x12.9"
WEIGHT	85 lbs

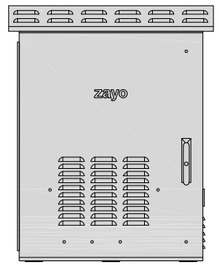
BOTTOM



BACK



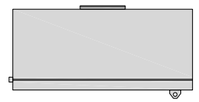
SIDE



FRONT

FIBER NID ENCLOSURE DETAIL — NO SCALE — 5

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



FRONT

SIDE

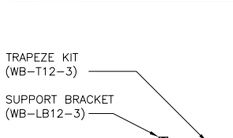
BACK

FRONT

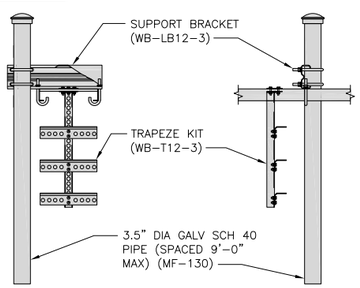
FIBER TELCO ENCLOSURE DETAIL — NO SCALE — 6

COMMSCOPE WB-K110-B WAVEGUIDE BRIDGE KIT	
DIMENSIONS (HxL)	160"x10'
WEIGHT/ VOLUME	325.0 LBS
CABLE RUN (QTY)	12

INCLUDED PRODUCTS:	
	WB-T12-3 TRAPEZE KIT, 3 RUNGS
	WB-LB12-3 SUPPORT BRACKET
	MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"



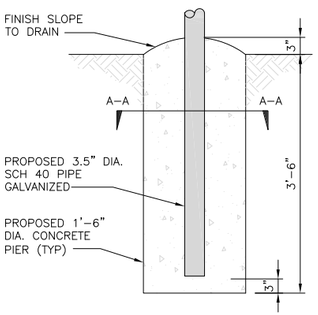
PLAN



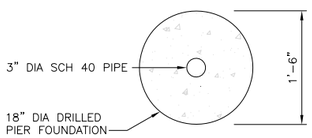
FRONT

SIDE

ICE BRIDGE DETAIL — NO SCALE — 7

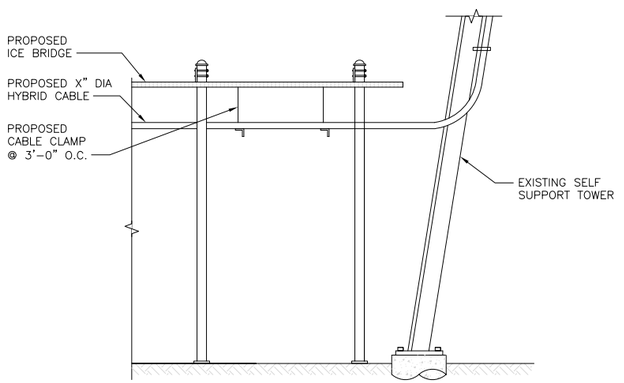


CONCRETE PIER



A-A SECTION

TYPICAL ICE BRIDGE CONCRETE PIER DETAIL — NO SCALE — 8



HYBRID CABLE RUN — NO SCALE — 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT — CHAD NEVILLE — No. 23924 — LICENSED PROFESSIONAL ENGINEER — 1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

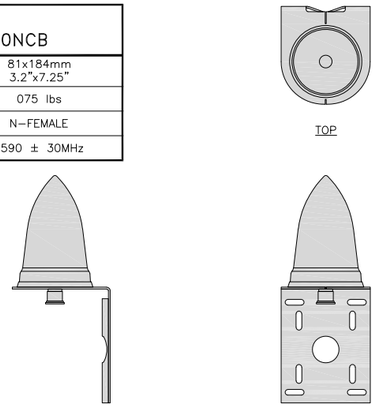
SHEET TITLE

EQUIPMENT DETAILS

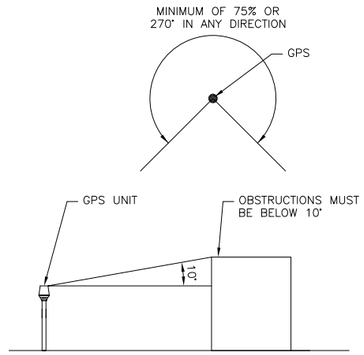
SHEET NUMBER

A-4

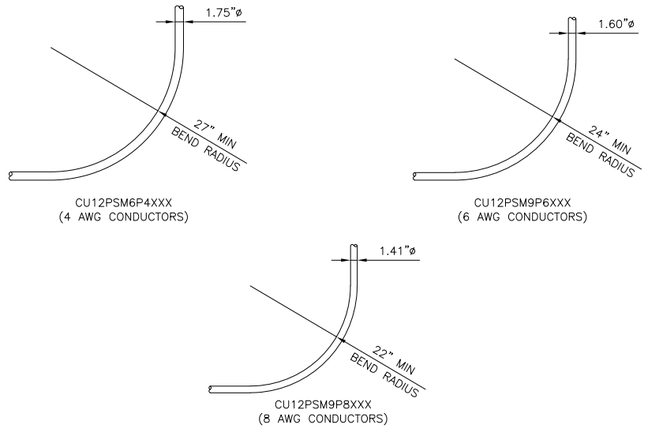
PCTEL GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DIAxH) MM/INCH	81x184mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1590 ± 30MHz



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

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

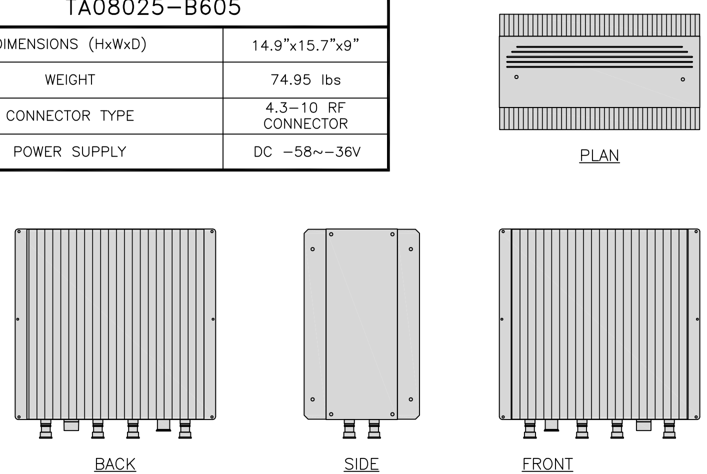
EQUIPMENT DETAILS

SHEET NUMBER

A-5

FUJITSU TRIPLE BAND TA08025-B605

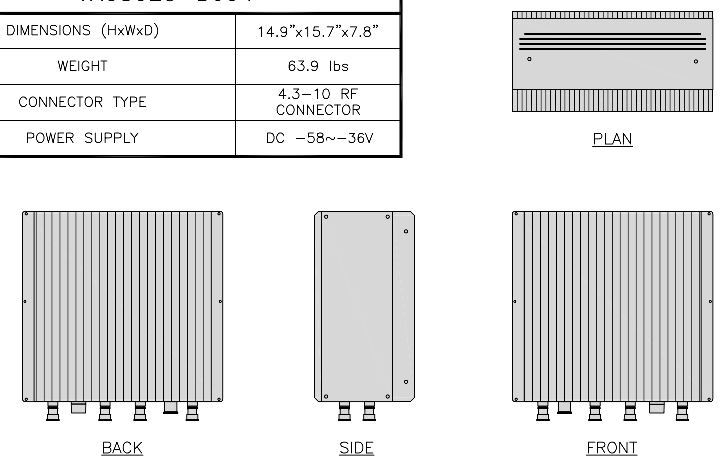
DIMENSIONS (HxWxD)	14.9"x15.7"x9"
WEIGHT	74.95 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
POWER SUPPLY	DC -58~-36V



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

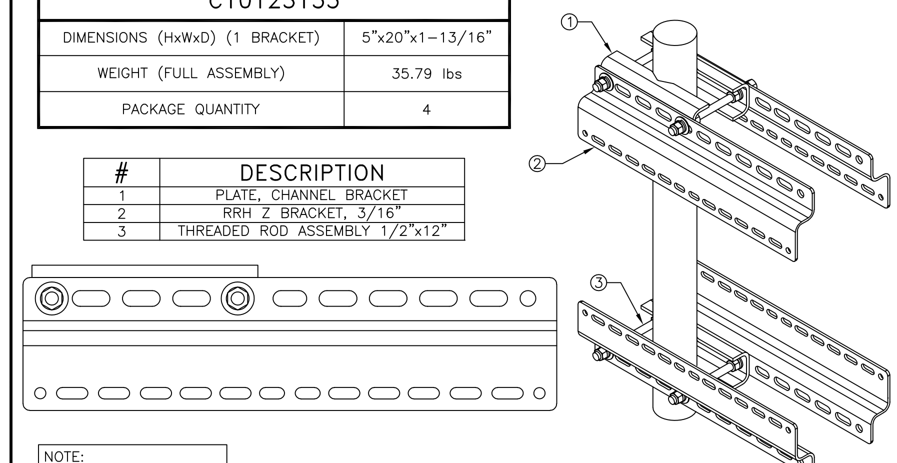


RRH DETAIL | NO SCALE | 2

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"

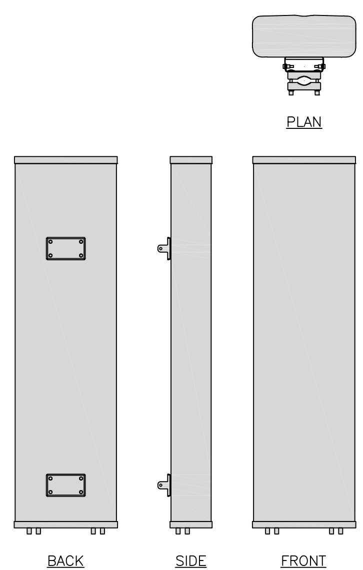


NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT

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



ANTENNA DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

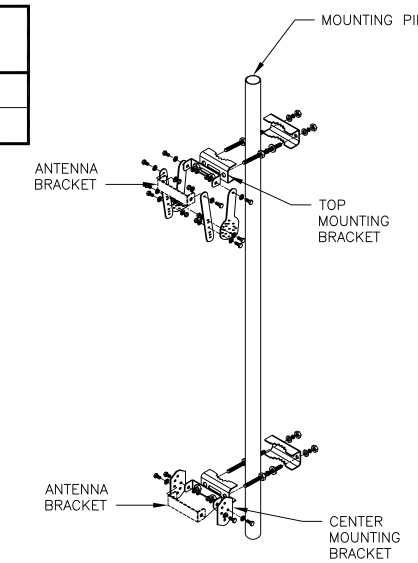
JMA ANTENNA MOUNT BRACKET #91900318

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

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

ANTENNA BRACKET NOT PART OF KIT

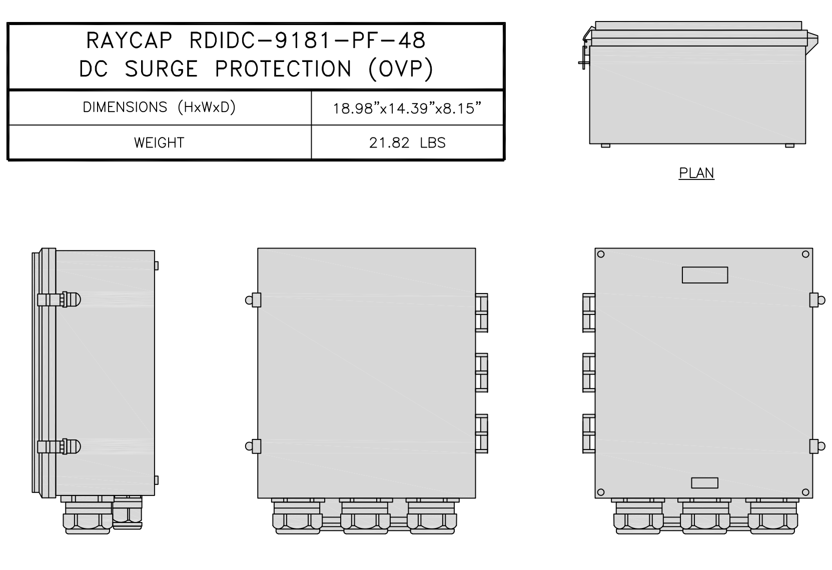
NOTE:
OR DISH Wireless L.L.C. APPROVED EQUIVALENT



ANTENNA BRACKET DETAIL | NO SCALE | 6

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

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

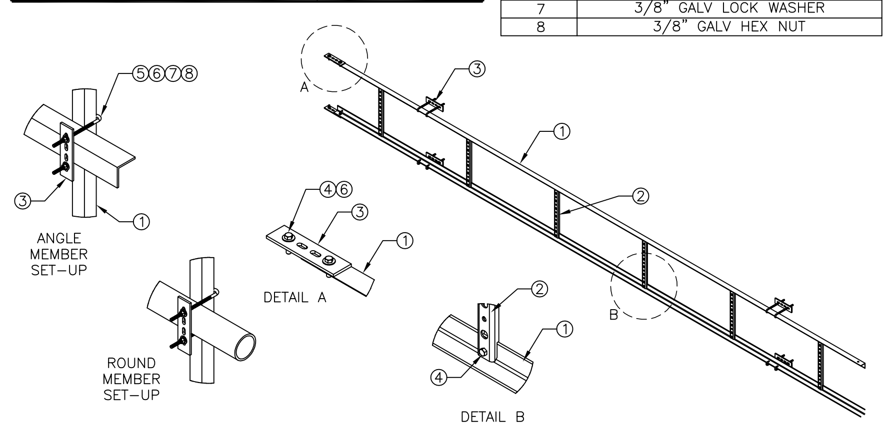


SURGE SUPPRESSION DETAIL (OVP) | NO SCALE | 7

COMMSCOPE 20' CABLE LADDER 6 HOLE RUNGS

DIMENSIONS (WxL)	20.5"x240"
WEIGHT	84.94 lbs

ITEM#	DESCRIPTION
1	20' ANGLE SIDE RAIL
2	20" LADDER RUNG
3	BACKING PLATE
4	3/8"x1-1/2" GALV BOLT KIT
5	8" GALV J-BOLT KIT
6	3/8" GALV FLAT WASHER
7	3/8" GALV LOCK WASHER
8	3/8" GALV HEX NUT

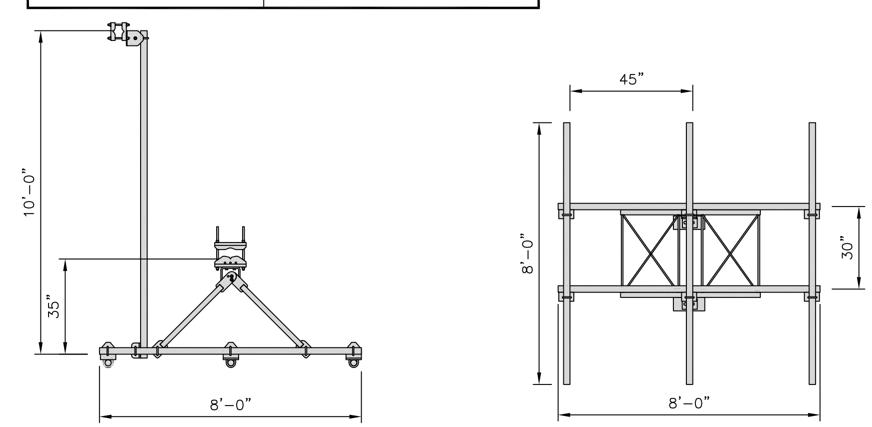


CABLE LADDER DETAIL | NO SCALE | 8

COMMSCOPE V-FRAME MTC3975083

FACE SIZE	8'-0"
WEIGHT	352.136 lbs

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



ANTENNA FRAME DETAIL | NO SCALE | 9

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
A-6

DISH Wireless L.L.C. TEMPLATE VERSION 45 - 10/08/2021

STIFF ARM LOCATION NOTES:

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

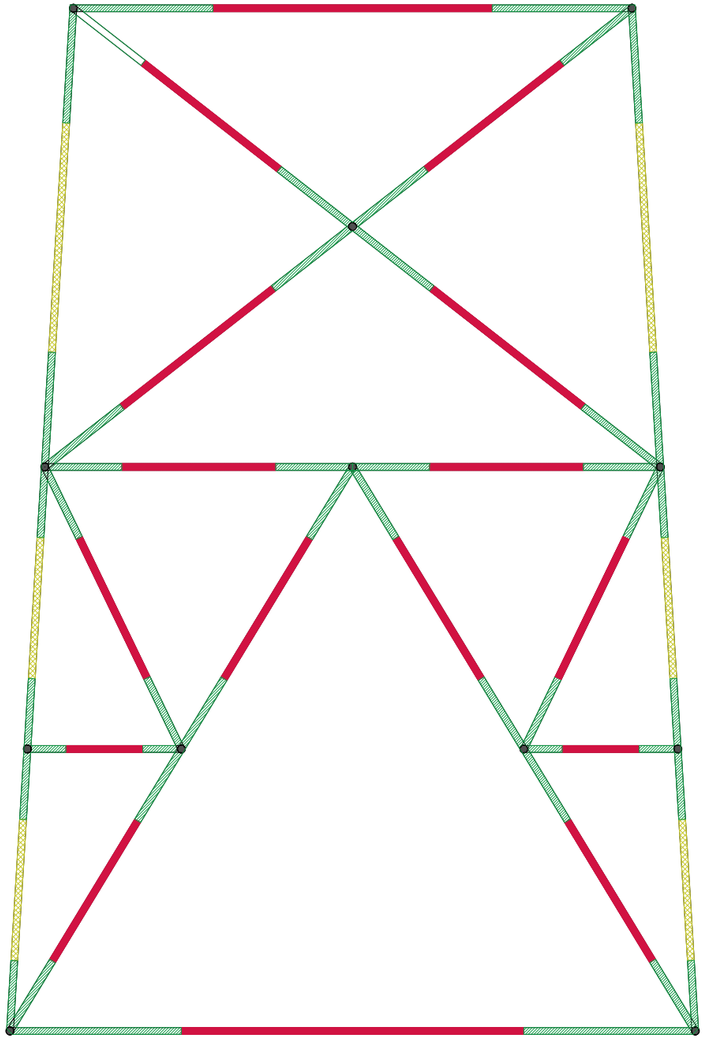
ACCEPTABLE ATTACHMENT REGION & FORCE

ACCEPTABLE ATTACHMENT REGION & FORCE

DO NOT ATTACH HERE

(DO NOT ATTACH HERE)

INTERIOR BRACING



TOWER LEG

TOWER SECTION

STIFF ARM LOCATIONS | NO SCALE | 1

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

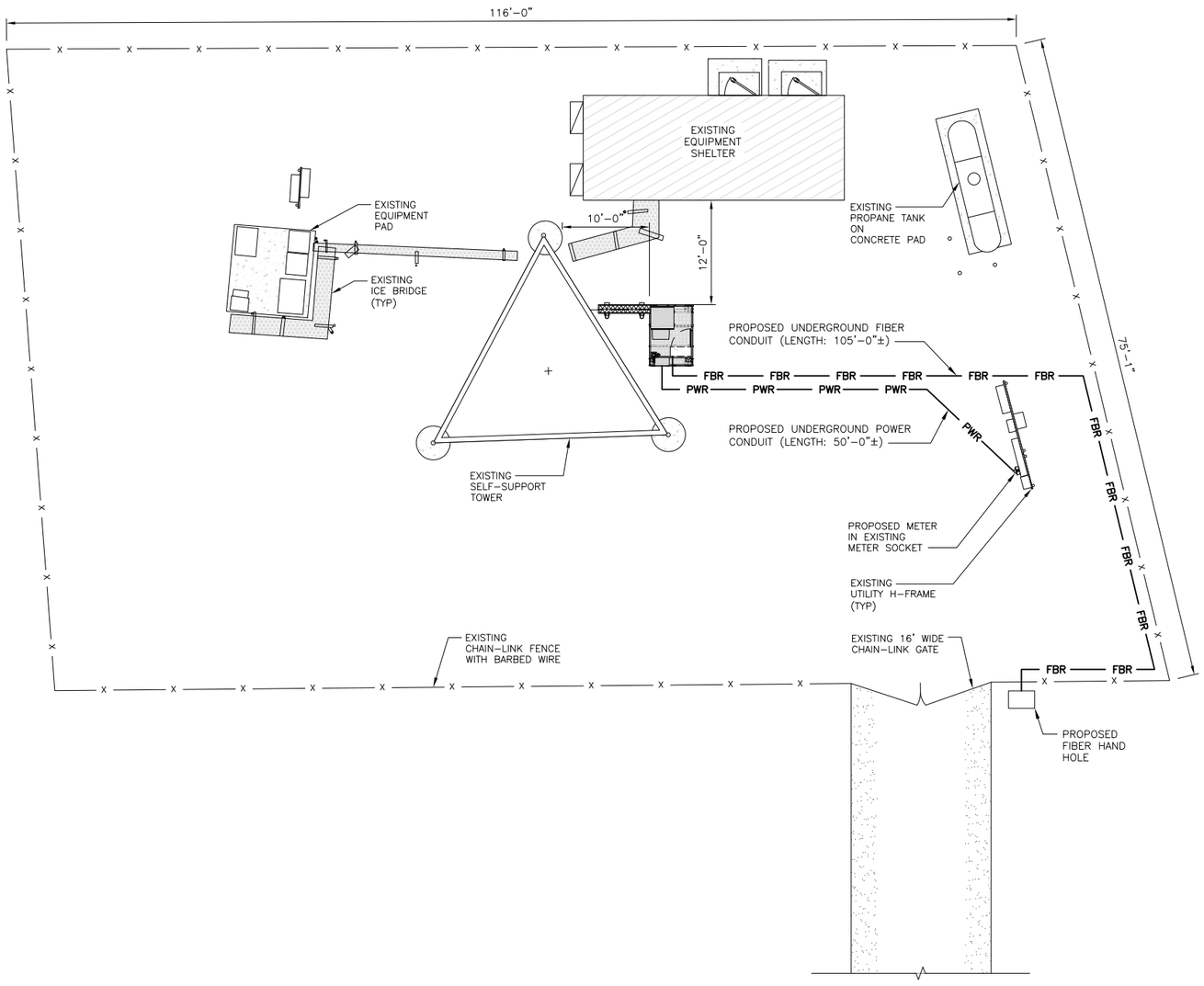
STIFF ARM
LOCATION DETAIL

SHEET NUMBER

A-7

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.



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

UTILITY ROUTE PLAN | 8' 4' 0 8' 16' 1/8"=1'-0" | 1

ELECTRICAL NOTES | NO SCALE | 2

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

B0B0S00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

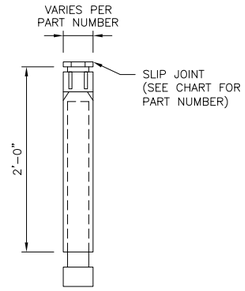
ELECTRICAL/FIBER ROUTE PLAN AND NOTES

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"

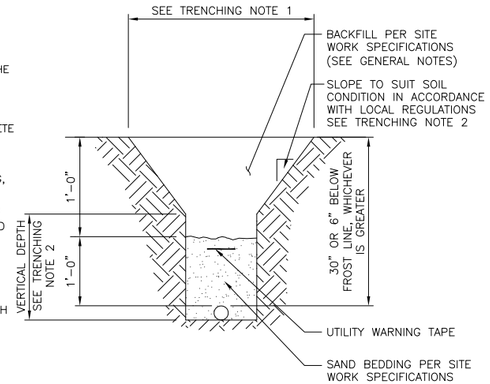


NOTE:
CONTRACTOR TO INSTALL EXPANSION FITTING SLIP JOINT AT METER CENTER CONDUIT TERMINATION, AS PER LOCAL UTILITY POLICY, ORDINANCE AND/OR SPECIFIED REQUIREMENT.

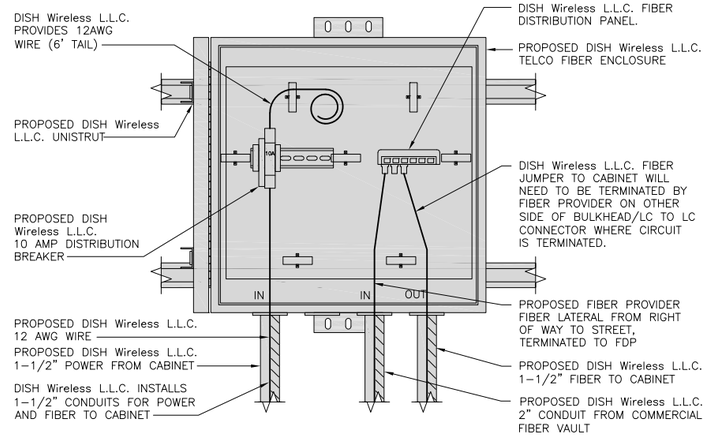
EXPANSION JOINT DETAIL | NO SCALE | 1

TRENCHING NOTES

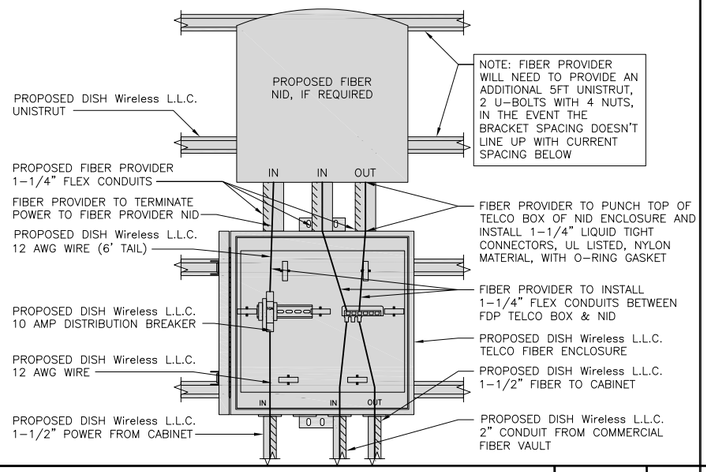
1. CONTRACTOR SHALL RESTORE THE TRENCH TO ITS ORIGINAL CONDITIONS BY EITHER SEEDING OR SODDING GRASS AREAS, OR REPLACING ASPHALT OR CONCRETE AREAS TO ITS ORIGINAL CROSS SECTION.
2. TRENCHING SAFETY; INCLUDING, BUT NOT LIMITED TO SOIL CLASSIFICATION, SLOPING, AND SHORING, SHALL BE GOVERNED BY THE CURRENT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

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

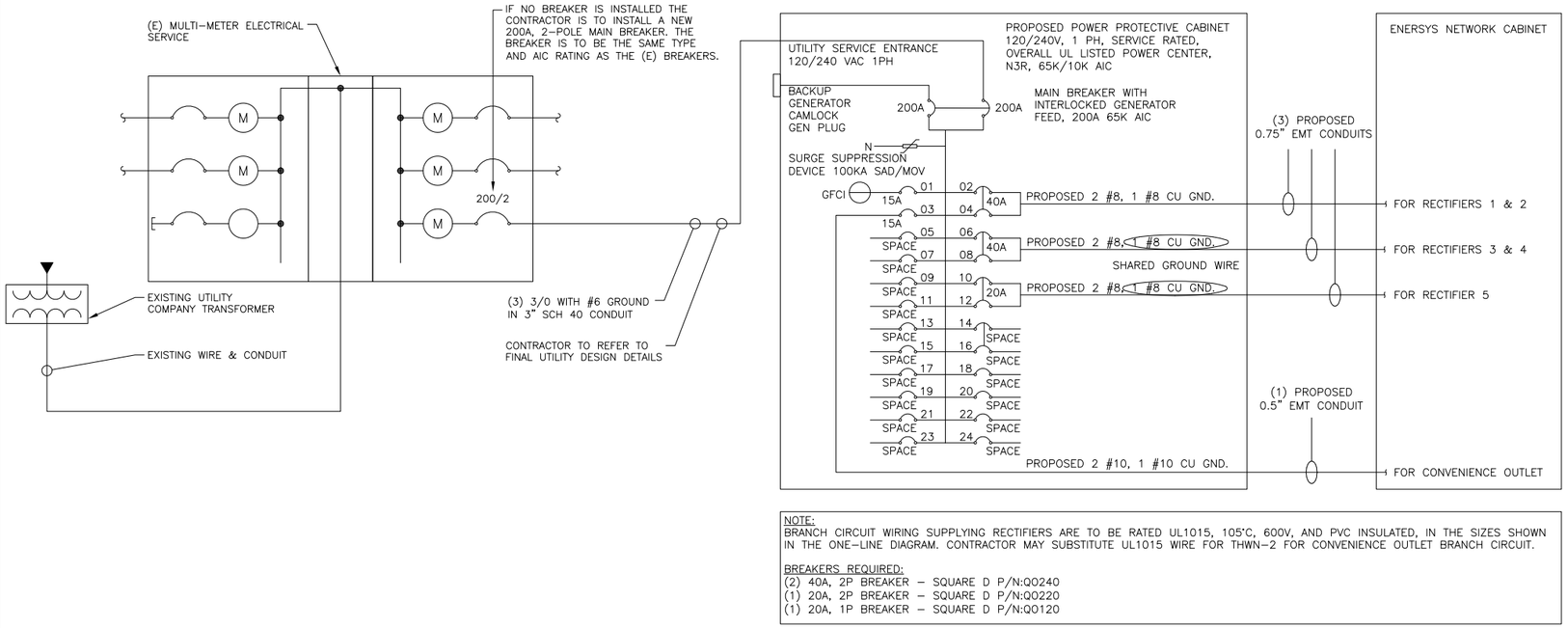
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

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:
(2) 40A, 2P BREAKER - SQUARE D P/N:QO240
(1) 20A, 2P BREAKER - SQUARE D P/N:QO220
(1) 20A, 1P BREAKER - SQUARE D P/N:QO120

NOTES

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

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

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

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

#10	- 0.0211 SQ. IN X 2	= 0.0422 SQ. IN
#10	- 0.0211 SQ. IN X 1	= 0.0211 SQ. IN <GROUND
TOTAL		= 0.0633 SQ. IN

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

RECTIFIER CONDUCTORS (3 CONDUITS): USING UL1015, CU.

#8	- 0.0552 SQ. IN X 2	= 0.1103 SQ. IN
#8	- 0.0131 SQ. IN X 1	= 0.0131 SQ. IN <BARE GROUND
TOTAL		= 0.1234 SQ. IN

0.75" EMT CONDUIT IS ADEQUATE TO HANDLE THE TOTAL OF (3) 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.

PPC ONE-LINE DIAGRAM

NO SCALE | 1

PROPOSED ENERSYS PANEL SCHEDULE

LOAD SERVED	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	TRIP	CKT #	PHASE	CKT #	TRIP	VOLT AMPS (WATTS) L1	VOLT AMPS (WATTS) L2	LOAD SERVED
PPC GFCI OUTLET	180		15A	1	A	2	40A	3840		ENERSYS ALPHA CORDEX
ENERSYS GFCI OUTLET		180	15A	3	B	4			3840	RECTIFIERS 1 & 2
-SPACE-				5	A	6	40A	3840		ENERSYS ALPHA CORDEX
-SPACE-				7	B	8			3840	RECTIFIER 3 & 4
-SPACE-				9	A	10	20A	1920		ENERSYS ALPHA CORDEX
-SPACE-				11	B	12			1920	RECTIFIER 5
-SPACE-				13	A	14				-SPACE-
-SPACE-				15	B	16				-SPACE-
-SPACE-				17	A	18				-SPACE-
-SPACE-				19	B	20				-SPACE-
-SPACE-				21	A	22				-SPACE-
-SPACE-				23	B	24				-SPACE-
VOLTAGE AMPS	180	180						9500	9500	
200A MCB, 1φ, 24 SPACE, 120/240V			L1		L2					
MB RATING: 65,000 AIC			9680		9680		VOLTAGE AMPS			
			81		81		AMPS			
			81				MAX AMPS			
			102				MAX 125%			

PANEL SCHEDULE | NO SCALE | 2

NOT USED | NO SCALE | 3

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22
B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

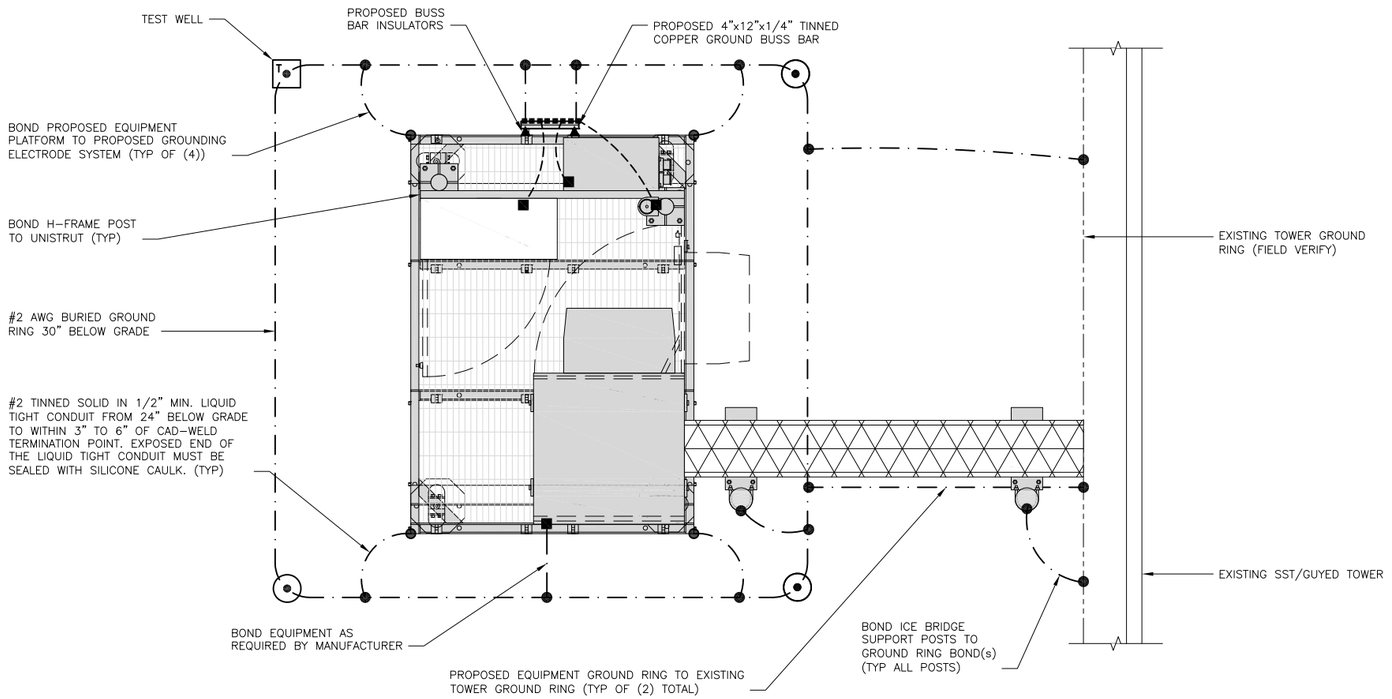
REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149428.001.01

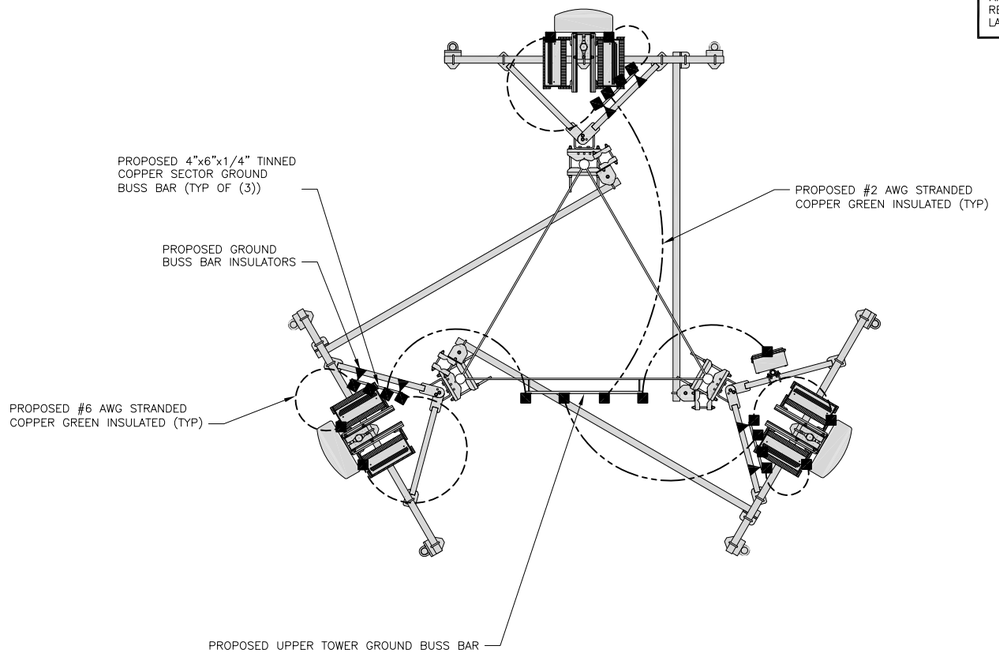
DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

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

SHEET NUMBER
E-3



TYPICAL EQUIPMENT GROUNDING PLAN | NO SCALE | 1



TYPICAL ANTENNA GROUNDING PLAN | NO SCALE | 2

NOTES

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

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

GROUNDING LEGEND

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

GROUNDING KEY NOTES

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

GROUNDING KEY NOTES | NO SCALE | 3

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

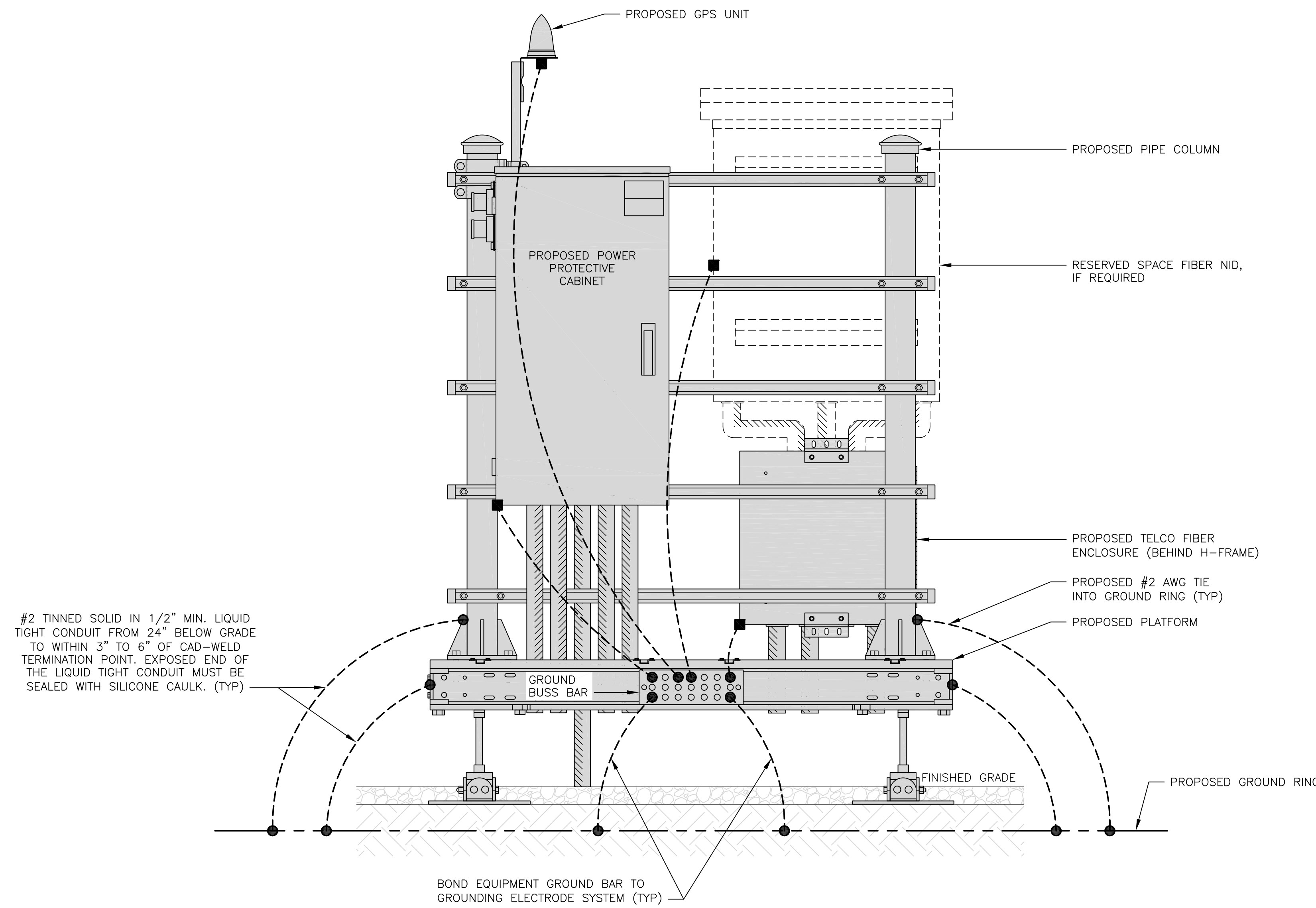
GROUNDING PLANS AND NOTES

SHEET NUMBER

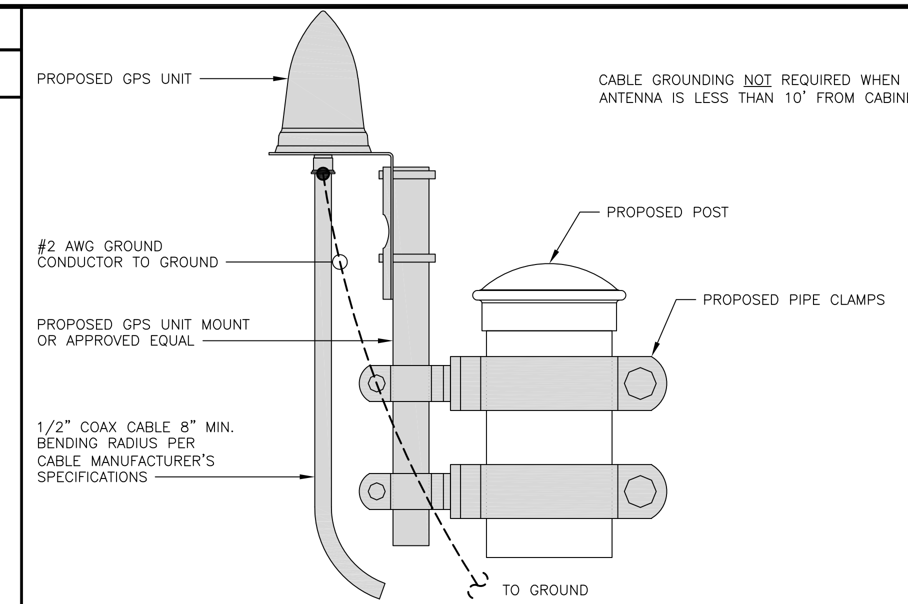
G-1

NOTES

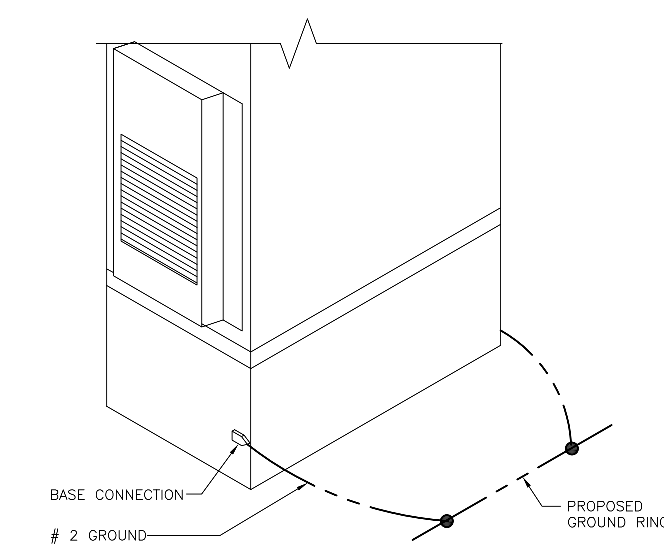
EQUIPMENT CABINET OMITTED FOR CLARITY



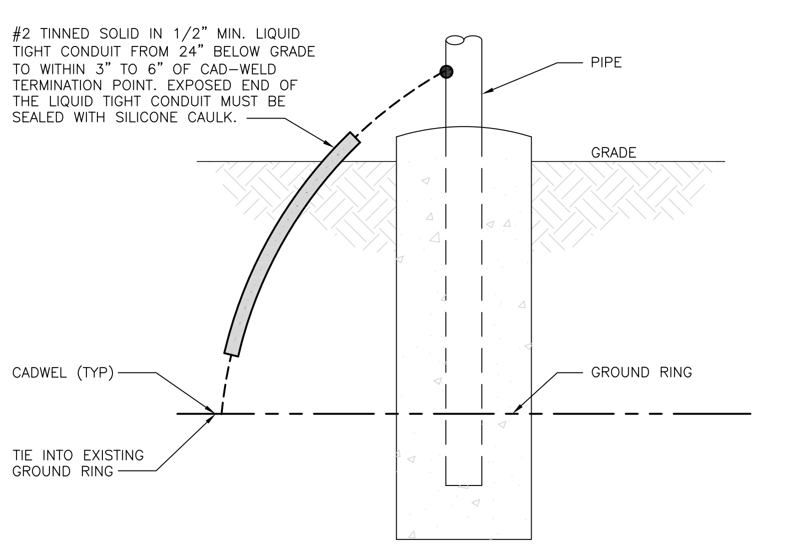
H-FRAME GROUNDING DETAIL | NO SCALE | 1



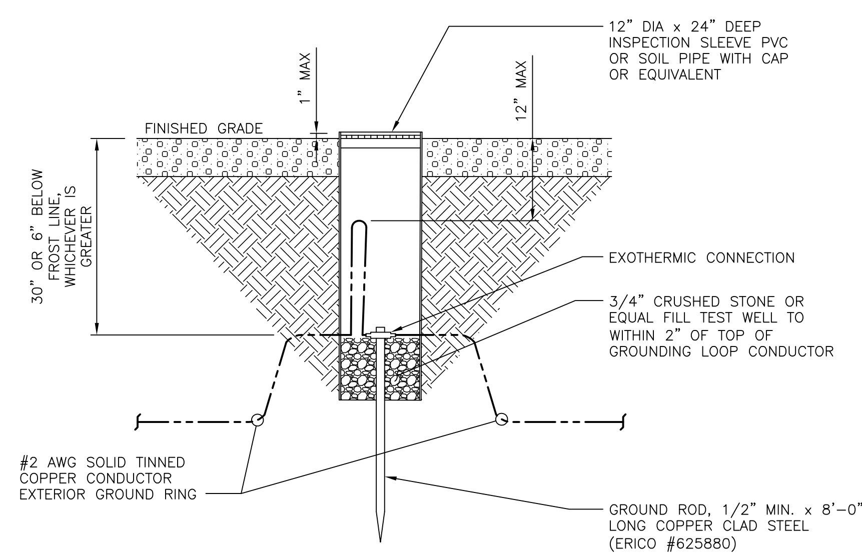
TYPICAL GPS UNIT GROUNDING | NO SCALE | 2



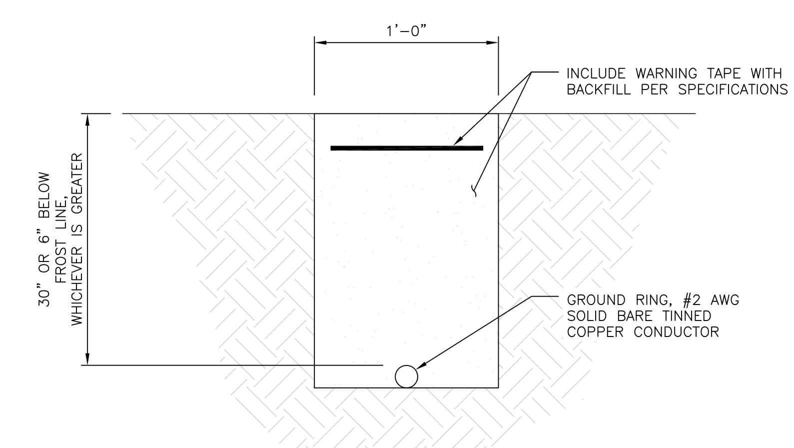
OUTDOOR CABINET GROUNDING | NO SCALE | 3



TRANSITIONING GROUND DETAIL | NO SCALE | 4



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



TYPICAL GROUND RING TRENCH | NO SCALE | 6

dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD TITLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

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

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

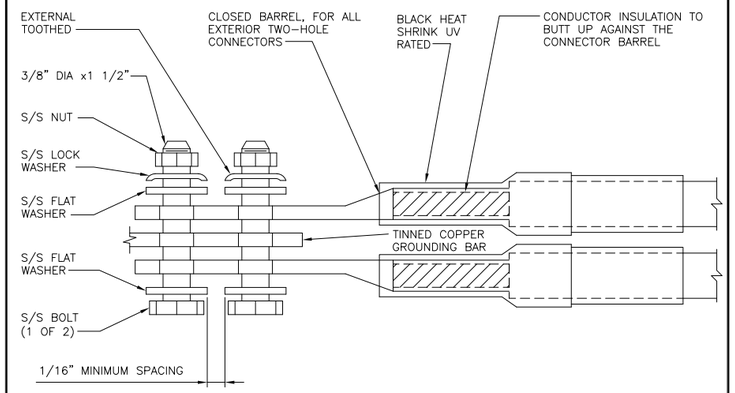
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE
GROUNDING DETAILS

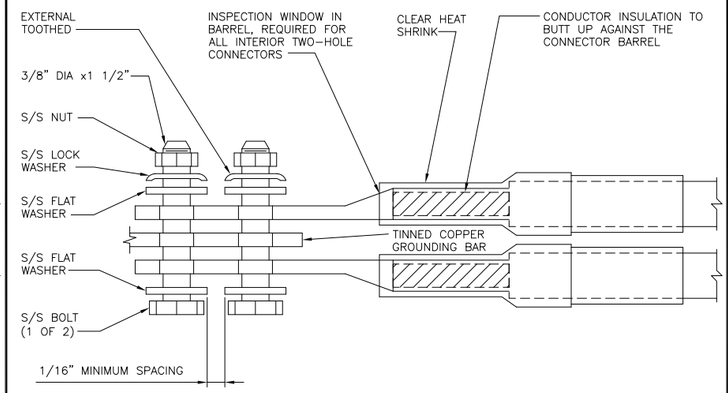
SHEET NUMBER
G-2

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

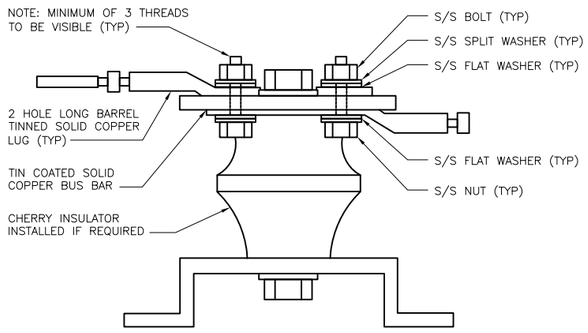
TYPICAL GROUNDING NOTES | NO SCALE | 1



TYPICAL EXTERIOR TWO HOLE LUG | NO SCALE | 2



TYPICAL INTERIOR TWO HOLE LUG | NO SCALE | 3



LUG DETAIL | NO SCALE | 4

NOT USED | NO SCALE | 5

NOT USED | NO SCALE | 6

NOT USED | NO SCALE | 7

NOT USED | NO SCALE | 8

NOT USED | NO SCALE | 9

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

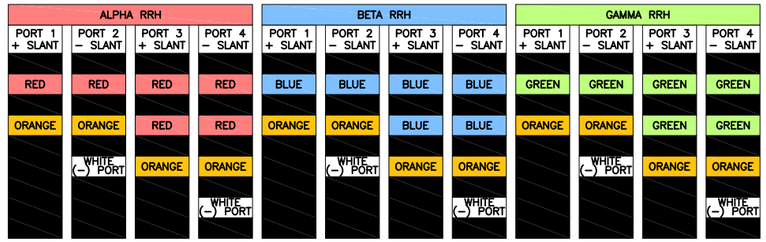
G-3

HYBRID/DISCREET CABLES

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

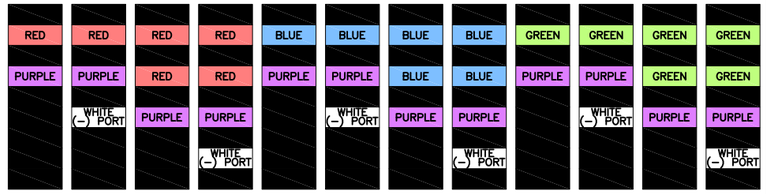
LOW-BAND RRH
(600 MHz N71 BASEBAND) +
(850 MHz N26 BAND) +
(700 MHz N29 BAND) – OPTIONAL PER MARKET

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)



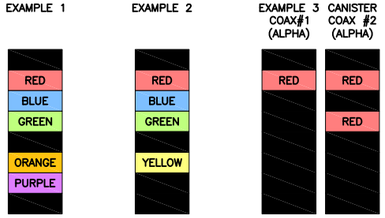
HYBRID/DISCREET CABLES

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.

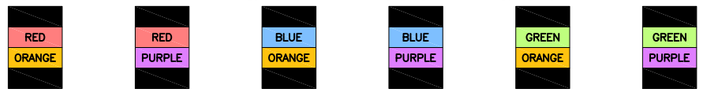
EXAMPLE 3 – MAIN COAX WITH GROUND MOUNTED RRHs.



CONTRACTOR TO REFER TO FINAL CONSTRUCTION RFDS FOR ALL RD DETAILS. FINAL RFDS IS IN NEXSYSONE.

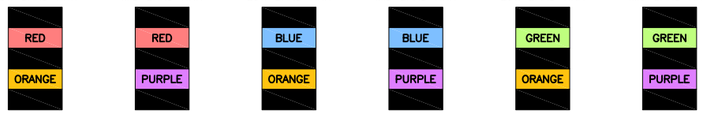
FIBER JUMPERS TO RRHs

LOW-BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.



POWER CABLES TO RRHs

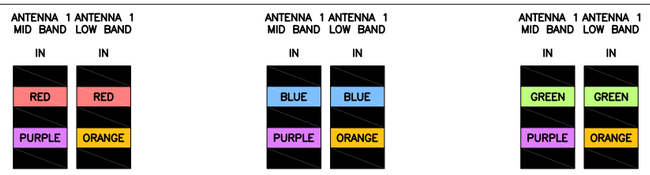
LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY



RET MOTORS AT ANTENNAS

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

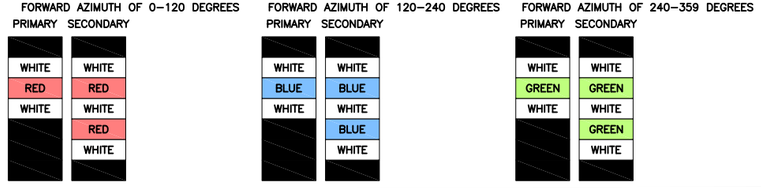
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.



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.



RF CABLE COLOR CODES | NO SCALE | 1

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

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

CBRS TECH (3 GHz): YELLOW

NEGATIVE SLANT PORT ON ANT/RRH: WHITE

ALPHA SECTOR: RED

BETA SECTOR: BLUE

GAMMA SECTOR: GREEN

COLOR IDENTIFIER | NO SCALE | 2

NOT USED | NO SCALE | 3

NOT USED | NO SCALE | 4

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

SBA
8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED PROFESSIONAL ENGINEER
1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER
149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION
BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

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

W.P.

SECTION REFERENCE

XX
X–X

DETAIL REFERENCE

XX
X–X

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

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP

1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD W. TUTTLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

LEGEND AND ABBREVIATIONS

SHEET NUMBER

GN-1

SITE ACTIVITY REQUIREMENTS:

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

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

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

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

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

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

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

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

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

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

10. ALL EXISTING ACTIVE SEWER, WATER, GAS, ELECTRIC AND OTHER 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.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-2

CONCRETE, FOUNDATIONS, AND REINFORCING STEEL:

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

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

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

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

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

#4 BARS AND SMALLER 40 ksi

#5 BARS AND LARGER 60 ksi

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

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

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

ELECTRICAL INSTALLATION NOTES:

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

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

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

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

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

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

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

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

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

8. TIE WRAPS ARE NOT ALLOWED.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

27. THE CONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CARRIER AND/OR DISH Wireless 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

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com

STATE OF CONNECTICUT
CHAD TITLE
No. 23924
LICENSED
PROFESSIONAL ENGINEER
1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-3

GROUNDING NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

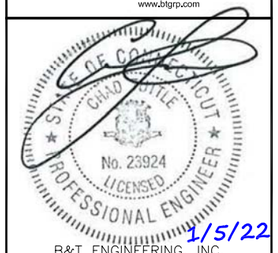
dish wireless.

5701 SOUTH SANTA FE DRIVE
LITTLETON, CO 80120

SBA

8051 CONGRESS AVENUE
BOCA RATON, FL 33487

B+T GRP
1717 S. BOULDER
SUITE 300
TULSA, OK 74119
PH: (918) 587-4630
www.btgrp.com



1/5/22

B&T ENGINEERING, INC.
PEC.0001564
Expires 2/10/23

DRAWN BY:	CHECKED BY:	APPROVED BY:
NGN	RMC	RMC

RFDS REV #: 1

CONSTRUCTION DOCUMENTS

SUBMITTALS

REV	DATE	DESCRIPTION
A	11/30/21	ISSUED FOR REVIEW
0	1/5/22	ISSUED FOR CONSTRUCTION

A&E PROJECT NUMBER

149428.001.01

DISH Wireless L.L.C.
PROJECT INFORMATION

BOBOS00043A
63 INDUSTRIAL PARK ROAD
PUTNAM, CT 06260

SHEET TITLE

GENERAL NOTES

SHEET NUMBER

GN-4

Exhibit D

Structural Analysis Report

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 196 ft Sabre Self Supporting Tower
Customer Name: SBA Communications Corp
Customer Site Number: CT00802-S
Customer Site Name: Putnam Freight
Carrier Name: Dish Wireless (App#: 177006, v1)
Carrier Site ID / Name: BOBOS00043A / 0
Site Location: 63 Industrial Park Road
Putnam, Connecticut
Windham County
Latitude: 41.897141
Longitude: -71.892247

Analysis Result:

Max Structural Usage: 96.9% [Pass]
Max Foundation Usage: 41.0% [Pass]
Additional Usage Caused by New Mount/Mount Modification: N/A

Report Prepared By : Cesar Rojas

Tower Engineering Solutions
Phone (972) 483-0607, Fax (972) 975-9615
1320 Greenway Drive, Suite 600, Irving, Texas 75038

Structural Analysis Report

Existing 196 ft Sabre Self Supporting Tower

Customer Name: SBA Communications Corp

Customer Site Number: CT00802-S

Customer Site Name: Putnam Freight

Carrier Name: Dish Wireless (App#: 177006, v1)

Carrier Site ID / Name: BOBOS00043A / 0

Site Location: 63 Industrial Park Road

Putnam, Connecticut

Windham County

Latitude: 41.897141

Longitude: -71.892247

Analysis Result:

Max Structural Usage: 96.9% [Pass]

Max Foundation Usage: 41.0% [Pass]

Additional Usage Caused by New Mount/Mount Modification: N/A

Report Prepared By : Cesar Rojas

Introduction

The purpose of this report is to summarize the analysis results on the 196 ft Sabre Self Supporting Tower to support the proposed antennas and transmission lines in addition to those currently installed. Any modification listed under Sources of Information was assumed completed and was included in this analysis.

Sources of Information

Tower Drawings	Sabre Communications Corporation, Job No. 99-04060. dated 04/19/1999.
Foundation Drawing	Sabre Communications Corporation, Job No. 99-04060. dated 04/19/1999.
Geotechnical Report	Jaworski Geotech, Inc.Project No. C98364G. dated 12/18/1998.
Modification Drawings	N/A
Mount Analysis	N/A

Analysis Criteria

The rigorous analysis was performed in accordance with the requirements and stipulations of the TIA-222-G-2**.** In accordance with this standard, the structure was analyzed using **TESTowers,** a proprietary analysis software. The program considers the structure as an elastic 3-D model with second-order effects and temperature effects incorporated in the analysis. The analysis was performed using multiple wind directions.

Wind Speed Used in the Analysis:	Ultimate Design Wind Speed V_{ult} = 117.0 mph (3-Sec. Gust)/ Nominal Design Wind Speed V_{asd} = 101.0 mph (3-Sec. Gust)
Wind Speed with Ice:	50 mph (3-Sec. Gust) with 1" radial ice concurrent
Operational Wind Speed:	60 mph + 0" Radial ice
Standard/Codes:	TIA-222-G-2 / 2015 IBC / 2018 Connecticut State Building Code
Exposure Category:	C
Structure Class:	II
Topographic Category:	1
Crest Height:	0 ft
Seismic Parameters:	S_S = 0.172, S_1 = 0.063

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

Existing Antennas, Mounts and Transmission Lines

The table below summarizes the antennas, mounts and transmission lines that were considered in the analysis as existing on the tower.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
-	196.0	-	-	(3) T Frame	-	-
1	186.0	3	Powerwave - 7770 - Panel	(3) Frames MTC3615 with modifications, (3) Pipe Mast, (6) Diagonal Angles and (3) Pipe Brace	(12) 1 5/8" (1) 3" Conduit (6) 3/4" DC (2) 5/8" Fiber	AT&T
2		3	Kathrein - 800-10966 - Panel			
3		3	CCI - OPA-65R-LCUU-H8 - Panel			
4		6	Powerwave LGP21401 TMA			
5		6	Powerwave 21401TMA			
6		3	Ericsson RRUS-11 (19)			
7		3	Ericsson RRUS 4415 B30			
8		3	Ericsson RRUS 12			
9		3	Ericsson RRUS E2			
10		3	Ericsson RRUS 4449 B5, B12			
11		3	Ericsson RRUS A2			
12		2	Raycap DC6-48-60-18-8F			
13	176.0	6	CommScope - JAHH-65B-R3B - Panel	(3) Modified Sector Frame and (3) CommScope BSAMNT-SBS-2-2	(10) 1 5/8" (2) 1 5/8" Hybrid	Verizon
14		3	Samsung - MT6407-77A - Panel			
15		3	CommScope CBC78T-DS-43-2X			
16		3	Samsung B2/B66A			
17		3	Samsung B5/B13			
18		2	RFS DB-T1-6Z-8AB-0Z			

Proposed Carrier's Final Configuration of Antennas, Mounts and Transmission Lines

Information pertaining to the proposed carrier's final configuration of antennas and transmission lines was provided by SBA Communications Corp. The proposed antennas and lines are listed below.

Items	Elevation (ft)	Qty.	Antenna Descriptions	Mount Type & Qty.	Transmission Lines	Owner
19	166.0	3	Fujitsu TA08025-B604-RRU	(1) Commscope MTC3975083 - Platform w/HRK]	(1) 1.75" Hybrid	Dish Wireless
20		3	Fujitsu TA08025-B605-RRU			
21		1	Raycap RDIDC-9181-PF-48- OVP			
22		3	Commscope FFVV-65B-R2-Panel			

See the attached coax layout for the line placement considered in the analysis.

Analysis Results

The results of the structural analysis, performed for the wind and ice loading and antenna equipment as defined above, are summarized as the following:

Tower Component	Legs	Diagonals	Horizontals
Max. Usage:	**67.8%**	**96.9%**	**54.5%**
Pass/Fail	**Pass**	**Pass**	**Pass**

Foundations

	Compression (Kips)	Uplift (Kips)	Shear (Kips)
Analysis Reactions	374.1	314.3	42.7

The foundation has been investigated using the supplied documents and soils report and was found adequate. Therefore, no modification to the foundation will be required.

Operational Condition (Rigidity):

Operational characteristics of the tower are found to be within the limits prescribed by TIA-222 for the installed antennas. The maximum twist/sway at the elevation of the proposed equipment is 0.1266 degrees under the operational wind speed as specified in the Analysis Criteria.

Conclusions

Based on the analysis results, the existing structure and its foundation were found to be adequate to safely support the existing and proposed equipment and meet the minimum requirements per the TIA-222 Standard under the design basic wind speed as specified in the Analysis Criteria.

Standard Conditions

1. This analysis was performed based on the information supplied to **(TES) Tower Engineering Solutions, LLC.** Verification of the information provided was not included in the Scope of Work for **TES**. The accuracy of the analysis is dependent on the accuracy of the information provided.

2. The structural analysis was performance based upon the evidence available at the time of this report. All information provided by the client is considered to be accurate.

3. The analyses will be performed based on the codes as specified by the client or based on the best knowledge of the engineering staff of **TES**. In the absence of information to the contrary, all work will be performed in accordance with the latest relevant revision of ANSI/TIA-222. If wind speed and/or ice loads are different from the minimum values recommended by the ANSI/TIA-222 standard or other codes, **TES** should be notified in writing and the applicable minimum values provided by the client.

4. The configuration of the existing mounts, antennas, coax and other appurtenances were supplied by the customer for the current structural analysis. **TES** has not visited the tower site to verify the adequacy of the information provided. If there is any discrepancy found in the report regarding the existing conditions, **TES** should be notified immediately to evaluate the effect of the discrepancy on the analysis results.

5. The client will assume responsibility for rework associated with the differences in initially provided information, including tower and foundation information, existing and/or proposed equipment and transmission lines.

6. If a feasibility analysis was performed, final acceptance of changed conditions shall be based upon a rigorous structural analysis.

Structure: CT00802-S-SBA

Site Name:	Putnam Freight			**Code:**	EIA/TIA-222-G	11/22/2021
Type:	Self Support	**Base Shape:**	Triangle	**Basic WS:**	101.00	
Height:	196.00 (ft)	**Base Width:**	27.00	**Basic Ice WS:**	50.00	
Base Elev:	0.00 (ft)	**Top Width:**	7.40	**Operational WS:**	60.00	Page: 1

Tower Engineering Solutions

Section Properties

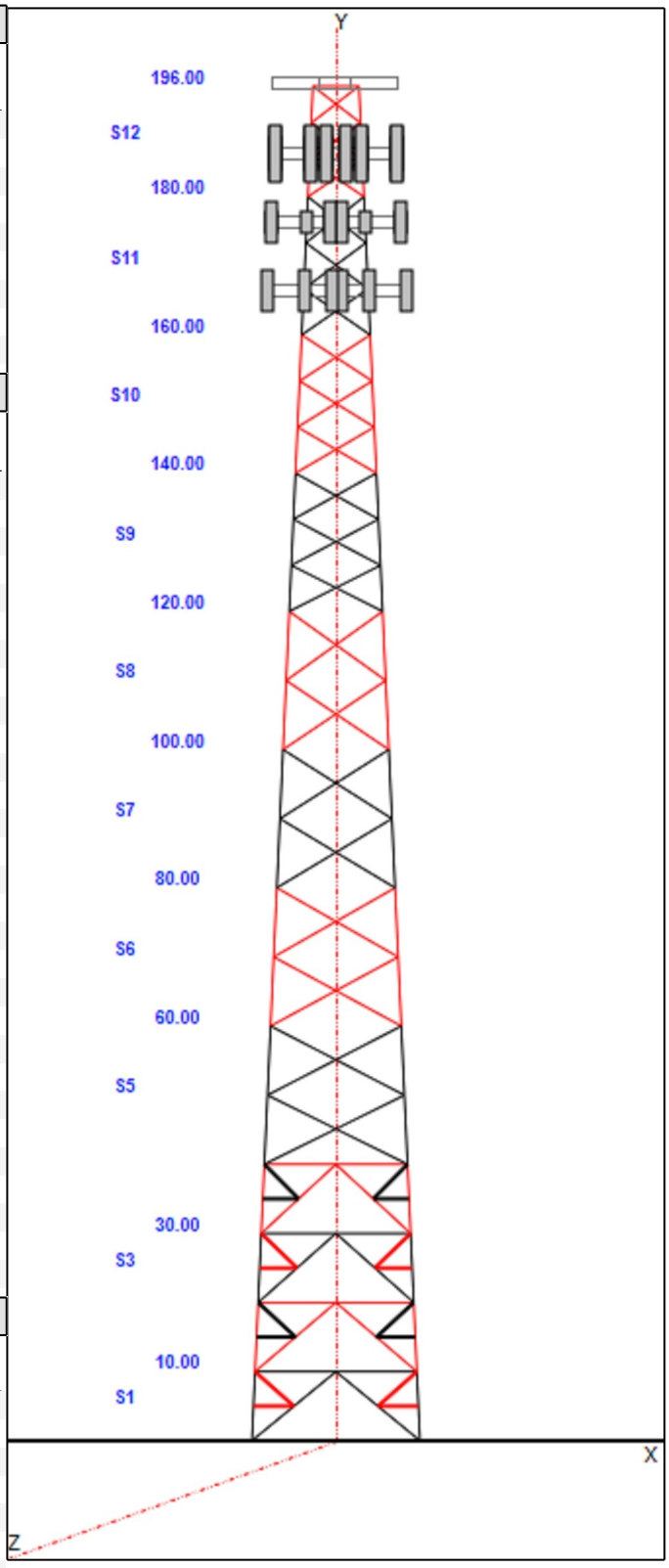
Sect	Leg Members	Diagonal Members	Horizontal Members
1-2	PST 10" DIA PIPE	SAE 3.5X3.5X0.375	SAE 4X4X0.375
3-4	PX 8" DIA PIPE	SAE 3.5X3.5X0.375	SAE 4X4X0.375
5	PX 8" DIA PIPE	SAE 4X4X0.375	
6	PX 8" DIA PIPE	SAE 3.5X3.5X0.375	
7	PST 8" DIA PIPE	SAE 3.5X3.5X0.25	
8-9	PX 6" DIA PIPE	SAE 3.5X3.5X0.25	
10	PX 5" DIA PIPE	SAE 2.5X2.5X0.25	
11	PSP 4.5 x 0.438	SAE 2.5X2.5X0.1875	
12	PX 3-1/2" DIA PIPE	SAE 2X2X0.1875	SAE 2X2X0.1875

Discrete Appurtenances

Attach Elev (ft)	Force Elev (ft)	Qty	Description
196.00	196.00	3	Sector Frame
186.00	186.00	1	Reinforing Kit
186.00	186.00	3	7770
186.00	186.00	3	800-10966
186.00	186.00	3	OPA-65R-LCUU-H8
186.00	186.00	6	Powerwave LGP21401 TMA
186.00	186.00	6	Powerwave 21401TMA
186.00	186.00	3	Ericsson RRUS-11 (19)
186.00	186.00	3	Ericsson RRUS 4415 B30
186.00	186.00	3	Ericsson RRUS 12
186.00	186.00	3	Ericsson RRUS E2
186.00	186.00	3	Ericsson RRUS 4449 B5, B12
186.00	186.00	3	Ericsson RRUS A2
186.00	186.00	2	Raycap DC6-48-60-18-8F
186.00	186.00	3	Sector Frame
176.00	176.00	6	JAHH-65B-R3B
176.00	176.00	3	MT6407-77A
176.00	176.00	3	Commscope CBC78T-DS-43-2X
176.00	176.00	3	Samsung B2/B66A
176.00	176.00	3	Samsung B5/B13
176.00	176.00	2	RFS DB-T1-6Z-8AB-0Z
176.00	176.00	1	Mount Mods1
176.00	176.00	1	Mount Mods2
176.00	176.00	3	Sector Frame
166.00	166.00	3	TA08025-B604
166.00	166.00	3	TA08025-B605
166.00	166.00	1	RDIDC-9181-PF-48
166.00	166.00	3	Commscope FFVV-65B-R2
166.00	166.00	1	(3) MTC3975083

Linear Appurtenances

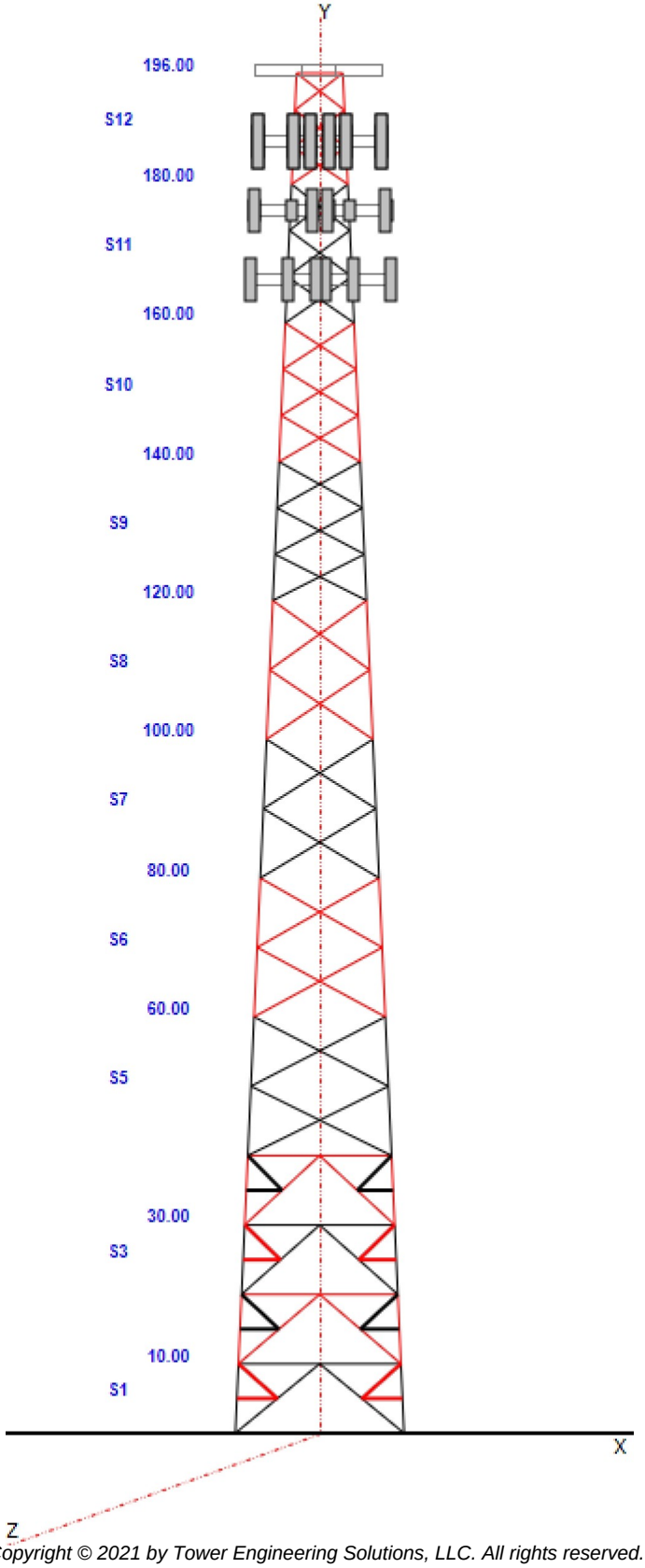
Elev From (ft)	Elev To (ft)	Qty	Description
0.00	196.00	1	W/G Ladder
0.00	196.00	1	W/G Ladder
0.00	186.00	12	1 5/8" Coax
0.00	186.00	1	3" Conduit
0.00	186.00	6	3/4" DC
0.00	186.00	2	5/8" Fiber
0.00	176.00	10	1 5/8" Coax
0.00	176.00	2	1 5/8" Hybrid



0.00	166.00	1	1.75" Hybrid

Base Reactions

Leg			Overturning	
Max Uplift:	-314.25 (kips	Moment:	8208.92	(ft-kips)
Max Down:	374.09 (kips	Total Down:	69.07	(kips)
Max Shear:	42.67 (kips	Total Shear:	72.70	(kips)

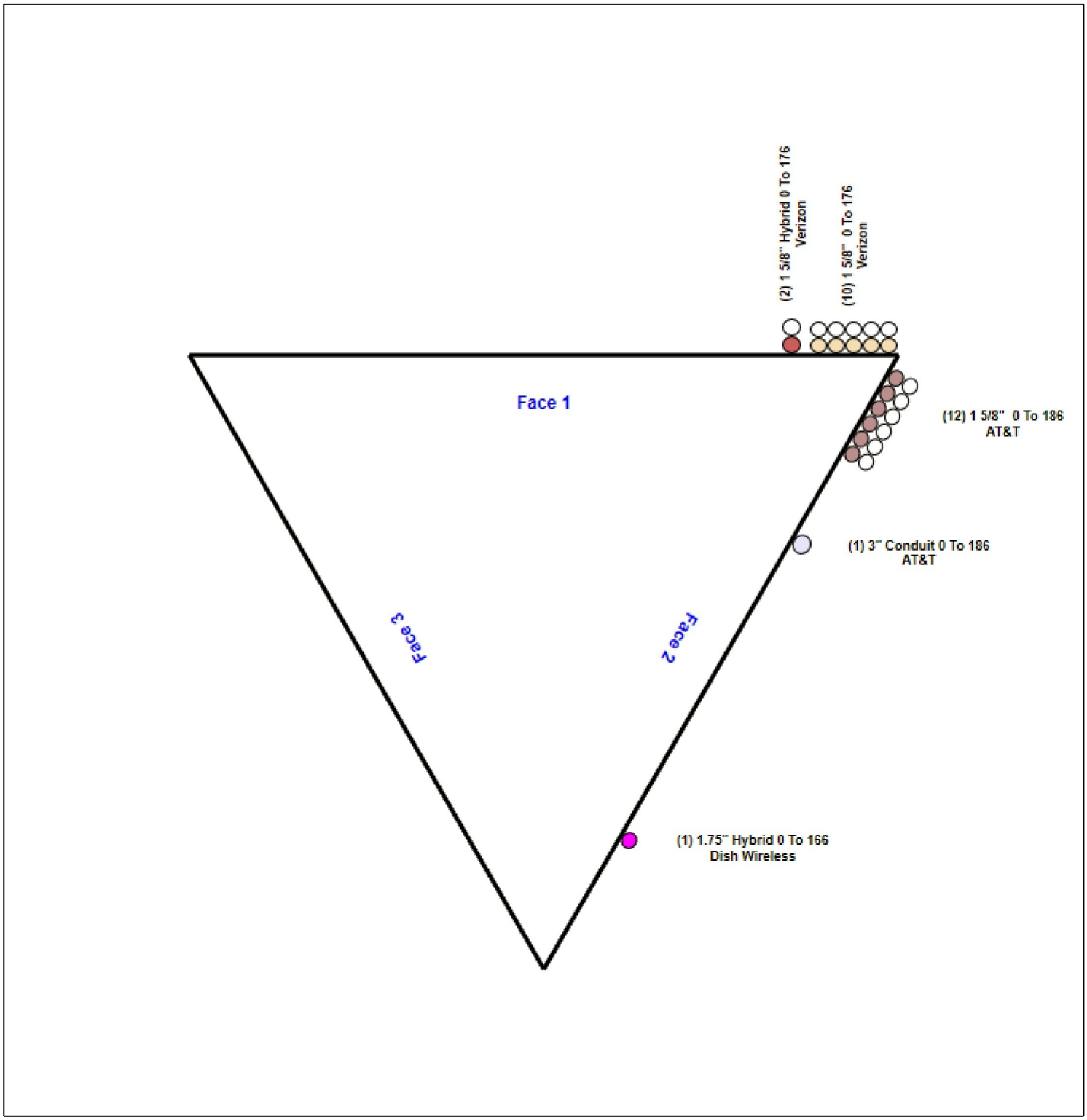


Structure: CT00802-S-SBA - Coax Line Placement

Type: Self Support
Site Name: Putnam Freight
Height: 196.00 (ft)

11/22/2021

Tower Engineering Solutions



Loading Summary

Structure:	CT00802-S-SBA		**Code:**	EIA/TIA-222-G	11/22/2021
Site Name:	Putnam Freight		**Exposure:**	C	
Height:	196.00 (ft)		**Crest Height:**	0.00	
Base Elev:	0.000 (ft)		**Site Class:**	D - Stiff Soil	
Gh:	0.85	**Topography:** 1	**Struct Class:**	II	Page: 5

Tower Engineering Solutions

Discrete Appurtenances Properties

Attach Elev (ft)	Description	Qty	No Ice Weight (lb)	No Ice CaAa (sf)	Ice Weight (lb)	Ice CaAa (sf)	Len (in)	Width (in)	Depth (in)	Ka	Orientation Factor	Vert Ecc (ft)
196.00	Sector Frame	3	450.00	14.000	929.83	23.596	0.000	0.000	0.000	0.75	0.75	0.000
186.00	Reinforing Kit	1	650.00	15.500	1763.88	37.635	0.000	0.000	0.000	1.00	1.00	0.000
186.00	7770	3	35.00	5.500	234.87	6.987	55.000	11.000	5.000	0.80	0.73	0.000
186.00	800-10966	3	125.70	17.360	639.11	19.864	96.000	20.000	6.900	0.80	0.72	0.000
186.00	OPA-65R-LCUU-H8	3	88.00	12.980	508.99	15.231	92.400	14.800	7.400	0.80	0.91	0.000
186.00	Powerwave LGP21401 TMA	6	14.10	1.290	48.20	2.430	14.400	9.200	2.600	0.80	1.00	0.000
186.00	Powerwave 21401TMA	6	14.10	1.290	48.20	2.430	14.400	9.200	2.600	0.80	1.00	0.000
186.00	Ericsson RRUS-11 (19)	3	50.70	2.520	182.58	3.437	17.000	17.800	9.200	0.80	0.67	0.000
186.00	Ericsson RRUS 4415 B30	3	46.00	1.640	102.06	2.343	15.000	13.200	5.400	0.80	0.67	0.000
186.00	Ericsson RRUS 12	3	58.00	3.150	198.80	4.155	20.400	18.500	7.500	0.80	0.67	0.000
186.00	Ericsson RRUS E2	3	59.40	3.150	147.62	4.110	20.400	18.500	7.500	0.80	0.67	0.000
186.00	Ericsson RRUS 4449 B5, B12	3	71.00	1.970	143.80	2.716	17.900	13.200	9.400	0.80	0.67	0.000
186.00	Ericsson RRUS A2	3	21.20	1.860	70.45	3.188	12.800	15.000	3.400	0.80	0.67	0.000
186.00	Raycap DC6-48-60-18-8F	2	31.80	0.920	116.12	1.517	24.000	11.000	11.000	0.80	1.00	0.000
186.00	Sector Frame	3	500.00	17.500	1452.04	36.493	0.000	0.000	0.000	0.75	0.75	0.000
176.00	JAHH-65B-R3B	6	63.30	9.110	393.53	10.966	72.000	13.800	8.200	0.80	0.83	0.000
176.00	MT6407-77A	3	79.40	4.690	252.91	5.990	35.100	16.100	5.500	0.80	0.70	0.000
176.00	Commscope CBC78T-DS-43-2X	3	10.40	0.370	43.31	0.781	6.400	6.900	4.800	0.80	0.85	0.000
176.00	Samsung B2/B66A	3	84.40	1.880	153.61	2.624	15.000	15.000	10.000	0.80	0.67	0.000
176.00	Samsung B5/B13	3	70.30	1.880	135.96	2.624	15.000	15.000	8.100	0.80	0.67	0.000
176.00	RFS DB-T1-6Z-8AB-0Z	2	18.90	4.800	182.37	6.157	24.000	24.000	10.000	0.80	0.71	0.000
176.00	Mount Mods1	1	650.00	15.500	1752.73	37.413	0.000	0.000	0.000	0.75	1.00	0.000
176.00	Mount Mods2	1	140.00	3.700	377.51	8.931	0.000	0.000	0.000	0.75	1.00	0.000
176.00	Sector Frame	3	500.00	17.500	1442.50	36.303	0.000	0.000	0.000	0.75	0.75	0.000
166.00	TA08025-B604	3	63.90	1.960	132.26	2.717	15.800	15.000	7.900	0.80	0.67	0.000
166.00	TA08025-B605	3	75.00	1.960	145.62	2.717	15.800	15.000	9.100	0.80	0.67	0.000
166.00	RDIDC-9181-PF-48	1	21.90	2.010	93.79	2.777	16.600	14.600	8.500	1.00	1.00	0.000
166.00	Commscope FFVV-65B-R2	3	73.60	11.400	440.94	13.381	72.000	18.000	7.000	0.80	0.75	0.000
166.00	(3) MTC3975083	1	1242.0	28.050	2880.83	75.637	0.000	0.000	0.000	0.75	1.00	0.000
	Totals:	**84**	**10,740.30**		**32,477.00**						**Number of Appurtenances :**	**29**

Linear Appurtenances Properties

Elev. From (ft)	Elev. To (ft)	Description	Qty	Width (in)	Weight (lb/ft)	Pct In Block	Spread On Faces	Bundling Arrangement	Cluster Dia (in)	Out of Zone	Spacing (in)	Orientation Factor	Ka Override
0.00	196.00	W/G Ladder	1	2.00	6.00	100.00	1	Individual NR		N	1.00	1.00	
0.00	196.00	W/G Ladder	1	2.00	6.00	100.00	2	Individual NR		N	1.00	1.00	
0.00	186.00	1 5/8" Coax	12	1.98	1.04	50.00	2	Block		N	1.00	1.00	
0.00	186.00	3" Conduit	1	3.00	1.61	100.00	2	Individual NR		N	1.00	1.00	
0.00	186.00	3/4" DC	6	0.75	0.40	100.00	2	Individual NR		N	1.00	1.00	
0.00	186.00	5/8" Fiber	2	0.87	0.15	100.00	2	Individual NR		N	1.00	1.00	
0.00	176.00	1 5/8" Coax	10	1.98	1.04	50.00	1	Block		N	1.00	1.00	
0.00	176.00	1 5/8" Hybrid	2	2.00	1.10	50.00	1	Block		N	1.00	1.00	
0.00	166.00	1.75" Hybrid	1	1.75	1.99	100.00	2	Individual NR		N	1.00	1.00	

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 7	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W Normal Wind — 1.2D + 1.6W 101 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	1.00	1.00	0.00	31.86	39.81	0.00	4,735.1	0.0	2253.39	902.70	3,156.09
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	1.00	1.00	0.00	31.12	39.81	0.00	4,646.8	0.0	2192.24	902.70	3,094.94
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	1.00	1.00	0.00	28.84	39.81	0.00	4,665.3	0.0	2288.34	1003.87	3,292.21
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	1.00	1.00	0.00	28.16	39.81	0.00	4,577.9	0.0	2387.73	1077.56	3,465.29
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	43.07	79.62	0.00	7,584.0	0.0	4036.19	2323.18	6,359.37
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	1.00	1.00	0.00	37.03	79.62	0.00	6,910.6	0.0	3733.80	2493.71	6,227.51
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	1.00	1.00	0.00	35.09	79.62	0.00	4,820.2	0.0	3688.04	2629.20	6,317.24
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	1.00	1.00	0.00	30.45	79.62	0.00	4,677.8	0.0	3373.07	2742.65	6,115.72
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	1.00	1.00	0.00	35.62	79.62	0.00	5,044.6	0.0	3902.88	2840.83	6,743.71
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	1.00	1.00	0.00	25.06	79.62	0.00	3,755.8	0.0	2924.83	2927.71	5,852.55
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	1.00	1.00	0.00	22.13	72.28	0.00	3,114.8	0.0	2646.36	2739.30	5,385.66
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	1.00	1.00	0.00	16.28	18.39	0.00	1,653.2	0.0	1953.15	755.91	2,709.06
														56,186.3	**0.0**			**58,719.36**

Load Case: 1.2D + 1.6W 60° Wind — 1.2D + 1.6W 101 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	0.80	1.00	0.00	27.00	39.81	0.00	4,735.1	0.0	1909.54	902.70	2,812.24
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	0.80	1.00	0.00	26.41	39.81	0.00	4,646.8	0.0	1860.59	902.70	2,763.29
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	0.80	1.00	0.00	24.28	39.81	0.00	4,665.3	0.0	1926.06	1003.87	2,929.93
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	0.80	1.00	0.00	23.73	39.81	0.00	4,577.9	0.0	2012.54	1077.56	3,090.10
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	36.82	79.62	0.00	7,584.0	0.0	3450.18	2323.18	5,773.35
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	0.80	1.00	0.00	31.98	79.62	0.00	6,910.6	0.0	3224.57	2493.71	5,718.28
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	0.80	1.00	0.00	30.45	79.62	0.00	4,820.2	0.0	3200.54	2629.20	5,829.74
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	0.80	1.00	0.00	26.18	79.62	0.00	4,677.8	0.0	2900.62	2742.65	5,643.28
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	0.80	1.00	0.00	30.38	79.62	0.00	5,044.6	0.0	3329.28	2840.83	6,170.11
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	0.80	1.00	0.00	21.75	79.62	0.00	3,755.8	0.0	2538.11	2927.71	5,465.82
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	0.80	1.00	0.00	19.22	72.28	0.00	3,114.8	0.0	2298.52	2739.30	5,037.81
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	0.80	1.00	0.00	14.16	18.39	0.00	1,653.2	0.0	1698.24	755.91	2,454.15
														56,186.3	**0.0**			**53,688.11**

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 8	

Tower Engineering Solutions

Load Case: 1.2D + 1.6W 90° Wind — 1.2D + 1.6W 101 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	0.85	1.00	0.00	28.22	39.81	0.00	4,735.1	0.0	1995.51	902.70	2,898.21
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	0.85	1.00	0.00	27.59	39.81	0.00	4,646.8	0.0	1943.50	902.70	2,846.20
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	0.85	1.00	0.00	25.42	39.81	0.00	4,665.3	0.0	2016.63	1003.87	3,020.50
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	0.85	1.00	0.00	24.84	39.81	0.00	4,577.9	0.0	2106.34	1077.56	3,183.90
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	38.38	79.62	0.00	7,584.0	0.0	3596.68	2323.18	5,919.86
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	0.85	1.00	0.00	33.24	79.62	0.00	6,910.6	0.0	3351.88	2493.71	5,845.59
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	0.85	1.00	0.00	31.61	79.62	0.00	4,820.2	0.0	3322.42	2629.20	5,951.62
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	0.85	1.00	0.00	27.25	79.62	0.00	4,677.8	0.0	3018.73	2742.65	5,761.39
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	0.85	1.00	0.00	31.69	79.62	0.00	5,044.6	0.0	3472.68	2840.83	6,313.51
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	0.85	1.00	0.00	22.57	79.62	0.00	3,755.8	0.0	2634.79	2927.71	5,562.50
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	0.85	1.00	0.00	19.95	72.28	0.00	3,114.8	0.0	2385.48	2739.30	5,124.77
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	0.85	1.00	0.00	14.69	18.39	0.00	1,653.2	0.0	1761.97	755.91	2,517.88
														56,186.3	**0.0**			**54,945.92**

Load Case: 0.9D + 1.6W Normal Wind — 0.9D + 1.6W 101 mph Wind at Normal To Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	1.00	1.00	0.00	31.86	39.81	0.00	3,551.3	0.0	2253.39	902.70	3,156.09
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	1.00	1.00	0.00	31.12	39.81	0.00	3,485.1	0.0	2192.24	902.70	3,094.94
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	1.00	1.00	0.00	28.84	39.81	0.00	3,499.0	0.0	2288.34	1003.87	3,292.21
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	1.00	1.00	0.00	28.16	39.81	0.00	3,433.4	0.0	2387.73	1077.56	3,465.29
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	43.07	79.62	0.00	5,688.0	0.0	4036.19	2323.18	6,359.37
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	1.00	1.00	0.00	37.03	79.62	0.00	5,183.0	0.0	3733.80	2493.71	6,227.51
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	1.00	1.00	0.00	35.09	79.62	0.00	3,615.2	0.0	3688.04	2629.20	6,317.24
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	1.00	1.00	0.00	30.45	79.62	0.00	3,508.4	0.0	3373.07	2742.65	6,115.72
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	1.00	1.00	0.00	35.62	79.62	0.00	3,783.5	0.0	3902.88	2840.83	6,743.71
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	1.00	1.00	0.00	25.06	79.62	0.00	2,816.9	0.0	2924.83	2927.71	5,852.55
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	1.00	1.00	0.00	22.13	72.28	0.00	2,336.1	0.0	2646.36	2739.30	5,385.66
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	1.00	1.00	0.00	16.28	18.39	0.00	1,239.9	0.0	1953.15	755.91	2,709.06
														42,139.7	**0.0**			**58,719.36**

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 9	

Tower Engineering Solutions

Load Case: 0.9D + 1.6W 60° Wind — 0.9D + 1.6W 101 mph Wind at 60° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	0.80	1.00	0.00	27.00	39.81	0.00	3,551.3	0.0	1909.54	902.70	2,812.24
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	0.80	1.00	0.00	26.41	39.81	0.00	3,485.1	0.0	1860.59	902.70	2,763.29
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	0.80	1.00	0.00	24.28	39.81	0.00	3,499.0	0.0	1926.06	1003.87	2,929.93
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	0.80	1.00	0.00	23.73	39.81	0.00	3,433.4	0.0	2012.54	1077.56	3,090.10
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	36.82	79.62	0.00	5,688.0	0.0	3450.18	2323.18	5,773.35
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	0.80	1.00	0.00	31.98	79.62	0.00	5,183.0	0.0	3224.57	2493.71	5,718.28
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	0.80	1.00	0.00	30.45	79.62	0.00	3,615.2	0.0	3200.54	2629.20	5,829.74
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	0.80	1.00	0.00	26.18	79.62	0.00	3,508.4	0.0	2900.62	2742.65	5,643.28
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	0.80	1.00	0.00	30.38	79.62	0.00	3,783.5	0.0	3329.28	2840.83	6,170.11
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	0.80	1.00	0.00	21.75	79.62	0.00	2,816.9	0.0	2538.11	2927.71	5,465.82
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	0.80	1.00	0.00	19.22	72.28	0.00	2,336.1	0.0	2298.52	2739.30	5,037.81
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	0.80	1.00	0.00	14.16	18.39	0.00	1,239.9	0.0	1698.24	755.91	2,454.15
														42,139.7	**0.0**			**53,688.11**

Load Case: 0.9D + 1.6W 90° Wind — 0.9D + 1.6W 101 mph Wind at 90° From Face

Wind Load Factor: 1.60 — **Wind Importance Factor:** 1.00

Dead Load Factor: 0.90

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	18.87	24.312	17.95	0.00	0.15	2.76	0.85	1.00	0.00	28.22	39.81	0.00	3,551.3	0.0	1995.51	902.70	2,898.21
2	15.0	18.87	23.540	17.95	0.00	0.16	2.75	0.85	1.00	0.00	27.59	39.81	0.00	3,485.1	0.0	1943.50	902.70	2,846.20
3	25.0	20.98	22.832	14.40	0.00	0.15	2.78	0.85	1.00	0.00	25.42	39.81	0.00	3,499.0	0.0	2016.63	1003.87	3,020.50
4	35.0	22.52	22.121	14.40	0.00	0.15	2.77	0.85	1.00	0.00	24.84	39.81	0.00	3,433.4	0.0	2106.34	1077.56	3,183.90
5	50.0	24.28	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	38.38	79.62	0.00	5,688.0	0.0	3596.68	2323.18	5,919.86
6	70.0	26.06	25.252	28.80	0.00	0.13	2.84	0.85	1.00	0.00	33.24	79.62	0.00	5,183.0	0.0	3351.88	2493.71	5,845.59
7	90.0	27.48	23.189	28.80	0.00	0.14	2.81	0.85	1.00	0.00	31.61	79.62	0.00	3,615.2	0.0	3322.42	2629.20	5,951.62
8	110.0	28.66	21.325	22.12	0.00	0.13	2.84	0.85	1.00	0.00	27.25	79.62	0.00	3,508.4	0.0	3018.73	2742.65	5,761.39
9	130.0	29.69	26.175	22.12	0.00	0.17	2.71	0.85	1.00	0.00	31.69	79.62	0.00	3,783.5	0.0	3472.68	2840.83	6,313.51
10	150.0	30.60	16.566	18.57	0.00	0.14	2.80	0.85	1.00	0.00	22.57	79.62	0.00	2,816.9	0.0	2634.79	2927.71	5,562.50
11	170.0	31.41	14.543	15.02	0.00	0.14	2.80	0.85	1.00	0.00	19.95	72.28	0.00	2,336.1	0.0	2385.48	2739.30	5,124.77
12	188.0	32.09	10.623	10.68	0.00	0.16	2.75	0.85	1.00	0.00	14.69	18.39	0.00	1,239.9	0.0	1761.97	755.91	2,517.88
														42,139.7	**0.0**			**54,945.92**

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 10	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi Normal Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	4.62	24.312	39.93	21.98	0.23	2.49	1.00	1.00	1.66	47.50	53.61	27.60	10,491.	5756.2	465.30	300.80	766.10
2	15.0	4.62	23.540	41.93	23.98	0.25	2.45	1.00	1.00	1.85	48.02	55.21	30.81	11,089.	6442.9	462.78	316.38	779.17
3	25.0	5.14	22.832	39.06	24.66	0.24	2.46	1.00	1.00	1.95	45.61	56.02	32.42	11,239.	6574.4	490.56	362.46	853.01
4	35.0	5.52	22.121	39.30	24.91	0.25	2.44	1.00	1.00	2.01	45.12	56.57	33.53	11,296.	6718.2	515.85	394.56	910.41
5	50.0	5.95	31.267	76.31	47.51	0.23	2.49	1.00	1.00	2.08	75.61	114.36	69.50	18,294.	10710.3	951.76	877.06	1,828.82
6	70.0	6.39	25.252	75.34	46.55	0.24	2.47	1.00	1.00	2.16	69.13	115.55	71.87	17,259.	10348.4	927.69	956.72	1,884.41
7	90.0	6.73	23.189	73.92	45.12	0.25	2.42	1.00	1.00	2.21	66.51	116.47	73.70	15,165.	10345.6	922.99	1013.64	1,936.64
8	110.0	7.02	21.325	65.57	43.45	0.26	2.42	1.00	1.00	2.26	59.79	117.21	75.20	14,623.	9945.4	863.11	1068.40	1,931.51
9	130.0	7.28	26.175	73.01	50.89	0.33	2.21	1.00	1.00	2.29	70.68	117.85	76.46	16,079.	11035.0	967.89	1064.56	2,032.45
10	150.0	7.50	16.566	66.07	47.49	0.32	2.24	1.00	1.00	2.33	56.60	118.40	77.57	13,379.	9623.5	808.17	1114.10	1,922.27
11	170.0	7.70	14.543	59.09	44.07	0.34	2.19	1.00	1.00	2.36	50.77	108.40	73.04	11,851.	8736.1	727.75	1048.10	1,775.84
12	188.0	7.86	10.623	49.63	38.94	0.42	2.02	1.00	1.00	2.38	42.68	33.47	21.42	6,184.5	4531.2	576.97	322.90	899.87
														156,953.5	**100767.3**			**17,520.50**

Load Case: 1.2D + 1.0Di + 1.0Wi 60° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face

Wind Load Factor: 1.00
Dead Load Factor: 1.20
Ice Dead Load Factor: 1.00
Wind Importance Factor: 1.00
Ice Importance Factor: 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	4.62	24.312	39.93	21.98	0.23	2.49	0.80	1.00	1.66	42.64	53.61	27.60	10,491.	5756.2	417.67	300.80	718.48
2	15.0	4.62	23.540	41.93	23.98	0.25	2.45	0.80	1.00	1.85	43.31	55.21	30.81	11,089.	6442.9	417.41	316.38	733.79
3	25.0	5.14	22.832	39.06	24.66	0.24	2.46	0.80	1.00	1.95	41.04	56.02	32.42	11,239.	6574.4	441.44	362.46	803.90
4	35.0	5.52	22.121	39.30	24.91	0.25	2.44	0.80	1.00	2.01	40.69	56.57	33.53	11,296.	6718.2	465.26	394.56	859.82
5	50.0	5.95	31.267	76.31	47.51	0.23	2.49	0.80	1.00	2.08	69.36	114.36	69.50	18,294.	10710.3	873.04	877.06	1,750.10
6	70.0	6.39	25.252	75.34	46.55	0.24	2.47	0.80	1.00	2.16	64.07	115.55	71.87	17,259.	10348.4	859.91	956.72	1,816.63
7	90.0	6.73	23.189	73.92	45.12	0.25	2.42	0.80	1.00	2.21	61.87	116.47	73.70	15,165.	10345.6	858.63	1013.64	1,872.28
8	110.0	7.02	21.325	65.57	43.45	0.26	2.42	0.80	1.00	2.26	55.52	117.21	75.20	14,623.	9945.4	801.54	1068.40	1,869.94
9	130.0	7.28	26.175	73.01	50.89	0.33	2.21	0.80	1.00	2.29	65.45	117.85	76.46	16,079.	11035.0	896.20	1064.56	1,960.76
10	150.0	7.50	16.566	66.07	47.49	0.32	2.24	0.80	1.00	2.33	53.28	118.40	77.57	13,379.	9623.5	760.86	1114.10	1,874.96
11	170.0	7.70	14.543	59.09	44.07	0.34	2.19	0.80	1.00	2.36	47.86	108.40	73.04	11,851.	8736.1	686.06	1048.10	1,734.15
12	188.0	7.86	10.623	49.63	38.94	0.42	2.02	0.80	1.00	2.38	40.55	33.47	21.42	6,184.5	4531.2	548.24	322.90	871.14
														156,953.5	**100767.3**			**16,865.96**

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 11	

Tower Engineering Solutions

Load Case: 1.2D + 1.0Di + 1.0Wi 90° Wind — 1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.20

Ice Dead Load Factor: 1.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	4.62	24.312	39.93	21.98	0.23	2.49	0.85	1.00	1.66	43.86	53.61	27.60	10,491.	5756.2	429.58	300.80	730.38
2	15.0	4.62	23.540	41.93	23.98	0.25	2.45	0.85	1.00	1.85	44.49	55.21	30.81	11,089.	6442.9	428.75	316.38	745.14
3	25.0	5.14	22.832	39.06	24.66	0.24	2.46	0.85	1.00	1.95	42.18	56.02	32.42	11,239.	6574.4	453.72	362.46	816.18
4	35.0	5.52	22.121	39.30	24.91	0.25	2.44	0.85	1.00	2.01	41.80	56.57	33.53	11,296.	6718.2	477.91	394.56	872.47
5	50.0	5.95	31.267	76.31	47.51	0.23	2.49	0.85	1.00	2.08	70.92	114.36	69.50	18,294.	10710.3	892.72	877.06	1,769.78
6	70.0	6.39	25.252	75.34	46.55	0.24	2.47	0.85	1.00	2.16	65.34	115.55	71.87	17,259.	10348.4	876.86	956.72	1,833.57
7	90.0	6.73	23.189	73.92	45.12	0.25	2.42	0.85	1.00	2.21	63.03	116.47	73.70	15,165.	10345.6	874.72	1013.64	1,888.37
8	110.0	7.02	21.325	65.57	43.45	0.26	2.42	0.85	1.00	2.26	56.59	117.21	75.20	14,623.	9945.4	816.93	1068.40	1,885.33
9	130.0	7.28	26.175	73.01	50.89	0.33	2.21	0.85	1.00	2.29	66.76	117.85	76.46	16,079.	11035.0	914.12	1064.56	1,978.68
10	150.0	7.50	16.566	66.07	47.49	0.32	2.24	0.85	1.00	2.33	54.11	118.40	77.57	13,379.	9623.5	772.68	1114.10	1,886.79
11	170.0	7.70	14.543	59.09	44.07	0.34	2.19	0.85	1.00	2.36	48.59	108.40	73.04	11,851.	8736.1	696.48	1048.10	1,744.58
12	188.0	7.86	10.623	49.63	38.94	0.42	2.02	0.85	1.00	2.38	41.08	33.47	21.42	6,184.5	4531.2	555.43	322.90	878.33
														156,953.5	**100767.3**			**17,029.59**

Load Case: 1.0D + 1.0W Normal Wind — 1.0D + 1.0W 60 mph Wind at Normal To Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	6.66	24.312	17.95	0.00	0.15	2.76	1.00	1.00	0.00	33.06	39.81	0.00	3,945.9	0.0	515.61	199.11	714.72
2	15.0	6.66	23.540	17.95	0.00	0.16	2.75	1.00	1.00	0.00	32.30	39.81	0.00	3,872.3	0.0	501.90	199.11	701.01
3	25.0	7.40	22.832	14.40	0.00	0.15	2.78	1.00	1.00	0.00	30.33	39.81	0.00	3,887.8	0.0	530.77	221.42	752.19
4	35.0	7.95	22.121	14.40	0.00	0.15	2.77	1.00	1.00	0.00	29.53	39.81	0.00	3,814.9	0.0	552.36	237.67	790.03
5	50.0	8.57	31.267	28.80	0.00	0.13	2.84	1.00	1.00	0.00	45.72	79.62	0.00	6,320.0	0.0	945.12	512.42	1,457.54
6	70.0	9.20	25.252	28.80	0.00	0.13	2.84	1.00	1.00	0.00	39.47	79.62	0.00	5,758.9	0.0	877.76	550.03	1,427.79
7	90.0	9.70	23.189	28.80	0.00	0.14	2.81	1.00	1.00	0.00	37.30	79.62	0.00	4,016.9	0.0	864.72	579.91	1,444.64
8	110.0	10.12	21.325	22.12	0.00	0.13	2.84	1.00	1.00	0.00	33.23	79.62	0.00	3,898.2	0.0	811.97	604.94	1,416.91
9	130.0	10.48	26.175	22.12	0.00	0.17	2.71	1.00	1.00	0.00	38.15	79.62	0.00	4,203.8	0.0	921.95	626.59	1,548.55
10	150.0	10.80	16.566	18.57	0.00	0.14	2.80	1.00	1.00	0.00	27.03	79.62	0.00	3,129.9	0.0	695.98	645.76	1,341.74
11	170.0	11.09	14.543	15.02	0.00	0.14	2.80	1.00	1.00	0.00	23.06	72.28	0.00	2,595.7	0.0	608.26	604.20	1,212.46
12	188.0	11.32	10.623	10.68	0.00	0.16	2.75	1.00	1.00	0.00	16.69	18.39	0.00	1,377.7	0.0	441.76	166.73	608.49
														46,821.9	**0.0**			**13,416.05**

Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 12	

Tower Engineering Solutions

Load Case: 1.0D + 1.0W 60° Wind — 1.0D + 1.0W 60 mph Wind at 60° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	6.66	24.312	17.95	0.00	0.15	2.76	0.80	1.00	0.00	28.19	39.81	0.00	3,945.9	0.0	439.77	199.11	638.88
2	15.0	6.66	23.540	17.95	0.00	0.16	2.75	0.80	1.00	0.00	27.59	39.81	0.00	3,872.3	0.0	428.75	199.11	627.86
3	25.0	7.40	22.832	14.40	0.00	0.15	2.78	0.80	1.00	0.00	25.76	39.81	0.00	3,887.8	0.0	450.86	221.42	672.28
4	35.0	7.95	22.121	14.40	0.00	0.15	2.77	0.80	1.00	0.00	25.11	39.81	0.00	3,814.9	0.0	469.60	237.67	707.27
5	50.0	8.57	31.267	28.80	0.00	0.13	2.84	0.80	1.00	0.00	39.47	79.62	0.00	6,320.0	0.0	815.87	512.42	1,328.28
6	70.0	9.20	25.252	28.80	0.00	0.13	2.84	0.80	1.00	0.00	34.42	79.62	0.00	5,758.9	0.0	765.44	550.03	1,315.47
7	90.0	9.70	23.189	28.80	0.00	0.14	2.81	0.80	1.00	0.00	32.66	79.62	0.00	4,016.9	0.0	757.20	579.91	1,337.11
8	110.0	10.12	21.325	22.12	0.00	0.13	2.84	0.80	1.00	0.00	28.97	79.62	0.00	3,898.2	0.0	707.76	604.94	1,312.70
9	130.0	10.48	26.175	22.12	0.00	0.17	2.71	0.80	1.00	0.00	32.91	79.62	0.00	4,203.8	0.0	795.44	626.59	1,422.03
10	150.0	10.80	16.566	18.57	0.00	0.14	2.80	0.80	1.00	0.00	23.72	79.62	0.00	3,129.9	0.0	610.68	645.76	1,256.44
11	170.0	11.09	14.543	15.02	0.00	0.14	2.80	0.80	1.00	0.00	20.15	72.28	0.00	2,595.7	0.0	531.54	604.20	1,135.74
12	188.0	11.32	10.623	10.68	0.00	0.16	2.75	0.80	1.00	0.00	14.57	18.39	0.00	1,377.7	0.0	385.54	166.73	552.27
														46,821.9	**0.0**			**12,306.33**

Load Case: 1.0D + 1.0W 90° Wind — 1.0D + 1.0W 60 mph Wind at 90° From Face

Wind Load Factor: 1.00 — **Wind Importance Factor:** 1.00

Dead Load Factor: 1.00

Ice Dead Load Factor: 0.00 — **Ice Importance Factor:** 1.00

Sect Seq	Wind Height (ft)	qz (psf)	Total Flat Area (sqft)	Total Round Area (sqft)	Ice Round Area (sqft)	Sol Ratio	Cf	Df	Dr	Ice Thick (in)	Eff Area (sqft)	Linear Area (sqft)	Ice Linear Area (sqft)	Total Weight (lb)	Weight Ice (lb)	Struct Force (lb)	Linear Force (lb)	Total Force (lb)
1	5.0	6.66	24.312	17.95	0.00	0.15	2.76	0.85	1.00	0.00	29.41	39.81	0.00	3,945.9	0.0	458.73	199.11	657.84
2	15.0	6.66	23.540	17.95	0.00	0.16	2.75	0.85	1.00	0.00	28.77	39.81	0.00	3,872.3	0.0	447.04	199.11	646.15
3	25.0	7.40	22.832	14.40	0.00	0.15	2.78	0.85	1.00	0.00	26.91	39.81	0.00	3,887.8	0.0	470.84	221.42	692.26
4	35.0	7.95	22.121	14.40	0.00	0.15	2.77	0.85	1.00	0.00	26.21	39.81	0.00	3,814.9	0.0	490.29	237.67	727.96
5	50.0	8.57	31.267	28.80	0.00	0.13	2.84	0.85	1.00	0.00	41.03	79.62	0.00	6,320.0	0.0	848.18	512.42	1,360.60
6	70.0	9.20	25.252	28.80	0.00	0.13	2.84	0.85	1.00	0.00	35.68	79.62	0.00	5,758.9	0.0	793.52	550.03	1,343.55
7	90.0	9.70	23.189	28.80	0.00	0.14	2.81	0.85	1.00	0.00	33.82	79.62	0.00	4,016.9	0.0	784.08	579.91	1,363.99
8	110.0	10.12	21.325	22.12	0.00	0.13	2.84	0.85	1.00	0.00	30.03	79.62	0.00	3,898.2	0.0	733.82	604.94	1,338.75
9	130.0	10.48	26.175	22.12	0.00	0.17	2.71	0.85	1.00	0.00	34.22	79.62	0.00	4,203.8	0.0	827.06	626.59	1,453.66
10	150.0	10.80	16.566	18.57	0.00	0.14	2.80	0.85	1.00	0.00	24.55	79.62	0.00	3,129.9	0.0	632.01	645.76	1,277.76
11	170.0	11.09	14.543	15.02	0.00	0.14	2.80	0.85	1.00	0.00	20.88	72.28	0.00	2,595.7	0.0	550.72	604.20	1,154.92
12	188.0	11.32	10.623	10.68	0.00	0.16	2.75	0.85	1.00	0.00	15.10	18.39	0.00	1,377.7	0.0	399.60	166.73	566.32
														46,821.9	**0.0**			**12,583.76**

Force/Stress Compression Summary

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 13	

Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	10	PST - 10" DIA PIPE	-355.94	1.2D + 1.6W Normal Wind	10.02	50	50	50	16.38	50.00	525.10	67.8	Member X
2	20	PST - 10" DIA PIPE	-335.67	1.2D + 1.6W Normal Wind	10.02	50	50	50	16.38	50.00	525.10	63.9	Member X
3	30	PX - 8" DIA PIPE	-315.27	1.2D + 1.6W Normal Wind	10.02	50	50	50	20.88	50.00	556.18	56.7	Member X
4	40	PX - 8" DIA PIPE	-294.73	1.2D + 1.6W Normal Wind	10.02	50	50	50	20.88	50.00	556.18	53.0	Member X
5	60	PX - 8" DIA PIPE	-283.91	1.2D + 1.6W Normal Wind	10.02	100	100	100	41.77	50.00	505.44	56.2	Member X
6	80	PX - 8" DIA PIPE	-243.81	1.2D + 1.6W Normal Wind	10.02	100	100	100	41.77	50.00	505.44	48.2	Member X
7	100	PST - 8" DIA PIPE	-203.35	1.2D + 1.6W Normal Wind	10.02	100	100	100	40.88	50.00	334.51	60.8	Member X
8	120	PX - 6" DIA PIPE	-163.41	1.2D + 1.6W Normal Wind	10.02	100	100	100	54.89	50.00	303.27	53.9	Member X
9	140	PX - 6" DIA PIPE	-126.10	1.2D + 1.6W Normal Wind	6.68	100	100	100	36.59	50.00	342.75	36.8	Member X
10	160	PX - 5" DIA PIPE	-85.34	1.2D + 1.6W Normal Wind	6.68	100	100	100	43.55	50.00	239.35	35.7	Member X
11	180	PSP - 4.5 x 0.438	-44.35	1.2D + 1.6W Normal Wind	6.68	100	100	100	55.78	50.00	200.33	22.1	Member X
12	196	PX - 3-1/2" DIA PIPE	-9.29	1.2D + 1.6W Normal Wind	5.34	100	100	100	48.94	50.00	139.00	6.7	Member X

Splices

		Top Splice						Bottom Splice					
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	10	1.2D + 1.6W Normal Wind	354.73	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	375.38	0.00			
2	20	1.2D + 1.6W Normal Wind	334.47	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	354.73	0.00			
3	30	1.2D + 1.6W Normal Wind	314.13	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	334.47	0.00		. 3/8 A325	6
4	40	1.2D + 1.6W Normal Wind	293.59	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	314.13	0.00		. 3/8 A325	6
5	60	1.2D + 1.6W Normal Wind	253.94	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	293.59	0.00		. 3/8 A325	6
6	80	1.2D + 1.6W Normal Wind	213.51	0.00	0.0	1 3/8	6	1.2D + 1.6W Normal Wind	253.94	0.00		. 3/8 A325	6
7	100	1.2D + 1.6W Normal Wind	173.29	0.00	0.0	1 1/4	6	1.2D + 1.6W Normal Wind	213.51	0.00		. 3/8 A325	6
8	120	1.2D + 1.6W Normal Wind	132.70	0.00	0.0	1 1/4	6	1.2D + 1.6W Normal Wind	173.29	0.00		. 1/4 A325	6
9	140	1.2D + 1.6W Normal Wind	91.91	0.00	0.0	1 1/4	4	1.2D + 1.6W Normal Wind	132.70	0.00		. 1/4 A325	6
10	160	1.2D + 1.6W Normal Wind	51.11	0.00	0.0	1 1/4	4	1.2D + 1.6W Normal Wind	91.91	0.00		. 1/4 A325	4
11	180	1.2D + 1.6W Normal Wind	13.04	0.00	0.0	1 A325	4	1.2D + 1.6W Normal Wind	51.11	0.00		. 1/4 A325	4
12	196	1.2D + 1.0Di + 1.0Wi 60° Wind	1.62	0.00	0.0			1.2D + 1.6W Normal Wind	13.04	0.00		1 A325	4

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	10	SAE - 4X4X0.375	-12.4	0.9D + 1.6W 90° Wind	13.00	100	100	100	167.95	36.00	22.91	2	1	24.86	52.20	54	Member Z
2	20	SAE - 4X4X0.375	-12.6	0.9D + 1.6W 90° Wind	12.50	100	100	100	163.27	36.00	24.24	2	1	24.86	52.20	52	Member Z
3	30	SAE - 4X4X0.375	-12.1	0.9D + 1.6W 90° Wind	12.00	100	100	100	158.59	36.00	25.69	2	1	24.86	52.20	49	Bolt Shear
4	40	SAE - 4X4X0.375	-11.8	0.9D + 1.6W 90° Wind	11.50	100	100	100	153.90	36.00	27.28	2	1	24.86	52.20	48	Bolt Shear
5	60										0.00	0	0				
6	80										0.00	0	0				
7	100										0.00	0	0				
8	120										0.00	0	0				
9	140										0.00	0	0				
10	160										0.00	0	0				
11	180										0.00	0	0				
12	196	SAE - 2X2X0.1875	-0.61	1.2D + 1.6W 60° Wind	7.40	100	100	100	225.38	36.00	3.16	1	1	12.43	9.79	19	Member Z

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls

Force/Stress Compression Summary

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 14	

Tower Engineering Solutions

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Len (ft)	Bracing % X	Y	Z	KL/R	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	Use %	Controls
1	10	SAE - 3.5X3.5X0.375	-16.6	1.2D + 1.6W 90° Wind	16.80	48	96	48	157.46	36.00	22.60	2	1	24.86	52.2	74	Member Y
2	20	SAE - 3.5X3.5X0.375	-17.4	1.2D + 1.6W 90° Wind	16.40	48	96	48	154.81	36.00	23.38	2	1	24.86	52.2	75	Member Y
3	30	SAE - 3.5X3.5X0.375	-17.0	1.2D + 1.6W 90° Wind	16.01	48	96	48	152.21	36.00	24.18	2	1	24.86	50.2	70	Member Y
4	40	SAE - 3.5X3.5X0.375	-16.7	1.2D + 1.6W 90° Wind	15.62	48	96	48	149.65	36.00	25.02	2	1	24.86	50.2	67	Bolt Shear
5	60	SAE - 4X4X0.375	-12.8	1.2D + 1.6W 90° Wind	24.62	48	48	48	179.99	36.00	19.94	1	1	17.89	21.5	72	Bolt Shear
6	80	SAE - 3.5X3.5X0.375	-11.9	1.2D + 1.6W 90° Wind	22.81	50	50	50	199.22	36.00	14.12	1	1	17.89	21.5	85	Member Z
7	100	SAE - 3.5X3.5X0.25	-11.1	1.2D + 1.6W 90° Wind	21.03	50	50	50	181.83	36.00	11.55	1	1	17.89	14.3	97	Member Z
8	120	SAE - 3.5X3.5X0.25	-10.4	1.2D + 1.6W 90° Wind	19.30	50	50	50	166.82	36.00	13.72	1	1	17.89	14.3	76	Member Z
9	140	SAE - 3.5X3.5X0.25	-8.70	1.2D + 1.6W 90° Wind	16.11	50	50	50	139.30	36.00	19.68	1	1	17.89	14.3	61	Bolt Bear
10	160	SAE - 2.5X2.5X0.25	-7.81	1.2D + 1.6W 90° Wind	14.32	50	50	50	174.93	36.00	8.79	1	1	12.43	14.7	89	Member Z
11	180	SAE - 2.5X2.5X0.1875	-7.26	1.2D + 1.6W 90° Wind	12.58	50	50	50	152.49	36.00	8.76	1	1	12.43	11.0	83	Member Z
12	196	SAE - 2X2X0.1875	-3.66	1.2D + 1.6W 90° Wind	10.23	50	50	50	155.85	36.00	6.60	1	1	12.43	11.0	55	Member Z

Force/Stress Tension Summary

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 15	

TES Tower Engineering Solutions

LEG MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Leg Use %	Controls
1	10	PST - 10" DIA PIPE	299.25	0.9D + 1.6W 60° Wind	50	535.50	55.9	Member
2	20	PST - 10" DIA PIPE	282.75	0.9D + 1.6W 60° Wind	50	535.50	52.8	Member
3	30	PX - 8" DIA PIPE	266.50	0.9D + 1.6W 60° Wind	50	574.20	46.4	Member
4	40	PX - 8" DIA PIPE	250.05	0.9D + 1.6W 60° Wind	50	574.20	43.5	Member
5	60	PX - 8" DIA PIPE	241.49	0.9D + 1.6W 60° Wind	50	574.20	42.1	Member
6	80	PX - 8" DIA PIPE	208.26	0.9D + 1.6W 60° Wind	50	574.20	36.3	Member
7	100	PST - 8" DIA PIPE	174.22	0.9D + 1.6W 60° Wind	50	378.00	46.1	Member
8	120	PX - 6" DIA PIPE	139.27	0.9D + 1.6W 60° Wind	50	378.00	36.8	Member
9	140	PX - 6" DIA PIPE	106.53	0.9D + 1.6W 60° Wind	50	378.00	28.2	Member
10	160	PX - 5" DIA PIPE	70.49	0.9D + 1.6W 60° Wind	50	274.95	25.6	Member
11	180	PSP - 4.5 x 0.438	32.96	0.9D + 1.6W 60° Wind	50	251.51	13.1	Member
12	196	PX - 3-1/2" DIA PIPE	4.39	0.9D + 1.6W 60° Wind	50	165.60	2.7	Member

Splices

		Top Splice					Bottom Splice					
Sect	Top Elev	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts	Load Case	Force (kips)	Cap (kips)	Use %	Bolt Type	Num Bolts
1	10	0.9D + 1.6W 60° Wind	298.19	545.68	54.6	1 3/8	6	0.9D + 1.6W 60° Wind	316.2	0.00			
2	20	0.9D + 1.6W 60° Wind	281.70	545.68	51.6	1 3/8	6	0.9D + 1.6W 60° Wind	298.1	0.00			
3	30	0.9D + 1.6W 60° Wind	265.49	545.68	48.7	1 3/8	6	0.9D + 1.6W 60° Wind	281.7	545.68	51.6	1 3/8 A325	6
4	40	0.9D + 1.6W 60° Wind	248.99	545.68	45.6	1 3/8	6	0.9D + 1.6W 60° Wind	265.4	545.68	48.7	1 3/8 A325	6
5	60	0.9D + 1.6W 60° Wind	215.44	545.68	39.5	1 3/8	6	0.9D + 1.6W 60° Wind	248.9	545.68	45.6	1 3/8 A325	6
6	80	0.9D + 1.6W 60° Wind	181.66	545.68	33.3	1 3/8	6	0.9D + 1.6W 60° Wind	215.4	545.68	39.5	1 3/8 A325	6
7	100	0.9D + 1.6W 60° Wind	147.14	457.92	32.1	1 1/4	6	0.9D + 1.6W 60° Wind	181.6	545.68	33.3	1 3/8 A325	6
8	120	0.9D + 1.6W 60° Wind	111.44	457.92	24.3	1 1/4	6	0.9D + 1.6W 60° Wind	147.1	457.92	32.1	1 1/4 A325	6
9	140	0.9D + 1.6W 60° Wind	75.79	305.28	24.8	1 1/4	4	0.9D + 1.6W 60° Wind	111.4	457.92	24.3	1 1/4 A325	6
10	160	0.9D + 1.6W 60° Wind	38.81	305.28	12.7	1 1/4	4	0.9D + 1.6W 60° Wind	75.79	305.28	24.8	1 1/4 A325	4
11	180	0.9D + 1.6W 60° Wind	7.39	212.04	3.5	1 A325	4	0.9D + 1.6W 60° Wind	38.81	305.28	12.7	1 1/4 A325	4
12	196		0.00	0.00	0.0			0.9D + 1.6W 60° Wind	7.39	212.04	3.5	1 A325	4

HORIZONTAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	10	SAE - 4X4X0.375	12.97	1.2D + 1.6W 90° Wind	36	92.66	2	1	24.86	52.20	46.25	52.2	Bolt Shear
2	20	SAE - 4X4X0.375	13.19	1.2D + 1.6W 90° Wind	36	92.66	2	1	24.86	52.20	46.25	53.1	Bolt Shear
3	30	SAE - 4X4X0.375	12.60	1.2D + 1.6W 90° Wind	36	92.66	2	1	24.86	52.20	46.25	50.7	Bolt Shear
4	40	SAE - 4X4X0.375	11.92	1.2D + 1.6W 90° Wind	36	92.66	2	1	24.86	52.20	46.25	47.9	Bolt Shear
5	60	-			36	0.00	0	0					
6	80	-			36	0.00	0	0					
7	100	-			36	0.00	0	0					
8	120	-			36	0.00	0	0					
9	140	-			36	0.00	0	0					
10	160	-			36	0.00	0	0					
11	180	-			36	0.00	0	0					
12	196	SAE - 2X2X0.1875	0.56	0.9D + 1.6W Normal Wi	36	23.00	1	1	12.43	9.79	8.51	6.6	Blck Shear

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
1	10	SAE - 3.5X3.5X0.375	15.83	0.9D + 1.6W 90° Wind	36	71.73	2	1	24.86	52.20	38.10	63.7	Bolt Shear

Force/Stress Tension Summary

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 16	

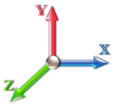
Tower Engineering Solutions

DIAGONAL MEMBERS

Sect	Top Elev	Member	Force (kips)	Load Case	Fy (ksi)	Mem Cap (kips)	Num Bolts	Num Holes	Shear Cap (kips)	Bear Cap (kips)	B.S. Cap (kips)	Use %	Controls
2	20	SAE - 3.5X3.5X0.375	16.37	0.9D + 1.6W 90° Wind	36	71.73	2	1	24.86	52.20	38.10	65.8	Bolt Shear
3	30	SAE - 3.5X3.5X0.375	15.94	0.9D + 1.6W 90° Wind	36	71.73	2	1	24.86	50.24	37.34	64.1	Bolt Shear
4	40	SAE - 3.5X3.5X0.375	15.72	0.9D + 1.6W 90° Wind	36	71.73	2	1	24.86	50.24	37.34	63.2	Bolt Shear
5	60	SAE - 4X4X0.375	12.57	0.9D + 1.6W 90° Wind	36	82.60	1	1	17.89	21.53	24.93	70.3	Bolt Shear
6	80	SAE - 3.5X3.5X0.375	11.77	0.9D + 1.6W 90° Wind	36	70.20	1	1	17.89	21.53	24.93	65.8	Bolt Shear
7	100	SAE - 3.5X3.5X0.25	10.99	1.2D + 1.6W 90° Wind	36	48.00	1	1	17.89	14.35	16.62	76.5	Bolt Bear
8	120	SAE - 3.5X3.5X0.25	10.31	1.2D + 1.6W 90° Wind	36	48.00	1	1	17.89	14.35	16.62	71.8	Bolt Bear
9	140	SAE - 3.5X3.5X0.25	8.69	1.2D + 1.6W 90° Wind	36	48.00	1	1	17.89	14.35	16.62	60.5	Bolt Bear
10	160	SAE - 2.5X2.5X0.25	7.73	1.2D + 1.6W 90° Wind	36	32.71	1	1	12.43	14.79	13.22	62.2	Bolt Shear
11	180	SAE - 2.5X2.5X0.1875	7.27	1.2D + 1.6W 90° Wind	36	24.84	1	1	12.43	11.09	9.91	73.3	Blck Shear
12	196	SAE - 2X2X0.1875	3.59	0.9D + 1.6W 90° Wind	36	18.58	1	1	12.43	11.09	7.88	45.6	Blck Shear

Seismic Section Forces

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 17	



IES
Tower Engineering Solutions

Load Case: 1.2D + 1.0E

Dead Load Factor	1.20	**Sds**	0.183	**Ss**	0.1720	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.100	**S1**	0.0630	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.183	**R**	3.0000	**Vs**	4.2264	**f1**	1.9763

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	5.00	3945.9	0.00	0.03	0.01	6.59
2	15.00	3872.3	0.01	0.06	0.03	15.72
3	25.00	3887.7	0.03	0.07	0.04	23.10
4	35.00	3814.9	0.06	0.07	0.04	30.16
5	50.00	6320.0	0.12	0.07	0.03	73.32
6	70.00	5758.8	0.24	0.06	0.02	104.03
7	90.00	4016.8	0.40	0.02	0.01	102.17
8	110.00	3898.1	0.60	-0.05	0.01	128.87
9	130.00	4203.8	0.83	-0.12	0.06	178.23
10	150.00	3129.8	1.11	-0.07	0.19	182.67
11	170.00	7938.1	1.42	0.33	0.45	704.05
12	188.00	6775.5	1.74	1.28	0.88	912.35

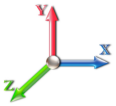
Load Case: 0.9D + 1.0E

Dead Load Factor	0.90	**Sds**	0.183	**Ss**	0.1720	**Fa**	1.6000	**Ke**	0.0000
Seismic Load Factor	1.00	**Sd1**	0.100	**S1**	0.0630	**Fv**	2.4000	**Kg**	0.0000
Seismic Importance Factor	1.00	**SA**	0.183	**R**	3.0000	**Vs**	4.2264	**f1**	1.9763

Sect #	Elev (ft)	Wz (lb)	a	b	c	Lateral Fsz (lb)
1	5.00	3945.9	0.00	0.03	0.01	6.59
2	15.00	3872.3	0.01	0.06	0.03	15.72
3	25.00	3887.7	0.03	0.07	0.04	23.10
4	35.00	3814.9	0.06	0.07	0.04	30.16
5	50.00	6320.0	0.12	0.07	0.03	73.32
6	70.00	5758.8	0.24	0.06	0.02	104.03
7	90.00	4016.8	0.40	0.02	0.01	102.17
8	110.00	3898.1	0.60	-0.05	0.01	128.87
9	130.00	4203.8	0.83	-0.12	0.06	178.23
10	150.00	3129.8	1.11	-0.07	0.19	182.67
11	170.00	7938.1	1.42	0.33	0.45	704.05
12	188.00	6775.5	1.74	1.28	0.88	912.35

Support Forces Summary

Structure:	CT00802-S-SBA	**Code:**	EIA/TIA-222-G	11/22/2021	
Site Name:	Putnam Freight	**Exposure:**	C		
Height:	196.00 (ft)	**Crest Height:**	0.00		
Base Elev:	0.000 (ft)	**Site Class:**	D - Stiff Soil		
Gh:	0.85 **Topography:** 1	**Struct Class:**	II	Page: 18	



Tower Engineering Solutions

Load Case	Node	FX (kips)	FY (kips)	FZ (kips)	(-) = Uplift (+) = Down
1.2D + 1.6W Normal Wind	1	0.00	374.09	-42.67	
	1a	12.85	-152.51	-15.01	
	1b	-12.85	-152.51	-15.01	
1.2D + 1.6W 60° Wind	1	-5.86	188.93	-20.98	
	1a	-21.10	188.93	5.41	
	1b	-31.63	-308.79	-18.26	
1.2D + 1.6W 90° Wind	1	-7.03	23.03	-1.92	
	1a	-32.42	314.55	14.77	
	1b	-29.48	-268.50	-12.85	
0.9D + 1.6W Normal Wind	1	0.00	368.03	-42.18	
	1a	13.25	-158.11	-15.26	
	1b	-13.25	-158.11	-15.26	
0.9D + 1.6W 60° Wind	1	-5.87	183.03	-20.50	
	1a	-20.69	183.03	5.17	
	1b	-32.04	-314.25	-18.50	
0.9D + 1.6W 90° Wind	1	-7.03	17.27	-1.44	
	1a	-32.01	308.54	14.53	
	1b	-29.88	-274.00	-13.09	
1.2D + 1.0Di + 1.0Wi Normal Wind	1	0.00	166.80	-16.23	
	1a	0.50	11.05	-2.41	
	1b	-0.50	11.05	-2.41	
1.2D + 1.0Di + 1.0Wi 60° Wind	1	-1.75	113.66	-10.10	
	1a	-9.62	113.66	3.54	
	1b	-6.28	-38.42	-3.63	
1.2D + 1.0Di + 1.0Wi 90° Wind	1	-2.05	62.97	-4.33	
	1a	-12.98	151.30	6.32	
	1b	-5.52	-25.36	-1.99	
1.2D + 1.0E	1	0.00	39.39	-2.08	
	1a	0.01	14.84	-0.18	
	1b	-0.01	14.84	-0.18	
0.9D + 1.0E	1	0.00	33.62	-1.60	
	1a	0.43	9.09	-0.42	
	1b	-0.43	9.09	-0.42	
1.0D + 1.0W Normal Wind	1	0.00	98.39	-10.86	
	1a	1.91	-20.41	-2.81	
	1b	-1.91	-20.41	-2.81	
1.0D + 1.0W 60° Wind	1	-1.35	56.67	-5.93	
	1a	-5.81	56.67	1.79	
	1b	-6.15	-55.78	-3.55	
1.0D + 1.0W 90° Wind	1	-1.60	19.19	-1.59	
	1a	-8.39	85.03	3.93	
	1b	-5.66	-46.65	-2.34	

[Max Reactions]

Leg			Overturning		
Max Uplift:	-314.25	(kips)	Moment:	8208.92	(ft-kips)
Max Down:	374.09	(kips)	Total Down:	69.07	(kips)
Max Shear:	42.67	(kips)	Total Shear:	72.70	(kips)

Max Reactions

Leg			Overturning		
Max Uplift:	-314.25	(kips)	Moment:	8208.92	(ft-kips)
Max Down:	374.09	(kips)	Total Down:	69.07	(kips)
Max Shear:	42.67	(kips)	Total Shear:	72.70	(kips)

Anchor Bolts

Bolt Size (in.):	1.50	Number Bolts:	8
Yield Strength (Ksi):	50.00	Tensile Strength (Ksi):	65.00
Detail Type:	D	Length:	0.25

Interaction Ratio: 0.79

Max Usages

Max Leg: 67.8% (1.2D + 1.6W Normal Wind - Sect 1)
Max Diag: 96.9% (1.2D + 1.6W 90° Wind - Sect 7)
Max Horiz: 54.5% (0.9D + 1.6W 90° Wind - Sect 1)

Max Deflection, Twist and Sway

Load Case	Elevation (ft)	Deflection (ft)	Twist (deg)	Sway (deg)
0.9D + 1.0E - Normal To Face	166.67	0.0489	0.0012	0.0353
	173.33	0.0529	0.0011	0.0354
	185.33	0.0603	0.0010	0.0364
	196.00	0.0669	0.0006	0.0353
0.9D + 1.6W 101 mph Wind at 60° From Face	166.67	0.8264	0.0178	0.5412
	173.33	0.8888	0.0154	0.5344
	185.33	1.0012	0.0120	0.5354
	196.00	1.0980	0.0075	0.5346
0.9D + 1.6W 101 mph Wind at 90° From Face	166.67	0.8363	-0.0212	0.5496
	173.33	0.8998	-0.0184	0.5380
	185.33	1.0136	-0.0146	0.5429
	196.00	1.1109	-0.0095	0.5463
0.9D + 1.6W 101 mph Wind at Normal To Face	166.67	0.8664	0.0193	0.5640
	173.33	0.9320	0.0168	0.5569
	185.33	1.0491	0.0136	0.5584
	196.00	1.1500	0.0093	0.5576
1.0D + 1.0W 60 mph Wind at 60° From Face	166.67	0.1859	0.0041	0.1210
	173.33	0.2000	0.0036	0.1197
	185.33	0.2252	0.0028	0.1198
	196.00	0.2469	0.0018	0.1194
1.0D + 1.0W 60 mph Wind at 90° From Face	166.67	0.1883	-0.0048	0.1231
	173.33	0.2025	-0.0042	0.1206
	185.33	0.2280	-0.0033	0.1216
	196.00	0.2498	-0.0022	0.1224

1.0D + 1.0W 60 mph Wind at Normal To Face	166.67	0.1950	0.0043	0.1266
	173.33	0.2095	0.0038	0.1248
	185.33	0.2358	0.0030	0.1253
	196.00	0.2584	0.0020	0.1253
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 60° From Face	166.67	0.2521	0.0055	0.1620
	173.33	0.2709	0.0048	0.1603
	185.33	0.3044	0.0038	0.1613
	196.00	0.3336	0.0024	0.1588
1.2D + 1.0Di + 1.0Wi 50 mph Wind at 90° From Face	166.67	0.2532	-0.0064	0.1636
	173.33	0.2722	-0.0056	0.1605
	185.33	0.3059	-0.0044	0.1621
	196.00	0.3351	-0.0029	0.1622
1.2D + 1.0Di + 1.0Wi 50 mph Wind at Normal From Face	166.67	0.2566	-0.0056	0.1659
	173.33	0.2759	-0.0049	0.1631
	185.33	0.3102	-0.0039	0.1643
	196.00	0.3397	0.0026	0.1642
1.2D + 1.0E - Normal To Face	166.67	0.0490	-0.0012	0.0354
	173.33	0.0530	-0.0012	0.0355
	185.33	0.0604	-0.0010	0.0365
	196.00	0.0670	-0.0006	0.0354
1.2D + 1.6W 101 mph Wind at 60° From Face	166.67	0.8274	0.0178	0.5419
	173.33	0.8899	0.0155	0.5352
	185.33	1.0025	0.0120	0.5362
	196.00	1.0994	0.0075	0.5352
1.2D + 1.6W 101 mph Wind at 90° From Face	166.67	0.8373	-0.0212	0.5504
	173.33	0.9009	-0.0184	0.5388
	185.33	1.0149	-0.0146	0.5437
	196.00	1.1124	-0.0096	0.5472
1.2D + 1.6W 101 mph Wind at Normal To Face	166.67	0.8675	0.0193	0.5649
	173.33	0.9331	0.0168	0.5577
	185.33	1.0505	0.0137	0.5593
	196.00	1.1515	0.0094	0.5585

Pier Foundation For Self Supporting Tower

			Date: 11/22/2021
Customer Name:	**SBA Communications Corp**	**EIA/TIA Standard:**	EIA-222-G
Site Name:		**Structure Height (Ft.):**	196
Site Number:	CT00802-S-SBA	**Engineer Name:**	H. You
Engr. Number:	119617	**Manager Login Req'd:**	

Foundation Info Obtained from: Drawings/Calculations

Structure Type: Self Supporting Tower

Analysis or Design? Analysis

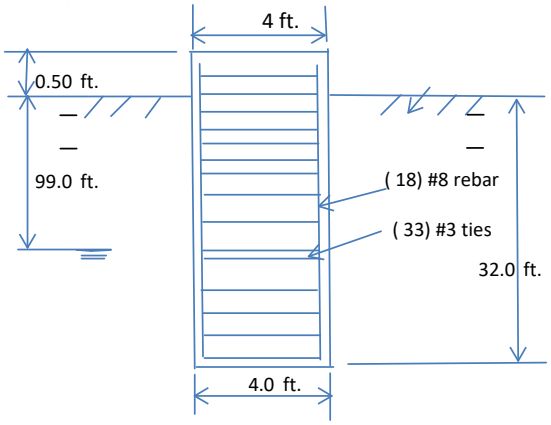
Acceptable overstress (? 5.0%

Base Reactions (Factored):

Axial Load (Kips):	374.1	Shear Force (Kips):	42.7
Uplift Force (Kips):	314.3	Moment (Kips-ft):	0.0

Foundation Geometries:

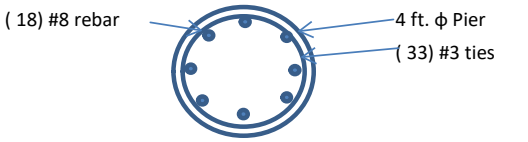
Diameter of Pier (ft.):	4.0	Depth of Base B. G. S. :	32.0	ft.
Pier Height A. G. (ft.):	0.50			



Material Properties and Reabr Info:

Concrete Strength (psi):	3000	Steel Elastic Modulus:	29000	ksi
Vertical bar yield (ksi)	60	Tie steel yield strength:	60	ksi
Vertical Rebar Size #:	8	Tie / Stirrup Size #:	3	
Qty. of Vertical Rebars:	18	Tie Spacing:	12.0	in.
Concrete Cover (in.):	3	Concrete unit weight:	150.0	pcf

Consider ties in concrete shear strength? Yes



SST Pier Foundation

Soil Design Parameters:

Water Table B.G.S. (ft):	99.0	Unit weight of water:	62.4	psf
Ratio of Uplift/Axial Skin Friction:	1.00	Pullout failure Angle:	30	(°)

Skin Frictions are to be obtained from: Soil Report

Sand

Depth of Layers (ft) Top	Bottom	γ_{soil} (pcf)	ϕ (°)	Cohesion (psf)	Ultimate Skin Friction (psf)	Ultimate Bearing (psf)	Soil Types
0.0	2.0	115	0	0	0		Clay
2.0	4.0	115	32	0	1500	0	Sand
4.0	20.0	115	32	0	1500	0	Sand
20.0	26.0	115	32	0	4000	40000	Sand
26.0	32.0	135	36	0	4000	40000	Sand
32.0	37.0						

Soil weight Increase Factor for bouyant soils (1.0 to 1.15): 1.1

Foundation Analysis and Design:

Uplift Strength Reduction Factor:	0.75	Soil Bearing Strength Reduction Factor:	0.75	
Total Dry Soil Volume from Conical Failure (cu. Ft.):	15147	Dry Soil Weight from Conical Failure:	1556	Kips
Total Buoyant Soil Volume from Conical Failure (cu. Ft.):	0	Buoyant Soil Weight from Conical Failure (Ki	0	Kips
Total Dry Concrete Volume (cu. Ft.):	408	Total Dry Concrete Weight:	61.26	Kips
Total Buoyant Concrete Volume (cu. Ft.):	0	Total Buoyant Concrete Weight:	0.00	Kips
Total Effective Concrete Weight (Kips):	61.3	Total Effective Soil Weight:	1556	Kips
Total Effective Vertical Load on Base (Kips):	394			

Check Soil Capacities:

					Usage	
Calculated Foundation Allowable Axail Capacity (Kips):	1053.0	>	Design Factored Axial Load (Kips):	394	0.37	OK!
Calculated Foundation Uplift Capacity (Kips):	761.99	>	Design Factored Uplift Load (Kips):	314	0.41	OK!

Check the capacities of Reinforceing Concrete:

Strength reduction factor (Flexure and axial tension):	0.90	Strength reduction factor (Shear):	0.75	
Strength reduction factor (Axial compression):	0.65	Wind Load Factor on Concrete Design:	1.00	

Reinforcing Concrete Pier:

					Usage	
Vertical Steel Rebar Area (sq. in./each):	0.79		Tie / Stirrup Area (sq. in./each):	0.11		
Calculated Moment Capacity (Mn,Kips-Ft):	782	>	Design Factored Moment (Mu, K-Ft):	232.6	0.30	OK!
Calculated Shear Capacity (Kips):	121.3	>	Design Factored Shear (Kips):	42.7	0.35	OK!
Calculated Tension Capacity (Tn, Kips):	767.9	>	Design Factored Tension (Tu Kips):	314.3	0.41	OK!
Calculated Compression Capacity (Pn, Kips):	2381	>	Design Factored Axial Load (Pu Kips):	374.1	0.16	OK!
Moment & Tension Strength Combination:	0.30	OK!	Max. Allowable Tie/Stirrup Spacing:	12.00	in.	
Pier Reinforcement Ratio:	0.008	Reinforcement Ratio is satisfied per ACI				

Reinforce Pier Foundation by Adding Concrete Block (Yes/No ?) No

Exhibit E

Mount Analysis

November 24, 2021

Sherri Knapik
SBA Network Services, LLC.
134 Flanders Road, Suite 125
Westborough, MA 01581
(508) 251-0720 x 3805

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630
btwo@btgrp.com

Subject:	**Appurtenance Mount Analysis Report**	
Carrier Designation:	***Dish Wireless* Co-Locate**	
	Site Number:	BOBOS00043A
	Site Name:	SBA - Industrial Park Road
SBA Network Services Designation:	**Site Number:**	CT00802-S
	Site Name:	Putnam Freight
	Application Number:	177006, v1
Engineering Firm Designation:	**B+T Group Project Number:**	149428.003.01
Site Data:	**63 Industrial Park Road, Putnam, CT, 06260, Windham County**	
	Latitude *41.89714*°, Longitude *-71.89224*°	
	Monopole	
	8 ft. Sector Mount	

Dear Ms. Knapik,

B+T Group is pleased to submit this **"Appurtenance Mount Analysis Report"** to determine the structural integrity of the antenna mount on the above-mentioned structure.

The purpose of the analysis is to determine acceptability of the mount's stress level. Based on our analysis we have determined the stress level for the mount under the following load case to be:

Proposed Equipment Note: See Table 1 for the final loading configuration	**Sufficient Capacity** **(Passing at 52.5%)**

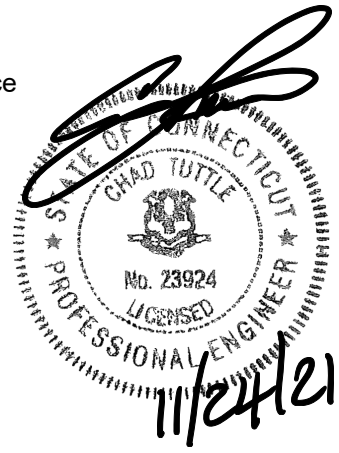
This analysis utilizes an ultimate 3-second gust wind speed of 121 mph as required by the 2018 Connecticut State Building Code(2018 IBC). Applicable Standard references and design criteria are listed in Section 2 - Analysis Criteria.

All the equipment proposed in this report shall be installed in accordance with the drawings for the determined available structural capacity to be effective.

We at *B+T Group* appreciate the opportunity of providing our continuing professional services to you and *SBA Network Services, LLC*. If you have any questions or need further assistance on this or any other projects, please give us a call.

Mount structural analysis prepared by: Anne Delice

Respectfully submitted by: B&T Engineering, Inc.
COA: PEC.0001564 Expires: 02/10/2022



Chad E. Tuttle, P.E.

TABLE OF CONTENTS

1) INTRODUCTION

The appurtenance mount consists of Commscope sector mount (Part # MTC3975083) at 166 ft., attached to self-support tower at 63 Industrial Park Road, Putnam, CT, 06260, Windham County. The proposed antenna loading information was obtained from SBA Network Services, LLC. All information provided to B+T Group was assumed accurate and complete.

2) ANALYSIS CRITERIA

The structural analysis was performed for this mount in accordance with the ANSI/TIA-222-H-2017 Structural Standard for Antenna Supporting Structures and Antennas and Small Wind Turbine Support Structures using a 3-second gust wind speed of 121 mph with no ice and 50 mph with 1 inch escalated ice thickness Exposure category C & Topographic Category 1 and Risk Category II were used in the analysis. In addition, the sector mount has been analyzed for various live loading conditions consisting of a 250-lb man live load applied individually at the midpoint and cantilevered ends of horizontal members as well as a 500-pound man live load applied individually at mount pipe locations using a 3-second gust of 30mph. The mount was analyzed under 30º increments in the wind direction. The analyzed loading is detailed in Table 1.

Table 1 – Proposed Equipment Information

Loading	RAD Center Elev. (ft.)	Position	Qty.	Description	Note
Proposed	166	1	3	Commscope FFVV-65B-R2	1
			3	Fujitsu TA08025-B605	2
			3	Fujitsu TA08025-B604	
		-	1	Raycap RDIDC-9181-PF-48	3

Note:
1) Proposed Antenna to be installed on the Proposed Mount Pipe.
2) Proposed Equipment to be installed directly behind the Antenna.
3) Proposed Equipment to be installed on Mount.

Table 2 - Documents Provided

Documents	Remarks	Reference	Source
SBA Application	Proposed Loading	Date: 10/23/2021	SBA Network Services, LLC.
RFDS		Date: 09/07/2021	

3) ANALYSIS PROCEDURE

3.1) Analysis Method

RISA-3D (Version 19.0.4), a commercially available analysis software package, was used to create a three-dimensional model of the mount and calculate member stresses and deflections for various loading cases. Selected output from the analysis is included in Appendix A.

Manufacturer's drawings were used to create the model.

3.2) Assumptions

1. The mount was built in accordance with the manufacturer's specifications.
2. The mount has been maintained in accordance with the manufacturer's specifications and is free of damage.
3. The configuration of antennas and other appurtenances are as specified in Table 1.
4. All mount components have been assumed to be in sufficient condition to carry their full design capacity for the analysis.
5. Mount areas and weights are determined from field measurements, standard material properties, and/or manufacturer product data.

6. Serviceability with respect to antenna twist, tilt, roll or lateral translation is not checked and is left to the carrier or tower owner to ensure conformance.
7. All prior structural modifications, if any are assumed to be correctly installed and fully effective.
8. All member connections are assumed to have been designed to meet or exceed the load carrying capacity of the connected member unless otherwise specified in this report.
9. The following material grades were assumed (Unless Noted Otherwise):
   a) Connection Bolts : ASTM A325
   b) Steel Pipe : ASTM A53 (GR. 35)
   c) HSS (Round) : ASTM 500 (GR. B-42)
   d) HSS (Rectangular) : ASTM 500 (GR. B-46)
   e) Channel : ASTM A36 (GR. 36)
   f) Steel Solid Rod : ASTM A36 (GR. 36)
   g) Steel Plate : ASTM A36 (GR. 36)
   h) Steel Angle : ASTM A36 (GR. 36)
   i) UNISTRUT : ASTM A570 (GR. 33)

This analysis may be affected if any assumptions are not valid or have been made in error. B+T Group should be notified to determine the effect on the structural integrity of the antenna mounting system.

4) ANALYSIS RESULTS

Table 3 – Mount Component Stresses vs. Capacity

Notes	Component	Elevation (ft.)	% Capacity	Pass / Fail
-	Face Horizontals	166	17.0	Pass
-	Support Arms	166	29.8	Pass
-	Diagonals	166	30.1	Pass
-	Connection Plates	166	24.5	Pass
-	Verticals	166	52.5	Pass
-	Tieback	166	19.2	Pass
-	Mount Pipes	166	19.9	Pass
-	Connection Bolts	-	14.3	Pass

5) RECOMMENDATIONS

The Commscope sector mount, Part # MTC3975083 has sufficient capacity to carry the proposed loads and is in compliance with the ANSI/TIA-222-H standard for the proposed loading. (Refer to the RISA output for the specific members).

APPENDIX A

(RISA-3D Output)

PROJECT	**149428.003.01 - Putnam Frei**		**KSC**
SUBJECT	**Sector Mount Analysis**		
DATE	**11/24/21**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

Tower Type		:	SST		
Ground Elevation	z_s	:	258	ft	[ASCE7 Hazard Tool]
Tower Height		:	196.00	ft	
Mount Elevation		:	166.00	ft	
Antenna Elevation		:	166.00	ft	
Crest Height		:	0	ft	
Risk Category		:	II		[Table 2-1]
Exposure Category		:	C		[Sec. 2.6.5.1.2]
Topography Category		:	1.00		[Sec. 2.6.6.2]
Wind Velocity	V	:	121	mph	[ASCE7 Hazard Tool]
Ice wind Velocity	V_i	:	50	mph	[ASCE7 Hazard Tool]
Service Velocity	V_s	:	30	mph	[ASCE7 Hazard Tool]
Base Ice thickness	t_i	:	1.00	in	[ASCE7 Hazard Tool]
Seismic Design Cat.		:	B		[ASCE7 Hazard Tool]
	S_S	:	0.18		
	S_1	:	0.06		
	S_{DS}	:	0.20		
	S_{D1}	:	0.09		

Gust Factor	G_h	:	1.00		[Sec. 16.6]
Pressure Coefficient	K_z	:	1.41		[Sec. 2.6.5.2]
Topography Factor	K_{zt}	:	1.00		[Sec. 2.6.6]
Elevation Factor	K_e	:	0.99		[Sec. 2.6.8]
Directionality Factor	K_d	:	0.95		[Sec. 16.6]
Shielding Factor	K_a	:	0.90		[Sec. 16.6]
Design Ice Thickness	t_{iz}	:	1.18	in	[Sec. 2.6.10]

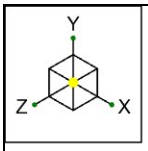
Importance Factor	I_e	:	1		[Table 2-3]
Response Coefficient	C_s	:	0.098		[Sec. 2.7.7.1]
Amplification	A_s	:	2.387755		[Sec. 16.7]

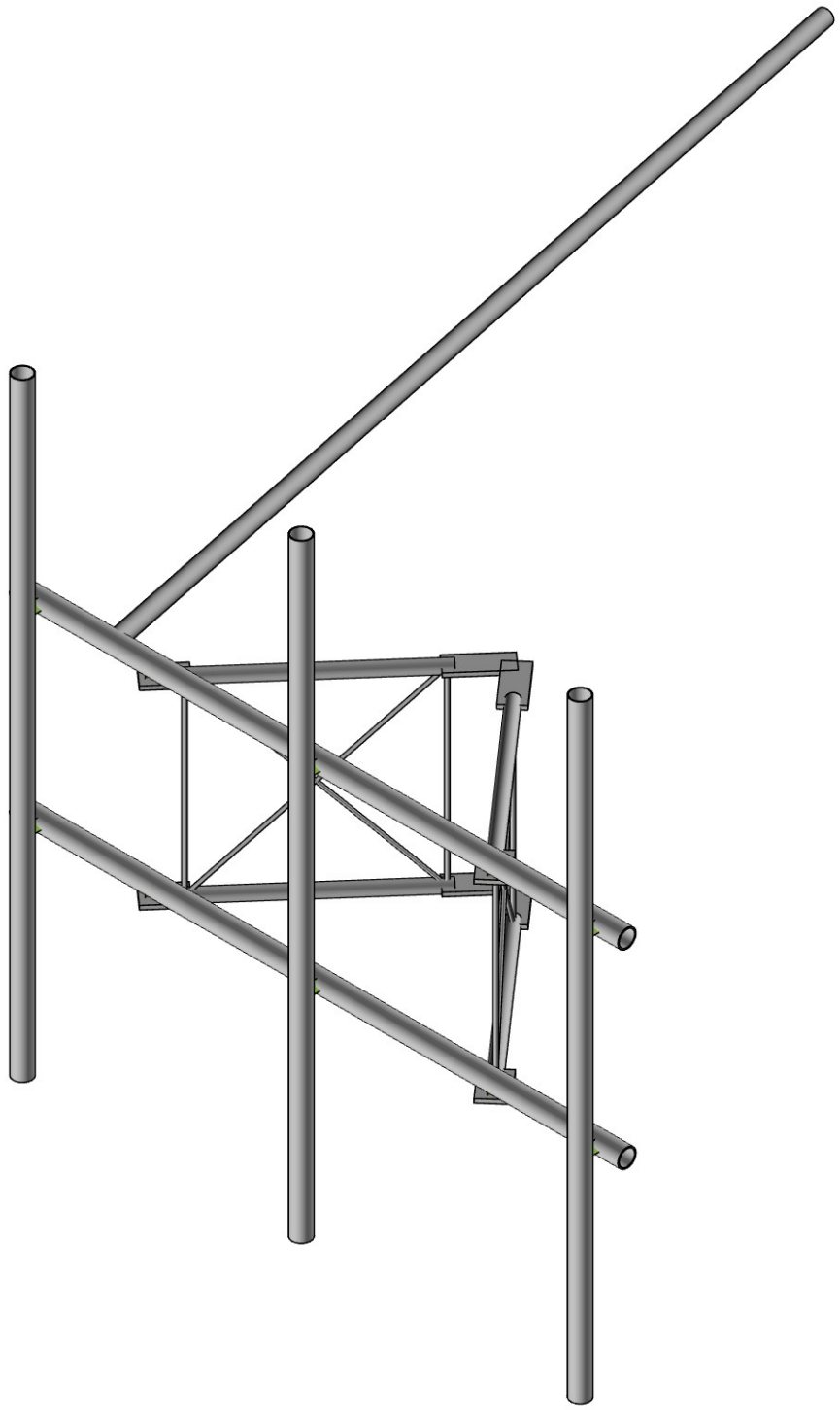
	q_z	:	49.67	psf

PROJECT	**149428.003.01 - Putnam Frei**		**KSC**
SUBJECT	**Sector Mount Analysis**		
DATE	**11/24/21**	PAGE	OF

B+T GRP
1717 S. Boulder, Suite 300
Tulsa, OK 74159
(918) 587-4630

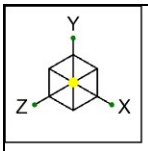
Manufacturer	Model	Qty	Aspect Ratio	C_a flat/round	EPA_N (ft^2)	EPA_T (ft^2)	$EPA_{N\text{-}Ice}$ (ft^2)	$EPA_{T\text{-}Ice}$ (ft^2)	$F_{A\ No\ Ice\ (N)}$	$F_{A\ No\ Ice\ (T)}$	$F_{A\ Ice\ (N)}$	$F_{A\ Ice\ (T)}$
COMMSCOPE	FFVV-65B-R2	0.5	3.67	1.25	4.90	1.95	5.67	2.62	0.27	0.11	0.05	0.02
COMMSCOPE	FFVV-65B-R2	0.5	3.67	1.25	4.90	1.95	5.67	2.62	0.27	0.11	0.05	0.02
Fujitsu	TA08025-B605	1	1.05	1.20	1.64	0.99	2.18	1.43	0.09	0.05	0.01	0.01
Fujitsu	TA08025-B604	1	1.05	1.20	1.64	0.86	2.18	1.28	0.09	0.05	0.01	0.01
RAYCAP	RDIDC-9181-PF-48	1	1.14	1.20	1.68	0.94	2.22	1.38	0.09	0.05	0.02	0.01

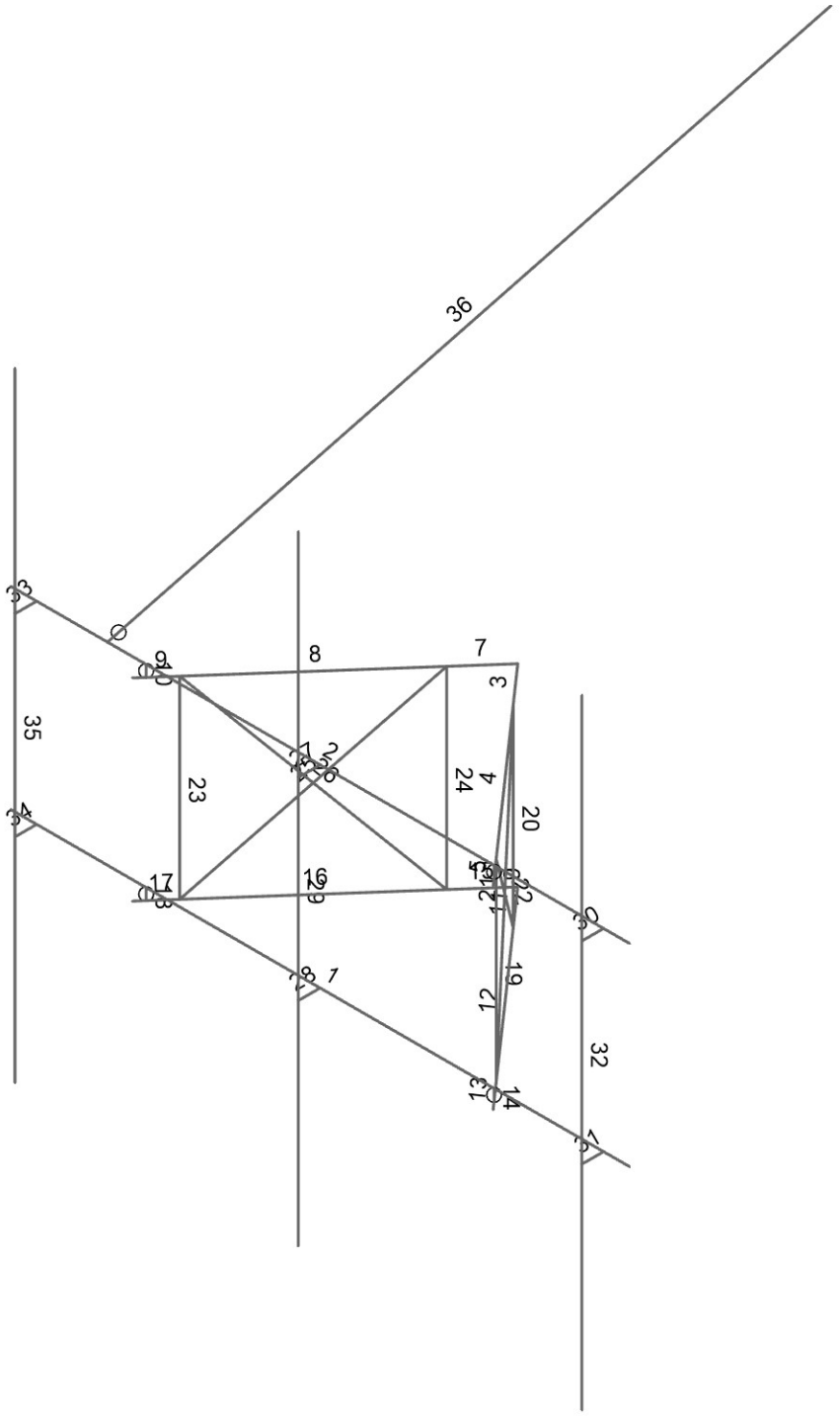




Envelope Only Solution

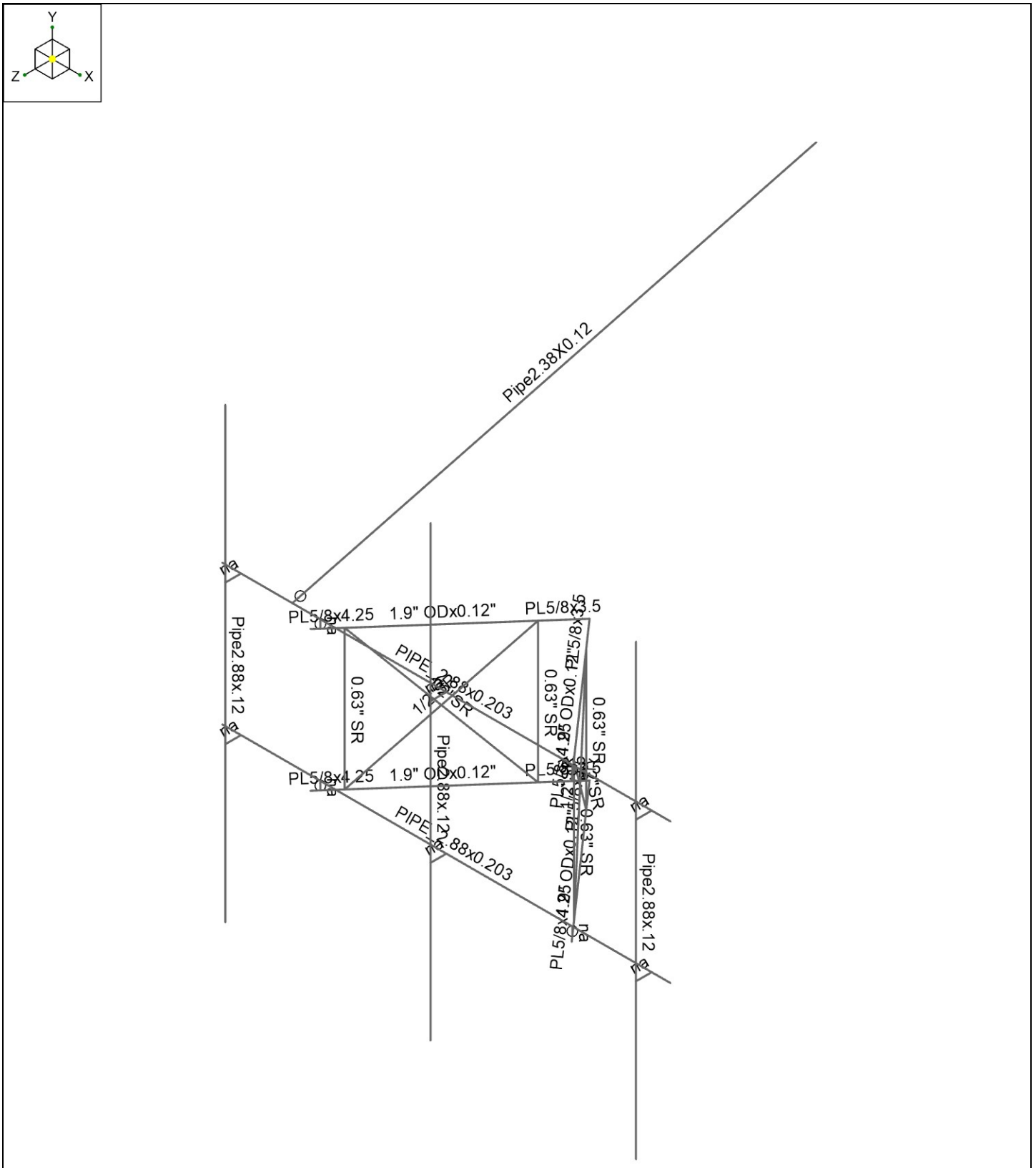
B+T Group	CT00802-S - Putnam Freight	SK-1
AS		Nov 20, 2021
149428.003.01		149428_003_01_Putnam Freight_…





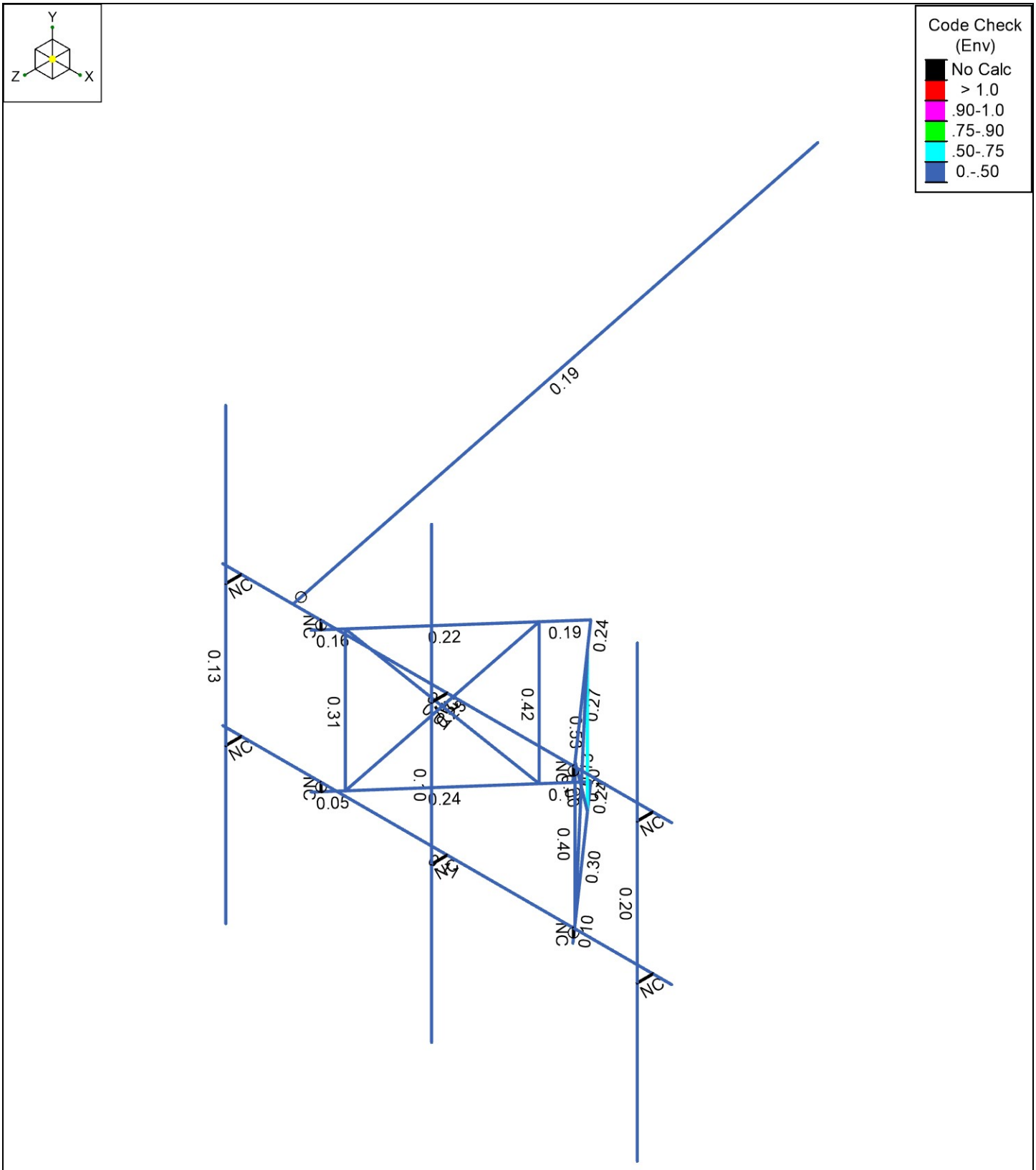
Envelope Only Solution

B+T Group	CT00802-S - Putnam Freight	SK-2
AS		Nov 20, 2021
149428.003.01		149428_003_01_Putnam Freight_…



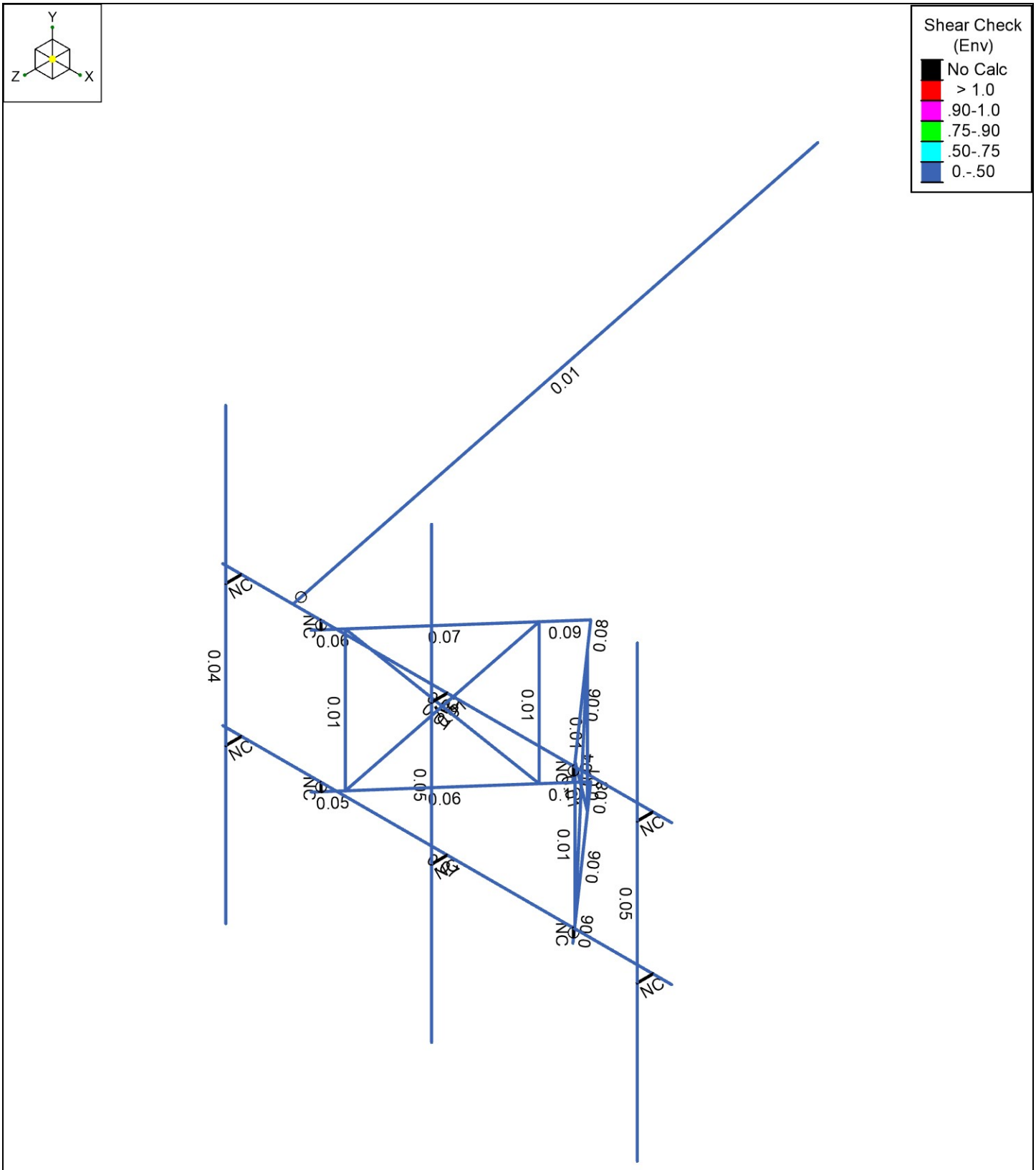
Envelope Only Solution

B+T Group	CT00802-S - Putnam Freight	SK-3
AS		Nov 20, 2021
149428.003.01		149428_003_01_Putnam Freight_…



Member Code Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CT00802-S - Putnam Freight	SK-4
AS		Nov 20, 2021
149428.003.01		149428_003_01_Putnam Freight_…



Member Shear Checks Displayed (Enveloped)
Envelope Only Solution

B+T Group	CT00802-S - Putnam Freight	SK-5
AS		Nov 20, 2021
149428.003.01		149428_003_01_Putnam Freight_…

Node Coordinates

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
1	1	-4	-2.354167	2.796875	
2	2	4	-2.354167	2.796875	
3	3	-4	0.145833	2.796875	
4	4	4	0.145833	2.796875	
5	5	0.467947	0	0.771833	
6	6	0.385368	0	0.677994	
7	7	2.091999	0	2.61733	
8	8	2.00942	0	2.523491	
9	9	2.332579	0	2.890714	
10	10	2.25	0.145833	2.796875	
11	11	2.25	0	2.796875	
12	12	0	0	0.24008	
13	13	-0.467947	0	0.771833	
14	14	-0.385368	0	0.677994	
15	15	-2.091999	0	2.61733	
16	16	-2.00942	0	2.523491	
17	17	-2.332579	0	2.890714	
18	18	-2.25	0.145833	2.796875	
19	19	-2.25	0	2.796875	
20	20	0.467947	-2.5	0.771833	
21	21	0.385368	-2.5	0.677994	
22	22	2.091999	-2.5	2.61733	
23	23	2.00942	-2.5	2.523491	
24	24	2.332579	-2.5	2.890714	
25	25	2.25	-2.354167	2.796875	
26	26	2.25	-2.5	2.796875	
27	27	0	-2.5	0.24008	
28	28	-0.467947	-2.5	0.771833	
29	29	-0.385368	-2.5	0.677994	
30	30	-2.091999	-2.5	2.61733	
31	31	-2.00942	-2.5	2.523491	
32	32	-2.332579	-2.5	2.890714	
33	33	-2.25	-2.354167	2.796875	
34	34	-2.25	-2.5	2.796875	
35	35	0.430236	0	0.72898	
36	36	2.047131	-2.5	2.566344	
37	37	2.047131	0	2.566344	
38	38	0.430236	-2.5	0.72898	
39	39	-0.430236	0	0.72898	
40	40	-2.047131	-2.5	2.566344	
41	41	-2.047131	0	2.566344	
42	42	-0.430236	-2.5	0.72898	
43	43	0	0.145833	2.796875	
44	44	0	0.145833	3.078125	
45	45	0	-2.354167	2.796875	
46	46	0	-2.354167	3.078125	
47	47	0	2.895833	3.078125	
48	48	0	-5.104167	3.078125	
49	49	3.666667	0.145833	2.796875	
50	50	3.666667	0.145833	3.078125	
51	51	3.666667	-2.354167	2.796875	
52	52	3.666667	-2.354167	3.078125	
53	53	3.666667	2.895833	3.078125	
54	54	3.666667	-5.104167	3.078125	
55	55	-3.666667	0.145833	2.796875	

Node Coordinates (Continued)

	Label	X [ft]	Y [ft]	Z [ft]	Detach From Diaphragm
56	56	-3.666667	0.145833	3.078125	
57	57	-3.666667	-2.354167	2.796875	
58	58	-3.666667	-2.354167	3.078125	
59	59	-3.666667	2.895833	3.078125	
60	60	-3.666667	-5.104167	3.078125	
61	61	0	0	0	
62	62	-2.75	0.145833	2.796875	
63	63	-5.2	0	-9.006664	
64	65	5.2	0	-9.006664	
65	66	-5.2	0.145833	-9.006664	

Node Boundary Conditions

	Node Label	X [k/in]	Y [k/in]	Z [k/in]
1	12	Reaction	Reaction	Reaction
2	27	Reaction	Reaction	Reaction
3	66	Reaction	Reaction	Reaction

Hot Rolled Steel Properties

	Label	E [ksi]	G [ksi]	Nu	Therm. Coeff. [1e^{5}°F^{-1}]	Density [k/ft^{3}]	Yield [ksi]	Ry	Fu [ksi]	Rt
1	A992	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
2	A36 Gr.36	29000	11154	0.3	0.65	0.49	36	1.5	58	1.2
3	A572 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
4	A500 Gr.B RND	29000	11154	0.3	0.65	0.527	42	1.4	58	1.3
5	A500 Gr.B Rect	29000	11154	0.3	0.65	0.527	46	1.4	58	1.3
6	A53 Gr.B	29000	11154	0.3	0.65	0.49	35	1.6	60	1.2
7	A1085	29000	11154	0.3	0.65	0.49	50	1.4	65	1.3
8	A529 Gr.50	29000	11154	0.3	0.65	0.49	50	1.1	65	1.1
9	A500 Gr.42	29000	11154	0.3	0.65	0.49	42	1.4	58	1.3
10	A500 Gr.46	29000	11154	0.3	0.65	0.49	46	1.4	58	1.3
11	A500 Gr.C	29000	11154	0.3	0.65	0.49	46	1.4	62	1.3

Hot Rolled Steel Section Sets

	Label	Shape	Type	Design List	Material	Design Rule	Area [in^{2}]	Iyy [in^{4}]	Izz [in^{4}]	J [in^{4}]
1	MF-H1	PIPE_2.88x0.203	Beam	Pipe	A500 Gr.C	Typical	1.707	1.538	1.538	3.076
2	MF- SA1	1.9" ODx0.12"	Beam	Pipe	A500 Gr.B RND	Typical	0.671	0.267	0.267	0.534
3	MF-D1	1/2"SR	VBrace	BAR	A529 Gr.50	Typical	0.196	0.003	0.003	0.006
4	MF-CP1	PL5/8x3.5	Beam	RECT	A572 Gr.50	Typical	2.205	0.073	2.251	0.259
5	MF-V1	0.63" SR	Column	BAR	A529 Gr.50	Typical	0.312	0.008	0.008	0.015
6	MF-CP2	PL5/8x4.25	Beam	RECT	A572 Gr.50	Typical	2.656	0.086	3.998	0.314
7	Tieback	Pipe2.38X0.12	Beam	Pipe	A500 Gr.C	Typical	0.852	0.545	0.545	1.091
8	MF-P1	Pipe2.88x.12	Column	Pipe	A500 Gr.C	Typical	1.04	0.993	0.993	1.985

Member Primary Data

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
1	1	1	2		MF-H1	Beam	Pipe	A500 Gr.C	Typical
2	2	3	4		MF-H1	Beam	Pipe	A500 Gr.C	Typical
3	3	12	5	90	MF-CP1	Beam	RECT	A572 Gr.50	Typical
4	4	6	7		MF- SA1	Beam	Pipe	A500 Gr.B RND	Typical
5	5	8	9	90	MF-CP2	Beam	RECT	A572 Gr.50	Typical
6	6	10	11	90	RIGID	None	None	RIGID	Typical

Member Primary Data (Continued)

	Label	I Node	J Node	Rotate(deg)	Section/Shape	Type	Design List	Material	Design Rule
7	7	12	13	90	MF-CP1	Beam	RECT	A572 Gr.50	Typical
8	8	14	15		MF- SA1	Beam	Pipe	A500 Gr.B RND	Typical
9	9	16	17	90	MF-CP2	Beam	RECT	A572 Gr.50	Typical
10	10	18	19	90	RIGID	None	None	RIGID	Typical
11	11	27	20	90	MF-CP1	Beam	RECT	A572 Gr.50	Typical
12	12	21	22		MF- SA1	Beam	Pipe	A500 Gr.B RND	Typical
13	13	23	24	90	MF-CP2	Beam	RECT	A572 Gr.50	Typical
14	14	25	26	90	RIGID	None	None	RIGID	Typical
15	15	27	28	90	MF-CP1	Beam	RECT	A572 Gr.50	Typical
16	16	29	30		MF- SA1	Beam	Pipe	A500 Gr.B RND	Typical
17	17	31	32	90	MF-CP2	Beam	RECT	A572 Gr.50	Typical
18	18	33	34	90	RIGID	None	None	RIGID	Typical
19	19	37	36		MF-V1	Column	BAR	A529 Gr.50	Typical
20	20	35	38		MF-V1	Column	BAR	A529 Gr.50	Typical
21	21	35	36		MF-D1	VBrace	BAR	A529 Gr.50	Typical
22	22	37	38		MF-D1	VBrace	BAR	A529 Gr.50	Typical
23	23	41	40		MF-V1	Column	BAR	A529 Gr.50	Typical
24	24	39	42		MF-V1	Column	BAR	A529 Gr.50	Typical
25	25	39	40		MF-D1	VBrace	BAR	A529 Gr.50	Typical
26	26	41	42		MF-D1	VBrace	BAR	A529 Gr.50	Typical
27	27	43	44	90	RIGID	None	None	RIGID	Typical
28	28	45	46	90	RIGID	None	None	RIGID	Typical
29	29	47	48		MF-P1	Column	Pipe	A500 Gr.C	Typical
30	30	49	50	90	RIGID	None	None	RIGID	Typical
31	31	51	52	90	RIGID	None	None	RIGID	Typical
32	32	53	54		MF-P1	Column	Pipe	A500 Gr.C	Typical
33	33	55	56	90	RIGID	None	None	RIGID	Typical
34	34	57	58	90	RIGID	None	None	RIGID	Typical
35	35	59	60		MF-P1	Column	Pipe	A500 Gr.C	Typical
36	36	62	66		Tieback	Beam	Pipe	A500 Gr.C	Typical

Member Advanced Data

	Label	I Release	T/C Only	Physical	Deflection Ratio Options	Seismic DR
1	1			Yes	N/A	None
2	2			Yes	Default	None
3	3			Yes	N/A	None
4	4			Yes	N/A	None
5	5			Yes	N/A	None
6	6	OOOOXO		Yes	** NA **	None
7	7			Yes	N/A	None
8	8			Yes	N/A	None
9	9			Yes	N/A	None
10	10	OOOOXO		Yes	** NA **	None
11	11			Yes	N/A	None
12	12			Yes	N/A	None
13	13			Yes	N/A	None
14	14	OOOOXO		Yes	** NA **	None
15	15			Yes	N/A	None
16	16			Yes	N/A	None
17	17			Yes	N/A	None
18	18	OOOOXO		Yes	** NA **	None
19	19			Yes	** NA **	None
20	20			Yes	** NA **	None
21	21			Yes	** NA **	None
22	22		Euler Buckling	Yes	** NA **	None

Member Advanced Data (Continued)

	Label	I Release	T/C Only	Physical	Deflection Ratio Options	Seismic DR
23	23			Yes	** NA **	None
24	24			Yes	** NA **	None
25	25			Yes	** NA **	None
26	26		Euler Buckling	Yes	** NA **	None
27	27			Yes	** NA **	None
28	28			Yes	** NA **	None
29	29			Yes	** NA **	None
30	30			Yes	** NA **	None
31	31			Yes	** NA **	None
32	32			Yes	** NA **	None
33	33			Yes	** NA **	None
34	34			Yes	** NA **	None
35	35			Yes	** NA **	None
36	36	BenPIN		Yes	Default	None

Hot Rolled Steel Design Parameters

	Label	Shape	Length [ft]	Lcomp top [ft]	Function
1	1	MF-H1	8	Lbyy	Lateral
2	2	MF-H1	8	Lbyy	Lateral
3	3	MF-CP1	0.708	Lbyy	Lateral
4	4	MF- SA1	2.583	Lbyy	Lateral
5	5	MF-CP2	0.489	Lbyy	Lateral
6	7	MF-CP1	0.708	Lbyy	Lateral
7	8	MF- SA1	2.583	Lbyy	Lateral
8	9	MF-CP2	0.489	Lbyy	Lateral
9	11	MF-CP1	0.708	Lbyy	Lateral
10	12	MF- SA1	2.583	Lbyy	Lateral
11	13	MF-CP2	0.489	Lbyy	Lateral
12	15	MF-CP1	0.708	Lbyy	Lateral
13	16	MF- SA1	2.583	Lbyy	Lateral
14	17	MF-CP2	0.489	Lbyy	Lateral
15	19	MF-V1	2.5	Lbyy	Lateral
16	20	MF-V1	2.5	Lbyy	Lateral
17	21	MF-D1	3.499	Lbyy	Lateral
18	22	MF-D1	3.499	Lbyy	Lateral
19	23	MF-V1	2.5	Lbyy	Lateral
20	24	MF-V1	2.5	Lbyy	Lateral
21	25	MF-D1	3.499	Lbyy	Lateral
22	26	MF-D1	3.499	Lbyy	Lateral
23	29	MF-P1	8	Lbyy	Lateral
24	32	MF-P1	8	Lbyy	Lateral
25	35	MF-P1	8	Lbyy	Lateral
26	36	Tieback	12.055	Lbyy	Lateral

Member Point Loads (BLC 1 : Dead)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Y	-0.035	%15
2	32	Y	-0.035	%85
3	32	Y	-0.075	%20
4	32	Y	-0.064	%50
5	32	Y	0	0
6	8	Y	-0.022	%50
7	8	Y	0	0

Member Point Loads (BLC 1 : Dead) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
8	8	Y	0	0
9	8	Y	0	0
10	8	Y	0	0

Member Point Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Z	-0.274	%15
2	32	Z	-0.274	%85
3	32	Z	-0.088	%20
4	32	Z	-0.088	%50
5	32	Z	0	0
6	8	Z	-0.09	%50
7	8	Z	0	0
8	8	Z	0	0
9	8	Z	0	0
10	8	Z	0	0

Member Point Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	X	-0.109	%15
2	32	X	-0.109	%85
3	32	X	-0.053	%20
4	32	X	-0.046	%50
5	32	X	0	0
6	8	X	-0.05	%50
7	8	X	0	0
8	8	X	0	0
9	8	X	0	0
10	8	X	0	0

Member Point Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Z	-0.047	%15
2	32	Z	-0.047	%85
3	32	Z	-0.015	%20
4	32	Z	-0.015	%50
5	32	Z	0	0
6	8	Z	-0.015	%50
7	8	Z	0	0
8	8	Z	0	0
9	8	Z	0	0
10	8	Z	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	X	-0.019	%15
2	32	X	-0.019	%85
3	32	X	-0.009	%20
4	32	X	-0.008	%50
5	32	X	0	0

Member Point Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
6	8	X	-0.009	%50
7	8	X	0	0
8	8	X	0	0
9	8	X	0	0
10	8	X	0	0

Member Point Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Z	-0.017	%15
2	32	Z	-0.017	%85
3	32	Z	-0.005	%20
4	32	Z	-0.005	%50
5	32	Z	0	0
6	8	Z	-0.006	%50
7	8	Z	0	0
8	8	Z	0	0
9	8	Z	0	0
10	8	Z	0	0

Member Point Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	X	-0.007	%15
2	32	X	-0.007	%85
3	32	X	-0.003	%20
4	32	X	-0.003	%50
5	32	X	0	0
6	8	X	-0.003	%50
7	8	X	0	0
8	8	X	0	0
9	8	X	0	0
10	8	X	0	0

Member Point Loads (BLC 8 : Ice)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Y	-0.096	%15
2	32	Y	-0.096	%85
3	32	Y	-0.035	%20
4	32	Y	-0.034	%50
5	32	Y	0	0
6	8	Y	-0.035	%50
7	8	Y	0	0
8	8	Y	0	0
9	8	Y	0	0
10	8	Y	0	0

Member Point Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	Z	-0.017	%15
2	32	Z	-0.017	%85
3	32	Z	-0.018	%20

Member Point Loads (BLC 9 : 0 Seismic) (Continued)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
4	32	Z	-0.015	%50
5	32	Z	0	0
6	8	Z	-0.005	%50
7	8	Z	0	0
8	8	Z	0	0
9	8	Z	0	0
10	8	Z	0	0

Member Point Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	32	X	-0.017	%15
2	32	X	-0.017	%85
3	32	X	-0.018	%20
4	32	X	-0.015	%50
5	32	X	0	0
6	8	X	-0.005	%50
7	8	X	0	0
8	8	X	0	0
9	8	X	0	0
10	8	X	0	0

Member Point Loads (BLC 15 : Maint LL 1)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	16	Y	-0.25	%50

Member Point Loads (BLC 16 : Maint LL 2)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	8	Y	-0.25	%50

Member Point Loads (BLC 17 : Maint LL 3)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	12	Y	-0.25	%50

Member Point Loads (BLC 18 : Maint LL 4)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	4	Y	-0.25	%50

Member Point Loads (BLC 19 : Maint LL 5)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	1	Y	-0.25	%95

Member Point Loads (BLC 20 : Maint LL 6)

	Member Label	Direction	Magnitude [k, k-ft]	Location [(ft, %)]
1	2	Y	-0.25	%95

Member Distributed Loads (BLC 2 : 0 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.013	-0.013	0	%100
2	2	Z	-0.013	-0.013	0	%100
3	3	Z	-0.004	-0.004	0	%100
4	4	Z	-0.007	-0.007	0	%100
5	5	Z	-0.003	-0.003	0	%100
6	7	Z	-0.004	-0.004	0	%100
7	8	Z	-0.007	-0.007	0	%100
8	9	Z	-0.003	-0.003	0	%100
9	11	Z	-0.004	-0.004	0	%100
10	12	Z	-0.007	-0.007	0	%100
11	13	Z	-0.003	-0.003	0	%100
12	15	Z	-0.004	-0.004	0	%100
13	16	Z	-0.007	-0.007	0	%100
14	17	Z	-0.003	-0.003	0	%100
15	19	Z	-0.003	-0.003	0	%100
16	20	Z	-0.003	-0.003	0	%100
17	21	Z	-0.002	-0.002	0	%100
18	22	Z	-0.002	-0.002	0	%100
19	23	Z	-0.003	-0.003	0	%100
20	24	Z	-0.003	-0.003	0	%100
21	25	Z	-0.002	-0.002	0	%100
22	26	Z	-0.002	-0.002	0	%100
23	29	Z	-0.013	-0.013	0	%100
24	32	Z	-0.013	-0.013	0	%100
25	35	Z	-0.013	-0.013	0	%100
26	36	Z	-0.011	-0.011	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.013	-0.013	0	%100
2	2	X	-0.013	-0.013	0	%100
3	3	X	-0.004	-0.004	0	%100
4	4	X	-0.007	-0.007	0	%100
5	5	X	-0.003	-0.003	0	%100
6	7	X	-0.004	-0.004	0	%100
7	8	X	-0.007	-0.007	0	%100
8	9	X	-0.003	-0.003	0	%100
9	11	X	-0.004	-0.004	0	%100
10	12	X	-0.007	-0.007	0	%100
11	13	X	-0.003	-0.003	0	%100
12	15	X	-0.004	-0.004	0	%100
13	16	X	-0.007	-0.007	0	%100
14	17	X	-0.003	-0.003	0	%100
15	19	X	-0.003	-0.003	0	%100
16	20	X	-0.003	-0.003	0	%100
17	21	X	-0.002	-0.002	0	%100
18	22	X	-0.002	-0.002	0	%100
19	23	X	-0.003	-0.003	0	%100
20	24	X	-0.003	-0.003	0	%100
21	25	X	-0.002	-0.002	0	%100
22	26	X	-0.002	-0.002	0	%100
23	29	X	-0.013	-0.013	0	%100
24	32	X	-0.013	-0.013	0	%100
25	35	X	-0.013	-0.013	0	%100

Member Distributed Loads (BLC 3 : 90 Wind - No Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
26	36	X	-0.011	-0.011	0	%100

Member Distributed Loads (BLC 4 : 0 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.002	-0.002	0	%100
2	2	Z	-0.002	-0.002	0	%100
3	3	Z	-0.004	-0.004	0	%100
4	4	Z	-0.002	-0.002	0	%100
5	5	Z	-0.004	-0.004	0	%100
6	7	Z	-0.004	-0.004	0	%100
7	8	Z	-0.002	-0.002	0	%100
8	9	Z	-0.004	-0.004	0	%100
9	11	Z	-0.004	-0.004	0	%100
10	12	Z	-0.002	-0.002	0	%100
11	13	Z	-0.004	-0.004	0	%100
12	15	Z	-0.004	-0.004	0	%100
13	16	Z	-0.002	-0.002	0	%100
14	17	Z	-0.004	-0.004	0	%100
15	19	Z	-0.002	-0.002	0	%100
16	20	Z	-0.002	-0.002	0	%100
17	21	Z	-0.002	-0.002	0	%100
18	22	Z	-0.002	-0.002	0	%100
19	23	Z	-0.002	-0.002	0	%100
20	24	Z	-0.002	-0.002	0	%100
21	25	Z	-0.002	-0.002	0	%100
22	26	Z	-0.002	-0.002	0	%100
23	29	Z	-0.002	-0.002	0	%100
24	32	Z	-0.002	-0.002	0	%100
25	35	Z	-0.002	-0.002	0	%100
26	36	Z	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 5 : 90 Wind - Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.002	-0.002	0	%100
2	2	X	-0.002	-0.002	0	%100
3	3	X	-0.004	-0.004	0	%100
4	4	X	-0.002	-0.002	0	%100
5	5	X	-0.004	-0.004	0	%100
6	7	X	-0.004	-0.004	0	%100
7	8	X	-0.002	-0.002	0	%100
8	9	X	-0.004	-0.004	0	%100
9	11	X	-0.004	-0.004	0	%100
10	12	X	-0.002	-0.002	0	%100
11	13	X	-0.004	-0.004	0	%100
12	15	X	-0.004	-0.004	0	%100
13	16	X	-0.002	-0.002	0	%100
14	17	X	-0.004	-0.004	0	%100
15	19	X	-0.002	-0.002	0	%100
16	20	X	-0.002	-0.002	0	%100
17	21	X	-0.002	-0.002	0	%100
18	22	X	-0.002	-0.002	0	%100
19	23	X	-0.002	-0.002	0	%100
20	24	X	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 5 : 90 Wind - Ice) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
21	25	X	-0.002	-0.002	0	%100
22	26	X	-0.002	-0.002	0	%100
23	29	X	-0.002	-0.002	0	%100
24	32	X	-0.002	-0.002	0	%100
25	35	X	-0.002	-0.002	0	%100
26	36	X	-0.002	-0.002	0	%100

Member Distributed Loads (BLC 6 : 0 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.0004	-0.0004	0	%100
2	2	Z	-0.0004	-0.0004	0	%100
3	3	Z	-0.0002	-0.0002	0	%100
4	4	Z	-0.0003	-0.0003	0	%100
5	5	Z	-0.0002	-0.0002	0	%100
6	7	Z	-0.0002	-0.0002	0	%100
7	8	Z	-0.0003	-0.0003	0	%100
8	9	Z	-0.0002	-0.0002	0	%100
9	11	Z	-0.0002	-0.0002	0	%100
10	12	Z	-0.0003	-0.0003	0	%100
11	13	Z	-0.0002	-0.0002	0	%100
12	15	Z	-0.0002	-0.0002	0	%100
13	16	Z	-0.0003	-0.0003	0	%100
14	17	Z	-0.0002	-0.0002	0	%100
15	19	Z	-1e-04	-1e-04	0	%100
16	20	Z	-1e-04	-1e-04	0	%100
17	21	Z	-1e-04	-1e-04	0	%100
18	22	Z	-1e-04	-1e-04	0	%100
19	23	Z	-1e-04	-1e-04	0	%100
20	24	Z	-1e-04	-1e-04	0	%100
21	25	Z	-1e-04	-1e-04	0	%100
22	26	Z	-1e-04	-1e-04	0	%100
23	29	Z	-0.0004	-0.0004	0	%100
24	32	Z	-0.0004	-0.0004	0	%100
25	35	Z	-0.0004	-0.0004	0	%100
26	36	Z	-0.0003	-0.0003	0	%100

Member Distributed Loads (BLC 7 : 90 Wind - Service)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.0004	-0.0004	0	%100
2	2	X	-0.0004	-0.0004	0	%100
3	3	X	-0.0002	-0.0002	0	%100
4	4	X	-0.0003	-0.0003	0	%100
5	5	X	-0.0002	-0.0002	0	%100
6	7	X	-0.0002	-0.0002	0	%100
7	8	X	-0.0003	-0.0003	0	%100
8	9	X	-0.0002	-0.0002	0	%100
9	11	X	-0.0002	-0.0002	0	%100
10	12	X	-0.0003	-0.0003	0	%100
11	13	X	-0.0002	-0.0002	0	%100
12	15	X	-0.0002	-0.0002	0	%100
13	16	X	-0.0003	-0.0003	0	%100
14	17	X	-0.0002	-0.0002	0	%100
15	19	X	-1e-04	-1e-04	0	%100

Member Distributed Loads (BLC 7 : 90 Wind - Service) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
16	20	X	-1e-04	-1e-04	0	%100
17	21	X	-1e-04	-1e-04	0	%100
18	22	X	-1e-04	-1e-04	0	%100
19	23	X	-1e-04	-1e-04	0	%100
20	24	X	-1e-04	-1e-04	0	%100
21	25	X	-1e-04	-1e-04	0	%100
22	26	X	-1e-04	-1e-04	0	%100
23	29	X	-0.0004	-0.0004	0	%100
24	32	X	-0.0004	-0.0004	0	%100
25	35	X	-0.0004	-0.0004	0	%100
26	36	X	-0.0003	-0.0003	0	%100

Member Distributed Loads (BLC 8 : Ice)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Y	-0.006	-0.006	0	%100
2	2	Y	-0.006	-0.006	0	%100
3	3	Y	-0.012	-0.012	0	%100
4	4	Y	-0.004	-0.004	0	%100
5	5	Y	-0.014	-0.014	0	%100
6	7	Y	-0.012	-0.012	0	%100
7	8	Y	-0.004	-0.004	0	%100
8	9	Y	-0.014	-0.014	0	%100
9	11	Y	-0.012	-0.012	0	%100
10	12	Y	-0.004	-0.004	0	%100
11	13	Y	-0.014	-0.014	0	%100
12	15	Y	-0.012	-0.012	0	%100
13	16	Y	-0.004	-0.004	0	%100
14	17	Y	-0.014	-0.014	0	%100
15	19	Y	-0.003	-0.003	0	%100
16	20	Y	-0.003	-0.003	0	%100
17	21	Y	-0.002	-0.002	0	%100
18	22	Y	-0.002	-0.002	0	%100
19	23	Y	-0.003	-0.003	0	%100
20	24	Y	-0.003	-0.003	0	%100
21	25	Y	-0.002	-0.002	0	%100
22	26	Y	-0.002	-0.002	0	%100
23	29	Y	-0.006	-0.006	0	%100
24	32	Y	-0.006	-0.006	0	%100
25	35	Y	-0.006	-0.006	0	%100
26	36	Y	-0.005	-0.005	0	%100

Member Distributed Loads (BLC 9 : 0 Seismic)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	Z	-0.001	-0.001	0	%100
2	2	Z	-0.001	-0.001	0	%100
3	3	Z	-0.002	-0.002	0	%100
4	4	Z	-0.0005	-0.0005	0	%100
5	5	Z	-0.002	-0.002	0	%100
6	7	Z	-0.002	-0.002	0	%100
7	8	Z	-0.0005	-0.0005	0	%100
8	9	Z	-0.002	-0.002	0	%100
9	11	Z	-0.002	-0.002	0	%100
10	12	Z	-0.0005	-0.0005	0	%100

Member Distributed Loads (BLC 9 : 0 Seismic) (Continued)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
11	13	Z	-0.002	-0.002	0	%100
12	15	Z	-0.002	-0.002	0	%100
13	16	Z	-0.0005	-0.0005	0	%100
14	17	Z	-0.002	-0.002	0	%100
15	19	Z	-0.0005	-0.0005	0	%100
16	20	Z	-0.0005	-0.0005	0	%100
17	21	Z	-0.0004	-0.0004	0	%100
18	22	Z	-0.0004	-0.0004	0	%100
19	23	Z	-0.0005	-0.0005	0	%100
20	24	Z	-0.0005	-0.0005	0	%100
21	25	Z	-0.0004	-0.0004	0	%100
22	26	Z	-0.0004	-0.0004	0	%100
23	29	Z	-0.0008	-0.0008	0	%100
24	32	Z	-0.0008	-0.0008	0	%100
25	35	Z	-0.0008	-0.0008	0	%100
26	36	Z	-0.0007	-0.0007	0	%100

Member Distributed Loads (BLC 10 : 90 Seismic)

	Member Label	Direction	Start Magnitude [k/ft, F, ksf, k-ft/ft]	End Magnitude [k/ft, F, ksf, k-ft/ft]	Start Location [(ft, %)]	End Location [(ft, %)]
1	1	X	-0.001	-0.001	0	%100
2	2	X	-0.001	-0.001	0	%100
3	3	X	-0.002	-0.002	0	%100
4	4	X	-0.0005	-0.0005	0	%100
5	5	X	-0.002	-0.002	0	%100
6	7	X	-0.002	-0.002	0	%100
7	8	X	-0.0005	-0.0005	0	%100
8	9	X	-0.002	-0.002	0	%100
9	11	X	-0.002	-0.002	0	%100
10	12	X	-0.0005	-0.0005	0	%100
11	13	X	-0.002	-0.002	0	%100
12	15	X	-0.002	-0.002	0	%100
13	16	X	-0.0005	-0.0005	0	%100
14	17	X	-0.002	-0.002	0	%100
15	19	X	-0.0005	-0.0005	0	%100
16	20	X	-0.0005	-0.0005	0	%100
17	21	X	-0.0004	-0.0004	0	%100
18	22	X	-0.0004	-0.0004	0	%100
19	23	X	-0.0005	-0.0005	0	%100
20	24	X	-0.0005	-0.0005	0	%100
21	25	X	-0.0004	-0.0004	0	%100
22	26	X	-0.0004	-0.0004	0	%100
23	29	X	-0.0008	-0.0008	0	%100
24	32	X	-0.0008	-0.0008	0	%100
25	35	X	-0.0008	-0.0008	0	%100
26	36	X	-0.0007	-0.0007	0	%100

Node Loads and Enforced Displacements (BLC 11 : Live Load a)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	57	L	Y	-0.5

Node Loads and Enforced Displacements (BLC 12 : Live Load b)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	45	L	Y	-0.5

Node Loads and Enforced Displacements (BLC 13 : Live Load c)

	Node Label	L, D, M	Direction	Magnitude [(k, k-ft), (in, rad), (k*s²/ft, k*s²*ft)]
1	51	L	Y	-0.5

Basic Load Cases

	BLC Description	Category	Y Gravity	Nodal	Point	Distributed
1	Dead	DL	-1		10	
2	0 Wind - No Ice	WLZ			10	26
3	90 Wind - No Ice	WLX			10	26
4	0 Wind - Ice	WLZ			10	26
5	90 Wind - Ice	WLX			10	26
6	0 Wind - Service	WLZ			10	26
7	90 Wind - Service	WLX			10	26
8	Ice	OL1			10	26
9	0 Seismic	ELZ			10	26
10	90 Seismic	ELX			10	26
11	Live Load a	LL		1		
12	Live Load b	LL		1		
13	Live Load c	LL		1		
14	Live Load d	LL				
15	Maint LL 1	LL			1	
16	Maint LL 2	LL			1	
17	Maint LL 3	LL			1	
18	Maint LL 4	LL			1	
19	Maint LL 5	LL			1	
20	Maint LL 6	LL			1	
21	Maint LL 7	LL				
22	Maint LL 8	LL				
23	Maint LL 9	LL				
24	Maint LL 10	LL				
25	Maint LL 11	LL				
26	Maint LL 12	LL				
27	Maint LL 13	LL				
28	Maint LL 14	LL				
29	Maint LL 15	LL				

Load Combinations

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
1	1.4 Dead	Yes	Y	1	1.4						
2	1.2 D + 1.0 - 0 W	Yes	Y	1	1.2	2	1				
3	1.2 D + 1.0 - 30 W	Yes	Y	1	1.2	2	0.866	3	0.5		
4	1.2 D + 1.0 - 60 W	Yes	Y	1	1.2	3	0.866	2	0.5		
5	1.2 D + 1.0 - 90 W	Yes	Y	1	1.2	3	1				
6	1.2 D + 1.0 - 120 W	Yes	Y	1	1.2	3	0.866	2	-0.5		
7	1.2 D + 1.0 - 150 W	Yes	Y	1	1.2	2	-0.866	3	0.5		
8	1.2 D + 1.0 - 180 W	Yes	Y	1	1.2	2	-1				
9	1.2 D + 1.0 - 210 W	Yes	Y	1	1.2	2	-0.866	3	-0.5		
10	1.2 D + 1.0 - 240 W	Yes	Y	1	1.2	3	-0.866	2	-0.5		
11	1.2 D + 1.0 - 270 W	Yes	Y	1	1.2	3	-1				

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
12	1.2 D + 1.0 - 300 W	Yes	Y	1	1.2	3	-0.866	2	0.5		
13	1.2 D + 1.0 - 330 W	Yes	Y	1	1.2	2	0.866	3	-0.5		
14	1.2 D + 1.0 - 0 W/Ice	Yes	Y	1	1.2	4	1			8	1
15	1.2 D + 1.0 - 30 W/Ice	Yes	Y	1	1.2	4	0.866	5	0.5	8	1
16	1.2 D + 1.0 - 60 W/Ice	Yes	Y	1	1.2	5	0.866	4	0.5	8	1
17	1.2 D + 1.0 - 90 W/Ice	Yes	Y	1	1.2	5	1			8	1
18	1.2 D + 1.0 - 120 W/Ice	Yes	Y	1	1.2	5	0.866	4	-0.5	8	1
19	1.2 D + 1.0 - 150 W/Ice	Yes	Y	1	1.2	4	-0.866	5	0.5	8	1
20	1.2 D + 1.0 - 180 W/Ice	Yes	Y	1	1.2	4	-1			8	1
21	1.2 D + 1.0 - 210 W/Ice	Yes	Y	1	1.2	4	-0.866	5	-0.5	8	1
22	1.2 D + 1.0 - 240 W/Ice	Yes	Y	1	1.2	5	-0.866	4	-0.5	8	1
23	1.2 D + 1.0 - 270 W/Ice	Yes	Y	1	1.2	5	-1			8	1
24	1.2 D + 1.0 - 300 W/Ice	Yes	Y	1	1.2	5	-0.866	4	0.5	8	1
25	1.2 D + 1.0 - 330 W/Ice	Yes	Y	1	1.2	4	0.866	5	-0.5	8	1
26	1.2 D + 1.0 E - 0	Yes	Y	1	1.2	9	1				
27	1.2 D + 1.0 E - 30	Yes	Y	1	1.2	9	0.866	10	0.5		
28	1.2 D + 1.0 E - 60	Yes	Y	1	1.2	10	0.866	9	0.5		
29	1.2 D + 1.0 E - 90	Yes	Y	1	1.2	10	1				
30	1.2 D + 1.0 E - 120	Yes	Y	1	1.2	10	0.866	9	-0.5		
31	1.2 D + 1.0 E - 150	Yes	Y	1	1.2	9	-0.866	10	0.5		
32	1.2 D + 1.0 E - 180	Yes	Y	1	1.2	9	-1				
33	1.2 D + 1.0 E - 210	Yes	Y	1	1.2	9	-0.866	10	-0.5		
34	1.2 D + 1.0 E - 240	Yes	Y	1	1.2	10	-0.866	9	-0.5		
35	1.2 D + 1.0 E - 270	Yes	Y	1	1.2	10	-1				
36	1.2 D + 1.0 E - 300	Yes	Y	1	1.2	10	-0.866	9	0.5		
37	1.2 D + 1.0 E - 330	Yes	Y	1	1.2	9	0.866	10	-0.5		
38	1.2 D + 1.5 LL a + Service - 0 W	Yes	Y	1	1.2	6	1			11	1.5
39	1.2 D + 1.5 LL a + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	11	1.5
40	1.2 D + 1.5 LL a + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	11	1.5
41	1.2 D + 1.5 LL a + Service - 90 W	Yes	Y	1	1.2	7	1			11	1.5
42	1.2 D + 1.5 LL a + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	11	1.5
43	1.2 D + 1.5 LL a + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	11	1.5
44	1.2 D + 1.5 LL a + Service - 180 W	Yes	Y	1	1.2	6	-1			11	1.5
45	1.2 D + 1.5 LL a + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	11	1.5
46	1.2 D + 1.5 LL a + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	11	1.5
47	1.2 D + 1.5 LL a + Service - 270 W	Yes	Y	1	1.2	7	-1			11	1.5
48	1.2 D + 1.5 LL a + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	11	1.5
49	1.2 D + 1.5 LL a + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	11	1.5
50	1.2 D + 1.5 LL b + Service - 0 W	Yes	Y	1	1.2	6	1			12	1.5
51	1.2 D + 1.5 LL b + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	12	1.5
52	1.2 D + 1.5 LL b + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	12	1.5
53	1.2 D + 1.5 LL b + Service - 90 W	Yes	Y	1	1.2	7	1			12	1.5
54	1.2 D + 1.5 LL b + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	12	1.5
55	1.2 D + 1.5 LL b + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	12	1.5
56	1.2 D + 1.5 LL b + Service - 180 W	Yes	Y	1	1.2	6	-1			12	1.5
57	1.2 D + 1.5 LL b + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	12	1.5
58	1.2 D + 1.5 LL b + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	12	1.5
59	1.2 D + 1.5 LL b + Service - 270 W	Yes	Y	1	1.2	7	-1			12	1.5
60	1.2 D + 1.5 LL b + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	12	1.5
61	1.2 D + 1.5 LL b + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	12	1.5
62	1.2 D + 1.5 LL c + Service - 0 W	Yes	Y	1	1.2	6	1			13	1.5
63	1.2 D + 1.5 LL c + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	13	1.5
64	1.2 D + 1.5 LL c + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	13	1.5
65	1.2 D + 1.5 LL c + Service - 90 W	Yes	Y	1	1.2	7	1			13	1.5
66	1.2 D + 1.5 LL c + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	13	1.5

Load Combinations (Continued)

	Description	Solve	P-Delta	BLC	Factor	BLC	Factor	BLC	Factor	BLC	Factor
67	1.2 D + 1.5 LL c + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	13	1.5
68	1.2 D + 1.5 LL c + Service - 180 W	Yes	Y	1	1.2	6	-1			13	1.5
69	1.2 D + 1.5 LL c + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	13	1.5
70	1.2 D + 1.5 LL c + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	13	1.5
71	1.2 D + 1.5 LL c + Service - 270 W	Yes	Y	1	1.2	7	-1			13	1.5
72	1.2 D + 1.5 LL c + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	13	1.5
73	1.2 D + 1.5 LL c + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	13	1.5
74	1.2 D + 1.5 LL d + Service - 0 W	Yes	Y	1	1.2	6	1			14	1.5
75	1.2 D + 1.5 LL d + Service - 30 W	Yes	Y	1	1.2	6	0.866	7	0.5	14	1.5
76	1.2 D + 1.5 LL d + Service - 60 W	Yes	Y	1	1.2	7	0.866	6	0.5	14	1.5
77	1.2 D + 1.5 LL d + Service - 90 W	Yes	Y	1	1.2	7	1			14	1.5
78	1.2 D + 1.5 LL d + Service - 120 W	Yes	Y	1	1.2	7	0.866	6	-0.5	14	1.5
79	1.2 D + 1.5 LL d + Service - 150 W	Yes	Y	1	1.2	6	-0.866	7	0.5	14	1.5
80	1.2 D + 1.5 LL d + Service - 180 W	Yes	Y	1	1.2	6	-1			14	1.5
81	1.2 D + 1.5 LL d + Service - 210 W	Yes	Y	1	1.2	6	-0.866	7	-0.5	14	1.5
82	1.2 D + 1.5 LL d + Service - 240 W	Yes	Y	1	1.2	7	-0.866	6	-0.5	14	1.5
83	1.2 D + 1.5 LL d + Service - 270 W	Yes	Y	1	1.2	7	-1			14	1.5
84	1.2 D + 1.5 LL d + Service - 300 W	Yes	Y	1	1.2	7	-0.866	6	0.5	14	1.5
85	1.2 D + 1.5 LL d + Service - 330 W	Yes	Y	1	1.2	6	0.866	7	-0.5	14	1.5
86	1.2 D + 1.5 LL Maint (1)	Yes	Y	1	1.2					15	1.5
87	1.2 D + 1.5 LL Maint (2)	Yes	Y	1	1.2					16	1.5
88	1.2 D + 1.5 LL Maint (3)	Yes	Y	1	1.2					17	1.5
89	1.2 D + 1.5 LL Maint (4)	Yes	Y	1	1.2					18	1.5
90	1.2 D + 1.5 LL Maint (5)	Yes	Y	1	1.2					19	1.5
91	1.2 D + 1.5 LL Maint (6)	Yes	Y	1	1.2					20	1.5
92	1.2 D + 1.5 LL Maint (7)	Yes	Y	1	1.2					21	1.5
93	1.2 D + 1.5 LL Maint (8)	Yes	Y	1	1.2					22	1.5
94	1.2 D + 1.5 LL Maint (9)	Yes	Y	1	1.2					23	1.5
95	1.2 D + 1.5 LL Maint (10)	Yes	Y	1	1.2					24	1.5
96	1.2 D + 1.5 LL Maint (11)	Yes	Y	1	1.2					25	1.5
97	1.2 D + 1.5 LL Maint (12)	Yes	Y	1	1.2					26	1.5
98	1.2 D + 1.5 LL Maint (13)	Yes	Y	1	1.2					27	1.5
99	1.2 D + 1.5 LL Maint (14)	Yes	Y	1	1.2					28	1.5
100	1.2 D + 1.5 LL Maint (15)	Yes	Y	1	1.2					29	1.5

Envelope Node Reactions

	Node Label		X [k]	LC	Y [k]	LC	Z [k]	LC	MX [k-ft]	LC	MY [k-ft]	LC	MZ [k-ft]	LC
1	12	max	0.792	40	0.708	65	1.373	13	0	100	0	100	0	100
2		min	-1.457	70	0.267	11	-2.582	7	0	1	0	1	0	1
3	27	max	1.448	65	0.67	59	1.414	14	0	100	0	100	0	100
4		min	-0.782	47	0.252	5	0.113	8	0	1	0	1	0	1
5	66	max	0.281	6	0.051	24	1.054	6	0	100	0	100	0	100
6		min	-0.281	12	0.021	43	-1.055	12	0	1	0	1	0	1
7	Totals:	max	1.161	5	1.392	25	1.607	2						
8		min	-1.161	11	0.634	7	-1.607	8						

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
1	1	PIPE_2.88x0.203	0.106	6.25	8	0.069	6.25		68	35.519	70.68	5.029	5.029	1.647	H1-1b
2	2	PIPE_2.88x0.203	0.17	6.25	8	0.088	1.75		6	35.519	70.68	5.029	5.029	1.503	H1-1b
3	3	PL5/8x3.5	0.245	0.583	67	0.08	0.583	y	38	84.578	99.225	1.302	7.235	2.224	H1-1b
4	4	1.9" ODx0.12"	0.272	0.135	67	0.056	2.449		18	21.867	25.364	1.2	1.2	2.071	H1-1b
5	5	PL5/8x4.25	0.13	0.362	8	0.039	0.362	y	43	110.629	119.531	1.556	10.583	1.425	H1-1b

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

	Member	Shape	Code Check	Loc[ft]	LC	Shear Check	Loc[ft]	Dir	LC	phi*Pnc [k]	phi*Pnt [k]	phi*Mn y-y [k-ft]	phi*Mn z-z [k-ft]	Cb	Eqn
6	7	PL5/8x3.5	0.19	0.583	49	0.095	0.007	y	67	84.578	99.225	1.302	7.235	1.244	H1-1b
7	8	1.9" ODx0.12"	0.217	1.292	87	0.065	2.449		7	21.867	25.364	1.2	1.2	1.317	H1-1b
8	9	PL5/8x4.25	0.16	0.362	13	0.055	0.362	y	7	110.629	119.531	1.556	10.583	1.429	H1-1b
9	11	PL5/8x3.5	0.236	0.583	67	0.081	0.583	y	45	84.578	99.225	1.302	7.235	1.018	H1-1b
10	12	1.9" ODx0.12"	0.298	0.135	66	0.064	2.449		8	21.867	25.364	1.2	1.2	2.068	H1-1b
11	13	PL5/8x4.25	0.1	0.127	8	0.056	0.362	y	8	110.629	119.531	1.556	10.583	1.444	H1-1b
12	15	PL5/8x3.5	0.188	0.583	49	0.098	0.583	y	67	84.578	99.225	1.302	7.235	1.059	H1-1b
13	16	1.9" ODx0.12"	0.236	0.135	49	0.061	0.135		67	21.867	25.364	1.2	1.2	2.056	H1-1b
14	17	PL5/8x4.25	0.048	0.127	13	0.047	0.362	y	68	110.629	119.531	1.556	10.583	1.446	H1-1b
15	19	0.63" SR	0.398	2.5	65	0.006	2.5		67	1.941	14.028	0.147	0.147	2.228	H1-1a
16	20	0.63" SR	0.525	2.5	67	0.013	0		67	1.941	14.028	0.147	0.147	2.266	H1-1a
17	21	1/2"SR	0.301	0	68	0.008	3.499		48	0.393	8.836	0.074	0.074	1.859	H1-1a
18	22	1/2"SR	0	3.499	100	0.007	0		43	0.393	8.836	0.074	0.074	1	H1-1a
19	23	0.63" SR	0.307	2.5	49	0.012	0		6	1.941	14.028	0.147	0.147	1.189	H1-1a
20	24	0.63" SR	0.418	2.5	49	0.014	0		67	1.941	14.028	0.147	0.147	2.263	H1-1a
21	25	1/2"SR	0.231	0	49	0.011	0		71	0.393	8.836	0.074	0.074	1.679	H1-1a
22	26	1/2"SR	0.013	3.499	6	0.015	0		7	0.393	8.836	0.074	0.074	3	H1-1b*
23	29	Pipe2.88x.12	0.099	2.75	7	0.049	2.75		7	22.493	43.056	3.157	3.157	3	H1-1b
24	32	Pipe2.88x.12	0.199	2.75	2	0.047	5.25		62	22.493	43.056	3.157	3.157	3	H1-1b
25	35	Pipe2.88x.12	0.126	5.25	43	0.037	5.25		49	22.493	43.056	3.157	3.157	3	H1-1b
26	36	Pipe2.38X0.12	0.192	0	6	0.006	12.055		11	5.883	35.273	2.115	2.115	1.136	H1-1b*

APPENDIX B

(Additional Calculations)

PROJECT	**149428.003.01 - Putnam Freight, CT**				**KSC**
SUBJECT	**Sector Mount Analysis**				
DATE	**11/24/21**	PAGE	1	OF	1

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

[REF: AISC 360-05]

Reactions at Bolted Connection

Tension	:	1.373	k
Vertical Shear	:	0.708	k
Horizontal Shear	:	0.792	k
Torsion	:	0	k.ft
Moment from Horizontal Forces	:	0	k.ft
Moment from Vertical Forces	:	0	k.ft

Bolt Parameters

Bolt Grade	:	A307	
Bolt Diameter	:	0.625	in
Nominal Bolt Area	:	0.307	in^2
Bolt spacing, Horizontal	:	6	in
Bolt spacing, Vertical	:	6	in
Bolt edge distance, plate height	:	1.5	in
Bolt edge distance, plate width	:	1.5	in
Total Number of Bolts	:	4	bolts

Summary of Forces

Shear Resultant Force	:	1.06	k
Force from Horz. Moment	:	0.00	k
Force from Vert. Moment	:	0.00	k
Shear Load / Bolt	:	0.27	k
Tension Load / Bolt	:	0.34	k
Resultant from Moments / Bolt	:	0.00	k

Bolt Checks

Nominal Tensile Stress, F_{nt}	:	45.00	ksi	[AISC Table J3.2]
Available Tensile Stress, ΦR_{nt}	:	10.36	k/bolt	[Eq. J3-1]
Unity Check, Bolt Tension	:	**3.31%**		**OKAY**
Nominal Shear Stress, F_{nv}	:	24.00	ksi	[AISC Table J3.2]
Available Shear Stress, ΦR_{nv}	:	5.53	k/bolt	[Eq. J3-1]
Unity Check, Bolt Shear	:	**11.02%**		**OKAY**
Unity Check, Combined	:	**14.33%**		**OKAY**
Available Bearing Strength, ΦR_n	:	34.66	k/bolt	
Unity Check, Bolt Bearing	:	**0.77%**		**OKAY**

PROJECT	**149428.003.01 - Putnam Freight, CT**				**KSC**
SUBJECT	**Sector Mount Analysis**				
DATE	**11/24/21**	PAGE	1	OF	1

B+T Group
1717 S. Boulder, Suite 300
Tulsa, OK 74119
(918) 587-4630

[REF: AISC 360-05]

Connecting Member Parameters

Plate Yield Strength, F_y	:	36.00	ksi	[AISC Table 2-5]
Plate Tensile Strength, F_u	:	58.00	ksi	[AISC Table 2-5]
Plate Height	:	9.00	in	
Plate Width	:	9.00	in	
Plate Thickness	:	0.50	in	
Edge Distance	:	1.06	in	
Gross Tension Area, A_{gt}	:	4.50	in^2	
Gross Shear Area, A_{gv}	:	0.75	in^2	
Net Area for tension, A_{nv}	:	4.16	in^2	
Net Area for shear, A_{nt}	:	3.00	in^2	

Plate Check

Available Tensile Yield	:	145.80	k	[Eq. J4-1]
Available Tensile Rupture	:	180.80	k	[Eq. J4-2]
Unity Check, Plate Tension	:	**0.24%**		**OKAY**
Available Shear Yield	:	16.20	k	[Eq. J4-3]
Available Shear Rupture	:	104.40	k	[Eq. J4-4]
Unity Check, Plate Shear	:	**6.56%**		**OKAY**
Available Block Shear, ΦRn	:	77.40	k	[Eq. J4-5]
Unity Check, Block Shear	:	**1.37%**		**OKAY**

Exhibit F

Power Density/RF Emissions Report

Fox Hill Telecom

Radio Frequency Emissions Analysis Report

Site ID: BOBOS00043A

SBA - Industrial Park Road
63 Industrial Park Road
Putnam, CT 06260

May 3, 2022

Fox Hill Telecom Project Number: 220983

Site Compliance Summary	
Compliance Status:	**COMPLIANT**
Site total MPE% of FCC general population allowable limit:	**11.03 %**

Fox Hill Telecom

May 3, 2022

Dish Wireless
5701 South Santa Fe Drive
Littleton, CO 80120

Emissions Analysis for Site: **BOBOS00043A – SBA - Industrial Park Road**

Fox Hill Telecom, Inc ("Fox Hill") was directed to analyze the proposed radio installation for Dish Wireless, LLC (Dish) facility located at **63 Industrial Park Road, Putnam, CT**, for the purpose of determining whether the emissions from the Proposed Dish radio and antenna installation located on this property are within specified federal limits.

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

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

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

Population exposure to radio frequencies is regulated and enforced in units of microwatts per square centimeter ($\mu W/cm^2$). The general population exposure limits for the 600 MHz & 700 MHz bands are approximately 400 $\mu W/cm^2$ and 467 $\mu W/cm^2$ respectively. The general population exposure limit for the 1900 MHz (PCS) and 2100 MHz (AWS / AWS-4) bands is 1000 $\mu W/cm^2$. Because each carrier will be using different frequency bands, and each frequency band has different exposure limits, it is necessary to report percent of MPE rather than power density.

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

Additional details can be found in FCC OET 65.

CALCULATIONS

Calculations were performed for the proposed radio system installation for **Dish** on the subject site located at **63 Industrial Park Road, Putnam, CT**, using the equipment information listed below. All calculations were performed per the specifications under FCC OET 65. Since **Dish** is proposing highly focused directional panel antennas, which project most of the emitted energy out toward the horizon, all calculations were performed assuming a lobe representing the maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was focused at the base of the tower. For this report the sample point is the top of a 6-foot person standing at the base of the tower.

Per FCC OET Bulletin No. 65 - Edition 97-01 recommendations to achieve the maximum anticipated value at each sample point, all power levels emitting from the proposed antenna installation are increased by a factor of 2.56 to account for possible in-phase reflections from the surrounding environment. All power values expressed and analyzed are maximum power levels expected to be used on all radios.

All emissions values for additional carriers were taken from the Connecticut Siting Council (CSC) active MPE database. Values in this database are provided by the individual carriers themselves

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

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

Table 1: Channel Data Table

The following antennas listed in *Table 2* were used in the modeling for transmission in the 600 MHz (n71) frequency band, and the 2100 MHz (AWS 4) frequency bands at 1995-2020 MHz (n70) and 2180-2200 MHz (n66). This is based on feedback from the carrier with regards to anticipated antenna selection. Maximum gain values for all antennas are listed in the Inventory and Power Data table below. The maximum gain of the antenna per the antenna manufactures supplied specifications, minus 10 dB for directional panel antennas, was used for all calculations. This value is a very conservative estimate as gain reductions for these particular antennas are typically much higher in this direction.

Sector	Antenna Number	Antenna Make / Model	Antenna Centerline (ft)
A	1	Commscope FFVV-65B-R2	166
B	1	Commscope FFVV-65B-R2	166
C	1	Commscope FFVV-65B-R2	166

Table 2: Antenna Data

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

RESULTS

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

Antenna ID	Antenna Make / Model	Frequency Bands	Antenna Gain (dBd)	Channel Count	Total TX Power (W)	ERP (W)	MPE %
Antenna A1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	3.25
						Sector A Composite MPE%	**3.25**
Antenna B1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	3.25
						Sector B Composite MPE%	**3.25**
Antenna C1	Commscope FFVV-65B-R2	n71 (600 MHz) / n70 (AWS-4 / 1995-2020) / n66 (AWS-4 / 2180-2200)	12.15 / 15.95 / 16.25	12	566	17,079.80	3.25
						Sector C Composite MPE%	**3.25**

Table 3: Dish Emissions Levels

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

Site Composite MPE%	
Carrier	**MPE%**
Dish – Max Per Sector Value	**3.25 %**
AT&T	1.75 %
Verizon Wireless	6.03 %
Site Total MPE %:	**11.03 %**

Table 4: All Carrier MPE Contributions

Dish Sector A Total:	3.25 %
Dish Sector B Total:	3.25 %
Dish Sector C Total:	3.25 %
Site Total:	11.03 %

Table 5: Site MPE Summary

FCC OET 65 specifies that for carriers utilizing directional antennas that the highest recorded sector value be used for composite site MPE values due to their greatly reduced emissions contributions in the directions of the adjacent sectors. *Table 6* below details a breakdown by frequency band and technology for the MPE power values for the maximum calculated **Dish** sector(s).. For this site, all three sectors have the same configuration yielding the same results on all three sectors.

Dish _ Frequency Band / Technology Max Power Values (Per Sector)	# Channels	Watts ERP (Per Channel)	Height (feet)	Total Power Density ($\mu W/cm^2$)	Frequency (MHz)	Allowable MPE ($\mu W/cm^2$)	Calculated % MPE
Dish n71 (600 MHz) 5G	4	1,008.96	166	5.67	n71 (600 MHz)	400	1.42%
Dish n70 (AWS-4 / 1995-2020) 5G	4	1,574.20	166	8.84	n70 (AWS-4 / 1995-2020)	1000	0.88%
Dish n66 (AWS-4 / 2180-2200) 5G	4	1,686.79	166	9.48	n66 (AWS-4 / 2180-2200)	1000	0.95%
						Total:	**3.25%**

Table 6: Dish Maximum Sector MPE Power Values

Summary

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

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

Dish Sector	Power Density Value (%)
Sector A:	3.25 %
Sector B:	3.25 %
Sector C:	3.25 %
Dish Maximum Total (per sector):	3.25 %
Site Total:	11.03 %
Site Compliance Status:	**COMPLIANT**

The anticipated composite MPE value for this site assuming all carriers present is **11.03 %** of the allowable FCC established general population limit sampled at the ground level. This is based upon values listed in the Connecticut Siting Council database for existing carrier emissions.

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

Scott Heffernan
Principal RF Engineer
Fox Hill Telecom, Inc
Holden, MA 01520
(978)660-3998

Exhibit G

Letter of Authorization

SBA Letter of Authorization

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

Re: Tower Share Application

SBA COMMUNICATIONS CORPORATION hereby authorizes DISH Wireless LLC, including their Agent, to act as our Agent in the processing of all zoning applications, building permits and approvals through the CONNECTICUT SITING COUNCIL for existing wireless communications towers.

Kri Pelletier
Site Development Manager
SBA COMMUNICATIONS CORPORATION
134 Flanders Road, Suite 125
Westboro, MA 01581

SBA
By: _____ Date: _____

Exhibit H

Recipient Mailings

UNITED STATES POSTAL SERVICE®

Click-N-Ship®

9405 5036 9930 0258 3299 52 0089 5000 0010 1581

usps.com
$8.95
US POSTAGE
Flat Rate Env

U.S. POSTAGE PAID
Click-N-Ship®

05/25/2022 Mailed from 01566

P

PRIORITY MAIL 1-DAY™

Expected Delivery Date: 05/27/22
Ref#: SBDS-00043

0006

R005

DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

SHIP TO: SBA COMMUNICATIONS CORPORATION
13 FLANDERS RD
STE 125
WESTBOROUGH MA 01581

USPS TRACKING #

9405 5036 9930 0258 3299 52

Electronic Rate Approved #038555749

Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 3299 52

Trans. #:	564311952
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/27/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

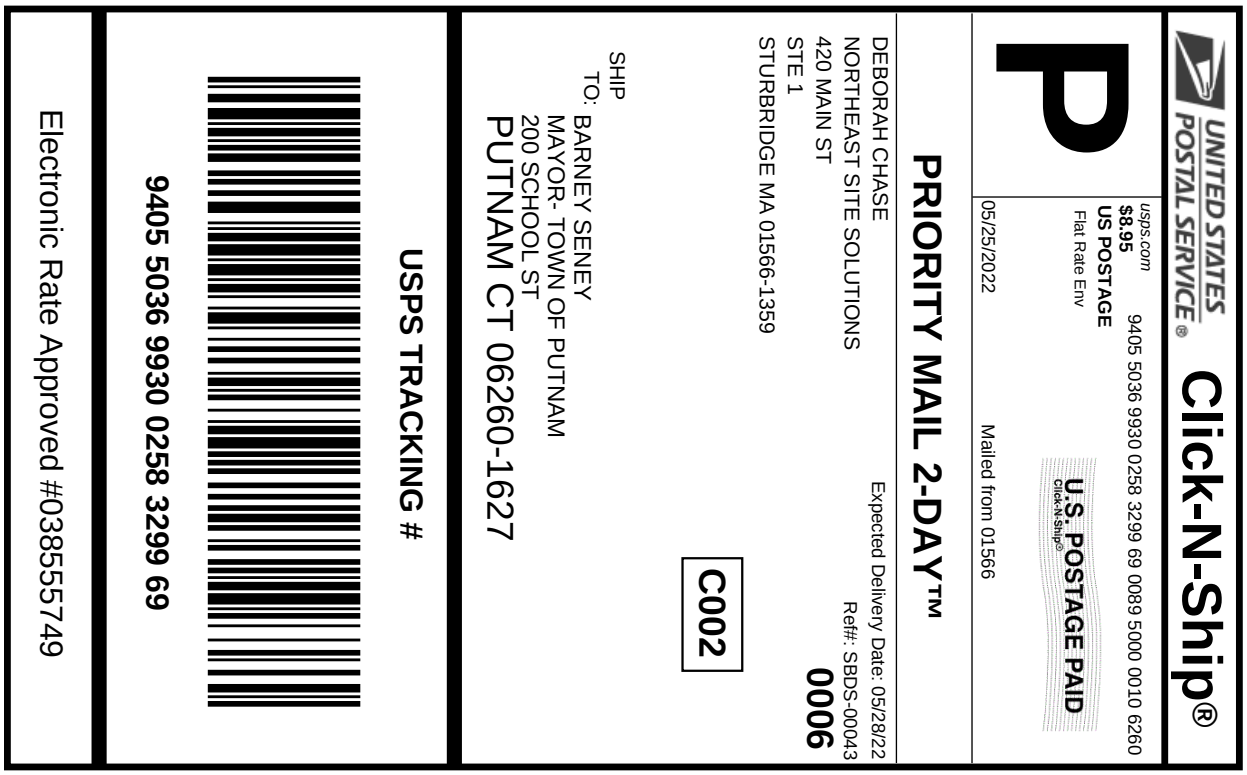
Ref#: SBDS-00043

To: SBA COMMUNICATIONS CORPORATION
13 FLANDERS RD
STE 125
WESTBOROUGH MA 01581

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

UNITED STATES POSTAL SERVICE®

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com



Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 3299 69

Trans. #:	564311952
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/28/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

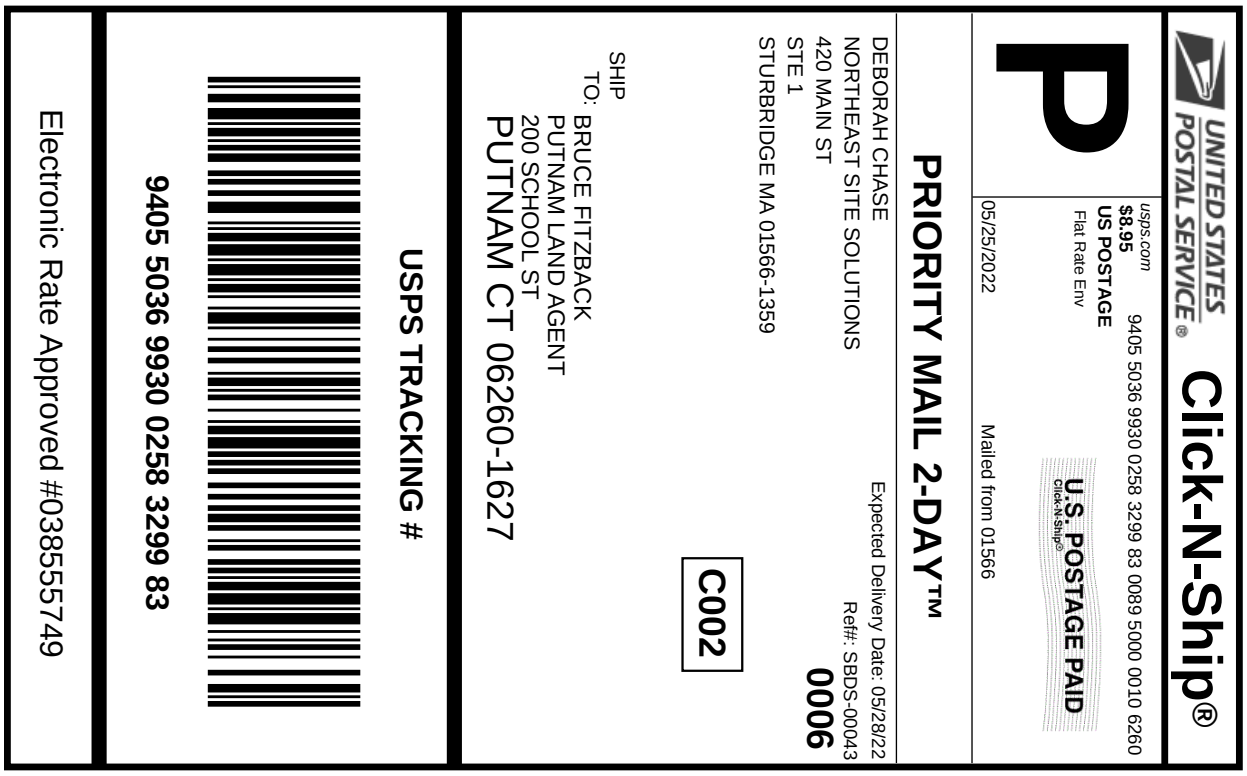
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: SBDS-00043

To: BARNEY SENEY
MAYOR- TOWN OF PUTNAM
200 SCHOOL ST
PUTNAM CT 06260-1627

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com



Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 3299 83

Trans. #:	564311952
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/28/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

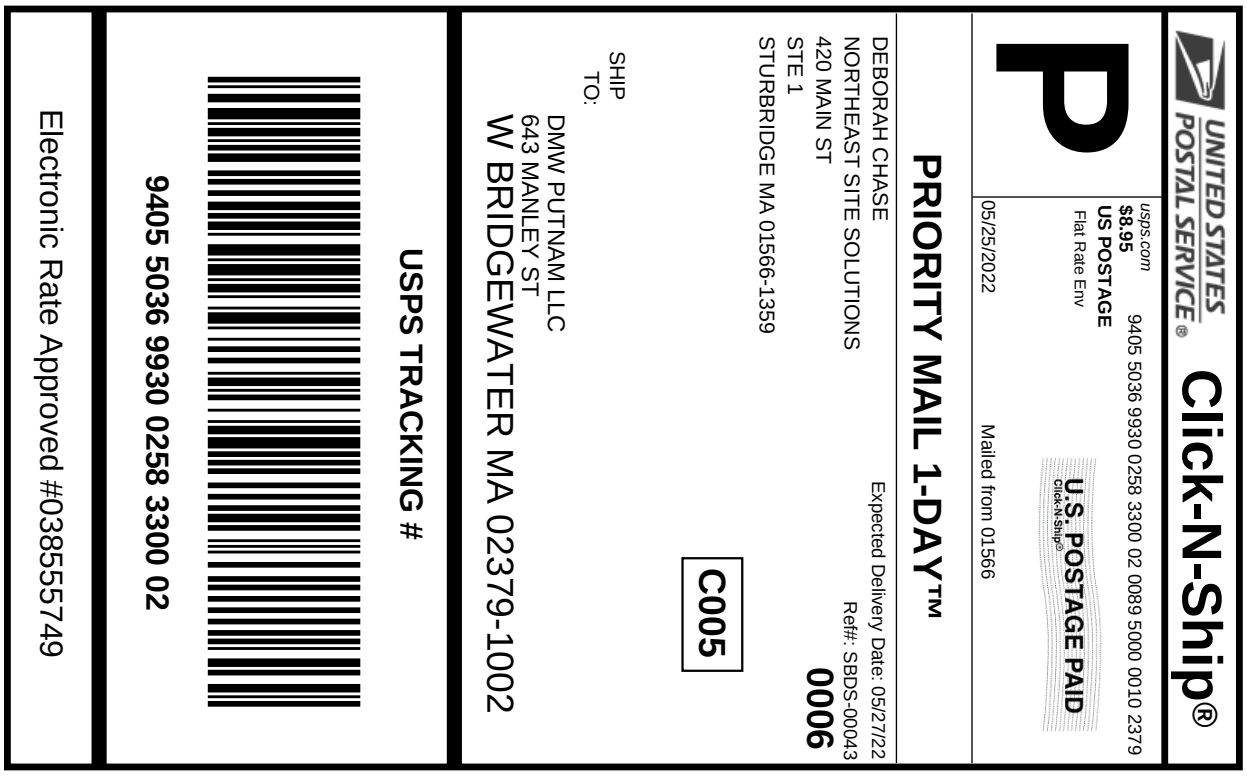
From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: SBDS-00043

To: BRUCE FITZBACK
PUTNAM LAND AGENT
200 SCHOOL ST
PUTNAM CT 06260-1627

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com



Cut on dotted line.

Instructions

1. **Each Click-N-Ship® label is unique. Labels are to be used as printed and used only once. DO NOT PHOTO COPY OR ALTER LABEL.**
2. **Place your label so it does not wrap around the edge of the package.**
3. **Adhere your label to the package. A self-adhesive label is recommended. If tape or glue is used, DO NOT TAPE OVER BARCODE. Be sure all edges are secure.**
4. **To mail your package with PC Postage®, you may schedule a Package Pickup online, hand to your letter carrier, take to a Post Office™, or drop in a USPS collection box.**
5. **Mail your package on the "Ship Date" you selected when creating this label.**

Click-N-Ship® Label Record

USPS TRACKING # :
9405 5036 9930 0258 3300 02

Trans. #:	564311952
Print Date:	05/25/2022
Ship Date:	05/25/2022
Expected Delivery Date:	05/27/2022

Priority Mail® Postage:	**$8.95**
Total:	**$8.95**

From: DEBORAH CHASE
NORTHEAST SITE SOLUTIONS
420 MAIN ST
STE 1
STURBRIDGE MA 01566-1359

Ref#: SBDS-00043

To: DMW PUTNAM LLC
643 MANLEY ST
W BRIDGEWATER MA 02379-1002

* Retail Pricing Priority Mail rates apply. There is no fee for USPS Tracking® service on Priority Mail service with use of this electronic rate shipping label. Refunds for unused postage paid labels can be requested online 30 days from the print date.

Thank you for shipping with the United States Postal Service!
Check the status of your shipment on the USPS Tracking® page at usps.com

DDB0SD043A

SBA-Nish

UNITED STATES POSTAL SERVICE.

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

05/31/2022 08:47 AM

Product	Qty	Unit Price	Price
Prepaid Mail West Bridgewater, MA 02379 Weight: 0 lb 10.60 oz Acceptance Date: Tue 05/31/2022 Tracking #: 9405 5036 9930 0258 3300 02	1		$0.00
Prepaid Mail Westborough, MA 01581 Weight: 0 lb 2.00 oz Acceptance Date: Tue 05/31/2022 Tracking #: 9405 5036 9930 0258 3299 52	1		$0.00
Prepaid Mail Putnam, CT 06260 Weight: 0 lb 10.60 oz Acceptance Date: Tue 05/31/2022 Tracking #: 9405 5036 9930 0258 3299 83	1		$0.00
Prepaid Mail Putnam, CT 06260 Weight: 0 lb 10.60 oz Acceptance Date: Tue 05/31/2022 Tracking #: 9405 5036 9930 0258 3299 69	1		$0.00
Grand Total:			$0.00

****
Every household in the U.S. is now
eligible to receive a third set
of 8 free test kits.
Go to www.covidtests.gov
****

Preview your Mail
Track your Packages
Sign up for FREE @
https://informeddelivery.usps.com

All sales final on stamps and postage.
Refunds for guaranteed services only.
Thank you for your business.

Tell us about your experience.
Go to: https://postalexperience.com/Pos
or scan this code with your mobile device.