



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

**ORDERED:**

**IN CITY COUNCIL  
NOTICE OF DECISION  
GRANT OF SPECIAL PERMIT**

Special Permit Application of:  
Dish Wireless, LLC  
5701 South Santa Fe Drive  
Littleton, CO 80120  
Order No. 24-1009210B

Locus:  
450 Boston Post Road East  
Marlborough, MA 01752  
Assessors Map 73, Parcel(s) 31

## **DECISION**

The City Council of the City of Marlborough hereby **GRANTS** the Application for a Special Permit to Dish Wireless L.L.C., with a principal office located at 5701 South Santa Fe Drive, Littleton, CO 80120 c/o Network Building & Consulting, LLC, 300 Unicorn Park, Suite 501, Woburn, MA 01801, as provided in the DECISION and subject to the Findings of Fact and Conditions therein.

Decision date: **September 9, 2024.**

The Decision of the City Council was filed in the Office of the City Clerk of Marlborough on the **10<sup>th</sup>** day of **September 2024.**

This is to certify that twenty (20) days have passed since the filing of the within decision and no appeal has been filed with this office.

Given at Marlborough this **1<sup>st</sup>** day of **October 2024.**

Given under Chapter 40A Section 17 of the General Laws.

A TRUE COPY  
ATTEST:

City Clerk



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

**ORDERED:**

## IN CITY COUNCIL

### NOTICE OF DECISION GRANT OF SPECIAL PERMIT

Special Permit Application of:  
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Decision date: September 9, 2024.

The Decision of the City Council was filed in the Office of the City Clerk of Marlborough on the 10<sup>th</sup> day of September 2024.

### APPEALS

Appeals, if any, shall be made pursuant to Massachusetts General Laws Chapter 40A, § 17, and shall be filed within twenty (20) days after the date of the filing of this Notice of Decision in the Office of the City Clerk of the City of Marlborough, Massachusetts.

A TRUE COPY  
ATTEST:

City Clerk



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

PAGE 1

ORDERED:

## IN CITY COUNCIL

### DECISION ON A SPECIAL PERMIT DISH WIRELESS, LLC

#### ORDER NO. 24-1009210B

The City Council of the City of Marlborough hereby **GRANTS** the Application for a Special Permit to Dish Wireless L.L.C. (the “Applicant”) to allow for the co-location of a new Wireless Communications Facility (3 antennas and associated equipment) on an existing rooftop pursuant to the submitted plans, as provided in the DECISION and subject to the Findings of Fact and Conditions therein.

#### FINDINGS OF FACT

1. The Applicant is a duly organized and existing corporation and FCC Licensee having a business address of 5701 South Santa Fe Dr., Littleton, CO 80120 c/o Network Building & Consulting, LLC, 300 Unicorn Park, Suite 501, Woburn, MA 01801.
2. The Applicant is a lessee of a portion of the property located at 450 Boston Post Rd. East, Marlborough, MA (Assessor’s Map 73, Parcel 31), Marlborough, Massachusetts (the “Site”).
3. On June 17, 2024, the Applicant filed with the City Clerk of the City of Marlborough an application (hereinafter referred to as the “Application”) for a Special Permit under Chapter 650 (Zoning) of the Code of the City of Marlborough (hereinafter referred to as the “Zoning Ordinance”), Section 650-25 entitled Wireless Communications Facilities.
4. In accordance with Article V, Section 650-18(A)(20) and Section 650-25 of the Zoning Ordinance, the Applicant proposes the co-location of a new Wireless Communications Facility (3 antennas and associated equipment) (the “Use”) at the Site, as shown in the plans submitted with the Application and referenced in paragraph 5 below.
5. In connection with the Application, the Applicant submitted a certified list of abutters, filing fees, and plans by NB&C Engineering Services, LLC, with the last revision date of May 26, 2023, (collectively the “Plans”), attached hereto as **“Attachment A.”**
6. Pursuant to the Application, the Applicant is licensed by the FCC to provide personal wireless services in the City of Marlborough and surrounding areas and currently has a problem with significant gaps in coverage and capacity issues with coverage that could be alleviated by installing the Use on the subject location as shown on the Plans.



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

PAGE 2

## ORDERED:

7. The Site is located in the Business and Residence A-1 Zoning Districts, which allow a Special Permit to be issued for a Wireless Communication Facility (“WCF”).
8. Pursuant to the Rules and Regulations of the City Council of the City of Marlborough and applicable statutes of the Commonwealth of Massachusetts, the City Council established a date for a public hearing on the Application, and the City Clerk for the City of Marlborough caused notice of the same to be advertised and determined that notice of the same was provided to abutters and the planning boards of all surrounding towns entitled thereto in accordance with applicable regulations and law.
9. The Marlborough City Council, pursuant to Massachusetts General Laws Chapter 40A, opened a public hearing on the Application on July 22, 2024. The public hearing was held in the City Council Chamber, at the Marlborough City Hall, 140 Main Street. The public hearing was closed on July 22, 2024.
10. The Applicant presented oral testimony and demonstrative evidence at the public hearing, demonstrating that the Use meets all the applicable Special Permit criteria of Article VI, Section 650-25 and Article VIII, Section 650-59.
11. At the Public Hearing, there were no members of the public speaking in opposition to the Use.
12. The Council, in reviewing the Application, considered the Review Standard and Development Requirements, as enumerated in Article VI, Section 650-25 and Article VII, Section 650-59 of the City of Marlborough Zoning Ordinance, applicable to the Use.

### **BASED ON THE ABOVE, THE CITY COUNCIL MAKES THE FOLLOWING FINDINGS AND TAKES THE FOLLOWING ACTIONS:**

- A. The Applicant has complied with the Rules and Regulations promulgated by the Marlborough City Council as they pertain to special permit applications.
- B. The City Council finds the proposed Use of the Site is in harmony with the intent and general purpose of the Zoning Ordinance of the City of Marlborough when subject to appropriate terms and conditions as provided in this Decision. The City Council makes these findings subject to the completion and adherence by the Applicant, its successors and/or assigns to the conditions more fully set forth herein.
- C. The City Council finds that the proposed Use is consistent with the purposes of Section 650-25 governing WCFs in the City.
- D. The proposed WCF and location are consistent with both the applicable review standards in Section 650-25(D) and the development requirements in Section 650-25(E).



# IN CITY COUNCIL

Marlborough, Mass., SEPTEMBER 9, 2024

PAGE 3

## ORDERED:

- E. The City Council recognizes the Applicant is a federal licensee afforded certain protection under federal telecommunications law, to the extent provided by law.
- F. The City Council confirms the Applicant has demonstrated the need to construct the proposed facility to solve certain wireless coverage and capacity issues that currently exist in its network in the vicinity.
- G. The City Council finds that the proposed Use, which will enhance wireless telecommunications, is good for business and good for the public safety and convenience where much of the population now owns and relies on wireless connectivity and a majority of 911 calls are now made on wireless telephones.
- H. The City Council finds that there are adequate, ample parking spaces on the host parcel.
- I. The City Council finds the proposed Use, which consists of an unmanned and unoccupied facility, will have no impact on traffic and pedestrian safety in the area.
- J. The City Council finds the proposed Use will not be contrary to the public health, safety, convenience, and welfare and will not be offensive or detrimental.
- K. The City Council, pursuant to its authority under MGL Chapter 40A and the City of Marlborough Zoning Ordinance **GRANTS** to the Applicant a Special Permit for construction of the Use, a wireless communications facility on the existing rooftop **SUBJECT TO THE FOLLOWING CONDITIONS**, which conditions shall be binding on the Applicant, its successors and/or assigns:
  - 1. Construction in Accordance with Applicable Laws. Construction of all structures on the Site is to be in accordance with all applicable Building Codes and Zoning Regulations in effect in the City of Marlborough and the Commonwealth of Massachusetts and shall be built according to the Plans as may be amended during Site Plan Review.
  - 2. Site Plan Review. The issuance of the Special Permit is further subject to detailed Site Plan Review by the Site Plan Review Committee, in accordance with the City of Marlborough Site Plan Review Ordinance prior to the issuance of the building permit. Any additional changes, alterations, modifications, or amendments, as required during the process of Site Plan Review, shall be further conditions attached to the building permit. Subsequent Site Plan Review shall be consistent with the conditions of this Special Permit and the Plans submitted, reviewed and approved by the City Council as the Special Permit Granting Authority.



# IN CITY COUNCIL

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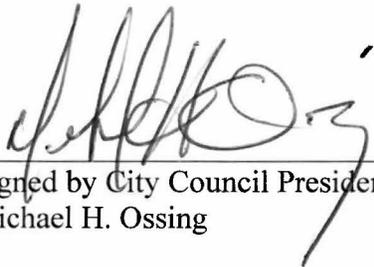
PAGE 4

## ORDERED:

3. Incorporation of Submissions. All plans, photo renderings, site evaluations, briefs and other documentation provided by the Applicant as part of the Application, and as amended or revised during the application/hearing process before the City Council and/or the City Council's Public Services Committee, are herein incorporated into and become a part of this Special Permit and become conditions and requirements of the same, unless otherwise altered by the City Council.
4. Compliance with Applicable Laws. The Applicant, its successors and/or assigns agrees to comply with all municipal, state, and federal rules, regulations, and ordinances as they may apply to the construction, maintenance, and operation of the Use.
5. All work performed on the Site shall comply with this Decision. No other building or construction or activity (including but not limited to any other communications device, WCF, tower, etc.) shall occur without further modification of this Special Permit. This condition shall be interpreted consistent with federal law governing WCF's.
6. The Applicant shall comply with all applicable conditions for WCFs as set forth in Section 650-25(F), each of which shall constitute conditions of this special permit.
7. In accordance with the provisions of Massachusetts General Laws Chapter 40A, Section 11, the Applicant, its successors and/or assigns, at its expense shall record this Special Permit in the Middlesex South Registry of Deeds after the City Clerk has certified that the twenty-day period for appealing this Special Permit has elapsed with no appeal having been filed, and before the Applicant has applied to the Building Commissioner for a building permit. Upon recording, the Applicant shall forthwith provide a copy of the recorded Special Permit to the City Council Office, the Building Department and the City Solicitor's Office.

**Yea: 11 – Nay: 0**

**Yea: Vital, Doucette, Preciado, Brown, Irish, Fuccillo, Landers, Navin, Oram, Ossing, & Robey.**

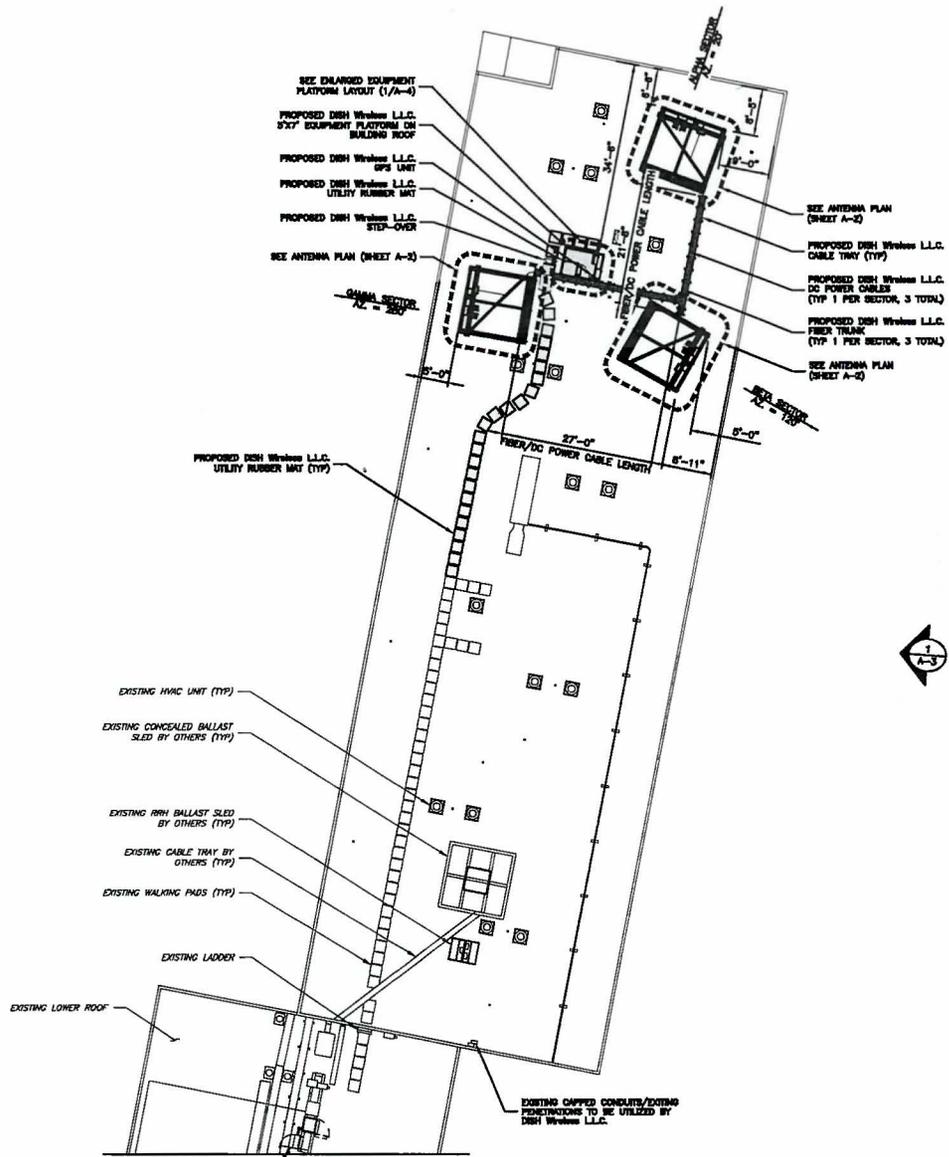
  
Signed by City Council President  
Michael H. Ossing

ADOPTED  
In City Council  
24-1009210B

# ATTACHMENT

# A





- NOTES**
1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
  2. CONTRACTOR SHALL MAINTAIN A 10'-0" MINIMUM SEPARATION BETWEEN THE PROPOSED OPS UNIT, TRANSMITTING ANTENNAS AND EXISTING OPS UNITS.
  3. UTILITY RUBBER MAT TO BE INSTALLED UNDER ALL DISH Wireless L.L.C. EQUIPMENT THAT IS RESTING ON OR AFFIXED TO ROOF MEMBRANE.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.  
100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 858-4308



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

DRAWN BY:	CHEKED BY:	APPROVED BY:
CSG	NSB	DRG
RFDS REV #:		0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
0	01/18/23	ISSUED FOR CONSTRUCTION
1	03/02/23	REVISED FOR COMMENTS
2	05/28/23	REVISED FOR COMMENTS

ARE PROJECT NUMBER  
**100753**

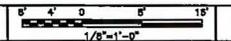
DISH Wireless L.L.C.  
PROJECT INFORMATION  
**BOBOS1052A**

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
**BUILDING PLAN**

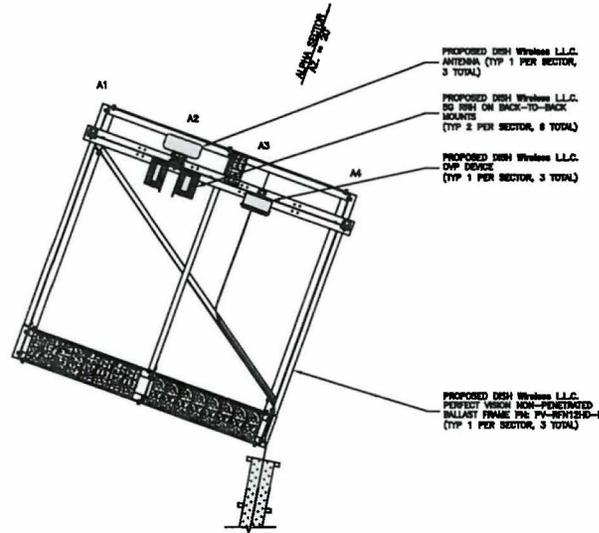
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**A-1**

**BUILDING PLAN**

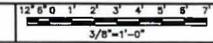


**NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. ANTENNA SPECIFICATIONS REFER TO ANTENNA SCHEDULE AND TO FINAL CONSTRUCTION RFDS FOR ALL RF DETAILS.
3. EXISTING EQUIPMENT OMITTED FOR CLARITY.
4. ALPHA SECTOR SHOWN TYPICAL FOR BETA AND GAMMA SECTORS.



ANTENNA PLAN (TYPICAL PER SECTOR)



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.  
100 APOLLO DRIVE  
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DRAWN BY: CHECKED BY: APPROVED BY:

CSC NSB DRG

RFDS REV #: 0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS

REV	DATE	DESCRIPTION
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1	05/02/23	REVISED PER COMMENTS
2	06/28/23	REVISED PER COMMENTS

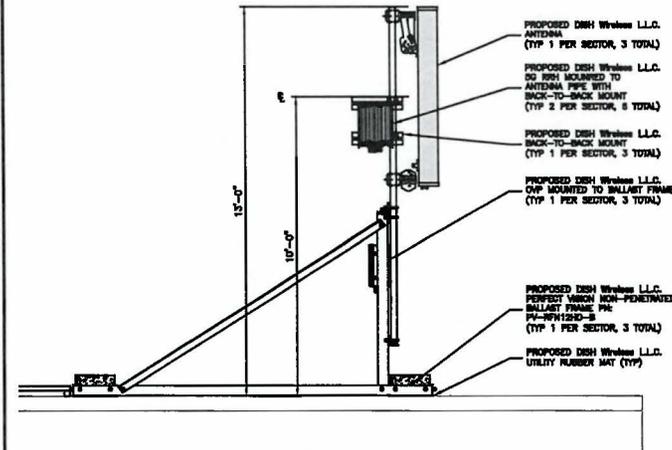
ARE PROJECT NUMBER  
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DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOS0501052A  
450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

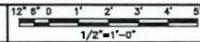
SHEET TITLE  
ANTENNA PLAN,  
ELEVATION AND SCHEDULE

SHEET NUMBER

A-2



ANTENNA ELEVATION



SECTOR POS.	ANTENNA					TRANSMISSION CABLE		RRH			OVP
	EXISTING OR PROPOSED	MANUFACTURER - MODEL NUMBER	TECH	AZIMUTH	RAD CENTER	FEED LINE TYPE AND LENGTH	MANUFACTURER - MODEL NUMBER	TECH	POS.	MANUFACTURER MODEL	
A1	---	---	---	---	---	(1) BAWG DC POWER CABLE	SAMSUNG - MID BAND SFG-APR30A01DL_RF4451D-70A	5G	A2	---	RAYCAP RDCD-3045-PF-48
A2	PROPOSED	COMMSCOPE - FFY-85B-R2	5G	20°	46'-8"	(1) FIBER TRUNK (30' LONG)	SAMSUNG - LOW BAND SFG-APR30A01DL_RF4450T-71A	5G	A2	---	RAYCAP RDCD-3045-PF-48
A3	---	---	---	---	---	---	---	---	---	---	---
A4	---	---	---	---	---	---	---	---	---	---	---
B1	---	---	---	---	---	---	---	---	---	---	---
B2	PROPOSED	COMMSCOPE - FFY-85B-R2	5G	120°	46'-8"	(1) BAWG DC POWER CABLE	SAMSUNG - MID BAND SFG-APR30A01DL_RF4451D-70A	5G	B2	---	RAYCAP RDCD-3045-PF-48
B3	---	---	---	---	---	(1) FIBER TRUNK (30' LONG)	SAMSUNG - LOW BAND SFG-APR30A01DL_RF4450T-71A	5G	B2	---	---
B4	---	---	---	---	---	---	---	---	---	---	---
C1	---	---	---	---	---	---	---	---	---	---	---
C2	PROPOSED	COMMSCOPE - FFY-85B-R2	5G	280°	46'-8"	(1) BAWG DC POWER CABLE	SAMSUNG - MID BAND SFG-APR30A01DL_RF4451D-70A	5G	C2	---	RAYCAP RDCD-3045-PF-48
C3	---	---	---	---	---	(1) FIBER TRUNK (30' LONG)	SAMSUNG - LOW BAND SFG-APR30A01DL_RF4450T-71A	5G	C2	---	---
C4	---	---	---	---	---	---	---	---	---	---	---

- 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

**NOTES**

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5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



**TOTALLY COMMITTED.**  
NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 856-8308



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DRAWN BY:	CHECKED BY:	APPROVED BY:
CSG	NSB	DRG
RFDS REV #:		0

**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
REV	DATE	DESCRIPTION
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1	03/02/23	REVISED PER COMMENTS
2	05/26/23	REVISED PER COMMENTS

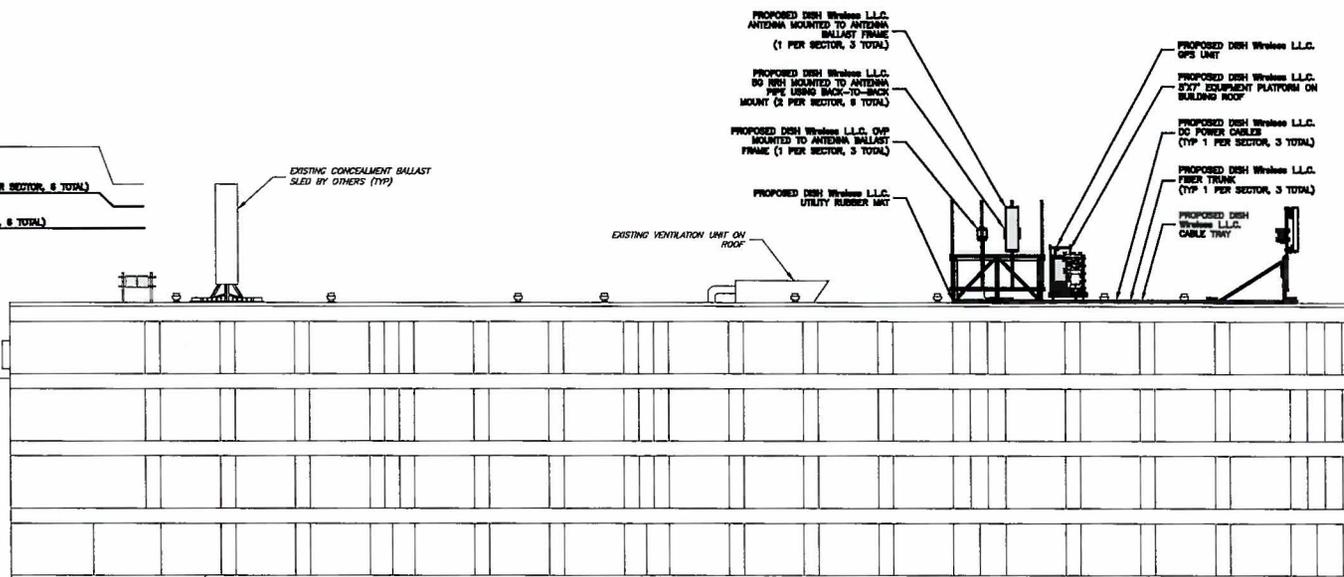
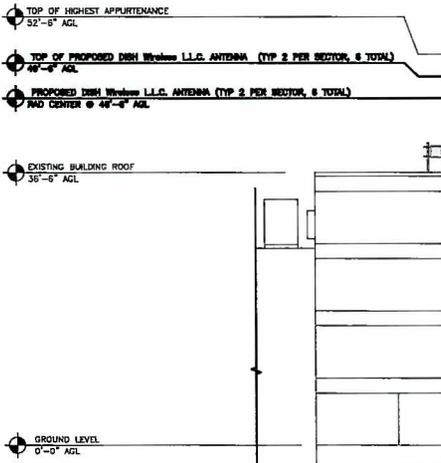
A&E PROJECT NUMBER  
**100753**

DISH Wireless L.L.C.  
PROJECT INFORMATION  
**BOB0501052A**

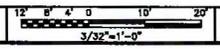
**450 BOSTON POST STREET  
MARLBOROUGH, MA 01752**

SHEET TITLE  
**BUILDING  
ELEVATION**

SHEET NUMBER  
**A-3**



**BUILDING ELEVATION**





<b>ENERSYS HVAC</b> 2000005995	
DIMENSIONS (HxWxD)	73"x20"x23"
POWER SYSTEM	-48V ALPHA/800A
HVAC	ROOF
TOTAL WEIGHT (EMPTY)	371 lbs

<b>RAYCAP PPC</b> RDIAC-2465-P-240-MTS	
ENCLOSURE DIMENSIONS (HxWxD)	36"x22.865"x12.253"
WEIGHT	80 lbs
OPERATING AC VOLTAGE	240/120 1 PHASE 3Ø+G

<b>SITEPRO1 STEP 48</b> ROOFTOP STEEL STEP OVER	
DIMENSIONS (HxWxD)	13.2"x41.8"x70.8"
WEIGHT/ VOLUME	148.367 LBS

NOTE: NON-PENETRATING

CABINET DETAIL NO SCALE 1

POWER PROTECTION CABINET (PPC) DETAIL NO SCALE 2

ROOFTOP STEEL STEP OVER DETAIL NO SCALE 3

<b>LEVITON 1N240-21</b> SUBMETER	
WATTAGE	3
AMPS	200
VOLTS AC	120, 208, 240
PHASE	1

<b>PCTEL</b> GPSGL-TMG-SPI-40NCB	
DIMENSIONS (DxHxW) MM/INCH	81x104mm 3.2"x7.25"
WEIGHT W/ACCESSORIES	075 lbs
CONNECTOR	N-FEMALE
FREQUENCY RANGE	1900 ± 30MHz

MINIMUM OF 75% OR 270° IN ANY DIRECTION

GPS UNIT  
OBSTRUCTIONS MUST BE BELOW 10'

E-MON D-MON DETAIL NO SCALE 4

GPS DETAIL NO SCALE 5

GPS MINIMUM SKY VIEW REQUIREMENTS NO SCALE 6

<b>SQUARE D SAFETY SWITCHES</b> D224NRB	
ENCLOSURE DIM (HxWxD)	29.25"x18.00"x8.50"
ENCLOSURE TYPE	NEHA 3R RAINPROOF
UL LISTED	FILE E-2875

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

<b>ZAYO 5RU CABINET</b> LEFT SWING DOOR ("LIT" SITES)	
DIMENSIONS (HxWxD)	36.118"x29"x12.9"
WEIGHT	85 LBS
POWER INPUT	20A, -48VDC

SAFETY SWITCH DETAIL NO SCALE 7

FIBER TELCO ENCLOSURE DETAIL NO SCALE 8

NETWORK INTERFACE UNIT DETAIL NO SCALE 9

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DRAWN BY: CHECKED BY: APPROVED BY:

CSG NSB DRG

RFDS REV #: 0

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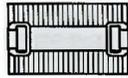
DISH Wireless LLC.  
PROJECT INFORMATION  
BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

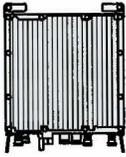
SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER  
**A-5**

SAMSUNG - MID BAND SFG-ARR3KM01DL_RF4451D-70A	
DIMENSIONS (HxWxD)	15"x15"x8.9"
WEIGHT	61.3 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
INPUT VOLTAGE	-48VDC (-36 to 58 VDC)



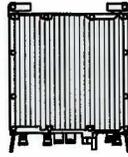
PLAN



BACK



SIDE



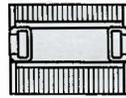
FRONT

RRR DETAIL

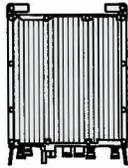
NO SCALE

1

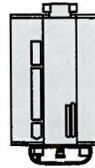
SAMSUNG - LOW BAND SFG-ARR3J601DL_RF4450T-71A	
DIMENSIONS (HxWxD)	15"x16.5"x11"
WEIGHT	94.6 lbs
CONNECTOR TYPE	4.3-10 RF CONNECTOR
INPUT VOLTAGE	-48VDC (-36 to 58 VDC)



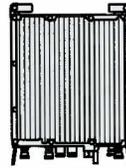
PLAN



BACK



SIDE



FRONT

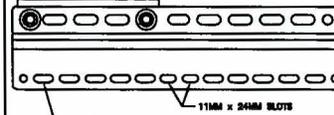
RRR DETAIL

NO SCALE

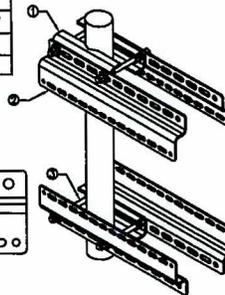
2

SABRE INDUSTRIES RRU BRACKET MOUNT C10123155	
DIMENSIONS (HxWxD) (1 BRACKET)	6"x20"x1-13/16"
WEIGHT (FULL ASSEMBLY)	35.79 lbs
PACKAGE QUANTITY	4

ITEM #	DESCRIPTION
1	PLATE CHANNEL BRACKET
2	ROOF BRACKET 3/16"
3	THREADED ROD 3/8"x2.5" 1/2"x1 1/2"



11MM ± 0.2MM SLOTS  
40MM ON CENTER

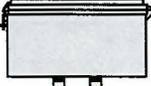


REMOTE RADIO MOUNT DETAIL

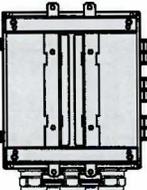
NO SCALE

3

RAYCAP RDIDC-3045-PF-48 SURGE PROTECTION DEVICE (OVP)	
DIMENSIONS (HxWxD)	18.00"x18.21"x8.84"
WEIGHT	21 lbs



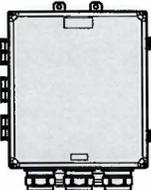
PLAN



BACK



SIDE



FRONT

SURGE PROTECTION DEVICE DETAIL (OVP)

NO SCALE

4

COMMSCOPE FFV-65B-R2	
DIMENSIONS (HxWxD)(M/M/W)	1828x486x187 72"x18.8"x7.5"
RF CONNECTOR INTERFACE	4.3-10 FEMALE
WEIGHT	70.8 lbs
WEIGHT WITH BRACKETS	96.1 lbs



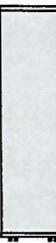
PLAN



BACK



SIDE



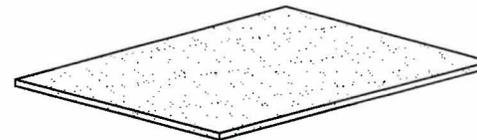
FRONT

ANTENNA DETAIL

NO SCALE

5

UTILITY RUBBER MAT, BLACK	
DIMENSIONS	4'x 3'x 1/2"
WEIGHT/ VOLUME	38.5 LB AVERAGE
MATERIAL	100% RECYCLE RUBBER



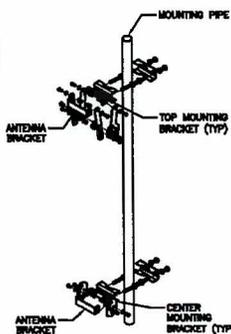
UTILITY RUBBER MAT DETAIL

NO SCALE

6

JMA ANTENNA MOUNTING BRACKET #91900318	
TOTAL WEIGHT (WITH BRACKETS)	18 lbs (8.18 kg)
POLE DIAMETER RANGE	2.5 TO 4.5 INCHES

NOTE:  
KIT #91900318: TOP AND BOTTOM BRACKETS FOR 4-, 5-, AND 8-FOOT ANTENNAS  
ANTENNA BRACKET NOT PART OF KIT



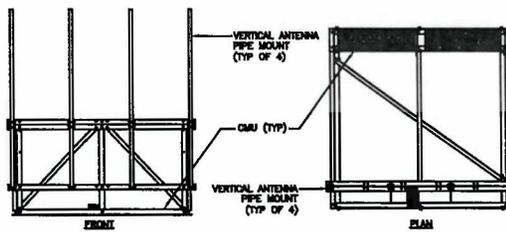
ANTENNA BRACKET DETAIL

NO SCALE

7

PERFECT VISION PV-RFN12HD-B NON-PENETRATING 4-MAST TRAY	
FACE SIZE	12'-0"
WEIGHT	1,312lbs

NOTE:  
THE PROPOSED SLED MOUNTS (PV-RFN12HD-B) REQUIRES A BALLAST OF 540 LBS. (TWENTY FOUR 6"x8"x16" SOLID CMU BLOCKS) ON THE REAR TRAYS AND 280 LBS. (SEVEN 6"x8"x16" SOLID CMU BLOCKS) ON THE FRONT TRAY FOR A TOTAL BALLAST LOADING OF 1120 LBS. (32 6"x8"x16" SOLID CMU BLOCKS).



ANTENNA FRAME DETAIL

NO SCALE

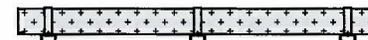
8

COMMSCOPE RT-CB4D ROOFTOP COVER KIT	
DIMENSIONS (HxWxD)	7"x 11.25"x 0.6"
WEIGHT/ VOLUME	65.98 LBS
CABLE RUN (FT)	4

MOUNTING PRODUCT:	NON-PENETRATING
RTCB4D.01 CHANNEL	(1)
MT-F1906 SLEEPERS	(3)
RTCM HARDWARE	
RTHC.01 HOLD-DOWN CLAMPS	(8)



END



SIDE



PLAN

ROOFTOP CABLE TRAY DETAIL

NO SCALE

9



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 556-8308



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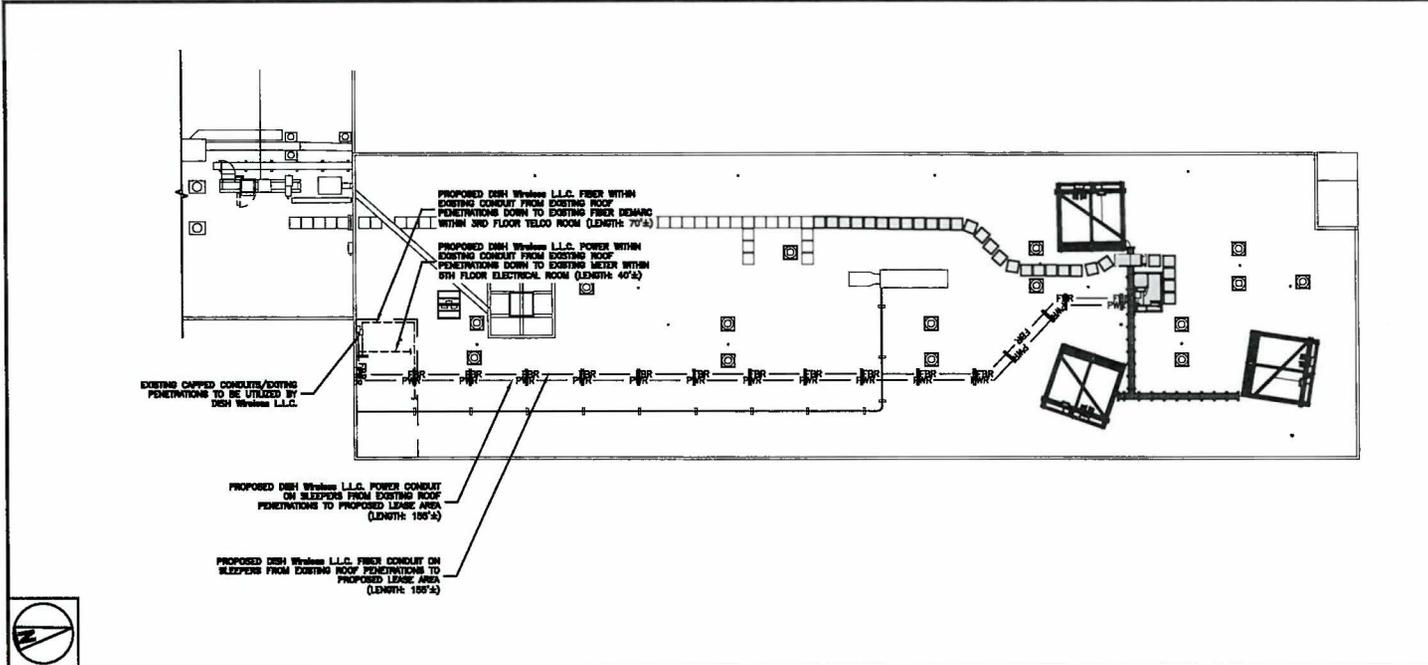
ARE PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

EQUIPMENT DETAILS

SHEET NUMBER  
A-6



- NOTES**
1. UTILIZE EXISTING ABANDONED CONDUITS WHERE AVAILABLE. REPLACE/INSTALL NEW CONDUIT SECTIONS AS NEEDED.
  2. CONTRACTOR TO VERIFY WITH DISH Wireless L.L.C. O.M. THE LOCATION OF THE POWER AND FIBER SOURCE PRIOR TO CONSTRUCTION.
  3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.



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LITTLETON, CO 80120



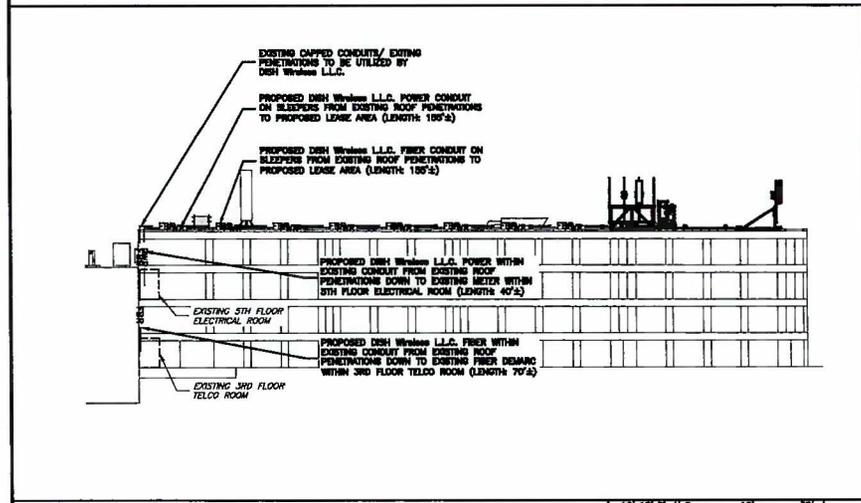
NB+C ENGINEERING SERVICES, LLC.  
101 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
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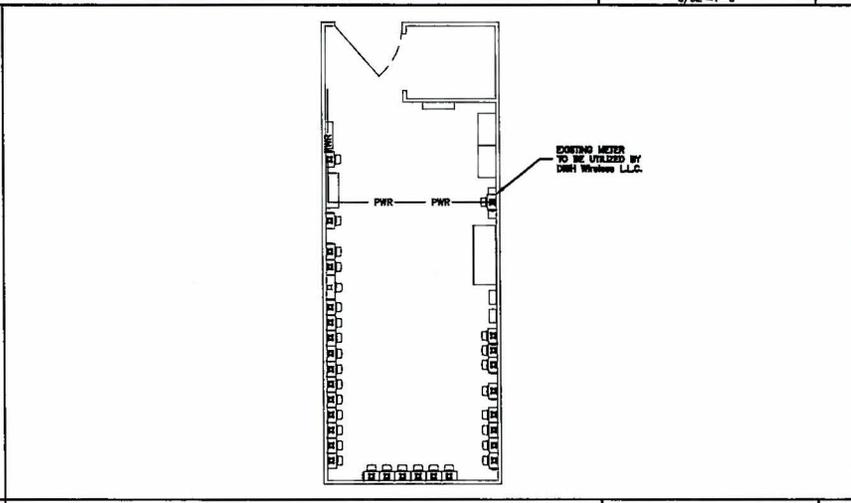
**UTILITY ROUTE PLAN**

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



**UTILITY ROUTE ELEVATION**

18' 12' 8' 4' 0' 16' 32'  
1/16"=1'-0" 2



**ELECTRICAL ROOM PLAN**

NO SCALE 3

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CSC NSB DRG

RFDS REV #: 0

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SUBMITTALS		
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0	01/19/23	ISSUED FOR CONSTRUCTION
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PROJECT INFORMATION  
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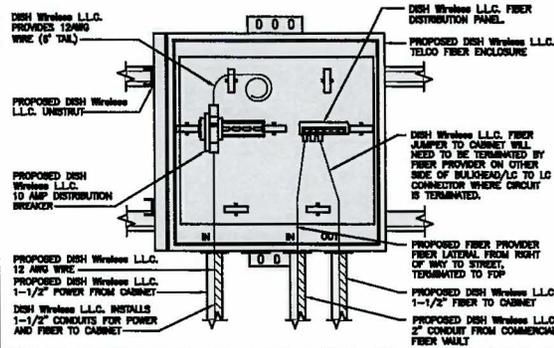
450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
ELECTRICAL/FIBER ROUTE  
PLAN AND NOTES

SHEET NUMBER  
**E-1**

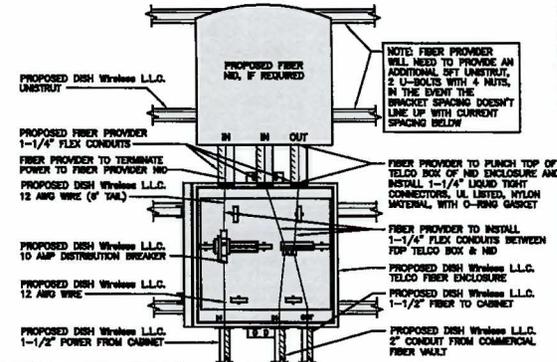
DC POWER WIRING SHALL BE COLOR CODED AT EACH END FOR IDENTIFYING +24V AND -48V CONDUCTORS. RED MARKINGS SHALL IDENTIFY +24V AND BLUE MARKINGS SHALL IDENTIFY -48V.

- CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARD 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.
- 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.
- LOCATION OF EQUIPMENT, CONDUIT AND DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE AND SHALL BE COORDINATED WITH FIELD CONDITIONS PRIOR TO CONSTRUCTION.
- CONDUIT BUSH-IN SHALL BE COORDINATED WITH THE MECHANICAL EQUIPMENT TO AVOID LOCATION CONFLICTS. VERIFY WITH THE MECHANICAL EQUIPMENT CONTRACTOR AND COMPLY AS REQUIRED.
- CONTRACTOR SHALL PROVIDE ALL BREAKERS, CONDUITS AND CIRCUITS AS REQUIRED FOR A COMPLETE SYSTEM.
- CONTRACTOR SHALL PROVIDE PULL BOXES AND JUNCTION BOXES AS REQUIRED BY THE NEC ARTICLE 314.
- CONTRACTOR SHALL PROVIDE ALL STRAIN RELIEF AND CABLE SUPPORTS FOR ALL CABLE ASSEMBLIES. INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
- 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.
- 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 DISCONNECT SWITCHES, AND EQUIPMENT CABINETS.
- ALL NEW MATERIAL SHALL HAVE A U.L. LABEL.
- PANEL SCHEDULE LOADING AND CIRCUIT ARRANGEMENTS REFLECT POST-CONSTRUCTION EQUIPMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR AS-BUILT PANEL SCHEDULE AND SITE DRAWINGS.



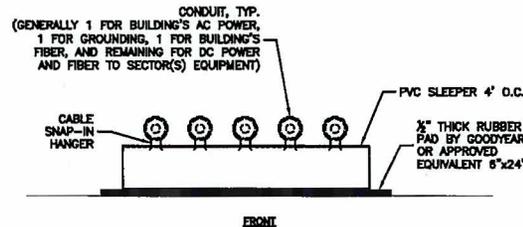
DARK TELCO BOX - INTERIOR WIRING LAYOUT

NO SCALE 2



LIT TELCO BOX - INTERIOR WIRING LAYOUT (OPTIONAL)

NO SCALE 3



ROOFTOP SLEEPER DETAIL

NO SCALE 4

ELECTRICAL NOTES

NO SCALE 1

NOT USED

NO SCALE 5

NOT USED

NO SCALE 6

NOT USED

NO SCALE 7

NOT USED

NO SCALE 8



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LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.

100 APOLLO DRIVE  
SUITE 301  
CHELSEA, MA 01824  
(978) 858-0310



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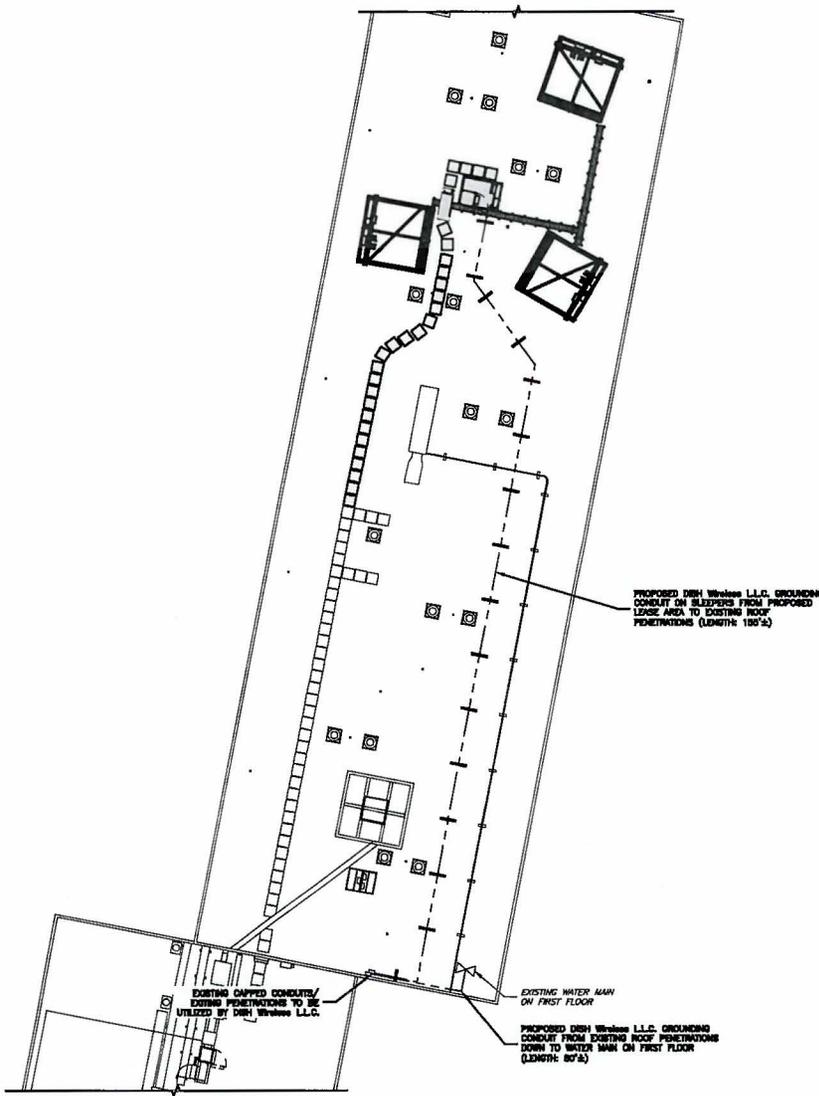
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOSD1052A  
450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
ELECTRICAL  
DETAILS

SHEET NUMBER

E-2

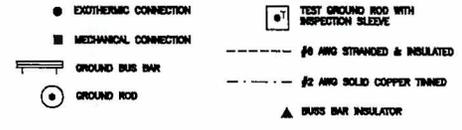




GROUNDING PLAN



1



GROUNDING LEGEND

- GROUNDING IS SHOWN DIAGNOSTICALLY ONLY.
- 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.
- ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.
- NO EXOTHERMIC WELDING ON ROOFTOP

GROUNDING ROOFTOP KEY NOTES

- (A) EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 8 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.
- (B) ROOFTOP GROUND SYSTEM: THE 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 GROUND 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 OR ROOM.
- (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 (CRGB): 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 COMMON BUILDING GROUND SYSTEM WITH (2) #2 SOLID TINNED COPPER CONDUCTORS.
- (G) MATCH PLATE GROUND BAR: BOND TO THE COMMON BUILDING GROUND SYSTEM WITH TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS. WHEN A MATCH-PLATE AND A CELL REFERENCE GROUND BAR ARE BOTH PRESENT, THE CRGB MUST BE CONNECTED TO THE MATCH-PLATE AND TO THE INTERIOR GROUND RING USING (2) TWO #2 AWG STRANDED GREEN INSULATED COPPER CONDUCTORS EACH.
- (H) EXTERIOR CABLE ENTRY POINT GROUND BARS: LOCATED AT THE ENTRANCE TO THE CELL SITE ROOM. BOND TO GROUND RING WITH A #2 AWG SOLID TINNED COPPER CONDUCTORS WITH MECHANICAL CONNECTIONS.
- (J) TIEED GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- (K) FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENT'S METAL FRAMEWORK.
- (L) INTERIOR LIMIT BONDING: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITH THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.
- (M) FENCE AND GATE GROUNDING: METAL FENCES SHALL BE BONDED TO THE COMMON BUILDING GROUND SYSTEM WITH A #2 AWG SOLID TINNED COPPER CONDUCTOR AT AN INTERVAL NOT EXCEEDING 25 FEET. BONDS SHALL BE MADE AT EACH GATE POST AND ACROSS GATE OPENINGS.
- (N) EXTERIOR LIMIT BONDING: METALLIC OBJECTS, EXTERNAL TO OR MOUNTED TO THE BUILDING, SHALL BE BONDED TO THE COMMON BUILDING GROUND SYSTEM USING #2 TINNED SOLID COPPER WIRE.
- (P) ICE BRIDGE SUPPORTS: EACH ICE BRIDGE LEG SHALL BE BONDED TO THE GROUND RING WITH #2 AWG BARE TINNED COPPER CONDUCTOR. PROVIDE EXOTHERMIC WELDS AT BOTH THE ICE BRIDGE LEG AND BURIED GROUND RING.
- (Q) DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OR CHANGES TO DC CONVERTER SYSTEMS IT SHALL BE ASSUMED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH A MASTER DC SYSTEM RETURN GROUND CONDUCTOR FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR.
- (R) ROOFTOP COLLECTOR BUS BAR IS TO BE MECHANICALLY BONDED TO COMMON BUILDING GROUND SYSTEM. REFER TO DISH Wireless L.L.C. GROUNDING NOTES.

GROUNDING KEY NOTES

NO SCALE

2



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



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SUITE 303  
CHELSEA, MA 01824  
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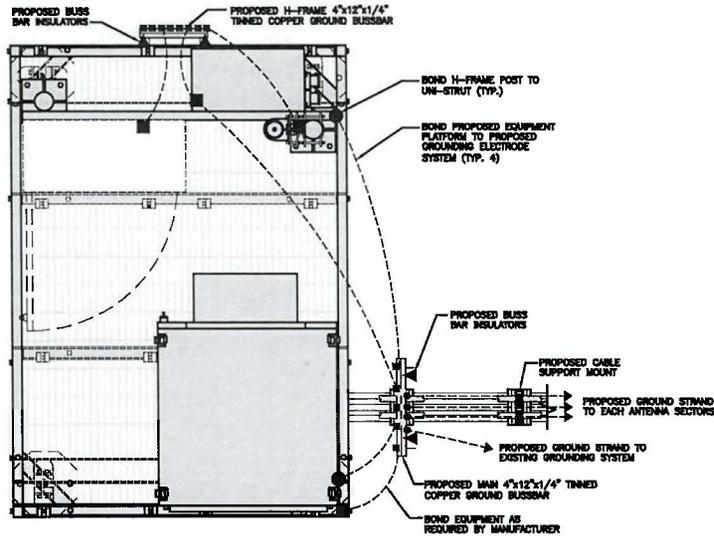
DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GROUNDING PLANS  
AND NOTES

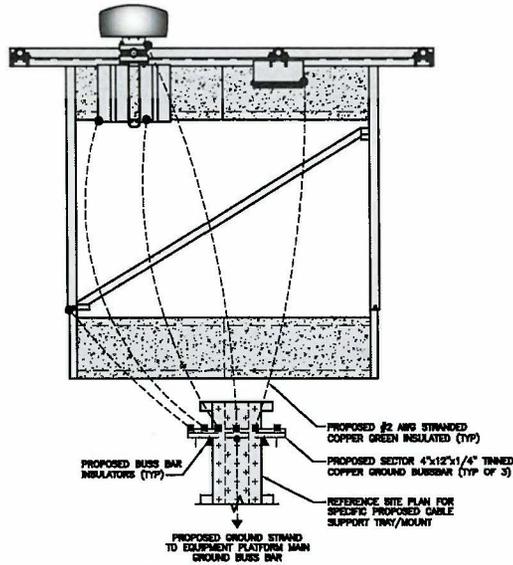
SHEET NUMBER

G-1



TYPICAL ROOFTOP EQUIPMENT GROUNDING PLAN

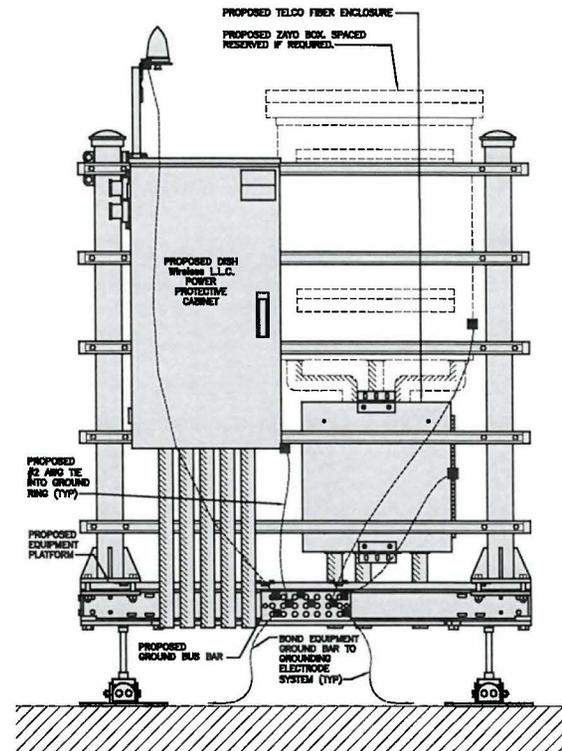
NO SCALE 1



TYPICAL ROOFTOP ANTENNA GROUNDING PLAN

NO SCALE 2

NOTE  
EQUIPMENT CABINET OMITTED FOR CLARITY



H-FRAME GROUNDING DETAIL

NO SCALE 3



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LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.

100 APOLLO DRIVE  
SUITE 203  
CHELMSFORD, MA 01924  
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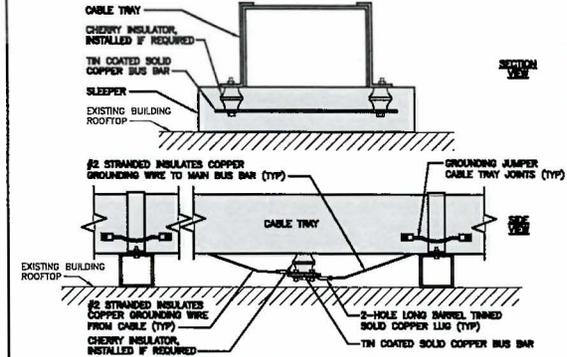
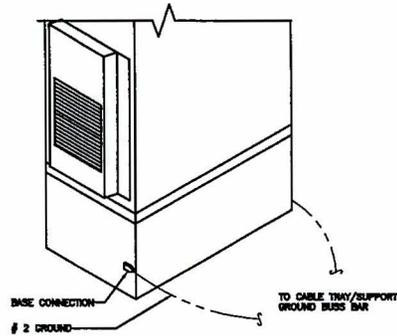
450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GROUNDING DETAILS

SHEET NUMBER

G-2

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



TYPICAL GROUNDING NOTES

NO SCALE 1

OUTDOOR CABINET GROUNDING

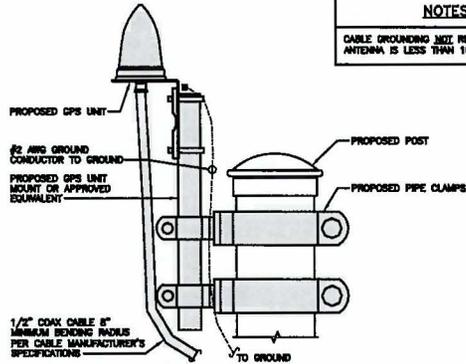
NO SCALE 2

TYPICAL CABLE TRAY GROUND BUSS BAR

NO SCALE 3

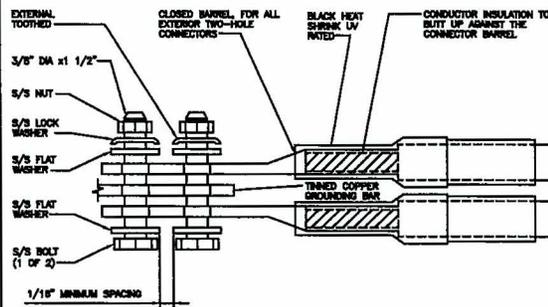
NOTES

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



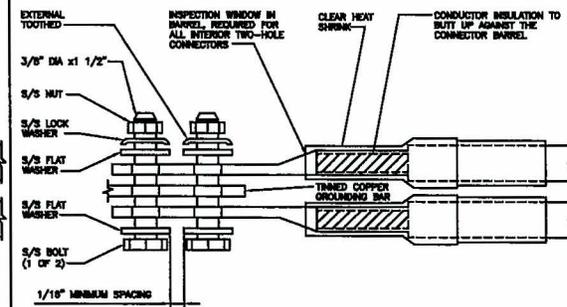
TYPICAL GPS UNIT GROUNDING

NO SCALE 4



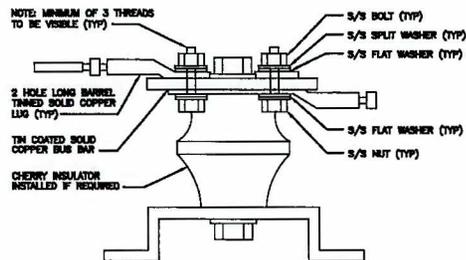
TYPICAL EXTERIOR TWO HOLE LUG

NO SCALE 5



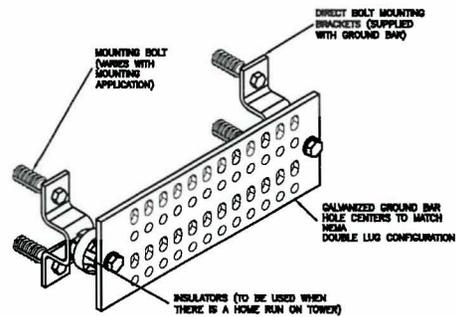
TYPICAL INTERIOR TWO HOLE LUG

NO SCALE 6



LUG DETAIL

NO SCALE 7

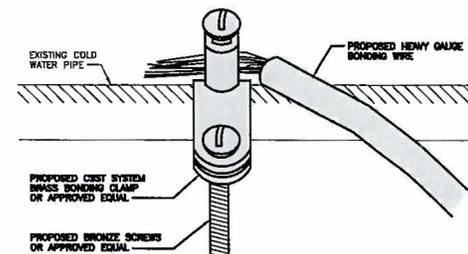


GROUND BAR DETAIL

NO SCALE 8

NOTE

REMOVE ANY FLANT ON PIPE OR FITTING SURFACE UNDER BONDING CLAMP.



TYPICAL COLD WATER CONDUIT GROUNDING DETAIL

NO SCALE 9



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE  
SUITE 101  
CHELSEA, MA 01824  
(978) 568-0316



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DRAWN BY: CHECKED BY: APPROVED BY:

CSG HSB DRG

RFDS REV #: 0

CONSTRUCTION DOCUMENTS

SUBMITTALS		
REV	DATE	DESCRIPTION
0	01/18/23	ISSUED FOR CONSTRUCTION
1	03/02/23	REVISED PER COMMENTS
2	05/24/23	REVISED PER COMMENTS

A&E PROJECT NUMBER

100753

DISH Wireless, L.L.C.

PROJECT INFORMATION

BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE

GROUNDING DETAILS

SHEET NUMBER

G-3

HYBRID/DISCREET CABLES		3/4" TAPE WIDTHS WITH 3/4" SPACING											
LOW-BAND RRH (600 MHz N71 BASEBAND) + (850 MHz N26 BAND) + (700 MHz N29 BAND) - OPTIONAL PER MARKET ADD FREQUENCY COLOR TO SECTOR BAND (CBRS WILL USE YELLOW BAND)	ALPHA RRH				BETA RRH				GAMMA RRH				
	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	
	RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN	
	ORANGE	ORANGE	RED	RED	ORANGE	ORANGE	BLUE	BLUE	ORANGE	ORANGE	GREEN	GREEN	
			ORANGE	ORANGE							ORANGE	ORANGE	
MID-BAND RRH (AWS BANDS N68+N70) ADD FREQUENCY COLOR TO SECTOR BAND (CBRS WILL USE YELLOW BANDS)	ALPHA RRH				BETA RRH				GAMMA RRH				
	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	PORT 1 + SLANT	PORT 2 - SLANT	PORT 3 + SLANT	PORT 4 - SLANT	
	RED	RED	RED	RED	BLUE	BLUE	BLUE	BLUE	GREEN	GREEN	GREEN	GREEN	
	PURPLE	PURPLE	RED	RED	PURPLE	PURPLE	BLUE	BLUE	PURPLE	PURPLE	GREEN	GREEN	
			PURPLE	PURPLE							PURPLE	PURPLE	
HYBRID/DISCREET CABLES		EXAMPLE 1	EXAMPLE 2	EXAMPLE 3	CANISTER COAX #1 (ALPHA)		CANISTER COAX #2 (ALPHA)						
INCLUDE SECTOR BANDS BEING SUPPORTED ALONG WITH FREQUENCY BANDS.					RED		RED						
EXAMPLE 1 - HYBRID, OR DISCREET, SUPPORTS ALL SECTORS, BOTH LOW-BANDS AND MID-BANDS.		RED	RED	RED	RED		RED						
EXAMPLE 2 - HYBRID, OR DISCREET, SUPPORTS CBRS ONLY, ALL SECTORS.		BLUE	BLUE	BLUE	RED		RED						
EXAMPLE 3 - MAIN COAX WITH GROUND MOUNTED RRHs.		ORANGE	YELLOW		RED		RED						
		PURPLE			RED		RED						
FIBER JUMPERS TO RRHs		LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	MID BAND RRH	
LOW-BAND HHR FIBER CABLES HAVE SECTOR STRIPE ONLY.		RED	RED	BLUE	BLUE	GREEN	GREEN	ORANGE	ORANGE	ORANGE	ORANGE	PURPLE	
		ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	PURPLE	
POWER CABLES TO RRHs		LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	LOW BAND RRH	MID BAND RRH	MID BAND RRH	
LOW-BAND RRH POWER CABLES HAVE SECTOR STRIPE ONLY.		RED	RED	BLUE	BLUE	GREEN	GREEN	ORANGE	ORANGE	ORANGE	ORANGE	PURPLE	
		ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	PURPLE	
RET MOTORS AT ANTENNAS		ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 MID BAND	ANTENNA 1 LOW BAND	ANTENNA 1 LOW BAND	
RET CONTROL IS HANDLED BY THE MID-BAND RRH WHEN ONE SET OF RET PORTS EXIST ON ANTENNA.		IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	IN	
SEPARATE RET CABLES ARE USED WHEN ANTENNA PORTS PROVIDE INPUTS FOR BOTH LOW AND MID BANDS.		RED	RED	BLUE	BLUE	GREEN	GREEN	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE	
		PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	PURPLE	ORANGE	ORANGE	
MICROWAVE RADIO LINKS		FORWARD AZIMUTH OF 0-120 DEGREES		FORWARD AZIMUTH OF 120-240 DEGREES		FORWARD AZIMUTH OF 240-358 DEGREES							
LINKS WILL HAVE A 1.5-2 INCH WHITE WRAP WITH THE AZIMUTH COLOR OVERLAPPING IN THE MIDDLE.		PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY	PRIMARY	SECONDARY
ADD ADDITIONAL SECTOR COLOR BANDS FOR EACH ADDITIONAL MW RADIO.		WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
MICROWAVE CABLES WILL REQUIRE P-TOUCH LABELS INSIDE THE CABINET TO IDENTIFY THE LOCAL AND REMOTE SITE ID's.		RED	RED	BLUE	BLUE	GREEN	GREEN	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
		WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE
		RED	RED	BLUE	BLUE	GREEN	GREEN	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE
		WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE

RF CABLE COLOR CODES

NO SCALE

1

NOT USED

NO SCALE

4

LOW BANDS (N71+N28)  
OPTIONAL - (N29)

ORANGE

AWS  
(N68+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

RF CABLE COLOR CODES

NO SCALE

1

NOT USED

NO SCALE

4

**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.

100 APOLLO DRIVE  
SUITE 303  
CHELMSFORD, MA 01824  
(978) 558-4308



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DRAWN BY: CHECKED BY: APPROVED BY:

CSG NSB DRG

RFDS REV #: 0

CONSTRUCTION  
DOCUMENTS

SUBMITTALS

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0	01/16/23	ISSUED FOR CONSTRUCTION
1	03/02/23	REVISED PER COMMENTS
2	05/26/23	REVISED PER COMMENTS

A&E PROJECT NUMBER

100753

DISH Wireless LLC.

PROJECT INFORMATION

BOBOS1052A

450 BOSTON POST STREET

MARLBOROUGH, MA 01752

SHEET TITLE

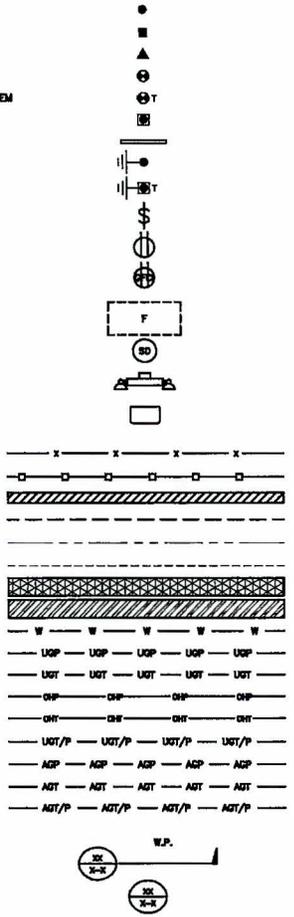
RF

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  
 DESIN 4884ADD/SIK-574-120-PE-0067KD  
 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



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  
 BLKD 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 FINISHED  
 FLR FLOOR  
 FDN FOUNDATION  
 FOC FACE OF CONCRETE  
 FOM FACE OF MASONRY  
 FOB 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  
 MSC 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  
 PRG 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  
 REIN'D REINFORCED  
 RET REMOTE ELECTRIC TILT  
 RF RADIO FREQUENCY  
 RMC RIGID METALLIC CONDUIT  
 RRH REMOTE RADIO HEAD  
 RRU REMOTE RADIO UNIT  
 RRV RACEWAY  
 SCH SCHEDULE  
 SHT SHEET  
 SAD SMART INTERMEDIATE ACCESS DEVICE  
 SIM SIMILAR  
 SPED SPECIFICATION  
 SQ SQUARE  
 SS STAINLESS STEEL  
 STD STANDARD  
 STL STEEL  
 TEMP TEMPORARY  
 THK THICKNESS  
 TMA TOWER MOUNTED AMPLIFIER  
 TN TIE NAIL  
 TDA TOP OF ANTENNA  
 TCC TOP OF CURB  
 TDF TOP OF FOUNDATION  
 TDP TOP OF PLATE (PARAPET)  
 TDS TOP OF STEEL  
 TOW TOP OF WALL  
 TVSS TRANSIENT VOLTAGE SURGE SUPPRESSION  
 TYP TYPICAL  
 UG UNDERGROUND  
 UL UNDERWRITERS LABORATORY  
 UNO UNLESS NOTED OTHERWISE  
 UMS UNIVERSAL MOBILE TELECOMMUNICATIONS SYSTEM  
 UPS UNINTERRUPTIBLE POWER SYSTEM (DC POWER PLANT)  
 VIF VERIFIED IN FIELD  
 W WIDE  
 W/ WITH  
 WD WOOD  
 WP WEATHERPROOF  
 WT WEIGHT

ABBREVIATIONS



5701 SOUTH SANTA FE DRIVE  
 LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
 100 APOLLO DRIVE SUITE 201  
 CHELSEA, MA 01824  
 (978) 888-8338



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DRAWN BY: CSB CHECKED BY: HSB APPROVED BY: DRG  
 RFDS REV #: 0

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A&E PROJECT NUMBER  
 100753

DISH Wireless LLC  
 PROJECT INFORMATION  
 BOBOS01052A

450 BOSTON POST STREET  
 MARLBOROUGH, MA 01752

SHEET TITLE  
 LEGEND AND ABBREVIATIONS

SHEET NUMBER  
 GN-1

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

**SIGN PLACEMENT:**

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

**NOTES:**

1. FOR DISH Wireless L.L.C. LOGO, SEE DISH Wireless L.L.C. DESIGN SPECIFICATIONS (PROVIDED BY DISH Wireless L.L.C.)
2. SITE ID SHALL BE APPLIED TO SIGNS USING "LASER ENGRAVING" OR ANY OTHER WEATHER RESISTANT METHOD (DISH Wireless L.L.C. APPROVAL REQUIRED)
3. TEXT FOR SIGNAGE SHALL INDICATE CORRECT SITE NAME AND NUMBER AS PER DISH Wireless L.L.C. CONSTRUCTION MANAGER RECOMMENDATIONS.
4. CABINET/SHELTER MOUNTING APPLICATION REQUIRES ANOTHER PLATE APPLIED TO THE FACE OF THE CABINET WITH WATER PROOF POLYURETHANE ADHESIVE
5. ALL SIGNS WILL BE SECURED WITH EITHER STAINLESS STEEL ZIP TIES OR STAINLESS STEEL TECH SCREWS
6. ALL SIGNS TO BE 6.5"x11" AND MADE WITH 0.04" OF ALUMINUM MATERIAL.

# INFORMATION

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

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

Site ID: \_\_\_\_\_



THIS SIGN IS FOR REFERENCE PURPOSES ONLY

NOTICE

Transmitting Antenna(s)

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

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

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

Site ID: \_\_\_\_\_

dish

THIS SIGN IS FOR REFERENCE PURPOSES ONLY

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Transmitting Antenna(s)

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dish

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Site ID: \_\_\_\_\_

dish

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RF SIGNAGE



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.  
100 APOLLO DRIVE  
SUITE 203  
CHELMSFORD, MA 01824  
(978) 858-0306



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DRAWN BY: _____			CHECKED BY: _____			APPROVED BY: _____		
CSC	NSB	DRG	CSC	NSB	DRG	CSC	NSB	DRG
RFDS REV #:						0		

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A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOSO1052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
RF SIGNAGE

SHEET NUMBER  
GN-2

**SITE ACTIVITY REQUIREMENTS:**

- 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.
- "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.
- 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.
- 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).
- 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."
- 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.
- 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.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- THE CONTRACTOR SHALL CONTACT UTILITY LOCATING SERVICES INCLUDING PRIVATE LOCATES SERVICES PRIOR TO THE START OF CONSTRUCTION.
- 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.
- ALL SITE WORK SHALL BE AS INDICATED ON THE STAMPED CONSTRUCTION DRAWINGS AND DISH PROJECT SPECIFICATIONS, LATEST APPROVED REVISION.
- 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.
- 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.
- 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.
- THE SITE SHALL BE GRADED TO CAUSE SURFACE WATER TO FLOW AWAY FROM THE CARRIER'S EQUIPMENT AND TOWER AREAS.
- THE SUB GRADE SHALL BE COMPACTED AND BROUGHT TO A SMOOTH UNIFORM GRADE PRIOR TO FINISHED SURFACE APPLICATION.
- 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.
- 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.
- 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.
- 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.
- CONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION. TRASH AND DEBRIS SHOULD BE REMOVED FROM SITE ON A DAILY BASIS.
- 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:**

- 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
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
- THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
- 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.
- 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.
- 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
- 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.
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5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
100 APOLLO DRIVE  
SUITE 302  
CHELSEA, MA 01824  
(978) 856-4306



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DRAWN BY: CHECKED BY: APPROVED BY:		
CSG	NSB	DRG
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**CONSTRUCTION DOCUMENTS**

SUBMITTALS		
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A&E PROJECT NUMBER  
100753

DISH Wireless L.L.C.  
PROJECT INFORMATION  
BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE  
GENERAL NOTES

SHEET NUMBER  
GN-3

**CONCRETE FOUNDATIONS AND REINFORCING STEEL**

1. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE ACI 301, ACI 318, ACI 338, 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 0.46.
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 THW, 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 THW, 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 THW, 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/90° 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 (WIREFORM SPEGMATE 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 LOCKOUT 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.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, L.L.C.

100 SPOLLO DRIVE  
SUITE 303  
CHELSEA, MA 01924  
(978) 556-6306



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DISH Wireless L.L.C. PROJECT INFORMATION BOBOS01052A		
450 BOSTON POST STREET MARLBOROUGH, MA 01752		
SHEET TITLE GENERAL NOTES		
SHEET NUMBER GN-4		

**GROUNDING NOTES:**

1. ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION AND AC POWER GES'S) SHALL BE BONDED TOGETHER AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
2. THE CONTRACTOR SHALL PERFORM IEEE FALL-OF-POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR GROUND ELECTRODE SYSTEMS, THE CONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS.
3. THE CONTRACTOR IS RESPONSIBLE FOR PROPERLY SEQUENCING GROUNDING AND UNDERGROUND CONDUIT INSTALLATION AS TO PREVENT ANY LOSS OF CONTINUITY IN THE GROUNDING SYSTEM OR DAMAGE TO THE CONDUIT AND PROVIDE TESTING RESULTS.
4. METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH #8 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 ITS 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 5 FT OF MAIN GROUND RING WITH (1) #2 BARE SOLID TINNED COPPER GROUND CONDUCTOR.
19. GROUND CONDUCTORS USED FOR THE FACILITY GROUNDING AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON-METALLIC MATERIAL SUCH AS PVC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (i.e., NONMETALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
20. ALL GROUNDS THAT TRANSITION FROM BELOW GRADE TO ABOVE GRADE MUST BE #2 BARE SOLID TINNED COPPER IN 3/4" NON-METALLIC, FLEXIBLE CONDUIT FROM 24" BELOW GRADE TO WITHIN 3" TO 6" OF CAD-WELD TERMINATION POINT. THE EXPOSED END OF THE CONDUIT MUST BE SEALED WITH SILICONE CAULK. (ADD TRANSITIONING GROUND STANDARD DETAIL AS WELL).
21. BUILDINGS WHERE THE MAIN GROUNDING CONDUCTORS ARE REQUIRED TO BE ROUTED TO GRADE, THE CONTRACTOR SHALL ROUTE TWO GROUNDING CONDUCTORS FROM THE ROOFTOP, TOWERS, AND WATER TOWERS GROUNDING RING, TO THE EXISTING GROUNDING SYSTEM, THE GROUNDING CONDUCTORS SHALL NOT BE SMALLER THAN 2/0 COPPER. ROOFTOP GROUNDING RING SHALL BE BONDED TO THE EXISTING GROUNDING SYSTEM, THE BUILDING STEEL COLUMNS, LIGHTNING PROTECTION SYSTEM, AND BUILDING MAIN WATER LINE (FERROUS OR NONFERROUS METAL PIPING ONLY). DO NOT ATTACH GROUNDING TO FIRE SPRINKLER SYSTEM PIPES.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.

100 APOLLO DRIVE  
SUITE 303  
CHELSEA/FORD, MA 01824  
(978) 858-4300



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CSG	NSB	DRG
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**CONSTRUCTION DOCUMENTS**

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A/E PROJECT NUMBER

100753

DISH Wireless L.L.C.

PROJECT INFORMATION

BOBOS01052A

450 BOSTON POST STREET  
MARLBOROUGH, MA 01752

SHEET TITLE

GENERAL NOTES

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GN-5