

|                                      |                 |
|--------------------------------------|-----------------|
| CHARLES INDUSTRY HEX CUBE-PM639155N4 |                 |
| DIMENSIONS (HxWxD)                   | 74.75x32.1x32"  |
| POWER PLANT                          | -48VDC ABB/600W |
| TOTAL WEIGHT (EMPTY)                 | 408 LBS         |

PLAN

SIDE BACK SIDE FRONT

|                                 |                      |
|---------------------------------|----------------------|
| RAYCAP PPC RDIAC-2465-P-240-MTS |                      |
| ENCLOSURE DIMENSIONS (HxWxD)    | 39"x22.835"x12.593"  |
| WEIGHT                          | 50 lbs               |
| OPERATING AC VOLTAGE            | 740/170 1 PHASE 3W4Q |

BACK SIDE FRONT SIDE

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

SIDE FRONT

CABINET DETAIL NO SCALE 1

POWER PROTECTION CABINET (PPC) DETAIL NO SCALE 2

SAFETY SWITCH DETAIL NO SCALE 3

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

PLAN

SIDE BACK FRONT

|                                |              |
|--------------------------------|--------------|
| CIENA 3931 FIBER NID ENCLOSURE |              |
| DIMENSIONS (HxWxD)             | 17"x18.8"x7" |
| WEIGHT                         | 28.3 lbs     |

SIDE FRONT

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

SIDE BACK FRONT

METER SOCKET DETAIL NO SCALE 4

FIBER NID ENCLOSURE DETAIL NO SCALE 5

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: WD-T12-3 TRAPEZE KIT, 3 RUNCS; WB-R12-3 SUPPORT BRACKET; MF-130 DIRECT BURIAL PIPE COLUMN, 13'-4"

TRAPEZE KIT (WB-T12-3)  
SUPPORT BRACKET (WB-R12-3)  
3.5" DIA GALV SCH 40 PIPE (SPACED 9'-0" MAX) (MF-130)

PLAN FRONT SIDE

PROPOSED ICE BRIDGE  
PROPOSED HYBRID CABLE  
PROPOSED CABLE CLAMP 9'-2"-0" C.C.  
HYBRID SUPPORT BRACKET AND RANING 9'-2"-0" C.C.  
EXISTING MONOPOLE

NOT USED

ICE BRIDGE DETAIL NO SCALE 7

HYBRID CABLE RUN NO SCALE 8

NOT USED NO SCALE 9

**dish wireless.**

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.  
NB+C ENGINEERING SERVICES, LLC.  
6096 MARSHLEE DRIVE, SUITE 300  
ELK GROVE, MD 21075  
(410) 712-7012

STATE OF MARYLAND  
KARAN KOLTA  
Professional Engineer  
02/25/2021

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DRAWN BY: AN CHECKED BY: BRN APPROVED BY: TA

RFDS REV #:

**CONSTRUCTION DOCUMENTS**

| REV | DATE       | DESCRIPTION             |
|-----|------------|-------------------------|
| 4   | 10/21/2021 | ISSUED FOR REVIEW       |
| 3   | 11/19/2021 | ISSUED FOR CONSTRUCTION |
| 1   | 02/24/2022 | ISSUED FOR CONSTRUCTION |

A&E PROJECT NUMBER  
**828930**

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
DCWDC00677A  
700 ROUTE 32  
SYKESVILLE, MD 21784

SHEET TITLE  
**EQUIPMENT DETAILS**

SHEET NUMBER  
**A-4**

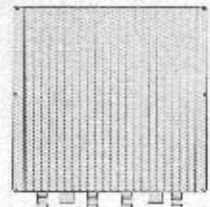
RECEIVED  
FEB 28 2021  
LICENSES & PERMITS DIVISION



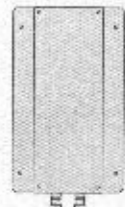
| FUJITSU TRIPLE BAND<br>TA08025-B605 |                     |
|-------------------------------------|---------------------|
| DIMENSIONS (HxWxD)                  | 14.9"x15.7"x9"      |
| WEIGHT                              | 74.85 lbs           |
| CONNECTOR TYPE                      | 4.3-10 RF CONNECTOR |
| POWER SUPPLY                        | DC -58V-36V         |



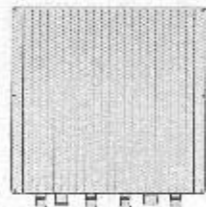
PLAN



BACK



SIDE



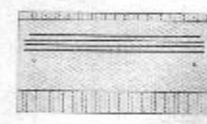
FRONT

RRH DETAIL

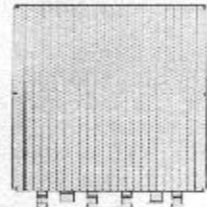
NO SCALE

1

| FUJITSU DUAL BAND<br>TA08025-B604 |                     |
|-----------------------------------|---------------------|
| DIMENSIONS (HxWxD)                | 14.9"x15.7"x7.6"    |
| WEIGHT                            | 63.8 lbs            |
| CONNECTOR TYPE                    | 4.3-10 RF CONNECTOR |
| POWER SUPPLY                      | DC -58V-36V         |



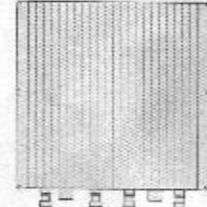
PLAN



BACK



SIDE



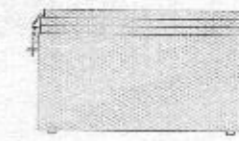
FRONT

RRH DETAIL

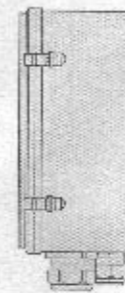
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2

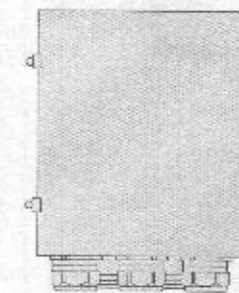
| RAYCAP RDIDC-9181-PF-48<br>DC SURGE PROTECTION (OVP) |                     |
|--|---------------------|
| DIMENSIONS (HxWxD)                                   | 18.00"x14.03"x8.15" |
| WEIGHT   | 21.89 lbs           |



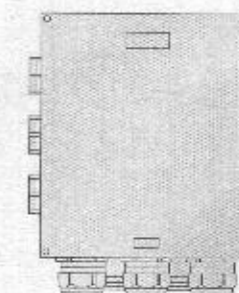
PLAN



SIDE



BACK



FRONT

SURGE SUPPRESSION DETAIL (OVP)

NO SCALE

3

| JMA<br>MX08FR0665-21     |                   |
|--------------------------|-------------------|
| DIMENSIONS (HxWxD)       | 72"x20.0"x8.0"    |
| RF PORTS, CONNECTOR TYPE | 8 x 4.3-10 FEMALE |
| WEIGHT                   | 84.5 lbs          |
| WEIGHT WITH BRACKETS     | 82.5 lbs          |



PLAN



SIDE



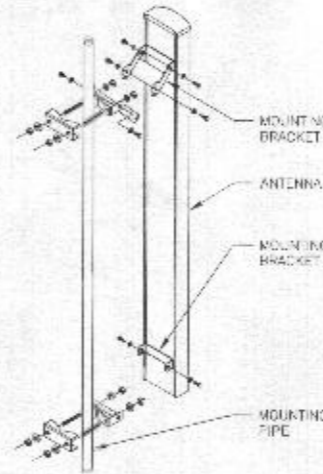
FRONT

ANTENNA DETAIL

NO SCALE

4

| M04 MOUNTING BRACKET<br>HPA-33R-BUU-H4-K |                     |
|--|---------------------|
| WIDTH                                    | 3"                  |
| DEPTH                                    | 2"                  |
| HEIGHT                                   | 8"                  |
| TOTAL WEIGHT                             | 1.5 lbs             |
| HOUSING MATERIAL                         | ASA/ABS/ALUMINUM    |
| PADCOLE COLOR                            | LIGHT GRAY          |
| CONNECTOR                                | 1x8-PIN DAISY CHAIN |



MOUNTING BRACKET

ANTENNA

MOUNTING BRACKET

MOUNTING PIPE

NOTE:  
OR DISH Wireless LLC  
APPROVED EQUIVALENT

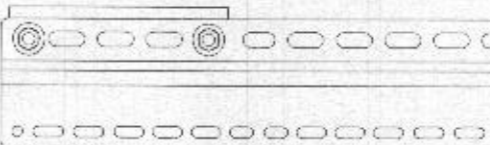
ANTENNA MOUNTING DETAIL

NO SCALE

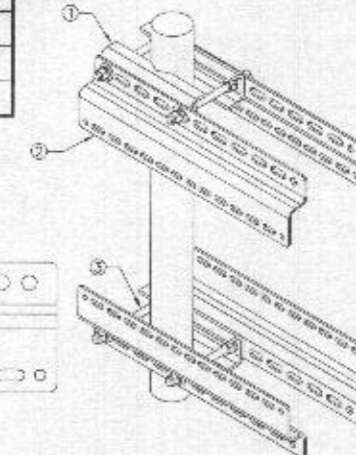
5

| SABRE DOUBLE Z-BRACKET<br>C10123155 |                 |
|-------------------------------------|-----------------|
| DIMENSIONS (HxWxD) (1 BRACKET)      | 5"x20"x1-13/16" |
| WEIGHT (FULL ASSEMBLY)              | 25.78 lbs       |
| PACKAGE QUANTITY                    | 4               |

| # | DESCRIPTION                   |
|---|-------------------------------|
| 1 | PLATE, D-RING, BRACKET        |
| 2 | RRH-Z BRACKET, 3/16"          |
| 3 | THREADED ROD ASSEMBLY 1/2"x2" |



NOTE:  
OR DISH Wireless LLC  
APPROVED EQUIVALENT



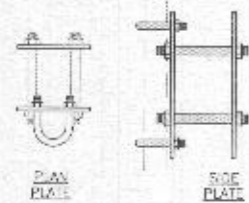
RRH MOUNT DETAIL

NO SCALE

6

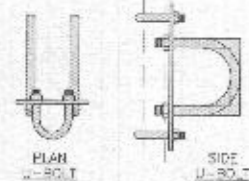
| COMMSCOPE XP-2040<br>CROSSOVER PLATE |         |
|--------------------------------------|---------|
| DIMENSIONS (HxW)                     | 10"x 2" |
| WEIGHT                               | 11 lbs  |

NOTE:  
OR DISH Wireless LLC  
APPROVED EQUIVALENT



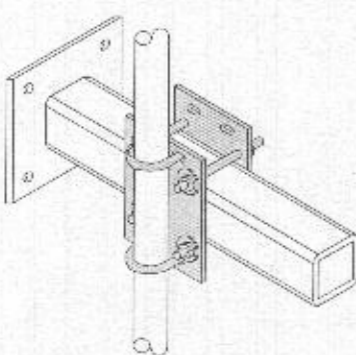
PLAN

SIDE



PLAN

SIDE



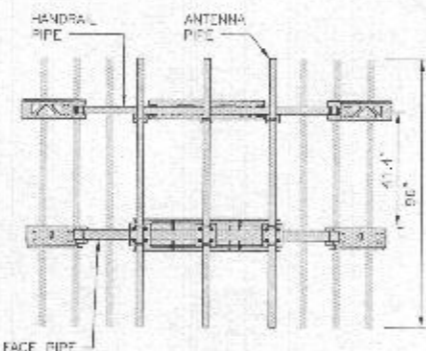
RRH/OVP MOUNT DETAIL

NO SCALE

7

| COMMSCOPE<br>MC-PK8-DSH |             |
|-------------------------|-------------|
| FACE WIDTH              | 96"         |
| WEIGHT                  | 1373.08 lbs |
| NOTE: 15" TO 38" O.D.   |             |

NOTE:  
OR DISH Wireless LLC  
APPROVED EQUIVALENT

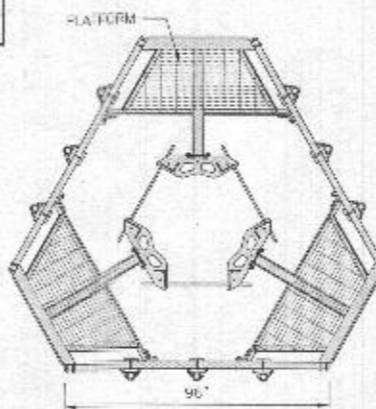


FACE PIPE

HANDRAIL PIPE

ANTENNA PIPE

PLATFORM



96"

ANTENNA PLATFORM DETAIL

NO SCALE

8

NOT USED

NO SCALE

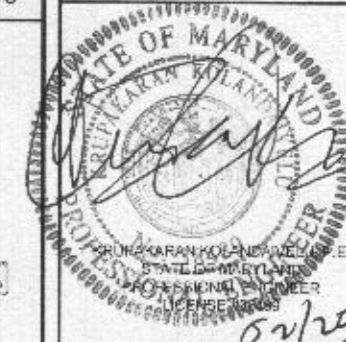
9

**dish**  
wireless.

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC  
600 WASHINGTON DRIVE, SUITE 300  
ELK RIDGE, MD 21075  
(410) 712-7000



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TO ALTER THIS DOCUMENT.

DRAWN BY: CHECKED BY: APPROVED BY:

AN BRN TA

RFDS REV #:

CONSTRUCTION  
DOCUMENTS

SUBMITTALS

| REV | DATE       | DESCRIPTION             |
|-----|------------|-------------------------|
| A   | 10/21/2021 | ISSUED FOR REVIEW       |
| B   | 11/19/2021 | ISSUED FOR CONSTRUCTION |
| C   | 02/04/2022 | ISSUED FOR CONSTRUCTION |

A&E PROJECT NUMBER

828930

DISH WIRELESS, LLC.  
PROJECT INFORMATION

DCWDC00677A  
700 ROUTE 32  
SYKESVILLE, MD 21784

SHEET TITLE  
EQUIPMENT DETAILS

SHEET NUMBER

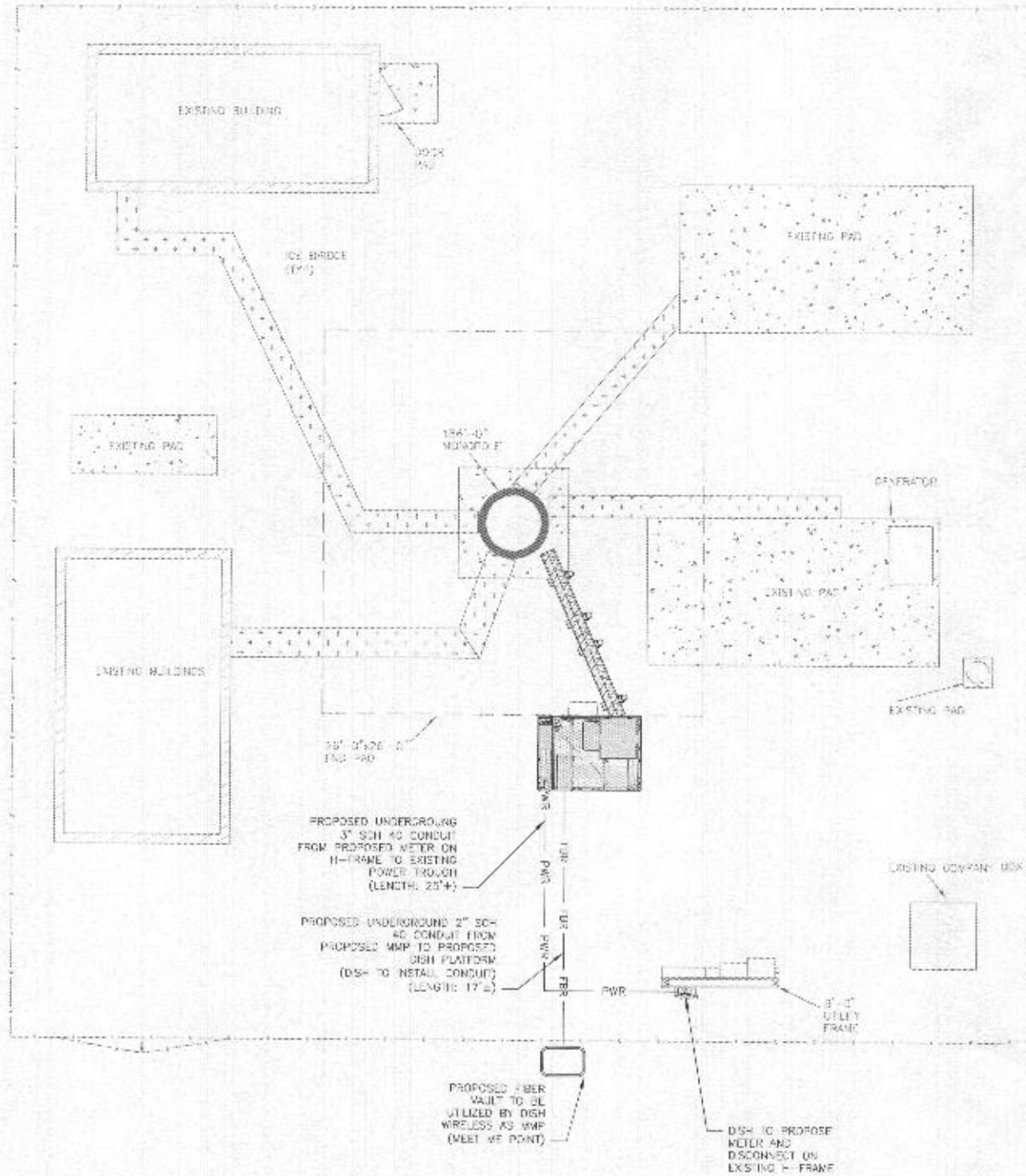
A-6

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FEB 28 2021  
LICENSES & PERMITS  
DIVISION

**EASEMENT RIGHTS**

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. FWR AND TWR 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 CROWN CASTLE REAL ESTATE 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.

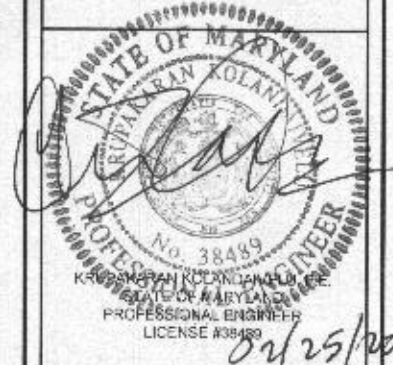
1. CONTRACTOR SHALL INSPECT THE EXISTING CONDITIONS PRIOR TO SUBMITTING A BID. ANY QUESTIONS ARISING DURING THE BID PERIOD IN REGARDS TO THE CONTRACTOR'S FUNCTIONS, THE SCOPE OF WORK, OR ANY OTHER ISSUE RELATED TO THIS PROJECT SHALL BE BROUGHT UP DURING THE BID PERIOD WITH THE PROJECT MANAGER FOR CLARIFICATION, 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 LOADINGS 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.



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
6306 MARSHLEE DRIVE, SUITE 300  
ELK RIDGE, MD 21075  
(410) 712-7000



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|           |             |              |
|-----------|-------------|--------------|
| DRAWN BY: | CHECKED BY: | APPROVED BY: |
| AN        | BRN         | TA           |

RFDS REV #:

**CONSTRUCTION DOCUMENTS**

| SUBMITTALS |            |                         |
|------------|------------|-------------------------|
| REV        | DATE       | DESCRIPTION             |
| 6          | 10/27/2021 | ISSUED FOR REVIEW       |
| 5          | 11/15/2021 | ISSUED FOR CONSTRUCTION |
| 1          | 01/04/2022 | ISSUED FOR CONSTRUCTION |

A&E PROJECT NUMBER  
**828930**

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
**DCWDC00677A**  
700 ROUTE 32  
SYKESVILLE, MD 21784

SHEET TITLE  
**ELECTRICAL/FIBER ROUTE PLAN AND NOTES**

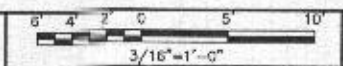
SHEET NUMBER  
**E-1**

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LICENSES & PERMITS

**UTILITY ROUTE PLAN**



1

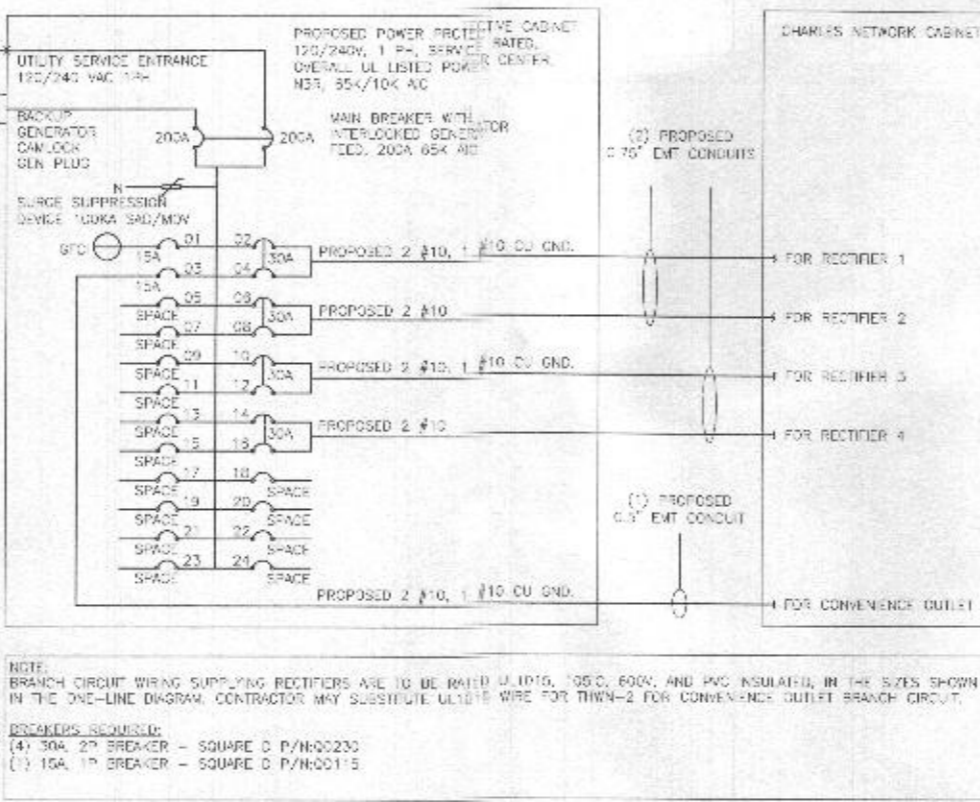
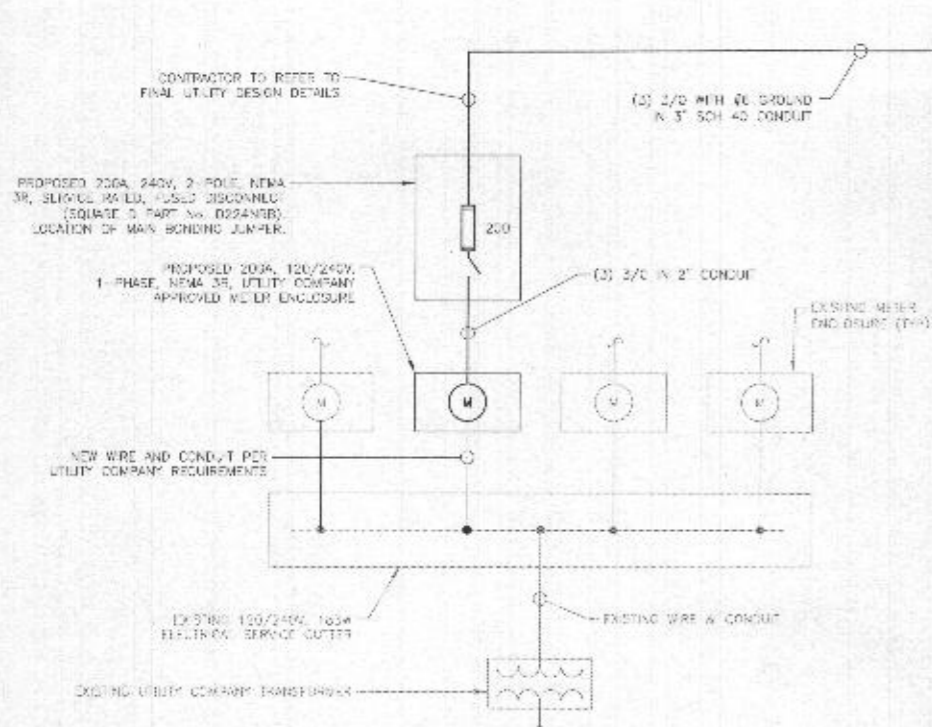
ELECTRICAL NOTES

DIVISION

NO SCALE

2





**NOTES**

THE ENGINEER OF RECORD HAS PERFORMED ALL REQUIRED SHORT-CIRCUIT CALCULATIONS AND THE AC 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 210.15(A)(1) FROM NO. 4.

THE (2) CONDUITS WITH (4) CURRENT CARRYING CONDUCTORS EACH, SHALL APPLY THE ADJUSTMENT FACTOR OF 50% PER 2014/17 NEC TABLE 310.15(B)(3)(a) OR 2020 NEC TABLE 310.15(C)(1) FOR UL1015 WIRE.

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

CONDUIT SIZING: AT 40% FILL PER NEC CHAPTER 9, TABLE 4, ARTICLE 358.  
 0.5" CONDUIT = 0.122 SQ. IN. AREA  
 0.75" CONDUIT = 0.213 SQ. IN. AREA  
 1.0" CONDUIT = 0.316 SQ. IN. AREA  
 1.5" CONDUIT = 0.607 SQ. IN. AREA

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

#10 =  $0.0211 \text{ SQ. IN.} \times 2 = 0.0422 \text{ SQ. IN.}$   
 #10 =  $0.0211 \text{ SQ. IN.} \times 1 = 0.0211 \text{ SQ. IN.} < \text{GROUND}$   
**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 (2 CONDUITS) USING UL1015, CU.

#10 =  $0.0268 \text{ SQ. IN.} \times 4 = 0.1074 \text{ SQ. IN.}$   
 #10 =  $0.0268 \text{ SQ. IN.} \times 1 = 0.0268 \text{ SQ. IN.} < \text{BARE GROUND}$   
**TOTAL = 0.1342 SQ. IN.**

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

FPC FEED CONDUCTORS (1 CONDUIT) USING THWN, CU.

3/0 =  $0.2879 \text{ SQ. IN.} \times 3 = 0.8637 \text{ SQ. IN.}$   
 #6 =  $0.0507 \text{ SQ. IN.} \times 1 = 0.0507 \text{ SQ. IN.} < \text{GROUND}$   
**TOTAL = 0.9144 SQ. IN.**

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

**dish wireless.**

5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120

**NB+C**  
TOTALLY COMMITTED.

NB+C ENGINEERING SERVICES, LLC.  
505 MARSHALL DRIVE, SUITE 300  
ELK RIDGE, MD 21075  
410-712-7362

STATE OF MARYLAND  
PROFESSIONAL ENGINEER  
J. BURKAR  
1/28/2021

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DRAWN BY: AN CHECKED BY: BRN APPROVED BY: TA

RFDS REV #:

**CONSTRUCTION DOCUMENTS**

SUBMITTALS

| REV | DATE       | DESCRIPTION             |
|-----|------------|-------------------------|
| A   | 11/21/2021 | ISSUED FOR REVIEW       |
| B   | 11/19/2021 | ISSUED FOR CONSTRUCTION |
| 1   | 01/04/2022 | ISSUED FOR CONSTRUCTION |

A&E PROJECT NUMBER  
**828930**

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
DCWDC00677A  
700 ROUTE 32  
SYKESVILLE, MD 21784

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

SHEET NUMBER  
**E-3**

**PROPOSED CHARLES PANEL SCHEDULE**

| LOAD SERVED                     | VOLT AMPS (WATTS) |        | TRIP   | CKT # | PHASE | CKT # | TRIP | VOLT AMPS (WATTS) |        | LOAD SERVED                 |
|---------------------------------|-------------------|--------|--------|-------|-------|-------|------|-------------------|--------|-----------------------------|
|                                 | L1                | L2     |        |       |       |       |      | L1                | L2     |                             |
| FPC GFCI OUTLET                 | 180               | 180    | 15A    | 1     | A     | 2     | 30A  | 2850              | 2850   | 489/CF INFINITY RECTIFIER 1 |
| CHARLES GFCI OUTLET             | 180               | 180    | 15A    | 3     | B     | 4     | 30A  | 2850              | 2850   | 489/CF INFINITY RECTIFIER 2 |
| -SPACE-                         |                   |        |        | 5     | A     | 6     | 30A  | 2850              | 2850   | 489/CF INFINITY RECTIFIER 3 |
| -SPACE-                         |                   |        |        | 7     | B     | 8     | 30A  | 2850              | 2850   | 489/CF INFINITY RECTIFIER 4 |
| -SPACE-                         |                   |        |        | 9     | A     | 10    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 11    | B     | 12    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 13    | A     | 14    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 15    | B     | 16    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 17    | A     | 18    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 19    | B     | 20    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 21    | A     | 22    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| -SPACE-                         |                   |        |        | 23    | B     | 24    | 20A  | 2850              | 2850   | CONVENIENCE OUTLET          |
| VOLTAGE AMPS                    |                   | 60     | 180    |       |       |       |      | 11,520            | 11,520 |                             |
| 200A NEMA 3R 24 SPACED 120/240V |                   |        |        | L1    | L2    |       |      |                   |        |                             |
| MB RATING: 65,000 AC            |                   | 11,700 | 11,700 |       |       |       |      |                   |        |                             |
|                                 |                   | 88     | 98     |       |       |       |      |                   |        |                             |
|                                 |                   | 88     | 98     |       |       |       |      |                   |        |                             |
|                                 |                   | 123    | 123    |       |       |       |      |                   |        |                             |

**FAULT CURRENT VALUES BASED ON POINT-TO-POINT METHOD OF CALCULATION**

F1 (SINGLE PHASE)

LOCATION: TRANSFORMER

TRANSFORMER SIZE = 100.0 KVA

SECONDARY VOLTAGE (L-L) = 240 V

SECONDARY VOLTAGE (L-N) = 120 V

ISC = 43,000 A

F2 (SINGLE PHASE)

LOCATION: METER

TYPE OF CONDUIT: PVC

CONDUCTOR SIZE AND TYPE: 3/0 COPPER

SETS OF CONDUCTORS = 1

LENGTH OF CONDUCTORS = 100 FEET

"C" VALUE = 13923

I(L-L) = 1.8153

M(L-L) = 0.3430

I(L-N) = 5.7459

M(L-N) = 0.1482

ISC (L-L) = 13,721 A

ISC (L-N) = 8,804 A

F3 (SINGLE PHASE)

LOCATION: DISCONNECT

TYPE OF CONDUIT: PVC

CONDUCTOR SIZE AND TYPE: 3/0 COPPER

SETS OF CONDUCTORS = 1

LENGTH OF CONDUCTORS = 1 FEET

"C" VALUE = 13923

I(L-L) = 0.0821

M(L-L) = 0.0241

I(L-N) = 0.1065

M(L-N) = 0.0326

ISC (L-L) = 12,578 A

ISC (L-N) = 8,036 A

F4 (SINGLE PHASE)

LOCATION: 200A FPC

TYPE OF CONDUIT: PVC

CONDUCTOR SIZE AND TYPE: 3/0 COPPER

SETS OF CONDUCTORS = 1

LENGTH OF CONDUCTORS = 20 FEET

"C" VALUE = 13923

I(L-L) = 0.2277

M(L-L) = 0.0148

I(L-N) = 0.2687

M(L-N) = 0.7790

ISC (L-L) = 10,328 A

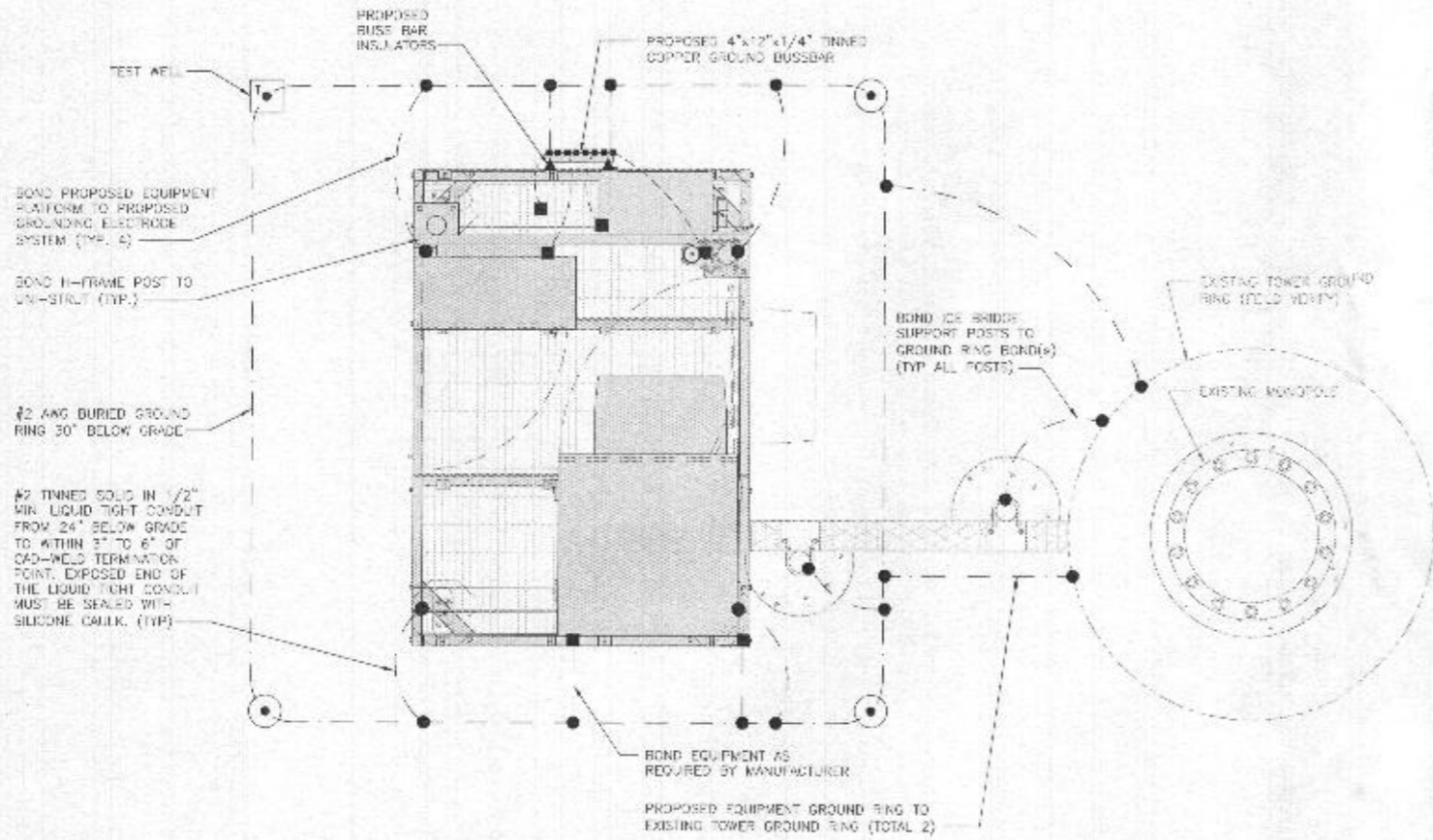
ISC (L-N) = 6,238 A

PANEL SCHEDULE

NO SCALE 2

FAULT CALCULATIONS

NO SCALE 3

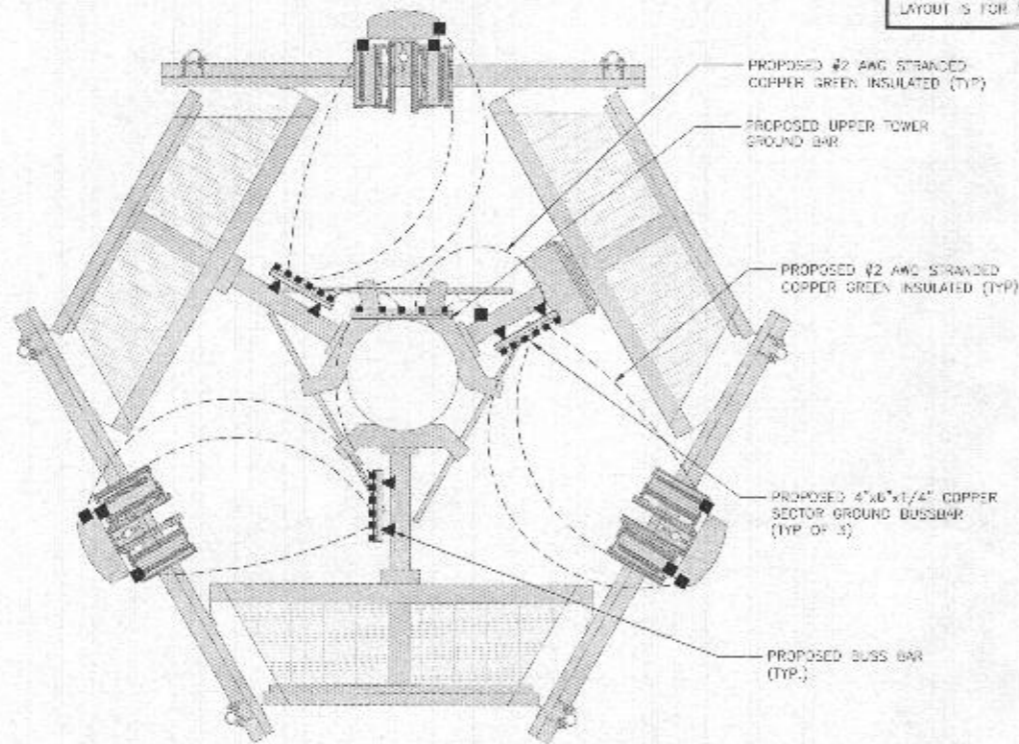


TYPICAL EQUIPMENT GROUNDING PLAN

NO SCALE 1

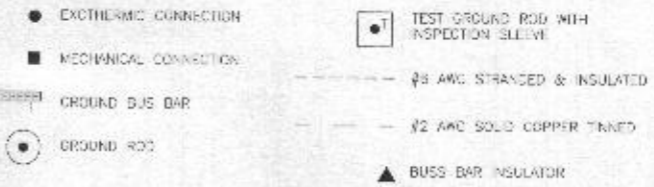
NOTES

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



TYPICAL ANTENNA GROUNDING PLAN

NO SCALE 2



GROUNDING LEGEND

- GROUNDING IS SHOWN DIAGRAMMATICALLY ONLY.
- CONTRACTOR SHALL GROUND ALL EQUIPMENT AS A COMPLETE SYSTEM. GROUNDING SHALL BE IN COMPLIANCE WITH NEC SECTION 250 AND DISH WIRELESS, LLC. GROUNDING AND BONDING REQUIREMENTS AND MANUFACTURER'S SPECIFICATIONS.
- ALL GROUND CONDUCTORS SHALL BE COPPER; NO ALUMINUM CONDUCTORS SHALL BE USED.

GROUNDING KEY NOTES

- EXTERIOR GROUND RING: #2 AWG SOLID COPPER, BURIED AT A DEPTH OF AT LEAST 30 INCHES BELOW GRADE, OR 5 INCHES BELOW THE FROST LINE AND APPROXIMATELY 24 INCHES FROM THE EXTERIOR WALL OR FOOTING.
- TOUR'S 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 SYSTEM AND THE BUILDING RING GROUND SYSTEM USING MINIMUM #2 AWG SOLID COPPER CONDUCTORS.
- 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 #8 AWG STRANDED GREEN INSULATED CONDUCTOR.
- 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.
- 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.
- 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.
- 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.
- EXCESS 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.
- TELECOM GROUND BAR: BOND TO BOTH CELL REFERENCE GROUND BAR OR EXTERIOR GROUND RING.
- FRAME BONDING: THE BONDING POINT FOR TELECOM EQUIPMENT FRAMES SHALL BE THE GROUND BUS THAT IS NOT ISOLATED FROM THE EQUIPMENT'S METAL FRAMEWORK.
- INTERIOR UNIT BONDS: METAL FRAMES, CABINETS AND INDIVIDUAL METALLIC UNITS LOCATED WITHIN THE AREA OF THE INTERIOR GROUND RING REQUIRE A #6 AWG STRANDED GREEN INSULATED COPPER BOND TO THE INTERIOR GROUND RING.
- 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.
- 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.
- ICE BRIDGE SUPPORTS: EACH ICE BRIDGE 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.
- DURING ALL DC POWER SYSTEM CHANGES INCLUDING DC SYSTEM CHANGE OUTS, RECTIFIER REPLACEMENTS OR ADDITIONS, BREAKER DISTRIBUTION CHANGES, BATTERY ADDITIONS, BATTERY REPLACEMENTS AND INSTALLATIONS OF CHARGERS TO DC CONVERTER SYSTEMS IT SHALL BE REQUIRED THAT SERVICE CONTRACTORS VERIFY ALL DC POWER SYSTEMS ARE EQUIPPED WITH REMANUFACTURED SYSTEM RETURN GROUND CONDUCTORS FROM THE DC POWER SYSTEM COMMON RETURN BUS DIRECTLY CONNECTED TO THE CELL SITE REFERENCE GROUND BAR.
- TOWER TOP COLLECTOR BUSS BAR IS TO BE MECHANICALLY BONDED TO PROPOSED ANTENNA MOUNT COLLAR. REFER TO DISH WIRELESS, LLC. GROUNDING NOTES.

GROUNDING KEY NOTES

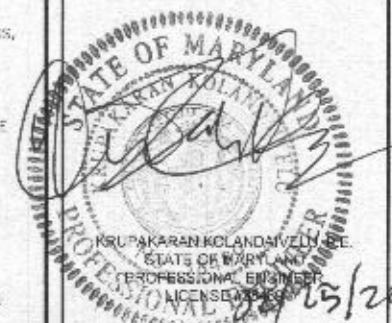
NO SCALE 3



5701 SOUTH SANTA FE DRIVE  
LITTLETON, CO 80120



NB+C ENGINEERING SERVICES, LLC.  
685 WIND-LEE DRIVE, SUITE 200  
EDRIDGE, MD 21035  
410-712-7532



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: AN CHECKED BY: BRN APPROVED BY: TA

RFDS REV #:

CONSTRUCTION DOCUMENTS

| SUBMITTALS |            |                         |
|------------|------------|-------------------------|
| REV        | DATE       | DESCRIPTION             |
| A          | 10/21/2017 | ISSUED FOR REVIEW       |
| B          | 11/19/2021 | ISSUED FOR CONSTRUCTION |
| 1          | 02/15/2022 | ISSUED FOR CONSTRUCTION |

M&E PROJECT NUMBER  
828930

DISH WIRELESS, LLC.  
PROJECT INFORMATION  
DCWDC00677A  
700 ROUTE 32  
SYKESVILLE, MD 21784

SHEET TITLE  
GROUNDING PLANS AND NOTES

SHEET NUMBER

G-1

FEB 28 2021  
LICENSES & PERMITS  
DIVISION

