

PROJECT: DO MACRO UPGRADE

SITE NAME: USWW MANITOU WATER

SITE CASCADE: DN14XC247

ADDRESS: 7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
EL PASO COUNTY

LATITUDE: 38.88689° N / 38° 53' 12.8" N

LONGITUDE: 104.95846° W / 104° 57' 30.5" W

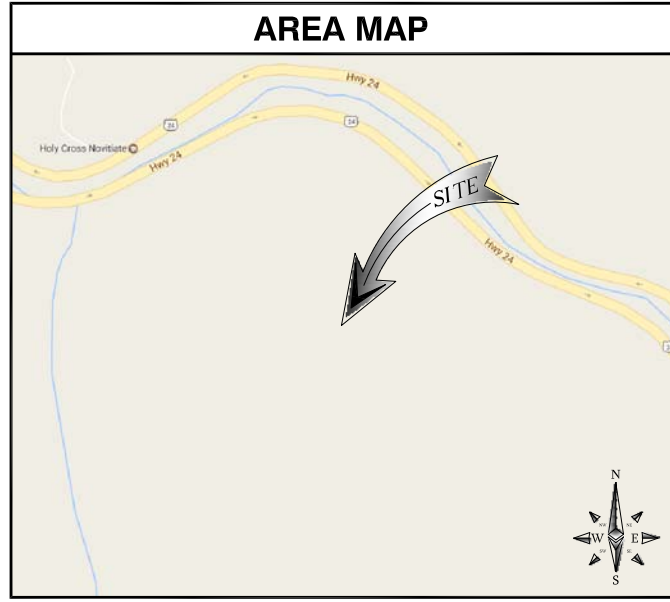
SITE TYPE: MONOPOLE



DRAWN BY: MB

CHECKED BY: MM

SITE INFORMATION	
PROPERTY OWNER:	GEORGE VAHSOLTZ 7225 WEST HIGHWAY 24 MANITOU SPRINGS, CO 80829 GEORGE VAHSOLTZ
APPLICANT:	SPRINT
GROUND ELEVATION:	±7460'
LAT/LONG TYPE:	NAD-83
LATITUDE:	38.88689° N / 38° 53' 12.8" N
LONGITUDE:	104.95846° W / 104° 57' 30.5" W
ZONING JURISDICTION:	EL PASO COUNTY
ZONING CLASSIFICATION:	RESIDENTIAL - TOPOGRAPHIC (R-T)
CURRENT USE:	UNMANNED TELECOMMUNICATIONS FACILITY
ASSESSOR'S PARCEL NO.:	83264-00-018
PROPOSED USE:	UNMANNED TELECOMMUNICATIONS FACILITY
TYPE OF CONSTRUCTION:	V-8
OCCUPANCY GROUP:	U-2

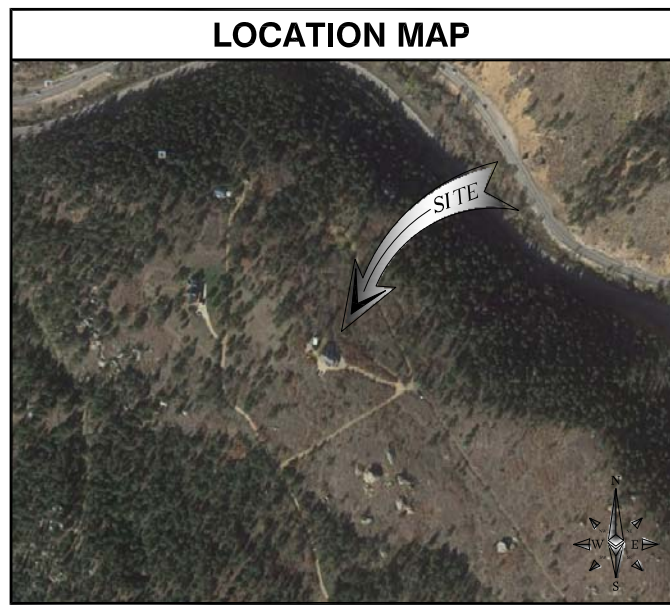


PROJECT DESCRIPTION	
SPRINT PROPOSES TO MODIFY AN EXISTING WIRELESS INSTALLATION. THE SCOPE WILL CONSIST OF THE FOLLOWING:	
• REMOVE	(2) EXISTING SPRINT PANEL ANTENNAS
• RELOCATE	(2) EXISTING SPRINT 1900 RRU'S TO ANTENNA LEVEL
• INSTALL	(1) NEW SPRINT MONOPOLE MOUNT
• INSTALL	(2) NEW SPRINT PANEL ANTENNAS
• INSTALL	(4) NEW SPRINT RRU @ ANTENNA LEVEL
• INSTALL	(2) NEW SPRINT HYBRID CABLE
• INSTALL	(2) NEW SPRINT POWER JUNCTION CYLINDERS
• INSTALL	(2) NEW SPRINT FIBER JUNCTION CYLINDERS
• INSTALL	(4) NEW SPRINT BATTERIES IN EXISTING BBU CABINET
• INSTALL	(1) NEW SPRINT 2.5GHZ BASEBAND UNIT IN EXISTING MMBS CABINET
• INSTALL	(2) NEW SPRINT QUADPLEXERS

DRAWING INDEX	
SHEET NO:	SHEET TITLE
T-1	TITLE SHEET
GN-1	GENERAL NOTES
GN-2	GENERAL NOTES
A-1	SITE PLAN
A-2	EQUIPMENT LAYOUT
A-3	ANTENNA LAYOUT
A-4	ELEVATIONS
A-5	COLOR CODING
D-1	EQUIPMENT DETAILS
D-2	EQUIPMENT DETAILS
D-3	EQUIPMENT DETAILS
E-1	GENERAL ELECTRICAL NOTES
E-2	ONE-LINE DIAGRAM
E-3	PANEL SCHEDULE
E-4	ANTENNA GROUNDING PLAN AND DIAGRAM
E-5	GROUNDING DETAILS
RF-1	RADIO FREQUENCY DATA SHEET

REV	DATE	DESCRIPTION
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW

PROJECT TEAM	
REAL ESTATE MANAGER: CONTACT: CHRISTINE POULIGNOT REAL ESTATE MANAGER - COLORADO SPRINT NEXTEL CORPORATION C/O CHRISTINE POULIGNOT MAILSTOP: COENGJ0201 333 INVERNESS DRIVE SOUTH ENGLEWOOD, CA 80112 PH: (720) 329-7983 EMAIL: christine.poulignot@sprint.com	ENGINEER: M SQUARED WIRELESS 1387 CALLE AVANZADO SAN CLEMENTE, CA 92673 CONTACT: MICHAEL MONTELLO EMAIL: michael@msquaredwireless.com
SITE ACQUISITION M SQUARED WIRELESS CONTACT: MATTHEW BABB 1387 CALLE AVANZADO SAN CLEMENTE, CA 92673 PH: (619) 992-5561 EMAIL: matthewbabb61@gmail.com	RF ENGINEER: CONTACT: NEERAJ BERI PH: (440) 222-8729 EMAIL: neeraj.beri@sprint.com
	CONSTRUCTION MANAGER: CONTACT: BRANDON WHINERY PH: (303) 505-5750 EMAIL: brandon.whinery@sprint.com



APPLICABLE CODES	
ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES:	
<ul style="list-style-type: none"> 2015 INTERNATIONAL BUILDING CODE 2014 NATIONAL ELECTRICAL CODE LOCAL BUILDING CODES CITY/COUNTY ORDINANCES 	

APPROVALS	
THE FOLLOWING PARTIES HEREBY APPROVE AND ACCEPT THESE DOCUMENTS & AUTHORIZE THE SUBCONTRACTOR TO PROCEED WITH THE CONSTRUCTION DESCRIBED HEREIN. ALL DOCUMENTS ARE SUBJECT TO REVIEW BY THE LOCAL BUILDING DEPARTMENT & MAY IMPOSE CHANGES OR MODIFICATIONS.	
SPRINT RF ENGINEER: _____	DATE: _____
SPRINT OPERATIONS: _____	DATE: _____
SITE ACQUISITION: _____	DATE: _____
CONSTRUCTION MANAGER: _____	DATE: _____
PROPERTY OWNER: _____	DATE: _____
ZONING: _____	DATE: _____
PROJECT MANAGER: _____	DATE: _____
DO NOT SCALE DRAWINGS	
SUBCONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS & FIELD CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME.	

GENERAL NOTES	
THE FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION. HANDICAPPED ACCESS REQUIREMENTS ARE NOT REQUIRED IN ACCORDANCE WITH THE 2015 INTERNATIONAL BUILDING CODE. A TECHNICIAN WILL VISIT THE SITE AS REQUIRED FOR ROUTINE MAINTENANCE. THE PROJECT WILL NOT RESULT IN ANY SIGNIFICANT DISTURBANCE OR EFFECT ON DRAINAGE; NO SANITARY SEWER SERVICE, POTABLE WATER, OR TRASH DISPOSAL IS REQUIRED AND NO COMMERCIAL SIGNAGE IS NEW.	

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.

USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
TITLE SHEET

SHEET NUMBER
T-1

THESE OUTLINE SPECIFICATIONS IN CONJUNCTION WITH THE SPRINT STANDARD CONSTRUCTION SPECIFICATIONS, INCLUDING CONTRACT DOCUMENTS AND THE CONSTRUCTION DRAWINGS DESCRIBE THE WORK TO BE PERFORMED BY THE CONTRACTOR.

SECTION 01 100 - SCOPE OF WORK:

THE WORK:
SHALL COMPLY WITH APPLICABLE NATIONAL CODES AND STANDARDS, LATEST EDITION, AND PORTIONS THEREOF.

PRECEDENCE:
SHOULD CONFLICTS OCCUR BETWEEN THE STANDARD CONSTRUCTION SPECIFICATIONS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, INFORMATION ON THE CONSTRUCTION DRAWINGS SHALL TAKE PRECEDENCE.

SITE FAMILIARITY:
CONTRACTOR SHALL BE RESPONSIBLE FOR FAMILIARIZING HIMSELF WITH ALL CONTRACT DOCUMENTS, FIELD CONDITIONS AND DIMENSIONS PRIOR TO PROCEEDING WITH CONSTRUCTION.

ON-SITE SUPERVISION:
THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, AND PROCEDURES IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

DRAWINGS, SPECIFICATIONS AND DETAILS REQUIRED AT JOBSITE:
THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A FULL SET OF THE CONSTRUCTION DRAWINGS AT THE JOBSITE FROM MOBILIZATION THROUGH CONSTRUCTION COMPLETION.

A. DETAILS ARE INTENDED TO SHOW DESIGN INTENT, PROVIDE ALL MATERIALS AND LABOR AS REQUIRED TO PROVIDE A COMPLETE AND FUNCTIONING SYSTEM, MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK .

B. CONTRACTOR SHALL NOTIFY SPRINT CONSTRUCTION MANAGER OF ANY VARIATIONS PRIOR TO PROCEEDING WITH THE WORK, DIMENSIONS SHOWN ARE TO FINISH SURFACES UNLESS NOTED OTHERWISE, MODIFICATIONS MAY BE REQUIRED TO SUIT JOB DIMENSIONS OR CONDITIONS, AND SUCH MODIFICATIONS SHALL BE INCLUDED AS PART OF THE WORK.

C. MARK THE FIELD SET OF DRAWINGS IN RED, DOCUMENTING ANY CHANGES FROM THE CONSTRUCTION DOCUMENTS.

METHODS OF PROCEDURE (MOPS) FOR CONSTRUCTION:
CONTRACTOR SHALL PERFORM WORK AS DESCRIBED IN THE FOLLOWING INSTALLATION AND COMMISSIONING MOPS.

- A. TOP HAT
- B. HOW TO INSTALL A NEW CABINET
- C. BASE BAND UNIT IN EXISTING UNIT
- D. INSTALLATION OF BATTERIES
- E. INSTALLATION OF HYBRID CABLE
- F. INSTALLATION OF RRU'S
- G. CABLING
- H. TS-0200 REV 4 - ANTENNA LINE ACCEPTANCE STANDARDS
- I. SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.
- J. COMMISSIONING MOPS
- K. GROUNDING NE-312-201
- L. SPRINT INTEGRATED CONSTRUCTION STANDARDS VERSION 4.0

SECTION 01 200 - COMPANY FURNISHED MATERIAL AND EQUIPMENT

COMPANY FURNISHED MATERIAL AND EQUIPMENT IS IDENTIFIED ON THE RF DATA SHEET IN THE CONSTRUCTION DRAWINGS.

CONTRACTOR IS RESPONSIBLE FOR SPRINT PROVIDED MATERIAL AND EQUIPMENT TO ENSURE IT IS PROTECTED AND HANDLED PROPERLY THROUGHOUT THE CONSTRUCTION DURATION.

CONTRACTOR IS RESPONSIBLE FOR RECEIPT OF SPRINT FURNISHED EQUIPMENT AT CELL SITE OR CONTRACTORS LOCATION, CONTRACTOR TO COMPLETE SHIPPING AND RECEIPT DOCUMENTATION IN ACCORDANCE WITH COMPANY PRACTICE.

SECTION 01 300 - CELL SITE CONSTRUCTION

NOTICE TO PROCEED:
NO WORK SHALL COMPLETE PRIOR TO COMPANY'S WRITTEN NOTICE TO PROCEED AND THE ISSUANCE OF WORK ORDER.

SITE CLEANLINESS:
CONTRACTOR SHALL KEEP THE SITE FREE FROM ACCUMULATING WASTE MATERIAL, DEBRIS, AND TRASH, AT THE COMPLETION OF THE WORK, CONTRACTOR SHALL REMOVE FROM THE SITE ALL REMAINING RUBBISH, IMPLEMENTS, TEMPORARY FACILITIES, AND SURPLUS MATERIALS.

SECTION 01 400 - SUBMITTALS & TESTS

ALTERNATES:
AT THE COMPANY'S REQUEST, ANY ALTERNATIVES TO THE MATERIALS OR METHODS SPECIFIED SHALL BE SUBMITTED TO SPRINTS CONSTRUCTION MANAGER FOR APPROVAL. SPRINT WILL REVIEW AND APPROVE ONLY THOSE REQUESTS MADE IN WRITING. NO VERBAL APPROVALS WILL BE CONSIDERED.

TESTS AND INSPECTIONS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION TESTS, INSPECTION AND PROJECT DOCUMENTATION.

B. CONTRACTOR SHALL ACCOMPLISH TESTING INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. COAX SWEEPS AND FIBER TESTS PER TS-0200 REV 4 ANTENNA LINE ACCEPTANCE STANDARDS.

2. AGL, AZIMUTH AND DOWNTILT PROVIDE AN AUTOMATED REPORT UPLOADED TO SITERRA USING A COMMERCIAL MADE-FOR THE PURPOSE ELECTRONIC ANTENNA ALIGNMENT TOOL (AAT). INSTALLED AZIMUTH, CENTERLINE AND DOWNTILT MUST CONFORM WITH RF CONFIGURATION DATA.

3. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL CORRECTIONS TO ANY WORK IDENTIFIED AS UNACCEPTABLE IN SITE INSPECTION ACTIVITIES AND/OR AS A RESULT OF TESTING.

4. ALL TESTING REQUIRED BY APPLICABLE INSTALLATION MOPS.

C. REQUIRED CLOSEOUT DOCUMENTATION INCLUDES, BUT IS NOT LIMITED TO THE FOLLOWING:

1. AZIMUTH, DOWNTILT, AGL FROM SUNSIGHT INSTRUMENTS - ANTENNA ALIGNMENT TOOL (ATT)

2. SEEP AND FIBER TESTS

3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT

4. ALL AVAILABLE JURISDICTIONAL INFORMATION

5. PDF SCAN REDLINES PRODUCED IN FIELD

6. A PDF SCAN OF RELINE MARK-UPS SUITABLE FOR USE IN ELECTRONIC AS-BUILT DRAWING PRODUCTION

7. LIEN WAIVERS

8. FINAL PAYMENT APPLICATION

9. REQUIRED FINAL CONSTRUCTION PHOTOS

10. CONSTRUCTION AND COMMISSIONING CHECKLIST COMPLETE WITH NO DEFICIENT ITEMS

11. ALL POST NTP TASKS INCLUDING DOCUMENT UPLOADS COMPLETED IN SITERRA (SPRINTS DOCUMENT REPOSITORY OF RECORD.

12. CLOSEOUT PHOTOGRAPHS:

a. PROVIDE PHOTOGRAPHS OF FINAL PROJECT PER THE FOLLOWING LIST. ADDITIONAL PHOTOGRAPHS MAY BE REQUIRED TO SUPPORT ACCEPTANCE PROCESSES

- (I) MAIN HYBRID CABLE ROUTE (MINIMUM TWO PHOTOS)
- (II) PHOTOS OF EACH ANTENNA AND RRU
- (III) MANUFACTURERS NAME TAG FOR ALL SERIALIZED EQUIPMENT
- (IV) PULL AND DISTRIBUTION BOXES INTERMEDIATE BETWEEN RRU'S AND MMBS (DOOR OPEN)
- (V) MMBS CABINET WITH DOOR OPEN SHOWING MODIFICATIONS

- (VI) POWER CABINET, DOORS OPEN, BATTERIES INSTALLED
- (VII) BREAK OUT CYLINDERS
- (VIII) ASR SIGNAGE FOR SPRINT OWNED TOWERS
- (IX) RADIATION EXPOSURE WARNING SIGNS
- (X) PHOTOGRAPH FROM EACH SECTOR FROM APPROXIMATELY RAD CENTER OF ANY NEW ANTENNA AT HORIZON.

b. LOAD PHOTOS TO SITERRA PROJECT LIBRARY 15. IN 15 CREATE NEW CATEGORY: 2.5 DEPLOYMENT AND SECTION: PERMANENT CONSTRUCTION. LABEL PHOTOS WITH SITE CASCADE AND VIEW BEING DEPICTED, CAMERAS USED TO TAKE PHOTOGRAPHS SHALL GPS ENABLED SUCH THAT THE GPS COORDINATED ARE INCLUDED IN THE PHOTO MEDIA-FILE INFORMATION.

COMMISSIONING:
PERFORM ALL COMMISSIONING AS REQUIRED BY APPLICABLE MOPS

INTEGRATION:
PERFORM ALL INTEGRATION ACTIVITIES AS REQUIRED BY APPLICABLE MOPS

SECTION 07 500 - ROOF CUTTING, PATCHING AND REPAIR

SUMMARY:
THIS SECTION SPECIFIES CUTTING AND PATCHING EXISTING ROOFING SYSTEMS WHERE CONDUIT OR CABLES EXIT THE BUILDING-MOUNTED ANTENNAS, AND AS REQUIRED FOR WATERTIGHT PERFORMANCE. ROOFTOP ENTRY OPENINGS IN MEMBRANE ROOFTOPS SHALL BE CONSTRUCTED TO COMPLY WITH LANDLORD, ANY EXISTING WARRANTY, AND LOCAL JURISDICTIONAL STANDARDS.

1.4 SUBMITTALS:

A. **PRE-CONSTRUCTION ROOF PHOTOS:** COMPLETE A ROOF INSPECTION PRIOR TO THE INSTALLATION OF SPRINT EQUIPMENT ON ANY ROOFTOP BUILD, AT A MINIMUM INSPECT AND PHOTOGRAPH (MINIMUM 3 EA) ALL AREAS IMPACTED BY THE ADDITION OF THE SPRINT EQUIPMENT.

B. PROVIDE SIMILAR PHOTOGRAPHS SHOWING ROOF CONDITIONS AFTER CONSTRUCTION (MINIMUM 3 EA.)

C. ROOF INSPECTION PHOTOGRAPHS SHOULD BE UPLOADED WITH CLOSEOUT PHOTOGRAPHS.

SECTION 09 900 - PAINTING

QUALITY ASSURANCE:

A. COMPLY WITH COVERING CODES AND REGULATIONS, PROVIDE PRODUCTS OF ACCEPTABLE MANUFACTURERS WHICH HAVE BEEN IN SATISFACTORY USE IN SIMILAR SERVICE FOR THREE YEARS. USE EXPERIENCED INSTALLERS, DELIVER, HANDLE, AND STORE MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

B. COMPLY WITH ALL ENVIRONMENTAL REGULATIONS FOR VOLATILE ORGANIC COMPOUNDS.

MATERIALS:

A. MANUFACTURERS; BENJAMIN MOORE, ICI DEVCOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL, PROVIDE PREMIUM GRADE, PROFESSIONAL - QUALITY PRODUCTS FOR COATING SYSTEMS.

PAINT SCHEDULE:

A. EXTERIOR ANTENNAS AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAS SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAS, ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER, REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.

B. **ROOF TOP CONSTRUCTION:** TOUCH UP - PREPARE SURFACES TO BE REPAIRED, FOLLOW INDUSTRY STANDARDS AND REQUIREMENTS OF OWNER TO MATCH EXISTING COATING AND FINISH.

PAINTING APPLICATION:

1. INSPECT SURFACES, REPORT UNSATISFACTORY CONDITIONS IN WRITING; BEGINNING WORK MEANS ACCEPTANCE OF SUBSTRATE.

2. COMPLY WITH MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR PREPARATION, PRIMING AND COATING WORK, COORDINATE WITH WORK OF OTHER SECTIONS.

3. MATCH APPROVED MOCK-UPS FOR COLOR, TEXTURE, AND PATTERN. RE-COAT OR REMOVE AND REPLACE WORK WHICH DOES NOT MATCH OR SHOWS LOSS OF ADHESION.

4. CLEAN UP, TOUCH UP AND PROTECT WORK.

TOUCHUP PAINTING:

1. GALVANIZING DAMAGE AND ALL BOLTS AND NUTS SHALL BE TOUCHED UP AFTER TOWER ERECTION WITH "GALVANOX", "DRY GALY", OR "ZINC-IT".

2. FIELD TOUCHUP PAINT SHALL BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

3. ALL METAL COMPONENTS SHALL BE HANDLED WITH CARE TO PREVENT DAMAGE TO THE COMPONENTS, THEIR PRESERVATIVE TREATMENT, OR THEIR PROTECTIVE COATINGS.

SECTION 11 700 - ANTENNA ASSEMBLY, REMOTE RADIO UNITS AND CABLE INSTALLATION

SUMMARY:
THIS SECTION SPECIFIES INSTALLATION OF ANTENNAS, RRU'S, AND CABLE EQUIPMENT, INSTALLATION, AND TESTING OF COAXIAL FIBER CABLE.

ANTENNAS AND RRU'S:
THE NUMBER AND TYPE OF ANTENNAS AND RRU'S TO BE INSTALLED IS DETAILED ON THE CONSTRUCTION DRAWINGS.

HYBRID CABLE:
HYBRID CABLE WILL BE DC/FIBER AND FURNISHED FOR INSTALLATION AT EACH SITE. CABLE SHALL BE INSTALLED PER THE CONSTRUCTION DRAWINGS AND THE APPLICABLE MANUFACTURER'S REQUIREMENTS.

JUMPERS AND CONNECTORS:
FURNISH AND INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS SHALL BE TYPE LDF 4, FLC 12-50, CR 540, OR FXL 540. SUPER-FLEX CABLES ARE NOT ACCEPTABLE. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE. DO NOT USE SUPER-FLEX OUTDOORS. MAXIMUM OF 4 FEET EXCESS PER JUMPER AND HAVE CONNECTORS AT EACH END, MANUFACTURED BY SUPPLIER. IF JUMPERS ARE FIELD FABRICATED, FOLLOW MANUFACTURER'S REQUIREMENTS FOR INSTALLATION OF CONNECTORS.

REMOTE ELECTRICAL TILT (RET) CABLES:

MISCELLANEOUS:
INSTALL SPLITTERS, COMBINERS, FILTERS PER RF DATA SHEET, FURNISHED BY SPRINT.

ANTENNA INSTALLATION:
THE CONTRACTOR SHALL ASSEMBLE ALL ANTENNAS ONSITE IN ACCORDANCE WITH THE INSTRUCTIONS SUPPLIED BY THE MANUFACTURER, ANTENNA HEIGHT, AZIMUTH, AND FEED ORIENTATION INFORMATION SHALL BE A DESIGNATED ON THE CONSTRUCTION DRAWINGS.

A. THE CONTRACTOR SHALL POSITION THE ANTENNA ON TOWER PIPE MOUNTS SO THAT THE BOTTOM STRUT IS LEVEL, THE PIPE MOUNTS SHALL BE PLUMB TO WITHIN 1 DEGREE.

B. ANTENNA MOUNTING REQUIREMENTS: PROVIDE ANTENNA MOUNTING HARDWARE AS INDICATED ON THE DRAWINGS.

HYBRID CABLE INSTALLATION:

A. THE CONTRACTOR SHALL ROUTE, TEST, AND INSTALL ALL CABLES AS INDICATED ON THE CONSTRUCTION DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. THE INSTALLED RADIUS OF THE CABLES SHALL NOT BE LESS THAN THE MANUFACTURER'S SPECIFICATIONS FOR BENDING RADIUS.

C. EXTREME CARE SHALL BE TAKEN TO AVOID DAMAGE TO THE CABLES DURING HANDLING AND INSTALLATION.

1. FASTENING MAIN HYBRID CABLES: ALL CABLES SHALL BE PERMANENTLY FASTENED TO THE COAX LADDER AT 4'-0" OC USING NON-MAGNETIC STAINLESS STEEL CLIPS.

2. FASTENING INDIVIDUAL FIBER AND DC CABLES ABOVE BREAKOUT ENCLOSURE (MEDUSA), WITHIN THE MMBS CABINET AND ANY INTERMEDIATE DISTRIBUTION BOXES:

a. FIBER: SUPPORT FIBER BUNDLES USING 1/2" VELCRO STRAPS OF THE REQUIRED LENGTH 0 18" OC. STRAPS SHALL BE UV, OIL AND WATER RESISTANT AND SUITABLE FOR INDUSTRIAL INSTALLATIONS AS MANUFACTURED BY TEXTOL OR APPROVED EQUAL

b. DC: SUPPORT DC BUNDLES WITH ZIP TIES OF THE ADEQUATE LENGTH, ZIP TIES TO BE UV STABILIZED, BLACK NYLON, WITH TENSILE STRENGTH AT 12,000 PSI AS MANUFACTURED BY NELCO PRODUCTS OR EQUAL.

3. FASTENING JUMPERS: SECURE JUMPERS TO THE SIDE ARMS OR HEAD FRAMES USING STAINLESS STEEL TIE WRAPS OR STAINLESS STEEL BUTTERFLY CLIPS.

4. CABLE INSTALLATION:

a. INSPECT CABLE PRIOR TO USE FOR SHIPPING DAMAGE, NOTIFY THE CONSTRUCTION MANAGER.

b. CABLE ROUTING: CABLE INSTALLATION SHALL BE PLANNED TO ENSURE THAT THE LINES WILL BE PROPERLY ROUTED IN THE CABLE ENVELOP AS INDICATED ON THE DRAWINGS.

c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURERS RECOMMENDED MAXIMUM BEND RADIUS.

5. GROUNDING OF TRANSMISSION LINES: ALL TRANSMISSION LINES SHALL BE GROUNDED AS INDICATED ON DRAWINGS.

6. HYBRID CABLE COLOR CODING: ALL COLOR CODING SHALL BE AS REQUIRED IN TS 0200 REV 4.

7. HYBRID CABLE LABELING: INDIVIDUAL HYBRID AND DC BUNDLES SHALL BE LABELED ALPHA-NUMERICALLY ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001 REV 4.

WATERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:

A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WATERPROOFED.

B. WEATHERPROOFED USING ONE OF THE FOLLOWING METHODS. ALL INSTALLATIONS MUST BE DONE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND INDUSTRY BEST PRACTICES.

1. COLD SHRINK: ENCOMPASS CONNECTOR IN COLD SHRINK TUBING AND PROVIDE A DOUBLE WRAP OF 2" ELECTRICAL TAPE EXTENDING 2" BEYOND TUBING, PROVIDE 3M COLD SHRINK CXS SERIES OR EQUAL.

2. SELF-AMALGAMATING TAPE: CLEAN SURFACES. APPLY A DOUBLE WRAP OF SELF-AMALGAMATING TAPE 2" BEYOND CONNECTOR. APPLY A SECOND WRAP OF SELF-AMALGAMATING TAPE IN OPPOSITE DIRECTION, APPLY DOUBLE WRAP OF 2" WIDE ELECTRICAL TAPE EXTENDING 2" BEYOND THE SELF-AMALGAMATING TAPE.

3. 3M SLIM LOCK CLOSURE 716: SUBSTITUTIONS WILL NOT BE ALLOWED.

4. OPEN FLAME ON JOB SITE IS NOT ACCEPTABLE

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE AND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS.

DC CIRCUIT BREAKER LABELING

A. LABEL CIRCUIT BREAKERS ACCORDING TO SPRINT CELL SITE ENGINEERING NOTICE - EN 2012-001, REV 1.

SECTION 11 800 - INSTALLATION OF MULTIMODAL BASE STATIONS (MMBS) AND RELATED EQUIPMENT

SUMMARY:

A. THIS SECTION SPECIFIES MMBS CABINETS, POWER CABINETS, AND INTERNAL EQUIPMENT INCLUDING BY NOT LIMITED TO RECTIFIERS, POWER DISTRIBUTION UNITS, BASE BAND UNITS, SURGE ARRESTORS, BATTERIES, AND SIMILAR EQUIPMENT FURNISHED BY THE COMPANY FOR INSTALLATION BY THE CONTRACTOR (OFCI).

B. CONTRACTOR SHALL PROVIDE AND INSTALL ALL MISCELLANEOUS MATERIALS AND PROVIDE ALL LABOR REQUIRED FOR INSTALLATION EQUIPMENT IN EXISTING CABINET OR NEW CABINET AS SHOWN ON DRAWINGS AND AS REQUIRE BY THE APPLICABLE INSTALLATION MOPS.

C. COMPLY WITH MANUFACTURERS INSTALLATION AND START-UP REQUIREMENTS.

SUPPORTING DEVICES:

A. MANUFACTURED STRUCTURAL SUPPORT MATERIALS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY THE FOLLOWING:

- 1. ALLIED TUBE AND CONDUIT
- 2. B-LINE SYSTEM
- 3. SUNISTRUT DIVERSIFIED PRODUCTS
- 4. THOMAS & BETTS

B. FASTENERS: TYPES, MATERIALS, AND CONSTRUCTION FEATURES AS FOLLOWS:

- 1. EXPANSION ANCHORS: CARBON STEEL WEDGE OR SLEEVE TYPE.
- 2. POWER-DRIVEN THREADED STUDS: HEAT-TREATED STEEL, DESIGNED SPECIFICALLY FOR THE INTENDED SERVICE.
- 3. FASTEN BY MEANS OF WOOD SCREWS ON WOOD.
- 4. TOGGLE BOLTS ON HOLLOW MASONRY UNITS.
- 5. CONCRETE INSERTS OF EXPANSION BOLTS ON CONCRETE OR SOLID MASONRY.
- 6. MACHINE SCREWS, WELDED THREADED STUDS, OR SPRING-TENSION CLAMPS ON STEEL.
- 7. EXPLOSIVE DEVICES FOR ATTACHING HANGERS TO STRUCTURE SHALL NOT BE PERMITTED.
- 8. DO NOT WELD CONDUIT, PIPE STRAPS, OR ITEMS OTHER THAN THREADED STUDS TO STEEL STRUCTURES.
- 9. IN PARTITIONS OF LIGHT STEEL CONSTRUCTION, USE SHEET METAL SCREWS.

SUPPORTING DEVICES:

- A. INSTALL SUPPORTING DEVICES TO FASTEN ELECTRICAL COMPONENTS SECURELY AND PERMANENTLY IN ACCORDANCE WITH NEC.
- B. COORDINATE WITH THE BUILDING STRUCTURAL SYSTEM AND WITH OTHER TRADES.
- C. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTING HARDWARE SECURELY TO THE STRUCTURE IN ACCORDANCE WITH THE FOLLOWING:
- D. ENSURE THAT THE LOAD APPLIED BY ANY FASTENER DOES NOT EXCEED 25 PERCENT OF THE PROOF TEST LOAD.
- E. USE VIBRATION AND SHOCK-RESISTANT FASTENERS FOR ATTACHMENTS TO CONCRETE SLABS.



DRAWN BY: MB

CHECKED BY: MM

B 11/30/2017 90% CD'S - REVISED

A 11/2/2017 90% CD'S FOR REVIEW

REV DATE DESCRIPTION

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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE

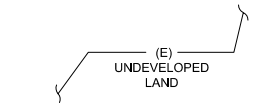
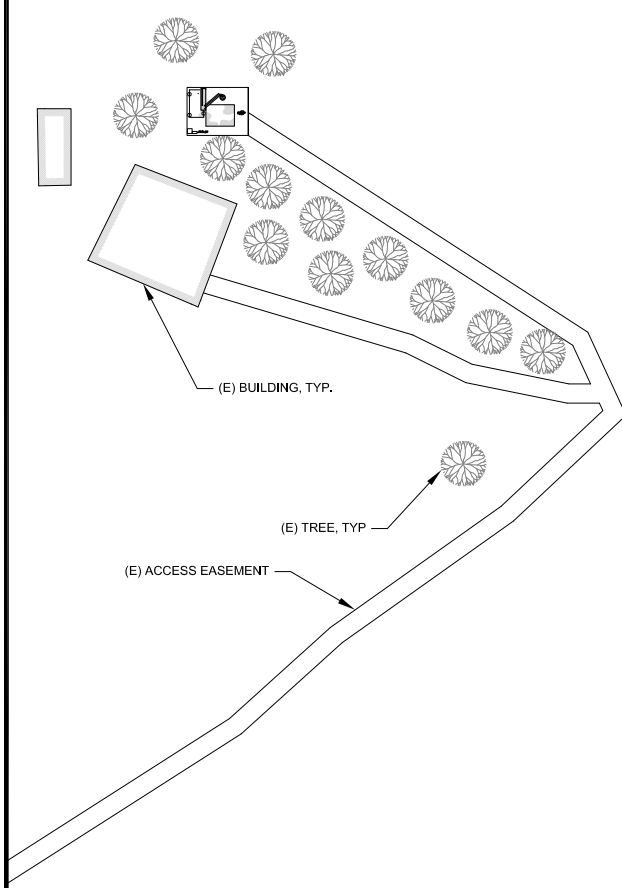
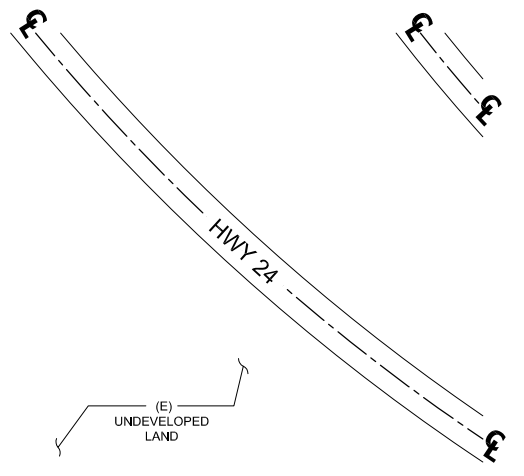
SITE PLAN

SHEET NUMBER

GN-1

- NOTES:**
1. THE WIRELESS COMMUNICATION FACILITY COMPLIES WITH FEDERAL STANDARDS FOR RADIO FREQUENCY IN ACCORDANCE WITH THE TELECOMMUNICATION ACT OF 1996 AND SUBSEQUENT AMENDMENTS AND ANY OTHER REQUIREMENTS IMPOSED BY STATE OR FEDERAL REGULATORY AGENCIES.
 2. NO EXISTING PARKING STALLS ARE BEING ADDED OR REMOVED AS PART OF THE NEW INSTALLATION.
 3. THESE DRAWINGS WERE PRODUCED WITHOUT THE BENEFIT OF A CURRENT LAND SURVEY. ALL PROPERTY LINES, EASEMENTS, SETBACKS, AND EXISTING CONDITIONS ARE APPROXIMATE AND SHALL BE VERIFIED PRIOR TO START OF CONSTRUCTION.
 4. NO GRADING WORK IS INCLUDED IN THIS SCOPE OF WORK ON THIS PAGE.

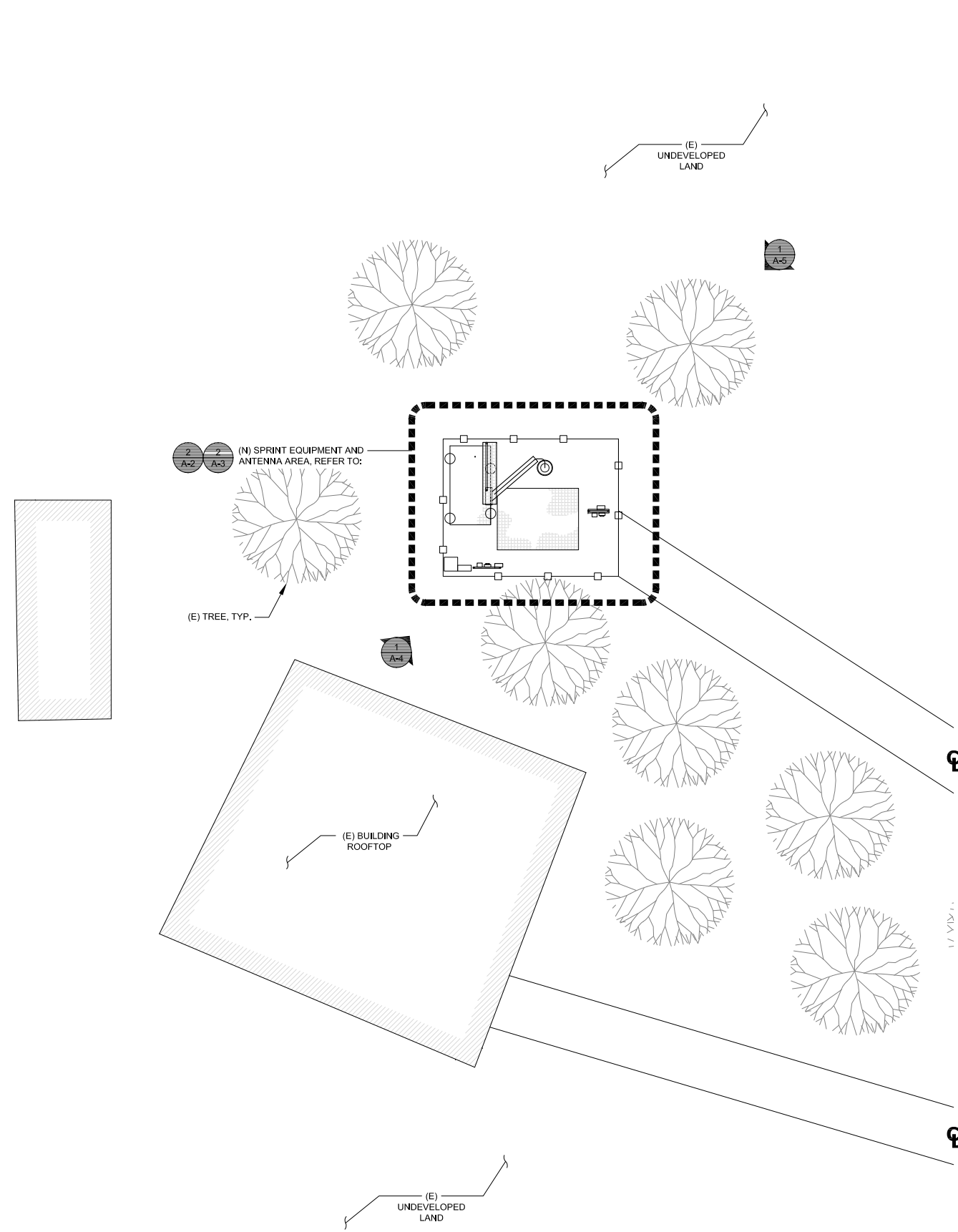
APN: 83264-00-018



24"x36" SCALE: 1" = 40'-0"
11"x17" SCALE: 1" = 80'-0"

SITE PLAN

1



24"x36" SCALE: 1" = 10'-0"
11"x17" SCALE: 1" = 20'-0"

ENLARGED SITE PLAN

2



M SQUARE
WIRELESS
1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-8824

DRAWN BY: MB
CHECKED BY: MM

REV	DATE	DESCRIPTION
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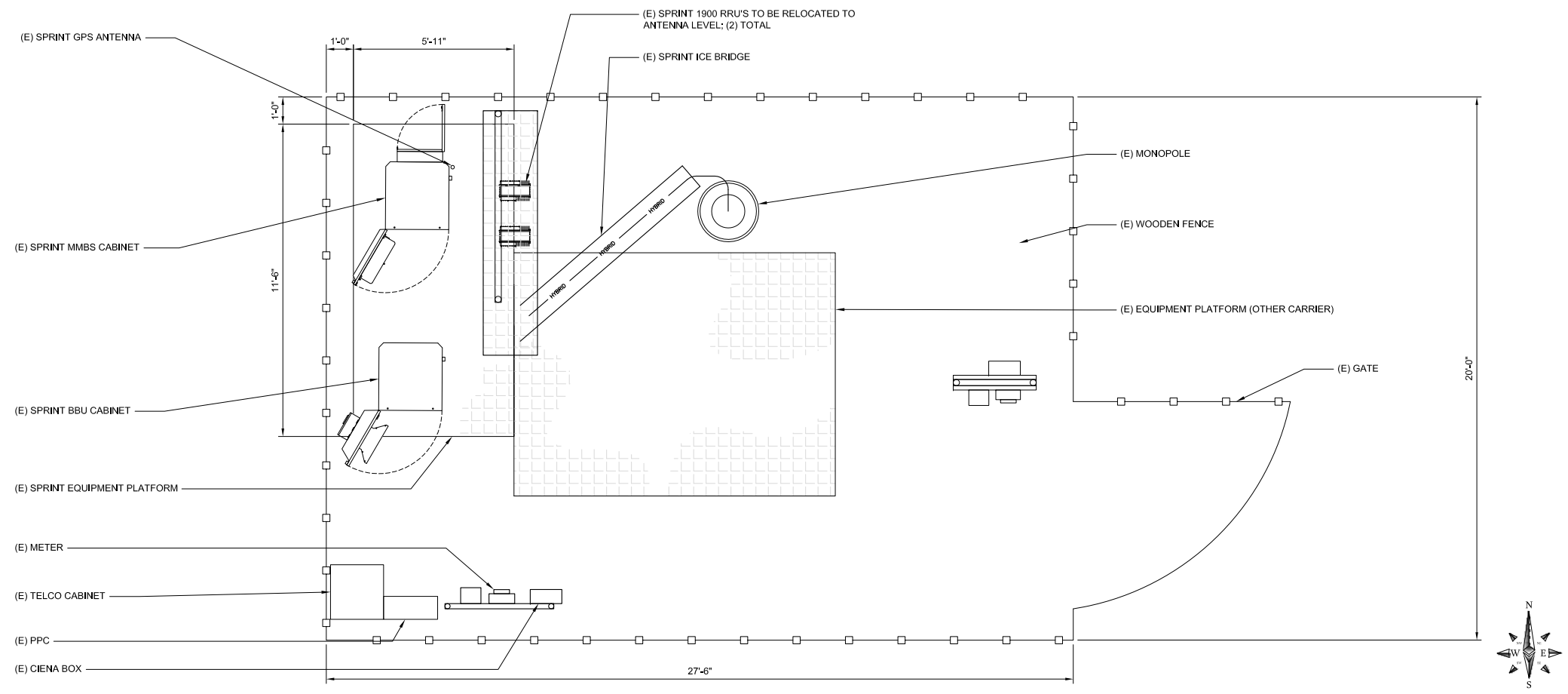
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DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
SITE PLAN

SHEET NUMBER
A-1

NOTE:
ANTENNAS NOT SHOWN FOR CLARITY.



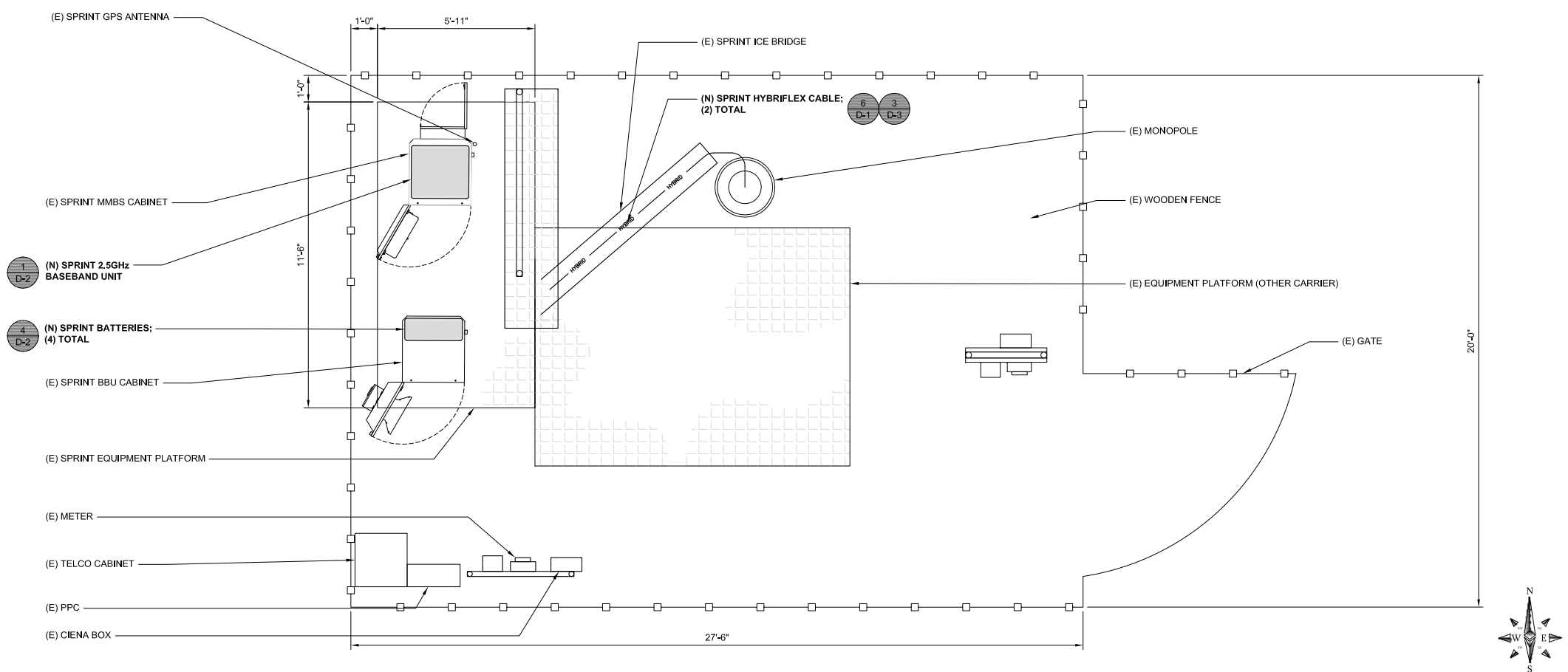
EXISTING EQUIPMENT LAYOUT

24"x36" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/4" = 1'-0"

0" 1' 2' 4'

1

NOTE:
ANTENNAS NOT SHOWN FOR CLARITY.



PROPOSED EQUIPMENT LAYOUT

24"x36" SCALE: 3/8" = 1'-0"
11"x17" SCALE: 3/4" = 1'-0"

0" 1' 2' 4'

2



M SQUARE
WIRELESS

1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-6824

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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
EQUIPMENT LAYOUT

SHEET NUMBER
A-2

NOTE:

- M. SQUARED ENGINEERS ACCEPTS NO LIABILITY FOR THE STRUCTURAL CAPACITY OF THE TOWER STRUCTURE, MOUNTS, ANTENNAS, CABLES OR ANY OTHER APPURTENANCE ON THE TOWER. THE CONTRACTOR AND SUBCONTRACTOR SHALL COORDINATE WITH AND COMPLY WITH THE PROVISIONS OF THE STRUCTURAL ANALYSIS PREPARED FOR THIS SITE AND PROJECT PRIOR TO THE INSTALLATION OF ANTENNAS AND CABLE ON THE TOWER, IMMEDIATELY REPORT ANY DISCREPANCIES BETWEEN THE CONSTRUCTION DRAWINGS AND THE STRUCTURAL ANALYSIS TO SPRINT. REFER TO THE STRUCTURAL ANALYSIS AND/OR STRUCTURAL LETTER FOR THE APPROVAL OF ALL MODIFICATIONS TO AND ADDING EQUIPMENT OF NEW TOWER APPURTENANCES.
- REFER TO ADDITIONAL DRAWINGS SPECIFIC TO TOWER REINFORCEMENT FOR THIS SITE SHOULD THERE BE A REQUIREMENT FOR ANY TOWER REINFORCEMENT.
- REFER TO STRUCTURAL ANALYSIS FOR COAXIAL AND OTHER CABLE SUPPORT AND CONFIGURATION DETAIL.
- REFER TO STRUCTURAL ANALYSIS FOR ALL CARRIERS APPURTENANCES AS THEY MAY NOT BE SHOWN IN ELEVATION DETAIL.

ANTENNA POSITION	REMOTE RADIO UNITS		DC CABLES	
	RRUS MAKE AND MODEL	RRUS COUNT	LENGTH	AWG
1	(N) 2500MHz RRU	1	±75'	--
2	(N) 800MHz RRU	1	±75'	--
3	(E)1900MHz RRU	1	±75'	--
4	--	--	--	--

NEW OPTIMAL ANTENNA REQUIREMENTS (VERIFY WITH CURRENT RFDS)			ANTENNA MAKE AND MODEL		RAD CENTER		AZIMUTH		TRANSMISSION LINE		
ANTENNA POSITION	TECHNOLOGY	ANTENNA COUNT	EXISTING	NEW	EXISTING	NEW	EXISTING	NEW	CABLE LENGTH	CABLE QTY.	FEEDER TYPE
1	800/1900MHz/2500MHz	1	GENERIC SPRINT ANTENNA	HPA65R-KE4A-K	58'-0"	58'-0"	320°	325°	±10'	10	JUMPERS
2	--	--	--	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--	--	--	--

NOTES TO CONTRACTOR:

- CONTRACTOR IS TO REFER TO SPRINT'S MOST CURRENT RADIO FREQUENCY DATA SHEET (RFDS) PRIOR TO CONSTRUCTION
- CABLE LENGTHS WERE DETERMINED BASED ON VISUAL INSPECTION DURING SITE-WALK. CONTRACTOR TO VERIFY ACTUAL LENGTH DURING PRE-CONSTRUCTION WALK
- CONTRACTOR TO VERIFY PORTS HAVE SUFFICIENT ROOM

NOTE:

- (E) ANTENNA AZIMUTHS ARE ESTIMATED AND ARE TO BE VERIFIED BY RF.
- ALL NEW FIBER/CABLE RUNS TO UTILIZE (E) CONDUIT PATHS PREVIOUSLY ESTABLISHED WITHIN A PRE-APPROVED ACCESS/UTILITY ROUTE.



M SQUARED WIRELESS
 1387 CALLE AVANZADO
 SAN CLEMENTE CA 92673 (949) 391-6824

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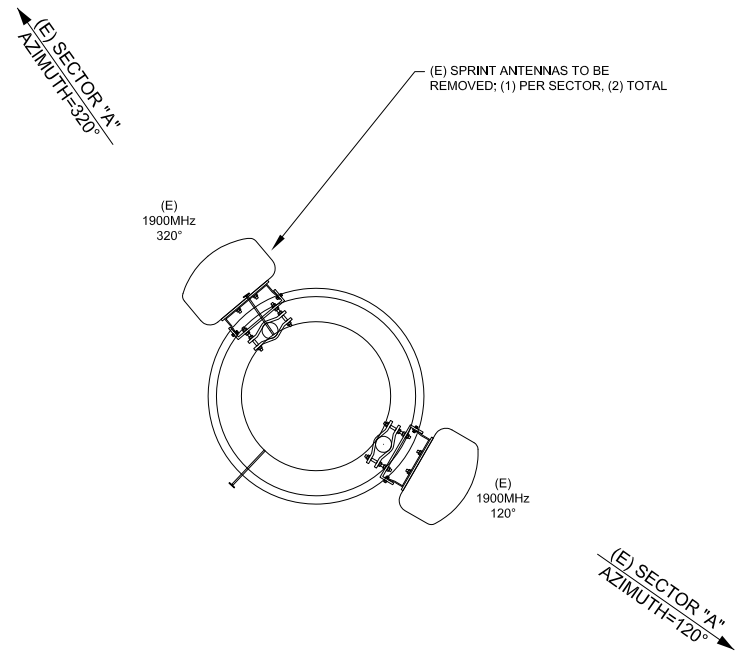
USWW MANITOU WATER
 DN14XC247
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 MONOPOLE

SHEET TITLE
ANTENNA LAYOUT

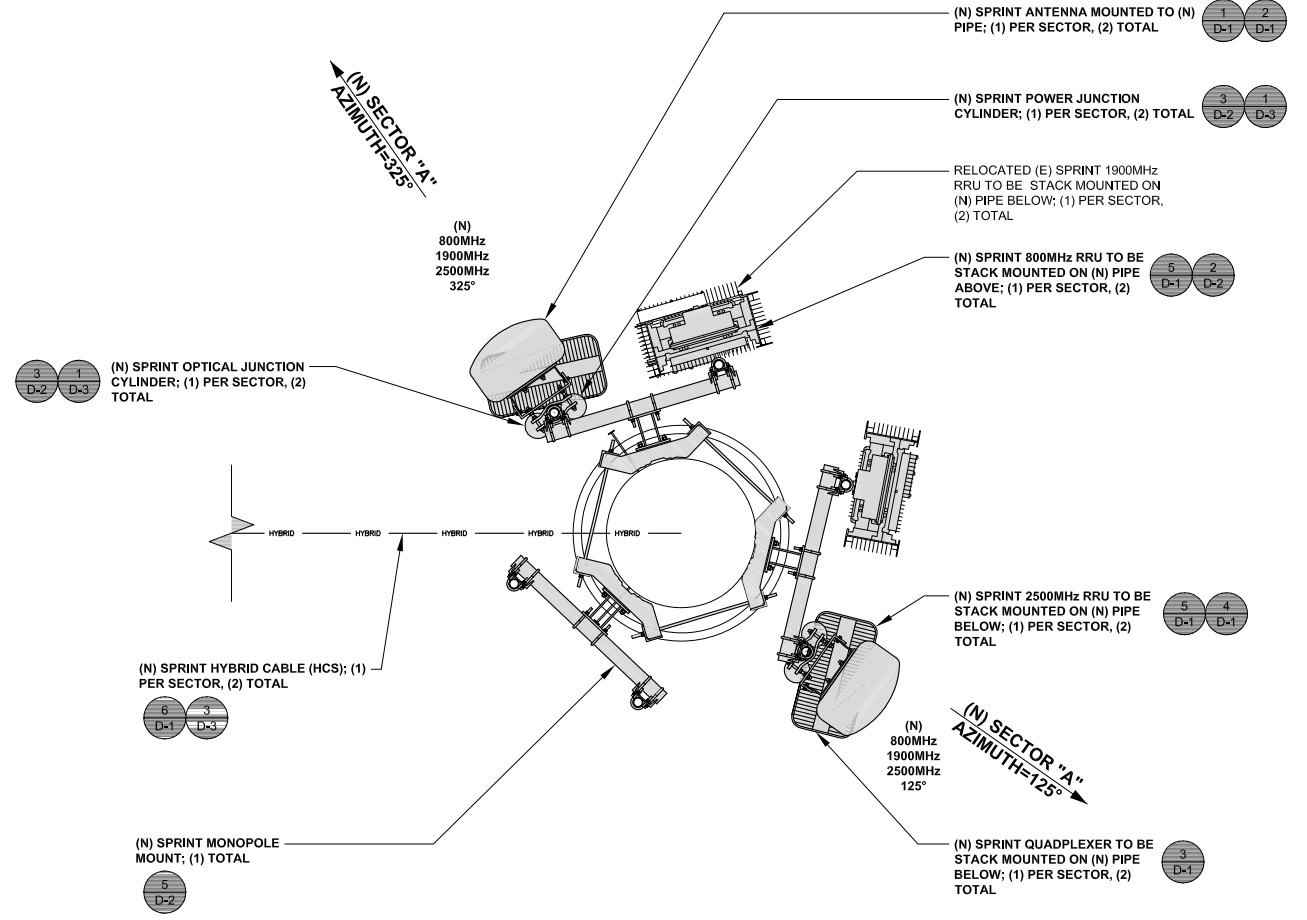
SHEET NUMBER
A-3

NOTES

NOTE:
 GROUND EQUIPMENT NOT SHOWN FOR CLARITY.



NOTE:
 GROUND EQUIPMENT NOT SHOWN FOR CLARITY.



EXISTING ANTENNA LAYOUT

24"x36" SCALE: 1" = 1'-0"
 11"x17" SCALE: 2" = 1'-0"

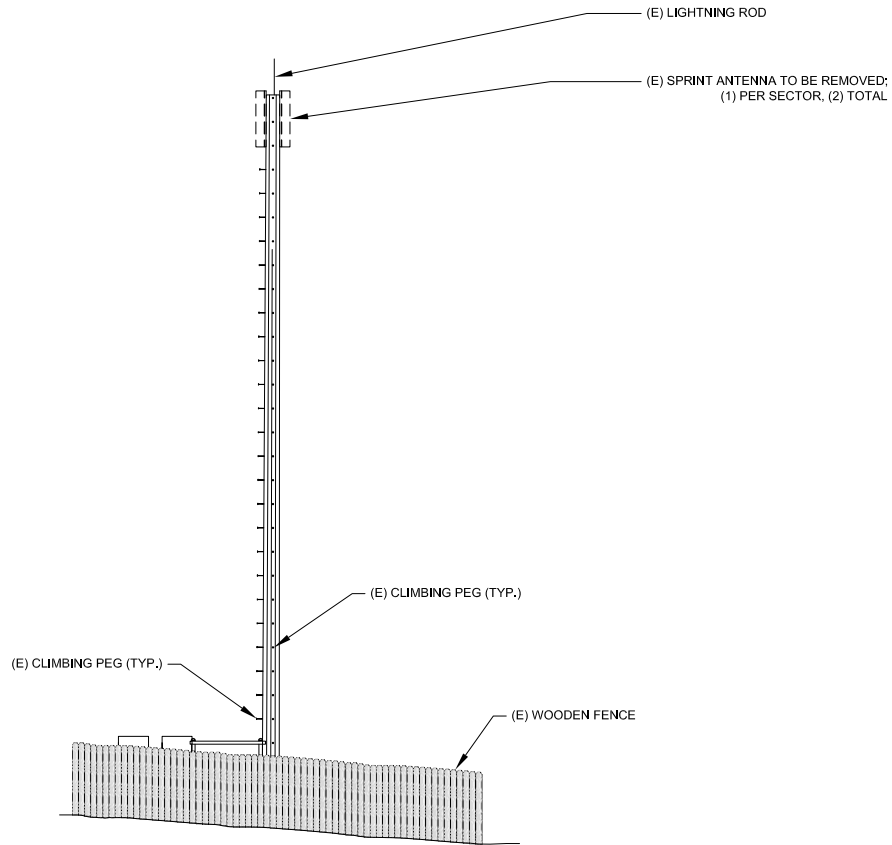
PROPOSED ANTENNA LAYOUT

24"x36" SCALE: 1/4" = 1'-0"
 11"x17" SCALE: 1/2" = 1'-0"

TOP OF (E) SPRINT PANEL ANTENNAS
ELEV. 60'-4" AGL

TOP OF (E) MONOPOLE
ELEV. 60'-0" AGL

RAD CENTER OF (E) SPRINT PANEL ANTENNAS
ELEV. 58'-0" AGL



(E) EQUIPMENT PLATFORM LEVEL
ELEV. ±1'-6" AGL

GROUND LEVEL
ELEV. 0'-0" AGL

EXISTING SOUTHWEST ELEVATION

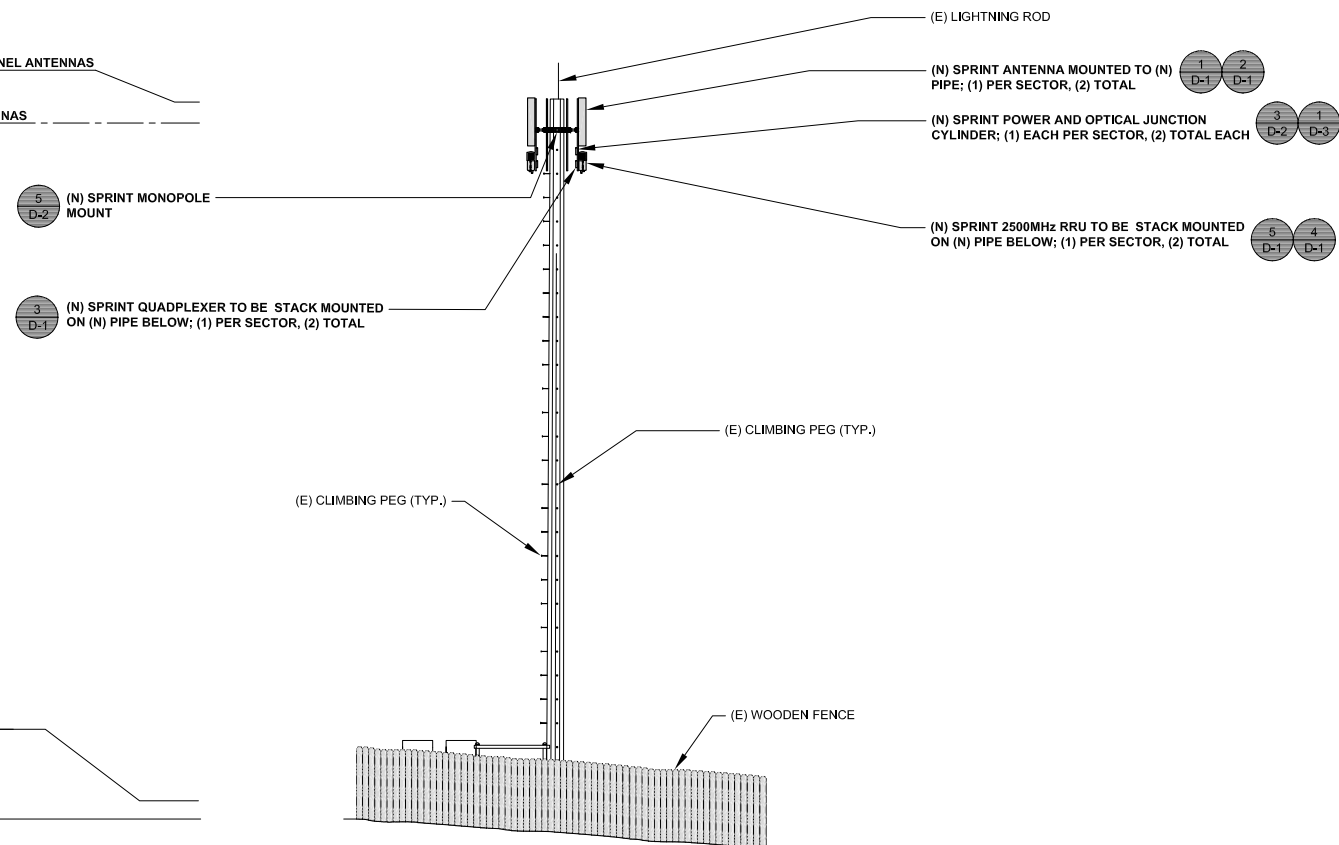
24"x36" SCALE: 1/8" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

0" 4' 8' 16'

1

TOP OF (E) MONOPOLE AND (N) SPRINT PANEL ANTENNAS
ELEV. 60'-0" AGL

RAD CENTER OF (N) SPRINT PANEL ANTENNAS
ELEV. 58'-0" AGL



(E) EQUIPMENT PLATFORM LEVEL
ELEV. ±1'-6" AGL

GROUND LEVEL
ELEV. 0'-0" AGL

PROPOSED SOUTHWEST ELEVATION

24"x36" SCALE: 1/8" = 1'-0"
11"x17" SCALE: 1/4" = 1'-0"

0" 4' 8' 16'

2



M SQUARE
WIRELESS

1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-8824

DRAWN BY: MB
CHECKED BY: MM

REV	DATE	DESCRIPTION
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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
ELEVATIONS

SHEET NUMBER
A-4



1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-6824

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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
COLOR CODING

SHEET NUMBER
A-5

Frequency / Radio	Indicator	ID
800 #1	Yellow	Green
1900 #1	Yellow	Red
1900 #2	Yellow	Brown
1900 #3	Yellow	Blue
1900 #4	Yellow	Grey
800 #2	Yellow	Orange
2500 #1	Yellow	White
2500 #2	Yellow	Purple

Sector	Cable	First Ring	Second Ring	Third Ring
1 Alpha	1	Green	No Tape	No Tape
1	2	Blue	No Tape	No Tape
1	3	Brown	No Tape	No Tape
1	4	White	No Tape	No Tape
1	5	Red	No Tape	No Tape
1	6	Grey	No Tape	No Tape
1	7	Purple	No Tape	No Tape
1	8	Orange	No Tape	No Tape
2 Beta	1	Green	Green	No Tape
2	2	Blue	Blue	No Tape
2	3	Brown	Brown	No Tape
2	4	White	White	No Tape
2	5	Red	Red	No Tape
2	6	Grey	Grey	No Tape
2	7	Purple	Purple	No Tape
2	8	Orange	Orange	No Tape
3 Gamma	1	Green	Green	Green
3	2	Blue	Blue	Blue
3	3	Brown	Brown	Brown
3	4	White	White	White
3	5	Red	Red	Red
3	6	Grey	Grey	Grey
3	7	Purple	Purple	Purple
3	8	Orange	Orange	Orange

TECHNOLOGY COLOR CODING

24"x36" SCALE: NTS
11"x17" SCALE: NTS **1**

2500MHz #1 Cal Cable - Sector	Cable	First Ring	Second Ring	Third Ring	Forth Ring	Fifth Ring	Sixth Ring
1 Alpha	1	Yellow		Yellow	White		
2 Beta	2	Yellow	Yellow		Yellow	White	
3 Gamma	3	Yellow	Yellow	Yellow		Yellow	White

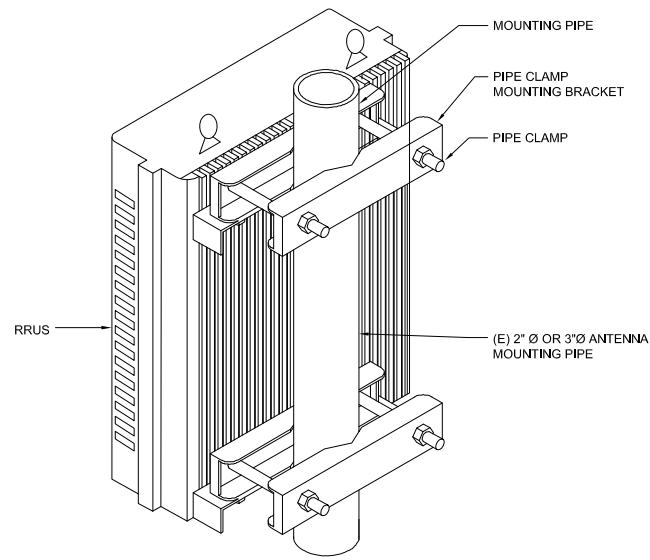
2500MHz #2 Cal Cable - Sector	Cable	First Ring	Second Ring	Third Ring	Forth Ring	Fifth Ring	Sixth Ring
1 Alpha	1	Yellow		Yellow	Purple		
2 Beta	2	Yellow	Yellow		Yellow	Purple	
3 Gamma	3	Yellow	Yellow	Yellow		Yellow	Purple

2500 MHz RADIO CALIBRATION CABLE COLOR CODING

24"x36" SCALE: NTS
11"x17" SCALE: NTS **2**

HYBRID CABLE COLOR CODING

24"x36" SCALE: NTS
11"x17" SCALE: NTS **3**

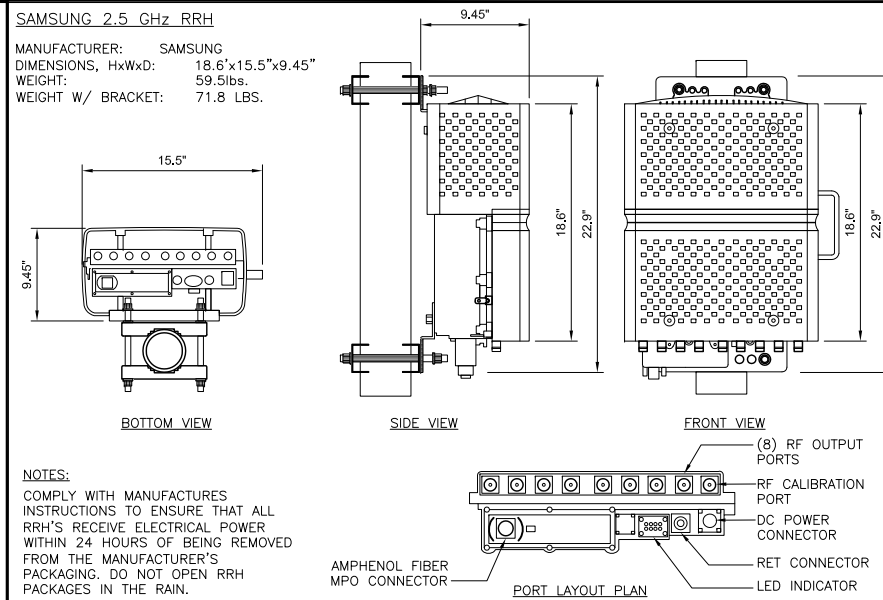


(N) AND (E) RRUS MOUNTING DETAIL

24"x36" SCALE: NTS
11"x17" SCALE: NTS

5

(N) 2500 MHZ RRU

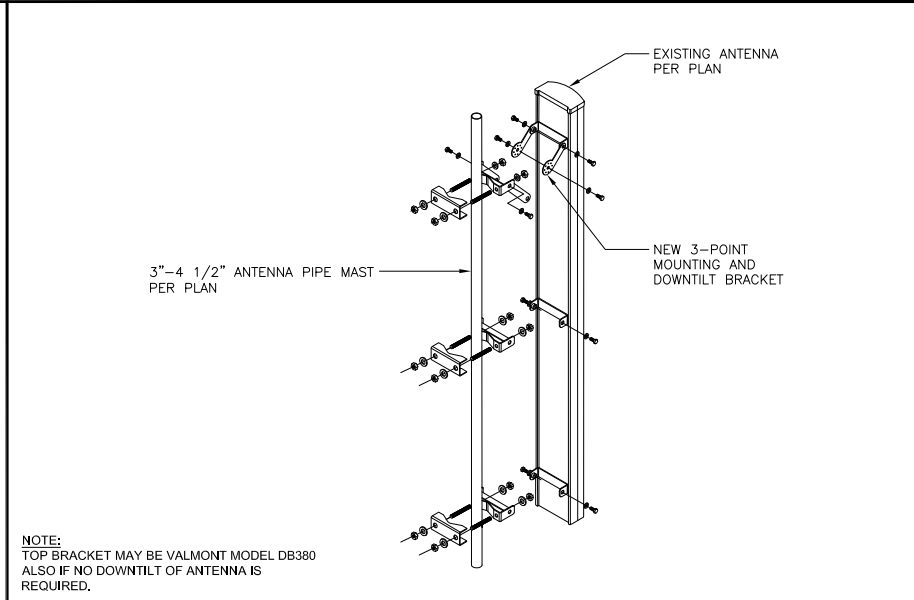


NOTES:
COMPLY WITH MANUFACTURER'S INSTRUCTIONS TO ENSURE THAT ALL RRU'S RECEIVE ELECTRICAL POWER WITHIN 24 HOURS OF BEING REMOVED FROM THE MANUFACTURER'S PACKAGING. DO NOT OPEN RRU PACKAGES IN THE RAIN.

24"x36" SCALE: NTS
11"x17" SCALE: NTS

4

(N) ANTENNA MOUNTING



NOTE:
TOP BRACKET MAY BE VALMONT MODEL DB380 ALSO IF NO DOWNTILT OF ANTENNA IS REQUIRED.

24"x36" SCALE: NTS
11"x17" SCALE: NTS

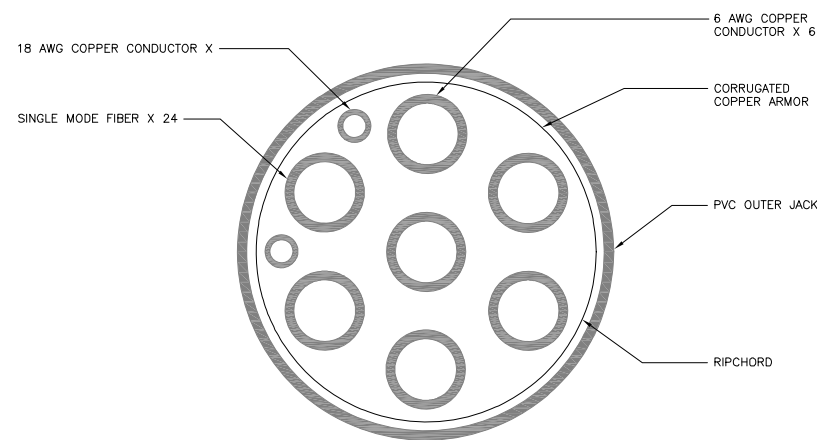
1

CABLE TYPE	NUMBER, SIZE (AWG)	6/C #6 + 2/C #18
VOLTAGE		600
OUTER JACKET		PVC
SHIELDING		CORRUGATED COPPER
MAX SHIELDING RESISTANCE (OHM/FT @ 20 C)		0.0035
DRAIN		N/A
RIPCHORD		KEVLAR
DC CONDUCTOR MATERIAL		COPPER
DC CONDUCTOR SIZE (AWG)		6
MAX DC RESISTANCE (OHM/1000FT)		0.411 @ 20° C
COLOR CODE		BLACK/RED
ALARM CONDUCTOR MATERIAL		COPPER
ALARM CONDUCTOR SIZE (AWG)		18
MAX DC RESISTANCE (OHM/1000FT)		6.7
COLOR CODE		TBD
FIBER CABLES		SM
OUTER DIAMETER (IN) - NOMINAL		1.24
WEIGHT (LB/FT)		1.05
MINIMUM BEND RADIUS (IN)		15
BEND MOMENT (LB/IN)		TBD
TENSIL STRENGTH (LB)		325
CRUST RESISTANCE, FOTP-41 (N/MM)		22
STRENGTH MEMBER		NO
OPERATING TEMPERATURE RANGE (LOW)		-40° C
OPERATING TEMPERATURE RANGE (HIGH)		+80° C
FIBER TYPE		LOW WATER PEAK SINGLE MODE LOOSE TUBE
FIBER STRAND COMPLIANCE		ITU-T REC. G.652.D, G657.A2
FIBER COATING DIAMETER (UM)		IEC 60793-2-50 TYPE B.1.3 & TYPE B.6 A&B
FIBER COUNT		.242 +/- 0.007MM 0.9+/- 0.005MM
NUMBER OF FIBER SUBUNITS		24
FIBER COUNT EACH UNITS		.1
FIBER COUNT JACKETS		24
FIBER COUNT JACKETS		FR JACKET
MAX ATTENUATION, 1310 NM (DB/KM)		LESS THAN EQUA 0.5
MAX ATTENUATION, 1550 NM (DB/KM)		LESS THAN EQUA 0.5

(N) HYBRID CABLE SPECIFICATIONS

24"x36" SCALE: NTS
11"x17" SCALE: NTS

6



NOTE: CABLE CROSS-SECTION NOT DRAWN TO SCALE

MANUFACTURER:		CCI	
MODEL NO.:		HPA65R-KE4A-K	
DIMENSIONS:		CONNECTOR TYPE:	TOTAL WEIGHT :
A	48"	(6) 7/16" DIN (FEMALE)	28.7 LBS
B	11.7"	CONNECTOR LOCATION:	
C	7.6"	BOTTOM	

(N) PANEL ANTENNA

MECHANICAL			
MODULARITY	QUAD		
WEIGHT W/ BRACKETS	14.4 LBS (6.6KG)		
	6.26X7.42X8.17 in. (159X188.5X207.4mm)		
ELECTRICAL			
RF PARAMETERS	PORTS	FREQUENCY(MHz)	SPECIFICATION
RETURN LOSS	COMMON	1695 - 2180	18 dB min, 20 dB typ.
	PCS/AWS	1695 - 2180	18 dB min, 20 dB typ.
	BRS	2496 - 2690	18 dB min, 20 dB typ.
INSERTION LOSS	COMMON TO PCS/AWS	1695 - 2180	0.2 dB typ, 0.25dBmax
	COMMON TO BRS	2496 - 2690	0.2 dB typ, 0.25dBmax
REJECTION	COMMON TO PCS/AWS	2496 - 2690	50 dB mini
	COMMON TO BRS	1695 - 2180	50 dB mini
ISOLATION	PCS/AWS TO BRS	1695 - 2180	50 dB mini
	BRS TO PCS/AWS	2496 - 2690	50 dB mini
GENERAL CHARACTERISTICS			
General Impedance	50 ohms		
Cont. Average PWR	250 W max (input ports), 500 W maximum (Common port)		
Peak Envelope PWR	1 kW max (input ports), 3 kW maximum (Common port)		
Intermodulation	<-117 dBm (-160 dBc) at 2 x +43 dBm tones all bands		

(N) QUADPLEXER DPO-7126Y-0X1

24"x36" SCALE: NTS
11"x17" SCALE: NTS

3



1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY: MB
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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
EQUIPMENT DETAILS

SHEET NUMBER
D-1

DRAWN BY: MB
CHECKED BY: MM

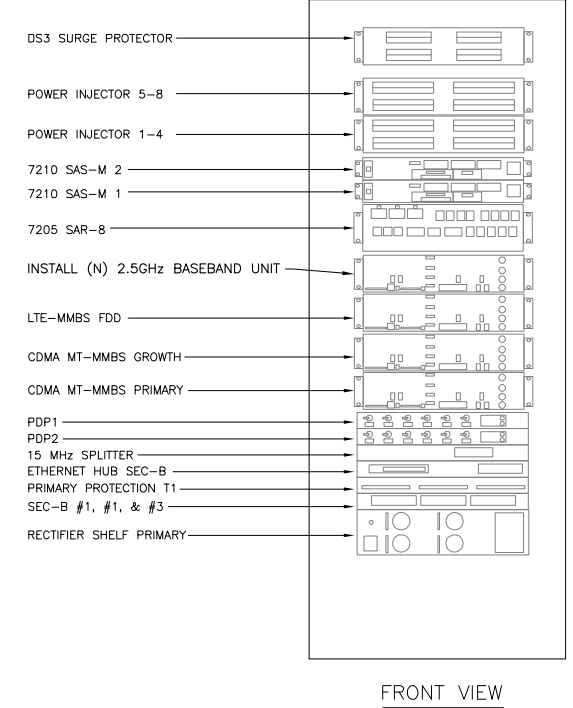
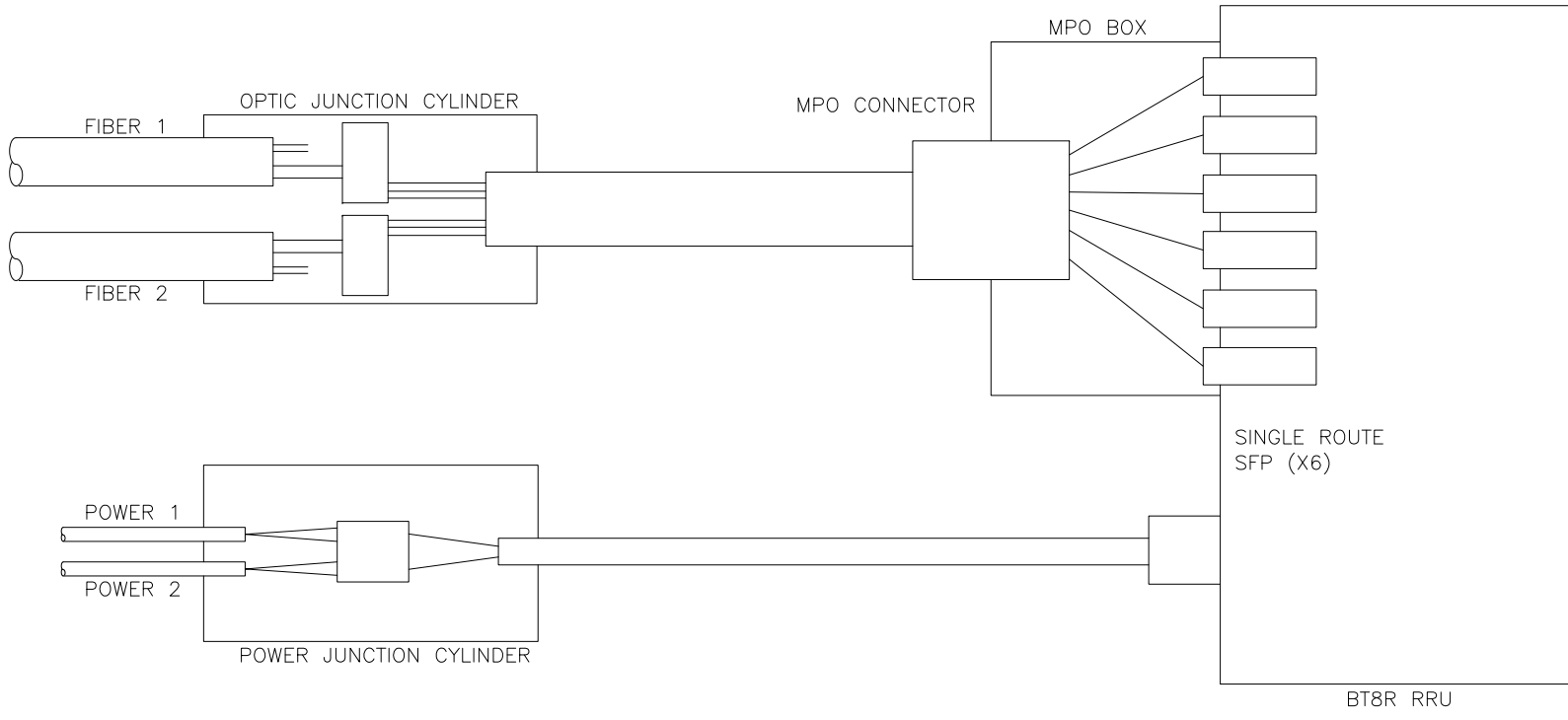
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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
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MONOPOLE

SHEET TITLE
DETAILS

SHEET NUMBER
D-2



(N) POWER & OPTIC CYLINDER SCHEMATIC DETAIL

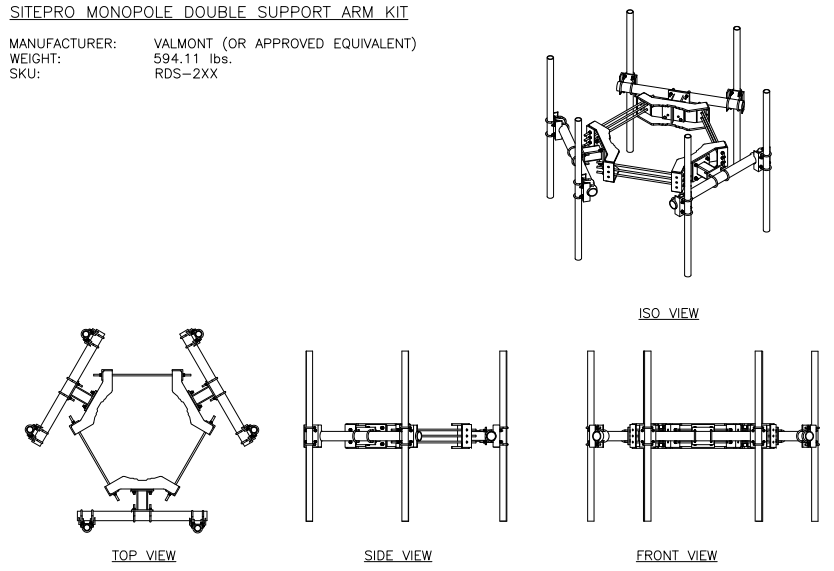
24"x36" SCALE: NTS
11"x17" SCALE: NTS

3

(E) MMBS CABINET

24"x36" SCALE: NTS
11"x17" SCALE: NTS

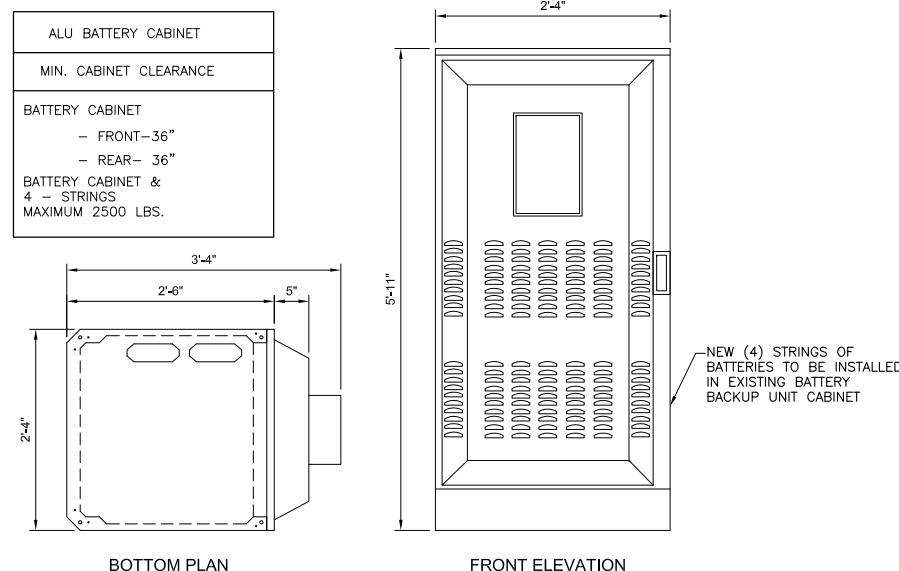
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(N) MONOPOLE MOUNT

24"x36" SCALE: NTS
11"x17" SCALE: NTS

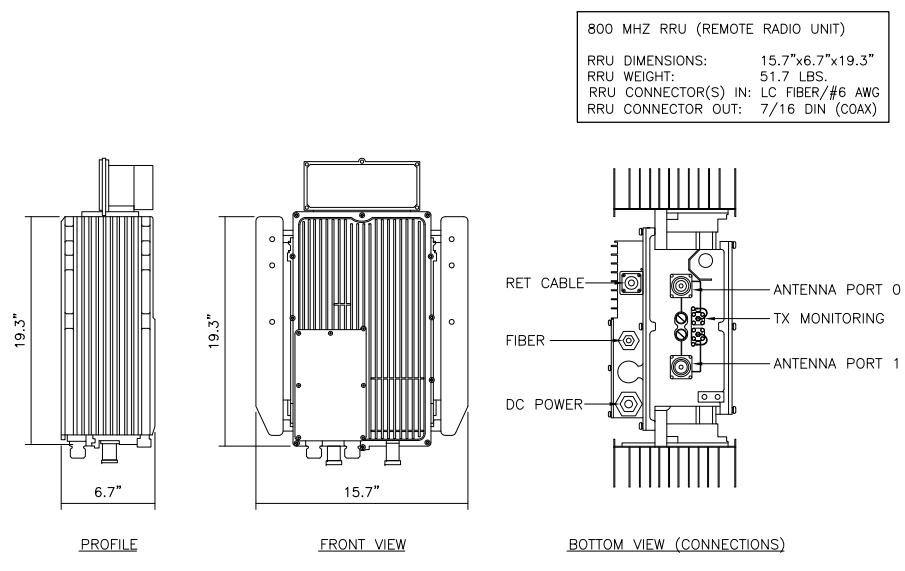
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(E) BATTERY BACKUP UNIT CABINET

24"x36" SCALE: NTS
11"x17" SCALE: NTS

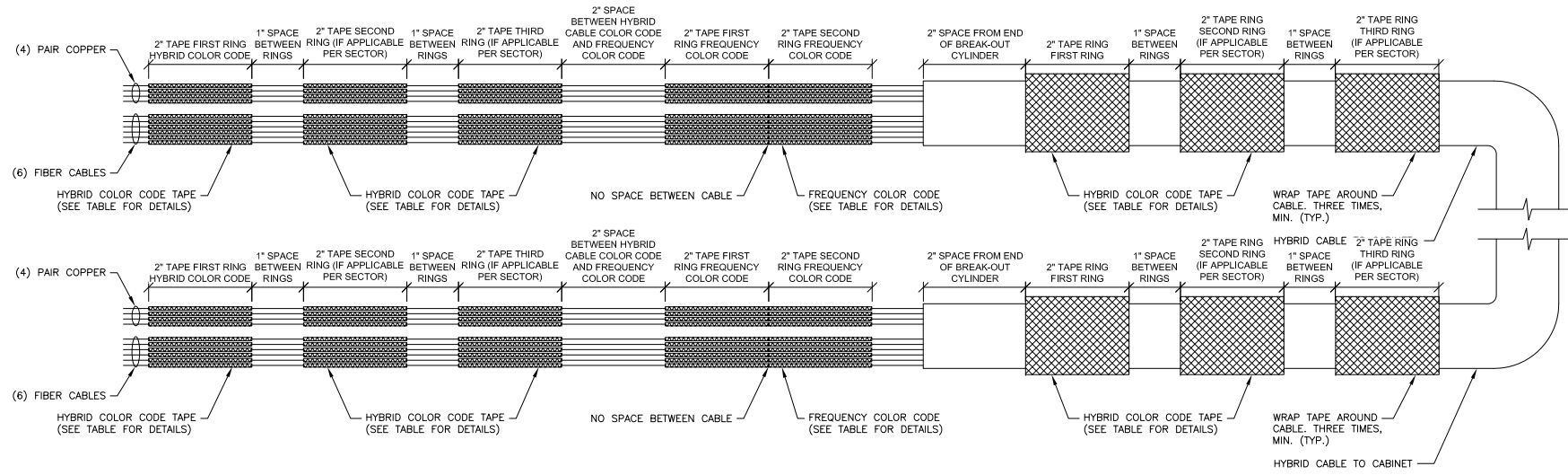
4



(N) 800MHz RRU

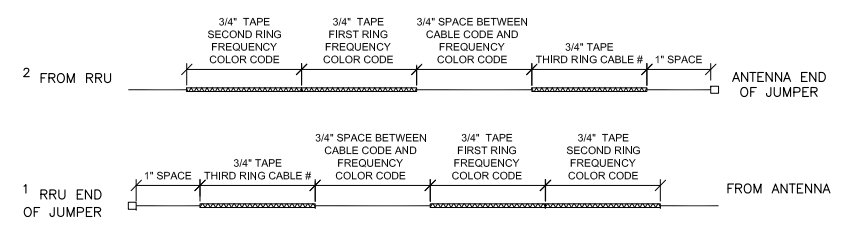
24"x36" SCALE: NTS
11"x17" SCALE: NTS

2

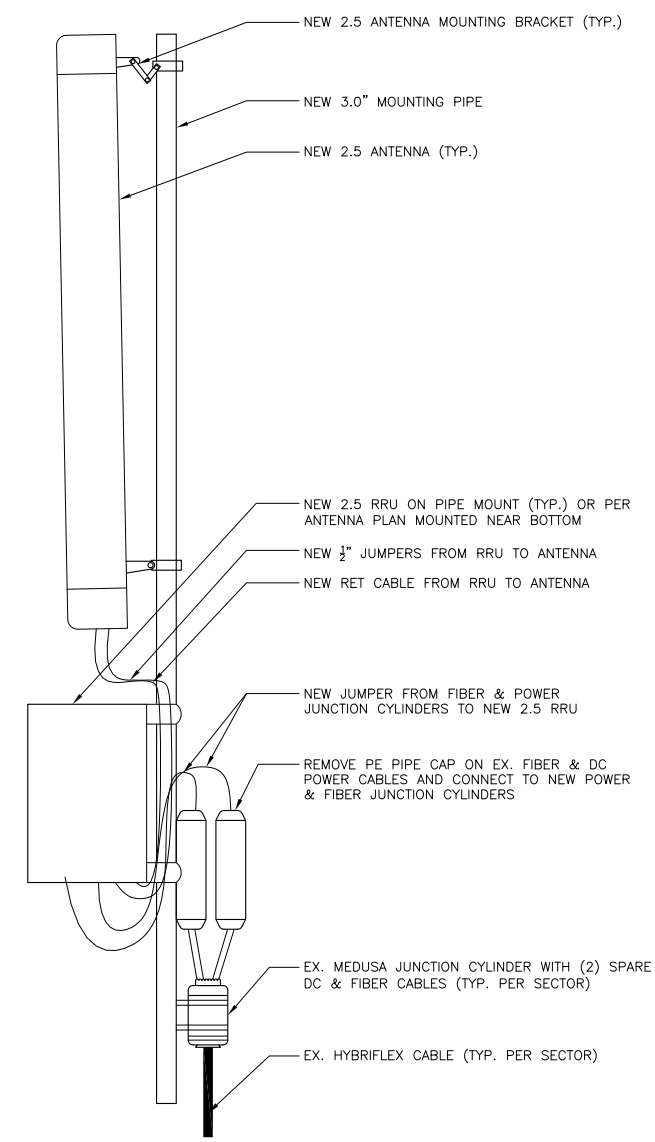


HYBRID CABLE CONNECTION AT CABINET

- NOTES:**
1. ALL CABLES SHALL BE MARKED AT THE TOP AND BOTTOM WITH 2" COLORED TAPE OR STENCIL TAG. COLOR TAPE SHALL BE OBTAINED FROM GRAYBAR ELECTRIC.
 2. THE FIRST RING SHALL BE CLOSEST TO THE END OF THE CABLE AND SPACED APPROXIMATELY 2" FROM AN END CONNECTOR, WEATHERPROOFING, OR BREAK-OUT CYLINDER, WITH 1" SPACE BETWEEN EACH RING.
 3. THE HYBRID CABLE COLOR SHALL BE APPLIED IN ACCORDANCE WITH THE "TYPICAL HYBRID CABLE COLOR CODE" TABLE BELOW FOR THE RESPECTIVE SECTOR.
 4. INDIVIDUAL POWER PAIRS AND FIBER CABLES SHALL BE LABELED WITH BOTH THE HYBRID CABLE COLOR FOR THE RESPECTIVE SECTOR AND A FREQUENCY COLOR CODE IN ACCORDANCE WITH THE "FREQUENCY COLOR CODE FOR PAIRS AND FIBER CABLES OF HYBRID CABLE" TABLE.
 5. A 2" GAP SHALL SEPARATE THE HYBRID CABLE COLOR CODE FROM THE FREQUENCY COLOR CODE.
 6. THE 2" COLOR RINGS FOR THE FREQUENCY CODE SHALL BE PLACED NEXT TO EACH OTHER WITH NO SPACES.
 7. THE 2" COLORED TAPE(S) SHALL EACH BE WRAPPED A MINIMUM OF 3 TIMES AROUND THE HYBRID CABLE OR INDIVIDUAL CABLES, AND THE TAPE SHALL BE KEPT IN THE SAME LOCATION AS MUCH AS POSSIBLE.
 8. COLOR BAND ON JUMPERS SHALL BE 2" WIDE WITH A 2" SPACE.



JUMPER CABLE CONNECTION AT RRU AND ANTENNA

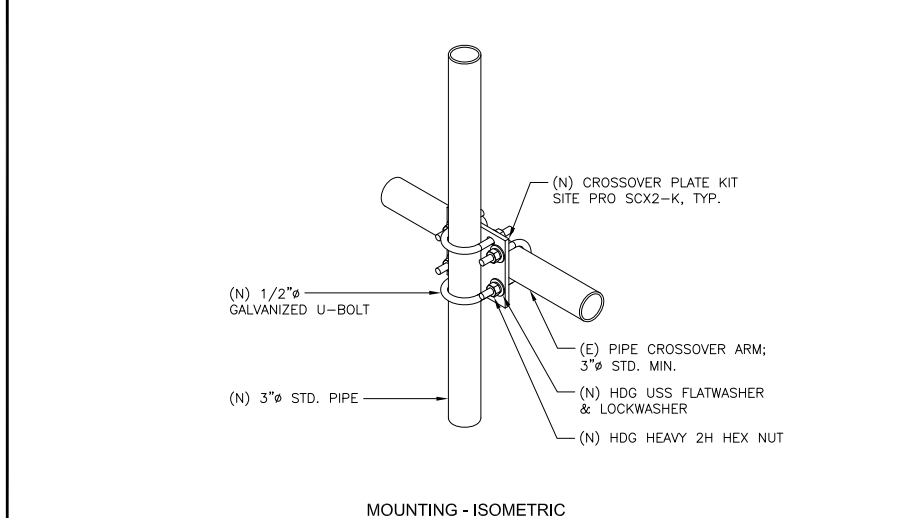


(N) HYBRID CABLE COLOR SCHEME DETAIL

	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 5	TYPE 6	TYPE 7
TOTAL LENGTH	~35 M (114.8')	~55 M (114.8')	~65 M (213.3')	~80 M (262.5')	~100 M (328.1')	~120 M (420.0')	~160 M (550.0')
HYBRID POWER CABLE CONFIGURATION	AWG 10 1 PAIR, AWG 12 3 PAIR	AWG 8 1 PAIR, AWG 10 3 PAIR	AWG 6 1 PAIR, AWG 8 1 PAIR, AWG 10 2 PAIR	AWG 6 PAIR, AWG 8 3 PAIR	AWG 4 1 PAIR, AWG 6 1 PAIR, AWG 8 2 PAIR	AWG 6 1 PAIR, AWG 8 3 PAIR	AWG 2 1 PAIR, AWG 4 3 PAIR
CABLE Ø	25MM (0.98")	27MM (1.06")	30MM (1.18")	30/32MM (1.18"/1.25")	39.2MM (1.25")	39.2MM (1.56")	43.5MM (1.69")
BEND RADIUS	11.81"	12.99"	15.35"	17.71"	17.71"	18.00"/30.00"	21.00"/35.00"
OPTIC CABLE	LC/PC-TO-LC/PC, SINGLE MODE						
DU CABINET (POWER CABLE TERMINAL MAX SIZE AWG 4)	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE						
RRU POWER CABLE SPEC	AWG 8, 14.7~15.4MM (0.57"-0.60") / AWG 10, 11.5~12.4MM (0.45"-0.48")					8 AWG CABLES 4 PAIRS	
NON-USE POWER AND OPTIC CABLE PROTECTION	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE	2 PAIR POWER AND OPTIC CABLE WITH PE PIPE
SAMSUNG FIBER	0.5LBS/LF	0.6LBS/LF	0.8LBS/LF	0.9LBS/LF	1.1LBS/LF	N/A	N/A
ASIA TAI	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	0.7LBS/LF	N/A	N/A
TESCO	N/A	N/A	N/A	N/A	N/A	1.6LBS/LF	2.2LBS/LF

(N) HYBRID CABLE TYPE

3 2.5 ANTENNA/RRU CONNECTIONS, TYP.



5 CROSSOVER MOUNTING KIT

4 NOT USED



2 NOT USED



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REV	DATE	DESCRIPTION
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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
DETAILS

SHEET NUMBER
D-3

GENERAL ELECTRICAL NOTES

1. SUBMITTAL OF BIO INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PREFORMED UNDER THIS CONTRACT.
2. CONTRACTOR SHALL PERFORM ALL FIELD VERIFICATION AND EXAMINATION WORK PRIOR TO THE ORDERING OF THE ELECTRICAL EQUIPMENT AND THE ACTUAL CONSTRUCTION. CONTRACTOR SHALL ISSUE A WRITTEN NOTICE OF ALL FINDINGS TO THE ENGINEER AND OWNER LISTING ALL MALFUNCTIONS, FAULTY, EQUIPMENT, AND DISCREPANCIES.
3. THESE PLANS ARE SCHEMATIC ONLY; CONTRACTOR SHALL FOLLOW AS CLOSELY AS POSSIBLE.
4. ANTENNA MOUNTING HEIGHTS AND AZIMUTHS SHALL BE VERIFIED WITH OWNER PRIOR TO INSTALLATION.
5. CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, ETC., FOR A COMPLETE AND PROPERLY OPERATIVE SYSTEM ENERGIZED THROUGHOUT AND AS INDICATED ON DRAWINGS, AS SPECIFIED HEREIN AND/OR AS OTHERWISE INDICATED. NOTE THAT CONTRACTOR SHALL SECURE ALL NECESSARY ELECTRICAL PERMITS, AND PAY ALL REQUIRED FEES.
6. IF REQUIRED, CONTRACTOR SHALL COORDINATE WITH LOCAL UTILITY COMPANY FOR CONNECTION OF TEMPORARY AND PERMANENT POWER TO THE SITE. THE TEMPORARY POWER AND ALL HOOK-UP COSTS SHALL BE PAID BY THE CONTRACTOR.
7. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND IN PERFECT CONDITION WHEN INSTALLED AND SHALL BE OF THE BEST GRADE AND OF THE SAME MANUFACTURER THROUGHOUT FOR EACH CLASS OR GROUP OF EQUIPMENT. EXCEPTIONS TO THIS MAY BE PERMITTED IF NEW REPLACEMENT BREAKERS OR SWITCHES ARE NOT AVAILABLE FOR ORIGINAL ELECTRICAL DISTRIBUTION EQUIPMENT -- ON THAT CASE, RECONDITIONED EQUIPMENT MAY BE PERMISSIBLE IF IT CARRIES ONE (1) YEAR WARRANTY. MATERIALS SHALL BE LISTED AND APPROVED BY UNDERWRITER'S LABORATORY AND SHALL BEAR THE INSPECTION LABEL "J" WHERE SUBJECT TO SUCK APPROVAL. Materials SHALL MEET WITH APPROVAL OF THE DIVISION OF INDUSTRIAL SAFETY AND ALL GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY ANSI, NEMA, AND NBFU.
8. IF CONTRACTOR IS PROPOSING ALTERNATE MATERIALS OR CONSTRUCTION METHODS FROM WHAT IS SPECIFIED IN THE PLANS, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND/OR CATALOG CUT-SHEETS TO OWNER FOR APPROVAL PRIOR TO COMMENCEMENT OF THE WORK.
9. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH CURRENT NATIONAL CODES AND ALL LOCAL AND STATE CODES, LAWS, AND ORDINANCES. PROVIDE ALL COMPONENTS AND WIRING SIZES AS REQUIRED TO MEET NEC.
10. EACH CONDUCTOR OF EVERY SYSTEM SHALL BE PERMANENTLY TAGGED IN EACH PANELBOARD, PULLBOX, J-BOX, SWITCH BOX, ETC., IN COMPLIANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (O.S.H.A.) REQUIREMENTS.
11. COMPLETE JOB SHALL BE GUARANTEED FOR A PERIOD OF ONE (1) YEAR AFTER THE DATE OF JOB ACCEPTANCE BY OWNER. ANY WORK, MATERIAL OR EQUIPMENT FOUND TO BE FAULTY DURING THAT PERIOD SHALL BE CORRECTED AT ONCE, UPON WRITTEN NOTIFICATION, AT THE EXPENSE OF THE CONTRACTOR.
12. CLEAN WORK SITE DAILY, AND REMOVE ALL DEBRIS RESULTING FROM CONSTRUCTION. LEAVE JOB SITE IN A TIDY AND UNDAMAGED CONDITION.
13. UPON COMPLETION OF WORK, PERFORM CONTINUITY, SHORT CIRCUIT, AND GROUNDING TEST. GROUNDING SYSTEM SHALL BE TESTED BY INDEPENDENT TESTING AGENCY, WITH WRITTEN REPORT SUBMITTED TO THE OWNER FOR REVIEW AND APPROVAL. AFTER APPROVAL, FURNISH ONE COPY OF REPORT TO ENGINEER.
14. PROVIDE OWNER WITH ONE SET OF COMPLETE ELECTRICAL "AS BUILT" DRAWINGS AT THE COMPLETION OF THE JOB, SHOWING ACTUAL EQUIPMENT LOCATIONS, CONDUIT/CABLE ROUTING, PANEL SCHEDULE, AND OTHER DETAILS WITHIN 10 DAYS OF PROJECT COMPLETION. DATE OF JOB COMPLETION SHALL BE THE DATE ON THE CONTRACTOR'S "NOTICE OF COMPLETION" SUBMITTED TO THE OWNER, AFTER SITE INSPECTION AND SIGNOFF BY OWNER.
15. ALL BROCHURES, OPERATING MANUAL, CATALOGS, SHOP DRAWINGS, ETC. SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION.
16. ALL CIRCUIT BREAKERS, FUSES AND ELECTRICAL EQUIPMENT SHALL HAVE AN INTERRUPTING RATING NOT LESS THAN THE MAXIMUM SHORT CIRCUIT CURRENT TO WHICH THEY MAY BE SUBJECTED, AND A MINIMUM OF 10,000 A.I.C.
17. PATCH, REPAIR AND PAINT ANY AREA THAT HAS BEEN DAMAGED IN THE COURSE OF THE ELECTRICAL WORK.

18. IN DRILLING HOLES INTO CONCRETE WHETHER FOR FASTENING OR ANCHORING PURPOSED THORUGH THE FLOOR OR WALLS FOR CONDUIT RUNS, PIPE RUNS, ETC., IT MUST CLEARLY UNDERSTOOD THAT TENDONS AND/OR REINFORCING STEEL WILL NOT BE DRILLED INTO, CUT, OR DAMAGED UNDER ANY CIRCUMSTANCES.
19. EXACT LOCATION OF TENDONS AND/OR REINFORCING STEEL ARE NOT KNOWN AND THEREFORE MUST BE SEARCHED FOR BY APPROPRIATE METHODS, SUCH AS X-RAY EQUIPMENT OR OTHER DEVICES THAT CAN ACCURATELY LOCATE THE REINFORCING AND/OR STEEL TENDONS.
20. ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WITH SUITABLE WEATHERPROOF SEALANT. PENETRATIONS IN FIRE RATED WALLS SHALL BE FIRE STOPPED IN ACCORDANCE WITH CURRENT LOCAL BUILDING CODES USING U.L. RATED MATERIALS.
21. ALL CONDUCTORS SHALL BE COPPER, #12 AWG MINIMUM. UNLESS NOTED OTHERWISE, INSULATION SHALL BE 90°C RATED, AND DUAL RATED THHN/THWN-2. NO BX OR ROMEX CABLE IS PERMITTED UNLESS SPECIFICALLY NOTED OTHERWISE ON DRAWINGS.
22. ALL CONDUIT ONLY (C.O.) RUNS SHALL HAVE A PULL WIRE OR ROPE, AND TRUE TAPE.
23. GROUND THE ENTIRE ELECTRICAL SYSTEM IN ACCORDANCE WITH THE NEC AND DRAWINGS. BELOW GRADE GROUND CONDUCTORS SHALL BE #2 AWG SOLID BARE TINTED COPPER. ABOVE GRADE, ALL CONDUCTORS SHALL BE STRANDED GREEN INSULATED COOPER, SEIZED #2 AWG OR AS SHOWN IN THE DRAWINGS. GROUND CONDUCTOR SHALL HAVE A MINIMUM 24" BENDING RADIUS. GROUND RODS SHALL BE COPPER CLAD STEEL, 5/8" ROUND AND 8' LONG. GROUNDING HARDWARE SHALL BE ERICO, STORM COPPER COMPONENTS, FUSHI COPPERWELD OR APPROVED EQUAL.
24. GROUND ALL ANTENNA BASES, ENCLOSURES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO THE BUS BARS. FOLLOW EQUIPMENT MANUFACTURER'S RECOMMENDATIONS FOR GROUNDING. GROUND COAX SHIELD AT BOTH ENDS USING CABLE MANUFACTURER'S RECOMMENDATIONS.
25. THE NUMBER OF GROUNDING BARS MAY VARY DEPENDING UPON THE SITE LAYOUT, ANTENNA LOCATION, AND OTHER FACTORS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING SUFFICIENT GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.
26. EXOTHERMIC WELDS SHALL INCLUDE ALL CABLE TO CABLE, SPLICES, CABLE TO GROUND RODS, GROUND ROD SPLICES AND OTHER SYSTEMS AS INDICATED. ALL MATERIALS USED (MOLDS, WELDING, METAL, ETC.) SHALL BE INSTALLED PER MANUFACTURERS' RECOMMENDATIONS AND PROCEDURES. ALL EXOTHERMIC WELD CONNECTIONS ON GALVANIZED SURFACES SHALL BE CLEANED THOROUGHLY AND COLORED TO MATCH SURFACE WITH (2) TWO COATS OF GALVITE (WHITE) PAINT OR SILVERBRITE (ALUMINUM).
27. ALL STRANDED COPPER WITH GREEN INSULATION TO BE ATTACHED WITH CRIMPED DOUBLE LUG, ATTACHED WITH NUTS, BOLTS AND STAR WASHERS TYPICAL. ALL MECHANICAL CONNECTIONS SHALL HAVE ANTI-OXIDANT GREASE (E.G. NO-OX) APPLIED BETWEEN LUG AND BUS BAR.
28. ALL EXPOSED TINNED COPPER GROUNDS SHALL BE PROTECTED BY 1/2" PVC CONDUIT AND SECURED. WHERE SUBJECT TO MECHANICAL DAMAGE, OTHER GROUND LEADS SHALL ALSO BE ENCLOSED IN 1/2" OR 3/4" LTFC.
29. COMPRESSION FITNESS TO BE USED ON ALL CONDUITS (NO SETSCREWS).
30. PVC CONDUIT INSTALLED IN OUTDOOR LOCATIONS SUBJECT TO SUNLIGHT EXPOSURE SHALL BE UV RESISTANT. SURFACE-MOUNTED CONDUIT INSTALLED IN LOCATIONS SUBJECT TO FOOT TRAFFIC OR OTHER WEAR AND TEAR, SHALL BE PVC SCHEDULE 80, IMC, OR GRC. CONDUIT RUNS ALONG WALLS OR FLOORS SHALL BE SURFACE MOUNTED UNLESS SPECIFICALLY NOTED OTHERWISE ON THE PLANS. OTHER CONDUIT REQUIREMENTS:
 - 30.a. INTERMEDIATE METALLIC CONDUIT (IMC) SHALL HAVE U.L. LABEL. FITTINGS SHALL BE WATERTIGHT COMPRESSION TYPE. IMC SHALL BE USED FOR OUTDOOR RUNS, IMC IN CONTACT WITH EARTH SHALL BE 1/2 LAPPED WRAPPED WITH HUNTS WRAP PROCESS NO. 3
 - 30.b. ELECTRICAL METALLIC TUBING (EMT) SHALL HAVE U.L. LABEL. FITTINGS SHALL BE GLAND RING COMPRESSION TYPE. EMT SHALL BE USED ONLY FOR INTERIOR RUNS.
 - 30.c. FLEXIBLE METALLIC CONDUIT SHALL HAVE U.L. LISTED LABEL AND MAY BE USED WHERE PERMITTED BY CODE. FITTINGS SHALL BE "JAKE" OR "SQUEEZE" TYPE, LENGTH SHALL HAVE FULL SIZE GROUND WIRE.
 - 30.d. ALL UNDERGROUND CONDUIT SHALL BE PVC SCHEDULE 40 (UNLESS NOTED OTHERWISE) AT A MINIMUM DEPTH OF 24" BELOW GRADE.
31. ALL NEW ELECTRICAL ENCLOSURES (EXCEPT FOR JUNCTION OR SPLICE BOXES) SUCH AS PANELBOARDS AND DISCONNECT SWITCHES SHALL BE LABELED WITH PERMANENT ENGRAVED PHENOLIC NAMEPLATES, BLACK WITH WHITE LETTERING, AND ATTACHED WITH RIVETS.



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USWW MANITOU WATER
 DN14XC247
 7225 WEST HIGHWAY 24
 MANITOU SPRINGS, CO 80829
 MONOPOLE

SHEET TITLE
**GENERAL ELECTRICAL
 NOTES, ABBREVIATIONS,
 AND ELEC. LEGEND**

SHEET NUMBER
E-1

ABBREVIATIONS

AAV	ALTERNATE ACCESS VENDOR	GR	GROWTH (CABINET)	UADU	UNIVERSAL TYPE A DIGITAL UNIT
ACCA	ANTENNA CABLE ASSEMBLY	GRC	GALVANIZED RIGID (STEEL) CONDUIT	U/G	UNDERGROUND
AFF	ABOVE FINISHED FLOOR	IGB	INTERNAL GROUND BAR	WP	WEATHERPROOF
AFG	ABOVE FINISHED GRADE	IGR	INTERIOR GROUND RING	WW	WIREWAY
AWS	ADVANCED WIRELESS SERVICES	IMC	INTERMEDIATE METALLIC CONDUIT	XFMR	TRANSFORMER
A/G	ABOVE GROUND	ISCW	INSULATED STRANDED COPPER WIRE		
AGB	ANTENNA GROUND BAR	LTE	LONG TERM EVOLUTION		
ATS	AUTOMATIC TRANSFER SWITCH	LTFC	LIQUID TIGHT FLEXIBLE CONDUIT		
AWG	AMERICAN WIRE GAUGE	MGB	MAIN (OR MASTER) GROUND BAR		
BBU	BASEBAND UNIT	MMBS	MULTI-MODE BASE STATION		
BCW	BARE COPPER WIRE	MTS	MANUAL TRANSFER SWITCH		
BSCW	BARE STRANDED COPPER WIRE	NEC	NATIONAL ELECTRIC CODE		
BTCW	BARE TINNED COPPER WIRE	NID	NETWORK INTERFACE DEVICE		
C	CONDUIT	NV	NETWORK VISION		
CAB	CABINET	O/H	OVERHEAD		
CE	CONCRETE ENCASED	PCS	PERSONAL COMMUNICATION SERVICES		
CGB	COLLECTOR GROUND BAR	PPC	POWER PROTECTION CABINET		
CKT	CIRCUIT	PRC	PRIMARY RADIO CABINET		
COVP	CAPACITOR OVERVOLTAGE PROTECTION	PVC	POLYVINYL CHLORIDE		
DB	DIRECT BURIED	PWR	POWER		
DEI	DIGITAL EXPANSION INTERFACE	RGS	RIGID GALVANIZED STEEL		
DISC	DISCONNECT	RRH	REMOTE RADIO HEAD		
EMT	ELECTRICAL METALLIC TUBING	RPU	REMOTE RADIO UNIT		
GFCI	GROUND FAULT CURRENT INTERRUPTER	SPD	SURGE PROTECTIVE DEVICE		
G	GROUND	S/S	STAINLESS STEEL		
GND	GROUND	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR		
GPS	GLOBAL POSITIONING SYSTEM	TYP	TYPICAL		

ELECTRICAL LEGEND

- UGP	— UGP	— UGP	— EXISTING U/G ELECTRICAL	- X	— X	— X	— EXISTING CHAINLINK FENCE
- OE	— OE	— OE	— EXISTING O/H ELECTRICAL	- X	— X	— X	— NEW CHAINLINK FENCE
- AGP	— AGP	— AGP	— EXISTING A/G ELECTRICAL	—	□	— □	— EXISTING WOOD FENCE
- UGT	— UGT	— UGT	— EXISTING U/G TELEPHONE	—	□	— □	— NEW WOOD FENCE
—	FO	—	— EXISTING FIBER OPTIC				
- HFLEX	— HFLEX	— HFLEX	— EXISTING HYBRIFLEX CABLE				
- UGP	— UGP	— UGP	— NEW U/G ELECTRIC				
- OE	— OE	— OE	— NEW O/H ELECTRIC				
- AGP	— AGP	— AGP	— NEW A/G ELECTRIC				
- UGT	— UGT	— UGT	— NEW U/G TELEPHONE				
—	FO	—	— NEW FIBER OPTIC				
- HFLEX	— HFLEX	— HFLEX	— NEW HYBRIFLEX CABLE				



ELEVATION/SECTION REFERENCE. TOP NUMBER IS THE DETAIL; BOTTOM NUMBER IS THE SHEET NO.

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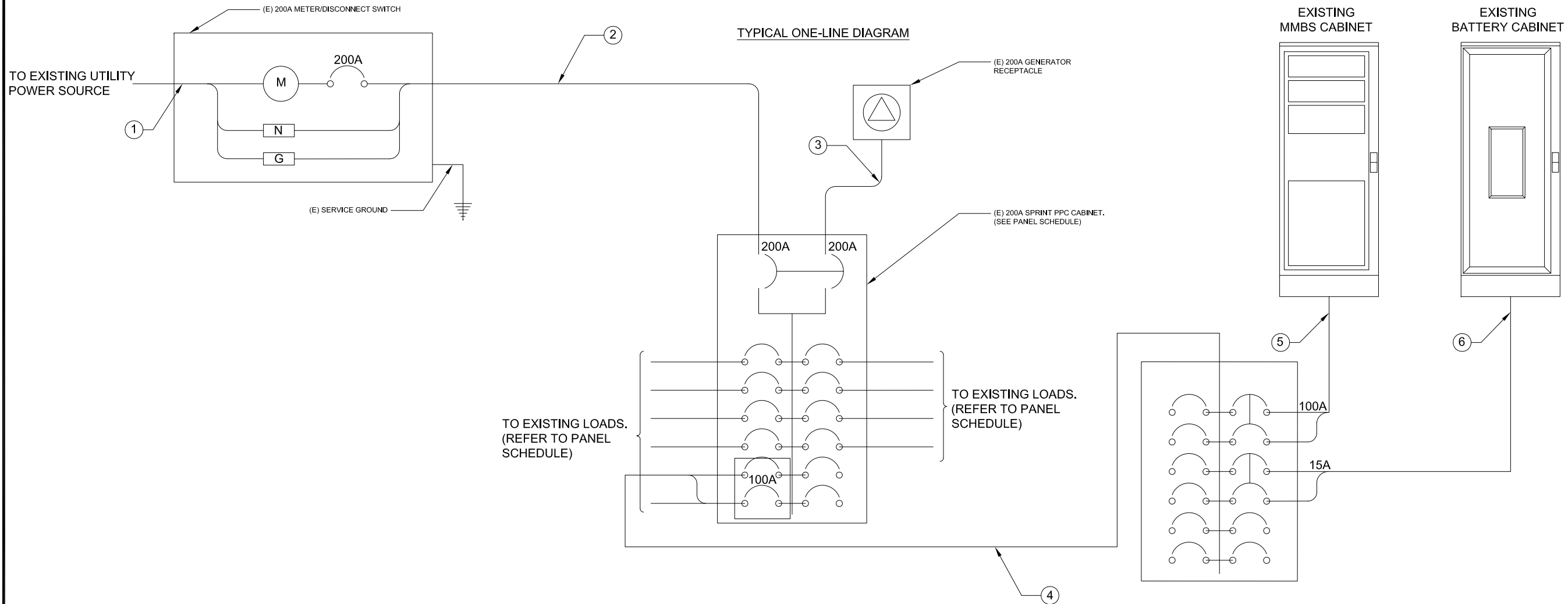
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DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
ONE-LINE DIAGRAM

SHEET NUMBER
E-2



CIRCUIT SCHEDULE			
NO	FROM	TO	CONFIGURATION
①	UTILITY SOURCE	METER/ DISCONNECT	EXISTING
②	METER/ DISCONNECT	TRANSFER & LOAD CENTER	EXISTING
③	TRANSFER & LOAD CENTER	GENERATOR RECEPTICLE	EXISTING
④	TRANSFER & LOAD CENTER	SUB PANEL	EXISTING
⑤	SUB PANEL	EXISTING MMBS CABINET	EXISTING
⑥	SUB PANEL	EXISTING MMBS CABINET	EXISTING

NOTES:
1. MECHANICALLY INTERLOCKED TO PREVENT SIMULTANEOUS FEED FROM UTILITY AND GENERATOR, "BREAK-BEFORE-MAKE."



MAIN PANEL

SITE NUMBER:	DN14XC247	ENCLOSURE TYPE:	NEMA 3R	BUSS RATING:	200 AMPS	INTERNAL TVSS:	YES
VOLTAGE:	240V/120	PANEL STATUS:	EXISTING	NEUTRAL RATING:	YES	WIRE:	3
MAIN BREAKER:	200 AMP	MODEL NUMBER:	TBD	NEUTRAL BUS:	YES	AIC:	22,000
MOUNT:	SURFACE	PHASE:	1	N to GROUND BOND:	YES	GROUND BAR:	YES

CKT NO	CKT BKR			SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR			CKT NO
	AMPS	P	STAT									STAT	P	AMPS	
1	200	2	----	0	0.00	GENERATOR MAIN	0		TVSS	1.00	0	----	----	----	2
3	----	----	----	0	0.00	—		0		1.00	0	----	----	----	4
5	----	----	----	0	0.00	SPACE	500		SPACE	0.00	0	----	----	----	6
7	----	----	----	0	0.00	SPACE		0	LIGHT	1.00	500	ON	1	20	8
9	100	2	ON	9150	1.25	SUB PANEL	11618		FAN	1.00	200	ON	1	10	10
11	----	----	----	9150	1.25			11637.5	TELCO GFI	1.00	180	ON	1	20	12
										TOTAL KVA:		23.76			
										AMPS		98.98			

NOTE: CL = LONG CONTINUOUS LOAD
LML = LARGEST MOTOR LOAD
UM = UTILITY MAIN CIRCUIT BREAKER
GM = GENERATOR MAIN CIRCUIT BREAKER

SEE SINGLE LINE DIAGRAM FOR WIRING DIAGRAM
*THIS IS A TYPICAL PANEL SCHEDULE SUBJECT TO CHANGE AND TO BE FIELD VERIFIED.

SUB-PANEL

SITE NUMBER:	DN14XC247	ENCLOSURE TYPE:	NEMA 3R	BUSS RATING:	125 AMPS	INTERNAL TVSS:	YES
VOLTAGE:	240V/120	PANEL STATUS:	EXISTING	NEUTRAL RATING:	YES	WIRE:	3
MAIN BREAKER:	100 AMP	MODEL NUMBER:	TBD	NEUTRAL BUS:	YES	AIC:	22,000
MOUNT:	SURFACE	PHASE:	1	N to GROUND BOND:	YES	GROUND BAR:	YES

CKT NO	CKT BKR			SERV LD VA	USE FAC	DESCRIPTION	PHASE A VA	PHASE B VA	DESCRIPTION	USE FAC	SERV LD VA	CKT BKR			CKT NO
	AMPS	P	STAT									STAT	P	AMPS	
1	----	----	----			SPACE	8750		SAMSUNG MMBS CABINET	1.00	0	ON	2	100	2
3	----	----	----			SPACE		8750		1.00	0	----	----	----	4
5	----	----	----			SPACE	400		SAMSUNG BATTERY	0.00	0	ON	2	15	6
7	----	----	----			SPACE		400		1.00	500	----	----	----	8
9	----	----	----			SPACE	0		SPACE	1.00	200	----	----	----	10
11	----	----	----			SPACE		0	SPACE	1.00	180	----	----	----	12
										TOTAL KVA:		18.30			
										AMPS		76.25			

NOTE: CL = LONG CONTINUOUS LOAD
LML = LARGEST MOTOR LOAD
UM = UTILITY MAIN CIRCUIT BREAKER
GM = GENERATOR MAIN CIRCUIT BREAKER

SEE SINGLE LINE DIAGRAM FOR WIRING DIAGRAM
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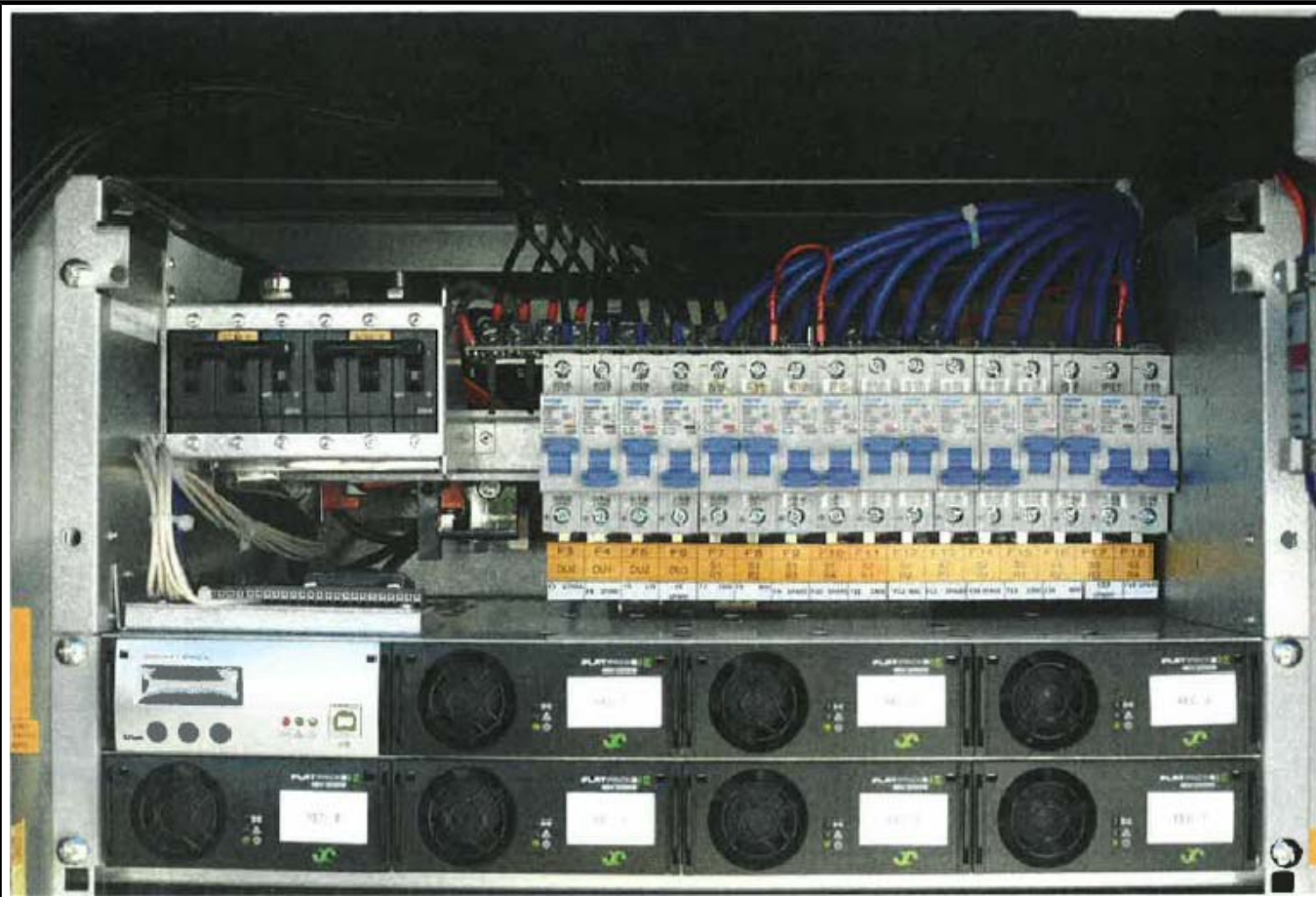
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DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

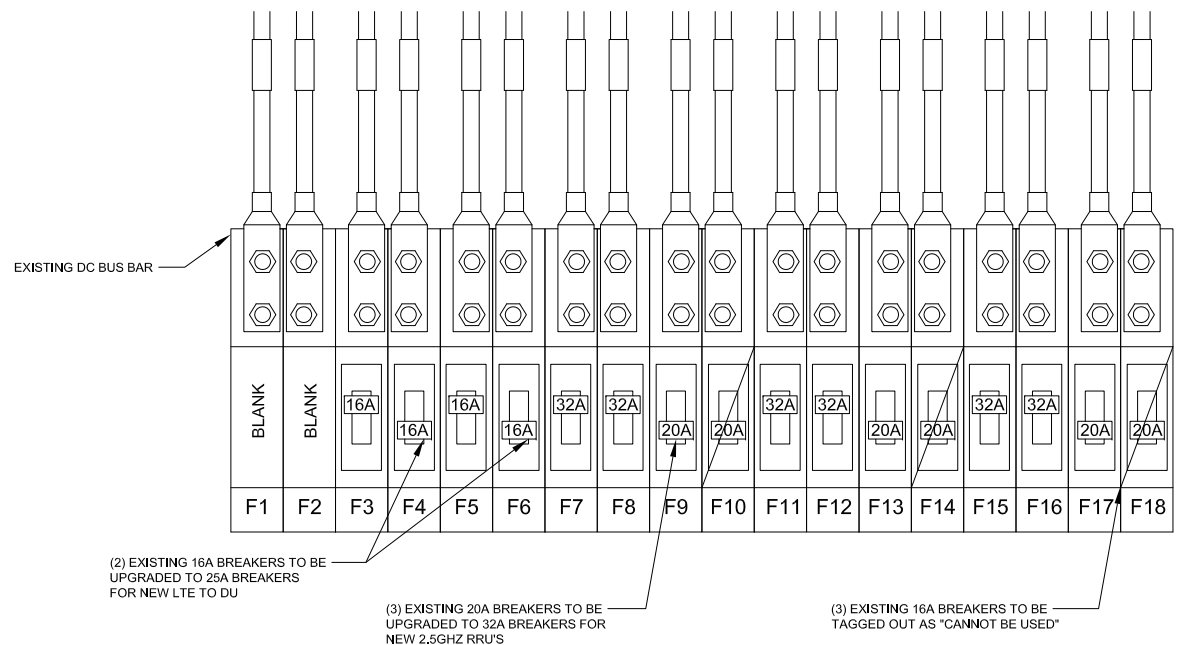
SHEET TITLE
PANEL SCHEDULE

SHEET NUMBER
E-3

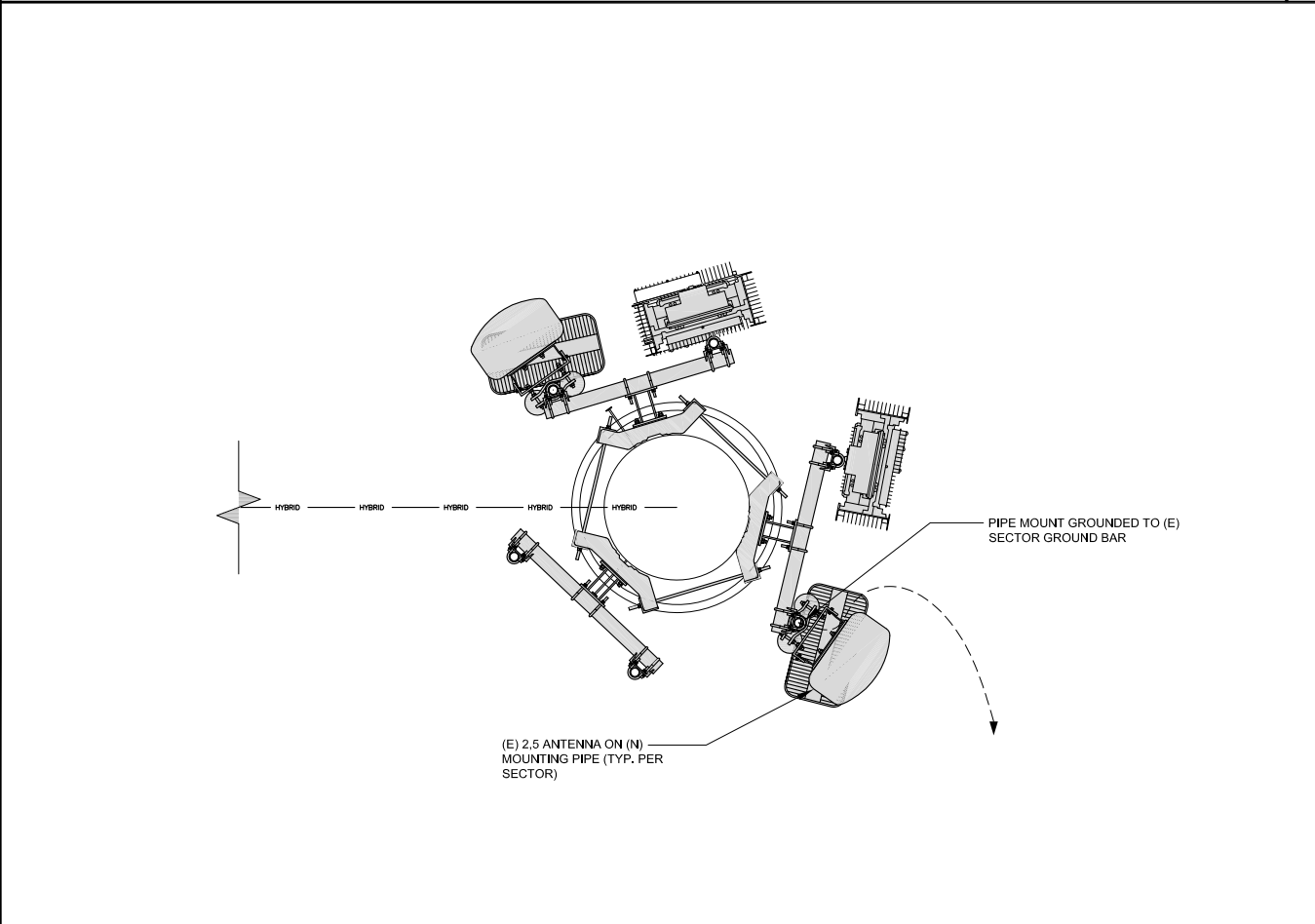


EXISTING DC POWER DISTRIBUTION

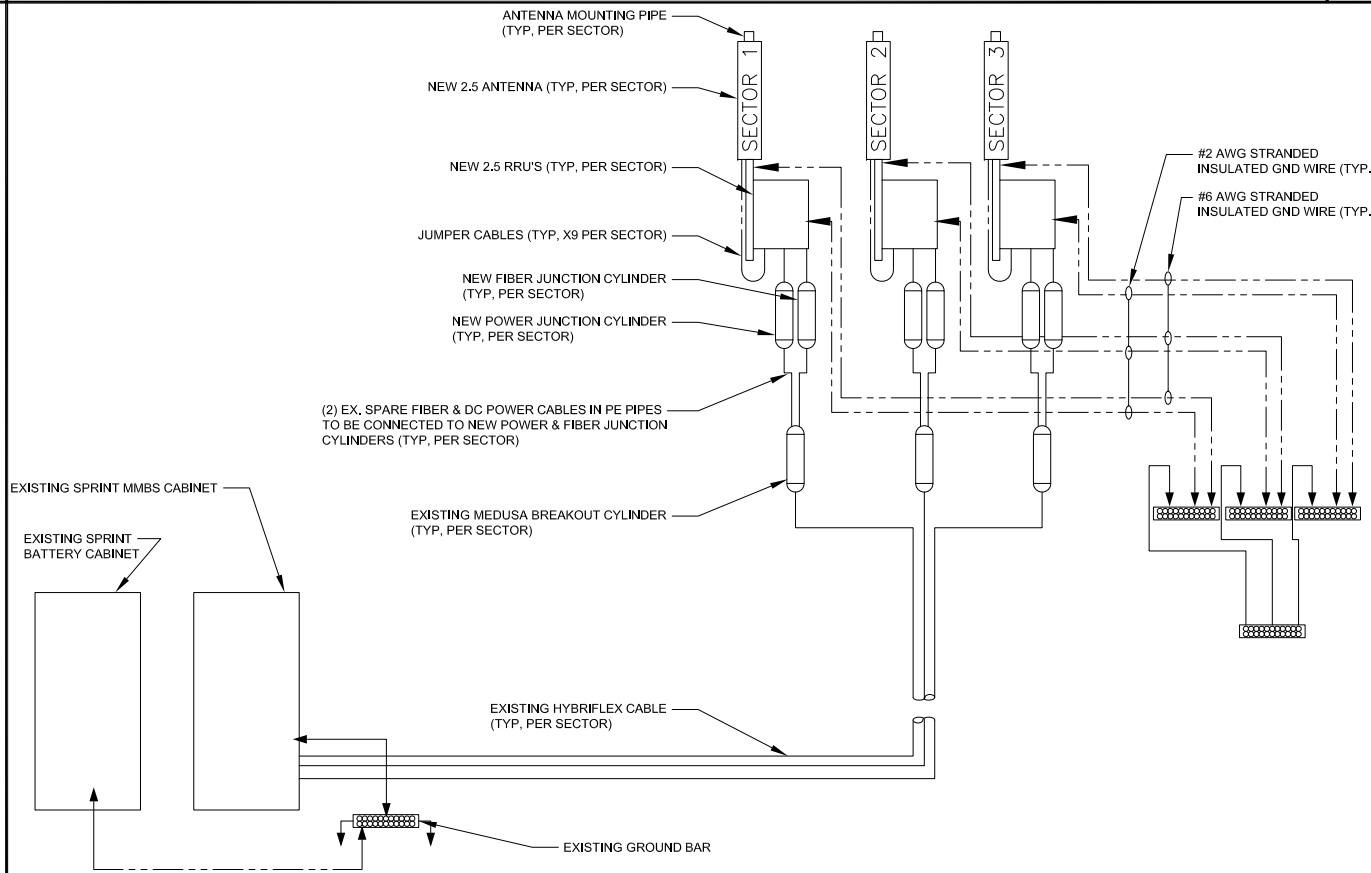
- NOTES:
 1. (2) DU BREAKERS TO BE UPGRADED FROM 16A TO 25A.
 2. (3) RRU BREAKERS TO BE UPGRADED FROM 20A TO 32A.
 3. REMAINING/UNUSED RRU BREAKERS TO BE TAGGED OUT AS "CANNOT BE USED"



TYPICAL DC POWER DISTRIBUTION



TYPICAL ANTENNA GROUNDING PLAN



TYPICAL GROUNDING RISER DIAGRAM



M SQUARE
 WIRELESS
 1387 CALLE AVANZADO
 SAN CLEMENTE CA 92673 (949) 391-6824

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 CHECKED BY: MM

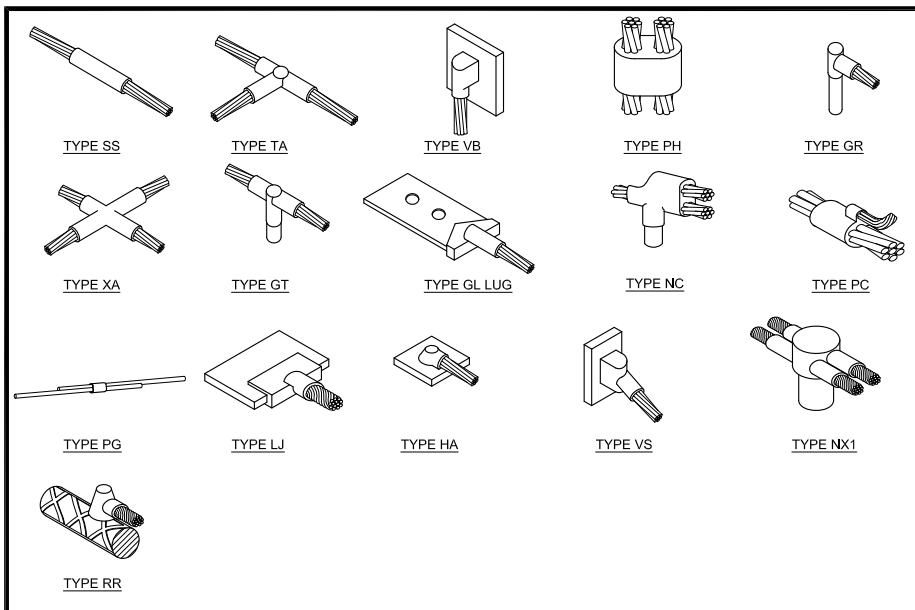
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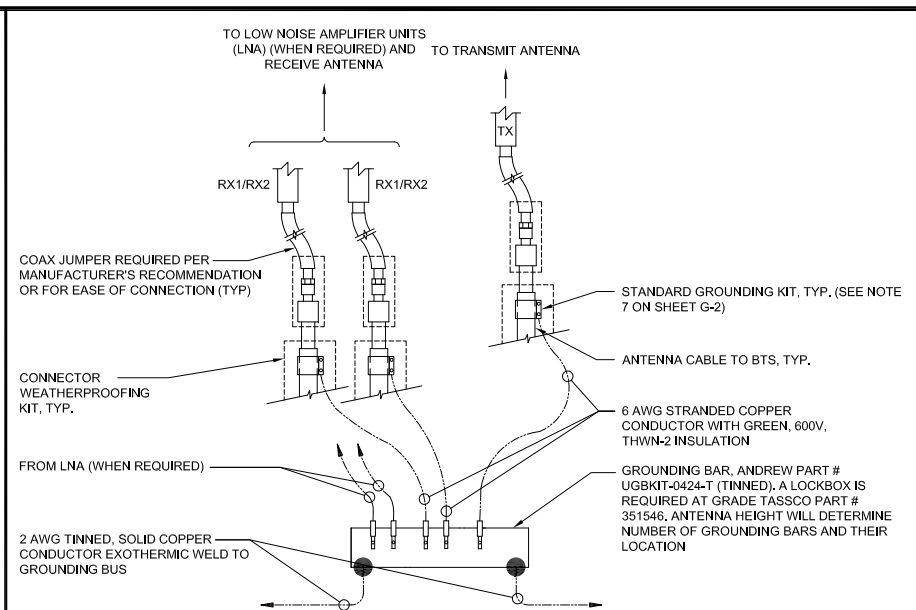
USWW MANITOU WATER
 DN14XC247
 7225 WEST HIGHWAY 24
 MANITOU SPRINGS, CO 80829
 MONOPOLE

SHEET TITLE
DC DISTRIBUTION AND ANTENNA GROUNDING PLAN AND DIAGRAM

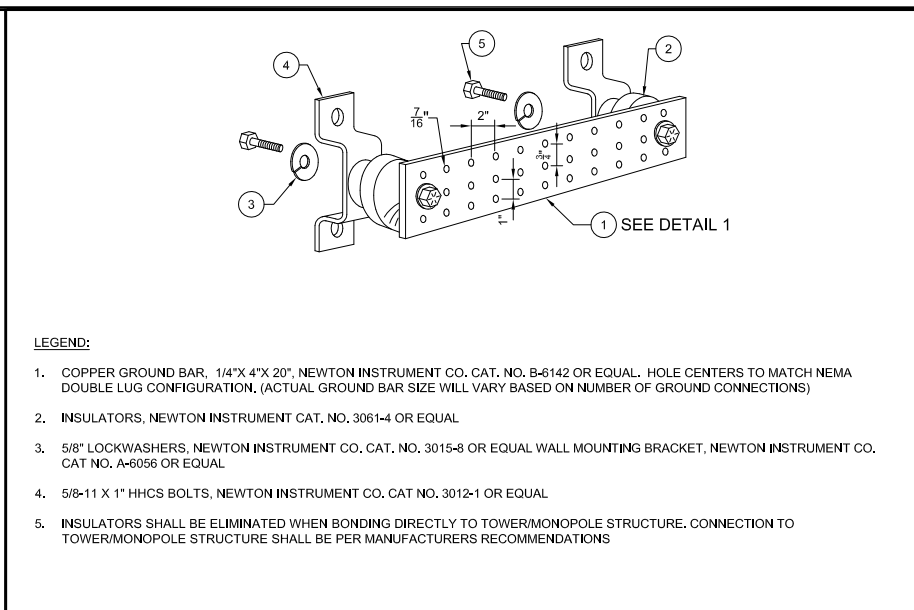
SHEET NUMBER
E-4



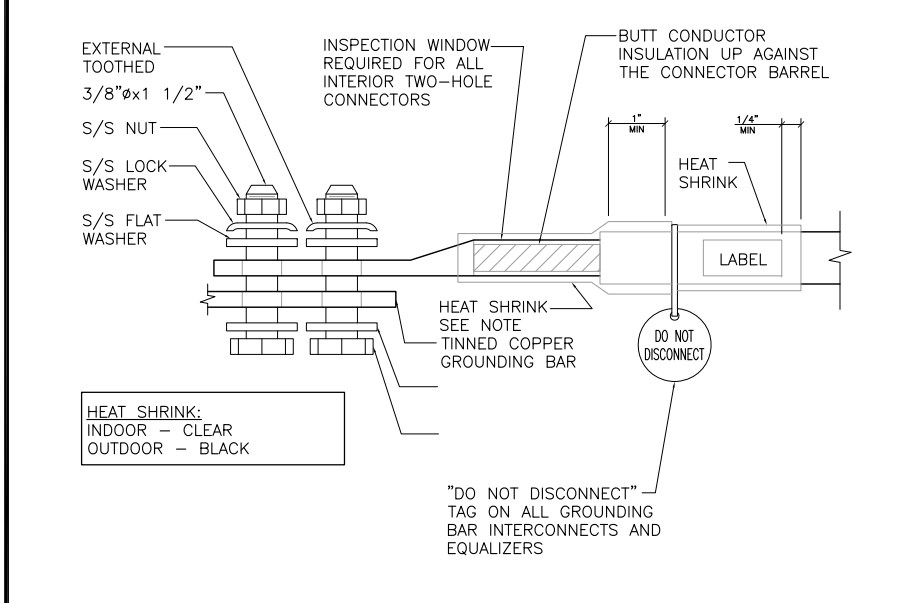
TYPICAL CADWELD TYPES 24"x36" SCALE: NTS 11"x17" SCALE: NTS **7**



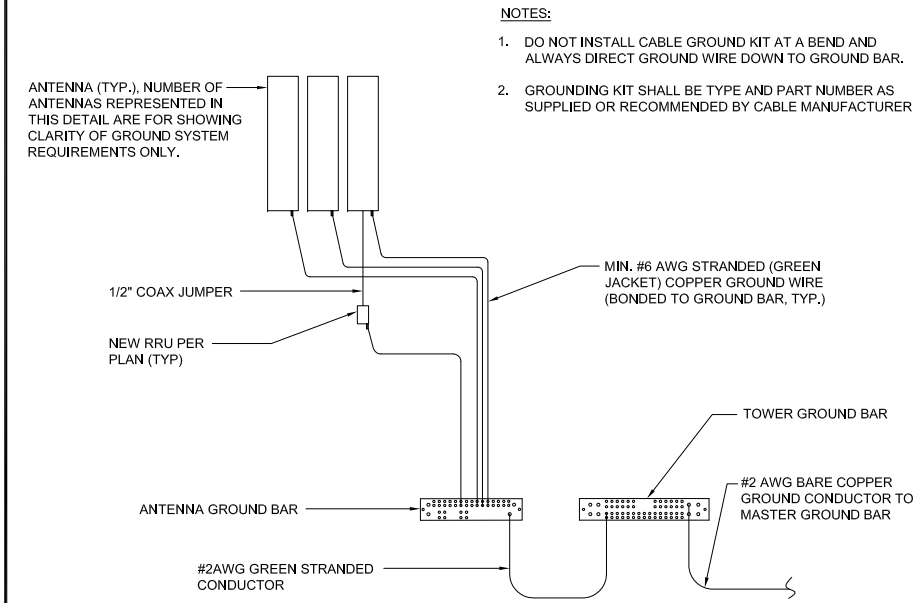
GROUNDING BAR CONNECTION 24"x36" SCALE: NTS 11"x17" SCALE: NTS **4**



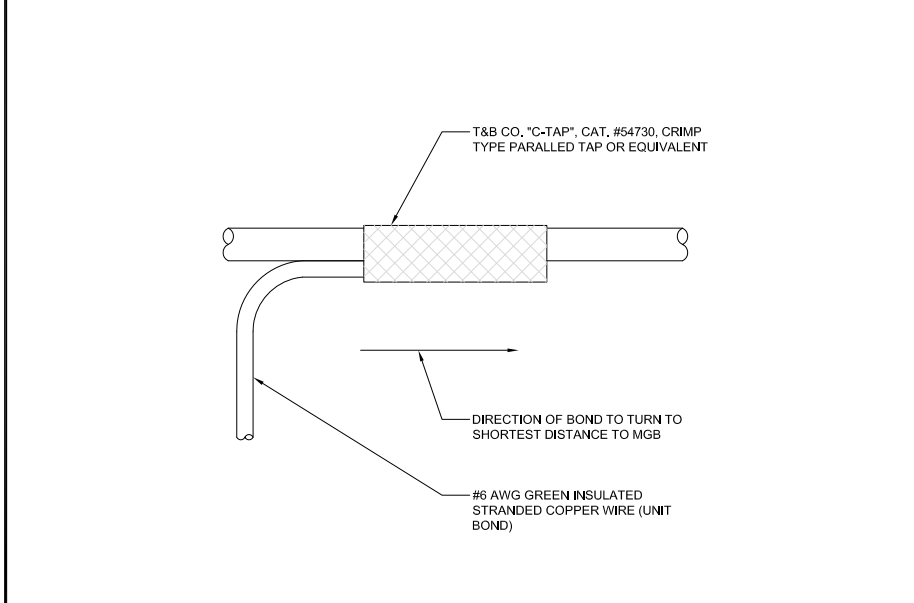
GROUNDING BAR DETAIL 24"x36" SCALE: NTS 11"x17" SCALE: NTS **1**



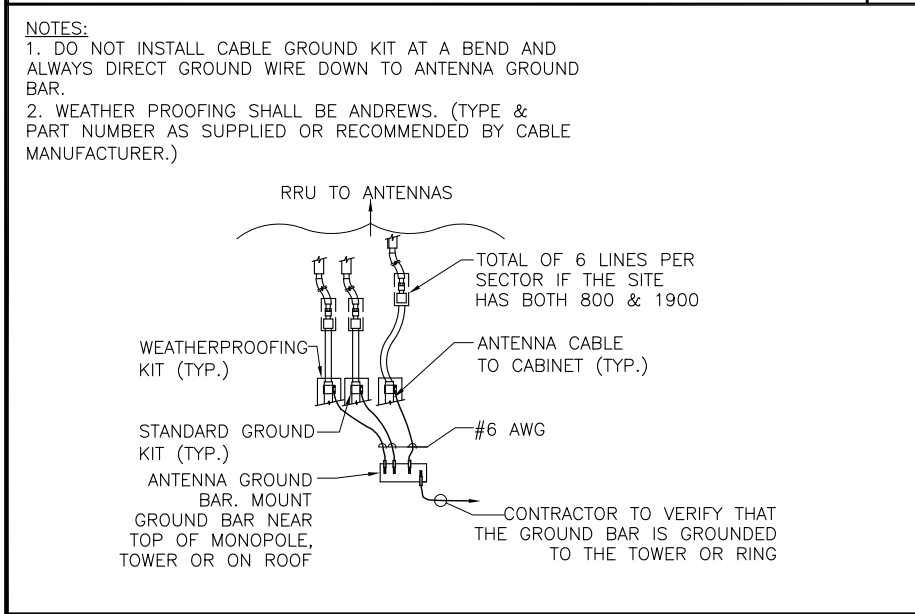
GROUND LUG TO BUS BAR 24"x36" SCALE: NTS 11"x17" SCALE: NTS **8**



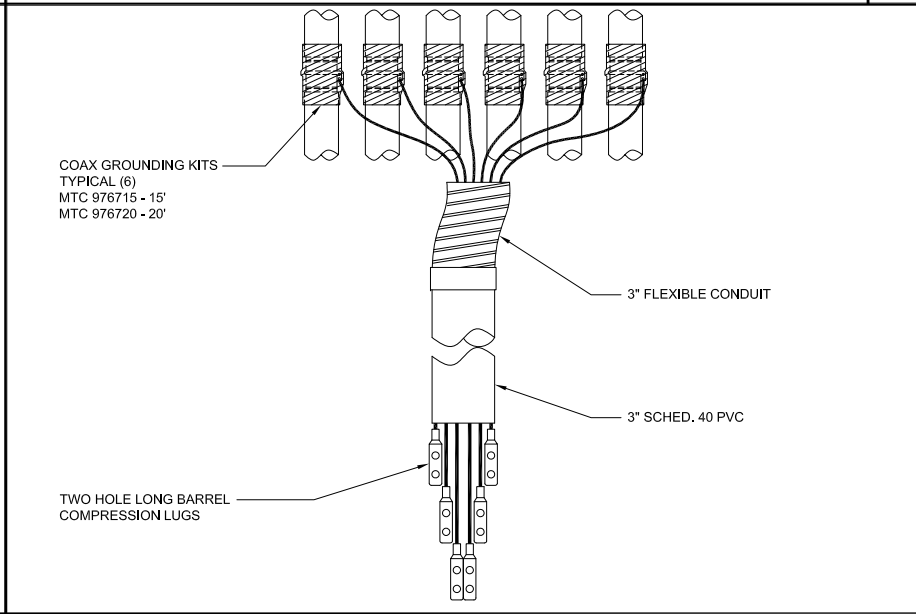
ANTENNA GROUNDING PLAN 24"x36" SCALE: NTS 11"x17" SCALE: NTS **5**



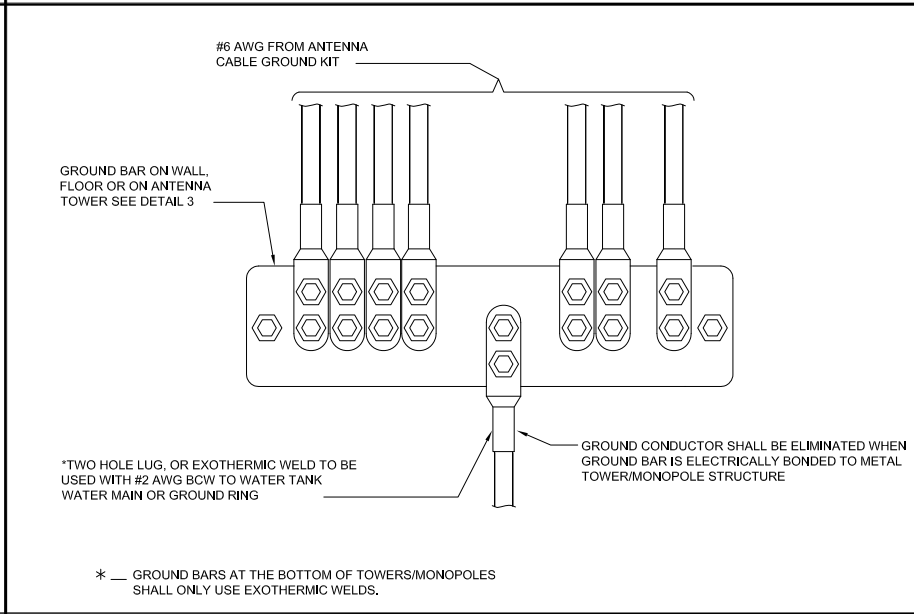
GROUNDING WIRE CONNECTION 24"x36" SCALE: NTS 11"x17" SCALE: NTS **2**



TYPICAL COAX GROUNDING 24"x36" SCALE: NTS 11"x17" SCALE: NTS **9**



COAX GROUND KIT 24"x36" SCALE: NTS 11"x17" SCALE: NTS **6**



WIRE TO GROUND BAR CONNECTION 24"x36" SCALE: NTS 11"x17" SCALE: NTS **3**

1387 CALLE AVANZADO
SAN CLEMENTE CA 92673 (949) 391-6824

DRAWN BY:	MB
CHECKED BY:	MM

REV	DATE	DESCRIPTION
B	11/30/2017	90% CD'S - REVISED
A	11/2/2017	90% CD'S FOR REVIEW

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USWW MANITOU WATER
DN14XC247
7225 WEST HIGHWAY 24
MANITOU SPRINGS, CO 80829
MONOPOLE

SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
E-5



Site Identification		Contact Information		Location Details	
Cascade	DN14XC247	Engineer Email	garima.2.ireani@sprint.com	Latitude	38.88984
SMS Schedule ID	1204904	Sprint Badged RF Engineer	Garima Irem	Longitude	-104.88482
SMS Schedule Name	DD Upgrade Upgrade	RF Engineer Email	garima.2.ireani@sprint.com	Market	Colorado
RFD		RF Engineer Phone	224.345.9619	Region	West
RRU OEM	Summing	RF Manager	Chayranda.Rau@sprint.com	City	Manitou Springs
Switch OEM	STA	RF Manager Email	Chayranda.Rau@sprint.com	State	CO
RFDS Issue Date	2017.04.12 09:00:00.0	RF Manager Phone	948-218-5431	Zip Code	CO80829
RFDS Revision	3			County	El Paso
Filter Analysis Complete	YES	Carrier Count		Sector Count	
RFDS - Issue Date		2500 LTE	3	2500MHz	2
Design Status	Complete	1900 LTE		1900MHz	
Border Analysis Complete	YES	1900 EVDO		1900MHz	
Project Description	ADD 800 3G/4G AND 2500 4G. ON EACH SECTOR, REPLACE EXISTING ANTENNA WITH (1) 4' 6-PORT TRIBAND ANTENNA. DPLEX 1900 & 2500 BANDS. RELOCATE 1900 RRUS TO TOWER TOP.	1900 Voice		800MHz	2
		800 LTE	1		
		800 Voice	1		

Additional RF Notes
Add 800 3G/4G and 2500 4G. On each sector, replace existing antenna with (1) 4' 6-port triband antenna. Dplex 1900 & 2500 bands. Relocate 1900 RRUs to tower top.

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-B8	RRH-B8	N/A	N/A	N/A	N/A
Weight (lbs)	59.75	59.75	N/A	N/A	N/A	N/A
Dimensions	21.26 x 15.03 x 8.03	21.26 x 15.03 x 8.03	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Number of RRUs needed	1	1	0	0	0	0

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Radio Model						
Model Number	RRH-C2A	RRH-C2A	N/A	N/A	N/A	N/A
Weight (lbs)	55.16	55.16	N/A	N/A	N/A	N/A
Dimensions	23.7 x 15.75 x 6.73	23.7 x 15.75 x 6.73	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Number of RRUs needed	1	1	0	0	0	0

Trunk Cable 1						
Model Number	1900 Hybrid_STA	1900 Hybrid_STA	N/A	N/A	N/A	N/A
Weight (lbs)	2.2	2.2	N/A	N/A	N/A	N/A
Dimensions (in.)	1.76	1.76	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A

Power Junction Cylinder Model						
Model Number	EP96-04223A	EP96-04223A	N/A	N/A	N/A	N/A
Weight (lbs)	4.58	4.58	N/A	N/A	N/A	N/A
Dimensions (in.)	15.35 High x 3.15 dia	15.35 High x 3.15 dia	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Power Junction Cylinder Qty	1	1	0	0	0	0

Optical Junction Cylinder Qty needed						
Model Number	EP96-04225A	EP96-04225A	N/A	N/A	N/A	N/A
Weight (lbs)	4.04	4.04	N/A	N/A	N/A	N/A
Dimensions (in.)	11.22 High x 3.15 dia	11.22 High x 3.15 dia	N/A	N/A	N/A	N/A
Manufacturer	STA	STA	N/A	N/A	N/A	N/A
Optical Junction Cylinder Qty needed						

Band: 2500	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	Antenna assigned on a different band	Antenna assigned on a different band				
Weight (lbs)	0	0	N/A	N/A	N/A	N/A
Dimensions	0 x 0 x 0	0 x 0 x 0	N/A	N/A	N/A	N/A
Manufacturer	-	-	N/A	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	2.5 Jumper 4	2.5 Jumper 4	N/A	N/A	N/A	N/A
Ant1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	325	125	N/A	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	58	58	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT	2	N/A	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT 2	N/A	2	N/A	N/A	N/A	N/A

Band: 800	Alpha	Beta	Gamma	Delta	Epsilon	Zeta
Antenna1						
Model Number	HPA65R-KE4AA-K	HPA65R-KE4AA-K				
Weight (lbs)	28.7	28.7	N/A	N/A	N/A	N/A
Dimensions	48 x 11.7 x 7.6	48 x 11.7 x 7.6	N/A	N/A	N/A	N/A
Manufacturer	CCI	CCI	N/A	N/A	N/A	N/A
Ant1 Top Jumper Make/Model/Qty	800/1900 Jumper 1	800/1900 Jumper 2	N/A	N/A	N/A	N/A
Ant1 RF requested Diameter	N/A	N/A	N/A	N/A	N/A	N/A
Ant1 RF requested Top Jumper Length(ft)	N/A	N/A	N/A	N/A	N/A	N/A
Antenna 1 Azimuth	325	125	N/A	N/A	N/A	N/A
Antenna 1 Mechanical DT	0	0	N/A	N/A	N/A	N/A
Antenna 1 Center Line (ft)	58	58	N/A	N/A	N/A	N/A
Antenna 1 Electrical DT	3	3	N/A	N/A	N/A	N/A



DRAWN BY: MB
CHECKED BY: MM

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MONOPOLE

SHEET TITLE
RADIO FREQUENCY DATA SHEET

SHEET NUMBER
RF-1