





**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 INCLUDING THE STANDARD CONSTRUCTION DETAILS FOR WIRELESS SITES AND THE CONSTRUCTION DRAWINGS, THE MORE STRINGENT REQUIREMENT 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

**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 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 CO.**

**NOTICE TO PROCEED:**  
NO WORK SHALL COMMENCE 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, INSPECTIONS 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 - ANTENNALIGN ALIGNMENT TOOL (AAT)
  - 2. SWEEP AND FIBER TESTS
  - 3. SCANABLE BARCODE PHOTOGRAPHS OF TOWER TOP AND INACCESSIBLE SERIALIZED EQUIPMENT
  - 4. ALL AVAILABLE JURISDICTIONAL INFORMATION
  - 5. PDF SCAN OF REDLINES PRODUCED IN FIELD
  - 6. A PDF SCAN OF REDLINE 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) BACK MAIN HYBRID CABLE ROUTE (MINIMUM TWO PHOTOS)
  - (ii) 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 I5. IN I5 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 COORDINATES 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 09 900 - PAINTING**

**QUALITY ASSURANCE:**

- A. COMPLY WITH GOVERNING 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 DEVOE COATINGS, PPG, SHERWIN WILLIAMS OR APPROVED EQUAL. PROVIDE PREMIUM GRADE, PROFESSIONAL-QUALITY PRODUCTS FOR COATING SYSTEMS

**PAINT SCHEDULE:**

- A. EXTERIOR ANTENNAE AND ANTENNA MOUNTING HARDWARE: ONE COAT OF PRIMER AND TWO FINISH COATS. PAINT FOR ANTENNAE SHALL BE NON-METALLIC BASED AND CONTAIN NO METALLIC PARTICLES. PROVIDE COLORS AND PATTERNS AS REQUIRED TO MASK APPEARANCE OF ANTENNAE ON ADJACENT BUILDING SURFACES AND AS ACCEPTABLE TO THE OWNER. REFER TO ANTENNA MANUFACTURER'S INSTRUCTIONS WHENEVER POSSIBLE.
- B. WATER TANKS: 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 GALV," 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:**  
INSTALL 1/2" COAX JUMPER CABLES BETWEEN THE RRU'S AND ANTENNAS. JUMPERS FURNISHED BY SPRINT FOR INSTALLATION BY CONTRACTOR PER CURRENT SPRINT STANDARDS. JUMPERS BETWEEN THE RRU'S AND ANTENNAS OR TOWER TOP AMPLIFIERS SHALL CONSIST OF 1/2 INCH FOAM DIELECTRIC, OUTDOOR RATED COAXIAL CABLE, MIN LENGTH FOR JUMPER SHALL BE 10'-0".

**REMOTE ELECTRICAL TILT (RET) CABLES: INSERT SPEC**

**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 CABLES 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 RADIII.
- 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 @ 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. AVOID TWISTING AND CROSSOVERS.
    - c. HOIST CABLE USING PROPER HOISTING GRIPS. DO NOT EXCEED MANUFACTURES RECOMMENDED MAXIMUM BEND RADIUS.



PROJECT NO:	T-16503-45
DRAWN BY:	J.E.S
CHECKED BY:	M.T.D.

REV	DATE	DESCRIPTION
B	4/15/2019	100% ZD REV.1
A	10/30/18	100% ZD SUBMITTAL

**10/30/18**

**100% ZD Submittal**

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.

**SF52XC168**

**Cherry Industrial**

6590 CENTRAL AVENUE  
NEWARK, CA

SHEET TITLE  
**GENERAL NOTES**

SHEET NUMBER  
**GN-1**



**CONTINUE FROM SP-1**

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 1

**WEATHERPROOFING EXTERIOR CONNECTORS AND HYBRID CABLE GROUND KITS:**

- A. ALL FIBER & COAX CONNECTORS AND GROUND KITS SHALL BE WEATHERPROOFED.
- 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 OR OTHER SPRINT APPROVED WEATHER PROOFING ENCLOSURE.
  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, 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

**DC CIRCUIT BREAKER LABELING**

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

**SECTION 26 100 - BASIC ELECTRICAL REQUIREMENTS**

**SUMMARY:**  
THIS SECTION SPECIFIES BASIC ELECTRICAL REQUIREMENTS FOR SYSTEMS AND COMPONENTS.

**QUALITY ASSURANCE:**

- A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.
- B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.
- C. **MATERIALS AND EQUIPMENT:** ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS

**SUPPORTING DEVICES:**

- A. ALL EQUIPMENT FURNISHED UNDER DIVISION 26 SHALL CARRY UL LABELS AND LISTINGS WHERE SUCH LABELS AND LISTINGS ARE AVAILABLE IN THE INDUSTRY.
- B. MANUFACTURERS OF EQUIPMENT SHALL HAVE A MINIMUM OF THREE YEARS EXPERIENCE WITH THEIR EQUIPMENT INSTALLED AND OPERATING IN THE FIELD IN A USE SIMILAR TO THE PROPOSED USE FOR THIS PROJECT.
- C. **MATERIALS AND EQUIPMENT:** ALL MATERIALS AND EQUIPMENT SPECIFIED IN DIVISION 26 OF THE SAME TYPE SHALL BE OF THE SAME MANUFACTURER AND SHALL BE NEW, OF THE BEST QUALITY AND DESIGN, AND FREE FROM DEFECTS

**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 OR 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.

**ELECTRICAL IDENTIFICATION:**

- A. UPDATE AND PROVIDE TYPED CIRCUIT BREAKER SCHEDULES IN THE MOUNTING BRACKET, INSIDE DOORS OF AC PANEL BOARDS WITH ANY CHANGES MADE TO THE AC SYSTEM.
- B. BRANCH CIRCUITS FEEDING AVIATION OBSTRUCTION LIGHTING EQUIPMENT SHALL BE CLEARLY IDENTIFIED AS SUCH AT THE BRANCH CIRCUIT PANELBOARD.

**SECTION 26 200 - ELECTRICAL MATERIALS AND EQUIPMENT**

**CONDUIT:**

- A. RIGID GALVANIZED STEEL (RGS) CONDUIT SHALL BE USED FOR EXTERIOR LOCATIONS ABOVE GROUND AND IN UNFINISHED INTERIOR LOCATIONS AND FOR ENCASED RUNS IN CONCRETE. RIGID CONDUIT AND FITTINGS SHALL BE STEEL, COATED WITH ZINC EXTERIOR AND INTERIOR BY THE HOT DIP GALVANIZING PROCESS. CONDUIT SHALL BE PRODUCED TO ANSI SPECIFICATIONS C80.1, FEDERAL SPECIFICATION WW-C-581 AND SHALL BE LISTED WITH THE UNDERWRITERS' LABORATORIES. FITTINGS SHALL BE THREADED - SET SCREW OR COMPRESSION FITTINGS WILL NOT BE ACCEPTABLE. RGS CONDUITS SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND.
- B. UNDERGROUND CONDUIT IN CONCRETE SHALL BE POLYVINYLCHLORIDE (PVC) SUITABLE FOR DIRECT BURIAL AS APPLICABLE. JOINTS SHALL BE BELLED, AND FLUSH SOLVENT WELDED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. CONDUIT SHALL BE CARLON ELECTRICAL PRODUCTS OR APPROVED EQUAL.
- C. TRANSITIONS BETWEEN PVC AND RIGID (RGS) SHALL BE MADE WITH PVC COATED METALLIC LONG SWEEP RADIUS ELBOWS.
- D. EMT OR RIGID GALVANIZED STEEL CONDUIT MAY BE USED IN FINISHED SPACES CONCEALED IN WALLS AND CEILINGS. EMT SHALL BE MILD STEEL, ELECTRICALLY WELDED, ELECTRO-GALVANIZED OR HOT-DIPPED GALVANIZED AND PRODUCED TO ANSI SPECIFICATION C80.3, FEDERAL SPECIFICATION WW-C-563, AND SHALL BE UL LISTED. EMT SHALL BE MANUFACTURED BY ALLIED, REPUBLIC OR WHEATLAND, OR APPROVED EQUAL. FITTINGS SHALL BE METALLIC COMPRESSION. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE.
- E. LIQUID TIGHT FLEXIBLE METALLIC CONDUIT SHALL BE USED FOR FINAL CONNECTION TO EQUIPMENT. FITTINGS SHALL BE METALLIC GLAND TYPE COMPRESSION FITTINGS, MAINTAINING THE INTEGRITY OF CONDUIT SYSTEM. SET SCREW CONNECTIONS SHALL NOT BE ACCEPTABLE. MAXIMUM LENGTH OF FLEXIBLE CONDUIT SHALL NOT EXCEED 6- FEET. LFMC SHALL BE PROTECTED AND SUPPORTED AS REQUIRE BY NEC. MANUFACTURERS OF FLEXIBLE CONDUITS SHALL BE CAROL, ANACONDA METAL HOSE OR UNIVERSAL METAL HOSE, OR APPROVED EQUAL.
- F. MINIMUM SIZE CONDUIT SHALL BE 3/4 INCH (21MM).

**HUBS AND BOXES:**

- A. AT ENTRANCES TO CABINETS OR OTHER EQUIPMENT NOT HAVING INTEGRAL THREADED HUBS PROVIDE METALLIC THREADED HUBS OF THE SIZE AND CONFIGURATION REQUIRED. HUB SHALL INCLUDE LOCKNUT AND NEOPRENE O-RING SEAL. PROVIDE IMPACT RESISTANT 105 DEGREE C PLASTIC BUSHINGS TO PROTECT CABLE INSULATION.
- B. CABLE TERMINATION FITTINGS FOR CONDUIT
  1. CABLE TERMINATORS FOR RGS CONDUITS SHALL BE TYPE CRC BY O-Z/GEDNEY OR EQUAL.
  2. CABLE TERMINATORS FOR LFMC SHALL BE ETCO - CL2075; OR MADE FOR THE PURPOSE PRODUCTS BY ROXTEC.
- C. EXTERIOR PULL BOXES AND PULL BOXES IN INTERIOR INDUSTRIAL AREAS SHALL BE PLATED CAST ALLOY, HEAVY DUTY, WEATHERPROOF, DUST PROOF, WITH GASKET, PLATED IRON ALLOY COVER AND STAINLESS STEEL COVER SCREWS, CROUSE-HINDS WAB SERIES OR EQUAL.
- D. CONDUIT OUTLET BODIES SHALL BE PLATED CAST ALLOY WITH SIMILAR GASKETED COVERS. OUTLET BODIES SHALL BE OF THE CONFIGURATION AND SIZE SUITABLE FOR THE APPLICATION. PROVIDE CROUSE-HINDS FORM 8 OR EQUAL.
- E. MANUFACTURER FOR BOXES AND COVERS SHALL BE HOFFMAN, SQUARE "D", CROUSE-HINDS, COOPER, ADALET, APPLETON, O-Z GEDNEY, RACO, OR APPROVED EQUAL.

**SUPPLEMENTAL GROUNDING SYSTEM**

- A. FURNISH AND INSTALL A SUPPLEMENTAL GROUNDING SYSTEM AS INDICATED ON THE DRAWINGS. SUPPORT SYSTEM WITH NON-MAGNETIC STAINLESS STEEL CLIPS WITH RUBBER GROMMETS. GROUNDING CONNECTORS SHALL BE TINNED COPPER WIRE, SIZES AS INDICATED ON THE DRAWINGS. PROVIDE STRANDED OR SOLID BARE OR INSULATED CONDUCTORS AS INDICATED.
- B. SUPPLEMENTAL GROUNDING SYSTEM: ALL CONNECTIONS TO BE MADE WITH CAD WELDS, EXCEPT AT EQUIPMENT USE LUGS OR OTHER AVAILABLE GROUNDING MEANS AS REQUIRED BY MANUFACTURER; AT GROUND BARS USE TWO HOLE SPADES WITH NO OX.
- C. STOLEN GROUND-BARS: IN THE EVENT OF STOLEN GROUND BARS, CONTACT SPRINT CM FOR REPLACEMENT INSTRUCTION USING THREADED ROD KITS.

**EXISTING STRUCTURE:**

- A. EXISTING EXPOSED WIRING AND ALL EXPOSED OUTLETS, RECEPTACLES, SWITCHES, DEVICES, BOXES, AND OTHER EQUIPMENT THAT ARE NOT TO BE UTILIZED IN THE COMPLETED PROJECT SHALL BE REMOVED OR DE-ENERGIZED AND CAPPED IN THE WALL, CEILING, OR FLOOR SO THAT THEY ARE CONCEALED AND SAFE. WALL, CEILING, OR FLOOR SHALL BE PATCHED TO MATCH THE ADJACENT CONSTRUCTION.

**CONDUIT AND CONDUCTOR INSTALLATION:**

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



PROJECT NO:	T-16503-45
DRAWN BY:	J.E.S
CHECKED BY:	M.T.D.

REV	DATE	DESCRIPTION
B	4/15/2019	100% ZD REV.1
A	10/30/18	100% ZD SUBMITTAL

10/30/18

100% ZD Submittal

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Cherry Industrial

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NEWARK, CA

SHEET TITLE

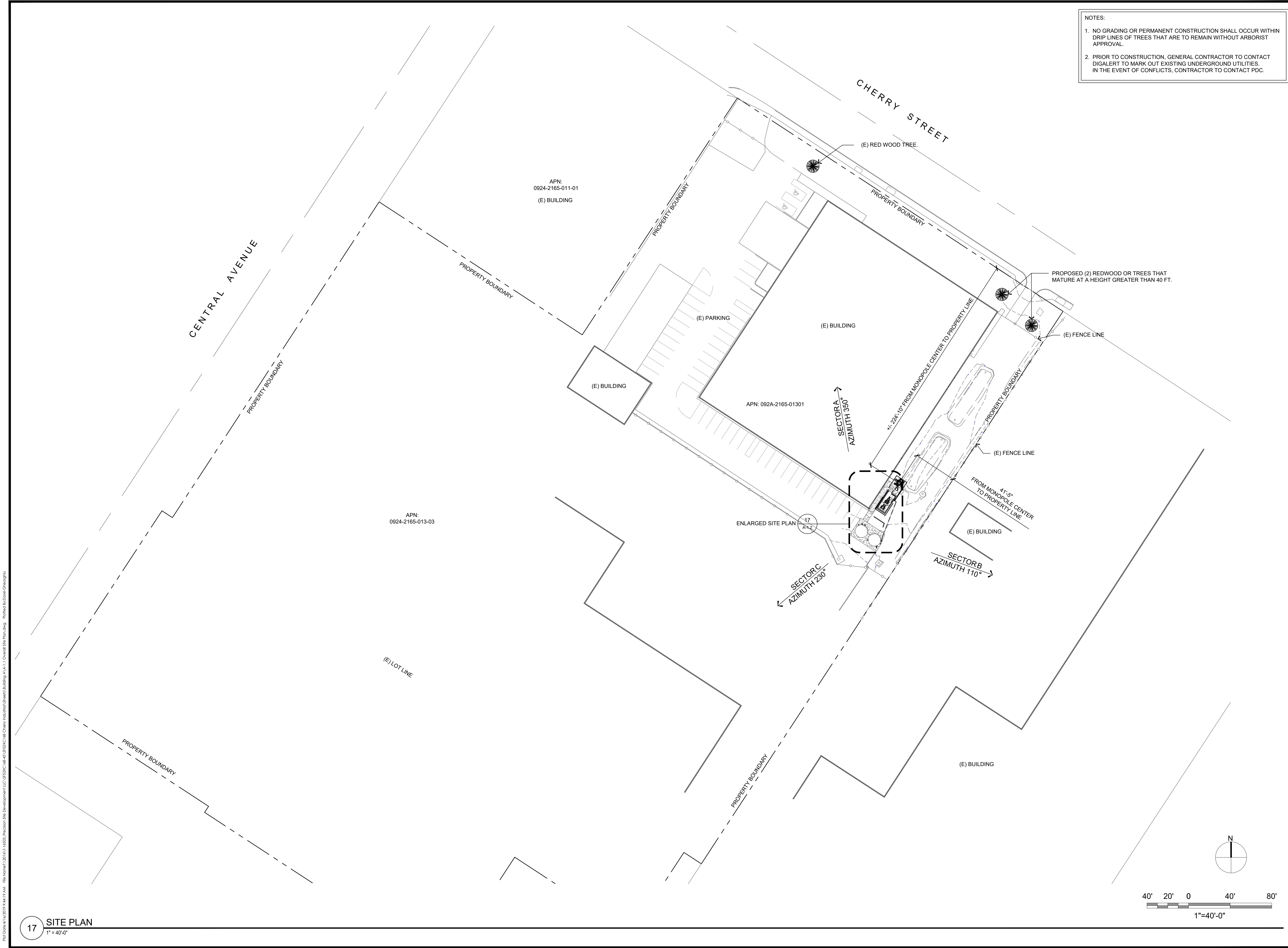
GENERAL NOTES

SHEET NUMBER

GN-2

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NOTES:

1. NO GRADING OR PERMANENT CONSTRUCTION SHALL OCCUR WITHIN DRIP LINES OF TREES THAT ARE TO REMAIN WITHOUT ARBORIST APPROVAL.
2. PRIOR TO CONSTRUCTION, GENERAL CONTRACTOR TO CONTACT DIGALERT TO MARK OUT EXISTING UNDERGROUND UTILITIES. IN THE EVENT OF CONFLICTS, CONTRACTOR TO CONTACT PDC.

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**PRECISION**  
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 ROSEVILLE, CA 95747



**Borges** ARCHITECTURAL GROUP  
 borgesarch.com  
 1478 STONE POINT DRIVE, SUITE 350  
 ROSEVILLE CA 95661  
 916 782 7200 TEL  
 916 773 3037 FAX

PROJECT NO: T-16503-45  
 DRAWN BY: J.E.S  
 CHECKED BY: M.T.D.

REV	DATE	DESCRIPTION
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A	10/30/18	100% ZD SUBMITTAL

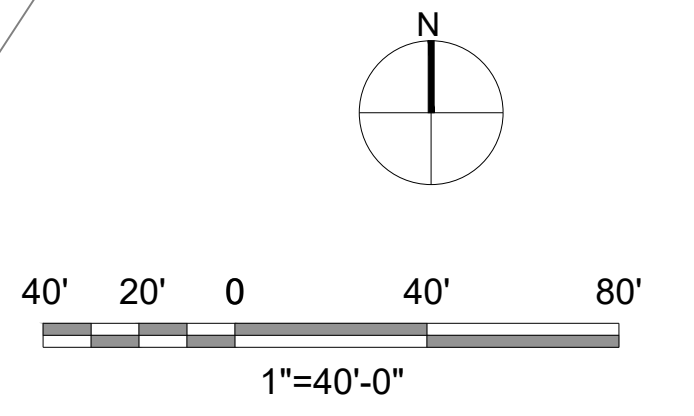
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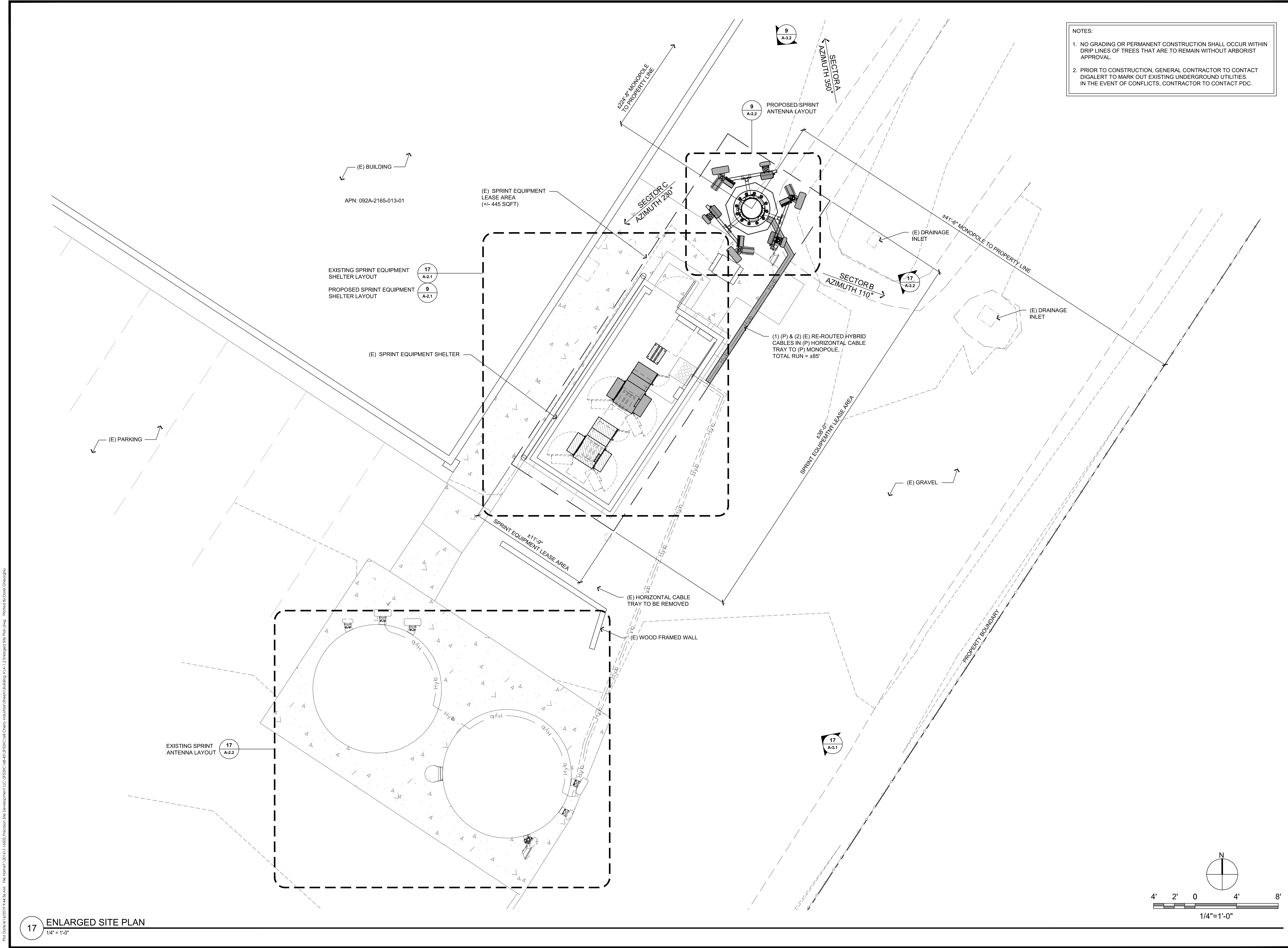
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 OVERALL SITE PLAN

SHEET NUMBER  
**A-1.1**



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NOTES:  
 1. NO GRADING OR PERMANENT CONSTRUCTION SHALL OCCUR WITHIN DRIP LINES OF TREES THAT ARE TO REMAIN WITHOUT ARBORIST APPROVAL.  
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 DRAWN BY: J.E.S  
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REV	DATE	DESCRIPTION
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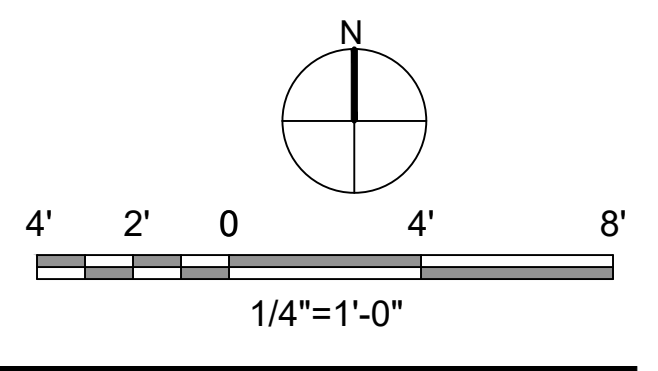
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SHEET TITLE  
 ENLARGED SITE PLAN

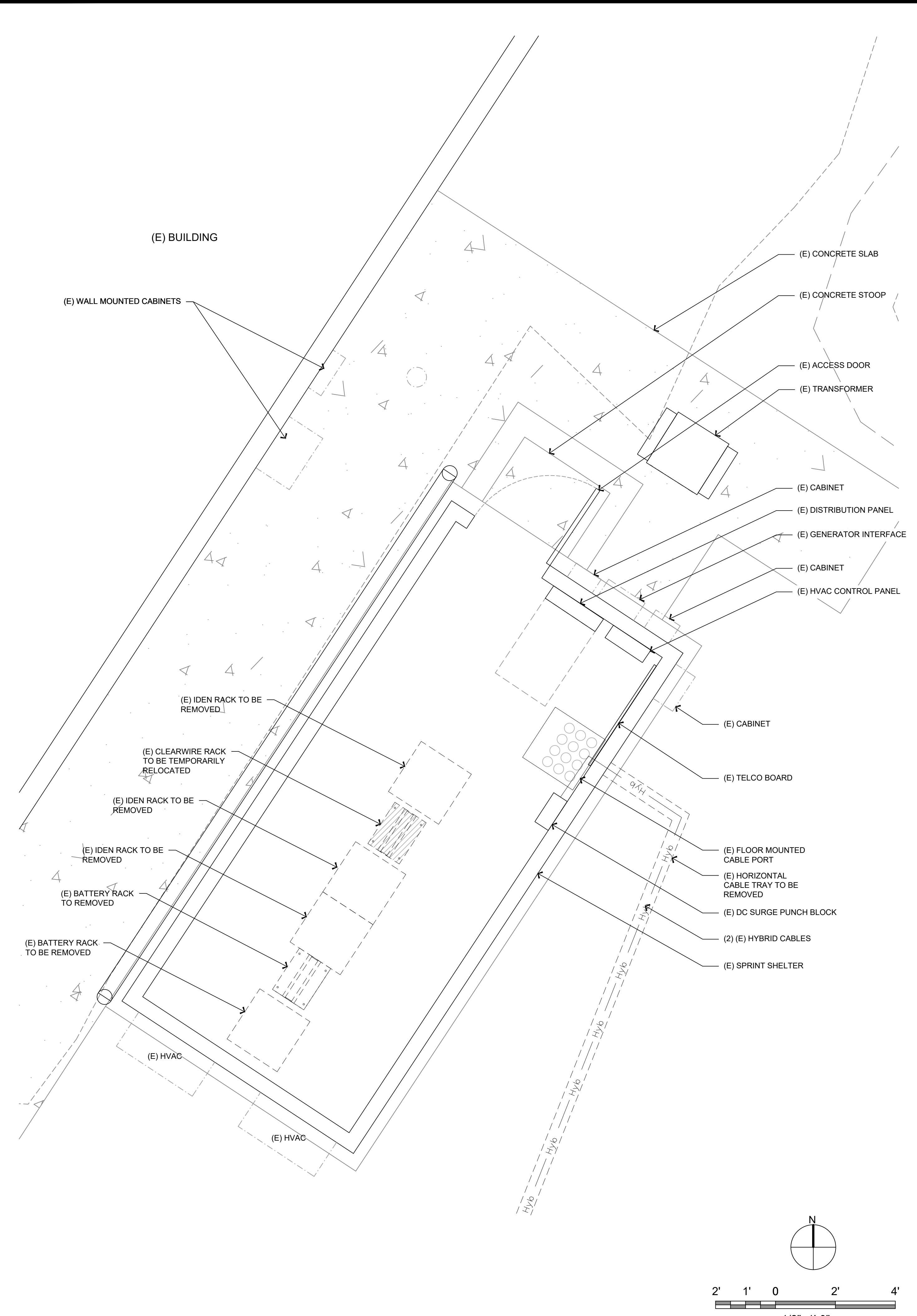
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**A-1.2**



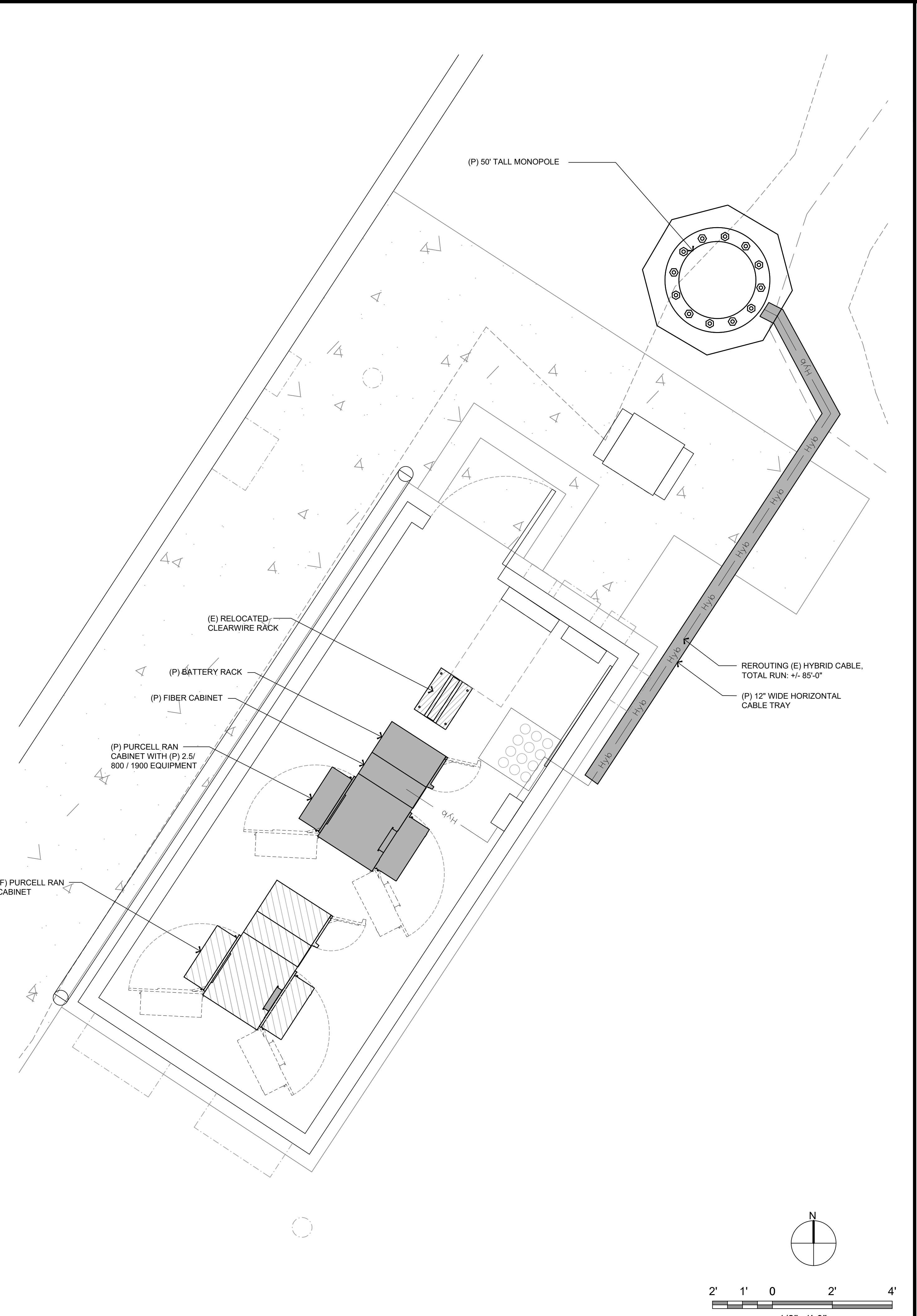
17 ENLARGED SITE PLAN  
 1/4" = 1'-0"

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**17** EXISTING EQUIPMENT LAYOUT  
1/2" = 1'-0"



**9** PROPOSED EQUIPMENT LAYOUT  
1/2" = 1'-0"



PROJECT NO: T-16503-45  
DRAWN BY: J.E.S  
CHECKED BY: M.T.D.

REV	DATE	DESCRIPTION
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SHEET TITLE  
ENLARGED  
EQUIPMENT  
LAYOUTS

SHEET NUMBER  
**A-2.1**



**NOTES**

1. CONDUIT ROUTING IS DIAGRAMMATICALLY SHOWN ON PLANS AND ARE ONLY APPROXIMATIONS. THE EXACT LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
2. ALL ELECTRICAL EQUIPMENT AND CONTROLLING DEVICES SHALL BE PROVIDED WITH LAMI COLD NAMEPLATES, INDICATING THE CIRCUITS ORIGIN AND ALL EQUIPMENT TERMINATIONS
3. CONTRACTOR SHALL SUPPLY BREAKERS, CONDUITS AND CIRCUIT CONDUCTORS, AS REQUIRED FOR A COMPLETED SYSTEM AND SHALL BE IN COMPLIANCE WITH MANUFACTURER SPECIFICATIONS.

ANTENNA SCHEDULE					
SECTOR	ANTENNA MODEL NO.	AZIMUTH	RAD CENTER	HYBRID	LENGTH
A L P H A	A1 COMMSCOPE NNVV-65B-R4	350°	47'-0"	(1)	+/- 85'-0"
	A2 COMMSCOPE TTT65AP-1XR	350°	47'-0"		
B E T A	B1 COMMSCOPE NNVV-65B-R4	110°	47'-0"	(1)	+/- 85'-0"
	B2 COMMSCOPE TTT65AP-1XR	110°	47'-0"		
C A P P A	C1 COMMSCOPE NNVV-65B-R4	230°	47'-0"	(1)	+/- 85'-0"
	C2 COMMSCOPE TTT65AP-1XR	230°	47'-0"		

12 ANTENNA SCHEDULE  
1/2" = 1'-0"

**ACRONYM LEGEND**

BBU: BATTERY BACKUP UNIT	CAB: CABINET
CDMA: CODE DIVISION MULTIPLE ACCESS	CMU: CONCRETE MASONRY UNIT
(E): EXISTING	GND: GROUND
GPS: GLOBAL POSITIONING SYSTEM	HVAC: HEATING VENTILATION AIR CONDITIONING
HYB: HYBRID LINE	MMBS: MULTI MODAL BASE STATION
(N): NEW	(P): PROPOSED
PPC: POWER PROTECTION UNIT	PRI: LEGACY PRIMARY CABINET
PWR: POWER	RAD: RADIATION CENTER
RET: REMOTE ELECTRICAL TILT	RF: RADIO FREQUENCY
RFP: REINFORCED FIBERGLASS PANEL	RRU: REMOTE RADIO UNIT
TEL: TELCO	HFC: HYDROGEN FUEL CELL
HSM: HYDROGEN STORAGE MODULE	

**GRAPHICS LEGEND**

ICE BRIDGE:	
CABLE TRAY:	
WALL/PARTITION:	
FENCE:	
WOOD/IRON FENCE:	
LEASE AREA:	
POWER:	
TELCO:	
HYBRID:	

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PROJECT NO: T-16503-45  
DRAWN BY: J.E.S  
CHECKED BY: M.T.D.

REV	DATE	DESCRIPTION
B	4/15/2019	100% ZD REV.1
A	10/30/18	100% ZD SUBMITTAL

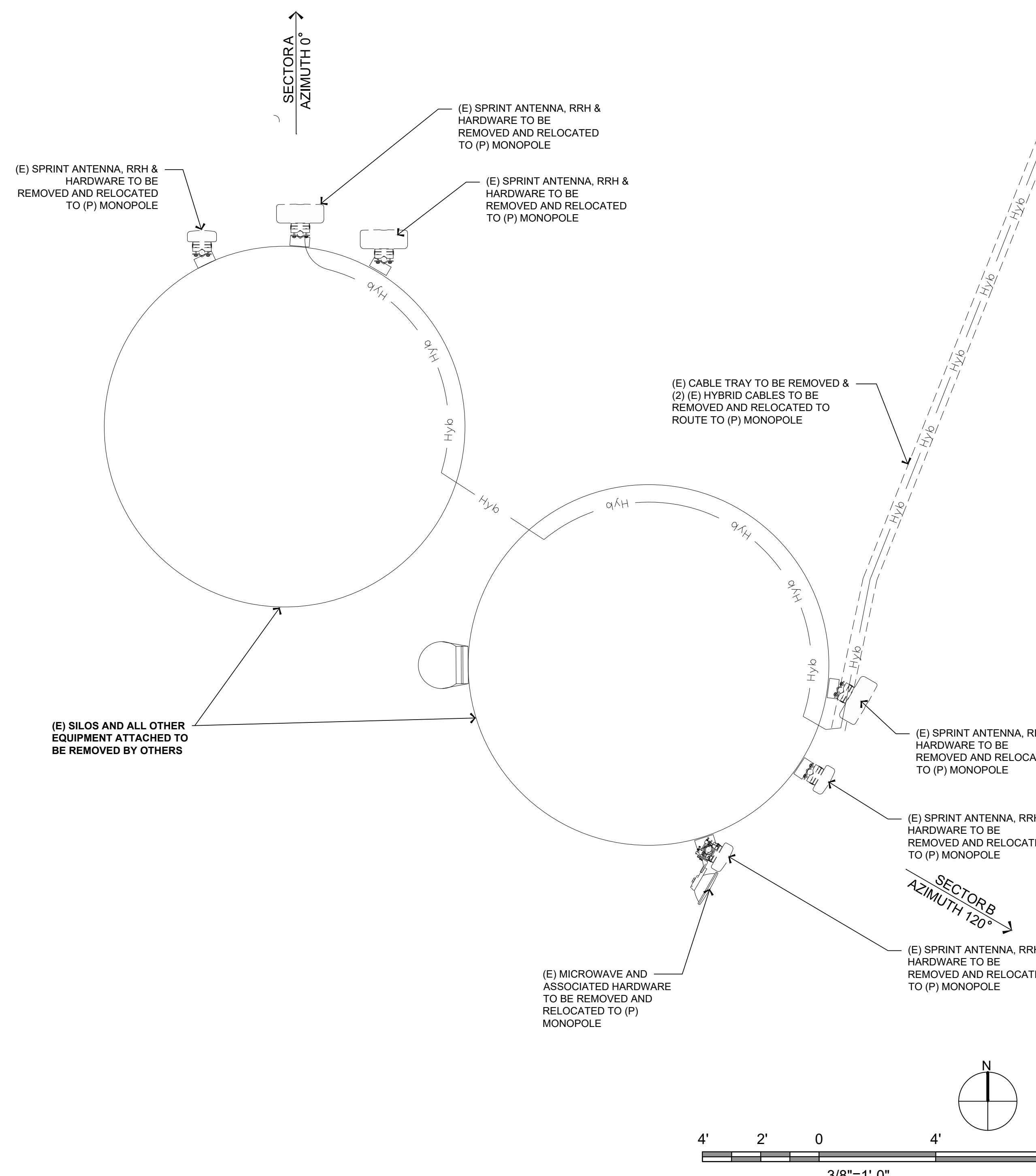
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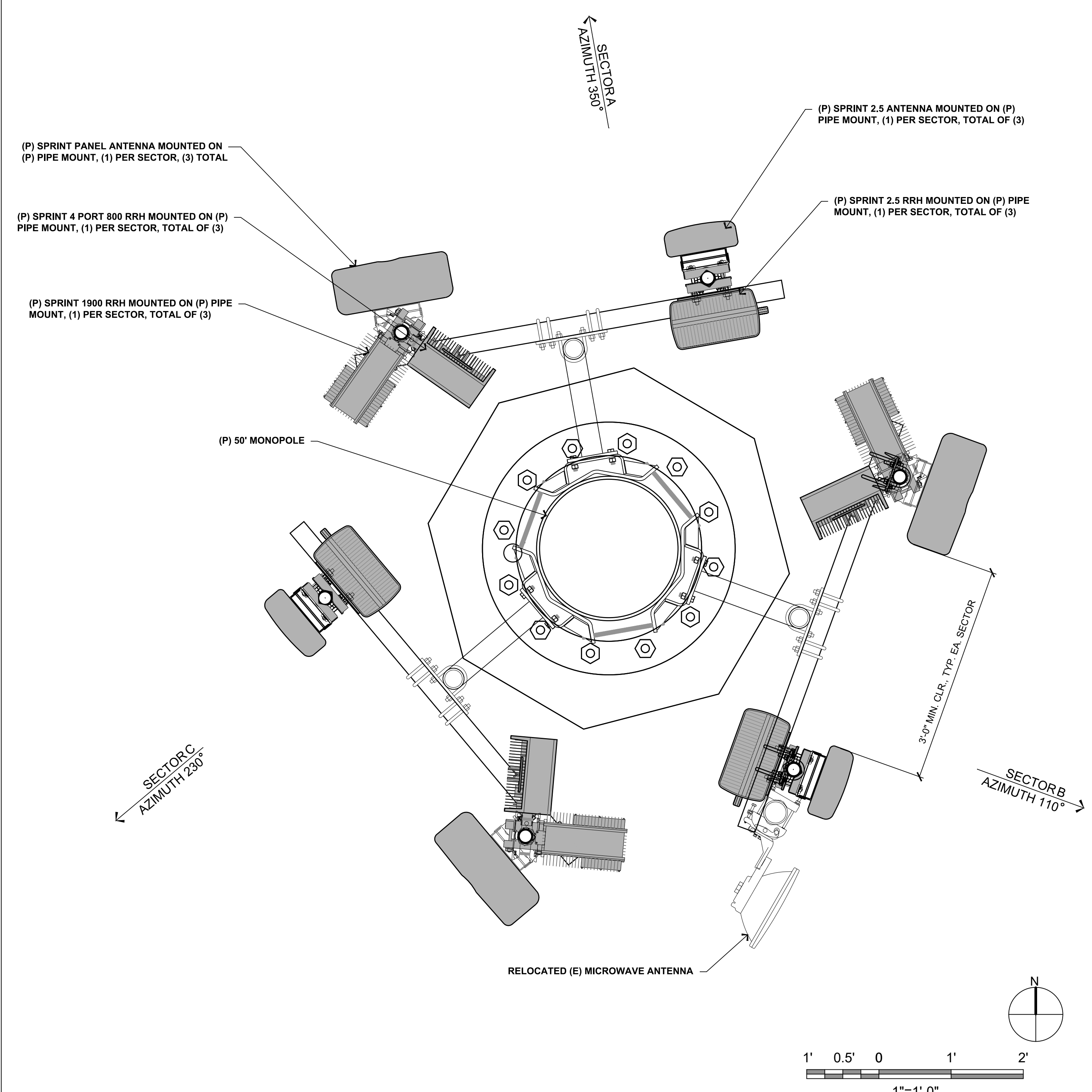
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SHEET TITLE  
**ENLARGED ANTENNA LAYOUT**

SHEET NUMBER  
**A-2.2**



17 EXISTING ANTENNA LAYOUT  
3/8" = 1'-0"



9 PROPOSED ANTENNA LAYOUT  
1" = 1'-0"

PROJECT NO: T-16503-45, DATE: 10/30/18, DRAWN BY: J.E.S., CHECKED BY: M.T.D., SCALE: 1/2" = 1'-0", SHEET: A-2.2, PROJECT: CHERRY INDUSTRIAL, 6590 CENTRAL AVENUE, NEWARK, CA 94583.

REV	DATE	DESCRIPTION
B	4/15/2019	100% ZD REV.1
A	10/30/18	100% ZD SUBMITTAL

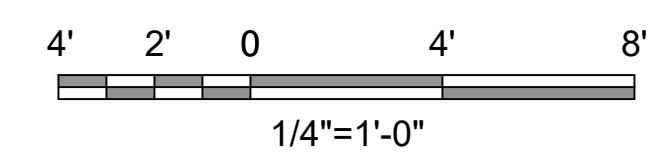
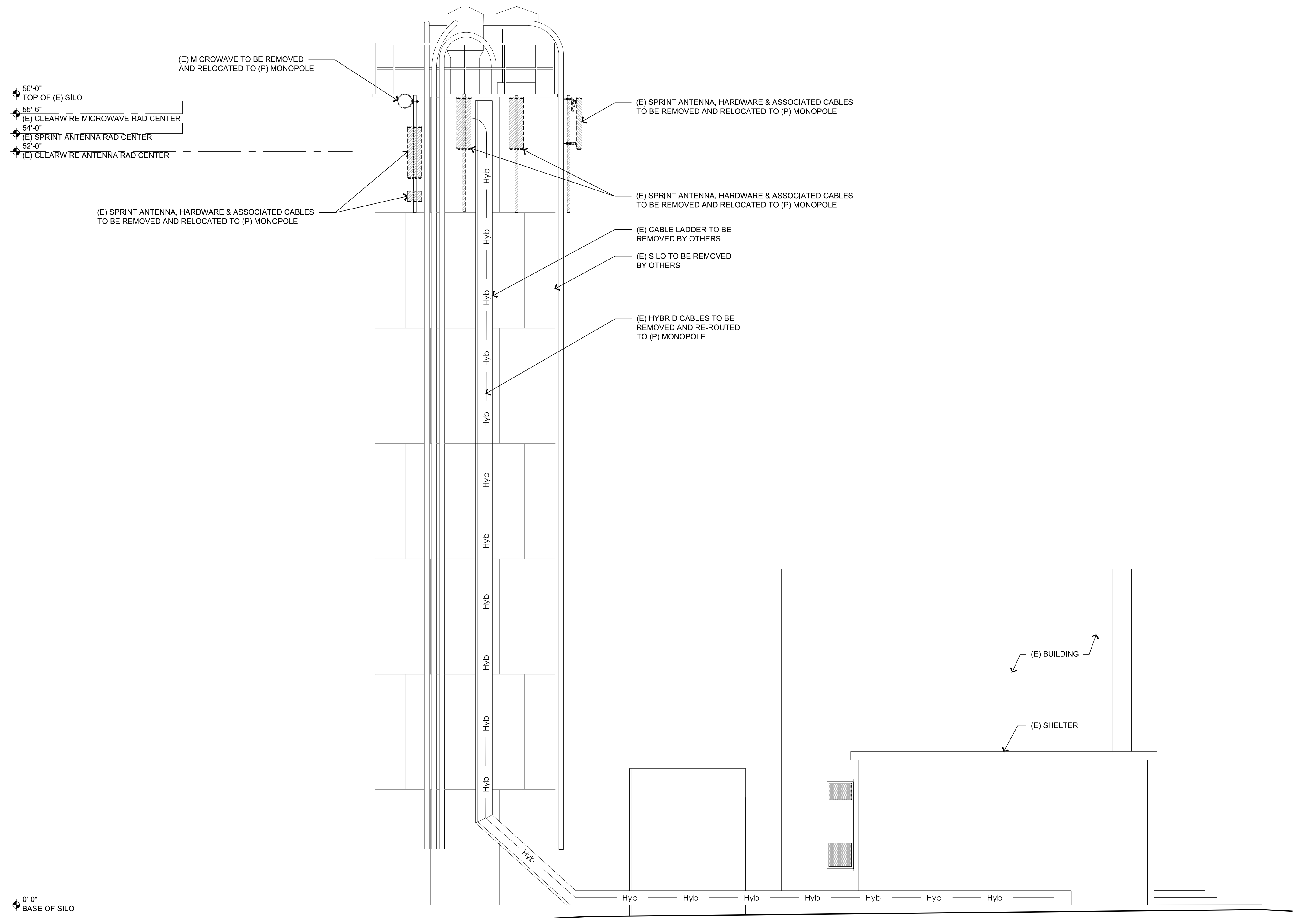
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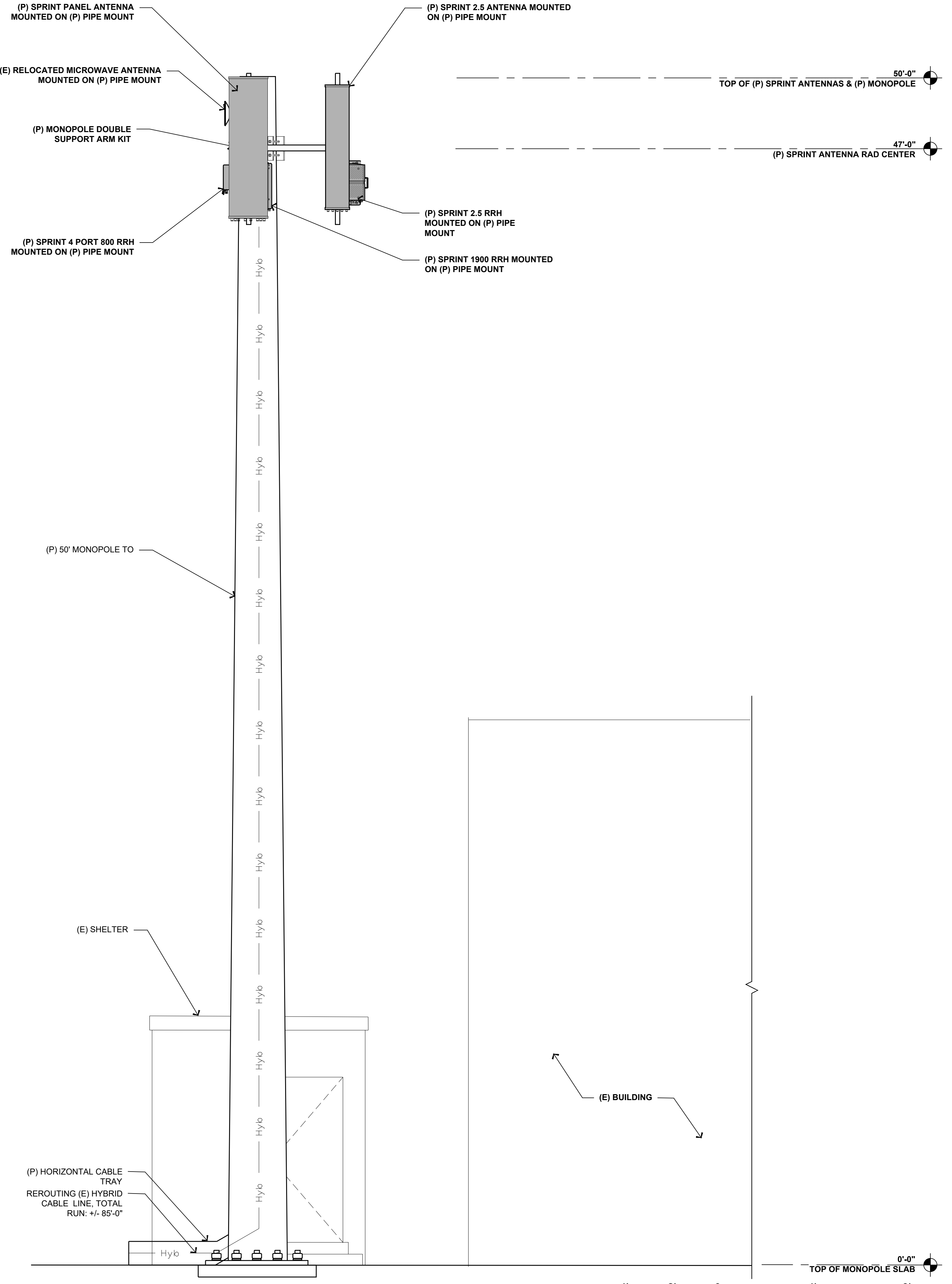
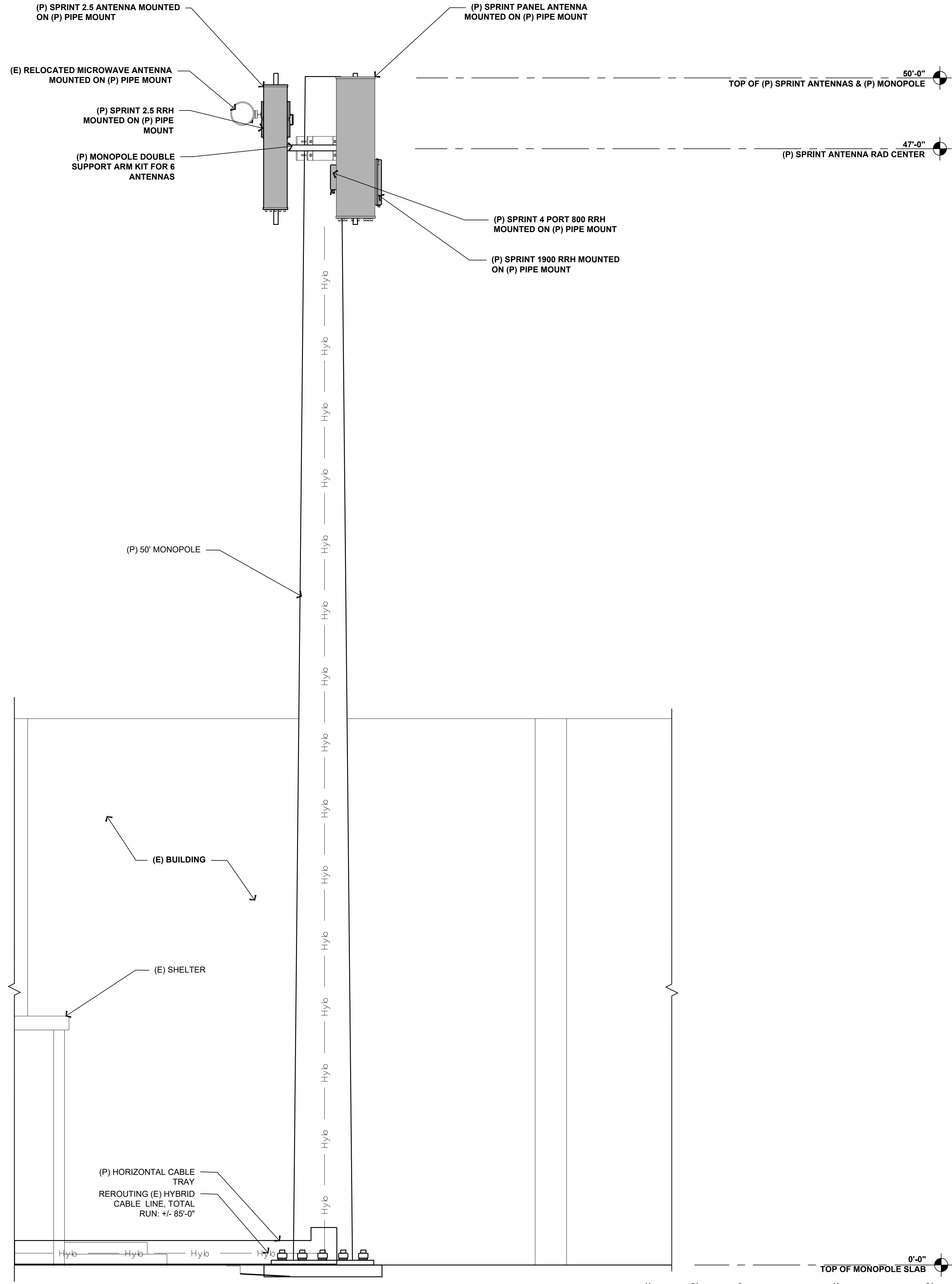
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SHEET TITLE  
 ELEVATIONS

SHEET NUMBER  
**A-3.1**







17 PROPOSED SOUTHEAST ELEVATION  
3/8" = 1'-0"

9 PROPOSED NORTHEAST ELEVATION  
3/8" = 1'-0"

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PROJECT NO: T-16503-45  
DRAWN BY: J.E.S  
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REV	DATE	DESCRIPTION
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SHEET TITLE  
ELEVATIONS

SHEET NUMBER  
**A-3.2**

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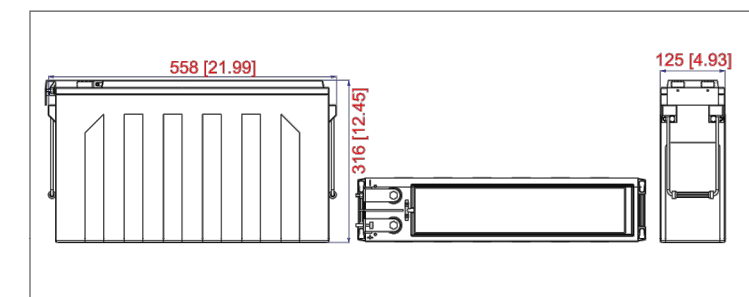
stored energy solutions for a demanding world



Model: 12NDT190

The Acme T range of front access VRLA batteries has been specifically designed for applications using 19" and 23" cabinets, especially telecoms. Reliability is assured with the patented post seal and a state-of-the-art design developed to comply with the latest IEC, British and Telcordia standards. A 12+ years design life and centralised venting system add to the suitability and flexibility of this superior range.

Dimensions-mm (inch)



**Specifications**

Battery Model	12NDT190
Nominal Voltage	12V
Rated Capacity	190Ah (10 hour rate) to 1.80V/cell @25°C(77°F)
Typical Weight	60.5kg
Internal Resistance	Approx 3.98mΩ
Temperature Ranges	Operation (maximum): -40°C to 50°C (-40°F to 122°F) Operation (recommended): 15°C to 25°C (59°F to 77°F) Storage: -20°C to 40°C (-4°F to 104°F)
Float Voltage	2.25V/cell@25°C(77°F)
Recommended Maximum Charging Current Limit	47.5A
Equalize and Cycle Service	2.35V~2.40V/cell@25°C(77°F)
Self Discharge	The residual capacity is above 90% after 90 days storage(25°C/77°F)
Terminal	M6 Female
Terminal Hardware Torque	8 ± 1.0Nm
Container Material	ABS (V0 optional)

**Constant Current Discharge Characteristics Units: Amperes (25°C, 77°F)**

Current (A)	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	9.00	10.00
1.60V	532	334	229	162	132	102	82.8	67.2	54.0	42.8	33.6	26.4	21.0	16.2	12.6	9.8	7.8	6.2
1.67V	498	328	216	161	131	101	81.6	66.0	52.8	41.6	32.4	25.2	19.8	15.0	11.4	8.8	7.0	5.6
1.70V	480	322	213	160	130	100	81.0	65.4	52.2	41.0	31.8	24.6	19.2	14.4	10.8	8.4	6.8	5.4
1.75V	456	308	205	157	129	101	80.4	64.8	51.6	40.4	31.2	24.0	18.6	13.8	10.2	7.8	6.2	4.8
1.80V	410	283	193	150	125	102	81.6	66.0	52.8	41.6	32.4	25.2	19.8	15.0	11.4	8.8	7.0	5.6
1.83V	374	265	184	144	122	102	81.6	66.0	52.8	41.6	32.4	25.2	19.8	15.0	11.4	8.8	7.0	5.6
1.85V	355	252	179	138	119	102	81.6	66.0	52.8	41.6	32.4	25.2	19.8	15.0	11.4	8.8	7.0	5.6

**Discharge Data with Constant Power Units: Watts per cell (25°C, 77°F)**

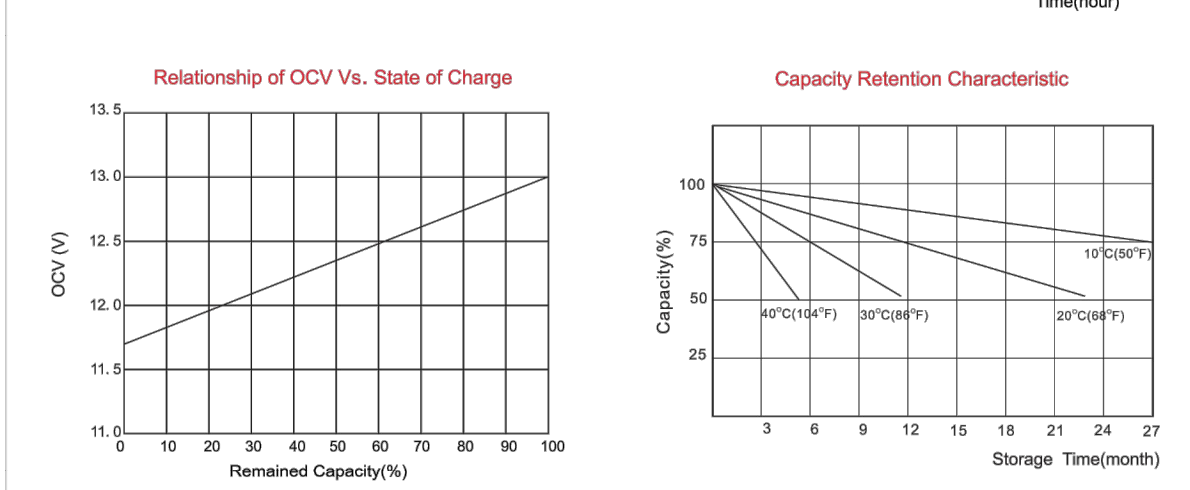
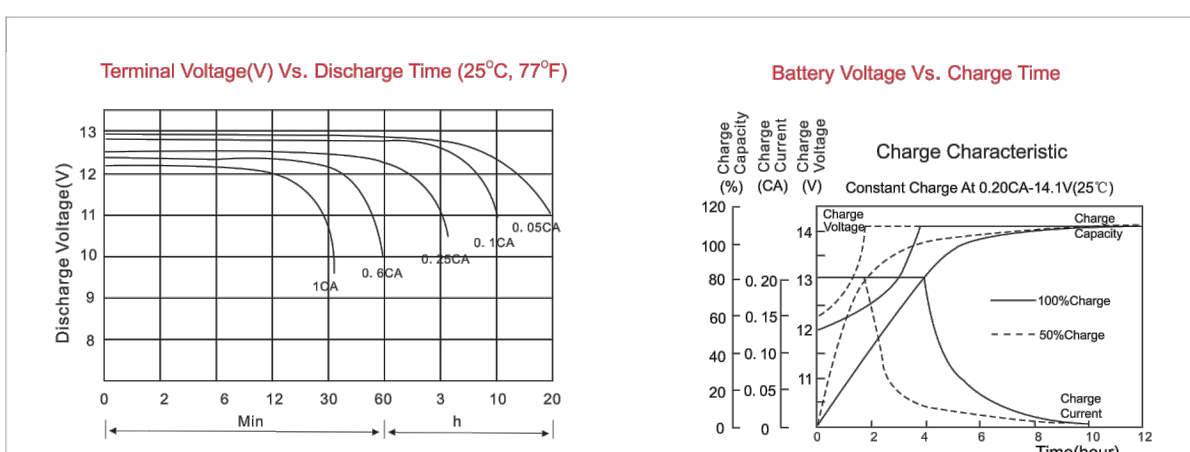
Power (W)	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.50	4.00	4.50	5.00	6.00	7.00	8.00	9.00	10.00
1.60V	928	616	395	317	269	159	113	88.1	74.2	63.1	48.5	41.6	36.0	22.1	18.4	14.4	11.8	9.4
1.67V	877	600	392	315	268	159	113	87.8	73.9	62.9	48.3	41.5	35.9	21.9	18.3	14.3	11.7	9.3
1.70V	846	588	389	314	267	158	112	87.6	73.6	62.8	48.2	41.5	35.8	21.8	18.2	14.2	11.6	9.2
1.75V	781	566	382	309	263	157	112	87.1	73.1	62.5	47.9	41.4	35.7	21.5	18.2	14.2	11.6	9.2
1.80V	718	535	370	300	256	154	110	86.0	72.1	62.0	47.6	41.2	35.5	21.2	18.2	14.2	11.6	9.2
1.83V	697	507	359	291	249	150	108	85.0	71.0	61.3	47.4	40.9	35.3	21.0	18.1	14.1	11.5	9.1
1.85V	683	483	351	285	244	147	105	83.9	69.8	60.6	47.1	40.7	35.0	20.7	18.0	14.0	11.4	9.0

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stored energy solutions for a demanding world



Model: 12NDT190



**Charging Procedures**

Application	Temperature	Set Point	Allowable Range	Max. Charge Current
Cycle	25°C	2.40	2.35~2.40	0.25C
Standby	25°C	2.25	2.23~2.27	

**Discharge Current VS. Discharge Voltage**

Final Discharge Voltage/V/Cell	1.80	1.70	1.55	1.30
Discharge Current (A)	0.2C(A)	0.2C(A)+0.5C	0.5C(A)+1.0C	(A)+1.0C

NARADA POWER SOURCE CO., LTD. 72 JINGGUAN ROAD, QINGSHAN TOWN, LIN'AN ECONOMIC DEVELOPMENT ZONE, ZHEJIANG, CHINA 311305  
 TEL: (+86-571) 56975980 FAX: (+86-571) 56975955  
 Website: www.naradabattery.com Email: intl@narada.biz

NARADA ASIA PACIFIC PTE. LTD. 65 Ubi Crescent #07-03 Ubi Centre, Singapore  
 Tel: +65-6648 1191 Fax: +65-6749 3498  
 Website: www.naradabattery.com Email: intl@narada.biz

NARADA EUROPE (UK) LIMITED Spectrum House, Dunstable Road, Redbourn, St. Albans, Herts. AL3 7PP, UK  
 Tel: +44 (0)845 371 7099 Fax: +44 (0)845 612 2031  
 Email: sales@naradapower.com



12NDT190-D30-EN (Ver 03 July 2012) Subject to revision without prior notice. E.S.O.E.

MATERIAL SAFETY DATA SHEET

Jan. 20, 2015

**SECTION 1: PRODUCTS AND MANUFACTURE**  
 Product: Valve Regulated Lead Acid Battery (VRLA Battery)  
 Manufacturer: **NARADA POWER SOURCE CO., LTD.**  
 72 Jingguan Road, Qingshan Town, Lin'an Economic Development Zone, Zhejiang, China 311305  
 Tel: (+86-571) 56975980 Fax: (+86-571) 56975955  
 Email: intl@narada.biz Website: www.naradabattery.com

**Product:** COMMERCIAL NAME: BATTERIES WITH ABSORBED ELECTROLYTE WET, NON-SPILLABLE  
**TECHNICAL NAME:** BATTERIES CONTAINING A SOLUTION OF SULPHURIC ACID AND DISTILLED WATER, ABSORBED IN SEPARATORS

**SECTION 2: HAZARDOUS COMPONENTS**

COMPONENTS	%WEIGHT	TLV	LD50 ORAL	LC50 INHALATION	LC50 CONTACT
Lead (Pb, PbO2, PbSO4)	About 70%	-	(500) mg/Kg	-	-
Sulfuric Acid DILUTED SULPHURIC ACID - H2SO4	About 20%	1 mg/m <sup>3</sup>	(2.140) mg/Kg	-	-
Fiberglass Separator	About 5%	-	-	-	-
ABS or PP	About 5%	-	-	-	-

**SECTION 3: PHYSICAL DATA**

COMPONENTS	DENSITY	MELTING POINT	SOLLUBILITY (H2O)	ODOR	APPEARANCE
Lead	11.34	327.4°C (Boiling)	None	None	Silver-Gray Metal
Lead Sulfate	6.2	1070°C (Boiling)	40 mg/l (15°C)	None	White Powder
Lead Dioxide	9.4	290°C (Boiling)	None	None	Brown Powder
Sulfuric Acid	About 1.3	About 114°C (Boiling)	100%	Acidic	Clear Colorless Liquid
Fiberglass Sep.	-	-	SLIGHT	TOXIC	WHITE FIBROUS GLASS
ABS or PP	-	-	NONE	NO ODOR	SOLID

**NARADA POWER SOURCE CO., LTD.**  
 72 Jingguan Road, Qingshan Town, Lin'an Economic Development Zone, Zhejiang, China 311305  
 Tel: (+86-571) 56975980 Fax: (+86-571) 56975955  
 Email: intl@narada.biz Website: www.naradabattery.com



**SECTION 4: PROTECTION**

EXPOSURE	PROTECTION	COMMENTS
SKIN	Rubber gloves, Apron, Safety shoes	Protective equipment must be worn if battery is cracked or otherwise damaged.
RESPIRATORY	Respirator (for lead)	A respirator should be worn during reclaim operations if the TLV exceeded.
EYES	Safety goggles, Face Shield	

**SECTION 5: FLAMMABILITY DATA**

COMPONENTS	FLASHPOINT	EXPLOSIVE LIMITS	COMMENTS
Lead	None	None	
Sulfuric Acid	None	None	
Hydrogen	259°C	4% - 74.2%	Sealed batteries can emit hydrogen only if over charged (float voltage > 2.4 VPC). The gas enters the air through the vent caps. To avoid the chance of a fire or explosion, keep sparks and other sources of ignition away from the battery. Extinguishing Media: Dry chemical, foam, CO2.
Fiberglass Sep.	-	-	Toxic vapors may be released. In case of fire: wear self-contained breathing apparatus.
478 Polystyrene	None	-	Temperatures over 300 °C (572°F) may release combustible gases. In case of fire: wear positive pressure self-contained breathing apparatus.

**SECTION 6: REACTIVITY DATA**

COMPONENT	Lead/lead compounds
STABILITY	Stable
INCOMPATIBILITY	Potassium, carbides, sulfides, peroxides, phosphorus, sulfur.
DECOMPOSITION PRODUCTS	Oxides of lead and sulfur.
CONDITIONS TO AVOID	High temperature, Sparks and other sources of ignition.
COMPONENT	Sulfuric Acid
STABILITY	Stable at all temperatures
POLYMERIZATION	Will not polymerize
INCOMPATIBILITY	Reactive metals, strong bases, most organic compounds
DECOMPOSITION	Sulfuric dioxide, trioxide, hydrogen sulfide, hydrogen

**NARADA POWER SOURCE CO., LTD.**  
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PROJECT NO: T-16503-45

DRAWN BY: J.E.S

CHECKED BY: M.T.D.

REV	DATE	DESCRIPTION
B	4/15/2019	100% ZD REV.1
A	10/30/18	100% ZD SUBMITTAL

10/30/18  
100% ZD Submittal

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**SF52XC168**  
 Cherry Industrial  
 6590 CENTRAL AVENUE  
 NEWARK, CA

SHEET TITLE  
**BATTERY SPECIFICATIONS**

SHEET NUMBER  
**A-4.2**



PRODUCTS	CONDITIONS TO AVOID
	Prohibit smoking, sparks, etc. from battery charging area. Avoid mixing acid with other chemicals.

**SECTION 7: CONTROL MEASURES**

- Store lead/acid batteries with adequate ventilation. Room ventilation is required for batteries utilized for standby power generation. Never recharge batteries in an unventilated, enclosed space.
- Do not remove vent caps. Follow shipping and handling instructions that are applicable to the battery type. To avoid damage to terminals and seals, do not double-stack industrial batteries.

**STEPS TO TAKE IN CASE OF LEAKS OR SPILLS**

If sulfuric acid is spilled from a battery, neutralize the acid with sodium bicarbonate (baking soda), sodium carbon (soda ash), or calcium oxide (lime). Flush the area with water discard to the sewage systems. Do not allow unneutralized acid into the sewage system.

**WASTE DISPOSAL METHOD:**

Neutralized acid may be flushed down the sewer. Spent batteries must be treated as hazardous waste and disposed of according to local state, and federal regulations. A copy of this material safety data must be supplied to any scrap dealer or secondary smelter with battery.

**ELECTRICAL SAFETY**

Due to the battery's low internal resistance and high power density, High levels of short circuit can be developed across the battery terminals. Do not rest tools or cables on the battery. Use insulated tools only. Follow all installation instruction and diagrams when installing or maintaining battery systems.

**SECTION 8: HEALTH HAZARD DATA**

**LEAD:** The toxic effects of lead are accumulative and slow to appear. It affects the kidneys, reproductive, and central nervous system.

The symptoms of lead overexposure are anemia, vomiting, headache, stomach pain (lead colic), dizziness, loss of appetite, and muscle and joint pain. Exposure to lead from a battery most often occurs during lead reclaim operations through the breathing or ingestion of lead dusts and fumes.

THIS DATA MUST BE PASSED TO ANY SCRAP OR SMELTER WHEN A BATTERY IS RESOLD.

**SULFURIC ACID:** Sulfuric acid is a strong corrosive. Contact with acid can cause severe burns on the skin and in the eyes. Ingestion of sulfuric acid will cause GI tract burns. Acid can be released if the battery case is damaged or if the vents are tampered with.

**FIBERGLASS SEPARATOR:** Fibrous glass is an irritant of the upper respiratory tract, skin and eyes. For exposure up to 10F/CC use MSA Comfort with type H filter. Above 10F/CC up to 50F/CC use Ultra-Twin with type H filter.

NTP or OSHA does not consider this product carcinogenic.

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**SECTION 9: SULFURIC ACID PRECAUTIONS**

**INHALATION:** Acid mist form formation process may cause respiratory irritation, remove from exposure and apply oxygen if breathing is difficult.

**SKIN CONTACT:** Acid may cause irritation, burns or ulceration. Flush with plenty of soap and water, remove contaminated clothing, and see physician if contact area is large or if blisters form.

**EYE CONTACT:** Acid may cause severe irritation, burns, cornea damage and blindness. Call physician immediately and flush with water until physician arrives.

**INGESTION:** Acid may cause irritation of mouth, throat, esophagus and stomach. Call physician. If patient is conscious, flush mouth with water, have the patient drink milk or sodium bicarbonate solution.

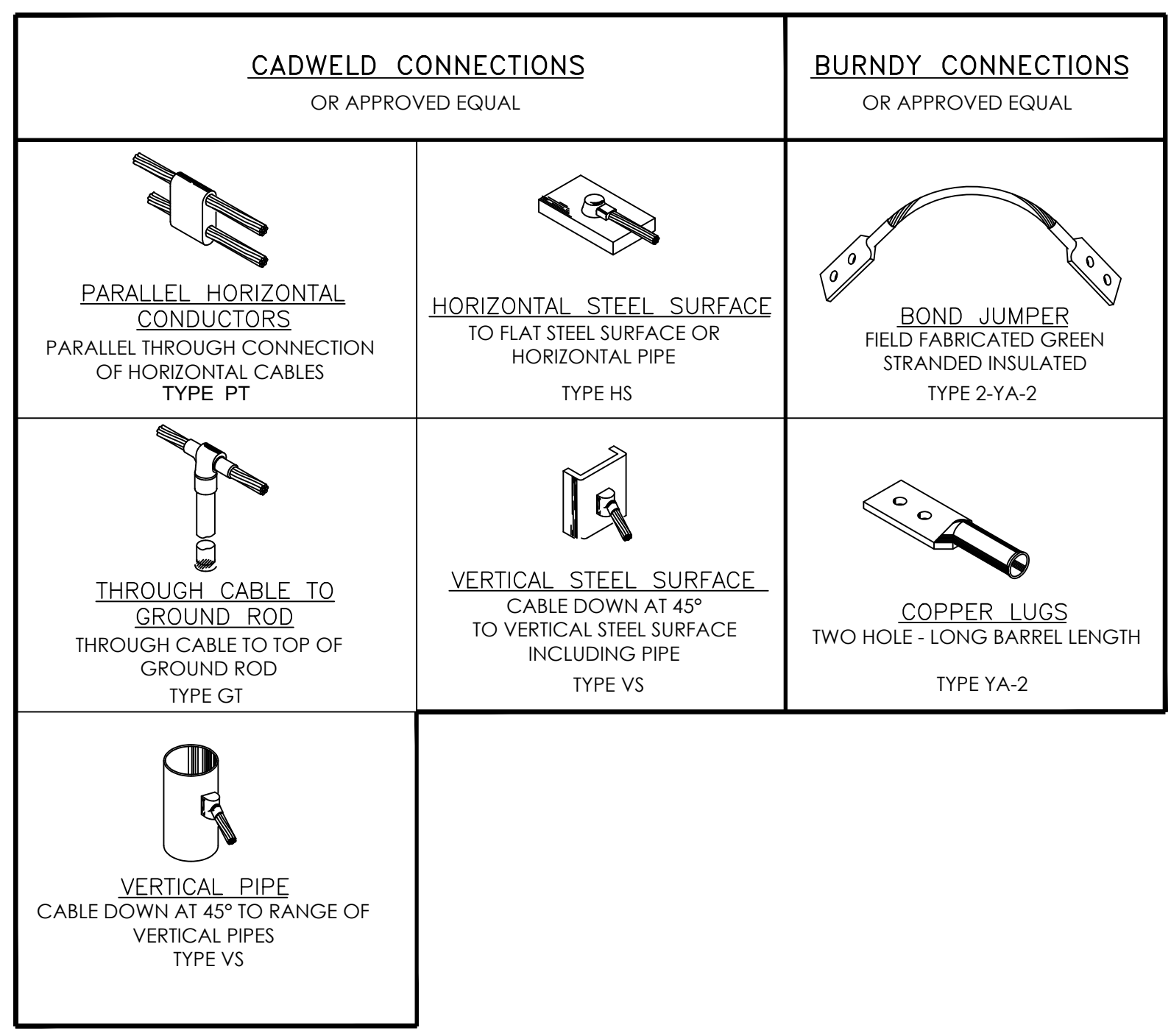
DO NOT GIVE ANYTHING TO AN UNCONSCIOUS PERSON.

**SECTION 10: TRANSPORTATION REGULATIONS**

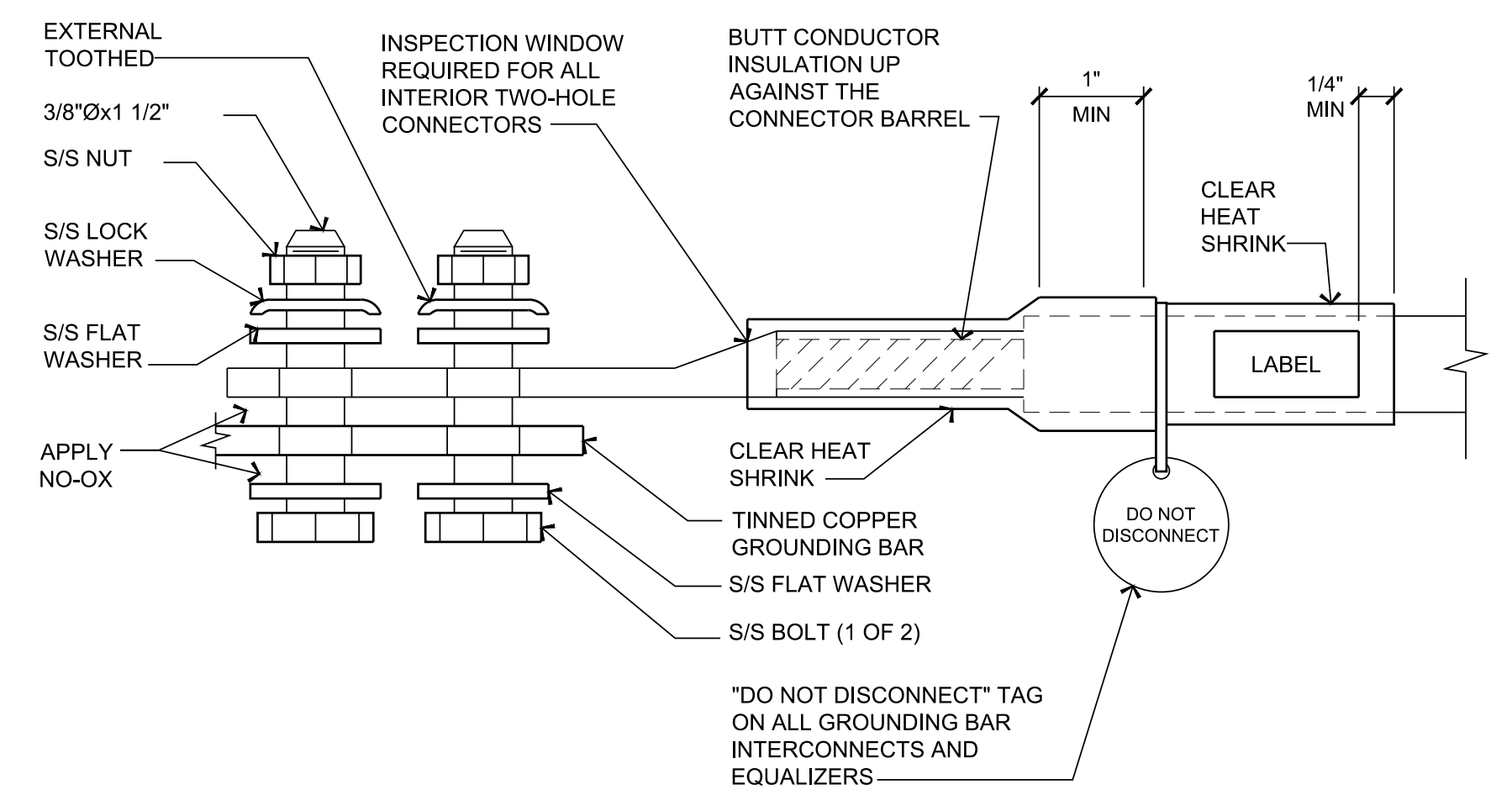
Acceptable modes of transportation: air, rail, road and water. Batteries must be protected so as to prevent short circuit and must be securely packed.

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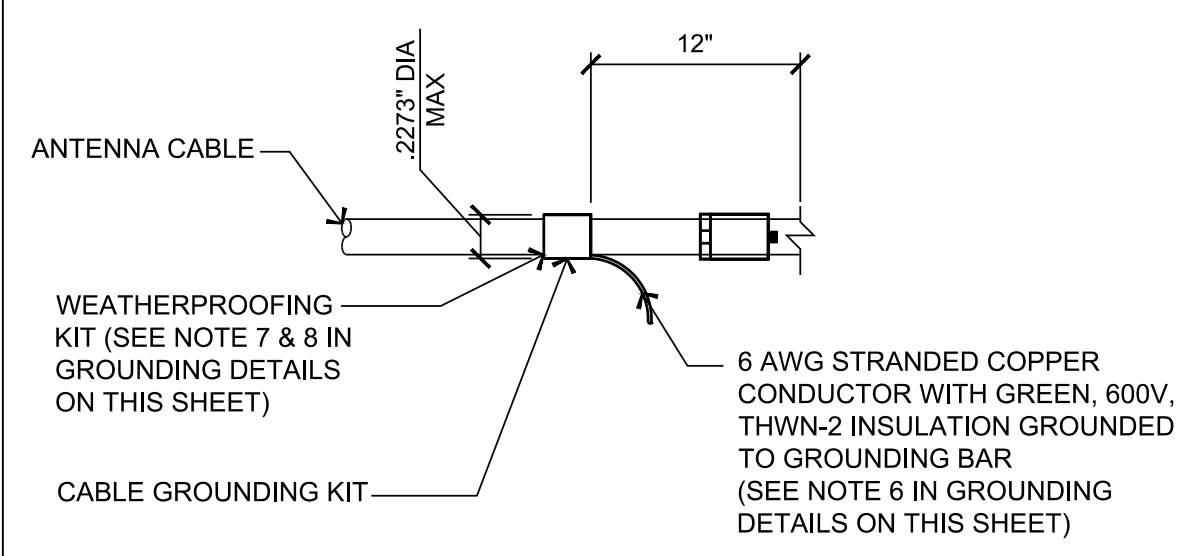




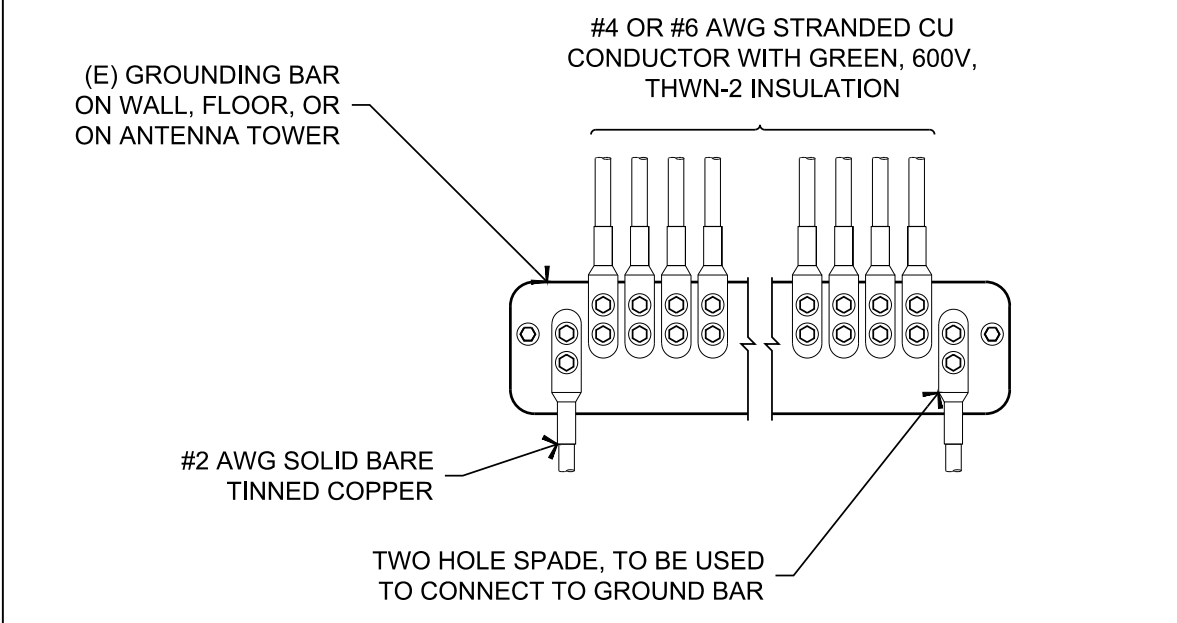
TYPICAL CADWELD TYPE CONNECTIONS  
NO SCALE



12 TWO HOLE LUG  
NOT TO SCALE

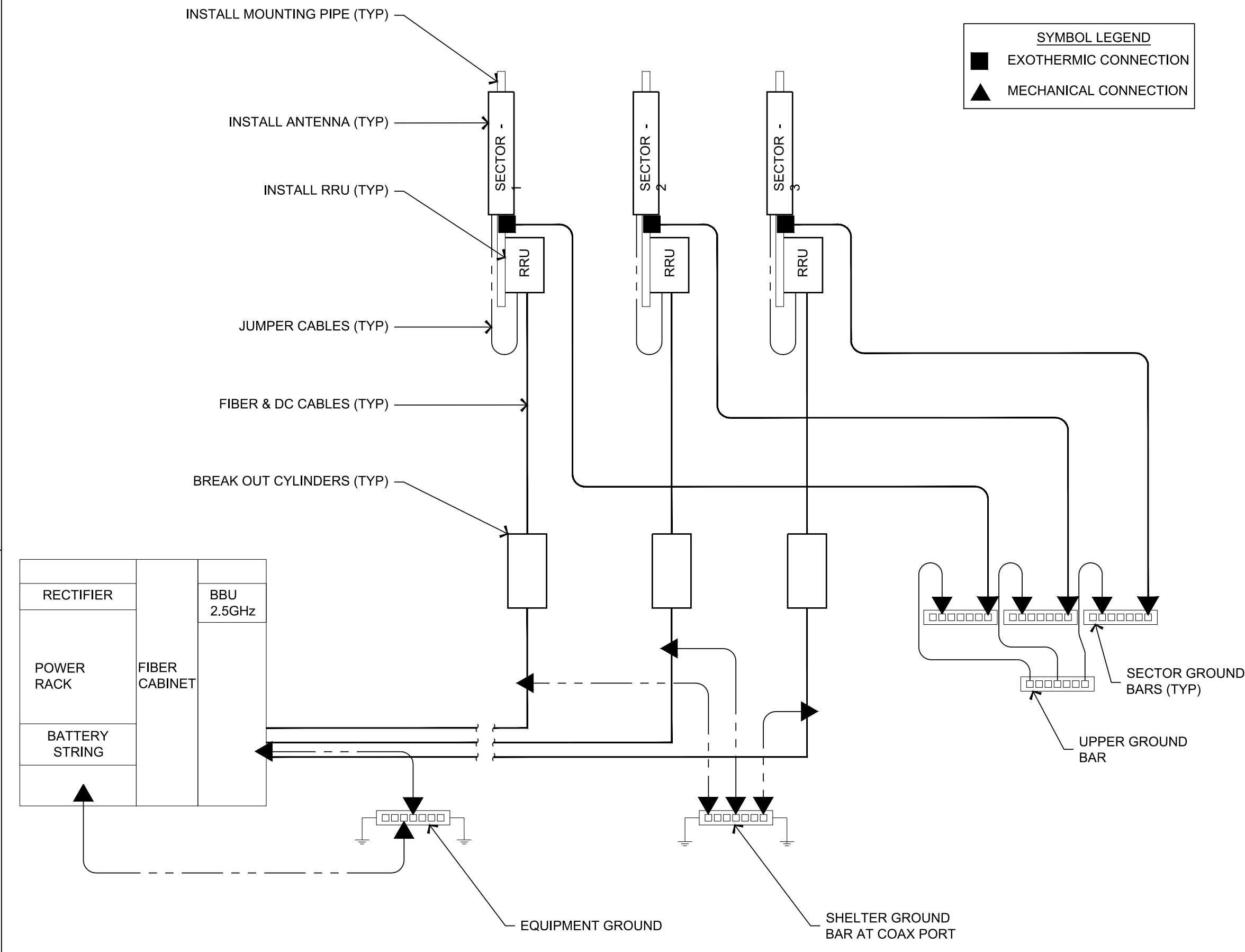


11 CONNECTION OF GROUNDING KIT TO ANTENNA CABLE  
NOT TO SCALE



- NOTES
1. APPLY NO-OX TO LUG AND BAR CONTACT SURFACE. DO NOT COAT INLINE LUG.
  2. IF STOLEN GROUND BARS ARE ENCOUNTERED, CONTACT SPRINT CM FOR REPLACEMENT THREADED ROD KIT.

10 GROUNDING CONDUCTOR TO GROUNDING BAR  
3/8" = 1'-0"



6 GROUNDING RISER DIAGRAM  
1/2" = 1'-0"

1. COMPRESSION CONNECTIONS (2) 2 AWG BARE TINNED SOLID COPPER CONDUCTORS TO GROUNDING BAR. ROUTE CONDUCTORS TO BURIED GROUNDING RING AND PROVIDE PARALLEL EXOTHERMIC WELD.
2. EC SHALL USE PERMANENT MARKER TO DRAW THE LINES BETWEEN EACH SECTION AND LABEL EACH SECTION ("P", "A", "N", "T") WITH 1" HIGH LETTERS.
3. ALL HARDWARE 18-8 STAINLESS STEEL, INCLUDING LOCK WASHERS, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING. ALL HARDWARE SHALL BE STAINLESS STEEL 3/8 INCH DIAMETER OR LARGER.
4. FOR GROUND BOND TO STEEL ONLY: INSERT A CADMIUM FLAT WASHER BETWEEN LUG AND STEEL, COAT ALL SURFACES WITH AN ANTI-OXIDANT COMPOUND BEFORE MATING.
5. NUT & WASHER SHALL BE PLACED ON THE FRONT SIDE OF THE GROUNDING BAR AND BOLTED ON THE BACK SIDE. INSTALL BLACK HEAT-SHRINKING TUBE, 600 VOLT INSULATION, ON ALL GROUNDING TERMINATIONS. THE INTENT IS TO WEATHERPROOF THE COMPRESSION CONNECTION.
6. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. PROVIDE AS REQUIRED.
7. GROUNDING KIT SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
8. WEATHERPROOFING SHALL BE TYPE AND PART NUMBER AS SUPPLIED OR RECOMMENDED BY CABLE MANUFACTURER.
9. GROUND RESISTANCE NOT TO EXCEED 10 OHMS.
10. WHEN THE SCOPE OF WORK REQUIRES THE ADDITION OF A GROUNDING BAR TO AN EXISTING TOWER, THE SUBCONTRACTOR SHALL OBTAIN APPROVAL FROM THE TOWER OWNER PRIOR TO MOUNTING THE GROUNDING BAR TO THE TOWER.
11. EXTEND TWO (2) 2 AWG TINNED CU CONDUCTOR FROM BURIED GROUNDING RING AND CONNECT TO THE PROPOSED TOWER. FOLLOW MANUFACTURERS RECOMMENDATIONS FOR GROUNDING CONNECTIONS TO THE TOWER. (APPLICABLE TO NEW TOWERS ONLY.)
12. NUMBER OF GROUNDING BARS MAY VARY DEPENDING ON THE TYPE OF TOWER, ANTENNA LOCATION, AND CONNECTION ORIENTATION. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ADDITIONAL GROUNDING BARS AS REQUIRED, PROVIDING 50% SPARE CONNECTION POINTS.

5 GROUNDING NOTES  
NOT TO SCALE

**GROUNDING NOTES**

1. ALL ELECTRICAL AND GROUNDING AT THE CELL SITE SHALL COMPLY WITH THE NATIONAL ELECTRICAL CODE (NEC), NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 780 (LATEST EDITION), AND MANUFACTURER SPECIFICATION.
2. IF THE AC PANEL IN THE POWER CABINET IS WIRED AS SERVICE ENTRANCE, THE AC SERVICE GROUND CONDUCTOR SHALL BE CONNECTED TO GROUND ELECTRODE SYSTEM. WHEN THE AC PANEL IN THE POWER CABINET IS CONSIDERED A SUB-PANEL, THE GROUND WIRE SHALL BE INSTALLED IN THE AC POWER CONDUIT. THE INSTALLATION SHALL BE PER LOCAL AND NATIONAL ELECTRIC CODE (NFPA-70).
3. EXOTHERMIC WELDING IS RECOMMENDED FOR GROUNDING CONNECTION WHERE PRACTICAL. OTHERWISE, THE CONNECTION SHALL BE MADE USING COMPRESSION TYPE-2 HOLES. LONG BARREL LUGS OR DOUBLE CRIMP CLAMP "C" CLAMP. THE COPPER CABLES SHALL BE COATED WITH ANTI-OXIDANT (COPPER SHIELD) BEFORE MAKING THE CONNECTIONS. THE MANUFACTURER'S TORQUING RECOMMENDATIONS ON THE BOLT ASSEMBLY TO SECURE CONNECTIONS SHALL BE FOLLOWED.
4. THE ANTENNA CABLES SHALL BE GROUNDED AT THE TOP AND BOTTOM OF THE VERTICAL RUN FOR LIGHTNING PROTECTION. THE ANTENNA CABLE SHIELD SHALL BE BONDED TO A COPPER GROUND BUSS AT THE LOWER MOST POINT OF A VERTICAL RUN JUST BEFORE IT BEGINS TO BEND TOWARD THE HORIZONTAL PLANE. WIRE RUNS TO GROUND SHALL BE KEPT AS STRAIGHT AND SHORT AS POSSIBLE. ANTENNA CABLE SHIELD SHALL BE GROUNDED JUST BEFORE ENTERING THE CELL CABINET. ANY ANTENNA CABLES OVER 200 FEET IN LENGTH SHALL ALSO BE EQUIPPED WITH ADDITIONAL GROUNDING AT MID-POINT.
5. ALL GROUNDING CONDUCTORS INSIDE THE BUILDING SHALL BE RUN IN CONDUIT RACEWAY SYSTEM, AND SHALL BE INSTALLED AS STRAIGHT AS PRACTICAL WITH MINOR BENDS TO AVOID OBSTRUCTIONS. THE BENDING RADIUS OF ANY #2 GROUNDING CONDUCTOR IS 9". PVC RACEWAY MAY BE FLEXIBLE OR RIGID PER THE FIELD CONDITIONS. GROUNDING CONDUCTORS SHALL NOT MAKE CONTACT WITH ANY METALLIC CONDUITS, SURFACES OR EQUIPMENT.
6. PROVIDE PVC SLEEVES WHERE GROUNDING CONDUCTORS PASS THROUGH THE BUILDING WALLS AND /OR CEILINGS.
7. INSTALL GROUND BUSHINGS ON ALL METALLIC CONDUITS AND BOND TO THE EQUIPMENT GROUND BUSS IN THE PANEL BOARD.
8. GROUND ANTENNA BASES, FRAMES, CABLE RACKS AND OTHER METALLIC COMPONENTS WITH #2 GROUNDING CONDUCTORS AND CONNECT TO INSULATED SURFACE MOUNTED GROUND BARS. CONNECTION DETAILS SHALL FOLLOW MANUFACTURER'S SPECIFICATIONS FOR GROUNDING.
9. ALL PROPOSED GROUNDING CONDUCTORS SHALL BE ROUTED AND CONNECTED TO THE MAIN GROUND BAR OR EXISTING GROUND RING.

**GROUNDING LEGEND**

- EXISTING GROUND RING
- CADWELD CONNECTION (EXOTHERMIC WELD)
- ▲ MECHANICAL CONNECTION
- ⊗ GROUND ROD

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**15 PANEL SCHEDULE**  
NOT TO SCALE

END OF DAY ELECTRICAL PANEL SCHEDULE

**(E) SPRINT PANEL**

VOLTAGE:	208/120 V., 3 PHASE, 4 WIRE	MOUNTING:	SURFACE	ENCLOSURE:	NEMA 1
BUS:	200 AMPS	TYPE:	200/2 TRANSFER DEVICE	AIC RATING:	22,000
LOAD	KVA	CB	NO	KVA	LOAD
INTERIOR LIGHTS	0.50	10	1	0.50	EXTERIOR LIGHTS
OUTLETS	0.18	10	3	0.18	OUTLETS
FIBER	0.18	10	5	0.18	FIBER
HVAC	2.53	40	7	2.53	HVAC
	2.53		9	2.53	
	2.53		11	2.53	
SPARE	0.00	30	13	0.00	SPARE
			15		
SPARE	0.00	30	17	0.00	SPARE
			19		
SPARE	0.00	30	21	0.00	SPARE
			23		
SPARE	0.00	30	25	0.00	SPARE
			27		
PURCELL EQUIPMENT CABINET	8.99	100	2	1.50	CLEARWIRE
	8.99		31		
SPACE			33		SPACE
SPACE			35		SPACE
SPACE			37		SPACE
SPACE			39		SPACE
SPACE			41		SPACE
			42		
CONNECTED LOAD		36.39			
25% LIGHTING					
25% LARGEST MOTOR		0.00			
TOTAL CONNECTED LOAD		36.39	CONNECTED LOAD:		101.13 AMPERES

NOTE:  
1. ALL (E) LOADS FROM SITE MUST BE INCORPORATED INTO THE (N) INTEGRATED LOAD CENTER  
2. ALL (E) CIRCUITS SHALL BE RELOCATED TO PROPOSED LOAD CENTER UPON COMPLETION OF EQUIPMENT MIGRATION

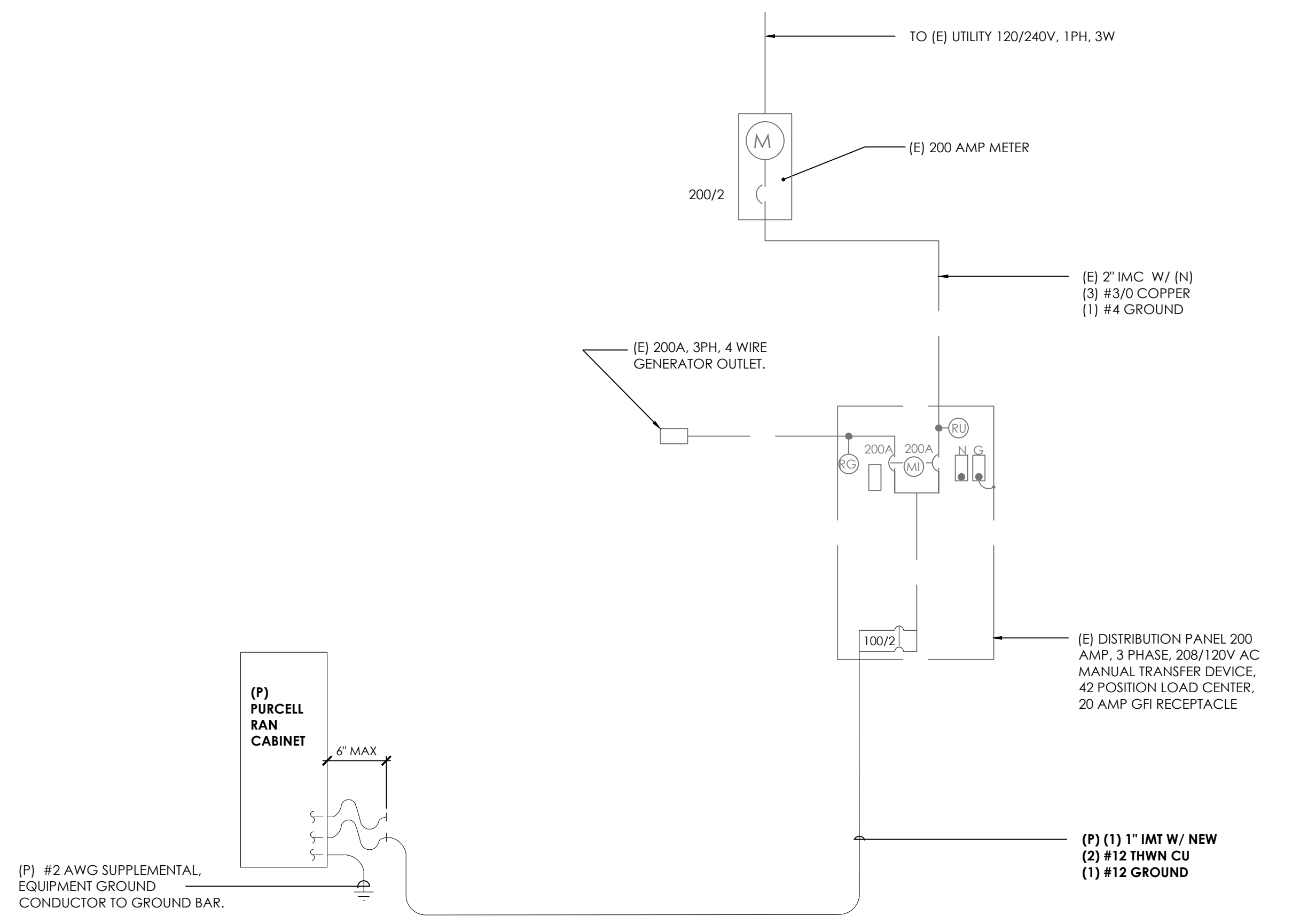
PROVIDE NEW BREAKER IN THIS EXISTING PANEL. ALL BREAKERS BOTH NEW AND EXISTING SHALL BE CLEARLY MARKED WITH PERMANENT LABELS.

- ### TYPICAL SYMBOLS
- LIGHTING FIXTURE, WALL MOUNTED
  - NIGHT LIGHT - FIXTURES TAGGED "EM" TO HAVE EMERGENCY BATTERY BALLAST
  - FLUORESCENT LIGHT FIXTURE, SEE FIXTURE SCHEDULE
  - FLUORESCENT LIGHT FIXTURE, SEE FIXTURE SCHEDULE
  - EXIT LIGHT FIXTURE, DIRECTIONAL ARROWS AS REQUIRED.
  - EMERGENCY LIGHT. MOUNT AT 84" AFF.
  - LIGHT FIXTURE TAG. SEE FIXTURE SCHEDULE.
  - FIRE ALARM CONTROL PANEL
  - FIRE PULL STATION AT +48"
  - FIRE FLOW SWITCH
  - FIRE TAMPER SWITCH
  - JUNCTION BOX
  - SINGLE POLE TOGGLE SWITCH, 20A, +48"
  - TWO GANG TOGGLE SWITCH, 20A, +48" UON LETTERS DENOTE FIXTURES SERVED
  - 2 POLE TOGGLE SWITCH, 20A, +48"
  - 3 WAY TOGGLE SWITCH, 20A, +48"
  - DIMMER SWITCH, 20A, +48"
  - TIMER SWITCH 20A, @ +48"
  - KEYED SWITCH, @ +48"
  - PUSH BUTTON
  - MOTION SENSOR SWITCH - SINGLE LEVEL LEVITON #6768 W +48"
  - MOTION SENSOR SWITCH - DUAL LEVEL LEVITON #6772 W +48"
  - CEILING HALLWAY MOUNTED OCCUPANT SENSING DEVICE, LEVITON #6787 W.
  - CEILING MOUNTED OCCUPANT SENSING DEVICE "OS", LEVITON #16786 WITH POWER PACK "PP" LEVITON #6779-DT
  - MOTION SENSOR SWITCH - CEILING MOUNTED
  - POWER PACK FOR MOTION SENSORS
  - FOURPLEX RECEPTACLE 15A, 125V, +18" AFF UON.
  - DUPLEX RECEPTACLE OUTLET 20A, 125V, +18" AFF UON
  - MOUNT OUTLET ABOVE COUNTER OR BACKSPLASH (VERIFY HEIGHT W/ARCHITECT)
  - OUTLET MOUNTED IN FLOOR OR CEILING.
  - SECURITY OUTLET WITH LOCKABLE COVER
  - TELEPHONE OUTLET: +18" AFF UON, PROVIDE PULL WIRE OR 3/4" CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE.
  - COMBINATION COMM/DATA OUTLET: +18" AFF UON, PROVIDE PULL WIRE OR 3/4" CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE.
  - DATA OUTLET: +18" AFF UON, PROVIDE PULL WIRE OR 3/4" CONDUIT TO NEAREST ACCESSIBLE CEILING SPACE.
  - TELEPHONE / DATA OUTLET MOUNTED IN FLOOR OR CEILING.
  - MICROPHONE OUTLET MOUNTED IN FLOOR OR CEILING.
  - MAIN SWITCHBOARD
  - LIGHTING OR DISTRIBUTION PANEL.
  - SURFACE OR FLUSH TERMINAL CABINET
  - DISTRIBUTION TRANSFORMER, MOUNTING AS NOTED
  - DISCONNECT SWITCH SIZE & TYPE AS REQUIRED F=FUSED
  - MOTOR SEE MECHANICAL PLANS AND SPECIFICATION
  - EXHAUST FAN - SEE MECHANICAL PLANS AND SPECIFICATION
  - MECHANICAL EQUIPMENT I.D. TAG - SEE MECHANICAL PLANS
  - CIRCUIT CONCEALED IN CEILING OR WALL
  - CIRCUIT CONCEALED IN FLOOR OR UNDERGROUND
  - HOME RUN TO PANELBOARD OR TERMINAL CABINET
  - DENOTES # OF #12 WIRES, NO MARKS = 2 #12, 1/2" C, CURVED HATCH DENOTES GROUND, OTHERS AS NOTED
  - CONDUIT SEAL OFF
  - TELEPHONE TERMINAL BOARD: SIZE AS SHOWN, FOURPLEX RECEPTACLE & 1 #6 CU TO GROUND.
- NOTE: SYMBOLS INDICATED ABOVE MAY NOT NECESSARILY APPEAR AS PART OF THESE DRAWINGS IF NOT REQUIRED.

**ABBREVIATIONS**

- BCW BARE COPPER WIRE
- C CONDUIT
- CEC CALIFORNIA ELECTRICAL CODE
- (E) EXISTING
- EG EQUIPMENT GROUND
- FACP FIRE ALARM CONTROL PANEL
- G GROUND FAULT CIRCUIT INTERRUPTER
- IG ISOLATED GROUND
- IMC INTERMEDIATE METAL CONDUIT
- LFMC LIQUID TIGHT FLEXIBLE METAL CONDUIT
- MC/M MILLION CIRCULAR MILLS
- MP&S SEE MECHANICAL PLANS & SPECIFICATIONS
- (N) NEW
- NEC NATIONAL ELECTRICAL CODE - NFPA 70
- NEMA NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- NL NIGHT LIGHT - FIXTURE TO BE UNSWITCHED
- PB PROVISION FOR FUTURE BREAKER
- PVC POLYVINYL CHLORIDE CONDUIT
- (R) RELOCATE AS INDICATED
- (RV) REMOVE - RESTORE CONTINUITY TO REMAINING DEVICES.
- TYP TYPICAL
- UON UNLESS OTHERWISE NOTED
- WP WEATHERPROOF
- GFCI GROUND FAULT CIRCUIT INTERRUPTER

**13 ONE LINE DIAGRAM AND PANEL SCHEDULE**  
1" = 1'-0"



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SHEET TITLE  
**ELECTRICAL  
DETAILS & PANEL  
SCHEDULE**

SHEET NUMBER  
**E-1**