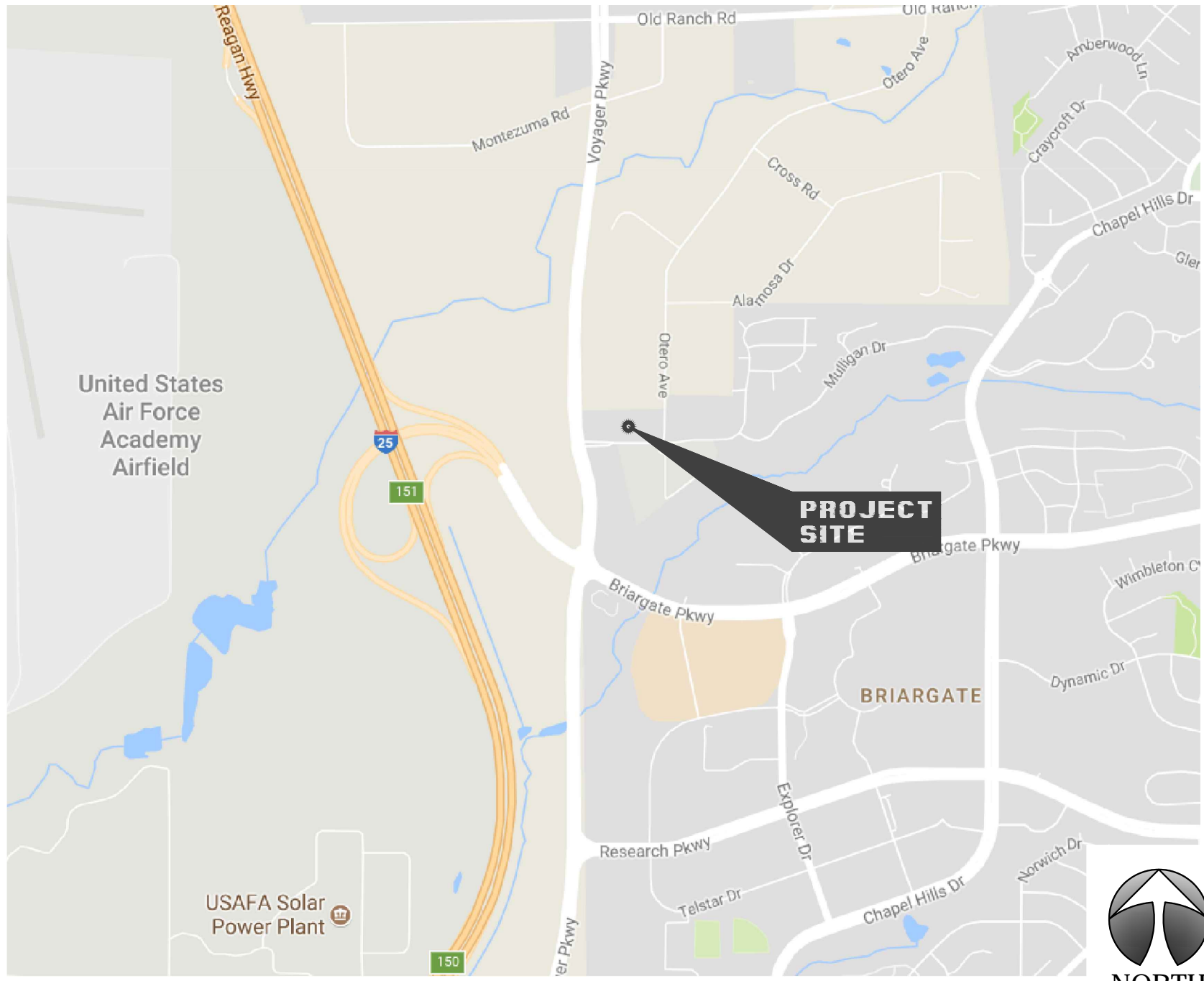


<div>PROJECT DESCRIPTION</div> <div>REPLACE (2) ANTENNAS PER SECTOR, REPLACE (3) RRH UNITS PER SECTOR, AND INSTALL (1) NEW RRH UNITS PER SECTOR. INSTALL NEW 5C & 6C RADIO CARDS. INSTALL (1) NEW CONVERTER MODULE IN EXISTING POWER PLANT.</div>				<div><div><div><div></div><div>at&t</div><div>Mobility</div></div></div></div> <div>SITE NAME: RESEARCH PARKWAY</div> <div>SITE NUMBER: COL02020</div> <div>CONSTRUCTION DRAWINGS</div>				<div><div><div><div><div><div></div><div>at&t</div><div>Mobility</div></div></div><div>AT&T MOBILITY</div><div>188 INVERNESS DR WEST, SUITE 400</div><div>ENGLEWOOD, CO 80112</div></div></div><div><div><div><div></div><div>smartlink</div></div></div><div>8502 E VIA DE VENTURA, SUITE 220</div><div>SCOTTSDALE, AZ 85258</div></div><div><div><div><div></div><div>WYCO</div></div></div><div>FIELD SERVICES</div><div>here quality still counts.</div><div>4240 E. ELWOOD ST.</div><div>PHOENIX, AZ 85040</div></div><div><div>ADDRESS</div><div>9550 OTERO AVENUE</div><div>COLORADO SPRINGS, CO 80920</div><div>SITE NUMBER</div><div>COL02020</div><div>SITE NAME</div><div>RESEARCH PARKWAY</div></div><div><div>SEAL</div></div></div>																																													
<div>SCOPE OF WORK</div> <div><div><div><input type="checkbox"/> 1C</div><div><input type="checkbox"/> 3C</div><div><input checked="" type="checkbox"/> 5C</div><div><input checked="" type="checkbox"/> RRH SWAP</div><div><input checked="" type="checkbox"/> (2) 4T4R</div></div><div><div><input type="checkbox"/> 2C</div><div><input type="checkbox"/> 4C</div><div><input checked="" type="checkbox"/> 6C</div><div><input type="checkbox"/> 2ND RRH ADD</div></div></div>				<div>VICINITY MAP</div> <div><div>DIRECTIONS: (188 INVERNESS DR WEST, SUITE 400 ENGLEWOOD, CO 80112):</div><div>GET ON I-25 S IN LONE TREE 1.7 MI, HEAD SOUTH ON INVERNESS DR W 0.4 MI, USE THE RIGHT 2 LANES TO TURN RIGHT ONTO E COUNTY LINE RD 0.3 MI, USE THE RIGHT LANE TO MERGE ONTO I-25 S VIA THE RAMP TO COLO SPRINGS 1.0 MI, FOLLOW I-25 S TO EL PASO COUNTY. TAKE EXIT 151 FROM I-25 S 43.4 MI, MERGE ONTO I-25 S 42.8 MI, TAKE EXIT 151 TOWARD BRIARGATE PKWY 0.7 MI, CONTINUE ON BRIARGATE PKWY. TAKE VOYAGER PKWY TO SPRINGCREST RD IN COLORADO SPRINGS 0.5 MI, CONTINUE ONTO BRIARGATE PKWY 0.2 MI, USE THE 2ND FROM THE LEFT LANE TO TURN LEFT ONTO VOYAGER PKWY 0.2 MI, TURN RIGHT ONTO SPRINGCREST RD 430 FT.</div></div> <div></div>		<div>APPLICABLE BLDG. CODES AND STANDARDS</div> <div><div>SUBCONTRACTOR'S WORK SHALL COMPLY WITH ALL APPLICABLE NATIONAL, STATE, AND LOCAL CODES AS ADOPTED BY THE LOCAL AUTHORITY HAVING JURISDICTION (AHJ) FOR THE LOCATION. THE EDITION OF THE AHJ ADOPTED CODES AND STANDARDS IN EFFECT ON THE DATE OF CONTRACT AWARD SHALL GOVERN THE DESIGN.</div><div>BUILDING CODE: [INTERNATIONAL BUILDING CODE (IBC), 2009 AS ADOPTED BY THE LOCAL JURISDICTION]</div><div>ELECTRICAL CODE: [NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) 70 - 2007, NATIONAL ELECTRICAL CODE, 2014 AS ADOPTED BY THE LOCAL JURISDICTION]</div><div>LIGHTNING PROTECTION CODE: [NFPA 780 - 2002, LIGHTNING PROTECTION CODE]</div><div>SUBCONTRACTOR'S WORK SHALL COMPLY WITH THE LATEST EDITION OF THE FOLLOWING STANDARDS. AMERICAN CONCRETE INSTITUTE (ACI) 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC), MANUAL OF STEEL CONSTRUCTION, ASD, THIRTEENTH EDITION ANSI/TIA 222-G, STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS.</div><div>TIA 607, COMMERCIAL BUILDING GROUNDING AND BONDING REQUIREMENTS FOR TELECOMMUNICATIONS</div><div>INSTITUTE FOR ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE) 81, GUIDE FOR MEASURING EARTH RESISTIVITY, GROUND IMPEDANCE, AND EARTH SURFACE POTENTIALS OF A GROUND SYSTEM IEEE 1100 (1999) RECOMMENDED PRACTICE FOR POWERING AND GROUNDING OF ELECTRONIC EQUIPMENT</div><div>IEEE C2 NATIONAL ELECTRIC SAFETY CODE, LATEST VERSION</div><div>TELCORDIA GR-1275, GENERAL INSTALLATION REQUIREMENTS</div><div>ANSI T1.311, FOR TELECOM - DC POWER SYSTEMS - TELECOM, ENVIRONMENTAL PROTECTION</div><div>FOR ANY CONFLICTS BETWEEN SECTIONS OF LISTED CODES AND STANDARDS REGARDING MATERIAL, METHODS OF CONSTRUCTION, OR OTHER REQUIREMENTS, THE MOST RESTRICTIVE REQUIREMENT SHALL GOVERN. WHERE THERE IS CONFLICT BETWEEN A GENERAL REQUIREMENT AND A SPECIFIC REQUIREMENT, THE SPECIFIC REQUIREMENT SHALL GOVERN.</div></div>																																															
<div>RF DATA SHEET</div> <div>DATE ISSUED: 12/05/2017</div> <div>VERSION: 2.00</div>				<div>DRAWING INDEX</div> <div><div>10093626-COL02020-T-1</div><div>10093626-COL02020-GN-1</div><div>10093626-COL02020-A-1</div><div>10093626-COL02020-A-2</div><div>10093626-COL02020-A-3</div><div>10093626-COL02020-A-4</div><div>10093626-COL02020-RF-1</div><div>10093626-COL02020-RF-2</div><div>10093626-COL02020-G-1</div><div>10093626-COL02020-G-2</div></div> <div><div>TITLE SHEET</div><div>GENERAL NOTES</div><div>OVERALL SITE PLAN</div><div>EXISTING ENLARGED EQUIPMENT LAYOUT</div><div>NEW ENLARGED EQUIPMENT LAYOUT</div><div>EXISTING & NEW ELEVATIONS</div><div>EXISTING & NEW ANTENNA CONFIGURATION</div><div>RF & EQUIPMENT DETAILS</div><div>SCHEMATIC GROUNDING PLAN</div><div>GROUNDING DETAILS</div></div> <div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div><div>C</div></div>		<div>DIG INFO</div> <div><div><div><div></div><div>CALL COLORADO ONE CALL</div><div>(800) 922-1987</div><div>CALL 3 WORKING DAYS</div><div>BEFORE YOU DIG!</div></div><div><div>811</div></div></div></div> <div><div>SCALING DRAWINGS</div><div>SUBCONTRACTOR SHALL VERIFY ALL PLANS, EXISTING DIMENSIONS & CONDITIONS ON THE JOB SITE & SHALL IMMEDIATELY NOTIFY THE ENGINEER IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR THE SAME.</div><div>IF USING 11"x17" PLOT, DRAWINGS WILL BE AT HALF SCALE.</div></div>																																															
<div>SITE PROJECT PARTICIPANTS</div> <table><tr><th></th><th>NAME</th><th>COMPANY</th><th>NUMBER</th></tr><tr><td>A/E</td><td>JON BOUTILIER</td><td>WYCO FIELD SERVICES</td><td>602-218-8820</td></tr><tr><td>SAC</td><td>BEN CRUTCHLEY</td><td>SMARTLINK, LLC</td><td>410-980-1269</td></tr><tr><td>RF</td><td>ROMMEL LICUDINE</td><td>AT&T WIRELESS</td><td>703-956-0341</td></tr><tr><td>LANDLORD</td><td>ALICIA SAYED</td><td>CROWN CASTLE</td><td>980-209-8230</td></tr><tr><td>SAC MNGR</td><td>BEN CRUTCHLEY</td><td>SMARTLINK, LLC</td><td>410-980-1269</td></tr></table>					NAME	COMPANY	NUMBER	A/E	JON BOUTILIER	WYCO FIELD SERVICES	602-218-8820	SAC	BEN CRUTCHLEY	SMARTLINK, LLC	410-980-1269	RF	ROMMEL LICUDINE	AT&T WIRELESS	703-956-0341	LANDLORD	ALICIA SAYED	CROWN CASTLE	980-209-8230	SAC MNGR	BEN CRUTCHLEY	SMARTLINK, LLC	410-980-1269	<div><div>DRAWN BY: APR</div><div>CHECKED BY: CW</div><div>APPROVED BY: CW</div></div> <div><div>FA #: 10093626</div><table><tr><th>REV</th><th>DATE</th><th>DESCRIPTION</th></tr><tr><td>A</td><td>11/15/17</td><td>PRELIMINARY CONSTRUCTION DRAWINGS</td></tr><tr><td>B</td><td>12/07/17</td><td>CLIENT COMMENTS</td></tr><tr><td>C</td><td>12/29/17</td><td>CLIENT COMMENTS</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table></div> <div><div>SHEET TITLE</div><div>TITLE SHEET</div><div>SHEET NUMBER</div><div>T-1</div></div>		REV	DATE	DESCRIPTION	A	11/15/17	PRELIMINARY CONSTRUCTION DRAWINGS	B	12/07/17	CLIENT COMMENTS	C	12/29/17	CLIENT COMMENTS												
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GENERAL NOTES:

1.

FOR THE PURPOSE OF CONSTRUCTION DRAWING, THE FOLLOWING DEFINITIONS SHALL APPLY:
CONTRACTOR – SMARTLINK, LLC
SUBCONTRACTOR – GENERAL CONTRACTOR (CONSTRUCTION)
OWNER – AT&T MOBILITY
OEM – ORIGINAL EQUIPMENT MANUFACTURE
2.

PRIOR TO THE SUBMISSION OF BIDS, THE BIDDING SUBCONTRACTOR SHALL VISIT THE CELL SITE TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND TO CONFIRM THAT THE WORK CAN BE ACCOMPLISHED AS SHOWN ON THE CONSTRUCTION DRAWINGS. ANY DISCREPANCY FOUND SHALL BE BROUGHT TO THE ATTENTION OF CONTRACTOR.
3.

ALL MATERIALS FURNISHED AND INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS, AND ORDINANCES. SUBCONTRACTOR SHALL ISSUE ALL APPROPRIATE NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS, AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY REGARDING THE PERFORMANCE OF THE WORK. ALL WORK CARRIED OUT SHALL COMPLY WITH ALL APPLICABLE MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS AND LOCAL JURISDICTIONAL CODES, ORDINANCES AND APPLICABLE REGULATIONS.
4.

UNLESS NOTED OTHERWISE, THE WORK SHALL INCLUDE FURNISHING MATERIALS, EQUIPMENT, APPURTENANCES, AND LABOR NECESSARY TO COMPLETE ALL INSTALLATIONS AS INDICATED ON THE DRAWINGS.
5.

THE SUBCONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH MANUFACTURER’S RECOMMENDATIONS UNLESS SPECIFICALLY STATED OTHERWISE.
6.

IF THE SPECIFIED EQUIPMENT CANNOT BE INSTALLED AS SHOWN ON THESE DRAWINGS, THE SUBCONTRACTOR SHALL PROPOSE AN ALTERNATIVE INSTALLATION FOR APPROVAL BY THE CONTRACTOR.
7.

SUBCONTRACTOR SHALL DETERMINE ACTUAL ROUTING OF CONDUIT, POWER AND T1 CABLES, GROUNDING CABLES AS SHOWN ON THE POWER, GROUNDING AND TELCO PLAN DRAWING. SUBCONTRACTOR SHALL UTILIZE EXISTING TRAYS AND/OR SHALL ADD NEW TRAYS AS NECESSARY. SUBCONTRACTOR SHALL CONFIRM THE ACTUAL ROUTING WITH THE CONTRACTOR. ROUTING OF TRENCHING SHALL BE APPROVED BY CONTRACTOR.
8.

THE SUBCONTRACTOR SHALL PROTECT EXISTING IMPROVEMENTS, PAVEMENTS, CURBS, LANDSCAPING AND STRUCTURES. ANY DAMAGED PART SHALL BE REPAIRED AT SUBCONTRACTOR’S EXPENSE TO THE SATISFACTION OF OWNER.
9.

SUBCONTRACTOR SHALL LEGALLY AND PROPERLY DISPOSE OFF ALL SCRAP MATERIALS SUCH AS COAXIAL CABLES AND OTHER ITEMS REMOVED FROM THE EXISTING FACILITY. ANTENNAS REMOVED SHALL BE RETURNED TO THE OWNER’S DESIGNATED LOCATION.
10.

SUBCONTRACTOR SHALL LEAVE PREMISES IN CLEAN CONDITION.
11.

ALL CONCRETE REPAIR WORK SHALL BE DONE IN ACCORDANCE WITH AMERICAN CONCRETE INSTITUTE (ACI) 301.
12.

ANY NEW CONCRETE NEEDED FOR THE CONSTRUCTION SHALL HAVE 4000 PSI STRENGTH AT 28 DAYS UNLESS OTHERWISE SPECIFIED. ALL CONCRETING WORK SHALL BE DONE IN ACCORDANCE WITH ACI 318 CODE REQUIREMENTS.
13.

ALL STRUCTURAL STEEL WORK SHALL BE DONE IN ACCORDANCE WITH AISC SPECIFICATIONS.
14.

CONSTRUCTION SHALL COMPLY WITH SPECIFICATION 25741–000–3APS–A00Z–00002, "GENERAL CONSTRUCTION SERVICES.
15.

SUBCONTRACTOR SHALL VERIFY ALL EXISTING DIMENSIONS AND CONDITIONS PRIOR TO COMMENCING ANY WORK. ALL DIMENSIONS OF EXISTING CONSTRUCTION SHOWN ON THE DRAWINGS MUST BE VERIFIED. SUBCONTRACTOR SHALL NOTIFY THE CONTRACTOR OF ANY DISCREPANCIES PRIOR TO ORDERING MATERIAL OR PROCEEDING WITH CONSTRUCTION.
16.

THE EXISTING CELL SITE IS IN FULL COMMERCIAL OPERATION. ANY CONSTRUCTION WORK BY SUBCONTRACTOR SHALL NOT DISRUPT THE EXISTING NORMAL OPERATION. ANY WORK ON EXISTING EQUIPMENT MUST BE COORDINATED WITH CONTRACTOR. ALSO, WORK MAY NEED TO BE SCHEDULED FOR AN APPROPRIATE MAINTENANCE WINDOW USUALLY IN LOW TRAFFIC PERIODS AFTER MIDNIGHT.
17.

SINCE THE CELL SITE MAY BE ACTIVE, ALL SAFETY PRECAUTIONS MUST BE TAKEN WHEN WORKING AROUND HIGH LEVELS OF ELECTROMAGNETIC RADIATION. EQUIPMENT SHOULD BE SHUTDOWN PRIOR TO PERFORMING ANY WORK THAT COULD EXPOSE THE WORKERS TO DANGER. PERSONAL RF EXPOSURE MONITORS ARE REQUIRED TO BE WORN TO ALERT OF ANY DANGEROUS EXPOSURE LEVELS.

ELECTRICAL INSTALLATION NOTES:

1.

WIRING, RACEWAY, AND SUPPORT METHODS AND MATERIALS SHALL COMPLY WITH THE REQUIREMENTS OF THE NEC AND TELCORDIA.
2.

SUBCONTRACTOR SHALL MODIFY EXISTING CABLE TRAY SYSTEM AS REQUIRED TO SUPPORT RF AND TRANSPORT CABLEING TO THE NEW BTS EQUIPMENT. SUBCONTRACTOR SHALL SUBMIT MODIFICATIONS TO CONTRACTOR FOR APPROVAL.
3.

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

ELECTRICAL INSTALLATION NOTES CONT.:

4.

CABLES SHALL NOT BE ROUTED THROUGH LADDER–STYLE CABLE TRAY RUNGS.
5.

EACH END OF EVERY POWER, GROUNDING, AND T1 CONDUCTOR AND CABLE SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, 1/2 INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). THE IDENTIFICATION METHOD SHALL CONFORM WITH NEC & OSHA, AND MATCH EXISTING INSTALLATION REQUIREMENTS.
6.

POWER PHASE CONDUCTORS (I.E., HOTS) SHALL BE LABELED WITH COLOR–CODED INSULATION OR ELECTRICAL TAPE (3M BRAND, ½ INCH PLASTIC ELECTRICAL TAPE WITH UV PROTECTION, OR EQUAL). PHASE CONDUCTOR COLOR CODES SHALL CONFORM WITH THE NEC & OSHA AND MATCH EXISTING INSTALLATION REQUIREMENTS.
7.

ALL ELECTRICAL COMPONENTS SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS. ALL EQUIPMENT SHALL BE LABELED WITH THEIR VOLTAGE RATING, PHASE CONFIGURATION, WIRE CONFIGURATION, POWER OR AMPACITY RATING, AND BRANCH CIRCUIT ID NUMBERS (I.E., PLANELOAD AND CIRCUIT ID’S).
8.

PANELBOARDS (ID NUMBERS) AND INTERNAL CIRCUIT BREAKERS (CIRCUIT ID NUMBERS) SHALL BE CLEARLY LABELED WITH ENGRAVED LAMACOID PLASTIC LABELS.
9.

ALL TIE WRAPS WHERE PERMITTED SHALL BE CUT FLUSH WITH APPROVED CUTTING TOOL TO REMOVE SHARP EDGES. USE LOW PROFILES TIE WRAPS.
10.

POWER, CONTROL, AND EQUIPMENT GROUND WIRING IN TUBING OR CONDUIT SHALL BE SINGLE CONDUCTOR (12 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
11.

SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED INDOORS SHALL BE SINGLE CONDUCTOR (6 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2 GREEN INSULATION, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; LISTED OR LABELED FOR THE LOCATION AND RACEWAY SYSTEM USED, UNLESS OTHERWISE SPECIFIED.
12.

SUPPLEMENTAL EQUIPMENT GROUND WIRING LOCATED OUTDOORS, OR BELOW GRADE, SHALL BE SINGLE CONDUCTOR 2 AWG SOLID TINNED COPPER CABLE, UNLESS OTHERWISE SPECIFIED.
13.

POWER WIRING, NOT IN TUBING OR CONDUIT, SHALL BE MULTI–CONDUCTOR, TYPE TC CABLE (12 AWG OR LARGER), 600 V, OIL RESISTANT THHN OR THWN–2, CLASS B STRANDED COPPER CABLE RATED FOR 90 °C (WET AND DRY) OPERATION; WITH OUTER JACKET; LISTED OR LABELED FOR THE LOCATION USED, UNLESS OTHERWISE SPECIFIED.
14.

ALL POWER AND GROUNDING CONNECTIONS SHALL BE CRIMP–STYLE, COMPRESSION WIRE LUGS AND WIRENUTS BY THOMAS AND BETTS (OR EQUAL). LUGS AND WIRENUTS SHALL BE RATED FOR OPERATION AT NO LESS THAN 75°C (90°C IF AVAILABLE).
15.

RACEWAY AND CABLE TRAY SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
16.

NEW RACEWAY OR CABLE TRAY WILL MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
17.

ELECTRICAL METALLIC TUBING (EMT) OR RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40, OR RIGID PVC SCHEDULE 80 FOR LOCATIONS SUBJECT TO PHYSICAL DAMAGE) SHALL BE USED FOR EXPOSED INDOOR LOCATIONS.
18.

ELECTRICAL METALLIC TUBING (EMT), ELECTRICAL NONMETALLIC TUBING (ENT), OR RIGID NONMETALLIC CONDUIT (RIGID PVC, SCHEDULE 40) SHALL BE USED FOR CONCEALED INDOOR LOCATIONS.
19.

GALVANIZED STEEL INTERMEDIATE METALLIC CONDUIT (IMC) SHALL BE USED FOR OUTDOOR LOCATIONS ABOVE GRADE.
20.

RIGID NONMETALLIC CONDUIT (I.E., RIGID PVC SCHEDULE 40 OR RIGID PVC SCHEDULE 80) SHALL BE USED UNDERGROUND; DIRECT BURIED, IN AREAS OF OCCASIONAL LIGHT VEHICLE TRAFFIC OR ENCASED IN REINFORCED CONCRETE IN AREAS OF HEAVY VEHICLE TRAFFIC.
21.

LIQUID–TIGHT FLEXIBLE METALLIC CONDUIT (LIQUID–TITE FLEX) SHALL BE USED INDOORS AND OUTDOORS, WHERE VIBRATION OCCURS OR FLEXIBILITY IS NEEDED.
22.

CONDUIT AND TUBING FITTINGS SHALL BE THREADED OR COMPRESSION–TYPE AND APPROVED FOR THE LOCATION USED. SETSCREW FITTINGS ARE NOT ACCEPTABLE.
23.

CABINETS, BOXES, AND WIREWAYS SHALL BE LISTED OR LABELED FOR ELECTRICAL USE IN ACCORDANCE WITH NEMA, UL, ANSI/IEEE, AND NEC.
24.

CABINETS, BOXES, AND WIREWAYS TO MATCH THE EXISTING INSTALLATION WHERE POSSIBLE.
25.

WIREWAYS SHALL BE EPOXY–COATED (GRAY) AND INCLUDE A HINGED COVER, DESIGNED TO SWING OPEN DOWNWARD; SHALL BE PANDUIT TYPE E (OR EQUAL); AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
26.

EQUIPMENT CABINETS, TERMINAL BOXES, JUNCTION BOXES, AND PULL BOXES SHALL BE GALVANIZED OR EPOXY–COATED SHEET STEEL, SHALL MEET OR EXCEED UL 50, AND RATED NEMA 1 (OR BETTER) INDOORS, OR NEMA 3R (OR BETTER) OUTDOORS.
27.

METAL RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL BE GALVANIZED, EPOXY–COATED, OR NON–CORRODING; SHALL MEET OR EXCEED UL 514A AND NEMA OS 1; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.

ELECTRICAL INSTALLATION NOTES CONT.:

28.

NONMETALLIC RECEPTACLE, SWITCH, AND DEVICE BOXES SHALL MEET OR EXCEED NEMA OS 2; AND RATED NEMA 1 (OR BETTER) INDOORS, OR WEATHER PROTECTED (WP OR BETTER) OUTDOORS.
29.

THE SUBCONTRACTOR SHALL NOTIFY AND OBTAIN NECESSARY AUTHORIZATION FROM THE CONTRACTOR BEFORE COMMENCING WORK ON THE AC POWER DISTRIBUTION PANELS.
30.

THE SUBCONTRACTOR SHALL PROVIDE NECESSARY TAGGING ON THE BREAKERS, CABLES AND DISTRIBUTION PANELS IN ACCORDANCE WITH THE APPLICABLE CODES AND STANDARDS TO SAFEGUARD AGAINST LIFE AND PROPERTY.

GROUNDING NOTES:

1.

THE SUBCONTRACTOR SHALL REVIEW AND INSPECT THE EXISTING FACILITY GROUNDING SYSTEM AND LIGHTNING PROTECTION SYSTEM (AS DESIGNED AND INSTALLED) FOR STRICT COMPLIANCE WITH THE NEC (AS ADOPTED BY THE AHJ), THE SITE–SPECIFIC (UL, LPI, OR NFPA) LIGHTING PROTECTION CODE, AND GENERAL COMPLIANCE WITH TELCORDIA AND TIA GROUNDING STANDARDS. THE SUBCONTRACTOR SHALL REPORT ANY VIOLATIONS OR ADVERSE FINDINGS TO THE CONTRACTOR FOR RESOLUTION.
2.

ALL GROUND ELECTRODE SYSTEMS (INCLUDING TELECOMMUNICATION, RADIO, LIGHTNING PROTECTION, AND AC POWER GES’S) SHALL BE BONDED TOGETHER, AT OR BELOW GRADE, BY TWO OR MORE COPPER BONDING CONDUCTORS IN ACCORDANCE WITH THE NEC.
3.

THE SUBCONTRACTOR SHALL PERFORM IEEE FALL–OF–POTENTIAL RESISTANCE TO EARTH TESTING (PER IEEE 1100 AND 81) FOR NEW GROUND ELECTRODE SYSTEMS. THE SUBCONTRACTOR SHALL FURNISH AND INSTALL SUPPLEMENTAL GROUND ELECTRODES AS NEEDED TO ACHIEVE A TEST RESULT OF 5 OHMS OR LESS. TESTS SHALL BE PERFORMED IN ACCORDANCE WITH 25471–000–3PS–EG00–0001, DESIGN & TESTING OF FACILITY GROUNDING FOR CELL SITES.
4.

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

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

EXOTHERMIC WELDS SHALL BE USED FOR ALL GROUNDING CONNECTIONS BELOW GRADE.
7.

APPROVED ANTIOXIDANT COATINGS (I.E., CONDUCTIVE GEL OR PASTE) SHALL BE USED ON ALL COMPRESSION AND BOLTED GROUND CONNECTIONS.
8.

ICE BRIDGE BONDING CONDUCTORS SHALL BE EXOTHERMICALLY BONDED OR BOLTED WITH STAINLESS STEEL HARDWARE TO THE BRIDGE AND THE TOWER GROUND BAR.
9.

ALUMINUM CONDUCTOR OR COPPER CLAD STEEL CONDUCTOR SHALL NOT BE USED FOR GROUNDING CONNECTIONS.
10.

MISCELLANEOUS ELECTRICAL AND NON–ELECTRICAL METAL BOXES, FRAMES AND SUPPORTS SHALL BE BONDED TO THE GROUND RING, IN ACCORDANCE WITH THE NEC.
11.

METAL CONDUIT AND TRAY SHALL BE GROUNDED AND MADE ELECTRICALLY CONTINUOUS WITH LISTED BONDING FITTINGS OR BY BONDING ACROSS THE DISCONTINUITY WITH 6 AWG COPPER WIRE UL APPROVED GROUNDING TYPE CONDUIT CLAMPS.
12.

GROUND CONDUCTORS USED IN THE FACILITY GROUND AND LIGHTNING PROTECTION SYSTEMS SHALL NOT BE ROUTED THROUGH METALLIC OBJECTS THAT FORM A RING AROUND THE CONDUCTOR, SUCH AS METALLIC CONDUITS, METAL SUPPORT CLIPS OR SLEEVES THROUGH WALLS OR FLOORS. WHEN IT IS REQUIRED TO BE HOUSED IN CONDUIT TO MEET CODE REQUIREMENTS OR LOCAL CONDITIONS, NON–METALLIC MATERIAL SUCH AS PVC PLASTIC CONDUIT SHALL BE USED. WHERE USE OF METAL CONDUIT IS UNAVOIDABLE (E.G., NON–METALLIC CONDUIT PROHIBITED BY LOCAL CODE) THE GROUND CONDUCTOR SHALL BE BONDED TO EACH END OF THE METAL CONDUIT.
13.

ALL TOWER GROUNDING SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF ANSI/TIA 222. FOR TOWERS BEING BUILT TO REV G OF THE STANDARD, THE WIRE SIZE OF THE BURIED GROUND RING AND CONNECTIONS BETWEEN THE TOWER AND THE BURIED GROUND RING SHALL BE CHANGED FROM 2 AWG TO 2/0 AWG. IN ADDITION, THE MINIMUM LENGTH OF THE GROUND RODS SHALL BE INCREASED FROM 8 FEET TO 10 FEET.



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ADDRESS
9550 OTERO AVENUE
COLORADO SPRINGS, CO 80920

SITE NUMBER
COL02020

SITE NAME
RESEARCH PARKWAY

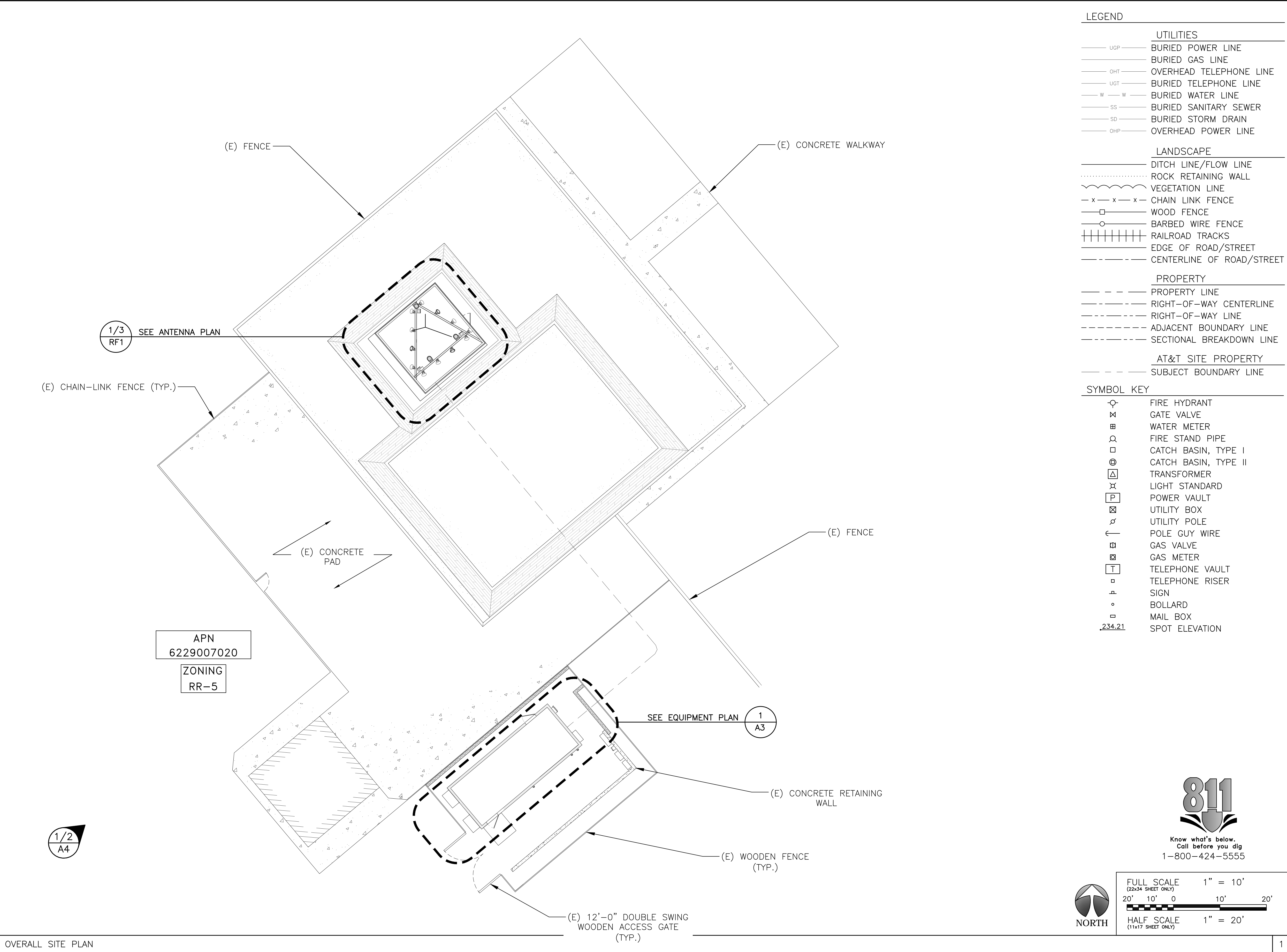
SEAL

FA #: 10093626

DRAWN BY: APR CHECKED BY: CW APPROVED BY: CW

SHEET TITLE
GENERAL NOTES

SHEET NUMBER
GN-1



LEGEND	
UTILITIES	
UGP	BURIED POWER LINE
OGT	BURIED GAS LINE
UGT	OVERHEAD TELEPHONE LINE
W	BURIED TELEPHONE LINE
SS	BURIED WATER LINE
SD	BURIED SANITARY SEWER
OHP	BURIED STORM DRAIN
	OVERHEAD POWER LINE
LANDSCAPE	
	DITCH LINE/FLOW LINE
	ROCK RETAINING WALL
	VEGETATION LINE
x x x	CHAIN LINK FENCE
	WOOD FENCE
	BARBED WIRE FENCE
	RAILROAD TRACKS
	EDGE OF ROAD/STREET
	CENTERLINE OF ROAD/STREET
PROPERTY	
	PROPERTY LINE
	RIGHT-OF-WAY CENTERLINE
	RIGHT-OF-WAY LINE
	ADJACENT BOUNDARY LINE
	SECTIONAL BREAKDOWN LINE
AT&T SITE PROPERTY	
	SUBJECT BOUNDARY LINE

SYMBOL KEY	
	FIRE HYDRANT
	GATE VALVE
	WATER METER
	FIRE STAND PIPE
	CATCH BASIN, TYPE I
	CATCH BASIN, TYPE II
	TRANSFORMER
	LIGHT STANDARD
	POWER VAULT
	UTILITY BOX
	UTILITY POLE
	POLE GUY WIRE
	GAS VALVE
	GAS METER
	TELEPHONE VAULT
	TELEPHONE RISER
	SIGN
	BOLLARD
	MAIL BOX
	SPOT ELEVATION

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where quality still counts.
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PHOENIX, AZ 85040

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REV	DATE	DESCRIPTION
A	11/15/17	PRELIMINARY CONSTRUCTION DRAWINGS
B	12/07/17	CLIENT COMMENTS
C	12/29/17	CLIENT COMMENTS

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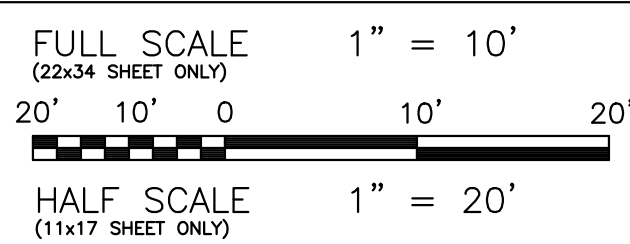
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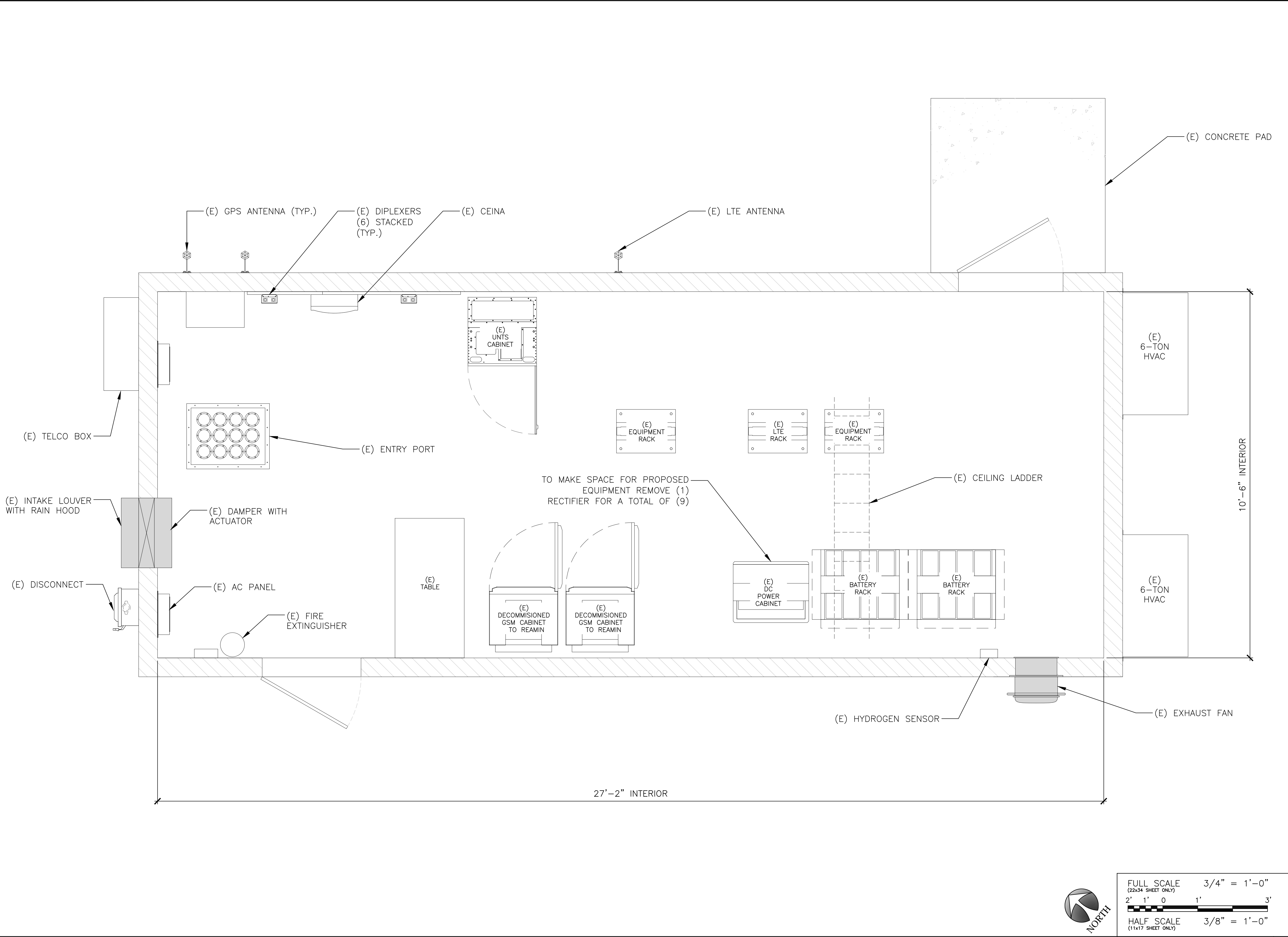
SHEET TITLE

OVERALL SITE PLAN

SHEET NUMBER

A-1





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FA #: 10093626

SHEET TITLE

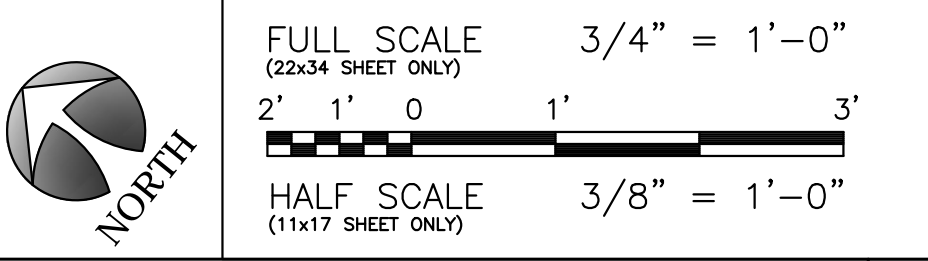
EXISTING ENLARGED EQUIPMENT PLAN

SHEET NUMBER

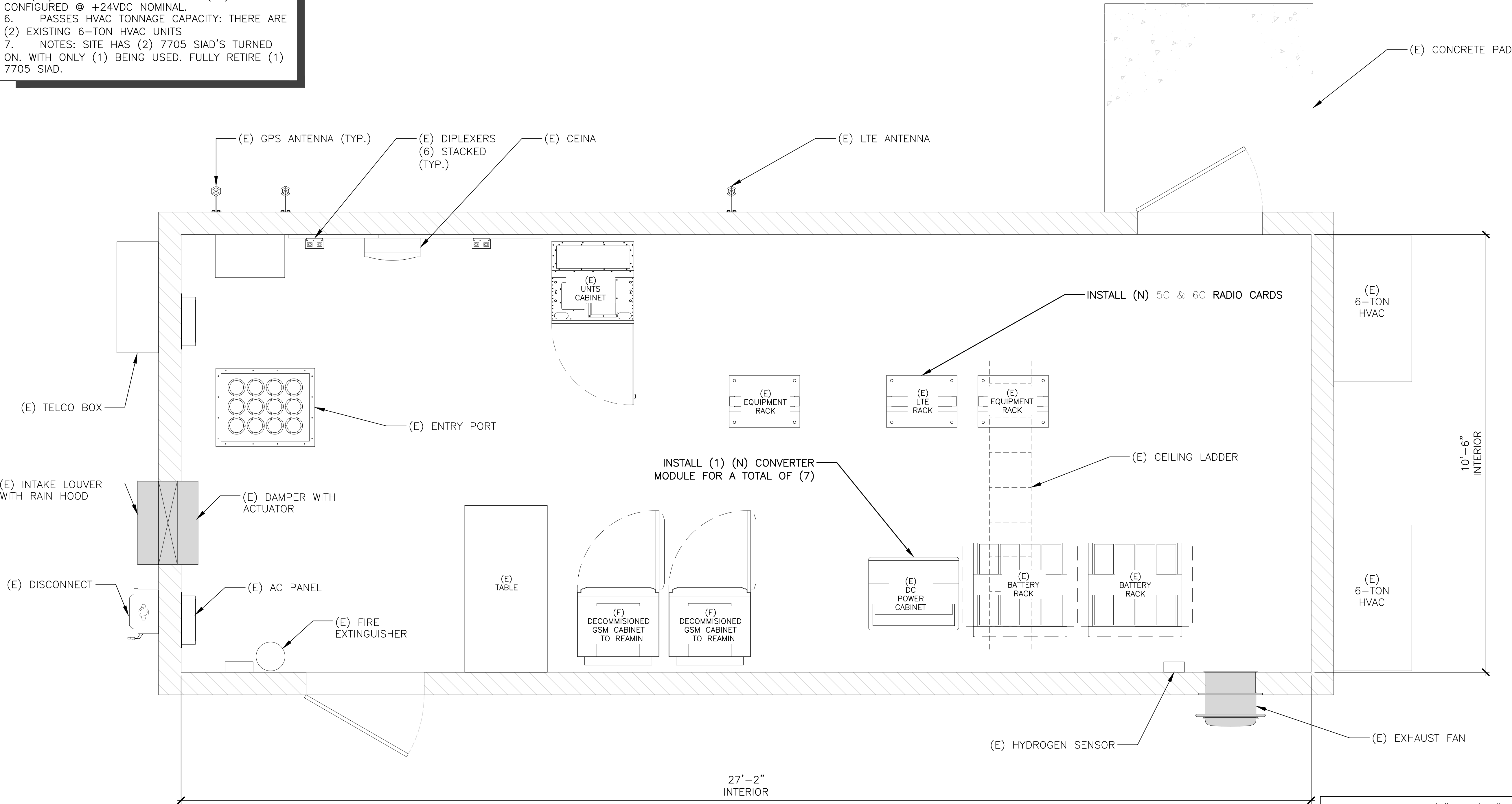
A-2

1

EXISTING EQUIPMENT LAYOUT



ELECTRICAL SOW SUMMARY:
1. PROPOSED UPGRADE PER RFDS V1.0 10.02.17 (UPDATED 10.19.17)
2. PASSES RECTIFIER; EXISTING INDOOR GE POWER STD +24V INFINITY M W/CONV. [NEQ.15266]. IS EQUIPPED WITH (10) EA. +24VDC 100A RECTIFIERS [NEQ.15263]. ONLY (7) RECTIFIERS NEEDED TO SATISFY N+1. REMOVE (1) RECTIFIER TO MAKE SPACE FOR NEW CONVERTER MODULE. FOR A TOTAL OF (9) RECTIFIERS.
3. FAILS CONVERTER; THERE ARE (6) EXISTING +24VDC/-48VDC 30A CONVERTER MODULES [NEQ.13100]. INSTALL (1) NEW +24VDC/-48VDC 30A CONVERTER MODULES [NEQ.13100]. FOR A TOTAL OF (7) CONVERTERS TO SATISFY N+1.
4. SITE DOES NOT HAVE PERMANENT STANDBY GENERATOR
5. PASSES BATTERY RESERVE @ 10.12 HRS; SITE HAS (40) M12V155FT BATTERIES I.E. (20) STRINGS CONFIGURED @ +24VDC NOMINAL.
6. PASSES HVAC TONNAGE CAPACITY: THERE ARE (2) EXISTING 6-TON HVAC UNITS
7. NOTES: SITE HAS (2) 7705 SIAD'S TURNED ON. WITH ONLY (1) BEING USED. FULLY RETIRE (1) 7705 SIAD.



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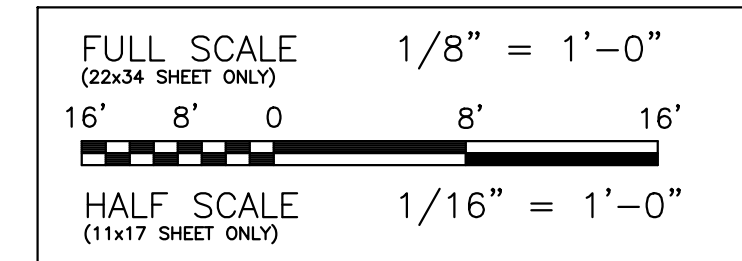
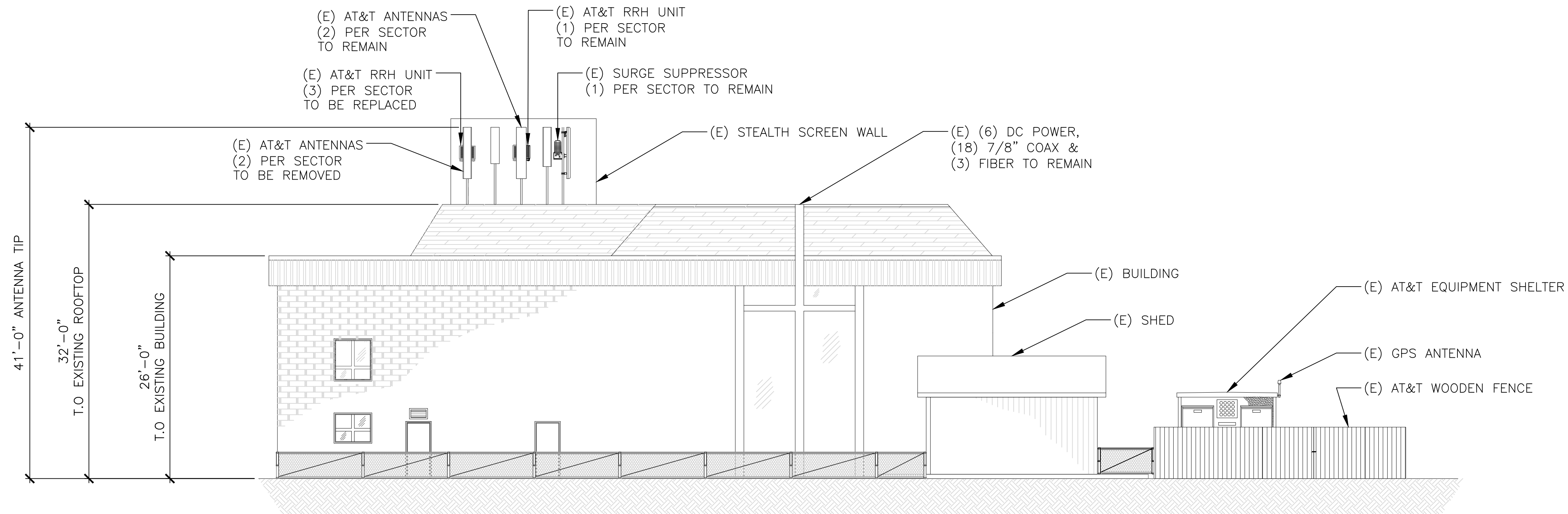
FA #: 10093626

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SHEET TITLE
NEW ENLARGED
EQUIPMENT LAYOUT

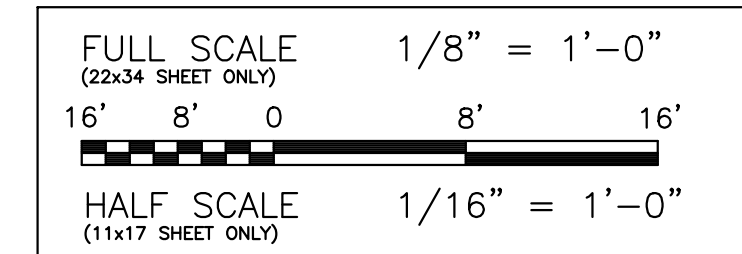
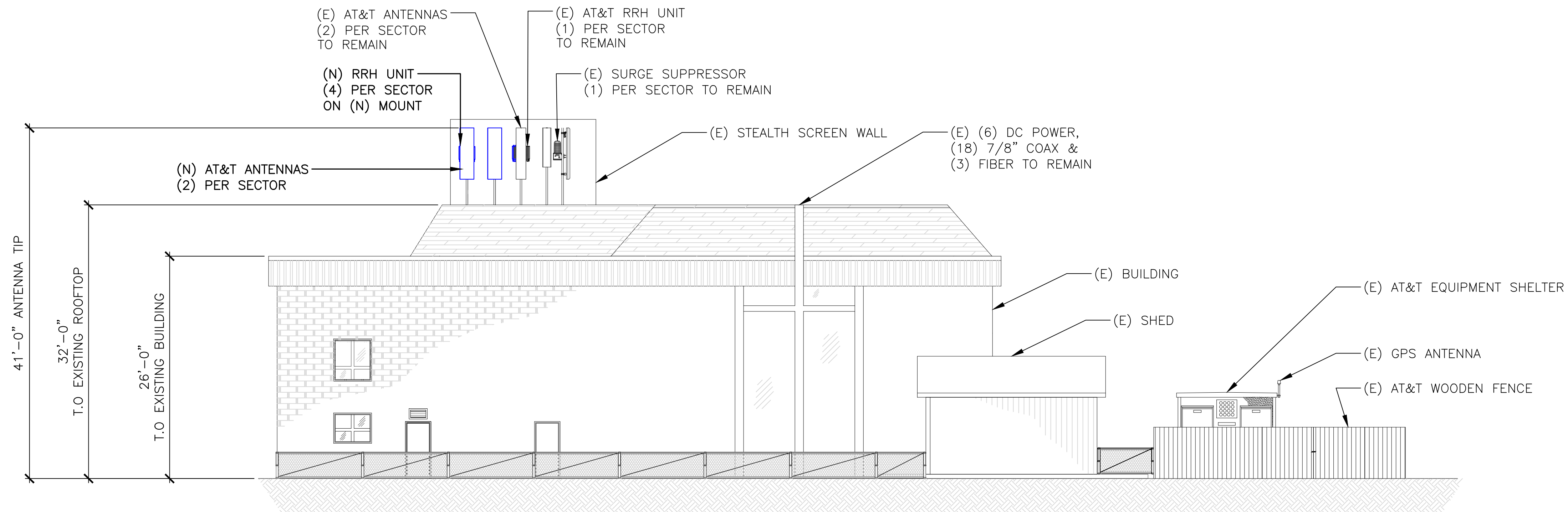
SHEET NUMBER

A-3



EXISTING SOUTHWEST BUILDING ELEVATION

1



NEW SOUTHWEST BUILDING ELEVATION

2



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SHEET TITLE
EXISTING & NEW
BUILDING ELEVATION

SHEET NUMBER

A-4

EXISTING ANTENNA SCHEDULE					
SECTOR	POSITION	TECH	ANTENNA	RRH	FEED LINE TYPE
ALPHA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
ALPHA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
ALPHA	3	LTE	72" PANEL	—	—
ALPHA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS
BETA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
BETA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
BETA	3	LTE	72" PANEL	—	—
BETA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS
GAMMA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
GAMMA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
GAMMA	3	LTE	72" PANEL	—	—
GAMMA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS

NEW ANTENNA SCHEDULE					
SECTOR	POSITION	TECH	ANTENNA	RRH	FEED LINE TYPE
ALPHA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
ALPHA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
ALPHA	3	LTE	72" PANEL	(1) LTE	EXISTING FIBER TRUNK
ALPHA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS
BETA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
BETA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
BETA	3	LTE	72" PANEL	(1) LTE	EXISTING FIBER TRUNK
BETA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS
GAMMA	1	UMTS	55" PANEL	—	EXISTING COAX CABLES
GAMMA	2	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNK
GAMMA	3	LTE	72" PANEL	(1) LTE	EXISTING FIBER TRUNK
GAMMA	4	LTE	72" PANEL	(2) LTE	EXISTING FIBER TRUNKS

NOTES:
1. DO NOT USE COAX LENGTHS FOR CUT LENGTHS: ESTIMATES ONLY
2. CONFIRM THAT GENERAL CONTRACTOR IS USING LATEST VERSION OF RFDS.
* OR SIMILAR



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SHEET TITLE
EXISTING & NEW
ANTENNA CONFIGURATION

SHEET NUMBER

RF-1

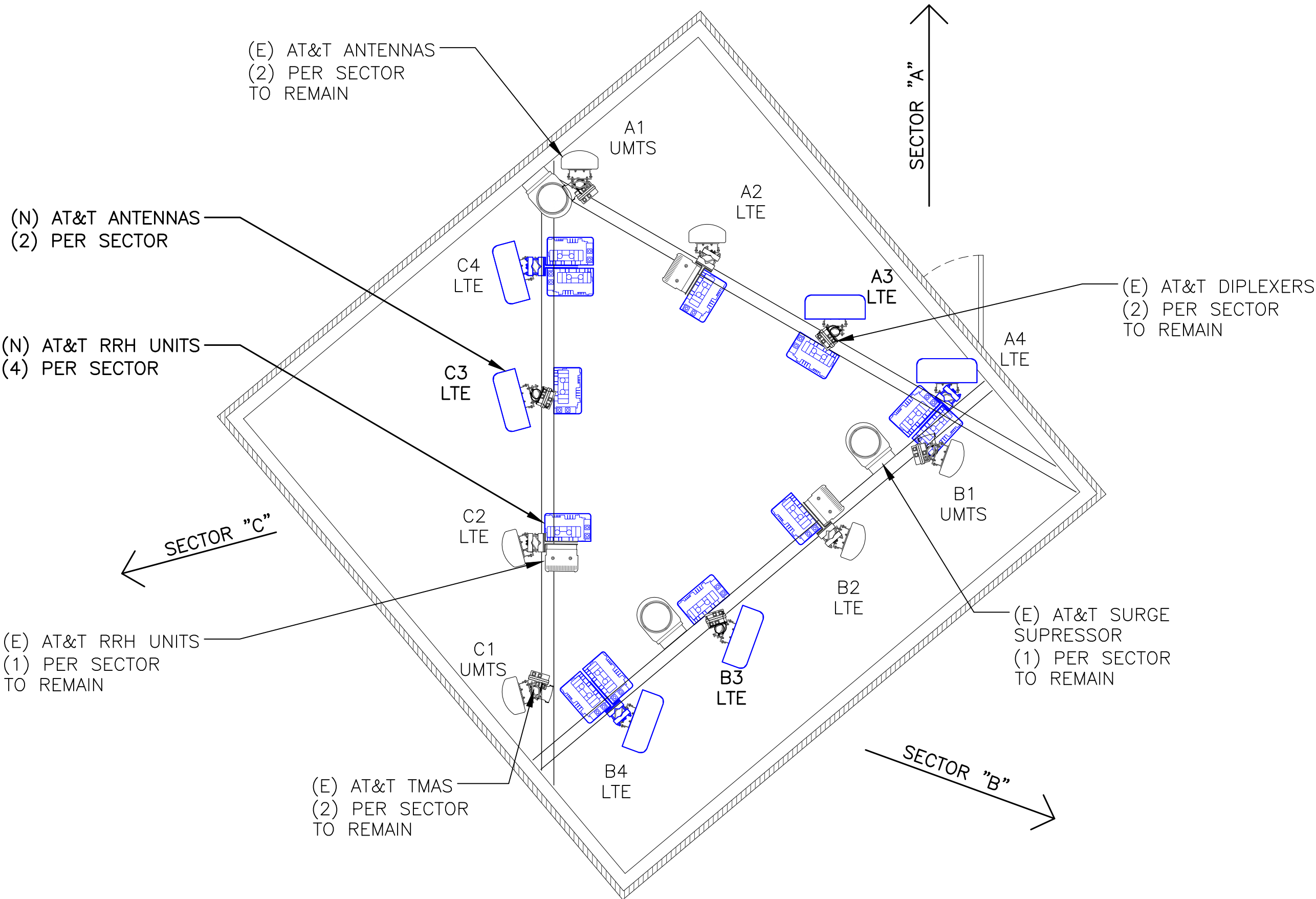
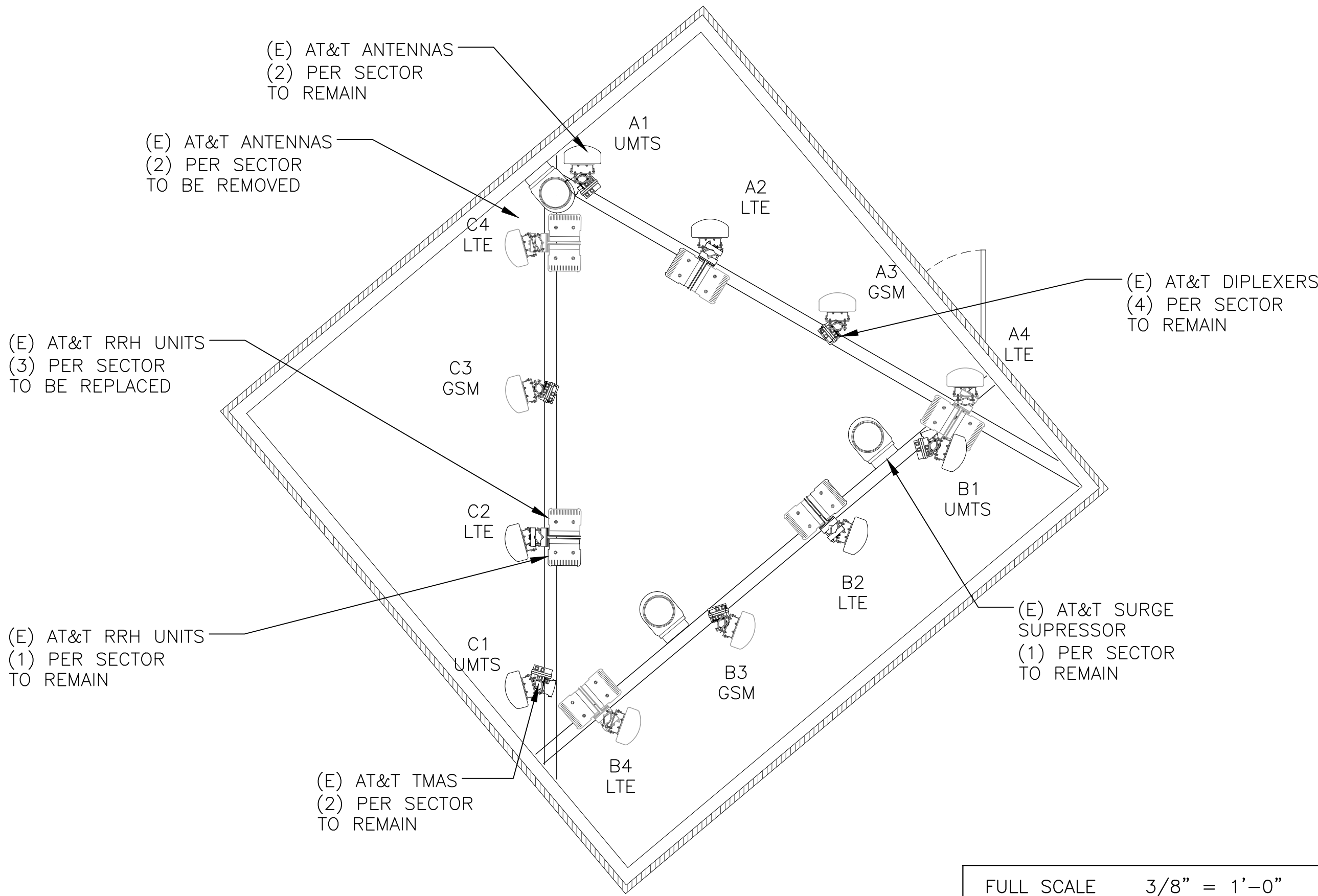
EXISTING ANTENNAS AND COAX CONFIGURATION AND SCHEDULE

2

NEW ANTENNA AND COAX CONFIGURATION AND SCHEDULE

4

NOTE:
STRUCTURAL ANALYSIS
REQUIRED & DONE
BY OTHERS

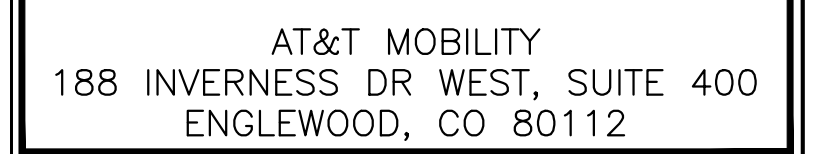


EXISTING ANTENNA CONFIGURATION

1

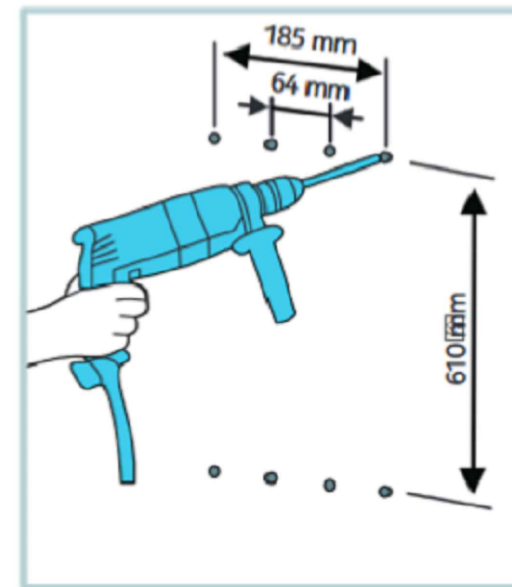
NEW ANTENNA CONFIGURATION

3



SITE NUMBER
COL02020

SEAL

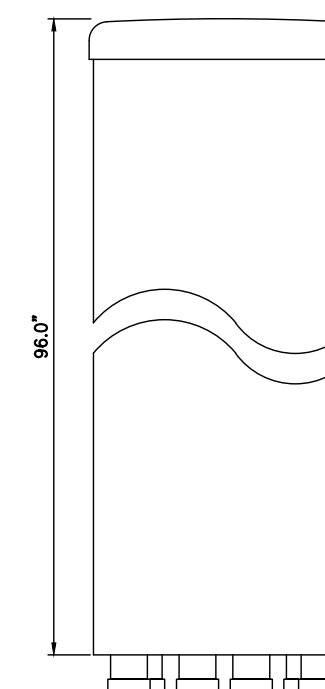


HFIB

Figure 45 Fixing six M8 screws

Figure 45 shows the installation of six M8 screws into the top rail of the HFIB unit. The left side is a perspective view showing the screws being driven into the top rail. The right side is a detailed technical drawing of the top rail assembly, showing dimensions and screw locations. Key dimensions include: overall width 272, top rail width 185, screw spacing 64, and various vertical dimensions for the rail and mounting plate. The drawing is labeled "Detail A" and "End of Forms".

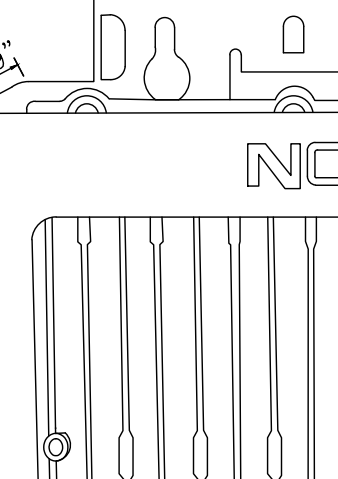
RF CONNECTORS, TYP -



	5
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Technical drawing of the Nokia 1200 mobile phone showing dimensions: 12.87 inches wide, 6.49 inches deep, and 26.57 inches high.

Technical drawing of the Nokia 1200 mobile phone showing dimensions: 12.87 inches (width), 6.49 inches (depth), and 26.57 inches (height). The phone is shown in a perspective view with a flip cover.



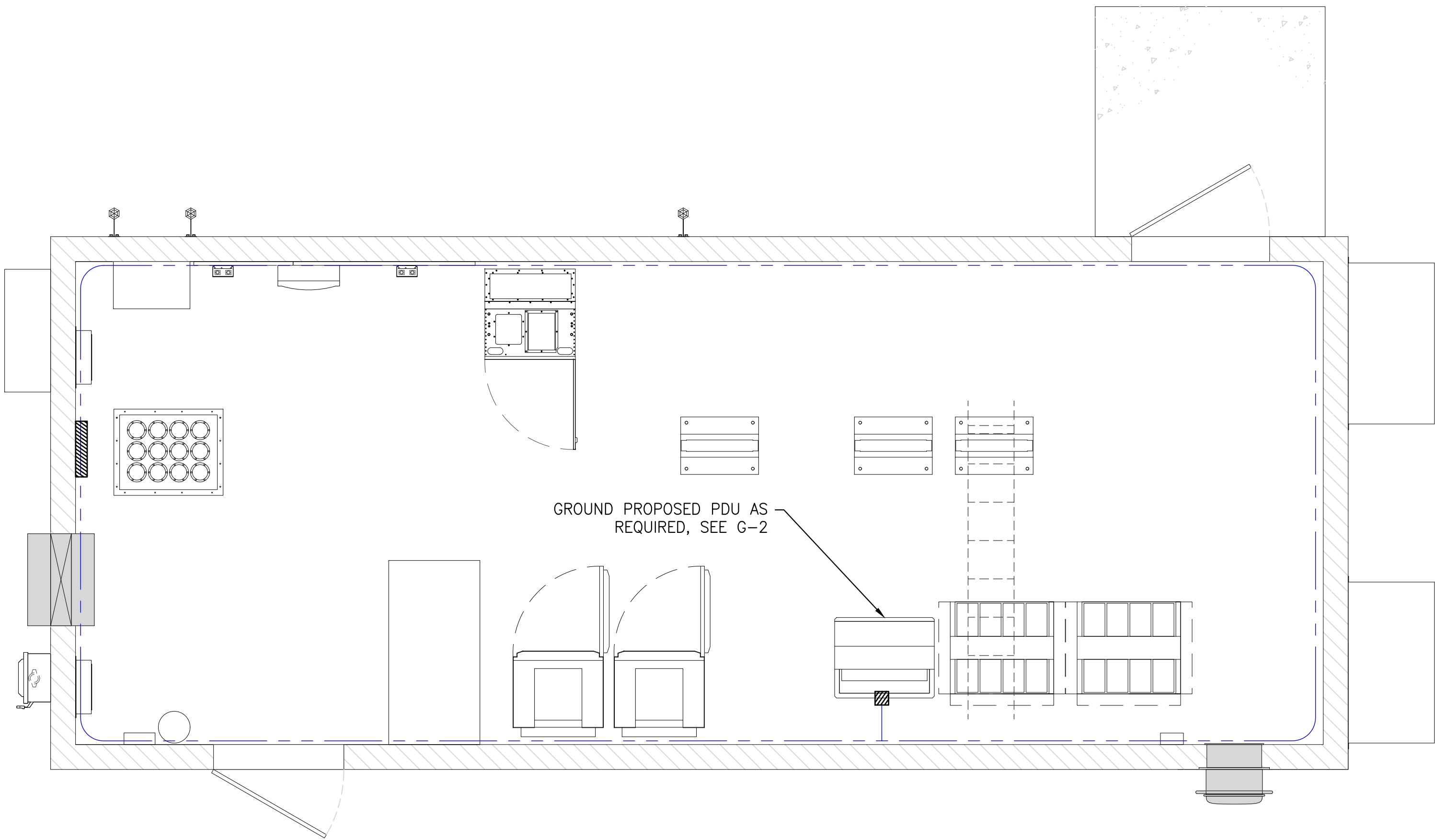
Technical drawing of the Nokia 13.26, showing the front and top views. The top view indicates a width of 11.61" and a depth of 8.49". The front view shows the Nokia logo and a large display area with vertical lines. The side view indicates a height of 13.26".

	1
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IDENTITY	STATUS	ORGANIZATION	FILE NUMBER
FA #:	10093626		

REV	DATE	DESCRIPTION
A	11/15/17	PRELIMINARY CONSTRUCTION DRAWINGS
B	12/07/17	CLIENT COMMENTS
C	12/29/17	CLIENT COMMENTS

RF-2



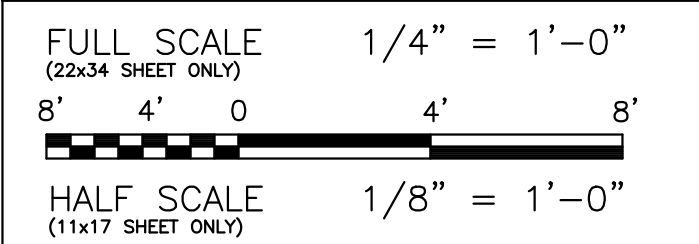
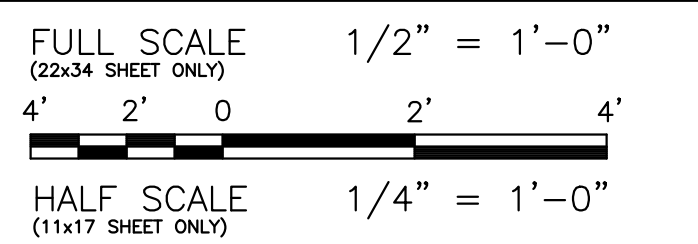
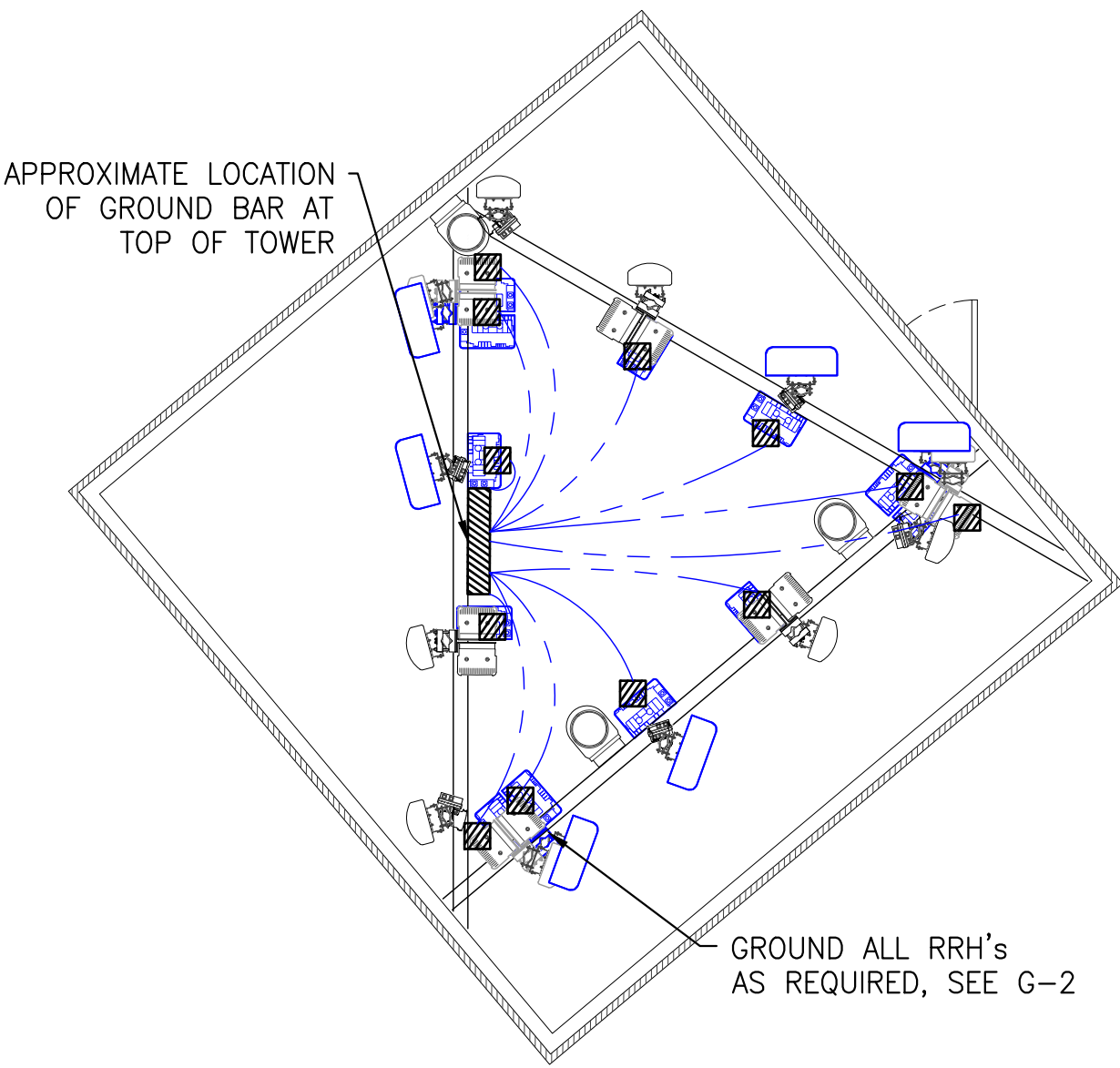
SYMBOL	DESCRIPTION
	COPPER GROUND ROD
	TEST WELL
	CADWELD CONNECTION
	GROUND BAR
	MECHANICAL CONNECTION
	FIELD VERIFY & TIE INTO EXISTING GROUNDING SYSTEM

GENERAL GROUNDING NOTES:

- GROUNDING SHALL BE INSTALLED 6" BELOW FROST DEPTH OR 30" BELOW GRADE, WHICHEVER IS GREATER. CONFIRM FROST DEPTH WITH JURISDICTION.
- ALL DETAILS ARE SHOWN IN GENERAL TERMS. ACTUAL INSTALLATION AND CONSTRUCTION MAY VARY DUE TO SITE SPECIFIC CONDITIONS.
- GROUND ALL ANTENNA BASES, FRAMES, CABLE RUNS, AND OTHER METALLIC COMPONENTS USING GROUND WIRES AND CONNECT TO SURFACE MOUNTED BUS BARS. FOLLOW ANTENNA AND BTS MANUFACTURERS PRACTICES FOR GROUNDING REQUIREMENTS. GROUND COAX SHIELD AT BOTH ENDS AND EXIT FROM TOWER OR POLE USING MFR'S PRACTICES.
- ALL GROUND CONNECTIONS SHALL BE CADWELDED. ALL WIRES SHALL BE COPPER THHN/THWN. ALL GROUND WIRE SHALL BE GREEN INSULATED WIRE ABOVE GROUND.
- CONTRACTOR TO VERIFY AND TEST GROUND TO SOURCE. GROUNDING AND OTHER OPERATIONAL TESTING WILL BE WITNESSED BY AT&T REPRESENTATIVE.
- REFER TO DIVISION 16 GENERAL ELECTRIC; GENERAL ELECTRICAL PROVISION AND COMPLY WITH ALL REQUIREMENTS OF GROUNDING STANDARDS.
- ELECTRICAL CONTRACTOR TO PROVIDE DETAILED DESIGN OF GROUNDING SYSTEM, AND RECEIVE APPROVAL OF DESIGN BY AUTHORIZED AT&T MOBILITY REPRESENTATIVE, PRIOR TO INSTALLATION OF GROUNDING SYSTEM. PHOTO DOCUMENT ALL CADWELDS AND GROUND RING
- NOTIFY CONSTRUCTION MANAGER IF THERE ARE ANY DIFFICULTIES INSTALLING GROUNDING SYSTEM DUE TO SITE SOIL CONDITIONS.

GENERAL ROD NOTES (WHERE APPLICABLE):

- ELECTRICAL CONTRACTOR SHALL ORDER GROUND RESISTANCE TESTING ONCE THE GROUND SYSTEM HAS BEEN INSTALLED; A QUALIFIED INDIVIDUAL, UTILIZING THE FALL OF POTENTIAL METHOD, SHOULD PERFORM THE TEST. THE REPORT WILL SHOW THE LOCATION OF THE TEST AND CONTAIN NO LESS THAN 9 TEST POINTS ALONG THE TESTING LINE, GRAPHED OUT TO SHOW THE PLATEAU.
- 2 POINT GROUND TEST OR 3 POINT 62% TESTS WILL NOT BE ACCEPTED AS ALTERNATIVES TO THE AFOREMENTIONED GROUND TESTS. TEST SHALL BE PERFORMED WHILE THE COUNTERPOISE IS ISOLATED FROM THE A/C SYSTEM GRIDS AND EXISTING COMMUNICATIONS FACILITY.



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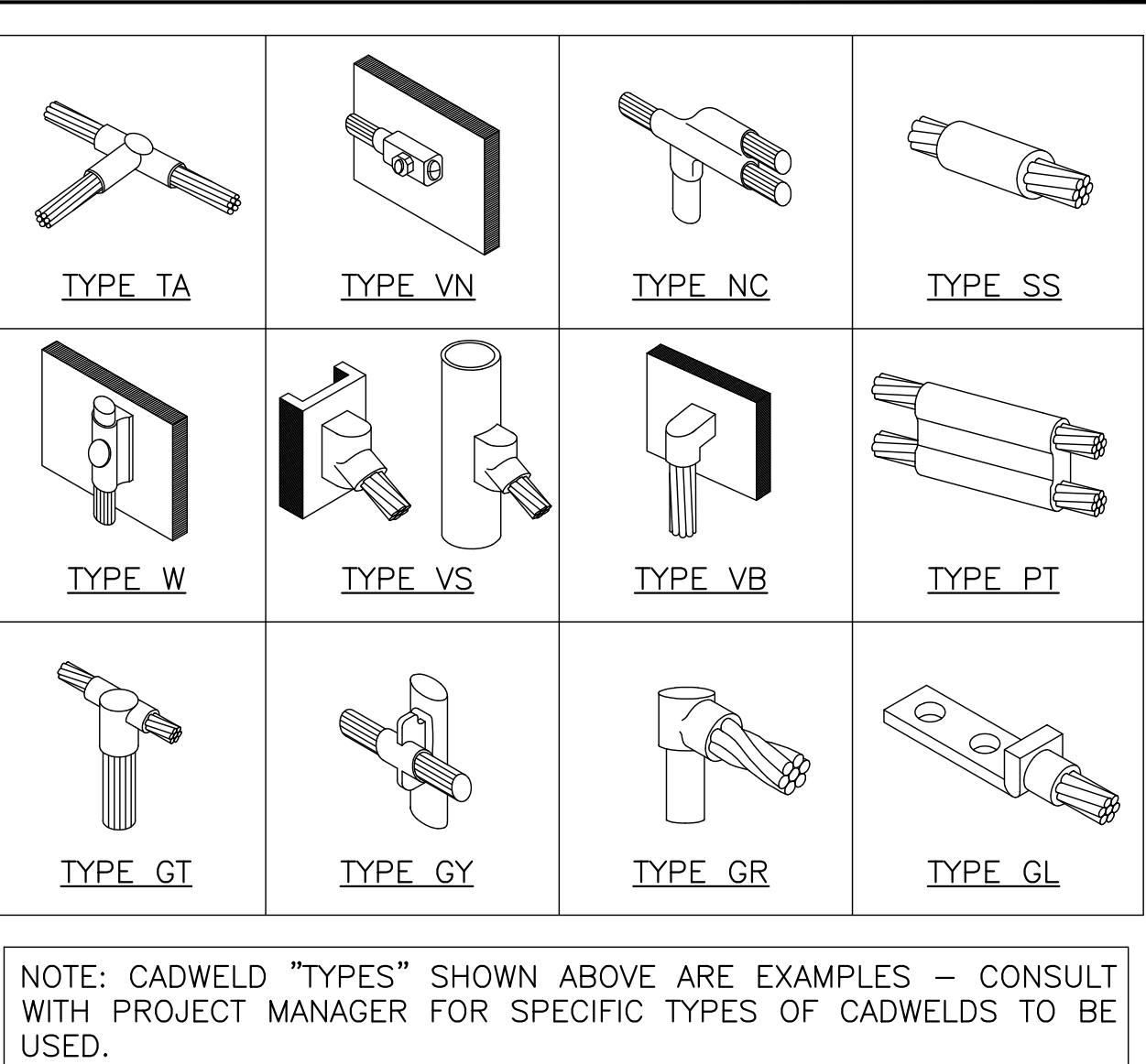
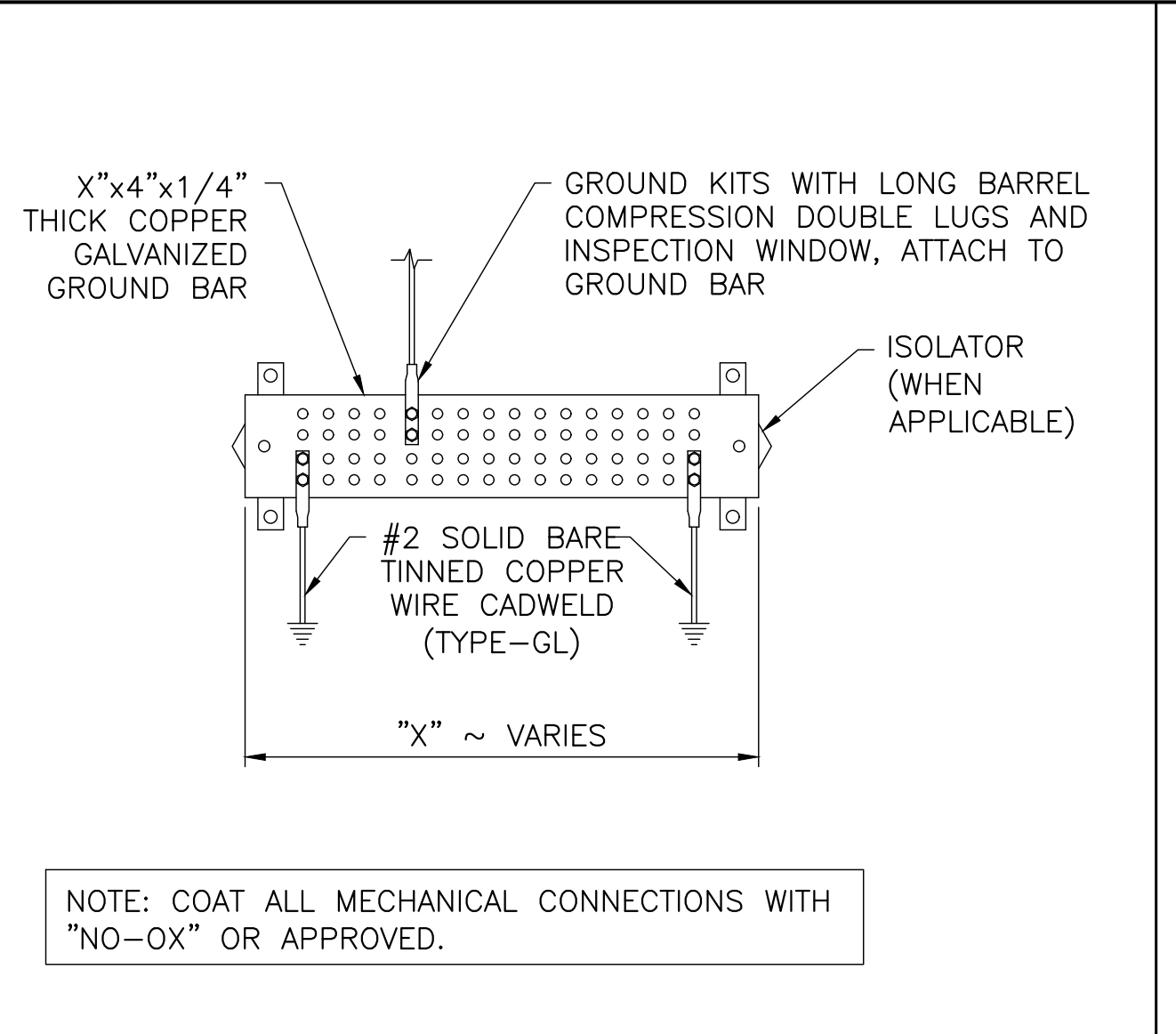
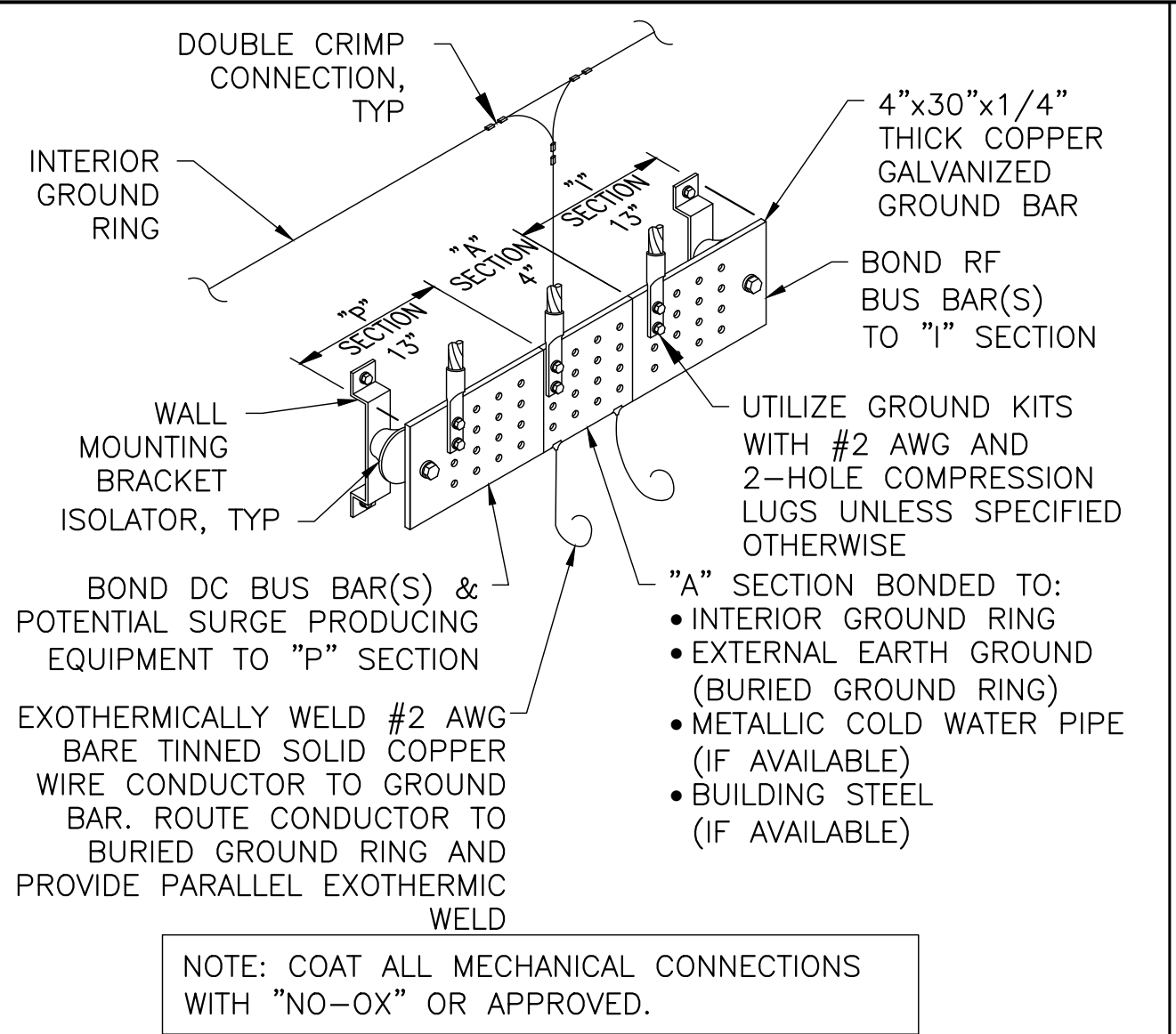
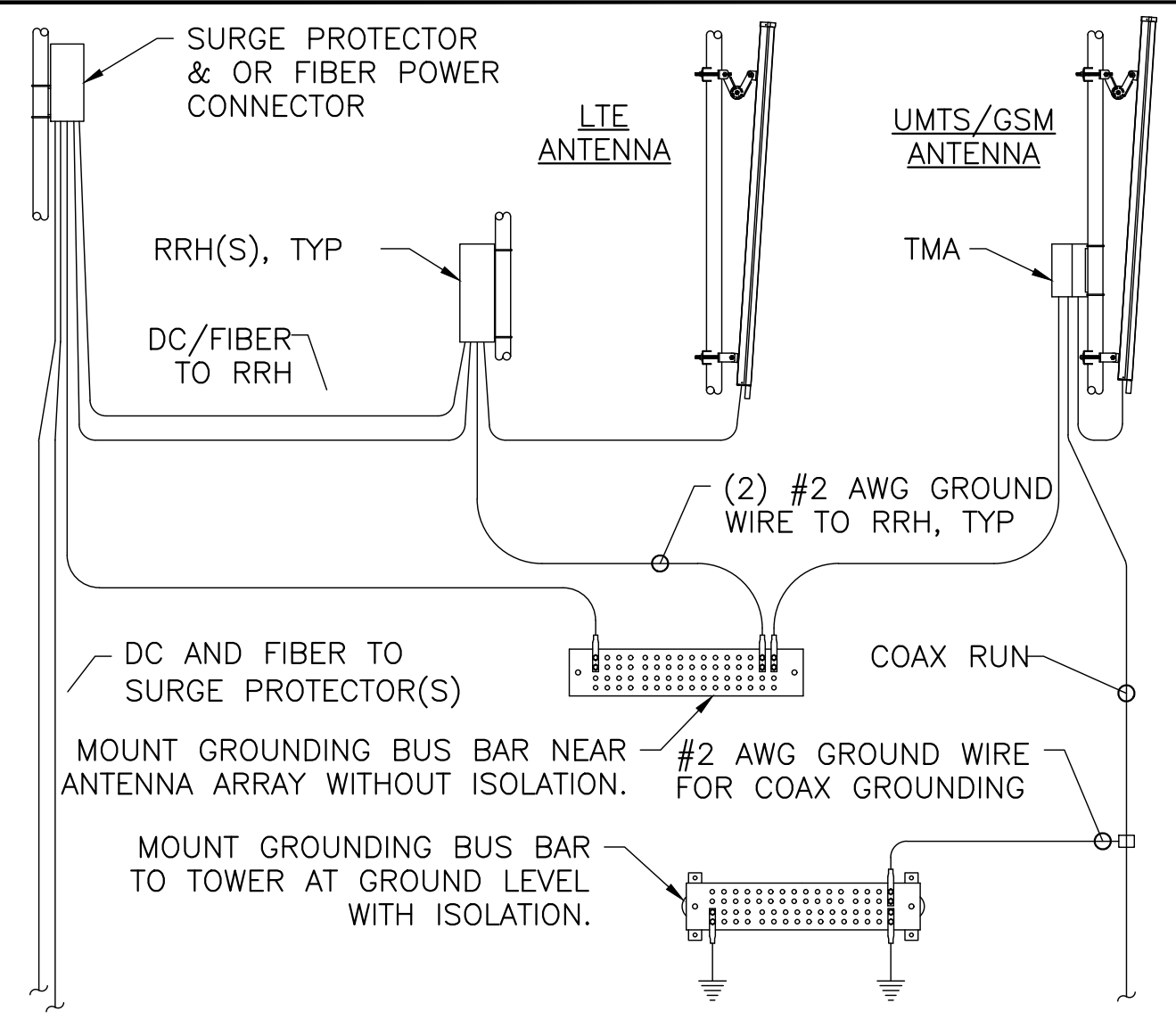
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C	12/29/17	CLIENT COMMENTS

SHEET TITLE
SCHEMATIC GROUNDING
PLAN

SHEET NUMBER
G-1

DRAWN BY: APR CHECKED BY: CW APPROVED BY: CW



GROUNDING DETAILS

5

GROUNDING DETAILS

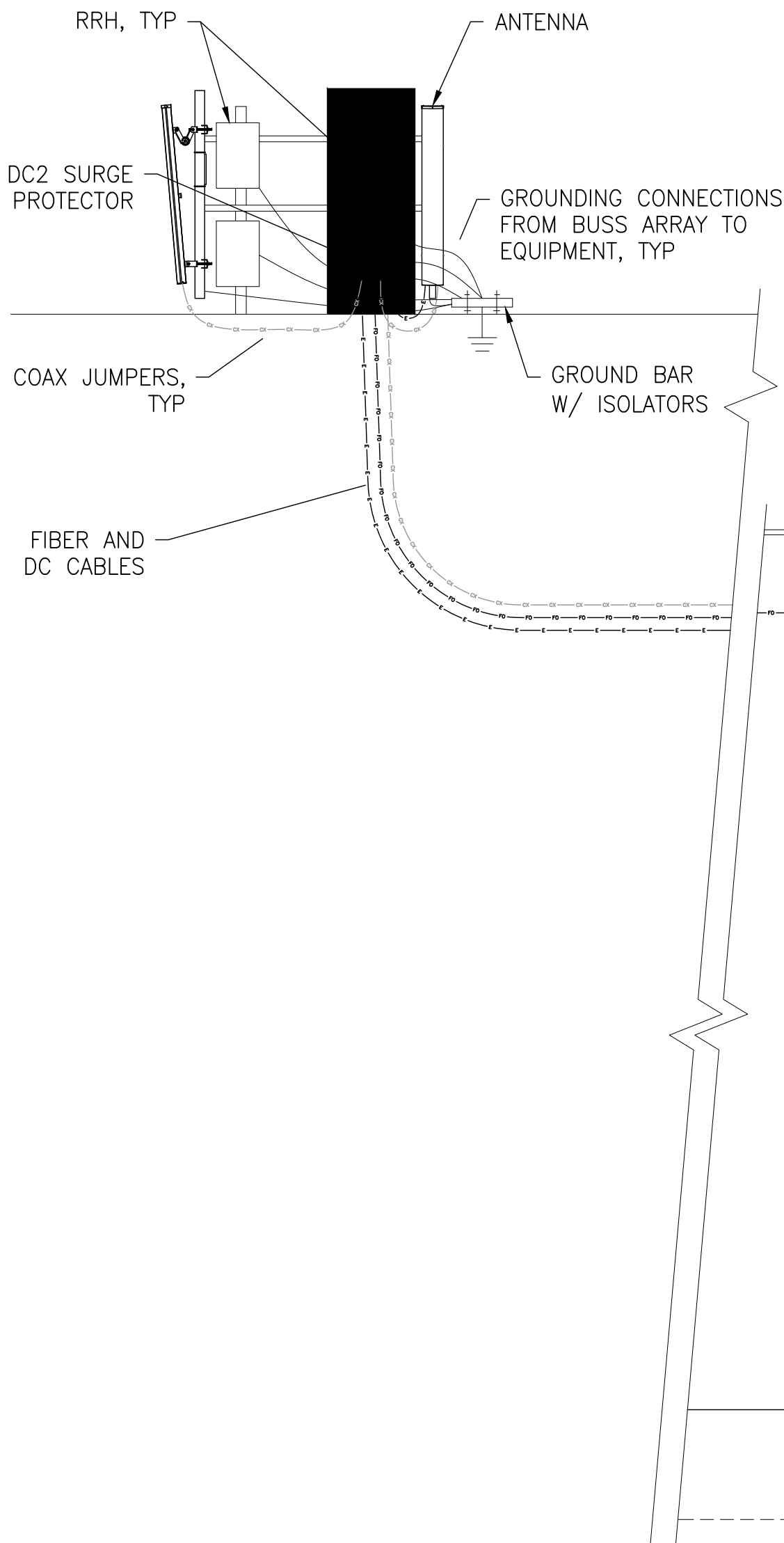
4

GROUNDING DETAILS

3

CAD WELD EXAMPLES

2



- NOTE:
- GROUNDING CONNECTIONS RUNNING TO GROUND RING MUST BE CADWELDED.
 - ALTERNATIVE CONNECTIONS MUST BE APPROVED BY THE CONSTRUCTION MANAGER.
 - VERIFY OUTDOOR, ABOVE-GROUND METALLIC OBJECTS ARE GROUNDED IN ACCORDANCE WITH AT&T NATIONAL STANDARDS. BANDED, HOSE CLAMP STYLE MOUNTS ARE NOT APPROVED FOR GROUNDING CONNECTIONS.
 - COAT ALL MECHANICAL CONNECTIONS WITH "NO-OX" OR APPROVED.

GROUNDING SCHEMATIC DIAGRAM

1



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SHEET TITLE
GROUNDING DETAILS

SHEET NUMBER
G-2