2024

Communications Design & Construction Standards

PUBLISHED: 2024

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PUBLISHED BY SALT RIVER PROJECT

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REVISION LOG

Revisions Previous to 04/25/2024		
Standard Title	**Standard Change**	**Date**
All	Republication	04/24/2024
Antenna Installation – Yagi Antenna Underground	Pole Mount Antenna Bracket	07/05/2024

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I. PURPOSE AND SCOPE

A. THE FOLLOWING COMMUNICATIONS DESIGN AND CONSTRUCTION STANDARDS ADDRESS THE MAJORITY OF CONSTRUCTION ISSUES.

B. IT IS IMPERATIVE TO MAINTAIN STANDARDIZATION AND THAT COMPLETED JOB ORDERS REFLECT ANY CHANGES ON THE COMPLETED "INSTALLATION RECORDS" TO ASSURE THAT ALL RECORD SYSTEMS REFLECT THE ACTUAL LOCATION AND FACILITIES AS THEY HAVE BEEN CONSTRUCTED. THE ACCURACY OF CONSTRUCTION TO STANDARDS WILL ALLOW SRP TO EXPEDITE FUTURE LOCATING, REBUILDING OR REPAIRING OF THESE FACILITIES TO IMPROVE CUSTOMER SERVICE.

II. HOW TO USE THIS BOOK

A. REVISIONS ARE INDICATED BY RED TEXT OR GRAPHICS.

B. TITLE BLOCKS ARE USED TO HOLD INFORMATION ABOUT THE BOOK, SECTION, AND STANDARD AND ARE LOCATED AT THE BOTTOM OF THE PAGE.

1. “APPROVAL” REFERS TO THE ENGINEER RESPONSIBLE FOR THAT STANDARD.
2. “ISSUE DATE” IS WHEN THE STANDARD WAS ORIGINALLY CREATED.
3. REVISION DATE (“REV DATE”) IS THE DATE THE STANDARD WAS LAST UPDATED. NOTE THAT STANDARDS ARE REVIEWED PERIODICALLY BY THE RESPONSIBLE ENGINEER, AND IF NO UPDATES ARE NECESSARY IN THAT REVIEW, THE REV DATE WILL REMAIN UNCHANGED.
4. REVISION STATEMENTS ARE A SUMMARY OF THE CHANGES MADE ON THE PAGE AND ARE LOCATED AT THE TOP OF THE TITLE BLOCK.
5. IF A REVISION RESULTS IN THE COMPLETE REMOVAL OF A DIAGRAM OR AN ENTIRE SECTION OF A DIAGRAM OR A COMPLETE SECTION OF TEXT, A BRIEF EXPLANATION OF THE REMOVAL WILL BE ENTERED IN THE REVISION STATEMENT LOCATION OF THE TITLE BLOCK.
6. REVISIONS TO FORMATTING AND CORRECTIONS TO TYPOGRAPHICAL ERRORS AND/OR PAGE NUMBERS WILL NOT BE NOTED AS A REVISION DATE CHANGE, HOWEVER, IT WILL BE ENTERED AS A CHANGE IN THE STANDARDS REVISION LOG.

C. UTILIZING SRP STANDARDS

1. WHEN UTILIZING SRP’S STANDARDS IN DESIGN PROJECTS, MODIFICATION OF SAID STANDARDS IS NOT PERMITTED.
2. DETAILS OR IMAGES MAY BE EXTRACTED AND USED IN DESIGN PROJECTS WHEN THEY DO NOT INCLUDE THE TITLE BLOCK OF THE STANDARD AND ARE NOT PRESENTED AS A STANDARD.

D. WATERMARKS

1. STANDARDS

A) FOR REFERENCE ONLY – STANDARDS THAT ARE NOT FOR NEW CONSTRUCTION. EXISTING FACILITIES MAY BE MAINTAINED OR REPLACED AS LIKE FOR LIKE. REPLACES REFERENCE ONLY, OBSOLETE FOR REFERENCE ONLY, OBSOLETE FOR REPLACEMENT ONLY, OBSOLETE REFERENCE ONLY, REFERENCE ONLY DO NOT CONSTRUCT, AND REMOVE OR REPLACE ONLY.

B) FOR REMOVAL ONLY – STANDARDS THAT ARE NOT FOR NEW CONSTRUCTION. EXISTING FACILITIES NOT MAINTAINED OR REPLACED. REPLACES OBSOLETE FOR REMOVAL ONLY AND REFERENCE ONLY REMOVE WHEN LOCATED.

2. COMPATIBLE UNITS (CUS)

A) REPLACEMENT ONLY – CUS THAT ARE TO BE USED IN SITUATIONS WHERE A LIKE FOR LIKE REPLACEMENT IS REQUIRED. THESE CUS ARE RELATED TO A PIECE OF EQUIPMENT THAT IS NO LONGER BEING USED FOR NEW CONSTRUCTION, BUT IS ABLE TO BE MAINTAINED IN THE FIELD.

B) REMOVAL ONLY – CUS THAT ARE TO BE USED TO REMOVE EXISTING EQUIPMENT IN THE FIELD. THESE CUS ARE NOT TO BE USED TO CONSTRUCT NEW EQUIPMENT.

TO ACCESS THE "GENERAL COMPATIBLE UNIT USER GUIDE FOR DISTRIBUTION AND TRANSMISSION LINE CUS", VISIT:

HTTPS://ECM/OTCS/CS.EXE/FETCH/24135121/GENERAL%20CU%20USERS%20GUIDE.PDF

III. CHANGES TO STANDARDS

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HTTPS://WWW.SRPNET.COM/DOING-BUSINESS/BUILDERS-DEVELOPERS-CONTRACTORS/COMMERCIAL-SPECIFICATIONS-GUIDELINES-HANDBOOKS

IV. CONTACT INFORMATION

A. BUSINESS AND RESIDENTIAL

BLUE STAKE	WITHIN MARICOPA COUNTY OUTSIDE OF MARICOPA COUNTY	**(602) 263-1100** **(800) 782-5348**
BUSINESS CENTER	GENERAL INFORMATION, BILLING INQUIRIES, INSPECTIONS, MUNICIPAL CUSTOMERS, PUBLIC AGENCY CUSTOMERS, TEMPORARY DISCONNECT	**(602) 236-8833**
ELECTRICAL EMERGENCIES	**NOTE:** CALL 9-1-1 FIRST FOR MEDICAL EMERGENCIES. FALLEN POWER LINES, ARCING, ELECTRIC SHOCK, DAMAGE TO SRP FACILITIES	**(602) 236-8811**
RESIDENTIAL	GENERAL INFORMATION, BILLING INQUIRIES, POWER OUTAGES, MAINTENANCE OF SRP FACILITIES, TEMPORARY DISCONNECT, INSPECTIONS	**(602) 236-8888**
SPANISH	LA LINEA – SERVICIO EN ESPAÑOL	**(602) 236-1111**
SRP EARTHWISE SOLAR	MAIN LINE RESIDENTIAL PHOTOVOLTAIC RESIDENTIAL SOLAR WATER HEATERS COMMERCIAL PHOTOVOLTAIC (SOLAR INITIATIVES)	**(602) 236-4448** **(602) 236-4661** **(602) 236-4662** **(602) 236-4663**
SRP WATER (IRRIGATION)	EMERGENCIES, WATER (IRRIGATION), FLOODING, GENERAL INFORMATION, BILLING INQUIRIES, IRRIGATION ORDERS, SCHEDULE TIME INQUIRIES	**(602) 236-3333**
LOCATION OF UNDERGROUND FACILITIES	NATIONAL "CALL BEFORE YOU DIG" ("ONE CALL" OFFICE)	**811**

B. ADDITIONAL RESOURCES

GRAPHIC RECORDS:	CONTRACT CONSTRUCTION COMPANIES CAN REQUEST PRINTING SERVICES ONLINE AT SRPNET.COM/ELECTRIC/BUSINESS/GRAPHICREQUEST.ASPX
SHOP DRAWINGS:	CUSTOMERS ARE REQUIRED TO SUPPLY SHOP DRAWINGS FOR SERVICE ENTRANCE SECTIONS WITH NON-PRE-APPROVED METER PEDESTALS (SINGLE OR DOUBLE), NON-PRE-APPROVED 320 AMPS, AND ALL 400 AMPS AND ABOVE. EMAIL SHOPDRAW@SRPNET.COM (PDF FILES ARE PREFERRED).
STANDARDS-RELATED QUESTIONS OR FOR HISTORICAL COPIES OR VERSIONS OF STANDARDS	EMAIL: ENGINEERING_STANDARDS@SRPNET.COM
SRP'S WEBSITE:	SRPNET.COM RESIDENTIAL / BUSINESS ELECTRIC / WATER ASSISTANCE INFORMATION.

V. AREA BUSINESS OFFICE LOCATIONS

EAST VALLEY SERVICE CENTER ..... 7050 E. UNIVERSITY DR., MESA 85207
PROJECT ADMINISTRATION BUILDING ..... 1500 N. MILL AVE., TEMPE 85281
PINAL COUNTY CUSTOMER SERVICE CENTER ..... 3735 E. COMBS RD., QUEEN CREEK 85242
WEST VALLEY SERVICE CENTER ..... 221 N. 79TH AVE., TOLLESON 85353

VI. REFERENCES

THERE ARE NUMEROUS DOCUMENTS AND STANDARDS THAT WERE USED IN DEVELOPING THESE GUIDELINES. MANY OF THESE DOCUMENTS ARE MODIFIED AND UPDATED OVER TIME; THE EQUIPMENT OF AN INTERCONNECTED GENERATOR SHALL CONFORM TO THE MOST RECENT VERSIONS OF THESE DOCUMENTS. A PARTIAL LIST OF DOCUMENTS USED IS INCLUDED BELOW:

- ELECTRIC UTILITY SERVICE EQUIPMENT REQUIREMENTS COMMITTEE (EUSERC) MANUAL
- INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
- INTERNATIONAL BUILDING CODE (IBC)
- NATIONAL ELECTRIC CODE (NEC)
- NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
- NATIONAL ELECTRIC SAFETY CODE (NESC)
- UNDERWRITER LABORATORIES (UL)
- VARIOUS STATE AND MUNICIPAL REQUIREMENTS

SECTION 1: DESIGN

I. COMMUNICATIONS/CONTROL CABLE

A. COMMUNICATIONS CABLE SYSTEM IS USED ON THE TRANSMISSION SYSTEM FOR DATA, VOICE, TELEMETRY AND PILOT RELAYING.

B. TELECOM ENGINEERING DETERMINES COMMUNICATIONS CABLE REQUIREMENTS. THE COMMUNICATIONS CABLE REQUIREMENTS ARE TRANSMITTED TO TRANSMISSION LINE DESIGN ENGINEERING AND DESIGN SERVICES THROUGH THE ANNUAL BUDGET REQUEST. AS INDIVIDUAL JOBS ARE REQUIRED FOR NEW/REBUILD SUBSTATION PROJECTS TELECOM ENGINEERING WILL SUBMIT A “TRANSMISSION LINE DESIGN WORK REQUEST” FOR THAT WORK.

C. SYSTEM IMPROVEMENTS PREPARES BUDGET ESTIMATES FOR THE COMMUNICATIONS LINE CONSTRUCTION FROM THE BUDGET REQUEST AND THEN SENDS THE COST ESTIMATE TO COMMUNICATIONS ENGINEERING.

D. SYSTEM IMPROVEMENTS ORDERS COMMUNICATIONS CABLE AND EQUIPMENT BASED ON BUDGET ESTIMATES AND ESTIMATED ON-HAND REQUIREMENTS.

E. SPECIFIC JOB ORDER MATERIALS REQUIRED AT THE TIME OF CONSTRUCTION ARE CALLED UP BY THE DESIGNER THROUGH COMPATIBLE UNITS ESTIMATES.

II. OVERHEAD COMMUNICATIONS CABLE DESIGN

A. THE JOB ORDER DESIGNER DETERMINES THE COMMUNICATIONS CABLE ROUTE. UNDER NORMAL CONDITIONS, THE ROUTE TAKEN IS OPTICAL GROUND WIRE (OPGW) ON THE 69 KV ROUTE.

B. AERIAL COMMUNICATIONS CABLE IS NORMALLY INSTALLED IN THE COMMERCIAL TELEPHONE CABLE AREA OF THE POLE.

C. WHEN THE FIELD SURVEY IS MADE, NOTE SHOULD BE MADE AS TO THE POSSIBILITY FOR LAYING OUT THE CABLE ON THE RIGHT-OF-WAY AND THEN ATTACHED UP ON THE POLE. THIS IS THE PREFERRED INSTALLATION METHOD AND SHOULD BE NOTED ON THE JOB ORDER SKETCH WHEN IT CAN BE USED.

D. IF THE ROUTE REQUIRES THE CABLE BE PULLED FROM A STATIONARY REEL, THE MAXIMUM PULL SHALL BE LIMITED BY CABLE TENSION.

E. VERTICAL, CROSSING AND STRUCTURE CLEARANCE REQUIREMENTS ARE SHOWN IN THE ELECTRICAL CLEARANCE STANDARDS.

F. SAG CHARTS FOR COMMUNICATIONS CABLE CAN BE FOUND ON THE POLICY, PROCEDURES & STANDARDS (PP&S) WEB PAGE: HTTPS://INSRPTEAMS/COMMUNITY/DC/STANDARDS/PAGES/DEFAULT.ASPX. IF OTHER SIZE CABLES ARE ENCOUNTERED, CONTACT PP&S FOR ASSISTANCE.

G. IF THE WORK WILL REQUIRE AN OUTAGE ON THE CABLE, MAKE A NOTE IN THE "CONSTRUCTION MUST BE SCHEDULED WITH" AREA OF THE CS&S CHECKLIST AND ON THE JOB ORDER SKETCH, INSTRUCTING THE CREW TO CONTACT COMMUNICATIONS TECHNICIANS PRIOR TO CONSTRUCTION TO ARRANGE FOR THE NECESSARY OUTAGES FROM SYSTEMS OPERATIONS.

III. OPGW SPLICE ENCLOSURES

A. GENERAL DESCRIPTION: OPGW SPLICE ENCLOSURES ARE INSTALLED DURING THE CONSTRUCTION OF A NEW OPGW CABLE AS PART OF A NEW TRANSMISSION/SUB-TRANSMISSION LINE. THE OPGW SPLICE ENCLOSURES ALLOW THE ENDS OF TWO SEPARATE CABLES TO BE FUSION SPLICED TOGETHER TO PROVIDE OPTICAL CONNECTIVITY.

B. DESIGN CONSIDERATIONS: EVERY PROPOSED OPGW SPLICE ENCLOSURE MUST BE EVALUATED ON A CASE BY CASE BASIS WITH TE, TI , TLD, AND TLC. THE FOLLOWING FACTORS WILL DETERMINE IF A NEW OPGW SPLICE ENCLOSURE CAN BE ADDED TO AN EXISTING ENERGIZED LINE/SPAN:

- VOLTAGES (69 KV, 115 KV, 230 KV, 500 KV)
- HEIGHT OF POLES
- CLASS OF POLES
- POLE LOADING
- CONSTRUCTION TYPE
- REQUIRED GRADE B CONSTRUCTION
- LENGTH REQUIREMENT OF PROJECT
- DEDICATED CIRCUIT
- DOUBLE CIRCUIT
- ENERGIZED DISTRIBUTION CIRCUIT(S)
- OUTAGE CONSTRAINT/RESTRICTIONS

C. DESIGN CRITERIA: AFTER EVALUATION FROM TE, TI, TLD AND TLC – IF A SPLICE CASE CAN BE ADDED, THE FOLLOWING CRITERIA CAN GREATLY AFFECT THE COSTS AND CONSTRUCTIONS METHODS. ALL REQUESTS TO ADD ADDITIONAL OPGW SPLICE ENCLOSURES SHOULD BE INDEPENDENTLY EVALUATED TO DETERMINE THE SAFEST, MOST EFFICIENT AND COST EFFECTIVE SOLUTION FOR THE PROJECT.

1. VOLTAGE: 115 KV AND ABOVE REQUIRE LARGE EQUIPMENT TO REACH THE TOP OF STRUCTURES.
2. HEIGHT OF POLES: DICTATES TYPE OF EQUIPMENT REQUIRED TO INSTALL NEW OPGW.
3. CLASS OF POLES: WILL EXISTING POLES BE ABLE TO SUPPORT NEW OPGW DEADENDS, OR WILL HEAVIER CLASS POLES BE REQUIRED?
4. CONSTRUCTION TYPE: WILL EXISTING POLE FRAMING ALLOW REQUIRED CLEARANCES BETWEEN THE NEW OPGW AND THE EXISTING ENERGIZED CONDUCTOR, OR WILL REFRAMING OR POLE REPLACEMENT BE NECESSARY?
5. LENGTH REQUIREMENT OF PROJECT: THE OVERALL LENGTH OF OPGW TO BE INSTALLED OR REPLACED TO ACCOMMODATE THE INSTALLATION OF NEW SPLICE CASES WITH ALL OTHER CRITERIA DISCUSSED HAS A DIRECT EFFECT ON COST.
6. DEDICATED CIRCUIT: WHAT ARE THE OUTAGE CONSTRAINTS AND/OR RESTRICTIONS ASSOCIATED WITH DE-ENERGIZING A DEDICATED CIRCUIT?
7. DOUBLE CIRCUIT: CAN A CREW WORK ON ONE SIDE OF THE CIRCUIT WHILE THE OTHER SIDE REMAINS ENERGIZED? POLE/STRUCTURE FRAMING DICTATES WHETHER THIS IS POSSIBLE.

8. ENERGIZED DISTRIBUTION CIRCUITS: CAN A CREW WORK ON THE POLE WHEN 12 KV UNDERBUILT CIRCUIT(S) ARE ENERGIZED, OR ARE THERE ANY SPECIAL OUTAGE REQUIREMENTS OR RESTRICTIONS?
9. OUTAGE CONSTRAINTS: CAN THE POWER DISPATCHING OFFICE (PDO) SCHEDULE THE REQUIRED OUTAGES, OR ARE THERE OUTAGE RESTRICTIONS ON DEDICATED CIRCUITS AND/OR SUBSTATIONS?
10. TIME FRAMES, 69 KV: THE TIME FRAME TO HAVE AN OPGW SPLICE CASE INSTALLED ON AN EXISTING 69 KV CIRCUIT WILL BE DETERMINED DURING THE EVALUATION PROCESS. GENERALLY ON A 69KV SINGLE CIRCUIT, WITH GRADE B CONSTRUCTION, WITH EXISTING POLES THAT CAN SUPPORT DEADENDS, WITH NO UNDERBUILT CIRCUITS AND WITH NO OUTAGE CONSTRAINTS, THE TIME FRAME WOULD BE ONE TO THREE MONTHS AFTER THE DESIGN AND ENGINEERING HAS BEEN COMPLETED.
11. TIME FRAMES, 115 KV – 500 KV: THE TIME FRAME TO HAVE AN OPGW SPLICE CASE INSTALLED ON EXISTING 115 KV – 500 KV CIRCUITS WILL BE DETERMINED DURING THE EVALUATION PROCESS. GENERALLY ON 115 KV – 500 KV CIRCUITS WITH GRADE B CONSTRUCTION, WITH EXISTING STRUCTURES THAT CAN SUPPORT DEADENDS, WITH NO UNDERBUILT CIRCUITS AND WITH NO OUTAGE CONSTRAINTS, THE TIME FRAME WOULD BE SIX TO TWELVE MONTHS AFTER THE DESIGN AND ENGINEERING HAS BEEN COMPLETED.

IV. UNDERGROUND COMMUNICATIONS CABLE DESIGN

A. THE DESIGNER DETERMINES THE FINAL COMMUNICATIONS CABLE ROUTE TO UTILIZE COMMON TRENCH WITH OTHER DISTRIBUTION FACILITIES WHERE POSSIBLE.

B. THE COMMUNICATIONS CABLE WILL NORMALLY BE INSTALLED UNDERGROUND FROM A PULL BOX OR CABLE TRENCH IN THE SUBSTATION TO THE FIRST RISER POLE IN THE DIRECTION THE CABLE IS TO BE ROUTED. THE EXACT POLE TO BE USED FOR THE RISER WILL BE DETERMINED BY THE LEAD ENGINEER IN THE COMMUNICATIONS ENGINEERING DEPARTMENT.

C. COMMUNICATIONS CABLES SHALL NOT BE INSTALLED IN A PULLBOX OR MANHOLE WHICH CONTAINS ENERGIZED CIRCUITS.

D. THE FOLLOWING ARE GENERAL GUIDELINES FOR THE COMMUNICATIONS CONDUITS WITHIN SUBSTATION PROPERTY OR AT ROAD CROSSINGS:

1. ONE THREE INCH PVC CONDUIT IS REQUIRED PER CABLE.
2. THE LIMITATION ON PULLING DISTANCE SHALL BE THE MANUFACTURER'S SPECIFIED MAXIMUM TENSION LIMIT OF THE CABLE BEING PULLED AND/OR THE CONDUIT SIDE-WALL PRESSURE AS DETERMINED BY PP&S'S "UNDERGROUND CABLE PULLING" DESIGN TOOL.
3. THE CONDUIT IS TO BE PLACED IN A COMMON TRENCH ABOVE DISTRIBUTION FEEDER CONDUIT BANKS ON THE FIELD SIDE AS SHOWN IN SECTION 2 – UNDERGROUND. COMMUNICATIONS CONDUITS NEED NOT BE ENCASED EXCEPT WITHIN SUBSTATION PROPERTY, AT ROAD CROSSINGS, FOR CONDUIT CROSSINGS IN AREAS WHERE THERE IS EVIDENCE OF EROSION SUCH AS WASHES OR WHERE ADEQUATE DEPTH CANNOT BE OBTAINED.
4. CONDUIT INSTALLATION DESIGN TO BEGIN FROM THE PULL BOX WITHIN THE SUBSTATION AS PROVIDED BY DISTRIBUTION GRID SERVICES.
5. CONDUIT TO TERMINATE AT FIRST RISER POLE OR AT POINT DETERMINED BY THE RESPONSIBLE ENGINEER IN THE TELECOM ENGINEERING DEPARTMENT.

6. COMMUNICATIONS CABLE SHALL NOT BE INSTALLED IN A PULL BOX OR MANHOLE WHICH CONTAINS ENERGIZED CIRCUITS.

   EXCEPTION: WHEN RETRO-FITTING AN EXISTING SUBSTATION FEEDER GETAWAY, 500 MCM TO 750 MCM ALUMINUM OR COPPER, ALL DIELECTRIC FIBER CABLE MAY BE INSTALLED WITH THE FEEDER CABLE IN EXISTING CONDUITS.

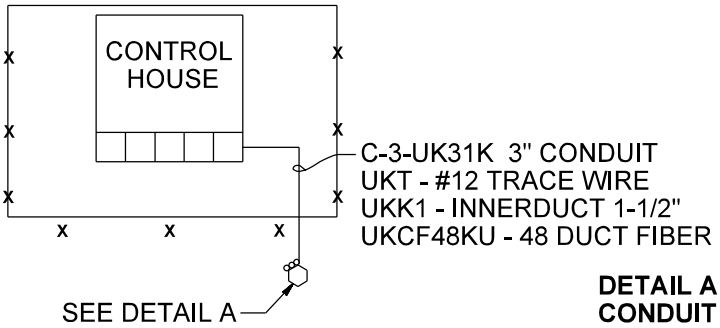
E. PULL BOXES MAY BE REQUIRED DUE TO PULLING TENSIONS OR SIDEWALL BEARING PRESSURE. REFER TO SECTION 2 - UNDERGROUND, PULL BOXES.

F. DESIGNER SHOULD INDICATE DIRECTION OF PULL ON CONDUIT ONE LINE.

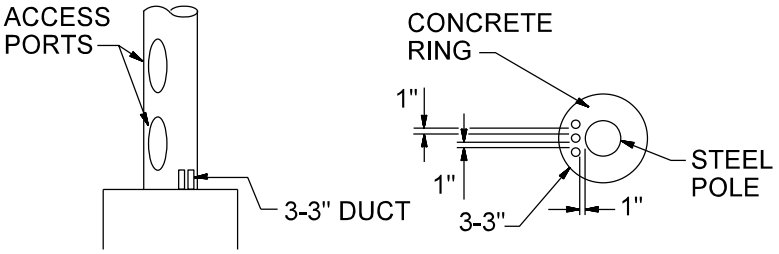
G. COMMUNICATIONS WORK IN RIGHT-OF-WAY WILL GENERALLY REQUIRE TWO 4” CONDUITS.

H. INNERDUCT AND TRACEWIRE SHALL BE INSTALLED WITH ALL UNDERGROUND OPTIC CABLE.

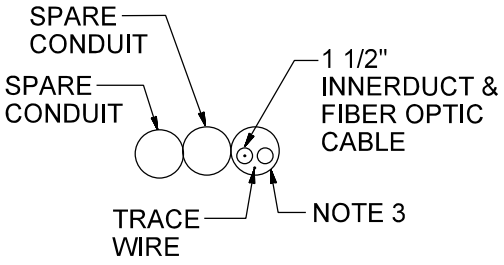
SINGLE-DROP POLE



SIDE VIEW CONDUIT IN COLLAR DETAIL



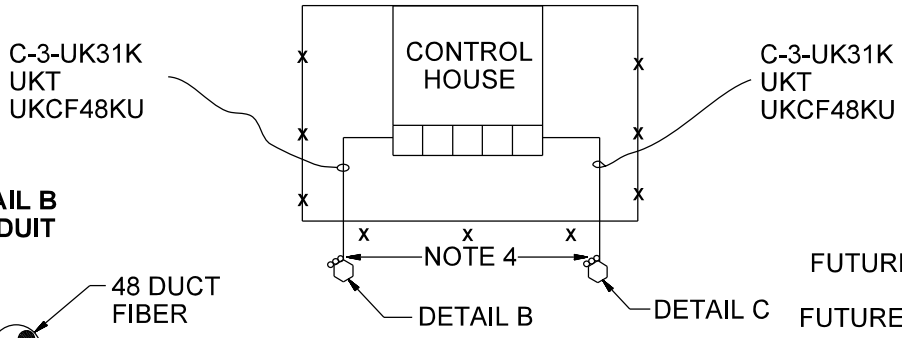
DETAIL A CONDUIT



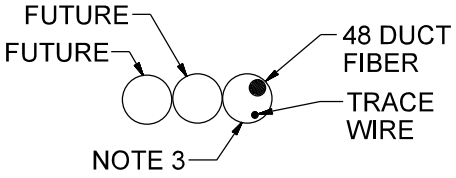
NOTES

1. INSTALL 3-3" CONDUIT FROM THE DROP POLE TO THE CABLE TRENCH.
2. INSTALL THE INNER DUCT, TRACE WIRE AND THE FIBER IN ONE OF THE TWO DUCTS LEAVING THE SECOND AS FUTURE.
3. SEE SECTION 2 - COMMUNICATIONS INNERDUCT.

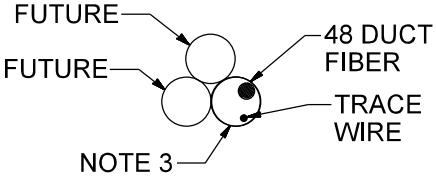
TWO-DROP POLE



DETAIL B CONDUIT



DETAIL C CONDUIT



NOTES

1. INSTALL 3-3" CONDUIT FROM BOTH DROP POLES TO THE CABLE TRENCH.
2. INSTALL TRACE WIRE AND FIBER IN ONE OF THE 3" CONDUITS LEAVING THE SECOND AS FUTURE AT BOTH DROP POLE LOCATIONS.
3. SEE SECTION 2 - COMMUNICATIONS INNERDUCT.
4. COORDINATE CONDUIT NUMBER AND ORIENTATION FOR TRANSMISSION AND SUBSTATION PLANS.
5. WHEN A SECOND DROP POLE IS INSTALLED, INNER DUCT WILL NOT BE NECESSARY.
   - IT IS ALWAYS PREFERRED TO HAVE THE RISER CONDUIT INSTALLED IN THE CONCRETE COLLAR OF THE DROP POLES.
   - LEAVE 1" OF SPACE BETWEEN THE RISER DUCT AND THE POLE AND 1" OF SPACE BETWEEN THE CONDUITS.
   - ALWAYS KEEP THE RISER DUCT OUT FROM UNDER THE ACCESS PORTS.
6. LEAVE A MINIMUM 50' COIL OF FIBER AT TERMINATION RACK.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	DESIGN TYPICAL DESIGN SUBSTATION COMMUNICATIONS CONDUIT SINGLE-DROP POLE AND TWO-DROP POLE	ISSUE DATE: 04/15/04 REV. DATE: 06/19/13 APPROVAL: W. LARAMIE
	1-2-1	8505E67.DGN

VI. OPGW INSTALLATION

A. OPTICAL GROUNDWIRE INSTALLATION REQUIREMENTS PRIMARILY RELATE TO:

1. MINIMUM BENDING RADIUS.
2. ALLOWABLE PULLING TENSION.
3. THE NEED FOR AN ANTI-TWIST DEVICE DURING THE STRINGING OPERATION.
4. THE NEED FOR HARDWARE AND ACCESSORIES TO BE SPECIFICALLY DESIGNED FOR USE WITH OPGW.

B. TENSION REQUIREMENTS

1. INSTALLATION TENSION SHOULD NOT EXCEED 25% OF THE RATED BREAKING STRENGTH.
2. BULLWHEELS SHOULD BE LINED.
3. BULLWHEEL DIAMETER SHOULD BE 36 INCHES.

C. SHEAVE DIAMETER

1. SHEAVES SHOULD BE LINED.
2. THE FIRST SHEAVE AFTER THE TENSIONER AND THE LAST SHEAVE BEFORE THE PULLER SHOULD BE 24 INCHES IN DIAMETER.
3. THE DIAMETER OF THE SHEAVES LOCATED WITHIN THE SPANS SHOULD BE AT LEAST 25 TIMES THE CABLE DIAMETER. THIS ASSUMES A MAXIMUM LINE ANGLE OF 30 DEGREES AND A MAXIMUM TENSION OF 25% OF RATED BREAKING STRENGTH.

D. PULLING

1. THE ROPE USED IN PULLING NEW CONSTRUCTION SHOULD HAVE THE SAME LAY DIRECTION AS THE OPGW TO HELP PREVENT TWISTING.
2. AN ANTI-ROTATIONAL DEVICE MUST BE ATTACHED TO THE OPGW WHEN PULLING FROM THE REEL.

ADSS

MATERIAL ITEM	COMPATIBLE UNIT	FIBER COUNT	MODE	DIA. (IN.)	WT. (LBS./FT.)	CROSS SECTIONAL AREA (MM^2)	MINIMUM BEND RADIUS (IN.)		TENSION (LBS.)	
							INSTALL (IN TENSION)	IN PLACE (NO TENSION)	MAX PULL	LONG TERM
5020594	KCF48 KCF48T TC-KCF48 TC-KCF48T TC-UKCF48K TC-KCF48KT UKCF48K	48	SINGLE	0.69	0.152	241	13.8	16	1,000	7,500
5020700	KCF96 KCF96T TC-KCF96	96	SINGLE	0.69	0.152	241	13.8	16	1,000	7,500

DUCT FIBER

MATERIAL ITEM	COMPATIBLE UNIT	FIBER COUNT	MODE	DIA. (IN.)	WT. (LBS./FT.)	MINIMUM BEND RADIUS (IN.)		TENSION (LBS.)	
						INSTALL (IN TENSION)	IN PLACE (NO TENSION)	MAX PULL	LONG TERM
5020699	UKCF12KU UKCF12KUT TC-UKCF12KU TC-UKCF12KUT	12	SINGLE	0.41	0.049	6.2	4.1	600	200
5020701	UKCF48KU UKCF48KUT TC-UKCF48KU TC-UKCF48KUT	48	SINGLE	0.41	0.049	6.2	4.1	600	200
5020702	UKCF96KU UKCF96KUT TC-UKCF96KU TC-UKCF96KUT	96	SINGLE	0.48	0.066	7.2	4.8	600	200
5027199	UKCF6MK UKCF6MMKU TC-UKCF6MK TC-UKCF66MMKU	6	MULTI	0.41	0.049	6.2	4.1	600	200
5027200	UKCF12MK UKCF12MMKU TC-UKCF12MMKU	12	MULTI	0.41	0.049	6.2	4.1	600	200
5027202	UKCF24MK UKCF24MMKU TC-UKCF24MMKU	24	MULTI	0.41	0.049	6.2	4.1	600	200

OPTICAL GROUND WIRE (OPGW)

MATERIAL ITEM	COMPATIBLE UNIT	FIBER COUNT	MODE	TYPE	DIA. (IN.)	WT. (LBS./FT.)	CROSS SECTIONAL AREA (MM2)	MINIMUM BEND RADIUS (IN.)		TENSION (LBS.)		AFL DNO
								INSTALL (IN TENSION)	IN PLACE (NO TENSION)	MAX PULL	BREAK STRENGTH	
5035757	TA24OP	24	SINGLE	CENTRACORE (NOTE 1)	0.425	0.2674	67.18	9	7	2,849	14,245	DNO-5950
5035758	TA48OP	48	SINGLE	ALUMACORE	0.637	0.4767	135.14	13	10	4,630	23,150	DNO-7623
5093603	TA96OP	96	SINGLE	ALUMACORE	0.637	0.4826	135.14	13	10	4,630	23,150	DNO-7702
5033842	TA144OP	144	SINGLE	ALUMACORE (NOTE 2)	0.646	0.4733	143.37	13	10	4,630	23,150	DNO-11011
5037531	TA96OPS	96	SINGLE	SLOTTEDCORE	0.668	0.444	149.32	14	10	3,255	16,277	DNO-2745
5091558	TA288OP	288	SINGLE	ALUMACORE (NOTE 2)	0.668	0.476	124.52	14	10	4,460	22,299	DNO-12071
5093331	TA432OP	432	SINGLE	ALUMACORE (NOTE 2)	0.667	0.467	119.56	14	10	4,310	21,551	DNO-12073
5093335 (NOTE 5)	—	24	SINGLE	ALUMACORE (NOTE 2)	0.637	0.476	135.14	13	10	4,630	23,150	DNO-5530
5095461 (NOTE 5)	TA24OPIC	24	SINGLE	ALUMACORE	0.637	0.476	135.14	13	10	4,630	23,150	DNO-12987

NOTES

1. PURCHASED FOR EASTERN MINING AREA.
2. DATA TAKEN FROM MATERIAL SPECIFICATION SHEET.
3. THIS 24 COUNT OPGW TYPE IS STANDARD FOR INTERCONNECTING CUSTOMERS (IC) TO PROCURE AND INSTALL ON THE INTERCONNECTING CUSTOMER SIDE OF THE POINT OF CHANGE OF OWNERSHIP (PCO) STRUCTURE.
4. SRP HAS USED TWO DIFFERENT STANDARD 24 COUNT OPGW TYPES. THESE WERE FORMALLY KNOWN AS TA67MM AND TA67MM. THE TA67MM WAS ADOPTED PRIMARILY FOR THE EASTERN MINING AREA. SRP CURRENTLY ONLY MAINTAINS STANDARDS FOR TA24OP WHICH IS BASED UPON THE PRIOR TA67MM STANDARD. PLEASE NOTE THAT TA24OP IS NOT COMPATIBLE WITH NORMAL SPLICING MATERIAL AND CABLE TRAYS.
5. DNO-5530 WELDED FINISH SHALL BE DISCONTINUED WHENEVER DEPLETED AND REPLACED WITH THE DNO-12987 EXTRUDED FINISH. TLD SHALL BE RESPONSIBLE TO BATCH THE CORRECT FIBER FOR THE PROJECTS.

SECTION 2: UNDERGROUND

TITLE / DESCRIPTION **PAGE**

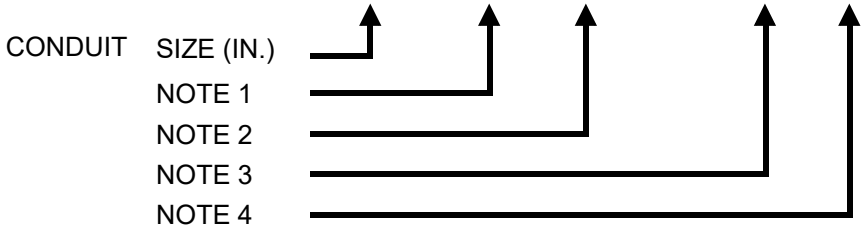
SECTION 2: UNDERGROUND

TITLE / DESCRIPTION **PAGE**

FOR REFERENCE ONLY

CONDUIT		COMPATIBLE UNIT (CU)						MATERIAL ITEM
STRAIGHT								
PVC	3”	UK3	___	___	K	___	___	5035470
NOTE 5	4”	UK4	___	___	K	___	___	5035473
	3 1.5”	UKF15	3	*	K	___	___	**
SPOOLED DUCT	2”	UKF2	___	*	K	___	___	5031714
	3”	UKF3	___	*	K	___	___	5033738
	4”	UKF4	___	*	K	___	___	5033737

** NOT APPLICABLE.*
*** NOT STOCKED, CONTACT ENGINEERING TO ORDER.*



TO OBTAIN THE COMPLETE CU, SELECT THE APPROPRIATE SUFFIXES. DO NOT LEAVE BLANK SPACES IF SUFFIX DOES NOT APPLY.

EXAMPLE: FOR A COMMUNICATIONS DUCT BANK OF 2 STRAIGHT PVC 3" CONDUITS, CONCRETE ENCASED, FULL STRENGTH AND INSTALLED BY DEVELOPER = UK32FKG

NOTES / INSTRUCTIONS

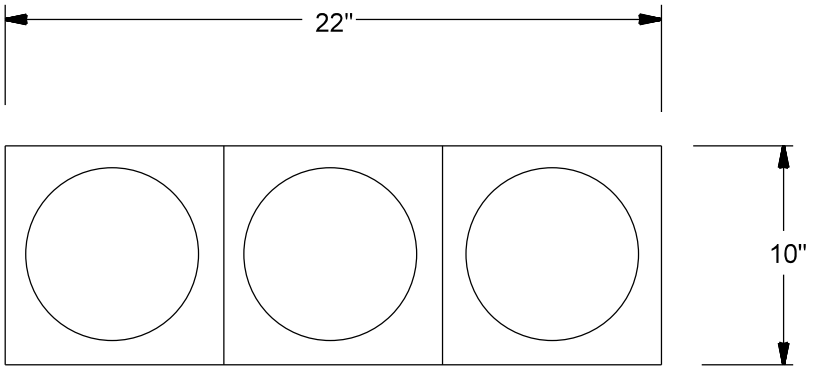
1.

# OF PARALLEL CONDUITS	COMMUNICATIONS ACCOUNTS
STRAIGHT PVC	1 OR 2
SPOOLED - DUCT	1 OR 2

TWO PARALLEL CONDUITS MAXIMUM, USE MULTIPLE CUS TO REQUEST MORE PARALLEL CONDUIT PER FOOT. INSTALL PULL TAPE (5031726) TIED TO END PLUGS ON BOTH ENDS OF THE RUN WHEN ANY STRAIGHT PVC OR SPOOL DUCT IS INSTALLED.

2. CONDUIT ENCASEMENT
   E = LEAN MIX BACKFILL (1-½ SACK 5075315)
   F = 2000 PSI CONCRETE SRP MATERIAL ITEM 5075320 OR MAG C
   FE = RED CONCRETE (EL PASO GAS CROSSING ONLY)
3. ADD "T" TO THE END OF THE CU ON TELECOM JOBS (ELECTRIC PLANT ACCOUNT = 997)
4. CONDUIT SUPPLIED BY SRP AND INSTALLED BY OTHERS ADD “G” TO THE END OF THE CU (THIS IS NOT THE SAME AS GIFTED CONDUIT).
   G = DEVELOPER OR CONTRACTOR INSTALLED (MAXIMUM CONDUITS – SAME AS NOTE 1)
5. PLACE COMMUNICATIONS MARKER TAPE (UFT). SEE CONDUIT, WARNING TAPE TRENCH DETAIL.

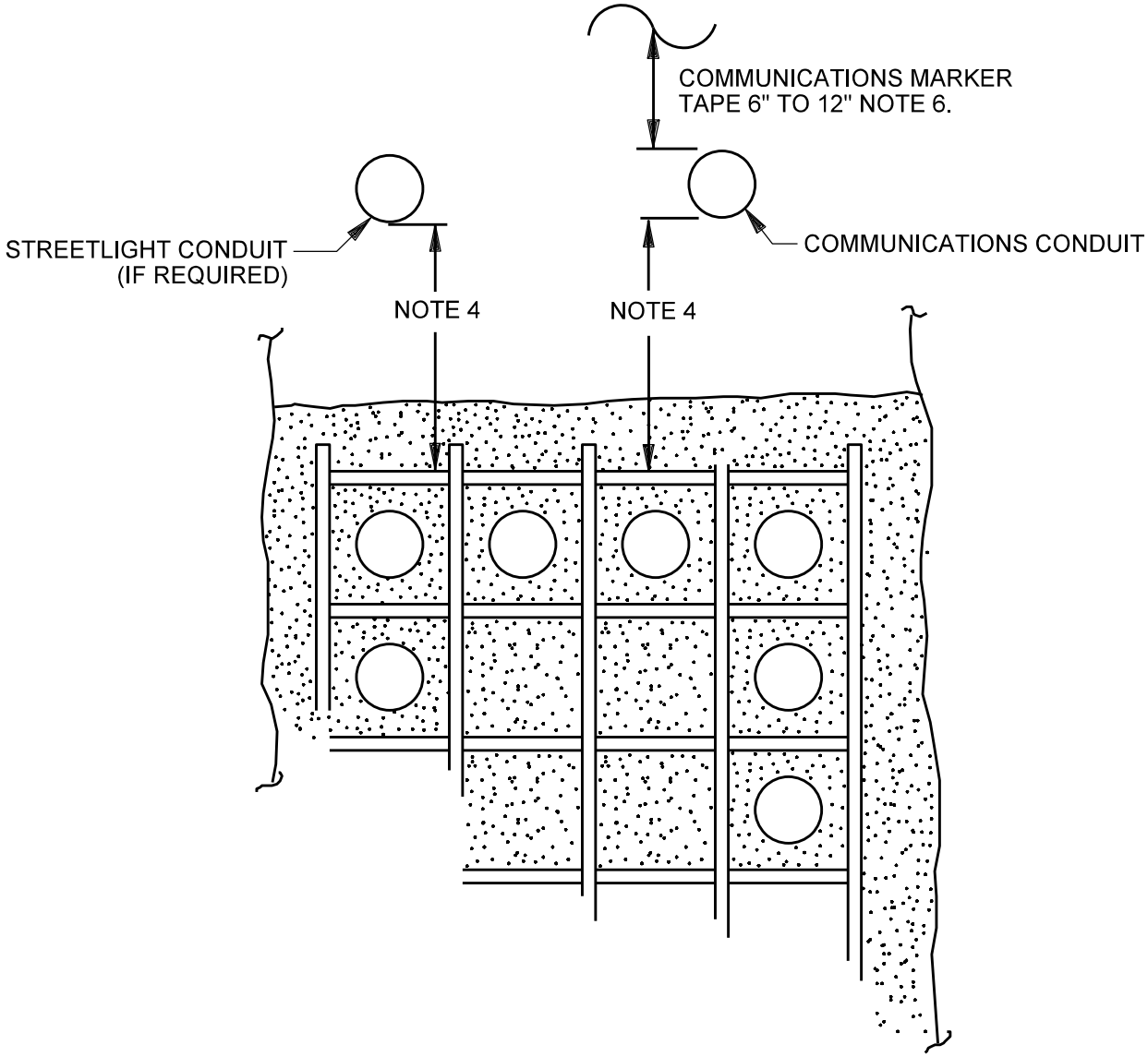
UKB3K



NOTES

1. ALL UKB CONDUIT BANKS CONSIST OF 3" CONDUITS IN RIGHT-OF-WAY WITH A MINIMUM OF 2" LEAN MIX BACKFILL (1-1/2 SACKS CEMENT/YD.) ENCASEMENT AND WILL HAVE SPACERS LOCATED AT 6' INTERVALS.
2. THESE CONDUIT BANKS MAY BE ROTATED 90° OR 180° AS SPECIFIED BY DESIGNER.
3. THE ABOVE DIMENSIONS ARE NOMINAL OVERALL FOR DETERMINING TRENCH DIMENSIONS.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	UNDERGROUND 3" CONDUIT BANK SPECIFICATION	ISSUE DATE: 12/27/05 REV. DATE: 06/28/11 APPROVAL: W. LARAMIE
	2-2-1	8505E72.DGN



NOTES

1. COMMUNICATIONS CONDUIT MAY BE INSTALLED WITH POWER CABLE DUCT BANK. POWER CABLE DUCT REQUIRES FULL ENCASEMENT (CLSM 1-1/2 SACK). COMMUNICATIONS CONDUIT (AND STREETLIGHT CONDUIT) WILL BE ENCASED WITH DUCT BANK ENCASEMENT. IT IS NOT NECESSARY TO CALL FOR ENCASEMENT WITH COMMUNICATIONS OR STREETLIGHT CONDUIT WHEN IT IS INSTALLED WITH POWER DUCT BANK.
2. STREETLIGHT CONDUIT SHOULD BE PLACED ON SIDE OF TRENCH CLOSEST TO STREETLIGHT POLE LOCATION.
3. COMMUNICATIONS CONDUIT MAY BE TIED TO DUCT BANK SPACERS, AND SHOULD BE LOCATED ON FIELD SIDE OF BANK IF POSSIBLE.
4. COMMUNICATIONS AND STREETLIGHT CONDUIT MAY NOT BE DIRECT BURIED NEXT TO POWER CABLE OR POWER CABLE IN CONDUIT. IT MUST BE SEPARATED BY A MINIMUM OF 3" OF CLSM 1-1/2 SACK CONCRETE OR 12" OF EARTH.
5. FERROUS OR MAGNETIC TIE WIRE MUST NOT ENCIRCLE POWER CONDUIT WHEN INSTALLING COMMUNICATIONS OR STREETLIGHT CONDUIT.
6. INSTALL SRP COMMUNICATIONS WARNING TAPE 6" TO 12" ABOVE COMMUNICATIONS CONDUIT. SEE IN THIS SECTION CONDUIT TRACER WIRE/PULL TAPE, COMPATIBLE UNITS, UFT.

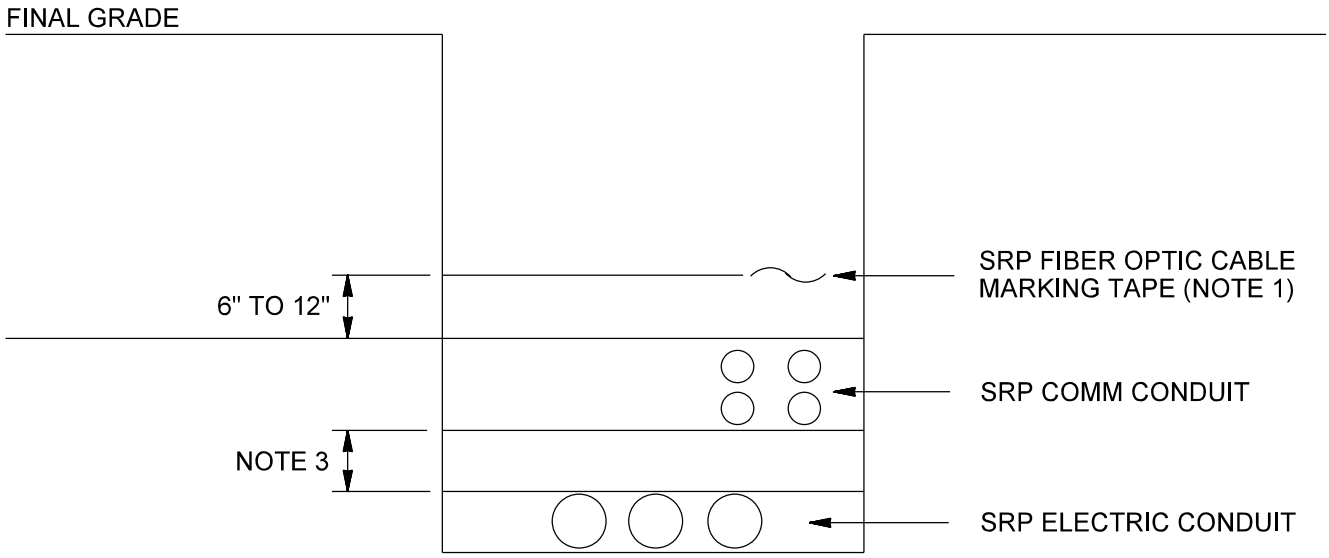
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND COMMUNICATIONS OR STREETLIGHT CONDUIT INSTALLATION INSTRUCTIONS	ISSUE DATE: 11/14/95 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-3-1	8505E22.DGN

UKT	TRACE WIRE 5008590 #12 SOLID COPPER, GREEN 500' REEL
UKTG	TRACE WIRE 5008590 FOR CONTRACTOR INSTALL
UKMT	PULL TAPE 5031726 1,500' REEL 2,500 LBS.
UKMTG	PULL TAPE 5031726 FOR CONTRACTOR INSTALL
UFT	MARKER TAPE 5035673 (6' WIDE, ORANGE WITH “CAUTION – FIBER OPTIC BELOW”) 1,000' REEL
UFTG	MARKER TAPE 5035673 FOR CONTRACTOR INSTALL

NOTES

1. PULL TAPE AND #12 COPPER WIRE IN WITH FIBER TO MAINTAIN TRACEABILITY OF CONDUIT FIBER.

UFT	5035673 - MARKER TAPE, 6" X 1,000' ROLL
UFTG	UFTG - FOR CONTRACTOR INSTALL.

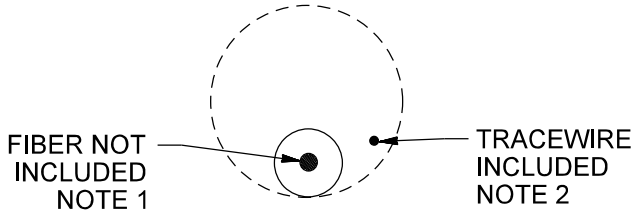


NOTES

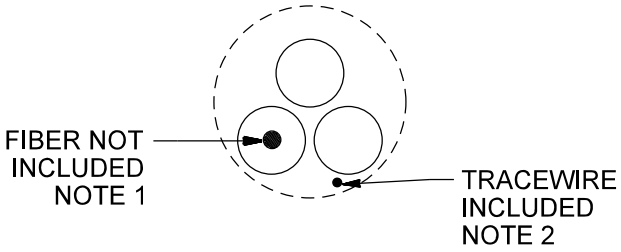
1. INSTALL SRP FIBER WARNING TAPE 6" TO 12" ABOVE COMMUNICATIONS CONDUIT.
2. INSTALL SRP COMMUNICATIONS CONDUIT ON THE FIELD SIDE OF THE TRENCH WHEN POSSIBLE.
3. CONDUIT CLEARANCES AND CONDUIT COVERAGE MUST BE INSTALLED PER THE "ELECTRIC CLEARANCE STANDARDS" (RED BOOK).
4. TAPE READS - "CAUTION: SRP FIBER OPTIC LINE BURIED BELOW"

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SRP FIBER OPTIC WARNING TAPE/TRENCH DETAIL	ISSUE DATE: 04/29/04 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-5-1	8505E68.DGN

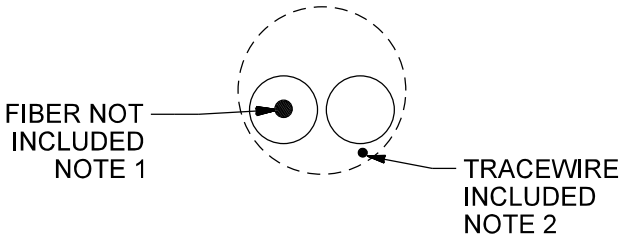
UKK1 | UKK1T **3" OR 4" CONDUIT, 1 INNERDUCT**



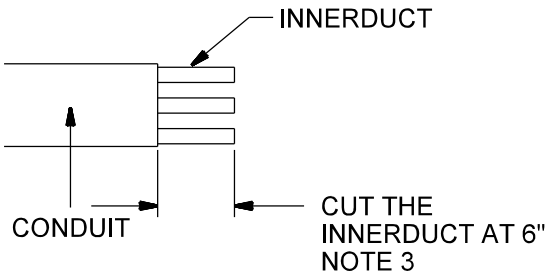
UKK3 | UKK3T **4" CONDUIT, 3 INNERDUCTS MAX**



UKK2 | UKK2T **3" CONDUIT, 2 INNERDUCTS MAX**



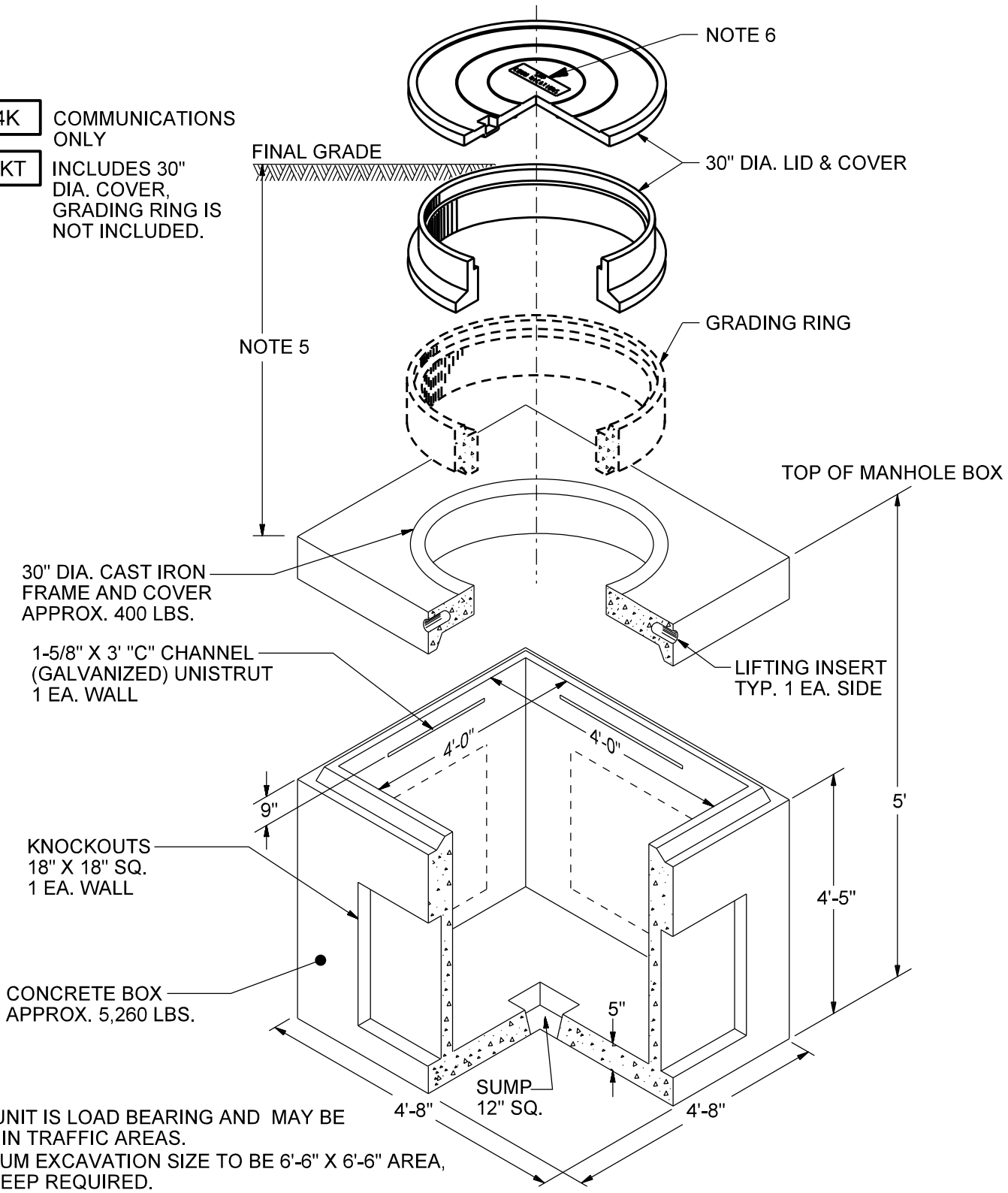
TERMINATION OF INNERDUCT DETAIL
NOTE 4



CONDUIT SEALS	SIZE	MATERIAL NUMBER
ROUND KNOCKOUTS	2"	5097239
	3"	5097240
	4"	5097241
SQUARE KNOCKOUTS	2"	5097236
	3"	5097237
	4"	5097238

NOTES

1. INSTALL FIBER IN THE INNERDUCT ON THE INITIAL INSTALLATION AS APPLICABLE
2. TRACE WIRE MUST ALWAYS BE INSTALLED, PULL IT WITH THE FIBER AND INNERDUCT
3. ALWAYS CUT THE INNERDUCT 6" LONGER THAN THE CONDUIT ENDS.
4. INNERDUCT IS MATERIAL ITEM 5020593 WITH 1" I.D. AND 1.25" O.D. 5,000' REELS.



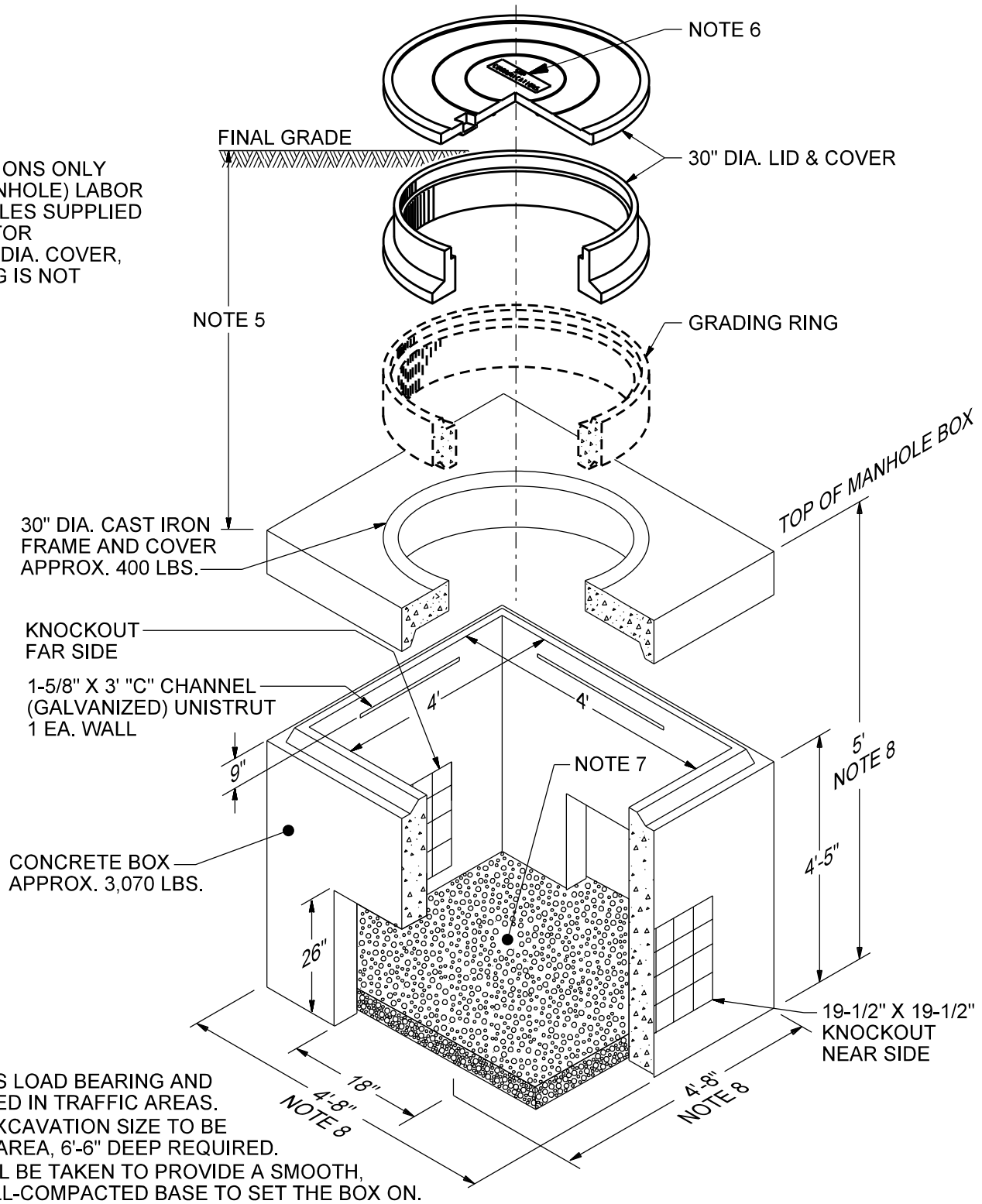
NOTES

1. THIS UNIT IS LOAD BEARING AND MAY BE USED IN TRAFFIC AREAS.
2. MINIMUM EXCAVATION SIZE TO BE 6'-6" X 6'-6" AREA, 6'-6" DEEP REQUIRED.
3. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL-COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING AROUND BOX.
4. CONDUITS MUST EXTEND A MINIMUM 4", MAXIMUM 6" INSIDE OF BOX. CUT CONDUIT ENDS EVENLY AND PLUG.
5. 5' MAXIMUM DEPTH FROM TOP OF MANHOLE BOX TO FINAL GRADE. INCLUDES 6" OR 12" GRADING RING(S) AND 30" DIA. LID & COVER.
6. "SRP COMMUNICATIONS" CAST IN OR WELDED ON COVER. 1-1/4" LETTERS MINIMUM.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES MANHOLE 4' X 4' INSIDE	ISSUE DATE: 06/15/98 REV. DATE: 11/15/13 APPROVAL: W. LARAMIE
	2-7-1	8505E58.DGN

UVPBS4K

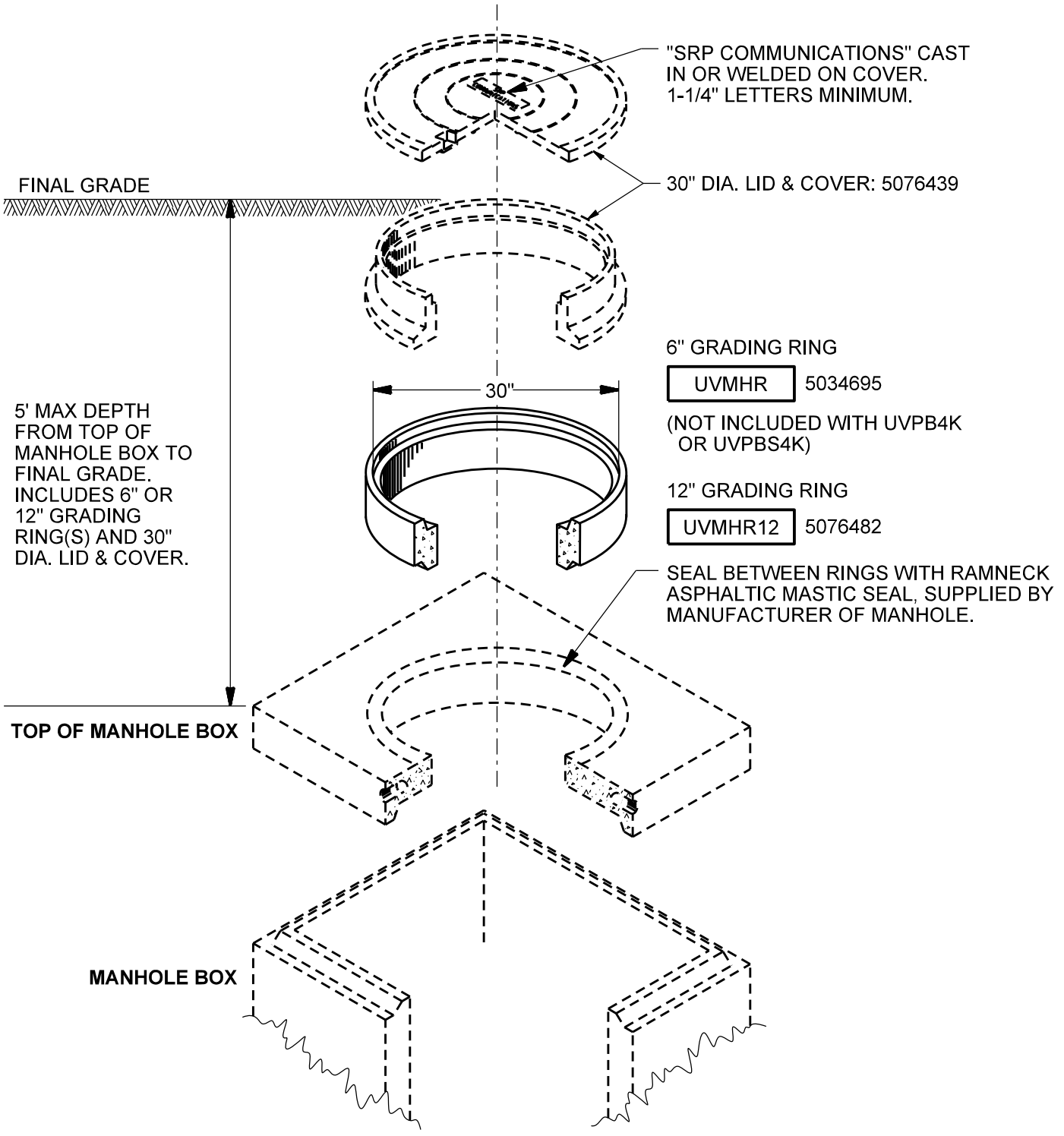
COMMUNICATIONS ONLY (SLOTTED MANHOLE) LABOR ONLY, MANHOLES SUPPLIED BY CONTRACTOR INCLUDES 30" DIA. COVER, GRADING RING IS NOT INCLUDED.



NOTES

1. THIS UNIT IS LOAD BEARING AND MAY BE USED IN TRAFFIC AREAS.
2. MINIMUM EXCAVATION SIZE TO BE 6'-6" X 6'-6" AREA, 6'-6" DEEP REQUIRED.
3. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL-COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING AROUND BOX.
4. CONDUITS MUST EXTEND A MINIMUM 4", MAXIMUM 6", INSIDE OF BOX. CUT CONDUIT ENDS EVENLY AND PLUG.
5. 5' MAXIMUM DEPTH FROM TOP OF MANHOLE BOX TO FINAL GRADE. INCLUDES 6" OR 12" GRADING RING(S) AND 30" DIA. LID & COVER.
6. "SRP COMMUNICATIONS" CAST IN OR WELDED ON COVER. 1-1/4" LETTERS MINIMUM.
7. FILL BOTTOM TO 6" LEVEL WITH PEA GRAVEL.
8. APPROXIMATE, MAY VARY SLIGHTLY DEPENDING ON MANUFACTURER'S DESIGN.

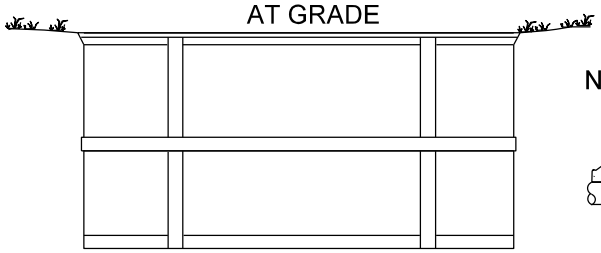
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES SLOTTED MANHOLE 4' X 4' INSIDE	ISSUE DATE: 07/07/11 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-7-2	8505E154.DGN



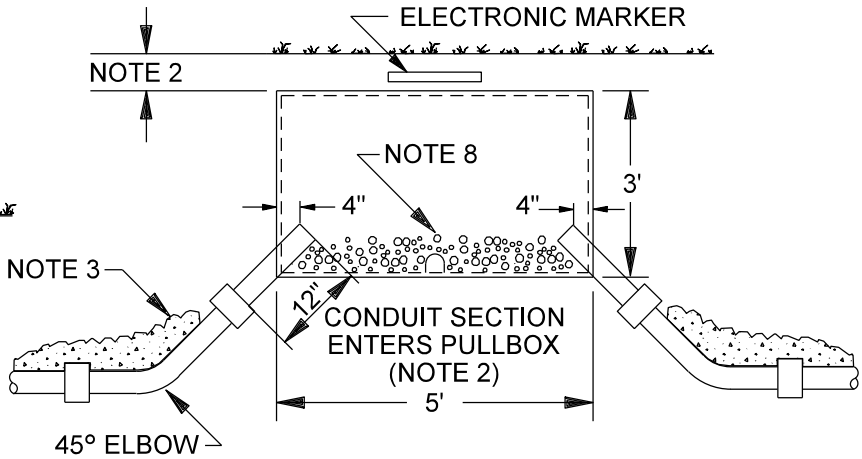
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES MANHOLES GRADE RING 30" DIAMETER	ISSUE DATE: 06/15/98 REV. DATE: 06/10/13 APPROVAL: W. LARAMIE
	2-8-1	8505E155.DGN

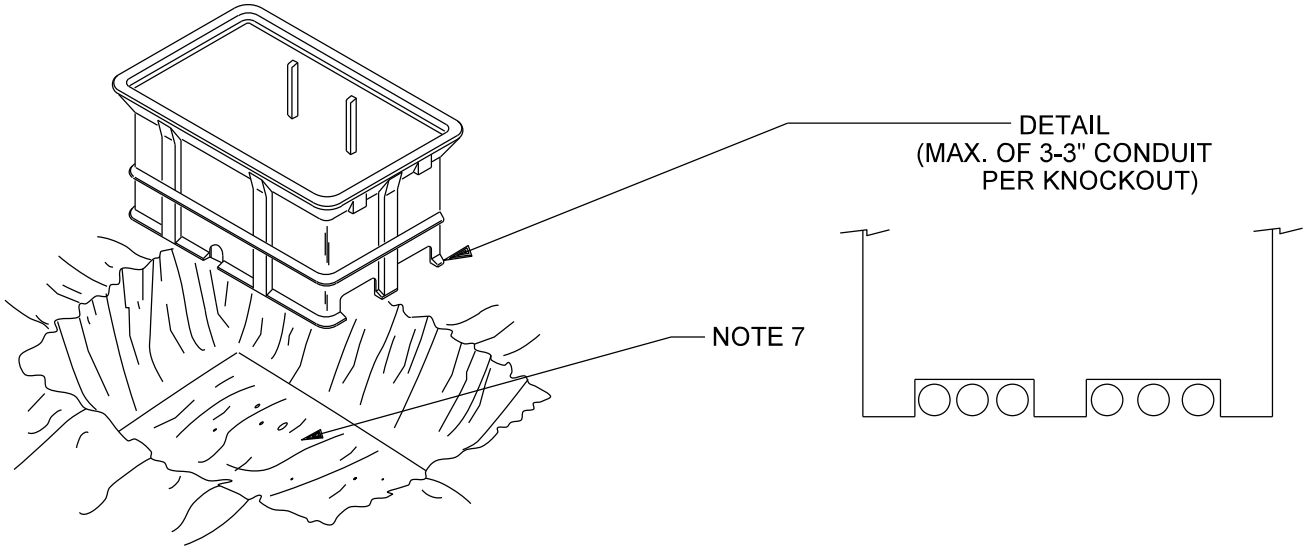
UVPB1K	5034676
UVPBKG	CONTRACTOR INSTALLED

NON-LOAD BEARING
(NOTE 1)



LOAD BEARING
(NOTE 2)



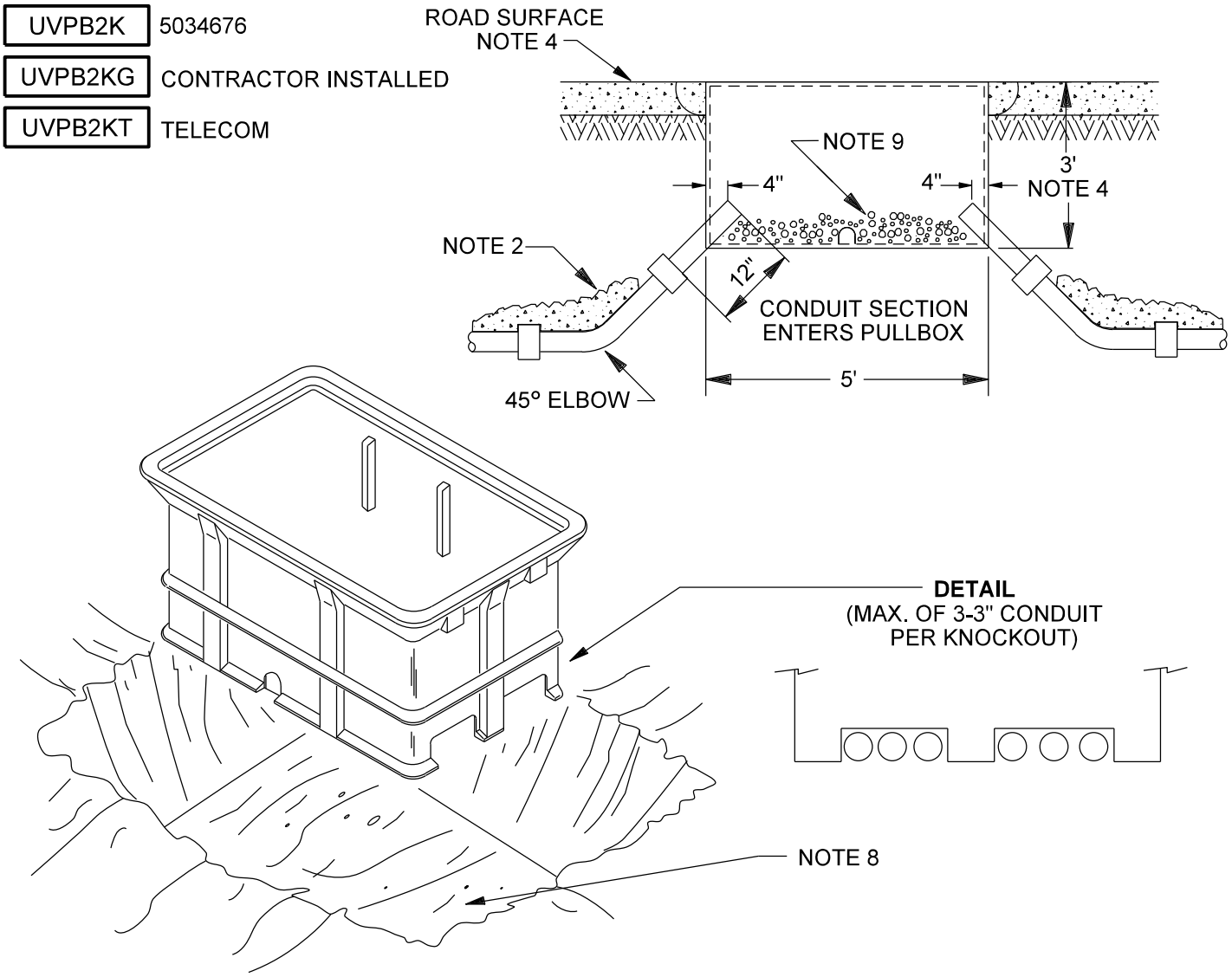


NOTES

1. FOR NO TRAFFIC, NON-LOAD BEARING APPLICATIONS, SUCH AS LANDSCAPED AREAS.
2. FOR LOAD BEARING APPLICATIONS, SUCH AS AN ALLEY WITH LOW SPEED VEHICLES, THIS BOX SHALL HAVE 12" OF COVER. WHEN INSTALLED IN AREAS WHERE SUBJECT TO FINAL GRADE CHANGES, THIS BOX SHALL HAVE 18" TO 24" OF COVER.
3. ELBOWS INTO PULLBOX SHALL BE GROUTED IN. ELBOWS NOT INCLUDED IN THIS COMPATIBLE UNIT.
4. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL-COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING.
5. CUSTOMER-SUPPLIED PULL BOX MUST MEET SPECIFICATIONS LISTED IN MATERIAL DESCRIPTION 5034676.
6. CONDUITS MUST EXTEND A MINIMUM OF 4" INSIDE OF BOX.
7. DIMENSIONS AT BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF 6' X 8'.
8. FILL BOTTOM TO 6" LEVEL WITH PEA GRAVEL.
9. "SRP COMMUNICATIONS" IMPRINTED ON COVER. 1-1/4" LETTERS MINIMUM.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND 5' X 3' X 3' PULL BOX FLUSH MOUNT (NON-LOAD BEARING) AND BELOW GRADE (LOAD BEARING)	ISSUE DATE: 01/15/97 REV. DATE: 05/22/13 APPROVAL: W. LARAMIE
	2-9-1	8505E60.DGN

UVPB2K	5034676
UVPB2KG	CONTRACTOR INSTALLED
UVPB2KT	TELECOM

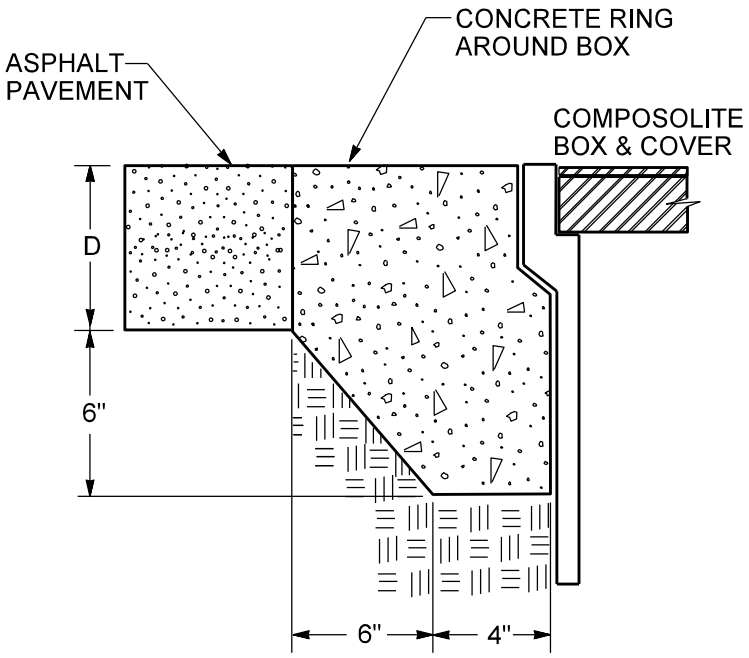


NOTES

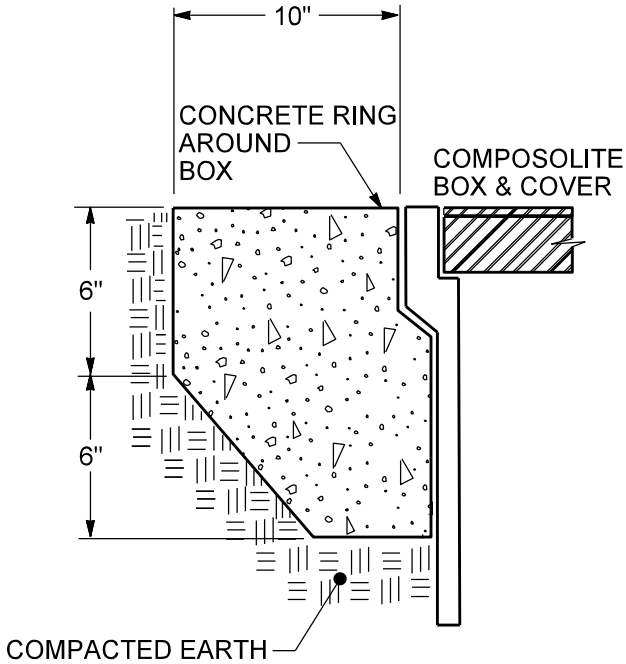
1. THIS UNIT IS LOAD BEARING FOR USE IN AREAS SUCH AS A PARKING LOT, BUT NOT IN THE TRAVELLED WAY. FOR APPLICATION WHERE NO VEHICLE TRAFFIC EXISTS, THIS BOX MAY BE INSTALLED WITHOUT THE CONCRETE RING.
2. ELBOWS INTO PULL BOX SHALL BE GROUTED IN (ELBOWS NOT INCLUDED IN THIS COMPATIBLE UNIT).
3. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING AROUND BOX.
4. WHEN INSTALLED IN CONCRETE, ASPHALT, OR A FIXED GRADE, THE BOX SHALL BE FLUSH MOUNTED WITH EXISTING GRADE PER DETAIL ON NEXT PAGE.
5. CUSTOMER-SUPPLIED PULL BOX MUST MEET SPECIFICATIONS LISTED IN MATERIAL DESCRIPTION OF 5034676.
6. CONDUITS MUST EXTEND A MINIMUM OF 4" INSIDE OF BOX.
7. A STEEL LID IS AVAILABLE FOR REPLACEMENT OF DAMAGED LIDS. NOT FOR STREET INSTALLATION. FOR QUAZITE OR HUBBLE, UVPB2S. FOR ARMORCAST, UVPB2S1.
8. DIMENSIONS AT BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF 6' X 8'.
9. FILL BOTTOM TO 6" LEVEL WITH PEA GRAVEL.
10. "SRP COMMUNICATIONS" IMPRINTED ON COVER. 1-1/4" LETTERS MINIMUM.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND 5' X 3' X 3' PULL BOX FLUSH MOUNT (LOAD BEARING)	ISSUE DATE: 01/15/97 REV. DATE: 06/12/13 APPROVAL: W. LARAMIE
	2-10-1	8505E156.DGN

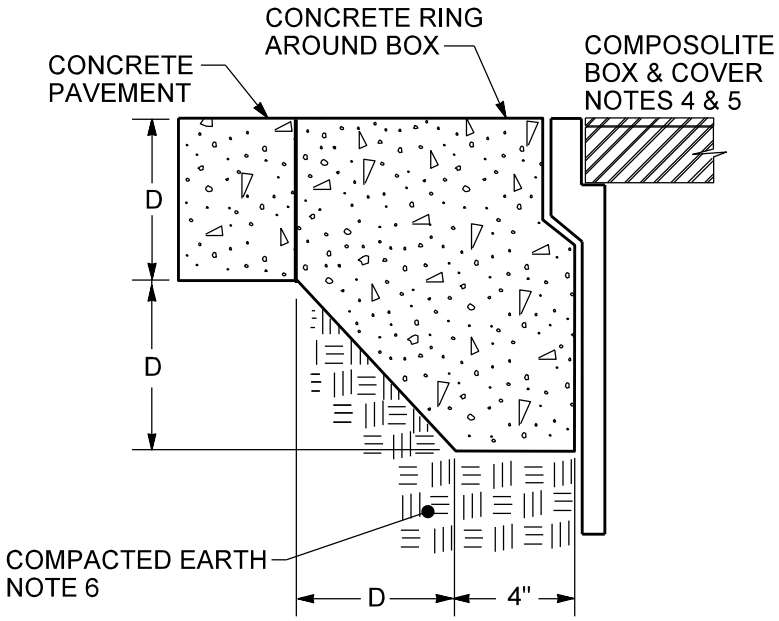
IN ASPHALT PAVEMENTS



IN COMPACTED EARTH



IN CONCRETE PAVEMENTS



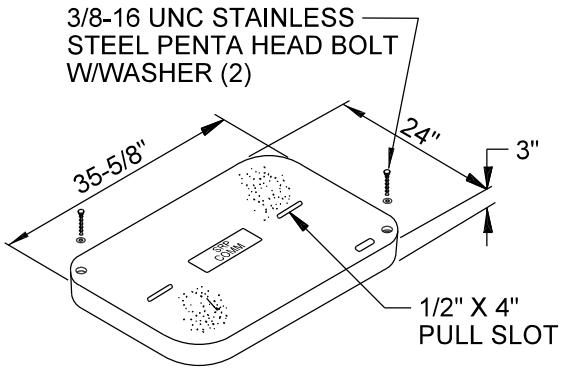
NOTES

1. CONCRETE ENCASEMENT TO BE 3,000 PSI MINIMUM.
2. CONCRETE ENCASEMENT RING DIMENSION "D" TO BE EQUAL TO DESIGN PAVEMENT DEPTH.
3. PAVEMENT AND SUBGRADE TO BE AS SHOWN ON THE ENGINEERING PLANS.

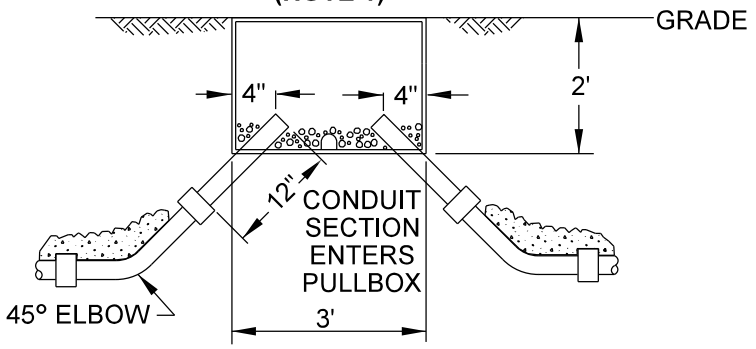
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND LOAD BEARING PULL BOX FLUSH MOUNTING DETAILS	ISSUE DATE: 04/04/01 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-10-2	8505E63.DGN

UVPB5K 5020846

3' X 2' X 2' PULL BOX

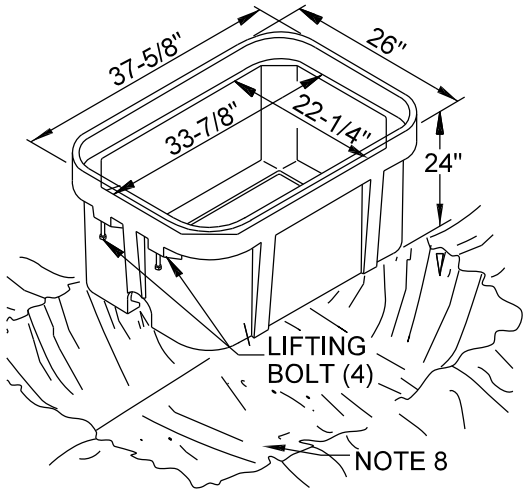


FLUSH MOUNT NON-LOAD BEARING (NOTE 1)

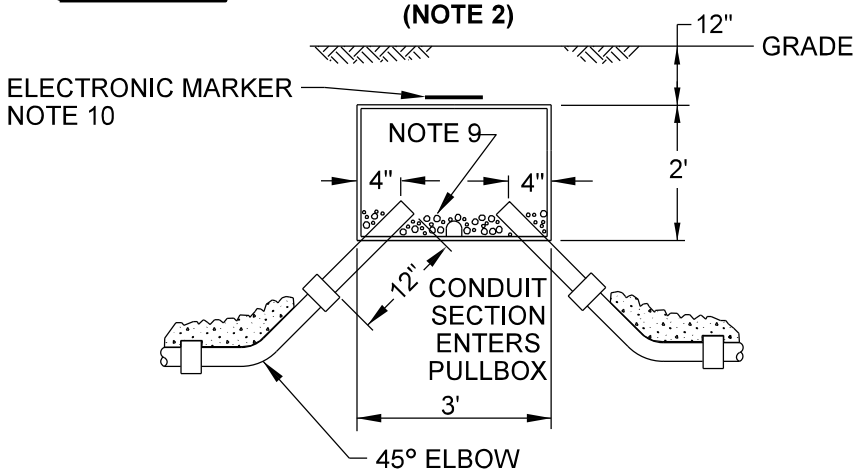


UVPB6K 5020846

UVPB6KT



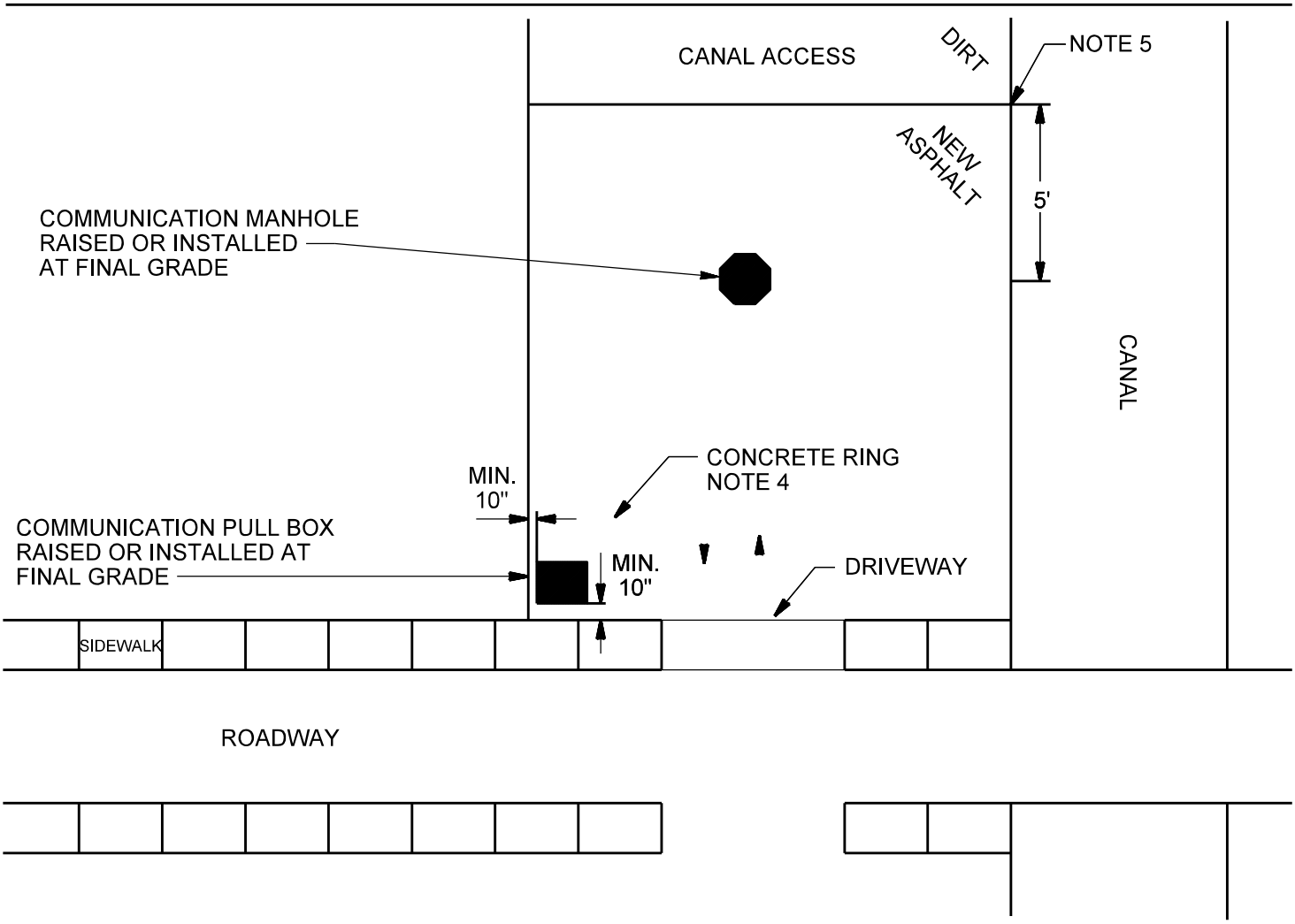
BURIED LOAD BEARING (NOTE 2)



NOTES

1. FOR NO TRAFFIC NON-LOAD BEARING APPLICATIONS, THIS BOX MAY BE INSTALLED FLUSH MOUNTED WITHOUT A SUPPORTING CONCRETE COLLAR.
2. FOR POSSIBLE TRAFFIC LOAD BEARING APPLICATIONS, THIS BOX SHALL HAVE 12" OF COVER. WHEN INSTALLED IN ALLEYS OR WHERE SUBJECT TO FINAL GRADE CHANGES, THIS BOX SHALL HAVE 18" TO 24" OF COVER.
3. ELBOWS INTO PULLBOX SHALL BE GROUTED IN (ELBOWS NOT INCLUDED IN THIS COMPATIBLE UNIT).
4. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL-COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING.
5. CUSTOMER-SUPPLIED PULL BOX MUST MEET SPECIFICATIONS LISTED IN MATERIAL DESCRIPTION 5020846.
6. CONDUITS MUST EXTEND A MINIMUM OF 4" INSIDE OF BOX.
7. PULL BOX LID MUST SAY "SRP COMM", NO EXCEPTIONS, MINIMUM 1-1/4" LETTERS.
8. DIMENSIONS AT BOTTOM OF EXCAVATION SHALL BE A MINIMUM OF 6' X 5'.
9. FILL BOTTOM TO 6" LEVEL WITH PEA GRAVEL.
10. FOR ELECTRONIC MARKER DETAIL, SEE UNDERGROUND DISTRIBUTION CONSTRUCTION STANDARDS, BASIC ASSEMBLY UNIT.

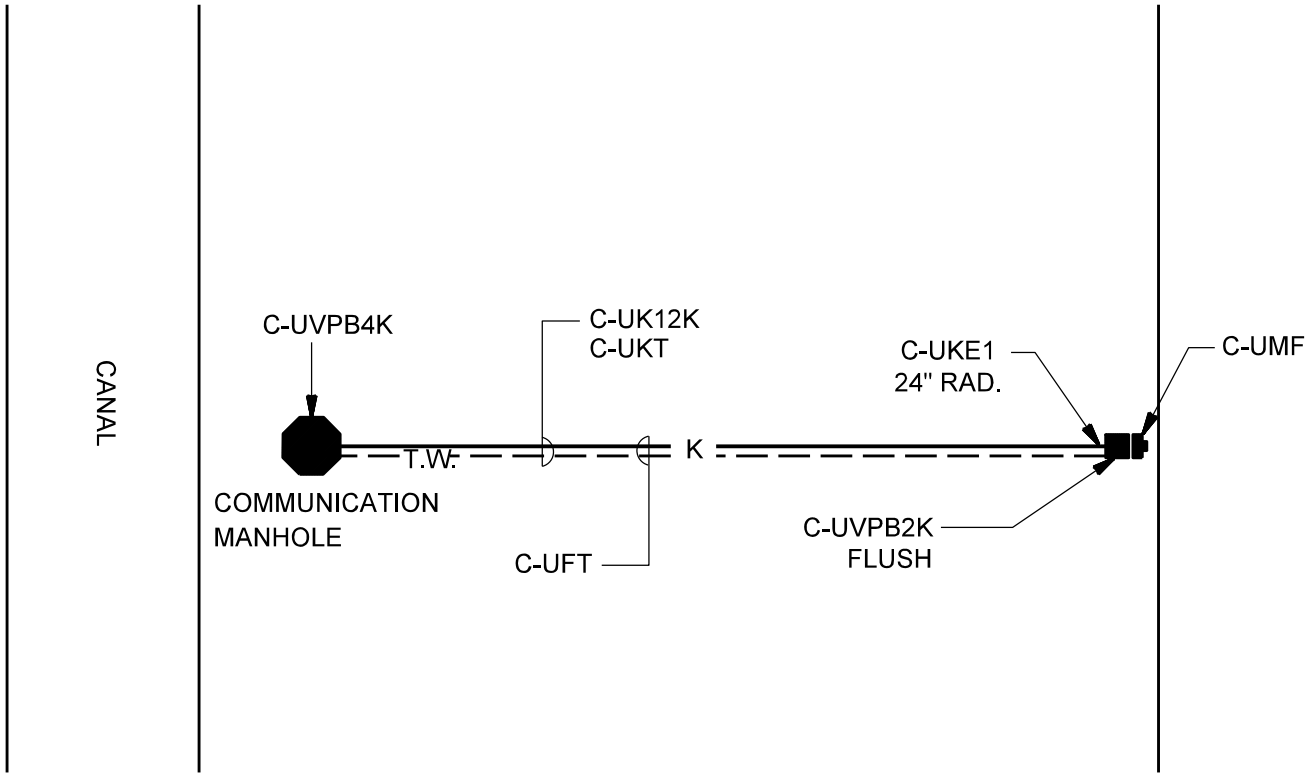
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND 3' X 2' X 2' PULL BOX WITH FLUSH MOUNT (NON-LOAD BEARING) AND BURIED (LOAD BEARING) INSTALLATION DETAILS	ISSUE DATE: 02/12/09 REV. DATE: 06/11/13 APPROVAL: W. LARAMIE
	2-11-1	8505E112.DGN



NOTES

1. OPTION FOR MANHOLES AND PULL BOXES INSTALLED NEAR A STREET AND/OR A PERMANENT SIDEWALK.
2. WHEN A FLUSH-MOUNTED MANHOLE AND/OR A PULL BOX IS FREQUENTLY ACCESSED, REQUEST APPROVAL TO PAVE THE APPROACH FROM THE WATER GROUP.
3. CONTACT WATER & GROUNDWATER C & M FOR THIS TYPE OF INSTALLATION.
4. SEE VAULTS, MANHOLES AND BOXES, LOAD BEARING PULL BOX, FLUSH-MOUNTING DETAILS.
5. THICKENED EDGE PER MAG DETAIL 201 TYPE A.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND ASPHALT INSTALLATION AT CANAL ENTRANCE	ISSUE DATE: 05/18/05 REV. DATE: 06/11/11 APPROVAL: W. LARAMIE
	2-12-1	8505E71.DGN

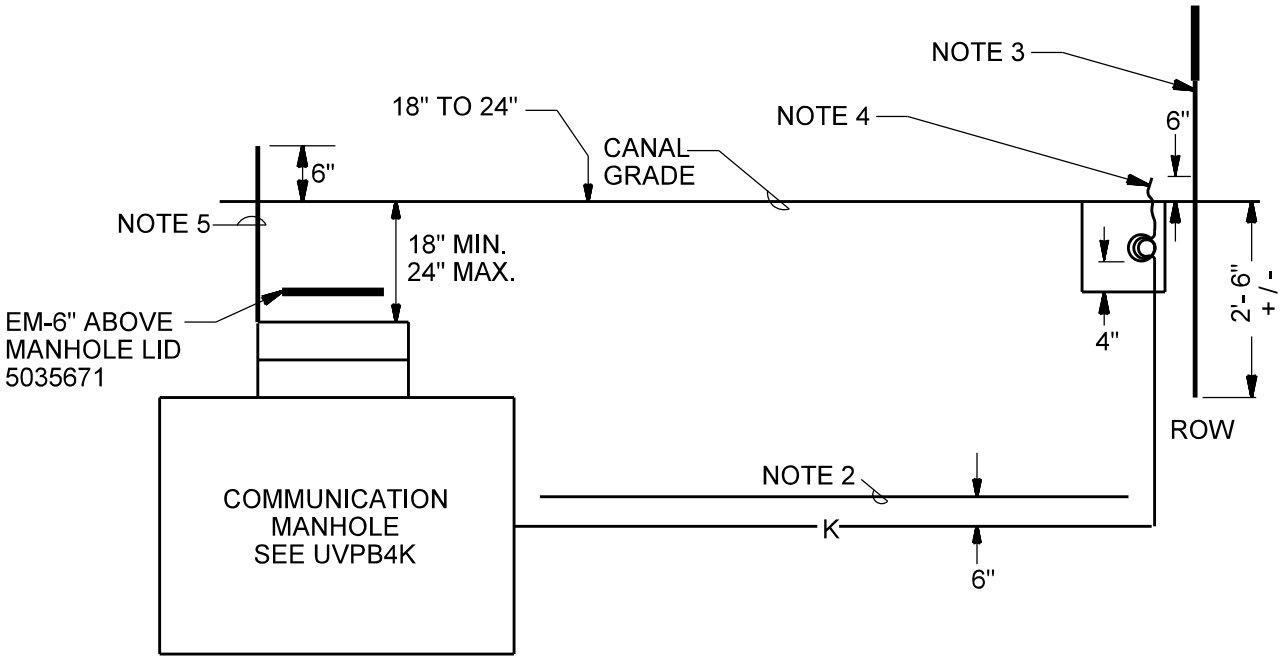


NOTES

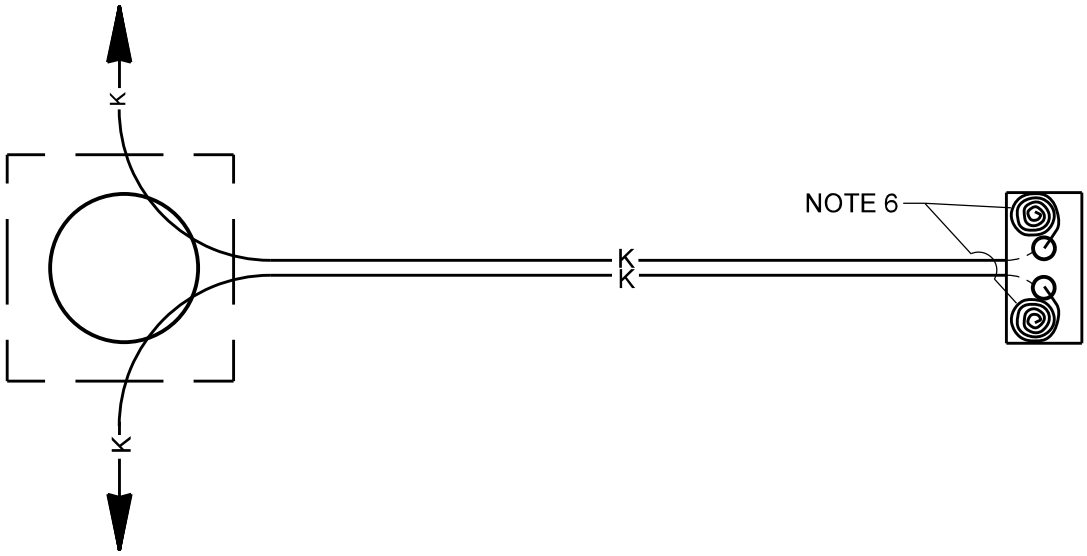
1. SIGN AND J-BOX TO BE PLACED DIRECTLY ADJACENT TO THE BURIED COMMUNICATIONS MANHOLE OR PULL BOX.
2. SIGN TO BE PLACED AS NOT TO INTERFERE WITH TRAFFIC AND CANAL GRADING.
3. TRACE WIRES TO BE EXTENDED INTO THE J-BOX TO INDICATE THE DIRECTION OF THE U/G RUN. LEAVE 36" TO 48" OF TRACE WIRE COILED INSIDE AND EXTEND THE TAIL 6" OUT OF THE J-BOX. DO NOT LEAVE THE TRACE WIRE COILED INSIDE THE MANHOLE OR PULL BOX.
4. INSTALL FIBER OPTIC CABLE MARKING TAPE 6" ABOVE THE CONDUIT-UFT.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SRP CONDUIT AND TRACE WIRE DETAIL FOR BURIED COMMUNICATION MANHOLES	ISSUE DATE: 05/18/05 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-13-1	8505E157.DGN

SIDE VIEW



TOP VIEW

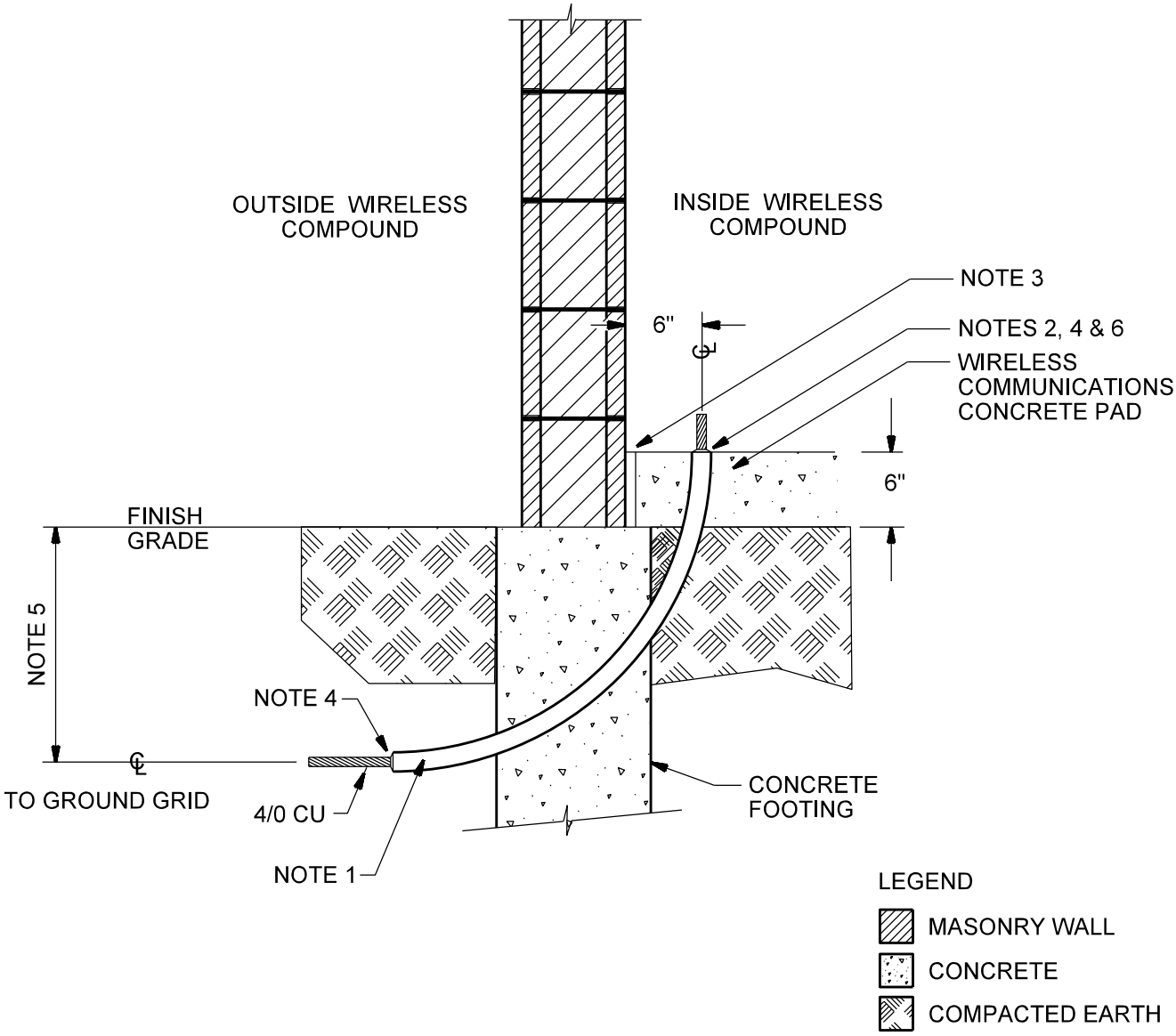


NOTES

1. INSTALL TRACE WIRE ON THE SIDE OF THE J-BOX TO INDICATE THE DIRECTION OF THE CONDUIT RUN. (I.E., NORTH SIDE OF THE J-BOX INDICATES A NORTH DIRECTION OF THE CONDUIT RUN).
2. FIBER OPTIC CABLE WARNING MARKING TAPE 6" ABOVE CONDUIT.
3. SIGN "CAUTION BURIED FIBER OPTIC CABLE" (SEE UMF).
4. TRACE WIRE EXTENDED 6" ABOVE J-BOX.
5. FLAG CUT 6" ABOVE FINAL GRADE (5035669).
6. 36" TO 48" OF TRACE WIRE COILED INSIDE THE J-BOX.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SRP CONDUIT AND TRACE WIRE DETAIL FOR BURIED COMMUNICATION MANHOLES	ISSUE DATE: 05/18/05 REV. DATE: 05/20/13 APPROVAL: W. LARAMIE
	2-13-2	8505E158.DGN

SECTION A

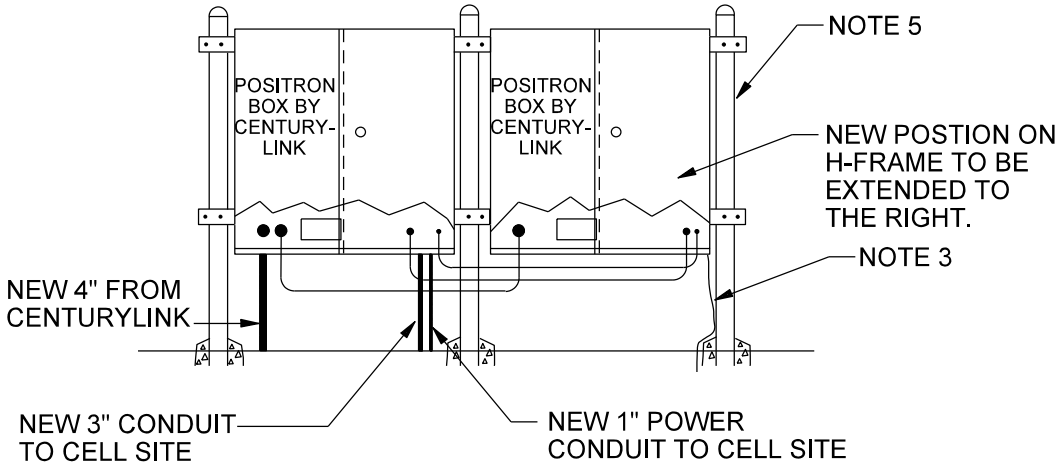


NOTES

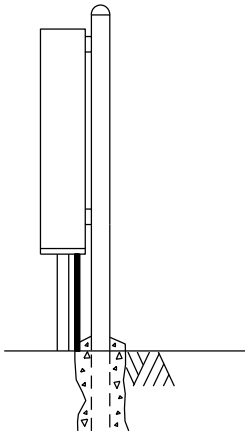
1. USE 2" PVC W / 2' RADIUS SWEEP, 5033600.
2. CUT OFF PVC FLUSH WITH TOP OF PAD.
3. IF CONCRETE PAD IS POURED TO MASONRY WALL USE 1/2" JOINT MATERIAL.
4. USE FOAM TO SEAL CONDUIT OPENING AROUND 4/0 GROUND.
5. 4/0 GROUND SHOULD BE A MINIMUM OF 18" BELOW FINISHED GRADE, DEPTH DEPENDENT ON SOIL CONDITIONS.
6. ASSUMING CONCRETE PAD THICKNESS OF 6", FOR GROUND GRID DEPTHS OF MORE THAN 18", ADD 2" STRAIGHT PVC EXTENSION THROUGH PAD.
7. FOR NEW CONSTRUCTION ONLY.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND GROUNDING WIRELESS COMMUNICATIONS UNSECURE SITE	ISSUE DATE: 09/27/06 REV. DATE: 07/26/13 APPROVAL: W. LARAMIE
	2-14-1	8505E76.DGN

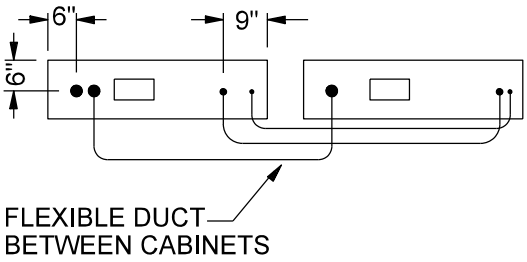
SIDE BY SIDE



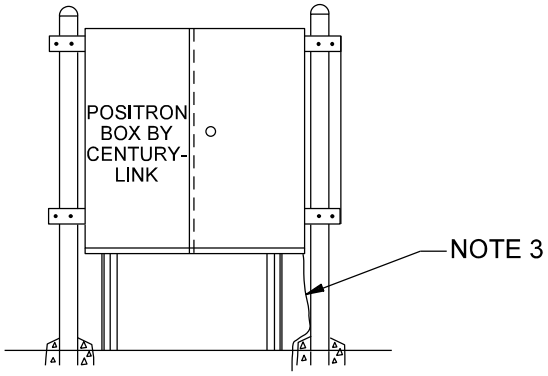
SIDE VIEW



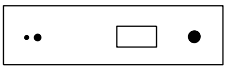
DETAIL



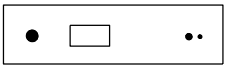
BACK TO BACK



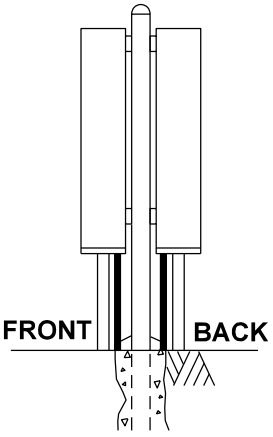
BACK



FRONT



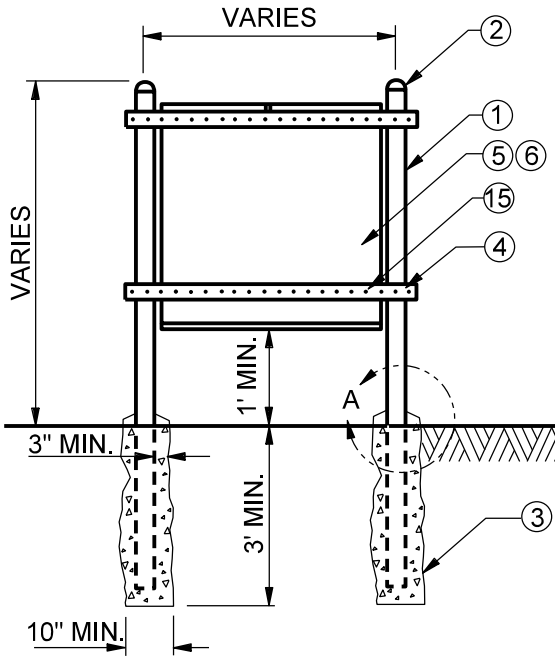
SIDE VIEW



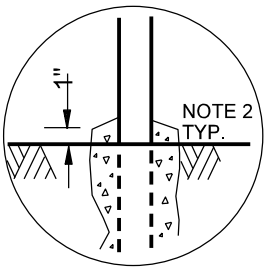
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	UNDERGROUND SECURE ACCESS POINT BOX AND H-FRAME PLAN, SECTION AND DETAILS	ISSUE DATE: 11/15/10 REV. DATE: 06/25/13 APPROVAL: W. LARAMIE
	2-15-1	8505E115.DGN

UHF	H-FRAME ALONE
UHFN3	H-FRAME AND NEMA 3 BOX
UHFN4	H-FRAME AND NEMA 4 BOX

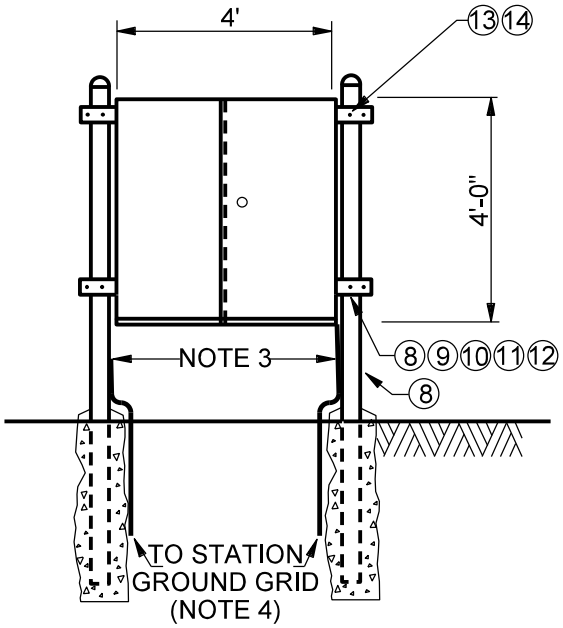
BACK VIEW



DETAIL A
CONTOUR POST FOUNDATION



FRONT VIEW



Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SECURE ACCESS POINT BOX AND H-FRAME CONSTRUCTION DETAILS	ISSUE DATE: 11/15/10 REV. DATE: 06/25/13 APPROVAL: W. LARAMIE
	2-15-2	8505E159.DGN

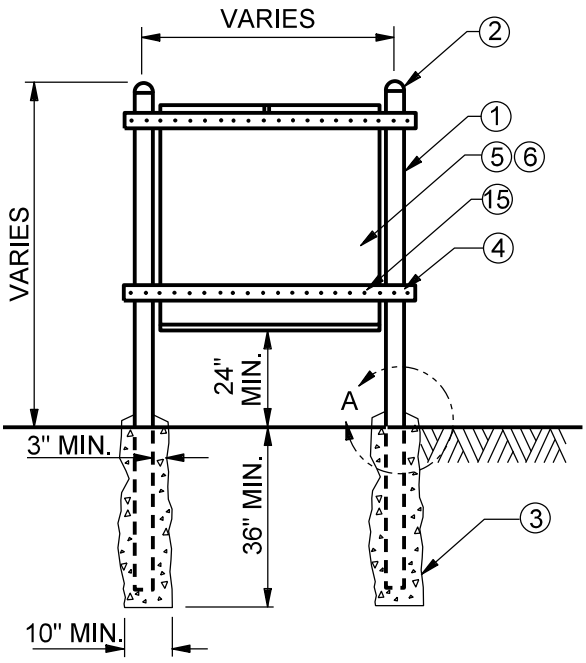
BILL OF MATERIALS					
ITEM	DESCRIPTION	MATERIAL ITEM	QUANTITY		
			UHF	UHFN3	UHFN4
1	PIPE, ASTM A-53, 3" SCH 40	5000149	1	1	1
2	WEATHER TIGHT OR PRESSED STEEL CLOSURE CAP, BROWN	5034875	2	2	2
3	CONCRETE, 2500 PSI STRENGTH MIN. OR CLASS C PER MAG SECTION 725	5003303	4	4	4
4	CHANNEL, 1-5/8", 7/8", 10 FT. LENGTH	5016348	2	2	2
5	SECURE ACCESS POINT BOX NEMA 3	5020331		1	
6	SECURE ACCESS POINT BOX NEMA 4	5019402			1
7	CONNECTOR, GROUND, #4/0 STR. TO 3.5" O.D. PIPE	5016610	2	2	2
8	CONNECTOR, COMP, #4/0 STR. AL OR CU 2-HOLE	5035286		2	2
9	BOLT, HEX, 1/2" X 3/4"	5069526		2	2
10	NUT, HEX 1/2" X 13 THREAD	5069398		2	2
11	WASHER, FLAT, 1/2"	5004963		2	2
12	WASHER, LOCK, 1/2"	5005093		2	2
13	BOLT, MACHINE, 1/2" X 4 1/2"	5027614	4	4	4
14	WASHER, LOCK, 1/2" BOLT	5029177	4	4	4
15	NUT, CHANNEL WITH SPRING	5016349		4	4

NOTES

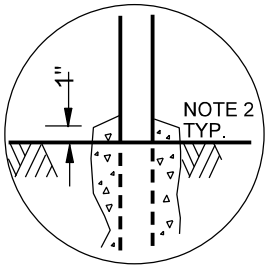
1. ITEM 2, CLOSURE CAP TO BE INSTALLED.
2. TOP OF CONCRETE FOR POSTS SHALL SLOPE UP TO POST 1" ABOVE FINAL GRADE.
3. RUN 4/0 CU FROM GROUND GRID OR 8' ROD TO BOX GROUND TAB. ALSO RUN 4/0 CU FROM GROUND GRID OR SEPARATE ROD TO EACH SUPPORT POST. USE COMPRESSION TWO-HOLE CONNECTOR (ITEM 8). DRILL AND TAP FOR 1/2" BOLTS (ITEM 9).
4. IF NO STATION GROUND, INSTALL 8' GROUND ROD MATERIAL ITEM 5034975 AND CLAMP MATERIAL ITEM 5035596.
5. SEE “SAP BOX AND H-FRAME PLAN, SECTIONS AND DETAILS” FOR H-FRAME CONSTRUCTION AND GROUNDING.

UHF24	H-FRAME ALONE
UHF24N4	H-FRAME AND NEMA 3R BOX

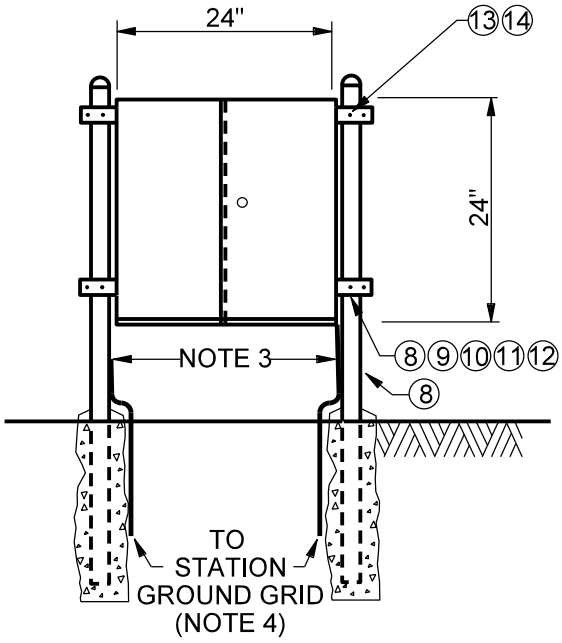
BACK VIEW



DETAIL A
CONTOUR POST FOUNDATION



FRONT VIEW



Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND H-FRAME W/ NEMA 3 CONSTRUCTION DETAILS MATERIAL LIST AND NOTES	ISSUE DATE: 04/04/24 REV. DATE: APPROVAL: J. LUERA
	2-15-4	8505E197.DGN

BILL OF MATERIALS				
ITEM	DESCRIPTION	MATERIAL ITEM	QUANTITY	
			UHF24	UHF24N4
1	PIPE, ASTM A-53, 3" SCH 40	5000149	2	2
2	WEATHER TIGHT OR PRESSED STEEL CLOSURE CAP, BROWN	5034875	2	2
3	CONCRETE, 2500 PSI STRENGTH MIN. OR CLASS C PER MAG SECTION 725	5003303	4	4
4	CHANNEL, 1-5/8", 7/8", 10 FT. LENGTH	5016348	2	2
5	24 X 24 X 10 NEMA 3R BOX	5092794		1
6	BACK PLANE INNER PANEL	5092804		1
7	CONNECTOR, GROUND, #4/0 STR. TO 3.5" O.D. PIPE	5016610	2	2
8	CONNECTOR, COMP, #4/0 STR. AL OR CU 2-HOLE (N4 GROUNDING)	5035286		1
9	BOLT, HEX, 1/2" X 3/4" (N4 GROUNDING)	5069526		1
10	NUT, HEX 1/2" X 13 THREAD (N4 GROUNDING)	5069398		1
11	WASHER, FLAT, 1/2" (N4 GROUNDING)	5004963		1
12	WASHER, LOCK, 1/2" (N4 GROUNDING)	5005093		1
13	BOLT, MACHINE, 1/2" X 4-1/2"	5027614	4	4
14	WASHER, LOCK, 1/2" BOLT	5029177	4	4
15	NUT, CHANNEL WITH SPRING	5016349	4	4

NOTES

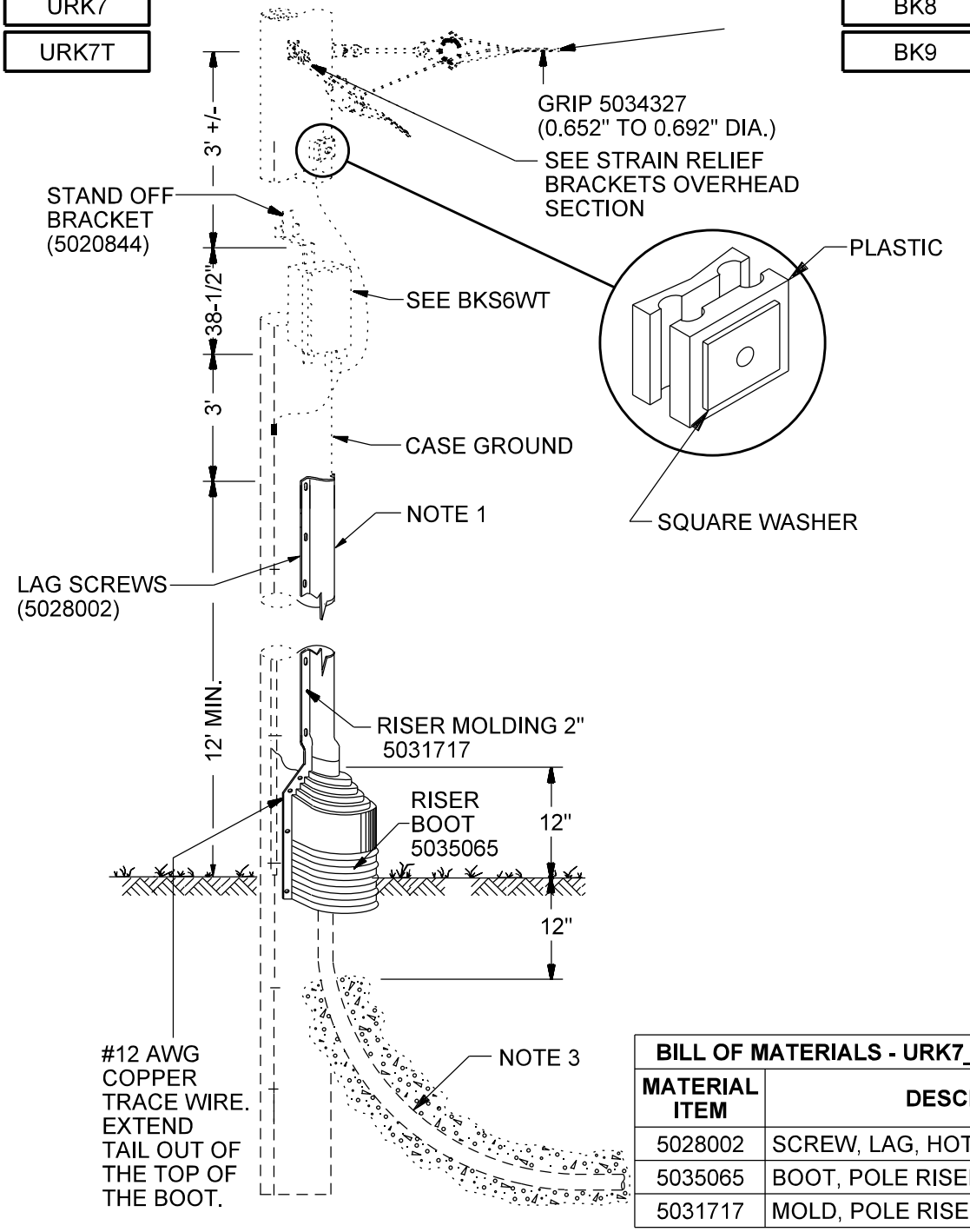
1. ITEM 2, CLOSURE CAP TO BE INSTALLED.
2. TOP OF CONCRETE FOR POSTS SHALL SLOPE UP TO POST 1" ABOVE FINAL GRADE.
3. RUN 4/0 CU FROM GROUND GRID OR 8' ROD TO BOX GROUND TAB. ALSO RUN 4/0 CU FROM GROUND GRID OR SEPARATE ROD TO EACH SUPPORT POST. USE COMPRESSION TWO-HOLE CONNECTOR ITEM 8, (5035286). DRILL AND TAP FOR 1/2" BOLTS ITEM 9, (5069526).
4. IF NO STATION GROUND, INSTALL 8' GROUND ROD MATERIAL ITEM 5034975 AND CLAMP MATERIAL ITEM 5035596.

URK7

URK7T

BK8 SINGLE DEAD END

BK9 DOUBLE DEAD END



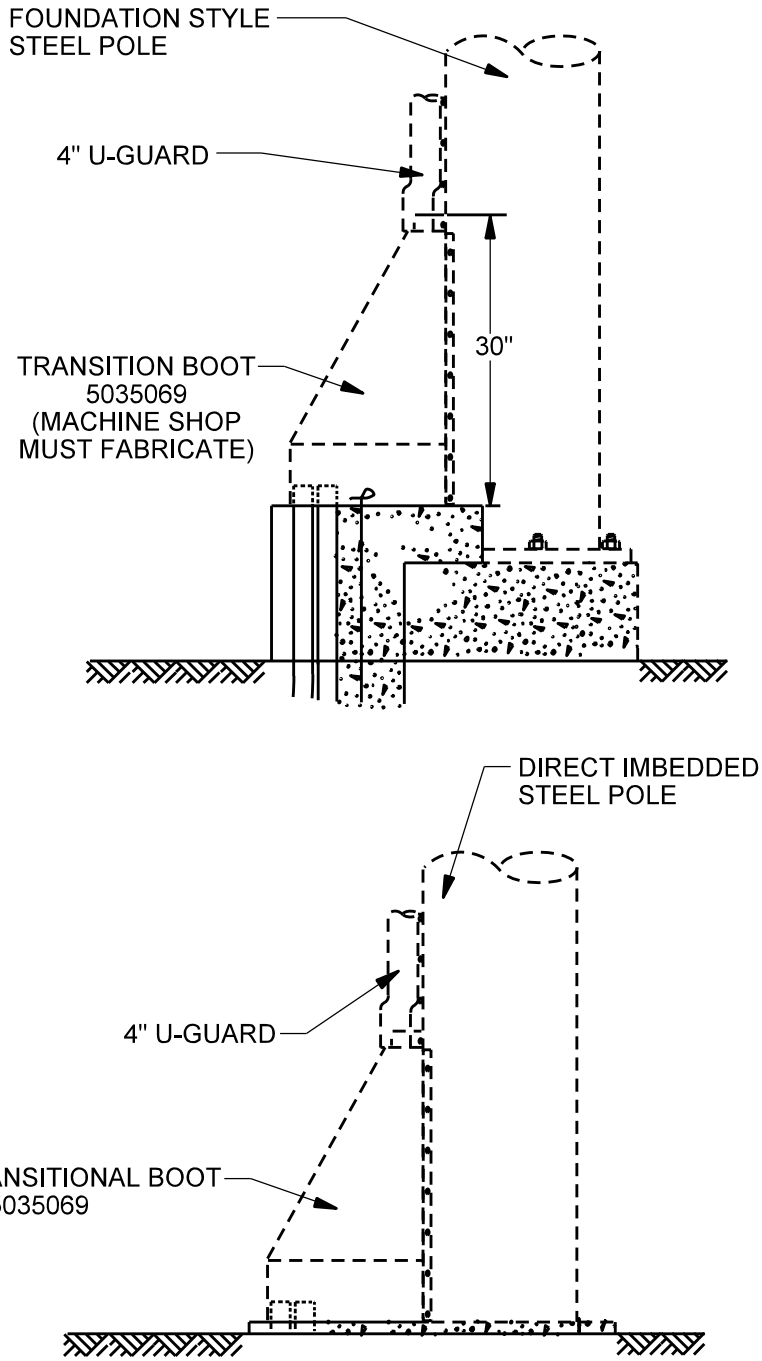
BILL OF MATERIALS - URK7_-2" WOOD POLE RISERS		
MATERIAL ITEM	DESCRIPTION	QTY.
5028002	SCREW, LAG, HOT DIP GALV., 1/4" DIA.	36
5035065	BOOT, POLE RISER	1
5031717	MOLD, POLE RISER 2"	2

NOTES

1. LOCATE RISER AT 45° ANGLE TO LINE DIRECTION ON A NON-TRAFFIC QUADRANT.
2. OPTIONAL CONCRETE ENCASEMENT SHALL END 12" BELOW GRADE.
3. CONDUIT ELBOW NOT INCLUDED. USE UKE2E FOR ENCASED CONDUIT SYSTEM.
4. ADD "T" TO COMPATIBLE UNITS ON TELECOM JOBS, ELECTRIC PLANT ACCOUNT = 997.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND ADSS COMMUNICATIONS CABLE RISER SINGLE OR DOUBLE DEADEND, WOOD POLE	ISSUE DATE: 11/13/95 REV. DATE: 07/25/13 APPROVAL: W. LARAMIE
	2-16-1	8505E17.DGN

DETAILS



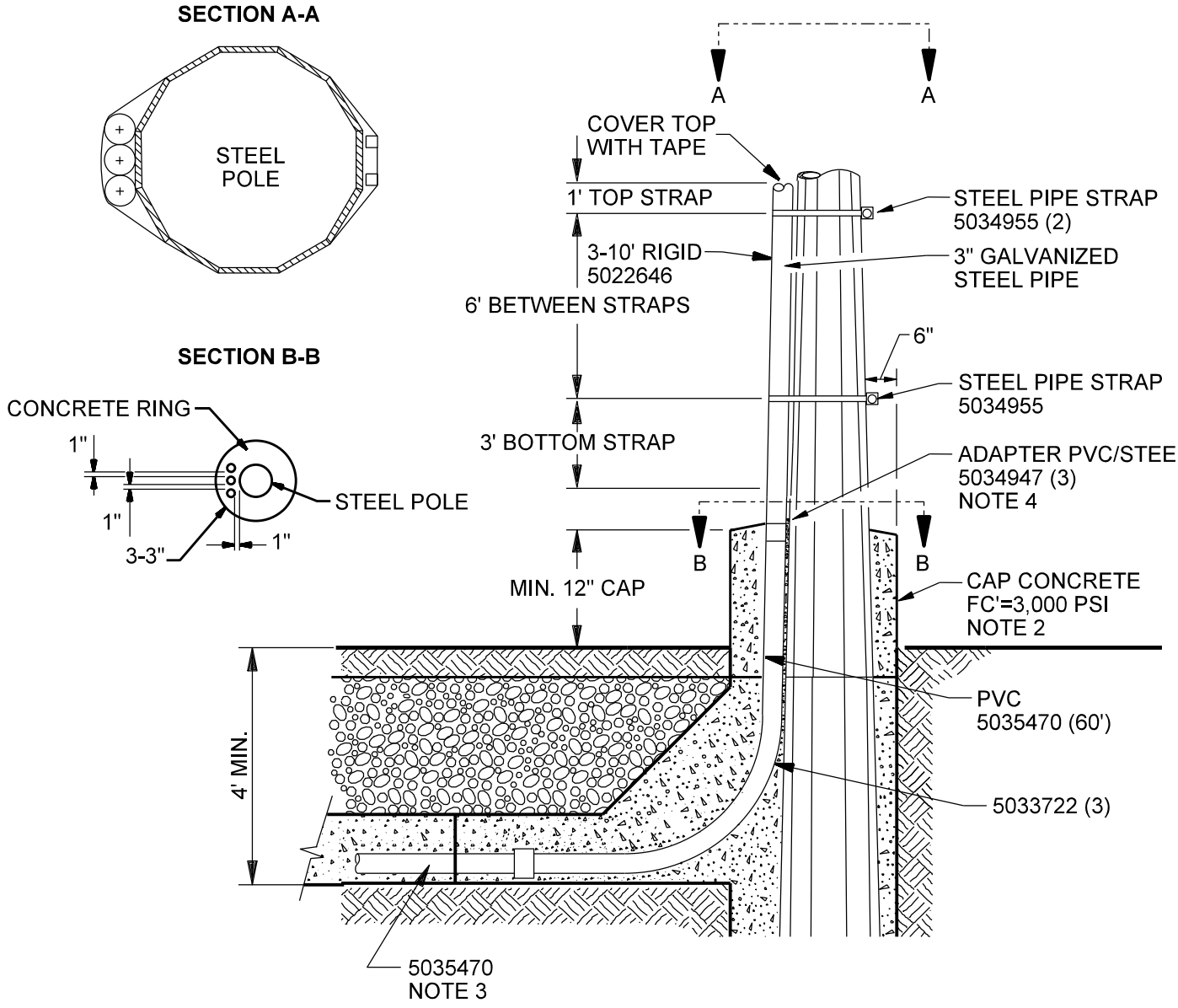
NOTES

1. CONDUIT ENCASEMENT TO PROVIDE FLAT PLATFORM FOR RISER BOOT.
2. FOR RISER STUB UP AT DIRECT IMBEDDED POLE, CONTACT COMMUNICATIONS ENGINEERING SUPERVISOR OR PRINCIPAL ENGINEER FOR SPECIFIC DETAILS.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	UNDERGROUND BOOT FOR STEEL POLE DETAILS	ISSUE DATE: 02/19/97 REV. DATE: 05/20/13 APPROVAL: W. LARAMIE
	2-17-1	8505E160.DGN

URKD

URKDT

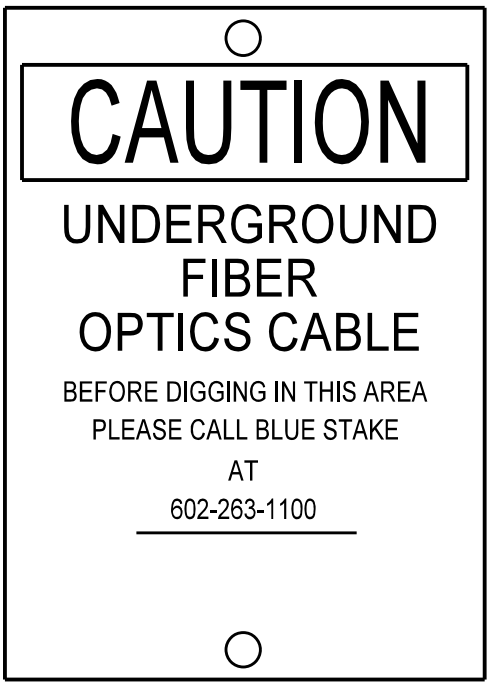


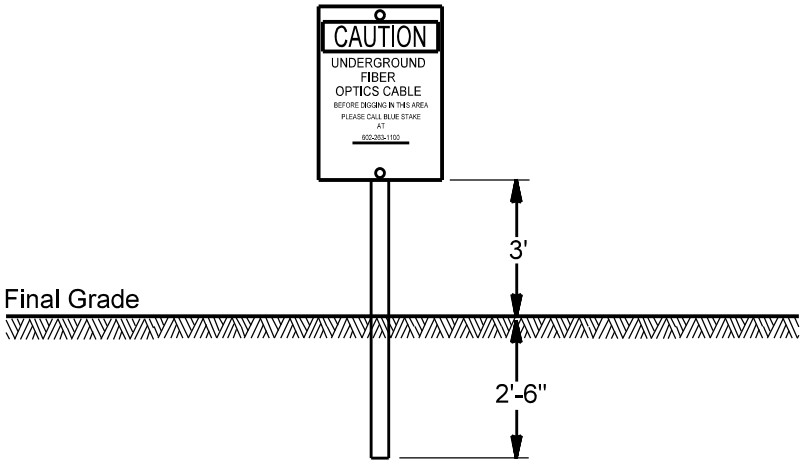
NOTES

1. SEE 69 KV OVERHEAD TRANSMISSION CONSTRUCTION STANDARDS, SECTION TP, DIRECT EMBED FOUNDATION DETAILS, SECONDARY RISER NOTES.
2. TAPER TOP OF CAP TO DRAIN WATER AWAY FROM POLE.
3. INCLUDED IN 60' TOTAL, THIS CONDUIT IS INCLUDED TO ALLOW INSTALLATION DURING POLE FOUNDATION WORK IN ADVANCE OF TRENCHING.
4. FLUSH WITH SURFACE OF CONCRETE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SUBSTATION DROP POLE	ISSUE DATE: 12/16/04 REV. DATE: 05/22/13 APPROVAL: W. LARAMIE
	2-18-1	8505E70.DGN

UMF



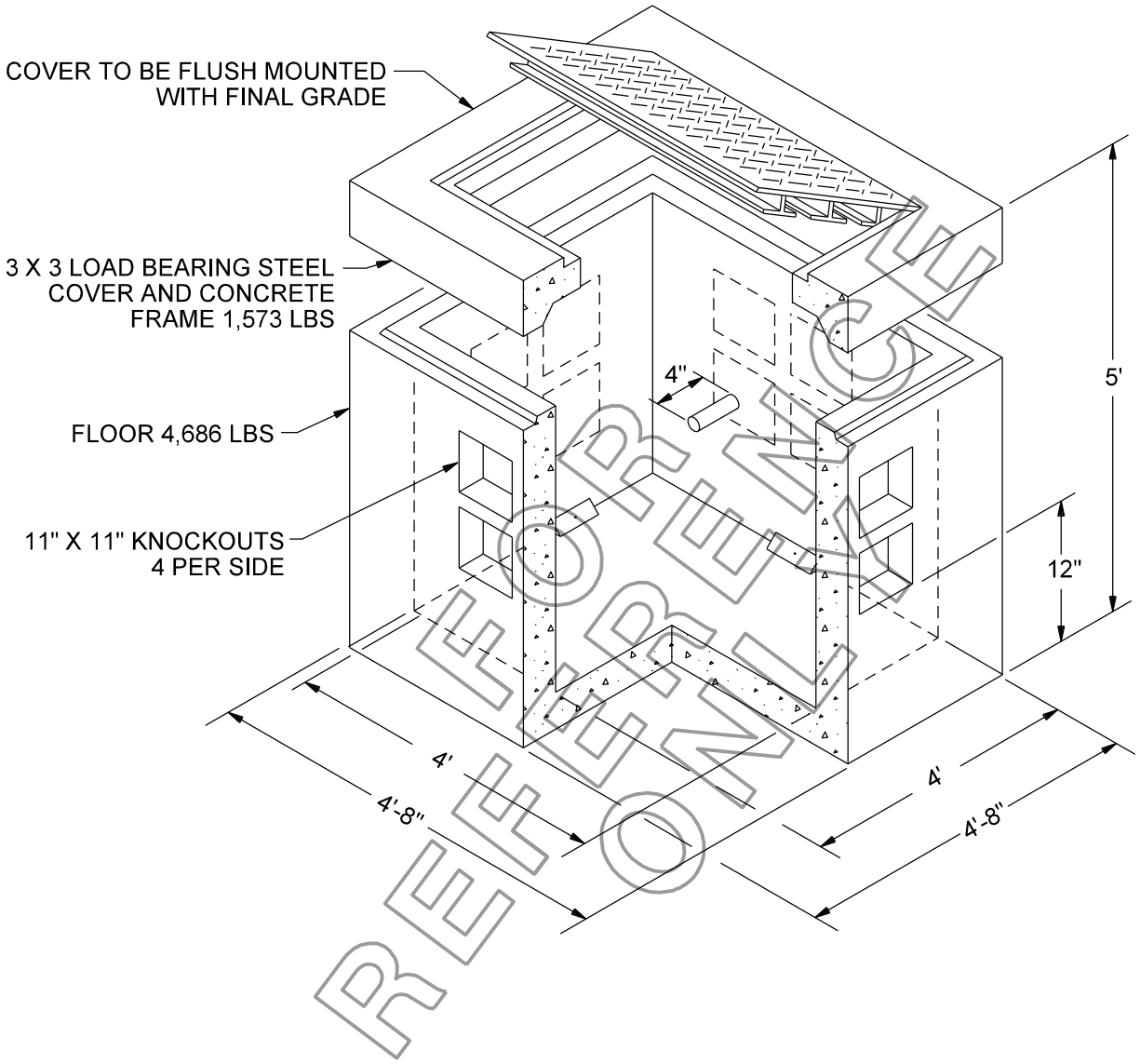


NOTES

1. SECURE SIGN TO POST WITH NUTS, BOLTS AND LOCK WASHERS.
2. BEND BOLTS TO PREVENT UNAUTHORIZED REMOVAL AND TO AVOID LEAVING SHARP EDGES.
3. LOCATION TO BE SPECIFIED BY DESIGNER.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND SIGN, CAUTION UNDERGROUND FIBER OPTIC FACILITIES	ISSUE DATE: 02/09/98 REV. DATE: 05/16/11 APPROVAL: W. LARAMIE
	2-19-1	8505E49.DGN

UVPB3K | COMMUNICATIONS ONLY 5034699



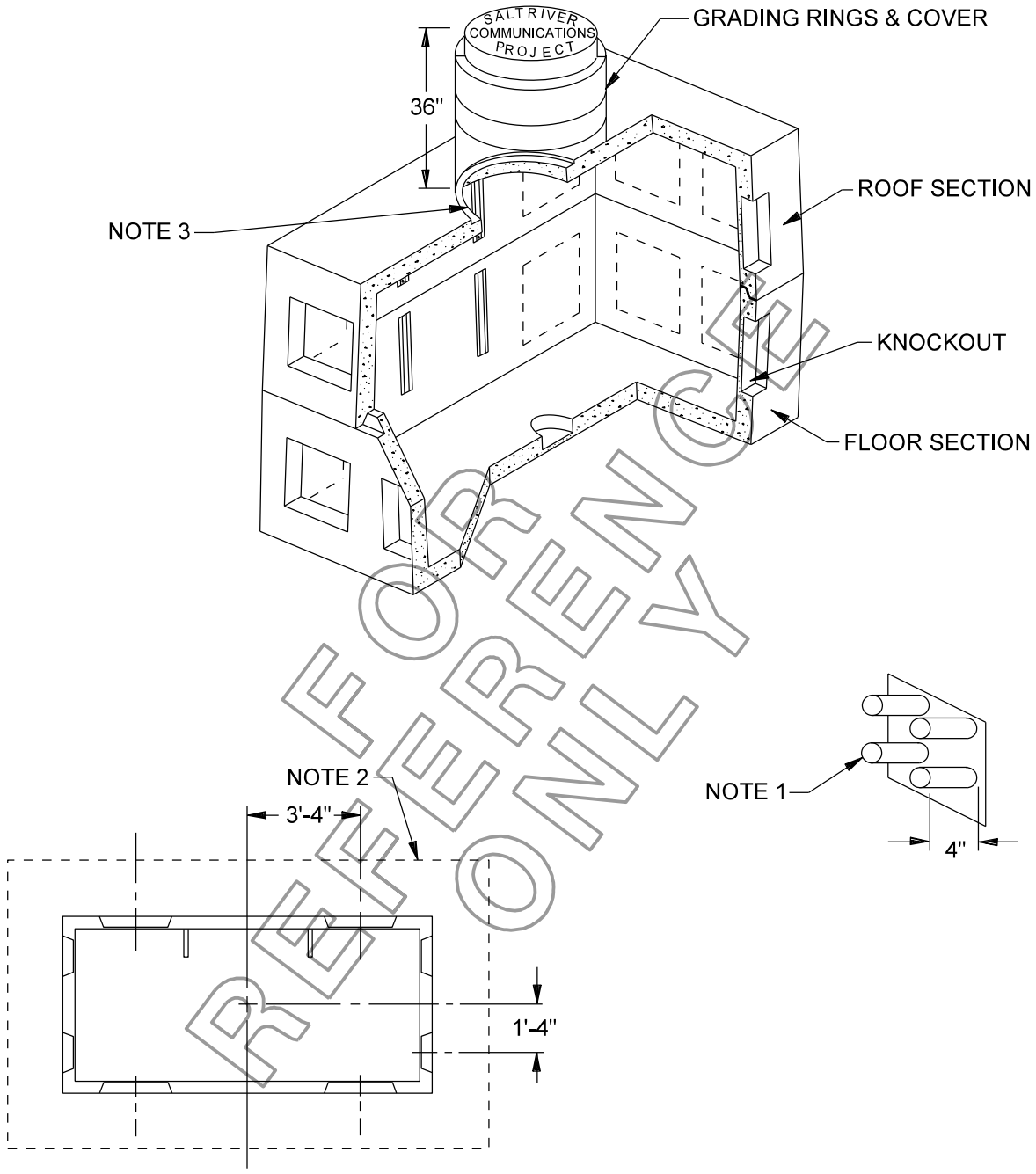
NOTES

1. THIS UNIT MAY BE USED IN SUBSTATION, SIDEWALK OR LIGHTLY LOADED TRAFFIC AREAS (MAXIMUM OF ONE 18,000 LB. SINGLE AXLE LOAD/DAY).
2. MINIMUM EXCAVATION SIZE TO BE 6'- 6" X 6'- 6" DEPTH REQUIRED.
3. CARE SHALL BE TAKEN TO PROVIDE A SMOOTH, LEVEL, WELL-COMPACTED BASE TO SET THE BOX ON. COMPACT AROUND SIDES OF BOX TO PREVENT SETTLING AROUND BOX.
4. CONDUITS MUST EXTEND A MINIMUM OF 4" INSIDE OF BOX.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES 4' X 4' X 4' PULL BOX (LOAD BEARING)	ISSUE DATE: 09/06/95 REV. DATE: 05/20/13 APPROVAL: W. LARAMIE
	2-20-1	8505E24.DGN

UVMH1K USED EXCLUSIVELY FOR TELECOMMUNICATIONS (397)

UVMH1KT (997)



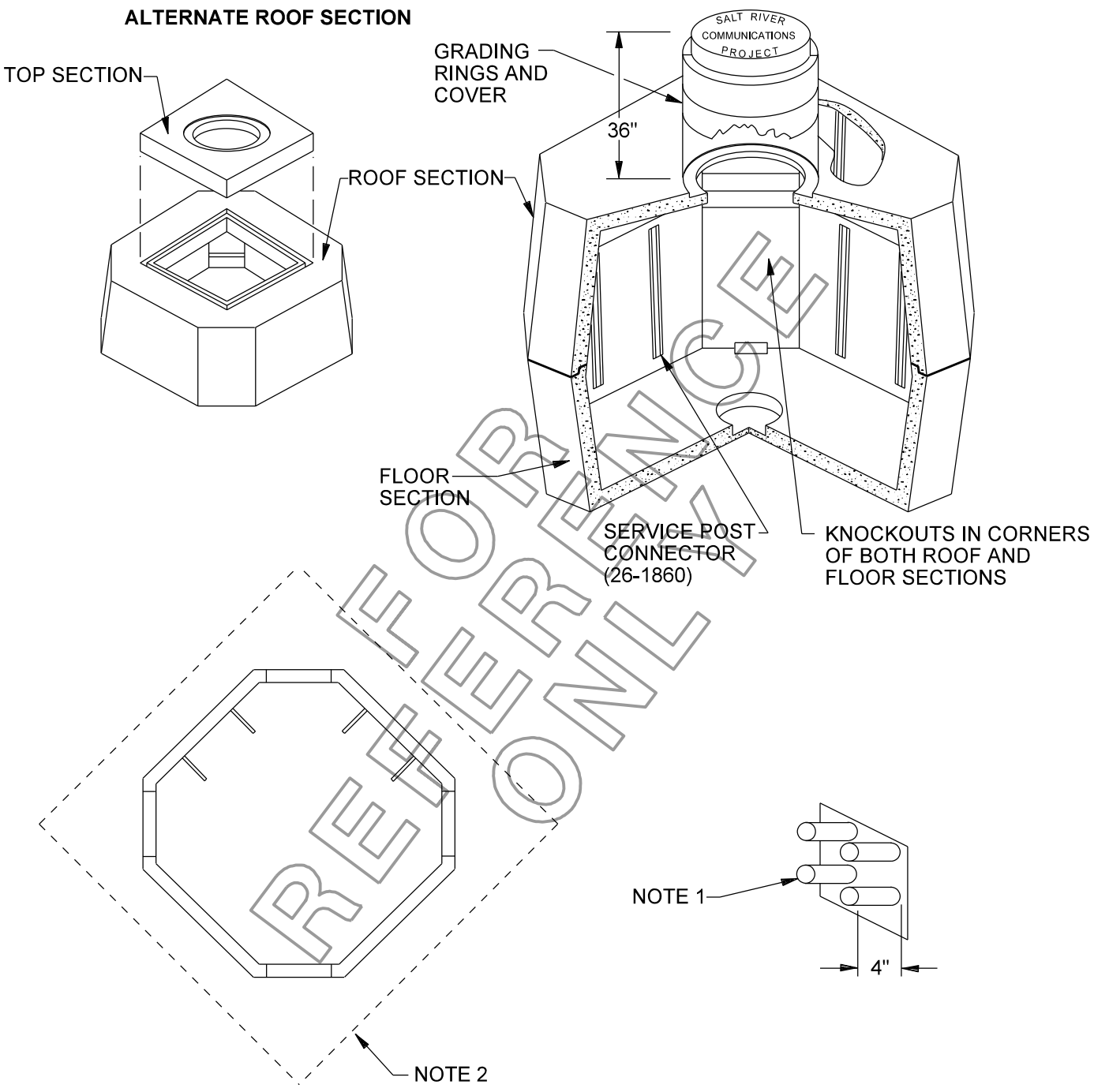
NOTES

1. CONDUITS MUST EXTEND AT LEAST 4" INTO MANHOLE AND WITHOUT END BELLS.
2. EXCAVATION TO BE 8' X 13' X 11' DEEP FROM FINAL GRADE AND OFFSET FROM CENTER OF TRENCH TO WINDOW LOCATIONS.
3. OPENING ON ROOF SECTION MAY BE OFFSET IF NEEDED.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES 5' X 10' MANHOLE	ISSUE DATE: 09/10/95 REV. DATE: 05/21/13 APPROVAL: W. LARAMIE
	2-21-1	8505E26.DGN

UVMH2K (397)

UVMH2KT USED EXCLUSIVELY FOR TELECOMMUNICATIONS (997)

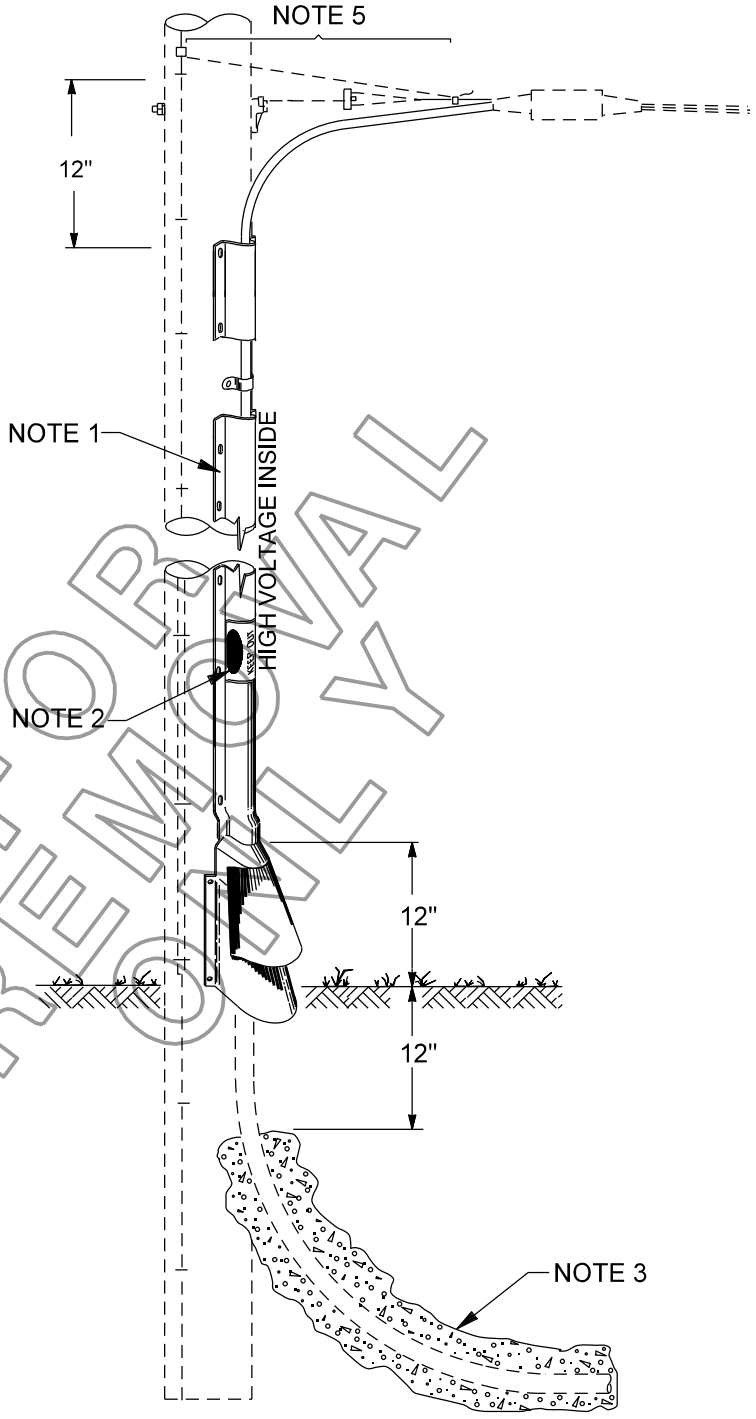


NOTES

1. CONDUITS MUST EXTEND AT LEAST 4" INTO MANHOLE AND WITHOUT END BELLS.
2. EXCAVATION TO BE 12' X 12' X 11' DEEP FROM FINAL GRADE

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND VAULTS, MANHOLES AND BOXES 9' X 9' MANHOLE, CABLE RACKING	ISSUE DATE: 09/10/95 REV. DATE: 05/21/13 APPROVAL: W. LARAMIE
	2-22-1	8505E25.DGN

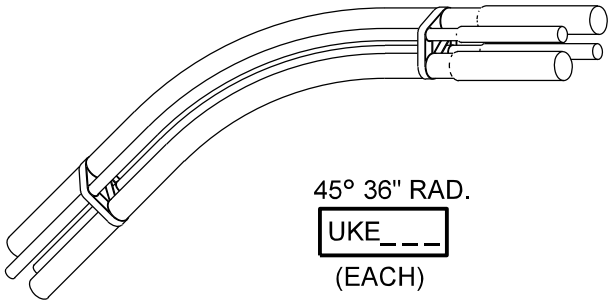
URK1	6 PAIR CABLE
URK2	25 PAIR CABLE
URK3	50 PAIR CABLE
URK4	100 PAIR CABLE
URK5	200 PAIR CABLE
URK6	300 PAIR CABLE



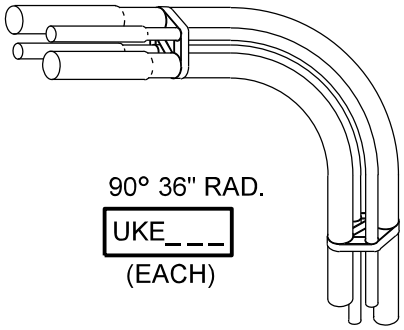
NOTES

1. LOCATE RISER AT 45° ANGLE TO LINE DIRECTION ON A NON-TRAFFIC QUADRANT.
2. LOCATE SIGN "DANGER: HIGH VOLTAGE INSIDE KEEP OUT" VERTICALLY ON RISER MOLD WITH RIGHT-HAND SIDE AT TOP, APPROXIMATELY 8' FROM GRADE.
3. OPTIONAL CONCRETE ENCASEMENT SHALL END 12" BELOW GRADE.
4. CONDUIT ELBOW NOT INCLUDED. USE UKE3 FOR DIRECT BURIAL OR UKE3E FOR ENCASED CONDUIT SYSTEM.
5. THE FIRST RISER FROM THE SUBSTATION SHALL HAVE THE MESSENGER BONDED TO THE 'GREEN' GROUNDING CONDUCTOR THAT IS INSTALLED WITH THE UNDERGROUND CABLE. DO NOT BOND TO POLE GROUND WITHIN 6 POLES OF A SUBSTATION.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND RISERS COMMUNICATIONS CABLE RISER	ISSUE DATE: 04/22/08 REV. DATE: 06/30/11 APPROVAL: W. LARAMIE
	2-23-1	8513E117.DGN



45° 36" RAD.
UKE_ _ _
(EACH)



90° 36" RAD.
UKE_ _ _
(EACH)

5035200

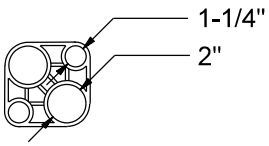
22.5° 48" RAD.
UKE_ _ _
(EACH)

MINIMUM BEND RADIUS = 40'

5035201

SEE PAGE 2-1-1
2-2" AND 2 - 1-1/4"

END VIEW

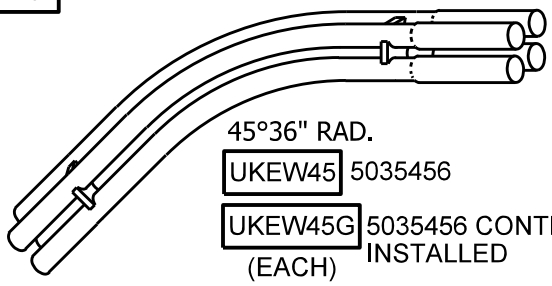


NOTES

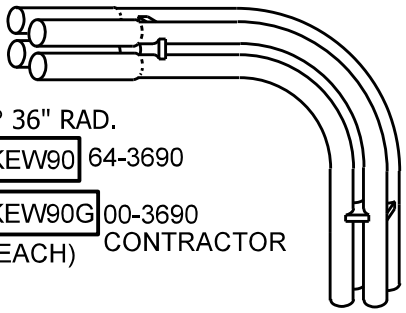
1. FOR INSTALLATION INTO A BORE THE SOLVENT MUST BE COMPLETELY SET UP, ENDS PLUGGED AND A PULLING ROPE WITH BACKING PLATE ON THE END OF THE ASSEMBLED DUCT USED TO PULL THE INSTALLATION INTO THE BORE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND CONDUIT COMMUNICATIONS QUAD-DUCT (UKE_)	ISSUE DATE: 06/08/98 REV. DATE: 06/30/11 APPROVAL: W. LARAMIE
	2-24-1	8505E57.DGN

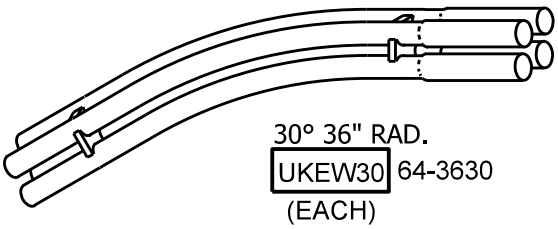
BKRACKS



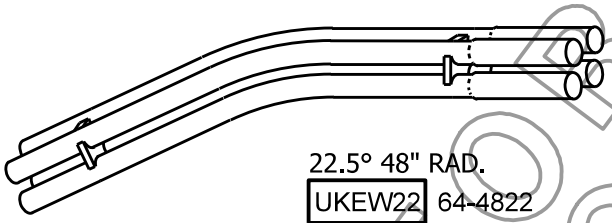
45°36" RAD.
UKEW45 5035456
UKEW45G 5035456 CONTRACTOR INSTALLED
(EACH)



90° 36" RAD.
UKEW90 64-3690
UKEW90G 00-3690 CONTRACTOR
(EACH)



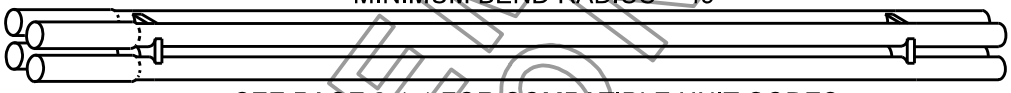
30° 36" RAD.
UKEW30 64-3630
(EACH)



22.5° 48" RAD.
UKEW22 64-4822
UKEW22G 00-4822 CONTRACTOR
(EACH)

11-1/2° 48" RAD.
UKEW11 64-4811
(EACH)

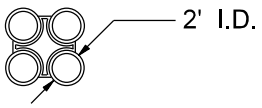
MINIMUM BEND RADIUS = 40'



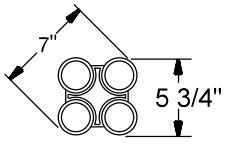
64-2126

SEE PAGE 2-1-1 FOR COMPATIBLE UNIT CODES
4 - 2"
(COMES PRE-ASSEMBLED)

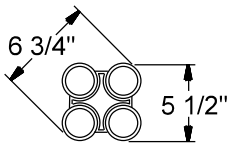
END VIEW



BELLED END



NON-BELLED END



NOTES

1. FOR INSTALLATION INTO A BORE THE SOLVENT MUST BE COMPLETELY SET UP, ENDS PLUGGED AND A PULLING ROPE WITH BACKING PLATE ON THE END OF THE ASSEMBLED DUCT USED TO PULL THE INSTALLATION INTO THE BORE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	UNDERGROUND CONDUIT COMMUNICATIONS QUAD-DUCT (UKEW_)	ISSUE DATE: 06/08/98 REV. DATE: 06/30/11 APPROVAL: W. LARAMIE
	2-25-1	8505E161.DGN

SECTION 3: OVERHEAD

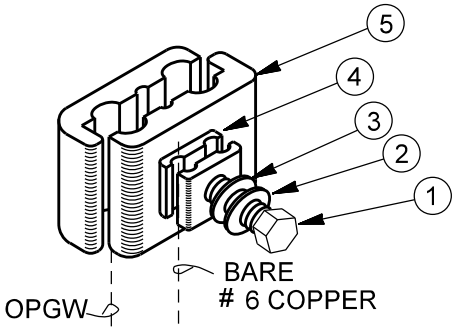
TITLE / DESCRIPTION **PAGE**

POLE DESCRIPTION			COMPATIBLE UNIT FOR POLE CONSTRUCTION		COMPATIBLE UNIT FOR POLE REMOVAL (ANY CLASS)	
HEIGHT	CLASS	MATERIAL ITEM	SRP TELECOM	SRP COMMUNICATION CABLE	SRP TELECOM	SRP COMMUNICATION CABLE
35'	5	5029021	W35T	W35K	RW35T	RW35K
40'	4	5029023	W40T	-	RW40T	-
45'	3	5029026	W45T	-	RW45T	-

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

OPGW GROUNDING BRACKETS

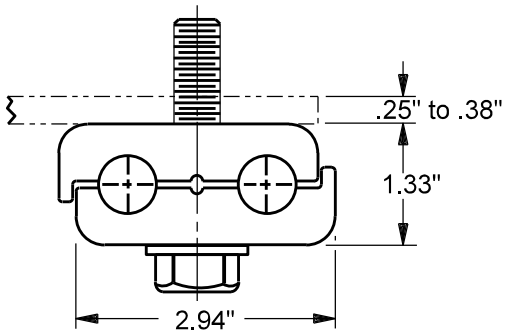
MATERIAL FOR EACH COMPATIBLE UNIT IN THE OPGW GROUNDING BRACKETS



1. BOLT, 1/2" X 14".....5027724 (WOOD)
   OR BOLT 1/2" X 3".....5069535 (STEEL)
2. WASHER, SPRING.....5029167 (WOOD)
3. WASHER, ROUND.....5029172 (WOOD)
   5029177 (STEEL)
4. CLIP, GROUND.....5028897
5. POLE GROUND CLAMP....SEE TABLE

NOTES
1. HARDWARE IS HIGH STRENGTH ALUMINUM.
2. CLAMP GROOVES ARE COATED WITH NO-OX-ID AND PREFILLED WITH ALNOX.
3. RECOMMENDED BOLT TORQUE: 25 FT.-LB.
4. DRILL AND TAP FOR 1/2" X 3" NC BOLT.

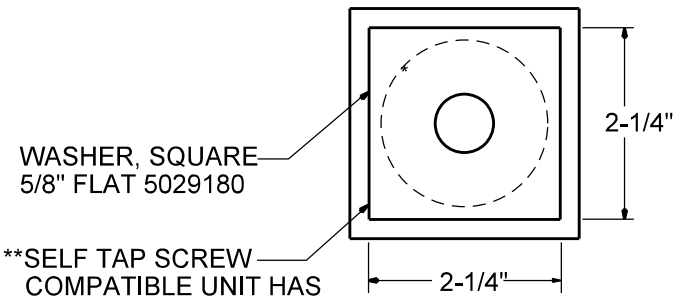
TOP VIEW

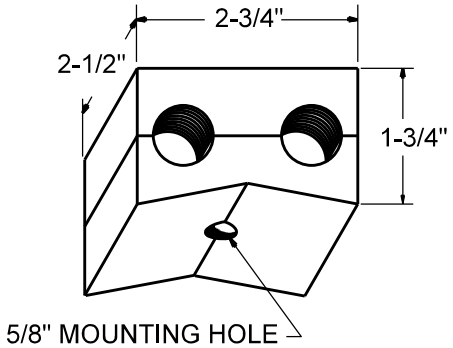


COMPATIBLE UNITS		PG CLAMP MATERIAL ITEM	CONDUCTOR DIAMETER RANGE (IN.)
WOOD	STEEL		
BKPG58W	BKPG58S	5028132 *	0.425 - 0.440 0.157 - 0.171
BKPG56W	BKPG56S	5028130	0.541 - 0.555
BKPG49W	BKPG49S	5028123	0.631 - 0.645
BKPG55W	BKPG55S	5028129	0.646 - 0.660
BKPG59W	BKPG59S	5028133	0.676 - 0.690
BKPG57W	BKSPG57S	5028131	0.736 - 0.750

* OPGW ONE SIDE AND #6 CU OTHER

OPGW STRAIN RELIEF BRACKETS



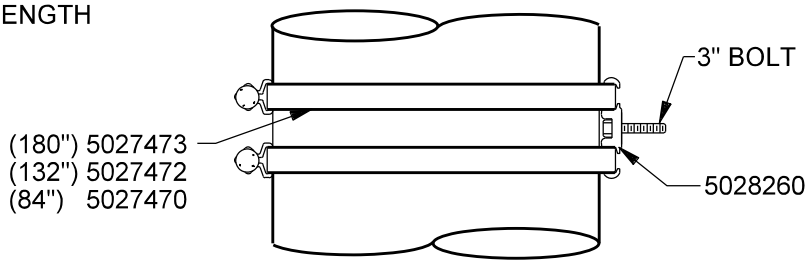


COMPATIBLE UNITS			MATERIAL ITEM	CABLE DIAMETER RANGE (IN.)
WOOD 1/2" X 14" BOLT	WOOD 2-1/2" X 1/4" LAG	**STEEL SELF TAP 3"		
—	BKSRL81	BKSRT81	5028144	0.375 - 0.468
OBSOLETE	BKSRL80	BKSRT80	5028143	0.469 - 0.562
—	BKSRL51	BKSRT51	5028125	0.563 - 0.656
—	BKSRL50	BKSRT50	5028124	0.657 - 0.750

**SELF TAP SCREW 5028983 IS 3" L

COMMUNICATIONS UNDERBUILD

BK2AL	180" BAND LENGTH
BK2AM	132" BAND LENGTH
BK2AS	84" BAND LENGTH

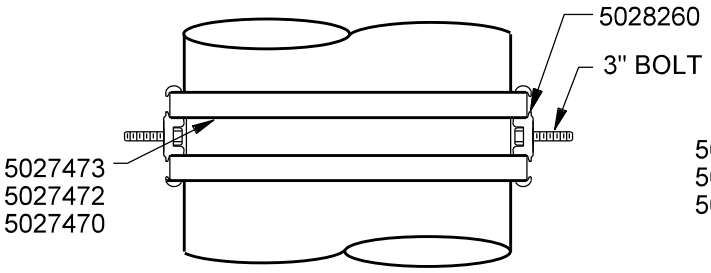


NOTES

1. FOR CONDUCTOR ATTACHMENT USE BK2, BK4T, BK4X, BK5, ETC

COMMUNICATIONS UNDERBUILD DEADEND

BK2BL
BK2BM
BK2BS

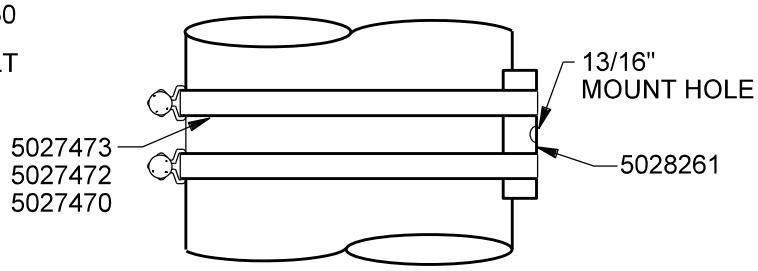


NOTES

1. MAXIMUM DEADEND TENSION 5,000 LBS
2. FOR CONDUCTOR ATTACHMENT USE BK4, BK5A, ETC

COMMUNICATIONS UNDERBUILD INSULATOR MOUNT

BK2CL
BK2CM
BK2CS



NOTES

1. FOR PRIMARY CONDUCTORS USE POST INSULATOR B22C__ OR B22CA__

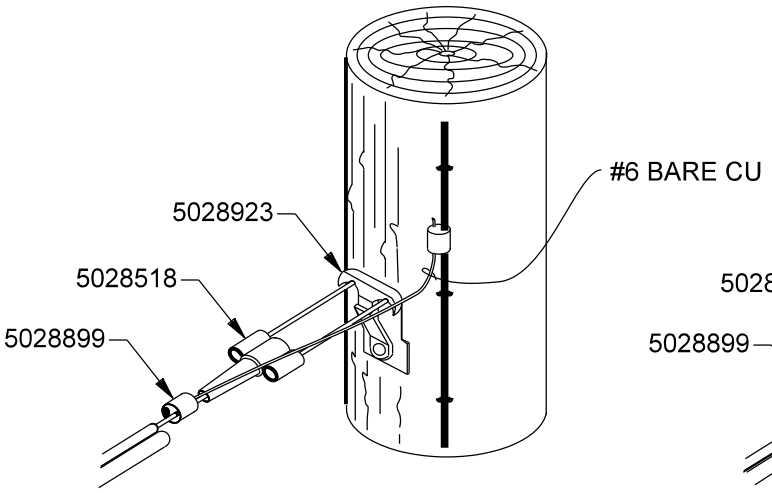
CORRECT BAND COMPATIBLE UNIT TO USE BASED ON POLE DIAMETER			
TYPE	MAXIMUM ALLOWABLE POLE DIAMETER AT CONTACT LOCATION		
	4" - 25"	25" - 40"	40" - 55"
TANGENT	BK2AS	BK2AM	BK2AL
DEADEND	BK2BS	BK2BM	BK2BL
INSULATOR MOUNT	BK2CS	BK2CM	BK2CL

Communications Design & Construction Standards PROPRIETARY MATERIAL	OVERHEAD COMMUNICATIONS UNDERBUILD (69 kV STEEL POLE)	ISSUE DATE: 12/03/90 REV. DATE: 06/27/13 APPROVAL: W. LARAMIE
	3-3-1	8505E28.DGN

BKRACKS

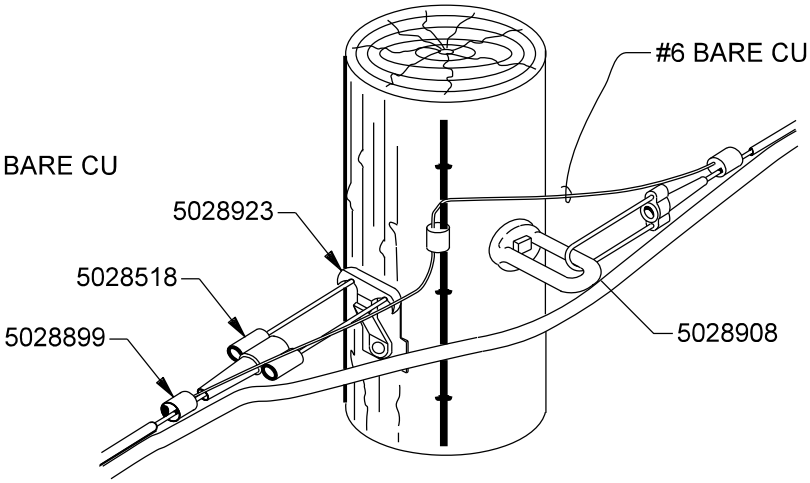
DEADEND
1/4" EXTRA HIGH STRENGTH MESSENGER

BK5



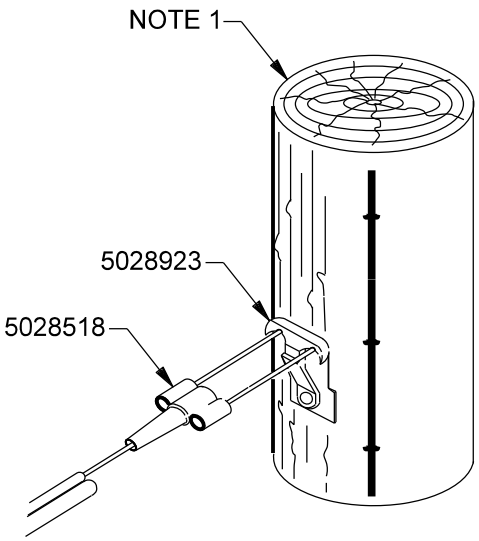
DEADEND WITH SLACK SPAN
1/4" EXTRA HIGH STRENGTH MESSENGER

BK5A



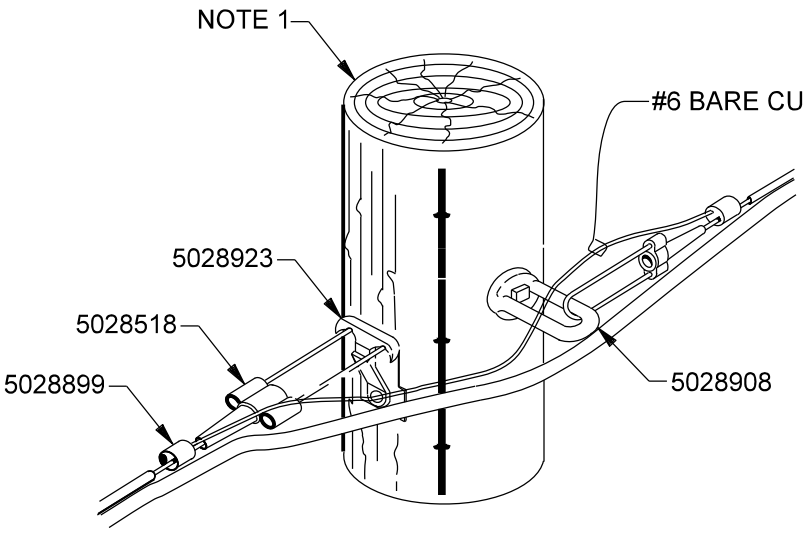
DEADEND
1/4" EXTRA HIGH STRENGTH MESSENGER
WITHIN 2,000 FEET OF SUBSTATIONS

BK5D



DEADEND WITH SLACK SPAN
1/4" EXTRA HIGH STRENGTH MESSENGER
WITHIN 2,000 FEET OF SUBSTATIONS

BK5E

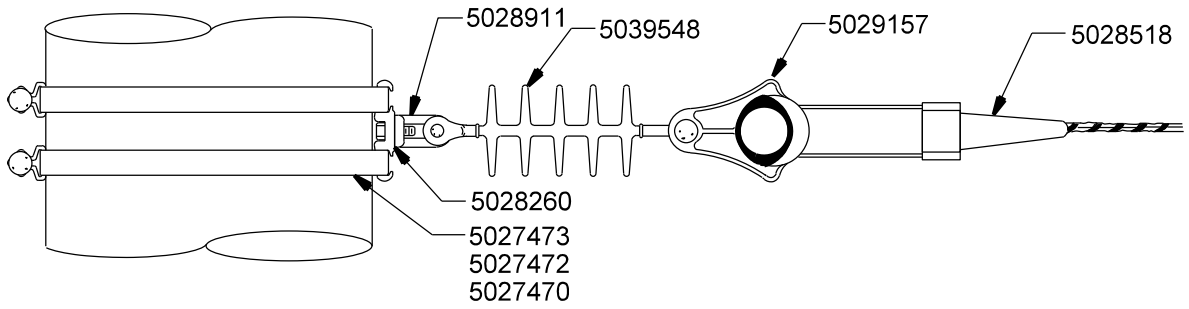


NOTES
1. DO NOT USE THROUGH BOLT FOR DOWN GUY WIRE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	OVERHEAD DEADENDS FOR MESSENGER SUPPORTED CABLE	ISSUE DATE: 09/10/95 REV. DATE: 06/24/13 APPROVAL: W. LARAMIE
	3-4-1	8505E18.DGN

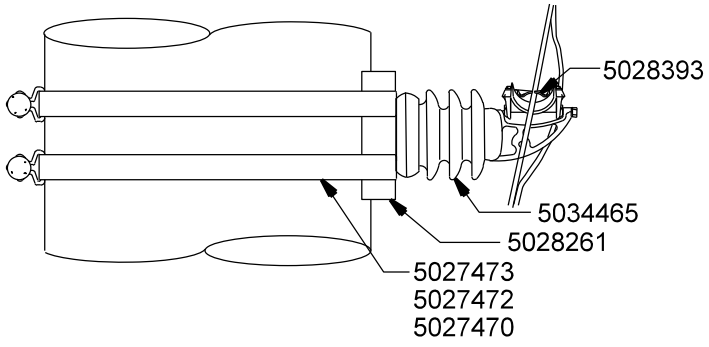
INSULATED DEADEND
1/4" EXTRA HIGH STRENGTH MESSENGER FOR STEEL POLES
WITHIN 2,000 FEET OF SUBSTATIONS

BK5BL	40"-55" DIA.
BK5BM	25"-40" DIA.
BK5BS	4"-25" DIA.



INSULATED TANGENT
1/4" EXTRA HIGH STRENGTH MESSENGER FOR STEEL POLES
WITHIN 2,000 FEET OF SUBSTATIONS

BK5CL	40"-55" DIA.
BK5CM	25"-40" DIA.
BK5CS	4"-25" DIA.

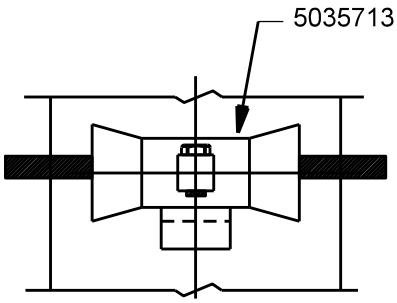


Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	OVERHEAD INSULATED DEADEND / TANGENT WITHIN 2,000 FEET OF SUBSTATIONS	ISSUE DATE: 11/13/95 REV. DATE: 05/22/13 APPROVAL: W. LARAMIE
	3-5-1	8505E19.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

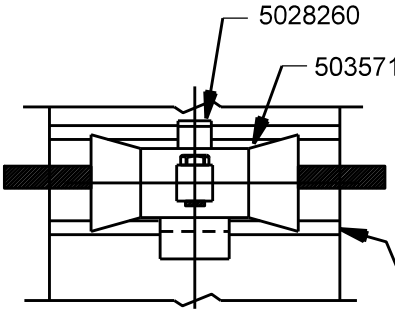
ANGLE 0°-10° WOOD POLE

BK6



ANGLE 0°-10° STEEL POLE

BK6AL	40"-55" DIA.
BK6AM	25"-40" DIA.
BK6AS	4"-25" DIA.



BAND	LENGTH
5027473	180"
5027472	132"
5027470	84"

NOTES

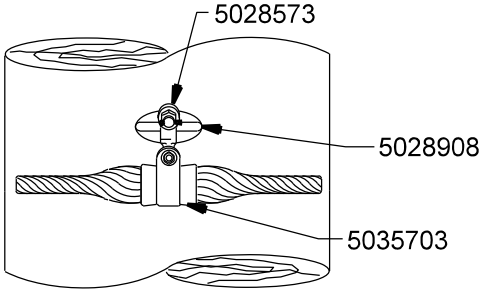
1. USE 2 BUSHING INSERTS 5035714 FOR 0.676-0.725" OUTSIDE DIAMETER ADSS FIBER CABLE.
2. CLAMP WITHOUT BUSHING INSERT MAY BE USED AS STRINGING DEVICE.

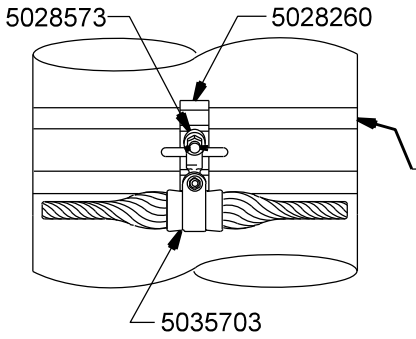
ANGLE 11°-25° WOOD POLE

BK7

ANGLE 11°-25° STEEL POLE

BK7AL	40"-55" DIA.
BK7AM	25"-40" DIA.
BK7AS	4"-25" DIA.





BAND	LENGTH
5027473	180"
5027472	132"
5027470	84"

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	OVERHEAD TANGENT POLE ATTAHMENTS ALL DIELECTRIC SELF SUPPORTING	ISSUE DATE: 09/10/95 REV. DATE: 05/20/13 APPROVAL: W. LARAMIE
	3-6-1	8505E20.DGN

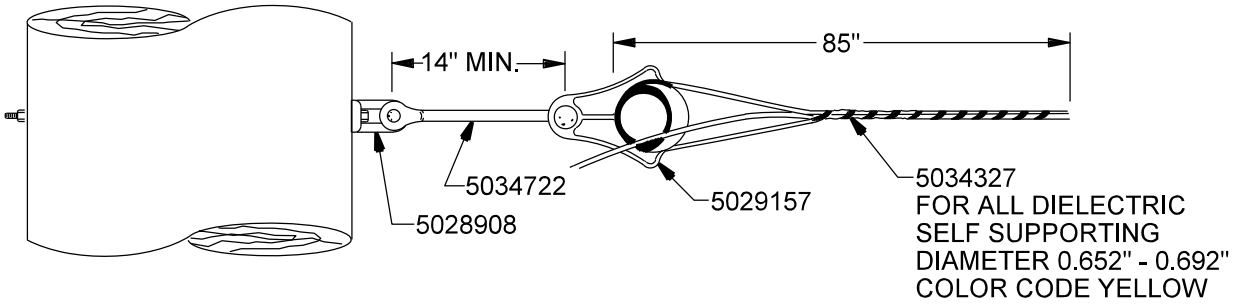
SINGLE DEAD-END WOOD POLE

BK8

FOR SPANS EXCEEDING 3000 LBS.

BK8HD

USES DIFFERENT PARTS THAN IDENTIFIED

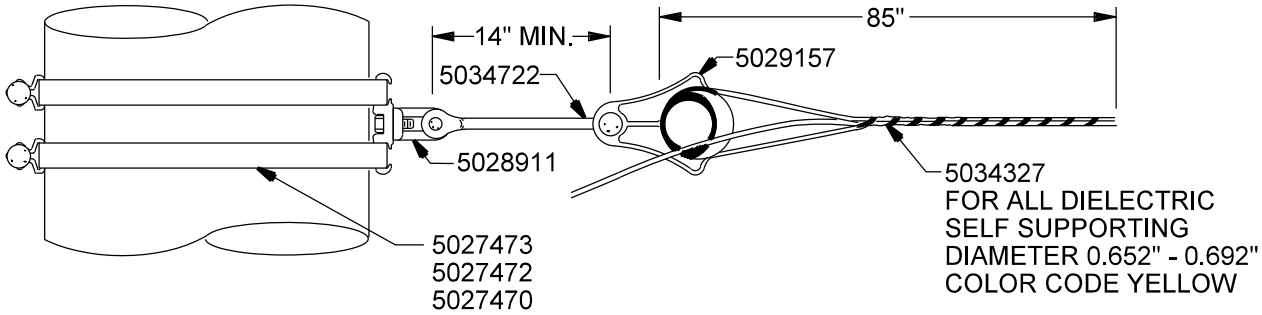


SINGLE DEAD-END STEEL POLE

BK8AL 40"-55" DIA.

BK8AM 25"-40" DIA.

BK8AS 4"-25" DIA.

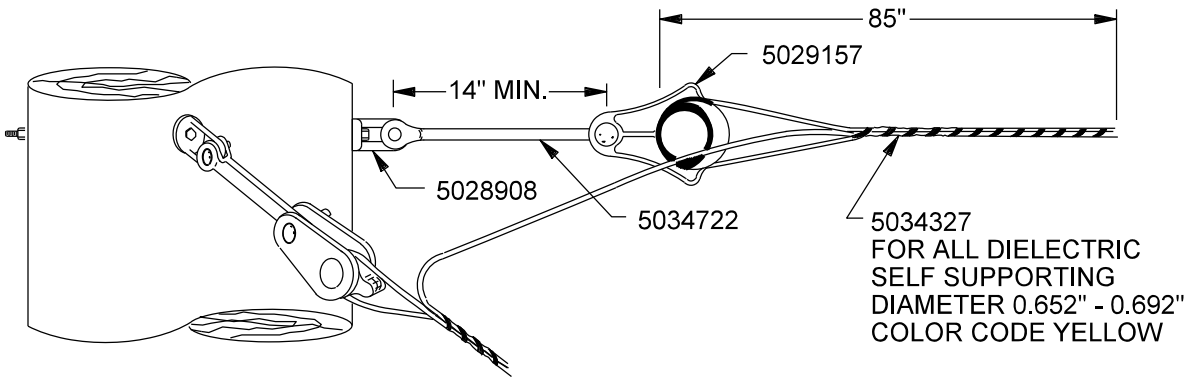


Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	OVERHEAD DEADEND POLE ATTACHMENTS ALL DIELECTRIC SELF SUPPORTING	ISSUE DATE: 09/10/95 REV. DATE: 02/03/22 APPROVAL: J. LUERA
	3-7-1	8505E163.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS
WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

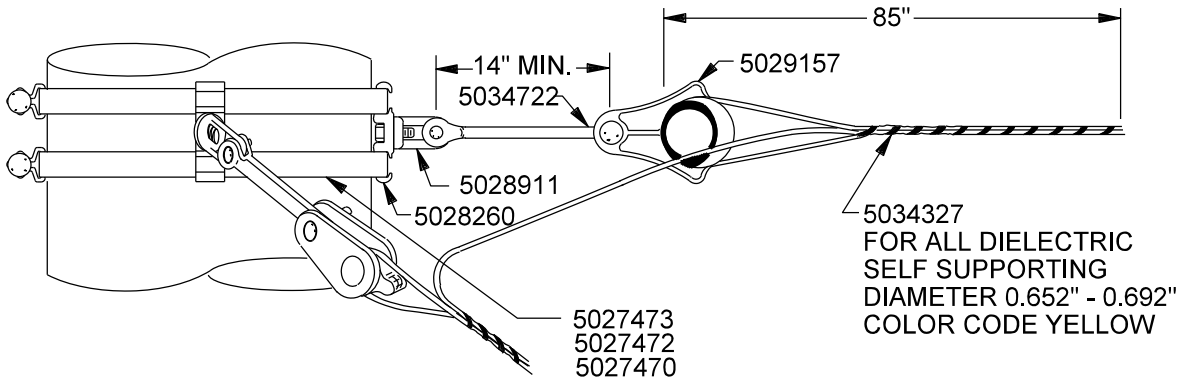
DOUBLE DEADEND OR ANGLE OVER 25° WOOD POLE

BK9



DOUBLE DEADEND OR ANGLE OVER 25° STEEL POLE

BK9AL	40"-55" DIA.
BK9AM	25"-40" DIA.
BK9AS	4"-25" DIA.



Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	OVERHEAD DOUBLE DEADEND POLE ATTACHMENTS ALL DIELECTRIC SELF SUPPORTING	ISSUE DATE: 09/10/95 REV. DATE: 01/07/14 APPROVAL: W. LARAMIE
	3-8-1	8505E21.DGN

ACFOPGW_ _ (COLOR) (OPGW DIAMETER)

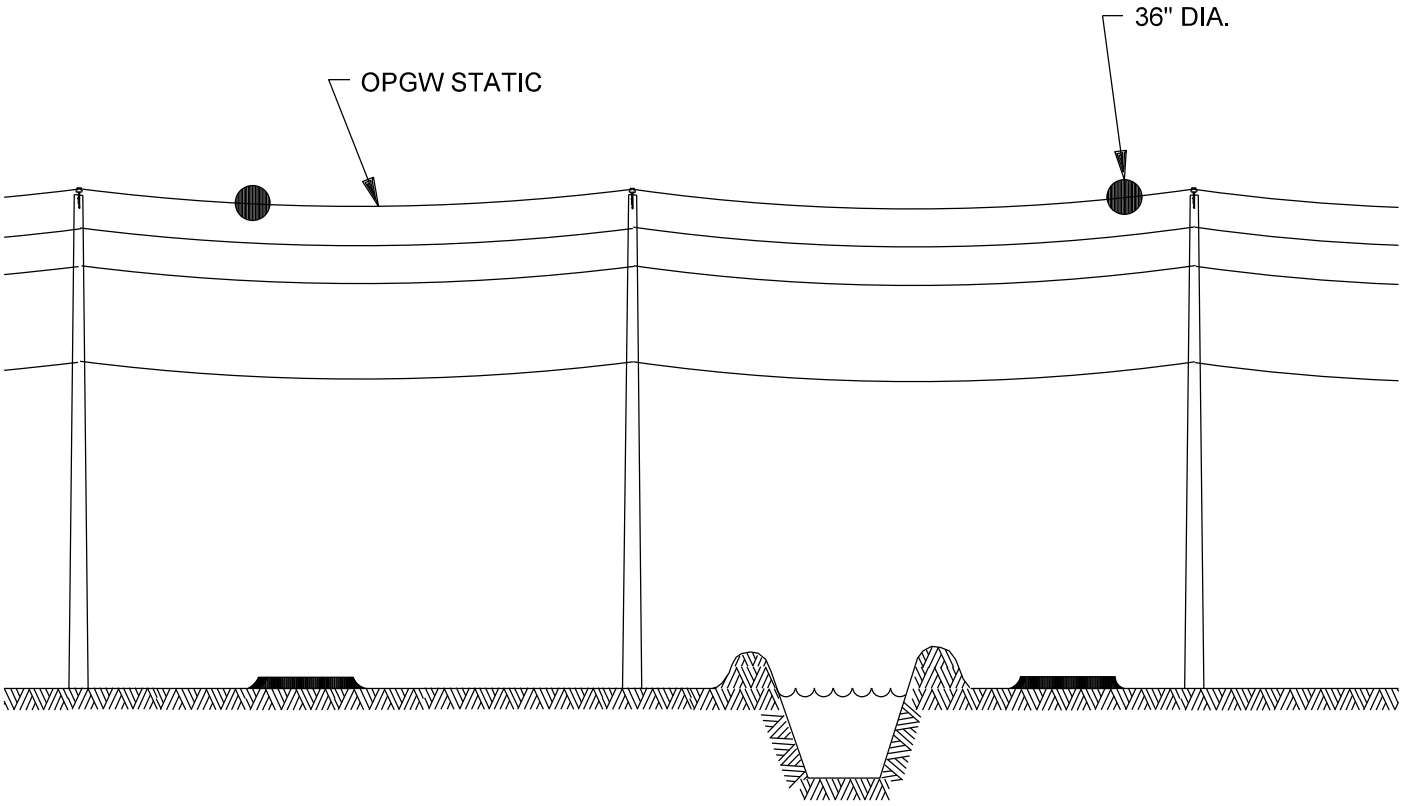
MARKER BALL COLOR

ORANGE (R) GUARD 5034455
WHITE (W) GUARD 5034456
YELLOW (Y) GUARD 5034457

OPGW DIAMETER

0.425" (A) GRIP 5034461, ROD 5034965
0.637" (B) GRIP 5034463, ROD 5034966
0.646" (C) GRIP 5034463, ROD 5034966
0.678" (D) GRIP 5034463, ROD 5034967

ELEVATION



NOTES

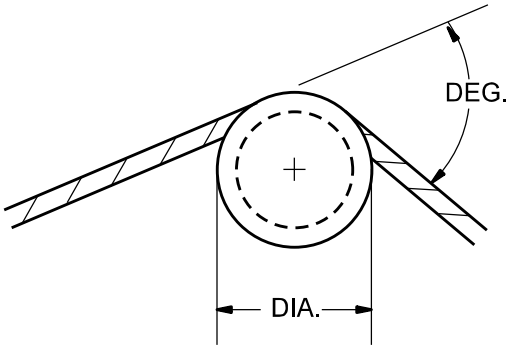
1. SPHERE IS TO BE ATTACHED TO THE STATIC, OPGW. SEE 69 KV OVERHEAD TRANSMISSION CONSTRUCTION STANDARDS FOR WARNING SPHERES TO FIT 7#8.
2. EACH SPHERE REQUIRES ONE SET OF REINFORCING RODS TO FIT THE CONDUCTOR TO WHICH THE SPHERE IS TO BE ATTACHED AND ONE GRIP TO FIT OVER THE REINFORCING RODS.
3. WARNING SPHERES TO BE LOCATED WHERE REQUESTED BY THE FAA.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	OVERHEAD AIRCRAFT WARNING SPHERES FAA REQUIREMENT	ISSUE DATE: 11/12/08 REV. DATE: 07/29/13 APPROVAL: W. LARAMIE
	3-9-1	8505E111.DGN

AIRCRAFT WARNING SPHERES				
COMPATIBLE UNIT	**COLOR**	**OPGW DIAMETER**	**GRIP**	**ROD**
ACFOPGW24	WHITE/ORANGE	0.425	5034344	5035087
ACFOPGW48	WHITE/ORANGE	0.637	5034453	5034991
ACFOPGWRA	ORANGE	0.425	5034461	5034965
ACFOPGWRB	ORANGE	0.634	5034463	5034966
ACFOPGWRC	ORANGE	0.646	5034463	5034966
ACFOPGWRD	ORANGE	0.678	5034463	5034567
ACFOPGWWA	WHITE	0.425	5034461	5034965
ACFOPGWWB	WHITE	0.637	5034463	5034966
ACFOPGWWC	WHITE	0.646	5034463	5034966
ACFOPGWWD	WHITE	0.678	5034463	5034567
ACFOPGWYA	YELLOW	0.425	5034461	5034965
ACFOPGWYB	YELLOW	0.637	5034463	5034966
ACFOPGWYC	YELLOW	0.646	5034463	5034966
ACFOPGWYD	YELLOW	0.678	5034463	5034567

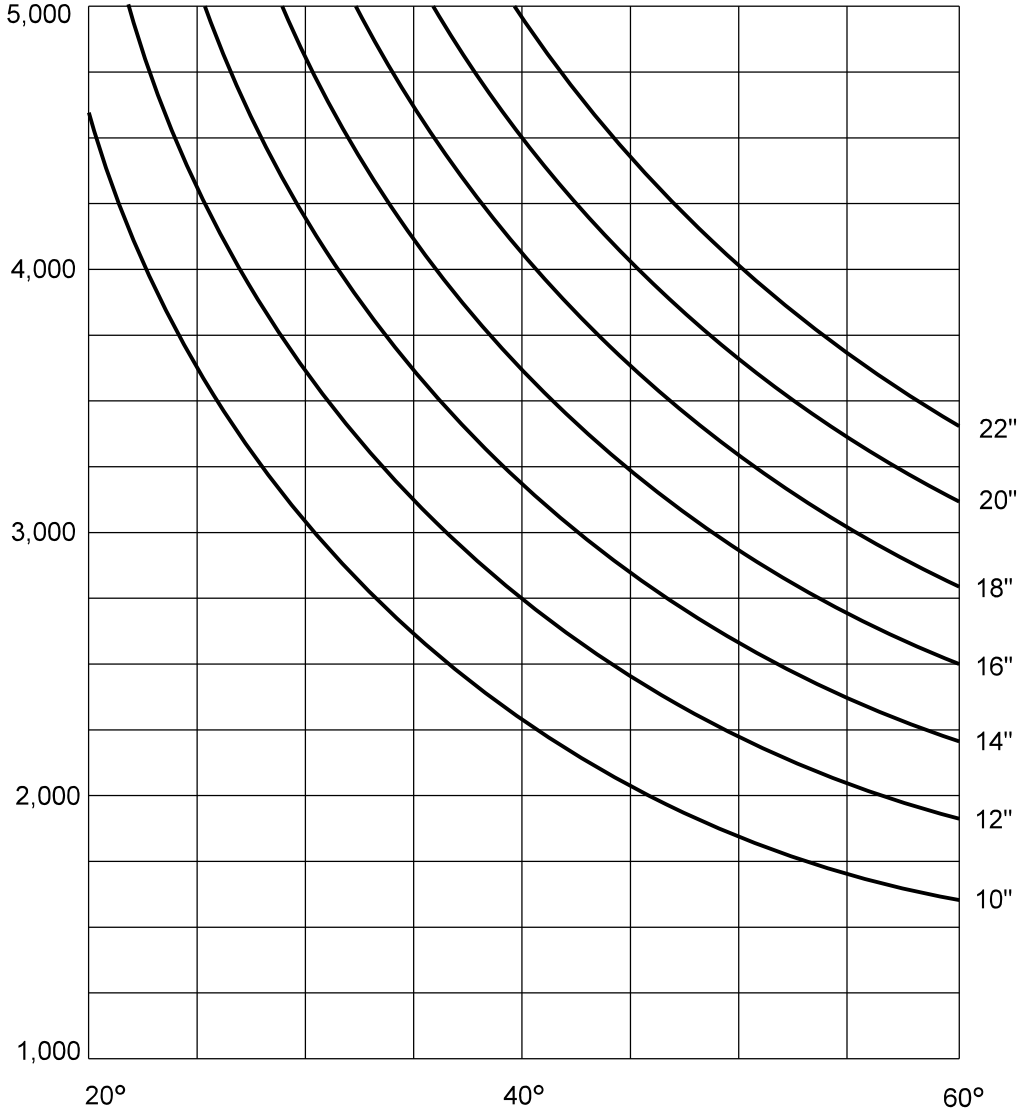
SECTION 4: TRANSMISSION

TITLE / DESCRIPTION **PAGE**



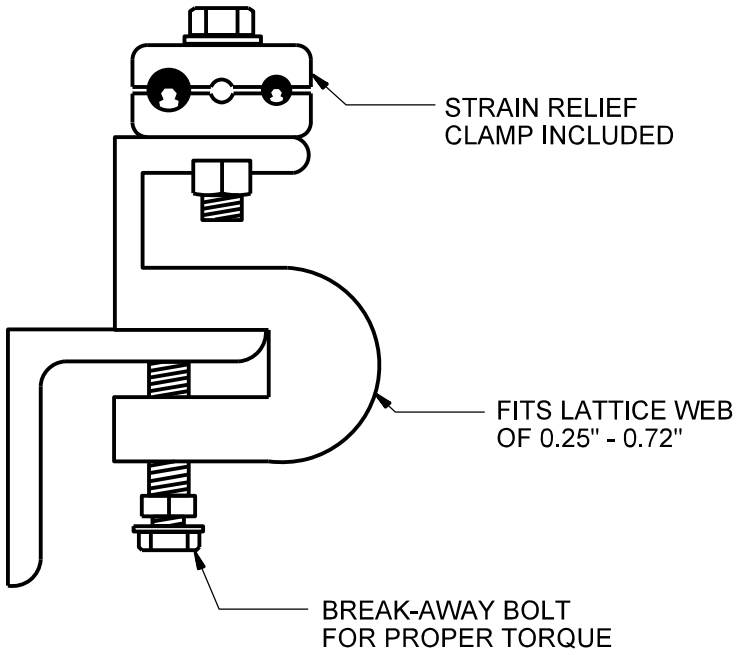
MAX. STRINGING TENSION (LBS)

MIN. SHEAVE DIAMETER



Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	TRANSMISSION MINIMUM SHEAVE DIAMETERS FOR STRINGING TENSIONS VS. THRU-ANGLE FOR OPGW INSTALLATION	ISSUE DATE: 01/01/99 REV. DATE: 06/16/13 APPROVAL: W. LARAMIE
	4-1-1	8505E51.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

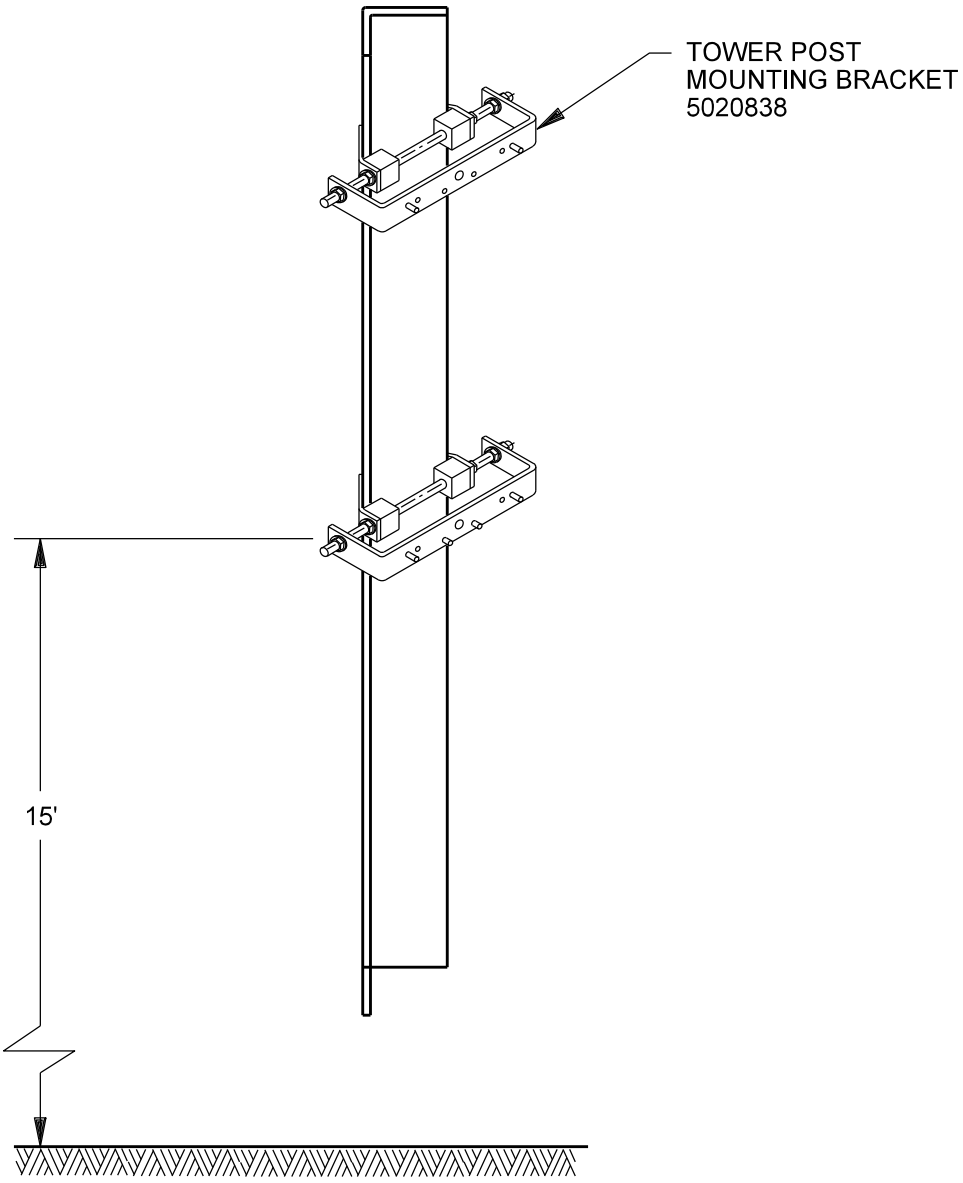


LATTICE TOWER CLAMP INCLUDES OPGW BRACKET	
MATERIAL ITEM	**OPGW DIA.**
5028137	0.35" - 0.50"
5028138	0.601" - 0.70"

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION OPGW AND ADSS LATTICE TOWER CLAMP	ISSUE DATE: 03/10/98 REV. DATE: 06/11/13 APPROVAL: W. LARAMIE
	4-2-1	8505E55.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

TB2	5020838



NOTES

1. (1) USED WITH BKS6ST (5020845)

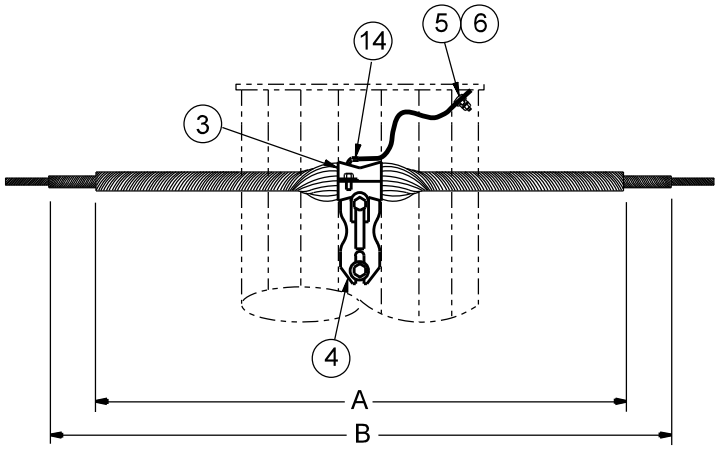
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION SPLICE CASES WINDSOR TOWER POST MOUNTING BRACKET	ISSUE DATE: 04/07/98 REV. DATE: 06/18/13 APPROVAL: W. LARAMIE
	4-3-1	8505E56.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

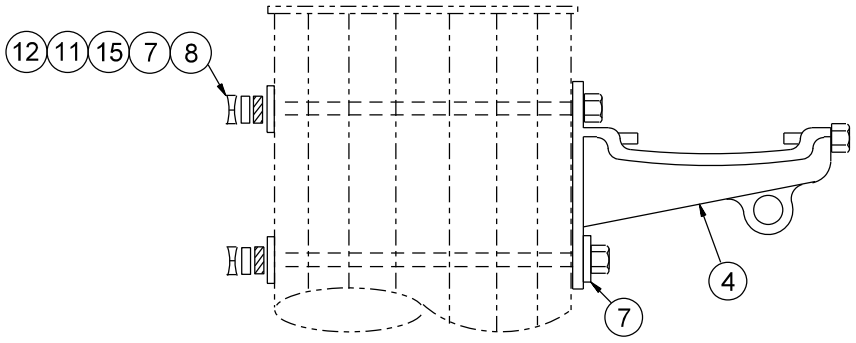
DRILLABLE
STEEL POLES SEE NOTE 4 ON PAGE 4-4-4.

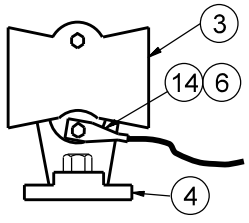
TA242TWM	24 FIBER (0.419" TO 0.439" DIA.)
TA24TWM	24 FIBER (0.537" TO 0.559" DIA.)
TA48TWM	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA96TWM	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA144TWM	144 FIBER (0.667" TO 0.682" DIA.)
TA288TWM	288 FIBER (0.667" TO 0.682" DIA.)

STEEL POLES FOR DEFLECTION ANGLES 0° TO 15°



SEE NOTES ON PAGE 4-4-4





PLAN VIEW
GROUNDING

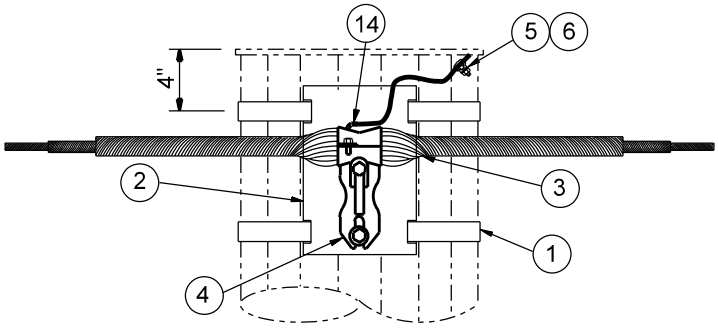
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION OPGW TANGENT ASSEMBLY DRILLABLE STEEL POLES TANGENT (0° TO 15°)	ISSUE DATE: 08/15/96 REV. DATE: 02/09/23 APPROVAL: E. LUBANDI
	4-4-1	8505E31.DGN

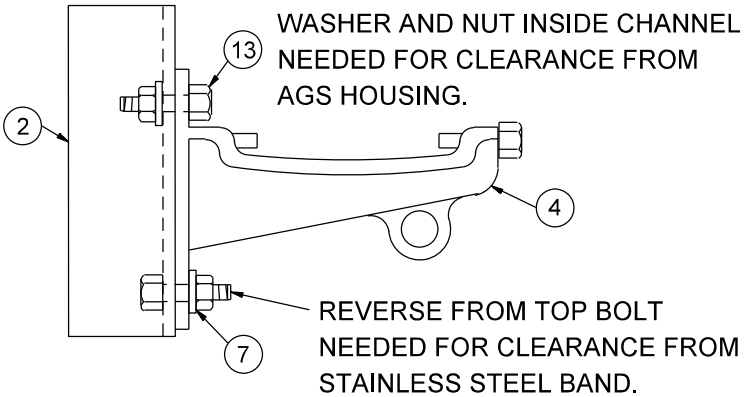
REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

NON-DRILLABLE
STEEL POLES SEE NOTE 4 ON PAGE 4-4-4

TA242TM	24 FIBER (0.419" TO 0.439" DIA.)
TA24TM	24 FIBER (0.537" TO 0.559" DIA.)
TA48TM	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA96TM	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA144TM	144 FIBER (0.667" TO 0.682" DIA.)
TA288TM	288 FIBER (0.667" TO 0.682" DIA.)

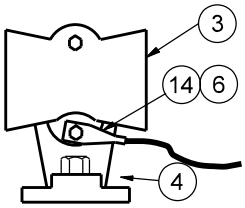
STEEL POLES FOR DEFLECTION ANGLES 0° TO 15°





WASHER AND NUT INSIDE CHANNEL NEEDED FOR CLEARANCE FROM AGS HOUSING.

REVERSE FROM TOP BOLT NEEDED FOR CLEARANCE FROM STAINLESS STEEL BAND.



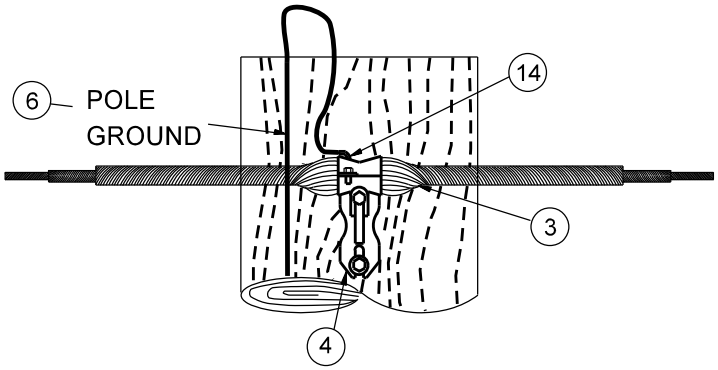
PLAN VIEW GROUNDING

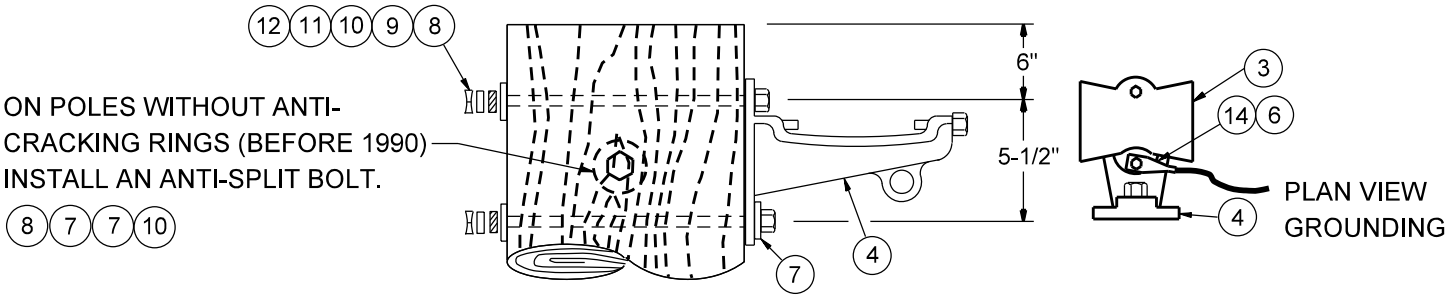
Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	TRANSMISSION OPGW TANGENT ASSEMBLY NON - DRILLABLE STEEL POLES TANGENT (0° TO 15°)	ISSUE DATE: 05/15/96 REV. DATE: 02/09/23 APPROVAL: E. LUBANDI
	4-4-2	8505E140.DGN

WOOD POLES

TA242W	24 FIBER (0.419" TO 0.439" DIA.)
TA24W	24 FIBER (0.537" TO 0.559" DIA.)
TA48W	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA96W	TA48OP, TA96OP, TA24OPIC FIBER (0.633" TO 0.666" DIA)
TA144W	144 FIBER (0.667" TO 0.682" DIA.)
TA288W	288 FIBER (0.667" TO 0.682" DIA.)

WOOD POLE FOR DEFLECTION ANGLES 0° TO 15°





Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION OPGW TANGENT ASSEMBLY WOOD POLES TANGENT (0° TO 15°)	ISSUE DATE: 08/15/96 REV. DATE: 12/09/23 APPROVAL: E. LUBANDI
	4-4-3	8505E141.DGN

BILL OF MATERIALS					
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**TA_WM QTY**	**TA_M QTY**	**TA_W QTY**
1	BAND, POLE 1 ¼" W X 180" L	5027473	0	2	0
2	MOUNT, BRACKET, 10" X 5"	5028962	0	1	0
3	SUPPORT ASSEMBLY, ARMOR GRIP (AGS)	NOTE 1	1	1	1
4	BRACKET, SINGLE TRUNNION AND FASTENER	5034469	1	1	1
5	CONNECTOR, GROUND	5034347*	1	1	0
6	WIRE, COPPER, #6 BARE	5033845	—	—	—
7	WASHER, ROUND, 1 ¾" OD X #10 GA.	5029173	1	1	1
8	BOLT, MACHINE, 5/8" X14" **	5027739	2	0	2
9	WASHER, SQUARE, FOR 5/8" BOLT	5029180	2	0	2
10	WASHER, DOUBLE COIL LOCK, 5/8"	5029168	0	0	2
11	NUT (SUPPLIED ON BOLT ITEM #8)		—	—	—
12	LOCKNUT, MF 5/8"	5028257	2	0	2
13	BOLT, HEX, 5/8" X 2 ½" (W/TRUNNION 5034469)		0	0	0
14	CONNECTOR, COMPRESSION, 2 AWG., STR.	5089794	0	0	1
15	WASHER, SPRING LOCK 5/8" BOLT	5029178	2	0	0

* IMPREST BIN ITEM

** BOLT LENGTH FOR CLASS H4 POLES.

NOTES

1. SUPPORT ASSEMBLY, ARMOR GRIP (AGS) – FOR EACH SIZE OPGW, THE MATERIAL ITEM IS:

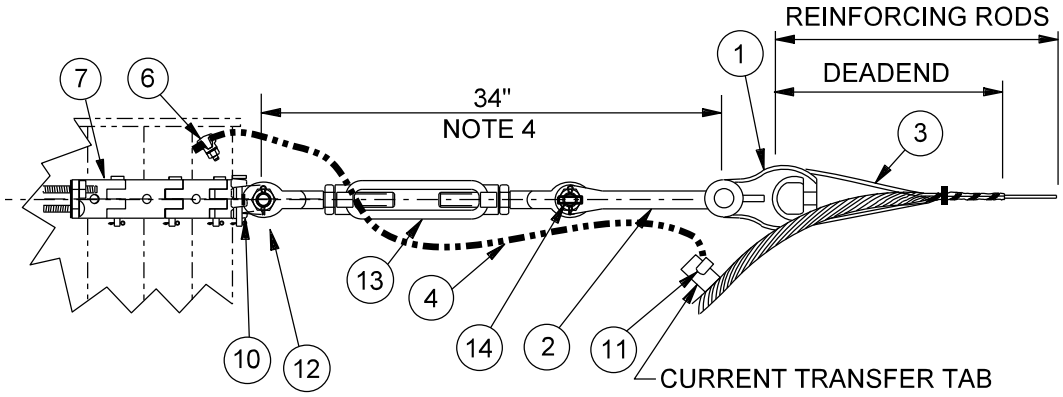
CU	MATERIAL ITEM	DULMISON (OBSOLETE) A (ROD)			DULMISON (OBSOLETE) B (REINFORCING ROD)			PREFORMED LINE A (ROD)			PREFORMED LINE B (REINFORCING ROD)		
		LENGTH	COLOR CODE	QTY	LENGTH	COLOR CODE	QTY	LENGTH	COLOR CODE	QTY	LENGTH	COLOR CODE	QTY
TA242 _ _	5035500	–	–	–	–	–	–	42"	BLACK	11	67"	BLACK	10
TA24 _ _	5035499	48"	GREEN	12	58"	BLACK	11	49"	GREEN	11	77"	GREEN	11
TA48 _ _	5035501	53"	BROWN	13	64"	YELLOW	13	63"	BLUE	11	94"	RED	11
TA96 _ _	5035501	53"	BROWN	13	64"	YELLOW	13	63"	BLUE	11	94"	RED	11
TA144 _ _	5035502	62"	PURPLE	11	72"	BLUE	14	63"	GREEN	11	94"	YELLOW	11
TA288_ _	5035502	62"	PURPLE	11	72"	BLUE	14	63"	GREEN	11	94"	YELLOW	11
TA432_ _	5035502	62"	PURPLE	11	72"	BLUE	14	63"	GREEN	11	94"	YELLOW	11
EACH MATERIAL ITEM INCLUDES THE ALUMINUM HOUSING, RUBBER INSERT, ARMOR RODS (A), AND REINFORCING RODS (B).													

2. FOR DEFLECTION ANGLES GREATER THAN 15°, USE DOUBLE DEADEND ASSEMBLY OR SUSPENSION ASSEMBLY.
3. ATTACH GROUND WIRE TO STEEL POLE GROUNDING NUT. IF POLE DOES NOT HAVE A GROUNDING NUT, DRILL AND TAP FOR ½" – 13 UNC BOLT.
4. THE STEEL POLE MAY BE DRILLED TO USE THE BOLTED TRUNNION IF IT IS EITHER WEATHERING OR GALVANIZED. ("W" OR "G" AT END OF POLE COMPATIBLE UNIT). IT MAY NOT BE DRILLED IF IT IS PAINTED OR METALIZED ("M" AT END OF POLE DESIGNATION.)

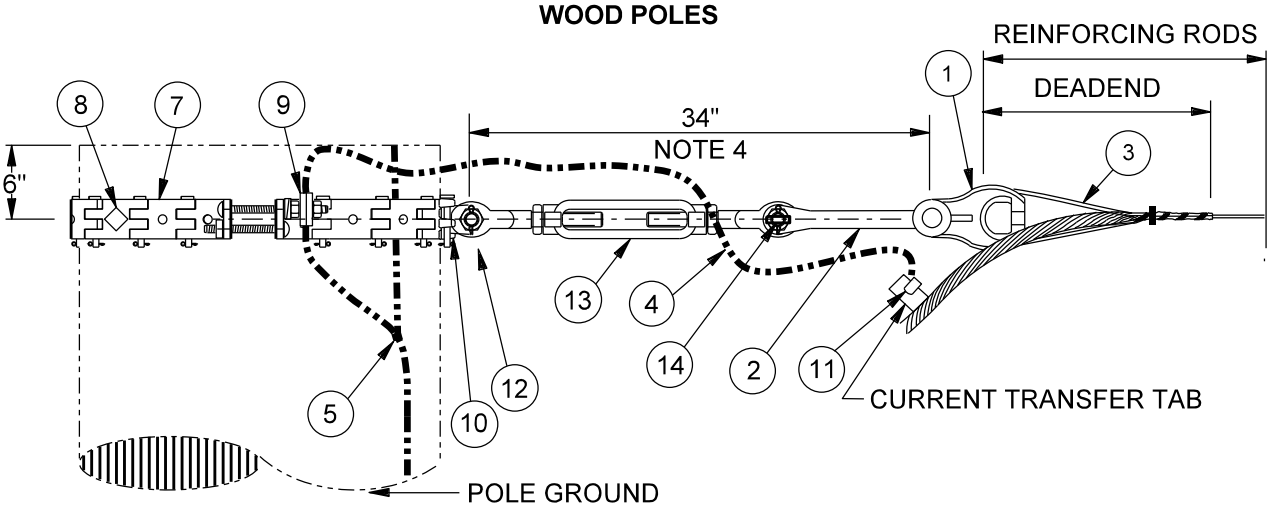
REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

WOOD POLE	TWM & TM SERIES STEEL POLE	
TA275W	TA275M	24 FIBER (0.505" TO 0.555" DIA.)
TA276W	TA276M	TA48OP, TA96OP, TA24OPIC FIBER (0.611" TO 0.680" DIA) 288 FIBER/432 FIBER (0.667" TO 0.682" DIA.)
TA277W	TA277M	144 FIBER (0.611" TO 0.680" DIA.) 288 FIBER/432 FIBER (0.667" TO 0.682" DIA.)
TA280W	TA280M	24 FIBER (0.40" TO 0.449" DIA.)

FOR TWM & TM SERIES STEEL POLES



WOOD POLES



MATERIAL ITEM	REINFORCING RODS LENGTH	DEADEND LENGTH
5035590	47.5"	42"
5035592	56"	49"
5035594	56"	49"
5035591	40.5"	36"

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION OPGW SINGLE DEADEND ASSEMBLY FIBER OPTIC GROUND WIRE	ISSUE DATE: 08/15/96 REV. DATE: 02/09/23 APPROVAL: E. LUBANDI
	4-5-1	8505E32.DGN

BILL OF MATERIALS				
ITEM	DESCRIPTION	MATERIAL ITEM	QUANTITY	
			TA2_M	TA2_W
1	THIMBLE - CLEVIS	5029157	1	1
2	EXTENSION LINK 14" 10,000 LBS.	5034722	1	1
3	DEADEND WIRE WRAP FOR OPGW	NOTE 3	1	1
4	WIRE, COPPER, #6 BARE, SOFT DRAWN	5033845	—	—
5	CONNECTOR, COMP. COPPER, 2SOL – 2STR TO 8SOL – 4SOL	5033933*	—	1
6	CONNECTOR, GROUND, #2 ST - #3/0 SOL, ½" STUD	5016613	1	—
7	LINK BAND ASSEMBLY, 40" CIRC.	5028719	1	1
8	SCREW, LAG, ½" X 4", FETTER DRIVE	5028003	—	1
9	CLIP, GROUND, FOR 5/8" BOLTS	5028897	—	1
10	VANG, VERTICAL PI LINK	5029395	1	1
11	CONNECTOR, GROUND, #10 SOL TO #1 STR, CU	5034347	1	1
12	CLEVIS – CLEVIS (NOTE 4)	5028894	—	—
13	TURNBUCKLE, CLEVIS CLEVIS	5016930	1	1
14	LINK, CHAIN	5034734	1	1

* IMPREST BIN ITEM

NOTES

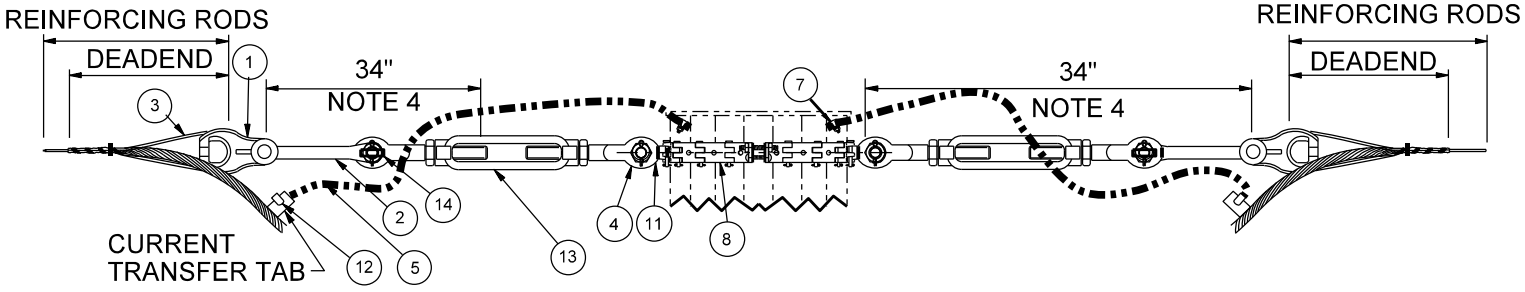
1. ATTACH GROUND WIRE STEEL POLE GROUNDING NUT. IF POLE DOES NOT HAVE GROUNDING NUT, DRILL AND TAP FOR ½" – 13 UNC BOLT.
2. REFER TO THE 69 KV CONSTRUCTION STANDARDS TA85 FOR INSTALLATION DETAILS OF LINK-TYPE POLE BANDS.
3. TA275__(5035590), TA276__(5035592), TA277__(5035594), TA280__(5035591)
4. FOR TA280WV THIS DIMENSION IS 17 5/8". THE STRAP (14") AND THIMBLE CLEVIS IS INCLUDED IN MATERIAL ITEM 5035591. THE CLEVIS – CLEVIS ARE IN THESE COMPATIBLE UNITS ONLY.

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

WOOD POLE	TWM & TM SERIES *STEEL POLE	
TA275WV	TA275MV	24 FIBER (0.505" TO 0.555" DIA.)
TA276WV	TA276MV	TA48OP, TA96OP, TA24OPIC FIBER (0.611" TO 0.680" DIA)
TA277WV	TA277MV	144 FIBER (0.611" TO 0.680" DIA.) 288 FIBER/432 FIBER (0.667" TO 0.682" DIA.)
TA280WV	TA280MV	24 FIBER (0.40" TO 0.449" DIA.)

***STEEL POLES**

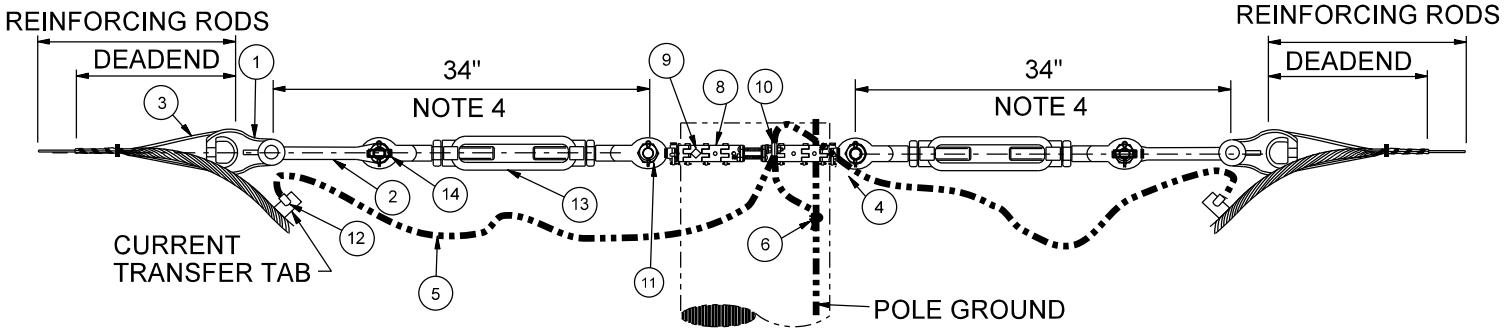
FOR STEEL POLES WITH VANGS OR ARMS, ADD SUFFIX "N" TO THE COMPATIBLE UNIT CODE TO OMIT LINK BANDS.



NOTES

1. DUAL GROUNDS ARE ONLY NEEDED IF THE OPGW IS CUT AT THE POLE SUCH AS FOR A DROP TO A SPLICE CASE.

WOOD POLES



Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TRANSMISSION OPGW DOUBLE DEADEND ASSEMBLY FIBER OPTIC GROUND WIRE	ISSUE DATE: 08/15/96 REV. DATE: 02/09/23 APPROVAL: E. LUBANDI
	4-6-1	8505E162.DGN

BILL OF MATERIALS				
ITEM	DESCRIPTION	MATERIAL ITEM	QUANTITY	
			TA2_MV	TA2_WV
1	THIMBLE-CLEVIS	5029157	2	2
2	STRAP, EXTENSION, LINK 14" 10,000LBS.	5034722	2	2
3	DEADEND WIRE WRAP FOR OPGW	NOTE 3	2	2
4	CLEVIS – CLEVIS (NOTE 4)	5028894	—	—
5	WIRE, COPPER, #6 BARE, SOFT DRAWN		—	—
6	CONNECTOR, COMP. COPPER, 2SOL – 2STR TO 8SOL – 4STR	5033845*	—	1
7	CONNECTOR, GROUND, #2 ST - #3/0 SOL, ½" STUD	5016613	2	—
8	LINK BAND ASSEMBLY, 40" CIRC.	5028719	1	1
9	SCREW, LAG, ½" X 4", FETTER DRIVE	5028003	—	1
10	CLIP, GROUND, FOR 5/8" BOLTS	5028897	—	1
11	VANG, VERTICAL PI LINK	5029395	2	2
12	CONNECTOR, GROUND, #10 SOL TO #1 STR, CU, ½" STUD	5034347	2	2
13	TURNBUCKLE, CLEVIS CLEVIS	5016930	2	2
14	LINK, CHAIN	5034734	2	2

* IMPREST BIN ITEM

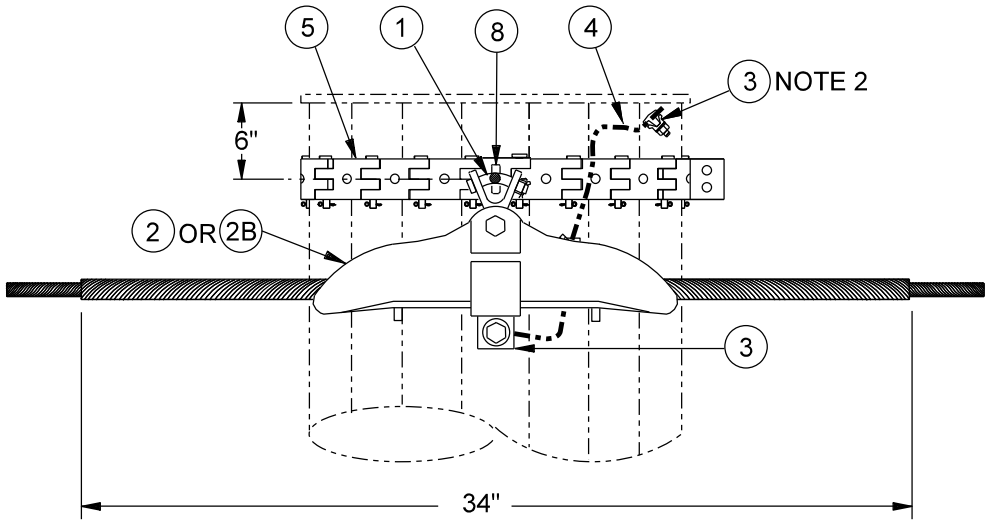
NOTES

1. ATTACH GROUND WIRE TO STEEL POLE GROUNDING NUTS. IF POLE DOES NOT HAVE GROUNDING NUT, DRILL AND TAP FOR ½" – 13 UNC BOLT.
2. SEE TA85 FOR INSTALLATION DETAILS OF LINK-TYPE POLE BANDS.
3. TA275__(5035590), TA276__(5035592), TA277__(5035594), TA280__(5035591)
4. FOR TA280WV AND TA280MV THIS DIMENSION IS 17 5/8". THE STRAP (14") AND THIMBLE CLEVIS IS INCLUDED IN MATERIAL NUMBER 5035591. THE CLEVIS – CLEVIS ARE IN THESE COMPATIBLE UNITS ONLY.

STEEL POLE

* TA28M 24 FIBER, (0.400" TO 0.449" DIA. OPGW)

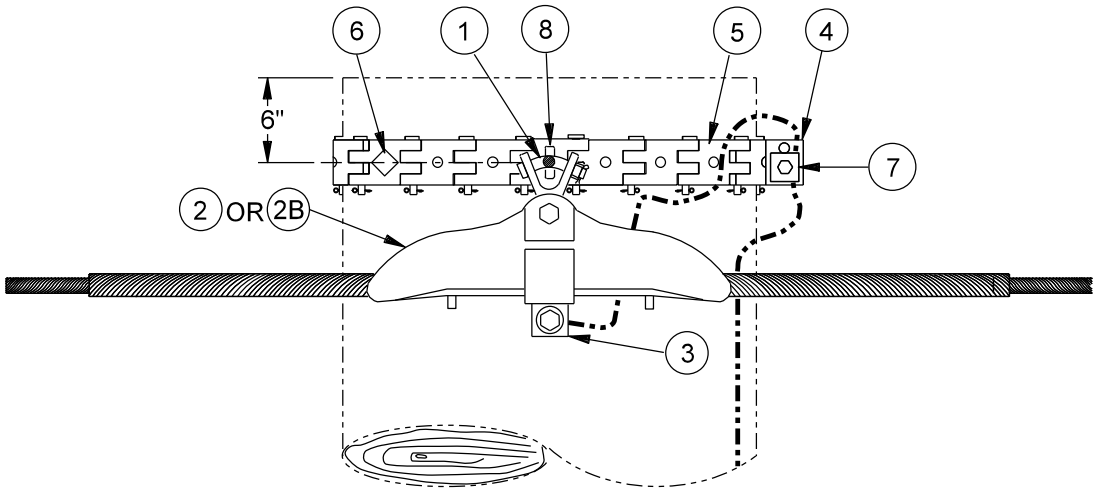
STEEL POLES FOR LINE OR ELEVATION CHANGES OF 0° - 30°



WOOD POLE

* TA28W 24 FIBER, (0.400" TO 0.449" DIA. OPGW)

WOOD POLES FOR LINE OR ELEVATION CHANGES OF 0° - 30°



* FOR REPLACEMENT WHEN A SUSPENSION APPLICATION EXISTS. TA242 _ _ _ IS THE PREFERRED STANDARD.

Communications Design & Construction Standards PROPRIETARY MATERIAL	TRANSMISSION OPGW SUSPENSION ASSEMBLY STEEL AND WOOD POLES 0.425" DIAMETER 24 FIBER FIBER OPTIC GROUND WIRE	ISSUE DATE: 07/22/08 REV. DATE: 01/06/23 APPROVAL: E. LUBANDI
	4-7-1	8505E109.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW AND FACILITIES.

BILL OF MATERIALS				
ITEM	DESCRIPTION	MATERIAL ITEM	QUANTITY	
			TA28M	TA28W
1	Y-CLEVIS NOTE 1 AND 5	5035496	1	1
2	SUSPENSION ASSEMBLY		1	1
2B	SUSPENSION ASSEMBLY, CGS (TA24OP)	5093658	1	1
3	CONNECTOR, GROUND	5034347*	2	1
4	WIRE, COPPER, #6 BARE	5033845	10	10
5	LINK BAND ASSEMBLY	5028719	1	1
6	SCREW, LAG, ½" X 4"	5028003	0	1
7	CLIP, GROUND, FOR 5/8" BOLTS	5028897	0	1
8	VANG, VERTICAL	5029395	1	1

** IMPREST BIN ITEM*

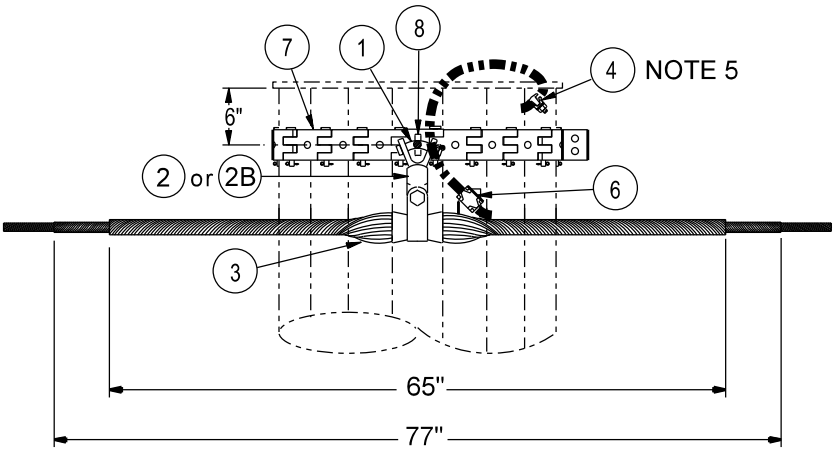
NOTES

1. 5035496 INCLUDES SUSPENSION (ITEM 2) AND Y-CLEVIS (ITEM 1) AND THE ARMOR RODS.
2. ATTACH GROUND WIRE TO STEEL POLE GROUNDING NUT. IF POLE DOES NOT HAVE GROUNDING NUT, DRILL AND TAP FOR ½" – 13 UNC BOLT.
3. UNLESS OTHERWISE NOTED, BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED AWAY FROM THE STRUCTURE.
4. REFER TO 69 KV CONSTRUCTION STANDARDS TA85 FOR INSTALLATION DETAILS OF LINK-TYPE POLE BANDS.
5. 5035496 IS KEPT ALIVE FOR EMERGENCY REPLACEMENT AND FOR USE IN APPLICATIONS OTHER THAN SHOWN ON THIS STANDARD.
6. ADD SUFFIX “C” TO CU TO GET THE PREFORMED CUSHION GRIP SUPPORT.

NON-DRILLABLE
STEEL POLE

TA270M	24 FIBER (0.537" TO 0.559" DIA.)
TA271M	TA48OP, TA96OP, TA144OP, TA24OPIC FIBER (0.633" TO 0.652" DIA)
TA272M	288 FIBER (0.646" TO 0.627" DIA.)

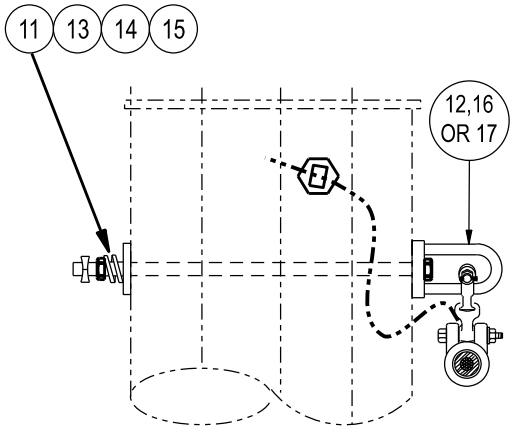
STEEL POLES FOR DEFLECTION ANGLES 15° - 30°

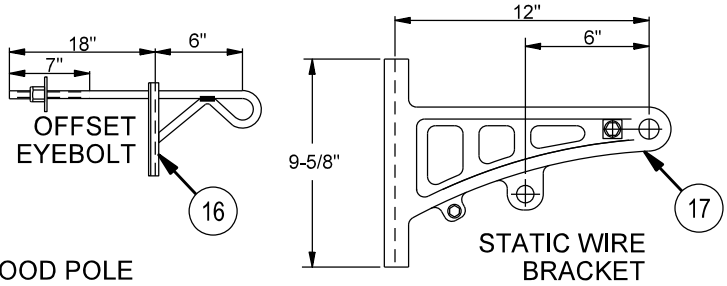


DRILLABLE
STEEL POLE

TA270ML	24 FIBER (0.537" TO 0.559" DIA.)
TA271ML	TA48OP, TA96OP, TA144OP, TA24OPIC FIBER (0.633" TO 0.652" DIA)
TA272ML	96OPS/288/432 FIBER (0.646" TO 0.627" DIA.)

FOR DEFLECTION ANGLES 15° - 30°

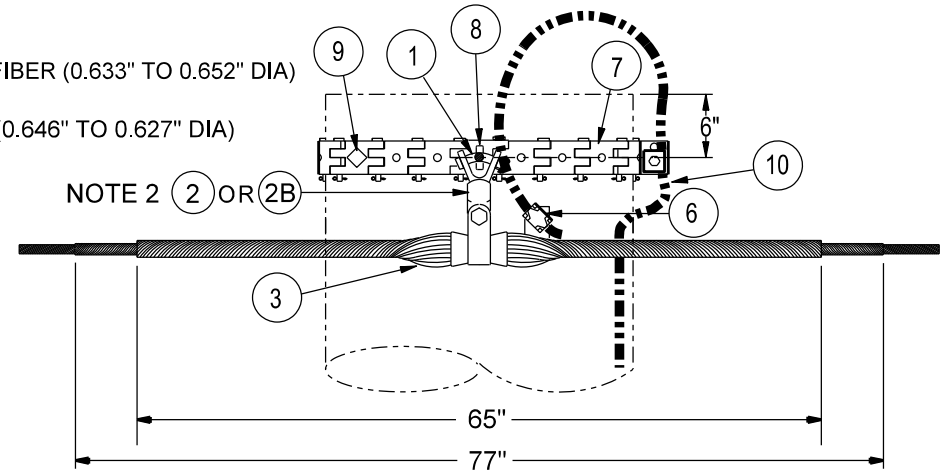




WOOD POLE

TA270W	24 FIBER (0.537" TO 0.559" DIA.)
TA271W	TA48OP, TA96OP, TA44OP, TA24OPIC FIBER (0.633" TO 0.652" DIA)
TA272W	TA96OPS, TA288OP, TA432OP FIBER (0.646" TO 0.627" DIA)

FOR DEFLECTION ANGLES 15° - 30°



Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	TRANSMISSION OPGW SUSPENSION ASSEMBLY STEEL AND WOOD POLES DEFLECTION ANGLES 15° - 30° FIBER OPTICAL GROUND WIRE	ISSUE DATE: 08/21/18 REV. DATE: 02/09/23 APPROVAL: E. LUBANDI
	4-8-1	8505E138.DGN

BILL OF MATERIALS					
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**TA_M QTY**	**TA_W QTY**	**TA_ML QTY**
1	Y-CLEVIS/BALL	5028913	1	1	1
2	SOCKET EYE	5034216	1	1	1
2B	SUSPENSION ASSEMBLY, CGS (TA24OP)	5093658	1	1	1
	SUSPENSION ASSEMBLY, CGS (TA48OP & TA96OP)	5093096	1	1	1
	SUSPENSION ASSEMBLY, CGS (TA288OP)	5091558	1	1	1
3	SUSPENSION ASSEMBLY, ARMOR GRIP (AGS)	NOTE 1	1	1	1
4	CONNECTOR, GROUND	5034347*	1	—	1
5	WIRE, COPPER, #6 BARE	5033845	—	—	—
6	CONNECTOR, TERMINAL	5016724*	1	1	1
7	LINK BAND ASSEMBLY	5028719	1	1	—
8	VANG, VERTICAL	5029395	1	1	—
9	SCREW, LAG, ½" X 4"	5028003*	—	1	—
10	CLIP, GROUND, FOR 5/8" BOLT	5028897	—	1	—
11	BOLT, MACHINE, 5/8" X 14" **	5027739*	—	—	1
12	BOLT - EYE	5028908*	—	—	1
13	LOCKNUT, MF 5/8"	5028257*	—	—	1
14	WASHER, DOUBLE COIL LOCK, 5/8"	5029168*	—	—	1
15	WASHER, SQUARE, FOR 5/8" BOLT	5029180*	—	—	1
16	BRACKET, OFFSET	5092495	—	—	1
17	BRACKET, OFFSET	5093316	—	—	1

* IMPREST BIN ITEM

** BOLT LENGTH FOR CLASS H4 POLES.

NOTES

1. SUSPENSION ASSEMBLY, ARMOR GRIP (AGS) – FOR EACH OPGW, THE MATERIAL ITEM NUMBER IS:

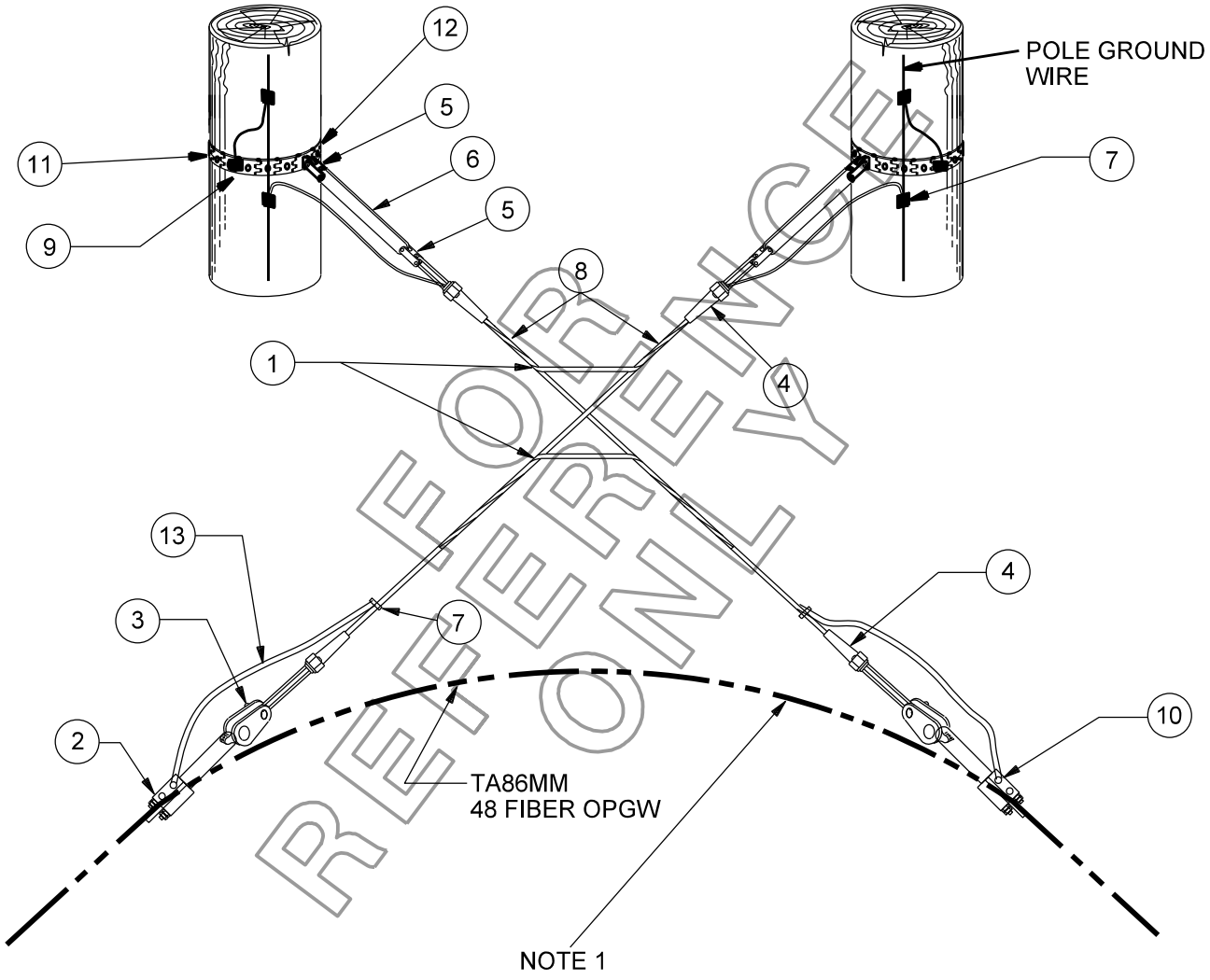
PREFORMED LINE PRODUCTS							
COMPATIBLE UNIT	**MATERIAL ITEM**	**A (ROD)**			**B (REINFORCING ROD)**		
		LENGTH	**COLOR CODE**	**QTY**	**LENGTH**	**COLOR CODE**	**QTY**
TA270_	5035495	49"	GREEN	11	77"	GREEN	11
TA271_	5035497	63"	BLUE	11	94"	RED	11
EACH MATERIAL ITEM NUMBER INCLUDES THE ALUMINUM HOUSING, RUBBER INSERT, ARMOR RODS (A), AND REINFORCING RODS (B).							

2. Y-CLEVIS EYE MUST ARTICULATE IN AGS. DO NOT OVERTIGHTEN THE BOLT THROUGH THE STRAP.
3. UNLESS OTHERWISE NOTED, BOLTS AND PINS SHALL HAVE NUTS AND COTTERS FACED AWAY FROM STRUCTURE.
4. FOR DEFLECTION ANGLES GREATER THAN 30°, USE DOUBLE DEADEND ASSEMBLY.
5. ATTACH GROUND WIRE TO STEEL POLE GROUNDING NUT. IF IT'S NOT PRESENT, DRILL AND TAP FOR ½" – 13 UNC BOLT.
6. REFER TO 69KV CONSTRUCTION STANDARDS TA85 FOR INSTALLATION DETAILS OF LINK-TYPE POLE BANDS.

7. THE STEEL POLE MAY BE DRILLED TO USE BOLTED ASSEMBLY IF IT IS EITHER WEATHERING OR GALVANIZED. (“W” OR “G” AT END OF POLE DESIGNATION.) DO NOT DRILL IF PAINTED OR METALIZED (“M” AT END OF POLE DESIGNATION.)
8. ADD SUFFIX “E” TO SPECIFY OFFSET EYE-BOLT INSTEAD OF THE STANDARD EYE-BOLT TO MITIGATE MECHANICAL SUSPENSION CONTACT WITH POLE. 14” EXTENSION OPTION 5093194.
9. ADD SUFFIX “EX” TO SPECIFY STATIC WIRE BRACKET OPTION 5093316.
10. ADD SUFFIX “HE” TO SPECIFY OFFET EYE-BOLT INSTEAD OF THE STANDARD EYE-BOLT TO MITIGATE MECHANICAL SUSPENSION CONTACT WITH POLE. 18” EXTENSION OPTION 5092495.
11. ADD SUFFIX “C” TO CU TO GET THE PREFORMED CUSHION GRIP SUPPORT.

(MODIFIED)
2-WAY TENSION-AERIAL CORNER 90° TA86MM - 48 FIBER COMMUNICATIONS OPGW

TA4XPW



NOTES

1. CONSTRUCT TO ALLOW FOR MINIMUM BENDING RADIUS OF FIBER OPTIC CABLE. SEE SECTION 1 FOR OPGW CHARACTERISTICS.
2. LINK-TYPE POLE BAND ASSEMBLIES ARE FOR 13" - 14.5" POLE DIAMETER. REFER TO 69 KV CONSTRUCTION STANDARDS, TA85 FOR PARTS NEEDED TO INCREASE DIAMETERS.

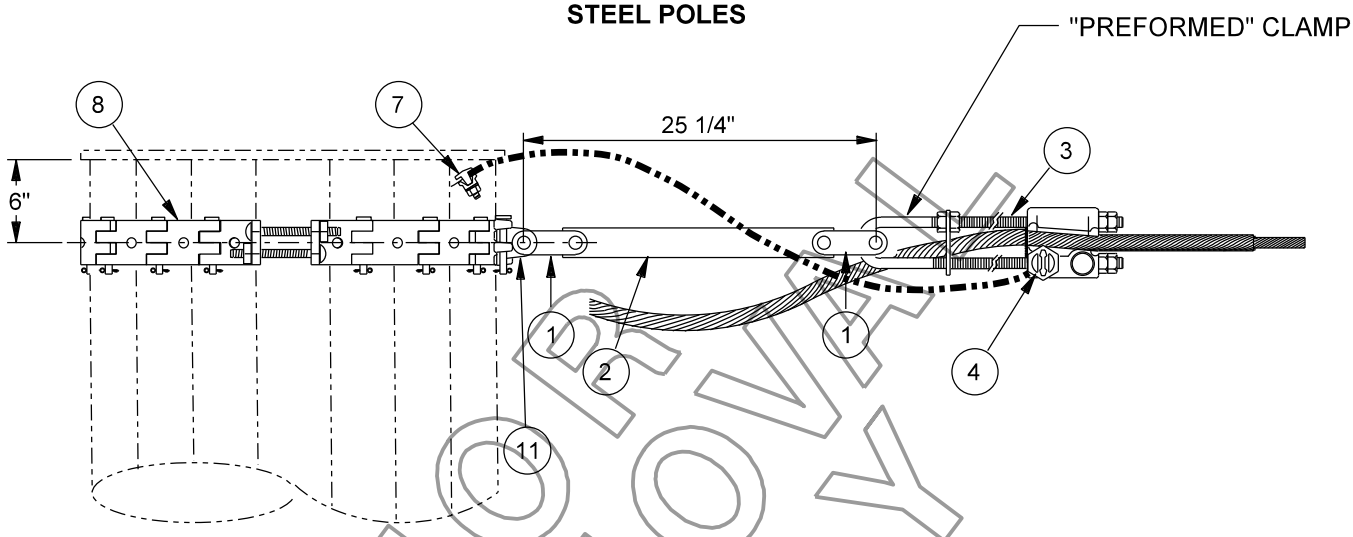
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	TRANSMISSION 90° OPGW AERIAL CORNER 48 FIBER WOOD POLE	ISSUE DATE: 06/25/96 REV. DATE: 06/16/13 APPROVAL: W. LARAMIE
	4-9-1	8505E48.DGN

90° OPGW AERIAL CORNER
48 FIBER WOOD POLE

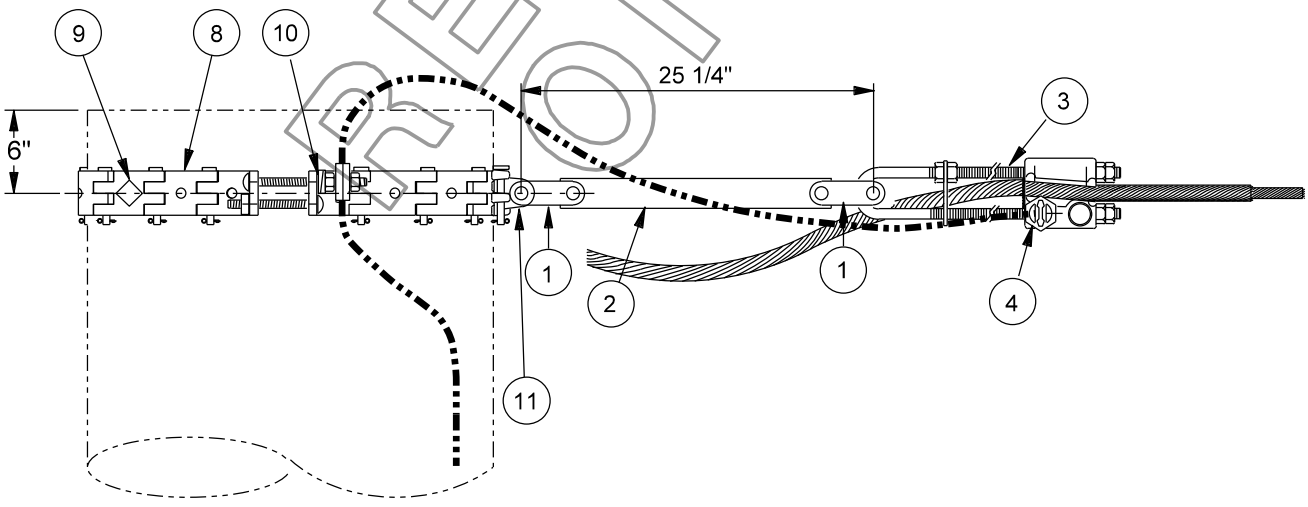
BILL OF MATERIAL			
ITEM #	**DESCRIPTION**	**MATERIAL ITEM NO.**	**QTY**
1	GRIP, $^3/_8$"	58-5450	4
2	CLAMP, OPGW, 48 FIBER	59-0825	2
3	CLEVIS, THIMBLE	58-9312	2
4	CLAMP, AUTOMATIC, $^3/_8$"	58-4560	4
5	CLEVIS/CLEVIS	58-4685	4
6	STRAP, EXTENSION, 18"	59-7642	2
7	CLIP, WIRE ROPE, $^3/_8$"	59-5070	4
8	WIRE, GUY, $^3/_8$"	59-9720	50
9	CLIP, GROUND	58-4892	2
10	CONNECTOR, SEPUIT POST	26-1820	2
11	POLE BAND, LINK TYPE, TA85	57-1298	2
12	VANG, VERTICAL	57-9305	2
13	WIRE, COPPER, #6	59-8320	15

WOOD POLE	TWM & TM SERIES STEEL POLE	
TA275W	TA275M	24 FIBER (0.550" TO 0.599" DIA.)
TA276W	TA276M	48 FIBER (0.611" TO 0.649" DIA.)
TA277W	TA277M	144 FIBER (0.662" TO 0.677" DIA.)
	TA278M	144 FIBER (0.611" TO 0.649" DIA.)

STEEL POLES



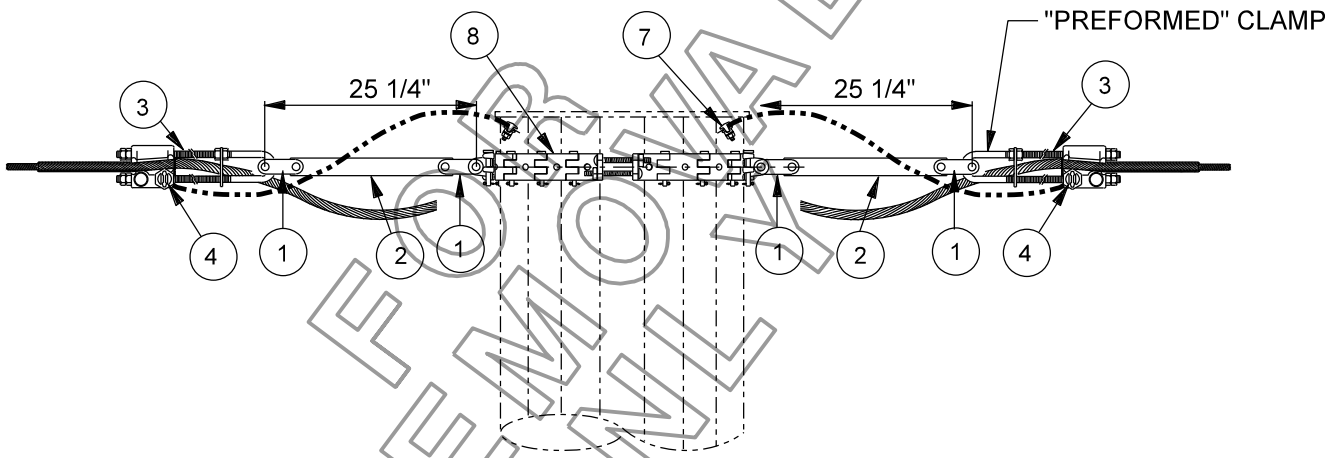
WOOD POLES



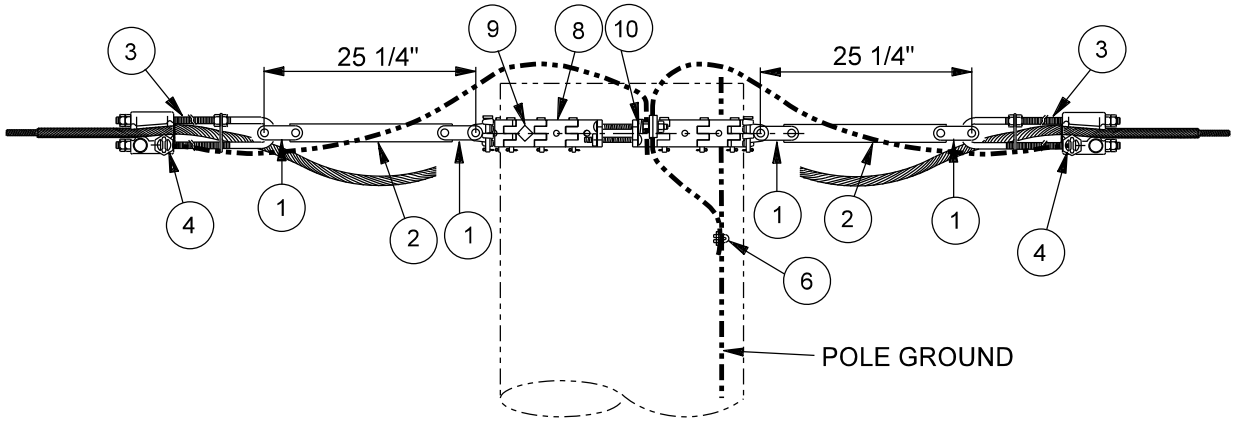
Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	TRANSMISSION OPGW DEADEND ASSEMBLY TWM SERIES STEEL POLES FIBER OPTIC GROUND WIRE	ISSUE DATE: 01/12/06 REV. DATE: 07/29/13 APPROVAL: W. LARAMIE
	4-10-1	8505E106.DGN

WOOD POLE	TWM & TM SERIES STEEL POLE	
TA275WV	TA275MV	24 FIBER (0.550" TO 0.599" DIA.)
TA276WV	TA276MV	48 FIBER (0.611" TO 0.649" DIA.)
TA277WV	TA277MV	144 FIBER (0.662" TO 0.677" DIA.)

STEEL POLES



WOOD POLES



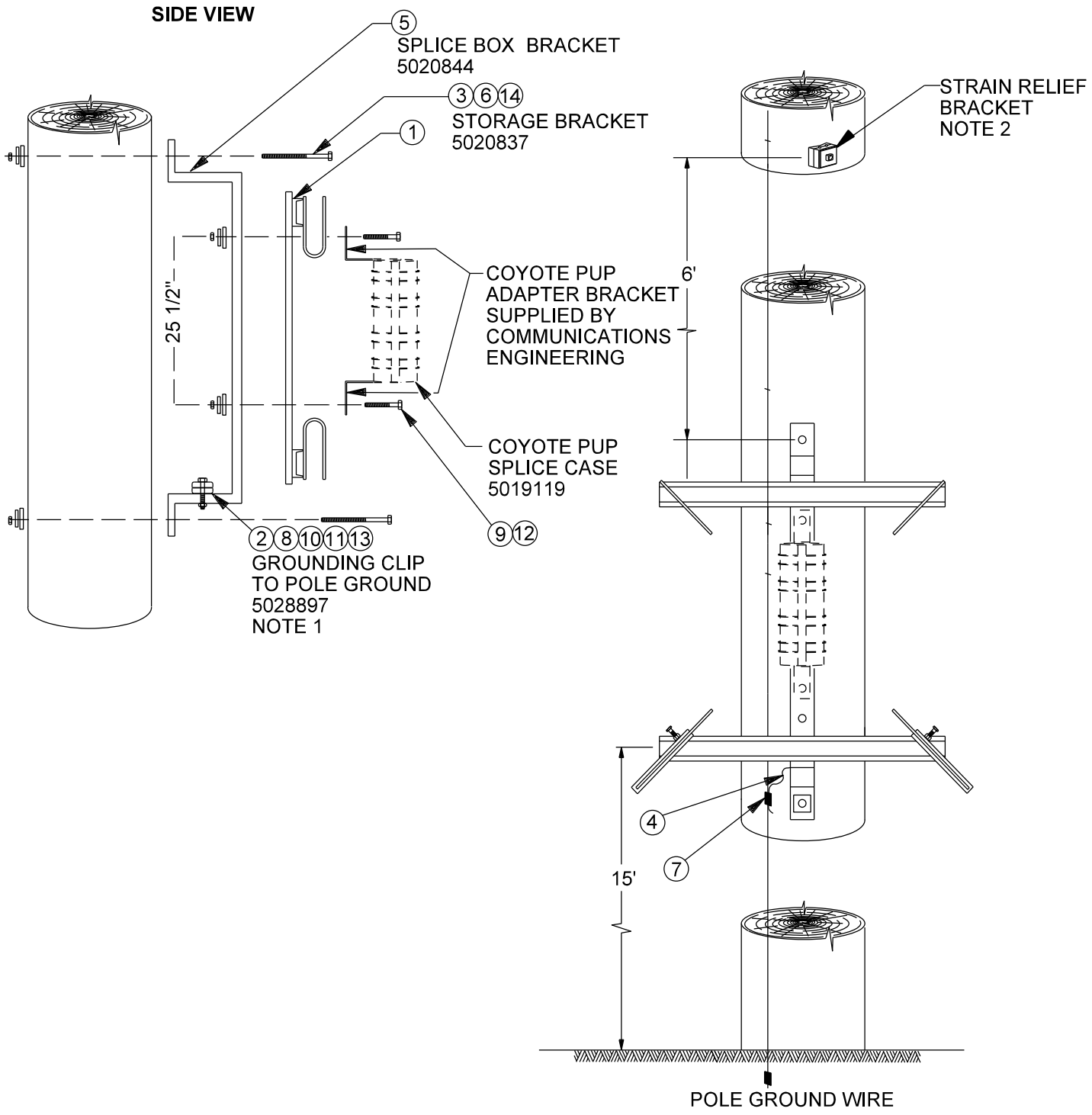
Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	TRANSMISSION OPGW DOUBLE DEADEND ASSEMBLY RETIREMENT ONLY FIBER OPTIC GROUND WIRE	ISSUE DATE: 08/15/96 REV. DATE: 07/29/13 APPROVAL: W. LARAMIE
	4-11-1	8505E105.DGN

SECTION 5: SPLICE CASES

TITLE / DESCRIPTION **PAGE**

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

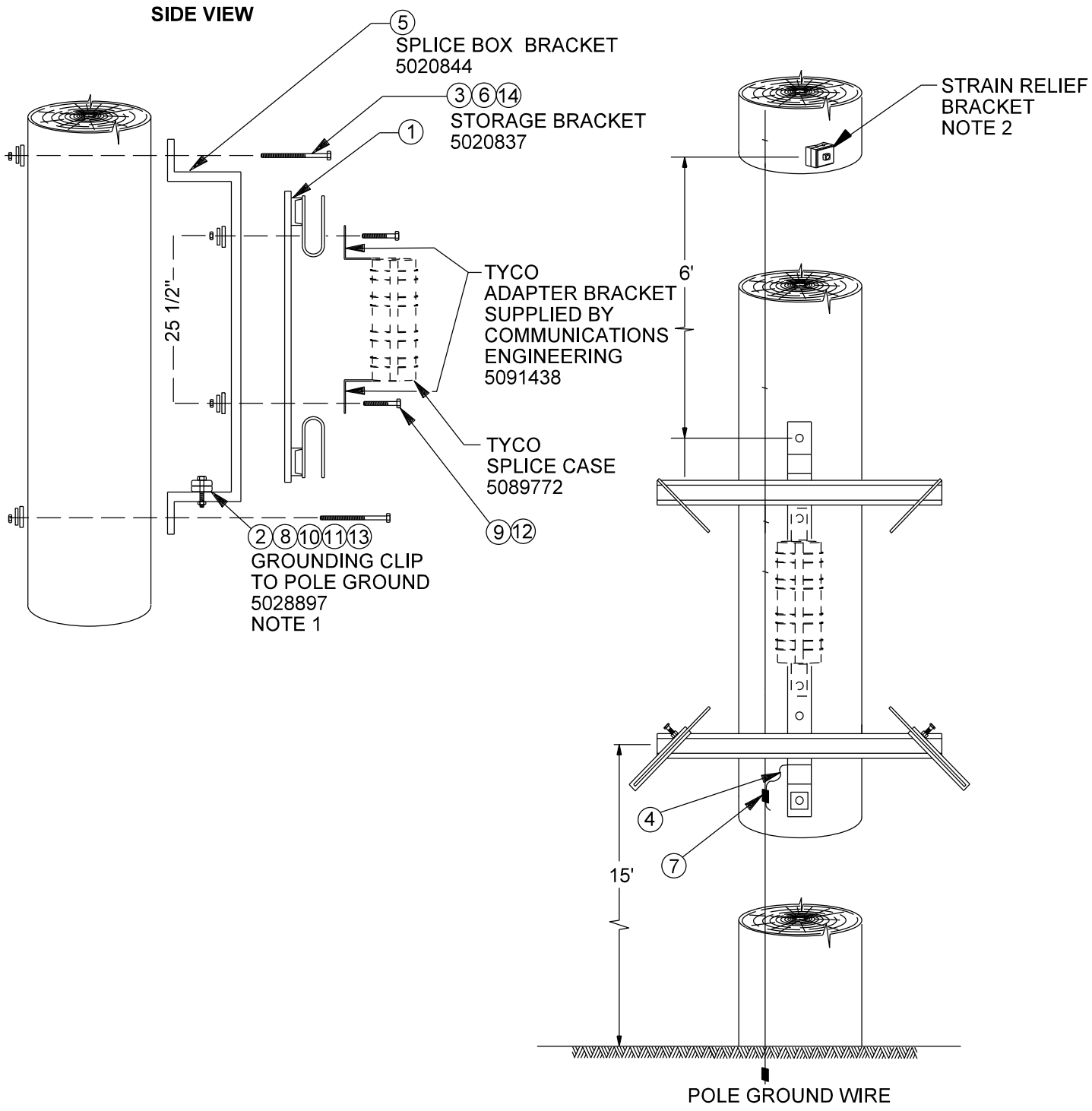
BKRACKW



Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL		
	SPLICE CASES FIBER STORAGE BRACKET WITH SPLICE CASE BOLTED TO WOOD POLE	ISSUE DATE: 05/16/11 REV. DATE: 06/27/13 APPROVAL: W. LARAMIE
	5-1-1	8505E54.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKRACKT



Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	TYCO SPLICE CASES FIBER STORAGE BRACKET WITH SPLICE CASE BOLTED TO WOOD POLE	ISSUE DATE: 05/16/11 REV. DATE: 12/03/20 APPROVAL: E. LUBANDI
	5-1-2	8505E195.DGN

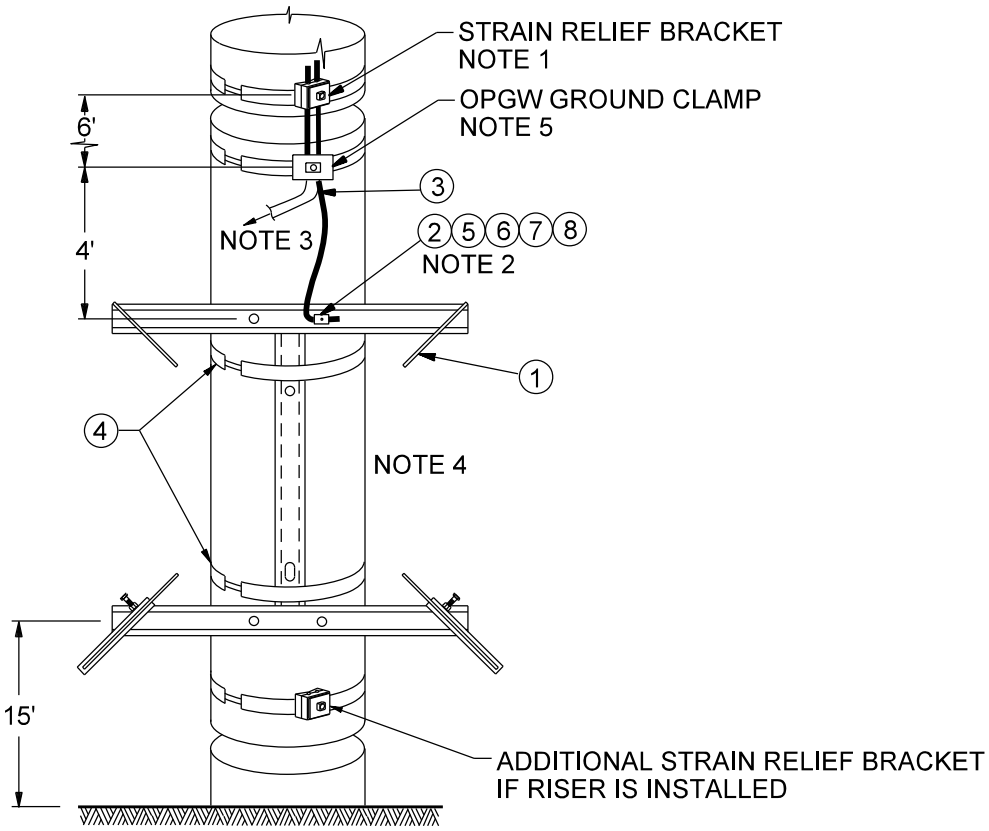
BILL OF MATERIALS – BKRACKW			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	BRACKET	5020837	1
2	GROUND CLIP, 5/8" NUT INCLUDED	5028897	1
3	BOLT, 5/8" X 20", HOT DIP GALVANIZED	5027742	2
4	#6 BARE COPPER	5033845	6
5	BRACKET, SPLICE CASE	5020844	1
6	WASHER, SQUARE, 2-¼" X 2-¼" X 3/16" HOT DIP GALV.	5029180	2
7	CONNECTOR, COMPRESSION	5033933	1
8	WASHER FLAT ½"	5004963	1
9	WASHER SPRING $^5/_8$"	5029178	2
10	BOLT, HEX, ½" X 2-¾"	5069534	1
11	NUT, HEX, ½"	5069398	1
12	BOLT, HEX, $^5/_8$" X 4", HOT DIP GALVANIZED	5027732	2
13	WASHER, LOCK, ½"	5029177	1
14	WASHER, LOCK, $^5/_8$" DBL COIL	5029168	2

NOTES

1. THE STORAGE BRACKET IS BONDED TO THE POLE GROUND WIRE.
2. STRAIN RELIEF BRACKETS MUST BE PLACED EVERY 6' UP THE POLE. THESE MUST BE ORDERED IN ADDITION TO BKRACKW. SEE SECTION 3 – STRAIN RELIEF BRACKETS.
3. LEAVE 80' OF TAIL COILED ON BRACKET FOR THE FIBER SPLICE CREW. USE BLACK TAPE TO SECURE THE CABLE TO THE BRACKET.
4. DO NOT PLACE THE POLE-MOUNTING BOLTS BETWEEN THE HORIZONTAL CROSS MEMBERS OF THE BRACKET. THIS SPACE AND THE HOLES ARE NEEDED FOR MOUNTING THE SPLICE CASE.

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKRACKD



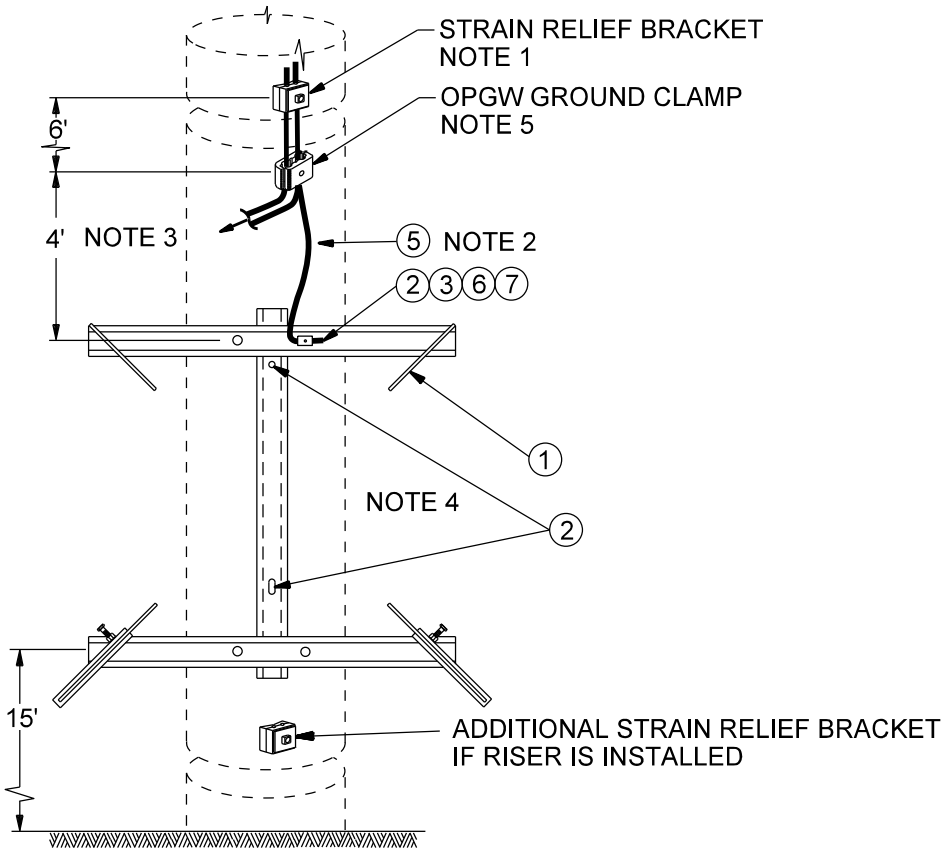
BILL OF MATERIALS - BKRACKS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	BRACKET	5020837	1
2	GROUND CLIP, 5/8" NUT INCLUDED	5028897	2
3	#6 BARE COPPER	5033845	5
4	BAND, STAINLESS STEEL	5027473	2
5	BOLT, HEX, 1/2" X 2-3/4"	5069534	1
6	NUT, HEX, 1/2"	5069398	1
7	WASHER, LOCK, 1/2"	5029177	1
8	WASHER, FLAT, 1/2"	5004963	1

NOTES

1. STRAIN RELIEF BRACKETS MUST BE PLACED EVERY 6' UP THE POLE. THESE MUST BE ORDERED IN ADDITION TO BKRACKD. SEE STRAIN RELIEF BRACKETS, SECTION 3.
2. THE OPGW IS USED TO GROUND THE STORAGE BRACKET.
3. LEAVE 80' OF TAIL COILED ON BRACKET FOR THE FIBER SPLICE CREW. USE BLACK TAPE TO SECURE THE CABLE TO THE BRACKET.
4. FOR USE ON METALIZED OR PAINTED STEEL POLES.
5. THESE MUST BE ORDERED IN ADDITION TO BKRACKD. SEE OPTIONS FOR THIS CLAMP IN SECTION 3 - GROUNDING BRACKET, OPGW.

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKRACKS



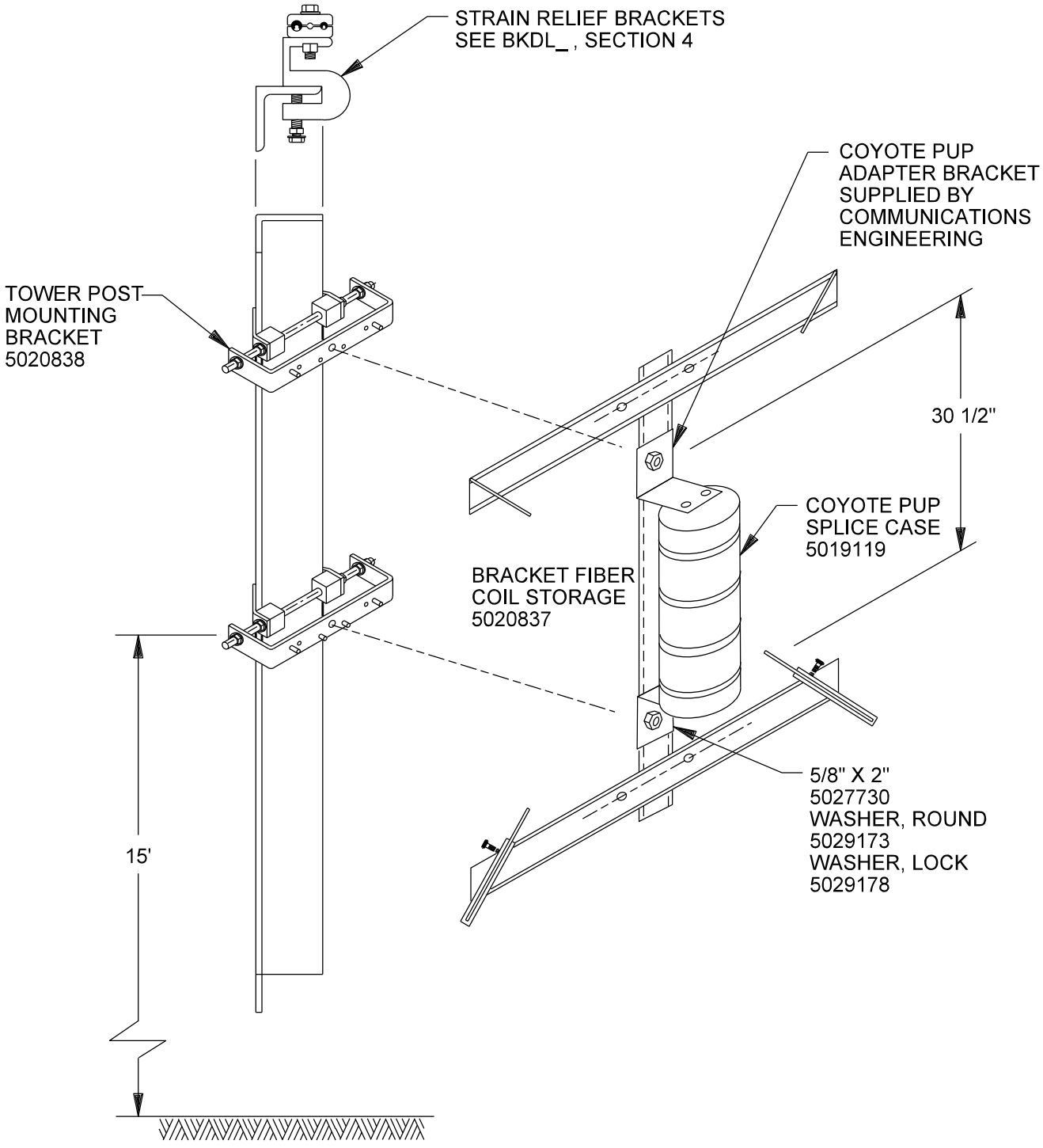
BILL OF MATERIALS - BKRACKS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	BRACKET	5020837	1
2	BOLT, HEX, 1/2" X 2-3/4"	5069534	3
3	NUT, HEX, 1/2"	5069398	1
4	GROUND CLIP	5028897	1
5	#6 BARE COPPER	5033845	6
6	WASHER, LOCK, 1/2"	5029177	1
7	WASHER, FLAT, 1/2"	5064963	2

NOTES

1. STRAIN RELIEF BRACKETS MUST BE PLACED EVERY 6' UP THE POLE. THESE MUST BE ORDERED IN ADDITION TO BKRACKS. SEE STRAIN RELIEF BRACKETS, SECTION 3.
2. THE OPGW GROUND CLIP IS USED TO GROUND THE STORAGE BRACKET.
3. LEAVE 80' OF TAIL COILED ON BRACKET FOR THE FIBER SPLICE CREW. USE BLACK TAPE TO SECURE THE CABLE TO THE BRACKET.
4. DO NOT USE BKRACKS ON METALIZED OR PAINTED POLES.
5. THESE MUST BE ORDERED IN ADDITION TO BKRACKS. SEE OPTIONS FOR THIS CLAMP IN SECTION 3 - GROUNDING BRACKET, OPGW.

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS
WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKRACKL

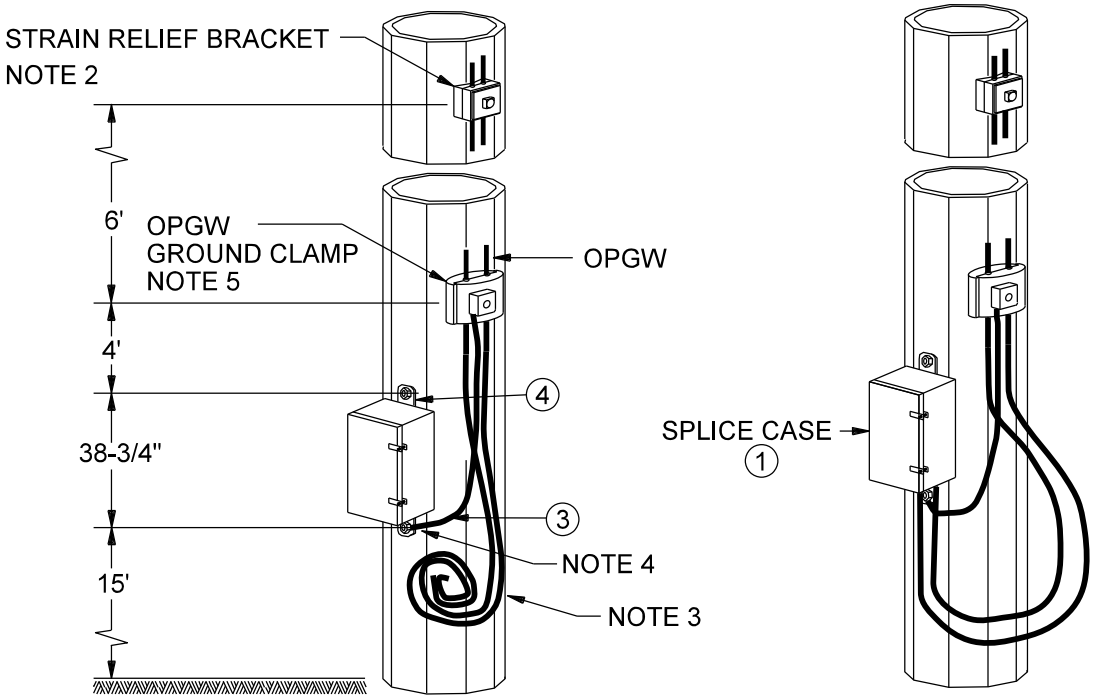


Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL	SPLICE CASES FIBER STORAGE BRACKET ON WINDSOR TOWER POST MOUNTING BRACKET	ISSUE DATE: 07/02/13 REV. DATE: APPROVAL: W. LARAMIE
	5-4-1	8505E131.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKS6ST

INSTALLED BY LINE CREW **FINAL SPLICED CONFIGURATION**



BILL OF MATERIALS - BKS6ST			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	SRP 12 X 36 FIBER SPLICE CASE	5020845	1
2	GROUND CLIP	5028897	1
3	#6 BARE COPPER	5033845	6
4	BOLT, MACHINE, 5/8" X 3"	5027731	2
5	BOLT, 1/2" X 2-3/4"	5069534	1
6	WASHER, LOCK, 1/2"	5029177	1

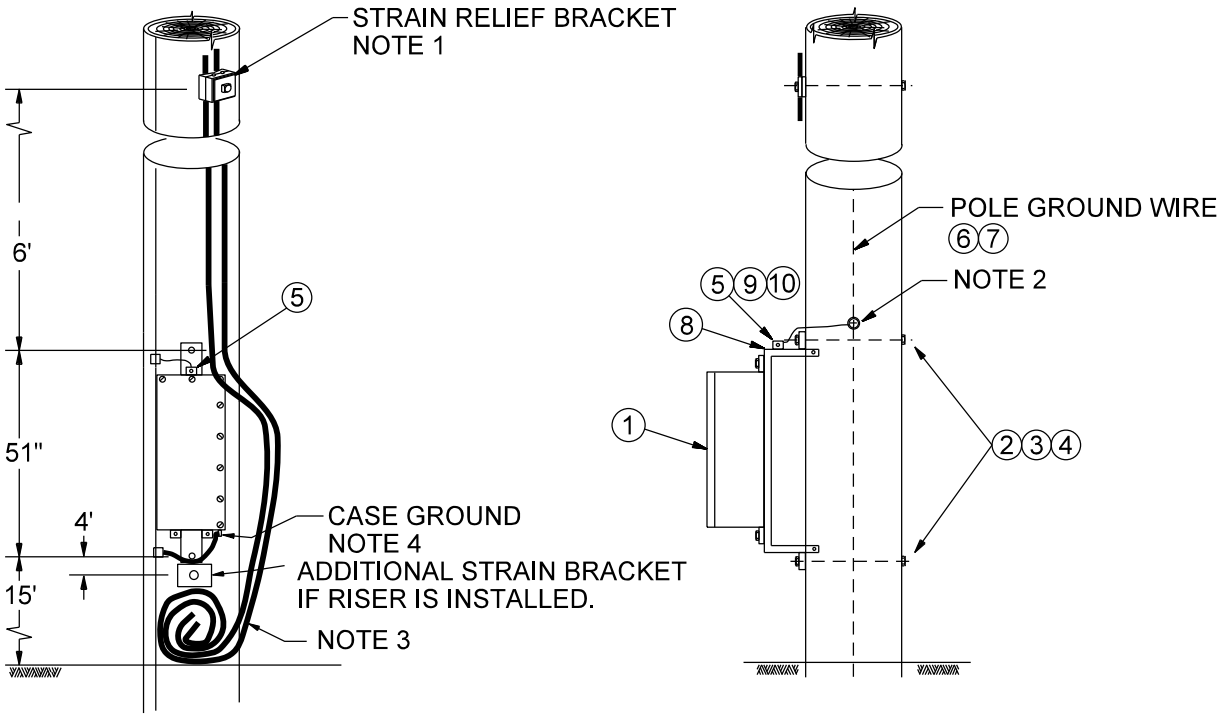
NOTES

1. STEEL POLE SHALL BE DRILLED AND TAPPED AS REQUIRED FOR STRAIN RELIEF BRACKET, GROUND CLAMP AND SPLICE CASE.
2. STRAIN RELIEF BRACKETS MUST BE PLACED EVERY 6' UP THE POLE. THESE MUST BE ORDERED IN ADDITION TO BKS6ST. SEE STRAIN RELIEF BRACKETS, SECTION 3.
3. LEAVE 80' OF TAIL ON EACH CABLE TO BE SPLICED. TIE COIL TO SPLICE CASE BRACKET.
4. THE OPGW GROUND CLIP IS USED TO GROUND THE SPLICE CASE.
5. THESE MUST BE ORDERED IN ADDITION TO BKS6ST. SEE OPTIONS FOR THIS CLAMP IN SECTION 3 - GROUNDING BRACKET, OPGW.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	SPLICE CASES OPTICAL OVERHEAD GROUND WIRE SRP COMMUNICATIONS CABLE SPLICE CASE BOLTED TO STEEL POLE	ISSUE DATE: 05/10/99 REV. DATE: 07/30/13 APPROVAL: W. LARAMIE
	5-5-1	8505E37.DGN

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKS6WT



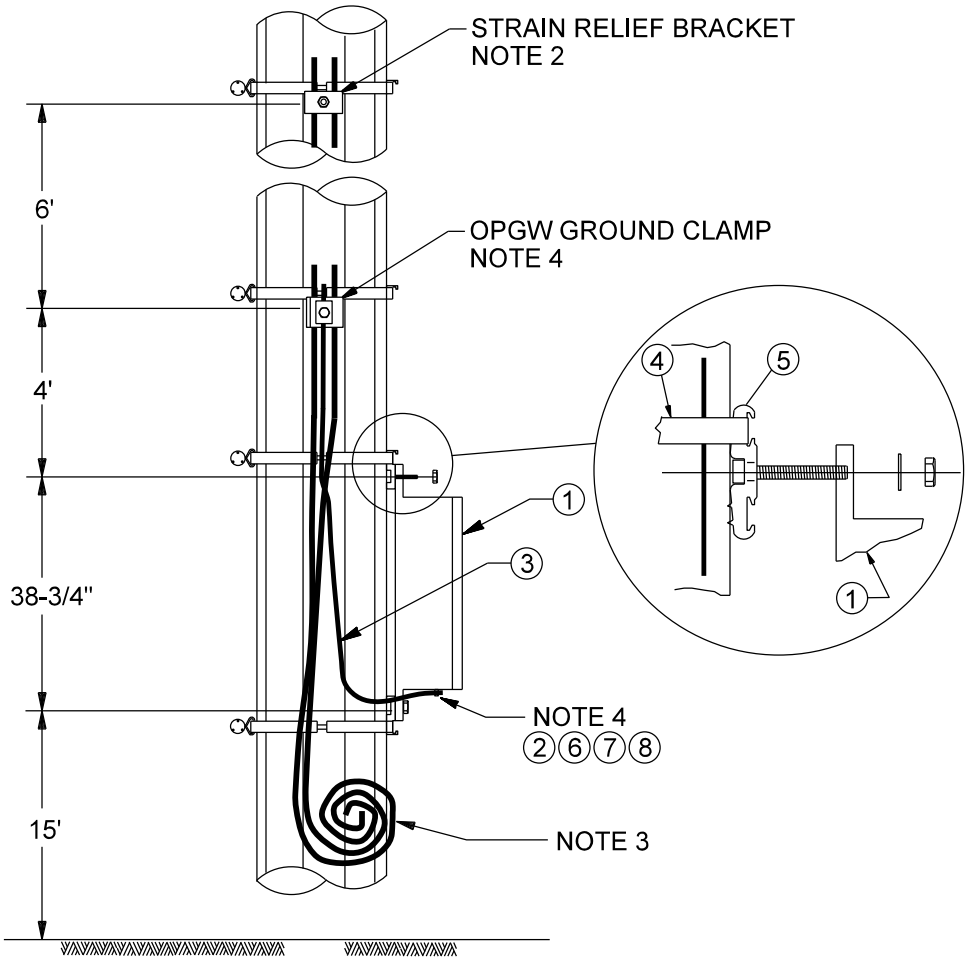
BILL OF MATERIALS - BKS6ST			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	SRP 12 X 36 FIBER SPLICE CASE	5020845	1
2	BOLT, 1/2" X 20" W / NUT	5027727	2
3	WASHER, FOR 1/2" BOLT	5029172	2
4	WASHER, SPRING LOCK, FOR 1/2' BOLT	5029167	2
5	GROUND CLIP	5028897	1
6	CONNECTOR, COMPRESSION	5033933	1
7	#6 BARE COPPER	5033845	6
8	BRACKET, SPLICE BRACKET	5020844	1
9	BOLT, HEX, 1/2" X 2-3/4"	5069534	1
10	NUT, HEX, 1/2"	5069398	1
11	WASHER, LOCK, 1/2"	5029177	1
12	WASHER, FLAT, 1/2"	5004963	1

NOTES

1. STRAIN RELIEF BRACKETS SHOULD BE PLACED EVERY 6', UP POLE. THESE MUST BE ORDERED IN ADDITION TO BKS6WT. SEE STRAIN RELIEF BRACKETS, SECTION 3.
2. GROUND SPLICE BOX BRACKET TO POLE GROUND WIRE.
3. LEAVE 80' OF OPGW TAIL TIED TO SPLICE CASE BRACKET.
4. BOND SPLICE CASE GROUND LUG TO POLE GROUND WIRE WITH #6 BARE COPPER.

REFER TO THE MOST RECENT PERSONAL PROTECTIVE GROUNDING STANDARDS WHEN CONSTRUCTING OR MAINTAINING OPGW FACILITIES.

BKS6SD

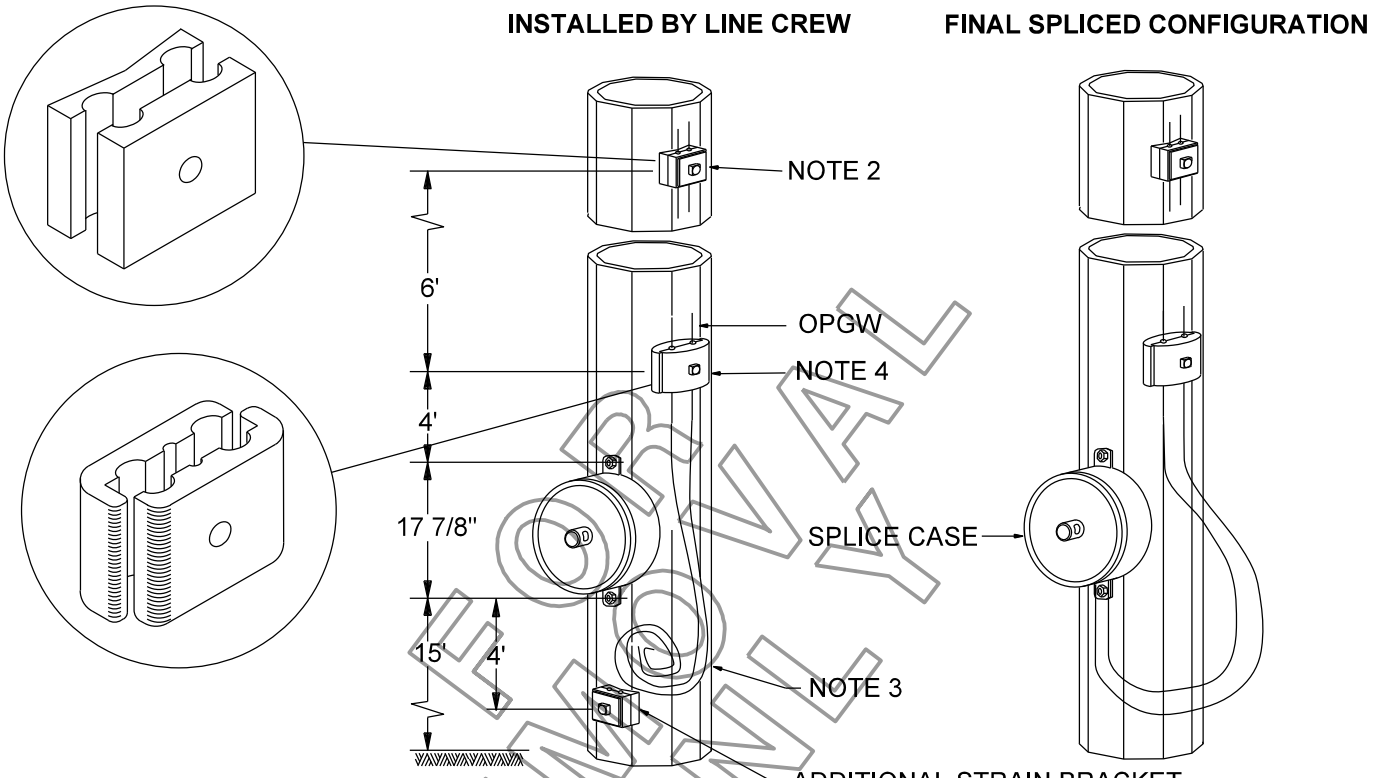


BILL OF MATERIALS - BKRACKS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	SRP 12 X 36 FIBER SPLICE CASE	5020845	1
2	GROUND CLIP	5028897	1
3	#6 BARE COPPER	5033845	8
4	BAND, STAINLESS STEEL	5027473	2
5	MOUNT, STUD, 3" X 5/8"	5028260	2
6	BOLT, HEX, 1/2" X 2-3/4"	5069534	1
7	WASHER, LOCK, 1/2"	5029177	1
8	WASHER, FLAT, 1/2"	5004963	1

NOTES

1. FOR USE ON METALIZED OR PAINTED STEEL POLES. DO NOT DRILL POLES. IF PREVIOUS ATTACHMENTS ARE REMOVED, FILL HOLES.
2. STRAIN RELIEF BRACKETS SHOULD BE PLACED EVERY 6' UP POLE.
3. LEAVE 80' OF TAIL COILED ON BRACKET FOR THE FIBER SPLICE CREW.
4. GROUND CASE WITH #6 BARE COPPER TO OPGW GROUND BRACKET.
5. THESE MUST BE ORDERED IN ADDITION TO BKS6SD. SEE OPTIONS FOR THIS CLAMP IN SECTION 3 - GROUNDING BRACKET, OPGW.

BKS3ST REMOVAL ONLY

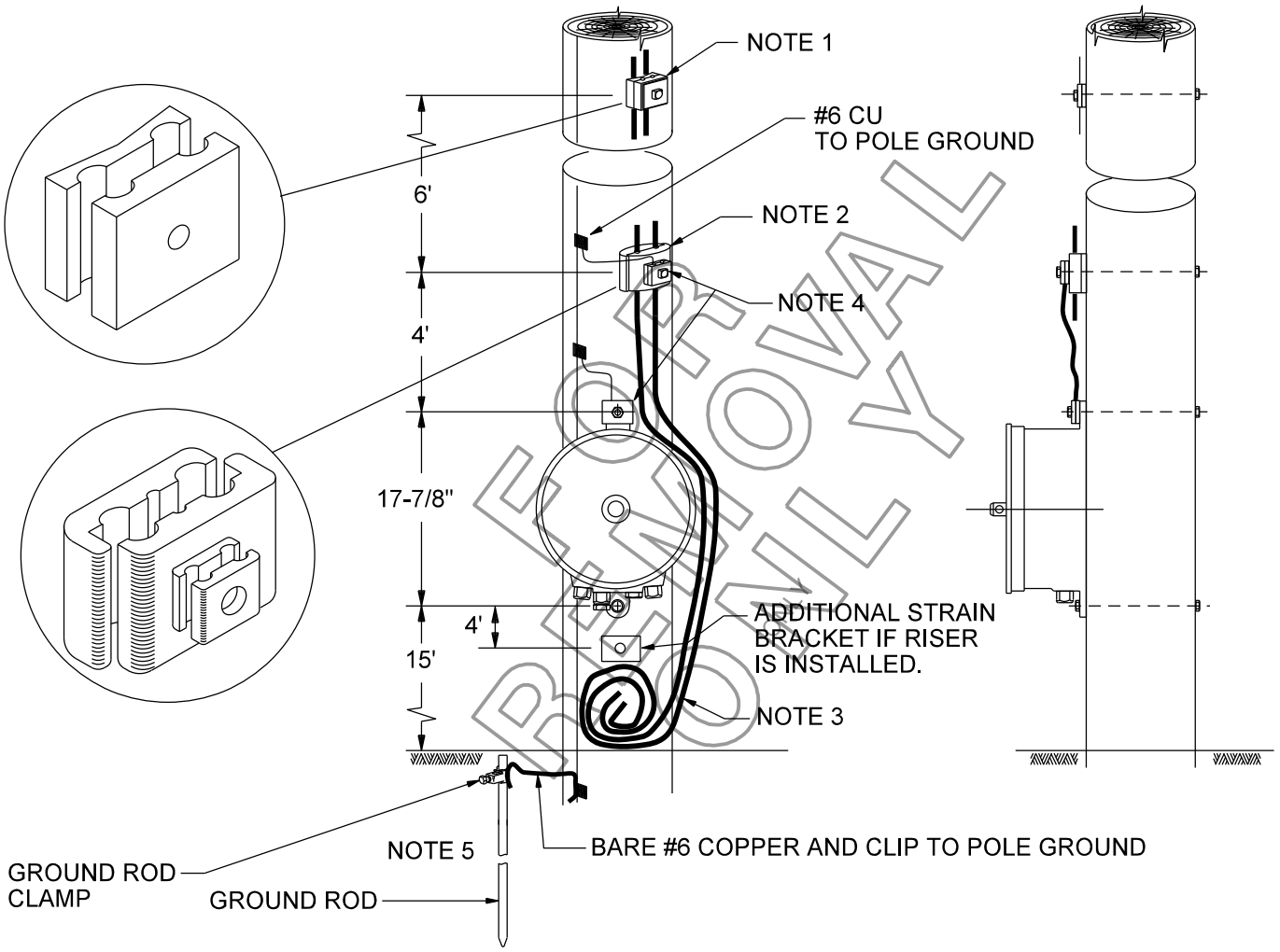


NOTES

1. STEEL POLE SHALL BE DRILLED AND TAPPED AS REQUIRED FOR STRAIN RELIEF BRACKET, GROUND CLAMP AND SPLICE CASE.
2. SPACE STRAIN RELIEF BRACKETS EVERY 6' UP POLE. THESE MUST BE ORDERED IN ADDITION TO BKS6ST.
3. LINE CREW TO LEAVE 60' OF TAIL ON EACH CABLE TO BE SPLICED. TIE COIL TO SPLICE CASE BRACKET.
4. EACH OPGW MUST BE GROUNDED AT THE SPLICE CASE. THESE MUST BE ORDERED IN ADDITION TO BKS6ST. ADSS DOES NOT NEED TO BE GROUNDED.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	SPLICE CASES OPTICAL OVERHEAD GROUND WIRE ALCOA COMMUNICATIONS CABLE SPLICE CASE BOLTED STEEL POLE	ISSUE DATE: 05/01/96 REV. DATE: 07/30/13 APPROVAL: W. LARAMIE
	5-8-1	8505E113.DGN

BKS3WT REMOVAL ONLY

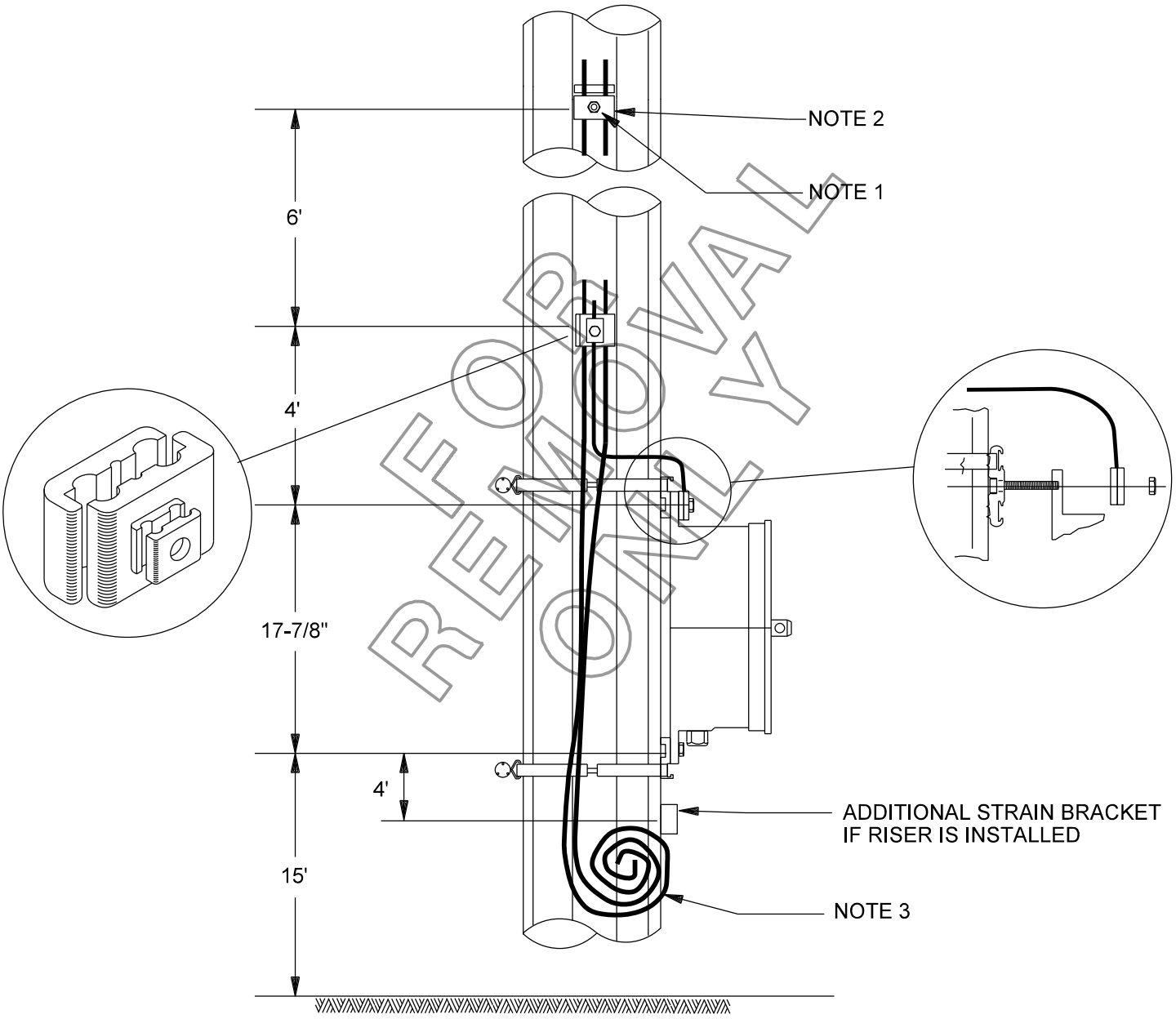


NOTES

1. STRAIN RELIEF BRACKETS SHOULD BE PLACED EVERY 6' UP POLE. THESE MUST BE ORDERED IN ADDITION TO BKS3WT.
2. EACH OPGW MUST BE GROUNDED AT THE SPLICE CASE. THESE MUST BE ORDERED IN ADDITION TO BKS3WT. (ADSS DOES NOT NEED TO BE GROUNDED).
3. LINE CREW TO LEAVE 60' OF OPGW TIED TO SPLICE CASE BRACKET.
4. GROUND CLIP ON TOP LUG HOLE POSITION OF SPLICE BOX AND ON OPGW GROUND CLAMP.
5. DRIVE ONE 8' GROUND ROD TO 1" BELOW GRADE 1' FROM THE BASE OF THE POLE DIRECTLY IN FRONT OF THE POLE WIRE. CONNECT THE ROD TO THE POLE GROUND WIRE WITH #6 BARE COPPER WIRE. THE GROUND ROD IS REQUIRED FOR A GROUND CONNECTION POINT WHEN THE OPGW IS TERMINATED.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	SPLICE CASES OPTICAL OVERHEAD GROUND WIRE ALCOA COMMUNICATIONS CABLE SPLICE CASE BOLTED WOOD POLE	ISSUE DATE: 01/15/97 REV. DATE: 07/13/13 APPROVAL: W. LARAMIE
	5-9-1	8505E42.DGN

BKS3SD REMOVAL ONLY



NOTES

1. EACH OPGW MUST BE GROUNDED AT THE SPLICE CASE. THESE MUST BE ORDERED IN ADDITION TO BKS3SD. DRILL AND TAP FOR 1/2" X 2-3/4" BOLT.
2. STRAIN RELIEF BRACKETS SHOULD BE PLACED EVERY 6' UP POLE. BRACKETS NOT INCLUDED IN BK3SD.
3. LINE CREW TO LEAVE 60' OF TAIL COILED ON POLE FOR FIBER SPLICE CREW.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	SPLICE CASES ALCOA BANDED STEEL POLE	ISSUE DATE: 01/15/97 REV. DATE: 07/30/11 APPROVAL: W. LARAMIE
	5-10-1	8505E43.DGN

SECTION 6: CELL SITES

SECTION 6: CELL SITES

POLICY FOR CELL SITES, ANTENNAS OR RELATED EQUIPMENT ON 230 KV STRUCTURES

I. FUTURE CELL SITES ON 230 KV STRUCTURES

NEW CELL SITES WILL ONLY BE APPROVED FOR ANTENNA LOCATIONS BELOW CONDUCTOR ON SUCH STRUCTURES. THEY WILL NOT BE APPROVED FOR ANY ANTENNA LOCATIONS IN OR ABOVE 230 KV CONDUCTORS.

II. EXISTING CELL SITES ON 230 KV STRUCTURES

EXISTING CELL SITES WITH ANTENNAS LOCATED ABOVE THE 230 KV CONDUCTOR, EXISTING ANTENNAS ARE ALLOWED TO STAY. IF AN UPGRADE OR ANTENNA CHANGE OUT IS REQUESTED ON SUCH SITES, THE ANTENNAS AND COAX CAN BE CHANGED OUT LIKE FOR LIKE, AND CAN ONLY BE INCREASED IN SIZE OR QUANTITY IF THE ANTENNAS PHYSICALLY FIT ON THE SAME ANTENNA MOUNTS THAT ARE CURRENTLY IN PLACE (ANTENNA PIPES MAY BE MODIFIED OR ADDED) ON THAT STRUCTURE AND NO REINFORCING STEEL ADDITIONS OR REPLACEMENTS ARE REQUIRED PER THE STRUCTURAL ANALYSIS OF THAT STRUCTURE.

COMPOL-7002 CELL SITE DESIGN AND CONSTRUCTION

I. PURPOSE

POLICIES AND GUIDELINES FOR THE DESIGN AND CONSTRUCTION OF CELL SITES HAS EVOLVED SINCE THE INCEPTION OF THE CELL SITE BUSINESS, WHICH HAVE BEEN LARGELY UNDOCUMENTED OR DOCUMENTED IN VARIOUS LOCATIONS. THE PURPOSE OF THIS DOCUMENT IS TO HAVE ONE LOCATION FOR CELL SITE DESIGN, CONSTRUCTION AND PARAMETERS.

II. SCOPE

THE SCOPE OF THIS POLICY IS TO DOCUMENT CELL SITE DESIGN AND CONSTRUCTION PRACTICES THAT HAVE EVOLVED SINCE THE INCEPTION OF THE CELL SITE BUSINESS.

III. DEFINITIONS

PROVIDE DEFINITIONS FOR TERMS OR CONCEPTS USED IN THE POLICY. DEFINITIONS SHALL BE USED AS NECESSARY TO ENSURE CLEAR COMMUNICATIONS TO THE AUDIENCE.

IV. POLICY CHANGES

CHANGES TO THE COMPOL-7002 CELL SITE DESIGN AND CONSTRUCTION POLICY SHALL BE SUBMITTED TO AND APPROVED BY SRP TELECOMMUNICATIONS INFRASTRUCTURE.

V. DESIGN

A. INITIAL DESIGN

1. CUSTOMER REQUESTS A SITE WALK WHICH SHALL BE ATTENDED BY TELECOMMUNICATIONS INFRASTRUCTURE, SRP CUSTOMER CONSTRUCTION SERVICES (CCS), AND SRP TELECOMMUNICATIONS WIRELESS.
2. AFTER THE SITE WALK, THE CARRIER (CUSTOMER) SHALL PROVIDE TELECOMMUNICATIONS INFRASTRUCTURE WITH THE RADIO FREQUENCY DATA SHEET.
3. SRP BEGINS ITS INITIAL DESIGN WHILE COORDINATING WITH CARRIER DESIGN FIRM TO ENSURE PLANS MATCH. CCS AND TELECOMMUNICATIONS INFRASTRUCTURE SHALL ALSO COORDINATE TO ALIGN TELECOMMUNICATIONS DESIGN WITH POWER DESIGN.
4. WHEN DESIGNS ARE COMPLETE AND MATCH ACROSS DEPARTMENTS/ENTITIES, BOTH TELECOMMUNICATIONS INFRASTRUCTURE AND CCS SHALL SUBMIT PLANS THROUGH WORKFLOW AND TPLUR FOR APPROVAL.

B. FINAL DESIGN

1. SRP TELECOMMUNICATIONS INFRASTRUCTURE SHALL SET UP A FINAL DESIGN DRAWING REVIEW MEETING ONCE ALL THE FOLLOWING STIPULATIONS HAVE BEEN MET:

   A) ZONING APPROVAL (IF NECESSARY).

   B) CITY/COUNTY REQUIREMENTS REVIEWED AND APPROVED BY INTERNAL DEPARTMENTS AND INCORPORATED INTO THE DESIGN DRAWINGS.

   C) CARRIER PROVIDED ALL SIGNED DOCUMENTATION AND PURCHASE ORDERS TO TELECOMMUNICATIONS.

2. A REPRESENTATIVE FOR TELECOMMUNICATIONS, THE CARRIER, SUBSTATION DESIGN, CONSTRUCTION AND MAINTENANCE, AND TRANSMISSION LINE DESIGN CONSTRUCTION & MAINTENANCE MUST BE IN ATTENDANCE. THIS IS REQUIRED TO INCORPORATE COMMENTS AND PROCEED TO THE CONSTRUCTION PHASE.

3. ALL FINAL CARRIER CHANGES NEED TO BE NOTED AT THIS TIME. CHANGES MADE AFTER THE FINAL DESIGN REVIEW MAY CAUSE SIGNIFICANT DELAYS AND ADDITIONAL COSTS.

4. AT THE END OF THE FINAL DESIGN DRAWING REVIEW MEETING, TELECOMMUNICATIONS INFRASTRUCTURE SHALL CONVEY TO THE CARRIER AN ESTIMATED CONSTRUCTION COMPLETION DATE.

VI. GROUND WORK

A. GENERAL NOTE

ALL WORK WITHIN SRP SUBSTATIONS SHALL CONFORM TO SRP SUBSTATION MAINTENANCE DESIGN AND CONSTRUCTION STANDARDS.

B. GRADING

1. SRP SHALL PERFORM ALL GRADING WORK AS REQUIRED. THIS INCLUDES BACKFILL, DRAINAGE, RETENTION BASINS AND EXCAVATION.

2. ALL GRADING AND BACKFILL MATERIALS ARE PER SRP STANDARDS SUCH AS A 6" THICK BASE OF AGGREGATE BASE COURSE (ABC) COMPACTED TO 95%. THE SURFACE MATERIAL OF THE CELL SITE COMPOUND SHALL BE A COMPACTED ABC BASE.

C. CONDUIT

1. COAX

   SRP SHALL PROVIDE AND INSTALL THIRTEEN 4" CONDUITS (MAXIMUM) FOR THE INSTALLATION OF THE COAX CABLE. THIS QUANTITY MAY BE MODIFIED DEPENDING ON SPACE CONSTRAINTS AND REQUIRED QUANTITY OF COAX.

   TELCO

2. SRP SHALL PROVIDE AND INSTALL ALL REQUIRED TELCO CONDUIT FROM THE CELL SITE COMPOUND TO THE PROPERTY OR EASEMENT LINE.

   POWER

3. SRP SHALL INSTALL ALL POWER CONDUITS WITHIN SRP'S SUBSTATIONS, REGARDLESS OF SERVICING TERRITORY. SRP SHALL INSTALL POWER CONDUIT WITHIN SRP'S EASEMENT UNLESS OTHERWISE APPROVED BY TELECOMMUNICATIONS INFRASTRUCTURE DURING THE DESIGN PROCESS. IN SUCH CASES, AN SRP INSPECTION IS REQUIRED AND INSTALLATION MUST MEET SRP REQUIREMENTS.

ADDITIONAL

4. ADDITIONAL CONDUIT FOR ALARMING, POWER CIRCUITS OR TELCO MAY BE INCLUDED IN THE SCOPE OF WORK AS REQUESTED BY THE CARRIER. THE CARRIER SHALL SUBMIT THE REQUEST TO TELECOMMUNICATIONS INFRASTRUCTURE AND INCLUDE A DETAILED PLAN SHOWING THE QUANTITY, SIZE AND LOCATION OF THE CONDUIT.

D. GROUNDING

1. SRP SHALL PROVIDE AND INSTALL ALL BELOW GRADE GROUNDING CABLE FOR CELL SITES. THE GROUNDING SYSTEM IS COMPATIBLE WITH EXISTING SRP GROUNDING REQUIREMENTS, WHICH IS BASED ON POTENTIAL FAULT CURRENT.
2. CELL SITES WITHIN SUBSTATIONS: THE GROUNDING SYSTEM FOR NEW CELL SITES IS TIED TO THE ELECTRIC SUBSTATION GROUND GRID.
3. CELL SITES ON THE TRANSMISSION LINES: GROUNDING IS DESIGNED ON A CASE-BY-CASE BASIS AND UTILIZES GROUND RINGS, GROUND ATTACHMENT TO THE POLES, AND GROUND RODS IF NECESSARY.
4. THE FOLLOWING MATERIAL IS USED IN THE GROUNDING SYSTEM:
   A) 4/0, COPPER CABLE, OR TINNED AS NEEDED
   B) TWO-HOLE LUG CONNECTORS FOR MECHANICAL CONNECTIONS
   C) ALL BELOW GRADE CONNECTIONS ARE EXOTHERMIC.
   D) GROUND RODS
5. SRP WILL INCLUDE ADDITIONAL GROUNDING TAILS CONNECTED TO THE BELOW GRADE GROUND CABLE IF REQUESTED BY THE CARRIER. THE CARRIER SHALL SUBMIT A PLAN SHOWING THE LOCATION OF ADDITIONAL GROUND TAILS.

E. FOUNDATIONS

1. SRP SHALL PROVIDE AND INSTALL CONCRETE FOUNDATION FOR THE EQUIPMENT SHELTER. A 5’ X 5’ CONCRETE STOOP IS PROVIDED AT THE DOOR OF THE SHELTER. ALL CONCRETE SHALL BE A MINIMUM OF 3,000 PSI.
2. SRP SHALL PROVIDE AND INSTALL EQUIPMENT FOUNDATION TO ACCOMMODATE THE CARRIER GROUND-MOUNTED EQUIPMENT CABINETS. THE SIZE OF THE FOUNDATION SHALL BE BASED ON THE QUANTITY, SIZE OF CABINETS, AS WELL AS SPACE CONSTRAINTS OF THE COMPOUND. ALL CONCRETE SHALL BE A MINIMUM OF 3,000 PSI.

F. SHELTERS

1. SRP SHALL ORDER, PROVIDE, DELIVER AND SET THE EQUIPMENT SHELTERS FOR ALL SRP-PROVIDED SHELTERS. SRP SHALL PERFORM THE ATTACHING OF THE GROUNDING SYSTEM AND ELECTRIC SERVICE.
2. THE CARRIER SHALL BE RESPONSIBLE FOR SCHEDULING OF THEIR SHELTER DELIVERY AND ANY CRANE REQUIREMENTS AT THE JOB SITE. THE SHELTER SHALL MEET SRP REQUIREMENTS.

G. ENCLOSURES

1. SRP SHALL PROVIDE A CHAIN LINK ENCLOSURE WITHIN SUBSTATION SITES AND ON TRANSMISSION SITES IF ZONING AND SPACE IS FEASIBLE. THE CHAIN LINK FENCE SHALL BE EIGHT FEET HIGH WITH ONE FOOT OF BARBED WIRE AND ACCESS GATE.

2. SRP SHALL INSTALL A MASONRY WALL IF REQUIRED BY ZONING. THE HEIGHT OF THE WALL DEPENDS ON ZONING STIPULATIONS. SITES THAT ARE ADJACENT TO THE OUTSIDE OF THE SUBSTATION, SHALL REQUIRE A SUBSTATION GRADE ENCLOSURE WALL TO MATCH THE SUBSTATION WALL.

VII. GENERATORS, BACKUP POWER

A. THE CARRIER IS PERMITTED TO INSTALL BATTERY BACK-UP POWER SYSTEMS ON SITE. THE CARRIER MUST NOTIFY TELECOMMUNICATIONS INFRASTRUCTURE PRIOR TO INSTALLING LARGE BATTERIES IN THE SHELTER SO THE STRUCTURAL LOADING ON THE FLOOR CAN BE VERIFIED.

B. ELECTRICAL SUBSTATIONS

PERMANENT DIESEL-FUELED GENERATORS ARE ALLOWED ON ELECTRICAL SUBSTATION PROPERTY PER CELL SITE GENERATOR POLICY COMPOL-3000. TEMPORARY DIESEL GENERATORS ARE ALSO PERMITTED ON SUBSTATION PROPERTY. SRP SHALL BE RESPONSIBLE FOR FUELING ALL GENERATORS.

C. CANALS

PERMANENT GENERATORS ARE NOT PERMITTED ON SRP CANALS UNLESS THE CARRIER CAN OBTAIN ACCESS FROM ADJACENT PROPERTY OWNERS FOR FUELING OPERATIONS. FUEL AND GENERATOR MAINTENANCE VEHICLES ARE NOT PERMITTED TO USE SRP CANAL RIGHT-OF-WAYS FOR ACCESS.

D. TRANSMISSION LINE/EASEMENT SITES

PERMANENT GENERATORS ARE PERMITTED ON NON-SUBSTATION SITES WITH PERMISSION FROM TELECOMMUNICATIONS INFRASTRUCTURE.

VIII. SECURITY

A. ACCESS DOORS/GATES

UPON PROJECT COMPLETION, SRP SHALL RE-KEY THE SITE AND PROVIDE A KEY TO THE CARRIER FOR ACCESS. THIS KEY IS TYPICALLY PLACED IN A LOCKBOX INSTALLED BY SRP ON SITE. THE CARRIER IS RESPONSIBLE FOR KEEPING THE GATE/ACCESS DOOR LOCKED WHEN NOT ON SITE AND KEEPING THE KEY IN THE LOCKBOX.

IX. DISTRIBUTION

A. WITHIN SRP SERVICE TERRITORY

1. SITE TO BE BUILT BY SRP: CARRIER MUST ORDER POWER AND INSPECTION THROUGH COMMERCIAL CUSTOMER SERVICES (NEW POWER), UNLESS AGREED TO OTHERWISE.
2. SITE TO BE BUILT BY CARRIER (GROUND PORTION): CARRIER MUST ORDER POWER AND INSPECTION THROUGH COMMERCIAL CUSTOMER SERVICES (NEW POWER).

B. NOT WITHIN SRP SERVICE TERRITORY (WITHIN SRP EASEMENT)

IT IS THE CARRIER'S RESPONSIBILITY TO CONTACT THE ELECTRICAL PROVIDER FOR THAT AREA. PRIOR TO CONSTRUCTION, THE CARRIER MUST SUBMIT A DRAWING TO BE APPROVED BY TELECOMMUNICATIONS INFRASTRUCTURE OF ALL CONDUITS WITHIN THE EASEMENT.

1. ONLY SECONDARY POWER IS ALLOWED WITHIN SRP'S EASEMENT. NO PRIMARY CONDUCTORS ARE ALLOWED. NO TRANSFORMERS ARE ALLOWED.
2. SEE 'POWER CONDUIT' UNDER 'GROUND WORK' FOR OTHER INFORMATION.

X. BACKHAUL

A. BACKHAUL METHOD

THE CARRIER SHALL INFORM TELECOMMUNICATIONS INFRASTRUCTURE OF THEIR BACKHAUL METHOD AT THE TIME OF THE SITE WALK IF POSSIBLE OR NO LATER THAN THE IDD MEETING.

B. TELCO CONDUIT (CENTURYLINK OR COX)

SRP SHALL PROVIDE AND INSTALL TELCO CONDUIT FROM THE CELL SITE COMPOUND TO THE PROPERTY OR EASEMENT LINE. THE CARRIER SHALL BE RESPONSIBLE FOR COORDINATING ALL SERVICE WITH THE TELCO PROVIDER AND INSTALLATION TO MEET POINT AT PROPERTY OR EASEMENT LINE.

C. TELCO CONDUIT (SRP FIBER)

SRP SHALL INSTALL CONDUIT ON SRP PROPERTY IF SRP'S FIBER IS USED FOR BACKHAUL. THE CONDUIT IS TYPICALLY INSTALLED FOR THE CARRIER'S CELL SITE TO THE MEET POINT MANHOLE/PULL BOX OR SRP CONTROL HOUSE. SRP SHALL INSTALL AND TERMINATE THE FIBER/CABLE WHEN USING ITS FIBER NETWORK FOR BACKHAUL. THE CARRIER IS RESPONSIBLE FOR PLACING THE ORDER FOR SERVICE.

D. MICROWAVE BACKHAUL

SRP SHALL INSTALL THE ANTENNA, COAX AND ASSOCIATED HARDWARE FOR THE MICROWAVE BACKHAUL SYSTEM. SRP WILL ALIGN THE ANTENNA ON THE SRP POLE. THE CARRIER IS RESPONSIBLE FOR PROVIDING THE MATERIAL TO THE SRP CREWS PERFORMING THE AERIAL WORK. THE CUSTOMER IS RESPONSIBLE FOR PROVIDING, INSTALLING AND OPTIMIZING THE ASSOCIATED ELECTRONICS.

XI. CELLULAR ON WHEELS (COW)

A. CARRIER'S COW

CARRIER'S COW MAY BE USED PENDING APPROVAL FROM TELECOMMUNICATIONS INFRASTRUCTURE. A PAD/PLATFORM-MOUNTED TOWER MAY BE USED INSTEAD OF HAVING A TRAILER-MOUNTED TOWER.

B. LOCATION

1. TELECOMMUNICATIONS INFRASTRUCTURE WILL CREATE A DRAWING TO SHOW THE LOCATION OF THE COW AND VERTICALITY OF THE ANTENNAS. IF A CARRIER-SUPPLIED COW IS USED, A DRAWING SHOWING THE COW, GENERATOR, AND FUEL CELL FOOTPRINTS ARE NEEDED FROM THE CARRIER.
2. LOCATION OF COWS SHALL BE APPROVED BY SUBSTATION DESIGN, CONSTRUCTION AND MAINTENANCE.
3. COWS ARE NOT ALLOWED ALONG SRP CANALS.

C. SET UP

AN SRP INSPECTOR MUST BE ON SITE TO VERIFY SET UP PER DESIGN. GROUND PENETRATION IS NOT PERMITTED. TO GROUND THE COW, SEE GROUNDING INFORMATION IN THIS SECTION. IF GUYS ARE REQUIRED, THEY SHALL BE ATTACHED TO CONCRETE ANCHORS (NO WATER BARRELS).

D. FUELING (GENERATOR)

1. WITHIN A SUBSTATION

A) SRP SHALL PERFORM ALL FUELING.

B) THE CARRIER MUST PROVIDE A FUELING SCHEDULE FOR CARRIER-PROVIDED GENERATORS.

2. WITHIN AN SRP TRANSMISSION LINE EASEMENT

A) SRP OR CARRIER MAY FUEL.

3. ON SRP CANALS

B) PERMANENT GENERATORS ARE NOT PERMITTED ON SRP CANALS UNLESS THE CARRIER CAN OBTAIN ACCESS FROM ADJACENT PROPERTY OWNERS FOR FUELING OPERATIONS.

C) FUEL AND GENERATOR MAINTENANCE VEHICLES ARE NOT PERMITTED TO USE THE SRP CANAL RIGHT-OF-WAY FOR ACCESS.

E. GROUNDING

COW SHALL BE GROUNDED PER SRP STANDARDS. SEE COW GROUNDING UNDER GROUND WORK PROCEDURES FOR MORE INFORMATION.

XII. POLE WORK

A. STRUCTURAL ANALYSIS

1. SRP SHALL PERFORM OR MAY CONTRACT A STRUCTURAL ANALYSIS ON ANY STRUCTURE THAT IS DEEMED NECESSARY BY TELECOMMUNICATIONS INFRASTRUCTURE.

2. ALL CALCULATIONS, SPECIFICATIONS FOR STRUCTURES AND ANTENNA MOUNTS ARE PROPRIETARY AND WILL NOT BE PROVIDED TO CUSTOMERS, CARRIERS OR OTHER MUNICIPALITIES. ENGINEER STAMPED DRAWINGS ARE NOT CREATED OR PROVIDED.

B. ELECTRICAL OUTAGES

DUE TO THE NATURE OF SRP'S ELECTRIC SYSTEM, ELECTRICAL OUTAGES REQUIRED TO CONSTRUCT, MAINTAIN OR UPGRADE A CELL SITE ARE UNIQUE AND HAVE THEIR OWN REQUIREMENTS BECAUSE OF THE SPECIFIC CIRCUIT, THE CONSTRUCTION OR MAINTENANCE OCCURRING ELSEWHERE IN THE SYSTEM, THE WEATHER, THE TEMPERATURE, AND/OR VARIOUS OTHER REASONS. THE VARIOUS OUTAGE SITUATIONS MAY CAUSE UNFORESEEN DELAYS AND ADDITIONAL COSTS WHEN WORKING ON CELL SITES.

C. WORK ON SRP POLES OR STRUCTURES

1. ALL BUILDINGS, POLES AND TOWERS ON SRP FACILITIES OR EASEMENTS BELONG TO SRP; ONLY SRP PERSONNEL ARE ALLOWED TO PERFORM OR CONTRACT THE WORK ON THESE STRUCTURES. CARRIERS ARE NOT ALLOWED TO CLIMB, ATTACH TO OR OTHERWISE PERFORM WORK ON ANY POLE OR TOWER ON SRP FACILITIES OR EASEMENTS. THE CARRIER SHALL ONLY PERFORM WORK THAT HAS BEEN APPROVED BY TELECOM INFRASTRUCTURE IN THE BUILDING OR ON THEIR ASSIGNED PAD OR POLE, SUCH AS IN CASES WHERE THE CARRIER WILL ATTACH A CABINET TO AN SRP POLE AS PART OF AN APPROVED SMALL CELL SITE PROJECT. ALL WORK SHALL BE PERFORMED BY SRP OR ITS APPROVED CONTRACTOR.

A) STEEL POLES MAY BE CUT OR SHORTENED IN ACCORDANCE WITH ZONING REQUIREMENTS. SUCH MODIFICATIONS SHALL BE APPROVED BY TELECOMMUNICATIONS INFRASTRUCTURE AND PERFORMED BY SRP.

B) NO PORT SHALL BE CUT INTO THE STRUCTURES IN THE FIELD OR YARDS. ANY PORTS ON THE STRUCTURES MUST BE PROVIDED FROM THE FACTORY UNLESS COMPLETED AS A PART OF AN APPROVED POLE MODIFICATION.

C) WELDING ON SRP POLES OR TOWERS IS STRICTLY REGULATED BY TELECOMMUNICATIONS INFRASTRUCTURE AND WILL BE PERFORMED ONLY BY SRP PERSONNEL KNOWLEDGEABLE IN THESE PROCESSES, AND ONLY WHEN APPROVED IN ADVANCE BY TELECOMMUNICATIONS INFRASTRUCTURE.

2. ANCILLARY INSTALLATION

SRP SHALL INSTALL ALL ANTENNAS, COAX (AND RELATED GROUNDS, CONNECTORS, ETC.), RET'S, MW DISH, ETC., UP TO THE CARRIER BUSS BAR, POLYPHASER RACK, ETC. THE CARRIER SHALL BE RESPONSIBLE FOR INSTALLING THEIR EQUIPMENT ON THE SLAB OR IN THE BUILDING AND FOR INSTALLING ALL JUMPERS AND GROUNDS FROM THE HAND-OFF POINT TO THEIR EQUIPMENT. CHANGES MADE TO THE APPROVED DESIGN MUST BE APPROVED BY TELECOMMUNICATIONS INFRASTRUCTURE BEFORE PROCEEDING.

D. MATERIAL

1. SRP-PROVIDED ANCILLARY OR POLE-RELATED MATERIAL

A) POLE

FOR SITES TO BE ATTACHED TO AN SRP TRANSMISSION OR DISTRIBUTION POLE SUPPORTING ELECTRICAL CONDUCTORS, THE POLE DESIGN MUST CONFORM TO SRP POLE STANDARDS. THE POLE WILL COME FROM AN SRP STANDARD LINE OF POLES OR MAY BE SPECIAL ORDERED USING APPROVED SRP TRANSMISSION LINE STANDARDS AND FACTORS. THE STRUCTURES DETAILING WILL TYPICALLY BE 'BARE SHAFT', EXCEPT FOR VARIOUS PORTS OR GROUNDING LUGS. MONOPOLE DESIGNS SHALL BE APPROVED ON A SITE-BY-SITE BASIS.

B) ARRAY/ANTENNA MOUNT

SRP SHALL DESIGN AND PROVIDE VARIOUS ANTENNA MOUNTS TO FIT INDIVIDUAL POLES AND TOWERS AND TO ALLOW APPROVED ANTENNA ARRAY PER THE CARRIER'S REQUIREMENTS (SEE ARRAYS FOR MAXIMUM SECTOR SIZES)

C) COAX BOOT/DOG HOUSE AND MOLDING

SRP SHALL DESIGN AND PROVIDE ANY NECESSARY COAX BOOT REQUIRED TO PROTECT THE COAX AND CONDUIT WHERE IT COMES OUT OF THE GROUND AT THE BASE OF THE POLE. SRP SHALL ALSO SUPPLY COAX PROTECTIVE MOLDING THAT COVERS THE COAX ON THE OUTSIDE OF THE POLE, WHEN ALLOWED AND WHEN COAX DOES NOT FIT INSIDE THE POLE. IN SOME INSTANCES, THIS MOLDING IS NOT ALLOWED BECAUSE IT CONFLICTS WITH CONSTRUCTION AND MAINTENANCE OF EXISTING OR FUTURE TRANSMISSION AND DISTRIBUTION FACILITIES. EACH SITE AND STRUCTURE MUST BE LOOKED AT INDIVIDUALLY TO DETERMINE THE RESTRICTIONS THAT APPLY.

D) ICE BRIDGES

ICE BRIDGES SHALL BE PROVIDED BY SRP WHEN ALLOWED.

2. CARRIER-PROVIDED ANCILLARY OR POLE-RELATED MATERIAL

A) CARRIER SHALL PROVIDE ALL OTHER MATERIALS NECESSARY TO INSTALL THE ANCILLARY AND ANTENNAS. MATERIAL INCLUDES BUT IS NOT LIMITED TO THE FOLLOWING:

(1) ANTENNAS AND CUT SHEETS FOR SRP DESIGNS.

(2) COAX, HELIAX, WAVEGUIDE, ETC., NEEDED TO BUILD THE SITE. CARRIER SHALL ADD SUITABLE COAX TO ESTIMATED LENGTH REQUIRED TO ALLOW FOR SWEEPS, VERTICAL ELEMENTS, CUTTING, PULLING AND OTHER WASTED FOOTAGES.

(3) CONNECTORS AND WEATHERPROOFING MATERIALS, EXCEPT JMA CONNECTORS WHICH SRP SHALL PROVIDE.

(4) REMOTE ELECTRICAL DOWN-DILT DEVICES, CABLES, ETC., AND ASSOCIATED MATERIALS REQUIRED TO BUILD THE SITE.

(5) MICROWAVE DISH (2' MAXIMUM DIAMETER) AND ANY ASSOCIATED PARTS AS REQUIRED.

(6) BUSS BARS, LEADS AND GROUND KITS AS REQUIRED.

(7) SUPPORT BRACKETS, CLIPS, HOSE CLAMPS, STAINLESS WIRE-TIES, STAND-OFF BRACKETS, ANGLE BRACKETS FOR SUPPORTING COAX ON THE ANTENNA MOUNT BRACKETS AND ARMS.

3. ANCILLARY MATERIAL PROCUREMENT

SRP SHALL PROCURE, TRANSPORT AND STORE ANCILLARY MATERIAL PROVIDED BY THE CARRIER TO FACILITATE THE CONSTRUCTION OF THE CELL SITE. ALL MATERIAL SHOULD BE BATCHED AND LOCATED AT ONE FACILITY FOR SRP PICK UP. MATERIAL MUST BE AVAILABLE BEFORE SRP WILL SCHEDULE WORK.

E. ARRAY DESIGN STANDARDS

1. POLE EXTENSION

SRP MAY ADD EXTENSIONS TO APPROVED POLES, UP TO FIVE-FOOT MAXIMUM. UP TO A TEN-FOOT MAXIMUM SECTOR SIZE MAY BE ADDED TO AN EXTENSION ARRAY WITH PRIOR APPROVAL FROM TELECOMMUNICATIONS INFRASTRUCTURE.

2. ARRAY ATTACHED DIRECTLY TO POLE SHAFT

FLUSH MOUNT UP TO AN EIGHT-FOOT MAXIMUM SECTOR SIZE MAY BE ADDED TO BARE POLE SHAFTS, DEPENDING ON DIAMETERS AND STRUCTURAL CAPACITIES OF THE POLE.

3. LATTICE TOWERS

THE MAXIMUM ALLOWABLE SECTOR SIZE ON LATTICE TOWERS IS 12 FEET.

F. PAINTING

SRP TYPICALLY PAINTS ANTENNAS, BOOTS AND MOLDINGS TO MATCH THE STRUCTURE. THE ANTENNA PAINT IS COMPATIBLE WITH RADIO FREQUENCY SIGNALS.

G. SYSTEM SWEEPS

1. CARRIER PERFORMED SWEEPS

IF THE CARRIER PREFERS TO PERFORM THE SWEEPS, THEY ARE REQUIRED TO PROVIDE SRP WITH ELECTRONIC COPIES.

2. ALL SWEEPS MUST BE PERFORMED AND APPROVED DURING THE INITIAL SITE CONSTRUCTION. ANY PROBLEMS SHALL BE NOTED AND FIXED DURING THE INITIAL SITE CONSTRUCTION. ANY CARRIER REQUESTS TO RETURN TO THE SITE AFTER THE INITIAL SITE CONSTRUCTION SHALL BE HANDLED AS A NEW MAINTENANCE/UPGRADE PROPOSAL.

H. PHOTOS AND SITE DOCUMENTATION

SRP SHALL PROVIDE PHOTOS AND SITE DOCUMENTATION AS REQUIRED FOR EACH CELL SITE.

I. CELL SITE AVAILABILITY

THE CELL SITE IS NOT CONSIDERED AVAILABLE TO THE CARRIER UNTIL THE ANCILLARY WORK IS COMPLETE; THEREFORE, THE CARRIER WILL NOT BE ALLOWED ON SITE TO INSTALL OTHER EQUIPMENT UNTIL THAT WORK IS COMPLETE. IN SOME SPECIFIC INSTANCES, THIS MAY BE ALLOWED FOR SHORT PERIODS OF TIME DEPENDING ON THE WORK PLAN OF THE CREW INSTALLING THE ANCILLARY MATERIAL. IF THE CREW DETERMINES THE CARRIER OR CARRIER'S REPRESENTATIVE ARE CREATING AN UNSAFE ENVIRONMENT, OR PROHIBIT THE CREW'S PROGRESS, THEY WILL BE ASKED TO VACATE THE SITE.

J. SRP CREW WORK HOURS

TYPICAL WORK HOURS ARE SUNRISE TO SUNSET, MONDAY THROUGH FRIDAY. SPECIAL EXCEPTION MAY BE TAKEN FOR EMERGENCY WORK OR WORK RELATED TO DIFFICULT ELECTRIC OUTAGES ONLY.

K. CLEARANCES

1. ELECTRICAL CLEARANCE

ELECTRICAL CLEARANCES ARE FROM THE ANTENNA TIP TO THE NEAREST CONDUCTOR TO THAT ANTENNA (ABOVE OR BELOW). THE CLEARANCE, WHEN ABOVE CONDUCTOR, IS USUALLY JUST A WORKING CLEARANCE TO THE STATIC CONDUCTOR

VOLTAGE	REQUIRED CLEARANCE
12 KV	6'
69 KV	6'
115 KV	9'
230 KV	13' ANTENNAS ALLOWED ONLY BELOW CONDUCTOR. STRUCTURAL ANALYSIS REQUIRED.
500 KV	N/A = NO LONGER ALLOWED.

2. POLE TO CELL SITE COMPOUND CLEARANCE

PHYSICAL CLEARANCE OF A TRANSMISSION POLE (EDGE OF CAP) TO A COMPOUND IN AN SRP EASEMENT IS 35 FEET (CASE-BY-CASE

3. COAX BOOT TO SUBSTATION WALL OR FENCE

INSIDE SUBSTATION, BOOT MUST BE AT LEAST FOUR FEET FROM THE SUBSTATION (SIX FEET PREFERRED). WHEN OUTSIDE, SIX FEET MINIMUM IS REQUIRED.

L. WORK ON DOUBLE CIRCUIT STRUCTURES

1. EACH PROPOSED CELL SITE AND ANTENNA ARRAY SHALL BE REVIEWED ON A CASE-BY-CASE BASIS. THE DECISION TO PLACE CELLULAR ANTENNAS ABOVE CONDUCTORS ON ANY DOUBLE CIRCUIT STRUCTURE (115 KV AND LOWER VOLTAGES) WILL BE BASED ON, BUT NOT LIMITED TO, THE FOLLOWING CRITERIA:

A) THE OUTAGE EFFECTS ON THE SUBSTATION FED BY THE CIRCUITS ON THE STRUCTURE.

B) THE OUTAGE EFFECTS ON THE OTHER CIRCUITS, SUBSTATIONS AND SERVICE AREAS.

C) HOW THE CIRCUITS MIGHT CHANGE IN CRITICALITY BASED ON SRP'S SIX-YEAR PLAN.

D) HOW THE ANTENNA ARRAY MAY AFFECT FUTURE CONSTRUCTION AND MAINTENANCE OF AN SRP FACILITY.

XIII. PREVENTATIVE MAINTENANCE AND INSPECTION

A. SRP SHALL MAINTAIN THE FOLLOWING ON A COMPLETED SITE:

1. AIR CONDITIONERS ON SHELTER SITES (UNLESS OTHER ARRANGEMENTS HAVE BEEN MADE)
2. VANDALISM
3. VEGETATION ABATEMENT

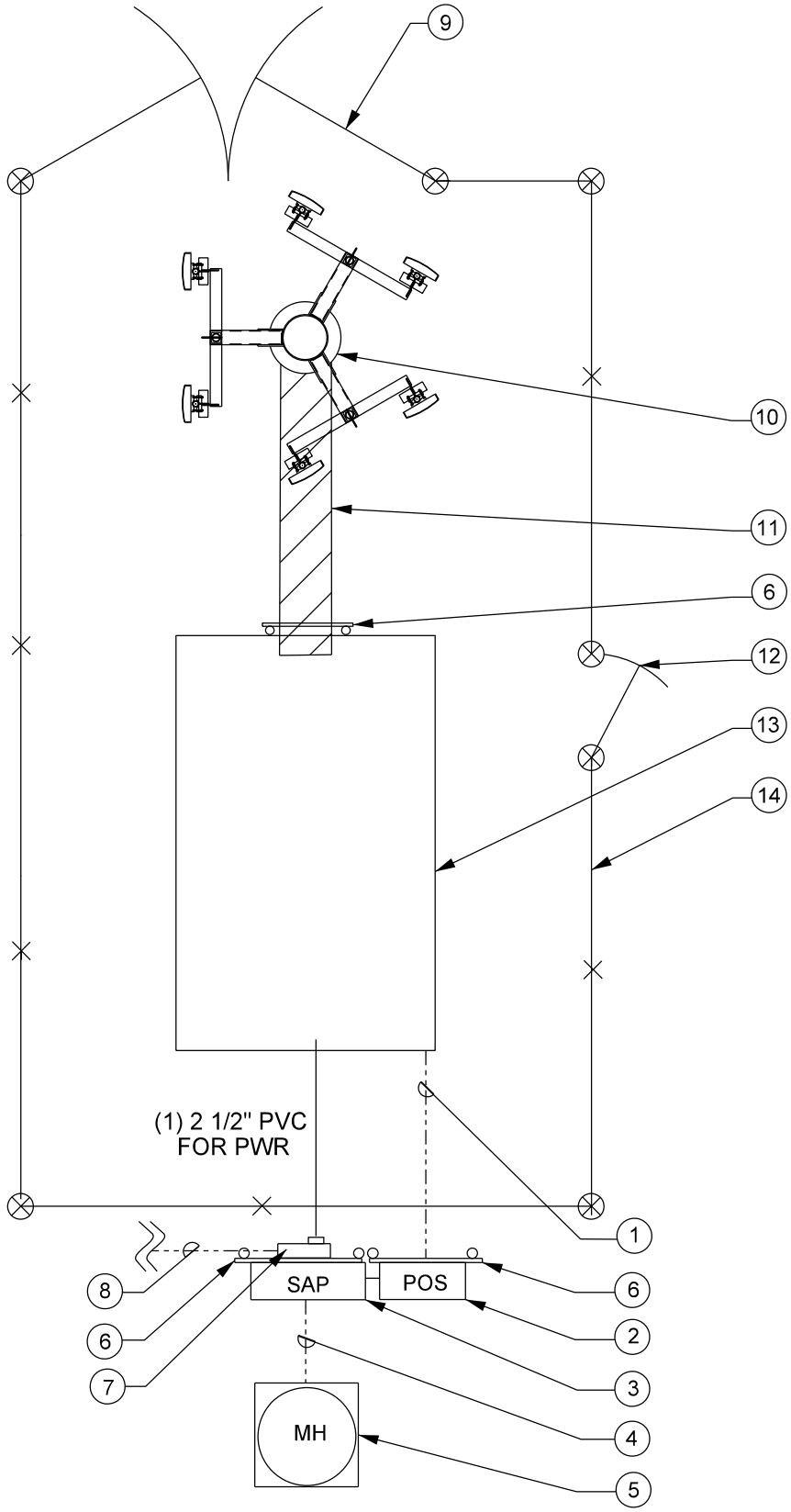
B. PREVENTATIVE MAINTENANCE

1. SRP SHALL PERIODICALLY INSPECT THE SITES FOR THE FOLLOWING:

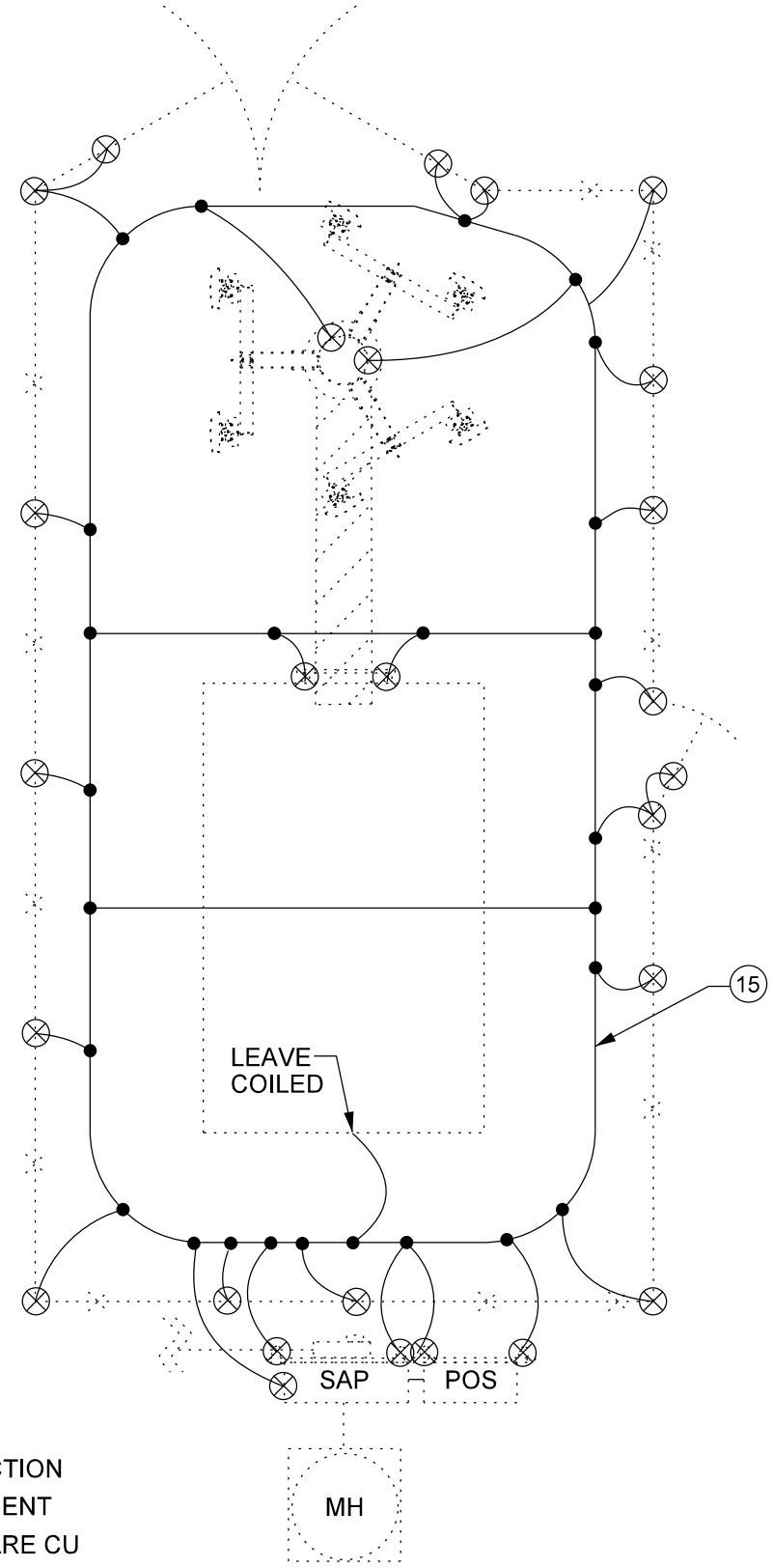
   A) VANDALISM, WHICH INCLUDES CUT, MISSING, AND/OR DAMAGED GROUND CABLES, AND GRAFFITI.

   B) VISIBLE DAMAGE

   IF AN INSPECTOR NOTICES VISIBLE DAMAGE DUE TO STORMS OR GENERAL WEAR AND TEAR, IT WILL BE REPORTED AND TELECOMMUNICATIONS INFRASTRUCTURE WILL NOTIFY TELECOMMUNICATIONS WIRELESS, WHO WILL THEN NOTIFY THE CARRIER. THIS APPLIES TO THE CIVIL/GROUND AND POLE/ANTENNA PORTION OF THE SITE.



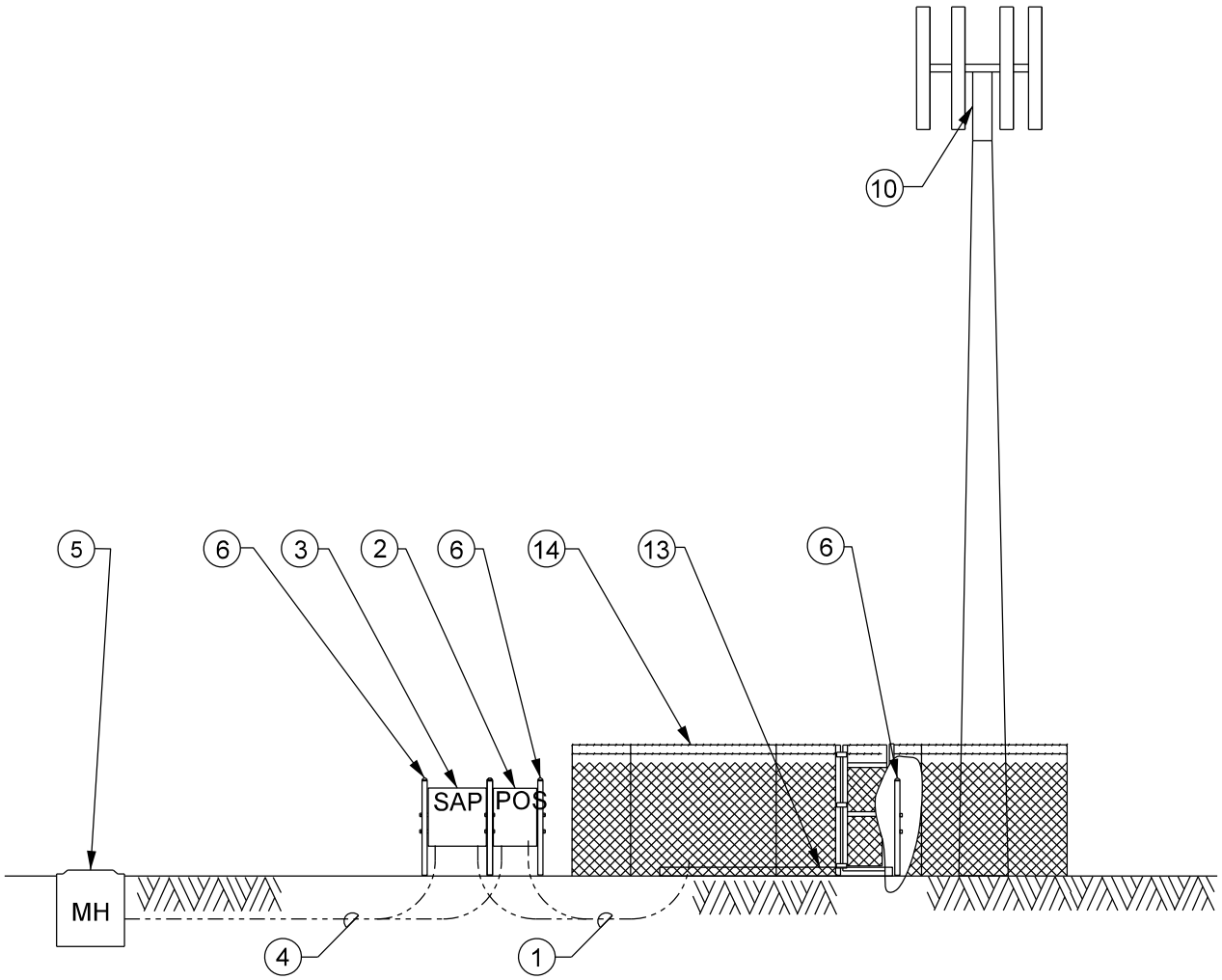
Communications Design & Construction Standards SRP® PROPRIETARY MATERIAL		
	CELL SITE TYPICAL LAYOUT	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-2-1	8505E165.DGN



LEGEND

- CHAIN LINK FENCE
- CADWELD CONNECTION
- GROUND ATTACHMENT
- CONSTRUCT 4/0 BARE CU
- FENCE POST

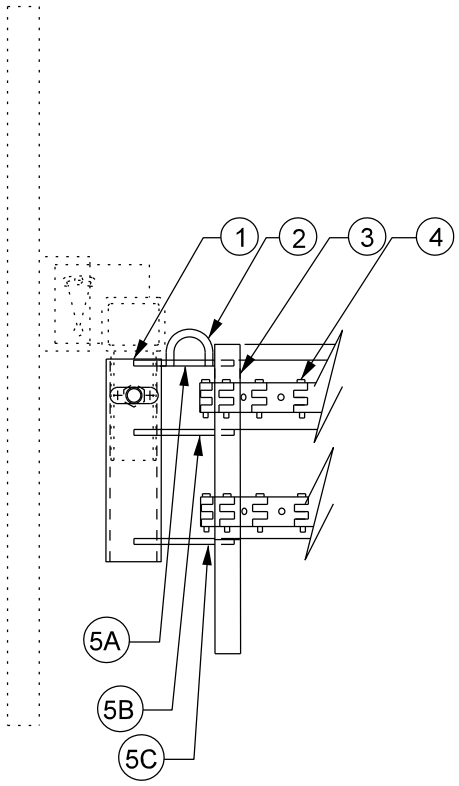
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITE TYPICAL LAYOUT GROUNDING	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-2-2	8505E166.DGN



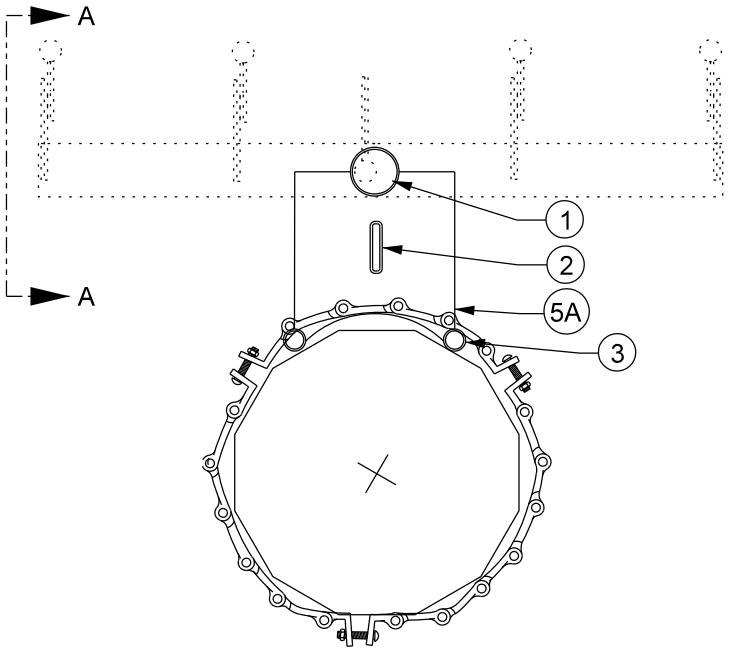
BILL OF MATERIALS		
ITEM	**DESCRIPTION**	**QUANTITY**
1	4" PLC (TELCO)	2
2	POSITRON (IF NEEDED SUPPLIED BY OTHER)	1
3	(SAP) BOX 4'X4' SECURED ACCESS POINT NEMA4	1
4	4" PLC TO MANHOLE	2
5	4' X 4' X 4' MANHOLE	1
6	4' H-FRAME	3
7	200 AMP SERVICE	1
8	2 1/2" PLC FOR POWER	1
9	(2) 8' GATES	1
10	ANTENNA MOUNT	1
11	ICE BRIDGE	10'
12	(1) 4' WALK GATE	1
13	EQUIPMENT PAD OR CELL BUILDING	1
14	8' CHAIN LINK FENCE WITH 1' BARB WIRE	100'
15	4/0 GROUNDING LOOP	1

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITE TYPICAL LAYOUT ELEVATION	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-2-3	8505E167.DGN

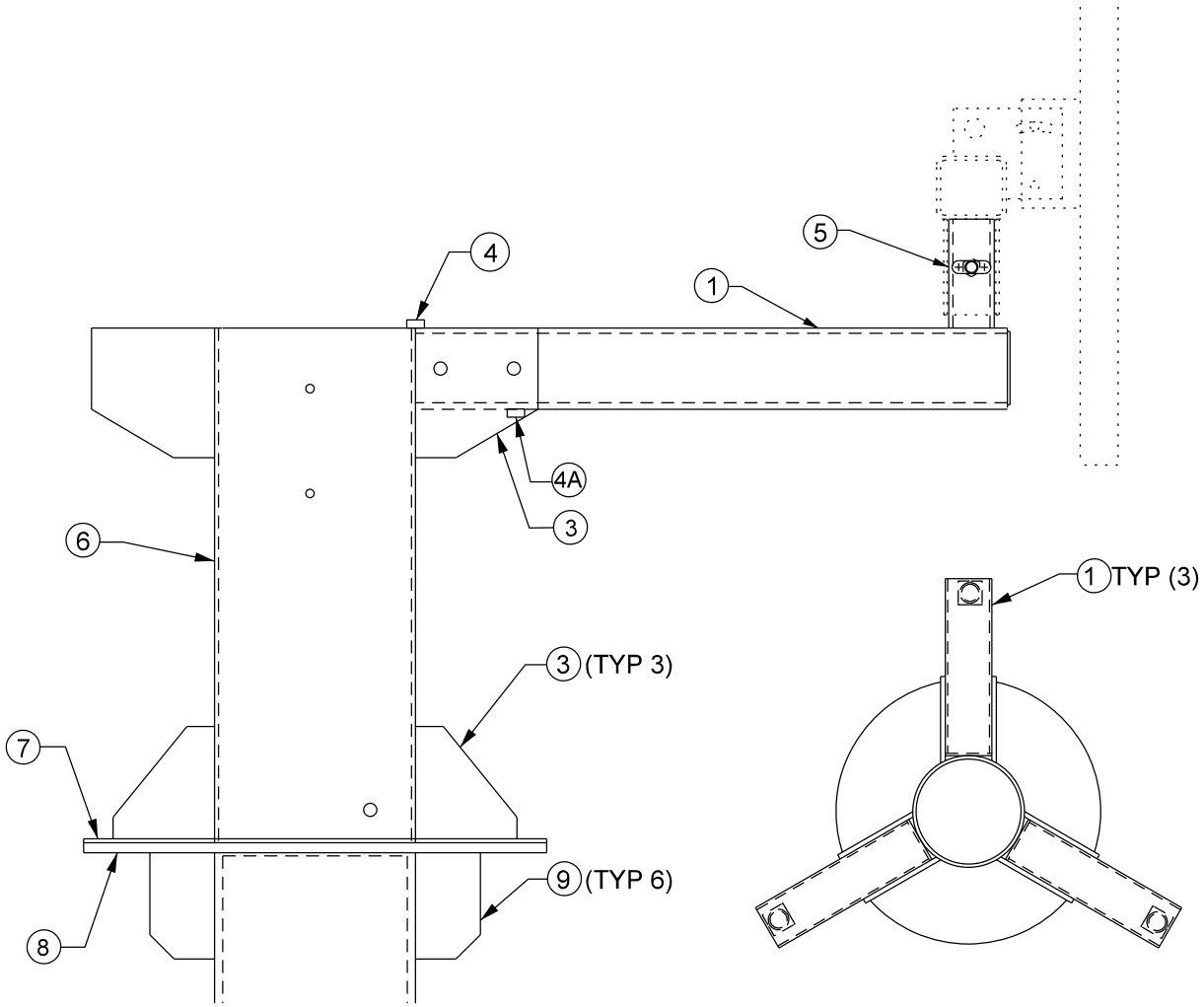
SECTION A-A



PLAN



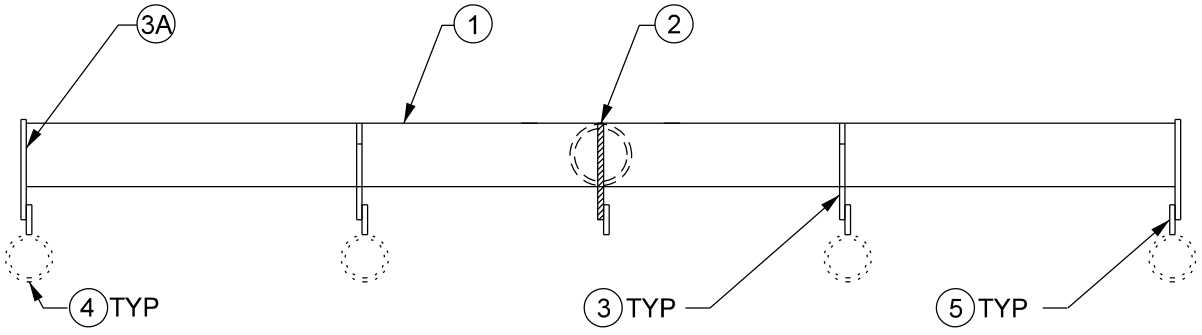
BILL OF MATERIALS		
ITEM	**DESCRIPTION**	**QUANTITY**
1	OUTSIDE PIPE, 3" DIA. X 18"L, SCH 80	1
2	LIFTING EYE, 5/8" DIA. X 3"L	1
3	BANDING PIPE, 1 1/4" DIA. X 24"L, SCH 40	2
4	CHAIN BAND	2
5A	ATTACHMENT PLATE, 10" W X 14" L X 1/4" T	1
5B	ATTACHMENT PLATE, 10" W X 13 7/8" L X 1/4" T	1
5C	ATTACHMENT PLATE, 10" W X 13 3/4" L X 1/4" T	1



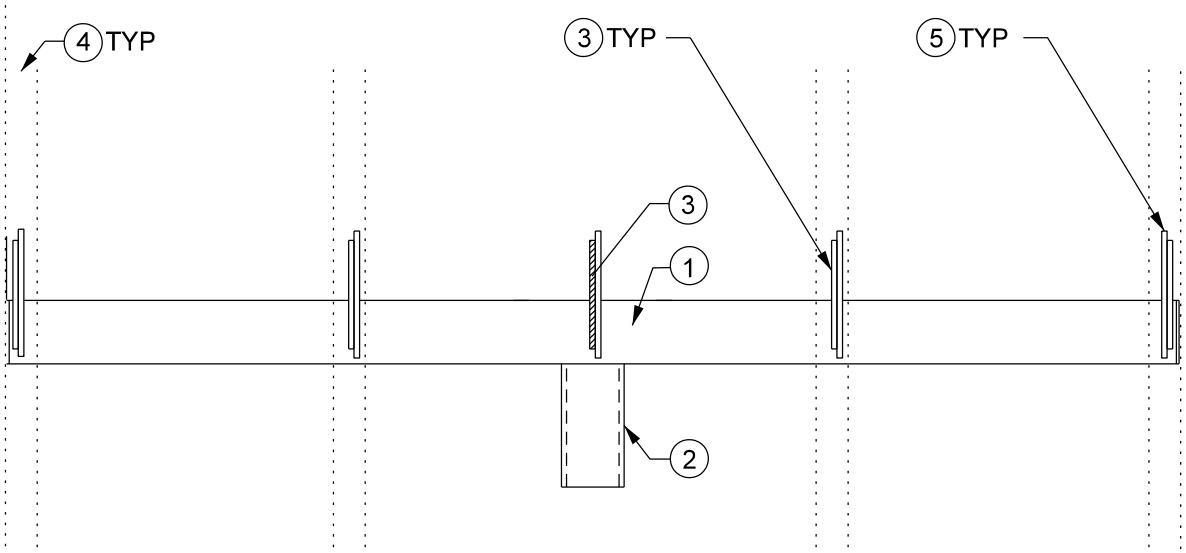
BILL OF MATERIALS		
ITEM	**DESCRIPTION**	**QUANTITY**
1	BOOM ARM, 5" X 5" X 5" X 1/4"	3
2	BASE PLATE GUSSET, 8" H X 8" W X 1/2" T	6
3	ARM GUSSET, 8" H X 8.5" L X 1/2" T	6
4	UPPER SUPPORT ARM, 3" H X 5-3/4" L X 1/2" T	3
4A	LOWER SUPPORT ARM, 3" H X 1" L X 1/2" T	6
5	INSIDE PIPE, 2-1/2" DIA. SCH 40 X 5 1/2" L	3
6	EXTENSTION PIPE, 16" OD X 50" L X SCH 40	1
7	BASE PLATE, 33" X 15.5" ID X 1/2" T	1
8	POLE FLANGE PLATE, 33" X 15.5" ID X 1" T	1
9	POLE FLANGE PLATE GUSSET, 8" H X 4-3/4" W X 1/2" T	6

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITE CROSS ARM EXTENSION ANTENNA MOUNT	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-4-1	8505E170.DGN

PLAN



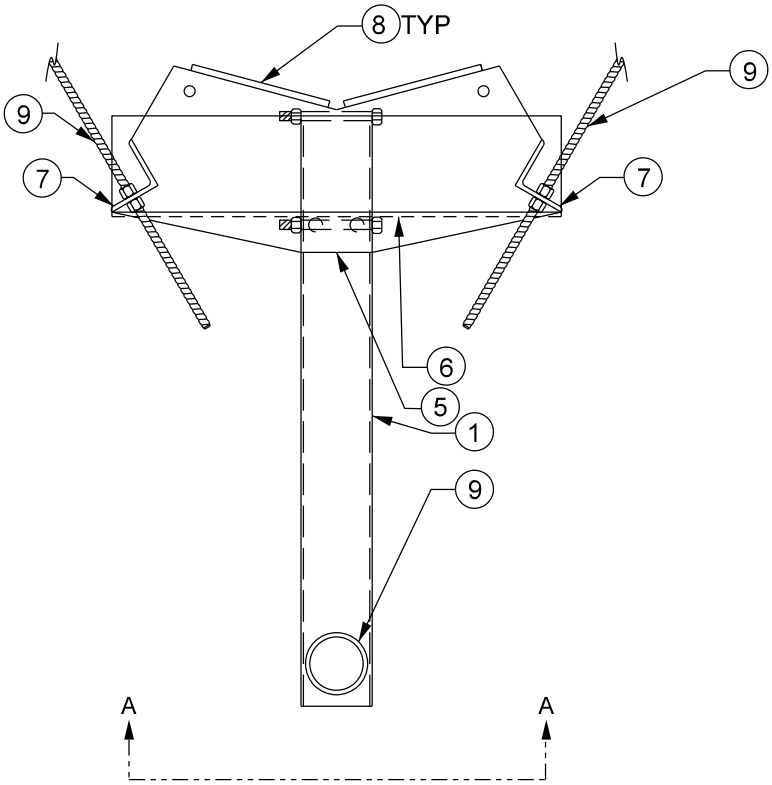
ELEVATION



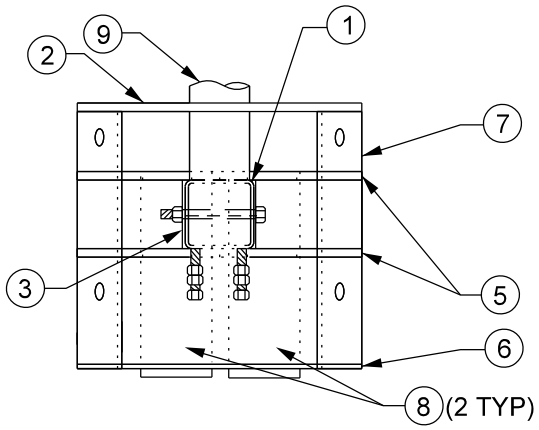
BILL OF MATERIALS			
ITEM	**DESCRIPTION**	**QUANTITY 2' & 4' ARM**	**QUANTITY 6', 8' & 10' ARM**
1	CROSSARM & LENGTH, 4" X 4" X 1/4"	1	1
2	OUTSIDE PIPE, 3" DIA. SCH 80 X 5" L.	1	1
3	CROSSARM VANG PLATES WITH EYES, 5' H X 7-1/4" L X 3/8" T	3	3
3A	CROSSARM VANG END CAP WITH EYE, 6-3/4' H X 7-1/2" L X 3/8" T	2	2
4	ANTENNA PIPE, 2" GALV X 108" L	3	4
5	PIPE BRACKET VANGS, 6" X 3.5" X 3/8"	3	4
6	SUPPORT ANGLE, 1" X 1" X 72"	3	3

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITE CROSS ARM EXTENSION/BOLT-ON ANTENNA MOUNT	ISSUE DATE: 07/22/13 REV. DATE: APPROVAL: W. LARAMIE
	6-5-1	8505E171.DGN

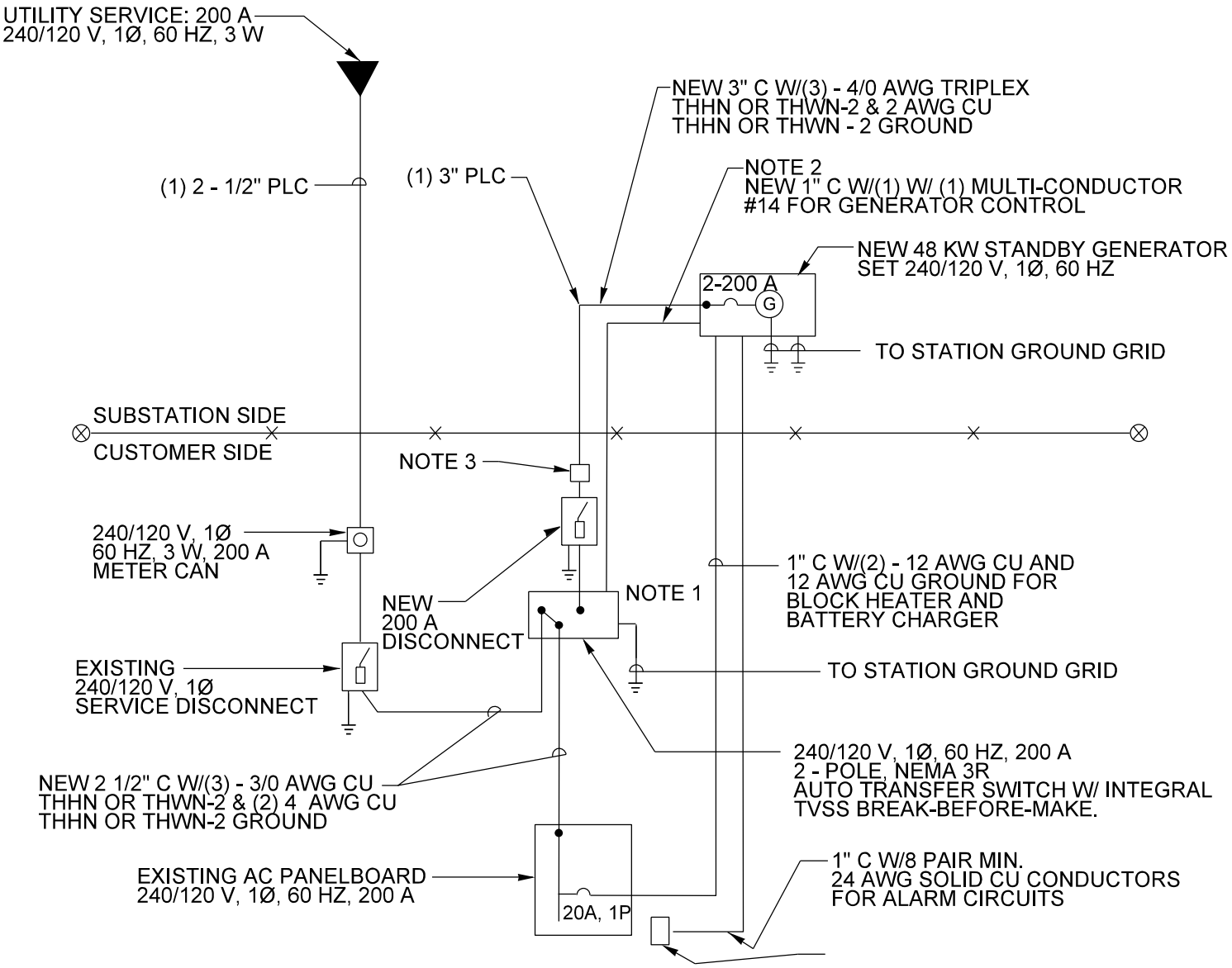
PLAN VIEW



VIEW A-A
FRONT ELEVATION



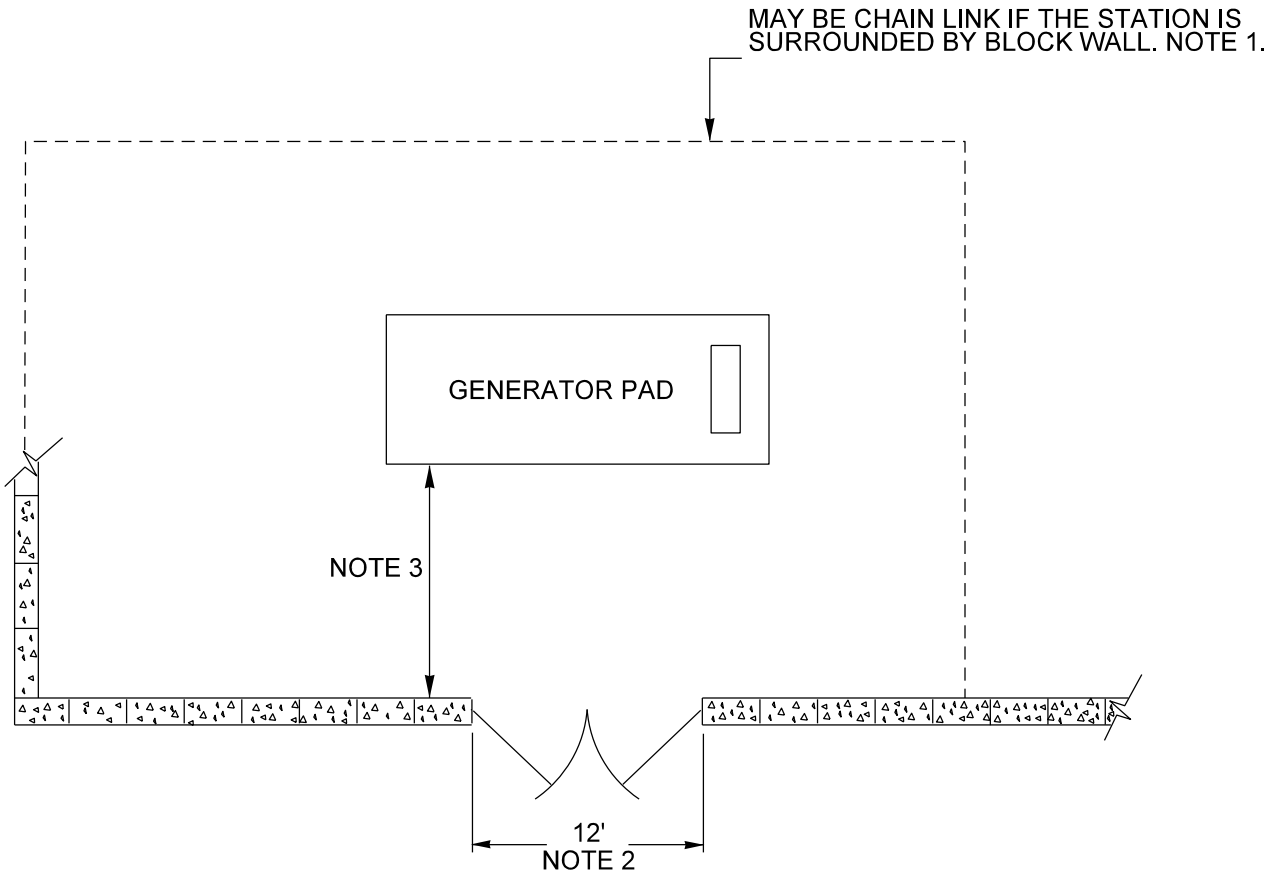
BILL OF MATERIALS - BKRACKS		
ITEM	**DESCRIPTION**	**QUANTITY**
1	BOOM ARM, 5" X 5" X 1/4"	1
2	TOP SUPPORT PLATE, 4-1/8" X 1/2" X 25-9/16"	1
3	BOOM ATTACHMENT PLATES, 6" X 3/8" X 8-5/8"	2
4	BOOM ARM, 5" X 5" X 1/4"	1
5	BRACKET PLATES, 1/2" THICKNESS	2
6	BRACE PLATE, 1/4" THICKNESS	2
7	BRACKET / ANGLE, 3" X 3" X 1/4" X 17" L	2
8	LOAD TRANSFER PLATE, 8" X 14-1/2" X 3/8"	2
9	ALL THREAD ROD, 1" DIA. X 36" L	2



NOTES

1. AUTO TRANSFER SWITCH MUST COMPLY WITH SRP ELECTRIC SERVICE SPECIFICATIONS SECTION 1 - STANDBY GENERATOR OR MULTIPLE SERVICE AND TRANSFER SWITCH REQUIREMENTS.
2. CELL CARRIER CANNOT CYCLE THE GENERATOR FOR TESTING.
3. REMOVE APPLETON GENERATOR PLUG AS NEEDED.

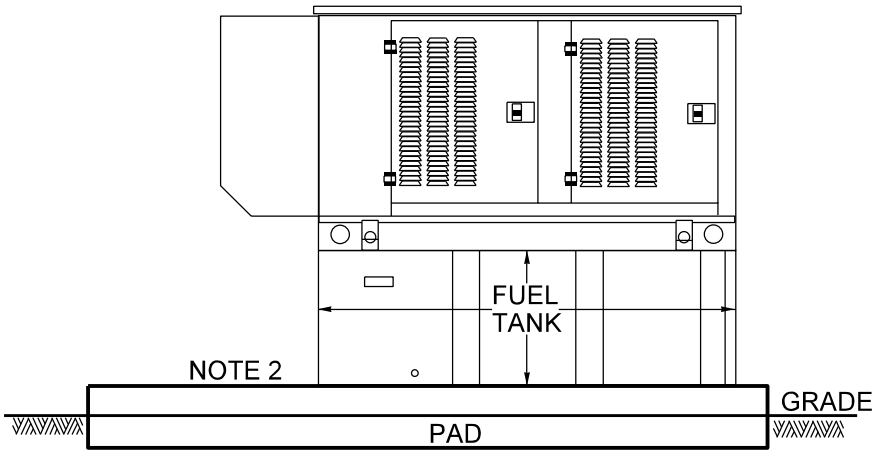
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES 200 A STANDBY GENERATOR SINGLE LINE DIAGRAM	ISSUE DATE: 07/31/13 REV. DATE: APPROVAL: W. LARAMIE
	6-7-1	8505E118.DGN



NOTES

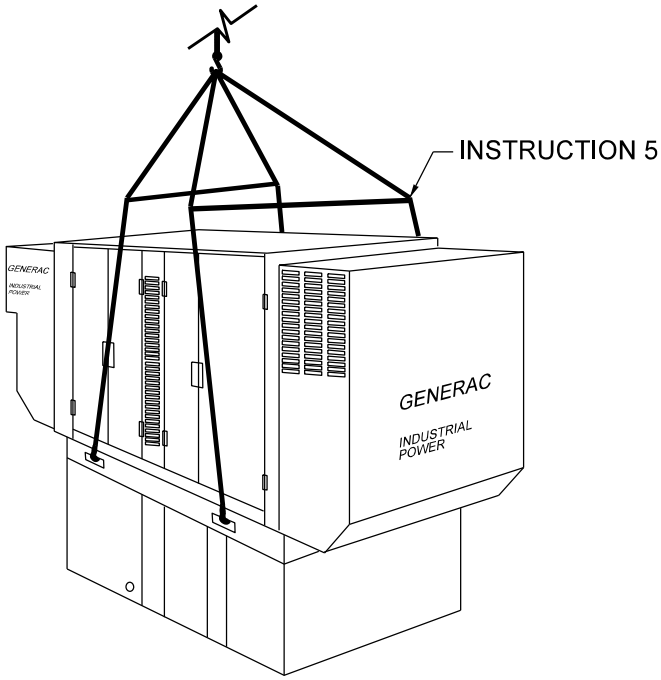
1. AN 8' MINIMUM BLOCK WALL ON ALL FOUR SIDES AND GATE (SOLID WITH NO VISIBILITY IN) SHALL SURROUND THE GENERATOR BUT IS NOT NEEDED IF THE STATION IS SURROUNDED BY A BLOCK WALL. IF THE STATION HAS BLOCK AND CHAIN LINK THE CELL SITE BLOCK WALL SHALL BE BUILT TO THE SAME HEIGHT AND DESIGN AS THE STATION WALL.
2. IF A WALL IS REQUIRED, THE GATE SHALL BE DOUBLE. 6' EACH.
3. A 4' CLEAR, FLAT, LEVEL WORK AREA SURROUNDING THE GENERATOR SHALL BE PROVIDED ON ALL FOUR SIDES.
4. A FUELING VEHICLE SHALL BE ABLE TO ACCESS THE GENERATOR THROUGH THE GATES FROM THE STATION ACCESS.
5. THE MANY SUBSTATION CONFIGURATIONS DEMAND A CUSTOM PLACEMENT OF THE GENERATOR AT EACH SITE INCORPORATING THESE GENERAL REQUIREMENTS IN ADDITION TO EXISTING CLEARANCE AND ACCESS REQUIREMENTS FOR THE STATION ELECTRICAL APPARATUS. OBTAIN A COPY OF THE STATION ULTIMATE GENERAL ARRANGEMENT DRAWING AND MAKE SURE THE GENERATOR FITS WITHOUT OBSTRUCTING THE ULTIMATE PLAN OR ACCESS. HAVE THE GENERATOR PLACED ON THE ULTIMATE GENERAL ARRANGEMENT DRAWING.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	CELL SITES BACKUP GENERATOR CLEAR SPACE AND FENCE REQUIREMENTS	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-8-1	8505E124.DGN



NOTES

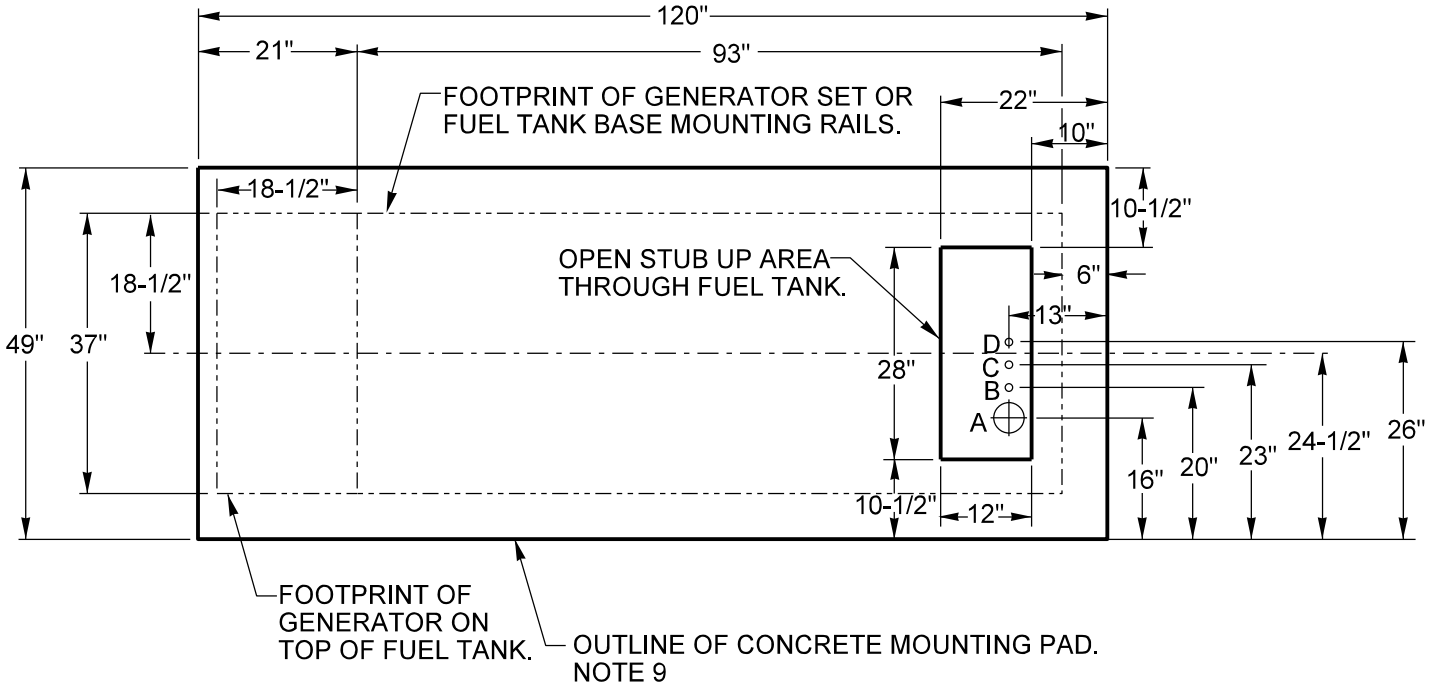
1. GENERAC SD050, UL 142 APPROVED 210 GALLON DIESEL FUEL TANK, STANDARD ENCLOSURER.
2. THE PAD IS DESIGNED FOR 50 KW OR 100 KW GENERATOR.



NOTES

1. DO NOT LIFT GENERATOR SET BY THE LIFTING EYES ATTACHED TO THE GENERATOR OR ALTERNATOR.
2. THE MOUNTING SKID HAS FOUR LIFTING POINTS.
3. SPREADER BAR SHOULD BE USED TO AVOID CONTACT WITH GENERATOR, ALTERNATOR OR WEATHER HOUSING CABINET (WEATHER HOUSING CABINET NOT SHOWN ABOVE).
4. LIFT THE WEATHER HOUSING CABINET AND GENERATOR SET TOGETHER AS ONE UNIT.
5. SPACER BAR MUST BE SLIGHTLY WIDER THAN THE SKID.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES GENERATOR, INTEGRAL DIESEL FUEL TANK AND PAD	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-9-1	8505E129.DGN



LEGEND

A = 4" PLC POWER CABLES TO PRIMARY MAINLINE CIRCUIT BREAKER

B = 1" PLC AC POWER SUPPLY FOR JACKET WATER HEATER AND BATTERY CHARGER

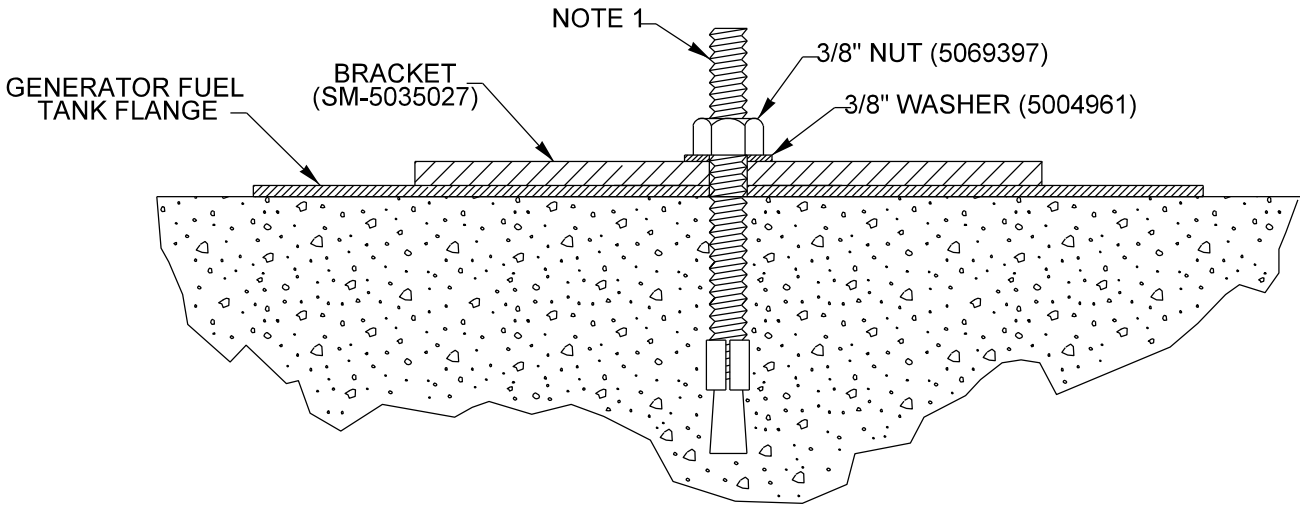
C = 1" PLC DC CONTROL WIRING TO AUTOMATIC TRANSFER SWITCH

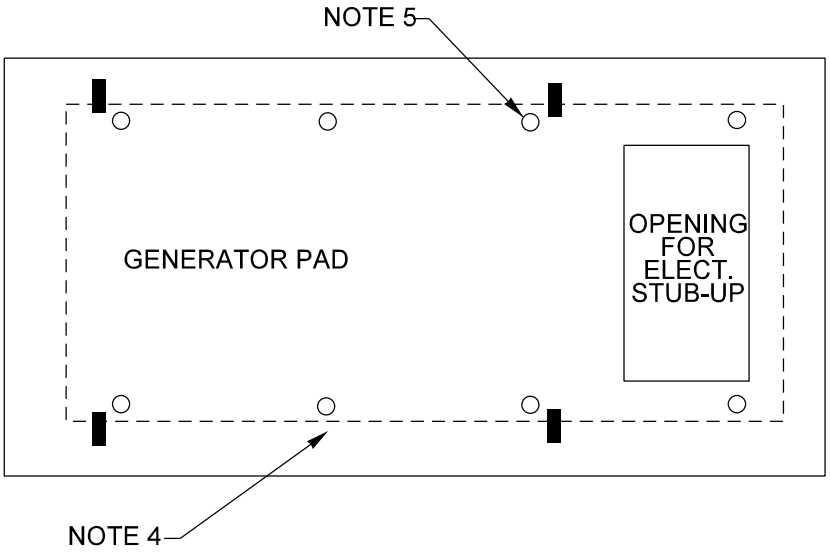
D = 1" PLC CONTROL WIRES TO REMOTE ANNUNCATOR OR COMMUNICATIONS PORT IF REQUIRED

NOTES

1. CONCRETE SHALL BE 3000 PSI AT 28 DAYS, PER MATERIAL ITEM 5075323.
2. ALL REINFORCING STEEL SHALL BE ASTM A615 GRADE 60 PER SRP SPECIFICATION 03210, STANDARD SPECIFICATION FOR REINFORCING STEEL.
3. 6" OF AGGREGATE BASE SHALL BE PLACED BELOW FOUNDATION. ALL AGGREGATE BASE SHALL BE COMPACTED TO MINIMUM 95% OF THE MAXIMUM DENSITY PER ASTM D-698 (STANDARD PROCTOR). AGGREGATE BASE SHALL BE IN ACCORDANCE WITH SRP SPECIFICATION 02230, SPECIFICATION FOR AGGREGATE BASE AND SELECT MATERIAL.
4. THE GENERATOR MOUNTS ON ITS FUEL TANK 37" OVER THE PAD.
5. STUB UP CONDUIT TO SURFACE OF PAD.
6. BACKFILL CONDUIT UNDER PAD WITH CLSM 1/2 SACK (SM-0060013).
7. SEAL CONDUIT WINDOW AGAINST VERMIN WITH SPEED CRETE (SM-5011902) TO DEPTH OF 2". DO NOT OVERFLOW INTO CONDUIT.
8. SEAL THE CONDUIT AFTER CABLE IS INSTALLED WITH FOAM (SM-5012047).
9. DIMENSIONS SHOWN ASSUME 6" CLEARANCE FROM FOOTPRINT OF MOUNTING RAILS. TOTAL WEIGHT OF GENERATOR SET WITH FUEL IS APPROXIMATELY 4,739 LBS. THE RECOMMENDED MINIMUM DEPTH IS 10" BASED ON WEIGHT SHOWN. REINFORCE WITH STEEL FABRIC OR REBAR IN COMPLIANCE WITH LOCAL BUILDING CODES.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES CUSTOMER BACK-UP 50kW OR 100kW GENERATION PAD AND CONDUIT STUB-UP LOCATION	ISSUE DATE: 07/30/13 REV. DATE: APPROVAL: W. LARAMIE
	6-10-1	8505E127.DGN





NOTES

1. 3" X 3/8" RED HEAD WEDGE ANCHOR OR EQUIVALENT.
2. DRILL PAD FOR FOUR WEDGE ANCHORS WITH HAMMER DRILL.
3. USE SRP 5035027 FASTENING BRACKET.
4. GENERATOR FUEL TANK FLANGE OUTLINE WITH HOLES FOR ANCHOR BOLTS. IN THIS INSTALLATION, THE HOLES ARE USED TO LOCATE THE ANCHOR BRACKET POSITIONS ONLY.
5. INSTALL THE ANCHOR BRACKETS (4 MINIMUM) NEAR THE EXISTING FUEL TANK FLANGE HOLES AS SHOWN IN THE UPPER DETAIL.
6. WEDGE ANCHORS AND CONCRETE DRILLS AVAILABLE AT TSC/LINE C&M TOOL ROOM.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	CELL SITES CUSTOMER BACKUP 50kW OR 100kW GENERATION ATTACHMENT TO PAD	ISSUE DATE: 07/29/13 REV. DATE: APPROVAL: W. LARAMIE
	6-10-2	8505E126.DGN

I. GENERATOR MAINTENANCE INFORMATION

A. ASSUMPTIONS

WORK IS PERFORMED BASED ON MANUFACTURER'S RECOMMENDATIONS. BASED ON THIS INFORMATION AND INPUT FROM GENERAC, THE GENERATOR IS ESTIMATED TO LAST 15 YEARS OR ABOUT 4,000 HRS.

B. PREVENTATIVE MAINTENANCE

1. SRP SHALL COMPLETE QUARTERLY AND ANNUAL INSPECTIONS AND MAINTENANCE. QUALIFIED PERSONNEL WILL BE ON SITE TO COMPLETE THE FOLLOWING:

A) THREE TIMES PER YEAR

- CHECK OIL
- CHECK OIL FILTER (CONDITION, TIGHTNESS, ETC.)
- CHECK HOSES
- CHECKS BELTS
- CHECK RADIATOR FLUID
- CHECK BATTERY VOLTAGE
- CHECK AIR FILTER
- CHECK FUEL LINES
- VALIDATE SHUTDOWN WARNINGS
- CHECK EMERGENCY SHUTDOWN CYCLE
- CHECK PERCENTAGE OF FUEL
- RECORD GENERATOR RUN HOURS

B) YEARLY

- CHANGE OIL
- CHANGE OIL FILTER
- CHANGE AIR FILTER
- CHANGE COOLANT

NOTE: GENERAC HAS A TWO YEAR STANDARD PARTS AND LABOR WARRANTY WITH UP TO 5 YEARS AVAILABLE.

DESIGN RULES

1. TRANSMISSION & DISTRIBUTION POLES SELECTED FOR SCS INSTALLATIONS SHALL:
   A. BE STEEL POLES WITH ADEQUATE STRENGTH FOR THE ADDITIONAL LOADS. DESIGNS SHALL MEET NESC.
   B. BE IN A LOCATION WHERE THE CABINET CAN BE MOUNTED SO THAT IT DOES NOT BLOCK SIDEWALKS, PEDESTRIAN OR VEHICULAR PATHS.
   C. TRANSMISSION POLES:
   D. CANDIDATE POLE MUST BE APPROVED BY TRANSMISSION LINE ASSET MANAGEMENT (TLAM).
      - GRADE B CONSTRUCTION. CALCULATIONS MUST BE REVIEWED AND APPROVED BY TRANSMISSION LINE DESIGN (TLD). UTILIZE THE TRANSMISSION POLE LAND USE REQUEST FORM TO INITIATE THE REVIEW PROCESS.
      - HAVE NO PRIMARY RISERS, NOR ANY EQUIPMENT SUCH AS SWITCHES OR CAPACITOR BANKS. TRANSFORMERS ARE ACCEPTABLE.
      - BECAUSE VEHICULAR ACCESS AND SETUP IS CRITICAL FOR MAINTENANCE, POSITION OF THE CABINET ON THE POLE SHALL BE APPROVED BY TLAM.
   E. BE ACCESSIBLE BY SRP BOOMED VEHICLES FOR MAINTENANCE.
2. ELECTRIC SERVICE TO SCS CABINET:
   A. PULL SECTION AND METER SOCKET SHALL BE MOUNTED TO THE SCS CABINET.
   B. SRP OWNED SERVICE CONDUCTOR (TRANSFORMER/SECONDARY TO SES WEATHER HEAD) SHALL BE IN PLASTIC RISER MOLDING.
   C. CUSTOMER OWNED CONDUCTOR SHALL BE INSTALLED IN STEEL RISER AND SUPPORTED/BRACED IN ACCORDANCE WITH REQUIREMENTS PUT FORTH IN SRP'S ELECTRIC SERVICE SPECIFICATIONS.
   D. THE TOP OF THE SCS CABINET SHALL BE USED IN PLACE OF "GROUND" WHEN ESTABLISHING VERTICAL CLEARANCES OF POINT OF ATTACHMENT AND DRIP LOOP TO GROUND
   E. THE SERVICE ENTRANCE SECTION AND SERVICE CONDUCTOR SHALL BE DESIGNED IN ACCORDANCE WITH REQUIREMENTS PUT FORTH IN SRP'S ELECTRIC SERVICE SPECIFICATIONS. AUTHORITY HAVING JURISDICTION (AHJ) INSPECTIONS SHALL BE REQUIRED PRIOR TO ENERGIZING.
   F. IF THE AHJ REQUIRES A GROUND ROD, THE GROUND ROD SHALL BE NO CLOSER THAN 6" TO THE FACE OF THE POLE AND LOCATED UNDER THE CABINET.
   G. ANY UNDERGROUND FACILITIES TO THE SCS SHALL BE REVIEWED AND APPROVED BY TLD. TLD SHALL REQUEST ADDITIONAL SUPPORT FROM CIVIL ENGINEERING SERVICES IF REQUIRED ON AN AS-NEEDED BASIS. THE CONCRETE FOUNDATION AND/OR FOUNDATION BACKFILL SHALL NOT BE DISTURBED.
   H. FOR UNDERGROUND SERVICES, A TRENCHING PLAN WITH WIDTHS AND DEPTHS OF CONDUITS SHALL BE SUPPLIED FOR APPROVAL BY THE APPLICABLE DISTRIBUTION DESIGN GROUP.
3. SCS EQUIPMENT:
   A. ALL ATTACHMENTS SHALL BE BELOW THE MINIMUM CLEARANCES SHOWN ON THE CONSTRUCTION STANDARD.
   B. ALL CUSTOMER EQUIPMENT SHALL BE MOUNTED TO POLES WITH STAINLESS OR SEGMENTED STEEL BANDS.
   C. ANTENNA ARRAYS AND ATTACHMENTS SHALL BE REVIEWED BY TLD TO DETERMINE ACCEPTABLE LOCATION AND CONFIGURATIONS.

D. NO HOLES SHALL BE DRILLED EXCEPT TO MAKE A GROUND CONNECTION BETWEEN THE SCS CABINET AND THE STEEL POLE OR SO THAT CONDUIT AND RISER MOLDING CAN BE SECURED. UTILIZE STAINLESS STEEL SELF-DRILL AND TAP SCREWS.

E. CABLING BETWEEN SCS CABINET AND ANTENNA SHALL BE CONTAINED WITHIN THE POLE OR IN RISER MOLDING FOR THE LENGTH OF ATTACHMENT TO THE POLE. MOLDING SHALL BE PAINTED TO MATCH THE COLOR OF THE POLE.

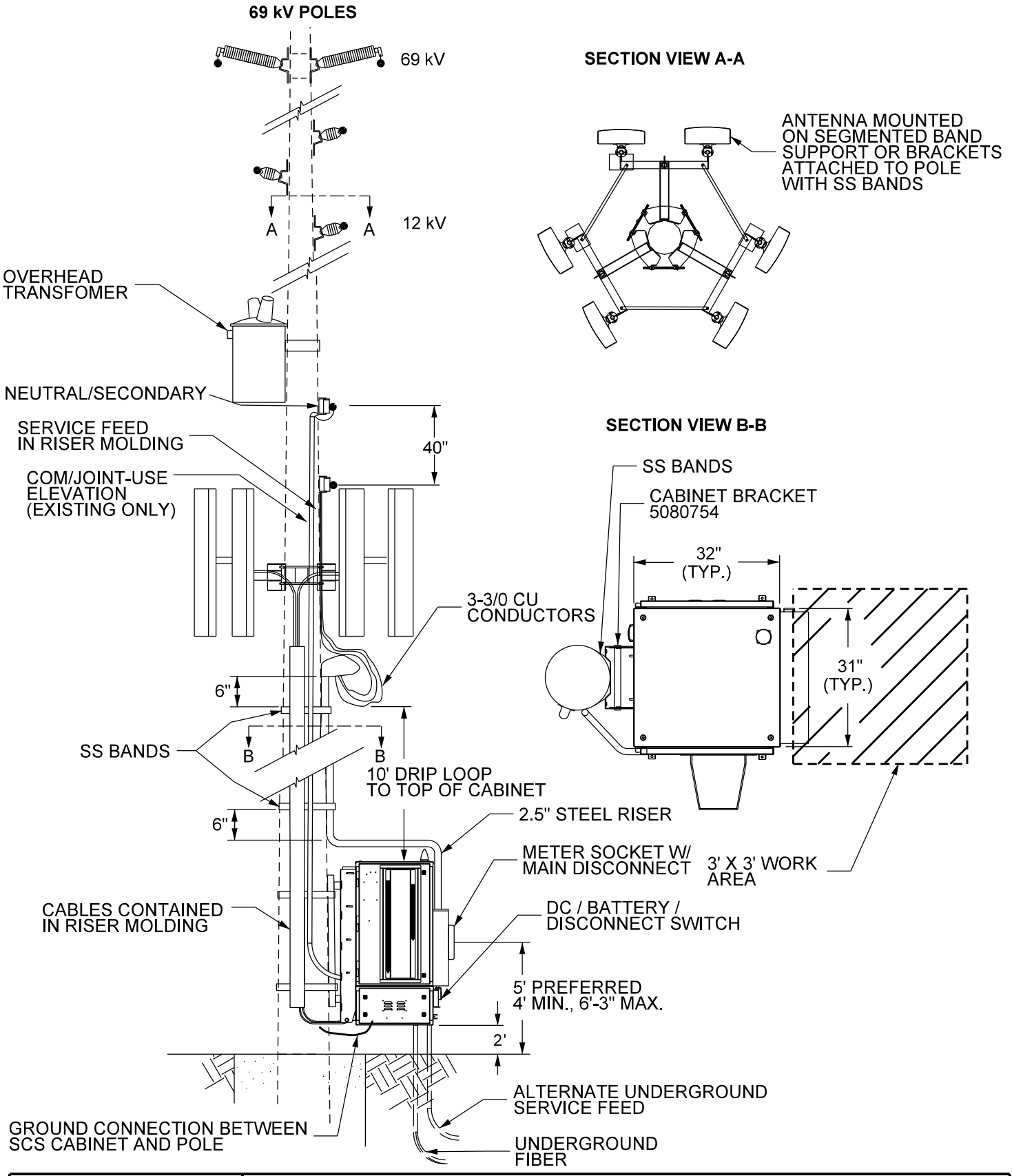
F. SCS CABINET SHALL BE MOUNTED ON POLE USING GALVANIZED STEEL BRACKET (ITEM NUMBER 5080754) AND STAINLESS STEEL BANDS.

G. SCS CABINET ATTACHED TO STEEL TRANSMISSION POLES SHALL BE BONDED TO THE POLE. DRILL AND TAP STEEL POLE TO MAKE GROUND CONNECTION WITH 2/0 COPPER CONDUCTOR.

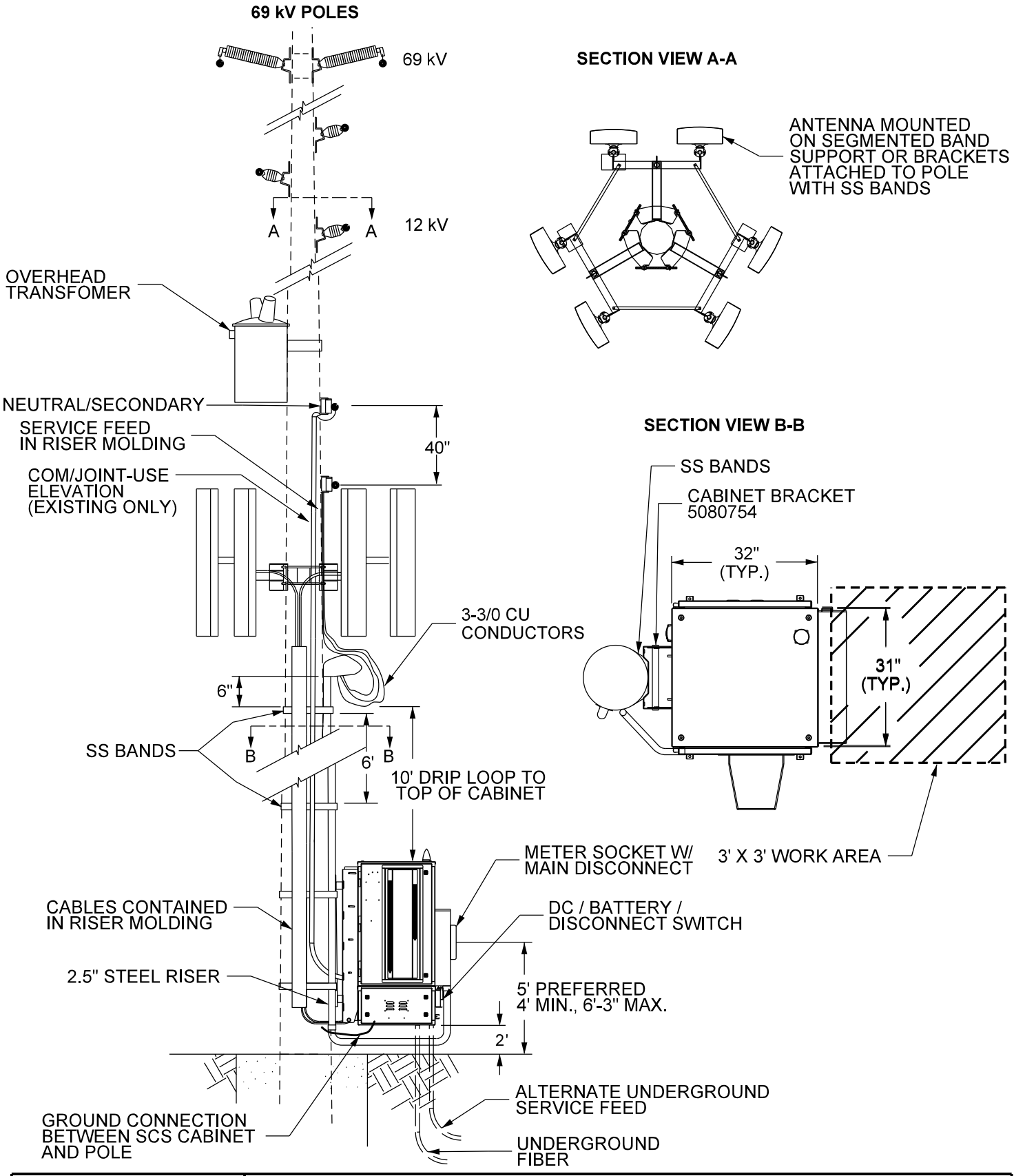
H. ANY SIGNAGE INDICATING THE PRESENCE OF RF EXPOSURE SHALL BE AFFIXED TO THE SCS CABINET. NO SIGNAGE SHALL BE APPLIED TO THE POLE.

IF A HIGHLY DESIRABLE LOCATION IS IDENTIFIED AND AN EXISTING WOOD POLE IS PRESENT, CHECK WITH TLD SUPERVISION TO DETERMINE IF FUNDING IS AVAILABLE FOR SHARED COST OF UPGRADING THE POLE.

SCS LOCATIONS SHALL BE MAPPED. OWNER AND EMERGENCY CONTACT INFORMATION SHALL BE RECORDED FOR EACH INSTALLATION. SEE OVERHEAD DISTRIBUTION CONSTRUCTION STANDARDS, SECTION 1 FOR MAPPING SYMBOLOGY.

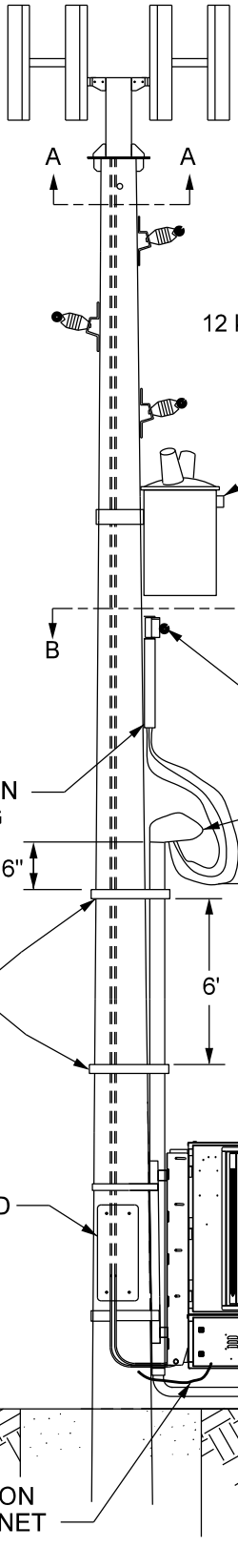


Communications Design & Construction Standards SRP PROPRIETARY MATERIAL	CELL SITES SMALL CABINET SITE TOP RISER ON 69 kV TRANSMISSION POLE	ISSUE DATE: 07/29/19 REV. DATE: 03/09/20 APPROVAL: J. LUERA
	6-12-3	8505E136.DGN

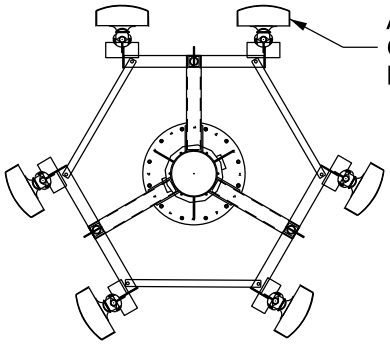


Communications Design & Construction Standards SRP PROPRIETARY MATERIAL	CELL SITES SMALL CABINET SITE BOTTOM RISER ON 69 kV TRANSMISSION POLE	ISSUE DATE: 07/29/19 REV. DATE: 03/09/20 APPROVAL: J. LUERA
	6-12-4	8504E137.DGN

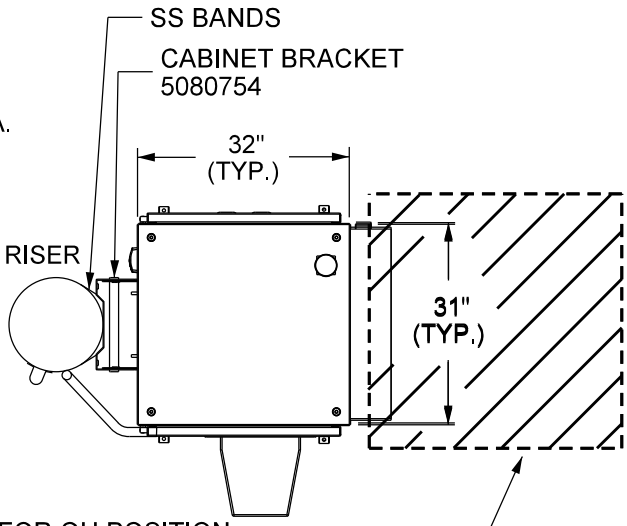
DISTRIBUTION POLES



SECTION VIEW A-A

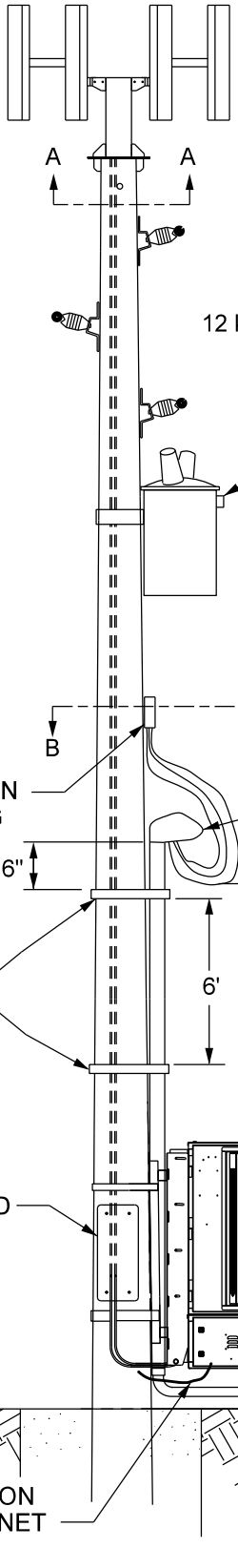


SECTION VIEW B-B

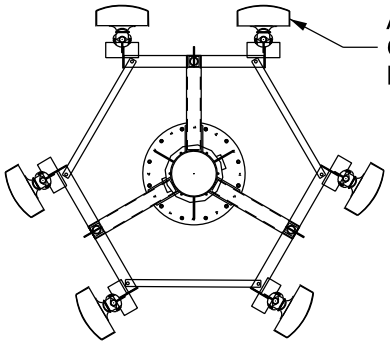


Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES SMALL CABINET SITE ON DISTRIBUTION POLE	ISSUE DATE: 07/29/19 REV. DATE: 03/09/20 APPROVAL: J. LUERA
	6-12-5	8505E179.DGN

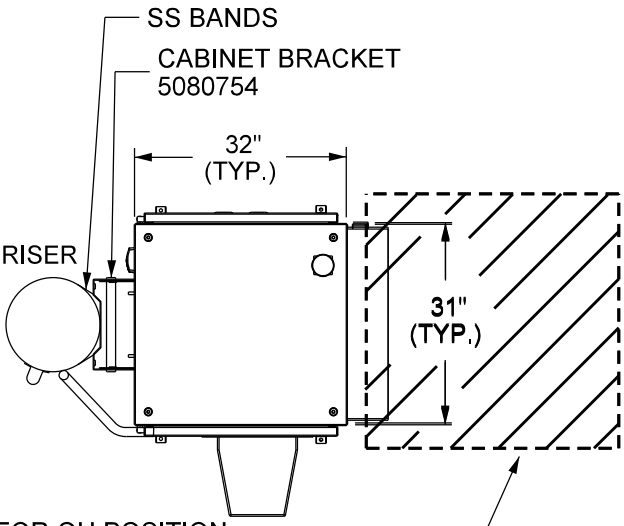
DISTRIBUTION POLES



SECTION VIEW A-A

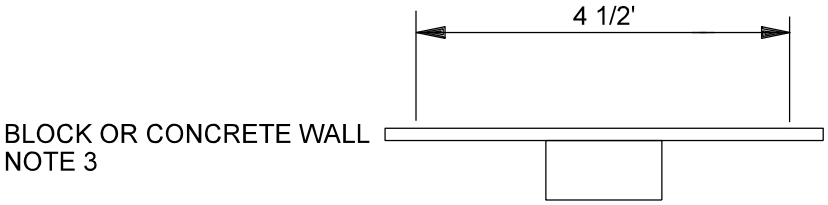


SECTION VIEW B-B

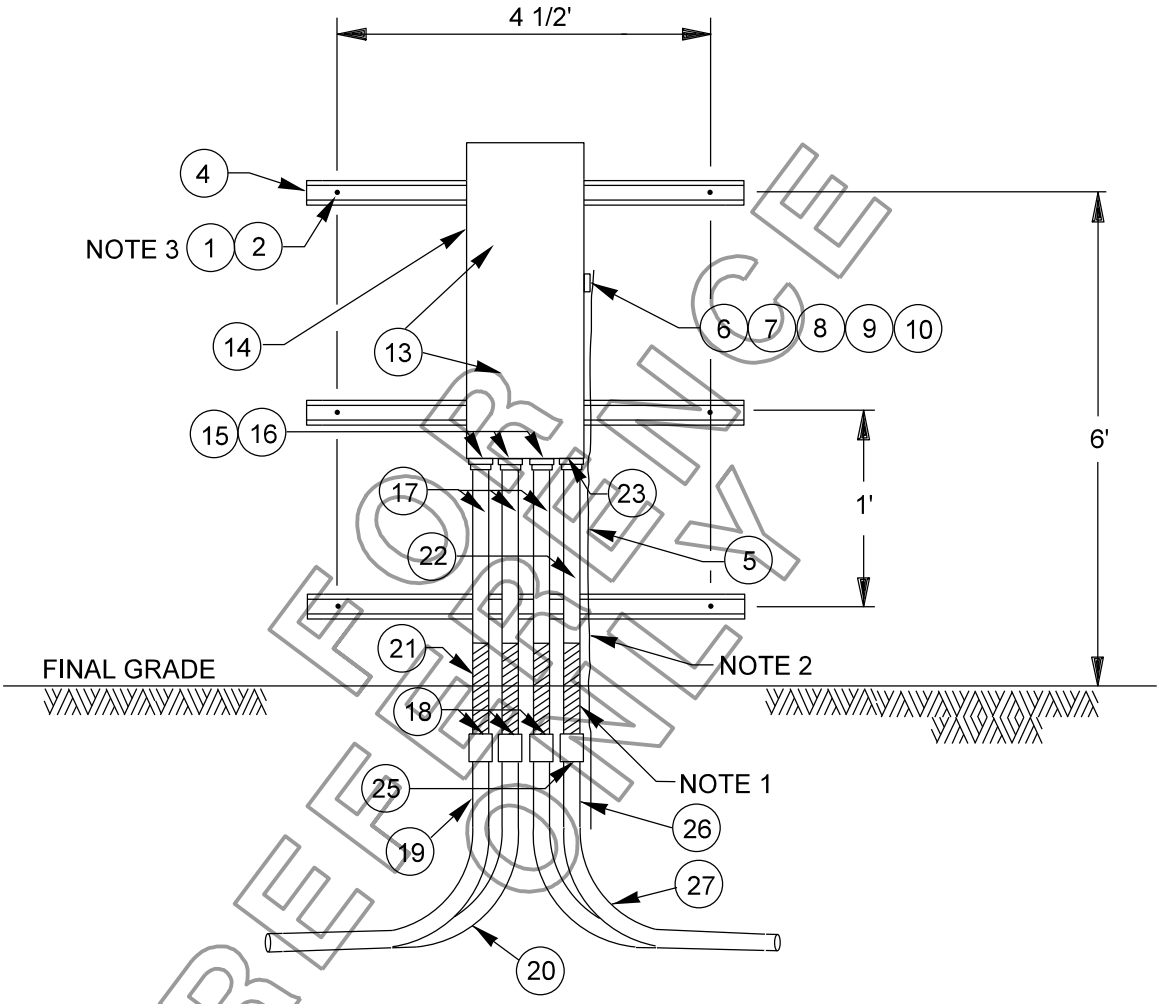


Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES SMALL CABINET SITE ON DISTRIBUTION POLE	ISSUE DATE: 03/09/20 REV. DATE: 03/09/20 APPROVAL: J. LUERA
	6-12-6	8505E188.DGN

TOP VIEW



FRONT VIEW



NOTES

1. METAL CONDUIT INSTALLED UNDERGROUND SHALL BE WRAPPED WITH A UL-APPROVED PVC TAPE, MINIMUM 1/2" OVERLAP TO AT LEAST 6" ABOVE FINAL GRADE.

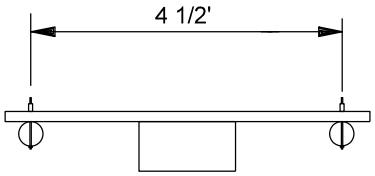
2. TO STATION GROUND GRID, IF THERE ISN'T A STATION GROUND, INSTALL 8' GROUND ROD MATERIAL ITEM 5034975 AND A CLAMP 5035027.

3. DEPENDING ON THE WALL CONSTRUCTION, EITHER FASTENER ITEM 1 OR ITEM 2 MAY BE USED.

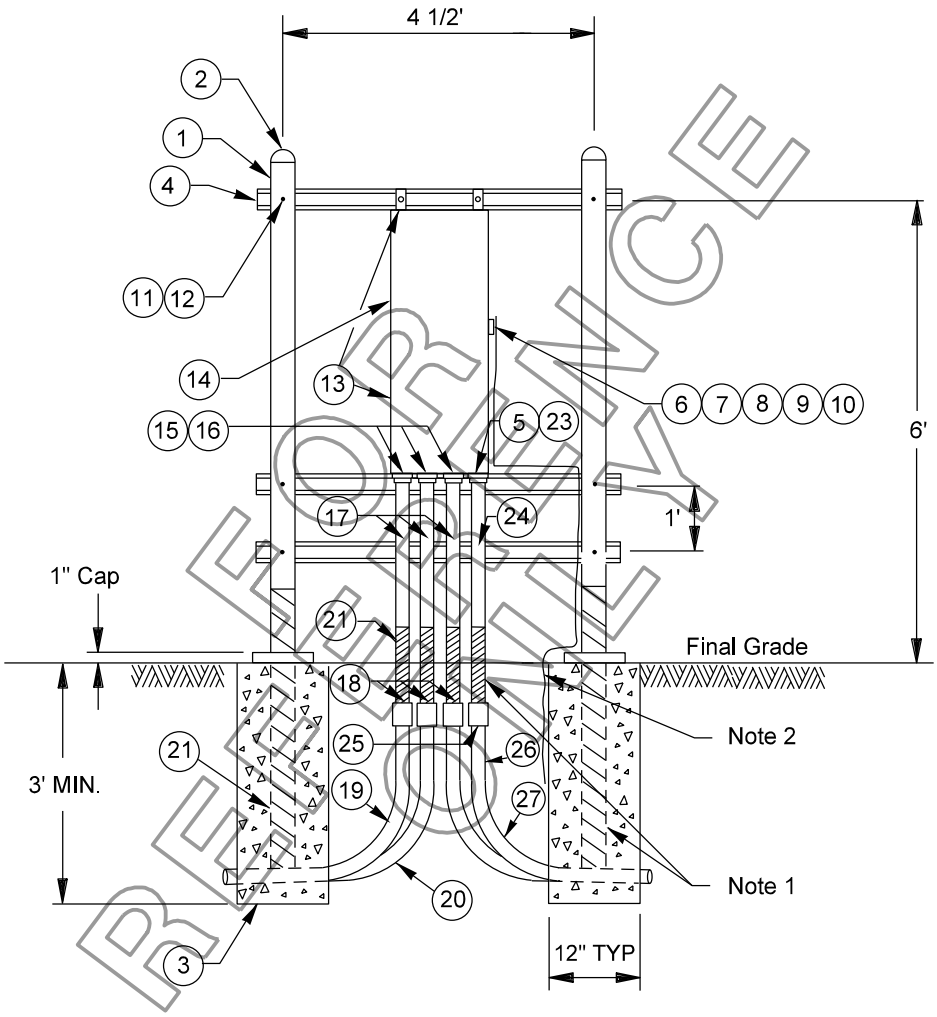
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES ATS ON BLOCK WALL DETAILS	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-13-1	8505E119.DGN

BILL OF MATERIALS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QTY**
1	TOGGLE BOLT, 3/8", ANCHORS, 11K314, GRAINGER INDUSTRIAL SUPPLY		NOTE 3
2	WEDGE ANCHOR 3/8" X 3" LONG	5069664	NOTE 3
3	CHANNEL, FRAMING, 1-5/8", 1-5/8", 20 FT. LENGTH	5035188	1 – 20'
4	WIRE, COPPER, #4/0	5033859	20
5	CONNECTOR, COMP, #4/0 STR. AL OR CU 2-HOLE	5035286	1
6	BOLT, HEX, ½" X ¾"	5069526	1
7	NUT, HEX ½" X 13 THREAD	5069398	1
8	WASHER, FLAT, ½"	5004963	1
9	WASHER, LOCK, ½"	5005093	1
10	ASCO AUTO TRANSFER SWITCH	—	1
11	BUSHING, CONDUIT, GROUNDING, 2"	5022622	4
12	LOCKNUT, CONDUIT, GALVANIZED, 2"	5021122	4
13	CONDUIT, RIGID, GALVANIZED, 2"	5022645	2
14	ADAPTER, CONDUIT, PLASTIC TO RIGID, 2"	5034945	4
15	CONDUIT, PLASTIC, 2"	5035466	4
16	ELBOW, 90 DEG., PLASTIC, 2"	5033600	4
17	TAPE, PIPE WRAP, 2" X .1 MIL.	5012311	4
18	CONDUIT, RIGID, GALVANIZED, 1"	—	1
19	LOCKNUT, CONDUIT, GALVANIZED, 1"	—	1
20	BUSHING, CONDUIT, GROUNDING, 1"	—	1
21	ADAPTER, CONDUIT, PLASTIC TO RIGID, 1"	—	1
22	CONDUIT, PLASTIC, 1"	—	1
23	ELBOW, 90°, PLASTIC, 1"	—	1

TOP VIEW



FRONT VIEW

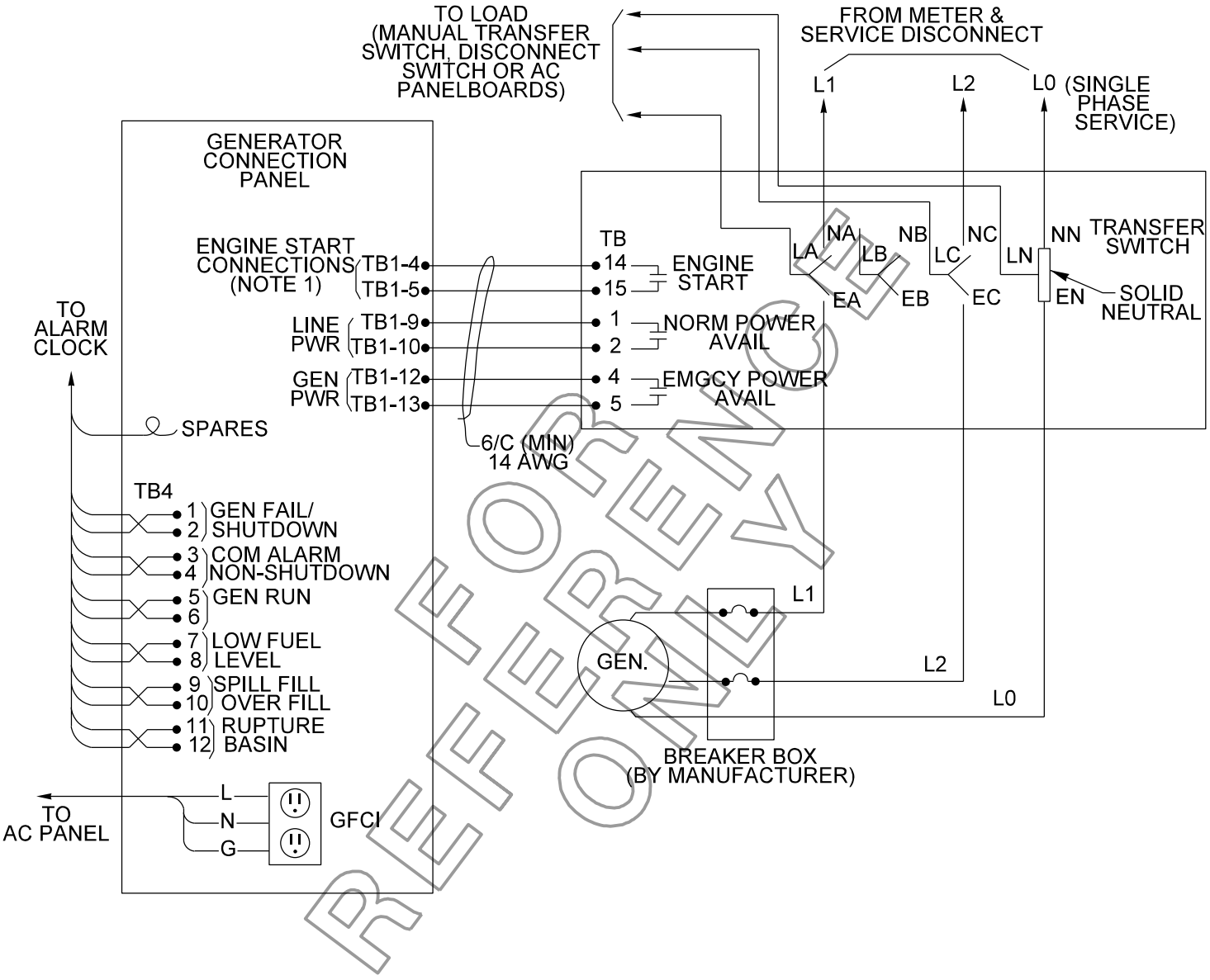


NOTES

1. METAL CONDUIT INSTALLED UNDERGROUND SHALL BE WRAPPED WITH A UL-APPROVED PVC TAPE, MINIMUM 1/2" OVERLAP TO AT LEAST 6" ABOVE FINAL GRADE.
2. TO STATION GROUND GRID, IF THERE ISN'T A STATION GROUND, INSTALL 8' GROUND ROD MATERIAL ITEM 5034975 AND A CLAMP 5035596.
3. MUST BE A MINIMUM OF 4' FROM THE SUBSTATION WALL / FENCE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES ATS ON H-FRAME DETAILS	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-14-1	8505E173.DGN

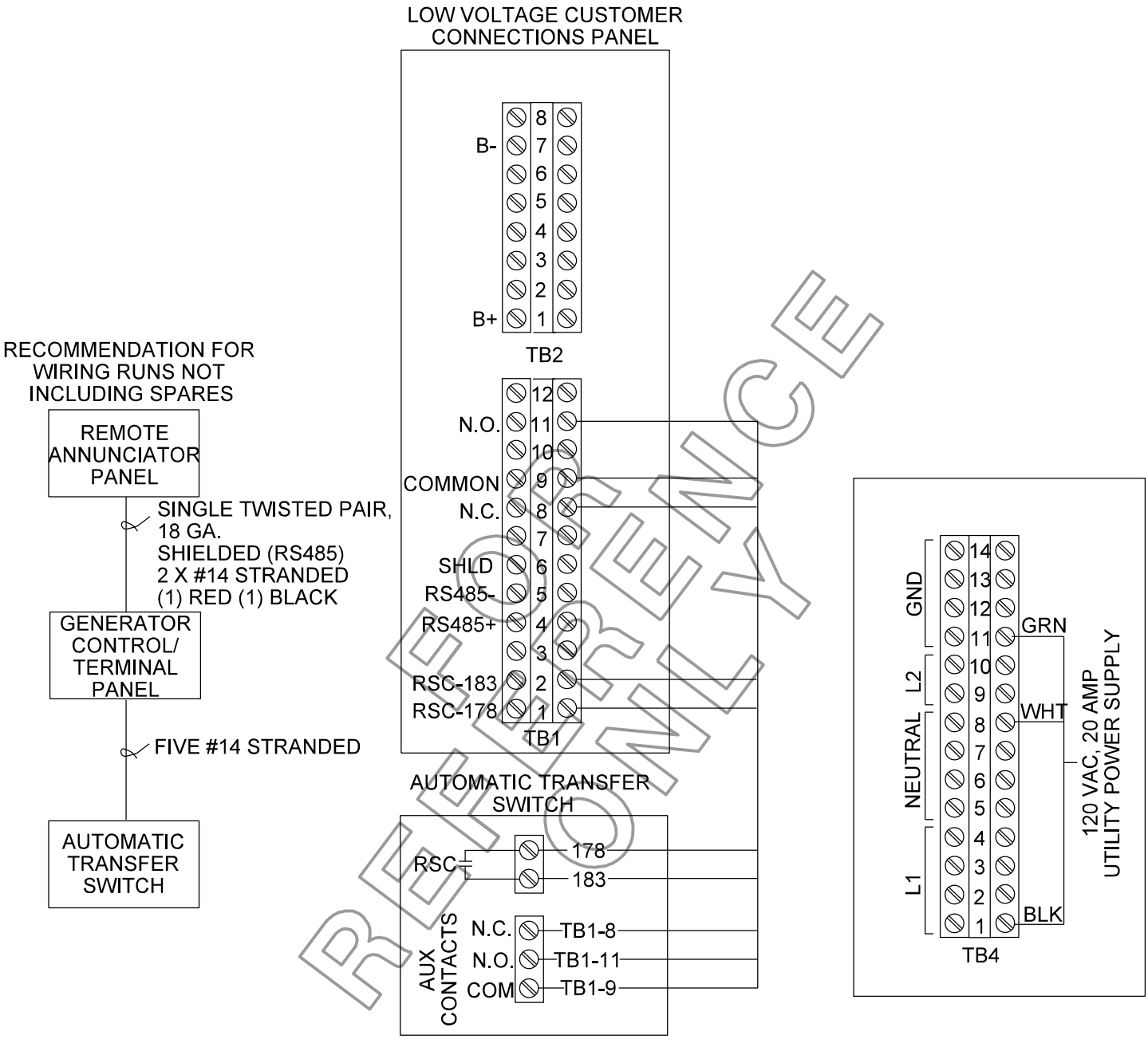
BILL OF MATERIALS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QTY**
1	PIPE, ASTM A-53, 3" SCH 40	5000149	1
2	WEATHER TIGHT OR PRESSED STEEL CLOSURE CAP, BROWN	5034875	2
3	CONCRETE, 2500 PSI STRENGTH MIN. OR CLASS C PER MAG SECTION 725	5003303	4
4	CHANNEL, 1-5/8", 1-5/8", 20 FT. LENGTH	5035188	1 – 20'
5	LOCKNUT, CONDUIT, GALVANIZED, 1"		
6	CONNECTOR, COMP, #4/0 STR. AL OR CU 2-HOLE	5035286	1
7	BOLT, HEX, ½" X ¾"	5069526	1
8	NUT, HEX ½" X 13 THREAD	5069398	1
9	WASHER, FLAT, ½"	5004963	1
10	WASHER, LOCK, ½"	5005093	1
11	BOLT, MACHINE, ½" X 4 ½"	5027614	4
12	WASHER, LOCK, ½" BOLT	5029177	4
13	NUT, CHANNEL WITH SPRING	5016349	4
14	ASCO AUTO TRANSFER SWITCH		1
15	BUSHING, CONDUIT, GROUNDING, 2"	5022622	4
16	LOCKNUT, CONDUIT, GALV., 2"	5021122	4
17	CONDUIT, RIGID, GALV., 2"	5022645	2
18	ADAPTER, CONDUIT, PLASTIC TO RIGID, 2"	5034945	4
19	CONDUIT, PLASTIC, 2"	5035466	4
20	ELBOW, 90°, PLASTIC, 2"	5033600	4
21	TAPE, PIPE WRAP, 2" X .1 MIL.	5012311	4
22	WIRE, COPPER, #4/0	5033859	20
23	BUSHING, CONDUIT, GROUNDING, 1"	5022621	1
24	CONDUIT, RIGID, GALVANIZED, 1"	5022642	1
25	ADAPTER, CONDUIT, PLASTIC TO RIGID, 1"	5034943	1
26	CONDUIT, PLASTIC, 1"	5035464	1
27	ELBOW, 90°, PLASTIC, 1"	5034958	1



NOTES

1. ENGINE START CONNECTIONS ON ATS INCLUDES 7-DAY AUTO EXERCISER CLOCK.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES 200 AMPS STANDBY GENERATOR GENERATOR & AUTOMATIC TRANSFER SWITCH WIRING DIAGRAM	ISSUE DATE: 7/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-15-1	8505E121.DGN

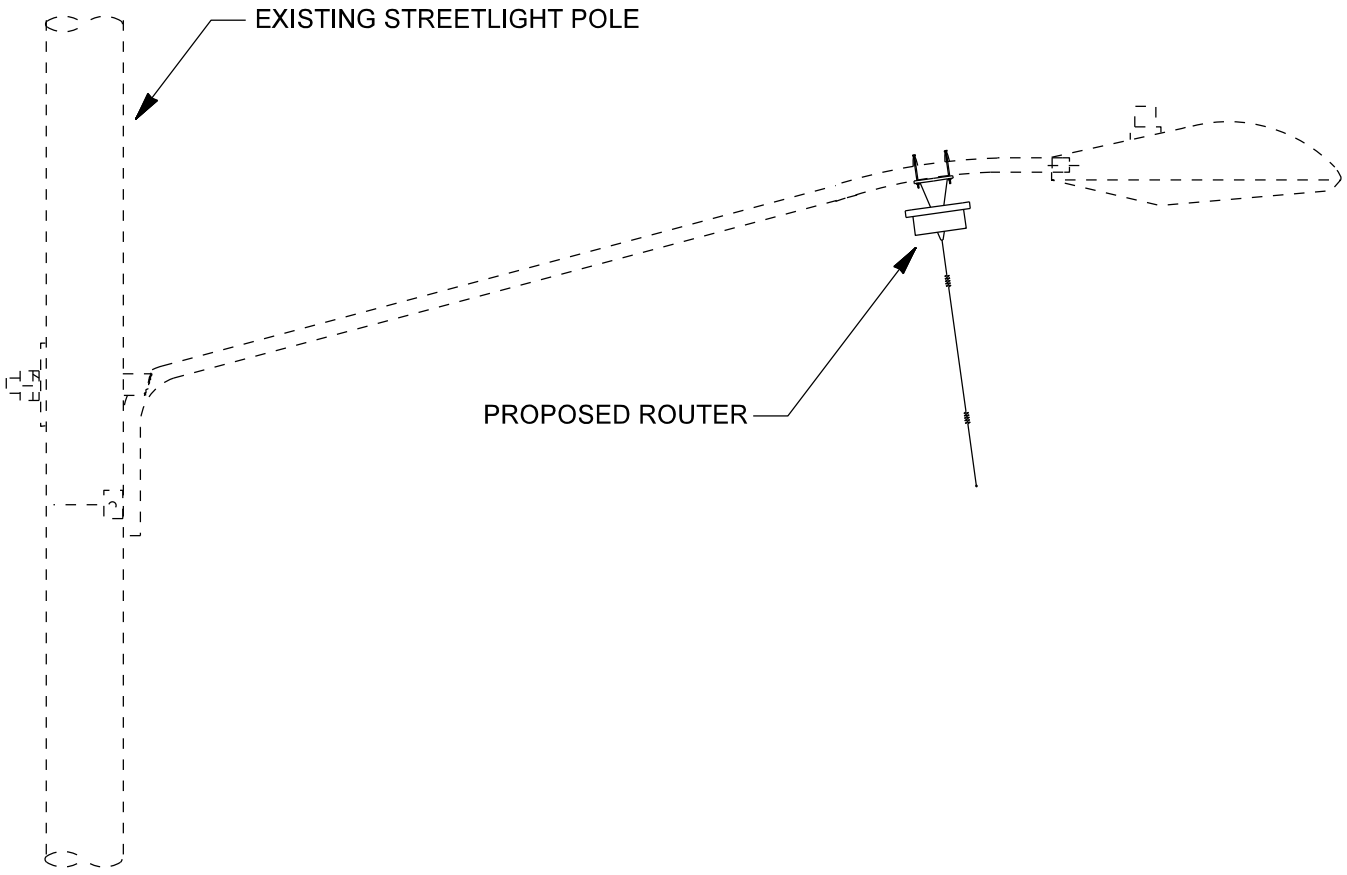


Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	CELL SITES GENERATOR TO ATS INTERCONNECTION	ISSUE DATE: 07/25/13 REV. DATE: APPROVAL: W. LARAMIE
	6-16-1	8505E130.DGN

SECTION 7: METERING ROUTER

(EXISTING WOOD OR STEEL STREETLIGHT POLE WITH EXISTING SECONDARY, ROUTER INSTALLATION ONLY.)

MTR	METERING ROUTER

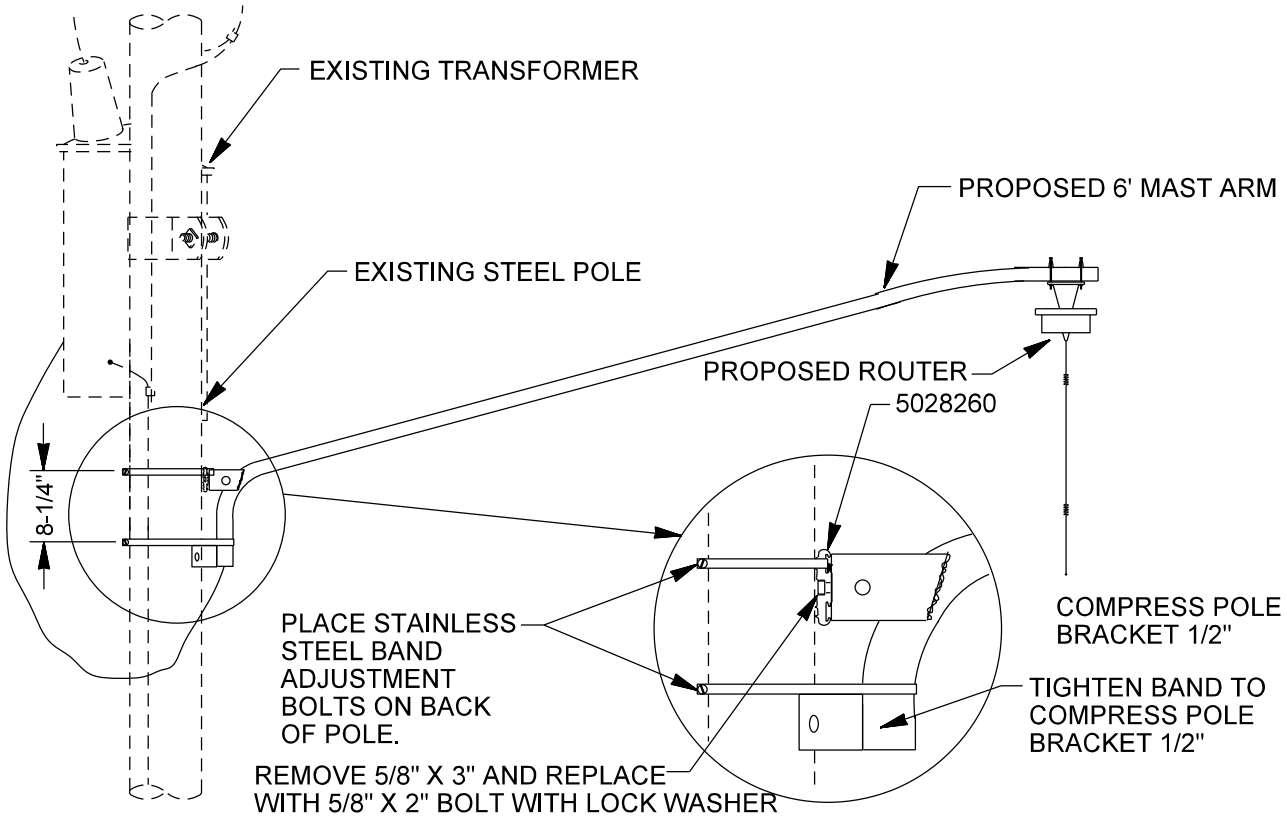


MTR BILL OF MATERIALS		
DESCRIPTION	**MATERIAL ITEM**	**QUANTITY**
METERING ROUTER	5076179	1
PLATE, VISIBILITY, 1-1/2 X 12" X1/16"	5035695	1

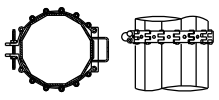
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	METERING ROUTER ROUTER ONLY ON EXISTING STREETLIGHT	ISSUE DATE: 09/20/18 REV. DATE: APPROVAL: S. DURAN
	7-1-1	8505E145.DGN

(EXISTING STEEL POLE, ROUTER AND 6' MAST ARM INSTALLATION ONLY.)

MTR6S METERING ROUTER 6' MAST ARM



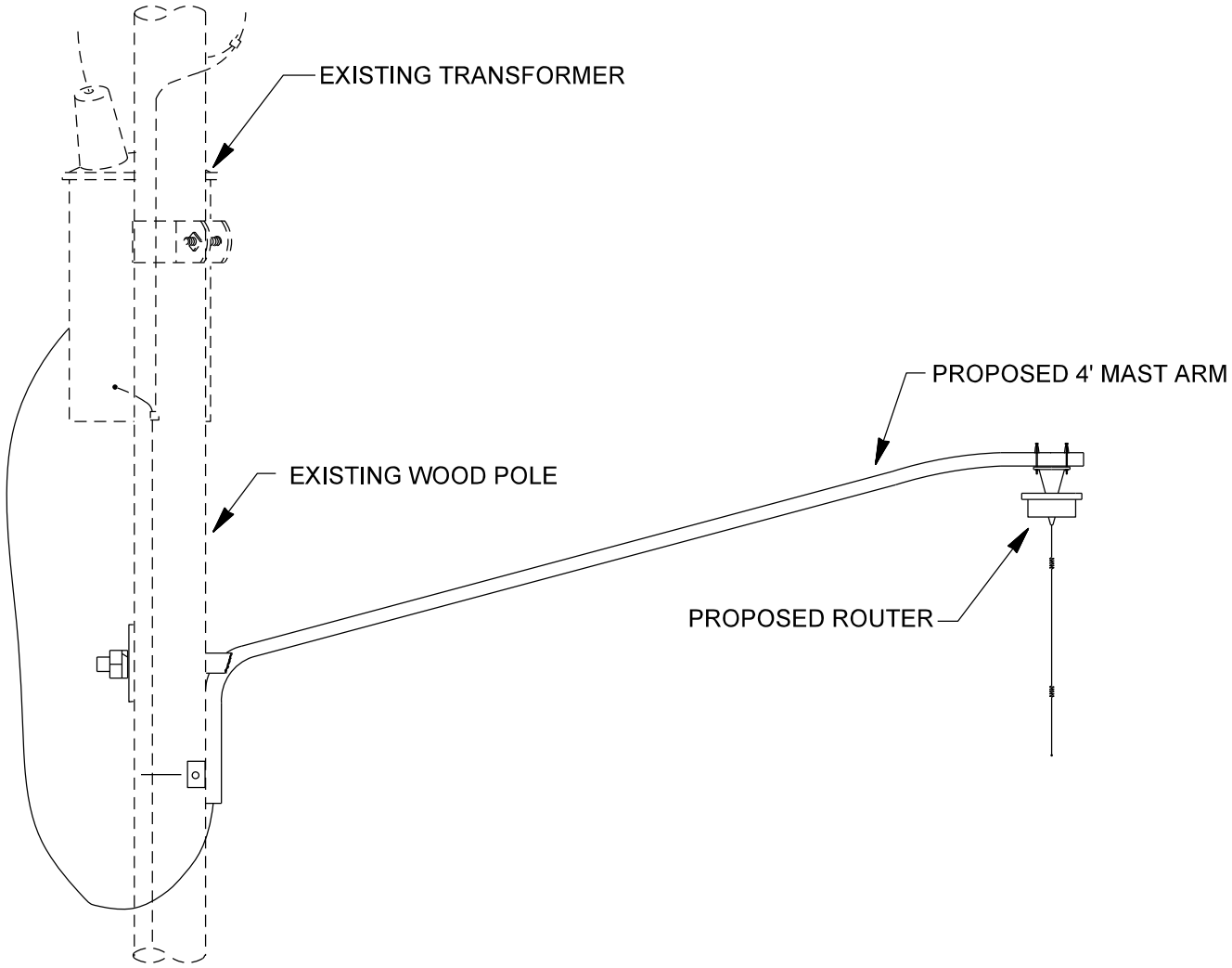
MTR6S BILL OF MATERIALS		
DESCRIPTION	**MATERIAL ITEM**	**QUANTITY**
METERING ROUTER	5020837	1
ARM, MAST 6'	5034865	1
PLATE, VISIBILITY, 1-1/2" X 12" X 1/16"	5035695	1
CONNECTOR, WIRE, 14-8 X 6-2 AWG	5033809	2
WASHER, SQUARE, 2-1/4" X 2-1/4" X 3/16", HOT GALVANIZED, 5/8" BOLT	5029180	1
WASHER, LOCK, 0.219" X 0.188" C/S, 5/18" BOLT, DOUBLE COIL, GALVANIZED, PIGTAIL, 1000 CARTO	5029168	1
STEEL BANDS TO BE DETERMINED BY LBKS/LBKM/LBKL CU USE	TBD	1

COMPATIBLE UNITS		
CU	**DESCRIPTION**	**QUANTITY**
*LBKS	BAND AND BRACKET FOR 4" - 25" MAX STEEL POLE DIA.	-
*LBKM	BAND AND BRACKET FOR 25" - 40" MAX STEEL POLE DIA.	-
*LBKL	BAND AND BRACKET FOR 40" - 55" MAX STEEL POLE DIA.	-
BTA851SC	STREETLIGHT ARM BRACKET	
BTA851TC	12kV UNIVERSAL BRACKET	

*For mounting on steel pole order Band compatible unit (CU) based on pole diameter.

(EXISTING WOOD POLE, ROUTER AND 4' MAST ARM INSTALLATION ONLY.)

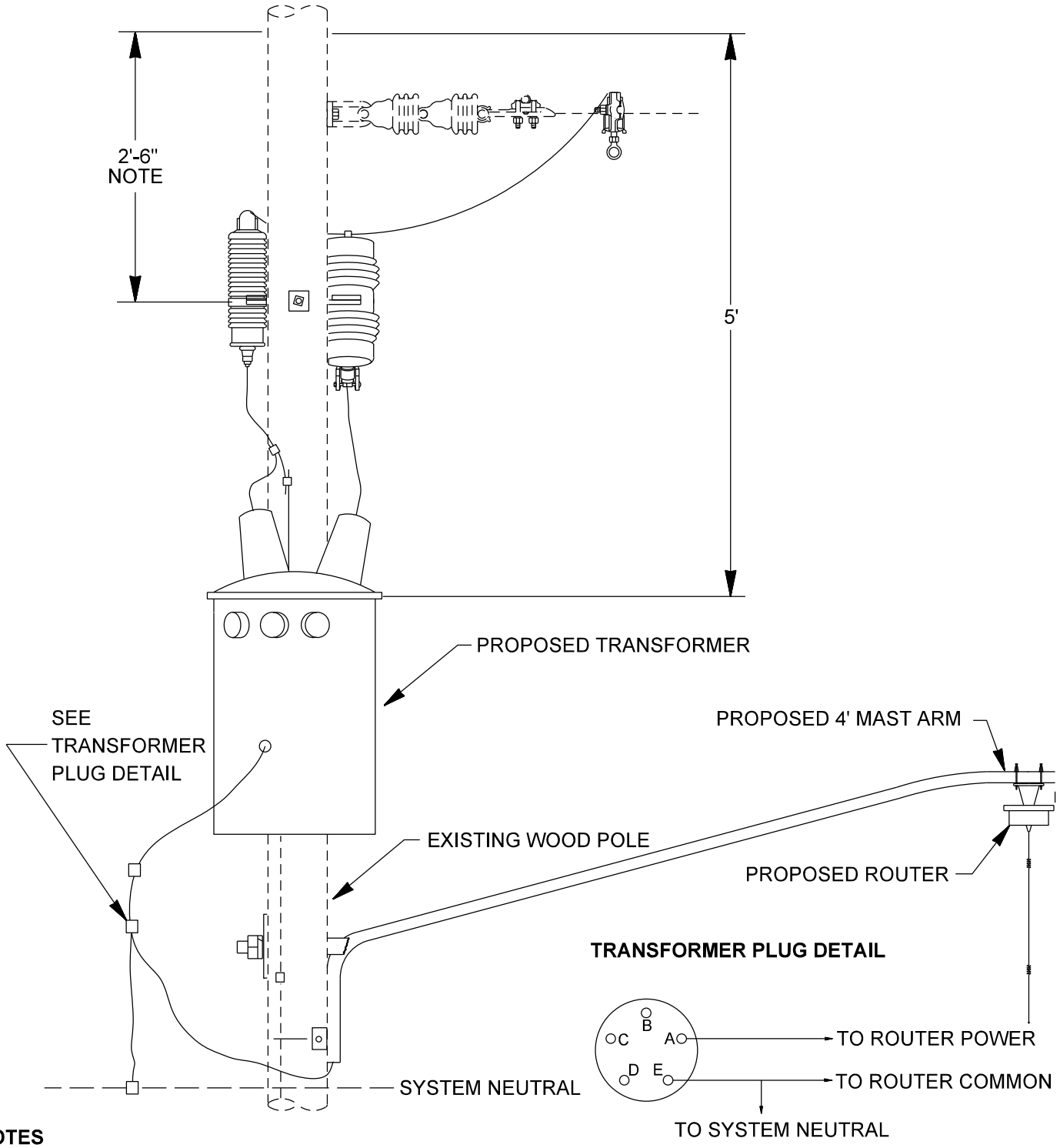
MTR4W METERING ROUTER 4' MAST ARM



MTR4W BILL OF MATERIALS		
DESCRIPTION	**MATERIAL ITEM**	**QUANTITY**
METERING ROUTER	5076197	1
ARM MAST 4'	5034863	1
PLATE, VISIBILITY, 1-1/2" X 12" X 1/16"	5035695	1
SCREW/LAG, 1/2" DIA. X 4" L	5028003	1
CONNECTOR, WIRE, 14-8 X 6-2 AWG	5033809	2
WASHER, SQUARE, 2-1/4" X 2-1/4" X 3/16", HOT GALVANIZED, 5/8" BOLT	5029180	1
WASHER, LOCK, 0.219" X 0.188" C/S, 5/8" BOLT, DOUBLE COIL, GALVANIZED, PIGTAIL CURLIES, 1000/CARTO	5029168	1
BOLT, MACHINE, 5/8" DIA. X 12" L, ROLD THD. HOT GLVZ. SQU NUT, ASSEMBLY, TA-200, McGRAW-EDISON	5027738	1

(EXISTING WOOD POLE, ROUTER AND 4' MAST ARM INSTALLATION ONLY.)

MTR4WX METERING ROUTER 4' MAST ARM WITH TRANSFORMER



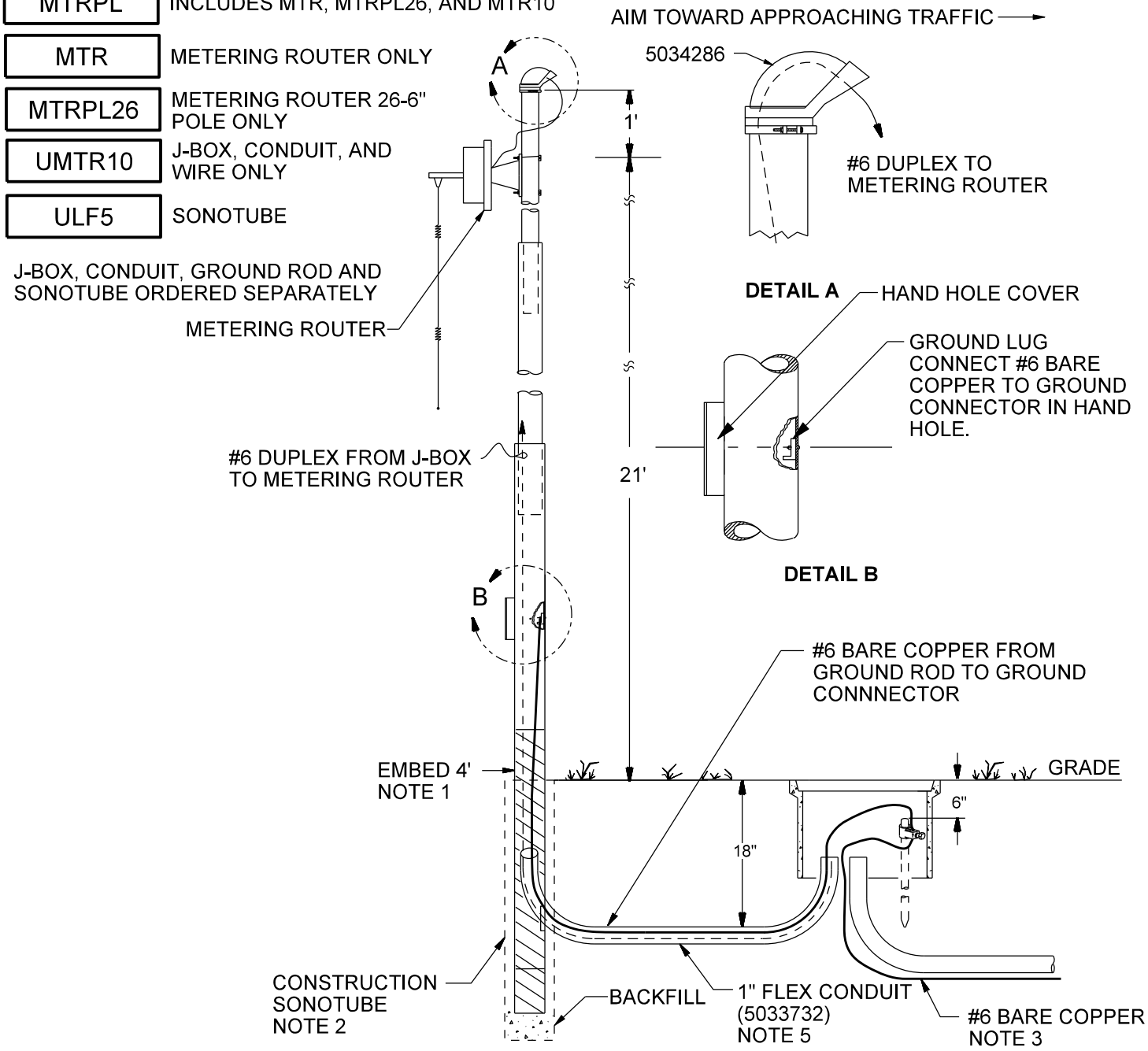
NOTES

1. THIS DIMENSION 3'-6" MAXIMUM WITH NUETRAL LOCATED 7'-2" FROM TOP OF POLE.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	METERING ROUTER ROUTER, MAST ARM, AND 0.5 kVA TRANSFORMER ON EXISTING DISTRIBUTION WOOD POLE	ISSUE DATE: 09/20/18 REV. DATE: APPROVAL: S. DURAN
	7-4-1	8505E148.DGN

MTR4WX BILL OF MATERIALS			
ITEM	**DESCRIPTION**	**MATERIAL ITEM**	**QUANTITY**
1	METERING ROUTER	5076197	1
2	ARM, MAST 1-¼" ID X 4', GALVANIZED STEEL	5034863	1
3	PLATE, VISIBILITY, 1-½ X 12 X 1/16", BLACK PLASTIC	5035695	1
4	SCREW/LAG, ½" DIA. X 4" L IN	5028003	1
5	CONNECTOR, WIRE, 14-8 X 6-2 AWG	5033809	2
6	WASHER, SQUARE, 2-¼ X 2-¼ X 3/16", HOT GALVANIZED, 5/8" BOLT	5029180	3
7	WASHER, LOCK, 0.219 X 0.188 C/S IN, 5/8" BOLT DOUBLE COIL, GALVANIZED, PIGTAIL CURLIES	5029168	3
8	TRANSFORMER, POTENTIAL, 0.5/1 KVA/1 PH, 7,200-120 V CAPACITOR BANK, 5-PIN RECPT	5034764	1
9	FUSE, LINK, 3/4 A, UNIVERSAL, SEALD FBR LND BAKL CRTG, DISTRIBUTION, WITH BTN HD & FLEX LEDR	5034484	1
10	CONNECTOR, GROUNDING, 10 AWG SOL X 1 AWG STR COPPER, TRANSFORMER, TANK TO CABLE	5034347	1
11	CONNECTOR, TAP, 4-1/0 AWG ACSR RUN 8-2 AWG	5035724	1
12	COVER, PROTECTIVE, UP TO 2-½" L, SECONDARY SPLICES, BURNDY, BLACKBURN, HOMAC	5034080	1
13	CONNECTOR, COMPR. COPPER, 115 KV, 2 SOL-2 STR X 8 SOL-4 STR, COMPRSN, C CRMP SM	5033933	1
14	BOLT, MACHINE, 5/8" DIA. X 12" L, ROLD THD, HOT GLVZ SQ NUT, ASSEMBLY, TA-200, MCGRAW-EDISON	5027738	3
15	ARRESTOR, LIGHTNING, 9 KV, MCOV 7.65 KV, NORMAL DUTY, METAL OXIDE, NEMA GRAY, W/GROUND LEAD INSULATOR	5033988	1
16	FUSE, CUTOUT, 7.2 KV, 100 A, 10 KA ASYM, CUTOUT OPEN 95 KV BIL NEMA GRA	5034369	1
17	NUT, LOCK, 5/8" BOLT, M.F, HOT GALVANIZED, 1250/PACK	5028257	2
18	CABLE, CAPACITOR TRANSFORMER, 16 AWG, 2/C CAPACITOR TRANSFORMER	5034102	1
19	BRACKET, ANGLE 9-¼ X 5-¾ X 2 X ½ X 3/16, T, SMALL 90°	5034613	1

MTRPL	INCLUDES MTR, MTRPL26, AND MTR10
MTR	METERING ROUTER ONLY
MTRPL26	METERING ROUTER 26-6" POLE ONLY
UMTR10	J-BOX, CONDUIT, AND WIRE ONLY
ULF5	SONOTUBE



NOTES

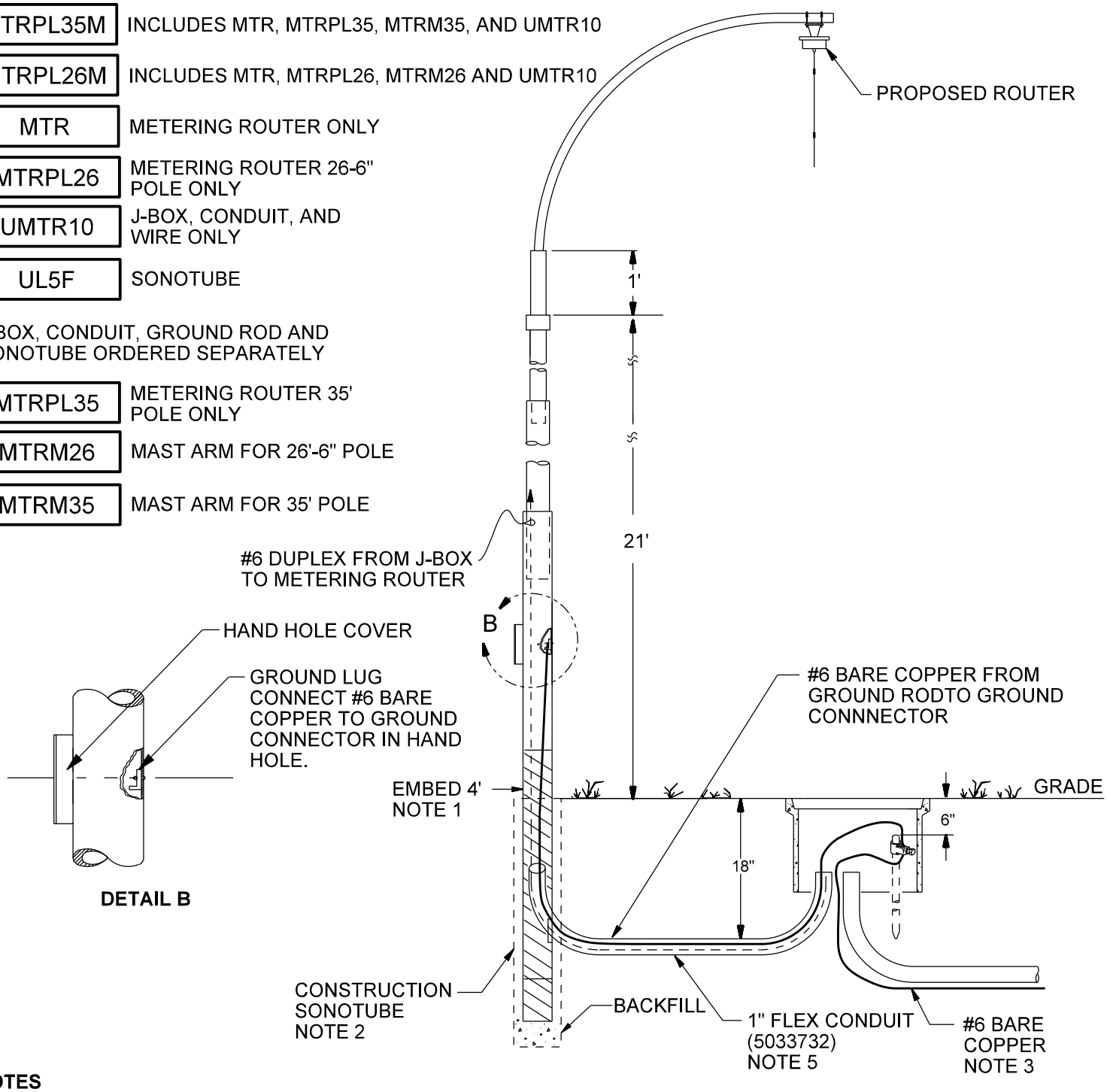
1. EMBED POLE BUTT 4' BELOW FINAL GRADE IN 10" DIAMETER HOLE AND BACKFILL WITH POLE SET FOAM, MATERIAL ITEM 5012018.
2. REFERENCE OUTDOOR LIGHTING STANDARDS PAGE 6-1-1 FOR INSTALLATIONS UTILIZING A CONSTRUCTION SONOTUBE.
3. POLE AND ANY METALLIC POWER AND COMMUNICATION APPARATUS SPACED 6' OR LESS AND SHALL BE BONDED USING #6 BARE COPPER.
4. INSTALL GROUND ROD IN J-BOX AS SHOWN.
5. MAKE CONDUCTOR CONNECTIONS IN J-BOX PER OUTDOOR LIGHTING STANDARDS PAGE 6-6-1.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	METERING ROUTER INSTALLATION ON ROUND GREY STEEL POLE UNDERGROUND FEED	ISSUE DATE: 09/20/18 REV. DATE: 05/06/21 APPROVAL: J. LUERA
	7-5-1	8505E150.DGN

MTRPL35M	INCLUDES MTR, MTRPL35, MTRM35, AND UMTR10
MTRPL26M	INCLUDES MTR, MTRPL26, MTRM26 AND UMTR10
MTR	METERING ROUTER ONLY
MTRPL26	METERING ROUTER 26-6" POLE ONLY
UMTR10	J-BOX, CONDUIT, AND WIRE ONLY
UL5F	SONOTUBE

J-BOX, CONDUIT, GROUND ROD AND SONOTUBE ORDERED SEPARATELY

MTRPL35	METERING ROUTER 35' POLE ONLY
MTRM26	MAST ARM FOR 26'-6" POLE
MTRM35	MAST ARM FOR 35' POLE

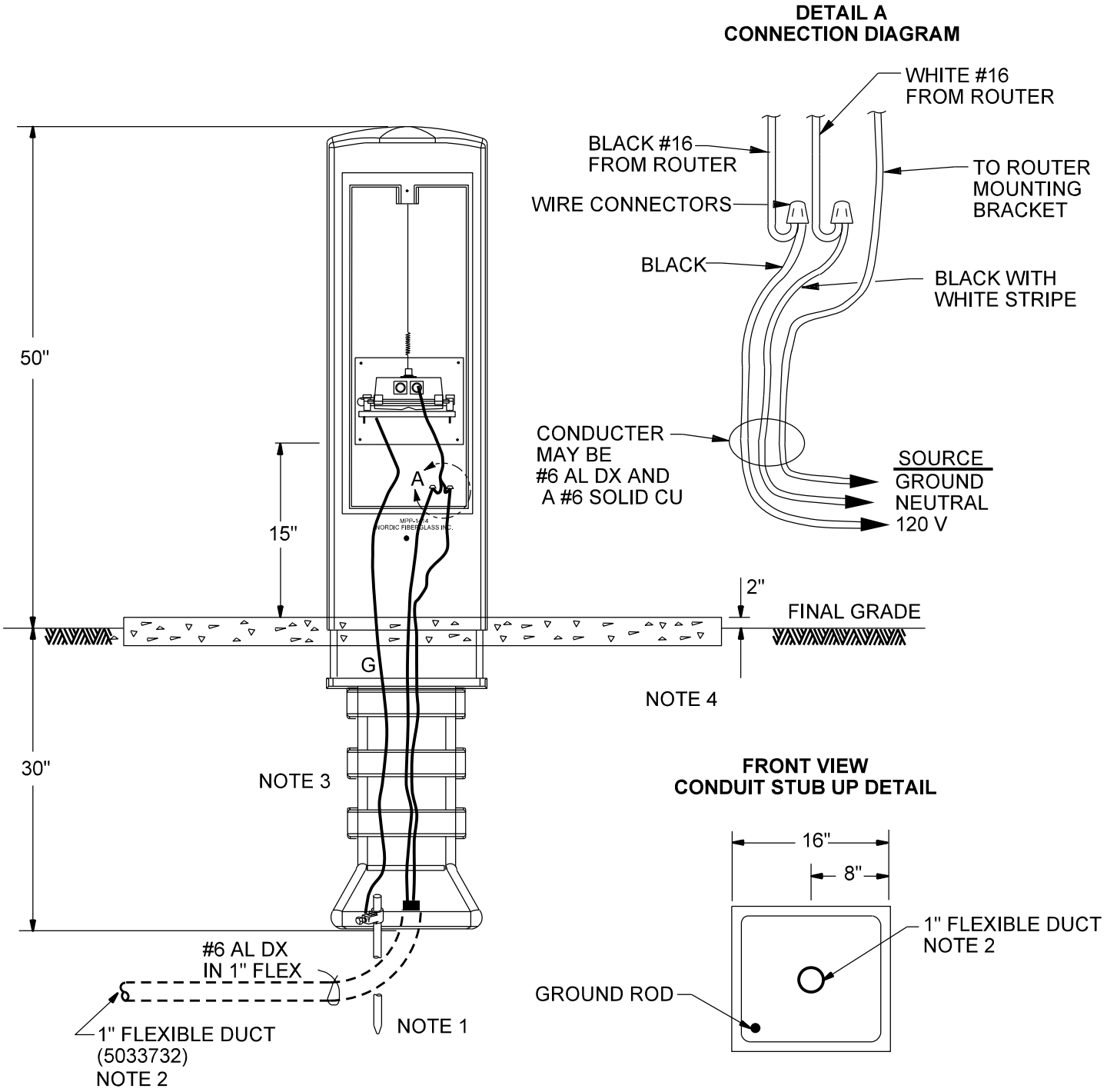


NOTES

1. EMBED POLE BUTT 4' BELOW FINAL GRADE IN 10" DIAMETER HOLE AND BACKFILL WITH POLE SET FOAM, MATERIAL ITEM 5012018.
2. REFERENCE OUTDOOR LIGHTING STANDARDS PAGE 6-1-1 FOR INSTALLATIONS UTILIZING A CONSTRUCTION SONOTUBE.
3. POLE AND ANY METALLIC POWER AND COMMUNICATION APPARATUS SPACED 6' OR LESS AND SHALL BE BONDED USING #6 BARE COPPER.
4. INSTALL GROUND ROD IN J-BOX AS SHOWN.
5. MAKE CONDUCTOR CONNECTIONS IN J-BOX PER OUTDOOR LIGHTING STANDARDS PAGE 6-6-1.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	METERING ROUTER INSTALLATION ON ROUND GREY STEEL POLE UNDERGROUND FEED	ISSUE DATE: 04/28/23 REV. DATE: APPROVAL: J. LUERA
	7-5-2	8505E194.DGN

MTRPED PEDESTAL-MOUNTED METERING ROUTER

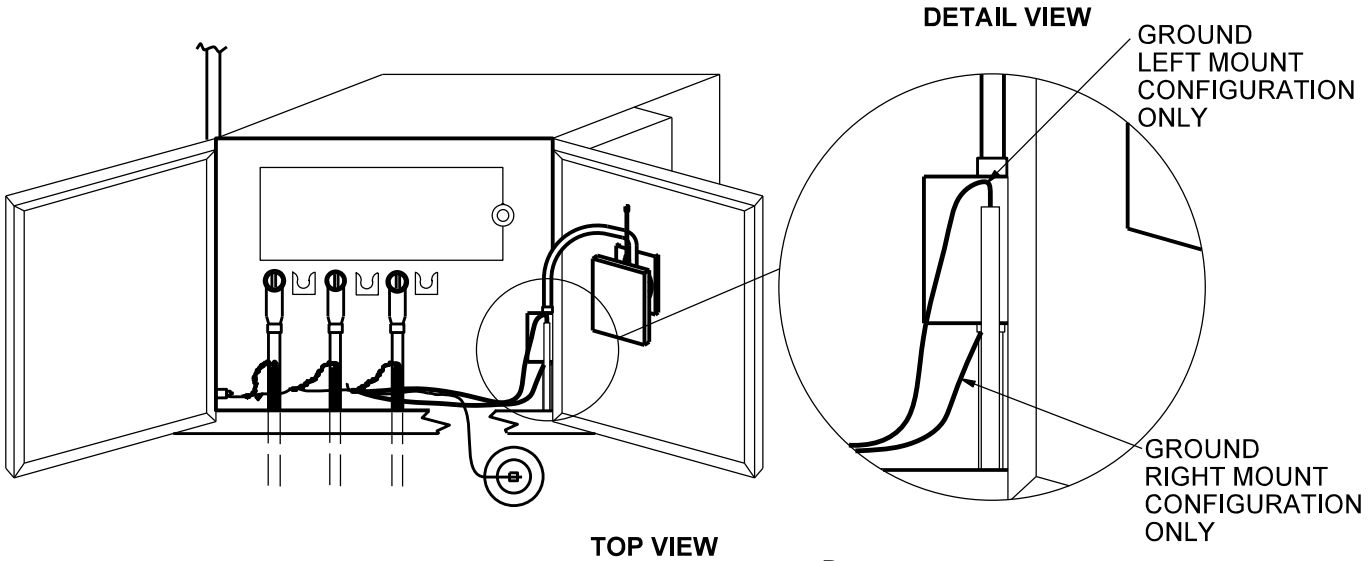


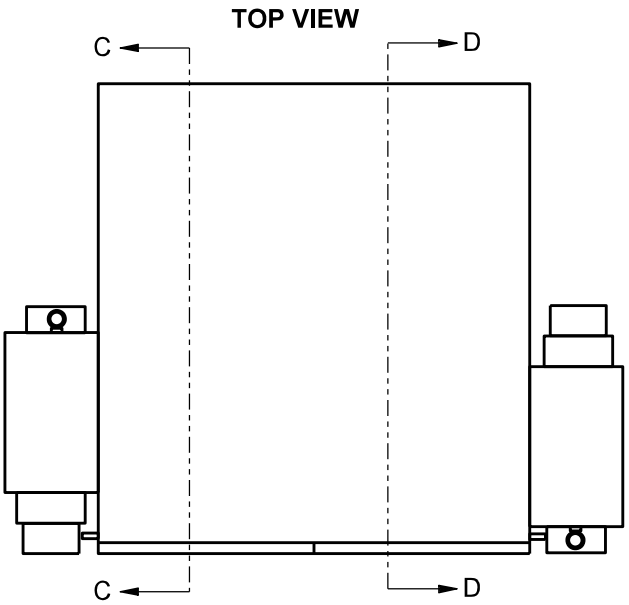
NOTES

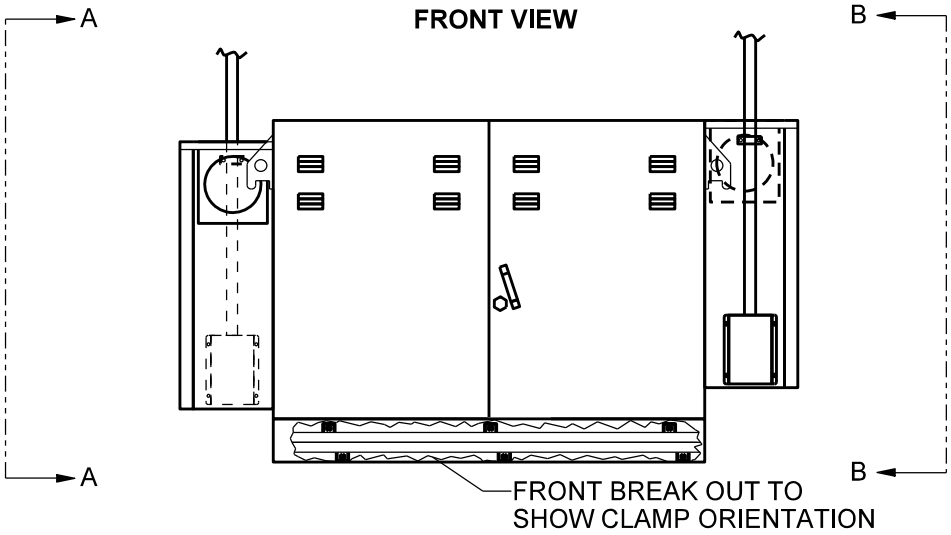
1. GROUND ROD TO BE INSTALLED AT BOTTOM OF TRENCH PRIOR TO SETTING PEDESTAL ENCLOSURE.
2. FOR DISTANCES GREATER THAN 25', INSTALL 2.5" PVC CONDUIT.
3. BACKFILL AROUND PEDESTAL ENCLOSURE WITH ½ SACK SLURRY FOR ADDED FOUNDATIONAL STRENGTH.
4. FORMED CONCRETE PAD TO BE 2.5' X 2.5' X 4".

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	METERING ROUTER PEDESTAL-MOUNTED METER ROUTER	ISSUE DATE: 09/20/18 REV. DATE: APPROVAL: S. DURAN
	7-6-1	8505E164.DGN

SECTION 8: FIELD AREA NETWORK (FAN)

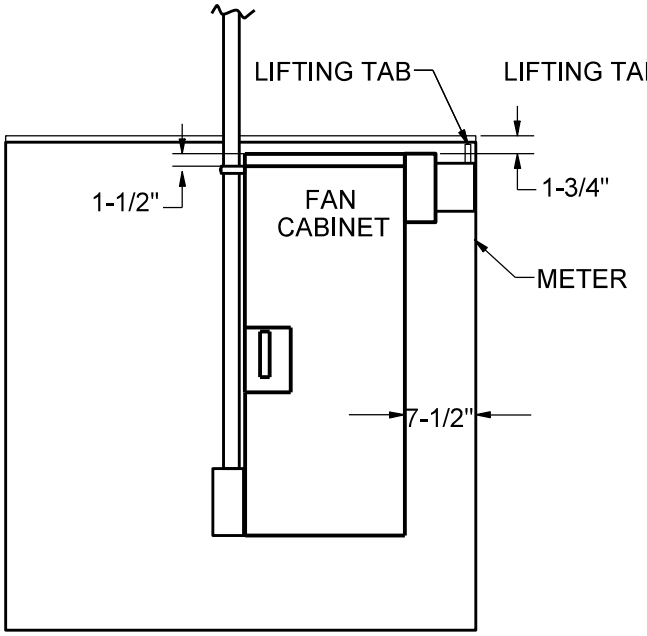




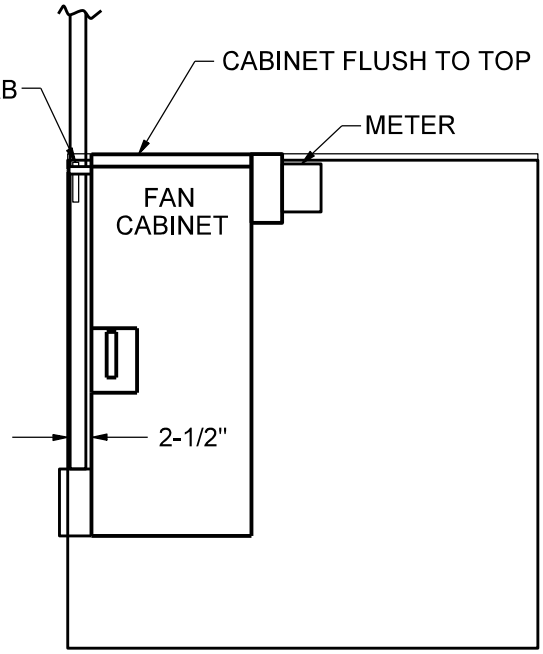


Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
	FIELD AREA NETWORK (FAN) UNDERGROUND CAPACITOR BANK TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: APPROVAL: K. MACFADYEN
	8-1-1	8505E180.DGN

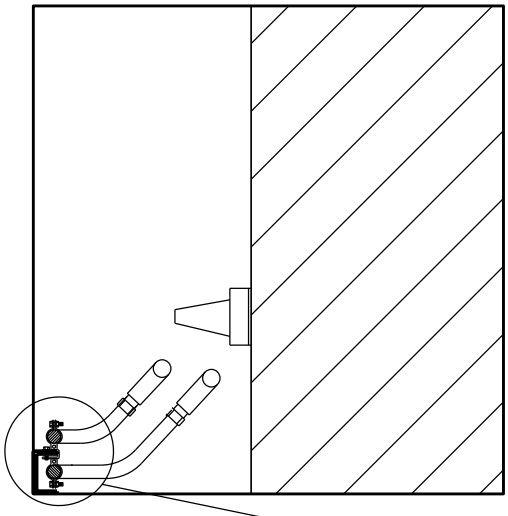
VIEW A-A
LEFT MOUNT CONFIGURATION



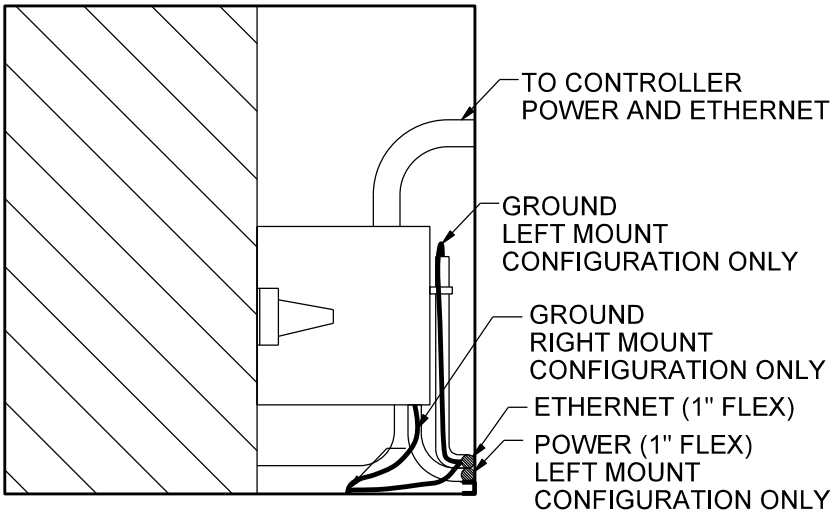
VIEW B-B
RIGHT MOUNT CONFIGURATION



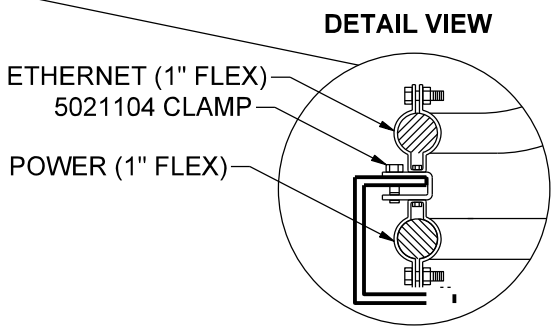
SECTION VIEW C-C
LEFT MOUNT
CONFIGURATION ONLY



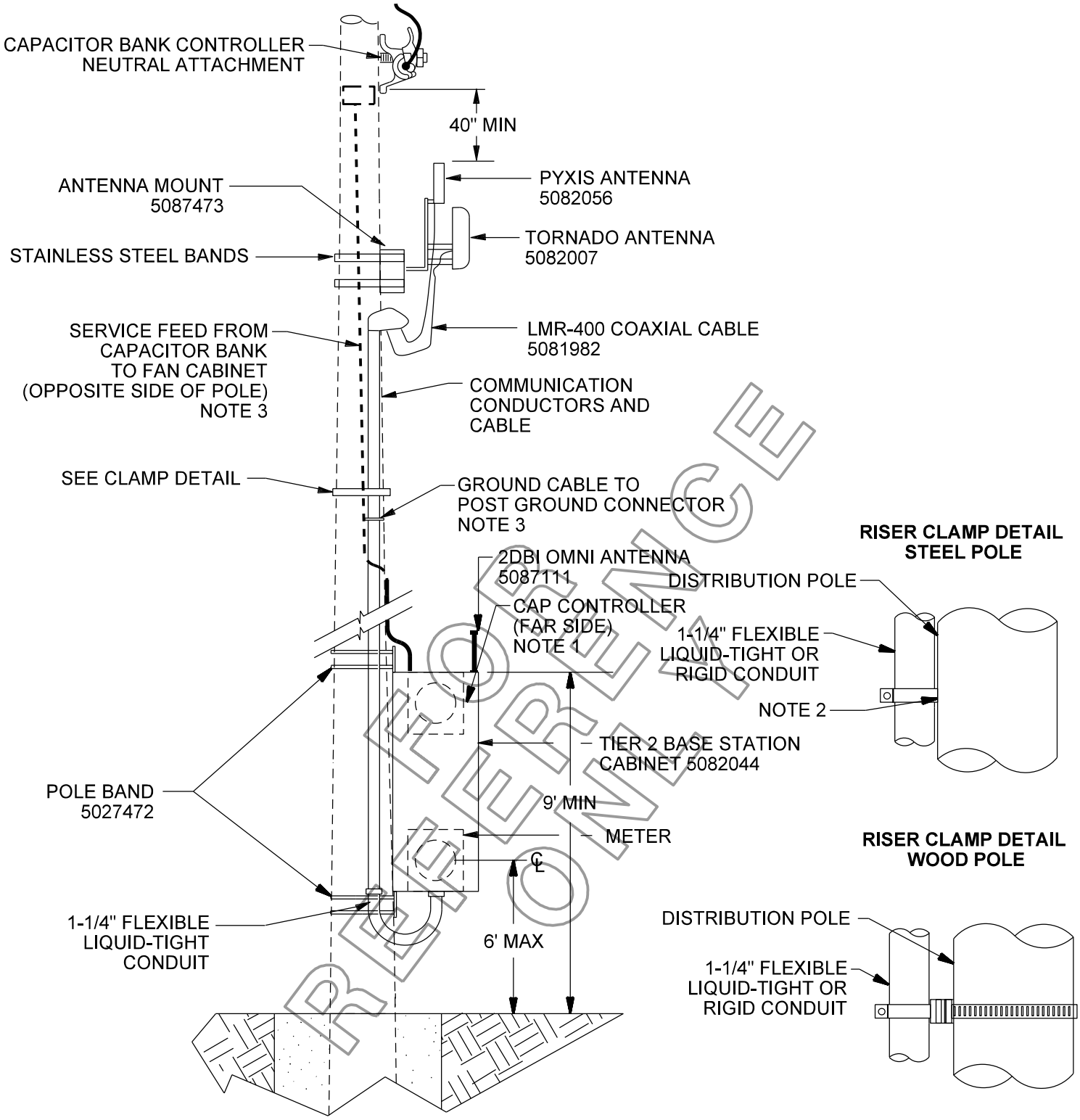
SECTION VIEW D-D



DETAIL VIEW



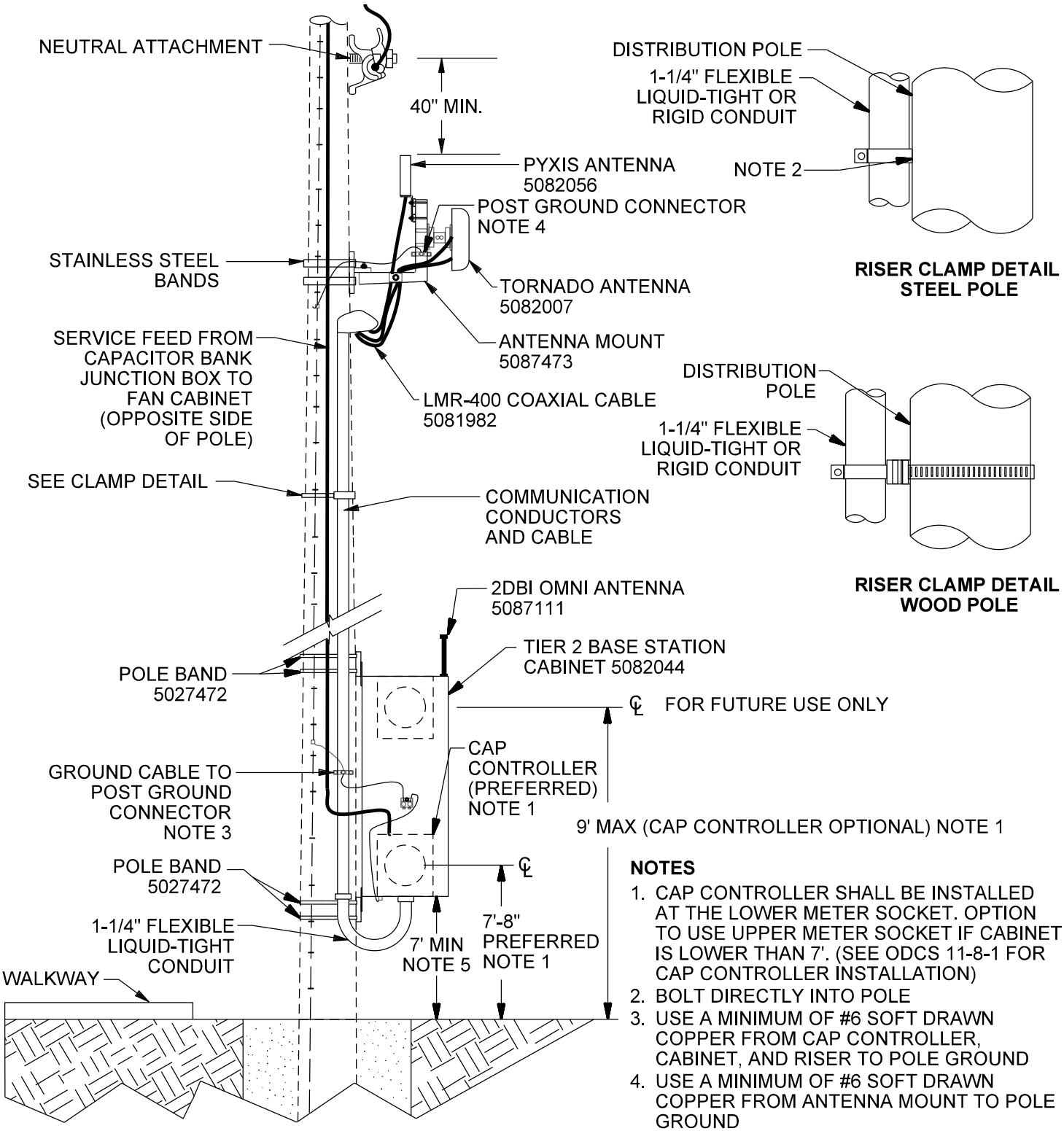
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) UNDERGROUND CAPACITOR BANK TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: APPROVAL: K. MACFADYEN
	8-1-2	8505E181.DGN



NOTES

1. CAPACITOR BANK CONTROLLER TO BE RELOCATED TO UPPER METER SOCKET ON FAN CABINET.
2. BOLT DIRECTLY INTO POLE.
3. RUN #2 STRANDED INSULATED COPPERWELD GROUND FROM CABINET, CONTROLLER, AND RISER TO POLE GROUND.

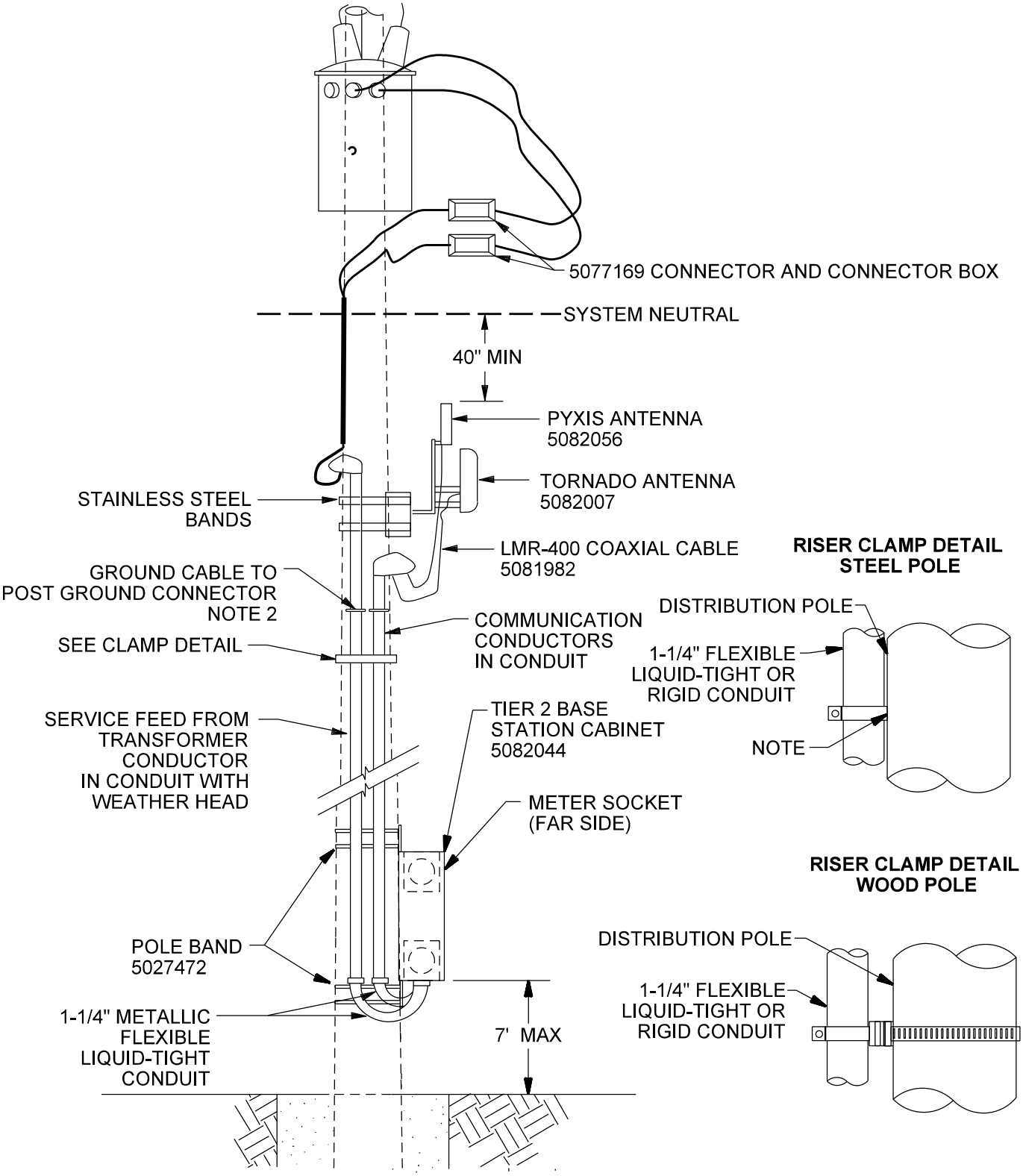
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) OVERHEAD CAPACITOR BANK TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: 11/32/21 APPROVAL: J. ROBBINS
	8-2-1	8505E182.DGN



NOTES

1. CAP CONTROLLER SHALL BE INSTALLED AT THE LOWER METER SOCKET. OPTION TO USE UPPER METER SOCKET IF CABINET IS LOWER THAN 7'. (SEE ODCS 11-8-1 FOR CAP CONTROLLER INSTALLATION)
2. BOLT DIRECTLY INTO POLE
3. USE A MINIMUM OF #6 SOFT DRAWN COPPER FROM CAP CONTROLLER, CABINET, AND RISER TO POLE GROUND
4. USE A MINIMUM OF #6 SOFT DRAWN COPPER FROM ANTENNA MOUNT TO POLE GROUND
5. IF THE CABINET IS INSTALLED LOWER THAN 7', INSTALL ON THE FIELD SIDE OF POLE, OPPOSITE TO PEDESTRIAN WALKWAY. NO PART SHALL PROTRUDE MORE THAN 4" INTO WALKWAY

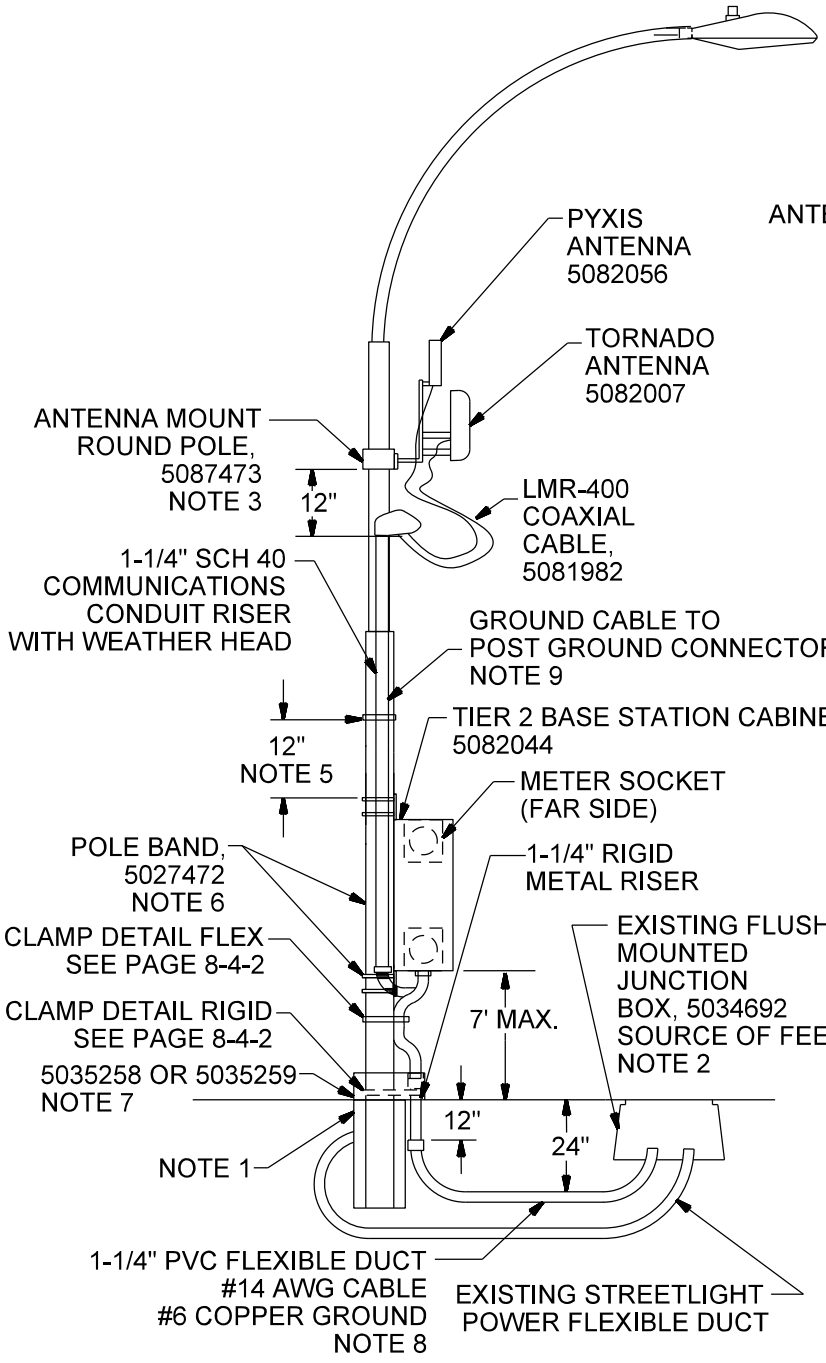
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) OVERHEAD CAPACITOR BANK TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: 11/23/21 APPROVAL: J. ROBBINS
	8-2-2	8505E196.DGN



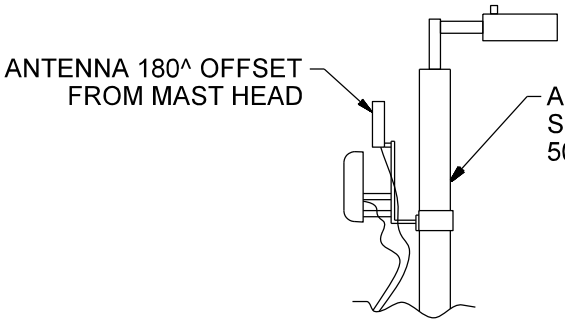
NOTES

1. BOLT DIRECTLY INTO POLE.
2. RUN #2 STRANDED INSULATED COPPERWELD GROUND FROM CABINET AND RISERS TO POLE GROUND.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) OVERHEAD TRANSFORMER TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: APPROVAL: K. MACFADYEN
	8-3-1	8505E183.DGN



SQUARE POLE ANTENNA INSTALLATION DETAIL



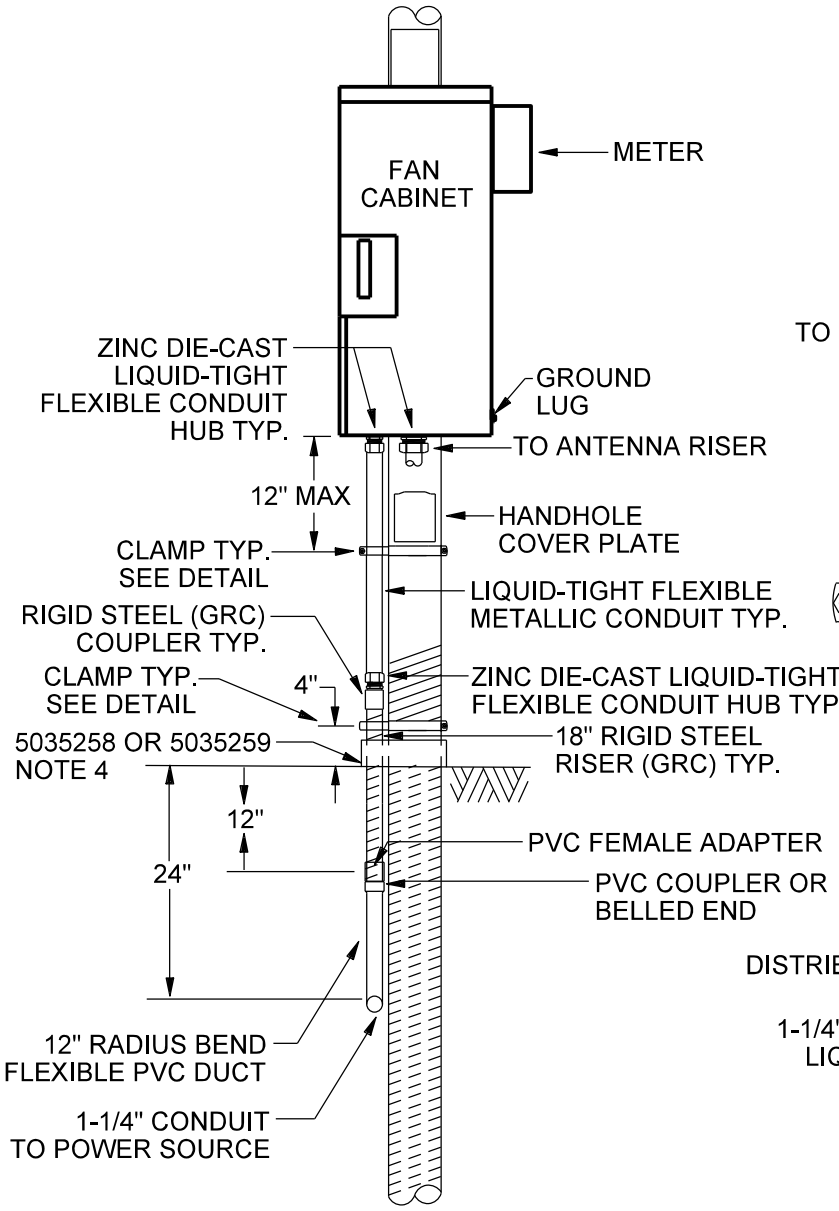
STEEL STREETLIGHT POLE OPTIONS

MAT. ITEM NEW	NEW POLE DESCRIPTION	MAT. ITEM EXISTING	EXISTING POLE HEIGHT
5088415	19', 4 SQ IN; BRWN 2-1/2" TENON TOP	5035266	18'
5088429	OBSOLETE	5035265	23.5'
5088430	26', 5 SQ IN; BRWN 2-1/2" TENON TOP	5035268	25.5'
5088431	30', ROUND; GALV	5035375	26.5'
5088432	30', ROUND; GALV OVERHEAD FED	5035376	26.5'
5088433	32', 4 SQ IN; BRWN 2-1/2" TENON TOP	5035269	28.5'
5088434	40', 4 SQ IN; BRWN 2-1/2" TENON TOP	5035270	36'
5035379	31', ROUND; BRWN 2-1/2" TENON TOP	5035379	31'
5035380	35', ROUND; GALV	5035380	35'
5035263	OBSOLETE	5035263	17.5'
5088399	34', ROUND; GALV	5035377	31'
5035271	40', ROUND; GALV	5035271	40'

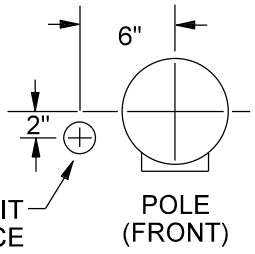
NOTES

1. SEE PAGE 6-1-1 FOR SONOTUBE INSTALLATION. USE 1 CLSM FOR POLE BACKFILL.
2. SEE PAGE 6-6-1. ADD MOLE ASSEMBLY 5034921 IF NEEDED.
3. ANTENNA MOUNTED 1' FROM TOP OF STEEL POLE, PRIOR TO MAST ARM.
4. SEE PAGE 6-16-2 FOR CONDUIT INSTALLATION DETAILS.
5. RISER CLAMP INSTALLED EVERY 4" ALONG COMMUNICATIONS CONDUIT RISER. SEE RISER CLAMP DETAIL PAGE 8-2-1.
6. MOUNTING BRACKETS INSTALLED WITH STEEL POLE BANDS.
7. COLLAR COLOR SHALL MATCH POLE.
8. RUN #6 COPPER GROUND FROM J-BOX GROUND ROD TO CABINET.
9. RUN #2 STRANDED INSULATED COPPERWELD GROUND FROM CABINET AND RISER TO POLE GROUND.

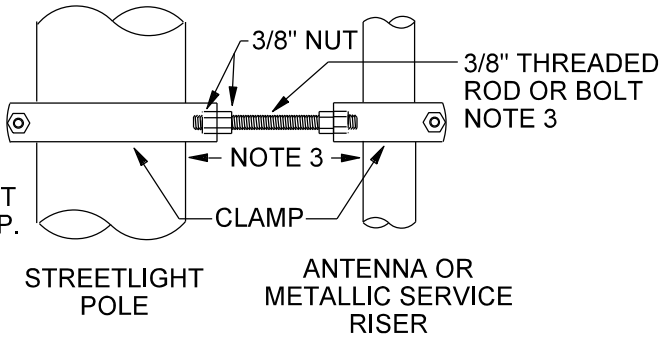
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) STREETLIGHT INSTALLATION CONDUIT DETAIL	ISSUE DATE: 12/23/19 REV. DATE: APPROVAL: K. MACFADYEN
	8-4-1	8505E184.DGN



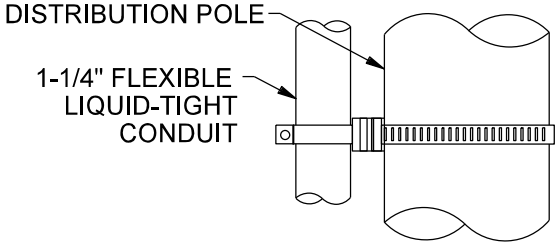
CONDUIT TO POLE STUB-UP DIMENSIONS



CLAMP DETAIL RIGID



CLAMP DETAIL FLEX



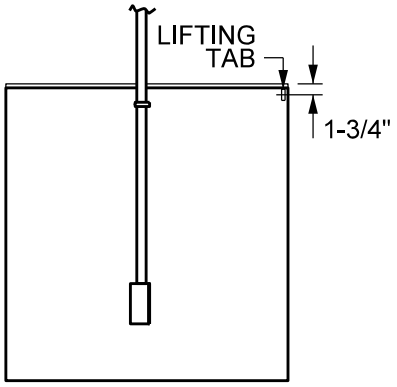
NOTES

1. POLE, ELBOWS, #6 BARE CU, RIGID STEEL CONDUIT STUB UPS, AND ELBOWS SHALL BE INSTALLED PRIOR TO BACKFILLING AROUND POLE. BACKFILL SHALL BE 1 SACK CLSM (SRP MATERIAL ITEM 00-0015-MAG CLSM).
2. CONDUIT TO REMAIN SAME SIZE THROUGH ENTIRE RUN.
3. ANTENNA RISER TO BE SPACED 4" FROM LIGHT POLE. CONDUIT RISER TO BE SPACED IN ACCORDANCE WITH CONDUIT TO POLE STUB UP DIMENSIONS. SIZE THREADED ROD OR BOLT ACCORDINGLY.
4. COLLAR COLOR SHALL MATCH POLE.

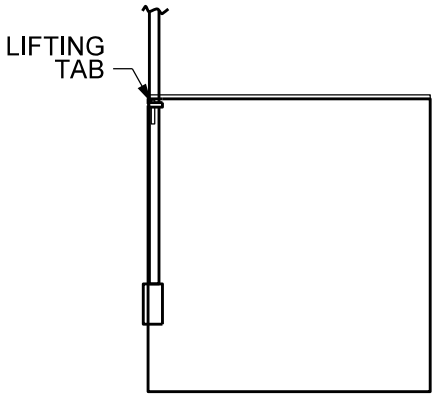
Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) STREETLIGHT INSTALLATION TIER 2 BASE STATION INSTALLATION	ISSUE DATE: 12/23/19 REV. DATE: APPROVAL: K. MACFADYEN
	8-4-2	8505E185.DGN

UNDERGROUND INSTALLATION CONFIGURATION

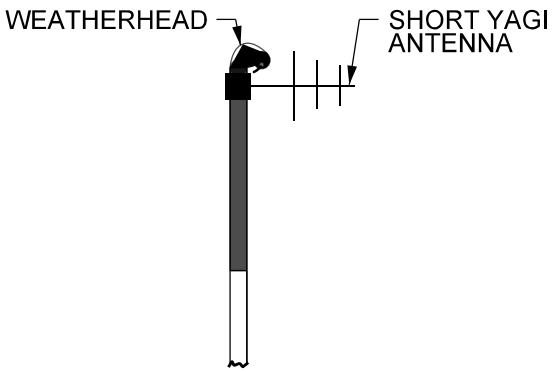
PAD MOUNTED CAPACITOR BANK



LEFT MOUNT CONFIGURATION



RIGHT MOUNT CONFIGURATION



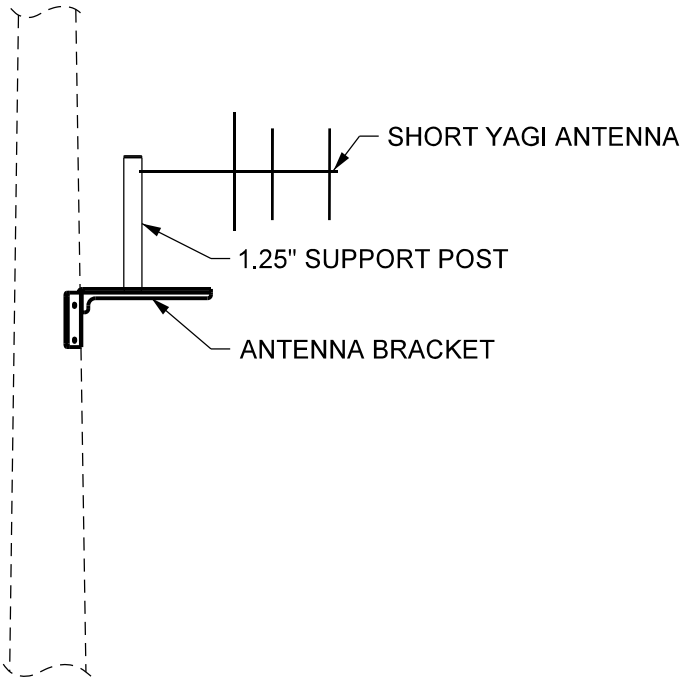
BILL OF MATERIALS	
DESCRIPTION	**MATERIAL ITEM**
SHORT YAGI ANTENNA	5095335
WEATHERHEAD	5034286
MYERS HUB	5009151
2x10 RIGED THREAD PIPE	5022645

NOTES

1. POLE HEIGHT VARIES BASED ON PAD MOUNTED CAPACITOR BANK LOCATION. NOT TO EXCEED 6'.
2. SHORT YAGI ANTENNA POLE ATTACHMENT COMES WITH THE ANTENNA.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	ANTENNA INSTALLATION YAGI ANTENNA UNDERGROUND	ISSUE DATE: 07/05/24 REV. DATE: APPROVAL: C. OBRIEN
	8-4-3	8505E193.DGN

OVERHEAD INSTALLATION CONFIGURATION



WOOD POLE

BILL OF MATERIALS	
DESCRIPTION	**MATERIAL ITEM**
SHORT YAGI ANTENNA	5095335
ANTENNA BRACKET	5095911
1.25" SUPPORT POST	5095782

NOTES

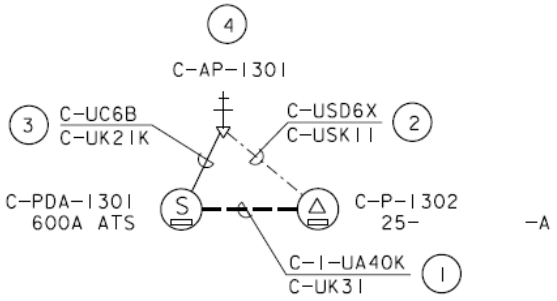
1. FOR INFORMATION REGARDING THE ANTENNA BRACKET AND 1.25" SUPPORT POST, SEE SRP'S STANDARD MATERIAL (SM) BOOK, SECTION SM 38: COMMUNICATION SUPPLIES.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	ANTENNA INSTALLATION YAGI ANTENNA OVERHEAD	ISSUE DATE: 07/05/24 REV. DATE: APPROVAL: C. OBRIEN
	8-4-4	8505E198.DGN

SWITCHES WITH REMOTE SUPERVISORY CONTROL

WHEN A FAN CABINET MOUNTED ON AN ANTENNA POLE IS REQUESTED BY CONTROL ENGINEERING, INCORPORATE THE FOLLOWING INTO THE DESIGN.

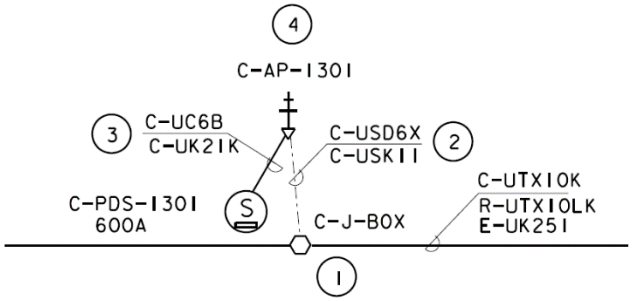
A. AUTOMATIC TRANSFER SWITCH (ATS)



1. 1- #4/0 TAP IN 3" PVC FROM SWITCH TO 25 KVA TRANSFORMER
2. #6 DX AL. IN 1 INCH PVC FROM TRANSFORMER TO FAN CABINET MOUNTED TO ANTENNA POLE
3. 2" PVC AND #6 BARE CU GROUND FROM SWITCH TO FAN CABINET; RUN #6 INTO PAD WINDOW; RUN 2" PVC TO SWITCH RTU; ETHERNET FROM SWITCH TO FAN CABINET BY CONTROL ENGINEERING
4. CONTROL ENGINEERING TO APPROVE ANTENNA POLE LOCATION; DISTRIBUTION DESIGN TO ORDER POLE; SWITCH AND ANTENNA POLE TO HAVE SAME PAD/POLE NUMBER UFAP35FAN

8505E189.DGN

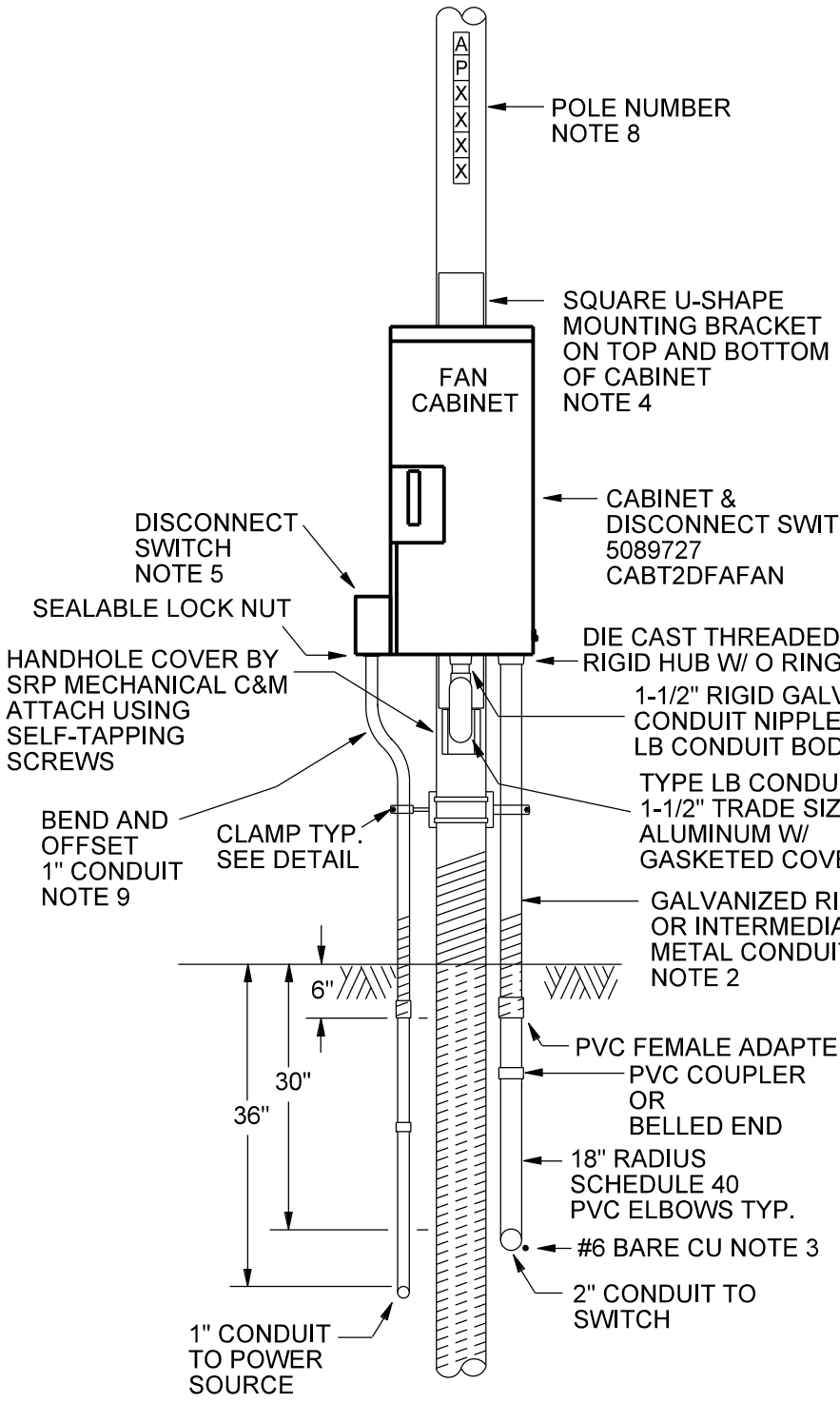
B. DISTRIBUTION FEEDER AUTOMATION (DFA) SWITCH



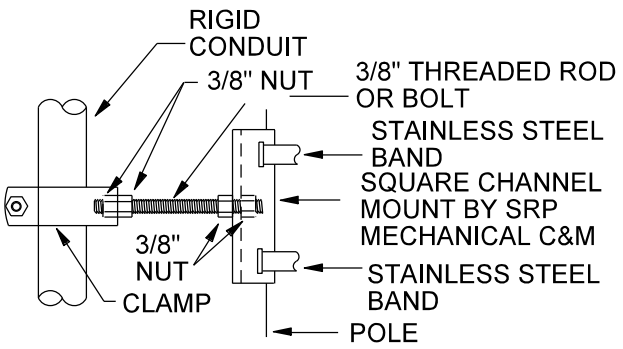
1. 120 V POWER SOURCE FOR FAN CABINET FROM TRANSFORMER OR J-BOX INSTALLED IN EXISTING SECONDARY CIRCUIT; IF STREET LIGHT CIRCUIT, CONDUCTORS AND CONDUIT TO BE RE-CLASSIFED AS SECONDARY
2. #6 DX AL. IN 1" PVC FROM POWER SOURCE TO FAN CABINET MOUNTED TO ANTENNA POLE
3. 2 INCH PVC AND #6 BARE CU GROUND FROM SWITCH TO POLE LOCATION; RUN #6 INTO PAD WINDOW; RUN 2" PVC TO SWITCH RTU; ETHERNET FROM SWITCH TO FAN CABINET BY CONTROL ENGINEERING
4. CONTROL ENGINEERING TO APPROVE ANTENNA POLE LOCATION; DISTRIBUTION DESIGN TO ORDER POLE; SWITCH AND ANTENNA POLE TO HAVE SAME PAD/POLE NUMBER NUMBER UFAP35FAN

8505E190.DGN

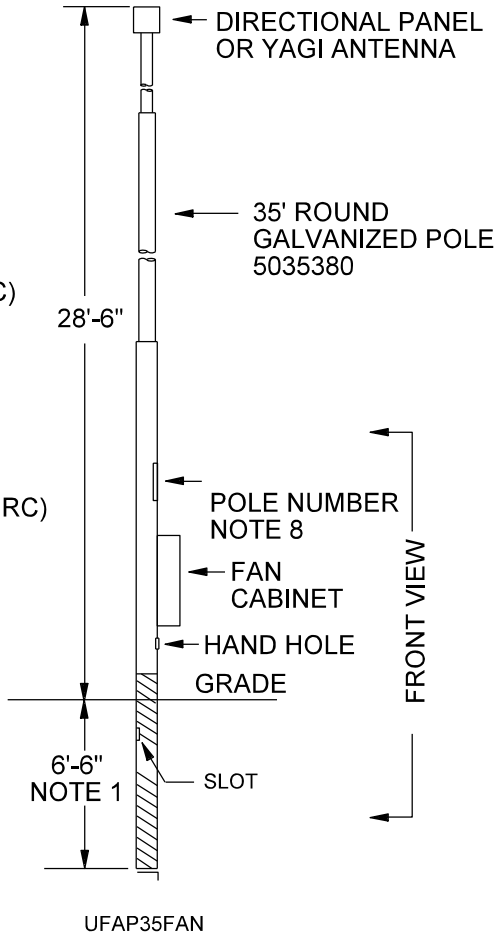
CABINET AND CONDUIT DETAIL FRONT VIEW



CONDUIT RISER CLAMP DETAIL



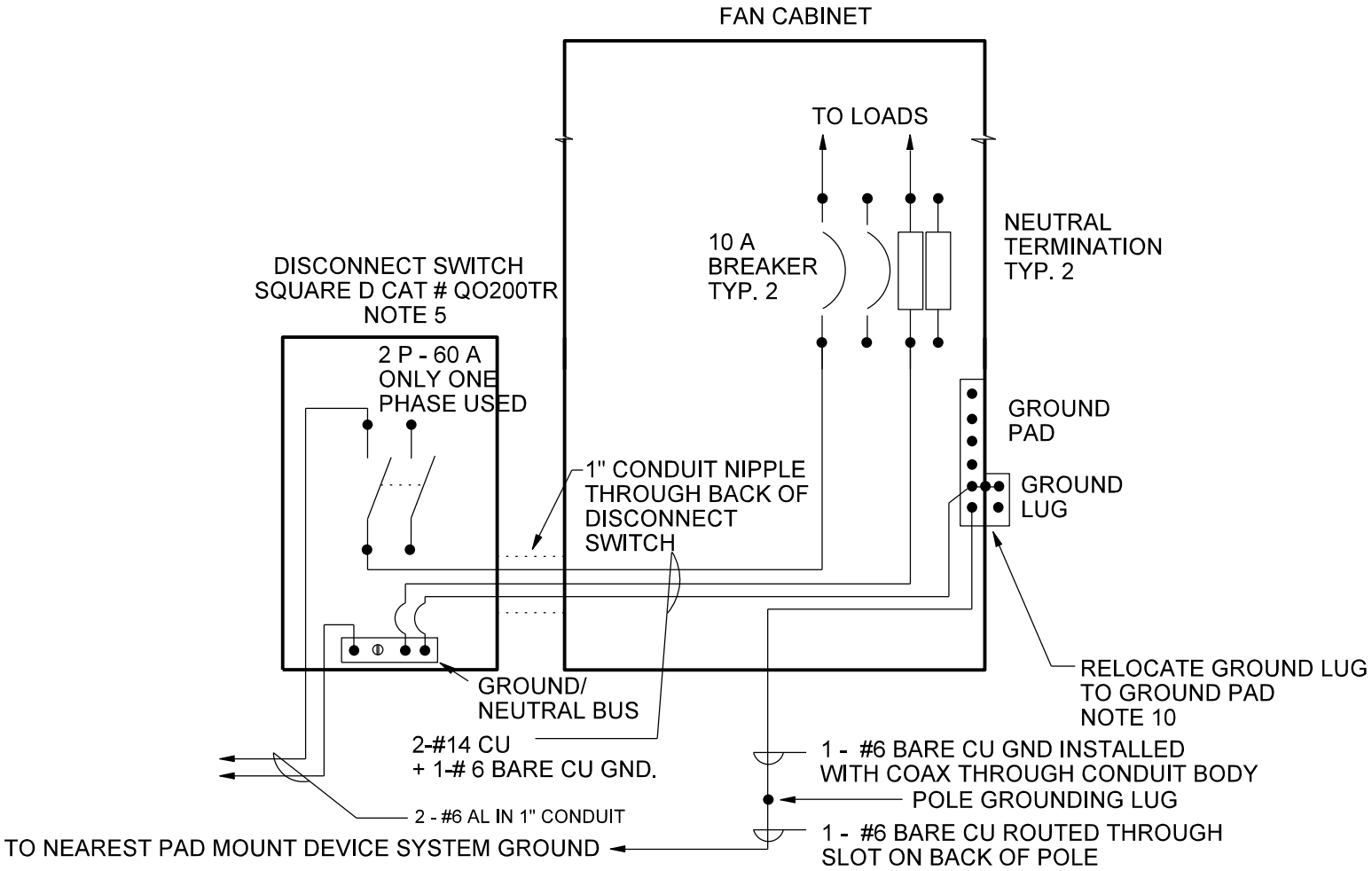
ANTENNA POLE



UFAP35FAN

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) SWITCHES W/ REMOTE SUPERVISORY CONTROL ANTENNA POLE W/ FAN CABINET	ISSUE DATE: 05/15/20 REV. DATE: APPROVAL: J. LUERA
	8-5-2	8505E191.DGN

120 V POWER AND GROUNDING
WIRING DIAGRAM



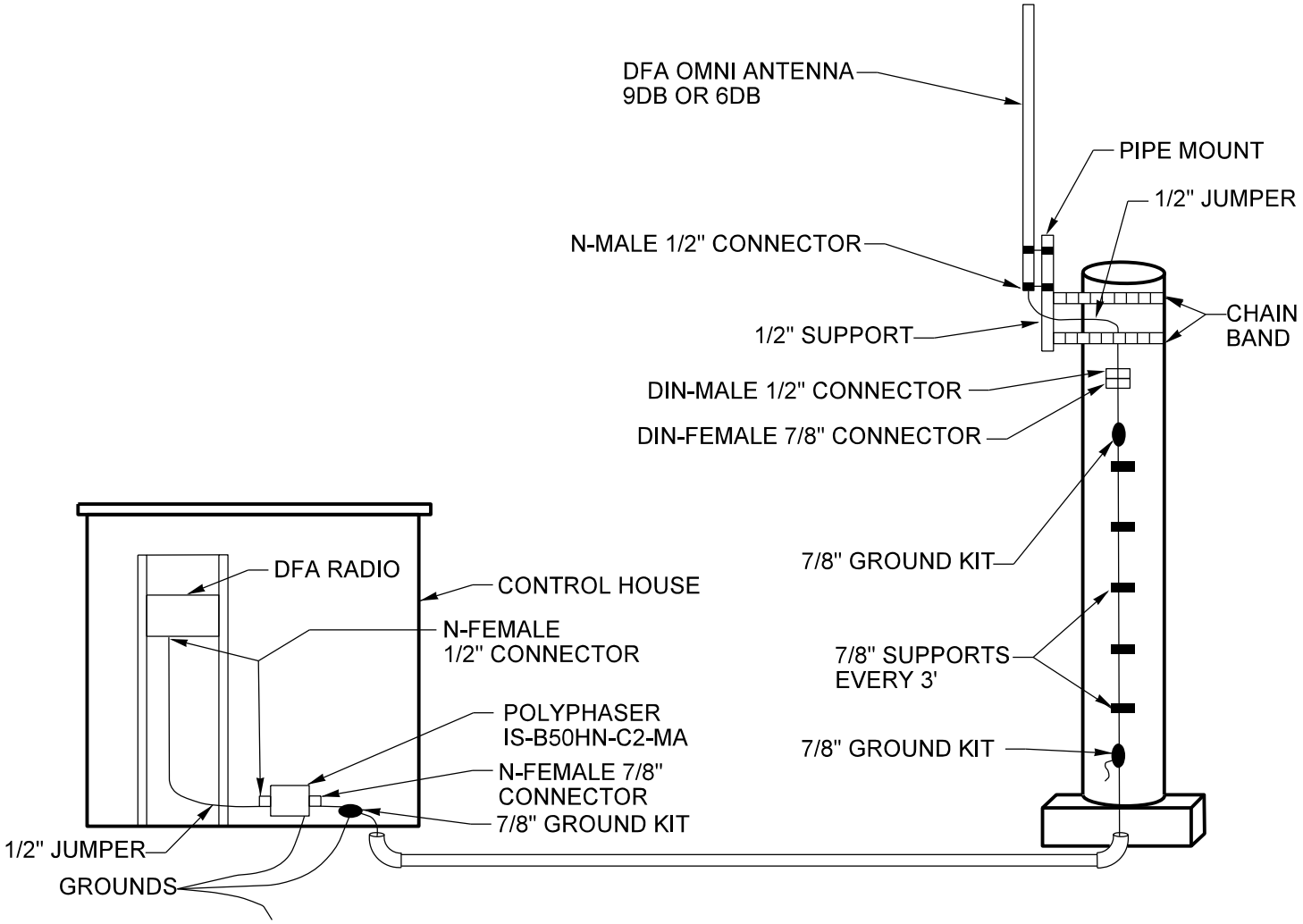
NOTES

1. STUB AND CAP CONDUIT RUNS 3 FEET FROM POLE. COIL 13' OF #6 BARE CU. AT CONDUIT STUB OUT LOCATION. CONNECT TO CONDUIT STUB OUTS WHEN INSTALLING POLE. BACKFILL AROUND POLE USING 1 SACK CLSM (SRP MATERIAL ITEM 5075314).
2. WRAP RIGID STEEL CONDUIT WITH UL APPROVED PVC TAPE OVERLAPPED WITH A MINIMUM HALF THE TAPE STARTING FROM BOTTOM OF ADAPTER TO 6" ABOVE FINAL GRADE.
3. RUN #6 BARE CU FROM NEAREST PAD MOUNT DEVICE THROUGH SLOT IN BACK OF POLE AND CONNECT TO POLE GROUNDING LUG AND DEVICE SYSTEM GROUND.
4. ATTACH CABINET TO POLE DIRECTLY ABOVE POLE HAND HOLE USING STAINLESS STEEL BANDS (4 ABOVE AND 4 BELOW), RUN 2 CLAMPS THROUGH EACH SLOT ON SQUARE U-SHAPE MOUNT.
5. FASTEN DISCONNECT SWITCH TO CABINET TO MOUNTING PLATE BY MECHANICAL C&M AND BOLT TO CABINET USING THREADED INSERTS IN CABINET SIDES. PLACE "SERVICE DISCONNECT FOR FAN CABINET" LABEL ON FRONT OF DISCONNECT SWITCH. INSTALL SEALABLE LOCKNUTS ON 1 INCH NIPPLE ON EXTERIOR CONNECTIONS TO SWITCH AND CABINET.
6. CONDUIT TO REMAIN SAME SIZE THROUGH ENTIRE RUN.
7. INSTALL PLASTIC THROAT LINERS AT THE ENDS OF ALL CONDUIT CONNECTIONS.
8. IDENTIFY ANTENNA POLE BY PLACING 1-3/4" X 2-7/8" ADHESIVE LETTERS AND NUMBERS (5035560 AND 5035 557) VERTICALLY ON FRONT SIDE OF POLE. BOTTOM OF NUMBER TO START 16" ABOVE CABINET. NUMBERING SEQUENCE SHALL BEGIN WITH THE PREFIX LETTERS "AP" AT THE TOP FOLLOWED BY THE THE FOUR DIGIT PAD NUMBER OF THE NEAREST DFA DEVICE. I.E AP1234. CLEAN POLE SURFACE USING CLEANER (5003005) PRIOR TO INSTALLING THE STICKERS,
9. BEND AND OFFSET 1 INCH CONDUIT TO BRING CONDUIT STUB UP NEARER TO ANTENNA POLE. BENDING RADIUS SHALL NOT BE LESS THAN 5-7/8" FROM CENTER OF CONDUIT.
10. REMOVE AND MOUNT EXTERIOR MOUNTED GROUND LUG TO GROUND PAD INSIDE CABINET AND CONNECT #6 CU GROUNDS TO LUG. REMOVE AS REQUIRED BOLTS AND WASHERS FROM THREADED STUDS ON GROUND PADS TO SECURELY MOUNT GROUND LUG. PLACE TWO BOLTS ON THREADED STUD ON THE EXTERIOR OF THE CABINET.

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*	FIELD AREA NETWORK (FAN) SWITCHES W/ REMOTE SUPERVISORY CONTROL ANTENNA POLE W/ FAN CABINET	ISSUE DATE: 05/15/20 REV. DATE: APPROVAL: J. LUERA
	8-5-3	8505E192.DGN

SECTION 9: DISTRIBUTION FEEDER AUTOMATION (DFA)

TITLE / DESCRIPTION **PAGE**



NOTES

1. COAX, CONNECTORS, SUPPORTS AND GROUND KITS MUST BE SIZED FOR COAX WHICH COULD BE 1/2", 7/8", 1-1/4", OR 1-5/8".

Communications Design & Construction Standards SRP® *PROPRIETARY MATERIAL*		
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